# TCEQ Interoffice Memorandum

TO: Office of the Chief Clerk
Texas Commission on Environmental Quality

THRU: Iliana Delgado, Team Leader
Water Rights Permitting Team

FROM: Chris Kozlowski, Project Manager
Water Rights Permitting Team

DATE: September 5, 2014

SUBJECT: North Texas Municipal Water District
Docket # 2014-0913-WR
WRPERM 12151
CN601365448, RN105156137, RN105156145, RN105156152
Application No. 12151 for a Water Use Permit
TWC §§11.121, 11.085, and 11.046, Requiring Mailed and Published Notice
Lower Bois d'Arc Creekand the East Fork TrinityRiver, Red, Sulphur, and Trinity River Basins
Fannin, Collin, Dallas, Denton, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

The Executive Director received an application from the North Texas Municipal Water District seeking a Water Use Permit pursuant to Texas Water Code §11.121 and Texas Commission on Environmental Quality Rules 30 TAC §§295.1, *et seq.*

The application was received on December 29, 2006. The application was declared administratively complete and filed with the Office of the Chief Clerk on June 26, 2007. The notice of the application was filed with the Chief Clerk on July 31, 2007, and notice was subsequently mailed to the water right holders in the Red River, Sabine River, and Trinity River Basins. Several requests for a contested case hearing were received.

Because this application was declared administratively complete after September 1, 1999, the rules in Chapter 55, Subchapter G, Section 55.250 - 55.256 apply. The Chief Clerk shall mail notice to the applicant, executive director, public interest counsel, and timely hearing requestors not later than 35 days prior to the agenda setting. Applicants, the public interest counsel, and the executive director shall file a response no later than 23 days before agenda, and the hearing requestors shall reply no later than nine days before agenda.

The application is now technically complete and the staff has recommended that the application be granted based on the analysis in the technical review memos.

Below is the caption for this application:

Consideration of the application by North Texas Municipal Water District (NTMWD) for Water Use Permit No. 12151 to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) on Bois d'Arc Creek, Red River Basin, in Fannin County, for recreational purposes and to divert and use not to exceed 175,000 acre-feet of water per year from any point on the perimeter of the proposed reservoir for municipal, industrial and agricultural purposes. NTMWD indicates that diversions may overdraft the firm yield of the reservoir as part of a system operation with existing NTMWD supplies, and requests authorization to divert and reuse

the return flows generated from the diversion and use of water from the proposed reservoir. The Applicant further requests an interbasin transfer to the Trinity River and Sulphur River Basins within its service area within Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall Counties. The Commission will consider all timely filed hearing requests and related responses and replies. (Chris Kozlowski, Robin Smith)

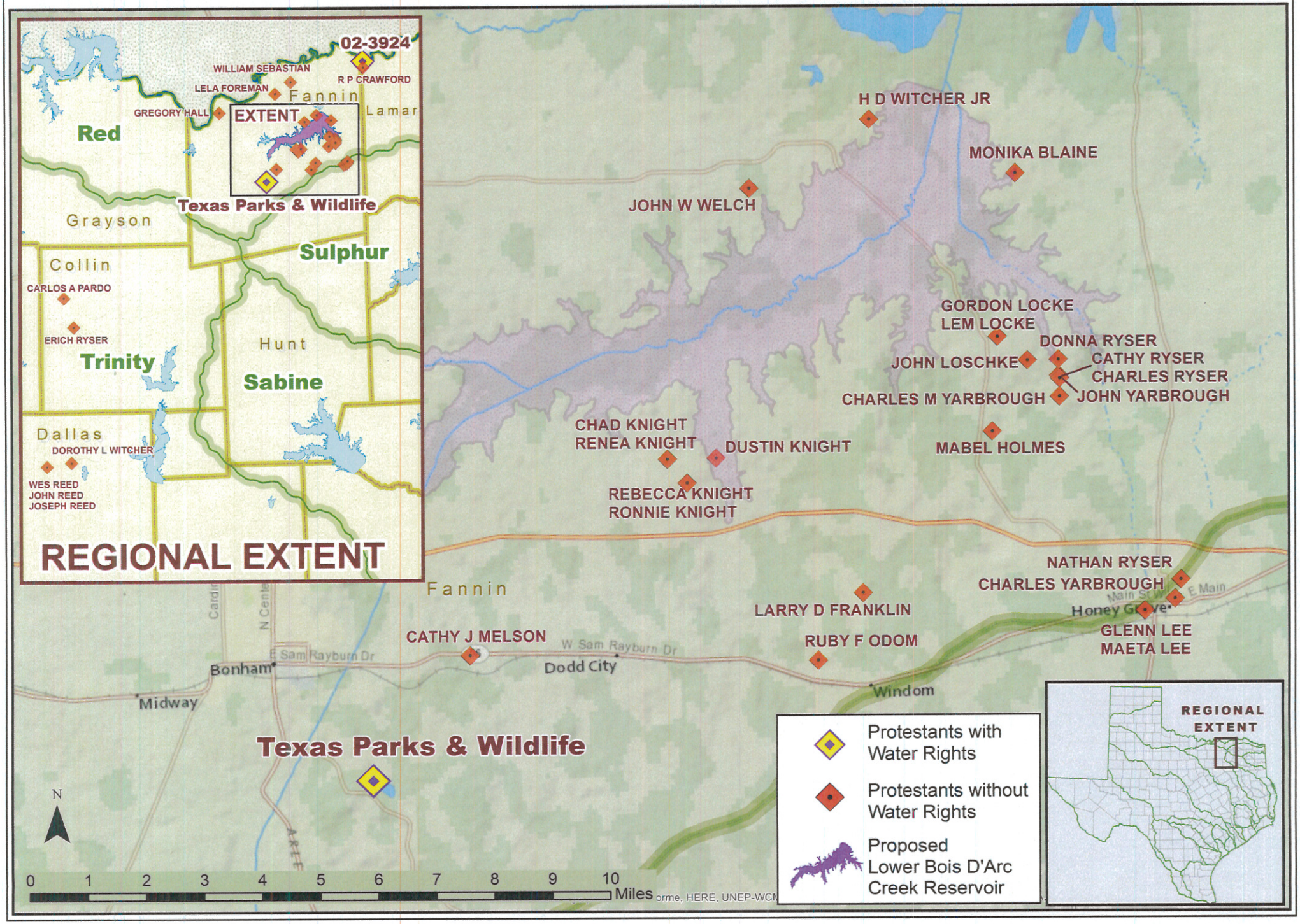
Chris Kozlowski, Project Manager
Water Rights Permitting Team

Enclosure

cc: Kellye Rila, TCEQ
Kathy Alexander, TCEQ
Ron Ellis, TCEQ
Robin Smith, TCEQ
Iliana Delgado, TCEQ
Chris Loft, TCEQ

# Docket No. 2014-0913-WR

North Texas Municipal Water District
Lower Bois d'Arc Creek Reservoir - P12151



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



**NOTICE OF AN APPLICATION**
**FOR A WATER USE PERMIT**
**AND PUBLIC MEETINGS**

APPLICATION NO. 12151

**SUMMARY.** The North Texas Municipal Water District (Applicant) has applied for a Water Use Permit to construct and maintain a reservoir, known as Lower Bois d'Arc Creek Reservoir, on Lower Bois d'Arc Creek, Red River Basin, Fannin County, Texas. Applicant requests authorization to divert and use water from the reservoir for municipal, industrial, and agricultural purposes, including the right to use water within the reservoir for in-place recreational purposes. Applicant requests interbasin transfer authorization to use water from the reservoir within its service area in the Red, Sabine, and Trinity River Basins, and within Fannin County in the Sulphur River Basin. NTMWD's service area is currently located within the following counties: Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall. Applicant requests authorization to use the bed and banks of Pilot Grove Creek and the East Fork Trinity River to transport water diverted from the reservoir for subsequent diversion and use from Lake Lavon. Applicant further seeks authorization to reuse return flows generated from the diversion and use of water from the proposed reservoir. Applicant indicates that diversions from the reservoir may overdraft the firm yield of the reservoir as part of a system operation with existing and future supplies. A total of three public meetings will be held in the Red, Sabine and Trinity River Basins. More information on the application and how to participate in the permitting process is given below.

The application was received on December 29, 2006. Additional fees and information were received on March 21, 2007, and June 13, 2007. The application was declared administratively complete and filed with the Office of the Chief Clerk on June 26, 2007. The Executive Director has not completed the technical review of the application.

**PUBLIC COMMENT / PUBLIC MEETINGS.** The Texas Commission on Environmental Quality (TCEQ) will hold public meetings to receive comments on the application for a Water Use Permit filed by North Texas Municipal Water District. The public meetings will consist of two parts, an Informal Discussion Period and a Formal Comment Period. During the Informal Discussion Period, the public is encouraged to ask questions of the Applicant and TCEQ staff concerning the application, but comments made during the informal period will not be considered by the Commissioners before reaching a decision on the application and no formal response will be made. During the Formal Comment Period, members of the public may state their comments into the official record. The Executive Director will summarize the formal

comments and prepare a written response. The written response will be considered by the Commissioners in their decision-making process and upon request will be available to the public.

**Public Meetings are to be held:**

Monday, September 10, 2007 at 7:00pm
Fletcher Warren Civic Center
5501 Business Highway 69 South
Greenville, Texas 75402

Tuesday, September 11, 2007 at 7:00pm
Fannin County Multi-Purpose Complex
700 FM 87
Bonham, Texas 75418

Thursday, September 13, 2007 at 7:00pm
McKinney High School Auditorium
1400 Wilson Creek Parkway
McKinney, Texas 75071

Citizens are encouraged to submit written comments anytime during the meetings or by mail before the meetings to the Office of the Chief Clerk, TCEQ, MC 105, P.O. Box 13087, Austin, Texas, 78711-3087. If you need more information, please call the TCEQ Office of Public Assistance, Toll Free at 1-800-687-4040.

**APPLICATION.** North Texas Municipal Water District (NTMWD or Applicant) P.O. Box 2408, Wylie, Texas 75098, seeks a Water Use Permit pursuant to Texas Water Code §§11.121, 11.085, 11.042, and 11.046 and Texas Commission on Environmental Quality Rules 30 Texas Administrative Code §§ 295.1, et seq. Pursuant to 30 TAC §295.155, published and mailed notice of the application is being given to all of the water right holders of record in the Red River Basin, the basin of origin, and the Sabine and Trinity River Basins, receiving basins. Although the Sulphur River Basin is a receiving basin, it is exempt from notice requirements pursuant to 30 TAC §295.155(d).

Applicant seeks a Water Use Permit to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) with a maximum normal operating capacity of 367,609 acre-feet of water and a surface area of 16,526 acres on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County. Applicant seeks authorization to divert and use not to exceed 175,000 acre-feet of water per year from any point on the perimeter of the proposed reservoir at a maximum combined diversion rate of 365.15 cfs (163,889 gpm, 236 mgd) for municipal, industrial and agricultural purposes, including the right to use water within the reservoir for in-place recreational purposes. Applicant requests interbasin transfer authorization to use the water within its service area in the Red, Sabine, and Trinity River Basins, and within Fannin County in the Sulphur River Basin. NTMWD's service area is currently located within the following counties: Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall.

The proposed Lower Bois d'Arc Creek Reservoir will be located 15.2 miles in a northeast direction from City of Bonham and 9.7 miles in a north-northwest direction from the Town of Honey Grove. Station 42+33 on the centerline of the proposed dam will be S 23.2677° E, 514 feet from the southeast corner of O.H.P. Wood Survey, Abstract No. 1177, in Fannin County, Texas, also being at 33.7180° N Latitude, 95.9822° W Longitude. The proposed dam will be located in the George W. King Original Survey, Abstract No. 604, the James Kerr Original Survey, Abstract No. 614, and the John Reynolds Original Survey, Abstract 931 in Fannin County, Texas. The proposed dam and reservoir will be located on the land of the Applicant, which will be acquired prior to construction.

Applicant also seeks authorization to use the bed and banks of Pilot Grove Creek and the East Fork Trinity River to transport up to 725 acre-feet per day (236 mgd) of surface water from the proposed Lower Bois d'Arc Creek Reservoir to Lake Lavon at a maximum discharge rate of 365.15 cfs (163,889 gpm) for subsequent diversion from any point on the perimeter of Lake Lavon at a maximum combined diversion rate of 365.15 cfs (163,889 gpm) for the previously stated uses. The discharge point into Pilot Grove Creek will be located approximately three to seven miles upstream of Lake Lavon within the stream reach between F.M. 545 and F.M. 2756. Applicant indicates that losses associated with the bed and banks transport will be 0.2% per mile of transport.

Applicant also seeks authorization to reuse return flows generated from the diversion and use of water from the proposed reservoir. Until facilities are developed to reuse said water, return flows may be discharged to the Red, Sabine, Sulphur, or Trinity River Basins.

Applicant indicates that diversions may overdraft the firm yield of the reservoir as part of a system operation with existing NTMWD supplies to achieve maximum conservation of limited water resources.

The Commission will review the application as submitted by the Applicant and may or may not grant the application as requested.

Information relating to the contract price of the water to be transferred; a statement of each general category of proposed use of the water to be transferred, and a detailed description of the proposed uses and users under each category; the cost of diverting, conveying, distributing, and supplying the water to, and treating the water for, the proposed users; and the projected effect on user rates and fees for each class of ratepayers can be obtained without cost by submitting a written request to Mr. Robert McCarthy at P.O. Box 2408, 505 East Brown Street, Wylie, Texas 75098, or by accessing the Applicant's website at http://www.ntmwd.com/bois_dArc.html.

**CONTESTED CASE HEARING.** The TCEQ may grant a contested case hearing on this application if a written hearing request is filed within 30 days from the date of newspaper publication of this notice. The Executive Director may approve the application unless a written request for a contested case hearing is filed within 30 days after newspaper publication of this notice.

To request a contested case hearing, you must submit the following: (1) your name (or for a group or association, an official representative), mailing address, daytime phone number, and fax number, if any; (2) applicant's name and permit number; (3) the statement "[*I/we*] request a contested case hearing"; (4) a brief and specific description of how you would be affected by the application in a way not common to the general public; and (5) the location and distance of your property relative to the proposed activity. You may also submit proposed conditions for the requested permit which would satisfy your concerns. Requests for a contested case hearing must be submitted in writing to the Office of the Chief Clerk at the address provided in the information section below.

If a hearing request is filed, the Executive Director will not issue the permit and will forward the application and hearing request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

**INFORMATION.** Written hearing requests, public comments or requests for a public meeting should be submitted to the Office of the Chief Clerk, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087. For information concerning the hearing process, please contact the Public Interest Council, MC 103, the same address. For additional information, individual members of the general public may contact the Office of Public Assistance at 1-800-687-4040. General information regarding the TCEQ can be found at our web site at http://www.tceq.state.tx.us. Si desea información en Español, puede llamar al 1-800-687-4040.

Issued: July 31, 2007

WATER USE PERMIT

| | | | |
|---|---|---|---|
| PERMIT NO. 12151 | | TYPE §§ 11.121, 11.085, 11.046 | |
| Permittee: | North Texas Municipal Water District | Address: | P.O. Box 2408<br>Wylie, TX 75098 |
| Filed: | June 26, 2007 | Granted: | |
| Purposes: | Municipal, Industrial, Agricultural, and Recreation | Counties: | Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall Counties |
| Watercourse: | Lower Bois d'Arc Creek, tributary of the Red River | Watershed: | Red, Trinity, and Sulphur River Basins |

WHEREAS, North Texas Municipal Water District (NTMWD, Applicant or Permittee) seeks a Water Use Permit to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) with a maximum normal operating capacity of 367,609 acre-feet of water and a surface area of 16,526 acres on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County for recreation purposes; and

WHEREAS, Applicant also seeks authorization to divert and use not to exceed 175,000 acre-feet of water per year from any point on the perimeter of the proposed reservoir at a maximum combined diversion rate of 365.15 cfs (163,889 gpm) for municipal, industrial and agricultural purposes; and

WHEREAS, Applicant seeks authorization to reuse the return flows generated from the diversion and use of water from the proposed reservoir and until facilities are developed to reuse diverted water, such water will be returned to the Red , Sulphur, and Trinity River Basins; and

WHEREAS, Applicant also seeks an interbasin transfer authorization to use the water within the Trinity River Basin, and within that portion of Fannin County located in the Sulphur River Basin. NTMWD's service area is currently located within Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall Counties; and

WHEREAS, Applicant indicates the proposed Lower Bois d'Arc Creek Reservoir will be located 15.2 miles in a northeast direction from City of Bonham and 9.7 miles in a north-northwest direction from the Town of Honey Grove. Station 42+33 on the centerline of the proposed dam will be S 23.2677° E, 514 feet from the southeast corner of O.H.P. Wood Survey, Abstract No. 1177, in Fannin County, Texas, also being at 33.7180° N Latitude, 95.9822° W Longitude. The proposed dam will be located in the George W. King Original Survey, Abstract No. 604; the James Kerr Original Survey, Abstract No. 614; and the John Reynolds Original Survey, Abstract 931 in Fannin County, Texas. The proposed dam and reservoir will be located on the land of the Applicant, which will be acquired prior to construction; and

WHEREAS, Applicant indicates that diversions may overdraft the firm yield of the reservoir as part of a system operation with existing NTMWD supplies to achieve maximum conservation of limited water resources; and

WHEREAS, this application is subject to the obligations of the state of Texas pursuant to the terms of the Red River Compact; and

WHEREAS, the Texas Commission on Environmental Quality (TCEQ) finds that jurisdiction over the application is established; and

WHEREAS, Applicant submitted the *Proposed Lower Bois d'Arc Creek Reservoir Mitigation Plan*, which was accepted and approved by the Executive Director; and

WHEREAS, Applicant submitted the *North Texas Municipal Water District Reservoir Accounting Plan*, which was accepted and approved by the Executive Director; and

WHEREAS, Applicant submitted the *North Texas Municipal Water District Monitoring Plan for Proposed Lower Bois d'Arc Creek Reservoir,* which was accepted and approved by the Executive Director; and

WHEREAS, the Executive Director recommends that special conditions be included in the permit; and

WHEREAS, numerous requests for a contested case hearing were received for this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this water use permit;

NOW, THEREFORE, this Water Use Permit No. 12151 is issued to North Texas Municipal Water District subject to the following terms and conditions:

1. IMPOUNDMENT

Permittee is authorized to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) with a maximum normal operating capacity of 367,609 acre-feet of water on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County located 15.2 miles in a northeast direction from City of Bonham and 9.7 miles in a north-northwest direction from the Town of Honey Grove. Station 42+33 on the centerline of the proposed

dam will be S 23.2677° E, 514 feet from the southeast corner of O.H.P. Wood Survey, Abstract No. 1177, in Fannin County, Texas, also being at 33.7180° N Latitude, 95.9822° W Longitude. The proposed dam will be located in the George W. King Original Survey, Abstract No. 604 the James Kerr Original Survey, Abstract No. 614; and the John Reynolds Original Survey, Abstract 931 in Fannin County, Texas.

2. USE

A. Permittee is authorized to use the impounded water for recreation purposes.

B. Permittee is authorized to divert and use not to exceed 175,000 acre-feet of water per year for municipal, industrial and agricultural purposes within its service area in Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall Counties.

C. Permittee is authorized an interbasin transfer to use the water appropriated hereunder within the Trinity River Basin, and within that portion of Fannin County located in the Sulphur River Basin.

D. Permittee is authorized to divert and reuse the return flows resulting from the diversion and use of water from the Lower Bois d'Arc Creek Reservoir as authorized under this permit, subject to the Permittee's compliance with Special Condition 6.Y.

3. DIVERSION

A. Permittee is authorized to divert the water authorized herein from any point on the perimeter of Lower Bois d'Arc Creek Reservoir.

B. Permittee is authorized to divert the water authorized herein at a maximum combined diversion rate of 365.15 cfs (163,889 gpm).

4. TIME PRIORITY

The time priority for this right is June 26, 2007.

5. CONSERVATION

Permittee shall fully implement water conservation plans, developed in accordance with this provision, that provide for the utilization of those reasonably available practices, techniques, and technologies that reduce the consumption of water for municipal use on a gallons per-capita per day basis within NTMWD's service area and that, for each category of use authorized by this permit not including recreation use, prevent the waste of water, prevent or reduce the loss of water, improve the efficiency in the use of water, increase the recycling and reuse of water, and prevent the pollution of water, so that a water supply is made available for future or alternative uses. Permittee shall develop, submit and implement water conservation plans as required by law. Each water conservation plan submitted to the Executive Director shall be designed to comply with relevant state conservation standards then in effect, and, at the time of submission, shall be designed to

achieve, for each category of authorized uses, the highest practicable levels of water conservation and efficiency achievable within the jurisdiction of the Permittee. Permittee shall report annually to the Executive Director on the implementation of its water conservation plans and shall make both its most current water conservation plan and the annual reports on the implementation of its conservation plans easily accessible to the public through electronic and other means.

Such plans shall ensure that every water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, requires that each successive wholesale customer shall develop and implement conservation measures that will result in the highest practicable levels of water conservation and efficiency in order to comply with TWC § 11.085 (l)(2), and that each wholesale customer will report, no less frequently than once every year, to Permittee on the implementation of those conservation measures. If Permittee enters into a water supply contract on or after the effective date of this permit that authorizes the resale of water, such contract shall require that each successive customer in the resale of the authorized water implement water conservation measures at least as stringent as those included in Permittee's approved water conservation plan.

6. SPECIAL CONDITIONS

A. Permittee shall only impound and divert water authorized by this permit in accordance with the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan.* Permittee shall maintain said plan in electronic format and make the data available to the Executive Director upon request. Any modifications to the *North Texas Municipal Water District Reservoir Accounting Plan* shall be approved by the Executive Director. Only modifications that would result in a change to a permit term must be in the form of an amendment to the permit. Should Permittee fail to maintain the accounting plan or timely notify the Executive Director of any modifications to the plan, Permittee shall immediately cease impoundments and diversions authorized in Paragraph 1. IMPOUNDMENT and Paragraph 2. USE, and either apply to amend the permit, or voluntarily forfeit the permit. Permittee shall provide prior notice to the Executive Director of any proposed modifications to the accounting plan and provide copies of the appropriate documents effectuating such changes.

B. All mitigation plans and monitoring required herein shall comply with requirements set forth in 33 United States Code §1341, commonly known as the federal Clean Water Act (CWA), §401 and 30 TAC Chapter 279. Mitigation and monitoring plans shall also comply with the requirements in §404 of the CWA as implemented through the U.S. Army Corps of Engineers permit for the Lower Bois d'Arc Creek Reservoir.

C. Impoundment of water and diversion under this permit is contingent upon the initiation of implementation of the approved *Mitigation Plan for the Proposed Lower Bois d'Arc Creek Reservoir*. Permittee's continued authorization of impoundment and diversion of water under this permit is contingent on timely completion of implementation in accordance with the terms of that plan. Modifications or changes to the plan must be approved by the Executive Director.

Only modifications that would result in a change to a permit term must be in the form of an amendment to the permit.

D. Permittee shall document compliance with the terms and conditions of this permit relating to environmental flow requirements, as set out in Special Conditions 6.E. through 6.R., in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan.*

E. Permittee shall determine compliance with pulse flow conditions and subsistence period freshet conditions using measured flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX or, in the case of deliberate releases to pass qualifying pulse flow events or qualifying subsistence period freshets, measurements of the releases from the reservoir as documented in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan.*

F. If calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan,* constitute a qualifying pulse flow event as defined in Special Condition 6.L., the pulse flow requirement for the season has not been met, and the flows at USGS gage 07332622 for the same time period do not exceed the pulse flow trigger requirement, the pulse shall be passed through the reservoir in a manner as close as practicable to the applicable seasonal release pattern identified in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan.* Permittee may release water to augment naturally occurring high flow events so that flows at the USGS Gage 07332622 meet or exceed the pulse flow trigger requirement, subject to the requirements of Special Condition 6.J.

G. Consistent with Special Condition 6.F., when calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan,* equal or exceed the pulse flow trigger requirements of Special Condition 6.R. and the pulse flow requirement for the season has not been met, inflows to the reservoir in excess of applicable base flow requirements may be temporarily impounded. Consistent with Special Condition 6.F, if the calculated volume or duration criterion for an applicable qualifying pulse flow event, as specified in Special Condition 6.L., is met, Permittee shall promptly release the temporarily impounded water in a manner as close as practicable to the applicable seasonal release pattern identified in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan.*

H. Permittee is not required to release stored water, except temporarily impounded water as described in Special Condition 6.G. or a qualifying subsistence period freshet required to be released pursuant to Special Condition 6.Q., to meet the environmental flow requirements in this permit. All requirements for pass-throughs of inflows or releases of temporarily impounded water pursuant to Special Conditions 6.E. through 6.R. are limited to the volume of calculated inflows to the reservoir.

I. Subject to compliance with the subsistence and base flow requirements of Special Conditions 6.Q and 6.R, inflows may be stored if either: (i) the pulse flow requirement for a season has been met; or (ii) inflows to the reservoir are below the applicable pulse flow trigger; or (iii) inflows equal or exceed the applicable pulse flow trigger but the calculated volume and duration criteria for a qualifying pulse flow event are both not met. If Permittee has stored water, other than temporarily stored water pursuant to Special Condition 6.G. that is part of a qualifying pulse flow event or water that is part of a qualifying subsistence period freshet required to be passed pursuant to Special Condition 6.Q., then in accordance with the terms and conditions of this permit, including any applicable environmental flow requirements in effect at the time the water was stored, Permittee may divert and use that stored water, even if the applicable environmental flow requirement is not met at the time of the subsequent diversion and use of that stored water.

J. If a naturally occurring qualifying pulse flow event is recorded at USGS gage 07332622, such pulse flow event shall satisfy a pulse flow requirement for that event within the respective season. In addition, a pulse flow requirement for an event within a season may be satisfied by a naturally occurring high flow event which has been augmented by reservoir releases as authorized in Special Condition 6.F., but only if the applicable trigger, duration and volume criteria are all met as measured at that gage.

K. Each season is independent of the preceding and subsequent seasons with respect to the pulse flow requirements of Special Condition 6.R.

L. Except as otherwise provided in Special Condition 6.J., a pulse flow is considered to be a qualifying pulse flow event if the pulse flow trigger requirement is met and either the pulse flow volume or duration requirement is met, as specified in Special Condition 6.R.

M. Permittee shall determine compliance with the requirement to pass reservoir inflows up to the applicable subsistence or base flow values of Special Condition 6.R. based on measured flows at the outlet works of the dam.

N. Seasons are defined as Fall-Winter (November - February), Spring (March – June), and Summer (July - October).

O. Reservoir storage is the trigger for determining the applicable instream flow requirements in Special Conditions 6.E. through 6.R. Subsistence flow requirements apply when storage is less than 40% of the authorized conservation storage. Base flow and pulse flow requirements apply when conservation storage is equal to or greater than 40%.

P. Pulse flow requirements are not applicable under subsistence flow conditions.

Q. When subsistence flow requirements are in effect, as provided in Special Condition 6.O., inflows into the reservoir up to 1 cfs shall be passed downstream and a subsistence period freshet pass-through requirement shall be in effect.

A qualifying subsistence period freshet is characterized by a trigger flow of at least 20 cfs and either a volume of at least 69 acre-feet or a duration of at least three days. Volume will be determined based on cumulative flows occurring over a three-day period, beginning with the day during which the trigger flow occurs. Duration will be determined based on the number of days of inflow greater than 1 cfs, beginning with the day on which the trigger flow occurs. During the time that subsistence flow requirements are in effect pursuant to Special Condition 6.O., Permittee shall track flows at USGS gage 07332622, Bois d'Arc Creek at FM 409, and inflows to the reservoir, to determine if a qualifying subsistence period freshet has occurred at either location.

If, while subsistence flow requirements are in effect pursuant to Special Condition 6.O., a 60-day period occurs without a qualifying subsistence period freshet at USGS gage 07332622, Bois d'Arc Creek at FM 409, but, during which, a qualifying subsistence period freshet has occurred as reservoir inflow, the subsistence period freshet shall be promptly passed through the dam. If a qualifying subsistence period freshet has not occurred as reservoir inflow during such 60-day period, flows will continue to be monitored to determine when a qualifying subsistence period freshet occurs at the FM 409 gage or a qualifying subsistence period freshet has occurred as inflow to the reservoir. During that period of continued monitoring, a qualifying subsistence period freshet will be passed as soon as such an event occurs as inflow into the reservoir unless a qualifying subsistence period freshet has occurred at the FM 409 gage.

As closely as practicable, the subsistence period freshet pass-through shall average 20 cfs the first day, 10 cfs the second day, and 5 cfs the third day. As long as subsistence flow requirements are in effect, once a qualifying subsistence period freshet has occurred at USGS gage 07332622, Bois d'Arc Creek at FM 409, or such flow has been passed through the dam, a new 60-day period will be started for the purpose of determining when a qualifying subsistence flow event must be passed through the dam. In passing an individual subsistence period freshet through the dam, Permittee shall never be required to pass a volume of more than 69 acre-feet.

R. Impoundment or diversion of reservoir inflows when flows are at or below the following values, at the applicable measurement points described in Special Conditions 6.L. and 6.M., is authorized only in compliance with Special Conditions 6.A. and 6.D. through 6.Q., above:

| Season | Subsistence | Base | Pulse |
|---|---|---|---|
| Fall-Winter | 1 cfs* | 3 cfs | 2 per season<br>Trigger: 150 cfs<br>Volume: 1,000 af<br>Duration: 7 days |
| Spring | 1 cfs* | 10 cfs | 2 per season<br>Trigger: 500 cfs<br>Volume: 3,540 af |

| | | | |
|---|---|---|---|
| | | | Duration: 10 days |
| Summer | 1 cfs* | 3 cfs | 1 per season<br>Trigger: 100 cfs<br>Volume: 500 af<br>Duration: 5 days |

cfs = cubic feet per second
af = acre-feet
*A subsistence period freshet requirement with a trigger level of 20 cfs, a volume of 69 af, and a duration of 3 days, as further defined in Special Condition 6.Q., also applies.

This special condition is subject to adjustment by the commission if the commission determines, through an expedited public review process, that such adjustment is appropriate to achieve compliance with applicable environmental flow standards adopted pursuant to Texas Water Code § 11.1471. Any adjustment shall be made in accordance with the provisions of Texas Water Code § 11.147(e-1).

S. Permittee shall implement measures to minimize impacts to aquatic resources due to entrainment or impingement including, but not limited to, the installation of screens at the diversion facilities. Such measures shall include intake diversion facilities designed and operated to result in a velocity of water into the diversion facility of no greater than 1 foot-per-second. At all times that diversions are occurring, the intake diversion facilities shall be equipped with screens resulting in individual openings no larger than 1 square inch in size.

T. After commencing deliberate impoundment in the reservoir, Permittee shall conduct hydrologic and water quality monitoring in accordance with the approved North Texas Municipal Water District Monitoring Plan. Permittee shall submit a summary of hydrologic and water quality monitoring data to the Executive Director on an annual basis. Permittee shall submit to the Executive Director a summary report of hydrologic and water quality data in the fifth and tenth years following deliberate impoundment in the reservoir and every five years thereafter for as long as monitoring under Special Condition 6.U. continues. Hydrologic and water quality monitoring for all sites and parameters, other than daily flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX, and water quality monitoring associated with reservoir releases undertaken pursuant to Special Condition 6.W., may cease after ten years, or when instream monitoring specified in Special Condition 6.U. ceases, whichever is later.

U. Permittee shall conduct instream monitoring of Bois d'Arc Creek at the FM 409 Site and, at a minimum, one additional site within the non-channelized portion of the Creek farther downstream, in the first, third, fifth and tenth years following deliberate impoundment of water in the reservoir. In addition, if diversions from the reservoir, as calculated on an annualized basis, have not reached 100,000 acre-feet prior to the fifth year following deliberate impoundment, instream monitoring shall continue every fifth year thereafter until instream monitoring has been undertaken during two years following the year that diversions reach 100,000 acre-feet per year. Instream monitoring during any year in which it is required shall

include a twice per year assessment of fish and macroinvertebrate communities and physical habitat assessment at each site, plus a twice per year analysis of water quality data collected at the USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX. All aquatic biological monitoring and physical habitat assessments shall take place in the index period (March 15 – October 15) with at least one of the twice per year monitoring events taking place in the critical period (July 1 – September 15). Aquatic biological monitoring and habitat characterization shall follow TCEQ protocols set forth in the most recently approved *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data.*

V. Permittee shall submit a report to the Executive Director summarizing the twice per year monitoring activities in Special Condition 6.U. within six months after the second monitoring event in any year is completed. The report shall detail all monitoring efforts and shall include an assessment of the fish and macroinvertebrate communities and the biological metric scoring criteria used to assess aquatic life uses. Should aquatic life use not meet the water quality standards for Segment 0202A or future segment designation, Permittee shall develop and implement remedial management strategies, subject to Executive Director approval, to meet the designated aquatic life use. Permittee shall also submit summary reports to the Executive Director no later than six months after the end of the fifth and tenth year monitoring events, and any subsequent year's monitoring events, that compare all monitoring data to baseline conditions.

W. Permittee shall construct and operate a multilevel outlet tower and regulate releases to ensure that water released from the reservoir maintains DO and temperature levels that meet the surface water quality standards for Segment 0202A or future segment designation. Permittee shall monitor water quality near the outlet tower in accordance with the approved Monitoring Plan during the life of the permit.

X. Permittee shall install and maintain measuring devices which account for, within 5% accuracy, the quantity of water diverted from the points authorized above in Paragraph 3. DIVERSION. Permittee shall allow representatives of the TCEQ reasonable access to the property to inspect the measuring device.

Y. Prior to the diversion and reuse of the return flows authorized pursuant to Paragraph 2.D. USE, resulting from the diversion and use of water from the Lower Bois d'Arc Creek Reservoir as authorized under this permit, Permittee shall apply for and be granted an amendment to identify all specific points of discharge and diversion, and secure the appropriate authorizations to transfer such return flows through state watercourses pursuant to TWC §11.042, except to the extent such points of discharge, diversion, and transfer may be authorized by separate grant of authority from the Commission.

7. TIME LIMITATIONS

A. Construction of the dam for Lower Bois d'Arc Creek Reservoir must be in accordance with plans approved by the Executive Director. Construction of the dam

without final approval of the construction plans is a violation of this authorization.

B. Construction shall begin within two years of issuance of this permit and be completed within seven years of the issuance of this permit, unless Permittee applies for and is subsequently granted an extension of time before the expiration of these time limitations.

This water use permit is issued subject to all superior and senior water rights in the Red River Basin.

This permit is issued subject to the obligations of the State of Texas pursuant to the terms of the Red River Compact.

Permittee agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this permit.

All other matters requested in the application which are not specifically granted by this water use permit are denied.

This water use permit is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State resources exercised by the Commission.



For the Commission

ISSUED:

**Texas Commission on Environmental Quality**

INTEROFFICE MEMORANDUM

To: Ron Ellis, Section Manager
Water Rights Permitting & Availability Section
Date: September 5, 2014

From: Kathy Alexander, Ph.D.
Technical Specialist
Water Availability Division

Subject: North Texas Municipal Water District
WRPERM 12151
CN 601365448
Bois d'Arc Creek, Red River Basin
Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

## WATER AVAILABILITY ANALYSIS ADDENDUM

### Application Summary

The initial Water Availability Analysis was completed November 22, 2013 and a draft permit was sent to the North Texas Municipal Water District (District) on November 22, 2013. The District submitted comments on December 16, 2013 and January 23, 2014 and staff prepared an addendum to its Water Availability Analysis on February 14, 2014. On August 15, 2014, the District proposed revisions to the draft permit as a result of a settlement agreement. In support of its revisions, the District submitted a revised draft accounting plan on August 15, 2014. After discussions with staff, the District submitted a draft final accounting plan on September 3, 2014, and a final accounting plan description document on September 5, 2014. The District also submitted a revised Water Availability Model (WAM) on August 20, 2014.

### Water Availability Analysis

In addition to the requirements in Resource Protection staff's November 19, 2013 memorandum, the District proposed an additional environmental flow requirement for a subsistence period freshet, which is discussed in more detail in Resource Protection staff's September 5, 2014 addendum. Both the accounting plan and the WAM were revised to include the freshet requirement.

Staff reviewed the revised model submitted by the District and finds that the modifications to include the subsistence freshet are appropriate. Staff also agrees with the District's non-substantial changes to water rights and control point identifiers in the existing model code, which were necessary to incorporate the freshet requirement into the model. Staff used the revised model to re-evaluate the firm yield request. The

simulation results indicate that 120,590 acre-feet of water is available 100 percent of the time, a reduction of 75 acre-feet of firm water per year from the value reported in the original Water Availability Analysis. Staff then used the same simulation to re-evaluate the full requested diversion of 175,000 acre-feet of less than firm water. The simulation results continue to indicate that if the District diverts 175,000 acre-feet per year when that water is available, 100 percent of the total annual demand of 175,000 acre-feet would be met in 78 percent of the years, and 75 percent of the monthly demand would be met in 92 percent of the months.

The District provided a revised accounting plan, *North Texas Municipal Water District Reservoir Accounting Plan* that incorporates the freshet requirements, improves the compliance checks for environmental flows, and includes additional minor changes to conform to modifications in permit language in the District's proposed August 15, 2014 revised draft permit. Staff reviewed the accounting plan and found it adequately documents compliance with the terms and conditions of the permit. Staff also reviewed the hydrologic monitoring components in the revised *North Texas Municipal Water District Monitoring Plan* and finds that the proposed hydrologic monitoring continues to be adequate to document the flow regime in Lower Bois D'Arc Creek after deliberate impoundment in the reservoir.

**Conclusion**

Hydrology staff can support granting the application, including all revisions to the draft permit.

**Texas Commission on Environmental Quality**

INTEROFFICE MEMORANDUM

To: Ron Ellis, Manager
Water Rights Permitting & Availability Section

Date: February 14, 2014

From: Kathy Alexander, Ph.D.
Technical Specialist
Water Availability Division

Subject: North Texas Municipal Water District
WRPERM 12151
CN 601365448
Bois d'Arc Creek, Red River Basin
Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

## WATER AVAILABILITY ANALYSIS ADDENDUM

The initial hydrology memorandum was completed November 22, 2013 and a draft permit was sent to the applicant on November 22, 2013. The applicant submitted comments on December 16, 2013 and January 23, 2014. Staff reviewed the information and recommend the Special Conditions in the draft permit be modified as follows. These recommended modifications are considered to be non-substantive and provided solely for clarification.

In lieu of Special Condition 6.X.

Prior to the diversion and reuse of the return flows authorized pursuant to Paragraph 2.C. USE, resulting from the diversion and use of water from the Lower Bois d'Arc Creek Reservoir as authorized under this permit, Permittee shall apply for and be granted an amendment to identify all specific points of discharge and diversion, and secure the appropriate authorizations to transfer such return flows through state watercourses pursuant to TWC §11.042, except to the extent such points of discharge, diversion, and transfer may be authorized by separate grant of authority from the Commission.

All other recommendations in the original memo dated November 22, 2013 remain unchanged unless specifically addressed in the addendum.

**Texas Commission on Environmental Quality**

INTEROFFICE MEMORANDUM

To: Ron Ellis, Manager
Water Rights Permitting & Availability Section

Date: November 22, 2013

From: Kathy Alexander, Ph.D.
Technical Specialist
Water Availability Division

Subject: North Texas Municipal Water District
WRPERM 12151
CN 601365448
Bois d'Arc Creek, Red River Basin
Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

## WATER AVAILABILITY ANALYSIS

### Application Summary

North Texas Municipal Water District (District) seeks a Water Use Permit to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) with a maximum normal operating capacity of 367,609 acre-feet of water and a surface area of 16,526 acres on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County. The District seeks authorization to divert and use not to exceed 175,000 acre-feet of water per year from any point on the perimeter of the reservoir at a maximum combined diversion rate of 365.15 cfs (163,889 gpm, 236 mgd) for municipal, industrial and agricultural purposes, including the right to use water within the reservoir for in-place recreational purposes. Further, the District requests an interbasin transfer authorization to use the water within its service area in the Red and Trinity River Basins, and within Fannin County in the Sulphur River Basin. The District's service area is currently located within the following counties: Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall.

The District also seeks authorization to reuse return flows generated from the diversion and use of water from the proposed reservoir. Until facilities are developed to reuse said water, return flows may be discharged to the Red, Sulphur, or Trinity River Basins. The District indicates that diversions may overdraft the firm yield of the reservoir as part of a system operation with existing NTMWD supplies.

The District also requested authorization to use the bed and banks of Pilot Grove Creek and the East Fork Trinity River to transport water diverted from the reservoir for subsequent diversion and use from Lake Lavon. On March 15, 2011, the District

withdrew this request. Therefore, the request is not considered in staff's review of the application.

**Water Availability Analysis**

Resource Protection staff recommended flow requirements for this application. Specifically, Resource Protection staff recommended subsistence, base, and pulse flow requirements that vary by season:

| Season | Subsistence | Base | Pulse |
|---|---|---|---|
| Fall-Winter | 1 cfs | 3 cfs | 2 per season<br>Trigger: 150 cfs<br>Volume: 1,000 af<br>Duration: 7 days |
| Spring | 1 cfs | 10 cfs | 2 per season<br>Trigger: 500 cfs<br>Volume: 3,540 af<br>Duration: 10 days |
| Summer | 1 cfs | 3 cfs | 1 per season<br>Trigger: 100 cfs<br>Volume: 500 af<br>Duration: 5 days |

The flow requirements are implemented as follows:

- Seasons are defined as Fall-Winter (November – February), Spring (March – June), and Summer (July-October);
- Each season is independent of preceding and subsequent seasons with respect to pulse flow frequencies;
- All instream flow pass through releases are limited to calculated inflows to the reservoir;
- Subsistence and base flow releases shall be measured at the outlet works;
- Subsistence conditions apply when reservoir storage is less than 40% of the conservation storage;
- The measurement point for pulse flows is USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX;
- Pulse flow pass-through releases are not required during subsistence conditions;
- If calculated inflows exceed the pulse flow trigger requirement, the pulse flow requirement for the season has not been met, **and** the flows at USGS gage 07332622 do not exceed the pulse flow trigger requirement, the pulse flow must be passed through the reservoir, in accordance with the release pattern in the approved accounting plan;
- If a qualifying pulse flow event is recorded at USGS Gage 07332622, then this pulse event satisfies the pulse requirement for that event within the respective season in that year;
- A pulse flow is considered to be a qualifying event if the pulse flow trigger requirement is met and either the volume or duration requirement is met;

- When calculated inflows equal or exceed the pulse flow trigger requirement, inflows may be temporarily impounded, even if the pulse flow requirement for the season has not been met, until the criteria for a qualifying event are met;

The Water Rights Analysis Package (WRAP) simulates management of the water resources of a river basin. TCEQ uses WRAP in the evaluation of water right permit applications using priority-based water allocation. WRAP is a generalized simulation model for application to any river basin, and input datasets must be developed for the particular river basin of concern. The TCEQ developed water availability models (WAMs) for Texas' river basins that include geographical information, water right information, naturalized flows, evaporation rates, and specific management assumptions. Hydrology staff operates WRAP to evaluate water rights applications and protects existing water rights using the prior appropriation doctrine.

The District submitted suggested modifications to the naturalized flows in the Red River WAM as part of the application and submitted additional supporting documentation on August 2, 2011. The existing TCEQ naturalized flows for Lower Bois D'Arc Creek are based on a drainage area ratio to the incremental flow between gages located on the main stem of the Red River. The District's modified flows are based on flows in adjacent watersheds because the incremental flows may not provide the best estimation of flows in the Bois D'Arc Creek watershed. The District submitted information supporting their modified flows, including a Hydrology Memorandum detailing the hydrologic basis for their suggested modifications, and a memorandum comparing naturalized flows at USGS gage 07332620, Bois D'Arc Creek at FM 1396 near Honey Grove, TX to flows in the North Sulphur River. Staff reviewed this information and concluded that although the naturalized flows in the TCEQ WAM are adequate to determine water availability in the Red River Basin, the District's suggested modifications would better reflect water availability more specific to the Bois D'Arc Creek watershed. Therefore, staff updated the TCEQ WAM naturalized flows based on the hydrology review of the District's suggested modifications.

Of the 175,000 acre-feet diversion request, the District indicates that some of the water will be available on a firm basis, while the remaining water will be available on a less than firm basis. Staff modeled this application using the Full Authorization simulation of the Red River Basin WAM, adjusted as described above to include modifications to the naturalized flows for the Bois D'Arc Creek watershed. In the Full Authorization simulation all water rights use their maximum authorized amounts and return flows are not included. The priority date of this application is June 26, 2007.

Staff first used the WAM Full Authorization Simulation to evaluate the firm yield request. The simulation results indicate that 120,665 acre-feet of water is available 100 percent of the time. Staff then used the same simulation for the full requested diversion of 175,000 acre-feet of less than firm water. The simulation results indicate that if the District diverts 175,000 acre-feet per year when that water is available, 100 percent of the total annual demand of 175,000 acre-feet would be met in 78 percent of the years, and 75 percent of the monthly demand would be met in 92 percent of the months.

Pursuant to 30 TAC §297.42 (d), staff may, on a case by case basis, recommend granting a municipal water right that is less than firm. In this case, the District will use diversions under this permit in combination with its other five major water supply sources (Lakes Lavon, Texoma, Chapman, and Tawakoni, and reuse of return flows) as well as additional projects the District could develop in the future, to meet its demands. The District indicates that it will balance the needs for reliable supply, costs, water quality, water rights and agreements when operating its water supply system. Based on the District's evidence of multiple sources of supply that can be used to meet their system demands, staff believes that the availability of less than firm water is viable for the intended purposes.

The District provided an accounting plan, *North Texas Municipal Water District Reservoir Accounting Plan*, dated March 7, 2012 that tracks diversion and storage from the reservoir, compliance with the instream flow recommendations, and operating rules for pulse releases, if those releases are applicable. Staff reviewed the accounting plan and found it adequate. Staff also reviewed the hydrologic monitoring components of the *North Texas Municipal Water District Monitoring Plan* and found that the proposed hydrologic monitoring was adequate to document the flow regime in Lower Bois D'Arc Creek after deliberate impoundment in the reservoir.

Regarding the District's request to reuse return flows attributable to the diversion and use of water from the proposed reservoir, this request will not impact existing water rights. This is because the return flows have not been discharged to the river and therefore no water rights could have relied on these return flows in the river. The District did not identify specific discharge and diversion points for these return flows; therefore, staff cannot perform the analysis required under TWC, §11.042. Prior to reusing these return flows in the future, the District would need to apply for and be granted the appropriate authorizations under TWC, §11.042 and the request to use specific watercourses to convey return flows can be analyzed at that time.

Reviews of interbasin transfer (IBT) requests are conducted in accordance with §11.085 of the Texas Water Code and TCEQ rules regarding IBTs. This application requests a new appropriation of water and the priority date of the new appropriation is junior to any other water rights in the basin at the time the application was filed. Because the priority date for the new appropriation and the IBT are the same, any IBT or new appropriation granted will be junior to all basin water rights in existence on the filing date. The junior priority date of this permit and maintenance of the approved accounting plan should mitigate any possible impacts on other water rights in the basin, should those impacts be determined to exist. Therefore, the IBT cannot possibly impact senior water rights to a greater degree than the new appropriation does.

## Conclusion

Hydrology staff can support granting the application provided the permit includes Resource Protection staff's recommendations and the following special conditions:

1. Permittee shall only impound and divert water authorized by this permit in accordance with the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*. Permittee shall maintain said plan in electronic format and make the data available to the Executive Director upon request. Any modifications to the *North Texas Municipal Water District Reservoir Accounting Plan* shall be approved by the Executive Director. Any modification that changes the permit terms must be in the form of an amendment to the permit. Should Permittee fail to maintain the accounting plan or notify the Executive Director of any modifications to the plan, Permittee shall immediately cease impoundments and diversions authorized in Paragraph 1. IMPOUNDMENT and Paragraph 2. USE, and either apply to amend the permit, or voluntarily forfeit the permit. Permittee shall immediately notify the Executive Director of any modifications of the accounting plan and provide the appropriate documents effectuating such changes.

2. Prior to the reuse of the return flows attributable to diversion of water authorized under this permit, Permittee shall apply for and be granted an amendment to identify all specific points of discharge and diversion and the appropriate authorizations to transfer such return flows through state watercourses pursuant to TWC, §11.042.

Note that any permit issued is subject to the obligations of the State of Texas pursuant to the Red River Compact.

# HYDROLOGY UNIT ANALYSIS FACT SHEET

Applicant: North Texas Municipal Water District Basin: Red

Water Right: P12151 County: Fannin

Stream: Bois D'Arc Creek Drainage Area: 327 sq. miles

Requested Amount: 175,000 acre-feet

Changes to *.FLO file:

A new IN record was added for naturalized flows at BODARC representing the flows available at this point. See the District's application and the Hydrology memorandum dated 8/1/2011.

Changes to *.DIS file:

```
FDX10190  BODARC     -1
FDX10200  BODARC     -1
FDX10210  BODARC      0
FDX10220  BODARC      0
FDX10230  BODARC      0
FDX10240  BODARC      0
FDX10250  BODARC      0
FD FM409  BODARC     -1
FDFM409A  BODARC     -1
FDX10260  BODARC      0
FDX10270  BODARC      0
FDX10280  BODARC      0
FDX10290  BODARC      0
FDX10300  BODARC      0
FDX10310  BODARC      0
FDX10320  BODARC      0
FDX10330  BODARC      0
FDX10340  BODARC      0
WPBODARC  327.00
WPBODAR2  327.01
WP FM409  370.00
WPFM409A  370.01
```

Changes to *.DAT file:

```
** P12151 FM 409 flow requirement
UC FMSUB      61      56      61      59      61      59    =   719
UC            61      61      59      61      59      61
UC FMBAS     184     168     615     595     615     595    =  3864
UC           184     184     178     184     170     184
**  P12151 PROJECTED USE PATTERN
UC  NTMW  0.0637  0.0560  0.0647  0.0718  0.0775  0.0959
UC        0.1273  0.1216  0.1013  0.0871  0.0678  0.0653
**  FOR MODELING P12151
UC MONTH      31   28.25      31      30      31      30
UC            31      31      30      31      30      31
**  changed method to 7, no loss factors in this reach
CPX10190  X10180                      7            NONE
CPX10200  X10190                      7            NONE
CPX10210  X10200                      7             412
**  Lake Crockett
CPX10220  X10200                      7             412
**  Coffee Mill Lake -- now above FM 409
```

```
**CPX10230  X10200                        6
CPX10230    FM409                       7
**
CPX10240  X10230                        7              411
CPX10250  X10200                        7              412
** Added new primary CP - BODARC. Drainage area 327 sq.mi. No losses in this reach.
**  Since this is a primary CP we can repeat hydrology for the instream flow control points.
**
CPBODARC  BODAR2                        0
CPBODAR2  FMSUBS                        2  BODARC     NONE
CPFMSUBS  FMBASE                        2  BODARC     NONE
CPFMBASE  FMLPUL                        2  BODARC     NONE
CPFMLPUL   FM409                        2  BODARC     NONE
CPFMLPND     OUT                        2    ZERO     ZERO
**General E-Flow CP
CPFAKE01     OUT                        2    NONE     NONE
CPDAYSPY     OUT                        2    ZERO     ZERO
**FM 409 e-FLOW CPs
CPFKFM02     OUT                        2    NONE     NONE
CPFKFM03     OUT                        2    NONE     NONE
CPFKFM04     OUT                        2    NONE     NONE
CPFKFM05     OUT                        2    NONE     NONE
CPFKFM06     OUT                        2    NONE     NONE
CPFKFM07     OUT                        2    NONE     NONE
CPFKFM08     OUT                        2    NONE     NONE
CPFKFM09     OUT                        2    NONE     NONE
CPFKFM10     OUT                        2    NONE     NONE
CPFKFM11     OUT                        2    NONE     NONE
** adding new control point at FM 409.
CP FM409  FM409A                        7              NONE
CPFM409A  X10200                        7              NONE
CPX1D260  BODARC                        7              NONE
**START E-FLOWS CI RECORDS**
CIDAYSPY      31   28.25      31      30      31      30
CI            31      31      30      31      30      31
CIFAKE01 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
** FM 409
CIFKFM02 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM03 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM04 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM05 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM06 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM07 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM08 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM09 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM10 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFKFM11 9999999 9999999 9999999 9999999 9999999 9999999
CI       9999999 9999999 9999999 9999999 9999999 9999999
CIFMLPND      7       7      10      10      10      10
CI            5       5       5       5       7       7
**  Modeling of Lower Bois d'Arc Creek Reservoir
** DETERMINE NUMBER OF DAYS THAT ARE OUTSIDE OF THE VARIOUS VOLUMES, TO TAKE INTO ACCOUNT THAT
** PULSE VOLUME WAS FOR A PERIOD OF LESS THAN 1 MONTH. AND DETERMINE FACTORS TO
** BE APPLIED TO BASE AND SUBSISTENCE FLOWS TO REPRESENT THE PERIOD OF THE MONTH OUTSIDE OF PULSE
WRFAKE01          XMONTH20070625                                    BF-FMB-LP1
TO      2            ADD                  DAYSPY                        CONT
TO      2            SUB                  FMLPND
WRFAKE01          XMONTH20070625                                    BF-FMB-LP2
TO      6            ADD                                      BF-FMB-LP1    CONT
TO      2            DIV                  DAYSPY
WRFAKE01    3866  FMBAS20070625                                    BF-FMB-LP3
TO      6            MUL                                      BF-FMB-LP2
**
** FM 409 BASE TRIGGERS **
IFFMSUBS     719   FMSUB20070625              2         FMSUBSIS
IFFMBASE    3864   FMBAS20070625              3           FMBASE
**
** Pulse On if Base\Off if Sub
WRFKFM03        1  XMONTH20070625                                3    .    SUBPULOFF
**
** Developing pulse+base flow targets, Determining if Reg Flow at FM409 exceeded target
WRFKFM04     1000  XMONTH20070625                                      FKFMLPULW1
TO      6            ADD                                      BF-FMB-LP3
WRFKFM05          XMONTH20070625                                      FMWINONOFF
```

```
TO    2              ADD                    BODARC                          CONT
TO    6              DIV                                          FKFMLPULM1
FS    5  FKFM03       1        0       1 9999999   1
**
WRFKFM06    3540  XMONTH20070625                                        FKFMLPUSP1
TO    6              ADD                                          BF-FMB-LP3
WRFKFM07           XMONTH20070625                                        FMSPRONOFF
TO    2              ADD                    BODARC                          CONT
TO    6              DIV                                          FKFMLPUSP1
FS    5  FKFM03       1        0       1 9999999   1
**
WRFKFM08     500  XMONTH20070625                                        FKFMLPULS1
TO    6              ADD                                          BF-FMB-LP3
WRFKFM09           XMONTH20070625                                        FMSUMONOFF
TO    2              ADD                    BODARC                          CONT
TO    6              DIV                                          FKFMLPULS1
FS    5  FKFM03       1        0       1 9999999   1
**
** ENGAGING PULSE
IFFMLPUL    1000  XMONTH20070625                              FMLPULM1
TO    6              ADD                                          BF-FMB-LP3
FS    5  FKFM05       1        0       1 9999999   2   1   2   3  11   2
IFFMLPUL    1000  XMONTH20070625   3                          FMLPULW2
TO    6              ADD                                          BF-FMB-LP3
FS    5  FKFM05       1        0       1 9999999   2   1   2   0  11   2
IFFMLPUL    3540  XMONTH20070625                              FMLPUSP1
TO    6              ADD                                          BF-FMB-LP3
FS    5  FKFM07       1        0       1 9999999   2   1   2   3   3   6
IFFMLPUL    3540  XMONTH20070625   3                          FMLPUSP2
TO    6              ADD                                          BF-FMB-LP3
FS    5  FKFM07       1        0       1 9999999   2   1   2   0   3   6
IFFMLPUL     500  XMONTH20070625                              FMLPULS1
TO    6              ADD                                          BF-FMB-LP3
FS    5  FKFM09       1        0       1 9999999   2   1   1   3   7  10
IFFMLPUL     500  XMONTH20070625   3                          FMLPULS2
TO    6              ADD                                          BF-FMB-LP3
FS    5  FKFM09       1        0       1 9999999   2   1   1   0   7  10
** COMBINE TO CREATE IF FOR ENTIRE YEAR.
IFFMLPUL                20070625                                FMLPFIN
TO   13              ADD                                          FMLPULW2    CONT
TO   13              ADD                                          FMLPUSP2    CONT
TO   13              ADD                                          FMLPULS2
FS    5  FKFM03       1        0       1 9999999   1
****** Bois d'Arc reservoir
SVBODARC       0     477    4726   19393   33894   67678  110849  161105  202651  249275  302570  367609
SA             0     152    1022    2473    3237    5272    7588    9816   11353   12826   14724   16526
**   drought indices for SUBSIS
DI    2   0   1  BODARC
IS    4       0  147043  147044  367609
IP          100     100       0       0
**   drought indices for BASE
DI    3   0   1  BODARC
IS    4       0  147043  147044  367609
IP            0       0     100     100
```

# Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Ron Ellis, Section Manager
Water Rights Permitting & Availability Section
Date: September 5, 2014

Through: Chris Loft, Team Leader
Resource Protection Team
Water Rights Permitting & Availability Section

From: RH Robert Hansen, SeniorAquatic Scientist
Resource Protection Team
Water Rights Permitting & Availability Section

Subject: North Texas Municipal Water District
WRPERM 12151
CN601365448
Water Right Application No. 12151
Lower Bois d'Arc Creek Reservoir, Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

**ENVIRONMENTAL ANALYSIS ADDENDUM**

**INSTREAM USES**

The initial environmental memorandum was completed November 19, 2013 and a draft permit was sent to the Applicant on November 22, 2013. The Applicant submitted comments on December 16, 2013 and January 23, 2014. The additional information provided by the Applicant was reviewed by Resource Protection Staff and ~~recommendations for modifications to the Special Conditions in the November 22, 2013~~ draft permit were provided by Staff in an Environmental Analysis Addendum dated February 14, 2014. On August 15, 2014, the Applicant proposed revisions to the draft permit as a result of a settlement agreement. The Applicant also submitted supporting information concerning the rationale for the proposed subsistence freshet releases and revised monitoring requirements for Lower Bois d'Arc Creek Reservoir. Staff reviewed the information provided in support of the subsistence freshet releases and concurs that these short duration releases would refresh pools and provide moisture to sustain instream and riparian vegetation. Staff also reviewed revisions to the monitoring requirements. Staff determined that the revised monitoring requirements are reasonable. Detailed discussion of the *North Texas Municipal Water District Reservoir Accounting Plan* and associated hydrologic concerns will be addressed in the Water

Availability Analysis. Additional recommendations for modification of the November 22, 2013 draft permit are provided below.

Proposed modifications for Special Conditions 6.B. through 6.D., 6.K. and 6.O. are minor and intended to provide for clarification purposes only. The recommended modifications beginning with Special Condition 6.E. provide more detail with respect to subsistence period freshets, pass-throughs and pulse flow requirements, minimization of impacts to aquatic resources, hydrologic and water quality monitoring, and biological monitoring and water quality data reporting requirements. Staff reviewed the proposed revisions and recommends the draft permit be modified as follows:

In lieu of Special Condition 6.E.

Permittee shall determine compliance with pulse flow conditions and subsistence period freshet conditions using measured flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX or, in the case of deliberate releases to pass qualifying pulse flow events or qualifying subsistence period freshets, measurements of the releases from the reservoir as documented in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*.

In lieu of Special Condition 6.F.

If calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*, constitute a qualifying pulse flow event as defined in Special Condition 6.L., the pulse flow requirement for the season has not been met, and the flows at USGS Gage 07332622 for the same time period do not exceed the pulse flow trigger requirement, the pulse shall be passed through the reservoir in a manner as close as practicable to the applicable seasonal release pattern identified in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*. Permittee may release water to augment naturally occurring high flow events so that flows at the USGS Gage 07332622 meet or exceed the pulse flow trigger requirement, subject to the requirements of Special Condition 6.J.

In lieu of Special Condition 6.G.

Consistent with Special Condition 6.F., when calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*, equal or exceed the pulse flow trigger requirements of Special Condition 6.R. and the pulse flow requirement for the season has not been met, inflows to the reservoir in excess of applicable base flow requirements may be temporarily impounded. Consistent with Special Condition 6.F., if the calculated volume or duration criterion for an applicable qualifying pulse flow event, as specified in Special Condition 6.L., is met, Permittee shall promptly release the temporarily impounded water in a manner as close as practicable to the applicable seasonal release pattern identified in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*.

In lieu of Special Condition 6.H.

Permittee is not required to release stored water, except temporarily impounded water as described in Special Condition 6.G. or a qualifying subsistence period freshet required to be released pursuant to Special Condition 6.Q., to meet the environmental flow requirements in this permit. All requirements for pass-throughs of inflows or releases of temporarily impounded water pursuant to Special Conditions 6.E. through 6.R. are limited to the volume of calculated inflows to the reservoir.

In lieu of Special Condition 6.I.

Subject to compliance with the subsistence and base flow requirements of Special Conditions 6.Q and 6.R, inflows may be stored if either: (i) the pulse flow requirement for a season has been met; or (ii) inflows to the reservoir are below the applicable pulse flow trigger; or (iii) inflows equal or exceed the applicable pulse flow trigger but the calculated volume and duration criteria for a qualifying pulse flow event are both not met. If Permittee has stored water, other than temporarily stored pursuant to Special Condition 6.G that is part of a qualifying pulse flow event or water that is part of a qualifying subsistence period freshet required to be passed pursuant to Special Condition 6.Q., then in accordance with the terms and conditions of this permit, including any applicable environmental flow requirements in effect at the time the water was stored, Permittee may divert and use that stored water, even if the applicable environmental flow requirement is not met at the time of the subsequent diversion and use of that stored water.

In lieu of Special Condition 6.J.

If a naturally occurring qualifying pulse flow event is recorded at USGS Gage 07332622, such pulse flow event shall satisfy a pulse flow requirement for that event within the respective season. In addition, a pulse flow requirement for an event within a season may be satisfied by a naturally occurring high flow event which has been augmented by reservoir releases as authorized in Special Condition 6.F., but only if the applicable trigger, duration and volume criteria are all met as measured at that gage.

In lieu of Special Condition 6.L.

Except as otherwise provided in Special Condition 6.J., a pulse flow is considered to be a qualifying pulse flow event if the pulse flow trigger requirement is met and either the pulse flow volume or duration requirement is met, as specified in Special Condition 6.R.

In lieu of Special Condition 6.M.

Permittee shall determine compliance with the requirement to pass reservoir inflows up to the applicable subsistence or base flow values of Special Condition 6.R. based on measured flows at the outlet works of the dam.

New Special Condition 6.Q to be added:

When subsistence flow requirements are in effect, as provided in Special Condition 6.O., inflows into the reservoir up to 1 cfs shall be passed downstream and a subsistence period freshet pass-through requirement shall be in effect. A qualifying subsistence period freshet is characterized by a trigger flow of at least 20 cfs and either a volume of at least 69 acre-feet or a duration of at the least three days. Volume will be determined based on cumulative flows occurring over a three-day period, beginning with the day during which the trigger flow occurs. Duration will be determined based on the number of days of inflow greater than 1 cfs, beginning with the day on which the trigger flow occurs. During the time that subsistence flow requirements are in effect pursuant to Special Condition 6.O., Permittee shall track flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409, and inflows to the reservoir, to determine if a qualifying subsistence period freshet has occurred at either location.

If, while subsistence flow requirements are in effect pursuant to Special Condition 6.O, a 60-day period occurs without a qualifying subsistence period freshet at USGS Gage 073326222, Bois d'Arc at FM 409, but, during which, a qualifying subsistence period freshet has occurred as reservoir inflow, the subsistence period freshet shall be promptly passed through the dam. If a qualifying subsistence period freshet has not occurred as reservoir inflow during such 60-day period, flows will continue to be monitored to determine when a qualifying subsistence period freshet occurs at the FM 409 gage or a qualifying subsistence period freshet has occurred as inflow to the reservoir. During that period of continued monitoring, a qualifying subsistence period freshet will be passed as soon as such an event occurs as inflow into the reservoir unless a qualifying subsistence period freshet has occurred at the FM 409 gage.

As closely as practicable, the subsistence period freshet pass-through shall average 20 cfs the first day, 10 cfs the second day, and 5 cfs the third day. As long as subsistence flow requirements are in effect, once a qualifying subsistence period freshet has occurred at USGS Gage 07332622, Bois d'Arc Creek at FM 409, or such flow has been passed through the dam, a new 60-day period will be started for the purpose of determining when a qualifying subsistence flow event must be passed through the dam, Permittee shall never be required to pass a volume of more than 69 acre-feet.

In lieu of Special Condition 6.Q. (now Special Condition 6.R.)

Impoundment or diversion of reservoir inflows when flows are at or below the following values, at the applicable measurement points described in Special Conditions 6.E. and 6.M., is authorized only in compliance with Special Conditions 6.A. and 6.D. through 6.Q., above:

| Season | Subsistence | Base | Pulse |
|---|---|---|---|
| Fall-Winter | 1 cfs* | 3 cfs | 2 per season<br>Trigger: 150 cfs<br>Volume: 1,000 af<br>Duration: 7 days |
| Spring | 1 cfs* | 10 cfs | 2 per season<br>Trigger: 500 cfs<br>Volume: 3,540 af<br>Duration: 10 days |
| Summer | 1 cfs* | 3 cfs | 1 per season<br>Trigger: 100 cfs<br>Volume: 500 af<br>Duration: 5 days |

cfs = cubic feet per second
af = acre-feet
*A subsistence period freshet requirement with a trigger level of 20 cfs, a volume of 69 acre-feet, and a duration of 3 days, as further defined in Special Condition 6.Q., also applies.

This special condition is subject to adjustment by the commission if the commission determines, through an expedited public review process, that such adjustment is appropriate to achieve compliance with applicable environmental flow standards adopted pursuant to Texas Water Code §11.1471. Any adjustment shall be made in accordance with the provisions of Texas Water Code §11.147(e-1).

In lieu of Special Condition 6.R. (now Special Condition 6.S.)

Permittee shall implement measures to minimize impacts to aquatic resources due to entrainment or impingement including, but not limited to, the installation of screens at the diversion facilities. Such measures shall include intake diversion facilities designed and operated to result in a velocity of water into the diversion facility of no greater than 1 foot-per-second. At all times that diversions are occurring, the intake diversion facilities shall be equipped with screens resulting in individual openings no larger than 1 square inch in size.

~~In lieu of Special Condition 6.S. (now Special Condition 6.T.)~~

After commencing deliberate impoundment in the reservoir, Permittee shall conduct hydrologic and water quality monitoring in accordance with the approved North Texas Municipal Water District Monitoring Plan. Permittee shall submit a summary of hydrologic and water quality monitoring data to the Executive Director on an annual basis. Permittee shall submit to the Executive Director a summary report of hydrologic and water quality data in the fifth and tenth years following deliberate impoundment in the reservoir and every five years thereafter for as long as monitoring under Special Condition 6.U continues. Hydrologic and water quality monitoring for all sites and parameters, other than daily flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409, near Honey Grove, TX, and water quality monitoring associated with reservoir

releases undertaken pursuant to Special Condition 6.W., may cease after ten years, or when instream monitoring specified in Special Condition 6.U. ceases, which is later.

In lieu of Special Condition 6.T. (now Special Condition 6.U.)

Permittee shall conduct instream monitoring of Bois d'Arc Creek at the FM 409 site and, at a minimum, one additional site within the non-channelized portion of the creek farther downstream, in the first, third, fifth, and tenth years following deliberate impoundment of water in the reservoir. In addition, if diversions from the reservoir, as calculated on an annualized basis, have not reached 100,000 acre-feet prior to the fifth years following deliberate impoundment, instream monitoring shall continue every fifth year thereafter until instream monitoring has been undertaken during two years following the year that diversion reach 100,000 acre-feet per year. Instream monitoring during any year in which it is required shall include a twice-per-year assessment of fish and macroinvertebrate communities, and physical habitat assessment, at each site, plus a twice-per-year analysis of water quality data collected at the USGS Gage 07332622, Bois d'Arce Creek at FM 409 near Honey Grove, TX. All aquatic biological monitoring and physical habitat assessments shall take place in the index period (March 15 – October 15) with at least one of the twice-per-year monitoring events taking place in the critical period (July 1 – September 15). Aquatic biological monitoring and habitat characterization shall follow TCEQ protocols set forth in the most recently approved *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data.*

In lieu of Special Condition 6.U. (now Special Condition 6.V.)

Permittee shall submit a report to the Executive Director summarizing the twice-per-year monitoring activities in Special Condition 6.U. within six months after the second monitoring event in any year is completed. The report shall detail all monitoring efforts and shall include an assessment of the fish and macroinvertebrate communities and the biological metric scoring criteria used to assess aquatic life uses. Should aquatic life use not meet the water quality standards for Segment 0202A or future segment designation, Permittee shall develop and implement remedial management strategies, subject to Executive Director approval, to meet the designated aquatic life use. Permittee shall also submit summary reports to the Executive Director no later than six months after the end of the fifth and tenth year monitoring events, and any subsequent year's monitoring events, that compare all monitoring data to baseline conditions.

In lieu of Special Condition 6.V. (now Special Condition 6.W.)

Permittee shall construct and operate a multilevel outlet tower and regulate releases to ensure that water released from the reservoir maintains DO and temperature levels that meet the surface water quality standards for Segment 0202A or future segment designation. Permittee shall monitor water quality near the outlet tower in accordance with the approved Monitoring Plan during the life of the permit.

All other recommendations in the original memo dated November 19, 2013 and addendum dated February 14, 2014 remain unchanged unless specifically addressed in this addendum.

# Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Ron Ellis, Section Manager
Water Rights Permitting & Availability Section
Date: February 14, 2014

Through: Chris Loft, Team Leader
2/14/14
Resource Protection Team
Water Rights Permitting & Availability Section

From: RH 2/14/14
Robert Hansen, Aquatic Scientist
Resource Protection Team
Water Rights Permitting & Availability Section

Subject: North Texas Municipal Water District
WRPERM 12151
CN601365448
Water Right Application No. 12151
Lower Bois d'Arc Creek Reservoir, Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

**ENVIRONMENTAL ANALYSIS ADDENDUM**

**INSTREAM USES**

The initial environmental memorandum was completed November 19, 2013 and a draft permit was sent to the applicant on November 22, 2013. The applicant submitted comments on December 16, 2013 and January 23, 2014. The additional information provided by the applicant was reviewed by Resource Protection Staff. Staff recommend the Special Conditions in the November 22, 2013 draft permit be modified as follows. These recommended modifications are considered to be non-substantive and provided solely for clarification.

In lieu of Special Condition 6.F.

If calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*, constitute a qualifying pulse flow event as defined in Special Condition 6.L., the pulse flow requirement for the season has not been met, and the flows at USGS gage 07332622 do not exceed the pulse flow trigger requirement, the pulse shall be passed through the reservoir in a manner as

close as practicable to the applicable seasonal release pattern identified in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*. Permittee may release water so that flows at the USGS gage 07332622 meet or exceed the pulse flow trigger requirement.

In lieu of Special Condition 6.G.

Consistent with Special Condition 6.F., when calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Reservoir Accounting Plan*, equal or exceed the pulse flow trigger requirements of Special Condition 6.Q. and the pulse flow requirement for the season has not been met, inflows to the reservoir may be temporarily impounded until the calculated volume or duration criteria for a qualifying pulse flow event, as specified in Special Condition 6.L., have been met.

In lieu of Special Condition 6.H.

Permittee is not required to release stored water, except temporarily impounded water as described in Special Condition 6.G., to meet the environmental flow requirements in this permit. All pass-throughs of inflows or releases of temporarily impounded water required by Special Conditions 6.E. through 6.Q. are limited to the volume of calculated inflows to the reservoir.

In lieu of Special Condition 6.I.

If the pulse flow requirement for a season has been met or if the calculated volume or duration criteria for a qualifying pulse flow event are not met, then inflows may be stored. If Permittee has stored water in accordance with the terms and conditions of this permit, including any applicable environmental flow requirements in effect at the time the water was stored, Permittee may divert and use that stored water, even if the applicable environmental flow requirement is not met at the time of the subsequent diversion and use of that stored water.

In lieu of Special Condition 6.Q.

Consistent with Special Conditions 6.A. and 6.D. through 6.P., storage and diversion of water under this permit shall be authorized when streamflows exceed the following values, at measurement points described in Special Conditions 6.E. and 6.M. above:

| **Season** | **Subsistence** | **Base** | **Pulse** |
|---|---|---|---|
| Fall-Winter | 1 cfs | 3 cfs | 2 per season<br>Trigger: 150 cfs<br>Volume: 1,000 af<br>Duration: 7 days |
| Spring | 1 cfs | 10 cfs | 2 per season |

| | | | |
|---|---|---|---|
| | | | Trigger: 500 cfs<br>Volume: 3,540 af<br>Duration: 10 days |
| Summer | 1 cfs | 3 cfs | 1 per season<br>Trigger: 100 cfs<br>Volume: 500 af<br>Duration: 5 days |

cfs = cubic feet per second
af = acre-feet

This special condition is subject to adjustment by the commission if the commission determines, through an expedited public review process, that such adjustment is appropriate to achieve compliance with applicable environmental flow standards adopted pursuant to Texas Water Code §11.471. Any adjustment shall be made in accordance with the provisions of Texas Water Code §11.471(e-1).

All other recommendations in the original memo dated November 19, 2013 remain unchanged unless specifically addressed in the addendum.

# Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Ron Ellis, Section Manager Date: November 19, 2013
Water Rights Permitting & Availability Section

Through: Chris Loft, Team Leader 11/22/13
Resource Protection Team
Water Rights Permitting & Availability Section

From: Robert Hansen, Senior Aquatic Scientist 11/19/13
Resource Protection Team
Water Rights Permitting & Availability Section

Subject: North Texas Municipal Water District
WRPERM 12151
CN 601365448
Water Right Application No. 12151
Lower Bois d'Arc Creek Reservoir, Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties

Environmental reviews of water right applications are conducted in accordance with §11.085, §11.147, §11.1491, §11.150, and §11.152 of the Texas Water Code and with TCEQ administrative rules which include 30 TAC §297.53 through §297.56. These statutes and rules require the TCEQ to consider the possible impacts of the granting of a water right on fish and wildlife habitat, water quality, and instream uses associated with the affected body of water. Possible impacts to bays and estuaries are also addressed.

## ENVIRONMENTAL ANALYSIS

**Application Summary:** Applicant seeks a Water Use Permit to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) with a maximum capacity of 367,609 acre-feet of water and a surface area of 16,526 acres on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County for recreation purposes. Applicant also seeks to divert and use not to exceed 175,000 acre-feet of water per year from any point on the perimeter of the proposed reservoir at a maximum combined diversion rate of 365.15 cfs (163,889 gpm, 236 mgd) for municipal, industrial, and agricultural purposes, including the right to use water within the reservoir for in-place recreational purposes. Further, the Applicant requests an interbasin transfer authorization to use the water within its service area in the Red and Trinity River Basins, and within Fannin County in the Sulphur River Basin. The Applicant's service area is currently located within the following counties: Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall.

Additionally, Applicant seeks authorization to reuse the return flows generated from the diversion and use of water from the proposed reservoir. Until facilities are developed to reuse diverted water, such water will be returned to the Red, Sulphur, and Trinity River Basins.

Applicant indicates that diversions may overdraft the firm yield of the reservoir as part of a system operation with existing North Texas Municipal Water District (NTMWD) supplies. The Applicant also requested authorization to use the bed and banks of Pilot Grove Creek and the East Fork Trinity River to transport water diverted from the reservoir for subsequent diversion and use from Lake Lavon. On March 15, 2011, the Applicant withdrew this request. Therefore, the request is not considered in staff's review of the application.

In support of the application, the Applicant submitted numerous reports and conducted multiple studies related to the reservoir project. A list of selected reports is presented below.

- *Report Supporting an Application for a Texas Water Right for Lower Bois d'Arc Creek Reservoir, 2 Volumes. 2006.* Referred to as "the Report" hereafter.
- *Section 404 Permit Application and Jurisdictional Determination Report. 2008.*
- *Environmental Report, Supporting an Application for a 404 Permit for Lower Bois d'Arc Creek Reservoir. 2008.*
- *Instream Flow Study Report for the Proposed Lower Bois d'Arc Creek Reservoir. 2010.* Referred to as "the Study" hereafter.
- *Instream Flow Study Supplemental Data. 2010.*
- *Mitigation Plan for the Proposed Lower Bois d'Arc Creek Reservoir. 2011.* Referred to as "the Mitigation Plan" hereafter.

## INSTREAM USES

**Aquatic and Riparian Habitats:** The Applicant's proposed reservoir project is located on Bois d'Arc Creek in Fannin County. The proposed reservoir footprint also encompasses portions of Sandy Creek, Bullard Creek, and Honey Grove Creek, tributaries of Bois d'Arc Creek. According to the *Handbook of Texas Online,* Bois d'Arc Creek rises two miles northwest of Whitewright in southeastern Grayson County, runs northeast across Fannin County, and eventually forms a natural boundary between Fannin and Lamar counties before its confluence with the Red River. The stream, intermittent in its upper reaches, is 60 miles long. It flows over the permeable, clayey soils of Grayson County and the highly calcareous Catalpa clay of Fannin County.

Bullard Creek rises a mile southeast of Dodd City in central Fannin County and runs north for 9.5 miles, passing beneath the Missouri Pacific railroad bridge just east of the city limits of Dodd City before reaching its mouth on Bois d'Arc Creek. Honey Grove Creek rises just north of the city limits of Honey Grove in east central Fannin County and runs northwest for 10.5 miles to its mouth on Bois d'Arc Creek, just south of Coffee Mill Lake. Sandy Creek rises just southeast of Lamasco in north central Fannin County and runs southeast for approximately 2.5 miles before reaching its mouth on Bois d' Arc Creek. All of these streams are intermittent in their upper reaches. Historic land use in these watersheds has been predominantly range and crop land.

The Bois d'Arc Creek watershed is located in four distinct ecoregions (Griffith et al. 2007). As described in the Study, the southern portion of the watershed is in the Northern Blackland Prairies of the Texas Blackland Prairies Ecoregion, which is dominated by a diverse assortment of grasses and forbs (Freese and Nichols 2010a). The central portion of the watershed lies within the Northern Post Oak Savannah in the East Central Texas Plains Ecoregion. In both of these ecoregions the forested or wooded areas tend to be restricted to bottomlands along major rivers and streams. The most northern portion of the watershed is within the Pleistocene Fluvial Terraces of the South Central Plains Ecoregion and eventually converges with the Red River in

the Red River Bottomlands of the South Central Plains Ecoregion. Each ecoregion has unique characteristics of soils, climate, flora and fauna. With the Bois d'Arc Creek watershed crossing four ecoregions, the stream system changes as it traverses from the upper end of the watershed to the Red River. These changes tend to coincide with changes in geologic structure and anthropogenic impacts in the form of historic channelization.

As described in the Mitigation Plan, historical land uses were primarily cropland and pastureland (Freese and Nichols 2011). In 1939, harvested cropland represented almost half of the area of the county, with cotton representing the largest crop, followed by corn and oats. Most of the remaining land within the county was used for pasture. During this time, practically all of the highly productive land was cultivated except for the lower floodplain of Bois d'Arc Creek, which needed protection from floods. The floodplain areas were densely forested with such species as Bois d'Arc (*Maclura pomifera*), ash (*Fraxinus* spp.), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), elm (*Ulmus* spp.), hackberry (*Celtis occidentalis*), and pecan (*Carya illinoinensis*). Although these areas could not be cultivated due to flooding, a considerable amount of rough lumber was cut, especially along Bois d'Arc Creek, due to its value as fence posts.

The 2001 Soil Survey of Fannin County indicates that agriculture is still the main land use in Fannin County. The major land uses are cropland and improved pasture with nearly half of the agriculture income being derived from the sale of livestock. Crop production has shifted away from being primarily cotton based to close-growing crops such as wheat, grain sorghum, soybeans, and peanuts. Rangeland comprises about six percent of the land area with almost half located in the Caddo National Grasslands and the remainder located in the southern part of the county. Only 0.5% of the land in Fannin County is used as commercial woodland.

Based on historical maps and satellite imagery of the watershed, which were reviewed in the Study, there is evidence that portions of Bois d'Arc Creek were straightened by bypassing and/or abandoning the natural channel. This drainage modification, a type of channelization, started around 1920 and continued well into the 1970s. Comparison of the historical 1915 watershed map to the current stream configuration indicates that Bois d'Arc Creek has lost over 20 stream miles through channelization. Most of the channelization occurred in the upper watershed near the upper end of the proposed reservoir. A smaller channelized section is evident from near the proposed dam site to a few miles downstream at FM 409, where the extended channelization stops. After dam construction and impoundment, approximately 19% of the linear distance of the creek would be channelized, with the vast majority of the stream channel downstream of the dam exhibiting natural meandering. The natural meandering reaches below the dam currently provide adequate instream habitat to support a diverse assemblage of fish and macroinvertebrates and areas of incision have led to the recruitment of large woody debris instream habitat.

Approximately 40 species representing 11 families of fish native to Texas were collected in Bois d'Arc Creek as part of the Study. Relative abundance, index of biological integrity (IBI), habitat utilization, and species life history information were evaluated and described in detail in the Study. The fish assemblage in Bois d'Arc Creek can be described as dominated by fishes belonging to the Cyprinidae and Centrarchidae (minnows and sunfish) families, comprising approximately 80% of fish collected. A longitudinal trend of increasing IBI scores is evident from upstream to downstream sample sites within Bois d'Arc Creek.

Texas Parks and Wildlife Department (TPWD) has identified several species of special concern potentially inhabiting the project area both in the reservoir footprint as well as the riverine

portion of the creek below the proposed dam location (El-Hage et al. 1999; TPWD 2012). State listed threatened species potentially inhabiting the project area include the blackside darter *(Percina maculata)*, blue sucker *(Cycleptus elongatus)*, creek chubsucker *(Erimyzon oblongus)*, paddlefish *(Polyodon spathula)*, and shovelnose sturgeon *(Scaphirhynchus platorynchus)*. TPWD also lists rare species as goldeye *(Hiodon alosoides)*, orangebelly darter *(Etheostoma radiosum)*, taillight shiner *(Notropis maculatus)*, and the western sand darter *(Ammocrypta clara)*. None of these state listed fish species were collected or observed during the Study in support of this project.

The impoundment of creeks and rivers, such as Bois d'Arc Creek, and the transformation from a riverine ecosystem to a lacustrine ecosystem will have effects on the fish community (Jackson and Marmulla 2001). Species richness and relative abundance are expected to change over time. The change from lotic (river) to lentic (lake) habitat will shift the present species composition toward more pool-associated species, largely composed of warmwater reservoir fishes such as sunfish (Centrarchids), temperate bass (Moronids), catfish (Ictalurids), and suckers (Catostomids) (Aaland 1993). While most of the fish collected as part of the Study can be characterized as flow and habitat generalists, several less abundant species are classified as either fluvial specialists or members of a big river fish guild. These fishes depend on various flowing water velocities, depths, substrates, and connectivity to larger rivers (in this case the Red River), and variability in flows, to successfully carry out portions of their life cycle including feeding, breeding, sheltering, and migrating. Information from the Study was analyzed to ensure critical habitat availability for the fluvial specialists and big river fish guild species.

Benthic invertebrates within Bois d'Arc Creek were also sampled, sorted, identified, and analyzed for relative abundance and functional feeding groups. Rapid bioassessment (RBA) metrics were calculated for each sample. Aquatic and terrestrial insects from approximately 100 genera representing 46 families were collected during the Study. A more detailed account of the macroinvertebrate assemblage in Bois d'Arc Creek can be found in the Study.

Freshwater mussels were collected and identified at each of the Study sample locations when they were encountered during other data collection efforts. Six species of freshwater mussels were observed live within Bois d'Arc Creek. These mussels were photographed and later identified. According to the U.S. Fish and Wildlife Service, no federally listed threatened or endangered aquatic mollusk species occur in Fannin County (USFWS 2012). A review of the *Texas Parks and Wildlife Department (TPWD) Annotated List of Rare Species for Fannin County* indicates that three mollusk species are listed for Fannin County (TPWD 2012). None of these mussel species were encountered during the Study in support of this project.

**Recreational Uses:** According to *An Analysis of Texas Waterways*, Bois D'Arc Creek, one of the major drainages of the Red River in Texas, maintains an average wetted width of 75 feet from FM 79 to its intersection with the Red River (TPWD 1979). This is normally enough water for recreational use of this two-mile stretch; however, the nearest road crossing on the Red River is U.S. Highway 271, approximately 40 miles downstream. Most of the time, the water in Bois D'Arc Creek is clear, and fishing is rated as good. Also, good camping areas are available where Bois D'Arc Creek passes through Caddo National Grasslands (administrated by the U.S. Forest Service). Russell Graves describes canoeing Bois d'Arc Creek in the Texas Parks and Wildlife Magazine (Graves 2010). Lower Bois d'Arc Creek Reservoir can be expected to provide various types of recreation in the forms of boating, fishing, swimming, and birding.

**Water Quality:** Based on the *Texas Surface-Water Quality Standards*, Bois d'Arc Creek is an unclassified water body in Segment 0202, Red River below Lake Texoma (TCEQ 2010).

According to the 2010 *Texas Water Quality Inventory and 303(d) List*, the upper portion of Bois d'Arc Creek from the confluence with Sandy Creek upstream to the confluence with Pace Creek is categorized as having perennial flow and intermediate aquatic life use (TCEQ 2012). The lower portion of Bois d'Arc Creek from the confluence with the Red River upstream to the confluence with Sandy Creek is listed as having high aquatic life use. The *Texas Water Quality Inventory and 303(d) List* indicates no water quality impairments or concerns for Segment No. 0202A, Bois d'Arc Creek (TCEQ 2012).

The potential effects of reservoirs on downstream water quality have been well documented (Poff et al. 1997; Poole and Berman 2001; Caissie 2006; and Olden and Naiman 2010). Of particular concern are the effects on temperature and dissolved oxygen (DO). The extent to which a dam affects downstream thermal and DO regimes is dependent on the stratification dynamics of the reservoir, mode of operation, outflow mechanism(s), and depth of water releases (Bohac and Ruane 1990; Olden and Naiman 2010; and USEPA 2010).

In order to mitigate for any potential water quality impacts downstream, the applicant indicates the proposed reservoir will be designed with a multiple-level intake structure to allow water to be selectively withdrawn from a depth that would not be likely to result in temperature and DO problems downstream.

In support of the application, the applicant has conducted and performed a water quality review, analysis, study, and modeling effort of Bois d'Arc Creek including approximations of future water quality conditions in the proposed reservoir. Each of these individual tasks is described in the Report, the Study, and the Mitigation Plan. Based on the extensive water quality evaluation, the future condition modeling, the use of a multiple level intake structure to pass water downstream, and the recommended flow regime and special conditions described below, the proposed project should have minimal impacts to water quality and aquatic life in the proposed reservoir and the riverine section of Bois d'Arc Creek downstream of the proposed dam location.

**Flow Regimes for River Ecosystems:** Over the past 20 years, scientific research on streamflows to support river ecosystems indicates that establishing streamflows only on the basis of fish needs may not be sufficient to fully protect ecosystem functions (NRC 2005). Such a limited focus may result in insufficient flows to support the maintenance of the stream channel, geomorphological processes, and riparian vegetation (Hill et al. 1991). Four flow components are now widely recognized as important to river ecosystems: subsistence flows, base flows, high flow pulses, and overbank flows (NRC 2005). A river requires a natural (i.e., unaltered) flow regime, or critical components of the natural flow regime, to achieve ecological integrity or ecosystem health (Poff et al., 1997; Bunn and Arthington, 2002; Richter et al., 2003 , and Larned et. al. 2010). A body of scientific literature recognizes that this "environmental dynamism is central to sustaining and conserving native species diversity and ecological integrity in rivers and other ecosystems" (Poff et al. 1997) and that species have evolved life history strategies compatible with the flow regime in which they live and reproduce (Schlosser 1985; Meffe and Minckley 1987; Bunn and Arthington 2002). The Texas Instream Flow Program is based on these tenets of hydrologic variability and dynamism (TCEQ et al. 2008).

Magnitude, frequency, and duration of flow are critical factors for species recruitment, abundance, and survival. Extremely low flows, or subsistence flows, should only be temporary or infrequent conditions that will maintain survival of aquatic organisms, will not always provide suitable water quality, but will provide limited instream habitat. Base flow supports diverse aquatic communities, maintains groundwater levels for riparian vegetation, provides connectivity for fish movement, maintains suitable temperature and water quality

characteristics, and provides drinking water for terrestrial animals (Tennant 1976; Richter et al. 2003). Higher flow transports sediment through the channel (Leopold et al. 1964). This sediment movement is integral to redistributing the organic resources on which many species depend (Fisher 1983). High-flow events, like low-flow events, may serve as ecological "bottlenecks" that present critical stresses and opportunities for riverine species (Poff and Ward 1989). In many systems, the relative composition and abundance of species often reflect the frequency and intensity of high flows (e.g., Bernardo et al. 2003; Agostinho et al. 2004).

**Project Impacts:** The proposed reservoir will inundate approximately 651,000 linear feet of streams, an additional 87 acres of open water area, and approximately 5,900 acres of various types of wetlands within the proposed project area. A comprehensive discussion of impacts associated with the project can be found in the Mitigation Plan.

## INSTREAM FLOW RECOMMENDATIONS

A major objective of the recommendations presented herein is to maintain the ecological health of Bois d'Arc Creek by recommending environmental flow requirements which reflect historical patterns of hydrological variability. Given the relatively short hydrological record for Bois d'Arc Creek, the Applicant developed long-term historical hydrological data using stream flow records from the USGS gage at the North Sulphur River near Cooper, TX (USGS 07343000). This gage is located in an adjacent watershed with similar characteristics to Bois d'Arc Creek. This long-term modeled hydrologic data was used in development of the instream flow recommendations described below.

Subsistence flow and base flow recommendations proposed in the Study were reviewed and found to be adequate to maintain the ecological health and instream uses of Bois d'Arc Creek downstream of the proposed dam location. Pulse flow recommendations were developed utilizing a multitude of data, models, and analyses submitted by the Applicant as part of the Study. Natural life history information, including spawning requirements for fish and life history information from published literature for a riparian indicator tree species, was used to identify time periods when pulse flows would be necessary to provide suitable conditions within Bois d'Arc Creek to maintain the health of existing aquatic biota and in-channel riparian communities. Flow statistics, based on the modeled long-term flows, and flow separation tools were also used to identify the necessary frequency and duration of pulse flows and to assign specific seasons when pulses should occur.

The instream flow regime recommendations specified in the table below will be adequate to maintain the health of existing aquatic fish, invertebrate, and in-channel riparian communities, and provide sediment transport and channel maintenance flows in Bois d'Arc Creek.

Instream flow criteria for Bois d'Arc Creek

| Season | Subsistence | Base | Pulse |
|---|---|---|---|
| Fall-Winter | 1 cfs | 3 cfs | 2 per season<br>Trigger: 150 cfs<br>Volume: 1,000 af<br>Duration: 7 days |
| Spring | 1 cfs | 10 cfs | 2 per season |

| | | | |
|---|---|---|---|
| | | | Trigger: 500 cfs<br>Volume: 3,540 af<br>Duration: 10 days |
| Summer | 1 cfs | 3 cfs | 1 per season<br>Trigger: 100 cfs<br>Volume: 500 af<br>Duration: 5 days |

cfs = cubic feet per second
af = acre-feet

The following conditions apply to the instream flow regime recommendations:

- Seasons are defined as Fall-Winter (November – February), Spring (March – June), and Summer (July-October);
- Each season is independent of preceding and subsequent seasons with respect to pulse flow frequencies;
- All instream flow pass-through releases are limited to calculated inflows to the reservoir;
- Subsistence and base flow releases shall be measured at the outlet works;
- Subsistence conditions apply when reservoir storage is less than 40% of the conservation storage;
- The measurement point for pulse flows is USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX;
- Pulse flow pass-through releases are not required during subsistence conditions;
- If calculated inflows exceed the pulse flow trigger requirement, the pulse flow requirement for the season has not been met, **and** the flows at USGS gage 07332622 do not exceed the pulse flow trigger requirement, the pulse flow must be passed through the reservoir, in accordance with the release pattern in the approved accounting plan;
- If a qualifying pulse flow event is recorded at USGS Gage 07332622, then this pulse event satisfies the pulse requirement for that event within the respective season in that year;
- A pulse flow is considered to be a qualifying event if the pulse flow trigger is met and either the volume or duration requirement is met;
- When calculated inflows equal or exceed the pulse flow trigger requirement, inflows may be temporarily impounded, even if the pulse flow requirement for the season has not been met, until the criteria for a qualifying event are met;

Staff had additional concerns regarding the impacts of the project on higher flow events further downstream of the reservoir site. These higher flow events maintain connectivity between Lower Bois D'Arc Creek and the Red River. The Applicant submitted the *North Texas Municipal Water District Monitoring Plan* and has agreed to establish a partial record gage near FM 100 and collect stage data at this location to determine impacts, if any, on these higher flow events as a result of the project. Staff reviewed the Monitoring Plan and found it adequate.

**Bay and Estuary Freshwater Inflows:** Freshwater inflows are critical for maintaining the historical productivity of bays and estuaries along the Gulf Coast. The proposed project site is located near the Texas and Oklahoma border and is significantly more than 200 river miles from the Gulf Coast. The receiving estuaries are located in Louisiana. The cumulative effects of all diversions and impoundments on the Red River Basin and its receiving estuary in Louisiana are unknown at this time.

## PROPOSED MITIGATION

The Applicant has proposed a mitigation plan *Mitigation Plan for Proposed Lower Bois d'Arc Creek Reservoir, Fannin County, Texas* dated July 2011. The Applicant has also provided additional information related to the Mitigation Plan on March 9, 2012. The Mitigation Plan is part of the application for Clean Water Act §404 authorization submitted to the United States Army Corps of Engineers. The goal of the Mitigation Plan is to compensate for impacts to aquatic and terrestrial resources for the proposed Lower Bois d'Arc Creek Reservoir project (Freese and Nichols, Inc. 2011). A detailed summary of project impacts, mitigation plans for aquatic and terrestrial resources, and monitoring plans can be found in the Mitigation Plan and the March 9, 2012 submittal.

According to the Mitigation Plan, all compensatory mitigation would be provided through in-kind mitigation that would occur through on-site or near-site mitigation strategies. On-site mitigation would be provided at the proposed reservoir site and near-site mitigation would be provided on Bois d'Arc Creek downstream of the reservoir and on an approximately 15,000-acre parcel of land (Riverby Ranch) located downstream of the proposed reservoir. The Applicant has acquired this site specifically because of its unique characteristics and qualities for mitigation for the proposed project. As proposed the mitigation plan would provide:

- Preservation and enhancement for 452 acres of forested wetlands, 1,377 acres of emergent wetlands, 98 acres of shrub wetlands, 34 acres of open water, and 354,582 linear feet of streams;
- Restoration of 3,000 acres of forested wetlands, 600 acres of emergent wetlands, and 180,672 feet of riparian corridors;
- Creation of 1,402 acres of emergent/fringe wetlands and 15,239 acres of open waters;
- A net gain of 810.6 habitat units (HUs) of forested wetlands and 562.2 HUs of emergent wetlands and,
- Dedicated instream flow pass-throughs. The applicant proposes to pass inflows to meet instream flow criteria.

Resource Protection staff has reviewed the Mitigation Plan and additional information submitted by the applicant and considers them adequate to compensate for aquatic and terrestrial impacts by the proposed project.

## SUMMARY

Applicant seeks a Water Use Permit to construct and maintain a dam and reservoir (Lower Bois d'Arc Creek Reservoir) with a maximum capacity of 367,609 acre-feet of water and a surface area of 16,526 acres on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County for recreation purposes. Applicant also seeks to divert and use not to exceed 175,000 acre-feet per year from any point on the perimeter of the proposed reservoir at a maximum combined diversion rate of 365.15 cfs (163,889 gpm, 236 mgd) for municipal, industrial, and agricultural purposes, including the right to use water within the reservoir for in-place recreational purposes. Further, the Applicant requests an interbasin transfer authorization to use the water within its service area in the Red and Trinity River Basins, and within Fannin County in the Sulphur River Basin. The Applicant's service area is currently located within the following counties: Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains and Rockwall.

Additionally, Applicant seeks authorization for reuse of the return flows generated from the diversion and use of water from the proposed reservoir. Until facilities are developed to reuse diverted water, such water will be returned to the Red, Sulphur, and Trinity River Basins.

Applicant indicates that diversions from the reservoir may overdraft the firm yield of the reservoir as part of a system operation with existing NTMWD supplies.

**Resource Protection staff recommends the following Special Conditions be included in the permit, if granted:**

1. All mitigation plans and monitoring required herein shall comply with requirements set forth in 33 United States Code §1341, commonly known as the federal Clean Water Act (CWA), §401 and 30 TAC §279. Mitigation and monitoring plans shall also comply with the requirements in §404 of the CWA.

2. Impoundment of water and diversions under this permit are contingent upon implementation of the approved *Mitigation Plan for the Proposed Lower Bois d'Arc Creek Reservoir*. Modifications or changes to the plan must be approved by the Executive Director. Any modification that changes the permit terms must be in the form of an amendment to the permit.

3. Permittee shall document compliance with the terms and conditions of this permit relating to environmental flow requirements in the most recently approved *North Texas Municipal Water District Accounting Plan*.

4. Permittee shall determine compliance with pulse flow conditions using measured flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX or releases from the reservoir as documented in the most recently approved *North Texas Municipal Water District Accounting Plan*.

5. If calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Accounting Plan*, exceed the pulse flow trigger requirements, and the pulse flow requirement for the season has not been met, and the flows at USGS gage 07332622 do not exceed the pulse flow trigger requirement, the pulse shall be passed through the reservoir, in a manner as close as practicable to the applicable seasonal release pattern identified in the most recently approved *North Texas Municipal Water District Accounting Plan*.

6. When calculated reservoir inflows, as determined in the most recently approved *North Texas Municipal Water District Accounting Plan*, equal or exceed the pulse flow trigger requirement, inflows to the reservoir may be temporarily impounded, even if the pulse flow requirement for the season has not been met, until the criteria for a qualifying event, as specified in Special Condition16, have been met.

7. Permittee is not required to release stored water, except as described in Special Condition 6, to meet the environmental flow requirements in this permit. All instream flow pass-through releases are limited to calculated inflows to the reservoir.

8. If permittee has stored water in accordance with the terms and conditions of this permit, including any applicable environmental flow requirements in effect at the time the water was stored, permittee may divert and use that stored water, even if the applicable

environmental flow requirement is not met at the time of the subsequent diversion and use of that stored water.

9. If a qualifying pulse flow event is recorded at USGS gage 07332622, this pulse event shall satisfy a pulse requirement for that event within the respective season.

10. Each season is independent of the preceding and subsequent seasons with respect to high flow pulse frequency.

11. A pulse flow is considered to be a qualifying event if the pulse flow trigger requirement is met and either the pulse flow volume or duration requirement is met.

12. Permittee shall determine compliance with subsistence and base flow conditions based on measured flows at the outlet works of the dam.

13. Seasons are defined as Fall-Winter (November – February), Spring (March – June), and Summer (July-October).

14. Reservoir storage is the trigger for determining the applicable instream flow requirements. Subsistence flow requirements apply when storage is less than 40% of the conservation storage. Base flow and pulse flow requirements apply when conservation storage is greater than 40%.

15. Pulse flow requirements are not applicable under subsistence flow conditions.

16. Storage and diversion of water under this permit shall be authorized when streamflows exceed the following values, at measurement points described in Special Conditions 4 and 12 above:

| Season | Subsistence | Base | Pulse |
|---|---|---|---|
| Fall-Winter | 1 cfs | 3 cfs | 2 per season<br>Trigger: 150 cfs<br>Volume: 1,000 af<br>Duration: 7 days |
| Spring | 1 cfs | 10 cfs | 2 per season<br>Trigger: 500 cfs<br>Volume: 3,540 af<br>Duration: 10 days |
| Summer | 1 cfs | 3 cfs | 1 per season<br>Trigger: 100 cfs<br>Volume: 500 af<br>Duration: 5 days |

17. Permittee shall implement measures to minimize impacts to aquatic resources due to entrainment or impingement including, but not limited to, the installation of screens at

the diversion facilities.

18. After deliberate impoundment in the reservoir, Permittee shall conduct hydrologic and water quality monitoring in accordance with the approved *North Texas Municipal Water District Monitoring Plan*. Permittee shall submit a summary of hydrologic and water quality monitoring data to the Executive Director on an annual basis. Permittee shall submit to the Executive Director a summary report of hydrologic and water quality data in the fifth and tenth years following deliberate impoundment in the reservoir. Hydrologic and water quality monitoring for all sites and parameters other than daily flows at USGS Gage 07332622, Bois d'Arc Creek at FM 409, shall cease after ten years, or when instream monitoring specified in Special Condition No. 19 ceases, whichever is later.

19. Permittee shall conduct instream monitoring of Bois d'Arc Creek downstream of the dam at the FM 409 Site and, at a minimum, one additional site, twice per year in the first, third, fifth and tenth years after deliberate impoundment of water in the reservoir. Monitoring shall include assessment of fish and macroinvertebrate communities, physical habitat assessment, and an analysis of water quality data collected at the USGS Gage 07332622, Bois d'Arc Creek at FM 409 near Honey Grove, TX. All aquatic biological monitoring and physical habitat assessments shall take place in the index period (March 15 – October 15) with at least one of the biannual monitoring events taking place in the critical period (July 1 – September 15). Aquatic biological monitoring and habitat characterization shall follow TCEQ protocols set forth in the most recent approved *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data.*

20. Permittee shall submit a report to the Executive Director summarizing the twice per year monitoring activities in Special Condition No. 19 within six months after monitoring is completed. The report shall detail all monitoring efforts and shall include an assessment of the fish and macroinvertebrate communities and the biological metric scoring criteria used to assess aquatic life uses. Should aquatic life use not meet the water quality standards for Segment 0202A or future segment designation, Permittee shall develop and implement remedial management strategies, subject to Executive Director approval, to meet the designated aquatic life use. Permittee shall also submit a summary report to the Executive Director no later than six months after the end of the fifth and tenth year monitoring events that compares all monitoring data to baseline conditions.

21. Permittee shall construct a multilevel outlet tower to ensure that water released from the reservoir maintains DO and temperature levels that meet the surface water quality standards for Segment 0202A or future segment designation.

This instream use assessment was conducted using current TCEQ operation procedures and policies and available data and information. Authorizations granted to the permittee by the water rights permit shall comply with all rules of the Texas Commission on Environmental Quality, and other applicable State and Federal authorizations.

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**Texas Commission on Environmental Quality**

INTEROFFICE MEMORANDUM

**To:** Ron Ellis, Section Manager **Date:** September 4, 2014
Water Rights Permitting Team
Water Rights Permitting and Availability Section

**Thru:** CL 9/4/14 Chris Loft, Team Leader
Resource Protection Team
Water Rights Permitting and Availability Section

**Thru:** Jennifer Allis, Senior Water Conservation Specialist
Resource Protection Team
Water Rights Permitting and Availability Section

**From:** Kristin Wang, Senior Water Conservation Specialist
KW 9/4/2014 Resource Protection Team
Water Rights Permitting and Availability Section

**Subject:** North Texas Municipal Water District
WRPERM 12151
CN601365448
Water Conservation Review Addendum

The initial water conservation review memorandum was completed November 22, 2013 and a draft permit was sent to the Applicant on November 22, 2013. On August 15, 2014, North Texas Municipal Water District proposed revisions to the water conservation language in the draft permit. Staff have reviewed the proposed modification and recommend the following water conservation language be included in the permit in lieu of the language in the November 22, 2013 draft permit:

Permittee shall fully implement water conservation plans, developed in accordance with this provision, that provide for the utilization of those reasonably available practices, techniques, and technologies that reduce the consumption of water for municipal use on a gallons per-capita per day basis within NTMWD's service area and that, for each category of use authorized by this permit not including recreation use, prevent the waste of water, prevent or reduce the loss of water, improve the efficiency in the use of water, increase the recycling and reuse of water, and prevent the pollution of water, so that a water supply is made available for future or alternative uses. Permittee shall develop, submit and implement water conservation plans as required by law. Each water conservation plan submitted to the Executive Director shall be designed to comply with relevant state conservation standards then in effect, and, at the time of submission, shall be designed to achieve, for each category of authorized uses, the highest practicable levels of water conservation and efficiency achievable within the jurisdiction of the

Permittee. Permittee shall report annually to the Executive Director on the implementation of its water conservation plans and shall make both its most current water conservation plan and the annual reports on the implementation of its conservation plans easily accessible to the public through electronic and other means.

Such plans shall ensure that every water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, requires that each successive wholesale customer shall develop and implement conservation measures that will result in the highest practicable levels of water conservation and efficiency in order to comply with TWC § 11.085 (l)(2), and that each wholesale customer will report, no less frequently than once every year, to Permittee on the implementation of those conservation measures. If Permittee enters into a water supply contract on or after the effective date of this permit that authorizes the resale of water, such contract shall require that each successive customer in the resale of the authorized water implement water conservation measures at least as stringent as those included in Permittee's approved water conservation plan.

All other analyses and recommendations in the memo dated November 22, 2013 remain unchanged unless specifically addressed in this addendum.

## Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

**To:** Ron Ellis, Section Manager **Date:** November 22, 2013
Water Rights Permitting and Availability Section

**Thru:** Chris Loft, Team Leader
11/22/13 Resource Protection Team
Water Rights Permitting and Availability Section

**Thru:** Jennifer Allis, Senior Water Conservation Specialist
Resource Protection Team
11/22/13 Water Rights Permitting and Availability Section

**From:** Kristin Wang, Senior Water Conservation Specialist
KW Resource Protection Team
11/22/13 Water Rights Permitting and Availability Section

**Subject:** North Texas Municipal Water District
WRPERM 12151
CN601365448
Application No. 12151 for a Water Use Permit
Water Conservation Review

North Texas Municipal Water District (NTMWD or applicant) seeks authorization to construct and maintain a dam and reservoir (known as Lower Bois d'Arc Creek Reservoir) with a maximum capacity of 367,609 acre-feet of water and a surface area of 16,526 acres on Bois d'Arc Creek, tributary of the Red River, Red River Basin in Fannin County for recreation purposes and to divert and use not to exceed 175,000 acre-feet of water per year from any point on the perimeter of the proposed reservoir at a maximum combined diversion rate of 365.144 cfs (163,889 gpm, 236 mgd) for municipal, industrial, and agricultural purposes including the right to use the water within the reservoir for in-place recreational purposes. Applicant requests to use the water in all or parts of Collin, Dallas, Denton, Fannin, Hopkins, Hunt, Kaufman, Rains, and Rockwall Counties within the Red, Sulphur, and Trinity River Basins under an interbasin transfer (IBT) authorization.

Applicant also seeks authorization to reuse 100% of the return flows generated from the diversion and use of water from the proposed reservoir. Until facilities are developed to reuse diverted water, such water will be returned to the Red, Sulphur, and Trinity River Basins.

Applicant indicates that diversions from the reservoir will be part of a system operation with existing and future district supplies from other basins.

The applicant is required to provide evidence that the amount of water appropriated will be beneficially used, i.e., effectively managed and not wasted pursuant to Texas Water Code (TWC) Section 11.134(b)(3)(A). Also, the applicant must provide evidence that reasonable diligence will be used to avoid waste and achieve water conservation, pursuant to TWC, Section 11.134(b)(4). To provide that evidence, the applicant has submitted a water conservation plan in accordance with Title 30, Texas Administrative Code (TAC) Chapter 288. In applications where new water is

requested, the review analyzes whether the requested appropriation is reasonable and necessary for the proposed uses in accordance with Section 11.134 of the Code, and Title 30, TAC, Chapter 297.50. In applications where an IBT of water is requested, the review considers the effects of the proposed transfer in accordance with the relevant requirements of Title 30, TAC, Chapter 297.18, and TWC, Section 11.085.

The purpose of this review is to:

(1) determine whether reasonable water conservation goals have been set;
(2) determine whether the proposed strategies can achieve the stated goals;
(3) determine whether there is a substantiated need for the water and whether the amount to be appropriated is reasonable for the proposed use;
(4) determine whether the application meets the requirements of TWC 11.085 (k) and (l) for IBTs; and
(5) determine whether the water conservation plan addresses a water supply need in a manner that is consistent with the state water plan and the relevant approved regional water plan.

If these criteria are met, then staff considers this sufficient evidence to conclude that the applicant will avoid waste and achieve water conservation. This review forms a basis for permit conditions and limitations as provided by TWC 11.134 and 11.085.

NTMWD initially submitted a 2004 water conservation plan with the application. On May 15, 2008, NTMWD submitted its 2008 water conservation and drought contingency plan. In addition, NTMWD submitted a memorandum dated June 16, 2011 to further document their efforts in water conservation.

**WATER CONSERVATION GOALS & STRATEGIES**

NTMWD's plans were reviewed in accordance with 30 TAC 288. NTMWD's 2008 water conservation plan establishes five and ten-year goals for municipal per capita water use within its service area and water loss goals. The goals are to achieve 170 gallon per capita per day (gpcd) by 2012 and to achieve 165 gpcd by 2017 and maintain the level of unaccounted-for water in the system below 5%.

In the 2008 water conservation plan, NTMWD lists the following strategies to help achieve the stated goals:

- Maintain universal metering of customers, meter calibration with an accuracy of ±2%, and meter replacement and repair
- Maintain a program of leak detection and repair with regular inspections of its system to detect unauthorized connections
- Hold water conservation workshops, and provide model water conservation and drought contingency plans for use by member cities and customers in developing their own plans
- Require member cities and customers to provide annual water conservation reports
- Continue efforts for reuse and recycling of wastewater
- Assist and supplement the public education efforts of its member cities and customers
- Implement water conservation efforts in NTMWD's facilities, such as landscaping with native, drought tolerant plants, and irrigating with treated wastewater effluent

According to the 2011 memorandum, NTMWD also provides a Contract Rebate Program to give rebates to wholesale customers for using less water than their contact amounts.

In addition, NTMWD has developed a reuse and recycling program, including indirect reuse of treated effluent from Wilson Creek Regional Wastewater Treatment Facility, and East Fork Raw Water Supply (Wetland) Project. The level of reuse from those projects represents about 25% of its current water supplies.

Thus, NTMWD has managed to maintain or reduce the average municipal per capita water use for the past five years (2005 to 2009) to 147 GPCD according to its 2011 conservation memorandum, which is less than the goals (165 and 170 GPCD) set in the NTMWD's 2008 water conservation plan.

Staff determined that the overall water conservation strategies provided in the NTMWD's water conservation plan are reasonable and have achieved and can maintain the stated goals.

**WATER NEED**

Based on the 2008 water conservation plan, NTMWD is a regional wholesale supplier providing treated water to 13 member cities and 60 other customers in Collin, Dallas, Denton, Rockwall, Kaufman, Hunt, Hopkins, Fannin, and Rains Counties in North Central Texas. NTMWD's customers include cities, water supply corporations, and utility districts. NTMWD also provides direct retail service to 75 customers (72 retail connections in 2007) who do not have access to retail service from other sources. NTMWD obtains its raw water supplies from Lavon Lake, Lake Texoma, Jim Chapman Lake, Sabine River Authority (SRA), and the East Fork Raw Water Supply Project, and reuse of treated wastewater effluent from its Wilson Creek Regional Wastewater Treatment Plant. NTMWD operates four water treatment plants in Wylie, near Lavon Lake, with a total treatment capacity of 770 MGD in 2007.

Based on the summary of the water utility profile in NTMWD's water conservation plan, the total estimated population served by NTMWD was 1,357,230 in 2007. The projected population for the same current member cities and customers of NTMWD is estimated to increase to 3,090,268 in 2060.

In the 2011 Region C Water Plan, projected water demands for NTMWD are expected to more than double from 2010 to 2060, with NTMWD needing more than 368,000 acre-feet per year in additional supplies by 2060.

The recommended water management strategies listed in Region C Water Plan for NTMWD include the following:

- Conservation
- Lake Texoma Pump Station Expansion
- Renewed Interim Purchase of Lake Texoma Water from GTUA/Sherman
- Main Stem Pump Station
- Chapman Booster Pump Station
- Lower Bois d'Arc Creek Reservoir
- Additional Lake Texoma Supplies
- Fannin County Water Supply System
- Marvin Nichols Reservoir
- Toledo Bend Reservoir
- Oklahoma Water
- Water Treatment Plant and Distribution Improvements

Table 1 shows a summary of recommended water management strategies for NTMWD's water supply development. Conservation savings from NTMWD customers is projected to reach 80,372 acre-feet per year by 2060. As shown in Table 1 below, a maximum yield of 120,200 acre-feet per year from Lower Bois d'Arc Creek Reservoir has been listed as a recommended supply strategy to help NTMWD meet projected water demands during the planning period.

**Table 1**
**Summary of Recommended**
**Water Management Strategies for NTMWD**

| **Planned Supplies (acre-feet/year)** | **2010** | **2020** | **2030** | **2040** | **2050** | **2060** |
|---|---|---|---|---|---|---|
| **Projected Demands (including losses for Treatment & Delivery)** | **387,574** | **492,647** | **580,733** | **667,711** | **736,064** | **789,466** |
| **Existing Supplies** | | | | | | |
| Lake Lavon | 112,033 | 110,767 | 109,500 | 108,233 | 106,967 | 105,700 |
| Lake Texoma | 77,300 | 77,300 | 77,300 | 77,300 | 77,300 | 77,300 |
| Lake Chapman | 47,132 | 47,132 | 47,132 | 47,132 | 47,132 | 47,132 |
| Wilson Creek Reuse | 50,000 | 60,941 | 71,882 | 71,882 | 71,882 | 71,882 |
| Lake Bonham | 5,340 | 5,340 | 5,340 | 5,340 | 5,340 | 5,340 |
| East Fork Reuse (with Ray Hubbard Pass through) | 51,790 | 67,148 | 87,102 | 102,000 | 102,000 | 102,000 |
| Interim GTUA | 15,500 | 0 | 0 | 0 | 0 | 0 |
| Upper Sabine Basin | 49,718 | 29,646 | 9,573 | 9,501 | 9,428 | 9,356 |
| Direct Reuse for Irrigation (Collin & Rockwall Co) | 2,695 | 2,695 | 2,695 | 2,695 | 2,695 | 2,695 |
| **Total Available Supplies** | **411,508** | **400,968** | **410,524** | **424,083** | **422,744** | **421,405** |
| | | | | | | |
| **Need (Demand-Supply)** | **0** | **91,679** | **170,209** | **243,628** | **313,320** | **368,061** |
| | | | | | | |
| **Water Management Strategies** | | | | | | |
| Conservation (Wholesale Customers) | 5,180 | 27,104 | 45,757 | 58,937 | 70,535 | 80,372 |
| Texoma Pump Station Expansion | 0 | 0 | 0 | 0 | 0 | 0 |
| Additional Direct Reuse – Rockwall Co. Irrigation | 64 | 64 | 64 | 64 | 64 | 64 |

| Table 1<br>Summary of Recommended<br>Water Management Strategies for NTMWD | | | | | | |
|---|---|---|---|---|---|---|
| Renewed Interim GTUA | | 21,900 | 21,900 | 21,900 | | |
| Main Stem PS (additional East Fork) | | 34,900 | 15,100 | 0 | 0 | 0 |
| Chapman Booster Pump Station | 0 | 0 | 0 | 0 | 0 | 0 |
| Lower Bois d'Arc Creek Reservoir | | 56,050 | 120,200 | 118,000 | 115,800 | 113,600 |
| Additional Lake Texoma – Blend with new Supplies | | | 69,200 | 68,500 | 113,000 | 113,000 |
| Fannin County Water Supply System | | 0 | 0 | 0 | 0 | 0 |
| Marvin Nichols | | | 87,400 | 87,400 | 174,800 | 174,800 |
| Toledo Bend Phase 1 | | | | | 100,000 | 100,000 |
| Oklahoma | | | | | | 50,000 |
| **Total Supplies from Strategies** | **5,244** | **140,018** | **359,621** | **354,801** | **574,199** | **631,836** |
| **Total Supplies (if all strategies implemented)** | **416,752** | **540,987** | **770,145** | **778,884** | **996,943** | **1,053,241** |
| **Reserve or (Shortage)** | **29,178** | **48,340** | **189,412** | **111,173** | **260,878** | **263,775** |

**source: 2011 Region C Water Plan (Volume I, Table 4E.7, pages 4E.26-4E.27)*

## ALTERNATIVE WATER MANAGEMENT STRATEGIES

The following alternative water management strategies are listed for NTMWD in the 2011 Region C Water Plan:

- Toledo Bend Reservoir Phase 2
- Treated water from Dallas Water Utilities
- Lake O' the Pines
- Wright Patman Lake
- Lake Texoma with desalination rather than blending
- Ogallala groundwater in Roberts County (Region A)
- Carrizo-Wilcox groundwater in Brazos County Area (Region G)
- George Parkhouse Reservoir (North)
- George Parkhouse Reservoir (South)
- Lake Livingston

## INTERBASIN TRANSFER CONSIDERATIONS

Review of the IBT request is based on the projected water needs for the basin of origin and receiving basin for the 50-year planning period. Red River Basin is the basin of origin, and the Trinity and Sulphur River Basins are receiving basins for the proposed Lower Bois d'Arc Creek Reservoir Project. The Sulphur River Basin is exempt and would not be discussed further in this memorandum. The detailed information concerning the water needs of Trinity River Basin was addressed in the 2006 Region C Water Plan. In the table 4C.5 (*Volume I, page 4C.19*) of the 2006 plan, projected shortages for the Trinity River Basin will reach 145,550 and 535,830 acre-feet per year in 2050 and 2060, respectively. The 2006 plan indicates that the IBT request from this project can help meet the water demands for the Trinity River Basin during the 50-year planning period and meet the overall water demands for the region.

The 2011 Region C Water Plan provided a detailed comparison of supply and demands by county *(Volume I, Table 4A.2, page 4A.5)*. In general, the majority of counties located in the Trinity River Basin in Region C are projected to have shortages over the planning period. The 2011 plan also concluded that development of adequate water supplies for Region C will require interbasin transfers.

The 2011 Region C Water Plan also includes an analysis (conducted by TWDB and prepared in support of the 2011 Region C Regional Water Plan) of the social-economic impacts of not meeting the projected water demands. The analysis indicates that a severe drought occurring in a single year would reduce the projected 2060 population, employment, and income/taxes. Further, the plan indicates if no additional water supplies are developed, Region C will face substantial shortages in water supply over the next 50 years. Subsequently, the TWDB Analysis summarized that without any additional supplies to meet the projected water needs, the region's projected annual income and taxes in 2060 would be reduced by over $64 billion. The detailed information of these impacts to Collin, Dallas, Denton, Fannin, Kaufman, and Rockwall Counties is presented in Appendix N of 2011 Region C Water Plan.

Based on the 2011 Region C Water Plan, the population in Fannin County is expected to increase from 31,242 (2000 population) to 86,970 in 2060. Fannin County anticipates no water need through the planning period; however several water user groups in the county were identified with projected 2060 shortages. NTMWD, the Greater Texoma Utility Authority (GTUA), and local suppliers in Fannin County have begun to develop the Fannin County Water Supply Project which will supply treated surface water from Lower Bois d'Arc Creek Reservoir to those groups. The projected supplies from the Fannin County Water Supply Project to water use groups are listed in Table 2.

NTMWD submitted a Report Supporting an Application for a Texas Water Right for Lower Bois d'Arc Creek Reservoir (prepared in 2006) to TCEQ. In this report, Bonham, Ector, Honey Grove, Savory, and SW Fannin County SUD are listed as NTMWD's customers or potential future customers in the Red River Basin. Honey Grove and Leonard are listed as NTMWD's potential future customers in Sulphur River Basin.

**Table 2**
**Supplies from the Fannin County Water Supply Project**
**(values in acre-feet per year)**

| Water Use Group | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| Bonham | 0 | 402 | 459 | 585 | 1,286 | 2,769 |
| Ector | 0 | 2 | 3 | 4 | 6 | 9 |
| Fannin County Other | 0 | 408 | 320 | 233 | 155 | 98 |
| Honey Grove | 0 | 65 | 123 | 228 | 328 | 433 |
| Leonard | 0 | 62 | 200 | 487 | 848 | 1,138 |
| Savoy | 0 | 7 | 3 | 1 | 3 | 5 |
| Southwest Fannin County SUD | 0 | 399 | 560 | 666 | 756 | 859 |
| Trenton | 0 | 110 | 294 | 586 | 975 | 1,362 |
| Fannin County Manufacturing | 0 | 0 | 0 | 0 | 0 | 11 |
| Total | 0 | 1,455 | 1,962 | 2,790 | 4,357 | 6,684 |

**source: 2011 Region C Water Plan (Volume I, Table 4F.143, page 4F.188)*

NTMWD's member cities and customers are mainly located in Collin, Dallas, Denton, Kaufman, and Rockwall Counties of the Trinity River Basin in Region C.

**Table 3**
**Water Reserve or (Need) by County for Region C**
**(values in acre-feet per year)**

| County | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 |
|---|---|---|---|---|---|---|
| Collin | 983 | (54,228) | (103,468) | (157,988) | (213,648) | (258,282) |
| Dallas | (28,507) | (160,086) | (224,387) | (274,788) | (338,013) | (427,978) |
| Denton | 7,337 | (43,987) | (82,146) | (117,509) | (155,003) | (208,300) |
| Kaufman | 607 | (7,387) | (13,499) | (19,741) | (26,208) | (33,317) |
| Rockwall | (32) | (6,276) | (12,053) | (17,412) | (21,915) | (25,655) |

**source: 2011 Region C Water Plan (Volume I, Table 4A.2, page 4A.5)*

Accordingly, the majority of counties located in the Trinity River Basin in Region C are projected to have shortages over the planning period (Table 3), while the Red River Basin may have supplies in excess of its projected demands. The potential interbasin transfer listed in Table 4 will help NTMWD fully utilize the water provided by the Lower Bois d'Arc Creek Reservoir to its member cities and customers located in Collin, Dallas, Denton, Kaufman, and Rockwall Counties within the Trinity River Basin for municipal, industrial, and agricultural purposes.

**Table 4**
**Potentially Feasible Interbasin Transfers**
**for 2011 Region C Water Plan**

| Source | Basin of Origin | Receiving Basin | Maximum Amount (ac-feet/year) | Comments |
|---|---|---|---|---|
| Lower Bois d'Arc Creek Reservoir | Red | Trinity | 123,000 | New Surface Water |

**Source: 2011 Region C Water Plan (Volume I, Table 4C.4, page 4C.18)*

In the above-mentioned 2006 supporting documentation for this water right application, an economic analysis report "The Economic, Fiscal, and Development Impacts of the Proposed Lower Bois d'Arc Reservoir Project" has also been included to further validate the reservoir project.

Based on the 2006 economic analysis report, the reservoir construction will bring recreational and other benefits to the Red River Basin. The analysis also details the costs and benefits to Fannin County (basin of origin) from the construction of Lower Bois d'Arc Reservoir and shows the reservoir project will provide short-term economic gains to Fannin County. The economic gains will certainly spill over to residents and businesses in surrounding counties as the dam and related infrastructure are constructed over a multi-year period and the economic opportunities supported by the proposed reservoir will promote sustainable development while diversifying the local job base. In sum, the report indicates a significant net economic benefit (approximately 250 million in increased economic activity per year) to the region of origin.

In addition, the same report also indicates that the economic impact in the receiving basins will be positive. The water diverted from the Lower Bois d'Arc Creek Reservoir will benefit the receiving basins by supporting municipal and economic growth in the NTMWD service area.

The economic impacts of new reservoirs were discussed and included in 2011 Region C Water Plan as well. Economic studies have been conducted for Lower Bois d'Arc Reservoir, and the studies indicated a significant net economic benefit to the region of origin. New reservoirs can stimulate the rural economy through new recreational business and local improvement.

The 2006 Region C Water Plan identified a set of water conservation strategies that will result in the highest practicable level of conservation and efficiency achievable as required for IBTs under TWC 11.085. The 2006 Region C Plan's recommended water conservation strategies include a basic package that includes low-flow plumbing fixture rules, public and school education, water use reduction due to increasing water prices, water system audit, leak detection and repair, pressure control, and Federal residential clothes washer standards. Reuse of treated wastewater effluent has been identified as one of the strategies for an expanded water conservation package. The 2011 Region C Water Plan updated the potentially feasible water conservation strategies from the 2006 Region C Water Plan. In the 2011 plan, water conservation pricing structure and waste water prohibition strategies have been included into the basic water conservation package; landscape irrigation restrictions and reuse of treated wastewater effluent are two of the strategies included in the expanded water conservation package.

NTMWD has included a majority of the identified water conservation strategies in its 2008 water conservation plan and included a model water conservation plan for its members and customers. In order to comply with TCEQ conservation rule requirements, NTMWD is required to submit a water conservation implementation report every five years. The implementation report must include: (a) the list of dates and descriptions of the conservation measures implemented; (b) data about whether or not targets in the plans are being met; (c) the actual amount of water saved; and (d) if the targets are not being met, an explanation as to why any of the targets are not being met, including any progress on that particular target.

As a wholesale public water supplier, NTMWD has implemented many of the Best Management Practices for Wholesale Water Providers (see Table 5) from the Water Conservation Best Management Practices Guide Report 362 (revised February 2013).

| Table 5<br>Implemented Wholesale Water Provider<br>Best Management Practices<br>(BMP Element of Strategy) |
|---|
| Baseline Profile |
| Wholesale agency goals (5- and 10-year) |
| Wholesale water system accounting and measurement |
| Description of practices/devices |
| Record management |
| Metering and leak detection |
| Requirement that every wholesale customer develop a conservation plan |
| Wholesale customer assistance |
| Plans and program implementation |
| Methodologies for accounting water use and loss |
| Wholesale service area education and outreach programs |
| Cost sharing of programs |
| Reuse/recycling of water |
| Any other practice deemed appropriate |
| In-House water conservation |
| Zero discharge from Water Treatment Plants |
| Means for implementing this BMP |

**Source: 2011 Conservation Memorandum, North Texas Municipal Water District (page 8 of 14)*

If NTMWD implements all elements of its water conservation plan and applicable water conservation BMPs, then staff believes that the highest practicable level of conservation for NTMWD can be achieved. By preparing a drought contingency plan and preparing and implementing a water conservation plan that will result in the highest practicable levels of water conservation and efficiency within its jurisdiction, and if NTMWD ensures through contracts that its customers develop water conservation plans that implement the recommended strategies listed in the approved Regional Water Plan, the application can meet the requirements of TWC 11.085(l)(2).

**CONSISTENCY WITH STATE AND REGIONAL WATER PLANS**

The Lower Bois d'Arc Reservoir Project is listed as one of the recommended water management strategies in the 2011 Region C Water Plan and the 2012 State Water Plan and is one of the major water conveyances proposed by the planning group. This application is consistent with 2011 Region C Water Plan and 2012 State Water Plan.

**SUMMARY**

The application and 2008 water conservation and drought contingency plan have been evaluated and determined to meet the review requirements in TCEQ rules and applicable statutes. Staff determined that the listed conservation goals and strategies in NTMWD's water conservation plan can help to achieve the highest practicable levels of water conservation and efficiency in NTMWD's service area.

The application is consistent with the approved 2012 State Water Plan and the January 2011 Region C Water Plan because the Lower Bois d'Arc Creek Reservoir project is listed as one of the recommended water management strategies for NTMWD in both plans.

**RECOMMENDATIONS**

Staff recommends that, if the application is granted, the following water conservation language should be included in the permit:

Permittee shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future or alternative uses. Such plans shall include a requirement that in every water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, that each successive wholesale customer develop and implement conservation measures that can result in the highest practicable levels of water conservation and efficiency in order to comply with TWC 11.085 (l)(2). If Permittee authorizes the resale of water by a customer, then the contract for resale shall have applicable water conservation requirements so that each successive customer in the resale of the authorized water will be required to implement water conservation measures accordingly.