

**APPENDIX F: WATER RIGHTS PERMIT
(WATER USE PERMIT)
FROM TEXAS COMMISSION ON ENVIRONMENTAL
QUALITY FOR
BOIS D'ARC CREEK RESERVOIR**

**F-1: SIGNED TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER
USE PERMIT FOR LOWER BOIS D'ARC CREEK RESERVOIR**

**F-2: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY MEMORANDUM,
WATER AVAILABILITY ANALYSIS**

**F-3: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY MEMORANDUM,
REVISED WATER AVAILABILITY ANALYSIS**

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.

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 07332622, 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 Trigger: 150 cfs Volume: 1,000 af Duration: 7 days
Spring	1 cfs*	10 cfs	2 per season Trigger: 500 cfs Volume: 3,540 af Duration: 10 days
Summer	1 cfs*	3 cfs	1 per season Trigger: 100 cfs Volume: 500 af 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 Team
Water Rights Permitting and Availability Section

Date: September 4, 2014

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

Thru: *JL* Jennifer Allis, Senior Water Conservation Specialist
9/4/14 Resource Protection Team
Water Rights Permitting and Availability Section

From: *KW* Kristin Wang, Senior Water Conservation Specialist
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 (1)(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.