

North Texas Municipal Water District 2024 Water Conservation Plan

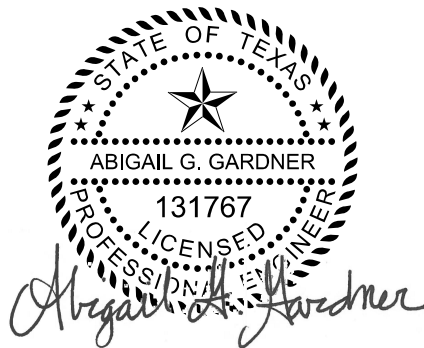


NORTH
TEXAS
MUNICIPAL
WATER
DISTRICT

2024 WATER CONSERVATION PLAN

Prepared for:

NORTH TEXAS MUNICIPAL WATER DISTRICT



02/29/2024

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TEXAS REGISTERED
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2024 NTMWD WATER CONSERVATION PLAN

FOREWORD

The North Texas Municipal Water District (NTMWD or the District) developed the following water conservation plan with assistance from Freese and Nichols, Inc. (FNI). This Plan is prepared pursuant to Texas Commission on Environmental Quality (TCEQ) rules. This updated water conservation plan is a replacement for the most recent District water conservation plan dated January 2019.

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This 2024 Water Conservation Plan is based on the Texas Administrative Code included in **Appendix B**. In 2007, the Texas Legislature created the Water Conservation Advisory Council (WCAC), a council with expertise in water conservation representing various interests, and charged it to regularly review existing Best Management Practices (BMPs) and add new BMPs as appropriate. WCAC's recommendations have been included in guidance materials published and made publicly available by the Texas Water Development Board (TWDB). In 2021, a collaborative effort between the District and other North Texas water providers (Dallas Water Utilities, Tarrant Regional Water District, and Upper Trinity Regional Water District) published BMPs specifically for North Texas water conservation programs. These recommendations for BMPs have been reviewed and considered in the preparation of this Plan.



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DEFINITIONS

ATHLETIC FIELD means a public sports competition field, the essential feature of which is turf grass, used primarily for organized sports practice, competition or exhibition events for schools, professional sports and league play sanctioned by the utility providing retail water supply.

BEST MANAGEMENT PRACTICES (BMPs) are voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and that can be implemented within a specific time frame.

CONSERVATION includes those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.

COOL SEASON GRASSES are varieties of turf grass that grow best in cool climates primarily in northern and central regions of the U.S. Cool season grasses include, but are not limited to, perennial and annual rye grass, Kentucky blue grass and fescues.

CUSTOMERS include those entities to whom NTMWD provides wholesale water that are not member cities of NTMWD.

DRIP IRRIGATION is a type of micro-irrigation system that operates at low pressure and delivers water in slow, small drips to individual plants or groups of plants through a network of plastic conduits and emitters; also called trickle irrigation.

EVAPOTRANSPIRATION (ET) represents the amount of water lost from plant material to evaporation and transpiration. The amount of ET can be estimated based on the temperature, wind, and relative humidity.

ET/SMART CONTROLLERS are irrigation controllers that adjust their schedule and run times based on weather (ET) data. These controllers are designed to replace the amount of water lost to evapotranspiration.

IRRIGATION SYSTEM means a permanently installed, custom-made, site-specific system of delivering water generally for landscape irrigation via a system of pipes or other conduits installed below ground.

LANDSCAPE means any plant material on a property, including any tree, shrub, vine, herb, flower, succulent, ground cover, grass or turf species, that is growing or has been planted out of doors.

MEMBER CITIES include the cities of Allen, Farmersville, Forney, Frisco, Garland, McKinney, Mesquite, Plano, Princeton, Richardson, Rockwall, Royse City, and Wylie, Texas, which are members of NTMWD.



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MUNICIPAL USE means the use of potable water provided by a public water supplier as well as the use of treated wastewater effluent for residential, commercial, industrial, agricultural, institutional, and wholesale uses.

POND is a still body of water with a surface area of 500 square feet or more. This does not include recreational swimming pools.

PUBLIC WATER SUPPLIER is an individual or entity that supplies water to the public for human consumption.

REGIONAL WATER PLANNING GROUP is a group established by the Texas Water Development Board to prepare a regional water plan under Texas Water Code §16.053.

REGULATED IRRIGATION PROPERTY means any property of a designated customer class (i.e., commercial) that uses one million gallons of water or more for irrigation purposes in a single calendar year or is greater than one acre in size.

RESIDENTIAL GALLONS PER CAPITA PER DAY (RESIDENTIAL GPCD) means the total gallons sold for retail residential use by a public water supplier divided by the residential population served and then divided by the number of days in the year.

REUSE is the authorized use for one or more beneficial purposes of use of water that remains unconsumed after the water is used for the original purpose of use and before that water is either disposed of or discharged or otherwise allowed to flow into a watercourse, lake, or other body of state-owned water.

SPRINKLER/SPRAY IRRIGATION is the method of applying water in a controlled manner that is similar to rainfall. The water is distributed through a network that may consist of pumps, valves, pipes, and sprinklers.

RECREATIONAL/SWIMMING POOL is defined as a body of water that involves contact recreation. This includes activities that are presumed to involve a significant risk of ingestion of water (e.g. wading by children, swimming, water skiing, diving, tubing, surfing, etc.)

TOTAL GALLONS PER CAPITA PER DAY (TOTAL GPCD) means the total amount of water diverted and/or pumped for potable use less wholesale sales divided by the total permanent population divided by the days of the year. Diversion volumes of reuse as defined in TAC §288.1 shall be credited against total diversion volumes for the purposes of calculating GPCD for targets and goals.

WATER CONSERVATION COORDINATOR is the person designated by a retail public water supplier that is responsible for implementing a water conservation plan.

WATER CONSERVATION PLAN means the Member City or Customer water conservation plan approved and adopted by the utility.



ABBREVIATIONS

Ac-Ft/Yr.....	Acre-Feet per Year
BMP.....	Best Management Practices
CDC.....	Centers for Disease Control and Prevention
DWU.....	Dallas Water Utilities
E&O.....	Education and Outreach
EPA.....	Environmental Protection Agency
ET.....	Evapotranspiration
FNI.....	Freese and Nichols, Inc.
gpf.....	Gallons per Flush
gpm.....	Gallons per Minute
LAMP.....	Linear Asset Management Plan
LRWSP.....	Long Range Water Supply Plan
FWSD.....	Fresh Water Supply District
GPCD.....	Gallons per Capita per Day
ICIM.....	Industrial, Commercial, Institutional and Multifamily
MGD.....	Million Gallons per Day
MUD.....	Municipal Utility District
NCTCOG.....	North Central Texas Council of Governments
NTMWD.....	North Texas Municipal Water District
SUD.....	Special Utility District
TCEQ.....	Texas Commission on Environmental Quality
TRWD.....	Tarrant Regional Water District
TWDB.....	Texas Water Development Board
UTRWD.....	Upper Trinity Regional Water District
UD.....	Utility District
WCAC.....	Water Conservation Advisory Council
WCP.....	Water Conservation Plan
WSC.....	Water Supply Corporation
WENNT.....	Water Efficiency Network of North Texas
WRRF.....	Water Resource Recovery Facility
WTP.....	Water Treatment Plant
WWTP.....	Wastewater Treatment Plant

1.00 INTRODUCTION

NTMWD has been providing reliable wholesale water supply service to the North Texas region since 1956. The population the District serves has grown from about 32,000 in 1956 to over 2,000,000 people today, and NTMWD's system has grown in size and complexity to provide a continuous and reliable water supply. NTMWD's water supplies support public health and welfare and are key to the local economy and the prosperity of the region. NTMWD is committed to its vision of regional service through unity and providing for the region's needs today and tomorrow.

NTMWD is committed to good stewardship of our natural resources. NTMWD has been a leader in water conservation efforts and will continue to aggressively pursue conservation in the future. Since the District's conservation efforts began in earnest, over 20 years ago, NTMWD has won several awards. Furthermore, through the water permitting process for Bois d'Arc Lake, NTMWD proved its achievement of the highest practicable levels of conservation, a requirement for any inter-basin transfer permit from TCEQ. NTMWD's water conservation efforts will not end with its past success. NTMWD understands the importance of conservation and the leadership role the District plays and will continue to play in the region. NTMWD is continuing its commitment to water conservation through the development of this water conservation plan, participation with regional partners in media messaging and education, providing conservation resources for its Member Cities and Customers, and many other activities supported by more than a million dollars in annual funding for conservation related activities. Through these efforts, NTMWD intends to continue to work towards its conservation goals.

NTMWD recognizes that to achieve its goals of maximizing water conservation and efficiency, it is necessary to develop and implement a water conservation plan that goes beyond basic compliance with TCEQ guidelines and requirements (**Appendix B**). In 2007, the Texas Legislature created the Water Conservation Advisory Council (WCAC), which was given several charges, one of which is monitoring new technologies for possible inclusion in the best management practice guide. The Water Conservation Implementation Task Force developed the *TWDB Report 362 Water Conservation Best Management Practices Guide* in partial fulfillment of the Texas Legislature's charge to TCEQ and TWDB to develop recommendations for optimum levels of water use efficiency and conservation in the state. The WCAC regularly reviews, updates, and creates new best management practices through a collaborative process. As best management practices are developed, they are published online at <https://www.twdb.texas.gov>. Those BMPs were incorporated, where practicable, in the development of this Plan.

In 2021, a collaborative effort between the District and other North Texas water providers (Dallas Water Utilities, Tarrant Regional Water District, and Upper Trinity Regional Water

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District) published BMPs specifically for North Texas water conservation programs. These recommendations for BMPs have also been reviewed and considered in the preparation of this Plan.

As a wholesale supplier of water to customers, NTMWD does not have any direct control over the end user of water, nor does it have the authority to create ordinances or enforce the measures laid out in this Plan for end users. To work within the confines of its role as a wholesaler, NTMWD has developed a Model Water Conservation Plan which can be used by Member Cities and Customers, who then can enforce those measures through ordinances or regulations on end users (**Section 8.02**). NTMWD has also specified required minimum conservation strategies for its Member Cities and Customers (**Section 8.03**).

The District continually re-evaluates ways to improve water conservation and efficiency. The District is committed to evaluating and implementing new BMPs, as appropriate, whenever new opportunities to improve upon water conservation and efficiency are identified. The District's efforts also include receiving input from water conservation advocacy groups, like the Sierra Club and the National Wildlife Federation, to further enhance water conservation and efficiency.

The goal of the Water Conservation Plan is to serve as good stewards of water resources by preserving water supplies for essential uses and the protection of public health. The objectives to achieve this goal are as follows:

The objectives of this Water Conservation Plan are as follows:

- To reduce the loss and waste of water.
- To improve efficiency in both indoor and outdoor water use.
- To maximize the level of recycling and reuse.
- To protect and preserve environmental resources.
- To extend the life of current water supplies.
- To raise public awareness of water conservation and encourage responsible personal behavior through public education programs.

1.01 CONSERVATION COORDINATOR AND TEAM

NTMWD hosts a committed multi-disciplinary conservation team that includes executive level support and participation, engineers and scientists, communications professionals, public education specialists, and support staff. NTMWD has a designated Conservation Coordinator as well as two full-time water conservation positions that are fully dedicated to water conservation advocacy and advancement.

1.02 WATER CONSERVATION PROGRAM HISTORY AND AWARDS

Over the last 20 years, NTMWD has developed a robust water conservation program that has helped significantly reduce the per person water demand in its service area. This has been a concerted effort between both NTMWD and its Member Cities and Customers. The success of a conservation program ultimately hinges on the participation of both the water provider and the water user.

Important elements of the conservation plan include:

- Expenditures of more than \$8.6 million on water conservation from 2018 through 2022.
- An award-winning public education program, coordinated with other suppliers in the region.
 - [Water My Yard](#) program of weather stations and communication with residents on water needs for lawns.
 - Water4Otter youth water conservation program.
 - Annual North Texas Regional Water Conservation Symposiums, co-sponsored with other suppliers in the region.
 - Water is Awesome public education campaign developed in collaboration with TRWD and DWU.
- Robust support and technical assistance for Member Cities and Customers.
 - Development of model water conservation plans that can be implemented by Member Cities and Customers.
 - Sponsorship of Alliance for Water Efficiency membership for Member Cities and Customers.
 - Regular conservation workshops for Member City and Customer staff.



- Industrial/Commercial/Institutional/Multifamily (ICIM) water efficiency program.
- Annual reporting on water use and conservation by Member Cities and Customers to allow tracking of conservation efforts.
- Required conservation strategies that go beyond minimum regulatory requirements.
 - Limiting lawn watering to no more than twice a week in the summer and no more than once per week in the winter.
 - Time of day restrictions on lawn watering.
 - Conservation-oriented retail water rate structures for Member Cities and Customers.

NTMWD’s conservation efforts have not gone unrecognized. Through the water permitting process for Bois d’Arc Lake, NTMWD proved its achievement of the highest practicable levels of conservation, a requirement for any inter-basin transfer permit from TCEQ. Furthermore, NTMWD has won numerous awards for its leadership in conservation in the region and beyond. **Table 1** lists the awards the District’s water conservation efforts have won in recent years.

TABLE 1: NTMWD WATER CONSERVATION AWARDS

Year	Award	In Honor of:
2006	Texas Section American Water Works Association Watermark Award	Water IQ Public Education Campaign
2007	Texas Public Relations Association Silver Spur Award for External Relations	Water IQ Public Education Campaign
2007	Texas Public Relations Association Best of Texas Silver Award	Water IQ Public Education Campaign
2007	Texas Public Relations Association Best of Texas Silver Spur Award for Special Video Programs	Water IQ Public Education Campaign
2011	TCEQ Texas Excellence Award	Water Conservation Program
2011	Texas Water Conservation Advisory Council Water Conservation Award	Innovation in Conservation
2011	American Advertising Federation ADDY Award	Water IQ Public Education Campaign
2011	Texas Section American Water Works Association Watermark Award	Water IQ Public Education Campaign
2013	American Water Works Association Public Communications Achievement Honorable Mention	Water IQ Public Education Campaign
2014	American Water Works Association Public Communications Achievement Honorable Mention	Water IQ Public Education Campaign

Year	Award	In Honor of:
2015	Texas Water Conservation Advisory Council Blue Legacy Award	WaterMyYard
2015	American Advertising Federation ADDY Award	Water4Otter Youth Water Conservation Program
2015	Texas Section American Water Works Association and Water Environment Association of Texas Watermark Award	Water4Otter Youth Water Conservation Program
2017	Texas Water Conservation Advisory Council Blue Legacy Award	Water4Otter Youth Water Conservation Program
2017	American Advertising Federation ADDY Award	Water IQ Public Education Campaign
2018	Texas Section American Water Works Association and Water Environment Association of Texas Watermark Award for Communications Excellence	Video, eNewsletters, and Social Campaigns
2022	TELLY Award	Water Is Awesome Public Education Campaign
2022	Texas Section American Water Works Association Water Conservation/Reuse Award	ICIM Water Efficiency Program
2022	Water Environment Association of Texas and Texas Section American Water Works Association Watermark Award	Water Is Awesome Public Education Campaign
2022	Water Environment Association of Texas and Texas Section American Water Works Association Watermark Award Honorable Mention	Water4Otter Youth Water Conservation Program
2023	Water Environment Association of Texas and Texas Section American Water Works Association Watermark Award	Water Conservation STEM Clinics
2023	Water Environment Association of Texas and Texas Section American Water Works Association Watermark Award Honorable Mention	No Water Trivia Water Conservation Program

Figure 1 shows the history of the District’s use per person since 1988 (called per capita use and measured in gallons per capita day [GPCD]). The red bars show per capita use in dry years with no drought restrictions. The green bars are years in which there were temporary drought restrictions in use—the use would have been higher if the restrictions had not been in place. The blue bars are normal and wet years, when per capita use is naturally lower than in dry years. The black line shows a rolling average of per capita use for the last five years. The figure

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shows a substantial reduction in per capita use as NTMWD has implemented its conservation efforts. **Figure 2** shows how the District’s success in water conservation has affected the demands projected for the District’s Long Range Water Supply Plan (LRWSP), which is currently under development. NTMWD’s successful conservation program has reduced projected 2025 dry year demands by 95 MGD compared to what they would be if per capita demands were still at year 2000 levels and reduced projected 2080 dry year demands by 260 MGD.

FIGURE 1: NTMWD HISTORY OF PER CAPITA DEMAND

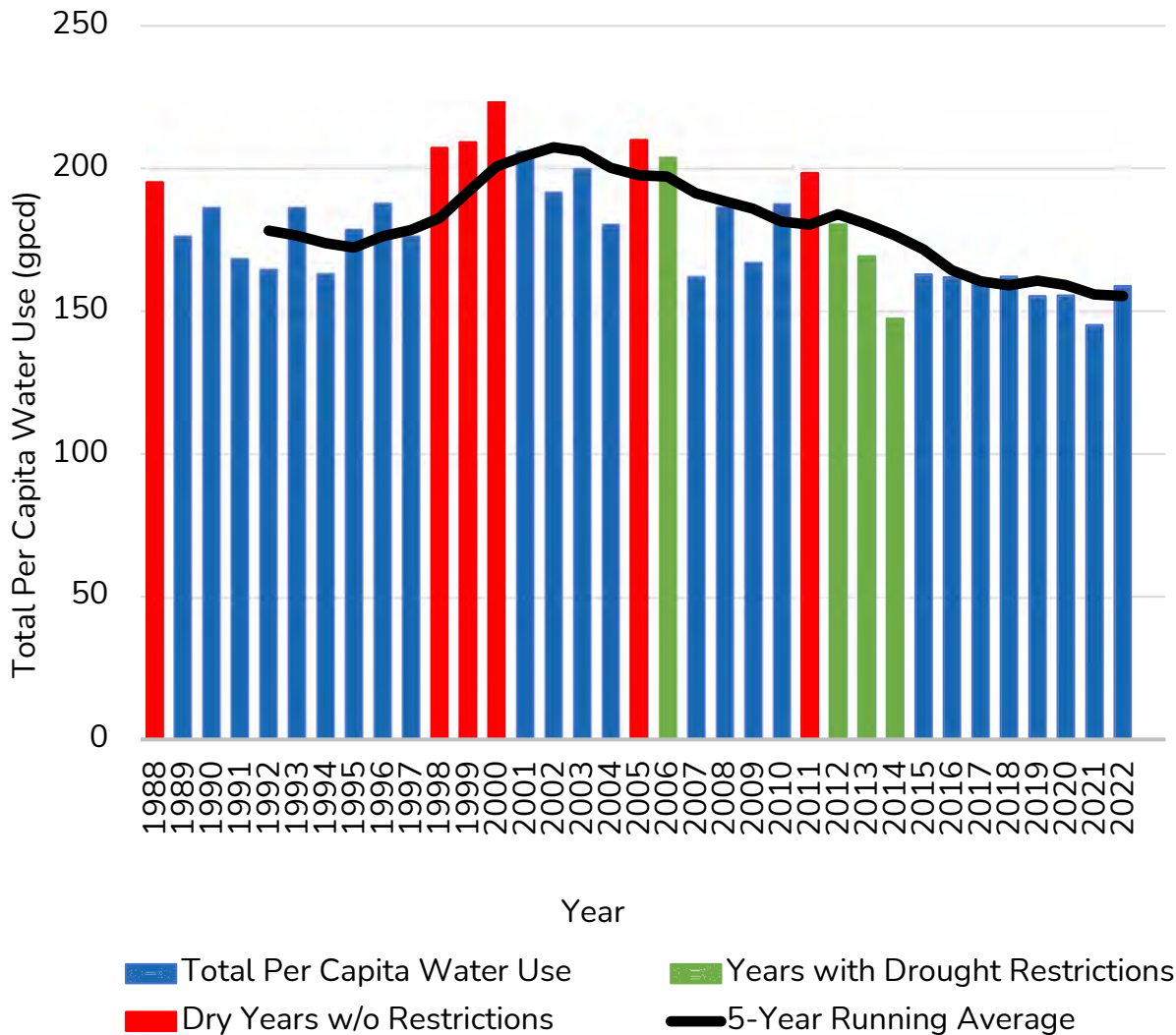
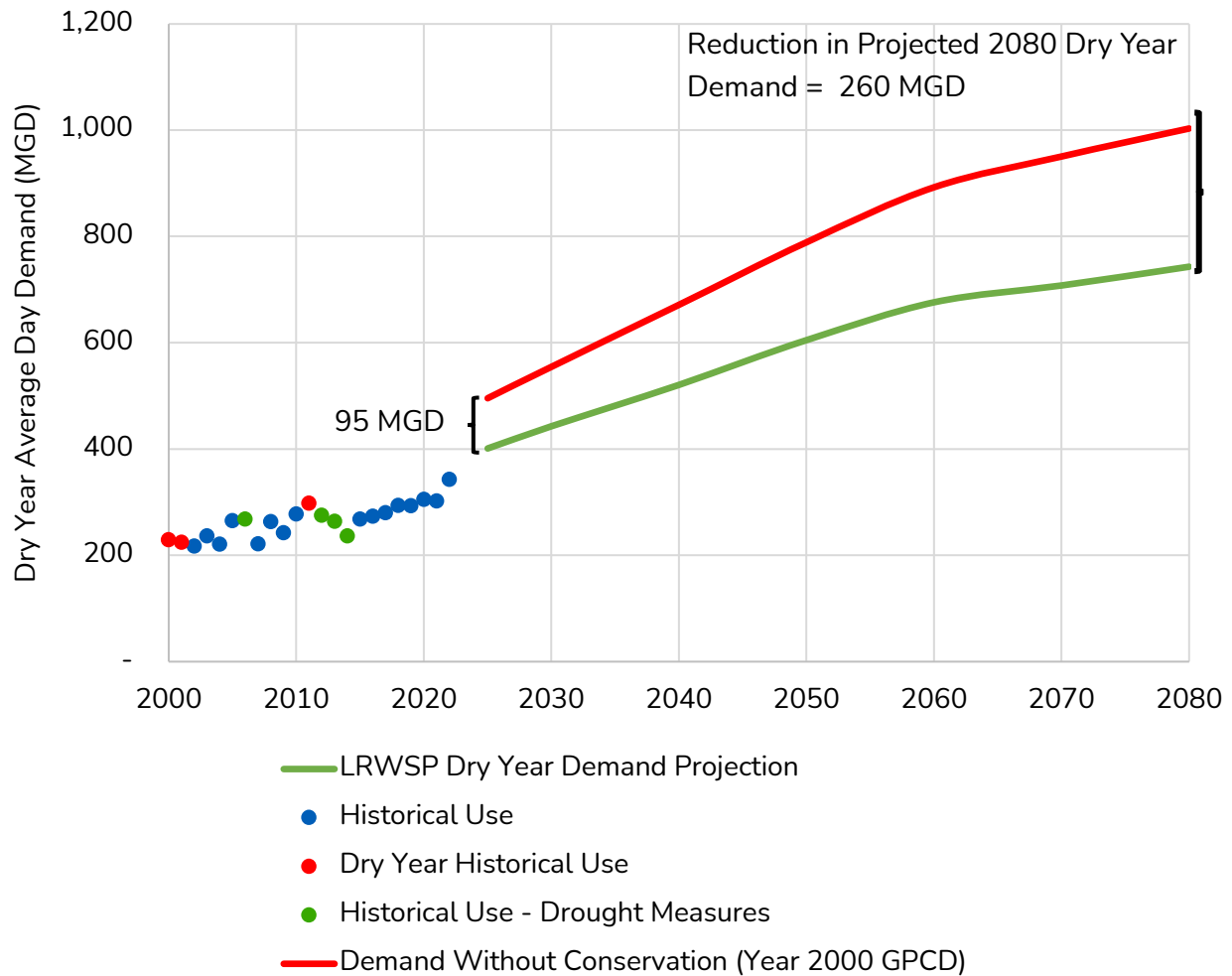


FIGURE 2: THE IMPACT OF WATER CONSERVATION ON DEMANDS



1.03 MINIMUM REGULATORY REQUIREMENTS CHECKLIST

TAC § 288.1(24) defines a water conservation plan as “[a] strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s).” Recognizing the need for efficient use of existing water supplies, TCEQ has developed guidelines and requirements governing the development of water conservation and drought contingency plans. NTMWD is both a wholesale water supplier as well as a retail water provider and must meet both requirements. The minimum TCEQ requirements and where they are addressed within this document are included in **Appendix B**.

2.00 WATER UTILITY PROFILE

The completed utility profile for NTMWD for 2022 is included in **Appendix E**. This section summarizes the main components that are included within the utility profile.

2.01 DESCRIPTION OF THE SERVICE AREA

NTMWD provides treated potable water to 13 Member Cities and 34 other Customers in North Central Texas. The District has also committed to serving additional customers in Fannin County. Many Member Cities and Customers provide wholesale service to other water suppliers, making these other suppliers indirect customers of NTMWD. **Figure 3** shows the NTMWD service area, which covers over 2,200 square miles in Collin, Dallas, Denton, Fannin, Grayson, Hopkins, Hunt, Kaufman, Rains, Rockwall, and Van Zandt Counties. **Figure 4** lists the District’s current Member Cities, Direct Customers and Indirect Customers. Some customers receive NTMWD supplies both directly from the District as well as indirectly through another Member City or Customer.

FIGURE 3: NTMWD SERVICE AREA

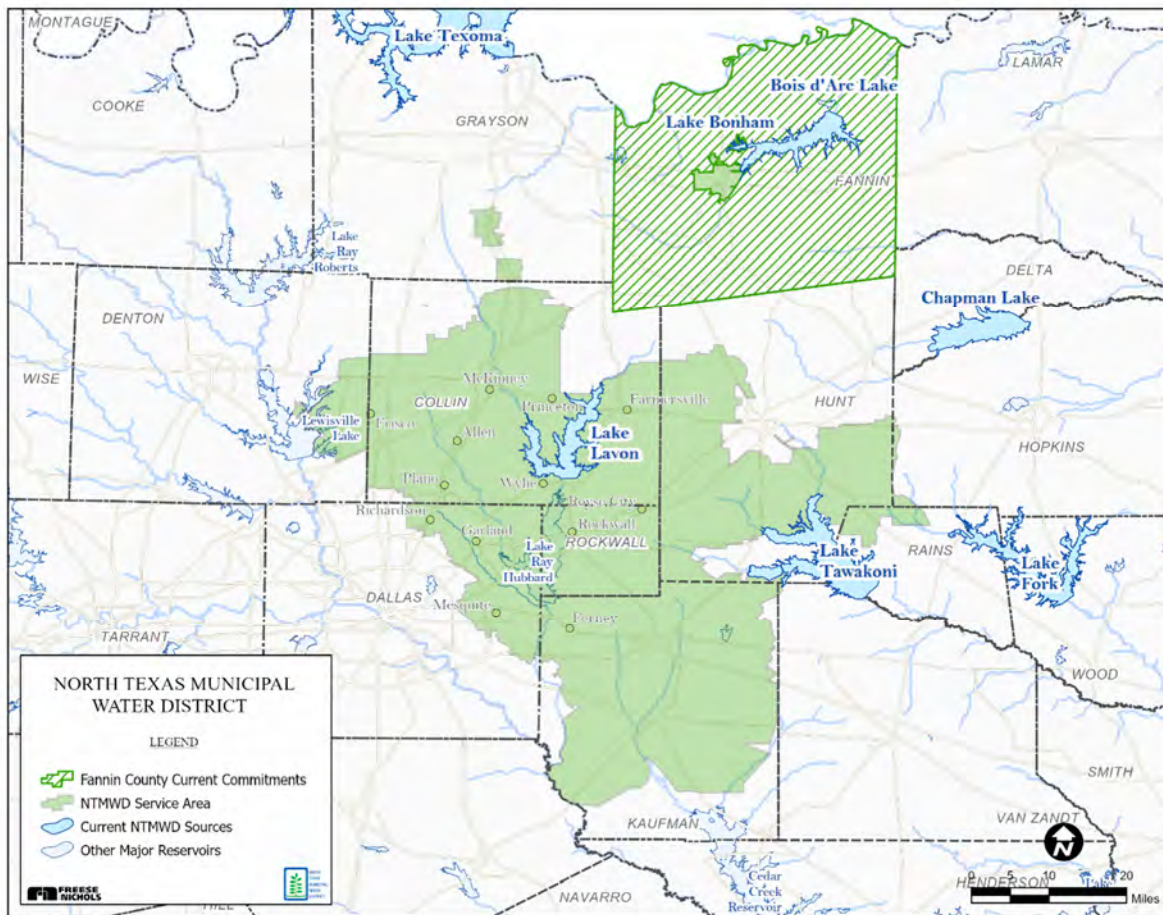
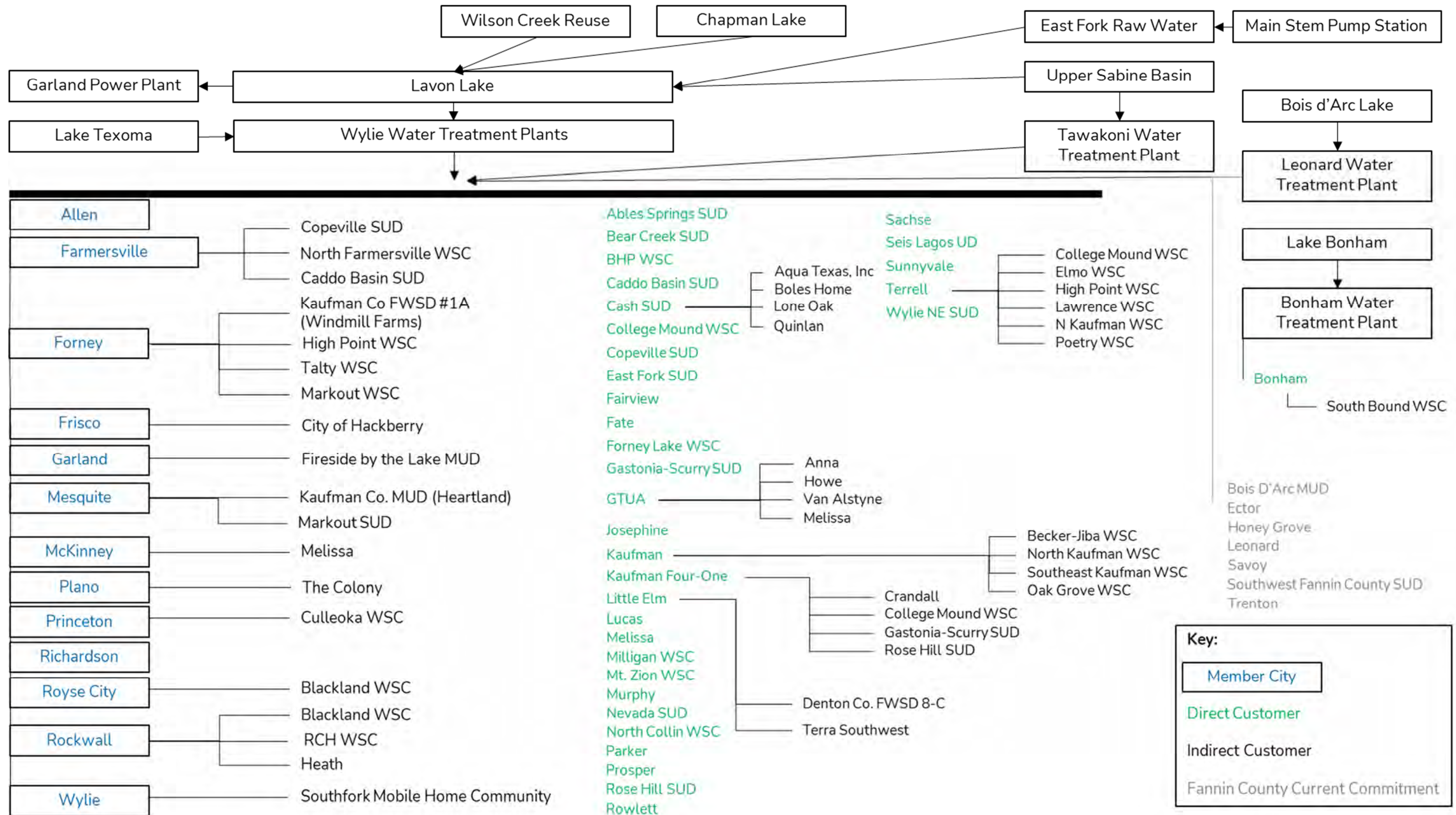


FIGURE 4: CURRENT NTMWD MEMBER CITIES AND CUSTOMERS



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2.02 WATER CONSERVATION UTILITY PROFILE

A. CUSTOMER DATA

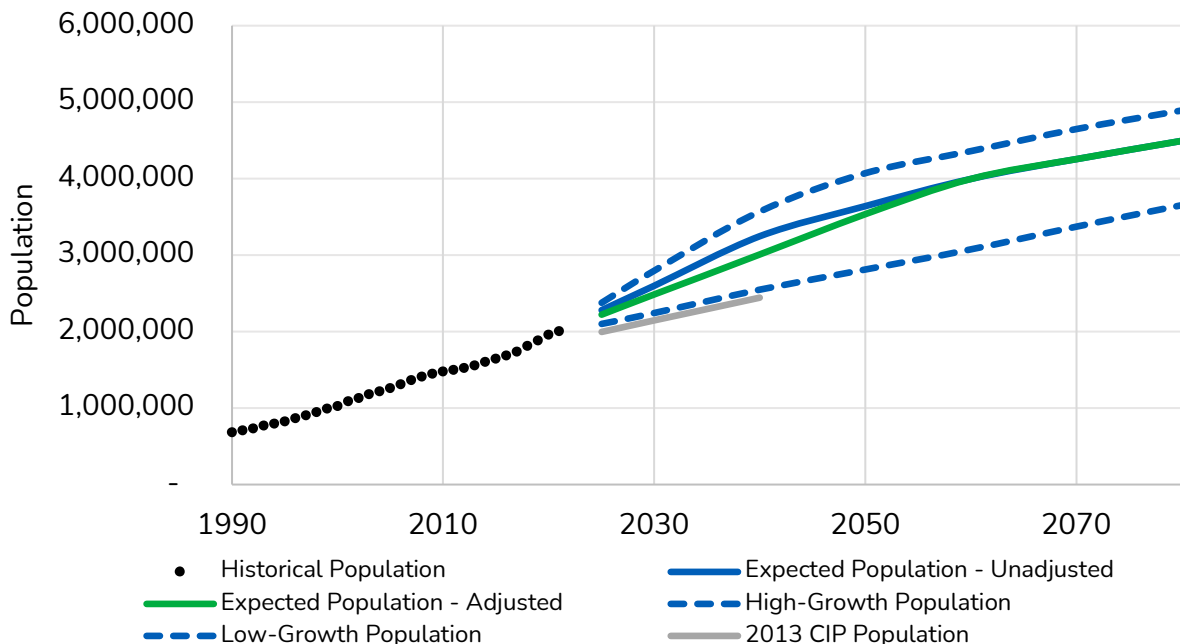
Historical population data and projected population are summarized in **Table 2** and **Figure 5**. Population projections were developed as part of the NTMWD Long Range Water Supply Plan and are inclusive of current Member Cities and Customers, and customers in Fannin County that NTMWD has committed to serve. Those potential future customers include Bois d’Arc MUD, Ector, Honey Grove, Leonard, Savoy, Southwest Fannin County SUD, and Trenton.

TABLE 2: HISTORICAL AND PROJECTED POPULATION OF SERVICE AREA

Year	Population of Service Area
2019	1,887,639
2020	1,960,757
2021	2,021,298
2022	2,103,481
2023	2,185,664
2030 ¹	2,486,000
2040	3,008,000
2050	3,536,000
2060	3,998,000
2070	4,258,000
2080	4,495,000

¹2030 – 2080 are Expected Scenario Population Projections - Adjusted from Long Range Water Supply Plan

FIGURE 5: LRWSP POPULATION PROJECTIONS





B. WATER USE DATA FOR SERVICE AREA

NTMWD provides treated water supplies. The total amount of raw water diverted for treatment for the previous five years for all water uses is summarized in **Table 3** and **Figure 6**. The projected dry year water demands are summarized in **Table 4** and **Figure 7**.

TABLE 3: HISTORICAL RAW WATER DIVERSION DATA (ACRE-FEET)

Year	2018	2019	2020	2021	2022
January	19,377	19,024	18,917	20,061	21,955
February	16,750	17,014	17,579	20,601	19,101
March	21,034	20,881	20,107	21,636	23,161
April	23,348	21,850	22,541	25,239	26,273
May	30,680	23,428	28,148	23,004	30,554
June	36,952	25,662	35,660	27,884	38,867
July	45,416	38,702	41,356	36,148	54,905
August	41,777	44,692	44,517	40,954	47,153
September	29,019	41,906	31,788	41,114	38,235
October	24,355	34,479	34,869	33,205	36,959
November	21,007	20,761	25,935	25,085	23,867
December	19,819	19,868	21,270	23,403	22,857
TOTAL	329,531	328,248	342,687	338,332	383,884

FIGURE 6: NTMWD RAW WATER DIVERSIONS SINCE 1999

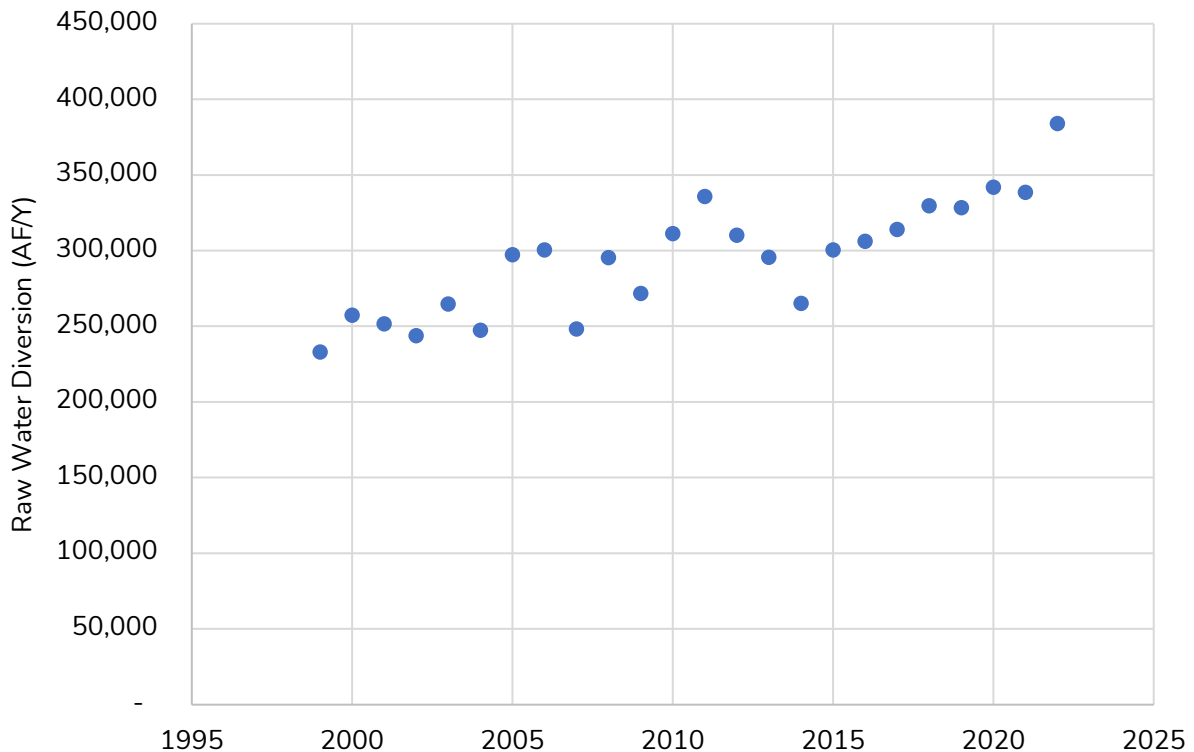
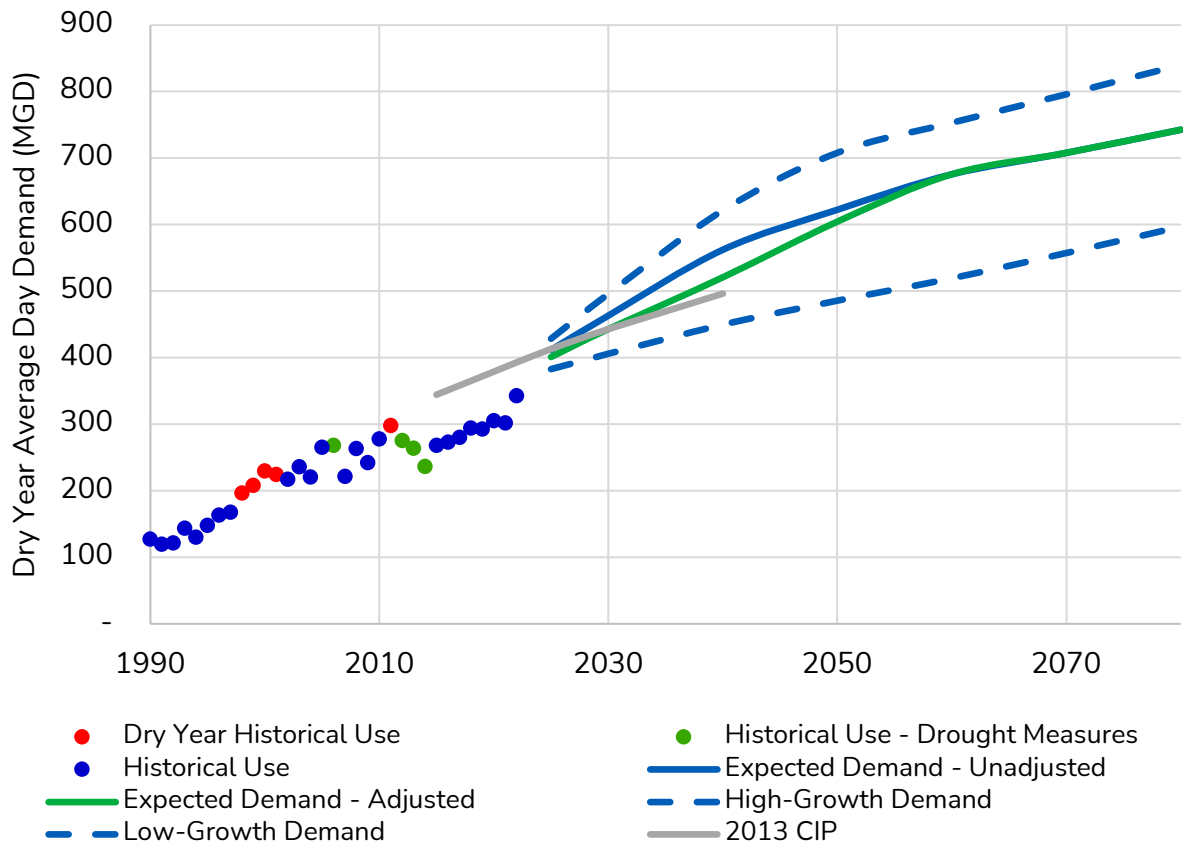


TABLE 4: PROJECTED DRY YEAR WATER DEMANDS

Year	Projected Demand (AF/Y)	Projected Demand (MGD) ¹
2025	449,494	401
2026	458,863	409
2027	468,232	418
2028	477,600	426
2029	486,969	434
2030	496,338	443
2031	505,056	451
2032	513,774	458
2033	522,492	466
2034	531,210	474
2035	539,928	482
2040	583,518	521
2050	677,141	605
2060	756,919	676
2070	792,908	708
2080	832,123	743

¹Expected Demand – Adjusted Projections from the LRWSP

FIGURE 7: LRWSP DEMAND PROJECTIONS





C. WATER SUPPLY SYSTEM DATA

NTMWD’s existing sources of supply include Lavon Lake, Jim Chapman Lake, Lake Texoma, Lavon Lake watershed reuse, East Fork Water Reuse Project, the Main Stem Pump Station, Lake Tawakoni, Lake Fork, Bois d’Arc Lake, and Bonham Lake. **Table 5** shows the permitted and contracted supplies as well as the projected 2025 available supply. The reliable supply from existing sources is less than the permitted supply because of reservoir yields, current return flow levels, and water quality. NTMWD is seeking additional supplies to meet its projected demands going forward.

TABLE 5: NTMWD PERMITTED AND CURRENT SUPPLY AMOUNTS (AC-FYR)

Source	Permitted or Contracted	2025 Supply ¹	Comments
Existing Surface Water			
Lavon Lake	118,670	90,240	Estimated firm yield with minimum pool of 467, adjusted for climate
Jim Chapman Lake	57,214	42,037	NTMWD’s share of firm yield based on minimum elevation of 415.5, adjusted for climate
Lake Texoma	197,000	71,296	Expected supply with 4:1 Blending
Bois d’Arc Lake	175,000	62,776	Adjusted for climate
Lake Bonham	5,340	1,906	Yield limited by Bonham demand
Reuse Supplies			
Lavon Watershed Reuse	71,882	46,600	Based on projected return flows
East Fork Water Reuse Project	157,393	41,400	Yield based on analysis of available diversions during the critical period for Lavon Lake with projected return flows and limited by the capacity of the East Fork Water Reuse Project
Main Stem Pump Station	56,050	56,050	Contract with Trinity River Authority
Upper Sabine Basin			
Long-Term Upper Sabine	11,100	10,762	
Interim Upper Sabine	33,900	31,164	Contract expires in 2025
Total	883,549	454,231	

¹2025 Supply from NTMWD Long Range Water Supply Plan

NTMWD operates the following water treatment plant facilities:

- **Wylie WTPs** – Four water treatment plants in Wylie, Texas, near Lavon Lake, with a total nominal treatment capacity of 840 MGD.
- **Tawakoni WTP** – Water treatment plant northeast of Terrell with a nominal treatment capacity of 30 MGD.
- **Leonard WTP** – Water treatment plant located in Leonard, Texas, south of Bois d’Arc Lake with a nominal treatment capacity of 70 MGD.
- **Bonham WTP** – Water treatment plant located in Bonham, Texas, near Lake Bonham with a nominal treatment capacity of 6.6 MGD.

It should be noted that nominal treatment capacities are not sustainable over an extended period of time.



WYLIE WATER TREATMENT PLANT



D. WASTEWATER SYSTEM DATA

NTMWD owns and/or operates 16 wastewater treatment plants. These are summarized in **Table 6**. The table includes both the permitted discharge as well as the receiving stream. **Figure 8** shows NTMWD’s raw water supply system and the water and wastewater treatment plants in addition to the wastewater treatment plants listed in **Table 6**,

NTMWD has permitted and is currently constructing the Sister Grove Regional Water Resource Recovery Facility (RWRRF) in the Lavon Lake watershed. This facility will have an initial capacity of 16 MGD and an ultimate capacity of 64 MGD.

TABLE 6: NTMWD WASTEWATER TREATMENT PLANTS

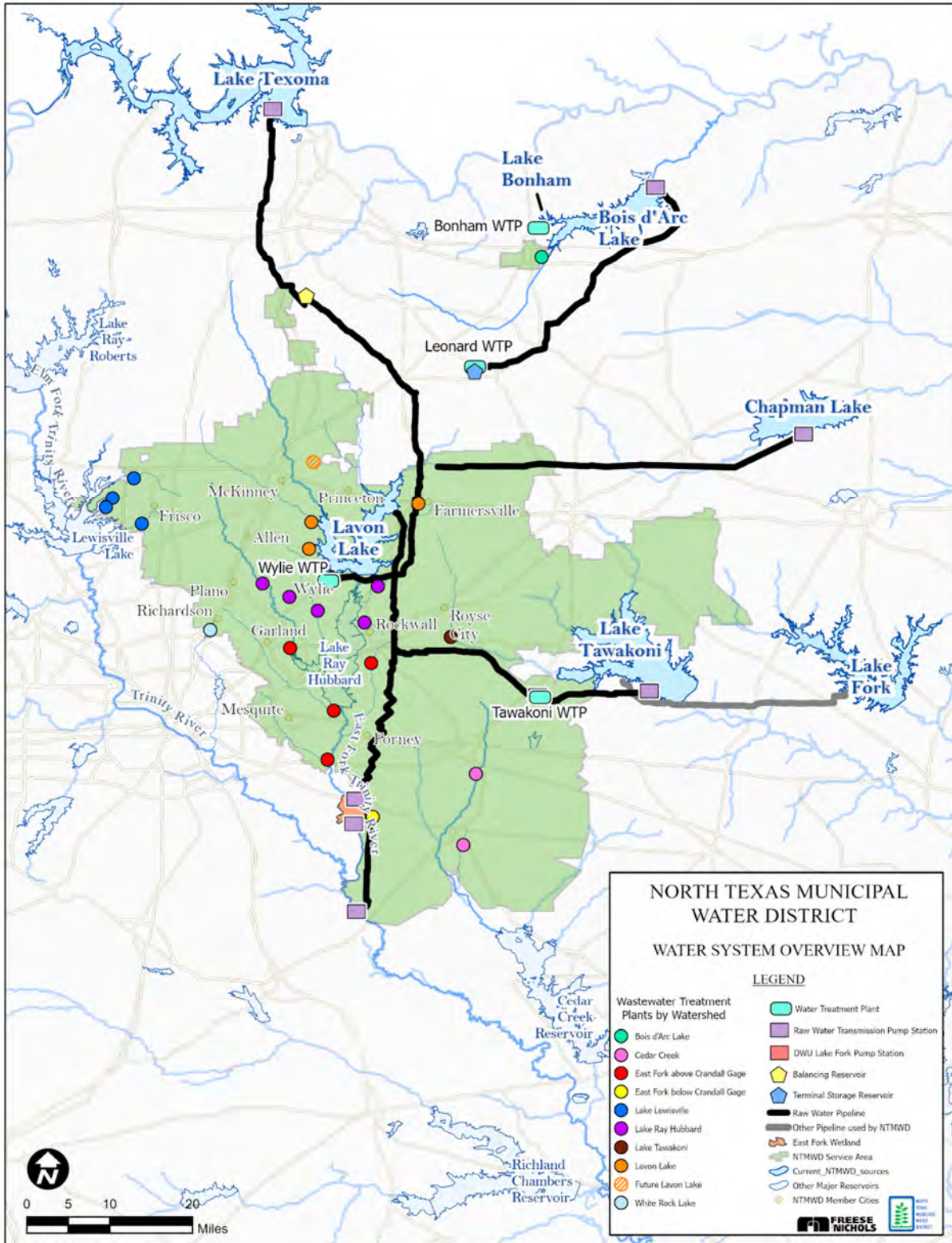
WWTP	TCEQ Number	Permitted Discharge (MGD)	Operator	Owner	Receiving Stream
Bear Creek	14577-001	0.75	NTMWD	City of Lavon	Bear Creek to Lake Ray Hubbard
Buffalo Creek	12047-001	2.25	NTMWD	NTMWD	Buffalo Creek
Farmersville #1	10442-001	0.225	NTMWD	City of Farmersville	Unnamed tributary of Elm Creek
Farmersville #2	10442-002	0.754	NTMWD	City of Farmersville	Unnamed tributary of Elm Creek
Floyd Branch	10257-001	4.75	NTMWD	NTMWD	Floyd Branch to Cottonwood Creek
Muddy Creek	14216-001	20	NTMWD	NTMWD	Muddy Creek to Lake Ray Hubbard
Panther Creek	14245-001	25	NTMWD	NTMWD	Unnamed tributary of Panther Creek
Rowlett Creek	10363-001	24	NTMWD	NTMWD	Rowlett Creek
Sabine Creek	14469-001	3	NTMWD	NTMWD	Parker Creek
Seis Lagos	11451-001	0.25	NTMWD	NTMWD and Seis Lagos UD	Unnamed tributary of Lavon Lake
South Mesquite	10221-001	41	NTMWD	NTMWD	South Mesquite Creek
Squabble Creek	10262-001	1.2	NTMWD	NTMWD	Squabble Creek

WWTP	TCEQ Number	Permitted Discharge (MGD)	Operator	Owner	Receiving Stream
Stewart Creek West	14008-001	5	NTMWD	NTMWD	Stewart Creek
Wilson Creek	12446-001	64	NTMWD	NTMWD	Lavon Lake Seg.# 0821



WILSON CREEK WASTEWATER TREATMENT PLANT

FIGURE 8: NTMWD'S RAW WATER SUPPLY SYSTEM AND EXISTING SOURCES OF SUPPLY



3.00 WATER CONSERVATION GOALS

3.01 5- AND 10-YEAR GOALS

As a wholesale water supplier, NTMWD does not control the water use of its Member Cities and Customers and does not have a direct relationship with the retail customers who are the ultimate consumers of the water. The total GPCD for NTMWD's system can be affected by changes in per capita use by its Member Cities and Customers and can also be affected by how much water NTMWD is asked to supply to high per capita use customers or low per capita use customers. These factors are not controlled by NTMWD. To gain a more accurate understanding of water use within its service area and assist Member Cities and Customers in conservation efforts, NTMWD, where practicable, works with its Member Cities and Customers to utilize the *Guidance and Methodology for Reporting on Water Conservation and Water Use*. This document was developed by TWDB and TCEQ, in consultation with WCAC, and was used by NTMWD for sector-based water use reporting. NTMWD also affords its Member Cities access to the Alliance for Water Efficiency's tracking tools at the District's expense, which enables the Member Cities to track water use more adequately by sector.

Figure 9 shows the historical total raw water per capita use for NTMWD from 1988-2022. The figure also distinguishes when drought restrictions were active and when there was a dry year. As is the case with most suppliers, there is great variability in per capita use due to weather and other factors. A five-year average total GPCD with credit for indirect reuse is plotted to show long-term trends. Since the early 2000s, NTMWD has greatly reduced the 5-year average total GPCD. As of 2022, the five-year average (2018-2022) for total raw water GPCD without credit for indirect reuse is 157 MGD. As of 2022, the five-year average for total GPCD with credit for indirect reuse is approximately 118 GPCD. Note that both *Water Conservation Implementation Task Force Report 362* and the 2021 Region C Water Plan identify a goal of 140 GPCD incorporating a credit for both direct and indirect reuse. NTMWD has mirrored that approach in its calculation of total GPCD with a credit for indirect reuse.

Figure 10 summarizes the historical total treated per capita use for NTMWD from 1990 – 2022 by water use category. Total treated per capita use is slightly lower than total raw per capita use due to associated treatment and transmission losses. **Figure 11** summarizes the historical ICIM treated per capita use for NTMWD from 1990-2022 by category. Prior to 2020, residential sales included both single and multifamily residences. These were divided into separate categories after 2020 in order to remain consistent with TWDB terminology. Historical information from the TWDB water use surveys was incorporated where available.

2024 NTMWD WATER CONSERVATION PLAN



FIGURE 9: NTMWD TOTAL RAW WATER PER CAPITA USE

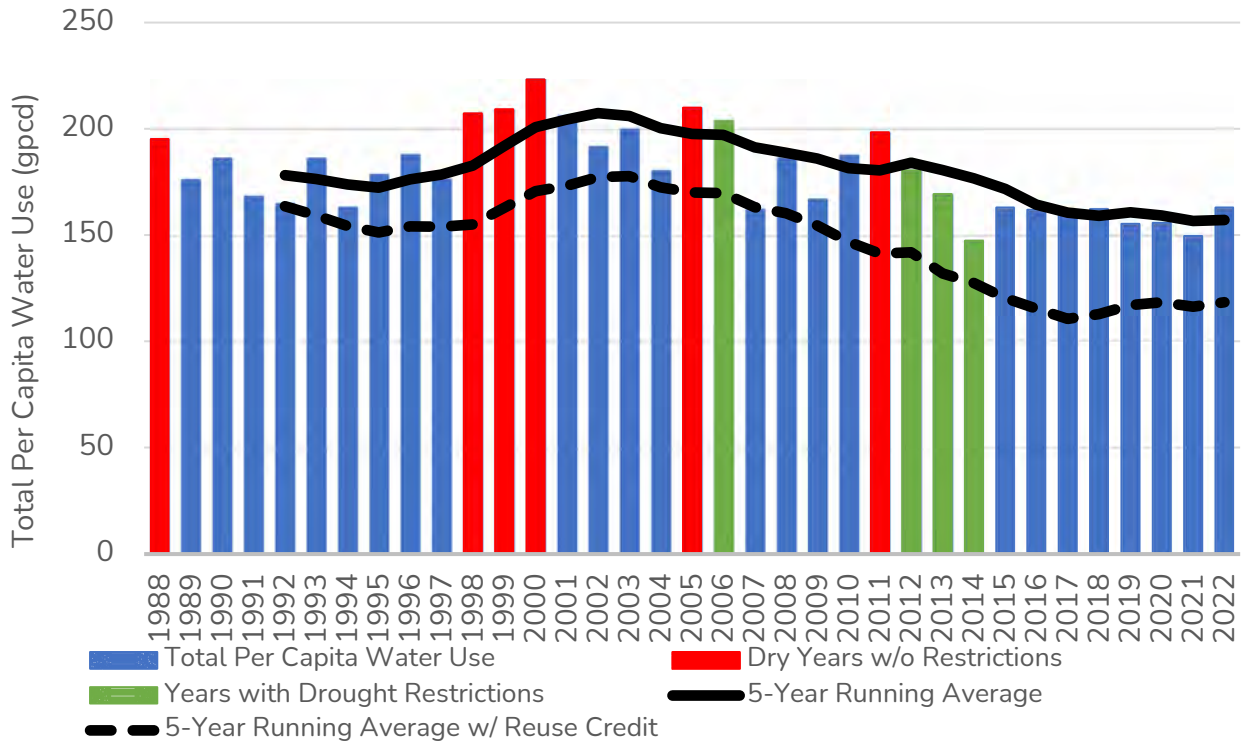


FIGURE 10: NTMWD TOTAL TREATED PER CAPITA USE BY CATEGORY

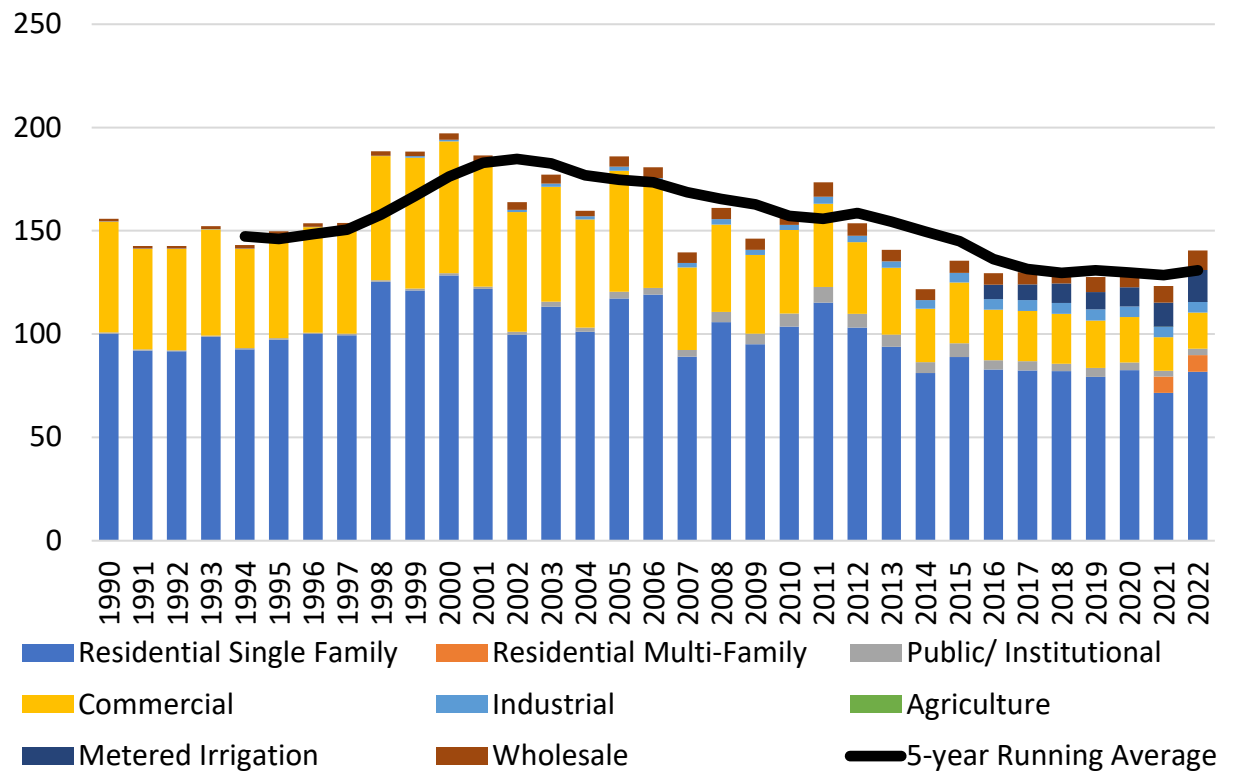


FIGURE 11: NTMWD ICIM TREATED PER CAPITA USE BY CATEGORY

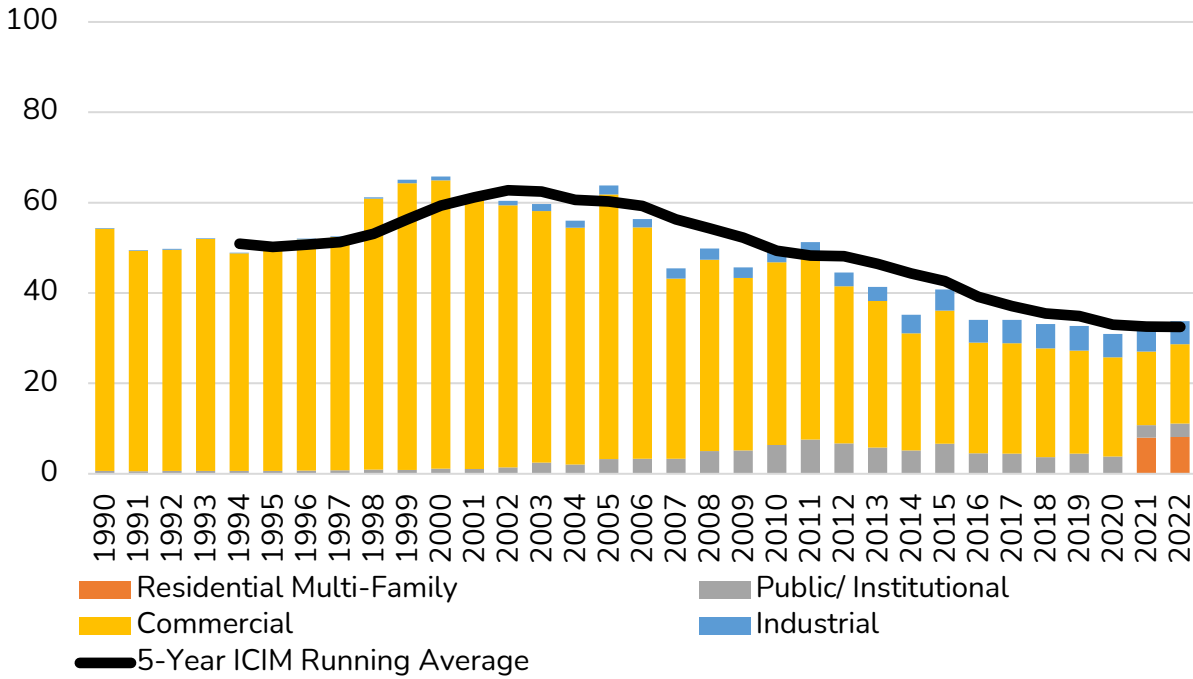


Figure 12 compares the historical per capita use with the five-year and ten-year GPCD goals from the 2019 Water Conservation Plan. Based on the current data, NTMWD is on track to meet the five-year goals established in the previous water conservation plan.

FIGURE 12: NTMWD 2019 WCP TOTAL 5-YEAR AVERAGE PER CAPITA AND PER CAPITA GOALS

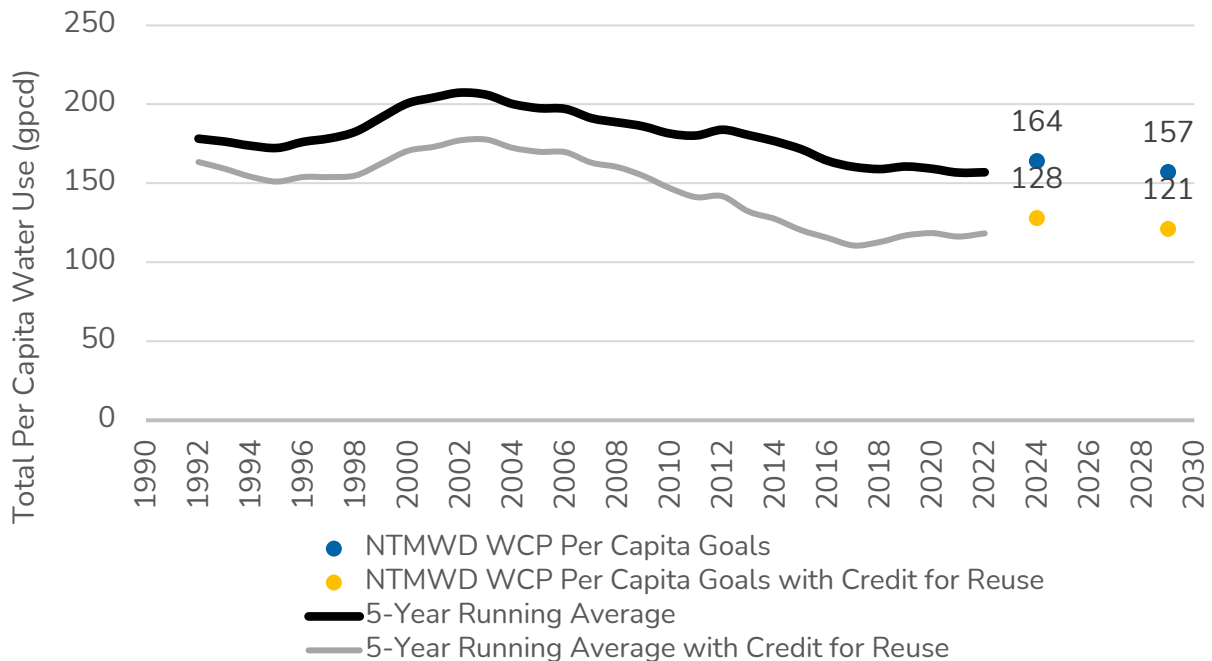




Table 7 shows the projected per capita use goals with credit for indirect reuse for NTMWD. NTMWD has outlined its five- and ten-year total GPCD goals and total GPCD with a credit for indirect reuse, as the GPCD goals recommended by the Region C Water Planning Group and approved by the TWDB incorporate a credit for indirect reuse. The 2019 WCP ten-year total GPCD goal of 157 is recommended to be maintained as the five-year goal for the 2024 WCP. The ten-year goal was developed by assuming 1% annual reduction. Since NTMWD’s total GPCD five-year rolling average in 2022 was equal to the five-year goal, it is recommended to maintain the historic five-year average as the five-year goal in the other categories as well. This historic five-year average includes 2022, which included a hot, dry summer that increased annual demands.

TABLE 7: 5-YEAR AND 10-YEAR TOTAL PER CAPITA USE GOALS (GPCD)

Description	Historic 5-Year Average	Baseline	5-Year Goal (2029)	10-Year Goal (2034)
Total (GPCD)	157	-	157	149
Reuse Credit (GPCD)	39	-	36	36
Total with Credit for Reuse (GPCD)	118	140	121	113
Residential (GPCD)	83	-	83	80
ICIM (GPCD)	32	-	32	30
NTMWD Water Loss (Percentage)	5%		5%	5%

3.02 METHOD FOR TRACKING

NTMWD requires Member Cities and Customers to complete annual conservation reports by March 31 of the following year and submit them to NTMWD. A copy of the form for the annual report is included as **Appendix D**. NTMWD compiles these reports and uses them to help generate its own annual water conservation report.

The completion of this annual water conservation report allows NTMWD to track the effectiveness of its water conservation programs over time and reassess those programs that are not providing water savings, ensuring maximum water use efficiency and greater levels of conservation. Updates on the water conservation program and GPCD data will be reported to the Water Committee of the NTMWD Board and the Board of Directors.

4.00 METERING AND WATER LOSS CONTROL

4.01 METERING PROGRAM

One of the key elements in water conservation is careful tracking of water use and control of losses. Accurate metering of water diversions and deliveries, detection and repair of leaks in the raw water transmission and potable water distribution systems, and regular monitoring of nonrevenue water are important elements of NTMWD's program to control losses. NTMWD has an ongoing meter vault standardization program that includes updating meters at water delivery sites. These metering upgrades allow for more accurate metering and ultimately, more careful monitoring of water use and water loss control.

Deliveries to all NTMWD's retail customers (like deliveries to all its wholesale customers) are metered. NTMWD tracks use for its retail customers to ensure that the meters remain in good working order. NTMWD has implemented a retail meter replacement program, in accordance with AWWA standards. At a minimum, all retail customer meters are planned to be replaced regularly, with an estimated interval of 15 years.

4.02 MONITORING AND RECORD MANAGEMENT PROGRAM

As a wholesale water supplier, NTMWD has instituted a program of careful monitoring and record management to assure that its Member Cities and Customers are charged appropriately for their water use.

The program includes the following elements:

- Deliveries to all Member Cities and Customers are metered by meters with accuracy of $\pm 2\%$. These readings are used to bill Member Cities and Customers.
- The meters used to measure deliveries to the Member Cities and Customers are calibrated quarterly and tested, as necessary.
- Potable drinking water leaving NTMWD's water treatment plants is metered by meters with accuracy of $\pm 2\%$.
- Plant potable water discharge meters are calibrated at least quarterly and more frequently if necessary.
- All meter readings are sent to Member Cities and Customers so that they can compare the readings against the operation of their systems.
- NTMWD monitors water loss in its delivery system. (For NTMWD, water loss is defined as raw water delivered to the water treatment plants less metered sales to Member Cities and Customers and known non-revenue water use.) NTMWD maintains and

manages electronic records of these raw water deliveries and sales, and tracks losses between the raw water system and treated water sales.

- Some NTMWD Member Cities and Customers have leak detection crews that are utilized and available for other Member Cities and Customers.

4.03 WATER LOSS CONTROL PROGRAM

NTMWD meters its raw water diversions by meters with accuracy of $\pm 2\%$. These meters are calibrated on an annual basis by NTMWD and are repaired and/or replaced as needed.

NTMWD has an active program to control, detect, and repair leaks:

- NTMWD has implemented a Linear Asset Management Plan (LAMP) to assist with the control of water loss. The program provides a framework to inventory, assess risk, prioritize and perform condition assessment inspections, and prioritize repairs and re-inspections. The LAMP program will not eliminate catastrophic pipeline failures, but it does aim to reduce them.
- All NTMWD raw water transmission pipelines are reinforced concrete cylinder pipe or steel cylinder pipe with an internal protective liner and an external protective coating. Because of the multiple layers of material, these pipelines have very long service lives and are not subject to frequent development of leaks.
- Most joints in NTMWD water transmission pipelines are designed with bell and spigot joint construction including a rubber gasket. Some joints are welded.
- All NTMWD water transmission pipelines are constructed in legally defined and identified rights-of-way, properly registered with authorities in each county.
- NTMWD personnel routinely inspect NTMWD facilities and water transmission pipelines for leaks or mechanical problems. Repairs are undertaken as soon as practicable in order to minimize waste.
- NTMWD operates a program for right-of-way identification for construction projects adjacent to NTMWD facilities and water transmission pipelines in order to minimize leaks caused by pipeline damage during construction.
- NTMWD's metering program allows comparison of measured flows in the system and metered deliveries, which can be used to identify leaks.
- NTMWD's regular monitoring of unaccounted water (on a monthly basis) provides a further check for problems in the distribution system.
- NTMWD personnel perform regular inspections of its system to detect unauthorized connections.

5.00 CONTRACT REQUIREMENTS FOR WHOLESALE CUSTOMERS

NTMWD has developed language for all contracts for the wholesale sale of water by NTMWD entered into, renewed, or extended after the adoption of this Plan that will require the wholesale customer and any wholesale customers of that wholesale customer to develop and implement a water conservation plan meeting the requirements of Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code. Note: NTMWD refers to their drought contingency plan (DCP) as the water resource and emergency management plan (WREMP) and should be considered synonymous with a DCP.

All wholesale contracts with Customers entered into, renewed, or extended after the adoption of this Plan will include the following language:

“Customer agrees to adopt, implement, and enforce any and all ordinances and policies related to water conservation and drought management as required by the Texas Water Code, rules of the TCEQ and/or as may be adopted by the Board of Directors of NTMWD. NTMWD’s obligations pursuant to this Contract shall be subject to the Customer preparing and implementing any water conservation plans and drought contingency plans adopted by NTMWD and required or approved by the TCEQ, the Board, or any federal, state, or local regulatory authority with power to require or approve water conservation and drought contingency plans. Upon execution of this Contract, Customer shall submit its water conservation plan or water conservation measures, and drought contingency plan, to NTMWD for review and approval, and Customer agrees to amend its water conservation plan or other water conservation measures, and drought contingency plan as requested by NTMWD in order to comply with the requirements of NTMWD’s water conservation plan and drought contingency plan, program and/or rules. Customer shall also submit any changes or amendments to its water conservation plan or water conservation measures, and drought contingency plan, to NTMWD for review and approval.

NTMWD has adopted a water conservation plan and a drought contingency plan, and may amend both from time to time. If Customer fails to implement NTMWD’s and its own drought contingency plan when trigger conditions occur, NTMWD may implement rationing and collect the rate for water withdrawn as provided in Section 8(h) of this Contract, as well as enforce any contractual, statutory, or common law remedies available. The amount of water that is provided pursuant to this Contract when Customer is not in compliance with NTMWD’s water conservation plan and drought contingency plan will be reduced to the amount estimated as necessary to satisfy Customer’s demand if Customer was operating in compliance with both NTMWD’s and Customer’s drought contingency plans.

If NTMWD authorizes Customer to resell water from the System pursuant to the conditions included herein, Customer shall require through a contract condition that any successive

2024 NTMWD WATER CONSERVATION PLAN



user(s) of water from the System must implement water conservation measures that comply with the NTMWD's and Customer's water conservation plans, measures, programs, and/or rules."

6.00 RESERVOIR SYSTEM OPERATIONS PLAN

NTMWD has several raw water supply sources. **Table 8** summarizes NTMWD’s permitted and contractual raw water supply sources.

TABLE 8: NTMWD PERMITTED AND CONTRACTUAL RAW WATER SUPPLY (AC-FT/YR)

Source	2025 Supply	Comments
Lavon Lake	90,240	Estimated firm yield with minimum pool of 467, adjusted for climate
Jim Chapman Lake	42,037	NTMWD’s share of firm yield based on minimum elevation of 415.5, adjusted for climate
Lake Texoma	71,296	Expected supply with 4:1 Blending
Bois d’Arc Lake	62,776	Adjusted for climate
Lake Bonham	1,906	Yield limited by Bonham demand
Lavon Watershed Reuse	46,600	Based on projected return flows
East Fork Water Reuse Project	41,400	Yield based on analysis of available diversions during the critical period for Lavon Lake with projected return flows and limited by the capacity of the East Fork Water Reuse Project
Main Stem Pump Station	56,050	Contract with Trinity River Authority
Upper Sabine Basin (Long-term)	10,762	
Upper Sabine Basin (Interim)	31,164	Contract expires in 2025
Total	454,231	

Water from Jim Chapman Lake is pumped by pipeline to the Lavon Lake watershed, where it flows into Lavon Lake. A pipeline from Lake Texoma brings water from the lake directly to NTMWD’s water treatment plant in Wylie. Treated wastewater effluent from the Wilson Creek Regional Wastewater Treatment Plant is returned to the Lavon Lake watershed. Water from East Fork Water Reuse Project is pumped to Lavon Lake. Soon, Sister Grove RWRRF will also discharge treated wastewater effluent to the Lavon Lake watershed for subsequent use by NTMWD. Water from Lake Tawakoni (Upper Sabine Basin) is pumped to the Lake Tawakoni Water Treatment Plant and delivered as raw water to Lavon Lake. Water from Lake Bonham is pumped to the NTMWD Bonham Water Treatment Plant.

NTMWD has developed a reservoir system operations plan for its various sources of supply to maximize the efficiency of operation within existing water rights. The NTMWD reservoir system operations plan includes pumping from alternative sources before Lavon Lake reaches extremely low elevations to avoid water supply problems that would be caused by low water surface elevations. The reservoir system operations plan minimizes pumping into the Lavon Lake watershed during flood conditions.

The reservoir system operations plan also avoids unnecessary pumping from alternative sources to minimize energy use and avoid causing low elevations in other sources. Overall, the operation of the reservoir system is intended to protect the District's water supply while optimizing the use of the District's sources (within the constraints of existing water rights), keeping energy use for pumping as low as practical, maintaining water quality, and avoiding unnecessary impacts on recreational users of the reservoirs and fish and wildlife.



LAVON LAKE DAM

7.00 CONSERVATION PLAN ADOPTION AND ENFORCEMENT

7.01 MEANS OF IMPLEMENTATION AND ENFORCEMENT

The Executive Director of NTMWD is authorized to implement and enforce the water conservation plan. **Appendix F** includes the TCEQ-required water conservation implementation report. NTMWD will submit this report to TCEQ annually by the required date (May 1). This report lists the various water conservation strategies that have been implemented, including the date the strategy was implemented. The report also lists the five-year and ten-year per capita water use goals from the previous water conservation plan, and the amount of water saved. This report will be used to review the effectiveness of NTMWD's water conservation program. Progress updates will be reported to the Water Committee of the NTMWD Board and the Board of Directors.

As a wholesale provider of water, NTMWD has no direct enforcement authority over those conservation practices ultimately implemented and enforced by its Member Cities and Customers. However, as discussed herein, NTMWD makes best efforts to ensure implementation and enforcement of its water conservation plan via outreach, technical assistance, and the contractual requirements for wholesale customers. Further, NTMWD's annual water conservation report provides a means by which NTMWD can measure its success and quantify water savings via conservation initiatives, thereby optimizing implementation of the Water Conservation Plan (the Plan) over time.

7.02 ADOPTION

Appendix H contains a copy of the minutes of the NTMWD Board of Directors meeting at which this water conservation plan was adopted.

TCEQ requires that water conservation plans be reviewed and, if necessary, updated every five years to coincide with the regional water planning process. This water conservation plan will be updated as required by TCEQ, and in addition, will be continually reassessed for opportunities to improve water efficiency and conservation based on new or updated information.

7.03 REGIONAL WATER PLANNING GROUP NOTIFICATION

NTMWD's service area is located within two regional water planning areas, Region C and the Northeast Texas Region (Region D). **Appendix G** includes copies of the letters sent to the Chairs of the Region C and Region D water planning groups with a copy of this water conservation plan.



8.00 WATER CONSERVATION PROGRAM

NTMWD has implemented several water conservation measures which allow the District to serve as a regional leader and resource for water conservation efforts throughout its service area. These water conservation measures are outlined below.

- The **blue section** outlines water conservation strategies that are specific to NTMWD.
- The **green section** outlines the technical assistance and outreach that NTMWD has implemented.
- The **purple section** outlines the water conservation strategies that all Member Cities and Customers must adopt in their own water conservation plans.
- The **grey section** outlines information on optional water conservation strategies that NTMWD encourages (but does not require) Member Cities and Customers to consider when developing their own water conservation plans.

8.01 NTMWD SPECIFIC WATER CONSERVATION STRATEGIES

NTMWD's conservation efforts begin at the source. The District has implemented several water conservation strategies that are specific to the District itself.

A. REUSE AND RECYCLING OF WASTEWATER

The reuse of treated wastewater is a major source of water supply for NTMWD.

- NTMWD reused 61,014 acre-feet of treated wastewater from the Wilson Creek WWTP for municipal purposes in 2022.
- In addition, NTMWD has developed the East Fork Water Reuse Project and the Main Stem Pump Station (diverting treated wastewater purchased from the Trinity River Authority). These sources provided 39,058 acre-feet in 2022.
- NTMWD also reuses treated wastewater discharges from smaller WWTPs, which provided 616 acre-feet in 2022.

In total, reuse provided 26% of NTMWD's raw water diversions in 2022. This percentage varies from year to year and is dependent on wastewater flows. During drier conditions, demands are typically higher and wastewater flows (and thus reuse supplies) are typically lower.

NTMWD's reuse projects represent the largest municipal water supply based on reuse in the state of Texas. NTMWD intends to continue and develop reuse supplies in the future.

The 18 wastewater treatment plants that NTMWD owns and/or operates use treated effluent for all necessary wastewater plant washdowns and for wastewater plant site irrigation. NTMWD also makes treated wastewater from its plants available for direct reuse for landscape irrigation use. In 2022, 1,898 acre-feet of NTMWD’s treated wastewater was reused for off-site irrigation.

NTMWD has been recognized, both at the state and national level, for its reuse program.

Table 9 lists the awards the District’s reuse efforts have won in recent years.

TABLE 9: NTMWD REUSE AWARDS

Year	Award	In Honor of:
2008	Water Reuse Association Large Project of the Year	East Fork Water Reuse Project
2010	WEAT Sidney L. Allison Award	East Fork Water Reuse Project
2011	TCEQ Texas Environmental Excellence Awards	East Fork Water Reuse Project
2012	ACEC Engineering Excellence Award	East Fork Water Reuse Project
2013	North Central Texas Council of Governments CLIDE Award	East Fork Water Reuse Project
2018	Texans by Nature Conservation Wrangle Award	East Fork Water Reuse Project
2022	WaterReuse Award for Excellence Community Water Champion	East Fort Water Reuse Project and Main Stem Pump Station

B. WATERSHED PROTECTION

NTMWD formed the Lavon Lake Watershed Partnership to help protect water quality in the Lavon Lake watershed and developed a Watershed Protection Plan (WPP). The Partnership consists of NTMWD, Texas State Soil and Water Conservation Board, Texas A&M AgriLife and local stakeholders. NTMWD monitors and samples about 14 sites monthly on Lavon Lake to evaluate the water quality of the reservoir. There are an additional 14 sites monitored on tributaries within the watershed. Additionally, the major hydraulic inputs into Lavon Lake are monitored to evaluate the nutrient and pollutant loading. Studies are performed periodically to evaluate and model hydraulics, nutrient loading and pollutant loading of the reservoir. NTMWD also launched a conservation campaign in 2018 called “Love Lavon Lake” specifically aimed at familiarizing residents with their primary source of water.

The District regularly monitors and performs water quality sampling of Bois d’Arc Lake as well. Monitoring takes place at three sites in the lake. The information is used to evaluate

nutrient loading and pollutant loading of the reservoir. In 2021, NTMWD coordinated with local stakeholders and hosted multiple meetings in Fannin County to develop a voluntary, non-regulatory WPP for Bois d'Arc Lake.

The watershed protection plans for both Lavon Lake and Bois d'Arc Lake are available at www.ntmwd.com/watershed/.

NTMWD regularly monitors and samples its other water supplies, including Lake Tawakoni, Jim Chapman Lake, Lake Texoma, and the East Fork Water Reuse Project, to evaluate water quality and the impact of pollutant loading over time.

The District also monitors and samples the effluent of each of the NTMWD-operated wastewater treatment plants. That information is used to evaluate hydraulics, nutrient, and pollutant loading of the receiving waterbodies.

C. ZERO DISCHARGE FROM WATER TREATMENT PLANTS

Since 1975, NTMWD's water treatment plants have aimed to operate with zero discharge. Wash water from filter washing and residuals from the water treatment process are pumped to lagoons for solar drying. After settling of solids, suitable water is decanted from the lagoons and recycled to the head of the water treatment plant for treatment. This approach saves water and contributes to NTMWD's excellent control of nonrevenue water in treatment and distribution.

D. NON-PROMOTIONAL RATE STRUCTURE

NTMWD has a three-tiered increasing block rate structure for its retail customers. Additionally, it is required that Member Cities and Customers also adopt an increasing block water rate structure, if not already in place.

E. IN-HOUSE WATER CONSERVATION EFFORTS

NTMWD has implemented an in-house water conservation program, including the following elements:

- Wherever possible, landscapes will use native or adapted drought tolerant plants, trees, and shrubs.
- Irrigation at NTMWD facilities will occur between 11 p.m. and 5 a.m. in the peak consumption summer months (April 1 and ending October 31) to lower evaporation losses.
- Irrigation will be limited to the amount needed to promote survival and health of plants and lawns.
- Irrigation will be avoided on days of high water use.

- Irrigation will be done with treated wastewater effluent wherever feasible and reasonable.

The recently constructed Bois d'Arc Lake Operations Center is a great example of NTMWD's exemplary in-house water conservation efforts. The facility serves as headquarters for the District's administrative operations at the lake and includes classroom and meeting spaces for local civic and school districts. The landscaping also utilizes minimal turf with the inclusion of native and drought tolerant plants.



BOIS D'ARC LAKE OPERATIONS CENTER

8.02 TECHNICAL ASSISTANCE AND OUTREACH

NTMWD has a strong focus on both providing technical assistance to its Member Cities and Customers as well as continuing outreach efforts through the District's own public education program.

A. NTMWD PUBLIC EDUCATION PROGRAM

As a regional wholesale water supplier, NTMWD has limited opportunities to directly interact with end users of water in its service area. However, NTMWD's public education program is intended to educate water suppliers and end users in conservation efforts, and to assist and supplement the public education efforts of its Member Cities and Customers to reach end users and effect water savings.

NTMWD's own public education and outreach efforts include the following elements:

- NTMWD has a dedicated **Conservation Coordinator** on NTMWD staff to field conservation-related queries from Member Cities and Customers and coordinate with media regarding conservation issues.
- Beginning in 2006 and continuing through 2018, NTMWD invested in the development and implementation of the "**Water IQ: Know Your Water**" campaign, including newspaper ads, radio spots, billboards, a website, and other forms of communication all intended to educate the public regarding water use and water conservation. During the 2017 campaign, over a quarter of a million people were reached by the program through media relations, outreach, and interactive media. The total audience reached through the campaign in 2017 was over 88 million impressions.
- In 2013, NTMWD participated in the "**Water My Yard**" program to install weather stations throughout its service area to provide consumers with a weekly email or text message and information through the Water My Yard website recommending the adequate amount of supplemental water that is needed to maintain healthy grass in specific locations. This service represents the largest network of weather stations providing ET-based irrigation recommendations in the state of Texas and provides the public with advanced information regarding outdoor irrigation needs, thereby reducing water use. Through a series of selections on the type of irrigation system a consumer has, a weekly email or text message is provided that will recommend how long (in minutes) that an irrigation system needs to run based on the past seven days of weather. This recommendation provides the actual amount of supplemental water that is required for a healthy lawn based on research of the Texas A&M Agrilife Extension Service and proven technologies.

- **“Water4Otter”** is a water conservation campaign for kids launched by NTMWD in 2014. It is based on the insight that most parents agree they would listen if their kids asked them to conserve water. The TWDB awarded the NTMWD a conservation grant to develop Water4Otter as a model program that could be used throughout the state. The 2023 program included 22 performances at 11 schools in eight different ISDs including stops at elementary schools in Wylie, Garland, Mesquite, Plano, Princeton, Richardson, and Royse City.
- **“Love Lavon Lake”** is a water conservation campaign designed to help North Texans know their primary water source. The campaign launched in 2018 with a call to action to, “Conserve your water source. Love Lavon Lake.” The campaign was based on market research showing the more people know the source of their drinking water, the more likely they are to use it wisely and efficiently.
- NTMWD implemented the **“#PledgetoPlantSmart”** initiative that seeks to inspire positive change in water conservation by encouraging North Texas residents to do their part and plant smart by selecting native or adapted plants for their garden and landscaping.
- NTMWD has prepared and presented programs to area cities, civic organizations and other groups concerning the need for water conservation and strategies that can be implemented on an individual and corporate level. Presentations have been made to Rotary Clubs, Lions Clubs, Chambers of Commerce, Leadership Training Classes, Boy Scouts, Girl Scouts, mayors, city councils, city staff, etc.
- Presenting at meetings and conferences to various commercial, institutional, and industry stakeholder groups: landscapers, irrigators, tree and nursery growers, pool and spa industries, school district facility managers, and hospitality industry groups.
- NTMWD provides conservation brochures and information to interested civic groups and schools. Information includes brochures on water-saving measures and xeriscape landscaping. NTMWD also participates in special events to distribute water conservation information to the public.
- NTMWD has been recognized at the state and national level for its water conservation program with several awards, as shown in **Table 1** in the Introduction.

B. NORTH TEXAS REGIONAL WATER PROVIDER CONSERVATION INITIATIVES

The four major water providers in North Texas (North Texas Municipal Water District, Dallas Water Utilities, Tarrant Regional Water District and Upper Trinity Regional Water District) have implemented several joint conservation initiatives. These suppliers cover 12 of the 16 counties included in Region C. The following joint initiatives have been undertaken to date:



- In 2016, the Dallas Water Utilities and Tarrant Regional Water District launched a regional outreach campaign called “**Water is Awesome.**” It aims to increase the general public’s knowledge of the value of water in their everyday lives and encourages the public not to waste it. The campaign provides simple tips, mixed with a bit of humor, through television, radio, digital, print, outdoor, and social media advertising. A few years later, the NTMWD joined forces with DWU and TRWD to help raise awareness about the importance of water conservation to local residents through the “Water is Awesome” public Outreach Campaign.
 - In 2019, an additional tagline, “Keep Texas Water on Tap,” was incorporated to promote the Water is Awesome brand and direct traffic to waterisawesome.com.
 - In 2020, a “customer city toolkit” provided customizable resources allowing cities to incorporate their logos with the campaign brand for their website, social media, and print. Cities are encouraged to use campaign resources to advance conservation efforts.
 - In 2021, the regional water providers collaborated to create the Regional Landscape Initiatives. This document was developed as a resource of best management practices for municipal staff to help reduce water waste and encourage long-term water conservation in the North Texas region. Information consists of the background, importance, and benefits of each BMP and key talking points to consider when implementing the strategy. Several of the optional water management measures included in this Plan are from this collaborative initiative.
 - The 2023 campaign will include a focus on short HGTV-style web series about converting yards into drought-resistant, water-conservative yardscapes.
- NTMWD has partnered with the other major water providers to host an annual **North Texas Regional Water Conservation Symposium**, an event where leading water conservation experts present best management practices. Speakers present on topics related to conservation’s value, outreach, best practices, and building relationships. In 2022, the 16th Annual North Texas Regional Water Conservation Symposium was held with attendees from across the region. Other regions of the state, including the Central and Gulf Coast regions, have organized similar symposiums modeled after the North Texas example.

C. OTHER CONSERVATION PARTNERSHIPS

NTMWD provides support for and partners with many other entities to promote conservation.



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- NTMWD operates the **John Bunker Sands Wetland Center** in cooperation with the Rosewood Corporation. NTMWD provides a portion of the funding for the operation and maintenance and personnel cost of the Center. As part of its mission, the Center provides education to the public, area school districts, wildlife and conservation organizations, and research institutions in the areas of water supply, water conservation and reuse.
- NTMWD has partnered with **Texas A&M AgriLife Extension Service** to provide proven, scientific-based best management practices to the region through public events, seminars, and brochures.
- NTMWD is an **EPA WaterSense Promotional Partner** and participates in the EPA Water Sense sponsored “Fix a Leak Week.” NTMWD encourages all Member Cities and Customers to become EPA WaterSense Partners.
- Member of **WENNT (Water Efficiency Network of North Texas)**. WENNT is a conglomerate of cities and water providers in the Dallas-Fort Worth area that meets monthly to discuss water conservation efforts and highlight specific programs. Attending these monthly meetings allows participants to gain new ideas and learn about new resources that may benefit their program.
- Member/partner of the **Alliance for Water Efficiency** (NTMWD membership, as well as membership paid for by NTMWD for Member Cities).
- Member/partner for the **Texas Water Foundation**.
- Member of **American Water Works Association and American Water Works Association Research Foundation**.
- NTMWD has been a supporting participant and member of the **Texas Water Smart** educational campaign and participates at Texas Water Smart meetings, conferences, and media events designed to increase public awareness and education on water conservation.
- NTMWD provided funding for the conversion of the Texas Smartscape CD-ROM into an interactive website. **Texas Smartscape** is an educational tool designed to assist citizens with the design and development of landscaping using Texas native and drought tolerant plants. NTMWD promotes the use of the Texas Smartscape website (www.txsmartscape.com).
- The District frequently evaluates opportunities to partner on public education with other entities in the region and around the state.

D. TECHNICAL ASSISTANCE FOR MEMBER CITIES AND CUSTOMERS

NTMWD continuously strives to provide more technical assistance to aid Member Cities and Customers implement their own public education programs on conservation.

- NTMWD hosts an **Online Portal** on the NTMWD website for Member Cities and Customers to access and share information on water conservation programs.
- NTMWD holds **Regularly Scheduled Meetings** with Member Cities and Customers for water supply updates, public campaign strategies, and legislative activities related to water and water conservation.
- NTMWD purchases **American Water Works Association Research Foundation Publications** for use by Member Cities and Customers to further enhance resources for water efficiency, water rate structures, etc. Additionally, NTMWD pays for Member City and Customer membership to the **Alliance for Water Efficiency**.
- To assist its Member Cities and Customers in the development of their own water conservation plans, NTMWD has developed a **Model Water Conservation Plan for NTMWD Member Cities and Customers**. The Model Water Conservation Plan addresses the TCEQ requirements for water conservation plans for municipal use by public water suppliers and includes advanced water conservation strategies beyond TCEQ requirements that mirror NTMWD's plan. This is available online at <https://www.ntmwd.com/login/portal/>.
- Since 2003, NTMWD has held **Water Conservation Workshops** for staff of its Member Cities and Customers. These workshops have covered several conservation-related topics, including TCEQ requirements for water conservation and drought contingency plans, advanced water conservation strategies, current NTMWD water conservation efforts, water conservation programs of the cities, current drought status, progress on future water supplies, and related topics. These workshops also provide training and education regarding water use accounting, irrigation evaluations, industrial, commercial, and institutional audits, and other procedures. Additional examples include workshops on Water Loss Audit Training as well as on the TWDB Water Conservation Planning Tool.
- Based on the annual reporting data collected from Member Cities and Customers from 2022, approximately 24% of the District's treated water sales went to supply Industrial, Commercial, Institutional, and Multifamily (ICIM) users within their service area. To target programs for this customer base, the District hired Plummer Associates, Inc. to create the **Industrial, Commercial, Institutional and Multifamily Program**. The ICIM program provides NTMWD Member City and Customer staff with the knowledge and tools necessary to identify ICIM customers with high water usage. This program

was created to categorize water use data to find outliers and identify areas to concentrate water conservation efforts. This program can help Member Cities' and Customers' ICIM water customers develop targeted methods for increasing water efficiency as an alternative to a traditional voluntary approach for water consumption improvement.

- As part of the ICIM program, the District is currently engaging with the Member Cities and Customers to encourage their ICIM customers to participate in **Water Efficiency Opportunity Surveys**. These surveys encompass a building audit that recommends various water conservation measures that can be implemented to save both money and water. Items addressed include toilet retrofits, urinal retrofits, showerhead retrofits, lavatory retrofits, non-lavatory faucet retrofits, leak repair, water cooled ice machine retrofit, commercial disposer, food steam, cooling tower efficiency and irrigation system efficiency. As of June 2023, NTMWD has utilized the ICIM program to audit four buildings resulting in an estimated annual water savings of 87.4 million gallons.
- As part of its wastewater system, NTMWD has developed **Industrial Pretreatment Programs** for the cities of Allen, Forney, Frisco, McKinney, Mesquite, Murphy, Plano, Richardson, Rockwall, Terrell, and Wylie. The pretreatment programs developed by NTMWD are adopted and implemented by the cities, which are also responsible for enforcement of the programs. By reducing allowable volumes of specific pollutants and encouraging pretreatment of industrial wastes, this joint effort by NTMWD and the cities has improved water quality in the region's streams and reservoirs. NTMWD industrial pretreatment personnel are also available to assist cities on request in the review or design of systems to allow industrial recycling and reuse of wastewater. Such systems have reduced water use by some industries, while also reducing wastewater volumes and saving money for the industries.
- NTMWD encourages its Member Cities and Customers to develop and implement **Rebate and Bulk Purchasing Programs**, that may benefit the Member Cities and Customers in achieving overall water savings. Further, NTMWD provides technical assistance to those Member Cities and Customers who wish to implement rebate and bulk purchasing programs.



8.03 REQUIRED MEMBER CITY AND CUSTOMER CONSERVATION STRATEGIES

The following water conservation strategies **must** be implemented by NTMWD Member Cities and Customers in their water conservation plans. These strategies represent minimum measures to be implemented and enforced to promote water conservation and are to remain in effect on a permanent basis.

Member Cities and Customers are required to develop and maintain regulations, ordinances, policies, or procedures for enforcement of water conservation guidelines. Examples of several sample ordinances are included in the Model Plans.

A. TCEQ CONSERVATION PLAN REQUIREMENTS FOR A PUBLIC WATER SUPPLIER

TCEQ has established rules for the development of water conservation plans for public water suppliers that provide retail services. The rules for water conservation plans for public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.2 of the Texas Administrative Code. These rules are included in **Appendix B**. NTMWD requires that all Member Cities and Customers fulfill these regulatory requirements in their own water conservation plans.

Minimum Conservation Plan Requirements for Public Water Suppliers

TCEQ's minimum requirements for water conservation plans for public water suppliers are shown below:

- 288.2(a)(1)(A) – Utility Profile
- 288.2(a)(1)(B) – Record Management System
- 288.2(a)(1)(C) – Specific, Quantifiable Goals
- 288.2(a)(1)(D) – Metering of Diversions (*NTMWD meets this requirement; see Section 4.0. Member Cities and Customers must measure non-NTMWD diversions*)
- 288.2(a)(1)(E) – Universal Metering
- 288.2(a)(1)(F) – Measures to Determine and Control Water Loss
- 288.2(a)(1)(G) – Program of Continuing Public Education and Information
- 288.2(a)(1)(H) – Non-Promotional Rate Structure
- 288.2(a)(1)(I) – Reservoir System Operation Plan (*NTMWD meets this requirement; see Section 6.0*)



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- 288.2(a)(1)(J) – Means of Implementation and Enforcement
- 288.2(a)(1)(K) – Documentation of Coordination with Regional Water Planning Groups
- 288.2(c) – Review and Update of Plan

Additional Requirements for Suppliers Serving a Current Population of 5,000 or More

TCEQ has additional requirements for water conservation plans for public water suppliers serving more than 5,000 people. Those additional TCEQ requirements are addressed below:

- 288.2(a)(2)(A) – Program of Leak Detection, Repair, and Water Loss Accounting
- 288.2(a)(2)(B) – Requirement for Water Conservation Plans by Wholesale Customers

B. CONSERVATION COORDINATOR

The designation of a Conservation Coordinator is required by House Bill 1648, effective September 1, 2017, for all retail public water utilities with 3,300 service connections or more. NTMWD requires that all Member Cities and Customers appoint a Conservation Coordinator who will serve as the primary point of contact between the entity and the District on conservation matters.

The duties of the Conservation Coordinator are as follows;

- Submit an annual conservation report to NTMWD by March 31. This is referred to as the 'Appendix D Report.' NTMWD will provide a blank workbook for each Member City and Customer to fill out prior to the deadline.
- Submit an adopted water conservation and water resource and emergency management plan by May 1, 2024 (and every five years afterwards). These plans must be submitted to NTMWD, the applicable Regional Water Planning Group, TCEQ, and TWDB. The Conservation Coordinator is also responsible for submitting a copy of the Plan if it is updated after initial adoption and submission.

C. WATER CONSERVATION PRICING

Each Member City and Customer must adopt an increasing block rate water structure that is intended to encourage water conservation and to discourage excessive use and waste of water. An example water rate structure is as follows:

Residential Rates

- 1) Monthly minimum charge. This can (but does not have to) include up to 2,000 gallons of water use with no additional charge.
- 2) Base charge per 1,000 gallons up to the approximate average residential use.



- 3) 2nd tier (from the average to 2 times the approximate average) at 1.25 to 2.0 times the base charge.
- 4) 3rd tier (above 2 times the approximate average) at 1.25 to 2.0 times the 2nd tier.
- 5) Additional tiers with further increases if desired.
- 6) The residential rate can also include a lower tier for basic household use up to 4,000 gallons per month or a determined basic use.

Commercial/Industrial Rates

Commercial/Industrial rates should include at least 2 tiers, with rates for the 2nd tier set at 1.25 to 2.0 times that of the first tier. Higher water rates for commercial irrigation use are encouraged, but not required.

D. ORDINANCES, PLUMBING CODES, OR RULES ON WATER-CONSERVING FIXTURES

Member Cities and Customers must adopt ordinances, plumbing codes, and/or rules on water-conserving fixtures that at least meet the minimum statutory requirements. The state has required water-conserving fixtures in new construction and renovations since 1992. The state standards call for flows of no more than 2.5 gallons per minute (gpm) for faucets, 2.5 gpm for showerheads. As of January 1, 2014, the state requires maximum average flow rates of 1.28 gallons per flush (gpf) for toilets and 0.5 gpf for urinals. Similar standards are now required under federal law. These state and federal standards assure that all new construction and renovations will use water-conserving fixtures.

E. REUSE AND RECYCLING OF WASTEWATER

Most Member Cities and Customers do not own and operate their own wastewater treatment plants, so their wastewater is treated by NTMWD. NTMWD currently has the largest wastewater reuse program in the state. NTMWD has water rights allowing reuse of up to 71,882 acre-feet per year (64 MGD) of treated wastewater discharges from the Wilson Creek Wastewater Treatment Plant for municipal purposes. In addition, NTMWD has also developed the East Fork Water Reuse Project which can divert treated wastewater discharges by NTMWD and purchased wastewater return flows from TRA via Main Stem Pump Station. NTMWD also provides treated effluent from its wastewater treatment plants available for direct reuse for landscape irrigation and industrial use.

Member Cities and Customers who own and operate their own wastewater treatment plants must reuse treated effluent for irrigation purposes at their plant site. These entities must also seek other alternatives for reuse of recycled wastewater effluent.

F. YEAR-ROUND OUTDOOR WATERING SCHEDULES

A mandatory weekly watering schedule has been gradually gaining acceptance in the region and the state. NTMWD requires all Member Cities and Customers to adhere to a permanent outdoor watering schedule. Although the frequency is specified, the schedule itself is left up to the Member Cities and Customers to designate. Some entities utilize “day of the week” irrigation schedules where watering is based on either even/odd address numbers, trash/recycling pick-up days, or geographic areas related to distribution pressure zones.

- **Summer (April 1 – October 31)** – Spray irrigation with sprinklers or irrigation systems at each service address must be limited to no more than **two days per week**. Additionally, prohibit lawn irrigation watering from **10 a.m. to 6 p.m.** Education should be provided that irrigation **should only be used when needed**, which is often less than twice per week, even in the heat of summer.
- **Winter (November 1 – March 31)** – Spray irrigation with sprinklers or irrigation systems at each service address must be limited to no more than **one day per week** with education that less than once per week (or not at all) is usually adequate.

Additional irrigation may be provided by hand-held hose with shutoff nozzle, use of dedicated irrigation drip zones, and/or soaker hose provided no runoff occurs. Many North Texas horticulturists have endorsed twice-weekly watering as more than sufficient for landscapes in the region, even in the heat of summer. This measure can be improved with the inclusion of the voluntary ET-based weekly watering advice/recommendations (**Section 8.04**) because landscapes frequently need less watering than the year-round watering schedule allows or affords. Additionally, Member Cities and Customers should also consider review of their existing requirements and updating any codes that may impede or limit the implementation of the year-round outdoor watering schedules or other water conservation measures.

G. TIME OF DAY WATERING SCHEDULE

NTMWD requires that during the summer months (April 1 – October 31) under normal conditions, spray irrigation with an irrigation system or sprinkler is only permitted on authorized watering days, before 10 a.m. or after 6 p.m. The primary purpose of this measure is to reduce wind drift and evaporation losses during the active growing season. The time-of-day watering schedule requirement increases watering efficiency by eliminating outdoor irrigation use when climatic factors negatively impact irrigation system efficiencies. Midday irrigation is not an optimal time to irrigate because evapotranspiration rates are higher, and plants are more susceptible to stress associated with factors such as higher temperatures and lower relative humidity.



H. IRRIGATION SYSTEM REQUIREMENTS FOR NEW AND COMMERCIAL SYSTEMS

In 2007, the 80th Texas Legislature passed House Bill 1656, Senate Bill 3, and House Bill 4 related to regulating irrigation systems and irrigators by adopting minimum standards and specifications for designing, installing, and operating irrigation systems. The Texas legislation required cities with a population over 20,000 to develop a landscape irrigation program that includes permitting, inspection, and enforcement of water conservation for new irrigation systems. The landscape irrigation rules must have been adopted to comply with the January 1, 2009, effective date.

NTMWD **requires** all Member Cities and Customers to adhere to a minimum set of irrigation standards:

- 1) Require that all new irrigation systems be in compliance with state design and installation regulations (Texas Administrative Code Title 30, Chapter 344).
- 2) Require operational rain and freeze sensors and/or ET or Smart controllers on all new irrigation systems. Rain and freeze sensors and/or ET or Smart controllers must be properly maintained to function properly.
- 3) Require that irrigation systems be inspected at the same time as initial backflow preventer inspection.
- 4) Require the owner of a regulated irrigation property obtain an evaluation of any permanently installed irrigation system on a periodic basis to be defined by the Member City or Customer. The irrigation evaluation shall be conducted by a licensed irrigator in the State of Texas and be submitted to the local water provider (i.e., city, water supply corporation).

There are many standards above the minimum state and NTMWD requirements that any entity can adopt. These measures are optional and discussed in more detail in **Section 8.04**.

I. WATER WASTE PROVISIONS

NTMWD requires all Member Cities and Customers prohibit activities that waste water. The main purpose of a water waste ordinance is to provide for a means to enforce that water waste is prevented during lawn and landscape irrigation, that water resources are conserved for their most beneficial and vital uses, and that public health is protected. It provides a defined enforcement mechanism for exceptional neglect related to the proper maintenance and efficient use of water fixtures, pipes, and irrigation systems. The ordinance can provide additional assistance or enforcement actions if no corrective action has been taken after a certain number of correspondences.

NTMWD **requires** that the following water waste ordinance offenses include:



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- 1) The use of irrigation systems that water impervious surfaces. (Wind-driven water drift will be taken into consideration.)
- 2) Outdoor watering during precipitation or freeze events.
- 3) The use of poorly maintained sprinkler systems that waste water.
- 4) Excess water runoff or other obvious waste.
- 5) Overseeding, sodding, sprigging, broadcasting or plugging with cool season grasses or watering cool season grasses, except for golf courses and athletic fields.
- 6) The use of potable water to fill or refill residential, amenity, and any other natural or manmade ponds. A pond is considered to be a still body of water with a surface area of 500 square feet or more. This does not include recreational swimming pools.
- 7) Non-commercial car washing that does not use a water hose with an automatic shut-off valve
- 8) Hotels and motels that do not offer a linen reuse water conservation option to customers.
- 9) Restaurants, bars, and other commercial food or beverage establishments that provide drinking water to customers unless a specific request is made by the customer for drinking water.

NTMWD does not control how the Member Cities and Customers enforce the water waste ordinance offenses. Entities should determine the best means of enforcement, be it tickets or administrative fees that work best for their community. Implementation of AMI systems may allow water providers to notify customers of potential leaks and support enforcement activities.

8.04 OPTIONAL MEMBER CITY AND CUSTOMER CONSERVATION STRATEGIES

NTMWD also urges its Member Cities and Customers to consider including the following additional water conservation measures in their plans. The following sections describe optional strategies; however, Member Cities and Customers are not limited to the strategies described in this Plan. NTMWD intends for these optional strategies to be used as guidance and allow Member Cities and Customers to have flexibility to modify their own water conservation plans to best fit their community needs and water conservation goals.

These optional strategies are from the *North Texas Water Providers Regional Landscape Initiative* or the *TWDB Best Management Practices Guides*.

A. USE OF ET-BASED WEEKLY WATERING ADVICE/RECOMMENDATIONS

NTMWD requires that Member Cities and Customers adhere to a year-round outdoor watering schedule. However, this conservation practice can be improved with the use of ET-based weekly watering advice and recommendations. Landscapes frequently require less watering than the year-round water schedule allows. This measure can be particularly useful for entities with a significant percentage of customers using automated landscape irrigation systems.

Water providers in the Dallas-Fort Worth (DFW) area (including NTMWD) sponsor weather stations to collect daily weather data and provide the most accurate watering recommendations. Many cities in the DFW area can already take advantage of these ET-based recommendations and incorporate them into their water conservation programs, at no cost to the city. Examples of such a service are shown below.

- **Water My Yard** – An online platform where homeowners can sign up to receive weekly watering recommendations based on their location and a few specifications about their sprinkler system. Users can then choose to accept the recommendations by email, text, or both. Recommendations are available for select cities in Collin, Dallas, Denton, Fannin, Hunt, Kaufman, and Rockwall Counties. Sponsored by NTMWD and Texas A&M AgriLife Extension Service (WaterMyYard.org).
- **Water Is Awesome Weekly Watering Advice** – Weekly watering recommendations for most of North Texas based on data from weather stations scattered throughout the DFW area. The recommendations are distributed by email and text every week and are provided in inches of water needed and the number of minutes necessary to apply that amount of water for spray, rotor, and multi-stream sprinklers. Advice service is available for all of North Central Texas and sponsored by DWU and TRWD. (<https://waterisawesome.com/weekly-watering-advice>).

- **WaterWise Newsletter and Hotline**– The City of Frisco (Frisco) provides weekly lawn watering advice on the city’s website and through the WaterWise Newsletter distributed to subscribers every Monday. Frisco also has a “Weekly Watering Advice Hotline” you can call weekly to get this information. Frisco has a weather station that is used to determine how much water is needed each particular week.

Providing evapotranspiration (ET)-based weekly watering recommendations can reduce the amount of water applied for outdoor watering if customers follow the guidance. A drawback with this BMP is the adoption rate. Since these recommendations may change every week, it requires customers to adjust their controllers more often.

It is important to note that at a minimum, Member Cities and Customers must adhere to the year-round outdoor watering schedule set by NTMWD and described in Section 8.03.

B. WATER EFFICIENT LANDSCAPE INITIATIVES

NTMWD recommends that Member Cities and Customers include water efficient landscape initiatives in their water conservation plans. A water efficient landscape is a landscape that is designed and maintained according to basic good horticultural principles that allow for a beautiful healthy landscape with minimal or no supplemental irrigation and no adverse runoff from the landscape property. Water efficient landscapes limit or exclude non-functional turf where possible. Examples of nonfunctional turf include streetscape turf and turf that is purely ornamental. As an alternative to non-functional turf grasses, water efficient landscapes use appropriate plants or other landscaping materials that require little or no supplemental irrigation. Appropriate plants are those selected based on their adaptability to the region’s soil and climate. NTMWD’s #PledgeToPlantSmart initiative seeks to inspire positive change in water conservation by encouraging North Texas residents to do their part and plant smart by selecting native or adaptive plants for their garden and landscaping. Member Cities and Customers should adopt a native and adaptive recommended plant list for water efficient landscaping. Water efficient landscapes can be an alternative to non-functional turf grasses and may be appropriate for application in new development or retrofits of existing landscapes for both commercial and residential areas.

Water efficient landscape initiatives can be encouraged through financial incentives or required through ordinance. Member Cities and Customers should also consider review of their existing requirements and removal of current codes that may impede or limit the application of water efficient landscapes. Texas Property Code § 202.007 may be a helpful resource for language for removing potential barriers to water efficient landscapes.

In lieu of an ordinance, water efficient landscapes can be encouraged through rebates for landscape conversion or installation or award programs. Good examples of water efficient landscapes should also be encouraged through public outreach, demonstration gardens,



and/or used in public landscapes and rights-of-way. NTMWD has a great example of the implementation of native plants and xeriscaping at the Bois d'Arc Lake Operations Center.

There are several programs available that offer a wealth of information on designing and implementing water efficient landscape.

- Water Wise (<http://urbanlandscapeguide.tamu.edu/waterwise.html>)
- Texas SmartScape™ (<http://www.txsmartscape.com/>)
- EARTH-KIND™ (<https://aggie-horticulture.tamu.edu/earthkind/publications/#water>)

NTMWD recommends, but does not require, implementation of this conservation practice in Member Cities' and Customers' own water conservation plans.

C. ADDITIONAL WATER SAVING MEASURES FOR NEW IRRIGATION SYSTEM REQUIREMENTS

NTMWD requires certain irrigation system requirements for new and commercial systems. However, this conservation practice can be improved with additional water saving measures. As discussed previously, Texas legislation regulates irrigation systems and irrigators by adopting minimum standards and specifications for designing, installing, and operating irrigation systems.

Many cities within Region C have adopted irrigation system standards above the minimum state requirements. Some of these standards include:

- Require property owners that install their irrigation system to also comply with the adopted city ordinance.
- Require submission of the irrigation plan in conjunction with the permit application to the applicable city official/department.
- Require all new irrigation systems to not utilize above-ground spray in landscapes that are less than 60 inches in either length or width and which contain impervious pedestrian or vehicular traffic surfaces along two or more perimeters. The use of subsurface or drip irrigation and pressure compensating tubing is permitted if the qualifying area will be irrigated.
- Require all non-turf landscape areas included in the irrigation plan to be designed with subsurface irrigation, drip irrigation, and/or pressure compensating tubing. If the irrigation plan includes a foundation watering system, require a separate zone be dedicated for drip irrigation for the purpose of watering a structure's foundation.
- Require a flow control master valve to be installed on the discharge side of the backflow prevention device on all new installations.

- Require check valves where elevation differences may result in low head drainage. Check valves may be located at the sprinkler head(s) or on the lateral line.
- Require that pop-up heads shall be installed at grade level and operated to extend above all landscape turfgrass.
- Require that all new irrigation systems must include an automatic controller capable of providing the following features:
 - Multiple irrigation programs with at least three start times per program
 - Limiting the irrigation frequency to once every 7 days and once every 14 days
 - Water budgeting feature
- Require additional information and description for the required “walk-through”. This may include but is not limited to a checklist of things to cover on the “walk-through” with the homeowner or educational leave behind materials.
- Require the signed maintenance checklist be submitted to the applicable city official/department. Require the irrigator’s name, license number, company name, telephone number, and the dates of the warranty period to be on the maintenance checklist.
- Require the irrigation plan indicating the actual installation of the system and the associated seasonal watering schedule be submitted to the applicable city official/department.
- Require the irrigation plan and maintenance checklist be transferred from the new home builder to the first home buyer with documentation confirming the transaction provided to the applicable city official/department.

It is important to note that at a minimum, Member Cities and Customers must adhere to the irrigation system requirements set by NTMWD and described in Section 8.03.

D. ADDITIONAL WATER WASTE PROVISIONS

NTMWD requires certain water waste provisions. However, this conservation practice can be improved with the inclusion of additional water waste provisions suited for your entity. As discussed previously, the main purpose of a water waste ordinance is to provide a means for enforcement that water waste is prevented during lawn and landscape irrigation, that water resources are conserved for their most beneficial and vital uses, and that public health is protected. It provides a defined enforcement mechanism for exceptional neglect related to the proper maintenance and efficient use of water fixtures, pipes, and irrigation systems. The



ordinance can provide additional assistance or enforcement actions if no corrective action has been taken after a certain number of correspondences.

NTMWD recommends, but does not require, the following additional water waste ordinance offenses:

- 1) Sprinkler runoff from a property greater than 50 feet.
- 2) Operating an irrigation system or other lawn watering device during any form of precipitation or when temperatures are below 32 degrees Fahrenheit.
- 3) Irrigation to pond in a street or parking lot to a depth greater than 1/4 inch.
- 4) Failure to repair a controllable leak, including but not limited to a broken sprinkler head, a leaking valve, leaking or broken pipes, or a leaking faucet.
- 5) Operating a permanently installed irrigation system with a broken head or a head that is out of adjustment where the arc of the spray head is over a street or parking lot.
- 6) Washing of driveways, sidewalks, parking lots or other impervious surface areas with an open hose or spray nozzle attached to an open hose, except when required to eliminate conditions that threaten public health, safety or welfare.
- 7) Installation of splash pads that use a flow-through system instead of a cycle tank.

All splash pads should follow the manufacturer's recommendations and health agency guidance for the operation and management of splash pads and have standard operating procedures that help ensure water quality and promote conservation. Standard operating procedures should be tailored to the type of splash-pad (flow-through or cycle tank). Regardless of splash pad type or configuration, consideration should be given towards conservation efforts. For example, operating hours could be adjusted often based on frequency and duration of public use or the runoff can be diverted to serve a functional purpose, such as maintaining native and adapted vegetation.

It is important to note that at a minimum, Member Cities and Customers must adhere to the water waste provisions set by NTMWD and described in Section 8.03.

E. PARK/ATHLETIC FIELD CONSERVATION

NTMWD recommends that Member Cities and Customers consider the implementation of this conservation practice if there are parks and/or athletic fields within their system that are heavy water users. This conservation practice is intended to address park and athletic field conservation if the water provider manages and/or serves customers with irrigated parks and/or athletic fields. These facilities often face scrutiny by the public for using large amounts

of water or being perceived as using excessive amounts. Athletic field and park irrigation conservation practices and the careful use of water in the operation and maintenance of park facilities can effectively reduce water demands. Once a water provider or customer adopts this practice, it should be followed closely to achieve maximum water efficiency benefits. With the dedication of an athletic field manager, athletic field conservation can effectively reduce system water demand. A manager can implement a watering regimen that only uses the amount of water necessary to maintain the viability of the turf and health of its users.

All park facilities should be metered and water use billed to reinforce the importance of water efficiency. Before developing an efficient watering program, the water provider should consider meeting with park irrigation personnel, management, and authorized landscape manager. This discussion should focus on water conservation issues and developing an adequate scope of action for efficiency. The first key is to understand the performance and capabilities of your irrigation system at these facilities. Requiring automatic irrigation systems and controllers at all facilities is recommended. It is essential to have training in soil management, proper aeration methods, nutrient management, mowing, soil testing, and irrigation management.

Achieving conservation can be voluntary or regulatory, based on the needs of the city. Cities may also consider if there is an opportunity to use reclaimed, reused, or recycled water for parks to conserve potable water. However, specific uses must meet TCEQ water quality standards for reclaimed water and human contact, and they must be appropriate for the particular use of the park. Reclaimed water should be applied based on the appropriate water budget. When developing athletic field conservation practices, identify the various stakeholders, including the school district staff, nonprofit athletic associations, private sports complex managers, and city staff. Meeting with them will help achieve long-term results.

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans.

F. GOLF COURSE CONSERVATION AND REUSE

NTMWD recommends that Member Cities and Customers consider the implementation of this conservation practice if there are golf courses within their system that are heavy water users. Golf courses can use a considerable amount of water for irrigation, especially during the summer. The Environmental Institute for Golf found that from 2003-2005, an 18-hole course in the southeast region of the country (including North Central Texas) applied an average of 29 inches of irrigation water per acre every year. Irrigation of course play areas, such as fairways, is necessary to support healthy turfgrass and landscape plants, which are important for course playability and aesthetics. However, golf courses can employ several practices to reduce water use while maintaining the course's playability and aesthetics. Also, over-watering and over-fertilization can negatively impact the water quality in local streams and lakes.



By adopting a conservation plan, golf courses can benefit by:

- Being a good neighbor by conserving local water supplies
- Saving money by reducing water use
- Protecting local water quality
- Maintaining playing conditions on the course
- Increasing irrigation equipment longevity

Water providers may take different golf course conservation approaches: encouraging voluntary efforts by the golf courses to conserve water, making it required as part of a contract, or, if possible, passing an ordinance requiring golf courses to develop and implement a conservation plan. It is important for water providers to work closely with golf courses since they know which practices will have the greatest potential for implementation. The courses may have already completed some best management practices and knowledge which may be effective or not. Water providers should work to coordinate and implement conservation practices on courses that are owned and operated by the local government.

Water conservation and water quality protection measures for golf courses may include, but are not limited to, the following:

Golf Course Landscape Design and Water Sources

- When feasible, use alternative water sources, such as reclaimed or reuse water from wastewater treatment facilities, to supplement or replace potable water sources. Monitor reclaimed water tests regularly for salinity. Rainwater harvesting and on-site pond storage are additional alternative water sources to consider.
- Select drought-tolerant turfgrass varieties to minimize water use while maintaining a high-quality playing surface.
- Reduce the number of irrigated acres on the course by converting non-play and rough areas to native grasses and other drought-tolerant plants. These plants will provide an attractive and low-maintenance landscape.
- Reduce water use by limiting the number and/or size of water features that only serve an aesthetic function.
- Develop a drought management plan that can be implemented when water supplies are low enough to enact local drought mitigation efforts.

Irrigation System Design and Maintenance

- Irrigation systems should be properly designed and installed to maximize water use efficiency while reducing operational costs and maintaining a healthy and playable course.
- Utilize new technology, such as soil moisture sensors, evapotranspiration data, and computer-controlled systems that maximize water efficiency by irrigating based on the turfgrass's moisture needs.
- Hand watering greens or other smaller areas will save water compared to running the entire zone in that area.
- Design the irrigation system to ensure that the irrigation water is distributed evenly and efficiently, with a Distribution Uniformity of 80% or better.
- Frequently inspect all sprinkler heads and other components of the irrigation system and make any adjustments or repairs as needed to improve water use efficiency. Conducting a system-wide audit by a licensed irrigation professional annually can help identify inefficiencies in the system.
- Fix leaks in the system immediately.
- Rain sensors can shut off the irrigation system when an adequate amount of rainfall is received.
- Irrigating in the early morning hours before temperatures rise and when wind speeds are low will reduce the amount of water lost to evaporation.
- Use mowing, aeration, nutrients, and soil amendments to improve soil condition and increase water infiltration.

Water Quality Protection

- Obtain a soil test before applying fertilizer to ensure the correct type and amount is used.
- Apply fertilizers and chemicals according to the directions on the label. Do not overapply.
- Do not overwater fertilizers when applying, resulting in runoff that could carry fertilizers into a nearby stream or pond.
- Maintain vegetated buffers at least 15 feet from the edge of a stream or pond to capture pollutants that may runoff from the course.

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans.

G. USE OF LICENSED IRRIGATORS TO INSPECT AND REVIEW ALL IRRIGATION PERMITS AND PLANS

Another potential conservation practice to implement is the requirement of licensed irrigation inspectors to review and inspect all irrigation system plans and installed components before a permit is released. Many cities use licensed plumbing inspectors, as allowed by TCEQ rules, to perform these duties. However, having dedicated licensed irrigation inspectors to implement all aspects of an irrigation system permitting program provides a certain level of focus for complying with water efficiency standards. Reviewing irrigation permits and plans before installing allows for changes to be made to the plans and not after the pipe is already in the ground. This ensures the irrigation system's overall quality promotes irrigation efficiency and guarantees that the system will comply with state and local requirements.

Developing a review and inspection program at the municipal level reduces the chance for unlicensed irrigators to install irrigation systems improperly. Improper installation can waste water, money, cause future maintenance issues, but most importantly, it may contaminate the public water supply. It is crucial to prevent non-potable water in lawn irrigation pipes from flowing into public water supply pipes.

Inspecting the system provides benefits for water conservation. With open-trench inspections, you can check:

- Depth of piping-which protects from freezing temperatures.
- Potential invasion of plant/shrubbery roots.
- Joints are glued appropriately, and no leaks occur.
- Pipe size-to eliminate water hammer.
- Pressure management requirements.
- The overall layout of the system.

Staff can hold an irrigator's license and inspector's license, but to prevent them from installing and inspecting their work, staff cannot have both running concurrently. In 2011, the 82nd Texas Legislature passed House Bill 2507, making it a Class C misdemeanor for an individual to operate as an irrigator in the state of Texas without a valid irrigation license. Therefore, effective September 1, 2011, individuals operating without a license are in direct violation of the Texas Occupational Code, Sec. 1903.256.

According to the Texas Administrative Code, upon completion of the irrigation system, four items must be completed to inform and educate the owner of the system: a final walk-through, a maintenance checklist, licensed irrigator contact information, and an as-built plan. All irrigation system plans, installation, and review requirements must be followed for long-term

water efficiency. Minimum state requirements for landscape irrigation can be found in Title 30, Chapter 344 of the Texas Administrative Code.

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans.

H. OFFER FREE OR DISCOUNTED IRRIGATION SYSTEM CHECK-UPS FOR RESIDENTIAL CUSTOMERS

EPA estimates that up to 70% of the total water used during the summer months is applied as outdoor irrigation. As much as 50% of the water used outdoors is wasted due to overwatering and inefficient or malfunctioning irrigation system components. Irrigation system check-ups (also known as evaluations or audits) for residential customers, is a tool that cities can employ to reduce outdoor watering demand. Check-ups are typically offered at no charge to homeowners. A licensed irrigator will evaluate the irrigation system components and controller settings during a typical check-up to see if the irrigation system can operate more efficiently and identify needed repairs or adjustments. The licensed irrigator will run the irrigation system to see if the sprinkler heads function correctly and apply water only to the intended areas. The licensed irrigator will check the irrigation system's pressure and discuss the controller settings with the homeowner to advise them on the most efficient watering methods.

One valuable aspect of check-ups is the one-on-one assistance and education that a residential customer receives on properly managing the irrigation system. This education can result in long-term water savings because the customer has a better understanding about the system. Water savings may last for multiple years after the evaluation is completed, mainly due to more efficient watering habits. As part of the check-up, the licensed irrigator will identify inefficiencies in the resident's irrigation system and educate them on programming the irrigation controller for more efficient watering practices, such as seasonal adjustment settings and 'Cycle and Soak.' The sponsoring water provider or city can also offer handouts, brochures, and other educational information to residents. The licensed irrigator can provide a report to the residential customer detailing equipment problems and offer recommendations to change watering habits. Reports can include an estimated water savings amount based on recommended adjustments to the controller run times. The licensed irrigator should also provide a copy of the report to the sponsoring water provider or city.

Benefits of check-ups include one-on-one contact with residential customers, providing educational information that may result in greater water savings than irrigation system fixes alone. Check-ups are an excellent customer service tool when managing residents' complaints. When using check-ups, cities can be selective by targeting high water users or those with large lots to maximize budget and water savings. Water providers or cities should consider conducting a customer satisfaction survey after the check-up is completed to determine how



many residents have implemented recommended modifications and gauge satisfaction with the check-up program.

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans.

I. REBATES

NTMWD recommends that Member Cities and Customers consider offering a rebate program as a conservation practice to be included as part of their water conservation plan. As the population increases in the North Texas region, the demand for water grows, especially because many newer cities require irrigation systems in new developments.

Creating a program that encourages residents to become educated on their irrigation system can improve operation and efficiency. Furthermore, when it comes to the type of irrigation system and standard efficiencies, the Texas AgriLife Research and Extension Urban Solutions Center provides the following average efficiencies by system type:

- Surface/Subsurface drip – 90%
- Surface micro drip irrigation – 85%
- Large Rotors – 70%
- Small Rotors – 65%
- Spray Heads – 50%

This conservation practice of a rebate program provides, in conjunction with a sprinkler evaluation (check-up) program, an incentive to have an evaluation done and make recommended changes. With such a substantial opportunity for efficiency gains, some entities may wish to consider offering rebates to both residential and commercial customers for upgrading their current irrigation systems. By changing out less efficient equipment, this conservation practice intends to increase the irrigation efficiency by 10% or more. With 31% of all residential water use statewide attributed to irrigation, and most of that conducted using spray heads with an average efficiency of 50%, there is a real benefit for developing a rebate program for irrigation systems.

Although rebates for irrigation systems can have large impacts, there are also several other water conservation incentive programs that can be implemented. Other examples include:

- Commercial clothes washer rebates for the purchase and installation of high efficiency card- or coin-operated commercial clothes washers.
- Low-flow toilet replacement and rebate programs.

- Rebates for rain/freeze sensors and/or ET or Smart controllers.
- Low-flow showerhead and sink aerators replacement programs or rebates.
- Residential water efficient clothes washer rebates.
- Pressure reducing valve installation programs or rebates.
- Rain barrel rebates.
- Pool cover rebates.
- On-demand hot water heater rebates.
- Other water conservation incentive programs

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans.

J. ICIM RECOMMENDATIONS

NTMWD has partnered with Plummer Associates, Inc. to develop the ICIM program that focuses on identifying areas where additional ICIM water savings can be achieved. Member Cities and Customers can adopt a similar approach by implementing the following conservation practices:

- **Classification of Customers by Specific End Use** - A billing system that identifies customers by criteria specific enough to assess usage patterns can greatly assist in reviewing drivers of demand and developing targeted conservation efforts. For example, rather than identify customers as residential, commercial, industrial, or institutional, which is very broad, utilities can classify customers by specific end uses such as Veterinary Hospitals, Full-Service Hotels, or Day Care Centers.
- **End Use Analysis** - To determine what water conservation and efficiency programs and policies will be most effective in managing demand, a water utility needs to understand the makeup of its customer base and conduct a thorough assessment of end use water efficiency measures. Understanding what technologies are available, understanding how far along end users are in adopting these new technologies, and understanding the potential impacts to long-term water use trends, allow planners to target the most effective drivers of change.
- **Benchmarking** - As businesses grow, they tend to add more customers and productions. As such, it can be difficult to see the benefit of targeted conservation efforts if you are only looking at the total annual water use. Development of effective and meaningful benchmarking, such as gallons per pound of product, gallons per guest per day, gallons per meal, etc., allows end users to gauge their effectiveness in using



water and energy efficiently by providing measures that are easy to define and allow for comparison amongst peers. Additionally, benchmarking allows end users to gauge the effectiveness of their efforts year over year.

- **Providing Water Efficiency Opportunity Surveys for ICIM Customers** - A detailed water efficiency survey can enable end users to understand how they use water, develop a complete inventory of water using equipment and processes, identify potential leaks and losses, set realistic reduction goals, identify and implement useful policies, identify low cost/no cost projects and assess potential investments in significant projects aimed at reducing long-term water demand. Members can reach out to NTMWD to participate in the ongoing Water Efficiency Opportunity Surveys.

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans. NTMWD recommends that all Member Cities and Customers participate in the ICIM program and take advantage of the Water Efficiency Opportunity Surveys.

K. WATER EFFICIENCY OUTREACH PROGRAM

NTMWD provides a wealth of technical assistance and outreach. Wholesale and retail water providers benefit from a consistent water conservation message across multiple cities and can enhance their reputation in the community. Utilizing resources and programs from NTMWD's conservation portal allows Member Cities and Customers to save money by not producing the resources or operating the programs themselves and amplifies a common message. Outreach assistance from NTMWD accomplishes public outreach and education elements in both the wholesale and retail water providers' respective water conservation plans.

However, it is recommended that each Member City and Customer develop their own water efficiency outreach program as well. Perhaps one of the most important actions a utility can take in increasing water use efficiency among its customers is through public education and outreach programs (E&O). The goal of E&O programs is to influence behavioral change for short- and long-term water savings. Regular and consistent messaging in customer education will provide an overall picture of water resources in the community. Communicating the need for conservation helps manage existing water supplies and avoids or delays the need for expanded or new infrastructure to meet increased water demands. Customer education also provides valuable information on specific actions they can take in their home or business to meet these community goals while also benefiting from them personally (i.e., managing their water bill).

Each utility should develop an education and outreach plan suited to their community that is adaptable over time. Understanding which messages need to be conveyed regularly and identifying the target audience(s) is key to a successful program. An effective public education



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program will help develop trust between the community and the utility as relevant, timely, and fact-based information is provided, and customer service is enhanced.

Many cities have dedicated water conservation web pages located within the main city or utility website with tips and other resources. TWDB is one source that provides publications and other materials that can be placed online or made available in city/utility buildings. NTMWD's online conservation portal is another. The various education and outreach tools also allow cities to promote other programs offered, such as rebates or events, and to communicate other important messages, such as drought conditions or water service outages.

Some customers prefer to gain information through a classroom setting or tour facilities or demonstration areas to better understand certain conservation techniques. Offering in-person or virtual classes or workshops provides an opportunity to connect with these customers, provides hands-on experience, and allows for questions on a range of conservation issues to be answered. NTMWD offers several programs such as these as described in **Section 8.02**.

NTMWD recommends but does not require implementation of this conservation practice in Member Cities' and Customers' own water conservation plans



APPENDIX A
List of References



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APPENDIX A

LIST OF REFERENCES

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5. Freese and Nichols, Inc.: Model Water Conservation Plan for NTMWD Members Cities and Customers, prepared for the North Texas Municipal Water District, Fort Worth, January 2019.
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APPENDIX B

TCEQ Rules on Water Conservation Plans for Municipal Uses by Public Water Suppliers and Wholesale Water Suppliers



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A water conservation plan is defined as “[a] strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document.” Recognizing the need for efficient use of existing water supplies, TCEQ has developed guidelines and requirements governing the development of water conservation and drought contingency plans. NTMWD is both a wholesale water supplier as well as a retail water provider and must meet both requirements.

TCEQ Conservation Plan Requirements for a Wholesale Water Supplier

TCEQ rules governing development of water conservation plans for wholesale water suppliers are contained in Title 30, Chapter 288, Subchapter A, Rule 288.5 of the Texas Administrative Code. The water conservation plan elements required by TCEQ water conservation rules for wholesale suppliers that are addressed in this Plan are listed below.

Minimum Conservation Plan Requirements for Wholesale Water Suppliers

NTMWD is a wholesale water supplier to Member Cities and Customers in North Central Texas (NTMWD’s customers include cities, water supply corporations, and utility districts). The minimum requirements in the Texas Administrative Code for water conservation plans for wholesale water suppliers are covered in this Plan as follows:

- **288.5(1)(A)** – Description of Service Area – Section 2.0
- **288.5(1)(B)** – Specific, Quantified Goals – Section 3.0
- **288.5(1)(C)** – Measure and Account for Water Diverted – Section 4.0
- **288.5(1)(D)** – Monitoring and Record Management Program – Section 4.0
- **288.5(1)(E)** – Program of Metering and Leak Detection and Repair – Section 4.0
- **288.5(1)(F)** – Requirement for Water Conservation Plans by Wholesale Customers – Section 5.0
- **288.5(1)(G)** – Reservoir System Operation Plan – Section 6.0
- **288.5(1)(H)** – Means of Implementation and Enforcement – Section 7.0
- **288.5(1)(I)** – Documentation of Coordination with Regional Water Planning Group – Section 7.0
- **288.5(3)** – Review and Update of Plan – Section 7.0

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Texas Administrative Code 288.7(a) imposes additional requirements for water conservation plans submitted with a water right application for new or additional state water. NTMWD has met this requirement for current water right applications for new or additional state water with its previous conservation plan. If the District should seek a new water right, this 2024 Water Conservation Plan would need to be supplemented to address these requirements.

Additional Conservation Strategies

The Texas Administrative Code lists additional water conservation strategies that can be adopted by a wholesale supplier but are not required. Additional strategies adopted by NTMWD include the following:

- **288.5(2)(A)** – Conservation-oriented Water Rates – Section 8.03
- **288.5(2)(C)** – Program for Reuse and/or Recycling – Section 8.01
- **288.5(2)(D)** – Other Measures – Section 8.0

TCEQ Conservation Plan Requirements for a Public Water Supplier

In addition to serving as a wholesale water supplier, NTMWD is also a public water supplier of potable water, providing direct retail service to several customers who do not have access to retail service from other sources. TCEQ has established rules for the development of water conservation plans for public water suppliers that provide retail services. The rules for water conservation plans for municipal uses by public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.2 of the Texas Administrative Code.

Minimum Conservation Plan Requirements for Public Water Suppliers

TCEQ's minimum requirements for water conservation plans for municipal uses by public water suppliers are addressed below:

- **288.2(a)(1)(A)** – Utility Profile –Section 2.0
- **288.2(a)(1)(B)** – Record Management System –Section 4.0
- **288.2(a)(1)(C)** – Specific, Quantifiable Goals –Section 3.0
- **288.2(a)(1)(D)** – Metering of Diversions –Section 4.0
- **288.2(a)(1)(E)** – Universal Metering – Section 4.0
- **288.2(a)(1)(F)** – Measures to Determine and Control Water Loss – Section 4.0
- **288.2(a)(1)(G)** – Program of Continuing Public Education and Information – Section 8.0
- **288.2(a)(1)(H)** – Non-Promotional Rate Structure – Section 8.0



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- **288.2(a)(1)(I)** – Reservoir System Operation Plan – Section 6.0
- **288.2(a)(1)(J)** – Means of Implementation and Enforcement – Section 7.0
- **288.2(a)(1)(K)** – Documentation of Coordination with Regional Water Planning Groups – Section 7.0
- **288.2(c)** – Review and Update of Plan – Section 7.0

Additional Requirements for Suppliers Serving a Current Population of 5,000 or More

TCEQ has additional requirements for water conservation plans for public water suppliers serving more than 5,000 people. Including its wholesale customers, NTMWD serves more than 5,000 people. Those additional TCEQ requirements are addressed below:

- **288.2(a)(2)(A)** – Program of Leak Detection, Repair, and Water Loss Accounting – Section 4.0
- **288.2(a)(2)(B)** – Requirement for Water Conservation Plans by Wholesale Customers – Section 5.0

Additional Conservation Strategies

TCEQ also lists additional water conservation strategies which may be implemented by a public water supplier but are not required. This water conservation plan includes several of those strategies:

- **288.2(a)(3)** – Additional Conservation Strategies – Section 8.0

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER A	WATER CONSERVATION PLANS
RULE §288.1	Definitions

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

(1) Agricultural or Agriculture--Any of the following activities:

(A) cultivating the soil to produce crops for human food, animal feed, or planting seed or for the production of fibers;

(B) the practice of floriculture, viticulture, silviculture, and horticulture, including the cultivation of plants in containers or non-soil media by a nursery grower;

(C) raising, feeding, or keeping animals for breeding purposes or for the production of food or fiber, leather, pelts, or other tangible products having a commercial value;

(D) raising or keeping equine animals;

(E) wildlife management; and

(F) planting cover crops, including cover crops cultivated for transplantation, or leaving land idle for the purpose of participating in any governmental program or normal crop or livestock rotation procedure.

(2) Agricultural use--Any use or activity involving agriculture, including irrigation.

(3) Best management practices--Voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and that can be implemented within a specific time frame.

(4) Conservation--Those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.



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(5) Commercial use--The use of water by a place of business, such as a hotel, restaurant, or office building. This does not include multifamily residences or agricultural, industrial, or institutional users.

(6) Drought contingency plan--A strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies. A drought contingency plan may be a separate document identified as such or may be contained within another water management document(s).

(7) Industrial use--The use of water in processes designed to convert materials of a lower order of value into forms having greater usability and commercial value, and the development of power by means other than hydroelectric, but does not include agricultural use.

(8) Institutional use--The use of water by an establishment dedicated to public service, such as a school, university, church, hospital, nursing home, prison or government facility. All facilities dedicated to public service are considered institutional regardless of ownership.

(9) Irrigation--The agricultural use of water for the irrigation of crops, trees, and pastureland, including, but not limited to, golf courses and parks which do not receive water from a public water supplier.

(10) Irrigation water use efficiency--The percentage of that amount of irrigation water which is beneficially used by agriculture crops or other vegetation relative to the amount of water diverted from the source(s) of supply. Beneficial uses of water for irrigation purposes include, but are not limited to, evapotranspiration needs for vegetative maintenance and growth, salinity management, and leaching requirements associated with irrigation.

(11) Mining use--The use of water for mining processes including hydraulic use, drilling, washing sand and gravel, and oil field re-pressuring.

(12) Municipal use--The use of potable water provided by a public water supplier as well as the use of sewage effluent for residential, commercial, industrial, agricultural, institutional, and wholesale uses.

(13) Nursery grower--A person engaged in the practice of floriculture, viticulture, silviculture, and horticulture, including the cultivation of plants in containers or nonsoil media, who grows more than 50% of the products that the person either sells or leases, regardless of the variety sold, leased, or grown. For the purpose of this definition, grow means the actual cultivation or propagation of the product beyond the mere holding or maintaining of the item prior to sale or lease, and typically includes activities associated with the production or multiplying of stock such as the development of new plants from cuttings, grafts, plugs, or seedlings.

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(14) Pollution--The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water in the state that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property, or to the public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.

(15) Public water supplier--An individual or entity that supplies water to the public for human consumption.

(16) Regional water planning group--A group established by the Texas Water Development Board to prepare a regional water plan under Texas Water Code, §16.053.

(17) Residential gallons per capita per day--The total gallons sold for residential use by a public water supplier divided by the residential population served and then divided by the number of days in the year.

(18) Residential use--The use of water that is billed to single and multifamily residences, which applies to indoor and outdoor uses.

(19) Retail public water supplier--An individual or entity that for compensation supplies water to the public for human consumption. The term does not include an individual or entity that supplies water to itself or its employees or tenants when that water is not resold to or used by others.

(20) Reuse--The authorized use for one or more beneficial purposes of use of water that remains unconsumed after the water is used for the original purpose of use and before that water is either disposed of or discharged or otherwise allowed to flow into a watercourse, lake, or other body of state-owned water.

(21) Total use--The volume of raw or potable water provided by a public water supplier to billed customer sectors or nonrevenue uses and the volume lost during conveyance, treatment, or transmission of that water.

(22) Total gallons per capita per day (GPCD)--The total amount of water diverted and/or pumped for potable use divided by the total permanent population divided by the days of the year. Diversion volumes of reuse as defined in this chapter shall be credited against total diversion volumes for the purposes of calculating GPCD for targets and goals.

(23) Water Conservation Coordinator--The person designated by a retail public water supplier that is responsible for implementing a water conservation plan.

(24) Water conservation plan--A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the



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recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s).

(25) Wholesale public water supplier--An individual or entity that for compensation supplies water to another for resale to the public for human consumption. The term does not include an individual or entity that supplies water to itself or its employees or tenants as an incident of that employee service or tenancy when that water is not resold to or used by others, or an individual or entity that conveys water to another individual or entity, but does not own the right to the water which is conveyed, whether or not for a delivery fee.

(26) Wholesale use--Water sold from one entity or public water supplier to other retail water purveyors for resale to individual customers.

Source Note: The provisions of this §288.1 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective August 15, 2002, 27 TexReg 7146; amended to be effective October 7, 2004, 29 TexReg 9384; amended to be effective January 10, 2008, 33 TexReg 193; amended to be effective December 6, 2012, 37 TexReg 9515; amended to be effective August 16, 2018, 43 TexReg 5218

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<u>TITLE 30</u>	ENVIRONMENTAL QUALITY
<u>PART 1</u>	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
<u>CHAPTER 288</u>	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
<u>SUBCHAPTER A</u>	WATER CONSERVATION PLANS
RULE §288.2	Water Conservation Plans for Municipal Uses by Public Water Suppliers

(a) A water conservation plan for municipal water use by public water suppliers must provide information in response to the following. If the plan does not provide information for each requirement, the public water supplier shall include in the plan an explanation of why the requirement is not applicable.

(1) Minimum requirements. All water conservation plans for municipal uses by public water suppliers must include the following elements:

(A) a utility profile in accordance with the Texas Water Use Methodology, including, but not limited to, information regarding population and customer data, water use data (including total gallons per capita per day (GPCD) and residential GPCD), water supply system data, and wastewater system data;

(B) a record management system which allows for the classification of water sales and uses into the most detailed level of water use data currently available to it, including, if possible, the sectors listed in clauses (i) - (vi) of this subparagraph. Any new billing system purchased by a public water supplier must be capable of reporting detailed water use data as described in clauses (i) - (vi) of this subparagraph:

- (i) residential;
 - (I) single family;
 - (II) multifamily;
- (ii) commercial;



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- (iii) institutional;
- (iv) industrial;
- (v) agricultural; and,
- (vi) wholesale.

(C) specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in total GPCD and residential GPCD. The goals established by a public water supplier under this subparagraph are not enforceable;

(D) metering device(s), within an accuracy of plus or minus 5.0% in order to measure and account for the amount of water diverted from the source of supply;

(E) a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement;

(F) measures to determine and control water loss (for example, periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections; abandoned services; etc.);

(G) a program of continuing public education and information regarding water conservation;

(H) a water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water;

(I) a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies; and

(J) a means of implementation and enforcement which shall be evidenced by:

(i) a copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the water supplier; and

(ii) a description of the authority by which the water supplier will implement and enforce the conservation plan; and

(K) documentation of coordination with the regional water planning groups for the service area of the public water supplier in order to ensure consistency with the appropriate approved regional water plans.

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(2) Additional content requirements. Water conservation plans for municipal uses by public drinking water suppliers serving a current population of 5,000 or more and/or a projected population of 5,000 or more within the next ten years subsequent to the effective date of the plan must include the following elements:

(A) a program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system;

(B) a requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

(3) Additional conservation strategies. Any combination of the following strategies shall be selected by the water supplier, in addition to the minimum requirements in paragraphs (1) and (2) of this subsection, if they are necessary to achieve the stated water conservation goals of the plan. The commission may require that any of the following strategies be implemented by the water supplier if the commission determines that the strategy is necessary to achieve the goals of the water conservation plan:

(A) conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;

(B) adoption of ordinances, plumbing codes, and/or rules requiring water-conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition;



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(C) a program for the replacement or retrofit of water-conserving plumbing fixtures in existing structures;

(D) reuse and/or recycling of wastewater and/or graywater;

(E) a program for pressure control and/or reduction in the distribution system and/or for customer connections;

(F) a program and/or ordinance(s) for landscape water management;

(G) a method for monitoring the effectiveness and efficiency of the water conservation plan; and

(H) any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

(b) A water conservation plan prepared in accordance with 31 TAC §363.15 (relating to Required Water Conservation Plan) of the Texas Water Development Board and substantially meeting the requirements of this section and other applicable commission rules may be submitted to meet application requirements in accordance with a memorandum of understanding between the commission and the Texas Water Development Board.

(c) A public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan every five years to coincide with the regional water planning group.

Source Note: The provisions of this §288.2 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384; amended to be effective December 6, 2012, 37 TexReg 9515

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<u>TITLE 30</u>	ENVIRONMENTAL QUALITY
<u>PART 1</u>	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
<u>CHAPTER 288</u>	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
<u>SUBCHAPTER A</u>	WATER CONSERVATION PLANS
RULE §288.5	Water Conservation Plans for Wholesale Water Suppliers

A water conservation plan for a wholesale water supplier must provide information in response to each of the following paragraphs. If the plan does not provide information for each requirement, the wholesale water supplier shall include in the plan an explanation of why the requirement is not applicable.

(1) Minimum requirements. All water conservation plans for wholesale water suppliers must include the following elements:

(A) a description of the wholesaler's service area, including population and customer data, water use data, water supply system data, and wastewater data;

(B) specific, quantified five-year and ten-year targets for water savings including, where appropriate, target goals for municipal use in gallons per capita per day for the wholesaler's service area, maximum acceptable water loss, and the basis for the development of these goals. The goals established by wholesale water suppliers under this subparagraph are not enforceable;

(C) a description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply;

(D) a monitoring and record management program for determining water deliveries, sales, and losses;

(E) a program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system;

(F) a requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of this chapter. If the customer intends to resell the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter;



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(G) a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plans shall include optimization of water supplies as one of the significant goals of the plan;

(H) a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan; and

(I) documentation of coordination with the regional water planning groups for the service area of the wholesale water supplier in order to ensure consistency with the appropriate approved regional water plans.

(2) Additional conservation strategies. Any combination of the following strategies shall be selected by the water wholesaler, in addition to the minimum requirements of paragraph (1) of this section, if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

(A) conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;

(B) a program to assist agricultural customers in the development of conservation pollution prevention and abatement plans;

(C) a program for reuse and/or recycling of wastewater and/or graywater; and

(D) any other water conservation practice, method, or technique which the wholesaler shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

(3) Review and update requirements. The wholesale water supplier shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. A wholesale water supplier shall review and update the next revision of its water conservation plan every five years to coincide with the regional water planning group.

Source Note: The provisions of this §288.5 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384; amended to be effective December 6, 2012, 37 TexReg 9515



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APPENDIX C

Texas Water Code Section 11.039



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2024 NTMWD WATER CONSERVATION PLAN

TEXAS WATER CODE SECTION 11.039

§ 11.039. DISTRIBUTION OF WATER DURING SHORTAGE.

(a) If a shortage of water in a water supply not covered by a water conservation plan prepared in compliance with Texas Natural Resource Conservation Commission or Texas Water Development Board rules results from drought, accident, or other cause, the water to be distributed shall be divided among all customers pro rata, according to the amount each may be entitled to, so that preference is given to no one and everyone suffers alike.

(b) If a shortage of water in a water supply covered by a water conservation plan prepared in compliance with Texas Natural Resource Conservation Commission or Texas Water Development Board rules results from drought, accident, or other cause, the person, association of persons, or corporation owning or controlling the water shall divide the water to be distributed among all customers pro rata, according to:

(1) the amount of water to which each customer may be entitled; or

(2) the amount of water to which each customer may be entitled, less the amount of water the customer would have saved if the customer had operated its water system in compliance with the water conservation plan.

(c) Nothing in Subsection (a) or (b) precludes the person, association of persons, or corporation owning or controlling the water from supplying water to a person who has a prior vested right to the water under the laws of this state.

Amended by Acts 1977, 65th Leg., p. 2207, ch. 870, § 1, eff. Sept. 1, 1977; Acts 2001, 77th Leg., ch. 1126, § 1, eff. June 15, 2001.

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APPENDIX D

NTMWD Summary and Example Member City and Customer Annual Water Conservation Report

2024 NTMWD WATER CONSERVATION PLAN



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APPENDIX D
NTMWD MEMBER CITY AND CUSTOMER WATER CONSERVATION REPORT
Due: March 31 of every year

Contact Information

Name of System:	NTMWD
Contact Name:	FNI
Email Address:	
Telephone Number:	(817) 735-7300
Year Covered:	2022
Days in Year	365

Water System Information

Estimated Water Service Area Population:	2,009,431
# of Backflow Preventers:	150,751

Source: Individual Appendix D Reports

Peak Day Usage

Peak Day (MG)	728.24	Note: this is the sum of peak days for all reporting member cities and customers. Not necessarily concurrent.
Average Day (MG)	324.92	Note: this is the sum of average days for all reporting member cities and customers. Not necessarily concurrent.
Peak/Average Day Ratio	2.24	
Peak Day Raw Water Pumping (MG)	644.87	Note: this is the actual peak day raw water pumping to NTMWD's treatment plants.
Average Day Raw Water Pumping (MG)	342.69	Note: this is the actual average day raw water pumping to NTMWD's treatment plants.
Peak Day Pumping/Average Day	1.88	

Authorized Consumption and Water Loss

Total System Input Volume:	111,126	Note: this is the total for all reporting member cities and customers.
Billed Metered:	96,021	Note: this is the total for all reporting member cities and customers.
Billed Unmetered (MG):	195.59	Note: this is the total for all reporting member cities and customers.
Unbilled Metered (MG):	1,149	Note: this is the total for all reporting member cities and customers.
Unbilled Unmetered (MG):	2,903	Note: this is the total for all reporting member cities and customers.
Total Authorized Consumption:	100,268	Note: this is the total for all reporting member cities and customers.
Water Loss (MG):	10,857	Note: this is the total for all reporting member cities and customers.
Water Loss (gpcd):	15	Note: This is the weighted average for all reporting member cities and customers.
Water Loss (percent):	9.77%	Note: This is the weighted average for all reporting member cities and customers.

Description: Please see Individual Appendix D Reports for detailed information

Description: Please see Individual Appendix D Reports for detailed information

Description: Please see Individual Appendix D Reports for detailed information

Per Capita Use (Gallons per person per day)¹

Total Use (MG)	111,126	Note: this is the total for all reporting member cities and customers.
Residential Use (MG)	65,889	Note: this is the total for all reporting member cities and customers.
Municipal Use (MG)	107,401	Note: this is the total for all reporting member cities and customers.
ICI Use (MG)	18,804	Note: this is the total for all reporting member cities and customers.
Total Per Capita Use (gpcd)	152	Note: This is the weighted average for all reporting member cities and customers.
Residential Per Capita Use (gpcd)	90	Note: This is the weighted average for all reporting member cities and customers.
Municipal Per Capita Use (gpcd)	146	Note: This is the weighted average for all reporting member cities and customers.
ICI Per Capita Use (gpcd)	26	Note: This is the weighted average for all reporting member cities and customers.

¹ Per capita numbers are for direct customers

Water Conservation Plan 5- and 10-Year Goals for Water Savings

	5-Year Goal	10-Year Goal
GPCD with Credit for Reuse	128	121
Water Loss (Percentage)	12%	12%

Recorded Deliveries and Sales by Month (in Million Gallons)

Month	Direct Deliveries from NTMWD	Other Supplies	Sales by Category								
			Residential Single Family	Residential Multi-Family	Public/ Institutional	Commercial	Industrial	Agriculture	Metered Irrigation	Wholesale	Direct Reuse
January	6,347.61	41.64	3,878.84	500.86	123.76	1,063.31	280.98	0.02	362.22	357.95	16.28
February	5,834.81	36.51	3,053.24	488.67	118.28	854.80	310.50	0.01	248.95	321.22	12.86
March	6,952.05	41.82	3,020.88	467.96	115.05	848.94	315.35	0.01	244.40	392.71	7.75
April	8,686.39	39.69	3,586.88	466.96	137.89	881.26	286.08	0.02	407.42	449.69	6.70
May	9,449.42	45.07	4,390.57	470.34	149.86	963.76	321.05	0.04	775.35	550.95	12.86
June	11,367.06	64.75	5,630.53	480.45	186.34	1,087.23	333.13	0.09	1,071.90	723.85	34.14
July	16,810.00	84.23	7,914.84	507.12	231.94	1,227.11	368.92	0.22	1,671.69	1,079.72	46.34
August	14,789.33	64.41	8,521.53	540.68	306.05	1,419.53	373.65	0.13	2,022.85	885.75	98.80
September	11,415.25	61.71	6,591.75	530.86	274.08	1,348.38	380.55	0.05	1,759.69	712.71	93.66
October	11,728.14	53.81	5,940.01	506.70	242.39	1,200.39	259.16	0.14	1,392.12	691.49	47.19
November	7,351.52	39.94	4,291.29	499.35	208.65	1,049.52	264.38	0.02	943.08	430.76	48.66
December	7,238.93	52.11	3,126.48	482.21	131.10	909.74	231.19	0.02	426.84	438.67	9.79
TOTAL	117,970.50	625.68	59,946.85	5,942.16	2,225.40	12,853.97	3,724.95	0.77	11,326.50	7,035.48	435.03
# of Connections (or Units)			560,395	81,227	4,386	30,043	520	9	13,317	-	45

Historical Water Use for Reporting NTMWD Member Cities and Customers

Year	Days in Year	Connections	Population Reported by Entities	Deliveries from NTMWD (MG)	Other Supplies (MG)	Metered Sales by Category (Million Gallons)										
						Residential Single Family	Residential Multi-Family	Public/ Institutional	Commercial	Industrial	Agriculture	Metered Irrigation	Wholesale	Reuse	Total	
1990	365	156,830	586,454	39,246	524	21,425			133	11,480	34			264		33,336
1991	365	156,576	600,162	36,719	526	20,139			125	10,682	32			279		31,257
1992	366	157,948	619,873	37,270	607	20,774			136	11,117	35			289		32,351
1993	365	171,229	656,529	43,015	869	23,634			154	12,302	39			351		36,481
1994	365	183,821	697,655	41,246	1,139	23,557			155	12,261	39			434		36,445
1995	365	189,669	723,207	46,577	1,359	25,682			171	13,174	43			464		39,534
1996	366	202,068	750,734	49,023	1,598	27,457			194	14,051	49			471		42,222
1997	365	206,050	785,268	51,096	762	28,483			219	14,792	56			542		44,092
1998	365	231,778	821,441	64,789	1,037	37,544			266	18,001	67			634		56,512
1999	365	262,824	883,270	68,570	658	39,039			278	20,445	254			699		60,716
2000	366	311,139	925,399	74,359	634	43,454			390	21,602	292			1,012		66,749
2001	365	327,171	970,025	76,588	621	43,169			361	21,057	272			1,134		65,995
2002	365	341,370	1,021,726	73,248	494	37,187			519	21,630	383			1,409		61,129
2003	365	359,188	1,073,848	79,032	518	44,347			968	21,806	631			1,691		69,443
2004	366	388,985	1,152,181	76,359	612	42,605			858	22,094	667			1,119		67,342
2005	365	412,301	1,210,539	88,503	729	51,810			1,437	25,873	894			2,191		82,205
2006	365	430,471	1,270,354	90,858	1,026	55,207			1,535	23,734	863			2,432		83,771
2007	365	447,324	1,334,711	75,775	963	43,350			1,603	19,436	1,100			2,477		67,967
2008	366	467,923	1,397,488	92,817	885	54,070			2,555	21,669	1,280			2,838		82,411
2009	365	471,475	1,410,416	85,687	578	48,903			2,642	19,659	1,219			2,838		75,261
2010	365	477,502	1,439,945	95,399	742	54,435			3,352	21,249	1,294			2,899		83,230
2011	365	500,666	1,469,951	102,697	754	61,807			4,056	21,665	1,769			3,740		93,037
2012	366	512,219	1,478,897	93,748	600	55,771			3,634	18,808	1,672			3,246		83,131
2013	365	525,858	1,522,230	87,148	550	52,151			3,223	18,035	1,718			3,094		78,222
2014	365	544,322	1,560,566	78,725	693	46,232			2,931	14,787	2,336			2,989		69,275
2015	365	554,414	1,615,861	90,128	817	52,364			3,926	17,383	2,728			3,524		79,925
2016	366	567,011	1,660,113	93,192	840	50,277			2,760	14,866	3,085		4,283	3,410		78,680
2017	365	590,072	1,721,899	93,637	807	51,734			2,796	15,340	3,257		4,862	3,702		81,691
2018	365	593,004	1,752,165	98,737	993	52,438			2,347	15,385	3,441		6,032	4,532		84,175
2019	365	611,563	1,816,697	98,372	928	52,507			2,960	15,114	3,605		5,600	4,768		84,553
2020	366	626,811	1,868,010	104,997	523	56,350			2,627	14,976	3,536		6,344	5,042		88,875
2021	365	668,869	1,946,846	103,894	832	50,750	5,702		1,964	11,537	3,596	1.14	8,303	5,690	405	87,948
2022	365	689,942	2,009,431	117,971	626	59,947	5,942		2,225	12,854	3,725	0.77	11,326	7,035	435	103,491

Note: After 2020, Residential sales were divided into single and multi-family classifications. Historical information from the TWDB Water Use Surveys were incorporated where available. The category of 'Other' was removed and replaced with 'Reuse'. Historical volumes for 'Other' were redistributed into the appropriate category. These changes were made to be consistent with TWDB terminology.

Historical Weighted Average Per Capita Use Data and Water Loss for NTMWD Member Cities and Customers

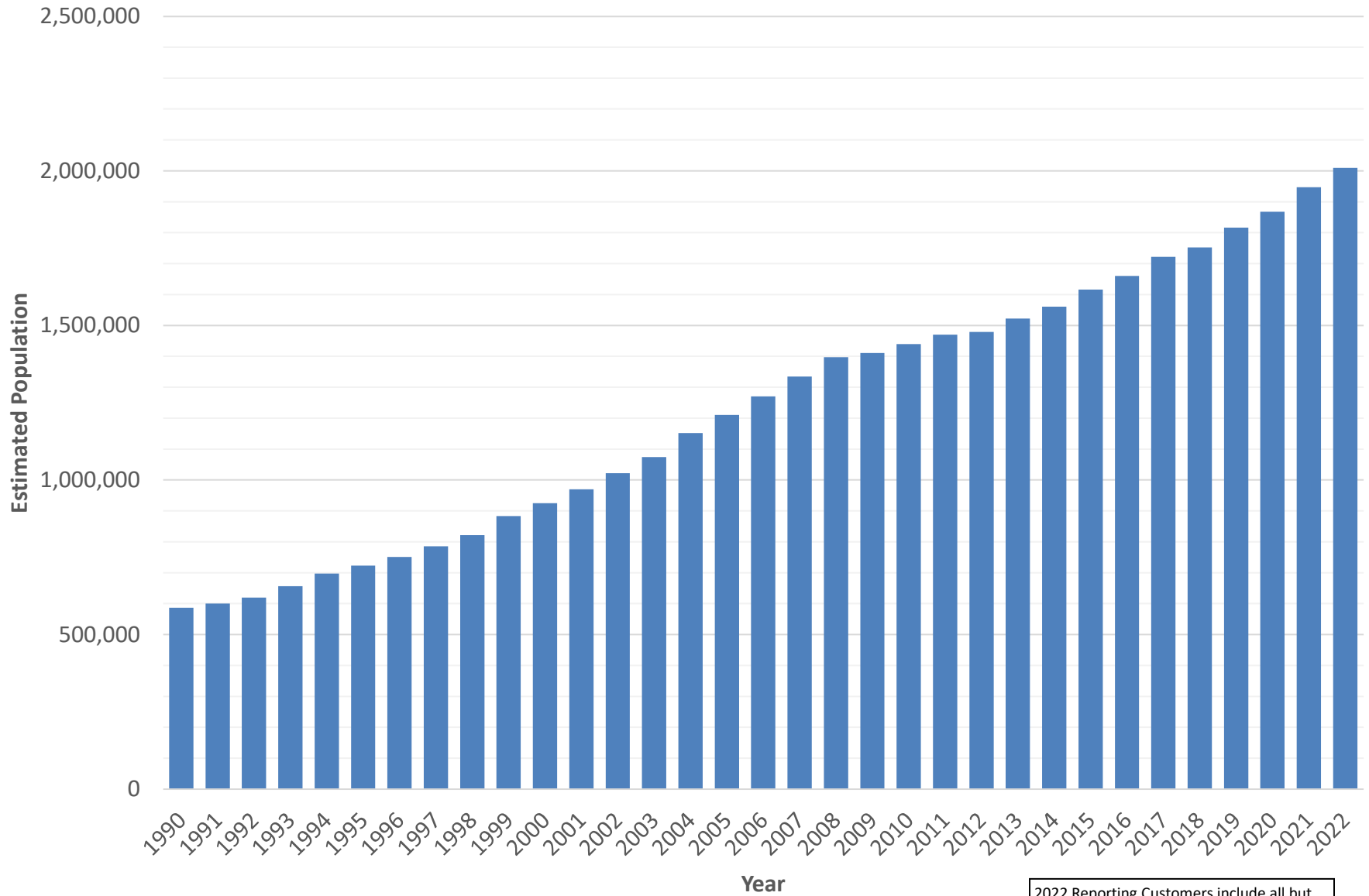
Year	Population Reported by Entities	Deliveries from NTMWD (MG)	% Reuse	Reuse (MG)	In-City Municipal Use (MG)	In-City Municipal Use with Credit for Reuse	Per Capita Municipal Use (gpcd)	Per Capita Municipal Use with Reuse Credit	In-City Residential Use (MG)	Per Capita Residential Use (gpcd)	Other Supplies (MG)	Wholesale Sales (MG)	Billed Metered (MG)	Billed Unmetered (MG)	Unbilled Metered (MG)	Unbilled Unmetered (MG)	Water Losses (MG)	% Water Loss
2000	925,399	74,359	12.69%	9,438	73,521	64,189	218	190	43,454	129	634	1,012	66,749	0	602	557	7,085	9.45%
2001	970,025	76,588	14.04%	10,752	75,635	65,017	214	184	43,169	122	621	1,134	65,995	0	617	577	10,020	12.98%
2002	1,021,726	73,248	14.38%	10,535	71,784	61,460	193	165	37,187	100	494	1,409	61,129	0	636	606	11,372	15.42%
2003	1,073,848	79,032	12.68%	10,019	76,873	67,128	197	171	44,347	113	518	1,691	69,443	0	646	607	8,855	11.13%
2004	1,152,181	76,359	16.04%	12,246	74,901	62,889	179	149	42,605	101	612	1,119	67,175	0	664	718	8,247	10.71%
2005	1,210,539	88,503	12.86%	11,379	85,705	74,685	195	169	51,810	117	729	2,191	82,017	0	689	779	5,559	6.23%
2006	1,270,354	90,858	14.03%	12,749	88,221	75,842	191	164	55,207	119	1,026	2,531	83,969	0	697	870	6,547	7.12%
2007	1,334,711	75,775	19.34%	14,658	72,691	58,629	149	120	43,331	89	963	2,623	68,110	0	807	916	7,055	9.19%
2008	1,397,488	92,817	13.88%	12,882	89,335	76,937	175	150	53,266	104	885	3,023	81,920	0	335	2,013	8,924	9.52%
2009	1,410,416	85,687	26.52%	22,724	81,940	60,209	159	117	47,862	93	578	2,943	74,848	0	80	1,586	9,186	10.65%
2010	1,439,945	95,399	22.96%	21,904	91,601	70,569	174	134	54,392	103	742	3,101	83,006	0	87	1,493	11,299	11.75%
2011	1,469,951	102,697	25.63%	26,321	97,850	72,771	182	136	61,487	115	754	3,740	92,678	0	76	1,465	8,862	8.57%
2012	1,488,911	93,754	25.92%	24,301	89,256	66,121	164	121	55,553	102	677	3,246	82,871	0	101	1,089	10,044	10.64%
2013	1,513,675	87,148	34.06%	29,683	82,661	54,506	150	99	51,886	94	550	3,090	77,920	0	116	828	8,557	9.76%
2014	1,560,566	78,725	32.14%	25,302	73,877	50,133	130	88	46,234	81	693	2,999	69,106	0	112	1,300	8,721	10.98%
2015	1,615,861	90,128	33.18%	29,905	84,374	56,379	143	96	52,364	89	817	3,524	79,724	0	92	1,523	9,380	10.31%
2016	1,660,113	93,192	23.96%	22,329	82,891	63,030	137	104	50,277	83	840	3,410	78,424	0	75	3,510	11,718	12.46%
2017	1,721,899	93,637	31.67%	29,655	87,209	59,590	139	95	51,734	82	807	3,702	77,989	145	763	3,074	8,770	9.67%
2018	1,752,165	98,737	24.77%	24,457	91,474	68,816	143	108	52,438	82	993	4,532	79,643	18	614	2,539	12,384	13.01%
2019	1,816,697	98,372	21.89%	24,367	90,675	70,827	137	107	52,507	79	928	4,768	79,785	35	858	2,540	11,314	11.97%
2020	1,868,010	104,997	25.63%	26,911	96,652	71,880	141	105	56,350	82	523	5,042	83,833	230	1,102	3,692	11,620	11.56%
2021	1,946,846	103,894	24.71%	25,672	95,035	71,552	134	101	56,452	79	832	5,690	81,853	34	1,936	3,015	11,793	11.96%
2022	2,009,431	117,971	26.23%	30,944	107,401	79,230	146	108	65,889	90	626	7,035	96,021	196	1,149	2,903	10,857	9.77%

Note:

In-city municipal use = total water supplied less sales to industry, wholesale sales and other sales.

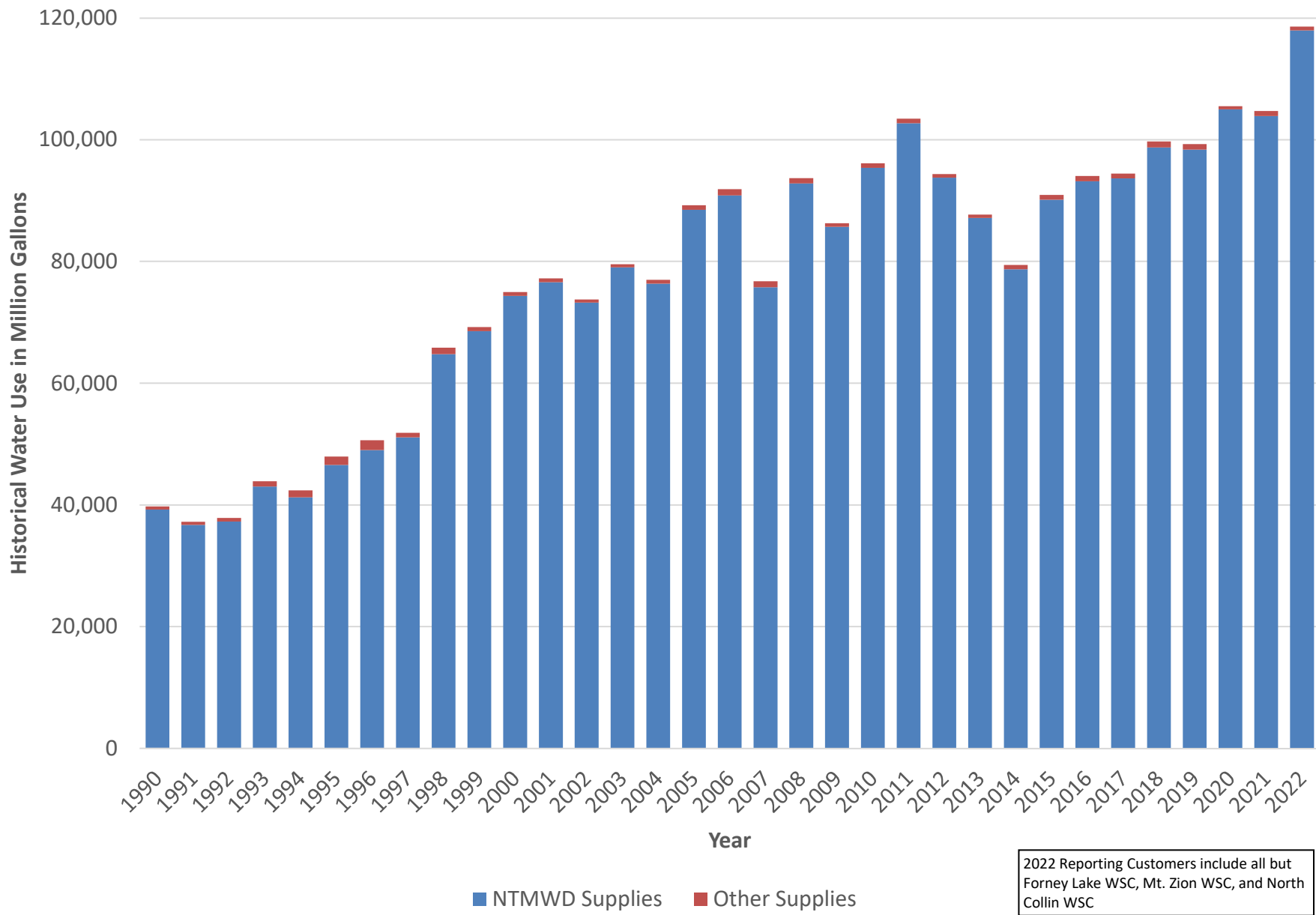
After 2017 - Unaccounted Water has been removed and replaced with Water Losses (per TWDB definition). This category is inclusive of real and apparent losses. Categories for authorized consumption were also added; Unbilled metered replaced estimated fire use, unbilled unmetered replaced estimated line flushing, and a new category for billed unmetered sales was added.

Estimated Historical Population for NTMWD Customers Providing Data for 2000 - 2022

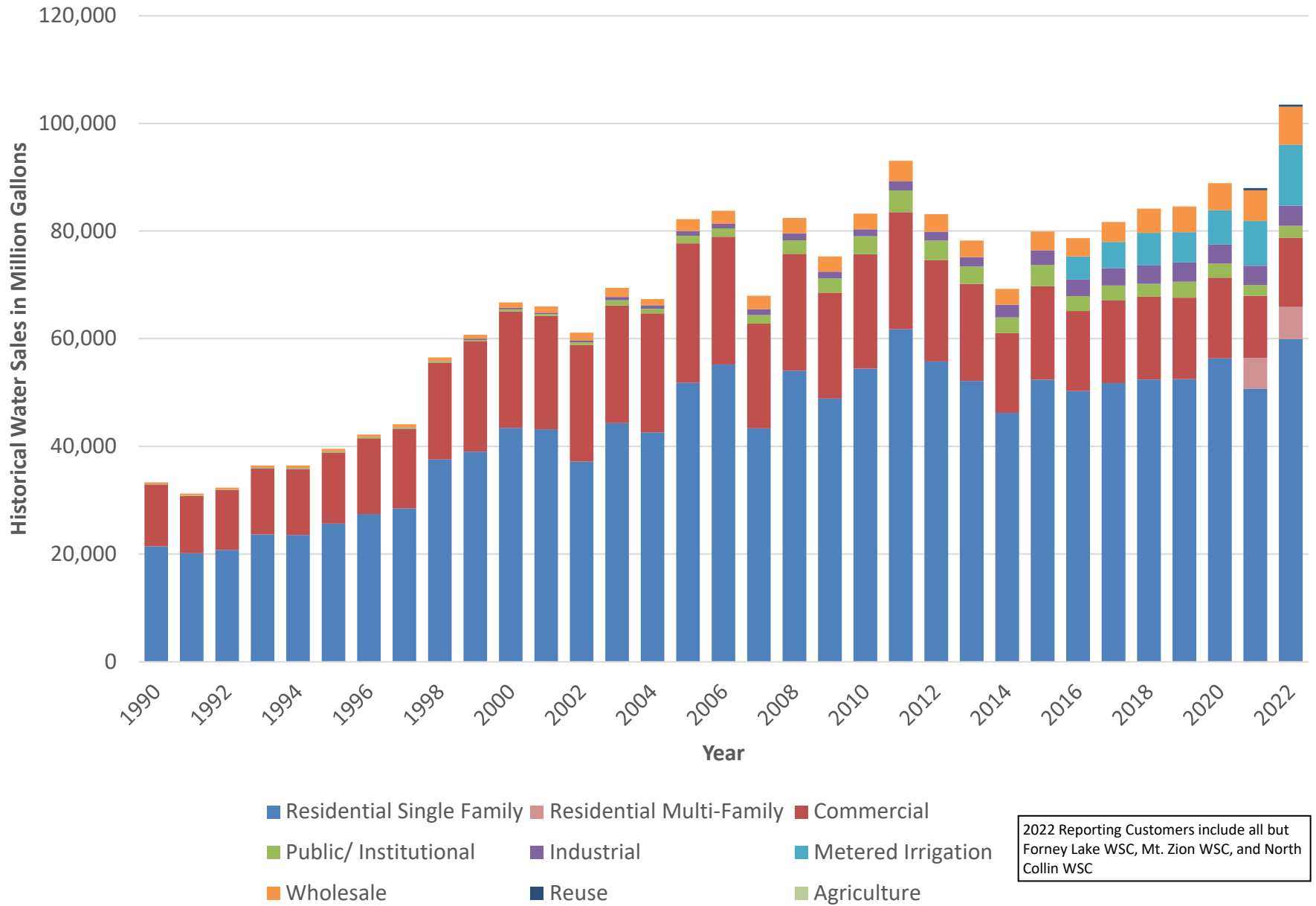


2022 Reporting Customers include all but Forney Lake WSC, Mt. Zion WSC, and North Collin WSC

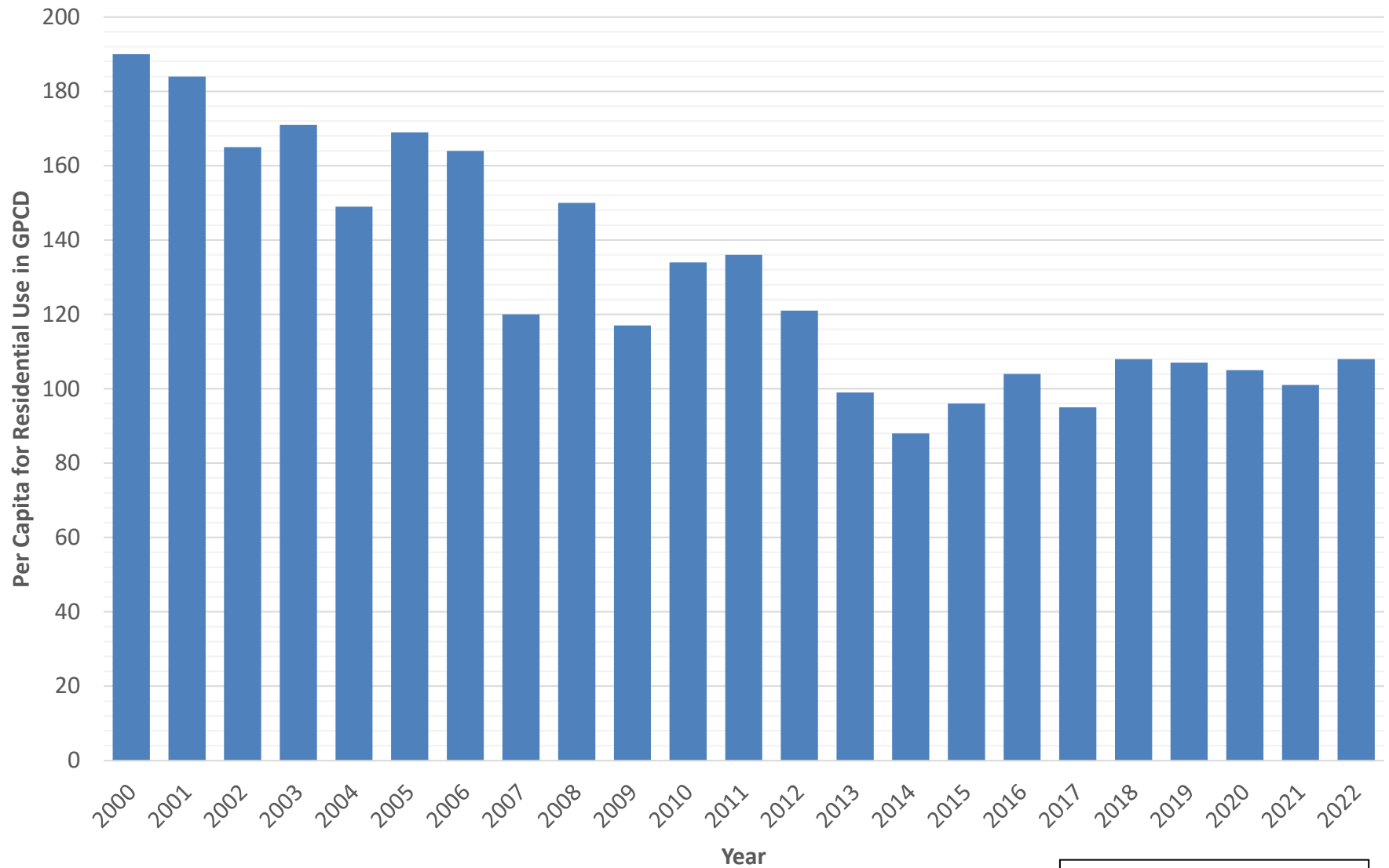
Historical Water Use for NTMWD Customers Providing Data



Historical Water Sales by Classification for NTMWD Customers Providing Data

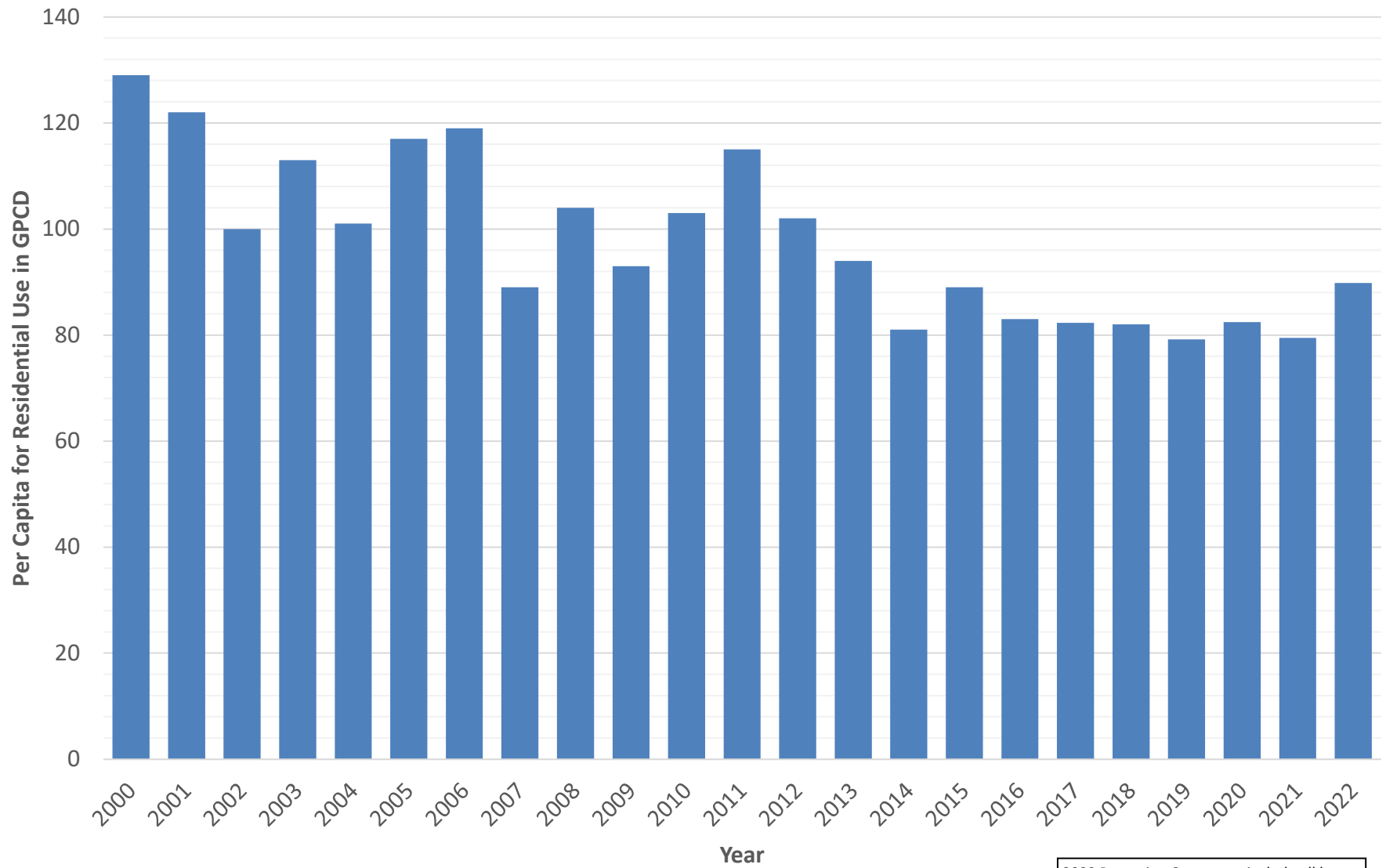


Historical Per Capita Municipal Use with Credit for Reuse for NTMWD Customers Providing Data



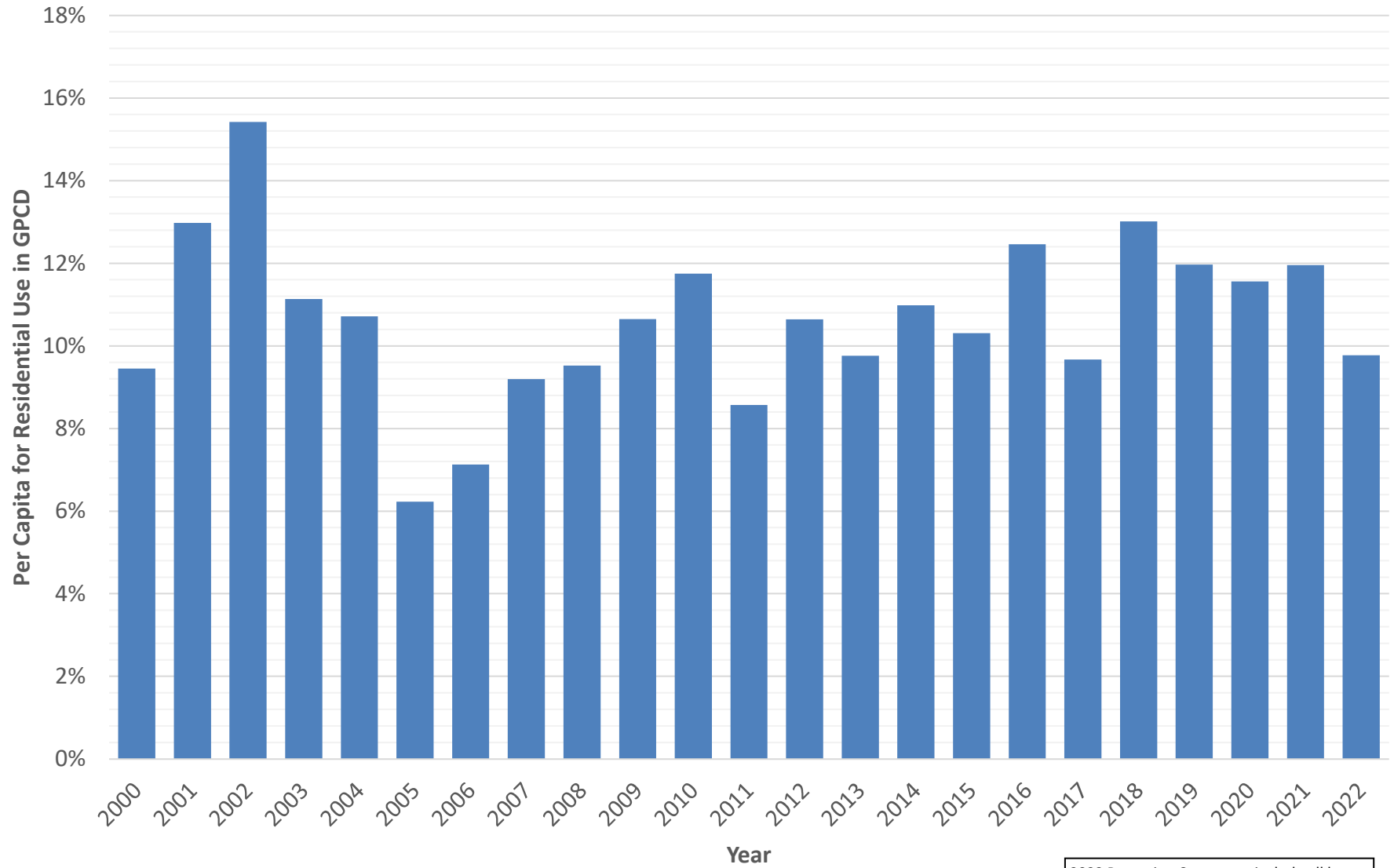
2022 Reporting Customers include all but Forney Lake WSC, Mt. Zion WSC, and North Collin WSC

Historical Per Capita Residential Use for NTMWD Customers Providing Data



2022 Reporting Customers include all but Forney Lake WSC, Mt. Zion WSC, and North Collin WSC

Historical Percent Water Loss for NTMWD Customers Providing Data



2022 Reporting Customers include all but Forney Lake WSC, Mt. Zion WSC, and North Collin WSC

APPENDIX D
NTMWD MEMBER CITY AND CUSTOMER WATER CONSERVATION REPORT
Due: March 31 of every year

Contact Information

TWDB Survey Number: _____
Name of System: _____
PWS ID: _____
Contact Name: _____
Title: _____
Email Address: _____
Telephone Number: _____
Year Covered: _____
Days in Year _____

Water System Information

Estimated Water Service Area Population: _____ **Source:** _____
 # of Backflow Preventers: _____

Peak Day Usage

	Total System
Delivery Point	_____
Peak Day (MG)	_____
Average Day (MG)	_____
Peak/Average Day Ratio	_____
Firm Pumping Capacity (MGD)	_____
Storage Volume (MG)	_____

Authorized Consumption and Water Loss

Total System Input Volume:	_____	
Billed Metered:	_____	
Billed Unmetered (MG):	_____	Description: _____
Unbilled Metered (MG):	_____	Description: _____
Unbilled Unmetered (MG):	_____	Description: _____
Total Authorized Consumption:	_____	
Water Loss (MG):	_____	
Water Loss (gpcd):	_____	
Water Loss (percent):	_____	

Per Capita Use (Gallons per person per day)

Total Use (MG)	_____
Residential Use (MG)	_____
Municipal Use (MG)	_____
ICIM Use (MG)	_____
Total Per Capita Use (gpcd)	_____
Residential Per Capita Use (gpcd)	_____
Municipal Per Capita Use (gpcd)	_____
ICIM Per Capita Use (gpcd)	_____

Water Conservation Plan 5- and 10-Year Goals for Water Savings

	5-Year Goal	10-Year Goal	
Total GPCD			$Total\ GPCD = (Total\ Gallons\ in\ System + Permanent\ Population) / 365$
Residential GPCD			$Residential\ GPCD = (Gallons\ Used\ for\ Residential\ Use / Residential\ Population) / 365$
Water Loss (GPCD)			$Water\ Loss\ GPCD = (Total\ Water\ Loss / Permanent\ Population) / 365$
Water Loss (Percentage)			$Water\ Loss\ Percentage = (Total\ Water\ Loss / Total\ Gallons\ in\ System) \times 100; \text{ or } (Water\ Loss\ GPCD / Total\ GPCD) \times 100$

Retail Water Metered by Month (in Million Gallons):

Month	Sales by Category								
	Residential Single Family	Residential Multi-Family	Public/ Institutional	Commercial	Industrial	Agriculture	Metered Irrigation	Wholesale	Direct Reuse
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									
<i># of Connections (or Units)</i>									

Recorded Supplies from Sources by Month (in Million Gallons):

Month	Deliveries from NTMWD	Other Sources							Total Supplies
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									

Recorded Supplies by Delivery Point from NTMWD by Month (in Million Gallons):

Month	NTMWD Delivery Point								Total System
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									

Wholesale Water Sales to Other Water Systems (in Million Gallons):

	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5	Sale 6	Sale 7	Sale 8	Total Wholesale Sales
<i>Buyer Name</i>									
<i>Type of Water</i>									
<i>Name of Source</i>									
<i>Estimated Water Service Area Population</i>									
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									

Water Sales to Industrial Production Facilities (in Million Gallons):

	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5	Sale 6	Sale 7	Sale 8	Total Industrial Production Facilities Sales
<i>Buyer Name</i>									
<i>Type of Water</i>									
<i>Name of Source</i>									
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									

Additional Information

Describe Any ICIM (Industrial, Commercial, Institutional & Multi-Family) Practices being Implemented to Improve Water Efficiency

Describe any Unusual Circumstances

Provide an Update on Progress in Implementation of Conservation Plan

What Conservation Measures are Planned for Next Year?

Do City Limits Differ Significantly from Water Service Area? If so, explain.

Is there any Assistance Requested from the North Texas Municipal Water District?

--

Other?

--

Historical Water Use Data for 0

Year	Days in Year	Connections	Estimated Population	Deliveries from NTMWD (MG)	Other Supplies (MG)	Metered Sales by Category (Million Gallons)									
						Residential Single Family	Residential Multi-Family	Public/ Institutional	Commercial	Industrial	Agriculture	Metered Irrigation	Wholesale	Direct Reuse	
1990	365														
1991	365														
1992	366														
1993	365														
1994	365														
1995	365														
1996	366														
1997	365														
1998	365														
1999	365														
2000	366														
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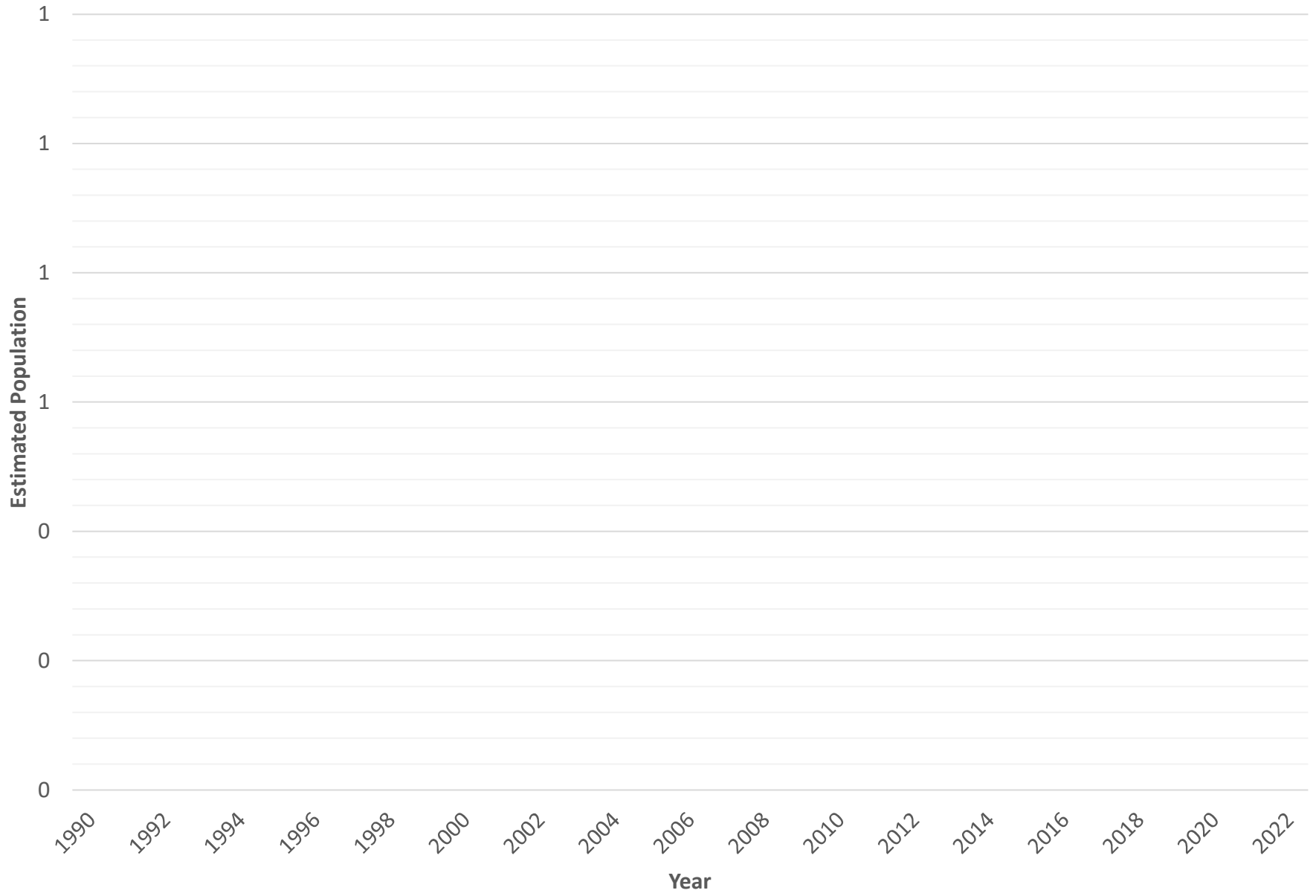
Note: After 2020, Residential sales were divided into single and multi-family classifications. Historical information from the TWDB Water Use Surveys were incorporated where available. The category of 'Other' was removed and replaced with 'Reuse'. Historical volumes for 'Other' were redistributed into the appropriate category when appropriate. These changes were made to be consistent with TWDB terminology.

Historical Per Capita Use Data and Water Loss for 0

Year	Estimated Population	Total Use			Residential Use			Municipal Per Capita Use (gpcd)	ICIM Per Capita Use (gpcd)	Authorized Consumption				Water Loss						
		Total Per Capita Use (gpcd)	Total 5-Year Per Capita Goal	Total 10-Year Per Capita Goal	Residential Per Capita Use (gpcd)	Residential 5-Year Per Capita Goal	Residential 10-Year Per Capita Goal			Billed Metered (MG)	Billed Unmetered (MG)	Unbilled Metered (MG)	Unbilled Unmetered (MG)	Water Loss (MG)	Water Loss (gpcd)	Water Loss 5-Year Per Capita Goal	Water Loss 10-Year Per Capita Goal	Water Loss (percentage)	Water Loss (percentage) 5-Year Goal	Water Loss (percentage) 10-Year Goal
1990																				
1991																				
1992																				
1993																				
1994																				
1995																				
1996																				
1997																				
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2021																				
2022																				

Note:
 In-city municipal use = total water supplied less sales to industry, wholesale sales and other sales.
 After 2017 - Unaccounted Water has been removed and replaced with Water Losses (per TWDB definition). This category is inclusive of real and apparent losses. Categories for authorized consumption were also added; Unbilled metered replaced estimated fire use, unbilled unmetered replaced estimated line flushing, and a new category for billed unmetered sales was added.

Estimated Historical Population

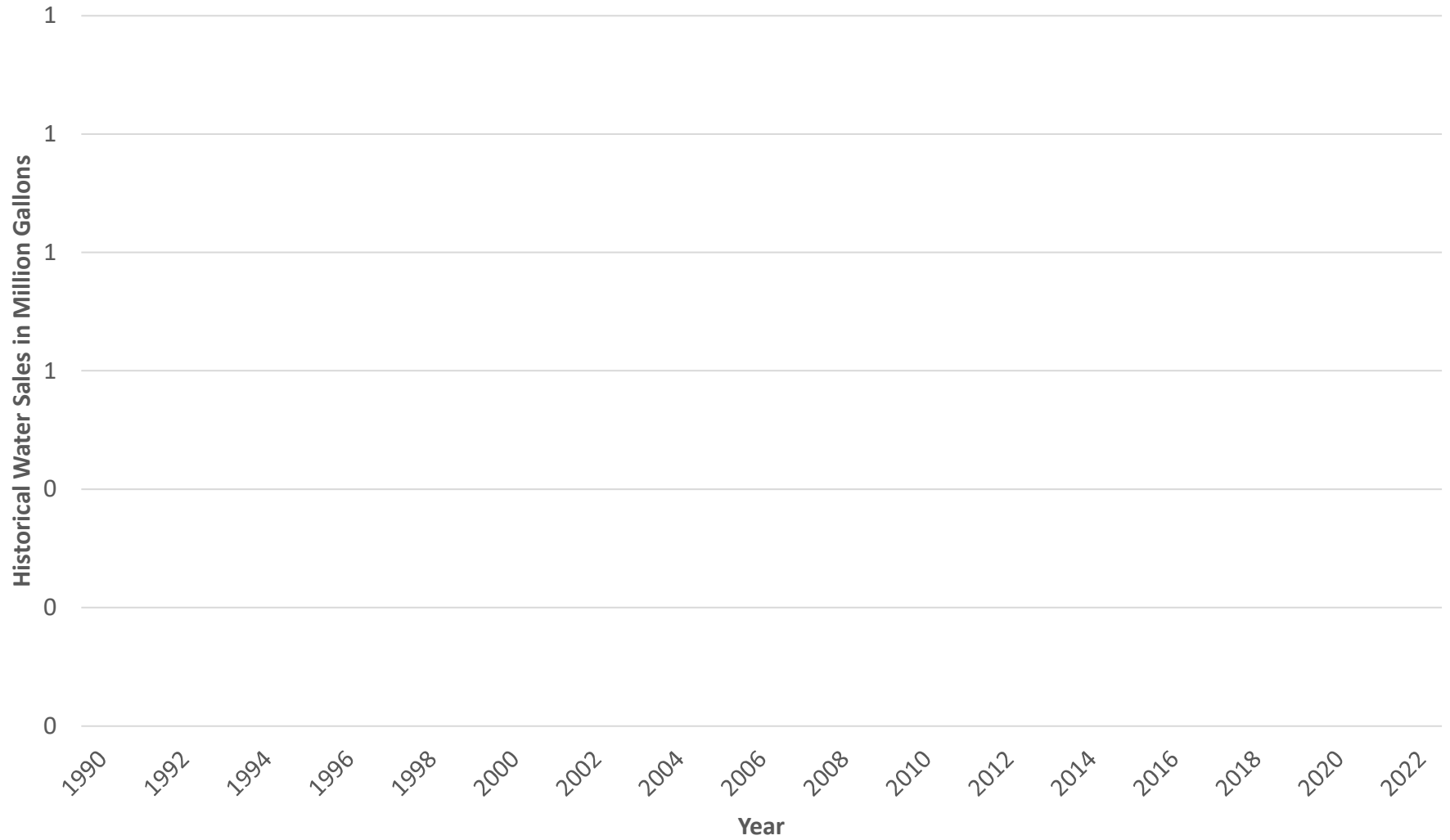


Historical Water Use



■ NTMWD Supplies ■ Other Supplies

Historical Water Sales by Classification



- Residential Single Family
- Residential Multi-Family
- Commercial
- Public/ Institutional
- Industrial
- Metered Irrigation
- Wholesale
- Direct Reuse
- Agriculture

Historical Total Per Capita Use



■ Total Per Capita Use (gpcd) ■ Total 5-Year Per Capita Goal ▲ Total 10-Year Per Capita Goal

Historical Residential Per Capita Use



■ Residential Per Capita Use (gpcd) ■ Residential 5-Year Per Capita Goal ▲ Residential 10-Year Per Capita Goal

Historical Municipal Per Capita Use



Historical ICIM Per Capita Use

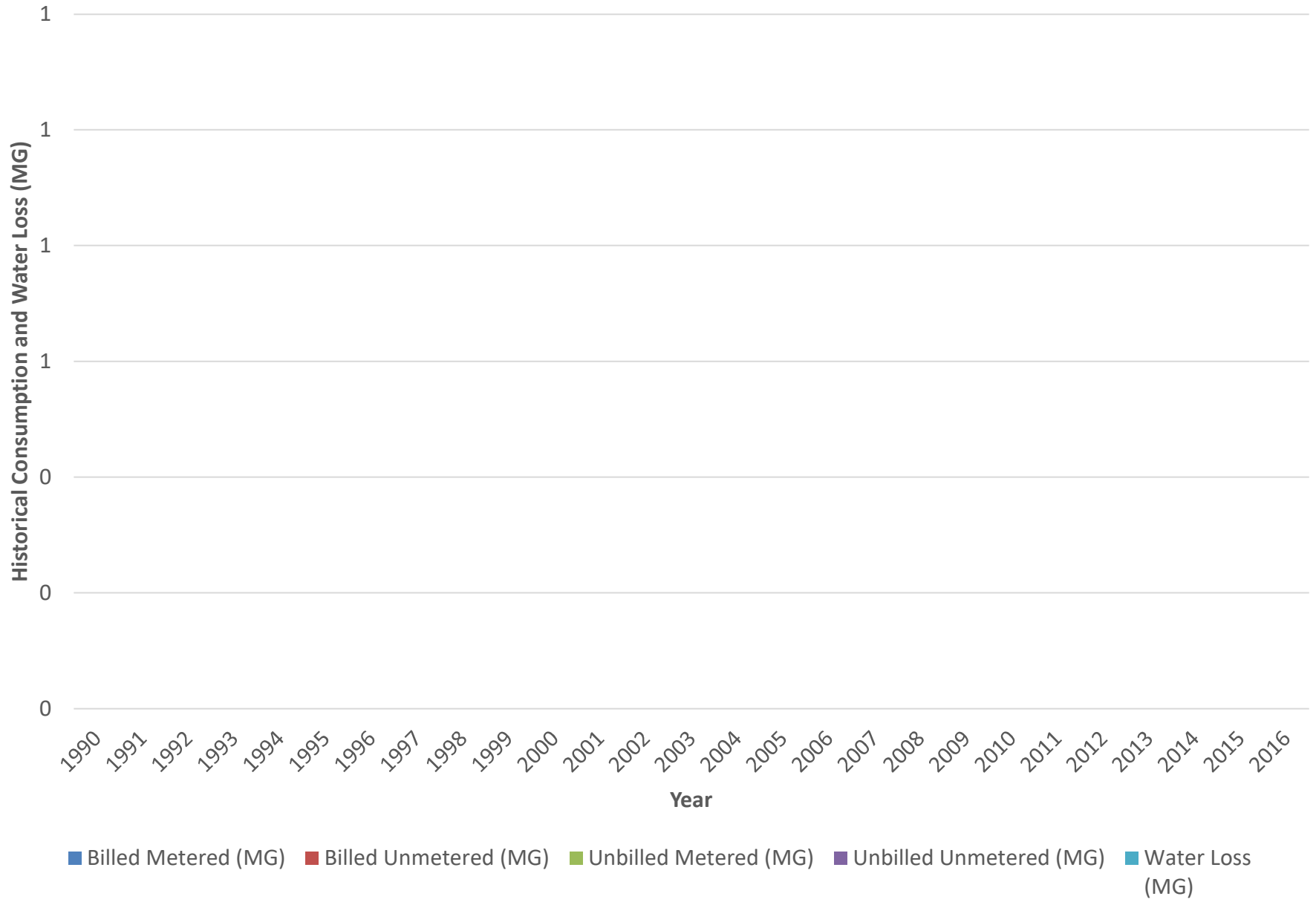


Historical Water Loss (Percentage)



- Water Loss (percentage)
- Water Loss (percentage) 5-Year Goal
- Water Loss (percentage) 10-Year Goal

Historical Authorized Consumption and Water Loss





APPENDIX E

NTMWD Water Utility Profile based on TCEQ Format

2024 NTMWD WATER CONSERVATION PLAN



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Texas Commission on Environmental Quality

Water Availability Division

MC-160, P.O. Box 13087 Austin, Texas 78711-3087

Telephone (512) 239-4600, FAX (512) 239-2214

Utility Profile and Water Conservation Plan Requirements for Wholesale Public Water Suppliers

This form is provided to assist wholesale public water suppliers in water conservation plan development. If you need assistance in completing this form or in developing your plan, please contact the Conservation staff of the Resource Protection Team in the Water Availability Division at (512) 239-4600.

Water users can find best management practices (BMPs) at the Texas Water Development Board's website <http://www.twdb.texas.gov/conservation/BMPs/index.asp>. The practices are broken out into sectors such as Agriculture, Commercial and Institutional, Industrial, Municipal and Wholesale. BMPs are voluntary measures that water users use to develop the required components of Title 30, Texas Administrative Code, Chapter 288. BMPs can also be implemented in addition to the rule requirements to achieve water conservation goals.

Contact Information

Name: North Texas Municipal Water District

Address: P.O. Box 2408, Wylie, TX 75098

Telephone Number: (972)442-5405 Fax: (972) 295-6440

Water Right No.(s): CA 08-2410, Permit 5003, CA 03-4798, CA 02-4925, Permit 4033, Permit 4044, CA 02-4920, Permit 12151, Permit 12152, Permit 12472, Permit 13733

Regional Water Planning Group: Region C and Region D

Person responsible for implementing conservation program: Kathy Fonville Phone: (469) 626-4306

Form Completed By: Abbie Gardner

Title: FNI Engineering Consultant

Signature: *Abigail H. Gardner* Date: 01 / 01 / 2024

A water conservation plan for wholesale public water suppliers must include the following requirements (as detailed in 30 TAC Section 288.5). If the plan does not provide information for each requirement, you must include in the plan an explanation of why the requirement is not applicable.

Utility Profile

I. WHOLESALE SERVICE AREA POPULATION AND CUSTOMER DATA

A. Population and Service Area Data:

1. Service area size (in square miles):

(Please attach a copy of service-area map)

Over 2,200 square miles in Collin, Dallas, Denton, Fannin, Grayson, Hopkins, Hunt, Kaufman, Rains, Rockwall and Van Zandt Counties. Please see Figure 3 for a service area map.

2. Current population of service area:

2,103,481

3. Current population served for:

- a. Water 2,103,481

- b. Wastewater 701,160 (approximately one third)

4. Population served for previous five years:

<i>Year</i>	<i>Population</i>
2018	1,814,006
2019	1,887,639
2020	1,960,757
2021	2,021,298
2022	2,103,481

5. Projected population for service area in the following decades:

<i>Year</i>	<i>Population</i>
2020	1,960,557
2030	2,486,000
2040	3,008,000
2050	3,536,000
2060	3,998,000

6. List source or method for the calculation of current and projected population size.

Population projections were developed as part of the NTMWD Long Range Water Supply Plan and are inclusive of Member Cities and Customers, and customers in Fannin County that NTMWD has committed to serve. Those potential future customers include Bois d'Arc MUD, Ector, Honey Grove, Leonard, Savoy, Southwest Fannin County SUD, and Trenton. Historical populations are collected from Member Cities and Customer's submitted annual reports (Appendix D Reports).

B. Customer Data

List (or attach) the names of all wholesale customers, amount of annual contract, and amount of annual use for each customer for the previous year:

NTMWD is primarily a wholesale water provider. However, NTMWD does provide retail service to several retail customers. Contracts are demand based with minimum take or pay amounts.

<i>Wholesale Customer</i>	<i>Contracted Amount (Acre-feet)</i>	<i>Previous Year Amount of Water Delivered (acre-feet)</i>
Allen	-	19,715
Farmersville	-	854
Forney	-	8,999
Frisco	-	42,943
Garland	-	34,880
McKinney	-	37,808
Mesquite	-	20,996
Plano	-	67,678
Princeton	-	4,003
Richardson	-	30,282
Rockwall	-	14,463
Royse City	-	2,736
Wylie	-	5,699
Ables Springs	-	353
Bear Creek SUD	-	1,310
BHP	-	579
Caddo Basin SUD	-	1,586
Cash WSC	-	1,108
College Mound WSC	-	321
Copeville WSC	-	445
East Fork SUD	-	2,215
Fairview	-	3,149
Fate	-	2,570
Forney Lake WSC	-	1,984
Gastonia-Scurry	-	266
GTUA	-	4,508
Josephine	-	747

Kaufman	-	1,416
Kaufman 4-1	-	1,412
Little Elm	-	5,547
Lucas	-	2,323
Melissa	-	1,102
Milligan WSC	-	327
Mt. Zion WSC	-	348
Murphy	-	5,052
Nevada WSC	-	433
N. Collin WSC	-	1,156
Parker	-	2,071
Prosper	-	9,180
Rose Hill	-	391
Rowlett	-	8,363
Sachse	-	4,008
Seis Lagos MUD	-	523
Sunnyvale	-	2,465
Terrell	-	4,573
Wylie NE WSC	-	1,158
Bonham WTP	-	1,495

II. WATER USE DATA FOR SERVICE AREA

A. Water Delivery

Indicate if the water provided under wholesale contracts is treated or raw water and the annual amounts for the previous five years (in acre feet):

<i>Year</i>	<i>Treated Water</i>	<i>Raw Water</i>
2022	364,706	-
2021	322,064	-
2020	327,696	-
2019	308,223	-

2018	309,657	-
Totals	1,632,346	-

B. Water Accounting Data

1. Total amount of water diverted at the point of diversion(s) for the previous five years (in acre-feet) for all water uses:

<i>Year</i>	2022	2021	2020	2019	2018
<i>Month</i>					
January	22,004	20,019	18,939	19,118	19,429
February	8,947	20,408	17,589	16,922	16,631
March	23,301	22,049	20,211	20,915	21,203
April	26,398	25,092	22,673	22,027	23,612
May	30,845	22,992	28,277	23,426	30,956
June	39,286	28,143	35,887	25,674	37,099
July	54,961	36,679	41,387	39,432	45,540
August	46,676	40,950	44,538	44,317	41,850
September	38,461	40,872	31,724	42,132	28,263
October	36,445	32,865	34,524	33,784	24,309
November	23,746	25,013	25,841	20,692	20,994
December	22,791	23,320	21,191	19,820	19,608
Totals	383,861	338,402	342,780	328,259	329,493

2. Wholesale population served and total amount of water diverted for **municipal use** for the previous five years (in acre-feet):

<i>Year</i>	<i>Total Population Served</i>	<i>Total Annual Water Diverted for Municipal Use</i>
2022	2,103,481	383,861
2021	2,021,298	338,402
2020	1,960,757	342,780
2019	1,887,639	328,259
2018	1,814,006	329,493

C. Projected Water Demands

If applicable, project and attach water supply demands for the next ten years using information such as population trends, historical water use, and economic growth in the service area over the next ten years and any additional water supply requirements from such growth.

See Table 4 in the water conservation plan for projected dry year demands.

III. WATER SUPPLY SYSTEM DATA

A. *Projected Water Demands*

List all current water supply sources and the amounts authorized (in acre feet) with each.

See Table 5 in the water conservation plan for water supply sources and amounts authorized.

B. *Treatment and Distribution System (if providing treated water)*

1. Design daily capacity of system (MGD):

Wylie WTP - 840 MGD Nominal Treatment Capacity

Tawakoni WTP - 30 MGD Nominal Treatment Capacity

Leonard WTP - 70 MGD Nominal Treatment Capacity

Bonham WTP - 6.6 MGD Nominal Treatment Capacity

2. Storage capacity (MGD):

a. Elevated 0 MGD

b. Ground 92.9 MGD

3. Please attach a description of the water system. Include the number of treatment plants, wells, and storage tanks

Please see Section 2.02 C for a description of the water supply system

IV. WASTEWATER SYSTEM DATA

A. *Wastewater System Data (if applicable)*

1. Design capacity of wastewater treatment plant(s) (MGD):

Please see Section 2.02 D for a description of the wastewater system.

2. Briefly describe the wastewater system(s) of the area serviced by the wholesale public water supplier. Describe how treated wastewater is disposed. Where applicable, identify treatment plant(s) with the TCEQ name and number, the operator, owner, and the receiving stream if wastewater is discharged.

Please see Section 2.02 D for a description of the wastewater system.

B. Wastewater Data for Service Area (if applicable)

1. Percent of water service area served by wastewater system: 33%
2. Monthly volume treated for previous five years (in 1,000 gallons):

<i>Year</i>	<i>2022</i>	<i>2021</i>	<i>2020</i>	<i>2019</i>	<i>2018</i>
<i>Month</i>					
January	<u>3,978,360</u>	<u>4,942,224</u>	<u>4,984,498</u>	<u>5,510,677</u>	<u>3,981,309</u>
February	<u>4,083,941</u>	<u>4,559,035</u>	<u>5,210,384</u>	<u>4,214,349</u>	<u>5,489,923</u>
March	<u>4,575,067</u>	<u>5,251,750</u>	<u>7,066,635</u>	<u>4,904,981</u>	<u>5,664,694</u>
April	<u>4,849,431</u>	<u>4,858,092</u>	<u>4,688,145</u>	<u>5,989,013</u>	<u>4,409,824</u>
May	<u>5,057,568</u>	<u>6,714,180</u>	<u>4,880,785</u>	<u>6,666,664</u>	<u>4,444,478</u>
June	<u>4,283,598</u>	<u>5,926,354</u>	<u>4,524,416</u>	<u>5,160,874</u>	<u>3,834,292</u>
July	<u>3,964,310</u>	<u>4,570,964</u>	<u>4,327,814</u>	<u>4,118,650</u>	<u>3,775,229</u>
August	<u>4,554,747</u>	<u>4,565,088</u>	<u>4,174,697</u>	<u>4,058,039</u>	<u>4,112,154</u>
September	<u>4,131,884</u>	<u>3,801,194</u>	<u>4,903,663</u>	<u>3,809,599</u>	<u>5,486,645</u>
October	<u>4,481,089</u>	<u>4,139,174</u>	<u>4,099,562</u>	<u>4,201,554</u>	<u>8,185,523</u>
November	<u>5,611,504</u>	<u>4,226,548</u>	<u>3,899,327</u>	<u>4,275,216</u>	<u>5,214,004</u>
December	<u>5,649,838</u>	<u>4,006,296</u>	<u>4,438,227</u>	<u>4,288,585</u>	<u>5,684,434</u>
Totals	<u>55,221,338</u>	<u>57,560,900</u>	<u>57,198,154</u>	<u>57,198,200</u>	<u>60,282,509</u>

Water Conservation Plan

In addition to the description of the wholesaler's service area (profile from above), a water conservation plan for a wholesale public water supplier must include, at a minimum, additional information as required by Title 30, Texas Administrative Code, Chapter 288.5. Note: If the water conservation plan does not provide information for each requirement an explanation must be included as to why the requirement is not applicable.

A. Specific, Quantified 5 & 10-Year Targets

The water conservation plan must include specific, quantified 5-year and 10-year targets for water savings including, where appropriate, target goals for municipal use in gallons per capita per day for the wholesaler's service area, maximum acceptable water loss, and the basis for the development of these goals. Note that the goals established by a wholesale water supplier under this subparagraph are not enforceable. These goals must be updated during the 5-year review and submittal.

B. Measuring and Accounting for Diversions

The water conservation plan must include a description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply.

C. Record Management Program

The water conservation plan must include a monitoring and record management program for determining water deliveries, sales, and losses.

D. Metering/Leak-Detection and Repair Program

The water conservation plan must include a program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system.

E. Contract Requirements for Successive Customer Conservation

The water conservation plan must include a requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of Title 30 TAC Chapter 288. If the customer intends to resell the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

F. Reservoir Systems Operations Plan

The water conservation plan must include a reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plan shall include optimization of water supplies as one of the significant goals of the plan.

G. Enforcement Procedure and Official Adoption

The water conservation plan must include a means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

H. Coordination with the Regional Water Planning Group(s)

The water conservation plan must include documentation of coordination with the regional water planning groups for the service area of the wholesale water supplier in order to ensure consistency with the appropriate approved regional water plans.

Example statement to be included within the water conservation plan:

The service area of the _____ (name of water supplier) is located within the _____ (name of regional water planning area or areas) and _____ (name of water supplier) has provided a copy of this water conservation plan to the _____ (name of regional water planning group or groups).

I. Plan Review and Update

A wholesale water supplier shall review and update its water conservation plan, as appropriate based on an assessment of previous 5-year and 10-year targets and any other new or updated information. A wholesale water supplier shall review and update the next revision of its water conservation plan no later than May 1, 2009, and every five years after that date to coincide with the regional water planning group. The revised plan must also include an implementation report.

V. ADDITIONAL CONSERVATION STRATEGIES

Any combination of the following strategies shall be selected by the water wholesaler, in addition to the minimum requirements of 30 TAC §288.5(1), if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved:

1. Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates;
2. A program to assist agricultural customers in the development of conservation, pollution prevention and abatement plans;
3. A program for reuse and/or recycling of wastewater and/or graywater;
4. Any other water conservation practice, method, or technique which the wholesaler shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

VI. WATER CONSERVATION PLANS SUBMITTED WITH A WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER

Water Conservation Plans submitted with a water right application for New or Additional State Water must include data and information which:

1. support the applicant's proposed use of water with consideration of the water conservation goals of the water conservation plan;
2. evaluates conservation as an alternative to the proposed appropriation; and
3. evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

Additionally, it shall be the burden of proof of the applicant to demonstrate that no feasible alternative to the proposed appropriation exists and that the requested amount of appropriation is necessary and reasonable for the proposed use.



APPENDIX F

TCEQ Water Conservation Implementation Report



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Texas Commission on Environmental Quality

Water Availability Division
MC-160, P.O. Box 13087 Austin, Texas 78711-3087
Telephone (512) 239-4600, FAX (512) 239-2214

WATER CONSERVATION IMPLEMENTATION REPORT FORM AND SUMMARY OF UPDATES/REVISIONS TO WATER CONSERVATION PLAN

(Texas Water Code §11.1271(b) and Title 30 Texas Administrative Code §288.30(1) to (4))

Please note, this form replaces the following forms: TCEQ-20645 (Non-Public Water Suppliers) and TCEQ-20646 (Public Water Suppliers)

This Form is applicable to the following entities:

1. Water Right Holders of 1,000 acre-feet or more for municipal, industrial, and other non-irrigation uses.
2. Water Right Holders of 10,000 acre-feet or more for irrigation uses.

The above noted entities are required by rule to submit updates to their water conservation plan(s) and water conservation implementation report(s) every five years beginning May 1, 2009. See 30 Texas Administrative Code (TAC) §288.30(1) to (4). Entities must also submit any revisions to their water conservation plan within 90 days of adoption when the plans are revised in between the five-year submittal deadlines. This form may be used for the five-year submittal or when revisions are made to the water conservation plans in the interim periods between five-year submittals. Please complete the form as directed below.

1. Water Right Holder Name: _____
2. Water Right Permit or Certificate Nos. _____

3. Please Indicate by placing an 'X' next to all that Apply to your Entity:

Water Right Holder of 1,000 acre-feet or more for non-irrigation uses

_____ Municipal Water Use by Public Water Supplier

_____ Wholesale Public Water Supplier

_____ Industrial Use

_____ Mining Use

_____ Agriculture Non-Irrigation

Water Right Holder of 10,000 acre-feet or more for irrigation uses

_____ Individually-Operated Irrigation System

_____ Agricultural Water Suppliers Providing Water to More Than One User

Water Conservation Implementation Reports/Annual Reports

4. Water Conservation Annual Reports for the previous five years were submitted to the Texas Water Development Board (TWDB) for each of the uses indicated above as required by 30 TAC §288.30(10)(C)? Yes _____ No _____

TCEQ no longer requires submittal of the information contained in the detailed implementation report previously required in Forms TCEQ-20645 (Non-Public Water Suppliers) and TCEQ-20646 (Public Water Suppliers). However, the Entity must be up-to-date on its Annual Report Submittals to the TWDB.

Water Conservation Plans

5. For the five-year submittal (or for revisions between the five-year submittals), attach your updated or revised Water Conservation Plan for each of the uses indicated in Section 3, above. Every updated or revised water conservation plan submitted must contain each of the minimum requirements found in the TCEQ rules and must be duly adopted by the entity submitting the water conservation plan. Please include evidence that each water conservation plan submitted has been adopted.
- Rules on minimum requirements for Water Conservation Plans can be found in 30 TAC Chapter 288.
http://texreg.sos.state.tx.us/public/readtac%24ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288
 - Forms which include the minimum requirements and other useful information are also available to assist you. Visit the TCEQ webpage for Water Conservation Plans and Reports. https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/conserves.html

Call 512-239-4600 or email to wcp@tceq.texas.gov for assistance with the requirements for your water conservation plan(s) and report(s).

6. For each Water Conservation Plan submitted, list dates and descriptions of the conservation measures implemented, and the actual amount of water saved.
7. For each Water Conservation Plan submitted, state whether the five and ten-year targets for water savings and water loss were met in your *previous* water conservation plan.
Yes _____ No _____
If the targets were not met, please provide an explanation as to why any of the targets were not met, including any progress on that particular target.

8. For each five-year submittal, does each water conservation plan submitted contain *updated* five and ten-year targets for water savings and water loss?
Yes _____ No _____

If yes, please identify where in the water conservation plan the updated targets are located (page, section).

9. In the box below (or in an attachment titled "Summary of Updates or Revisions to Water Conservation Plans), please identify any other revisions/updates made to each water conservation plan that is being updated or revised. Please specify the water conservation plan being updated and the location within the plan of the newly adopted updates or revisions.

10. *Form Completed by (Point of Contact):* _____
(If different than name listed above, owner and contact may be different individual(s)/entities)

Contact Person Title/Position: _____

Contact Address: _____

Contact Phone Number: _____ Contact Email Address: _____

Signature: Abigail A. Gardner

Date: _____



APPENDIX G

Letters to Region C and Region D Water Planning Groups

2024 NTMWD WATER CONSERVATION PLAN



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Regional. Reliable. Everyday.

January 31, 2024

Mr. Kevin Ward
Chair, Region C Water Planning Group
c/o Trinity River Authority
P.O. Box 60
Arlington, Texas 76004

Re: 2024 NTMWD Water Conservation Plan and 2024 NTMWD Water Resource and
Emergency Management Plan

Dear Mr. Ward:

Please find enclosed a copy of the 2024 North Texas Municipal Water District (NTMWD) Water Conservation Plan and the 2024 North Texas Municipal Water District (NTMWD) Water Resource and Emergency Management Plan. NTMWD is submitting a copy of these plans to the Region C Water Planning Group in accordance with the Texas Water Development Board and Texas Commission on Environmental Quality rules.

The Board of Directors of the NTMWD adopted these plans on January 25, 2024.

Sincerely,

JENNAFER P. COVINGTON
Executive Director

JPC/KF/bb

xc: Billy George
Galen Roberts
Alex Johnson
Kathy Fonville



Regional. Reliable. Everyday.

January 31, 2024

Mr. Jim Thompson
Chair, Region D Water Planning Group
c/o Northeast Texas Municipal Water District
P.O. Box 955
Hughes Springs, Texas 75656

Re: 2024 NTMWD Water Conservation Plan and 2024 NTMWD Water Resource and
Emergency Management Plan

Dear Mr. Thompson:

Please find enclosed a copy of the 2024 North Texas Municipal Water District (NTMWD) Water Conservation Plan and the 2024 North Texas Municipal Water District (NTMWD) Water Resource and Emergency Management Plan. NTMWD is submitting a copy of these plans to the Region D Water Planning Group in accordance with the Texas Water Development Board and Texas Commission on Environmental Quality rules.

The Board of Directors of the NTMWD adopted these plans on January 25, 2024.

Sincerely,

JENNAFER P. COVINGTON
Executive Director

JPC/KF/bb

xc: Billy George
Galen Roberts
Alex Johnson
Kathy Fonville



Regional. Reliable. Everyday.

January 31, 2024

Resource Protection Team, MC-160
c/o Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711

Re: 2024 NTMWD Water Conservation Plan and 2024 NTMWD Water Resource and
Emergency Management Plan

To Whom It May Concern:

Please find enclosed a copy of the 2024 North Texas Municipal Water District (NTMWD) Water Conservation Plan and the 2024 North Texas Municipal Water District (NTMWD) Water Resource and Emergency Management Plan. NTMWD is submitting a copy of these plans to the Texas Commission on Environmental Quality (TCEQ) in accordance with Texas Commission on Environmental Quality rules.

The Board of Directors of the NTMWD adopted these plans on January 25, 2024.

Sincerely,

JENNAFER P. COVINGTON
Executive Director

JPC/KF/bb

xc: Billy George
Galen Roberts
Alex Johnson
Kathy Fonville



APPENDIX H

NTMWD Board Minutes Showing Adoption of the Water Conservation and Water Resource and Emergency Management Plan



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NORTH TEXAS MUNICIPAL WATER DISTRICT
501 E. Brown Street • Wylie, Texas 75098 (972)
442-5405 – Phone
(972) 295-6440 – Fax

**MINUTES OF REGULAR MEETING
OF THE BOARD OF DIRECTORS
JANUARY 25, 2024**

The North Texas Municipal Water District (NTMWD) Board of Directors met in a regular meeting on Thursday, January 25, 2024, at 2:30 p.m. Notice of the meeting was legally posted in accordance with Government Code, Title 551, Open Meetings.

I. CALL TO ORDER

President Richard Peasley called the meeting to order at approximately 2:30 p.m.

President Peasley advised the following regarding the meeting:

The meeting today is being conducted in person with two-way video and audio communication between Board members participating by videoconference, establishing a quorum. The public may attend the meeting in person. Audio and video of Board members participating by videoconference will be visible. Members of the public wishing to listen to live audio from the meeting may do so by calling in.

II. INVOCATION

Director Keith Stephens offered the invocation.

III. PLEDGE OF ALLEGIANCE

President Peasley led the Pledge of Allegiance.

IV. PLEDGE OF ALLEGIANCE TO THE TEXAS FLAG

President Peasley led the Pledge of Allegiance to the Texas Flag.

V. ROLL CALL/ANNOUNCEMENT OF QUORUM

The roll was called, and attendance was confirmed as follows:

DIRECTOR	IN PERSON	REMOTE
Terry Sam ANDERSON		√
Kalen BOREN		√
John CARR	Absent	
Rick CROWLEY	√	
George CRUMP	√	
Lori Barnett DODSON	√	
Phil DYER	√	
Joe FARMER	√	
Marvin FULLER	√	
David HOLLIFIELD	√	
Chip IMRIE	√	
Blair JOHNSON	√	
Ronald KELLEY	√	
James KERR	√	
Geralyn KEVER	√	
Rick MANN		√
Jack MAY	√	
Don PASCHAL	√	
Richard PEASLEY	√	
Randy ROLAND		√
Lynn SHUYLER	Absent	
Keith STEPHENS	√	
Jody SUTHERLAND	√	
John SWEEDEN	√	
Larry THOMPSON	√	

The following NTMWD legal and professional consultants attended the meeting:

- Lauren Kalisek – Lloyd Gosselink Rochelle & Townsend
- David Butler and Brandon Tanous – Weaver and Tidwell, LLP
- Nick Kurk – McDonald Hopkins
- Darrell Switzer – Lodestone
- Jessica Ferrell and Victor Xu – Marten Law

VI. OPENING REMARKS

- A. President's Remarks concerning current events, recognitions, conduct of meeting, posted agenda items, committee assignments, and related matters

President Peasley reviewed the tentative meeting schedule for February 2024 as follows:

- Wednesday, February 7 : Executive and Finance Committees
- Wednesday, February 21: Water and Wastewater Committees
- Thursday, February 22: Board Meeting

- B. Executive Director's Status Report concerning legislation and regulatory matters, budgets, current projects and ongoing programs of the District including the Regional Water System, Regional Wastewater System, Regional Solid Waste System, Watershed Protection, and Water Conservation

Executive Director Jenna Covington reviewed the 2024 Management Focus Areas. She advised that the list includes plans for accomplishment and will be reviewed in her self-evaluation for the next year. She included the areas of Stewardship, Service and Partnerships, a District-wide approach to navigating PFAS regulations, Texas Oklahoma boundary completion, and regarding People, she plans to improve employee retention rates and enhance employee training programs.

Executive Director Covington provided an update on the Customer Premium matter. She advised that meetings are ongoing and added that discussions have centered on a possible "grandfathering" alternative for existing demands at the current five (5) cent differential and growth calculated at a higher premium percentage rate. She added that the rate consultant has conducted financial calculations and that information has been shared. The next meeting is scheduled for February 1st. Executive Director Covington advised that Customers still desire assurances that the Board will consider Customer representation.

Executive Director Covington advised that in regard to the Texas Oklahoma boundary issue, staff has met with the consultants and there will be a site visit at the Texoma pump station next week.

Executive Director Covington stated that the City of Health has officially requested to become a Direct Customer of the District.

President Peasley expressed his appreciation to all who completed an evaluation for the Executive Director.

VII. PUBLIC COMMENTS

Prior to the start of the meeting, speakers must complete and submit a "Public Comment Registration Form." During the public comment portion of the meeting, speakers will be recognized by name and asked to provide their comments.

The time limit is three (3) minutes per speaker, not to exceed a total of thirty (30) minutes for all speakers. The Board may not discuss these items but may respond with factual or policy information.

There were no requests for public comment.

VIII. DISCUSSION ITEMS**A. 2023 Independent Management Audit to the Texas Commission on Environmental Quality**

Executive Director Covington introduced Brandon Tanous, Partner with Weaver Tidwell, who provided a brief presentation. She added that later in the agenda there is an action item related to this audit.

Mr. Tanous explained that this type of audit must be performed and submitted to the Texas Commission on Environmental Quality (TCEQ) every five years. Guidelines for performance and management of the audit are outlined through the Texas Administrative Code and TCEQ. The purpose of the audit is to identify and/or prevent management issues that could impact the District's operations and the ability to meet the public/customer needs.

Mr. Tanous stated that an assessment of policies, procedures, processes, technology and controls are included in the audit to validate efficiency, effectiveness and compliance. He reviewed the District's policies that were evaluated. Other procedures performed included interviews with stakeholders; reviews of the District's Five-Year Plan, Mission Statement, and Organizational Chart were conducted as well as communication methods.

Mr. Tanous advised that his firm determined that the District has sufficient policies, procedures, and controls in place to enable effective management of the district's operations and employees to meet the established missions and goals of the District. The audit does include four areas for continuous improvement recommended to enhance the District's current processes, procedures, practices, governance and philosophy, including:

- Enhancement of succession planning
- Continued focus over the IT function
- Enhancement of the centralized training management system
- Enhancement of recruitment and talent retention strategies

Director Jack May asked if the NTMWD should have its own audit department. Mr. Tanous responded that some District's do, others do not; it depends on the size. Director Don Paschal inquired whether Weaver was involved with reviewing the recent cyber security breach. Mr. Tanous responded that it occurred after the audit was completed.

Discussion followed as to the number of Weaver staff who worked on this audit, and how many other water districts Weaver services. Mr. Tanous named several.

President Peasley reminded the Directors that an action item is included on today's agenda to consider accepting the audit.

IX. EXECUTIVE SESSION

At 2:59 p.m. President Peasley announced the need for an Executive Session of the Board of Directors to discuss items:

- A. Texas Government Code, Sections 551.071 Consultation with Attorney, 551.076 Deliberation regarding Security Devices, and 551.089 Security Audits;
 - 1. Cybersecurity incident
- B. Texas Government Code Section 551.071 Consultation with Attorney
 - 1. (1) City of Camden, et al. v. 3M Company, Civil Action No.: 2:23-cv-03147-RMG; and (2) City of Camden, et al. v. E.I. DuPont De Nemours and Company (n/k/a EIDP, Inc.) et al., Civil Action No.: 2:23-cv-03230-RMG

President Peasley confirmed with staff that the public access line was disconnected and that the audio recording was disabled during the Executive Session discussion.

X. RECONVENE INTO REGULAR SESSION

In accordance with Texas Government Code, Chapter 551, the Board of Directors of NTMWD will reconvene into regular session to consider action, if any, on matters discussed in Executive Session.

Open Session reconvened at 4:13 p.m. The public teleconference line was reconnected. No action was taken in Executive Session.

No action was taken in Open Session. President Peasley noted that action on the Executive Session items will be considered later in the agenda.

XI. CONSENT AGENDA ITEMS

President Peasley inquired whether any Director would like to remove an item from the Consent Agenda for separate discussion. There were no requests for separate discussion.

Upon a motion by Director Chip Imrie to approve the Consent Agenda items and a second by Director Don Paschal, the Board of Directors voted unanimously to approve the Consent Agenda items. Director Terry Sam Anderson was absent from the vote.

- A. **December 2023 Regular Board Meeting Minutes**
Recommend the Board of Directors approve the minutes of the regular Board meeting held on Thursday, October 26, 2023, as presented.
- B. **Modification of Capital Projects Request**
Recommend the Board of Directors approve the January 2024, Modification of Capital Projects Request as presented.

- C. **McKinney Delivery Point No. 3 to McKinney Delivery Point No. 4 Pipeline Project No. 101-0505-18; Resolution No. 24-01; Right-of-Way Acquisition Program**
Authorize resolution to amend the previously approved Right-of-Way acquisition program to include the acquisition of property and easements.

XII. AGENDA ITEMS FOR INDIVIDUAL CONSIDERATION

GENERAL / ADMINISTRATIVE AGENDA ITEMS

- A. **2023 Independent Management Audit**
Acceptance of the 2023 independent Management Audit report and authorize the Executive Director to submit the report to the Texas Commission on Environmental Quality in accordance with Section 292.13(5)(A) of the Texas Administrative Code.

President Peasley reminded the Directors of the earlier presentation on this report.

Upon a motion by Director Geralyn Keever and a second by Director Rick Crowley, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson was absent from the vote.

WATER AGENDA ITEMS

- B. **Amendments to the NTMWD Water Conservation Plan and NTMWD Water Resource and Emergency Management Plan**
Authorize amendments to the NTMWD Water Conservation Plan and NTMWD Water Resource and Emergency Management Plan in compliance with the Texas Commission on Environmental Quality requirements.

Director John Sweeden advised that the Water Committee reviewed this item yesterday and voted to recommend the Board authorize amendments to the NTMWD Water Conservation Plan and NTMWD Water Resource and Emergency Management Plan in compliance with the Texas Commission on Environmental Quality requirements.

In order to meet TCEQ guidelines and continue to advance the District's conservation efforts, revisions are needed to the Water conservation Plan and Water Resource and Emergency Management Plan. TCEQ requires updates to these plans every five years. The current plans were adopted in 2019.

Upon a motion by Director John Sweeden and a second by Director Larry Thompson, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson was absent from the vote.

- C. **Memorandum of Understanding between the North Texas Municipal Water District and Tarrant Regional Water District for Regional Water Conservation Public Awareness Campaign**
Authorize the Executive Director to execute a Memorandum of Understanding between the North Texas Municipal Water District and the Tarrant Regional Water District for funding and execution of a joint regional water conservation public awareness campaign.

Director John Sweeden advised that the Water Committee reviewed this item yesterday and voted to recommend the Board authorize the Executive Director to execute a Memorandum

of Understanding between NTMWD and the Tarrant Regional Water District for funding and execution of a joint regional water conservation public awareness campaign.

This MOU establishes a cooperative five-year partnership with NTMWD, TRWD, and the City of Dallas for the development of a regional public awareness campaign to encourage the efficient use of water, reduce water waste, and reduce water demand in the Dallas-Fort Worth region.

Upon a motion by Director John Sweeden and a second by Director James Kerr, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson was absent from the vote.

D. Texoma Raw Water Pipeline to Leonard Water Treatment Plant Pipeline; Project No. 101-0642-24; Engineering Services Agreement – Preliminary Engineering

Authorize funding for preliminary engineering services for the design of a proposed pipeline from the existing Texoma – Wylie Raw Water Pipeline to the Terminal Storage Reservoir at Leonard Water Treatment Plant.

Director John Sweeden advised that the Water Committee reviewed this item yesterday and voted to recommend the Board authorize funding for preliminary engineering services for the design of a proposed pipeline from the existing Texoma-Wylie Raw Water Pipeline to the Terminal Storage Reservoir at Leonard Water Treatment Plant.

This will divert 70 million gallons per day (MGD) of Texoma raw water to the Leonard Plant for blending with the Bois d'Arc Lake water to achieve a future treated water capacity of 210 MGD.

Director Jack May inquired if this Terminal Storage Reservoir will be at capacity with 70 MGD. Deputy Director Cesar Baptista responded that this will maximize the use of our Bois d'Arc Lake water for blending and will occur during Stage 3 of the Leonard Water Treatment Plant.

Upon a motion by Director John Sweeden and a second by Director Don Paschal, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson was absent from the vote.

E. Aquifer Storage and Recovery Feasibility Study; Project No. 101-0643-24; Engineering Services Agreement

Authorize an engineering services agreement for the development of the Aquifer Storage and Recovery Feasibility Study.

Director John Sweeden advised that the Water Committee reviewed this item yesterday and voted to recommend the Board authorize an engineering services agreement for the development of the Aquifer Storage and Recovery (ASR) Feasibility Study.

This study is designed to explore the feasibility of ASR in the North Texas region aquifers.

If ASR is feasible, the study will also provide recommendations on the next steps and planning cost estimates for those next steps.

Director Jack May expressed that there are many aspects of ASR to consider, adding that a study is appropriate. He requested a quarterly update so the Board stays informed on the progress of the study.

President Peasley inquired if an ASR would be considered near the Leonard Water Treatment Plant as well as the Wylie Water Treatment Plant. Assistant Deputy R.J. Muraski responded that those two locations as well as other aquifers will be evaluated. He added that the consultant to be engaged for the study is Advanced Groundwater Solutions.

Director Keith Stephens advised that in 2016 the City of Wylie obtained a "Municipal Setting Designation" and during that process it was discovered that the aquifer in Wylie has possible groundwater contamination.

Director James Kerr spoke in favor of researching the possibility of an ASR.

Director Joe Farmer inquired as to the cost of the study and how long it will take. Mr. Muraski responded that the cost of the study includes a not-to-exceed amount of \$966,000, including \$30,000 in special services. The study should take 12 to 18 months to complete.

Upon a motion by Director John Sweeden and a second by Director Phil Dyer, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson and Director Randy Roland were absent from the vote.

WASTEWATER AGENDA ITEMS

- F. Clemons Creek Lift Station, Project No. 501-0635-24; McKinney Prosper Sewer Improvements, Project No. 501-0641-24; Engineering Services Agreement**
Authorize an engineering services agreement for the preliminary design of the Clemons Creek Lift Station and McKinney Prosper Sewer Improvements projects.

Director Keith Stephens advised that the Wastewater Committee discussed this item at the December meeting.

This item will authorize an engineering services agreement for the preliminary design of the Clemons Creek Lift Station to identify options and routes for the lift station to accommodate growth in Anna, McKinney, and Melissa.

The consultant will also evaluate wastewater conveyance alternatives and recommend pipeline improvements to accommodate growth in McKinney and Prosper north of U.S. Highway 380 along the existing McKinney Prosper sewer infrastructure.

Upon a motion by Director Keith Stephens and a second by Director Geralyn Keever, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson and Director Randy Roland were absent from the vote.

G. Tickey Creek Force Main, Project No. 501-0637-24; Tickey Creek Lift Station, Project No. 501-0638-24; Engineering Services Agreement

Authorize an engineering service agreement for preliminary design of the Tickey Creek Force Main and Tickey Creek Lift Station projects.

Director Keith Stephens advised that the Wastewater Committee reviewed this item at the December meeting.

This item will authorize an engineering services agreement for preliminary design of the Tickey Creek Force Main and Tickey Creek Lift Station projects. The purpose of this project is to increase wastewater conveyance capacity serving growth in Princeton.

Upon a motion by Director Keith Stephens and a second by Director Phil Dyer, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson and Director Randy Roland were absent from the vote.

LAND ACQUISITION / RIGHT OF WAY AGENDA ITEMS

H. Waterline Relocations Along State Highways in Dallas, Rockwall, and Kaufman Counties; Project No. 101-0607-22; Resolution No. 24-02; Right-of-Way Acquisition Program

Authorize resolution to amend the previously approved Right-of-Way Acquisition Program to acquire additional easements and provide additional funding to this project.

Director Chip Imrie advised that the Real Estate Committee reviewed this item in the Committee meeting yesterday. He stated that this item will authorize additional funding to acquire permanent and temporary easements needed to facilitate relocation of waterlines in advance of TxDOT’s expansion of FM 552 and SH 205.

Upon a motion by Director Chip Imrie and a second by Director Jody Sutherland, the Board of Directors voted unanimously to approve. Director Terry Sam Anderson and Director Randy Roland were absent from the vote.

* * * * *

At this time, President Peasley stated that the Board would consider action on the Executive Session items. No action was taken on Item IX.A.1.

Executive Session Item IX.B.1.

(1) City of Camden, et al. v. 3M Company, Civil Action No.: 2:23 cv 03147 RMG; and (2) City of Camden, et al. v. E.I. DuPont De Nemours and Company (n/k/a EIDP, Inc.) et al., Civil Action No.: 2:23 cv 03230 RMG

Director Geralyn Kever made the following motion regarding 3M:

Motion to authorize the Executive Director and her staff to withdraw the District’s opt-out and thus join the settlement class that was conditionally certified in the AFFF Multi-District Litigation in the United States District Court for the District of South Carolina, Charleston Division, No. 2:18-mm-2873-RMG, subject to the results of ongoing negotiations with 3M

Company by outside counsel for NTMWD, and, in that event, to authorize the Executive Director to facilitate a settlement between the District and 3M Company; and to authorize the Executive Director and her staff to authorize and/or engage in any necessary actions for the District to act as a claimant in the 3M Settlement and to further engage in any necessary legal or other action to maximize the amount and value of the District's total settlement payment and any other benefits to the District.

Director Don Paschal seconded motion. The Board of Directors voted unanimously to approve the motion. Director Terry Sam Anderson and Director Randy Roland were absent from the vote.

Director Chip Imrie made the following motion regarding Dupont:

Motion to authorize the Executive Director and her staff to engage in any necessary actions for the District to act as a claimant in the DuPont Settlement and to further engage in any necessary legal or other action to maximize the amount and value of the District's total settlement payment and any other benefits to the District based on the Board's prior authorization to the Executive Director and her staff to participate in such settlement.

Director Geralyn Keever seconded motion. The Board of Directors voted unanimously to approve the motion. Director Terry Sam Anderson and Director Randy Roland were absent from the vote.

XIII. CLOSING ITEMS

- A. Opportunity for Board members to provide feedback or request potential future agenda items.

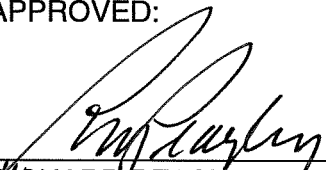
President Peasley stated that he attended yesterday's Water Committee meeting. He spoke favorably of the Bois d'Arc Lake staff and the work they are doing there. He noted that the Lake facilities highlight the District.

There were no other comments or requests for potential future agenda items.

XIV. ADJOURNMENT

There being no further business, the meeting adjourned at approximately 4:46 p.m.

APPROVED:



RICHARD PEASLEY, President

ATTEST:



DAVID HOLLIFIELD, Secretary



APPENDIX I

Data Requirements for Water Right Application for New or Additional State Water – Reuse of Discharges from Multiple Wastewater Treatment Facilities



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DATA REQUIREMENTS FOR WATER RIGHT APPLICATION FOR NEW OR ADDITIONAL STATE WATER – REUSE OF DISCHARGES FROM MULTIPLE WASTEWATER TREATMENT FACILITIES

Texas Administrative Code (TAC) Title 30, Part 1, Rule 288.7(a) addresses water conservation plans that accompany an application for a water right:

§288.7. Plans Submitted With a Water Right Application for New or Additional State Water.

- (a) A water conservation plan submitted with an application for a new or additional appropriation of water must include data and information which:
 - (1) supports the applicant's proposed use of water with consideration of the water conservation goals of the water conservation plan;
 - (2) evaluates conservation as an alternative to the proposed appropriation; and
 - (3) evaluates any other feasible alternative to new water development including, but not limited to, waste prevention, recycling and reuse, water transfer and marketing, regionalization, and optimum water management practices and procedures.

The North Texas Municipal Water District (NTMWD or District) currently has one application for reuse of treated wastewater discharges in technical review at TCEQ, is preparing one application for the reuse of treated wastewater discharges to be filed with TCEQ soon and plans to develop other reuse applications to file with TCEQ in the future. NTMWD filed its reuse application for Sister Grove Creek Regional Water Resource Recovery Facility (Sister Grove RWRRF), which is under construction and is owned and operated by NTMWD. TCEQ deemed the Sister Grove RWRRF application administratively complete on May 6, 2022 and is currently performing its technical review. NTMWD expects to file a reuse application for the Bonham Wastewater Treatment Plant (Bonham WWTP) in 2024. NTMWD also has other potential sources of reuse water that the District intends to develop at a later time when feasible. Table I-1 shows the sources of the discharges from Sister Gove RWRRP and Bonham WWTP for the new reuse applications.

TABLE I-1 SUMMARY OF POTENTIAL REUSE SOURCES

Facility	Existing or New	Facility Owner	Permitted Discharge (MGD)	River Basin	Watershed
Facilities with Current or Imminent Reuse Applications					
Sister Grove RWRRF	Under construction	NTMWD	64	Trinity	Lavon Lake
Bonham WWTP	Existing	City of Bonham ¹	2.5	Red	Bois d’Arc Lake

1. NTMWD provides all or most of the water supply to users from which the wastewater is generated.

Fully developing available reuse is a primary goal of the Plan. As acknowledged by the Water Conservation Implementation Task Force, water reuse is considered a component of water conservation and as such, should not be viewed as an alternative to conservation. While conservation



does not typically require a water right, water reuse does. Therefore, this appendix addresses the requirements of TAC §288.7(a) for the filed Sister Grove RWRRF reuse application and the soon to-be-filed Bonham WWTP reuse application.

I.1 CONSIDERATION OF WATER CONSERVATION GOALS - 288.7(A)(1)

NTMWD provides wholesale treated water to customers in a ten-county area in North-Central Texas. The area served by NTMWD is one of the fastest growing regions in the country. The population served by NTMWD has increased from 32,000 when NTMWD was formed in 1951 to about 2.0 million as of 2021, and this growth is expected to continue. To meet the anticipated growth and increased water demands, NTMWD is actively promoting water conservation measures with its Member Cities and Customers, and NTMWD is currently implementing the largest wastewater reuse program in the state, and potentially the largest in the U.S. Two of the larger current reuse projects include reuse from the Wilson Creek Regional WWTP (RWWTP) that discharges directly to Lavon Lake. This RWWTP is permitted to discharge up to 64 MGD. The other large reuse project is the East Fork Water Supply Project (the East Fork Wetland). This project diverts wastewater return flows from the East Fork Trinity River and the Trinity River Mainstem to a constructed wetland in Kaufman County. From there, the water is pumped to Lavon Lake for subsequent diversion. Collectively, these two projects can provide 175,000 acre-feet per year of supply. If the Sister Grove RWRRF reuse authorization is granted, the reuse supplies would increase by up to 71,882 acre-feet per year (64 MGD). The Bonham WWTP reuse water could provide an additional 2,800 acre-feet per year. This section describes NTMWD's conservation activities and the resulting water savings.

The Plan includes a variety of conservation measures that are actively implemented and monitored by NTMWD. This suite of water conservation measures goes above and beyond the minimum requirements for conservation plans for wholesale providers. In accordance with the Texas Administrative Code, Title 30, § 288.5, the minimum requirements are:

- Description of the wholesaler's service area;
- Specification of quantifiable conservation goals;
- Description of the means to measure the amount of water from a source;
- Monitoring and record managing program;
- Metering, leak detection and repair program;
- Requirement that wholesale customers must develop and implement a water conservation plan that incorporates the measures in the wholesale water provider plan;
- Reservoir systems operation plan;
- Means for implementing and enforcing the plan; and
- Documentation of coordination with associated regional water planning groups.



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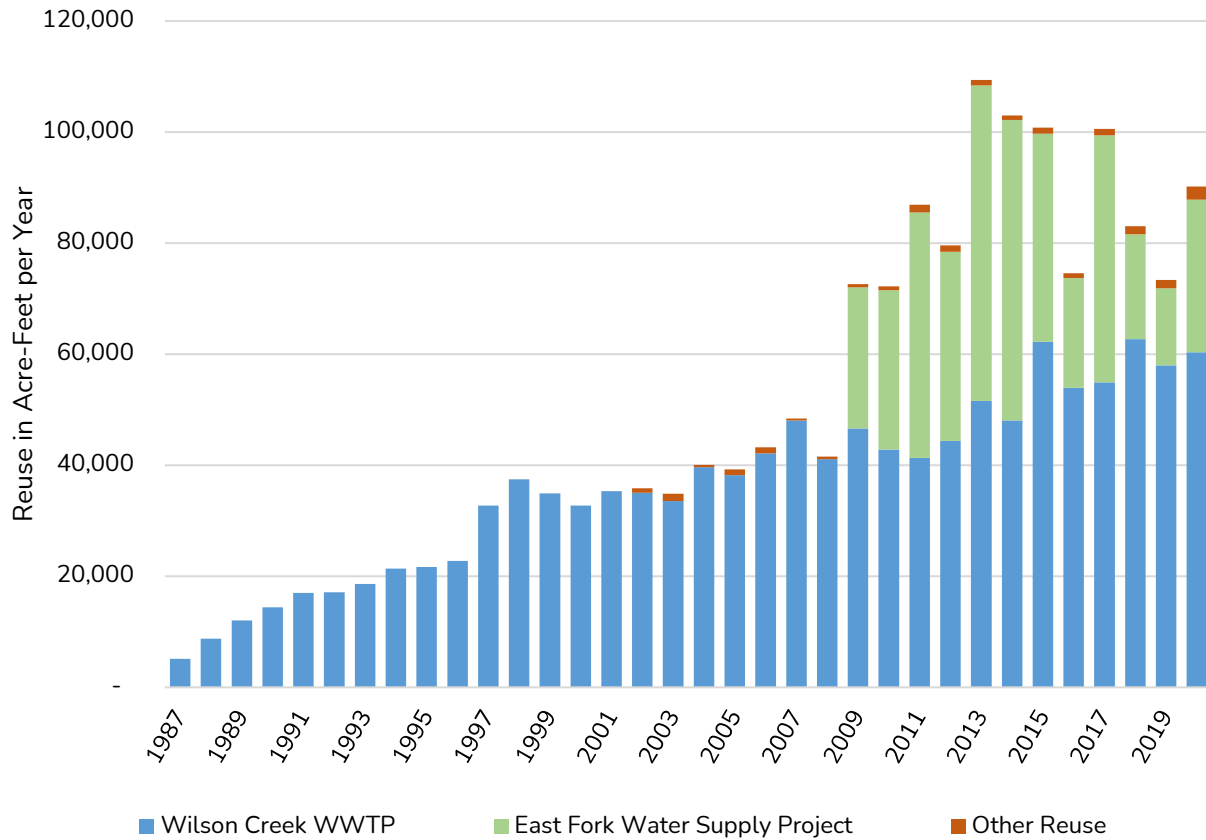
The Plan meets these minimum requirements and specifies other conservation activities that NTMWD and/or its Member Cities and Customers are undertaking to achieve water conservation and efficiency. These other measures include:

- Water conservation workshops for wholesale customers;
- Model Water Conservation and Drought Contingency / Water Resource Emergency Management Plans for Member Cities and Customers, including compulsory landscape and water management measures to conserve water;
- Annual reports and tracking of customer water use;
- Reuse and recycling of wastewater;
- Public education and outreach programs;
- Technical assistance to customers;
- Zero discharge from water treatment plants;
- In-house conservation efforts; and
- Landscape water management measures, including developing the Water My Yard program and the installation of weather stations to assess outdoor irrigation needs.

Each of these measures is described elsewhere in the Plan. As noted above, reuse and recycling of wastewater is a major part of the Plan. NTMWD has the largest reuse program in the state with plans for further development. This intent is captured in the goals of the Plan. The reuse of discharges from the wastewater facilities within NTMWD's service area is part of NTMWD's long-term reuse plan to increase available wastewater return flows for reuse, and fully developing available reuse is consistent with NTMWD's Water Conservation Plan goals. Figure I-1 shows NTMWD's historical water supplies from reuse.



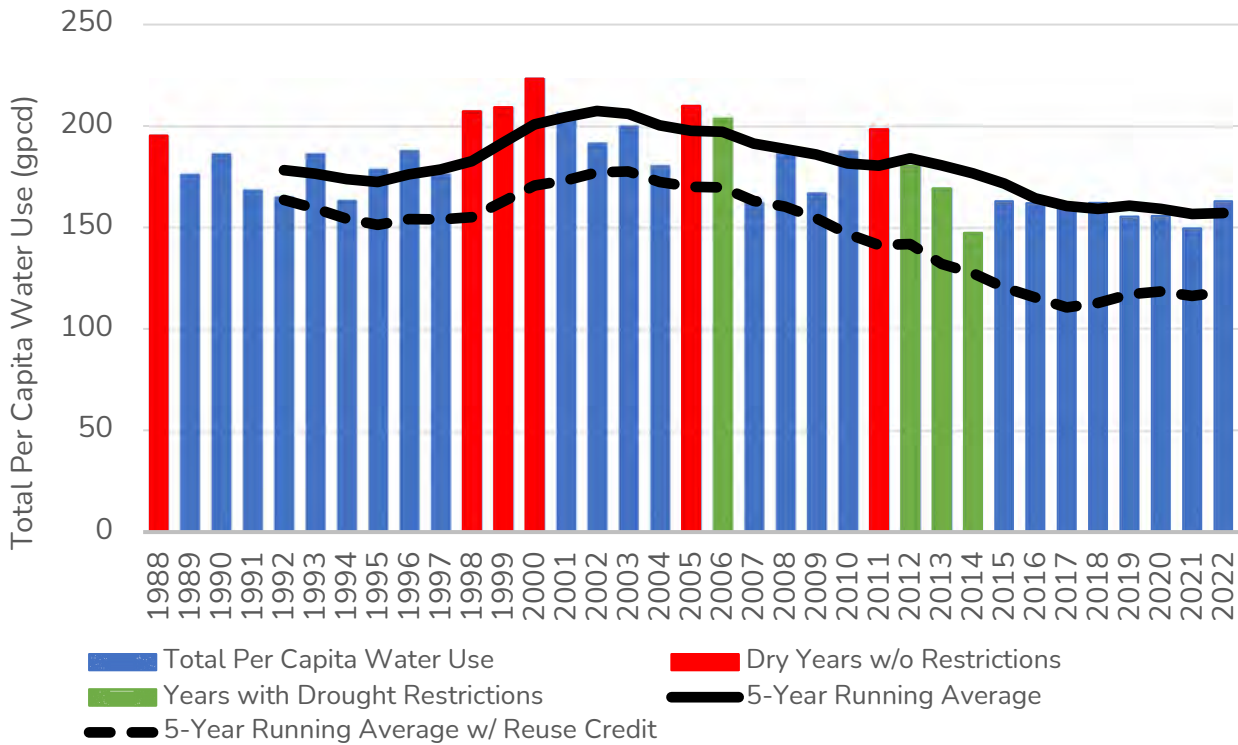
FIGURE I-1: NTMWD REUSE



Conservation Water Savings Realized by NTMWD

NTMWD collects water use data annually from its Member Cities and Customers and uses this information to track per capita water use. Figure I-2 shows the annual and five-year running average total per capita use for Member Cities and Customers from 1992 to 2020. Consistent with the Plan, total per capita use is defined as the amount of water used divided by the population served. As shown in this figure, the average per capita water use peaked during the early 2000s and has continued to decline over time. NTMWD’s total per capita use in 2000 (the year of highest historical per capita use) was 224 gallons per person per day. The 2020 dry year use for NTMWD in the 2021 *Region C Water Plan* is 185.7 gallons per person per day, a reduction of 15 percent from the year 2000 level. This shows the success of the conservation efforts of NTMWD, its Member Cities, and its Customers. When considering credit for reuse, there is an even greater decline in per capita water use since the early 2000s. This reflects NTMWD’s robust reuse program.

FIGURE I-2: TOTAL RAW WATER PER CAPITA USE



I.2 CONSERVATION AS AN ALTERNATIVE TO THE PROPOSED APPROPRIATION – 288.7 (A)(2)

NTMWD water use in 2020 totaled 342,135 acre-feet. 2020 was not a dry year, and demands would be higher in a dry year. The projected dry year demands for NTMWD in 2020 in the *2021 Region C Water Plan* are 408,700 acre-feet per year. The *2021 Region C Water Plan* and *2022 State Water Plan* project that these demands will nearly double by the year 2070. Based on current water supplies, NTMWD will need to develop an additional 369,000 acre-feet of supply to meet the 2070 demands projected in the *2021 Region C Water Plan*. NTMWD expects to meet a portion of this demand via conservation. The *2022 State Water Plan* indicates that additional water conservation efforts (beyond what NTMWD has already accomplished) will provide 26,000 acre-feet of NTMWD’s total water supplies by 2030 and approximately 44,400 acre-feet by 2070.

NTMWD plans to meet a significant part of its projected demands by reuse. Reuse comprises 37 percent of NTMWD’s existing 2020 water supply in the *2021 Region C Water Plan*. Increases in available reuse due to population growth and the development of specific reuse projects are expected to provide up to 106,400 acre-feet of additional reuse supplies by 2070. Combined, conservation and reuse are estimated to provide 255,000 acre-feet of water supplies by 2070, which represents approximately 33 percent of NTMWD’s projected total water demand in 2070.



Both conservation and reuse are integral strategies in NTMWD's plans to meet projected water demands. The reuse of wastewater discharges associated with current and future water supplies developed by NTMWD will provide supplies to help meet projected water demands. However, in light of NTMWD's projected total demand for nearly 770,000 acre-feet of water by 2070, intensified conservation and reuse alone cannot provide enough water to address all demands. Thus, conservation and reuse strategies are part of the portfolio of strategies that will be pursued by NTMWD to meet the rapidly rising demand for municipal water supplies in the NTMWD service area.

I.3 FEASIBLE ALTERNATIVES TO NEW WATER DEVELOPMENT – 288.7(A)(3)

The 2022 state water planning process identified and evaluated many potential water management strategies for NTMWD. The *2022 State Water Plan* considered 16 different water management strategies to meet the projected water supply shortages for NTMWD through 2070. Of these considered strategies, the State Water Plan recommended nine strategies for implementation by NTMWD.

NTMWD has or is currently implementing some of these strategies, including:

- Water Conservation (implemented)
- Bois d'Arc Lake (implemented)
- Sister Grove RWRRF Reuse (facility is currently being constructed and expected to be operating by mid-2024).

The other strategies recommended in the *2022 Texas State Water Plan* for implementation include:

- Additional Lake Texoma Blend Phase I (water will be blended with new supplies from Bois d'Arc Lake at the new Leonard water treatment plant)
- Additional measures to access full Lavon Lake yield
- Additional reuse supplies
 - Expanded wetland reuse
- Additional Lake Texoma water with blending with new fresh water supply Phase II
- Marvin Nichols Reservoir
- Wright Patman Reallocation
- Oklahoma water supply

Each of these strategies is scheduled for implementation based on the projected water needs and the time to implement the strategy, including considerations for planning and permitting.

Potential alternatives considered for NTMWD but not recommended for implementation in the *2021 Region C Water Plan* include developing other new reservoirs (George Parkhouse North and George Parkhouse South), transporting water from existing reservoirs (Toledo Bend and Lake O' the Pines), development of new groundwater supplies, aquifer storage and recovery, and desalination of Lake Texoma water. Most of these alternative strategies will require water rights for new appropriations



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and/or interbasin transfers, and they all will require the construction of infrastructure to store and transport water supplies to the NTMWD service area.

To continue its water supply development, NTMWD is applying for a water right from the TCEQ for reuse for wastewater discharges from the Sister Grove RWRRF and the Bonham WWTP. The Sister Grove RWRRF discharges to the Lavon Lake watershed. NTMWD has an intake on Lavon Lake, which could be used to divert the return flows. The Bonham WWTP discharges to the Bois d'Arc Lake watershed. Diversions from this lake began in 2023. NTMWD holds the water rights for Bois d'Arc Lake.

This discussion focuses on alternatives to reuse applications that have not been granted to date. Only alternative projects that have not been implemented and are not currently under construction are discussed here. Descriptions of potential project alternatives are presented below. Table I-2 presents a synopsis of the applicability of these potential strategies as feasible alternatives to reuse.

Each potential project alternative was vetted through the state water planning process and the discussions herein are consistent with the *2021 Region C Water Plan* and the *2022 State Water Plan*. Strategies that are recommended for implementation by NTMWD are part of suite of strategies to meet NTMWD's water needs. As such, these strategies are not alternatives to reuse but rather complement this supply. For completeness, a full range of potential alternatives is discussed in this appendix, including strategies that are recommended for implementation after reuse.

NTMWD's evaluation of the potential alternatives considered many factors, including cost of the water, quantity, reliability, the potential impacts of developing the project on the environment, natural resources and other water users, timing to develop the strategy, and potential implementation issues. **Table I-3** and **Figure I-3** show a comparison of the unit costs for the alternative strategies.

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TABLE I-2: LIST OF POTENTIAL WATER SUPPLY ALTERNATIVES FOR NTMWD

Strategy ¹	Feasible alternative (Yes/No)	Comment
Additional Lavon Lake	No	This strategy is considered an emergency supply during times of drought and not a significant source of long-term supply. It is not an alternative to long-term supplies from reuse.
Expanded Wetland Reuse	No	The source of water for this strategy is not available until population grows and generates more return flows.
New Lake Texoma Blend (Phase I – Bois d’Arc Lake)	No	Cannot be implemented until after 2030. This is not an alternative for Sister Grove RWRRF and Bonham WWTP reuse due to the online date.
New Lake Texoma Blend (Phase II)	No	Requires additional new source of fresh water to blend to meet drinking water quality standards.
Marvin Nichols Reservoir	No	Has greater environmental impacts than reuse. Significantly higher costs than Sister Grove RWRRF and Bonham WWTP reuse. Could take between 30 and 40 years to implement. Cannot be implemented within the timeframe water is needed.
Wright Patman Reallocation	No	Has greater environmental impacts than Sister Grove RWRRF and Bonham WWTP reuse. Could take between 30 and 40 years to implement. This is not an alternative for Sister Grove RWRRF and Bonham WWTP reuse due to the online date.
Oklahoma Water	No	Current political and legal impediments.
Toledo Bend Reservoir	No	High costs and energy use. Requires agreements with other providers. Cannot be implemented within the timeframe water is needed.
New Lake Texoma (Desalinate)	No	High costs and energy use. Cannot be implemented within the timeframe water is needed.
Lake O’ the Pines	No	Development of this source would require contracts with NETMWD and other suppliers. Agreements have not been reached to purchase this water. Due to uncertainty and expected time to develop, this is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse applications.
Carrizo-Wilcox Groundwater	No	Supply uncertainty and competing local interests for water.
Aquifer Storage and Recovery	No	Suitable geologic formation to store water has not been identified. Quantity is small. Unproven for size and location.
George Parkhouse North	No	Has greater environmental impacts than reuse. Yield is impacted by potential upstream reservoirs. Cannot be implemented within the timeframe water is needed.
George Parkhouse South	No	Has greater environmental impacts than reuse of discharges. Yield is impacted by upstream reservoir. Cannot be implemented within the timeframe water is needed.

- Each of these strategies was vetted through the state water planning process. Strategies that are recommended for implementation by NTMWD are part of a suite of strategies to meet NTMWD’s water needs. Some strategies that are identified as not feasible at this time may be a feasible water supply project in the future.

TABLE I-3: COSTS FOR POTENTIAL SUPPLY ALTERNATIVES

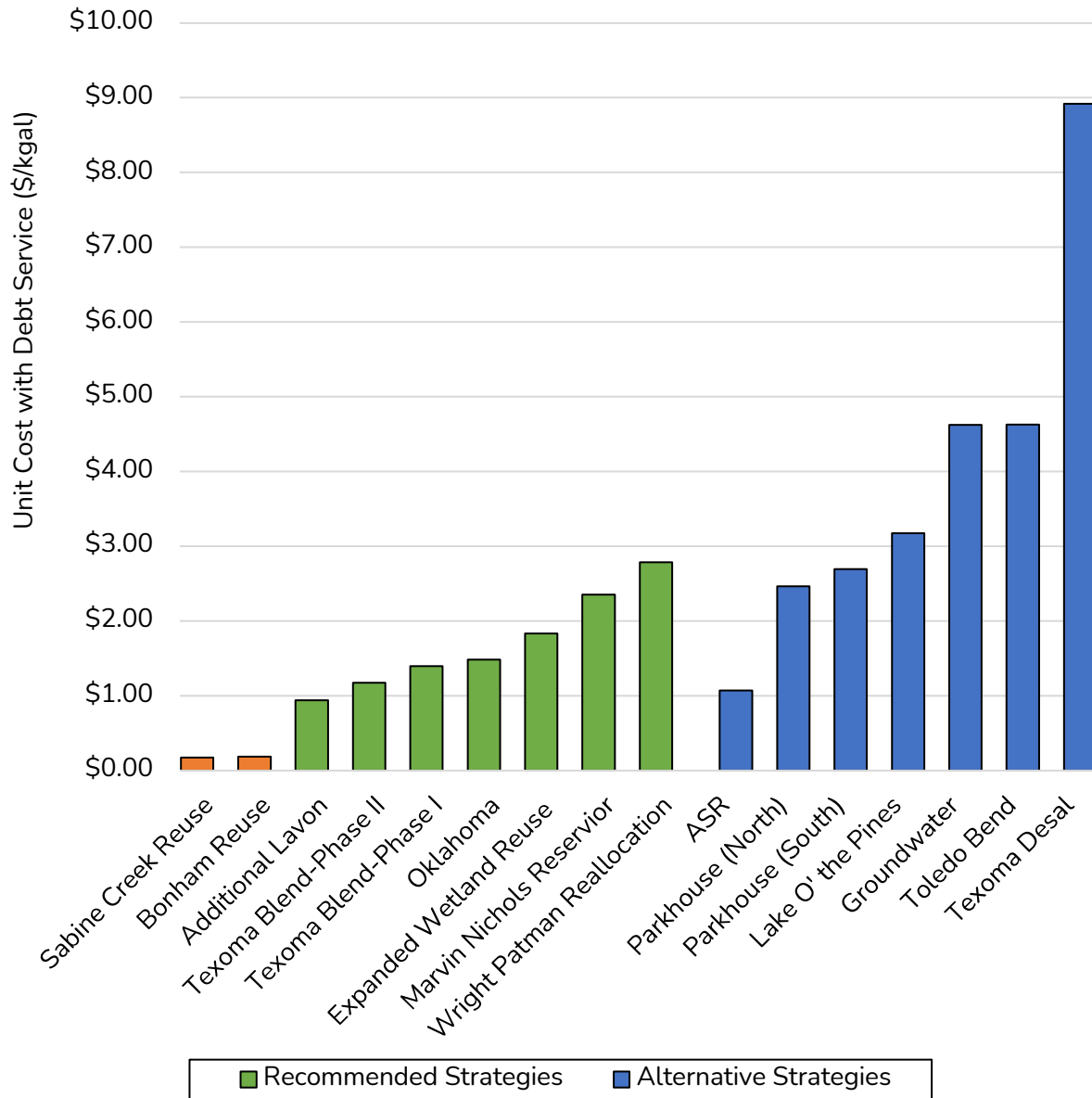
Strategy	Costs Reported in State Water Plan ¹		
	Capital Cost for NTMWD	Unit Cost for NTMWD (\$/kGal.)	
		Pre-Amortization	Post-Amortization
Proposed Projects			
Sister Grove RWRRF Reuse	\$0 ²	\$0.01	\$0.00
Bonham WWTP Reuse	\$0 ²	\$0.02	\$0.00
Potential Alternatives			
Additional Lavon Lake	\$36,546,000	\$0.94	\$0.35
Expanded Wetland Reuse ³	\$313,864,000	\$1.83	\$0.48
Lake Texoma Blend – Phase I	\$263,135,000	\$1.40	\$0.30
Lake Texoma Blend - Phase II	\$398,694,000	\$1.17	\$0.34
Marvin Nichols Reservoir	\$1,888,324,000	\$2.35	\$0.45
Toledo Bend Reservoir	\$1,856,658,000	\$4.63	\$1.41
Oklahoma Water	\$308,163,000	\$1.48	\$0.45
Lake O' the Pines	\$654,391,000	\$3.17	\$0.99
Wright Patman Reallocation	\$774,769,000	\$2.78	\$0.67
George Parkhouse North	\$1,051,889,000	\$2.46	\$0.54
George Parkhouse South	\$1,329,355,000	\$2.70	\$0.50
Lake Texoma Desalinate	\$989,141,000	\$8.92	\$4.01
Carrizo-Wilcox - Brazos Co.	\$818,677,000	\$4.62	\$1.37
Aquifer Storage and Recovery	\$6,747,000	\$1.07	\$0.49

1. Only alternative projects considered in the 2022 *State Water Plan* are included in Table I-3 and Figure I-3. Costs in Table I-3 are reported in 2021 dollars. Costs are for raw water only and do not include cost for treatment and treated water system distribution.
2. There are no capital costs estimated for the Sister Grove RWRRF and Bonham WWTP reuse projects. These facilities are currently or will be discharging to water bodies from which NTMWD has existing facilities for diversion and use. Only permitting costs are considered for these projects.
3. Future reuse projects, excluding Sister Grove RWRRF and Bonham WWTP reuse, are anticipated to be part of additional wetland.

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FIGURE I-3 COST COMPARISON OF POTENTIAL ALTERNATIVES TO REUSE PROJECT



The 2021 Region C Water Plan and the 2022 State Water Plan project that NTMWD will have water shortages of approximately 82,300 acre-feet per year by 2030, increasing to nearly 369,000 acre-feet per year by 2070. The near-term shortage is expected to be met through conservation and Bois d'Arc Lake. Expanded reuse through NTMWD's existing reuse projects and new reuse projects could provide up to nearly 25,000 acre-feet per year in 2030 and 106,400 acre-feet per year by 2070. However, to provide this level of reuse, authorizations for reuse from new or expanded WWTPs will be needed. As shown, additional reuse is a critical component of the District's water supply portfolio and conservation program.

Supply from Other Reuse Projects

Additional Wetland Reuse

NTMWD currently diverts return flows from the East Fork Trinity River and Trinity River Mainstem to a constructed wetland facility in Kaufman and Ellis counties (East Fork Wetland). The return flows are conveyed through the constructed wetland facility before being blended in Lavon Lake. With the population growth and an agreement with Dallas Water Utilities for access to these return flows, the quantity of return flows available from these sources exceeds the treatment capacity of the existing East Fork Wetland. This project proposes to expand the diversion and treatment capacity of the return flows through the development of new constructed wetland followed by membrane treatment to remove nutrients. The level of treatment proposed would allow NTMWD to transport the treated return flows either to Lavon Lake or directly to a water treatment plant.

This project is part of NTMWD's long-term reuse program. Due to the required infrastructure for this project, the costs are higher and the time to implement is longer than the reuse of discharges from Sister Grove RWRRF and the Bonham WWTP.

Supply from New (Undeveloped) Reservoirs

Marvin Nichols Reservoir Alternative

Marvin Nichols Reservoir is a proposed reservoir in the Sulphur River Basin in Titus and Red River Counties, about 45 miles west of Texarkana. It is a recommended strategy in the 2022 *State Water Plan* for NTMWD, the Tarrant Regional Water District (TRWD), and the Upper Trinity Regional Water District (UTRWD). The total available supply from the Marvin Nichols Reservoir to Region C providers is 361,200 acre-feet per year.

The proposed reservoir, if constructed, would be the largest lake contained completely within the State of Texas. At the recommended conservation pool elevation of 328 feet msl, the reservoir would inundate approximately 66,100 acres. Approximately 31,600 acres are classified as bottomland hardwoods or forested wetlands. The U.S. Fish and Wildlife Service (USFWS) has classified some of this acreage as Priority 1 bottomland hardwoods, which is the highest quality classified by USFWS (USFWS, 1984). Additional studies are needed to confirm the quality and extent of these resources.

The Marvin Nichols Reservoir would provide considerable amounts of new water supply to the North Texas area at a relatively low unit cost compared to some other strategies. However, the development of this strategy would have greater environmental impacts than the Sister Grove RWRRF and Bonham WWTP reuse. Environmental impacts of the reuse of discharges are negligible, as there are existing Texas Pollutant Discharge Elimination System permits authorizing the discharge of return flows. The reuse of this treated wastewater after it is discharged will have negligible impacts on the environment.



The development of the Marvin Nichols Reservoir as proposed in the 2022 *State Water Plan* also requires multiple participants to effectively achieve the cost benefits and full utilization of the available supply. As a result, the timing for this strategy is dependent upon the needs of other participants. In addition, development of this project could take between 30 and 40 years due to the permitting requirements and current opposition.

The Marvin Nichols Reservoir is not a feasible alternative to the reuse of discharges from the Sister Grove RWRRF and Bonham WWTP because it has greater environmental impacts and cannot be implemented within the proposed timeframe to satisfy the purpose and need of this project.

George Parkhouse South Lake Alternative.

George Parkhouse Lake (South) is a potential reservoir located on the South Sulphur River in Hopkins and Delta Counties. It is located immediately downstream from Jim Chapman Lake and would yield 116,000 acre-feet per year. At conservation elevation 401 feet msl, George Parkhouse Lake (South) would inundate approximately 29,000 acres and store 652,000 acre-feet. The yield of George Parkhouse Lake (South) would be reduced substantially by the development of Marvin Nichols Reservoir. The yield studies conducted as part of the Reservoir Site Protection Studies indicate the yield of this lake would be reduced by up to 60 percent (46,400 acre-feet per year) if constructed after Marvin Nichols (HDR et al, 2007).

The lake, as currently configured, would abut the dam for Jim Chapman Lake, and over fifty percent of the land impacted would be bottomland hardwood forest or marsh (HDR et al, 2007).

The proposed George Parkhouse Lake (South) is not a feasible alternative due to the uncertainty of the reliable supply with the development of other reservoirs in the river basin and the environmental impacts. Also, the project probably could not be implemented within the timeframe needed for additional water for NTMWD.

George Parkhouse North Lake Alternative

George Parkhouse Lake (North) is a potential reservoir located on the North Sulphur River in Lamar and Delta Counties, about 15 miles east of the City of Paris. At a proposed conservation elevation of 410.0 feet msl, the reservoir would store 331,000 acre-feet of water and inundate 14,400 acres. The firm yield would be 106,500 acre-feet per year, but its yield would be reduced substantially by the development of the Marvin Nichols Reservoir (HDR et al., 2007).

The reservoir site is located upstream of a designated Priority 1 bottomland hardwood preservation site known as Sulphur River Bottoms West. Most of the land impacted by this alternative is grassland or agricultural lands. Only about 1,200 acres are classified as wetlands. However, the acreage of affected wetlands would require field surveys and verification.

Similar to the George Parkhouse South Lake alternative, the economic viability of the project is dependent upon the ultimate yield of the project. The proposed reservoir is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse due to the uncertainty of the reliable supply with the development of other reservoirs in the river basin. Also, the project probably could not be implemented within the timeframe needed for additional water for NTMWD.

Transporting Water From Existing Reservoirs

Transporting water from existing reservoirs to NTMWD's service area requires agreements with the owner of the existing water supplies and often long transmission pipelines. Existing reservoirs that may have uncommitted supplies are commonly located in the eastern part of the state where there is more available surface water. However, most of these sources would require transporting the water over long distances with substantial vertical lift. NTMWD considered the following alternatives:

Additional Measures to Access Full Lavon Lake Yield

Currently, NTMWD does not have access to the full storage volume in Lavon Lake due to limitations of its diversion facilities. During most times these facilities provide the full authorized diversion from the lake. This strategy would provide for emergency measures to be taken during drought conditions when access to the full storage volume is limited. These measures may include, but are not limited to, development of raw water pump station #4 with a deep-water intake, extension and/or dredging intake channels to the pumping facilities, and floating barges equipped with pumps.

This strategy would provide additional supplies only during periods of drought and does not provide significant supply to help meet growing demands associated with population growth. This strategy is considered an emergency supply rather than an alternative to Sister Grove RWRRF and Bonham WWTP reuse.

Lake Texoma Alternatives

Lake Texoma is an existing U.S. Army Corps of Engineers (USACE) reservoir on the Red River on the border between Texas and Oklahoma. NTMWD has water rights to divert up to 197,000 acre-feet per year of water from Lake Texoma. Water from Lake Texoma is relatively high in dissolved salts and does not meet secondary drinking water standards. Until 2009, NTMWD diverted up to 84,000 acre-feet of Lake Texoma water and blended the water in Lavon Lake for subsequent use. With the detection of zebra mussels in Lake Texoma, this practice has ceased. NTMWD now transports water from Lake Texoma directly to the Wylie Treatment Plant and blends the water with supplies from Lavon Lake, but the amount of water that can be blended and still provide drinking water of acceptable quality is limited. NTMWD intends to blend Texoma water with water from Bois d'Arc Lake at the Leonard Water Treatment Plant. NTMWD also plans to make additional supplies available from Lake Texoma either through blending with new fresh water sources or desalination.



Blending and desalination are very different and are considered two different alternatives to reuse projects. Each alternative is discussed below.

Transport and Blend Lake Texoma Water with New Fresh Water Supplies

Due to environmental concerns and additional costs associated with large desalination projects, NTMWD's preferred use of this water source is to blend the Lake Texoma water with new fresh water supplies. It is anticipated that Lake Texoma water would be blended in a constructed balancing reservoir near a treatment facility and not in an existing lake or stream. This would reduce potential impacts of added dissolved solids to local lakes or streams.

Texoma Blending Phase I

Phase I of the Texoma Blending strategy would transport up to 40,000 acre-feet per year of Lake Texoma water through a new pipeline to the Howe Balancing Reservoir. From there, the water would be transported through an existing pipeline and a new connector pipeline to the Leonard Water Treatment Plant terminal storage facility. The Texoma Blending Phase I strategy is expected to be implemented between 2030 and 2040 to allow for filling of Bois d'Arc Lake and construction of the expanded infrastructure. This project is recommended for NTMWD and is part of its long-range water supplies. It is not considered an alternative to Sister Grove RWRRF and Bonham WWTP reuse because it will complement these projects by providing needed water supplies while the quantities of available return flows increase over time.

Texoma Blending Phase II

Texoma Blending Phase II would increase the use of water from Lake Texoma by blending with new fresh water supplies. Aside from Bois d'Arc Lake (Texoma Blending Phase I), there are no other readily available fresh water supplies in the amount needed to blend with the new water supply from Lake Texoma and existing supplies are not sufficient to provide a blended water of acceptable quality for municipal use. Therefore, the Phase II blended alternative cannot be implemented without also implementing another water supply alternative to provide fresh water to NTMWD. NTMWD does plan to make use of water supplies from this source, but only after development of other significant fresh water sources (such as Marvin Nichols Reservoir or other fresh water source). Blending (Phase II) cannot be considered an alternative to reuse without implementation of another water supply source; thus, blending Lake Texoma water with existing fresh water supplies is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse.

Transport and Desalinate Lake Texoma Water

One option to use Lake Texoma water for municipal purposes is to desalinate the water using reverse osmosis water treatment or another similar treatment method. Desalination can result in the loss of up to one fourth of the raw supply to the treatment process. For this strategy, it was assumed that 20

percent of the source water would be discharged as waste. Therefore for 40,000 acre-feet per year of source water, the amount of treated water for use is approximately 33,600 acre-feet per year. This strategy assumes a new 60 million gallons per day (mgd) desalination facility would be constructed at the Leonard Water Treatment Plant. Lake Texoma water would be transported directly to the Leonard Water Treatment Plant through a new pipeline and the desalination waste would be discharged to the Red River.

Desalination is a much more expensive strategy than blending, and there are considerable uncertainties in the operation and long-term costs of a large-scale desalination facility. The estimated costs for desalination of water from Lake Texoma are based on current cost information for large desalination facilities. However, they are more uncertain than other cost estimates developed for the potential alternatives because few large inland desalination facilities have been built to date. The Fort Bliss/ El Paso Water Utilities desalination facility, which is the largest inland desalination plant in the United States, produces 27.5 mgd. The technology for desalination is improving but it is still costly.

Desalination is also an energy intensive process, and as energy costs continue to increase, these costs are expected to increase. Large scale desalination of Lake Texoma water (>50 mgd) is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse due to the cost uncertainty, the greater energy usage associated with large-scale brine operations, and the time it would take to implement the project.

Toledo Bend Reservoir Alternative

Toledo Bend Reservoir is a 181,600-acre lake located in East Texas on the Texas-Louisiana state line. The total permitted supply from this source for Texas is 970,067 acre-feet per year (an additional authorization of 220,067 acre-feet per year was granted in August 2019). The Sabine River Authority of Texas operates the Texas portion of this lake. In the *2022 State Water Plan* the transport of water from Toledo Bend Reservoir to the North Texas area is an alternate joint strategy for NTMWD, TRWD, DWU, and UTRWD. This project, as presented in the *2021 Region C Water Plan*, could deliver a total of 650,000 acre-feet per year, with 200,000 acre-feet per year for NTMWD, in two phases.

This alternative will require multiple transmission pipelines to transport the water approximately 200 miles to North Texas. The current concept for this project includes the use and storage of existing reservoirs as part of the transmission system. This transfer of water is anticipated to have a low to medium low impact on the receiving reservoirs.

This strategy requires cooperation with other water providers and an agreement with the Sabine River Authority to purchase the water. The high capital costs for Phase 1 and energy usage associated with the long transmission pipelines result in a unit cost of over \$4.00 per 1000 gallons for raw water delivered to NTMWD. Costs for the other partners are higher. This project requires multiple agreements, which have not been reached, and an interbasin transfer to use the water in the North

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Texas area. Considering the costs, time to implement, and uncertainty of agreements, this strategy is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse.

Water from Oklahoma Alternative

Another potential alternative is the use of water from Oklahoma. At the present time, the Oklahoma Legislature has established a moratorium on the export of water from the state. Assuming the moratorium may be lifted in the future, the *2022 State Water Plan* recommends that NTMWD develop a project to use water from Oklahoma. It is an alternate strategy for the City of Irving and UTRWD. The recommended project is for 50,000 acre-feet per year and is planned for 2070.

NTMWD has applied for Oklahoma water rights to use water from the Kiamichi River, Muddy Boggy Creek, and stored water in Lake Hugo. At this time, the state cannot act upon these permits without further direction from the Oklahoma Legislature.

The challenges with this strategy are the development issues, including the legal moratorium on out-of-state water sales and the Lacey Act. Under the Lacey Act, it is unlawful to transport invasive species across state lines. Since there is considerable uncertainty as to when these obstacles could be overcome, this strategy cannot be counted on for near-term water supplies. Thus, it is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse.

Lake O' the Pines Alternative

Lake O' the Pines is an existing USACE reservoir in the Cypress River Basin with Texas water rights held by the Northeast Texas Municipal Water District (NETMWD). NTMWD has explored the possibility of purchasing supplies in excess of local needs from the Cypress River Basin. According to the *2021 Region D Water Plan*, there is no water available for export from the basin. However, there may be excess supplies from existing contracts.

Lake O' the Pines is about 120 miles from the Metroplex, and the distance and limited supply make this a relatively expensive water management strategy. Development of this source would require contracts with the NETMWD and other Cypress River Basin suppliers with excess supplies. At this time, agreements have not been reached to purchase this water. Due to this uncertainty and expected time to develop, Lake O' the Pines is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse.

Wright Patman Lake Alternatives

The Wright Patman Reallocation strategy involves development of new surface water supplies from the Sulphur River Basin through a reallocation of storage at Wright Patman Lake from its current purpose, flood control, to water conservation storage. The supply quantity and cost identified above are for a specific reallocation of Wright Patman at elevation 235 ft MSL. At that conservation pool



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elevation, the pool raise at Wright Patman Lake would inundate an additional 14,372 acres above the permitted conservation pool elevation (ultimate rule curve). Infrastructure would be developed to transport the water to the Region C water providers.

The Wright Patman Reallocation strategy is considered for NTMWD, UTRWD, TRWD, Dallas and the City of Irving, and recommended for NTMWD, TRWD and UTRWD.

The firm yield with reallocation of Wright Patman to elevation 235 ft MSL, above the 180,000 acre-feet per year permitted to Texarkana, would be 122,200 acre-feet per year. It is assumed that all the reallocation supplies would be available to Region C providers. These quantities assume that Marvin Nichols is senior to the Wright Patman Lake reallocation. However, the City of Texarkana has applied for a new water right from Wright Patman. If this right is granted, the amount of supply available to Region C providers would be less.

Reallocation to elevation 235 ft MSL was selected to minimize impacts to the White Oak Creek Wildlife Management Area (WOCWMA). This site is located upstream of Wright Patman Lake and is designated as mitigation for the construction of Jim Chapman Reservoir. At elevation 235 ft MSL, the increase in the conservation pool at Wright Patman Lake would increase water levels on approximately 450 acres of the WOCWMA and affect some riparian bottomland hardwoods. However, reallocation at this elevation would not affect the functioning of constructed wetland structures and would still allow the wetland structures to function as designed. Also, the USACE owns property up to the 235 ft MSL elevation, which simplifies additional land acquisition.

Reallocation of Wright Patman Lake would be sponsored by USACE and would require additional environmental studies. Currently, USACE is reluctant to approve reallocations of flood storage to water conservation storage. Further study would be needed to ensure that there is no increase in flooding risks after reallocation.

Due to the uncertainty of authorizing reallocation of flood storage, reaching agreements with strategy partners, and higher costs, this strategy is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse.

New Groundwater Supplies

There are limited new groundwater sources that could supply the quantity of water needed by NTMWD. The Ogallala aquifer in the Texas Panhandle has large quantities of water, but much of this supply is committed to users in the area, including agricultural users and local municipalities. Another potential source is the Carrizo-Wilcox aquifer. This aquifer is also heavily used by local entities.



Carrizo-Wilcox Aquifer Groundwater Alternative.

The Carrizo-Wilcox aquifer covers a large area of east, central, and south Texas. Organizations and individuals have been studying the development of water supplies in Anderson County and surrounding counties for export. Anderson County is about 100 miles from NTMWD service area. There are some uncertainties about developing such a large quantity of groundwater and exporting this water to North Texas. The Modeled Available Groundwater (MAG) values adopted through the Groundwater Joint Planning Process for the Carrizo-Wilcox in Anderson County are less than 25,000 acre-feet per year. Some of this groundwater is currently used by local producers. Due to the uncertainty of available supply and competition for this water source, the Carrizo-Wilcox groundwater alternative is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse.

Aquifer Storage and Recovery

Aquifer Storage and Recovery (ASR) is a water management approach that stores surplus water in local aquifers during periods of excess water availability and withdraws the stored water later during periods of drought or peak demands. This strategy can provide additional supply during drought. It requires a suitable aquifer formation and excess supplies that have been treated to a level that will not degrade existing water quality in the aquifer. The small-scale ASR strategy considered for NTMWD assumes a suitable formation can be identified near an existing water treatment facility, and the operations could provide up to 2,500 acre-feet per year during drought.

This quantity of water could help with peak demands but would not provide a significant source of new water. Further study is needed to determine if there are suitable geologic formations that are economically feasible for ASR, and the operation of the system may pose challenges for infrastructure that may not be used regularly. ASR is not a feasible alternative to Sister Grove RWRRF and Bonham WWTP reuse due to the technical uncertainties with implementation and time to implement.

Conclusion

Based upon the aforementioned information and analysis, there are no feasible alternatives to the Sister Grove RWRRF and Bonham WWTP reuse at this time. Furthermore, this project type is consistent with NTMWD's conservation goals to fully develop its available reuse to meet its future water needs.