2019 NORTH TEXAS MUNICIPAL WATER DISTRICT WATER CONSERVATION PLAN

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FOREWORD

This 2019 Water Conservation Plan (Plan) was prepared by Freese and Nichols, Inc. for the North Texas Municipal Water District (NTMWD), pursuant to Texas Commission on Environmental Quality (TCEQ) rules. Some material is based on the existing water conservation plans listed in Appendix A.

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This 2019 Water Conservation Plan is based on the Texas Administrative Code in effect on January 18, 2019 and considers water conservation best management practices from Texas Water Development Board (TWDB) Report 362, *Water Conservation Best Management Practices Guide*. In 2007, the state legislature created the Water Conservation Advisory Council (WCAC) as a council with expertise in water conservation representing various interests. One of the WCAC's charges is to regularly review existing Best Management Practices (BMPs) and add additional new BMPs as appropriate. The draft WCAC BMPs available as of November 30, 2018 have also been considered in the preparation of this Plan.

None of the currently proposed WCAC BMPs will cause this Plan to be obsolete. The most current annual report form should be obtained from TCEQ[1] when preparing the annual report (Appendix F) to submit to the TCEQ. A copy of the annual report should be sent to the TWDB as well as to the TCEQ.

[1]Superscripted numbers match references listed in Appendix A.

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1. INTRODUCTION AND OBJECTIVES

The North Texas Municipal Water District ("NTMWD" or the "District") is a regional wholesale supplier of water for 13 Member Cities and 60 other water suppliers in Collin, Dallas, Denton, Fannin, Grayson, Hopkins, Hunt, Kaufman, Rains, Rockwall and Van Zandt Counties. NTMWD currently provides water for over 1.7 million people throughout North Central Texas. The District has developed this updated Water Conservation Plan as a replacement for previous District water conservation plans dated August 2004, April 2006, March 2008, and April 2014.

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development of North Central Texas have led to growing demands for water supplies. At the same time, local and less expensive sources of water supply are largely already developed. Additional supplies to meet future demands will be expensive and difficult to secure. Severe drought conditions in recent years have highlighted the importance of efficient use of our existing supplies to make them last as long as possible. Extending current supplies will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the TCEQ has developed guidelines and requirements governing the development of water conservation and drought contingency plans for wholesale water suppliers[2]. The TCEQ guidelines and requirements for wholesale suppliers are included in Appendix B. NTMWD has developed this water conservation plan in accordance with TCEQ guidelines and requirements.

NTMWD also recognizes that in order 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. This Plan reflects NTMWD's commitment to enhanced water conservation and efficiency strategies – particularly those best management practices established by the Water Conservation Implementation Task Force[3] and the WCAC, which were incorporated, where practicable, in the development of these water conservation measures. 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 the TCEQ and TWDB to develop recommendations for optimum levels of water use efficiency and conservation in the State. In 2007, the state legislature created the WCAC which was given several charges, one of which is monitoring new

technologies for possible inclusion in the best management practice guide. 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 http://www.savetexaswater.org/bmp/index.asp. NTMWD has participated in the WCAC since its inception and for many years has had a member or alternate on the council.

NTMWD has, where practicable, implemented those best management practices that are appropriate for a wholesale water supplier of its type, reflecting the intent of the best management practices to provide flexibility to wholesalers in implementing those practices that are appropriate for their individual circumstances.

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. In order to work within the confines of its role as a wholesaler, NTMWD has developed Model Water Conservation Plans which can be used by Member Cities and Customers, who then have the ability to enforce those measures through ordinances or regulations on end users. (See Appendix C.)

NTMWD has also made significant financial and other investments to promote water conservation and efficiency, including public education and awareness programs and other initiatives targeted toward reducing water use. Specifically, the District maintains active participation in the WCAC, the Alliance for Water Efficiency (on behalf of itself and its Member Cities), EPA Water Sense, and the Water Efficiency Network of North Texas. The District also developed and financed the *Water IQ* Program, a highly successful public awareness campaign that is has been used statewide to promote water conservation.

NTMWD understands that achieving the highest practicable levels of water conservation and efficiency requires more than meeting the TCEQ requirement to update its plan every five years. To that end, the District continually reassesses ways to improve on its 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 efforts by the District 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 objectives of this Water Conservation Plan are as follows:

- To reduce water consumption from the levels that would prevail without conservation efforts.

- To reduce the loss and waste of water.
- To improve efficiency in the use of water.
- To encourage efficient outdoor water use.
- To maximize the level of recycling and reuse in the water supply.
- To extend the life of current water supplies by reducing the rate of growth in demand.

2. DEFINITIONS AND ABBREVIATIONS

1. 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.

2. 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 perennial and annual rye grass, Kentucky blue grass and fescues.

3. CUSTOMERS include those entities to whom NTMWD provides wholesale water that are not Member Cities of NTMWD.

4. 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.

5. EVAPOTRANSPIRATION (abbreviated as 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.

6. 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.

7. EXECUTIVE DIRECTOR means the Executive Director of NTMWD and includes a person the Executive Director has designated to administer or perform any task, duty, function, role, or action related to this Plan or on behalf of the Executive Director.

8. 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.

9. 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.

10. 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.

11. 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.

12. REGULATED IRRIGATION PROPERTY means any (customer class, i.e. commercial) property that uses 1 million gallons of water or more for irrigation purposes in a single calendar year or is greater than 1 acre in size.

13. RESIDENTIAL GALLONS PER CAPITA PER DAY (Residential GPCD) means 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.

14. NTMWD RETAIL CUSTOMERS include those customers to whom NTMWD provides retail water.

15. TOTAL GALLONS PER CAPITA PER DAY (Total GPCD) means 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 TAC 288.1 shall be credited against total diversion volumes for the purposes of calculating GPCD for targets and goals.

16. WATER CONSERVATION PLAN means this Water Conservation Plan approved and adopted by the NTMWD Board of Directors on January 24, 2019.

Abbreviations

Abbreviation	Full Nomenclature
BMP	Best Management Practices
NTMWD or District	North Texas Municipal Water District
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
WCAC	Water Conservation Advisory Council
WCP or Plan	Water Conservation Plan

3. REGULATORY BASIS FOR WATER CONSERVATION PLAN

3.1 TCEQ Rules Governing Wholesale Water Conservation Plans

The 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, which is included in Appendix B. For the purpose of these rules, 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."[2] The water conservation plan elements required by the TCEQ water conservation rules for wholesale suppliers that are addressed in this Water Conservation Plan are listed below. In addition to being a wholesale provider under TCEQ rules, NTMWD also acts as a retail water provider, and the TCEQ water conservation rules for retail water providers are addressed in Section 9 of this Plan.

<u>Minimum Conservation Plan Requirements for Wholesale Water Suppliers</u>

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 4 and Appendix D
- 288.5(1)(B) – Specific, Quantified Goals – Section 5
- 288.5(1)(C) – Measure and Account for Water Diverted – Section 6.1.1
- 288.5(1)(D) – Monitoring and Record Management Program – Section 6.1.2
- 288.5(1)(E) – Program of Metering and Leak Detection and Repair – Section 6.1.3
- 288.5(1)(F) – Requirement for Water Conservation Plans by Wholesale Customers – Section 6.2
- 288.5(1)(G) – Reservoir System Operation Plan – Section 6.3
- 288.5(1)(H) – Means of Implementation and Enforcement – Section 6.4

- 288.5(1)(I) – Documentation of Coordination with Regional Water Planning Group – Section 6.5
- 288.5(3) – Review and Update of Plan – Section 8

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 is not currently seeking a water right application for new or additional state water. If the District should seek a new water right, this 2019 Water Conservation Plan would need to be amended through the addition of an appendix addressing 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)(C) – Program for Reuse and/or Recycling – Section 7.1
- 288.5(2)(D) – Other Measures
  - Section 7.2 (public education),
  - Section 7.5 (model water conservation plans),
  - Sections 7.5.1 and 7.5.2 (landscape water management measures),
  - Section 7.11 (zero discharge from water treatment plants); and
  - Section 7.12 (in-house conservation measures).

3.2 Guidance and Methodology for Reporting on Water Conservation and Water Use

In addition to TCEQ rules regarding water conservation, this Plan also incorporates elements of the Guidance and Methodology for Reporting on Water Conservation and Water Use developed by TWDB and TCEQ, in consultation with the WCAC (the "Guidance"). The Guidance was developed in response to a charge by the 82nd Texas Legislature to develop water use and calculation methodology and guidance for preparation of water use reports and water conservation plans in accordance with TCEQ rules. While the Guidance is targeted toward retail water providers, the Guidance provides helpful resources for wholesalers such as NTMWD to determine water use and water loss for purposes of its Water Conservation Plan. NTMWD has

also incorporated features of the Guidance into the Model Water Conservation and Model Water Resource and Emergency Management Plans that it develops for use by its Member Cities and Customers. Copies of the Model Water Conservation Plans and Model Water Resource and Emergency Management Plans are included herewith as Appendix C.

3.3 Texas Water Development Board Water Conservation Planning Tool

The TWDB is currently developing a water conservation planning tool to be utilized by utilities to evaluate various best management practices. The tool will come pre-loaded with data submitted by utilities as part of the water use surveys and will have a library of best management practices with water savings and associated cost. The tool was released on December 14, 2018 and was not available in time for the development of this Water Conservation Plan, NTMWD intends to utilize the tool for future planning. In addition, NTMWD encourages each of its Member Cities and Customers to utilize the tool, to the extent practical, for water conservation planning. The TWDB is offering a training workshop on the tool in December 2018, and the tool should be available to for use by utilities after the training. The District is also hosting a training in January 2019 for its Member Cities and Customers.

4. DESCRIPTION OF THE NTMWD SERVICE AREA

NTMWD provides treated potable water to 13 Member Cities and 60 other Customers (some direct and some indirect) in North Central Texas. Figure 4-1 shows a schematic diagram of NTMWD's system and its Member Cities and Customers. Figure 4-2** 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.

NTMWD obtains its raw water supplies from Lavon Lake, Lake Texoma, Jim Chapman Lake, Lake Tawakoni, the Upper Sabine Basin, Lake Bonham, reuse of treated wastewater effluent from its Wilson Creek Regional Wastewater Treatment Plant, and reuse of treated wastewater through the East Fork Water Reuse Project. Table 4-1 shows the permitted and contracted supplies as well as the 2018 currently available supply.

Table 4-1 NTMWD Permitted and Current Supply Amounts (ac-ft/yr)

Source	Permitted or Contracted	2018 Current Supply	Notes
Lavon Lake	118,670	94,500	Estimated firm yield with minimum pool of 467
Lake Texoma	197,000	78,800	Assume 4:1 blend with other sources
Jim Chapman Lake	57,214	44,700	NTMWD's share of firm yield based on minimum elevation of 415.5
Lake Bonham	5,340	1,900	Limited to Bonham demand
Reuse - Wilson Creek Reg. WWTP*	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 Lake Lavon with projected return flows
Main Stem Pump Station	56,050	0	Contract with TRA; not online until 2019
Upper Sabine Basin (Lake Tawakoni and Lake Fork)	11,100	51,000	11,100 is permanent, additional 39,900 is temporary and contract expires in 2025
Bois d'Arc Lake	175,000	0	Texas Water Right Permit; Supply is not online until 2022
Total	**849,649**	**358,900**	

** The NTMWD service area shown in Figure 4.2 includes the entire service area of all of the entities to which NTMWD provides water. Actual NTMWD facilities do not extend into Grayson, Hopkins, Hunt, Rains, and Van Zandt Counties. Some of NTMWD's customers have other sources of water supply in addition to NTMWD.

The permitted supply available to NTMWD as of 2018 is 849,649 acre-feet per year. The reliable supply from existing sources is less than the permitted supply because of reservoir yields, current return flow levels, and water quality concerns. The current reliable supply is 358,900 acre-feet per year, and NTMWD is seeking additional supplies to meet its projected demands. NTMWD operates four water treatment plants in Wylie, Texas, near Lavon Lake, with a total treatment capacity of 770 MGD, along with the 30 MGD Tawakoni water treatment plant northeast of Terrell. The fourth Wylie Water Treatment Plant is currently undergoing a 70 MGD expansion. Upon completion of construction, the total treatment capacity at Wylie will be 840 MGD. NTMWD also operates the 6.6 MGD Bonham water treatment plant.

Appendix D to this Water Conservation Plan is a water utility profile for NTMWD, based on the format recommended by the TCEQ. Table 4-2 summarizes key facts from the Water Utility Profile.

Figure 4-1 North Texas Municipal Water District System Schematic

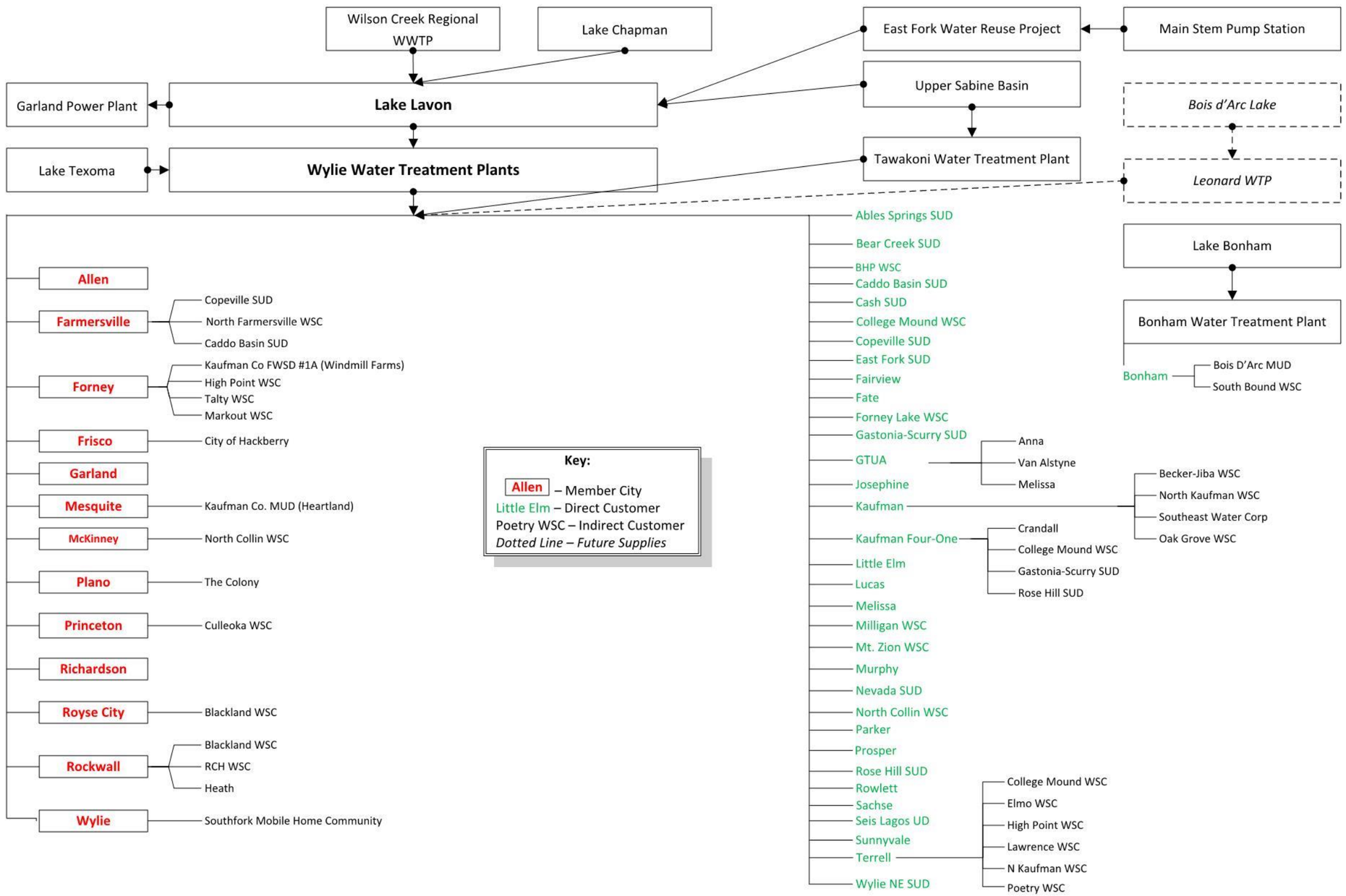


Figure 4-2 North Texas Municipal Water District Current Service Area Map

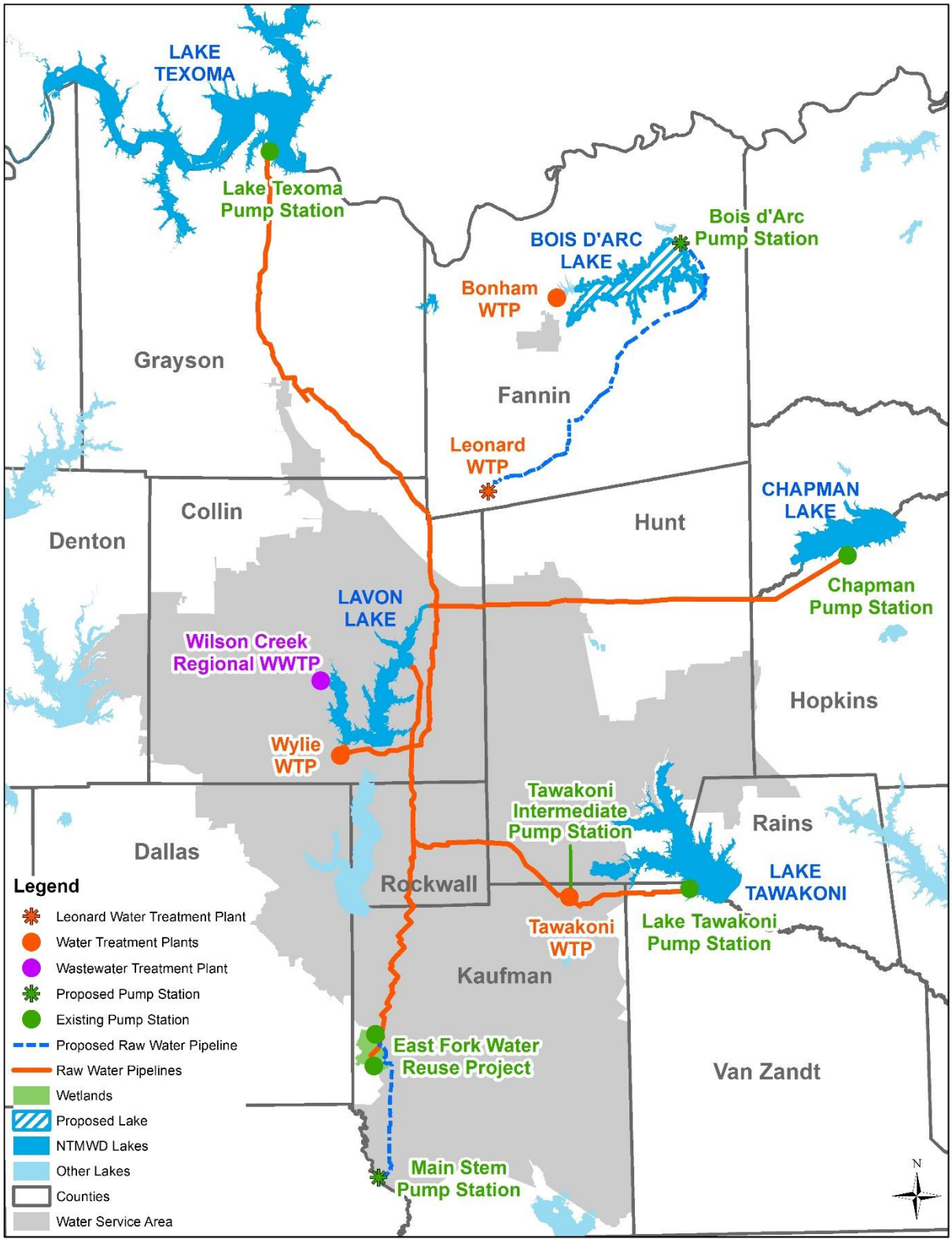


Table 4-2 Summary of Water Utility Profile for North Texas Municipal Water District

Water Service Area = 2,200 square miles

Miles of Raw and Potable Water Transmission Pipeline = 576 miles

Population:

Current Population Served = 1.7 million in 2017 (estimated)
Projected 2070 Population = 4.12 million (current & projected Member Cities & Customers)

Connections:

Current Retail Connections = 29 in 2018

Information on Water Sales for the Last Five Years:

Year	Total Municipal Raw Water Diverted (Million Gallons)	Estimated Population	Raw Water Total GPCD (GPCD)	Raw Water Total GPCD with Credit for Indirect Reuse (GPCD)	Ratio of Peak Day to Average Day
2013	295,504	1,534,084	172*	133*	1.84
2014	265,108	1,572,330	151*	118*	1.64
2015	300,497	1,602,714	167*	130*	2.05
2016	307,040	1,667,020	165	135	1.87
2017	313,897	1,699,173	165	129	1.59

*Years with drought restrictions.

Water Supply Sources (as of 2018) = Lavon Lake, Lake Texoma, Jim Chapman Lake, Lake Tawakoni, Lake Bonham, Reuse from Wilson Creek Regional Wastewater Treatment Plant, East Fork Water Reuse Project, and Upper Sabine Raw Water Supply.

Water Supply Sources in development (estimated completion) = Main Stem Pump Station (2019) and Bois d'Arc Lake (2022).

Treatment and Distribution System:
Treatment Plant Capacity = 806.6 MGD in August 2018
Ground storage = 92.9 million gallons (50.9 MG at Plants, 42 MG remote)

Current Wastewater Flow = 49,419 million gallons in 2017

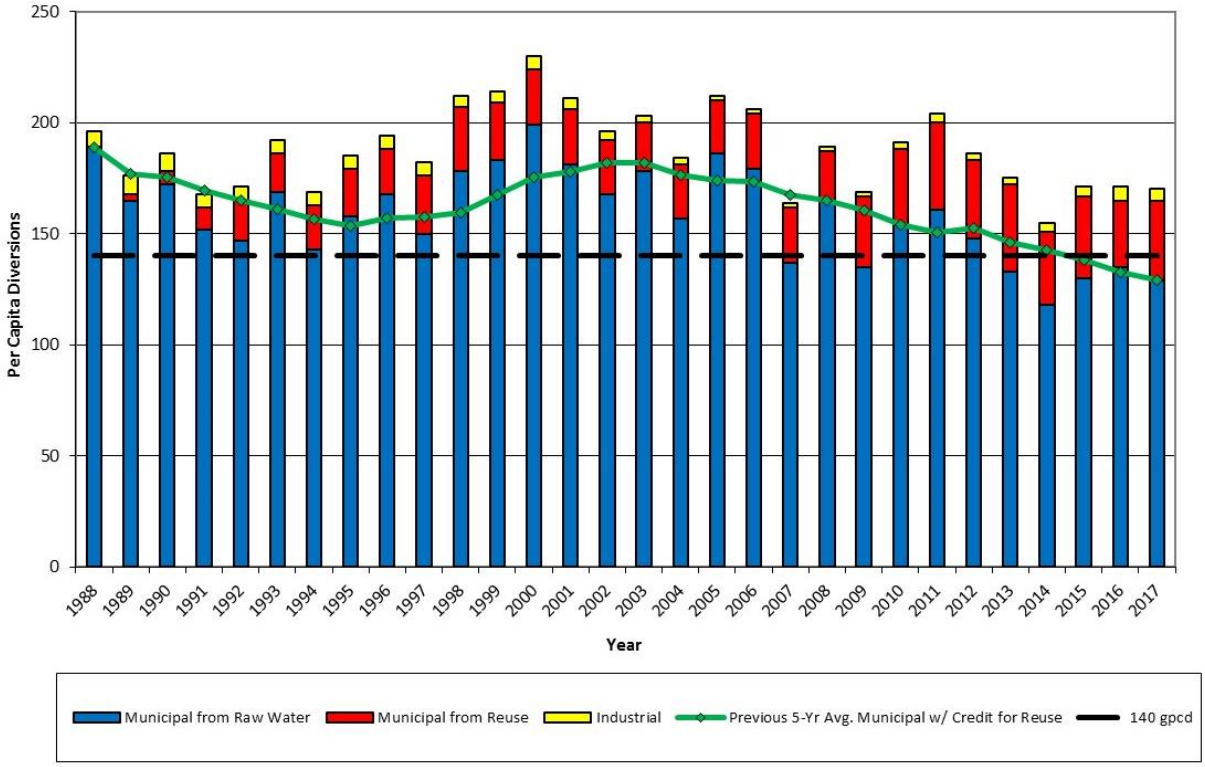
5. SPECIFICATION OF WATER CONSERVATION GOALS

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. In order 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 the 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 enable the Member Cities to more adequately track water use by sector.

Figure 5-1 shows the historical total GPCD, with credit for indirect reuse, for the NTMWD from 1988-2017. The figure shows the amount of per capita from municipal use, industrial use and from municipal reuse. As is the case with most suppliers, there is great variability in per capita use due to weather and other factors. A 5-year average total GPCD with credit for indirect reuse is plotted to show long-term trends. Since the early 2000s, NTMWD has experienced a steady decline in their 5-year average total GPCD. This data currently reflects the impacts of drought restrictions in 2006-2007 and 2011-2015 which led to lower demands in those years. Currently, the 5-year average for total GPCD, with credit for indirect reuse, is approximately 129 GPCD, which is below the State goal for water use outlined in the Water Conservation Implementation Task Force Report 362, as well as the 2016 Region C Water Plan.[7,††]

[††] Note that both Water Conservation Implementation Task Force Report 362 and the 2016 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 5-1 North Texas Municipal Water District Total GPCD Analysis



NTMWD has control over the operation of its water supply, treatment, and delivery system and takes direct action to keep that system efficient. In areas under its direct control, NTMWD adopts the following goals for water conservation and efficiency:

- Keep the level of nonrevenue water in the system below 5 percent in 2018 and subsequent years, as discussed in Section 6.1.
- Maintain universal metering of customers, meter calibration, and meter replacement and repair, as discussed in Section 6.1.
- Maintain a program of leak detection and repair, as discussed on Section 6.1.
- Continue to utilize wastewater reuse as a major source of water supply, as discussed in Section 7.1. Seek TCEQ authorization for additional reuse to increase the efficiency of the NTMWD water supply system.
- Raise public awareness of water conservation and encourage responsible public behavior by a public education program, as discussed in Section 7.2.
- Continue to recycle wash water from NTMWD water treatment plants, as discussed in Section 7.11.

- Continue to implement other in-house water conservation efforts, as discussed in Section 7.12.

As a wholesale provider, NTMWD will continue to assist its Member Cities and Customers in the development of water conservation programs. NTMWD has developed a Model Water Conservation Plan for NTMWD Member Cities and Customers[3] and a Model Water Resource and Emergency Management Plan that its Member Cities and Customers can use to develop their own water conservation and drought contingency plans. As part of the Model Water Conservation Plan, NTMWD requires Member Cities and Customers to provide annual water conservation reports. NTMWD reviews these reports and compiles the information as part of its own annual conservation report, which is used to manage NTMWD's water conservation program. Annual water conservation reports also provide for the reporting of annual sector-based water use information, where practicable.

Table 5-1 shows the projected Total GPCD and Total GPCD with credit for indirect reuse for NTMWD. NTMWD has outlined its 5- and 10-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 projected per capita use approved by the TWDB includes the estimated effect of low-flow plumbing fixtures but does not include the effect of new water conservation measures that may be adopted by NTMWD Member Cities and Customers. Table 5-1 also shows NTMWD's targets for reduction in Total GPCD and Total GPCD, with credit for indirect reuse, as a result of implementing this Water Conservation Plan and the plans to be developed by its Member Cities and Customers. The data shown on the table reflect the following:

- The adjusted 5-year moving average of the current Total GPCD and Total GPCD with credit for indirect reuse was used rather than a historical 5-year average based on the fact the District was in drought restrictions from 2013-2015. The adjusted per capita numbers were determined utilizing a demand model removing the impact of drought restrictions on demands in those years.
- The target for the 5-year (2024) Total GPCD for all NTMWD Member Cities and Customers is 164 gallons per capita per day, as shown in Table 5-1 (5-year goal). This represents a reduction of 9 gallons per capita per day.

- The target for the 10-year (2029) Total GPCD for all NTMWD Member Cities and Customers is 157 gallons per capita per day, as shown in Table 5-1 (10-year goal). This represents a reduction of 16 gallons per capita per day.
- The target for the 5-year (2024) Total GPCD with credit for indirect reuse for all NTMWD Member Cities and Customers is 128 gallons per capita per day as shown in Table 5-1 (5-year goal). This represents a reduction of 9 gallons per capita per day.
- The target for the 10-year (2029) Total GPCD with credit for indirect reuse for all NTMWD Member Cities and Customers is 121 gallons per capita per day, as shown in Table 5-1 (10-year goal). This represents a reduction of 16 gallons per capita per day.

The per capita use in recent years includes reductions due to drought measures that have been implemented in the past five years. In addition to these drought measures, NTMWD has continued to increase the percentage of its supply that comes from reuse, as shown in Table 5-1. The goal is for a 5-year average and some years (dry years) will be higher. A series of dry years might lead to an average exceeding the goal.

Table 5-1 5-Year and 10-Year Total GPCD Goals

Description	Current Average (GPCD)	5-Year Goal (2024) (GPCD)	10-Year Goal (2029) (GPCD)
Current 5-Year Average Per Capita Total Use	173		
Current 5-Year Average Per Capita Municipal Use from Reuse	36		
Current 5-Year Average Per Capita Municipal Use with Credit for Reuse	137		
Expected Reduction Due to Low-Flow Plumbing Fixtures		1	3
Projected Reduction Due to Elements in this Plan		8	13
Water Conservation Goals (Based on 5-Year Average)		**164**	**157**
Water Conservation Goals (Based on 5-Year Average with credit for reuse)		**128**	**121**

6. BASIC WATER CONSERVATION STRATEGIES

6.1 Metering, Water Use Records, Control of Nonrevenue Water, and Leak Detection and Repair

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. To that end, in 2012 the NTMWD Board of Directors authorized an expenditure of $4.8 million in flow metering improvements, including new meters for several of its water treatment plants. These metering upgrades allow for more accurate metering and ultimately, more careful monitoring of water use and water loss control.

6.1.1 Practices to Measure and Account for the Amount of Water Diverted

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

6.1.2 Monitoring and Record Management Program for Determining Deliveries, Sales, and Losses

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 ±2%, which are read monthly by NTMWD personnel. These readings are used to bill Member Cities and wholesale Customers.
- The meters used to measure deliveries to the Member Cities and wholesale Customers are calibrated quarterly and tested, as necessary.
- Potable drinking water leaving NTMWD's water treatment plants is metered by meters with accuracy of ±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 nonrevenue water in its delivery system. (For NTMWD, nonrevenue water is defined as raw water diverted from Lavon Lake less metered sales to Member Cities and Customers and line flushing use.) Historical records show that NTMWD's nonrevenue water has been as high as 9.0 percent and as low as 5.7 percent of raw water diversions and averaged 7.25 percent between 2013 and 2017.
- NTMWD maintains and manages electronic records of raw water deliveries, sales to Member Cities and Customers, 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.

One of the goals of NTMWD's water conservation program is to maintain nonrevenue water below 5 percent in every year.

6.1.3 Leak Detection and Repair

NTMWD's metering program for raw and potable water is described in Sections 6.1.1 and 6.1.2. NTMWD has an active program to control, detect, and repair leaks:

- All NTMWD 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 to Member Cities and Customers, which can be used to identify leaks.
- NTMWD's regular monitoring of nonrevenue 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.

6.2 Requirement for Water Conservation Plans by 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.

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 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.

6.3 Reservoir System Operation Plan

NTMWD currently has a long-term water supply of 849,649 acre-feet per year from the following permitted and contractual sources:

Lavon Lake water right	118,670 acre-feet per year
Lake Texoma†	197,000 acre-feet per year
Jim Chapman Lake	57,214 acre-feet per year
Lake Bonham	5,340 acre-feet per year
Reuse - Wilson Creek Reg. WWTP*	71,882 acre-feet per year
East Fork Water Reuse Project*	157,393 acre-feet per year
Main Stem Pump Station**	56,050 acre-feet per year
Upper Sabine Basin	11,100 acre-feet per year
Bois d'Arc Lake	175,000 acre-feet per year
TOTAL	**849,649 acre-feet per year**

* Availability from Wilson Creek Regional WWTP and East Fork Water Reuse Project is limited to actual discharges and is currently less than amount authorized.

** Contract with Trinity River Authority

† Availability from Lake Texoma is limited due to issues with zebra mussels and salt levels.

In addition, NTMWD has entered into a short-term interim contract for 40,000 acre-feet per year from the Sabine River Authority (decreasing incrementally over time and expiring in 2025). The current reliable

water supply in 2018 (based on current return flows and supplies available in a drought of record) is about 359,000 acre-feet per year.

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. Water from Lake Tawakoni (Upper Sabine Basin) is pumped to the Lake Tawakoni Water Treatment Plant and also 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 operation plan for its various sources of supply to maximize the efficiency of operation within existing water rights. The NTMWD reservoir system operation 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 plan minimizes pumping into the Lavon Lake during flood conditions. The 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 optimize the use of the District's sources (within the constraints of existing water rights) while 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.

6.4 Water Conservation Plan 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 the TCEQ by the required date of May 1 of every year. This report lists the various water conservation strategies that have been implemented, including the date the strategy was implemented. The report also lists the 5-year and 10-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, and results will be reported to the NTMWD 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 discussed in Section 6.2. 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 Plan over time.

6.5 Coordination with Regional Water Planning Groups

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

7. ENHANCED WATER CONSERVATION STRATEGIES

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

7.1 Reuse and Recycling of Wastewater

NTMWD's Wilson Creek Regional Wastewater Treatment Plant discharges treated effluent into Wilson Creek upstream from Lavon Lake. NTMWD reused 54,919 acre-feet of treated wastewater from the Wilson Creek WWTP for municipal purposes in 2017. In addition, NTMWD has developed the East Fork Water Reuse Project, which diverted 44,072 acre-feet in 2017. With the addition of the Main Stem Pump Station the District will be able to increase flows through the East Fork Water Reuse Project up to an additional 56,100 acre-feet per year. These three projects represent the largest municipal water supply based on reuse in the State of Texas. When fully developed, the three projects will provide up to 42 percent of the NTMWD's currently permitted water supplies.

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 fiscal year 2018, approximately 523 million gallons of NTMWD's treated wastewater were reused for off-site irrigation.

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

- North Central Texas Council of Governments CLIDE Award – 2013; in recognition of the East Fork Water Reuse Project
- ACEC Engineering Excellence Award – 2012; in recognition of the East Fork Water Reuse Project.
- TCEQ Texas Environmental Excellence Awards – 2011; in recognition of the East Fork Water Reuse Project
- WEAT Sidney L. Allison Award – 2010; in recognition of the East Fork Water Reuse Project.
- Water Reuse Association Large Project of the Year - 2008; in recognition of the East Fork Water Reuse Project.

- Texans By Nature – 2018 Conservation Wrangle Award; in recognition of the East Fork Water Reuse Project.

7.2 Public Education Program

As a regional wholesale water supplier, NTMWD has few opportunities to directly interact with end users of water throughout 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 public education efforts include the following elements:

- Beginning in 2006 and continuing through 2018, NTMWD has invested $16.6 million in the development and implementation of the "Water IQ: Know Your Water" campaign, including newspaper ads, radio spots, billboards, a web site, 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 88million impressions**.**
- "Water4Otter" is a water conservation campaign for kids launched by the North Texas Municipal Water District (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 Texas Water Development Board awarded the NTMWD a conservation grant to develop Water4Otter as a model program that could be used throughout the state. Since the program piloted in November 2014, the live, 45-minute Water4Otter program has reached nearly 19,500 students through 161 performances across North Texas.
- 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.
- NTMWD provided funding for the conversion of the Texas Smartscape CD-ROM into an interactive web site. 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 web site (www.txsmartscape.com).

- NTMWD provides conservation brochures and information to interested civic groups and schools. Information includes brochures on water-saving measures and xeriscape landscaping.
- NTMWD participates in special events to distribute water conservation information to the public.
- NTMWD participates in the Water Educators Network of North Texas to enhance regional programs and develop water efficiency brochures, videos, Collin County Newcomers outreach, in addition to numerous other activities for regional cooperation and water awareness.
- 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 has partnered with Dallas Water Utilities and Tarrant Regional Water District to host an annual Water Conservation Symposium, a half-day event where leading water conservation experts present best management practices. In 2018, the 12th annual North Conservation Symposium was held with over 130 attendees. Other regions of the state, including the Central and Gulf Coast regions, have organized similar symposiums modeled after the North Texas example.
- NTMWD is an EPA Water Sense Partner and participates in the EPA Water Sense sponsored "Fix a Leak Week." NTMWD encourages all Member Cities and Customers to become EPA Water Sense Partners.
- 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 cost of the Center, as well as the personnel cost. 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 been a supporting participant and member of the Texas Water Smart education campaign and participates at Texas Water Smart meetings, conferences, and media events designed to increase public awareness and education on water conservation.
- NTMWD has been recognized at the state and national level for its water conservation program with the following awards:
  - ADDY Award – 2017; in recognition of Water IQ "Journey of Water" Campaign
  - ADDY Award – 2015; in recognition of "Water4Otter" Youth Campaign
  - ADDY Award – 2011; in recognition of Water IQ "Waste Water – Waste Money" Campaign
  - WCAC Blue Legacy Award – 2015; in recognition of the "Water My Yard" program to install weather stations throughout the District's service area.
  - WCAC Large Supplier Water Conservation and Stewardship Award – 2011; in recognition of outstanding and innovative commitment to conservation of Texas' water resources.
  - Texas AWWA Watermark Award – 2011; in recognition of the 2010 "Water IQ" media campaign.
  - TCEQ Texas Excellence Environmental Awards – 2011; in recognition of the NTMWD water conservation program.
  - Texan By Nature Certification – 2018; in honor of commitment to conservation benefiting people, prosperity, and natural resources.
- The District frequently evaluates opportunities to partner on public education with other entities in the region and around the State. One such opportunity is the possibility of a state-wide conservation campaign being discussed by the TWDB. If this opportunity is approved through the State it is possible that the District may transition from Water IQ to this campaign or a regional conservation campaign with other entities in the region.

7.3 Interactive Weather Stations / Water My Yard Program

NTMWD has developed the Water My Yard program to install weather stations throughout its service area to provide consumers with a weekly e-mail and information through the Water My Yard website in determining an 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 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 is provided that will determine 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. This innovative program has been available to those within the NTMWD service area since May 2013. The District currently has over 39,000 subscribers within their service area receiving weekly watering advice.

Table 7-1 Weekly Water Advice Subscribers

Station	Subscriptions
Allen	745
Cash	4
Farmersville	178
Forney	294
Frisco*	27,990
Garland	721
McKinney	1,759
Melissa	225
Mesquite	434
Murphy	298
Plano	3,164
Princeton	333
Richardson	1,253
Rockwall	562
Royse City	231
Sachse	197
Seagoville	18
Tawakoni	7
Wylie	687
Total	39,100

*Frisco owns and operates their own system of weather stations and provides a weekly newsletter to subscribers

7.4 Technical Assistance and Outreach

Beginning in 2003, NTMWD has held a series of water conservation workshops for staff of its Member Cities and Customers. These workshops have covered a number of 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 (ICI) audits, and other procedures.

NTMWD encourages its Member Cities and Customers to develop and implement rebate and bulk purchasing programs, where such programs 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.

In addition, NTMWD staff participates in the following technical assistance and outreach for Member Cities and Customers:

- Dedicated conservation coordinator on NTMWD staff to field conservation-related queries from Member Cities and Customers and coordinate with media regarding conservation issues.
- Provision of training for Member Cities and Customers regarding Industrial, Commercial, and Institutional retail customer audits.
- Provision of online portal on NTMWD website for Member Cities and Customers to communicate and share information on water conservation programs.
- 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.
- Holding regularly scheduled meetings with Member Cities and Customers for water supply updates, Water IQ campaign strategies, and legislative activities related to water and water conservation.
- Provision of web-based water conservation tips on the NTMWD website, Water IQ website, and Water My Yard website, in addition to links to other water related agencies for additional resources.
- Purchasing 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.
- Member/partner of EPA Water Sense
- 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
- Member of WENNT (Water Efficiency Network of North Texas)
- Hosting TWDB Water Loss Audit Training
- Hosting a training on the TWDB Water Conservation Planning Tool

7.5 NTMWD Model Water Conservation Plan for NTMWD Member Cities and Customers

In order 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[5]. The Model Water Conservation Plan addresses the TCEQ requirements for water conservation plans for municipal use by public water suppliers[1] and includes advanced water conservation strategies beyond TCEQ requirements that mirror the NTMWD plan. NTMWD continues to assist Member Cities and Customers in the development of their water conservation plans using the Model Conservation Plan as a guide.

7.5.1 Compulsory Landscape and Water Management Measures

The following landscape water management measures are included in the NTMWD Model Water Conservation Plan to be utilized by Member Cities and Customers. These measures represent minimum measures to be implemented and enforced in order to irrigate the landscape appropriately and are to remain in effect on a permanent basis unless water resource management stages are declared.

1. Landscape Water Management Measures

- Limit landscape watering with sprinklers or irrigation systems at each service address to no more than two days per week (April 1 – October 31), with education that less than twice per week is usually adequate. Additional watering of landscape may be provided by hand-held hose with shutoff nozzle, use of dedicated irrigation drip zones, and/or soaker hose provided no runoff occurs.
- Limit landscape watering with sprinklers or irrigation systems at each service address to no more than one day per week beginning November 1 and ending March 31 of each year, with education that less than once per week is usually adequate.
- Estimated savings from the year-round watering restrictions, mentioned above, since the District terminated drought stages in 2015 is approximately 2.5 to 3.5 percent of water use on an average annual basis. Savings are higher in the summer and lower in the winter.

- Prohibit lawn irrigation watering from 10 AM to 6 PM (April 1 – October 31).
- Prohibit the use of irrigation systems that water impervious surfaces. (Wind-driven water drift will be taken into consideration.)
- Prohibit outdoor watering during precipitation or freeze events.
- Prohibition of use of poorly maintained sprinkler systems that waste water.
- Prohibit excess water runoff or other obvious waste.
- Require 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 maintained to function properly.
- Prohibit overseeding, sodding, sprigging, broadcasting or plugging with cool season grasses or watering cool season grasses, except for golf courses and athletic fields.
- Require that irrigation systems be inspected at the same time as initial backflow preventer inspection.
- Requirement that all new irrigation systems be in compliance with state design and installation regulations (Texas Administrative Code Title 30, Chapter 344).
- Require the owner of a regulated irrigation property to obtain an evaluation of any permanently-installed irrigation system on a periodic basis. 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).

2. Additional Water Management Measures

- Prohibit 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.
- Non-commercial car washing can be done only when using a water hose with a shut-off nozzle.
- Hotels and motels shall offer a linen reuse water conservation option to customers.
- Restaurants, bars, and other commercial food or beverage establishments may not provide drinking water to customers unless a specific request is made by the customer for drinking water.

- Adoption of an increasing block water rate structure, if not already in place.

7.5.2 Additional Water Conservation Measures in the NTMWD Model Water Conservation Plan

NTMWD also urges its Member Cities and Customers to consider including the following additional water conservation measures from the NTMWD Model Water Conservation Plan in their plans:

1. Landscape Water Management Regulations

- Requirement that all existing irrigation systems be retrofitted with rain and freeze sensors and/or ET or Smart controllers capable of multiple programming. Rain and freeze sensors and/or ET or Smart controllers must be maintained to function properly.
- Requirement that all new athletic fields be irrigated by a separate irrigation system from surrounding areas.
- Implementation of other measures to encourage off-peak water use.

2. Landscape Ordinance

- Landscape ordinances are developed by cities to guide developers in landscaping requirements for the city. A model landscape ordinance is provided in as part of the Model Plan and is intended as a guideline for adopting a landscape ordinance to promote water efficient landscape design.
- Native, drought tolerant or adaptive plants should be encouraged.
- Drip irrigation systems should be promoted.
- ET/Smart controllers that only allow sprinkler systems to irrigate when necessary should be promoted.

3. Water Audits

- Water audits are useful in finding ways in which water can be used more efficiently at a specific location. NTMWD recommends that Member Cities and Customers offer water audits to customers.
- Member Cities and Customers are required to develop regulations, ordinances, policies, or procedures for enforcement of water conservation guidelines.

4. Rebates

- In addition to the conservation measures described above, the NTMWD also recommends that Member Cities and Customers consider the following water conservation incentive:
  - 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; and/or
  - Other water conservation incentive programs.

7.6 Annual Reports

One element of NTMWD's Model Water Conservation Plan for NTMWD Member Cities and Customers is a requirement that Member Cities and Customers complete annual conservation reports by March 31 of the following year and submit them to NTMWD. A copy of the annual report is included herewith as Appendix E. NTMWD compiles these reports and uses them to help generate its own annual water conservation report.

NTMWD's annual water conservation report is used to review the effectiveness of its water conservation program and results will be reported to the NTMWD Water Committee of the NTMWD Board and the Board of Directors. 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.

7.7 Water Conservation Symposium

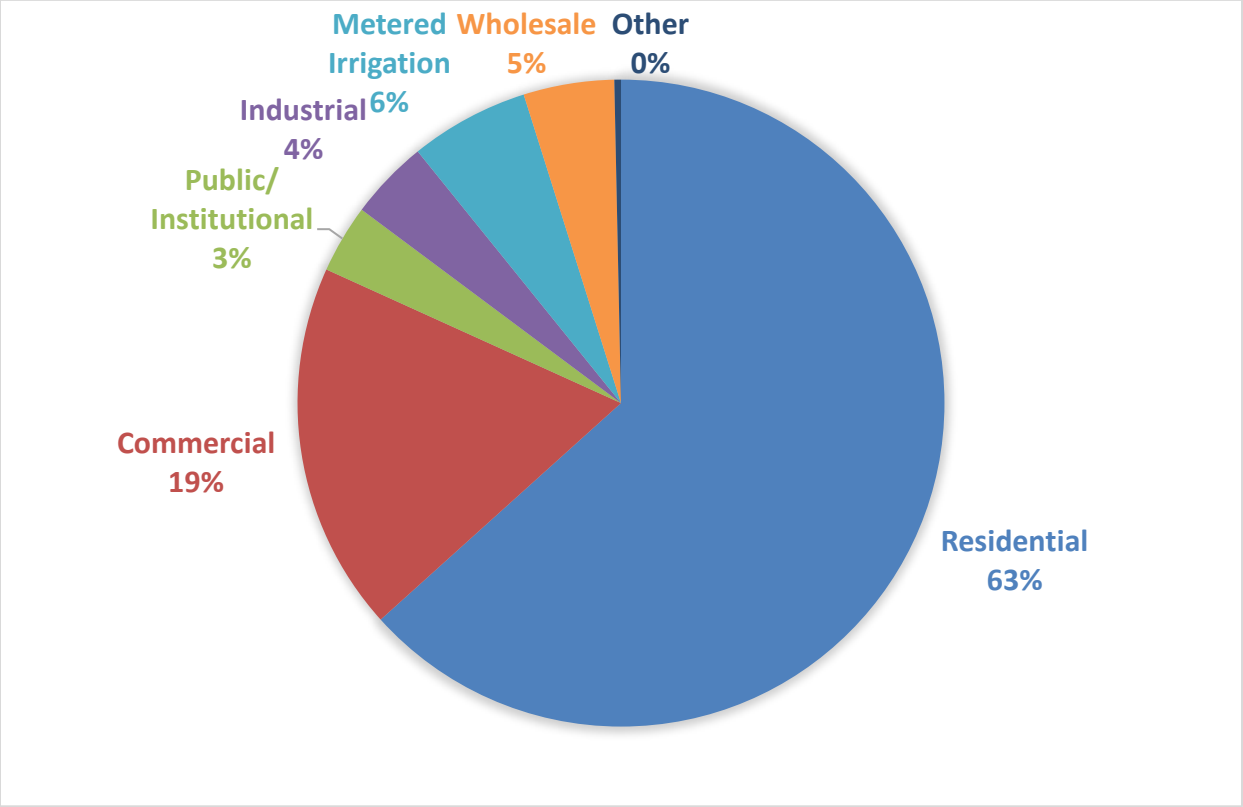
NTMWD has partnered with Dallas Water Utilities and Tarrant Regional Water District to host the annual North Texas Regional Water Conservation Symposium (Symposium). The Symposium is a half-day event

bringing together leading water conservation experts from Texas and around the country to present water conservation best management practices to a wide audience of water utility staff. In 2018, the 12th annual North Texas Regional Water Conservation Symposium was attended by over 130 professionals.

7.8 Industrial, Commercial and Institutional Customers

Based on the annual reporting data collected from Member Cities and Customers from 2017, approximately 25 percent of the District's treated water sales went to supply Industrial, Commercial and Institutional (ICI) users within their service area see Figure 7-1.

Figure 7-1 NTMWD Water Sales by Category in 2017



In order to target programs for this customer base, the District hired Alan Plummer and Associates, Inc. to conduct the "North Texas Municipal Water District Industrial, Commercial, and Institutional Water Use Efficiency Study." The primary scope items in the study are as follows:

- Develop ICI Customer Database
- Calculate per Capita Consumptions
- Identify, Define and Categorize

- Establish Base Use Estimates
- Identify Trends
- Select sectors for detailed analysis
- Benchmarking
- Identify Potential for Reduction
- Estimate Potential Demand Reduction by Strategy
- Program Development

The kick-off meeting was held on September 10, 2018 and the project is currently in the process of data collection. It is not anticipated that any recommended programs will be identified prior to the publication of this Plan. Once the results are published, the District will develop, in cooperation with the District's Member Cities and Customers and in collaboration with ICI water users within the District's service area, a program to reduce the per unit or per capita ICI water use within the District.

7.9 Industrial Pretreatment

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.

7.10 Watershed Protection

The NTMWD monitors and samples about fourteen sites monthly on Lavon Lake to evaluate the water quality of the reservoir. Additionally, the major hydraulic inputs into Lake Lavon 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.

The District monitors and performs monthly sampling of the major tributaries that will be contributing water to the future Bois d'Arc Lake. The information is used to evaluate nutrient loading and pollutant loading of the future reservoir.

NTMWD regularly monitors and samples its other water supplies, including Lake Tawakoni, Lake Jim Chapman, Lake Texoma, and the East Fork 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 waterbody.

7.11 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 sludge 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.

7.12 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) in order 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 Saturday and Sunday if possible, since these are periods of high water use by the public.
- Irrigation will be done with treated wastewater effluent wherever feasible and reasonable.

8. ADOPTION OF WATER CONSERVATION PLAN; PERIODIC REVIEW AND UPDATE OF PLAN

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.

9. CONSERVATION PLAN REQUIREMENTS FOR A PUBLIC WATER SUPPLIER

9.1 Introduction

In addition to serving as a wholesale water supplier, NTMWD is also a public water supplier of potable water, providing direct retail service to 29 customers who do not have access to retail service from other sources. The TCEQ has established rules for the development of water conservation plans for public water suppliers that provide retail service. 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.

An additional requirement for public water suppliers, beyond the requirements for wholesale water suppliers, is that they must report 5-year and 10-year goals for residential per capita water use in addition to such reporting for municipal per capita water use. Table 9-1 shows the residential per capita goals for the 29 direct retail service customers.

Table 9-1 5-Year and 10-Year Residential GPCD Goals

Description	Assumed Average (GPCD)	5-Year Goal (2017) (GPCD)	10-Year Goal (2022) (GPCD)
Assumed Current 5-Year Average Per Capita Residential Use	100		
Expected Reduction Due to Low-Flow Plumbing Fixtures		1	3
Projected Reduction Due to Elements in this Plan		8	13
Water Conservation Goals (Based on 5-Year Average)		**91**	**84**

NTMWD's Water Conservation Plan, specifically Sections 1-8 of the Plan, address the majority of requirements in the TCEQ rules pertaining to water conservation plans for public water suppliers. This section of the Plan summarizes the TCEQ requirements for public water suppliers, indicates where they are met in the Plan, and covers any additional information needed to meet public water supplier requirements.

9.2 State Requirements for Water Conservation Plans for Public Water Suppliers

Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.2 of the Texas Administrative Code contains the requirements for water conservation plans for public water suppliers. This rule is included in Appendix B.

Minimum Requirements

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

- 288.2(a)(1)(A) – Utility Profile – Included in Appendix D.
- 288.2(a)(1)(B) – Record Management System –Section 6.1.2
- 288.2(a)(1)(C) – Specific, Quantifiable Goals – Addressed in Section 5 (for municipal use) and Section 9.1 (for residential use).
- 288.2(a)(1)(D) – Metering of Diversions – Addressed in Section 6.1.1.
- 288.2(a)(1)(E) – Universal Metering – Addressed in Section 6.1. Deliveries to all of NTMWD's retail customers (like deliveries to all of 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 meter replacement program, in accordance with AWWA standards. At a minimum, all customer meters will be replaced every 15 years.
- 288.2(a)(1)(F) – Measures to Determine and Control Water Loss – Addressed in Section 6.1 and Section 6.1.2.
- 288.2(a)(1)(G) – Program of Continuing Public Education and Information – Addressed in Section 7.2. NTMWD also will also communicate directly with its retail customers by including brochures and other material on water conservation in monthly invoicing.
- 288.2(a)(1)(H) – Non-Promotional Rate Structure –NTMWD has a three-tiered increasing block rate structure for its residential customers as follows:
    - Monthly minimum charge of $15.00 with up to 2,000 gallons
    - Base rate of $3.50 per 1,000 gallons for water use of 2,000 to 10,000 gallons
    - 2nd tier rate of $5.38 per 1,000 gallons from 10,000 to 20,000 gallons
    - 3rd tier rate of $6.72 per 1,000 gallons for water use above 20,000 gallons
- 288.2(a)(1)(I) – Reservoir System Operation Plan – Addressed in Section 6.3.

- 288.2(a)(1)(J) – Means of Implementation and Enforcement – For their retail account, NTMWD can enforce any of the measures in the Plan.
- 288.2(a)(1)(K) – Documentation of Coordination with Regional Water Planning Groups – Addressed in Section 6.5.
- 288.2(c) – Review and Update of Plan – Section 8.

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 – NTMWD performs a regular review of water sales to their retail customers to track water losses.
- 288.2(a)(2)(B) – Record Management System – NTMWD's retail customers include 29 retail accounts. NTMWD has no retail industrial customers. The vast majority of NTMWD's sales are to wholesale suppliers. NTMWD makes records available for residential use by retail customers, commercial use by retail customers, public use by retail customers, and wholesale sales. NTMWD maintains electronic files by customer class for its retail customers.

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)(D) - Program for reuse and/or recycling of wastewater is described in Section 7.1.
- 288.2(a)(3)(H) – Other measures:
  - Sections 7.3, 7.4, and 7.5 describe additional measures NTMWD has adopted to encourage water conservation by its Member Cities and Customers.
  - Section 7.6 describes NTMWD's plans to monitor the effectiveness of the water conservation program.
  - Section 7.2 describes NTMWD's public education program.
  - Section 7.11 describes NTMWD's program to maintain zero discharge from its water treatment plants.
  - Section 7.12 describes NTMWD's in-house water conservation efforts.

APPENDIX A

LIST OF REFERENCES

APPENDIX A

LIST OF REFERENCES

1. Texas Commission on Environmental Quality Water Conservation Implementation Report. https://www.tceq.texas.gov/assets/public/permitting/forms/20645.pdf

2. Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter A, Rules 288.1 and 288.5, and Subchapter B, Rule 288.22, downloaded from http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288, November 2019.

3. Water Conservation Implementation Task Force: "Texas Water Development Board Report 362, Water Conservation Best Management Practices Guide," prepared for the Texas Water Development Board, Austin, November 2004.

4. Texas Water Development Board, Texas Commission on Environmental Quality, Water Conservation Advisory Council: Guidance and Methodology for Reporting on Water Conservation and Water Use, December 2012

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.

6. Freese and Nichols, Inc.: Model Water Resource and Emergency Management Plan for NTMWD Members Cities and Customers, prepared for the North Texas Municipal Water District, Fort Worth, January 2019.

7. Freese and Nichols Inc, Alan Plummer Associates, Inc., CP & Y Inc., Cooksey Communications. "2016 Region C Water Plan"

APPENDIX B

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

RULES ON MUNICIPAL WATER CONSERVATION AND DROUGHT CONTINGENCY PLANS FOR WHOLESALE WATER SUPPLIERS

APPENDIX B

TEXAS COMMISSION OF ENVIRONMENTAL QUALITY RULES ON MUNICIPAL WATER CONSERVATION AND DROUGHT CONTINGENCY PLANS FOR WHOLESALE WATER SUPPLIERS

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.

(5) Commercial use--The use of water by a place of business, such as a hotel, restaurant, or office building. This does not include multi-family 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.

(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 multi-family 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 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

TITLE 30	ENVIRONMENTAL QUALITY
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CHAPTER 288	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER A	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) multi-family;

(ii) commercial;

(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.

(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;

(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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SUBCHAPTER A	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;

(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

APPENDIX C

MODEL WATER CONSERVATION PLAN AND MODEL WATER RESOURCE AND EMERGENCY MANAGEMENT PLAN

2019 MODEL WATER CONSERVATION PLAN FOR NORTH TEXAS MUNICIPAL WATER DISTRICT MEMBER CITIES AND CUSTOMERS

JANUARY 2019

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FOREWARD

This 2019 Model Water Conservation Plan (WCP) was prepared by Freese and Nichols for the North Texas Municipal Water District (NTMWD). It is intended to be used as a guide by NTMWD Member Cities and Customers as they develop their own water conservation plans. The model plan was prepared pursuant to Texas Commission on Environmental Quality (TCEQ) rules. Some material is based on the existing water conservation plans listed in Appendix A.

Questions regarding this Model Water Conservation plan should be addressed to the following:

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This 2019 Model Water Conservation Plan is based on the Texas Administrative Code in effect on January 18, 2019 and considers water conservation best management practices from Texas Water Development Board (TWDB) Report 362, *Water Conservation Best Management Practices Guide*. In 2007, the state legislature created the Water Conservation Advisory Council (WCAC) as a council with expertise in water conservation representing various interest with one of their charges to regularly review existing Best Management Practices (BMPs) and add additional new BMPs as appropriate. The draft WCAC BMPs available as of November 30, 2018 have also been considered in the preparation of this plan.

None of the currently proposed BMPs will cause this plan to be obsolete. The most current annual report form should be obtained from TCEQ[1] when preparing the annual report (Appendix J) to submit to the TCEQ. A copy of the annual report should be sent to the TWDB as well as to the TCEQ.

WATER CONSERVATION PLAN FOR _____

DATE

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1. INTRODUCTION AND OBJECTIVES

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development of North Central Texas have led to growing demands for water supplies. At the same time, local and less expensive sources of water supply are largely already developed. Additional supplies to meet future demands will be expensive and difficult to secure. Severe drought conditions in recent years have highlighted the importance of efficient use of our existing supplies to make them last as long as possible. This will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the TCEQ has developed guidelines and requirements governing the development of water conservation and drought contingency plans for municipal uses by public water suppliers.[2] The TCEQ guidelines and requirements for wholesale suppliers are included in Appendix B. The North Texas Municipal Water District ("NTMWD or District") has developed this Model Water Conservation Plan to be consistent with TCEQ guidelines and requirements. The best management practices established by the Water Conservation Implementation Task Force[3] were also considered in the development of the water conservation measures.

This Model Water Conservation Plan includes measures that are intended to result in ongoing, long-term water savings. This plan replaces the previous plans dated August 2004, April 2006, March 2008 and April 2014[4].

The objectives of this water conservation plan are as follows:

- To reduce water consumption from the levels that would prevail without conservation efforts.
- To reduce the loss and waste of water.
- To improve efficiency in the use of water.
- Encourage efficient outdoor water use.
- To maximize the level of recycling and reuse in the water supply.
- To extend the life of current water supplies by reducing the rate of growth in demand.

The water conservation plan presented in this document is a Model Water Conservation Plan intended for adoption by the NTMWD Member Cities and Customers. In order to adopt this plan, each Member City and Customer will need to do the following:

- Complete the water utility profile (provided in Appendix C).
- Set five-year and ten-year goals for per capita water use.
- Adopt ordinance(s) or regulation(s) approving the model plan.
- Complete the annual water conservation implementation report (in Appendix J).

The water utility profile, goals, and ordinance(s) or regulations should be provided to NTMWD in draft form for review and comments. Final adopted versions should also be provided to NTMWD, as well as TCEQ and should be attached to the adopted water conservation plan as Appendix G. This Model Water Conservation Plan includes all the elements of such plans required by TCEQ. Some elements of this model plan go beyond TCEQ requirements. Any water supplier wishing to adjust elements of the Model Water Conservation Plan should coordinate with NTMWD.

[*]Superscripted numbers match references listed in Appendix A.

2. DEFINITIONS AND ABBREVIATIONS

1. 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.

2. 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 perennial and annual rye grass, Kentucky blue grass and fescues.

3. CUSTOMERS include those entities to whom NTMWD provides wholesale water that are not members of NTMWD.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. REGULATED IRRIGATION PROPERTY means any (customer class, i.e. commercial) property that uses (over a certain amount) of water or more for irrigation purposes in a single calendar year or is greater than (certain size).

12. RESIDENTIAL GALLONS PER CAPITA PER DAY means (Residential GPCD) 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.

13. RETAIL CUSTOMERS include those customers to whom the utility provides retail water from a water meter.

14. TOTAL GALLONS PER CAPITA PER DAY (Total GPCD) means 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 TAC 288.1 shall be credited against total diversion volumes for the purposes of calculating GPCD for targets and goals.

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

Abbreviations

Abbreviation	Full Nomenclature
BMP	Best Management Practices
NTMWD or District	North Texas Municipal Water District
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
WCAC	Water Conservation Advisory Council
WCP	Water Conservation Plan

3. REGULATORY BASIS FOR WATER CONSERVATION PLAN

3.1 TCEQ Rules Governing Conservation Plans

The TCEQ rules governing development of water conservation plans for municipal uses by public water suppliers are contained in Title 30, Chapter 288, Subchapter A, Section 288.2 of the Texas Administrative Code, which is included in Appendix B. For the purpose of these rules, 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." [2] The water conservation plan elements required by the TCEQ water conservation rules that are covered in this water conservation plan are listed below.

<u>Minimum Conservation Plan Requirements</u>

The minimum requirements in the Texas Administrative Code for Water Conservation Plans for Municipal Uses by Public Water Suppliers are covered in this water conservation plan as follows:

- 288.2(a)(1)(A) – Utility Profile – Section 4 and Appendix C
- 288.2(a)(1)(B) – Record Management System – Section 6.1.5
- 288.2(a)(1)(C) – Specific, Quantified Goals – Section 5
- 288.2(a)(1)(D) – Accurate Metering – Section 6.1.1
- 288.2(a)(1)(E) – Universal Metering – Section 6.1.2
- 288.2(a)(1)(F) – Determination and Control of Water Loss – Sections 6.1.3 and 6.1.4
- 288.2(a)(1)(G) – Public Education and Information Program – Section 6.2
- 288.2(a)(1)(H) – Non-Promotional Water Rate Structure – Section 6.6
- 288.2(a)(1)(I) – Reservoir System Operation Plan – Section 6.3
- 288.2(a)(1)(J) – Means of Implementation and Enforcement – Section 8
- 288.2(a)(1)(K) – Coordination with Regional Water Planning Group – Section 6.4 and Appendix F
- 288.2(c) – Review and Update of Plan – Section 9

Conservation Additional Requirements (Population over 5,000)

- The Texas Administrative Code includes additional requirements for water conservation plans for drinking water supplies serving a population over 5,000
- 288.2(a)(2)(A) – Leak Detection, Repair, and Water Loss Accounting – Sections 6.1.4
- 288.2(a)(2)(B) – Requirement for Water Conservation Plans by Wholesale Customers – Section 6.5

Additional Conservation Strategies

The TCEQ requires that a water conservation implementation report be completed and submitted on an annual basis. The template for this report is included in Appendix J.

In addition to the TCEQ required elements of a water conservation plan, NTMWD also requires the following water conservation strategies to be included in the Member City and Customer water conservation plans:

- 288.2(a)(3)(A) – Conservation Oriented Water Rates – Section 6.6
- 288.2(a)(3)(F) – Considerations for Landscape Water Management Regulations – Section 7.4 and Appendix E

TCEQ rules also include options of, conservation measures that may be adopted by public water suppliers but are not required. NTMWD recommends that the following strategies be included in Member City and Customer water conservation plans:

- 288.2(a)(3)(B) – Ordinances, Plumbing Codes or Rules on Water-Conserving Fixtures – Section 7.1
- 288.2(a)(3)(C) – Replacement or Retrofit of Water-Conserving Plumbing Fixtures – Section 7.5
- 288.2(a)(3)(D) – Reuse and Recycling of Wastewater – Section 7.2
- 288.2(a)(3)(F) – Considerations for Landscape Water Management Regulations – Section 7.3, 7.4
- 288.2(a)(3)(G) – Monitoring Method – Section 7.6
- 288.2(a)(3)(H) – Additional Conservation Practices – Section 7.5

3.2 Guidance and Methodology for Reporting on Water Conservation and Water Use

In addition to TCEQ rules regarding water conservation, this plan also incorporates elements of the Guidance and Methodology for Reporting on Water Conservation and Water Use developed by TWDB and TCEQ[5], in consultation with the WCAC (the "Guidance"). The Guidance was developed in response to a charge by the 82nd Texas Legislature to develop water use and calculation methodology and guidance for preparation of water use reports and water conservation plans in accordance with TCEQ rules.

4. WATER UTILITY PROFILE

Appendix C to this Model Water Conservation Plan is a template water utility profile based on the format recommended by the TCEQ. In adopting this Model Water Conservation Plan, each Member City and Customer will provide a draft water utility profile to NTMWD for review and comment. A final water utility profile will be provided to NTMWD as well as to TCEQ.

5. SPECIFICATION OF WATER CONSERVATION GOALS

TCEQ rules require the adoption of specific water conservation goals for a water conservation plan. As part of plan adoption, each Member City and Customer must develop 5-year and 10-year goals for water savings, including goals for per capita municipal use and for water loss programs. These goals should be submitted to NTMWD in draft form for review. The goals for this water conservation plan include the following:

- Maintain the total and residential per capita water use below the specified amount in gallons per capita per day in a dry year, as shown in the completed Table 5-1. NTMWD will publish the amount of reuse to be is calculating the credit for reuse.
- Maintain the water loss percentage in the system below 12 percent annually in 2018 and subsequent years, as discussed in Section 6.1.3. (The 12 percent goal for water loss is recommended but is not required. Systems with long distances between customers, such as rural systems, may adopt a higher percent nonrevenue water goal.)
- Implement and maintain a program of universal metering and meter replacement and repair, as discussed in Section 6.1.2.
- Increase efficient water usage through a water conservation ordinance, order or resolution as discussed in Section 7.4 and Appendix E. (This ordinance is required by NTMWD.)
- Decrease waste in lawn irrigation by implementation and enforcement of landscape water management regulations, as discussed in Section 7.5. (These landscape water management regulations are recommended but are not required.)
- Raise public awareness of water conservation and encourage responsible public behavior by a public education and information program, as discussed in Section 6.2.
- Develop a system specific strategy to conserve water during peak demands, thereby reducing the peak use.

Table 5-1 Five-Year and Ten-Year Per Capita Water Use Goals (GPCD)

Description	Current Average (GPCD)	5-Year Goal (GPCD)	10-Year Goal (GPCD)
Current 5-Year Average Total Per Capita Use with Credit for Reuse			
Current 5-Year Average Residential Per Capita Use			
Water Loss (GPCD)[1]			
Water Loss (Percentage)[2]			
Expected Reduction due to Low-Flow Plumbing Fixtures			
Projected Reduction Due to Elements in this Plan			
Water Conservation Goals (with credit for reuse)			

1. Water Loss GPCD = (Total Water Loss ÷ Permanent Population) ÷ 365
2. Water Loss Percentage = (Total Water Loss ÷Total Gallons in System) x 100; or (Water Loss GPCD ÷ Total GPCD) x 100

6. BASIC WATER CONSERVATION STRATEGIES

6.1 Metering, Water Use Records, Control of Water Loss, and Leak Detection and Repair

One of the key elements of water conservation is tracking water use and controlling losses through illegal diversions and leaks. It is important to carefully meter water use, detect and repair leaks in the distribution system and provide regular monitoring of real losses.

6.1.1 Accurate Metering of Treated Water Deliveries from NTMWD

Water deliveries from NTMWD are metered by NTMWD using meters with accuracy of ±2%. These meters are calibrated on an annual basis by NTMWD to maintain the required accuracy.

6.1.2 Metering of Customer and Public Uses and Meter Testing, Repair, and Replacement

The provision of water to all customers, including public and governmental users, should be metered. In many cases, Member Cities and Customers already meter retail and wholesale water users. For those Member Cities and Customers who do not currently meter all internal water uses, as well as all subsequent users.

Most Member Cities and Customers test and replace their customer meters on a regular basis. All customer meters should be replaced on a minimum of a 15-year cycle. Those who do not currently have a meter testing and replacement program should implement such a program.

6.1.3 Determination and Control of Water Loss

Total water loss is the difference between the water delivered to a Member City or Customer from NTMWD (and other supplies, if applicable) and the metered water sales to customers plus water authorized for use but not sold. (Authorized for use but not sold would include use for fire fighting, releases for flushing of lines, uses associated with new construction, etc.) Total water loss includes two categories:

- Apparent Losses – Includes inaccuracies in customer meters (customer meters tend to run more slowly as they age and under-report actual use); Losses due to

illegal connections and theft. (included in Appendix H); accounts that are being used but have not yet been added to the billing system.

- Real Losses – Includes physical losses from the system or mains, reported breaks and leaks, storage overflow and unreported losses.

Measures to control water loss should be part of the routine operations of Member Cities and Customers. Maintenance crews and personnel should look for and report evidence of leaks in the water distribution system. A leak detection and repair program is described in Section 6.1.4 below. Meter readers should watch for and report signs of illegal connections so that they can be quickly addressed.

Total water loss should be calculated in accordance with the provisions of Appendix J. With the measures described in this plan, Member Cities and Customers should maintain a water loss percentage below 12 percent in 2018 each year. If total water loss exceeds this goal, the Member City or Customer should implement a more intensive audit to determine the source(s) of loss and to reduce the water loss. The annual conservation report described below is the primary tool that should be used to monitor water loss.

As advance metering technology advances utilities that have these systems should consider as a BMP utilizing the capabilities of theses system to provide leak alerts. Retail customers whose accounts demonstrate leaks can be notified by their water provider of potential leak situations for account holder remediation.

6.1.4 Leak Detection and Repair

As described above, water utility crews and personnel should look for and report evidence of leaks in the water distribution system. Areas of the water distribution system in which numerous leaks and line breaks occur should be targeted for replacement as funds are available.

6.1.5 Record Management System

As required by TAC Title 30, Chapter 288, Section 288.2(a)(1)(B), a record management system should allow for the separation of water sales and uses into residential, commercial, public/institutional, and industrial categories. This information should be included in an annual water conservation report, as described in Section 7.6 below.

Those entities whose record management systems do not currently comply with this requirement should move to implement such a system within the next five years.

6.2 Continuing Public Education and Information Campaign

The continuing public education and information campaign on water conservation includes the following elements:

- Utilize the "Water IQ: Know Your Water" and other public education materials produced by NTMWD.
- Utilize the "Water4Otter" campaign for students.
- Insert water conservation information with water bills. Inserts will include material developed by Member Cities' and Customers' staff and material obtained from the TWDB, TCEQ, and other sources.
- Encourage local media coverage of water conservation issues and the importance of water conservation.
- Notify local organizations, schools, and civic groups that Member City or Customer staff and staff of NTMWD are available to make presentations on the importance of water conservation and ways to save water.
- Promote the *Texas Smartscape* web site (www.txsmartscape.com) and provide water conservation brochures and other water conservation materials available to the public at City Hall and other public places.
- Make information on water conservation available on the Member City's or Customer's website (if applicable) and include links to the "Water IQ: Know Your Water" website, *Texas Smartscape* website and to information on water conservation on the TWDB and TCEQ web sites and other resources.
- NTMWD is an EPA Water Sense Partner and participates in the EPA Water Sense sponsored "Fix a Leak Week." NTMWD encourages all member cities and customers to become EPA Water Sense Partners.
- Utilize the Water My Yard website and encourage customers to sign-up to receive weekly watering advice.

6.3 NTMWD Reservoir System Operation Plan

Member Cities and Customers of NTMWD purchase treated water from NTMWD and do not have surface water supplies for which to implement a reservoir system operations plan. NTMWD operates multiple sources of water supply as a system. The operation of the reservoir system is intended to optimize the use of the District's sources (within the constraints of existing water rights) while minimizing energy use cost for pumping, maintaining water quality, minimizing potential impacts on recreational users of the reservoirs and fish and wildlife.

6.4 Coordination with Regional Water Planning Group and NTMWD

Appendix F includes a letter sent to the Chairs of the water planning group accompanied by this Model Water Conservation Plan. The adopted ordinance(s) or regulation(s) and the adopted water utility profile will be sent to the Chair of the appropriate Water Planning Group and to NTMWD.

6.5 Requirement for Water Conservation Plans by Wholesale Customers

Every contract for the wholesale sale of water by a Member City and/or Customer that is entered into, renewed, or extended after the adoption of this water conservation plan will include a requirement that the wholesale customer and any wholesale customers of that wholesale customer develop and implement a water conservation plan meeting the requirements of Title 30, Chapter 288, of the Texas Administrative Code. This requirement extends to each successive wholesale customer in the resale of the water.

6.6 Increasing Block Water Rate Structure

Each Member City and Customer must adopt, if it has not already done so, an increasing block rate water structure that is intended to encourage water conservation and to discourage excessive use and waste of water upon completion its next rate study or within five years. An example water rate structure is as follows:

<u>Residential Rates</u>

1. Monthly minimum charge. This can (but does not have to) include up to 2,000 gallons 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.

7. ENHANCED WATER CONSERVATION STRATEGIES

7.1 Ordinances, Plumbing Codes, or Rules on Water-Conserving Fixtures

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. Rebate programs to encourage replacement of older fixtures with water conservation programs are discussed in Section 7.5.

7.2 Reuse and Recycling of Wastewater

Most Member Cities and Customers do not own and operate their own wastewater treatment plants. 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 of treated wastewater discharges from the Wilson Creek Wastewater Treatment Plant for municipal purposes. In addition, NTMWD has also developed the East Fork Reuse Project which can divert up to 157,393 acre-feet per year based on treated wastewater discharges by NTMWD. With the addition of the Main Stem Pump station the District will be able to increase flows through the East Fork Reuse Project up to an additional 56,100 acre-feet per year. When fully developed, these three reuse projects will provide up to 42 percent of the NTMWD's currently permitted water supplies. NTMWD also provides treated effluent from its wastewater treatment plants available for direct reuse for landscape irrigation and industrial use.

Those Member Cities and Customers who own and operate their own wastewater treatment plants should move toward reusing treated effluent for irrigation purposes at their plant site over the next three years. These entities should also seek other alternatives for reuse of recycled wastewater effluent.

7.3 Interactive Weather Stations / "Water My Yard" Program

NTMWD has developed the Water My Yard program to install weather stations throughout its service area in order to provide consumers with a weekly e-mail and information through the "Water My Yard" website to assist consumers in determining an adequate amount of

supplemental water to maintain healthy grass in a specific location. This service represents the largest network of weather stations providing ET-based irrigation recommendations in the State of Texas, and provides the public 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 is provided that will determine how long (in minutes) 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. This innovative program has been available to those within the NTMWD service area since May 2013. The city/utility will encourage customers to subscribe to weekly watering updates through Water My Yard or other similar program in an effort to reduce outdoor water consumption.

7.4 Compulsory Landscape and Water Management Measures

The following landscape water management measures are required by NTMWD for this plan. These measures represent minimum measures to be implemented and enforced in order to irrigate the landscape appropriately and are to remain in effect on a permanent basis unless water resource management stages are declared.

1. **Landscape Water Management Measures**

   - Limit landscape watering with sprinklers or irrigation systems at each service address to no more than two days per week (April 1 – October 31), with education that less than twice per week is usually adequate. (NTMWD has identified assigning designated watering days as a BMP and suggests implementing a watering schedule as part of this measure). Additional watering of landscape may be provided by hand-held hose with shutoff nozzle, use of dedicated irrigation drip zones. An exception is allowed for landscape associated with new construction that may be watered as necessary for 30 days from the installation of new landscape features.
   - Limit landscape watering with sprinklers or irrigation systems at each service address to no more than one day per week beginning November 1 and ending March 31 of each year, with education that less than once per week is usually adequate.

- Estimated savings from the year-round watering restrictions, mentioned above, since the District terminated drought stages in 2015 is approximately 2.5 to 3.5 percent on an average annualized basis.
- Prohibit lawn irrigation watering from 10 AM to 6 PM (April 1 – October 31).
- Prohibit the use or irrigation systems that water impervious surfaces. (Wind-driven water drift will be taken into consideration.)
- Prohibit outdoor watering during precipitation or freeze events.
- Prohibit use of poorly maintained sprinkler systems that waste water.
- Prohibit excess water runoff or other obvious waste.
- Require 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 maintained to function properly.
- Prohibit overseeding, sodding, sprigging, broadcasting or plugging with cool season grasses or watering cool season grasses, except for golf courses and athletic fields.
- Require that irrigation systems be inspected at the same time as initial backflow preventer inspection.
- Requirement that all new irrigation systems be in compliance with state design and installation regulations (Texas Administrative Code Title 30, Chapter 344).
- Require the owner of a regulated irrigation property to obtain an evaluation of any permanently installed irrigation system on a periodic basis. The irrigation evaluation shall be conducted by an licensed irrigator in the State of Texas and be submitted to the local water provider (i.e., city, water supply corporation).

2. Additional Water Management Measures

- Prohibit 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.
- Non–commercial car washing can be done only when using a water hose with a shut-off nozzle.
- Hotels and motels shall offer a linen reuse water conservation option to customers.

- Restaurants, bars, and other commercial food or beverage establishments may not provide drinking water to customers unless a specific request is made by the customer for drinking water.

Member Cities and Customers are responsible for developing regulations, ordinances, policies, or procedures for enforcement of water conservation guidelines.

Appendix E is a summary of considerations for landscape water management regulations adopted as part of the development of this water conservation plan. These regulations are intended to minimize waste in landscape irrigation. Appendix E includes the required landscape water measures laid out in this section.

7.5 Additional Water Conservation Measures (Not Required)

NTMWD also urges its Member Cities and Customers to consider including the following additional water conservation measures in their plans. Member Cities and Customers are responsible for developing regulations, ordinances, policies, or procedures for enforcement of water conservation guidelines.

1. **Landscape Water Management Regulations**
   - Requirement that all existing irrigation systems be retrofitted with rain and freeze sensors and/or ET or Smart controllers capable of multiple programming. Rain and freeze sensors and/or ET or Smart controllers must be maintained to function properly.
   - Requirement that all new athletic fields be irrigated by a separate irrigation system from surrounding areas.
   - Implementation of other measures to encourage off-peak water use.
2. **Landscape Ordinance**
   - Landscape ordinances are developed by a city to guide developers in landscaping requirements for the city. A sample landscape ordinance is provided in Appendix I and is intended as a guideline for adopting a landscape ordinance to promote water-efficient landscape design.
   - Native, drought tolerant or adaptive plants should be encouraged.

- Drip irrigation systems should be promoted.
- ET/Smart controllers that only allow sprinkler systems to irrigate when necessary should be promoted.

3. Water Audits

- Water audits are useful in finding ways in which water can be used more efficiently at a specific location. NTMWD recommends that Member Cities and Customers offer water audits to customers.

4. Industrial, Commercial, and Institutional Customers

In order to target programs towards this customer base, the District hired Alan Plummer Associates to conduct the "North Texas Municipal Water District Industrial, Commercial, and Institutional Water Use Efficiency Study." The primary scope items in the study are as follows:

- Develop ICI Customer Database
- Calculate per Capita Consumptions
- Identify, Define and Categorize
- Establish Base Use Estimates
- Identify Trends
- Select sectors for detailed analysis
- Benchmarking
- Identify Potential for Reduction
- Estimate Potential Demand Reduction by Strategy
- Program Development

The kick-off meeting was held on September 10, 2018 and the project is currently in the process of data collection. It is not anticipated that any recommended programs will be identified prior to the publication of this plan. Once the results are published, the District will develop, in cooperation with the District's Member Cities and Customers and in collaboration with ICI water users within the District's service area, a program to reduce the per unit or per capita ICI water use within the District.

5. Rebates

In addition to the conservation measures described above, NTMWD also recommends the following water conservation incentive programs for consideration by Member Cities and Customers:

- 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 covers;
- On-demand hot water heater rebates; and/or
- Other water conservation incentive programs.

7.6 Monitoring of Effectiveness and Efficiency - NTMWD Annual Water Conservation Report

Appendix D is a form that should be used in the development of an annual water conservation report by Member Cities and Customers. This form should be completed by March 31 of the following year and used to monitor the effectiveness and efficiency of the water conservation program and to plan conservation-related activities for the next year. The form records the water use by category, per capita municipal use, and total water loss for the current year and compares them to historical values. As part of the development of Appendix D, Member Cities and Customers will complete the tracking tool by March 31 of the following year and submit them to NTWMD. The annual water conservation report should be sent to NTMWD, which will monitor NTMWD Member Cities' and Customers' water conservation trends.

7.7 Water Conservation Implementation Report

Appendix J includes the TCEQ-required water conservation implementation report. The report is due to the TCEQ by May 1 of every year. This report lists the various water conservation strategies that have been implemented, including the date the strategy was implemented. The report also calls for the five-year and ten-year per capita water use goals from the previous water conservation plan. The reporting entity must answer whether or not these goals have been met and if not, why not. The amount of water saved is also requested.

8. IMPLEMENTATION AND ENFORCEMENT OF THE WATER CONSERVATION PLAN

Appendix G contains a draft ordinance, order, or resolution which may be tailored to meet Member or Customer City needs and may be adopted by the City Council or governing board regarding the Model Water Conservation Plan. The ordinance, order, or resolution designates responsible officials to implement and enforce the water conservation plan. Appendix E, the considerations for landscape water management regulations, also includes information about enforcement. Appendix H includes a copy of an ordinance, order, or resolution that may be adopted related to illegal connections and water theft.

9. REVIEW AND UPDATE OF WATER CONSERVATION PLAN

TCEQ requires that the water conservation plans be updated every five years. The plan will be updated as required and as appropriate based on new or updated information.

2019 MODEL WATER RESOURCE AND EMERGENCY MANAGEMENT PLAN NORTH TEXAS MUNICIPAL WATER DISTRICT MEMBER CITIES AND CUSTOMERS

JANUARY 2019

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FOREWORD

This 2019 Model Water Resource and Emergency Management Plan (WREMP) (which is an update to 2014 Model Water Resource and Emergency Management Plan) was prepared by Freese and Nichols, Inc. for the North Texas Municipal Water District (NTMWD). It is intended to be used by NTMWD Member Cities and Customers as a guide as they develop their own Water Resource and Emergency Management Plans. This plan was prepared pursuant to Texas Commission on Environmental Quality (TCEQ) rules. Some material is based on the existing drought contingency plans listed in Appendix A.

Questions regarding this Model WREMP should be addressed to the following:

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This Model WREMP plan is based on the Texas Administrative Code in effect on January 18, 2019.

2019 WATER RESOURCE AND EMERGENCY MANAGEMENT PLAN
[INSERT ENTITY NAME]

JANUARY 2019

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APPENDICES

1. INTRODUCTION AND OBJECTIVES

This document has been prepared as a Model Water Resource and Emergency Management Plan (Model WREMP), intended to be available for use by North Texas Municipal Water District (NTMWD) Member Cities and Customers as they develop their own respective WREMPs. This Model WREMP addresses all of the current TCEQ requirements for a drought contingency plan.[1] This Model WREMP will replace the plans dated August 2004, April 2006, March 2008, and April 2014.

The measures included in this Model WREMP are intended to provide short-term water savings during drought or emergency conditions. Water savings associated with ongoing, long-term strategies are discussed in the document entitled *Model Water Conservation Plan for North Texas Municipal Water District Member Cities and Customers*. [2]

The purpose of this Model WREMP is as follows:

- To conserve the available water supply in times of drought, water supply shortage, and emergency.
- To maintain supplies for domestic water use, sanitation, and fire protection.
- To protect and preserve public health, welfare, and safety.
- To minimize the adverse impacts of water supply shortages.
- To minimize the adverse impacts of emergency water supply conditions.

NTMWD supplies treated potable water to its Member Cities and Customers. This Model WREMP was developed by NTMWD in consultation with its Member Cities and Customers. In order to adopt this Model WREMP, each NTMWD Member City and Customer will need to adopt ordinance(s) or regulation(s) implementing the WREMP, including the establishment of fines and enforcement procedures. The Model WREMP calls for each Member City and Customer to adopt Water Resource Management Stages initiated by NTMWD during a drought or water supply emergency. Member Cities and Customers may also adopt more stringent Water Resource Management Stages than NTMWD if conditions so warrant.

In the absence of drought response measures, water demands tend to increase during a drought due to increased outdoor irrigation. The severity of a drought depends on the degree of depletion of supplies

and on the relationship of demand to available supplies. NTMWD considers a drought to end when all of NTMWD's supply reservoirs refill to conservation storage pool levels.

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[1] Superscripted numbers match references listed in Appendix A.

2. DEFINITIONS AND ABBREVIATIONS

1. AQUATIC LIFE means a vertebrate organism dependent upon an aquatic environment to sustain its life.

2. 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.

3. COMMERCIAL FACILITY means business or industrial buildings and the associated landscaping, but does not include the fairways, greens, or tees of a golf course.

4. COMMERCIAL VEHICLE WASH FACILITY means a permanently-located business that washes vehicles or other mobile equipment with water or water-based products, including but not limited to self-service car washes, full service car washes, roll-over/in-bay style car washes, and facilities managing vehicle fleets or vehicle inventory.

5. CUSTOMERS include those entities to whom NTMWD provides wholesale water that are not Member Cities of NTMWD.

6. DESIGNATED OUTDOOR WATER USE DAY means a day prescribed by rule on which a person is permitted to irrigate outdoors**.

7. 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.

8. DROUGHT, for the purposes of this report, means an extended period of time when an area receives insufficient amounts of rainfall to replenish the water supply, causing water supply sources (in this case reservoirs) to be depleted.

9. 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.

10. EXECUTIVE DIRECTOR means the Executive Director of the NTMWD and includes a person the Executive Director has designated to administer or perform any task, duty, function, role, or action related to this Plan or on behalf of the Executive Director.

11. FOUNDATION WATERING means an application of water to the soils directly abutting (within 2 feet) the foundation of a building, structure .

12. INTERACTIVE WATER FEATURES means water sprays, dancing water jets, waterfalls, dumping buckets, shooting water cannons, inflatable pools, temporary splash toys or pools, slip-n-slides, or splash pads that are maintained for recreation.

13. 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.

14. 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.

15. 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.

16. NEW LANDSCAPE means : (a) vegetation installed at the time of the construction of a residential or commercial facility; (b) installed as part of a governmental entity's capital improvement project; or (c) installed to stabilize an area disturbed by construction.

17. ORNAMENTAL FOUNTAIN means an artificially created structure (up to a certain diameter) from which a jet, stream, or flow of treated water emanates and is not typically utilized for the preservation of aquatic life.

18. RETAIL CUSTOMERS include those customers to whom the Supplier provides retail water from a water meter.

19. SOAKER HOSE means a perforated or permeable garden-type hose or pipe that is laid above ground that provides irrigation at a slow and constant rate.

20. SPRINKLER means an above-ground water distribution device that may be attached to a garden hose.

21. SUPPLIER means a Member City or Customer that purchases wholesale water from NTMWD and provides water to retail and/or wholesale customers.

22. SWIMMING POOL means any structure, basin, chamber, or tank including hot tubs, containing an artificial body of water for swimming, diving, or recreational bathing, and having a depth of two (2) feet or more at any point.

23. WATER RESOURCE MANAGEMENT PLAN means a strategy or combination of strategies for temporary supply management and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies required by Texas Administrative Code Title 30, Chapter 288, Subchapter B. This is sometimes called a drought contingency plan.

Abbreviations

Abbreviation	Full Nomenclature
ED	NTMWD Executive Director
NTMWD or District	North Texas Municipal Water District
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
Model WREMP	Model Water Resource and Emergency Management Plan for Member Cities and Customers

3. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

The TCEQ rules governing development of drought contingency plans for public water suppliers are contained in Title 30, Chapter 288, Section 288.20 of the Texas Administrative Code, a current copy of which is included in Appendix B. For the purpose of these rules, a drought contingency plan is defined as "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."[1]

Minimum Requirements

TCEQ's minimum requirements for drought contingency plans are addressed in the following subsections of this report:

- 288.20(a)(1)(A) – Provisions to Inform the Public and Provide Opportunity for Public Input – Section 4.1
- 288.20(a)(1)(B) – Program for Continuing Public Education and Information – Section 4.2
- 288.20(a)(1)(C) – Coordination with the Regional Water Planning Group – Section 4.6
- 288.20(a)(1)(D) – Description of Information to be Monitored and Criteria for the Initiation and Termination of Water Resource Management Stages – Section 4.3
- 288.20(a)(1)(E) – Water Resource Management Stages – Section 4.3
- 288.20(a)(1)(F) – Specific, Quantified Targets for Water Use Reductions During Water Shortages – Section 4.3
- 288.20(a)(1)(G) – Water Supply and Demand Management Measures for Each Stage – Section 4.3
- 288.20(a)(1)(H) – Procedures for Initiation and Termination of Water Resource Management Stages – Section 4.3
- 288.20(a)(1)(I) - Procedures for Granting Variances – Section 4.4
- 288.20(a)(1)(J) - Procedures for Enforcement of Mandatory Restrictions – Section 4.5
- 288.20(a)(3) – Consultation with Wholesale Water Supplier – Sections 1 and 4.3
- 288.20(b) – TCEQ Notification of Implementation of Mandatory Measures – Section 4.3
- 288.20(c) – Review and Update of WREMP – Section 4.7

4. WATER RESOURCE AND EMERGENCY MANAGEMENT PLAN

4.1 PROVISIONS TO INFORM THE PUBLIC AND OPPORTUNITY FOR PUBLIC INPUT

Member Cities and Customers will provide opportunity for public input in the development of this WREMP by the following means:

- Providing written notice of the proposed WREMP and the opportunity to comment on the WREMP by newspaper, posted notice, and notice on the utility's web site and social media (if available).
- Making the draft WREMP available on the supplier's web site (if available).
- Providing the draft WREMP to anyone that requests a copy.
- Supplier may hold a public meeting providing advance public notice of such meeting.

4.2 PROGRAM FOR CONTINUING PUBLIC EDUCATION AND INFORMATION

Member Cities and Customers will inform and educate the public about the Water Resource and Emergency Management Plan by the following means:

- Preparing a bulletin describing the plan and making it available at City Hall and other appropriate locations.
- Making the plan available to the public through the supplier's web site (if available).
- Including information about the Water Resource and Emergency Management Plan on the supplier's web site (if available).
- Notifying local organizations, schools, and civic groups that utility staff are available to make presentations on the Water Resource and Emergency Management Plan (usually in conjunction with presentations on water conservation programs).
- At any time that the Water Resource and Emergency Management Plan is activated or changes, Member Cities and Customers will notify local media of the issues, the Water Resource Management Stage (if applicable), and the specific actions required of the public. The information will also be publicized on the supplier's web site (if available). Billing inserts will also be used as appropriate.

4.3 CRITERIA FOR INITIATION AND TERMINATION OF WATER RESOURCE AND EMERGENCY MANAGEMENT STAGES AND TARGETS FOR WATER USE REDUCTIONS

Initiation of a Water Resource Management Stage

The City Manager, General Manager, Mayor, Chief Executive, or official designee may order the implementation of a Water Resource Management Stage when one or more of the trigger conditions for that stage is met.

- Water Resource and Emergency Management Plan stages imposed by NTMWD action must be initiated by Member Cities and Customers.
- For other trigger conditions internal to a city or water supply entity, the City Manager, General Manager, Mayor, Chief Executive, or official designee may decide not to order the implementation of a Water Resource Management Stage or Water Emergency even though one or more of the trigger criteria for the stage are met. Factors which could influence such a decision include, but are not limited to, the time of the year, weather conditions, the anticipation of replenished water supplies, or the anticipation that additional facilities will become available to meet needs. The reason for this decision should be documented.

The following actions will be taken when a water resource management stage is initiated:

- The public will be notified through local media and the supplier's web site (if available) as described in Section 4.2.
- Wholesale customers (if any) and NTMWD will be notified by e-mail with a follow-up letter that provides details of the reasons for initiation of the Water Resource Management Stage.
- If any mandatory provisions of the Water Resource and Emergency Management Plan are activated, Member Cities and Customers will notify the TCEQ Executive Director and the NTMWD Executive Director within 5 business days.

Termination of a Water Resource Management Stage

WREMP stages initiated by NTMWD may be terminated after NTMWD has terminated the stage. For WREMP stages initiated by the Supplier, the City Manager, General Manager, Mayor, Chief Executive, or

official designee may order the termination of a Water Resource Management Stage when the conditions for termination are met or at their discretion.

The following actions will be taken when a Water Resource Management Stage is terminated:

- The public will be notified through local media and the supplier's web site (if available) as described in Section 4.2.
- Wholesale customers (if any) and NTMWD will be notified by e-mail with a follow-up letter.
- If any mandatory provisions of the Water Resource and Emergency Management Plan that have been activated are terminated, Member Cities and Customers will notify the TCEQ Executive Director and the NTMWD Executive Director within 5 business days.

The City Manager, General Manager, Mayor, Chief Executive, or official designee may decide not to order the termination of a Water Resource Management Stage even though the conditions for termination of the stage are met. Factors which could influence such a decision include, but are not limited to, the time of the year, weather conditions, or the anticipation of potential changed conditions that warrant the continuation of the Water Resource Management Stage. The reason for this decision should be documented.

Water Resource and Emergency Management Plan Stages and Corresponding Measures

4.3.1 Stage 1

Initiation and Termination Conditions for Stage 1

NTMWD has initiated Stage 1, which may be initiated due to one or more of the following:

- The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1.
- Water demand is projected to approach the limit of NTMWD's permitted supply.
- The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB),[3] is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March.

- The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought.
- NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months.
- Water demand exceeds 95 percent of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days.
- Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate.
- Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause.
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted.

Supplier has initiated Stage 1 due to one or more of the following reasons:

- Supplier's water demand exceeds 95 percent of the amount that can be delivered to customers for three consecutive days.
- Supplier's water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate.
- Supply source becomes contaminated.
- Supplier's water system is unable to deliver water due to the failure or damage of major water system components.
- Supplier's individual plan may be implemented if other criteria dictate.

NTMWD has terminated Stage 1, which may be terminated due to one or more of the following:

- The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the termination of Stage 1.

- The storage level in Lavon Lake, as published by the TWDB,[3] is greater than 75 percent of the total conservation pool capacity during any of the months of April through October or greater than 65 percent of the total conservation pool capacity during any of the months of November through March.
- Other circumstances that caused NTMWD initiation of Stage 1 no longer prevail.

The circumstances that caused the Supplier's initiation of Stage 1 no longer prevail.

Goal for Use Reduction and Actions Available under Stage 1

The goal for water use reduction under Stage 1 is a two percent (2%) reduction in the amount of water produced by NTMWD from the previous corresponding annual payment period prior to institution of drought restrictions. **If circumstances warrant, or if required by NTMWD, the City Manager, General Manager, Mayor, Chief Executive, or official designee can set a goal for greater or lesser water use reduction under Stage 1.** The City Manager, General Manager, Mayor, Chief Executive, or official designee may order the implementation of any or all of the actions listed below, as deemed necessary, to achieve a two-percent reduction. Measures described as "requires notification to TCEQ" are those that impose mandatory requirements on customers. The supplier must notify TCEQ and NTMWD within five (5) business days if such mandatory measures are implemented.

- Continue actions established by the Water Conservation Plan.
- Notify any wholesale customers of actions being taken and request that they implement similar procedures.
- Initiate engineering studies to evaluate alternative water sources and/or alternative delivery mechanisms should conditions worsen.
- Further accelerate public education efforts on ways to reduce water use.
- Halt non-essential city government water use. Examples include street cleaning, vehicle washing, operation of ornamental fountains, etc.
- Encourage the public to wait until the current drought or emergency situation has passed before establishing New Landscape.
- Encourage all users to reduce the frequency of draining and refilling swimming pools.

- **Requires Notification to TCEQ** – Increase enforcement of the following landscape watering restrictions established by the Water Conservation Plan: (1) limit landscape watering with sprinklers or irrigation systems at each service address to no more than two (2) days per week, on designated days, between April 1 and October 31; and (2) limit landscape watering with sprinklers or irrigation systems at each service address to once every week, on designated days, between November 1 and March 31. Exceptions are as follows:
  - An exception is allowed for New Landscape associated with new construction that may be watered as necessary for 30 days from the date of installation of new landscape features.
  - An exception for additional watering of landscape may be provided by hand-held hose with shutoff nozzle, and/or use of dedicated irrigation drip zones provided no runoff occurs.
  - Foundation (within 2 feet), New Landscape Watering, watering of new plantings (first year) of shrubs, and watering of trees (within a ten foot radius of its trunk) may occur by a hand-held hose, a soaker hose, or a dedicated zone using a Drip Irrigation system provided no runoff occurs.
  - Locations using alternative sources of water supply only for irrigation may irrigate without day of the week restrictions provided proper signage is employed. However, irrigation using alternative sources of supply is subject all other restrictions applicable to this stage. If the alternative supply source is a well, proper proof of well registration with the North Texas Groundwater Conservation District or Red River Ground Water Conservation District is required. Other sources of water supply may not include imported treated water.
- **Requires Notification to TCEQ** – Initiate a rate surcharge for all water use over a certain level.
- **Requires Notification to TCEQ** – Parks, golf courses and Athletic Fields using potable water for landscape watering are required to meet the same reduction goals and measures outlined in this stage. Exception for golf course greens and tee boxes that may be hand-watered as needed.

4.3.2 Stage 2

<u>Initiation and Termination Conditions for Stage 2</u>

NTMWD has initiated Stage 2, which may be initiated due to one or more of the following:

- The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2.
- Water demand is projected to approach the limit of NTMWD's permitted supply.
- The storage level in Lavon Lake, as published by the TWDB,[3] is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March.
- SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought.
- NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months.
- Water demand exceeds 98 percent of the amount that can be delivered to Customers for three (3) consecutive days.
- Water demand for all or part of the delivery system equals delivery capacity, because delivery capacity is inadequate.
- Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause.
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the system impacted.

Supplier has initiated Stage 2 due to one or more of the following reasons:

- Supplier's water demand exceeds 98 percent of the amount that can be delivered to customers for three consecutive days.

- Supplier's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate.
- Supply source becomes contaminated.
- Supply source is interrupted or unavailable due to invasive species.
- Supplier's water supply system is unable to deliver water due to the failure or damage of major water system components.
- Supplier's individual plan may be implemented if other criteria dictate.

NTMWD has terminated Stage 2, which may be terminated due to one or more of the following:

- The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the termination of Stage 2.
- The storage level in Lavon Lake, as published by the TWDB,[3] is greater than 70 percent of the total conservation pool capacity during any of the months of April through October or greater than 60 percent of the total conservation pool capacity during any of the months of November through March.
- Other circumstances that caused the NTMWD's initiation of Stage 2 no longer prevail.

The circumstances that caused the Supplier's initiation of Stage 2 no longer prevail.

Goals for Use Reduction and Actions Available under Stage 2

The goal for water use reduction under Stage 2 is a reduction of ten percent (10%) in the amount of water obtained from NTMWD from the previous corresponding annual payment period prior to the institution of drought restrictions. **If circumstances warrant, or if required by NTMWD, the City Manager, General Manager, Mayor, Chief Executive, or official designee can set a goal for greater or lesser water use reduction.** The City Manager, General Manager, Mayor, Chief Executive, or official designee may order the implementation of any or all of the actions listed below, as deemed necessary to achieve a ten percent reduction. Measures described as "requires notification to TCEQ" are those that impose mandatory requirements on customers. The supplier must notify TCEQ and NTMWD within five (5) business days if such mandatory measures are implemented.

- Continue or initiate any actions available under the Water Conservation Plan and Stage 1.
- Notify any wholesale customers of actions being taken and request that they implement similar procedures.
- Implement viable alternative water supply strategies.
- Encourage all users to reduce the frequency of draining and refilling swimming pools.
- **Requires Notification to TCEQ** – Limit landscape watering with sprinklers or irrigation systems at each service address to once per week on designated days between April 1 and October 31. Limit landscape watering with sprinklers or irrigation systems at each service address to once every other week on designated days between November 1 and March 31. Exceptions are as follows:
    - New Landscape may be watered as necessary for 30 days from the date of the installation of new landscape features.
    - Foundation Watering (within 2 feet), New Landscape Watering, watering of new plantings (first year) of shrubs, and watering of trees (within a ten foot radius of its trunk) may occur for up to two hours on any day by a hand-held hose, a dedicated zone using a Drip Irrigation system and/or Soaker Hose, provided no runoff occurs.
    - Athletic Fields may be watered twice per week.
    - Locations using alternative sources of water supply only for irrigation may irrigate without day-of-the-week restrictions, provided proper signage is employed to notify the public of alternative water source(s) being used. However, irrigation using alternative sources of supply is subject all other restrictions applicable to this stage. If the alternative supply source is a well, proper proof of well registration with the North Texas Groundwater Conservation District or Red River Groundwater Conservation District is required. Alternative sources of water supply may not include imported treated water.
    - An exemption is allowed for Drip Irrigation systems from the designated outdoor water use day limited to no more than one day per week. Drip Irrigation systems are however subject to all other restrictions applicable under this stage.
    - Hand watering with shutoff nozzle, drip lines, and Soaker Hoses are allowed before 10 am and after 6 pm, provided no runoff occurs.

- **Requires Notification to TCEQ** – Prohibit hydro seeding, hydro mulching, and sprigging.
- **Requires Notification to TCEQ** – Initiate a rate surcharge as requested by NTMWD.
- **Requires Notification to TCEQ** – Initiate a rate surcharge for all water use over a certain level.
- **Requires Notification to TCEQ** – If NTMWD has imposed a reduction in water available to Member Cities and Customers, impose the same percent reduction on any wholesale customers.
- **Requires Notification to TCEQ** – Parks and golf courses using potable water for landscape watering are required to meet the same reduction goals and measures outlined in this stage. Exception for golf course greens and tee boxes which may be hand watered as needed.

4.3.3 Stage 3

Initiation and Termination Conditions for Stage 3

NTMWD has initiated Stage 3, which may be initiated due to one or more of the following:

- The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3.
- Water demand is projected to approach or exceed the limit of the permitted supply.
- The storage level in Lavon Lake, as published by the TWDB,[3] is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March.
- SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought.
- The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, or some other NTMWD water source has become limited in availability.
- Water demand exceeds the amount that can be delivered to Customers.
- Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate.

- Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure or other cause.
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the system impacted.

Supplier has initiated Stage 3 due to one or more of the following reasons:

- Supplier's water demand exceeds the amount that can be delivered to customers.
- Supplier's water demand for all or part of the delivery system seriously exceeds delivery capacity because the delivery capacity is inadequate.
- Supply source becomes contaminated.
- Supplier's water supply system is unable to deliver water due to the failure or damage of major water system components.
- Supplier's individual plan may be implemented if other criteria dictate.

NTMWD has terminated Stage 3, which may be terminated due to one or more of the following:

- The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the termination of Stage 3.
- The storage level in Lavon Lake, as published by the TWDB,[3] in Lavon Lake is greater than 55 percent of the total conservation pool capacity during any of the months of April through October or greater than 45 percent of the total conservation pool capacity during any of the months of November through March.
- Other circumstances that caused the NTMWD's initiation of Stage 3 no longer prevail.

When other circumstances that caused the Supplier's initiation of Stage 3 no longer prevail.

<u>Goals for Use Reduction and Actions Available under Stage 3</u>

The goal for water use reduction under Stage 3 is a reduction of whatever amount is designated by NTMWD in the amount of water obtained from NTMWD from the corresponding previous annual

payment period prior to institution of drought restrictions. **If circumstances warrant or if required by NTMWD, the City Manager, General Manager, Mayor, Chief Executive, or official designee can set a goal for greater or lesser water use reduction.** The City Manager, General Manager, Mayor, Chief Executive, or official designee may order the implementation of any or all of the actions listed below, as deemed necessary. Measures described as "requires notification to TCEQ" are those that impose mandatory requirements on Member Cities and Customers. The supplier must notify TCEQ and NTMWD within five (5) business days if such mandatory measures are implemented.

- Continue or initiate any actions available under the Water Conservation Plan and Stages 1 and 2.
- Notify any wholesale customers of actions being taken and request them to implement similar procedures.
- Implement viable alternative water supply strategies.
- **Requires Notification to TCEQ** – Initiate mandatory water use restrictions as follows:
  - Hosing and washing of paved areas, buildings, structures, windows or other surfaces is prohibited except by variance and performed by a professional service using high efficiency equipment.
  - Prohibit operation of ornamental fountains or ponds that use potable water except where supporting aquatic life or water quality.
- **Requires Notification to TCEQ** – Prohibit new sod, hydro-seeding, hydro-mulching, and sprigging.
- **Requires Notification to TCEQ** – Prohibit the use of potable water for the irrigation of New Landscape.
- **Requires Notification to TCEQ** – Prohibit all commercial and residential landscape watering, except that Foundation Watering (within 2 feet) and watering of trees (within a ten foot radius of its trunk) may occur for two hours one day per week with a hand-held hose or with a dedicated zone using a Drip Irrigation system and/or Soaker Hose, provided no runoff occurs. Drip Irrigation systems are not exempt from this requirement.
- **Requires Notification to TCEQ** – Prohibit washing of vehicles except at a Commercial Vehicle Wash Facility.

- **Requires Notification to TCEQ** – Landscape watering of parks, golf courses, and Athletic Fields with potable water is prohibited. Exception for golf course greens and tee boxes that may be hand watered as needed. Variances may be granted by the water provider under special circumstances.
- **Requires Notification to TCEQ** – Prohibit the filling, draining, and/or refilling of existing swimming pools, wading pools, Jacuzzi and hot tubs except to maintain structural integrity, proper operation and maintenance, or to alleviate a public safety risk. Existing pools may add water to replace losses from normal use and evaporation. Permitting of new swimming pools, wading pools, Jacuzzi, and hot tubs is prohibited.
- **Requires Notification to TCEQ** – Prohibit the operation of interactive water features such as water sprays, dancing water jets, waterfalls, dumping buckets, shooting water cannons, inflatable pools, temporary splash toys or pools, slip-n-slides or splash pads that are maintained for recreation.
- **Requires Notification to TCEQ** – Require all commercial water users to reduce water use by a percentage established by the City Manager, General Manager, Mayor, Chief Executive, or official designee.
- **Requires Notification to TCEQ** – If NTMWD has imposed a reduction in water available to Member Cities and Customers, impose the same percent reduction on any wholesale customers.
- **Requires Notification to TCEQ** – Initiate a rate surcharge over normal rates for all water use or for water use over a certain level.

4.4 PROCEDURES FOR GRANTING VARIANCES TO THE PLAN

The City Manager, General Manager, Mayor, Chief Executive, or official designee may grant temporary variances for existing water uses otherwise prohibited under this Water Resource and Emergency Management Plan if one or more of the following conditions are met:

- Failure to grant such a variance would cause an emergency condition adversely affecting health, sanitation, or fire safety for the public or the person or entity requesting the variance.
- Compliance with this plan cannot be accomplished due to technical or other limitations.

- Alternative methods that achieve the same level of reduction in water use can be implemented.

Variances shall be granted or denied at the discretion of the City Manager, General Manager, Mayor, Chief Executive, or official designee. All petitions for variances should be in writing and should include the following information:

- Name and address of the petitioners.
- Purpose of water use.
- Specific provisions from which relief is requested.
- Detailed statement of the adverse effect of the provision from which relief is requested.
- Description of the relief requested.
- Period of time for which the variance is sought.
- Alternative measures that will be taken to reduce water use and the level of water use reduction.
- Other pertinent information.

4.5 PROCEDURES FOR ENFORCING MANDATORY WATER USE RESTRICTIONS

Mandatory water use restrictions may be imposed in Stage 1, Stage 2 and Stage 3. The penalties associated with the mandatory water use restrictions will be determined by each entity and will be laid out in each entity's WREMP.

Appendix D contains potential ordinances, resolutions, and orders that may be adopted by the city council, board, or governing body approving the Water Resource and Emergency Management plan, including enforcement of same.

4.6 COORDINATION WITH THE REGIONAL WATER PLANNING GROUP AND NTMWD

Appendix C includes a copy of a letter sent to the Chairs of the Region C Water Planning Group and the Chairs of the North East Texas Water Planning Group in conjunction with this model Water Resource and Emergency Management Plan.

The suppliers will send a draft of its ordinance(s) or other regulation(s) implementing this plan to NTMWD for NTMWD's review and comment. The supplier will also send the final ordinance(s) or other regulation(s) to NTMWD.

4.7 REVIEW AND UPDATE OF WATER RESOURCE AND EMERGENCY MANAGEMENT PLAN

As required by TCEQ rules, Member Cities and Customers must review their respective Water Resource and Emergency Management plans every five years. The plan will be updated as appropriate based on new or updated information, such as the revision of the regional water plans.

APPENDIX D

NORTH TEXAS MUNICIPAL WATER DISTRICT

WATER UTILITY PROFILE BASED ON TCEQ FORMAT

APPENDIX D

North Texas Municipal Water District Water Utility Profile Based on TCEQ Format

Name of Utility: North Texas Municipal Water District
Address & Zip: P.O. Box 2408, Wylie, TX 75098
Telephone Number: (972) 442-5405
Fax Number: (972) 295-6440
Form Completed by: Denise Hickey
Title: Water Resource & Public Education Manager
Signature:
Date:

Name and phone number of person responsible for implementing a water conservation program:
Name: Denise Hickey
Phone Number: (972) 442-5405

I. CUSTOMER DATA

A. Population and Service Area Data

Service area map is included as Figure 3.2.

1. Service area size (square miles): 2,200
2. Current population of service area: 1,699,173 (Estimated 2017 total population of member cities and customers)
3. Current (2012) population served by utility:
   water: 1,699,173
   wastewater: 1,461,289

4. Population served by utility for the previous five years:

Year	Estimated Population
2013	1,534,084
2014	1,572,330
2015	1,602,714
2016	1,667,020
2017	1,699,173

Populations are based on estimates generated by NTWMD each year

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

Year	Estimated Population
2020	1,797,279
2030	2,093,105
2040	2,454,133
2050	2,889,282
2060	3,333,931
2070	3,814,388

Projected 2020-2070 population for current and potential Member Cities and Customers from Region C projections for the 2016 regional water plan (as approved by TWDB)

6. List source(s)/method(s) for the calculation of current and projected population:

As described above, the estimates are total populations of current Member Cities and Customers, based on yearly estimates generated by NTWMD and projections made for the *2016 Region C Water Plan* and approved by the TWDB.

B. Customers Data

List the names of all wholesale customers, amount of annual contract, and amount of the annual use for each for the previous year:

Note: NTMWD is primarily a wholesale water provider. However, NTMWD does provide retail service to 29 retail customers.

Customer	Contracted Amount (Acre-Feet)	Year 2017 Water Delivered (Acre-Feet)
Member Cities		
Allen	Demand Based Contract with Minimum Take or Pay	16,855
Farmersville		571
Forney		5,443
Frisco		30,388
Garland		31,565
McKinney		32,912
Mesquite		17,034
Plano		63,078
Princeton		1,481
Richardson		24,864
Rockwall		9,687
Royse City		1,321
Wylie		5,119
Subtotal Members		**240,318**
Customers		
Ables Springs SUD	Demand Based Contract with Minimum Take or Pay	248
Bear Creek SUD		658
BHP WSC		366
Bonham		1,458
Caddo Basin SUD		960
Cash SUD		799
College Mound WSC		489
Copeville SUD		254

Customer	Contracted Amount (Acre-Feet)	Year 2017 Water Delivered (Acre-Feet)
Crandall	Demand Based Contract with Minimum Take or Pay	395
East Fork SUD		1,367
Fairview		2,363
Fate		1,190
Forney Lake WSC		970
Gastonia-Scurry SUD		1,036
GTUA		1,811
Josephine		178
Kaufman		1,198
Little Elm		4,183
Lucas		1,592
Melissa		952
Milligan WSC		316
Mt. Zion WSC		261
Murphy		3,985
Nevada WSC		281
N. Collin WSC		898
Parker		1,302
Prosper		4,714
Rose Hill SUD		309
Rowlett		6,885
Sachse		3,118
Seis Lagos MUD		347
Sunnyvale		1,606
Terrell		3,696
Wylie NE SUD		666
Subtotal Customers		**50,851**
Retail Customers		
Subtotal		10
Total		**291,179**

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 amount for each for previous year.

Total amount sold for Year 2017 (acre-feet)

Treated	291,179
Raw	0

B. Water Accounting Data

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

Raw Water Diversions from Lavon Lake, Lake Bonham and Lake Tawakoni (acre-feet)

Year	2013	2014	2015	2016	2017
January	17,736	17,555	16,998	17,587	18,362
February	16,348	15,977	15,308	17,941	17,213
March	20,788	18,756	17,085	19,890	21,778
April	21,637	20,848	18,043	21,418	22,021
May	25,840	24,161	17,928	22,350	28,892
June	26,683	24,175	24,446	27,378	27,914
July	32,323	26,352	36,325	37,081	32,484
August	39,218	27,005	45,693	37,043	32,725
September	33,189	29,112	38,371	32,939	35,468
October	24,727	25,366	32,881	30,686	31,439
November	18,650	18,342	19,314	23,202	24,712
December	18,365	17,460	18,103	19,525	20,889
Total	**295,504**	**265,108**	**300,497**	**307,040**	**313,897**

2. Wholesale population served and total amount of water diverted for **municipal** use for previous five years:

Year	Total Population Served	Total Annual Water Diverted for Municipal Use (Acre-Feet)
2013	1,534,084	295,504
2014	1,572,330	265,108
2015	1,602,714	300,497
2016	1,667,020	307,040
2017	1,699,173	313,897

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 requirement from such growth.

Year	Projected Demand (AF/Y) (with Plumbing Code Reductions)	Source of data
2020	371,743	2016 Region C Plan
2021	377,603	Interpolated
2022	383,462	Interpolated
2023	389,322	Interpolated
2024	395,181	Interpolated
2025	401,041	Interpolated
2026	406,900	Interpolated
2027	412,760	Interpolated
2028	418,619	Interpolated
2029	424,479	Interpolated
2030	430,338	2016 Region C Plan
2040	504,964	*2016 Region C Plan*
2050	582,350	*2016 Region C Plan*
2060	646,378	*2016 Region C Plan*
2070	710,535	*2016 Region C Plan*

Note: Projections are for current and potential customers. Projections include TWDB estimated reductions for plumbing fixtures. Projections are from Region C Water Planning Group information for the 2016 Plan, as approved by TWDB.

III. WATER SUPPLY SYSTEM DATA

A. Water Supply Sources

List all current water supply sources and the amounts available with each:

Type[a]	Source	Amount Authorized (AF/Y)
Surface Water	Lavon Lake - municipal right	114,670
Surface Water	Lavon Lake - industrial or municipal	4,000
Surface Water	Lake Bonham	5,340
Surface Water	Lake Texoma[b]	197,000
Surface Water	Jim Chapman Lake	57,214
Surface Water	Upper Sabine Basin (contracted)	11,100
Indirect Reuse	Wilson Creek WWTP[c]	71,882
Indirect Reuse	East Fork Reuse Project[c]	157,393
Indirect Reuse	Main Stem Pump Station	56,100
Total		**674,699**

Notes: a. NTMWD dos not have any groundwater supplies.

b. Availability from Lake Texoma is limited due to issues with zebra mussels and salt levels.

c. Availability from Wilson Creek WWTP and East Fork Raw Water Supply Project is limited to actual discharges and is currently less than amount authorized.

B. Treatment and Distribution System

1. Design daily capacity of system:

Plant 1	70	MGD
Plant 2	280	MGD
Plant 3	280	MGD
Plant 4	140	MGD
Lake Tawakoni	30	MGD
Lake Bonham	6.6	MGD
Total	806.6	MGD

2. Storage capacity:

Elevated	0	MG
Ground	92.9	MG

3. If surface water, do you recycle filter backwash to the head of the plant?
   Yes X No ___. Approximately 5 MGD.

4. Please describe the water system and attach. Include the number of treatment plants, wells,

   and storage tanks. If possible, attach a sketch of the system layout.

   Plate 1 at the back of the report is a map of the NTMWD water system. Raw water is diverted from Lavon Lake and is blended with raw water from Lake Texoma at the Wylie WTP. (Raw water from , Jim Chapman Lake, the East Fork Reuse Project, Main Stem Pump Station and the Upper Sabine Basin is pumped to the Lavon Lake watershed through pipelines and delivered by bed and banks of streams. Treated effluent from Wilson Creek WWTP is released into Wilson Creek and delivered to Lavon Lake by the bed and banks.) The raw water is treated at four water treatment plants with a total treatment capacity of 770 mgd, all located near Lavon Lake in Wylie. NTMWD also operates the Bonham WTP which treats raw water from Lake Bonham and the Tawakoni WTP which can utilize Upper Sabine Basin raw water. The treated water is delivered to NTMWD Member Cities and Customers through the system of pump stations and pipelines shown on Plate 1. Treated water is delivered to member cities and customers through air gaps into ground storage facilities owned by the member cities and customers.

IV. WASTEWATER SYSTEM DATA

A. Wastewater System Data (if applicable)

1. Design capacity of wastewater treatment plant(s): 151.455 MGD

2. Briefly describe NTMWD's wastewater systems. Identify treatment plants with the TCEQ name and number, the operator, owner, and, if wastewater is discharged, the receiving stream. Please provide a location map showing the plants. Plants are described below. Locations are shown on Plate 1:

Treatment Plant Name	TCEQ Number	Permitted Discharge (MGD)	Operator	Owner	Receiving Stream
Bear Creek	14577-001	0.250	NTMWD	World Land Developers	Bear Creek to Lake Ray Hubbard
Buffalo Creek	12047-001	2.250	NTMWD	NTMWD	Bufallo Creek
Farmersville #1	10442-001	0.225	NTMWD	NTMWD	Unnamed tributary of Elm Creek
Farmersville #2	10442-002	0.530	NTMWD	NTMWD	Unnamed tributary of Elm Creek
Floyd Branch	10257-001	4.750	NTMWD	NTMWD	Floyd Branch to Cottonwood Creek
Muddy Creek	14216-001	10.000	NTMWD	NTMWD	Muddy Creek to Lake Ray Hubbard
Panther Creek	14245-001	10.000	NTMWD	NTMWD	Unnamed tributary of Panther Creek
Royse City	10366-001	0.500	NTMWD	NTMWD	Sabine Creek
Rowlett Creek	10363-001	24.000	NTMWD	NTMWD	Rowlett Creek
Sabine Creek	14469-001	1.500	NTMWD	NTMWD	Parker Creek
Seis Lagos	11451-001	0.250	NTMWD	NTMWD	Unnamed tributary of Lake Lavon
South Mesquite	10221-001	33.000	NTMWD	NTMWD	South Mesquite Creek
Squabble Creek	10262-001	1.200	NTMWD	NTMWD	Squabble Creek
Stewart Creek West	14008-001	5.000	NTMWD	NTMWD	Stewart Creek
Wilson Creek	12446-001	56.000	NTMWD	NTMWD	Lake Lavon Seg.# 0821
Wylie	10384-001	2.000	NTMWD	NTMWD	Unnamed tributary thence to Muddy Creek

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 three years (in 1,000 gallons):

Year	2015	2016	2017
January	4,085,761	4,751,881	4,194,457
February	3,771,574	3,815,368	3,869,681
March	5,681,118	4,991,721	4,002,884
April	5,096,343	5,258,603	4,245,198
May	7,594,902	4,672,745	3,887,873
June	4,749,788	5,165,519	4,587,522
July	3,600,199	3,855,731	4,435,141
August	3,418,242	3,996,239	4,491,332
September	3,344,622	3,832,589	3,805,243
October	4,490,369	3,850,655	3,894,988
November	6,120,924	4,104,081	3,771,256
December	6,281,372	3,780,048	4,270,793
Total	**58,235,212**	**52,075,179**	**49,456,366**

SUMMARY OF YEAR 2017
NTMWD MEMBER CITY AND CUSTOMER WATER CONSERVATION REPORT

Water Utility Reporting:	**NTMWD**
Filled Out By:	**FNI**
Phone Number:	**817-735-7300**
Email:	
Date Completed:	**4/30/2018**
Year Covered:	**2017**
# of Connections	**590,072**
Estimated Population	**1,721,899**
Source:	**Various; see individual tabs**
# of Backflow Preventers:	**118,275**

Recorded Deliveries and Sales by Month (in Million Gallons):

Month	Deliveries from NTMWD	Other Supplies	Sales by Category							
			Residential	Commercial	Public/ Institutional	Industrial	Metered Irrigation	Wholesale	Other	Total
January	5,170.393	58.328	3,161.109	973.881	105.615	246.083	166.953	221.264	15.819	4,890.723
February	5,007.794	51.347	2,966.258	935.839	119.905	202.444	116.739	221.148	17.764	4,580.097
March	6,409.334	60.983	3,136.356	981.434	130.025	275.335	149.545	268.750	17.645	4,959.091
April	6,964.101	59.068	3,788.070	1,070.990	174.361	271.865	235.719	241.642	21.971	5,804.617
May	8,388.845	77.579	4,227.877	1,187.393	212.359	266.914	361.337	326.884	22.776	6,605.540
June	8,113.817	74.728	4,835.690	1,383.358	314.066	292.594	492.416	328.271	20.760	7,667.155
July	10,221.993	74.357	5,002.027	1,427.249	263.960	297.068	564.141	368.665	21.537	7,944.646
August	9,847.866	74.354	5,663.826	1,509.551	353.421	301.967	642.826	381.096	22.622	8,875.310
September	10,278.117	78.873	5,447.232	1,542.420	335.076	329.288	658.658	421.505	27.193	8,761.372
October	9,808.625	73.697	5,356.940	1,527.220	342.715	274.560	635.478	378.245	37.649	8,552.807
November	7,577.438	57.871	4,374.864	1,358.501	290.043	279.973	488.864	289.910	25.427	7,107.581
December	5,848.645	65.697	3,773.492	1,171.657	154.203	218.780	349.437	255.005	18.618	5,941.193
TOTAL	**93,636.969**	**806.880**	**51,733.740**	**15,069.494**	**2,795.748**	**3,256.871**	**4,862.113**	**3,702.385**	**269.781**	**81,690.132**

Peak Day Usage

Peak Day (MG)	**513.277**
Average Day (MG)	258.750
Peak/Average Day Ratio	1.984

Authorized Consumption and Water Loss	
Total System Input Volume:	90,741.464
Billed Metered:	77,987.747
Billed Unmetered:	145.122
Unbilled Metered:	762.906
Unbilled Unmetered:	3,074.194
Total Authorized Consumption:	81,969.969
Water Losses:	8,771.496
Total Loss Percent:	9.67%
Goal for Total Loss Percent:	12.00%

Per Capita Use (Gallons per person per day)	
Municipal Use (MG)	82,353
Residential Use (MG)	51,733.740
Total Per Capita Use (gpcd)	144
Municipal Per Capita Use (gpcd)	131
Residential Per Capita Use (gpcd)	82
5-year Per Capita Goal	145
10-year Per Capita Goal	140

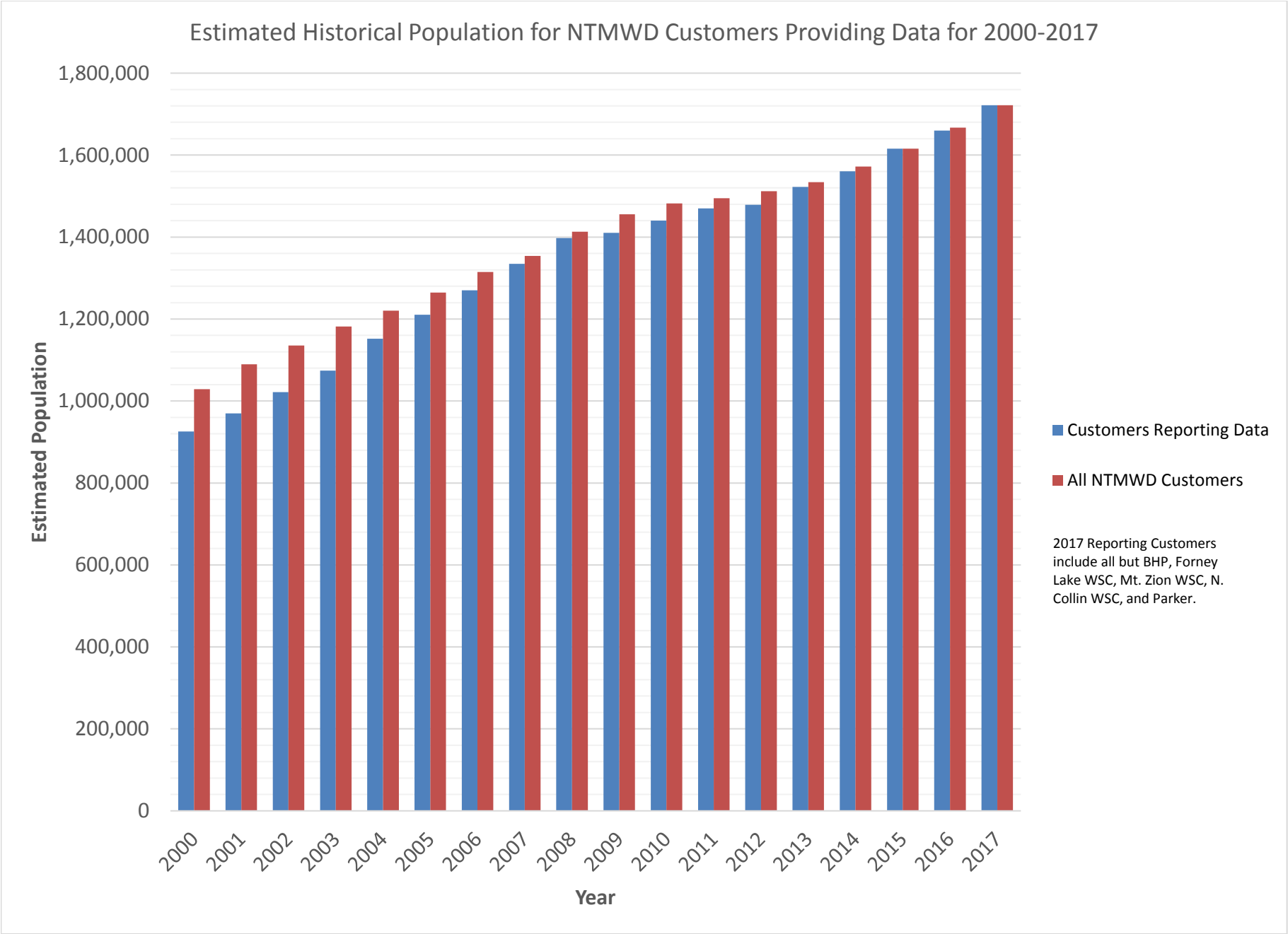
Historical Water Use Data for NTMWD

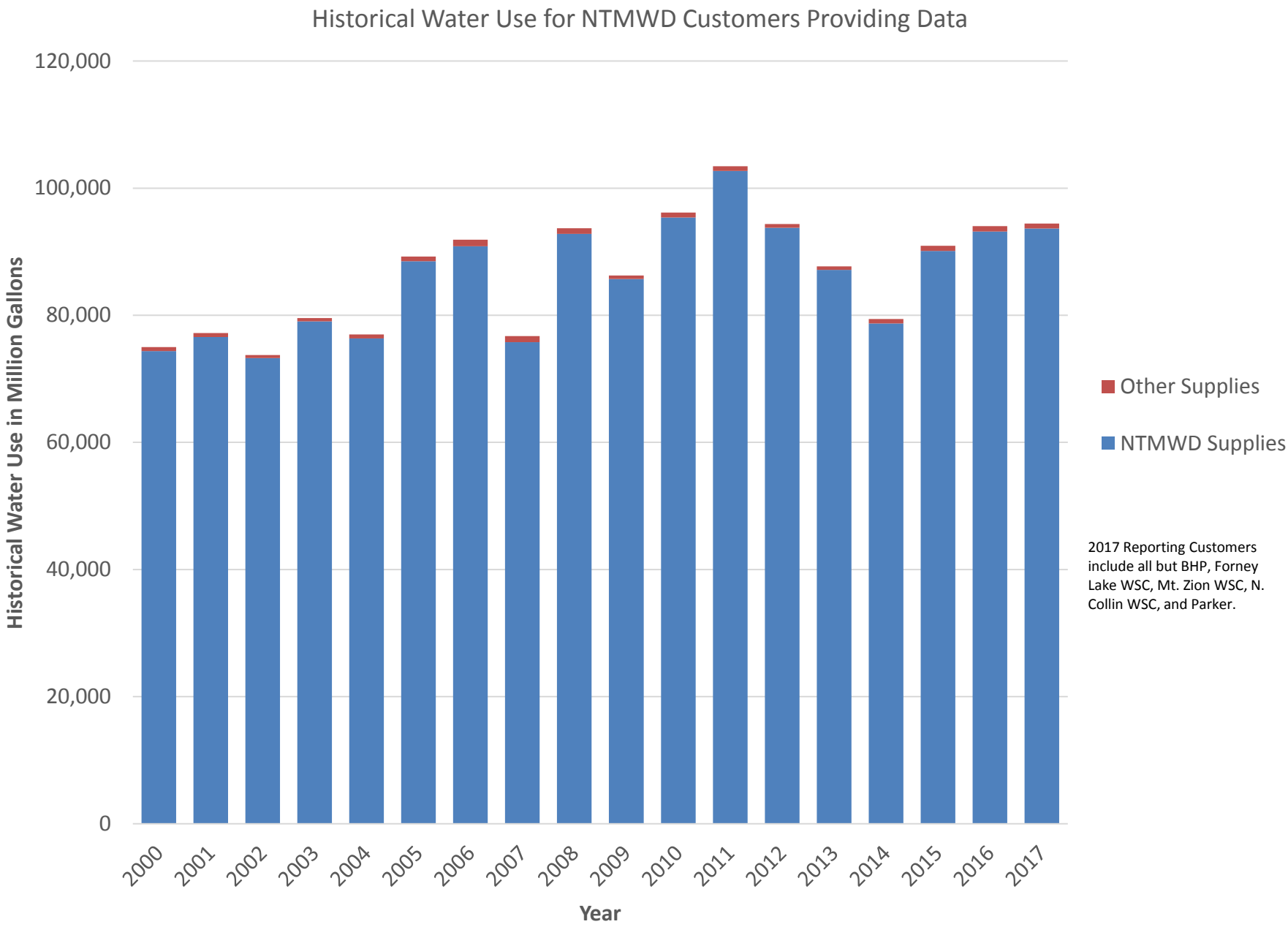
Year	Connections	Estimated Population	Deliveries from NTMWD (MG)	Other Supplies (MG)	Metered Sales by Category (Million Gallons)							
					Residential	Commercial	Public/ Institutional	Industrial	Metered Irrigation	Wholesale	Other	Total
1990	156,830	586,454	39,246	524	21,425	11,402	133	34		264	78	33,336
1991	156,576	600,162	36,719	526	20,139	10,609	125	32		279	73	31,257
1992	157,948	619,873	37,270	607	20,774	11,037	136	35		289	80	32,351
1993	171,229	656,529	43,015	869	23,634	12,212	154	39		351	90	36,481
1994	183,821	697,655	41,246	1,139	23,557	12,170	155	39		434	91	36,445
1995	189,669	723,207	46,577	1,359	25,682	13,074	171	43		464	100	39,534
1996	202,068	750,734	49,023	1,598	27,457	13,937	194	49		471	114	42,222
1997	206,050	785,268	51,096	762	28,483	14,664	219	56		542	128	44,092
1998	231,778	821,441	64,789	1,037	37,544	17,846	266	67		634	155	56,512
1999	262,824	883,270	68,570	658	39,039	20,283	278	254		699	162	60,716
2000	311,139	925,399	74,359	634	43,454	21,433	390	292		1,012	169	66,749
2001	327,171	970,025	76,588	621	43,169	20,891	361	272		1,134	167	65,995
2002	341,370	1,021,726	73,248	494	37,187	21,465	519	383		1,409	166	61,129
2003	359,188	1,073,848	79,032	518	44,347	21,451	968	631		1,691	355	69,443
2004	388,985	1,152,181	76,359	612	42,605	21,809	858	667		1,119	285	67,342
2005	412,301	1,210,539	88,503	729	51,810	25,432	1,437	894		2,191	442	82,205
2006	430,471	1,270,354	90,858	1,026	55,207	23,367	1,535	863		2,432	367	83,771
2007	447,324	1,334,711	75,775	963	43,350	18,967	1,603	1,100		2,477	470	67,967
2008	467,923	1,397,488	92,817	885	54,070	21,420	2,555	1,280		2,838	249	82,411
2009	471,475	1,410,416	85,687	578	48,903	19,392	2,642	1,219		2,838	267	75,261
2010	477,502	1,439,945	95,399	742	54,435	20,902	3,352	1,294		2,899	347	83,230
2011	500,666	1,469,951	102,697	754	61,807	21,572	4,056	1,769		3,740	93	93,037
2012	512,219	1,478,897	93,748	600	55,771	18,635	3,634	1,672		3,246	173	83,131
2013	525,858	1,522,230	87,148	550	52,151	17,810	3,223	1,718		3,094	225	78,222
2014	544,322	1,560,566	78,725	693	46,232	14,572	2,931	2,336		2,989	216	69,275
2015	554,414	1,615,861	90,128	817	52,364	17,064	3,926	2,728		3,524	319	79,925
2016	567,011	1,660,113	93,192	840	50,277	14,502	2,760	3,085	4,283	3,410	364	78,680
2017	590,072	1,721,899	93,637	807	51,734	15,069	2,796	3,257	4,862	3,702	270	81,690

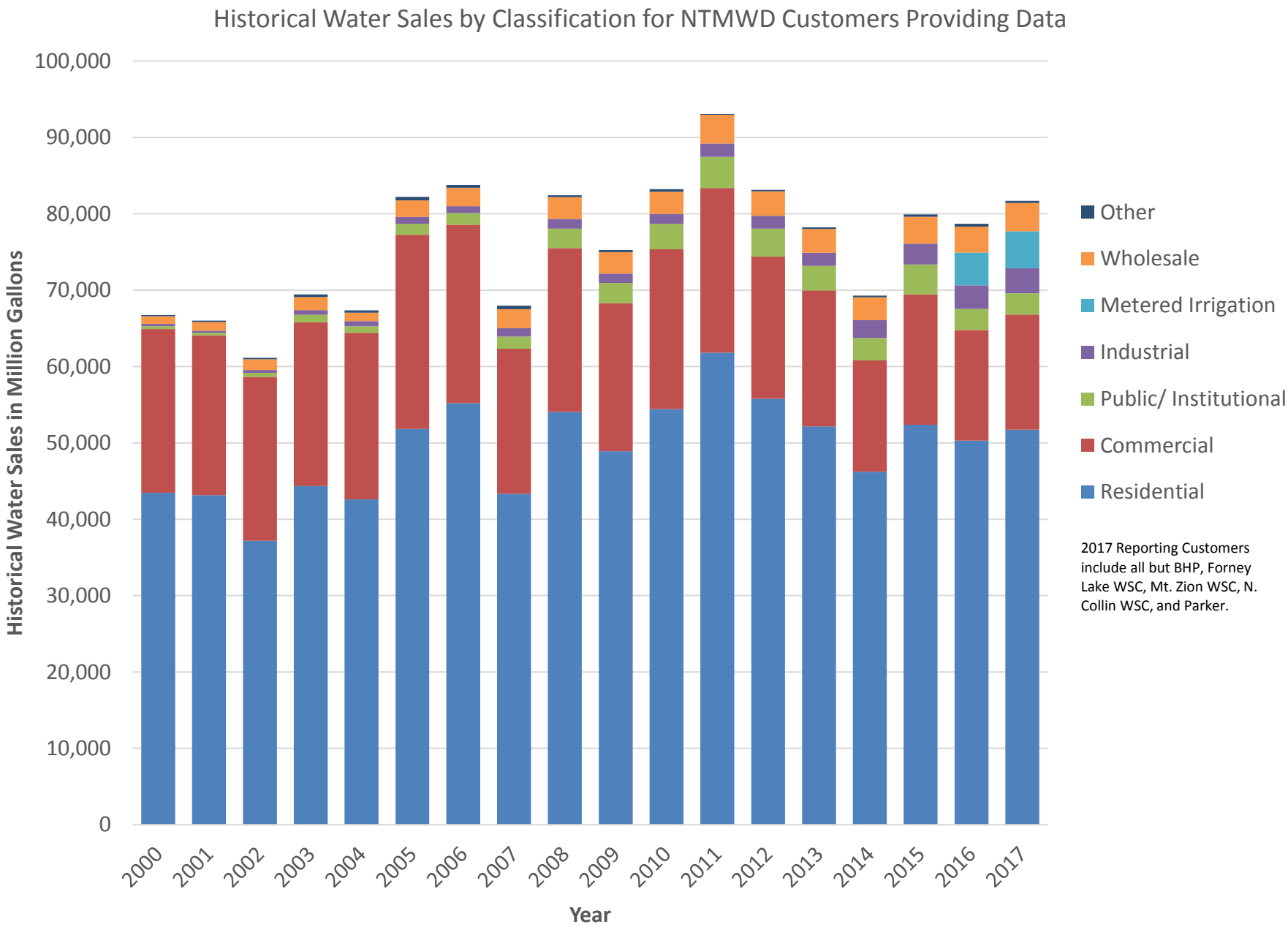
Historical Per Capita Use Data and Water Loss for NTMWD

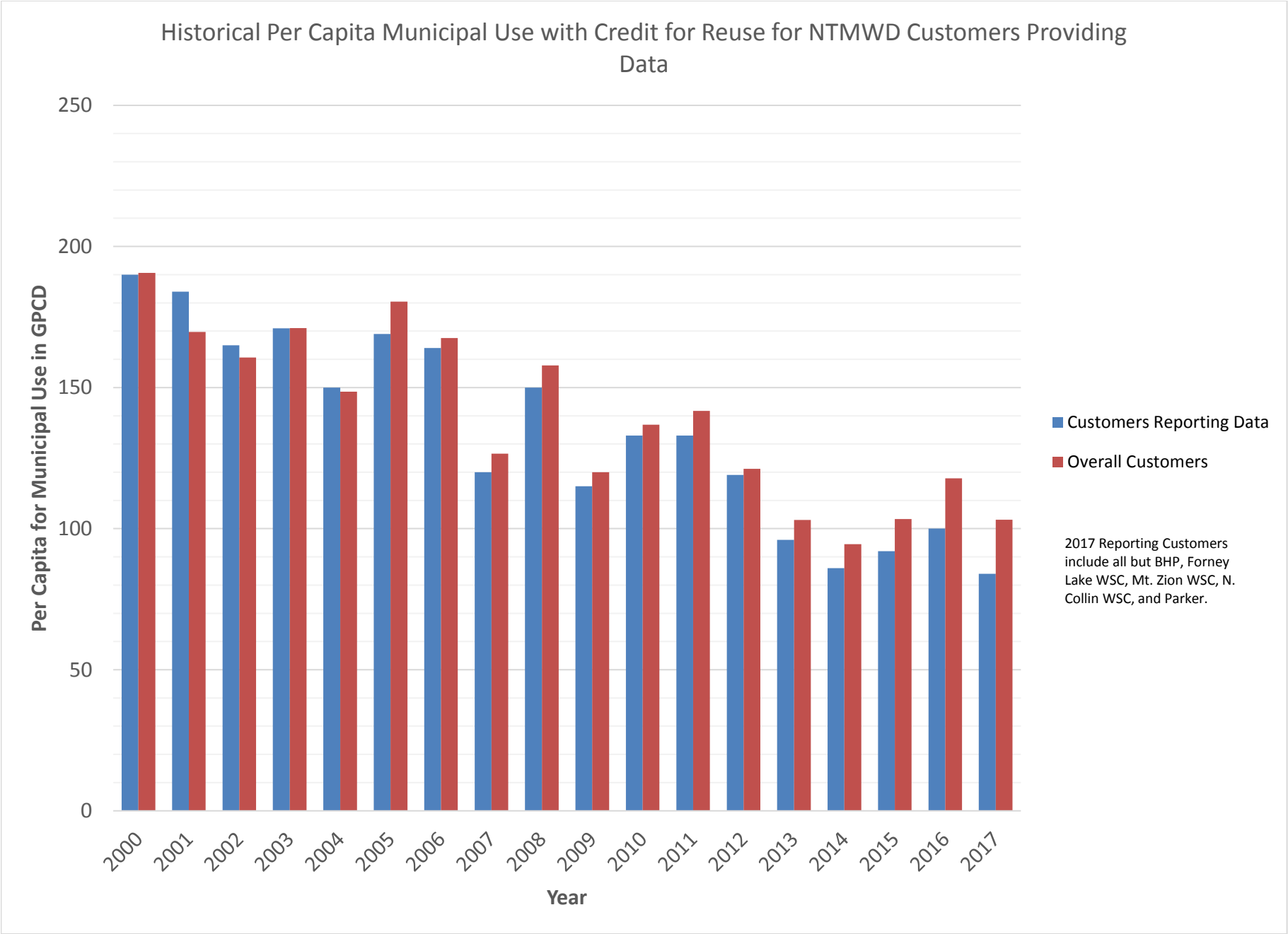
Year	Estimated Population	Deliveries from NTMWD (MG)	% Reuse	Reuse (MG)	In-City Municipal Use (MG)	In-City Municipal Use with Credit for Reuse	Per Capita Municipal Use (gpcd)	Per Capita Municipal Use with Reuse Credit	In-City Residential Use (MG)	Per Capita Residential Use (gpcd)	Other Supplies (MG)	Wholesale Sales (MG)	Billed Metered (MG)	Billed Unmetered (MG)	Unbilled Metered (MG)	Unbilled Unmetered (MG)	Water Losses (MG)	% Water Loss
1995																		
1996																		
1997																		
1998																		
1999																		
2000	925,399	74,359	12.69%	9,438	73,521	64,083	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	64,883	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	61,249	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	66,854	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	62,655	179	150	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	74,326	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	75,472	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	58,033	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	76,453	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	59,216	159	115	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	69,697	174	133	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	71,529	182	133	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	64,955	164	119	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	52,978	150	96	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	48,575	130	86	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	54,469	143	92	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	60,562	137	100	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	82,353	52,698	131	84	51,734	82	807	3,702	77,988	145	763	3,074	8,771	9.67%

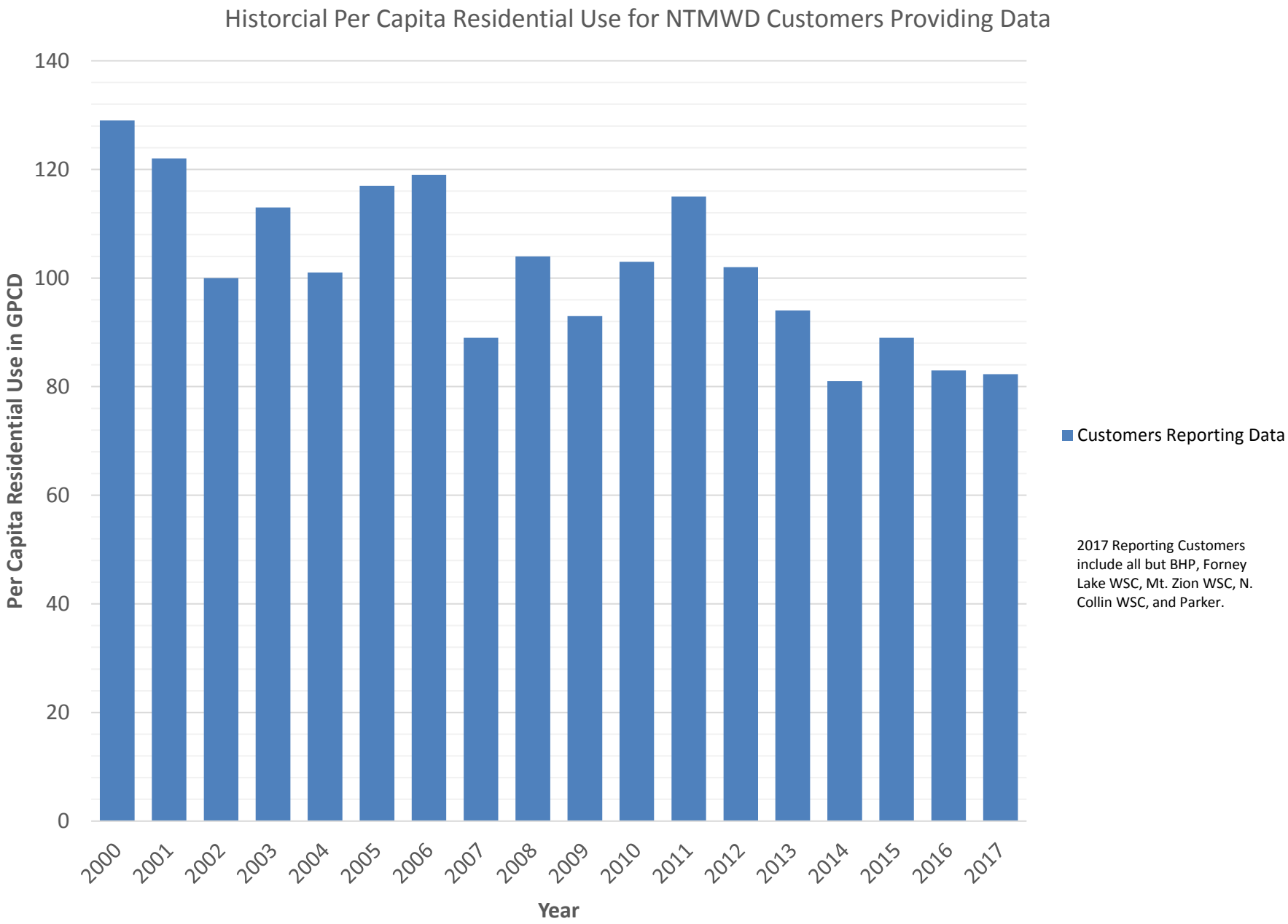
Note:
In-city municipal use = total water supplied less sales to industry, metered irrigation, wholesale sales and other sales.
After 2017 - Unaccounted Water has been removed and replaced with Water Losses (per TWDB definition). This category is inclusive of real and apparent losses. Categories for 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.

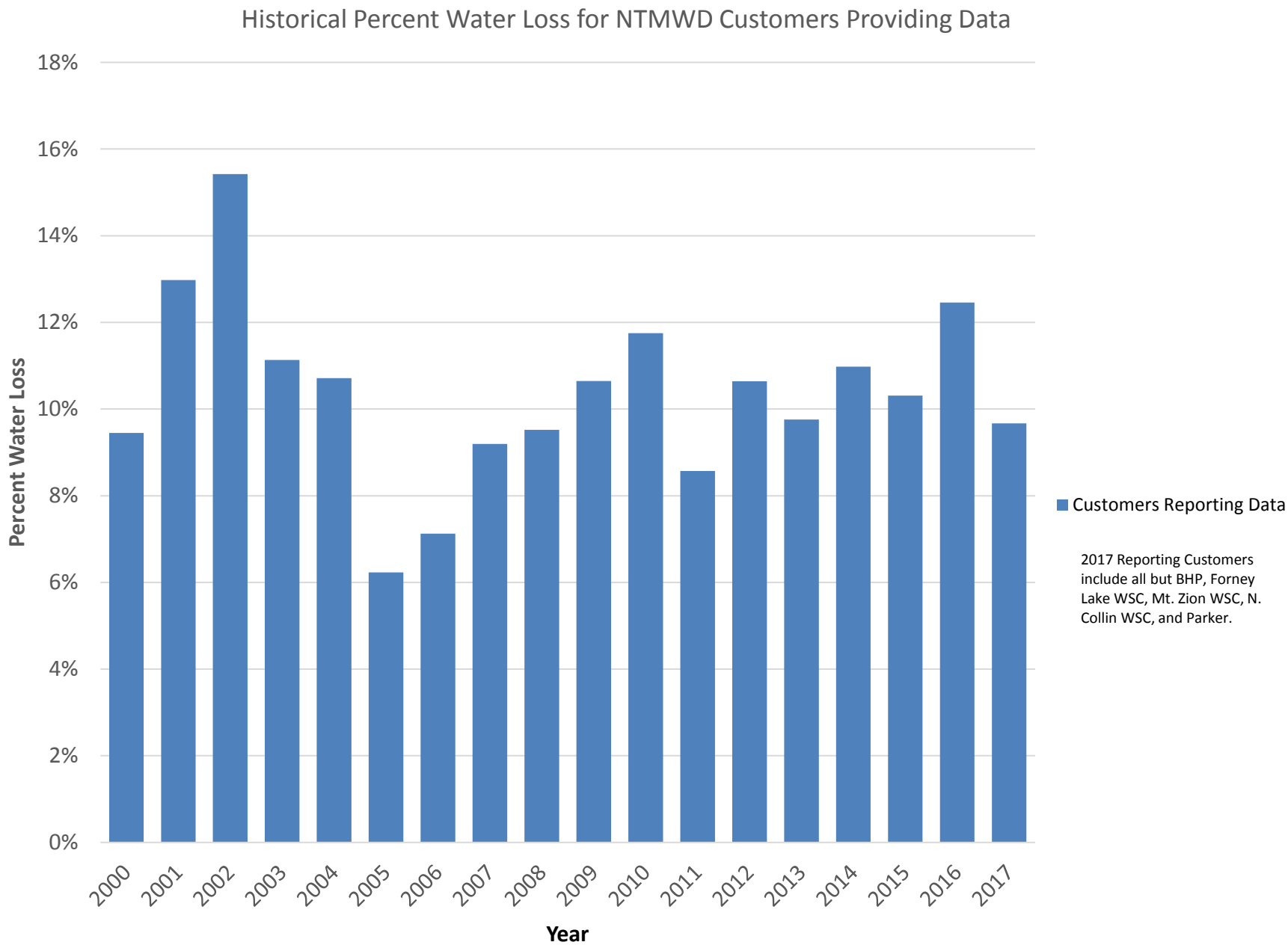

Estimated Historical Population for NTMWD Customers Providing Data for 2000-2017
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Estimated Population
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Customers Reporting Data
All NTMWD Customers
2017 Reporting Customers include all but BHP, Forney Lake WSC, Mt. Zion WSC, N. Collin WSC, and Parker.


Historical Water Use for NTMWD Customers Providing Data
120,000
100,000
80,000
60,000
40,000
20,000
0
Historical Water Use in Million Gallons
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Other Supplies
NTMWD Supplies
2017 Reporting Customers include all but BHP, Forney Lake WSC, Mt. Zion WSC, N. Collin WSC, and Parker.


Historical Water Sales by Classification for NTMWD Customers Providing Data
Historical Water Sales in Million Gallons
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Other
Wholesale
Metered Irrigation
Industrial
Public/ Institutional
Commercial
Residential
2017 Reporting Customers include all but BHP, Forney Lake WSC, Mt. Zion WSC, N. Collin WSC, and Parker.


Historical Per Capita Municipal Use with Credit for Reuse for NTMWD Customers Providing Data
Per Capita for Municipal Use in GPCD
250
200
150
100
50
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Customers Reporting Data
Overall Customers
2017 Reporting Customers include all but BHP, Forney Lake WSC, Mt. Zion WSC, N. Collin WSC, and Parker.


Historcial Per Capita Residential Use for NTMWD Customers Providing Data
Per Capita Residential Use in GPCD
140
120
100
80
60
40
20
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Customers Reporting Data
2017 Reporting Customers include all but BHP, Forney Lake WSC, Mt. Zion WSC, N. Collin WSC, and Parker.


Historical Percent Water Loss for NTMWD Customers Providing Data
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Percent Water Loss
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Customers Reporting Data
2017 Reporting Customers include all but BHP, Forney Lake WSC, Mt. Zion WSC, N. Collin WSC, and Parker.

APPENDIX E

NTMWD MEMBER CITY AND CUSTOMER ANNUAL WATER CONSERVATION REPORT

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

Water Utility Reporting: _____
Filled Out By: _____
Phone Number: _____
Email: _____
Date Completed: _____
Year Covered: _____
# of Connections _____
Estimated Population _____
Source: _____
# of Irrigation Systems _____

Recorded Deliveries and Sales by Month (in Million Gallons):

Month	Deliveries from NTMWD	Other Supplies	Sales by Category							
			Residential	Commercial	Public/ Institutional	Industrial	Metered Irrigation	Wholesale	Other	Total
January										
February										
March										
April										
May										
June										
July										
August										
September										
October										
November										
December										
TOTAL										

Peak Day Usage
Peak Day (MG)
Average Day (MG)
Peak/Average Day Ratio

Authorized Consumption and Water Loss
Total System Input Volume:
Billed Metered:
Billed Unmetered:
Unbilled Metered:
Unbilled Unmetered:
Total Authorized Consumption:
Water Losses:
Total Loss Percent:
Goal for Total Loss Percent:

Per Capita Use (Gallons per person per day)
Municipal Use (MG)
Residential Use (MG)
Total Per Capita Use (gpcd)
Municipal Per Capita Use (gpcd)
Residential Per Capita Use (gpcd)
5-year Per Capita Goal
10-year Per Capita Goal

Recorded Wholesale Sales by Month (in Million Gallons):

Month	Sales to…	Sales to…	Sales to…	Sales to…	Sales to…	Sales to…	Sales to…	Sales to…	Total Wholesale Sales
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									

Information on Wholesale Customers:

Customer	Estimated Total Population

Unusual Circumstances (use additional sheets if necessary):

Progress in Implementation of Conservation Plan (use additional sheets if necessary):

Conservation measures planned for next year (use additional sheets if necessary):

Assistance requested from North Texas Municipal Water District (use additional sheets if necessary):

Other (use additional sheets if necessary):

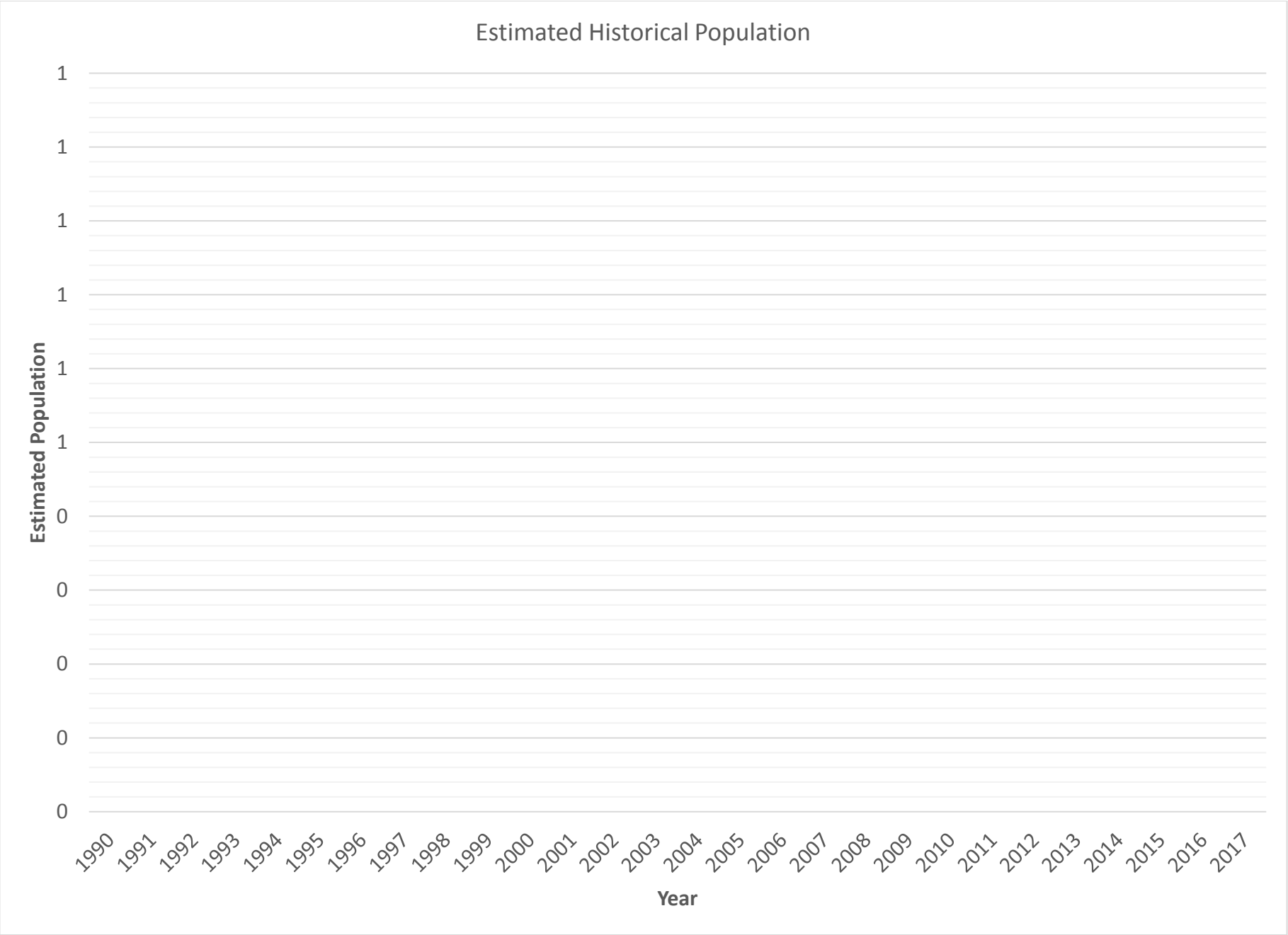
Historical Water Use Data for

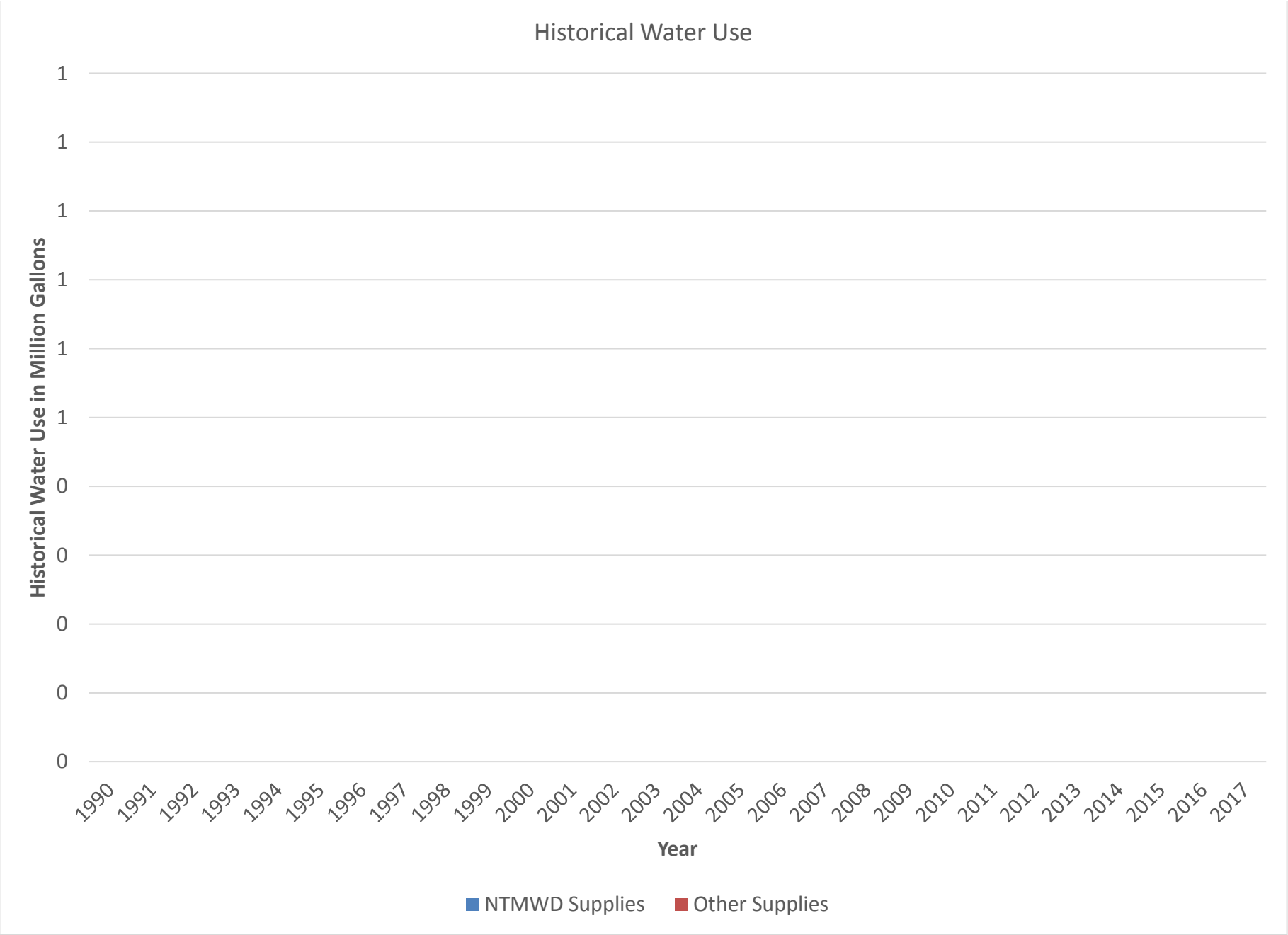
Year	Connections	Estimated Population	Deliveries from NTMWD (MG)	Other Supplies (MG)	Metered Sales by Category (Million Gallons)							
					Residential	Commercial	Public/ Institutional	Industrial	Metered Irrigation	Wholesale	Other	Total
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0

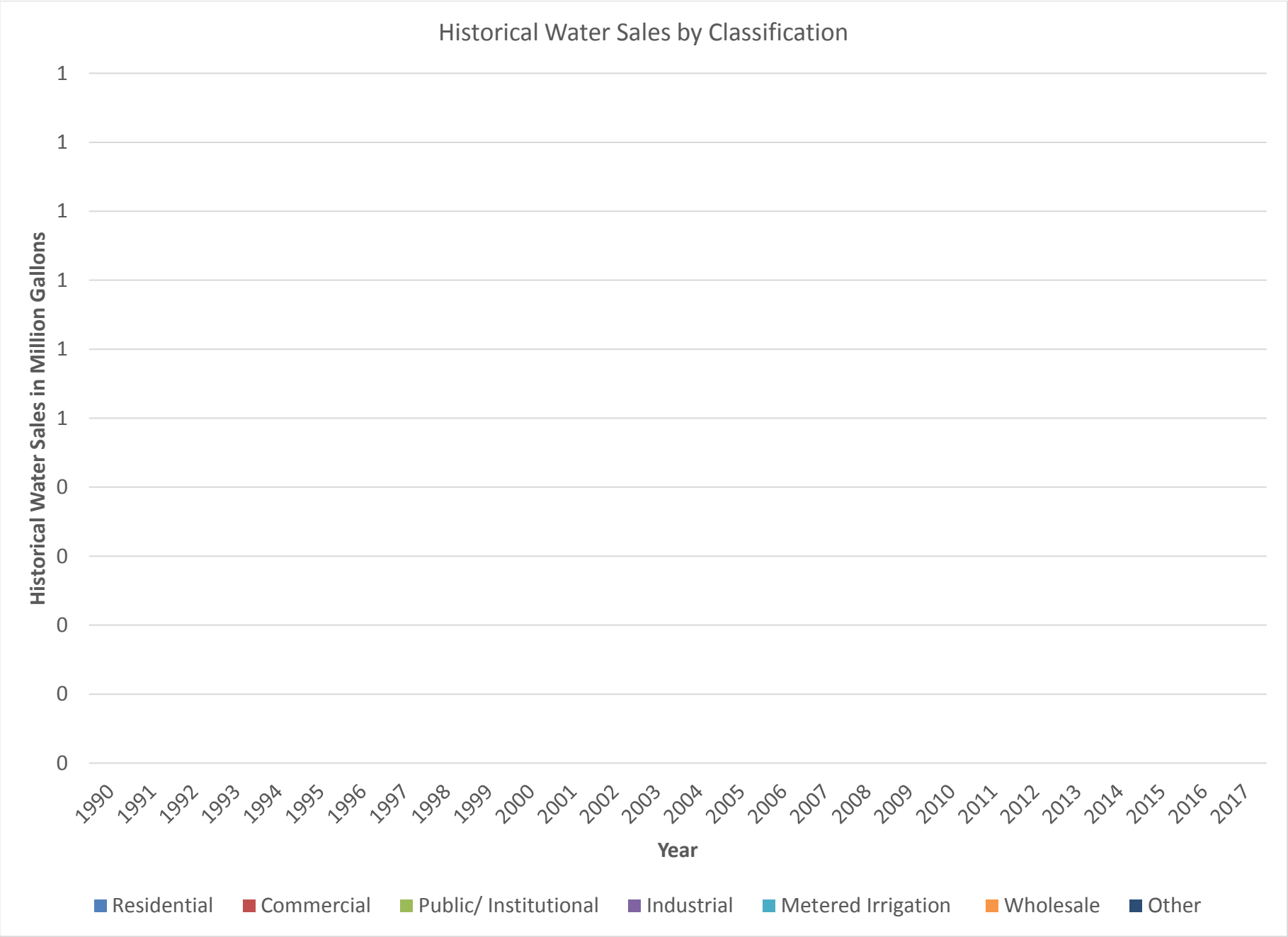
Historical Per Capita Use Data and Water Loss for

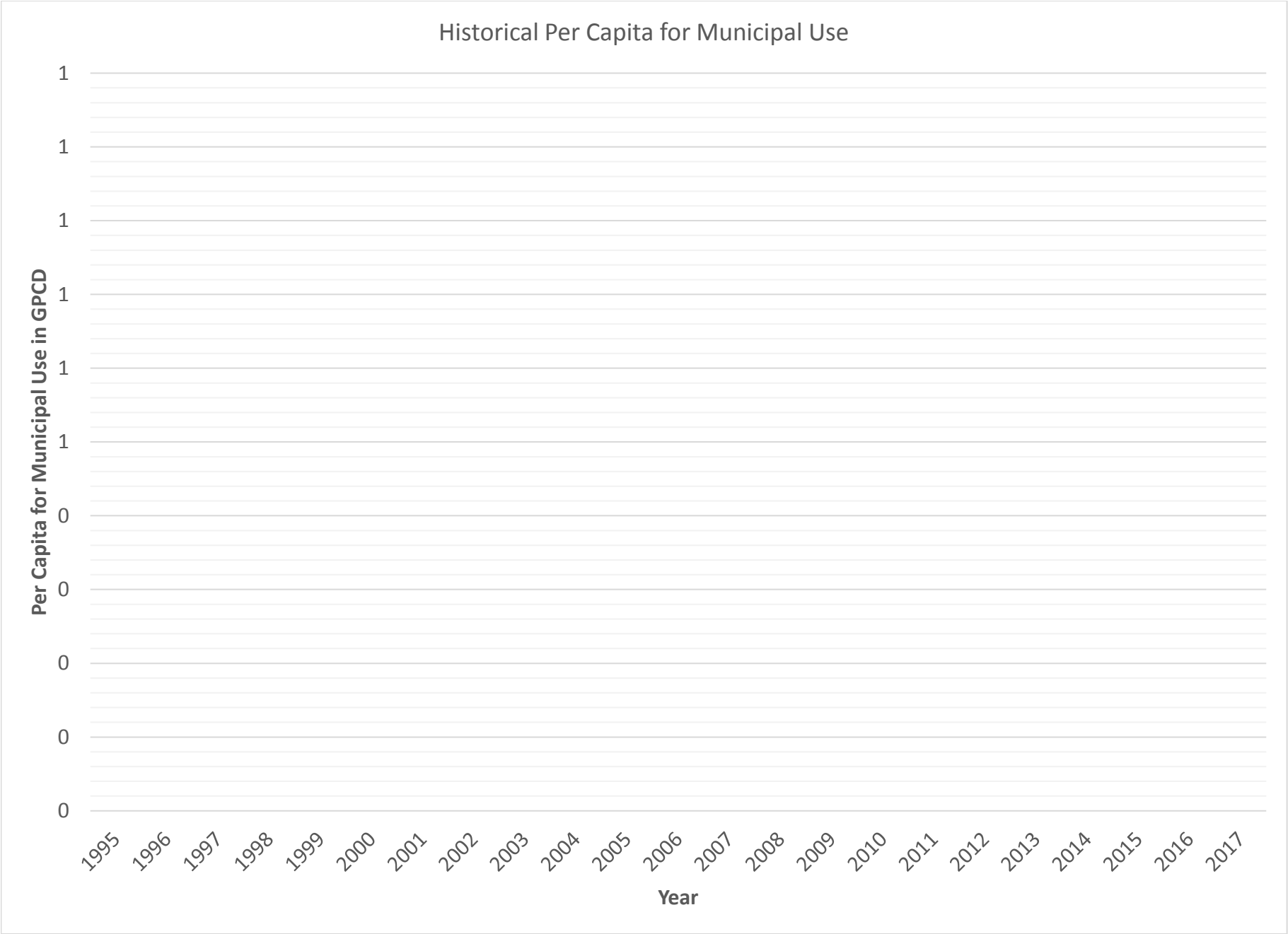
Year	Estimated Population	In-City Municipal Use (MG)	Per Capita Municipal Use (gpcd)	Per Capita Residential Use (gpcd)	Deliveries from NTMWD (MG)	Other Supplies (MG)	Wholesale Sales (MG)	Billed Metered (MG)	Billed Unmetered (MG)	Unbilled Metered (MG)	Unbilled Unmetered (MG)	Water Losses (MG)	% Water Loss
1995	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1996	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1997	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1998	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1999	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2000	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2001	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2002	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2003	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2004	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2005	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2006	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2007	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2008	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2009	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2010	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2011	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2012	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2013	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2014	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2015	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2016	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2017	0	0	0	0	0	0	0	0	0	0	0	0	0.00%

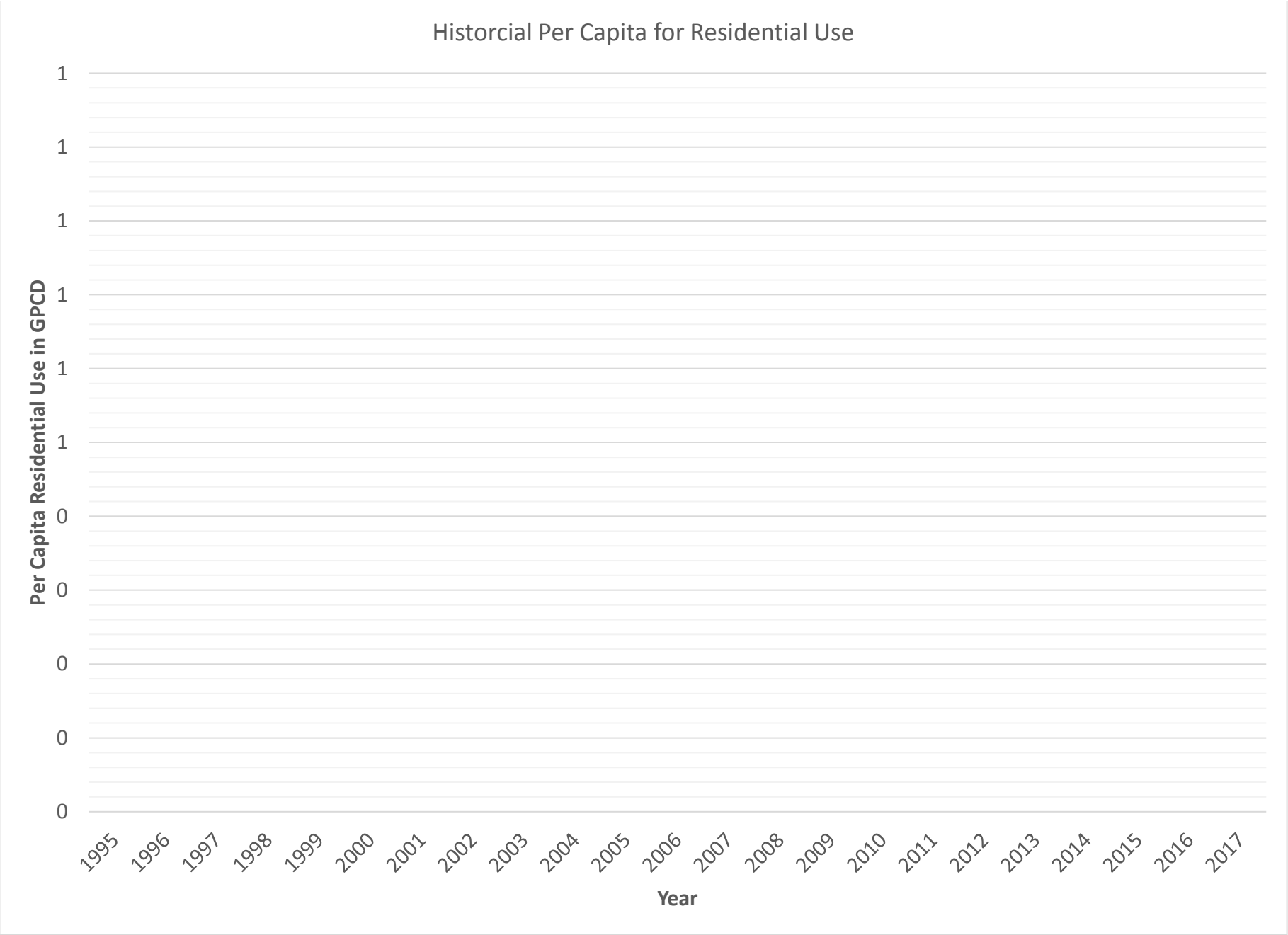
Note:
In-city municipal use = total water supplied less sales to industry, metered irrigation, wholesale sales and other sales.
After 2017 - Unaccounted Water has been removed and replaced with Water Losses (per TWDB definition). This category is inclusive of real and apparent losses. Categories for 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.

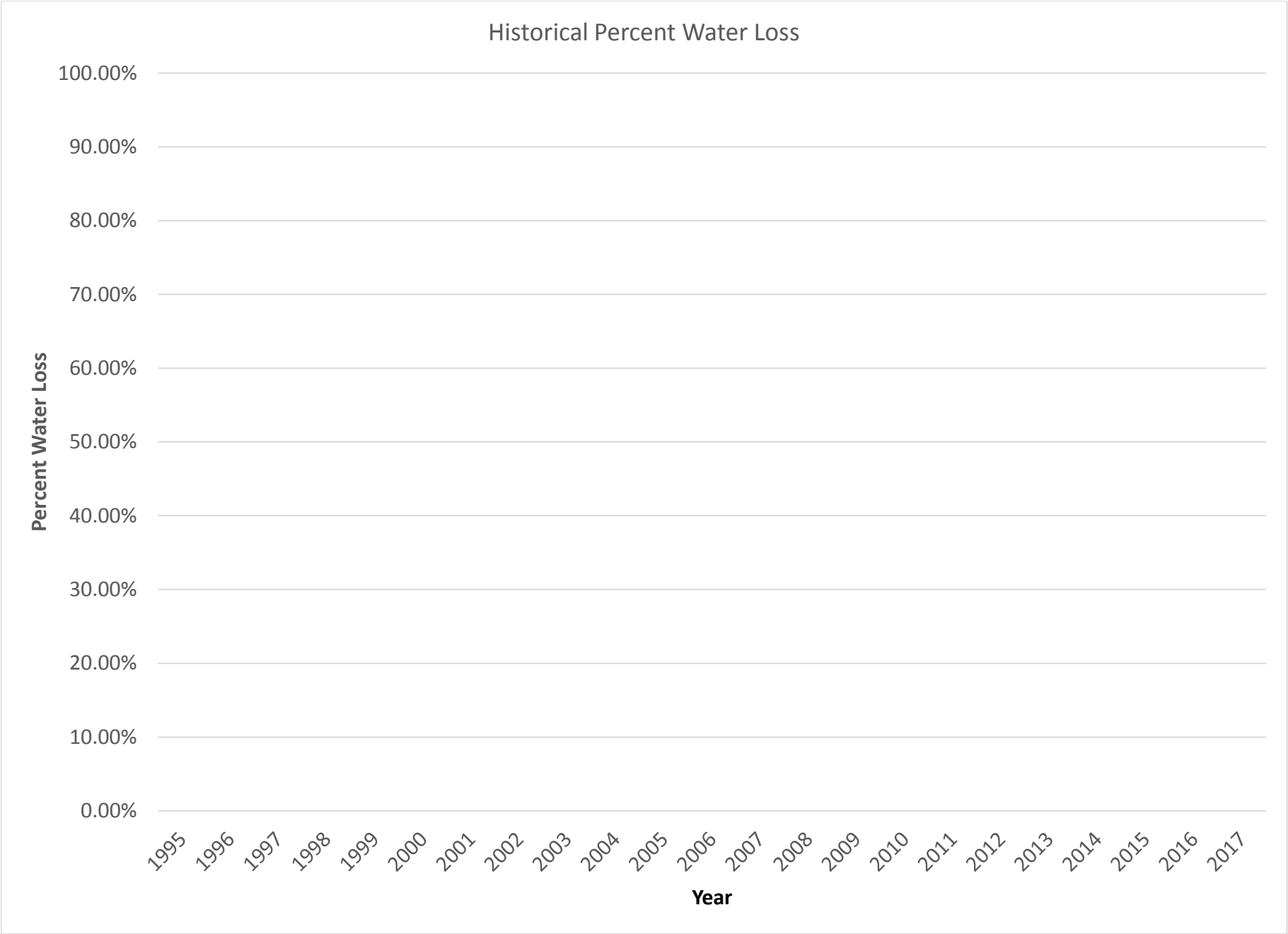

Estimated Historical Population
Estimated Population
1
1
1
1
1
1
0
0
0
0
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year


Historical Water Use
Historical Water Use in Million Gallons
1
1
1
1
1
1
0
0
0
0
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
NTMWD Supplies
Other Supplies


Historical Water Sales by Classification
Historical Water Sales in Million Gallons
1
1
1
1
1
1
0
0
0
0
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year
Residential
Commercial
Public/ Institutional
Industrial
Metered Irrigation
Wholesale
Other


Historical Per Capita for Municipal Use
Per Capita for Municipal Use in GPCD
1
1
1
1
1
1
0
0
0
0
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year


Historcial Per Capita for Residential Use
Per Capita Residential Use in GPCD
1
1
1
1
1
1
0
0
0
0
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year


Historical Percent Water Loss
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Percent Water Loss
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year

APPENDIX F

TCEQ WATER CONSERVATION IMPLEMENTATION REPORT

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Water Availability Division - MC-160, P.O. Box 13087 Austin, Texas 78711-3087
Telephone (512) 239-4691, 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. The most current five-year submittal deadline is **May 1st, 2019**. 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: North Texas Municipal Water District
2. Water Right Permit or Certificate Nos. CA 08-2410, Permit 5003, CA 03-4798, CA 02-4925, Permit 4033 Permit 4044, CA 02-4920, Permit 12151, Permit 12152, Permit 12472.
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

X_____Municipal Water Use by Public Water Supplier

X_____Wholesale Public Water Supplier

X_____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 Y____ 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 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/conserve.html

*Call **512-239-4691** 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, state whether the five and ten-year targets for water savings and water loss were met in your *previous* water conservation plan.
Yes Y____ No_____
If the targets were not met, please provide an explanation.

7. 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 Y_____ No_____

If yes, please identify where in the water conservation plan the updated targets are located (page, section).
Table 5-1 Page 5-5

8. 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.

Expanded discussion in several sections detailing conservation program implementation, including watermyyard.org, awards, education programs and others. Added section discussing ICI customers and on-going ICI study. Requirement for increasing block rates by all customers. Added rebate for commercial clothes washers.

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

Contact Person Title/Position: Water Resource and Public Education Manager

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

Contact Phone Number: (972) 442-5405 Contact Email Address: dhickey@ntmwd.com

Signature: _____ Date: 1/24/2019

APPENDIX G

LETTERS TO REGION C AND REGION D WATER PLANNING GROUPS

NORTH TEXAS MUNICIPAL WATER DISTRICT

Regional. Reliable. Everyday.

January 28, 2019

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

Re: NTMWD Water Conservation and Water Resource and Emergency Management Plans

Dear Mr. Ward:

Enclosed please find a copy of the following documents:

- 2019 Water Conservation Plan for the North Texas Municipal Water District
- 2019 Water Resource and Emergency Management Plan for the North Texas Municipal Water District
- 2019 Model Water Conservation Plan for North Texas Municipal Water District Member Cities and Customers
- 2019 Model Water Resource and Emergency Management Plan for North Texas Municipal Water District Member Cities and Customers

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 North Texas Municipal Water District adopted the plans on January 24, 2019.

Sincerely,

THOMAS W. KULA
Executive Director

TWK/DH/bb

NORTH TEXAS MUNICIPAL WATER DISTRICT

Regional. Reliable. Everyday.

January 25, 2019

Mr. Richard LeTourneau
Chair, Region D Water Planning Group
P.O. Box 12071
Longview, Texas 75607

Re: NTMWD Water Conservation and Water Resource and Emergency Management Plans

Dear Mr. LeTourneau:

Enclosed please find a copy of the following documents:

- 2019 Water Conservation Plan for the North Texas Municipal Water District
- 2019 Water Resource and Emergency Management Plan for the North Texas Municipal Water District
- 2019 Model Water Conservation Plan for North Texas Municipal Water District Member Cities and Customers
- 2019 Model Water Resource and Emergency Management Plan for North Texas Municipal Water District Member Cities and Customers

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 North Texas Municipal Water District adopted the plans on January 24, 2019.

Sincerely,

THOMAS W. KULA
Executive Director

TWK/DH/bb

501 E. Brown Street, P.O. Box 2408, Wylie, Texas 75098-2408 | Phone: 972-442-5405 | Fax: 972-295-6440 | www.ntmwd.com

APPENDIX H

NORTH TEXAS MUNICIPAL WATER DISTRICT BOARD MINUTES SHOWING ADOPTION OF THE WATER CONSERVATION AND WATER RESOURCE AND EMERGENCY MANAGEMENT PLAN

APPENDIX H

NORTH TEXAS MUNICIPAL WATER DISTRICT BOARD MINUTES SHOWING ADOPTION OF THE WATER CONSERVATION AND WATER RESOURCE MANAGEMENT PLAN

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APPENDIX I

TEXAS WATER CODE SECTION 11.039

APPENDIX I

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.