MEETING THE REGION’S THIRST FOR WATER
BOIS D’ARC LAKE

Annual Public Works Round Up
May 21, 2019
R.J. Muraski, Assistant Deputy for Planning/CIP
North Texas Municipal Water District
OVERVIEW

• History and Present Day of NTMWD
• Where We Get Our Water
• Why Bois d’Arc Lake is Needed
• Bois d’Arc Lake and Related Projects Construction
• Questions
HISTORY OF NTMWD

10 Original Member Cities
Farmersville, Forney, Garland, McKinney, Mesquite, Plano, Princeton, Rockwall, Royse City, and Wylie

“We decided we were all in this together. We couldn’t do it separately.”

- 1951 – Created by Texas Legislature to Provide Water Service
- 1956 – Began Providing Treated WATER to Member Cities
- 1970s – Expanded to WASTEWATER Service
- 1973 – Richardson added as Member City
- 1980s – Expanded to SOLID WASTE Service
- 1998 – Allen added as Member City
- 2001 – Frisco added as Member City
REGIONAL PROVIDER: WATER, WASTEWATER, SOLID WASTE

BY THE NUMBERS

<table>
<thead>
<tr>
<th>Service</th>
<th>Communities</th>
<th>Water Pump Stations</th>
<th>Large-Diameter Wastewater Pipelines</th>
<th>Transfer Stations</th>
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<tr>
<td></td>
<td>up to 80</td>
<td>14</td>
<td>250+ miles</td>
<td>up to 3,295 tons of solid waste/day</td>
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<tr>
<td>Serve</td>
<td>up to 80</td>
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<td>up to 80</td>
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<td>75 Daily basis</td>
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<td>15 Emergency basis</td>
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<tr>
<td>Service</td>
<td>area of 2,200 square miles in 10 counties</td>
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<td>Serving 1.7 million people in one of the fastest-growing regions in the country</td>
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DID YOU KNOW?

- 985,000+ tons/year accepted at landfill
- 13 Wastewater Treatment Plants
- 575+ miles Water Transmission Pipelines
- 806+ MGD Capacity Water Treatment Plants (million gallons/day)
- 151+ MGD Wastewater Treatment Capacity (million gallons/day)
**Existing:**
- Lavon Lake
- Lake Texoma
- Lake Tawakoni
- Chapman Lake
- Reuse/Wetland

**In Progress:**
- Bois d’Arc Lake
WATER SUPPLY PLANNING: FUTURE SOURCES

Conservation and Reuse = 21%
New Sources, Reservoirs = 25%

Current Supplies, 22%
Connect Existing Supplies, 32%

Conservation & Reuse, 21%
New Reservoirs, 25%

Chart represents NTMWD supplies in 2060
Source: 2016 Region C Water Plan
ECONOMIC GROWTH
WATER SUPPLY INFRASTRUCTURE IS THE DRIVING FORCE OF COMMUNITY AND BUSINESS VITALITY

NTMWD Total Population Served: Historical and Projected

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<tr>
<td>Population Served</td>
<td>32,000</td>
<td>60,000</td>
<td>200,000</td>
<td>800,000</td>
<td>1,700,000</td>
<td>2,500,000</td>
<td>3,700,000</td>
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Legacy West - Plano

The Star - Frisco

Watters Creek Convention Center – Allen

Craig Ranch - McKinney
Meeting the Water Needs of North Texas 2019-2060

- Existing Supplies
- Main Stem Pump Station
- Bois d'Arc Lake
- Texoma Blend
- Future Supplies
- Demand During Dry Years
- Demand During Normal Years

Average Day Demand and Supply in MGD

<table>
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<tr>
<th>Year</th>
<th>2019</th>
<th>2024</th>
<th>2029</th>
<th>2034</th>
<th>2039</th>
<th>2044</th>
<th>2049</th>
<th>2054</th>
<th>2059/2060</th>
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<tr>
<td>Supply</td>
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<td>Demand</td>
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BOIS D’ARC LAKE

- Decade+ of planning, permitting
- Surface Area: 16,641 acres
- Supply: Firm Yield of 108 MGD
- Average/ Max Depth: 22/70 ft
- Lake Elevation: 534 ft mean sea level
- Owner & operator: NTMWD
- Cost Estimate: $1.6B
- Permitting:
  - TX Water Rights – received June 2015
  - USACE Section 404 – received Feb. 2018
- Construction began May 2018
- Water delivery expected in 2022

First major reservoir to be constructed in Texas in nearly 30 years
PLANNING AND PERMITTING TIMELINE

December 2006
- State Water Rights Permit Application

June 2008
- USACE Section 404 Permit Application

February 2015
- USACE Issues Draft Environmental Impact Statement

June 2015
- State Water Rights Permit Received – Anticipating 404 Permit in Jan 2016

July 2015
- USACE Requires HGM methodology for Mitigation – Delay in expected 404 permit

March 2017
- USACE Issues Revised Draft Environmental Impact Statement

November 2017
- USACE Issues Final Environmental Impact Statement

Feb 2018
- USACE Section 404 Permit Received
BOIS D’ARC LAKE PROGRAM COMPONENTS

Major Components include several projects; projects were separated by type of work/infrastructure:

- **CMAR 1** – Dam and Reservoir Clearing/Terminal Storage Reservoir
- **Program Component 2** – Full Service Provider Mitigation Project
- **CMAR 3** – Leonard Water Treatment Plant and Pump Stations
- **CMAR 4** – Roads and Bridges
- **CMAR 5** – Raw Water and Treated Water pipelines
Bois d’Arc Lake: Key Components & Related Infrastructure

1. Dam and intake structure for reservoir
2. 35-mile raw water pipeline
3. $50 million road projects
4. Mitigation area (over 17,000 acres)
5. New water treatment plant, pump station, terminal storage reservoir
6. 25-mile treated water pipeline
CMAR 1 – DAM & TERMINAL STORAGE RESERVOIR (TSR)

Goal:
By December 2020:
  - Begin impounding water
  - Complete terminal storage reservoir at Leonard WTP

Scope:
  • Dam and Clearing
  • Intake Tower
  • 210 MG (420 MG ultimate) terminal storage reservoir
  • Bonham Dam Improvements
CMAR 1 PROGRESS PHOTOS

Intake Tower

Raw Water Pump Station

Service Spillway
CMAR 1 LOOKING WEST

2-mile long, 90-ft tall dam, Clearing of Dam footprint 100%

Intake Tower

Raw Water Pump Station

Service Spillway
CMAR 1 SERVICE SPILLWAY/CHUTE/STILLING BASIN/RWPS
CMAR 1 RAW WATER INTAKE PIPES LOOKING NORTH TO RWPS

Intake Tower 110'

Raw Water Pump Station
BOIS D’ARC LAKE DAM AND RESERVOIR

Raw Water Intake Structure

Pouring walls for the Intake Structure

Intake Structure looking toward the Raw Water Pump Station
CMAR 1 EMBANKMENT CROSSSECTION

- Zone 1 Material (Fat Clay, Impervious Core)
- Zone 2 Material (Loamer Clay, Cohesive Random)
- Zone 3 Material (Sandy Clay, Low Plasticity Random)
- Zone 4 Material (Mixed Clay, Random Fill)
- Zone 5 Material (Sand, Sand Filter)
- Zone 6 Material (Gravel, Gravel Drain)
- Zone 7 Material (Sandy Clay, Cohesionless Random)

Lake Side

TYPICAL EMBANKMENT SECTION
STA. 54+00 TO STA. 107+60
1" = 20' (EXCEPT FROM STA. 105+35 TO STA. 105+65)
**Goal:**
Replace trees, wetlands, streams, and wildlife habitat inundated by the reservoir

**Scope:**
- Conversion of Riverby Ranch to a mitigation area
- Turn-key approach – Full Service Provider (FSP)
- Current mitigation plan added;
  - Wetlands Reserve Property (WRP) to Riverby area – additional tree planting
  - Upstream Mitigation Area – tree planting in flood plain of Bois d’ Arc Creek
ENVIRONMENTAL IMPROVEMENTS

- Environmental mitigation on more than 17,000 acres in two locations
  - Largest permittee-responsible ecological mitigation project in nation
  - Over 8,500 acres of wetland restoration and enhancement
  - Planting approx. 5 million trees
  - Restoring or enhancing over 3,200 acres of native grasslands; 2,600 acres of forests
  - Improving over 70 miles of local streams
Mitigation

Crews planting trees
Approx. 1.67 million planted

Shumard Oak, Water Oak, Willow Oak, Pecan, Sugarberry, American Elm
Mitigation

Crews planting buttonbush

Stream restoration work
Goal:
Complete and operational by First Quarter of 2022

Scope:
- Raw Water Pump Station (RWPS) at the dam (90 MGD – 236 MGD ultimate)
- 70 MGD Leonard Water Treatment Plant (LWTP) (280 MGD ultimate)
- High Service Pump Station (HSPS) at WTP site (90 MGD – 330 MGD ultimate)
Leonard Water Treatment Plant – Site Map

Terminal Storage Reservoir
Phase 1 & 2 (2022)
210 MG

Terminal Storage Reservoir
Phase 3 & 4 (2029)
Add’l. 210 MG

WTP
Phase 1 (2021) – 70 MGD
Phase 2 (2026) – 140 MGD

WTP
Phase 3 (2030) – 210 MGD
Phase 4 (2034) – 280 MGD
BOIS D’ARC LAKE RELATED PROJECT

Leonard Water Treatment Plant

Looking north at plant site
Looking northeast at plant site
BOIS D’ARC LAKE RELATED PROJECT

Leonard Water Treatment Plant

Working on reinforcing steel for pipe encasement for Chlorine Contact Basin

Clearwell excavation
CMAR 4 – ROADS IMPROVEMENTS & BOAT RAMPS

Goal:
Before impoundment, complete the following
  – FM 897 Improvements
  – Fannin County Road improvements
  – Boat ramps

Scope:
• FM 897
  – 5.1 miles of new 2-lane FM roadway
  – 1.5 miles of new 2-lane bridge
  – ROW generally 120’ wide; varies to 275’ in some locations
• County roads
  – Improvements at 9 locations
  – Bridge, culvert, and roadway embankment (3.8 miles)
  – Bridge/culvert demolition at 5 additional locations
BOIS D’ARC LAKE

Cleared and Obstructed areas

Legend:
- Shoreline
- Clear Area
- Obstructed Area

FM 987 Bridge
CMAR 4 PROGRESS PHOTOS

- FM 897 south abutment looking north to Bois d’Arc Creek
- Cleared reservoir on the right
FM 897 BRIDGE

Pouring Columns and Bent Caps
August 2018

First Set of Beams Placed
September 2018

1.3 mile long bridge
240 concrete columns when complete
Each beam=115 ft long, weighs 101,000 lbs
CMAR 5 – RAW AND TREATED WATER PIPELINES

Goal:
Complete by early 2021

Scope:
Approximately 35 miles of 90-in raw water pipeline (RWPL) and
~25 miles of 84-in treated water pipeline (TWPL)

Status
• Design separated in five segments (A to E) of ~ 12-13 mi each
  – RWPL – 3 segments  100% Design completed. Procurement started on materials
  – TWPL – 2 segments @ 60% Design completed

• Coordination between CMAR and 5 design teams:
  Design standards, standard details, system surge and hydraulic analysis, survey/property
documents, corrosion protection design, and fiber optic design
BOIS D’ARC LAKE DAM AND RESERVOIR

Raw Water Pipe

90-inch pipe

Pipe near the dam site
BOIS D’ARC LAKE DAM AND RESERVOIR

Raw Water Pipe

Pipe installation at the dam site

21 tunnels and crossings need to be done
Raw water and Treated water pipelines – Site Map

21 Tunnels ~ ½ mile

84" Leonard to McKinney TWPL
134,983 LF; 25.5 mi.

90" Raw Water Pipeline
185,875 LF; 35 mi.
PARTNERING WITH FANNIN COUNTY

Goal: Involve and Assist our County Partner

LBCR Zoning Initiative
  – Protect water quality adjacent to the reservoir

Local Business & Contractor Outreach
  – NTMWD hosted programs on 7/20 & 8/29 in Fannin County
  – Approximately 180 businesses attended
  – Focused on educating local businesses:
    50 contractors in Fannin Co and surrounding area hired.
    ~ $50M
PARTNERING WITH FANNIN COUNTY

Goal: Involve and Assist our County Partner

TPWD Fish Habitat Enhancement
- Construct brush piles
- TPWD provides nursery stock (ShareLunker Program)

Fannin County Road & Bridges
- Upgrade bridges to minimum TXDOT standards
- Reestablish roadway network
PARTNERING WITH FANNIN COUNTY

Goal: Involve and Assist our County Partner

Fannin County Electric Supply

- Close coordination to maintain power network
- Improve high voltage transmission power service
- Two Electrical substations
BOIS D’ARC LAKE BENEFITS

• Supply water to the District’s members/customers including Bonham
  • Possibility to serve other Fannin County communities

• Major recreation amenity
  • 3 Public Boat Ramps
  • TPWD Establishing Fisheries

• Supports economic growth
  • $509 million economic activity in Fannin Co. during construction
  • $166 million annually economic activity after completion
Bois d’Arc Lake Project

PROJECT OVERVIEW

The Bois d’Arc Lake project in Fannin County will be a critical new source of water for residents and businesses in all the north Texas communities served by the District.

The project is needed to meet the growing water demands of the region including Fannin County. The new source of water is part of a comprehensive long-range strategy NTMWD has developed to meet the region's needs for several decades. The approach includes a continued commitment to water conservation and reuse, using and leveraging existing water supplies and sources, and building new sources of supplies.

Learn more about the Bois d’Arc Lake program business opportunities.

This will be the first new reservoir constructed in Texas in nearly three decades. NTMWD began permitting required for the project in 2003. The final permit was approved by the U.S. Army Corps of Engineers on Feb. 2, 2018, and ground was broken May 25 of the same year with anticipated water delivery in 2022.

The project will pipe water from the new lake 35 miles to a new water treatment plant to be constructed in Leonard.

Major components:

1. Reservoir dam and intake
2. Raw water pipeline
3. Roadway improvements and bridge
4. Environmental mitigation area

Other projects:

1. Water treatment plant (initial capacity of 70 MGD – million gallons per day)
2. 25-mile treated water pipeline

RELATED LINKS

- Bois d’Arc Lake Fact Sheet
- Bois d’Arc Lake Project Cost
- Our Water System
- Planning for the Future
- Projects
- Bois d’Arc Lake Business Opportunities
- Final Environmental Impact Statement
- Fannin County Comprehensive Plan for Bois d’Arc Lake, Part I (Split to Reduce Load Time)
- Fannin County Comprehensive Plan for Bois d’Arc Lake, Part II (Split to Reduce Load Time)
- Fannin County Bols d’Arc Lake Zoning Regulations
- Fannin County Amended Bols d’Arc Lake Future Land Use Plan
- Fannin County Bois d’Arc Lake Zoning Map

SCHEDULE
BOIS D’ARC LAKE
WEATHER RISKS ARE REAL!

Sep 24, 2018 7:38:08 AM
33.70752N 95.96509W
Honey Grove
QUESTIONS? FOLLOW US @NTMWD

Newsletter Signup

Email

First Name

Last Name

- News Stream
- Project Pipeline

Sign Up

www.BoisdArcLake.org