



Regional Service Through Unity... Meeting our Region's Needs Today and Tomorrow



## BOIS D'ARC LAKE

**Sulphur River Basin Authority**

**February 15, 2022**

**Billy George, Deputy Director - Water/Wastewater**

**R.J. Muraski, Assistant Deputy for Planning/CIP**

**North Texas Municipal Water District**





## BOIS D'ARC LAKE

### Agenda

- Who we are
- Existing and Planned Supplies
- Permitting
- Program Components
- Construction
- Cooperation with Fannin County





## REGIONAL PROVIDER: WATER, WASTEWATER, SOLID WASTE



NORTH  
TEXAS  
MUNICIPAL  
WATER  
DISTRICT

### BY THE NUMBERS

### DID YOU KNOW?



**18**  
MAJOR RAW & TREATED  
WATER PUMP STATIONS

**6**  
WATER TREATMENT PLANTS  
876 MGD Capacity  
(million gallons/day)

**610+**  
MILES  
WATER TRANSMISSION  
PIPELINES

**226+**  
MILES  
LARGE-DIAMETER  
WASTEWATER PIPELINES

**13**  
WASTEWATER  
TREATMENT PLANTS

**163+**  
MGD  
WASTEWATER TREATMENT  
CAPACITY  
MGD (million gallons/day)

**3** TRANSFER STATIONS  
up to 3,295 tons  
of solid waste/day

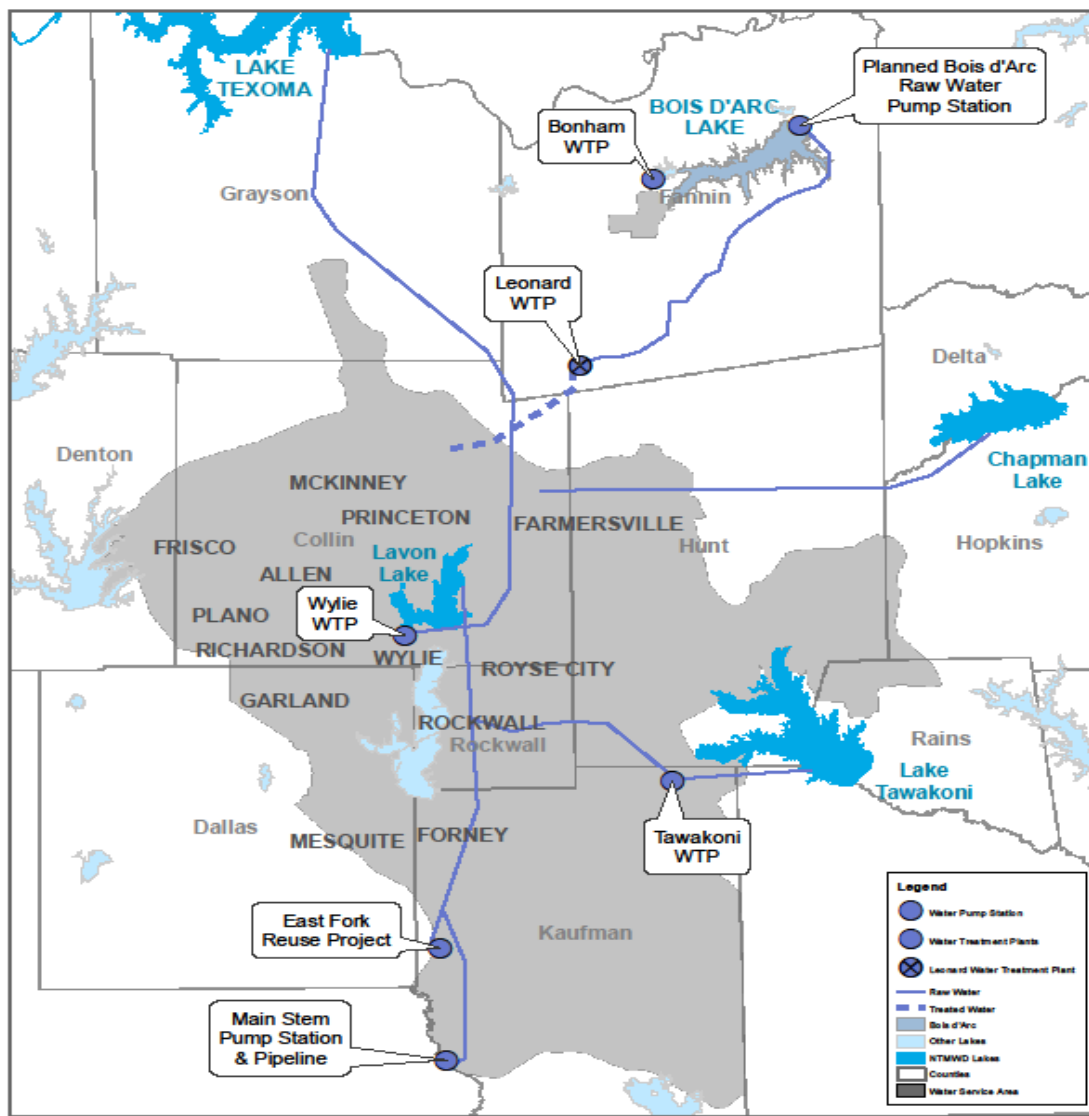
around  
**1 million**  
tons/year  
accepted  
at landfill

Rev. Feb. 2021





## EXISTING & PLANNED RAW WATER SUPPLIES



### Existing:

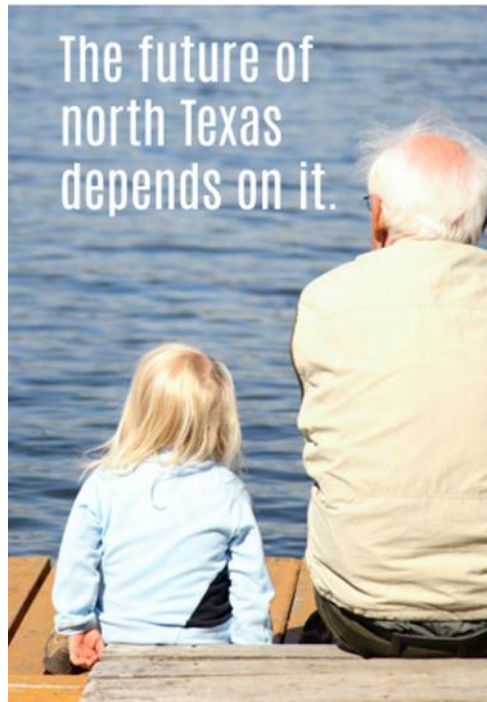
- Lavon Lake
- Lake Texoma
- Lake Tawakoni
- Chapman Lake
- Reuse/Wetland

### In Progress:

- Bois d'Arc Lake



## 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 –  
Anticipated 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

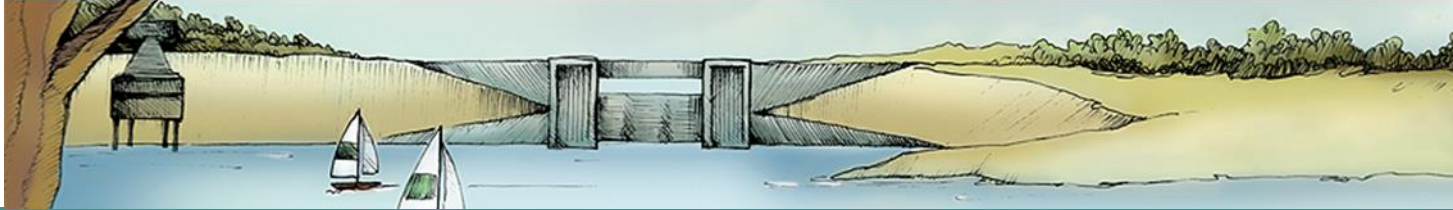
**November 2017**

USACE Issues  
Final  
Environmental  
Impact  
Statement

**Feb 2018**

**USACE  
Section  
404  
Permit  
Received**





## BOIS D'ARC LAKE

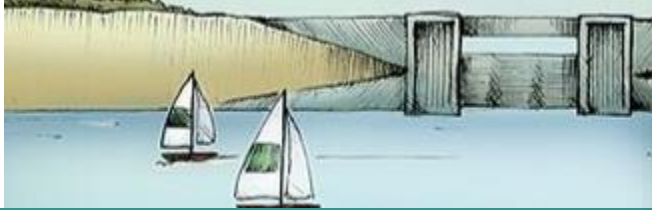
- Decade+ of planning, permitting
- Surface Area: 16,641 acres
- Supply: Firm Yield of 82 MGD
- Average/Max Depth: 22/70 ft
- Lake Elevation: 534 ft mean sea level (MSL)
- Owner & operator: NTMWD
- Cost Estimate: \$1.6B
- Construction began May 2018
- Impoundment began April 14, 2021
- Water delivery expected in 2022
- [BoisdArcLake.org](http://BoisdArcLake.org)



BOIS  
D'ARC  
LAKE

*First major reservoir to be constructed in Texas in nearly 30 years*





## BOIS D'ARC LAKE

### Bois d'Arc Lake

- In State Water Plan since 1990
  - (originally New Bonham Lake)
- Decade + of planning, permitting
- Surface Area: 16,641 acres
- Supply: Firm Yield of 82 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

# EVERYTHING'S BIGGER IN NORTH TEXAS, INCLUDING BOIS D'ARC LAKE

There's nothing small about Bois d'Arc Lake, which is the first major water reservoir in Texas in 30 years. When completed, the lake will ensure a reliable water supply for today and tomorrow, a big ongoing boost to the local economy and big-time recreation for the entire region. Construction of this vital infrastructure is a huge undertaking and investment.

**5.2M**

CUBIC YARDS OF  
EARTH EXCAVATED  
AND MOVED TO BUILD  
THE DAM

**90**

FOOT-TALL,  
TWO-MILE-  
LONG DAM



**1.3**

MILE-LONG BRIDGE  
AND IMPROVEMENTS  
ON OVER 11 MILES OF  
ROADWAY

**60**

MILES OF PIPELINE  
TO PROVIDE DRINKING  
WATER TO NORTH TEXAS

BOIS D'ARC LAKE

**110**

FOOT-TALL INTAKE  
TOWER TO CAPTURE  
WATER FROM LAKE



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LAKE

The 26-square-mile Bois d'Arc Lake starts delivering drinking water to 80 North Texas communities in 2022. Visit [BoisdArcLake.org](https://BoisdArcLake.org) for more information.

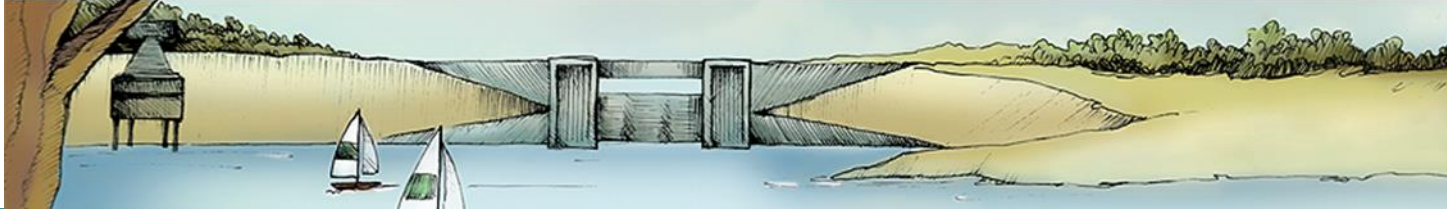


# BOIS D'ARC LAKE: KEY COMPONENTS

1. Dam, Intake, Terminal Storage Reservoir – ARCHER WESTERN
2. Environmental Mitigation (17,000+ acres) – RES
3. Raw Water Pump Station, Water Treatment Plant – GARNEY
4. FM 897, County Roads, Boat Ramps, Lake Office – AUSTIN BRIDGE & ROAD
5. Pipelines – GARNEY
  - 35-mile 90-inch raw water
  - 25-mile 84-inch treated water







## LAKE/DAM

- Lake:

- 16,641-acre lake
- Storage capacity: 367,609 acre-feet
- Average/Max Depth: 22/70 ft.

- Dam:

- 90 foot tall; 2 mile long zoned earthen embankment dam.
- Labyrinth weir spillway and spillway channel work ongoing.

- Intake Tower:

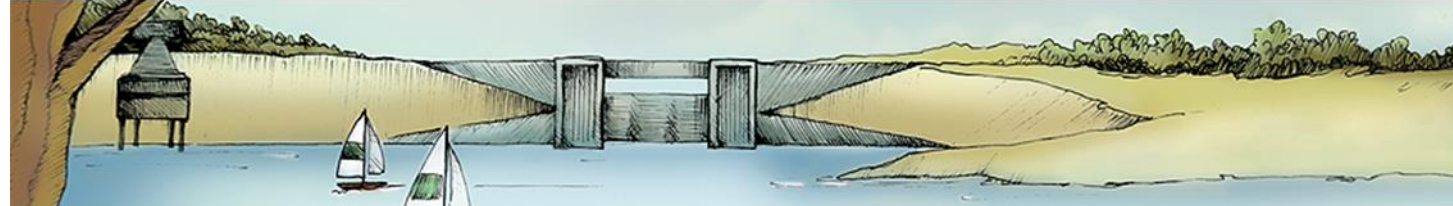
- 110' tall Intake structure near completion.







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## CONSTRUCTION PROGRESS PHOTOS



**CMAR 1 – Archer Western – Intake tower signage installed.**



**CMAR 1 – Archer Western – Grading around the flow meter vault.**



**CMAR 1 – Archer Western – West entrance of the dam.**

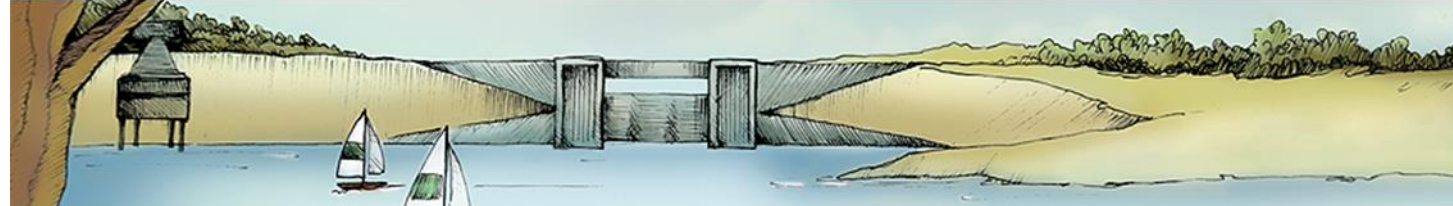


**CMAR 1 – Archer Western – Service spillway grading on each side.**





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**CMAR 1 – Archer Western – Dam site overview.**



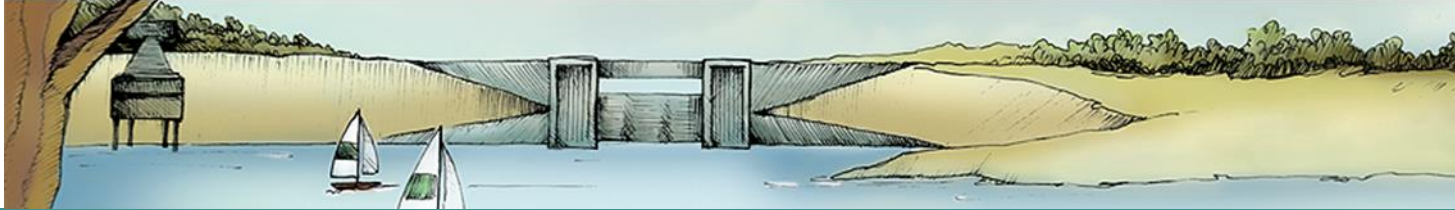
**CMAR 1 – Archer Western – Service spillway stilling basin.**



**CMAR 1 – Archer Western – Fence installation along west end of dam.**



**CMAR 1 – Archer Western – Embankment vegetation and drainage channels.**

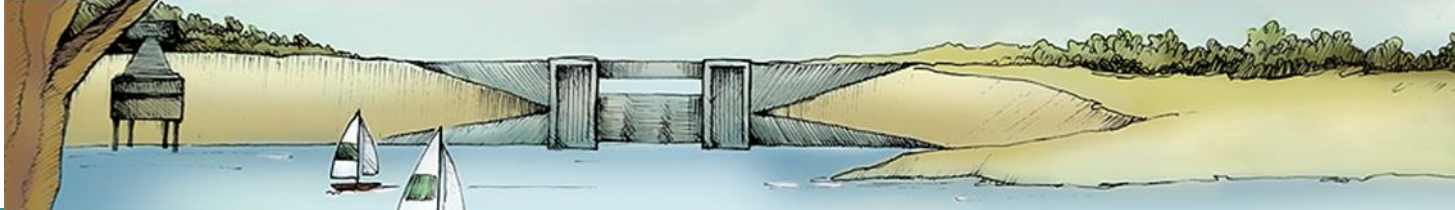


## FM 897 AND COUNTY ROADS

- FM 897
  - 6 miles of roadway; 1.3-miles of bridge
  - 60 spans; 115 ft spans
- Constructed by NTMWD, turned over to TxDOT





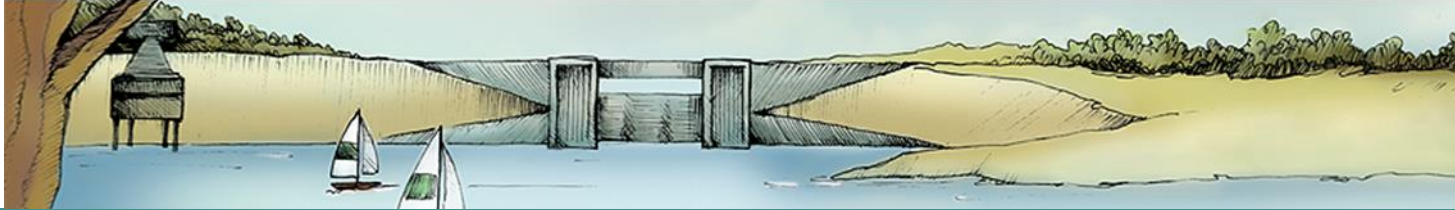


## RAW WATER PIPELINE/ TERMINAL STORAGE RESERVOIR

- Raw Water Pipeline:
  - 35 miles of 90" pipe from the Raw Water Pump Station to Leonard, TX.
  - Poly coated steel pipe – mortar lined.
  - Broken into 3 segments with 3 different designers.
  - 21 total tunnels; 2,752 LF
- Terminal Storage Reservoir:
  - 210 MG terminal storage reservoir located north of the water treatment plant in Leonard, TX.
  - Second cell to be constructed in phase 2 to bring total storage capacity to 420 MG.







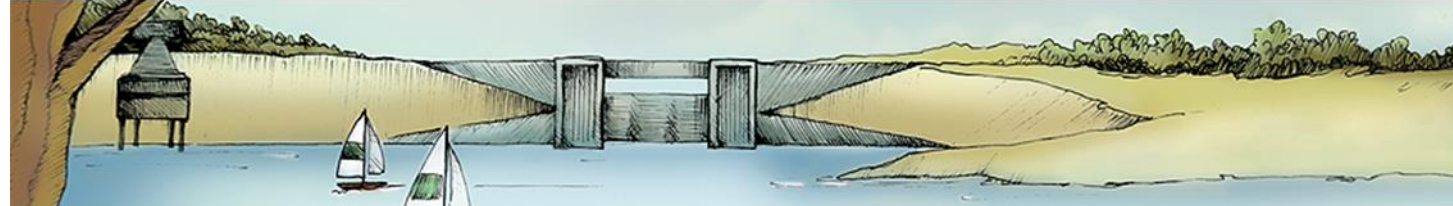
# LEONARD WATER TREATMENT PLANT







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**CMAR 3 – Garney – LWTP maintenance building and warehouse.**



**CMAR 3 – Garney – LWTP filters.**

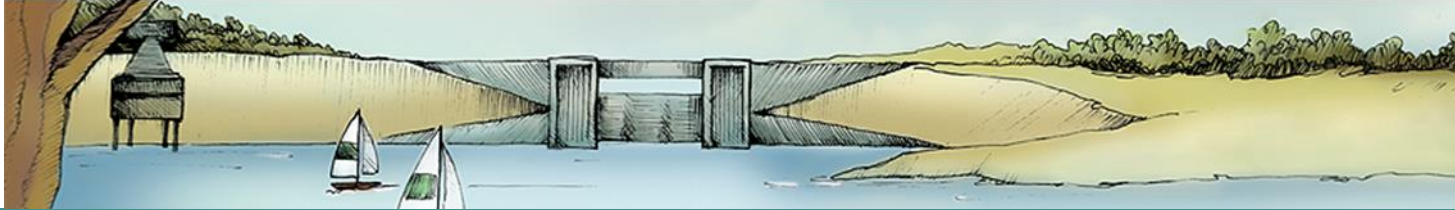


**CMAR 3 – Garney – LWTP gravity thickeners.**



**CMAR 3 – Garney – LWTP ozone facility.**





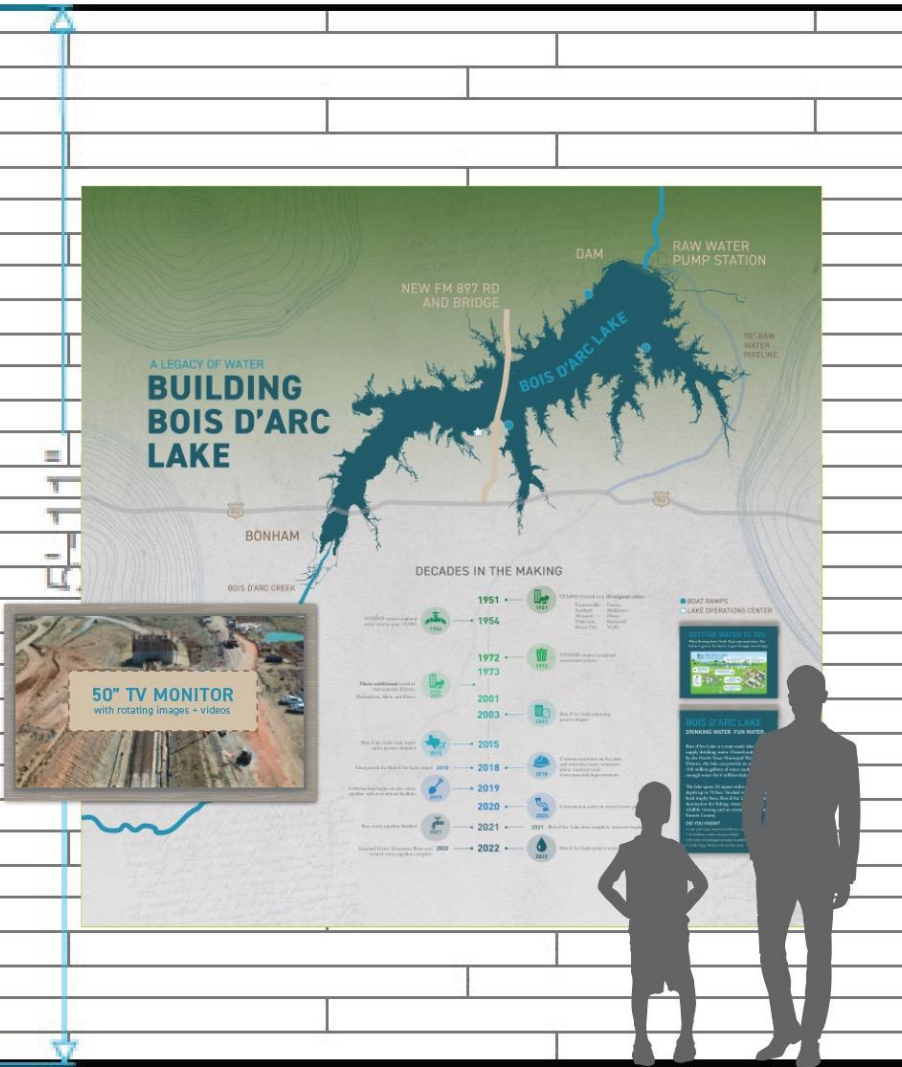
## LAKE FACILITIES

- Lake Facilities
  - Lake Operations Center
    - Shoreline Management Processes
    - Operations Offices
    - Public Areas
  - Dam Maintenance Facilities
  - Private Boat Ramp and Bunkhouse
  - 3 Public Boat Ramps
    - 150 parking spots between all three
    - Pavillions
    - Rest rooms





# BOIS D'ARC LAKE CONSTRUCTION



## CADDO NATION

**CADDO INDIANS**

The Caddo Indians (pronounced Cad-Oh) are aboriginal to Oklahoma, Texas, Northern Mexico, Louisiana, Arkansas, Missouri, and Kansas. The name Caddo comes from the native word Kadohadacho, which means "real chiefs." The Caddo people developed a successful farming economy growing corn, beans, squash and other crops. Their homes resembled beehives and were made of grass over a framework of poles. The Caddo Indians were renowned for their exceptional pottery and bow making.

Prior to the construction of Bois d'Arc Lake, Fannin County was considered to be the marginal western-extent of Caddo habitation. Archeological investigations done prior to the reservoir's construction uncovered numerous prehistoric Caddo sites, extending the region further west along Bois d'Arc Creek, including where the lake now resides. Among those, 6 sites were determined eligible for the National Register of Historic Places and State Antiquities Landmarks given their historic significance. More than 500,000 artifacts were uncovered and preserved during these excavations – including ceramics, stone tools, plant seeds, and charcoal – and have provided new insights into the life of prehistoric Caddo in Northeast Texas.

## SAVING WATER

Water is a precious, finite resource. Every drop counts. North Texas is among the fastest growing U.S. regions. Reducing the amount of water we use and increasing efficiency helps stretch limited supplies. The District is counting on water savings of up to 25% to meet our needs.

*"All the water that will ever be is, right now."*  
– National Geographic

The more people know, the less water they use. The District partners with the communities it serves and other water providers to educate the public on many ways to conserve water.

**DID YOU KNOW?**

- Water regulates the earth's temperature
- Human bodies are mostly made of water

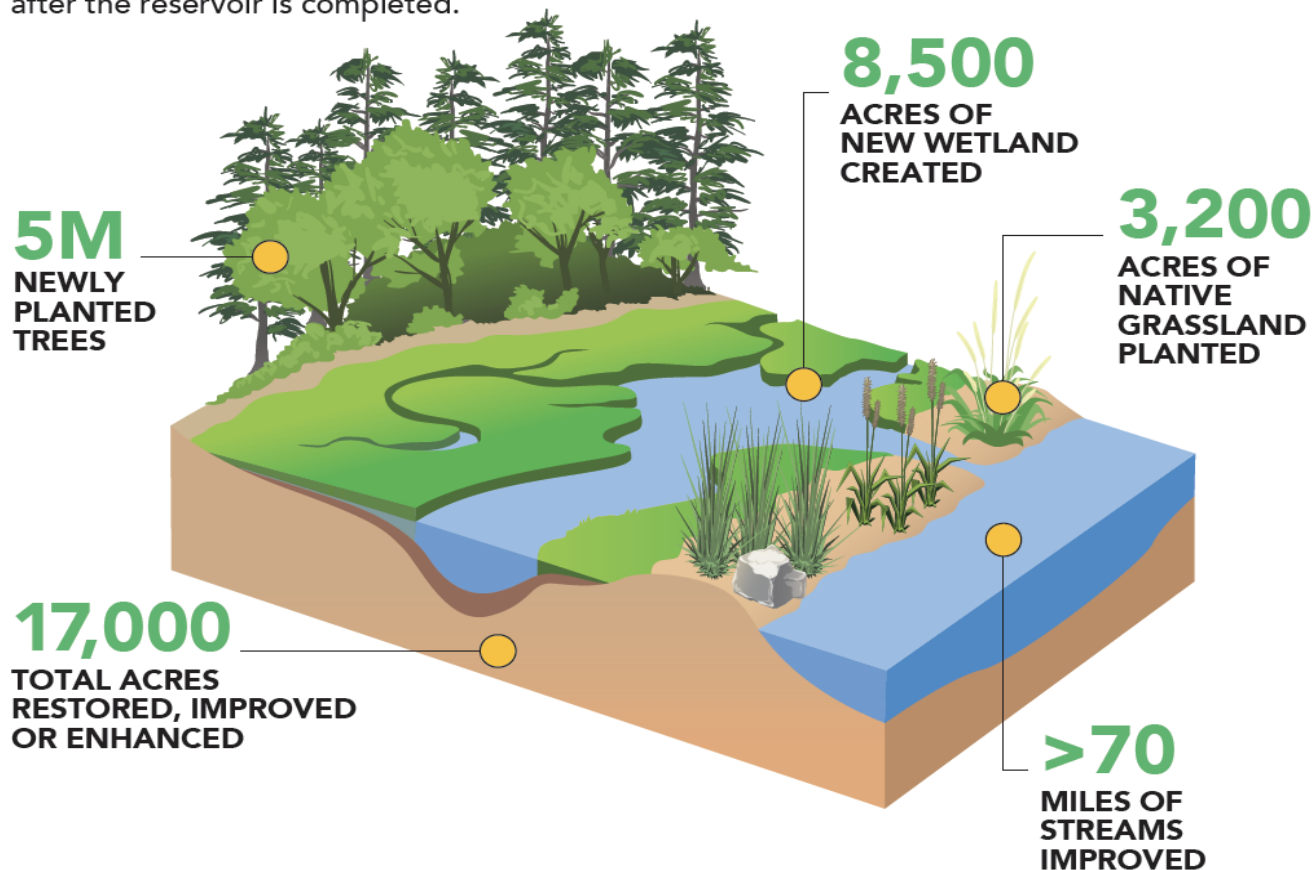


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## MITIGATION FOR BOIS D'ARC LAKE

# LOOK BEYOND BOIS D'ARC LAKE AND YOU'LL FIND A FOREST.

In addition to building the first lake in North Texas in nearly 30 years, North Texas Municipal Water District is following through on our commitment to honor and restore the environment after the reservoir is completed.



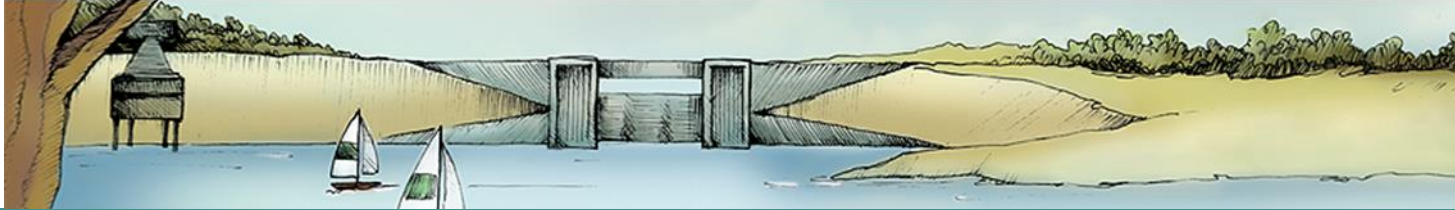
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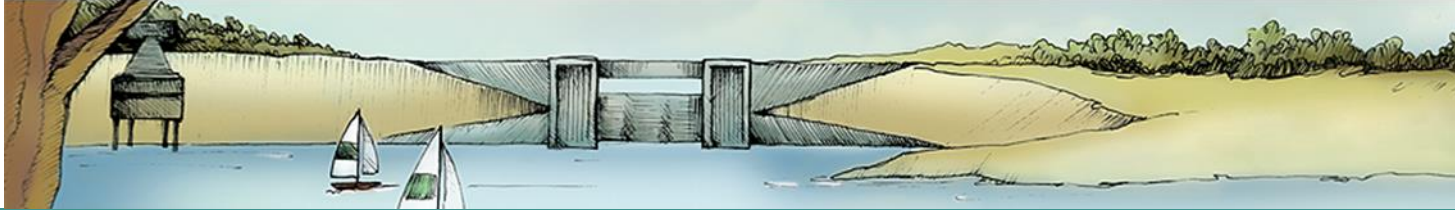


## MITIGATION PROJECT

- Working to construct/enhance over 17,000 acres of forested wetlands, riparian zones, upland forests, emergent wetlands and grasslands.
- Riverby Ranch - 15,000 Acres of Terrestrial and Aquatic Habitat; 4,127 Acres – Forested Wetlands; 306,547 LF Streams
- Upper Mitigation - 1,900 acres of riverine bottomlands; 1,674 acres of forested wetlands; 62,535 feet of streams
- Littoral Wetland and Grasslands - Additional wetland grassland mitigation acreage
- Mitigation Full Service Provider - Resource Environmental Solutions (RES) - started work in late summer 2018. Major work continues through 2022 with monitoring/management through completion in 15-20



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## BOIS D'ARC LAKE MITIGATION



5 million trees planted

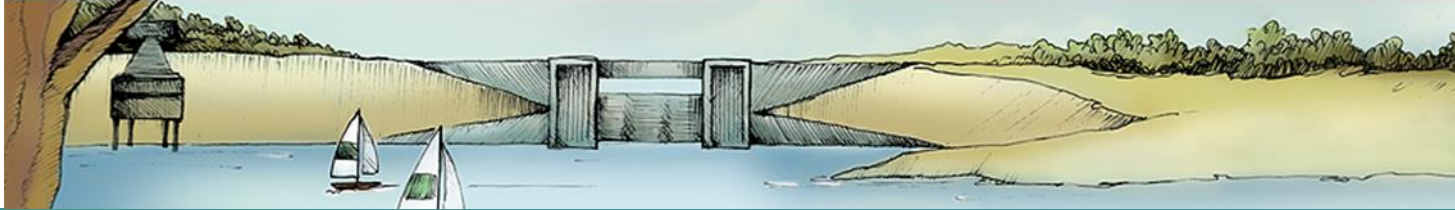


Restoring/Enhancing  
8,500 acres of wetlands





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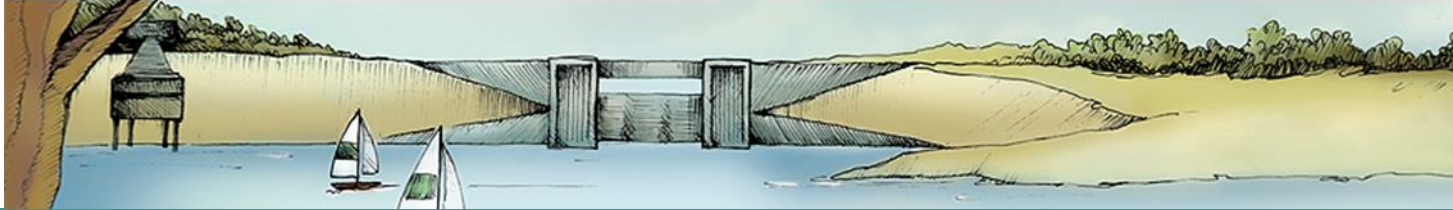
## BOIS D'ARC LAKE MITIGATION

### Mitigation – Stream Restoration





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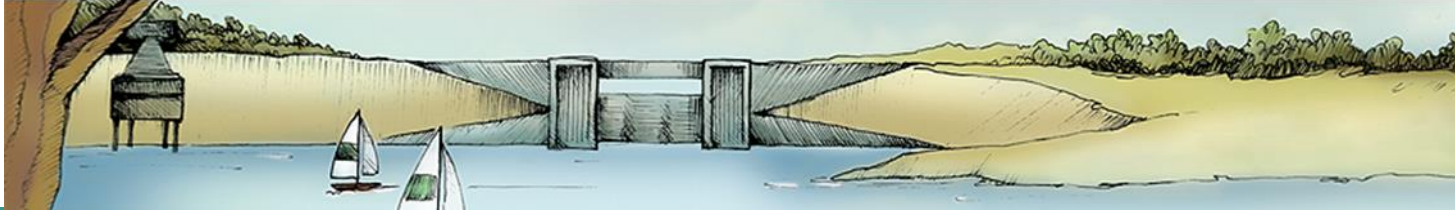
BOIS  
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## BOIS D'ARC LAKE MITIGATION

### Mitigation – Burrowing Owl & Bald Eagle @ Riverby Ranch







## COOPERATING WITH FANNIN COUNTY COMMUNITIES

### PARTNERING WITH LOCAL COMMUNITIES

- Working closely with leaders in Fannin County
- Project can serve local long-term water needs
- Support for zoning plans to guide development around lake: protect water quality
- Treating property owners fairly
- County road improvements
- Developed a Shoreline Management Plan
- Smart development protects water quality





## INTER-AGENCY AGREEMENTS OVERVIEW

### Current Agreements Exist Between NTMWD and:

- **Fannin County**
- **Fannin County Water Supply Agency (Memorandum of Agreement)**
- **National Wildlife Federation & Sierra Club**
- **City of Bonham**
- **Fannin County Sheriff**
- **Texas Parks & Wildlife Department**
- **City of Leonard**





## FANNIN COUNTY AGREEMENT

- **Significant Items Included in Agreement:**
  - Construct new FM 897 over lake
  - Construct 3 recreation areas
  - Consider access to Red River on at Riverby Ranch
  - Lake office to include: Emergency Command Center, Nature Center, Living Quarters (be equipped for education and emergency purposes)
  - NTMWD fund upgrades to wastewater treatment plants made necessary due to LBCR
  - Enter into water supply contracts for Fannin County entities



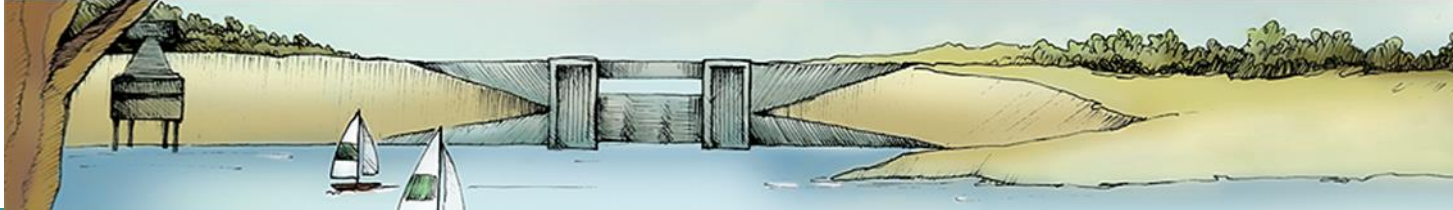
## FANNIN COUNTY AGREEMENT

- **Other Significant Items Included in Agreement (cont'd):**
  - Fannin County provide “full support”
  - Lease-back to owners properties acquired
  - No loss of tax revenue
  - Fannin Co. adopt zoning regulations around lake
  - NTMWD fund onsite sewage inspections for 3 years
  - NTMWD fund equipment necessary for policing LBCR



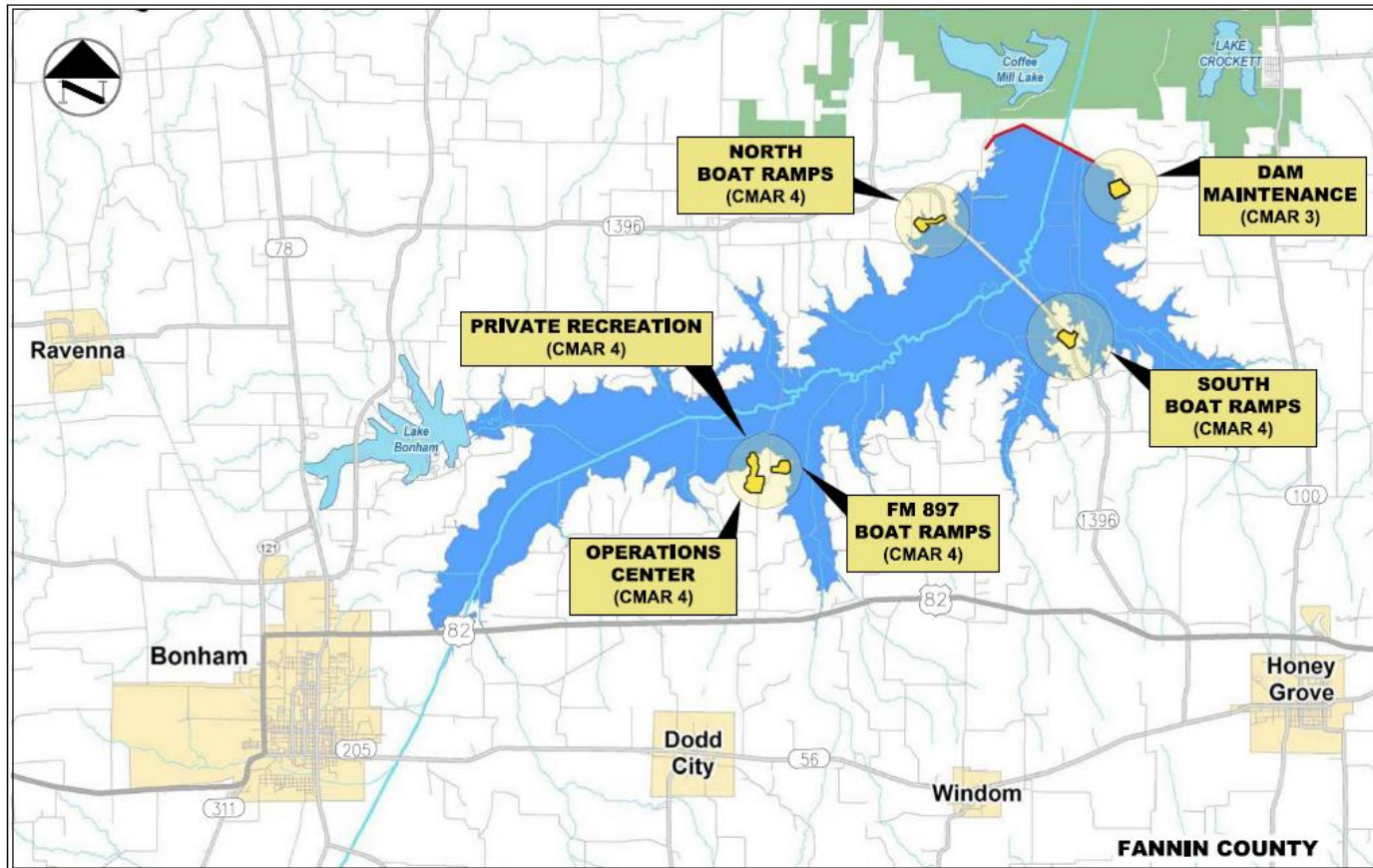


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# DAM MAINTENANCE, OPERATIONS CENTER, 3 PUBLIC BOAT RAMPS, PICNIC AREAS, AND RESTROOM FACILITIES



CMAR DESCRIPTION OF WORK:  
1. CMAR 4 WILL BE RESPONSIBLE FOR THE FOLLOWING SITES: OPERATIONS CENTER, PRIVATE RECREATION, FM 897 BOAT RAMPS, SOUTH BOAT RAMPS, AND NORTH BOAT RAMPS.  
2. CMAR 3 WILL BE RESPONSIBLE FOR THE DAM MAINTENANCE FACILITY.

(NOT TO SCALE)



05-02-19

THE SEAL, AFFIXED TO THE  
DRAWING, HAS AUTHORITY TO  
VARY IN JARAMEL'S P.E.  
LICENSE ON 05/02/2019  
EXPIRATION OF A THREE-  
MONTH PERIOD WITHOUT  
NOTIFICATION TO THE  
BOARDS OF ENGINEERS AND  
SURVEYORS UNDER THE BOARD  
CONSUMER PROTECTION ACT



Pacheco Koch  
12587 PACHICO KOCH, P.E.  
DALLAS, TX 75201-4775 (214) 303-  
1010 FAX (214) 303-1010  
PACHICO KOCH, P.E. HAS  
NOTES, ADVISING THAT HE IS A  
CONSULTANT



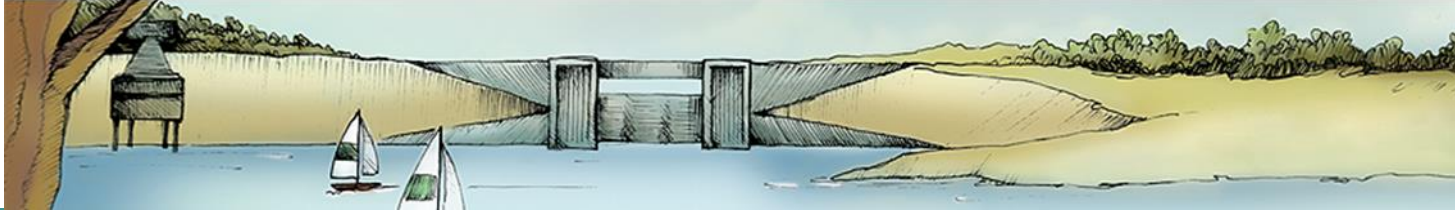
NORTH TEXAS MUNICIPAL WATER DISTRICT  
BOIS D'ARC LAKE FACILITIES  
05 - GENERAL  
FANNIN COUNTY, TEXAS  
LOCATION & DESCRIPTION  
OF CMAR SCOPE



NO.	DATE	REVISION
1	05 / 02 / 2019	
2		
3		
4		
5		
6		
7		
8		
9		
10		

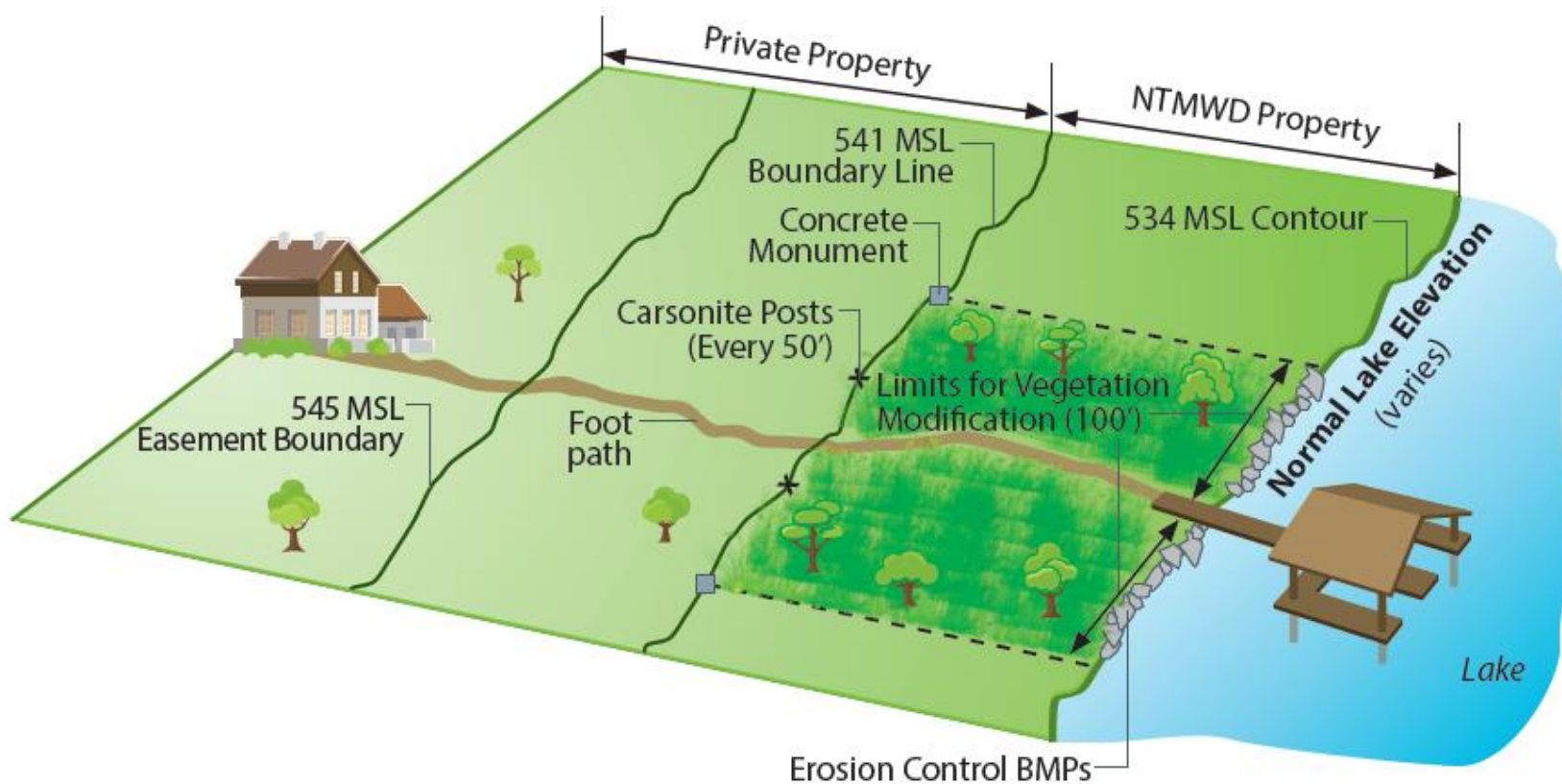
DATE: 05 / 02 / 2019  
SCALE:  
DESIGN:  
DRAWN:  
DWG NO. 00 - GCO.0  
SHEET NO. 01

CONSTRUCTION DOCUMENTS  
ISSUE FOR GMP



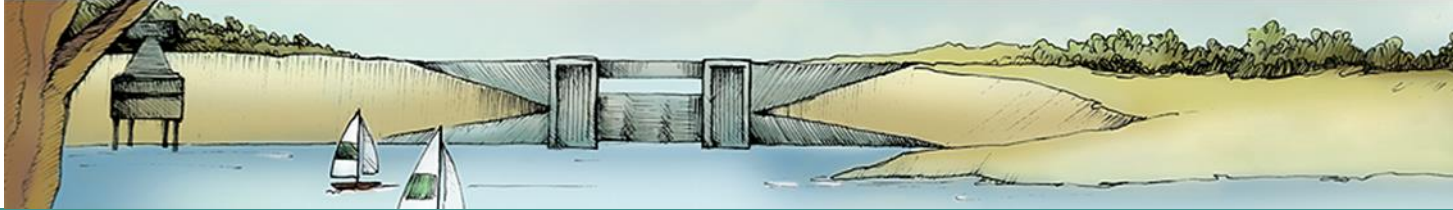
## SHORELINE USE

### Shoreline Example



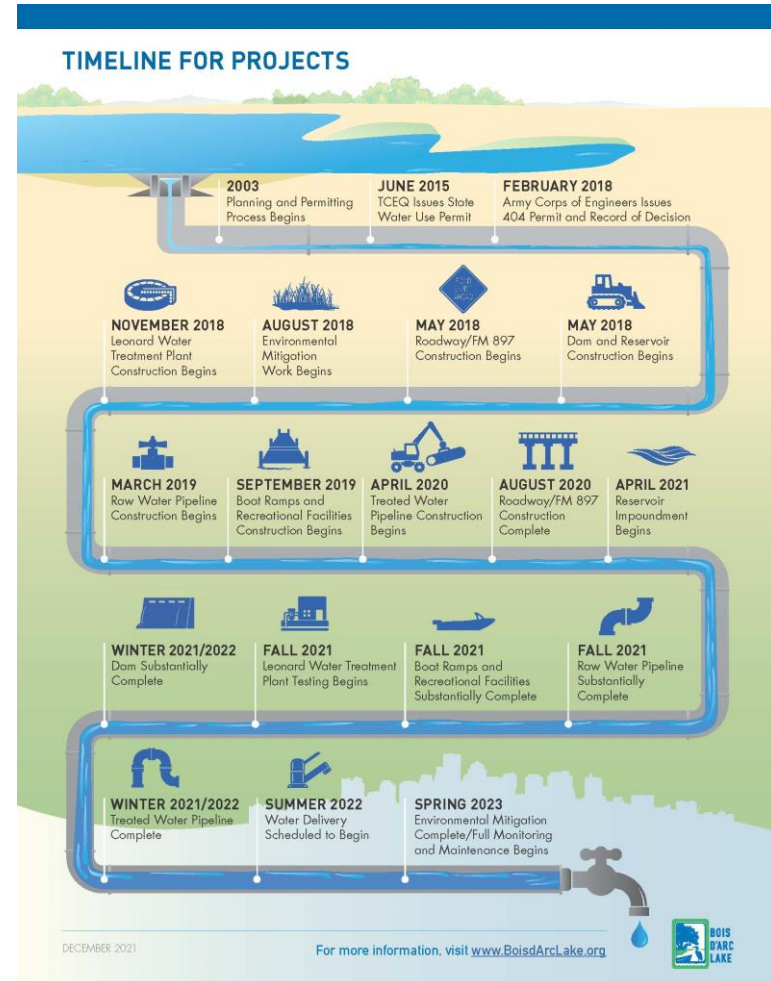
*Future Dock Development Guided by Shoreline Management Plan*





## SCHEDULE UPDATE

- Program and contractors in the field have “weathered” the delays well by adding resources, adding shifts and resequencing some key work.

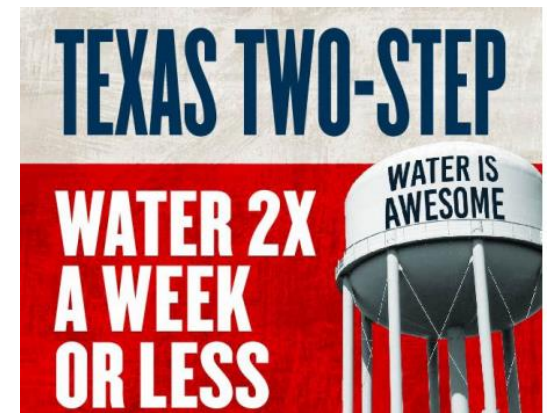
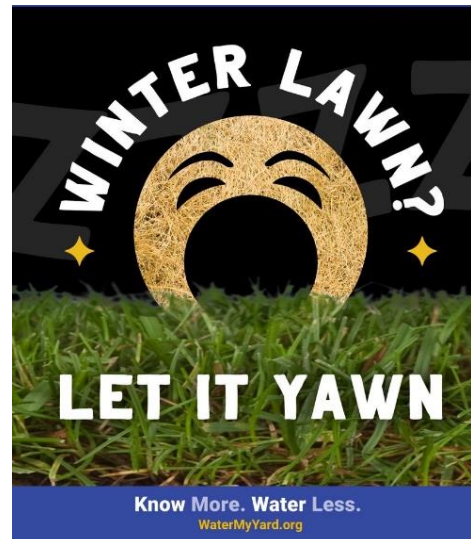




## CONSERVATION IS IMPORTANT PART OF WATER SUPPLY

- Critical strategy for maximizing supplies
- Has helped defer approx. **\$1B in projects**
- Award-winning outreach programs:
  - WaterMyYard.org
  - Water4Otter School Education Program
  - Local campaign – Know More. Water Less.
  - Regional campaign – Water is Awesome

WATER SAVING TIP:







**QUESTIONS?**



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Email

First Name

Last Name

☐ News Stream ☐ Project Pipeline

**Sign Up**



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**[www.BoisdArcLake.org](http://www.BoisdArcLake.org)**