



Permitting Lower Bois d'Arc Creek Reservoir

NCTCOG
Water Resource Council
November 13, 2014

Presented by:
Robert McCarthy



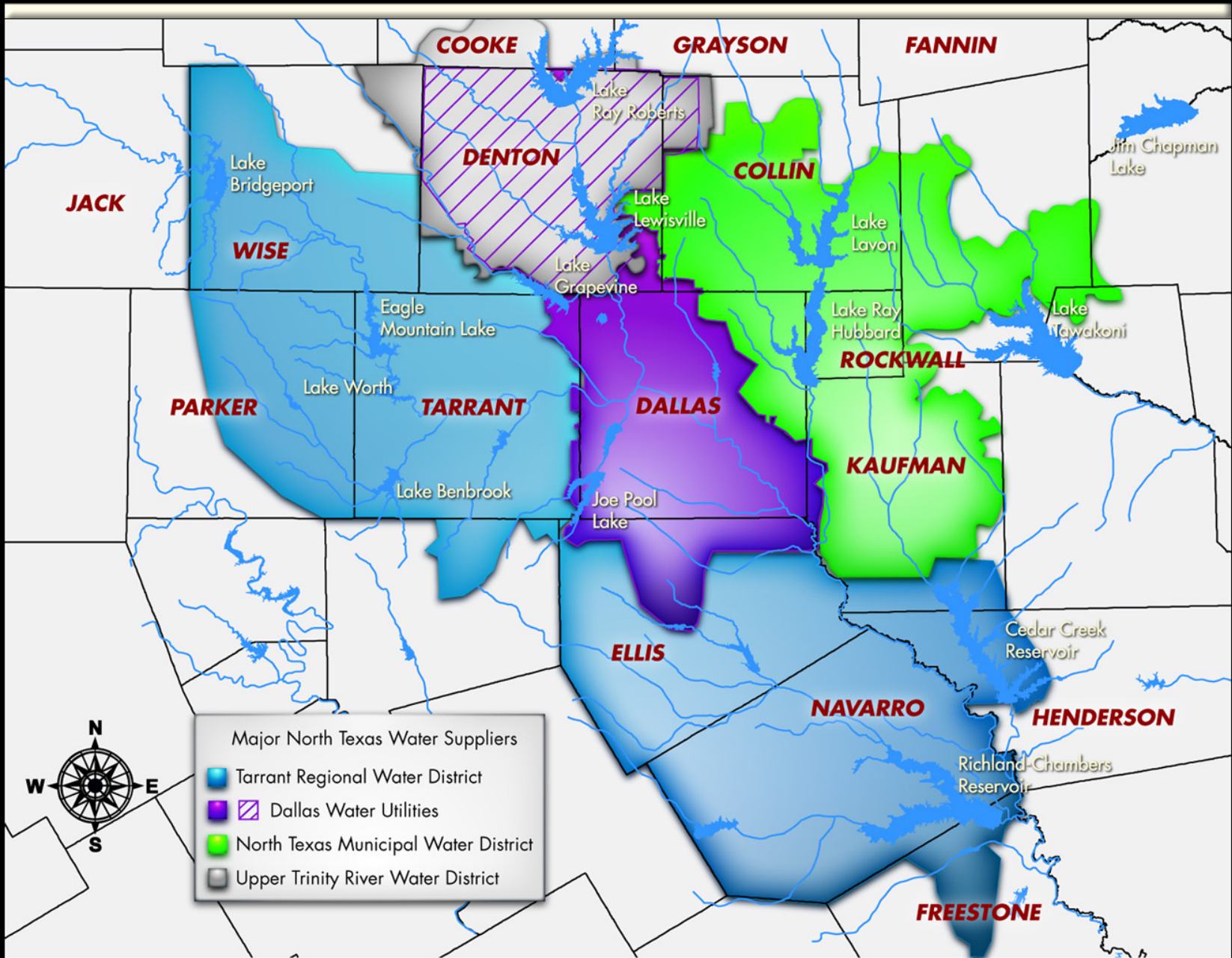


History of NTMWD

- 1951 - Created by Texas Legislature as a Special District to provide water service
- 1956 - Began providing treated water
- 1970s - Expanded to wastewater service
- 1980s - Expanded to solid waste service



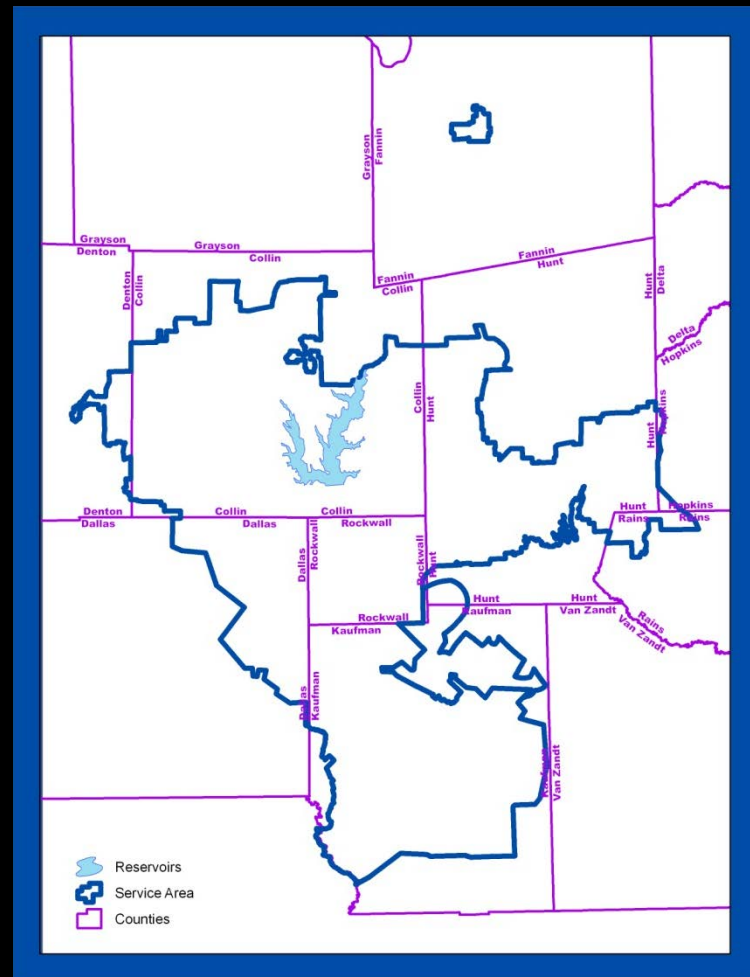
Major North Texas Water Providers





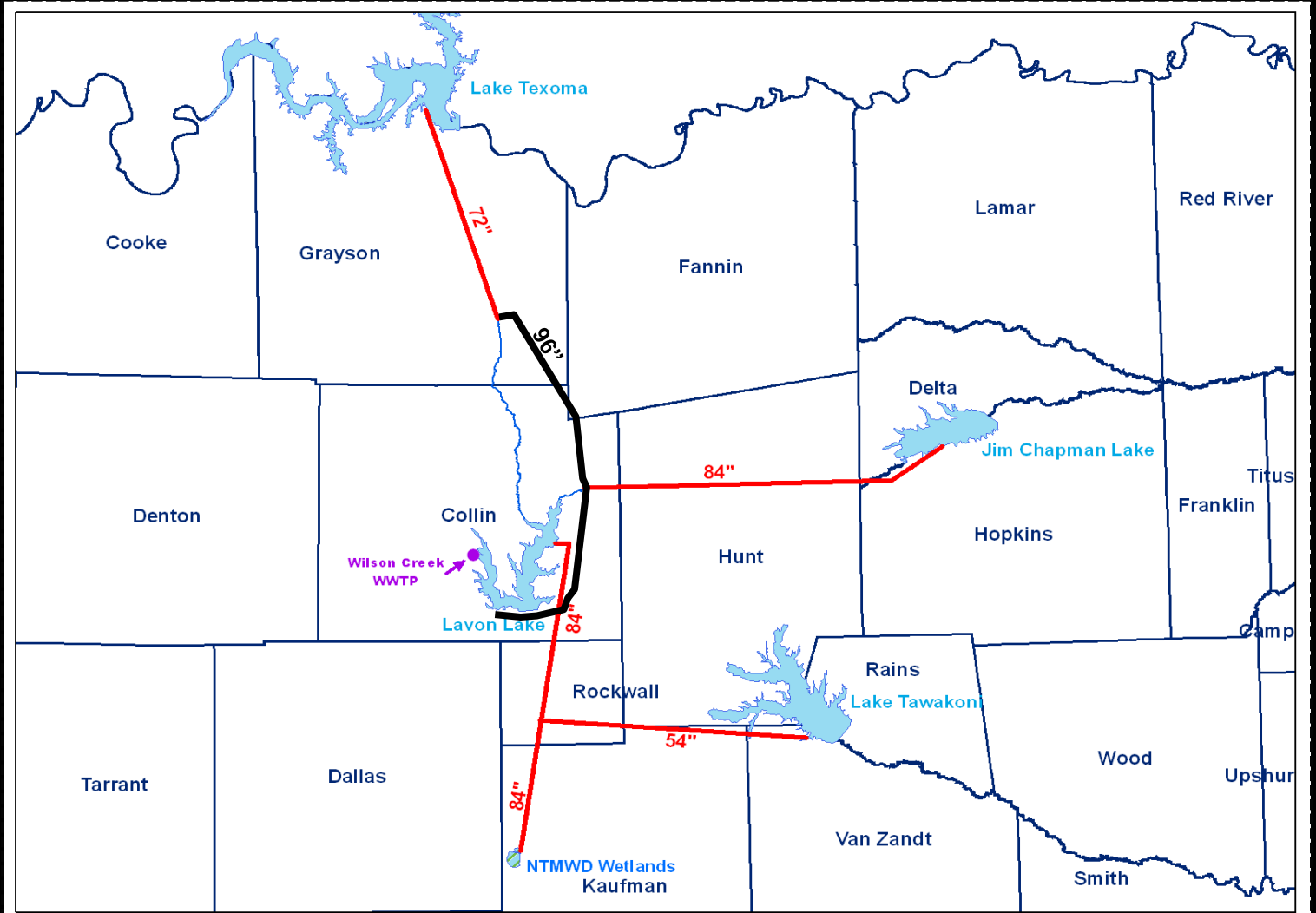
NTMWD Service Area

- 13 Member Cities
- 47 Customer Cities, Towns, MUDs, Special Utility Districts and Water Supply Corporations
- 1.6 Million People





NTMWD Raw Water Supply System





Lower Bois d'Arc Creek Reservoir

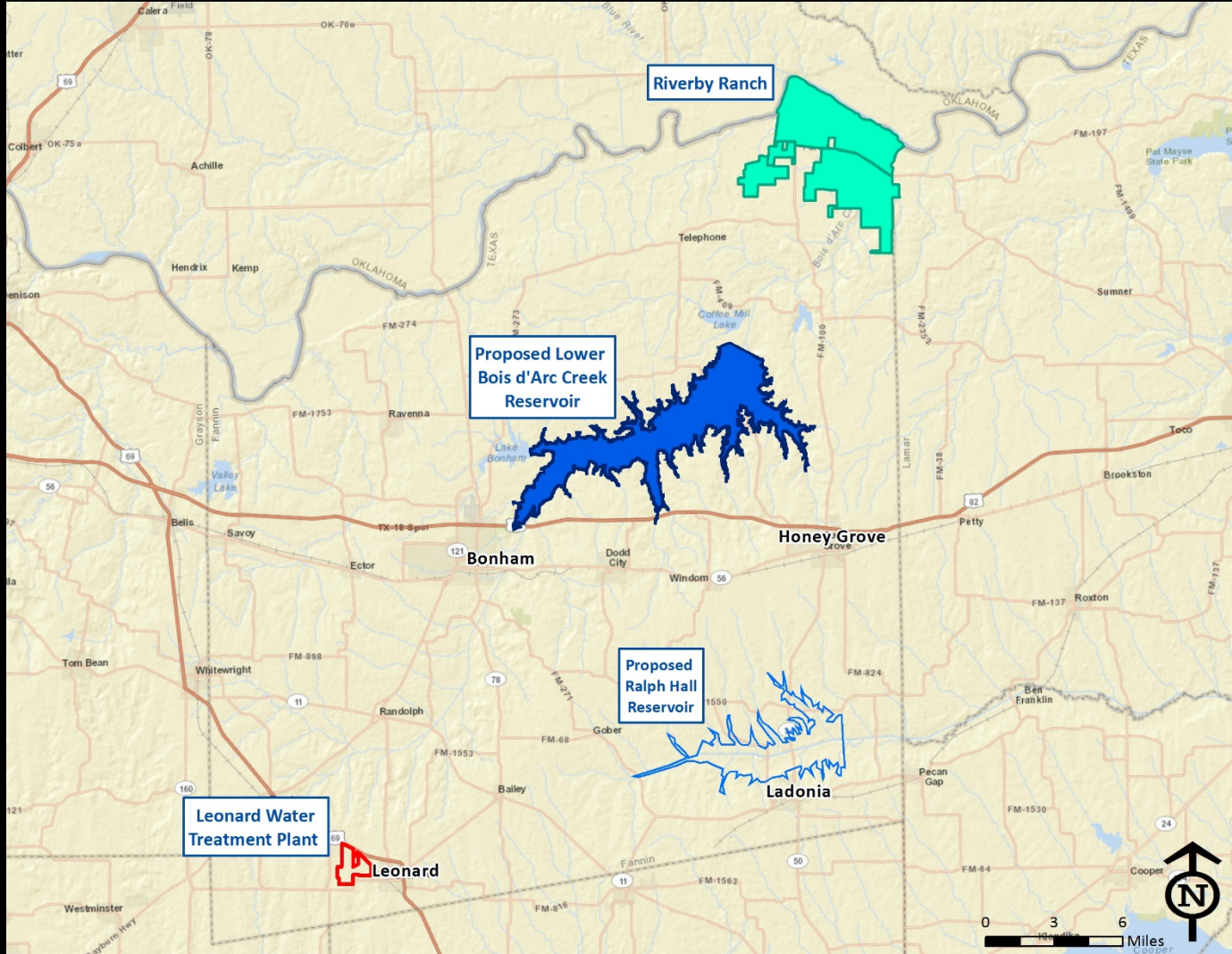
Fannin County, TX

Area: 16,526 acres
Storage: 367,609 ac-ft
Supply: 113 MGD
Average Depth: 22 ft
Maximum Depth: 70 ft
Lake Elevation: 534 ft msl
Owner & operator: NTMWD
(Not a USACE reservoir)





Lower Bois d'Arc Creek Reservoir Project



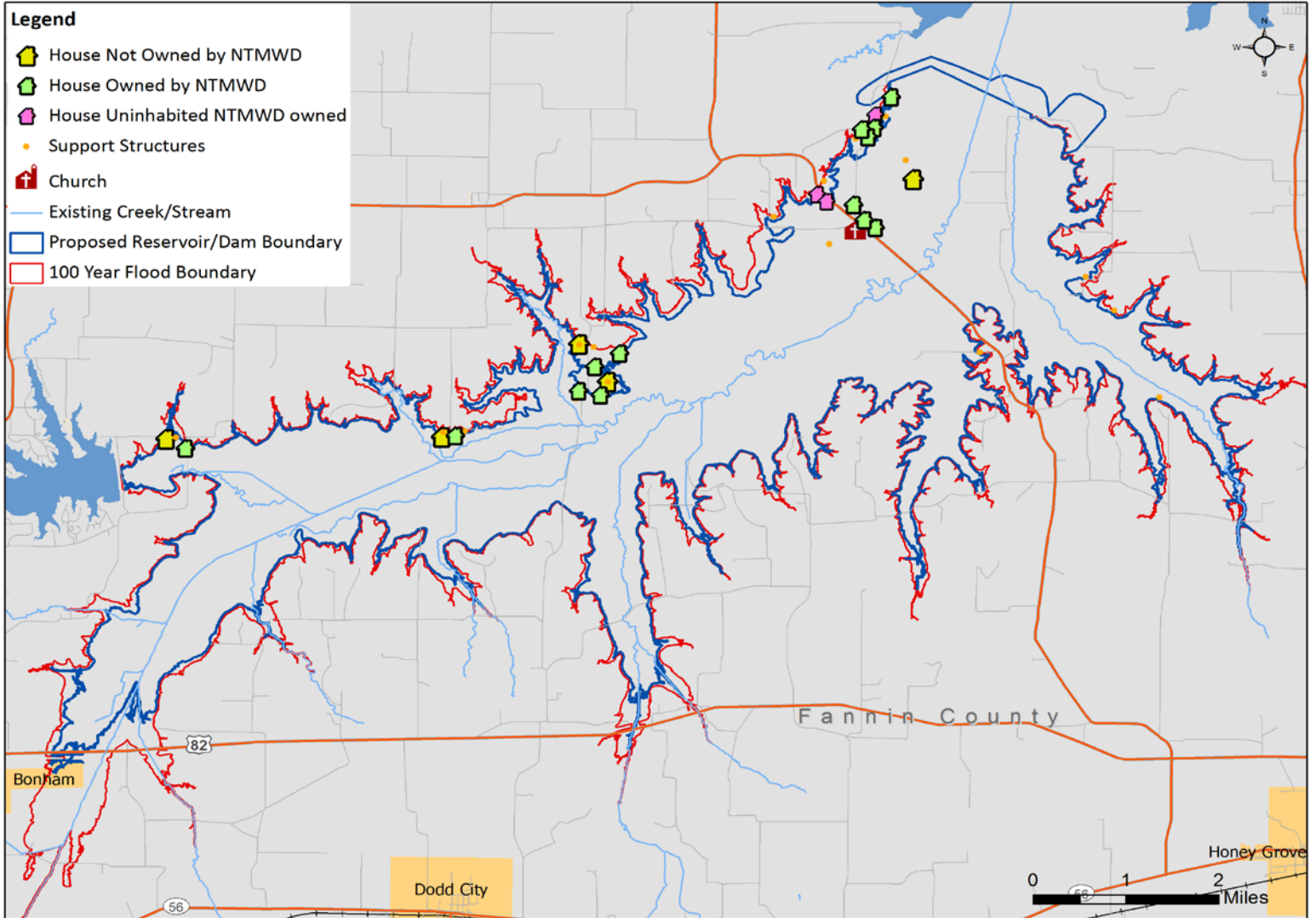
Current Cost Estimates

<u>Project Component</u>	<u>Cost Estimate</u>	<u>Expenditures</u>
<ul style="list-style-type: none">• Reservoir<ul style="list-style-type: none">– Land– Dam– Intake– PS– Conflicts– Permitting– Mitigation	\$413 M	\$110 M
<ul style="list-style-type: none">• WTP (70 MGD) & Terminal Storage	\$249 M	\$0.2 M
<ul style="list-style-type: none">• 90-inch Raw Water Pipeline	\$185 M	\$4.4 M
<ul style="list-style-type: none">• High Service PS & Pipeline	\$145 M	\$0 M
TOTAL	\$992 M	\$114.6 M





Lower Bois d'Arc Creek Reservoir Houses inside 100 year flood boundary





Three Purposes of the Reservoir

Vital New Source for Fannin County & NTMWD

- Provide water for Fannin County
- Supplement water supply for NTMWD Member Cities & Customers through 2040
- Provide recreational opportunities





Benefits To Economic Growth

During Construction:

- Dam and infrastructure will increase local economic activity in Fannin County between **\$509 M** & **\$563 M** during construction

Following Construction:

- Ongoing operation & maintenance of new infrastructure will support approximately 24 full-time equivalent jobs & spur approximately **\$2 M** in new economic activity per year



(2011 dollars)



Opportunities for Business Development & Commerce

- **\$145 M** in economic activity through new industrial & commercial activities
- **\$70 – 77 M** in annual spending by new, permanent & weekend residents
 - Supporting more than 500 new permanent jobs
- **\$16 - 22 M** in annual spending by non-local recreational visitors
- New housing, residents & recreational visitors will contribute:
 - **\$1.9 M** in county property tax revenues
 - **\$3.9 M** in school property tax revenues
 - **\$290,000** in municipal sales tax revenues
 - **\$175,000** in hotel occupancy tax revenues
- 3,200 new homes over a 30-year period

(2011 dollars)

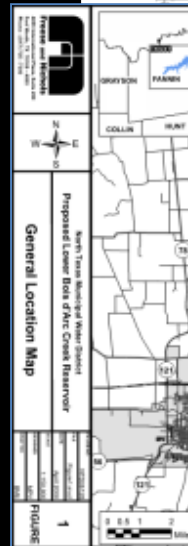
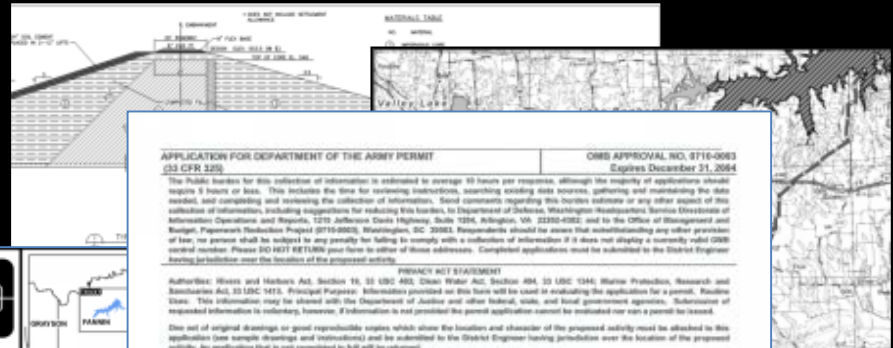




Lower Bois d'Arc Creek Reservoir

Two Major Permits Required

- CWA Section 404
– USACE
- Water Rights
– TCEQ



APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 320) O&M APPROVAL NO. 0710-0083
Expires December 31, 2004

The Public burden for this collection of information is estimated to average 30 hours per response, although the majority of applicants should require 3 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Justice, Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302 and to the Office of Management and Budget, Paperwork Reduction Project (0710-0083), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of these addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY NOTICE
 Authority: Rivers and Harbors Act, Section 10, 33 USC 402; Clean Water Act, Section 404, 33 USC 1346; Marine Protection, Research and Sanctuaries Act, 33 USC 1612. **Principal Purpose:** Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary. If information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will not be returned.

ITEMS 1 THRU 4 TO BE FILLED BY THE CORPUS

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
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ITEMS BELOW TO BE FILLED BY APPLICANT:

5. APPLICANT'S NAME North Texas Municipal Water District (NTMWD), c/o James Parks, Executive Director	6. AUTHORIZED AGENT'S NAME AND TITLE (see agent on file request) Michael Votaw, ARW Environmental Scientist
7. APPLICANT'S ADDRESS 505 East Brown Street P.O. Box 2400 Wylie, TX 75098	8. AGENT'S ADDRESS 4855 International Plaza Suite 200 Fort Worth, Texas 76109-4395
9. APPLICANT'S PHONE NO./ AREA CODE a. Residence N/A b. Business 972-442-5405	10. AGENT'S PHONE NO./ AREA CODE a. Residence N/A b. Business 817-735-7312

11. I hereby authorize Michael Votaw to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information of a general nature.

APPLICANT'S SIGNATURE: James M. Parks DATE: 30 May 2008

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY
 Lower Bois d'Arc Creek Reservoir

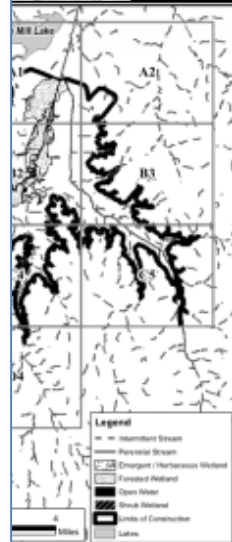
12. PROJECT NAME OR TITLE (see instructions) Lower Bois d'Arc Creek Reservoir	13. NAME OF WATERBODY, IF KNOWN (see instructions) Bois d'Arc Creek	14. PROJECT STREET ADDRESS (see instructions) N/A
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15. COUNTY: Fannin STATE: Texas

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions Section 1, paragraph 1, and the Appendix to Permit Number, for example).
 The project is located within the Bois d'Arc Creek watershed (HUC 1114101). The center coordinates of the proposed dam are approximately 33° 43' 05" N, 95° 58' 56" W. The location of the project is shown in Figure 1.

17. DIRECTIONS TO THE SITE:
 The Lower Bois d'Arc Creek Reservoir site is located northeast of the City of Beulah, Fannin County, Texas (Figure 1). The reservoir site is generally bounded by State Highway 82 to the south, FM 273 to the north, FM 390 to the east, and FM 608 to the west. The location of the proposed dam is approximately 15 miles northwest of Beulah on Bois d'Arc Creek and Honey Grove Creek.

THIS FORM OFFICE USE ONLY EDITION OF PERMITS 07/06/07E (Page One) (2/2004) (3)





CWA Section 404 Permit

- Application submitted – June 2008
- EIS Determination – March 2009
 - EIS contractor selected – August 2009
 - Public & Agency Scoping Meetings – December 2009
- Draft EIS expected to be published in early 2015





EIS Scoping Meeting December 8, 2009



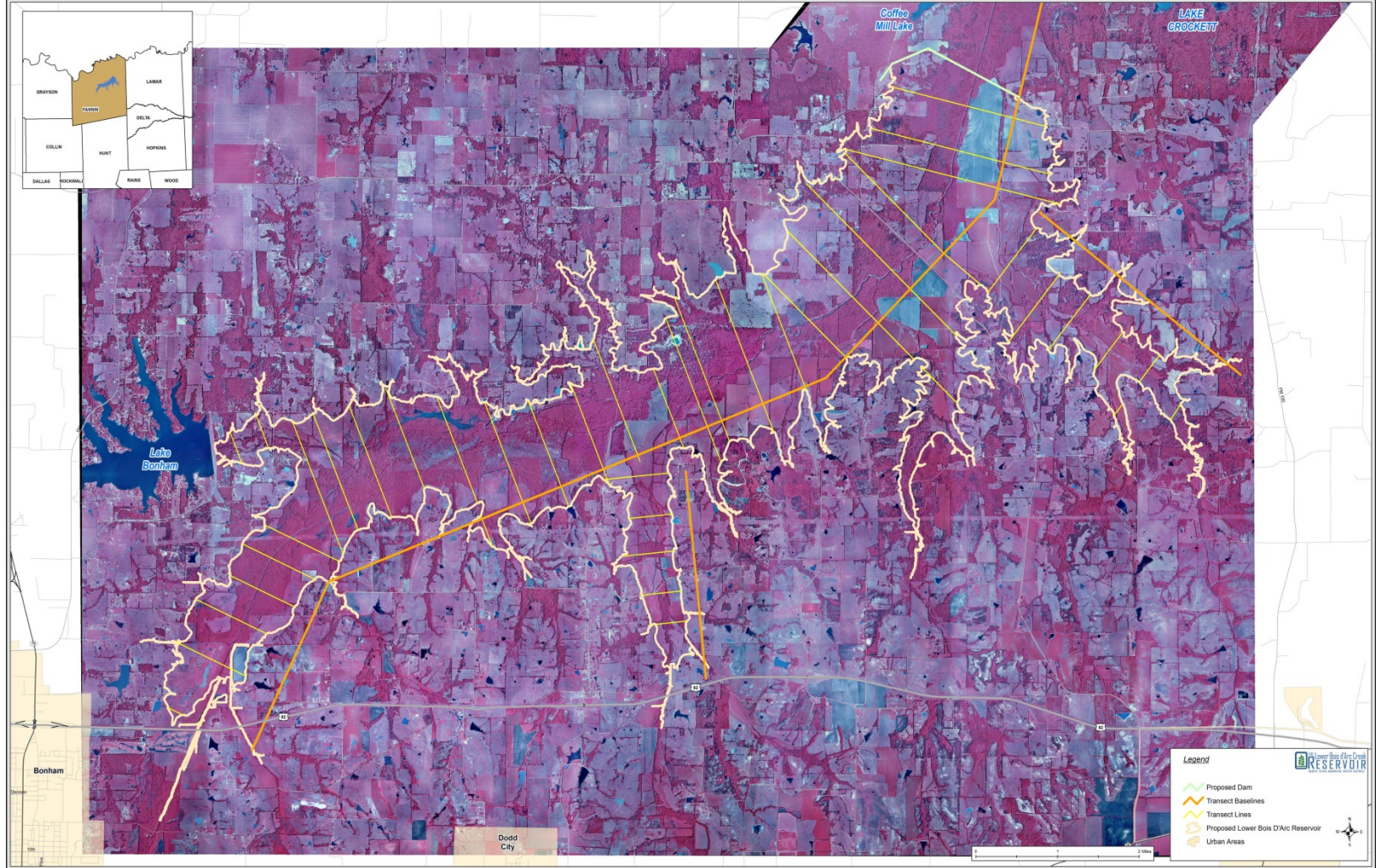
CWA Section 404 Permit Application

- Required by USACE
 - Jurisdictional Determination Report
 - Habitat Evaluation Procedures Study (HEP)
 - Geomorphic Assessment of Stream
 - Environmental Report
 - Archeological Report
 - Environmental Impact Statement early 2015(Draft)



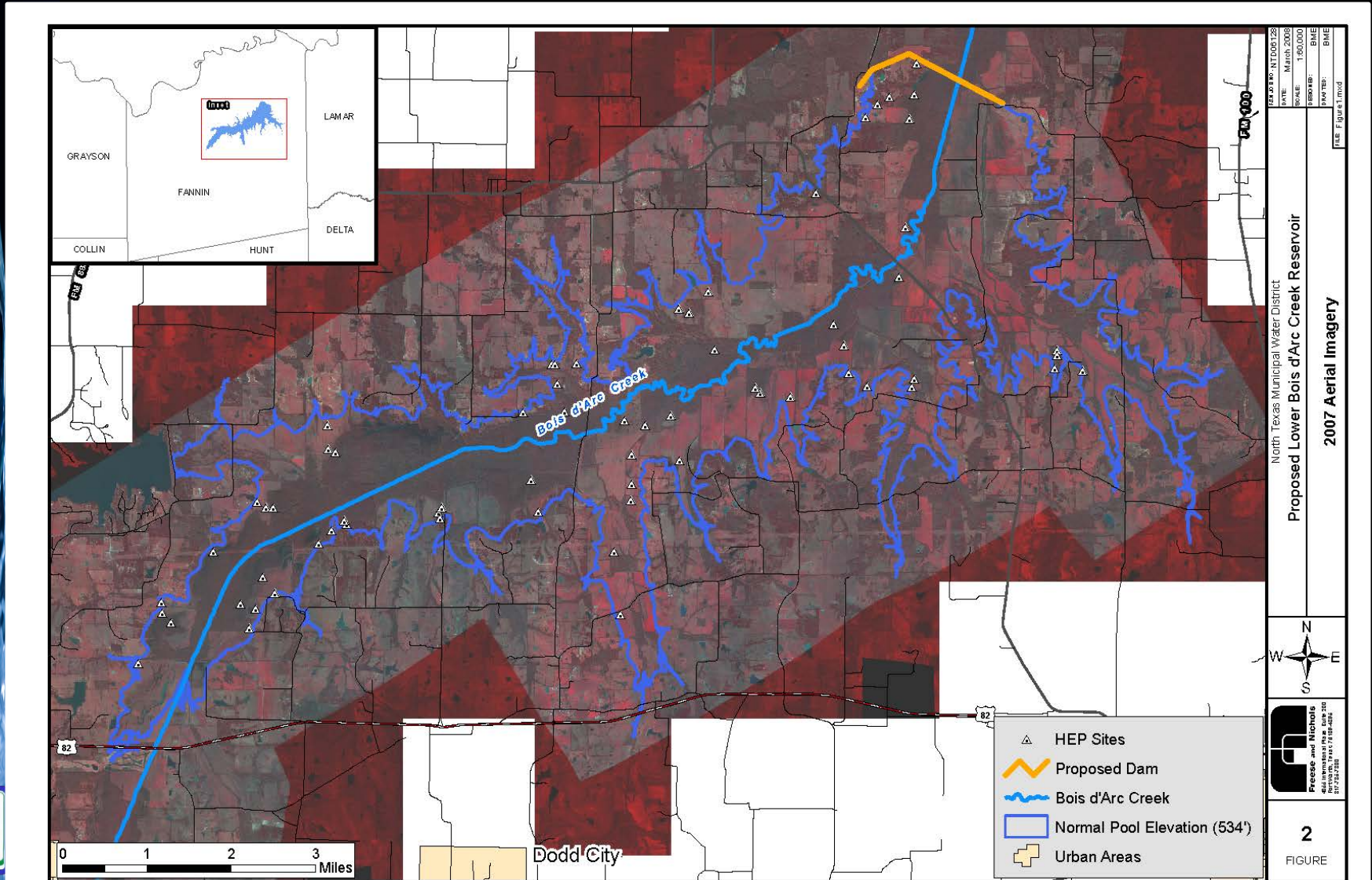
Jurisdictional Determination

Wetland Delineation Transects





Habitat Evaluation Procedures Study





Habitat Evaluation Procedures Study





Habitat Evaluation Procedures Study

**Table 2. HEP Field Data Summary:
Habitat Variable Measurements at Upland Deciduous Forest Sites.**

Cover Type: Upland Deciduous Forest						
Species: Barred Owl, Carolina Chickadee, Downy Woodpecker, Eastern Turkey, Fox Squirrel						
Habitat Variable	Sample Site Number					
	1	2	3	4	5	20
% tree canopy closure	85	50	45	85	95	50
% tree canopy closure of hard mast producers >10" dbh*	0	0	35	10	70	50
% tree canopy closure of soft mast producing trees	60	50	10	90	20	5
% canopy closure deciduous trees in stand	85	25	45	85	80	50
% canopy closure of overstory trees	40	40	35	85	70	50
Average dbh of overstory trees (in)	15	12	18	8	15	16
Average height of overstory trees (ft)	30	35	35	35	60	60
# per acre of snags <10" dbh	200	3	90	10	10	1
# per acre of snags >6" dbh	40	3	0	2	0	1
% shrub crown cover	20	20	15	5	90	45
% herbaceous canopy cover	95	25	15	60	0	30
Average height of herbaceous canopy cover in summer (in)	18	12	12	14	0	6
# per acre of trees >20" dbh	0	0	30	0	0	0
Distance to grain (yd)	660	660	660	660	660	660
Basal Area: area of exposed woody stems if cut horizontally at 4.5 ft height (ft ² /ac)	120	140	60	80	5	160
Average dbh of hard mast producing trees that are >10" dbh (in)	0	0	18	0	40	16
# per hectare of hard mast producing trees >10" dbh	0	0	124	0	99	8
% of shrub crown cover comprised of soft mast producing shrubs	100	5	90	100	15	30
% of forest canopy comprised of evergreens	0	25	0	2	20	0

*dbh: diameter at breast height - the diameter of the stem/trunk measured at a distance of 4.5 feet above the ground.





Geomorphic Assessment Of Streams



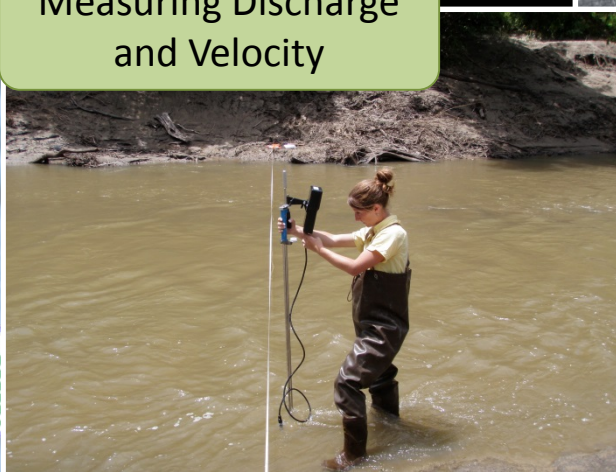
Mapping Geomorphic Units/Channel Processes



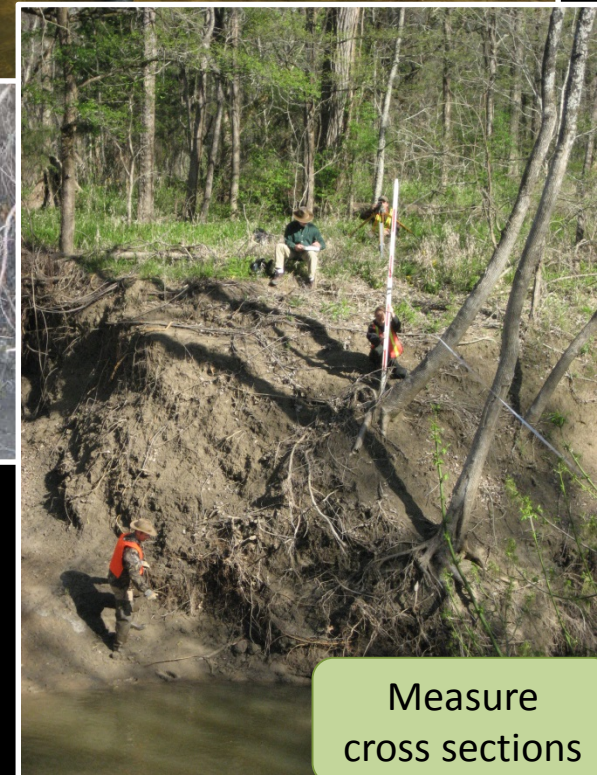
Monitoring Erosion



Soil Profiles
Depositional
Environment



Measuring Discharge
and Velocity



Measure
cross sections

Environmental Report



Proposed Lower Bois d'Arc
Creek Reservoir
Fannin County, Texas

ENVIRONMENTAL REPORT

Supporting an Application
for a 404 Permit for
Lower Bois d'Arc Creek
Reservoir

VOLUME II

June 2008

Submitted to:
USACE, Tulsa District

Applicant:
North Texas Municipal
Water District

Prepared by:





Archaeological Report

AR Consultants, Inc. _____

Archaeological and Environmental Consulting
805 Business Parkway, Richardson, Texas 74081
Phone: (214) 368-0478
Fax: (214) 321-1519
E-mail: arclife@aol.com

ARCHAEOLOGICAL SURVEY OF THE PROPOSED

LOWER BOIS D'ARC CREEK RESERVOIR

FANNIN COUNTY, TEXAS

Texas Antiquities Code Permit 5950

Cody S. Davis, MA
S. Alan Skinner, PhD
and
Molly A. Hall, MA

With Contributions from:
Deborah Anglin, MA, Stephanie Coffman, MS, Phillip L. Green, BA,
Kathryn Pocklington, BS, Nick Coleman, BA, and Rebecca Shelton, MA

Submitted to:

NORTH TEXAS MUNICIPAL WATER DISTRICT

505 E. Brown Street
Wylie, Texas 75098

Submitted by:

AR CONSULTANTS, INC.

805 Business Parkway
Richardson, TX 75081

Cultural Resources Report 2013-DRAFT
November 05, 2013

HISTORICAL BUILDINGS

ARCHAEOLOGY

NATURAL SCIENCES



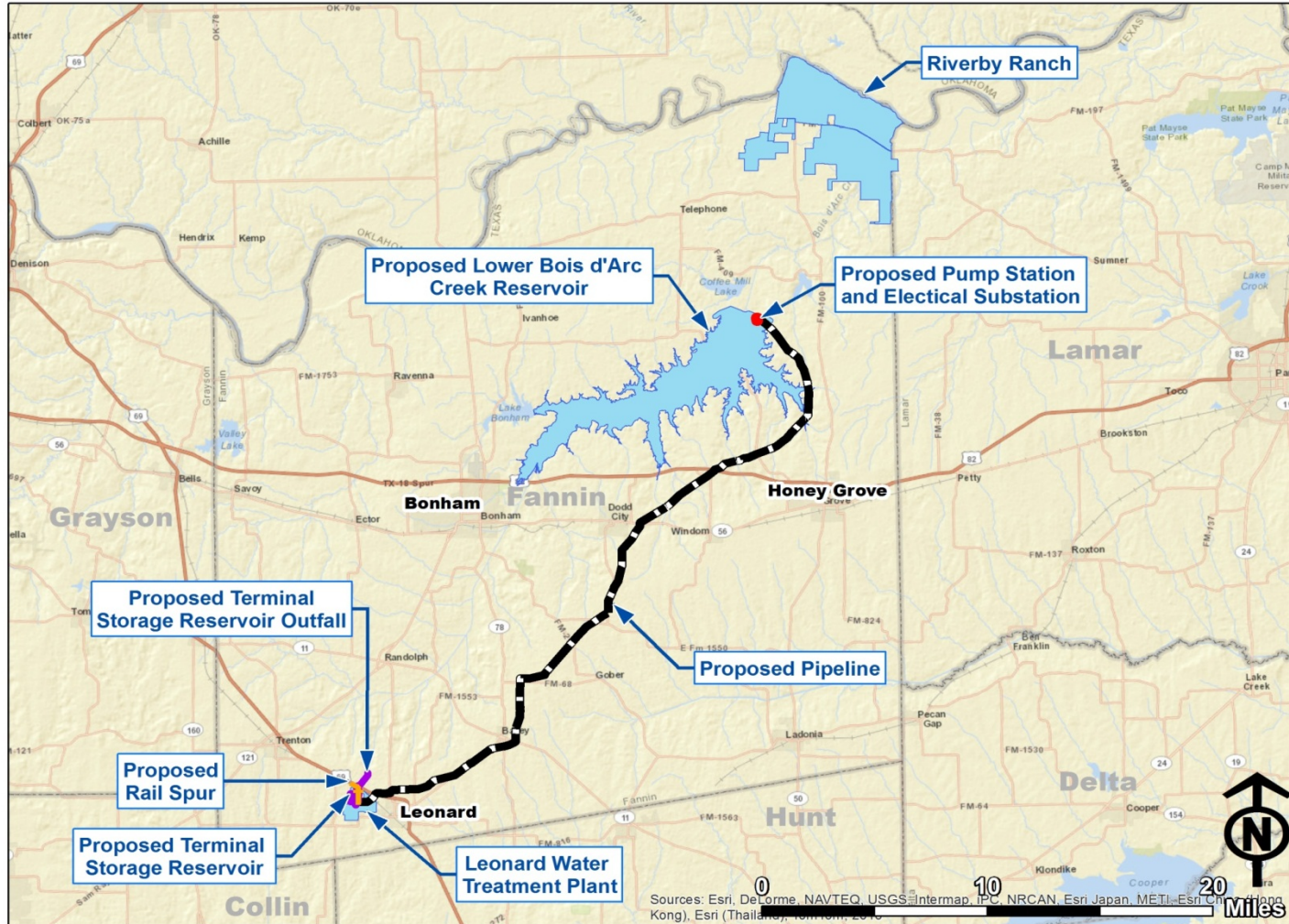


CWA Section 404 Permit Recent Activities

- Completed Final Pipeline Alignment, Intake Pump Station Location, and Terminal Storage Analysis Study
- Met with THC and USACE and Completed Archaeological Study of reservoir site, pipeline route and Leonard WTP site. Began Archaeological Study of Mitigation Site
- Completed Final Draft Proposed Mitigation Plan
- Reviewed Preliminary Draft EIS and provided comments to USACE
- Began Preliminary Dam Design



Final Pipeline Alignment, Intake Pump Station, and Terminal Storage Location



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Kong), Esri (Thailand), Swire, etc.





Leonard Water Treatment Plant

Site:

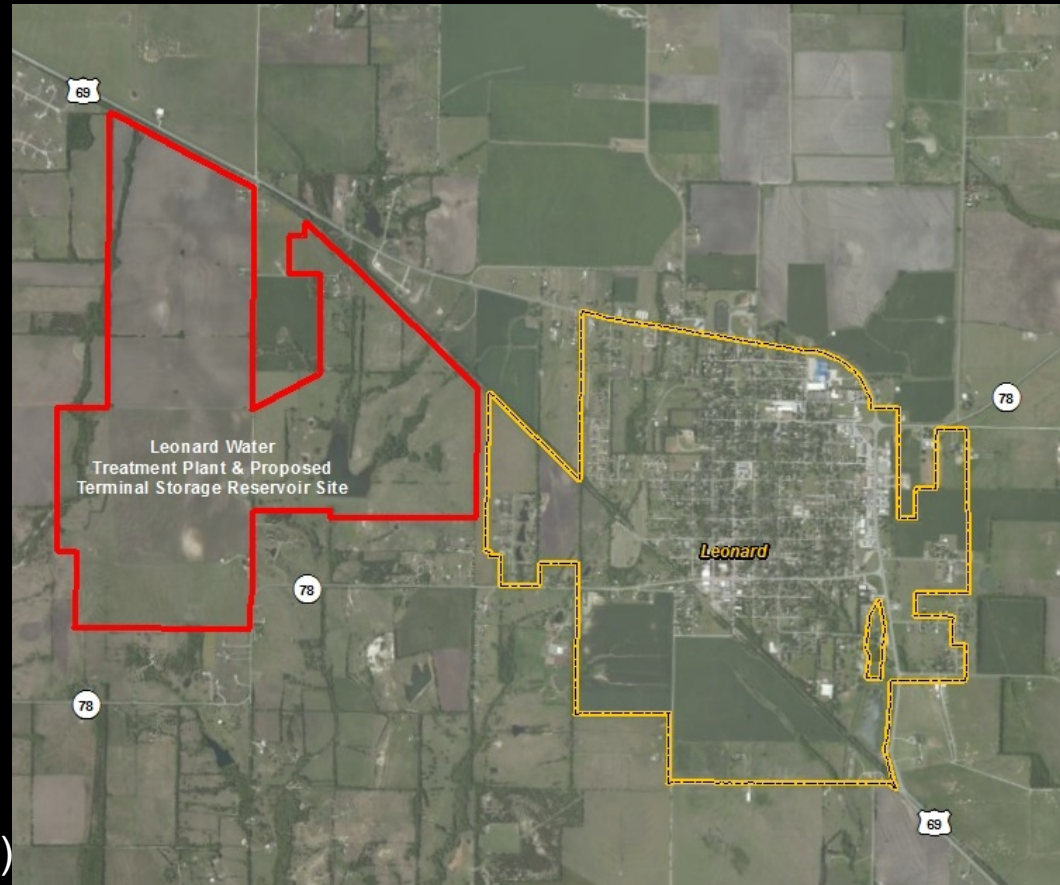
- Located west of Leonard
- Capacity: Phase I – 70 MGD; Ultimate – 280 MGD
- Storage Reservoir – 420 MG

Scope accomplished to date:

- Property purchased
- Facilities master plan underway

Schedule:

- Detail Engineering (2.5 years)
- Construction (2.5 years)





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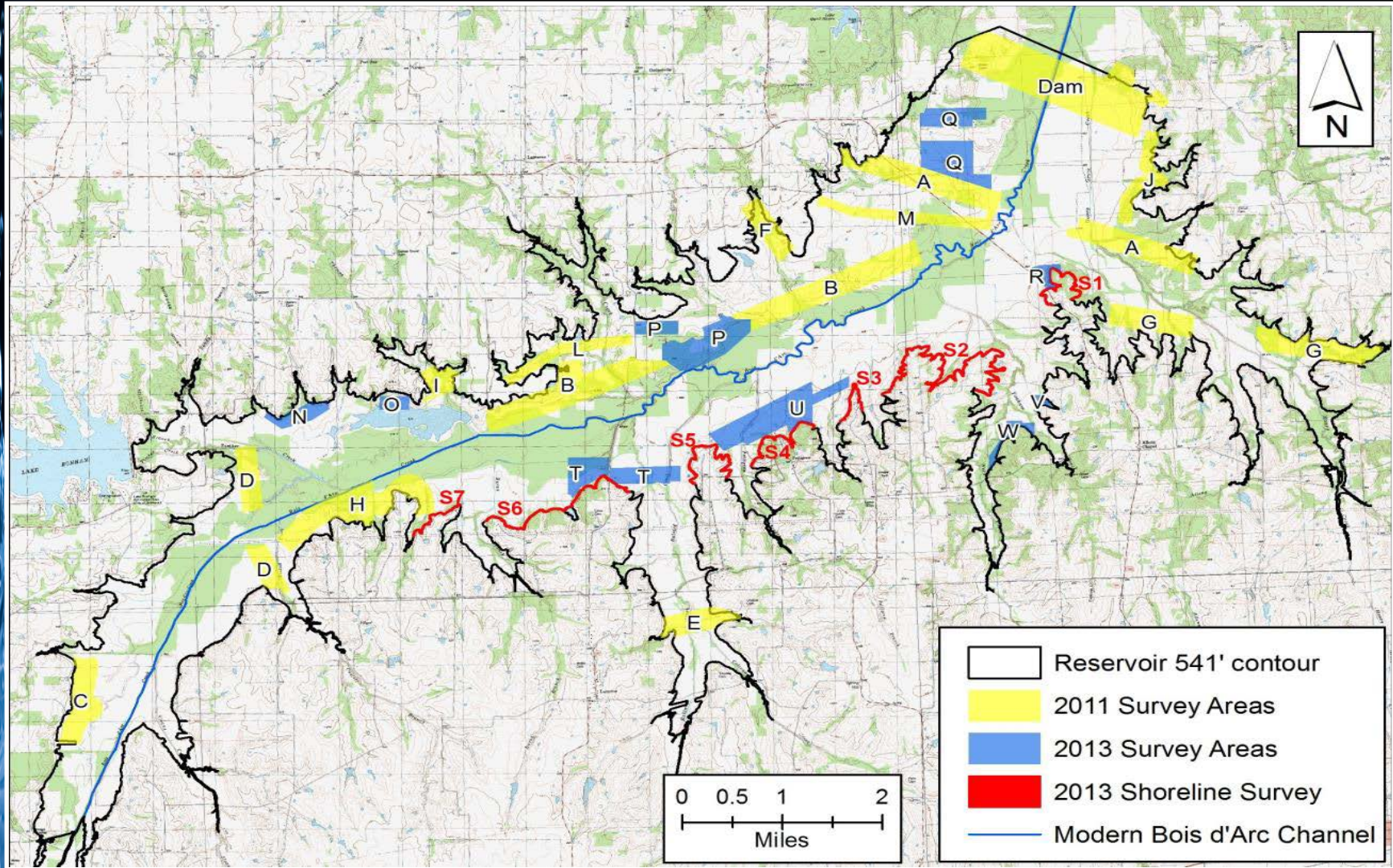
Archaeological Study

- Investigation
 - 22% of 22,590 acre reservoir site
 - Surveyed 4,500 acres
 - Walked 40 miles of creek channels - 500 acres
 - 5,423 shovel tests
 - 35 trenches
 - 4 stream bank profiles
- Findings
 - 38 historic structures - none recommended for NRHP
 - 61 sites - none recommended for NRHP
 - 31 prehistoric sites
 - 26 historic sites (includes Wilks Cemetery)
 - 4 prehistoric/historic sites
 - 9 sites recommended for further testing



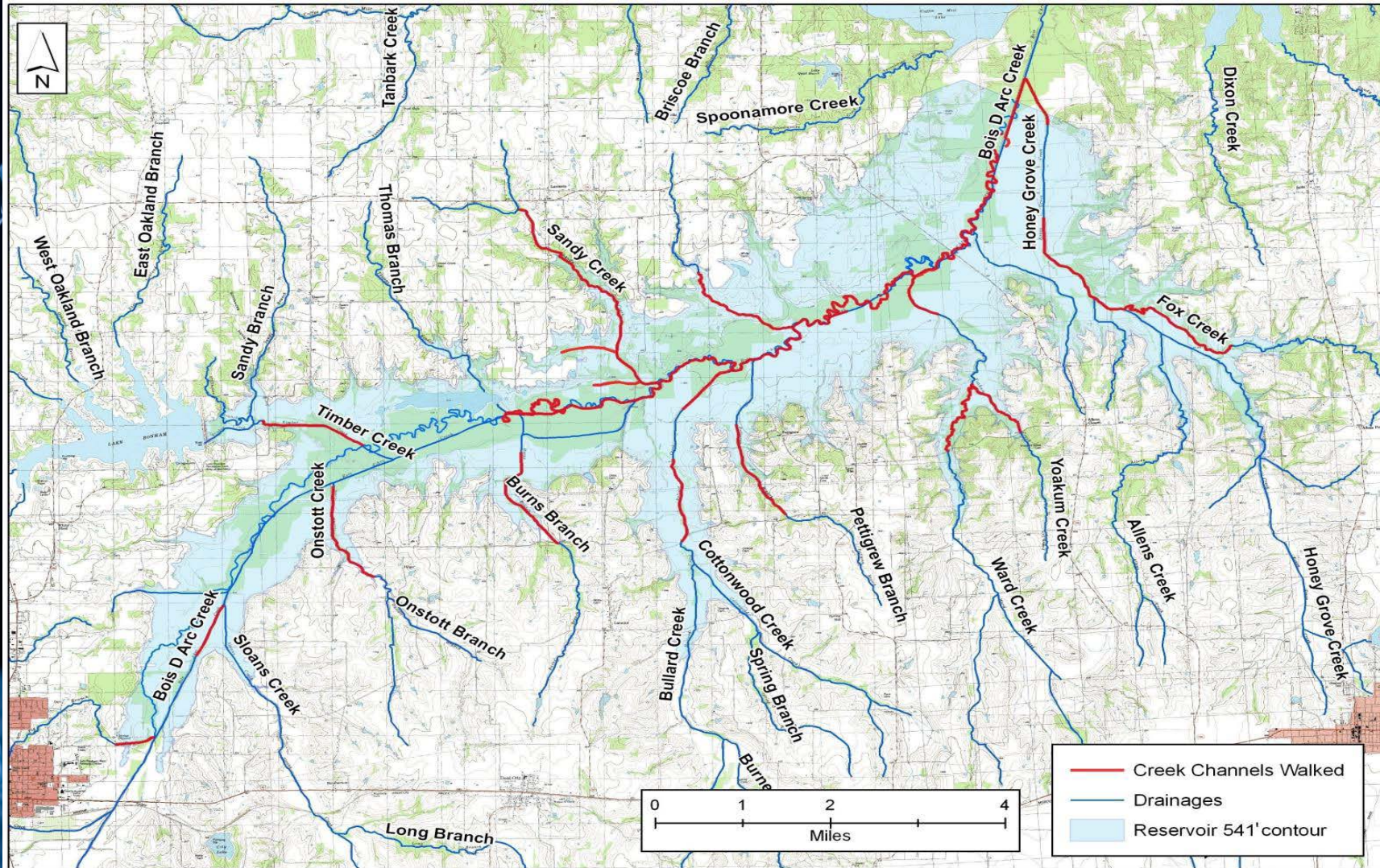


Archaeological Study





Archaeological Study



Archaeological Study Shovel Tests





Archaeological Study Trenching





Archaeological Study Stream Bank Profile



Archaeological Study

Prehistoric Artifacts



Archaeological Study Historic Artifacts





Archaeological Study Historic Site



Archaeological Study Historic Site





Archaeological Study Historic Cemeteries



HEADSTONE, INFANT HEADSTONE & FOOTSTONE



CEMETERY BOUNDARY AS PER AR CONSULTANTS

X:\Geo_SURVEYS\2011\DWG_Wilks_Cemetery.dwg

SCALE: 1"=50'

BAR SCALE

LEGEND

- HEADSTONE
- FOOTSTONE

HE HAYTER ENGINEERING INCORPORATED
4445 S.E. LODP 286 PARIS, TEXAS
803-785-6093
www.Hayter-Engineering.com
TBPE FIRM NO. F 000315

WILKS CEMETERY
FANNIN COUNTY, TEXAS
OCTOBER 2011





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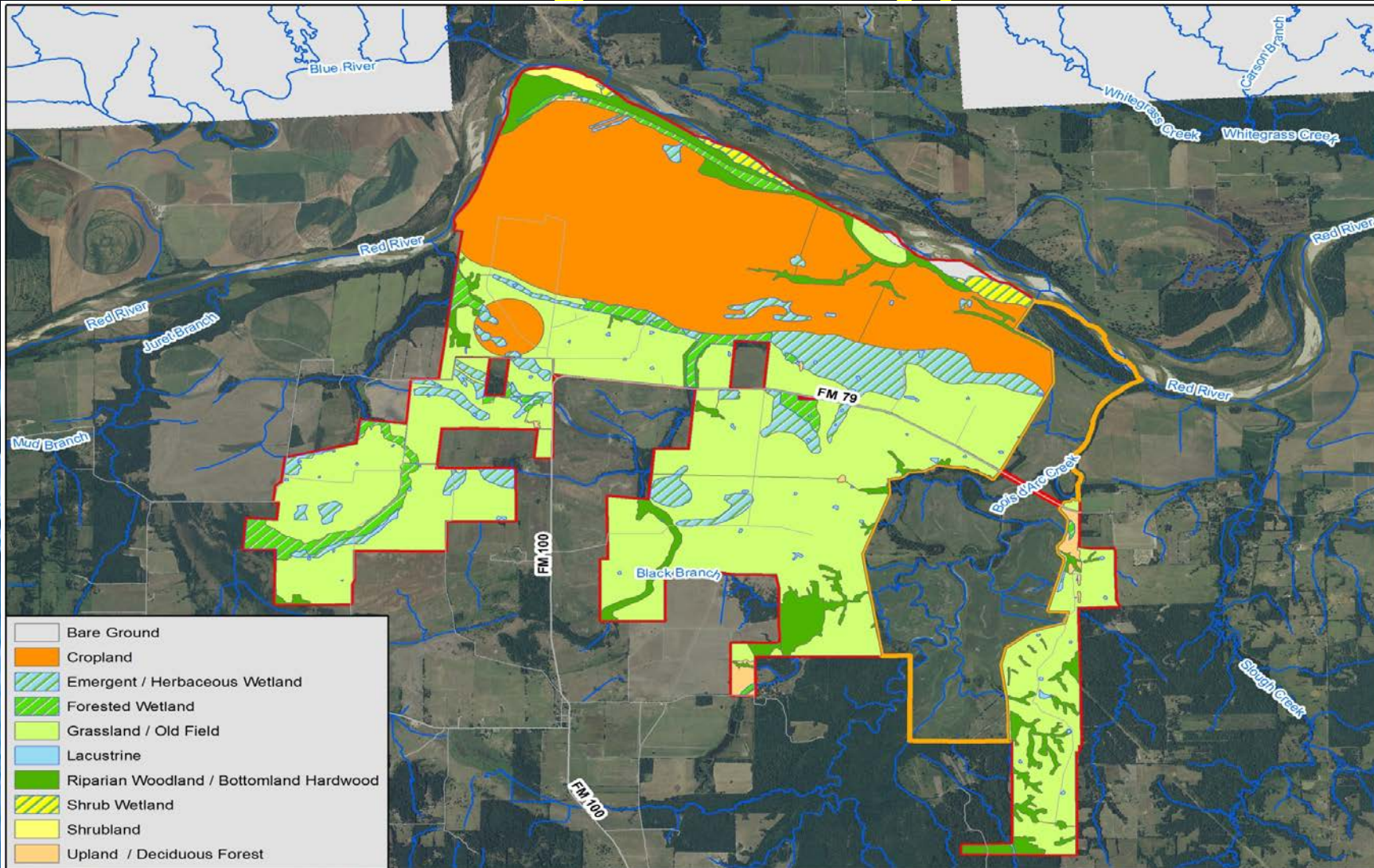


Riverby Ranch





Riverby Ranch Existing Cover Types





Baseline Habitat Units at Riverby Ranch

<u>Cover Type</u>	<u>Average HSI Values</u>	<u>Area (acres)</u>	<u>Habitat Units (HUs)</u>
Upland Deciduous Forest	0.58	78	45
Riparian Woodland / Bottomland Hardwood	0.38	840	317
Forested Wetland	0.38	452	171
Emergent / Herbaceous Wetland	0.24	1,377	337
Grassland / Old Field	0.41	5,413	2,234
Cropland	0.44	3,858	1,690
Shrubland	N/A	41	N/A
Shrub Wetland	N/A	98	N/A
Bare Ground	N/A	36	N/A
Lacustrine (Open Waters)	N/A	34	N/A
TOTAL:		12,228	4,794

**Does not include any of the Wetland Reserve Program habitat (approximately 2,700 acres) within the ranch that will remain enrolled in perpetuity.*



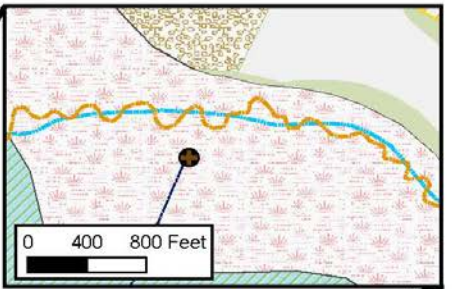
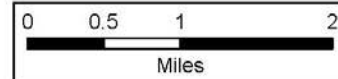
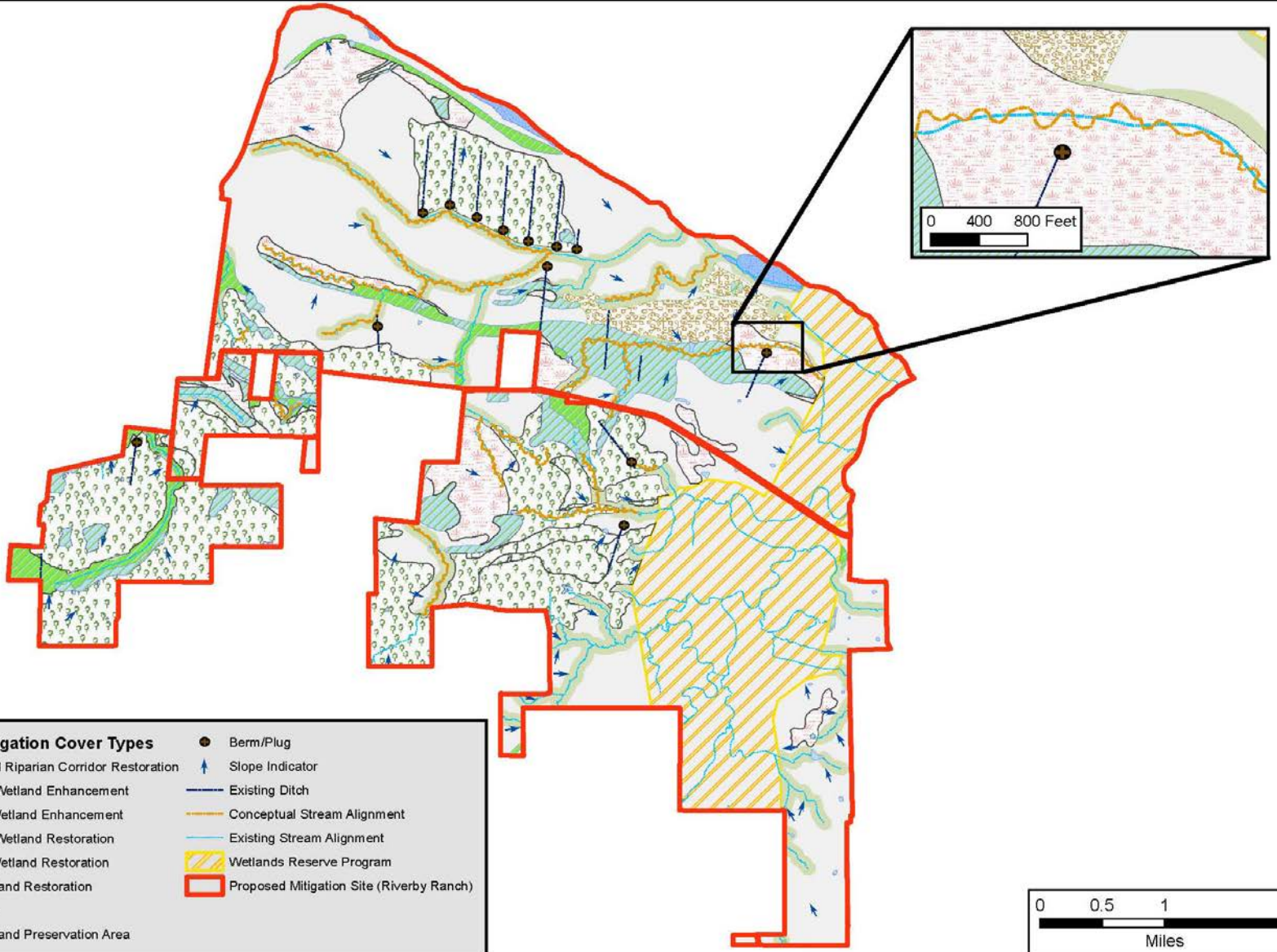


Mitigation Measures Utilized to Achieve Ecological Uplift

- Establishing conservation easements in perpetuity
- Removing cattle and stopping existing farming practices
- Earthwork/Stream Restoration
 - Restoring stream meanders and riparian corridors
 - Restoring stream and wetland hydrology
- Revegetation - Planting of native trees, shrubs, and herbaceous species
- Controlling invasive/non-native species
- Once implemented, these measures all provide for improvements (i.e., ecological uplift) to fish and wildlife habitat, which was estimated using the USFWS's Habitat Evaluation Procedures (HEP)



Proposed Future Cover Types at Riverby Ranch





Proposed Mitigation for Impacts to Waters of the U.S.

<u>Type of Water of the U.S.</u>	<u>Amount Impacted*</u>		<u>Amount of Mitigation</u>		<u>Net Gain (+) / Net Loss (-)</u>	
	Acres	HUs	Acres	HUs	Acres	HUs
Emergent Wetland	(-)1,223	(-)514	(+)3,879	(+)1,276.2	(+)2,656	(+)762.2
Forested Wetland	(-)4,602	(-)1,150.5	(+)3,952	(+)2,266.1	(-)650	(+)1,115.6
Shrub Wetland	(-)49	(-)23	(+)423	(+)224.3	(+)374	(+)201.3
Open Waters	(-)87	N/A	(+)15,273 ¹	N/A	(+)15,186	N/A
Streams (linear ft.)	(-)651,024		(+)486,375		(-)164,649	

**Total impacts from Reservoir, Raw Water Line, Terminal Storage Reservoir and Leonard Water Treatment Plant*





Proposed Mitigation for Impacts to Terrestrial Habitat

Terrestrial Resource Type	Amount Impacted*	Amount of Mitigation	Net Gain (+) / Net Loss (-)
Upland Deciduous Forest (HU)	(-) 1,046	(+) 665	(-) 381
Riparian Woodland / Bottomland Hardwood (HU)	(-) 433	(+) 855	(+) 422
Shrubland (acre)	(-) 64	(+) 41	(-) 23
Grassland / Old Field (HU)	(-) 2,886	(+) 2,393	(-) 493

**Total impacts from Reservoir, Raw Water Line, Terminal Storage Reservoir and Leonard Water Treatment Plant*





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Boring Locations at Dam Site

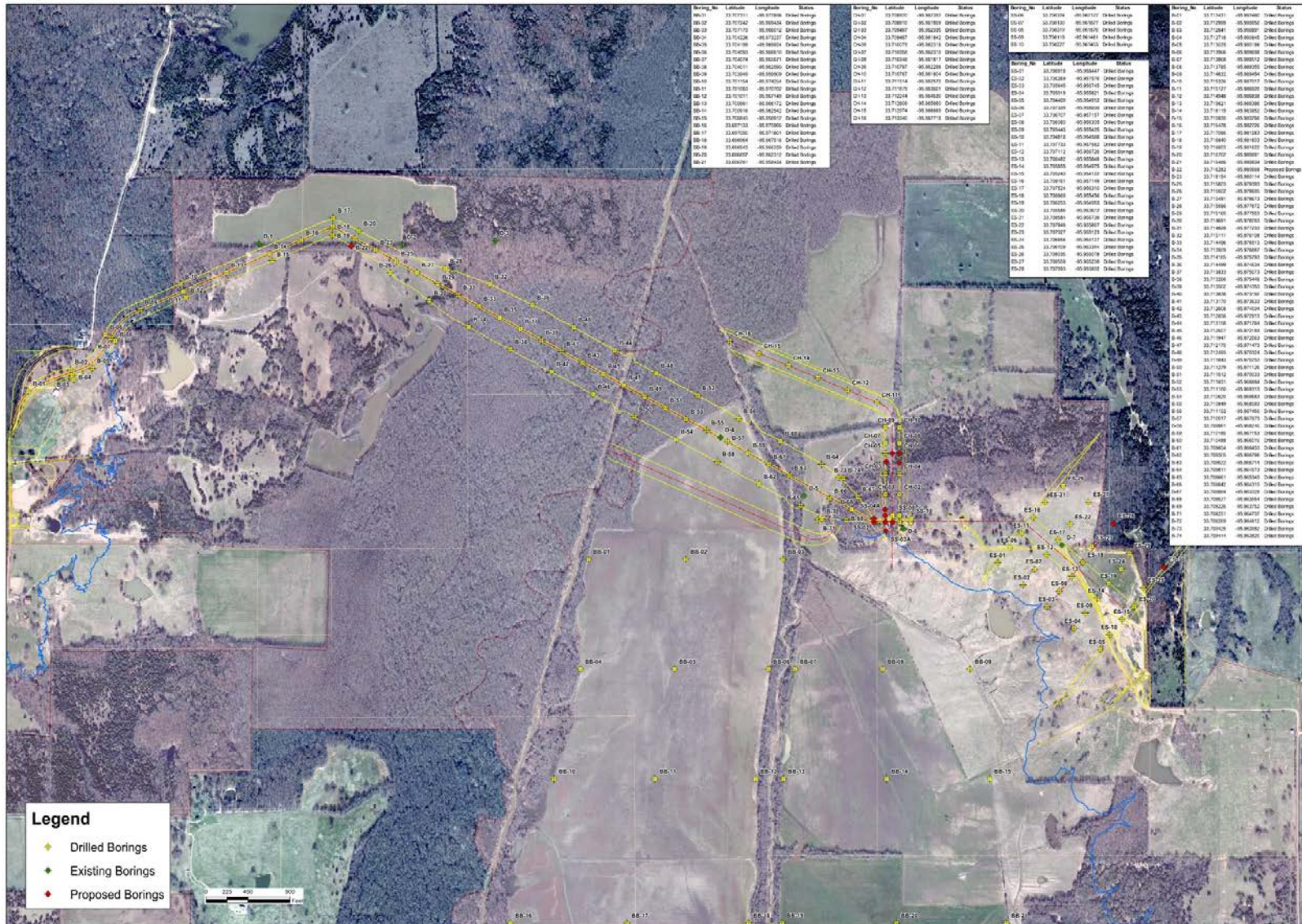


FIGURE
1



North Texas Municipal Water District
Boring Location Map

PREPARED BY
FRESE & NICHOLS
4055 International Plaza
Suite 200
Fort Worth, TX 76109





Boring at Dam Site





Core Sample from Boring



Core Sample from Boring B-66

Rock Core from 55' - 60'





Planned Activities

CWA Section 404 Permit

- Continued discussions:
 - USFS
 - Parks and Wildlife
 - TxDot
 - Fannin County
 - USACE
 - EPA Tour of Project Site scheduled for November 25, 2014
 - Draft EIS expected early 2015





TCEQ Water Rights Application

- Submitted - December 2006
- Administratively Complete - June 2007
- Interbasin Transfer Meetings - September 2007
- Supplemental Application
 - 401 Application (TCEQ must certify state water quality standards will be met for any CWA Section 404 Permits) – October 2008





2014 Activities – TCEQ Water Rights Permit

- Hired Conservation Experts and Enhanced Conservation Plan
- Met with protestants
 - National Wildlife Federation
 - Sierra Club
 - Texas Parks and Wildlife
 - Bois d’Arc MUD
 - Landowners
- SOAH Jurisdictional Hearing November 10, 2014
- **Contested Case Hearing April 20-29, 2015**





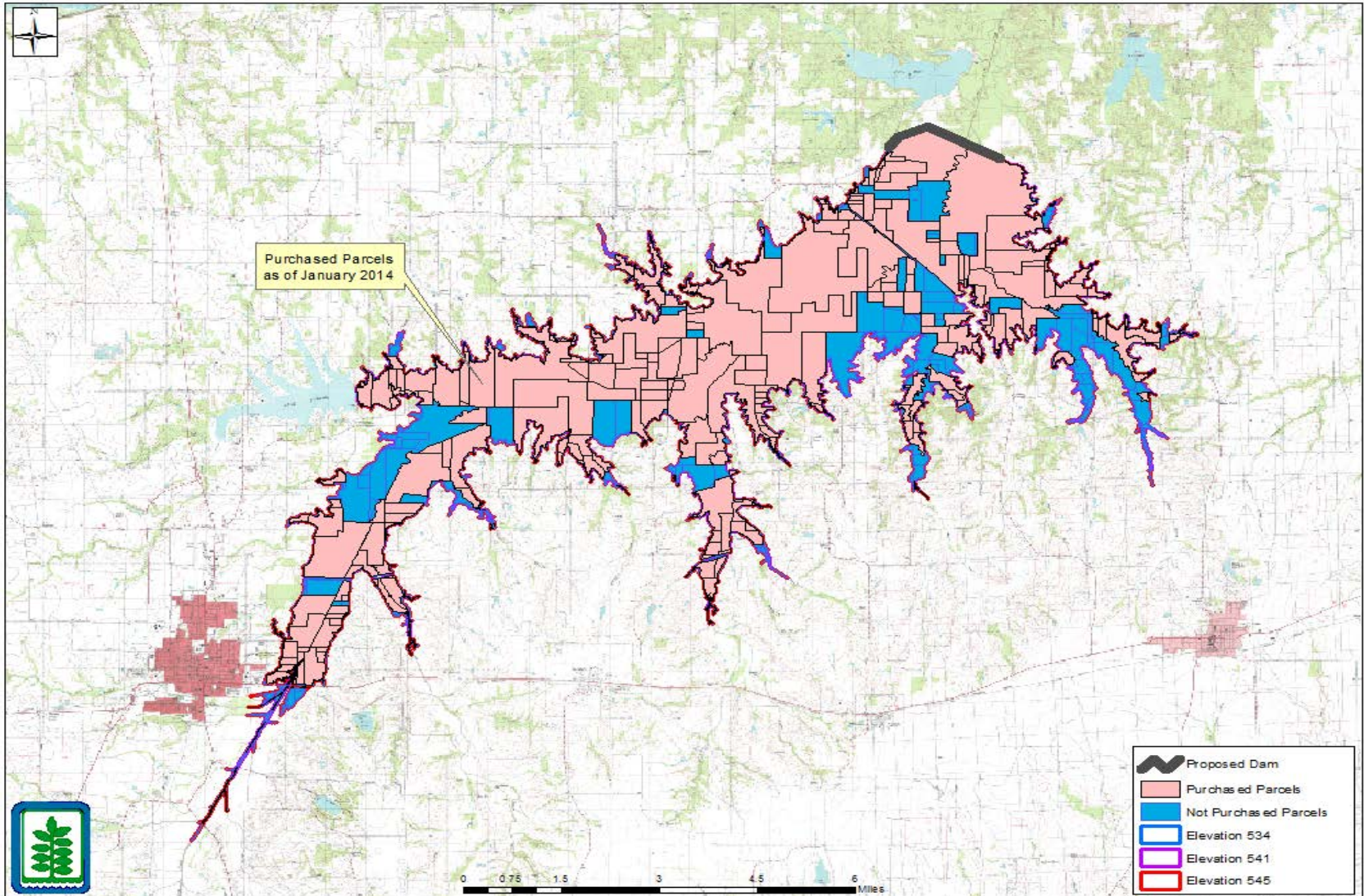
Property Acquisition

- NTMWD Board initially approved - Nov. 2007
- Reservoir site property needed - 22,590 acres
- Acquisitions to date - 18,560 acres (82%)
- Riverby Ranch mitigation area - 14,959 acres
- North (Leonard) WTP site - 841 acres





Lower Bois d'Arc Creek Reservoir Purchased Parcels





Impact on Local Taxing Authorities

- **Taxes paid to Fannin County by NTMWD**
 - Tax Years 2008 - 2010 - \$272,043.77
 - Tax Year 2011 - \$171,436.66
 - Tax Year 2012 - \$166,884.20
 - Tax Year 2013 - \$174,046.25
- **Taxes paid to Lamar County by NTMWD**
 - Tax Year 2010 - \$145.20
 - Tax Year 2011 - \$2,047.52
 - Tax Year 2012 - \$2,037.04
 - Tax Year 2013 - \$2,222.77





Senate Bill 525 - 82nd Legislature

- Grants Fannin County zoning authority over “the area within 5,000 feet of where the shoreline of the Lower Bois d’Arc Creek Reservoir would be if the reservoir were filled to its storage capacity”
- Effective upon passage of SB 525 (April 29, 2011)





Local Government Code

Section 231.133

- (a) The commissioners court of a county in which an area subject to this subchapter is located may regulate in that area:
- (1) the height, number of stories, & size of buildings & other structures;
 - (2) the percentage of a lot that may be occupied;
 - (3) the size of yards, courts, & other open spaces;
 - (4) population density;
 - (5) the location & use of buildings, other structures, & land for business, industrial, residential, or other purposes;
 - (6) the placement of water & sewage facilities, parks, & other public requirements





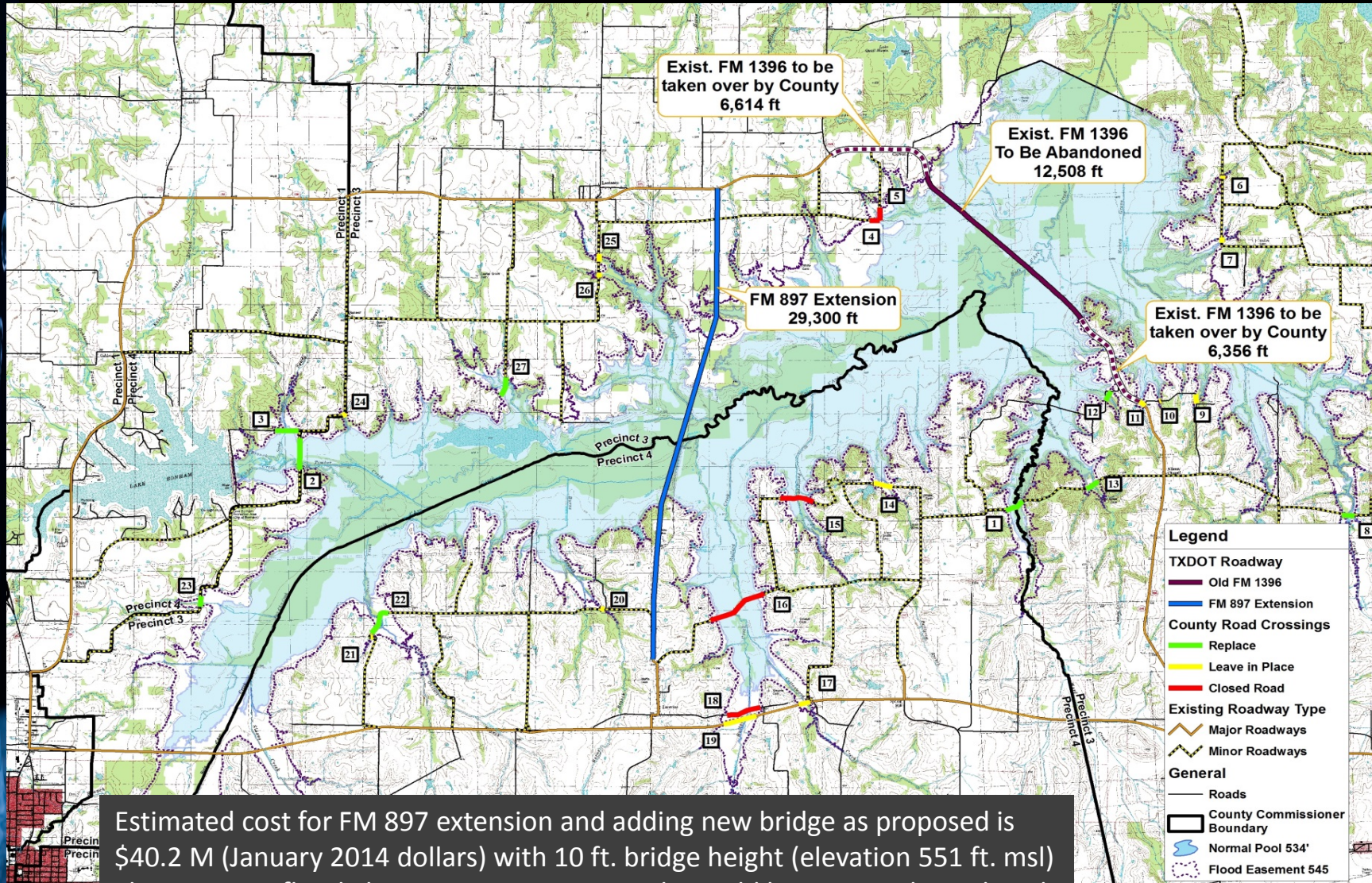
Other Issues

- Roads (Hwy. 1396 & County Road crossings)
- Reservoir clearing plan
- Utilities
 - Power lines
 - Telephone lines
 - Natural gas lines
 - Bois d’Arc MUD pipelines
- Lake Bonham
 - Dam protection
 - Emergency spillway enhancement





Highway 1396 Relocation



Estimated cost for FM 897 extension and adding new bridge as proposed is \$40.2 M (January 2014 dollars) with 10 ft. bridge height (elevation 551 ft. msl) above 100 yr. flood elevation. 27 County Roads would be impacted – 5 Closed, 13 left in place, 9 crossings reconstructed.





Reservoir Clearing

Major Scope Items:

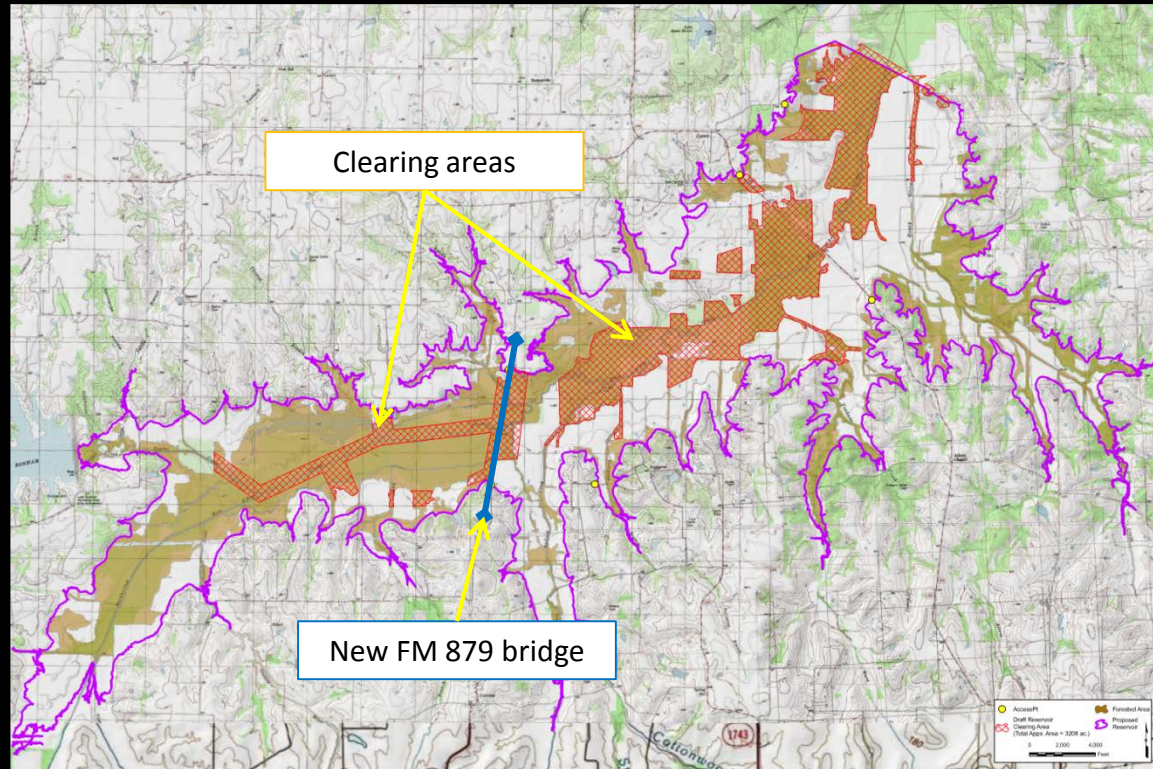
- Clear 3200 acres of timber
 - Enhance creation of fish habitat
 - Improve human access to shore locations
 - Reduce hazards to boating safety and fishing from large floating debris
- To be undertaken during 2 years preceding impoundment

Scope accomplished to date:

- Initial layout for permitting

Schedule:

- Engineering (1 year)
- Construction (2 years)



LBCR Overall Timeline

Activity	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Environmental Studies & Permitting		■	■	■	■	■	■	■	■	■	■						
Land & Easement Acquisition				■	■	■	■	■	■	■	■						
Dam & Reservoir Design										■	■						
Pipeline, Pump Station & WTP Design										■	■	■	■				
Dam & Reservoir Construction												■	■	■			
WTP & Pipeline Construction														■	■	■	■
Reservoir Impoundment																■	■
Delivering Water																	■



A close-up photograph of a person's legs and feet hanging over the edge of a weathered wooden dock. The person is barefoot, and their feet are positioned just above the dark, rippling water of a lake. In the background, a dense forest of trees lines the shore, and a yellow bucket is visible on the dock's surface. The word "Questions" is overlaid in a bright yellow, bold font across the center of the image.

Questions