

The City of Waco

Source Water Protection Plan

10.15.2024



Lisa Tyer, Director of Water Utility Services

Source Water Protection Plan

PURPOSE:

- Lake Waco and the Brazos River are essential to Waco's ecosystem and community
- Both are part of the Integrated Water Resource Plan to supply drinking water for the next 100 years
- These water bodies face threats from:
 - Seasonal weather changes
 - Sedimentation
 - Pollution from agricultural runoff and urban development
- To safeguard these vital resources, Waco must implement effective management strategies that consider both natural dynamics and human impacts, ensuring their continued benefit to the community and the environment

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Source Water Protection Plan

Agenda

- Bosque/Brazos Watershed
- Waco's History of Source Water Protection
- Confined Animal Feeding Operations
- Proposed Source Watershed Plan
- Key Points

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- **Longest:** in Texas
- **Watershed:** from New Mexico to the Gulf
- **Source:** location in New Mexico
- **Length:** 1050 miles
- **Watershed Area:** 44,620 square miles

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Bosque River Watershed

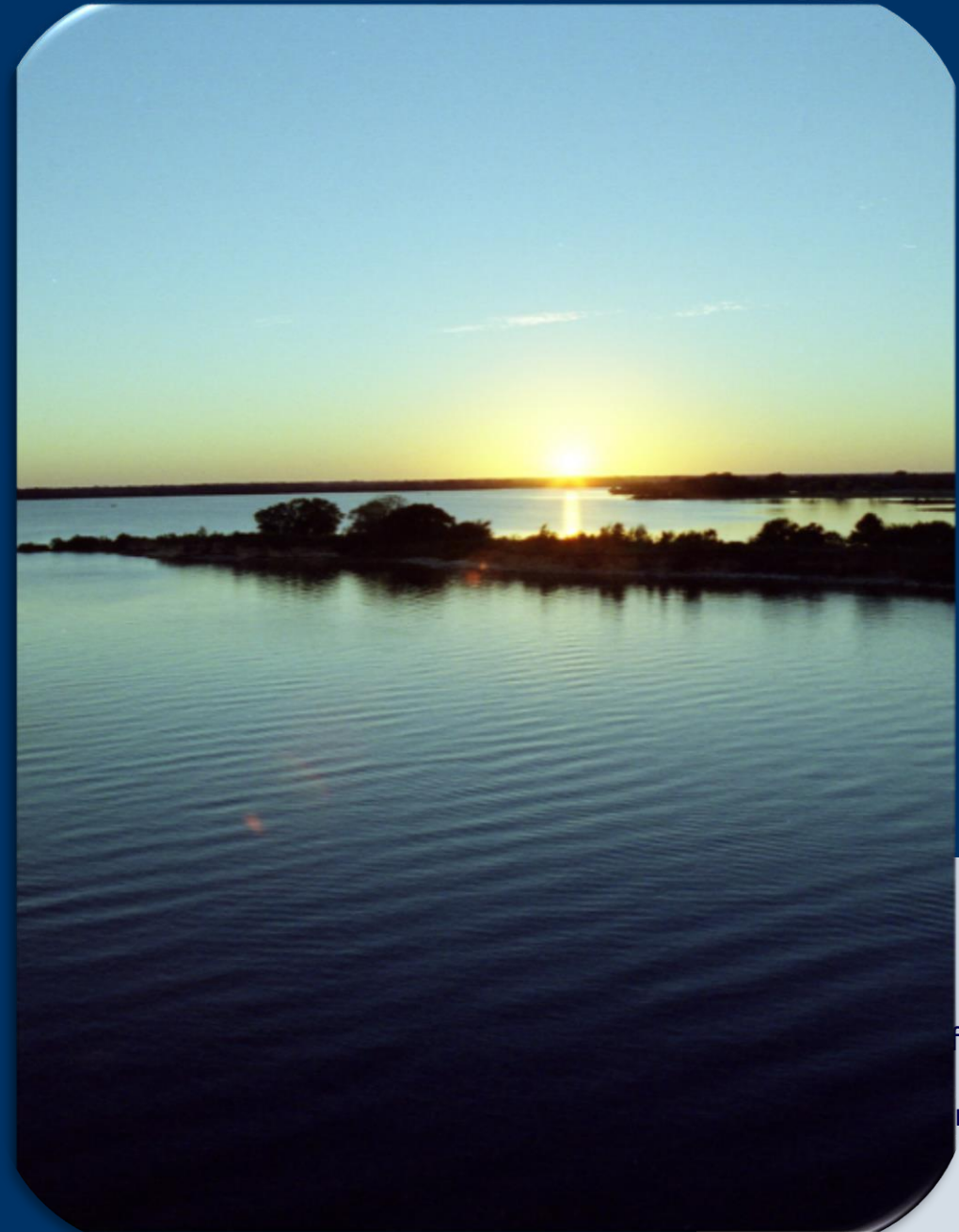
- **Located:** Brazos River Basin
- **Watershed:** from North of Stephenville to Waco
- **Length:** 115 miles
- **Watershed Area:** 1,190 square miles



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LAKE WACO

- 75% of water in Lake Waco originates from the North Bosque
 - Middle Bosque, South Bosque, and Hog Creek also contribute
- Waco's water right in Lake Waco is 79,000 acre feet (25,742,229,000 gallons)



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Brazos River

- 2,500,000 acre feet of storage capacity or 814,627,500,000 gallons
- Waco's water right is 8,001 acre feet or 2,607,133,851 gallons



Timeline of North Bosque River Impairment

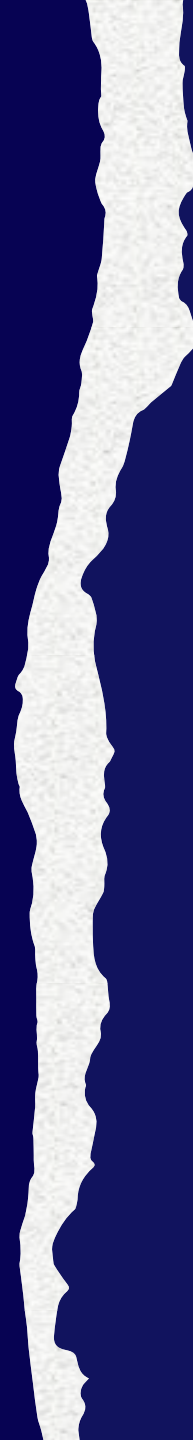
- 1990 – North Bosque River identified as a problem river
- 1992 – Listed as impaired on EPA’s 303d list of water bodies
- 1996 – Bosque River Advisory Committee formed
- 1998 – Total Maximum Daily Load (TMDL) development initiated for excessive algae associated with high nutrients
- 2001 – TMDLs for phosphorus approved
- 2002 – Implementation plan approved – included changing CAFO permits in the North Bosque from General Permits to Individual Permits

Timeline of North Bosque River Impairment

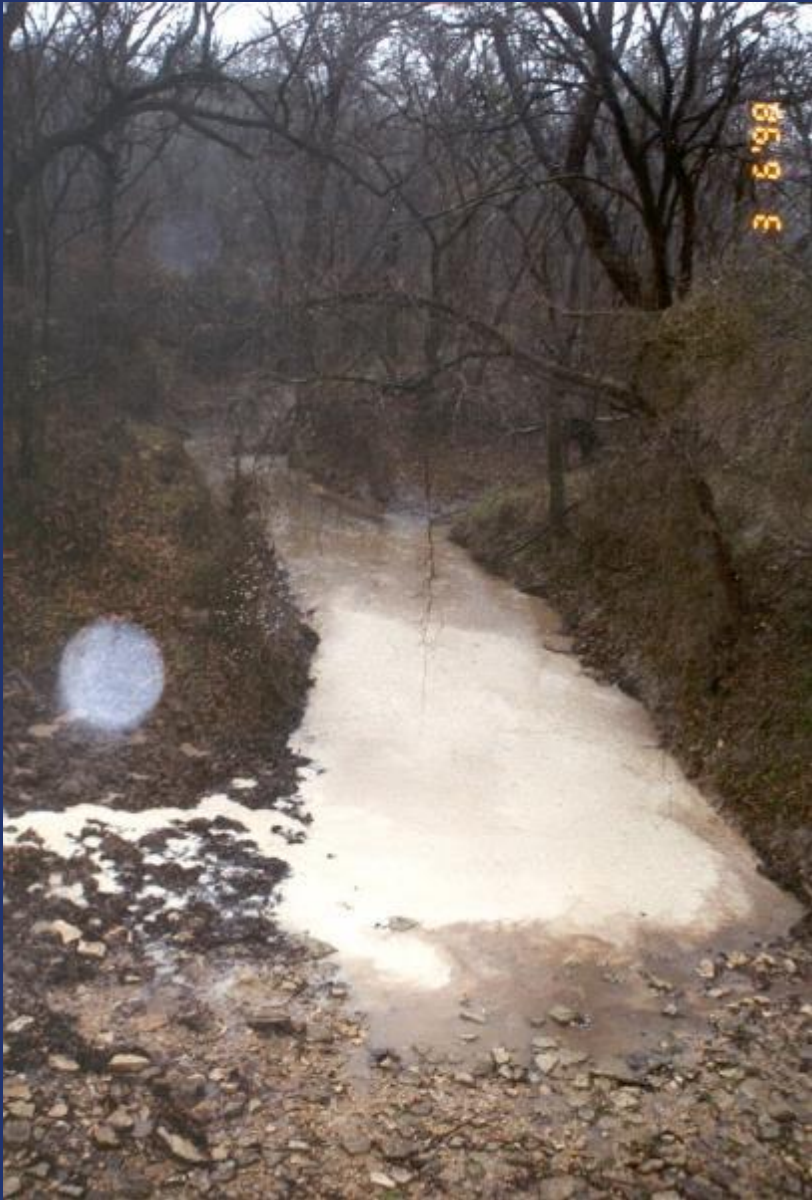
- 2004– Waco sued 14 CAFOs for damages and Clean Water Act violations
- 2005 – Agreements were reached with 8 CAFOs
- 2006 – Court mediation with 6 CAFOs resulting in Water Quality Sampling for 2 years
- 2008 – 2 years of sampling – no improvements.
- 2009 – Judgement upheld
- 2020 TCEQ formed the North Bosque River Group to discuss TMDL progress – ended March 2021
- 2023 – Legislation to alter the current law was introduced



What Did
Impairment Look
Like?



High phosphorous levels cause algae growth.



Duffau Creek, 1998

r utility bills impacted you?

Waco Tribune-Herald OPINION

THURSDAY
March 23, 2006

8A





120lbs of wet manure/day/cow
Approximately 64,000 dairy cows in 2009
2,803,200,000 pounds of waste
BUT WHERE DOES IT GO?



Solid Waste (Manure)

- Applied to Fields



Liquid Waste

Applied to fields for
"fertilizer" & waste
disposal





Algal Blooms at Lake Waco - 2009



More algal blooms in Lake Waco



5/11/2000

Filtration Basin at Riverside



What Changed?

- Waco was publicly vocal about the issues
- Upstream Wastewater Treatment Plants updated their process
- Waco pursued legal action against the “bad actors”
- June 2011 the Dissolved Air Flotation Plant became operational
 - Almost \$60M spent on engineering & construction
 - Approximately \$53M spent on operations and maintenance in the past 13 years
 - Over \$5M in legal fees



Waco has invested over \$118,000,000 and counting to try to solve a problem it did not create.

DAF skimming
organics from
raw water



Ramping Up Our Activities to Protect the Watershed 2022-2024

- Hired a Source Watershed Manager who starts in early November
- Increased sampling particularly during “flushing” or heavy rainfall events
- Monitoring other agencies’ water samples, including the Texas Institute of Applied Environmental Research at Tarleton State University
- Conducting water sampling at the request of property owners
- Meeting with CAFO operators to tour sites, and increase understanding of the digesters being installed
- Understanding the science regarding the application of phosphorus in waste application fields using studies from the University of Nebraska and Texas A & M

The background features a dark teal color with several overlapping, organic, rounded shapes in a lighter green shade. These shapes are arranged in a way that suggests a landscape or natural environment, with some shapes resembling hills or water bodies. The overall aesthetic is clean and modern.

Source Water Protection Plan



Potential Issues Affecting Lake Waco & Brazos River

- Algal Blooms
- Sedimentation & Turbidity
- Oxygen Depletion
- Excessive Aquatic Plant Growth
- Water Level Fluctuations
- Species Shifts
- Human Impacts

Strategies to Address Potential Issues

- Monitoring & Assessment
- Watershed Management
- Pollution Control
- Habitat Restoration
- Community Engagement & Education
- Invasive Species Management
- Adaptive Management



A close-up photograph of water being poured into a clear glass. The water is captured mid-pour, creating a dynamic splash with many white bubbles and ripples. The background is a soft, out-of-focus green, suggesting a natural setting. The lighting is bright, highlighting the clarity of the water and the texture of the bubbles.

Emphasis Going Forward

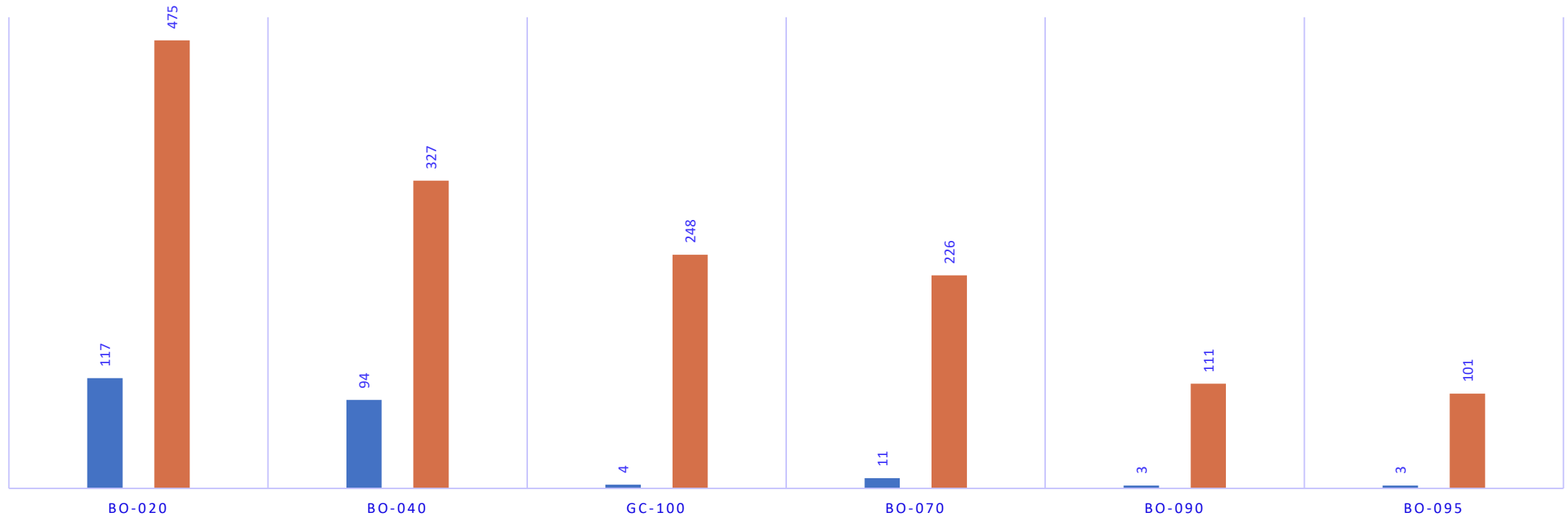
- Source Watershed Protection Manager - Kimberly Gamez, will begin early November
- Continue sampling and monitoring of Lake Waco, Brazos River, North Bosque River, and Tributaries
 - Utilize and develop partnerships with TIAERs and Brazos River Authority
- Revitalize the Bosque River Coalition
- Continue reviewing CAFO permit applications
- Continue monitoring TCEQ soil sample results of WAFs
- Informing our citizens of the value of Lake Waco and the Brazos Watershed
- Adoption of the CAFO Matrix

North Bosque River Drought and Flood Causing the Flushing Effect



LOW FLOW VERSUS RAIN EVENT ORTHO-PHOSPHATE OBSERVED LOADING (UNITS = MICROGRAMS PER LITER)

■ Mar-23 ■ Oct-23



CAFO Matrix

- Reviewed by City consultants
- Received by the Texas Association of Dairymen
 - Requested their comments
- The CAFO Matrix is designed to allow the growth of CAFO's without conflict from Waco by:
 - Utilizing a digester: efficiently processing waste
 - Ensuring WAF compliance: Maintain field levels below 200 ppm of phosphorus
 - Removing waste from the watershed: Manure transported out of the North Bosque Watershed
 - No outstanding violations: All operations comply with regulations
- Council approval of CAFO Matrix once all comments received and reviewed

CAFO – Permit Renewal or Amendments With Less Than a 10% Increase in Herd Size

Permit Renewals or Amendments		No Comment	Comment	Comment w/ Contest	
Headcount: 0-10% increase					
Waste Applied Outside Watershed		x			
Waste Applied Inside Watershed					
	Digester Used; "Cake" /Dry Waste Application				
		All Existing WAFs less than 200 ppm	x		
		Existing WAFs between 201-499	20% or less	x	
			21-35%		x
			More than 35%		
		Existing WAF 500 ppm or more			x
	No Digester; "Wet" Waste Application				
		All Existing WAFs less than 200 ppm	x		
		Existing WAFs between 201-499	10% or less	x	
			11%-25%		x
			More than 25%		
		Any WAF 500 ppm or more			x
	TCEQ Related				
		Operator Violations	Never	x	
Resolved				x	
Unresolved/Existing					x
	Operator ever had any Field on mandatory phosphorus reduction plan	Yes			
		No	x		
					x

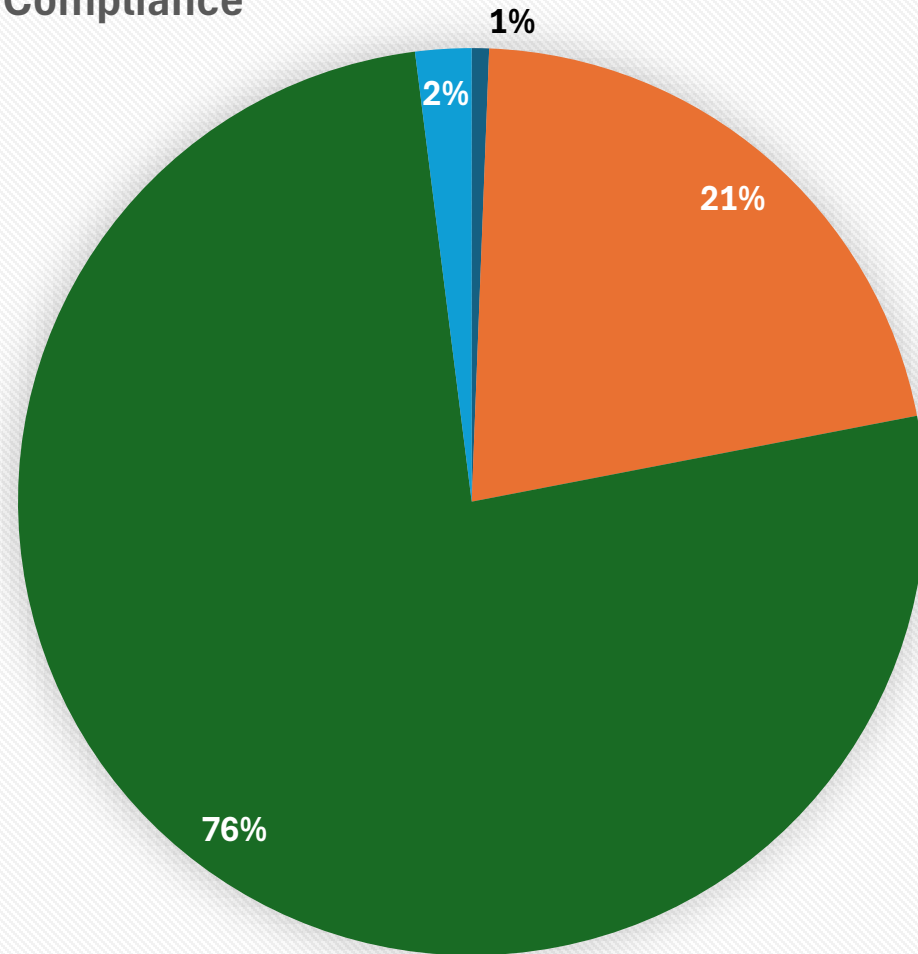
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		11%-25%		x	
		More than 25%			x
	Any WAF 500 ppm or more			x	
	TCEQ Related				
	Operator Violations	Never	x		
		Resolved		x	
Unresolved/Existing				x	
Operator ever had any Field on mandatory phosphorus reduction plan	Yes			x	
	No	x			

CAFO –New Application for Permit

ALL NEW PERMITS		No Comment	Comment	Comment w/ Contest
Waste Applied Outside Watershed		x		
Waste Applied Inside Watershed				
	Digester Used; "Cake" /Dry Waste Application			
	Use of any Existing or Former WAF			x
	No Digester; "Wet" Waste Application			x
	TCEQ Related			
	Operator Violations			
	Never	x		
	Resolved		x	
	Unresolved/Existing			x
	Operator ever had any Field on mandatory phosphorus reduction plan			
	Yes			x
No	x			

Number of WAFs in Compliance



■ Greater than 500ppm ■ Greater than 200ppm but less than 500 ■ In Compliance ■ Unknown

Working with Others

Waco continues to work with State and Federal Legislators and the Texas Association of Dairymen to:

- Look for ways to partner with the dairies for long-term solutions such as
 - Digesters, DAFs, and Composting
 - Tax incentives or credits for hauling manure out of the watershed
 - Legislation to refine the permit process – reward those who are complying and remove the manure out of the watershed with a streamlined process



Key Points

- Waco has a history of protecting Lake Waco, our drinking water supply, from upstream pollution with our time and money
- Waco will continue to advocate for sound watershed management practices in both the Brazos and North Bosque Watersheds
- Waco is looking for opportunities to partner with the CAFOs for long-term solutions
- Waco will not compromise on the water quality of the North Bosque River

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QUESTIONS?