

Status of TCEQ Project: Cottonwood Branch and Grapevine Creek Bacteria TMDLs

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Acknowledgements

- Agency Lead:
Texas Commission on Environmental Quality (TCEQ)
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Major Presentation Topics

- Background Information
- Recreational Use-Attainability (RUAA) Study
 - RUAA Components
 - Summary of 2009 Surveys
- Overview of TMDL
 - Background Information
 - Load duration curve approach
 - Summary of TMDL allocation
 - Next Steps

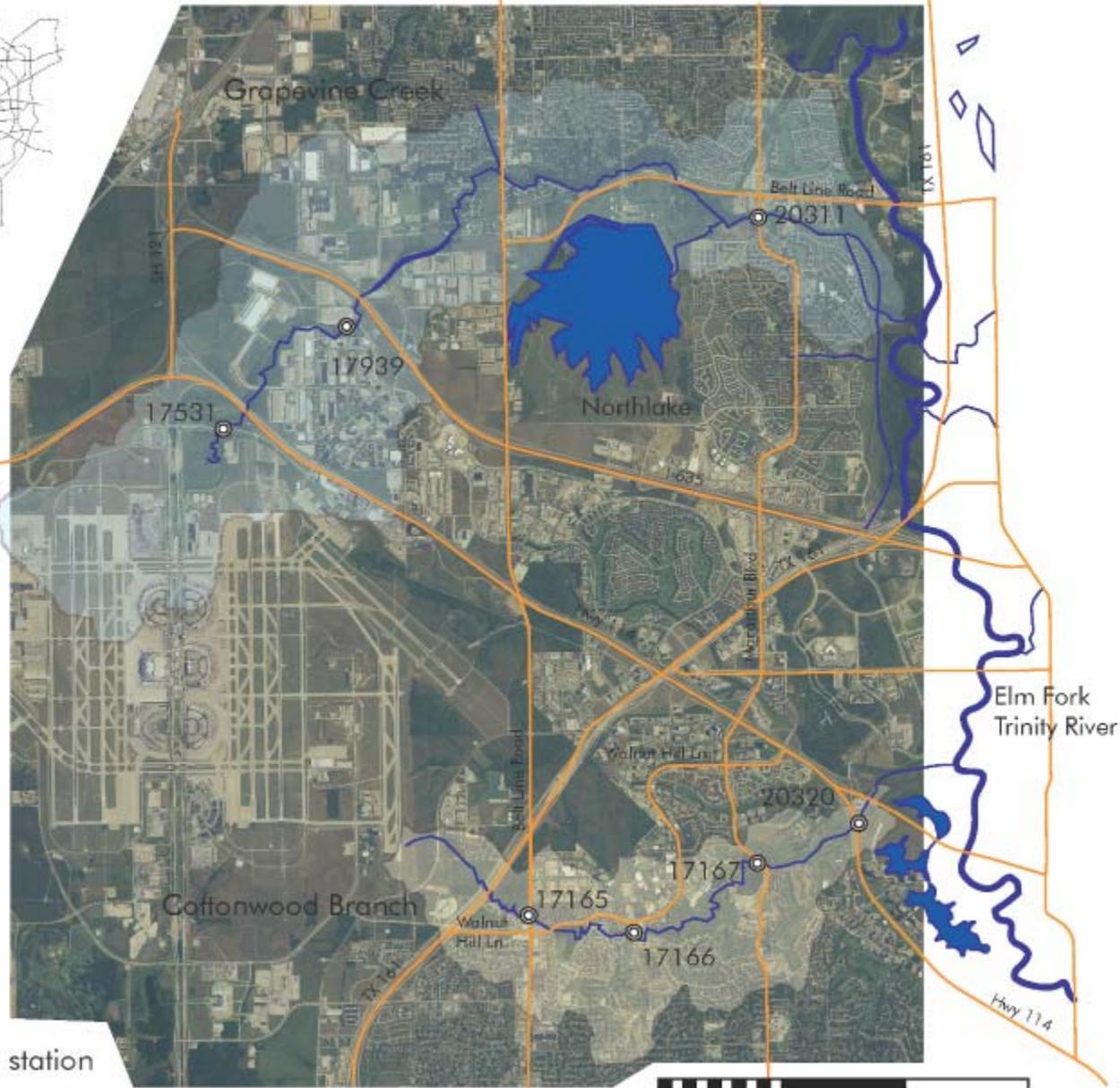
Background Information



Cottonwood Branch



Fort Worth
Indexing
Dallas



© Sampling station



Current vs. Proposed Contact Recreation Uses and Criteria

Category	Definition Summary	Current (2000) <i>E. coli</i> Criteria	Proposed (2010) <i>E. Coli</i> Criteria
Primary Contact	Significant risk of ingestion (swimming, diving, rafting, etc.)	126	206
Secondary Contact 1	No significant risk of ingestion (wading, fishing, etc.)	NA	630
Secondary Contact 2	No significant risk of ingestion; recreational activities occur less frequently because of physical characteristics or limited access	NA	1030
Non-Contact	No significant risk of ingestion and contact recreation should not occur because of unsafe conditions	605	2060

All criteria are based on geometric mean values (#cfu/100ml); Current WQS also include single sample maximum criterion of 394cfu/100mL which is not included in proposed revisions.

Cottonwood Branch (0822A) Grapevine Creek (0822B)

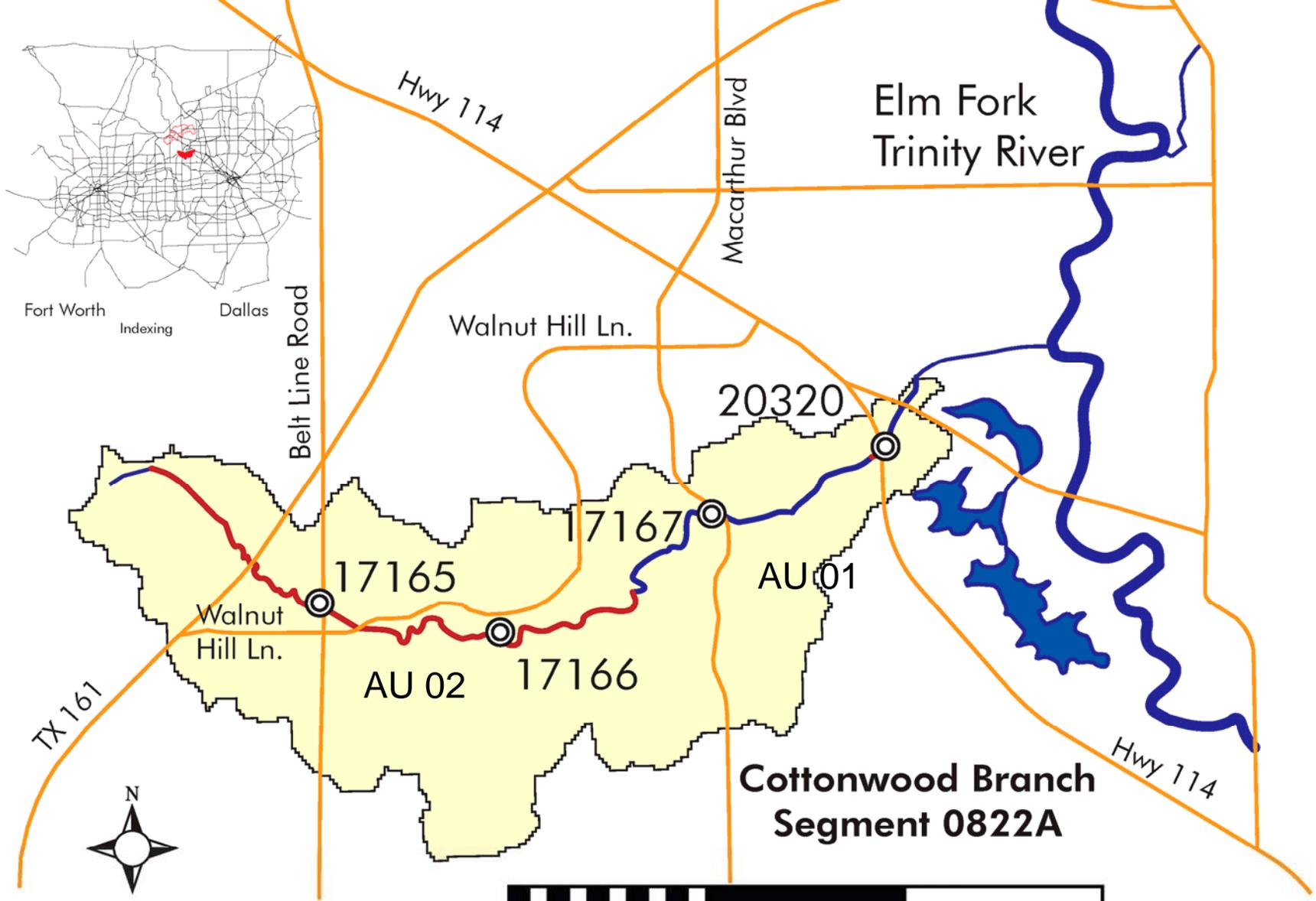
Source: 2008 Water Quality Inventory

Segment / Assessment Unit	Count	Geometric Mean (col/100 ml)	Percentage of samples exceeding 394 (%)
0822A_01	63	45	8
0822A_02	62	778	44
0822B_01	39	381	23

2008 Texas Water Quality Inventory and 303(d) List

0822A Cottonwood Branch (a tributary
to Hackberry Creek)

Not supporting in 3.5 mile stretch
from approx. 0.5 mi downstream of
N. Story Rd. to Valley View Rd.



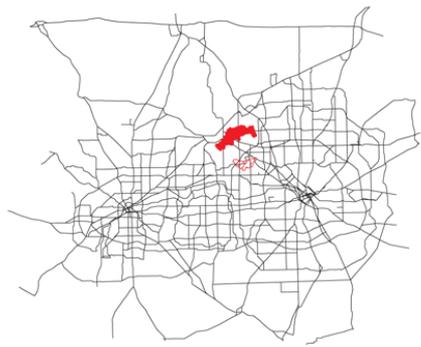
⊙ Sampling station

— Impaired section of reach

2008 Texas Water Quality Inventory and 303(d) List

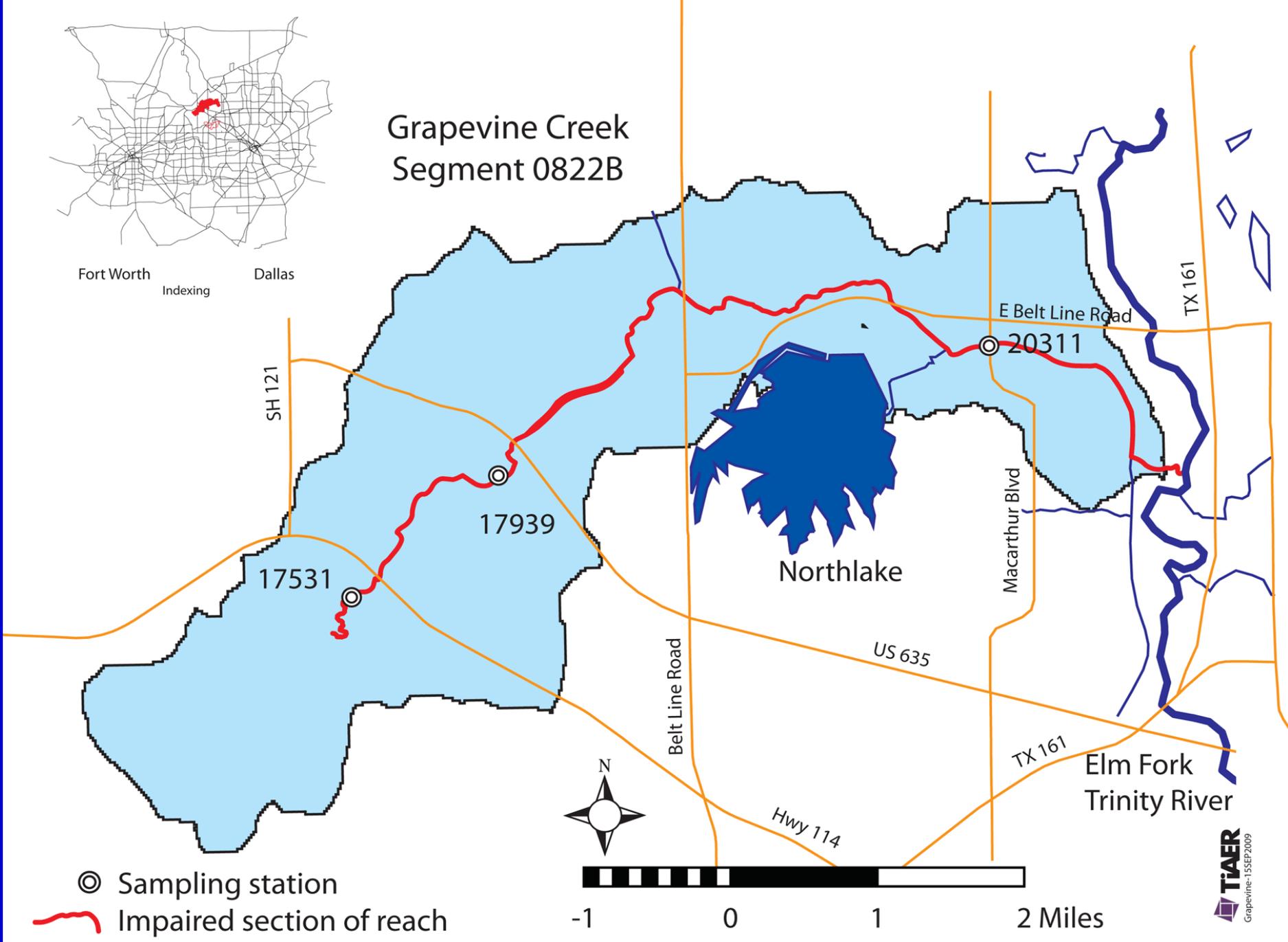
0822B Grapevine Creek

From the confluence with Elm Fork
Trinity River in Dallas County
upstream to its headwaters west of
International Parkway at DFW
Airport in Tarrant County.



Fort Worth
Indexing
Dallas

Grapevine Creek Segment 0822B



- ⊙ Sampling station
- Impaired section of reach

Comparison of Assessment Findings to Present and Proposed Criteria (all units in cfu/100 ml)

Segment/category	Assessed Geomean	Present Primary Contact	Proposed Primary Contact	Proposed SCR1
Cottonwood Br. 0822A_01	45	126	206	630
Cottonwood Br. 0822A_02	778	126	206	630
Grapevine Cr. 0822B_01	381	126	206	630

A photograph showing a man standing in a grassy field next to a body of water. In the background, there are trees and a large, multi-story building with a blue roof. The scene is outdoors and appears to be a park or recreational area.

Recreational Use-Attainability Study

- **RUAA Components**
- **Summary of 2009 Surveys**

Source of Information

Recreational Use-Attainability Analysis
(RUAAAs)

Procedures for a Comprehensive RUAA
and a Basic RUAA Survey

May 2009

[http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stakeholders/recUAAprocedures
May2009.pdf](http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stakeholders/recUAAproceduresMay2009.pdf)

Basic & Comprehensive RUAAAs

Basic RUAA:

1. Establish/verify a presumed use
2. Conducted on small unclassified streams

Comprehensive RUAA:

1. Includes Basic RUAA information
2. Required for classified water bodies or unclassified water bodies where presumed uses may be inappropriate

Study coordination with local entities and TCEQ

1. What we are continuing today (process started with meeting June 11, 2009)
2. Includes determination and documentation of appropriateness for stream or river to have RUAA conducted

Sampling Conditions for Surveys

1. Air temperature > 70 F
2. Sustained or typical dry, warm-weather streamflow
3. Performed during period when use likely (Spring Break, weekends, holidays, and summer)

Site Selection

1. Reconnaissance to select survey sites
2. Generally, 3 sites per 5 miles of stream
3. Sites located at road crossings or other public access locations

Components of a RUAA

- Conduct field surveys comprised of:
 - Complete field data sheet for each site
 - Documented weather conditions (current and antecedent)
 - Photographic record

Field Data Sheet Information

- Information on stream characteristics
- Streamflow measurement
- Current air and water temperature
- Riparian zone, ease of bank access, dominant substrate
- Document any recreation water and non-water uses observed
- Stream and pool measurements

RUAA Components (cont'd)

- Two or more separate survey trips
- Historical information review
- Interviews from users and others present during surveys
- Final RUAA report to be submitted to TCEQ

Summary of RUAA Surveys
Conducted to Date
August 4-9, 2009
&
August 25-29, 2009

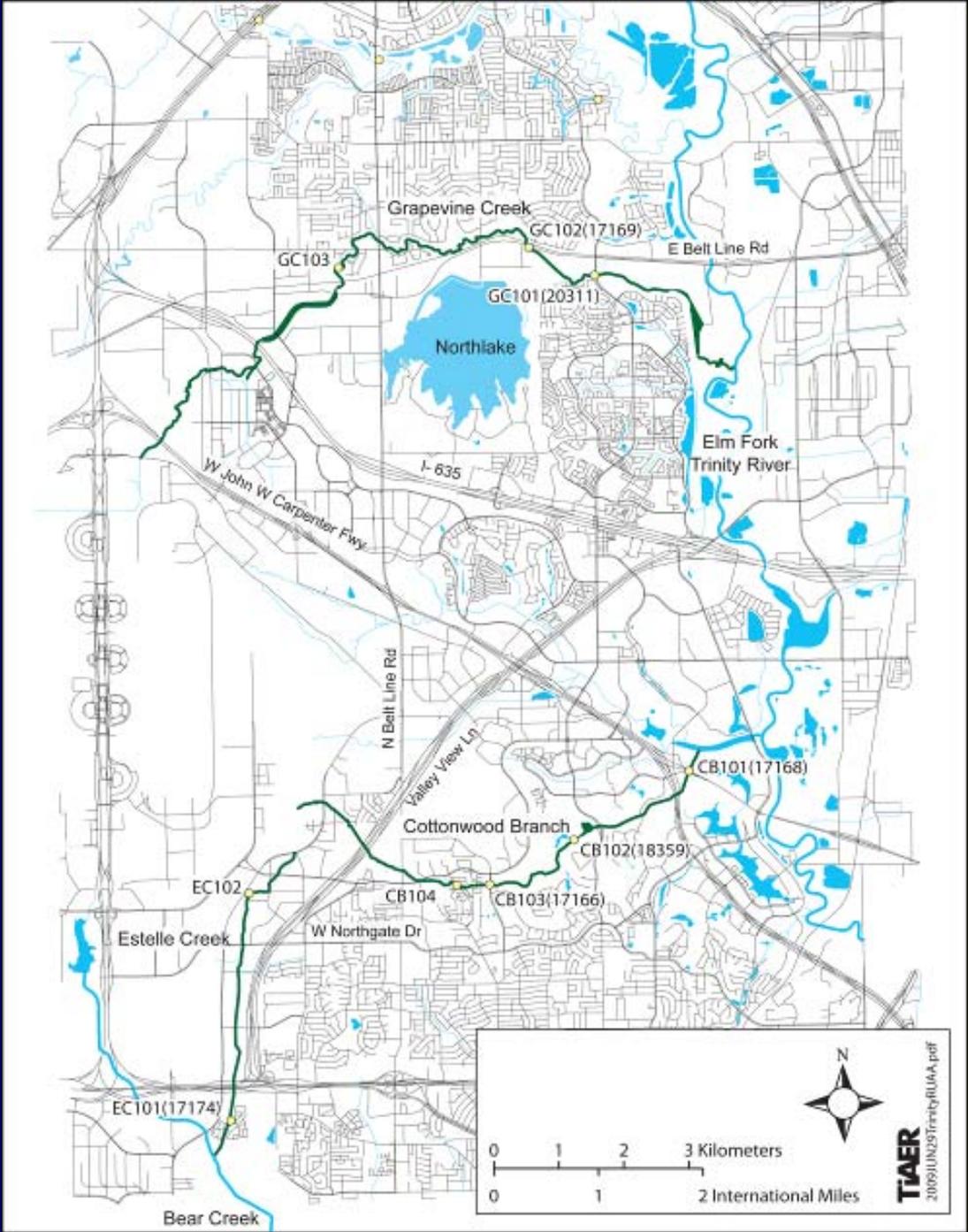
Grapevine Creek

- **Grapevine Creek (Stream Segment 0822B)** is small tributary of the Elm Fork Trinity River (0822) below Lake Lewisville. Grapevine Creek originates in Tarrant County on the north end of DFW Airport and flows generally northeast through Grapevine, Texas and forms the boundary between Coppell and Irving, Texas prior to entering the Elm Fork Trinity River near Carrollton, Texas north of Dallas.

Grapevine Creek Sites

- Site GC101 (TCEQ Station 20311) is located at N. McArthur Blvd. in Irving, Texas.
- Site GC102 (TCEQ Station 17169) is located approximately 30 m downstream of E. Beltline Rd.
- Site GC103 is located in Coppell at Park Rd. off W. Bethel Rd in Grapevine Springs Park

Grapevine Creek



Grapevine Creek Activity Summary

- Site GC101 no activities observed; ATV tracks documented.
- Site GC102 no activities observed; ATV tracks documented.
- Site GC103 observed park being used for picnicking and a scout meeting; no water contact observed

Grapevine Creek GC101 150m downstream August 6, 2009



**Site GC101 ATV tracks
August 6, 2009**



**Site GC102 180m ATV tracks
August 6, 2009**



Grapevine Creek GC103 150m upstream August 6, 2009



Grapevine Creek GC103 Park August 7, 2009



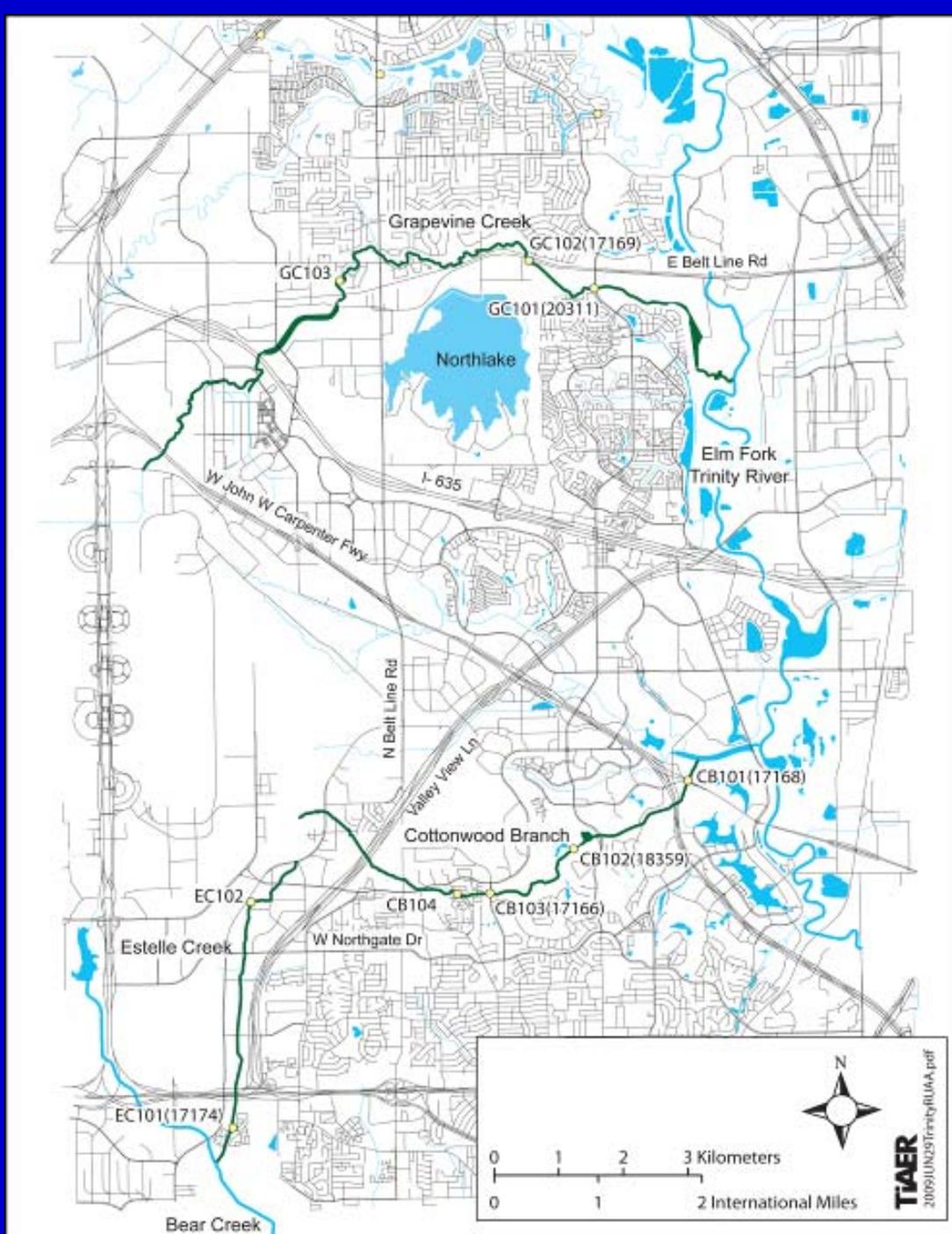
Cottonwood Branch

- **Cottonwood Branch (Stream Segment 0822A)** is a six mile unclassified stream running upstream from Hackberry Creek to Valley View Road in Irving, Texas, Dallas County. Cottonwood Branch flows generally west to east from near State Highway (SH) 161 on the east side of Dallas/Fort Worth (DFW) International Airport, through Irving, Texas, and to a confluence with Hackberry Creek near Dallas, Texas just west of the Elm Fork Trinity River.

Cottonwood Branch Sites

- Site CB101 (TCEQ Station 17168) is located on Cottonwood Branch at Highway Spur 348 near the confluence with Hackberry Creek, in Irving.
- Site CB102 (TCEQ Station 18359) is located on Cottonwood Branch on the campus of North Lake College approximately 433 m upstream of McArthur Blvd. in Irving.
- Site CB103 (TCEQ Station 17166) is located on Cottonwood Branch at N. Story Rd in Irving.
- Site CB104 is located on Cottonwood Branch at the crossing of Las Brisas Dr. in Irving.

Cottonwood Branch



Cottonwood Branch Activity Summary

- Site CB101 – no activities observed.
- Site CB102 – observed fishing at location on each visit during RUAA surveys.
- Site CB103 – no activities observed.
- Site CB104 – a couple of kids came to see what we were doing and they threw some rocks; an individual walking over the dirt bridge indicated no one entered the water.

Cottonwood Branch CB101 150m upstream August 6, 2009



Cottonwood Branch CB102 DCURD Sign



Cottonwood Branch CB102 fishing August 6, 2009



Cottonwood Branch CB103 weekend visit August 28, 2009



Cottonwood Branch CB104 rock throwers August 6, 2009



Remaining RUAA Components:

- Conduct final survey May-June 2010
- Develop draft RUAA Comprehensive report for TCEQ review (late summer 2010)
- Finalize RUAA report (fall 2010)
- TCEQ review findings
- If TCEQ determines use change justified, submitted with next water quality standards revision
- EPA must approve standards revision

THANK YOU

Questions?

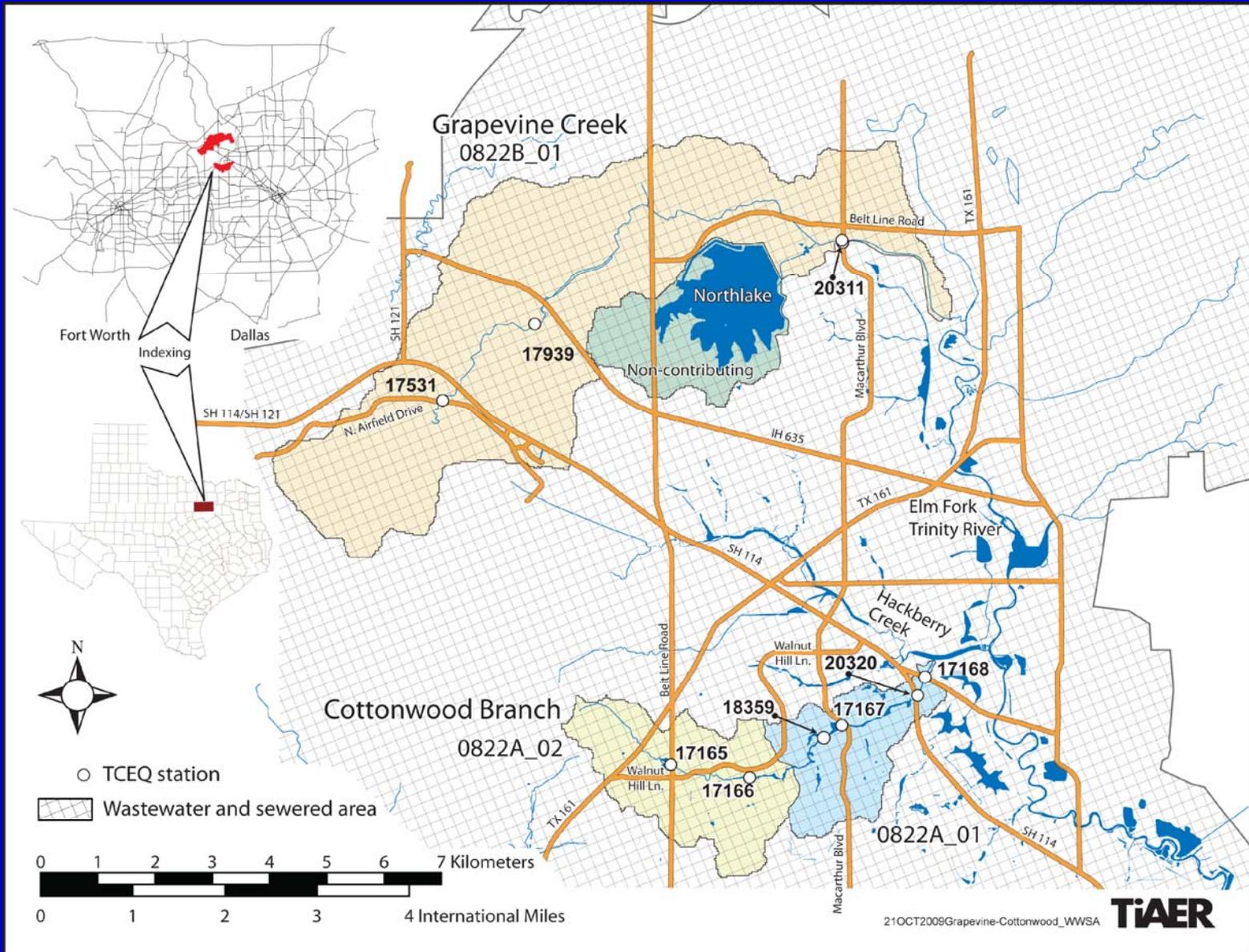
Overview of TMDL Development

- TCEQ contract with TIAER to collect additional data and to develop TMDL (Sept. 2007)
- Monitoring occurred January - August 2008 for additional bacteria data.
- Initiated preliminary work on TMDL, including load duration curve development (beginning summer 2009)

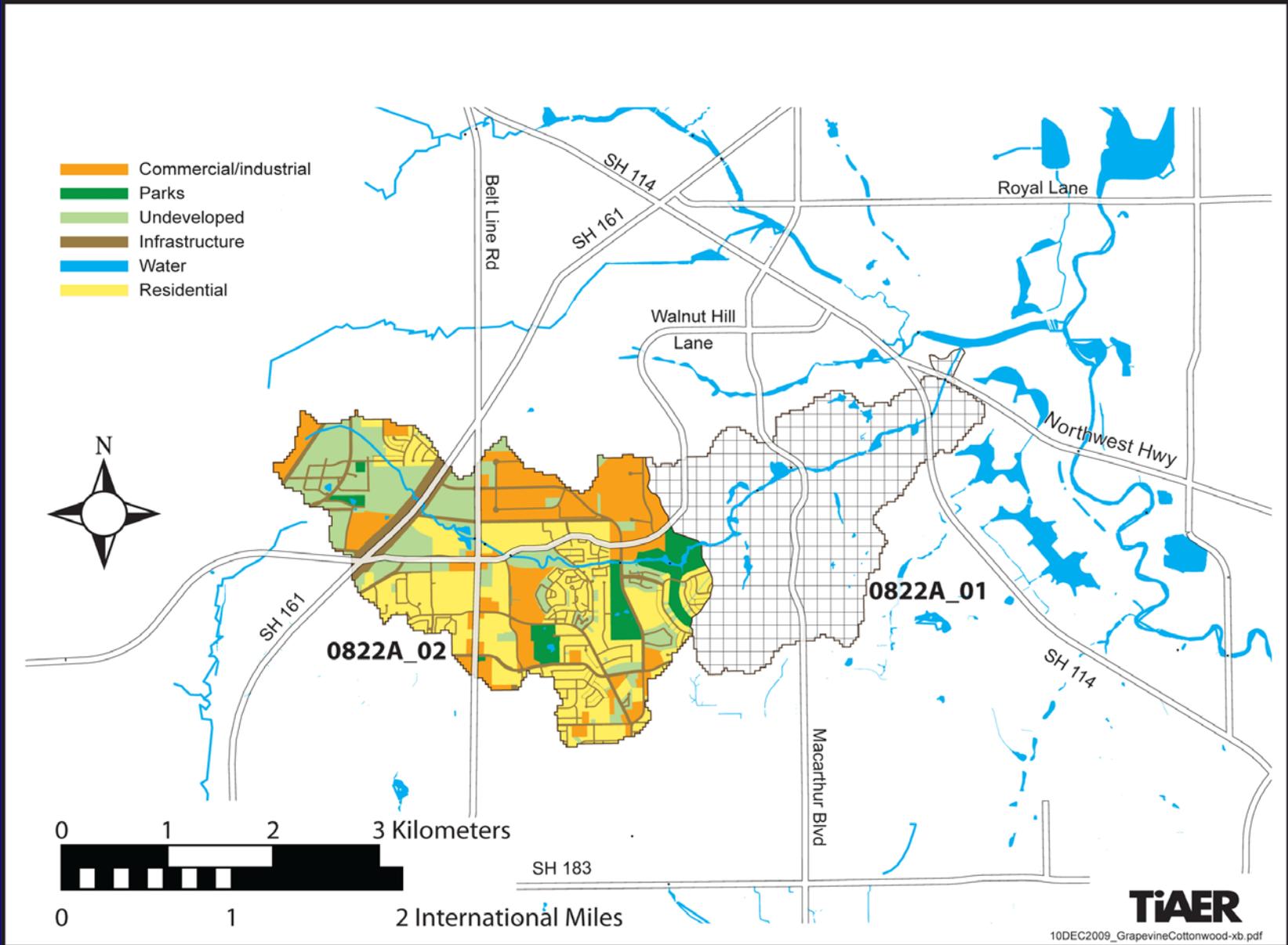
Overview TMDL (Cont'd)

- Developed TMDL Technical Support Document (report provided to TCEQ Jan. 13, 2010)
- TIAER assistance in TCEQ TMDL Report (ongoing)
- Public Meeting Process
 - June 10, 2008
 - September 9, 2009
 - April 22, 2010 (today!)

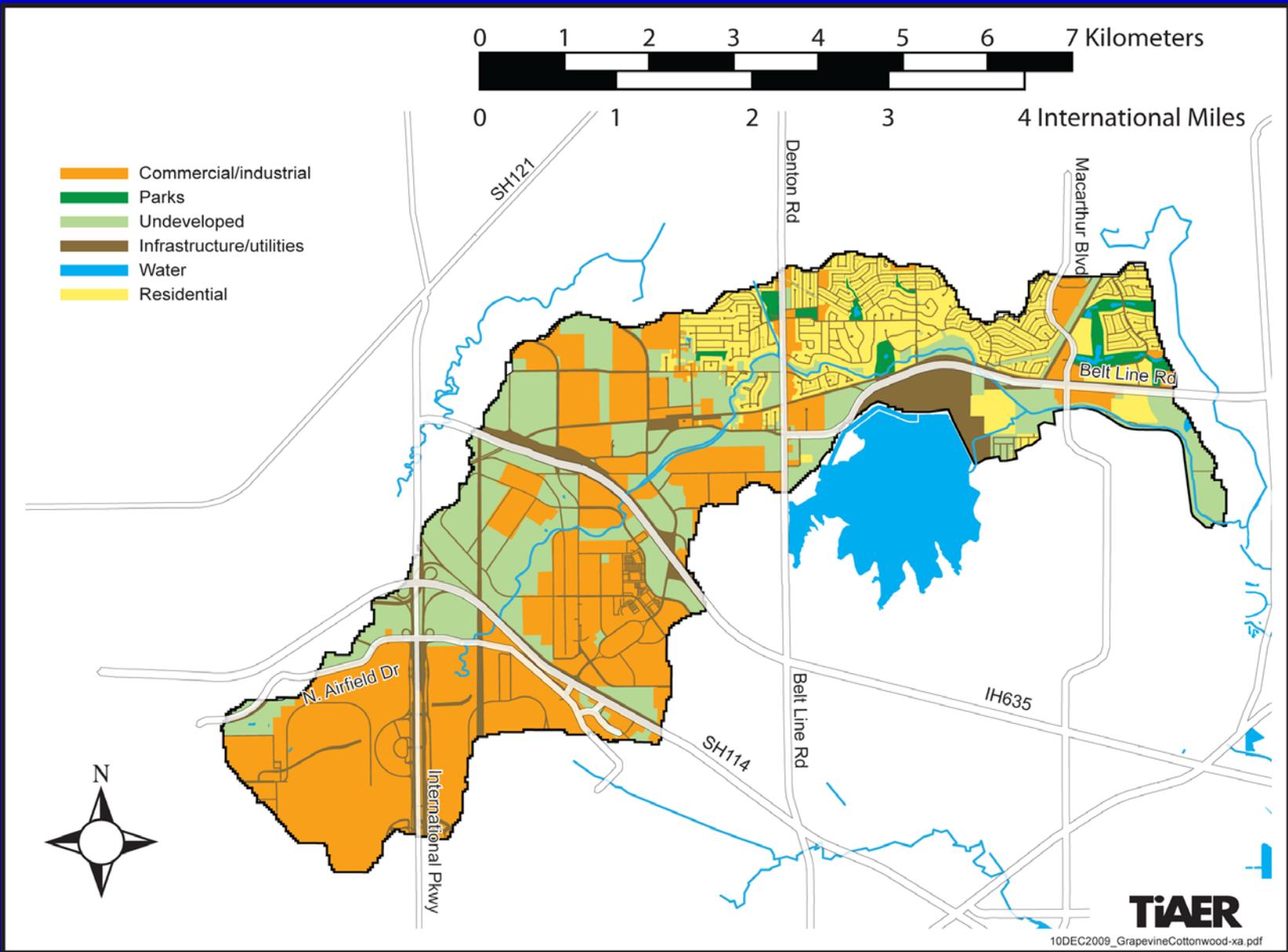
TMDL Allocations: Background Information



Cottonwood Branch (0822A) & Grapevine Creek (0822B) Location Map



**Cottonwood Branch (0822A)
2005 Land Use of Impaired AU (Source: NCTCOG)**



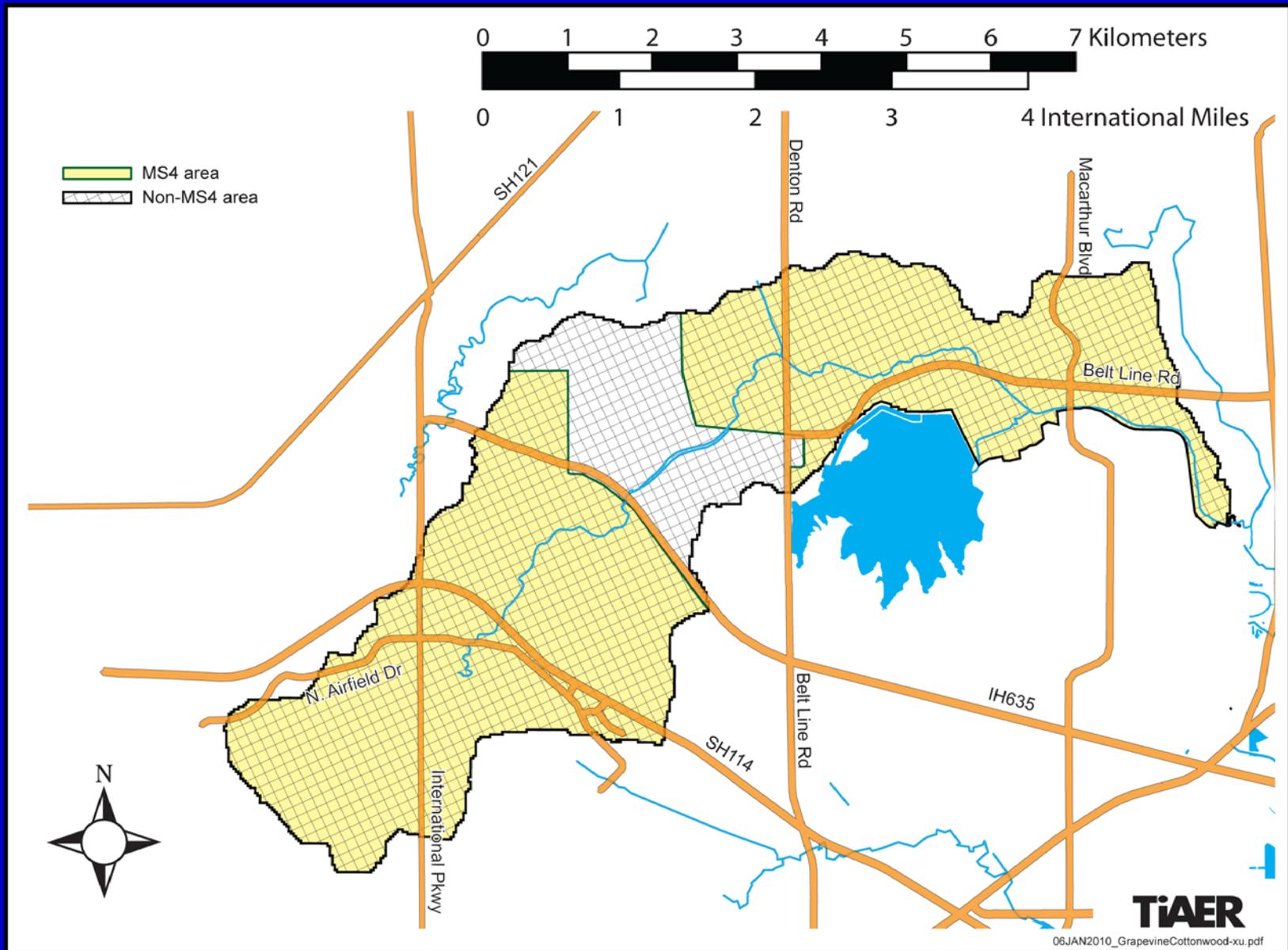
**Grapevine Creek (0822B)
2005 Land Use (Source: NCTCOG)**

MS4 Permitted Entities

Impaired Assessment Unit	Regulated Entity Name	NPDES Permit Number	TPDES Permit Number**
0822A_02	North Texas Tollway Authority	TXS000703	WQ0004400-000
0822A_02 and 0822B_01	City of Irving	TXS001301	WQ04691-000
0822B_01	City of Coppell	TXR040375	Phase II General Permit
0822B_01	City of Dallas	TXS000701	WQ0004396-000
0822B_01	DFW International Airport*	TXR040044	Phase II General Permit
0822B_01	City of Grapevine	TXR040114	Phase II General Permit

*Outfall 059 on the DFW Airport individual storm water permit (WQ0001441) included as MS4-permitted storm water.

** Phase II permits under TPDES General Permit No. TXR040000



Grapevine Creek (0822B)

Permitted and Non-Permitted Storm Water Areas

Overview of TMDL Allocation Process

TMDL Allocation Process

- Allocates pollutant loads among regulated (permitted) and non-regulated (non-permitted) sources in the watershed
- TMDL is the maximum amount of pollutant loading a water body can receive without violating water quality standards.

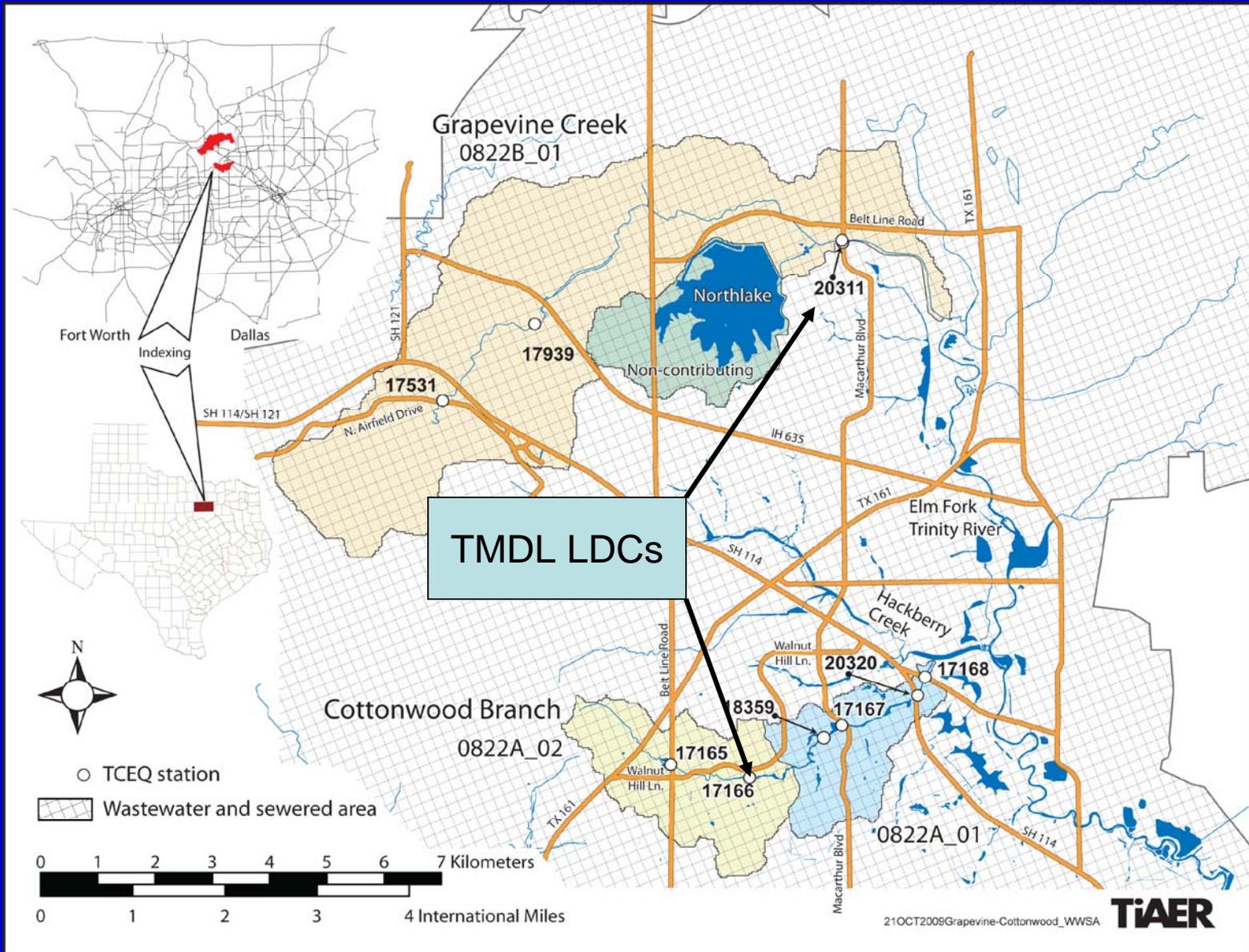
TMDL Allocation equation

$$\mathbf{TMDL = WLA_{WWTP} + WLA_{PSW} + LA + MOS}$$

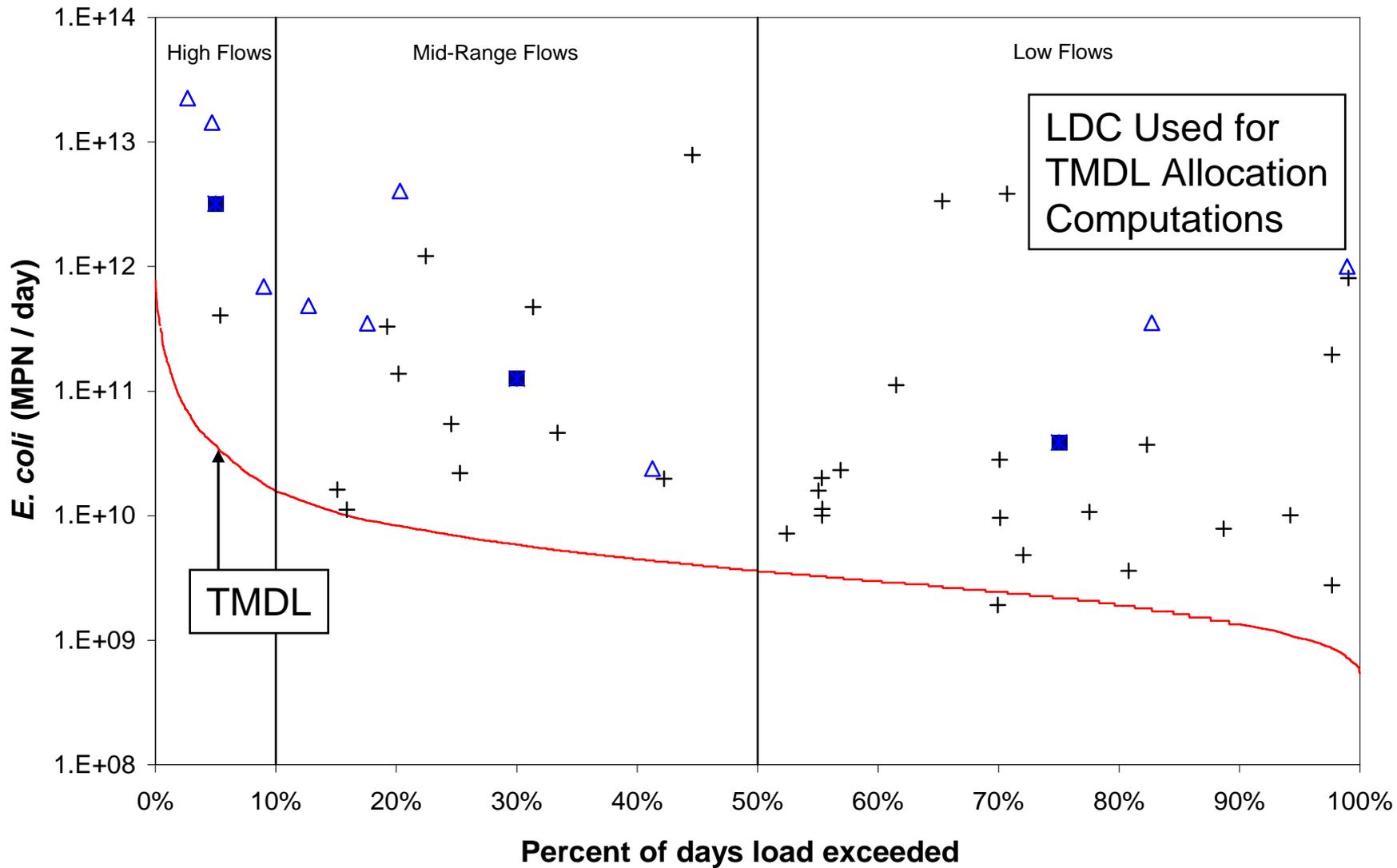
- Wasteload allocation for Waste Water Treatment Plants (WLA_{WWTP}) is the portion of the TMDL allocated to existing wastewater treatment discharges.
- Wasteload allocation for Permitted Storm Water sources (WLA_{PSW}) is the portion of the TMDL allocated to existing MS4 discharges.
- Load allocation (LA) is the portion of the TMDL allocated to existing non-regulated (nonpoint) sources and to natural background sources.
- Margin of safety (MOS) is the mechanism to account for uncertainty in the determination of the pollutant loadings.

Load Duration Curves (LDCs)

- The load duration curve method provides for allocation of pollutant (bacteria) loadings to the general categories of point and non-point sources. Point sources include regulated stormwater sources.
- The load duration curve method is widely used across the country and recommended by the State's recent Bacteria Task Force.

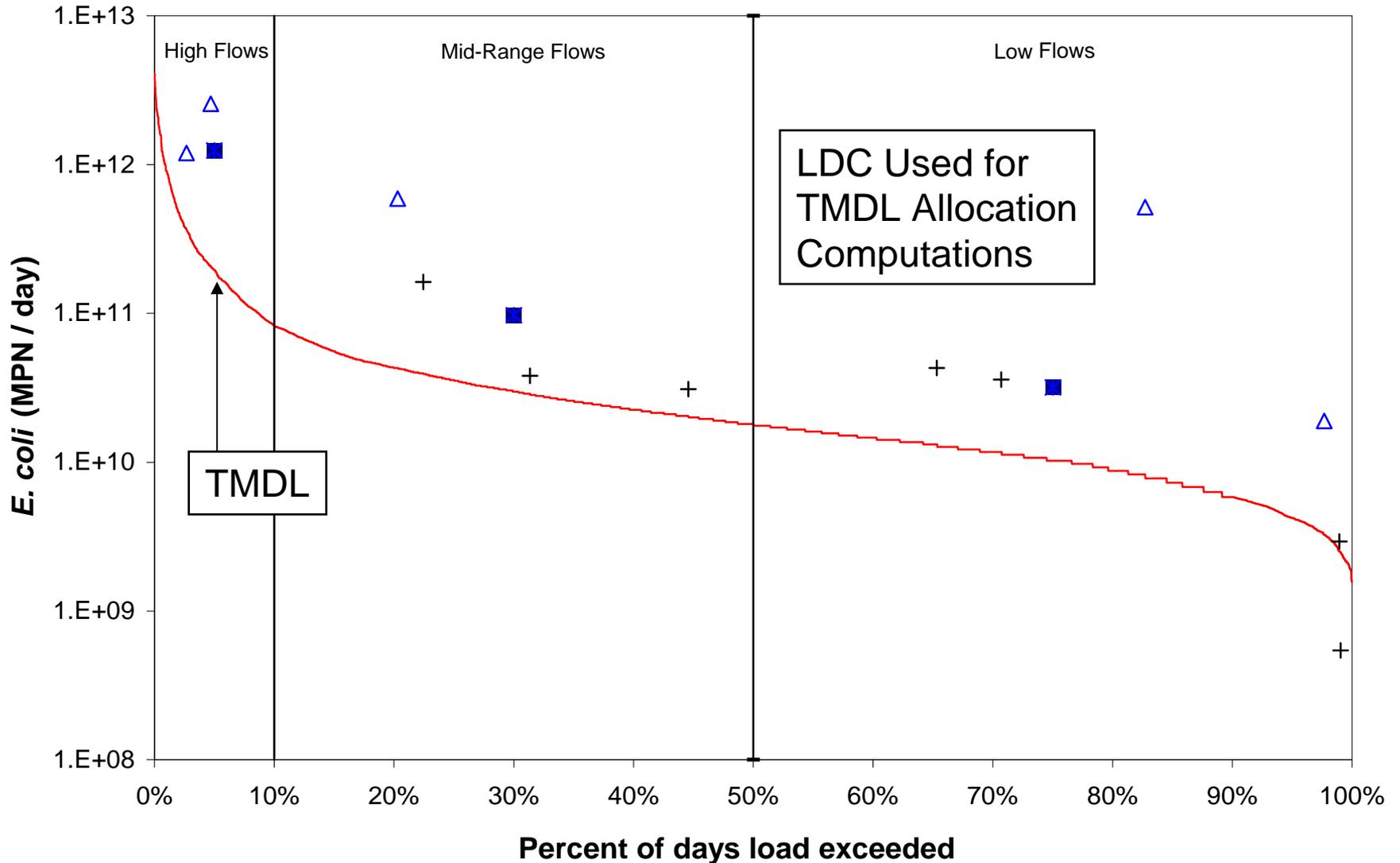


Cottonwood Branch (0822A) & Grapevine Creek (0822B) Location Map



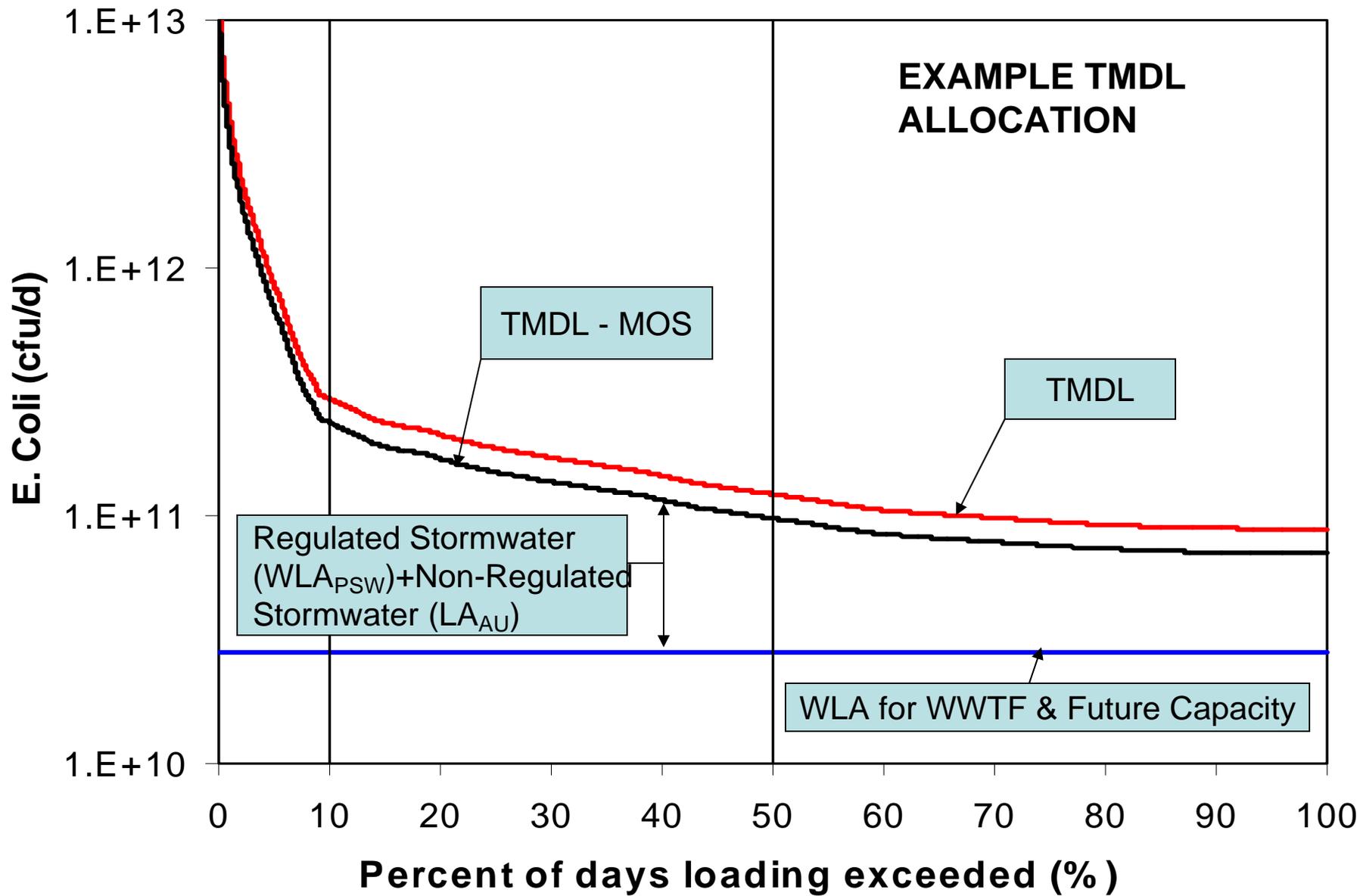
— Allowable Load at Geomean Criterion + Non-wet Weather Event Δ Wet Weather Event ■ Existing Geomean Load

Station 17166 (assessment unit 0822A_02)



— Allowable Load at Geomean Criterion + Non-wet Weather Event △ Wet Weather Event ■ Existing Geomean Load

Station 20311 (assessment unit 0822B_01)



— TMDL

— WLA for WWTFs

— TMDL - MOS

Pollutant Load Allocation Calculations: (TMDL for Cottonwood Branch & Grapevine Creek)

Segment	Station	Median Value of High Flow Regime (cms)	TMDL (billion MPN/day)
0822A_02	17166	0.3401	37.04
0822B_01	20311	1.802	196.22

Pollutant Load Allocation Calculations:

Margin of Safety (MOS)

$$\text{MOS (MPN/day)} = 0.05 \times \text{TMDL}$$

5 % Margin of Safety

$$\text{MOS for 0822A_02} = 37.0 \text{ Billion} \times 0.05 = 1.85 \text{ Billion}$$

$$\text{MOS for 0822B_01} = 196 \text{ Billion} \times 0.05 = 9.81 \text{ Billion}$$

Pollutant Load Allocation Calculations:

WLA for WWTF (MPN/day) = 0.0 MPN / 100 ml

No Wastewater Treatment Facilities in
Cottonwood Branch and Grapevine Creek
Watershed

Pollutant Load Allocation Calculations: (Future Growth)

Segment	2005 Population	2030 Population	Population Increase 2005 to 2030	Additional Wastewater Production (MGD)	Future Growth (Billion MPN/day)*
0822A	19,499	20,328	829	0.089	0.40
0822B	20,807	22,622	1,815	0.195	0.88

* Future growth includes a reduction for MOS of 5%

Pollutant Load Allocation Calculations:

WLA_{PSW} (MPN/day) =

$$\mathbf{(TMDL - WLA_{WWTF} - FG - MOS) * FDA}$$

TMDL = total maximum daily load allowed

WLA_{WWTF} = WWTF loads = 0.0 MPN / day

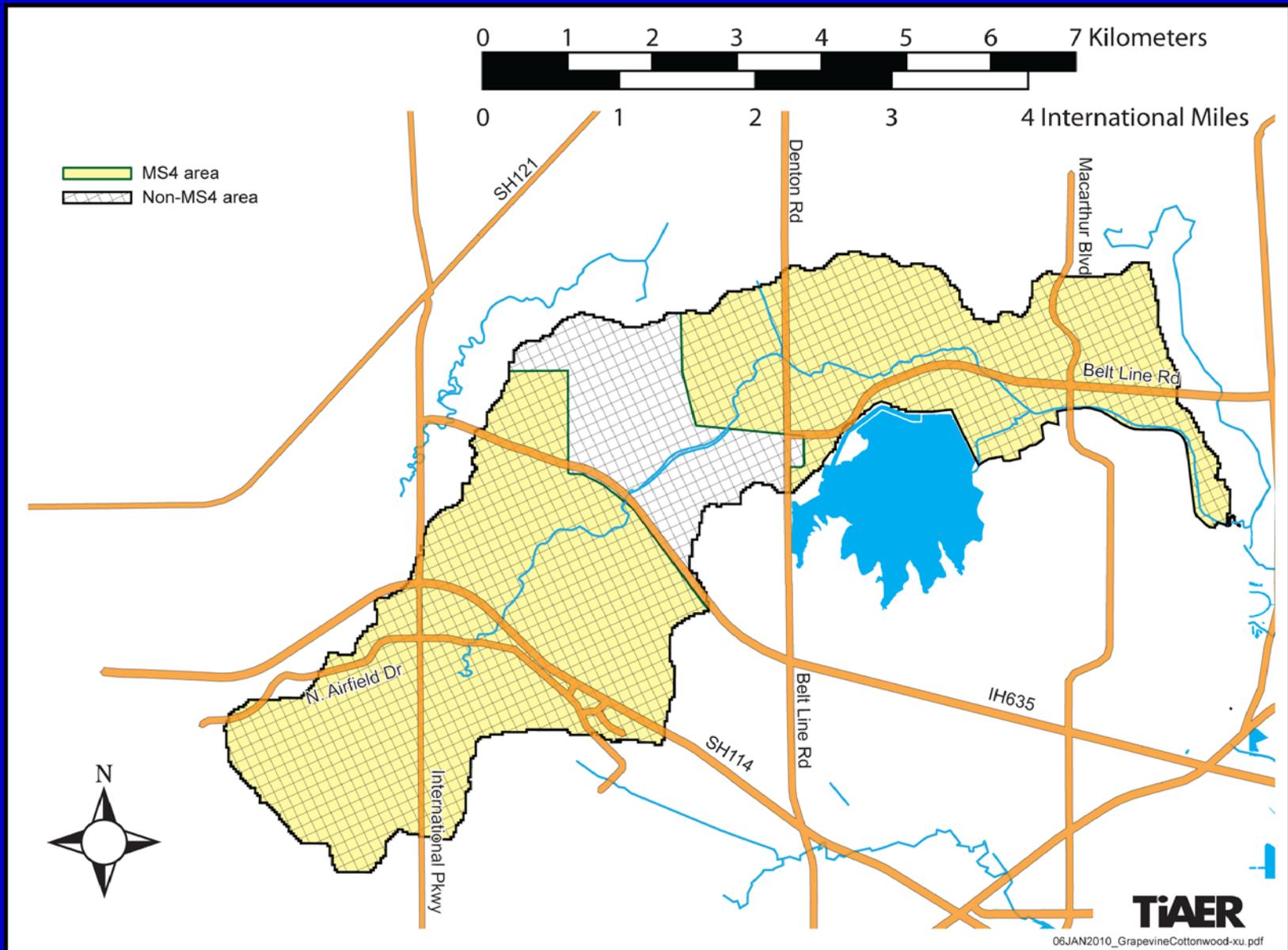
FG = Future Growth

MOS = Margin of Safety

FDA = Fraction of watershed under MS4 jurisdiction

FDA for 0822A_02 = 1.0 (or 100%)

FDA for 0822B_01 = 0.848 (or 84.8%)



Grapevine Creek (0822B)

Permitted and Non-Permitted Storm Water Areas

Pollutant Load Allocation Calculations:

$$WLA_{PSW}$$

(All units in Billion MPN/Day)

AU	TMDL	WLA_{WWTF}	Future Growth	MOS	FDA_{SWP}	WLA_{PSW}
0822A_02	37.04	0.00	0.40	1.85	1.000	34.78
0822B_01	196.22	0.00	0.88	9.81	0.848	157.25

Pollutant Load Allocation Calculations:

$$\text{LA (MPN/day)} = (\text{TMDL} - \text{WLA}_{\text{WWTF}} - \text{WLA}_{\text{PSW}} - \text{FG} - \text{MOS})$$

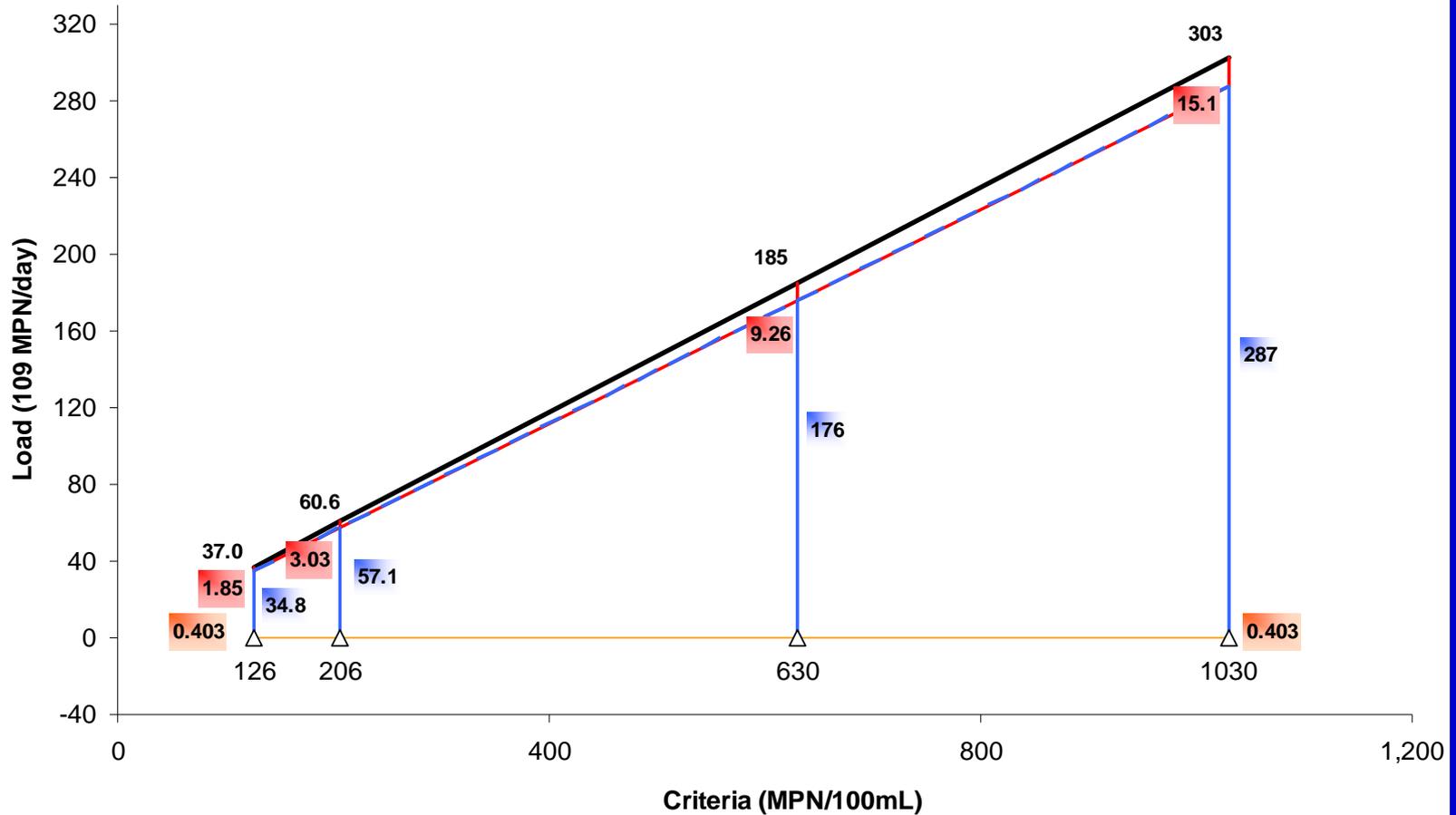
AU	LA (Billion MPN/day)
0822A_02	0.0
0822B_01	28.28

***E. coli* TMDL Allocation Summary**

(Billion MPN / day)

Assessment Unit	Stream Name	TMDL	WLA_{WWTF}	WLA_{SW}	LA	MOS	Future Growth
(all units in billion MPN per day)							
0822A_02	Cottonwood Branch	37.04	0.00	34.78	0	1.85	0.40
0822B_01	Grapevine Creek	196.22	0.00	157.25	28.28	9.81	0.88

Allocation loads for Cottonwood Branch (0822A_02) as a function of water quality criteria



△ Criteria

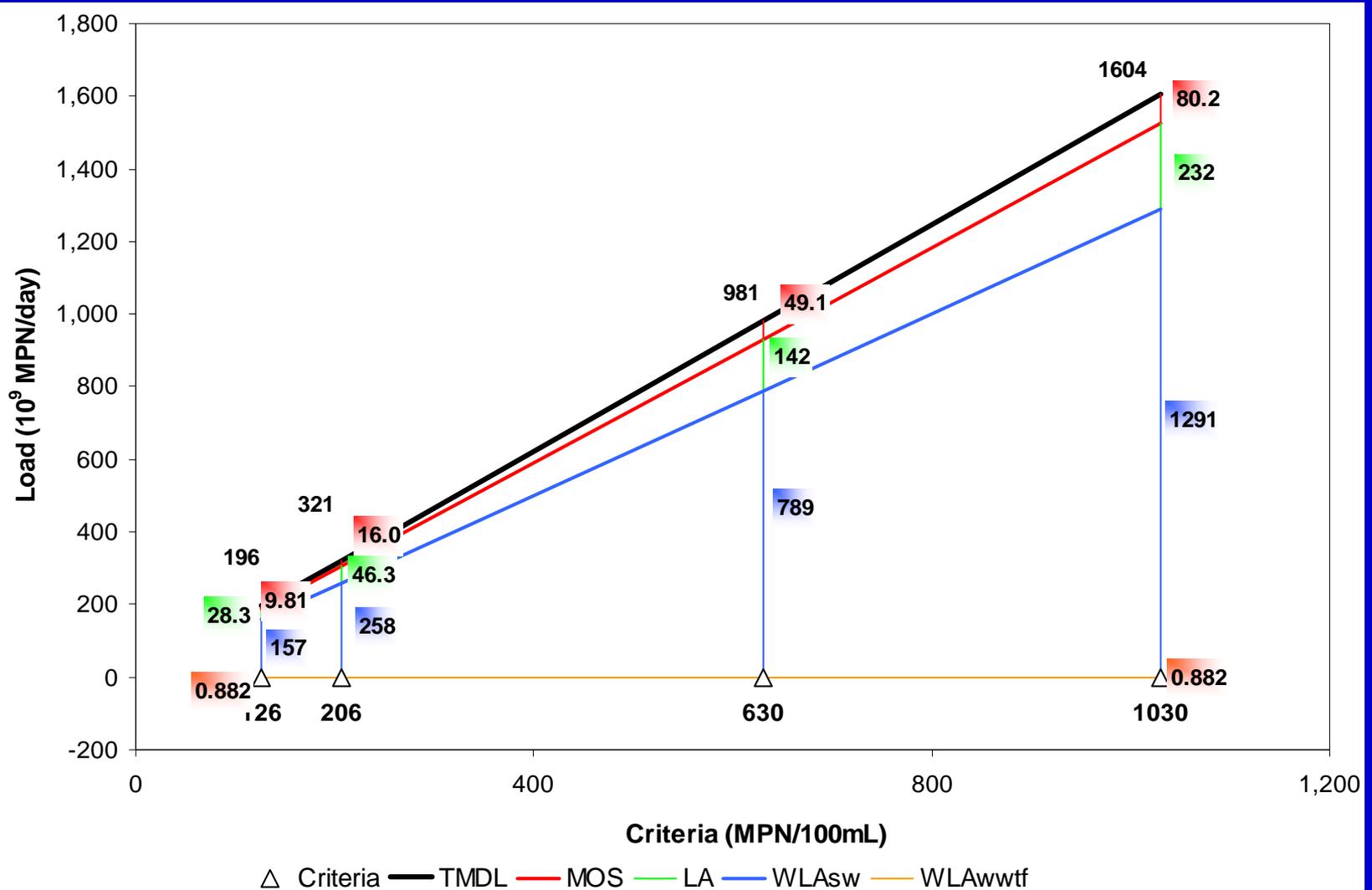
— TMDL

— MOS

- - WLAsw

— WLAwwtf

Allocation loads for Grapevine Creek (0822B-01) as a function of water quality criteria



What's next?



Grapevine Creek at
MacArthur Blvd.

Next Steps

Fiscal Year 2010 (Sept. 2009 – Aug. 2010)

- Continue process to inform stakeholders
- Initiate discussions on Implementation Plan
- Develop draft TMDL document
- Complete RUAA surveys and develop draft report

Fiscal Year 2011 and beyond

- Finalize TMDL document and adoption process
- Coordinate Implementation Plan development
- Evaluate information from RUAA Report

Implementation Plan Elements

- Stakeholder lead effort
- Approved by TCEQ
- Based on adaptive management approach
- Goal: Practical and sustainable plan with a monitoring component to demonstrate effectiveness
- Approved by TCEQ

Implementation Plan Development

- NCTCOG will act as local facilitators for all TMDL Implementation Plans in greater DFW area
- First focus on Upper Trinity River Bacteria
- Next move to Cottonwood Br. & Grapevine Cr.

THANK YOU
Questions?