

Greater Trinity Bacteria TMDL I-Plan Coordination Committee meeting

Regional Forum Room

June 14, 2018

Dr. Larry Hauck

Texas Institute for Applied Environmental Research



Overview of Sycamore Creek Bacteria TMDL(Segment 0806E)

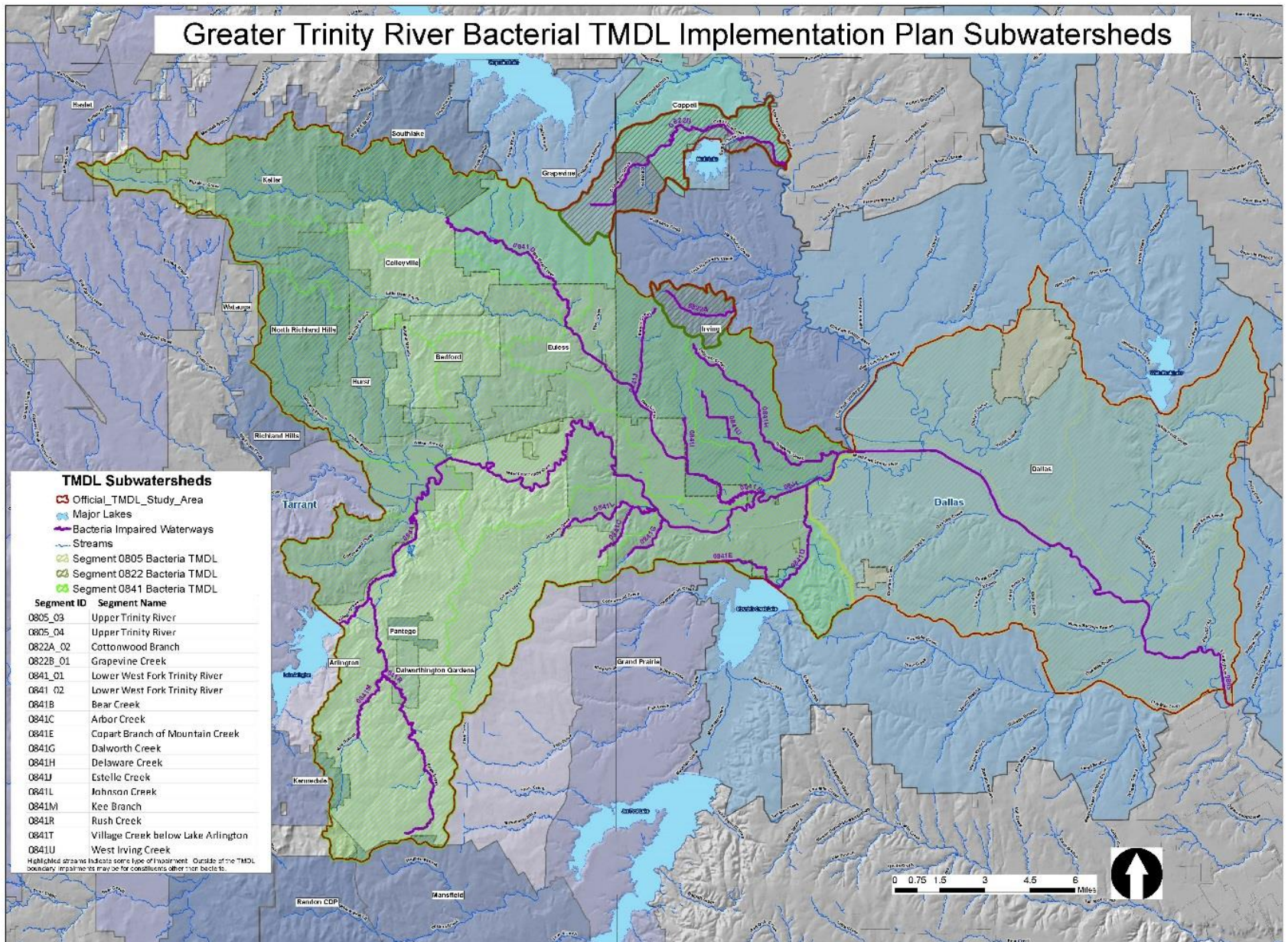
**Jimmy Millican
Larry Hauck**

**Texas Institute for Applied Environmental Research
(TIAER)**

**Tarleton State University
Stephenville, Texas**

June 14, 2018

Greater Trinity River Bacterial TMDL Implementation Plan Subwatersheds

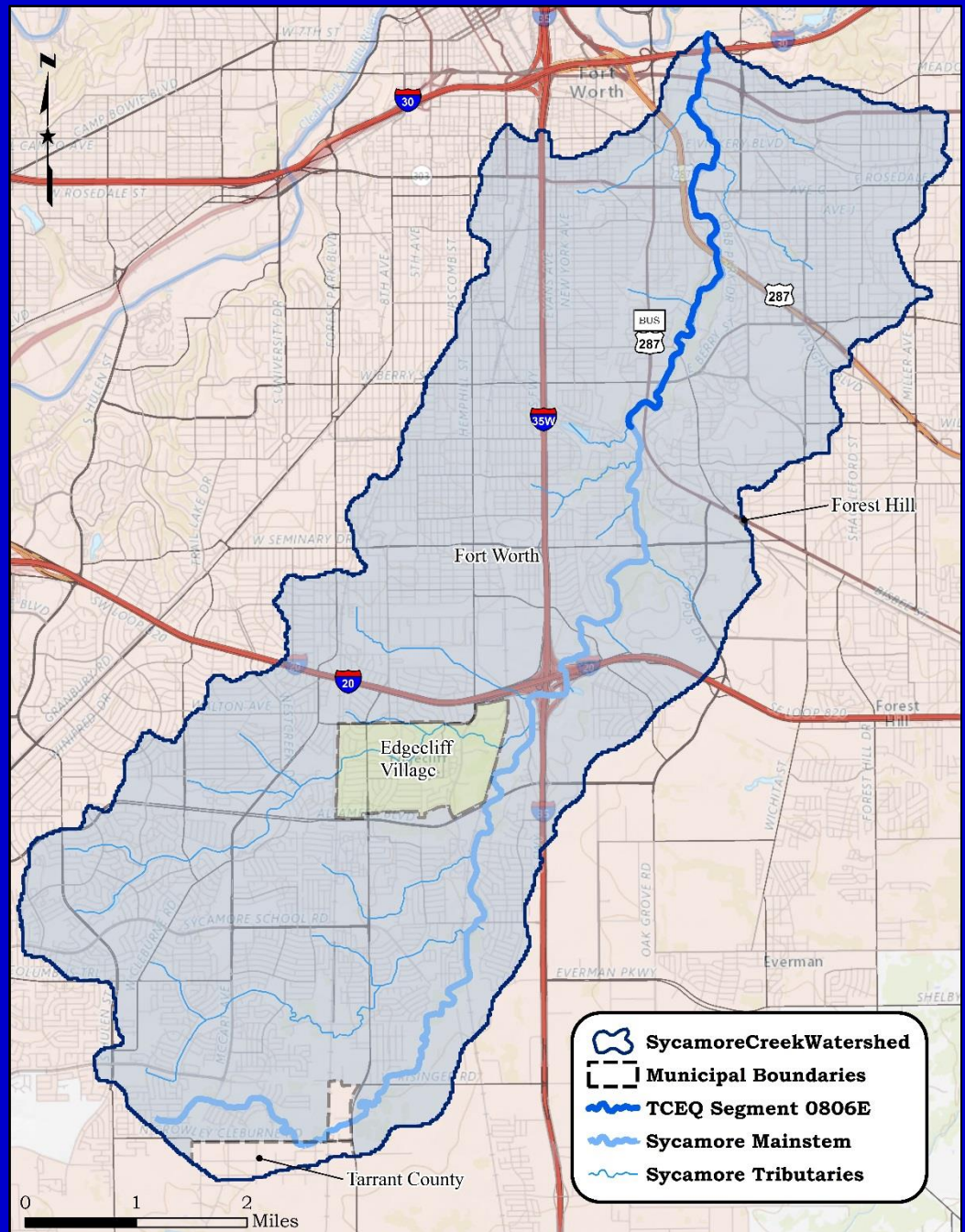


PREPARED IN COOPERATION WITH THE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND
U.S. ENVIRONMENTAL PROTECTION AGENCY
The preparation of this report was financed through grants
from the U.S. Environmental Protection Agency through
the Texas Commission on Environmental Quality

This map/data was created by the North Central Texas Council of Governments (NCTCOG) for use "as is" and as an aid in graphic
representation only. The data is not verified by a Registered Professional Land Surveyor for the State of Texas and is not intended to be
used as such. NCTCOG, its officials, and its employees do not accept liability for any discrepancies, errors, or omissions that may exist.

Data Sources: NCTCOG, TCEQ,
Watershed Boundary Dataset (WBD) by USDA, Natural Resources Conservation Service

TMDL Project Area: Sycamore Creek Watershed



What is a Total Maximum Daily Load (TMDL)?

A TMDL is a tool which:

- Determines the maximum amount of a particular pollutant (load) that a water body can receive and still meet its standards
- Determines sources of pollution by broad categories (i.e., point and nonpoint), though individual permitted wastewater dischargers are required to be listed.

A TMDL is also a document submitted to the EPA. It identifies the pollutant of concern and its sources, and allocates the allowable loads

Why develop TMDLs?

- Restore water quality
- Determine sources of pollution and necessary control strategies
- Comply with federal law
(e.g., Requirements for removal of water bodies from 303(d) List)

Elements of a TMDL

- Problem Definition
- Endpoint Identification
- Source Analysis
- Linkage Analysis
- Margin of Safety
- Pollutant Load Allocation
- Seasonal Variation
- Public Participation
- Implementation and Reasonable Assurance

Defining the Problem

- Nonsupport of primary contact recreation use
- Sycamore Creek Segment 0806E (AU 0806E_01)
- First listed on State of Texas 303(d) List in 2006 and every biennial report through 2014.

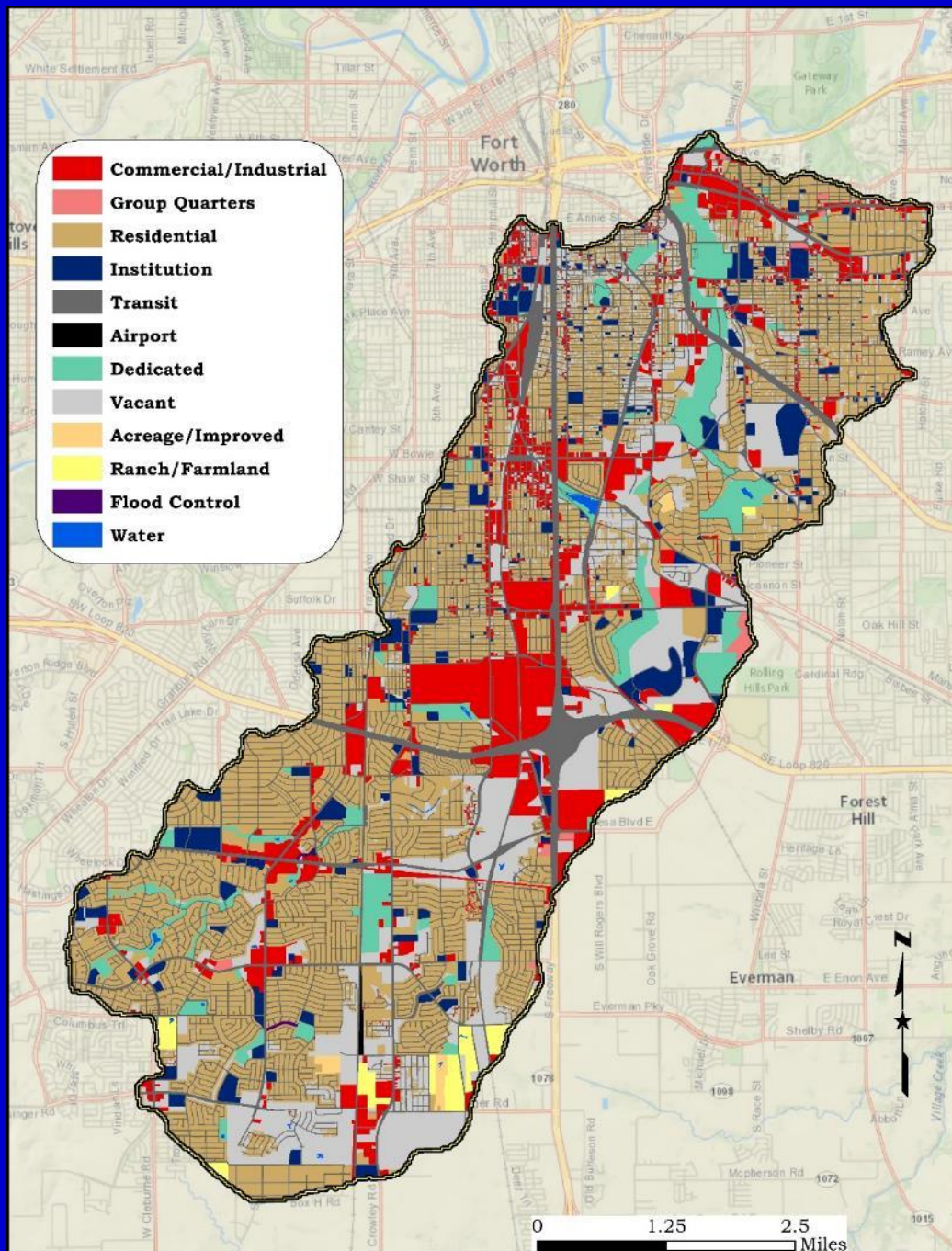
Identifying Endpoint

- Endpoint or “Measurable Goal”
- Primary contact recreation criterion
 - Geometric mean criterion
 - *E. Coli* of 126 colonies per 100 mL*
- 2014 Integrated Report Assessment Results
 - Sycamore Creek 0806E geometric mean = 213 colonies / 100 mL

* Interchangeable equivalent units of measurement:
colony forming units (or colonies) &
most probable number (MPN)

Watershed Overview

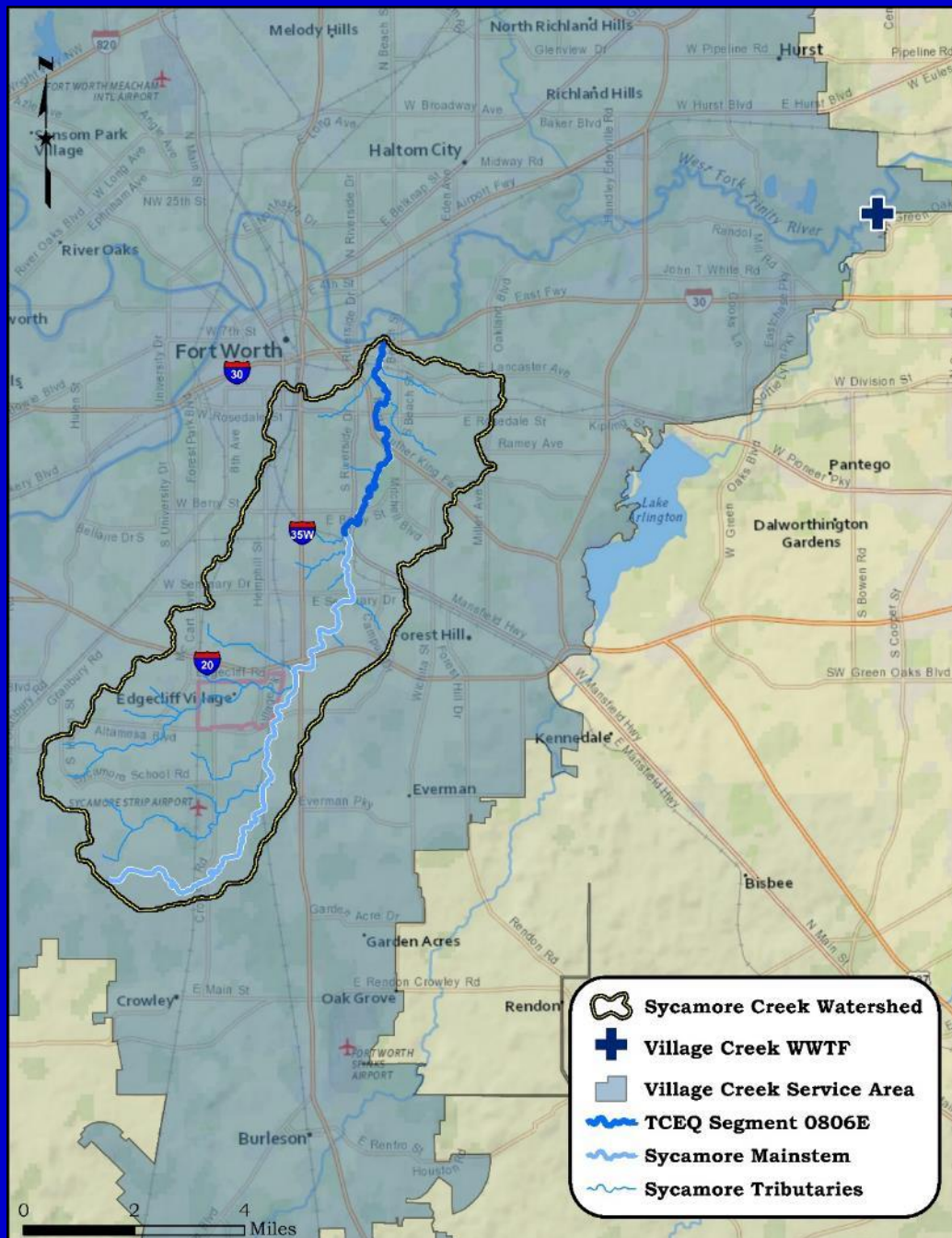
- Overview
 - Land use and land cover
 - Wastewater collection service area
 - Municipal Separate Storm Sewer System (MS4)



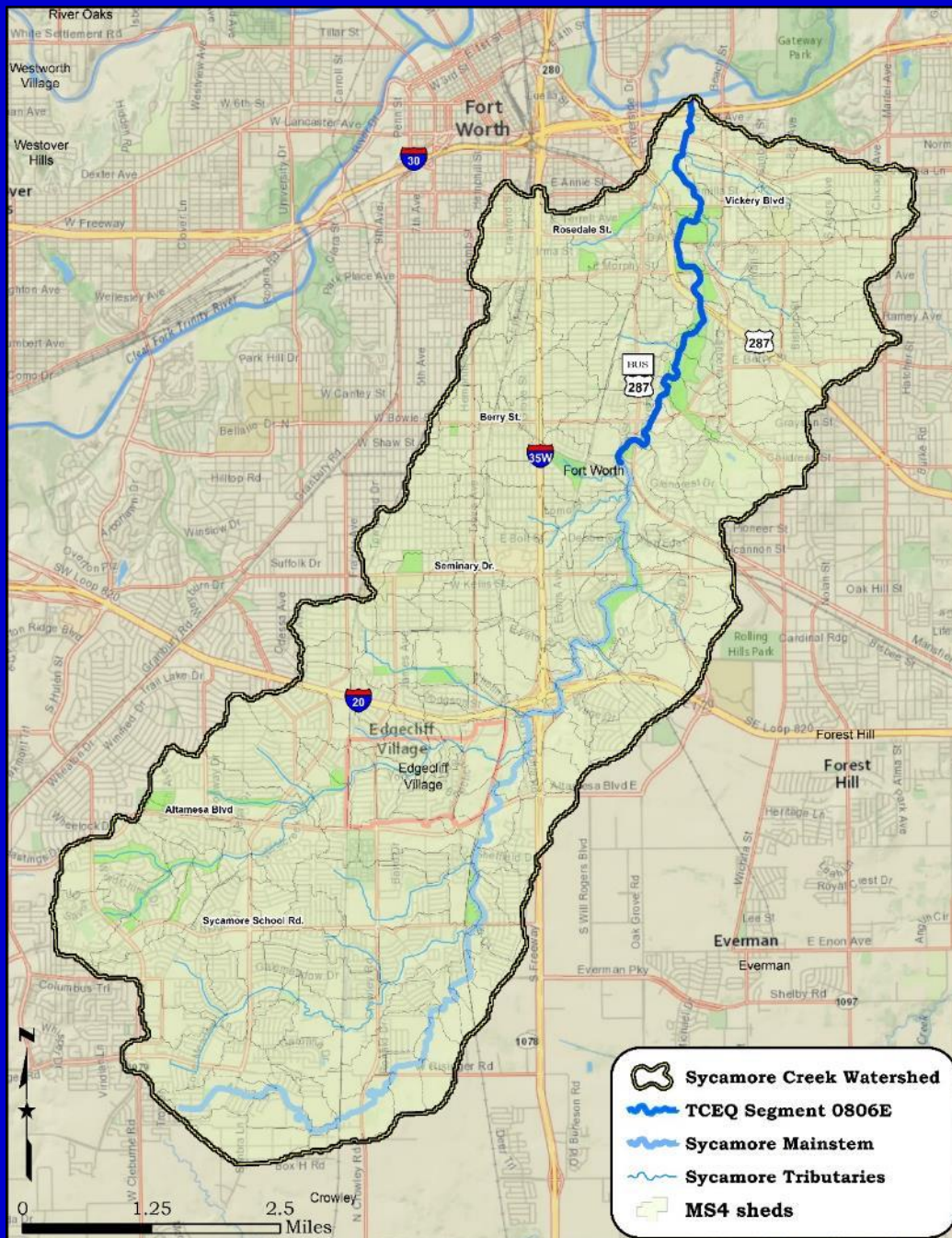
Overview: Land Use & Land Cover

Source: NCTCOG (2013)

Overview: Service area of City of Fort Worth Village Creek WWTF



Source: NCTCOG (2013)



MS4

(Note: the entire watershed area is under regulated stormwater permits)

Source: U.S. Census Bureau
Urbanized Areas

Regulated Stormwater Permits

Entity	TPDES Permit	NPDES Permit
City of Fort Worth, Tarrant Regional Water District	WQ0004350-000	TXS00901
Texas Department of Transportation (TxDOT)	WQ0005011-000	TXS002101
Town of Edgecliff Village	Phase II General Permit	TXR040595
Tarrant County	Phase II General Permit	TXR040052

Linkage Analysis

- Linkage – relationship of instream water quality and the sources of loadings.
- Load duration curve (LDC) used to provide linkage analysis.

Pollutant Load Allocation

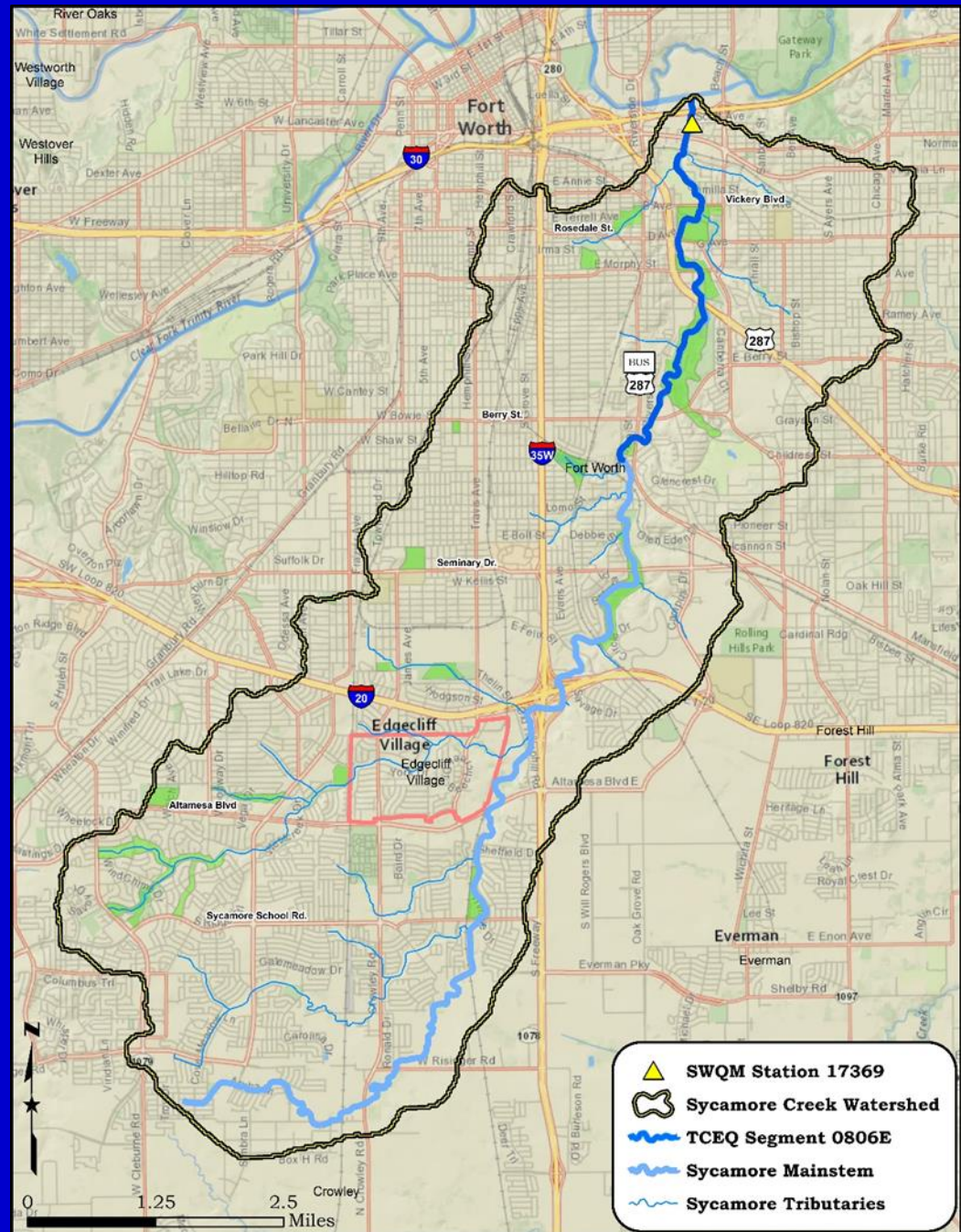
TMDL Allocation Process

- 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 in Texas.
- The load duration curve method has been used on the previous TMDLs in the DFW Metroplex area

Development of a Bacteria Load Duration Curve

- Requires streamflow data, *E. coli* concentration data, and the relevant bacteria criterion.

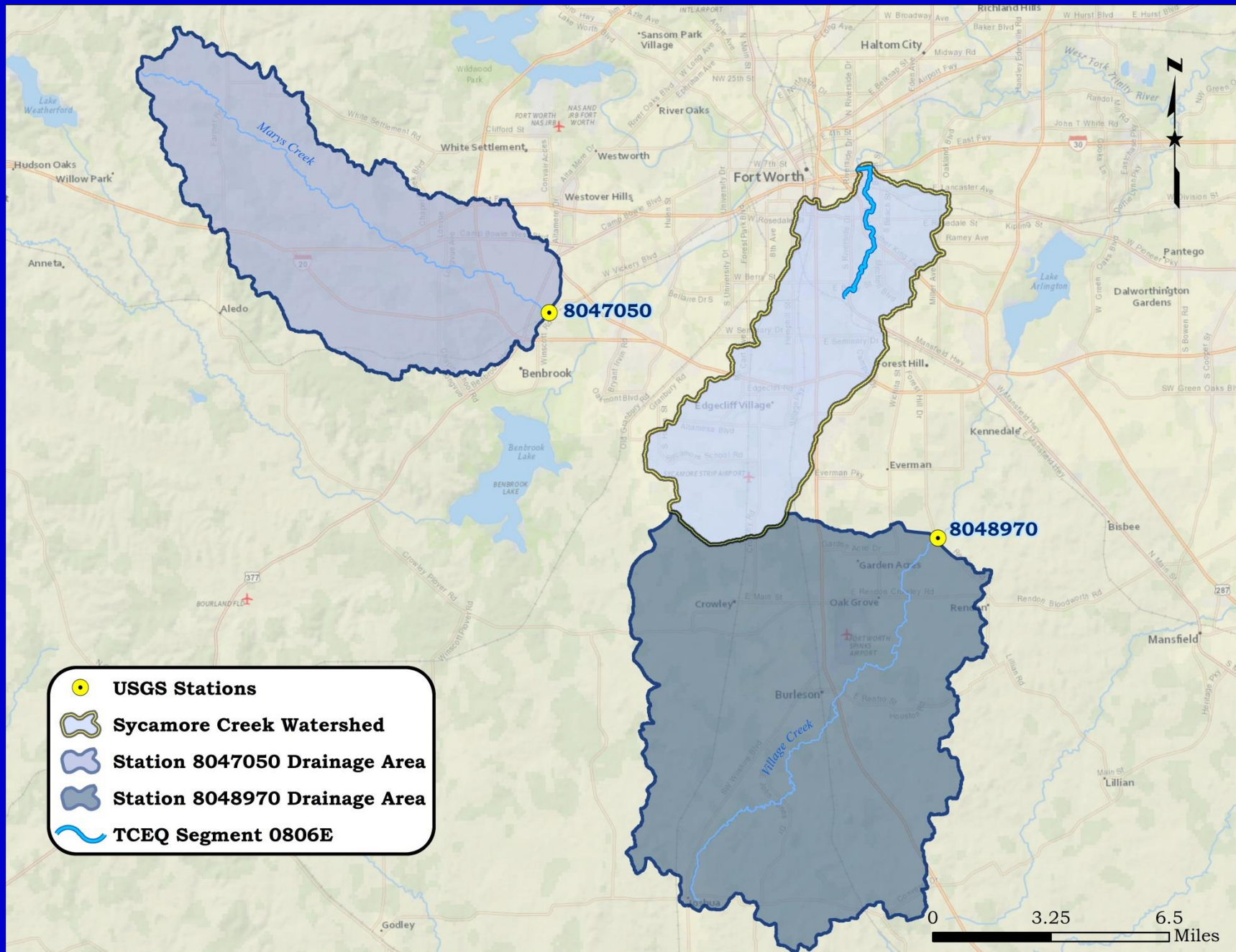
Project Area Showing Monitoring Station



First Step:

Develop a daily streamflow record (typically 10 to 20 years of data)

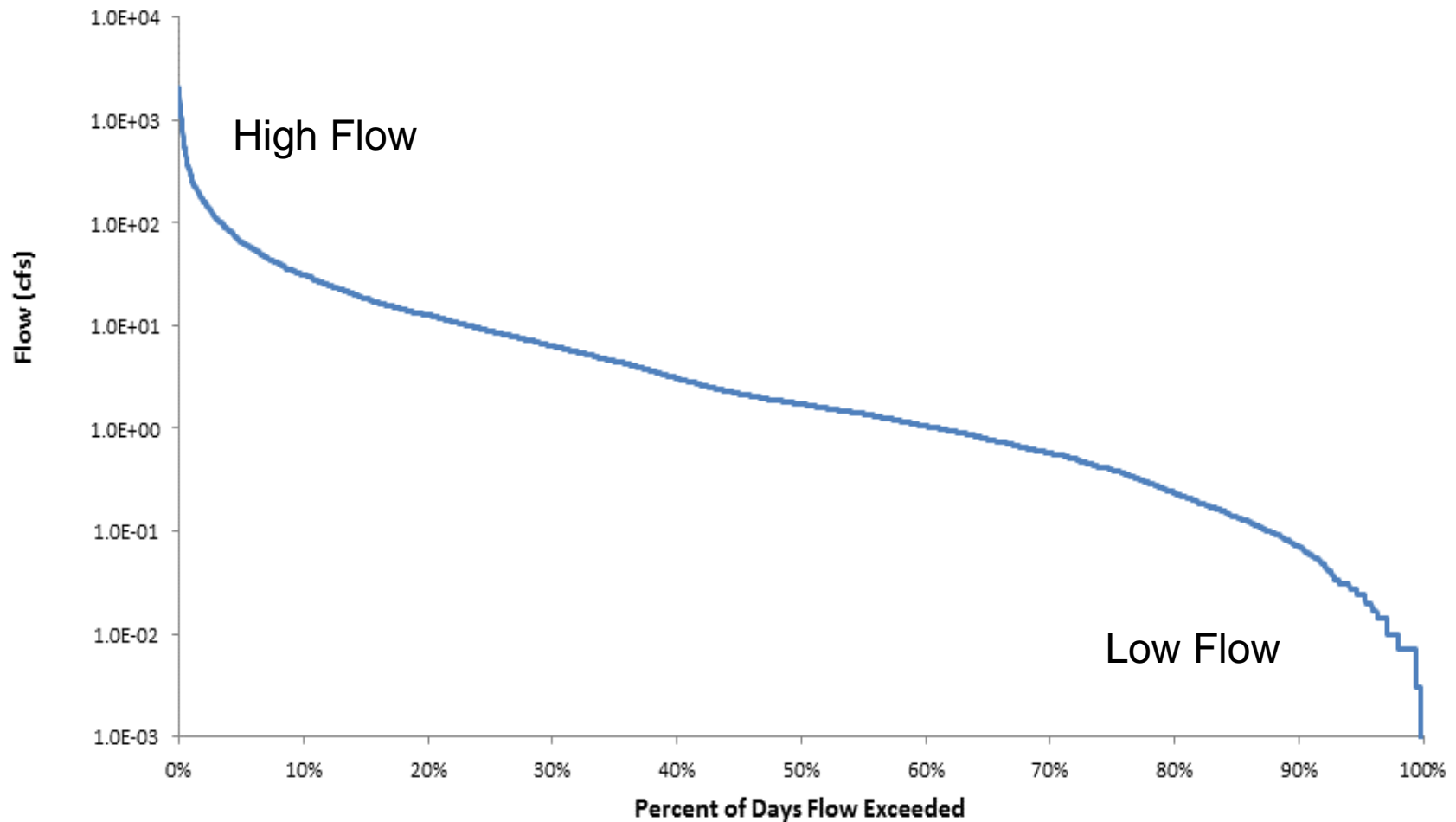
- Selected 16-year period: 1/1/01 – 12/31/16
- U.S. Geological Survey gages 08048970 (Village Creek at Everman, TX) and 08047050 (Marys Creek at Benbrook, TX) streamflow data and drainage area ratio.
- Daily record of streamflow data ranked highest to lowest to give a flow duration curve.



First Step (Cont'd): Flow Duration Curve

Example Streamflow Computations for FDC (9-day record Village Creek USGS gauge)

USGS Gauged Flows		Flows Sorted		0.437		
				DAR		
Date	Flow (cfs)	Date	Flow (cfs)	Flow (cfs)	Rank	% Days Flow Exceeded
4/1/2012	5.0	4/8/2012	533	232.9	1	10%
4/2/2012	4.5	4/9/2012	204	89.1	2	20%
4/3/2012	167	4/3/2012	167	73.0	3	30%
4/4/2012	59	4/4/2012	59	25.8	4	40%
4/5/2012	7.9	4/5/2012	7.9	3.5	5	50%
4/6/2012	5.3	4/6/2012	5.3	2.3	6	60%
4/7/2012	4.6	4/1/2012	5.0	2.2	7	70%
4/8/2012	533	4/7/2012	4.6	2.0	8	80%
4/9/2012	204	4/2/2012	4.5	2.0	9	90%

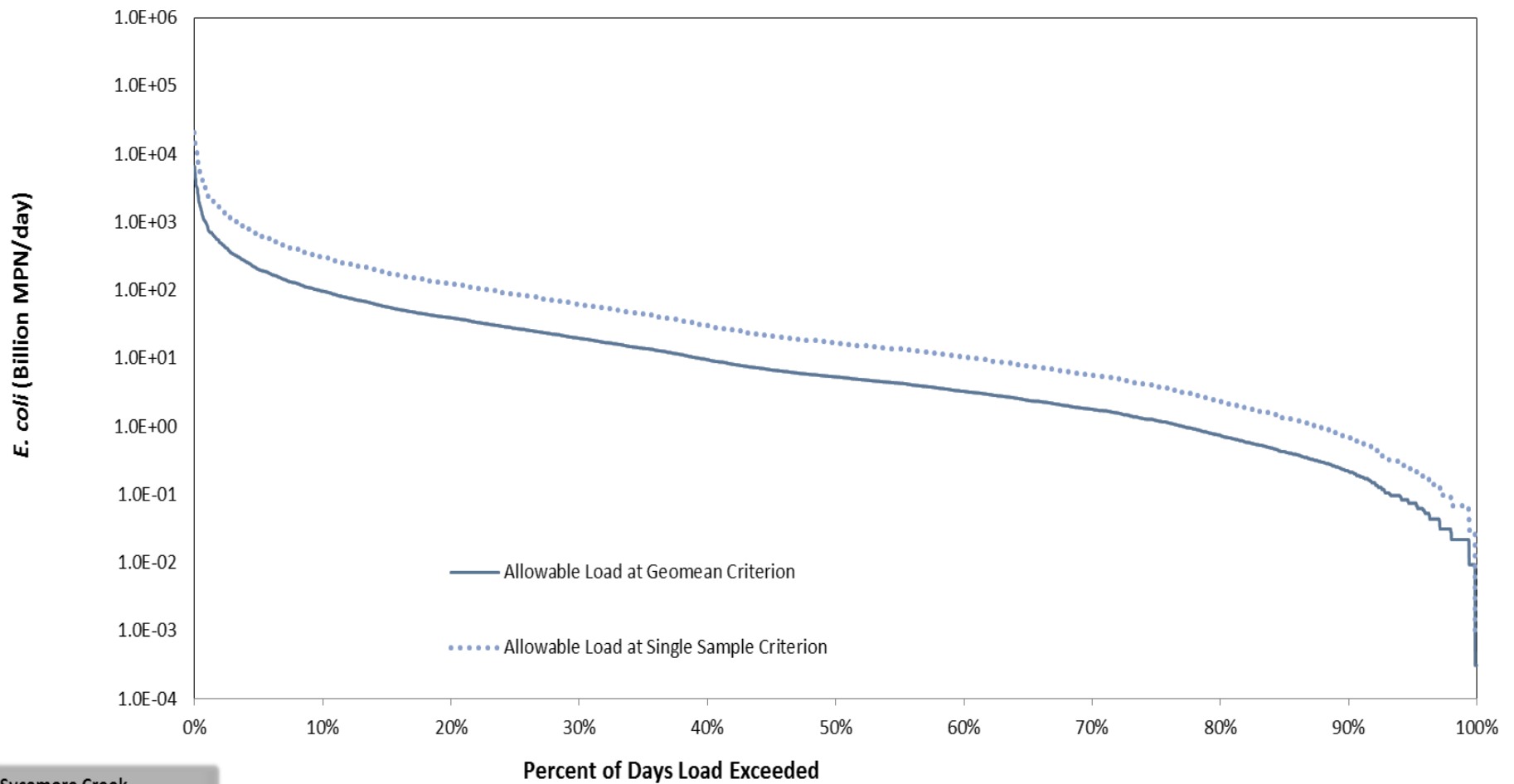


Sycamore Creek, Station 17369

Second Step:

The flow duration curve converted to a load duration curve by multiplying each flow value by the numeric criterion (geometric mean *E. coli* criterion = 126 MPN/100mL; single sample *E. coli* criterion = 399 MPN/100 mL) and the appropriate conversion factor to convert to MPN/day.

The result is a curve of the maximum allowable loading for each day of the period of record.

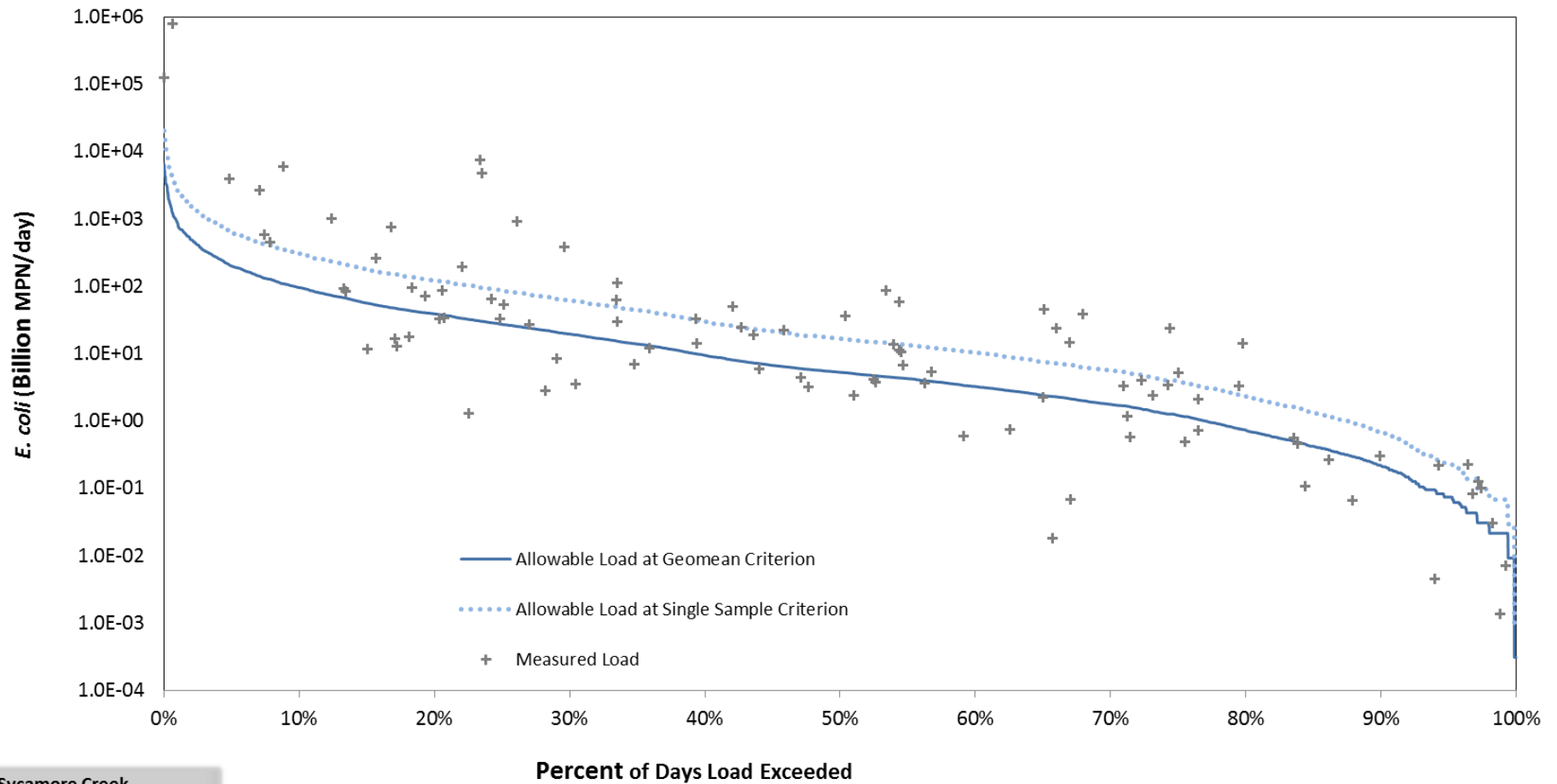


Sycamore Creek

Load duration curve of allowable bacteria, Station 17369

Third Step:

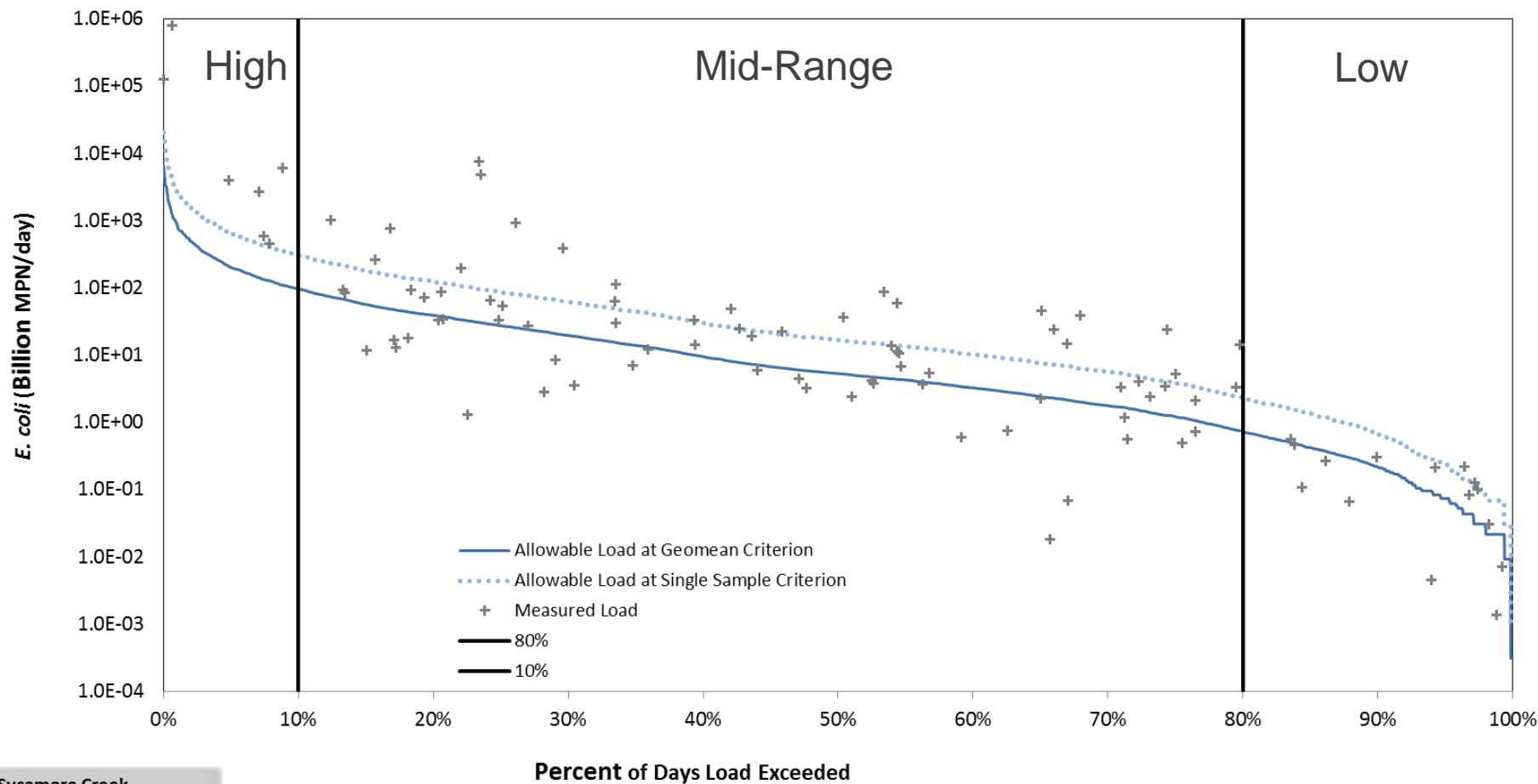
The existing *E. coli* concentration data for specific days are multiplied by the streamflow on that same day and the appropriate conversion factor to give units of MPN/day.



Load durations curve with historical data, Station 17369

Flow Regimes Selected

- Assign appropriate flow regimes :
 - High Flow (0 – 10%)
 - Mid-Range (10 – 80%)
 - Low Flow (80 – 100%)

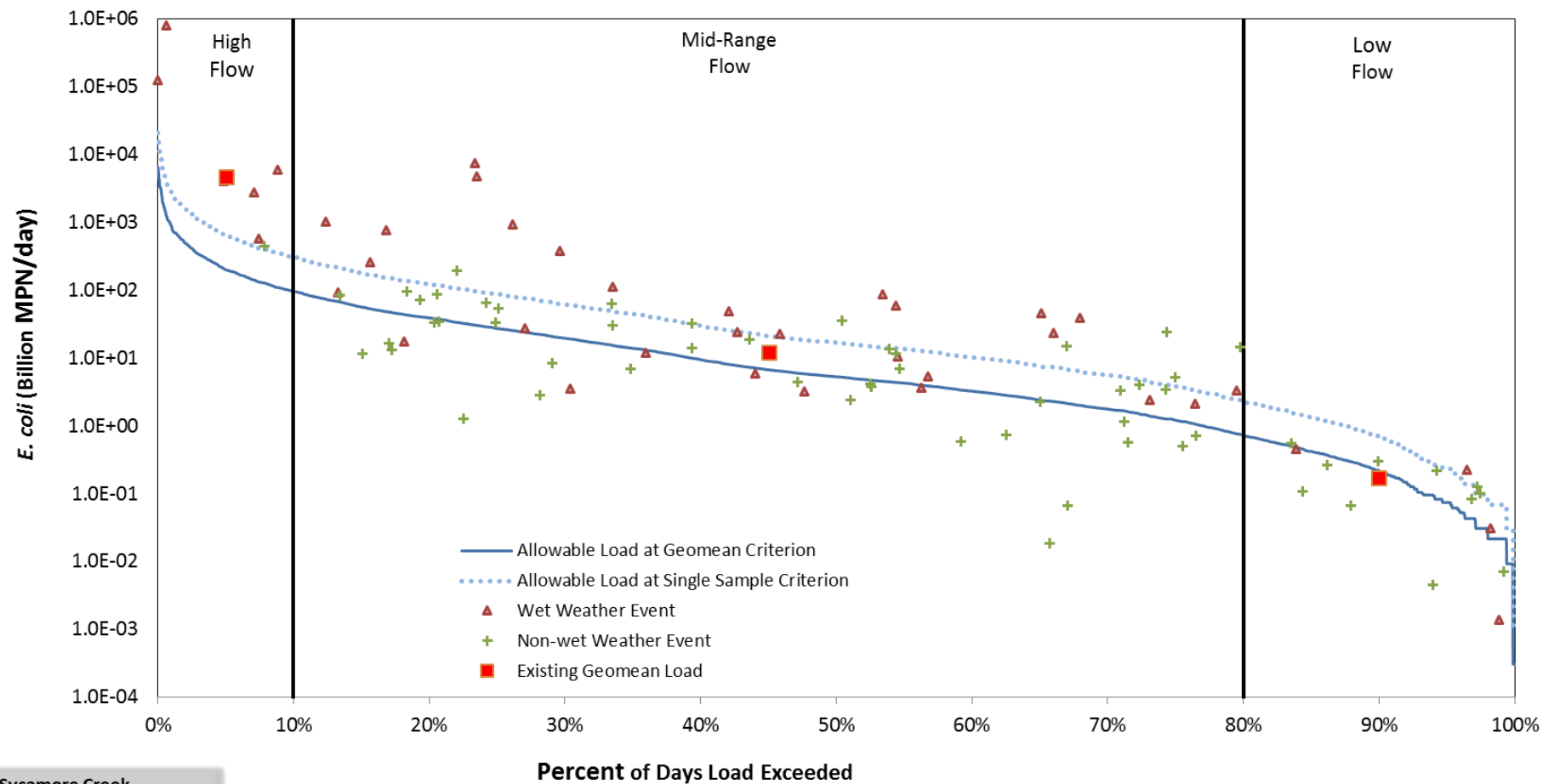


Sycamore Creek

Load duration curve including historical data and flow regimes - Station 17369 (Preliminary Results)

Final Step

- Identify Wet Weather Events
- Calculate Existing Geometric Mean Load



LDC including Wet and Non-wet Weather Events
and Existing Geometric Mean –
Station 17369

Pollutant Load Allocation Process

Allocation process equation:

$$\text{TMDL} = \cancel{\text{WLA}}_{\text{WWTF}}^0 + \text{WLA}_{\text{SW}} + \text{LA} + \cancel{\text{FG}}^0 + \text{MOS}$$

- WLA_{WWTF} - Existing wastewater treatment discharges.
- WLA_{SW} - Construction, industrial and MS4 discharges stormwater loading.
- LA - Unregulated stormwater loading.
- FG – Future growth from potential permitted facilities.
- MOS - Margin of safety.

Summary TMDL Calculations (draft numbers subject to change)

Units expressed in billion MPN/day *E. coli*

AU	TMDL	MOS	WLA _{WWTF}	WLA _{SW}	LA
0806E_01	200.523	10.026	0	190.348	0.149

Status of TMDLs for Indicator Bacteria Sycamore Creek Watershed

- Draft TMDL report is available for public comment.
- Public meeting to receive comments:

June 26, 2018 at 6:00 p.m.
Ella Mae Shamblee Library
Shamblee Library Meeting Room
1062 Evans Avenue
Fort Worth 76104
- Written comments must be received by midnight on July 9, 2018.

THANK YOU
Questions?

Christina Osterlund

City of Fort Worth

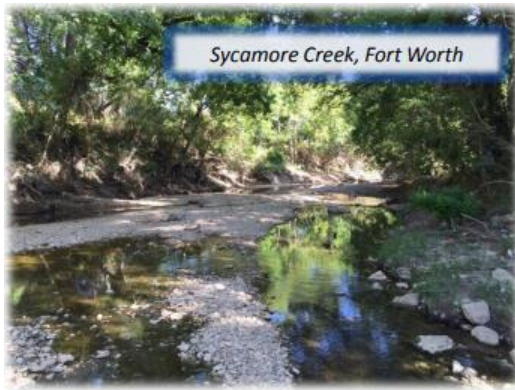


Sycamore Creek TMDL Update



















Greater Trinity River Bacteria TMDL I-Plan
Coordination Committee
NCTCOG
June 14, 2018





Sycamore Creek

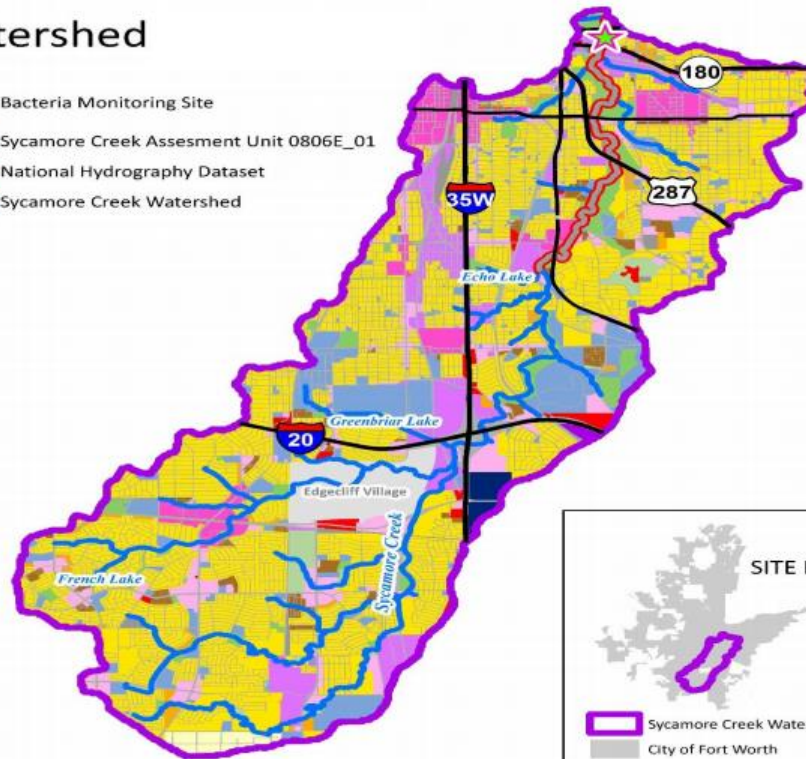
- Watershed – 22,660 acres
- 95.5% is within City of Fort Worth
- 303 (d) listed bacteria impairment in 2006



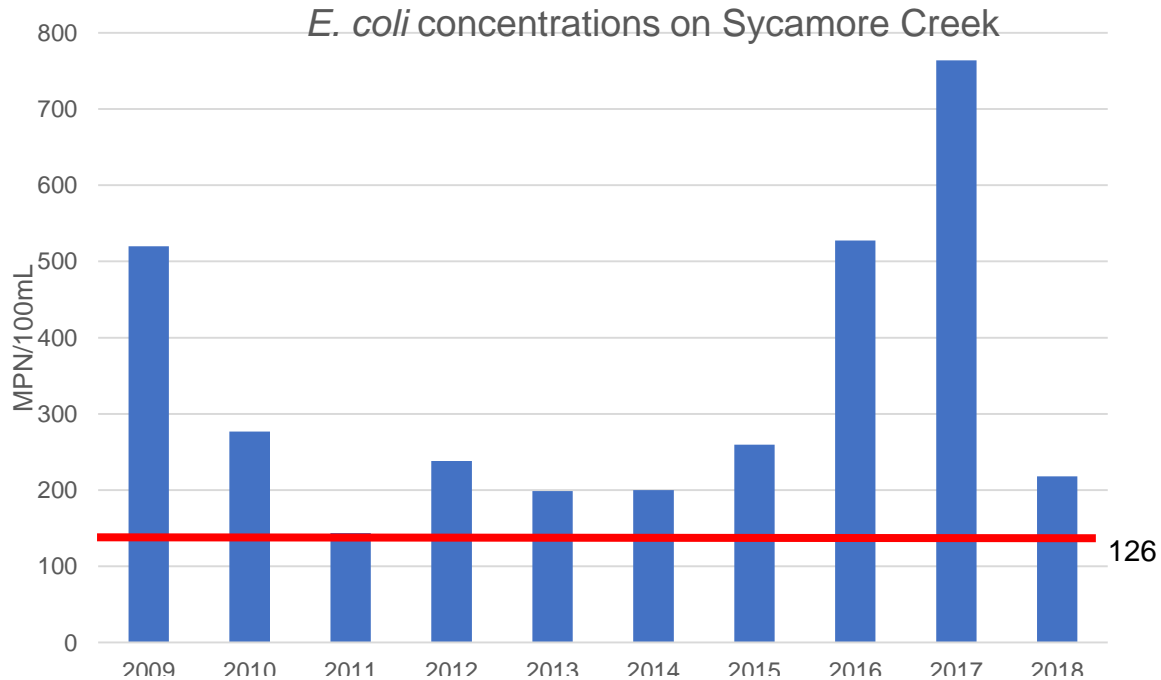
Sycamore Creek Watershed

	Edgecliff Village (Not Classified)
	Rural Residential (0.84%)
	Single Family Residential (40.57%)
	Low Density Residential (1.07%)
	Medium Density Residential (1.67%)
	High Density Residential (0.03%)
	Transportation (21.81%)
	Institutional (9.07%)
	Neighborhood Commercial (5.83%)
	General Commercial (1.08%)
	Light Industrial (5.43%)
	Heavy Industrial (0.13%)
	Mixed-Use (3.84%)
	Industrial Growth Center (0.69%)
	Infrastructure (0.78%)
	Public Park, Recreation, Open Space (5.37%)
	Private Park, Recreation, Open Space (1.65%)
	Lakes and Ponds (0.14%)

-  Bacteria Monitoring Site
-  Sycamore Creek Assessment Unit 0806E_01
-  National Hydrography Dataset
-  Sycamore Creek Watershed



Sycamore Creek Average Annual Bacteria Concentrations



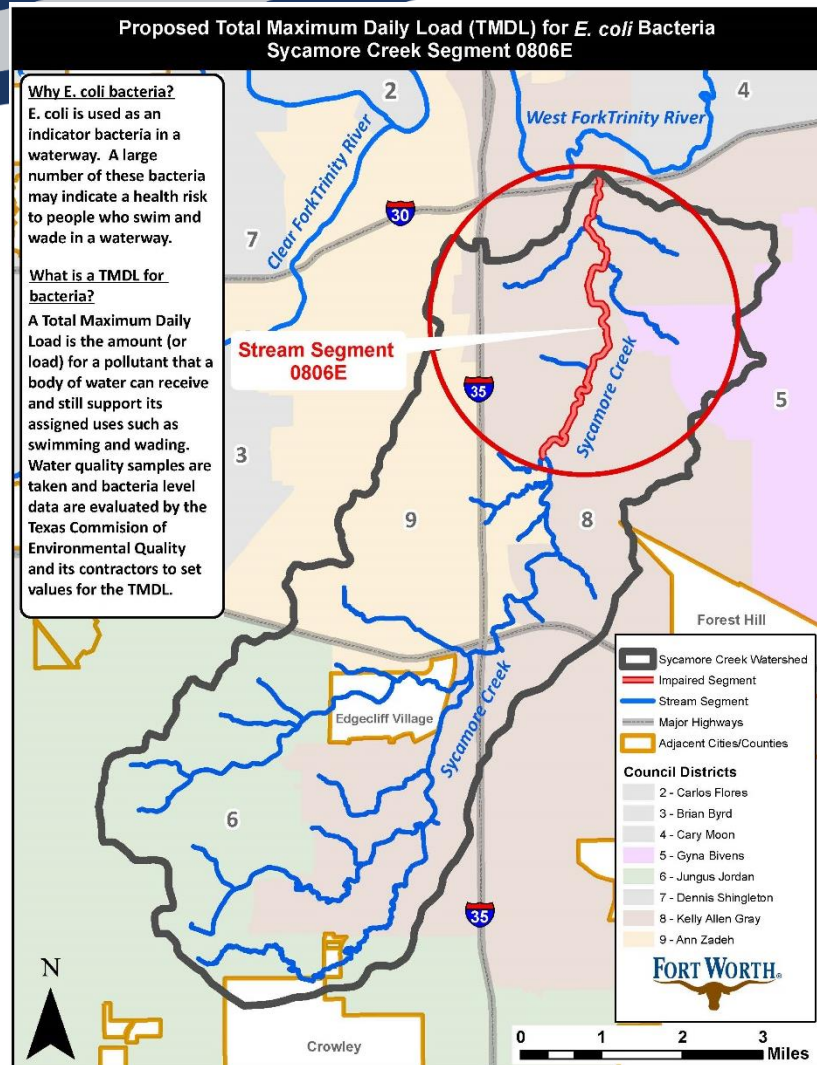
Values based on
monthly
sampling
geomean

Sycamore Creek TMDL

- June 16, 2016 : Discussed overview of Sycamore Creek watershed and TMDL development plan with a goal to include final TMDL in the Greater Trinity River Bacteria TMDL Implementation Plan
- June 15, 2017 : Recap on Sycamore Creek watershed and status update on TMDL development and upcoming public meeting

0806_E

- TCEQ contracted the Texas Institute for Applied Environmental Research (TIAER) at Tarleton State University to begin work on TMDL development in 2016.
- TIAER finalized TMDL Technical Support Document in August 2017.
- TCEQ held a public meeting on August 15, 2017 in Fort Worth.
- City of Fort Worth began a watershed-based project for sources of bacteria in Fall 2017.



Current and Future Status

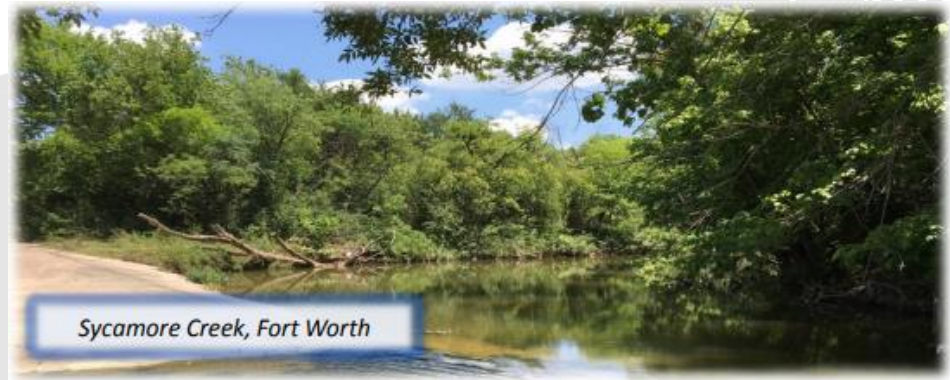
- TCEQ public meeting on June 26, 2018
- Public comment period ends July 9, 2018
- TCEQ plans to finalize TMDL later in 2018.
- City of Fort Worth and partners to continue efforts for watershed-wide bacteria management research
- 2019: Begin implementation of identified bacterial management strategies
- City of Fort Worth requests support for a resolution to adopt Sycamore Creek into the existing I-Plan

GOAL: To restore Sycamore Creek water quality to bacteria levels that support designated aquatic use

Thank you!

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Action Items

4. Greater Trinity River Bacteria TMDL I-Plan Coordination Committee Meeting Summary

- At the June 2017 meeting, the TMDL Coordination Committee received updates on several items in progress, including:
 - i. TCEQ Overview of the TMDL I-Plan Program
 - ii. iSWM Tiered Structure and Adoption for Certification
 - iii. The First Annual Implementation Status Report
 - iv. Administrative Updates to include the Mountain Creek Segments

Action Items

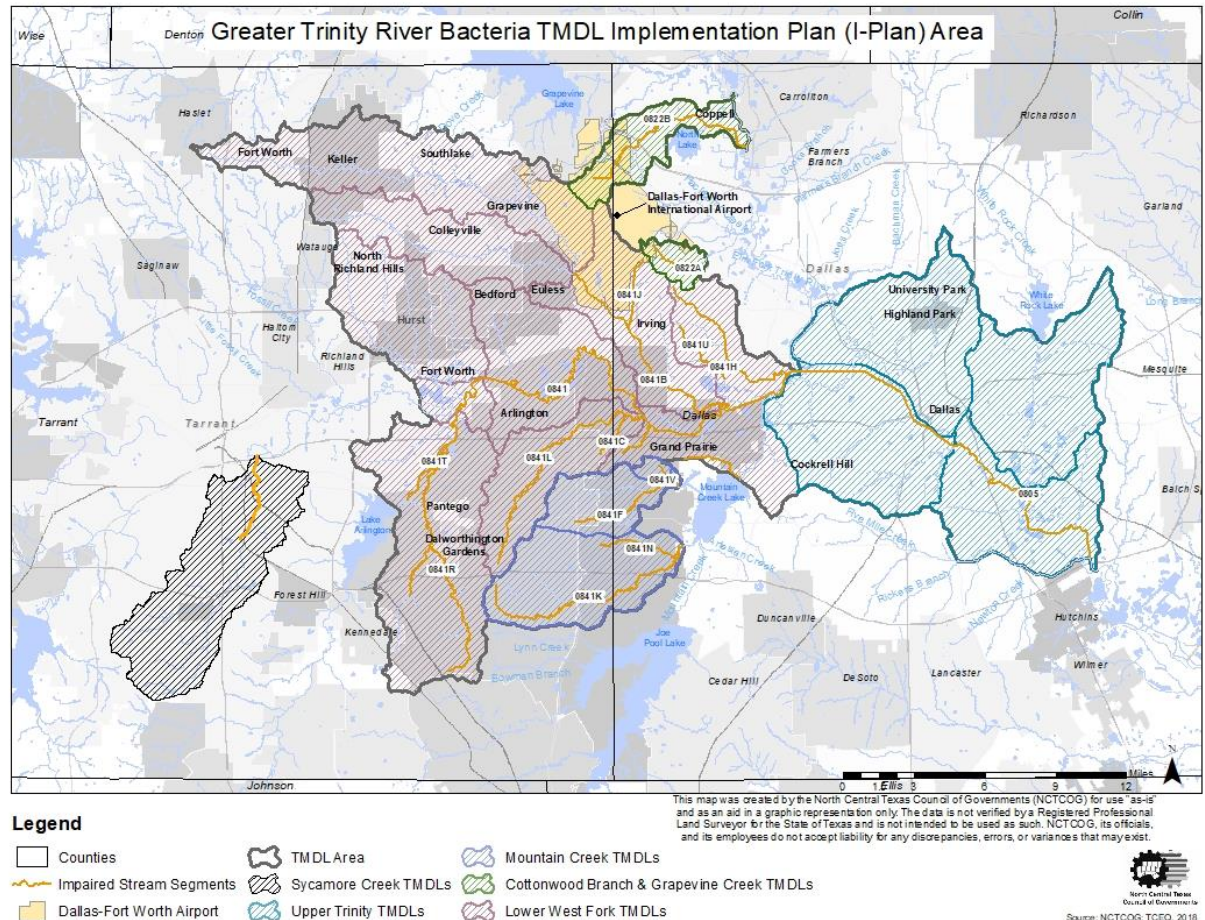
5. Approval of the second annual Implementation Status Report

- The Implementation Status Report highlights implementation efforts pursued by TMDL area stakeholders.



Action Items

6. Resolution to Support the Addition of Sycamore Creek Segment



Discussion

7. FY2018 Accomplishments

- Developed and distributed a TMDL Annual Questionnaire. Collected information from TMDL area stakeholders about TMDL I-Plan efforts.
- Attended public meetings in preparation for the inclusion of the Sycamore Creek TMDL to the Greater Trinity I-Plan.
- Helped plan and promote the North Texas Feral Hog Conference in November 2017, led by the Trinity River Authority, which created further progress on Strategy 4.0: Feral hog management.
- Planned and facilitated a Texas Stream Team (TST) workshop on March 6, 2018 to support the growth of the TST program in the region. Speakers included City of Dallas, City of Plano, and the Meadows Center.
- Coordinated three subcommittees meetings in Nov/Dec of 2017 and again in May 2018.

Discussion

7. FY2018 TMDL Technical Subcommittee Activities

- Wastewater Technical Subcommittee
 - i. OSSF inspector training & outreach for inspectors, real estate agents, and homeowners
- Stormwater Technical Subcommittee
 - i. Continued feral hog management coordination with stakeholders
 - ii. Development of education and outreach materials for avian feeding and pet waste
- Monitoring Coordination Forum
 - i. Analysis of TMDL water quality data to determine the effect of the current implementation efforts

Discussion

8. Upcoming TMDL Projects for FY18/19

- **Texas Stream Team: Train-the-Trainer**
 - July 25, 2018
- **On Site Sewage Facility Workshop for Real Estate Inspectors**
 - August 9, 2018
- **Feral Hog Sighting Database**
 - Beta in FY19
- **Riparian Bull's-Eye Evaluation Workshop**
 - FY19

Roundtable

9. Staff Updates and Roundtable Discussion

10. Adjournment

The next meetings of the TMDL I-Plan Program:

- TMDL Coordination Committee meeting:
Thursday, June 13, 2019
- TMDL Subcommittee Meetings (Monitoring Coordination Forum, Stormwater Technical, Wastewater Technical):
To Be Determined
- Regional Stormwater Public Education Task Force:
Wednesday, July 18, 2018

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