



Overview of Sycamore Creek Bacteria TMDL(Segment 0806E)

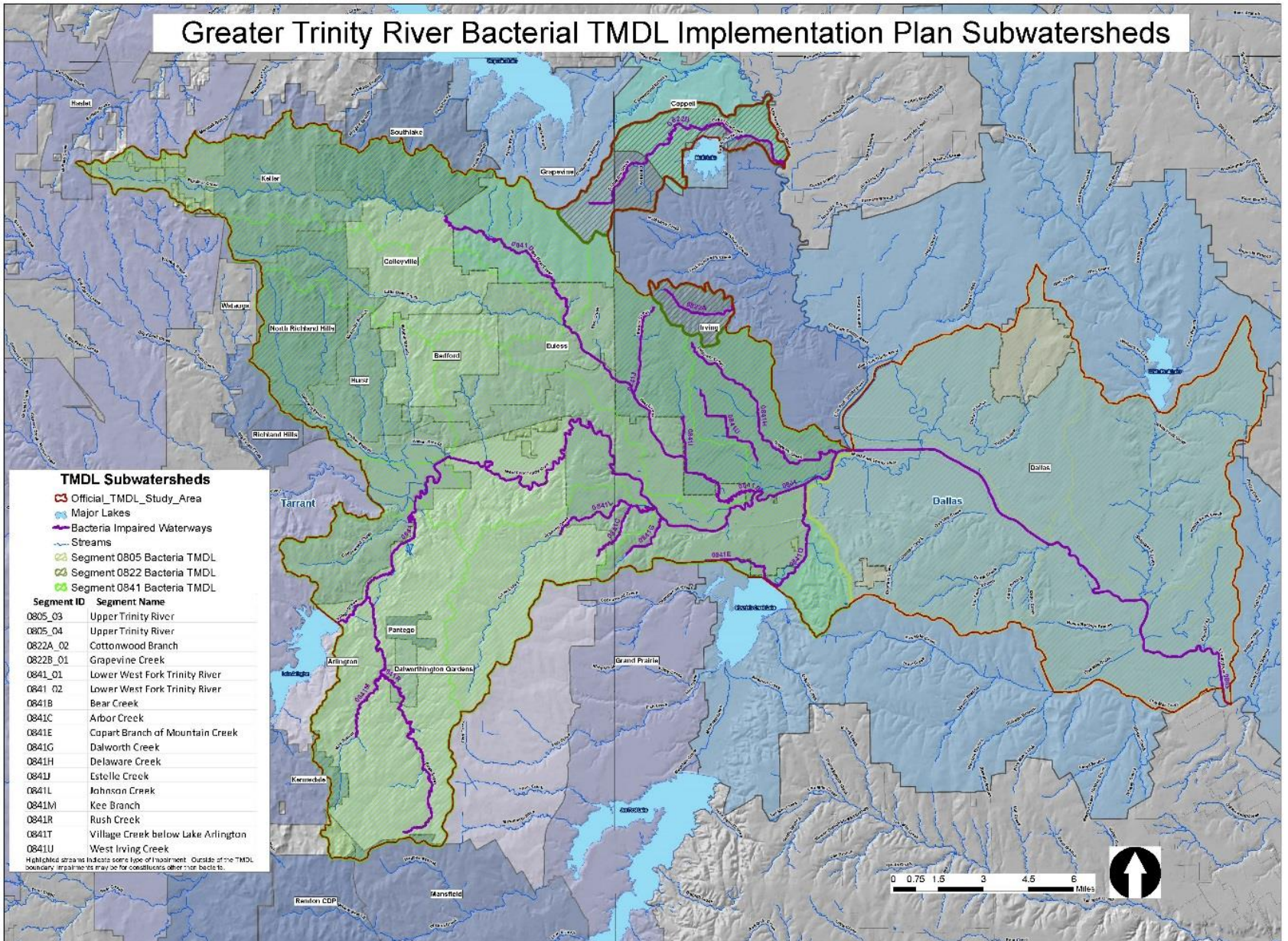
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June 14, 2018

Greater Trinity River Bacterial TMDL Implementation Plan Subwatersheds

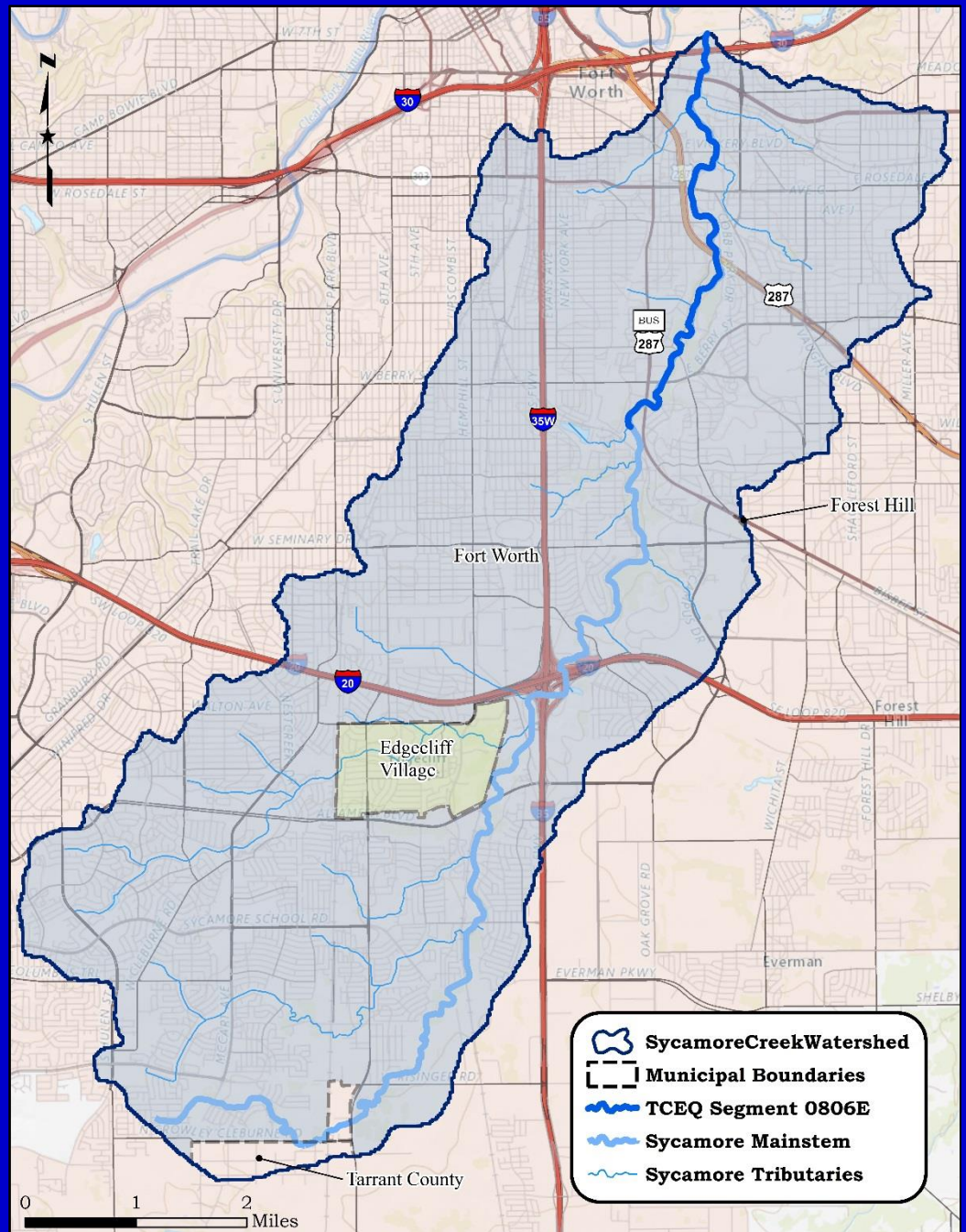


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 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND
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Data Sources: NCTCOG, TCEQ,
 Watershed Boundary Dataset (WBD) by USDA, Natural Resources Conservation Service

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.

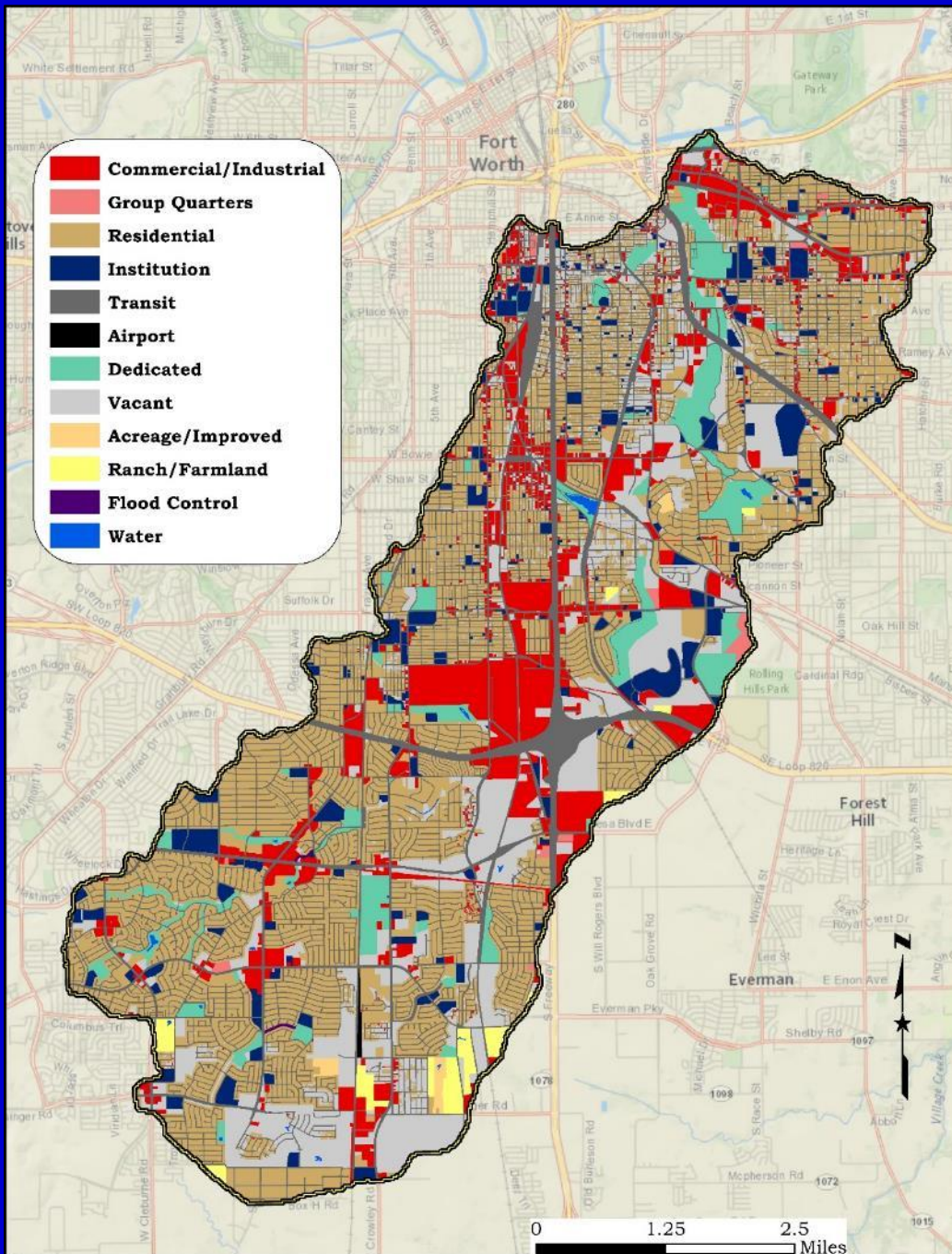
Identifying Endpoint

- 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

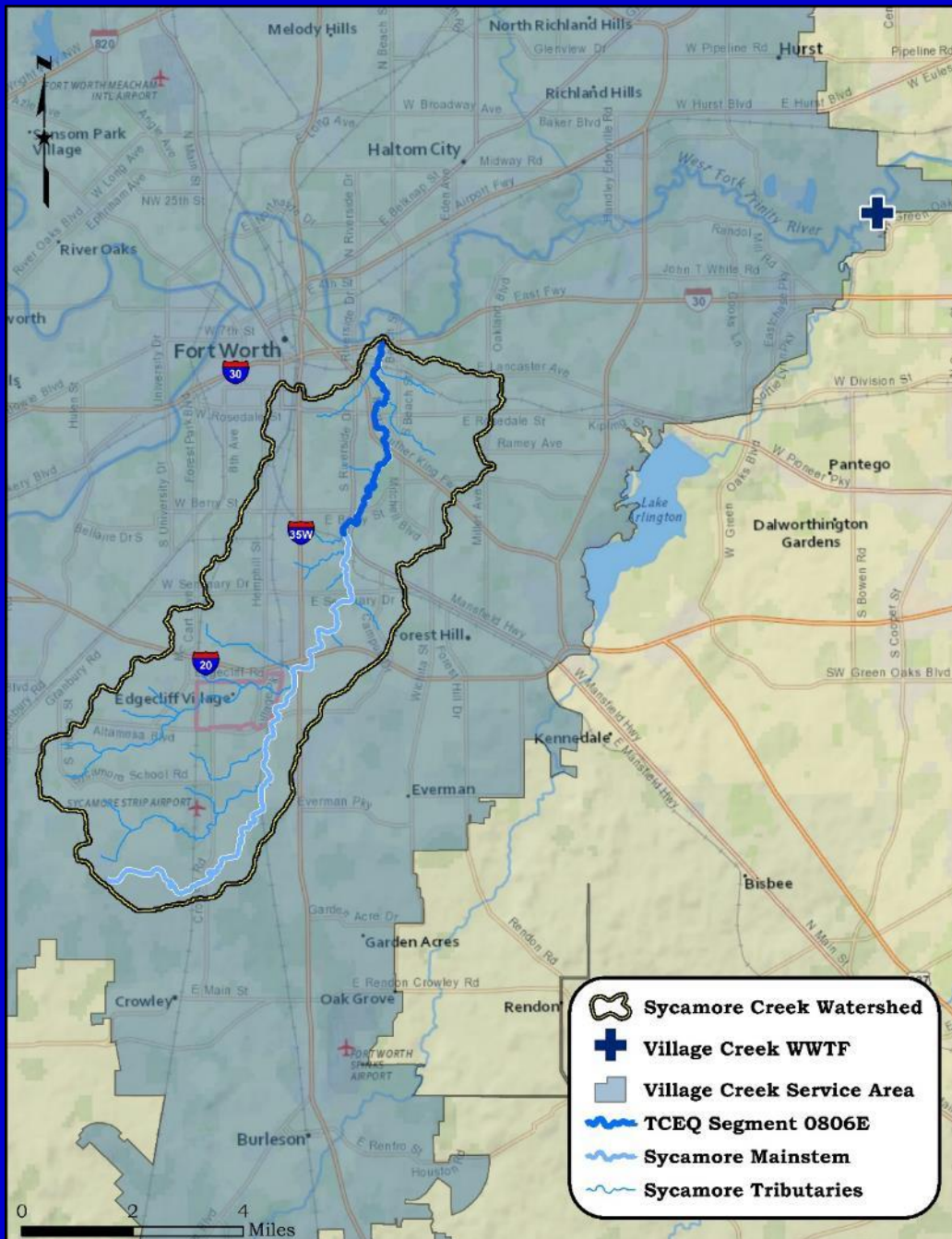
- Overview
 - Land use and land cover
 - Wastewater collection service area
 - Municipal Separate Storm Sewer System (MS4)



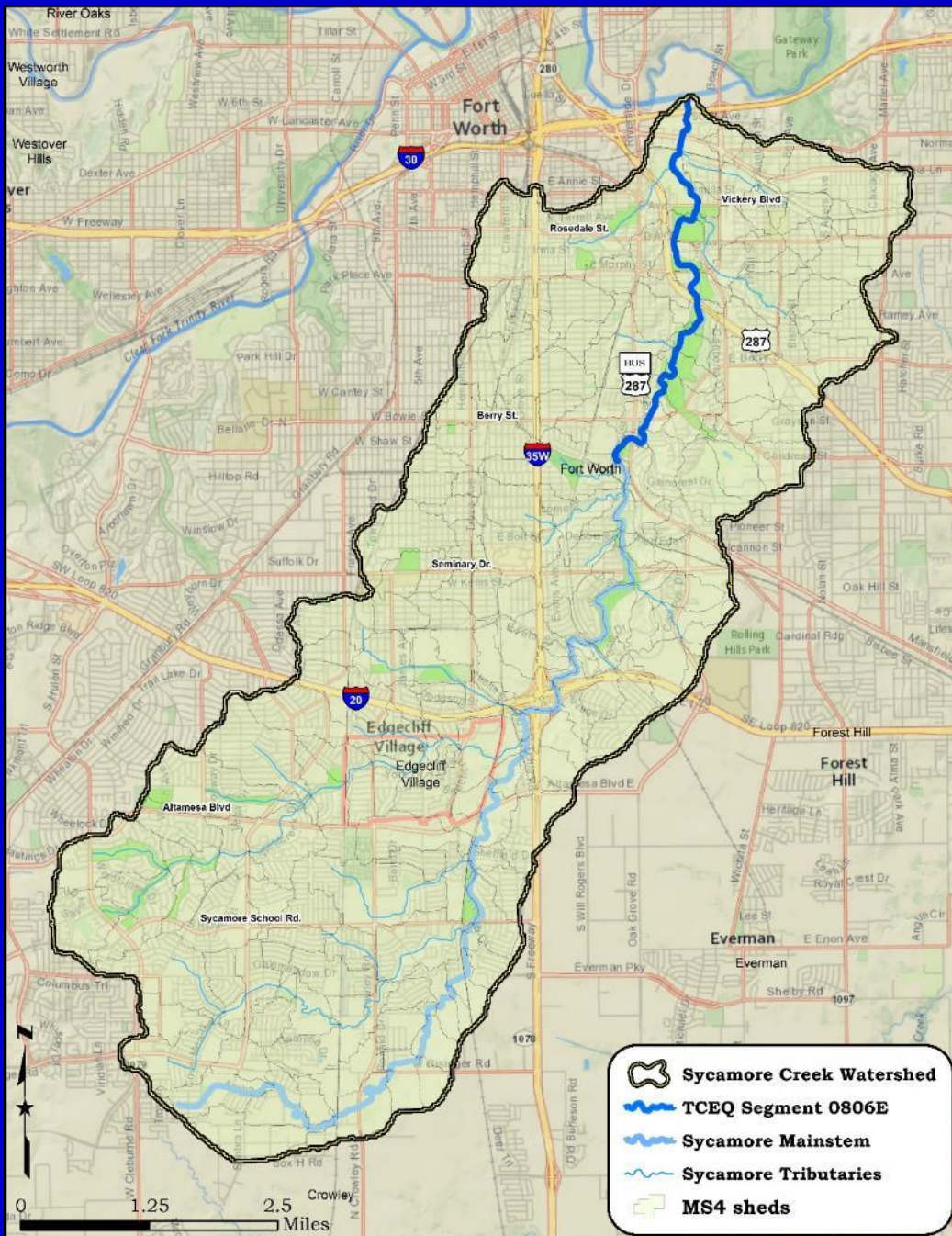
Overview: Land Use & Land Cover

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

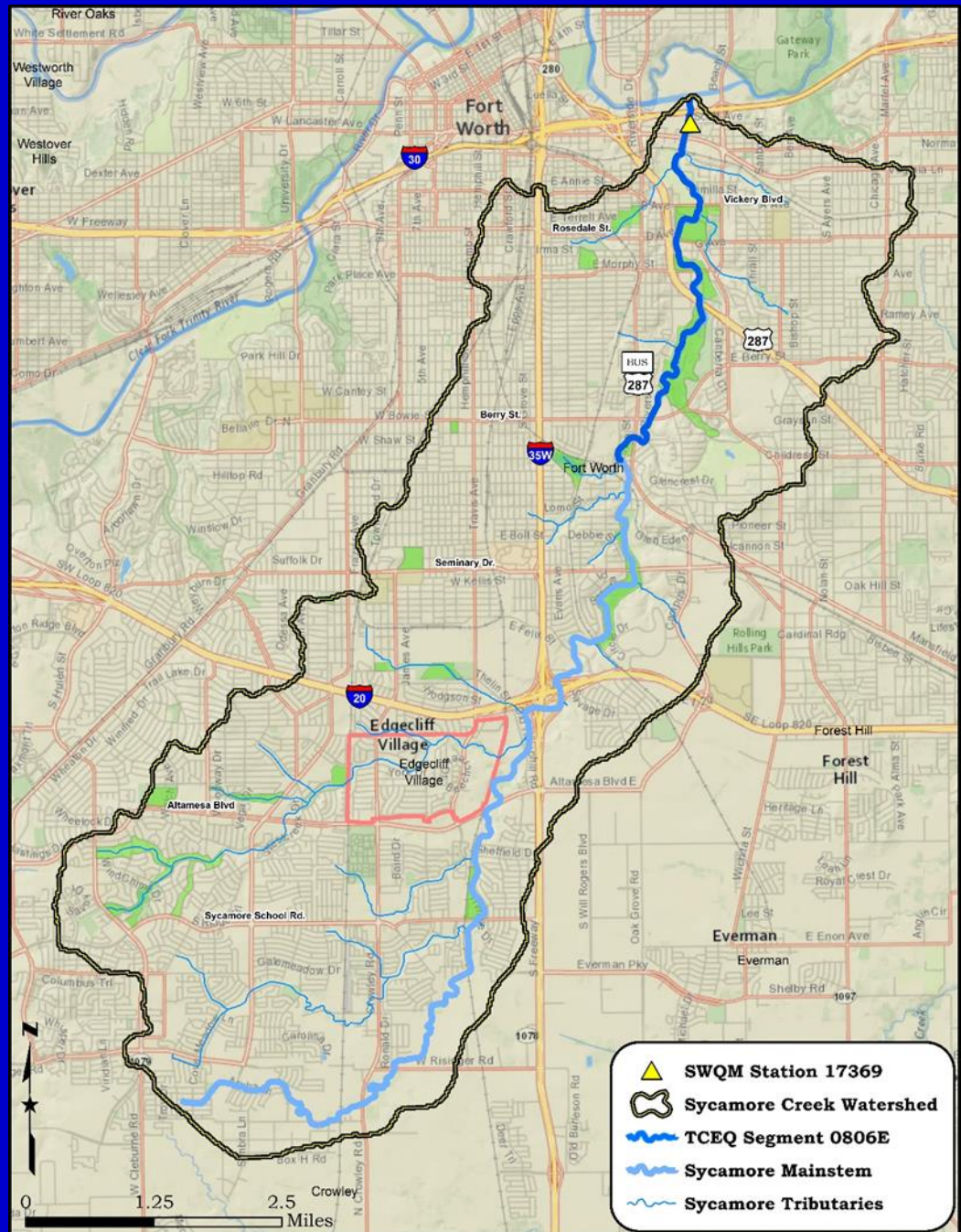
TMDL Allocation Process

- 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.

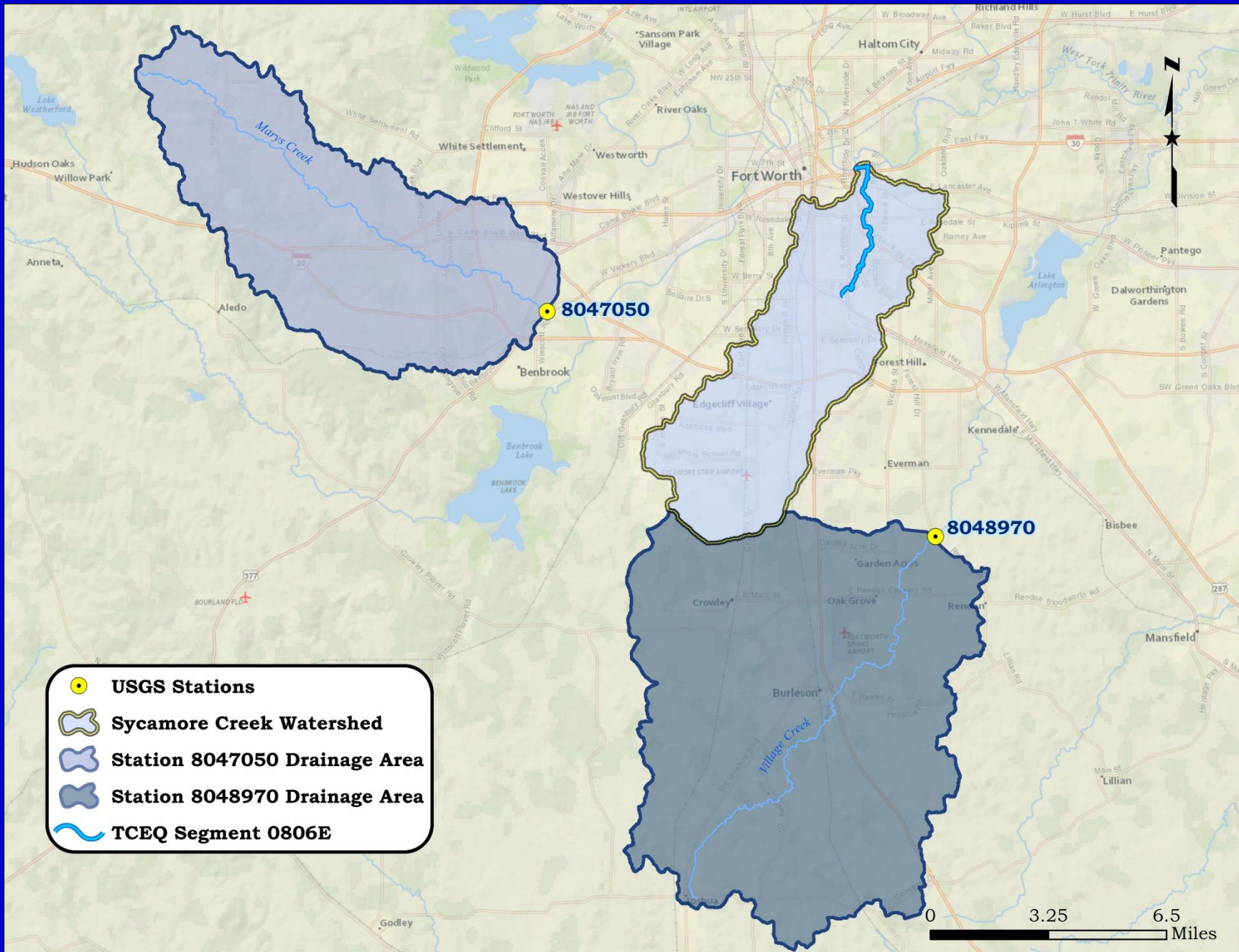
Project Area Showing Monitoring Station



First Step:

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

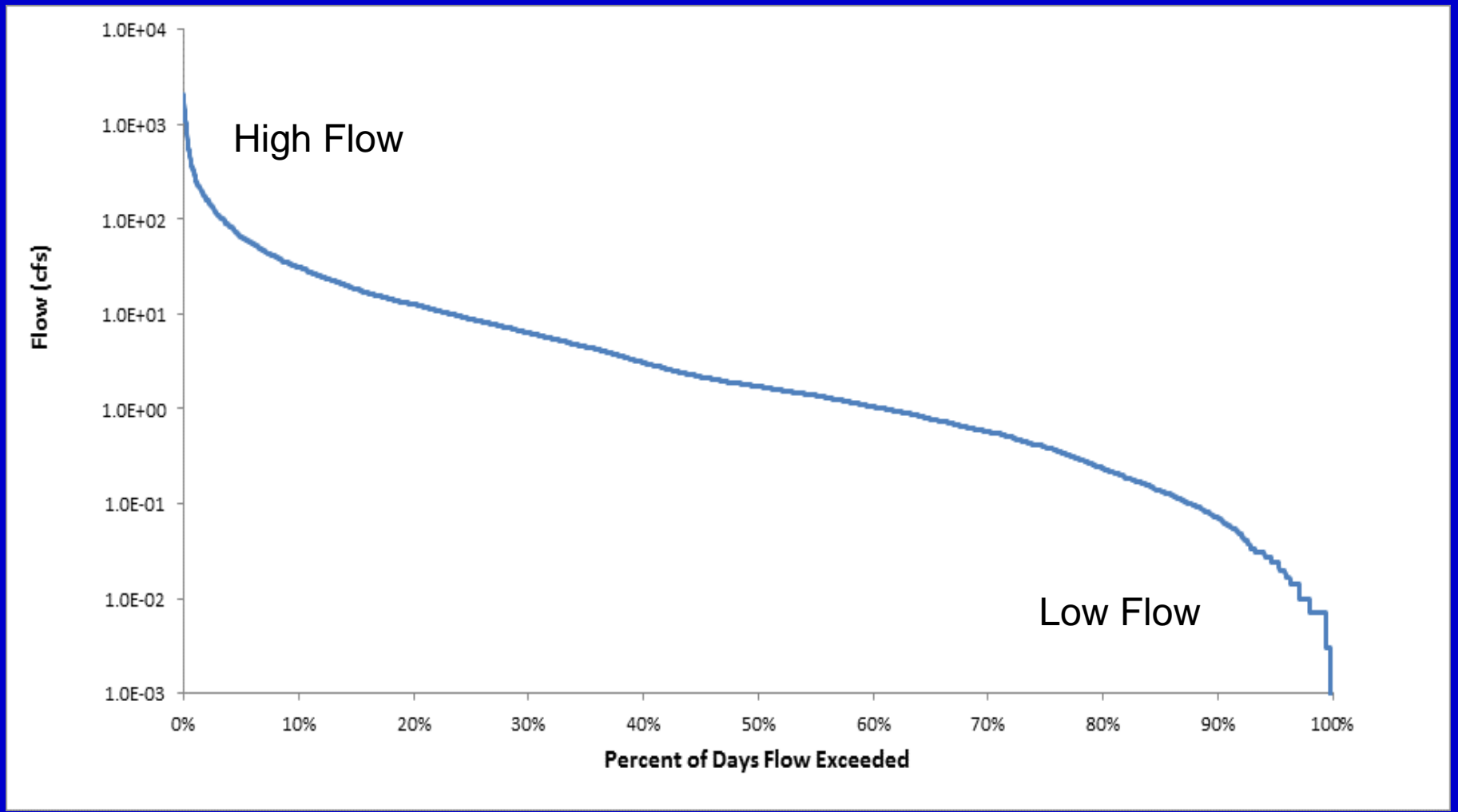
- Selected 16-year period: 1/1/01 – 12/31/16
- U.S. Geological Survey gages 08048970 (Village Creek at Everman, TX) and 08047050 (Marys Creek at Benbrook, TX) streamflow data and drainage area ratio.
- Daily record of streamflow data ranked highest to lowest to give a flow duration curve.



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%

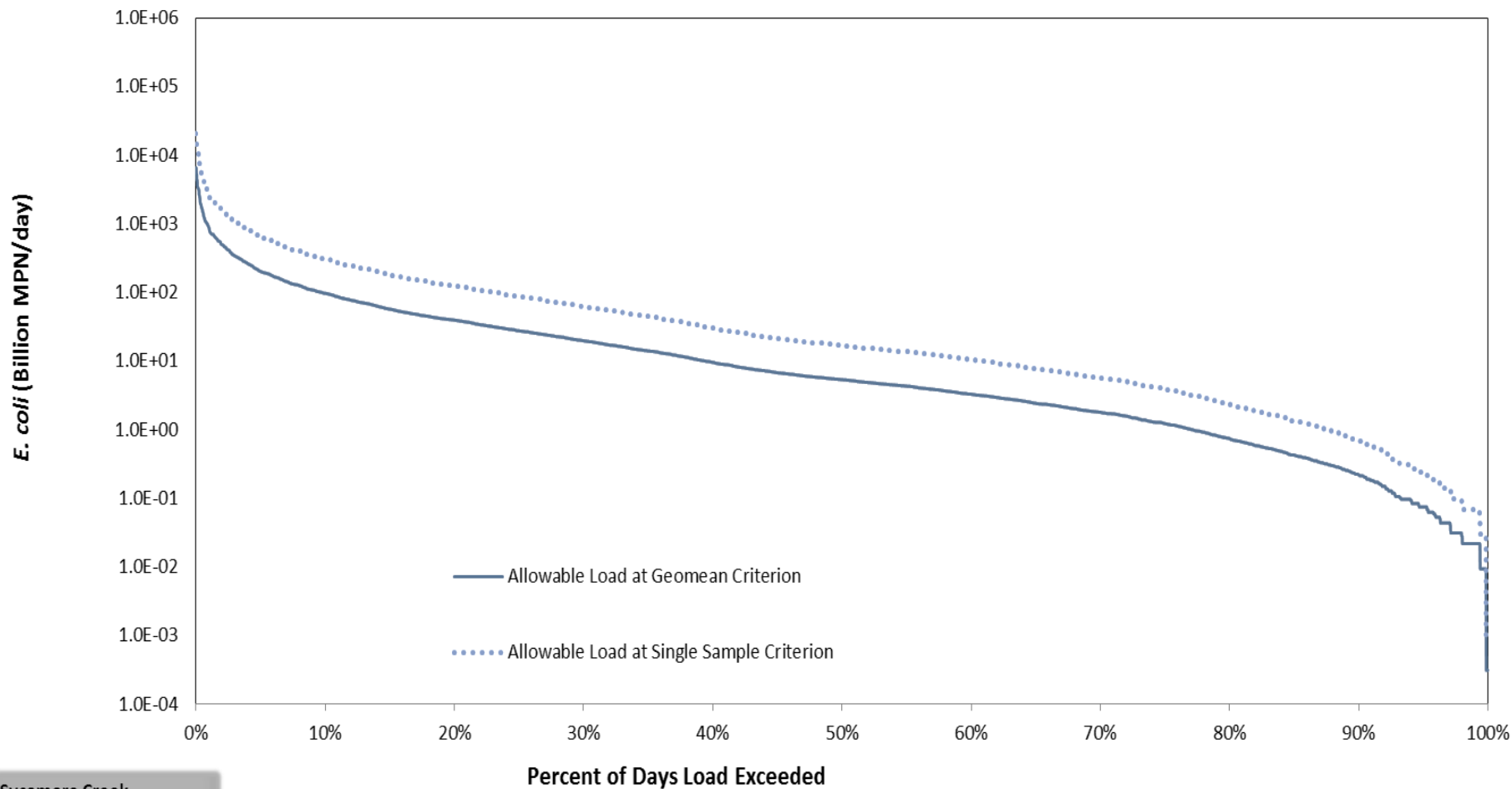


Sycamore Creek, Station 17369

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.

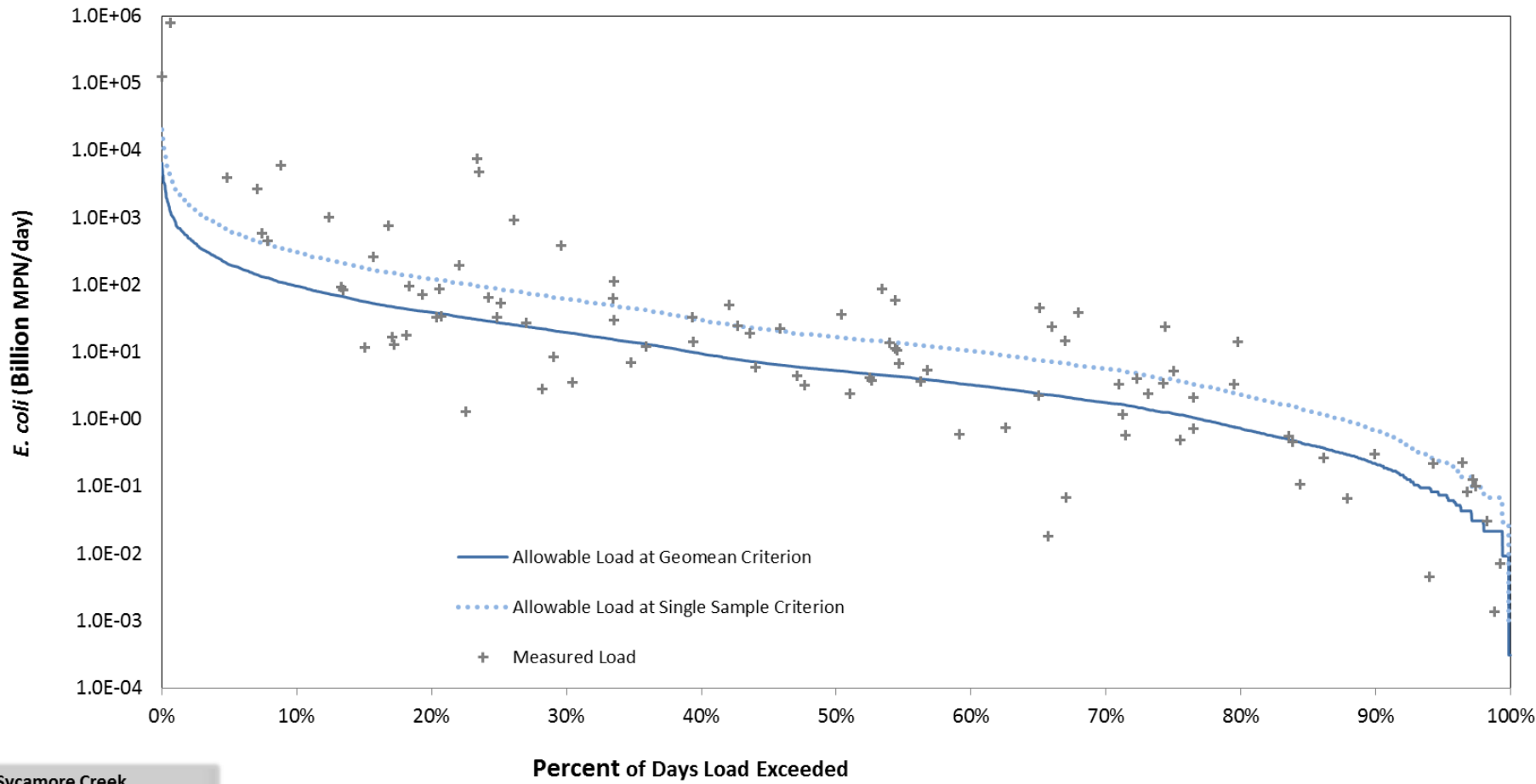


Sycamore Creek

Load duration curve of allowable bacteria, Station 17369

Third Step:

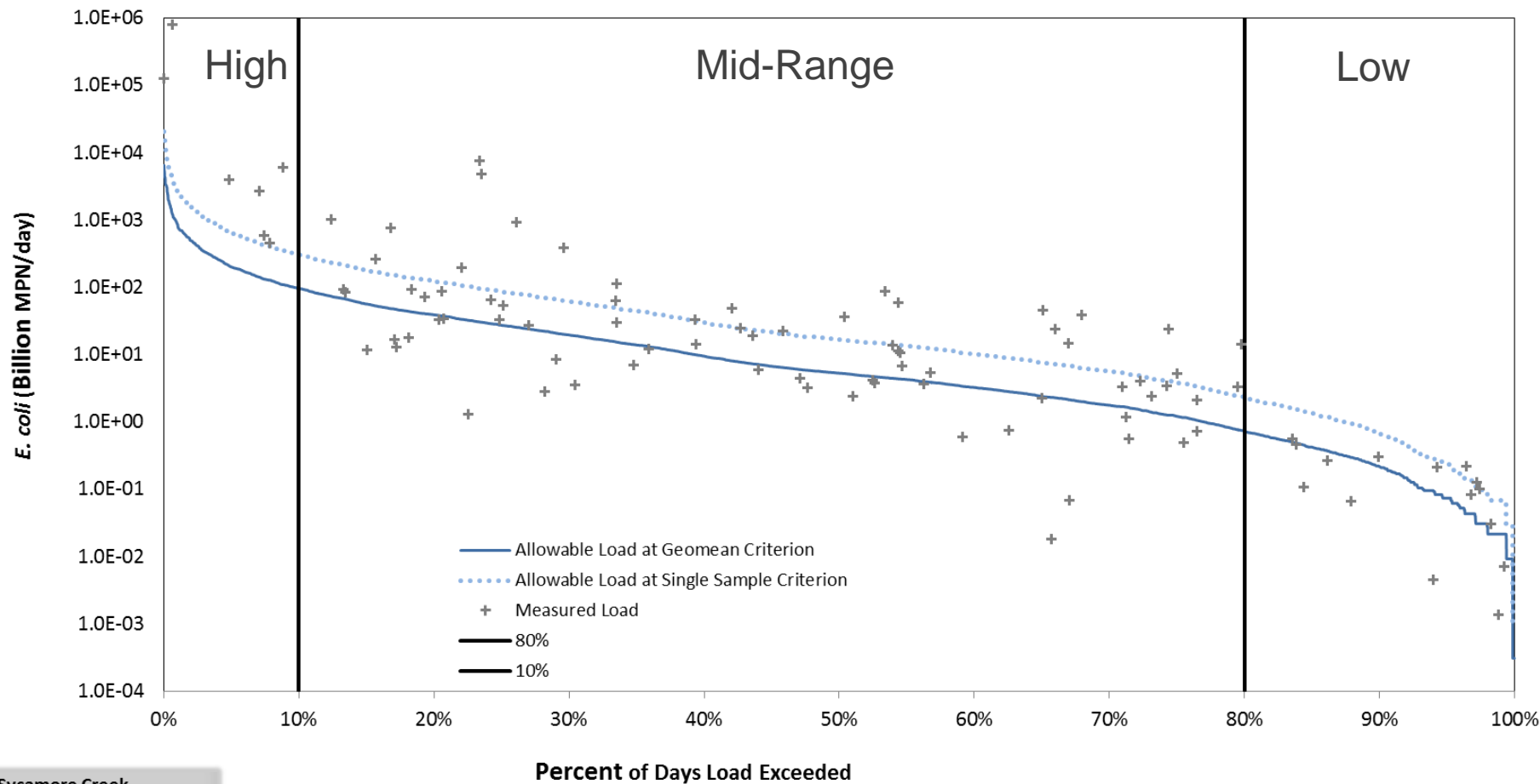
The existing *E. coli* concentration data for specific days are multiplied by the streamflow on that same day and the appropriate conversion factor to give units of MPN/day.



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%)

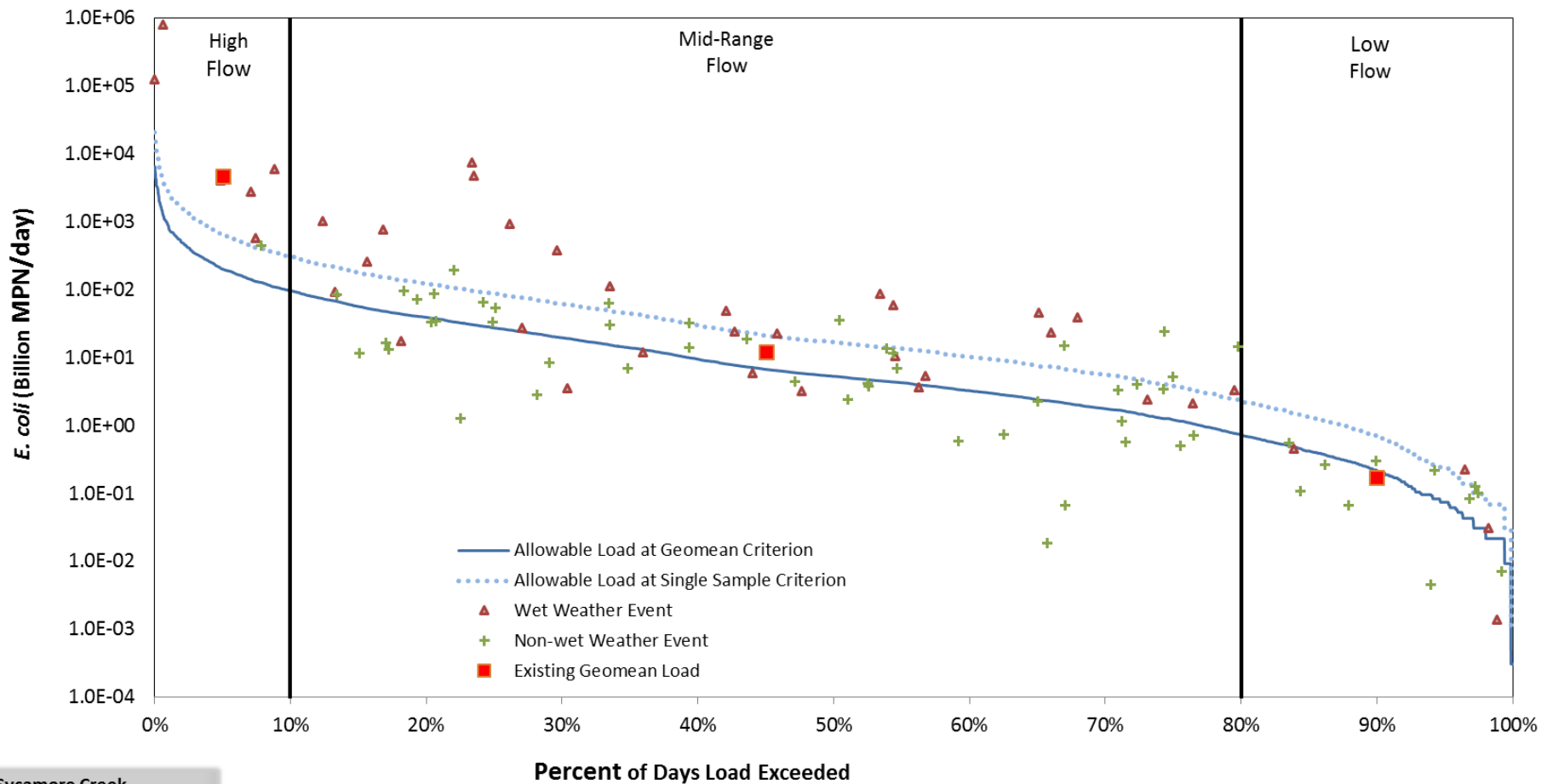


Sycamore Creek

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?