Bacteria TMDLs for Sims Bayou

November 5, 2008

TCEQ

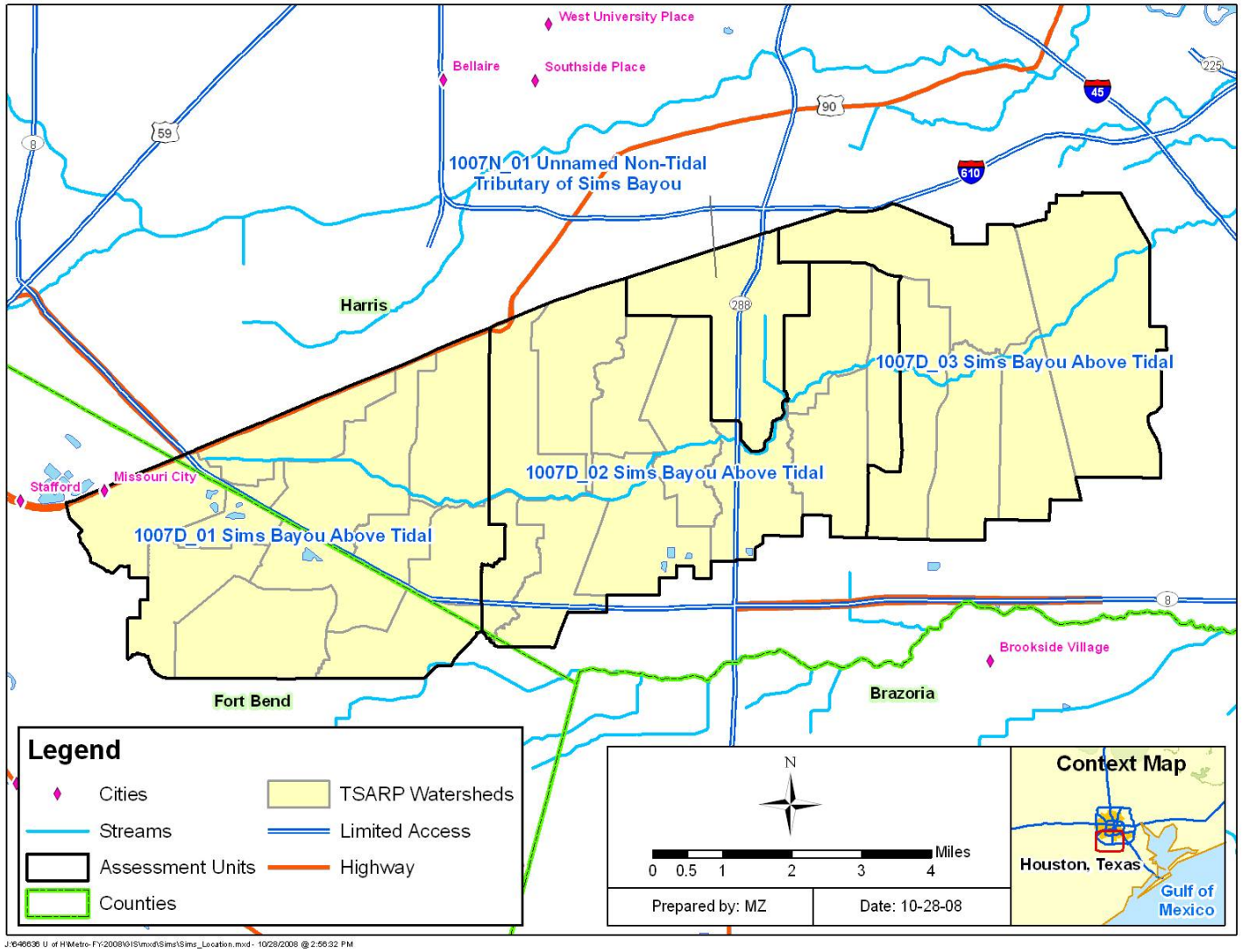
PARSONS

Outline

- Watershed Overview
- Pollutant Source Assessment
- Technical Approach: Load Duration Curves
- TMDL Calculations

Sims Bayou Watershed

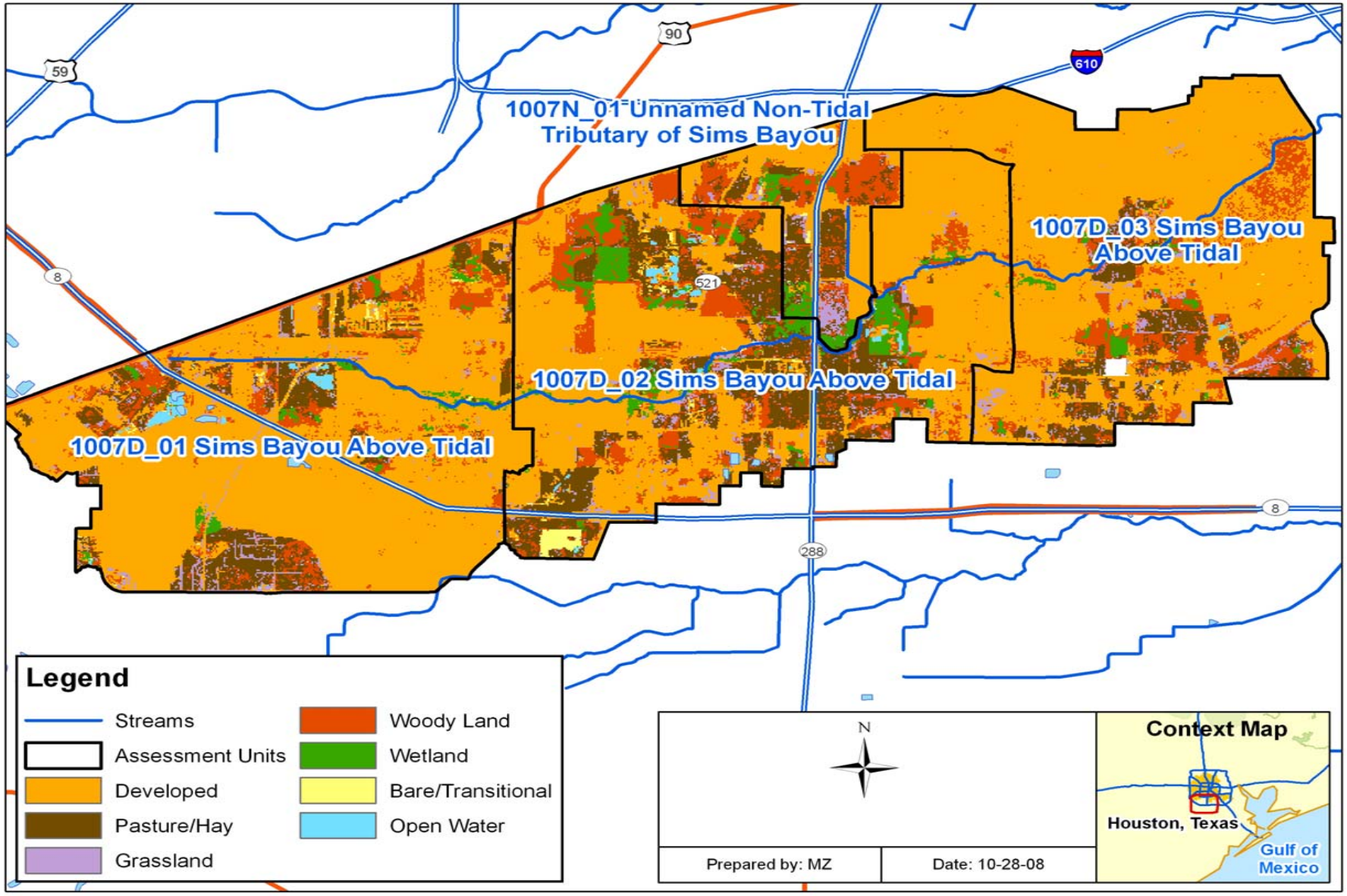
- ~50 square miles
- Located within 2 counties (Harris, Fort Bend)
- Average Annual Rainfall 46.3 inches *(NOAA 2007)*



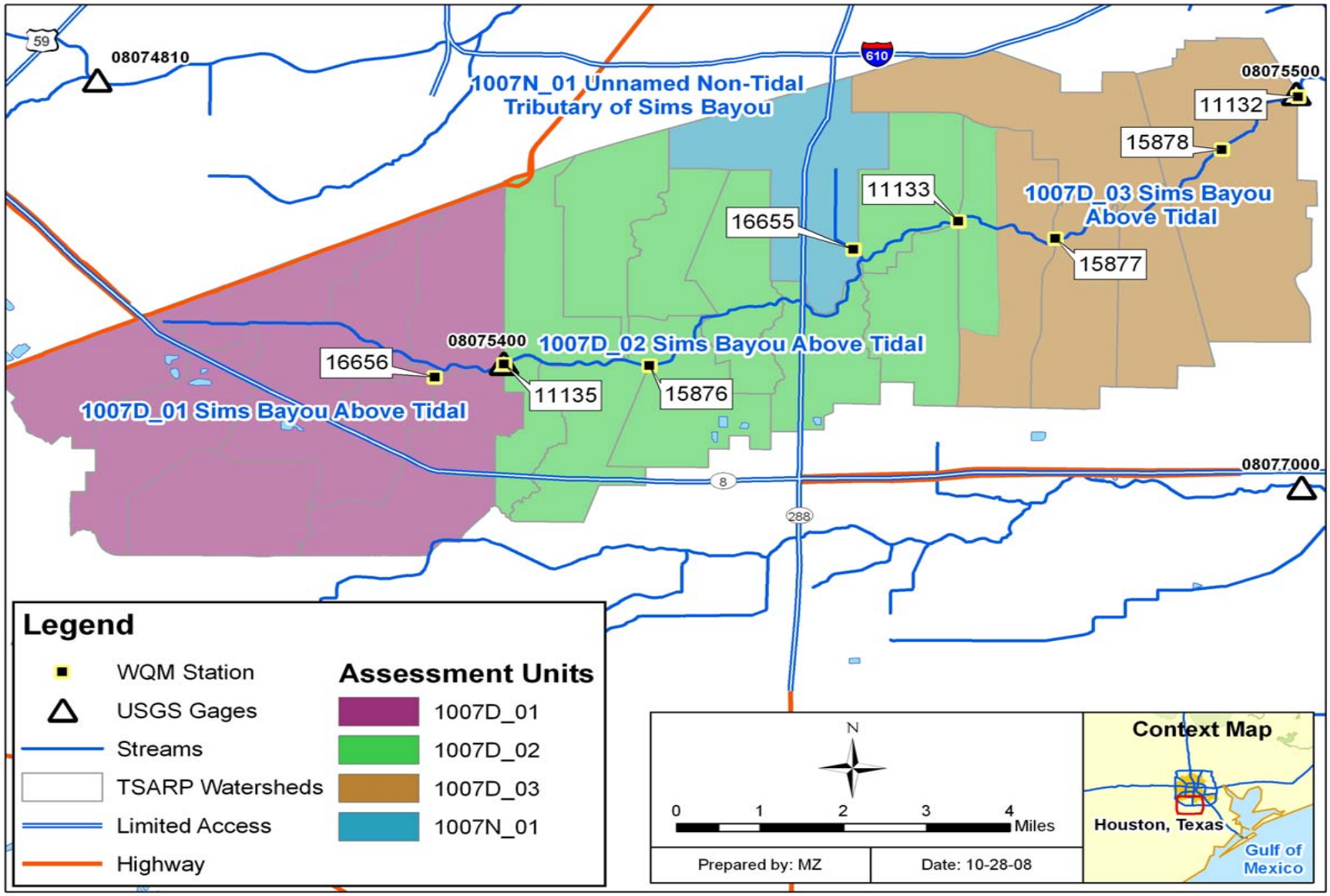
303 (d) Listed Assessment Units (2008)

Assessment Unit	Water Body	Description of Assessment Unit Not Supporting Contact Recreation Use
1007D_01	Sims Bayou above Tidal	From 0.4 miles north of Beltway 8 to Hiram Clark
1007D_02		From Hiram Clark to 11 miles upstream of the confluence with the Houston Ship Channel
1007D_03		From 11 miles upstream of the Houston Ship Channel confluence to SH 35
1007N_01	Unnamed Non-tidal Tributary of Sims Bayou	From confluence with Sims Bayou, south of Airport Road, to Reed Road, east of SH 288 in Harris County

Land Use/Land Cover



Water Quality Monitoring Stations

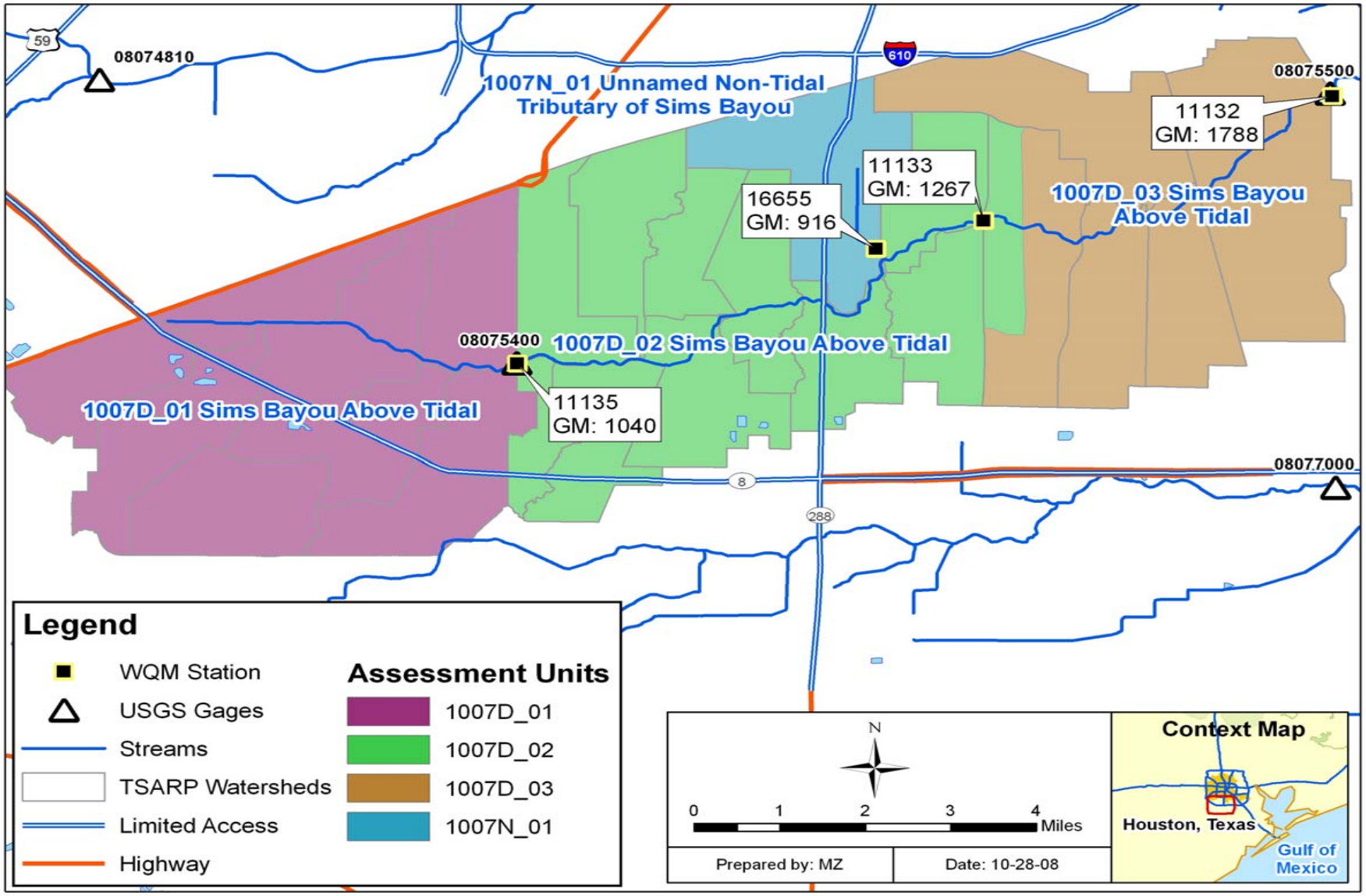


E. coli Data for TCEQ Stations from 1996 to 2006

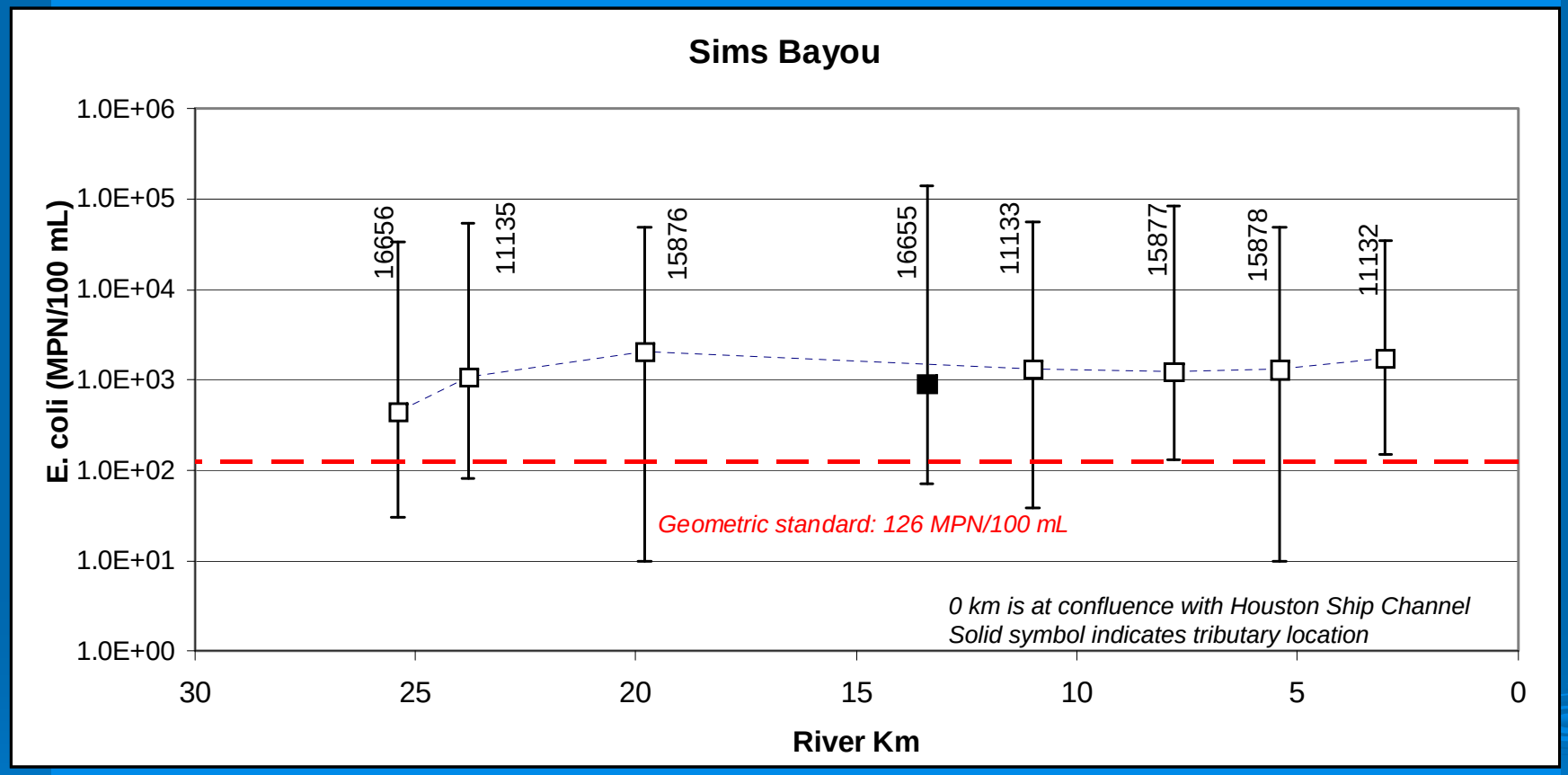
Segment	Station ID	Geometric Mean Concentration	Number of Samples	Number of Samples Exceeding Single Sample Criteria	% of Samples Exceeding
1007D_01	11135	1,040	60	46	77%
1007D_02	11133	1,267	85	69	81%
1007D_03	11132	1,788	79	76	96%
1007N_01	16655	916	82	54	66%

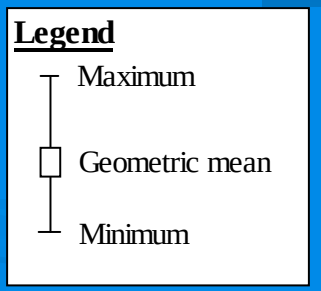
* Geometric Mean Criteria for E. coli is 126 MPN/100mL and Single Sample Criteria is 394 MPN/100mL

Sims Bayou *E. coli* Geomeans



Sims Bayou *E. coli* Longitudinal Profile





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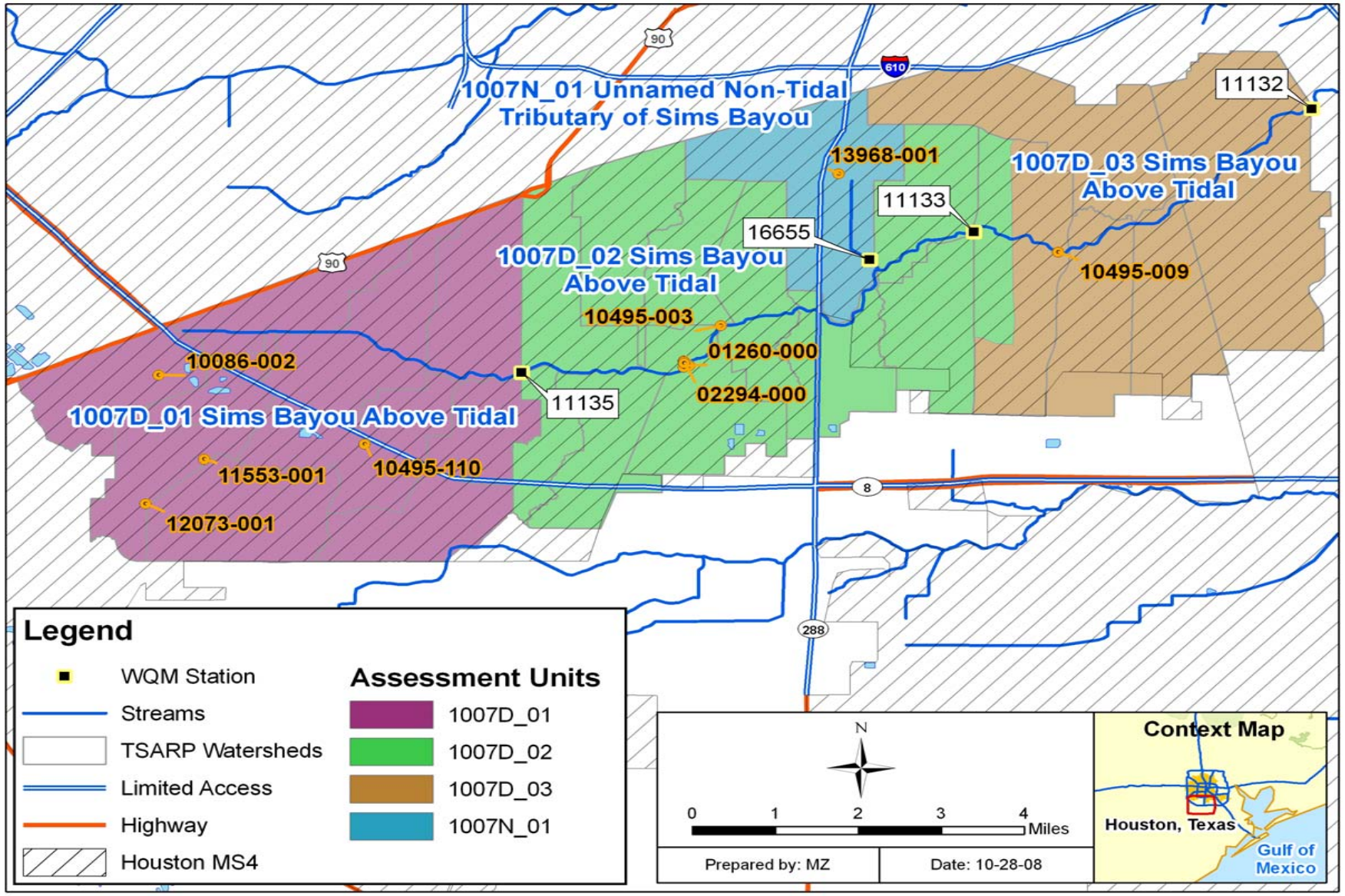
Wastewater Treatment Plants



Summary of TPDES-Permitted Facilities in the Study Area

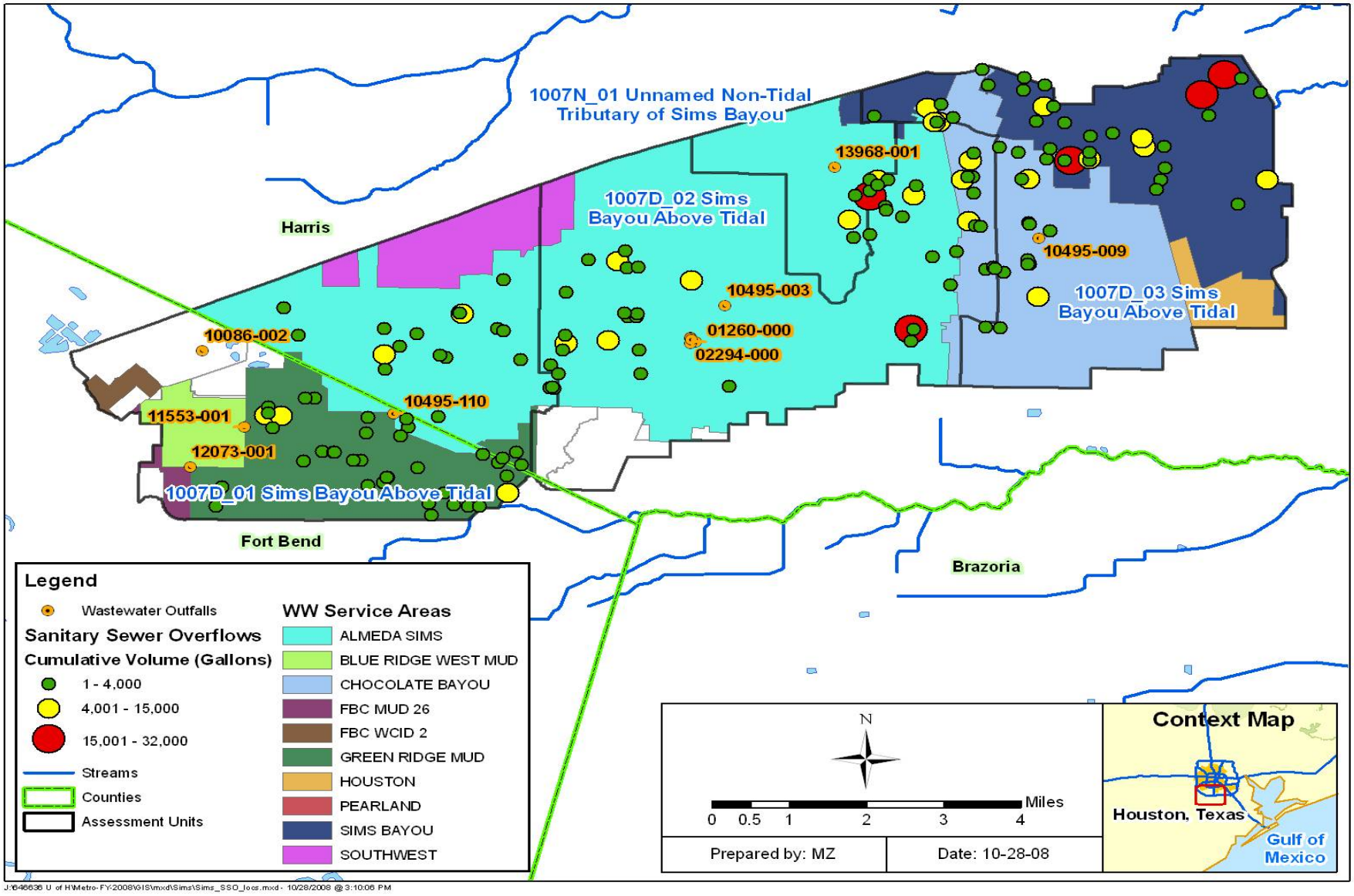
Assessment Unit	TPDES Number	2008 Permitted Flow (MGD)	Average Monthly Flow (MGD)
1007D_01	4	9.7	4.1
1007D_02	3	28.0	12.9
1007D_03	1	7.0	2.8
1007N_01	1	0.10	0.02

Population Projections

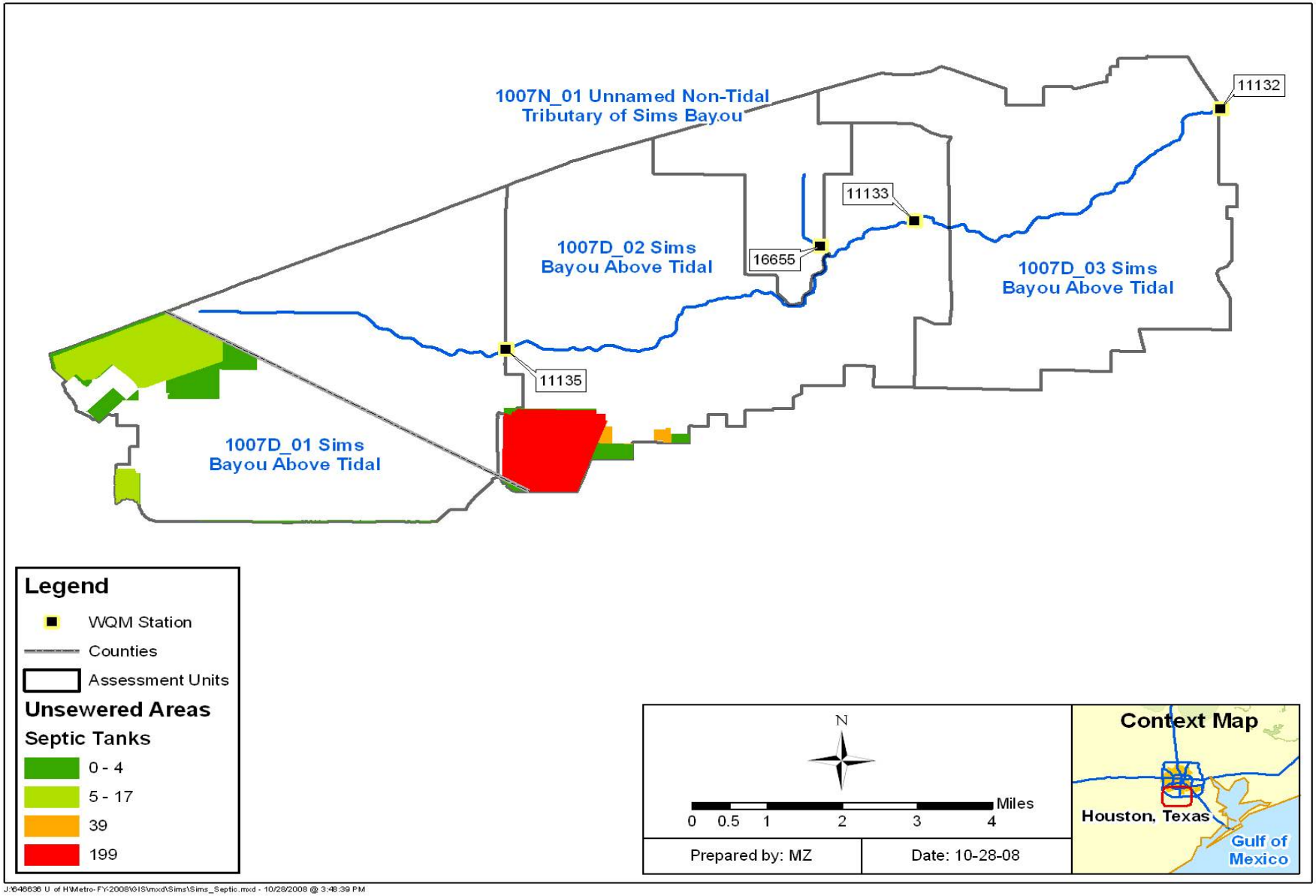
Stream Name	Assessment Unit	2005	2035	Increase
Sims Bayou Above Tidal	1007D_01	67,548	83,705	19%
Sims Bayou Above Tidal	1007D_02	40,778	62,978	35%
Sims Bayou Above Tidal	1007D_03	54,077	64,561	16%
Unnamed Non-tidal Tributary of Sims Bayou	1007N_01	6,739	10,107	33%

Source: HGAC 2007

Sanitary Sewer Overflows



On-Site Sewage Facilities



On-Site Sewage Facilities

Assessment Unit	Stream Name	OSSF Estimate using 1990 Census Method
1007D_01	Sims Bayou Above Tidal	40
1007D_02		240
1007D_03		0
1007L_01	Unnamed Non-Tidal Tributary of Sims Bayou	0

Estimated Number of Pets

Assessment Unit	Stream Name	Dogs	Cats
1007D_01	Sims Bayou Above Tidal	35,882	40,831
1007D_02		24,897	28,331
1007D_03		26,932	30,647
1007N_01	Unnamed Non-Tidal Tributary of Sims Bayou	2,351	2,675

Permitted Stormwater For WQ0004685000

Segment	Stream Name	Total Area (acres)	Area under MS4 Permit (Acres)	Percent of Assessment Unit under MS4 Jurisdiction
1007D_01	Sims Bayou Above Tidal	13,269	13,269	100%
1007D_02	Sims Bayou Above Tidal	13,690	12,875	94%
1007D_03	Sims Bayou Above Tidal	11,090	10,696	96%
1007N_01	Unnamed Non-Tidal Tributary of Sims Bayou	2,601	2,594	100%

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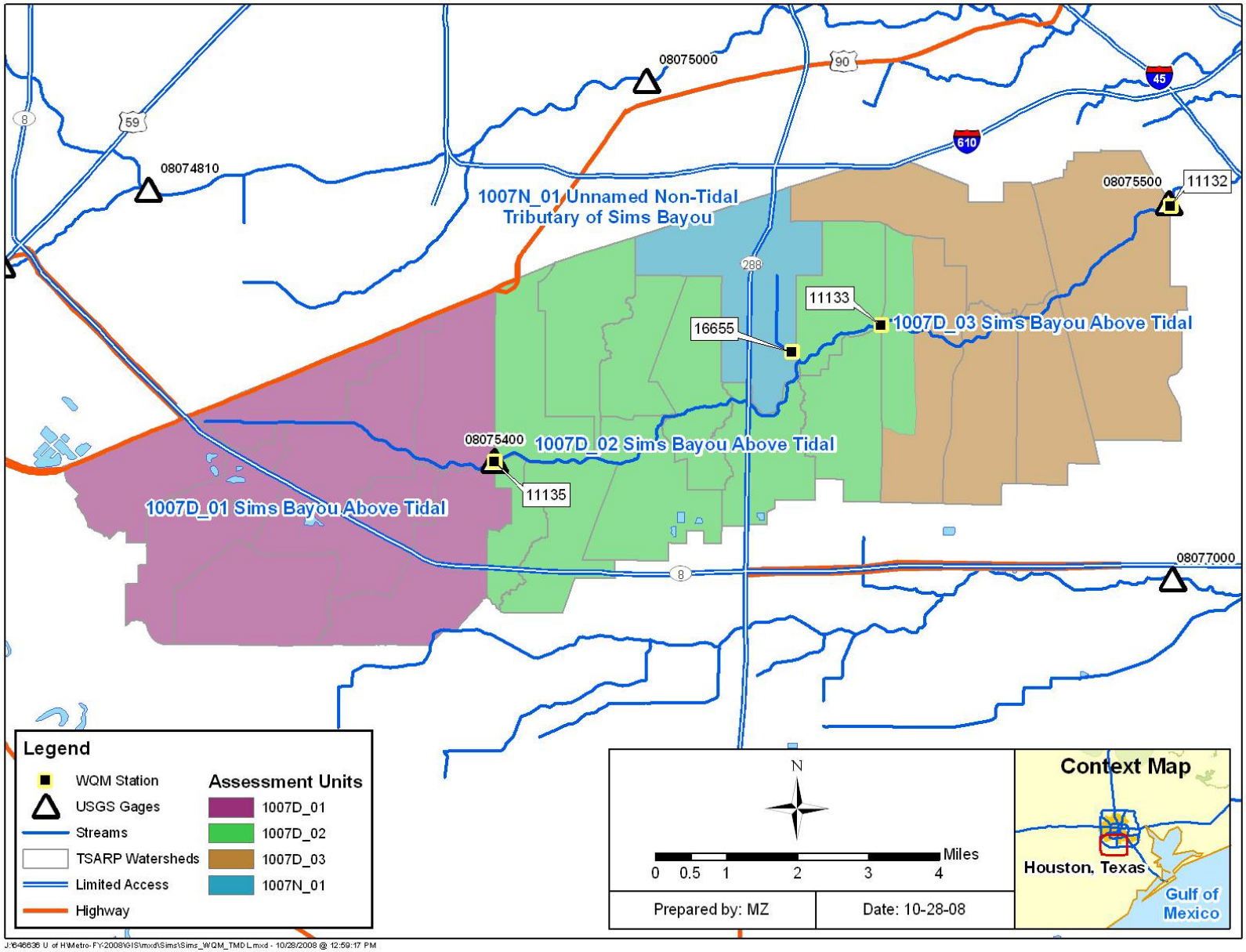
WQM Stations for TMDL Development



USGS Gages in the Sims Bayou Watershed

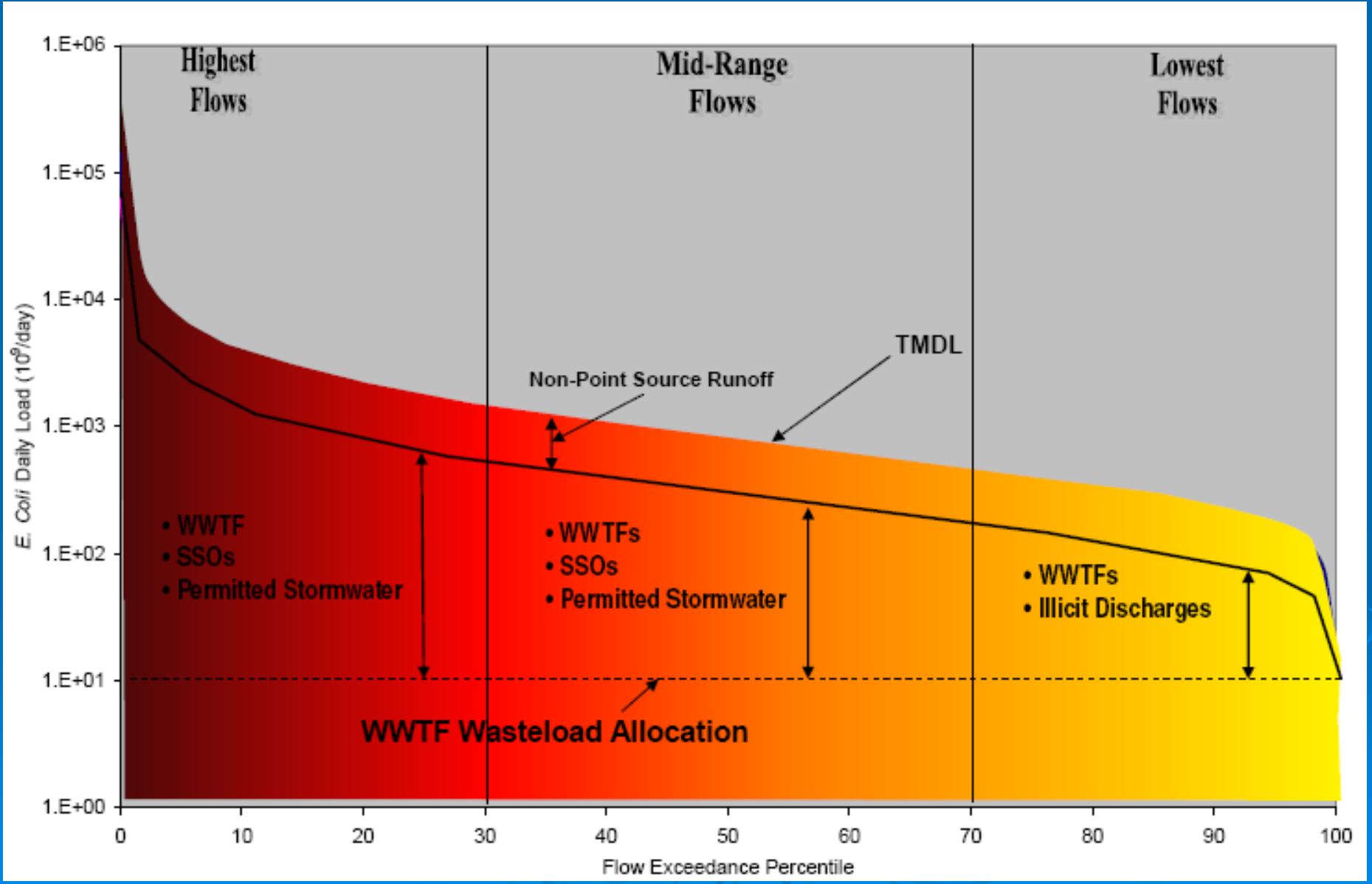
USGS Gage Number	Name	Period of Record	Data Type
08075400	Sims Bayou at Hiram Clarke St, Houston, TX	9/1/1964 - present	Discharge (cfs)
		9/14/1996 - present	Elevation (ft)
08075500	Sims Bayou at Houston, TX	10/1/1952 – 9/01/2001	Discharge (cfs)
		10/1/1997 – present	Elevation (ft)[a]

***** Highlight - USGS gage station used to project flows.

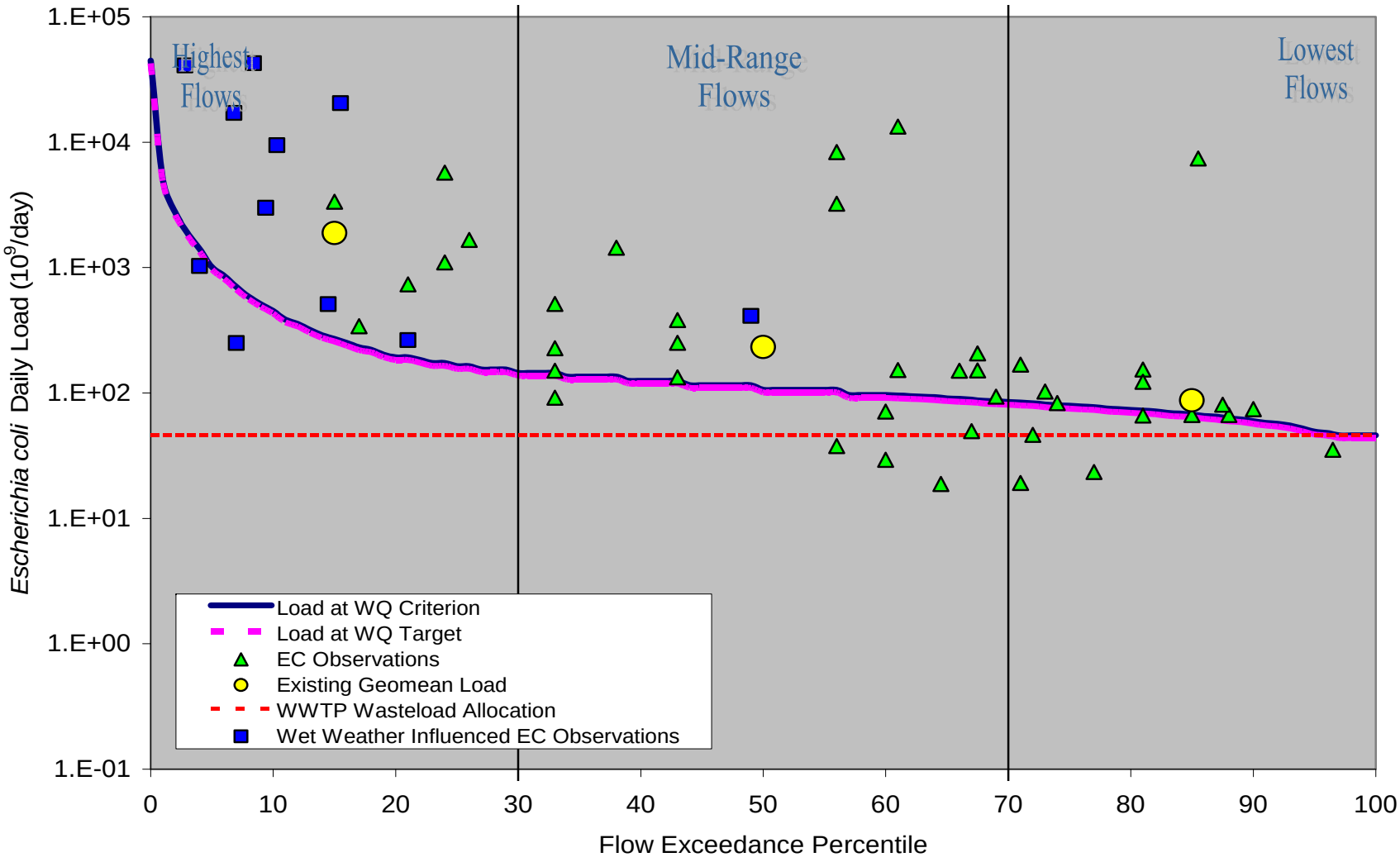
Flow Percentiles

Assessment Unit	1007D_01	1007D_02	1007D_03	1007N_01
Watershed Area (sq. mile)	20.7	46.2	63.5	4.1
Average Annual Rainfall (inch)	44.3	46.3	48.1	47.2
Percentile	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
0	4,650	9,228	16,893	1,320
10	47	114	189	8.8
20	20	55	82	2.1
30	15	43	59	1.1
40	13	37	51	0.7
50	11	34	45	0.6
60	10	31	40	0.5
70	8.8	29	37	0.3
80	7.6	25	31	0.2
90	6.2	6.4	12	0.1
100	1.5	0	0	0

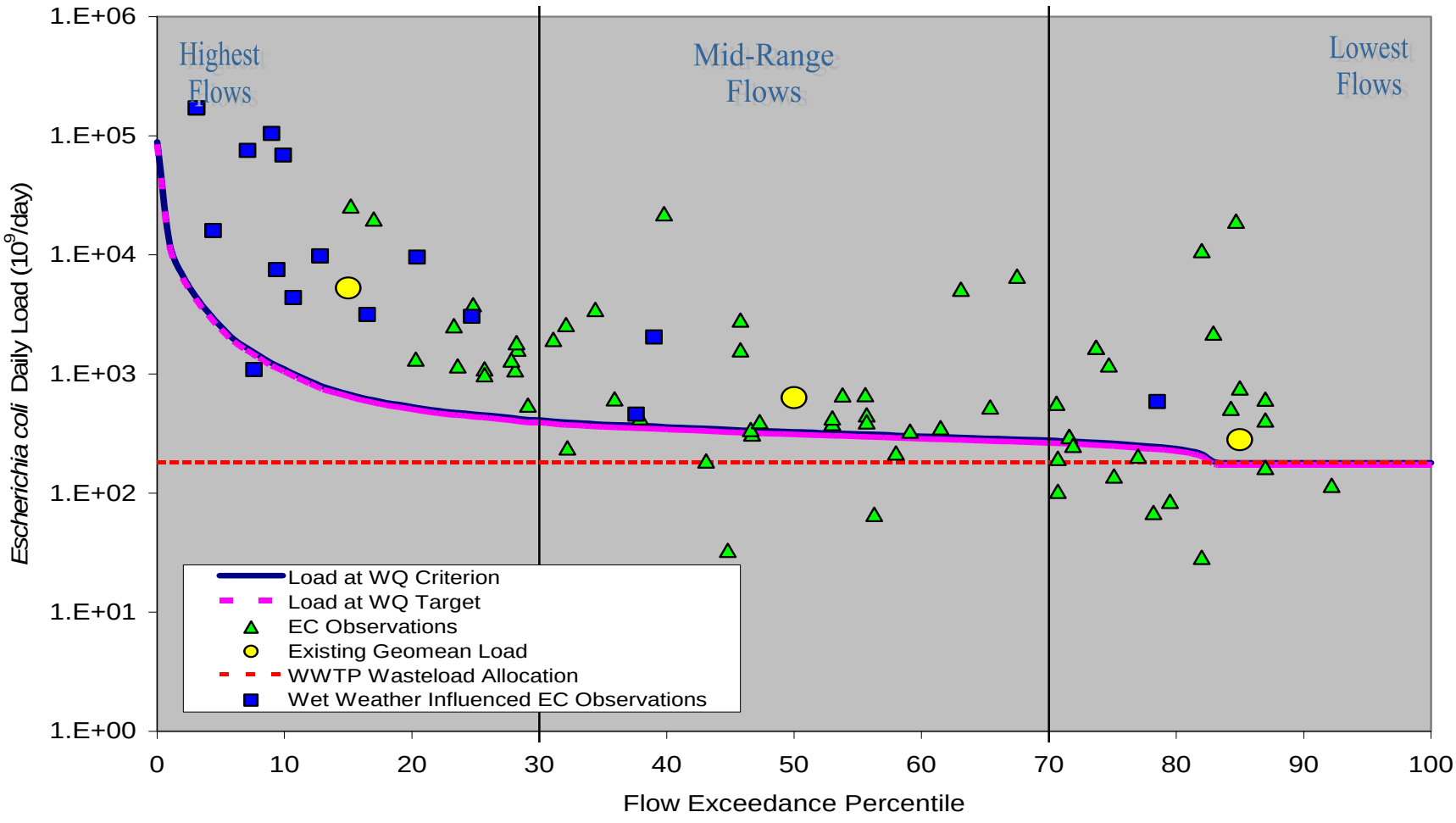
LDC Schematic



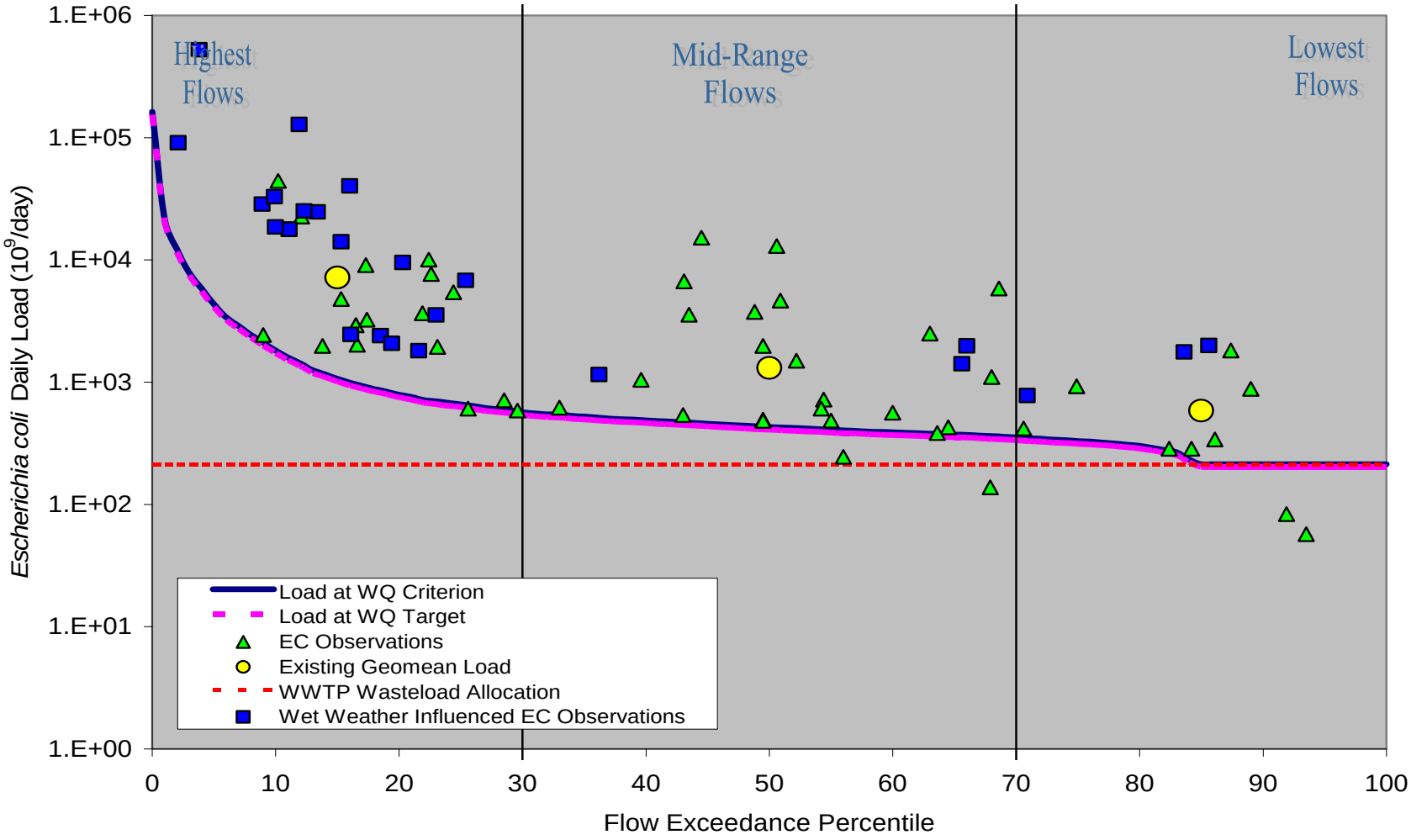
Load Duration Curve for Sims Bayou Above Tidal (1007D_01)



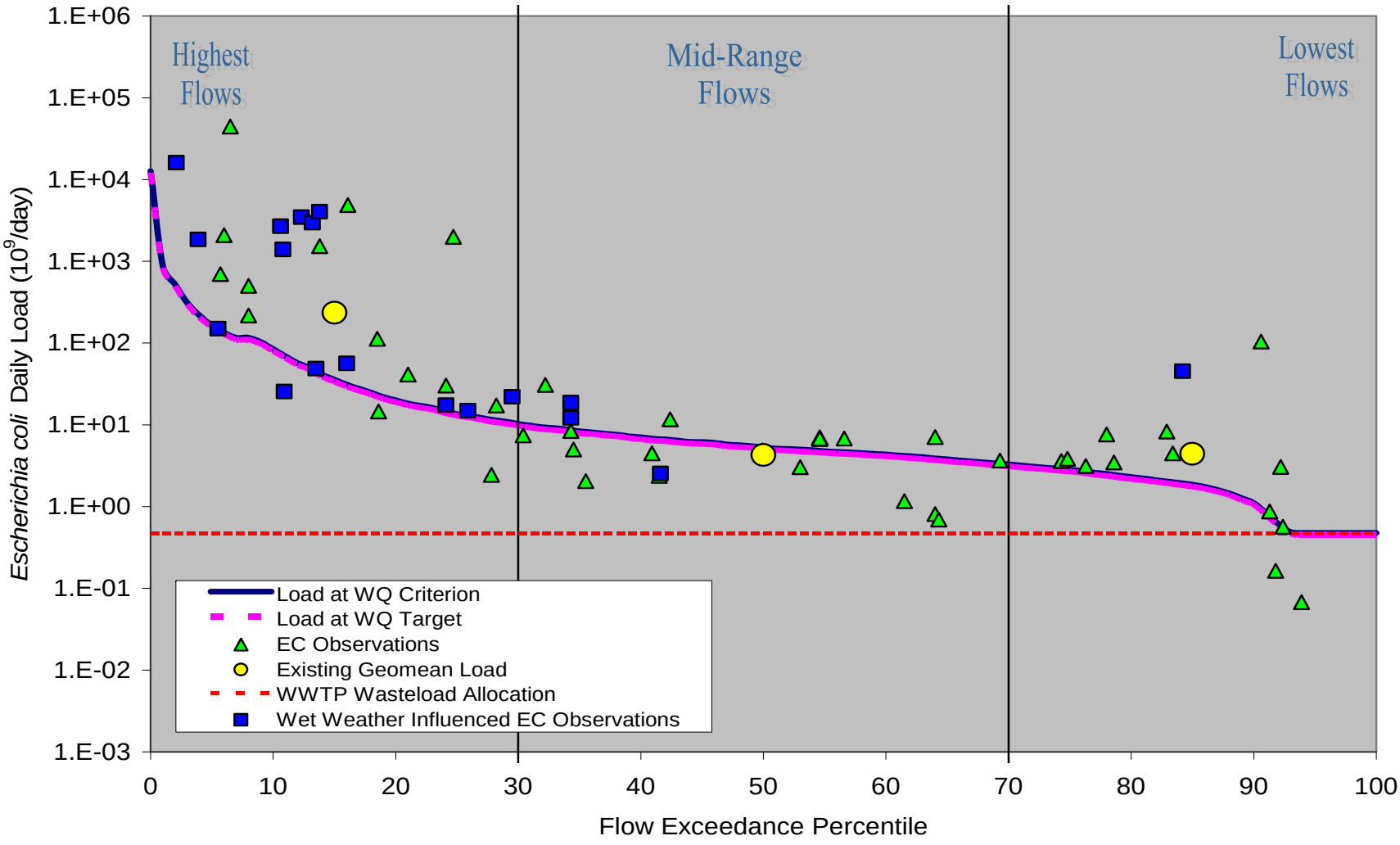
Load Duration Curve for Sims Bayou Above Tidal (1007D_02)



Load Duration Curve Sims Bayou Above Tidal (1007D_03)



Load Duration Curve for Unnamed Non-Tidal Tributary of Sims Bayou (1007N_01)



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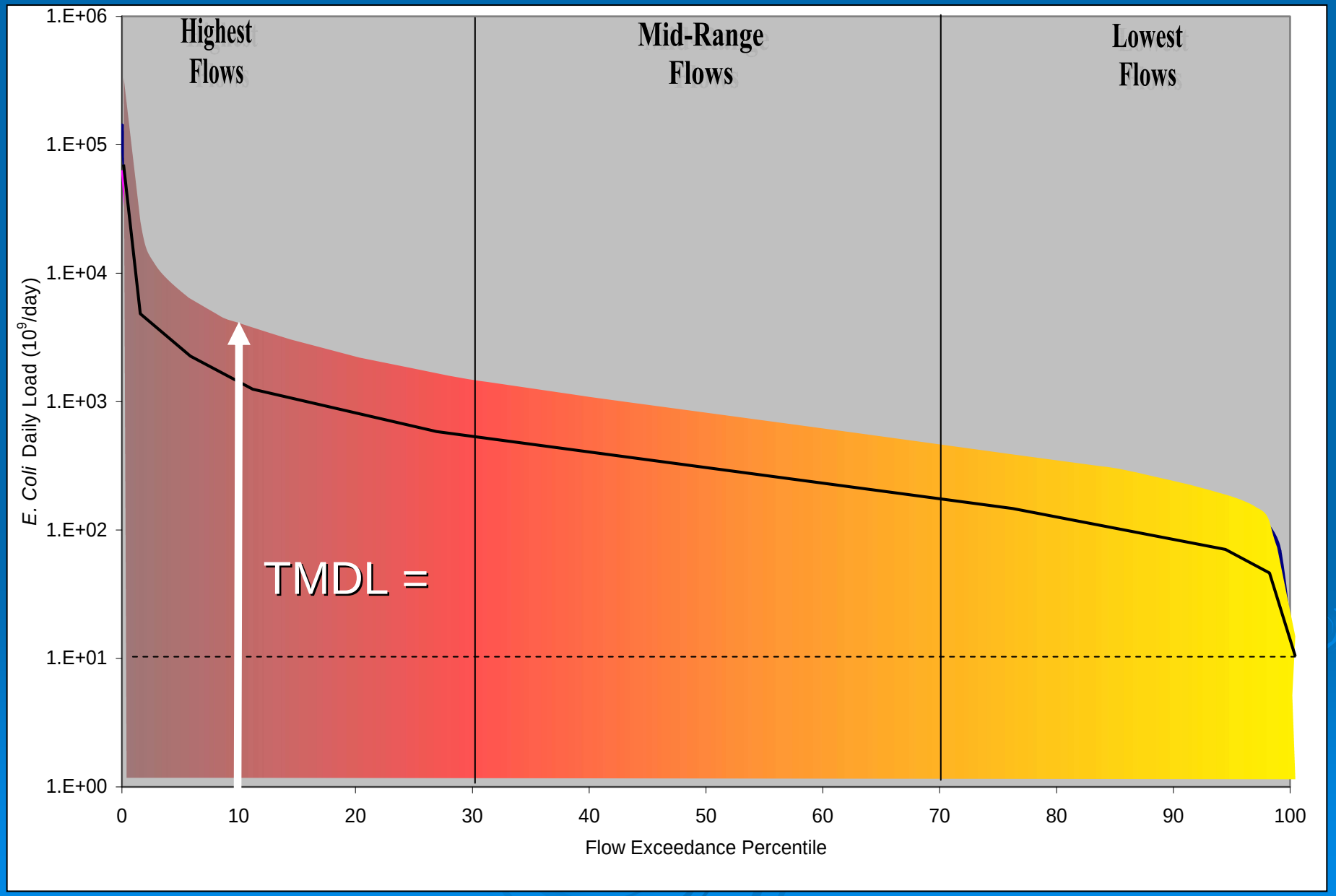

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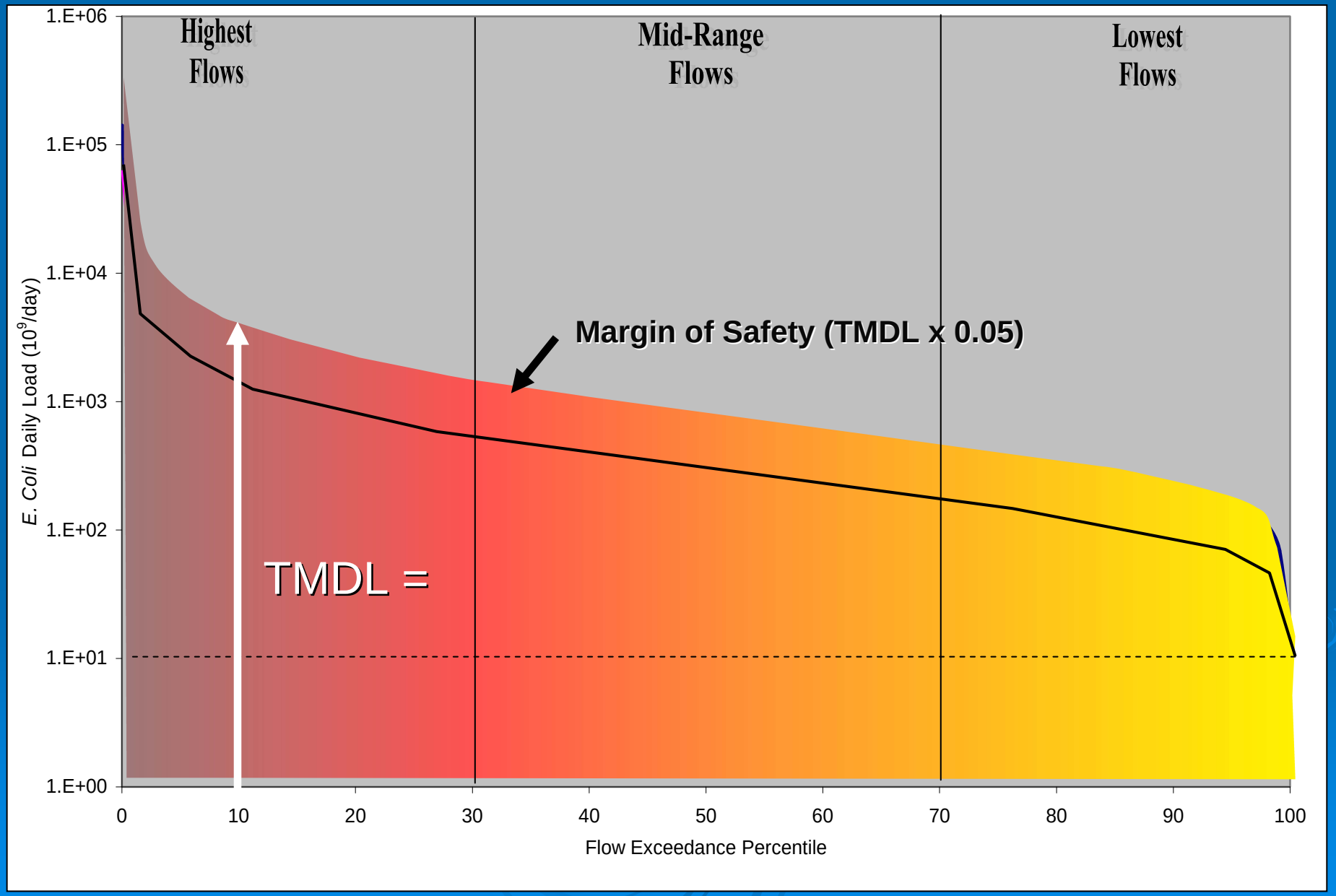

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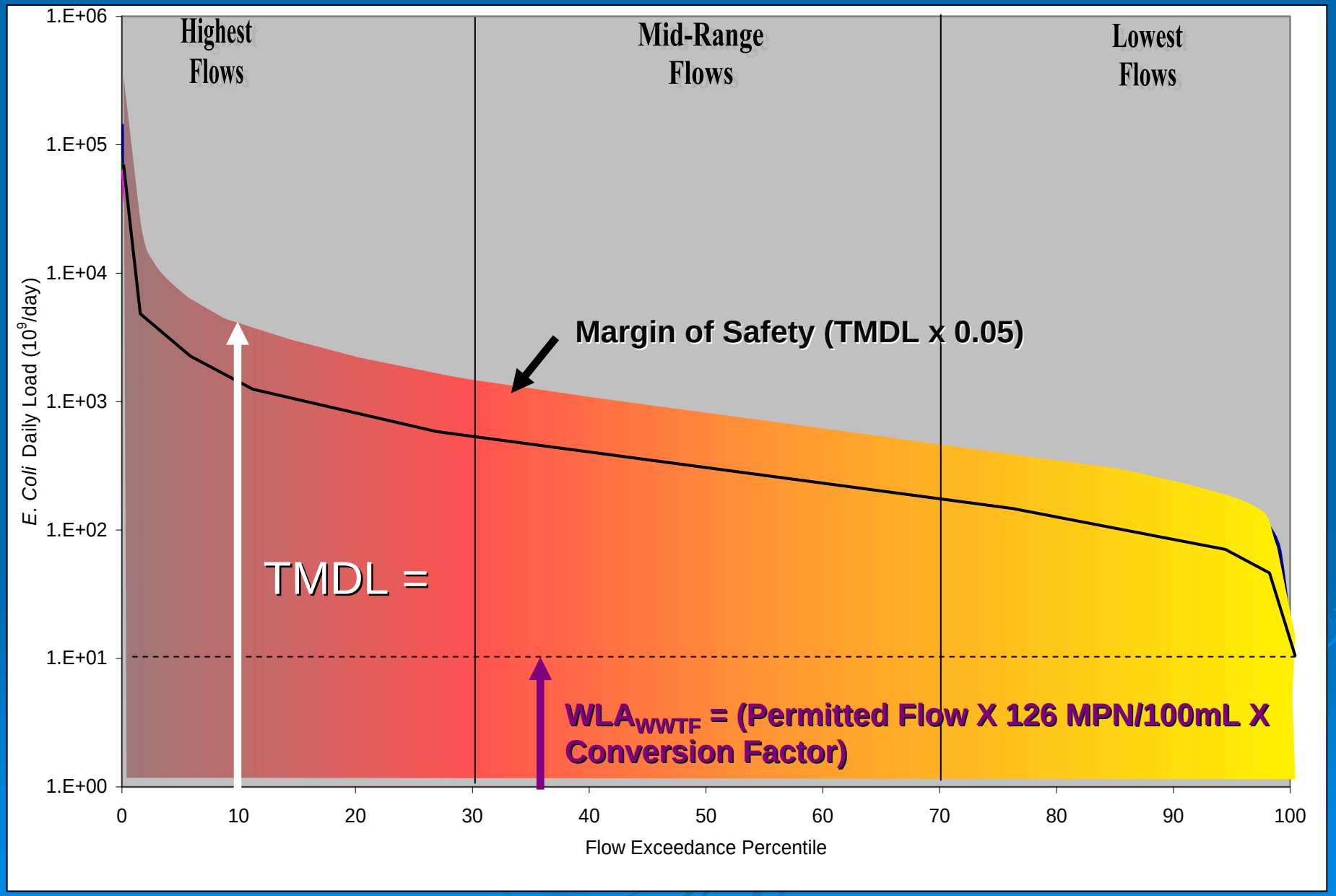

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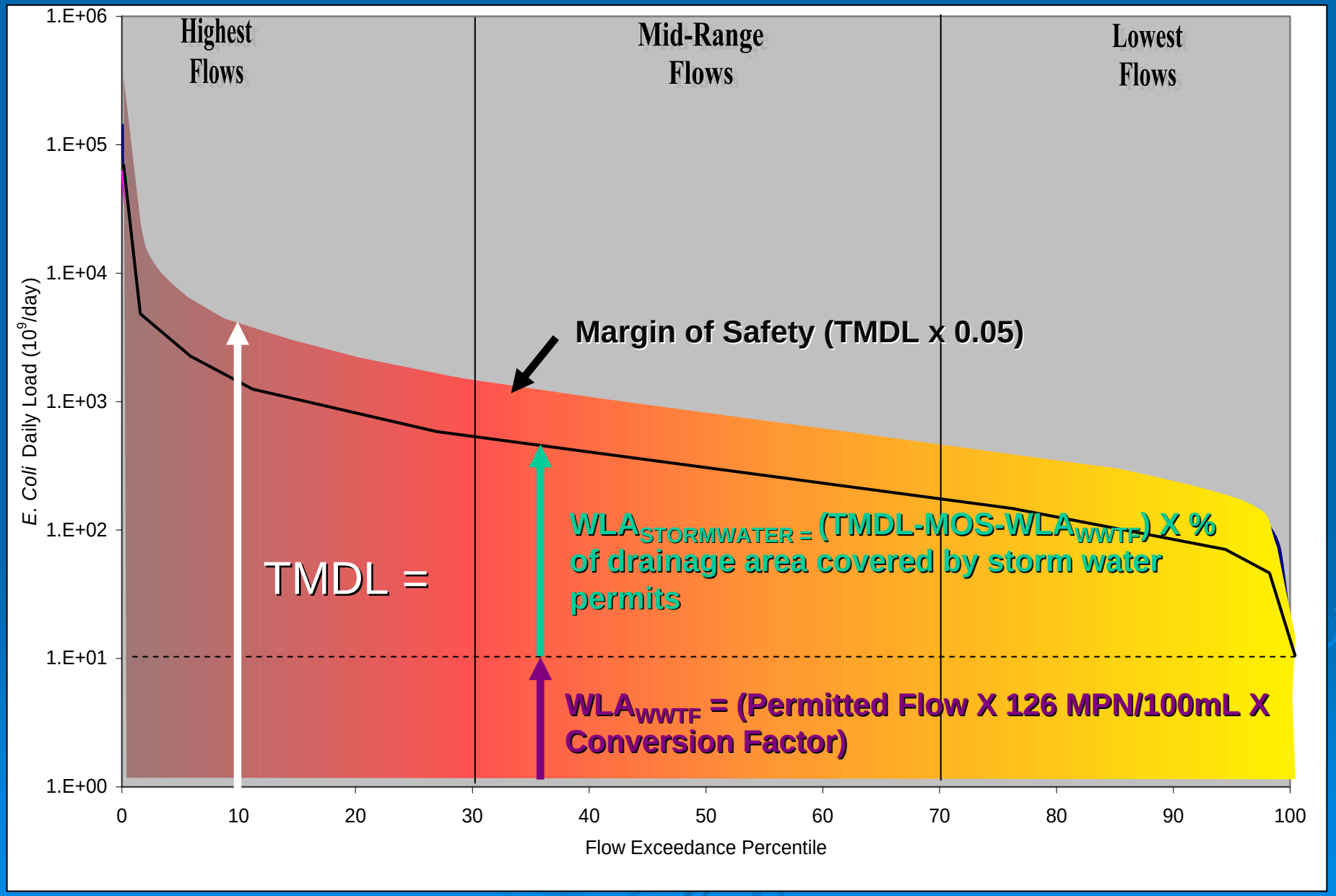

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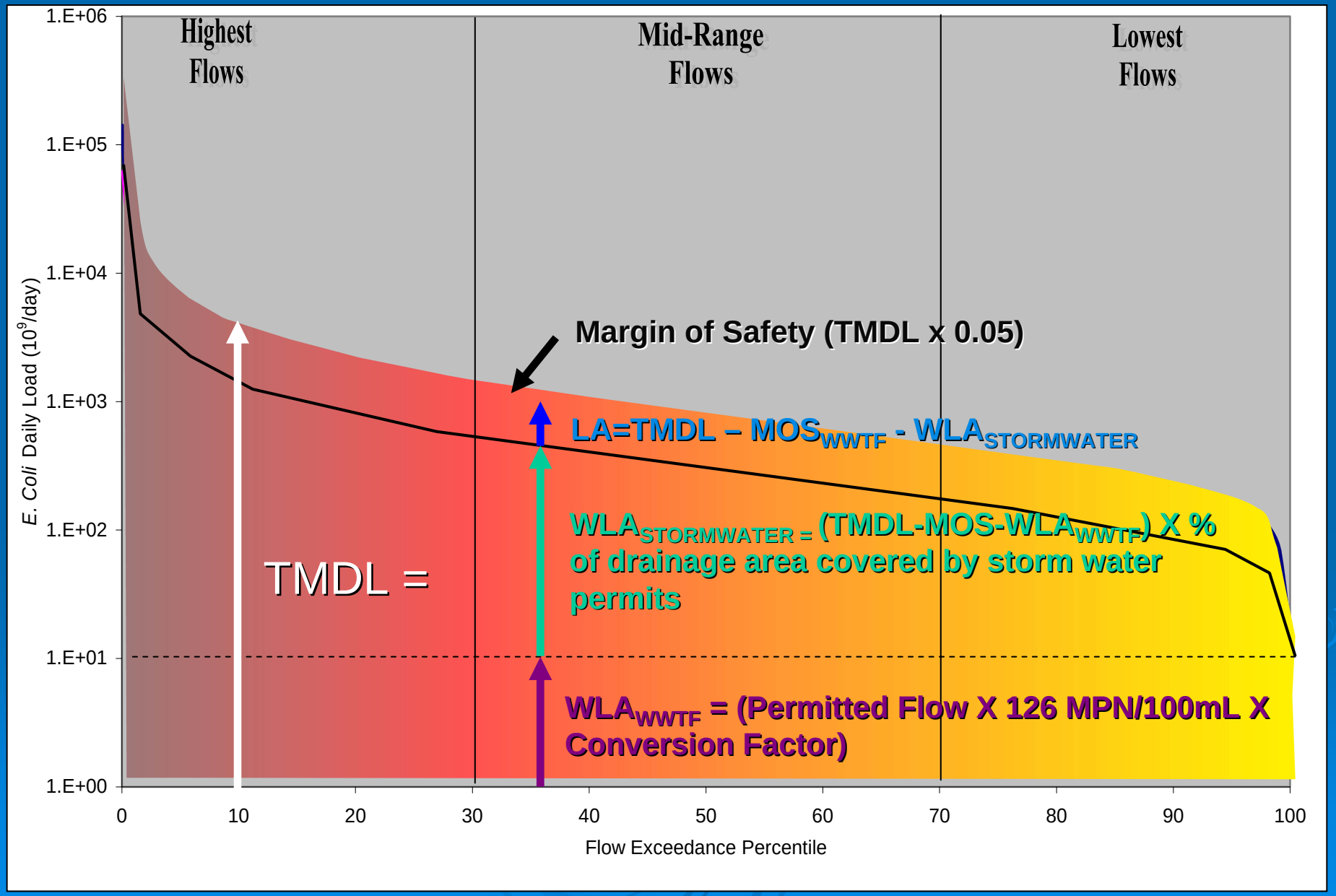

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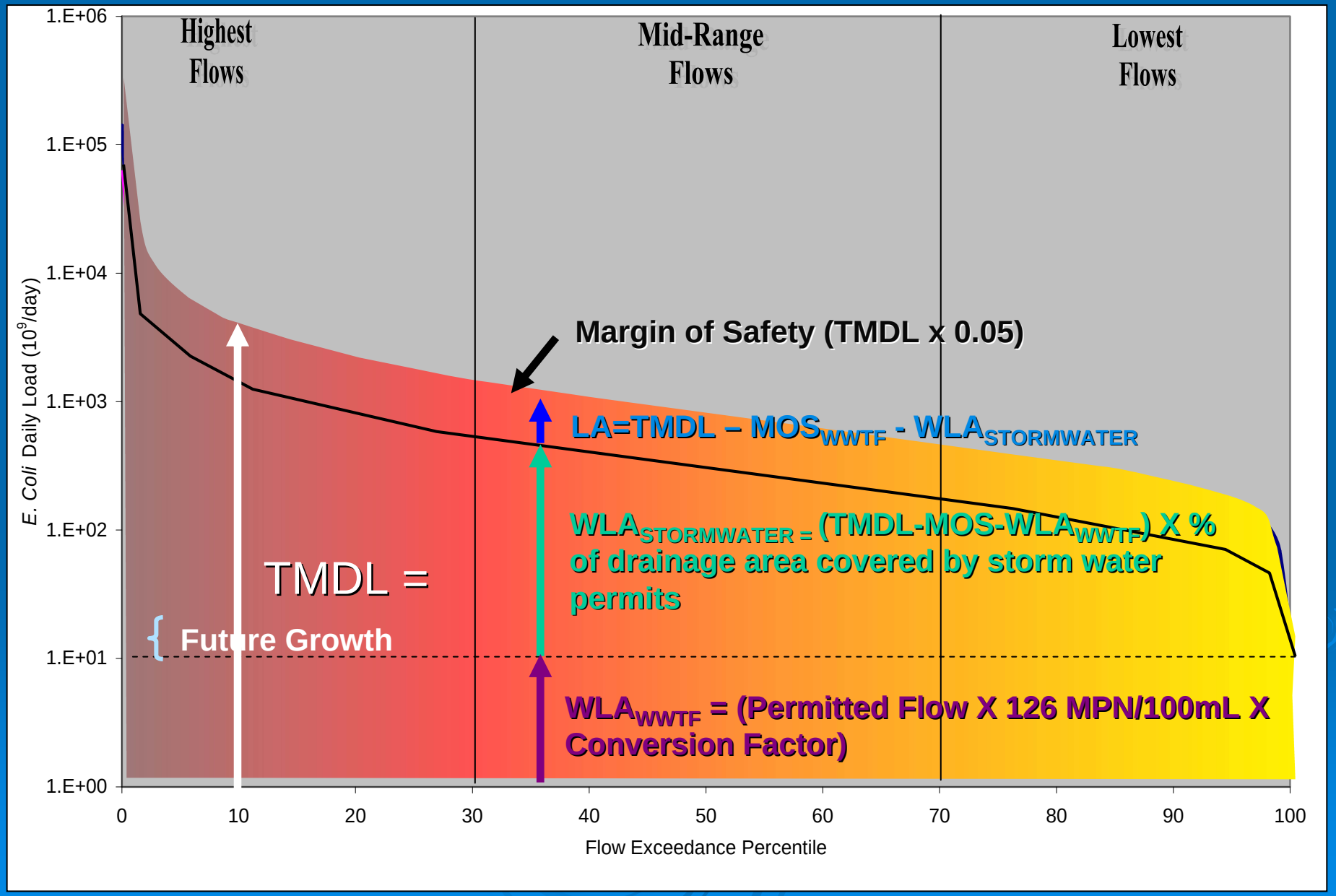

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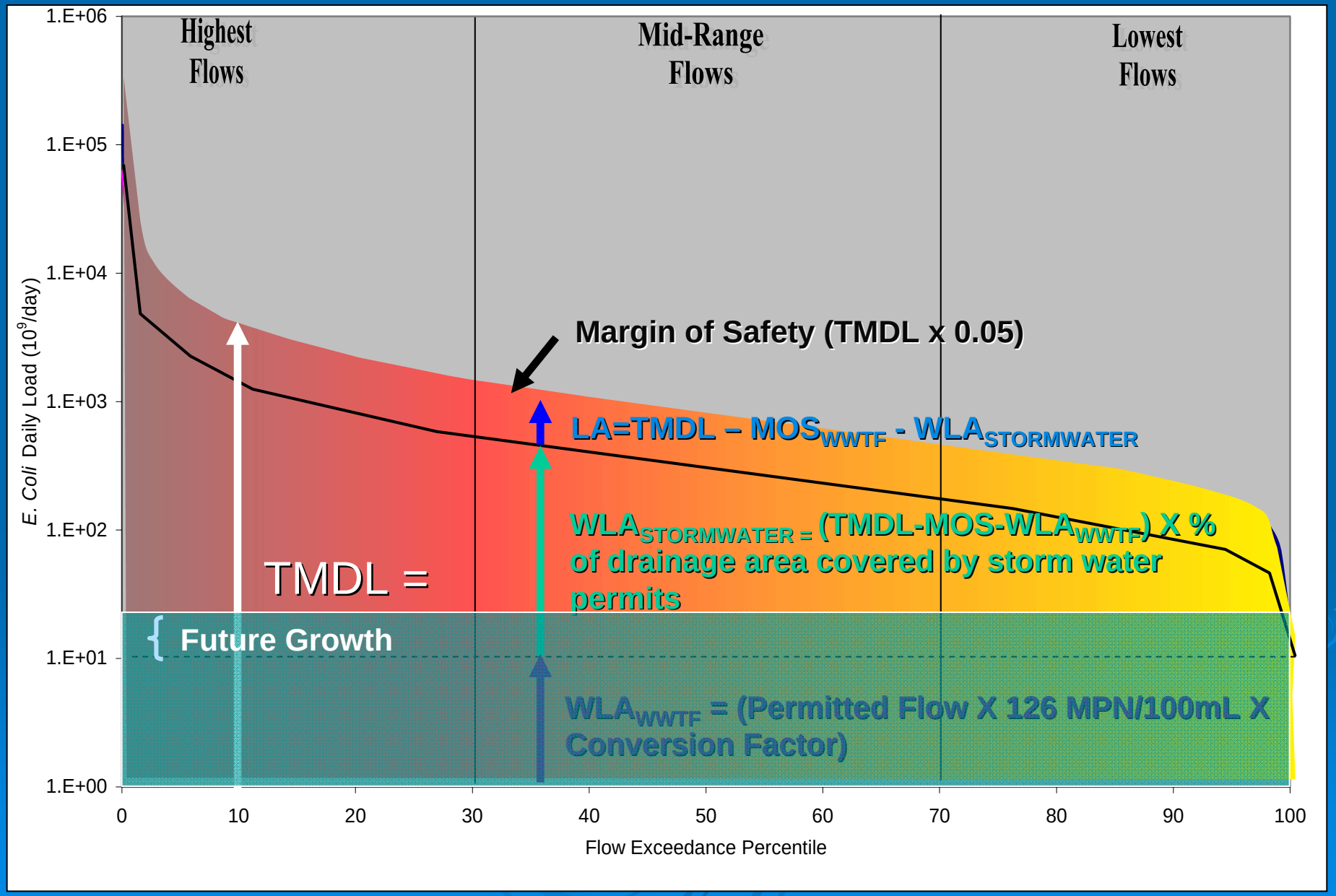

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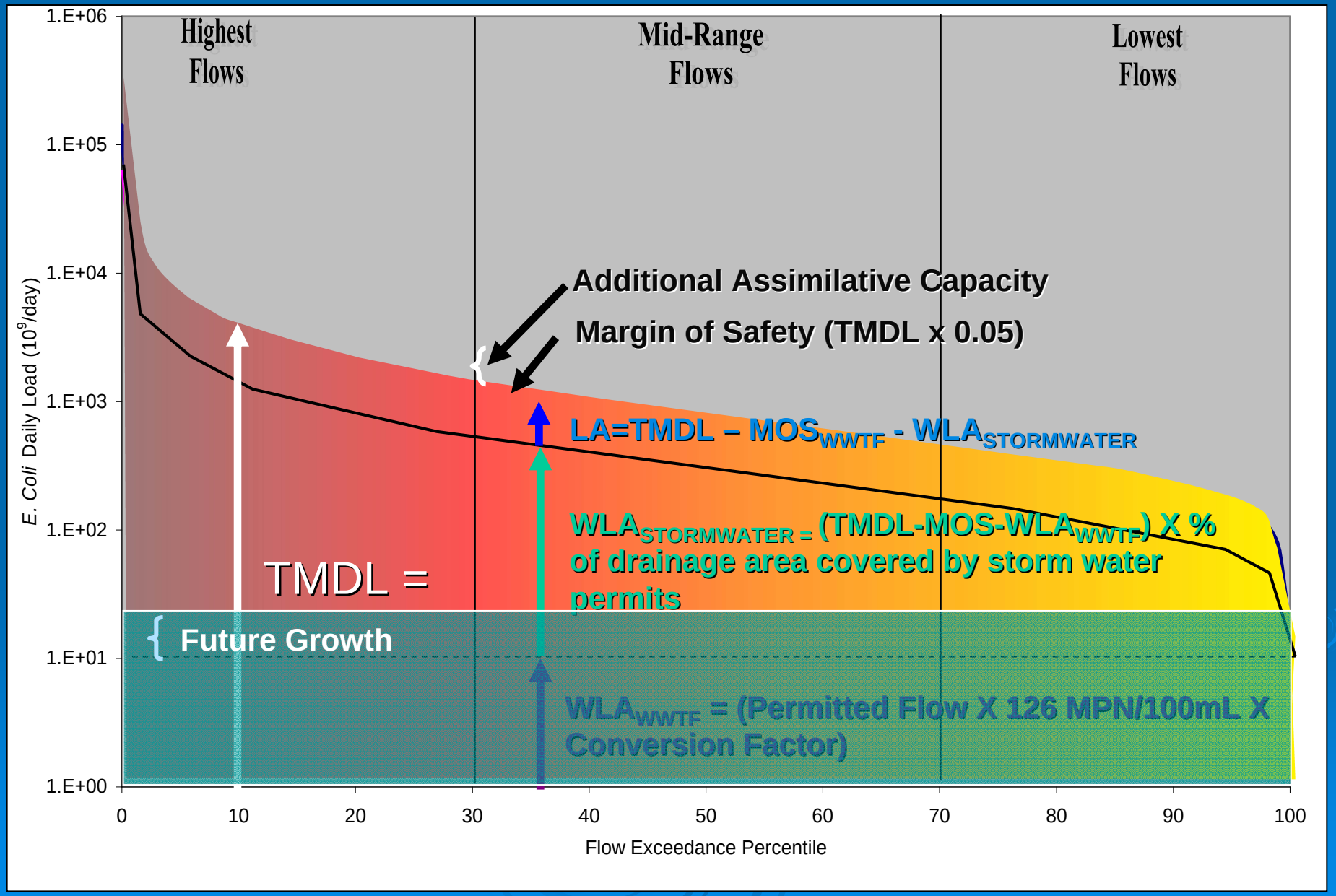

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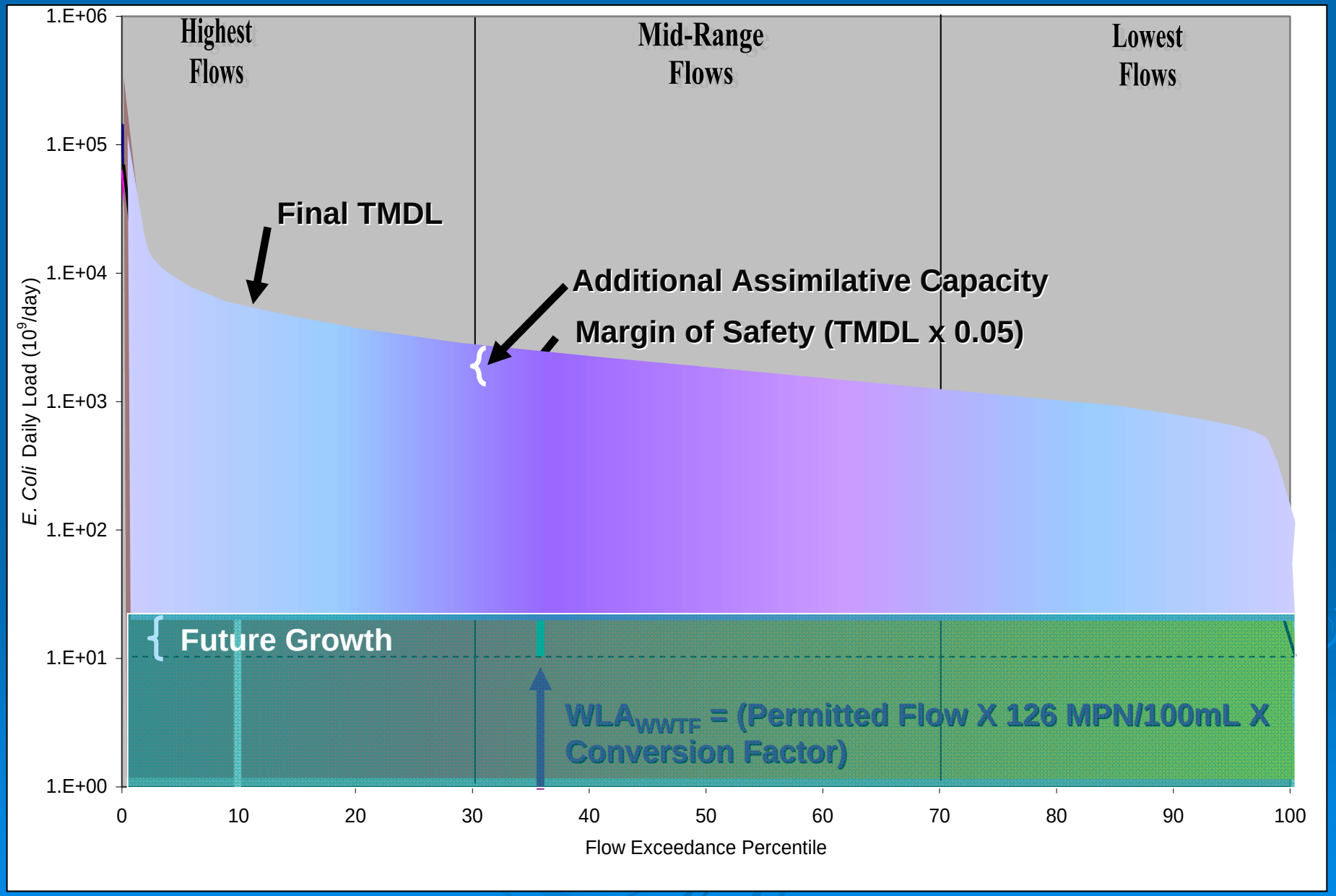

Final TMDL Allocations

Assessment Unit	TMDL (MPN/day)	WLA_{WWTF} (MPN/day)	$WLA_{STORM\ WATER}$ (MPN/day)	LA (MPN/day)	MOS (MPN/day)
1007D_01	1.35E+11	5.49E+10	7.30E+10	0	6.73E+09
1007D_02	3.69E+11	2.36E+11	1.11E+11	3.17E+09	1.84E+10
1007D_03	5.15E+11	2.75E+11	2.08E+11	6.41E+09	2.58E+10
1007N_01	1.11E+10	6.36E+08	9.96E+09	0	5.57E+08

a WLA_{WWTF} = WLA_{WWTF} + Future Growth

b LA includes upstream loads