

WHAT IS A TMDL?

Total Maximum Daily Load

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Total Maximum Daily Load (TMDL)

REQUIRED BY CLEAN WATER ACT

A TMDL equation specifies the maximum amount (load) of a pollutant that a water body can receive while still meeting water quality standards. The TMDL document allocates pollutant loadings among sources.

Example – A mug can only hold a specific amount of coffee before reaching its capacity.



TMDL Process Milestones

1st Milestone – Process and important terms to be discussed in this presentation.

Place Water Body on 303(d) List

2nd Milestone – Determine limits to pollutant loads

TMDL Document

3rd Milestone – Develop plan to improve water quality

Implementation Plan Document

Final Goal – Meet Water Quality Standards

303(d) List

1. “List of Impaired Water Bodies”
2. List of water bodies not meeting Water Quality Standards, required by the Clean Water Act and approved by the EPA.
3. TCEQ assesses water quality biennially.
4. If sufficient data is available and levels exceed water quality standards, the water body is listed as impaired on the 303(d) list.



Routine Monitoring Samples
Collected at Stream,
River, or Lake

Data Assessed
by TCEQ

Does water quality
meet Standards for
each Designated
Use and Criteria?

No

Yes

Place on 303(d) List

1st
Milestone
Complete

Meets Water
Quality
Standards
No Further Action



Water Quality Standards

- Water Quality Standards - define the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. *From 40 CFR Section 130.3*
- Components
 - Designated Uses
 - Contact Recreation, Water Supply, Aquatic Life Use, Non-contact Recreation
 - Criteria – limit numeric pollutant concentrations
 - Geometric Mean, Single Sample Maximum, 24-hour measurements
 - Pollutant Parameters
 - Bacteria, PCBs, Nutrients, Metals, etc.



Designated Use

- Contact Recreation - Recreational activities involving a significant risk of ingestion of water, including wading by children, swimming, water skiing, diving, and surfing. *From 30 TAC §307.3(a)(12)*
- Contact recreation criteria apply to all bodies of freshwater except where specifically designated otherwise in §307.10 of TAC.



Changing the Designated Use

- Designated Use can only be changed if a Use Attainability Analysis confirms that an alternative use is applicable. Designated Use changes must be approved by EPA.
- Secondary form of Contact Recreation is not assigned to any water body in the current WQS's.
- For more information on the history of Designated Uses - See Standards Table.



Criteria for Contact Recreation

- Texas Criteria for Bacteria (*E. coli*)
 - Geometric Mean (126 cfu/100mL)
 - Single Sample Max (less than 25% of sample exceed 394 cfu/100mL)
- States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. *From 40 CFR Section 131.11*



What if Water Quality Standards Change?

- Approved TMDLs will be revised to reflect any future changes in Water Quality Standards.
 - This includes changes in designated use and criteria.
 - However, TMDLs will not be delayed in anticipation of a change in Water Quality Standards.

Where Are We Now?

1. Water bodies in this watershed are on Impaired Water Body List - 303(d)
2. Review of data and preliminary sampling have been conducted
3. TMDL limits are being determined

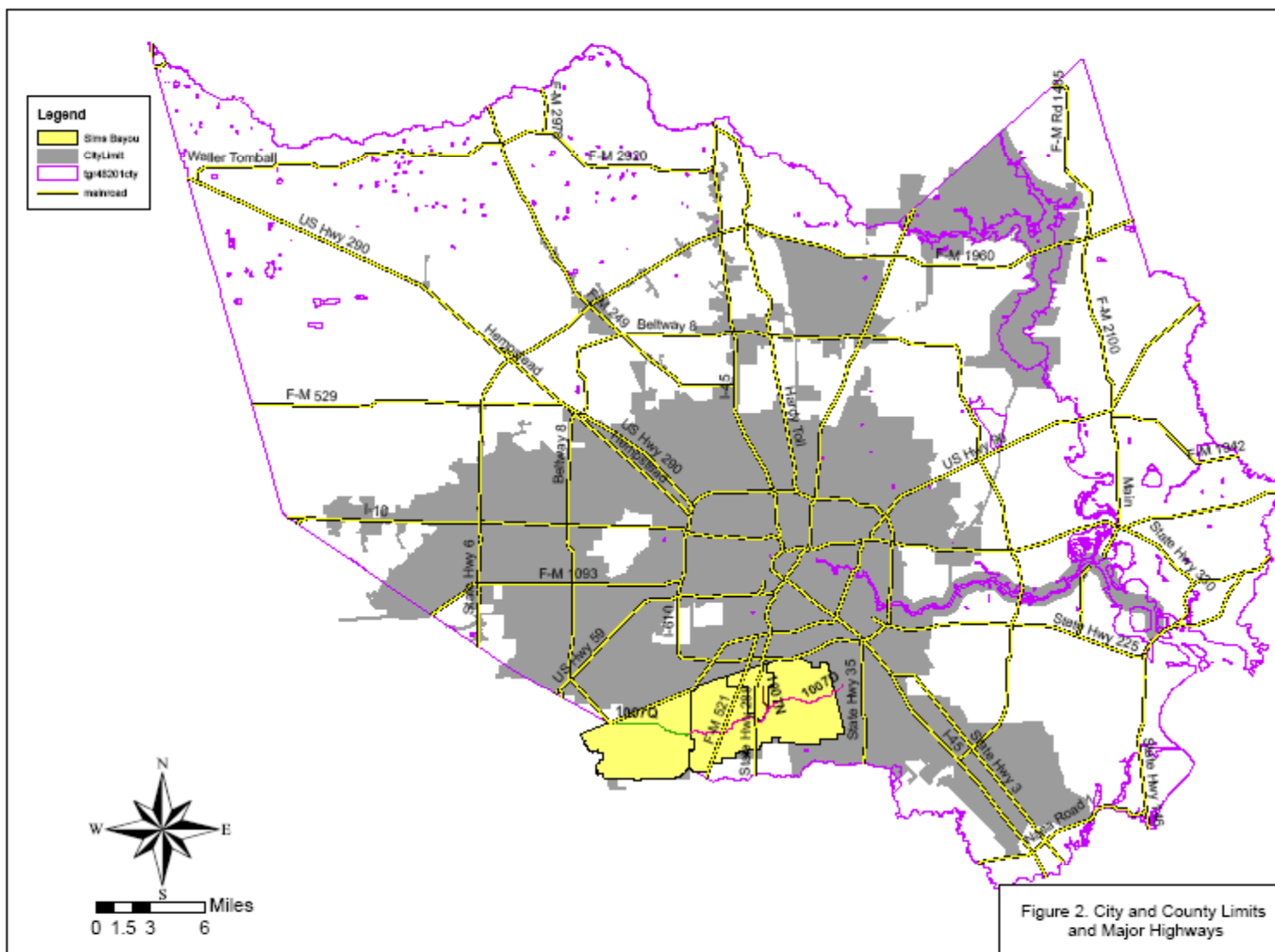


Background and Indicator Bacteria Data

Brays Bayou



Brays Bayou in Harris County & COH



Brays Bayou WQ Segments

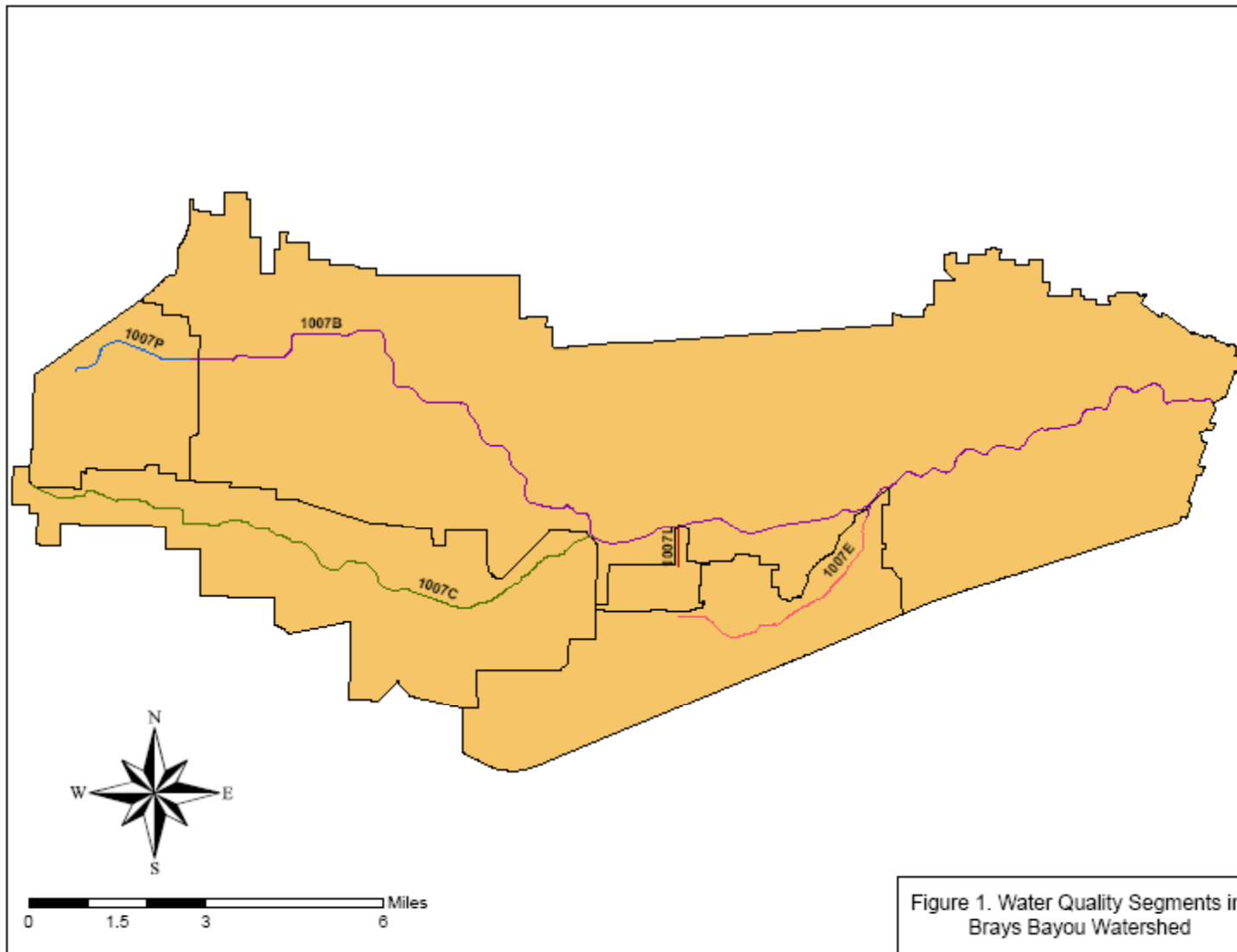


Figure 1. Water Quality Segments in Brays Bayou Watershed

Brays Bayou WQ Segments

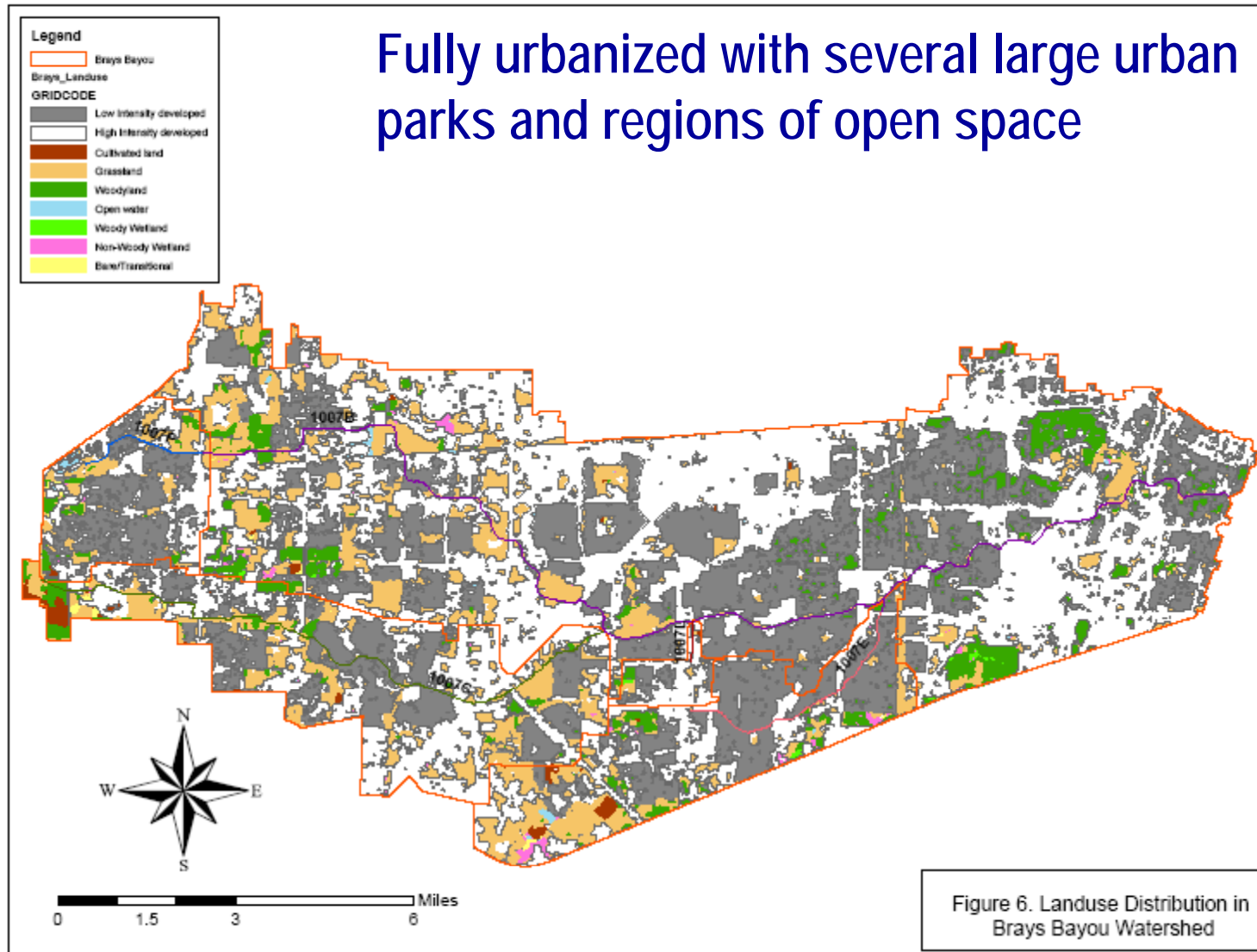
1007B	Brays Bayou Above Tidal
1007C	Keegans Bayou Above Tidal
1007E	Willow Waterhole Bayou Above Tidal
1007L	Unnamed Non-Tidal Tributary of Brays Bayou
1007P	Brays Bayou Above Tidal

Brays Bayou Watershed

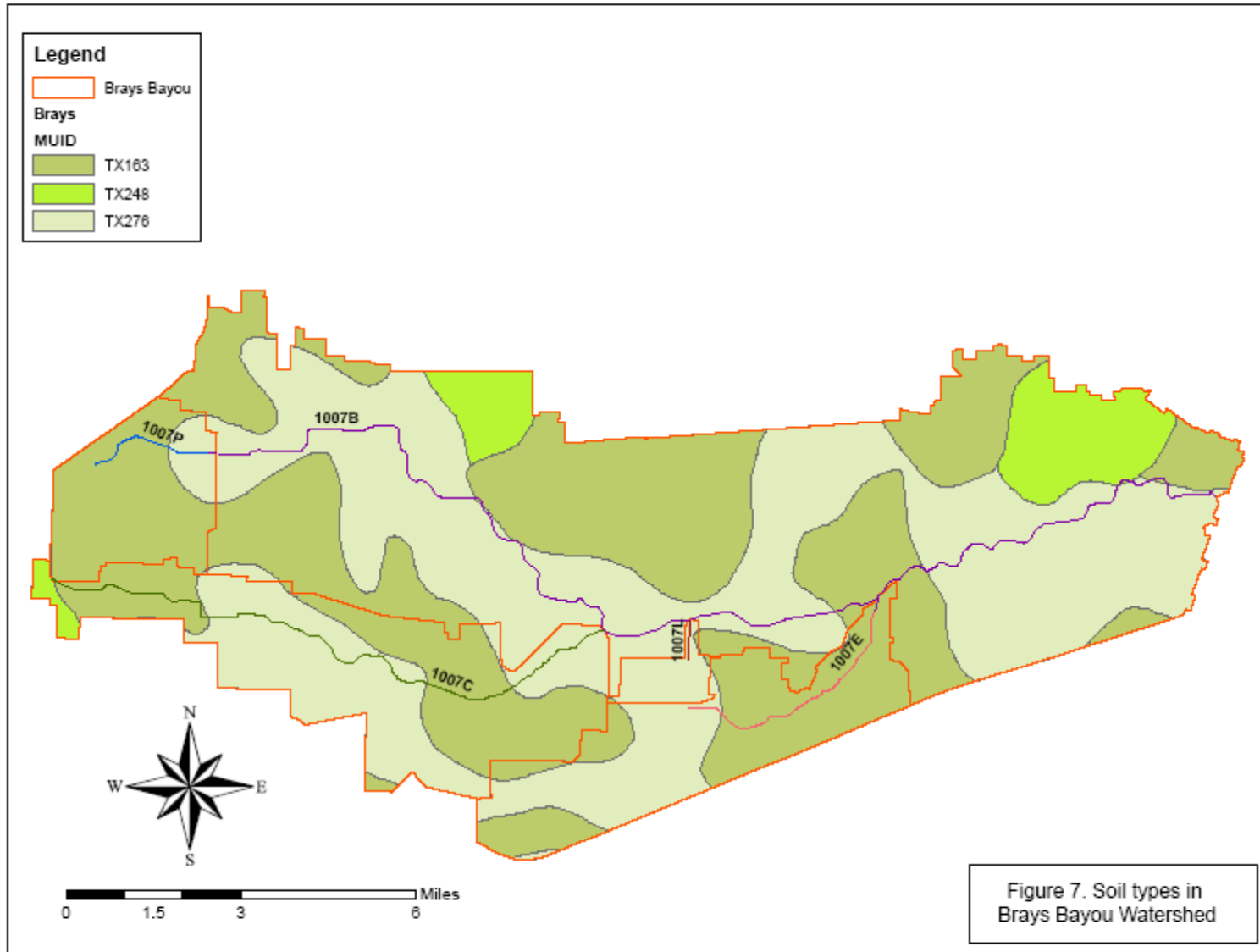
- Located in southwest Harris County and portions of Ft. Bend County
- Drains parts of the cities of Houston, Missouri City, Stafford, Bellaire, West University, Southside Place and the Meadows
- Heavily urbanized, approximately 127 square miles and includes three primary streams: Brays Bayou, Keegans Bayou and Willow Waterhole Bayou
- Estimated population of just over 722,000 in Harris County portion



Brays Bayou Landuse/Landcover



Brays Bayou Soils



Brays Bayou WQ Stations

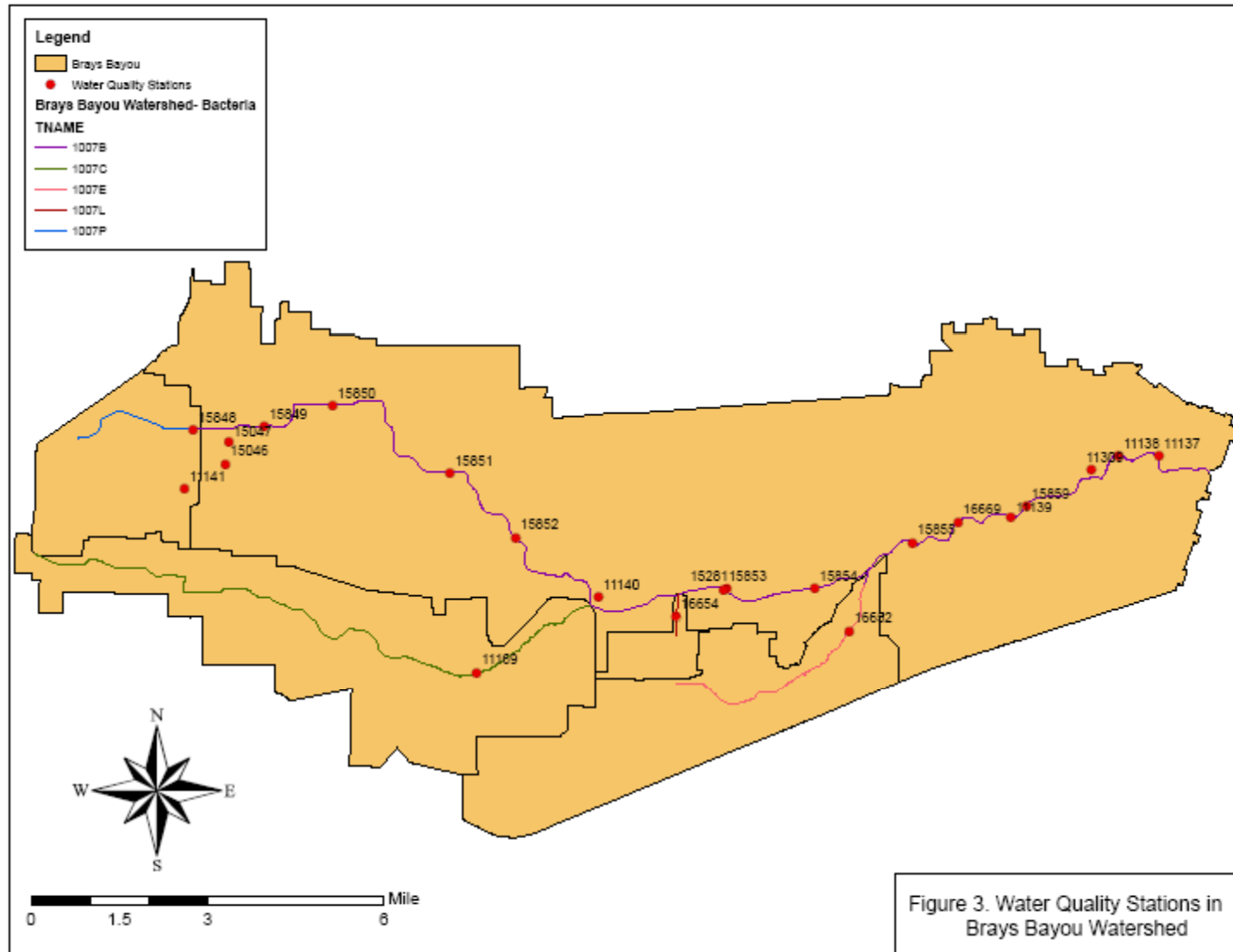
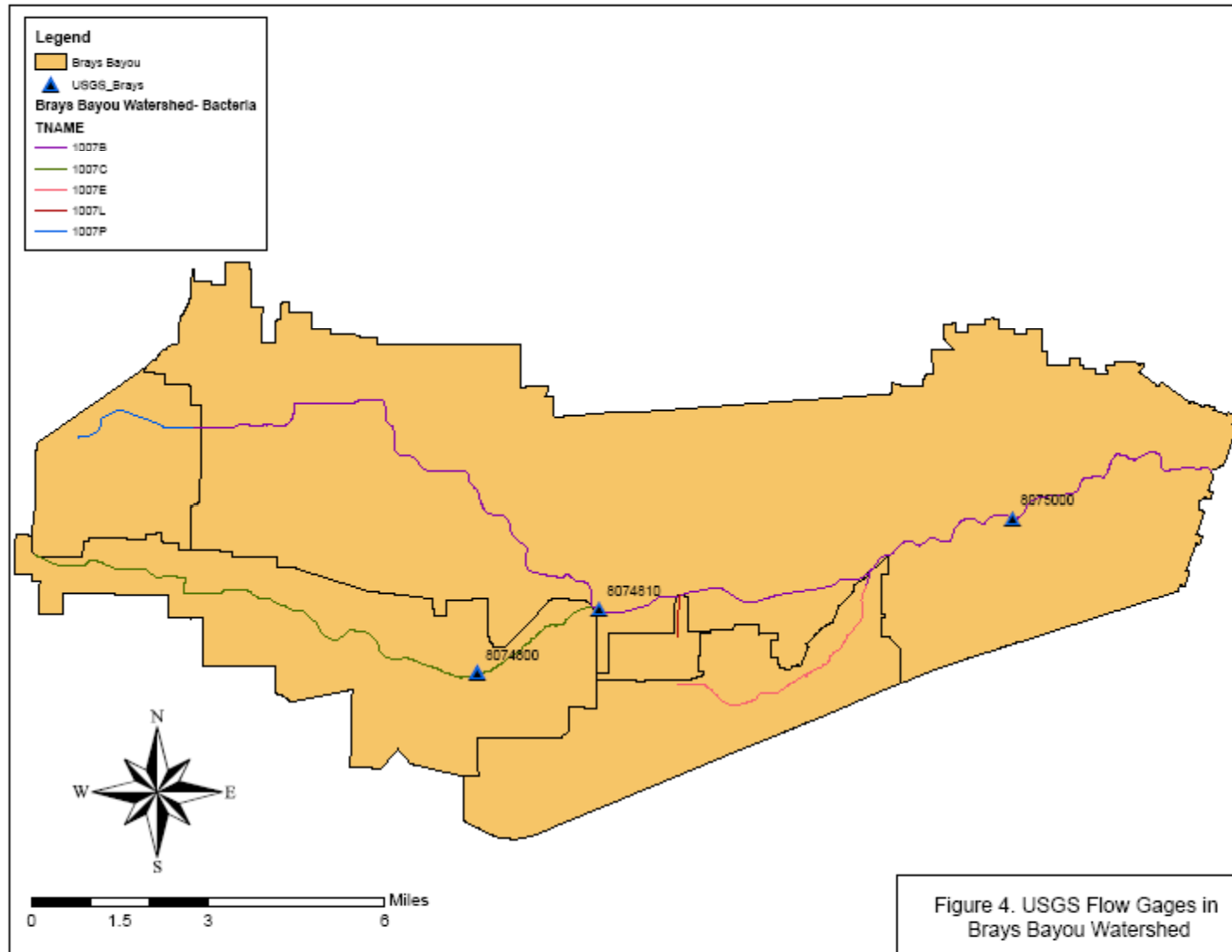
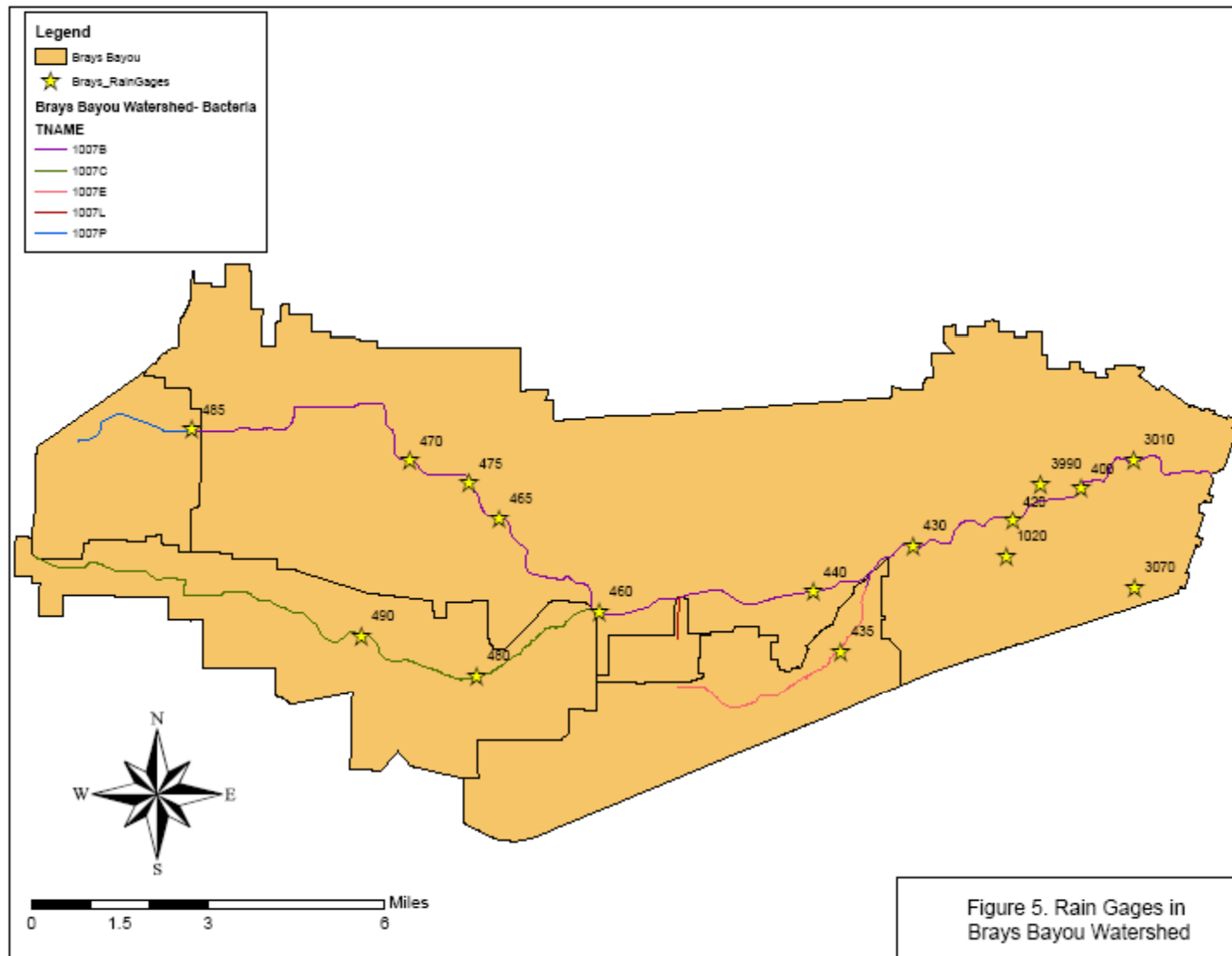


Figure 3. Water Quality Stations in Brays Bayou Watershed

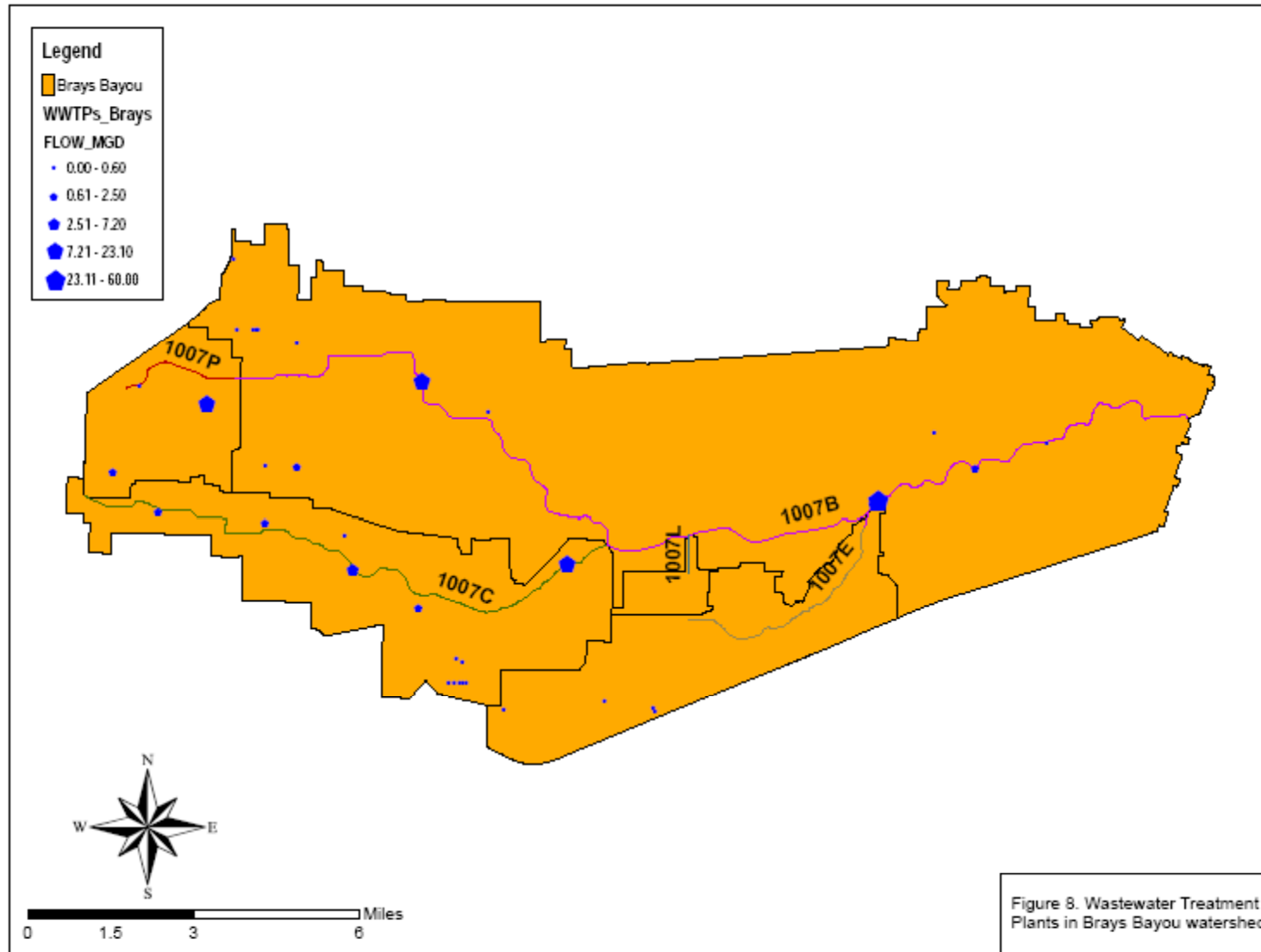
Brays Bayou Flow Gages



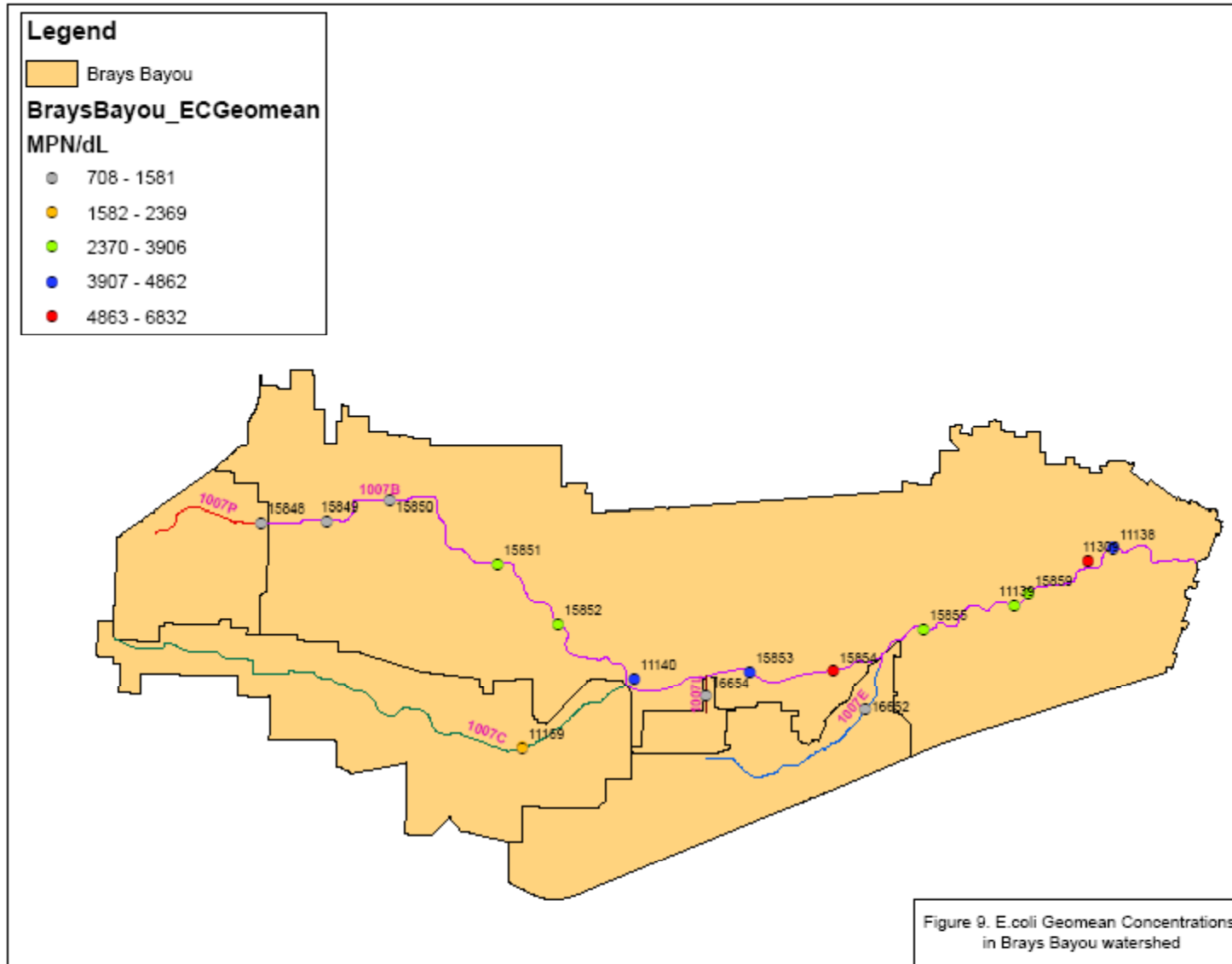
Brays Bayou Rain Gages



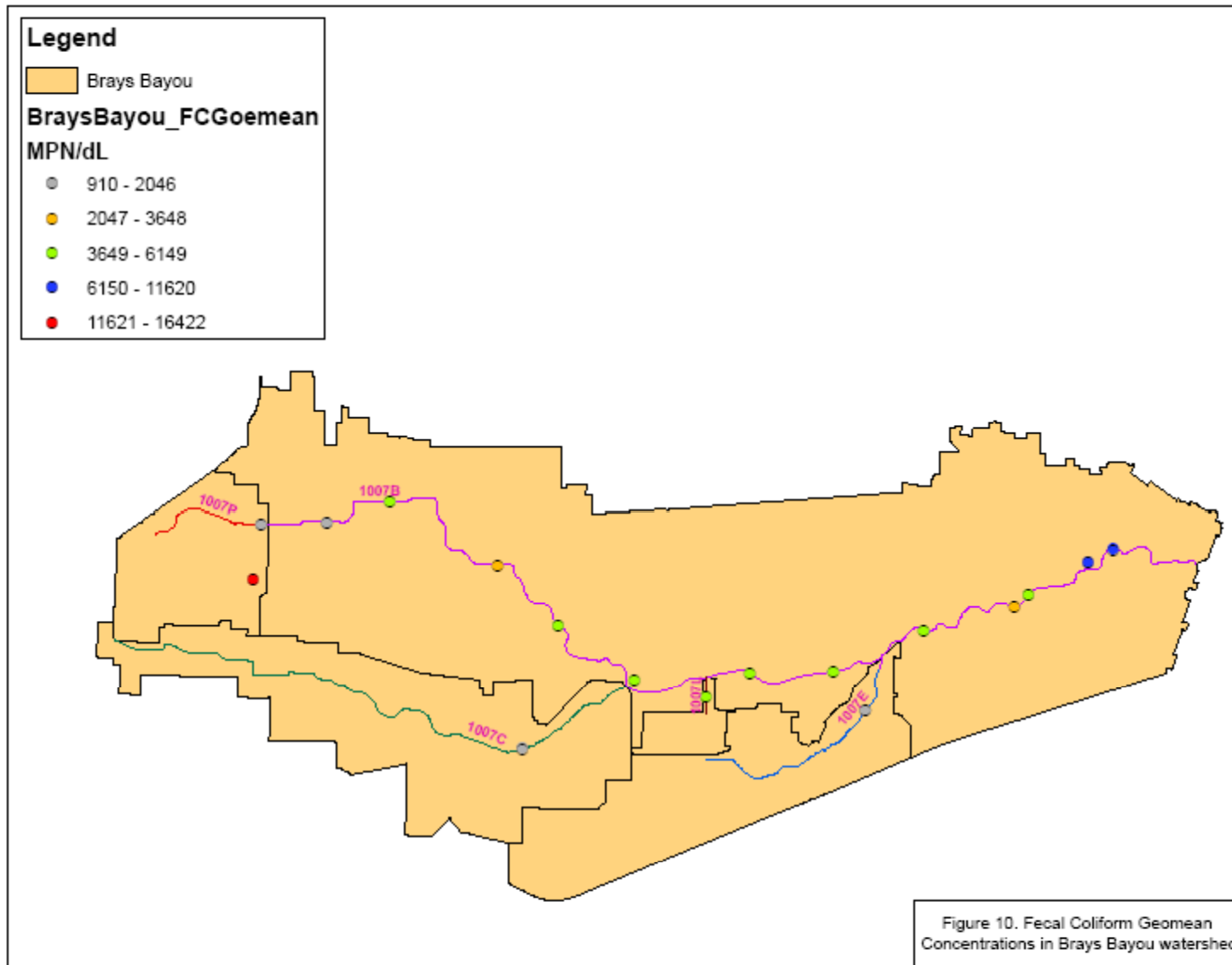
Brays Bayou Permitted Dischargers



Brays Bayou E. Coli Geometric Means



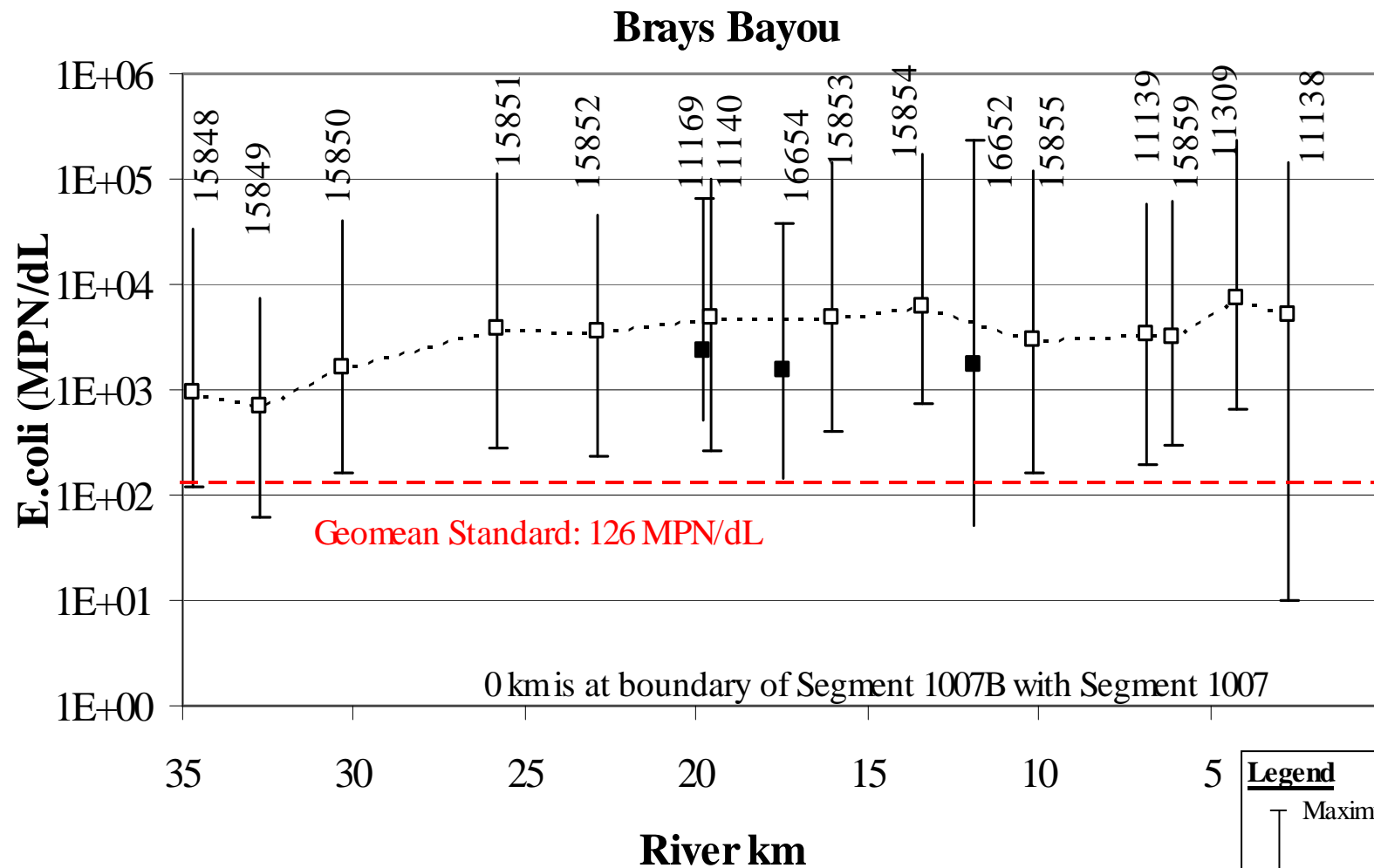
Brays Bayou Fecal Coliform Geomeans



% Exceedances for Brays Bayou

Watershed	Segment	StationID	Indicator Bacteria	Single Sample	Geometric Mean	Number of Samples	Number of Samples	% of Samples
BRAYS BAYOU	1007B	11139	EC	394	3175	54	52	96%
			FC	400	2943	158	115	73%
	1007B	11140	EC	394	4726	36	35	97%
			FC	400	4799	145	130	90%
	1007B	11309	EC	394	6832	39	39	100%
			FC	400	11620	63	60	95%
	1007B	15849	EC	394	708	36	24	67%
			FC	400	910	34	22	65%
	1007B	15850	EC	394	1581	36	31	86%
			FC	400	4268	35	30	86%
	1007B	15851	EC	394	3906	36	33	92%
			FC	400	3648	35	31	89%
	1007B	15852	EC	394	3652	36	35	97%
			FC	400	5241	35	32	91%
	1007B	15853	EC	394	4862	34	34	100%
			FC	400	5670	35	34	97%
	1007B	15854	EC	394	5912	34	34	100%
			FC	400	6149	35	34	97%
	1007B	15855	EC	394	3064	34	33	97%
			FC	400	4339	35	33	94%
	1007B	15859	EC	394	3151	33	32	97%
			FC	400	4176	35	33	94%
	1007L	16654	EC	394	1376	39	35	90%
			FC	400	4487	70	63	90%
	1007P	11141	FC	400	16422	11	10	91%
	1007B	11138	EC	394	4243	57	56	98%
			FC	400	9516	47	44	94%
	1007C	11169	EC	394	2369	39	39	100%
			FC	400	1946	112	81	72%
	1007P	15848	EC	394	972	56	40	71%
FC			400	1465	35	26	74%	
1007E	16652	EC	394	1468	55	41	75%	
		FC	400	2046	70	58	83%	

Brays Bayou E. Coli Longitudinal Profile

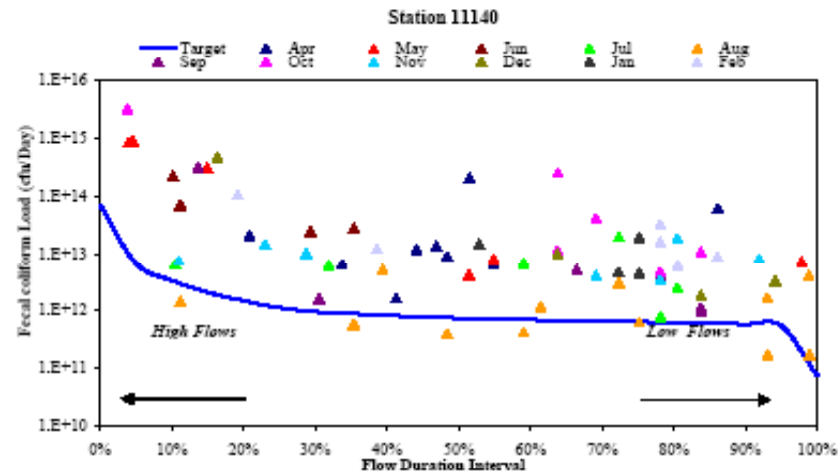
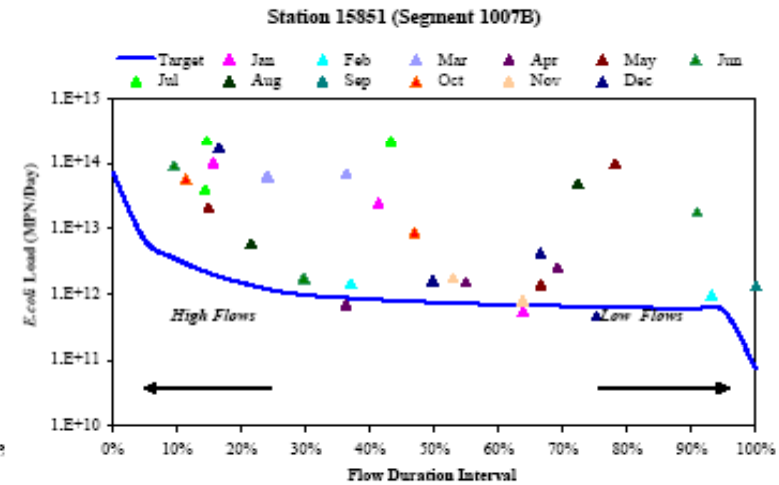
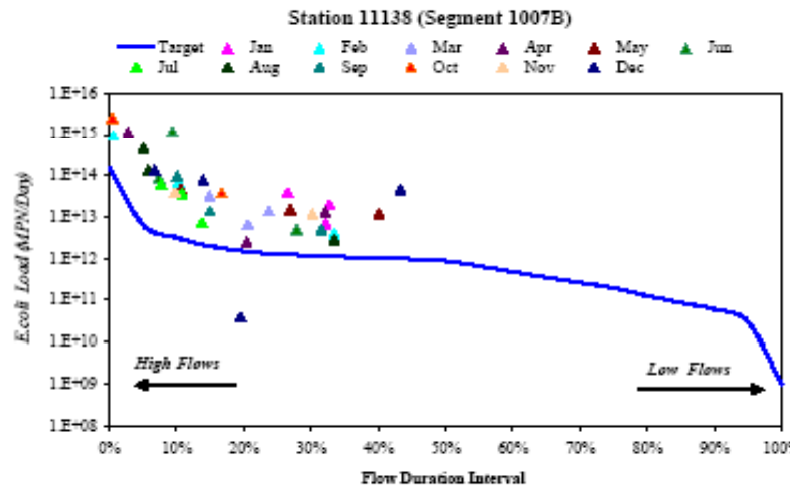


Legend

- Maximum
- Geometric mean
- Minimum

Historical LDCs for Brays Bayou

Indicator Bacteria in the Houston Metro TMDL Project



Load Duration Curves for Historical Data for Brays Bayou watershed

For More Information

- Project Website

<http://www.tceq.state.tx.us/implementation/water/tmdl/72-houstonbacteria.html>

- TCEQ TMDL Program

<http://www.tceq.state.tx.us/implementation/water/tmdl/index.html>



Questions?

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