

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.

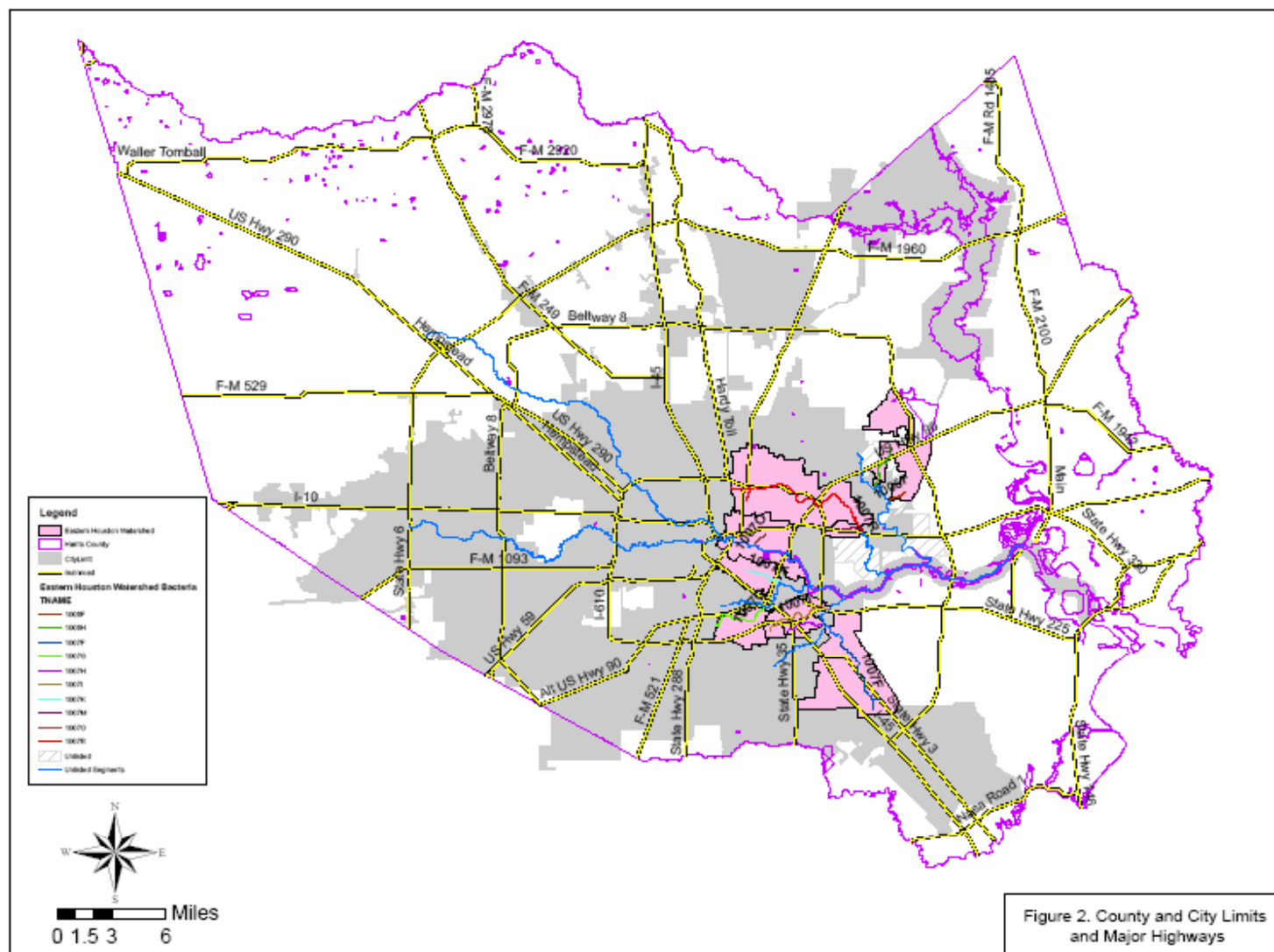
Where Are We Now?

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

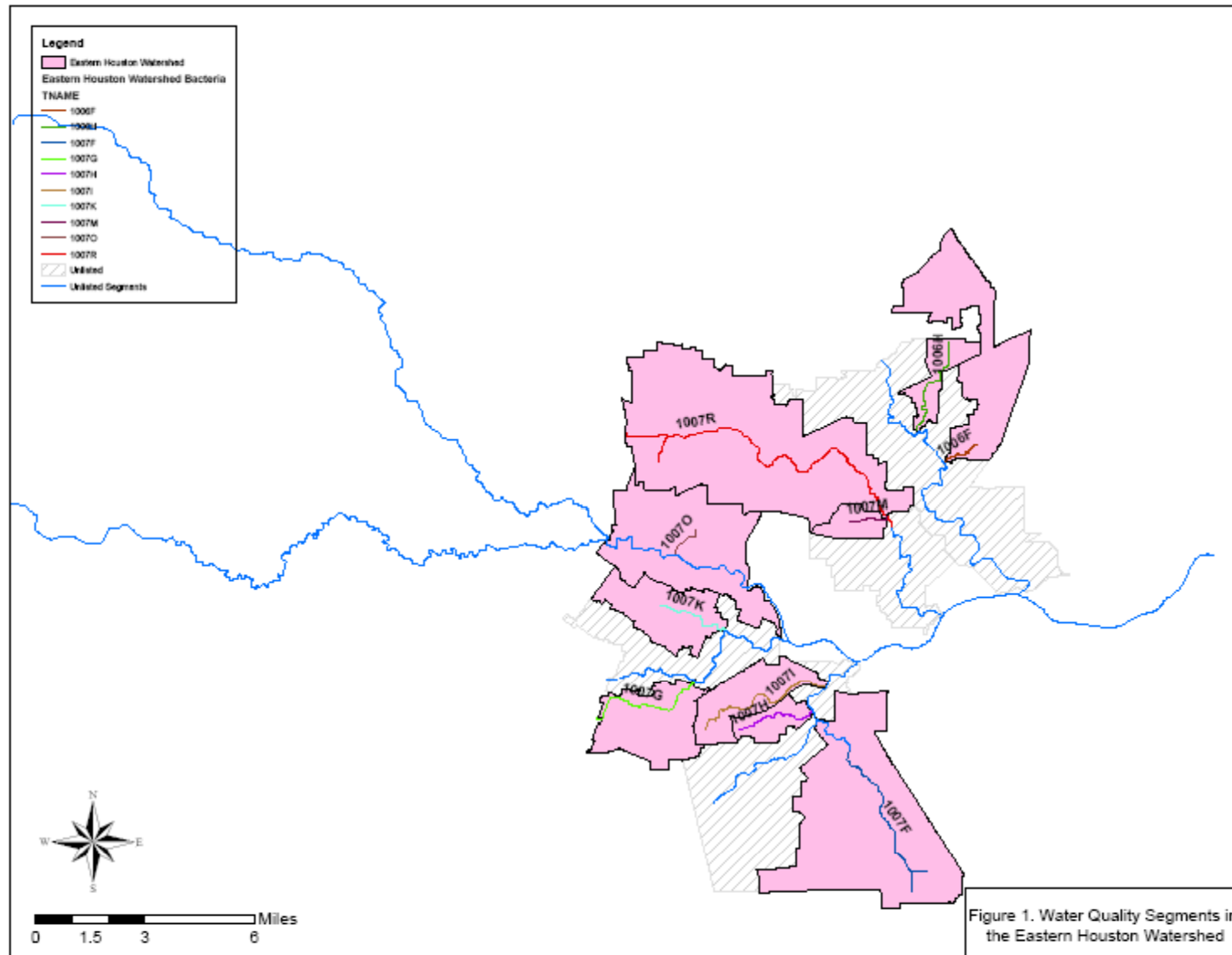


Background and Indicator Bacteria Data

Eastern Houston



Eastern Houston WQ Segments

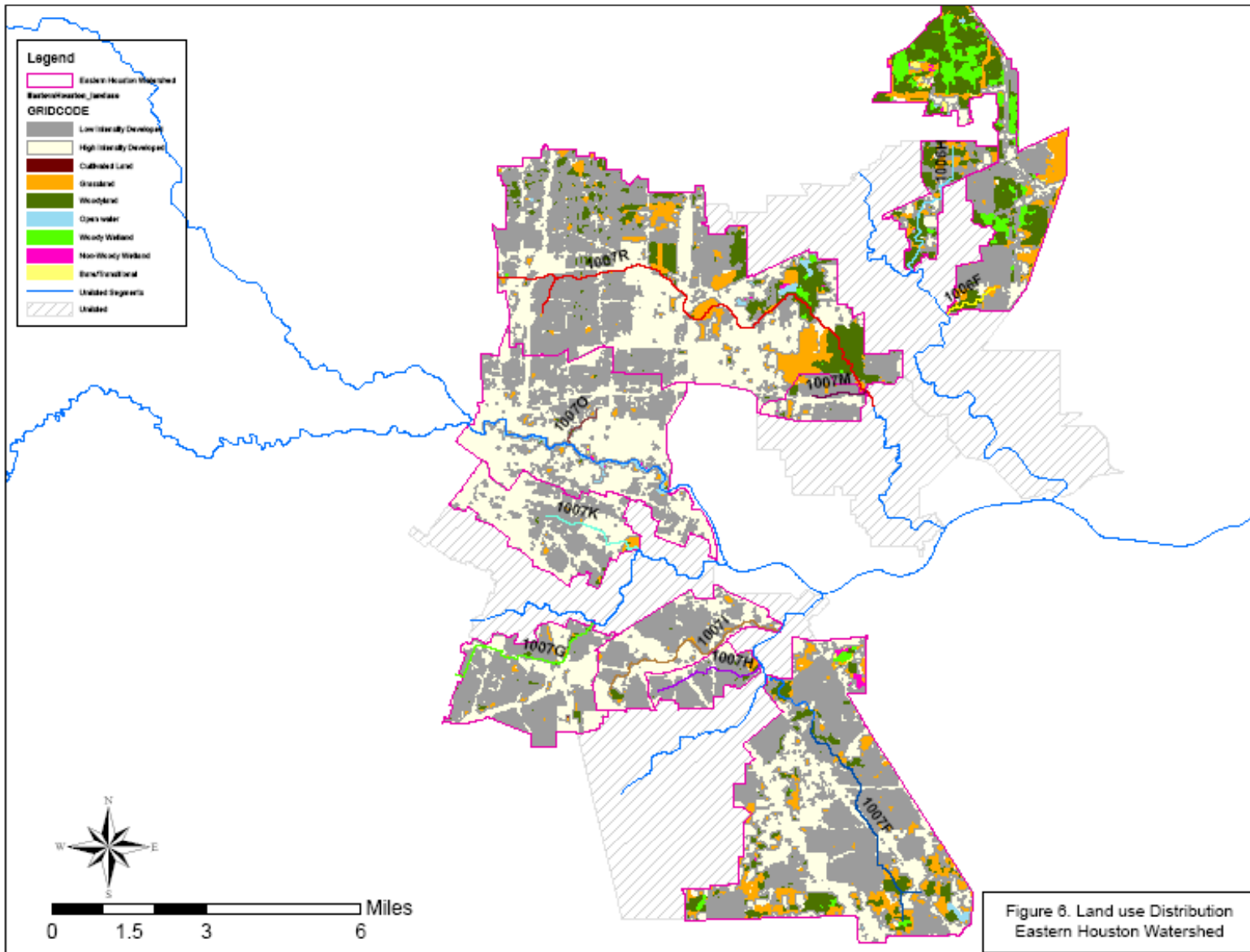


Eastern Houston WQ Segments

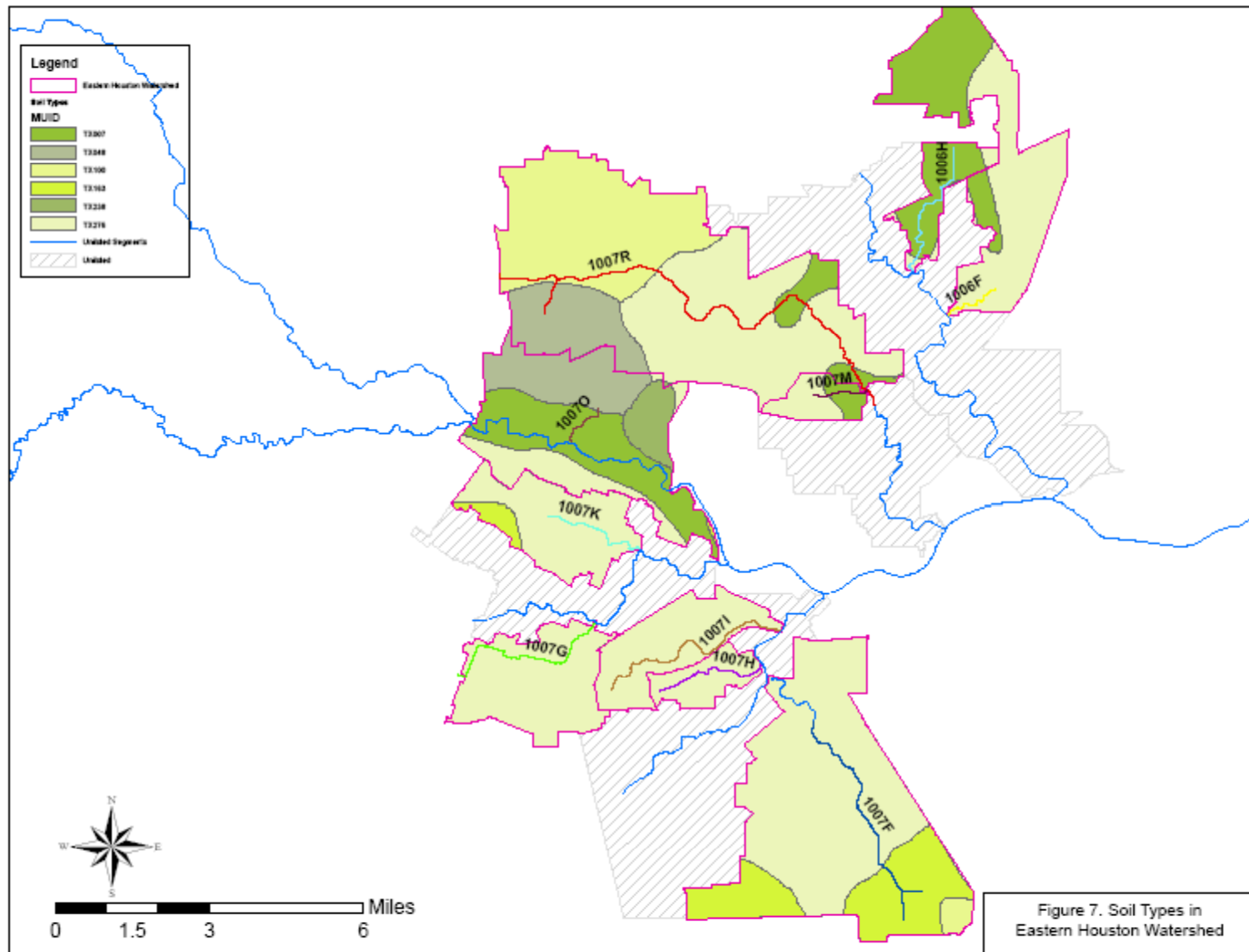
1006F	Big Gulch Above Tidal
1006H	Spring Gully Above Tidal
1007F	Berry Bayou Above Tidal
1007G	Kuhlman Gully Above Tidal
1007H	Pine Gully Above Tidal
1007I	Plum Creek Above Tidal
1007K	Country Club Bayou Above Tidal
1007M	Unnamed Tributary of Hunting Bayou
1007O	Unnamed Tributary of Buffalo Bayou
1007R	Hunting Bayou Above



Eastern Houston Landuse/Landcover



Eastern Houston Soils



Eastern Houston WQ Stations

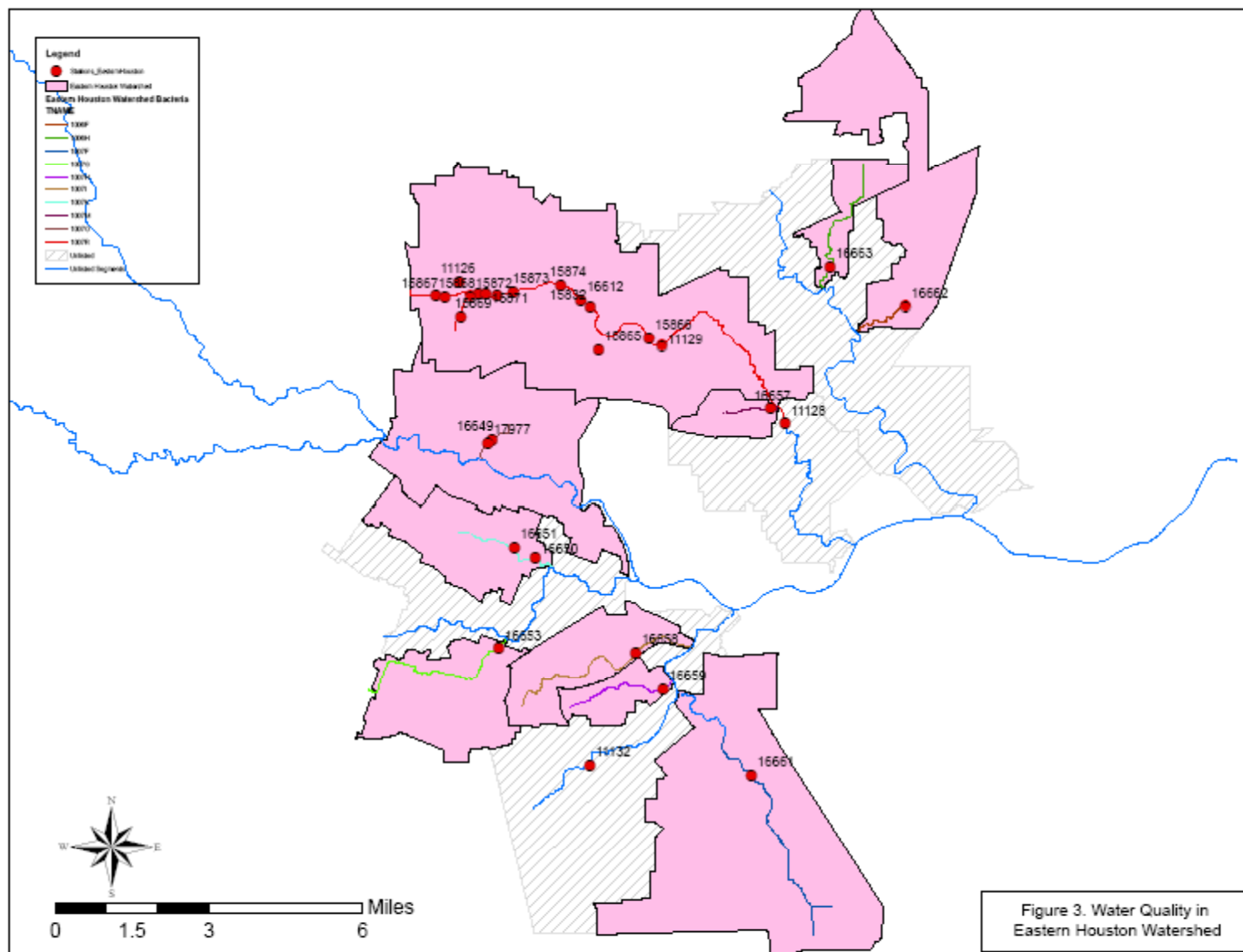
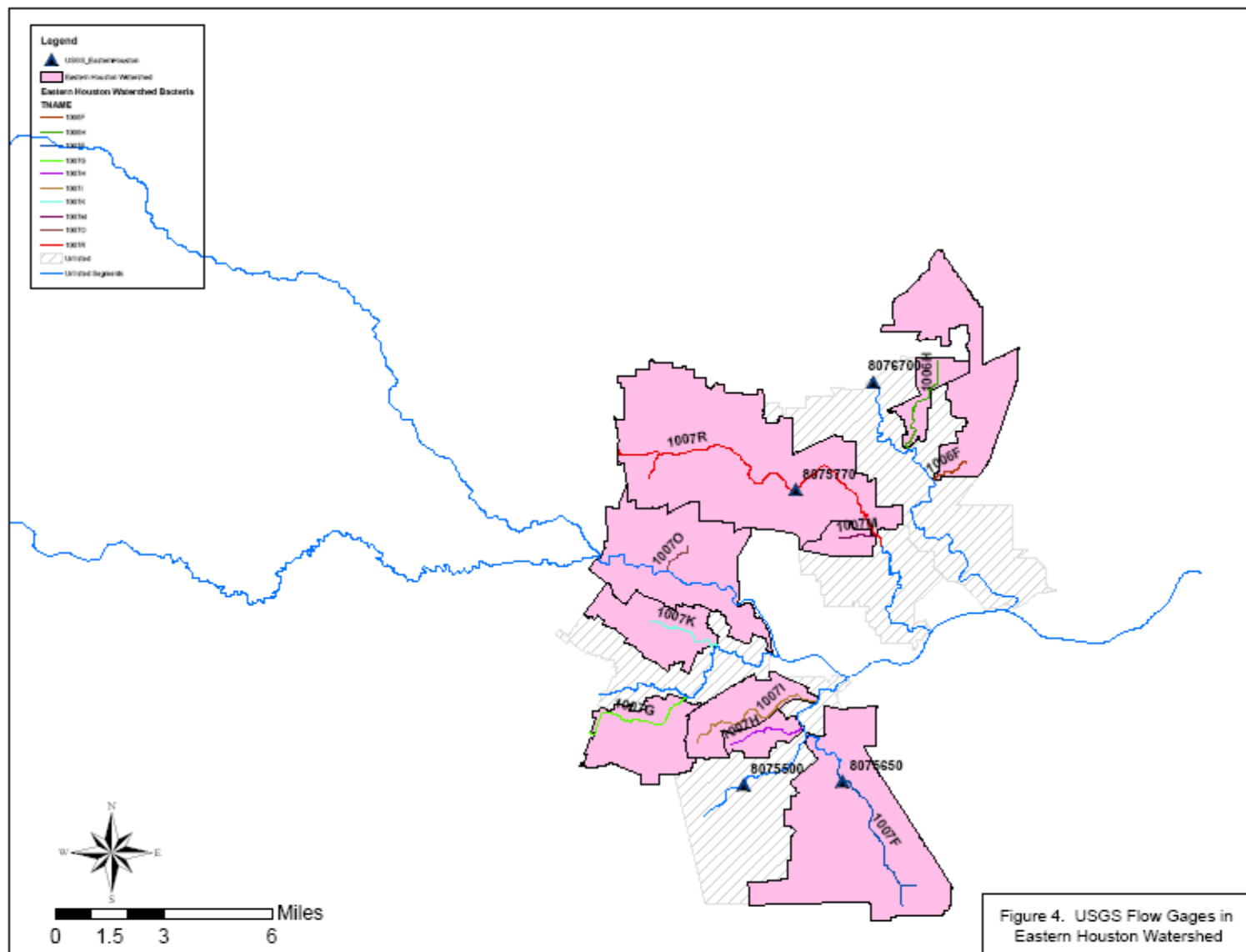
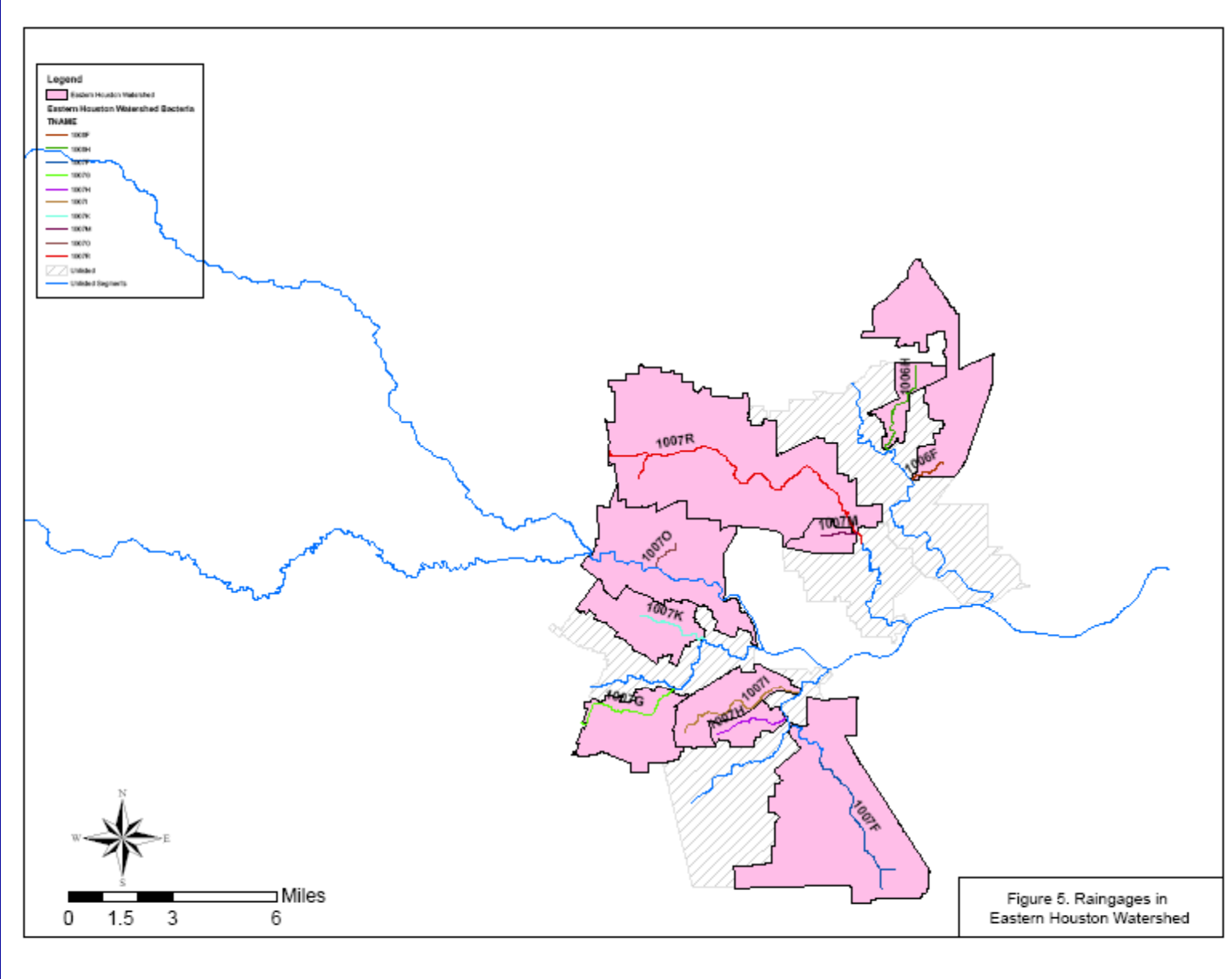


Figure 3. Water Quality in Eastern Houston Watershed

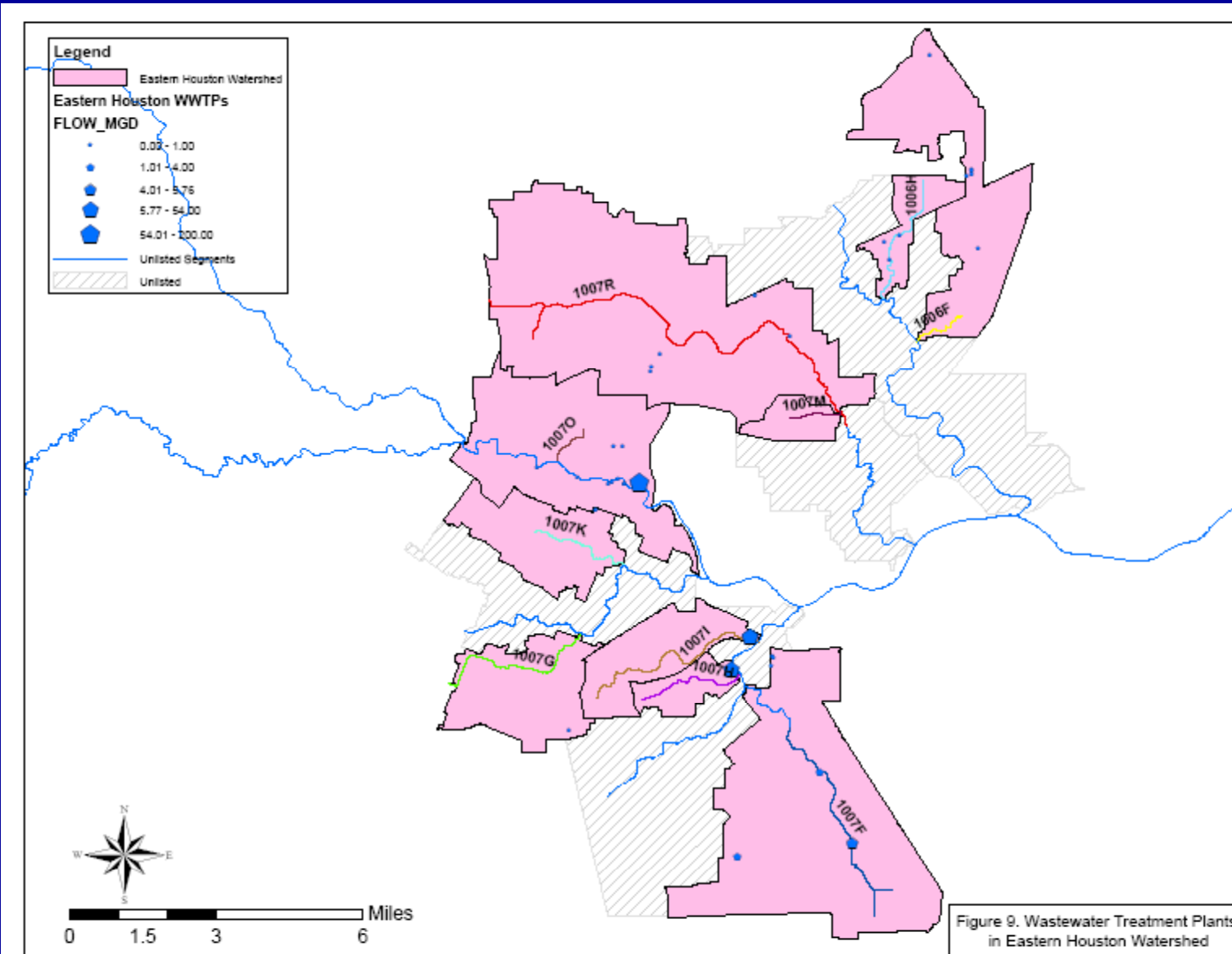
Eastern Houston Flow Gages



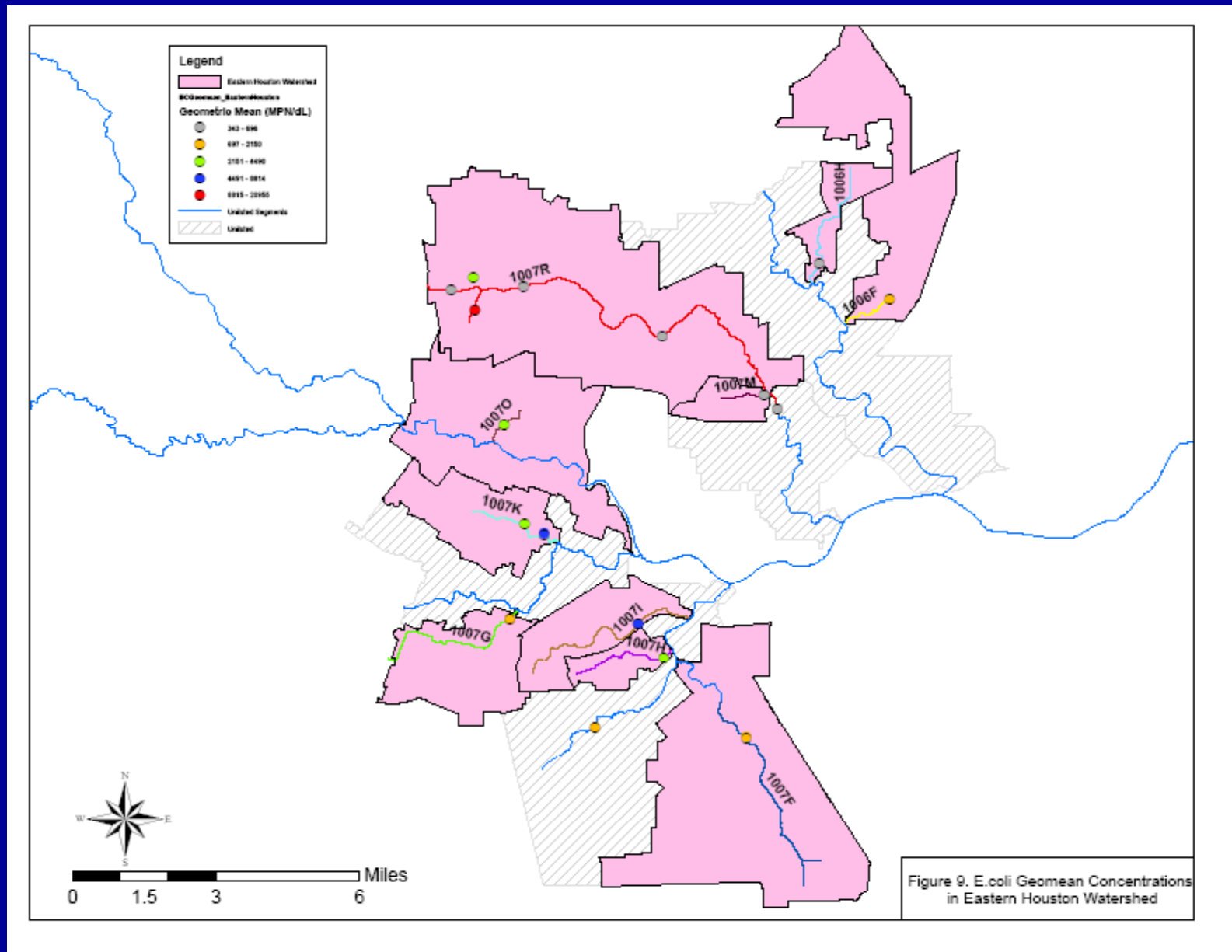
Eastern Houston Rain Gages



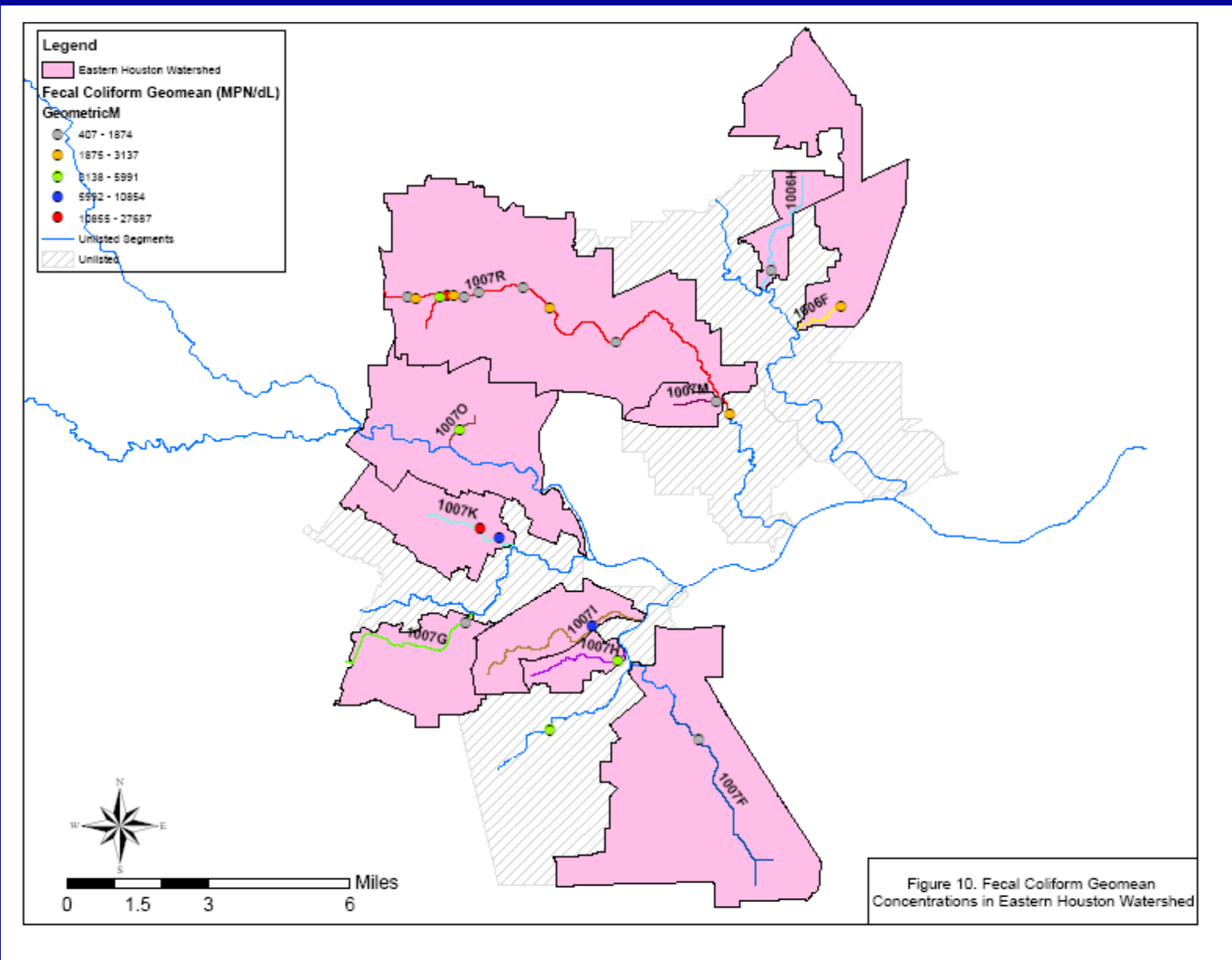
Eastern Houston Permitted Dischargers



Eastern Houston E. Coli Geo Means



Eastern Houston Fecal Geo Means

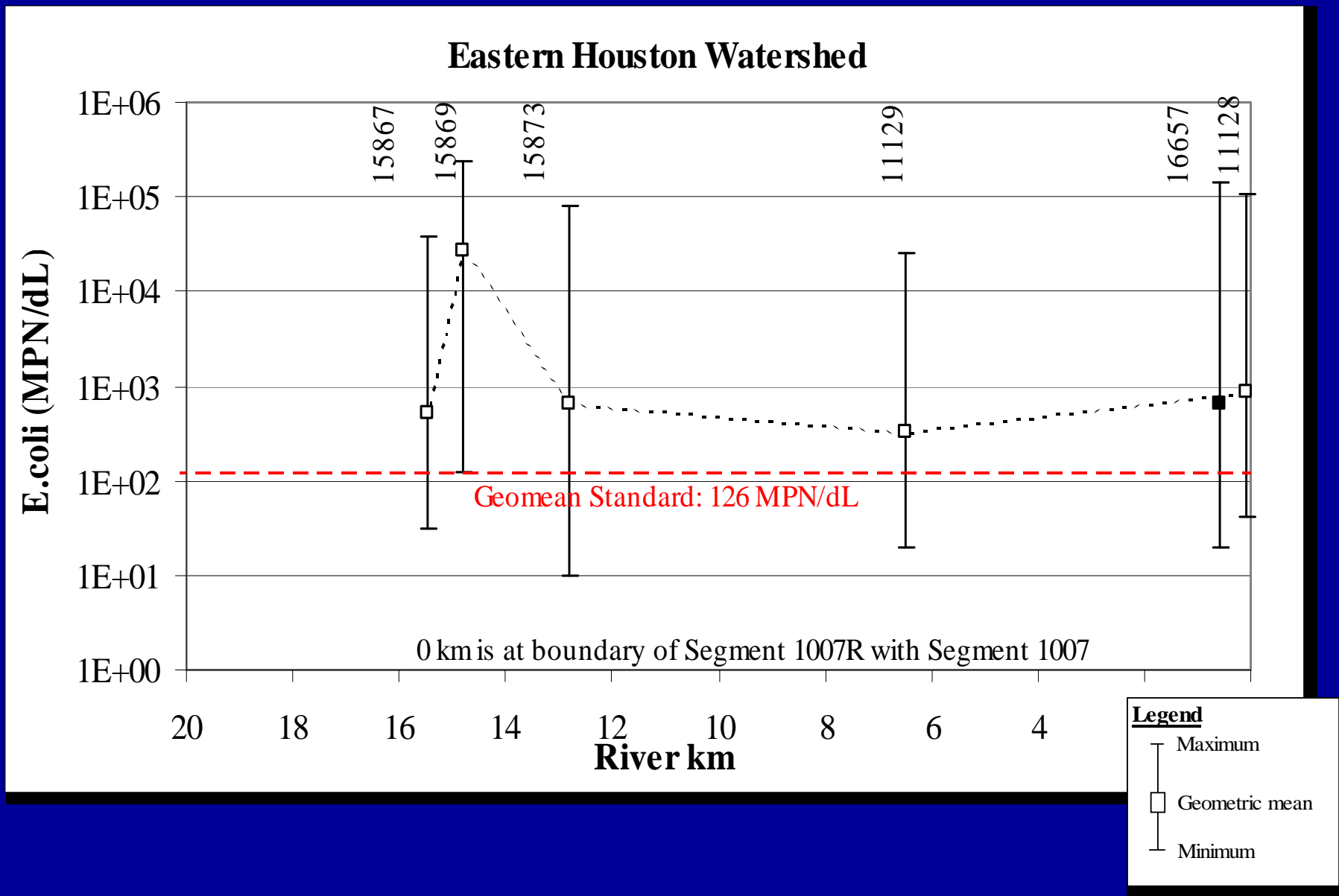


% Exceedances for Eastern Houston

Watershed	Segment	StationID	Indicator Bacteria	Single Sample Criteria (MPN/100ml)	Geometric Mean	Number of Samples	Number of Samples Exceeding Criteria	% of Samples Exceeding
EASTERN HOUSTON	1007R	11129	EC	394	343	43	15	35%
			FC	400	1310	159	107	67%
	1007R	15867	EC	394	549	43	29	67%
			FC	400	407	36	20	56%
	1007R	11130	FC	400	27687	19	19	100%
	1007R	11131	FC	400	4736	78	67	86%
	1007R	15832	FC	400	3052	4	4	100%
	1007R	15868	FC	400	2469	44	37	84%
	1007R	15871	FC	400	3137	5	5	100%
	1007R	15872	FC	400	1842	6	5	83%
	1007R	15874	FC	400	1732	5	5	100%
	1007R	15873	EC	394	696	43	25	58%
			FC	400	840	30	22	73%
	1007M	16657	EC	394	647	57	36	63%
			FC	400	1727	70	52	74%
	1007O	16649	EC	394	3032	60	50	83%
			FC	400	5465	68	57	84%
	1006F	16662	EC	394	1208	60	42	70%
			FC	400	2299	67	49	73%
	1006H	16663	EC	394	536	60	37	62%
			FC	400	1378	66	48	73%
	1007K	16650	EC	394	8814	61	59	97%
			FC	400	10854	70	62	89%
	1007K	16651	EC	394	4490	43	36	84%
			FC	400	18786	67	60	90%
	1007I	16658	EC	394	11299	61	56	92%
			FC	400	7829	67	64	96%
	1007H	16659	EC	394	3585	61	56	92%
			FC	400	4308	67	59	88%
	1007G	16653	EC	394	2150	61	41	67%
			FC	400	1874	69	45	65%
	1007F	16661	EC	394	2029	39	38	97%
FC			400	1360	66	48	73%	
1007R	11128	EC	394	434	55	35	64%	
		FC	400	2846	52	42	81%	
1007R	15869	EC	394	20955	43	41	95%	

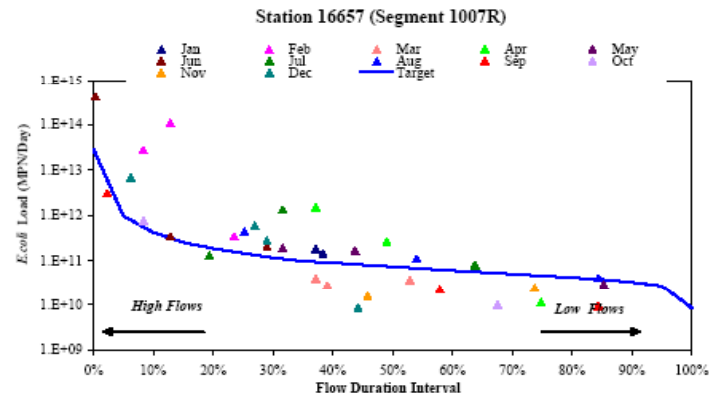
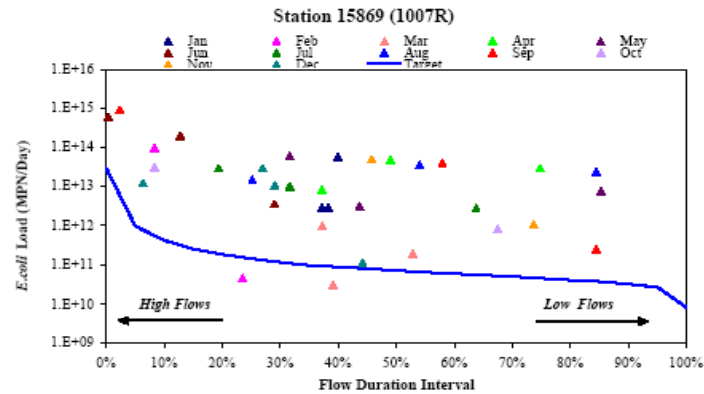


E. Coli Longitudinal Profile for Eastern Houston



Historical LDCs for Eastern Houston

Indicator Bacteria in the Houston Metro TMDL Project



Load Duration Curves for Historical Data for Eastern Houston 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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