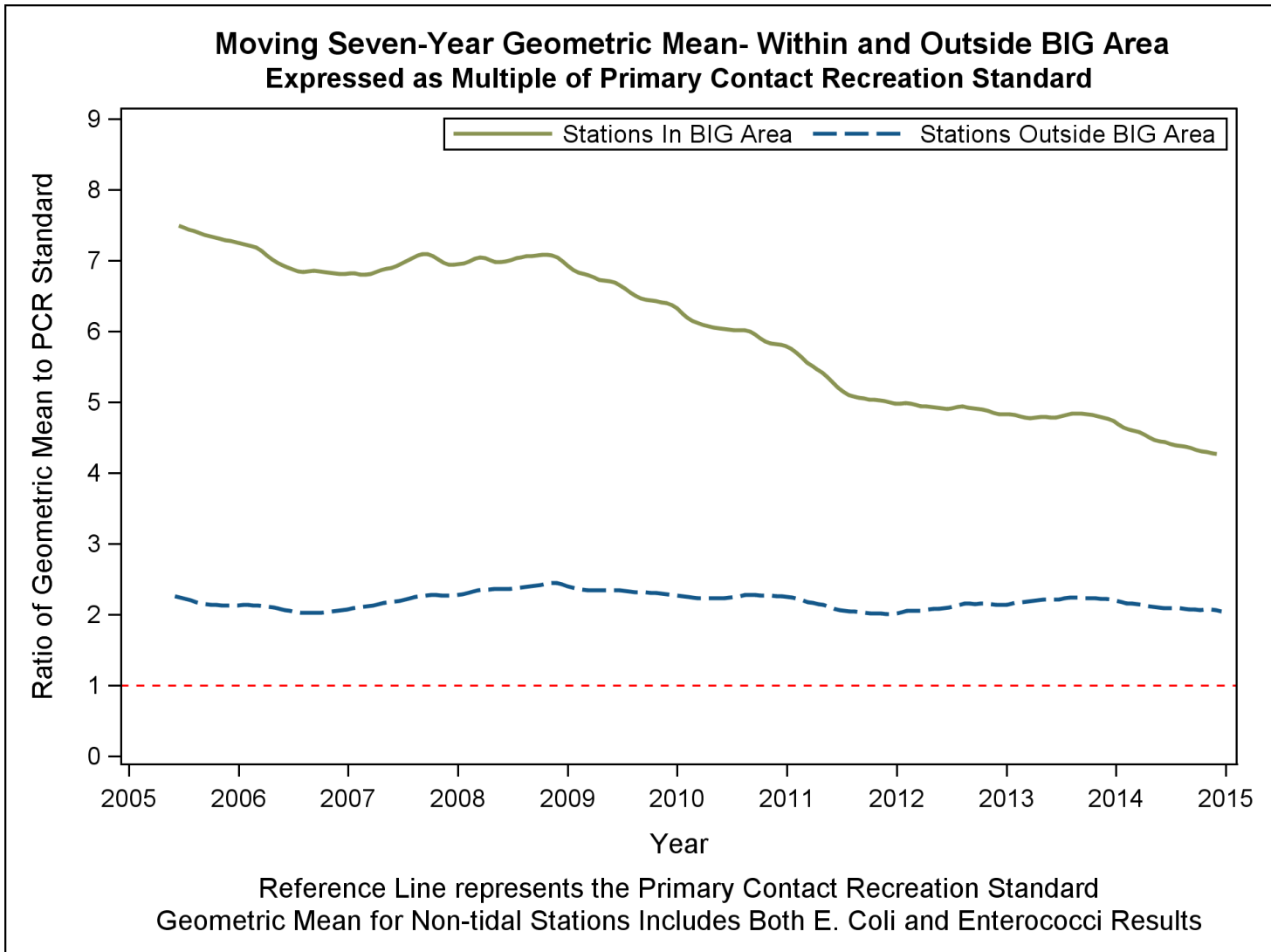


# Tables and Figures

## Executive Summary and Appendix



# Chapter 1 Table 1

<b>Table 1: 2014 Bacteria Permit Limit Exceedances</b> <b>Taken From DMR Database*</b>	
Number of Geomean Results Reported from Permittees with Limits in Permit	34018
Number of Samples Exceeding Daily Average Limit	28
Percentage of Samples Exceeding Daily Geomean Limit	0.7
Number of Highest Single Grab/Daily Max for WWTF DMR Monitoring Period	4217
Number of Highest Single Grab/Daily Max for WWTF DMR Monitoring Period Exceeding Limit	111
Percentage of Highest Single Grab/Daily Max for WWTF DMR Monitoring Period Exceeding Limit	44.4

*Table 1. Number and percentage of samples taken in 2014 that exceeded WWTF bacteria limits for facilities within the BIG project area.*

*Additional samples are potentially collected by WWTFs during the monitoring period depending on their permits with the state, but only the highest value reported during the monitoring period is used for this analysis.*

# Chapter 1 Table 2

<b>Table 2: Total Number of BIG WWTF By Type from 2014 DMR</b>					
<b>Permit Type</b>	<b>Permittees Submitting DMRs in 2013 (TCEQ Data)</b>	<b>Number of Permittees Reporting with E.coli Geomean Limit of 63MPN/100 mL (TCEQ DMR)</b>	<b>Number of Permittees Reporting with E. Coli Geomean Limit of 126MPN/100 mL (TCEQ DMR)</b>	<b>Number of Permittees Reporting with Enterococci Geomean Limit of 35 MPN/100 mL (TCEQ DMR)</b>	<b>No Geomean Limit in H-GAC Permit Database</b>
Industrial	35	9	2	2	22
Municipal Domestic	355	307	29	3	16
Private Domestic	106	92	4		10
<b>Total</b>	<b>496</b>	<b>408</b>	<b>35</b>	<b>5</b>	<b>48</b>

*Table 2. BIG project area WWTFs reporting DMRs to the TCEQ in 2013. WWTFs are broken out into type of facility, reporting limits per the permit reviewed either through H-GAC's permit database or the TCEQ's Central Registry. For WWTFs with 'No Geomean' those plants submitted data to the TCEQ DMR but as of the date data was pulled for the Annual Report, no limit could be determined. Many plants still remain to have their permits renewed or are undergoing review at the time of printing.*

# Chapter 1 Table 3

Table 3. Enforcement Cases for the BIG Project Area 2009-2014				
Year	Number of Enforcement Cases	Original Fine	Final Payable Fine	SEP Offset
2009	9	\$81,770	\$64,219	\$10,000
2010	32	\$267,177	\$218,789	\$20,282
2011	30	\$491,027	\$357,561	\$80,821
2012	24	\$238,672	\$211,074	\$0
2013	24	\$385,413	\$315,678	\$31,389
2014	5	\$50,155	\$29,299	\$10,000

Table 3. TCEQ enforceable cases, including original assessed fine, final payable fine and any SEP offset for in the BIG Project Area from 2009-2014. Data provided by TCEQ. There can be multiple violations per case.

# Chapter 1 Table 4

<b>Table 4: WWTFs in the BIG Project Area Inspected by Harris County Pollution Control Services 2014</b>								
<i>Relative Plant Size / Permitted (MGD)</i>	<i>Data Source</i>	<i>Number of Highest Single Grab/ Daily Max for WWTF DMR Monitoring Period</i>	<i>Number of Highest Single Grab/ Daily Max for WWTF DMR Monitoring Period Exceeding Limit</i>	<i>Percentage of Highest Single Grab/Daily Max for WWTF DMR Monitoring Period Exceeding Limit</i>	<i>Data Source</i>	<i>Number of Random Samples Collected</i>	<i>Number of Samples Exceeding TCEQ Grab/ Single Sample Limit</i>	<i>Percent HCPCS Samples Exceeding TCEQ Permit Limit</i>
Variable or Unknown	DMR	8	0	0	HCPCS	4	0	0
< 0.1 MGD	DMR	400	12	3	HCPCS	162	15	9.3
0.1-0.5 MGD	DMR	844	6	0.7	HCPCS	130	8	6.2
0.5-1 MGD	DMR	823	15	1.8	HCPCS	97	2	2.1
1-5 MGD	DMR	763	17	2.2	HCPCS	80	3	3.8
5-10 MGD	DMR	120	5	4.2	HCPCS	9	0	0
> 10 MGD	DMR	36	2	5.6	HCPCS	6	1	16.7

*Table 4. Domestic WWTFs in Harris County found within the BIG project area reporting to the DMR database that underwent Harris County Pollution Control Services (HCPCS) inspections and that had permit limits at the time of inspection in 2014. Here the random grab sample collected by HCPCS is compared to single grab/daily max samples, number of samples exceeding permit limits, and percentage exceeding.*

# Chapter 1 Table 5

Table 5: Permittees with 25% or More Excursions Above Permit Limit		
Plant Size/Permitted Flow	Daily Geomean	Daily Max or Grab
Variable or Unknown	1	1
< 0.1 MGD	11	17
0.1-0.5 MGD	.	1
0.5-1 MGD	.	.
1-5 MGD	.	3
5-10 MGD	.	1
> 10 MGD	.	2
<p><i>Table 5. WWTFs in the BIG project area in 2014 where 25% or greater samples taken exceeded the facility's permit limit.</i></p>		

# Chapter 1 Table 6

Table 6. Track Approval of Wastewater System Plans and Specifications Applications											
Jan 1, 2013 to Jan 1, 2015											
Application Type	Harris		Galveston		Brazoria		Fort Bend		Montgomery		Total
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	
Improvements	12	14	0	1	1	0	1	0	1	3	33
Rehabilitation	13	13	1	0	0	0	0	0	0	5	32
Reuse/Reclaim	2	1	0	0	0	0	0	1	2	1	7
Expansions	6	6	0	0	0	0	0	1	0	1	14
Modifications	2	4	0	0	0	0	0	1	0	0	7
Upgrade	1	2	0	0	0	0	2	0	0	1	6
Generator	1	2	0	0	0	0	0	0	0	1	4
Total	37	42	1	1	1	0	3	3	3	12	103

Table 6. Wastewater system plans and specification applications submitted to the TCEQ per year by county. Application approvals can be reviewed at: <http://www4.tceq.state.tx.us/wwdp/>.

# Chapter 1 Table 7

Table 7. Violations in the BIG Project Area		
Violation Type	2013	2014
Exceeded Effluent Limits	19	4
No Permit or Permit Expired	4	1
Other	1	.
Unauthorized Discharge	3	.

Table 7. Violation type and number from TCEQ enforceable cases from 2009-2014. Enforcement cases can be made up of multiple violations. Data provided by the TCEQ.

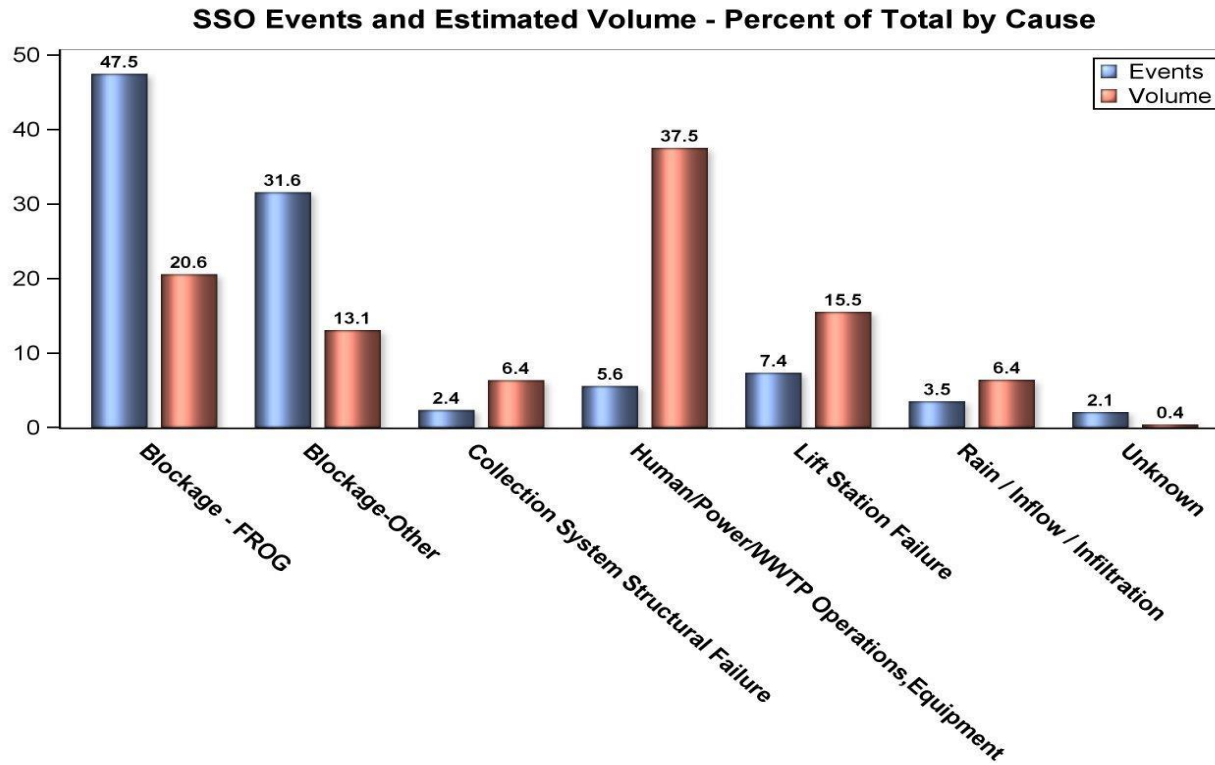


# Chapter 2 Table 8

Cause	Number of Events	Estimated Overflow, 1000 Gallons
Blockage Due To Roots/Rags/Debris	13	7.063
Blockage in Collection System Due To Fats/Grease	310	329.539
Blockage in Collection System-Other Cause	215	214.118
Collection System Structural Failure	16	104.251
Human Error	2	1.05
Lift Station Failure	50	253.653
Power Failure	7	210.85
Rain / Inflow / Infiltration	24	104.695
Unknown Cause	14	6.506
WWTP Operation or Equipment Malfunction	29	400.68
Total	680	1632.405

Table 8. The number and volume of SSOs reported to the TCEQ in 2014

# Chapter 2 Figure 2



# Chapter 9 Table 9

<i>Table 9 CRP Monitoring in the BIG Project Area</i>		
<i>Organizations</i>	<i>Number of Stations in Initial BIG Project Area</i>	<i>Number of Stations in Armand Watershed</i>
TCEQ	10	4
Environmental Institute of Houston	10	
Harris County Pollution Control	1	1
Houston Health and Human Services	111	6
Houston Water Quality Control	7	
San Jacinto River Authority	9	
Houston - Galveston Area Council	14	
<b>Total</b>	<b>162</b>	<b>11</b>

# Chapter 9 Table 10

<b>Table 10. CRP Stations Where Contact Recreation was Observed or Inferred 2012-2014</b>		
<b>Year</b>	<b>CRP Sites Recording Observed or Inferred Contact Recreation</b>	<b>Observed Recreators</b>
2012	16	17
2013	25	87
2014	17	24

Table 10. For the years 2012-2014, CRP partners have recorded evidence of contact recreation, either directly observed or inferred from the evidence. If observed, CRP monitors document the number of individuals recreating at the time.

# Chapter 10 Table 11

Table 11. DNA Bacteria Source Results Using PCR Methods			
Location	Hog <sup>1</sup>	Ruminant <sup>2</sup>	Human <sup>3</sup>
Hunting Bayou.	X	X	X
Garners Bayou		X	X
Halls Bayou	X	X	X
Vogel Creek	X	X	
Addicks Reservoir	X	X	X
Little White Oak Bayou	X	X	
Sims Bayou	X		X
Berry Bayou.	X	X	X
Brays Bayou	X	X	X
South Mayde Creek			X

Table 11. City of Houston study determining sources of Bacteroidales sources using polymerase chain reaction (PCR) methods. 1 - Hog marker detects fecal pollution from domestic as well as feral hogs. 2 - Ruminant marker detects fecal pollution from ruminants, such as deer and cattle, and some other animals; but rarely picks up human sources. 3 - Ninety percent reliable for human sources, but some rare animal sources also test positive. Treated sewage will also test positive because the marker can survive chlorination without the species being viable. However, treated wastewater will have a lower concentration than the raw waste.





# Appendix I MS4 Survey

ADDRESSING BACTERIA IN STORMWATER MANAGEMENT PROGRAMS							
MS4 ID	MCM 1	MCM 2	MCM 3	MCM 4	MCM 5	MCM 6	MCM 7
1							
2							
3	Y	Y	Y	Y	Y	N	N
4	Y	Y	Y	Y	Y	N	N
5	Y	Y	N	Y	Y	N	N
6	Y	Y	Y	Y	Y	N	N
7	Y	Y	N	Y	Y	N	N
8	Y	Y	Y	Y	Y	Y	Y
9	Y	Y	N	N	Y	N	N
10	Y	Y	Y	Y	Y	Y	N
11	Y	Y	N	N	Y	N	N
12	Y	Y	Y	Y	Y	N	N
13	Y	Y	Y	Y	Y	N	N
14	Y	Y	Y	Y	Y	N	N
15	Y	Y	Y	Y	Y	N	N
16	Y	Y	Y	Y	Y	N	N
17							
Total	14 Yes and 0 No	14 Yes and 0 No	10 Yes and 4 No	12 Yes and 2 No	14 Yes and 0 NO	2 Yes and 12 No	1 Yes and 13 No

Table XX. Local small Municipal Separate Storm Sewer Systems Operators answered Yes or No to questions of addressing impairments through their stormwater management program elements. Program elements: Minimum Control Measure -1 Public Outreach, Education, and Involvement (MCM 1), MCM 2 - Illicit Discharge and Detection, MCM 3 - Construction Site Stormwater Runoff Control, MCM 4 - Post Construction Stormwater Management in New Development and Redevelopment, MCM 5 - Pollution Prevention and Good Housekeeping for Municipal Operations, MCM 6 - Industrial Sources (if required), and MCM 7 - Construction Activities where the MS4 is the Site Operator (optional).



# Appendix I MS4 Survey

STRUCTURAL BEST MANAGEMENT PRACTICES										
MS4 ID	Vegetative Swales	LID	Native Vegetation	Green Roofs	Trash Reduction at Outfalls	Drain Markers	Rain Gardens	Permeable Pavement	Constructed Wetlands	Vegetated Buffers
1	N	Y	Y	N	Y	Y	N	N	N	N
7	Y	N	N	N	Y	Y	N	N	Y	Y
8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	N	N	N	N	N	Y	N	Y	N	N
11	N	N	Y	N	Y	Y	Y	N	Y	N
16	N	N	N	N	Y	N	N	N	N	N
17	N	N	N	N	Y	Y	N	N	N	N
Total	2 Yes and 5 No	2 Yes and 5 No	3 Yes and 4 No	1Yes and 6 No	6 Yes and 1 No	6 Yes and 1 No	2 Yes and 5 No	2 Yes and 5 No	3 Yes and 4 No	2 Yes and 5 No

Table XX. Local small Municipal Separate Storm Sewer Systems Operators whom, responding to the MS4 Questionnaire, provided an answer of Yes or No to questions of structural best management practices installed in 2013 or 2014.

# Appendix I MS4 Survey

NON-STRUCTURAL BEST MANAGEMENT PRACTICES						
MS4 ID	Outreach Brochures, Fliers, or Other Educational Materials	Public Involvement or Outreach Events	Construction Site SWP3 Education	Construction Site Inspections	Illicit Discharge or Illegal Dumping Inspections	Completed Storm Sewer Mapping
1						
2						
3	Y	N	Y	Y	Y	Y
4	Y	N	Y	Y	Y	Y
5		Y	Y	N	N	N
6		Y	Y	N	N	N
7	Y	Y	N	Y	Y	Y
8	Y	Y	Y	Y	Y	Y
9	Y	N	N	Y	N	Y
10	Y	N	Y	Y	Y	N
11	Y	Y	Y	Y	Y	N
12	Y	Y	N	N	N	N
13	Y	Y	Y	N	N	Y
14	Y	Y	N	N	N	Y
15	Y	Y	N	N	N	Y
16	Y	Y	Y	Y	Y	Y
17	Y	N	N	Y	N	Y
Total	13 Yes and 0 No	10 Yes and 5 No	9 Yes and 6 No	9 Yes and 6 No	7 Yes and 8 NO	10 Yes and 5 No

Table XX. Local small Municipal Separate Storm Sewer Systems Operators whom, responding to the MS4 Questionnaire, provided an answer of Yes or No to questions of non-structural best management practices installed in 2013 or 2014.

# Appendix I MS4 Survey

MS4 OPERATORS INTEREST IN FUTURE STORMWATER EDUCATION								
MS4 ID	TPDES AND STATE STORMWATER PERMIT	REGIONAL SWMP FORUM	STRUCTURAL BMPS	NON-STRUCTURAL BMPS	SWP3	ILLICIT DISCHARGE DETECTION AND ELIMINATION	LID AND GREEN INFRASTRUCTURE	GOOD HOUSEKEEPING BMPS
1	Y	Y	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y		Y		Y
3	Y	N	N	Y	N	Y	N	N
4								
5	Y	Y	Y	Y	Y	Y	Y	Y
6	Y	Y	Y	Y	Y	Y	Y	Y
7	Y	Y	Y	Y	Y	Y	Y	Y
8	Y	Y	Y	Y	Y	Y	Y	Y
9	Y	Y	Y	Y	Y	Y	N	Y
10	Y		Y	Y		Y	Y	Y
11	Y	Y	Y	Y	Y	Y	Y	Y
12	Y	Y	Y	Y	Y	Y	Y	Y
13	Y	Y	Y	Y	Y	Y	Y	Y
14	Y	Y	Y	Y	Y	Y	Y	Y
15	Y	Y	Y	Y	Y	Y	Y	Y
16	N	Y	Y	Y	N	Y	Y	Y
17	Y	Y	Y	Y	Y	Y	Y	Y
Total	15 Yes and 1 No	14 Yes and 1 No	15 Yes and 1 No	16 Yes and 0 No	12 Yes and 2 NO	16 Yes and 0 No	13 Yes and 2 No	15 Yes and 1 No

Table XX. Local small Municipal Separate Storm Sewer Systems Operators answered Yes or No to questions of interest in future stormwater education.