APPENDIX I
SUPPLEMENTAL RAINFALL DATA

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Table I.1 Calculation of Outliers

Table I.2 Values of Kn

Table I.3 Calculation of Average and Ten Year Rainfalls

Table I.1 - Calculation of Outliers

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Year	ANNUAL RAINFALL (log of inches)									
	Alvin	Anahuac	Cleveland	Galveston WSO	Houston WSMCO (Intercontinental AP)	Houston FAA Airport (Hobby AP)	Houston - Barker	Houston - Independent Heights	Houston - San Jacinto Dam	Liberty
1970	1.69	1.77	1.62	1.69	1.68	1.75	1.68	1.73	1.73	1.72
1971	1.58	1.64	1.60	1.56	1.58	1.57	1.62	1.62	1.65	1.59
1972	1.73	1.68	1.73	1.60	1.71	1.74	1.59	1.78	1.75	1.77
1973	1.86	1.88	1.95	1.78	1.85	1.91	1.77	1.87	1.85	1.92
1974	1.71	1.73	1.82	1.64	1.69	1.76	1.75	1.75	1.74	1.80
1975	1.64	1.80	1.75	1.69	1.71	1.69	1.67	1.69	1.67	1.78
1976	1.74	1.67	1.73	1.62	1.74	1.84	1.65	1.78	1.76	1.73
1977	1.54	1.65	1.60	1.62	1.54	1.62	1.57	1.62	1.63	1.79
1978	1.62	1.58	1.66	1.47	1.65	1.65	1.61	1.63	1.65	1.63
1979	2.01	1.85	1.88	1.77	1.77	1.92	1.73	1.81	1.89	1.85
1980	1.61	1.73	1.58	1.54	1.59	1.60	1.54	1.62	1.71	1.75
1981	1.72	1.81	1.77	1.67	1.75	1.91	1.71	1.68	1.88	1.82
1982	1.63	1.68	1.72	1.53	1.63	1.67	1.52	1.60	1.57	1.76
1983	1.78	1.79	1.78	1.73	1.73	1.75	1.72	1.78	1.78	1.92
1984	1.66	1.55	1.66	1.55	1.68	1.70	1.65	1.65	1.61	1.68
1985	1.77	1.77	1.73	1.62	1.69	1.68	1.68	1.67	1.70	1.79
1986	1.71	1.72	1.82	1.56	1.65	1.73	1.70	1.71	1.76	1.80
1987	1.70	1.71	1.72	1.57	1.61	1.64	1.62	1.68	1.76	1.79
1988	1.53	1.53	1.40	1.60	1.36	1.43	1.40	1.46	1.44	1.53
1989	1.64	1.77	1.81	1.61	1.72	1.73	1.57	1.77	1.76	1.80
1990	1.57	1.70	1.67	1.58	1.61	1.56	1.57	1.59	1.72	1.73
average	1.69	1.72	1.71	1.62	1.66	1.71	1.63	1.69	1.71	1.76
std dev	0.11	0.09	0.12	0.08	0.10	0.12	0.09	0.09	0.10	0.09
Vh	1.955	1.940	2.002	1.812	1.903	2.005	1.849	1.916	1.964	1.986
Vl	1.421	1.492	1.427	1.426	1.425	1.408	1.418	1.465	1.464	1.532

NOTES:

1. Source of Original Data: NOAA, 1970 - 1990.
2. Shaded box denoted calculated outlier; 1979 Alvin annual rainfall represents a high outlier (extemely wet year), while 1988 annual rainfall for Cleveland, Houston WSMCO, Houston - Barker, and Houston - San Jacinto Dam represent low outliers (extremely dry year).
3. Vh = high outlier threshold.
4. Vl = low outlier threshold.
5. For calculation procedure see text, Section 5.3.1.

Table I.2 - Values of Kn

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Skew Coefficient C_s	Recurrence Interval in Years							
	1.0101	2	5	10	25	50	100	200
	Percent Chance (≥) = 1 - F							
	99	50	20	10	4	2	1	0.5
1.9	-1.037	-0.294	0.627	1.310	2.207	2.881	3.553	4.223
1.8	-1.087	-0.282	0.643	1.318	2.193	2.848	3.499	4.147
1.7	-1.140	-0.268	0.660	1.324	2.179	2.815	3.444	4.069
1.6	-1.197	-0.254	0.675	1.329	2.163	2.780	3.388	3.990
1.5	-1.256	-0.240	0.690	1.333	2.146	2.743	3.330	3.910
1.4	-1.318	-0.225	0.705	1.337	2.128	2.706	3.271	3.828
1.3	-1.383	-0.210	0.719	1.339	2.108	2.666	3.211	3.745
1.2	-1.449	-0.195	0.732	1.340	2.087	2.626	3.149	3.661
1.1	-1.518	-0.180	0.745	1.341	2.066	2.585	3.087	3.575
1.0	-1.588	-0.164	0.758	1.340	2.043	2.542	3.022	3.489
.9	-1.660	-0.148	0.769	1.339	2.018	2.498	2.957	3.401
.8	-1.733	-0.132	0.780	1.336	1.993	2.453	2.891	3.312
.7	-1.806	-0.116	0.790	1.333	1.967	2.407	2.824	3.223
.6	-1.880	-0.099	0.800	1.328	1.939	2.359	2.755	3.132
.5	-1.955	-0.083	0.808	1.323	1.910	2.311	2.686	3.041
.4	-2.029	-0.066	0.816	1.317	1.880	2.261	2.615	2.949
.3	-2.104	-0.050	0.824	1.309	1.849	2.211	2.544	2.856
.2	-2.178	-0.033	0.830	1.301	1.818	2.159	2.472	2.763
.1	-2.252	-0.017	0.836	1.292	1.785	2.107	2.400	2.670
.0	-2.326	0.000	0.842	1.282	1.751	2.054	2.326	2.576
- .1	-2.400	-0.017	0.846	1.270	1.716	2.000	2.252	2.482
- .2	-2.472	0.033	0.850	1.258	1.680	1.945	2.178	2.389
- .3	-2.544	0.050	0.853	1.245	1.643	1.890	2.104	2.294
- .4	-2.615	0.066	0.855	1.231	1.606	1.834	2.029	2.201
- .5	-2.686	0.083	0.856	1.216	1.567	1.777	1.955	2.108
- .6	-2.755	0.099	0.857	1.200	1.528	1.720	1.880	2.016
- .7	-2.824	0.116	0.857	1.183	1.488	1.663	1.806	1.926
- .8	-2.891	0.132	0.856	1.166	1.448	1.606	1.733	1.837
- .9	-2.957	0.148	0.854	1.147	1.407	1.549	1.660	1.749
-1.0	-3.022	0.164	0.852	1.128	1.366	1.492	1.588	1.664
-1.1	-3.087	0.180	0.848	1.107	1.324	1.435	1.518	1.581
-1.2	-3.149	0.195	0.844	1.086	1.282	1.379	1.449	1.501
-1.3	-3.211	0.210	0.838	1.064	1.240	1.324	1.383	1.424
-1.4	-3.271	0.225	0.832	1.041	1.198	1.270	1.318	1.351
-1.5	-3.330	0.240	0.825	1.018	1.157	1.217	1.256	1.282
-1.6	-3.388	0.254	0.817	0.994	1.116	1.166	1.197	1.216
-1.7	-3.444	0.268	0.808	0.970	1.075	1.116	1.140	1.155
-1.8	-3.499	0.282	0.799	0.945	1.035	1.069	1.087	1.097
-1.9	-3.553	0.294	0.788	0.920	0.996	1.023	1.037	1.044

NOTES:

1. Source: Bedient and Huber, Table 3.4.

Table I.3 - Calculation of Average and Ten Year Rainfalls

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Year	ANNUAL RAINFALL (log of inches)									
	Alvin	Anahuac	Cleveland	Galveston WSO	Houston WSMCO (Intercontinental AP)	Houston FAA Airport (Hobby AP)	Houston - Barker	Houston - Independent Heights	Houston - San Jacinto Dam	Liberty
1970	1.69	1.77	1.62	1.69	1.68	1.75	1.68	1.73	1.73	1.72
1971	1.58	1.64	1.60	1.56	1.58	1.57	1.62	1.62	1.65	1.59
1972	1.73	1.68	1.73	1.60	1.71	1.74	1.59	1.78	1.75	1.77
1973	1.86	1.88	1.95	1.78	1.85	1.91	1.77	1.87	1.85	1.92
1974	1.71	1.73	1.82	1.64	1.69	1.76	1.75	1.75	1.74	1.80
1975	1.64	1.80	1.75	1.69	1.71	1.69	1.67	1.69	1.67	1.78
1976	1.74	1.67	1.73	1.62	1.74	1.84	1.65	1.78	1.76	1.73
1977	1.54	1.65	1.60	1.62	1.54	1.62	1.57	1.62	1.63	1.79
1978	1.62	1.58	1.66	1.47	1.65	1.65	1.61	1.63	1.65	1.63
1979	-	1.85	1.88	1.77	1.77	1.92	1.73	1.81	1.89	1.85
1980	1.61	1.73	1.58	1.54	1.59	1.60	1.54	1.62	1.71	1.75
1981	1.72	1.81	1.77	1.67	1.75	1.91	1.71	1.68	1.88	1.82
1982	1.63	1.68	1.72	1.53	1.63	1.67	1.52	1.60	1.57	1.76
1983	1.78	1.79	1.78	1.73	1.73	1.75	1.72	1.78	1.78	1.92
1984	1.66	1.55	1.66	1.55	1.68	1.70	1.65	1.65	1.61	1.68
1985	1.77	1.77	1.73	1.62	1.69	1.68	1.68	1.67	1.70	1.79
1986	1.71	1.72	1.82	1.56	1.65	1.73	1.70	1.71	1.76	1.80
1987	1.70	1.71	1.72	1.57	1.61	1.64	1.62	1.68	1.76	1.79
1988	1.53	1.53	-	1.60	-	1.43	-	1.46	-	1.53
1989	1.64	1.77	1.81	1.61	1.72	1.73	1.57	1.77	1.76	1.80
1990	1.57	1.70	1.67	1.58	1.61	1.56	1.57	1.59	1.72	1.73
average	1.67	1.72	1.73	1.62	1.68	1.71	1.65	1.69	1.73	1.76
std dev	0.08	0.09	0.10	0.08	0.07	0.12	0.07	0.09	0.08	0.09
skew	0.187	-0.368	0.430	0.494	0.173	-0.037	-0.037	-0.299	0.156	-0.610
K	1.300	1.235	1.319	1.323	1.299	1.278	1.278	1.245	1.297	1.198
10 year	1.78	1.83	1.86	1.72	1.77	1.86	1.74	1.81	1.84	1.87
Average and Ten Year Rainfalls at Gages (inches)										
average	46.99	51.98	53.72	41.57	47.74	50.89	44.19	49.03	53.46	57.43
10 year	60.55	67.71	72.18	53.06	59.35	73.27	54.79	64.13	68.74	74.49

NOTES:

1. Source of Original Data: NOAA, 1970 - 1990.
2. Based on Log Pearson Type III analysis.
3. For calculation procedure see text, Section 5.3.1.

APPENDIX II
RAINFALL CALCULATIONS

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Rainfall Analysis

RAINFALL ANALYSIS

GOAL: Determine a reasonable distribution of different storms that represent an entire year of rainfall for an average year. This rainfall distribution defined by two terms:

1) rainfall for a storm type (P) and
2) the number of storms for the storm type per year (N).

INPUT DATA:

Rainfall statistics taken from analysis of 1971 - 1981 hourly rainfall data from Houston Intercontinental Airport gage using the SYNOP program (Figure III-1, Winslow, 1986).

Average Yearly Precipitation = 50.13 inches

Average Precipitation per Storm (μ_x) = 0.600 inches/storm

$$\text{Number of Storms per Year} = \frac{50.13}{0.600} \approx 84 \text{ storms}$$

Coefficient of Variation of Storm Size (CV_x) = 1.67

Standard Deviation of Storm Size (σ_x) = 1.00 inches

STATISTICAL ANALYSIS:

Assume rainfall per storm is represented by a Log-Normal Distribution. Transform μ_x and σ_x to μ_y and σ_y using the following expressions (Bedient and Huber, 1988):

$$CV_x = e^{(\sigma_y)^2} - 1$$

Rearrange:

$$\sigma_y = \left[\ln\left(CV_x^2 + 1\right)\right]^{1/2}$$

$$\sigma_y = \ln\left[(1.67)^2 + 1\right]^{1/2}$$

$$\sigma_y = 1.1542$$

$$\mu_x = e^{(\mu_y - \sigma_y^2/2)}$$

Rearrange:

$$\mu_y = \ln(\mu_x) + \frac{\sigma_y^2}{2}$$

$$\mu_y = \ln(0.600) + (1.1542)^2/2$$

$$\mu_y = -1.1769$$

ASSUMPTIONS: All storms during a year will be represented by five storm types. For example, the rainfall for an average year can be distributed as such:

Storm Type	Rainfall (inches)	Number of Storms per Year
Very small storms	P1	N1
Small storms	P2	N2
Average storms	P3	N3
Large storms	P4	N4
Very large storms	P5	N5

P_{total} = P1*N1 + P2*N2 + P3*N3 + P4*N4 + P5*N5 = 50.13 inches (average annual rainfall from SYNOP program)

Since there are approximately 85 storms in a year, assume

$N_1 = N_2 = N_3 = N_4 = N_5 = 17$ storms

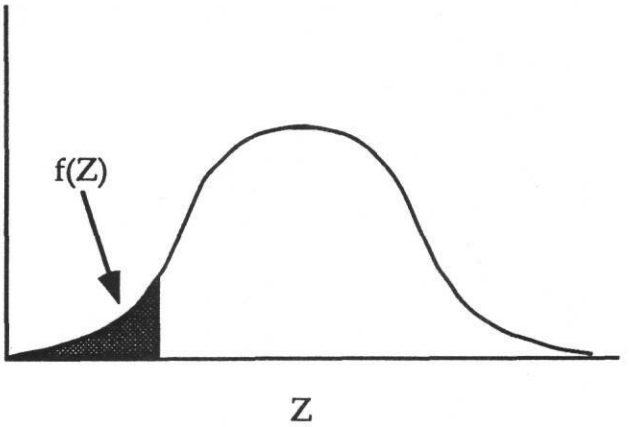
CALCULATIONS:

After transforming the data to log-space, use normal distribution relationships to determine values for P_1, P_2, P_3, P_4, and P_5.

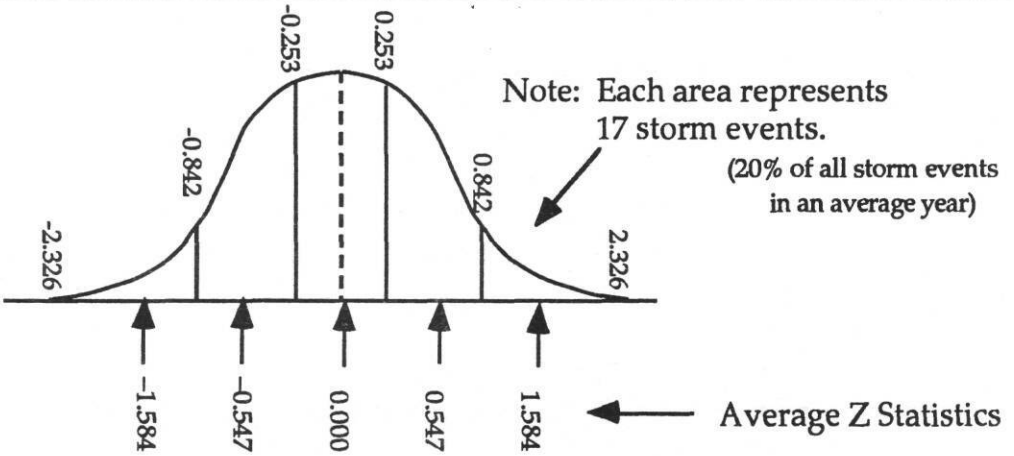
$$Y = \mu_y + Z\,\sigma_y$$

Using table D.3.2 (page 591, Bedient and Huber), calculate the following data:

Storm Type	Description	Upper Storm Percentile f(Z)	Lower Storm Percentile f(Z)	Upper Storm Z Statistic	Lower Storm Z Statistic	Average Z Statistic
Very Small Storm	Smallest 20%	0.20	0.01	-0.842	-2.326	-1.584
Small Storm	Next 20%	0.40	0.20	-0.253	-0.842	-0.547
Average Storm	Middle 20%	0.60	0.40	0.253	-0.253	0.000
Large Storm	Next 20%	0.80	0.60	0.842	0.253	0.547
Very Large Storm	Largest 20%	0.99	0.80	2.326	0.842	1.584



Relationship between f(Z) and Z



Relationship between f(Z) and average Z for GBNEP Project

Determine P for each storm size, assuming

1. Rainfall per storm is log-normal
2. μ_y = -1.1768 (see "Statistical Analysis")
   σ_y = 1.1542 (see "Statistical Analysis")
3. $Y = \mu_y + Z\,\sigma_y$
4. $P_{storm} = \exp Y$

Storm Size	Description	Average Z	P_{storm}	N	P_{total}
Very Small Storm	Smallest 20%	-1.584	P_1= 0.050	17	0.850
Small Storm	Next 20%	-0.547	P_2= 0.164	17	2.788
Average Storm	Middle 20%	0.000	P_3= 0.308	17	5.236
Large Storm	Next 20%	0.547	P_4= 0.580	17	9.860
Very Large Storm	Largest 20%	1.584	P_5 = 1.918	17	32.606

P_{total} (entire year) = 52.34 inches

CALIBRATION:

Predicted Annual Rainfall from this calculation = 52.34 inches

Actual Annual Rainfall from SYNOP program = 50.13 inches

Calibrate distribution by adjusting P_1, P_2, P_3, P_4, and P_5 by the following factor:

$$\frac{50.13}{52.34} = 0.977$$

Storm Size	Rainfall (unadjusted)	**Final Rainfall Distribution**	
		Rainfall (calibrated)	**Number of Storms**
Very Small Storm	0.050	$P_1 = 0.049$	$N_1 = 17$
Small Storm	0.164	$P_2 = 0.160$	$N_2 = 17$
Average Storm	0.308	$P_3 = 0.301$	$N_3 = 17$
Large Storm	0.580	$P_4 = 0.566$	$N_4 = 17$
Very Large Storm	1.918	$P_5 = 1.873$	$N_5 = 17$

P_{total} = 50.13 inches

APPLICATION:

Use final rainfall distribution for all annual rainfall models.

APPENDIX III
HOUSTON AREA EMC DATABASE
SUPPLEMENTAL LAND USE DATA
SUBWATERSHED LOAD DATA

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Table III.1 Event Mean Concentration Tables by Watershed Type

Table III.2 Land Use by Subwatershed

Table III.3 Subwatershed Load Data

Table III.1 - Event Mean Concentrations (EMCs)

A1. Small Watershed, High Density Urban (commercial + industrial >40%)

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
11th St. Storm Sewer	0.21	1	7	10/14/85	AVE	8.0	137	0.20	0.60	0.32	0.08		0.92	0.29										
11th St. Storm Sewer	0.21	2	7	10/14/85	AVE	7.5	96		0.80	0.30			1.10	0.22										
11th St. Storm Sewer	0.21	3	7	5/17/86	AVE	9.6	57		1.64	0.76			2.40	0.11										
Bettina St. Ditch	1.37	145	15	5/14/82	FWA	9.3	299		1.22	0.20			1.42	0.37										
Bettina St. Ditch	1.37	146	15	5/18/82	FWA																			
Bettina St. Ditch	1.37	147	15	6/18/82	FWA																			
Bettina St. Ditch	1.37	148	15	6/23/82	FWA	18.0	90		4.10	0.94			5.00	1.30			100.0	1.00	10.00	8.00	16.00	0.10	1.00	30.0
Bettina St. Ditch	1.37	149	15	7/13/82	FWA																			
Bettina St. Ditch	1.37	150	15	7/14/82	FWA		14																	
Bettina St. Ditch	1.37	151	15	7/16/82	FWA				2.43	0.71			3.13	0.22										
Bettina St. Ditch	1.37	152	15	9/18/82	FWA																			
Bettina St. Ditch	1.37	153	15	11/2/82	FWA		163		1.70	0.16			1.86	1.23										
Bettina St. Ditch	1.37	155	15	5/21/83	FWA	6.8	74		1.79	0.34			2.13	0.24			14.5	1.00	10.00	3.00	4.88	0.10	1.00	19.3
Bettina St. Ditch	1.37	157	15	3/23/84	FWA		190		2.25	0.35			2.61	0.96										
Bettina St. Ditch	1.37	1	7	10/21/85	AVE	7.5	21		2.23	0.32			2.55	0.61										
Bettina St. Ditch	1.37	2	7	3/12/86	AVE	10.3	38		0.50	0.61			1.11	0.38										
Bettina St. Ditch	1.37	3	7	5/1/86	AVE	8.3	343		1.57	0.64			2.21	0.53										
Bettina St. Ditch	1.37	4	7	5/17/86	AVE	20.4	46		4.49	1.20			5.68	0.82										
Bettina St. Ditch	1.37	5	7	6/8/86	AVE	5.1	75		1.46	0.13			1.59	0.21										
Bettina St. Ditch	1.37	6	7	10/21/85	AVE	7.0	68		1.20	0.36			1.56	0.37										
Bingle Rd. Storm Sewer	0.21	1	7	9/9/85	AVE	9.0	13	0.42	2.00	2.00	0.13		4.00	5.37										
Bingle Rd. Storm Sewer	0.21	2	7	11/11/85	AVE	<3	157	0.08	1.15	0.04	<0.05		1.19	0.19										
Bingle Rd. Storm Sewer	0.21	3	7	11/11/85	AVE	3.0	152		1.48	0.06			1.54	0.20										
Bingle Rd. Storm Sewer	0.21	4	7	2/5/86	AVE	5.8	170		1.14	0.27			1.41	0.24										
Bingle Rd. Storm Sewer	0.21	5	7	5/17/86	AVE	4.1	85		1.17	0.98			2.15	0.10										
Bingle Rd. Storm Sewer	0.21	6	7	5/27/86	AVE	5.9	185		1.28	0.32			1.60	0.18										
Bingle Rd. Storm Sewer	0.21	7	7	5/30/86	AVE	5.8	233		1.82	0.44			2.26	1.50										
Bingle Rd. Storm Sewer	0.21	96	15	6/9/80	FWA	19.0	451		1.99	0.30			2.32	0.18										
Bingle Rd. Storm Sewer	0.21	97	15	7/21/80	FWA	8.6			1.79	1.15			2.92	0.19										
Bingle Rd. Storm Sewer	0.21	98	15	2/25/81	FWA	10.2			1.01	0.53			1.53	0.17										
Bingle Rd. Storm Sewer	0.21	99	15	4/23/81	FWA	10.3	639		1.61	0.32			1.94	0.24										
Bingle Rd. Storm Sewer	0.21	100	15	7/7/81	FWA		44		0.99	0.38			1.38	0.09										
Bingle Rd. Storm Sewer	0.21	101	15	8/12/81	FWA	16.0	298		1.59	0.74			2.31	0.52										
Bingle Rd. Storm Sewer	0.21	102	15	8/31/81	FWA												0.0	0.00	0.00	1.00	2.00	0.00	0.00	10.0
Bingle Rd. Storm Sewer	0.21	103	15	10/5/81	FWA																			
Bingle Rd. Storm Sewer	0.21	109	15	6/14/82	FWA	0.0	0	0. 0	0. 0	0.00	0.00	0	0.00	0.00	0	0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Bingle Rd. Storm Sewer	0.21	105	15	3/22/82	FWA												100.0	1.00	10.00	6.88	7.34	0.10	1.00	164.4
Bingle Rd. Storm Sewer	0.21	107	15	5/6/82	FWA	11.0	170		1.80	0.30			2.10	0.18			23.0	3.00	10.00	6.00	8.00	0.10	1.00	21.0
Bingle Rd. Storm Sewer	0.21	108	15	5/12/82	FWA	7.5	64		1.70	0.42			2.10	0.42			41.0	3.00	10.00	4.00	1.00	0.10	1.00	18.0
Bingle Rd. Storm Sewer	0.21	109	15	6/14/82	FWA																			

Table III.1 - Event Mean Concentrations (EMCs)

A1. Small Watershed, High Density Urban (commercial + industrial >40%)

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Bingle Rd. Storm Sewer	0.21	110	15	6/26/82	FWA																			
Bingle Rd. Storm Sewer	0.21	111	15	7/13/82	FWA												32.9	1.00	10.00	4.33	1.30	0.10	1.00	87.4
Bingle Rd. Storm Sewer	0.21	112	15	7/16/82	FWA				2.20	1.08			3.29	0.21										
Bingle Rd. Storm Sewer	0.21	113	15	7/19/82	FWA												48.4	1.00	10.00	3.14	1.00	0.10	1.00	50.1
Bingle Rd. Storm Sewer	0.21	114	15	7/30/82	FWA		252																	
Bingle Rd. Storm Sewer	0.21	115	15	8/30/82	FWA												33.8	1.00	10.00	9.45	2.35	0.10	1.00	40.7
Bingle Rd. Storm Sewer	0.21	116	15	11/2/82	FWA		272		1.28	0.15			1.43	0.37										
Bingle Rd. Storm Sewer	0.21	117	15	11/16/82	FWA		103		1.46	0.68			2.14	0.15										
Bingle Rd. Storm Sewer	0.21	118	15	11/19/82	FWA		204		1.51	0.33			1.84	0.24										
Bingle Rd. Storm Sewer	0.21	119	15	2/5/83	FWA		48		1.33	0.80			2.14	0.67										
Bingle Rd. Storm Sewer	0.21	120	15	2/9/83	FWA		227		1.62	0.21			1.84	0.16										
Bingle Rd. Storm Sewer	0.21	121	15	2/15/83	FWA		82		1.05	0.32			1.37	0.13										
Bingle Rd. Storm Sewer	0.21	122	15	2/20/83	FWA		176		1.48	0.36			1.84	0.20										
Bingle Rd. Storm Sewer	0.21	123	15	6/15/83	FWA		121		1.82	0.87			2.69	0.35										
Bintliff at Bissonnet	4.41	1	2	11/1/77	FWA		517		0.90					1.23										
Bintliff at Bissonnet	4.41	2	2	11/21/77	FWA		292		1.32					0.44										
Bintliff at Bissonnet	4.41	3	2	12/13/77	FWA		727		2.05					0.78										
Bintliff at Bissonnet	4.41	4	2	1/11/78	FWA		658		2.25					1.42										
Bintliff at Bissonnet	4.41	5	2	2/12/78	FWA		933		2.23					1.09										
Bintliff at Bissonnet	4.41	6	2	5/29/78	FWA		1091		2.73					1.05										
Bintliff at Bissonnet	4.41	7	2	6/7/78	FWA		1114		5.38					2.22										
Hunting Bayou at Falls St.	3.09	1	3	3/20/74	FWA		71	2.44	ND		0.05	0.438		ND										
Hunting Bayou at Falls St.	3.09	2	3	3/26/74	FWA		197	2.51	3.52		0.07	0.509	4.09	0.41										
Hunting Bayou at Falls St.	3.09	3	3	4/11/74	FWA		122	0.73	1.56		0.07	0.338	1.96	0.90										
Hunting Bayou at Falls St.	3.09	4	3	5/8/75	FWA		207	1.20	3.25		0.06	0.511	3.82	1.08										
Hunting Bayou at Falls St.	3.09	5	3	6/30/75	FWA		182	2.10	3.94		0.04	0.373	4.36	1.28										
Sherwood Storm Sewer	0.18	1	7	8/20/85	AVE	13.0	38	1.07	17.38	0.89														
Sherwood Storm Sewer	0.18	2	7	11/11/85	FWA	4.0	186	1.10	2.01	0.08														
Median						8.5	166	1.09	1.62	0.36	0.00	0.44	2.10	0.37			37.4	1.00	####	4.16	2.18	0.10	1.00	35.4
Average						9.3	236	1.19	2.15	0.51	0.07	0.43	2.63	0.15			49.4	1.30	9.00	4.88	4.59	0.09	0.90	49.1
Standard deviation						4.4	259	0.89	2.34	0.39	0.03	0.08	2.62	0.24			37.5	0.95	3.16	2.63	4.77	0.03	0.32	46.4
Coefficient of variation						0.5	1	0.75	1.09	0.76	0.39	0.18	0.99	0.67			0.8	0.73	0.35	0.54	1.04	0.35	0.35	0.9
Number of data points						28	52	10	53	42	8	5	45	0			10	10	10	10	10	10	10	10

References:

2. Bedient, P.B. et al. Stormwater Pollutant Load-Runoff Relationships. JWPCF, 52:9 (September 1980).
3. Characklis, W.G. et al. Stormwater Runoff Quality: Data Collection, Reduction and Analysis. 1979.
7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.
15. USGS Database.

Note:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow Weighted Average.

AVE = Average of all discrete samples.

Table III.1 - Event Mean Concentrations (EMCs)

A2. Small Watershed, Residential (residential > 50%)

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Westbury	0.33	1	3,4	5/8/75	FWA		24	0.89	2.19		0.04	0.371	2.60	0.73		4.34								
Westbury	0.33	2	3,4	6/30/75	FWA		70	0.15	1.48		0.03	0.388	1.89	1.14		4.34								
Westbury	0.33	3	4	11/26/75	FWA											4.28								
Hunting Bayou at Falls St.	2.57	82	15	1/27/79	FWA	29.8	211		4.98	0.95			5.89	1.21			100.0	2.00	0.00	6.00	2.00	0.10	0.00	70.0
Hunting Bayou at Falls St.	2.57	83	15	9/19/79	FWA	19.2	405		3.44	0.55			3.99	0.81			80.0	3.00	0.00	0.00	2.00	0.10	0.00	20.0
Hunting Bayou at Falls St.	2.57	85	15	4/26/80	FWA	14.0	184		3.71	0.56			4.26	1.90										
Hunting Bayou at Falls St.	2.57	86	15	7/8/81	FWA	15.0	117		4.62	0.45			5.09	0.94			78.3	1.00	9.48	10.00	10.00	0.10	0.05	60.4
Lazybrook St. Storm Sewer	0.13	124	15	4/25/80	FWA	23.3	184		3.38	0.50			3.91	0.87			30.0	1.00	0.00	4.00	25.00	0.20	0.00	50.0
Lazybrook St. Storm Sewer	0.13	125	15	3/4/81	FWA																			
Lazybrook St. Storm Sewer	0.13	126	15	4/23/81	FWA	18.6	223		3.97	1.50			5.47	1.49			361.3	0.28	0.00	0.90	3.32	0.10	0.00	41.4
Lazybrook St. Storm Sewer	0.13	127	15	5/4/81	FWA		32																	
Lazybrook St. Storm Sewer	0.13	128	15	6/25/81	FWA		34		2.75	1.25			4.00	0.87										
Lazybrook St. Storm Sewer	0.13	129	15	7/7/81	FWA		13		1.38	0.49			1.91	0.41										
Lazybrook St. Storm Sewer	0.13	130	15	7/10/81	FWA		25		1.90	0.66			2.53	0.72										
Lazybrook St. Storm Sewer	0.13	131	15	10/5/81	FWA		37		6.50	0.34			6.85	1.42										
Lazybrook St. Storm Sewer	0.13	132	15	1/12/82	FWA	12.0	77		1.77	0.58			2.37	0.59										
Lazybrook St. Storm Sewer	0.13	133	15	2/25/82	FWA																			
Lazybrook St. Storm Sewer	0.13	134	15	3/6/82	FWA																			
Lazybrook St. Storm Sewer	0.13	135	15	7/30/82	FWA																			
Lazybrook St. Storm Sewer	0.13	136	15	8/2/82	FWA																			
Lazybrook St. Storm Sewer	0.13	137	15	11/2/82	FWA		387		2.46	0.17			2.84	0.21										
Lazybrook St. Storm Sewer	0.13	138	15	11/16/82	FWA		41		3. 0	0.10			1.10	0.32										
Lazybrook St. Storm Sewer	0.13	139	15	2/9/83	FWA		123		2.02	0.42			2.50	0.41										
Lazybrook St. Storm Sewer	0.13	140	15	2/15/83	FWA		21		1.16	0.45			1.61	0.24										
Lazybrook St. Storm Sewer	0.13	141	15	2/20/83	FWA		81		3.85	0.50			4.36	0.70										
Lazybrook St. Storm Sewer	0.13	142	15	3/23/84	FWA		136		3.09	0.63			3.72	0.96										
Lazybrook St. Storm Sewer	0.13	143	15	7/6/84	FWA		62		1.50	0.70			2.20	0.65			24.1	1.00	19.37	3.94	5.00	0.10	1.00	210.6
Lazybrook St. Storm Sewer	0.13	1	7	3/12/86	AVE	41.4	113		4.46	0.93			5.39	1.06										
Lazybrook St. Storm Sewer	0.13	2	7	5/17/86	AVE	8.0	100		3.51	1.03			4.55	0.87										
Lazybrook St. Storm Sewer	0.13	3	7	5/30/86	AVE	18.7	402		3.20	0.67			3.87	1.53										
Lazybrook St. Storm Sewer	0.13	4	7	8/20/85	AVE	10.0	26		2.33	0.78			3.11	0.76										
Vince Bayou at Pasadena	7.32	41	15	4/21/77	FWA	11.1	281		2.32	0.39			2.68	0.60										
Vince Bayou at Pasadena	7.32	42	15	3/20/79	FWA	10.8	513		1.50	0.85			2.34	0.48										
Median						15.0	100	0.52	2.88	0.57	0.03	0.38	3.41	0.79	8.30	4.34	79.2	1.00	0.00	3.97	4.16	0.10	0.00	55.2
Average						17.8	145	0.52	2.94	0.64	0.03	0.38	3.50	0.84	7.55	4.32	112.3	1.38	4.81	4.14	7.89	0.12	0.18	75.4
Standard deviation						9.3	140	0.53	1.30	0.32	0.01	0.01	1.46	0.42	4.77	0.03	125.6	0.97	8.08	3.62	8.90	0.04	0.40	68.4
Coefficient of variation						0.5	1	1.02	0.44	0.50	0.28	0.03	0.42	0.50	0.63	0.01	1.1	0.70	1.68	0.87	1.13	0.35	2.31	0.9
Number of data points						13	27	2	26	24	2	2	26	26	21	3	6	6	6	6	6	6	6	6

References:

3. Characklis, et al. Stormwater Runoff Quality: Data Collection, Reduction and Analysis. July 1979.
4. Davis, Bacterial Characteristics of Stormwaters in Developing Rural Areas, August 1979.
7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.
15. USGS Database.

Note:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow weighted average.

AVE = Average of all discrete samples.

Table III.1 - Event Mean Concentrations (EMCs)

A3. Small Size (<10 sq mi) or Single Land Use Watershed, Forest

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
P-10	25.08	7	3,4	12/5/74	AVE		27	0.09	0.83		0.00	0.012	0.84	0.08		3.20								
P-10	25.08	9	3,4	3/13/75	FWA		67	0.09	1.61		0.00	0.103	1.72	0.09		2.93								
P-10	25.08	10	3,4	4/8/75	FWA		39	0.08	1.37		0.00	0.065	1.44	0.06		3.36								
P-10	25.08	13	3,4	9/5/75	FWA		7	0.03	0.10		0.00	0.03	0.13	0.03		2.41								
P-10	25.08	14	3,4	10/25/75	FWA		8	0.05	0.26		0.01	0.03	0.30	0.05		3.48								
P-10	25.08	15	3,4	3/7/76	FWA		212	0.06			0.01	0.047												
P-10	25.08	16	3,4	3/8/76	FWA		130	0.02			0.01	0.023												
P-10	25.08	17	3,4	4/4/76	FWA			0.16	0.67		0.01	0.135	0.81	0.06										
Median							39	0.07	0.75		0.00	0.04	0.83	0.06		3.20								
Average							70	0.07	0.81		0.01	0.06		0.06		3.08								
Standard deviation							76	0.04	0.60		0.00	0.04		0.02		0.43								
Coefficient of variation							1	0.59	0.74		0.73	0.77		0.34		0.14								
Number of data points							7	8	6		8	8	6	6		5								

References:

3. Characklis, et al. Stormwater Runoff Quality: Data Collection, Reduction and Analysis. July 1979.
4. Davis, Bacterial Characteristics of Stormwaters in Developing Rural Areas, August 1979.

Note:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow weighted average.

AVE = Average of all discrete samples.

Table III.1 - Event Mean Concentrations (EMCs)
A4. Small Watershed, Open
Non-Point Source Characterization Project
Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Little Prong at Katy-Gaston		1	7	5/2/86	AVE		199	5.88	2.75	0.39	0.59													
Little Prong at Katy-Gaston		2	7	6/9/86	AVE		74	5.67	2.30	1.94	0.88													
Median							137	5.77	2.52	1.16	0.73													
Average							137	5.77	2.52	1.16	0.73													
Standard deviation							88	0.15	0.31	1.09	0.20													
Coefficient of variation							1	0.03	0.12	0.94	0.28													
Number of data points							2	2	2	2	2													

References:
7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.

Note:
AVE = Average of all discrete samples.

Table III.1 - Event Mean Concentrations (EMCs)
A5. Small Watershed, Mixed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	ype of ample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Sherwood Storm Sewer	0.18	1	7	11/11/85	AVE	10.5	929		7.10	0.06			7.16	0.61										
Sherwood Storm Sewer	0.18	2	7	5/17/86	AVE	5.4	57		1.23	0.79			2.02	0.21										
Sherwood Storm Sewer	0.18	3	7	5/27/86	AVE	8.8	100		1.60	0.55			2.15	0.28										
Sherwood Storm Sewer	0.18	4	7	6/8/86	AVE	5.5	85		1.32	0.27			1.59	0.36										
Sherwood Storm Sewer	0.18	5	7	8/20/85	AVE	13.0	38		17.38	0.89			18.27	0.28										
Sherwood Storm Sewer	0.18	6	7	11/11/85	AVE	4.0	186		2.01	0.08			2.09	0.41										
Median						7.1	92		1.81	0.41			2.12	0.32										
Average						7.9	232		5.11	0.44			5.55	0.36										
Standard deviation						3.5	345		6.42	0.36			6.57	0.14										
Coefficient of variation						0.4	1		1.26	0.81			1.18	0.39										
Number of data points						6	6		6	6			6	6										

References:
7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.

Note:
Underlined values represent values calculated for GBNEP Project.
AVE = Average of all discrete samples.

Table III.1 - Event Mean Concentrations (EMCs)

B1. Medium Size Watershed (10-100 sq mi), <10% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
P-30	33.76	1	3,4	1/18/74	FWA		236	0.03			0.00	0.029		ND		3.63								
P-30	33.76	5	3,4	4/22/74	FWA		939	0.33	1.34		0.01	0.235	1.59	0.48		3.89								
P-30	33.76	6	3,4	10/28/74	FWA		305	0.09			0.01	0.037	0.04	0.10		3.63								
P-30	33.76	7	3,4	12/5/74	FWA		86	0.10	0.91		0.01	0.023	0.93	0.10		3.86								
P-30	33.76	8	3,4	3/4/75	FWA		47	0.10	1.66		0.01	0.107	1.77	0.13		3.00								
P-30	33.76	9	3,4	3/13/75	FWA		90	0.07	1.09		0.00	0.111	1.20	0.16		2.41								
P-30	33.76	10	3,4	4/8/75	FWA		171	0.15	1.39		0.01	0.154	1.55	0.09		3.38								
P-30	33.76	13	3,4	9/5/75	FWA		100	0.20	0.44		0.02	0.305	0.76	0.18		3.39								
P-30	33.76	14	3,4	10/25/75	FWA		169	0.08	0.31		0.01	0.147	0.46	0.15		4.17								
P-30	33.76	15	3,4	3/7/76	FWA		237	0.06			0.02	0.252												
P-30	33.76	16	3,4	3/8/76	FWA		290	0.17			0.01	0.178												
P-30	33.76	17	3,4	4/4/76	FWA			0.39	2.04		0.02	0.42	2.48	0.15										
Median							171	0.10	1.22		0.01	0.15	1.20	0.15		3.63								
Average							243	0.15	1.15		0.01	0.17	1.20	0.17		3.48								
Standard deviation							247	0.11	0.59		0.01	0.12	0.74	0.12		0.53								
Coefficient of variation							1	0.74	0.51		0.64	0.72	0.62	0.71		0.15								
Number of data points							11	12	8		12	12	9	9		9								

References:

3. Characklis, et al. Stormwater Runoff Quality: Data Collection, Reduction and Analysis. July 1979.
4. Davis, Bacterial Characteristics of Stormwaters in Developing Rural Areas, August 1979.

Notes:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow weighted average.

Table III.1 - Event Mean Concentrations (EMCs)

B2. Medium Size Watershed (10-100 sq mi), 10-50% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Greens Bayou at Hwy 59	69.6	19	15	3/8/76	FWA	12.3	1737		2.693	1.02			3.72	1.43		4.82		0.00	0.00	8.00	0.00	0.50		20.0
Greens Bayou at Hwy 59	69.6	20	15	6/9/78	FWA	10.1	1350		1.528	0.17			1.72	0.42										
Greens Bayou at Hwy 59	69.6	21	15	4/19/79	FWA	12.2	632		1.22	0.32			1.58	0.25			100.0	2.00	0.00	2.00	0.00	0.10	0.00	20.0
Greens Bayou at Hwy 59	69.6	22	15	1/23/80	FWA	6.6	426		1.482	0.08			1.53	0.20			070.0	1.00	0.00	2.00	0.00	0.10	0.00	3.0
Greens Bayou at Hwy 59	69.6	23	15	8/31/81	FWA	4.9	498		1.814	0.22			2.05	0.53			049.0	1.00	0.00	3.00	2.00	0.10	0.00	3.0
Greens Bayou at Hwy 59	69.6	24	15	5/13/82	FWA	14.4	567		3.06	0.75			3.80	1.57			120.0	3.00	10.00	3.00	1.00	0.10	1.00	12.0
Greens Bayou at Hwy 59	69.6	27	15	5/11/83	FWA	14.0	718		3.577	0.55			4.13	0.90			108.6	1.00	10.00	2.61	6.93	0.10	1.00	6.7
White Oak Bayou at Heights	86.3	1	7	8/20/85	AVE	10.0	316	0.18	2.95	1.00	0.14		3.95	1.79										
White Oak Bayou at Heights	86.3	2	7	9/29/85	AVE	<3	342	0.27	14	0.38	0.3		14.38	1.15										
White Oak Bayou at Heights	86.3	3	7	10/28/85	AVE	5.0	122	0.47	1.6	0.99	0.32		2.59	0.93										
White Oak Bayou at Heights	86.3	4	7	8/21/85	AVE	12.0	365		2.86	1.49			4.35	1.29										
White Oak Bayou at Heights	86.3	5	7	9/30/85	AVE	3.8	276		13.85	3.67			17.52	1.11										
White Oak Bayou at Heights	86.3	6	7	10/28/85	AVE	3.8	75		1.333	1.88			3.21	1.43										
White Oak Bayou at Heights	86.3	7	7	5/25/86	AVE	32.3	190		2.757	1.07			3.82	0.94										
White Oak Bayou at Heights	86.3	8	7	6/9/86	AVE	1.5	176		1.326	0.45			1.77	1.19										
White Oak Bayou at Heights	86.3	9	15	11/19/75	FWA	38.7	181		3.427	0.77			4.46	1.76		4.29		0.00	0.00	4.00	36.00	0.50		140.0
White Oak Bayou at Heights	86.3	10	15	4/17/77	FWA	41.6	458		5.469	0.67			6.17	2.14										
White Oak Bayou at Heights	86.3	11	15	1/8/79	FWA	9.8	265		1.9	0.59			2.51	0.90			081.6	2.00	0.00	4.63	0.00	0.10	0.32	26.3
White Oak Bayou at Heights	86.3	12	15	10/23/79	FWA	32.5	171		2.405	0.73			3.17	1.17			100.0	1.00	0.00	0.00	2.00	0.00	0.00	30.0
White Oak Bayou at Heights	86.3	13	15	1/18/80	FWA	23.7	1072		3.689	0.67			4.35	1.03			060.0	1.00	10.00	5.00	27.00	0.20	0.00	20.0
White Oak Bayou at Heights	86.3	14	15	5/7/82	FWA	16.0	276		3.328	0.69			4.05	1.24			059.2	3.00	10.00	3.17	6.66	0.10	1.00	19.7
White Oak Bayou at Heights	86.3	15	15	5/20/83	FWA	8.0	726		2.331	0.44			0.44	0.59			054.7	1.00	10.00	4.16	2.69	0.10	1.00	9.3
White Oak Bayou at Heights	86.3	16	15	5/22/83	FWA	6.8	332		1.957	0.31			0.31	0.47			086.0	1.00	10.00	4.00	1.00	0.10	1.00	14.0
Brays Bayou at Gessner Rd.	53.4	1	2	5/29/78	FWA		518		1.8					0.81										
Brays Bayou at Gessner Rd.	53.4	2	2	1/1/04	FWA		55		0.17					0.28										
Brays Bayou at Gessner Rd.	53.4	3	2	1/1/04	FWA		229		0.38					0.17										
Keegans Bayou at Roark Rd.	12.4	1	2	1/30/77	FWA		83							0.56										
Keegans Bayou at Roark Rd.	12.4	2	2	2/10/77	FWA		560																	
Keegans Bayou at Roark Rd.	12.4	3	2	9/7/77	FWA		146		0.46					0.58										
Keegans Bayou at Roark Rd.	12.4	4	2	11/21/77	FWA		72		0.17					0.50										
Keegans Bayou at Roark Rd.	12.4	5	2	1/11/78	FWA		315		2.43					1.87										
Keegans Bayou at Roark Rd.	12.4	6	2	5/29/78	FWA		54		0.17					0.11										
Keegans Bayou at Roark Rd.	12.4	7	2	6/7/78	AVE		818		1.55					1.67										
Keegans Bayou at Roark Rd.	12.4	66	15	1/8/79	FWA	5.6	590		1.444	0.68			2.14	0.59			040.0	2.00	20.00	2.00	0.00	0.10	0.00	3.0
Keegans Bayou at Roark Rd.	12.4	67	15	4/3/79	FWA	8.2	1027		2.364	1.14			3.48	1.06			100.0	2.00	0.00	2.00	0.00	0.10	0.00	20.0
Keegans Bayou at Roark Rd.	12.4	68	15	12/13/79	FWA	11.5	468		2.105	1.32			3.42	1.34			100.0	1.00	0.00	0.00	0.00	0.10	0.00	30.0

Table III.1 - Event Mean Concentrations (EMCs)

B2. Medium Size Watershed (10-100 sq mi), 10-50% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Keegans Bayou at Roark Rd.	12.4	69	15	4/24/81	FWA	18.4	187		2.19	0.75			2.95	1.41										
Keegans Bayou at Roark Rd.	12.4	70	15	9/2/81	FWA	2.5	276		1.75	0.31			2.06	0.48			029.8	1.00	7.23	2.72	1.95	0.11	0.72	6.5
Keegans Bayou at Roark Rd.	12.4	71	15	6/19/82	FWA		243																	
Keegans Bayou at Roark Rd.	12.4	73	15	7/15/82	FWA		869		2.28	1.50			3.79	1.25										
Keegans Bayou at Roark Rd.	12.4	74	15	7/31/82	FWA		298																	
Keegans Bayou at Roark Rd.	12.4	75	15	8/11/82	FWA		149		2.38	1.88			4.27	1.38			052.8	1.00	10.00	2.00	1.00	0.10	1.00	79.1
Keegans Bayou at Roark Rd.	12.4	76	15	11/4/82	FWA	7.6	613		2.16	1.23			3.39	1.27			087.0	1.00	10.00	5.00	4.00	0.10	1.00	24.0
Keegans Bayou at Roark Rd.	12.4	77	15	11/20/82	FWA	2.8	341		2.13	1.42			3.55	0.95										
Keegans Bayou at Roark Rd.	12.4	78	15	11/26/82	FWA		183		2.07	2.22			4.30	1.66										
Keegans Bayou at Roark Rd.	12.4	79	15	1/20/83	FWA	2.9	168		2.95	3.19			6.14	1.77										
Keegans Bayou at Roark Rd.	12.4	80	15	2/10/83	FWA	6.3	813		2.59	1.16			3.76	1.01										
Keegans Bayou at Roark Rd.	12.4	81	15	2/17/83	FWA	4.1	256		2.36	1.18			3.53	0.76										
Median						9.0	316	0.27	2.18	0.76	0.30		3.54	1.03		4.56	81.6	1.00	7.23	3.00	1.00	0.10	0.32	20.0
Average						12.2	429	0.31	2.65	1.02	0.25		3.95	1.02		4.56	76.4	1.32	5.64	3.12	4.85	0.14	0.47	25.6
Standard deviation						10.6	350	0.15	2.69	0.78	0.10		3.24	0.51		0.38	26.5	0.82	6.00	1.86	9.74	0.13	0.49	32.5
Coefficient of variation						0.9	0.8	0.48	1.02	0.76	0.39		0.82	0.50		0.08	0.3	0.62	1.06	0.59	2.01	0.92	1.03	1.3
Number of data points						32	48	3	44	36	3		36	45		2	17	19	19	19.00	19.00	19.00	17	19.0

References:

2. Bedient, et al. Stormwater Pollutant Load-Runoff Realtionships, JWPCF, 52:9 (September 1980).
7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.
15. USGS Database.

Note:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow weighted average.

Table III.1 - Event Mean Concentrations (EMCs)

B3. Medium Size Watershed (10-100 sq mi), >50% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3+NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Sims Bayou at Telephone Rd.	63	1	7	[illegible]/14/85	AVE	8.0	433	0.36	1.50	1.14	0.11		2.64	1.06										
Sims Bayou at Telephone Rd.	63	2	7	10/28/85	AVE	5.0	178	0.68	1.80	1.68	0.54		3.48	1.18										
Sims Bayou at Telephone Rd.	63	3	7	10/28/85	AVE	6.5	264		1.60	2.47			4.07	1.71										
Sims Bayou at Telephone Rd.	63	4	7	11/14/85	AVE	2.9	109		2.17	0.29			2.46	0.45										
Sims Bayou at Telephone Rd.	63	5	7	4/10/86	AVE	5.0	98		2.60	2.36			4.95	1.92										
Sims Bayou at Telephone Rd.	63	6	7	5/2/86	AVE	9.1	206		2.68	2.74			5.42	1.35										
Sims Bayou at Telephone Rd.	63	7	7	5/26/86	AVE	4.0	112		3.11	5.43			8.54	1.46										
Sims Bayou at Telephone Rd.	63	8	7	6/5/86	AVE	2.0	206		0.98	0.84			1.83	0.71										
Sims Bayou at Telephone Rd.	63	9	7	6/9/86	AVE	5.6	223		1.77	0.91			2.68	0.81										
Sims Bayou at Telephone Rd.	63	10	15	9/29/76	FWA	11.0	410		2.76	0.41			3.17	1.31		5								
Sims Bayou at Telephone Rd.	63	11	15	3/11/77	FWA	11.9	135		3.29	2.39			5.68	2.27										
Sims Bayou at Telephone Rd.	63	12	15	9/21/83	FWA	4.6	458		4.52	0.21			4.73	0.78			23.0	1.00	10.00	3.00	2.00	0.10	1.00	5.0
Sims Bayou at Telephone Rd.	63	13	15	5/22/85	FWA	9.7	129		3.84	2.26			6.10	1.82			79.0	1.00	15.00	7.50	11.50	0.10	1.50	24.5
Sims Bayou at Telephone Rd.	63	14	15	8/14/86	FWA	7.8	215		1.27	2.17			3.44	1.56			42.3	1.00	10.00	3.16	5.00	0.10	1.00	12.2
Brays Bayou at Main St.	94.9	1	7	10/28/85	AVE	6.0	82	0.69	2.60	1.43	0.78		4.03	1.22										
Brays Bayou at Main St.	94.9	2	7	4/10/86	AVE	7.0	89	1.44	2.87	1.86	0.12		4.73	1.53										
Brays Bayou at Main St.	94.9	3	7	2/5/86	AVE	7.8	171		1.50	1.24			2.74	1.28										
Brays Bayou at Main St.	94.9	4	7	4/10/86	AVE	8.2	180		3.80	2.23			6.03	2.26										
Brays Bayou at Main St.	94.9	5	7	5/2/86	AVE	10.0	305		3.67	1.34			5.00	1.12										
Brays Bayou at Main St.	94.9	6	7	5/26/86	AVE	6.3	231		1.84	2.12			3.97	1.41										
Brays Bayou at Main St.	94.9	7	7	6/9/86	AVE	1.2	193		1.18	1.94			3.12	0.90										
Brays Bayou at Main St.	94.9	8	2	7/8/77	FWA		121		0.62					0.28										
Brays Bayou at Main St.	94.9	9	2	7/28/77	FWA		64		0.44					0.16										
Brays Bayou at Main St.	94.9	10	2	8/77/77	FWA		15		0.07					0.11										
Brays Bayou at Main St.	94.9	11	2	9/6/77	FWA		214		0.66					0.53										
Brays Bayou at Main St.	94.9	12	2	11/1/77	FWA		153		1.08					0.63										
Brays Bayou at Main St.	94.9	13	2	11/8/77	FWA		222		1.10					0.47										
Brays Bayou at Main St.	94.9	14	2	11/21/77	FWA		266		1.38					1.02										
Brays Bayou at Main St.	94.9	15	2	12/13/77	FWA		493		1.92					0.68										
Brays Bayou at Main St.	94.9	16	2	1/11/78	FWA		814																	
Brays Bayou at Main St.	94.9	17	2	2/12/78	FWA		652		2.22					1.32										
Brays Bayou at Main St.	94.9	33	15	3/11/77	FWA	25.8	351		3.97	1.72			5.76	2.27										
Brays Bayou at Main St.	94.9	34	15	9/9/77	FWA	6.3	475		1.48	0.74			2.23	0.54			100.0	0.00	0.00	3.00	0.00	0.50	0.00	60.0
Brays Bayou at Main St.	94.9	35	15	1/8/79	FWA	8.9	820		2.06	0.58			2.68	0.61			50.0	2.00	0.00	3.00	0.00	0.10	0.00	5.0
Brays Bayou at Main St.	94.9	37	15	12/13/79	FWA	38.8	381		3.75	0.64			4.44	0.96			100.0	1.00	10.00	0.00	6.00	0.00	0.00	30.0
Brays Bayou at Main St.	94.9	38	15	9/2/81	FWA	3.2	369		1.45	0.23			1.68	0.44			50.7	1.00	0.00	3.90	2.90	0.11	0.10	13.9

Table III.1 - Event Mean Concentrations (EMCs)

B3. Medium Size Watershed (10-100 sq mi), >50% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3+NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Brays Bayou at Main St.	94.9	39	15	2/10/83	FWA	9.0	496		2.80	0.58			3.62	0.73			35.3	1.00	10.00	4.56	1.46	0.10	1.00	22.1
Brays Bayou at Main St.	94.9	40	15	9/21/83	FWA	3.4	234		1.44	0.12				0.39			18.0	1.00	10.00	1.00	1.00	0.10	1.00	4.0
Hunting Bayou at IH-10	23.1	1	7	8/20/85	AVE	10.0	504	0.36	3.38	1.65	0.38		5.03	1.24										
Hunting Bayou at IH-10	23.1	2	7	10/14/85	AVE	7.0	423	0.71	2.20	1.25	0.11		3.45	1.14										
Hunting Bayou at IH-10	23.1	3	7	10/28/85	AVE	4.0	502	0.67	1.80	0.90	0.35		2.70	0.88										
Little White Oak at Trimble	18	1	7	9/29/85	AVE	<3	164	0.27	3.80	4.31	0.03		8.11	0.56										
Little White Oak at Trimble	18	2	7	10/14/85	AVE	10.0	396	0.35	2. 0	0.57	0.17		2.57	0.76										
Little White Oak at Trimble	18	3	7	10/28/85	AVE	5.0	94	0.63	1.40	0.40	0.05		1.80	0.54										
Little White Oak at Trimble	18	54	15	8/31/78	FWA	58.1	161		8.81	0.69			9.69	2.45			100.0	0.00	0.00	2.00	8.00	0.10	0.00	20.0
Little White Oak at Trimble	18	55	15	8/16/79	FWA	37.1	52		2.22	0.75			2.94	0.47										
Little White Oak at Trimble	18	56	15	12/13/79	FWA																			
Little White Oak at Trimble	18	57	15	1/18/80	FWA																			
Little White Oak at Trimble	18	62	15	9/1/81	FWA	3.5	136		1.62	0.24			1.82	0.43										
Little White Oak at Trimble	18	63	15	5/7/82	FWA	16.6	190		2.86	0.35			3.22	0.65			55.2	3.00	10.00	4.00	9.04	0.10	1.00	18.5
Little White Oak at Trimble	18	64	15	6/23/82	FWA	26.4	365		2.62	0.51			3.12	0.53			150.9	1.00	10.00	4.48	3.95	0.10	1.00	15.1
Little White Oak at Trimble	18	65	15	6/15/83	FWA		273		3.66	0.71			4.36	0.69										
Little White Oak at Trimble	18	1	7	9/29/85	AVE	4.5	281		9.40	2.92			12.32	0.62										
Little White Oak at Trimble	18	2	7	3/12/86	AVE	15.5	136		2.29	0.46			2.74	0.71										
Little White Oak at Trimble	18	3	7	5/1/86	AVE	12.5	275		1.95	0.82			2.77	0.56										
Little White Oak at Trimble	18	4	7	5/25/86	AVE	10.3	156		2.73	0.55			3.27	0.41										
Little White Oak at Trimble	18	5	7	5/30/86	AVE	8.8	287		3.24	0.56			3.80	1.09										
Little White Oak at Trimble	18	6	7	6/9/86	AVE	1.9	453		1.37	0.69			2.07	0.56										
Little White Oak at Trimble	18	7	7	9/29/85	AVE	1.5	164		3.80	4.31			8.11	0.56										
Little White Oak at Trimble	18	8	7	10/14/85	AVE	10.0	396		2. 0	0.57			2.57	0.76										
Little White Oak at Trimble	18	9	7	10/28/85	AVE	5.0	94		1.40	0.40			1.80	0.54										
Berry Bayou at Forest Oaks St.	10.7	15	15	8/16/76	FWA	5.7	41		2.57	4.42			6.99	5.11		3								
Berry Bayou at Forest Oaks St.	10.7	16	15	4/21/77	FWA	13.0	712		2.41	0.38			2.83	0.59										
Berry Bayou at Forest Oaks St.	10.7	17	15	1/17/78	FWA	8.6	456		2.19	0.43			2.65	0.65			100.0	0.00	0.00	2.00	3.00	0.10	0.00	0.0
Berry Bayou at Forest Oaks St.	10.7	18	15	6/5/81	FWA	4.2	110		1.17	0.19			1.37	0.32			200.0	1.00	10.00	10.00	10.00	0.10	0.00	10.0
Brickhouse Gulley at Costa Rica St.	11.4	50	15	1/17/78	FWA	5.6	683		1.29	0.24			1.56	0.37										
Brickhouse Gulley at Costa Rica St.	11.4	51	15	5/31/78	FWA	27.5	973		2.32	0.85			3.21	0.63	5.32		300.0	1.96	0.36	4.00	3.96	0.10	0.00	20.0
Brickhouse Gulley at Costa Rica St.	11.4	52	15	10/31/79	FWA	21.1	301		1.80	0.40			2.20	0.53	3.01		60.0	1.00	0.00	0.00	6.00	0.00	0.00	10.0
Brickhouse Gulley at Costa Rica St.	11.4	53	15	8/9/82	FWA		182		2.88	0.83			3.70	0.51	7.93		140.7	1.00	10.00	2.00	1.00	0.10	1.00	13.3
Halls Bayou at Jensen Dr.	27.6	87	15	4/19/79	FWA	12.8	639		2.48	0.50			2.95	0.82	6.9		100.0	0.00	0.00	0.00	0.00	0.10	0.00	20.0
Halls Bayou at Jensen Dr.	27.6	88	15	7/8/79	FWA	18.9	180		4.49	0.27			4.75	2.43	8.83		105.6	1.11	0.00	2.00	2.00	0.10	0.00	3.9
Halls Bayou at Jensen Dr.	27.6	89	15	1/23/80	FWA	7.0	256		1.81	0.19			1.99	0.39	9.37		70.0	1.00	0.00	0.00	0.00	0.00	0.00	9.0

Table III.1 - Event Mean Concentrations (EMCs)

B3. Medium Size Watershed (10-100 sq mi), >50% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Halls Bayou at Jensen Dr.	27.6	91	15	9/2/81	FWA	5.7	216		1.76	0.27			2.03	0.63			49.0	1.00	0.00	2.00	2.00	0.10	0.00	3.0
Halls Bayou at Jensen Dr.	27.6	92	15	5/14/82	FWA	11.3	169		2.70	0.36			3.07	1.03			85.0	3.00	10.00	2.00	1.00	0.10	1.00	12.0
Halls Bayou at Jensen Dr.	27.6	94	15	6/23/82	FWA	20.7	25		10.35	0.49			11.19	3.19			220.2	1.00	10.00	3.46	2.36	0.10	1.00	10.0
Halls Bayou at Jensen Dr.	27.6	95	15	5/11/83	FWA	13.7	385		4.37	0.51			4.88	1.05			97.8	1.00	10.00	1.66	1.66	0.10	1.00	14.8
Hunting Bayou at IH-610	15.8	43	15	4/21/77	FWA	12.1	271		4.98	1.15			6.15	1.04										
Hunting Bayou at IH-610	15.8	44	15	1/27/79	FWA	31.4	144		3.11	0.99			4.10	1.22			100.0	0.00	0.00	5.00	2.00	0.10	0.00	40.0
Hunting Bayou at IH-610	15.8	45	15	8/23/79	FWA	11.8	406		2.28	0.36			2.63	0.99										
Hunting Bayou at IH-610	15.8	46	15	4/27/80	FWA	15.7	265		3.64	1.09			4.73	1.08										
Hunting Bayou at IH-610	15.8	47	15	7/9/81	FWA	6.5	77		2.02	0.69			2.70	0.81			83.8	1.00	10.51	10.00	10.00	0.19	0.54	37.7
Hunting Bayou at IH-610	15.8	48	15	5/13/82	FWA	13.2	323		1.81	0.53			2.37	0.78			37.0	3.00	10.00	3.00	4.00	0.10	1.00	12.0
Hunting Bayou at IH-10	22.7	1	7	2/5/86	AVE	9.2	826		2.27	0.59			2.86	1.33										
Hunting Bayou at IH-10	22.7	2	7	5/2/86	AVE	13.5	977		2.97	1.93			4.90	0.72										
Hunting Bayou at IH-10	22.7	3	7	5/30/86	AVE	7.0	1557		5.83	1.37			7.19	1.26										
Hunting Bayou at IH-10	22.7	4	7	8/20/85	AVE	10.0	504		3.38	1.65			5.03	1.24										
Hunting Bayou at IH-10	22.7	5	7	10/14/85	AVE	7.0	423		2.20	1.25			3.45	1.14										
Hunting Bayou at IH-10	22.7	6	7	10/28/85	AVE	4.0	502		1.80	0.90			2.70	0.88										
Median						8.6	260	0.65	2.22	0.74	0.15		3.27	0.81		3.93	85.0	1.00	10.00	3.00	2.36	0.10	0.10	13.3
Average						11.0	322	0.62	2.63	1.16	0.26		4.02	1.01		3.93	94.6	1.11	5.77	3.21	3.70	0.11	0.49	16.5
Standard deviation						9.5	253	0.34	1.90	1.08	0.25		2.18	0.73		1.03	63.6	0.85	5.32	2.61	3.40	0.09	0.52	13.2
Coefficient of variation						0.9	1						0.54	0.72		0.26	0.7	0.76	0.92	0.81	0.92	0.81	1.08	0.8
Number of data points						73	86	10	85	76	10		75	85		2	27	27	27	27	27	27	27	27

References:

2. Bedient, et al. Stormwater Pollutant Load-Runoff Realtionships, JWPCF, 52:9 (September 1980).
7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.
15. USGS Database.

Note:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow weighted average.

AVE = Average of all discrete samples.

Table III.1 - Event Mean Concentrations (EMCs)

C1. Large Size Watershed (>100 sq mi), <10% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Cypress Creek at IH-45	323	1	13	10/10/84	GM											4.54								
Cypress Creek at IH-45	323	2	13	3/16/85	GM											3.49								
Cypress Creek at IH-45	323	3	13	6/19/85	GM											4.02								
Spring Creek at IH-45	446	1	13	10/10/84	GM											3.54								
Spring Creek at IH-45	446	2	13	3/16/85	GM											2.74								
Spring Creek at IH-45	446	3	13	6/19/85	GM											3.54								
West Fork San Jacinto at IH-45	956	1	13	10/10/84	GM											4.62								
West Fork San Jacinto at IH-45	956	2	13	3/16/85	GM											2.64								
West Fork San Jacinto at IH-45	956	3	13	6/19/85	GM											3.37								
Median																3.54								
Average																3.61								
Standard deviation																0.69								
Coefficient of variation																0.19								
Number of data points																9								

Reference:

13. Symons, Linkages Between Wastewater Treatment Plant Discharges, Lake Houston Water Quality, and Potable Water Supply During Storm Events, 1986.

Note:

GM = Geometric mean.

Table III.1 - Event Mean Concentrations (EMCs)

C2. Large Size Watershed (10-100 sq mi), 10-50% developed

Non-Point Source Characterization Project

Galveston Bay National Estuary Program, Houston, Texas

Subcategory	Area sq mi	Storm No.	Ref	Date	Type of Sample	BOD5 mg/L	TSS mg/L	NH3 mg/L	TKN mg/L	NO3 + NO2 mg/L	NO2 mg/L	NO3 mg/L	TN mg/L	TP mg/L	O&G mg/L	FC log no/ 100 ml	Ba µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Pb µg/L	Hg µg/L	Ag µg/L	Zn µg/L
Buffalo Bayou at 69th St	NA	1	15	12/3/71	FWA	38.6	370							3.52		4.81		0.00	0.00	6.05	1.99	0.22		101.0
Buffalo Bayou at Shepherd	358	1	7	9/29/85	AVE	1.5	112		6.20	3.96			10.16	1.02										
Buffalo Bayou at Shepherd	358	2	7	10/28/85	AVE	4.0	148	0.28	1.50	0.97	0.41		2.47	0.86										
Buffalo Bayou at Shepherd	358	3	7	12/11/85	AVE	5.0	168	0.33	1.27	0.08	ND		1.35	1.89										
Buffalo Bayou at Shepherd	358	4	7	10/28/85	AVE	2.8	128		1.60	0.85			2.45	0.99										
Buffalo Bayou at Shepherd	358	5	7	12/11/85	AVE	3.5	150		1.82	0.07			1.89	0.75										
Buffalo Bayou at Shepherd	358	6	7	2/5/86	AVE	9.8	261		2.78	1.17			3.96	1.61										
Buffalo Bayou at Shepherd	358	7	7	5/25/86	AVE	2.8	58		4.78	5.59			10.36	2.11										
Buffalo Bayou at Shepherd	358	8	7	6/9/86	AVE	6.0	297		1.73	1.35			3.08	0.86										
Buffalo Bayou at Shepherd	358	32	15	9/9/77	FWA	7.4	347		1.55	0.90			2.46	0.55			100.0	0.00	0.00	2.00	0.00	0.50	0.00	20.0
Greens Bayou at Ley Rd.	182	1	15	9/22/76	FWA	6.3	788		1.24	0.18			1.41	0.51		4.92								
Greens Bayou at Ley Rd.	182	2	15	12/14/77	FWA	23.7	1574		2.65	0.53			3.19	0.78										
Greens Bayou at Ley Rd.	182	3	15	6/9/78	FWA	11.3	936		2.05	0.17			2.26	0.35										
Greens Bayou at Ley Rd.	182	4	15	1/22/80	FWA	7.8	546		1.60	0.18			1.80	0.28			80.0	1.00	0.00	2.00	0.00	0.10	0.00	3.0
Greens Bayou at Ley Rd.	182	5	15	2/5/86	FWA	7.5	733		1.99	0.46			2.45	1.01										
Greens Bayou at Ley Rd.	182	6	15	5/2/86	FWA	14.7	764		5.15	2.16			7.31	1.39										
Greens Bayou at Ley Rd.	182	7	15	5/31/86	FWA	5.8	864		3.15	1.12			4.26	2.54										
Greens Bayou at Ley Rd.	182	8	15	6/5/86	FWA	1.5	736		2.64	1.73			4.38	1.29										
Greens Bayou at Ley Rd.	182	9	15	6/10/86	FWA	3.0	391		1.74	0.49			2.23	1.84										
Greens Bayou at Ley Rd.	182	10	7	8/20/85	AVE	12.0	592	0.27	3.81	1.42	0.45		5.23	1.50										
Greens Bayou at Ley Rd.	182	11	7	10/28/85	AVE	4.0	692	0.31	2.30	1.04	0.58		3.34	1.54										
Median						6.0	391	0.30	2.02	0.94	0.45		2.78	1.02		4.87	90.0	0.00	0.00	2.00	0.00	0.22		20.0
Average						8.5	507	0.30	2.58	1.22	0.48		3.80	1.29		4.87	90.0	0.33		3.35	0.66	0.27		41.3
Standard deviation						8.6	373	0.03	1.39	1.37	0.09		2.63	0.78			14.1			2.34		0.21		52.4
Coefficient of variation						1.0	1	0.09	0.54	1.12	0.19		0.69	0.61			0.2			0.70		0.75		1.3
Number of data points						21	21	4	20	20	3		20	21		2	2	3	3	3	3	3	2	3

References:

7. Winslow, et al. Relative Significance of Waste Loads Entering the Houston Ship Channel, Sept. 1986.
15. USGS Database.

Note:

Underlined values represent values calculated for GBNEP Project.

FWA = Flow weighted average.

AVE = Average of all discrete samples.

Table III.2 - Land Use by Subwatershed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
Austin/Bastrop Bayous	AB01	sq mi	2.46	4.35	55.23	21.14	1.15	13.36	1.54	0.25	99.49
		%	2.48	4.37	55.51	21.25	1.16	13.43	1.55	0.26	100.00
	AB02	sq mi	1.87	1.16	4.70	11.04	0.16	2.72	0.07	0.14	21.86
		%	8.54	5.32	21.50	50.51	0.75	12.42	0.34	0.63	100.00
	AB03	sq mi	2.08	7.51	28.35	25.75	1.27	26.07	0.60	0.21	91.83
		%	2.26	8.17	30.87	28.04	1.38	28.39	0.65	0.23	100.00
Addicks Reservoir	AD01	sq mi	10.66	3.11	61.70	25.23	0.02	5.05	0.46	2.40	108.62
		%	9.81	2.86	56.80	23.23	0.02	4.65	0.42	2.21	100.00
	AD02	sq mi	2.30	6.34	4.68	7.20	0.65	4.57	0.01	0.43	26.18
		%	8.77	24.23	17.90	27.49	2.50	17.44	0.02	1.65	100.00
Armand/Taylor Bayous	AT01	sq mi	4.29	1.38	2.18	8.15	0.03	1.43	0.00	0.04	17.50
		%	24.52	7.90	12.45	46.57	0.16	8.16	0.02	0.22	100.00
	AT02	sq mi	4.49	1.61	3.61	6.54	0.12	1.42	0.00	0.26	18.05
		%	24.88	8.91	19.99	36.23	0.66	7.89	0.01	1.44	100.00
	AT03	sq mi	3.13	3.77	2.87	8.89	1.94	4.38	0.59	0.08	25.65
		%	12.20	14.71	11.17	34.67	7.58	17.07	2.29	0.32	100.00
	AT04	sq mi	2.88	3.51	1.44	4.02	0.88	2.20	0.58	0.03	15.54
		%	18.51	22.58	9.29	25.86	5.68	14.15	3.71	0.22	100.00
Buffalo Bayou	BF01	sq mi	11.17	6.44	11.96	8.29	0.06	1.93	0.02	0.27	40.13
		%	27.82	16.06	29.80	20.65	0.15	4.81	0.05	0.67	100.00
	BF02	sq mi	9.48	14.48	0.96	3.35	0.51	0.59	0.00	0.06	29.43
		%	32.22	49.19	3.25	11.37	1.74	2.02	0.01	0.21	100.00
	BF03	sq mi	5.65	7.27	0.59	1.85	0.68	0.47	0.00	0.05	16.57
		%	34.08	43.89	3.56	11.17	4.09	2.87	0.02	0.33	100.00
	BF04	sq mi	5.11	1.84	0.15	0.62	0.00	0.30	0.01	0.01	8.05
		%	63.52	22.82	1.84	7.75	0.01	3.75	0.16	0.16	100.00
	BF05	sq mi	7.10	2.33	0.29	0.66	0.00	0.32	0.00	0.03	10.72
		%	66.20	21.71	2.73	6.14	0.00	2.94	0.04	0.24	100.00
Barker Reservoir	BK01	sq mi	6.59	2.89	55.11	19.70	0.21	6.52	0.07	7.98	99.07
		%	6.65	2.92	55.63	19.89	0.21	6.58	0.07	8.06	100.00
	BK02	sq mi	0.98	1.23	12.07	4.34	0.22	6.62	0.03	0.52	26.02
		%	3.75	4.75	46.39	16.70	0.83	25.45	0.12	2.01	100.00

Table III.2 - Land Use by Subwatershed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
Brays Bayou	BR01	sq mi	11.88	2.12	7.59	6.48	0.03	1.77	0.00	0.34	30.20
		%	39.33	7.01	25.14	21.44	0.09	5.86	0.00	1.12	100.00
	BR02	sq mi	4.87	0.81	3.37	2.56	0.00	0.76	0.00	0.10	12.46
		%	39.04	6.53	27.00	20.51	0.03	6.11	0.00	0.78	100.00
	BR03	sq mi	10.81	4.49	1.46	4.93	0.01	0.26	0.00	0.24	22.21
		%	48.68	20.20	6.59	22.21	0.04	1.19	0.00	1.08	100.00
	BR04	sq mi	9.42	9.96	2.51	6.93	0.04	0.86	0.00	0.17	29.89
		%	31.51	33.33	8.40	23.18	0.13	2.89	0.00	0.57	100.00
	BR05	sq mi	8.01	4.38	0.53	2.69	0.04	0.34	0.00	0.04	16.02
		%	50.00	27.32	3.28	16.79	0.23	2.13	0.02	0.23	100.00
	BR06	sq mi	3.91	3.31	0.32	1.44	0.03	0.19	0.00	0.01	9.20
		%	42.45	35.93	3.48	15.62	0.32	2.09	0.00	0.10	100.00
	BR07	sq mi	3.71	2.16	0.18	1.05	0.01	0.25	0.00	0.02	7.37
		%	50.31	29.37	2.41	14.19	0.13	3.36	0.02	0.22	100.00
Clear Creek	CC01	sq mi	1.39	1.04	15.19	10.25	0.69	6.85	0.04	0.30	35.75
		%	3.89	2.91	42.48	28.66	1.94	19.17	0.12	0.83	100.00
	CC02	sq mi	5.75	5.39	21.90	30.29	0.70	12.70	0.06	0.21	76.99
		%	7.46	7.00	28.45	39.34	0.90	16.50	0.07	0.27	100.00
	CC03	sq mi	4.70	2.02	1.91	7.78	0.12	1.57	0.06	0.03	18.19
		%	25.86	11.11	10.49	42.77	0.65	8.65	0.32	0.16	100.00
	CC04	sq mi	5.85	5.17	3.78	12.51	1.05	4.84	0.27	0.04	33.52
		%	17.47	15.44	11.29	37.32	3.14	14.43	0.80	0.11	100.00
	CC05	sq mi	2.74	1.59	1.54	6.58	0.32	2.26	2.32	0.02	17.38
		%	15.78	9.15	8.84	37.87	1.84	13.02	13.36	0.14	100.00
Cedar Bayou	CE01	sq mi	0.64	1.96	41.26	9.84	3.94	8.17	0.19	0.13	66.12
		%	0.96	2.96	62.41	14.88	5.96	12.35	0.29	0.20	100.00
	CE02	sq mi	3.36	6.21	32.48	26.44	14.23	15.24	0.53	0.34	98.82
		%	3.40	6.28	32.87	26.75	14.40	15.43	0.53	0.34	100.00
	CE03	sq mi	3.15	6.09	4.44	10.83	4.00	4.66	0.14	0.03	33.33
		%	9.44	18.26	13.33	32.48	11.99	13.99	0.43	0.08	100.00
	CE04	sq mi	0.83	3.70	1.91	2.41	1.45	2.64	0.16	0.00	13.11
		%	6.33	28.25	14.56	18.42	11.07	20.14	1.20	0.02	100.00

Table III.2 - Land Use by Subwatershed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
Chocolate Bayou	CH01	sq mi	0.94	1.49	62.83	9.00	1.38	11.49	0.05	0.45	87.63
		%	1.07	1.70	71.70	10.27	1.57	13.11	0.06	0.52	100.00
	CH02	sq mi	0.44	0.50	8.09	6.71	0.33	3.32	0.00	0.05	19.44
		%	2.29	2.57	41.63	34.49	1.71	17.05	0.00	0.27	100.00
	CH03	sq mi	2.30	3.87	24.21	16.75	3.34	11.47	0.71	0.16	62.81
		%	3.66	6.16	38.55	26.67	5.32	18.25	1.13	0.25	100.00
Dickinson Bayou	DB01	sq mi	2.41	4.60	14.16	26.97	0.57	10.19	0.02	0.06	59.00
		%	4.09	7.80	24.01	45.72	0.97	17.28	0.04	0.10	100.00
	DB02	sq mi	2.36	3.99	3.87	13.97	0.79	5.28	0.16	0.01	30.44
		%	7.75	13.11	12.73	45.89	2.60	17.36	0.51	0.04	100.00
	DB03	sq mi	0.62	0.44	2.04	4.35	0.06	3.47	0.54	0.01	11.54
		%	5.42	3.82	17.65	37.73	0.49	30.10	4.71	0.09	100.00
East Bay	EB01	sq mi	0.82	3.86	20.51	13.69	2.35	17.78	0.50	0.01	59.53
		%	1.38	6.48	34.45	23.00	3.95	39.87	0.84	0.02	100.00
	EB02	sq mi	1.77	9.85	42.41	24.83	4.11	41.16	0.60	0.00	124.74
		%	1.42	7.90	34.00	19.91	3.30	33.00	0.48	0.00	100.00
	EB03	sq mi	1.35	8.78	6.98	22.79	1.74	16.26	2.29	0.00	60.20
		%	2.24	14.59	11.59	37.86	2.89	27.01	3.81	0.01	100.00
	EB04	sq mi	5.92	5.86	3.51	11.07	0.25	14.20	2.22	0.03	43.07
		%	13.75	13.61	8.15	25.71	0.57	32.97	5.16	0.08	100.00
Greens Bayou	GR01	sq mi	8.92	7.18	3.85	13.15	1.98	2.82	0.00	0.22	38.12
		%	23.40	18.82	10.10	34.50	5.19	7.40	0.00	0.58	100.00
	GR02	sq mi	7.41	6.58	3.95	9.64	2.53	2.50	0.00	0.33	32.94
		%	22.49	19.97	12.00	29.28	7.68	7.58	0.01	0.99	100.00
	GR03	sq mi	5.55	7.00	1.63	10.27	0.73	1.52	0.00	0.11	26.81
		%	20.72	26.10	6.07	38.30	2.71	5.68	0.00	0.41	100.00
	GR04	sq mi	3.50	5.61	3.81	5.36	8.69	2.17	0.00	0.27	29.40
		%	11.89	19.09	12.95	18.23	29.55	7.37	0.00	0.93	100.00
	GR05	sq mi	1.95	6.05	1.99	4.54	7.66	1.94	0.03	0.05	24.21
		%	8.07	25.00	8.24	18.75	31.64	7.99	0.12	0.19	100.00
	GR06	sq mi	3.80	11.46	1.12	5.52	7.53	1.89	0.00	0.06	31.39
		%	12.12	36.49	3.58	17.58	23.99	6.02	0.01	0.21	100.00
	GR07	sq mi	6.02	8.18	1.84	5.45	2.34	1.58	0.03	0.15	25.58
		%	23.53	31.95	7.19	21.30	9.14	6.18	0.12	0.58	100.00

Table III.2 - Land Use by Subwatershed

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
North Bay	NB01	sq mi	6.28	4.78	1.34	9.27	0.58	2.30	0.22	0.05	24.82
		%	25.30	19.26	5.39	37.36	2.34	9.25	0.88	0.22	100.00
South Bay	SB01	sq mi	3.76	1.25	0.72	3.90	0.00	3.43	0.30	0.02	13.38
		%	28.09	9.31	5.40	29.15	0.02	25.60	2.27	0.15	100.00
	SB02	sq mi	7.95	0.78	1.41	0.94	0.00	1.32	0.08	0.02	12.51
		%	63.57	6.27	11.27	7.52	0.00	10.57	0.62	0.17	100.00
	SB03	sq mi	11.05	1.99	1.93	7.67	0.01	3.53	3.04	0.14	29.35
		%	37.64	6.79	6.56	26.13	0.03	12.01	10.37	0.47	100.00
	SB04	sq mi	1.96	1.97	3.11	9.18	0.10	3.50	2.46	0.02	22.30
		%	8.79	8.84	13.96	41.15	0.44	15.68	11.04	0.10	100.00
Ship Channel	SC01	sq mi	8.50	5.07	0.96	3.25	0.05	0.58	0.00	0.02	18.43
		%	46.14	27.48	5.23	17.63	0.27	3.14	0.00	0.11	100.00
	SC02	sq mi	8.21	4.97	1.07	4.53	0.24	1.38	0.36	0.05	20.82
		%	39.46	23.88	5.12	21.77	1.16	6.64	1.71	0.25	100.00
	SC03	sq mi	3.17	2.23	0.51	2.32	0.00	0.21	0.00	0.01	8.45
		%	37.51	26.38	6.07	27.46	0.02	2.47	0.00	0.07	100.00
	SC04	sq mi	8.46	2.92	1.38	2.74	0.02	1.13	0.55	0.12	17.32
		%	48.84	16.85	7.97	15.84	0.11	6.54	3.17	0.67	100.00
	SC05	sq mi	5.21	5.83	3.54	6.73	2.04	1.74	0.03	0.20	25.33
		%	20.55	23.02	13.97	26.58	8.06	6.88	0.13	0.80	100.00
	SC06	sq mi	8.83	2.87	2.66	5.66	0.19	1.61	1.22	0.14	23.18
		%	38.10	12.36	11.49	24.43	0.82	6.93	5.24	0.61	100.00
	SC07	sq mi	4.25	1.45	1.41	3.77	0.11	2.19	0.91	0.10	14.20
		%	29.95	10.24	9.91	26.55	0.78	15.46	6.43	0.68	100.00
	SC08	sq mi	3.11	3.18	2.36	7.85	0.71	2.63	0.30	0.03	20.16
		%	15.42	15.75	11.69	38.91	3.52	13.03	1.51	0.17	100.00
	SC09	sq mi	6.56	2.90	1.16	5.44	0.30	1.20	0.82	0.11	18.48
		%	35.52	15.68	6.28	29.45	1.60	6.47	4.42	0.57	100.00
San Jacinto River	SJ02	sq mi	5.38	11.12	7.92	16.66	14.84	7.72	4.25	0.40	68.29
		%	7.88	16.29	11.59	24.39	21.73	11.30	6.22	0.59	100.00

Table III.2 - Land Use by Subwatershed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
Sims Bayou	SM01	sq mi	4.15	1.69	3.81	9.63	0.14	1.66	0.03	0.12	21.23
		%	19.53	7.95	17.93	45.36	0.68	7.83	0.15	0.57	100.00
	SM02	sq mi	2.36	1.65	2.52	7.59	0.29	3.16	0.01	0.11	17.69
		%	13.34	9.32	14.25	42.89	1.65	17.88	0.06	0.60	100.00
	SM03	sq mi	5.03	5.27	2.86	9.76	0.25	2.37	0.00	0.06	25.60
		%	19.65	20.58	11.18	38.12	0.98	9.27	0.00	0.22	100.00
	SM04	sq mi	7.29	4.73	1.54	3.82	0.05	0.59	0.00	0.15	18.17
		%	40.10	26.05	8.46	21.03	0.28	3.23	0.02	0.82	100.00
	SM05	sq mi	3.88	2.02	0.55	3.66	0.01	0.16	0.00	0.02	10.30
		%	37.66	19.63	5.34	35.54	0.06	1.58	0.00	0.19	100.00
Trinity Bay	TB01	sq mi	0.81	3.22	34.75	20.28	42.76	22.17	0.37	0.17	124.53
		%	0.65	2.59	27.91	16.29	34.33	17.80	0.29	0.14	100.00
	TB02	sq mi	1.57	2.60	18.70	15.92	7.87	12.30	0.85	0.02	59.82
		%	2.62	4.34	31.26	26.61	13.16	20.57	1.42	0.03	100.00
	TB03	sq mi	1.75	4.40	16.65	20.25	8.09	21.54	7.65	0.01	80.34
		%	2.18	5.48	20.72	25.20	10.06	26.81	9.52	0.02	100.00
	TB04	sq mi	1.88	8.51	8.81	12.70	3.26	11.26	5.53	0.03	51.99
		%	3.62	16.37	16.94	24.42	6.28	21.66	10.64	0.06	100.00
Trinity River	TR02	sq mi	0.62	1.62	21.17	11.89	90.20	15.50	0.01	0.14	14.16
		%	0.44	1.15	15.00	8.42	63.90	10.98	0.01	0.10	100.00
	TR03	sq mi	0.85	1.85	11.25	6.94	33.36	9.45	0.17	0.12	64.00
		%	1.33	2.89	17.58	10.85	52.13	14.76	0.27	0.19	100.00
	TR04	sq mi	0.48	1.64	11.78	7.66	33.46	9.45	0.17	0.26	64.90
		%	0.74	2.52	18.15	11.81	51.56	14.56	0.27	0.40	100.00
	TR05	sq mi	0.20	1.34	5.24	1.92	29.24	2.78	0.03	0.22	40.96
		%	0.49	3.26	12.79	4.69	71.38	6.79	0.07	0.54	100.00
	TR06	sq mi	0.32	0.69	12.43	4.94	91.27	10.73	0.01	0.11	120.51
		%	0.27	0.57	10.32	4.10	75.74	8.90	0.01	0.09	100.00
	TR07	sq mi	1.34	2.44	15.86	20.54	94.80	21.40	0.88	0.16	157.42
		%	0.85	1.55	10.07	13.05	60.22	13.59	0.56	0.00	100.00
	TR08	sq mi	1.67	1.61	10.97	10.68	72.62	17.10	0.42	0.36	115.43
		%	1.44	1.40	9.51	9.25	62.92	14.82	0.36	0.31	100.00

Table III.2 - Land Use by Subwatershed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
Trinity River	TR09	sq mi	0.67	1.19	5.49	11.45	50.09	12.11	0.15	0.13	81.28
		%	0.82	1.47	6.75	14.08	61.63	14.90	0.18	0.17	100.00
	TR10	sq mi	0.82	1.54	5.83	11.02	45.02	14.22	0.18	0.17	78.80
		%	1.04	1.95	7.40	13.98	57.13	18.05	0.23	0.22	100.00
	TR11	sq mi	0.79	1.05	2.30	5.76	11.65	4.52	0.07	0.08	26.21
		%	3.00	3.99	8.76	21.97	44.45	17.24	0.27	0.32	100.00
	TR12	sq mi	0.57	1.67	11.85	9.87	9.68	4.65	0.01	0.12	38.42
		%	1.49	4.34	30.85	25.68	25.20	12.11	0.02	0.31	100.00
	TR13	sq mi	1.44	6.90	22.49	22.76	47.79	20.13	0.42	0.16	122.09
		%	1.18	5.65	18.43	18.65	39.14	16.49	0.34	0.13	100.00
	TR14	sq mi	1.29	10.97	15.07	14.13	33.79	15.66	5.00	0.00	95.93
		%	1.34	11.44	15.72	14.73	35.22	16.33	5.21	0.01	100.00
West Bay	WB01	sq mi	0.76	0.99	7.26	13.23	0.42	4.86	0.03	0.15	27.70
		%	2.75	3.58	26.21	47.76	1.50	17.56	0.10	0.54	100.00
	WB02	sq mi	1.35	1.35	1.29	4.90	0.06	0.86	0.02	0.03	9.85
		%	13.75	13.67	13.10	49.72	0.61	8.72	0.17	0.25	100.00
	WB03	sq mi	8.33	7.27	35.26	24.28	0.42	42.16	4.94	0.24	122.79
		%	6.78	5.92	28.72	19.77	0.34	34.33	4.02	0.12	100.00
	WB04	sq mi	5.53	6.42	27.70	33.40	0.90	33.11	3.28	0.04	110.38
		%	5.01	5.82	25.09	30.26	0.82	29.99	2.97	0.04	100.00
	WB05	sq mi	4.86	4.24	4.21	20.60	0.37	7.12	1.85	0.06	43.31
		%	11.22	9.80	9.72	47.56	0.85	16.45	4.26	0.14	100.00
	WB06	sq mi	5.22	0.70	0.65	1.53	0.00	0.70	0.25	0.11	9.16
		%	57.01	7.60	7.10	16.73	0.00	7.64	2.73	1.18	100.00
	WB07	sq mi	3.47	1.30	2.50	7.12	0.00	5.17	0.77	0.02	20.35
		%	17.06	6.37	12.30	34.98	0.00	.25.40	3.80	0.08	100.00

Table III.2 - Land Use by Subwatershed
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Watershed	Subwatershed	Area or Percent	Land Use								
			High Density Urban	Residential	Agricultural	Open/Pasture	Forest	Wetlands	Water	Barren	Total
White Oak Bayou	WO01	sq mi	11.82	8.55	6.30	14.41	0.08	2.37	0.01	0.43	43.98
		%	26.88	19.45	14.34	32.77	0.19	5.39	0.02	0.97	100.00
	WO02	sq mi	5.17	2.56	1.05	2.49	0.00	0.03	0.00	0.05	11.35
		%	45.51	22.59	9.25	21.90	0.01	0.30	0.00	0.44	100.00
	WO03	sq mi	8.95	8.45	1.71	3.97	0.00	0.35	0.00	0.22	23.66
		%	37.83	35.72	7.24	16.77	0.02	1.47	0.00	0.93	100.00
	WO04	sq mi	7.79	9.05	0.54	3.36	0.03	0.45	0.00	0.03	21.25
		%	36.65	42.60	2.55	15.83	0.13	2.11	0.00	0.14	100.00
	WO05	sq mi	5.08	3.67	0.39	0.73	0.00	0.18	0.00	0.04	10.09
		%	550.34	36.36	3.89	7.25	0.01	1.79	0.00	0.36	100.00

Table III.3 - Subwatershed Load Data
Case 1 - Average Annual Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Addicks Reservoir	AD01	66	18	151	27	0.5	0.3	7	252.1	15.2
	AD02	16	3	44	8	0.2	0.1	3	60.4	5.0
	Total	82	22	195	36	0.7	0.4	9	312.5	20.2
Armand & Taylor Bayous	AT01	17	3	40	7	0.2	0.1	3	63.5	5.5
	AT02	17	4	43	7	0.2	0.1	3	66.6	5.9
	AT03	21	3	47	8	0.2	0.1	3	73.8	5.8
	AT04	15	2	36	7	0.2	0.1	3	51.6	4.9
	Total	70	12	167	29	0.7	0.5	11	255.5	22.0
Austin & Bastrop Bayous	AB01	59	11	114	22	0.4	0.1	4	210.6	9.3
	AB02	14	2	30	5	0.1	0.1	1	52.6	3.2
	AB03	48	8	101	18	0.4	0.1	4	178.8	8.7
	Total	121	21	245	44	0.9	0.2	9	442.1	21.2
Barker Reservoir	BK01	59	29	153	26	0.5	0.2	5	223.2	11.8
	BK02	13	3	28	5	0.1	0.0	1	48.0	2.3
	Total	71	32	181	31	0.6	0.2	6	271.3	14.1
Brays Bayou	BR01	28	6	72	13	0.3	0.3	6	108.2	11.1
	BR02	12	2	29	5	0.1	0.1	2	44.4	4.5
	BR03	29	6	80	15	0.3	0.4	7	111.1	12.7
	BR04	34	6	100	19	0.4	0.3	8	130.3	14.4
	BR05	22	4	62	12	0.3	0.3	5	83.2	9.9
	BR06	12	2	35	7	0.1	0.1	3	45.3	5.4
	BR07	10	2	29	5	0.1	0.1	3	38.4	4.6
	Total	147	29	406	75	1.6	1.7	34	560.9	62.7
Buffalo Bayou	BF01	34	7	88	16	0.3	0.3	7	128.0	12.5
	BF02	35	6	110	22	0.5	0.4	9	132.9	15.9
	BF03	20	3	60	12	0.3	0.2	5	74.9	8.9
	BF04	12	2	33	6	0.1	0.2	3	45.9	5.7
	BF05	17	3	46	9	0.2	0.2	4	63.4	7.9
	Total	116	22	337	65	1.4	1.3	27	445.0	50.9

Table III.3 - Subwatershed Load Data
Case 1 - Average Annual Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Cedar Bayou	CE01	46	9	89	18	0.3	0.0	2	174.2	6.5
	CE02	71	11	141	24	0.5	0.1	5	264.4	12.8
	CE03	26	4	65	11	0.3	0.1	4	99.7	7.6
	CE04	10	1	27	5	0.1	0.0	2	37.5	3.1
	Total	153	26	321	58	1.2	0.3	13	575.9	30.0
Chocolate Bayou	CH01	48	11	94	19	0.3	0.0	2	182.2	6.6
	CH02	10	2	21	3	0.1	0.0	1	40.0	1.6
	CH03	36	6	73	13	0.3	0.1	3	132.3	6.6
	Total	95	19	188	36	0.6	0.1	5	354.5	14.9
Clear Creek	CC01	23	5	47	8	0.2	0.0	2	87.5	3.9
	CC02	54	9	119	20	0.5	0.2	6	206.7	12.2
	CC03	18	3	44	7	0.2	0.2	3	67.5	6.2
	CC04	26	4	63	11	0.3	0.2	4	96.1	8.3
	CC05	18	2	28	5	0.1	0.1	2	45.0	3.6
	Total	138	22	301	51	1.2	0.7	16	502.7	34.3
Dickinson Bayou	DB01	34	5	73	12	0.3	0.1	3	128.2	6.8
	DB02	19	3	45	7	0.2	0.1	2	72.1	4.9
	DB03	7	1	12	2	0.0	0.0	1	22.3	1.2
	Total	60	8	130	21	0.5	0.2	6	222.6	12.9
East Bay	EB01	37	5	71	13	0.3	0.0	2	135.1	5.7
	EB02	75	11	152	28	0.6	0.1	5	281.6	12.5
	EB03	43	4	87	14	0.4	0.1	4	141.5	8.2
	EB04	38	5	78	14	0.3	0.2	5	121.0	9.9
	Total	193	26	388	68	1.6	0.5	17	679.3	36.2

Table III.3 - Subwatershed Load Data
Case 1 - Average Annual Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Greens Bayou	GR01	35	6	92	16	0.4	0.3	7	134.6	12.8
	GR02	29	5	76	14	0.3	0.2	5	109.1	10.4
	GR03	25	4	70	13	0.3	0.2	5	97.2	9.4
	GR04	21	4	51	9	0.2	0.1	3	78.7	6.5
	GR05	16	2	42	8	0.2	0.1	3	62.7	5.2
	GR06	29	4	85	17	0.4	0.2	6	112.5	10.8
	GR07	28	5	80	15	0.3	0.2	6	106.9	11.1
	Total	184	30	497	92	2.1	1.4	34	701.6	66.1
North Bay	NB01	25	4	65	11	0.3	0.2	5	93.6	9.1
	Total	25	4	65	11	0.3	0.2	5	93.6	9.1
San Jacinto River	SJ02	65	8	126	22	0.5	0.2	7	201.6	14.4
	Total	65	8	126	22	0.5	0.2	7	201.6	14.4
Ship Channel	SC01	24	4	67	13	0.3	0.3	6	90.7	10.6
	SC02	26	4	68	13	0.3	0.3	6	94.5	10.6
	SC03	10	2	28	5	0.1	0.1	2	38.6	4.3
	SC04	24	4	60	11	0.2	0.3	5	85.9	9.8
	SC05	26	5	70	13	0.3	0.2	5	99.3	9.3
	SC06	30	5	67	12	0.3	0.3	6	100.4	10.4
	SC07	16	3	35	6	0.1	0.1	3	52.6	5.1
	SC08	19	3	45	8	0.2	0.1	3	68.6	5.6
	SC09	24	4	57	10	0.2	0.2	5	82.7	8.7
	Total	198	34	498	90	2.0	1.9	39	713.3	74.3
Sims Bayou	SM01	19	3	45	7	0.2	0.1	3	72.1	5.8
	SM02	14	2	32	5	0.1	0.1	2	52.5	3.8
	SM03	24	4	62	11	0.3	0.2	4	90.3	8.3
	SM04	22	4	63	12	0.3	0.2	5	85.3	9.6
	SM05	12	2	33	6	0.1	0.1	3	46.4	5.0
	Total	91	16	235	41	1.0	0.8	17	346.5	32.5

Table III.3 - Subwatershed Load Data
Case 1 - Average Annual Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
South Bay	SB01	10	2	22	4	0.1	0.1	2	34.3	3.4
	SB02	14	3	35	6	0.1	0.2	3	51.9	6.2
	SB03	29	4	57	10	0.2	0.3	5	86.0	9.3
	SB04	16	2	24	4	0.1	0.1	1	38.7	2.7
	Total	68	10	138	24	0.6	0.6	11	211.0	21.6
Trinity Bay	TB01	74	10	121	19	0.5	0.0	3	277.9	9.9
	TB02	40	6	72	12	0.3	0.1	2	142.1	6.2
	TB03	65	6	86	14	0.4	0.1	3	166.8	7.5
	TB04	47	4	78	14	0.3	0.1	4	121.7	8.0
	Total	225	26	356	59	1.5	0.3	12	708.5	31.6
Trinity River	TR02	64	7	90	12	0.5	0.0	2	245.5	8.2
	TR03	25	3	43	7	0.2	0.0	1	96.1	4.0
	TR04	26	4	42	6	0.2	0.0	1	99.2	3.6
	TR05	9	1	15	2	0.1	0.0	0	34.6	1.4
	TR06	30	3	39	5	0.2	0.0	1	112.9	3.6
	TR07	51	5	73	10	0.4	0.0	2	184.9	6.7
	TR08	60	6	83	10	0.4	0.1	2	224.4	8.3
	TR09	50	4	68	8	0.4	0.0	2	190.3	6.6
	TR10	53	5	76	9	0.4	0.0	2	201.9	7.2
	TR11	19	2	33	4	0.2	0.0	1	73.5	3.3
	TR12	30	4	55	9	0.2	0.0	2	113.0	4.6
	TR13	84	10	145	22	0.7	0.1	5	316.2	13.2
	TR14	70	6	114	20	0.5	0.1	5	215.9	11.4
	Total	572	62	877	124	4.3	0.5	27	2,108.6	82.1

Table III.3 - Subwatershed Load Data
Case 1 - Average Annual Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
West Bay	WB01	15	2	31	5	0.1	0.0	1	57.3	2.5
	WB02	7	1	18	3	0.1	0.0	1	27.3	2.1
	WB03	75	11	135	24	0.5	0.3	7	240.3	14.0
	WB04	66	9	121	20	0.5	0.2	5	219.0	11.7
	WB05	26	3	52	8	0.2	0.1	3	84.0	6.3
	WB06	10	2	24	4	0.1	0.1	2	35.7	4.2
	WB07	13	2	26	4	0.1	0.1	2	42.1	3.5
	Total	212	30	405	68	1.6	0.9	21	705.6	44.3
White Oak Bayou	WO01	45	9	120	21	0.5	0.4	9	170.1	16.6
	WO02	14	3	40	7	0.2	0.2	3	55.4	6.3
	WO03	29	6	86	17	0.4	0.3	7	110.1	12.8
	WO04	26	4	79	16	0.3	0.3	6	98.9	11.8
	WO05	14	3	41	8	0.2	0.2	4	53.0	6.5
	Total	128	24	365	69	1.5	1.3	29	487.5	54.0
Entire Project Watershed		3,014	481	6,422	1,113	26.3	14.2	355	10,900	749

Table III.3 - Subwatershed Load Data
Case 2 - Ten Year Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Addicks Reservoir	AD01	97	26	219	40	0.7	0.4	9	369.0	21.3
	AD02	23	5	64	12	0.3	0.1	4	88.2	7.0
	Total	120	31	282	51	1.0	0.5	13	457.2	28.3
Armand & Taylor Bayous	AT01	29	5	69	11	0.3	0.2	5	112.0	9.2
	AT02	31	6	75	13	0.3	0.2	5	117.2	9.7
	AT03	38	5	85	14	0.4	0.2	5	135.9	9.9
	AT04	26	4	64	12	0.3	0.2	4	91.9	8.2
	Total	124	20	293	50	1.2	0.8	19	456.9	37.0
Austin & Bastrop Bayous	AB01	93	17	180	34	0.6	0.1	5	335.3	14.3
	AB02	22	4	47	7	0.2	0.1	2	81.7	4.7
	AB03	77	12	158	27	0.6	0.1	6	287.2	13.2
	Total	191	33	385	69	1.4	0.3	13	704.2	32.2
Barker Reservoir	BK01	86	42	223	38	0.7	0.2	7	328.8	16.6
	BK02	19	5	41	7	0.1	0.0	1	72.3	3.3
	Total	105	47	264	45	0.8	0.3	8	401.1	19.9
Brays Bayou	BR01	39	8	98	17	0.4	0.4	8	149.1	14.9
	BR02	16	3	40	7	0.2	0.2	3	61.2	6.1
	BR03	41	8	112	20	0.5	0.5	9	155.1	17.5
	BR04	58	10	171	33	0.7	0.5	13	223.2	24.0
	BR05	36	7	103	19	0.4	0.4	9	137.8	16.1
	BR06	20	3	59	11	0.2	0.2	5	76.0	8.9
	BR07	17	3	48	9	0.2	0.2	4	63.6	7.6
	Total	226	43	630	117	2.6	2.4	51	865.8	95.0
Buffalo Bayou	BF01	47	9	122	23	0.5	0.4	9	179.1	17.0
	BF02	49	8	157	32	0.7	0.5	12	188.6	22.4
	BF03	28	5	86	17	0.4	0.3	7	106.2	12.5
	BF04	17	3	46	9	0.2	0.2	4	63.1	7.8
	BF05	27	5	75	14	0.3	0.4	7	102.7	12.7
	Total	167	31	486	94	2.0	1.8	39	639.7	72.4

Table III.3 - Subwatershed Load Data
Case 2 - Ten Year Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Cedar Bayou	CE01	73	15	140	27	0.5	0.0	3	276.3	10.1
	CE02	111	18	219	37	0.9	0.2	8	416.4	19.4
	CE03	41	6	99	17	0.4	0.2	5	156.2	11.3
	CE04	16	2	41	8	0.2	0.1	2	59.1	4.7
	Total	241	40	500	90	1.9	0.5	19	908.1	45.5
Chocolate Bayou	CH01	77	18	150	31	0.5	0.0	3	292.2	10.3
	CH02	17	3	33	5	0.1	0.0	1	64.1	2.5
	CH03	57	9	114	20	0.4	0.1	4	210.2	10.0
	Total	151	30	297	56	1.0	0.2	8	566.4	22.9
Clear Creek	CC01	44	9	89	15	0.3	0.1	3	169.0	7.1
	CC02	102	16	220	36	0.8	0.3	9	390.2	21.4
	CC03	31	5	76	13	0.3	0.2	5	118.5	10.2
	CC04	39	6	94	16	0.4	0.3	6	144.7	12.0
	CC05	25	3	41	7	0.2	0.1	3	67.1	5.2
	Total	242	39	520	87	2.0	1.0	26	889.5	55.9
Dickinson Bayou	DB01	53	8	114	18	0.4	0.1	4	203.0	10.3
	DB02	30	4	69	11	0.3	0.1	3	112.2	7.3
	DB03	11	1	19	3	0.1	0.0	1	35.5	1.7
	Total	94	13	201	32	0.8	0.3	9	350.6	19.3
East Bay	EB01	60	9	115	20	0.4	0.1	4	221.7	8.9
	EB02	123	18	245	44	1.0	0.2	8	462.3	19.5
	EB03	68	7	138	23	0.6	0.1	6	229.5	12.6
	EB04	57	7	118	20	0.5	0.3	7	187.9	14.4
	Total	308	41	615	107	2.5	0.6	25	1101.4	55.4

Table III.3 - Subwatershed Load Data
Case 2 - Ten Year Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Greens Bayou	GR01	51	9	133	23	0.5	0.4	9	196.0	18.0
	GR02	40	7	107	19	0.4	0.3	7	154.6	14.3
	GR03	37	6	102	18	0.4	0.3	7	141.5	13.3
	GR04	30	5	74	13	0.3	0.2	4	114.6	9.1
	GR05	24	3	61	11	0.3	0.1	4	92.0	7.3
	GR06	44	6	126	24	0.6	0.3	8	169.5	15.9
	GR07	41	7	117	22	0.5	0.3	8	157.2	15.9
	Total	268	43	720	132	3.0	1.9	48	1025.3	93.8
North Bay	NB01	44	7	111	19	0.5	0.3	8	163.4	15.2
	Total	44	7	111	19	0.5	0.3	8	163.4	15.2
San Jacinto River	SJ02	96	12	189	33	0.8	0.3	10	307.4	21.2
	Total	96	12	189	33	0.8	0.3	10	307.4	21.2
Ship Channel	SC01	33	6	94	18	0.4	0.4	8	126.9	14.7
	SC02	43	7	115	21	0.5	0.4	9	159.0	17.3
	SC03	17	3	48	9	0.2	0.2	4	65.4	7.1
	SC04	39	7	100	18	0.4	0.4	8	142.0	15.8
	SC05	39	7	103	19	0.4	0.3	7	147.2	13.4
	SC06	49	8	113	20	0.5	0.5	9	168.9	16.9
	SC07	27	4	59	10	0.2	0.2	4	90.5	8.4
	SC08	28	4	67	11	0.3	0.2	4	103.4	8.1
	SC09	34	6	82	14	0.3	0.3	6	119.4	12.2
	Total	310	53	779	140	3.2	2.9	60	1122.7	113.7
Sims Bayou	SM01	34	6	79	13	0.3	0.2	5	129.0	9.7
	SM02	25	4	58	9	0.2	0.1	3	96.5	6.5
	SM03	42	7	110	19	0.5	0.3	7	160.6	14.0
	SM04	38	7	106	20	0.4	0.4	8	143.8	15.7
	SM05	21	3	55	10	0.2	0.2	4	78.7	8.1
	Total	159	27	408	71	1.7	1.2	28	608.6	54.1

Table III.3 - Subwatershed Load Data
Case 2 - Ten Year Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
South Bay	SB01	14	2	32	5	0.1	0.1	3	50.4	4.8
	SB02	19	4	49	9	0.2	0.3	5	72.7	8.6
	SB03	41	6	81	14	0.3	0.4	7	123.6	12.9
	SB04	23	2	36	6	0.1	0.1	2	60.0	4.0
	Total	97	14	198	34	0.8	0.8	16	306.7	30.2
Trinity Bay	TB01	121	16	197	30	0.9	0.1	5	459.5	15.9
	TB02	64	9	115	19	0.5	0.1	4	231.5	9.7
	TB03	99	9	137	22	0.6	0.1	5	273.1	11.6
	TB04	71	7	122	22	0.5	0.1	6	195.0	12.2
	Total	355	41	572	93	2.4	0.4	19	1159.1	49.5
Trinity River	TR02	117	12	162	21	0.8	0.0	4	448.9	14.7
	TR03	46	6	47	12	0.3	0.1	2	175.4	7.0
	TR04	49	6	76	11	0.4	0.0	2	183.4	6.5
	TR05	19	3	30	5	0.1	0.0	1	71.2	2.8
	TR06	60	6	77	10	0.4	0.0	2	227.9	7.1
	TR07	96	9	137	17	0.7	0.1	4	355.4	12.2
	TR08	106	10	145	17	0.8	0.1	4	400.1	14.2
	TR09	82	7	111	12	0.6	0.0	3	312.9	10.6
	TR10	86	8	121	14	0.7	0.1	3	327.6	11.3
	TR11	31	3	51	7	0.2	0.0	2	117.4	5.0
	TR12	47	7	86	14	0.3	0.0	2	180.0	7.2
	TR13	135	16	230	35	1.1	0.1	7	510.3	20.6
	TR14	110	10	181	31	0.8	0.1	7	352.9	17.8
	Total	985	103	1454	205	7.4	0.8	43	3,663.5	136.9

Table III.3 - Subwatershed Load Data
Case 2 - Ten Year Rainfall
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
West Bay	WB01	24	4	48	7	0.2	0.0	1	91.5	3.8
	WB02	11	2	26	4	0.1	0.1	2	41.5	3.1
	WB03	115	16	208	36	0.8	0.4	10	379.6	20.6
	WB04	102	13	187	31	0.7	0.3	8	347.8	17.4
	WB05	39	5	79	12	0.3	0.2	4	129.3	9.1
	WB06	14	3	34	6	0.1	0.2	3	50.3	5.8
	WB07	19	3	68	6	0.2	0.1	3	63.8	5.0
	Total	323	45	651	103	2.5	1.2	31	1103.8	64.8
White Oak Bayou	WO01	64	12	171	31	0.7	0.5	12	245.1	23.3
	WO02	20	4	56	10	0.2	0.2	5	77.6	8.7
	WO03	41	8	121	23	0.5	0.4	10	155.4	17.8
	WO04	37	6	112	22	0.5	0.4	9	139.7	16.5
	WO05	19	4	57	11	0.2	0.2	5	73.7	9.0
	Total	181	34	518	98	2.1	1.8	40	691.5	75.3
Entire Project Watershed		4,789	747	10,073	1,727	41.5	20.4	531	17,493	1,138

Table III.3 - Subwatershed Load Data
Case 3 - Individual Storm Event
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (thousand kg)	Oil and Grease (thousand kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Addicks Reservoir	AD01	17	4.3	36	7	117	41	1	63	3.1
	AD02	4	0.7	10	2	42	14	1	15	1.0
	Total	20	5.1	46	8	159	55	2	78	4.1
Armand & Taylor Bayous	AT01	3	0.4	6	1	26	17	0	11	.8
	AT02	3	0.6	7	1	27	18	0	11	.8
	AT03	4	0.5	8	1	36	14	0	14	.9
	AT04	3	0.3	6	1	26	13	0	9	.7
	Total	12	1.9	28	5	114	62	2	45	3.2
Austin & Bastrop Bayous	AB01	14	2.7	28	5	93	13	1	53	2.0
	AB02	3	0.5	7	1	26	8	0	12	.6
	AB03	12	1.8	24	4	97	14	1	47	1.9
	Total	30	5.0	59	10	216	34	2	112	4.5
Barker Reservoir	BK01	15	6.6	37	6	113	26	1	57	2.5
	BK02	4	0.9	7	1	26	5	0	14	.5
	Total	19	7.4	44	8	139	31	1	71	3.0
Brays Bayou	BR01	5	1.1	13	2	49	45	1	20	1.7
	BR02	2	0.4	5	1	20	18	0	8	.7
	BR03	4	0.8	12	2	47	43	1	16	1.7
	BR04	5	0.9	16	3	64	42	1	20	2.1
	BR05	3	0.5	9	2	36	33	1	12	1.3
	BR06	2	0.3	5	1	22	17	0	7	.7
	BR07	1	0.2	4	1	17	15	0	5	.6
	Total	23	4.4	63	12	255	212	5	88	8.9
Buffalo Bayou	BF01	7	1.3	17	3	66	46	1	26	2.1
	BF02	5	0.9	17	4	74	46	1	21	2.4
	BF03	3	0.5	9	2	40	26	1	12	1.3
	BF04	2	0.3	5	1	19	20	0	6	.7
	BF05	2	0.4	6	1	25	28	1	8	1.0
	Total	19	3.4	55	11	224	166	4	72	7.5

Table III.3 - Subwatershed Load Data
Case 3 - Individual Storm Event
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Cedar Bayou	CE01	9	1.8	18	3	58	4	0	35	1.2
	CE02	14	2.1	26	4	105	17	1	53	2.2
	CE03	5	0.6	11	2	49	16	1	19	1.2
	CE04	2	0.2	5	1	21	6	0	7	.5
	Total	30	4.8	60	11	232	44	2	114	5.1
Chocolate Bayou	CH01	12	2.8	24	5	73	5	0	47	1.6
	CH02	3	0.5	5	1	18	2	0	10	.4
	CH03	9	1.4	17	3	65	11	1	33	1.4
	Total	24	4.6	46	9	156	18	1	91	3.3
Clear Creek	CC01	5	0.9	10	2	35	6	0	19	.7
	CC02	11	1.7	23	4	89	25	1	42	2.0
	CC03	3	0.4	7	1	28	19	0	11	.9
	CC04	5	0.7	12	2	51	25	1	20	1.4
	CC05	3	0.3	5	1	22	11	0	9	.6
	Total	27	4.1	57	9	224	86	3	101	5.6
Dickinson Bayou	DB01	8	1.1	17	3	67	13	1	32	1.4
	DB02	4	0.5	10	2	40	12	0	17	.9
	DB03	2	0.2	3		11	3	0	6	.2
	Total	14	1.9	30	4	119	27	1	54	2.5
East Bay	EB01	8	1.1	15	3	58	6	0	30	1.1
	EB02	16	2.4	31	5	126	15	1	63	2.3
	EB03	8	0.9	17	3	74	12	1	30	1.5
	EB04	6	0.7	13	2	57	26	1	22	1.4
	Total	39	5.1	76	13	315	59	3	145	6.2

Table III.3 - Subwatershed Load Data
Case 3 - Individual Storm Event
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
Greens Bayou	GR01	6	1.0	15	3	64	38	1	23	1.9
	GR02	5	0.9	14	2	57	32	1	21	1.7
	GR03	4	0.7	12	2	49	26	1	17	1.4
	GR04	4	0.7	10	2	45	17	1	17	1.2
	GR05	4	0.4	9	2	39	12	0	14	1.0
	GR06	5	0.6	14	3	61	23	1	19	1.6
	GR07	4	0.7	12	2	51	28	1	16	1.5
	Total	33	5.0	85	15	366	177	5	127	10.3
North Bay	NB01	4	0.6	10	2	43	27	1	15	1.3
	Total	4	0.6	10	2	43	27	1	15	1.3
San Jacinto River	SJ02	10	1.3	21	4	92	29	1	36	2.2
	Total	10	1.3	21	4	92	29	1	36	2.2
Ship Channel	SC01	3	0.6	10	2	41	35	1	13	1.4
	SC02	4	0.6	10	2	42	34	1	14	1.4
	SC03	2	0.2	4	1	18	13	0	6	.6
	SC04	3	0.6	8	2	34	33	1	12	1.3
	SC05	4	0.7	11	2	44	24	1	16	1.3
	SC06	4	0.7	10	2	40	34	1	15	1.4
	SC07	2	0.4	5	1	21	17	0	8	.7
	SC08	3	0.4	7	1	30	14	0	12	.8
	SC09	3	0.5	8	1	33	26	1	12	1.1
	Total	29	4.8	73	13	302	229	5	107	9.9
Sims Bayou	SM01	3	0.6	8	1	30	16	0	13	.8
	SM02	3	0.4	6	1	23	10	0	10	.6
	SM03	4	0.6	10	2	43	23	1	16	1.2
	SM04	3	0.6	9	2	38	30	1	13	1.3
	SM05	2	0.3	5	1	20	16	0	7	.7
	Total	15	2.5	38	6	154	95	2	58	4.6

Table III.3 - Subwatershed Load Data
Case 3 - Individual Storm Event
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
South Bay	SB01	2	0.3	5	1	20	15	0	8	.6
	SB02	2	0.5	6	1	24	29	1	9	1.0
	SB03	5	0.8	11	2	45	42	1	17	1.6
	SB04	3	0.4	6	1	25	9	0	11	.6
	Total	13	1.9	28	5	114	94	2	45	3.7
Trinity Bay	TB01	17	2.1	26	4	116	6	1	63	2.0
	TB02	8	1.1	15	2	59	8	0	31	1.1
	TB03	11	1.2	18	3	75	10	1	37	1.4
	TB04	8	0.8	15	3	63	14	1	25	1.4
	Total	44	5.2	73	11	313	37	2	155	5.9
Trinity River	TR02	16	1.5	21	3	114	3	0	61	1.9
	TR03	6	0.7	10	1	46	4	0	24	.9
	TR04	7	0.8	10	1	49	3	0	25	.8
	TR05	3	0.4	5	1	23	1	0	12	.4
	TR06	10	0.8	12	1	68	2	0	36	1.1
	TR07	14	1.3	19	2	102	6	0	53	1.7
	TR08	14	1.2	18	2	101	7	0	52	1.7
	TR09	10	0.8	13	1	74	3	0	38	1.2
	TR10	10	0.8	14	2	76	4	0	39	1.2
	TR11	4	0.3	5	1	28	4	0	13	.5
	TR12	5	0.8	9	1	39	3	0	20	.8
	TR13	16	1.7	26	4	121	11	1	59	2.2
	TR14	14	1.3	23	4	108	14	1	47	2.1
	Total	127	12.5	185	24	949	66	5	479	16.6

Table III.3 - Subwatershed Load Data
Case 3 - Individual Storm Event
Non-Point Source Characterization Project
Galveston Bay National Estuary Program

NPS Loads										
Watershed	Subwatershed	Runoff Volume (thousand acre-ft)	Total Suspended Solids (million kg)	Total Nitrogen (thousand kg)	Total Phosphorus (thousand kg)	Biochemical Oxygen Demand (million kg)	Oil and Grease (million kg)	Fecal Coliform (xE15 col)	Dissolved Copper (kg)	Pesticides (kg)
West Bay	WB01	4	0.6	7	1	28	4	0	15	.5
	WB02	2	0.2	4	1	14	6	0	6	.4
	WB03	17	2.4	30	5	123	36	1	60	2.6
	WB04	15	2.0	28	4	113	25	1	55	2.3
	WB05	7	0.8	13	2	55	21	1	23	1.3
	WB06	2	0.4	4	1	17	19	0	6	.7
	WB07	3	0.4	6	1	25	14	0	11	.7
	Total	49	6.7	93	15	377	125	4	177	8.4
White Oak Bayou	WO01	7	1.3	19	3	78	50	1	28	2.4
	WO02	2	0.4	6	1	24	21	0	8	.9
	WO03	4	0.8	13	3	54	39	1	17	1.8
	WO04	4	0.6	12	2	52	36	1	15	1.7
	WO05	2	0.4	6	1	25	21	0	7	.9
	Total	20	3.5	57	11	232	167	4	75	7.7
Entire Project Watershed		603	91.6	1,227	205	5,096	1,839	55	2,248	124.7

APPENDIX IV
LAKE HOUSTON
AND
LAKE LIVINGSTON
WATER QUALITY DATA

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Table IV.1 United States Geological Survey
Lake Houston Water Quality Data

Table IV.2 United States Geological Survey
Lake Livingston Water Quality Data

Table IV.3 Texas Water Commission
Lake Houston Water Quality Data

Table IV.4 Texas Water Commission
Lake Livingston Water Quality Data

Table IV.5 Example Calculation of Annual Average
Concentrations for Lakes

Table IV.1 - United States Geological Survey Lake Houston Water Quality Data

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Year	Site	Phosphorus			Nitrogen			BOD			Fecal Coliforms			Suspended Solids		
		Data (mg/l)	No of Obs	Annual Mean	Data (mg/l)	No of Obs	Annual Mean	Data (mg/l)	No of Obs	Annual Mean	Data (col/100ml)	No of Obs	Annual Mean	Data (mg/l)	No of Obs	Annual Mean
1983	AC	0.06	1		1.23	1		3.35	1		84	1		21.0	1	
	CC	0.07	1		1.33	1		2.60	1					60.0	1	
	EC	0.03	1		1.45	1		2.65	1		120	1		23.5	1	
	FC	0.22	1	0.10	1.60	1	1.40	3.65	1	3.06	210	1	138	113.0	1	54.4
1984	AC	0.13	4		0.95	4		1.58	3		130	1		20.0	3	
	CC	0.17	4		1.17	4		2.05	3					15.3	3	
	EC	0.09	4		1.08	4		2.28	3		20	1		15.0	3	
	FC	0.37	4	0.19	1.47	4	1.17	4.40	3	2.58	63	3	68	44.8	3	23.8
1985	AC	0.15	4		1.13	4		2.65	2		27	1		16.8	2	
	CC	0.18	4		1.13	4		3.35	2					22.0	2	
	EC	0.11	4		1.00	4		3.00	2		130	1		16.8	2	
	FC	0.62	4	0.27	1.48	4	1.19	5.20	2	3.55	180	1	112	28.8	2	21.1
1986	AC	0.20	6		1.11	6		2.33	2		240	1		15.5	2	
	CC	0.15	6		1.08	6		2.58	2					25.5	2	
	EC	0.10	6		1.11	6		3.03	2		2,800	1		58.8	2	
	FC	0.41	5	0.21	1.32	6	1.16	4.50	2	3.11	1,000	1	1,347	77.0	2	44.2
1987	AC	0.21	10		1.38	10		2.03	3		170	1		17.7	3	
	CC	0.25	10		1.35	11		2.53	3					32.8	3	
	EC	0.13	11		1.32	11		2.43	3		32	1		79.3	3	
	FC	0.48	12	0.27	1.65	12	1.43	4.13	3	2.78	130	1	111	61.2	3	47.8
1988	AC	0.16	12		0.79	12		1.92	3		230	1		14.0	3	
	CC	0.23	12		0.79	12		2.10	3					29.2	3	
	EC	0.19	12		0.88	12		2.70	3		54	1		18.5	3	
	FC	0.86	11	0.23	1.39	11	0.61	4.50	3	1.60	60	1	57	25.3	3	12.4
1989	AC	0.22	10		1.08	10		1.50	4		685	2		19.5	8	
	CC	0.25	10		0.96	10		2.40	4					25.4	5	
	EC	0.16	10		0.96	10		2.76	4		120	1		27.1	7	
	FC	0.63	10	0.32	1.79	10	1.20	3.06	4	2.43	193	3	345	87.3	2	29.4

Table IV.2 - United States Geological Survey
Lake Livingston Water Quality Data

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Year	Site	Phosphorus			Nitrogen		
		Data (mg/l)	No of Obs	Annual Mean	Data (mg/l)	No of Obs	Annual Mean
1975		0.15	1	0.15	0.27	1	0.27
1976		0.12	1	0.12	0.13	1	0.13
1977		0.17	1	0.17	0.34	1	0.34
1978	AC	0.62	1		1.80	1	
	DC	0.29	1		0.18	1	
	GC	0.81	1		0.79	1	
	JC	1.00	1	0.68	2.23	1	1.25
1979	AC	0.27	1		0.25	1	
	DC	0.32	1		0.33	1	
	GC	0.43	1		0.40	1	
	JC	0.53	1	0.39	0.81	1	0.45
1980	AC	0.38	1		1.58	1	
	DC	0.33	1		1.15	1	
	GC	0.46	1		1.83	1	
	JC	1.06	1	0.56	2.37	1	1.73
1981	AC	0.32	1		1.51	1	
	DC	0.53	1		1.97	1	
	GC	0.81	1		3.41	1	
	JC	0.72	1	0.60	3.75	1	2.66
1982	AC	0.53	2		2.30	2	
	DC	0.18	2		1.63	2	
	GC	0.24	2		3.13	2	
	JC	0.32	2	0.32	2.01	2	2.27
1983	AC	0.39	1		1.83	1	
	DC	0.40	1		1.73	1	
	GC	0.30	1		2.00	1	
	JC	0.70	1	0.45	3.90	1	2.37
1984	AC	0.36	2		1.33	2	
	DC	0.29	2		1.33	2	
	GC	0.89	2		3.53	2	
	JC	0.84	2	0.60	3.25	2	2.36
1985	AC	0.48	2		1.83	2	
	DC	0.25	2		1.50	2	
	GC	0.39	2		2.22	2	
	JC	0.70	2	0.46	4.48	2	2.51
1986	AC	1.21	2		1.67	2	
	DC	0.22	2		1.97	2	
	GC	0.34	2		2.20	2	
	JC	0.97	2	0.69	4.33	2	2.54
1987	AC	0.46	2		2.43	2	
	DC	0.61	2		1.87	2	
	GC	0.29	2		1.83	2	
	JC	0.46	2	0.46	2.43	2	2.14

Table IV.3 - Texas Water Commission
Lake Houston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		Nitrogen		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
6/30/81	0.56		0.72		2.00		200		16.0	
7/13/81	0.25		1.14		-		200		12.5	
7/27/81	0.34		-		-		200		4.0	
12/14/81	1.38	0.63	2.19	1.35	-	2.00	450	263	18.0	12.6
1/5/82	0.54		1.58		4.00		200		25.0	
1/11/82	0.42		1.85		-		800		23.0	
3/1/82	0.25		5.41		-		450		12.0	
3/9/82	0.07		1.06		2.00		500		6.0	
3/15/82	0.00		0.50		-		200		1.0	
5/3/82	2.42		2.47		12.00		200		8.5	
5/11/82	0.15		1.03		4.00		200		22.0	
5/24/82	1.00		1.34		-		200		18.0	
7/12/82	1.32		3.39		-		20		22.5	
7/27/82	0.25		3.20		2.00		20		11.0	
8/2/82	0.25		1.03		-		20		6.0	
8/30/82	0.17		1.34		-		20		8.5	
9/7/82	0.05	0.53	0.33	1.89	5.00	4.83	20	219	20.0	14.1
3/14/83	0.07		3.97		-		330		18.0	
5/3/83	0.44		0.53		2.00		20		21.0	
5/9/83	2.66		0.59		-		20		9.5	
5/17/83	0.14		0.60		2.00		50		3.0	
6/2/83	0.20		1.03		4.00		50		23.0	
6/7/83	0.40		8.27		12.00		50		6.0	
6/13/83	0.50		5.21		-		20		11.0	
6/21/83	0.40		2.19		2.00		20		7.0	
6/27/83	4.28		1.35		1.35		20		10.0	
7/5/83	0.50	0.96	2.57	2.63	19.00	6.05	20	60	34.0	14.3
2/22/84					4.00	4.00	940	940	4.0	4.0
1/20/88					6.00				5.0	
2/22/88					3.00				6.0	
2/24/88					2.00				8.0	
3/2/88					2.00				6.0	
3/9/88					2.00				6.0	
3/16/88					2.00				10.0	
3/21/88					2.00				10.0	
3/23/88					5.00				12.0	
4/27/88					3.00				4.0	
5/2/88					6.00				12.0	
5/4/88					2.00				-	
5/9/88					4.00				16.0	
5/18/88					8.00				5.0	
5/25/88					2.00				3.0	
6/13/88					3.00				2.0	
6/27/88					-	3.47			8.0	7.5

Table IV.4 - Texas Water Commission
Lake Livingston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
1/23/75	0.21		1.00		-		11.3	
1/30/75	0.25		1.60		-		6.0	
2/3/75	0.26		1.10		110		8.3	
2/9/75	0.02		0.70		2		8.4	
2/18/75	0.19		1.30		3		10.5	
2/25/75	0.23		1.80		3		18.0	
3/5/75	2.55		1.00		-		10.0	
3/12/75	1.90		0.80		-		11.5	
3/18/75	0.24		2.30		21		26.0	
3/27/75	0.16		1.80		-		1.5	
4/8/75	0.20		1.70		-		5.5	
4/22/75	0.11		1.50		-		5.5	
5/1/75	0.29		1.50		-		20.5	
5/8/75	0.71		1.80		-		17.0	
5/15/75	0.18		3.00		-		11.5	
5/20/75	0.16		3.20		-		8.0	
5/29/75	0.20		1.60		-		26.0	
6/5/75	0.28		2.10		-		10.0	
6/11/75	0.20		1.10		-		10.7	
6/24/75	0.12		1.70		1		7.6	
7/2/75	0.23		1.40		-		7.0	
7/10/75	0.14		2.20		5		8.0	
7/17/75	0.20		1.40		3		7.5	
7/22/75	0.20		2.30		1		7.3	
7/31/75	0.26		1.20		8		5.5	
8/21/75	0.29		1.40		-		5.0	
8/28/75	0.36		2.10		-		6.0	
9/2/75	0.20		1.80		-		6.0	
9/11/75	2.35		0.90		-		5.3	
9/16/75	0.16		4.00		-		7.3	
9/18/75	0.16		2.00		-		6.5	
9/25/75	0.27		2.50		-		14.0	
10/8/75	0.38		2.70		-		14.0	
10/16/75	0.15		1.80		3		8.0	
10/21/75	0.14		-		-		22.5	
10/30/75	0.15		3.10		2		11.5	
11/6/75	0.14		1.80		-		8.5	
11/11/75	0.20		4.10		5		7.5	
11/18/75	0.06		1.10		3		-	

Table IV.4 - Texas Water Commission
Lake Livingston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
11/24/75	0.13		2.20		-		9.5	
12/11/75	0.10		0.80		4		7.3	
12/18/75	0.10		1.70		44		7.5	
12/23/75	0.08	0.35	1.30	1.82	50	16	8.0	10.1
1/6/76	0.09		0.90		-		7.3	
1/13/76	0.09		1.7		-		5.3	
1/22/76	0.11		1.70		-		-	
1/29/76	0.09		-		-		5.0	
2/4/76	0.09		3.10		-		12.4	
2/10/76	0.10		2.10		-		10.7	
2/17/76	0.65		2.60		5		5.5	
2/26/76	0.10		1.30		-		8.3	
3/9/76	0.16		1.00		-		11.0	
3/16/76	0.12		1.50		16		24.7	
3/30/76	0.13		1.70		-		23.0	
4/19/76	-		1.60		-		10.5	
4/26/76	0.18		2.60		-		18.0	
5/4/76	0.23		3.00		-		10.0	
5/10/76	0.19		2.40		-		8.5	
5/18/76	0.33		3.50		-		15.0	
6/3/76	0.19		3.10		-		4.7	
6/10/76	0.15		2.40		-		7.0	
6/16/76	-		4.30		-		9.3	
7/15/76	-		2.00		-		2.0	
7/29/76	0.20		2.00		-		15.0	
8/13/76	0.31		2.00		-		7.0	
8/25/76	0.23		2.00		-		7.0	
9/7/76	0.40		3.00		-		2.0	
9/16/76	-		3.00		-		2.5	
9/30/76	0.26		4.00		-		5.5	
10/1/76	0.22		2.00		-		-	
10/4/76	0.25		2.00		-		5.3	
10/14/76	0.23		2.70		-		23.0	
11/1/76	0.15		2.80		-		7.3	
11/9/76	0.12		1.80		-		7.5	
11/11/76	0.15		4.70		-		5.6	
12/15/76	-		1.80		-		10.0	
12/20/76	-		2.50		-		44.7	
12/28/76	-	0.20	0.05	2.32	-	11	3.3	10.4

Table IV.4 - Texas Water Commission
Lake Livingston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
1/4/77	-		0.05		-		6.7	
1/10/77	-		0.05		-		11.3	
1/25/77	-		0.21		-		9.3	
2/4/77	-		-		-		21.0	
2/28/77	-		0.40		-		16.0	
3/15/77	-		0.16		-		6.0	
3/31/77	0.46		1.40		-		17.0	
4/7/77	0.20		2.20		-		11.3	
4/20/77	0.20		2.00		-		6.0	
4/27/77	0.20		2.20		-		12.7	
5/3/77	1.40		2.50		-		5.3	
5/24/77	0.3		1.8		-		6.7	
5/31/77	0.20		1.20		-		4.7	
6/7/77	0.20		-		-		8.0	
6/13/77	0.20		1.30		-		3.3	
6/16/77	0.20		1.50		-		5.3	
6/23/77	0.10		1.40		-		-	
6/28/77	0.20		2.90		-		4.0	
7/11/77	0.20		4.30		-		5.3	
7/18/77	0.30		3.60		-		5.3	
8/1/77	0.20		-		-		6.0	
8/3/77	0.20		3.20		-		4.7	
8/9/77	0.30		3.70		-		9.0	
8/16/77	0.50		3.00		-		6.0	
8/29/77	0.20		3.40		144		7.3	
9/8/77	0.20		2.10		0		4.7	
9/20/77	0.40		1.80		-		3.3	
9/29/77	0.30		1.70		-		2.0	
10/5/77	0.10		2.60		0		4.0	
10/11/77	0.04		1.90		-		12.0	
11/3/77	0.20		2.50		-		4.0	
11/28/77	0.20		1.10		-		-	
12/12/77	0.30	0.28	1.10	1.91	30	44	17.0	7.9
1/6/78	0.16		-		10		2.0	
1/11/78	0.20		1.40		-		7.3	
1/24/78	0.12		33.00		5		3.7	
2/6/78	0.18		1.00		-		6.0	
2/21/78	0.21		1.40		-		20.0	
3/16/78	0.07		3.60		-		12.0	

Table IV.4 - Texas Water Commission
Lake Livingston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
3/24/78	0.17		1.90		-		12.0	
3/29/78	1.30		1.30		-		12.7	
4/6/78	2.40		2.40		0		3.0	
4/13/78	2.60		2.60		-		7.3	
4/18/78	0.06		2.10		-		9.3	
4/27/78	0.16		1.40		25		11.0	
5/4/78	0.17		2.10		-		10.0	
5/23/78	0.16		1.90		-		8.7	
6/15/78	0.96		-		160		8.7	
7/6/78	0.36		3.00		-		8.0	
7/18/78	0.50		2.80		15		6.5	
7/25/78	0.34		-		30		6.0	
8/2/78	0.45		4.40		35		7.5	
8/9/78	0.36		4.50		-		8.7	
8/17/78	0.44		5.20		-		6.7	
8/30/78	0.45		-		-		14.0	
9/14/78	0.43		1.60		70		14.0	
9/20/78	0.38		3.2		10		4	
9/26/78	0.45		2.30		0		9.0	
10/18/78	0.29		2.40		25		6.0	
10/25/78	0.25		-		-		9.0	
11/15/78	0.35		1.20		0		5.0	
11/29/78	0.19		1.90		-		2.0	
12/5/78	0.24		2.40		0		10.0	
12/13/78	0.07	0.47	2.10	3.58	10	26	8.0	8.3
1/3/79	-		2.00		-		5.0	
2/14/79	0.23		1.40		20		10.0	
2/27/79	0.64		-		30		11.0	
3/14/79	0.35		2.30		5		10.0	
4/18/79	0.33		1.70		-		16.0	
5/22/79	0.30		2.00		40		13.0	
5/31/79	0.30		1.00		30		11.0	
6/20/79	0.22		1.00		20		35.0	
7/5/79	-		1.00		-		-	
7/17/79	0.20		2.00		0		9.0	
8/8/79	-		-		-		3.0	
9/26/79	0.20		3.00		-		32.0	
11/5/79	0.40	0.32	-	1.74	40	23	7.0	13.5
1/9/80	0.20		2.10		-		-	

Table IV.4 - Texas Water Commission
Lake Livingston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
2/21/80	0.20		3.20		10		10.0	
2/27/80	0.20		4.00		-		13.0	
3/19/80	0.20		1.60		-		8.0	
4/17/80	0.20		-		100		24.0	
5/29/80	0.20		5.00		4		24.0	
6/5/80	0.70		2.00		-		16.0	
6/18/80	0.20		3.00		-		11.0	
7/29/80	0.30		4.00		2		9.0	
8/27/80	0.20		2.00		40		8.0	
10/10/80	0.20		5.00		0		12.0	
11/7/80	0.20	0.25	2.20	3.10	-	26	9.0	13.1
1/23/81	0.10		2.00		-		5.0	
5/28/81	0.10	0.10	-	2.00	0	0	8.0	6.5
4/28/82	0.10	0.10	-		-		12.0	12.0
5/24/83	0.10		-		10		5.0	
7/26/83	0.20		-		10		5.0	
8/10/83	-		-		-		-	
8/30/83	0.10		-		20		1.0	
10/11/83	0.20		-		-		6.0	
11/29/83	0.10	0.13	-		10	13	-	5.8
1/11/84	0.10		-		10		14.0	
2/7/84	0.10		-		-		8.0	
3/27/84	0.10		-		10		8.0	
4/25/84	0.2		-		-		10	
5/14/84	-		-		-		11.0	
6/18/84	0.20		-		10		8.0	
7/16/84	0.30		-		10		4.0	
8/27/84	0.30		-		10		8.0	
9/25/84	0.20		-		10		7.0	
10/16/84	0.20		-		10		5.0	
12/11/84	0.20	0.19	-		-	10	26.0	9.9
2/19/85	0.20		-		10		7.0	
3/19/85	0.20		-		-		8.0	
4/9/85	0.20		-		-		10.0	
5/20/85	0.20		-		20		10.0	
6/25/85	0.20		-		10		3.0	
8/13/85	0.40		-		10		5.0	
9/24/85	0.20		-		10		9.5	
10/22/85	0.20		-		20		7.0	

Table IV.4 - Texas Water Commission
Lake Livingston Water Quality Data

Non-Point Source Characterization Project

Galveston Bay National Estuary Program

Date	Phosphorus		BOD		Fecal Coliforms		Suspended Solids	
	Data (mg/l)	Annual Mean	Data (mg/l)	Annual Mean	Data (col/100ml)	Annual Mean	Data (mg/l)	Annual Mean
11/25/85	0.20		-		60		8.0	
12/11/85	0.20	0.22	-		40	23	19.0	8.7
1/21/86	0.20		-		20		12.0	
2/11/86	0.20		-		10		28.0	
3/18/86	0.20		-		10		10.0	
4/8/86	0.20		-		-		3.0	
5/6/86	0.20		-		20		9.0	
6/10/86	0.20		-		60		12.0	
7/7/86	0.20		-		20		3.0	
8/9/86	0.10		-		20		5.0	
9/9/86	0.20		-		20		12.0	
10/7/86	0.10		-		20		7.0	
11/4/86	0.10		-		20		11.0	
12/16/86	0.20	0.18	-		20	22	18.0	10.8
1/26/87	0.20		-		20		14.0	
2/17/87	0.20		-		20		13.0	
3/10/87	0.20		-		20		16.0	
4/7/87	0.20		-		20		15.0	
5/12/87	0.10	0.18	-		20	20	5.0	12.6

Table IV.5 - Example Calculation of Average Concentration for Lakes

Non-Point Source Characterization Project
Galveston Bay National Estuary Program

Total Suspended Solids for Lake Houston					
Year	USGS Annual Average	Number of Observations	TWC Annual Average	Number of Observations	GBNEP Annual Average
1981		0	12.6	4	12.6
1982		0	14.1	13	14.1
1983	54.4	4	14.3	10	25.7
1984	23.8	12	4.0	1	22.3
1985	21.1	8	7.5	15	12.2
1986	44.2	8		0	44.2
1987	47.8	12		0	47.8
1988	12.4	12		0	12.4
1989	29.4	22		0	29.4
Annual Average Total Suspended Solids Load =					25 mg/l

NOTES:

1. GBNEP Annual Average Concentration calculated for Total Suspended Solids, Fecal Coliforms, Total Nitrogen, Total Phosphorus, and BOD for both Lake Livingston and Lake Houston.
2. Results reported in Table 5.15, Volume I.