

10 – PROJECT IMPLEMENTATION AND INTERIM MILESTONES FOR PROGRESS (ELEMENTS F & G)

Watershed monitoring and modeling have demonstrated a need to implement Best Management Practices in the San Bernard watershed to improve water quality. Previous chapters have identified causes and sources of pollution in the watershed, management practices to improve water quality, and possible sources of funding to help implement measures to improve water quality. This chapter will identify implementation of Best Management Practices and benchmarks to determine if water quality goals are being met. Below is a table showing the percent load reductions required by sub-basin as determined in the SWAT modeling. Overall a 70% reduction in the bacteria geomean is required in the watershed.

Sub-basin	Distance from Intercoastal Waterway (km)	<i>E. coli</i>	Enterococci	% Reduction from <i>E. coli</i> Geomean Std
1	312.1	87.8	-	n/a ¹
7	293.1	90.4	-	n/a ¹
8	289.0	93.6	-	n/a ¹
10	273.8	62.1	-	n/a ¹
11	254.1	122.9	-	n/a ¹
13	246.5	332.2	-	62%
16	237.8	282.3	-	55%
17	215.1	279.0	-	55%
21	200.0	274.8	-	54%
23	187.7	272.8	-	54%
26	179.3	1085.0	-	88%
28	173.9	956.8	-	87%
30	167.0	818.5	-	85%
31	139.1	554.9	-	77%
35	112.9	291.8	-	57%
34	108.8	1246.9	-	90%
36	94.7	359.3	-	65%

Sub-watersheds not showing a load reduction needed are at or below the standard.

OSSFs

OSSFs are a major contributor to the water quality impairments in the watershed. It was identified in the SWAT modeling that eliminating OSSF bacteria sources would help significantly improve water quality in the watershed. With the creation of the H-GAC OSSF database tracking of new OSSF systems in the watershed will become a more streamlined process. H-GAC is working with the area Authorized Agents to create a uniform system for reporting

and identifying OSSFs. Many Agents have also updated standards to ensure systems are placed and sized properly. It was noted during the public participation process that a few of the counties in the watershed have tightened up their OSSF regulations and are now requiring regular maintenance on permitted systems.

For the OSSF systems already in place in the watershed, a number appear to be failing or poorly maintained. Voluntary repair and replacement with funding through SEP funds and 319 grants will help eliminate sources of bacteria. Homeowner education workshops will also help OSSF owners maintain their systems, therefore lowering the cost of potential repairs and replacement. Over 6,800 potentially failing systems have been identified in the San Bernard Watershed. This means that over 4,700 systems will need to be repaired or replaced in the watershed.

Subbasin	Septic Density (km ⁻¹)	Distance from the Stream (km)	Subbasin Area (km ²)	Number of Septics/Subbasin potentially failing	How many need to be improved/repared – to reduce bacteria by 70%
1	5.48	0.422	19.06	104	72.8
2	4.89	0.422	13.01	64	44.8
3	12.40	0.422	7.16	89	62.3
4	13.80	0.422	6.90	95	66.5
5	9.33	0.422	0.45	4	2.8
6	6.16	0.422	14.63	90	63
7	7.78	0.422	4.19	33	23.1
8	10.28	0.422	0.67	7	4.9
9	11.65	0.422	9.13	106	74.2
10	20.05	0.422	6.08	122	85.4
11	17.75	0.422	7.23	128	89.6
12	7.73	0.422	17.58	136	95.2
13	9.53	0.422	3.32	32	22.4
14	15.69	0.422	10.74	169	118.3
15	16.17	0.422	6.39	103	72.1
16	21.41	0.422	1.74	37	25.9
17	25.80	0.422	5.19	134	93.8
18	27.63	0.422	3.03	84	58.8

19	16.40	0.422	10.84	178	124.6
20	36.91	0.422	4.13	152	106.4
21	21.88	0.422	5.66	124	86.8
22	18.89	0.422	9.36	177	123.9
23	32.28	0.422	0.96	31	21.7
24	17.82	0.422	3.31	59	41.3
25	17.91	0.422	18.33	328	229.6
26	60.93	0.422	0.54	33	23.1
27	33.69	0.422	7.34	247	172.9
28	19.10	0.422	0.68	13	9.1
29	42.52	0.422	1.12	48	33.6
30	23.26	0.422	1.07	25	17.5
31	33.20	0.422	5.48	182	127.4
32	24.24	0.422	11.35	275	192.5
33	21.21	0.422	9.21	195	136.5
34	10.02	0.422	0.90	9	6.3
35	37.38	0.422	4.32	162	113.4
36	129.31	0.422	3.45	446	312.2
37	77.54	0.422	27.56	2137	1495.9
38	61.05	0.422	4.00	244	170.8
39	51.49	0.422	4.16	214	149.8
40	7.70	0.422	0.14	1	0.7

Highlighted rows indicate sub-watersheds where the geomean exceeds the state standard.

WASTEWATER TREATMENT PLANTS/OUTFALLS

Wastewater Treatment Plants are a point source pollution found in the watershed, and their outputs can be directly measured. At this time, WWTPs in the watershed are not being tested for bacteria; however they will be as part of a continued monitoring program under a 319 (h) grant from the TSSWCB. WWTP bacteria limit testing began about two years ago to monitor outputs from plants.

In doing the SELECT and SWAT monitoring, it was assumed that their output was at the 126 standard – which does contribute to the baseline bacteria level in the watershed. However, if their outputs are lower, this will help lower the baseline bacteria levels. Bacteria monitoring at the wastewater treatment plant outfalls will help determine if and where outputs need to be lowered. Enforcement of permits and standards will help keep the baseline levels low.

WWTP OUTFALL PERMITS IN THE WATERSHED

Subbasin	Name	Location	Permitted Flow (MGD)
1	New ULM WSC WWTP	Bernard RD, 1 mi SE Intx FM New ULM, TX 78950	0.05
11	City of Wallis WWTP	FM RD 1093 & ST HWY 36 Wallis, TX 77485	0.2
13	Wharton County WCID No. 2	106 Fitzgerald St. East Bernard, TX 77435	0.4
21	City of Kendleton WWTP	1,500 Ft E Farm Market RD 2219 Kendleton, TX 77451	0.08
22	Hungerford Mud No. 1 WWTP	250 ft NW Int W Live Oak & Haber Hungerford, TX 77448	0.08
	Straightway Inc. WWTF	Interx FM 1161 & CR 218 Hungerford, TX 77448	0.03
32	City of Needville	14206 Church Street, Needville, TX 77461	0.4
33	Needville ISD WWTP	Roesler RD and Danhouse RD, Needville, TX 77461	0.036
36	Autumn Shadows WWTF	Sthwy 35, 570 ft East Sthwy 35 Danbury, TX 77534	0.007
37	City of Sweeny	N End of Ave. A on W Bank of Sweeny, TX 77480	0.975
	Bernard Timbers WSC	USHWY 90A, 1.4M NE USHWY 90A &	0.021

Subbasin	Name	Location	Permitted Flow (MGD)
		East Bernard, TX 77435	
	City of Brazoria WWTP	One Mile West of Intersection Brazoria, TX 77422	0.75
	Wild Peach Elementary WWTP	1 mi S of STHWY 36 @ PT 4.5 mi S West Columbia, TX 77486	0.01
40	Clemens Unit WWTP	0.5 mi N Intx St hwy 36 & FM 200 Brazoria, TX 77422	0.54

Highlighted rows indicate sub-watersheds where the geomean exceeds the state standard

SSO OVERFLOWS IN THE WATERSHED

Subbasin	WWTF	Location	SSO Flow (MGD)	Dates of Occurrence
21	City of Kendleton WWTP	1,500 Ft E Farm Market RD 2219 Kendleton, TX 77451	0.04	5/31/2003
33	Needville ISD WWTP	Roesler RD and Danhouse RD, Needville, TX 77461	0.00399428	5/31/2005
37	City of Brazoria WWTP	One Mile West of Intersection Brazoria, TX 77422	0.06 0.103 0.04	6/20/2006 12/11/2006 7/3/2007
	City of Sweeny	N End of Ave. A on W Bank of Sweeny, TX 77480	4.798	6/2/2002

Highlighted rows indicate sub-watersheds where the geomean exceeds the state standard

WILDLIFE/PETS

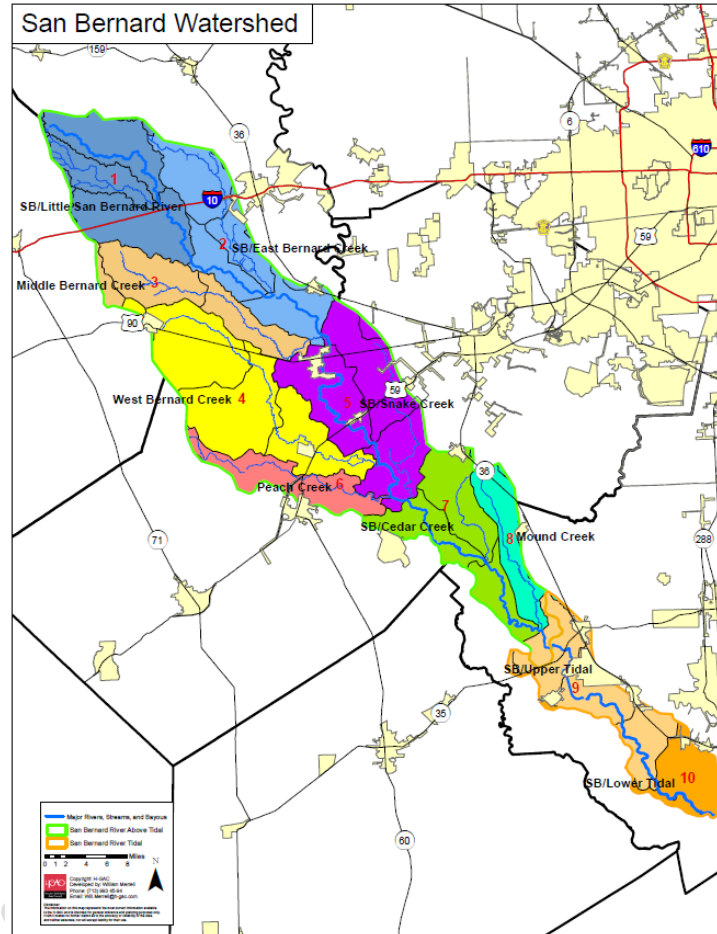
Wildlife has been identified as a major contributing factor to the bacteria levels in the watershed, particularly due to the contributions by feral hogs. However, the contribution is not significant enough to meet the standard if the source were eliminated. Pets are a contributing source, but not considered a significant source. However the watershed would benefit from a spay/neuter program to help control feral populations of cats and dogs.

Wildlife contributions are primarily from deer, feral hogs, and other minor sources such as raccoons, coyotes, opossums, and birds. Deer and feral hog populations were applied to certain land cover areas in the watershed.

Deer populations were applied to pasture and forested areas. Feral hogs were applied to all land categories except developed areas and open water. Feral hogs are the major contributor in this category and programs are being implemented statewide to help landowners deal with the destruction and damage caused by feral hogs.

Land Cover Category	SUBW 1	SUBW 2	SUBW 3	SUBW 4	SUBW 5	SUBW 6	SUBW 7	SUBW 8	SUBW 9	SUBW 10
High Intensity Developed	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Low Intensity Developed	1%	1%	1%	2%	2%	4%	1%	1%	5%	1%
Open Space Developed	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%
Cultivated	62%	87%	89%	85%	77%	68%	47%	60%	26%	7%
Grassland/Shrub	12%	5%	6%	7%	6%	14%	9%	15%	27%	5%
Forest	20%	1%	2%	1%	1%	7%	1%	1%	6%	3%
Woody Wetland	4%	4%	2%	3%	12%	6%	38%	21%	27%	7%
Herbaceous Wetland	1%	1%	1%	1%	1%	1%	2%	1%	4%	70%
Bare	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Open Water	0%	0%	0%	0%	0%	0%	1%	0%	2%	6%

Highlighted rows indicate land cover categories with the most wildlife except feral hogs – which are found in all land cover categories except developed and open water.



LIVESTOCK AND AGRICULTURE

Modeling has identified cattle as a source of concern in the San Bernard Watershed. A lot of pasture land directly fronts the San Bernard River and its tributaries. Agricultural lands are not a major contributor to the total loadings in the San Bernard watershed; however agricultural lands do make up the majority of the land cover in the watershed. The TSSWCB also offers Water Quality Management Plans to landowners in the watershed, and once approved landowners may be eligible for funding to help implement the practices identified in the plan. These plans include Best Management Practices specific to the property help reduce bacteria introduction into area waterways. Soil testing is also available for landowners to determine the necessary amount of nutrients to apply to their land.

Currently WQMPs are applied to approximately 10% of the land area in the San Bernard Watershed. In a survey conducted among watershed residents, there was little knowledge of the availability of these plans. Advertisement of these plans will help increase implementation in the watershed, and lowering of bacteria levels associated with livestock and agricultural uses. Additional plans could be added throughout the watershed – if an additional 1% of the watershed area was added to a WQMP each year, which would protect an additional 6,800 acres.

HUC-12	# WQMPs	Acreage under WQMP	HUC-12 Acreage	Prescribed Grazing	Nutrient Management	Crop Residue Management	Forage Harvest Management	Wildlife Land	Conservation Crop Rotation	%Acreage under WQMP
120904010101	1	113	30419	113	113	0	0	0	0	0.004
120904010102	0	0	18213	0	0	0	0	0	0	0.000
120904010103	1	109	36802	0	109	0	109	0	0	0.003
120904010104	1	11744	15587	9094	5817	2447	189	5913	2447	0.753
120904010105	1	376	27683	284	375	0	91	0	0	0.014
120904010106	1	1162	14004	1162	1162	0	0	0	0	0.083
120904010107	5	416	15979	1377	1520	105	38	39	105	0.026
120904010108	0	0	26935	0	0	0	0	0	0	0.000
120904010109	16	4377	29444	434	4945	4465	46	40	4465	0.149
120904010201	22	2414	34069	1053	2219	1039	281	14	1039	0.071
120904010202	8	2742	17383	1444	2401	2401	89	5	2401	0.158
120904010204	8	4560	38836	131	4010	2767	1112	505	2767	0.117
120904010203	11	11118	44591	1273	11398	10103	22	168	10103	0.249
120904010205	22	2890	29113	546	2708	1959	203	170	1959	0.099
120904010206	13	448	32892	137	386	82	167	4	82	0.014
120904010207	9	2965	16542	402	2940	2523	15	0	2523	0.179
120904010301	4	280	29696	208	265	0	57	0	0	0.009
120904010208	12	2788	31122	841	1941	1276	77	509	1276	0.090
120904010302	4	880	38781	646	433	137	160	0	137	0.023
120904010304	3	2670	26081	1796	1796	0	0	0	0	0.102
120904010303	3	910	35917	757	870	0	113	869	0	0.025
120904010305	2	202	21877	194	194	0	0	0	0	0.009
120904010306	4	878	23236	765	842	0	77	0	0	0.038
120904010307	1	10341	45233	9041	0	0	0	1220	0	0.229
TOTAL	152	64383	680435	31698	46444	29304	2846	9456	29304	10%

LAND MANAGEMENT

Land management in the San Bernard watershed includes a number of BMPs that could be done by land owners and city and county governments. A number of conservation easements exist in the watershed along the waterways, conservation easements are a good way for a landowner to preserve their property and prevent development from occurring adjacent to the waterways. A SEP fund account has been implemented in the watershed to purchase conservation easements along the San Bernard River.

There are concerns in the watershed about vegetation management along the waterways, some areas have been clear cut and are eroding, and some are overgrown to the point where water cannot flow. There are also a number of sites throughout the watershed where trash and appliances have been dumped off of bridges. There is an annual clean up hosted by the Friends of the River San Bernard to help combat this program. Currently Counties and Cities lack funding to clean up and monitor these sites. There is also a lack of sites in which to properly dispose of household hazardous waste, and some are prohibitively expensive for some residents.

Model ordinance could be used by the jurisdictions in the San Bernard watershed to design nonpoint source pollution control ordinances or storm water pollution prevention plans. A number of example ordinances have been collected and posted to the San Bernard Watershed website.