

APPENDIX B: SAMPLING PROCESS DESIGN AND MONITORING SCHEDULE (PLAN)

Sample Design Rationale

The sample design is based on the legislative intent of the Clean Rivers Program. Under the legislation, the Planning Agencies have been tasked with providing data to identify significant long-term water quality trends, to characterize water quality conditions in support of the 305(b) assessment. Based on Steering Committee input, achievable water quality objectives and priorities and the identification of water quality issues are used to develop work plans, which are in accord with available resources. As part of the Steering Committee process, the SRA coordinates closely with the TNRCC and other participants to ensure a comprehensive water monitoring strategy within the Watershed. Past assessments in the Sabine Basin have been used to focus limited monitoring resources on high priority subwatersheds. The 1999 Summary of Water Quality Report for the Sabine Basin identified several Subwatersheds with water quality problems. The Subwatersheds selected for special studies were determined by ranking from the SRA staff and the SRA Steering Committee.

Site Selection Criteria

This data collection effort involves monitoring fixed/routine water quality, using procedures that are consistent with the TNRCC SWQM program, for the purpose of data entry into the statewide database maintained by the TNRCC. To this end, some general guidelines are followed when selecting sampling sites, as identified below. Overall consideration is given to accessibility and safety. All monitoring activities have been developed with coordination with the CRP Steering Committee and with the TNRCC.

1. Fixed/routine monitoring sites are representative of in-stream data and are free from back-water effects.
2. Fixed/routine monitoring sites are selected to maximize stream coverage or basin coverage. For very long stretches of river length, a station is considered representative of a water body for not more than 25 miles in freshwater and tidal streams. A single monitoring site is considered representative of 25 percent of the total reservoir acres and estuary or ocean square miles, but not more than 5,120 acres or 8 square miles.
3. Fixed/routine monitoring sites are located preferentially where there are “localized” water quality effects based on past water quality data.
4. Fixed/routine monitoring sites are located where historical data exists. No degradation of water quality may be indicated. However, the continuation of water quality monitoring at this site has been deemed important.
5. At least one site for each classified segment will be selected for fixed/routine monitoring unless the segment is already covered by TNRCC or other qualified monitoring entities reporting fixed/routine data to TNRCC.
6. Fixed/routine monitoring sites may be selected to bracket sources of pollution, influence of tributaries, changes in land uses, and hydrological modifications.
7. Fixed/routine monitoring sites are chosen based on accessibility. When possible, sites are selected where it is possible to collect flow measurements during routine visits or where a stream flow gage is located.

Monitoring Sites

Monitoring Tables for fiscal year 2002 are presented on the following page.

Critical vs. non-critical measurements

All data taken for CRP and entered into the State of Texas SWQM Database are considered critical.

Segment	Region	Basin_id	LatNum	LongNum	SRA ID	LongDesc	StationId	StartDate	EndDate	MonitoringResp	MonitoringType	E. coli	AquaticCommun- 24hrDO	RoutineBenthics	RoutineNekton	TSWQSMetalsWate	OrganicsWater	MetalsSed	OrganicsSed	Conventional	AmbToxWat	AmbToxSed	Fecal coliform	InstFlow	FishTissue	Field
501	10	5	30.006	-93.745	BB1	Black Bayou in Cameron Parish Louisiana 0.7km Upstream of Confluence With Sabine River	15654	9/1/2001	8/31/2002	SR/SR	RT					1		1		12			12			12
501	10	5	30.059	-93.669	ICW1	Intracoastal Waterway 3.2km East of Sabine River at Perry Ridge in Calcasieu Parish Louisiana	15653	9/1/2001	8/31/2002	SR/SR	RT					1				12			12			12
501	10	5	30.179	-93.709	SR1	Sabine River 12.00 km Upstream of IH 10	10395	9/1/2001	8/31/2002	SR/SR	RT									12			12			12
501	10	5	30.004	-93.767	SRT1	Sabine River at Channel Can 3 - 3/4 Mile Below Mouth of New Cow Bayou	10391	9/1/2001	8/31/2002	SR/SR	RT									12			12			12
501	10	5	30.127	-93.701	SRT2	Sabine River at IH 10 in Orange	10394	9/1/2001	8/31/2002	SR/SR	RT					1		1		12			12			12
503	10	5	30.868	-93.509	BA4	Anacoco Bayou at Louisiana Hwy 111 Crossing Southwest of Knight LA.	10340	9/1/2001	8/31/2002	SR/SR	RT					1		1		12			12			12
503	10	5	30.304	-93.744	SR2	Sabine River at SH 12 North of Deweyville TX	10397	9/1/2001	8/31/2002	SR/SR	RT					1		1		12			12	12		12
503	10	5	31.064	-93.519	SR5	Sabine River at SH 63 East of Burkeville TX	10399	9/1/2001	8/31/2002	SR/SR	RT									12			12	12		12
503	10	5	30.747	-93.608	SR3	Sabine River at Us 190 East of Bon Wier TX	10398	9/1/2001	8/31/2002	SR/SR	RT									12			12	12		12
503	10	5	31.196	-93.565	TB6S	Sabine River Below Toledo Bend Reservoir at Right Abutment of Spillway For Dam	10401	9/1/2001	8/31/2002	SR/SR	RT									12			12	12		12

Segment	Region	Basin_id	LatNum	LongNum	SRA ID	LongDesc	StationId	StartDate	EndDate	MonitoringResp	MonitoringType	E_coli	AquaticCommun- 24hrDO	RoutineBenthics	RoutineNekton	TSWOSMetalsWate	OrganicsWater	MetalsSed	OrganicsSed	Conventional	AmbToxMat	AmbToxSed	Fecal coliform	InstFlow	FishTissue	Field
503	10	5	31.173	-93.565	TB6	Sabine River Immediately Below Powerhouse for Toledo Bend Reservoir	10400	9/1/2001	8/31/2002	SR/SR	RT								12			12	12		12	
503	10	5	30.227	-93.738	GC1CL	Sabine River Authority Canal at Pump Station South of Deweyville	10345	9/1/2001	8/31/2002	SR/SR	RT					1	1	52				52			52	
503	10	5	30.832	-93.737		Caney Creek 0.1km Upstream of Newton WWTP	15150	9/1/2001	8/31/2002	SR/SR	SS					1	1	6	6	6	6	6	6		6	
503	10	5	30.738	-93.635	CNY190	Caney Creek at Us 190 South of The City of Newton	14491	9/1/2001	8/31/2002	SR/SR	SS					1	1	6	6	6	6	6	6		6	
504	10	5	31.622	-93.650	TB6N	Bayou Scie at Louisiana SH 191 South of Zwolle Louisiana in Sabine Parish Louisiana	15658	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	5	31.466	-93.743	TB6H	Toledo Bend Reservoir at SH 21 Northeast of Milam	10402	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	5	31.972	-94.006	TB8	Toledo Bend Reservoir at US 84 near Logansport LA	10403	9/1/2000	8/31/2001	SR/SR	RT					1	1	12				12			12	
504	10	5	31.516	-93.652	TB6K	Toledo Bend Reservoir in Lanana Bayou at Louisiana SH 191 in Sabine Parish Louisiana West of Many	15659	9/1/2002	8/31/2003	SR/SR	RT					1	1	12				12			12	
504	10	5	31.631	-93.665	TB6L	Toledo Bend Reservoir in San Miguel Arm at Louisiana SH 191 Immediately West of Zwolle Louisiana	15656	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	5	31.684	-93.727	TB6M	Toledo Bend Reservoir in San Patricia Arm at Louisiana SH 191 Northwest of Zwolle Louisiana	15657	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	5	31.239	-93.756	TB6CN	Toledo Bend Reservoir in Six Mile Boat Lane at SH 87	10407	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	5	31.411	-93.782	TB6F	Toledo Bend Reservoir in Sunshine Bay Near FM 3121 Bridge	10411	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	

Segment	Region	Basin_id	LatNum	LongNum	SRA ID	LongDesc	StationId	StartDate	EndDate	MonitoringResp	MonitoringType	E. coli	AquaticCommun- 24hrDO	RoutineBenthics	RoutineNekton	TSWOSMetalsWate	OrganicsWater	MetalsSed	OrganicsSed	Conventional	AmbToxMat	AmbToxSed	Fecal coliform	InstFlow	FishTissue	Field
504	10	5	31.168	-93.578	TB6A	Toledo Bend Reservoir Main Lake Above The Dam at the Old River Channel	10404	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	5	31.522	-93.801	TB6J	Toledo Bend Reservoir Patroon Bayou Branch at FM 276	15655	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
504	10	10	31.800	-94.037		Teneha Creek at Bridge on County Road South of Campiti	10339	9/1/2001	8/31/2002	SR/SR	SS					1	1	12				12			12	
504	10	10	31.800	-94.037		Teneha Creek at Bridge on County Road South of Campiti	10339	9/1/2001	8/31/2002	SR/SR	DI	3											3			
505	5	5	32.125	-94.202	SR10	Sabine River at FM 2517 West of Deadwood TX	10415	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
505	5	5	32.417	-94.710	SR14	Sabine River at SH 149 South of Longview TX.	10423	9/1/2001	8/31/2002	SR/SR	RT					1		12				12	12		12	
505	5	5	32.477	-94.850	SR16	Sabine River at SH 42 Near Kilgore	10427	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12			12	
505	5	5	32.468	-94.781	SR15	Sabine River at Us 259 Near Longview	10426	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12	12		12	
505	5	5	32.527	-94.960	SR17	Sabine River at Us 271 at Gladewater TX	10428	9/1/2001	8/31/2002	SR/SR	RT					1	1	12				12	12		12	
505	5	5	32.329	-94.354	SR11	Sabine River at Us 59 - 8.4 Mi NE of Beckville 0.9 mi Upstream from Eightmile Creek	13628	9/1/2001	8/31/2002	SR/SR	RT					1		12				12			12	
505	5	5	32.462	-94.750	GC04	Grace Creek at FM 1845-LP 281	14499	9/1/2001	8/31/2002	SR/SR	DI		2											2		
505	5	5	32.434	-94.822	RBC03	Rabbit Ck at Co Rd 0.1 Km Upstream of IH 20	10371	9/1/2001	8/31/2002	SR/SR	SS	6				1	1	6	6			6	6		6	
505	5	5	32.493	-94.832	HWC2206	HAWKINS CREEK AT FM 2206	10383	9/1/2001	8/31/2002	SR/SR	NP			2	2	2	2	1		2	2		2	2		2
505	5	5	32.591	-94.841	HWK1844	HAWKINS CREEK AT FM 1844, NORTHWEST OF LONGVIEW	16684	9/1/2001	8/31/2002	SR/SR	NP			2	2	2	2	1		2	2		2	2		2

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505	5	5	32.557	-94.840	HWK2275	HAWKINS CREEK AT FM 2275, NORTHWEST OF LONGVIEW	16683	9/1/2001	8/31/2002	SR/SR	NP		2	2	2	2		1		2	2		2	2		2
505	5	5	32.538	-94.842	HWK2605	HAWKINS CREEK AT FM 2605, WEST OF LONGVIEW AND 0.2KM DOWNSTREAM OF SPRING HILL CREEK CONFLUENCE	15487	9/1/2001	8/31/2002	SR/SR	NP		2	2	2	2		1		2	2		2	2		2
505	5	5	32.526	-94.841	HWKWR	HAWKINS CREEK AT WHATLEY ROAD APPROXIMATELY 1.25 MI. EAST OF WHITEOAK AND APPROXIMATELY 1.0 MI. NORTH OF HWY 80	10384	9/1/2001	8/31/2002	SR/SR	NP		2	2	2	2		1		2	2		2	2		2
505	5	5	32.370	-94.458		Sabine River at SH 43 Northeast of Tatum	10418	9/1/2001	8/31/2002	SR/TE	TS					4										
505	5	5	32.427	-94.673		Eastman Chemical Wq0000471-002 WWTP Outfall at Buckhorn Cr 0.5 Km Upstream of Confluence With The Sabine River	16124	9/1/2001	8/31/2002	SR/TE	TS					4										
505	5	5	32.417	-94.710	SR14	Sabine River at SH 149 South of Longview TX	10423	9/1/2001	8/31/2002	SR/TE	TS					4										
505	5	5	32.477	-94.850	SR16	Sabine River at SH 42 Near Kilgore	10427	9/1/2001	8/31/2002	SR/TE	TS					4										
505	5	5	32.468	-94.781	SR15	Sabine River at Us 259 Near Longview	10426	9/1/2001	8/31/2002	SR/TE	TS					4										
505	5	5	32.527	-94.960	SR17	Sabine River at Us 271 at Gladewater TX	10428	9/1/2001	8/31/2002	SR/TE	TS					4										
505	5	5	32.329	-94.354	SR11	Sabine River at Us 59 - 8.4 mi NE of Beckville 0.9 Mi Upstream From Eightmile Creek	13628	9/1/2001	8/31/2002	SR/TE	TS					4										
506	5	5	32.560	-95.207	SR19	Sabine River at SH 14 4.17 Km South of Hawkins TX	10429	9/1/2001	8/31/2002	SR/SR	RT					1				12		12	12		12	

Segment	Region	Basin_id	LatNum	LongNum	SRA ID	LongDesc	StationId	StartDate	EndDate	MonitoringResp	MonitoringType	E_coli	24hrDO	AquaticCommun- Turbidity	RoutineBenthics	RoutineNekton	TSWOSMetalsWate	OrganicsWater	MetalsSed	OrganicsSed	Conventional	AmbToxMat	AmbToxSed	Fecal coliform	InstFlow	FishTissue	Field
506	5	5	32.613	-95.486	SR21	Sabine River at US 69 South of Mineola TX	10430	9/1/2001	8/31/2002	SR/SR	RT						1				12		12	12		12	
506	5	5	32.492	-95.158	HRS16	Harris Creek at FM 16 East of Winona	14500	9/1/2001	8/31/2002	SR/SR	SS			2	2	2	1		1		6	6	6	6		6	
506	5	5	32.492	-95.158	HRS16	Harris Creek at FM 16 East of Winona	14500	9/1/2001	8/31/2002	SR/SR	DI		2											2			
506	5	5	32.720	-95.635	SR22	Sabine River at the FM 17 Bridge Between Grand Saline and Alba	17065	9/1/2001	8/31/2002	SR/SR	RT						1		1		12		12			12	
506	5	5	32.457	-95.181	WIG3311	Wiggins Creek at FM 3311 South of Winona	14507	9/1/2001	8/31/2002	SR/SR	SS						1		1		6	6	6	6		6	
507	4	5	32.861	-96.067	LT23D	Lake Tawakoni in Kitsee Inlet Near White Point Causeway	10435	9/1/2001	8/31/2002	SR/SR	RT						1		1		12		12			12	
507	5	5	32.809	-95.921	LT23A	Lake Tawakoni in The Main Lake Near The Dam in the Old River Channel	10434	9/1/2001	8/31/2002	SR/SR	RT						1		1		12		12			12	
507	4	5	32.958	-96.002	LT23C	Lake Tawakoni in The Upper Lake (Cowleech Fork) at the Old River Channel	10440	9/1/2001	8/31/2002	SR/SR	RT						1		1		12		12			12	
507	5	5	32.809	-95.921	LT23A	Lake Tawakoni in The Main Lake Near The Dam in the Old River Channel	10434	9/1/2001	8/31/2002	SR/SR	DI		2														
508	10	5	30.064	-93.749	AB2	Adams Bayou at FM 1006 in Orange TX	10441	9/1/2001	8/31/2002	SR/SR	IS										12		12			12	
508	10	5	30.132	-93.787	AB7	Adams Bayou at FM 3247 NW of Orange	15107	9/1/2001	8/31/2002	SR/SR	IS										12		12			12	
508	10	5	30.132	-93.787	AB7	Adams Bayou at FM 3247 NW of Orange	15107	9/1/2001	8/31/2002	SR/SR	DI		2														
510	5	5	32.342	-94.701	CHERO2	Lake Cherokee at Silvey Bridge	15195	9/1/2001	8/31/2002	SR/LW	RT						1				9		9			9	
510	10	5	32.373	-94.657	CHERO1	Lake Cherokee City of Longview Water Intake, 2.5 Mi. East of FM 2963	15514	9/1/2001	8/31/2002	SR/LW	RT						1				9		9			9	

Segment	Region	Basin_id	LatNum	LongNum	SRA ID	LongDesc	StationId	StartDate	EndDate	MonitoringReap	MonitoringType	E_coli	24hrDO	AquaticCommun- 1hrDO	RoutineBenthics	RoutineNekton	TSWOSMetalsWate	OrganicsWater	MetalsSed	OrganicsSed	Conventional	AmbToxMat	AmbToxSed	Fecal coliform	InstFlow	FishTissue	Field
511	10	5	30.037	-93.796	CB1	Cow Bayou at FM 1442 (Downstream Crossing, Round Bunch Rd) East of Bridge City TX	10449	9/1/2001	8/31/2002	SR/SR	IS										12			12			12
511	10	5	30.108	-93.896	CB4	Cow Bayou at FM 1442 (North Crossing) Between SH 105 And IH 10	13781	9/1/2001	8/31/2002	SR/SR	IS										12			12			12
511	10	5	30.108	-93.896	CB4	Cow Bayou at FM 1442 (North Crossing) Between SH 105 And IH 10	13781	9/1/2001	8/31/2002	SR/SR	DI		2											2			
512	5	5	32.896	-95.524	LF3	Lake Fork Reservoir Mid-Arm in Caney Creek Arm at FM 515	10461	9/1/2001	8/31/2002	SR/SR	RT						1	1		12			12			12	
512	5	5	32.883	-95.627	LF4	Lake Fork Reservoir Mid-Cove in Lake Fork Creek Arm at FM 515	10462	9/1/2001	8/31/2002	SR/SR	RT						1	1		12			12			12	
512	5	5	32.805	-95.542	LF2	Lake Fork Reservoir Near Dam 300 Meters Northwest of Spillway at Mid-Reservoir	10458	9/1/2001	8/31/2002	SR/SR	RT						1	1		12			12			12	
513	10	5	30.605	-93.794	BCC1	Big Cow Creek at FM 1416 South of Bon Wier	10465	9/1/2001	8/31/2002	SR/SR	IS	12		1	1	1	1	1	1	12	6		12	6		12	
514	5	5	32.578	-95.082	BS18	Big Sandy Creek at US 80 West of Gladewater	10467	9/1/2001	8/31/2002	SR/SR	RT						1			12			12			12	
515	5	5	32.632	-95.354	LF20	Lake Fork Creek at US 80 12 Km East of Mineola	10469	9/1/2001	8/31/2002	SR/SR	RT						1			12			12			12	

Legend:

Field – pH, DO, Percent Saturation of DO, Conductivity, Salinity, TDS, Temperature, Secchi Depth, Days since last significant rainfall, Water Color, Water Odor, Weather, Wind Intensity, Wind Direction, Total water depth, Flow, Flow severity

Conventional – TSS, TOC, Turbidity, BOD, 5-day, O-phosphate-P, Nitrate/nitrite-N, Sulfate, Bromide, Fluoride, Chloride, Alkalinity, total, Hardness, total (as CaCO3), Chlorophyll-a, Pheophytin.

Bacteriological - E. coli, IDEXX Colilert, Fecal coliform, Fecal Streptococcus.

Metals (in water& in Sediment) – Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Zinc.