

## **8. Appendices**

Appendices A-D and G are too large to be included here. Please click on the link to access the Appendix files from the [Status and Trends Website](#).

[Appendix A – Maps](#)

[Appendix B – Water Quality Trends](#)

[Appendix C – Sediment Quality Trends](#)

[Appendix D – Fisheries Abundance Trends](#)

[Appendix G – Metadata](#)

**Appendix E – TCEQ Water Quality Trends Summary Table**

	<u>Christmas Bay/Bastrop Bayou</u>			<u>Galveston Channel</u>			<u>East Intracoastal Waterway</u>		
	<b>Trend</b>	<b>R<sup>2</sup></b>	<b>p</b>	<b>Trend</b>	<b>R<sup>2</sup></b>	<b>p</b>	<b>Trend</b>	<b>R<sup>2</sup></b>	<b>p</b>
Ammonia	Decreasing	0.32	<0.001	No Trend	0.01		No Trend	0.13	
BOD5	No Trend	0.23		Insufficient Data	--		Insufficient Data	--	
Chlor A + Pheophytin A	Decreasing	0.46	<0.001	No Trend	0.09		No Trend	0.30	0.036
DO 5a.m.-10a.m.	No Trend	0.47	0.014	No Trend	0.09		Insufficient Data	--	
DO 10a.m.-3p.m.	No Trend	0.00		No Trend	0.02		No Trend	0.04	
Fecal Col (Log)	No Trend	0.04		No Trend	0.01		Decreasing	0.59	<0.001
Nitrate Nitrite	No Trend	0.05		No Trend	0.01		Decreasing	0.38	0.005
Ph	No Trend	0.22		No Trend	0.00		No Trend	0.20	
Phosphorus	No Trend	0.07		No Trend	0.23		No Trend	0.23	
Salinity	No Trend	0.31	0.024	No Trend	0.25	0.041	No Trend	0.11	
TOC	No Trend	0.12		Decreasing	0.44	<0.001	Decreasing	0.77	<0.001
TSS	No Trend	0.13		No Trend	0.01		Decreasing	0.46	<0.001
Water Temperature	No Trend	0.10		No Trend	0.08		Insufficient Data	--	

	<u>Trinity River</u>			<u>West Bay</u>		
	<b>Trend</b>	<b>R<sup>2</sup></b>	<b>p</b>	<b>Trend</b>	<b>R<sup>2</sup></b>	<b>p</b>
Ammonia	Decreasing	0.31	0.001	Decreasing	0.27	0.002
BOD5	No Trend	0.15		No Trend	0.09	
Chlor A + Pheophytin A	No Trend	0.23		Decreasing	0.46	<0.001
DO 5a.m.-10a.m.	Insufficient Data	--		No Trend	0.04	
DO 10a.m.-3p.m.	No Trend	0.00		No Trend	0.00	
Fecal Col (Log)	No Trend	0.04		No Trend	0.00	
Nitrate Nitrite	No Trend	0.03		No Trend	0.20	
Ph	No Trend	2.00E-05		Decreasing	0.28	0.003
Phosphorus	Decreasing	0.44	<0.001	No Trend	0.24	
Salinity	No Trend	0.04		No Trend	0.00	
TOC	Decreasing	0.28	0.003	Decreasing	0.53	<0.001
TSS	Decreasing	0.25	0.004	No Trend	0.11	
Water Temperature	Insufficient Data	--		No Trend	0.00	

**Appendix E cont. TCEQ Sediment Quality Trends Summary Table**

	<u>Christmas Bay/ Bastrop Bayou Complex</u>		<u>West Bay</u>		<u>Galveston Channel</u>		<u>East Intracoastal Waterway</u>	
	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>
<b>Metals</b>								
Arsenic	No Trend	0.04	No Trend	0.00	Insufficient Data	--	Insufficient Data	--
Cadmium	Insufficient Data	--	Decreasing	0.38 (p=0.002)	Insufficient Data	--	Insufficient Data	--
Chromium	Decreasing	0.26 (p=0.129)	No Trend	0.10	Insufficient Data	--	Insufficient Data	--
Copper	No Trend	0.04	No Trend	0.11	Insufficient Data	--	Insufficient Data	--
Lead	Decreasing	0.48 (p=0.012)	No Trend	0.21	Insufficient Data	--	Insufficient Data	--
Mercury	No Trend	0.06	No Trend	0.14	Insufficient Data	--	Insufficient Data	--
Nickel	Decreasing	0.82 (p<0.001)	Decreasing	0.33 (p=0.007)	Insufficient Data	--	Insufficient Data	--
Zn	Decreasing	0.33 (p=0.05)	No Trend	0.10	Insufficient Data	--	Insufficient Data	--
<b>Organics</b>								
Aldrin	Insufficient Data	--	No Trend	0.22	Insufficient Data	--	Insufficient Data	--
Chlordane	Insufficient Data	--	Increasing	0.27 (p=0.084)	Insufficient Data	--	Insufficient Data	--
DDD	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--
DDE	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--
DDT	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--
Diazinon	Insufficient Data	--	Increasing	0.36 (p=0.050)	Insufficient Data	--	Insufficient Data	--
Dieldrin	Insufficient Data	--	No Trend	0.22	Insufficient Data	--	Insufficient Data	--
Endrin	Insufficient Data	--	No Trend	0.22	Insufficient Data	--	Insufficient Data	--
PCB Total	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--
TOC	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--

BDL=Below Detection Limit

**Appendix E cont. TCEQ Sediment Quality Trends Summary Table**

	<u>Trinity River</u>		<u>Upper Houston Ship Channel</u>		<u>Lower Houston Ship Channel</u>	
	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>
<b><u>Metals</u></b>						
Arsenic	Insufficient Data	--	No Trend	0.05	No Trend	0.01
Cadmium	No Trend	0.07	Decreasing	0.53 p<0.001	Insufficient Data	--
Chromium	No Trend	0.12	No Trend	0.22	No Trend	0.02
Copper	No Trend	0.07	No Trend	0.00	No Trend	0.00
Lead	No Trend	0.00	Decreasing	0.28 p=0.003	No Trend	0.01
Mercury	Increasing	0.39 p=0.072	No Trend	0.04	No Trend	0.05
Nickel	No Trend	0.03	No Trend	0.13	No Trend	0.03
Zn	No Trend	0.08	No Trend	0.20	No Trend	0.06
<b><u>Organics</u></b>						
Aldrin	Insufficient Data	--	No Trend	0.11	BDL	--
Chlordane	Insufficient Data	--	No Trend	0.10	No Trend	0.01
DDD	Insufficient Data	--	No Trend	0.08	Insufficient Data	--
DDE	Insufficient Data	--	No Trend	0.11	Insufficient Data	--
DDT	Insufficient Data	--	No Trend	0.11	Insufficient Data	--
Diazinon	Insufficient Data	--	BDL	--	Decreasing	0.27 p=0.066
Dieldrin	Insufficient Data	--	Decreasing	0.35 p=0.001	BDL	--
Endrin	Insufficient Data	--	BDL	--	BDL	--
PCB Total	Insufficient Data	--	No Trend	0.10	Insufficient Data	--
TOC	Insufficient Data	--	Insufficient Data	--	Insufficient Data	--

BDL=Below Detection Limit

**Appendix F – TPWD Fisheries Trends Summary Table – Bag Seine.**

Species	West Bay			Christmas Bay			Upper and Lower Galveston Bay			East Bay			Trinity Bay		
	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>	p
Atlantic Croaker	No Trend	0.07		No Trend	0.00		--	--		--	--		--	--	
Striped Mullet	No Trend	0.09		No Trend	0.01		--	--		--	--		--	--	
Spotted Seatrout	No Trend	0.16		No Trend	0.12		--	--		--	--		--	--	
Spot	No Trend	0.07		No Trend	0.17		--	--		--	--		--	--	
Grass Shrimp	No Trend	0.01		No Trend	0.02		--	--		--	--		--	--	
Brown Shrimp	No Trend	0.01		No Trend	0.02		--	--		--	--		--	--	
Atlantic Brief Squid	No Trend	0.04		No Trend	0.00		--	--		--	--		--	--	
Sheepshead Minnow	No Trend	0.13		No Trend	0.02		--	--		--	--		--	--	
Sand seatrout	No Trend	0.00		No Trend	0.01		--	--		--	--		--	--	
Pinfish	No Trend	0.02		No Trend	0.02		--	--		--	--		--	--	
Hardhead Catfish	No Trend	0.13		No Trend	0.05		--	--		--	--		--	--	
Gulf Menhaden	No Trend	0.00		No Trend	0.06		--	--		--	--		--	--	
Black Drum	No Trend	0.04		No Trend	0.09		--	--		--	--		--	--	
Bay Anchovy	No Trend	0.02		No Trend	0.05		--	--		--	--		--	--	
Atlantic Threadfin Shad	No Trend	0.11		No Trend	0.08		--	--		--	--		--	--	
White Shrimp	No Trend	0.14		No Trend	0.01		--	--		--	--		--	--	
Blue Crab	No Trend	0.07		No Trend	0.03		--	--		--	--		--	--	
Southern Flounder	No Trend	0.00		No Trend	0.10		--	--		--	--		--	--	
Longnose Killifish	No Trend	0.07		No Trend	0.10		No Trend	0.17		No Trend	0.08		No Trend	0.01	
Atlantic Stingray	No Trend	0.19	0.026	No Trend	0.05		No Trend	0.01		No Trend	0.06		No Trend	0.01	
Atlantic Threadfin	No Trend	0.03		No Trend	0.07		No Trend	0.03		No Trend	0.07		No Trend	0.04	
Bay Whiff	No Trend	0.20		No Trend	0.01		No Trend	7E-09		No Trend	0.01		No Trend	0.20	0.023
Searobin	No Trend	0.03		No Trend	0.02		No Trend	0.02		No Trend	0.12		No Trend	0.04	
Gizzard Shad	No Trend	0.00		No Trend	0.01		No Trend	0.01		No Trend	0.06		No Trend	0.04	
Gulf Killifish	Decreasing	0.25	0.009	No Trend	0.05		Decreasing	0.30	0.004	No Trend	0.05		No Trend	0.01	
Inland Silverside	No Trend	0.10		No Trend	0.06		No Trend	0.15		No Trend	0.13		No Trend	0.00	
Least Puffer	Decreasing	0.28	0.006	No Trend	0.17		No Trend	0.00		No Trend	0.17		No Trend	0.07	
Lesser Blue Crab	No Trend	0.01		Increasing	0.25	0.010	Increasing	0.32	0.002	No Trend	0.02		No Trend	0.05	
Naked Goby	No Trend	0.01		No Trend	0.01		No Trend	0.03		No Trend	0.08		No Trend	0.08	
Seabob	No Trend	0.09		No Trend	0.00		No Trend	0.03		No Trend	0.07		No Trend	0.08	
Spotfin Mojarra	No Trend	0.12		No Trend	0.01		No Trend	0.10		No Trend	0.24	0.015	No Trend	0.19	
White Mullet	No Trend	6E-06		No Trend	0.09		No Trend	0.03		No Trend	0.01		No Trend	0.04	
Sea Nettle	No Trend	0.01		No Trend	0.11		No Trend	0.13		No Trend	0.05		No Trend	0.08	
Ladyfish	No Trend	0.01		No Trend	0.00		No Trend	0.01		No Trend	0.00		No Trend	0.08	
Atlantic Bumper	No Trend	0.16		No Trend	0.00		No Trend	1E-05		No Trend	0.06		No Trend	*	
Diamond Killifish	No Trend	0.12		No Trend	0.01		No Trend	0.00		No Trend	0.03		No Trend	*	
Pigfish	No Trend	0.07		No Trend	0.17		No Trend	0.06		No Trend	0.05		No Trend	0.05	
Sheepshead	No Trend	0.08		No Trend	0.06		No Trend	0.01		No Trend	0.22		No Trend	0.05	

Annual Sample Size  
(Avg, Max, Min)

40,79,3

17,34,1

21,33,2

20,34,3

25,46,2

\* 0 CPUE in all years

-- Refer to [Status and Trends Fisheries Resources website](#) for trend graphs completed in 2002

Appendix F Cont... – TPWD Fisheries Trends Summary Table – Shrimp Trawl

Species	West Bay			Trinity Bay		Upper and Lower Galveston			East Bay			Christmas Bay	
	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>	p	Trend	R <sup>2</sup>
Atlantic Stingray	No Trend	0.11		No Trend	0.09	No Trend	0.07		No Trend	0.10		**	**
Atlantic Threadfin	No Trend	0.03		No Trend	0.05	No Trend	0.00		No Trend	0.00		**	**
Bay Whiff	No Trend	0.04		No Trend	0.19	No Trend	0.20		No Trend	0.22		**	**
Gizzard Shad	No Trend	*		No Trend	0.08	No Trend	0.01		No Trend	0.05		**	**
Least Puffer	No Trend	0.10		No Trend	0.02	No Trend	0.08		No Trend	0.14		**	**
Lesser Blue Crab	No Trend	0.16		No Trend	0.06	No Trend	0.16		No Trend	0.14		**	**
Seabob	No Trend	0.24	0.030	No Trend	0.18	No Trend	0.27	0.019	No Trend	0.05		**	**
Sea Nettle	No Trend	0.00		No Trend	0.02	No Trend	0.03		No Trend	0.01		**	**
Atlantic Bumper	No Trend	0.00		No Trend	0.03	No Trend	0.04		No Trend	0.08		**	**
Pigfish	No Trend	0.08		No Trend	*	No Trend	0.10		No Trend	0.03		**	**
Sheepshead	No Trend	0.02		No Trend	0.19	No Trend	0.09		No Trend	0.23	0.033	**	**
Mantis Shrimp	No Trend	0.15		No Trend	0.09	No Trend	0.00		No Trend	0.12		**	**
Cabbagehead	No Trend	0.06		No Trend	0.07	No Trend	0.16		No Trend	0.01		**	**
Fringed Flounder	No Trend	0.10		No Trend	0.00	No Trend	0.15		No Trend	0.01		**	**
Gafftop Sailfish	No Trend	0.03		No Trend	0.06	No Trend	0.26	0.023	No Trend	0.07		**	**
Gulf Butterfish	No Trend	0.01		No Trend	0.00	No Trend	0.06		No Trend	0.06		**	**
Pink Shrimp	No Trend	0		No Trend	0.01	Increasing	0.34	0.007	No Trend	0.08		**	**
Atlantic Croaker	No Trend	0.08		--	--	--	--		--	--		**	**
Bay Anchovy	Increasing	0.32	0.010	--	--	--	--		--	--		**	**
Blue Crab	Decreasing	0.33	0.009	--	--	--	--		--	--		**	**
Brown Shrimp	No Trend	0.02		--	--	--	--		--	--		**	**
Pinfish	No Trend	0.27	0.019	--	--	--	--		--	--		**	**
Sand Seatrout	No Trend	0.02		--	--	--	--		--	--		**	**
Spot	No Trend	0.20		--	--	--	--		--	--		**	**
White Shrimp	No Trend	0.11		--	--	--	--		--	--		**	**
Threadfin Shad	No Trend	0.19		--	--	--	--		--	--		**	**
Stone Crab	No Trend	0.14		--	--	--	--		--	--		**	**
Striped Mullet	No Trend	0.00		--	--	--	--		--	--		**	**
Spotted Seatrout	No Trend	0.04		--	--	--	--		--	--		**	**
Southern Flounder	No Trend	0.00		--	--	--	--		--	--		**	**
Hardhead Catfish	No Trend	0.10		--	--	--	--		--	--		**	**
Gulf Menhaden	No Trend	0.17		--	--	--	--		--	--		**	**
Black Drum	No Trend	0.11		--	--	--	--		--	--		**	**
Atlantic Brief Squid	No Trend	0.05		--	--	--	--		--	--		**	**

Sample Size: 36,53,27 62,68,54 110,122,97 24,33,14  
(Avg, Max, Min)

- \* 0 CPUE in all years
- \*\* No CPUE calculated for shrimp trawl due to shallow nature of sub-bay
- Refer to [Status and Trends Fisheries Resources website](#) for trend graphs completed in 2002

Appendix F Cont... – TPWD Fisheries Trends Summary Table – Gill Net

Species	<u>West Bay</u>		<u>Christmas Bay</u>		<u>Upper and Lower Galveston Bay</u>		<u>East Bay</u>		<u>Trinity Bay</u>	
	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>
<b>FINFISH</b>										
Atlantic Croaker	No Trend	0.21	No Trend	0.04	--	--	--	--	--	--
Drum, Black	<b>Increasing</b>	<b>0.32</b>	No Trend	0.00	--	--	--	--	--	--
Drum, Red	No Trend	0.2	No Trend	0.06	--	--	--	--	--	--
Flounder, Southern	No Trend	0.09	No Trend	0.11	--	--	--	--	--	--
Mullet, Striped	No Trend	0.10	No Trend	0.03	--	--	--	--	--	--
Seatrout, Spotted	<b>Increasing</b>	<b>0.58</b>	<b>Increasing</b>	<b>0.38</b>	--	--	--	--	--	--
<b>Sample Size: (Avg, Max, Min)</b>	<b>24,40,5</b>		<b>8,15,1</b>							

-- Refer to [Status and Trends Fisheries Resources website](#) for trend graphs completed in 2002

TPWD Fisheries Trends Summary Table – Oyster Dredge

Species	<u>West Bay</u>		<u>Christmas Bay</u>		<u>Upper and Lower Galveston Bay</u>		<u>East Bay</u>		<u>Trinity Bay</u>	
	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>	Trend	R <sup>2</sup>
Eastern Oyster	No Trend	0.02	No Trend	0.03	No Trend	0.20	No Trend	0.02	No Trend	0.03
<b>Sample Size: (Avg, Max, Min)</b>	<b>41,70,17</b>		<b>17,36,7</b>		<b>279,442,77</b>		<b>84,140,24</b>		<b>47,81,14</b>	

**Appendix H –Total Volume of Oil Spills in Galveston Bay Watershed by Water Body, 1998-2002; Source Texas General Land Office**

<b>Water Body Name</b>	<b>Amount Spilled (in Gallons)</b>	<b>% of Total Amount Spilled</b>
Houston Ship Channel	133,084	50.8%
Galveston Bay	52,118	19.9%
Texas City Ship Channel	17,634	6.7%
Greens Bayou	14,855	5.7%
San Jacinto River	12,021	4.6%
Brazos River	9,284	3.5%
Sims Bayou	7,536	2.9%
Gulf Intracoastal Waterway	5,524	2.1%
Gulf of Mexico	2,389	0.9%
Galveston Ship Channel	2,155	0.8%
Buffalo Bayou	1,441	0.5%
Old Brazos River	706	0.3%
Double Bayou	580	0.2%
Clear Lake	487	0.2%
Chocolate Bayou	358	0.1%
Clear Creek	335	0.1%
Dickinson Bayou	259	0.1%
Trinity Bay	229	0.1%
Bayport Channel & Turning Basin	223	0.1%
Carpenters Bayou	183	0.1%
Cedar Creek (Bayou)	120	0.0%
Tucker's Bayou	110	0.0%
Dickinson Bay	91	0.0%
Offatts Bayou	56	0.0%
Old River	50	0.0%
Freeport Channel	41	0.0%
Cotton Bayou	33	0.0%
Other	31	0.0%
West Bay	22	0.0%
Lost Lake	14	0.0%
Oyster Creek	13	0.0%
San Bernard River	10	0.0%
Goose Creek	10	0.0%
Jarbo Bayou	5	0.0%
Burnett Bay	2	0.0%
Horse Pen Bayou	1	0.0%
Tabbs Bay	1	0.0%
Lost River	0	0.0%
Bastrop Bayou	0	0.0%
Jones Bay	0	0.0%
Highland Bayou	0	0.0%
<b>Total</b>	<b>262,009.84</b>	