

TEXAS WATER DEVELOPMENT BOARD

REPORT 144

CHEMICAL AND PHYSICAL CHARACTERISTICS
OF WATER IN ESTUARIES OF TEXAS
OCTOBER 1968-SEPTEMBER 1969

By

D. C. Hahl and Karl W. Ratzlaff
United States Geological Survey

This report was prepared by the U.S. Geological Survey under cooperative agreement with the Texas Water Development Board.

April 1972

Second Printing
April 1977

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Texas Water Development Board
Post Office Box 13087
Austin, Texas 78711

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**D. C. Hahl and Karl W. Ratzlaff
United States Geological Survey**

INTRODUCTION

Purpose and Scope of the Investigation

Plans for the development and utilization of the water resources of Texas include provisions for the continued use and management of water in the estuaries of the State. This requires a continuing evaluation of the chemical and physical characteristics of estuarine waters.

In September 1967, the U.S. Geological Survey, in cooperation with the Texas Water Development Board, began a water-resources investigation of the principal estuaries along the Texas coast (Figure 1) except Galveston Bay, which is being studied by other agencies, and the Rio Grande, which is under the jurisdiction of the International Boundary and Water Commission.

The objectives of the investigation are to define: (1) the occurrence, source, and distribution of nutrients; (2) current patterns and directions and rates of movement; (3) physical, organic, and inorganic water quality and its areal distribution and time variation; (4) occurrence, quality, quantity, and dispersion of drainage entering the estuarine systems; and (5) chemical and physical characteristics of water which enters the estuaries from the Gulf of Mexico.

The method of acquiring and maintaining a knowledge of the chemical and physical characteristics of each estuarine system and of the relationship between the systems consists of three phases: (1) reconnaissance for establishment of an optimum data-collection network; (2) repetitive surveys throughout this network to determine the general chemical and physical characteristics of the estuarine systems; and (3) continued data collection at a reduced number of sites to maintain definition of the chemical and physical characteristics.

The coastal waters of Texas are not classical estuaries, but are similar to them in ecosystems and mixing phenomena. A description of various types of estuaries is presented in *Estuaries*, edited by George H. Lauff (1967, p. 3-11). In this report, the term estuary refers to concomitant water bodies in which overland runoff mixes with sea water.

Status of the Project

The three phases of the project for each of the estuaries are in various stages of completion. The following tabulation shows by estuary the progress made through September 1969:

ESTUARY	PHASE		
	(1)	(2)	(3)
Sabine-Neches	Completed	Underway	No surveys
Brazos	No surveys	No surveys	Do.
East Matagorda	Underway	do.	Do.
Colorado	Completed	Underway	Do.
Lavaca-Tres Palacios	do.	do.	Do.
Guadalupe	do.	do.	Do.
Mission-Aransas	Underway	No survey	Do.
Nueces	Completed	Beginning	Do.
Laguna Madre	Underway	No survey	Do.

Previous and Related Reports

This report is the second in an annual series of basic-data reports. Hahl and Ratzlaff (1970), in the first report of the series, presented data collected before

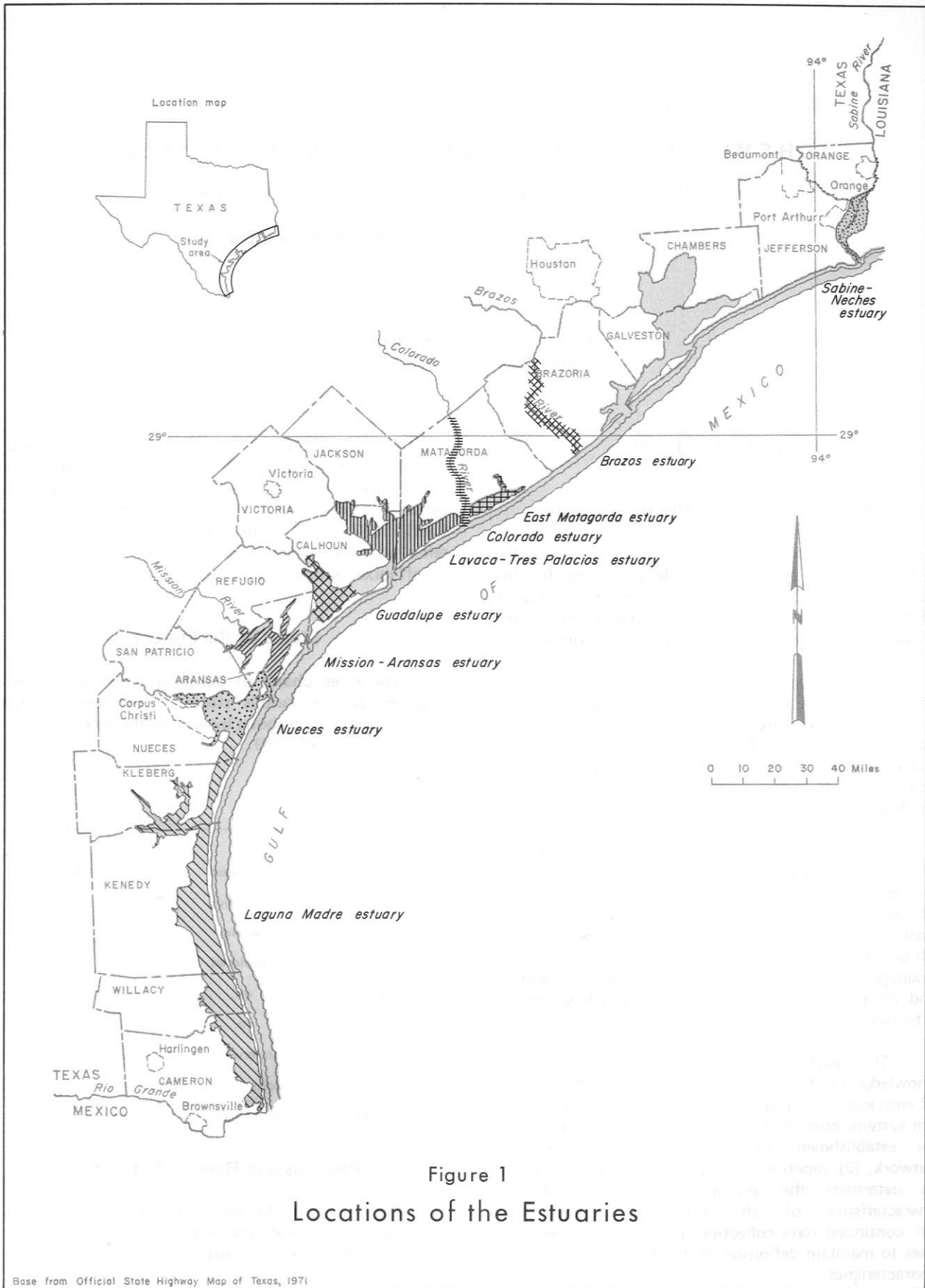


Figure 1
Locations of the Estuaries

Base from Official State Highway Map of Texas, 1971

October 1, 1968. Data collected during flooding caused by Hurricane Beulah have been published by the Texas Water Development Board (Grozier and others, 1968, p. 47-61). Interpretive reports will be published after sufficient data become available to establish the characteristics of an estuary.

Acknowledgements

Personnel of the U.S. Coast Guard at Sabine Pass, the U.S. Army Corps of Engineers at Galveston, the Texas Parks and Wildlife Department at Seadrift, and the Texas Water Development Board provided data and field assistance. Many private citizens and commercial fishermen furnished information on historical changes and existing conditions in the bays.

DATA-COLLECTION METHODS

A modified statistical grid was used to select initial data-collection sites. In areas where the sites were inadequate to provide a detailed record of significant changes in chemical and physical characteristics of the estuarine systems, the data-collection network was expanded. About 53 percent of the data-collection sites are located by navigation aids, bridge piers, power poles, survey platforms or well structures. These sites can be reoccupied exactly. About 32 percent of the sites are identified by shore features or reef structures and located by distance from the feature, compass heading, and water depth. These sites can be reoccupied within 100 feet. About 15 percent of the sites are remote to any reference. These sites are aligned with landmarks and other known reference points and located by compass heading and measured speed. These sites can be reoccupied within a quarter of a mile.

At each data-collection site, field data were collected from several points along a vertical. The sampler intake was lowered to the desired depth. Water was pumped through a manifold containing the probes of several instruments and then discharged over the side of the boat. Samples were collected and specific

conductance was measured at the discharge point. Samples for laboratory analyses were collected at predetermined sites and at other sites where significant changes in field data were noted.

Properties or constituents measured in the field are dissolved oxygen, specific conductance, temperature, pH, and turbidity. Laboratory analyses include the principal inorganic ions, biochemical oxygen demand (BOD), chemical oxygen demand (COD), insecticides and herbicides, ammonia nitrogen, nitrite nitrogen, nitrate nitrogen, ortho and total phosphate as phosphorus, and several other selected ions such as bromide, iodide, strontium, lithium, boron, and iron. Work has begun on determination of chlorophyll and suspended sediment.

Before October 1968, results of analyses for nitrogen species were reported as ammonia, nitrite, or nitrate; those for phosphorus were reported as phosphate. In this report, each of the nitrogen species are reported as nitrogen; and phosphorus species are reported as phosphorus. Similar data reported before October 1968 may be converted to nitrogen or phosphorus by multiplying the concentrations by the following factors:

TO CONVERT	TO	MULTIPLY BY
Ammonia (NH ₄)	Nitrogen (N)	0.777
Nitrite (NO ₂)	Nitrogen (N)	.305
Nitrate (NO ₃)	Nitrogen (N)	.226
Phosphate (PO ₄)	Phosphorus (P)	.326

Field Instruments

The field instruments used in this investigation are as follows, but mention herein of the manufacturers and their instruments does not constitute an endorsement of the project:

PARAMETER MEASURED	INSTRUMENT	MODEL	MANUFACTURER
pH	Specific ion meter	401	Orion Research
Dissolved oxygen	Oxygen meter	54	Yellow Springs Instruments
Specific conductance	Solubridge	RB-3	Industrial Instruments
Temperature	Research thermometer	ET-100 Marine	Applied Research

The specific ion meter used for pH measurements was calibrated daily by using three standards: pH 4.0, 7.0, and 10.0. The dissolved-oxygen meter was calibrated at least daily by using the oxygen-saturation data in "Standard Methods for the Examination of Water and Waste Water," twelfth edition, (American Public Health Association and others, 1966; p. 409). The Winkler method was used to verify the oxygen saturation during some of the calibrations. The conductivity meter was calibrated monthly by using at least two standards in each of the three conductivity ranges on the instrument. The electrical thermometer was calibrated weekly.

Several tests were conducted to determine the effect of streaming potential on instrument output. Dissolved oxygen readings of water passing through the manifold deviated from in situ readings by less than 0.1 mg/l (milligrams per liter), and pH readings differed by less than 0.05 pH units.

Treatment of Samples

All samples except those for insecticide and herbicide analyses were collected in plastic throwaway

bottles. The BOD, COD, and nutrient samples were chilled to about 1°C stored in a refrigerator or ice chest, and shipped to the laboratory as soon as possible, usually within 24 hours. All other samples were stored at ambient temperature.

Five milliliters of chloroform were added to each sample collected for nutrient analysis. Samples for heavy metals and selected trace constituents (except boron, bromide, fluoride, and iodide) were filtered through 0.45-micron membrane filters and collected in bottles prewashed with 10 percent nitric acid. Two milliliters of concentrated nitric acid were added to each filtered sample.

Depth-integrated water samples and bottom-sediment samples to be analyzed for insecticides and herbicides were collected in specially treated glass bottles and shipped to the laboratory as soon as possible. Sediment samples were collected by dragging a large-mouth bottle along the bottom until at least 100 grams of sediment were collected.

QUALITY OF WATER IN THE ESTUARIES

Sabine-Neches Estuary

The Sabine-Neches estuary covers an area of about 100 square miles and consists of the tidal parts of the Sabine and Neches Rivers and other tributaries, Sabine Lake, the Sabine-Neches Canal, the Port Arthur Canal, parts of the Intracoastal Waterway, and Sabine Pass (Figure 2). Water depth at mlw (mean low water) is greater than 40 feet in dredged parts of the rivers, canals,

and pass; about 15 feet in the Intracoastal Waterway; and generally 10 feet or less in Sabine Lake.

Most of the water-quality data for the Sabine-Neches estuary (Table 1) were collected during February and July in conjunction with special-purpose sampling. Samples were not collected at all sites shown on Figure 2.

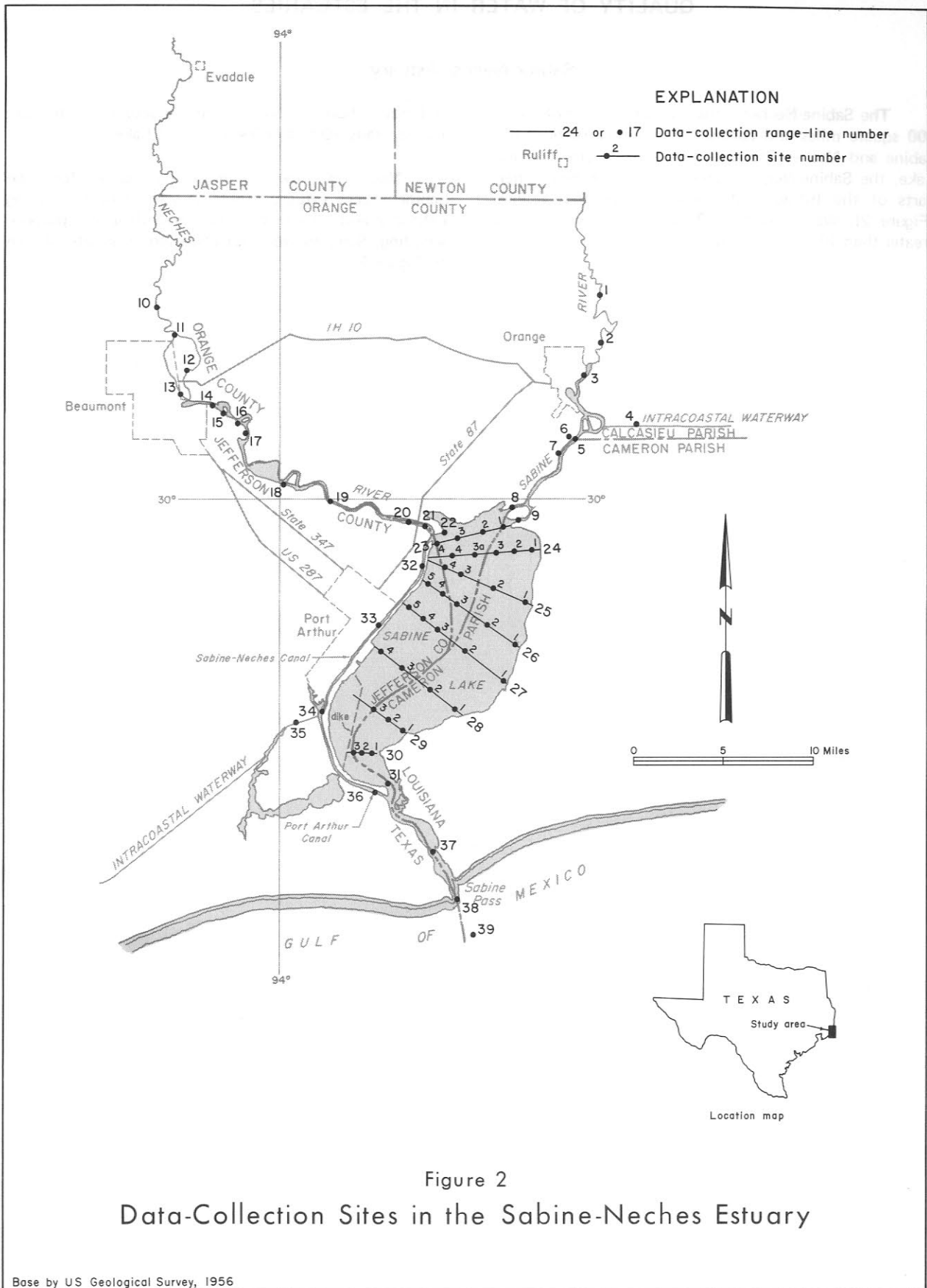


Table 1A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE SABINE-NECHES ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)							
								Concentration	Percent saturation															
<u>Line 8, Sabine River</u>																								
July 9	1510	2	1	2,800	8.2	33.1	71	7.8	108	2.7	18	4.8	0.3	QN	QN	0.03	0.07							
			3	3,000	7.7	32.3		7.0	97	--								--	--	--	--	--		
			5	3,000	7.5	31.7		5.5	75	--								--	--	--	--	--		
			8	5,000	7.6	31.8		5.5	75	--								--	--	--	--	--		
			10	7,400	7.7	31.9		4.4	61	--								--	--	--	--	--		
			15	10,000	7.7	32.3		2.9	40	--								--	--	--	--	--		
			20	15,000	7.8	32.2		2.1	30	--								--	--	--	--	--		
			30	17,000	7.8	32.0		1.4	20	--								--	--	--	--	--		
			34	17,000	7.7	32.1		1.4	20	1.4								--	3.6	.1	QN	0.68	.02	.06
			<u>Line 10, Neches River</u>																					
Feb. 27	1135	2	1	150	6.4	15.2	--	8.4	82	2.0	--	6.0	.1	QN	QN	--	.03							
<u>Line 15, Neches River</u>																								
Feb. 26	1040	1	1	150	6.3	14.6	33	8.6	83	--	--	--	--	--	--	--	--							
			5	160	6.5	15.1		8.0	78	--	--	--	--	--	--	--								
Do.	1045	2	1	120	6.2	14.3	35	9.2	88	--	--	--	--	--	--	--	--							
			5	150	6.2	14.3		9.2	88	--	--	--	--	--	--									
			10	160	6.2	14.2		9.0	87	--	--	--	--	--	--									
			20	160	6.2	14.2		8.8	85	--	--	--	--	--	--									
			36.5	160	6.4	14.2		8.0	77	--	--	--	--	--	--									
Do.	1102	3	1	150	6.2	14.6	33	8.7	84	--	--	--	--	--	--	--	--							
			5	160	6.2	14.8		8.6	84	--	--	--	--	--	--									
Feb. 27	1315	2	1	150	6.5	14.7	--	8.0	78	2.1	1.2	5.4	.2	QN	QN	--	.08							
			10	150	6.3	14.7		7.8	76	--								--	--	--				
			20	160	6.2	14.6		7.8	76	2.2								--	5.8	.1	QN	QN	--	.07
			36.5	160	6.1	14.5		7.8	76	2.5								56	5.8	.2	QN	QN	--	.03
<u>Line 17, Neches River</u>																								
Feb. 26	0955	1	1	190	6.0	14.5	30	8.4	82	--	--	--	--	--	--	--	--							
			5	270	6.2	14.7		8.1	79	--	--	--	--	--	--									
Do.	1005	2	1	150	6.2	14.3	35	9.0	87	--	--	--	--	--	--	--	--							
			5	180	6.2	14.3		8.9	86	--	--	--	--	--	--									
			10	160	6.1	14.2		8.8	85	--	--	--	--	--	--									
			20	200	6.1	14.1		8.6	83	--	--	--	--	--	--									
			41.5	200	6.2	14.2		7.8	75	--	--	--	--	--	--									
Do.	1020	3	1	210	6.6	14.7	--	8.6	83	--	--	--	--	--	--	--	--							
			5	180	6.5	14.6		8.6	83	--	--	--	--	--	--									
Feb. 27	1330	2	1	160	6.5	15.1	--	7.8	76	3.9	--	5.6	.1	QN	QN	--	.07							
			10	150	6.4	14.8		7.9	77	--								--	--	--				
			20	150	6.3	14.6		7.8	76	2.4								--	5.6	.3	QN	QN	--	.08
			41.5	150	6.2	14.7		7.8	76	2.3								--	5.6	.1	QN	QN	--	.07
<u>Line 19, Neches River</u>																								
Feb. 27	1445	2	1	280	6.3	15.2	--	7.8	76	--	--	--	--	--	--	--	--							
			10	310	6.3	15.2		7.8	76	--	--	--	--	--	--									
			20	310	6.3	15.3		7.6	74	--	--	--	--	--	--									
			36.5	310	6.3	15.6		7.2	71	--	--	--	--	--	--									
<u>Line 21, Neches River</u>																								
Feb. 27	1600	2	1	550	6.5	15.7	--	7.6	75	2.6	18	5.2	.1	QN	QN	--	.09							
			10	550	6.5	15.7		7.6	75	--								--	--	--	--			
			20	520	6.6	15.6		7.4	73	2.4								--	5.4	.2	QN	QN	--	.06
			41.5	490	7.0	15.8		7.0	70	2.2								38	5.5	.1	QN	QN	--	.08
July 9	1430	2	1	5,400	8.6	35.6	--	4.2	61	5.6	35	6.1	.2	QN	.07	.02	.05							
			2	5,500	8.5	35.5		4.4	64	--								--	--	--	--	--		
			3	5,500	8.5	35.4		4.6	67	--								--	--	--	--	--		
			5	5,900	8.0	33.8		3.0	43	--								--	--	--	--	--		
			10	10,000	7.8	32.8		1.9	27	--								--	--	--	--	--		
			15	16,000	7.9	32.3		1.7	24	--								--	--	--	--	--		
			20	18,000	7.9	32.0		1.6	23	--								--	--	--	--	--		
			30	23,000	7.9	31.7		.9	13	--								--	--	--	--	--		
			35	23,000	7.9	31.7		1.0	15	--								--	--	--	--	--		
			40	23,000	7.8	31.7		1.0	15	--								--	--	--	--	--		
44	22,000	7.9	31.7	.9	13	1.6	--	3.2	.0	QN	.23	.02	.06											

See footnotes at end of table.

Table 1A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE SABINE-NECHES ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)		
								Concentration	Percent saturation										
<u>Line 23. Sabine Lake</u>																			
Feb. 25	1645	4	1	2,100	6.7	13.8	25	9.1	88	--	--	--	--	--	--	--	--		
			3	2,100	6.7	14.0		9.1	88	--	--	--	--	--	--	--	--		
Feb. 26	1450	1	1	1,200	6.6	15.7	30	9.1	90	--	--	--	--	--	--	--	--		
			4	1,200	6.6	15.7		8.8	87	--	--	--	--	--	--	--			
Do.	1415	3	1	240	6.3	14.6	30	8.9	86	--	--	--	--	--	--	--	--		
			4	260	6.3	14.6		8.9	86	--	--	--	--	--	--	--			
Do.	1400	4	1	710	6.8	14.7	36	8.0	78	--	--	--	--	--	--	--	--		
			2	710	7.3	14.9		7.8	76	--	--	--	--	--	--	--			
Feb. 27	1630	4	1	400	6.5	14.7	--	7.6	74	2.6	--	5.4	0.2	QN	QN	--	0.09		
			4	440	6.5	14.8		7.6	74	2.2	--	5.6	.2	QN	QN	--	.05		
<u>Line 24. Sabine Lake</u>																			
Feb. 26	1515	1	1	4,000	7.1	16.6	50	9.9	101	--	--	--	--	--	--	--	--		
			5	3,400	7.0	16.8		9.8	100	--	--	--	--	--	--	--			
Do.	1525	2	1	700	6.9	16.0	41	9.9	99	--	--	--	--	--	--	--	--		
			5	2,800	7.0	15.9		9.7	97	--	--	--	--	--	--	--			
Do.	1540	3	1	280	6.5	14.7	30	9.2	89	--	--	--	--	--	--	--	--		
			5	330	6.5	14.7		9.3	90	--	--	--	--	--	--	--			
Do.	1555	4	1	790	6.6	15.5	30	8.4	83	--	--	--	--	--	--	--	--		
			4	790	6.6	15.5		8.4	83	--	--	--	--	--	--	--			
July 9	1610	1	1	2,800	9.0	34.7	51	9.8	140	--	--	--	--	--	--	--	--		
			2	2,800	9.0	34.8		10.1	144	--	--	--	--	--	--	--			
			3	2,800	9.0	34.7		10.1	144	--	--	--	--	--	--	--			
			4	3,000	7.6	32.4		5.9	81	--	--	--	--	--	--	--			
Do.	1620	2	1	3,600	8.8	33.7	56	11.2	158	2.5	19	4.5	.2	QN	QN	0.03	.06		
			3	3,400	8.4	32.7		10.4	144	--	--	--	--	--	--	--			
			5	3,600	7.4	31.3		7.7	104	--	--	--	--	--	--	--			
			7	3,800	7.3	31.4		6.6	89	--	--	--	--	--	--	--			
Do.	1630	3	1	4,600	7.9	34.1	58	9.7	137	--	--	--	--	--	--	--	--		
			3	4,600	7.6	33.2		9.0	125	--	--	--	--	--	--	--			
			5	5,100	7.3	31.9		6.4	88	--	--	--	--	--	--	--			
			7	5,200	7.3	31.9		5.4	74	--	--	--	--	--	--	--			
Do.	1645	3a	1	4,900	7.6	34.2	104	6.6	93	1.6	20	4.3	.2	QN	QN	.01	.04		
			3	4,700	7.7	33.9		6.5	92	--	--	--	--	--	--	--			
			5	5,300	7.4	32.4		4.8	66	--	--	--	--	--	--	--			
			6.5	5,300	7.4	32.3		6.3	86	1.1	--	4.8	.2	QN	QN	.03	.06		
Do.	1720	4	1	7,500	8.4	34.7	--	6.1	88	--	--	--	--	--	--	--	--		
			3	7,500	8.4	34.3		6.0	86	--	--	--	--	--	--	--			
			6	8,700	8.0	33.2		4.6	65	--	--	--	--	--	--	--			
Do.	1735	5	1	8,900	8.6	35.0	--	6.9	100	2.7	24	4.8	.2	QN	0.09	.03	.06		
			3	9,000	8.6	34.9		6.8	99	--	--	--	--	--	--	--			
<u>Line 25. Sabine Lake</u>																			
Feb. 26	1610	4	1	690	6.6	14.4	--	8.2	80	--	--	--	--	--	--	--	--		
			4	710	6.7	14.6		8.2	80	--	--	--	--	--	--	--			
<u>Line 30. Sabine Lake</u>																			
July 9	1840	2	1	8,600	8.3	32.3	--	8.0	111	1.2	--	4.7	.2	QN	QN	.01	.04		
			3	8,600	8.3	32.3		8.0	111	--	--	--	--	--	--	--			
			6.5	8,600	8.3	32.3		7.8	108	1.1	--	4.8	.2	QN	QN	.01	.04		
<u>Line 31. Sabine Lake</u>																			
Feb. 25	1045	2	1	9,400	7.1	13.7	53	9.5	90	3.5	--	5.5	.2	QN	QN	--	.04		
			5	10,000	7.1	13.6		9.7	92	--	--	--	--	--	--	--			
			10	10,000	7.3	13.6		10.1	96	2.5	--	5.2	.2	QN	QN	--	.05		
			20	12,000	7.4	13.6		10.5	100	--	--	--	--	--	--	--			
			26.5	12,000	7.4	13.8		10.4	100	1.8	--	5.3	.2	QN	QN	--	.04		
Feb. 26	1150	1	1	6,700	7.1	15.5	39	7.7	78	--	--	--	--	--	--	--	--		
			Do.	1135	2	1		6,300	7.0	15	--	6.7	67	--	--	--	--	--	--
						5		6,900	7.0	15		7.3	73	--	--	--	--	--	--
			20	11,000	7.6	15	9.8	99	--	--	--	--	--	--	--				

See footnotes at end of table.

Table 1A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE SABINE-NECHES ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) 1/	pH 1/	Temperature (°C) 1/	Secchi disk transparency (cm) 1/	Dissolved oxygen		Biochemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Orthophosphate as phosphorus (P)	Total phosphorus (P)
								Concentration 1/	Percent saturation								
<u>Line 31. Sabine Lake (continued)</u>																	
Feb. 26	1205	3	1	9,500	7.2	15	46	7.9	80	--	--	--	--	--	--	--	--
			5	10,000	7.2	15		7.5	76	--	--	--	--	--	--	--	--
Do.	1515	1	1	10,000	7.4	16.0	43	8.9	92	--	--	--	--	--	--	--	--
Do.	1520	2	1	10,000	7.4	15.5	33	8.4	86	--	--	--	--	--	--	--	--
			5	12,000	7.5	15.5		8.4	87	--	--	--	--	--	--	--	--
			20	16,000	7.7	15.4		8.2	85	--	--	--	--	--	--	--	--
			30	17,000	7.7	15.2		8.2	85	--	--	--	--	--	--	--	--
Do.	1530	3	1	10,000	7.4	15.5	39	7.8	80	--	--	--	--	--	--	--	--
			5	12,000	7.4	15.4		7.7	79	--	--	--	--	--	--	--	--
<u>Line 32. Sabine-Neches Canal</u>																	
Feb. 25	1630	2	1	2,200	6.7	14.0	25	9.4	90	2.3	--	5.7	0.2	QN	QN	--	0.05
			10	2,200	6.8	13.7		9.1	86	2.4	--	5.8	.2	QN	QN	--	.07
			20	2,200	6.8	13.7		9.1	86	--	--	--	--	--	--	--	--
			31.5	2,200	6.8	14.0		9.1	87	2.3	--	5.8	.2	QN	QN	--	.08
<u>Line 33. Sabine-Neches Canal</u>																	
Feb. 25	1550	2	1	2,700	6.8	14.0	25	9.3	89	--	--	--	--	--	--	--	--
			10	2,800	6.8	13.8		9.1	88	--	--	--	--	--	--	--	--
			20	3,000	6.9	13.6		8.9	85	--	--	--	--	--	--	--	--
			36.5	9,500	7.1	13.6		8.3	79	--	--	--	--	--	--	--	--
<u>Line 34. Sabine-Neches Canal</u>																	
Feb. 25	1515	2	1	4,000	6.9	14.3	28	8.6	83	2.7	--	5.4	.2	QN	QN	--	.05
			10	5,000	6.9	13.9		8.7	84	--	--	--	--	--	--	--	
			20	8,000	7.0	13.7		8.4	80	2.5	--	5.4	.2	QN	QN	--	.06
			31.5	17,000	7.1	14.1		7.8	75	2.2	--	4.5	.1	QN	QN	--	.04
<u>Line 35. Intracoastal Waterway</u>																	
Feb. 25	1500	2	1	440	6.3	16.1	18	6.4	64	--	--	--	--	--	--	--	--
			15	490	6.7	16.5		6.5	66	--	--	--	--	--	--	--	
<u>Line 36. Port Arthur Canal</u>																	
Feb. 25	1320	2	1	5,000	7.1	14.6	25	9.3	90	2.1	--	5.2	.2	QN	QN	--	.07
			5	6,000	7.0	14.2		8.8	85	--	--	--	--	--	--	--	
			10	14,000	7.3	14.1		9.6	92	--	--	--	--	--	--	--	
			20	21,000	7.7	13.9		9.9	95	2.6	--	4.2	.2	QN	QN	--	.06
			40	27,000	7.9	14.1		9.1	88	2.6	--	4.0	.0	QN	QN	--	.05
Feb. 26	1110	2	1	4,900	6.9	15	25	6.8	67	--	--	--	--	--	--	--	
			5	5,000	6.9	15		6.5	64	--	--	--	--	--	--		
Do.	1545	2	1	5,200	7.0	15.1	24	6.6	66	--	--	--	--	--	--	--	
			5	5,300	7.0	15.1		6.8	68	--	--	--	--	--	--		
July 9	1715	2	1	20,000	8.4	32.2	--	4.7	68	4.3	--	3.6	.1	QN	0.07	0.07	.16
			5	23,000	8.1	31.9		2.5	37	--	--	--	--	--	--	--	
			10	24,000	8.1	31.5		1.9	28	--	--	--	--	--	--	--	
			20	28,000	8.3	31.1		1.9	28	--	--	--	--	--	--	--	
			32.5	34,000	8.4	30.8		1.8	27	.9	--	1.4	.1	QN	.11	.03	.05
<u>Line 37. Sabine Pass</u>																	
Feb. 25	1245	2	1	12,000	7.6	14.6	76	10.9	106	2.2	--	5.4	.2	QN	QN	--	.05
			10	12,000	7.6	14.1		10.6	102	--	--	--	--	--	--	--	
			20	19,000	7.9	14.0		10.5	101	1.6	--	4.4	.2	QN	QN	--	.04
			30	24,000	8.0	14.0		10.2	98	--	--	--	--	--	--	--	
			50	40,000	8.1	14.2		9.0	87	1.8	--	2.1	.1	QN	QN	--	.04
Feb. 26	1045	1	1	9,800	7.3	15	46	8.2	83	1.8	--	5.6	--	--	--	--	
			5	9,800	7.3	15		8.2	83	2.8	--	--	--	--	--		
Do.	1325	1	1	10,000	7.4	16.0	43	8.0	82	--	--	--	--	--	--	--	
			5	11,000	7.4	16.0		8.0	82	--	--	--	--	--	--		
Do.	1350	1	1	11,000	7.4	16.0	36	8.1	84	--	--	--	--	--	--	--	
			5	11,000	7.4	16.0		8.1	84	--	--	--	--	--	--		
Do.	1445	1	1	13,000	7.6	16.1	46	8.5	89	--	--	--	--	--	--	--	
			5	15,000	7.7	16.1		8.4	88	--	--	--	--	--	--		
Do.	--	1	1	18,000	7.8	16.0	48	8.6	91	--	--	--	--	--	--	--	
			5	20,000	8.0	15.8		9.3	100	--	--	--	--	--	--		

See footnotes at end of table.

TABLE 1A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE SABINE-NECHES ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 37. Sabine Pass (continued)</u>																	
Feb. 26	1035	2	1	9,400	7.3	15.0	46	8.0	81	--	--	--	--	--	--	--	--
			5	9,500	7.3	15.0		8.0	81								
Do.	1330	2	1	10,000	7.4	16.0	48	8.0	82	--	--	--	--	--	--	--	--
			5	12,000	7.5	16.0		7.7	80								
Do.	1015	3	1	8,900	7.2	15	41	7.8	79	1.8	--	--	--	--	--	--	--
			5	9,000	7.2	15		7.8	79								
			20	10,000	7.4	15		8.6	87								
			43	14,000	7.6	15		8.6	88								
Do.	1335	3	1	10,000	7.4	16.0	43	8.0	82	--	--	--	--	--	--	--	--
			5	11,000	7.4	16.0		8.0	82								
Do.	1355	3	1	12,000	7.6	16.0	43	7.9	82	--	--	--	--	--	--	--	--
			5	14,000	7.7	16.0		8.0	83								
			20	32,000	8.1	15.8		7.9	89								
			44	39,000	8.1	15.8		7.9	92								
Do.	1450	3	1	14,000	7.7	16.1	51	8.3	86	--	--	--	--	--	--	--	--
			5	14,000	7.8	16.0		8.5	89								
			20	37,000	8.1	15.8		8.0	92								
			44	39,000	8.1	15.6		8.0	93								
Do.	1615	3	1	13,000	7.7	15.9	48	8.5	89	1.9	--	--	--	--	--	--	--
			5	25,000	8.0	15.3		8.2	88								
			20	37,000	8.1	15.2		8.6	98								
			44	41,000	8.1	15.1		8.9	103								
Do.	0950	4	1	7,000	7.1	15	36	8.1	81	--	--	--	--	--	--	--	--
			5	7,000	7.1	15		8.3	83								
Do.	1320	4	1	10,000	7.3	16.1	43	8.0	82	--	--	--	--	--	--	--	--
			5	10,000	7.3	16.0		8.1	84								
Do.	1005	5	1	7,000	7.1	15	36	8.0	80	3.0	--	--	--	--	--	--	--
			4	7,000	7.1	15		8.0	80								
Do.	1315	5	1	10,000	7.3	16.1	34	8.1	84	--	--	--	--	--	--	--	--
			5	10,000	7.3	16.2		8.3	86								
Do.	1410	5	1	12,000	7.6	16.1	43	7.7	80	--	--	--	--	--	--	--	--
			5	12,000	7.6	16.1		7.7	80								
Do.	1455	5	1	11,000	7.5	16.0	46	8.3	86	--	--	--	--	--	--	--	--
			5	12,000	7.6	16.0		8.2	85								
Do.	--	5	1	15,000	7.7	15.8	41	8.2	86	--	--	--	--	--	--	--	--
			5	18,000	7.8	15.5		8.5	89								
Aug. 6	1845	2	5	--	--	--	--	--	--	2.1	--	0.2	QN	QN	0.02	0.05	
<u>Line 38. Sabine Pass</u>																	
Feb. 25	1130	2	1	16,000	7.6	14.0	66	10.4	100	2.4	--	5.3	.2	QN	QN	--	.04
			10	18,000	7.8	13.7		10.2	97								
			20	25,000	8.0	13.8		9.8	94								
			30	35,000	8.0	13.8		9.2	88								
			35	38,000	8.0	13.8		9.4	90								

1/ Determined at data-collection site.
QN means qualitative test negative.

Table 1B.--CHEMICAL ANALYSES OF WATER FROM THE SABINE-NECHES ESTUARY, 1969 WATER YEAR

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) a/	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 8. Sabine River</u>															
July 9	1510	2	1	2,890	31	60	487		42	129	860	1,590	326	292	--
<u>Line 21. Neches River</u>															
July 9	1430	2	1 44	5,680 22,700	63 180	113 533	909 4,330		54 91	258 1,110	1,620 7,680	3,000 13,900	620 2,640	576 2,570	-- --
<u>Line 37. Sabine Pass</u>															
Aug. 6	1845	2	5	20,500	145	466	3,950		59	1,040	6,900	12,500	2,280	2,230	--

a/ Included in sodium-ion concentration.

Table 1C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE SABINE-NECHES ESTUARY, 1969 WATER YEAR

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25°C)	Iron (Fe) a/	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium VI (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 8. Sabine River</u>																			
July 9	1510	2	1	2,890	--	--	--	0.2	230	--	--	--	--	--	--	--	0.0	0.039	--
<u>Line 21. Neches River</u>																			
July 9	1430	2	1 44	5,680 22,700	--	--	--	.2 .5	390 170	--	--	--	--	--	--	--	3.7 25	.024 .048	-- --
<u>Line 37. Sabine Pass</u>																			
Aug. 6	1845	2	5	20,500	--	--	--	.5	1,600	--	--	--	--	--	--	--	23	.042	--

a/ Results in milligrams per liter.

Table 1 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE SABINE-NECHES ESTUARY, 1969 WATER YEAR.

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 24 site 3a. Sabine Lake</u>														
July 9	1645	Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
		Sediment	.00	1.1	1.6	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 30 site 2. Sabine Lake</u>														
July 9	1840	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
		Sediment	.00	.00	.00	.00	.00	.00	.00	.00	.00	--	--	--

Brazos Estuary

The Brazos estuary covers an area of about 3 square miles and consists of the tidal parts of the Brazos River and parts of the Intracoastal Waterway (Figure 3). Although Freeport Harbor is not directly connected with the estuary, wastes from industrial operations around the harbor are discharged into the estuary.

No water-quality data for the Brazos estuary were collected during the 1969 water year, but the proposed data-collection sites are shown on Figure 3.



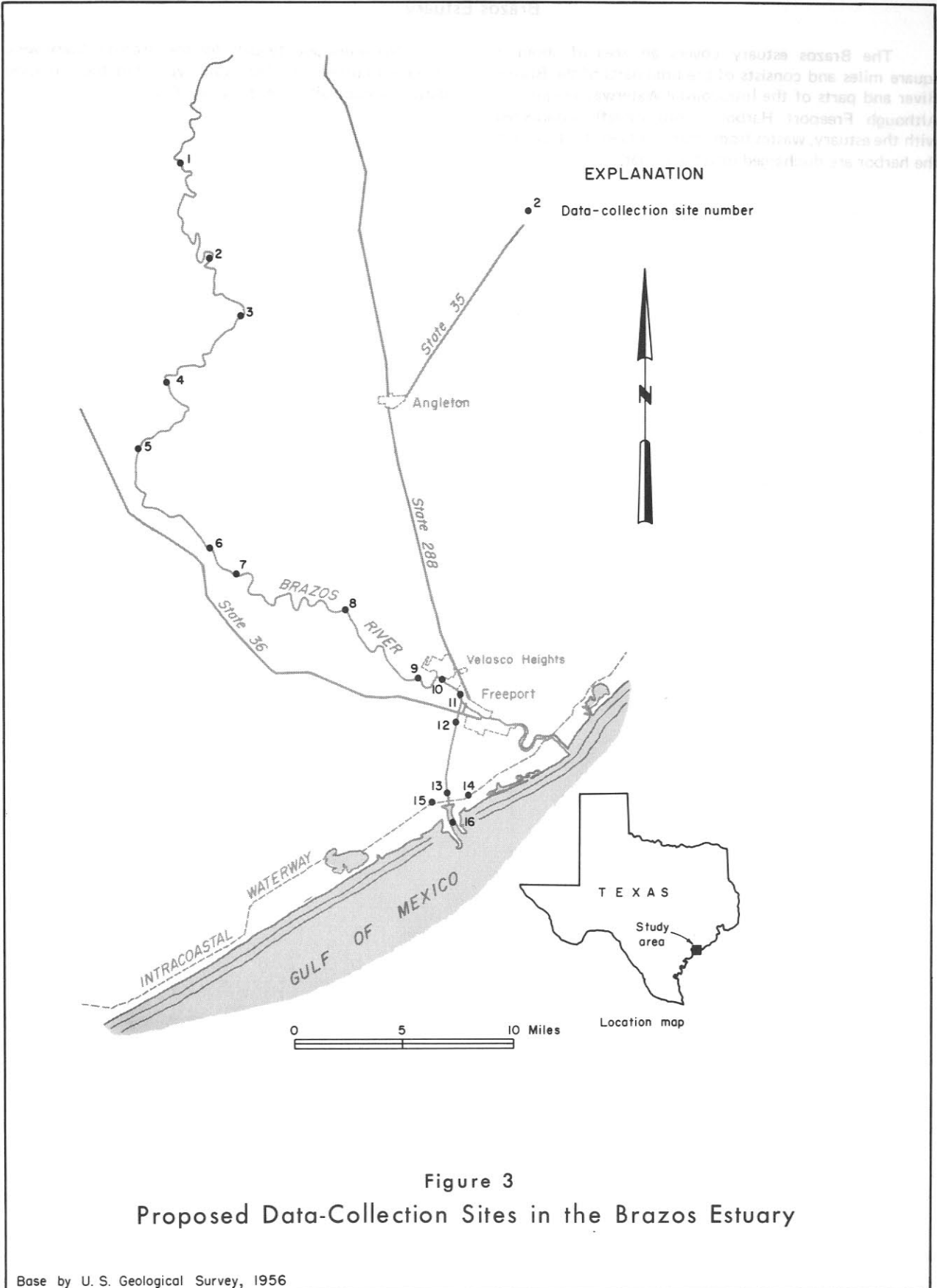


Figure 3
Proposed Data-Collection Sites in the Brazos Estuary

Base by U. S. Geological Survey, 1956

East Matagorda Estuary

The East Matagorda estuary covers an area of about 56 square miles and consists of East Matagorda Bay, part of the Intracoastal Waterway, the tidal reaches of Caney Creek, and Live Oak Bayou, and the tidal part of small tributaries (Figure 4). The maximum water

depth at mlw is 5 feet in East Matagorda Bay and about 15 feet in the Intracoastal Waterway.

Water-quality data (Table 2) were collected during June at most of the sites shown in Figure 4.

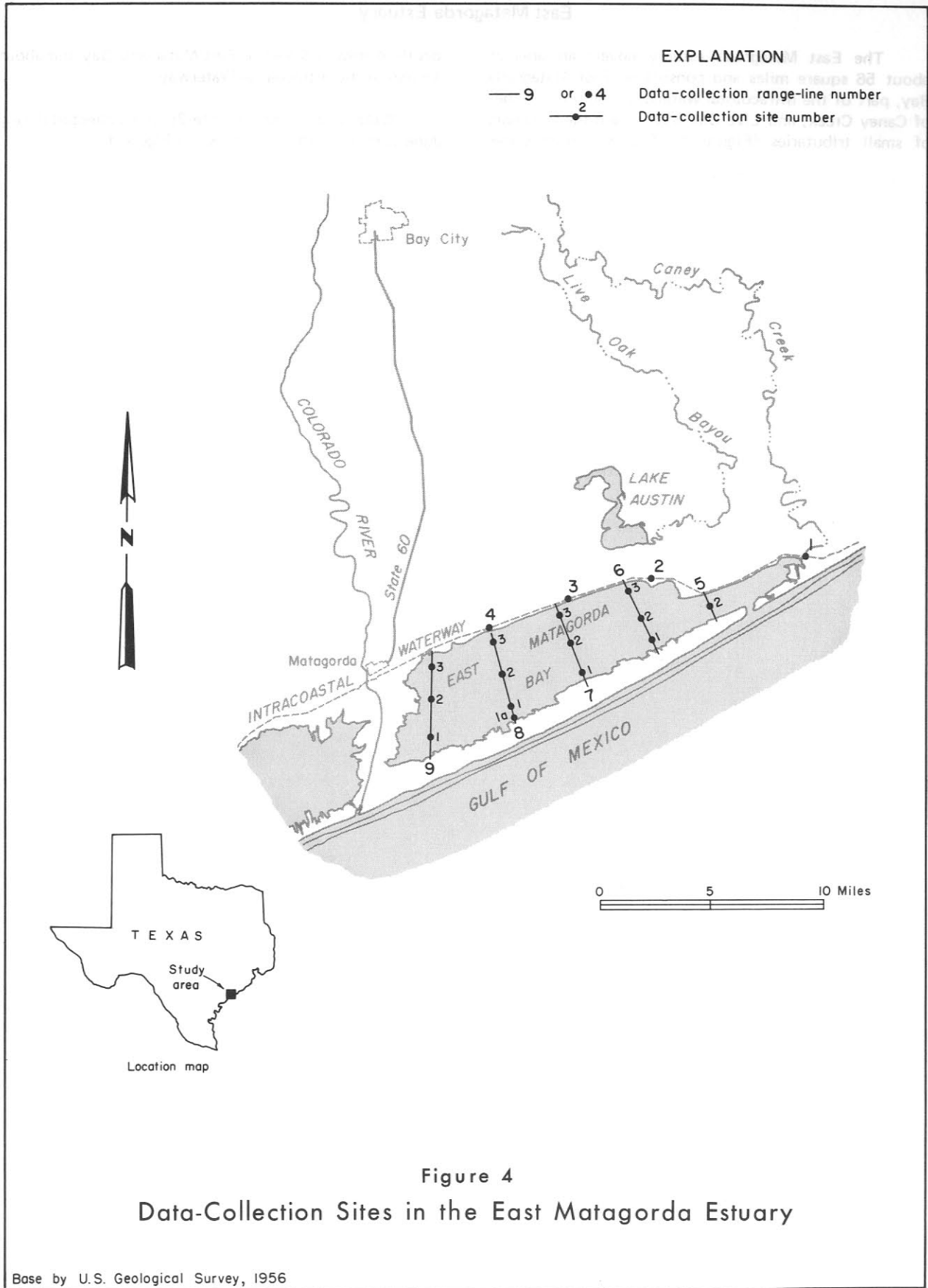


Figure 4
Data-Collection Sites in the East Matagorda Estuary

Base by U.S. Geological Survey, 1956

Table 2A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE EAST MATAGORDA ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 4. Intracoastal Waterway</u>																	
June 12	1645	2	1	21,000	8.5	30.8	--	8.0	114	--	--	--	--	--	--	--	--
			5	24,000	8.4	30.5	--	7.3	104	--	--	--	--	--	--	--	--
			10	24,000	8.4	30.2	--	6.7	96	--	--	--	--	--	--	--	--
			14	25,000	8.3	28.7	--	6.2	87	--	--	--	--	--	--	--	--
<u>Line 5. East Matagorda Bay</u>																	
June 12	1545	2	1	40,000	8.5	29.9	41	8.2	126	2.3	--	0.9	0.0	QN	QN	0.04	0.04
			3	40,000	8.5	29.6	--	7.5	115	2.0	--	.6	.0	QN	QN	.02	.03
<u>Line 6. East Matagorda Bay</u>																	
June 12	1530	1	1	29,000	8.5	29.2	33	8.4	120	--	--	--	--	--	--	--	--
			2.5	31,000	8.4	29.1	--	8.0	116	--	--	--	--	--	--	--	--
Do.	1515	3	1	31,000	8.3	29.6	48	7.9	116	--	--	--	--	--	--	--	--
			3.5	31,000	8.3	29.6	--	7.8	115	--	--	--	--	--	--	--	--
<u>Line 7. East Matagorda Bay</u>																	
June 12	1350	1	1	29,000	8.4	29.5	66	7.8	113	.8	--	5.7	.0	QN	QN	.02	.04
			2	29,000	8.4	29.5	--	7.9	114	--	--	--	--	--	--	--	--
			3	29,000	8.4	28.8	--	8.1	116	--	--	--	--	--	--	--	--
			3.5	29,000	8.4	28.6	--	8.2	117	.9	--	5.5	.1	QN	QN	.04	.04
Do.	1415	2	1	26,000	8.4	29.3	69	8.2	115	1.2	--	4.5	.0	QN	QN	.03	.04
			5	27,000	8.4	28.5	--	8.1	114	1.4	--	4.9	.0	QN	QN	.05	.05
Do.	1445	3	1	24,000	8.4	29.7	33	8.5	121	2.3	--	6.2	.0	QN	QN	.05	.06
			3.5	24,000	8.3	29.3	--	8.1	112	2.3	--	5.9	.0	QN	QN	.02	.08
<u>Line 8. East Matagorda Bay</u>																	
June 12	1245	1	1	29,000	8.4	28.8	61	8.1	116	--	--	--	--	--	--	--	--
			3	29,000	8.4	28.5	--	8.1	114	--	--	--	--	--	--	--	--
Do.	1300	1a	1	31,000	8.5	29.7	56	8.6	126	--	--	--	--	--	--	--	--
			2	31,000	8.5	29.6	--	8.5	125	--	--	--	--	--	--	--	--
Do.	1235	2	1	31,000	8.4	28.4	48	7.4	106	--	--	--	--	--	--	--	--
			5	31,000	8.3	28.2	--	7.0	100	--	--	--	--	--	--	--	--
Do.	1215	3	1	27,000	8.3	28.2	33	7.5	106	--	--	--	--	--	--	--	--
			3.5	29,000	8.3	27.8	--	7.0	99	--	--	--	--	--	--	--	--
<u>Line 9. East Matagorda Bay</u>																	
June 12	1320	1	1	31,000	8.3	28.9	41	7.9	114	2.0	--	5.5	.0	QN	QN	.03	.04
			5	31,000	8.3	28.5	--	7.5	107	2.2	--	5.6	.0	QN	QN	.01	.03

1/ Determined at data-collection site.
QN means qualitative test negative.

Table 2B.--CHEMICAL ANALYSES OF WATER FROM THE EAST MATAGORDA ESTUARY, 1969 WATER YEAR
(Results in milligrams per liter, except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20° C)
													Calcium, magnesium	Non-carbonate	
<u>Line 5. East Matagorda Bay</u>															
June 12	1545	2	3	38,500	285	970	7,330		133	1,840	13,200	23,700	4,700	4,590	1.014
<u>Line 7. East Matagorda Bay</u>															
June 12	1415	2	5	25,400	202	573	5,290		132	1,360	9,100	16,600	2,860	2,750	1.009
<u>Line 9. East Matagorda Bay</u>															
June 12	1320	1	5	27,600	226	690	5,680		124	1,480	10,000	18,100	3,400	3,300	1.010

a/ Included in sodium-ion concentration.
b Includes 0.7 mg/l Fluoride.
c Includes 0.6 mg/l Fluoride.

Table 2 C.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE EAST MATAGORDA ESTUARY, 1969 WATER YEAR.

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 5 site 2. East Matagorda Bay</u>														
June 12	1545	Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.02
			.00	.64	1.0	.47	.00	.00	.00	.00	.00	--	--	--
<u>Line 7 site 2. East Matagorda Bay</u>														
June 12	1415	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.01
		Sediment	.00	1.6	.77	1.2	.00	.00	.00	.00	.00	--	--	--

Colorado Estuary

The Colorado estuary covers an area of about 2 square miles and consists of the tidal part of the Colorado River and part of the Intracoastal Waterway (Figure 5). The minimum depth at mlw is about 6 feet in the river channel and about 15 feet in the Intracoastal Waterway.

Water-quality data (Table 3) for the Colorado estuary were collected in January, May, and June at sites shown on Figure 5. The specific conductance, dissolved oxygen, pH and water temperature data for different flow conditions are shown on Figures 6-9.

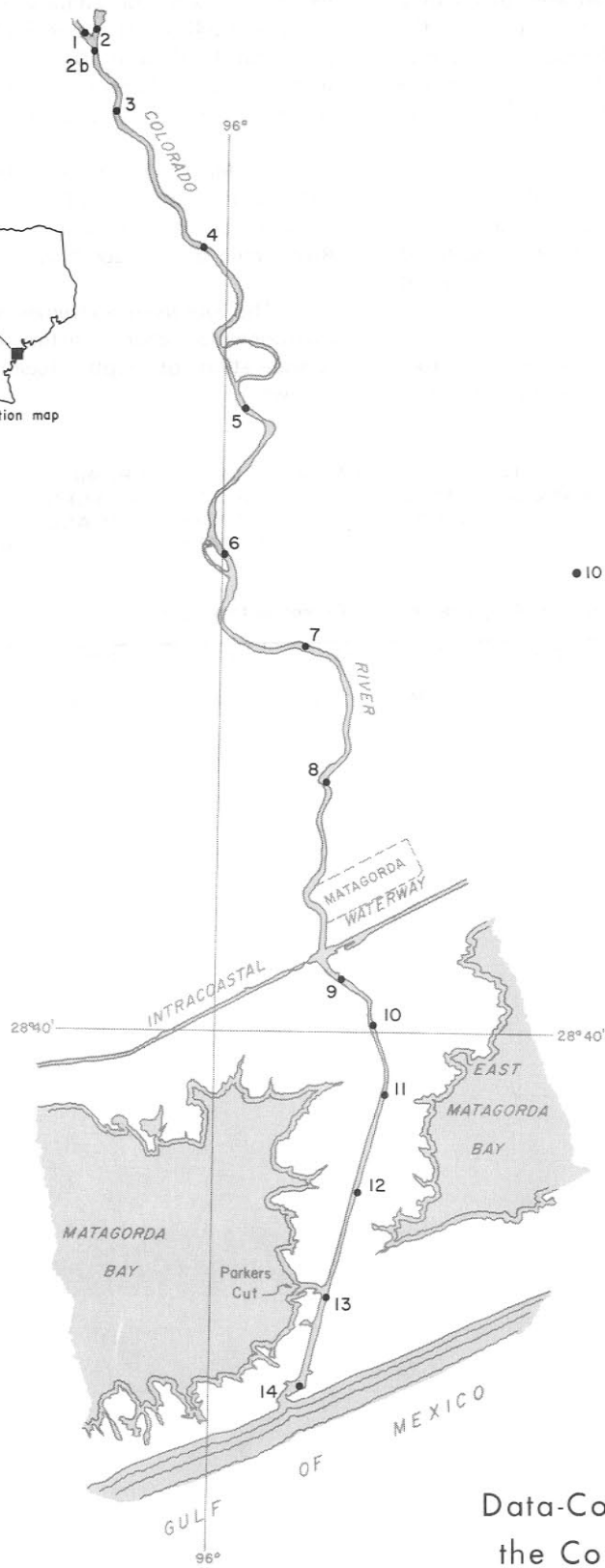
The average flow of the Colorado River at Bay City (U.S. Geological Survey, 1970a) was 655 cfs (cubic

feet per second) for January 23-29; 6,640 cfs for May 1-7; and 1,940 cfs for June 5-11. Data collected at lines 5, 8, and 13 (Figure 10) during the January and May surveys show changes in specific conductance and percent saturation of dissolved oxygen with depth.

On May 7, 1969, data were collected during flood and ebb tides at lines 13 and 14. Figure 11 shows the influence of tidal action near the mouth of the Colorado River when the average flow at Bay City was 6,640 cfs.

The observed extremes of nutrients and other environmental characteristics of the water, without consideration of depth, location, or season, are as follows:

EXTREME	NITRATE NITROGEN	AMMONIUM NITROGEN	NITRITE NITROGEN	TOTAL PHOS- PHORUS	SILICA	BIO- CHEMICAL OXYGEN DEMAND	CHEMICAL OXYGEN DEMAND	DISSOLVED OXYGEN (PERCENT SATURATION)	SECCHI DISK TRANS- PARENCY (CM)
(Results in Milligrams Per Liter Except As Indicated)									
Maximum	1.8	4.7	0.55	0.36	18	6.9	201	156	107
Minimum	.0	.00	.00	.04	.0	.9	.0	0	4



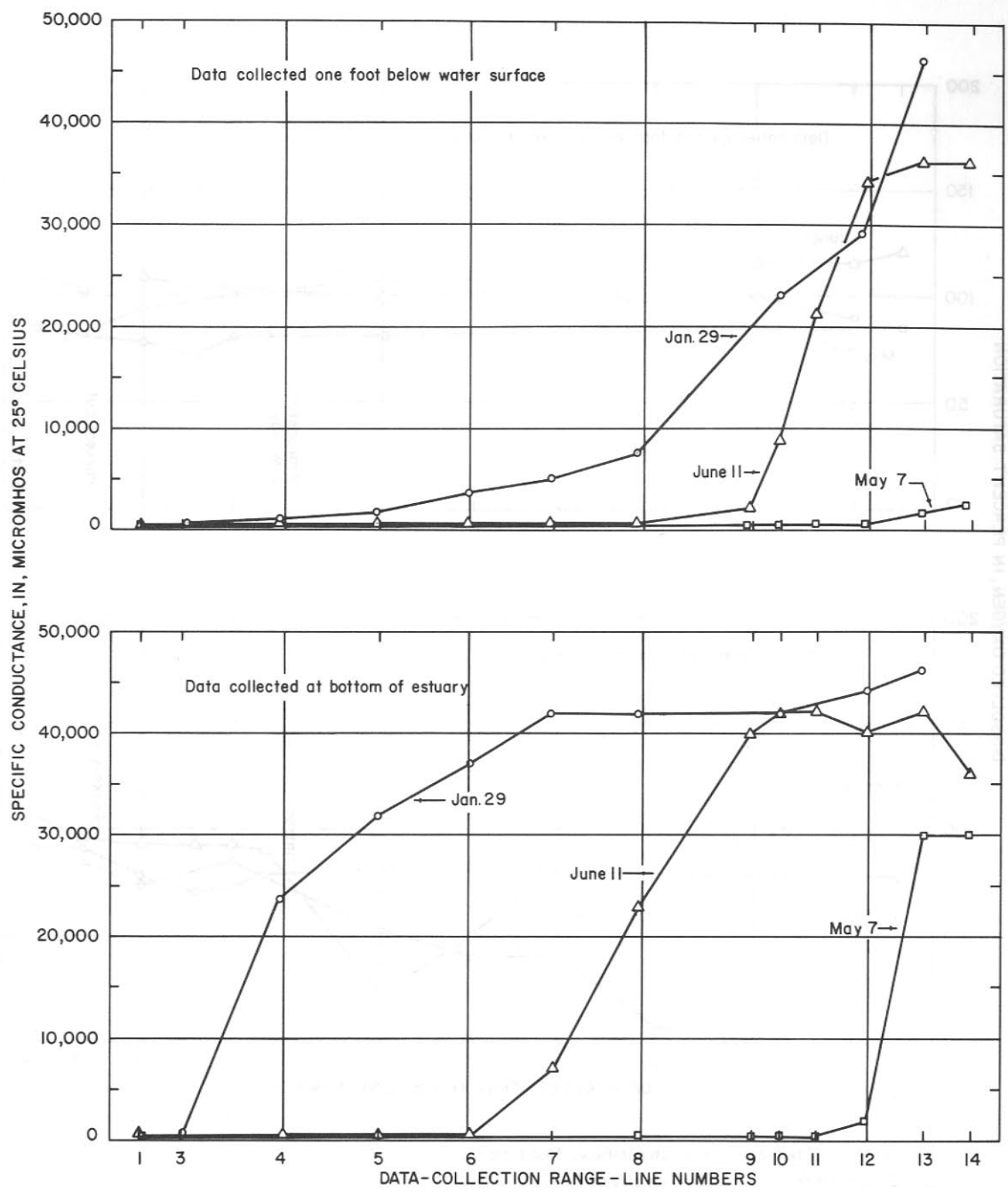
EXPLANATION

● IO Data-collection range-line number



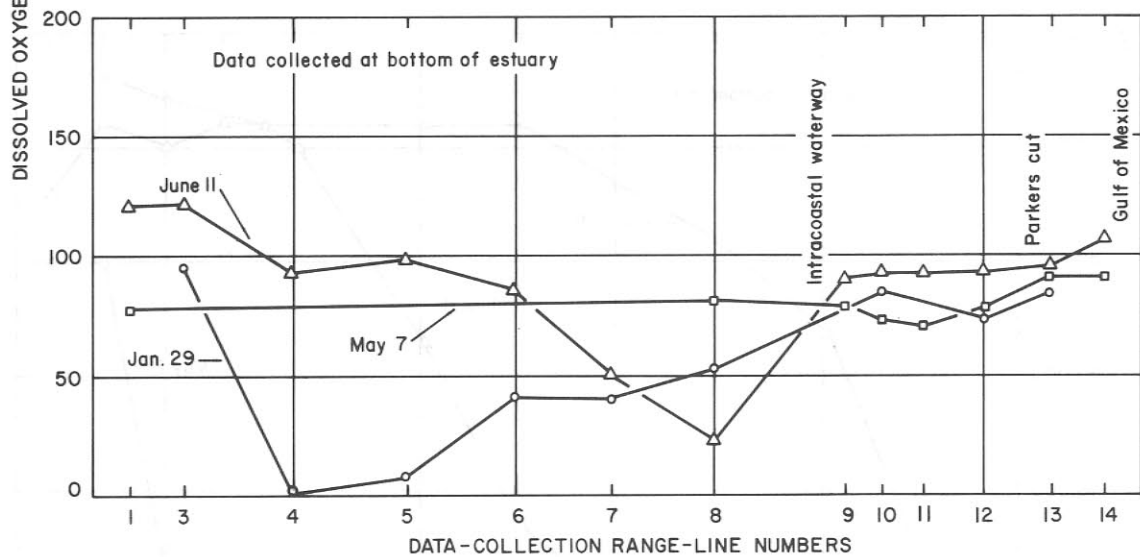
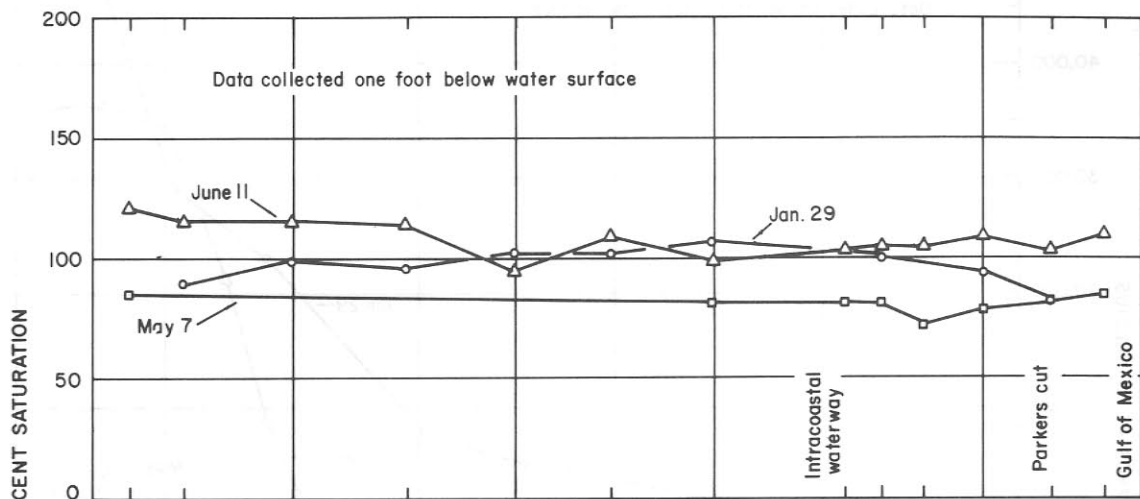
Figure 5
Data-Collection Sites in
the Colorado Estuary

Base by US Geological Survey, 1956



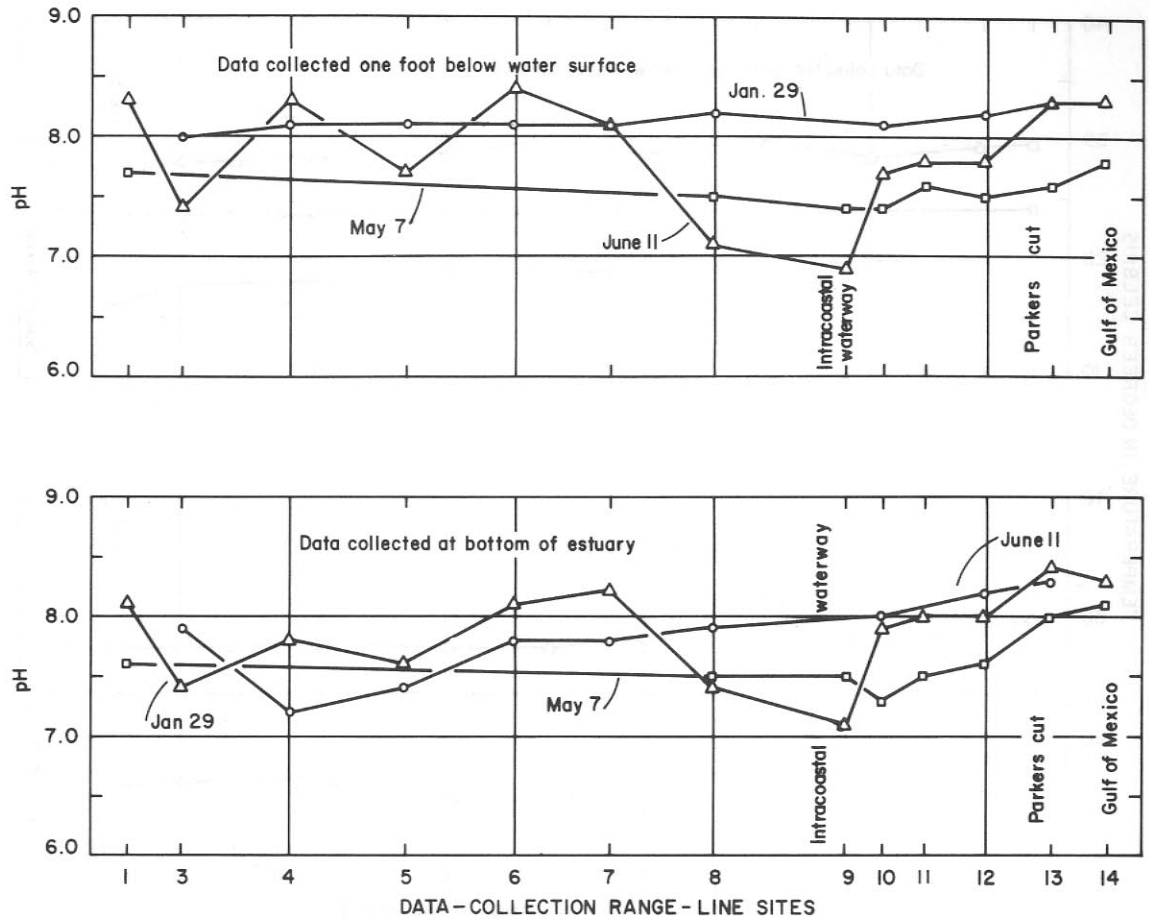
- Data collected during low streamflow, flood tide
- △ Data collected during medium streamflow, flood tide
- Data collected during high streamflow, flood tide

Figure 6
Specific Conductance for Different
Flow Conditions in the Colorado Estuary



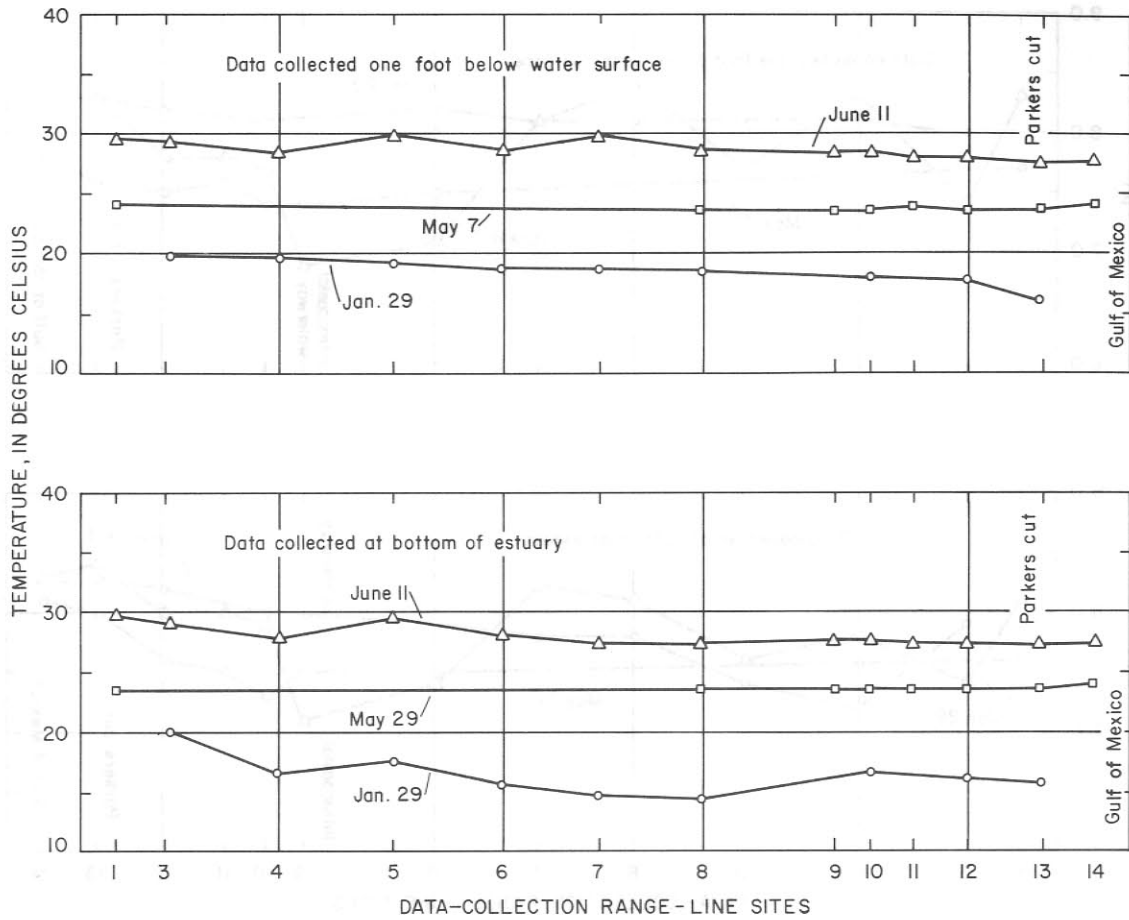
- Data collected during low streamflow, flood tide
- △ Data collected during medium streamflow, flood tide
- Data collected during high streamflow, flood tide

Figure 7
 Percent Saturation of Dissolved Oxygen for
 Different Flow Conditions in the Colorado Estuary



- Data collected during low streamflow, flood tide
- △ Data collected during medium streamflow, flood tide
- Data collected during high streamflow, flood tide

Figure 8
 pH for Different Flow Conditions in the Colorado Estuary



- Data collected during low streamflow, flood tide
- △ Data collected during medium streamflow, flood tide
- Data collected during high streamflow, flood tide

Figure 9
 Water Temperature for Different Flow
 Conditions in the Colorado Estuary

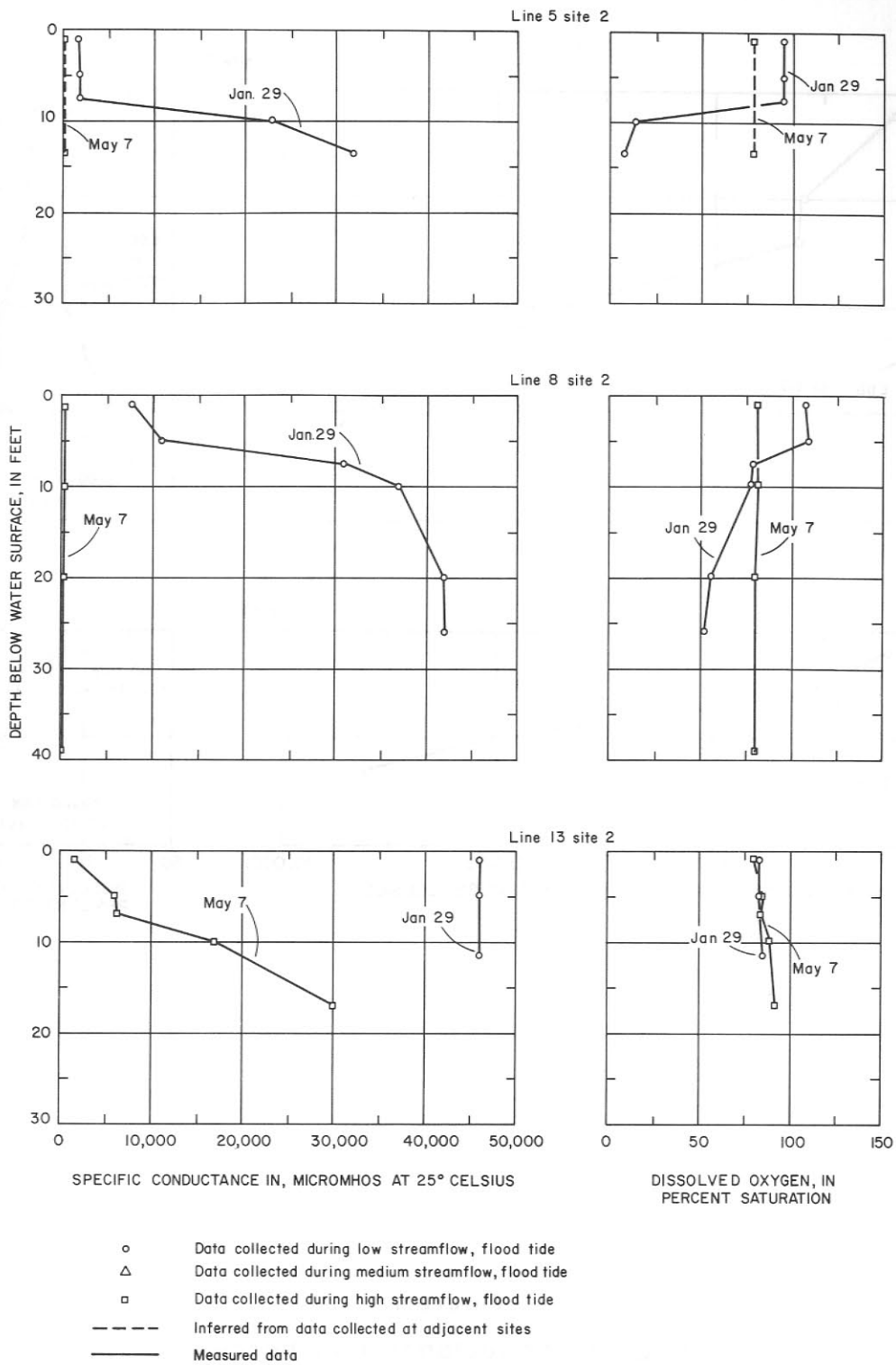


Figure 10
 Specific Conductance and Percent Saturation of Dissolved Oxygen Versus
 Depth for Different Flow Conditions at Flood Tide in the Colorado Estuary

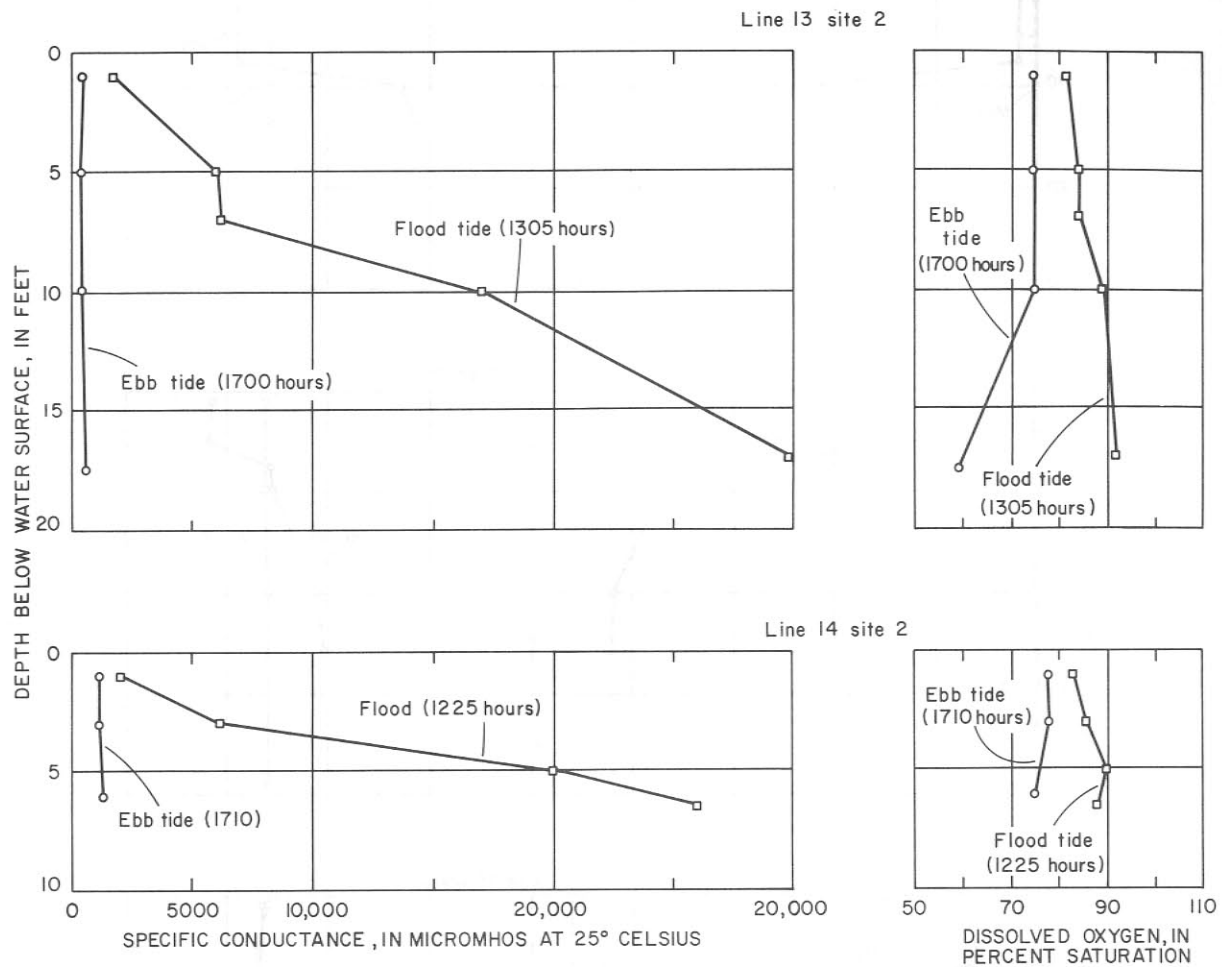


Figure 11
 Specific Conductance and Percent
 Saturation of Dissolved Oxygen Versus Depth During
 High Flow for Flood and Ebb Tides Near the Mouth
 of the Colorado River, May 7, 1969

Table 3A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE COLORADO ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 1. Colorado River</u>																	
May 7	1530	2	1	180	7.7	24.0	4	7.2	85	1.8	20	9.4	0.3	QN	QN	0.15	0.33
			5	180	7.7	24.0		7.1	84	--							
			10	180	7.6	23.5		6.6	78	2.0							
June 11	1530	1	1	600	8.4	30.3	--	9.2	121	3.1	--	8.5	.0	QN	QN	.08	.11
			Do.	1510	2	1	580	8.3	29.7	20	9.2	121	3.4	.8	9.0	.0	QN
Do.	1535	3	1	560	8.1	29.8	--	9.0	118	3.3	--	9.1	.0	QN	QN	.08	.08
<u>Line 2. Colorado River</u>																	
May 7	1545	2	1	290	7.6	24.6	9	6.8	80	1.9	12	9.7	.2	QN	QN	.03	.21
			5	290	7.6	24.0		6.6	78	--							
			10	260	7.5	23.5		6.6	78	--							
			17.5	280	7.4	23.6		6.2	73	2.3							
June 11	1540	2	1	520	8.3	28.8	--	12.2	156	4.5	1.8	10	.0	QN	QN	.05	.08
			5	520	8.4	28.4	10.6	134	--								
			7.5	520	8.1	27.8	8.3	105	--								
			8.5	520	7.9	26.9	5.0	62	--								
			11	600	8.2	24.9	.2	24	2.2								
<u>Line 2b. Colorado River</u>																	
May 7	1600	2	.2	3,800	10.6	26.9	--	6.6	82	4.8	201	18	1.8	4.7	0.55	.22	.29
			3	2,200	9.8	25.5	6.7	83	6.9								
<u>Line 3. Colorado River</u>																	
Jan 29	1315	2	1	700	8.0	19.9	18	8.2	89	1.0	--	6.4	.0	.00	.00	--	.11
			13	1,000	7.9	20.0		8.8	96	1.6							
Jan 31	0955	2	10	23,000	7.2	16.5	--	.0	0	--	--	--	--	--	--	--	--
			13	23,000	7.1	16.4	.0	0	--								
June 11	1500	1	1	560	7.5	29.3	27	9.0	115	3.1	---	8.5	.0	QN	QN	.07	.12
			Do.	1450	2	1	560	7.4	29.1	27	9.0	115	3.7	--	8.5	.2	QN
Do.	1455	3	5	560	7.4	29.0	--	9.0	115	--	--	--	--	--	--	--	--
			11	580	7.4	29.0	--	9.5	122	3.0	--	8.4	.0	QN	QN	.11	.12
			1	580	7.5	29.2	27	9.0	115	3.8	--	8.8	.0	QN	QN	.07	.09
<u>Line 4. Colorado River</u>																	
Jan. 29	1300	2	1	1,000	8.1	19.6	--	9.2	99	1.0	--	6.4	.0	.00	.00	--	.11
			5	1,000	8.1	19.4	8.9	96	--								
			10	2,200	8.1	19.1	7.6	81	--								
			12.5	24,000	7.2	16.7	.0	0	2.1								
June 11	1435	2	1	560	8.3	28.4	24	9.2	116	--	--	--	--	--	--	--	--
			5	560	7.9	28.2	--	8.6	109	--	--	--	--	--	--	--	--
			15	560	7.8	27.9	--	7.4	94	--	--	--	--	--	--	--	--
<u>Line 5. Colorado River</u>																	
Jan 29	1230	2	1	1,800	8.1	19.2	20	9.0	96	1.4	--	6.4	.0	.00	.00	--	.09
			5	2,000	8.2	19.3		8.9	96	--							
			7.5	2,000	8.1	19.4		8.9	96	--							
			10	23,000	7.4	17.3		1.5	15	--							
			13.5	32,000	7.4	17.5		.8	8	1.9							
June 11	1425	2	1	560	7.7	29.8	--	8.7	114	--	--	--	--	--	--	--	--
			5	560	7.7	29.7	--	8.6	113	--	--	--	--	--	--	--	--
			14	560	7.6	29.4	--	7.7	99	--	---	--	--	--	--	--	--
<u>Line 6. Colorado River</u>																	
Jan. 29	1353	2	1	3,700	8.1	18.7	--	9.6	102	2.2	--	7.0	.0	.00	.00	--	.08
			5	4,200	8.1	18.6		9.4	100	--							
			7.5	4,600	8.0	18.4		9.0	95	--							
			10	37,000	7.7	15.9		3.1	31	--							
			15	37,000	7.8	15.5		4.1	41	2.3							
June 11	1410	2	1	520	8.4	28.4	34	7.5	95	--	--	--	--	--	--	--	--
			5	480	8.4	28.4	--	7.4	94	--	--	--	--	--	--	--	--
			10	520	8.3	28.1	--	7.0	89	--	--	--	--	--	--	--	--
			16	640	8.1	28.0	--	6.8	86	--	--	--	--	--	--	--	--

See footnotes at end of table.

Table 3A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE COLORADO ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
<u>Line 7. Colorado River</u>																		
Jan. 29	1415	2	1	5,000	8.1	18.5	20	9.6	102	1.4	--	6.7	0.0	0.00	0.00	--	0.08	
			5	5,300	8.1	18.5		9.6	102	--	--	--	--	--	--	--	--	--
			7.5	5,500	8.2	18.2		9.4	99	--	--	--	--	--	--	--	--	--
			10	40,000	7.9	14.7		5.4	52	--	--	--	--	--	--	--	--	--
			20	42,000	7.8	14.6		4.7	46	2.2	--	1.7	.0	.00	.00	--	.10	
June 11	1350	2	1	450	8.1	29.8	28	8.2	108	--	--	--	--	--	--	--	--	
			5	450	8.2	28.6		7.2	92	--	--	--	--	--	--	--		
			10	640	8.2	28.1		6.8	86	--	--	--	--	--	--	--		
			13	450	8.3	28.0		6.8	86	--	--	--	--	--	--	--		
			15	600	8.5	28.0		6.7	85	--	--	--	--	--	--	--		
			16	750	8.4	28.0		6.7	85	--	--	--	--	--	--	--		
			19	7,000	8.2	27.4		4.0	51	--	--	--	--	--	--	--		
<u>Line 8. Colorado River</u>																		
Jan. 29	1435	2	1	7,700	8.2	18.4	56	10.2	107	1.4	--	5.7	.0	.00	.01	--	.08	
			5	11,000	8.2	18.3		10.4	110	--	--	--	--	--	--	--		
			7.5	31,000	7.8	16.5		7.8	79	--	--	--	--	--	--	--		
			10	37,000	8.0	16.0		7.8	78	--	--	--	--	--	--	--		
			20	42,000	8.0	14.4		5.8	56	--	--	--	--	--	--	--		
			26	42,000	7.9	14.6	5.5	53	2.5	--	.4	.0	.00	.00	--	.05		
May 7	1440	2	1	290	7.5	23.6	5	7.0	82	2.6	--	9.7	.7	QN	QN	0.18	.22	
			10	290	7.5	23.5		7.0	82	--	--	--	--	--	--	--		
			20	310	7.5	23.5		6.8	80	--	--	--	--	--	--	--		
			39	290	7.5	23.5		6.9	81	3.1	--	10	.4	QN	QN	.16	.28	
June 11	1335	2	1	650	7.1	28.5	29	7.8	99	--	--	--	--	--	--	--	--	
			7.5	900	7.2	28.0		7.3	92	--	--	--	--	--	--	--		
			10	1,400	7.3	27.8		7.1	90	--	--	--	--	--	--	--		
			12.5	8,800	6.9	27.3		4.5	57	--	--	--	--	--	--	--		
			15	20,000	7.4	27.0		2.4	32	--	--	--	--	--	--	--		
			20	23,000	7.4	27.2		1.8	24	--	--	--	--	--	--	--		
<u>Line 9. Colorado River</u>																		
May 7	1425	2	1	310	7.4	23.5	--	7.0	82	2.4	--	9.5	.4	QN	QN	.18	.32	
			5	310	7.4	23.5		7.0	82	--	--	--	--	--	--	--		
			10	310	7.4	23.5		6.8	80	--	--	--	--	--	--	--		
			15	310	7.4	23.5		6.6	78	--	--	--	--	--	--	--		
			20	310	7.5	23.6		6.7	79	2.6	--	9.5	.6	QN	QN	.14	.33	
June 11	1255	2	1	2,200	6.9	28.2	41	8.0	103	.9	0.0	10	.4	QN	QN	.07	.12	
			3	2,800	6.6	28.3		8.2	105	--	--	--	--	--	--	--		
			5	8,800	6.7	27.8		7.2	94	--	--	--	--	--	--	--		
			7.5	10,000	6.7	27.8		6.9	90	--	--	--	--	--	--	--		
			10	31,000	7.0	27.7		6.0	86	--	--	--	--	--	--	--		
			18	40,000	7.1	27.6		6.2	91	1.5	--	1.8	.0	QN	QN	.05	.06	
<u>Line 10. Colorado River</u>																		
Jan. 29	1515	2	1	23,000	8.1	17.8	102	9.5	100	2.4	--	3.8	.0	QN	QN	--	.06	
			5	37,000	8.1	16.4		8.3	84	--	--	--	--	--	--	--		
			10	44,000	8.1	16.4		8.2	83	--	--	--	--	--	--	--		
			13	42,000	8.0	16.6		8.3	85	1.7	--	.8	.0	QN	QN	--	.04	
May 7	1405	2	1	410	7.4	23.5	5	6.9	81	--	--	--	--	--	--	--		
			5	410	7.4	23.5		6.9	81	--	--	--	--	--	--	--		
			10	380	7.4	23.5		6.9	81	--	--	--	--	--	--	--		
			15	380	7.4	23.5		6.8	80	--	--	--	--	--	--	--		
			20	400	7.4	23.6		6.2	73	--	--	--	--	--	--	--		
			24	410	7.3	23.6		6.6	78	--	--	--	--	--	--	--		
June 11	1235	2	1	8,800	7.7	28.2	44	8.1	105	--	--	--	--	--	--	--		
			3	8,800	7.7	28.1		8.1	105	--	--	--	--	--	--	--		
			5	13,000	7.9	27.4		7.2	92	--	--	--	--	--	--	--		
			7.5	17,000	7.9	27.5		7.2	97	--	--	--	--	--	--	--		
			10	42,000	8.0	27.7		6.2	93	--	--	--	--	--	--	--		
			16	42,000	7.9	27.7		6.2	93	--	--	--	--	--	--	--		

See footnotes at end of table.

Table 3A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE COLORADO ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)		
								Concentration	Percent saturation										
<u>Line 11. Colorado River</u>																			
May 7	1345	2	1	560	7.6	23.9	--	6.2	73	2.8	--	9.5	0.6	QN	QN	0.13	0.29		
			5	580	7.6	23.8	--	6.2	73	--	--	--	--	--	--	--	--	--	
			10	580	7.6	23.8	--	6.2	73	--	--	--	--	--	--	--	--	--	--
			18	580	7.5	23.8	--	6.0	71	3.3	--	9.6	.5	QN	QN	.13	.30		
June 11	1225	2	1	21,000	7.8	27.9	65	7.7	105	--	--	--	--	--	--	--	--		
			5	21,000	7.9	27.8	--	7.4	101	--	--	--	--	--	--	--	--	--	
			7.5	34,000	8.0	27.7	--	6.5	94	--	--	--	--	--	--	--	--	--	
			10	42,000	8.1	27.4	--	6.5	96	--	--	--	--	--	--	--	--	--	
			16	42,000	8.0	27.7	--	6.2	93	--	--	--	--	--	--	--	--	--	--
<u>Line 12. Colorado River</u>																			
Jan. 29	1535	2	1	29,000	8.2	17.6	107	9.0	94	2.3	--	3.4	.0	0.00	0.00	--	.05		
			5	44,000	8.2	16.2	--	8.0	80	--	--	--	--	--	--	--	--	--	
			10	44,000	8.2	15.9	--	7.9	79	--	--	--	--	--	--	--	--	--	
			16.5	44,000	8.2	16.0	--	7.4	74	1.7	--	.4	.0	.00	.00	--	.05		
May 7	1330	2	1	340	7.5	23.7	6	6.6	78	--	--	--	--	--	--	--	--		
			5	360	7.5	23.6	--	6.6	78	--	--	--	--	--	--	--	--	--	
			10	380	7.5	23.6	--	6.6	78	--	--	--	--	--	--	--	--	--	
			15	400	7.6	23.6	--	6.4	75	--	--	--	--	--	--	--	--	--	
			22	2,100	7.6	23.6	--	5.9	79	--	--	--	--	--	--	--	--	--	
June 11	1215	2	1	34,000	7.8	27.9	62	7.5	109	--	--	--	--	--	--	--	--		
			5	38,000	7.8	27.7	--	7.5	110	--	--	--	--	--	--	--	--	--	
			10	40,000	7.9	27.6	--	7.4	109	--	--	--	--	--	--	--	--	--	
			17	40,000	8.0	27.3	--	6.5	94	--	--	--	--	--	--	--	--	--	
<u>Parkers Cut</u>																			
May 7	1725	-	1	410	7.7	23.8	4	6.3	74	--	--	--	--	--	--	--	--		
			5.5	520	7.7	24.0	--	6.2	73	--	--	--	--	--	--	--	--	--	
June 11	1200	-	1	34,000	7.9	28.0	25	7.7	112	--	--	--	--	--	--	--	--		
			5	36,000	7.8	28.4	--	7.4	107	--	--	--	--	--	--	--	--	--	
<u>Line 13. Colorado River</u>																			
Jan. 29	1555	2	1	46,000	8.3	15.9	--	8.3	83	2.0	--	.2	.0	.00	.00	--	.05		
			5	46,000	8.3	15.9	--	8.3	83	--	--	--	--	--	--	--	--	--	
			11.5	46,000	8.3	15.8	--	8.5	85	1.4	--	.0	.0	.00	.00	--	.19		
May 7	1305	2	1	1,700	7.6	23.6	8	7.0	82	2.2	--	8.9	.5	QN	QN	.10	.18		
			5	6,000	7.7	23.6	--	7.0	84	--	--	--	--	--	--	--	--		
			7	6,200	7.7	23.6	--	7.0	84	--	--	--	--	--	--	--	--		
			10	17,000	7.9	23.5	--	7.1	89	--	--	--	--	--	--	--	--		
			17	30,000	8.0	23.7	--	7.0	92	2.4	--	2.3	.2	QN	QN	.05	.08		
Do.	1700	2	1	490	7.7	24.0	--	6.4	75	--	--	--	--	--	--	--	--		
			5	450	7.7	24.0	--	6.4	75	--	--	--	--	--	--	--	--		
			10	470	7.8	24.0	--	6.4	75	--	--	--	--	--	--	--	--		
			17.5	520	8.0	24.4	--	5.0	59	--	--	--	--	--	--	--	--		
June 11	1115	2	1	36,000	8.3	27.4	35	7.3	103	1.5	--	2.7	.1	QN	QN	.04	.06		
			5	38,000	8.3	27.4	--	7.0	100	--	--	--	--	--	--	--	--		
			10	40,000	8.4	27.3	--	6.8	99	--	--	--	--	--	--	--	--		
			15	40,000	8.4	27.3	--	6.7	97	--	--	--	--	--	--	--	--		
			18	42,000	8.4	27.4	--	6.5	96	1.6	--	1.6	.1	QN	QN	.02	.04		
<u>Line 14. Colorado River</u>																			
May 7	1235	1	1	2,400	7.8	24.0	8	7.1	85	--	--	--	--	--	--	--	--		
			3	8,000	7.8	23.6	--	7.0	84	--	--	--	--	--	--	--	--		
			5	22,000	8.0	23.9	--	7.2	91	--	--	--	--	--	--	--	--		
			10.5	30,000	8.1	24.0	--	7.0	92	--	--	--	--	--	--	--	--		
Do.	1225	2	1	2,000	7.8	24.0	8	7.0	83	--	--	--	--	--	--	--	--		
			3	6,200	7.7	23.8	--	7.1	86	--	--	--	--	--	--	--	--		
			5	20,000	8.0	23.9	--	7.1	90	--	--	--	--	--	--	--	--		
			6.5	26,000	8.0	23.9	--	6.9	88	--	--	--	--	--	--	--	--		
Do.	1710	2	1	1,200	7.7	23.9	--	6.6	78	--	--	--	--	--	--	--	--		
			3	1,200	7.7	23.9	--	6.6	78	--	--	--	--	--	--	--	--		
			6	1,300	7.7	24.0	--	6.4	75	--	--	--	--	--	--	--			
June 11	1050	2	1	36,000	8.3	27.5	43	7.6	110	--	--	--	--	--	--	--			
			5	36,000	8.3	27.4	--	7.6	107	--	--	--	--	--	--	--			

1/ Determined at data-collection site.
QN means qualitative test negative.

Table 3B.--CHEMICAL ANALYSES OF WATER FROM THE COLORADO ESTUARY, 1969 WATER YEAR

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) a/	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 1. Colorado River</u>															
May 7	1530	2	10	212	27	60	9.1		97	10	13	126	92	12	--
June 11	1510	2	4	549	54	19	34		200	36	59	310	212	48	--
<u>Line 2. Colorado River</u>															
May 7	1545	2	17.5	291	34	7.3	14		118	17	19	163	115	18	--
<u>Line 2b. Colorado River</u>															
May 7	1600	2	3	1,880	54	14	367		135	646	150	1,320	192	82	--
<u>Line 3. Colorado River</u>															
Jan. 29	1315	2	1	680	53	19	65		200	56	91	389	212	48	--
<u>Line 8. Colorado River</u>															
May 7	1440	2	39	311	36	8.3	15		125	20	22	175	124	22	--
<u>Line 9. Colorado River</u>															
May 7	1425	2	20	319	36	9.0	17		128	20	24	182	127	22	--
June 11	1255	2	1 18	2,180 35,100	58 278	50 998	351 6,910		161 136	114 1,860	610 12,600	1,270 22,700	352 4,800	220 4,690	-- 1.015
<u>Line 11. Colorado River</u>															
May 7	1345	2	1	518	38	14	49		128	28	86	291	154	49	--
<u>Line 13. Colorado River</u>															
Jan. 29	1600	2	11.5	46,500	345	1,160	8,770		142	2,490	15,600	28,400	5,650	5,530	1.018
May 7	1305	2	1 17	1,570 29,200	42 210	32 670	212 5,730		120 125	68 1,480	372 10,000	797 18,200	238 3,280	140 3,180	-- --
June 11	1115	2	1 18	32,500 35,000	270 272	828 992	6,670 6,680		140 136	1,760 1,880	11,800 12,200	21,400 22,100	4,080 4,750	3,970 4,640	1.013 1.014

a/ Included in sodium-ion concentration.

Table 3C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE COLORADO ESTUARY, 1969 WATER YEAR

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25°C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium VI (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 1. Colorado River</u>																			
May 7	1530	2	10	212	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--
June 11	1510	2	4	549	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
<u>Line 2. Colorado River</u>																			
May 7	1545	2	17.5	291	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
<u>Line 2b. Colorado River</u>																			
May 7	1600	2	3	1,880	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
<u>Line 3. Colorado River</u>																			
Jan. 29	1315	2	1	680	--	--	--	.2	--	--	--	--	--	--	--	--	0.62	0.052	--
<u>Line 8. Colorado River</u>																			
May 7	1440	2	39	311	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
<u>Line 9. Colorado River</u>																			
May 7	1425	2	20	319	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
June 11	1255	2	1	2,180	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
			18	35,100	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--
<u>Line 11. Colorado River</u>																			
May 7	1345	2	1	518	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
<u>Line 13. Colorado River</u>																			
Jan. 29	1600	2	11.5	46,500	--	--	--	.9	--	--	--	--	--	--	--	--	62	.035	--
May 7	1305	2	1	1,570	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
			17	29,200	--	--	--	.6	--	--	--	--	--	--	--	--	--	--	--
June 11	1115	2	1	32,500	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--
			18	35,000	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--

a/ Results in milligrams per liter.

Table 3 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE COLORADO ESTUARY, 1969 WATER YEAR.

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 1 site 2. Colorado River</u>														
June 11	1510	Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02
		Sediment	.00	.00	.00	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 9 site 2. Colorado River</u>														
June 11	1255	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.04
		Sediment	(a)	5.8	6.1	4.3	.00	.00	(a)	.00	(a)	--	--	--
<u>Line 13 site 2. Colorado River</u>														
June 11	1115	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.03
		Sediment	(a)	15	9.6	8.8	.00	.00	(a)	.00	(a)	--	--	--

(a) Not detectable due to interfering compounds.

Lavaca-Tres Palacios Estuary

The Lavaca-Tres Palacios estuary covers about 350 square miles and consists of the tidal parts of the Lavaca and Navidad Rivers, Tres Palacios Creek and other tributaries, Lavaca Bay, Cox Bay, Keller Bay, Carancahua Bay, Tres Palacios Bay, Matagorda Bay, Matagorda Ship Channel pass, Pass Cavallo, and parts of the Intracoastal Waterway (Figure 12). Water depth at mlw is 13 feet or less in Matagorda Bay, except in the Matagorda Ship Channel, which is more than 40 feet deep. The rivers generally are less than 15 feet deep.

Water-quality surveys of the Lavaca-Tres Palacios estuary (Table 4) were made during two periods in April and one in June.

The average discharges for downstream gaging stations on the Lavaca and Navidad Rivers for four periods when water-quality surveys were made are shown in the following table. Many streams, which drain about 2,180 square miles of land contiguous to the estuary, are engaged.

STREAMFLOW STATION	AVERAGE WATER DISCHARGE IN CUBIC FEET PER SECOND ^{1/}			
	APRIL 4-10	APRIL 11-16	APRIL 17-23	JUNE 13-19
Lavaca River near Edna	131	6,030	371	98
Navidad River near Ganado	115	6,360	598	76

^{1/} U.S. Geological Survey, 1970a.

Water-quality data were collected on the estuary during flood tide prior to and following a period of high inflow on April 11-16. Changes in specific conductance and percent saturation of dissolved oxygen that occurred as a result of this inflow are shown on Figures 13 and 14.

The observed extremes of nutrients and other environmental characteristics of water, without consideration of depth, location, or season, are as follows:

EXTREME	NITRATE NITROGEN	AMMONIUM NITROGEN	NITRITE NITROGEN	TOTAL PHOSPHORUS	SILICA	BIO-CHEMICAL OXYGEN DEMAND	CHEMICAL OXYGEN DEMAND	DISSOLVED OXYGEN (PERCENT SATURATION)	SECCHI DISK TRANSPARENCY (CM)
(Results in Milligrams Per Liter Except As Indicated)									
Maximum	2.0	0.05	0.21	0.21	22	8.0	16	219	176
Minimum	.0	.00	.00	.01	.0	.3	8.3	0	15

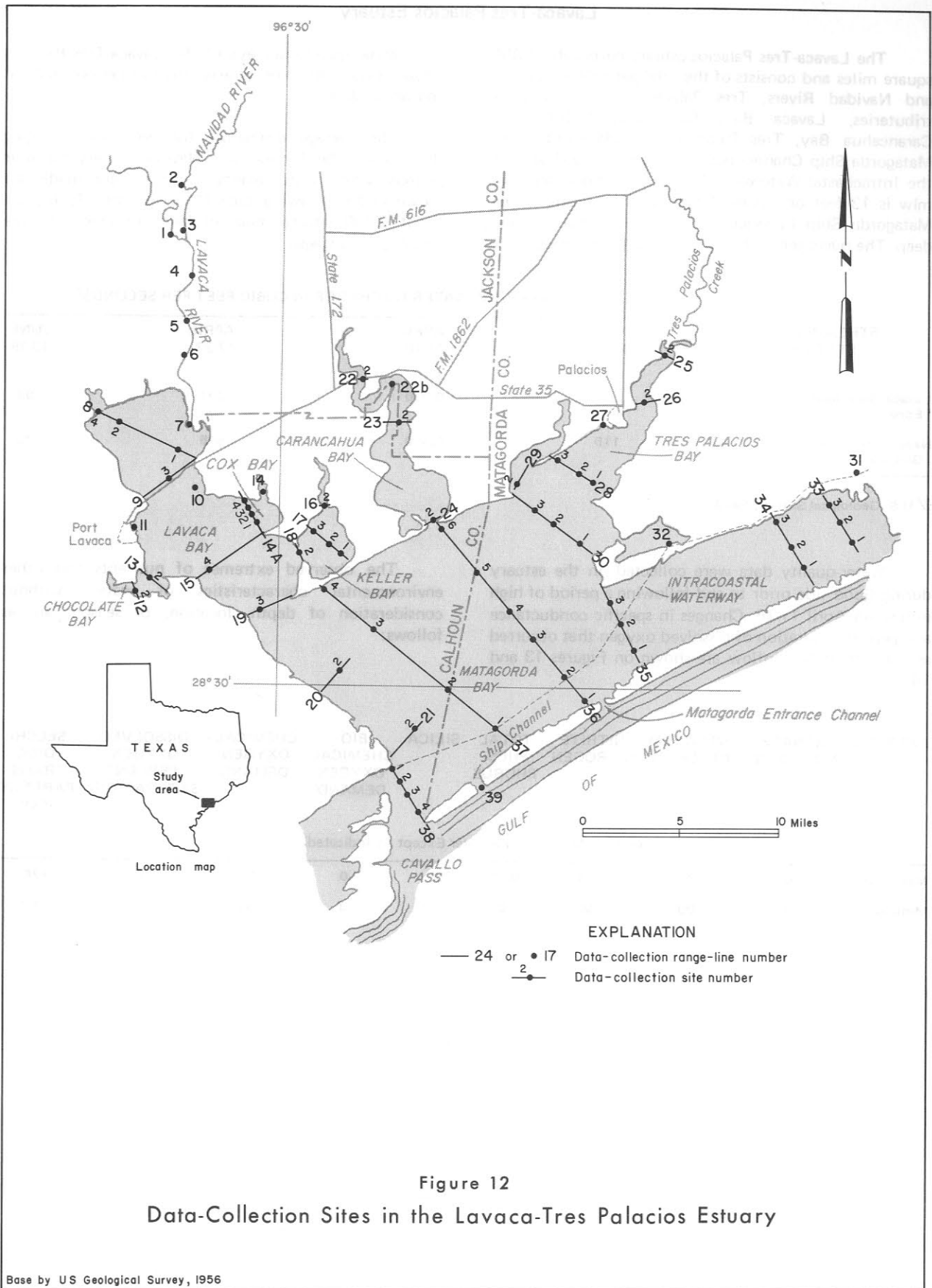


Figure 12
Data-Collection Sites in the Lavaca-Tres Palacios Estuary

Base by US Geological Survey, 1956

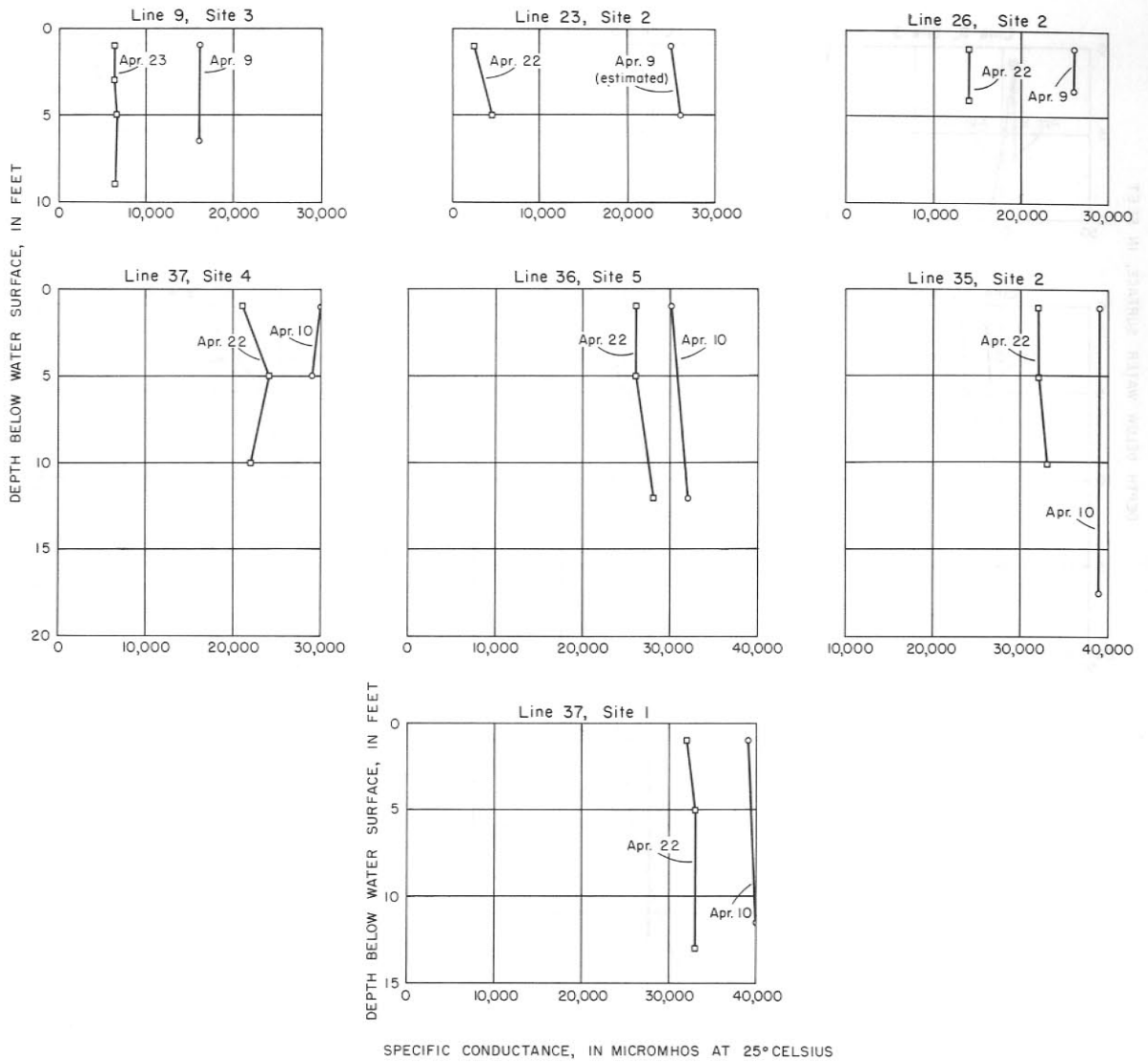


Figure 13
 Specific Conductance Versus Depth for
 Different Flow Conditions at Flood Tide
 in the Lavaca-Tres Palacios Estuary

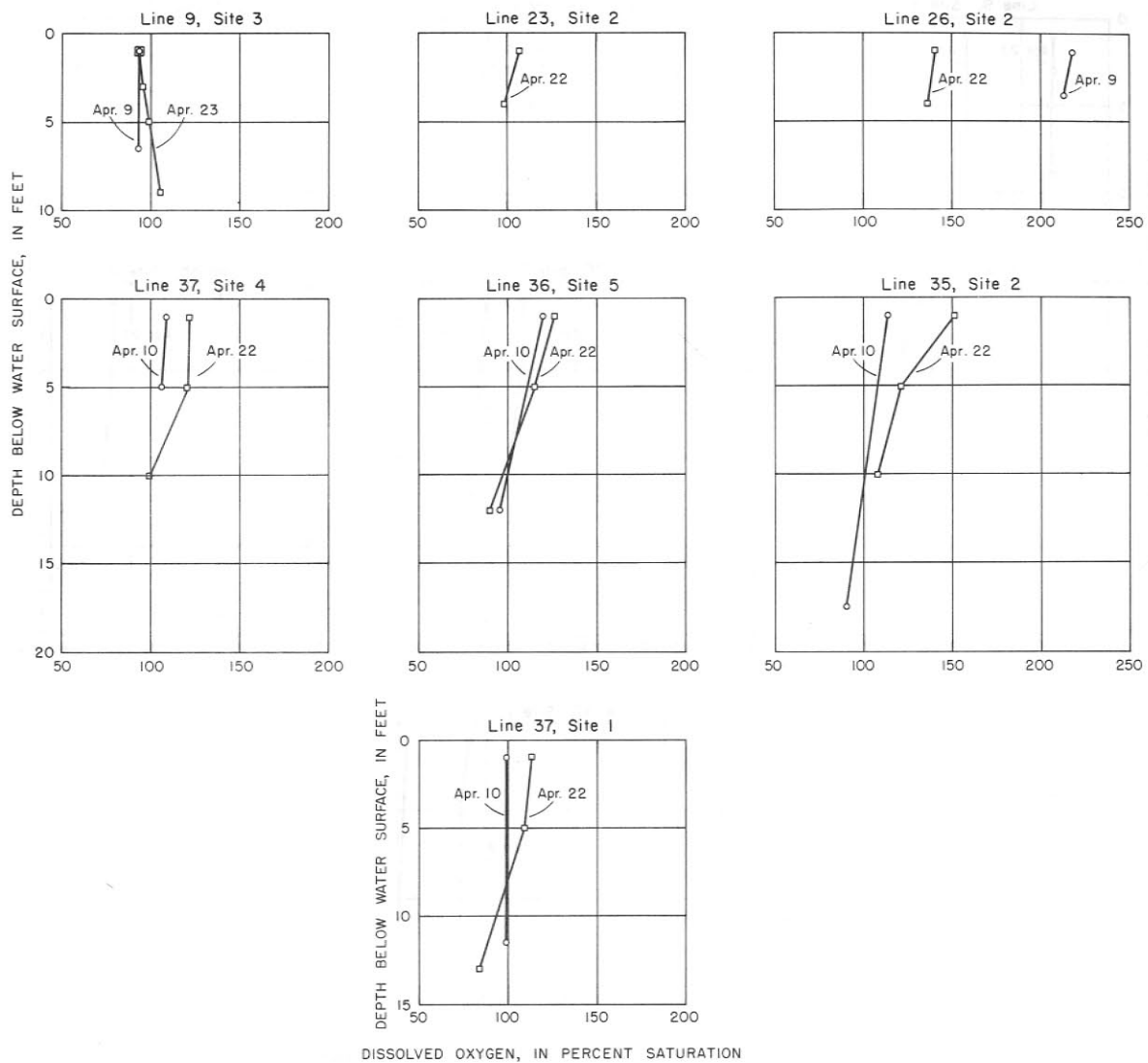


Figure 14
 Percent Saturation of Dissolved
 Oxygen Versus Depth for Different Flow
 Conditions at Flood Tide in the Lavaca-Tres Palacios Estuary

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
<u>Line 1. Lavaca River</u>																		
Apr. 9	1545	2	1	600	8.3	24.4	--	10.0	118	2.3	--	17	0.0	QN	QN	0.01	0.04	
			8	600	8.1	23.9	--	8.5	100	3.0	--	18	.0	QN	QN	.04	.06	
Apr. 23	1410	2	1	840	7.9	24.6	56	13.1	156	4.6	--	22	.0	QN	QN	.03	.07	
			3	830	7.7	23.3	10.2	117	--	--	--	--	--	--	--	--	--	
			5	850	7.6	23.0	9.4	108	--	--	--	--	--	--	--	--	--	--
			10	1,200	7.5	23.1	9.1	105	1.4	--	22	.0	QN	QN	.01	.10		
June 19	1120	2	1	670	8.0	29.3	67	8.2	105	3.1	16	20	.0	QN	QN	.09	.12	
			5	650	7.9	29.0	7.7	99	--	--	--	--	--	--	--	--	--	
			9	730	7.7	28.9	7.2	92	3.2	13	21	.0	QN	QN	.11	.13		
<u>Line 2. Navidad River</u>																		
Apr. 9	1510	2	1	600	8.2	24.3	--	10.6	125	2.5	--	17	.0	QN	QN	.03	.05	
			8.5	700	7.8	23.5	--	9.4	111	2.8	--	16	.0	QN	QN	.04	.06	
Apr. 23	1430	2	1	480	7.6	27.9	37	9.2	116	3.3	--	18	.0	QN	QN	.01	.06	
			3	480	7.4	24.3	8.6	101	--	--	--	--	--	--	--	--	--	
			5	480	7.4	23.4	8.3	95	--	--	--	--	--	--	--	--	--	
			9	480	7.3	23.3	8.7	100	1.7	--	18	.1	QN	QN	.01	.09		
June 19	1055	2	1	710	7.9	29.2	69	8.2	105	2.8	14	21	.0	QN	QN	.05	.10	
			5	700	7.8	28.8	7.7	99	--	--	--	--	--	--	--	--		
			9	720	7.6	28.6	6.7	86	2.4	8.3	22	.0	QN	QN	.05	.08		
<u>Line 3. Navidad River</u>																		
Apr. 23	1450	2	1	510	7.9	25.8	33	11.5	140	--	--	--	--	--	--	--	--	
			3	460	7.4	23.5	7.9	93	--	--	--	--	--	--	--	--		
			6	540	7.3	23.3	7.8	90	--	--	--	--	--	--	--	--		
June 19	1045	2	1	700	7.9	29.0	69	8.0	103	--	--	--	--	--	--	--	--	
			5	700	7.9	28.9	7.7	99	--	--	--	--	--	--	--	--		
			13	700	7.9	28.9	7.4	95	--	--	--	--	--	--	--	--		
<u>Line 4. Lavaca River</u>																		
Apr. 9	1450	2	1	600	8.3	24.2	84	9.4	111	--	--	--	--	--	--	--	--	
			9	900	8.3	24.1	9.2	108	--	--	--	--	--	--	--	--		
Apr. 23	1500	2	1	670	8.2	27.3	43	13.8	170	--	--	--	--	--	--	--	--	
			3	670	7.9	24.9	11.8	140	--	--	--	--	--	--	--			
			7	650	7.6	24.0	9.8	115	--	--	--	--	--	--	--			
June 19	1030	2	1	690	8.0	28.9	64	7.2	92	--	--	--	--	--	--	--	--	
			5	700	8.0	28.9	7.2	92	--	--	--	--	--	--	--			
			9	680	8.0	28.9	6.8	87	--	--	--	--	--	--	--			
<u>Line 5. Lavaca River</u>																		
Apr. 23	1515	2	1	740	8.1	26.3	36	12.8	156	--	--	--	--	--	--	--	--	
			3	710	8.0	25.5	12.0	146	--	--	--	--	--	--	--			
			5	820	7.7	24.0	9.6	113	--	--	--	--	--	--	--			
			10	690	7.6	23.8	9.5	112	--	--	--	--	--	--	--			
June 19	1020	2	1	920	8.1	29.0	71	7.2	92	--	--	--	--	--	--	--	--	
			5	920	8.1	28.9	7.2	92	--	--	--	--	--	--	--			
			11	1,300	8.1	28.7	6.2	79	--	--	--	--	--	--	--			
<u>Line 6. Lavaca River</u>																		
Apr. 9	1430	2	1	1,500	8.4	23.9	--	8.8	104	--	--	--	--	--	--	--	--	
			5	1,500	8.5	23.8	8.8	104	--	--	--	--	--	--	--			
			11.5	2,800	8.3	23.4	7.3	85	--	--	--	--	--	--	--			
Apr. 23	1530	2	1	810	7.9	25.4	38	10.3	123	--	--	--	--	--	--	--	--	
			3	760	7.9	24.9	10.0	119	--	--	--	--	--	--	--			
			5	760	7.7	24.0	9.5	112	--	--	--	--	--	--	--			
			11	760	7.6	23.8	9.8	115	--	--	--	--	--	--	--			
June 19	1005	2	1	1,000	7.9	28.6	67	6.8	87	--	--	--	--	--	--	--	--	
			5	1,000	7.9	28.6	6.8	87	--	--	--	--	--	--	--			
			12	1,100	7.9	28.5	6.4	81	--	--	--	--	--	--	--			
Do.	1150	2	1	970	8.0	29.1	--	7.5	96	--	--	--	--	--	--	--	--	
			5	920	8.0	29.0	7.3	94	--	--	--	--	--	--	--			
			11	970	7.8	29.0	6.7	86	--	--	--	--	--	--	--			

See footnotes at end of table.

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) 1/	pH 1/	Temperature (°C) 1/	Secchi disk transparency (cm) 1/	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration 1/	Percent saturation								
<u>Line 7. Lavaca River</u>																	
Apr. 9	1400	2	1	15,000	8.2	24.4	--	7.8	96	1.5	--	7.1	0.0	QN	QN	0.02	0.04
			7	15,000	7.8	24.0	--	8.4	104	1.4	--	6.1	.0	QN	QN	.02	.03
Apr. 23	1550	2	1	1,500	7.8	26.3	20	8.6	105	2.8	--	12	.2	QN	QN	.05	.12
			5	1,500	7.7	25.7	--	8.5	104	--	--	--	--	--	--	--	--
			10	1,700	7.6	25.1	--	8.5	101	2.1	--	12	.1	QN	QN	.06	.13
June 19	0930	2	1	2,800	7.9	28.1	41	7.4	95	1.8	--	12	.0	QN	QN	.04	.07
			3	6,000	7.9	27.6	--	7.1	92	--	--	--	--	--	--	--	--
			5	8,300	7.9	27.5	--	7.0	91	--	--	--	--	--	--	--	--
			11	8,800	7.9	27.5	--	6.8	88	2.3	--	10	.0	QN	QN	.05	.09
<u>Line 8. Lavaca Bay</u>																	
Apr. 9	1330	1	1	15,000	8.0	23.5	30	8.0	99	--	--	--	--	--	--	--	--
			6	15,000	8.0	23.5	--	7.8	96	--	--	--	--	--	--	--	--
Do.	1345	3	1	10,000	8.1	23.6	--	8.2	99	--	--	--	--	--	--	--	--
			4	10,000	8.1	23.8	--	8.2	99	--	--	--	--	--	--	--	--
Apr. 23	1600	1	1	2,000	7.5	24.7	18	6.7	81	--	--	--	--	--	--	--	--
			5	2,000	7.5	24.6	--	6.7	81	--	--	--	--	--	--	--	--
			7	2,000	7.5	24.7	--	6.5	78	--	--	--	--	--	--	--	--
Do.	1620	2	1	1,400	7.5	24.2	23	7.9	93	--	--	--	--	--	--	--	--
			5	1,400	7.5	24.2	--	8.1	95	--	--	--	--	--	--	--	--
Do.	1615	3	1	900	7.4	24.8	15	8.0	95	--	--	--	--	--	--	--	--
			4.5	950	7.4	24.7	--	8.4	100	--	--	--	--	--	--	--	--
June 19	0840	1	1	9,000	7.9	27.6	43	6.8	88	--	--	--	--	--	--	--	--
			5	10,000	7.9	27.6	--	6.5	84	--	--	--	--	--	--	--	--
Do.	0900	3	1	4,300	7.9	27.8	46	7.4	95	1.5	--	10	.0	QN	QN	.04	.07
			4.5	4,500	7.9	27.7	--	7.2	92	1.5	--	10	.0	QN	QN	.04	.07
<u>Line 9. Lavaca Bay</u>																	
Apr. 9	1235	3	1	16,000	8.1	23.2	--	7.8	94	4.2	--	5.5	.0	QN	QN	.04	.06
			6.5	16,000	7.9	23.2	--	7.7	93	1.7	--	6.2	.0	QN	QN	.08	.03
Apr. 23	1655	2	1	6,100	7.7	24.6	29	7.7	94	--	--	--	--	--	--	--	--
			5	6,100	7.7	24.8	--	8.2	100	--	--	--	--	--	--	--	--
Do.	1640	3	1	6,300	7.7	24.8	30	7.7	94	2.1	--	8.5	.3	QN	QN	.07	.08
			3	6,300	7.7	24.9	--	7.8	95	--	--	--	--	--	--	--	--
			5	6,500	7.7	24.9	--	8.0	98	--	--	--	--	--	--	--	--
			9	6,300	7.7	25.1	--	8.6	105	1.9	--	8.6	.1	QN	QN	.01	.07
Do.	--	3a	1	5,100	7.6	24.8	20	7.6	92	--	--	--	--	--	--	--	--
			6	5,000	7.6	24.6	--	7.8	94	--	--	--	--	--	--	--	--
--	--	4	1	1,500	7.6	24.1	19	7.7	91	--	--	--	--	--	--	--	--
			4	1,700	7.6	24.0	--	7.7	91	--	--	--	--	--	--	--	--
June 19	1640	3	1	13,000	8.2	29.6	48	8.0	110	3.0	--	8.1	.0	QN	QN	.03	.06
			5	13,000	8.2	29.6	--	7.9	108	--	--	--	--	--	--	--	--
			8.5	14,000	8.0	29.5	--	7.2	99	2.9	--	8.2	.0	QN	QN	.03	.06
<u>Line 10. Lavaca Bay</u>																	
Apr. 9	1135	1	1	24,000	8.1	22.9	51	7.5	94	--	--	--	--	--	--	--	--
			10	26,000	8.1	22.7	--	7.5	94	--	--	--	--	--	--	--	--
			20	26,000	8.1	22.5	--	7.3	90	--	--	--	--	--	--	--	--
			31.5	41,000	8.0	20.9	--	5.5	71	--	--	--	--	--	--	--	--
Apr. 23	1200	1	1	7,400	8.1	24.6	34	9.4	--	2.8	--	8.0	.1	QN	0.04	.02	.13
			3	10,000	8.0	24.1	--	8.8	--	--	--	--	--	--	--	--	--
			5	11,000	7.8	23.1	--	6.8	--	--	--	--	--	--	--	--	--
			10	11,000	7.7	22.8	--	6.2	--	--	--	--	--	--	--	--	--
			20	11,000	7.7	22.4	--	6.4	--	--	--	--	--	--	--	--	--
June 19	1600	1	1	18,000	8.2	29.7	58	7.5	104	2.7	--	6.8	.0	QN	QN	.03	.05
			5	20,000	8.2	29.6	--	7.3	103	--	--	--	--	--	--	--	--
			10	20,000	8.1	29.1	--	6.9	96	--	--	--	--	--	--	--	--
			20	31,000	7.9	28.5	--	3.3	47	--	--	--	--	--	--	--	--
			33	34,000	7.8	28.3	--	1.4	20	1.5	--	3.1	.0	QN	.21	.03	.05

See footnotes at end of table.

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) $\frac{1}{1}$	pH $\frac{1}{1}$	Temperature (°C) $\frac{1}{1}$	Secchi disk transparency (cm) $\frac{1}{1}$	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)		
								Concentration $\frac{1}{1}$	Percent saturation										
<u>Line 11. Lavaca Bay</u>																			
Apr. 9	1210	2	1	18,000	7.6	23.3	--	2.6	32	7.5	--	6.0	0.0	QN	QN	0.20	0.21		
			3	18,000	7.4	23.3		2.7	33	--	--	--	--	--	--	--	--	--	
			5	18,000	7.7	22.8		5.7	70	--	--	--	--	--	--	--	--	--	--
			11.5	19,000	7.7	22.9		6.1	74	2.0	--	5.2	.0	QN	QN	.10	.12		
Apr. 23	1740	2	1	4,800	7.7	26.4	23	7.6	94	4.4	--	8.4	.1	QN	QN	.11	.20		
			5	6,300	7.7	26.0		7.6	95	--	--	--	--	--	--	--	--	--	
			7	7,000	7.2	25.8		5.6	70	--	--	--	--	--	--	--	--	--	
			10	19,000	7.1	22.6		3.3	40	--	--	--	--	--	--	--	--	--	--
			13	21,000	7.1	22.7		4.7	58	2.2	--	5.8	.1	QN	QN	.05	.11		
June 19	1335	2	1	14,000	7.5	29.9	61	1.7	23	8.0	--	8.6	.0	QN	QN	.14	.15		
			5	14,000	7.6	29.7		2.4	33	--	--	--	--	--	--	--	--	--	
			10	16,000	7.6	29.1		1.8	24	--	--	--	--	--	--	--	--	--	
			17	21,000	6.9	28.1		.0	0	5.6	--	7.5	.0	QN	QN	.08	.10		
<u>Line 12. Chocolate Bay</u>																			
Apr. 23	1235	2	3	5,500	7.5	25.2	25	9.2	112	2.3	--	8.0	.0	QN	QN	.03	.06		
<u>Line 13. Chocolate Bay</u>																			
Apr. 23	1250	2	1	5,600	8.1	25.5	37	9.4	117	--	--	--	--	--	--	--	--		
			5	5,600	8.0	25.1		9.6	117	--	--	--	--	--	--	--	--	--	
			9.5	8,600	7.6	24.2		8.7	105	--	--	--	--	--	--	--	--	--	
<u>Line 14. Cox Bay</u>																			
Apr. 23	1050	2	1	5,900	8.0	25.8	39	9.2	115	--	--	--	--	--	--	--	--		
			3	5,200	7.9	23.7		8.5	102	3.3	--	7.5	.3	QN	0.06	.05	.06		
June 19	1515	2	1	18,000	8.0	30.3	46	8.0	111	--	--	--	--	--	--	--	--		
			3.5	18,000	8.0	30.3		8.3	115	1.5	--	6.8	.0	QN	QN	.02	.04		
Aug. 27	1150	2	1	38,000	7.7	28.8	68	6.7	100	--	--	--	--	--	--	--	--		
			4.5	38,000	7.6	28.7		6.8	102	1.8	--	4.0	.0	QN	QN	.03	.03		
<u>Line 14a. Cox Bay</u>																			
Apr. 23	1120		1	5,700	8.4	25.2	44	10.3	124	--	--	--	--	--	--	--	--		
			3	5,700	8.0	23.8		9.4	113	--	--	--	--	--	--	--	--	--	
			5	5,700	7.8	24.0		9.0	107	--	--	--	--	--	--	--	--	--	
Aug. 27	1155	1	1	38,000	7.7	29.6	98	7.5	114	--	--	--	--	--	--	--	--		
			3	40,000	7.7	29.5		7.3	112	--	--	--	--	--	--	--	--	--	
			6	40,000	7.6	29.4		6.8	103	--	--	--	--	--	--	--	--	--	
Do.	1230	2	1	38,000	7.7	29.5	72	7.1	108	--	--	--	--	--	--	--	--		
			3	38,000	7.8	29.2		7.0	104	--	--	--	--	--	--	--	--	--	
			5	38,000	7.7	29.1		6.5	97	--	--	--	--	--	--	--	--	--	
			7	38,000	7.7	29.0		5.7	85	--	--	--	--	--	--	--	--	--	
Do.	1215	3	1	38,000	7.8	29.2	71	7.2	108	--	--	--	--	--	--	--	--		
			3	38,000	7.8	29.2		7.3	109	--	--	--	--	--	--	--	--	--	
			7	38,000	7.7	29.0		6.5	97	--	--	--	--	--	--	--	--	--	
Do.	1210	4	1	38,000	7.7	29.5	62	6.9	103	--	--	--	--	--	--	--	--		
			3	36,000	7.7	29.4		7.0	103	--	--	--	--	--	--	--	--	--	
			6	38,000	7.7	29.0		6.8	102	--	--	--	--	--	--	--	--	--	
<u>Line 15. Lavaca Bay</u>																			
Apr. 9	1110	4	1	26,000	8.1	22.7	61	7.6	95	--	--	--	--	--	--	--	--		
			10	26,000	8.1	22.7		7.5	94	--	--	--	--	--	--	--	--	--	
			20	31,000	8.1	21.9		6.3	80	--	--	--	--	--	--	--	--	--	
			36.5	32,000	8.0	21.7		5.9	75	--	--	--	--	--	--	--	--	--	
Apr. 23	1135	2	1	6,200	8.5	25.3	51	9.2	111	--	--	--	--	--	--	--	--		
			3	6,200	8.4	25.4		11.6	141	--	--	--	--	--	--	--	--	--	
			5	6,300	8.0	23.5		12.6	154	--	--	--	--	--	--	--	--	--	
			6.5	6,200	7.8	23.4		9.4	110	--	--	--	--	--	--	--	--	--	
<u>Line 16. Keller Bay</u>																			
Jan. 14	1325	2	1	34,000	--	12.9	--	9.5	90	1.5	--	.0	.0	0.00	.00	--	.03		
			4.5	34,000	--	12.9		9.5	90	1.6	--	.1	.1	.00	.00	--	.03		
Apr. 23	1015	2	1	12,900	8.2	25.1	52	--	--	2.7	--	6.1	.1	QN	QN	.01	.03		
			2	12,400	8.1	24.9		--	--	2.9	--	5.7	.1	QN	QN	.02	.04		
Aug. 27	1110	2	1	38,000	7.8	28.9	90	6.6	99	--	--	--	--	--	--	--	--		
			4	40,000	7.8	28.9		6.7	102	1.8	--	4.0	.0	QN	QN	.01	.03		

See footnotes at end of table.

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 17. Keller Bay</u>																	
Jan. 14	1440	1	1	34,000	--	12.4	--	9.5	89	0.9	--	0.1	0.0	0.00	0.00	--	0.03
			5	34,000	--	12.4	--	9.5	89	.7	--	.2	.0	.00	.00	--	.03
Do.	1425	2	1	34,000	--	12.5	--	9.4	88	.9	--	.3	.0	.02	.00	--	.03
			5.5	34,000	--	12.7	--	9.3	87	.9	--	.4	.0	.00	.00	--	.03
Do.	1355	3	1	34,000	--	12.9	--	9.5	90	.9	--	.0	.0	.00	.00	--	.03
			5	34,000	--	12.9	--	9.5	90	--	--	--	--	--	--	--	--
<u>Line 18. Keller Bay</u>																	
Jan. 14	1500	2	1	34,000	--	12.3	--	8.9	82	.5	--	.6	.0	.00	.00	--	.04
			5	34,000	--	12.4	--	9.5	89	.3	--	.5	.0	.00	.00	--	.04
Apr. 23	0950	2	1	13,800	8.4	23.9	61	--	--	--	--	--	--	--	--	--	--
			3	13,800	8.4	23.8		--	--	--	--	--	--	--	--	--	--
			5	13,800	8.2	22.8		--	--	2.7	--	5.3	.1	QN	QN	0.01	.03
Aug. 27	1050	2	1	42,000	7.9	29.2	78	6.6	102	1.7	--	3.7	.0	QN	QN	.01	.04
			3	42,000	7.9	29.2		6.3	97	--	--	--	--	--	--	--	--
			7	42,000	8.0	29.1		6.1	94	1.9	--	4.1	.0	QN	QN	.01	.04
<u>Line 19. Lavaca Bay</u>																	
Apr. 9	1040	3	1	31,000	8.1	22.7	61	5.9	76	.7	--	2.8	--	--	--	--	--
			10	32,000	8.1	22.6		6.1	78	--	--	--	--	--	--	--	--
			20	32,000	8.1	22.6		7.1	91	--	--	--	--	--	--	--	--
			31.5	38,000	8.5	21.4		5.5	71	.7	--	4.0	.0	QN	QN	.02	.03
June 19	1435	3	1	24,000	8.2	29.3	74	7.3	101	1.8	--	4.6	.0	QN	QN	.01	.04
			5	24,000	8.2	29.2		7.3	101	--	--	--	--	--	--	--	--
			10	24,000	8.2	29.2		7.3	101	--	--	--	--	--	--	--	--
			20	27,000	8.0	29.1		6.9	99	--	--	--	--	--	--	--	--
			35	40,000	8.0	28.3		4.3	63	1.3	--	2.0	.0	QN	QN	.02	.04
Aug. 27	1010	3	1	42,000	8.3	29.4	58	6.1	94	1.8	--	4.0	.0	QN	QN	.01	.04
			5	42,000	8.3	29.3		5.9	91	--	--	--	--	--	--	--	--
			10	42,000	8.4	29.4		6.0	94	--	--	--	--	--	--	--	--
			20	43,000	8.4	29.5		6.2	97	--	--	--	--	--	--	--	--
			30	47,000	8.3	29.9		5.4	87	--	--	--	--	--	--	--	--
			40	57,000	8.1	30.2		4.3	73	1.5	--	2.6	.1	QN	QN	.03	.06
<u>Line 20. Matagorda Bay</u>																	
Apr. 9	1020	2	1	30,000	8.2	22.5	--	7.5	95	--	--	--	--	--	--	--	--
			10	32,000	8.1	22.2		7.0	89	--	--	--	--	--	--	--	--
			20	32,000	8.2	22.0		6.9	87	--	--	--	--	--	--	--	--
			35	43,000	8.3	21.0		6.6	87	--	--	--	--	--	--	--	--
<u>Line 21. Matagorda Bay</u>																	
Apr. 9	0930	2	1	44,000	8.3	22.1	61	7.0	95	.6	--	1.9	.0	QN	QN	.01	.02
			10	44,000	8.3	22.0		7.2	97	--	--	--	--	--	--	--	--
			20	44,000	8.3	21.8		7.1	96	--	--	--	--	--	--	--	--
			36.5	44,000	8.3	21.7		7.0	95	.4	--	1.1	.0	QN	QN	.01	.02
<u>Line 22. Carancahua Bay</u>																	
Jan. 16	1210	2	1	18,000	8.1	17.1	--	13.8	142	--	--	--	--	--	--	--	--
			2	21,000	8.1	17.2		15.0	155	1.5	--	6.0	.0	.0	.01	--	.04
<u>Line 22b. Carancahua Bay</u>																	
Jan. 16	1235	2	1	31,000	8.1	16.4	--	9.3	94	--	--	--	--	--	--	--	--
			2	31,000	8.1	16.5		9.2	93	--	--	--	--	--	--	--	--
			3.5	31,000	8.1	16.4		9.3	94	--	--	--	--	--	--	--	--
<u>Line 23. Carancahua Bay</u>																	
Jan. 16	1115	2	1	33,000	8.0	15.9	--	14.9	149	.5	--	.5	.0	.00	.00	--	.03
			5	34,000	8.0	15.5		14.4	143	.4	--	.2	.0	.00	.00	--	.03
Apr. 22	1100	2	1	2,400	7.8	23.9	25	9.0	107	1.4	--	--	.4	QN	--	.07	.08
			4	4,500	7.6	23.1		8.4	98	1.1	--	8.5	.4	QN	.08	.05	.07
<u>Line 24. Carancahua Bay</u>																	
Jan. 16	1040	2	1	42,000	8.1	13.9	--	15.5	130	.5	--	.0	.0	.00	.00	--	--
			5	42,000	8.0	14.2		13.5	149	.4	--	.0	.0	.05	.00	--	.03
Apr. 22	1130	2	1	22,000	8.3	23.9	57	9.4	119	--	--	--	--	--	--	--	--
			4.5	22,000	8.3	24.1		9.8	124	--	--	--	--	--	--	--	--

See footnotes at end of table

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 25. Tres Palacios Bay</u>																	
Jan. 16	1515	2	1	33,000	7.8	20.2	--	1.9	18	1.4	--	0.0	0.0	0.02	0.00	--	0.05
			2	33,000	7.8	20.1	--	1.9	17	1.6	--	.0	.0	.00	.00	--	.05
Apr. 9	1200	2	1	24,000	8.5	24.0	--	17.3	219	--	--	--	--	--	--	--	--
			2	24,000	8.4	24.0	--	17.2	218	2.1	--	3.0	.0	QN	QN	0.04	.05
<u>Line 26. Tres Palacios Bay</u>																	
Jan. 16	1530	2	1	34,000	7.8	17.3	--	8.7	90	--	--	--	--	--	--	--	--
			4	36,000	7.8	17.8	--	8.5	89	--	--	--	--	--	--	--	--
Apr. 9	--	2	1	26,000	8.2	23.7	--	17.0	218	--	--	--	--	--	--	--	--
			3.5	26,000	8.0	23.7	--	16.6	213	--	--	--	--	--	--	--	--
Apr. 22	1730	2	1	14,000	8.3	25.0	31	11.3	140	4.6	--	6.6	.2	QN	.10	.05	.08
			4	14,000	8.3	24.8	--	11.1	137	3.9	--	6.5	.2	QN	.09	.05	.08
June 18	1450	2	1	18,000	8.2	29.9	48	7.3	101	3.5	--	7.0	.0	QN	QN	.04	.07
			4	20,000	8.2	29.6	--	7.8	110	3.1	--	6.7	.0	QN	QN	.05	.08
<u>Line 27. Tres Palacios Bay</u>																	
Apr. 9	--	2	1	28,000	8.1	23.5	--	14.5	188	1.3	--	1.3	.0	QN	QN	.05	.06
			5	28,000	8.1	23.4	--	14.6	185	--	--	--	--	--	--	--	--
			10	28,000	8.1	23.3	--	14.2	180	--	--	--	--	--	--	--	--
			15.5	28,000	8.0	23.1	--	13.8	175	1.2	--	3.0	.0	QN	QN	.03	.04
June 18	1535	2	1	23,000	8.3	30.5	46	7.3	104	4.8	--	3.3	.0	QN	QN	.05	.08
			6	23,000	8.1	29.7	--	5.6	80	4.5	--	4.4	.0	QN	QN	.08	.11
<u>Line 28. Tres Palacios Bay</u>																	
Jan. 16	1610	2	1	41,000	7.8	14.5	--	15.8	155	.3	--	.0	.0	.00	.00	--	.03
			5	41,000	7.7	14.4	--	16.8	164	--	--	--	--	--	--	--	--
			10	39,000	7.8	15.1	--	17.8	173	--	--	--	--	--	--	--	--
			13.5	41,000	7.7	15.2	--	16.7	162	.5	--	.0	.0	.00	.00	--	.03
Apr. 9	0940	1	1	32,000	8.3	22.8	--	7.2	92	--	--	--	--	--	--	--	--
			5	30,000	8.2	22.7	--	7.3	94	--	--	--	--	--	--	--	--
Do.	0950	2	1	29,000	8.3	23.1	--	7.4	94	.7	--	1.8	.0	QN	QN	.02	.02
			6	29,000	8.3	22.8	--	7.1	90	1.0	--	4.2	.1	QN	QN	.03	.03
Do.	1015	3	1	29,000	8.3	23.3	--	7.2	91	--	--	--	--	--	--	--	--
			6	29,000	8.2	23.2	--	7.0	89	--	--	--	--	--	--	--	--
Apr. 22	1750	2	1	26,000	8.1	23.2	51	8.9	111	--	--	--	--	--	--	--	--
			5	28,000	8.1	22.9	--	8.8	111	--	--	--	--	--	--	--	--
			10	28,000	8.0	22.4	--	8.0	100	--	--	--	--	--	--	--	--
			14	26,000	8.0	22.6	--	8.5	106	--	--	--	--	--	--	--	--
<u>Line 30. Tres Palacios Bay</u>																	
Apr. 22	1810	2	1	26,000	8.5	24.3	109	11.1	142	2.5	--	2.8	.0	QN	QN	.02	.03
			5	28,000	8.3	23.9	--	10.8	140	--	--	--	--	--	--	--	--
			10	28,000	8.2	23.2	--	9.4	119	2.3	--	2.2	.0	QN	QN	.02	.03
			14.5	28,000	8.2	22.9	--	9.1	115	--	--	--	--	--	--	--	--
June 18	1625	1	1	27,000	8.3	29.4	86	6.5	93	2.7	--	2.7	.0	QN	QN	.02	.04
			5	29,000	8.2	29.2	--	6.6	94	--	--	--	--	--	--	--	
			10	29,000	8.2	28.4	--	6.0	85	--	--	3.4	.0	QN	QN	.03	.05
Do.	1625	2	1	27,000	8.3	29.4	74	6.6	94	2.5	--	3.2	.0	QN	QN	.01	.05
			5	29,000	8.3	28.9	--	6.5	93	--	--	--	--	--	--	--	
			14	29,000	8.2	28.9	--	6.5	93	2.5	--	4.1	.0	QN	QN	.05	.07
Do.	1640	3	1	27,000	8.3	29.6	63	6.6	96	2.9	--	3.7	.0	QN	QN	.02	.05
			5	27,000	8.3	28.3	--	6.6	93	2.6	--	3.7	.0	QN	QN	.02	.05
<u>Line 31. Intracoastal Waterway</u>																	
Apr. 22	1430	2	1	5,800	8.0	24.0	20	9.6	116	1.3	--	9.3	1.8	QN	QN	.09	.10
			5	5,800	8.0	23.9	--	9.3	112	--	--	--	--	--	--	--	--
			10	5,800	8.0	23.8	--	9.2	111	--	--	--	--	--	--	--	--
			15	6,200	7.9	23.8	--	9.0	108	.8	--	10	2.0	QN	QN	.11	.12
June 18	1130	2	1	21,000	7.9	28.9	38	5.8	81	1.7	--	4.9	.2	QN	QN	.02	.03
			5	21,000	7.9	28.8	--	5.8	81	--	--	--	--	--	--	--	--
			10	23,000	7.9	28.7	--	5.7	79	--	--	--	--	--	--	--	--
			14	23,000	7.9	28.9	--	5.8	81	1.4	--	4.9	.2	QN	QN	.03	.04

See footnotes at end of table.

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 32. Intracoastal Waterway</u>																	
Apr. 10	1345	2	1	32,000	--	24.8	--	7.5	100	--	--	--	--	--	--	--	--
			13.5	32,000	--	24.6	--	7.7	103	--	--	--	--	--	--	--	--
Apr. 22	1400	2	1	22,000	8.3	24.3	48	9.6	122	--	--	--	--	--	--	--	--
			5	25,000	8.4	23.7	--	9.5	122	--	--	--	--	--	--	--	--
			10	25,000	8.3	23.3	--	8.7	109	--	--	--	--	--	--	--	--
			15	25,000	8.2	23.3	--	8.1	101	--	--	--	--	--	--	--	--
June 18	1055	2	1	26,000	8.1	27.9	43	6.7	93	--	--	--	--	--	--	--	--
			5	26,000	8.1	27.6	--	6.6	92	--	--	--	--	--	--	--	
			13	26,000	8.1	27.6	--	6.7	93	--	--	--	--	--	--	--	
<u>Line 33. Matagorda Bay</u>																	
Apr. 22	1535	1	1	26,000	8.8	25.3	76	14.8	192	--	--	--	--	--	--	--	--
			6.5	30,000	8.5	23.4	--	10.6	136	--	--	--	--	--	--	--	--
Do.	1545	2	1	18,000	8.7	25.1	52	15.2	192	4.8	--	3.2	0.2	QN	QN	0.03	0.06
			5	21,000	8.6	23.6	--	12.5	158	4.9	--	1.4	.0	QN	QN	.04	.06
June 18	1310	1	1	34,000	8.3	28.9	51	7.6	112	3.6	--	2.8	.0	QN	QN	.04	.06
			3	34,000	8.3	28.8	--	6.3	93	3.6	--	2.4	.0	QN	QN	.04	.07
Do.	1330	2	1	34,000	8.2	29.6	53	7.1	106	--	--	--	--	--	--	--	--
			5	34,000	8.2	29.2	--	6.8	104	--	--	--	--	--	--	--	--
Do.	1335	3	1	31,000	8.2	29.4	41	7.5	109	--	--	--	--	--	--	--	--
			3	31,000	8.1	29.1	--	7.2	104	--	--	--	--	--	--	--	--
<u>Line 34. Matagorda Bay</u>																	
Apr. 22	1520	1	1	33,000	8.7	25.2	84	12.8	173	--	--	--	--	--	--	--	--
			8	33,000	8.4	23.5	--	9.5	127	--	--	--	--	--	--	--	--
Do.	1515	2	1	32,000	8.4	24.2	70	11.1	146	--	--	--	--	--	--	--	--
			6.5	32,000	8.3	23.7	--	9.8	129	--	--	--	--	--	--	--	--
Do.	1505	3	1	28,000	8.3	24.9	43	12.4	163	--	--	--	--	--	--	--	--
			4	28,000	8.3	23.8	--	10.4	135	--	--	--	--	--	--	--	--
June 18	1255	1	1	34,000	8.2	28.9	66	7.2	106	--	--	--	--	--	--	--	--
			7	34,000	8.2	28.5	--	6.8	99	--	--	--	--	--	--	--	--
Do.	1245	2	1	31,000	8.2	28.6	46	7.2	104	--	--	--	--	--	--	--	--
			6	31,000	8.1	28.2	--	6.5	93	--	--	--	--	--	--	--	--
Do.	1235	3	1	29,000	8.1	29.1	43	7.9	113	--	--	--	--	--	--	--	--
			4	29,000	8.0	27.9	--	6.4	90	--	--	--	--	--	--	--	--
<u>Line 35. Matagorda Bay</u>																	
Apr. 10	1250	1	1	39,000	--	23.9	76	8.5	115	--	--	--	--	--	--	--	--
			12	41,000	--	22.5	--	6.3	83	--	--	--	--	--	--	--	--
Do.	1320	2	1	39,000	--	24.8	--	8.3	114	1.4	--	2.0	.0	QN	QN	.02	.03
			17.5	39,000	--	22.5	--	7.1	92	2.4	--	5.3	.0	QN	QN	.02	.02
Do.	1310	3	1	39,000	--	24.6	64	8.1	111	--	--	--	--	--	--	--	--
			9.5	39,000	--	23.1	--	7.1	95	--	--	--	--	--	--	--	--
Apr. 22	1320	1	1	33,000	8.4	24.4	137	10.2	136	--	--	--	--	--	--	--	--
			5	33,000	8.4	24.1	--	9.3	124	--	--	--	--	--	--	--	
			10	33,000	8.3	24.1	--	9.0	120	--	--	--	--	--	--	--	
Do.	1330	2	1	32,000	8.5	24.6	75	11.4	152	2.5	--	1.8	.0	QN	QN	.00	.03
			5	32,000	8.4	22.7	--	9.5	122	--	--	--	--	--	--	--	
			10	33,000	8.2	22.9	--	8.4	109	1.4	--	2.2	.0	QN	QN	.02	.03
Do.	1340	3	1	29,000	8.6	25.1	53	12.2	161	--	--	--	--	--	--	--	
			6.5	28,000	8.2	23.2	--	7.6	96	--	--	--	--	--	--	--	
June 18	1010	1	1	34,000	8.2	27.7	69	6.2	90	--	--	--	--	--	--	--	--
			5	34,000	8.2	27.6	--	6.1	88	--	--	--	--	--	--	--	
			9	34,000	8.1	27.4	--	5.0	70	--	--	--	--	--	--	--	
Do.	1023	2	1	31,000	8.2	27.9	122	7.5	107	1.7	--	3.1	.0	QN	QN	.01	.06
			5	31,000	8.2	27.8	--	7.2	103	--	--	--	--	--	--	--	
			10	34,000	8.2	27.7	--	5.9	86	1.3	--	2.5	.0	QN	QN	.03	.03
Do.	1035	3	1	31,000	8.2	28.0	96	7.3	104	--	--	--	--	--	--	--	
			5	31,000	8.2	28.0	--	7.3	104	--	--	--	--	--	--		
			8	31,000	8.2	28.0	--	6.9	99	--	--	--	--	--	--		

See footnotes at end of table.

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 36. Matagorda Bay</u>																	
Apr. 10	1225	1	1 4.5	41,000 40,000	--	23.8 23.0	132	8.1 7.9	111 107	--	--	--	--	--	--	--	--
Do.	1210	2	1 14.5	34,000 43,000	--	24.5 22.2	94	8.8 7.0	117 93	1.2 1.3	--	2.1 2.0	0.0 .0	QN QN	QN QN	0.01 .02	0.03 .02
Do.	1150	3	1 10.5	34,000 39,000	--	24.9 22.9	--	8.6 6.8	116 91	--	--	--	--	--	--	--	--
Do.	1100	4	1 11.5	34,000 34,000	--	24.7 23.1	58	8.4 6.8	114 88	1.4 1.1	--	2.3 3.0	.0 .0	QN QN	QN QN	.01 .01	.02 .02
Do.	1030	5	1 12	30,000 32,000	--	24.3 23.1	56	9.1 7.5	120 96	--	--	--	--	--	--	--	--
Do.	1005	6	1 4	24,000 24,000	--	24.5 24.2	58	8.2 8.5	104 108	1.4 1.6	--	3.1 3.1	.0 .0	QN QN	QN QN	.01 .01	.02 .02
Apr. 22	1245	1	1 4	30,000 32,000	8.3 8.3	24.1 24.4	136	10.2 9.5	134 125	--	--	--	--	--	--	--	--
Do.	1230	2	1 5 12	32,000 33,000 36,000	8.4 8.4 8.0	24.1 23.1 22.6	119	10.8 10.6 5.7	142 138 75	1.7 -- 1.8	--	1.6 -- 1.7	.0 -- .0	QN -- QN	QN -- QN	.01 -- .03	.02 -- .04
Do.	1220	3	1 5 10	29,000 30,000 33,000	8.2 8.2 7.9	24.2 23.0 23.0	94	9.8 8.9 6.0	127 114 78	--	--	--	--	--	--	--	--
Do.	1210	4	1 5 12.5	28,000 28,000 29,000	8.1 8.0 8.0	24.3 22.6 23.1	74	9.6 8.4 8.2	125 106 104	1.2 -- .7	--	2.8 -- 2.6	.0 -- .1	QN -- QN	QN -- QN	.02 -- .02	.02 -- .02
Do.	1155	5	1 5 12	26,000 26,000 28,000	8.3 8.3 8.0	24.2 22.7 23.2	131	9.9 9.2 7.2	127 115 91	--	--	--	--	--	--	--	--
Do.	1145	6	1 5 10.5	22,000 25,000 22,000	8.5 8.2 7.9	23.9 22.8 22.9	98	11.2 9.5 7.4	142 119 91	2.0 -- 3.3	--	3.6 -- 4.6	.0 -- .0	QN -- QN	QN -- QN	.01 -- .02	.02 -- .03
June 18	0850	1	1 7	34,000 38,000	8.2 8.1	27.8 27.5	109	6.2 4.7	90 69	--	--	--	--	--	--	--	--
Do.	0905	2	1 5 7 13	31,000 31,000 38,000 43,000	8.2 8.2 8.0 7.9	27.6 27.6 27.9 27.9	--	6.9 6.8 1.9 .3	99 97 28 4	1.3 -- -- 1.7	--	2.7 -- -- 2.3	.0 -- -- .0	QN -- -- QN	QN -- -- QN	.02 -- -- .02	.04 -- -- .03
Do.	0925	3	1 5 10	31,000 31,000 31,000	8.2 8.2 8.2	27.7 27.7 27.7	53	6.4 6.4 6.4	91 91 91	--	--	--	--	--	--	--	--
Do.	0940	4	1 5 12	31,000 31,000 31,000	8.2 8.2 8.2	27.9 27.9 27.9	64	6.7 6.7 6.7	96 96 96	1.2 -- 1.4	--	2.3 -- 2.5	.0 -- .0	QN -- QN	QN -- QN	.02 -- .02	.03 -- .02
Do.	1710	6	1 5 10	27,000 27,000 27,000	8.3 8.3 8.2	29.4 29.2 28.7	79	5.9 6.0 6.1	84 86 87	2.6 -- 2.8	--	3.6 -- 4.0	.0 -- .0	QN -- QN	QN -- QN	.01 -- .02	.04 -- .05
<u>Line 37. Matagorda Bay</u>																	
Apr. 10	0800	1	1 11.5	39,000 40,000	--	22.5 21.9	110	7.7 7.6	100 100	1.0 1.5	--	1.2 .9	.0 .0	QN QN	QN QN	.01 .01	.02 .02
Do.	0825	2	1 13	32,000 36,000	--	23.1 22.8	46	7.6 7.3	97 96	1.4 1.2	--	2.0 2.1	.0 .0	QN QN	QN QN	.01 .02	.02 .02
Do.	0900	3	1 12	30,000 32,000	--	23.7 23.1	43	8.3 7.1	109 91	1.5 1.0	--	1.9 2.5	.0 .0	QN QN	QN QN	.01 .01	.02 .03
Do.	0945	4	1 5	30,000 29,000	--	24.2 23.9	36	7.6 7.7	109 106	1.7 1.6	--	2.0 2.0	.0 .0	QN QN	QN QN	.01 .01	.03 .02
Apr. 22	0905	1	1 5 13	32,000 33,000 33,000	7.4 7.3 7.1	22.2 22.0 21.7	127	8.9 8.6 6.6	113 110 85	1.4 -- 2.0	--	1.9 -- 2.8	.1 -- .0	QN -- QN	QN -- QN	.01 -- .02	.03 -- .03
Do.	0930	2	1 5 12	28,000 33,000 33,000	8.3 8.3 8.0	22.2 22.2 22.1	103	9.3 8.4 6.0	116 108 77	1.7 -- 1.2	--	2.9 -- 3.1	.1 -- .1	QN -- QN	QN -- QN	.01 -- .01	.04 -- .02

See footnotes at end of table.

Table 4A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) 1/	pH	Temperature (°C) 1/	Secchi disk transparency (cm) 1/	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration 1/	Percent saturation									
<u>Line 37. Matagorda Bay (continued)</u>																		
Apr. 22	0950	3	1	28,000	8.5	22.7	110	10.8	137	1.6	--	3.7	0.0	QN	QN	0.01	0.04	
			5	28,000	8.3	22.3		9.4	118	--	--	--	3.7	.1	QN	QN	.01	.03
			12.5	28,000	8.2	22.6		9.2	116	1.3	--	--	--	--	--	--	--	--
Do.	1005	4	1	21,000	8.4	23.0	109	10.0	123	1.9	--	4.0	.0	QN	QN	.02	.04	
			5	24,000	8.4	22.4		10.0	122	--	--	--	--	--	--	--	--	--
			10	22,000	7.9	23.1		8.0	99	2.5	--	--	4.2	.1	QN	QN	.02	.03
June 17	1405	1	1	42,000	8.2	28.6	127	7.2	111	1.8	--	.7	.0	QN	QN	.01	.02	
			5	42,000	8.2	28.9		6.9	106	--	--	--	--	--	--	--	--	--
			13	47,000	8.2	29.1		6.0	94	1.4	--	--	.2	.0	QN	QN	.01	.01
Do.	1440	2	1	34,000	8.2	29.1	122	8.0	118	--	--	--	--	--	--	--	--	
			5	38,000	8.2	28.9		7.7	115	--	--	--	--	--	--	--	--	--
			12.5	42,000	8.2	28.6		6.1	94	--	--	--	--	--	--	--	--	--
Do.	1500	3	1	31,000	8.2	29.0	127	8.3	120	1.4	--	2.4	.0	QN	QN	.01	.03	
			5	31,000	8.2	28.9		8.0	116	--	--	--	--	--	--	--	--	--
			12.5	34,000	8.1	28.5		5.8	84	1.9	--	--	2.5	.0	QN	QN	.03	.04
Do.	1510	4	1	27,000	8.3	29.3	--	8.8	126	--	--	--	--	--	--	--	--	
			5	26,000	8.3	29.2		8.8	124	--	--	--	--	--	--	--	--	--
			9	27,000	8.2	29.1		7.9	113	--	--	--	--	--	--	--	--	--
June 18	0835	1	1	36,000	8.2	27.8	99	6.1	88	--	--	--	--	--	--	--	--	
			5	36,000	8.2	27.8		6.0	87	--	--	--	--	--	--	--	--	--
			12	40,000	8.0	28.1		3.2	47	--	--	--	--	--	--	--	--	--
<u>Line 38. Matagorda Bay</u>																		
Apr. 9	0745	1	1	43,000	8.3	21.6	122	7.7	103	2.1	--	.8	.0	QN	QN	.01	.02	
			9.5	43,000	8.2	21.6		7.5	100	1.1	--	--	.8	.0	QN	QN	.01	.02
June 17	1210	1	1	47,000	8.2	28.6	173	7.1	111	1.9	--	.4	.0	QN	QN	.00	.02	
			5	45,000	8.2	28.5		7.1	108	--	--	--	--	--	--	--	--	--
			11	42,000	8.2	28.5		7.2	107	1.6	--	--	.3	.0	QN	QN	.02	.02
<u>Line 39. Matagorda Ship Channel</u>																		
Apr. 9	0855	2	1	43,000	8.4	20.7	160	6.6	87	.5	--	.7	.0	QN	QN	.01	.01	
			10	43,000	8.4	20.7		7.8	103	--	--	--	--	--	--	--	--	--
			20	43,000	8.4	20.6		8.4	111	--	--	--	--	--	--	--	--	--
			30	43,000	8.4	20.6		8.6	113	--	--	--	--	--	--	--	--	--
			41.5	43,000	8.4	20.7		8.6	113	.3	--	--	1.0	.0	QN	QN	.01	.02
June 17	1250	2	1	47,000	8.2	28.4	176	6.5	98	1.2	--	.4	.0	QN	QN	.00	.02	
			10	45,000	8.2	28.3		6.6	100	--	--	--	--	--	--	--	--	--
			20	45,000	8.2	28.3		6.6	100	--	--	--	--	--	--	--	--	--
			30	47,000	8.2	28.2		6.7	102	--	--	--	--	--	--	--	--	--
			41	47,000	8.2	28.2		6.7	102	1.3	--	--	.2	.0	QN	QN	.00	.01

1/ Determined at data-collection site.
QN means qualitative test negative.

Table 4B.--CHEMICAL ANALYSES OF WATER FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) $\frac{2}{2}$	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 1. Lavaca River</u>															
April 9	1545	2	8	755	96	8.9	53		304	21	84	430	276	27	--
April 23	1410	2	10	857	109	9.7	64		346	22	102	499	312	28	--
June 19	1120	2	9	742	95	7.5	61		308	24	86	446	268	16	--
<u>Line 2. Navidad River</u>															
April 9	1510	2	8.5	821	99	10	64		222	26	96	470	288	24	--
April 23	1430	2	9	527	68	7.2	34		225	14	52	305	199	14	--
June 19	1055	2	9	816	98	10	63		328	25	90	470	286	17	--
<u>Line 7. Lavaca River</u>															
April 9	1400	2	1	13,400	116	280	2,140		120	616	3,800	8,210	1,440	1,340	1.002
			7	15,600	124	338	2,510		110	654	4,520	7,020	1,700	1,610	1.003
June 19	0930	2	1	3,460	50	53	510		136	122	860	1,670	344	232	--
			11	9,320	90	185	1,600		130	418	2,780	5,150	985	878	--
<u>Line 9. Lavaca Bay</u>															
April 9	1235	3	1	15,600	126	371	2,510		105	694	4,600	8,360	1,840	1,750	1.003
			6.5	15,700	128	350	2,750		106	712	4,900	8,900	1,760	1,670	1.003
April 23	1640	3	9	7,560	72	165	1,240		106	260	2,260	4,060	860	773	--
June 19	1640	3	1	13,300	121	277	2,470		129	614	4,300	7,850	1,440	1,330	1.002
			8.5	14,500	127	310	2,690		129	672	4,700	8,570	1,590	1,480	1.002
<u>Line 14. Cox Bay</u>															
June 19	1515	2	3.5	18,100	145	413	3,300		122	776	5,900	10,200	2,060	1,960	1.005
<u>Line 17. Keller Bay</u>															
Jan. 14	1355	3	5	38,100	282	923	7,060		152	2,010	12,500	22,900	4,500	4,380	1.014
<u>Line 19. Lavaca Bay</u>															
April 9	1040	3	1	29,600	212	698	5,240		114	1,390	9,400	17,000	3,400	3,310	1.011
			31.5	36,500	265	897	6,770		127	1,700	12,200	21,900	4,350	4,250	1.013
June 19	1435	3	1	25,100	205	586	5,080		132	1,260	8,900	16,100	2,920	2,810	1.009
			35	39,300	295	964	7,630		139	1,920	13,600	24,500	4,700	4,590	1.015
Aug. 27	1010	3	40	54,400	425	1,350	11,000		148	2,170	19,600	35,200	6,600	6,480	--
<u>Line 22. Carancahua Bay</u>															
Jan. 16	1210	2	1	18,600	168	438	3,210		208	1,060	5,620	10,600	2,220	2,050	1.004
<u>Line 23. Carancahua Bay</u>															
April 22	1100	2	4	4,250	46	92	754		89	188	1,320	2,450	492	419	--
<u>Line 24. Carancahua Bay</u>															
Jan. 16	1040	2	1	41,600	310	1,020	7,640		162	2,100	13,700	24,900	4,950	4,820	1.016
<u>Line 25. Tres Palacios Bay</u>															
April 9	1200	2	2	23,800	190	580	4,470		125	1,150	8,000	14,500	2,860	2,760	1.007
<u>Line 28. Tres Palacios Bay</u>															
April 9	0950	2	6	29,100	220	698	5,650		131	1,290	10,100	18,000	3,420	3,310	1.011
<u>Line 30. Tres Palacios Bay</u>															
June 18	1625	2	14	27,800	220	679	5,560		140	1,440	9,800	17,800	3,340	3,230	1.009
<u>Line 31. Intracoastal Waterway</u>															
April 22	1430	2	1	6,230	84	125	1,000		168	270	1,760	3,330	725	588	--
June 18	1135	2	1	22,300	195	543	4,270		161	1,110	7,600	13,800	2,720	2,590	1.006
			14	23,000	200	559	4,520		161	1,160	8,000	14,500	2,800	2,670	1.007
<u>Line 33. Matagorda Bay</u>															
June 18	1310	1	3	34,800	272	808	6,680		151	1,700	11,800	21,300	4,000	3,880	1.013
<u>Line 35. Matagorda Bay</u>															
June 18	1025	2	10	34,500	265	807	6,570		143	1,710	11,600	21,000	3,980	3,860	1.012

See footnote at end of table

Table 4B.--CHEMICAL ANALYSES OF WATER FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) a/	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 36. Matagorda Bay</u>															
April 10	1100	4	11.5	36,400	262	862	6,740	129	1,760	12,000	21,700	4,200	4,090	1.013	
April 22	1210	4	12.5	27,400	215	667	5,130	117	1,320	9,200	16,600	3,280	3,180	1.009	
June 18	0945	4	1	31,300	242	719	5,900	137	1,540	10,400	18,900	3,560	3,450	1.011	
			12	31,300	232	715	5,890	137	1,490	10,400	18,800	3,520	3,410	1.011	
<u>Line 37. Matagorda Bay</u>															
June 17	1405	1	13	41,700	305	992	8,150	136	2,050	14,400	26,000	4,840	4,730	1.017	
	1500	3	12.5	32,900	255	760	6,310	136	1,640	11,100	20,100	3,760	3,650	1.011	
<u>Line 38. Matagorda Bay</u>															
June 17	1210	1	11	41,600	298	996	7,910	132	2,110	14,000	25,400	4,840	4,730	1.016	
<u>Line 39. Matagorda Ship Channel</u>															
April 9	0855	2	41.5	44,900	320	1,140	8,470	134	2,130	15,300	27,400	5,500	5,390	1.017	
June 17	1250	2	1	41,600	302	1,010	8,060	137	2,070	14,300	25,800	4,920	4,810	1.017	
			41	42,100	302	1,010	8,320	135	2,200	14,600	26,500	4,920	4,810	1.017	

a/ Included in sodium-ion concentration.

Table 4C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25°C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium VI (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 1. Lavaca River</u>																			
Apr. 9	1545	2	8	755	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--
Apr. 23	1410	2	10	857	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
June 19	1120	2	9	742	90	0	10	.3	--	0	4	--	100	--	--	0	0.70	0.029	600
<u>Line 2. Navidad River</u>																			
Apr. 9	1510	2	8.5	821	--	--	--	.4	--	--	--	--	--	--	--	--	--	--	--
Apr. 23	1430	2	9	527	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
June 19	1055	2	9	816	40	0	10	.3	--	0	5	--	70	--	--	0	.93	.030	400
<u>Line 7. Lavaca River</u>																			
Apr. 9	1400	2	1	13,400	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
			7	15,600	--	--	--	.6	--	--	--	--	--	--	--	--	--	--	--
June 19	0930	2	1	3,460	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
			11	9,320	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
<u>Line 9. Lavaca Bay</u>																			
Apr. 9	1235	3	1	15,600	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
			6.5	15,700	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
Apr. 23	1640	3	9	7,560	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
June 19	1640	3	1	13,300	60	0	40	.5	540	0	9	--	70	--	--	0	14	.059	1,800
			8.5	14,500	2,000	0	50	.6	780	0	29	--	840	--	--	3	14	.056	2,000
<u>Line 10. Lavaca Bay</u>																			
June 19	1600	2	1	19,300	60	0	60	--	780	0	8	--	90	--	--	1	21	.052	2,800
			33	35,000	90	190	120	--	820	0	9	--	80	--	--	0	30	.009	5,000
<u>Line 14. Cox Bay</u>																			
June 19	1515	2	3.5	18,100	90	0	60	.6	1,700	0	8	--	70	--	--	0	18	.057	2,500
<u>Line 17. Keller Bay</u>																			
Jan. 14	1355	3	5	38,100	--	--	--	.8	--	--	--	--	--	--	--	--	44	.035	--
<u>Line 19. Lavaca Bay</u>																			
Apr. 9	1040	3	1	29,600	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--
			31.5	36,500	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--
June 19	1435	3	1	25,100	--	--	--	.6	--	--	--	--	--	--	--	--	--	--	--
			35	39,300	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--
Aug. 27	1010	3	40	54,400	--	--	--	.8	4,800	--	--	--	--	--	--	--	63	.047	--
<u>Line 22. Carancahua Bay</u>																			
Jan. 16	1210	2	1	18,600	--	--	--	.5	--	--	--	--	--	--	--	--	21	.034	--
<u>Line 23. Carancahua Bay</u>																			
Apr. 10	1100	2	4	4,250	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
<u>Line 24. Carancahua Bay</u>																			
Jan. 16	1040	2	1	41,600	--	--	--	.8	--	--	--	--	--	--	--	--	49	.020	--
<u>Line 25. Tres Palacios Bay</u>																			
Apr. 9	1200	2	2	23,800	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
<u>Line 28. Tres Palacios Bay</u>																			
Apr. 9	0950	2	6	29,100	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--
<u>Line 30. Tres Palacios Bay</u>																			
June 18	1625	2	14	27,800	--	--	--	.6	--	--	--	--	--	--	--	--	--	--	--
<u>Line 31. Intracoastal Waterway</u>																			
Apr. 22	1430	2	1	6,230	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
June 18	1135	2	1	22,300	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
			14	23,000	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--

See footnote at end of table.

Table 4C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--continued

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25°C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium VI (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 33. Matagorda Bay</u>																			
June 18	1310	1	3	34,800	50	0	120	0.7	3,700	0	8	--	100		0	35	0.005	4,700	
<u>Line 35. Matagorda Bay</u>																			
June 18	1025	2	10	34,500	--	--	--	.7	--	--	--	--	--		--	--	--	--	--
<u>Line 36. Matagorda Bay</u>																			
Apr. 10	1100	4	11.5	36,400	--	--	--	.7	--	--	--	--	--		--	--	--	--	--
Apr. 22	1210	4	12.5	27,400	--	--	--	.6	--	--	--	--	--		--	--	--	--	--
June 18	0940	4	1 12	31,300 31,300	--	--	--	.6 .7	--	--	--	--	--		--	--	--	--	--
Do	1710	6	10	26,600	100	0	80	--	3,000	0	8	--	50		0	27	.005	3,800	
<u>Line 37. Matagorda Bay</u>																			
June 17	1405	1	13	41,700	160	40	120	.8	5,400	0	17	--	110		3	40	.008	5,800	
Do	1500	3	12.5	32,900	--	--	--	.7	--	--	--	--	--		--	--	--	--	--
<u>Line 38. Matagorda Bay</u>																			
June 17	1210	1	11	41,600	70	0	120	.8	4,800	0	20	--	70		0	39	.005	5,800	
<u>Line 39. Matagorda Ship Channel</u>																			
Apr. 9	0855	2	41.5	44,900	--	--	--	.8	--	--	--	--	--		--	--	--	--	--
June 17	1250	2	1 41	41,600 42,100	-- 30	-- 0	-- 120	.8 .8	-- 4,700	-- 0	-- 15	-- --	-- 80		0	41	.005	5,900	

a/ Results in milligrams per liter.

Table 4 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR.

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 1 site 2. Lavaca River</u>														
June 19	1130	Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sediment	.00	9.2	27	13	.00	.00	.00	.00	.00	--	--	--
<u>Line 2 site 2. Navidad River</u>														
Apr. 9	1515	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		Sediment	.00	2.8	4.6	.42	.34	.00	.00	.00	.00	--	--	--
June 19	1100	Water	.00	.00	.00	.00	.00	.00	.00	.00	.05 ^{a/}	.00	.00	.00
		Sediment	.00	14	20	4.4	.00	.00	.00	.00	.00	--	--	--
<u>Line 8 site 3. Lavaca Bay</u>														
June 19	0900	Water	.00	.00	.00	.01	.00	.00	.00	.00	.00	.05	.00	.02
		Sediment	.00	7.1	11	4.3	.00	.00	.00	.00	.00	--	--	--
<u>Line 9 site 3. Lavaca Bay</u>														
Apr. 9	1255	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.19	.00	.02
		Water	.00	.01	.01	1.0	.00	.00	.00	.00	.00	.14	.00	.00

See footnotes at end of table.

Table 4 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--Continued

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 25 site 2. Tres Palacios Bay</u>														
Apr. 9	1200	Water	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.03
		Sediment	.00	21	52	26	1.2	.00	.00	.00	.00	--	--	--
<u>Line 26 site 2. Tres Palacios Bay</u>														
June 18	1500	Water	.00	.00	.00	.01	.00	.00	.00	.00	.03 ^{b/}	.05	.00	.03
		Sediment	.00	.00	2.0	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 28 site 2. Tres Palacios Bay</u>														
Apr. 9	1030	Water ^{c/}	.00	.00	.00	.00	.00	.00	.00	.00	.00	.15	.00	.02
		Water ^{d/}	.00	.00	.00	.00	.00	.00	.00	.00	.00	.25	.00	.02
		Sediment	.00	1.2	1.8	.00	.17	.00	.00	.00	.00	--	--	--
<u>Line 37 site 1. Matagorda Bay</u>														
June 17	1415	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
		Sediment	.00	2.2	3.1	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 38 site 2. Matagorda Bay</u>														
Apr. 9	0745	Water ^{c/}	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		Water ^{e/}	.00	.01	.01	.67	.00	.00	.00	.00	.00	.00	.00	.00

See footnotes at end of table.

Table 4 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE LAVACA-TRES PALACIOS ESTUARY, 1969 WATER YEAR--Continued

Date	Time (24 hour)		Micrograms per liter										
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex

Line 39 site 2. Matagorda Ship Channel

June 17	1300	Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
---------	------	-------	------	------	------	------	------	------	------	------	------	------	------	------

- a/ Includes 0.01 micrograms per liter alpha-BHC and 0.01 micrograms per liter delta-BHC.
- b/ Includes 0.01 micrograms per liter alpha-BHC.
- c/ Collected 1 foot below water surface.
- d/ Collected 6 feet below water surface.
- e/ Collected 9.5 feet below water surface.

Guadalupe Estuary

The Guadalupe estuary covers an area of almost 150 square miles and consists of the tidal parts of the Guadalupe River, Mission Lake, Guadalupe Bay, Hynes Bay, San Antonio Bay, Victoria Channel, and parts of the Intracoastal Waterway (Figure 15).

At mlw, the Guadalupe River is about 10 feet deep; Mission Lake, Guadalupe Bay, and Hynes Bay are less than 3 feet deep; San Antonio Bay is less than 6 feet deep; Victoria Channel is more than 8 feet deep; and the Intracoastal Waterway is about 15 feet deep.

Water-quality data for the Guadalupe estuary (Table 5) were collected in November, January, April, June, and August at the sites shown on Figure 15.

The most downstream gaging station on the Guadalupe River is at Victoria. Two major streams, Coleta Creek and San Antonio River, join the Guadalupe River downstream from the station at Victoria. Flows of these three streams at gaging stations nearest the estuary for four periods when water-quality surveys were made are given in the following table. Runoff from an additional 860 square miles of drainage area contiguous to the estuary is ungaged.

STREAMFLOW STATION	AVERAGE DISCHARGE, IN CUBIC FEET PER SECOND ^{1/}			
	NOV. 15-21	APRIL 11-17	JUNE 7-13	AUG. 8-14
Guadalupe River at Victoria	810	9,570	1,850	662
Coleta Creek near Schroeder	11	2,570	87	7
San Antonio River at Goliad	326	1,810	984	139

^{1/} U.S. Geological Survey, 1970a.

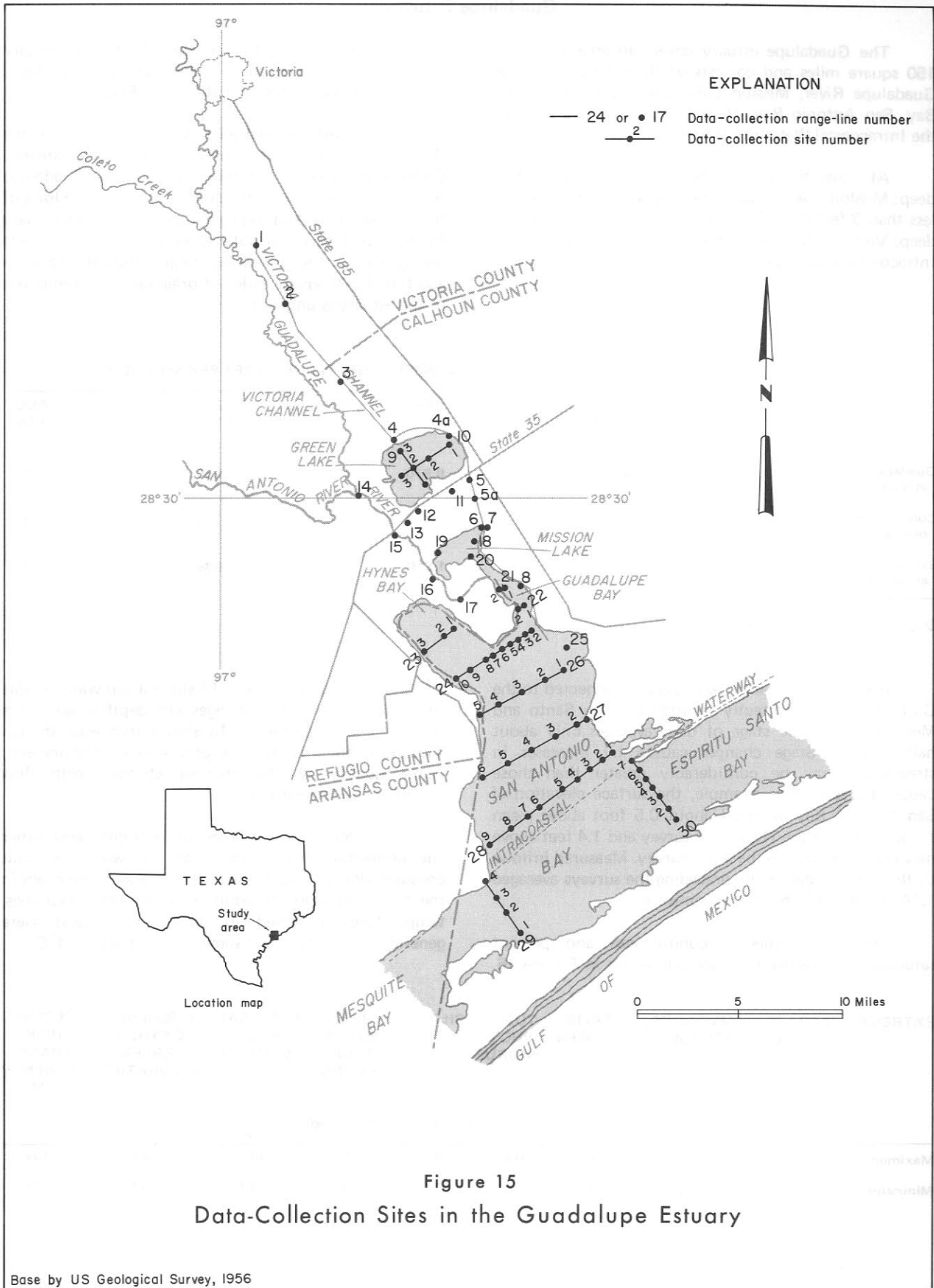
Because the Guadalupe estuary is connected to the Gulf of Mexico indirectly through Espiritu Santo and Mesquite Bays, the stage of tides averages only about half a foot. Stage changes caused by increases in streamflow may be considerably greater than those caused by tides. For example, the surface elevation of San Antonio Bay averaged about 0.5 foot above mean sea level during the November survey and 1.4 feet above mean sea level during the April survey. Measured inflows to the bay for the weeks preceding the surveys averaged 1,147 cfs and 13,950 cfs, respectively.

Changes in specific conductance and percent saturation of dissolved oxygen are shown in Figures 16,

17, and 18. Figures 16 and 17 show a salt-water wedge and other water-quality changes with depth in water less than 5 feet deep. Figure 18 shows that even though Victoria Channel is 25-miles long and closed at one end, water quality in the channel changes with flow conditions in the estuary.

The observed extremes of nutrients and other environmental characteristics of the water, without consideration of depth, location, or season are given in the following table. In addition to the listed extremes, temperatures observed in June and August were generally above 30°C and some were as high as 34°C.

EXTREME	NITRATE NITROGEN	AMMONIUM NITROGEN	NITRITE NITROGEN	TOTAL PHOS- PHORUS	SILICA	BIO- CHEMICAL OXYGEN DEMAND	CHEMICAL OXYGEN DEMAND	DISSOLVED OXYGEN (PERCENT SATURATION)	SECCHI DISK TRANS- PARENCY (CM)
(Results in Milligrams Per Liter Except As Indicated)									
Maximum	2.7	1.9	0.11	0.68	24	8.6	19	128	132
Minimum	.0	.00	.00	.03	3.7	.4	1.5	43	11



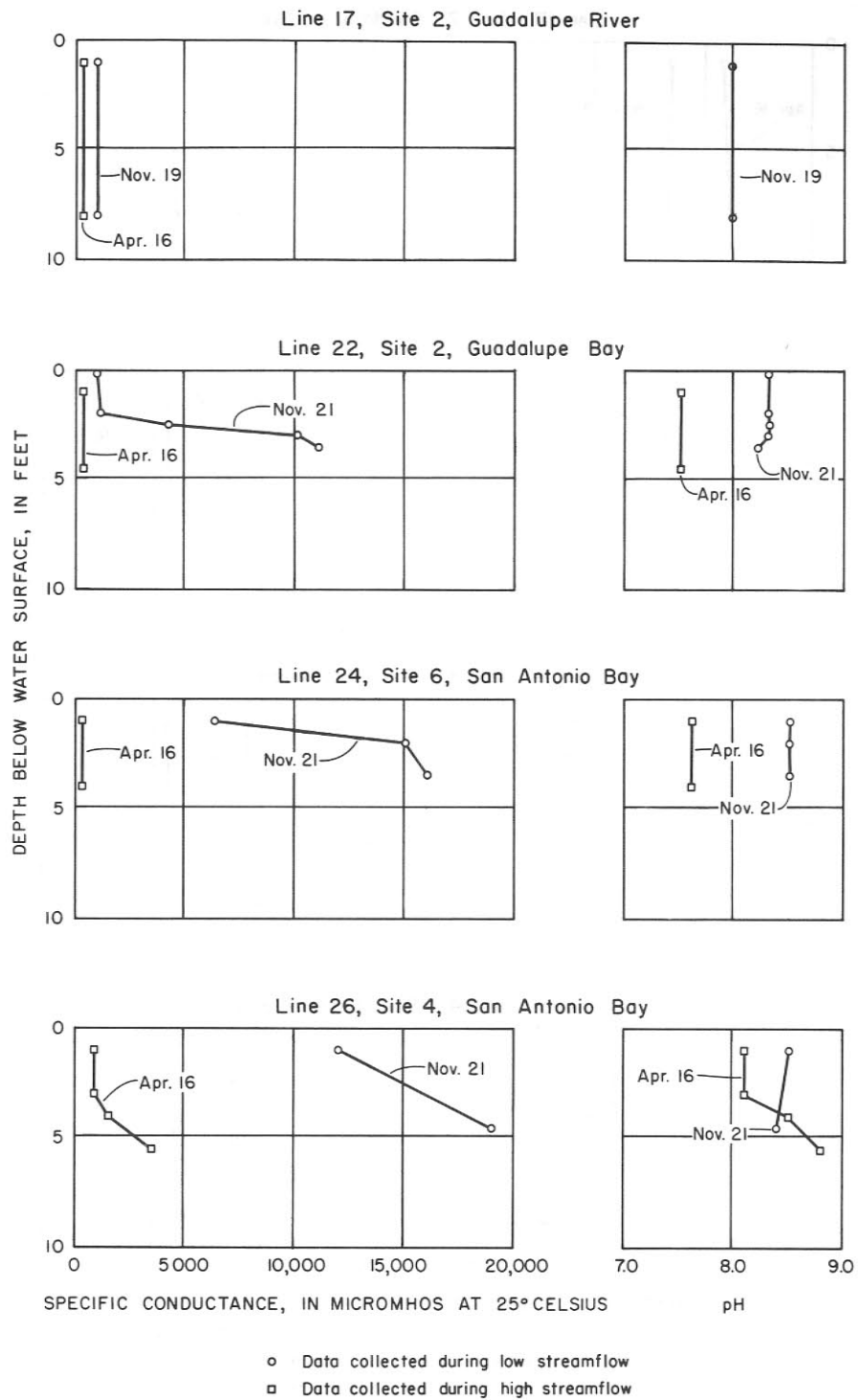


Figure 16
 Specific Conductance and pH Versus Depth for
 Different Flow Conditions in the Guadalupe Estuary

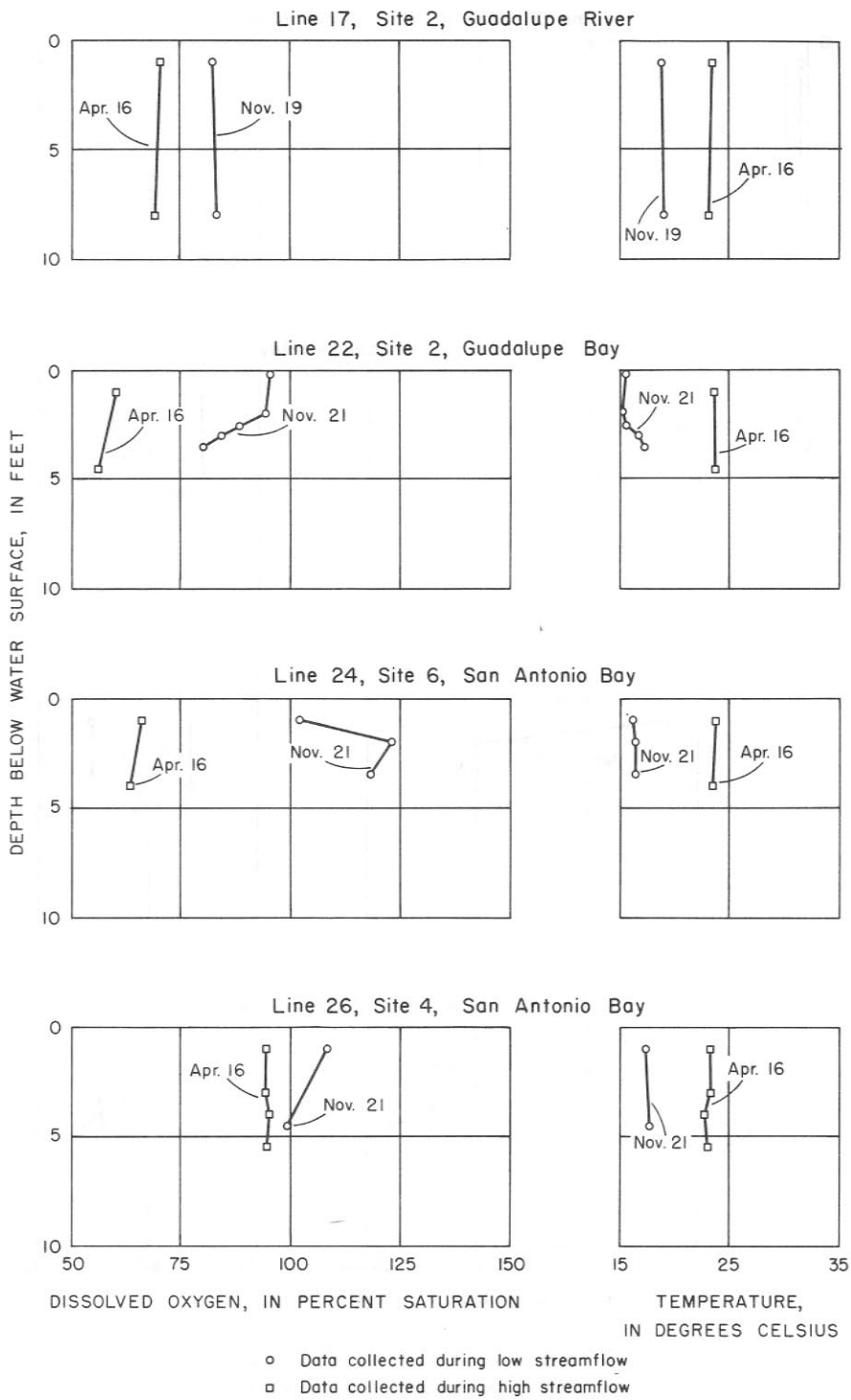


Figure 17
 Percent Saturation of Dissolved Oxygen and Temperature
 Versus Depth for Different Flow Conditions in the Guadalupe Estuary

LINE 6, SITE 2

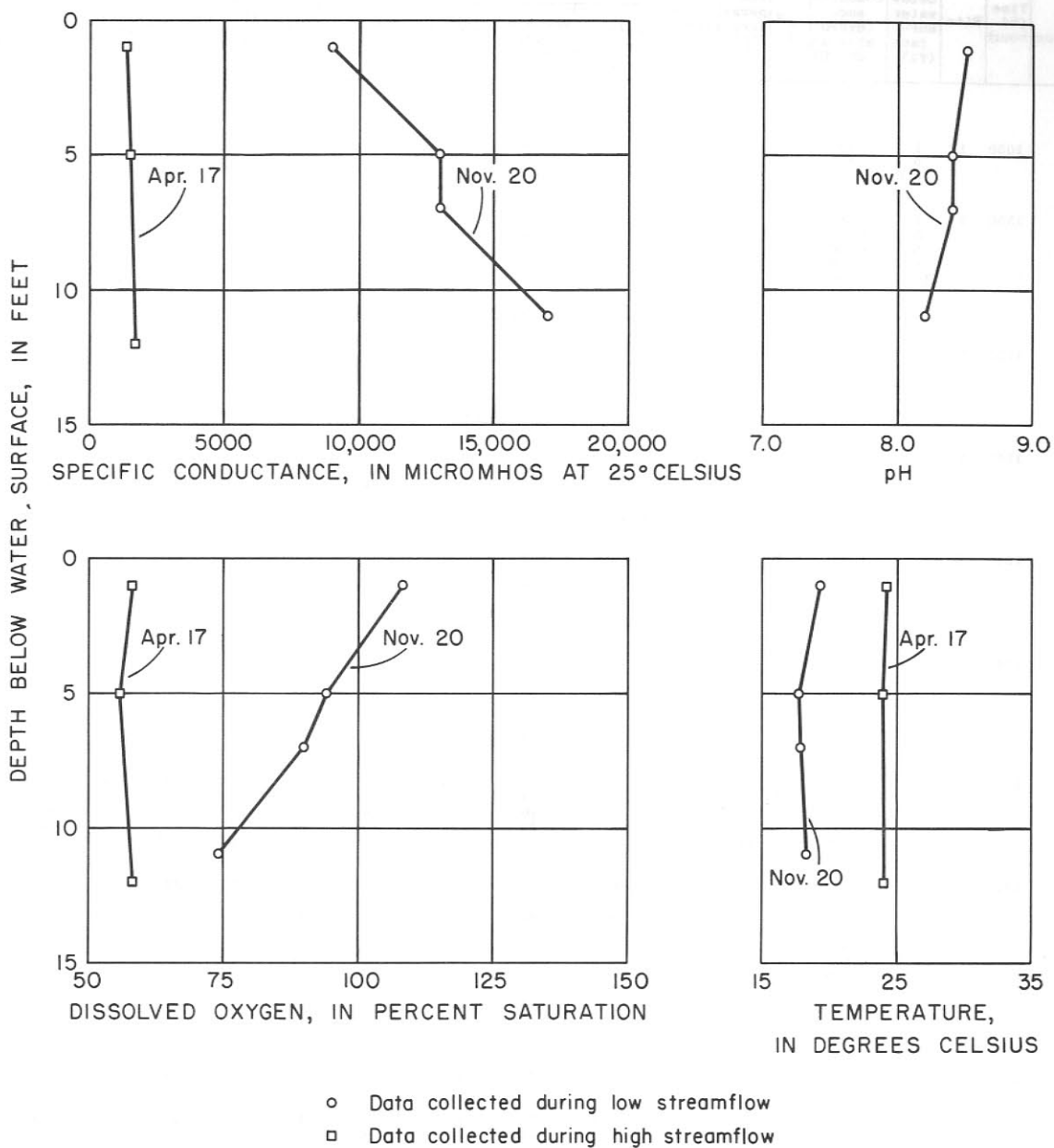


Figure 18
 Change in Specific Conductance, pH, Percent Saturation of Dissolved Oxygen, and Temperature with Depth in the Victoria Channel for Different Flow Conditions in the Guadalupe Estuary

Table 5A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE GUADALUPE ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 1. Victoria Channel</u>																	
1968																	
Nov. 20	1050	1	1	830	7.8	18.4	56	8.4	88	1.8	--	--	0.0	0.00	0.01	--	0.03
			5	810	7.7	18.1		8.5	90	--	--	--	--	--	--	--	--
			13.5	800	7.6	18.2		7.8	82	1.9	--	23	.0	.00	.02	--	.06
1969																	
Aug. 14	1350	2	1	980	--	34.5	--	7.9	110	2.2	5.0	24	.0	QN	QN	0.02	.05
			3	1,000	--	34.0		7.9	110	--	--	--	--	--	--	--	--
			5	1,000	--	33.5		7.9	110	--	--	--	--	--	--	--	--
			8	980	--	33.5		7.0	97	--	--	--	--	--	--	--	--
			10	1,000	--	33.5		6.0	83	2.2	3.3	24	.0	QN	QN	.02	.05
<u>Line 2. Victoria Channel</u>																	
1968																	
Nov. 20	1120	2	1	1,100	7.8	17.9	38	9.2	96	--	--	--	--	--	--	--	--
			5	1,100	7.7	17.1		8.6	89	--	--	--	--	--	--	--	--
			11.5	1,100	7.7	17.4		8.4	87	--	--	--	--	--	--	--	--
<u>Line 3. Victoria Channel</u>																	
1968																	
Nov. 20	1140	2	1	1,400	8.0	17.7	38	9.4	98	1.6	--	--	.0	.00	.02	--	.03
			5	1,200	8.0	16.7		9.4	96	--	--	--	--	--	--	--	--
			13	1,400	7.8	16.7		8.7	89	1.7	--	--	.0	.00	.02	--	.08
<u>Line 4. Victoria Channel</u>																	
1968																	
Nov. 20	1245	2	1	1,500	8.2	17.7	38	9.8	102	--	--	--	--	--	--	--	--
			5	1,500	8.2	17.0		9.6	99	--	--	--	--	--	--	--	--
			11	1,500	8.1	17.0		9.5	98	--	--	--	--	--	--	--	--
<u>Line 4a. Victoria Channel</u>																	
1968																	
Nov. 20	1340	2	1	3,200	8.4	18.7	41	9.6	102	--	--	--	--	--	--	--	--
			5	4,500	8.3	17.7		8.8	93	--	--	--	--	--	--	--	--
			7	5,000	8.3	17.3		8.3	85	--	--	--	--	--	--	--	--
			11	6,200	8.2	17.5		7.7	80	--	--	--	--	--	--	--	--
<u>Line 5. Victoria Channel</u>																	
1968																	
Nov. 20	1305	2	1	6,200	8.4	18.0	48	9.3	98	1.4	--	--	.0	.00	.02	--	.05
			5	8,000	8.3	17.7		8.1	84	--	--	--	--	--	--	--	--
			7	9,500	8.3	17.7		7.3	76	--	--	--	--	--	--	--	--
			10	12,000	8.2	18.4		5.2	55	--	--	--	--	--	--	--	--
			12.5	12,000	8.2	18.3		5.2	55	2.7	--	12	.0	.02	.03	--	.08
1969																	
June 13	1410	2	1	1,600	7.8	29.9	33	6.3	83	.6	--	17	.1	QN	QN	.05	.06
			5	1,600	7.8	29.4		6.2	79	--	--	--	--	--	--	--	--
			10	1,700	7.9	28.9		6.4	82	.6	--	18	.1	QN	QN	.06	.06
Aug. 14	1450	2	1	1,800	--	34.0	--	7.4	104	2.7	--	18	2.7	QN	QN	.04	.06
			3	1,800	--	33.0		7.3	100	--	--	--	--	--	--	--	--
			5	1,800	--	33.0		6.9	94	--	--	--	--	--	--	--	--
			8	1,800	--	32.5		6.3	86	--	--	--	--	--	--	--	--
			10	1,700	--	33.0		6.1	85	1.8	--	18	.0	QN	QN	.03	.08
<u>Line 5a. Victoria Channel</u>																	
1968																	
Nov. 20	1405	1	.2	2,000	8.6	21.7	36	7.9	90	8.1	--	17	.0	1.9	.04	--	.20
1969																	
Apr. 17	--	1	.2	1,800	--	25.0	28	6.2	74	8.6	--	11	.1	QN	QN	.13	.20
			2	1,800	--	25.0		6.2	74	--	--	--	--	--	--	--	--
1969																	
June 13	1425	1	.2	1,900	8.1	31.3	18	5.4	73	--	--	--	--	--	--	--	--
			1	1,800	7.8	30.4		4.7	62	7.2	--	14	.1	QN	QN	.12	.12
			2	1,800	7.7	30.4		4.8	63	--	--	--	--	--	--	--	--

See footnotes at end of table.

Table 5A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE GUADALUPE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 6. Victoria Channel</u>																	
1968																	
Nov. 20	1425	2	1	9,000	8.5	19.2	46	10.1	108	4.8	--	--	0.0	0.02	0.02	--	0.09
			5	13,000	8.4	17.6		9.0	94	--	--	--	--	--	--	--	--
			7	13,000	8.4	17.7		8.6	90	--	--	--	--	--	--	--	--
			11	17,000	8.2	18.1		7.0	74	2.6	--	10	.0	.00	.03	--	.12
1969																	
Apr. 17	1330	2	1	1,400	--	24.1	--	4.9	58	3.5	--	14	.2	QN	QN	0.07	.10
			5	1,500	--	24.0		4.8	56	--	--	--	--	--	--	--	--
			12	1,700	--	24.0		4.9	58	2.5	--	13	.2	QN	QN	.06	.07
June 12	1200	2	1	2,100	7.6	29.1	--	5.1	68	2.5	--	16	.1	QN	QN	.09	.11
			5	2,100	7.6	28.7		4.8	62	--	--	--	--	--	--	--	--
			10	2,000	7.6	28.9		4.7	61	2.6	--	16	.2	QN	QN	.09	.13
June 13	1440	2	1	1,700	7.6	29.7	43	6.1	80	1.5	--	16	.2	QN	.08	.07	.07
			10	1,700	7.5	29.1		4.8	62	.9	--	15	.2	QN	.08	.07	.07
Aug. 14	1510	2	1	2,000	--	33.0	--	6.3	88	2.0	12	16	.1	QN	QN	.04	.07
			5	2,000	--	32.5		5.9	81	--	--	--	--	--	--	--	--
			8	2,000	--	32.5		5.2	71	--	--	--	--	--	--	--	--
			10	2,000	--	33.0		5.1	71	1.8	14	17	.1	QN	QN	.05	.12
<u>Line 7. Victoria Channel</u>																	
1968																	
Nov. 20	1450	2	1	12,000	8.5	18.7	53	11.9	127	5.5	--	--	.0	.00	.02	--	.08
			5	13,000	8.3	18.2		7.6	80	--	--	--	--	--	--	--	--
			7	14,000	8.2	18.6		5.5	59	--	--	--	--	--	--	--	--
			12	17,000	8.0	19.0		4.0	43	3.6	--	--	.0	.05	.03	--	.19
1969																	
Apr. 17	1325	2	1	230	--	24.2	--	7.2	85	--	--	--	--	--	--	--	--
			12.5	2,800	--	24.2		6.3	75	--	--	--	--	--	--	--	--
June 12	1145	2	1	2,400	7.8	29.6	--	6.2	83	3.4	--	13	.1	QN	QN	.06	.09
			5	2,400	7.7	29.6		6.2	83	--	--	--	--	--	--	--	--
			11	2,300	7.8	29.6		5.1	68	2.1	--	13	.1	QN	QN	.07	.10
<u>Line 8. Victoria Channel</u>																	
1968																	
Nov. 20	1520	2	1	14,000	8.5	18.5	46	10.9	116	--	--	--	--	--	--	--	--
			5	17,000	8.4	17.3		9.0	93	--	--	--	--	--	--	--	--
			7	19,000	8.4	17.3		8.5	88	--	--	--	--	--	--	--	--
			13	22,000	8.2	17.3		7.2	74	--	--	--	--	--	--	--	--
1969																	
Apr. 17	1300	2	1	2,200	--	23.9	46	5.5	65	1.4	--	13	.1	QN	QN	.06	.08
			13.5	2,000	--	23.8		5.7	68	1.6	--	13	.1	QN	QN	.11	.15
June 12	1110	2	1	2,400	7.8	28.8	--	7.0	91	--	--	--	--	--	--	--	--
			5	2,400	7.7	28.8		6.6	86	--	--	--	--	--	--	--	--
			12	2,400	7.8	28.7		6.0	78	--	--	--	--	--	--	--	--
<u>Line 14. Guadalupe River</u>																	
1968																	
Nov. 19	1045	2	1	760	8.1	18.1	30	7.4	77	--	--	--	--	--	--	--	--
			7.5	800	8.0	18.2		7.9	83	2.1	--	14	.0	.16	.02	--	.68
1969																	
Jan. 30	1345	2	1	900	8.2	19.4	--	8.1	87	1.3	--	12	1.0	.00	.01	--	.46
			8.5	900	8.1	19.2		8.0	85	1.3	--	12	.9	.00	.01	--	.46
June 13	1115	2	1	570	7.9	28.8	--	5.1	65	1.5	1.5	13	.6	QN	QN	.27	.36
			9	600	7.6	28.7		5.1	65	1.7	2.8	13	.3	QN	QN	.19	.27
Aug. 13	1200	2	1	750	--	34.0	--	5.6	78	1.5	4.9	14	.6	QN	QN	.32	.39
			5	750	--	34.0		5.6	78	--	--	--	--	--	--	--	--
			10	750	--	34.0		5.4	75	1.7	9.9	14	.0	QN	QN	.26	.39
<u>Line 15. Guadalupe River</u>																	
1968																	
Nov. 19	1115	2	1	800	8.1	18.1	36	7.5	79	--	--	--	--	--	--	--	--
			12	840	8.0	18.0		7.9	83	--	--	--	--	--	--	--	--
1969																	
Jan. 30	1325	2	1	1,000	8.2	19.3	--	8.0	86	1.2	--	12	1.0	.00	.01	--	.49
			15	1,000	8.2	19.1		8.4	89	1.3	--	12	.9	.00	.01	--	.49
Apr. 16	1730	2	1	280	7.4	23.8	--	6.0	71	2.1	--	12	.1	QN	QN	.03	.24

See footnotes at end of table.

Table 5A--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE
GUADALUPE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Biochemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 16. Guadalupe River</u>																	
1968																	
Nov. 19	1150	2	1	800	8.0	18.6	41	7.4	79	--	--	--	--	--	--	--	--
			13	780	8.0	18.6		7.3	78	--	--	--	--	--	--	--	--
1969																	
Jan. 30	1305	2	1	840	8.4	18.9	--	8.0	85	1.5	--	12	1.2	0.00	0.02	--	0.65
			13.5	900	8.3	18.9		8.4	89	1.2	--	12	1.0	.00	.01	--	.59
<u>Line 17. Guadalupe River</u>																	
1968																	
Nov. 19	1220	2	1	800	8.0	18.8	41	7.7	82	--	--	--	--	--	--	--	--
			8	840	8.0	19.0		7.8	83	--	--	--	--	--	--	--	--
1969																	
Jan. 30	1240	2	1	920	8.0	19.6	--	8.2	88	1.3	--	12	1.1	.00	.01	--	.55
			9.5	940	7.9	19.6		8.2	88	1.2	--	12	1.0	.00	.01	--	.59
Apr. 16	1420	2	1	280	--	23.3	3	6.1	70	2.4	--	13	.0	QN	QN	0.09	.21
			8	280	--	23.1		6.0	69	1.5	--	13	.6	QN	QN	.23	.26
June 13	1200	2	1	570	7.9	29.4	--	5.3	68	1.8	--	13	.7	QN	QN	.25	.42
			10	570	8.0	29.6		5.2	68	1.5	--	13	.7	QN	QN	.26	.36
Aug. 13	1300	2	1	800	--	33.0	--	5.8	74	1.4	--	15	.5	QN	QN	.32	.36
			5	800	--	33.0		5.4	74	--	--	--	--	--	--	--	--
			10	800	--	33.0		5.4	74	1.6	--	14	.5	QN	QN	.33	.39
<u>Line 18. Mission Lake</u>																	
1968																	
Nov. 19	1355	1	2	760	8.1	15.5	36	9.7	96	--	--	--	--	--	--	--	--
1969																	
Jan. 30	1118	2	1	790	8.2	21.0	28	8.6	96	.9	--	11	1.1	.00	.03	--	.55
			2	820	8.2	21.3		9.6	108	--	--	--	--	--	--	--	--
<u>Line 19. Mission Lake</u>																	
1968																	
Nov. 19	1420	2	2	830	8.0	17.7	23	8.5	89	--	--	--	--	--	--	--	--
<u>Line 20. Guadalupe Bay</u>																	
1968																	
Nov. 19	1335	2	1	850	8.2	14.6	51	9.3	90	--	--	--	--	--	--	--	--
			3.5	790	8.1	15.0		9.5	93	1.2	--	14	.0	.09	.02	--	.52
1969																	
Jan. 30	1055	2	1	890	8.2	20.8	25	8.4	93	.8	--	11	1.2	.00	.01	--	.52
			3	890	8.2	20.7		8.7	96	.9	--	11	1.2	.30	.01	--	.55
Apr. 16	1330	2	1	250	--	24.1	18	6.0	71	1.6	--	8.6	.2	QN	QN	.09	.14
			4.5	250	--	24.0		5.7	67	1.7	--	9.2	.3	QN	QN	.17	.30
June 13	1410	2	1	570	8.1	30.9	--	6.2	83	1.2	--	12	.2	QN	QN	.08	.10
			3	570	8.1	31.0		6.2	83	1.1	--	12	.2	QN	QN	.08	.11
Aug. 13	1000	2	1	800	--	30.0	--	6.4	84	2.6	11	12	.0	QN	QN	.17	.25
<u>Line 21. Guadalupe Bay</u>																	
1968																	
Nov. 19	1323	1	1	800	8.3	16.2	--	9.9	99	--	--	--	--	--	--	--	--
			3.5	840	8.2	16.4		9.6	97	--	--	--	--	--	--	--	--
Do.	1315	3	1	840	8.1	17.8	41	8.7	92	--	--	--	--	--	--	--	--
			3	850	8.1	17.2		9.4	97	--	--	--	--	--	--	--	--
1969																	
Jan. 30	1043	1	1	860	8.3	20.6	--	8.8	97	.9	--	11	1.4	.00	.02	--	.65
			3	900	8.2	20.6		9.0	99	.8	--	12	.8	.00	.01	--	.59
Do.	1030	3	1	860	8.3	20.5	28	8.8	97	1.3	--	11	1.3	.00	.04	--	.62
			3	1,100	8.3	20.5		8.7	96	1.5	--	11	.9	.00	.01	--	.12
Apr. 16	1320	1	1	280	8.0	23.7	20	6.8	80	--	--	--	--	--	--	--	--
			4	300	7.9	23.1		6.6	76	--	--	--	--	--	--	--	--
Do.	1310	3	1	250	7.4	23.8	25	4.5	53	--	--	--	--	--	--	--	--
			3.5	250	7.4	23.8		4.8	56	--	--	--	--	--	--	--	--
June 13	1430	1	1	550	8.2	31.2	--	6.1	81	--	--	--	--	--	--	--	--
			3	570	8.2	31.1		6.2	83	--	--	--	--	--	--	--	--
Do.	1440	3	1	520	8.3	30.4	--	7.0	92	--	--	--	--	--	--	--	--
			3	570	8.3	30.4		7.1	93	--	--	--	--	--	--	--	--

See footnotes at end of table.

Table 5A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE
GUADALUPE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 22. Guadalupe Bay</u>																	
1968																	
Nov. 21	0930	1	0.2	1,000	8.3	15.2	51	9.3	91	1.0	--	--	0.2	0.00	0.11	--	0.49
			1	860	8.3	15.1		9.2	90	--	--	--	--	--	--	--	--
			2	5,600	8.3	16.6		8.2	84	--	--	--	--	--	--	--	--
			2.5	6,200	8.2	16.6		8.3	85	2.6	--	12	.0	.00	.01	--	.46
Do.	0945	2	.2	940	8.3	15.6	--	9.6	95	--	--	--	--	--	--	--	--
			2	1,000	8.3	15.0		9.6	94	--	--	--	--	--	--	--	--
			2.5	4,200	8.3	15.6		8.9	88	--	--	--	--	--	--	--	--
			3	10,000	8.3	16.7		8.2	84	--	--	--	--	--	--	--	--
			3.5	11,000	8.2	17.1		7.8	80	--	--	--	--	--	--	--	--
1969																	
Jan. 30	1200	1	1	2,300	8.3	20.9	28	9.4	104	--	--	--	--	--	--	--	--
			3	2,400	8.3	20.9		9.2	102	1.3	--	11	.8	.00	.01	--	.52
Do.	1150	2	1	970	8.2	20.6	25	8.8	97	--	--	--	--	--	--	--	--
			3.5	970	8.3	20.7		8.8	97	--	--	--	--	--	--	--	--
Apr. 16	1300	1	1	320	8.1	23.5	--	7.3	86	--	--	--	--	--	--	--	--
			3.5	310	8.0	23.4		7.2	83	--	--	--	--	--	--	--	--
Do.	1250	2	1	260	7.5	23.7	13	5.1	60	2.0	--	9.5	.2	QN	QN	0.09	.17
			4.5	270	7.5	23.7		4.8	56	2.0	--	9.3	.3	QN	QN	.15	.19
June 13	1505	1	1	510	8.4	31.5	--	7.9	107	1.9	--	13	.1	QN	QN	.10	.12
			2	570	8.5	31.5		7.9	107	2.1	--	13	.1	QN	QN	.10	.13
Do.	1455	2	1	540	8.3	30.4	--	7.3	96	--	--	13	.6	QN	QN	.30	.33
			3	550	8.4	30.6		7.3	97	1.1	--	12	.6	QN	QN	.29	.36
Aug. 12	1440	1	1	1,800	--	25.4	18	8.3	100	--	--	--	--	--	--	--	--
			2	2,300	--	25.4		8.3	100	2.4	--	13	.0	QN	QN	.13	.15
Do	1410	2	1	1,100	--	25.5	20	8.6	104	--	--	--	--	--	--	--	--
			2	1,300	--	26.0		8.5	104	3.0	--	13	.0	QN	QN	.14	.17
<u>Line 23. Hynes Bay</u>																	
1968																	
Nov. 21	1135	1	1	14,000	8.5	17.6	53	11.2	117	--	--	--	--	--	--	--	--
			2.5	15,000	8.6	17.7		11.8	123	--	--	--	--	--	--	--	--
Do.	1120	2	1	12,000	8.4	16.9	76	9.6	99	--	--	--	--	--	--	--	--
			2.5	13,000	8.7	16.4		11.6	117	5.6	--	--	.0	.00	.01	--	.21
Do.	1115	3	1	12,000	8.5	16.8	51	9.3	95	--	--	--	--	--	--	--	--
			2.5	12,000	8.5	16.2		9.1	91	--	--	--	--	--	--	--	--
1969																	
Apr. 16	1010	1	1	3,000	8.7	23.2	23	9.8	114	--	--	--	--	--	--	--	--
			3	3,400	8.7	23.1		9.3	108	--	--	--	--	--	--	--	--
Do.	1020	2	1	4,000	8.8	23.3	20	9.1	106	2.6	--	6.0	.0	QN	QN	.21	.29
			3	4,200	8.8	23.3		8.8	102	1.8	--	8.2	.0	QN	QN	.11	.20
Do.	1035	3	1	5,400	8.8	23.4	20	9.0	106	--	--	--	--	--	--	--	--
			3	5,600	8.8	23.2		8.6	101	--	--	--	--	--	--	--	--
June 13	1645	2	1	850	8.8	30.5	--	9.7	128	1.6	--	13	.1	QN	QN	.36	.36
			3.5	850	8.8	30.5		9.7	128	1.7	4.3	14	.1	QN	QN	.39	.39
Aug. 12	1510	2	1	4,500	--	25.4	11	8.1	98	--	--	--	--	--	--	--	--
			2	4,500	--	25.5		8.0	99	2.1	19	11	.0	QN	QN	.15	.20
Do.	1545	3	1	7,200	--	25.4	13	8.4	102	--	--	--	--	--	--	--	--
			2	7,200	--	25.4		8.8	107	--	--	--	--	--	--	--	--
<u>Line 24. San Antonio Bay</u>																	
1968																	
Nov. 20	1540	2	1	16,000	8.6	17.8	71	11.1	117	--	--	--	--	--	--	--	--
			3	16,000	8.6	17.8		11.1	117	--	--	--	--	--	--	--	--
			5	22,000	8.5	16.8		10.5	107	--	--	--	--	--	--	--	--
			11.5	23,000	8.2	16.5		7.2	73	--	--	--	--	--	--	--	--
Nov. 21	1005	4	1	9,000	8.5	15.9	64	10.6	106	1.6	--	--	.0	.00	.02	--	.36
			2	17,000	8.5	16.6		11.6	118	--	--	--	--	--	--	--	--
			3.5	18,000	8.5	16.7		12.0	122	3.6	--	--	.0	.00	.01	--	.17
Do.	1020	6	1	6,300	8.4	16.1	76	10.2	102	--	--	--	--	--	--	--	--
			2	15,000	8.5	16.3		12.2	123	--	--	--	--	--	--	--	--
			3.5	16,000	8.5	16.4		11.7	118	--	--	--	--	--	--	--	--

See footnotes at end of table.

Table 5A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE GUADALUPE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 24. San Antonio Bay (continued)</u>																	
1968																	
Nov. 21	1035	8	1	11,000	8.5	16.1	--	10.3	103	--	--	--	--	--	--	--	--
			2	12,000	8.6	16.0		10.2	102	--	--	--	--	--	--	--	--
			3.5	15,000	8.5	16.6		11.2	114	--	--	--	--	--	--	--	--
Do.	1050	9	1	12,000	8.7	16.0	61	10.1	101	3.7	--	--	0.0	0.00	0.01	--	0.16
			2	12,000	8.7	15.8		10.1	101	--	--	--	--	--	--	--	--
			4	13,000	8.5	16.4		8.1	82	6.0	--	--	.0	.05	.02	--	.21
Do.	1105	10	1	13,000	8.6	16.7	53	9.1	93	--	--	--	--	--	--	--	--
			2.5	13,000	8.5	16.2		8.9	89	--	--	--	--	--	--	--	--
1969																	
April 16	1220	4	1	340	8.2	23.4	18	7.7	89	--	--	--	--	--	--	--	--
			3	340	8.2	23.3		7.4	85	--	--	--	--	--	--	--	--
Do.	1205	6	1	280	7.6	23.6	15	5.6	66	--	--	--	--	--	--	--	--
			4	270	7.6	23.4		5.5	63	--	--	--	--	--	--	--	--
Do.	1150	8	1	300	7.7	23.3	20	6.6	76	--	--	--	--	--	--	--	--
			4.5	340	7.7	23.1		6.5	75	--	--	--	--	--	--	--	--
Do.	1135	9	1	1,900	8.7	23.3	20	8.8	102	--	--	--	--	--	--	--	--
			3	2,400	8.7	23.2		8.9	103	--	--	--	--	--	--	--	--
			4.5	6,000	8.8	23.0		8.0	94	--	--	--	--	--	--	--	--
Do.	1130	10	1	6,000	8.9	23.2	--	8.8	103	--	--	--	--	--	--	--	--
			3.5	5,600	8.9	23.2		8.6	101	--	--	--	--	--	--	--	--
June 12	1045	2	1	1,100	7.7	27.9	--	7.4	94	2.1	--	13	.1	QN	QN	0.08	.21
			5	1,400	7.3	27.6		7.5	95	--	--	--	--	--	--	--	--
			10	2,000	7.3	27.7		7.1	91	2.2	--	12	.0	QN	QN	.16	.22
Aug. 12	1400	3	1	14,000	--	32.5	--	7.7	108	1.7	--	10	.0	QN	QN	.10	.13
Do.	1415	6	1	14,000	--	32.5	--	8.6	121	2.4	--	10	.1	QN	QN	.12	.26
			2.5	13,000	--	32.5		8.6	121	2.5	--	11	.0	QN	QN	.12	.14
Do.	1435	9	1	14,000	--	32.5	--	8.2	115	1.7	--	11	.0	QN	QN	.12	.25
			4	14,000	--	32.5		8.1	114	2.1	--	11	.1	QN	QN	.12	.23
<u>Line 25. San Antonio Bay</u>																	
1968																	
Nov. 20	1615	2	1	22,000	8.5	16.7	48	9.9	101	--	--	--	--	--	--	--	--
			5	22,000	8.5	16.7		10.5	107	--	--	--	--	--	--	--	--
			7	25,000	8.5	16.6		10.5	107	--	--	--	--	--	--	--	--
			11	29,000	8.3	16.8		6.5	66	--	--	--	--	--	--	--	--
1969																	
Aug. 12	1240	2	1	22,000	--	25.6	--	7.0	92	2.4	--	8.0	.1	QN	QN	.09	.12
			5	26,000	--	25.5		6.8	91	1.8	--	8.2	.0	QN	QN	.10	.18
<u>Line 26. San Antonio Bay</u>																	
1968																	
Nov. 20	1600	1	1	22,000	8.6	16.4	69	10.6	107	--	--	--	--	--	--	--	--
			5	27,000	8.4	15.9		9.5	95	--	--	--	--	--	--	--	--
			8.5	29,000	8.3	16.2		8.0	80	--	--	--	--	--	--	--	--
Nov. 21	1610	1	1	24,000	8.0	17.6	100	9.9	103	2.3	--	--	.0	.00	.01	--	.10
			5	25,000	7.9	16.5		8.2	83	--	--	--	--	--	--	--	--
			12	27,000	7.8	16.6		7.6	78	1.3	--	--	.0	.00	.01	--	.09
Do.	1235	4	1	12,000	8.5	17.3	132	10.5	108	--	--	--	--	--	--	--	--
			4.5	19,000	8.4	17.6		9.5	99	--	--	--	--	--	--	--	--
1969																	
April 16	0935	1	1	1,500	8.3	23.1	20	8.5	98	1.8	--	8.7	.0	QN	QN	.06	.11
			13.5	5,200	8.4	22.9		8.0	94	2.9	--	9.1	.1	QN	QN	.06	.14
Do.	1105	4	1	840	8.1	23.1	--	8.2	94	2.3	--	13	.0	QN	QN	.06	.17
			3	840	8.1	23.1		8.2	94	--	--	--	--	--	--	--	--
			4	1,500	8.5	22.9		8.3	95	--	--	--	--	--	--	--	--
			5.5	3,500	8.8	23.0		8.1	94	2.3	--	8.1	.0	QN	QN	.20	.36
Aug. 12	--	1	1	19,000	8.5	29.9	--	8.4	118	--	--	--	--	--	--	--	--
			5	19,000	8.5	29.6		7.8	110	--	--	--	--	--	--	--	--
Do.	--	2	1	19,000	8.5	29.9	--	6.8	96	3.8	--	8.5	.0	QN	QN	.10	.27
			5	19,000	8.5	29.7		6.8	96	2.1	--	8.2	.0	QN	QN	.09	.18
Do.	--	3	1	16,000	8.5	30.0	--	7.6	106	--	--	--	--	--	--	--	--
			5	16,000	8.5	29.9		7.6	106	--	--	--	--	--	--	--	--

See footnotes at end of table.

Table 5A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE GUADALUPE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
Line 26. San Antonio Bay (continued)																		
1969	Aug. 12	--	4	1	10,000	8.5	30.6	--	6.8	93	2.8	--	11	0.0	QN	QN	0.13	0.16
				5	10,000	8.6	30.1	--	7.0	95	1.3	--	11	0.0	QN	QN	.12	.16
Do.	--		5	1	10,000	8.5	31.1	--	6.8	93	--	--	--	--	--	--	--	--
				3	9,000	8.5	30.8	--	6.6	90	--	--	--	--	--	--	--	--
Line 27. San Antonio Bay																		
1968	Nov. 21	1305	5	1	18,000	8.1	18.1	122	9.2	97	2.0	--	--	.0	0.00	0.01	--	.14
				4.5	25,000	7.9	17.6	--	7.6	79	.8	--	--	.0	.00	.01	--	.09
1969	April 17	0855	1	1	5,800	--	23.2	48	8.2	96	--	--	--	--	--	--	--	--
				5	6,200	--	23.2	--	7.9	93	--	--	--	--	--	--	--	--
				10	12,000	--	23.3	--	7.2	86	--	--	--	--	--	--	--	--
				14	13,000	--	23.4	--	7.1	85	--	--	--	--	--	--	--	--
Aug. 12	1020	1	1	20,000	8.0	30.5	24	6.8	97	1.6	--	8.1	.2	QN	QN	.09	.12	
				5	20,000	8.1	30.5	--	6.8	97	--	--	--	--	--	--	--	--
				10	20,000	8.1	30.5	--	6.7	96	2.1	--	8.1	.0	QN	QN	.09	.16
Do.	1110	3	1	13,000	8.1	31.0	37	7.8	108	2.1	--	9.7	.0	QN	QN	.11	.15	
				4	14,000	8.0	31.0	--	7.7	107	1.6	--	9.6	.0	QN	QN	.11	.14
Do.	1135	5	1	12,000	8.0	31.0	24	7.4	103	1.4	--	11	.1	QN	QN	.12	.14	
				5	12,000	8.0	31.5	--	7.6	106	2.0	--	11	.1	QN	QN	.13	.16
Line 28. San Antonio Bay																		
1968	Nov. 21	1430	8	1	20,000	8.0	18.0	122	9.6	101	--	--	--	--	--	--	--	--
				5.5	25,000	7.8	17.7	--	10.2	106	--	--	--	--	--	--	--	--
1969	April 17	0905	1	1	16,000	--	23.2	--	7.6	92	2.2	--	3.9	.0	QN	QN	.03	.05
				5	21,000	--	23.4	--	7.2	89	--	--	--	--	--	--	--	--
				10	21,000	--	23.4	--	7.2	89	--	--	--	--	--	--	--	--
				14	22,000	--	23.4	--	6.6	81	2.3	--	4.6	.0	QN	QN	.02	.04
Aug. 12	0920	1	1.6	22,000	--	28.9	--	6.8	94	5.9	--	8.2	.0	QN	QN	.12	.14	
			9.8	22,000	--	28.9	--	6.7	93	1.2	--	8.0	.0	QN	QN	.10	.13	
Do.	--	2	1.6	22,000	--	28.9	--	6.6	92	--	--	--	--	--	--	--	--	--
			3.2	22,000	--	29.1	--	6.6	92	--	--	--	--	--	--	--	--	--
Do.	0955	3	1.6	21,000	--	29.4	--	6.4	89	3.5	--	8.5	.0	QN	QN	.13	.16	
			3.6	21,000	--	29.4	--	6.4	89	2.2	--	8.7	.1	QN	QN	.09	.12	
Do.	--	4	1.6	24,000	--	29.5	--	6.4	91	--	--	--	--	--	--	--	--	--
			3.6	24,000	--	29.4	--	6.2	86	--	--	--	--	--	--	--	--	--
Do.	--	5	1.6	27,000	--	29.5	--	6.4	93	--	--	--	--	--	--	--	--	--
			7.4	30,000	--	29.3	--	6.1	88	--	--	--	--	--	--	--	--	--
Do.	--	6	1.6	33,000	--	29.5	--	6.2	93	--	--	--	--	--	--	--	--	--
			3.6	35,000	--	29.6	--	6.0	91	--	--	--	--	--	--	--	--	--
Do.	--	7	1.6	33,000	--	29.7	--	6.2	93	--	--	--	--	--	--	--	--	--
			4.2	33,000	--	29.7	--	6.0	90	--	--	--	--	--	--	--	--	--
Do.	1130	8	1.6	35,000	--	30.0	--	6.0	91	3.3	--	6.8	.0	QN	QN	.06	.12	
			4.2	35,000	--	30.0	--	5.4	82	1.9	--	6.4	.0	QN	QN	.08	.22	
Do.	--	9	1.6	41,000	8.2	30.3	--	5.7	88	--	--	--	--	--	--	--	--	--
			2.1	41,000	8.2	30.2	--	5.5	85	--	--	--	--	--	--	--	--	--
Aug. 14	1100	8	1	36,000	--	32.0	--	6.3	100	--	--	--	--	--	--	--	--	--
			2.5	39,000	--	31.5	--	6.1	100	--	--	--	--	--	--	--	--	--
			3.5	40,000	--	31.0	--	5.9	95	--	--	--	--	--	--	--	--	--
			5	40,000	--	32.0	--	5.8	95	--	--	--	--	--	--	--	--	--

See footnotes at end of table.

Table 5A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE GUADALUPE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration	Percent saturation								
<u>Line 29. San Antonio Bay</u>																	
1968																	
Nov. 21	1455	1	1	22,000	7.9	19.5	51	8.7	94	0.9	--	--	0.0	0.00	0.01	--	0.10
			5	22,000	7.9	17.9		8.2	86	--	--	--	--	--	--	--	--
			10	24,000	7.8	17.1		7.7	79	--	--	--	--	--	--	--	--
			16.5	25,000	7.8	16.8		7.5	77	5.1	--	--	.0	.00	.01	--	.15
1969																	
April 17	1045	2	1	13,000	--	23.2	--	7.7	92	2.2	--	5.0	.0	QN	QN	0.04	.07
			8	13,000	--	23.2		7.8	93	2.1	--	5.5	.0	QN	QN	.01	.08
Do.	1120	4	1	11,000	--	23.3	--	7.7	91	2.1	--	5.9	.0	QN	QN	.03	.15
			16	13,000	--	23.3		6.7	80	3.3	--	8.0	.0	QN	QN	.01	.08
June 13	1115	2	1	12,000	8.4	28.2	15	7.5	99	2.0	--	9.0	.1	QN	QN	.14	.17
			7	12,000	8.4	28.0		6.3	83	2.9	--	9.2	.0	QN	QN	.17	.28
Do.	1145	4	1	14,000	8.5	28.4	20	7.4	97	.8	--	8.2	.0	QN	QN	.10	.16
			5	17,000	8.4	28.0		6.3	85	--	--	--	--	--	--	--	--
			10	17,000	8.4	27.9		7.0	95	--	--	--	--	--	--	--	--
			14	17,000	8.3	27.9		5.3	72	1.5	--	8.4	.1	QN	QN	.16	.17
<u>Line 30. San Antonio Bay</u>																	
1968																	
Nov. 21	1540	1	1	31,000	7.8	17.7	76	8.2	86	.7	--	--	.0	.00	.01	--	.07
			5	31,000	7.8	18.2		8.1	85	--	--	--	--	--	--	--	--
			10	32,000	7.8	18.1		8.2	86	--	--	--	--	--	--	--	--
			15.5	31,000	7.8	18.1		7.9	83	.4	--	3.8	.0	.00	.01	--	.04
1969																	
April 17	0955	3	1	25,000	--	23.0	43	8.2	102	2.1	--	3.7	.0	QN	QN	.02	.06
			6	25,000	--	23.0		7.7	96	8.3	--	10	.0	QN	QN	.05	.07
Do.	0945	6	1	25,000	--	23.2	--	7.7	96	--	--	--	--	--	--	--	--
			6.5	25,000	--	23.2		7.4	92	--	--	--	--	--	--	--	--
Do.	0925	7	1	22,000	--	23.3	59	7.8	96	1.5	--	3.8	.0	QN	QN	.04	.05
			5	22,000	--	23.3		7.4	91	--	--	--	--	--	--	--	--
			10	22,000	--	23.3		7.5	93	--	--	--	--	--	--	--	--
			14	24,000	--	23.2		7.2	89	1.4	--	4.1	.0	QN	QN	.02	.05
June 13	1010	3	1	14,000	8.5	27.8	45	7.6	100	.8	--	8.2	.0	QN	QN	.11	.12
			3	16,000	8.5	27.8		7.4	99	--	--	--	--	--	--	--	--
			5	17,000	8.3	27.7		6.3	85	--	--	--	--	--	--	--	--
			6.5	18,000	8.3	27.7		5.3	72	.9	--	8.2	.0	QN	QN	.11	.22
Do.	0930	7	1	11,000	8.5	28.2	27	7.0	91	1.2	--	8.3	.0	QN	QN	.12	.16
			5	12,000	8.5	28.2		6.7	88	--	--	--	--	--	--	--	--
			10	12,000	8.5	28.2		6.6	87	--	--	--	--	--	--	--	--
			15	13,000	8.4	28.2		6.7	88	2.0	--	8.6	.0	QN	QN	.18	.26

1/ Determined at data-collection site.
QN means qualitative test negative.

Table 5B.--CHEMICAL ANALYSES OF WATER FROM THE GUADALUPE ESTUARY, 1969 WATER YEAR

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) a/	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 1. Victoria Channel</u>															
1968 Nov. 20	1055	2	13.5	849	90	13	88		276	45	138	534	280	54	--
1969 Aug. 14	1350	2	1 10	922 948	80 84	12 14	94 97		228 248	46 50	155 157	523 548	248 268	61 65	-- --
<u>Line 5. Victoria Channel</u>															
1968 Nov. 20	1305	2	12.5	12,500	142	266	2,170		227	576	3,820	7,100	1,450	1,260	1.003
<u>Line 5a. Victoria Channel</u>															
1968 Nov. 20	1405	1	.2	2,310	42	29	333		350	64	425	1,090	225	0	--
<u>Line 6. Victoria Channel</u>															
1968 Nov. 20	1425	2	11	18,400	170	412	3,200		215	852	5,680	10,400	2,120	1,940	1.004
1969 Aug. 14	1510	2	1 10	1,990 1,920	56 56	111 109	182 172		160 162	111 110	528 505	1,080 1,050	598 588	467 455	-- --
<u>Line 14. Guadalupe River</u>															
1968 Nov. 19	1045	2	1	840	85	22	65		310	56	93	488	304	50	--
1969 Jan. 30	1345	2	1 8.5	878 881	-- --	-- --	-- --		-- --	-- --	104 104	-- --	-- --	-- --	-- --
June 13	1115	2	1 9	542 527	63 64	13 12	33 31		216 212	36 36	45 44	313 306	212 210	35 36	-- --
Aug. 13	1200	2	10	760	78	19	68		268	57	99	468	272	52	--
<u>Line 15. Guadalupe River</u>															
1969 Jan. 30	1325	2	1 15	878 878	-- --	-- --	-- --		-- --	-- --	104 104	-- --	-- --	-- --	-- --
<u>Line 16. Guadalupe River</u>															
1968 Jan. 30	1310	2	1 13.5	877 877	-- --	-- --	-- --		-- --	-- --	103 103	-- --	-- --	-- --	-- --
<u>Line 17. Guadalupe River</u>															
1968 Jan. 30	1245	2	1 9.5	898 886	-- --	-- --	-- --		-- --	-- --	104 104	-- --	-- --	-- --	-- --
April 16	1420	2	8	337	39	5.5	23		125	24	27	196	120	18	--
1969 Aug. 13	1300	2	1 10	771 791	77 76	20 21	62 62		270 272	58 59	87 87	456 457	276 276	54 53	-- --
<u>Line 18. Mission Lake</u>															
1968 Jan. 30	1120	2	1	805	--	--	--		--	--	95	--	--	--	--
<u>Line 20. Guadalupe Bay</u>															
1968 Nov. 19	1340	2	3.5	860	86	21	75		317	63	98	514	300	40	--
1969 Jan. 30	1105	2	1 3	850 846	85 --	20 --	70 --		286 --	67 --	97 97	497 --	296 --	62 --	-- --
April 16	1330	2	1 4.5	311 313	33 36	8.4 5.9	15 24		115 123	13 15	29 34	165 186	117 114	23 13	-- --
Aug. 13	1000	2	1	760	66	21	66		237	57	92	438	252	48	--

See footnote at end of table

Table 5B.--CHEMICAL ANALYSES OF WATER FROM THE GUADALUPE ESTUARY, 1969 WATER YEAR--continued

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) a/	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20° C)
													Calcium, magnesium	Non-carbonate	
<u>Line 21. Guadalupe Bay</u>															
1969	Jan. 30	1045	1	828	--	--	--	--	--	--	96	--	--	--	--
			3	831	--	--	--	--	--	--	98	--	--	--	--
do	1035	3	1	818	--	--	--	--	--	--	96	--	--	--	--
			3	826	--	--	--	--	--	--	96	--	--	--	--
<u>Line 22. Guadalupe Bay</u>															
1968	Nov. 21	0930	1	6,820	118	144	1,050		279	308	1,860	3,630	885	660	--
1969	Jan. 30	1200	1	2,310	91	52	345		265	132	590	1,350	440	223	--
1969	April 16	1250	2	300	35	5.3	22		120	12	31	176	109	11	--
<u>Line 23. Hynes Bay</u>															
1969	June 13	1645	2	965	50	20	125		172	57	186	547	208	60	--
1969	Aug. 12	1510	2	4,060	60	105	718		220	217	1,230	2,450	580	400	--
<u>Line 24. San Antonio Bay</u>															
1969	June 12	1045	2	1,030	54	21	129		194	48	206	567	222	63	--
			10	2,060	58	37	287		198	90	470	1,050	296	134	--
<u>Line 25. San Antonio Bay</u>															
1969	Aug. 12	1240	2	23,900	210	563	4,470		172	1,160	7,950	14,400	2,840	2,700	--
			5	24,000	214	541	4,510		174	1,160	7,950	14,500	2,760	2,620	--
<u>Line 26. San Antonio Bay</u>															
1969	Aug. 12	--	4	11,700	126	269	2,050		206	506	3,680	6,750	1,420	1,250	--
			5	11,800	126	254	2,130		205	554	3,720	6,900	1,360	1,190	--
<u>Line 27. San Antonio Bay</u>															
1969	Aug. 12	1030	1	23,100	206	546	4,500		174	1,070	8,000	14,400	2,760	2,620	--
			10	23,100	204	542	4,350		176	1,110	7,720	14,000	2,740	2,600	--
do	1110	3	1	16,200	162	369	2,940		194	780	5,200	9,500	1,920	1,760	--
			4	15,900	160	380	2,910		194	772	5,200	9,530	1,960	1,800	--
do	1145	5	1	12,200	138	266	2,180		204	558	3,850	7,110	1,440	1,270	--
			5	12,200	132	255	2,180		205	564	3,800	7,050	1,380	1,210	--
<u>Line 28. San Antonio Bay</u>															
1969	Aug. 12	0955	3	21,100	192	477	4,030		179	1,000	7,100	12,900	2,440	2,290	--
			3.6	21,000	192	496	3,930		179	1,030	6,980	12,700	2,520	2,370	--
do	1130	8	1.6	33,200	272	844	6,300		166	1,160	11,700	20,400	4,150	4,010	--
			4.3	36,900	282	899	6,570		166	880	12,500	21,200	4,400	4,260	--
<u>Line 29. San Antonio Bay</u>															
1969	June 13	1145	4	17,200	150	395	3,250		164	860	5,700	10,400	2,000	1,870	1.005
<u>Line 30. San Antonio Bay</u>															
1968	Nov. 21	1540	1	33,500	248	810	6,370		172	1,660	11,300	20,500	3,950	3,810	1.013
1969	April 17	0955	3	22,300	188	552	4,250		142	1,100	7,600	13,800	2,740	2,620	1.007
			6	23,000	190	541	4,350		140	1,100	7,720	14,000	2,700	2,590	1.007
1969	June 13	1010	3	18,100	154	446	3,360		162	900	6,000	10,900	2,220	2,090	1.005

a/ Included in sodium-ion concentration.

Table 5C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE GUADALUPE ESTUARY, 1969 WATER YEAR

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25°C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 1. Victoria Channel</u>																			
1968 Nov. 20	1055	2	13.5	849	--	--	--	0.3	130	--	--	--	--	--	--	--	1.3	0.038	--
1969 Aug. 14	1350	2	1 10	922 948	--	--	--	.2 .2	150 120	--	--	--	--	--	--	--	1.2 1.7	.063 .066	--
<u>Line 5. Victoria Channel</u>																			
1968 Nov. 20	1315	2	12.5	12,500	--	--	--	.4	630	--	--	--	--	--	--	--	13	.044	--
<u>Line 5a. Victoria Channel</u>																			
1968 Nov. 20	1405	2	.2	2,310	--	--	--	.4	390	--	--	--	--	--	--	--	1.9	.056	--
<u>Line 6. Victoria Channel</u>																			
1968 Nov. 20	1425	2	11	18,400	--	--	--	.5	390	--	--	--	--	--	--	--	21	.027	--
1969 Aug. 14	1510	2	1 10	1,990 1,920	--	--	--	.3 .3	310 330	--	--	--	--	--	--	--	2.4 2.6	.111 .108	--
<u>Line 14. Guadalupe River</u>																			
1968 Nov. 19	1050	2	1	840	--	--	--	.4	200	--	--	--	--	--	--	--	.98	.013	--
1969 June 13	1115	2	1 9	542 527	--	--	--	.2 .2	--	--	--	--	--	--	--	--	--	--	--
1969 Aug. 13	1200	2	1 10	753 760	20 20	0 0	20 20	-- .3	-- 160	0 0	7 12	2 0	20 20	--	--	0 0	-- .99	-- .030	700 720
<u>Line 17. Guadalupe River</u>																			
1969 Apr. 16	1420	2	8	337	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
1969 Aug. 13	1300	2	1 10	771 791	--	--	--	.3 .3	180 180	--	--	--	--	--	--	--	1.8 1.0	.042 .042	--
<u>Line 20. Guadalupe Bay</u>																			
1968 Nov. 19	1340	2	3.5	860	--	--	--	.4	190	--	--	--	--	--	--	--	.98	.016	--
1969 Jan. 30	1140	2	1	850	--	--	--	.2	--	--	--	--	--	--	--	--	.82	.030	--
1969 Apr. 16	1335	2	1 4.5	311 313	--	--	--	.1 .2	--	--	--	--	--	--	--	--	--	--	--
1969 Aug. 13	1000	2	1	760	10	0	20	.3	200	0	16	5	30	--	--	0	1.3	.046	690
<u>Line 22. Guadalupe Bay</u>																			
1968 Nov. 21	0940	1	2.5	6,820	--	--	--	.4	590	--	--	--	--	--	--	--	7.6	.014	--
1969 Jan. 30	1200	1	3	2,310	--	--	--	.3	--	--	--	--	--	--	--	--	2.6	.029	--
1969 Apr. 16	1250	2	4.5	300	--	--	--	.2	--	--	--	--	--	--	--	--	--	--	--
<u>Line 23. Hynes Bay</u>																			
1969 June 13	1645	2	3.5	965	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--
1969 Aug. 12	1510	2	2	4,060	--	--	--	.4	480	--	--	--	--	--	--	--	4.6	.058	--
<u>Line 24. San Antonio Bay</u>																			
1969 June 12	1045	2	1 10	1,030 2,060	--	--	--	.2 .3	--	--	--	--	--	--	--	--	--	--	--
<u>Line 25. San Antonio Bay</u>																			
1969 Aug. 12	1240	2	1 5	23,900 24,000	0 0	20 50	80 80	.6 .6	2,200 2,400	0 2	40 48	35 2	60 50	--	--	0 0	28 28	.090 .085	3,900 4,300

See footnote at end of table.

Table 5C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE GUADALUPE ESTUARY, 1969 WATER YEAR--continued

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 26. San Antonio Bay</u>																			
1969																			
Aug. 12	--	4	1	11,700	--	--	--	0.5	1,100	--	--	--	--	--	--	--	14	0.076	--
			5	11,800	--	--	--	.5	1,100	--	--	--	--	--	--	--	13	.073	--
<u>Line 27. San Antonio Bay</u>																			
1969																			
Aug. 12	1030	1	1	23,100	--	--	--	.6	2,000	--	--	--	--	--	--	--	28	.074	--
			10	23,100	--	--	--	.6	2,000	--	--	--	--	--	--	--	27	.092	--
do	1110	3	1	16,200	--	--	--	.5	1,300	--	--	--	--	--	--	--	19	.083	--
			4	15,900	--	--	--	.5	1,800	--	--	--	--	--	--	--	20	.085	--
do	1145	5	1	12,200	--	--	--	.5	1,100	--	--	--	--	--	--	--	14	.076	--
			5	12,200	--	--	--	.5	1,100	--	--	--	--	--	--	--	14	.075	--
<u>Line 28. San Antonio Bay</u>																			
1969																			
Aug. 12	0955	3	1.6	21,100	--	--	--	.6	2,200	--	--	--	--	--	--	--	25	.084	--
			3.6	21,000	--	--	--	.6	1,800	--	--	--	--	--	--	--	26	.084	--
do	1130	8	1	33,200	10	0	160	.7	2,900	0	6	1	30			0	40	.085	5,800
			5	36,900	30	0	160	.7	3,000	0	5	26	50			0	42	.094	6,900
<u>Line 29. San Antonio Bay</u>																			
1969																			
June 13	1145	4	14	17,200	--	--	--	.6	--	--	--	--	--	--	--	--	--	--	--
<u>Line 30. San Antonio Bay</u>																			
1968																			
Nov. 21	1540	1	15.5	33,500	--	--	--	.6	5,100	--	--	--	--	--	--	--	41	.016	--
1969																			
Apr. 17	1000	3	1	22,300	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
			6	23,000	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--
June 13	1010	3	6.5	18,100	--	--	--	.5	--	--	--	--	--	--	--	--	--	--	--

a/ Results in milligrams per liter.

Table 5 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT FROM THE GUADALUPE ESTUARY, 1969 WATER YEAR--Continued

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 25 site 2. San Antonio Bay</u>														
Apr. 16	1525	Water	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.03
		Sediment	.00	2.5	3.2	2.0	.33	.00	.00	.00	.00	--	--	--
Aug. 12	1240	Water	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00
		Sediment	.00	2.9	1.9	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 28 site 8. San Antonio Bay</u>														
Aug. 14	1100	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		Sediment	.00	.00	.00	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 30 site 3. San Antonio Bay</u>														
June 13	1010	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.00	.03

Table 5 D.--INSECTICIDE AND HERBICIDE ANALYSES OF WATER AND SEDIMENT
FROM THE GUADALUPE ESTUARY, 1969 WATER YEAR.

Date	Time (24 hour)		Micrograms per liter											
			Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor epoxide	Lindane	2,4-D	Silvex	2,4,5-T
<u>Line 14 site 2. Guadalupe River</u>														
Aug. 13	1200	Water	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sediment	.00	2.2	1.8	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 20 site 2. Guadalupe Bay</u>														
Apr. 16	1340	Water	.00	.00	.00	.61	.00	.00	.00	.00	.00	.23	.00	.04
		Sediment	.00	2.9	2.6	3.0	.64	.00	.00	.00	.00	--	--	--
June 13	1415	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.00	.03
Aug. 13	1000	Water	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00
		Sediment	.00	2.4	1.9	.00	.00	.00	.00	.00	.00	--	--	--
<u>Line 23 site 2. Hynes Bay</u>														
June 13	1645	Water	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.03
		Sediment	.00	2.4	1.8	2.0	.00	.00	.00	.00	.00	--	--	--
Aug. 12	1510	Water	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00
		Sediment	.00	.85	1.5	.00	.00	.00	.00	.00	.00	--	--	--

Mission-Aransas Estuary

The Mission-Aransas estuary covers an area of about 140 square miles and consists of the tidal parts of Mission River, Aransas River, Copano Creek and other tributaries; Mission Bay, Copano Bay, Aransas Bay, St. Charles Bay, parts of the Intracoastal Waterway, Lydia Ann Channel, and Aransas Pass (Figure 19).

Water depth at mlw is less than 2 feet in Mission Bay, less than 8 feet in Copano Bay, less than 13 feet in

Aransas Bay, less than 5 feet in St. Charles Bay, about 15 feet in the Intracoastal Waterway, about 20 feet in the Lydia Ann Channel, and more than 40 feet in Aransas Pass.

No water-quality data for the Mission-Aransas estuary were collected during the 1969 water year, but the locations of sites previously established for data collection are shown on Figure 19.



EXPLANATION

— 12 or • 8 Data-collection range-line number

— 2 — Data-collection site number

Figure 19
Data-Collection Sites in the Mission-Aransas Estuary

Base by US Geological Survey, 1956

Nueces Estuary

The Nueces estuary covers an area of about 180 square miles and consists of the tidal parts of the Nueces River and other tributaries; Nueces Bay, Tule Lake Channel, Corpus Christi Bay, Aransas Pass, and parts of the Intracoastal Waterway (Figure 20).

Water depth at mlw is less than 13 feet in Corpus Christi Bay; less than 3 feet in Nueces Bay; more than 40

feet in Aransas Pass, Corpus Christi Ship Channel, and Tule Lake Channel; and about 15 feet in the Intracoastal Waterway.

Water-quality data for the estuary (Table 6) were collected during March and September at most of the sites shown on Figure 20.



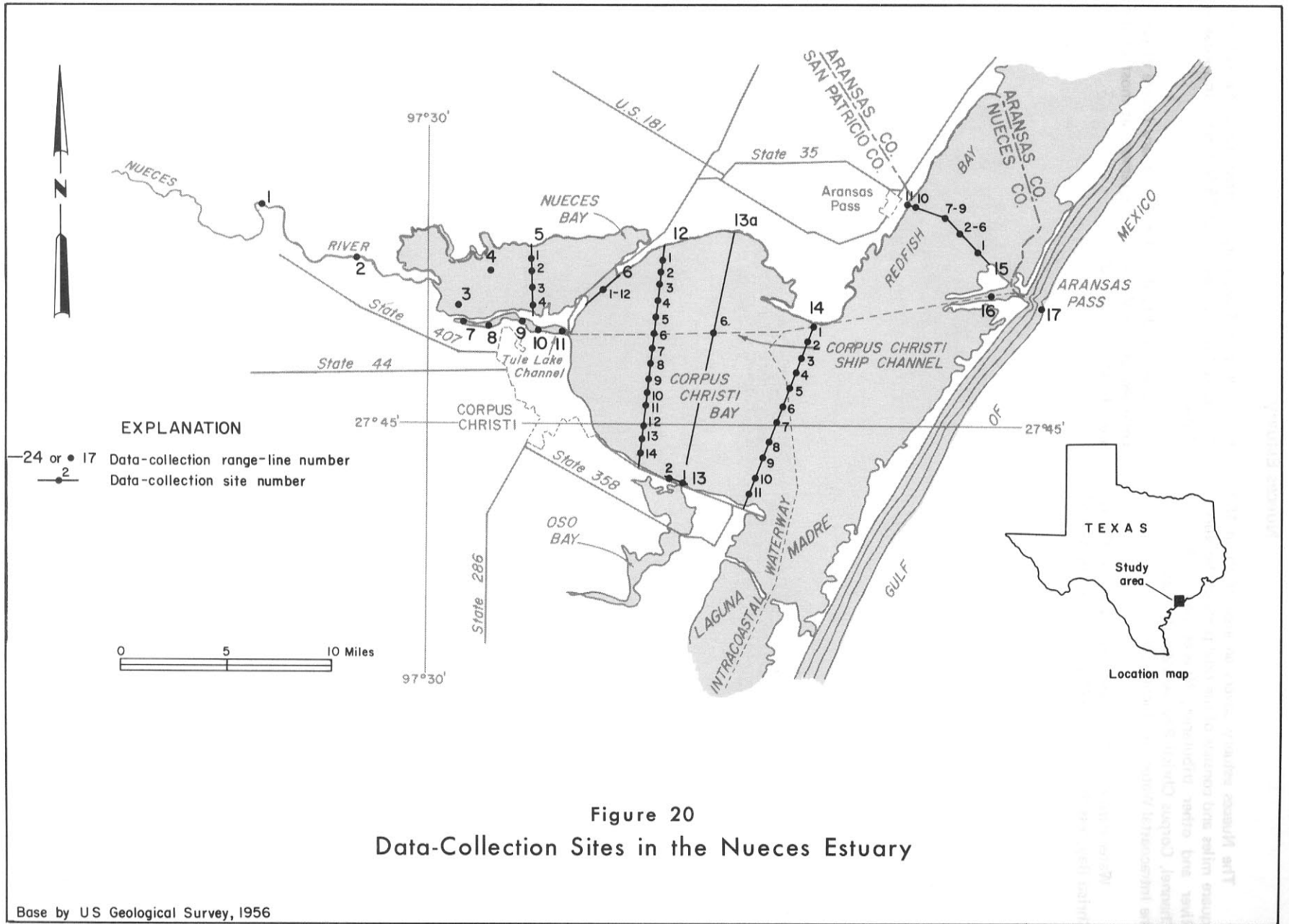


Figure 20
Data-Collection Sites in the Nueces Estuary

Table 6A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE NUECES ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)				
								Concentration	Percent saturation												
<u>Line 1. Nueces River</u>																					
Mar. 25	1315	2	1	1,500	7.8	19.2	--	8.6	92	2.5	--	17	0.0	QN	QN	0.07	0.12				
			5	1,300	7.8	18.2	--	8.2	86	--	--	--	--	--	--	--	--	--			
			7	2,200	7.6	18.7	--	7.0	75	--	--	--	--	--	--	--	--	--	--		
			10	5,500	7.1	17.2	--	2.0	21	--	--	--	--	--	--	--	--	--	--		
			11	6,300	7.0	17.5	--	1.5	16	--	--	--	--	--	--	--	--	--	--		
			12	11,000	6.8	17.1	--	.5	5	--	--	--	--	--	--	--	--	--	--		
			13	14,000	6.6	17.2	--	.0	0	--	--	--	--	--	--	--	--	--	--		
			14	29,000	6.4	17.6	--	.0	0	1.3	--	--	32	.2	QN	QN	.32	.32			
			Do.	1450	2	1	1,300	8.0	21	41	7.9	88	--	--	--	--	--	--	--	--	
						5	1,600	8.0	20	--	7.1	77	--	--	--	--	--	--	--	--	
						10	5,200	7.2	19	--	2.0	22	--	--	--	--	--	--	--	--	--
						14	31,000	6.4	19	--	.0	0	--	--	--	--	--	--	--	--	--
			<u>Line 4. Nueces Bay</u>																		
			Mar. 26	1215	2	1	40,000	8.1	18	20	7.9	96	--	--	--	--	--	--	--	--	
<u>Line 5. Nueces Bay</u>																					
Mar. 26	1125	2	1	40,000	8.1	17	--	7.6	92	--	--	--	--	--	--	--	--				
			2	40,000	8.1	17	--	8.1	98	2.2	--	2.9	.0	QN	QN	.02	.06				
Do.	1115	3	2	44,000	8.1	17	25	7.8	96	--	--	--	--	--	--	--					
Do.	1105	4	1	44,000	8.2	18	--	7.2	90	2.2	--	2.6	.0	QN	QN	.05	.08				
Do.	1050	5	1	44,000	8.2	21	23	7.1	95	--	--	--	--	--	--	--					
<u>Line 6. Nueces Bay</u>																					
Mar. 26	0830	6	1	42,000	8.0	17	--	6.5	79	--	--	--	--	--	--	--	--				
			10	42,000	8.0	18	--	6.2	77	2.0	--	2.2	.0	QN	QN	.03	.04				
Do.	0900	12	1	44,000	8.1	17	28	6.8	84	--	--	--	--	--	--	--	--				
			8	44,000	8.1	17	--	6.9	85	2.2	--	2.2	.0	QN	QN	.07	.08				
Sept. 18	1345	8	1	54,000	8.1	30.4	42	6.4	107	2.1	--	.4	.1	QN	QN	.03	.05				
			5	54,000	8.1	29.9	--	5.9	98	--	--	--	--	--	--	--	--				
			10	57,000	8.0	29.3	--	4.3	70	--	--	--	--	--	--	--	--				
			15	57,000	8.0	29.2	--	3.8	62	1.9	--	1.9	.0	QN	QN	.04	.08				
Do.	1410	12	1	54,000	8.2	30.9	65	7.0	119	--	--	--	--	--	--	--	--				
			5	54,000	8.2	30.3	--	6.6	110	--	--	--	--	--	--	--	--				
			8	54,000	8.2	30.5	--	6.9	115	--	--	--	--	--	--	--	--				
<u>Line 7. Tule Channel</u>																					
Mar. 25	1040	1	1	44,000	8.4	17.1	--	7.3	90	7.9	--	2.0	.0	QN	QN	.19	.30				
			5	44,000	8.4	17.1	--	7.4	91	--	--	--	--	--	--	--	--				
			10	44,000	8.4	17.0	--	7.1	88	--	--	--	--	--	--	--	--				
			15	44,000	8.4	16.9	--	7.2	89	--	--	--	--	--	--	--	--				
			20	44,000	8.4	16.9	--	7.6	94	--	--	--	--	--	--	--	--				
			28.5	44,000	8.3	16.9	--	7.8	96	--	--	--	--	--	--	--	--				
			Sept. 18	0930	2	1	53,000	7.3	30.2	94	.0	0	3.8	--	2.0	.0	QN	QN	.20	.23	
6	53,000	7.3	29.8	--	.0	0	--	--	--	--	--	--	--	--	--						
8	53,000	7.3	29.8	--	.0	0	--	--	--	--	--	--	--	--	--						
10	53,000	7.3	29.8	--	.0	0	--	--	--	--	--	--	--	--	--						
20	52,000	7.3	29.6	--	.0	0	--	--	--	--	--	--	--	--	--						
30	52,000	7.2	29.6	--	.0	0	--	--	--	--	--	--	--	--	--						
40	52,000	7.3	29.4	--	.0	0	3.6	--	--	2.0	.0	QN	QN	.23	.25						
<u>Line 9. Tule Channel</u>																					
Sept. 18	1015	2	1	54,000	7.4	30.2	112	.6	10	--	--	--	--	--	--	--	--				
			5	54,000	7.4	29.9	--	.6	10	--	--	--	--	--	--	--	--				
			10	54,000	7.4	29.9	--	.4	7	--	--	--	--	--	--	--	--				
			15	54,000	7.3	29.8	--	.5	8	--	--	--	--	--	--	--	--				
			20	54,000	7.3	29.7	--	1.4	23	--	--	--	--	--	--	--	--				
			25	54,000	7.2	29.3	--	.0	0	--	--	--	--	--	--	--	--				
			35	54,000	7.4	28.9	--	.0	0	--	--	--	--	--	--	--	--				

See footnotes at end of table.

Table 6A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE NUECES ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
<u>Line 10. Tule Channel</u>																		
Mar. 25	1120	2	1	44,000	8.4	17.0	--	7.6	94	--	--	--	--	--	--	--	--	
			10	44,000	8.5	17.0	--	7.1	88	--	--	--	--	--	--	--	--	--
			20	44,000	8.4	17.0	--	7.0	86	--	--	--	--	--	--	--	--	--
			30	45,000	8.4	17.1	--	7.1	88	--	--	--	--	--	--	--	--	--
			45.5	45,000	8.4	17.0	--	7.0	86	--	--	--	--	--	--	--	--	--
Sept. 18	1035	2	1	53,000	7.6	29.7	122	3.8	62	--	--	--	--	--	--	--	--	
			5	53,000	7.6	29.7	--	3.7	61	--	--	--	--	--	--	--	--	
			10	53,000	7.6	29.6	--	3.1	51	--	--	--	--	--	--	--	--	
			20	54,000	7.6	29.6	--	2.6	43	--	--	--	--	--	--	--	--	
			30	56,000	7.5	29.3	--	.9	15	--	--	--	--	--	--	--	--	
			41	56,000	7.5	28.8	--	.0	0	--	--	--	--	--	--	--	--	
<u>Line 11. Tule Channel</u>																		
Sept. 18	1050	2	1	54,000	8.0	29.8	122	4.4	73	2.2	--	1.2	0.0	QN	QN	0.08	0.13	
			5	54,000	8.0	29.7	--	4.4	73	--	--	--	--	--	--	--	--	
			10	54,000	8.0	29.7	--	4.2	70	--	--	--	--	--	--	--	--	
			20	54,000	8.0	29.7	--	4.2	70	--	--	--	--	--	--	--	--	
			30	54,000	7.9	29.7	--	4.2	70	--	--	--	--	--	--	--	--	
40	54,000	7.8	29.6	--	4.0	67	1.7	--	--	1.8	.0	QN	QN	.05	.08			
<u>Line 12. Corpus Christi Bay</u>																		
Mar. 25	1245	2	1	42,000	8.5	17.2	--	7.8	95	--	--	--	--	--	--	--	--	
			5	42,000	8.5	17.1	--	7.1	87	--	--	--	--	--	--	--		
			12	42,000	8.5	17.0	--	7.9	96	--	--	--	--	--	--			
Do.	1330	6	1	45,000	8.5	17.1	--	7.6	94	3.3	--	1.5	.0	QN	QN	.04	.07	
			5	44,000	8.6	17.0	--	7.4	91	--	--	--	--	--	--			
			20	44,000	8.5	16.9	--	7.6	94	--	--	--	--	--	--			
Do.	12	12	1	45,000	8.5	16.8	--	7.7	95	3.2	--	.9	.0	QN	QN	.04	.07	
			5	44,000	8.5	17.6	--	7.9	99	--	--	--	--	--	--			
			13	45,000	8.5	17.6	--	7.8	98	--	--	--	--	--	--			
Mar. 26	1515	6	1	42,000	8.4	16.6	33	7.1	87	--	--	--	--	--	--	--		
			30	44,000	8.4	16.4	--	7.4	89	--	--	--	--	--	--			
Sept. 18	1130	3	1	53,000	8.1	29.4	78	6.4	102	--	--	--	--	--	--	--		
			5	53,000	8.1	29.1	--	6.1	97	--	--	--	--	--	--			
			10	53,000	8.1	29.1	--	5.3	84	--	--	--	--	--	--			
			12	54,000	8.0	29.0	--	3.4	55	--	--	--	--	--				
Do.	1145	6	1	53,000	8.1	29.5	69	6.4	105	2.2	--	.9	.0	QN	QN	.02	.05	
			5	53,000	8.1	29.5	--	6.4	105	--	--	--	--	--	--			
			10	53,000	8.1	29.4	--	5.6	89	--	--	--	--	--	--			
			20	53,000	8.1	29.3	--	4.7	75	--	--	--	--	--	--			
			30	53,000	8.1	29.3	--	4.6	73	--	--	--	--	--	--			
38	53,000	8.0	29.3	--	4.7	75	5.0	--	3.0	.5	QN	QN	.22	.36				
Do.	1210	9	1	54,000	8.1	29.6	67	6.4	107	--	--	--	--	--	--	--		
			5	54,000	8.1	29.4	--	6.3	102	--	--	--	--	--	--			
			13	54,000	8.0	29.2	--	5.5	89	--	--	--	--	--	--			
Do.	1220	14	1	56,000	8.2	29.8	57	6.5	108	--	--	--	--	--	--	--		
			5	56,000	8.1	29.5	--	6.4	107	--	--	--	--	--	--			
			8	56,000	8.1	29.3	--	5.2	84	--	--	--	--	--	--			
			10	56,000	8.1	29.2	--	4.9	79	--	--	--	--	--	--			
			12	56,000	8.1	29.2	--	4.7	76	--	--	--	--	--	--			
<u>Line 13. Corpus Christi Bay</u>																		
Sept. 18	1300	2	1	59,000	8.3	31.6	41	8.1	142	--	--	--	--	--	--	--		
			5	59,000	8.3	31.5	--	8.1	142	--	--	--	--	--	--			
<u>Line 13a. Corpus Christi Bay</u>																		
Sept. 17	1100	6	1	53,000	8.3	29.1	83	8.7	138	--	--	--	--	--	--	--		
			5	54,000	8.3	29.0	--	8.2	132	--	--	--	--	--	--			
			10	56,000	8.3	28.8	--	7.8	126	--	--	--	--	--	--			
			20	56,000	8.3	28.8	--	8.4	136	--	--	--	--	--	--			
			30	56,000	8.3	28.8	--	8.7	140	--	--	--	--	--	--			
39	56,000	8.3	28.9	--	9.5	153	--	--	--	--	--	--						

See footnotes at end of table.

Table 6A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE NUCES ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
<u>Line 14. Corpus Christi Bay</u>																		
Mar. 26	1205	1	1	44,000	8.4	16.5	104	7.1	86	2.5	--	0.8	0.0	QN	QN	0.03	0.04	
			10	44,000	8.4	16.4		7.3	88	--	--	--	--	--	--	--	--	--
			30	44,000	8.4	16.4		7.2	87	2.7	--	1.0	.0	QN	QN	.05	.09	
Do.	1230	4	1	44,000	8.4	16.8	38	7.0	86	--	--	--	--	--	--	--	--	
			5	44,000	8.4	16.8		7.5	93	--	--	--	--	--	--	--	--	
			13	44,000	8.4	16.6		7.4	91	--	--	--	--	--	--	--	--	
Do.	1255	7	1	45,000	8.5	16.6	51	7.5	93	4.2	--	1.5	.0	QN	QN	.03	.05	
			13	44,000	8.5	16.5		7.4	89	2.7	--	1.2	.0	QN	QN	.04	.05	
Do.	1320	10	1	44,000	8.4	16.6	135	7.5	93	--	--	--	--	--	--	--	--	
			13.5	44,000	8.5	16.5		7.5	90	--	--	--	--	--	--	--	--	
Sept. 17	1120	1	1	52,000	8.3	29.4	98	8.2	130	.7	--	.2	.0	QN	QN	.01	.02	
			5	52,000	8.3	29.1		8.0	127	--	--	--	--	--	--	--	--	
			10	52,000	8.3	29.1		7.5	119	--	--	--	--	--	--	--	--	
			20	53,000	8.3	29.1		7.4	117	--	--	--	--	--	--	--	--	
			30	54,000	8.3	29.0		7.9	127	--	--	--	--	--	--	--	--	
			44	56,000	8.2	28.9		8.3	134	2.9	--	1.0	.3	QN	QN	.03	.05	
Do.	1035	3	1	56,000	8.4	29.2	87	9.9	160	--	--	--	--	--	--	--	--	
			5	54,000	8.4	29.1		8.9	144	--	--	--	--	--	--	--	--	
			10	56,000	8.4	29.0		9.0	145	--	--	--	--	--	--	--	--	
			12.5	56,000	8.4	29.0		8.9	144	--	--	--	--	--	--	--	--	
Do.	1000	6	1	57,000	8.4	28.9	65	9.0	148	1.0	--	2.0	.0	QN	QN	.05	.05	
			5	56,000	8.4	28.9		7.7	124	--	--	--	--	--	--	--	--	
			10	57,000	8.4	28.9		7.2	118	--	--	--	--	--	--	--	--	
			13.5	57,000	8.4	28.8		7.4	121	2.3	--	2.6	.2	QN	QN	.05	.07	
Do.	0945	9	1	57,000	8.4	29.5	88	7.1	120	--	--	--	--	--	--	--	--	
			5	57,000	8.4	29.5		7.2	122	--	--	--	--	--	--	--	--	
			10	59,000	8.5	29.5		7.9	134	--	--	--	--	--	--	--	--	
			14	60,000	8.5	29.2		7.4	121	--	--	--	--	--	--	--	--	
<u>Line 15. Aransas Pass</u>																		
Mar. 26	1100	8	1	32,000	8.5	15.3	81	8.6	96	--	--	--	--	--	--	--	--	
			5	33,000	8.5	15.2		8.5	96	--	--	--	--	--	--	--	--	
			9	34,000	8.5	15.3		8.3	93	--	--	--	--	--	--	--	--	
Do.	1130	10	1	32,000	8.6	15.8	145	7.6	85	1.8	--	2.4	.0	QN	QN	.03	.05	
			5	34,000	8.5	15.9		7.5	85	--	--	--	--	--	--	--	--	
			7	37,000	8.5	15.9		7.4	85	--	--	--	--	--	--	--	--	
			10	42,000	8.5	15.9		7.1	85	--	--	--	--	--	--	--	--	
			18	42,000	8.4	16.0		7.6	90	1.9	--	1.2	.0	QN	QN	.03	.03	
Sept. 17	1345	8	1	45,000	8.3	30.6	--	8.3	134	--	--	--	--	--	--	--	--	
			5	45,000	8.3	30.6		8.4	135	--	--	--	--	--	--	--	--	
			9	45,000	8.3	30.5		8.5	135	--	--	--	--	--	--	--	--	
Do.	1515	10	1	45,000	7.9	31.0	--	5.2	84	.8	--	1.2	.0	QN	QN	.02	.03	
			5	45,000	8.0	31.0		5.2	84	--	--	--	--	--	--	--	--	
			10	45,000	8.0	31.0		5.3	86	--	--	--	--	--	--	--	--	
			16	45,000	8.0	31.0		5.5	89	1.4	--	1.2	.0	QN	QN	.03	.03	
Do.	1410	11	1	45,000	8.3	30.6	94	8.2	132	--	--	--	--	--	--	--	--	
			5	45,000	8.3	30.2		7.7	122	--	--	--	--	--	--	--	--	
			9.5	45,000	8.3	30.3		8.1	129	--	--	--	--	--	--	--	--	
<u>Line 16. Corpus Christi Ship Channel</u>																		
Mar. 26	0915	2	1	34,000	8.5	15.7	--	8.3	94	2.5	--	2.3	.0	QN	QN	.02	.06	
			5	40,000	8.4	16.0		8.5	100	--	--	--	--	--	--	--	--	
			10	42,000	8.4	15.8		7.5	89	--	--	--	--	--	--	--	--	
			30	42,000	8.4	16.1		7.9	94	2.2	--	1.2	.0	QN	QN	.02	.05	
Sept. 17	1155	2	1	47,000	8.2	29.3	91	7.8	122	.5	--	1.0	.0	QN	QN	.02	.02	
			5	47,000	8.2	29.3		7.8	122	--	--	--	--	--	--	--	--	
			10	49,000	8.2	29.2		7.3	116	--	--	--	--	--	--	--	--	
			20	50,000	8.2	29.2		6.9	110	--	--	--	--	--	--	--	--	
			30	52,000	8.3	29.1		6.9	110	--	--	--	--	--	--	--	--	
			40	53,000	8.3	29.1		6.9	110	--	--	--	--	--	--	--	--	
47	52,000	8.3	29.1	7.1	113	2.1	--	1.1	.2	QN	QN	.03	.04					

See footnotes at end of table.

Table 6A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE NUECES ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) 1/	pH	Temperature (°C) 1/	Secchi disk transparency (cm) 1/	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)
								Concentration 1/	Percent saturation								
Line 17. Gulf of Mexico																	
Mar. 26	1045	2	1	44,000	8.4	15.4	39	8.2	98	1.2	--	0.3	0.0	QN	QN	0.01	0.02
			30	45,000	8.4	15.0		8.2	98	1.3	--	.2	.0	QN	QN	.03	.03
Sept. 17	1225	2	1	45,000	8.2	30.1	172	8.7	138	1.4	--	.2	.0	QN	QN	.01	.02
			5	45,000	8.2	29.7		8.6	136	--	--	--	--	--	--	--	
			10	45,000	8.2	29.4		7.3	114	--	--	--	--	--	--	--	
			20	47,000	8.2	29.2		6.7	105	--	--	--	--	--	--	--	
			30	49,000	8.1	29.2		6.7	106	--	--	--	--	--	--	--	
			36	59,000	8.1	29.2		7.3	116	2.4	--	1.5	.2	QN	QN	.03	.04

1/ Determined at data-collection site.
QN means qualitative test negative.

Table 6B.--CHEMICAL ANALYSES OF WATER FROM THE NUECES ESTUARY, 1969 WATER YEAR

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 1. Nueces River</u>															
Mar. 25	1325	2	1	1,310	77	19	169		200	74	280	735	272	108	--
			14	29,800	1,030	761	4,450		344	1,630	9,500	17,600	5,700	5,420	1.009
<u>Line 6. Nueces Bay</u>															
Mar. 26	0830	6	10	41,800	420	956	7,370		155	2,170	13,200	24,200	4,980	4,850	1.015
do	0900	12	8	43,300	402	972	7,760		164	2,190	13,800	25,200	5,000	4,870	1.015
Sept. 18	1345	8	15	59,100	628	1,520	12,100		150	3,020	21,900	39,300	7,800	7,680	--
<u>Line 12. Corpus Christi Bay</u>															
Sept. 18	1145	6	38	56,600	502	1,450	11,600		154	2,900	20,800	37,300	7,200	7,070	--
<u>Line 14. Corpus Christi Bay</u>															
Sept. 17	1000	6	13.5	57,700	505	1,470	12,000		170	3,000	21,300	38,400	7,300	7,160	--
<u>Line 16. Corpus Christi Ship Channel</u>															
Sept. 17	1155	2	47	53,500	452	1,380	11,000		158	2,750	19,700	35,400	6,800	6,670	--
<u>Line 17. Gulf of Mexico</u>															
Sept. 17	1225	2	1	47,200	365	1,190	9,140		145	2,330	16,400	29,500	5,800	5,680	--
			36	55,700	405	1,240	10,400		147	2,590	18,300	33,000	6,100	5,980	--

a/ Included in sodium-ion concentration.

Table 6C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE NUECES ESTUARY, 1969 WATER YEAR

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Elevation in feet above (+) or below (-) mean sea level	Specific conductance (micromhos at 25°C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F)	Boron (B)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br)	Iodide (I)	Strontium (Sr)	
																				a/
<u>Line 1. Nueces River</u>																				
Mar. 25	1325	2	1	1,310	--	--	--	0.3	--	--	--	--	--	--	--	--	--	--	--	--
			14	29,800	--	--	--	.3	--	--	--	--	--	--	--	--	--	--	--	--
<u>Line 6. Nueces Bay</u>																				
Mar. 26	0830	6	10	41,800	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--	--
do	0900	12	8	43,300	--	--	--	.7	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 18	1345	8	15	59,100	--	--	--	.9	6,200	--	--	--	--	--	--	--	73	0.016	--	--
<u>Line 12. Corpus Christi Bay</u>																				
Sept. 18	1145	6	38	56,600	--	--	--	.8	4,500	--	--	--	--	--	--	--	69	.069	--	--
<u>Line 14. Corpus Christi Bay</u>																				
Sept. 17	1000	6	13.5	57,700	--	--	--	.9	5,300	--	--	--	--	--	--	--	66	.677	--	--
<u>Line 16. Corpus Christi Ship Channel</u>																				
Sept. 17	1155	2	47	53,500	--	--	--	.8	5,400	--	--	--	--	--	--	--	64	.103	--	--
<u>Line 17. Gulf of Mexico</u>																				
Sept. 17	1225	2	1	47,200	0	0	140	.8	4,600	0	21	7	30			0	51	.042	6,400	
			36	55,700	30	0	160	.8	5,000	0	16	2	60			0	61	.042	7,000	

a/ Results in milligrams per liter.

Laguna Madre Estuary

The Laguna Madre estuary covers an area of about 640 square miles and consists of the tidal parts of the Arroyo Colorado and other tributaries; upper Laguna Madre, Baffin Bay, lower Laguna Madre, Brownsville Ship Channel, part of the Intracoastal Waterway, Port Mansfield Channel, and Brazos Santiago Pass (Figure 21).

At mlw, upper and lower Laguna Madre and Baffin Bay are generally less than 4 feet deep, but in a few areas

are as much as 10 feet deep. The Intracoastal Waterway, Port Mansfield Channel, and Arroyo Colorado are about 15 feet deep; the Brownsville Ship Channel is about 40 feet deep.

Water-quality data for the estuary (Table 7) were collected during September at sites shown on Figure 21.

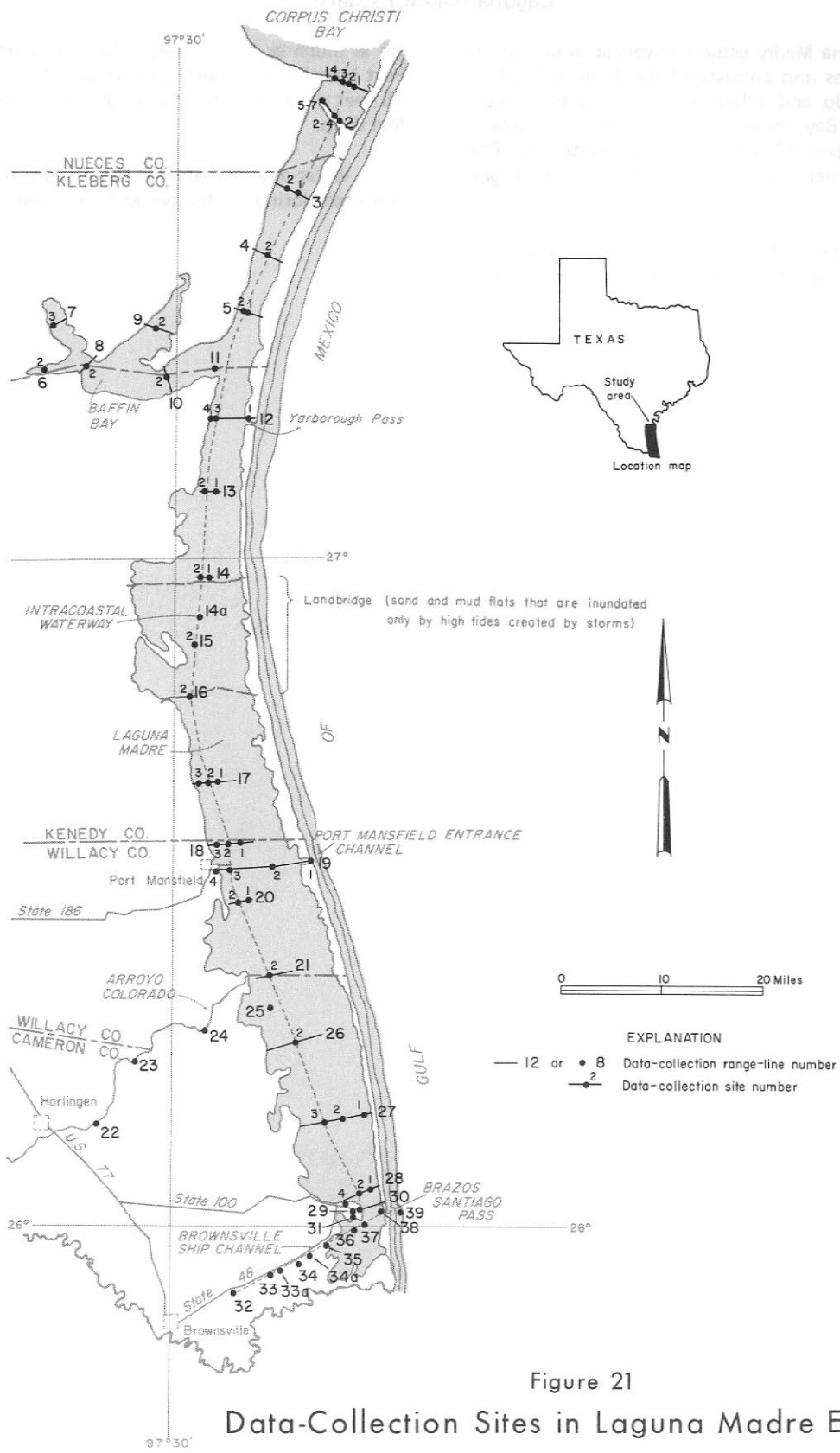


Figure 21
Data-Collection Sites in Laguna Madre Estuary

Base by U.S. Geological Survey, 1956

Table 7A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)		
								Concentration	Percent saturation										
<u>Line 1. Upper Laguna Madre</u>																			
Mar. 26	1410	3	1	45,000	8.4	15.5	145	6.8	82	2.4	--	0.5	0.0	QN	QN	0.02	0.03		
			5	45,000	8.4	15.5		7.1	86	--	--	--	--	--	--	--	--	--	
			10	45,000	8.4	15.5		7.3	88	--	--	--	--	--	--	--	--	--	--
			16	45,000	8.4	15.5		7.3	88	2.7	--	--	.5	.0	QN	QN	.03	.07	
Do.	1345	4	1	45,000	8.5	17.0	82	7.4	91	--	--	--	--	--	--	--	--		
			5	45,000	8.4	16.9		7.8	96	--	--	--	--	--	--	--	--	--	
Sept. 16	1620	3	1	64,000	8.7	31.3	--	8.7	155	4.2	--	2.8	.0	QN	QN	.02	.03		
			5	64,000	8.7	30.8		7.5	134	--	--	--	--	--	--	--	--	--	
			10	64,000	8.7	30.5		6.3	110	--	--	--	--	--	--	--	--	--	
			16	66,000	8.7	30.7		7.4	134	3.5	--	--	3.4	.0	QN	QN	.03	.04	
Do.	1650	4	1	62,000	8.6	30.4	--	8.1	140	--	--	--	--	--	--	--	--		
			4	63,000	8.7	30.7		9.1	162	4.5	--	--	2.9	.0	QN	QN	.02	.03	
Sept. 17	0920	2	1.5	57,000	8.4	28.2	59	7.2	116	--	--	--	--	--	--	--	--		
			Do.	0910	3	1		57,000	8.4	28.4	69	6.6	106	1.6	--	2.5	.0	QN	QN
5	57,000	8.5	28.5			6.7	108	--	--	--		--	--	--	--	--			
13.5	65,000	8.7	29.6			6.7	117	4.5	--	--		3.4	.0	QN	QN	.04	.05		
Do.	0935	4	1	59,000	8.5	28.8	74	7.8	128	--	--	--	--	--	--	--	--		
			5	59,000	8.6	29.0		7.8	128	--	--	--	--	--	--	--	--	--	
<u>Line 2. Upper Laguna Madre</u>																			
Sept. 16	1545	3	1	64,000	8.8	31.4	67	10.5	188	5.0	--	2.0	.0	QN	QN	.02	.03		
			5	64,000	8.8	31.2		11.1	198	--	--	--	--	--	--	--	--	--	
			7	66,000	8.8	31.0		9.6	174	--	--	--	--	--	--	--	--	--	
			10	68,000	8.7	29.7		7.1	129	--	--	--	--	--	--	--	--	--	--
			20	69,000	8.6	29.6		6.4	116	--	--	--	--	--	--	--	--	--	--
			27	69,000	8.6	29.4		7.5	132	6.8	--	--	5.4	.0	QN	QN	.03	--	
Do.	1520	6	1	64,000	8.7	31.5	56	9.9	183	--	--	--	--	--	--	--	--		
			5	64,000	8.7	31.4		10.9	195	--	--	--	--	--	--	--	--		
			10	66,000	8.7	31.0		9.7	176	--	--	--	--	--	--	--	--		
			12.5	66,000	8.6	31.0		9.4	171	--	--	--	--	--	--	--	--		
<u>Line 3. Upper Laguna Madre</u>																			
Sept. 16	1415	1	1	75,000	8.6	30.2	48	7.0	132	8.0	--	6.8	.0	QN	QN	.03	.03		
			5	75,000	8.6	29.9		6.8	128	--	--	--	--	--	--	--	--		
			7	75,000	8.6	29.7		5.7	108	--	--	--	--	--	--	--	--		
			10	75,000	8.5	28.7		3.7	67	--	--	--	--	--	--	--	--		
			14	79,000	8.5	28.5		3.0	54	7.1	--	--	5.7	.1	QN	QN	.04	.04	
Do.	1430	2	1	75,000	8.7	31.4	52	11.4	220	--	--	--	--	--	--	--	--		
			2	75,000	8.7	31.4		11.0	212	8.1	--	--	5.5	.0	QN	QN	.03	.03	
<u>Line 4. Upper Laguna Madre</u>																			
Sept. 16	1345	2	1	75,000	8.5	29.5	50	6.7	126	--	--	--	--	--	--	--	--		
			5	75,000	8.5	29.2		6.2	113	--	--	--	--	--	--	--	--		
			10	73,000	8.5	28.7		4.8	86	--	--	--	--	--	--	--	--		
			15	71,000	8.4	28.7		4.5	79	--	--	--	--	--	--	--	--		
<u>Line 5. Upper Laguna Madre</u>																			
Sept. 16	1320	1	1	75,000	8.7	29.7	48	7.2	136	--	--	--	--	--	--	--	--		
			3	75,000	8.7	29.7		7.4	140	7.9	--	--	4.4	.0	QN	QN	.04	.04	
Do.	1300	2	1	75,000	8.7	29.6	50	6.9	130	8.0	--	7.2	.0	QN	QN	.04	.04		
			5	75,000	8.6	29.4		6.4	116	--	--	--	--	--	--	--	--		
			10	71,000	8.6	28.8		5.1	89	--	--	--	--	--	--	--	--		
			14	71,000	8.6	28.6		3.8	67	8.0	--	--	5.7	.0	QN	QN	.03	.03	
<u>Line 6. Baffin Bay</u>																			
Sept. 15	1615	2	1	75,000	8.5	29.8	29	7.7	145	--	--	--	--	--	--	--	--		
			4	75,000	8.5	29.8		7.6	143	6.6	--	--	11	.0	QN	QN	.06	.06	
<u>Line 7. Baffin Bay</u>																			
Sept. 15	1515	2	1	71,000	8.2	29.9	21	6.5	118	--	--	--	--	--	--	--	--		
			4	71,000	8.2	29.9		5.0	91	4.2	--	--	12	.0	QN	QN	.05	.08	
<u>Line 8. Baffin Bay</u>																			
Sept. 15	1445	2	1	71,000	8.5	29.3	41	6.9	121	7.8	--	10	.0	QN	QN	.06	.08		
			3	71,000	8.6	29.4		7.0	123	--	--	--	--	--	--	--	--		
			6	71,000	8.5	29.3		5.0	88	8.0	--	--	11	.0	QN	QN	.06	.10	

See footnotes at end of table.

Table 7A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) 1/	pH 1/	Temperature (°C) 1/	Secchi disk transparency (cm) 1/	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)				
								Concentration 1/	Percent saturation												
<u>Line 10. Baffin Bay</u>																					
Sept. 15	1415	2	1	68,000	8.6	29.1	33	7.3	128	--	--	--	--	--	--	--	--				
			3	68,000	8.6	29.1		7.2	126	--	--	--	--	--	--	--					
			5	68,000	8.6	29.0		7.0	123	--	--	--	--	--	--	--					
			7	68,000	8.5	28.9		5.4	95	--	--	--	--	--	--	--					
<u>Line 11. Baffin Bay</u>																					
Sept. 15	1340	3	1	65,000	8.8	28.9	33	6.1	103	7.9	--	5.9	0.0	QN	QN	0.05	0.05				
			7.5	66,000	8.8	28.7		6.4	110	7.6	--	6.6	0.0	QN	QN	0.05	0.07				
Sept. 16	1235	3	1	69,000	8.6	29.3	41	8.5	149	--	--	--	--	--	--	--	--				
			3	68,000	8.6	29.2		8.3	146	--	--	--	--	--	--	--					
			5	73,000	8.5	29.1		7.2	128	--	--	--	--	--	--	--					
			8	73,000	8.5	29.8		4.2	78	--	--	--	--	--	--	--					
<u>Line 12. Upper Laguna Madre</u>																					
Sept. 16	1150	1	1	68,000	8.7	29.0	52	7.5	132	7.6	--	3.2	0.0	QN	QN	.02	.04				
			5	73,000	8.7	28.7		7.2	129	--	--	--	--	--	--	--					
			7	73,000	8.6	28.4		4.8	84	--	--	--	--	--	--	--					
			10	79,000	8.2	29.2		0	0	6.9	--	6.2	0.0	QN	QN	.18	.18				
Do.	1140	2	1	65,000	8.7	29.3	61	7.6	129	--	--	--	--	--	--	--	--				
			5	68,000	8.7	28.9		6.9	121	--	--	--	--	--	--	--					
			7	68,000	8.7	28.9		5.9	104	--	--	--	--	--	--	--					
Do.	1115	3	1	65,000	8.7	29.3	65	7.3	124	5.3	--	2.7	0.0	QN	QN	.02	.03				
			3	65,000	8.7	29.2		7.1	120	--	--	--	--	--	--	--					
			5	68,000	8.6	28.8		5.3	93	--	--	--	--	--	--	--					
			10	69,000	8.6	28.8		4.7	82	--	--	--	--	--	--	--					
			16.5	69,000	8.6	28.8		4.5	79	7.1	--	3.8	0.0	QN	QN	.01	.03				
Do.	1125	4	1	62,000	8.7	29.4	69	6.2	107	--	--	--	--	--	--	--	--				
			5.5	68,000	8.7	29.8		5.5	100	--	--	--	--	--	--	--					
<u>Line 13. Land Cut</u>																					
Sept. 11	1620	1	1	66,000	8.8	28.7	47	9.6	166	--	--	--	--	--	--	--	--				
			4	69,000	8.8	29.0		9.9	174	--	--	--	--	--	--	--					
Do.	1610	2	1	69,000	8.8	29.1	65	8.3	146	--	--	--	--	--	--	--	--				
			5	71,000	8.8	29.0		8.2	144	--	--	--	--	--	--	--					
			10	71,000	8.7	29.1		7.5	132	--	--	--	--	--	--	--					
			14	75,000	8.7	28.9		4.6	84	--	--	--	--	--	--	--					
Sept. 16	1040	1	1.5	53,000	8.6	29.1	46	7.9	125	--	--	--	--	--	--	--	--				
			Do.	1050	2	1		53,000	8.6	29.1	90	5.7	90	--	--	--	--	--	--	--	
5	53,000	8.6				28.9	5.5	87	--	--		--	--	--	--						
10	53,000	8.6				28.8	5.5	87	--	--		--	--	--	--						
17	52,000	8.5				28.8	5.1	81	--	--		--	--	--	--						
<u>Line 14. Land Cut</u>																					
Sept. 11	1515	2	1	32,000	8.9	27.4	76	10.1	140	--	--	--	--	--	--	--	--				
			2	48,000	8.8	27.8		9.8	148	--	--	--	--	--	--	--					
			3	54,000	8.8	28.2		9.4	149	--	--	--	--	--	--	--					
			4	60,000	8.8	28.5		9.3	150	--	--	--	--	--	--	--					
			5	66,000	8.7	28.7		8.4	145	--	--	--	--	--	--	--					
			6	68,000	8.7	28.7		8.3	146	--	--	--	--	--	--	--					
			7	69,000	8.7	29.0		7.5	132	--	--	--	--	--	--	--					
			8	69,000	8.7	28.9		7.4	130	--	--	--	--	--	--	--					
			10	71,000	8.7	29.0		7.6	133	--	--	--	--	--	--	--					
			15	73,000	8.7	28.7		8.1	144	--	--	--	--	--	--	--					
			17	73,000	8.6	28.6		9.1	162	--	--	--	--	--	--	--					
			<u>Line 14a. Land Cut</u>																		
			Sept. 11	1505	2	.2		6,000	9.0	27.3	--	8.5	108	--	--	--	--	--	--	--	--
			<u>Line 15. Land Cut</u>																		
			Sept. 11	1430	2	1		16,000	8.9	26.0	65	9.3	119	1.4	--	1.9	.2	QN	QN	.01	.02
						3		18,000	8.9	25.7		9.1	118	--	--	--	--	--	--	--	
						4		25,000	8.9	26.0		8.6	115	--	--	--	--	--	--	--	
5	33,000	8.9				26.5	8.3	115	--	--		--	--	--	--	--					
6	50,000	8.8				27.3	7.5	114	--	--		--	--	--	--	--					
7	62,000	8.7				28.2	7.3	118	--	--		--	--	--	--	--					
8	65,000	8.7				28.4	6.7	112	--	--		--	--	--	--	--					
10	68,000	8.7				28.6	6.3	110	--	--		--	--	--	--	--					
17.5	77,000	8.7				29.1	7.0	130	1.8	--		4.0	0.0	QN	QN	.02	.03				

See footnotes at end of table.

Table 7A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
<u>Line 16. Lower Laguna Madre</u>																		
Sept. 11	1400	2	1	12,000	8.9	26.5	57	9.3	118	--	--	--	--	--	--	--	--	
			3	13,000	8.8	26.4		9.9	125	--	--	--	--	--	--	--	--	--
			4	22,000	8.8	26.2		9.4	124	--	--	--	--	--	--	--	--	--
			5	42,000	8.9	26.2		9.5	138	--	--	--	--	--	--	--	--	--
			7.5	62,000	8.7	27.4		6.9	111	--	--	--	--	--	--	--	--	--
			16	73,000	8.8	28.3		6.8	119	--	--	--	--	--	--	--	--	--
			16	73,000	8.8	28.6	5.9	107	--	--	--	--	--	--	--	--		
<u>Line 17. Lower Laguna Madre</u>																		
Sept. 11	1300	1	1	64,000	8.6	28.2	77	7.7	128	3.5	--	4.6	0.0	QN	QN	0.01	0.03	
			3	64,000	8.6	28.2		8.1	135	3.8	--	4.7	0.0	QN	QN	0.04	0.07	
Do.	1240	2	1	66,000	8.7	29.4	69	7.0	121	--	--	--	--	--	--	--	--	
			5	68,000	8.7	29.4		5.7	100	--	--	--	--	--	--	--		
			13.5	73,000	8.6	29.6		5.8	107	2.5	--	4.2	0.0	QN	QN	0.02	0.05	
Do.	1310	3	1	66,000	8.7	29.1	122	6.8	117	--	--	--	--	--	--	--	--	
			4	66,000	8.7	29.1		7.0	121	--	--	--	--	--	--	--		
			4	66,000	8.7	29.1	8.6	148	0.8	--	2.5	0.0	QN	QN	0.02	0.04		
<u>Line 18. Lower Laguna Madre</u>																		
Sept. 11	1155	1	1	66,000	8.4	28.4	76	5.4	92	--	--	--	--	--	--	--	--	
			1	66,000	8.4	28.2		5.8	98	--	--	--	--	--	--	--		
			3	66,000	8.4	28.2		7.6	129	--	--	--	--	--	--	--		
Do.	1145	2	1	65,000	8.5	29.2	67	6.5	110	--	--	--	--	--	--	--	--	
			5	65,000	8.5	29.2		6.5	110	--	--	--	--	--	--	--		
			12	68,000	8.5	29.4		4.7	82	--	--	--	--	--	--	--		
Do.	1215	3	1	59,000	8.4	29.2	112	5.9	94	--	--	--	--	--	--	--	--	
			4.5	60,000	8.4	29.1		6.1	100	--	--	--	--	--	--	--		
			4.5	60,000	8.4	28.8	9.1	149	--	--	--	--	--	--	--	--		
<u>Line 19. Lower Laguna Madre</u>																		
Sept. 11	1020	1	1	52,000	8.3	28.9	94	5.7	91	0.8	--	0.8	0.0	QN	QN	0.02	0.04	
			5	52,000	8.3	29.1		5.5	87	--	--	--	--	--	--	--		
			10	53,000	8.3	29.2		5.5	87	--	--	--	--	--	--	--		
			15	53,000	8.3	29.1		5.5	87	0.8	--	0.8	0.0	QN	QN	0.01	0.03	
Do.	1110	2	1	49,000	8.5	28.7	82	6.5	103	--	--	--	--	--	--	--	--	
			5	49,000	8.5	28.5		6.0	92	--	--	--	--	--	--	--		
			10	60,000	8.5	28.5		5.4	87	--	--	--	--	--	--	--		
			19	62,000	8.5	28.6		6.0	100	--	--	--	--	--	--	--		
Do.	0945	3	1	63,000	8.6	28.6	81	4.7	80	2.4	--	3.4	0.0	QN	QN	0.02	0.03	
			5	63,000	8.6	28.6		4.7	80	--	--	--	--	--	--	--		
			10	64,000	8.5	28.8		4.3	73	--	--	--	--	--	--	--		
			15	66,000	8.5	29.2		3.8	66	2.7	--	3.8	0.0	QN	QN	0.03	0.04	
Do.	0920	4	1	54,000	8.4	28.0	51	5.4	86	1.7	--	3.3	0.0	QN	QN	0.02	0.04	
			5	53,000	8.5	28.0		5.3	83	--	--	--	--	--	--	--		
			10	49,000	8.5	29.3		4.9	78	--	--	--	--	--	--	--		
			16.5	63,000	8.4	29.7		1.5	26	--	--	--	--	--	--	--		
			16.5	66,000	7.6	28.6		0.0	0	7.9	--	8.6	0.0	QN	QN	0.12	0.15	
<u>Line 20. Lower Laguna Madre</u>																		
Sept. 11	1125	4	1	59,000	8.5	28.6	98	6.1	100	--	--	--	--	--	--	--	--	
			5	60,000	8.5	28.7		6.1	100	--	--	--	--	--	--	--		
			13	62,000	8.5	29.0		5.6	93	--	--	--	--	--	--	--		
<u>Line 21. Lower Laguna Madre</u>																		
Sept. 10	1035	2	1	54,000	8.1	28.6	51	4.0	65	--	--	--	--	--	--	--	--	
			5	54,000	8.1	28.7		4.2	68	--	--	--	--	--	--	--		
			10	56,000	8.1	28.7		4.4	71	--	--	--	--	--	--	--		
			16	56,000	8.1	28.7		4.6	74	--	--	--	--	--	--	--		
<u>Line 22. Arroyo Colorado</u>																		
Sept. 10	1340	2	1	5,500	7.8	31.0	41	10.5	144	5.2	20	25	0.6	QN	0.12	0.62	0.62	
			2	5,500	7.8	30.7		11.0	151	--	--	--	--	--	--	--		
			3	5,400	7.7	30.2		8.8	119	--	--	--	--	--	--	--		
			4	5,500	7.5	29.5		6.2	84	--	--	--	--	--	--	--		
			5	5,800	7.4	28.9		3.2	42	--	--	--	--	--	--	--		
			6	7,500	7.4	28.8		1.5	20	--	--	--	--	--	--	--		
			7	32,000	6.9	28.9		0.1	1	--	--	--	--	--	--	--		
			8	40,000	6.9	28.4		0.3	4	--	--	--	--	--	--	--		
			10	44,000	6.8	28.1		0.4	6	7.0	--	33	0.0	13	QN	3.6	3.6	

See footnotes at end of table.

Table 7A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)				
								Concentration	Percent saturation												
<u>Line 23. Arroyo Colorado</u>																					
Sept. 10	1300	2	1	13,000	8.6	31.2	39	18.7	262	--	--	--	--	--	--	--	--				
			2	11,000	8.6	31.4		17.8	244	--	--	--	--	--	--	--	--	--			
			3	11,000	8.5	31.4		17.8	244	--	--	--	--	--	--	--	--	--			
			4	11,000	8.5	31.0		16.6	228	--	--	--	--	--	--	--	--	--			
			5	12,000	8.2	30.4		7.5	103	--	--	--	--	--	--	--	--	--			
			6	27,000	7.3	29.7		.1	1	--	--	--	--	--	--	--	--	--			
			8	45,000	7.6	29.4		.0	0	--	--	--	--	--	--	--	--	--			
			10	52,000	7.9	29.4		.0	0	--	--	--	--	--	--	--	--	--			
			15.5	57,000	7.6	29.4		.0	0	--	--	--	--	--	--	--	--	--			
			<u>Line 24. Arroyo Colorado</u>																		
Sept. 10	1220	2	1	23,000	8.4	30.5	60	8.8	126	--	--	--	--	--	--	--	--				
			3	22,000	8.4	30.4		8.4	120	--	--	--	--	--	--	--	--				
			5	23,000	8.3	30.2		5.8	83	--	--	--	--	--	--	--	--				
			6	28,000	8.1	30.2		.5	7	--	--	--	--	--	--	--	--				
			7	52,000	8.1	29.5		.0	0	--	--	--	--	--	--	--	--				
			10	57,000	8.1	29.6		.3	5	--	--	--	--	--	--	--	--				
			15	57,000	8.0	29.3		.3	5	--	--	--	--	--	--	--	--				
			18	59,000	7.7	29.0		.3	5	--	--	--	--	--	--	--	--				
			<u>Line 25. Arroyo Colorado</u>																		
			Sept. 10	1055	2	1		28,000	8.3	29.9	48	9.2	133	5.4	--	15	0.0	QN	QN	0.13	0.20
3	28,000	8.2				29.8	7.3	106	--	--		--	--	--	--	--					
4	30,000	8.2				29.8	4.6	68	--	--		--	--	--	--	--					
5	50,000	8.1				29.5	2.6	42	--	--		--	--	--	--	--					
10	56,000	8.1				29.6	3.4	57	--	--		--	--	--	--	--					
16	59,000	8.0				29.6	3.9	63	2.5	--		4.0	.0	QN	QN	.01	.08				
<u>Line 26. Lower Laguna Madre</u>																					
Sept. 10	1005	2	1	53,000	8.2	28.9	81	4.9	78	--	--	--	--	--	--	--					
			5	53,000	8.2	28.7		4.4	70	--	--	--	--	--	--						
			10	54,000	8.2	28.7		3.8	61	--	--	--	--	--	--						
			14.5	54,000	8.2	28.7		4.4	71	--	--	--	--	--	--						
<u>Line 27. Lower Laguna Madre</u>																					
Sept. 10	0855	1	1	59,000	8.1	29.3	100	4.4	72	--	--	--	--	--	--	--					
			3	59,000	8.0	29.3		5.1	84	1.8	--	.3	.0	QN	QN	.01	.04				
Do.	0835	2	1	62,000	8.4	29.3	119	5.6	93	--	--	--	--	--	--						
			4	62,000	8.4	29.4		6.2	103	1.2	--	.6	.0	QN	QN	.01	.03				
Do.	0815	3	1	62,000	8.4	29.8	47	6.9	131	1.8	--	1.8	.0	QN	QN	.01	.04				
			3	63,000	8.4	29.8		6.7	118	--	--	--	--	--	--						
			5	63,000	8.4	29.7		6.6	116	--	--	--	--	--	--						
			10	63,000	8.4	29.5		6.3	110	--	--	--	--	--	--						
			14.5	65,000	8.4	29.4		6.4	108	3.5	--	2.2	.0	QN	QN	.01	.04				
<u>Line 28. Lower Laguna Madre</u>																					
Sept. 9	0900	1	1	56,000	7.7	29.5	99	4.5	75	--	--	--	--	--	--	--					
			2.5	56,000	7.8	29.3		4.8	78	--	--	--	--	--	--						
Do.	0850	2	1	54,000	7.7	29.1	131	5.2	85	--	--	--	--	--	--	--					
			3	54,000	7.7	29.1		5.2	85	--	--	--	--	--	--						
			5	54,000	7.7	29.1		5.2	85	--	--	--	--	--	--						
			10	54,000	7.7	29.1		5.2	85	--	--	--	--	--	--						
			14	56,000	7.7	29.0		5.2	85	--	--	--	--	--	--						
Do.	0835	4	1	56,000	7.8	29.6	47	5.0	83	--	--	--	--	--	--						
			3	56,000	7.8	29.6		5.0	83	--	--	--	--	--							
			6.5	59,000	7.8	29.6		5.2	88	--	--	--	--	--							
Sept. 10	0740	2	1	56,000	8.1	29.8	156	6.0	100	--	--	--	--	--	--						
			5	56,000	8.0	29.8		6.0	100	--	--	--	--	--							
			10	56,000	8.0	29.8		6.2	103	--	--	--	--	--							
			13.5	56,000	8.0	29.8		6.4	107	--	--	--	--	--							
<u>Line 29. Industrial Channel</u>																					
Sept. 9	1110	2	1	57,000	7.8	30.5	42	6.1	103	1.3	--	.7	.0	QN	QN	.01	.05				
			5	57,000	7.8	30.4		5.9	100	--	--	--	--	--	--						
			10	57,000	7.8	30.3		5.7	97	--	--	--	--	--	--						
			13.5	57,000	7.8	30.3		5.6	95	1.6	--	.8	.0	QN	QN	.02	.06				

See footnotes at end of table.

Table 7A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C)	pH	Temperature (°C)	Secchi disk transparency (cm)	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Nitrate nitrogen (N)	Ammonia nitrogen (N)	Nitrite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration	Percent saturation									
<u>Line 30. Industrial Channel</u>																		
Sept. 9	1100	2	1	57,000	7.9	30.7	86	5.4	93	--	--	--	--	--	--	--	--	
			5	57,000	7.9	30.7		5.5	95	--	--	--	--	--	--	--	--	--
			10	57,000	7.9	30.7		5.5	95	--	--	--	--	--	--	--	--	--
			20	57,000	7.9	30.7		5.4	93	--	--	--	--	--	--	--	--	--
<u>Line 31. Industrial Channel</u>																		
Sept. 9	1045	2	1	56,000	7.9	30.9	95	5.4	92	--	--	--	--	--	--	--	--	
			5	56,000	7.9	30.8		5.4	92	--	--	--	--	--	--	--	--	
			10	56,000	7.8	30.7		5.4	92	--	--	--	--	--	--	--	--	
			20	56,000	7.8	30.6		5.2	88	--	--	--	--	--	--	--	--	
			30	56,000	7.8	30.6		5.2	88	--	--	--	--	--	--	--	--	
			35.5	57,000	7.8	30.5		5.0	86	--	--	--	--	--	--	--		
<u>Line 32. Brownsville Ship Channel</u>																		
Sept. 9	1400	2	1	52,000	7.7	30.9	--	12.7	211	3.9	--	2.0	0.0	QN	QN	0.02	0.07	
			5	52,000	7.6	30.8		12.4	207	--	--	--	--	--	--	--	--	
			10	52,000	7.6	30.6		11.6	194	--	--	--	--	--	--	--	--	
			12.5	52,000	7.4	30.4		6.5	106	--	--	--	--	--	--	--	--	
			15	53,000	7.4	29.9		4.9	80	--	--	--	--	--	--	--	--	
			20	53,000	7.3	29.6		3.3	56	--	--	--	--	--	--	--	--	
			25	54,000	7.2	29.5		2.0	33	--	--	--	--	--	--	--	--	
			37	56,000	7.2	28.5		.2	0	2.3	--	4.0	.0	QN	QN	.17	.19	
<u>Line 33. Brownsville Ship Channel</u>																		
Sept. 9	1340	2	1	53,000	7.6	30.5	80	9.8	160	--	--	--	--	--	--	--	--	
			5	53,000	7.6	30.3		8.9	144	--	--	--	--	--	--	--		
			10	53,000	7.4	29.7		5.8	95	--	--	--	--	--	--	--		
			15	53,000	7.4	29.6		3.9	64	--	--	--	--	--	--	--		
			20	53,000	7.3	29.6		1.5	25	--	--	--	--	--	--	--		
			30	54,000	7.3	29.6		1.8	30	--	--	--	--	--	--	--		
			35	54,000	7.3	29.6	1.8	30	--	--	--	--	--	--	--			
			41	54,000	7.3	29.5	.8	13	--	--	--	--	--	--	--			
<u>Line 33a. Brownsville Ship Channel</u>																		
Sept. 9	1300	2	1	49,000	6.6	30.2	61	.0	0	7.8	--	4.2	.0	QN	QN	.04	.09	
			2	50,000	7.0	30.2		.0	0	--	--	--	--	--	--	--		
			5	52,000	7.2	30.3		1.6	26	--	--	--	--	--	--	--		
			10	53,000	7.3	29.9		1.7	28	--	--	--	--	--	--	--		
			15	54,000	7.4	29.8		2.4	40	--	--	--	--	--	--	--		
			20	54,000	7.5	29.8	3.4	57	--	--	--	--	--	--				
			30	56,000	7.5	30.2	5.3	88	--	--	--	--	--	--				
<u>Line 34. Brownsville Ship Channel</u>																		
Sept. 9	1220	2	1	53,000	7.4	30.4	66	2.3	38	--	--	--	--	--	--	--	--	
			5	53,000	7.4	30.3		3.1	51	--	--	--	--	--	--	--		
			10	53,000	7.5	29.8		2.9	48	--	--	--	--	--	--	--		
			15	54,000	7.5	29.9		3.8	63	--	--	--	--	--	--	--		
			20	54,000	7.6	30.2		5.0	83	--	--	--	--	--	--	--		
			30	56,000	7.7	30.6		5.3	90	--	--	--	--	--	--	--		
			38	56,000	7.7	30.7	5.3	90	--	--	--	--	--	--				
<u>Line 34a. Brownsville Ship Channel</u>																		
Sept. 9	1240	2	1	53,000	7.5	30.3	81	4.0	66	--	--	--	--	--	--	--	--	
			5	53,000	7.5	30.2		4.5	74	--	--	--	--	--	--	--		
			10	53,000	7.5	29.7		3.9	64	--	--	--	--	--	--	--		
			15	53,000	7.6	29.8		4.8	79	--	--	--	--	--	--	--		
			20	54,000	7.6	30.2		5.3	88	--	--	--	--	--	--	--		
			30	56,000	7.7	30.7	5.3	88	--	--	--	--	--	--				
<u>Line 35. Brownsville Ship Channel</u>																		
Sept. 9	1150	2	1	54,000	7.7	30.2	60	6.4	107	1.2	--	1.3	.0	QN	QN	.01	.04	
			5	54,000	7.7	29.8		6.1	101	--	--	--	--	--	--	--		
			10	54,000	7.7	29.7		5.7	95	--	--	--	--	--	--	--		
			20	56,000	7.8	30.3		5.4	90	--	--	--	--	--	--	--		
			30	56,000	7.8	30.3		5.4	90	--	--	--	--	--	--	--		
			34	56,000	7.8	30.3	5.5	92	.8	--	1.4	.0	QN	QN	.01	.04		

See footnotes at end of table.

Table 7A.--NUTRIENT AND OTHER ENVIRONMENTAL CHARACTERISTICS OF WATER IN THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR--continued

(Results in milligrams per liter except as indicated)

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25° C) l/	pH l/	Temperature (°C) l/	Secchi disk transparency (cm) l/	Dissolved oxygen		Bio-chemical oxygen demand (BOD)	Chemical oxygen demand (COD)	Silica (SiO ₂)	Ni-trate nitrogen (N)	Ammonia nitrogen (N)	Ni-trite nitrogen (N)	Ortho-phosphate as phosphorus (P)	Total phosphorus (P)	
								Concentration l/	Percent saturation									
<u>Line 38. Lower Laguna Madre</u>																		
Sept. 9	1015	2	1	54,000	7.8	29.8	252	5.5	92	0.6	--	0.6	0.0	QN	QN	0.00	0.03	
			5	54,000	7.8	29.8		5.5	92	--	--	--	--	--	--	--	--	--
			10	54,000	7.8	29.8		5.5	92	--	--	--	--	--	--	--	--	--
			20	54,000	7.8	29.7		5.4	90	--	--	--	--	--	--	--	--	--
			30	54,000	7.8	29.7		5.5	92	--	--	--	--	--	--	--	--	--
			38	56,000	7.8	29.7		5.8	97	.8	--	.5	.0	QN	QN	.01	.06	
<u>Line 39. Gulf of Mexico</u>																		
Sept. 9	0935	2	1	56,000	7.7	29.6	455	5.7	95	.6	--	.7	.0	QN	QN	.00	.02	
			5	56,000	7.8	29.5		5.7	95	--	--	--	--	--	--	--	--	
			10	56,000	7.7	29.5		5.7	95	--	--	--	--	--	--	--	--	
			20	56,000	7.7	29.5		5.7	95	--	--	--	--	--	--	--	--	
			30	56,000	7.7	29.5		5.7	95	--	--	--	--	--	--	--	--	
			48	56,000	7.7	29.4		5.6	90	.7	--	.6	.0	QN	QN	.00	.02	

l/ Determined at data-collection site.
QN means qualitative test negative.

Table 7B--CHEMICAL ANALYSES OF WATER FROM THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR

[Results in milligrams per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micromhos at 25° C)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K) a/	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Dissolved solids (calculated)	Hardness as CaCO ₃		Density (g/ml at 20°C)
													Calcium, magnesium	Non-carbonate	
<u>Line 3. Upper Laguna Madre</u>															
Sept. 16	1415	1	14	74,200	650	1,960	15,700		146	4,100	27,900	50,400	9,700	9,580	--
<u>Line 7. Baffin Bay</u>															
Sept. 15	1515	2	4	71,500	645	1,890	15,000		133	4,080	26,700	48,400	9,400	9,290	--
<u>Line 11. Baffin Bay</u>															
Sept. 15	1340	3	7.5	69,900	650	1,820	14,300		158	4,220	25,300	46,400	9,100	8,970	--
<u>Line 12. Upper Laguna Madre</u>															
Sept. 16	1115	3	1	65,200	565	1,680	13,400		129	3,540	23,800	43,100	8,300	8,190	--
<u>Line 15. Land Cut</u>															
Sept. 11	1430	2	1	14,000	155	334	2,530		40	780	4,550	8,370	1,760	1,730	--
			17.5	68,100	560	1,620	14,900		149	3,710	25,800	46,700	8,050	7,930	--
<u>Line 19. Lower Laguna Madre</u>															
Sept. 11	1020	1	15	53,100	402	1,320	10,800		146	2,700	19,100	34,400	6,450	6,330	--
<u>Line 22. Arroyo Colorado</u>															
Sept. 10	1340	2	1	5,270	230	113	771		276	840	1,140	3,260	1,040	814	--
			10	46,300	500	1,130	9,170		708	2,480	16,100	29,800	5,900	5,320	--
<u>Line 25. Arroyo Colorado</u>															
Sept. 10	1055	2	1	27,000	325	649	5,680		209	1,770	9,800	18,300	3,480	3,310	--
			16	57,100	468	1,420	11,800		161	3,030	20,800	37,600	7,000	6,870	--
<u>Line 27. Lower Laguna Madre</u>															
Sept. 10	0815	3	14.5	60,800	465	1,590	12,500		150	3,160	22,300	40,100	7,700	7,580	--
<u>Line 29. Industrial Channel</u>															
Sept. 9	1110	2	13.5	56,200	422	1,410	11,400		149	2,880	20,300	36,500	6,850	6,730	--
<u>Line 32. Brownsville Ship Channel</u>															
Sept. 9	1400	2	37	55,000	422	1,370	11,200		166	2,780	19,800	36,700	6,700	6,560	--
<u>Line 33a. Brownsville Ship Channel</u>															
Sept. 9	1300	2	1	50,200	420	1,240	10,000		198	2,600	17,800	32,200	6,150	5,990	--
<u>Line 39. Gulf of Mexico</u>															
Sept. 9	0935	2	48	55,800	448	1,380	11,300		147	3,000	20,000	36,200	6,800	6,680	--

a/ Included in sodium-ion concentration.

Table 7C.--ANALYSES FOR SELECTED IONS IN WATER FROM THE LAGUNA MADRE ESTUARY, 1969 WATER YEAR

[Results in micrograms per liter, except as indicated]

Date of collection	Time (24 hour)	Site	Depth below water surface (ft)	Specific conductance (micro-mhos at 25°C)	Iron (Fe)	Manganese (Mn)	Lithium (Li)	Fluoride (F) a/	Boron (B)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Bromide (Br) a/	Iodide (I) a/	Strontium (Sr)
<u>Line 3. Upper Laguna Madre</u>																			
Sept. 16	1415	1	1	72,300	0	0	280	--	--	0	12	1	20			0	--	--	12,000
			14	74,200	0	0	280	0.9	6,800	0	11	0	40			0	89	0.240	12,000
<u>Line 7. Baffin Bay</u>																			
Sept. 15	1515	2	4	71,500	0	0	320	1.2	8,100	0	18	4	60			0	94	.250	15,000
<u>Line 11. Baffin Bay</u>																			
Sept. 15	1340	3	7.5	69,600	0	0	240	1.0	7,800	0	7	0	40			0	90	.036	12,000
<u>Line 12. Upper Laguna Madre</u>																			
Sept. 16	1115	3	1	65,200	--	--	--	.9	6,300	--	--	--	--			--	82	.140	--
<u>Line 15. Land Cut</u>																			
Sept. 11	1430	2	1	14,000	0	0	40	.4	920	0	7	3	10			0	14	.040	2,900
			17.5	68,100	0	0	240	1.0	4,500	0	14	5	20			0	87	.150	11,000
<u>Line 19. Lower Laguna Madre</u>																			
Sept. 11	1020	1	1	52,000	0	0	160	--	--	0	35	5	50			0	--	--	7,400
			15	53,100	0	0	160	.9	4,000	0	43	7	40			0	51	.062	7,600
<u>Line 22. Arroyo Colorado</u>																			
Sept. 10	1340	2	1	5,270	10	10	150	.8	1,800	0	4	4	40			0	3.4	.450	5,200
			10	46,300	80	2,100	240	.8	5,300	0	7	2	30			0	45	--	10,000
<u>Line 25. Arroyo Colorado</u>																			
Sept. 10	1055	2	1	27,000	0	0	180	.9	3,000	0	7	2	20			0	26	.420	6,800
			16	57,100	10	0	240	.9	4,800	0	11	4	20			0	47	.074	8,500
<u>Line 27. Lower Laguna Madre</u>																			
Sept. 10	0815	3	1	60,800	20	0	200	--	--	0	13	2	30			0	--	--	9,200
			14.5	60,800	20	0	200	.9	5,200	0	4	5	20			0	43	.056	9,000
<u>Line 29. Industrial Channel</u>																			
Sept. 9	1110	2	13.5	56,200	--	--	--	.9	4,200	--	--	--	--			--	57	.051	--
<u>Line 32. Brownsville Ship Channel</u>																			
Sept. 9	1400	2	37	55,000	--	--	--	.9	4,700	--	--	--	--			--	36	.140	--
<u>Line 33a. Brownsville Ship Channel</u>																			
Sept. 9	1300	2	1	50,200	--	--	--	.9	4,500	--	--	--	--			--	45	.116	--
<u>Line 39. Gulf of Mexico</u>																			
Sept. 9	0935	2	48	55,800	--	--	--	.9	4,600	--	--	--	--			--	45	.056	--

a/ Results in milligrams per liter.