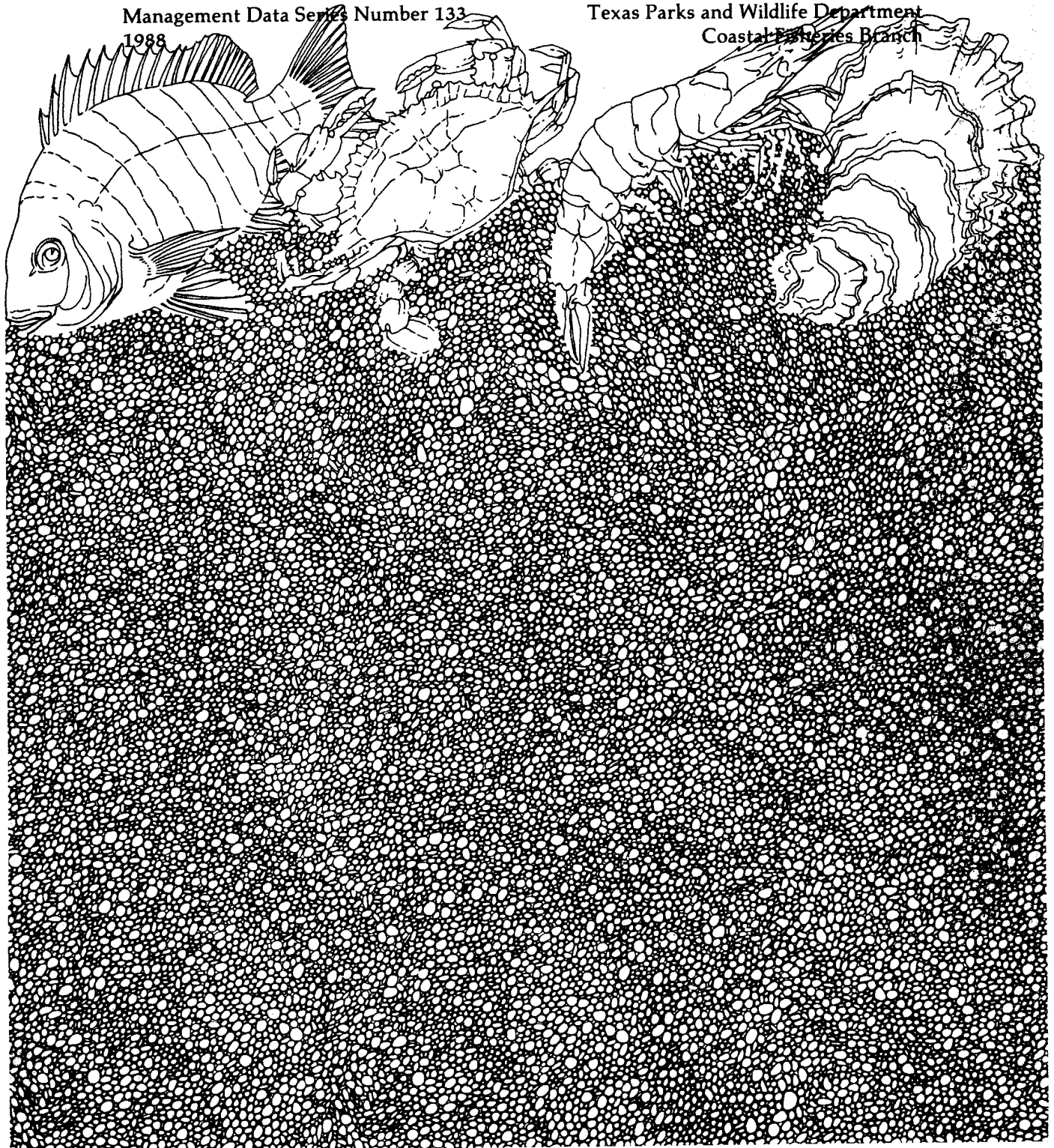


Trends in Relative Abundance of Selected Shellfishes and Finfishes Along the Texas Coast: January 1977-December 1986

by Paul C. Hammerschmidt, Lawrence W. McEachron and Karen L. Meador

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ABSTRACT

Trends in relative abundance and size of brown shrimp (Penaeus aztecus), white shrimp (P. setiferus), pink shrimp (P. duorarum), blue crab (Callinectes sapidus), and Eastern oyster (Crassostrea virginica) in Texas marine waters were monitored using a standardized fishery independent sampling program. Bag seines were used along bay shorelines, trawls in bay water ≥ 1.0 m deep and in the Texas Territorial Sea (gulf water ≥ 1.8 m deep). Oyster dredges were used to sample in bay "reef" and "non-reef" areas. Coastwide brown shrimp catch rates decreased in bag seines and in bay trawls in 1986 following general increases since 1983. Except for 1985, white shrimp catch rates declined in bay trawls during 1982-1986 but doubled in bag seines from 1985. Pink shrimp catch rates increased slightly from 1985 to 1986 in bag seines. Catch rates of blue crabs decreased in bag seines and bay trawls from 1985 to 1986. Catch rates of associated finfishes in trawls varied among years. Highest catches of market oysters occurred during January.

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INTRODUCTION

The Texas commercial fishery is composed of many components but reported landings (weight) are dominated by shrimp (Penaeus sp.) followed by blue crab (Callinectes sapidus), Eastern oyster (Crassostrea virginica), and finfishes (Osburn et al. 1986). During 1977-1985 shrimp coastwide annual reported landings averaged 37 million kg worth \$157 million to the fishermen; they consisted of 75.3% brown (P. aztecus) and pink (P. duorarum) shrimps, 24.5% white shrimp (P. setiferus), and < 0.2% other species. Eastern oyster and blue crab coastwide annual reported landings averaged 1.5 million kg (\$4.9 million) and 3.7 million kg (\$2.4 million), respectively, during 1977-1985.

The shrimp fishery is regulated primarily by the Texas Legislature through the Shrimp Conservation Act. The Texas Parks and Wildlife Commission (TPWC) has the responsibility for adjusting the Gulf of Mexico (gulf) shrimping season dates and has regulatory authority in four of the 18 coastal counties. The TPWC has regulatory authority for the harvest of blue crab in all Texas waters and for the harvest of oysters in 10 of the 18 coastal counties. In 1985, the Texas Legislature provided the TPWC regulatory authority for the harvest of shrimp and oysters in all Texas waters after shrimp and oyster fishery management plans are developed by the Texas Parks and Wildlife Department (TPWD) and approved by the TPWC.

The Texas Legislature mandated that sound management of the shellfish resources be based on statistically reliable data. Penaeid shrimp populations have been monitored in at least some bays since 1958 (Benefield and Baker 1980). Oyster populations have been monitored in Galveston Bay since 1951 (Hofstetter 1977). Blue crab populations have been monitored in Texas bay systems since 1977 (Hammerschmidt 1982). The TPWD initiated a standardized fishery-independent monitoring program in 1975 using gill nets, in 1977 using bag seines, in 1982 using trawls in bays, in 1984 using oyster dredges, and in 1985 using trawls in the gulf to monitor trends and assess the relative abundance and size of shellfishes and finfishes in Texas marine waters.

The TPWD collects information on all species captured in all gears. Finfishes caught in bag seines and gill nets are reported in Rice et al. (1987).

The objectives of this study were to:

1. monitor trends in brown shrimp, white shrimp, pink shrimp, blue crab, and Eastern oyster relative abundance and size in Texas bay systems and in the gulf off Texas, and
2. publish the results in a report which will assist resource managers to effectively manage selected shellfishes.

Differences in the statistics in this report compared to previous versions are due to updating the data base. This report should be considered the most accurate to date.

MATERIALS AND METHODS

Monofilament gill nets and multifilament bag seines were used along shorelines in eight bay systems during April 1983-November 1986 and during October 1977-December 1986, respectively. Bag seine sampling began in Sabine Lake during January 1986 and gill net sampling began in April 1986 (Fig. 1-9). Detailed descriptions of the gears, sample stations, and sample procedures are reported by Rice et al. (1987).

Trawls (6.1 m wide at mouth with 3.8-cm stretched mesh throughout, and doors 1.2 m long and 0.6 m tall) were used in eight bay systems during January 1982-December 1986; Sabine Lake was sampled beginning January 1986 (Fig. 1-8). Bays were stratified into two zones: Zone 1 (upper bay nearest mouths of rivers) and zone 2 (lower bay farthest from rivers). Trawl sites in each zone were randomly selected from bay grids (1-minute longitude by 1-minute latitude) that contained water ≥ 1 m deep in at least 1/3 of the grid and which were known to be free of obstructions. Five stations were sampled in each of zone 1 and zone 2 in each bay system during the 1st-15th and during the 16th-31st of each month except in the upper and lower Laguna Madre systems. In both the upper and lower Laguna Madre systems all water was designated as zone 2. No station was duplicated in a month. Trawls were pulled in a circular motion near the center of each grid. All tows were 10 minutes long.

Trawls, identical to those used in the bays, were used in the Texas Territorial Sea (≤ 16.7 km from shore) during January-December 1986 (Fig. 10). Five gulf areas were selected for sampling: 24.1 km either side of each of the Sabine Pass jetties (Sabine), Galveston jetties (Galveston), Matagorda jetties (Port O'Connor), and Aransas Pass jetties (Port Aransas), and 48.2 km north from the Texas-Mexico border (Port Isabel). The Sabine area was sampled beginning June 1986. Trawl sites in each area were randomly selected from gulf grids that contained water ≥ 1.8 m deep in at least 1/3 of the grid and which also were in the Texas Territorial Sea and free from known obstructions. Eight stations were sampled in each area during the 1st-15th and during the 16th-31st of each month. No station was duplicated in a month. Trawls were pulled linearly and direction of tow (north or south) was randomly chosen for the initial tow and alternated on subsequent tows. All tows were 10 minutes long.

Trawls (12.2 m wide at mouth) were used at night in the gulf off Sabine, Galveston, Port O'Connor, Port Aransas, and Port Mansfield-Port Isabel during 22 June-26 July 1986 in conjunction with the Southeast Area Monitoring and Assessment Program (SEAMAP). Detailed descriptions of the gear, sample stations, and sample procedures are reported by Stuntz et al. (1984).

Oyster dredges [8-tooth Louisiana style: 46 cm wide, 25 cm tall with a 36-cm deep bag (6 bottom rows of linked metal rings 5 cm in diameter; four top rows of 7.6-cm mesh webbing made of 0.8-cm nylon rope)] were used in nine Texas bay systems during January-December 1986 (Fig. 1-9). Each bay was stratified into "reef" (mapped area in which Eastern oysters form reefs and are ≥ 0.2 m higher than adjacent bottom for a continuous distance of ≥ 91.4 m long and 0.4 m wide) and "non-reef" (remaining bay bottom ≥ 1 m deep) areas. Oyster dredge sites in each "reef" and "non-reef" area were randomly selected from bay grids. Each selected grid was divided into 144 5-sec "gridlets". All "gridlets" that contained the respective "reef" or "non-reef" area were used to randomly choose sample sites. During the 1st-15th and 16th-31st of each month, 38 stations (28 "reef"; 10 "non-reef") were sampled in each of Galveston and Aransas Bays; 23 stations (13 "reef"; 10 "non-reef") were sampled in each of East Matagorda, Matagorda, San Antonio, and Corpus Christi Bays; 15 stations (5 "reef"; 10 "non-reef") were sampled in each of Sabine Lake and lower Laguna Madre; and 10 stations (10 "non-reef") in upper Laguna Madre. Stations ("reef" and "non-reef") were duplicated no more than twice each month except in Sabine Lake and lower Laguna Madre where 5 replicate "reef" tows were made in each bay. Dredges were pulled linearly for 30 seconds.

Each sampling week for trawls and oyster dredges extended from sunrise Monday through sunset the following Sunday. Collections were made during day only. Spring SEAMAP collections were made during night only.

Blue crab gill net catch rates were calculated by dividing the total number caught by the total h fished from all samples in a season. Trawl and bag seine catch rates of blue crab, brown shrimp, pink shrimp, and white shrimp were calculated by dividing the total number of each species by the total h fished (trawl) or ha sampled (bag seine) from all samples in a month. Catch rates of associated finfishes caught in trawls were calculated identically to those for shellfishes. Live Eastern oysters were grouped into spat (5-25 mm), small oysters (26-75 mm), and market oysters (> 76 mm); catch rates were calculated by dividing the total number captured by the total h fished from all samples in a month. Coastwide catch rates were weighted by the length of each bay system's shoreline (gill net, bag seine), by the amount of surface area over water ≥ 1 m deep (Matlock and Ferguson 1982) in each bay system (bay trawl), or by the total number of trawlable grids (gulf trawl). Both bag seine and trawl annual catch rates were calculated from monthly means (unweighted by sample size).

Total length (carapace width measured from spine to spine) of blue crabs caught in gill nets were obtained for the first 19 individuals caught in each mesh size each week in each bay system; mean lengths were calculated for each of the four mesh sizes in each sample. Mean lengths for the combined gill net meshes were calculated by weighting the mean lengths in each mesh by the proportion of blue crabs caught in each mesh. Total lengths (shrimp: tip of rostrum to tip of telson) for brown shrimp, pink shrimp, white

shrimp, and blue crab caught in bag seines were obtained from a random selection of no more than 19 individuals of each species in each sample. Total lengths of selected shrimps and blue crab caught in trawls were obtained from a random selection of no more than 50 shrimp of each species and 35 blue crabs in each sample. Total lengths of associated finfishes (tip of anterior-most part to tip of compressed caudal fin) caught in trawls were obtained from a random selection of no more than 19 individuals of each species in each sample. Total lengths (hinge to bill) of Eastern oysters caught in oyster dredges were obtained from a random selection of no more than 19 live oysters in each sample. Coastwide lengths (nearest 1 mm) of all organisms were weighted according to the catch rate in each bay system.

Bottom salinity, water temperature, dissolved oxygen, and turbidity were measured prior to each trawl and oyster dredge sample; means were calculated for each month. Surface salinity, water temperature, dissolved oxygen, and turbidity were measured at the set and pickup for each gill net and prior to each bag seine sample. Hydrologic characteristic means for gill nets (season) and bag seines (month) are reported by Rice et al. (1987).

RESULTS

Gill Net

Spring and fall coastwide blue crab catch rates were $\leq 0.2/h$ in all years (Tables 1 and 2). Catch rates among bay systems during spring ranged from $< .1/h$ in upper Laguna Madre during 1983 and 1986 to $0.6/h$ in East Matagorda during 1986. Catch rates during fall ranged from $< .1/h$ in all bay systems, except San Antonio, Corpus Christi, and lower Laguna Madre, during 1986 and in Matagorda during 1985 to $0.3/h$ in East Matagorda, upper, and lower Laguna Madre during 1983.

Bag Seine

Coastwide annual blue crab bag seine catch rates fluctuated from $49/ha$ in 1978 to $114/ha$ in 1985 (Table 3). Catch rates among bay systems ranged from $9/ha$ in lower Laguna Madre during 1977 to $193/ha$ in Aransas Bay during 1982.

Coastwide annual brown shrimp catch rates increased from $136/ha$ in 1977 to $511/ha$ in 1982, decreased to $363/ha$ in 1983, increased to $525/ha$ in 1985, and decreased to $317/ha$ in 1986 (Table 3). Catch rates among bay systems ranged from $9/ha$ in upper Laguna Madre during 1977 to $1008/ha$ in lower Laguna Madre during 1985.

The highest coastwide annual pink shrimp catch rates occurred during 1981 ($24/ha$) and 1982 ($26/ha$); they ranged from $3-12/ha$ in all other years (Table 3). Highest catch rates generally occurred in Aransas Bay ($0-124/ha$), Corpus Christi Bay ($0-67/ha$), and upper Laguna Madre ($6-48/ha$).

The highest coastwide annual white shrimp catch rate occurred during 1982 (1277/ha); they fluctuated from 242-755/ha in all other years (Table 3). Catch rates among bay systems ranged from 2/ha in upper Laguna Madre during 1986 to 3560/ha in Galveston Bay during 1982.

Coastwide monthly bag seine catch rates during January-December 1986 indicated seasonal peaks in abundance varied among species (Appendix A). Blue crab catch rates were highest during February-May. Brown shrimp catch rates were highest during April-June. Highest pink shrimp catch rates occurred during March, September, and October; none were caught in Galveston and Matagorda Bays. White shrimp catch rates were highest during June-November.

Bay Trawl

Coastwide annual blue crab bay trawl catch rates ranged from 13/h in 1986 to 21/h in 1985 (Table 4). Catch rates among bay systems ranged from 2/h in Corpus Christi Bay during 1983 to 50/h in lower Laguna Madre during 1984.

Coastwide annual brown shrimp catch rates were lower in 1982 (27/h), 1983 (21/h), and 1986 (24/h) than in 1984 and 1985 (30/h each year) (Table 4). Catch rates among bay systems ranged from < 1/h in Sabine Lake during 1986 to 106/h in Aransas Bay during 1984.

Coastwide annual pink shrimp catch rates were $\leq 2/h$ in all years (Table 4). Catch rates among bay systems ranged from 0/h in Sabine Lake during 1986, Galveston Bay during 1984, and lower Laguna Madre during 1982 to 8/h in Aransas Bay during 1983 and 1986, and in Corpus Christi Bay during 1986.

Coastwide annual white shrimp catch rates decreased from 47/h in 1982 to 23/h in 1986 (Table 4). Catch rates among bay systems ranged from 1/h in lower Laguna Madre during 1985 to 88/h in Galveston Bay during 1982.

Coastwide monthly bay trawl shellfish catch rates during January-December 1986 indicated seasonal peaks in abundance varied among species (Appendix A). Blue crab catch rates were highest during March-June. Brown shrimp catch rates were highest during April-June. The highest catch rate of pink shrimp occurred during April. White shrimp catch rates were highest during July-October.

Individual finfish coastwide and monthly catch rates and mean lengths varied among species, among bays, among years, and among months (Table 4; Appendix A).

Hydrologic characteristics at bay trawl stations varied among months and among bay systems (Appendix B). Bay system salinities were generally higher (32.4-47.6 o/oo) in upper and lower Laguna Madre than in any other bay system (2.5-39.1 o/oo). Water temperatures followed seasonal trends increasing from lowest values

during January (11.3-15.4 C) to highest values during August (28.7-30.7 C) then declining through December (11.6-15.2 C). Dissolved oxygen ranged from 5-13 ppm among bay systems. Turbidities ranged from 24-183 Jackson Turbidity Units (JTU) among bay systems.

Gulf Trawls

Coastwide annual blue crab gulf trawl catch rates increased from 1/h in 1985 to 2/h in 1986 (Table 5). Catch rates among gulf areas ranged from < 1/h off Galveston during 1985 and Port Isabel during 1985 and 1986 to 4/h in Galveston during 1986. Coastwide monthly catch rates were highest (5/h) during July (Appendix A).

Coastwide annual brown shrimp catch rates decreased from 20/h in 1985 to 6/h in 1986. Catch rates among gulf areas ranged from 4/h off both Port O'Connor and Port Isabel in 1986 to 47/h off Port Aransas in 1985 (Table 5). Coastwide monthly catch rates were highest (25/h) during May (Appendix A).

Coastwide annual pink shrimp catch rates were 1/h during 1985 and 1986 (Table 5). Catch rates among gulf areas ranged from 0/h off Sabine in 1986 to 3/h off Port Aransas in 1986. Coastwide monthly catch rates were highest (5/h) during May (Appendix A).

Coastwide annual white shrimp catch rates decreased from 23/h in 1985 to 16/h in 1986. Catch rates among gulf areas ranged from 1/h off Port Isabel in 1985 and 1986 to 53/h off Galveston in 1985 (Table 5). Coastwide monthly catch rates were highest (67/h) during January (Appendix A).

Individual finfish coastwide and monthly catch rates and mean lengths varied among species, among gulf areas, and among months (Appendix A).

Hydrologic characteristics at gulf trawl stations varied among months and among gulf areas (Appendix B). Gulf area salinities were generally higher (29.2-36.4 o/oo) off Port Isabel and Port O'Connor than the other gulf areas (26.6-35.4 o/oo). Water temperatures followed seasonal trends increasing from lowest values in January (11.8-15.6 C) to highest values in September (28.9-30.2 C). Dissolved oxygen ranged from 5-14 ppm among gulf areas. Turbidities ranged from 24-66 JTU among gulf areas.

SEAMAP

Summer

Catch rates of brown shrimp by depth zone ranged from 809/h in 19-37 m to 49/h in 74-91 m during 1986 (Appendix C). Catch rates in most depth zones during 1986 were generally less than those recorded during 1982-1985 except in 38-55 m.

White shrimp were caught primarily in waters from 0-18 m deep during all years (Appendix C). Catch rates increased each year from

15/h in 1982 to 41/h in 1985 then declined to 33/h in 1986 in the 0-18 m depth zone.

Pink shrimp were captured in waters from 0-55 m deep (0-195/h) during all years (Appendix C). They were caught predominately in waters 0-37 m deep.

Blue crabs were caught primarily in the 0-18 m zone (Appendix C). Catch rates ranged from 0-20/h in all years.

Fall

During fall 1986, brown shrimp were caught in all depth zones with highest catch rates (93/h) in 19-37 m (Appendix C). White shrimp and pink shrimp were caught in waters 0-37 m deep with greatest catch rates (77/h and 26/h, respectively) in 0-18 m. Blue crabs were only caught in 19-37 m at a rate of 1/h.

Oyster Dredge

Reef areas

Coastwide annual catch rates of Eastern oyster spat were 806/h in 1986; they ranged from 108/h in Corpus Christi Bay to 2186/h in East Matagorda Bay (Table 6). Coastwide monthly catch rates were highest (1261-1381/h) during August, October, and November (Appendix A).

Coastwide annual catch rates of small Eastern oysters were 933/h in 1986; they ranged from 120/h in Sabine Lake to 1316/h in Galveston Bay (Table 6). Coastwide monthly catch rates were highest (1042-1617/h) during January-April (Appendix A).

Coastwide annual catch rates of market Eastern oysters were 398/h in 1986; they ranged from 27/h in lower Laguna Madre to 617/h in Galveston Bay (Table 6). Coastwide monthly catch rates were highest (735/h) during January (Appendix A).

Hydrologic characteristics at oyster reef stations varied among months and among bay systems (Appendix B). Bay system salinities were generally higher (25.5-38.5 o/oo) in lower Laguna Madre and Corpus Christi Bay than in any other bay system (2.7-32.5 o/oo). Water temperatures followed seasonal trends increasing from lowest values during January (11.6-14.6 C) to highest values during August (24.1-30.8 C) then declining through December (11.7-15.8 C). Dissolved oxygen ranged from 6-14 ppm among bay systems. Turbidities ranged from 24-117 JTU among bay systems.

Non-reef Areas

Coastwide annual catch rates of Eastern oyster spat were 106/h in 1986; they ranged from 0/h in upper Laguna Madre to 403/h in East Matagorda Bay (Table 7). Coastwide monthly catch rates were highest (454/h) during August (Appendix A).

Coastwide annual catch rates of small Eastern oysters were 103/h in 1986; they ranged from 0/h in upper and lower Laguna Madre to 220/h in East Matagorda Bay (Table 7). Coastwide monthly catch rates were highest (293/h) during January (Appendix A).

Coastwide annual catch rates of market Eastern oysters were 36/h in 1986; they ranged from 0/h in upper and lower Laguna Madre to 120/h in East Matagorda Bay (Table 7). Coastwide monthly catch rates were highest (124/h) during April (Appendix A).

Hydrologic characteristics of oyster non-reef stations varied among months and among bay systems (Appendix B). Bay system salinities were generally higher (31.7-50.1 o/oo) in upper and lower Laguna Madre than in any other bay system (3.6-39.2 o/oo). Water temperatures followed seasonal trends increasing from lowest values during January (11.4-14.7 C) to highest values during August (26.7-31.3 C) then declining through December (11.8-14.3 C). Dissolved oxygen ranged from 5-13 ppm among bay systems. Turbidities ranged from 24-114 JTU among bay systems.

DISCUSSION

The TPWD is mandated by the Texas Legislature and the TPWC to investigate the supply, economic value, environment, breeding habits, sex ratios, effects of fishing, and other factors or conditions causing increases or decreases in the supply of shellfishes and finfishes in Texas waters. Long-term trend data based on independent standardized monitoring programs are necessary to assess changes in relative abundance of these populations. Data in this report can be used to determine long-term trends in abundance and stability of shellfish and finfish populations in Texas coastal waters.

Data obtained during this study have been used to implement management regulations. Shrimp data were used to recommend the dates for the closure of Texas gulf waters to shrimping (Bryan 1985, 1986, 1987). Oyster data were used to implement oyster season closures in Galveston Bay from 9 December 1986-19 February 1987 and in all other bays (except San Antonio) from 13 January-19 February 1987 (TPWD unpublished data). Oyster data were used to establish the oyster transplant season in Galveston Bay (TPWD unpublished data). All of these data are also being used to develop management plans for shrimp and oysters as mandated by the Texas Legislature, and for blue crabs and selected finfishes as part of the TPWD's 6-year plan.

Relative abundance of shellfishes is not uniform throughout the year. The monthly bag seine, trawl, and oyster dredge catches in this report indicate specific periods of high abundance for brown shrimp, white shrimp, pink shrimp, blue crab, and Eastern oyster. A more efficient method of estimating abundance from year to year (estimate having the highest precision for effort expended) might be to identify and pool data for months which do not have significantly different catch rates. It is recommended that periods of high abundance in bag seines, trawls, and oyster dredges be statistically

determined for each of the species for the appropriate gear and that these "seasonal" catch rates be considered for presentation in future reports.

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Table 1. Annual mean catch rates (No./h) and mean total lengths (mm), of blue crab caught with 183-m gill nets in Texas bay systems during spring 1983-1986. Blank indicates no measurement taken; ND = no data.

Bay system	Year	Mesh Size					Total		
		7.6-cm No./h	10.2-cm Length	12.7-cm No./h	15.2-cm Length	No./h		Length	
Sabine Lake	1983	ND	ND	ND	ND	ND	ND		
	1984	ND	ND	ND	ND	ND	ND		
	1985	ND	ND	ND	ND	ND	ND		
	1986	0.1	138	147	159	<.1	179	0.2	146
Galveston	1983	<.1	137	153	155	0.1	155	<.1	151
	1984	<.1	129	155	147	<.1	177	<.1	150
	1985	0.1	136	153	150	0.1	164	<.1	149
	1986	0.1	142	151	157	0.1	157	<.1	151
East Matagorda	1983	0.1	132	159	161	0.1	172	<.1	154
	1984	0.1	120	135	151	0.1	171	0.0	135
	1985	0.1	132	150	159	0.2	171	<.1	151
	1986	0.2	116	137	147	0.1	134	<.1	133
Matagorda	1983	<.1	150	150	155	<.1	140	<.1	151
	1984	<.1	127	150	155	<.1	137	<.1	144
	1985	<.1	140	144	156	<.1	144	<.1	144
	1986	<.1	133	137	144	<.1	151	<.1	140
San Antonio	1983	0.1	123	144	151	0.1	153	<.1	142
	1984	0.1	119	143	151	<.1	142	<.1	137
	1985	0.1	136	131	143	0.1	130	<.1	136
	1986	<.1	131	137	148	<.1	128	<.1	135
Aransas	1983	0.1	131	147	146	0.1	139	<.1	142
	1984	0.1	133	143	165	<.1	156	<.1	142
	1985	0.1	130	144	151	<.1	151	<.1	141
	1986	<.1	131	143	157	<.1	142	<.1	144
Corpus Christi	1983	<.1	149	146	159	<.1	176	<.1	151
	1984	0.1	136	147	154	0.1	156	<.1	147
	1985	0.1	140	150	156	0.1	155	<.1	149
	1986	<.1	122	153	156	<.1	171	<.1	154

Table 1. (Cont'd.)

Bay system	Year	Mesh Size								Total	
		7.6-cm		10.2-cm		12.7-cm		15.2-cm		No./h	Length
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Upper Laguna Madre	1983	<.1	145	<.1	164	<.1	164	<.1	168	<.1	158
	1984	0.1	134	0.1	145	0.1	148	<.1	164	0.3	146
	1985	0.1	145	<.1	141	<.1	134	<.1	132	0.1	141
	1986	<.1	138	<.1	146	<.1	154	0.0		<.1	147
Lower Laguna Madre	1983	<.1	133	0.1	147	<.1	154	<.1	158	0.2	145
	1984	0.1	127	0.1	145	<.1	157	<.1	132	0.2	142
	1985	<.1	155	0.1	157	0.1	161	<.1	153	0.2	158
	1986	<.1	140	<.1	150	<.1	156	<.1	126	0.1	148
Coastwide	1983	<.1	133	0.1	151	<.1	154	<.1	153	0.2	148
	1984	0.1	128	0.1	144	<.1	152	<.1	157	0.2	142
	1985	0.1	137	0.1	147	0.1	154	<.1	155	0.2	147
	1986	<.1	134	0.1	145	<.1	154	<.1	151	0.2	145

Table 2. Annual mean catch rates (No./h) and mean total lengths (mm), of blue crab caught with 183-m gill nets in Texas bay systems during fall 1983-1986. Blank indicates no measurement taken; ND = no data.

Bay system	Year	Mesh Size									
		7.6-cm		10.2-cm		12.7-cm		15.2-cm		Total	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Sabine Lake	1983	ND		ND		ND		ND		ND	
	1984	ND		ND		ND		ND		ND	
	1985	ND		ND		ND		ND		ND	
	1986	0.1	141	0.1	158	<.1	155	<.1	149	0.2	150
Galveston	1983	0.1	134	0.1	140	<.1	135	<.1	130	0.2	136
	1984	<.1	141	<.1	158	<.1	169	<.1	156	0.1	151
	1985	<.1	150	<.1	154	<.1	131	<.1	152	0.1	148
	1986	<.1	143	<.1	144	<.1	147	<.1	198	<.1	146
East Matagorda	1983	<.1	132	0.1	150	0.1	163	<.1	158	0.3	153
	1984	<.1	137	<.1	136	<.1	138	<.1	180	0.1	140
	1985	<.1	154	<.1	149	<.1	156	<.1	156	0.1	154
	1986	<.1	130	<.1	167	<.1	148	<.1	135	<.1	144
Matagorda	1983	<.1	149	0.1	152	<.1	154	<.1	141	0.1	151
	1984	<.1	145	<.1	152	<.1	146	<.1	139	0.1	146
	1985	<.1	148	<.1	137	<.1	122	<.1	168	<.1	142
	1986	<.1	135	<.1	134	<.1	147	<.1	252	<.1	161
San Antonio	1983	<.1	134	<.1	140	<.1	137	<.1	160	0.1	138
	1984	<.1	143	<.1	149	<.1	152	<.1	142	0.1	147
	1985	<.1	133	<.1	143	<.1	149	<.1	154	0.1	139
	1986	<.1	146	<.1	144	<.1	147	<.1	162	0.1	146
Aransas	1983	0.1	137	0.1	149	<.1	155	<.1	153	0.2	145
	1984	<.1	140	<.1	143	<.1	151	<.1	157	0.2	145
	1985	<.1	134	<.1	138	<.1	147	<.1	148	0.1	145
	1986	<.1	156	<.1	133	<.1	137	<.1	112	<.1	138
Corpus Christi	1983	<.1	139	0.1	150	0.1	147	<.1	142	0.2	145
	1984	0.1	137	<.1	140	<.1	148	<.1	150	0.2	141
	1985	<.1	139	<.1	145	<.1	156	<.1	144	0.1	144
	1986	<.1	144	<.1	148	<.1	135	<.1	129	0.1	144

Table 2. (Cont'd.)

Bay system	Year	Mesh Size									
		7.6-cm		10.2-cm		12.7-cm		15.2-cm		Total	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Upper Laguna Madre	1983	0.1	140	0.1	146	<.1	153	<.1	162	0.3	146
	1984	0.1	135	0.1	139	<.1	135	<.1	143	0.2	137
	1985	0.1	147	0.1	145	<.1	150	<.1	151	0.2	147
	1986	<.1	146	<.1	148	<.1	143	<.1	152	<.1	147
Lower Laguna Madre	1983	0.1	143	0.1	145	0.1	151	<.1	150	0.3	146
	1984	<.1	143	0.1	148	<.1	149	<.1	161	0.2	148
	1985	<.1	137	<.1	155	<.1	167	<.1	157	0.1	149
	1986	<.1	148	<.1	145	<.1	154	<.1	156	0.1	149
Coastwide	1983	0.1	139	0.1	147	<.1	152	<.1	150	0.2	146
	1984	<.1	139	<.1	144	<.1	148	<.1	153	0.1	144
	1985	<.1	142	<.1	146	<.1	150	<.1	153	0.1	146
	1986	<.1	144	<.1	146	<.1	147	<.1	169	<.1	147

Table 3. Annual mean catch rates (No./ha) and mean total lengths (mm) of select shellfishes caught with 18.3-m bag seines in Texas bay systems during 1977-1986. Blank indicates no measurement taken; ND = no data.

Species	Year	East												Upper						Lower					
		Sabine Lake		Galveston		Matagorda		Matagorda		San Antonio		Arkansas		Corpus Christi		Laguna Madre		Laguna Madre		Laguna Madre		Coastwide			
		No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length		
Blue crab	1977 ^a	ND		106	44	ND		29	46	52	46	95	56	56	38	16	58	9	63	9	63	57	48		
	1978	ND		66	52	ND		11	38	52	51	57	62	34	43	98	61	19	60	19	60	49	55		
	1979	ND		106	52	ND		27	51	76	49	84	62	152	43	90	48	61	54	61	54	83	51		
	1980	ND		122	54	ND		24	56	114	45	65	52	80	38	65	40	176	46	40	176	46	48		
	1981	ND		58	53	ND		44	44	51	54	85	45	86	40	42	58	167	35	167	35	75	44		
	1982	ND		101	48	ND		31	51	107	42	193	48	52	49	35	54	175	42	175	42	102	46		
	1983	ND		148	43	15	77	35	34	106	40	145	43	49	40	37	59	115	33	59	115	33	95	41	
	1984	ND		88	58	58	60	58	42	43	46	62	50	62	42	37	61	80	46	61	80	46	64	51	
	1985	ND		144	49	107	54	56	46	42	42	141	38	184	37	73	52	152	34	152	34	114	42		
	1986	37	79	90	55	86	55	58	53	62	46	30	48	77	40	23	45	91	41	91	41	63	49		
Brown shrimp	1977 ^a	ND		146	46	ND		61	52	188	50	229	54	99	58	9	63	200	53	200	53	136	51		
	1978	ND		540	50	ND		172	63	102	63	152	60	262	56	188	68	120	53	120	53	247	56		
	1979	ND		482	58	ND		194	66	69	63	438	63	499	61	53	59	155	59	155	59	285	61		
	1980	ND		495	52	ND		143	68	561	60	386	60	183	62	64	64	234	56	234	56	315	58		
	1981	ND		719	57	ND		157	74	310	64	355	60	679	53	102	76	1008	58	1008	58	490	59		
	1982	ND		915	64	ND		207	64	609	51	505	54	428	57	62	63	565	61	565	61	511	60		
	1983	ND		484	60	100	76	250	66	313	57	534	60	300	56	57	65	541	50	541	50	363	58		
	1984	ND		623	64	294	65	198	56	246	66	737	66	291	58	83	61	389	63	389	63	394	64		
	1985	ND		522	60	413	59	367	63	308	56	755	61	370	55	288	70	1007	56	1007	56	525	59		
	1986	605	74	160	58	558	63	524	67	137	65	233	63	204	58	193	66	627	54	627	54	317	62		
Pink shrimp	1977 ^a	ND		0		ND		0		13	41	0		0		48	77	0		0		7	69		
	1978	ND		0		ND		0		<1	100	<1	63	0		26	77	0		0		3	77		
	1979	ND		0		ND		0		0		0		58	51	12	78	<1	106	<1	106	7	57		
	1980	ND		0		ND		0		1	42	13	50	58	55	10	60	2	75	2	75	9	55		
	1981	ND		0		ND		0		28	54	87	44	67	54	8	62	6	49	6	49	24	49		
	1982	ND		0		ND		0		0		124	47	67	46	7	61	3	52	3	52	26	48		
	1983	ND		0		0		0		9	51	51	56	32	47	12	54	0		0		12	53		
	1984	ND		0		0		<1	25	<1	73	15	48	26	48	14	65	<1	79	<1	79	6	53		
	1985	ND		0		0		0		0		18	59	8	49	8	76	0		0		4	61		
	1986	0		0		<1	73	0		<1	68	15	39	25	49	6	43	3	65	3	65	5	46		

Table 3. (Cont'd.).

Species	Year	East												Upper		Lower		Coastwide		
		Sabine Lake No./ha	Galveston Length	Matagorda No./ha	Matagorda Length	San Antonio No./ha	Aransas Length	Corpus Christi No./ha	Laguna Madre Length	Upper No./ha	Laguna Madre Length	Lower No./ha	Laguna Madre Length	Coastwide No./ha	Length					
White shrimp	1977 ^a	ND	1656	55	ND	994	102	127	47	26	63	84	57	36	85	23	57	561	68	
	1978	ND	858	66	ND	571	70	130	61	92	49	63	52	21	55	130	53	337	65	
	1979	ND	1720	61	ND	543	70	212	56	99	64	817	52	5	53	143	47	608	61	
	1980	ND	571	64	ND	522	68	295	57	133	61	141	69	62	71	18	45	288	64	
	1981	ND	1393	62	ND	805	59	66	64	183	50	173	51	19	56	264	61	527	60	
	1982	ND	3560	58	ND	1750	64	663	51	297	43	369	54	14	51	326	50	1277	58	
	1983	ND	1524	50	348	397	65	136	64	130	53	136	42	3	71	226	52	479	53	
	1984	ND	1543	59	409	1438	71	168	56	411	53	311	63	17	58	625	58	755	62	
	1985	ND	307	61	552	589	63	37	44	239	44	33	53	6	73	204	54	242	58	
	1986	308	73	1400	62	173	65	66	140	66	289	44	101	58	2	48	175	49	493	61

^aValues collected for Oct-Dec only.

Table 4. Annual mean catch rates (No./h) and mean total lengths (mm) of select organisms caught with 6.1-m trawls in Texas bay systems during 1982-1986. Blank indicates no measurement taken; ND = no data.

Species	Year	Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide b		
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	
SHELLFISHES																				
Blue crab	1982 ^a	ND		28	91	5	99	17	81	29	66	7	97	9	148	10	100	17	89	
	1983	ND		24	88	10	86	21	80	40	81	2	96	7	113	12	96	18	86	
	1984	ND		19	92	4	88	8	82	31	81	8	88	24	106	50	86	15	90	
	1985	ND		30	79	10	85	19	76	23	72	5	115	21	103	36	86	21	81	
	1986	4	132	19	79	9	85	13	85	17	78	10	88	12	100	10	85	13	83	
	1982 ^a	ND		23	90	25	94	17	101	54	80	40	90	40	101	6	61	27	91	
Brown shrimp	1983	ND		12	99	26	100	31	99	57	91	8	99	8	102	9	66	21	97	
	1984	ND		13	102	7	102	58	96	106	80	50	103	25	108	6	74	30	94	
	1985	ND		33	75	24	89	27	90	68	81	24	96	16	108	11	63	30	83	
	1986	<1		10	94	19	99	47	98	75	96	28	95	10	108	10	64	24	96	
	1982 ^a	ND		<1	94	<1	113	<1	96	7	89	2	100	1	96	0		1	93	
	1983	ND		<1	95	1	112	5	95	8	95	2	103	1	113	1	88	2	99	
Pink shrimp	1984	ND		0		<1	76	<1	72	3	86	3	109	<1	94	<1	71	1	97	
	1985	ND		<1	88	<1	104	3	98	4	100	5	96	4	107	1	98	2	100	
	1986	0		<1	118	2	114	3	103	8	101	8	103	2	109	<1	70	2	104	
	1982 ^a	ND		88	93	39	86	14	99	16	95	26	101	17	110	4	61	47	92	
White shrimp	1983	ND		78	93	20	101	13	96	18	100	14	111	6	112	2	85	37	95	
	1984	ND		60	98	15	99	8	99	38	106	24	106	11	126	10	109	32	100	
	1985	ND		62	99	21	110	23	91	18	106	22	104	6	120	1	105	33	101	
	1986	10	105	30	95	41	98	11	96	9	101	13	98	5	108	4	57	23	97	
	1982 ^a	ND		<1	259	0		<1	221	<1	166	2	235	<1	264	0		<1	238	
	1983	ND		<1	274	<1	199	<1	192	<1	201	<1	347	<1	266	<1	440	<1	280	
Atlantic croaker	1984	ND		<1	168	0		0		<1	251	<1	341	1	202	<1	544	<1	253	
	1985	ND		<1	242	0		0		<1	403	<1	315	1	280	<1	267	<1	267	
	1986	<1	226	<1	233	0		0		0		<1	334	<1	236	<1	335	<1	248	
	1982 ^a	ND		43	131	102		10	110	87	75	110	43	149	37	157	28	62	75	
	1983	ND		30	126	31	117	18	110	44	106	43	120	121	15	137	31	155	30	127
	1984	ND		15	126	30	104	22	87	52	83	120	42	138	15	151	44	138	35	112
Black drum	1985	ND		20	124	41	110	17	105	33	101	42	138	13	148	24	148	27	119	
	1986	7	157	21	123	36	114	30	105	39	96	56	125	20	139	19	153	30	117	
	1982 ^a	ND		<1	259	0		<1	221	<1	166	2	235	<1	264	0		<1	238	
	1983	ND		<1	274	<1	199	<1	192	<1	201	<1	347	<1	266	<1	440	<1	280	

Table 4. (Cont'd.)

Species	Year	Sabine Lake		Galveston		Matagorda		San Antonio		Arkansas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide ^b		
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	
Gafftopsail catfish	1982 ^a	ND	<1			4		3		3		<1	138	<1	193	0		2	141	
	1983	ND	<1	137		1	132	2	123	2	135	<1	175	0		0		1	133	
	1984	ND	<1	139		1	144	5	121	2	109	<1	218	<1	131				1	126
	1985	ND	<1	154		2	137	2	128	3	128	1	150	0		<1	210		1	134
	1986	0	<1	126		1	134	3	128	1	121	<1	92	<1	158	0			1	128
Gulf menhaden	1982 ^a	ND	12			10		11		24		2	<1	<1		<1		10		
	1983	ND	7	103		10	109	17	76	3	89	3	104	1	87	0		8	96	
	1984	ND	3	98		3	93	23	58	45	44	4	82	6	76	<1	59	9	61	
	1985	ND	18	112		10	109	27	79	12	92	2	119	4	106	0		14	101	
	1986	<1	12	95		2	79	12	64	6	55	<1	156	<1	49	0		6	84	
Hardhead catfish	1982 ^a	ND	1			3		2		8		29	25	25	6			7		
	1983	ND	1	177		2	183	2	206	8	125	26	191	12	205	5	196	6	184	
	1984	ND	1	186		2	169	1	199	5	128	21	186	7	215	5	193	4	182	
	1985	ND	2	159		4	149	1	165	4	144	14	171	5	207	5	176	4	165	
	1986	3	5	167		2	147	1	187	6	149	12	172	3	233	7	207	5	170	
Pinfish	1982 ^a	ND	1			7		5		22		85	44	44	39			17		
	1983	ND	1	121		6	110	14	106	38	106	119	124	20	133	45	109	22	119	
	1984	ND	1	121		6	107	7	96	39	96	25	113	67	108	73	111	15	107	
	1985	ND	1	120		9	111	23	104	53	110	48	118	18	133	48	110	18	113	
	1986	2	2	118		7	101	12	98	37	103	68	116	45	109	65	108	19	109	
Red drum	1982 ^a	ND	0			<1		<1	230	<1	102	<1	649	<1	619	0		<1	394	
	1983	ND	0			0		<1	319	<1	224	0	0	0		<1	280	<1	242	
	1984	ND	<1	583		<1	305	<1	344	<1	142	<1	81	<1	241	<1	401	<1	306	
	1985	ND	0			<1	56	0	0	<1	54	<1	276	<1	475	<1	90	<1	293	
	1986	<1	0	212		0		<1	35	<1	78	0	0	<1	630	<1	340	<1	339	
Sand seatrout	1982 ^a	ND	4			5	185	<1	141	3	126	14	147	1	201	5	164	5	161	
	1983	ND	3	134		4	132	<1	108	3	111	9	158	<1	196	1	164	3	140	
	1984	ND	2	147		1	121	<1	115	1	107	4	141	0		1	161	1	138	
	1985	ND	4	127		3	126	<1	136	1	119	7	144	1	160	1	117	3	131	
	1986	<1	2	141		1	117	<1	112	<1	133	3	148	0		<1	154	1	137	
Sheepshead	1982 ^a	ND	<1	295		0		<1	119	<1	85	<1	345	1	366	1	241	<1	288	
	1983	ND	<1	344		0		<1	113	<1	138	<1	365	1	358	<1	248	<1	322	
	1984	ND	<1	339		<1	147	0	0	<1	157	<1	342	<1	402	<1	300	<1	313	
	1985	ND	<1	341		<1	102	<1	112	<1	143	<1	259	<1	412	<1	80	<1	242	
	1986	1	<1	451		0		0	0	<1	122	<1	288	<1	356	1	160	<1	231	

Table 4. (Cont'd.)

Species	Year	Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide ^b			
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length		
Southern flounder	1982 ^a	ND	<1	158	<1	169	1	155	1	186	1	181	2	203	<1	279	<1	279	1	176	
	1983	ND	<1	175	<1	196	<1	120	1	180	<1	242	<1	203	<1	161	<1	161	<1	179	
	1984	ND	<1	193	<1	194	<1	153	2	148	<1	175	1	145	<1	168	<1	168	<1	160	
	1985	ND	<1	234	<1	202	<1	147	1	152	1	221	1	262	<1	261	<1	261	<1	191	
	1986	<1	141	161	<1	165	<1	141	1	144	1	184	1	262	<1	212	<1	212	1	169	
	1982 ^a	ND	0	0	<1	326	0	0	0	0	0	0	0	0	0	0	0	0	<1	326	
Spanish mackerel	1983	ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1984	ND	0	0	1	202	0	0	0	0	0	0	0	0	0	0	0	0	<1	202	
	1985	ND	0	0	<1	171	0	0	0	0	<1	233	0	0	0	0	0	0	<1	183	
	1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	183	
	1982 ^a	ND	9	120	26	121	5	5	112	68	118	33	140	10	118	4	135	4	135	19	128
	1983	ND	6	120	17	122	5	5	112	18	118	36	140	2	163	6	135	6	135	12	127
Spotted seatrout	1983	ND	8	115	34	107	35	84	131	91	74	112	82	118	10	108	10	108	40	103	
	1984	ND	13	121	20	118	13	110	60	116	215	132	24	137	19	129	19	129	41	126	
	1985	ND	10	120	20	121	14	99	63	106	78	129	9	118	4	135	4	135	23	119	
	1986	4	120	120	121	121	14	99	63	106	78	129	9	118	4	135	4	135	23	119	
	1982 ^a	ND	<1	173	0	0	<1	232	<1	163	<1	187	1	166	<1	142	<1	142	<1	171	
	1983	ND	<1	288	<1	155	<1	168	2	207	2	327	2	188	<1	200	<1	200	<1	210	
Striped mullet	1984	ND	<1	418	<1	174	<1	252	<1	237	<1	385	<1	351	<1	236	<1	236	<1	327	
	1985	ND	<1	286	<1	171	<1	156	1	156	<1	171	1	146	<1	218	<1	218	<1	188	
	1986	<1	187	259	<1	193	<1	170	<1	162	<1	176	<1	151	1	196	1	196	<1	200	
	1982 ^a	ND	<1	204	<1	131	2	137	2	209	2	212	1	311	<1	331	<1	331	1	235	
	1983	ND	1	244	<1	204	2	174	3	209	3	211	2	323	2	307	1	307	1	210	
	1984	ND	2	195	<1	163	<1	136	1	158	1	209	6	287	1	254	1	254	1	251	
Other finfishes	1985	ND	2	255	<1	116	<1	157	<1	158	<1	226	<1	278	<1	266	<1	266	2	181	
	1986	<	187	255	<1	116	<1	157	<1	158	<1	226	<1	278	<1	266	<1	266	1	250	
	1982 ^a	ND	17	197	35	104	9	23	51	69	93	113	192	204	70	219	70	219	43	146	
	1983	ND	13	103	90	80	46	73	52	86	69	121	114	82	52	136	52	136	52	90	
	1984	ND	15	112	34	95	11	73	33	77	44	92	13	65	35	138	35	138	24	96	
	1985	ND	22	98	25	103	11	84	62	60	51	116	27	67	50	131	50	131	29	96	
Total finfishes	1986	1	171	94	17	101	7	83	24	85	36	125	42	77	32	130	32	130	17	101	
	1982 ^a	ND	88	199	193	139	47	176	270	119	166	166	313	232	153	180	153	180	167	167	
	1983	ND	63	126	162	99	107	93	175	108	308	308	171	115	143	139	143	139	136	116	
	1984	ND	46	123	111	104	104	82	311	86	294	124	197	123	169	130	169	130	131	108	
	1985	ND	82	117	115	114	96	101	237	100	380	129	96	127	149	128	149	128	139	117	
	1986	19	151	122	86	112	81	97	178	104	257	132	122	109	128	132	128	132	104	117	

^aValues calculated May-Dec only.^b1986 values include Sabine Lake.

Table 5. Annual mean catch rates (No./h) and mean total lengths (mm) of select shellfishes and finfishes caught with 6.1-m trawls in the Texas Territorial Sea during 1985^a-1986^b. Blank indicates no measurement taken; ND = no data.

Species	Year	Sabine		Galveston		Port O'Connor		Port Aransas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
SHELLFISHES													
Blue crab	1985	ND		<1	105	1	134	1	127	<1	144	1	127
	1986	3	96	4	105	1	141	1	145	<1	123	2	109
Brown shrimp	1985	ND		7	103	7	125	47	109	18	106	20	109
	1986	7	107	9	99	4	113	7	105	4	110	6	105
Pink shrimp	1985	ND		<1	120	<1	130	1	119	1	108	1	116
	1986	0		<1	124	1	109	3	105	2	118	1	111
White shrimp	1985	ND		53	110	26	124	11	125	1	105	23	115
	1986	28	101	36	101	10	119	5	123	1	137	16	105
FINFISHES													
Atlantic croaker	1985	ND		22	145	42	139	17	145	9	149	23	142
	1986	30	134	31	126	67	136	30	130	6	132	33	132
Black drum	1985	ND		0		0		<1	825	0		<1	825
	1986	0		0		<1	900	0		0		<1	900
Gafftopsail catfish	1985	ND		<1	165	<1	156	<1	136	0		<1	160
	1986	9	121	<1	118	<1	115	<1	176	0		2	121
Gulf menhaden	1985	ND		2	150	1	159	1	151	0		1	152
	1986	2	125	1	147	<1	180	<1	197	0		1	135
Hardhead catfish	1985	ND		2	157	3	143	9	157	<1	256	4	154
	1986	3	164	4	163	2	156	5	156	<1	211	3	160
King mackerel	1985	ND		<1	173	0		<1	124	0		<1	142
	1986	0		<1	159	0		0		0		<1	159
Pinfish	1985	ND		<1	124	3	109	4	110	1	135	2	113
	1986	<1	98	2	104	1	105	2	107	2	103	1	105

Table 5. (Cont'd.)

Species	Year	Sabine		Galveston		Port O'Connor		Port Arkansas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Red drum	1985	ND		0		0		<1	84	0		<1	84
	1986	0		0		0		0		0		0	
Red snapper	1985	ND		0		0		2	85	7	89	2	88
	1986	0		0		<1	152	1	95	<1	103	<1	100
Sand seatrout	1985	ND		10	141	6	168	3	140	<1	221	5	150
	1986	3	164	3	141	2	151	1	174	0		2	154
Sheepshead	1985	ND		0		0		0		0		0	
	1986	0		0		0		0		0		0	
Southern flounder	1985	ND		0		<1	280	<1	137	0		<1	199
	1986	<1	162	<1	255	<1	184	<1	311	0		<1	173
Spanish mackerel	1985	ND		0		0		0		0		0	
	1986	<1	200	0		0		0		0		<1	200
Spot	1985	ND		3	132	20	130	21	141	1	142	12	136
	1986	2	124	6	128	5	124	17	123	1	125	6	124
Spotted seatrout	1985	ND		0		0		<1	140	0		<1	140
	1986	<1	163	<1	172	<1	165	0		0		<1	165
Striped mullet	1985	ND		0		0		0		0		0	
	1986	0		0		0		0		0		0	
Other finfishes	1985	ND		108	109	111	106	170	106	113	97	126	105
	1986	58	112	95	111	69	114	141	115	39	106	81	113
Total finfishes	1985	ND		148	119	187	118	227	114	130	101	174	114
	1986	108	122	141	118	146	123	197	119	49	110	129	120

^aSampling began in February 1985 off Port Arkansas and in August 1985 off all other areas.

^bSampling began in June 1986 off Sabine.

Table 6. Annual mean catch rates (No./h) and mean total length (mm) by size class^a of Eastern oyster caught with 46.0-cm wide dredges on reef stations, in Texas bay systems during 1984-1986. Blank indicates no measurement taken; ND = no data.

Size Class	Year	Sabine Lake			Galveston			East			Upper			Lower			
		No./h	Length	No./h	No./h	Length	No./h	Length	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	Length	No./h	Length	Coastwide
Spat	1984	ND	ND	491	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	491
	1985	ND	ND	892	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	892
	1986	26	2186	1010	2186	764	551	108	ND	ND	ND	ND	ND	1135	ND	ND	806
Small	1984	ND	ND	1705	47	91	447	91	ND	ND	ND	ND	ND	ND	ND	ND	1705
	1985	ND	ND	2097	54	88	674	88	ND	ND	ND	ND	ND	ND	ND	ND	2097
	1986	120	61	1316	54	944	53	382	51	566	58	326	48	ND	148	49	933
Market	1984	ND	ND	447	91	88	617	88	92	445	92	116	98	ND	27	86	447
	1985	ND	ND	674	88	485	93	212	92	445	92	116	98	ND	27	86	647
	1986	190	97	617	88	485	93	212	92	445	92	116	98	ND	27	86	398

^aSpat (5-25 mm), small (26-75 mm), market (≥ 76 mm).

Table 7. Annual mean catch rates (No./h) and mean total length (mm) by size class^a of Eastern oyster caught with 46.0-cm wide dredges on non-reef stations, in Texas bay systems during 1984-1986. Blank indicates no measurement taken; ND = no data.

Size Class	Year	Sabine Lake			Galveston			East			Upper			Lower			
		No./h	Length	No./h	No./h	Length	No./h	Length	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	Length	No./h	Length	Coastwide
Spat	1984	ND	ND	56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	56
	1985	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20
	1986	11	50	50	403	324	95	18	ND	9	ND	ND	0	3	ND	ND	106
Small	1984	ND	ND	62	53	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	62
	1985	ND	ND	141	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	141
	1986	51	50	73	48	220	53	79	46	43	57	43	43	0	0	0	103
Market	1984	ND	ND	15	97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15
	1985	ND	ND	35	91	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	35
	1986	30	97	25	96	120	96	41	93	23	89	5	98	0	0	0	36

^aSpat (5-25 mm), small (26-75 mm), market (≥ 76 mm).

Figure 1. Sabine Lake System.

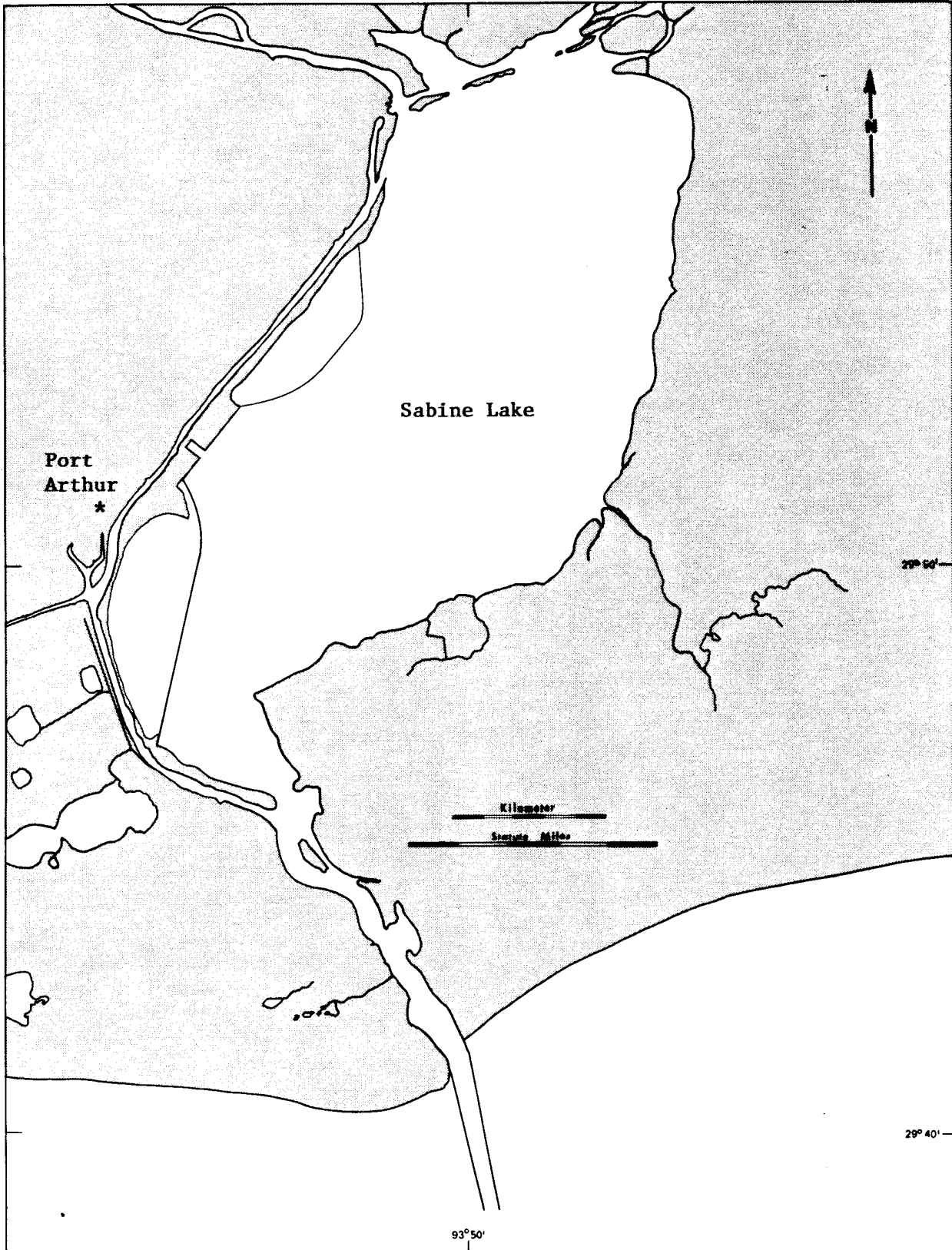
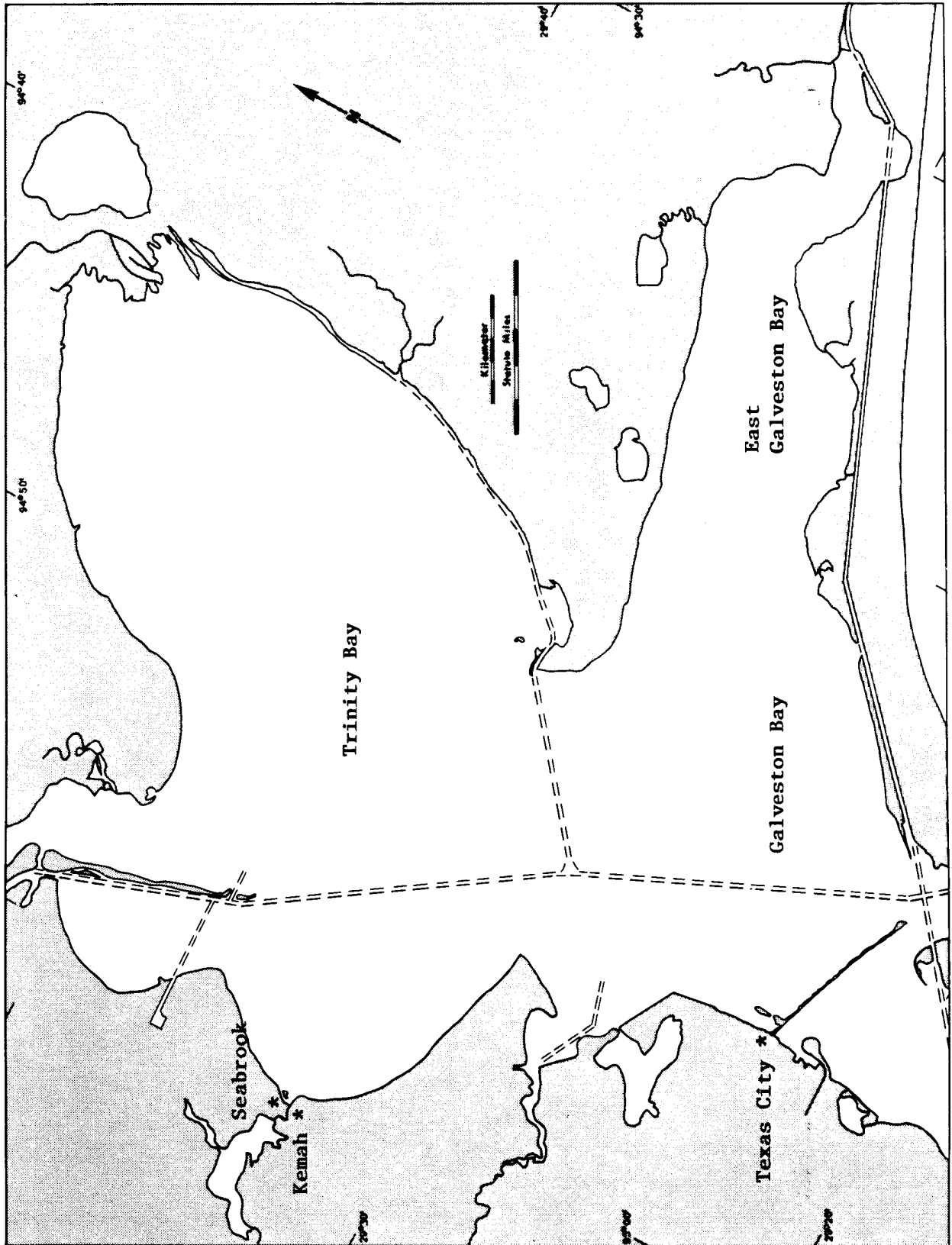
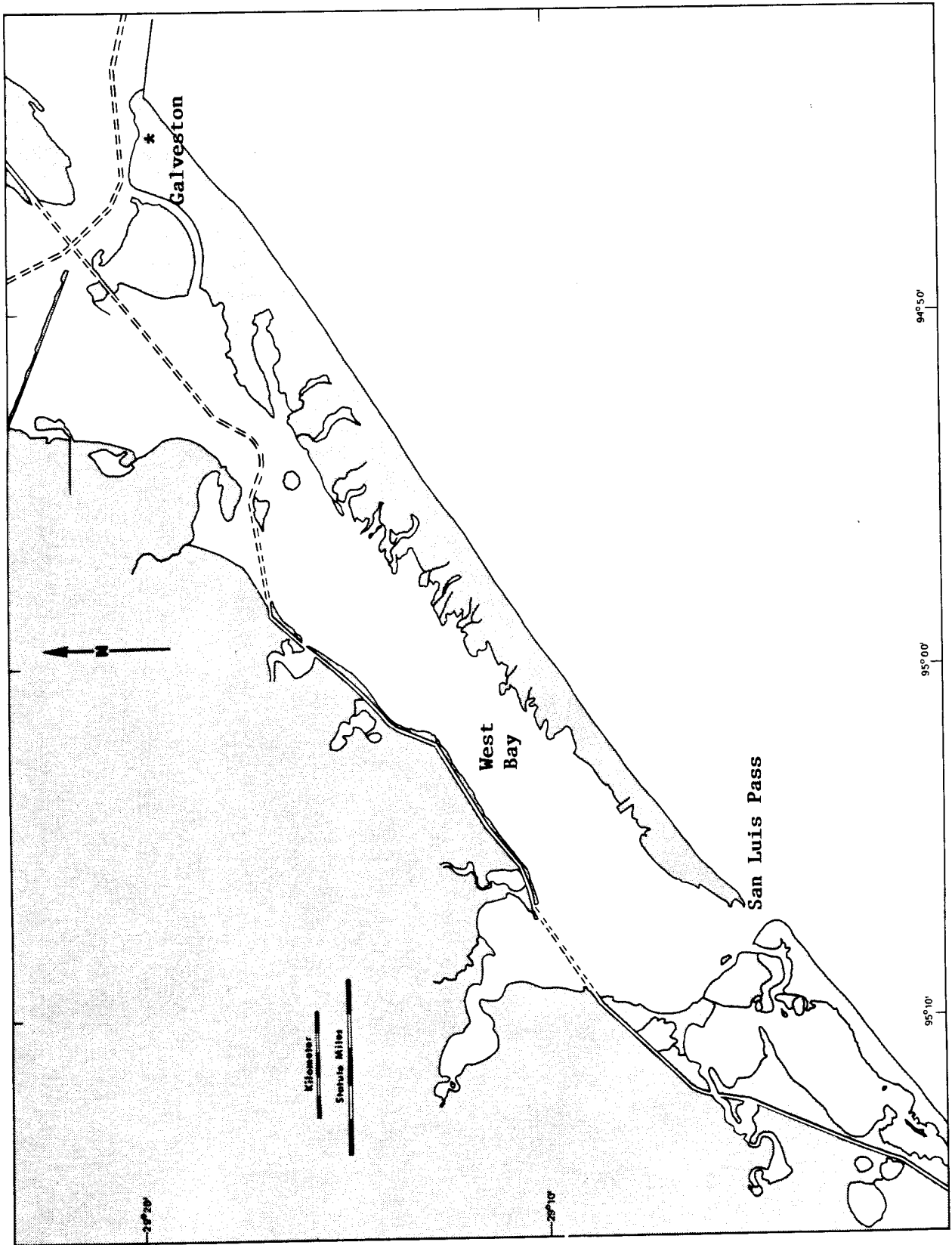


Figure 2. Galveston Bay System.

- (A) Trinity, upper Galveston and East Bays
- (B) West Bay



(A)

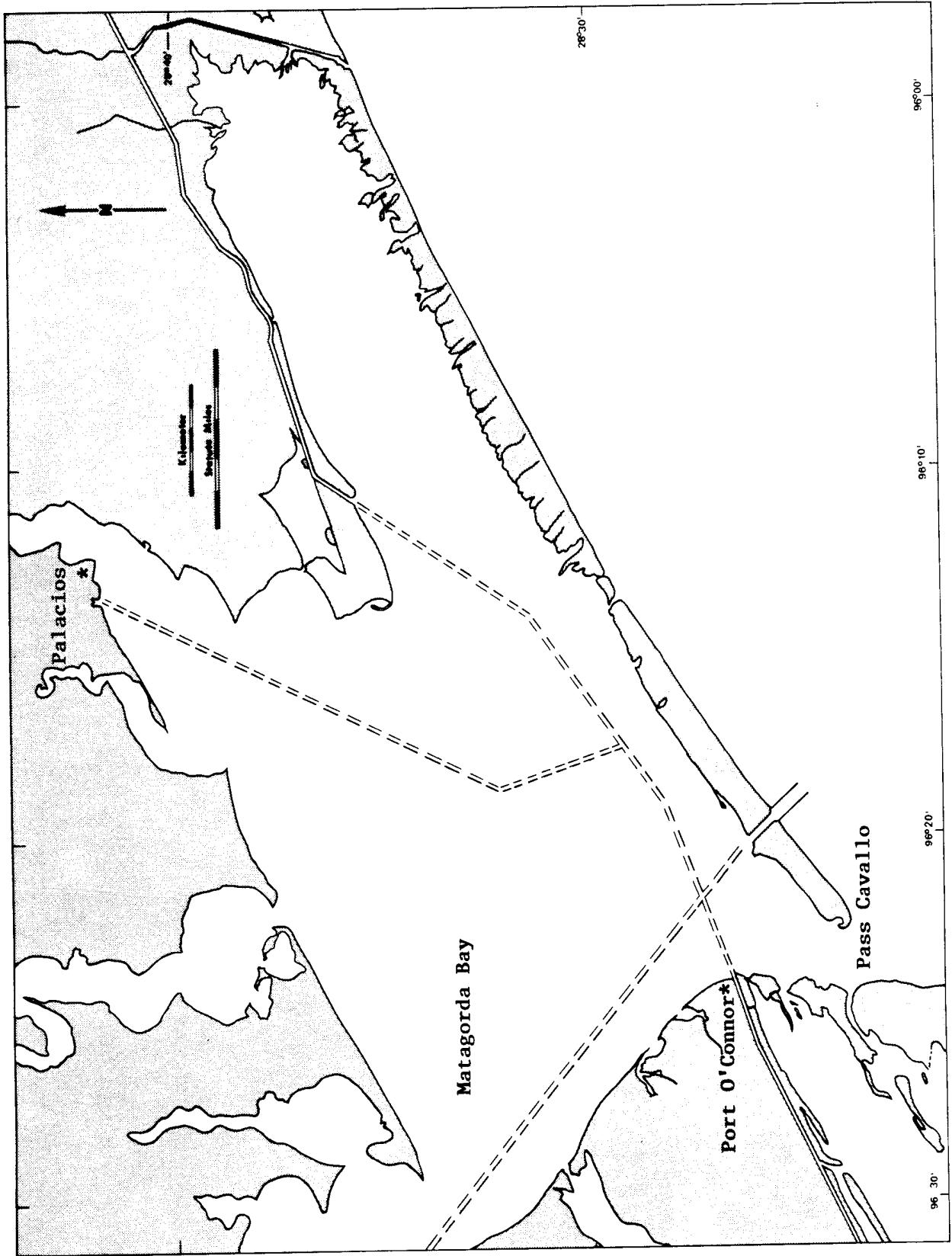


(B)

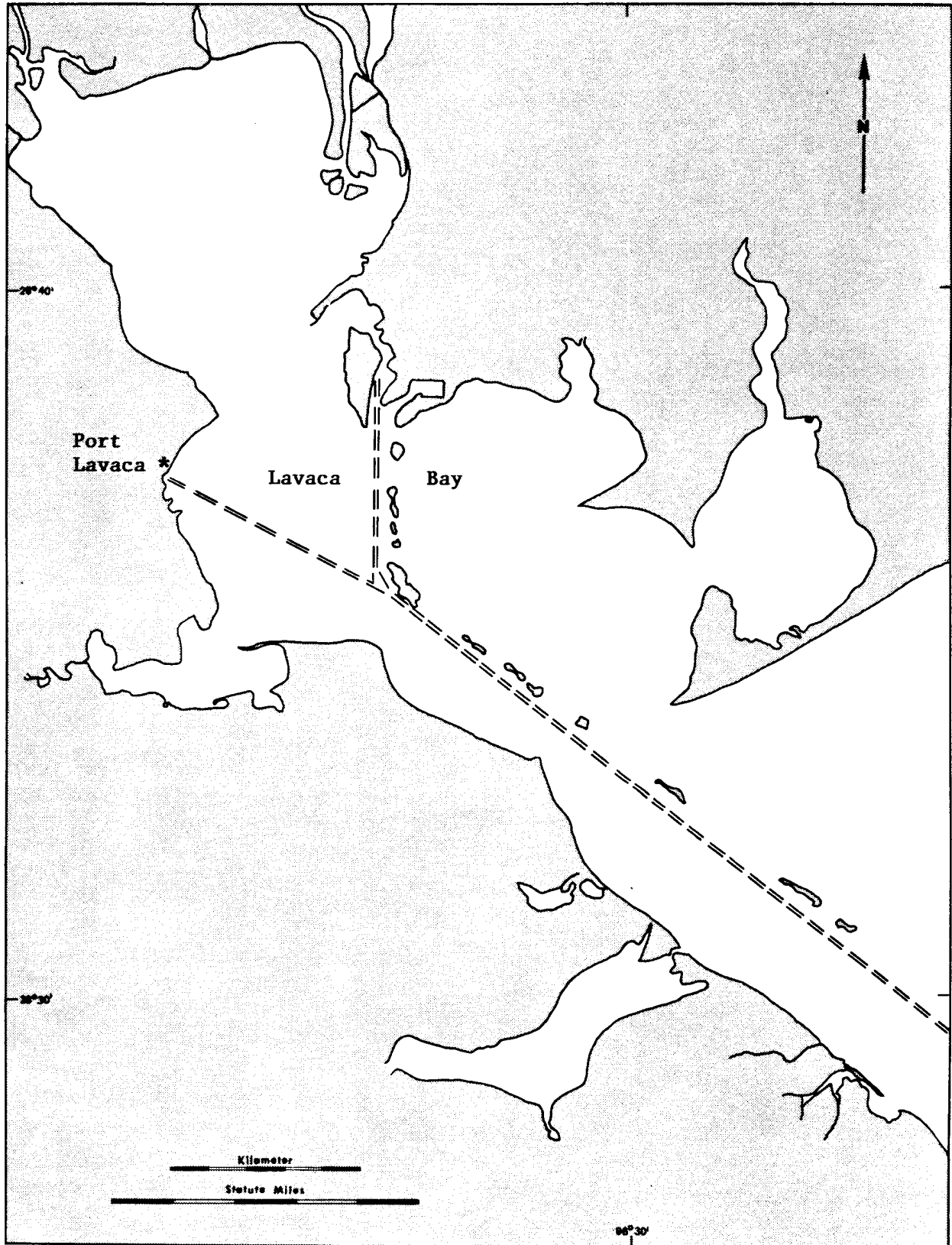
Figure 3. Matagorda Bay System.

(A) Matagorda Bay

(B) Lavaca Bay



(A)



(B)

Figure 4. San Antonio Bay System.

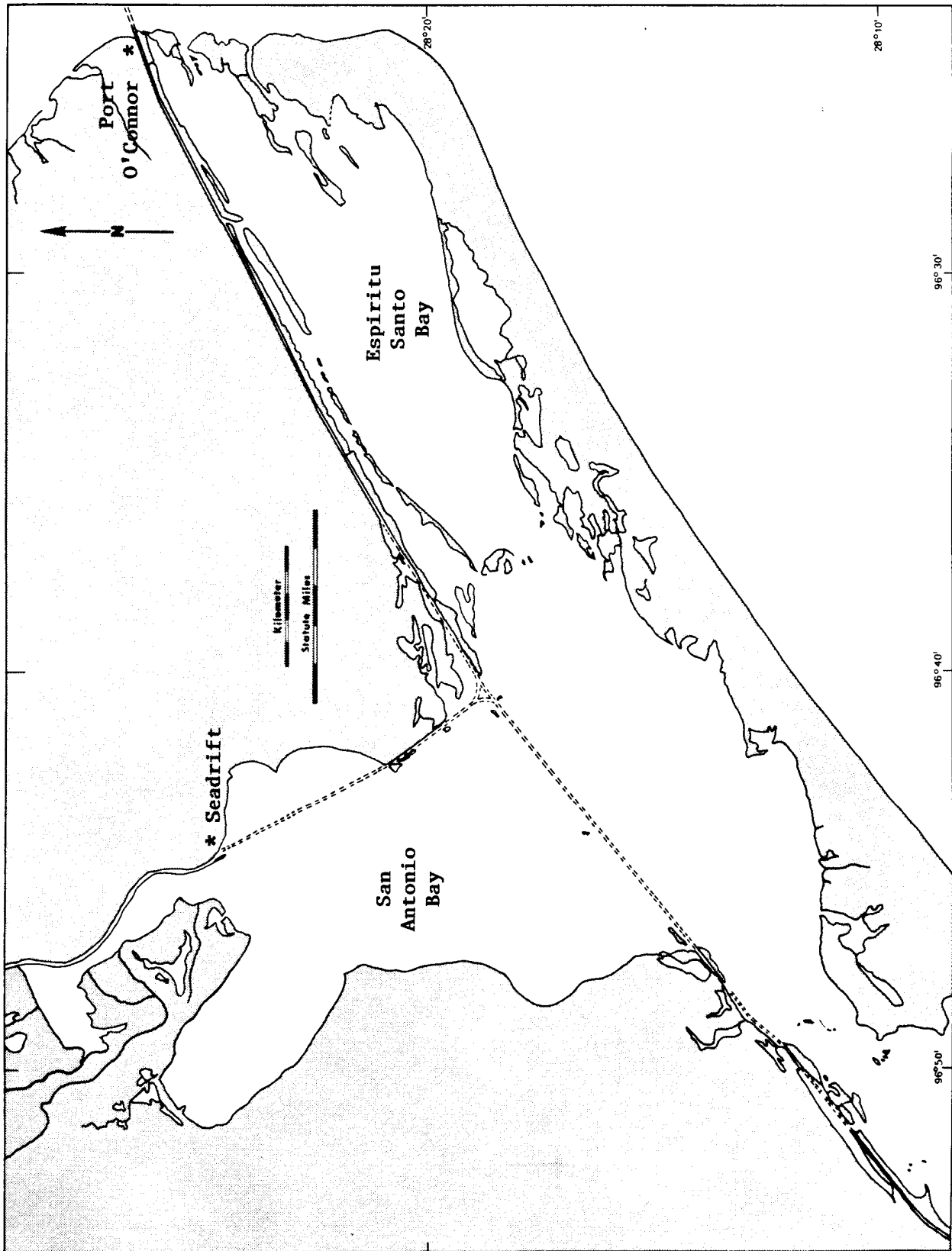


Figure 5. Aransas Bay System.

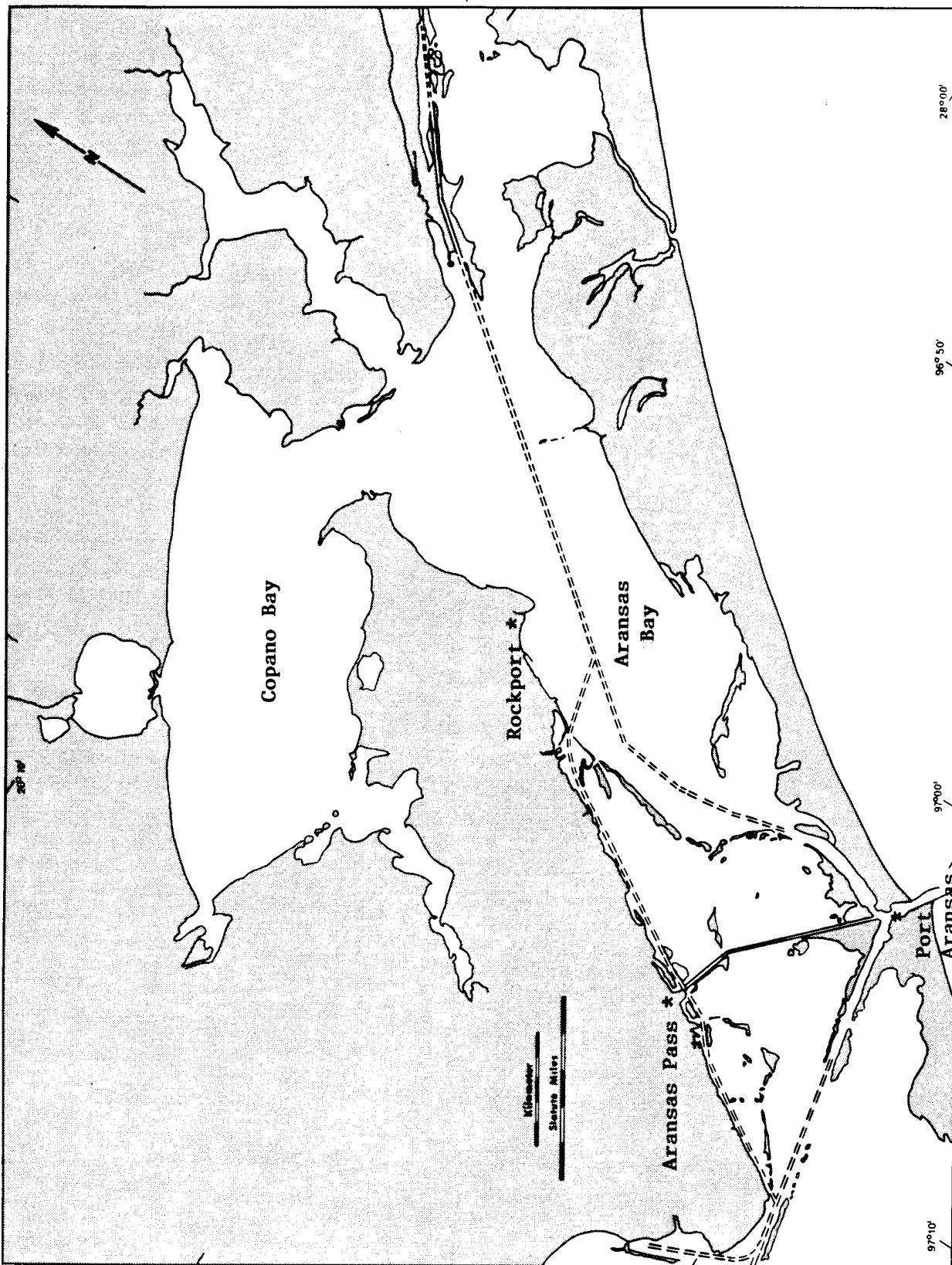


Figure 6. Corpus Christi Bay System.

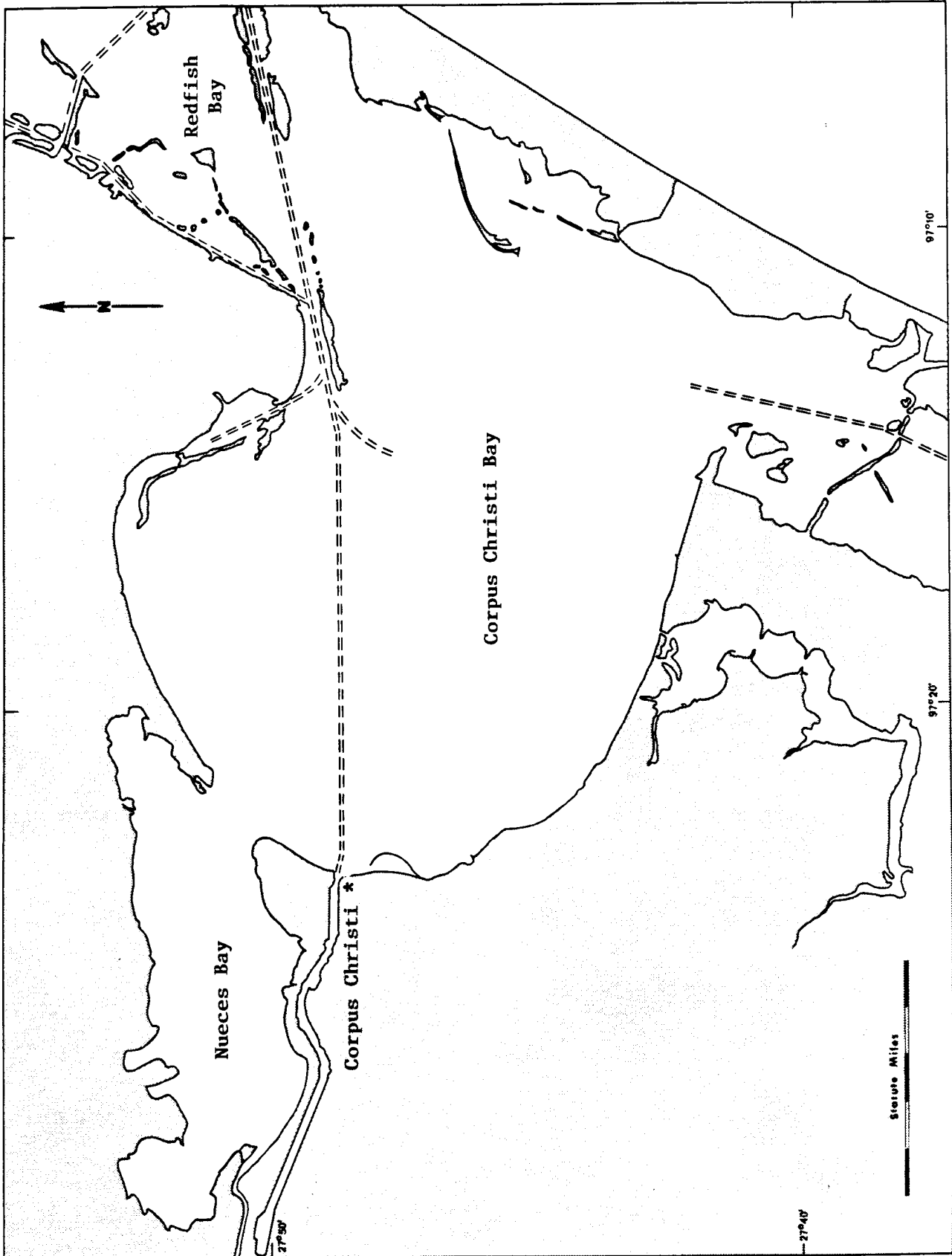


Figure 7. Upper Laguna Madre System.

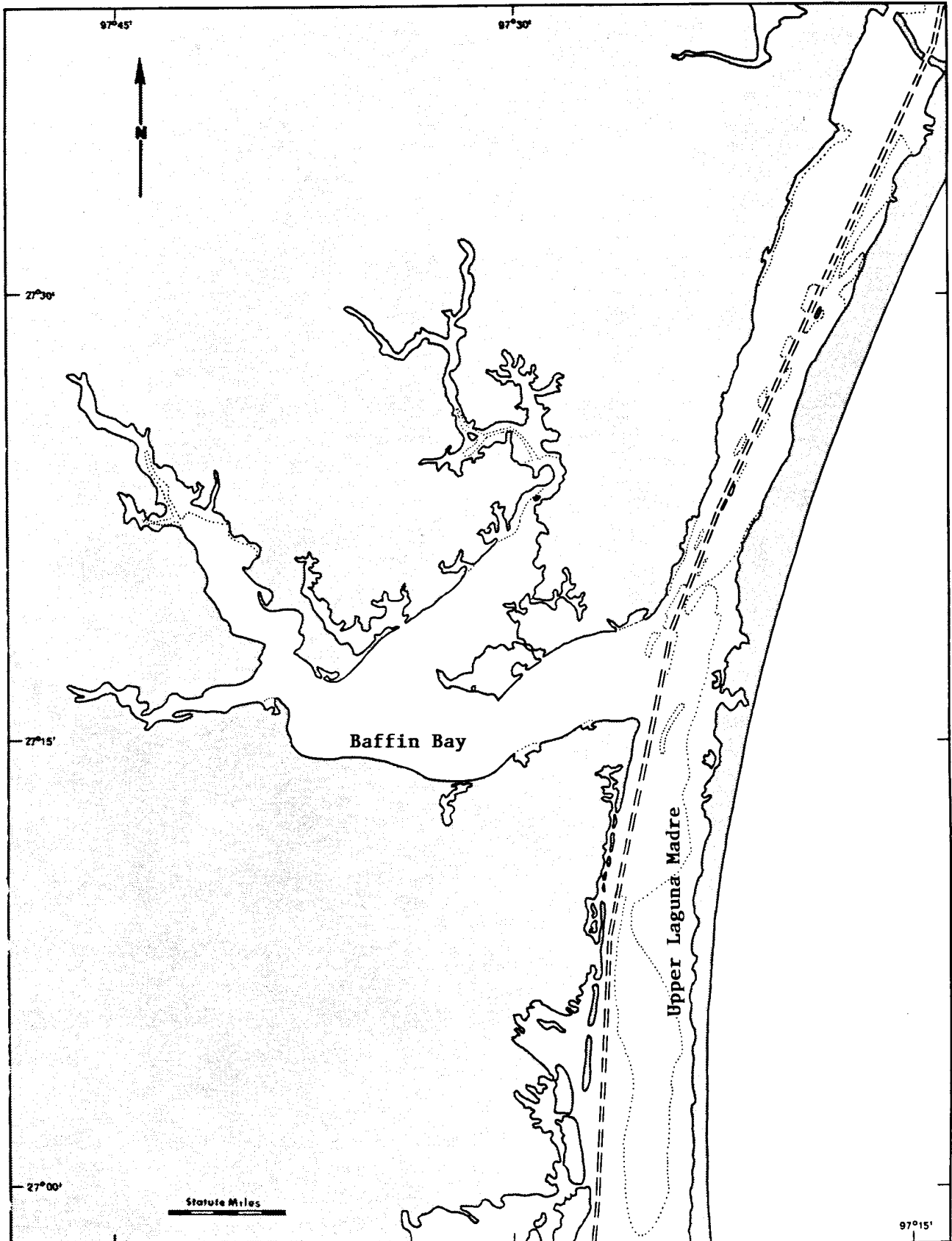
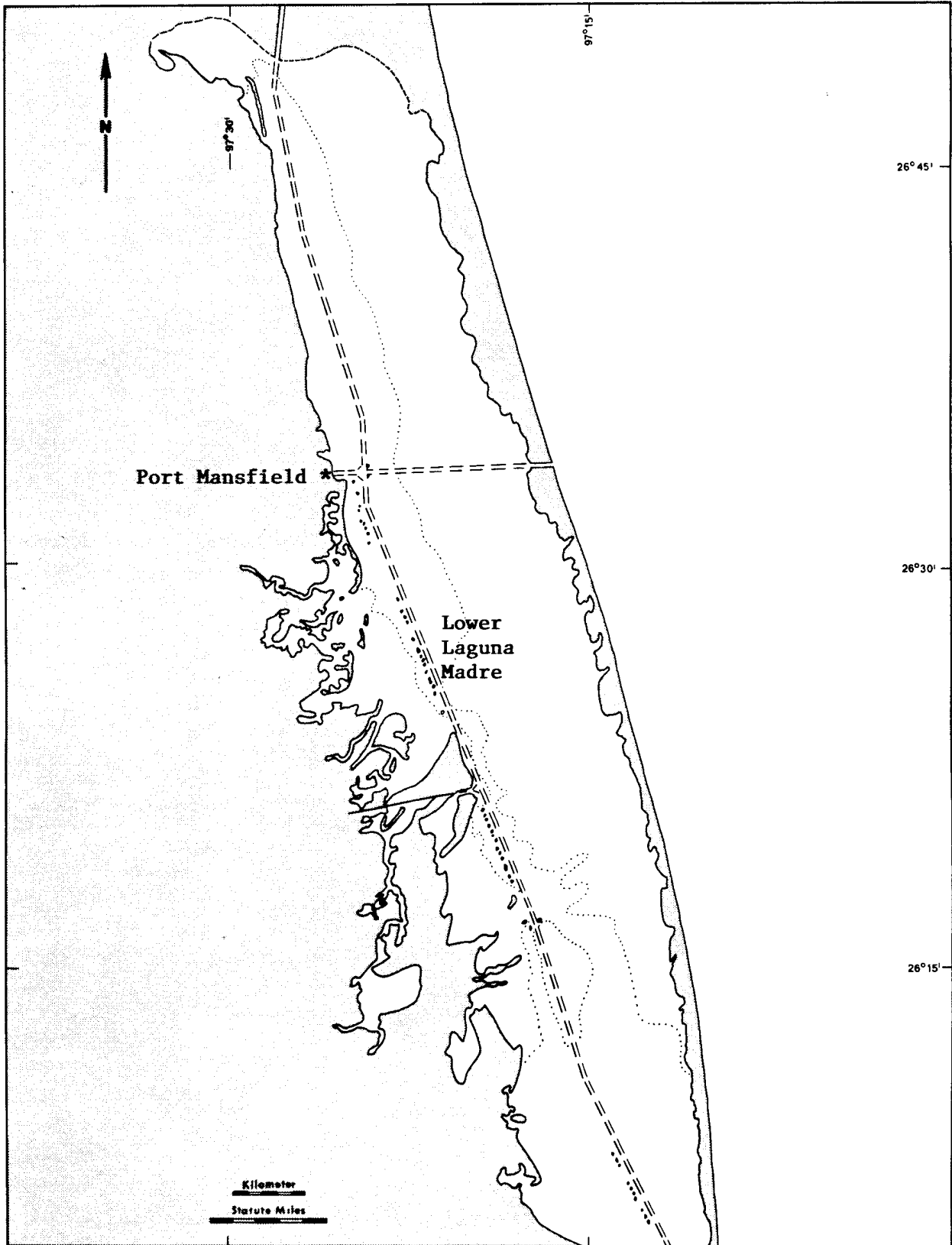


Figure 8. Lower Laguna Madre System.

(A) Lower Laguna Madre

(B) South Bay



(A)

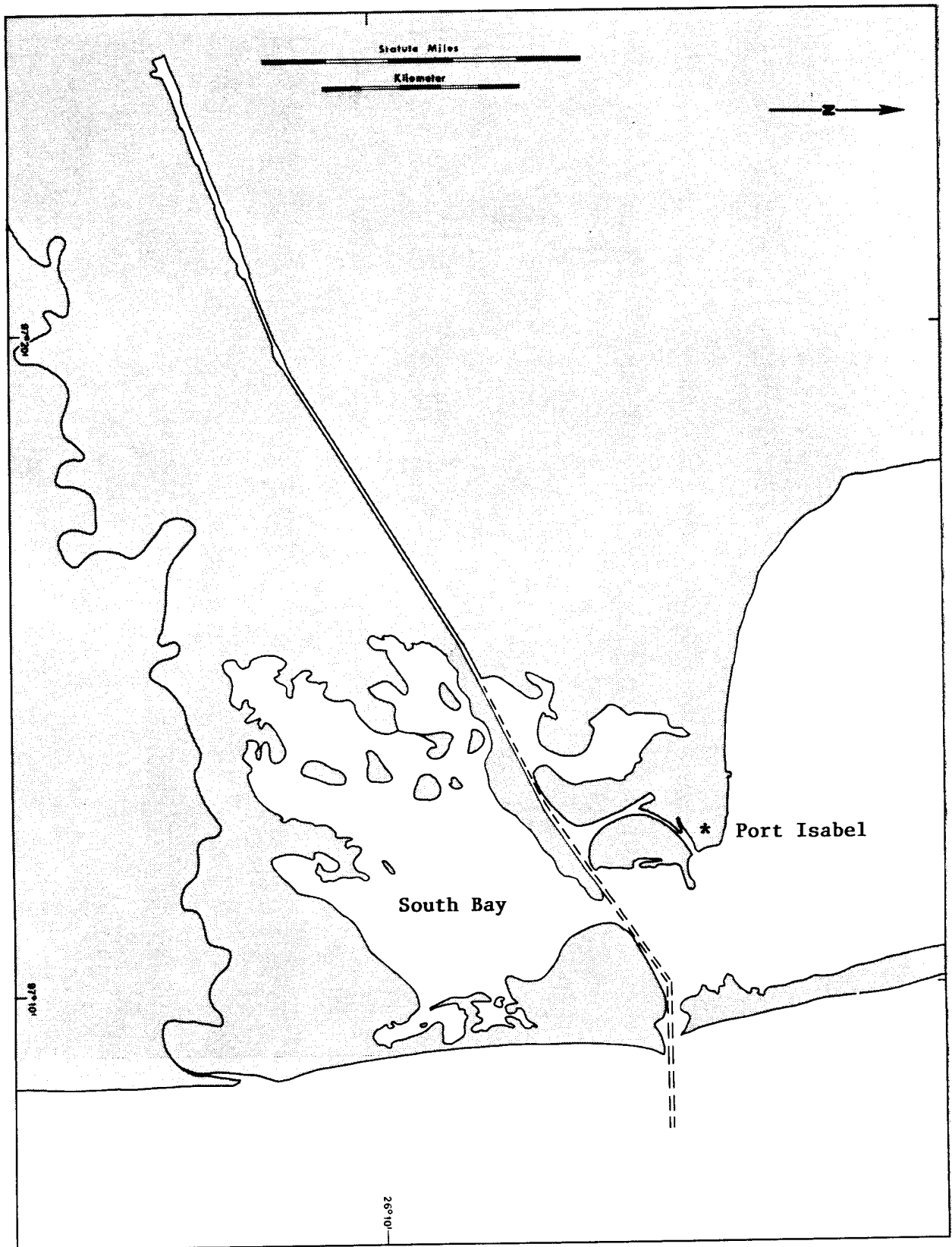


Figure 9. East Matagorda Bay System.

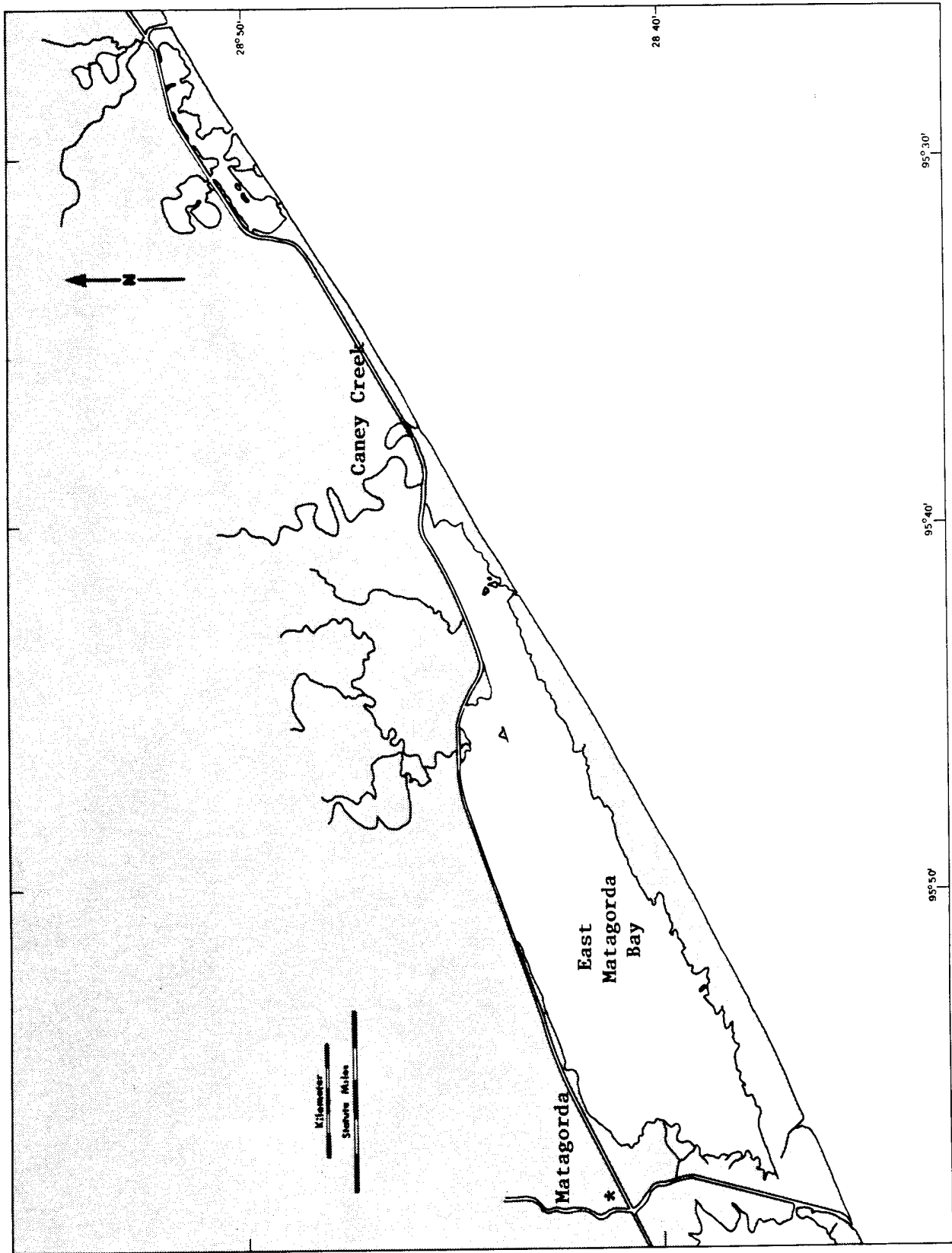
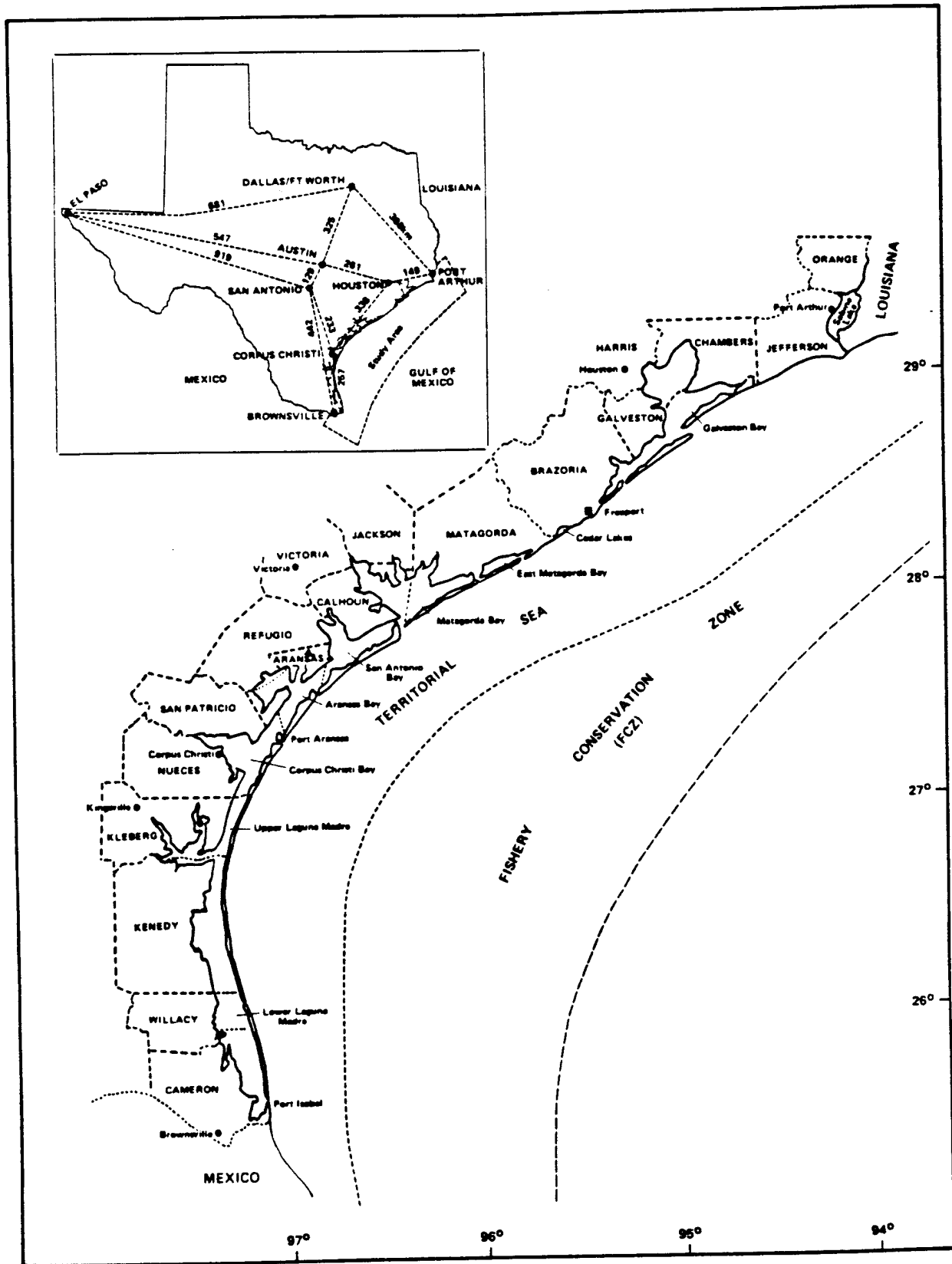


Figure 10. Texas Territorial Sea.



Appendix A. Monthly mean catch rates of selected shellfishes and finfishes caught in bag seines, bay trawls and gulf trawls in Texas bay systems.

Table A.1. Monthly mean catch rates (No./ha) and mean total lengths (mm) of select shellfishes caught with 18.3-m bag seines in Texas bay systems during January-December 1986. Blank indicates no measurement taken.

Species	Month	East						Upper						Coastwide							
		Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Laguna Madre		Laguna Madre					
		No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length				
Blue crab	Jan	43	46	70	30	20	57	7	17	3	31	7	20	3	54	13	30	53	26	28	30
	Feb	43	47	20	30	50	49	137	30	110	38	7	18	17	22	37	27	107	37	60	33
	Mar	77	63	277	48	410	39	170	37	327	40	77	52	423	40	63	54	563	40	262	42
	Apr	60	83	277	58	107	61	133	54	53	40	80	45	147	32	40	44	97	45	129	52
	May	53	107	78	72	53	88	90	61	60	58	30	53	110	43	70	39	27	32	65	58
	Jun	17	134	37	115	87	89	67	104	27	52	23	41	43	37	0	20	20	29	33	82
	Jul	40	119	97	74	110	62	17	92	20	90	13	51	30	57	23	49	67	50	46	69
	Aug	27	86	13	74	27	97	23	121	10	98	60	42	30	58	10	66	63	60	29	67
	Sep	0		10	47	73	74	33	46	83	61	17	57	30	38	13	85	57	27	32	50
	Oct	33	84	47	35	17	33	7	24	17	53	19	91	33	60	0	27	27	64	23	52
	Nov	23	69	10	24	43	32	7	26	10	65	23	25	13	48	3	21	7	19	12	34
	Dec	27	64	147	51	37	47	0	0	27	26	7	59	40	33	0	0	3	33	41	39
Brown shrimp	Jan	0		0		0		0		13	50	0		0	3	30	7	56	3	49	
	Feb	0		0		7	40	10	35	27	54	3	37	3	54	23	40	147	46	27	46
	Mar	33	40	17	32	180	37	60	34	0	54	13	51	197	51	3	42	727	51	132	49
	Apr	1593	68	743	49	1077	63	1610	67	113	64	950	55	223	52	860	55	1580	54	943	58
	May	1850	70	626	68	2920	63	3223	71	470	67	500	54	1257	59	1283	74	2213	55	1422	65
	Jun	3427	81	170	67	1550	65	913	63	257	70	657	82	340	71	3	61	1463	59	684	69
	Jul	160	79	150	58	770	65	83	63	183	60	230	74	80	62	30	69	490	55	199	62
	Aug	3	53	137	50	20	50	63	51	27	65	290	59	43	51	43	59	117	58	104	58
	Sep	3	63	80	62	40	59	67	47	323	57	53	54	130	49	3	86	263	48	117	54
	Oct	190	61	27	61	47	55	213	58	203	72	59	60	137	45	30	63	387	52	141	57
	Nov	3	43	17	63	80	51	37	102	30	75	23	49	30	71	30	41	113	52	39	62
	Dec	0		0		3	24	0	0	0	0	0	0	7	51	0	0	17	41	3	42
Pink shrimp	Jan	0		0		3	73	0		0		0		0	0	0	0	0		<1	73
	Feb	0		0		0		0		0		0		0	0	0	0	0		0	0
	Mar	0		0		0		0		0		150	37	33	56	17	32	40	65	30	43
	Apr	0		0		0		0		0		3	30	30	51	3	73	0		3	51
	May	0		0		0		0		0		0		7	88	0	0	0		<1	88
	Jun	0		0		0		0		0		0		0	0	0	0	0		0	0
	Jul	0		0		0		0		0		0		0	0	0	0	0		0	0
	Aug	0		0		0		0		0		10	50	0	0	0	0	0		1	50
	Sep	0		0		0		0		3	68	7	37	123	47	3	46	0		12	47
	Oct	0		0		0		0		0		11	55	73	44	23	40	0		10	45
	Nov	0		0		0		0		0		0		23	53	23	47	0		5	49
	Dec	0		0		0		0		0		0		7	64	7	48	0		1	55

Table A.1. (Cont'd.)

Species	Month	East												Upper				Lower				
		Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aranzas	Corpus Christi	Laguna Madre	Laguna Madre	Laguna Madre	Laguna Madre	Coastwide	Laguna Madre	Laguna Madre	Laguna Madre	Coastwide					
		No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	No./ha	Length	
White	Jan	0		0		0		0		0		0		0		0		0		0		0
shrimp	Feb	0		0		0		0		0		0		0		3	66	1	89			
	Mar	23	80	0		0		0		0		17	57	0		0		0		2	66	
	Apr	123	82	7	120	0		33	76	0		0		0		0		0		9	85	
	May	13	102	0		10	142	0		3	27	0		0		0		0		1	86	
	Jun	0		53	36	263	53	1050	48	13	33	340	48	0		1443	50	403	49			
	Jul	1033	79	693	61	1017	64	480	74	90	49	27	66	13	62	3	43	10	43	304	66	
	Aug	417	77	417	61	140	91	400	84	453	67	2553	39	133	80	10	37	110	47	585	52	
	Sep	233	81	1950	68	300	76	3190	67	410	70	347	65	743	52	3	45	140	47	1063	66	
	Oct	1150	71	11777	62	253	56	2313	69	433	75	170	56	283	64	13	58	320	41	2984	63	
	Nov	680	63	1760	61	93	51	670	66	63	66	17	36	20	72	0	70	55	513	62		
	Dec	23	52	3	43	3	63	0		180	40	0		3	65	0	0	0	23	41		

Table A.2. Monthly mean catch rates (No./h) and mean total lengths (mm) of select shellfishes and finfishes caught with 6.1-m trawls in Texas bay systems during January-December 1986. Blank indicates no measurement taken.

Species	Month	Sabine Lake		Galveston		Mataforda		San Antonio		Aransas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Blue crab	Jan	1	127	7	59	1	115	7	85	5	77	0	0	0	0	1	145	4	73
	Feb	1	133	11	82	11	51	9	77	9	61	8	65	4	128	6	95	9	72
	Mar	1	119	16	70	10	54	18	65	46	70	14	75	18	82	15	90	16	69
	Apr	<1	149	61	67	24	82	51	75	74	73	57	82	35	83	34	65	47	73
	May	11	127	61	81	20	99	32	91	22	94	13	96	25	114	15	92	35	88
	Jun	13	130	28	101	13	111	12	98	12	95	9	108	22	97	11	102	18	103
	Jul	7	115	11	90	5	99	11	108	12	88	8	117	4	119	15	84	9	97
	Aug	4	134	10	79	10	93	4	126	9	94	4	125	18	103	13	89	9	93
	Sep	4	153	8	88	2	117	2	132	3	101	1	113	5	142	4	92	4	102
	Oct	5	147	8	91	5	67	2	116	6	98	1	134	1	143	7	101	5	91
	Nov	3	168	4	53	2	60	3	71	3	67	1	108	6	129	1	67	3	71
	Dec	1	129	3	68	2	94	2	68	4	65	1	32	2	80	1	151	2	73
Brown shrimp	Jan	0		<1	90	0		0		1	74	2	107	5	103	1	74	1	99
	Feb	0		0		8	111	1	70	2	86	15	104	6	104	0		4	106
	Mar	0		2	98	2	103	8	90	22	97	10	105	32	123	8	83	7	103
	Apr	0		15	94	38	95	146	88	107	90	57	102	25	102	2	71	48	92
	May	<1	99	50	92	105	103	296	100	438	98	80	96	28	107	19	67	124	99
	Jun	3	98	39	99	72	93	49	106	151	94	67	86	5	113	4	65	54	96
	Jul	0		4	102	3	106	19	108	118	100	96	93	8	106	9	65	24	98
	Aug	0		1	74	2	85	1	108	33	95	4	102	0		<1	48	4	93
	Sep	0		1	78	1	91	14	96	7	96	1	84	4	102	62	60	6	79
	Oct	1	103	7	79	2	82	10	95	22	92	1	86	0		9	62	6	85
	Nov	0		<1	88	<1	92	15	104	5	91	5	100	4	92	6	80	3	99
	Dec	0		0		0		2	100	<1	96	2	101	7	86	0		1	94
Pink shrimp	Jan	0		0		0		<1	104	1	78	1	103	1	86	0		>1	95
	Feb	0		0		1	131	0		2	83	5	99	0		0		1	102
	Mar	0		0		6	115	7	101	15	101	9	105	0		0		4	106
	Apr	0		<1	118	11	115	23	103	50	108	36	114	15	114	0		14	110
	May	0		0		1	108	1	104	0		2	98	0		0		1	103
	Jun	0		0		0		0		0		1	99	1	83	0		<1	92
	Jul	0		0		0		0		0		0		0		0		0	0
	Aug	0		0		0		<1	130	<1	40	0		0		0		<1	80
	Sep	0		0		0		0		1	91	<1	92	0		0		<1	91
	Oct	0		0		0		1	97	16	88	1	85	1	55	0		1	88
	Nov	0		0		0		3	103	3	88	36	94	1	124	<1	70	4	94
	Dec	0		0		1	95	0		4	85	6	98	0		0		1	94

SHELLFISHES

Table A. 2. (Cont'd.)

Species	Month	Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide			
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length		
White shrimp	Jan	0		12	81	0		2	80	<1	98	1	99	0		0		0	4	81	
	Feb	0		6	87	2	88	1	72	<1	87	5	100	2	107	0		0	3	89	
	Mar	2	84	15	97	16	106	4	65	1	59	3	105	6	114	0		0	10	99	
	Apr	8	106	32	108	2	132	16	86	3	135	5	128	2	130	<1	131		14	107	
	May	50	119	9	123	1	151	1	155	1	132	3	142	1	154	0		0	6	125	
	Jun	1	128	<1	131	<1	138	1	72	1	63	2	165	1	135	0		0	1	128	
	Jul	0		46	92	213	92	26	95	23	88	73	92	1	129	0		0	74	92	
	Aug	12	98	53	97	97	112	21	100	35	106	13	105	2	142	0		0	46	105	
	Sep	<1	106	62	93	93	54	100	17	97	3	105	28	90	8	86	40	51	40	93	
	Oct	42	92	83	99	67	97	20	107	25	104	8	101	13	110	1	91	1	50	99	
	Nov	2	80	31	82	8	94	11	104	9	99	9	102	18	104	3	114	3	17	88	
	Dec	1	65	13	85	29	85	6	91	2	98	4	101	2	90	<1	104	<1	12	86	
Atlantic croaker	Jan	8	161	6	91	1	74	4	59	1	47	7	108	3	138	2	122	2	4	96	
	Feb	6	156	4	92	14	74	15	68	10	45	24	108	15	127	5	112	5	11	87	
	Mar	4	169	30	109	35	79	39	82	74	67	78	112	7	141	9	114	9	37	94	
	Apr	4	152	47	114	58	111	146	108	101	91	74	108	48	119	15	124	15	66	109	
	May	10	189	89	122	190	116	63	117	108	105	105	116	53	124	11	129	11	102	118	
	Jun	8	188	13	132	41	122	48	104	58	95	69	123	45	135	55	140	36	36	119	
	Jul	3	174	13	139	28	119	34	116	34	109	90	131	6	148	18	153	18	28	126	
	Aug	4	158	12	134	44	129	4	124	46	115	90	131	12	155	75	172	31	31	134	
	Sep	2	137	15	148	8	135	5	123	10	130	77	140	28	169	26	174	19	19	145	
	Oct	10	135	10	155	3	142	3	139	14	133	45	147	7	184	5	159	11	11	148	
	Nov	15	138	8	127	1	144	<1	151	4	144	17	151	14	182	8	150	7	7	143	
	Dec	10	147	4	146	2	60	0	0	2	136	3	130	2	173	<1	205	<1	3	134	
Black drum	Jan	<1	229	<1	256	0		0	0	0	0	0	0	0	0	0	0	0	<1	253	
	Feb	<1	316	0		0		0	0	0	0	0	0	1	250	0		0	<1	268	
	Mar	0		<1	245	0		0	0	0	0	<1	269	0		1	285	0	<1	261	
	Apr	0		<1	227	0		0	0	0	0	0	0	0		0		0	<1	227	
	May	<1	256	0		0		0	0	0	0	0	0	0		0		0	<1	256	
	Jun	0		0		0		0	0	0	0	0	0	0		0		0	0	0	
	Jul	0		0		0		0	0	0	0	0	0	0		0		0	0	0	
	Aug	<1	162	0		0		0	0	0	0	0	0	0		0		0	<1	162	
	Sep	<1	230	0		0		0	0	0	0	0	0	0		0		0	<1	230	
	Oct	<1	277	0		0		0	0	0	0	0	0	1	222	0		0	<1	237	
	Nov	<1	180	<1	180	0		0	0	0	0	<1	465	0		0		<1	436	<1	262
	Dec	1	194	0		0		0	0	0	0	0	0	0		0		0	<1	194	

FISHES

Table A. 2. (Cont'd.)

Species	Month	Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Gafftopsail catfish	Jan	0		0		0		0		0		0		0		0		0	
	Feb	0		0		0		0		0		0		0		0		0	
	Mar	0		0		0		0		0		0		0		0		0	
	Apr	0		0		0		0		0		0		0		0		0	
	May	0		0		0		0		0		<1	232	0		0		<1	
	Jun	0		0		0		0		0		0		0		0		0	
	Jul	0		3	112	4	111	28	123	6	106	2	57	0		0		6	116
	Aug	0		1	152	8	143	8	142	10	127	0		0		0		4	140
	Sep	0		1	167	1	137	1	145	1	139	0		1	158	0		1	150
	Oct	0		0		<1	180	<1	151	<1	71	0		0		0		<1	151
	Nov	0		0		0		0		0		0		0		0		0	
	Dec	0		0		0		0		0		0		0		0		0	
Gulf menhaden	Jan	<1	109	36	88	1	88	4	77	<1	104	<1	152	0		0		13	87
	Feb	0		11	99	12	59	1	35	7	33	0		2	26	0		7	78
	Mar	<1	156	18	86	2	66	54	38	40	46	0		0		0		17	58
	Apr	1	122	2	86	<1	137	13	72	7	63	<1	204	0		0		3	76
	May	0		6	90	4	112	2	90	2	92	<1	210	0		0		3	96
	Jun	0		2	106	<1	138	16	65	3	75	1	66	0		0		3	77
	Jul	0		4	100	2	88	12	76	3	91	<1	203	1	53	0		4	88
	Aug	0		4	73	4	81	7	87	<1	78	<1	150	0		0		3	80
	Sep	0		3	94	0		2	84	1	105	0		2	70	0		1	91
	Oct	0		2	111	3	107	3	92	2	91	1	170	0		0		3	103
	Nov	0		35	106	0		<1	118	0		1	167	0		0		12	107
	Dec	<1	98	16	100	<1	77	24	86	1	137	1	154	0		0		9	96
Hardhead catfish	Jan	0		0		0		0		0		<1	243	0		<1	396	<1	287
	Feb	0		2	259	1	162	<1	331	<1	320	1	181	0		2	207	1	226
	Mar	0		29	168	4	166	<1	151	4	195	24	182	17	257	<1	250	14	176
	Apr	1	162	2	172	4	149	2	179	8	189	11	172	7	244	6	173	4	177
	May	5	186	1	148	1	141	1	283	4	184	10	179	6	183	11	185	3	178
	Jun	9	192	3	176	2	160	1	209	6	221	21	175	3	238	8	220	5	185
	Jul	5	175	10	157	6	116	2	220	6	108	20	159	2	242	5	199	8	152
	Aug	6	162	5	158	6	152	<1	208	5	218	23	182	2	239	20	199	77	175
	Sep	2	187	5	169	1	135	2	165	3	161	18	169	2	209	5	208	5	170
	Oct	6	169	6	152	1	145	1	109	4	124	14	152	0		8	244	5	155
	Nov	0		<1	186	1	213	<1	99	32	114	4	157	2	159	15	219	4	142
	Dec	0		0		0		0		0		<1	155	0		<1	180	<1	166

Table A.2. (Cont'd.)

Species	Month	Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Upper Laguna Madre		Lower Laguna Madre		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Pinfish	Jan	0		<1	159	1	100	1	97	1	91	78	106	1	132	51	121	10	109
	Feb	<1	149	2	126	3	94	1	100	1	104	52	111	1	157	18	117	7	112
	Mar	<1	113	1	113	1	102	3	97	3	108	58	117	4	136	29	111	8	115
	Apr	0		0		1	104	1	100	9	70	26	121	2	130	19	70	5	103
	May	<1	68	1	92	10	87	5	86	31	114	20	126	6	117	96	87	12	100
	Jun	1	96	2	93	4	108	14	84	34	90	57	112	37	115	47	100	16	105
	Jul	1	100	2	100	16	93	23	91	35	95	30	109	128	106	38	89	22	100
	Aug	10	101	2	105	26	107	14	96	91	96	35	107	142	106	32	116	29	104
	Sep	9	126	1	117	3	129	40	97	53	104	21	119	53	108	36	116	17	107
	Oct	5	136	1	134	6	101	33	108	105	109	38	125	115	113	42	103	26	112
	Nov	2	145	6	138	6	111	8	108	70	113	309	116	47	120	346	114	58	116
	Dec	0		<1	118	<1	90	2	99	14	105	95	118	9	108	24	115	13	116
Red drum	Jan	0		0		0		0		<1	78	0		0		0		<1	78
	Feb	0		0		0		0		0		0		0		0		0	
	Mar	0		0		0		0		0		0		0		0		0	
	Apr	0		0		0		0		0		0		0		0		0	
	May	0		0		0		0		0		0		0		0		0	
	Jun	0		0		0		0		0		0		0		0		0	
	Jul	<1	212	0		0		0		0		0		0		0		<1	212
	Aug	0		0		0		0		0		0		0		<1	273	<1	273
	Sep	0		0		0		0		0		0		0		0		0	
	Oct	0		0		0		0		0		0		1	630	0		<1	630
	Nov	0		0		0		0		0		0		0		1	362	<1	362
	Dec	0		0		0		<1	35	0		0		0		0		<1	35
Sand seatrout	Jan	0		1	82	0		0		0		0		0		0		<1	82
	Feb	0		0		<1	154	0		0		2	213	0		0		<1	201
	Mar	0		1	132	3	121	0		<1	157	<1	136	0		0		1	125
	Apr	0		2	154	<1	191	0		0		1	179	0		0		1	162
	May	1	152	2	163	2	146	0		0		1	171	0		0		1	157
	Jun	2	137	<1	146	1	86	0		2	125	4	124	0		<1	176	1	124
	Jul	<1	141	4	123	2	88	0		1	125	7	136	0		0		3	121
	Aug	<1	248	3	118	6	110	0		1	137	6	149	0		0		3	122
	Sep	1	164	6	156	2	138	<1	84	0		15	147	0		1	143	4	150
	Oct	1	152	6	144	1	109	<1	164	1	150	4	148	0		0		3	141
	Nov	0		1	194	<1	61	<1	88	0		2	164	0		0		1	156
	Dec	0		1	112	0		0		0		0		0		0		<1	112

Table A. 2. (Cont'd.)

Species	Month	Sabine Lake		Galveston		Matagorda		San Antonio		Aransas		Corpus Christi		Upper		Lower		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Other finfishes	Jan	2	200	25	48	6	108	10	53	7	43	5	98	34	47	5	100	14	57
	Feb	1	63	7	120	22	94	5	56	11	67	20	128	60	51	6	111	14	90
	Mar	<1	138	15	106	34	95	17	75	39	77	29	126	57	80	15	118	24	96
	Apr	<1	310	7	119	27	107	6	90	33	98	45	116	39	99	12	141	19	109
	May	2	333	5	92	13	133	5	99	18	88	42	143	60	68	49	119	16	112
	Jun	1	162	4	157	17	142	9	80	34	79	91	97	26	83	19	131	20	106
	Jul	<1	174	5	120	19	111	9	123	27	88	40	134	66	57	16	140	17	105
	Aug	1	107	7	110	24	84	5	98	18	115	56	148	23	106	63	158	19	120
	Sep	2	125	12	92	10	103	5	106	50	89	46	135	59	87	53	110	21	104
	Oct	3	129	21	83	8	77	10	97	21	96	17	139	25	98	44	145	17	99
	Nov	<1	126	10	108	16	73	2	81	10	87	27	136	51	96	92	123	17	105
	Dec	0		5	108	5	82	6	51	19	60	7	104	7	157	6	130	6	95
Total finfishes	Jan	21	170	106	122	28	122	19	65	11	57	153	126	40	62	66	133	66	119
	Feb	10	145	35	122	108	104	22	71	34	66	152	131	82	73	30	123	62	109
	Mar	5	165	101	124	102	102	123	61	176	75	236	132	87	124	56	118	117	107
	Apr	8	152	69	114	100	113	194	102	201	94	166	123	107	119	56	115	111	110
	May	21	192	131	124	253	113	98	112	227	95	230	140	139	130	172	178	168	119
	Jun	25	166	35	126	81	123	122	91	233	97	273	122	136	117	134	127	105	114
	Jul	10	164	46	132	94	111	122	109	219	103	239	129	228	92	82	123	110	115
	Aug	23	133	39	125	147	113	46	111	259	114	437	133	192	116	196	155	135	124
	Sep	18	145	47	133	34	123	83	106	230	111	273	137	152	115	124	133	94	125
	Oct	32	142	50	119	24	105	68	108	282	115	226	138	160	118	102	136	91	122
	Nov	29	134	75	123	33	99	19	109	191	121	545	136	122	122	483	137	133	129
	Dec	29	137	47	136	30	126	53	99	70	109	151	128	21	150	35	126	54	125

Table A.3. Monthly mean catch rates (No./h) and mean total lengths (mm) of select shellfishes and finfishes caught with 6.1-m trawls in the Texas Territorial Sea during January-December 1986. Blank indicates no measurement taken; ND = no data.

Species	Month	Sabine		Galveston		Port O'Connor		Arkansas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Blue crab	Jan	ND		4	54	0		0		0		1	54
	Feb	ND		12	61	0		0		0		3	61
	Mar	ND		2	99	<1	163	0		<1	70	1	103
	Apr	ND		4	148	0		1	165	2	88	2	137
	May	ND		7	129	1	152	<1	172	2	139	3	134
	Jun	5	136	10	114	2	138	4	148	0		4	127
	Jul	8	87	10	136	5	135	2	134	<1	138	5	121
	Aug	0		1	149	1	162	2	139	1	150	1	148
	Sep	0		0		0		<1	130	1	140	<1	135
	Oct	0		0		0		0		0		0	
	Nov	<1	64	0		0		0		0		<1	64
	Dec	8	82	<1	38	0		<1	148	0		2	83
Brown shrimp	Jan	ND		0		<1	97	<1	99	0		<1	98
	Feb	ND		<1	89	0		<1	94	0		<1	92
	Mar	ND		2	113	3	116	1	122	12	116	5	116
	Apr	ND		<1	103	<1	108	3	113	6	98	2	103
	May	ND		59	98	5	102	29	98	8	95	25	98
	Jun	30	105	12	103	19	110	24	108	9	115	19	107
	Jul	10	108	10	102	16	119	14	106	4	115	11	110
	Aug	4	116	10	111	1	127	2	108	5	118	4	114
	Sep	2	117	4	109	<1	140	7	116	3	118	3	115
	Oct	<1	89	12	85	<1	73	1	98	<1	96	3	86
	Nov	0		1	82	0		1	97	<1	106	<1	94
	Dec	0		0		0		<1	98	<1	110	<1	101
Pink shrimp	Jan	ND		0		0		0		1	116	<1	116
	Feb	ND		0		0		<1	116	9	122	2	122
	Mar	ND		1	124	1	114	9	107	4	117	4	111
	Apr	ND		<1	125	1	108	7	105	10	113	4	110
	May	ND		0		9	111	6	101	4	117	5	109
	Jun	0		0		<1	136	2	119	0		1	122
	Jul	0		0		<1	140	0		<1	148	<1	145
	Aug	0		0		0		0		<1	121	<1	121
	Sep	0		0		0		<1	119	0		<1	119
	Oct	0		0		0		0		0		0	
	Nov	0		0		0		2	99	0		<1	99
	Dec	0		0		1	81	3	102	<1	128	1	99

SHELLFISHES

Table A.3. (Cont'd.)

Species	Month	Sabine		Galveston		Port O'Connor		Aransas		Port Isabel		Coastwide		
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	
Gafftopsail catfish	Jan	ND		0		0		0		0		0		
	Feb	ND		0		0		<1	189	0		<1	189	
	Mar	ND		0		0		0		0		0		
	Apr	ND		0		0		0		0		0		
	May	ND		0		0		0		0		0		
	Jun	0		0		0		0		0		0		
	Jul	40	110	<1	108	1	115	0		0		0	8	110
	Aug	16	136	0		0		0		0		0	3	136
	Sep	6	146	2	122	0		0		0		0	1	141
	Oct	1	197	0		0		<1	164	0		0	<1	188
	Nov	0		0		0		0		0		0	0	
	Dec	0		0		0		0		0		0	0	
Gulf menhaden	Jan	ND		2	127	<1	191	0		0		0	1	134
	Feb	ND		2	141	0		0		0		0	1	141
	Mar	ND		<1	137	0		0		0		<1	137	
	Apr	ND		0		<1	184	0		0		<1	184	
	May	ND		2	150	0		0		0		<1	150	
	Jun	0		5	155	<1	165	0		0		1	155	
	Jul	1	120	0		<1	179	<1	197	0		<1	148	
	Aug	3	106	2	180	0		0		0		1	131	
	Sep	2	124	<1	99	0		0		0		<1	121	
	Oct	5	142	2	148	0		0		0		1	144	
	Nov	<1	230	<1	130	0		0		0		<1	195	
	Dec	5	110	<1	96	0		0		0		1	108	
Hardhead catfish	Jan	ND		<1	102	<1	91	0		0		1	201	
	Feb	ND		2	100	17	154	32	146	0		0	13	148
	Mar	ND		1	116	2	169	3	217	0		0	2	185
	Apr	ND		<1	289	0		0		0		0	<1	289
	May	ND		0		0		0		0		0	0	
	Jun	4	171	3	159	0		0		0		0	2	166
	Jul	4	170	14	182	<1	238	<1	214	0		0	4	182
	Aug	3	152	19	158	0		2	201	0		0	5	160
	Sep	3	192	2	207	0		<1	235	1	262	0	1	207
	Oct	4	164	1	118	0		0	17	160	0		4	159
	Nov	2	96	2	117	<1	131	1	188	1	184	0	1	138
	Dec	0		0		0		6	140	0		0	1	140

Table A.3. (Cont'd.)

Species	Month	Sabine		Galveston		Port O'Connor		Arkansas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Red snapper	Jan	ND		0		0		0		0		0	
	Feb	ND		0		0		0		0		0	
	Mar	ND		0		0		0		0		0	
	Apr	ND		0		0		0		0		0	
	May	ND		0		0		<1	123	<1	120	<1	120
	Jun	0		0		0		<1		0		<1	123
	Jul	0		0		0		0		0		0	
	Aug	0		0		0		3	101	<1	175	1	107
	Sep	0		0		<1	152	3	89	0		1	93
	Oct	0		0		0		<1	92	3	94	1	94
	Nov	0		0		0		0		<1	121	<1	121
	Dec	0		0		0		0		0		0	
Sand seatrout	Jan	ND		13	133	6	144	2	191	0		5	141
	Feb	ND		2	94	5	134	1	139	0		2	125
	Mar	ND		3	191	4	143	1	114	0		2	158
	Apr	ND		0		1	199	0		0		<1	199
	May	ND		2	184	2	155	<1	176	0		1	170
	Jun	<1	193	1	104	5	166	<1	222	0		1	162
	Jul	4	141	1	156	1	181	0		0		1	152
	Aug	10	163	0		<1	191	0		0		2	164
	Sep	4	164	2	152	0		0		0		1	159
	Oct	2	210	2	131	0		<1	193	0		1	168
	Nov	2	168	3	117	1	149	4	183	0		2	153
	Dec	<1	122	5	154	0		1	168	0		1	156
Sheepshead	Jan	ND		0		0		0		0		0	
	Feb	ND		0		0		0		0		0	
	Mar	ND		0		0		0		0		0	
	Apr	ND		0		0		0		0		0	
	May	ND		0		0		0		0		0	
	Jun	0		0		0		0		0		0	
	Jul	0		0		0		0		0		0	
	Aug	0		0		0		0		0		0	
	Sep	0		0		0		0		0		0	
	Oct	0		0		0		0		0		0	
	Nov	0		0		0		0		0		0	
	Dec	0		0		0		0		0		0	

Table A.3. (Cont'd.)

Species	Month	Sabine		Galveston		Port O'Connor		Arkansas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Southern flounder	Jan	ND		0		0		0		0		0	
	Feb	ND		0		<1	194	0		0		<1	194
	Mar	ND		0		0		0		0		0	
	Apr	ND		0		0		0		0		0	
	May	ND		0		0		<1	311	0		<1	311
	Jun	0		0		0		0		0		0	
	Jul	0		0		<1	164	0		0		<1	164
	Aug	0		0		<1	195	0		0		<1	195
	Sep	<1	210	0		0		0		0		<1	210
	Oct	2	132	<1	255	0		0		0		1	144
	Nov	<1	306	0		0		0		0		<1	306
	Dec	<1	122	0		0		0		0		0	122
Spanish mackerel	Jan	ND		0		0		0		0		0	
	Feb	ND		0		0		0		0		0	
	Mar	ND		0		0		0		0		0	
	Apr	ND		0		0		0		0		0	
	May	ND		0		0		0		0		0	
	Jun	0		0		0		0		0		0	
	Jul	0		0		0		0		0		0	
	Aug	0		0		0		0		0		0	
	Sep	0		0		0		0		0		0	
	Oct	<1	200	0		0		0		0		<1	200
	Nov	0		0		0		0		0		0	
	Dec	0		0		0		0		0		0	
Spot	Jan	ND		23	133	23	127	<1	174	1	163	12	131
	Feb	ND		3	137	7	140	18	132	0		7	135
	Mar	ND		2	153	0		7	143	<1	159	3	147
	Apr	ND		0		0		2	143	0		<1	143
	May	ND		12	118	6	113	8	108	2	116	7	114
	Jun	6	110	18	120	6	119	57	111	<1	117	18	114
	Jul	1	103	7	122	15	120	46	114	6	125	15	117
	Aug	0		1	136	<1	119	11	126	4	112	3	124
	Sep	0		0		0		1	126	<1	165	<1	134
	Oct	<1	150	1	161	0		0		0		<1	157
	Nov	<1	148	0		0		3	136	0		1	138
	Dec	6	135	2	150	0		54	137	0		12	137

Table A.3. (Cont'd.)

Species	Month	Sabine		Galveston		Port O'Connor		Aransas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Spotted seatrout	Jan	ND		<1	172	<1	165	0		0		<1	168
	Feb	ND		0		0		0		0		0	
	Mar	ND		0		0		0		0		0	
	Apr	ND		0		0		0		0		0	
	May	ND		0		0		0		0		0	
	Jun	0		0		0		0		0		0	
	Jul	0		0		0		0		0		0	
	Aug	0		0		0		0		0		0	
	Sep	0		0		0		0		0		0	
	Oct	0		0		0		0		0		0	
	Nov	0		0		0		0		0		0	
	Dec	<1	163	0		0		0		0		<1	163
Striped mullet	Jan	ND		0		0		0		0		0	
	Feb	ND		0		0		0		0		0	
	Mar	ND		0		0		0		0		0	
	Apr	ND		0		0		0		0		0	
	May	ND		0		0		0		0		0	
	Jun	0		0		0		0		0		0	
	Jul	0		0		0		0		0		0	
	Aug	0		0		0		0		0		0	
	Sep	0		0		0		0		0		0	
	Oct	0		0		0		0		0		0	
	Nov	0		0		0		0		0		0	
	Dec	0		0		0		0		0		0	
Other finfishes	Jan	ND		118	97	45	108	107	113	34	114	76	106
	Feb	ND		81	92	67	101	76	117	61	108	72	104
	Mar	ND		122	117	101	116	230	118	96	105	137	115
	Apr	ND		302	101	204	108	359	109	64	116	235	107
	May	ND		111	132	107	115	276	111	60	104	139	116
	Jun	70	125	40	120	126	126	204	113	37	87	96	117
	Jul	86	109	75	144	98	122	83	126	28	101	75	123
	Aug	78	117	42	153	33	127	50	143	26	112	46	131
	Sep	86	104	42	103	4	120	126	133	19	117	55	118
	Oct	38	116	44	100	5	91	81	119	14	109	36	112
	Nov	34	93	46	94	23	106	77	85	16	109	39	93
	Dec	14	129	111	114	13	103	34	101	18	73	39	108

Table A.3. (Cont'd.)

Species	Month	Sabine		Galveston		Port O'Connor		Aransas		Port Isabel		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Total finfishes	Jan	ND		159	109	76	119	112	114	40	116	98	113
	Feb	ND		90	97	97	117	128	125	61	108	95	113
	Mar	ND		129	120	110	118	243	124	99	106	146	119
	Apr	ND		306	101	206	109	364	109	65	116	238	107
	May	ND		333	127	138	116	332	112	116	114	231	118
	Jun	136	123	103	123	222	129	358	115	38	90	173	120
	Jul	196	118	198	140	799	128	326	127	46	112	321	128
	Aug	178	128	84	152	54	134	82	135	38	114	87	134
	Sep	125	120	62	117	4	122	140	137	27	134	71	127
	Oct	56	130	53	108	6	92	102	127	17	106	46	121
	Nov	39	102	52	97	25	109	88	95	20	110	45	100
	Dec	26	127	120	116	14	104	99	122	19	76	56	116

Table A.4. Monthly mean catch rates (No./h) and mean total lengths (mm)^a by size class (mm)^b of Eastern oyster caught with 46.0-cm wide dredges on reef stations in Texas bay systems during January-December 1986.

Size Class	Month	East						Lower								
		Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	Coastwide						
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	
Spat	Jan	0	648	3788	661	1798	708	143	4198	1028						
	Feb	12	595	1344	1119	0	902	5	1872	618						
	Mar	0	582	479	17	9	1449	32	1102	510						
	Apr	0	364	3220	161	1854	700	0	3866	814						
	May	0	528	371	153	407	106	19	112	319						
	Jun	0	444	110	2106	283	640	0	225	584						
	Jul	0	561	484	234	435	131	163	738	376						
	Aug	0	2138	907	2315	362	1170	24	62	1381						
	Sep	0	1756	1018	252	65	287	136	1265	816						
	Oct	0	1709	7256	161	136	287	531	25	1284						
	Nov	280	2258	4626	657	11	115	119	75	1261						
	Dec	25	541	2633	1338	621	118	156	75	683						
Small	Jan	200	1781	1851	988	1286	51	72	318	44	1617	55				
	Feb	228	1361	1346	60	448	1329	51	300	46	1042	56				
	Mar	212	2325	1056	56	441	2057	52	758	52	1371	53				
	Apr	188	1925	1683	58	392	1785	49	406	61	1270	55				
	May	188	62	731	54	610	878	50	77	58	12	54				
	Jun	100	60	596	53	417	2614	51	77	62	0	1008	55			
	Jul	75	52	1095	56	765	940	49	43	25	64	732	54			
	Aug	12	61	777	60	1292	1124	50	167	25	50	774	56			
	Sep	12	70	1058	51	272	572	49	188	52	0	622	50			
	Oct	0	905	866	40	205	318	47	799	42	25	43	602	51		
	Nov	162	64	1146	49	180	310	44	1224	42	25	60	744	47		
	Dec	62	64	1511	49	469	208	52	319	48	0	781	49			
Market	Jan	238	101	1127	86	580	84	34	132	87	735	87				
	Feb	384	98	1308	86	389	88	69	38	85	479	89				
	Mar	238	100	664	84	352	209	86	66	96	373	87				
	Apr	238	94	1134	88	291	300	87	157	97	540	90				
	May	250	98	615	98	477	211	89	106	105	312	92				
	Jun	200	88	637	89	347	352	86	125	99	25	90				
	Jul	238	105	593	88	370	74	85	111	95	0	325	90			
	Aug	50	95	638	90	997	200	86	246	94	0	480	89			
	Sep	100	92	685	91	453	35	81	159	102	0	367	92			
	Oct	0	650	158	92	175	32	86	206	103	0	323	91			
	Nov	162	87	243	88	330	16	80	89	96	12	171	92			
	Dec	188	96	387	87	579	29	84	37	114	0	269	90			

^aAll oysters except spat were measured.

^bSpat (5-25 mm), small (26-75 mm), market (>76 mm).

Table A.5. Monthly mean catch rates (No./h) and mean total lengths (mm)^a by size class (mm)^b of Eastern oyster caught with 46.0-cm wide dredges on non-reef stations in Texas bay systems during January-December 1986.

Size Class	Month	Sabine Lake		Galveston		East		Matagorda		San Antonio		Aransas		Corpus Christi		Upper		Lower		Coastwide	
		No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length	No./h	Length
Spat	Jan	28		0		440		0		0		460		0		0		12		69	
	Feb	0		0		122		13		0		0		0		0		0		0	
	Mar	12		0		35		0		0		78		0		0		0		0	
	Apr	0		35		32		425		0		444		0		0		0		0	
	May	0		0		159		0		0		0		0		0		25		8	
	Jun	0		488		101		0		105		88		0		0		0		151	
	Jul	0		0		24		200		0		20		0		0		0		0	
	Aug	0		0		1442		2031		0		6		0		0		0		0	
	Sep	0		0		38		0		0		0		0		0		0		0	
	Oct	69		78		1781		10		0		45		212		0		0		0	
	Nov	25		0		251		240		0		0		0		0		0		0	
	Dec	0		0		412		950		0		0		0		0		0		0	
Small	Jan	138	31	44	56	119	49	6	49	12	65	2558	51	0	0	0	0	0	0	293	50
	Feb	12	56	341	52	177	60	39	62	0	0	206	47	0	0	0	0	0	0	128	53
	Mar	31	52	0		38	33	0		0		149	61	0	0	0	0	0	0	57	0
	Apr	0		12	71	44	51	116	64	213	60	1733	54	0	0	0	0	0	0	222	56
	May	169	57	38	46	653	50	0		151	58	677	48	31	41	0	0	0	0	139	50
	Jun	25	58	25	59	326	56	183	53	94	45	69	43	0	0	0	0	0	0	73	52
	Jul	0		19	38	150	53	0		19	58	12	72	0	0	0	0	0	0	14	50
	Aug	25	56	12	58	305	56	193	52	6	75	0	0	0	0	0	0	0	0	56	54
	Sep	41	64	0		81	57	6	30	25	66	19	56	0	0	0	0	0	0	13	58
	Oct	112	49	388	43	280	50	88	40	0	0	19	48	464	43	0	0	0	0	188	44
	Nov	62	63	0		131	54	6	29	0	0	0	0	25	40	0	0	0	0	15	53
	Dec	0		0		339	56	306	32	0	0	0	0	0	0	0	0	0	0	74	37
Market	Jan	0		38	117	31	126	0	0	25	83	354	87	0	0	0	0	0	0	49	94
	Feb	19	108	115	85	204	90	26	94	0	0	12	82	0	0	0	0	0	0	47	88
	Mar	0		0		50	88	0		0		188	92	0	0	0	0	0	0	21	92
	Apr	0		38	104	31	107	215	89	137	86	580	91	0	0	0	0	0	0	124	91
	May	138	99	12	106	509	95	0		18	78	111	86	0	0	0	0	0	0	52	94
	Jun	62	90	12	102	218	104	42	92	0	0	0	0	0	0	0	0	0	0	27	97
	Jul	6	91	6	98	56	100	6	81	75	99	38	96	0	0	0	0	0	0	16	97
	Aug	0		62	97	139	89	170	101	6	87	12	90	0	0	0	0	0	0	57	98
	Sep	102	96	0		25	92	0		6	98	12	80	0	0	0	0	0	0	13	94
	Oct	0		12	85	58	94	0		6	82	6	95	55	98	0	0	0	0	12	93
	Nov	31	102	0		50	96	0		0	0	0	0	0	0	0	0	0	0	5	100
	Dec	6	86	0		73	94	38	88	0	0	0	0	0	0	0	0	0	0	11	89

^aAll oysters except spat were measured.

^bSpat (5-25 mm), small (26-75 mm), market (>76 mm).

. Appendix B. Hydrological summary for bay trawl, oyster dredge and gulf trawl.

Table B.1. Monthly mean bottom salinity (o/oo) at sampled bay trawl sites in Texas bay systems during January - December 1986.

Month	Sabine Lake	Galveston	Matagorda	San Antonio	Aransas	Corpus Christi	Upper		Lower	
							Laguna Madre	Coastwide	Laguna Madre	Coastwide
Jan	5.2	16.4	24.4	16.6	17.9	28.1	32.4	33.3	20.5	
Feb	5.0	14.7	24.0	16.4	18.1	26.4	33.5	32.8	19.7	
Mar	4.5	15.5	25.2	15.8	21.8	30.0	35.9	32.8	20.9	
Apr	11.5	17.5	27.4	20.6	20.8	30.3	40.4	34.8	23.3	
May	10.2	13.8	26.6	19.6	19.6	29.2	41.7	34.5	21.5	
Jun	4.9	9.2	20.3	15.1	18.1	28.0	39.4	33.8	17.4	
Jul	3.4	11.3	21.0	10.1	23.9	30.9	41.1	37.4	18.6	
Aug	10.5	19.8	26.2	17.5	27.8	39.1	43.5	37.8	25.1	
Sep	16.3	17.8	29.0	23.4	32.3	38.4	47.6	38.9	26.6	
Oct	15.0	17.6	26.5	18.8	29.7	36.8	44.7	39.8	24.8	
Nov	7.9	13.6	20.1	16.3	22.0	29.5	41.0	39.5	19.9	
Dec	2.5	10.0	21.6	21.2	20.9	29.5	35.9	37.2	19.0	

Table B.2. Monthly mean bottom temperature (C) at sampled bay trawl sites in Texas bay systems during January - December 1986.

Month	Sabine Lake	Galveston	Matagorda	San Antonio	Aransas	Corpus Christi	Upper		Lower	
							Laguna Madre	Coastwide	Laguna Madre	Coastwide
Jan	10.9	11.6	11.3	15.4	13.1	13.9	14.0	14.0	12.6	
Feb	18.2	17.5	16.7	18.6	17.7	17.9	19.5	19.3	17.7	
Mar	18.4	18.0	18.8	18.8	19.3	17.7	20.0	18.1	18.5	
Apr	22.2	23.2	22.8	23.1	23.9	23.4	23.7	24.0	23.2	
May	25.5	23.9	24.8	23.5	25.4	25.1	26.3	26.7	24.6	
Jun	28.5	30.5	29.5	29.8	29.7	29.1	29.6	28.3	29.8	
Jul	30.6	30.6	30.1	29.4	30.3	29.9	28.9	29.6	30.1	
Aug	31.4	30.0	30.7	30.3	30.4	30.5	30.7	28.7	30.3	
Sep	30.8	29.4	28.9	28.4	28.8	29.8	29.3	26.5	29.1	
Oct	24.2	21.8	23.6	24.5	22.0	23.5	25.5	24.0	23.1	
Nov	18.0	17.4	18.9	19.9	15.7	16.1	21.2	14.6	17.9	
Dec	12.3	11.6	15.2	13.5	12.9	12.2	14.3	14.8	13.1	

Table B.3. Monthly mean bottom dissolved oxygen (ppm) at sampled bay trawl sites in Texas bay systems during January - December 1986.

Month	Sabine Lake	Galveston	Matagorda	San Antonio	Aransas	Corpus Christi	Upper			Lower		
							Laguna Madre	Laguna Madre	Coastwide	Laguna Madre	Laguna Madre	Coastwide
Jan	10	12	11	10	11	11	10	10	10	10	11	11
Feb	9	11	10	10	8	8	9	9	9	9	10	10
Mar	9	10	9	9	9	9	7	7	10	10	10	10
Apr	10	8	8	8	8	8	7	7	9	9	8	8
May	10	9	8	8	8	8	8	8	8	9	9	9
Jun	8	7	8	8	8	8	8	8	5	5	7	7
Jul	10	7	8	8	8	7	7	7	7	7	8	8
Aug	10	6	8	7	7	7	8	8	7	7	7	7
Sep	10	6	8	8	8	7	8	8	8	8	7	7
Oct	10	8	9	8	10	8	8	8	9	9	9	9
Nov	9	10	9	10	13	8	7	7	10	10	10	10
Dec	10	10	10	10	10	10	10	10	10	10	10	10

Table B.4. Monthly mean bottom turbidity (JTU) at sampled bay trawl sites in Texas bay systems during January - December 1986.

Month	Sabine Lake	Galveston	Matagorda	San Antonio	Aransas	Corpus Christi	Upper			Lower		
							Laguna Madre	Laguna Madre	Coastwide	Laguna Madre	Laguna Madre	Coastwide
Jan	25	32	26	39	33	25	73	73	183	183	39	39
Feb	28	36	42	35	25	56	46	46	24	24	38	38
Mar	32	32	30	42	46	50	70	70	53	53	39	39
Apr	26	35	95	96	91	80	80	80	109	109	70	70
May	35	31	63	58	47	53	48	48	38	38	46	46
Jun	61	33	47	55	27	26	37	37	26	26	39	39
Jul	37	46	43	92	42	42	76	76	42	42	52	52
Aug	24	31	38	76	43	26	33	33	26	26	38	38
Sep	24	28	52	43	34	46	39	39	69	69	40	40
Oct	24	43	29	50	33	25	30	30	52	52	37	37
Nov	48	53	28	34	31	26	24	24	141	141	42	42
Dec	41	42	25	28	27	27	30	30	24	24	32	32

Table B.5. Monthly mean bottom salinity (o/oo) at sampled gulf trawl sites in the Texas Territorial Sea during January-December 1986. ND = no data.

Month	Sabine	Galveston	Port O'Connor	Port Aransas	Port Isabel	Coastwide
Jan	ND	29.0	30.4	30.2	29.2	29.7
Feb	ND	28.8	30.8	30.5	30.8	30.2
Mar	ND	30.6	30.7	31.3	32.8	31.3
Apr	ND	28.0	29.3	25.9	31.9	28.7
May	ND	28.6	31.0	27.2	31.6	29.6
Jun	29.5	28.6	33.6	28.8	33.9	30.8
Jul	27.6	31.6	35.2	31.8	34.9	32.2
Aug	32.3	35.4	35.8	33.6	34.4	34.4
Sep	31.9	31.8	36.4	33.1	34.1	33.5
Oct	28.4	28.3	31.4	34.1	34.4	31.3
Nov	26.6	29.2	30.7	30.4	31.1	29.6
Dec	27.7	27.2	32.6	29.1	32.8	29.9

Table B.6. Monthly mean bottom temperature (C) at sampled gulf trawl sites in the Texas Territorial Sea during January-December 1986. ND = no data.

Month	Sabine	Galveston	Port O'Connor	Port Aransas	Port Isabel	Coastwide
Jan	ND	11.8	15.6	15.4	14.5	14.3
Feb	ND	13.7	16.6	16.5	16.2	15.7
Mar	ND	18.2	18.5	18.6	19.9	18.8
Apr	ND	21.0	21.4	20.8	22.5	21.4
May	ND	25.3	23.5	24.0	24.8	24.4
Jun	27.7	26.0	25.8	25.9	26.8	26.4
Jul	31.5	30.0	28.4	28.1	25.6	28.7
Aug	31.2	30.1	28.8	25.7	24.9	28.2
Sep	30.2	29.4	29.1	28.9	29.6	29.4
Oct	25.2	25.2	25.2	26.2	27.4	25.8
Nov	20.5	20.0	21.4	21.9	22.5	21.2
Dec	13.1	12.7	16.3	17.5	17.5	15.4

Table B.7. Monthly mean bottom dissolved oxygen (ppm) at sampled gulf trawl sites in the Texas Territorial Sea during January-December 1986. ND = no data.

Month	Sabine	Galveston	Port O'Connor	Port Aransas	Port Isabel	Coastwide
Jan	ND	10	10	9	10	10
Feb	ND	14	10	8	10	10
Mar	ND	10	9	10	9	9
Apr	ND	8	9	8	9	9
May	ND	6	8	8	8	8
Jun	7	6	7	7	9	7
Jul	8	5	7	9	9	8
Aug	8	5	7	8	8	7
Sep	8	7	8	8	8	8
Oct	10	7	9	8	8	8
Nov	10	7	8	8	8	8
Dec	10	10	10	9	9	10

Table B.8. Monthly mean bottom turbidity (JTU) at sampled gulf trawl sites in the Texas Territorial Sea during January-December 1986. ND = no data.

Month	Sabine	Galveston	Port O'Connor	Port Aransas	Port Isabel	Coastwide
Jan	ND	24	50	24	24	31
Feb	ND	30	55	26	24	34
Mar	ND	24	28	25	24	24
Apr	ND	24	24	24	24	25
May	ND	24	24	25	24	24
Jun	24	24	25	24	24	24
Jul	24	24	24	24	24	24
Aug	24	24	24	24	24	24
Sep	24	24	24	24	24	24
Oct	24	24	24	24	24	24
Nov	24	24	24	24	24	24
Dec	66	24	24	24	24	32

Table B.9. Monthly mean bottom salinity (o/oo) at sampled oyster dredge reef sites in Texas bay systems during January-December 1986. No samples were collected in upper Laguna Madre.

Month	East					Lower			Coastwide
	Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	
Jan	5.5	17.0	25.3	21.7	18.5	15.0	25.9	32.5	19.0
Feb	6.0	15.6	24.1	23.1	18.3	17.2	26.8	33.0	19.1
Mar	6.4	17.5	23.6	23.9	15.0	18.4	28.9	35.5	19.8
Apr	23.8	18.5	25.3	26.0	20.2	18.7	30.2	36.0	21.6
May	18.4	16.4	25.8	25.2	19.6	18.5	29.4	36.0	20.5
Jun	6.7	8.1	24.3	17.7	14.8	17.6	29.2	38.5	15.5
Jul	3.3	10.7	20.4	19.5	11.3	21.4	31.6	37.5	16.8
Aug	22.9	19.1	24.3	22.5	18.0	26.9	38.1	36.0	23.2
Sep	22.4	21.7	23.6	23.8	23.7	26.7	36.7	36.0	24.9
Oct	17.6	17.9	21.2	22.3	22.6	32.5	35.3	39.0	23.9
Nov	8.5	13.8	14.4	18.1	16.6	20.2	30.8	25.5	17.8
Dec	2.7	10.4	11.9	16.5	19.0	21.5	30.5	29.0	16.7

Table B.10. Monthly mean bottom temperature (C) at sampled oyster dredge reef sites in Texas bay systems during January-December 1986. No samples were collected in upper Laguna Madre.

Month	East					Lower			Coastwide
	Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	
Jan	11.6	12.6	13.4	11.9	14.6	12.9	13.0	14.2	13.0
Feb	17.5	14.8	18.2	15.7	18.0	17.6	15.6	21.3	16.3
Mar	17.9	18.7	19.5	18.9	18.6	19.5	19.4	20.4	19.0
Apr	22.4	23.4	23.6	23.8	25.1	24.2	24.0	23.4	23.9
May	26.0	25.0	26.1	25.4	23.8	25.2	25.6	28.0	25.1
Jun	28.6	29.9	30.1	29.0	29.5	29.7	29.9	28.6	29.7
Jul	31.1	31.0	30.8	30.4	29.0	30.1	30.5	27.7	30.4
Aug	31.0	30.3	30.7	30.8	30.4	29.9	30.3	24.1	30.3
Sep	32.1	29.5	29.7	28.0	28.4	28.3	29.4	29.2	29.0
Oct	25.6	22.0	20.2	23.3	24.7	23.0	21.8	28.0	22.6
Nov	18.8	17.7	19.4	18.9	19.4	15.8	17.1	25.3	17.9
Dec	12.2	11.7	12.5	13.8	12.7	12.4	13.2	15.8	12.5

Table B.11. Monthly mean bottom dissolved oxygen (ppm) at sampled oyster dredge reef sites in Texas bay systems during January-December 1986. (No samples were collected in upper Laguna Madre.)

Month	East					Lower			
	Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	Coastwide
Jan	10	11	11	12	10	11	11	11	11
Feb	9	9	10	10	10	8	10	9	9
Mar	9	11	9	9	9	9	8	8	10
Apr	10	8	9	8	8	8	8	9	8
May	10	9	9	9	8	8	7	10	8
Jun	8	7	9	9	8	7	8	8	8
Jul	10	7	9	9	7	8	7	8	8
Aug	11	7	8	8	7	7	7	8	7
Sep	11	6	8	8	8	8	7	7	7
Oct	10	8	8	9	8	9	8	9	9
Nov	9	11	9	9	10	14	8	9	11
Dec	10	10	10	10	11	11	9	10	10

Table B.12. Monthly mean bottom turbidity (JTU) at sampled oyster dredge reef sites in Texas bay systems during January-December 1986. (No samples were collected in upper Laguna Madre.)

Month	East					Lower			
	Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Corpus Christi	Laguna Madre	Coastwide
Jan	28	46	24	24	37	40	27	24	37
Feb	24	56	27	33	43	26	44	65	43
Mar	24	37	51	77	45	42	79	50	49
Apr	24	35	114	87	71	54	53	36	58
May	50	32	117	97	59	39	80	24	57
Jun	27	37	27	54	50	26	31	38	38
Jul	57	39	72	41	70	43	70	38	50
Aug	24	27	41	46	52	46	62	24	41
Sep	24	26	40	39	53	27	37	47	34
Oct	24	39	28	30	46	41	29	24	37
Nov	44	66	33	37	39	30	46	27	47
Dec	36	50	34	26	26	27	27	54	36

Table B.13. Monthly mean bottom salinity (o/oo) at sampled oyster dredge non-reef sites in Texas bay systems during January-December 1986.

Month	East						Corpus Christi		Lower	
	Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Christi	Laguna Madre	Laguna Madre	Coastwide
Jan	5.1	17.0	24.4	21.4	20.0	17.9	26.2	33.7	35.3	20.2
Feb	5.5	16.7	23.9	21.8	18.8	19.4	26.2	34.7	33.2	20.2
Mar	4.2	17.2	24.6	25.0	16.2	22.7	29.0	36.8	35.2	21.5
Apr	12.1	16.0	24.8	26.1	16.9	20.6	29.2	40.1	35.0	22.3
May	13.9	13.9	25.7	24.7	21.0	19.6	29.9	42.1	35.0	22.1
Jun	6.0	6.8	22.5	17.3	13.8	20.7	28.9	39.5	31.7	19.0
Jul	5.6	12.4	20.5	17.8	11.2	23.2	31.3	41.3	37.0	25.1
Aug	13.2	17.2	24.6	24.9	20.5	29.1	39.2	46.2	36.7	25.1
Sep	17.7	17.8	25.1	26.2	20.5	31.7	38.7	50.1	38.4	26.5
Oct	14.1	17.2	20.6	24.0	19.0	33.0	36.9	46.0	37.5	24.9
Nov	6.6	13.4	14.8	18.7	18.1	21.0	31.0	42.3	36.8	19.7
Dec	3.6	12.1	11.0	17.9	20.5	23.4	31.4	39.3	35.5	19.0

Table B.14. Monthly mean bottom temperature (C) at sampled oyster dredge non-reef sites in Texas bay systems during January-December 1986.

Month	East						Corpus Christi		Lower	
	Sabine Lake	Galveston	Matagorda	Matagorda	San Antonio	Aransas	Christi	Laguna Madre	Laguna Madre	Coastwide
Jan	12.1	12.7	13.4	11.4	14.7	13.3	14.5	13.1	12.0	12.8
Feb	18.3	14.6	17.8	15.6	18.0	18.2	14.4	20.1	19.9	16.6
Mar	17.3	18.4	19.6	18.5	18.8	19.2	19.7	20.2	17.6	18.7
Apr	22.8	23.1	23.6	22.9	25.6	23.9	23.2	24.0	24.5	23.4
May	26.2	25.0	26.0	25.1	22.5	26.0	25.0	26.9	27.0	25.3
Jun	29.0	30.6	29.7	29.4	30.2	29.6	29.2	29.2	28.5	29.7
Jul	29.6	31.2	30.2	30.5	29.0	29.9	29.6	29.3	29.0	30.1
Aug	31.3	30.3	30.7	30.4	30.9	30.7	30.7	30.3	26.7	30.4
Sep	31.0	29.8	29.9	28.6	28.5	28.6	29.8	29.8	28.2	29.4
Oct	23.9	21.8	19.9	22.5	24.8	24.0	21.5	25.3	28.6	23.1
Nov	18.6	17.6	19.8	18.9	19.4	16.8	17.4	21.0	22.7	18.6
Dec	12.1	11.8	12.4	14.3	13.2	13.0	13.2	14.2	13.8	13.0

Table B.15. Monthly mean bottom dissolved oxygen (ppm) at sampled oyster dredge non-reef sites in Texas bay systems during January-December 1986.

Month	East									
	Sabine Lake	Galveston	Matagorda		San Antonio	Aransas	Corpus Christi		Lower	
			Matagorda	Matagorda			Laguna Madre	Laguna Madre	Laguna Madre	Coastwide
Jan	10	11	10	12	10	11	11	11	10	11
Feb	8	7	10	10	10	8	9	9	9	9
Mar	9	11	9	9	9	9	8	8	9	10
Apr	9	9	9	8	8	8	7	8	9	9
May	10	9	9	9	8	8	7	7	9	8
Jun	9	7	10	8	7	8	8	7	8	8
Jul	10	9	8	8	7	8	7	8	7	8
Aug	10	6	8	7	7	7	8	8	8	7
Sep	10	6	8	8	8	8	8	8	8	8
Oct	10	8	9	9	8	9	8	9	9	9
Nov	10	10	9	9	9	13	8	5	9	9
Dec	10	10	10	10	11	12	8	10	10	10

Table B.16. Monthly mean bottom turbidity (JTU) at sampled oyster dredge non-reef sites in Texas bay systems during January-December 1986.

Month	East									
	Sabine Lake	Galveston	Matagorda		San Antonio	Aransas	Corpus Christi		Lower	
			Matagorda	Matagorda			Laguna Madre	Laguna Madre	Laguna Madre	Coastwide
Jan	26	62	41	24	40	35	29	58	30	41
Feb	26	66	34	40	44	25	45	53	24	45
Mar	27	44	80	42	31	41	65	114	60	49
Apr	27	41	98	65	98	50	86	93	98	63
May	61	37	60	65	47	44	99	42	31	53
Jun	34	39	34	57	62	26	32	37	26	41
Jul	48	31	71	40	65	35	41	63	34	43
Aug	24	29	36	39	70	32	45	50	25	37
Sep	30	34	35	33	63	36	38	39	35	37
Oct	28	34	28	30	70	40	32	41	25	36
Nov	38	49	39	32	35	34	26	25	27	37
Dec	39	43	44	35	26	26	29	33	32	35

Appendix C. Summary of SEAMAP samples by year and depth zone for brown shrimp, white shrimp, pink shrimp and blue crab off Texas during 1982-1986.

Table C.1. Mean catch rates (No./h) and mean size (mm) of select shellfishes caught during SEAMAP^a sampling off Texas during June-July 1982-1986. Blanks indicate no measurement taken.

Year	Depth (m)	Samples (No.)	Brown Shrimp		White Shrimp		Pink Shrimp		Blue Crab	
			No./h	Length	No./h	Length	No./h	Length	No./h	Length
1982	0-18	22	1222	108	15	173	161	136	8	
	19-37	50	1427	115	0		20	138	1	
	38-55	29	138	145	0		<1	126	0	
	56-73	5	117	179	0		0		0	
	74-91	3	79	182	0		0		0	
1983	0-18	28	254	99	20	153	195	127	8	
	19-37	47	1445	119	1	167	87	121	4	
	38-55	24	304	132	0		1	118	1	
	56-73	8	66	156	0		0		0	
	74-91	2	71	168	0		0		0	
1984	0-18	16	733	116	30	174	4	151	6	
	19-37	40	1594	116	1	168	3	150	0	
	38-55	16	544	131	0		0		0	
	56-73	12	194	138	0		0		0	
	74-91	5	86	151	0		0		0	
1985	0-18	30	450	98	41	168	15	135	20	
	19-37	40	1362	112	2	167	10	131	4	
	38-55	14	150	127	0		<1	127	0	
	56-73	5	154	144	0		0		0	
	74-91	1	36	179	0		0		0	
1986	0-18	35	250	98	33	165	18	116	11	
	19-37	43	809	108	0		42	130	10	
	38-55	10	311	124	0		0		0	
	56-73	5	176	136	0		0		0	
	74-91	3	49	147	0		111		0	

^a Data presented here were collected by R/V OREGON II (NMFS) in conjunction with TPWD research vessels. The data were made available by the Southeast Area Monitoring and Assessment Program (SEAMAP). Samples collected with 12.2-m trawl.

Table C.2. Mean catch rates (No./h) and mean size (mm) of select shellfishes caught during SEAMAP^a sampling off Texas during November 1986. Blanks indicate no measurement taken.

Year	Depth (m)	Samples (No.)	Brown Shrimp		White Shrimp		Pink Shrimp		Blue Crab	
			No./h	Length	No./h	Length	No./h	Length	No./h	Length
1986	0-18	12	71		77		26		0	
	19-37	34	93		15		2		1	
	38-55	26	68		0		0		0	
	56-73	12	41		0		0		0	
	74-91	4	22		0		0		0	

^a Data presented here were collected with 12.2-m trawl by R/V OREGON II (NMFS) and with 6.1-m trawl by TPWD research vessels. The data were made available by the Southeast Area Monitoring and Assessment Program (SEAMAP).

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