

Paul H

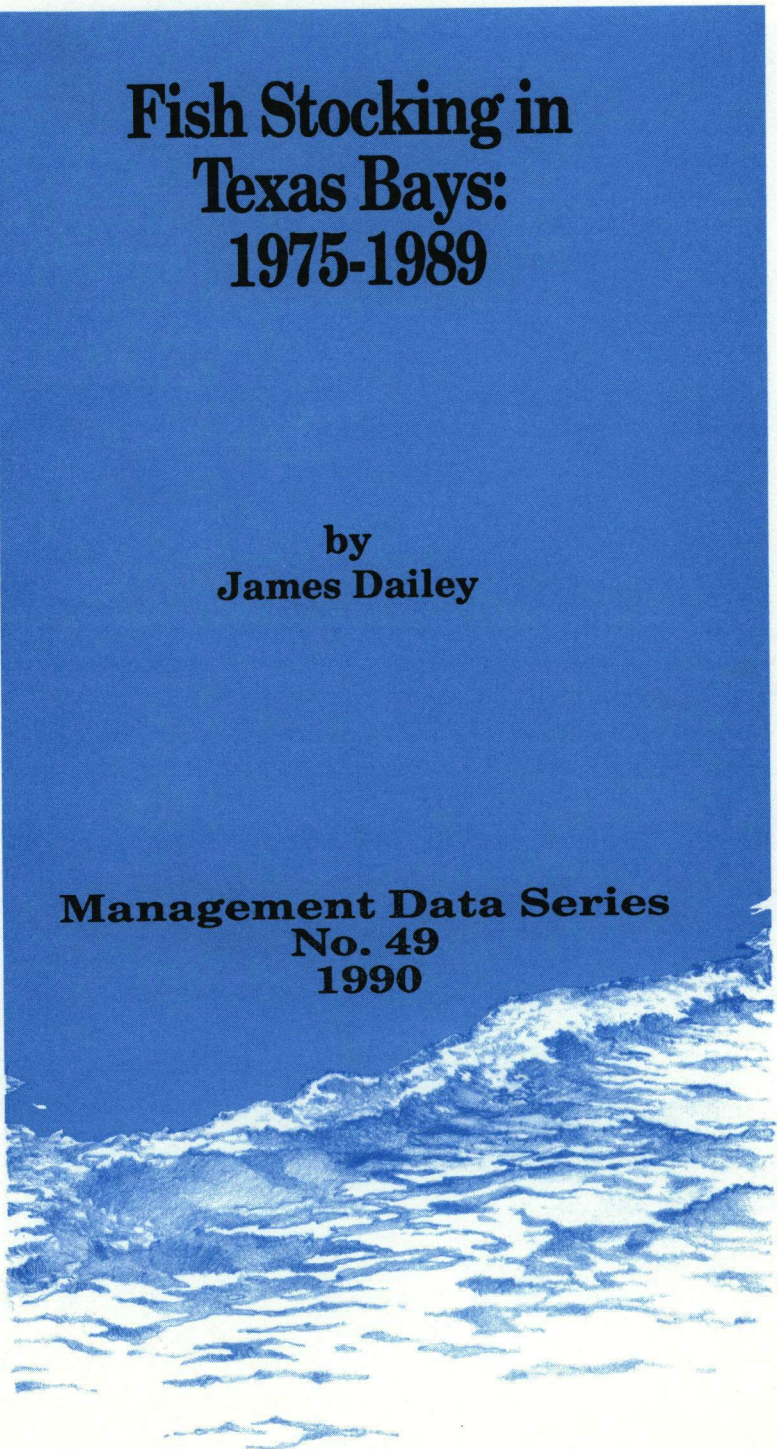
# Fish Stocking in Texas Bays: 1975-1989

by  
James Dailey

Management Data Series  
No. 49  
1990



TEXAS  
PARKS & WILDLIFE  
DEPARTMENT  
FISHERIES DIVISION  
4200 Smith School Road  
Austin, Texas 78744



NON-REEF OYSTER SAMPLING IN THE  
LAGUNA MADRE, TEXAS

by

Joe H. Martin, Lawrence W. McEachron  
and  
Kenneth W. Rice

MANAGEMENT DATA SERIES

No. 50  
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Texas Parks and Wildlife Department  
Fisheries Division  
Coastal Fisheries Branch  
4200 Smith School Road  
Austin, Texas 78744

ACKNOWLEDGEMENTS

We would like to thank all Texas Parks and Wildlife Department field personnel who diligently collected the samples. C. E. Bryan, Tom Heffernan, Paul Hammerschmidt, Ed Hegen and Lynn Benefield reviewed the manuscript.

## ABSTRACT

The Texas Parks and Wildlife Department initiated non-reef oyster sampling in the upper and lower Laguna Madre in January 1986 to determine if concentrations of Eastern oyster (Crassostrea virginica) existed in water  $\geq 1$  m deep that were not documented or mapped. No small (26-75 mm) or market ( $\geq 76$  mm) live oysters were caught in 1,440 non-reef oyster samples collected in upper and lower Laguna Madre during January 1986-December 1988. Oyster spat (5-25 mm) were encountered in lower Laguna Madre non-reef oyster samples on 10 occasions. Two pelecypod mollusks (Chione cancellata, Argopecten irradians) accounted for 66% of the 2,819 organisms caught. Because Eastern oyster concentrations in water  $\geq 1$  m deep are limited to the South Bay area of lower Laguna Madre it is recommended that non-reef oyster sampling in the Laguna Madre be discontinued.

## INTRODUCTION

Eastern oyster (*Crassostrea virginica*) supports a valuable commercial fishery in Texas with reported landings of 2.3 million kg (worth \$5.7 million) in 1988 (Quast et al. 1989). The Eastern oyster fishery in Texas is concentrated in the Galveston Bay area, which accounts for almost 80% of the reported coastwide commercial landings (Quast et al. 1989). Eastern oysters are also harvested in the Matagorda, San Antonio and Aransas Bay systems (Quast et al. 1988). Prior to 1988 there was no documented commercial production of Eastern oysters from the upper Laguna Madre. Eastern oysters harvested from the lower Laguna Madre represent <1% of the coastwide total; almost all commercial production is reported from South Bay (Quast et al. 1989).

The Texas Parks and Wildlife Department (TPWD) began monitoring relative abundance and size of Eastern oysters in Galveston Bay in the early 1950's (Hofstetter 1977, 1983). In 1985 the Sixty-ninth Texas Legislature delegated the authority to manage the Texas oyster fishery to the Texas Parks and Wildlife Commission once an Oyster Management Plan was approved.

In October 1984 the TPWD initiated a fishery-independent oyster monitoring program in Galveston Bay. In January 1986 this program was expanded to cover nine major Texas bay systems (Figure 1)(Quast et al. 1988). Bays were stratified into reef and non-reef areas. An area was considered to be a reef if Eastern oysters on the bottom were at least 0.2 m higher than adjacent bay bottom for a continuous area of at least 91.4 m long by 0.5 m wide in any direction; all other areas  $\geq 1$  m deep were designated non-reef. Non-reef areas were sampled to determine if live oysters existed in areas where Eastern oyster concentrations were not mapped or documented. Non-reef areas found to contain concentrations of Eastern oysters were added to the reef strata if the reef criteria were met.

The objectives of the present study were to:

1. summarize catches of non-reef oyster samples collected in upper and lower Laguna Madre during January 1986-December 1988.
2. determine if revision of TPWD non-reef oyster sampling in upper and lower Laguna Madre is warranted.

## MATERIALS AND METHODS

Nine Texas bay systems were stratified into reef and non-reef areas as previously described (Meador et al. 1988). Twenty non-reef oyster samples were collected each month in all bay systems including upper Laguna Madre (Figure 2) and lower Laguna Madre (Figure 3) during January 1986-December 1988. Oyster dredge descriptions and sampling techniques are found in Meador et al. (1988). Organisms caught in each oyster dredge sample were identified to species and counted. Nineteen individuals of each species were measured (nearest 1 mm TL). Eastern oysters were measured along the dorsoventral axis of the largest valve and categorized by three size groups: spat (5-25 mm), small (26-75 mm), and market ( $\geq 76$  mm)(Doerzbacher and Meador 1989).

## RESULTS

Seven hundred and twenty non-reef oyster dredge samples were collected in each of upper and lower Laguna Madre during January 1986-December 1988. Eighty percent of the samples had no catch. A total of 2,819 organisms representing 38 species were collected (Table 1). Two pelecypod mollusks, cross-barred venus (Chione cancellata) and bay scallop (Argopecten irradians), represented 66% of the total number of organisms caught (Table 1).

No live small (26-75 mm) or market ( $\geq 76$  mm) Eastern oysters were caught. Oyster spat (5-25 mm) were collected in lower Laguna Madre on 10 occasions (Figure 3).

Most of the by-catch was associated with submerged vegetation. Ninety-six percent of non-reef oyster samples collected in mostly unvegetated Baffin Bay (Cornelius 1984) had no catch. Fifty-one percent of the samples collected in the more heavily vegetated upper Laguna Madre (Simmons 1957) had no catch.

## DISCUSSION

There are small concentrations of Eastern oysters in isolated shallow (<1 m) areas of the upper and lower Laguna Madre (TPWD unpublished data). However, conditions apparently are not conducive for the formation of oyster reefs as defined for this study. Oyster reefs are found only in South Bay. Most Eastern oysters in Texas occur in salinities ranging from 10 to 30 o/oo (Quast et al. 1988). Eastern oysters from South Bay are able to spawn and grow in salinities exceeding 40 o/oo (Gunter and Geyer 1955, Copeland and Hoese 1966). These oysters are genetically different from Eastern oysters in Corpus Christi Bay (King and Gray, In Preparation). Most spat in lower Laguna Madre were encountered in and adjacent to South Bay. Because concentrations of Eastern oysters in water  $\geq 1$  m are found only in South Bay, it is recommended that TPWD non-reef oyster sampling in upper and lower Laguna Madre be discontinued.

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Table 1. Numbers of invertebrate and vertebrate organisms collected in non-reef oyster samples from the upper and lower Laguna Madre during January 1986-December 1988. ULM = upper Laguna Madre; LLM = lower Laguna Madre.

Common name	Species <sup>a</sup> Scientific name	Bay system		Total
		ULM	LLM	
<b>INVERTEBRATE</b>				
Cross-barred venus	<u>Chione cancellata</u>	1,411	7	1,418
Bay scallop	<u>Argopecten irradians</u>	446	11	457
Scorched mussel	<u>Brachidontes exustus</u>	245	0	245
Ragged seahare	<u>Bursatella leachi pleii</u>	96	0	96
Gulf grassflat crab	<u>Dyspanopeus texana</u>	66	0	66
Grass shrimp	<u>Palaemonetes</u> sp.	34	2	36
Brown shrimp	<u>Penaeus aztecus</u>	6	24	30
Tampa tellin	<u>Tellina tampaensis</u>	21	0	21
Alternate tellin	<u>Tellina alternata</u>	21	0	21
Blue crab	<u>Callinectes sapidus</u>	11	8	19
Morten's egg cockle	<u>Laevicardium mortoni</u>	18	0	18
Pink shrimp	<u>Penaeus duorarum</u>	12	0	12
Portly spider crab	<u>Libinia emarginata</u>	3	3	6
Sea hare	<u>Aplysia willcoxi</u>	0	4	4
Prickly welk	<u>Busycon pulleyi</u>	2	1	3
Spotted porcelain crab	<u>Porcellana sayana</u>	0	3	3
Sea urchin	<u>Arabacia punctulata</u>	0	3	3
Starfish	<u>Luidia clathrata</u>	1	2	3
Southern quahog	<u>Mercenaria campechiensis</u>	0	3	3
Gulf stone crab	<u>Menippe adina</u>	2	0	2
Pistol shrimp	<u>Alpheus heterochaelis</u>	0	2	2
Arrow shrimp	<u>Tozeuma carolinense</u>	2	0	2
Longnose spider crab	<u>Libinia dubia</u>	1	0	1
Sea cucumber	<u>Holothuroides</u> sp.	1	0	1
Florida rocksnail	<u>Thais haemastoma floridana</u>	1	0	1
Lesser blue crab	<u>Callinectes similis</u>	1	0	1
Striate bubble	<u>Bulla striata</u>	0	1	1
Hermit crab	Family Paguridae	0	1	1
<b>VERTEBRATE</b>				
Code goby	<u>Gobiosoma robustum</u>	113	0	113
Gulf pipefish	<u>Syngnathus scovelli</u>	57	3	60
Rainwater killifish	<u>Lucania parva</u>	55	0	55
Gulf toadfish	<u>Opsanus beta</u>	34	2	36
Naked goby	<u>Gobiosoma bosci</u>	3	4	7
Pinfish	<u>Lagodon rhomboides</u>	1	5	6
Atlantic stingray	<u>Dasyatis sabina</u>	1	1	2
Dusky pipefish	<u>Syngnathus floridae</u>	0	1	1
Florida pompano	<u>Trachinotus carolinus</u>	0	1	1

<sup>a</sup>Species names provided by Turgeon et al. (1988) and Williams et al. (1989).

Figure 1. Texas Coast

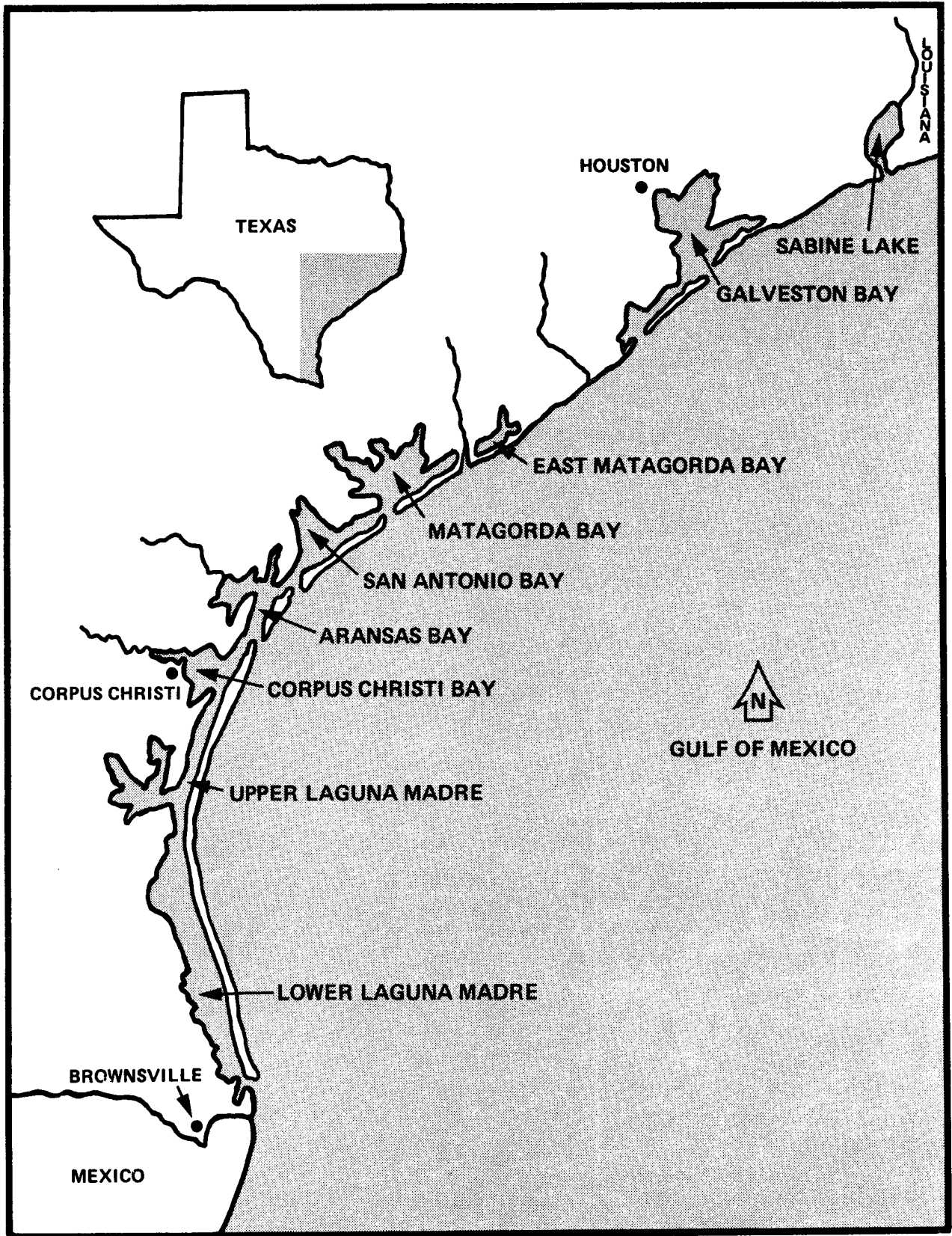


Figure 2. Upper Laguna Madre

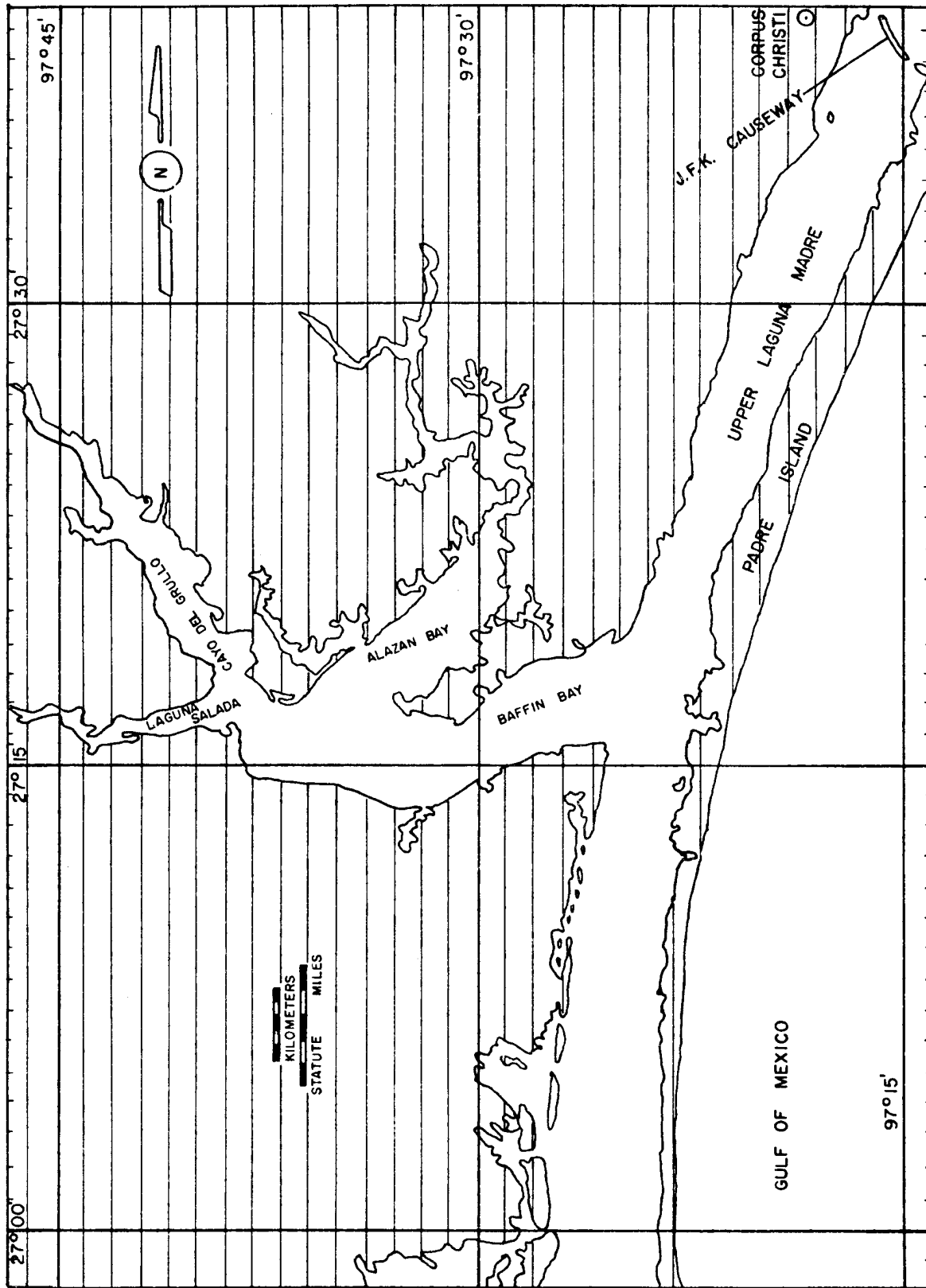
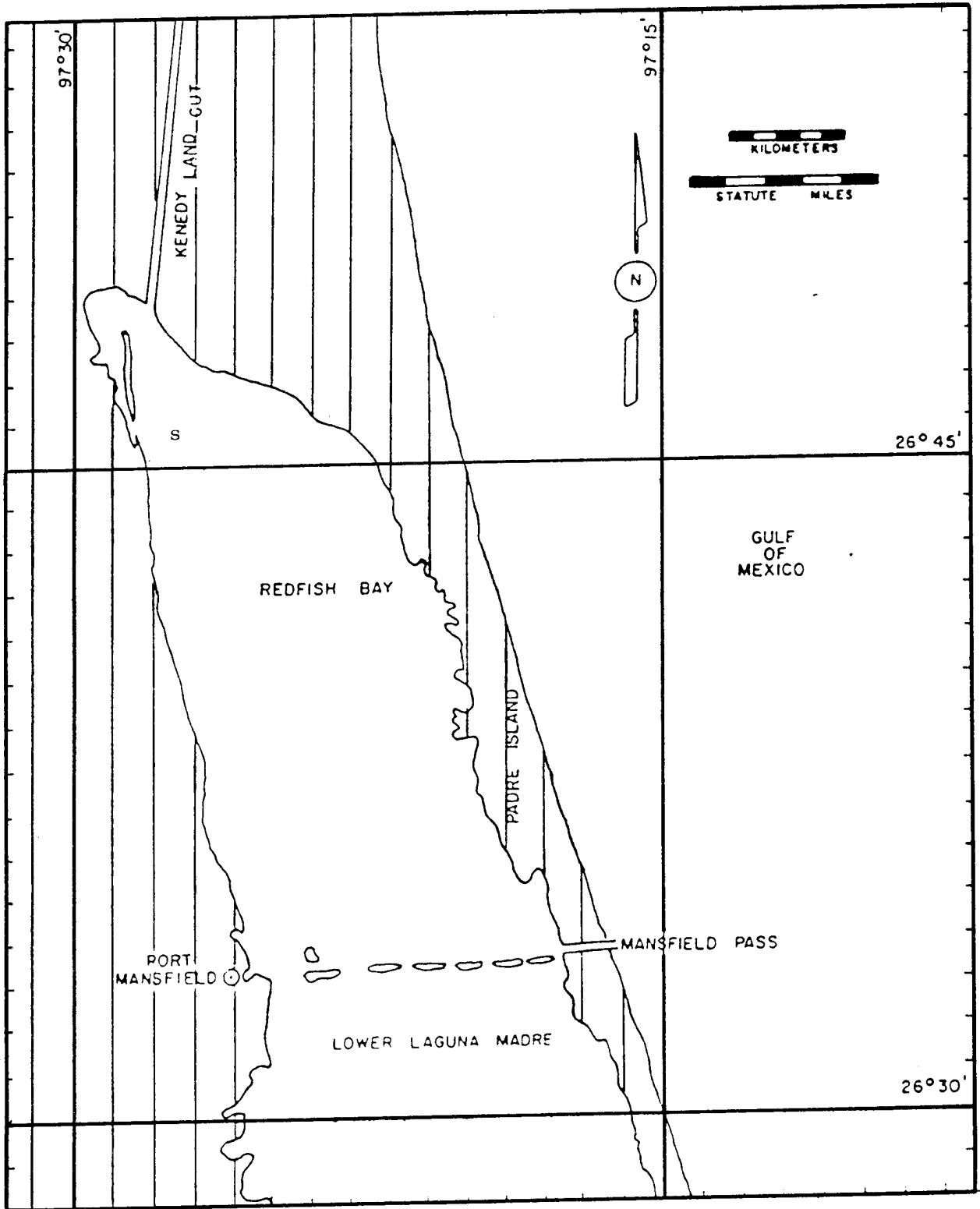


Figure 3. Lower Laguna Madre

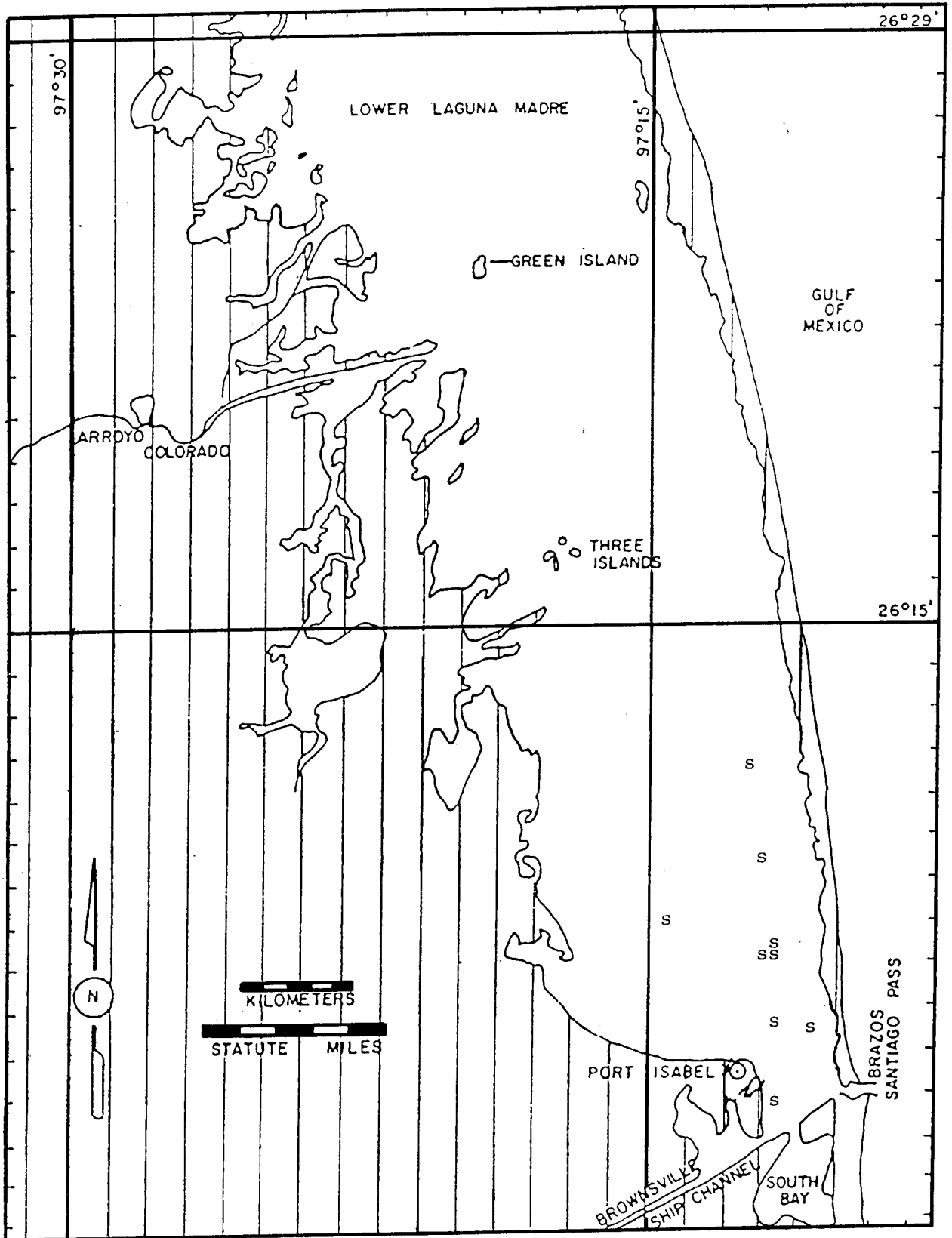
(A) Port Mansfield

(B) Port Isabel

s = areas spat encountered



(A)



(B)



PWD-RP-3400-343-1/91

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