

JOB COMPLETION REPORT

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Project No. M-5-R-1 Date May 31, 1960

Project Name: Oyster and Fisheries Investigations of Area M-5.

Period Covered: May 1, 1959 - May 31, 1960. Job No. B-2a

Preliminary Survey of Oyster Bottoms in
San Antonio and Esperitu Santo Bays

Objectives: To map oyster producing areas with favorable conditions for oysters.

Procedure: Commercial shell survey maps (mudshell industry) were used, when possible, to plot exposed shell reefs. Bottom soundings and samples were made and favorable locations plotted with the sextant. All locations of existing reefs and locations of suitable bottoms for new reefs were plotted on accurately drawn charts.

Approximately 235 bottom samples were taken in the area. These samples were taken on a grid system following a north-south compass course until the whole area was examined. The sampling device was a standard Eckman dredge.

Findings: The surface area of the bays within area M-5 is approximately 134,000 acres, or 209 square miles. Within this area are to be found four general types of bay bottom: brown mud, gray mud, sand, and shell (Figures I and II). The muds make up the largest portion or 67% of bay bottom. This is composed of 38% or 80 square miles of brown mud and 29% or 50 square miles of gray mud. The gray mud found in this area is highly organic and rather sticky. The brown mud is less organic and is mostly clay deposited by sedimentation and flocculation from the outflow of the Guadalupe River. The sand which makes up 26% or 55 square miles of the bay bottom is found along the shore of Matagorda Island and in Esperitu Santo Bay. The final 7% or 14 square miles of the bay bottom is composed of either live or dead oyster shell. This last figure could probably be substantially increased by including the many small spots of shell that cover only a few hundred square feet or less.

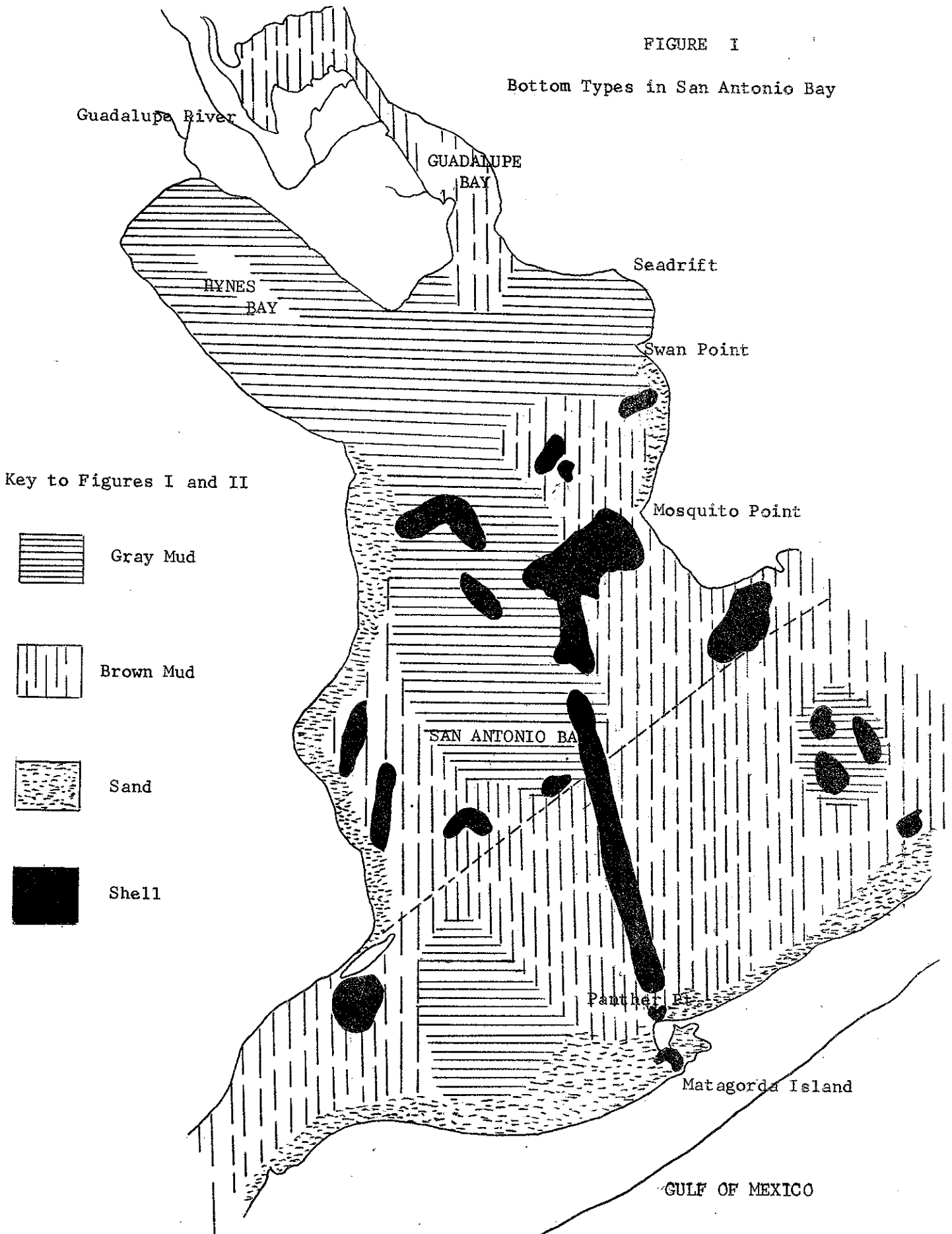
San Antonio Bay is a shallow bay ranging in depth from two to six feet. Most of the tertiary bays connected to San Antonio Bay are even more shallow and range from two feet up to tidal flats covered only at high tide. As a general rule these shallow tertiary bays are unfit for oyster production because of deep soft mud bottoms and their shallow water depth. Shallow water is affected by adverse temperature changes that may occur. Extreme summer temperatures and low summer tides would probably expose any future attempt at oyster production to unfavorable conditions.

At the present time the whole of San Antonio Bay has a very dense oyster population and high commercial production. There is a great fluctuation in amount of production from this bay due to the rate of flow of the Guadalupe River. Periodically the influx of fresh water kills most of the reefs in this bay. This is especially true in those areas nearest the mouth of the river.

Esperitu Santo Bay, on the other hand, is much more stable in its oyster

FIGURE I

Bottom Types in San Antonio Bay

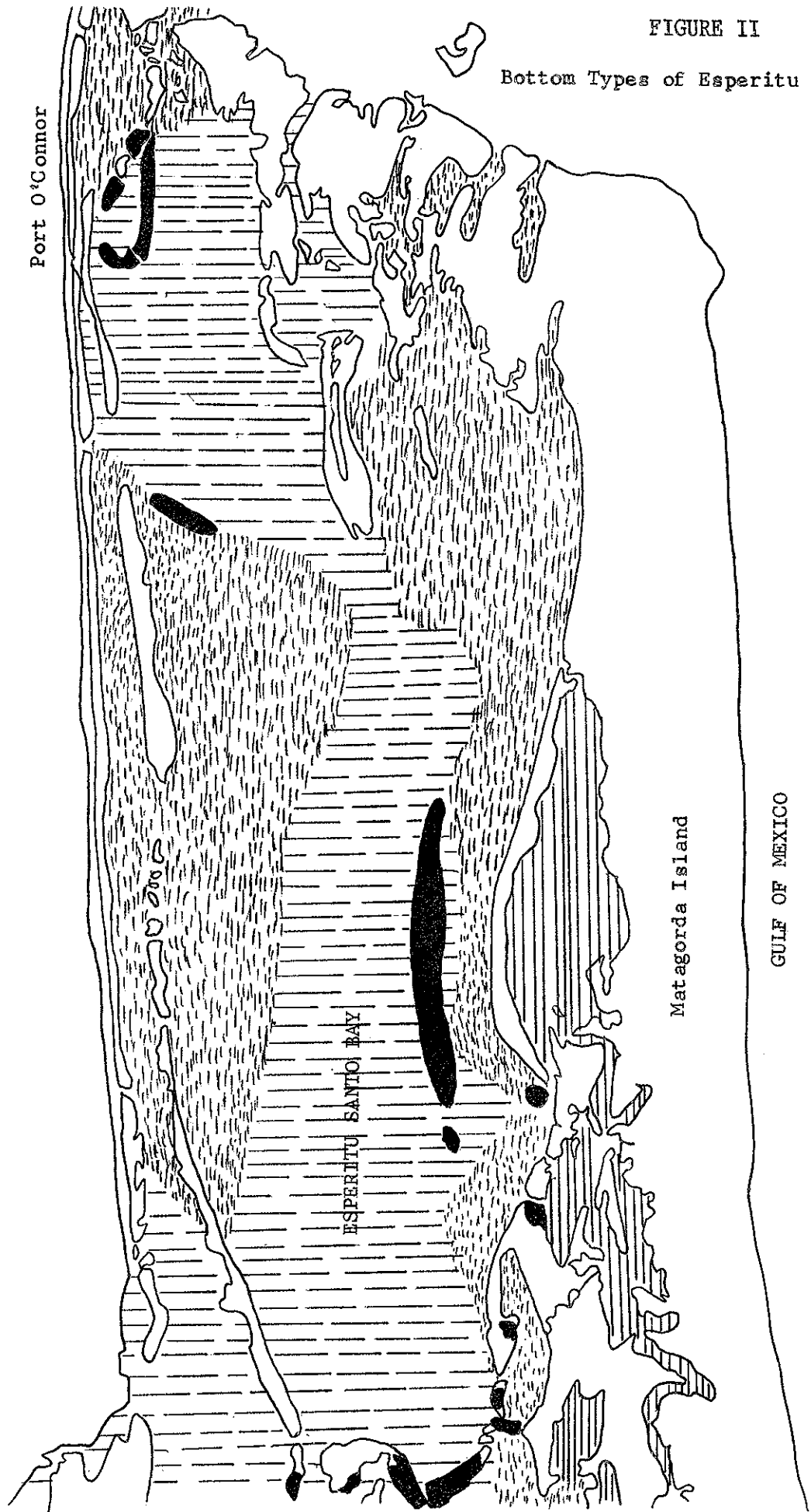


Key to Figures I and II

- Gray Mud
- Brown Mud
- Sand
- Shell

FIGURE II

Bottom Types of Esperitu Santo Bay



production. It is essentially cut off from the flow of the river and maintains salinities high enough to sustain production. Esperitu Santo is a somewhat deeper bay than San Antonio Bay and averages five to eight feet of water in most of its area. Its floor is composed of sand or a mud that is much more firm than in San Antonio Bay. Oyster spat find a more suitable bottom for attachment, and find the bottom firm enough to support their weight. At the present time there is considerable commercial production from most of this area.

Figure III shows areas that are considered potentially productive but at the present are not populated. To understand why some areas would be considered potentially productive for oysters it is necessary to comprehend some of the essential factors involved in reproduction and growth of the oyster. There are several limiting factors to be taken into consideration. When these essentials are applied to an area it is then sometimes possible to predict the outcome of oyster cultivation in these areas. Oysters are a brackish water mollusc that thrive best when the salinity of the water is between 15 and 30 parts per thousand. Hence, we need an area where there is mixing between the saltier Gulf of Mexico waters and the fresh river water. The oyster may withstand some silt without damage, but we need an area where there is not so much silt as to cover the oyster and smother it. Finally, the oyster must have the first two conditions plus a bottom that is firm enough to support its weight and provide attachment of the young spat. A deep soft mud would be unsuitable as well as fine sand. The sand will shift with currents and rapidly cover the oyster.

Figures I, II, and III show that the areas selected for future oyster production are located approximately equidistant between the mouth of the Guadalupe River and Pass Cavallo and Cedar Bayou on the Gulf of Mexico. This location allows considerable mixing of the river and gulf waters. These areas have a firm bottom that would support the weight of a productive oyster reef, and enough nutrients from the river flow reach these areas to support production. At the same time there is not enough silt or sand to bury the live oysters.

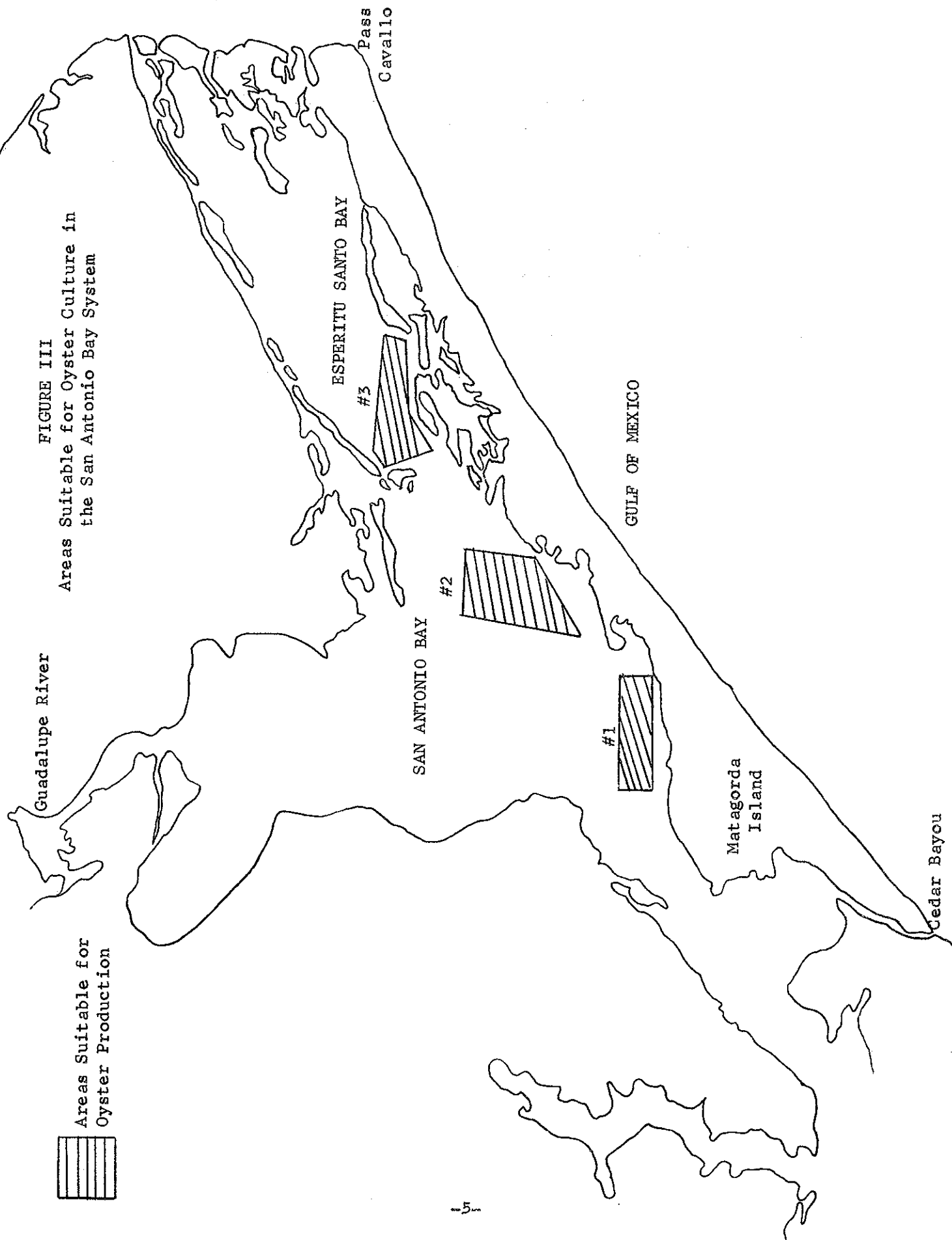
Comments: The present oyster population of area M-5 sustained a peak production throughout the period of the 1959-60 oyster season. The natural reefs are heavily populated with rapidly growing oysters. Since production from this area is rather erratic due to the flow of the Guadalupe River a sustained oyster crop is uncertain. Through cultivation of areas maintaining a more favorable environment it might be possible to continue production through periods of fluctuating river flow.

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Date 1 July 1960

FIGURE III
Areas Suitable for Oyster Culture in
the San Antonio Bay System



Guadalupe River

ESPERITU SANTO BAY

Pass Cavallo

SAN ANTONIO BAY

GULF OF MEXICO

Matagorda Island

Cedar Bayou

Areas Suitable for
Oyster Production

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