

JOB REPORT

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Project No. M-5-R-1 Date 27 September 1960

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

Period Covered: May 1, 1959 - April 30, 1960. Job No. E-2

Hydrographic and Climatological Data - San Antonio and Espiritu Santo Bays

Objectives: To maintain records of hydrographic and climatological conditions as an aid in evaluating ecological changes in the bay system.

Procedure: Hydrographic data including water temperature, salinities, and fresh water influx from streams were maintained. Climatological data from the nearest U.S. Weather Bureau station (Port Lavaca) were used for air temperature and precipitation records.

Findings: River gage readings taken on the Guadalupe River at Victoria and the San Antonio River at Goliad show that the influx of river waters into San Antonio Bay reached a peak of over 640,000 acre feet in the month of February 1958, and gradually subsided to less than 60,000 acre feet in the month of September 1959. More recent readings are not yet available.

Salinities throughout this area averaged about 11 ppt in May 1959, when this job was started, and gradually increased to over 22 ppt by April 1960.

During the study period surface water temperatures ranged from a high of 30° C. at the beginning of August 1959, to a low of 11.5° C. in mid-January 1960. During the same period air temperatures ranged from a high of 93° F. (34° C.) in early August 1959, to a low of 42° F. (6° C.) in February 1960. All temperatures are averages.

Monthly precipitation records show a low of 0.52 inches for the month of January 1959, with the peaks of rainfall for the study period being 13.54 inches in August 1959 and 11.59 inches in October 1959.

River Discharge

The only river system emptying into San Antonio Bay is that of the Guadalupe River. No streams empty into Espiritu Santo Bay. Three smaller rivers empty into the Guadalupe River before reaching San Antonio Bay. These are the San Antonio River, San Marcos River, and the Blanco River. Of these three tributary streams the San Antonio River is the largest, having a drainage area of 3,918 square miles. The Guadalupe River drainage area, which includes the San Marcos and Blanco Rivers, has a drainage area of 5,161 square miles. The total drainage area of the Guadalupe River system as it enters San Antonio Bay is 9,079 square miles (see Figure I).

The discharge of the Guadalupe River into San Antonio Bay has averaged 1,507,800 acre feet per year for a period of twenty-four years. River gage readings of the Guadalupe River at Victoria show an average of 1,127,000 acre feet per year for the period 1935-59. Readings on the San Antonio River taken at Goliad for the period 1924-28, 1939-59 show a 24-year average of 380,800 acre feet per year.

This twenty-four year average discharge rate of 1,507,800 acre feet per year is approximately 1/15,000 of the volume of water in Area M-5. Considering an average depth of four feet for San Antonio and Espiritu Santo Bays, and an area of 209 square miles, the volume of water in this area would be 23,306,262,400 acre feet.

The flow of the Guadalupe River is highly erratic and looking at average discharge rates can be misleading. As an example; in 1956 only 166,810 acre of water was discharged into San Antonio Bay. In 1958 3,268,800 acre of water was discharged into San Antonio Bay (see Figure II).

This erratic river flow produces a constantly fluctuating salinity pattern. As a result the marine environment is in a continual state of change.

Water Salinity and Temperatures

Surface salinities and temperatures were taken at fourteen established stations twice monthly throughout the area during the study period. See Figure III. Salinities ranged from 11 parts per thousand in May 1959, to 22 parts per thousand by April 1960. Surface water temperatures ranged from 30° C. in August 1959 to a low of 11.5° C. in January 1960. See Figure IV.

Air Temperature and Precipitation

Equipment not being available for the recording of air temperatures and precipitation; the records of the nearest U.S. Weather Bureau station (Port Lavaca) were used. Average monthly air temperatures (in 0° F.) for this area is shown in Figure VI. Also shown are the maximum and minimum monthly average temperature for each month of the study period.

Precipitation records (shown in Figure V), show the rainfall for this general area from January 1959, through May 1960. These readings will not be exact in showing the precipitation for Area M-5, but they will give an indication of rainfall for this general area of the Texas coast.

Comments: It is felt by this writer that the single most important factor affecting the environment of this area is the discharge of the Guadalupe River. It's erratic flow creates an ever changing environment in this area. It is recommended that a continued study of river discharge be made, and its ecological effects on Area M-5 be studied.

Prepared by U.R. Childress

Accepted by

Howard T. Lee
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Marine Biologist.

Date

4 November 1960

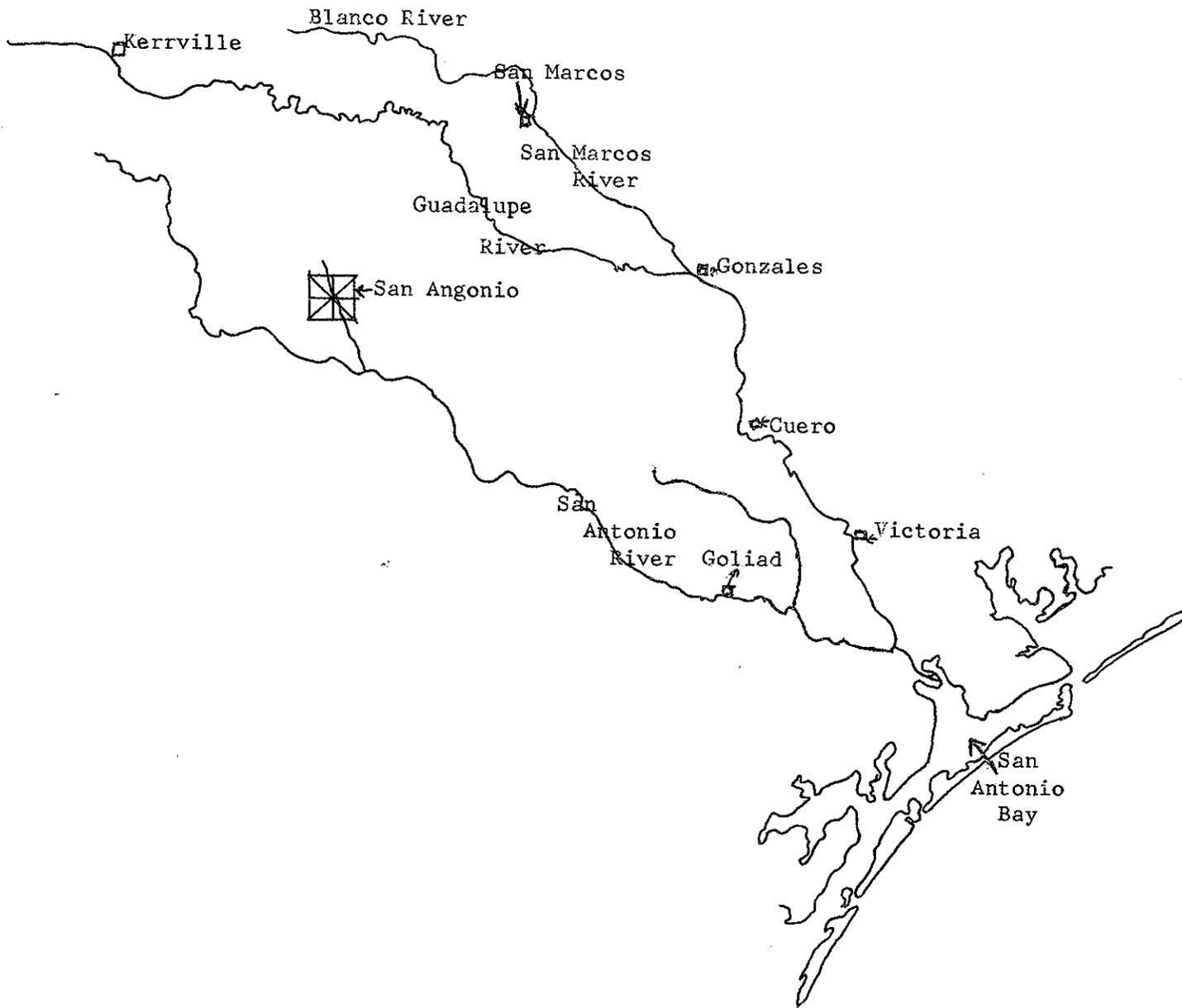


FIGURE I

FIGURE II

Discharge of Guadalupe River into San Antonio Bay

Average Flow Per Month for Two Years - 201,877 acre feet per month

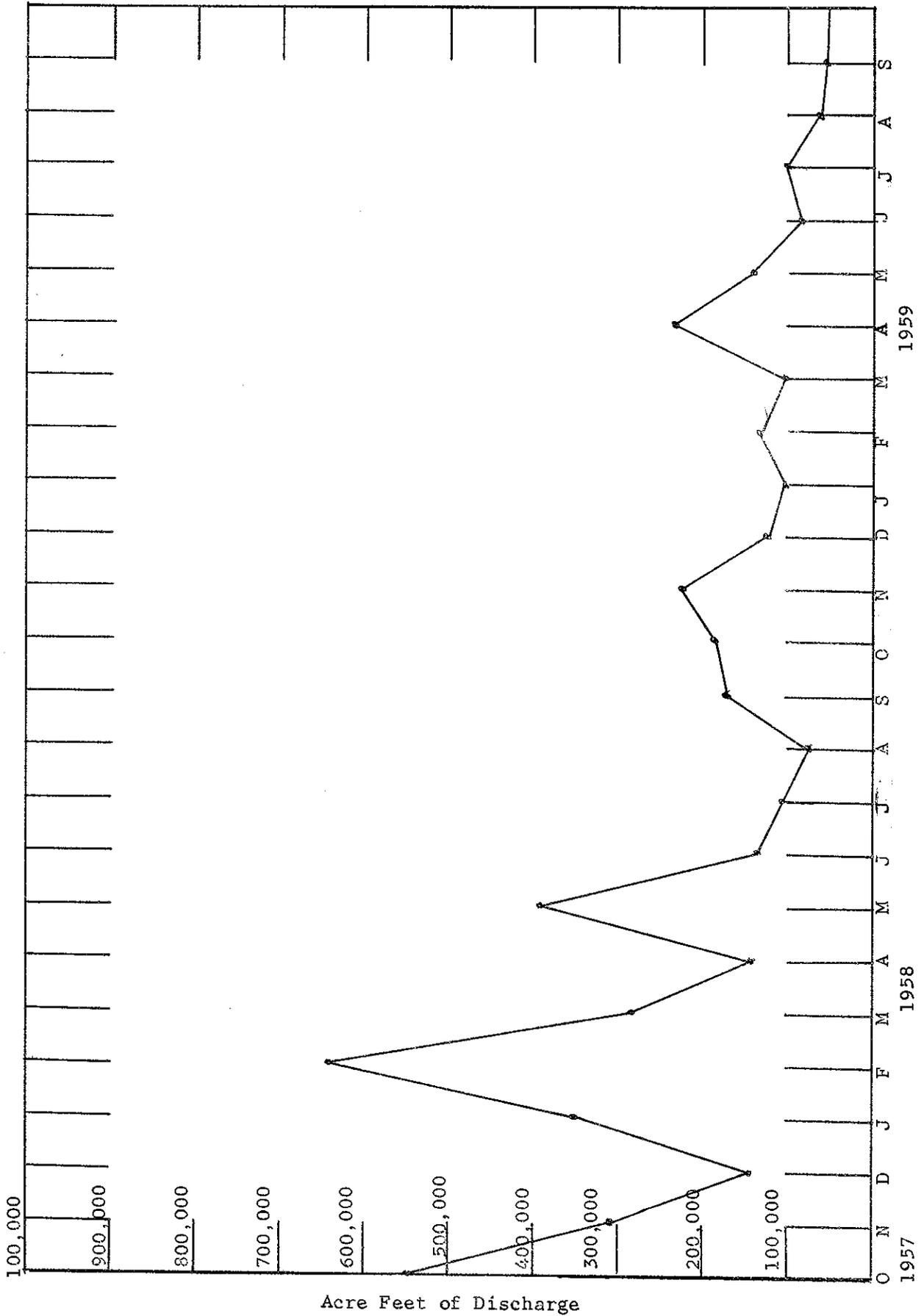
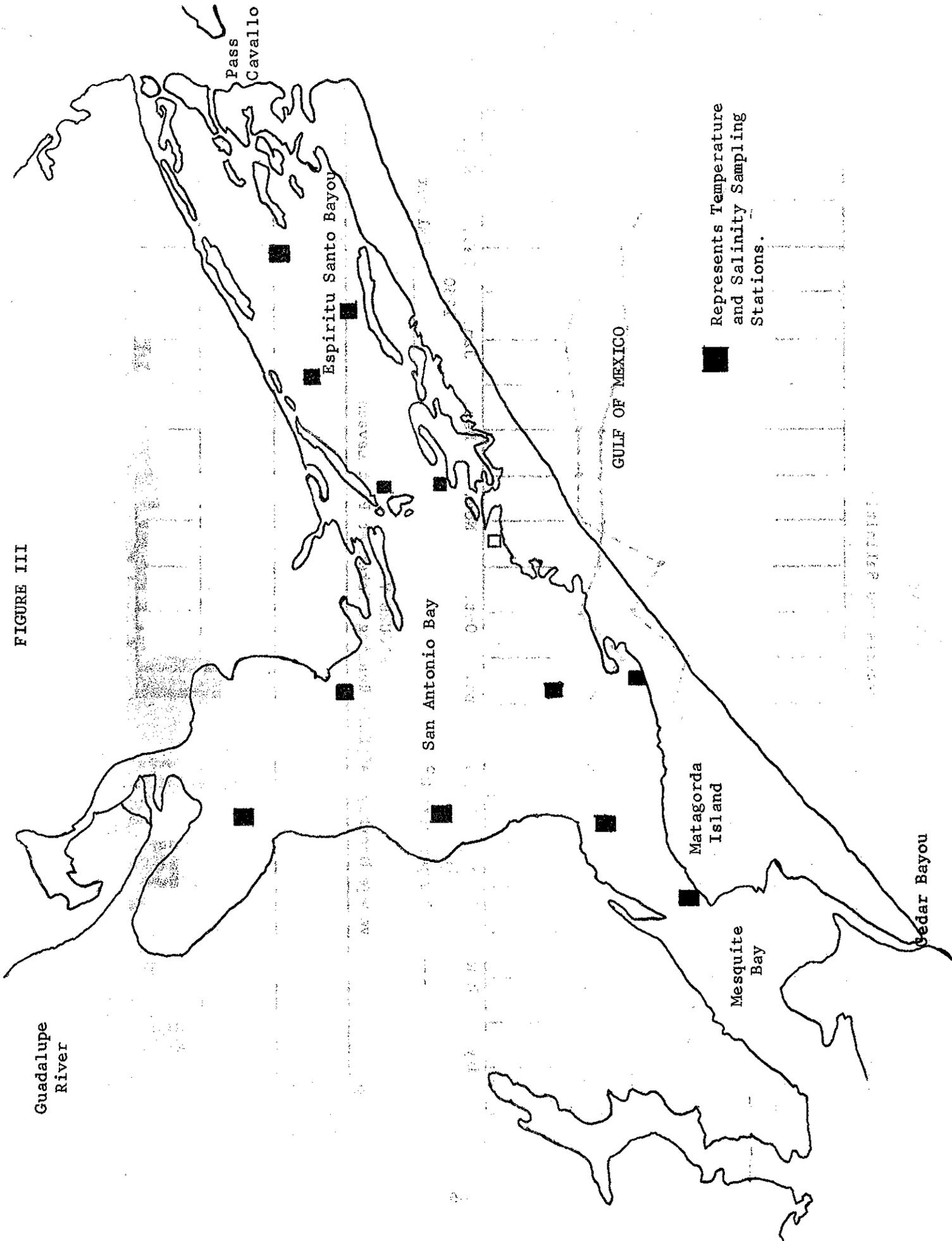


FIGURE III



Guadalupe River

Pass Cavallo

Espiritu Santo Bayou

San Antonio Bay

Matagorda Island

Mesquite Bay

Cedar Bayou

GULF OF MEXICO

Represents Temperature and Salinity Sampling Stations.

FIGURE IV

Surface Temperatures and Salinities

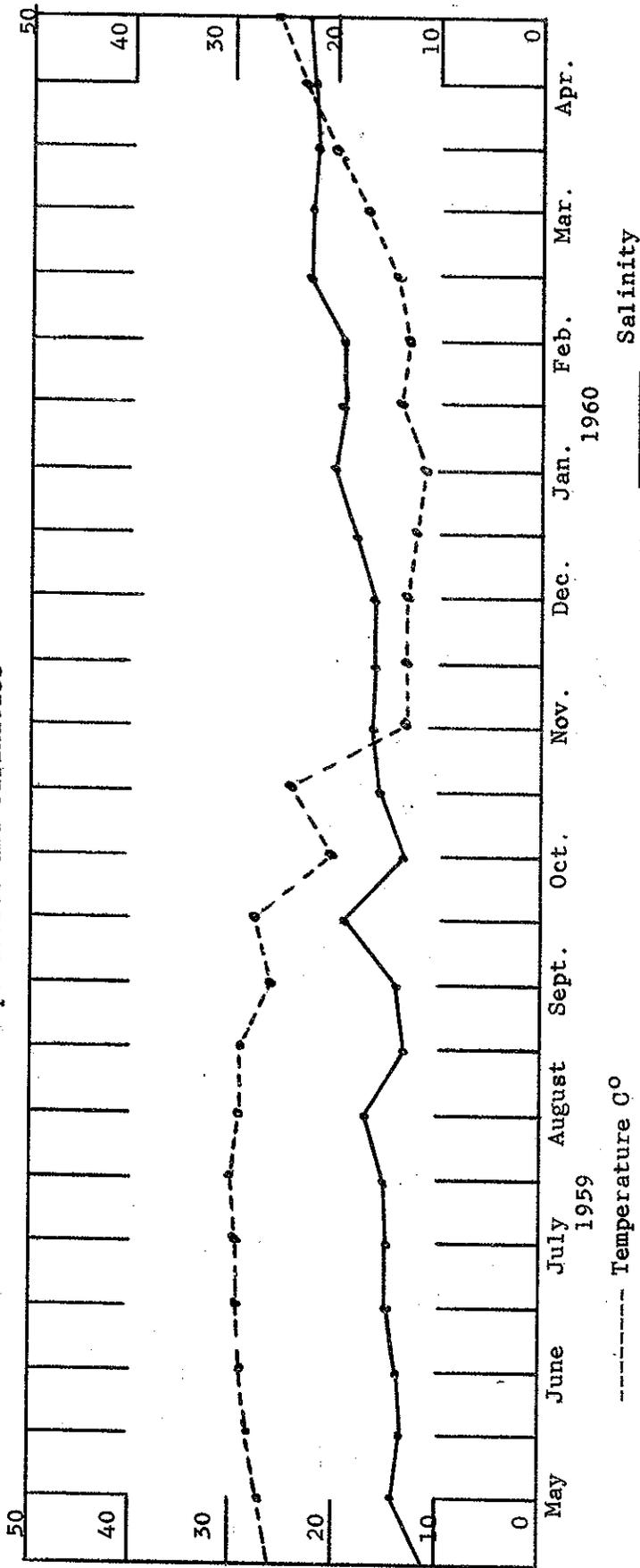


FIGURE V

Average Monthly Rainfall Readings Taken At Port Lavaca

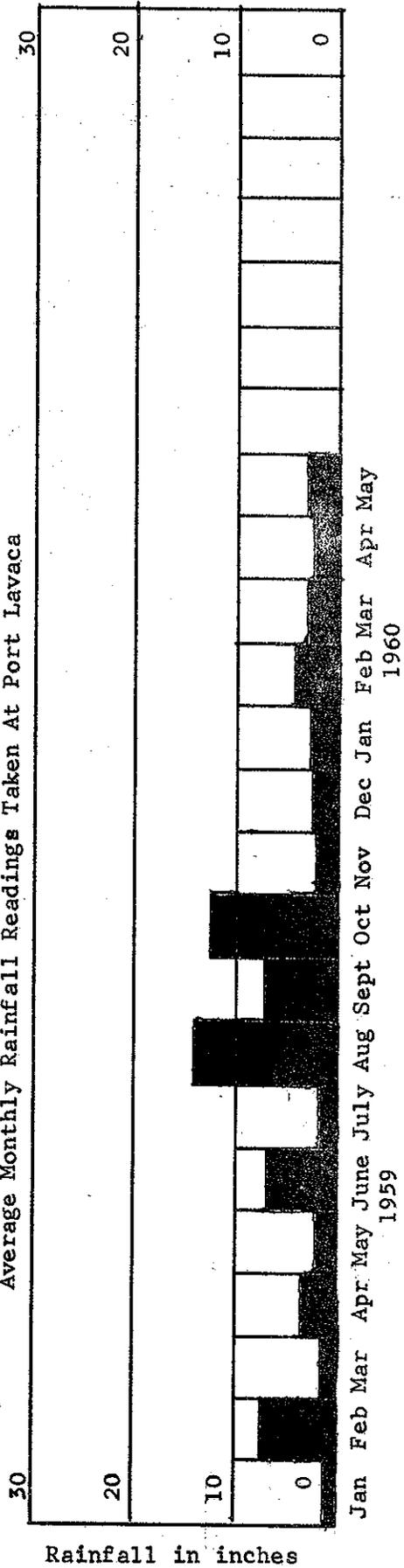


FIGURE VI

Air Temperature Taken at Port Lavaca

