

Job Report

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Project No. MF-R-4 Date April 3, 1963
Project Name: Analysis of Populations of Sports and Commercial Fin-fish
and of Factors Which Affect these Populations in the
Coastal Bays of Texas
Period Covered: September 1, 1961 to December 31, 1962 Job No. 17

Hydrographic and Meterological Study of the San Antonio Bay System

Abstract: Water temperatures dropped to a low of 2° Centigrade in mid-January, 1962. Then a steady temperature increase brought them to slightly above normal during July, August, and September, 1962.

Salinities were about 14.5 parts per thousand at the start of this study and gradually increased to about 25 parts per thousand at the end of the study.

Rainfall and riverflow were below normal for the study period. The below normal rainfall and river flow allowed the area to have fairly clear waters during the study, with 50 to 75 ppt turbidity being normal for the bay complex.

Objectives: To gather information on the hydrography and meterology of San Antonio-Espiritu Santo Bays and to present this information in a report that will be convenient for use in this project and other projects.

Procedures: Six stations located in San Antonio and Espiritu Santo Bays was sampled twice each month when possible. (See Figure 13.) A surface water sample was collected at each station. Information recorded in the field includes surface water temperature and water turbidity for each station and the time each station was sampled. Notes on general meterological conditions also were taken.

Salinities were determined through use of hydrometer.

Additional information was gained from water samples collected as a part of bay studies of shrimp, oysters, crabs, and fish.

Information on precipitation, air temperature, wind, tide, and river discharge was obtained from various publications.

All data gathered were evaluated locally and compiled into this report.

Findings:

Water Temperatures: Surface water temperatures in the San Antonio-Espiritu Santo Bay System were 28-30° Centigrade throughout this area at the start of the study period in September, 1961. (See Figures 1 to 7 and Figure 13) These water temperatures gradually decreased to 12-14° Centigrade by the first of January, 1962, then abruptly dropped to a low of 2° Centigrade between January 6-11, 1962, when a severe cold wave gripped the area. San Antonio and Espiritu Santo Bays were completely frozen over for about 3 or 4 days. By the middle of

February water temperatures again increased to 20-21° Centigrade. After the first of April 1962 the water temperatures slowly increased to about 30° Centigrade by mid-July and maintained these temperatures until mid-September when the fall cooling trend again started.

At the end of this study period December 31, 1962 water temperatures in the area were 16-18° Centigrade. (See Figures 1 to 7 and Figure 13.)

Salinities: Salinities varied widely at the different sampling stations throughout this area during the study period, (see Figures 1 to 7 and Figure 13) but one thing in common to sampling stations was a steady salinity increase for the whole 16 month study period. All sampling stations combined had an average salinity increase of 10 ppt between September 1961 and December 1962.

The average salinity in the area in September 1961 was 14.7 ppt. In December, 1962, the average salinity was 25.5 ppt (see Figures 1 to 7).

Turbidity: The water turbidity in San Antonio and Espiritu Santo Bays is controlled mostly by wind and wave action.

There was a turbidity peak in December 1961 that could be partially attributed to river flow. In November 1961 the Guadalupe River was flowing above average. High winds with the accompanying wave action were still responsible for most of the turbidity in this area (see Figures 8 and 9).

Precipitation: Precipitation in the water shed of the Guadalupe and San Antonio Rivers was below normal for most of this study period. The largest monthly rainfall for the immediate area (Calhoun County) was slightly over 7 inches in September, 1961. This was the month Hurricane Carla hit this area. The only other month the rainfall approached this record month of the study period was June 1962 with slightly under 7 inches of rainfall. The remainder of the study period was considerably below normal. Drought conditions existed in the area for the period of July through October, 1962 (see Figure 10).

River Flow: The combined flow of the Guadalupe and San Antonio Rivers at the start of the study period in September, 1961 were approximately 95,000 acre feet per month. The river flow showed a steady decrease until August 1962 with the exception of June 1962 when the river flow peaked at about 90,000 acre feet for the month. It then dropped to a low for the study period in August 1962 of about 27,000 acre feet. After this low the river flow started a gradual increase through the end of the study period. (See Figure 12.)

Air Temperatures: Monthly average air temperatures for the area were taken by the U. S. Weather Bureau at Port Lavaca. The air temperature at the start of the study period in September 1961 was about 80°F. This average gradually decreased to a low of 44°F. for the month of January 1962. On the 12th of January 1962 the air temperature reached a low for the year of 14°F. After this low a gradual increase again brought the average monthly temperatures into the low 80's (84°F.) in August 1962. The high monthly average for the year was in August 1962 with 84°F., then was followed by a steady decrease until the end of the study period in December, 1962 (see Figure 11).

Comments: At the beginning of the study period in September 1961 this portion of the Texas coast had one of the most violent and destructive hurricanes ever recorded for this area. The eye of the hurricane passed over the eastern two-thirds of this area.

This violent storm did not seem to affect the hydrographic conditions of the area as much as would be expected. Air temperatures were about normal, precipitation was only slightly above normal, salinities normal, and river flow increased only slightly.

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Figure 1
Station 1
Temperature (0°C) and Salinity (ppt)

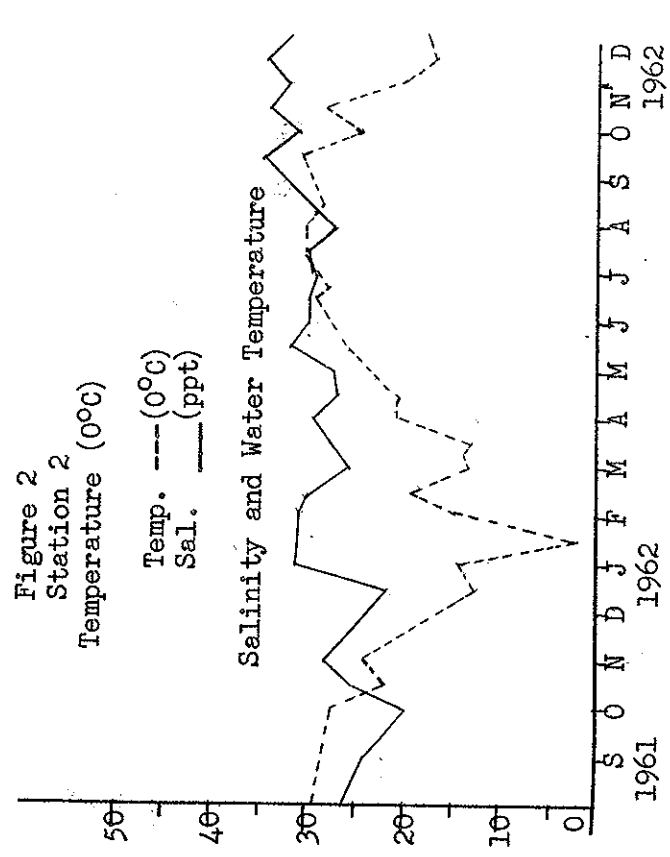
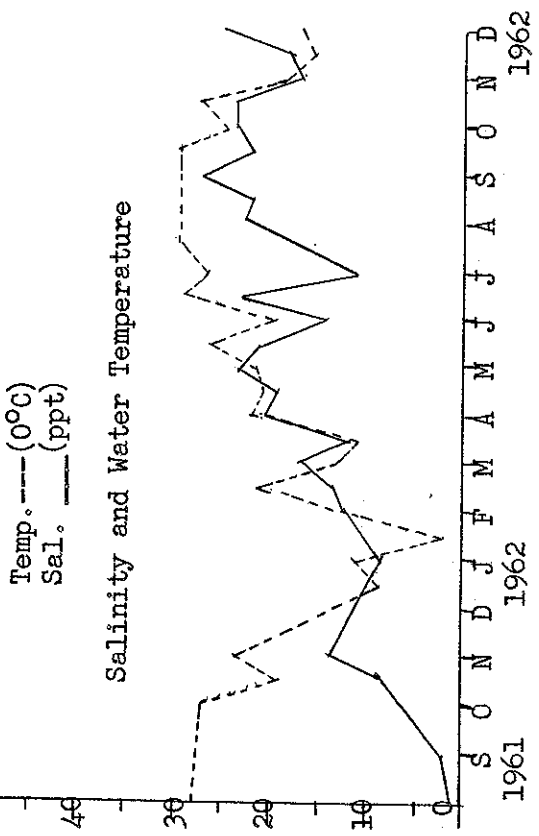


Figure 3
Station 3

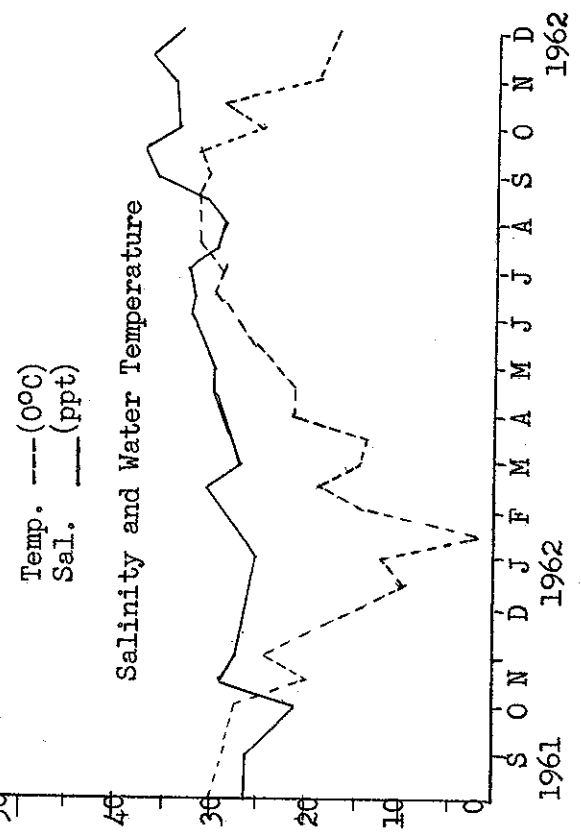


Figure 4
Station 4

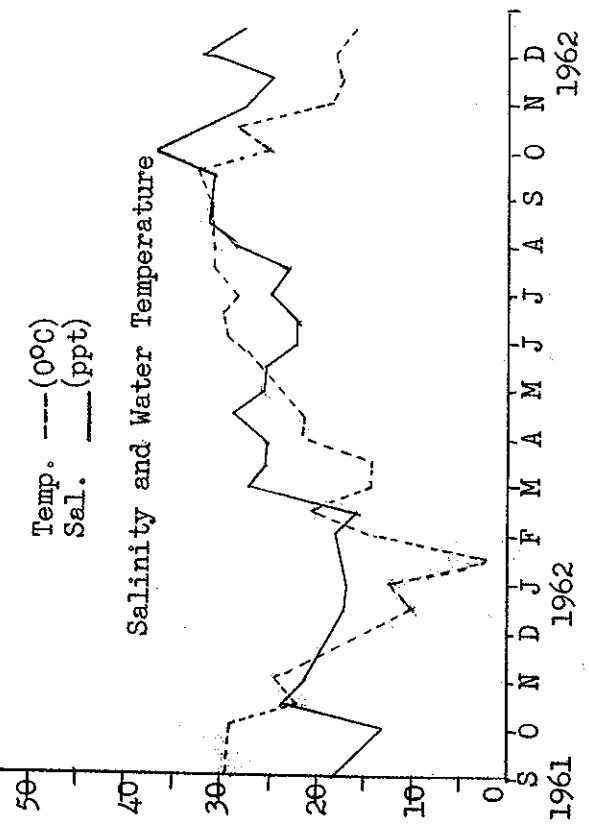


Figure 5
Station 5

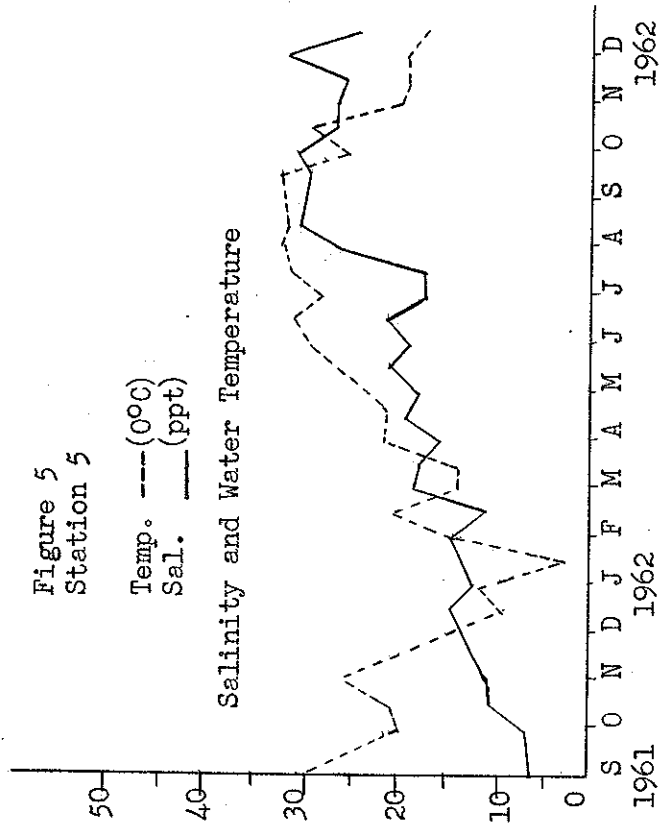


Figure 6
Station 6

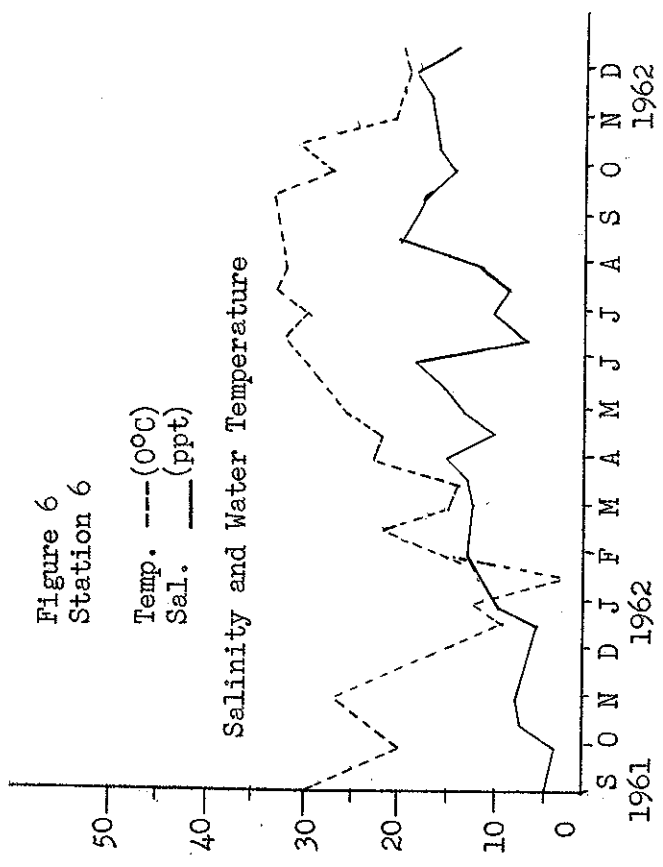


Figure 7
Chicken Foot Reef

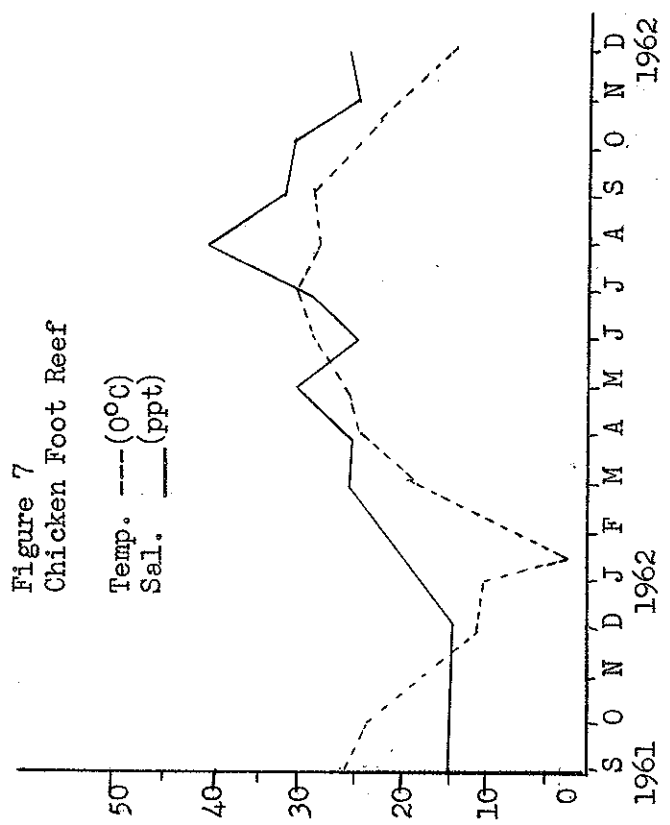


Figure 8
Turbidity - San Antonio Bay (ppt)

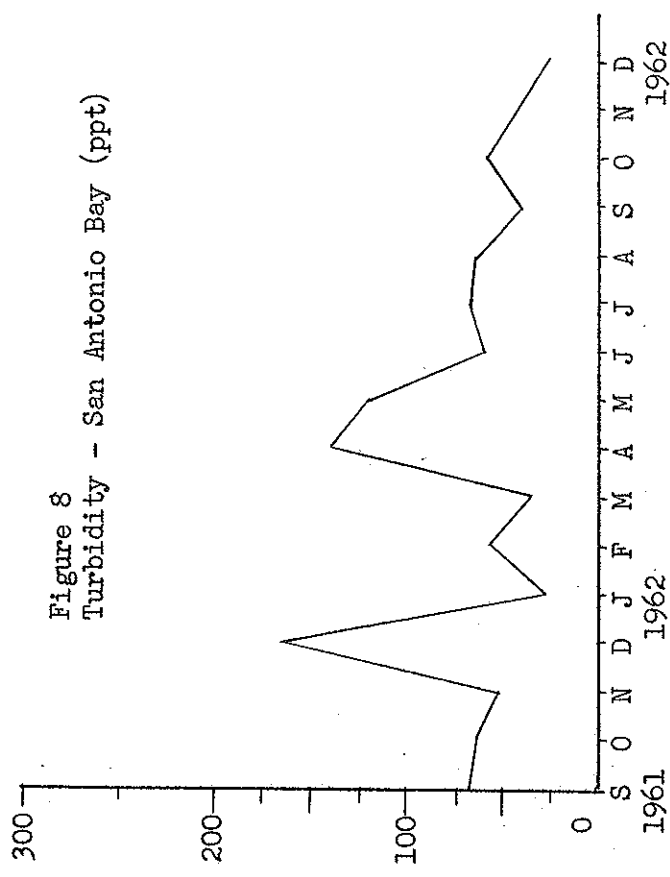


Figure 9
Turbidity-Espiritu Santo Bay (ppt)

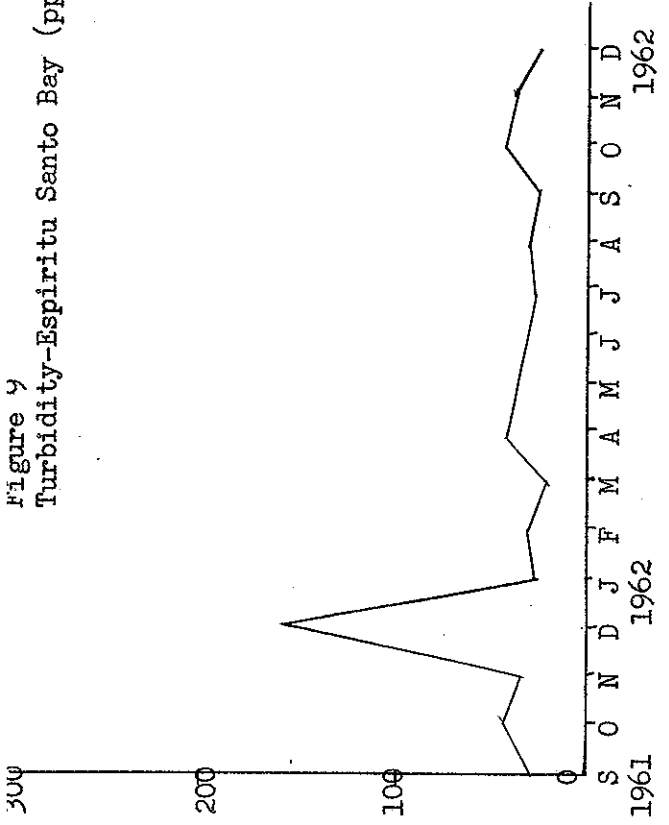


Figure 10
Precipitation-Area M-5

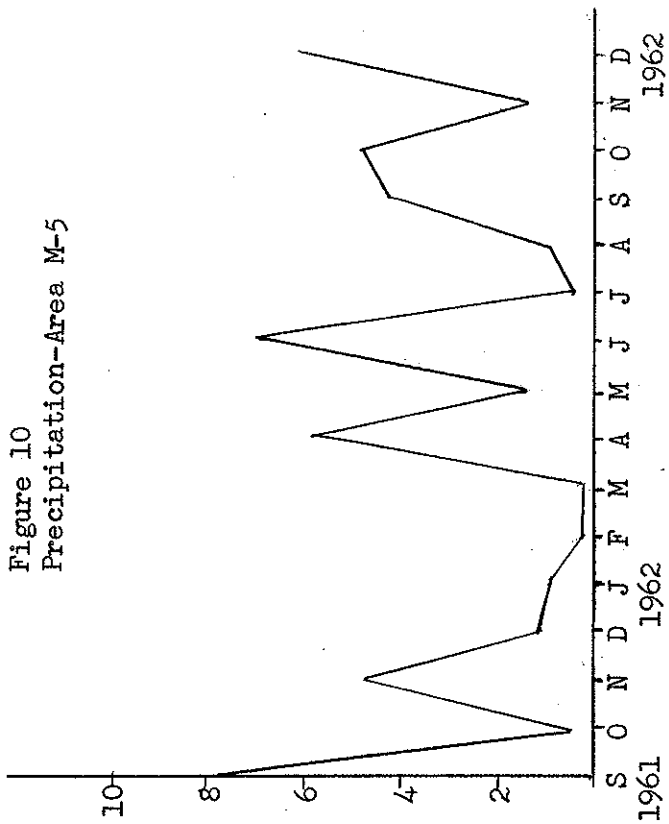


Figure 11
Monthly Average Air Temp. (°F) -Area M-5

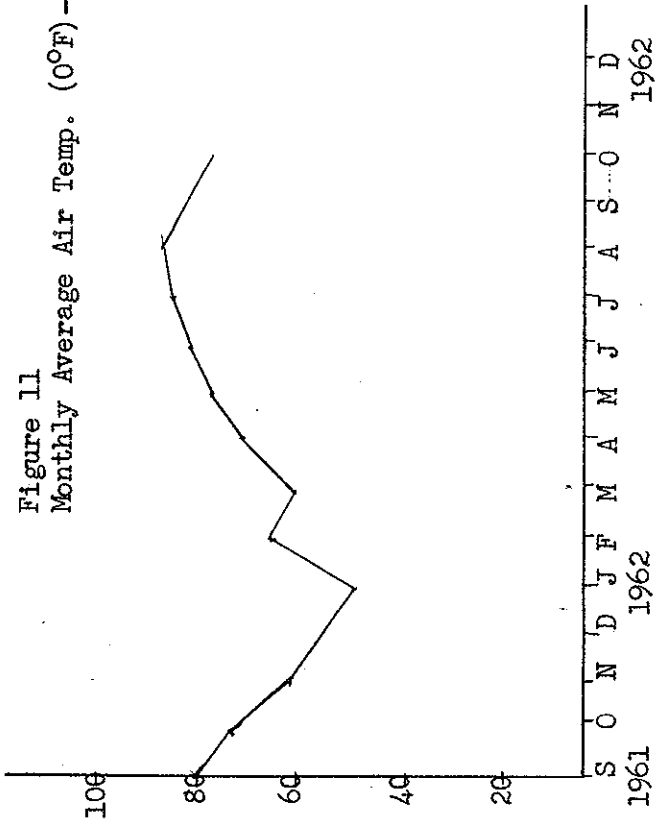
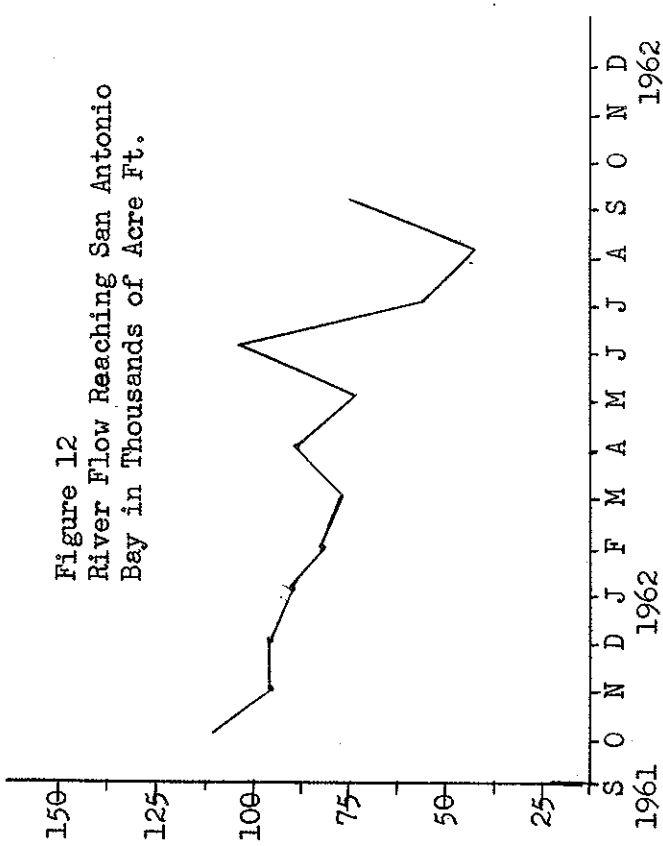
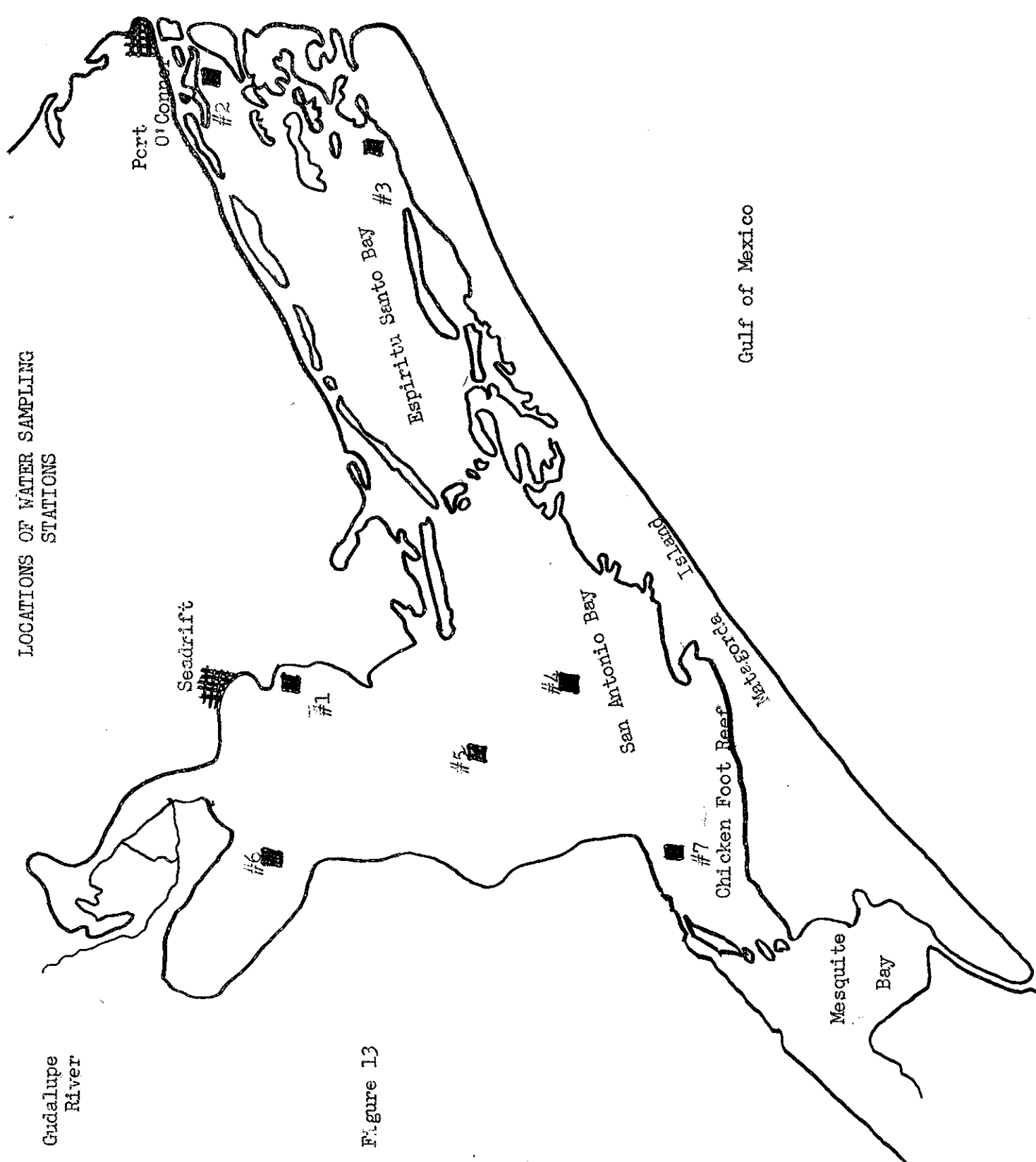


Figure 12
River Flow Reaching San Antonio Bay in Thousands of Acre Ft.





LOCATIONS OF WATER SAMPLING STATIONS

Figure 13

