

## Job Report

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Project No. MF-R-5 Date February 11, 1964  
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: January 1, 1963 to December 31, 1963 Job No. 16

### Hydrographic and Meteorological Study of Aransas Bay System

Abstract: Salinities in the Aransas Bay System were higher in 1963 than in 1962. Copano Bay salinities reached a high of 49 ppt in 1963 as compared to 32 ppt in 1962. Rainfall in 1963 was 15 per cent less than in 1962. Water temperatures in 1963 were of a pattern similar to years past. Although a freeze was recorded, in January of 1963, the lowest water temperature reading recorded was 4.5°C.

Objectives: To provide data on the hydrographical and climatological conditions prevailing in the Aransas-Copano Bay System for correlation with fluctuations in populations of marine organisms.

Procedure: Twenty hydrographic stations, located in the Aransas Bay System (Figure 1), were sampled twice each month on or near the first and the fifteenth. At each station a water sample, taken from near the bottom, was tested for salinity and for water temperature. The temperature was measured in degrees centigrade and the salinity determined with a specific gravity hydrometer and the use of Knudsen's Hydrographic Tables.

All climatological information presented herein were taken from records maintained at the Marine Laboratory, Rockport, Texas.

### Findings and

Discussion: Salinity, precipitation, and water temperature comparisons are found in Figure 2 of this report. More detailed records are available for examination at the laboratory if further information is needed.

Salinity averages (Figure 2) were higher in 1963 than in 1962. Copano Bay salinities in 1962 were lower than in either Aransas or Mesquite Bays. In 1963, however, Copano Bay salinities reached 49 ppt; the highest recorded in the past four years. This increase in salinity in Copano, Aransas, and Mesquite Bays is attributed to a 15 per cent decrease in rainfall in 1963 compared to 1962. Rainfall in 1962 was 61 per cent lower than in 1961.

Copano Bay may be considered a separate bay system. It receives very little water exchange from Aransas Bay and little runoff. With poor circulation, and drouth conditions, Copano Bay becomes a high salinity lagoon much like the Laguna Madre (Figure 2).

It was found (Simmons and Hoese 1959) that during drouth years, when Cedar Bayou Pass was open between Mesquite Bay and the Gulf of Mexico (Figure 1), Mesquite Bay's salinities got as high as 44 ppt.

In 1963, weather conditions were the same as in the previous study and salinities in Mesquite Bay never averaged higher than 40 ppt (Figure 2). It was further found that, in 1960 and in 1963, the salinities of Mesquite Bay were determined somewhat by the influence of Gulf waters through Cedar Bayou. If Cedar Bayou remains open, Mesquite Bay salinities will seldom, if ever, exceed 45 ppt. If drouth conditions prevail, and Cedar Bayou is closed, Mesquite Bay will become a hypersaline lagoon.

Aransas Bay is similar to Mesquite Bay. Its salinities are regulated by river discharge and by waters from the Gulf of Mexico. Because Aransas Bay has a permanent connection with the Gulf of Mexico, salinity averages should never exceed 45 ppt.

Water temperatures in 1963 were similar to those of 1961 and 1962. Although a freeze occurred, in January of 1963, the lowest temperature recorded at that time was 4.5°C. in Copano Bay. This freeze seemed to have no outward effect on the fish populations, but there is some evidence that the 1962-1963 redfish young-of-the-year may have suffered mortalities due to the freeze. This will be further discussed in Job 5 of Project MF-R-5.

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#### Bibliography

Simmons, E. G. and Hoese, H. D. 1959. Studies on the Hydrography and Fish Migrations of Cedar Bayou, a Natural Inlet on the Central Texas Coast. Publications of the Institute of Marine Science, University of Texas, Port Aransas, Vol. 6

Figure 1  
Hydrographic Stations in the Aransas Bay Area 1962-1963

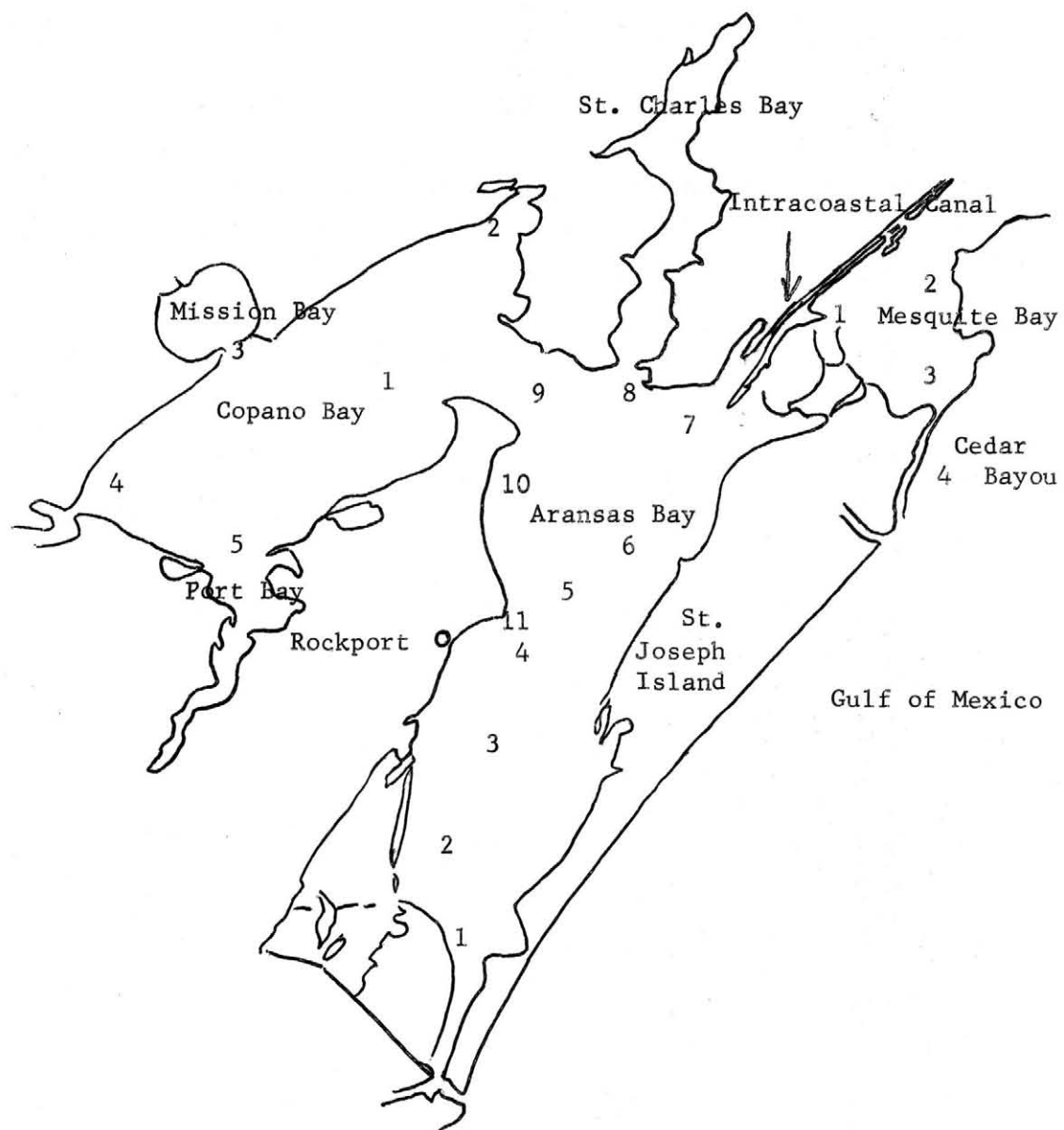


Figure 2  
Salinity, Water Temperature, and Rainfall Averages in the Aransas Bay Area  
as Recorded at the Marine Laboratory, Rockport, Texas

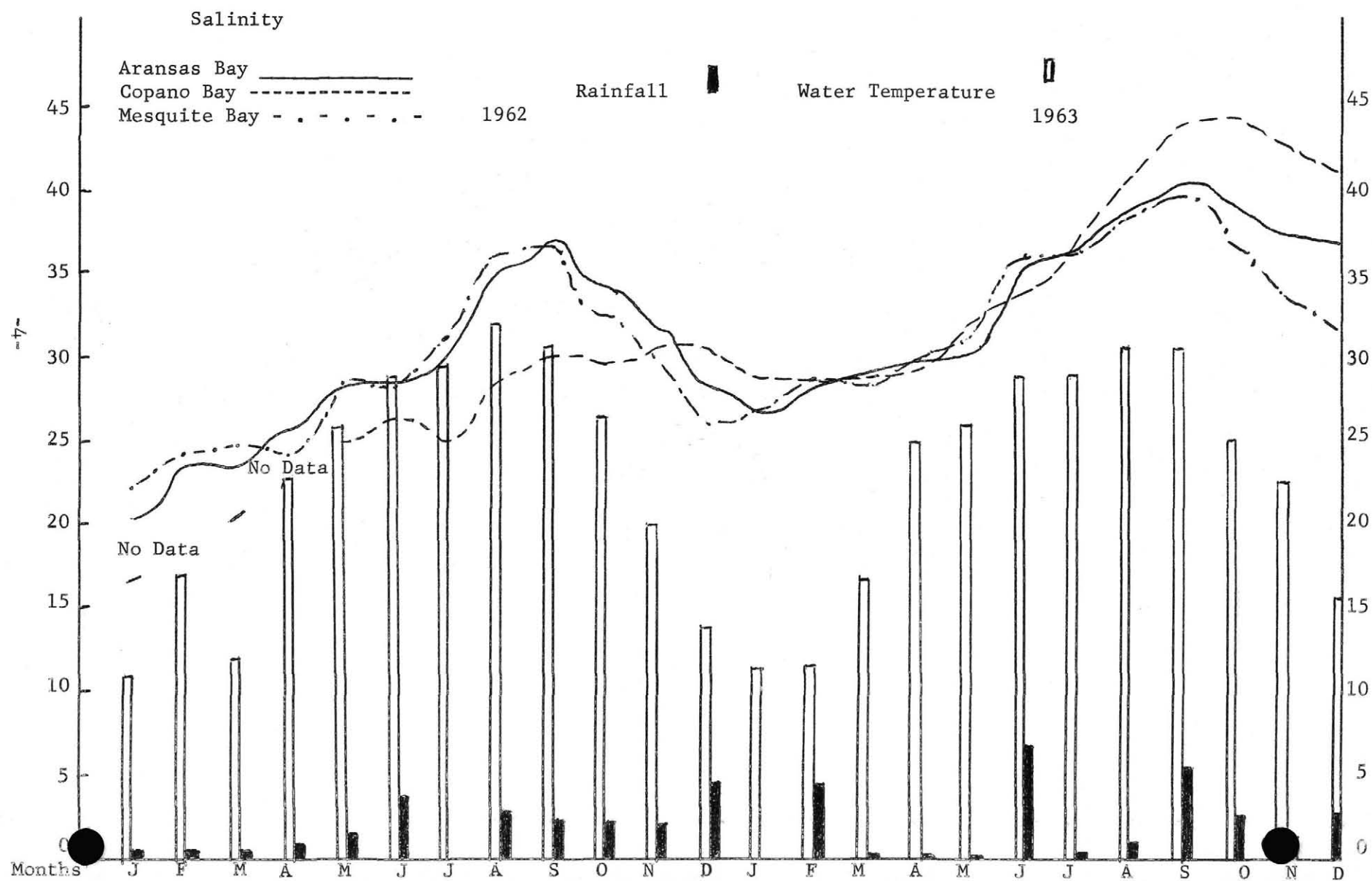


Table 1  
Stations in Aransas Bay - 1963

<u>MONTH</u>	<u>SALINITY IN PPT.</u>											
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>Avg.</u>
Jan.	30.7	28.6	26.4	26.1	26.6	25.6	25.6	25.6	26.8	25.8	26.5	26.8
Feb.	30.1	29.0	27.7	26.3	26.9	26.8	27.8	26.4	26.8	26.2	26.7	27.2
Mar.	29.4	29.3	27.9	27.2	27.3	28.2	30.1	26.9	27.6	27.3	27.9	28.1
Apr.	29.8	29.7	29.7	29.2	29.3	30.3	30.1	29.3	29.6	29.6	28.8	29.6
May	32.5	31.6	31.1	31.5	31.8	31.2	30.7	29.4	31.1	31.2	30.9	31.2
June	36.8	36.6	36.2	34.3	35.6	35.4	36.1	34.9	34.8	34.8	34.8	35.5
July	36.0	36.9	36.8	36.1	35.8	36.2	36.8	36.3	36.0	35.2	36.4	36.2
Aug.	35.3	38.4	38.4	39.0	39.2	39.4	40.1	40.5	40.0	39.6	38.8	38.9
Sept.	35.1	38.1	40.2	40.5	41.0	41.4	42.7	41.6	41.6	42.1	39.9	40.8
Oct.	36.0	39.1	38.9	40.2	40.0	38.8	37.7	38.5	41.7	39.9	38.6	39.1
Nov.	34.1	37.0	37.6	38.3	38.7	38.2	36.4	36.7	39.7	37.8	38.7	37.6
Dec.	35.2	36.4	36.5	35.3	32.6	31.4	31.1	35.1	40.2	35.7	35.1	35.0

	TEMPERATURES °C.											
Jan.	12.2	11.2	10.8	10.7	10.8	11.2	11.2	12.9	11.3	11.2	11.6	11.4
Feb.	11.3	12.2	11.8	11.6	12.3	11.6	13.1	12.2	12.0	11.9	12.3	11.9
Mar.	15.6	16.4	16.9	16.6	15.5	16.7	16.1	17.1	17.0	17.2	17.1	16.6
Apr.	24.4	24.4	24.1	24.3	24.8	26.3	25.4	25.5	24.8	24.4	26.0	24.9
May	25.0	25.5	25.8	25.4	25.2	25.5	25.8	26.5	26.3	26.4	26.5	25.8
June	29.0	28.7	28.7	28.8	28.6	28.5	28.3	29.0	28.8	28.9	29.1	28.8
July	26.6	27.2	29.4	29.1	28.6	29.2	28.6	29.5	29.4	29.4	29.6	28.8
Aug.	29.9	30.1	30.2	30.4	30.3	30.1	30.2	31.7	31.0	30.7	31.2	30.5
Sept.	30.2	30.1	30.1	30.2	30.3	29.9	30.0	31.5	30.6	30.2	30.9	30.4
Oct.	24.3	24.5	24.9	24.8	24.4	24.3	24.6	26.0	25.0	25.1	25.8	24.9
Nov.	23.2	22.5	22.0	22.2	22.0	22.1	22.9	23.7	22.4	21.7	21.8	22.4
Dec.	17.6	16.4	15.7	15.8	16.0	14.4	18.0	13.6	13.8	14.5	15.0	15.5

Table 2

## HYDROGRAPHIC DATA FOR MESQUITE AND COPANO BAYS

## SALINITY IN PPT.

MONTH	<u>MESQUITE BAY</u>						<u>COPANO BAY</u>					
	Stations	1	2	3	4	Avg.	1	2	3	4	5	Avg.
Jan.		25.2	25.0	26.3	30.6	26.8	28.6	28.7	28.8	28.2	28.6	28.6
Feb.		28.0	28.1	28.5	30.1	28.6	28.2	28.3	29.4	27.7	28.9	28.6
Mar.		29.5	26.2	27.9	29.6	28.3	28.4	29.0	28.8	28.7	28.4	28.7
Apr.		30.2	28.1	30.3	30.1	29.7	28.9	28.6	28.9	29.7	30.5	29.3
May		30.6	30.7	32.7	31.1	31.1	31.4	31.4	32.3	32.3	32.5	32.0
June		36.8	36.1	35.4	35.8	36.0	34.1	34.2	34.4	36.1	35.0	34.8
July		36.2	37.0	35.7	35.8	36.0	36.4	35.4	36.9	38.0	36.3	36.6
Aug.		40.1	39.4	37.8	36.3	38.4	39.4	39.9	40.7	41.8	40.4	40.4
Sept.		42.8	39.8	38.9	37.0	39.6	44.0	43.0	43.7	45.0	44.0	43.9
Oct.		38.4	38.6	35.9	34.9	36.9	43.9	43.4	44.3	44.1	44.4	44.1
Nov.		35.7	33.6	34.9	33.6	34.4	43.0	42.5	41.0	42.7	43.7	42.6
Dec.		30.8	30.5	31.9	32.2	31.4	41.6	39.7	40.7	41.1	41.9	41.0

## TEMPERATURE °C

Jan.	11.4	11.1	11.5	12.9	11.8	10.0	10.4	9.8	9.6	9.5	9.9
Feb.	12.8	14.2	11.6	12.6	12.8	10.2	11.9	10.9	10.2	9.8	10.8
Mar.	16.6	15.9	17.2	16.7	16.6	21.8	23.1	22.2	22.0	22.6	22.3
Apr.	26.0	25.8	26.0	26.4	26.0	23.7	25.5	24.8	23.8	22.5	24.3
May	25.5	25.6	26.2	26.0	25.8	25.1	26.0	25.5	25.6	25.3	25.5
June	28.9	28.8	29.3	30.0	29.2	28.9	29.7	29.3	29.3	29.2	29.3
July	28.8	28.8	29.8	29.9	29.3	29.8	30.6	30.9	30.4	30.1	30.3
Aug.	30.3	30.3	30.5	30.9	30.5	29.8	30.6	30.9	30.4	30.1	30.3
Sept.	30.3	30.3	30.6	31.5	30.6	30.0	30.8	30.6	30.1	29.9	30.2
Oct.	24.8	24.9	24.6	25.0	24.8	25.2	25.3	24.9	25.2	25.3	25.0
Nov.	23.0	23.5	23.0	23.7	23.3	23.4	24.3	23.7	23.6	23.1	23.6
Dec.	17.4	17.4	18.2	18.8	18.0	13.9	15.0	14.2	14.2	13.4	14.1