

Job Report

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Project Name: Fisheries Investigations in the Aransas-Copano Bay System
Period Covered: January 1, 1960 to December 31, 1960 Job No. E-1

Hydrographic Studies in Mesquite Bay and Cedar Bayou Pass

Abstract: Maximum and minimum water temperatures for the study period were 32.3°C and 10.8°C. Maximum and minimum salinities were 35.9 ppt and 0.4 ppt. The lowest temperatures were recorded during January, February and March.

The highest rainfall occurred during September, October and November, which corresponds to the low salinities recorded in November.

The greatest single factor affecting the salinity of Mesquite Bay is rainfall.

Objectives: The object of this study was to gather hydrographic information during a period when Cedar Bayou was open for comparison with conditions prevailing during 1958 when a study was made with Cedar Bayou closed (Hoesel, 1958).

Procedure: Fourteen stations were established in approximately the same positions used in the former study (Figure 1). Twice each month at 15-day intervals, these stations were visited and water samples were taken. Temperature of these samples were measured in degrees Centigrade and the salinity of these samples determined by the Mohr Titration Method. This work was conducted in conjunction with Jobs No. A-2, B-2 and C-2.

Findings: A comparison of monthly average salinities in Mesquite Bay and Cedar Bayou is presented in Figure 2. Salinities and temperatures taken during the year are presented in Tables 1 and 2, respectively.

Discussion: The major difference in salinities during the two studies can be attributed to rainfall (Figure 3) or river discharge and the exchange of Gulf waters through Cedar Bayou.

The effect the opening of Cedar Bayou had on Mesquite Bay's hydrography varied with the amount of rainfall. Also, in periods of light precipitation, Gulf waters entering Mesquite Bay through Cedar Bayou affect salinities greatly in the lower portion of the bay. When rainfall was heavy, salinities were little affected by the influx of salt water entering through Cedar Bayou and largely affected by the fresh water entering from San Antonio Bay system.

Cedar Bayou, when open, tends to stabilize bay salinities in times of drouth and somewhat during periods of abnormally heavy precipitation. In times of drouth the influx of Gulf water into Mesquite Bay would tend to moderate salinities, which would otherwise become very high. In times of

Figure 1

Hydrographic Stations in Mesquite Bay
and Cedar Bayou

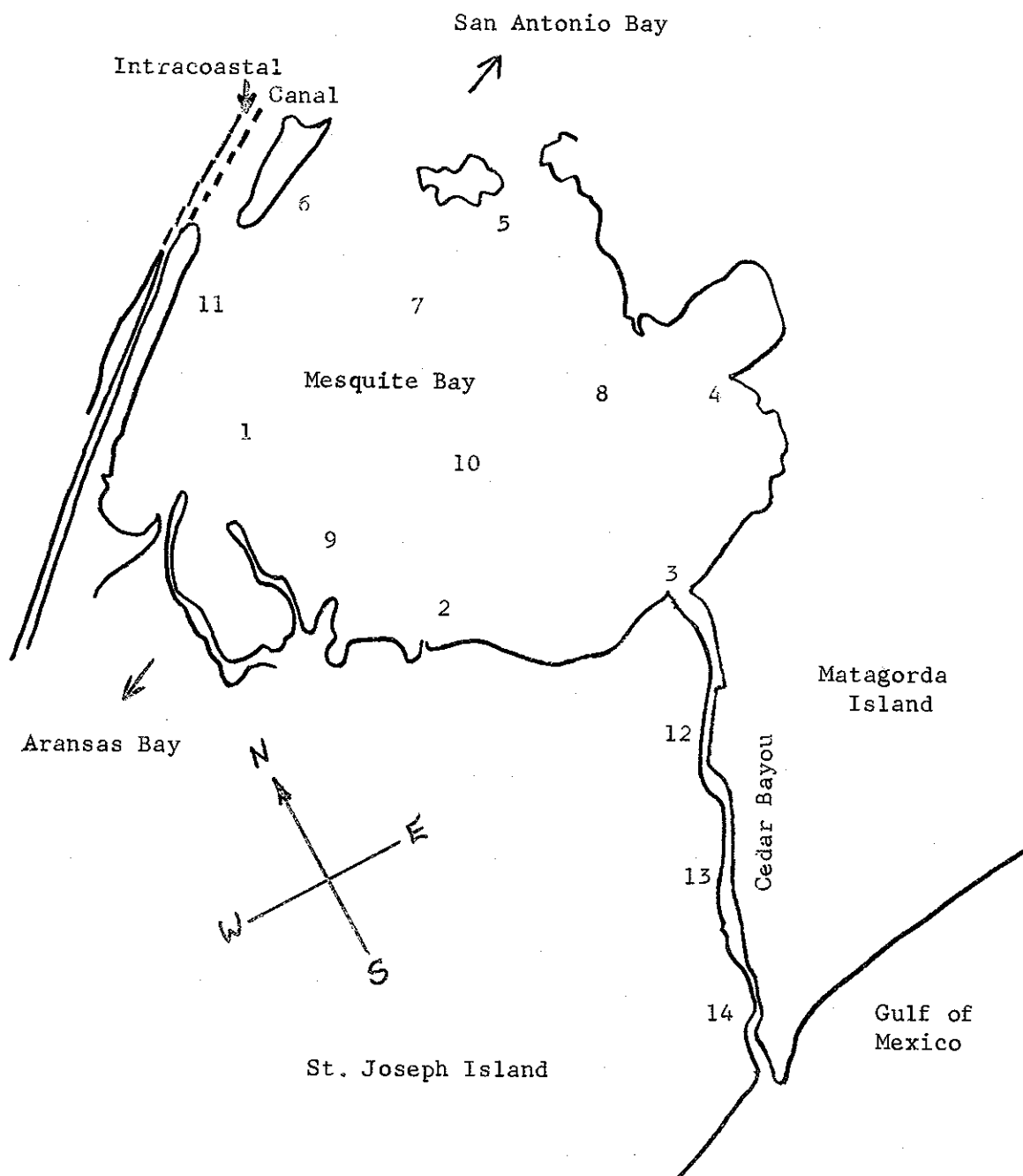


Figure 2

A Comparison Between Recorded Salinities
From Work Done by Hoese (1958) and Schultz (1960)

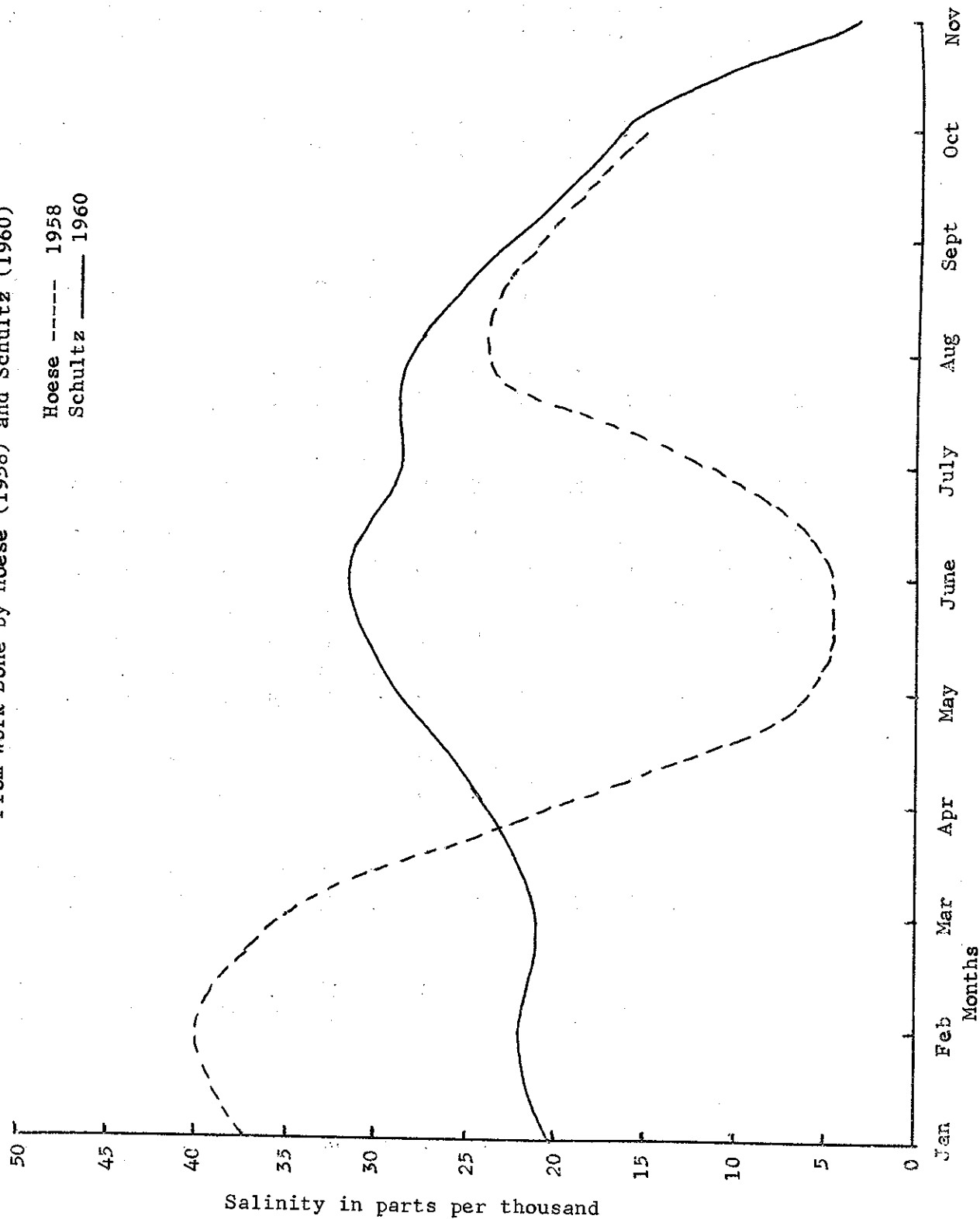


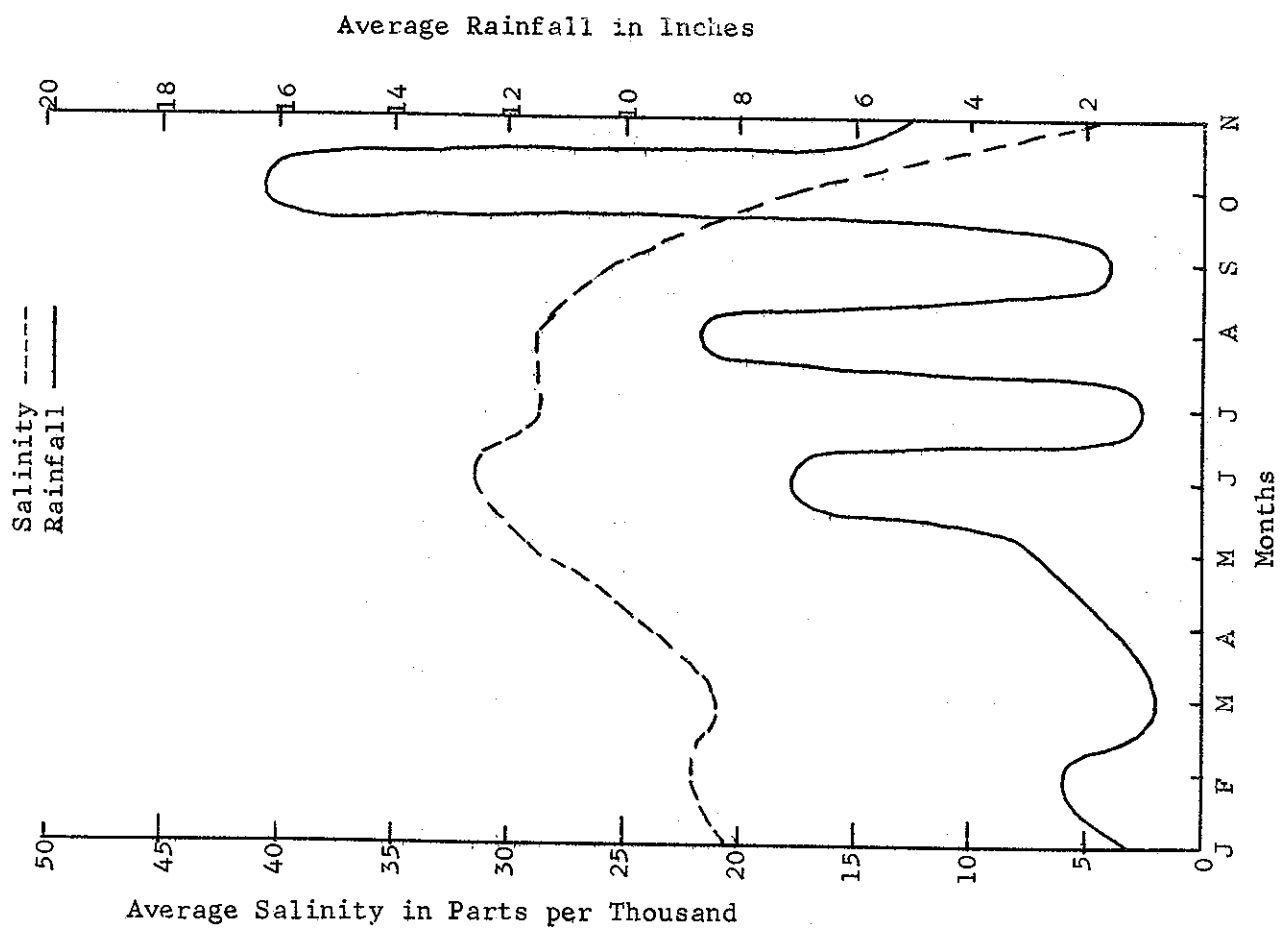
Table 1
Mesquite Bay and Cedar Bayou
Average Semi-Monthly Salinities for the Year 1960

<u>Stations</u>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
1	17.7	22.2	19.4	22.5	27.0	27.2	34.6	21.2	15.0	14.5	4.0	Unable
2	22.3	24.2	20.0	25.7	28.7	33.3	35.5	31.3	21.3	16.8	3.0	to
3	22.8	24.2	20.8	25.9	32.7	33.9	34.5	34.3	24.5	16.8	3.4	Sample
4	20.8	22.2	21.8	25.3	31.6	33.4	31.3	32.7	26.7	17.8	3.8	
5	17.7	19.0	21.9	22.6	27.9	31.5	29.4	24.4	18.9	14.5	2.0	
6	16.6	16.8	19.9	21.1	27.3	30.5	27.9	22.1	14.3	13.4	2.1	
7	17.7	18.1	20.9	22.6	26.9	30.8	26.6	24.4	18.9	14.2	3.7	
8	19.9	21.5	21.9	23.8	27.9	33.6	23.1	30.0	22.1	16.8	3.0	
9	20.4	24.2	20.2	25.4	30.9	27.6	25.4	25.6	19.6	15.6	3.2	
10	28.7	21.5	20.8	22.9	27.1	33.7	24.7	27.8	22.5	16.5	3.3	
11	16.9	19.0	18.9	21.8	27.9	28.1	24.7	21.1	14.2	14.0	3.0	
12	23.8	24.2	20.8	25.9	32.5	33.9	27.5	33.7	30.3	21.6	3.6	
13	23.9	25.4	24.2	26.0	32.3	33.8	28.9	34.0	30.2	21.9	3.7	
14	23.8	27.0	24.7	26.5	33.2	32.8	28.2	33.9	30.5	22.2	4.4	

Table 2
Mesquite Bay and Cedar Bayou
Temperatures for the Year 1960

Stations	January	February	March	April	May	June	July	August	September	October	November	December
1	14.0	13.7	14.0	21.1	26.4	28.5	30.7	29.9	28.6	24.8	19.2	Unable
2	14.0	13.9	15.2	23.2	28.0	29.7	30.8	31.1	29.7	24.6	20.6	to
3	13.6	14.3	14.6	22.1	27.1	29.2	31.1	30.8	28.8	25.0	19.7	Sample
4	14.2	16.0	14.6	23.3	27.1	28.7	30.2	31.0	28.8	25.0	19.4	
5	14.0	15.3	15.1	21.7	26.4	28.8	30.1	30.5	29.1	25.0	19.2	
6	14.6	15.8	15.0	21.5	26.3	28.7	29.8	30.4	28.9	25.0	19.3	
7	13.9	15.0	15.8	24.3	27.7	29.4	30.3	31.5	30.1	24.6	19.2	
8	13.9	15.0	14.7	21.9	26.7	28.7	29.2	30.6	28.8	25.0	19.4	
9	14.0	13.8	15.4	23.1	27.9	28.7	29.9	30.9	29.9	24.8	20.7	
10	13.7	14.8	15.5	23.7	27.8	29.6	29.5	31.7	29.9	25.0	19.2	
11	14.6	15.4	14.9	21.5	26.8	28.6	30.4	30.8	28.8	24.9	19.4	
12	13.2	14.8	14.7	22.2	26.8	29.8	30.4	30.7	29.3	25.0	19.7	
13	13.6	14.9	13.7	22.1	27.4	29.7	30.5	30.6	29.6	25.0	19.8	
14	13.2	14.7	15.0	22.1	28.5	29.9	30.7	31.1	30.3	25.1	19.9	

Figure 3
Rainfall as Compared With
Salinity for 1960 in Mesquite Bay



heavy rainfall Cedar Bayou allows passage of fresh water out of the bay faster than would occur with the Bayou closed.

Summary: 1. During this survey, Cedar Bayou's opening affected salinities appreciably; in periods of heavy rainfall it aided in the discharge of fresh water from the bay.

2. The lower bay stations feel the effect of influx of Gulf water through the Bayou. In years where drouth conditions prevail, Cedar Bayou would tend to moderate bay salinities unless it closed.

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Bibliography

Hoese, H.D. 1958. A Report of the Mesquite Bay Project to the Marine Fisheries Division of the Texas Game and Fish Commission (Thesis).

