

Job Report

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Project No. MF-R-4 Date May 16, 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. 15

Hydrographic and Meteorological Study of the
Galveston Bay System

Abstract: Hydrographic data as gathered in the field and climatological data as taken from publications are presented in this report.

Air and water temperatures varied little from previous studies.

Salinities were found to be higher than in the previous study. This was caused by reduced rainfall and the resulting decrease in fresh water flow from rivers.

Objective: To gather information on the hydrography and meteorology of Galveston Bay System and to present this information in a report that will be convenient for use in this project and other projects.

Procedure: Forty-eight stations located in Trinity Bay, East Bay, West Bay, and Galveston Bay were sampled once each month. At each station, surface and bottom samples were taken. Information recorded in the field included surface water temperature for each station, bottom water temperature for selected stations, water depth for each station, general meteorological conditions, tide movements when obvious, and the time each station was sampled. Salinity was determined by titration with silver nitrate using potassium chromate as an indicator.

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, and wind was taken from "Climatological Data, Texas".

Findings: Figure 1 is a map of the Galveston Bay System showing the locations of hydrographic stations.

I. Climatological Data

A. Air Temperature

Monthly air temperature averages steadily decreased from just over 26 degrees C. in September 1961 to a low of just under 10 degrees in January 1962 (Figure 1). A hard freeze occurred during that month. Air temperatures then rose to an average of 16.8 degrees in February but dropped again to 15.5

degrees in March. During the previous study a similar drop was recorded, but it occurred in April instead of March. A gradual warming followed until a high of 30.2 degrees was reached in July. Air temperatures once again decreased until November when the average was 16.5 degrees. No data were available for December.

Air temperatures were recorded by the U. S. Weather Bureau at the Galveston Airport.

B. Precipitation

Monthly precipitations as recorded at the Houston and Galveston Airports are presented in Figure 3. The month of highest precipitation was September 1961. It was during this month that Hurricane "Carla" crossed the Texas Coast.

C. Wind

The prevailing wind, per cent of time prevailing, and average wind velocity for each month as recorded at the Galveston Airport are presented in Table 1.

November 1961, January 1962, and November 1962 had prevailing winds that were offshore.

The remaining months had "onshore" prevailing winds. The per cent of time that these onshore winds prevailed was higher in the spring and summer months with the high occurring in July.

II Hydrographic Data

A. Salinities

The average monthly salinities for six arbitrary divisions of the Galveston Bay Area are shown on Figure 4. These areas are Clear Lake, West Bay, East Bay, Trinity Bay, Lower Galveston Bay, and Upper Galveston Bay (see Figure 1). The values were determined by averaging all salinities taken from a particular division for each month.

West Bay and Lower Galveston Bay, being adjacent to the two natural passes, maintained the highest salinities. Trinity Bay, receiving fresh water from the Trinity River, maintained the lowest salinities after January 1962.

Salinities were higher during this study period than in the previous one. For example, during the period of February 1960 thru August 1961, the salinities in East Bay ranged between 5 and 17 parts per thousand. During this study, salinities in East Bay ranged between 7 and 21 parts per thousand.

B. Water Temperature

The average monthly water temperatures for the Galveston Bay System are included in Figure 2. Water temperature averages were calculated from all temperature readings taken in the field each month.

These averages follow the air temperature averages closely. The drop in air temperature that occurred in March 1962 was reflected with a corresponding drop in water temperatures.

C. River Discharge

Monthly run-off of fresh-water in acre-feet for the Trinity River is given in Table 2. This information is taken from unpublished records of the United States Department of the Interior, Geological Survey, Surface Water Branch. The recording station is located at Romayor, Texas.

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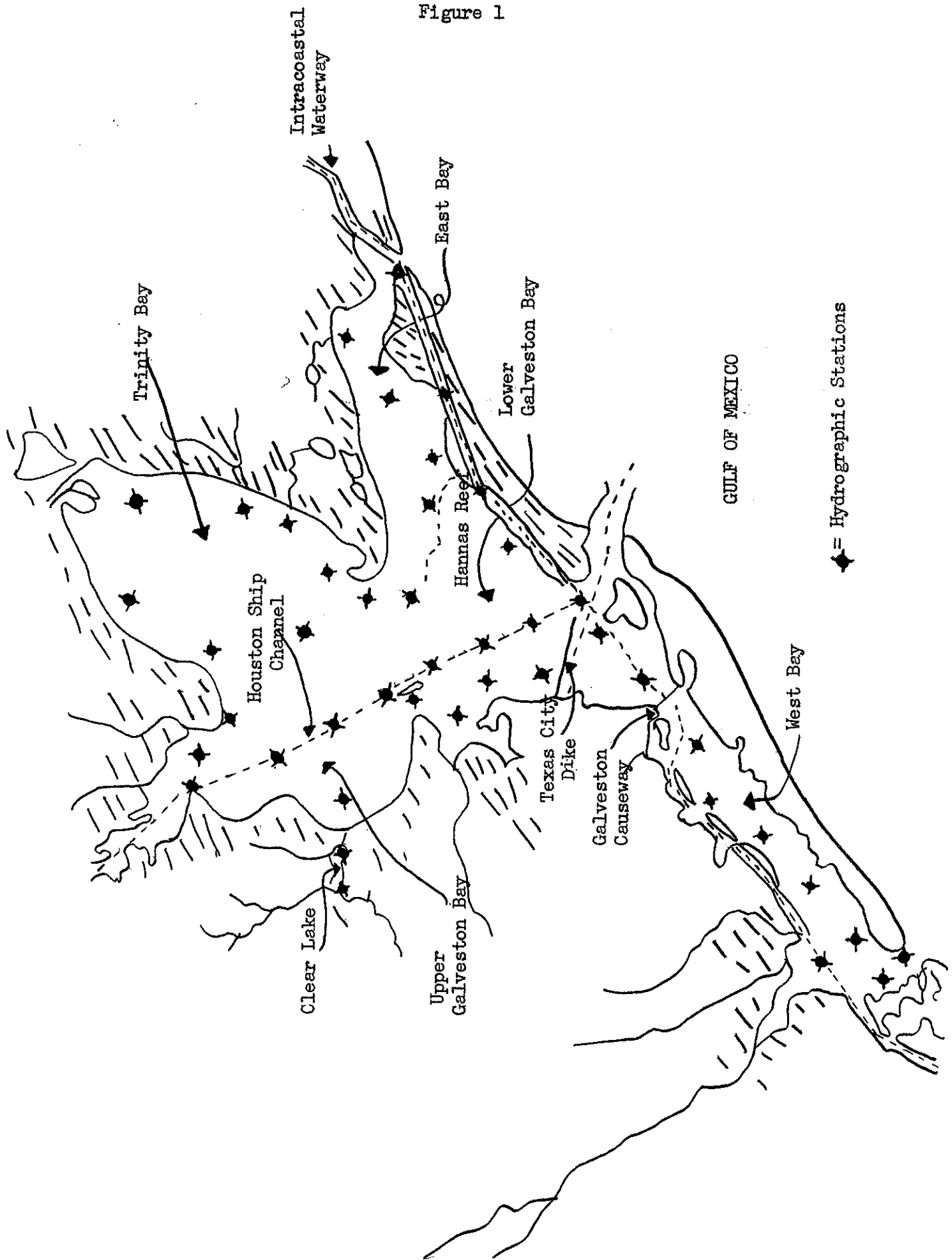
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Coordinator

References

- U. S. Department of Commerce, Weather Bureau, 1961. Climatological Data, Texas, Vol. 66, Nos. 9-12; Vol. 67, Nos. 1-11. National Weather Records Center, Asheville, North Carolina.
- U. S. Department of the Interior, Geological Survey, Surface Water Branch, Form 9-192-a, 1962 Water Gear for the Trinity River, Romayor, Texas.

Figure 1



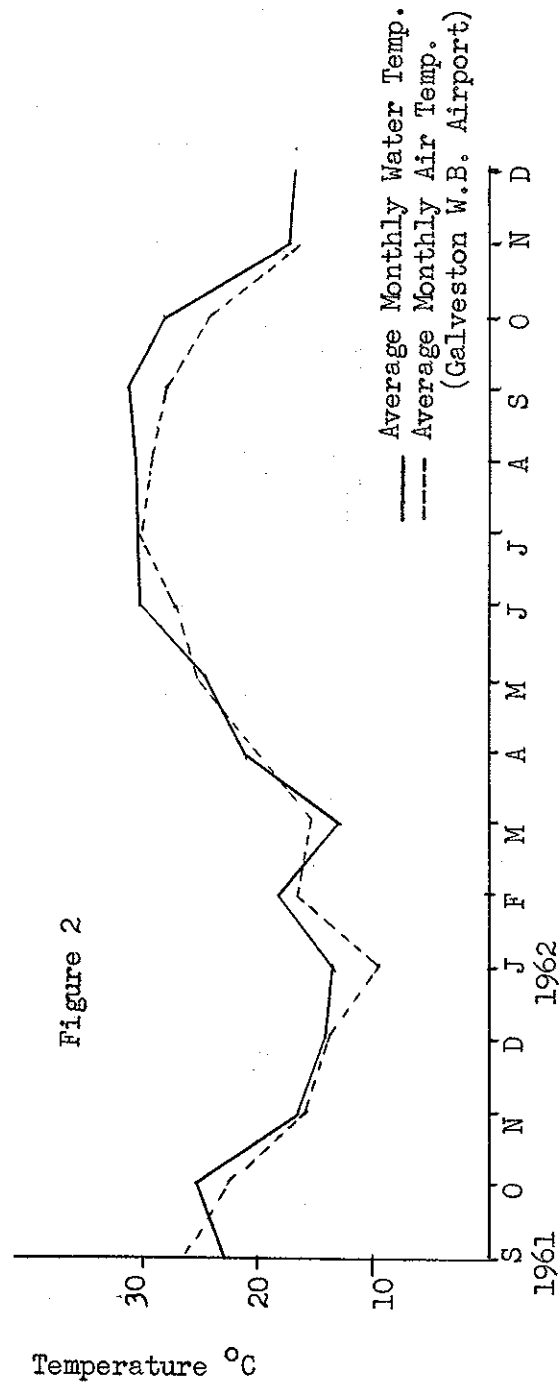
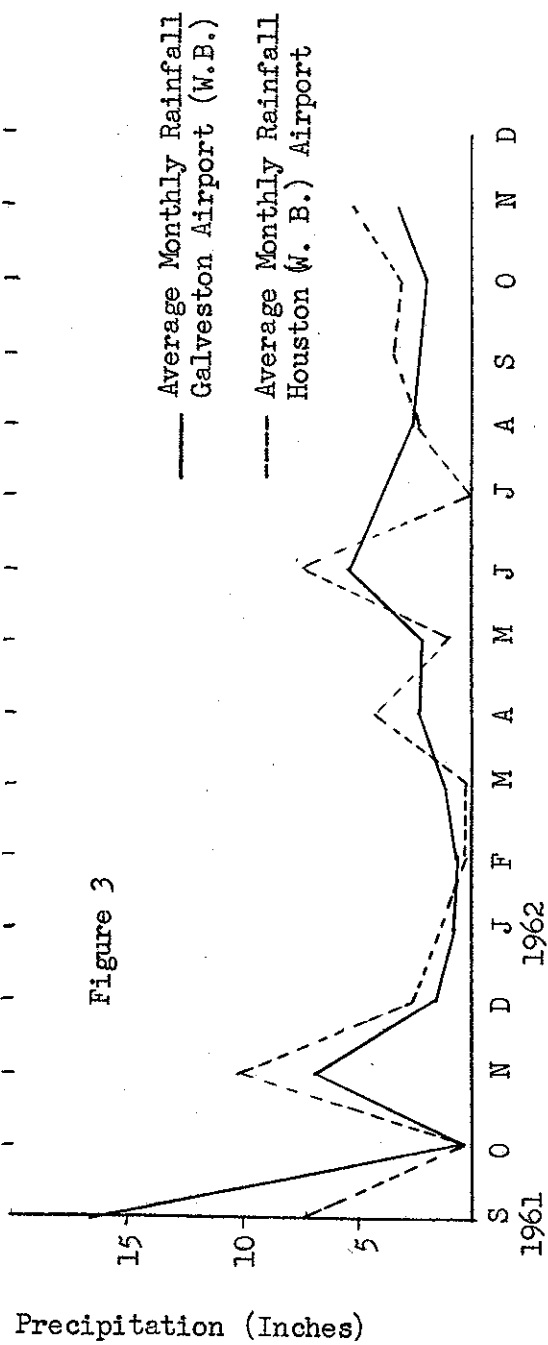


Table 1

Prevailing Wind - Galveston Airport

Month	1961 Sept.	Oct.	Nov.	Dec.	1962 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Prevailing Wind	S. E.	S. E.	N.	S. E.	N.	S. E.	S. E.	S. E.	S.	S. E.	S.	S.	S. E.	S. E.	N.	
% of Time Prevailing	16	19	16	13	21	18	21	22	34	25	51	29	18	18	15	
Average Velocity in Miles Per Hour	14.5	10.3	11.9	10.9	11.8	11.0	10.7	11.9	13.3	9.5	8.7	9.4	9.4	10.4	11.3	

- 6 -

Table 2

Fresh-water Discharge - Trinity River

Month	Oct. 1961	Nov.	Dec.	'62 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Run-off in Acre-feet	82,940	126,900	548,200	346,100	243,300	229,000	221,900	498,900	159,900	158,600	231,300	388,400

Figure 4

Average Monthly Salinities
Galveston Bay Area

- Clear Lake
- - - West Bay
- ... East Bay
- + + + Trinity Bay
- + + + + Lower Galveston
- x x Upper Galveston

