

## Job Report

William Hawley  
Marine Biologist

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Project Name: Analysis of Population of Sports and Commercial Fin-Fish and  
of Factors Which Affect These Population in the Coastal  
Bays of Texas  
Period Covered: September 1, 1961 to December 31, 1962 Job No. 21

### Hydrographic and Meteorological Study of the Upper Laguna Madre

Abstract: Water temperatures and salinities were measured at each of 12 stations monthly for 16 months. Water temperatures lagged close behind average air temperatures. Salinities varied inversely with the volume of rainfall with a low of 25 ppt. in December 1961 and a high of 56 ppt. the following October. A hurricane in 1961 opened Packery Channel, which remained opened for eight months and disturbed the sandy bottom on the east flats to kill most of the live shell there. Three consecutive days of freezing weather in January 1962 caused a fish kill in Baffin Bay and Nine-Mile-Hole. Most of the sow trout and many drum in these areas were killed. A hypersaline fish kill also occurred in Nine-Mile-Hole in May 1962.

Objectives: To gather information of the hydrography and meteorology of the upper Laguna Madre and to present this information in a report that will be convenient for use in this project and other projects.

Procedures: Twelve stations located in the upper Laguna Madre were sampled once a month from September 1961 through December 1962. Surface water temperature was measured and a sample of water was collected at each station. Sampling was done during daylight hours and 6 to 8 hours were required to visit all stations. Salinities were determined at the laboratory by specific gravity hydrometers.

Information on precipitation, air temperature and wind was obtained from the U. S. Weather Station at the Corpus Christi Airport. Average monthly water temperatures at Port Aransas was recorded by the U. S. Coast Guard Station in that area. Water temperatures were recorded each day at 6:00 a.m.

Tide level was estimated at Tyler's Basin at Flour Bluff from a line that was arbitrarily called normal tide level. Surface level fluxations from this line were estimated to the nearest one-half foot.

### Findings and

Discussion: Table 1 presents the information collected in this report. It can be seen from the table that water temperatures taken at Port Aransas correspond very closely to the average air temperature. If the Port Aransas water temperatures were plotted on a graph with a line connecting them, it would have the same general shape as the air temperature curve on Figure 1. The water temperatures would lag slightly behind the air temperatures.

Laguna Madre water temperatures as shown in this report fall roughly into this pattern but are more erratic because these were taken less frequently and in a different manner (see procedure).

Generally, salinity is inversely proportional to the amount of rainfall as is illustrated in Figure 1. A total of 26.44 inches of rain fell in 1961 compared to 14.95 inches in 1962. Highest monthly salinity average for 1961 was 42 ppt. in June while salinity passed 56 ppt. in October 1962. Over five inches of rain in September 1962 did not bring the salinity average down because of large amounts of salt that were washed into the lagoon from tidal flats and immediate shores.

Prepared by: William Hawley  
Marine Biologist

Ernest G. Simmons  
Regional Supervisor

Approved by

Tenace R. Leary  
Coordinator

Table 1  
Hydrographic and Meteorological Data for September 1961 through December 1962

| <u>Date</u> | <u>Air Temp.</u> |             |             | <u>Water Temp.</u> |                    | <u>Precp. in<br/>Inches</u> | <u>Avg.</u> |              | <u>Salinity</u> | <u>Tide</u> |
|-------------|------------------|-------------|-------------|--------------------|--------------------|-----------------------------|-------------|--------------|-----------------|-------------|
|             | <u>Max.</u>      | <u>Min.</u> | <u>Avg.</u> | <u>Lag. Madre</u>  | <u>Pt. Aransas</u> |                             | <u>Wind</u> | <u>Speed</u> |                 |             |
| <u>1961</u> |                  |             |             |                    |                    |                             |             |              |                 |             |
| Sept.       | 96               | 63          | 80.2        | 85.8               | 79.9               | 3.14                        | 9.9         |              | 41.6            | +2.0        |
| Oct.        | 91               | 48          | 73.4        | 82.6               | 74.7               | .05                         | 9.7         |              | 33.3            | +1.0        |
| Nov.        | 86               | 42          | 62.6        | 58.8               | 64.1               | 1.09                        | 11.1        |              | 32.8            | +1.5        |
| Dec.        | 33               | 33          | 59.6        | 63.5               | 60.4               | .53                         | 10.9        |              | 24.9            | +0.5        |
| <u>1962</u> |                  |             |             |                    |                    |                             |             |              |                 |             |
| Jan.        | 81               | 14          | 50.5        | 67.6               | 52.4               | .22                         | 12.8        |              | 33.4            | -0.5        |
| Feb.        | 93               | 32          | 67.6        | 72.0               | 62.1               | .06                         | 14.1        |              | 36.4            | -1.0        |
| Mar.        | 89               | 32          | 63.0        | 55.6               | 60.5               | .41                         | 13.6        |              | 32.0            | ----        |
| Apr.        | 96               | 40          | 72.0        | 75.9               | 68.4               | 1.18                        | 15.4        |              | 41.2            | +0.5        |
| May         | 94               | 56          | 77.8        | 79.2               | 72.6               | .24                         | 16.4        |              | 43.8            | -0.5        |
| June        | 97               | 66          | 82.2        | 84.4               | 80.9               | 2.39                        | 11.3        |              | 41.2            | +0.5        |
| July        | 97               | 73          | 85.4        | 86.9               | 82.4               | ----                        | 13.7        |              | 46.4            | -0.5        |
| Aug.        | 103              | 72          | 86.4        | 86.5               | 85.0               | .90                         | 11.7        |              | 48.6            | +0.5        |
| Sept.       | 96               | 65          | 82.5        | 86.9               | 83.8               | 5.37                        | 10.2        |              | 50.5            | +0.5        |
| Oct.        | 96               | 50          | 78.7        | 84.7               | 79.2               | .39                         | 12.3        |              | 56.3            | -0.5        |
| Nov.        | 89               | 40          | 64.7        | 68.4               | 67.2               | 1.13                        | 11.8        |              | 55.7            | -1.0        |
| Dec.        | 80               | 31          | 56.4        | 60.3               | 60.2               | 2.66                        | 11.0        |              | 48.6            | -1.0        |

All temperatures are expressed in degrees fahrenheit.  
Wind speed is shown in MPN.

Salinities are measured in ppt.  
Average tide is shown to the nearest  
half foot.

Figure 1  
Hydrographic and Meteorological Graphs for September 1961 Through December 1962

