

STATE Texas

DATE July 1, 1952

From: April 1, 1952

To: June 30, 1952

Biologist: Robert P. Hofstetter

Boat: Narwhale

Boat Captain: W. W. Rose

INTRODUCTION

The primary purpose of this project is to determine the status of the major oyster reefs in Galveston Bay; their location, their condition and their productivity. In addition it is planned to secure the basic data necessary for an interpretation of the biological character of the bay, itself.

STATUS OF PROJECT AT TIME OF LAST REPORT

This project was begun in March, 1952. That month was spent in developing and testing sampling techniques for use on an oyster reef.

AREAS WORKED ON

The oyster survey was confined to the portion of Red Fish Bar between the Houston Ship Channel and San Leon. This part of the reef is known locally as Todd's Dump. Other work was confined to Galveston Bay proper, excluding East Bay and West Bay.

ACTIVITIES

The oyster reef survey took up a major portion of the time.

Oyster spat studies were initiated to test methods of collecting and rearing spat and to attempt to find methods for determining the spat production of an oyster reef.

Plankton samples were taken in connection with the oyster spatfall studies and also to obtain information as to the kinds, relative abundance, and fluctuations of the plankton populations.

Drift cards were released in order to study the water currents of the bay.

Water samples were taken at various points for the determination of salinity, turbidity, pH, and dissolved oxygen content.

OTHER ACTIVITIES

The annual Seminar of the Marine Laboratory was attended at Rockport on April 10-11.

A number of oyster reefs in Copano and Aransas bays were examined on April 21-22 at the request of Heldenfels Bros. Due to rough water no conclusive data could be obtained as to the productivity of the reefs.

BIOLOGICAL DATA ACCUMULATED

1. Oyster Survey

This survey has the following objectives in mind: (1) to locate the major oyster reefs in the bay; (2) to obtain an accurate census of the oysters on the reefs; (3) to determine the condition or "state of health" of the reefs; and (4) to determine the factors influencing the condition and productivity of the reefs. This data, when assimilated, would provide the basis for a conservation program for oysters in Galveston Bay.

Before the survey could be started it was necessary to develop techniques which would provide accurate samples of the oyster population. Much time was spent experimenting with ~~the~~ dredging and tonging procedures and a method was finally found which would provide the desired accuracy without elaborate equipment and with a minimum of time and effort. This method is described below.

The boat is anchored over the selected station with anchors at the bow and stern to minimize movement over the station. Then, a strip of bottom five feet long and as wide as the width of the tongs (18") is completely tonged. This gives a sample area of approximately ten square feet. It has the following advantages: (1) the completeness of the sample can be checked by probing the bottom after the sample has been taken and any remaining oysters can be recovered; (2) once the boat has been positioned, there is no need to move it as would be the case if a larger sample area were used; (3) the sample can be checked if needed by taking a duplicate sample on the opposite side of the boat; (4) the method is simple and requires only a boat, a pair of oyster tongs and someone to use them.

The method also has these disadvantages. (1) it can not be used in rough water since the boat tends to swing in an arc over the station; (2) it is difficult to use in water over seven feet in depth unless an experienced tonger is present; (3) due to the relatively small sample area, a larger number of samples must be taken per area sampled thus increasing the time spent on a particular reef.

In practice the survey is executed as follows: a base line is established on the reef with sample stations at 100 foot intervals. "Substations" are also sampled at 100 and 200 foot intervals at right angles to the base line and on either side of each base line station. This is, in effect, the same as running five base lines at 100 foot intervals and parallel to each other. This system of sampling could be used for a series of cross sections or could cover the entire reef. It is believed that a carefully planned series of cross sections would provide reliable data concerning the entire reef but more work must be done before this can be verified.

The following information is gathered from each sample tonged:

- (1). The volume of culled oysters is obtained. This furnishes information as to the number of barrels or bushels of culled oysters per unit area.
2. All the oysters are counted and all oysters in one bushel or less are measured. The measurements are taken in centimeters and the oysters are grouped in classes with a class interval of one centimeter.
3. The kinds of fouling organisms and the relative amount of fouling are noted. The amount of fouling is an arbitrary value since no way has, as yet, been found to estimate and tabulate the degree of fouling with any accuracy.

4. The presence of other organisms such as boring clams and sponge, crabs, fish, etc. are noted although no attempt is made to estimate their relative abundance.
5. The number of recent dead oysters is noted. For this purpose a "recent dead oyster" includes those cases in which the two valves are still entire and the inner surfaces of the valves are clean.
6. The character of the bottom is noted. That is, whether the oysters are predominately in clumps or clusters in an attempt to raise themselves off the bottom (coon bed), or whether the bottom is firm and above the level of silt action.
7. The depth of water over the sample station is noted.

At the present time, one base line has been established along the northern edge of the reef known as Todd's Dump. This base line has not yet been completely sampled. Nineteen major stations and 56 substations have been sampled and have yielded 138,000 cubic inches of culled oysters or approximately 17 barrels. Since the total area of the sample stations is 750 - 800 square feet, the average production would be approx. 50 barrels of oysters per 2500 square feet. It should be remembered that this figure is based on the total of the culled oysters and not on the market sized oysters alone. Measurements have been taken on 15,328 of the 16,942 oysters obtained. The complete data furnished by these samples will not be presented until the reef has been surveyed.

2. Oyster Spat Studies

Oysters in Todd's Dump were examined regularly to check the development of the gonads. Plankton samples were also taken to detect the presence of the oyster larvae. Todd's Dump oysters showed ripening gonads during the second week of April and it was believed that spawning would take place shortly. However, no oyster larvae were taken in the plankton tows until May 20, even though conditions for spawning had been present for a considerable time. Since all the larvae taken at this time were in the umbo stage, spawning must have taken place during the week of May 12, if not earlier.

In order to study the spatfall, about 50 cardboard egg case fillers were dipped in a mixture of cement, sand and lime, and prepared for use as spat collectors. To determine when the spatfall would begin, a few of these were placed on the reef and examined at intervals. Although some set must have occurred, ~~few~~ spat have been observed, either on the collectors or on clean shell that is tonged up in the oyster samples. It must be concluded that the bulk of the oysters have yet to spawn or there are factors, as yet unknown, which tend to prohibit the attachment and/or the growth of the spat.

3. Plankton

Plankton tows have been made regularly at selected stations and counts have been made of the organisms collected. Zooplankton forms have been predominant with copepods and barnacle larvae the most numerous. Diatoms have been scarce with *Coscinodiscus* the most common form. The total amount of plankton has not been large in any plankton tow although colder weather produced the greatest number.

4. Drift Card Data

In order to obtain information about the general movements of the water currents in Galveston Bay, drift cards were released at 14 stations along the length of the bay. The usual number of cards released at each station was ten, a number which was found to be too small to insure sufficient returns. No clear picture of the water currents has been obtained. However, the returns have served as a basis for planning the location of the next card releases. There is an indication of a clockwise current in upper

