

Job Report

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Biologist III

Project No. MS-R-4

Date: April 11, 1963

Project Name: A Study of Texas Shrimp Populations

Period Covered: September 1, 1961 to December 31, 1962

Job No: 5

Populations of Juvenile Shrimp in the San Antonio Bay Complex

Abstract: Sampling methods and stations were changed from previous study periods, and now conform with a standard method for the Texas coastal bays. Sampling stations were reduced from 14 to 6. This includes 2 primary bay stations, 2 secondary bay stations, and 2 tertiary bay stations. These sampling stations were derived from previous years sampling as being the best to show populations and consistent presence of shrimp over a long period of time.

Brown shrimp were present in the area about 15 days earlier than in the two previous years; also they remained in this bay complex over a greater period of time than in the 2 previous years. They were present in both quantity and size suitable for commercial bait production from May through December 1962.

White shrimp in samples were less abundant than in the two years previous to this study. However, production was not as low as may have been expected with the high salinities which prevailed from late June through the end of the study period.

White shrimp (juvenile) appeared in this area in appreciable quantities almost one month later than in 1960 and 1961.

Objectives: To determine the seasonal abundance and size of juvenile shrimp in the San Antonio Bay Area.

Procedures: On the first and fifteenth day of each month (plus or minus 2 days) a fifteen minute day sample was taken with: 1. A 10-foot trawl of $1\frac{1}{4}$ inch stretch mesh with a bag liner of $\frac{1}{2}$ inch stretch mesh in primary, secondary, and tertiary bay sampling stations. 2. A 20-foot trawl of $1\frac{1}{2}$ inch stretch mesh was used in the areas being worked commercially by the shrimp fleet. Night samples were made periodically for comparison of catch.

Hydrographic data was taken at time of sampling. Station sheets and length frequency sheets containing sampling information were sent to Seabrook Field Laboratory for evaluation.

Findings:

Brown Shrimp: The brown shrimp, Penaeus aztecus, were present in the area throughout the study period with the exception of February 1962 when no brown shrimp were taken in the trawl samples. (For location of stations, See Figure 3) After September 1961 the mode size of 65-75 mm gradually declined to 35-45 mm by

December 1961. In January 1962 the size range was very limited, but those present were 70-80 mm in size. It seems that these few that had not migrated to the Gulf were only stragglers and not an indication of a bay population at this time of year. Figure 1 shows the size range of these shrimp, and the mode throughout the study. Figure 2a shows a comparison of numbers of shrimp present in trawl samples in 1960, 1961, and 1962. Figure 2a shows for at least these three years the bay shrimp populations in this area in January, February, and March is negligible.

In 1961 the brown shrimp did not appear in this area in quantity until April, but in more abundance than in 1962 when the increase in numbers of brown shrimp was less rapid, reaching one population peak in May. In 1961 there was one distinct peak of population density in May with a gradual decrease until August, then a decline to practically no bay population present for the remainder of the year.

Looking at Figure 2a it can be seen that this was not the case in 1962. Here a peak population was reached in May 1962 then a gradual decline until September. Then in October and November the population increased for a second peak of the season. This would seem to indicate two distinct populations for the year, or two waves of juvenile brown shrimp moving into the area. By December 31, 1962, the brown shrimp population was again practically non-existent.

The months of July, August, September, and October 1962 were very hot and dry. Bay salinities often were as high as those of the Gulf (35 ppt). These two factors were the main reasons for the long sustained population of brown shrimp in 1962 as compared to the two previous years. See Project No. MF-R-4, Job No. 17 for specific hydrographic data.

White Shrimp: In September, 1961, the white shrimp (*Penaeus setiferus*) in the area had an average size of 70-80 mm and a size range from 35 to 145 mm. (Figure 1.) The maximum size range and maximum modal size for the year was in October. At this time the mode was 100-110 mm with a range from 37 mm to 165 mm. However, the maximum sample abundance occurred in July (see Figure 2b.) Shrimp were found in commercial quantities through October. By the end of December 1961 only scattered white shrimp were found.

Only stragglers were found in samples from January 1962 until May. In May and June (Figures 1 and 2b) large white shrimp were occasionally encountered. These shrimp presumably entered passes from the Gulf. All were near spawning condition. These large shrimp (Mode 180-190 mm in June 1962) were not taken after June.

In July the juvenile white shrimp were abundant in the area and rapidly grew both in size and numbers until a peak of size and abundance was reached in late October or early November 1962. See Figures 1 and 2b. After this time there was a rapid decline in abundance towards the end of 1962. In December 1962 the white shrimp had a mode of 75-85 mm, and some commercial production occurred.

Conclusions: In both Figures 1 and 2a and 2b, previous years' abundance and size has been included as references for size range, mode, and relative abundance. As shown in Figure 2a and 2b, the relative abundance was high in 1960 as compared to 1961 and 1962. This can be partially attributed to sampling methods and to an incomplete understanding of areas of concentration. Also, the trawl used in the 1960 sampling was a 10 foot trawl with 2 inch stretch mesh. This mesh size allowed many of the smaller shrimp to escape. The use of standard trawls as described in "procedures" will provide samples for future studies that should be better for comparison purposes.

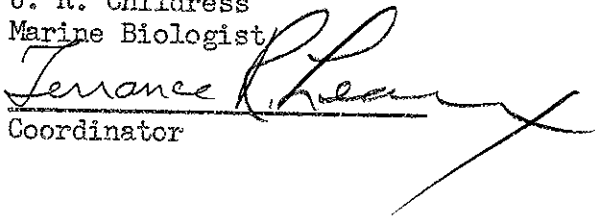
Of importance during the study period was the increase in salinity in the area. In September 1961 the average salinity for the area was 14.5 ppt and at the end of the study period in December 1962 salinities averaged 25.8 ppt.

Figure 2a shows the broad span of months in 1962 that brown shrimp were present as compared to the two previous years. It also indicates that the time span of white shrimp abundance was considerably narrowed. This I attribute to the above mentioned increase in salinity.

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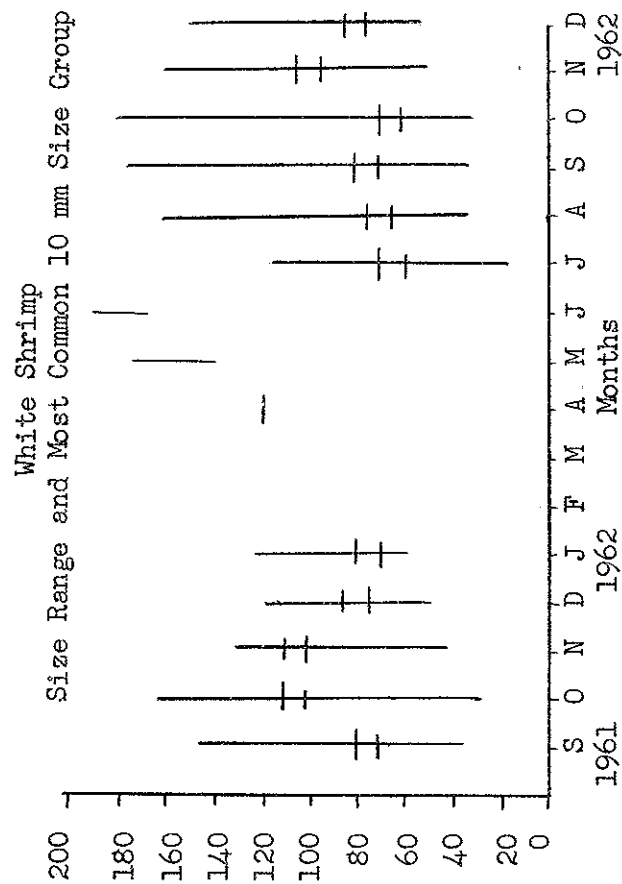
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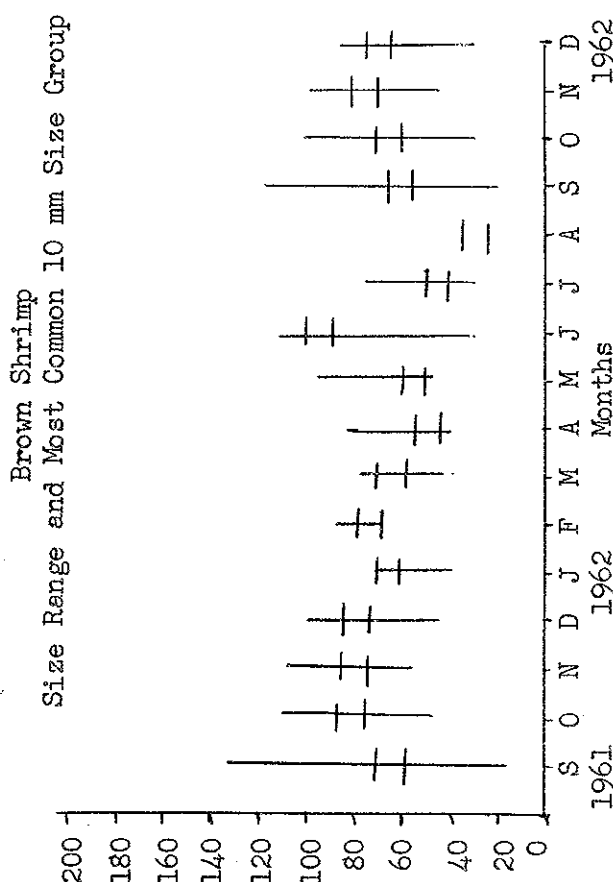
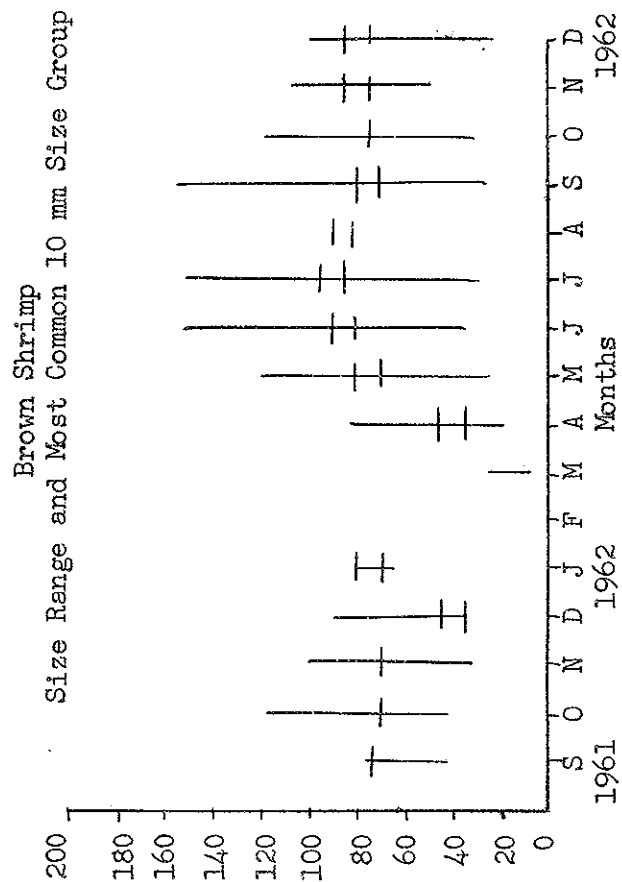
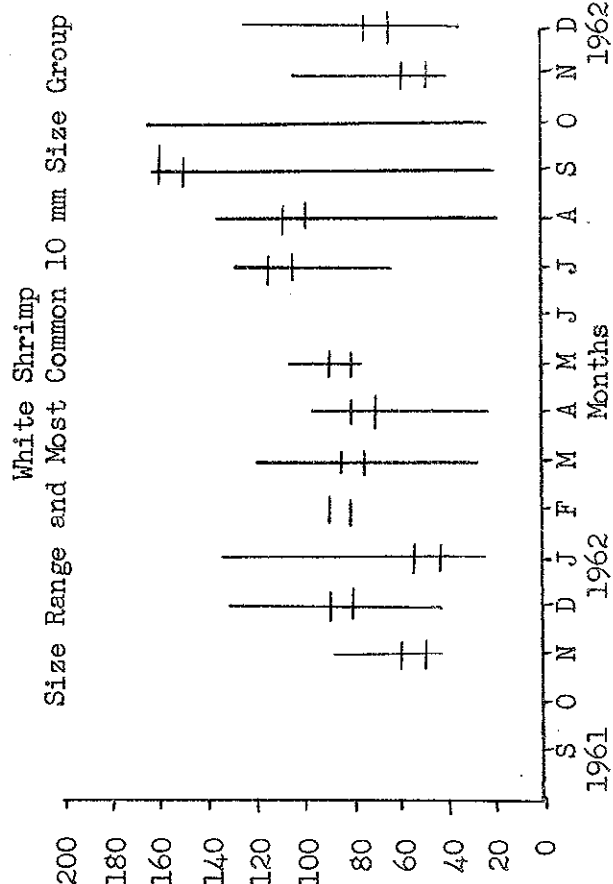
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Comparison of Size Range and Mode for Study Period
and Previous 16 Month Period

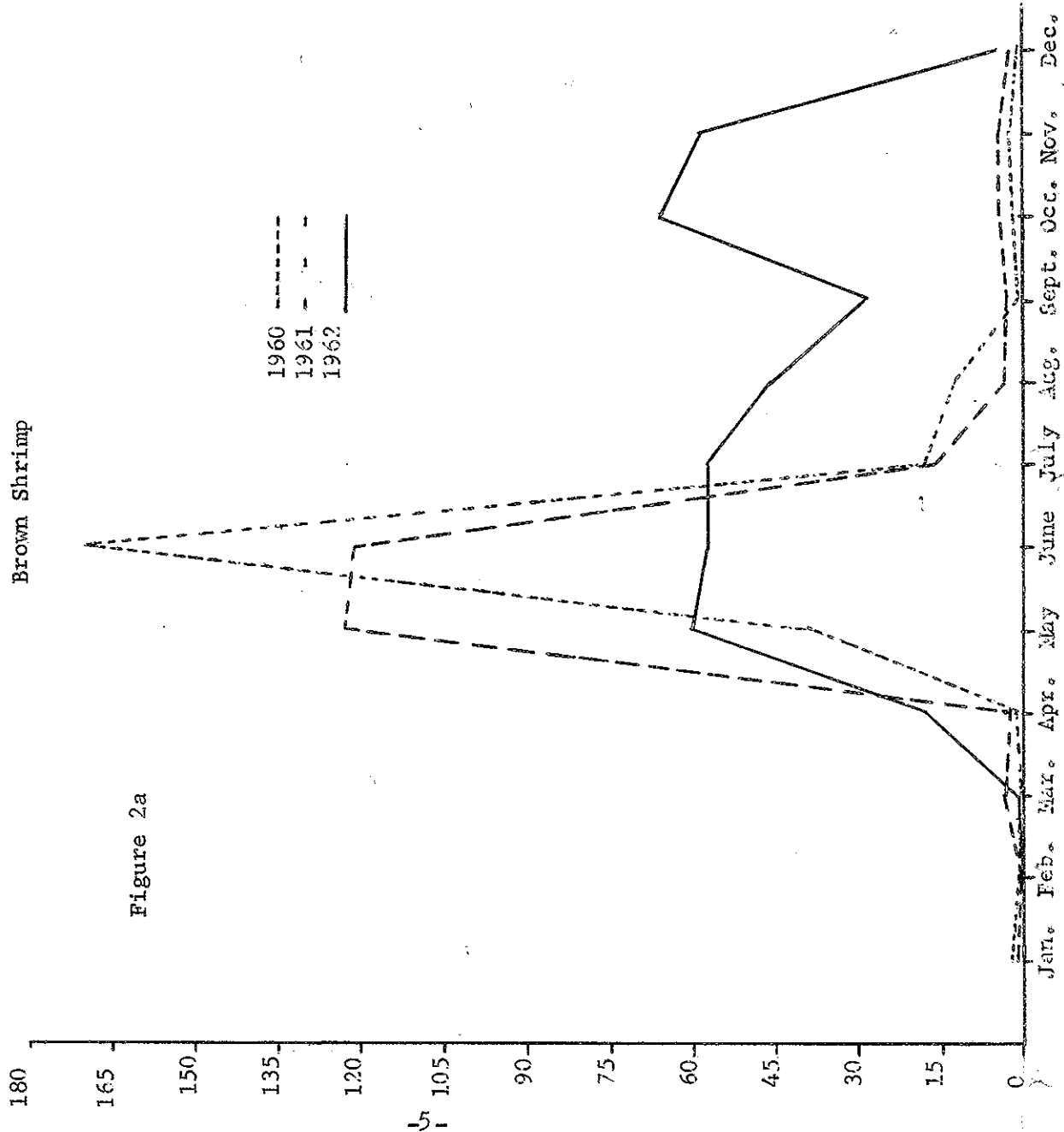
Figure 1



Comparison of Previous 16 Month Period to Present Study



Numbers of Shrimp Per Sample Trawl
Comparison of years - 1960, 1961, 1962



Numbers of Shrimp Per Sample Trawl
Comparison of years, 1960, 1961, 1962

White Shrimp

Figure 2b

1960
1961
1962

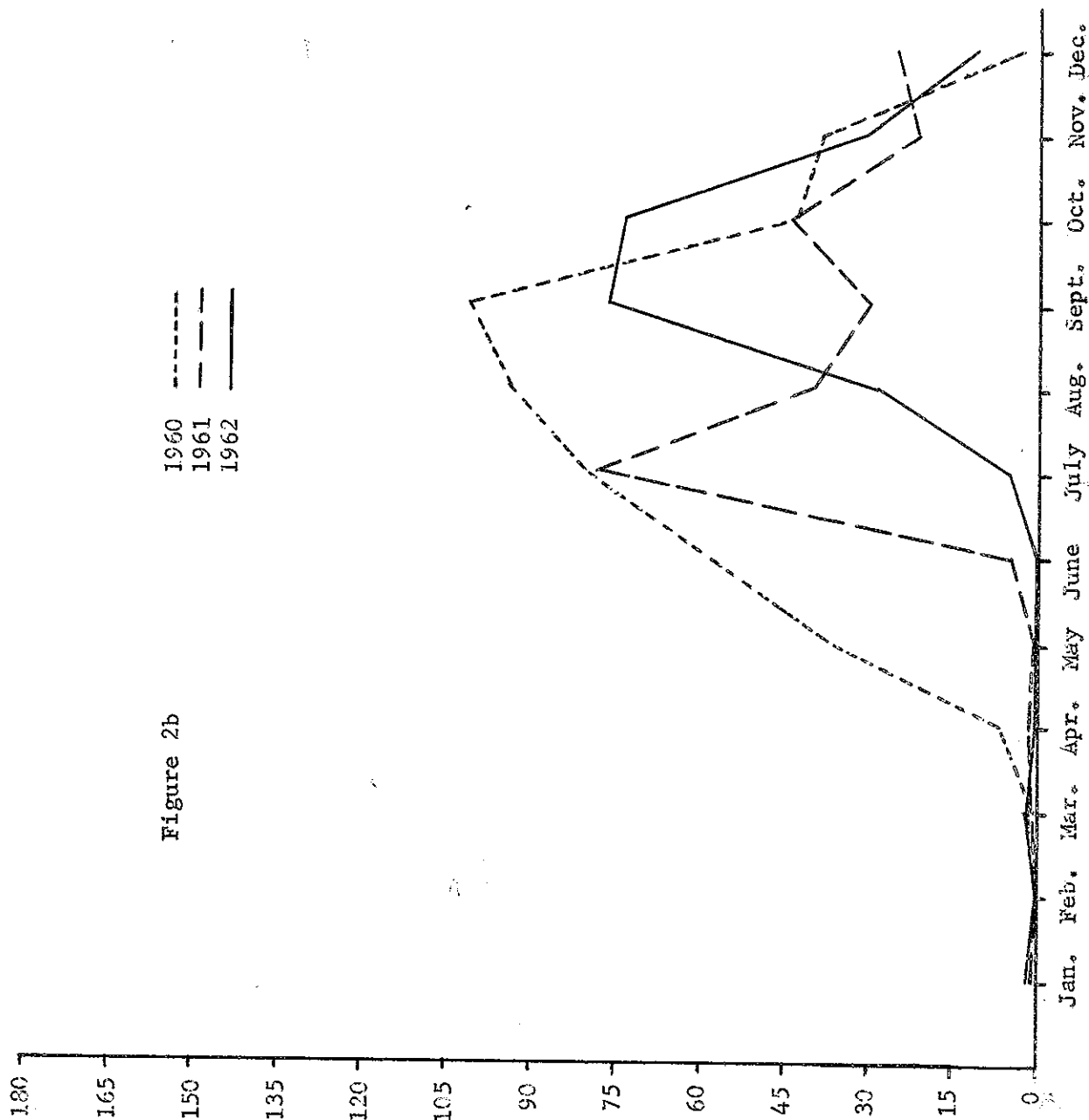


Figure 3

Location of Shrimp
Sampling Stations
Sampled Twice Each Month

