

Job Report

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A Survey of Forage Fish

Abstract: It appears from this study that increases in the abundance of forage fish have occurred since 1960. A difference in seasonal peaks of abundance was noted in 1961. Cooler spring weather in 1961 is possibly a factor accounting for the later peaks that year. The efficiency of the twenty-foot otter trawl is believed to be greater than that of the ten-foot otter trawl by a factor larger than two.

Objectives: The object of this study was to obtain data concerning relative abundance of forage fish in the Aransas-Copano Bay system.

Procedure: Two stations were established in the Aransas-Copano Bay System (Figure 1). In 1960, these stations were sampled with a ten-foot, 1 1/2-inch stretch mesh otter trawl. In 1961, a twenty-foot trawl of the same mesh size was used. In order to compare the results of this sampling it is assumed that the twenty-foot trawl catches two times more than the ten-foot trawl. Captured specimens were counted and weighed and their rough average size was noted. Water temperature, salinity, and turbidity measurements were made at each station at the time of sampling. Turbidity readings were made with a U. S. Geological Survey Turbidity Scale. Temperature was measured in degrees centigrade and salinity was determined by the use of specific gravity hydrometers corrected to Knudsen's Hydrographic Tables. Salinities which were too low to record with the hydrometer were determined by the Mohr Titration method. Sampling was done on a semi-monthly basis.

Findings: Table 1 contains results of sampling in 1961 compared to 1960. Figure 2 is a graphic comparison of the catch per unit of effort for the two study years.

Discussion: Figure 2 shows the difference in monthly catch per unit of effort for the four most commonly caught forage fish. Figures for the 1960 study were increased by a factor of two because the twenty-foot catches at least twice as much as the ten-foot trawl. It is probable that the efficiency of the twenty-foot trawl is greater than the ten-foot trawl by more than two times, however, the exact figure is not known at this time. Forage fish in 1961 were more abundant than in 1960 (Figure 2). The peak catch per unit of effort for the croaker, Micropogon undulatus, came in April and May in 1960 and in June and July in 1961. This difference in peak abundance was not pronounced for the other species shown in Figure 2. It was found from salinity and temperature records (Job E-1, Hydrographical and Climatological Survey for Area M-6 1961) that temperatures in April and May were nearly the same during both studies. However, a cool period in March 1961 delayed the warming of

Figure 1
20-Foot Trawl Stations for Forage Fish
in the Aransas Bay Area
1961

Stations - ●

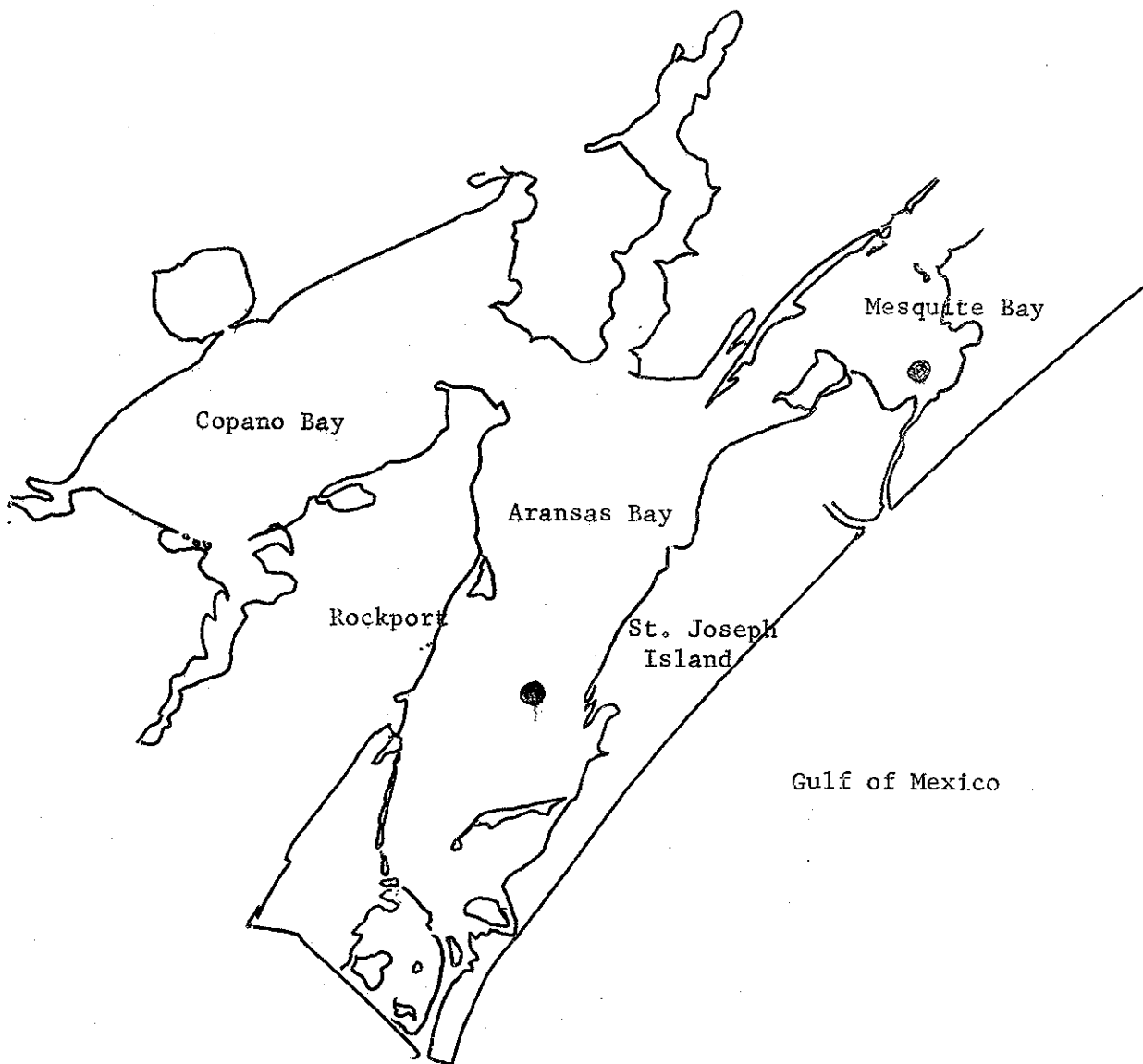
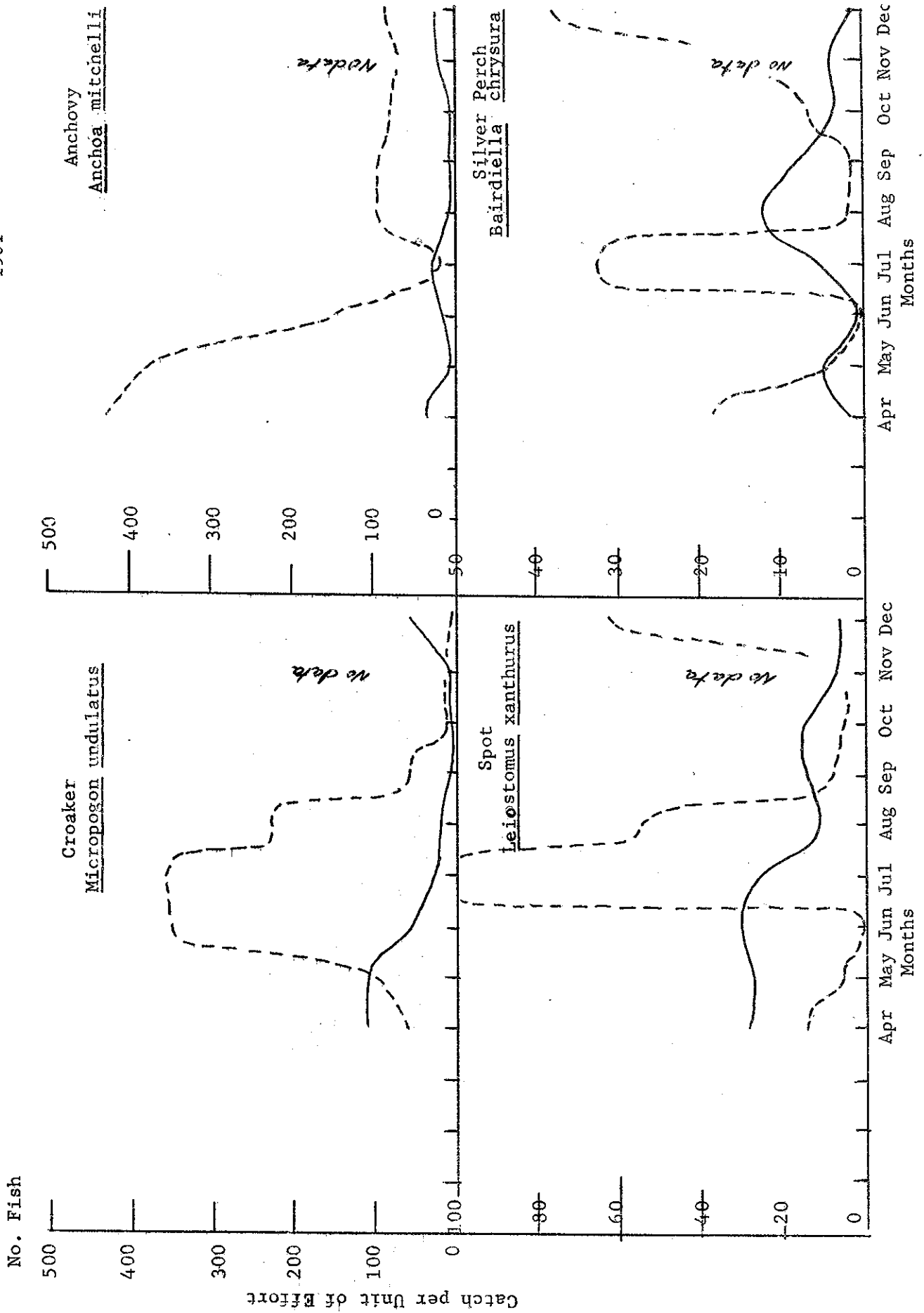


Table 1
A Comparison of Numbers of Fish Per Unit Effort
for 1960 and 1961 Trawl Catch of Forage Fish

Species	April		May		June		July		August		September	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Croaker	108.4	58.5	109.6	94.0	65.0	350.5	26.36	356.5	19.62	221.0	9.0	58.7
Anchovy	31.4	427.5	3.42	378.0	12.2	141.0	22.36	18.0	2.54	91.7	7.6	90.2
Spot	28.2	14.5	27.42	5.0	31.4	0.0	25.44	111.0	11.08	54.2	14.5	8.3
Silver Perch	1.8	18.5	4.56	4.3	0.2	0.0	5.26	32.5	12.00	1.8	7.16	1.2
Sand Trout	0.56	7.0	0.56	1.0	0.2	11.0	2.72	53.0	2.72	27.2	0.16	2.0

Species	October		November		December	
	1960	1961	1960	1961	1960	1961
Croaker	4.0	8.3	5.08	No	55.0	8.00
Anchovy	1.48	75.7	17.08		17.82	84.75
Spot	14.50	5.5	6.72	Data	6.66	62.00
Silver Perch	3.16	6.5	3.62		1.16	38.00
Sand Trout	1.84	23.0	0.72		0.32	39.00

Figure 2
A Comparison Between Forage Fish Catch
Per Unit of Effort for 1960 and 1961



waters and could have resulted in shifting of populations to other areas.

If the 1961 catches of croaker and anchovy, Anchoa mitchelli, are compared, an inverse ratio of abundance is evident between the two species. Whether this is a result of predation by croaker on anchovies or strictly a seasonal dip in the anchovy population abundance is not known at the moment, but a study to further evaluate these aspects might prove valuable.

The increase in peak abundance for croaker over the previous study was 225 per cent; for the anchovy it was 1,364 per cent; for the spot, 353 per cent; and for the silver perch, 270 per cent. This large increase in abundance can be explained in two ways. The first is the difference in gear. It is possible that the factor of two is far too low for accurate adjustment of catch figures for the 10-foot to the 20-foot trawl. The second possibility is that there was an actual increase in abundance in forage fish.

In the coming year, the 20-foot trawl will be utilized so an accurate comparison of catches can be made without correction factors.

Conclusions: Forage fish appear to have been more abundant in 1961 than in 1960. Differences in trawl efficiency may account for some difference in catch figures. In the coming years, sampling gear will be standardized so accurate comparisons can be made.

The abundance of the anchovy is in inverse relationship to the abundance of the croaker.

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