

Juvenile and Adult Food and Game Fish of the Laguna Madre
Project CF 2-2
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Abstract

In 1971, important food and game fish were sampled in the Laguna Madre, Texas. Juveniles were sampled with a 60-foot bag seine while adults were sampled with a 1200-foot trammel net. Techniques employed were similar to those used in previous years and results from several years' study were compared. Species included the spotted sea trout (Cynocion nebulosus), redfish (Sciaenops ocellata), southern flounder (Paralichthys lethostigma), black drum (Pogonias cromis) and sheepshead (Archosargus probatocephalus).

In the Upper Laguna Madre, juvenile redfish were less abundant in 1971 than in 1970. Juvenile sea trout numbers were unchanged. In the Lower Laguna Madre redfish numbers were unchanged from those found in 1969 (1970 figures unavailable), while sea trout numbers were about one-half of those found in 1969. Adult fish samples in the Lower Laguna show that redfish yields in pounds continue to surpass those for sea trout as they have since fall, 1968. The relative shortage of yearling redfish in fall, 1971 indicated a poor hatch in the preceeding year.

Introduction

Routine sampling of juvenile and adult bay sports and commercial fish was conducted in 1971. Procedures were similar to those made for the previous six years so that any changes in availability of species could be noted. The principal methods of comparison are by average number of juveniles and average pounds of adults per acre. The sample results, together with commercial landings and sports fishing reports, help determine the condition of the bay fishery from year to year. Since the Parks and Wildlife Department has certain areas of responsibility in managing fish species in the Laguna Madre, continuing current knowledge of the status of each important species is desirable.

Materials and Methods

Juvenile Fish - In this report, juvenile fish are those which are normally taken in a 60-foot bag seine and are generally less than one year old. The principal sampling device is the 60-foot bag seine, 6 feet deep and of 3/8-inch bar mesh used at prescribed stations in the area. In the Upper Laguna Madre samples were taken monthly except in September when high water prevented sampling. In the Lower Laguna Madre, bag seine samplings which had been discontinued since June, 1970

were again taken starting in September, 1971 and continued through the remainder of the year. The area covered by each seine drag was calculated. All juvenile game fish taken were measured and reported as numbers of individuals per acre.

Adult Fish - In this report adult fish are those which are normally taken in a trammel net and are generally one year old or older. The trammel net used in the Lower Laguna Madre during this period was 1200 feet long; 40 inches deep, of 3-inch stretched mesh inside and 12-inch stretched mesh outside webbing and was used at prescribed stations. Each of 10 stations was checked 3 times each spring and fall. The nets were set, struck and the enclosed areas calculated. Game fish were measured and counted by species. Length-weight relationship tables were used for each species to calculate weights, and the yield was reported in pounds per acre by species.

Results

Juvenile Fish, Upper Laguna Madre

Spotted Sea Trout (Cynoscion nebulosus), (Figure 1). Assuming that the peak of abundance for 1971 was reached in December, there appears to be little difference in the availability of juvenile trout in 1969, 1970 or 1971. There has been no further decrease in abundance since 1967 and 1968.

The results of juvenile fish sampling from 1968 through 1971 in both the Upper and Lower Laguna Madre are shown in Figures 1 through 3. (Juvenile trout catches in the Lower Laguna Madre in November and December 1969 have been corrected in Figure 2 from data reported in the two previous job reports. An analysis of all area bag seine stations has revealed that the station on the Arroyo Colorado known as Parker Lake inlet is not representative since it is essentially a dead-end pocket, not part of the bay proper, and therefore should not be considered in reporting juvenile trout populations. The graph in Figure 2 has been adjusted, removing this station for all years. Since 21 of the 23 juvenile trout taken during the two months in question were found at this station, the peak of abundance of juvenile trout in 1969-1970 has been changed considerably.

Redfish (Sciaenops ocellata) (Figure 1). Using March as the indicator month, the yield of redfish in 1971 was only a third of that in the previous year. With the December 1971 yield at 7.5 per acre, there should be a pronounced increase in 1972.

Flounder (Paralichthys lethostigma) - Three juvenile flounder were taken in 1971 compared to only 1 in 1970 and 21 in 1969. The sampling method may be inadequate, but the station types are suitable for flounder.

Black Drum (Pogonias cromis) - Only one juvenile black drum was taken in the last three years and that one was in 1969. A true decline

in abundance is apparent, but it is possible that the best nurseries have not been located.

Sheepshead (Archosargus probatocephalus) - Again, too few were taken to warrant much comment; 1 in 1969, 2 in 1970 and 1 in 1971. This species is difficult to capture in the sampling gear used.

Juvenile Fish, Lower Laguna Madre

Spotted Sea Trout (Figure 2). The yield of trout in the Lower Laguna Madre has declined again to less than half that of the two previous years. Assuming the 1971 peak was reached in December, the average yield was slightly over 1 per acre compared to 2 per acre in 1969 and 6.5 per acre in 1968.

Redfish (Figure 2). It appears from incomplete sampling that the peak yield of juvenile redfish in 1971 would approximately equal that of the last previous sampling in 1969. While both yields are dwarfed by those attained in 1968 following Hurricane Beulah, they are deemed adequate with peaks of from 20 to 30 individuals per acre in the sample areas.

Flounder (Figure 3). Peak yields of juvenile flounder remained disappointing at less than 1 per acre in 1970 and 1971 compared to peaks of 2.4 per acre in 1969 and over 5 per acre in 1968. The long range trend for flounder closely follows that of trout.

Black Drum - Only 3 black drum were taken in the last 5 months of 1971 and these were from 170 to 225 mm. in total length.

Sheepshead (Figure 3). With a peak yield of 5.5 per acre in samples taken in October 1971, a significant increase is shown over samples taken in 1968 and 1969.

Supplemental Juvenile Fish Sampling

In the summer of 1970 an intensive effort was made to survey known nursery grounds of spotted sea trout in the Lower Laguna Madre.* Between July 22 and 28, 134 trawl and seine samples were taken covering over 3 acres in the known trout nursery. Efforts were made to compare results with similar surveys made in 1967 and 1969 and with earlier juvenile fish sampling conducted between 1958 and 1965. There were 103 twelve-foot trawl samples, 23 six-foot trawl samples, and 8 bag seine samples which produced 184 juvenile spotted sea trout.

During the summer of 1971, this survey was repeated in order to evaluate the current status of juvenile sea trout populations in the

*Coastal Fisheries Project Report 1970 (Project CF-2-1, Biological Studies in the Laguna Madre of Texas, Job No. 4), A Survey of the Spotted Sea Trout Nursery Areas of the Lower Laguna Madre.

area. Every effort was made to duplicate the 1970 survey using the same sampling stations, sampling period, equipment and personnel. Salinity ranges, water depths, and temperatures were similar to those existing in 1970, and the conclusions drawn were the same as to the preferred habitat for juvenile trout.

The 40 five-minute drags with the 12-foot trawl and 5 samples with the 20-foot 1/4-inch mesh bag seine yielded 4 juvenile trout between ICW Marker #306 and #311, which is a shallow (2 foot) area midway between the Arroyo Colorado Cutoff and Port Mansfield. This was the center of the area which produced 184 juvenile trout the previous summer. As in 1970, maximum effort was exerted in the middle of the Lower Laguna Madre, that portion generally from Port Mansfield south to Three Islands which has traditionally produced the bulk of the juvenile spotted sea trout of the area. While only 40 trawl samples were made in 1971, compared to 94 made in 1970, approximately the same number was made in the prime middle area so that the catch results of trout are generally comparable. It appears obvious that the productive bay area for spotted sea trout was drastically reduced in 1971 or the same area produced less.

As an additional check on the validity of the juvenile fish sampling, raw data from the biological samples of the Survey of the Commercial Shrimp of the Lower Laguna Madre (Project 2-132-R) was examined. These samples consisted of trawl and bar seine stations established along 9 transects extending east-west from mainland to island and north-south over the entire length of the project area. The stations represented all water depths and all habitat types. Trawls used were 10 feet in width and of 1/2-inch bar mesh with 1/4-inch liner in the cod end. The bar seines were 6 feet wide and of 1/4-inch bar mesh. Each round of sampling consisted of 46 trawl samples and 13 bar seine samples. Trawls were pulled by boat for 5 minutes (1,500 feet) and bar seines by hand for 500 feet. There were 17 rounds of samples taken in 1971.

The 782 trawl drags covered approximately 270 acres; the 221 bar seine sampled another 15 acres. In the entire 285 acres, 25 juvenile trout were caught. The trawl has been shown to be a reasonably acceptable sampling device for small juvenile trout in previous years and it is assumed that the low catch of juvenile trout in all biological samples is consistent, and the catch data of juvenile trout in the bag seine samples in the known trout nursery areas is valid.

Adult Fish Sampling--Lower Laguna Madre

Adult fish sampling in the spring of 1971 extended from April 7 to June 8 and consisted of 26 strikes covering a total calculated area of 131.6 acres. Fall sampling commenced on October 6 and concluded on November 9 and consisted of 27 strikes covering a calculated area of 160.7 acres.

In the spring sampling, the yield of spotted sea trout averaged 2.45 pounds per acre compared to 2.40 pounds per acre for the previous spring. Fall samples showed an average of 1.36 pounds per acre compared to 1.28 pounds per acre in the fall of 1970. Figure 4 shows the similarity in yields of spotted sea trout from 1970 and 1971 along with comparisons for similar data from 1968 and 1969.

In the spring samples, redfish yields averaged 3.45 pounds per acre compared to 4.70 pounds per acre the previous spring. Fall samples indicate an average of 3.86 pounds per acre compared to 1.70 pounds per acre in the previous fall samples.

For the seventh consecutive sampling period since the fall of 1968, yields of redfish in pounds per acre have exceeded those of spotted sea trout in the Lower Laguna Madre. This continues to be due, in part, to low production of spotted sea trout, the result of a continuous decline which started in 1963. The rate of difference in yields of redfish to trout in the fall of 1971 may be somewhat misleading (Figure 4) due to the differences in age groups. In the 1971 fall samples, 103 of the 121 redfish taken were Year Class II or older fish with only 18 Year Class I fish in the samples. During the same period in 1970, only 23 of the 38 redfish taken (60.5%) were Year Class II or older with 15 in Year Class I. In the fall 1971 samples, trout actually outnumbered redfish 236 to 152, but redfish outweighed trout by 619.65 pounds to 218.49 pounds (calculated weights). In 1970, redfish outnumbered trout 285 to 182 and outweighed trout 633.28 pounds to 331.64 pounds (calculated weights).

The shortage of Year Class I redfish in the fall samples indicates a relatively poor spawn in 1970.

Black Drum - Spring samples accounted for 167 black drum weighing a calculated 397.76 pounds or 2.61 pounds per acre. Fall samples produced 79 black drum weighing 171.99 pounds for a yield of 1.07 pounds per acre.

Flounder - In spring samples, 9 flounder were taken; in the fall there were 7. These low yields are typical of trammel net strikes as they seldom produce significant numbers of flounder even when the species is abundant.

Sheepshead - There were 27 sheepshead taken in the spring samples and 11 in the fall samples. Considering the ability of sheepshead to avoid capture in a trammel net, this would tend to indicate a sizable population in the area.

Summary

In the Upper Laguna Madre juvenile redfish declined in abundance in 1971, while there appeared to be no change in the status of juvenile

spotted sea trout. In the Lower Laguna Madre comparisons could not be made with 1970, but redfish yields were comparable with those in 1969, while those of trout dropped in 1971 to half of the 1969 yields. Adult fish samples in the Lower Laguna Madre show that redfish yields in pounds continue to surpass those for trout, as they have since the fall of 1968. The relative shortage of yearling redfish in the fall of 1971 samples indicates a poor hatch in the fall of 1970.

Figure 1 Juvenile Spotted Sea Trout and Redfish Taken by 60-foot Seine in the Upper Laguna Madre in Average Number per Acre in 1969, 1970 and 1971

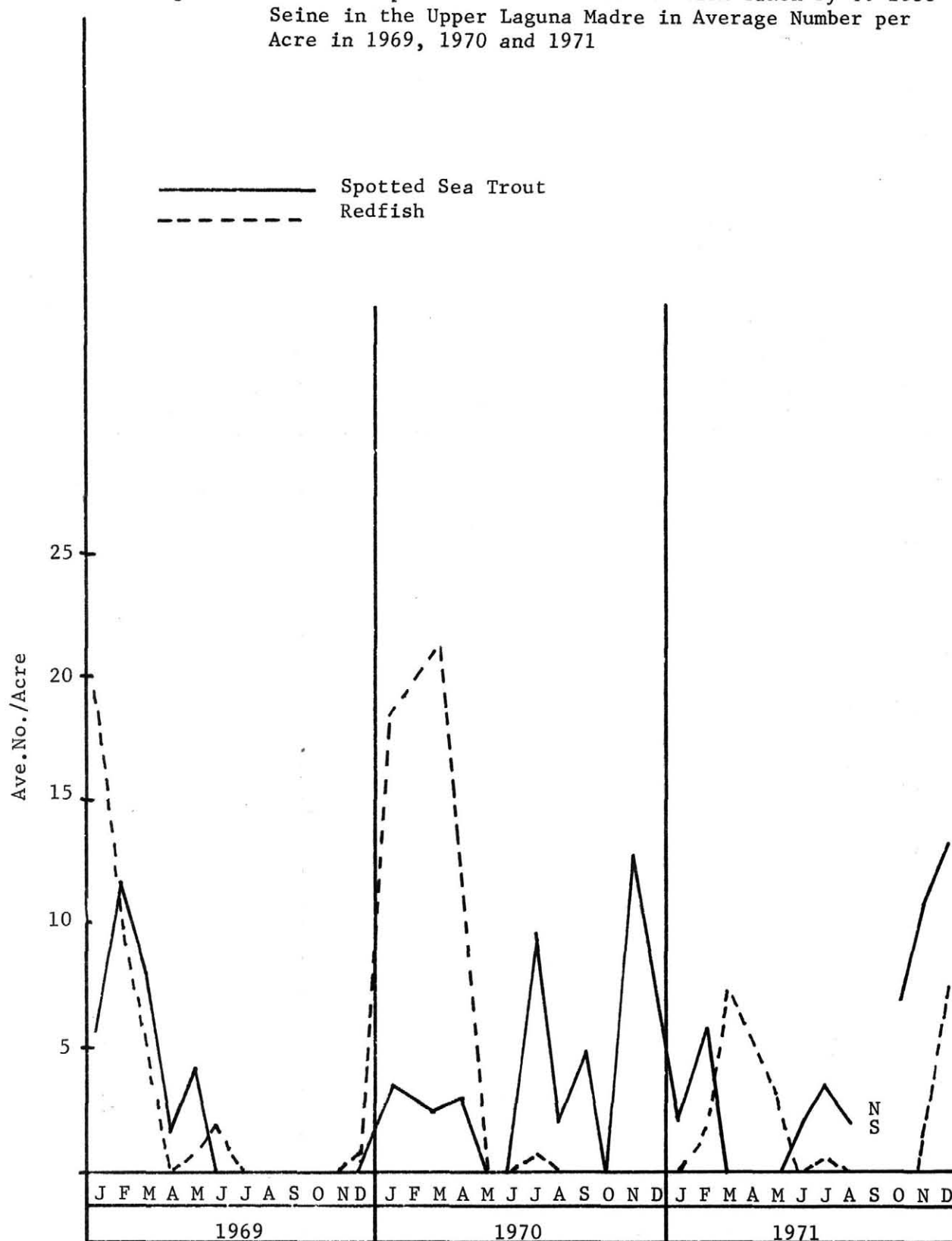


Figure 2 Juvenile Spotted Sea Trout and Redfish Taken by 60-Foot Seine in the Lower Laguna Madre in Average No./Acre in 1968-1971

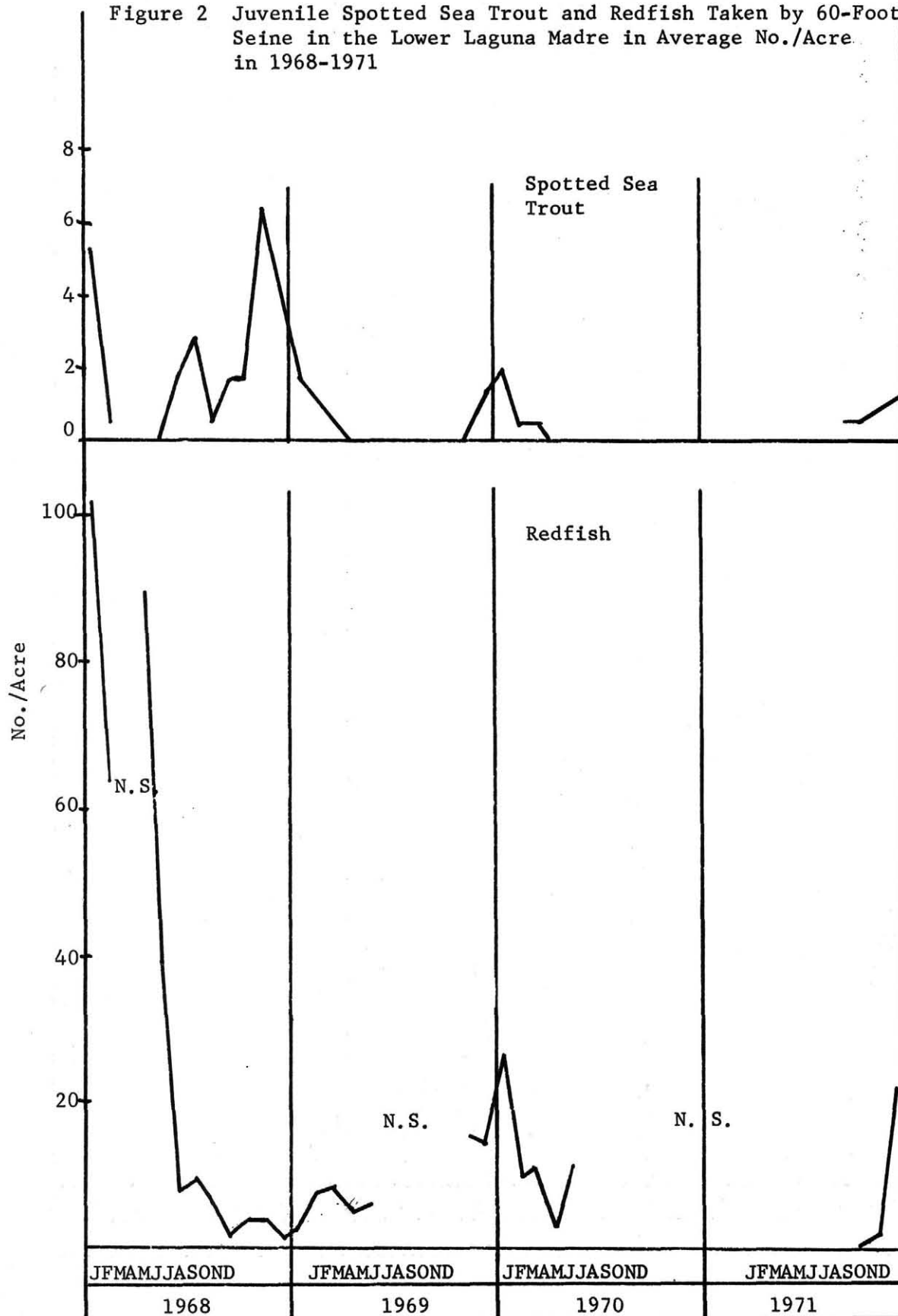


Figure 3 Juvenile Flounder and Sheepshead Taken by 60-Foot Seine
in the Lower Laguna Madre in Ave.No/Acre in 1968-1971

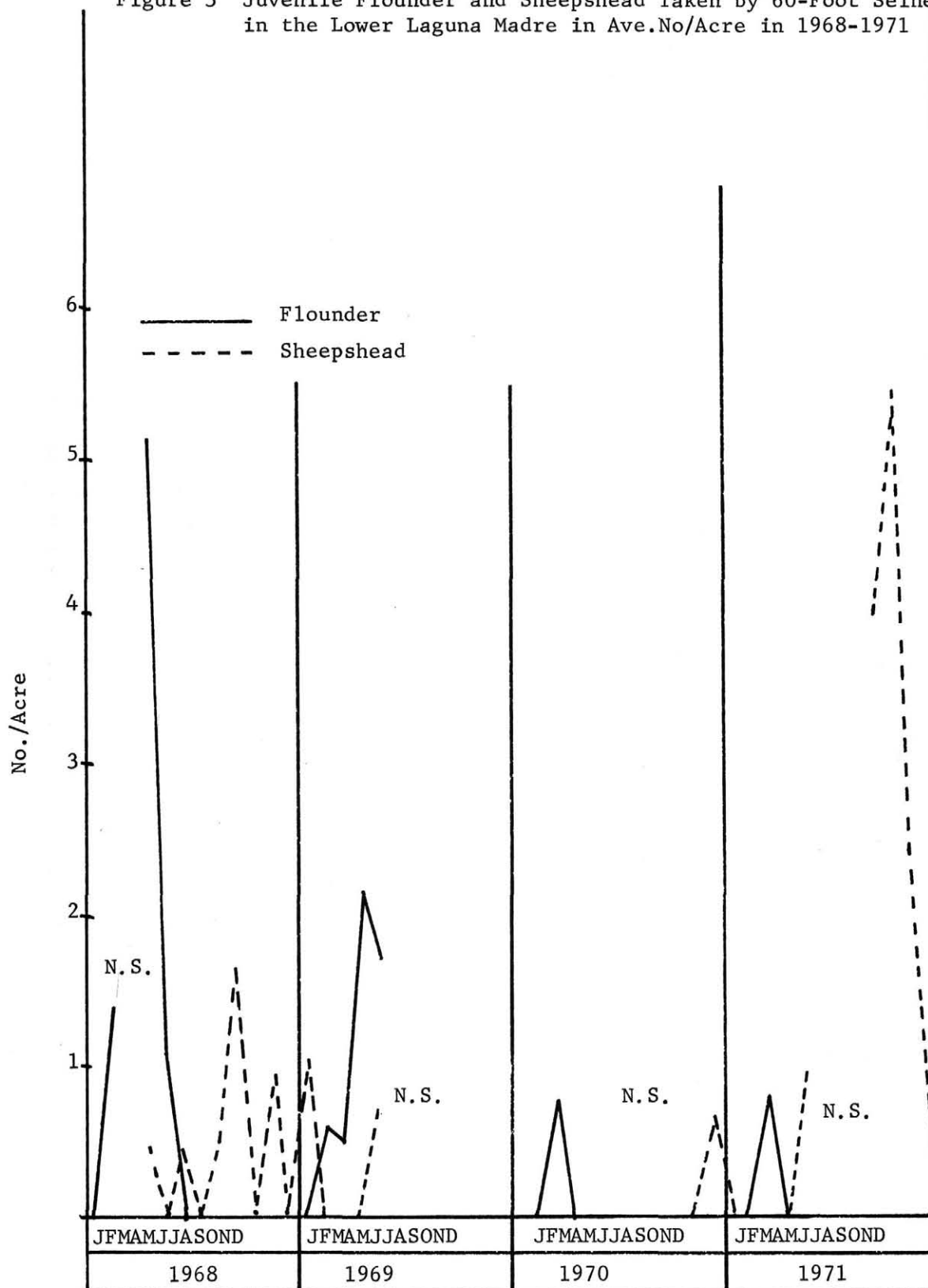


Figure 4 Yields of Adult Spotted Sea Trout and Redfish Taken by Trammel Net in the Upper Laguna Madre in Pounds per Acre from 1968 through 1971

