Job Report

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Project Name: Biological Survey of the Waters of the Laguna Madre of Cameron, Willacy, and the Southern Half of Kenedy Counties and Adjacent Waters

Period Covered: September 1, 1960 to August 31, 1961 Job No. E-1

Life History Studies of the Important Sports, Commercial, and Bait Fishes of the Lower Laguna Madre

Abstract: Mullet, abundant throughout the year, are consumed by both trout and redfish. Anchovies are next most abundant, particularly in the winter. Young golden croaker, abundant in spring, are replaced by pigfish and pinfish in summer and fall. Other major forage fish are spot croakers, silversides, and skipjack.

Spawning and nursery grounds of spotted trout were found widespread in the area in water two to four feet deep with shoal grass substrate. Spawning occurred from April to August with the peak in late May. Small trout frequented deep channels; large ones preferred shallow water.

Juvenile redfish were found on the bay side of Padre Island near Brazos Santiago Pass from December through May. Summer nursery areas included the Arroyo Colorado. Adult redfish, over three years old, were not common in the region.

Black drum were present most of the year. They entered Brazos Santiago Pass in late June, dispersed during cold weather, and were scattered over the entire area from November through March. Larger adults entered the bay in January and February, and many spawned in the bay and gulf in February and March. There was a general northward movement within the bay, and most left the bay by late May. Juvenile grounds are not well known but include shallow sloughs. Contract netters removed over one million pounds of drum during the period from December through May.

Sheepshead frequented jetties and passes in summer and deep water in winter.

Flounder were extremely abundant for the third consecutive year. They were most abundant in summer, but some were present in winter.

Objectives: To determine the life histories of the important sports, commercial, and bait fishes of the area.

Procedure: Biological samples were collected at 12 established stations each month. Sampling was conducted with a 10-foot otter trawl of 1-1/4 inch stretch mesh interlined with 1/2 inch stretch mesh. All specimens were counted and weighed by species. Samples were also obtained to determine salinity and water temperature. Wind direction and strength, turbidity, and bottom type were also noted at each station. These data were used to determine the time and circumstances of spawning, rate of growth, food habits, and movements and migrations of the fishes concerned, and to determine the physical, chemical,

and meteorological factors which tend to influence spawning, rate of growth, food habits, and movements and migrations of these fish.

Findings: Bait Fish - Anchovies must be considered an important food item in this area, especially during cold winter months. They constitute the most abundant bait fish of their size in the vast areas vacated by pin perch. Anchovies are present throughout the year and are most abundant from October through March. Postlarvae and juveniles appeared in large numbers from mid-May to mid-June, indicating April and May spawning. Adults have been found in the Gulf surf in September, although complete and regular sampling has not been done there. Anchovies are not particular as to habitat and populate almost all areas of the bay.

Silversides appear in the sampling only near passes and are not abundant within the bay. Large numbers occur near passes in March.

The yellowtail or silver perch is present throughout the year, and while too small to be classified a sports fish, is important as bait. During the winter months, it is present with anchovies and probably feeds on them. Post-larvae and juveniles appear in April and May. Juveniles are very abundant over the entire area in June.

The golden croaker seldom reaches food or game fish size in this area. They are important as forage, however. Postlarvae and juveniles are abundant in January from Brazos Santiago Pass to the Arroyo Colorado. By February they extend north to Port Mansfield. In March late juveniles can be found in abundance only near passes, and by June the golden croaker is not abundant anywhere in the area and remains scarce or not present for the remainder of the year. The golden croaker utilizes this bay area as a nursery ground only, being present as larvae and juveniles from January through March and appearing to spend the summer and fall months in the Gulf.

The spot croaker follows the same pattern as the golden croaker but did not enter the trawl samples in sufficient numbers to present a clear picture. In March the young frequent the perimeters of spoil banks, farther away from the passes than the golden croaker.

The pin perch is the most abundant bait fish in this area from May through September. It is abundant over beds of shoal grass and is readily taken as food by trout. When as bait for trotlines, it accounts for much of the commercial trout landings. Juveniles appear first near the passes in late March, and by April have spread over most of the bay. Growth occurs during this northward spreading, and by May the late juveniles are abundant over the entire area. All sizes are present from June through September, with the larger specimens usually in deeper water, along the edge of the channels and surrounding spoil areas. Pin perch are scarce or not present from October through February except near passes.

The pig fish is highly [illegible]ed in this area as bait for large trout. It is not as abundant as the [illegible] perch, however, and its use as bait is limited. It does not trap as well as pin perch and must be taken by seine or trawl. Like the pin perch, it is absent from the area during the winter months. Adults appear along the edges of channels in May. The first juveniles appear in June. Pig fish or "piggies" are most abundant in the bay from July through October but are confined to pass areas during the winter months.

The skipjack is normally considered a bay sports fish in this area, but the juveniles and young adults are utilized as food by large trout and must be considered as bait. Little is known of this fish in this area, except that large numbers are present in the late spring and summer months, frequenting not

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only the channels but the flats as well, in water as shallow as four inches.

Food and Sports Fish

The spotted trout - Considerable effort was made to locate the extent of trout nursery grounds in the area. Trawl samples at hydrographic stations since 1954 have yielded a few juvenile trout, particularly near Padre Island. In July 1961 a survey was made using a 10-foot shrimp trawl, 1-1/4 inch mesh with 1/4 inch liner. Over 60 samples were collected in the lower Laguna Madre. Twenty-four of these samples contained no trout. The remaining 36 trawl samples yielded 173 juvenile trout ranging in total length from 10 to 75 mm., with a mode from 18 to 29 mm. Those areas inaccessible to the TANG were sampled by other means and methods. While the survey may not have located the entire trout nursery of the area, Figure 1 shows the extent of these nursery areas known to date and which, in view of the extensive sampling done during this period, account for the majority of the trout produced in the lower Laguna Madre.

An analysis of the type habitat of these trout nursery areas shows the prime areas to be in two to four feet of water over patches of shoal grass. Marginal areas are less than two feet in depth over very sparse or extremely dense shoal grass.

The presence of 24 trout from 49 to 75 mm. would suggest, from known growth rates, that spawning started as early as mid-March. Small trout, 12 to 15 mm., were taken in the area as late as August, indicating that the spring spawning extends into July.

Trouts up to 136 mm. were found in July and up to 165 mm. in September. Large numbers of 150 to 225 mm. trout were present in the Arroyo Colorado in April.

Two hundred and thirty-eight trout were tagged during the period in the vicinity of the Arroyo Colorado. Meager returns help substantiate earlier findings that movements in the area are local. Trout in this area move from the mouth of the Arroyo up into the Arroyo proper and back; their movements are related to both food and salinity. There are no indications at present that this trout population travels as far as Redfish or Port Isabel Bays.

Over 200 trout were tagged at the south end of the land cut in early June 1961. These fish were caught at nights under lights and tagged in hope of determining whether they moved north into the upper Laguna Madre. Seven returns have been reported to date, four recaptured at the point of tagging, and three moved southward.

Legal-sized trout appeared to be abundant over the entire area throughout the year. Commercial fishermen reported more year class II and III trout in Redfish Bay in the late spring of 1961 than had been noticed since 1959. Sports and commercial catches during the summer months appeared to bear this out. Sow trout were observed to be more abundant than in past years, particularly in east Redfish Bay and in the Green Island-Three Islands area.

Redfish - A preliminary survey of redfish nursery grounds was made in March. Juvenile redfish were found in abundance along the bay side of Padre Island from Brazos Santiago Pass northward for twelve miles. A few juveniles were located around the southernmost spoil banks of the Intracoastal Waterway just north of Port Isabel.

While work on the juvenile redfish has been limited to a preliminary study, the pattern of first growth and movements appears to be clear. Larval redfish enter Brazos Santiago Pass from mid-October through January, utilizing the bay side of Padre Island as nursery grounds when they are from 50 to 100 mm. in total length. In April these fish, 80-120 mm. long, travel north-

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west along a shelf or bar and enter the Intracoastal Canal near Marker #79, where they are occasionally taken in cast nets and perch traps. In late April and early May these redfish are common at the mouth of the Arroyo Colorado, and many have been taken by commercial fishermen using cast nets for the purpose of capturing mullet for trotline bait. In June a sample of redfish in the Arroyo Colorado ranged in size from 130 to 200 mm. and averaged 157 mm. The Arroyo Colorado appears to be the summer habitat for year class 0 redfish until September, when they leave en masse. They are next located at Brazos Santiago Pass jetties and are 300 to 375 mm. in total length.

From this point until maturity, all ages of redfish appear to utilize both bay and Gulf beach habitat. All ages of sexually immature redfish are present throughout the entire bay area all year and are found principally on the extensive flats between the Intracoastal Canal and Padre Island from Three Islands north to the land cut. Their food consists of small crabs, eels, pistol shrimp, Penaeid shrimp, and small fish. A part of this redfish population moves to the Gulf beaches from November through March. The winter Gulf beach population of sexually immature redfish appeared to re-enter the bay during early April and was present in greatly increased numbers at the mouth of the Arroyo from April 5 to April 15 and at Port Mansfield from April 15 to April 30. This large population was present in Redfish Bay during May and had migrated from the area by June.

Ripe adult redfish are rare in this bay and are only occasionally taken in the surf. Practically nothing is known of the habits of the adult redfish in this area.

Sheepshead - The adult sheepshead first appears in the area at the north end of Redfish Bay in late December and moves steadily south, reaching the Port Isabel area by late April. The summer habitat of adult sheepshead in the Port Isabel area is around the numerous barnacle-encrusted pilings at Port Isabel, beneath the Queen Isabella Causeway, and at the jetties of Brazos Santiago Pass. Juvenile sheepshead are common along the edges of the Intracoastal Canal from Port Isabel to Port Mansfield during the late spring and summer.

The sheepshead is a popular sports fish in the Port Isabel area during the summer months. As a commercial species, it if marketed along with drum.

Flounder - The southern flounder has increased in abundance and stature as a sports fish in this area during the past three years. Despite the supposition that flounder leave the bay for the Gulf each fall to spawn and return in the spring, large numbers are present in this area throughout the year. During the winter months, the preferred habitat is the deeper waters of Port Isabel and Redfish Bays. From April through September they appear to be most abundant adjacent to the Intracoastal Canal. Sports catches by gig and by rod and reel were exceptionally heavy this past summer, along the edge of the Intracoastal Canal from Three Islands north to Port Mansfield and in the Port Mansfield channel east to Padre Island. Night floundering with gig and lantern has continued to be productive, but a marked increase in the use of pole and line fishing with shrimp and rod and reel using spoons along the channels has provided a new and productive sport. No work was done on the larval and juvenile forms.

Drum - Adult black drum are very abundant throughout the bay area from July through April. In July large numbers of drum were reported in Port Isabel Bay and were extremely abundant near Port Mansfield in August, when 3,500 drum were tagged. From December through May most of the information concerning drum came from the contract nets in Cameron and Willacy Counties. Drum were abundant in the deeper water of both counties during northers and low tides and tended to enter shallower waters in warmer weather and normal tides. These drum are not

in the tight schools which are prevalent in summer but are scattered over large areas. All drum were either ripe or ripening by February, but no spawning had occurred. Female drum outnumbered male drum from two to one to almost five to one. By the end of March 50 percent of the drum were spent, with spawning apparently taking place in the open bay.

By April Cameron and most of Willacy County contained few drum, with large populations reported in Kenedy County in Redfish Bay. By mid-May these too had left, perhaps traveling north into the upper Laguna Madre.

Nursery grounds of the black drum are not definitely defined but in all probability include the extremely shallow and virtually inaccessible delta areas of the Arroyo Colorado. Juvenile drum, 85 to 115 mm. long and averaging 104 mm., were found in the Arroyo Colorado in mid-June. Other known drum nursery areas include the extensive shallow sloughs along the Brownsville Ship Channel from Port Isabel to Port Brownsville.

The 1960-1961 contract drum netting season in Cameron and Willacy Counties removed over 1,000,000 pounds (live weight) of black drum from this area. It is doubtful if this amount was sufficient to counteract the reproductive potential of this fish and thereby reduce their numbers for more than a few months.

Comments: While much is known of the forage, food, and sports fish of this area, some gaps still remain in the knowledge of basic information. More work is needed in all phases of work on the forage fish, including seasonal availability and their use as food by sports and food fish. Information needed on sports and food fish includes spawning and nursery grounds of redfish, nursery grounds of drum and flounder, food habits and sexual development of all species, as well as the role of passes on the larval, juvenile, and adult forms of all species.

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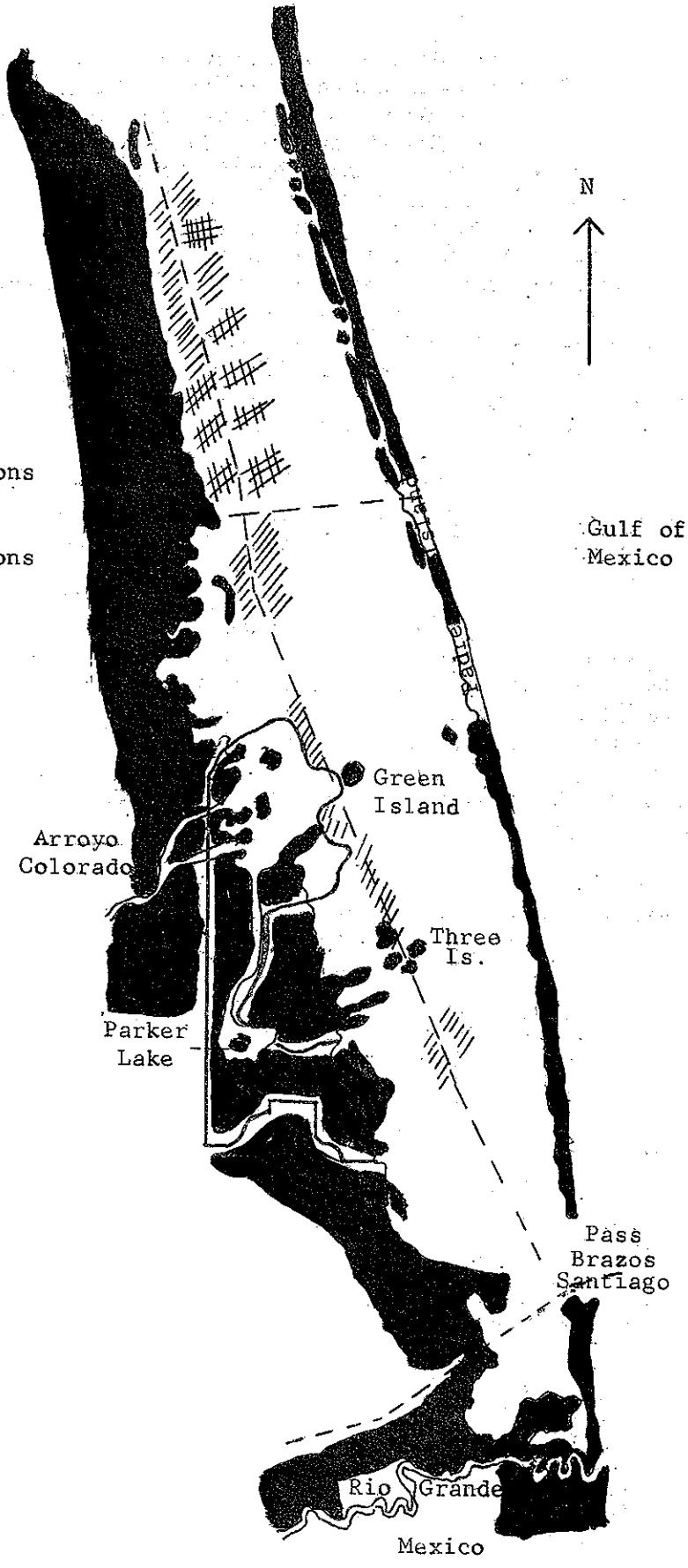
Figure 1.
Lower Laguna Madre
Trout Nursery Grounds

Heavy Concentrations
Of Trout

Light Concentrations
Of Trout



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