Job Report

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Project Name: Analysis of Populations of Sports and Commercial Fin-Fish and of Factors Which Affect These Populations in the Coastal Bays of Texas

Period Covered: January 1, 1963 to December 31, 1963 Job No. 11

Evaluation of the Effects on Fin-Fish Populations of Opening the Port Mansfield Channel in the Lower Laguna Madre

Abstract: The opening of Port Mansfield Pass appears to have increased the bay populations of pinfish, Lagodon rhomboides, in the summer, and anchovies, Anchoa sp., in the winter. No relation was found between the opening of the pass and the abundance of grooved shrimp, Penaeus aztecus and P. duorarum.

There was evidence that Port Mansfield Pass was used by adult southern flounder, Paralichthys lethostigma; adult redfish, Sciaenops ocellata; post-larval and juvenile penaeid shrimp; and by blue crabs, Callinectes sapidus, of all stages.

A general decrease in the numbers of fish and shrimp in trawl samples was noted in 1963, probably due to large quantities of dead, wind-rowed vegetation at many of the stations and to high salinities in the Port Mansfield area.

Port Mansfield Pass was ineffective in reducing or stabilizing salinities in the area.

Objectives: To determine the effects of opening Port Mansfield Pass on the fin-fish populations of the Lower Laguna Madre.

Procedures: Salinity and temperature were determined monthly at Stations 21 to 25 (Figure 1). Trawl samples of 15 minutes duration were taken monthly with a 10-foot trawl of 1¼-inch stretch mesh and one-fourth of an inch liner, at Stations 22 to 22c, and at Station 24. Results were compared with similar collections which had been made since 1954.

Findings and Discussion: A brief history of Port Mansfield Pass is as follows. Prior to 1957, no pass existed. A navigable pass was present from 1957 to 1958, and a fish pass existed from 1958 to 1960. The pass was closed from 1960 to 1962 to allow the construction of permanent, granite block jetties. The jetties were completed in 1962 and the pass has been open and navigable since that time.

Environmental Conditions

Monthly salinities from each station in the Port Mansfield area from 1955 through 1963 are presented in Table 1. Before Port Mansfield Pass existed, 30 salinity samples were taken from Stations 21 through 25 from August 1955

through June 1956. Average monthly salinities ranged from 26.3 to 46.9 ppt. The average for the period was 35.5 ppt. No extreme hypersalinity was detected during the period, although a steady increase from 26.3 ppt in September 1955 to 41.4 ppt in June 1956 was evident.

During the open period from November 1957 to July 1960, comparatively low monthly averages were recorded in January and April 1959 (26.1 and 28.2 ppt, respectively). These were evidently caused by heavy rainfall. By August 1959, the average monthly salinity had increased to 42.3 ppt. During the remainder of time the pass was open the monthly average remained above 40.0 ppt.

The pass was closed in July 1960, and an average salinity of 45.6 ppt ensued the following month. Considering the pattern of increasing salinity that had occurred in the area since January 1959, it would appear that lack of rainfall was the principal reason for the increase. During this closed period which lasted until May 1962, average monthly salinities increased from 31.7 ppt in January 1961 to 39.1 ppt in January 1962, and remained near 39.0 ppt for the last 5 months of the period.

A pattern of increase began after the pass was reopened in June 1962, with the average salinity reaching 45.2 ppt by December 1962. During 1963, salinities in the area fluctuated from an average of 36.1 ppt in July to 50.7 ppt in December. The average for the period from June 1962 through December 1963 was 43.4 ppt. High salinities in 1962-1963 were correlated with drought conditions on the lower Texas Coast.

From these observations it was concluded that the opening of Port Mansfield Pass has had little affect on salinities in the Port Mansfield area. Extreme hypersalinity was not recorded before the initial opening of the pass or during any closed period thereafter. Neither was any evident stabilization of salinities brought about with the opening of the pass.

Abundance Comparisons

An increase in the numbers of pinfish, Lagodon rhomboides, correspond with the opening of Port Mansfield Pass in 1957 (Table 2). From 1958 through 1960, during which time the pass was open, the average number per summer trawl sample was 209. This was compared to a summer average of 87 per sample prior to the opening of the pass in 1957. During 1961 spring and summer samples were not taken. Pinfish were fairly abundant after the pass was reopened in 1962. During the summer periods of 1962-1963, an average of 104 per sample was taken.

Prior to the opening of the pass in 1957, anchovies, Anchoa sp., were only taken in small numbers in the Port Mansfield area (Table 2). During the winter of 1957, after the initial opening of the pass, 11 per sample were taken. The average for winter periods from 1957 to 1959 was 41, with the highest average of 119 per sample occurring during the winter of 1958. An average of 48 appeared in the winter samples of 1960-1961, during which time the pass was closed. An average of 84 and 85, respectively, occurred during the winter periods of 1962-1963.

No correlation was found between the opening of the pass and the abundance of grooved shrimp, Penaeus aztecus and P. duorarum. Average samples during the summer periods from 1954-1957 ranged from 19 to 244 and averaged 93. From 1958-1960 average summer samples ranged from 3 to 110 and averaged 53. Samples were not taken in the spring or summer of 1961 while the pass was closed. The summer average for 1962-1963 was 48.

During the current study period a general decrease in the numbers of fish and shrimp in trawl samples was noted. Pinfish were present in the study area from March through December 1963, but were approximately 65 per cent less abundant

during the summer than in 1962. Grooved shrimp were fairly abundant during the summer and fall of 1963; however, average samples during those periods showed a decrease of approximately 50 per cent from 1962. This decrease may have been due to large quantities of dead wind-rowed vegetation at most stations at sometime during the year, and especially at Stations 22, 22a, and 22b during the summer. High salinities in the project area during 1963 probably also contributed to the decrease.

Movements and Migrations

Little information has been collected to compare the relative abundance of adult game fish since 1954. However, many aspects concerning the use of the pass have been observed. In 1963, large commercial catches of southern flounder, Paralichthys lethostigma, were observed in Port Mansfield fish houses, and good catches of flounder were reported by sports and commercial fishermen. Numerous flounder were observed in the Port Mansfield Channel and around the Port Mansfield jetties in September. These observations indicate that flounder used the pass extensively in 1963.

Although the sports and commercial catches of flounder have increased greatly in the project area since the pass was first opened in 1957, gill net catches of flounder in the Upper Laguna Madre increased fourfold in 1958-1960 over 1952-1956 (Simmons-personal communication). Thus, the increase of flounder in the Port Mansfield area may not have been caused by the pass.

Sport catches of large redfish, Sciaenops ocellata, in the surf near Port Mansfield jetties and catches along the channel just inside the jetties during the fall of 1963 indicated that redfish used the pass during that time. Attempt to determine the extent of use of the pass by larval redfish during 1962-1963 were unsuccessful due to poor spawns in those years.

In 1963, samples of post-larval penaeid shrimp were obtained from the surf at Port Mansfield Pass from early spring to late fall. Abundant grooved shrimp from 20 to 40 millimeters in length were taken in trawl samples on the bay side of Padre Island, just north of the Port Mansfield Channel in September 1963. These observations suggested that post-larval shrimp used the pass to enter the bay. Migration studies of brown shrimp, P. aztecus, by Pullen (1962) showed that Port Mansfield Pass was used as a route of egress from the bay.

Numerous sponge blue crabs, Callinectes sapidus, were taken between the Port Mansfield jetties during the summer of 1962, and blue crab larvae were taken from the Gulf surf near Port Mansfield Pass in October 1962 (Osborn 1962). Juvenile crabs of small sizes were taken in 1962 and 1963 at Stations 22b and others in the project area. From these observations it was concluded that Port Mansfield Channel and Pass was used extensively by adult, juvenile, and larval blue crabs.

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References

Osborn, Kenneth W. 1962. Population Studies of the Blue Crabs of the Lower Laguna Madre. Texas Game and Fish Commission, Project Report, 1961-1962

Pullen, Edward J. 1962. Migration Study on Brown Shrimp, Penaeus aztecus (Ives), in the Lower Laguna Madre. Texas Game and Fish Commission, Project Report, 1961-1962

Table 1
Salinities in ppt from each Station in the Port Mansfield Area, by Month from 1955-1963

Stations Year & Month	21	22	23	24	25	22a	22b	22c	Average	Condition of Pass
1955										
August	46.8	45.2	47.2	47.4	47.8				46.9	No pass
September	29.2	24.9	25.5	25.1	27.0				26.3	"
November	23.4	25.0	28.3	28.4	29.0				26.8	"
1956										
January	35.3	32.1	37.1	28.7	39.5				34.5	No pass
March	35.0	32.4	36.6	39.2	40.6				36.8	"
June	41.0	40.6	41.6	41.4	42.2				41.4	"
1958										
January	35.3	49.5	40.9	40.3	40.1				39.2	Pass open
August	35.6	36.4	36.0	39.6	42.2				38.0	"
1959										
January	25.5	25.9	28.2	27.6	22.9				26.1	Pass open
April	28.0	26.9	27.7	28.3	30.0				28.2	"
July	37.7	38.9	39.2	39.8	40.8				39.3	"
August	44.9	39.6	42.6	42.8	41.8				42.3	"
December	41.5	42.0							41.6	"
1960										
February	41.2	40.6	42.1	43.6	45.2				42.5	Pass open
April	43.7	37.1	42.1	42.5	41.5				41.4	"
June	41.4	40.8	42.5	42.7	43.2				42.1	"
August	45.5	45.3	45.5	46.0	45.8				45.6	Pass closed
October	39.1	36.0	37.0	37.4	36.4				37.2	"

Table 1--Continued

Stations Year & Month	21	22	23	24	25	22a	22b	22c	Average	Condition of Pass
1961										
January	29.8	30.8	28.0	30.2	29.8				31.7	Pass closed
October	33.0	29.4	30.5	32.0	35.9	33.5	33.5		32.5	"
November	32.0	32.1	33.5	38.4	40.5	31.0	32.5	33.1	34.1	"
December	30.7		34.3	34.9	39.7				34.6	"
1962										
January	36.7	39.1	39.9	40.1	39.0	38.9	40.0	38.9	39.1	Pass closed
February	38.1		40.7	39.5	40.0			39.9	39.6	"
March	34.0		41.6	41.6	41.6	39.2		35.7	39.0	"
April	38.7	39.0	36.0	38.6	41.0	40.6	39.8	37.8	38.9	"
May			37.7	39.9	41.3	37.4		35.7	38.4	Pass open
June	38.0	37.1	39.8	38.5	38.5	40.6	40.5	38.7	39.0	"
July	41.4	38.7	36.0	37.4	39.3	47.8	47.3	36.9	40.6	"
August	40.3	38.0	41.0	40.8	34.9	48.0	43.8	42.7	41.2	"
September	42.0	41.4	44.4	44.1	45.5	43.9	43.9	42.4	43.5	"
October	40.8	42.0	40.5	39.2	42.2	42.6	42.6	42.1	41.5	"
November	41.8	41.8	42.9	44.1	56.2	38.2	36.6	41.6	42.9	"
December	42.3	42.2	43.2	46.7	55.5	42.7	43.5	45.1	45.2	"
1963										
January	43.5	41.5	43.9	47.9	49.8	47.3	48.4		46.0	Pass open
February	43.3	45.8	49.0	50.0	51.9	37.9	36.8		45.0	"
March	47.3	47.7	47.8			49.8	47.8	46.6	47.8	"

Table 1--Continued

Stations Year & Month	21	22	23	24	25	22a	22b	22c	Average	Condition of Pass
1963										
April	39.9	46.0	46.0	45.0	43.5	39.5	39.2	39.9	42.4	Pass open
May	29.4	30.1	39.8	42.4	42.8	39.9	35.8	37.6	37.2	"
June	42.8	42.5	43.6	42.8	43.0	41.9	43.6	41.9	42.8	"
July	38.1	31.2	33.5	34.5	35.4	39.4	40.1	36.1	36.0	"
August	44.5	46.5	46.6	46.6	46.1	45.9	49.6	46.1	46.5	"
September	45.1	48.4	49.7	49.7	49.9	41.8	43.1	49.7	47.2	"
October	45.4	45.9	47.8	48.5	50.2	47.4	47.4	47.4	47.5	"
November	40.5	37.4	42.7	44.4	44.4	40.5	41.1	39.4	41.3	"
December	48.8	50.3	51.2	52.8	54.3	48.9	48.8	50.3	50.7	"

Table 2
Average Number of Pinfish, Grooved Shrimp and Anchovies in Trawl Samples*
by Season for the Years 1954-1963 in the Port Mansfield Area
Lower Laguna Madre

*Pass opened in Nov. 1957 **Pass closed July 1960

Pinfish - Lagodon rhomboides

Condition of Pass	None 1954	None 1955	None 1956	Closed* 1957	Open 1958	Open 1959	Open** 1960	Closed 1961	Open 1962	Open 1963
Spring	---	---	---	---	---	5	330	---	3	3
Summer	154	140	50	3	190	63	373	---	54	55
Fall	---	40	---	---	35	20	15	5	20	27
Winter	5	5	---	0	50	70	5	0	10	0

Grooved Shrimp - Penaeus aztecus and P. duorarum

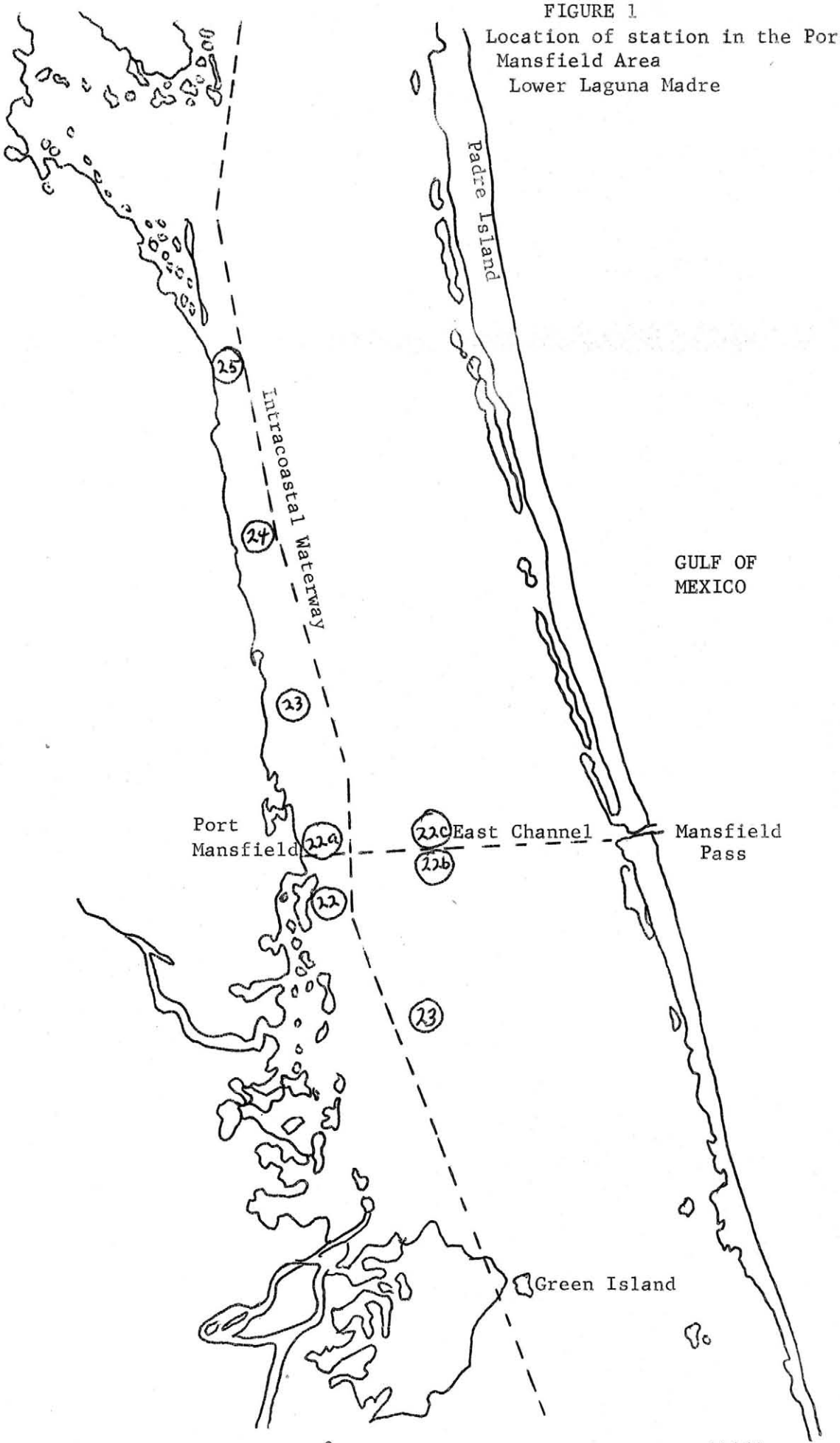
	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Spring	---	---	55	---	---	155	293	---	5	3
Summer	88	22	244	19	3	45	110	---	76	19
Fall	---	5	---	---	5	15	5	13	3	18
Winter	5	5	---	5	3	40	0	5	0	3

Anchovies - Anchoa sp.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Spring	---	---	0	---	---	19	21	---	12	132
Summer	0	0	0	4	42	0	1	---	3	58
Fall	---	2	---	---	0	0	6	15	14	44
Winter	3	0	---	11	119	15	19	54	84	85

---Denotes no samples taken
* 15 minutes duration

FIGURE 1
Location of station in the Port Mansfield Area
Lower Laguna Madre



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