

Job Report

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Project No. MF-R-6 Date May 17, 1965
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, 1964 to December 31, 1964 Job No. 7

Population Studies of the Sports and Commercial Fin-Fish Species of the Corpus Christi Bay System

Abstract: Juvenile game fish samples indicate a reduction in trout, Cynoscion nebulosus; and sheepshead, Archosargus probatocephalus; with a corresponding increase of redfish, Sciaenops ocellatus, and drum, Pogonias cromis, as compared with samples taken in 1963. Catches of flounder, Paralichthys lethostigma remained the same as in 1963, with an average of 1.0 fish per acre sampled. The most abundant juvenile game fish was the redfish with an average of 22.2 fish per acre sampled.

Fish tag returns were highest for redfish which had 8.2 per cent reported recoveries. Trout and sheepshead had relatively low tag returns, while drum and flounder had no returns.

The most abundant adult game fish taken was the trout with an average of 2.73 pounds per acre sampled, followed by sheepshead, redfish, drum and flounder respectively.

Objectives: To determine the population fluctuation of food and game fish species of the Corpus Christi Bay System.

Procedures: Collections were made with drag seine and minnow seine. These collections were made at fixed stations in widely scattered areas of the bay so that all type habitat were sampled (Figure 1).

Two collections were made each month with a drag seine. The net was 8 feet deep and 2,400 feet long. The mesh measured 3 inches stretched. The net was pulled and the area sampled was calculated (Table 5). All game fish collected were measured and counted. Those game fish which were in good condition after capture were tagged with either monel jaw tags or internal anchor tags and released.

Eight collections were made each month with a seine. This seine was 60 feet long and 6 feet deep. It contained a center pocket which was 3.5 feet wide and 7 feet deep. The mesh measured three-fourths of an inch stretched. The seine was pulled, and the area sampled was calculated. All juvenile game fish collected were counted and measured.

Special collections were also made with gear such as traps, gill nets, and hook and line to capture fish for tagging purposes.

Findings and

Discussion:

Juvenile game fish samples collected during this period are listed in Table 1 as number of fish per acre by species and by month. The area sampled at juvenile fish stations measured 300 by 30 feet for a total of 9,000 square feet. Juvenile redfish, Sciaenops ocellatus, and trout, Cynoscion nebulosus, were the most abundant species collected in the 60-foot seine samples (Table 1 and Figure 2).

Juvenile redfish reached a peak of abundance of 120.0 fish per acre in March and another slightly larger peak of 123.1 fish per acre in April. The largest peak of abundance in 1962 was also reached in April but was smaller with only 60 fish per acre. Figure 2 shows a monthly comparison of juvenile fish per acre during 1963 and 1964. The largest concentrations were found at Ingleside Cove and Shamrock Cove, the same as in 1962 and in 1963. A collection of 87 small redfish 60-110 millimeters long was collected during March when they were abundant and were taken to Rockport to be used in transplanting experiments into fresh water.

The first group of juvenile redfish that entered the area in March had a size range from 58-116 mm. (Figure 3). During April the size range increased to 70-120 mm. Only one redfish 190 mm. long was taken during May, despite intensive sampling at that time. Juvenile redfish were not taken after June. The two most productive redfish nursery areas, Ingleside and Shamrock Cove, contain large patches of widgeon grass, Ruppia maritima, and shoal grass, Diplanthera wrightii, over firm sand and mud bottom. The areas closer to shore contain cord grass, Spartina patens, over soft black mud.

Figure 3 shows monthly size range of juvenile game fish taken in 60-foot seine samples. Juvenile trout ranged in size from 54-120 mm. in February to 90-180 mm. in May. A peak of abundance was reached in April with 11.1 trout per acre. Two other smaller peaks of 5.2 per acre each were reached in May and August (Table 2, Figure 2). Trout remained scarce from September through December.

Sheepshead, Archosargus probatocephalus, and drum, Pogonias cromis, were not taken during January and February but a few sheepshead were taken from April through October. Drum were taken only from July through November.

Flounder, Paralichthys lethostigma, were taken during all months except March and April. The period of greatest abundance was in August with 2.9 fish per acre.

Table 1 shows a comparison between the average number of juvenile fish per acre in 1962, 1963 and 1964. There was an increase of 33.3 per cent for drum and an increase of 41.4 per cent for redfish in 1964 over 1963. There was a reduction of 48.5 per cent for trout and 53.8 per cent for sheepshead. The average number of flounder remained the same.

Adult Game Fish

The results of adult game fish monthly sampling are expressed in pounds per acre in Table 2. Stations were sampled by making a shore set with 2,400 feet of drag seine covering an area of 16.5 acres. Station No. 1 is the same as last year (1963), but Station No. 2 was changed from the west shore of Redfish Bay to the east shore where the bottom has a more gradual slope. The bottom consists of clay-mud and hard sand with large patches of widgeon grass and shoal grass growing over most of the area.

Figure 4 shows monthly catch of adult game fish per acre in 1963 and 1964.

The most abundant adult game fish taken was trout with peaks of 9.3 pounds per acre in August and 11.0 pounds per acre in July, followed by a decline to just under 3.0 pounds per acre in August and to a low of about 0.04 pounds per acre in September. Trout increased and remained at just over 1.0 pounds per

acre in October and November. Sheepshead followed trout in abundance and had a peak of 1.60 pounds per acre in April. Redfish were most abundant in June with 1.80 pounds per acre. Drum and flounder showed trends in abundance similar to those in 1963.

Figure 5 shows commercial landings in 1964 for the Corpus Christi Bay area; however, a large percentage of the fish reported from Corpus Christi Bay are actually caught in the Laguna Madre. It was not possible to obtain population estimates for this report due to the lack of information on commercial landings from Corpus Christi Bay only.

Tag returns received prior to the closing date of this report, along with data on growth and movement of tagged fish are presented in Table 4. Returns of fish tagged in the Corpus Christi Bay system in 1964, along with accumulative per cent tag returns by month are presented in Table 5. A total of 815 speckled trout, 120 sheepshead, 97 redfish, 24 drum and 18 flounder was tagged in 1964. Redfish had the highest yield of returns, 8.2 per cent. Redfish last year had 10.4 per cent returns. Sheepshead had 2.5 per cent returns compared to 1.3 per cent in 1963. Trout had 1.7 per cent returns in 1964 compared to 6.8 per cent in 1963. There were no tag returns from drum and flounder. A redfish tagged during May at Shamrock Cove traveled the longest distance for a tagged redfish. It was recovered in the Gulf of Mexico 45 miles from the site of tagging. This fish also had the record for the longest time lapse for 1964 which was 349 days. Most tagged fish were caught near the site of tagging.

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Table 1
Number of Juvenile Fish Per Acre for 60-Foot Seine

	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Average Per Acre
Trout	2.9	0.0	11.1	5.2	2.4	2.9	5.2	3.6	1.7	1.7	2.9	36.9	3.6
Redfish	0.0	120.0	123.1	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	244.8	22.2
Flounder	1.2	0.0	0.0	1.7	1.2	1.2	2.9	1.7	0.5	1.7	1.7	13.8	1.2
Sheepshead	0.0	0.0	1.2	0.5	0.5	1.7	2.4	0.0	0.5	0.0	0.0	6.8	0.6
Drum	0.0	0.0	0.0	0.0	0.0	0.5	1.2	1.2	0.5	0.5	0.0	3.9	0.3
No. of Samples	8	5	8	8	8	8	8	8	8	8	8	85	7.7

Comparison Between 1962, 1963 and 1964 Average
Number Per Acre Catch of Juvenile Fish

	Trout	Redfish	Flounder	Sheepshead	Drum
1962	8.6	14.9	2.2	1.9	2.5
1963	6.8	5.4	1.0	1.3	0.1
1964	3.6	22.2	1.0	0.6	0.3

Table 2
Summary of Adult Game Fish Caught in Drag Seine Samples by Station by Month 1964
Pounds Per Acre Sampled

<u>Month</u>	<u>Station</u>	<u>Trout</u>	<u>Redfish</u>	<u>Drum</u>	<u>Flounder</u>	<u>Sheepshead</u>	<u>No. Acres Sampled</u>
March	1	0.53	0.00	0.00	0.00	0.04	26.0
	2	xx	xx	xx	xx	xx	xx
April	1	2.06	0.00	0.00	0.05	1.12	16.5
	2	2.31	0.00	0.09	0.00	2.59	16.5
May	1	1.37	0.05	0.00	0.04	0.43	16.5
	2	8.16	0.00	0.00	0.01	0.43	16.5
June	1	4.40	0.32	0.00	0.22	0.62	16.5
	2	14.37	3.60	0.00	0.00	0.87	16.5
July	1	17.62	0.68	0.00	0.00	0.12	16.5
	2	4.40	0.43	0.00	0.00	0.94	16.5
August	1	2.30	0.40	0.06	0.00	0.00	16.5
	2	3.50	1.00	0.00	0.00	1.20	16.5
September	1	0.07	0.01	0.00	0.00	0.02	16.5
	2	0.02	0.01	0.00	0.00	0.00	16.5
October	1	2.79	0.18	0.03	0.43	0.64	16.5
	2	0.45	0.53	0.09	0.12	1.43	16.5
November	1	2.10	0.05	0.00	0.37	0.06	16.5
	2	0.00	0.37	0.62	0.08	0.88	16.5
TOTAL		46.45	7.63	1.70	1.32	11.39	290.0
Average		2.73	0.44	0.10	0.07	0.67	17.0
xx. No Sample							

Table 3
Growth and Movement of Fish Tagged in the Corpus Christi Bay System in 1964

<u>Species</u>	<u>Date Recovered</u>	<u>Size Tagged</u>	<u>Location Tagged</u>	<u>Growth</u>	<u>Time Free</u>	<u>Movement</u>
Trout*	3/ 1/64	540 mm.	Shamrock Cove	45 mm.	280 Days	None
Trout	5/20/64	260 mm.	Redfish Bay	None	23 Days	None
Trout*	5/28/64	355 mm.	Redfish Bay	None	172 Days	12 Miles S.
Trout	6/24/64	285 mm.	Redfish Bay	20 mm.	34 Days	None
Trout	6/25/64	335 mm.	Shamrock Cove	25 mm.	61 Days	None
Trout	7/ 9/64	300 mm.	Redfish Bay	25 mm.	49 Days	None
Trout*	7/10/64	495 mm.	Ransom Island	192 mm.	70 Days	11 Miles S.
Trout*	7/10/64	325 mm.	Long Reef	25 mm.	60 Days	6 Miles S.
Trout	7/13/64	280 mm.	Redfish Bay	25 mm.	43 Days	6 Miles E.
Trout	7/23/64	400 mm.	Redfish Bay	None	86 Days	6.5 Miles S.
Trout	7/23/64	270 mm.	Redfish Bay	None	64 Days	6.5 Miles S.
Trout	9/12/64	275 mm.	Shamrock Cove	65 mm.	114 Days	8.5 Miles S.
Trout	10/27/64	335 mm.	Redfish Bay	25 mm.	183 Days	None
Trout	11/23/64	345 mm.	Redfish Bay	10 mm.	61 Days	6.5 Miles S.W.
Trout	12/ 3/64	290 mm.	Shamrock Cove	30 mm.	99 Days	None
Trout	12/25/64	325 mm.	Shamrock Cove	60 mm.	120 Days	8.5 Miles S.
Trout	12/27/64	335 mm.	Shamrock Cove	25 mm.	247 Days	10 Miles S.W.
Redfish*	1/21/64	610 mm.	East Flats	165 mm.	240 Days	None
Redfish*	1/25/64	616 mm.	Shamrock Cove	6 mm.	240 Days	19 Miles S.
Redfish*	1/27/64	545 mm.	East Flats	140 mm.	240 Days	41 Miles S.

* Tagged last year 1963 but returned in 1964.

Table 4
Growth and Movement Data of Fish Tagged in the Corpus Christi Bay System in 1964 (Continued)

<u>Species</u>	<u>Date Recovered</u>	<u>Size Tagged</u>	<u>Location Tagged</u>	<u>Growth</u>	<u>Time Free</u>	<u>Movement</u>
Redfish*	2/29/64	610 mm.	Shamrock Cove	280 mm.	515 Days	None
Redfish	5/24/64	190 mm.	Shamrock Cove	190 mm.	349 Days	45 Miles S.
Redfish*	6/20/64	504 mm.	Shamrock Cove	252 mm.	355 Days	12 Miles W.
Redfish	10/14/64	292 mm.	Redfish Bay	12 mm.	16 Days	7 Miles S.
Redfish	10/19/64	252 mm.	Shamrock Cove	302 mm.	21 Days	3 Miles S.
Redfish	10/20/64	252 mm.	Redfish Bay	90 mm.	61 Days	6 Miles W.
Redfish	10/24/64	280 mm.	Shamrock Cove	76 mm.	61 Days	12 Miles N.W.
Redfish	11/16/64	445 mm.	East Flats	No. Info.	No. Info.	No Info.
Redfish	11/16/64	320 mm.	Shamrock Cove	25 mm.	31 Days	None
Redfish	12/ 3/64	290 mm.	Shamrock Cove	30 mm.	106 Days	None
Drum	1/11/64	264 mm.	Ransom Island	12 mm.	131 Days	5 Miles S.E.
Drum*	1/12/64	264 mm.	Shamrock Cove	None	47 Days	None
Drum*	1/27/64	264 mm.	Ransom Island	37 mm.	147 Days	5 Miles S.E.
Drum*	6/ 6/64	330 mm.	Nueces Bay	50 mm.	485 Days	None
Drum*	12/15/64	350 mm.	Packery Channel	No Info.	608 Days	4 Miles W.
Sheepshead*	1/23/64	242 mm.	Ransom Island	12 mm.	47 Days	13 Miles N.
Sheepshead	5/20/64	425 mm.	Redfish Bay	None	23 Days	None
Sheepshead	6/29/64	355 mm.	Shamrock Cove	None	4 Days	None
Sheepshead	7/24/64	275 mm.	Redfish Bay	None	30 Days	None

* Tagged last year 1963 but returned in 1964.

Table 5

<u>Species</u>	<u>Number Tagged</u>	<u>Returns</u>	<u>Per Cent Returns</u>	<u>Longest Dist. Moved</u>	<u>Shortest Dist. Moved</u>	<u>Longest Time Lapsed</u>	<u>Shortest Time Lapsed</u>
Trout	815	14	1.7	12 Miles	6 Miles	280 Days	23 Days
Redfish	97	8	8.2	45 Miles	3 Miles	349 Days	16 Days
Drum	24	0	0.0	0 Miles	0 Miles	0 Days	0 Days
Flounder	18	0	0.0	0 Miles	0 Miles	0 Days	0 Days
Sheepshead	120	3	2.5	13 Miles	0 Miles	30 Days	4 Days

Accumulative Per Cent Tag Returns by Month From Month of Tagging to End of Tagging Period

[illegible]

Table 6
Revised Returns of Fish Tagged in the Corpus Christi Bay System in 1963 (Includes Tags Returned in 1964)

<u>Species</u>	<u>Number Tagged</u>	<u>Returns</u>	<u>Per Cent Returns</u>	<u>Longest Dist. Moved</u>	<u>Shortest Dist. Moved</u>	<u>Longest Time Lapsed</u>	<u>Shortest Time Lapsed</u>
Trout	482	7	1.4	14 Miles	5 Miles	280 Days	7 Days
Redfish	67	12	17.0	41 Miles	0 Miles	355 Days	36 Days
Drum	231	14	6.0	44 Miles	0 Miles	485 Days	12 Days
Flounder	44	0	0.0	0 Miles	0 Miles	0 Days	0 Days
Sheepshead	108	2	1.8	13 Miles	0 Miles	98 Days	0 Days

Comparison of Returns in 1962, 1963 and 1964

	<u>1962</u>		<u>1963</u>		<u>1964</u>	
	<u>No. Tagged</u>	<u>% Ret.</u>	<u>No. Tagged</u>	<u>% Ret.</u>	<u>No. Tagged</u>	<u>% Ret.</u>
Trout	103	3.9	482	1.4	815	1.7
Redfish	51	25.2	67	1.7	97	8.2
Drum	89	3.2	231	6.0	24	0.0
Flounder	19	0.0	44	0.0	18	0.0
Sheepshead	38	0.0	108	0.9	120	2.5

Figure 1
Fin-Fish Stations

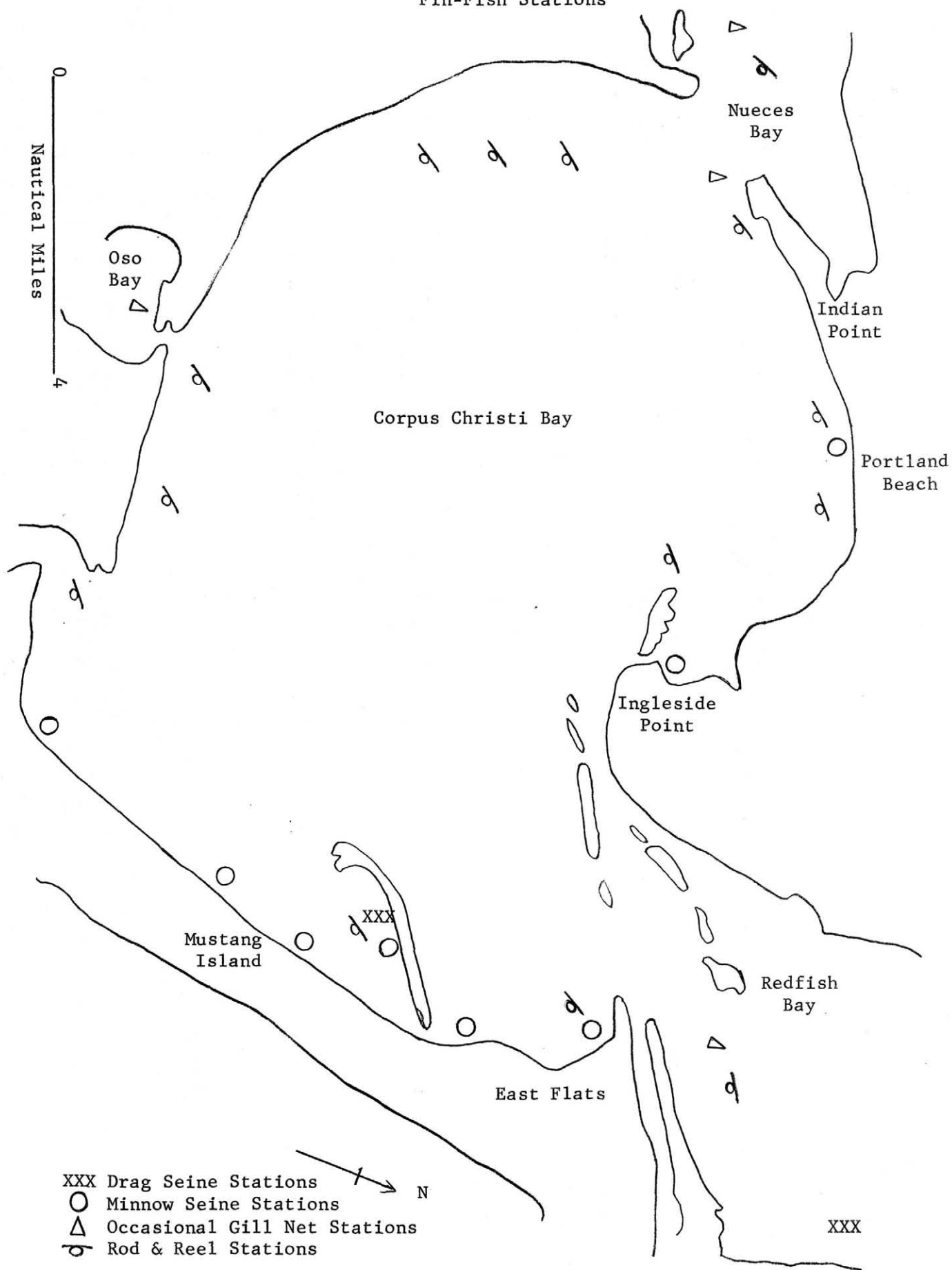


Figure 2

Monthly Catch of Juvenile Fish Per Acre
1963-1964 (60-Foot Seine)

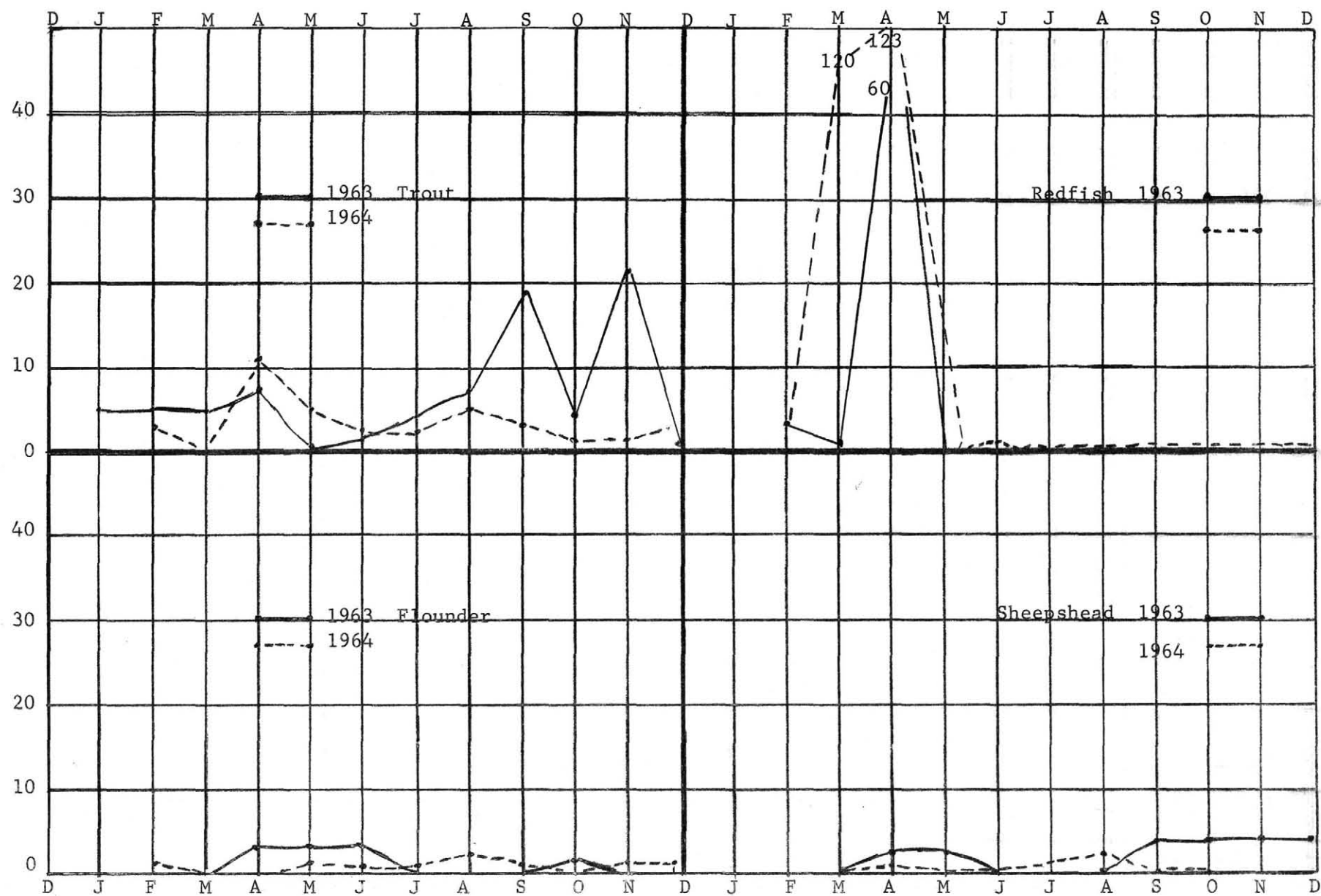


Figure 3
Monthly Size Range of Juvenile Game Fish - 1964

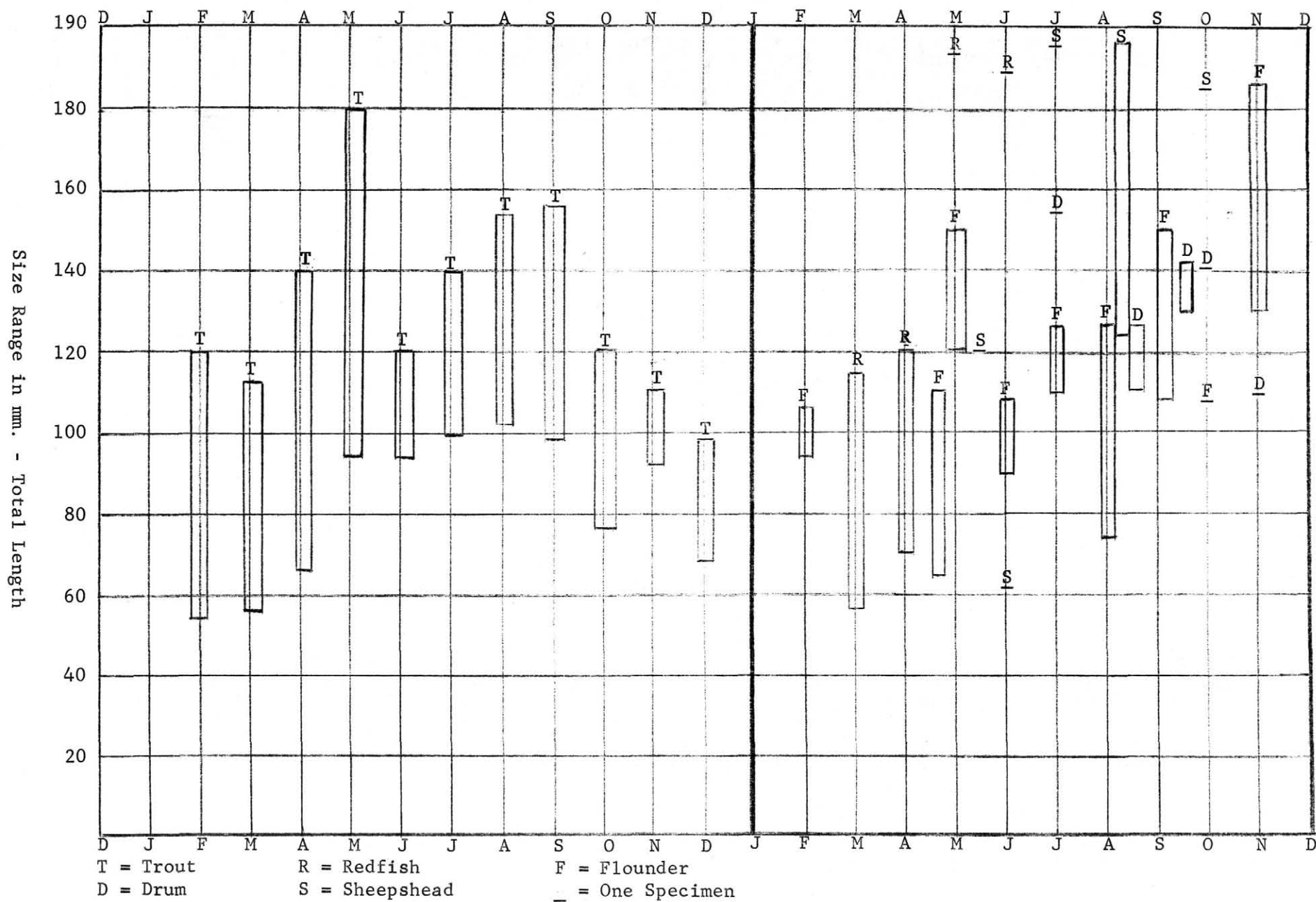


Figure 4

Monthly Catch of Adult Game Fish Per Acre in 1964 as Compared to 1963
Pounds Per Acre

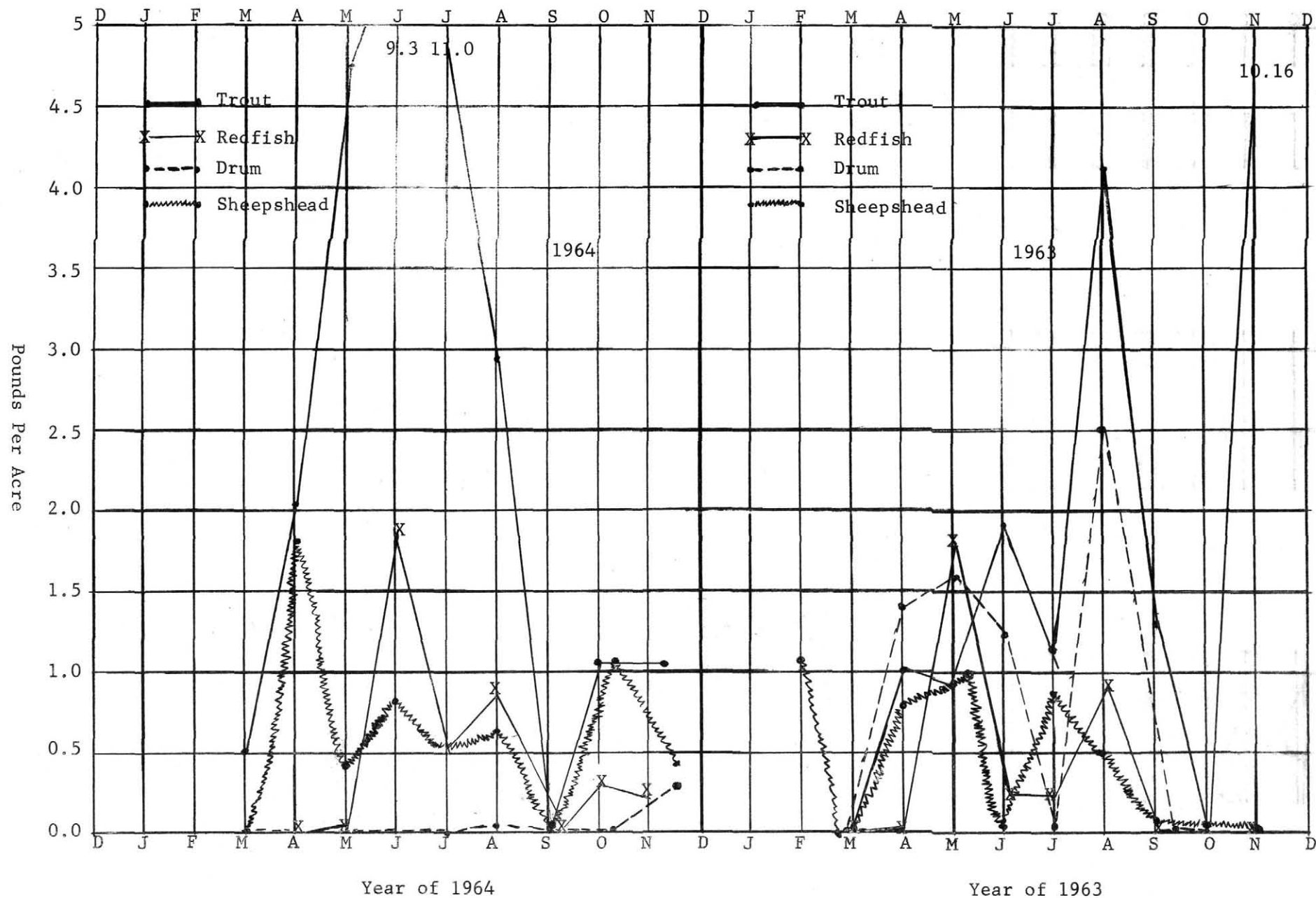


Figure 5

Commercial Landings From Corpus Christi Bay Area 1963, 1964

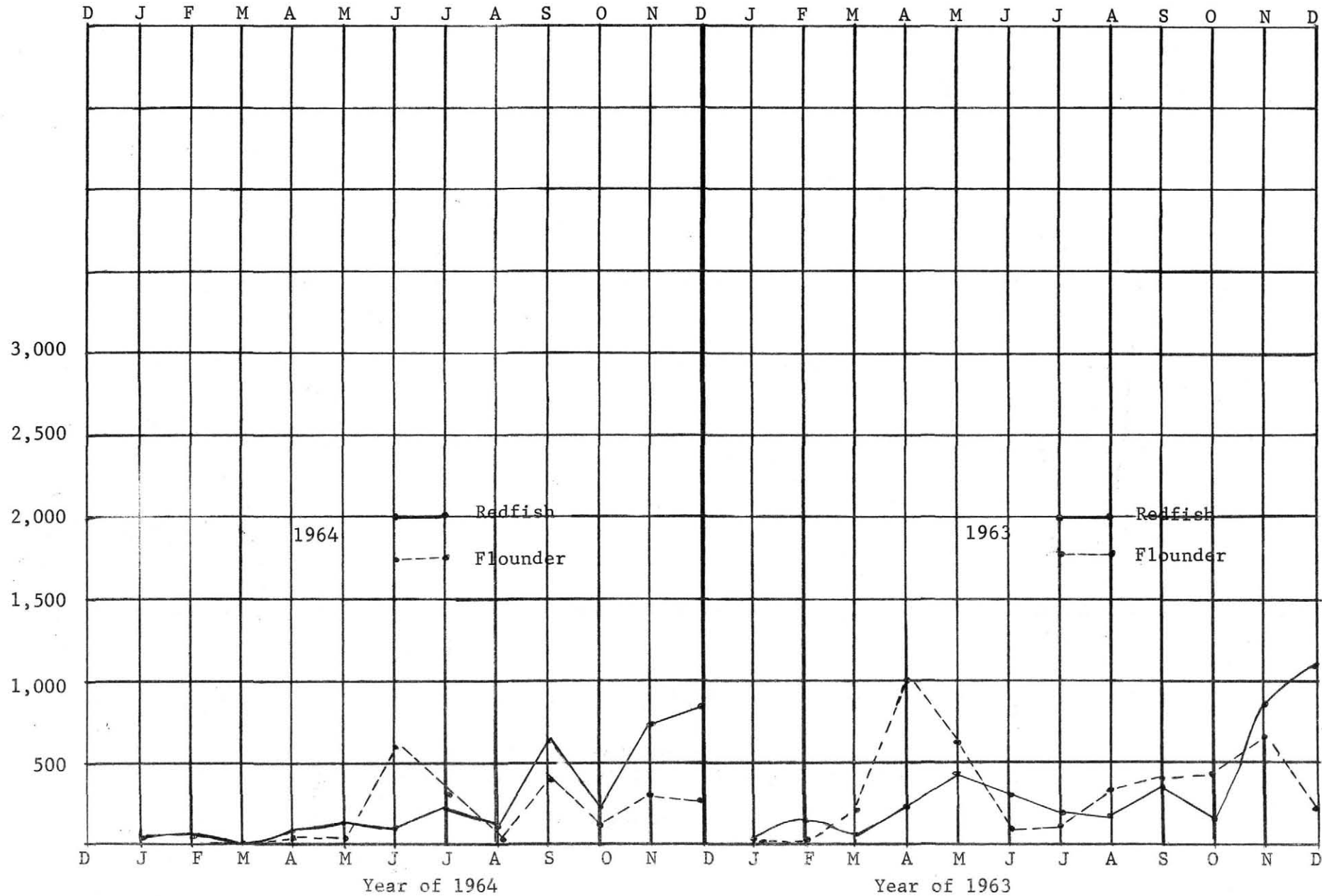
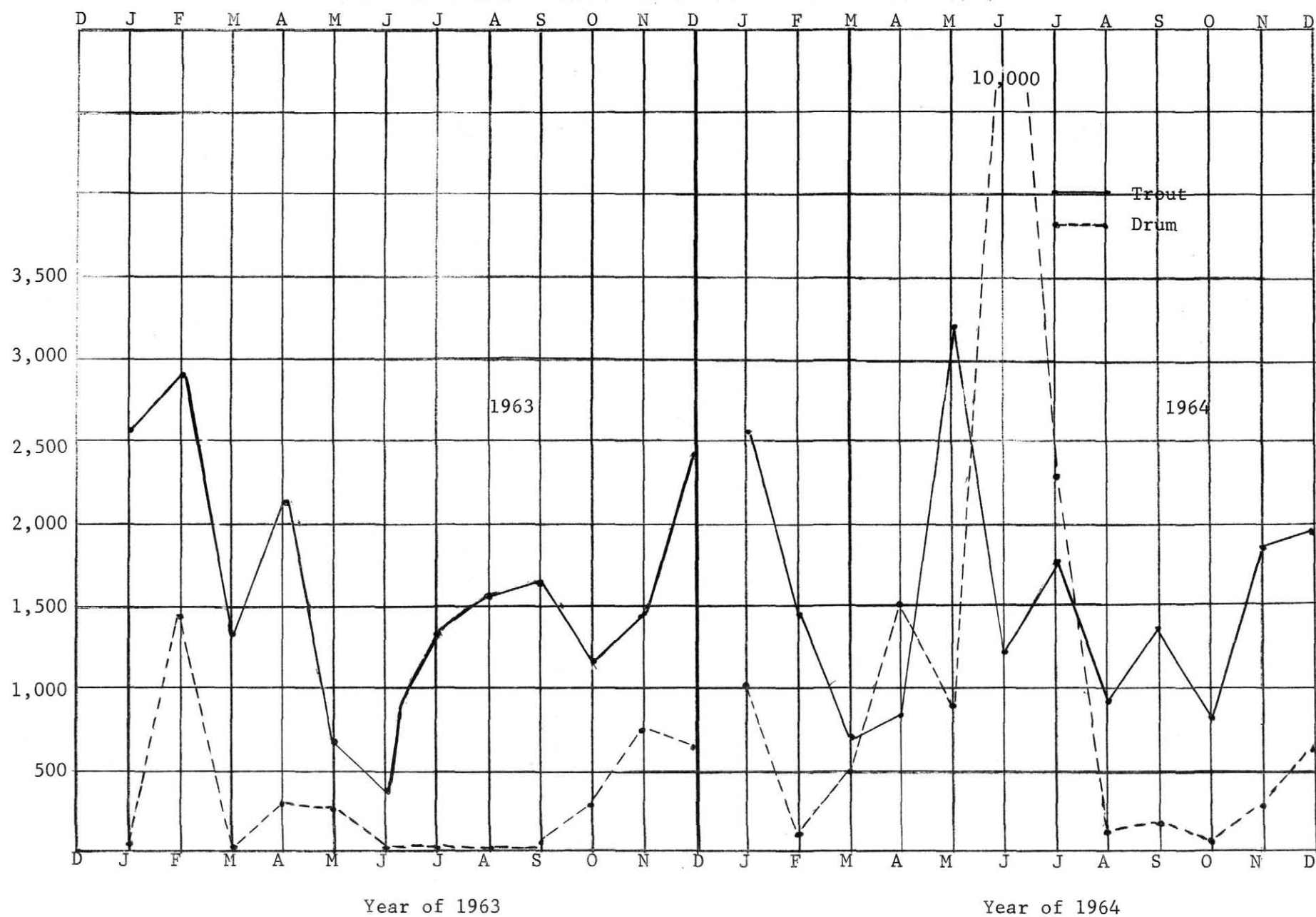


Figure 6

Commercial Landings From Corpus Christi Bay Area 1963-1964



Job Report

Edward Bradley
Marine Biologist

Project No. MF-R-5,6 Date May 20, 1965
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, 1964 Job No. 8

Population Studies of Fin-Fish on Artificial Shell Reefs in Corpus Christi Bay and the Upper Laguna Madre

Abstract: Perch traps, rods and reels and trammel nets were used to sample vertebrate and invertebrate populations on artificial shell reefs, none of these were found to be effective in regular sampling. A small trawl did not catch any large commercial fish, but did indicate the relative abundance of organisms on which these fish might feed.

In Corpus Christi Bay, Breakwater Reef contained more organisms than Oso Reef and was probably a better feeding ground for fin-fish. It appears; however, that this reef was placed in an area already populated with marine fauna and did not actually improve the bottom habitat for commercial fish as much as did Oso Reef.

In the Upper Laguna Madre, Green Hill Reef seems to have improved the ecology of the area in which it was placed more so than has Oil Channel Reef, which is in an area already suitable for feeding grounds. Some fishermen claim that the fishing is better near both reefs.

Objectives: To determine the effects of modifying habitat by the placement of two artificial reefs constructed of oyster shell in Corpus Christi Bay and the Upper Laguna Madre.

Procedures: 1963

In Corpus Christi Bay, collections were made each month over each reef with hook and line. The time period of sampling was noted. A clover leaf perch trap, constructed of one-fourth of an inch hardware cloth, was set on each reef each month. The traps were allowed to set overnight. A similar trap was set within one-fourth of a mile of the reef to serve as a control. All fish captured were counted, measured, and weighed. Once each month, when possible, each reef was encircled with a trammel net. This net was 600 feet long and 40 inches deep. The outer mesh measured 12 inches stretched while the inner mesh was 3 inches stretched. Fish were driven into the net by creating a disturbance within the enclosure. Similar sets were made within the control areas, one-fourth of a mile from the reefs. All fish captured were measured and weighed.

The sampling procedure in the Upper Laguna Madre was similar to that of Corpus Christi Bay.