

Job Report

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Biologist

Project No. MC-R-1 Date August 1, 1963

Project Name: Studies of the Blue Crab Populations of the Texas Coast

Period Covered: September 1, 1961 through December 31, 1962 Job No. 1

Coordination of the Blue Crab Studies of the Texas Coast

Abstract: This report is compiled from a total of 1,307 samples. Of these 878 were trawl samples, 151 trammel or gill net samples, and 278 seine samples. A total of 11,097 blue crabs were taken in these samples during the study period. There were 5,680 males (51.185%) and 5,417 females (48.814%).

Twice monthly sampling of blue crabs in the Texas Bays in 1961 and 1962 confirms there are at least three waves of juvenile blue crabs spawned each year, and possibly more are indicated in some areas.

Growth rates ranged from 10.1 mm per month to 16.2 mm per month with an average monthly growth rate of 13.1 mm for the year.

A peak abundance was found from April to June with a lesser peak on the upper coast in November which was not present on the lower coast.

Objectives: To coordinate all coastal crab jobs and to summarize and interpret coastwide blue crab data received from area biologists.

Procedures: Field biologists from the seven Texas bay areas sampled crab populations twice monthly with a standard six-foot bar seine (1/2 inch mesh) and a ten-foot shrimp trawl 1 1/4-inch mesh with a 1/2-inch cod end liner). A twenty-foot shrimp trawl was used once each month in the area of the bay the commercial shrimpers were working. Varying numbers of collections were made each month with standard 60-foot minnow seine (3/8-inch mesh), and 1,200 foot trammel net or drag seine (3 inch mesh). All samples were taken in conjunction with the shrimp and fish jobs. In some areas crab traps were used experimentally. Blue crabs were also sampled in Gulf Area 20 with a 42-foot shrimp trawl (2-inch mesh) in conjunction with shrimp sampling. All crabs collected were measured by carapace width, sexed, and a "catch per unit effort" record was maintained. Duplicate copies of station sheets and length-frequency sheets containing sampling information were sent to the Crab Project Leader in Seadrift to be evaluated and compiled into an annual report.

Figures 10 through 13 were prepared to show a comparison of sample catch by gear. Under the heading "Trawls" are the 10-foot and 20-foot otter trawls used in shrimp, forage fish, and crab sampling. "Nets" are here meant to be trammel nets, drag seines, and gill nets. "Seines" are classified as minnow seines, bar seines, push nets, and hand trawls.

Figures 5 through 8 were prepared from length-frequency sheets which contained measurement of all crabs caught in each bay area for a one-half month period.

In combining station catches for the area, enough crabs were in evidence to distinguish "age classes" in the different millimeter ranges. The average size in millimeters of each age class distinguishable was then used to plot Figures 5 through 8.

Findings: The present sampling methods do not provide information on the migration and movement of crab populations. A crab tagging program will be conducted during the next study period to gain information on crab movements.

There is a close correlation between observed adult crab disappearances and juvenile crab appearances with the work of other researchers on the Texas Coast.

In the work of F. M. Daughtery, Jr. (The Blue Crab Investigation, 1949-50. In the Texas Journal of Science, Vol. IV, No. 1, 1952 a) it is stated that there is evidence of spawning ten months of the year, from December to September with a definite possibility of spawning until November.

He further states the peak spawning periods are March and April, the largest in June and July, and some spawning in September and October. Spawnings are closely associated with the movement of the adult crabs to the Gulf.

This would then tend to clarify the findings of this report concerning the sudden disappearances of adult crabs from the bays.

Galveston Bay Area--There were indications of four waves of juvenile crabs appearing in the area during the study period (See Figure 5). In September 1961 a group about 15 mm in size were present. Another group appeared in mid-February 1962, another in July 1962, and the last in October 1962. All of these were first taken at about 15 mm except the mid-February group which was first noticed at 40 mm. Inadequate sampling during bad winter weather was probably responsible for not detecting this group earlier.

The age group present in September 1961 grew from 15 mm to 140 mm and disappeared in mid-September 1962. The age group appearing in mid-February 1962 grew from 15 mm to 80 mm and disappeared in mid-August 1962. The groups appearing in July and October 1962 were both present at the end of this study. The group appearing in July grew from 15 mm to 75 mm by December 1962 and the group appearing in October 1962 grew to 28 mm by December 1962.

In 1961 and 1962 a group of large crabs with a peak abundance in October (both years) was present. They ranged from 160 mm to 180 mm in size (see Figure 5).

Table 1 shows the number of crabs taken in all samples. Breakdown is by area and month. Catch of male and female crabs is shown.

Table 2 shows the number of samples taken in each area by month. In Figure 1, a and b, the number of crabs caught per sample is shown. A sharp decline in the numbers of crabs per sample caught in December 1961, April 1962, and September 1962 is shown. In Figure 5 there are groups of crabs appearing February 15, July, and October 1962. At about 13 mm per month growth rate for the whole study period it would seem to substantiate a spawn coinciding with the disappearance of crabs in samples taken in the area. The June and September disappearance of crabs in samples is followed one month later by the appearance of a new 15 mm group in the area.

Matagorda Bay Area--There were definite indications of two groups of crabs entering the area and a partial indication of a third group. One group appeared in November 1961 (see Figure 6), but without the expected sharp decline in catch of adults per sample in October (see Figure 2, a and b). However, in October 1961 the catch per sample was low which might indicate a less sharply defined migration to spawn.

In March and October 1962 there were sharp declines in catch of adult crabs per sample (see Figure 2, a and b) with the accompanying appearance of a new group of juvenile crabs in mid-March and November (see Figure 6).

Throughout most of the study period there were numbers of large adult crabs present (155-185 mm) although not always abundant.

In the Matagorda area the larger sizes of crabs did not tend to disappear as in the Galveston area, but at 160 (plus) mm all age class distinction was lost.

Aransas-Corpus Christi Bay Area--There were indications of four groups of juvenile crabs appearing in this area during the study period, and six periods when catch per sample was low. Figure 3, a and b, shows catch per sample dropped in November 1961, January 1962, July 1962, and September 1962. Only four of these can be correlated with population modes of the age classes in Figure 7. After low catches in November 1961 there appeared a group in mid-February 1962 at 25 mm. Low sample catches in March 1962 were followed by the appearance of a new juvenile group at 12 mm in April 1962. Another low sample catch of adults in July 1962 was followed by a new age group appearing at 30 mm in mid-August. The final low sample catch of adults in September 1962 was followed by a new age group appearing at 25 mm in mid-October 1962.

In this area as in the Matagorda Bay area large adult crabs were present most of the time (155-174 mm) during the study period (see Figure 7).

Here again as in the Matagorda Bay area all age class distinction is lost at 160 (plus) mm.

Upper and Lower Laguna Madre Area--There were indications of four distinct groups of juvenile crabs appearing during the study period in this area (see Figure 8).

There was a sustained population of adult crabs present most of the time (150-170 mm). Here again as in the Galveston Bay area the large adult crabs disappear suddenly, probably to the Gulf to spawn (see Figure 4, a and b).

Efficiency of Sampling Gear--Of all the gear used in sampling blue crabs, the trawls are the most consistent method but do not produce the numbers that occasionally occur in nets and seines.

In the seines there occasionally appear large numbers of small juvenile crabs, and the nets sometimes catch large numbers of large adult crabs. However, the results with nets and seines are so periodic that this type of sampling does not give consistent data. The trawls sample all sizes and are less selective. In combining all three sampling methods, as was done in the main part of this report, sufficient numbers are produced to successfully plot growth and migration of the different age groups.

Commercial Landings:

Figure 9, which shows the number of blue crabs landed commercially in Texas, when compared with Figure 1 through 4 shows a fairly close comparison of peak numbers in samples taken and in peaks of commercial production.

In the Galveston Bay Area peaks of sample catch coincide with peaks of production in November 1961, May, July, and November 1962.

The Matagorda Bay Area does not correspond nearly so well, but the general "peak" production and sample catches are within one month of each other.

In the Aransas-Corpus Christi Bay area there was high production in November 1961 and low numbers in samples. In June 1962 there is a high plateau of commercial production and a peak in crab numbers in samples.

Of all the areas sampled the only close comparison is in Galveston Bay area. There are no reported commercial landings from the Laguna Madre area for comparison.

It may become necessary to sample blue crabs with crab traps in the same general area as commercial production occurs to gain valid sample information that will compare with the commercial landings.

If further study will be necessary to validate or disprove the present sampling methods which do not include crab traps as regular sampling devices.

Summary: There was evidence in most bays that at least three waves of juvenile blue crabs appear during the year. These waves were definite in the north and south but not in the central coastal bays.

Growth rates ranged from 10.1 mm to 16.2 mm per month with the average being 13.1 mm per month for the whole Texas Coast all year.

A total of 1,307 samples were taken during the study period; of these 878 were trawl, 151 trammel, gill, or drag seine samples, and 278 minnow seine samples.

All of the samples produced 11,097 blue crabs, 5,680 males, and 5,417 females. This is 51.185% males and 48.814% females.

Gulf Area 20 data was not included in this report due to a lack of sample data. Only 38 trawl samples were reported that produced 85 crabs. This is only about 2.2 crabs per trawl sample; and only a minority of these were measured.

Recommendations For Sampling

1. The program should continue for at least one more year.
2. Efforts should be made to increase the data from Gulf Area 20, especially females and sponge crabs.
3. More adequate sampling of very small (under 15 mm) and large crabs should be done.

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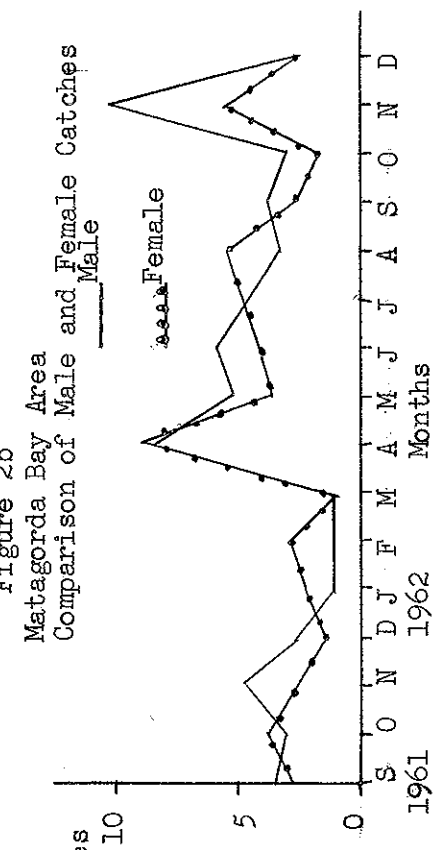
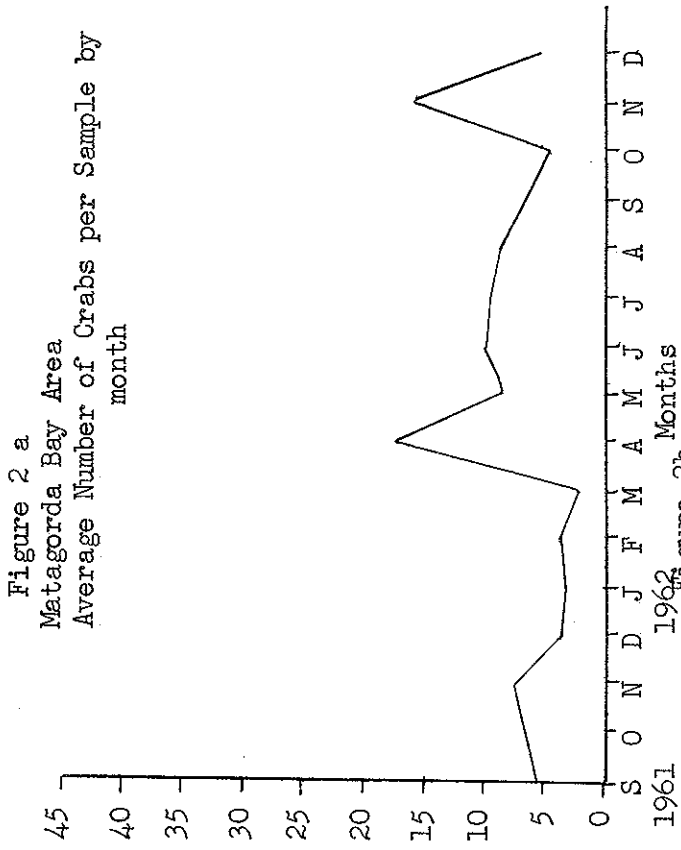
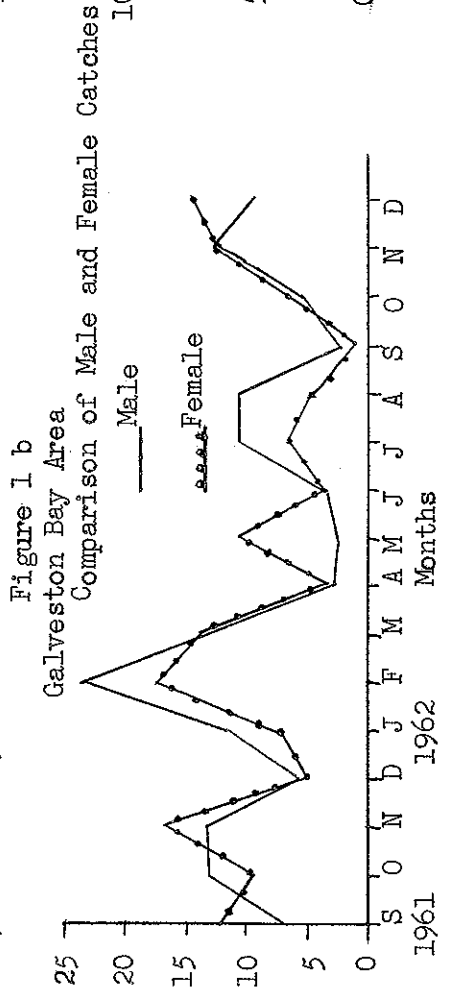
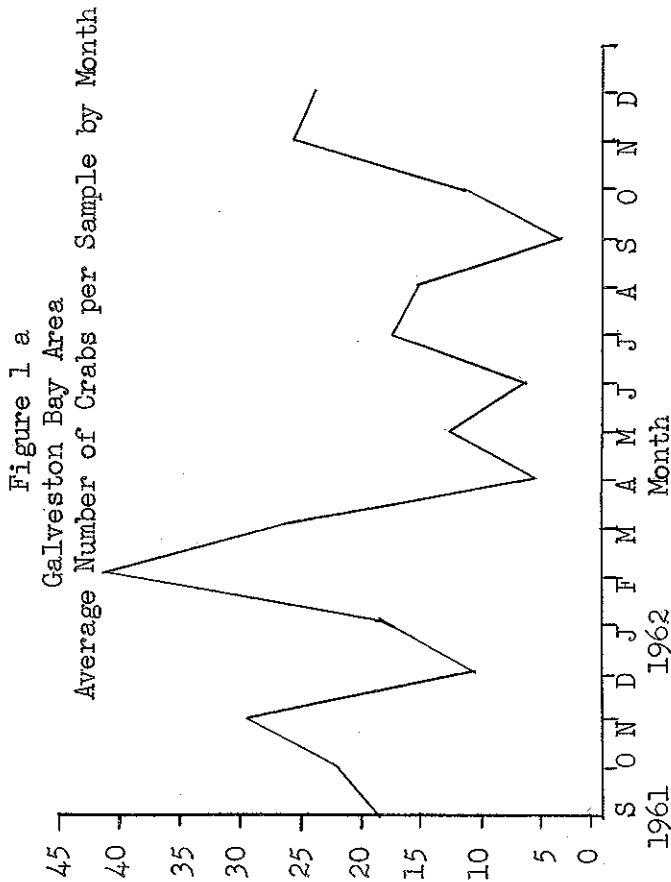


Figure 3 a
 Aransas-Corpus Christi Bay Area
 Number of Crabs per Sample

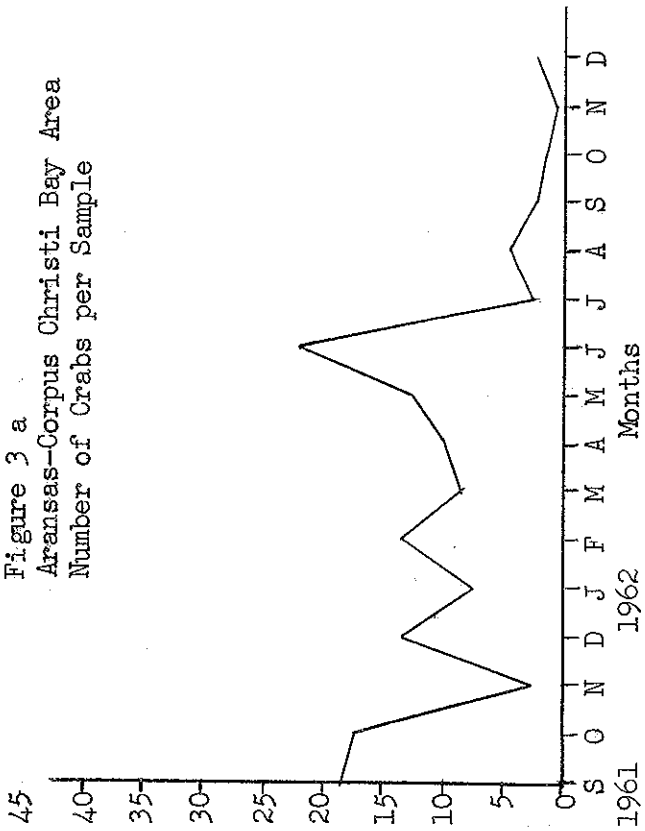


Figure 4 a
 Upper and Lower Laguna Madre Area
 Number of Crabs per Sample

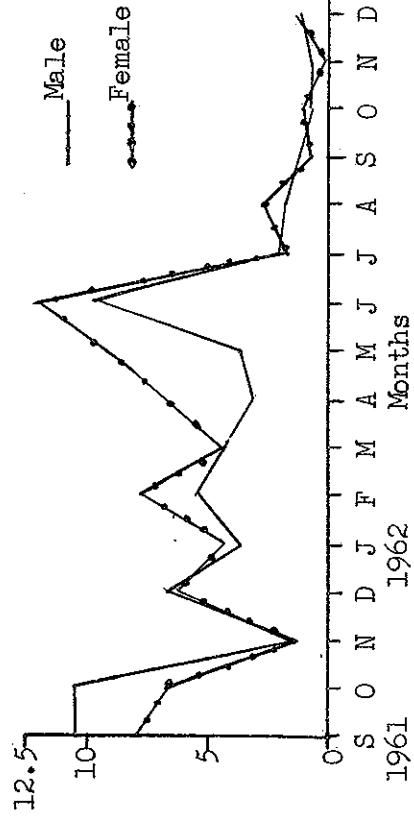
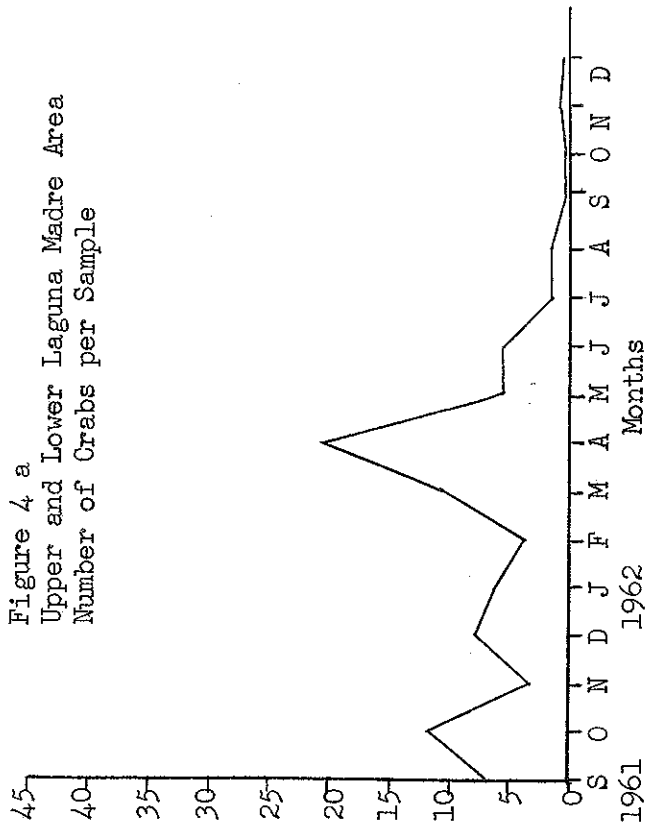


Figure 3 b
 Aransas-Corpus Christi Bay Area
 Comparison of Numbers of Males and Females per Sample

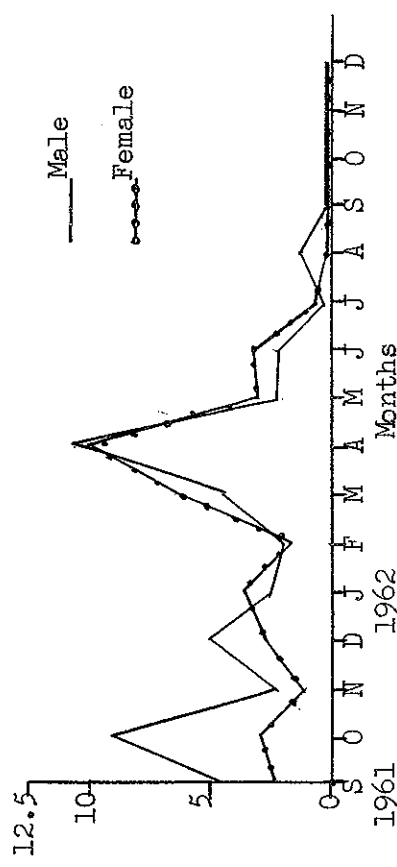


Figure 4 b
 Upper and Lower Laguna Madre Area
 Numbers of Males and Females per Sample

Figure 5
 Galveston Bay Area (M-2, M-3)
 Total Population
 Twice Monthly Population Modes

Average Size of Age
 Classes of Blue Crabs
 Present in millimeters

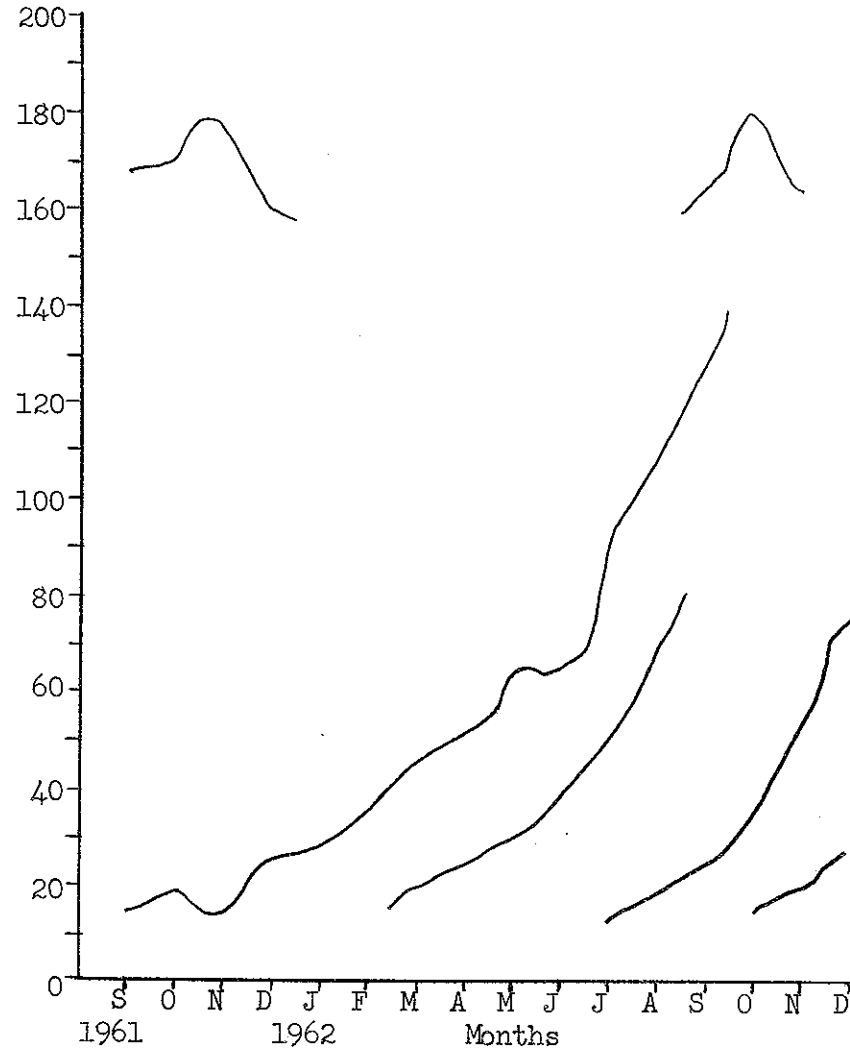


Figure 6
 Average Size Age
 Classes of Blue Crabs
 Present in millimeters.

Matagorda Area (M-4, M-5)
 Twice Monthly Population Modes

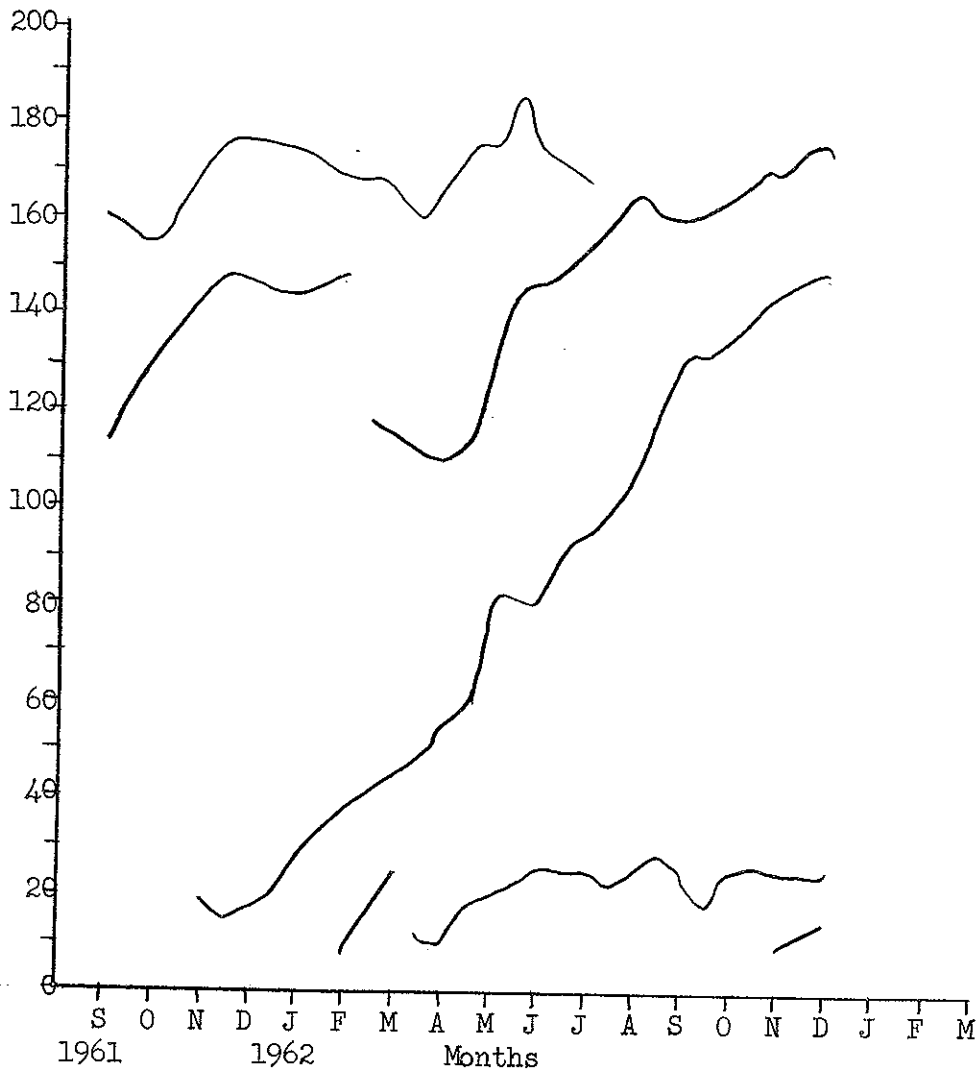


Figure 7
Aransas-Corpus Christi Area (M-6, M-7)
Total Population
Twice Monthly Population Modes

Average Size of Age
Classes of Blue Crabs
Present in millimeters

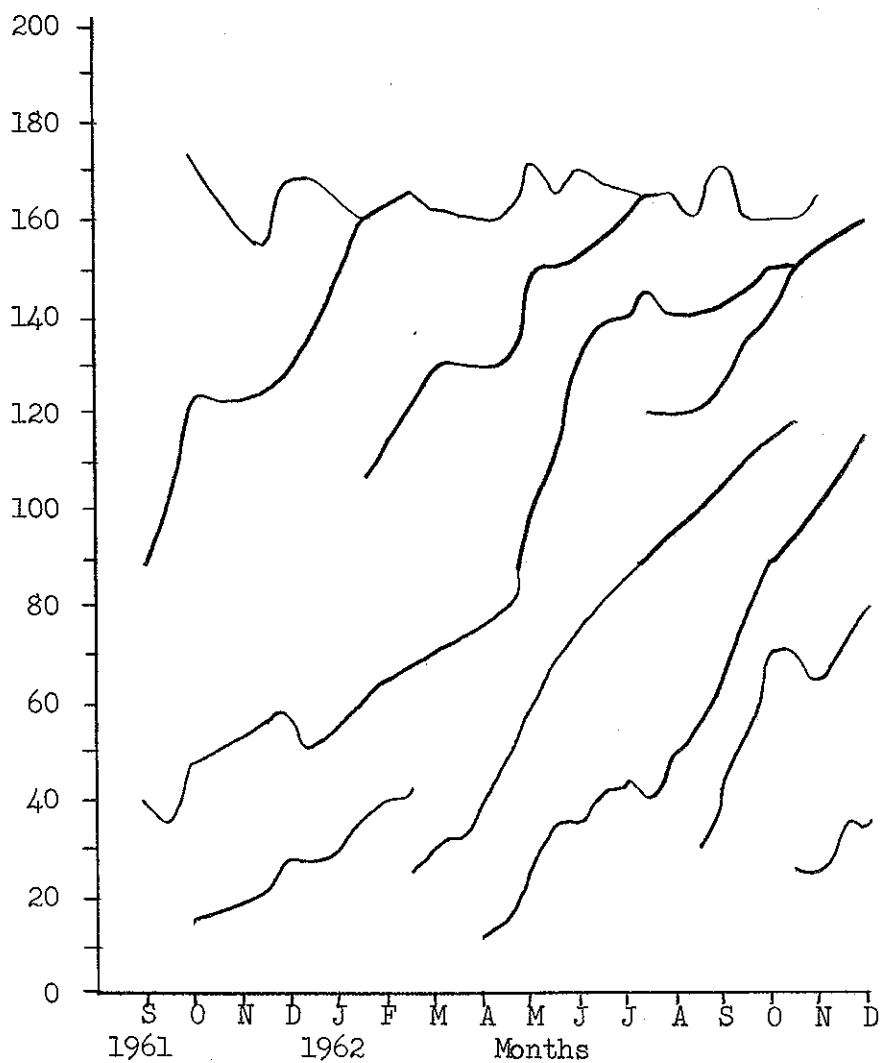


Figure 8
 Upper and Lower Laguna Madre (M-8, M-9)
 Total Population
 Twice Monthly Population Modes

Average Size of Age
 Classes of Blue Crabs
 Present in millimeters

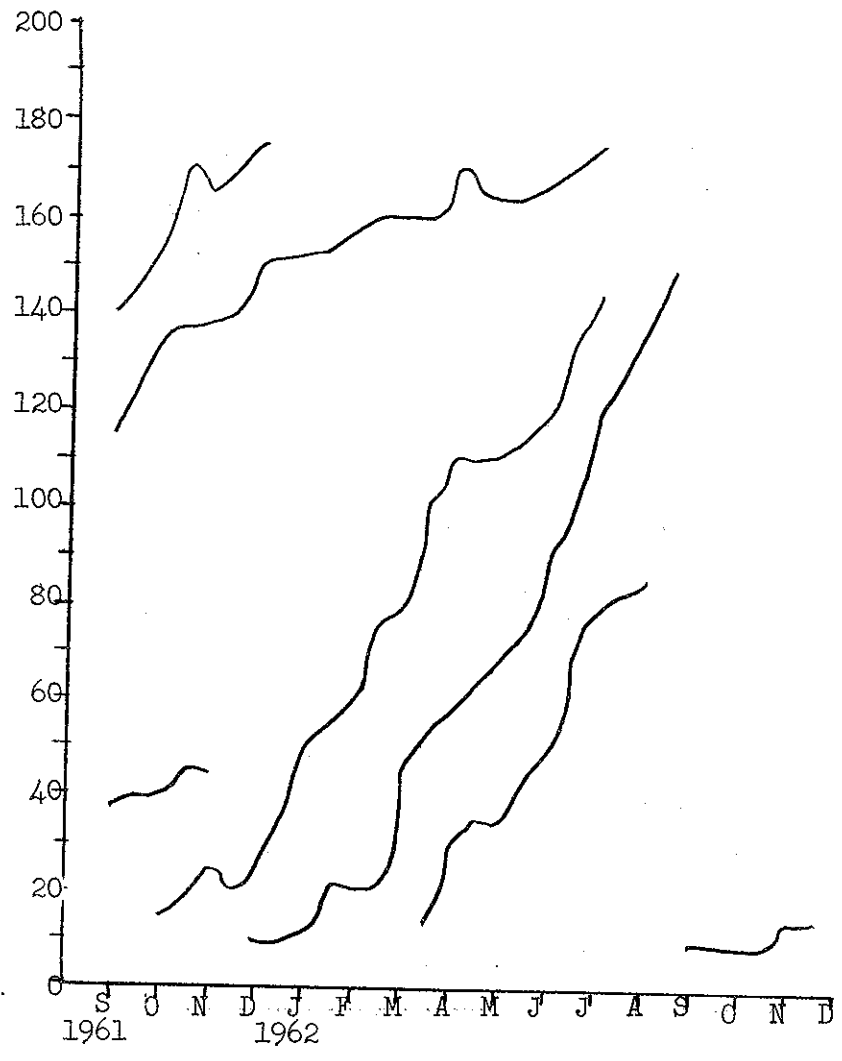


Figure 9.
Blue Crab Landings in Thousands
of Pounds

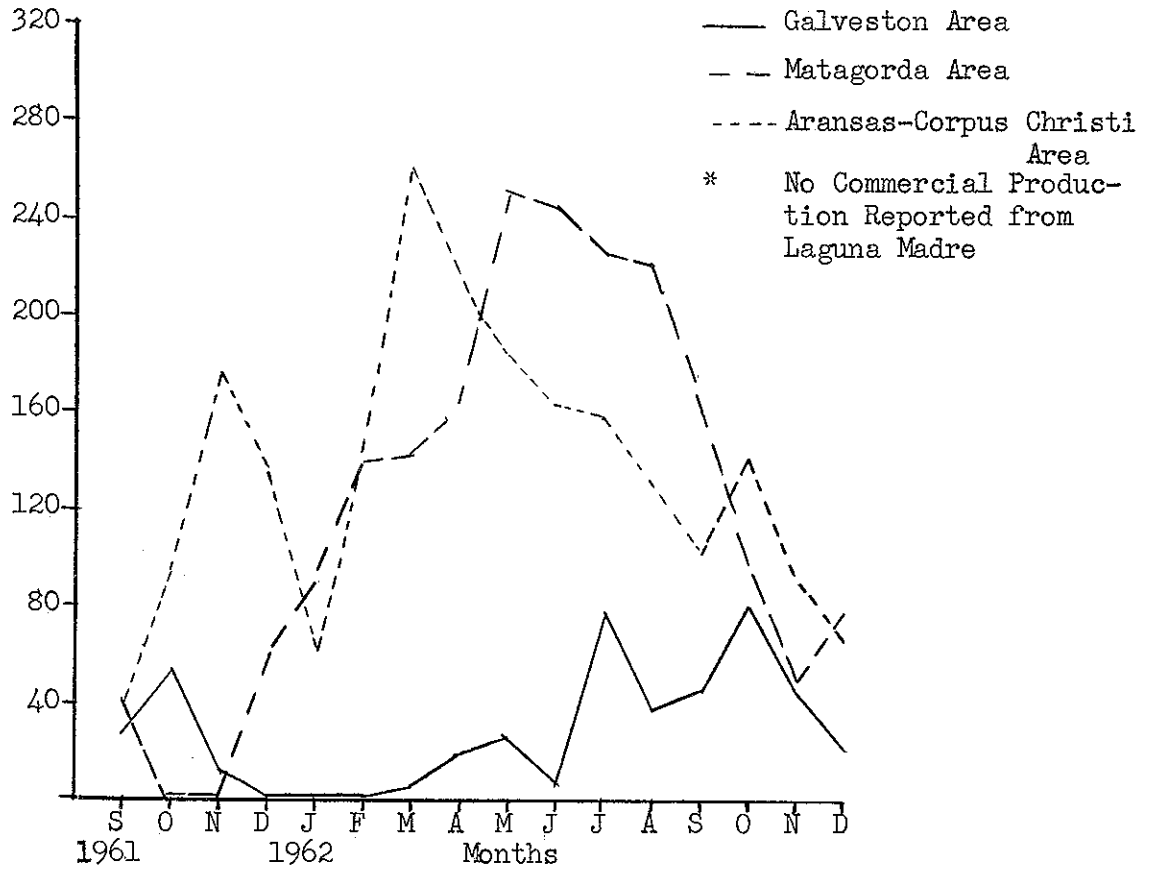


Figure 10
Galveston Bay Area
Comparison of Catch by Gear
Numbers Per Sample

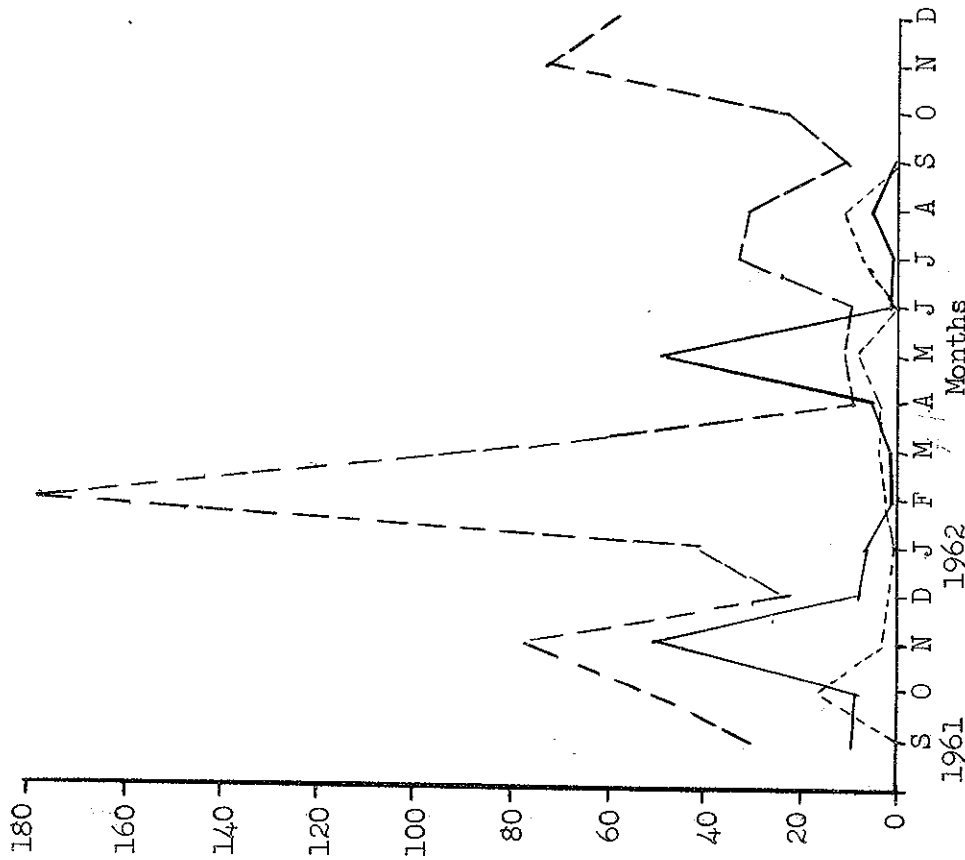


Figure 11
Matagorda Bay Area
Comparison of Catch by Gear
Numbers Per Sample

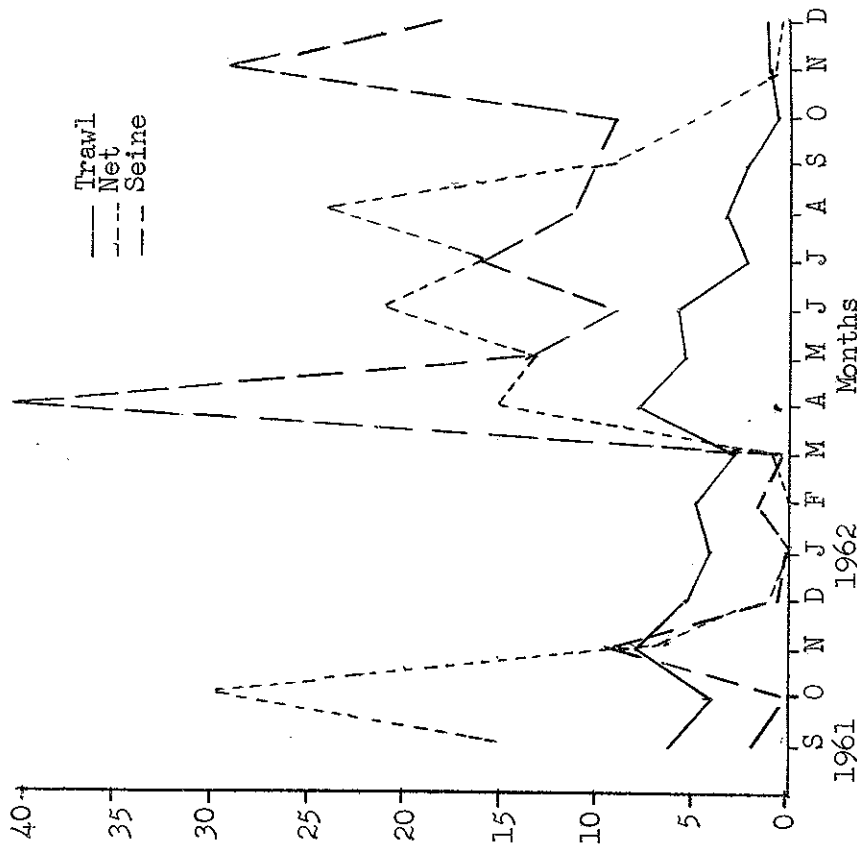


Figure 12
 Aransas-Corpus Christi Bay Area
 Comparison of Catch by Gear
 Numbers Per Sample

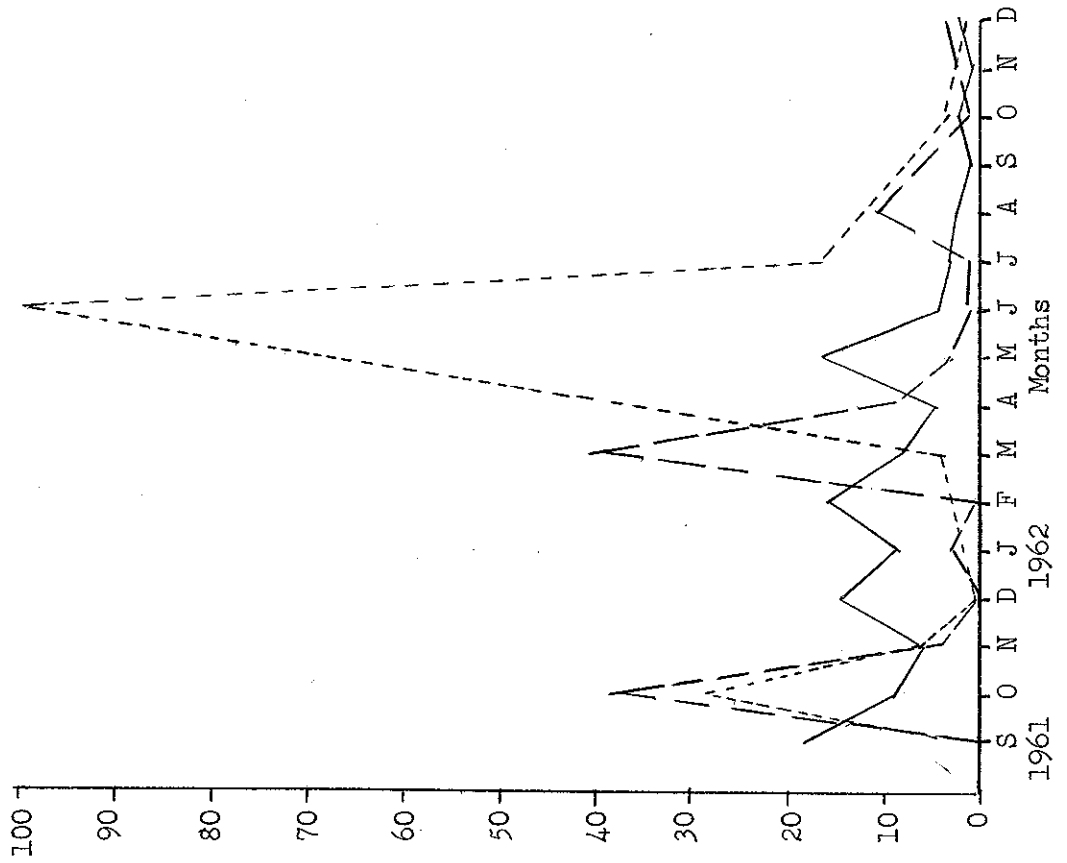


Figure 13
 Laguna Madre Area
 Comparison of Catch by Gear
 Numbers Per Sample

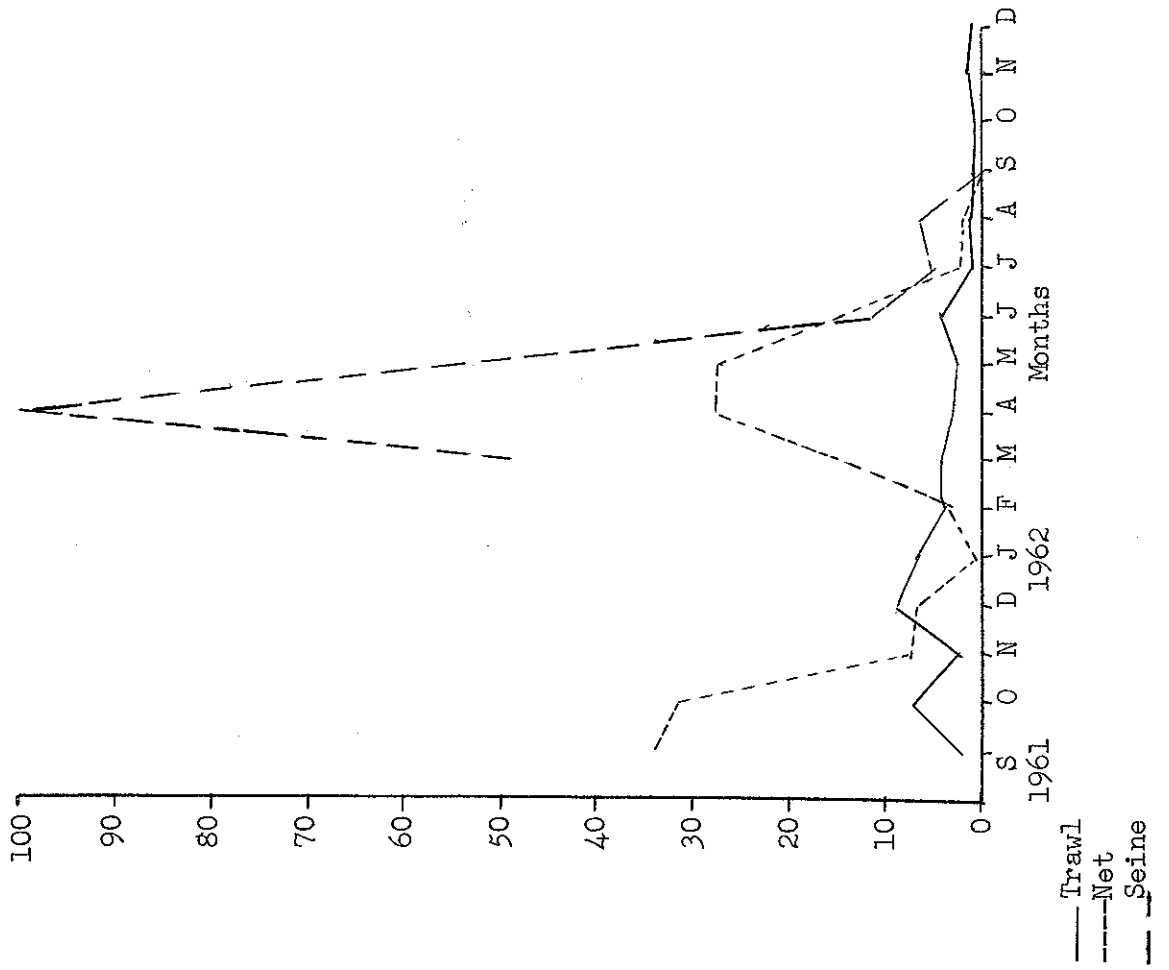


Table 1

Numbers of Blue Crabs Taken in All Samples
by Sex

	Area M-2, M-3			Area M-4, M-5			Area M-6, M-7			Area M-8, M-9			Gulf Area 20		
	Total	M	FE	Total	M	FE	Total	M	FE	Total	M	FE	Total	M	FE
Sept., 1961	94	36	58	82	44	38	253	145	108	85	57	28	No Report		
Oct.,	333	195	138	99	45	54	223	137	86	203	154	49	No Report		
Nov.	474	209	265	118	77	41	20	10	10	49	33	16	No Report		
Dec.	197	107	90	92	61	31	315	158	157	132	85	47	No Report		
Jan.	112	70	42	61	20	41	180	83	97	67	29	38	0	0	0
Feb.	373	214	159	109	29	80	261	108	153	78	40	38	2	1	1
Mar., 1962	292	144	148	68	39	29	193	96	97	174	73	101	43	22	21
April	89	44	45	520	252	268	200	63	137	331	169	162	3	2	1
May	231	48	183	293	168	125	294	86	208	67	29	38	No Report		
June	46	23	23	370	218	152	213	97	116	71	28	43	0	0	0
July	122	75	47	417	208	209	103	52	51	22	9	13	No Report		
Aug.	247	171	76	409	153	256	125	52	73	15	12	3	29	2	27
Sept.	29	16	13	196	116	80	70	41	29	3	2	1	8	0	8
Oct.	143	70	73	286	186	100	52	24	28	3	2	1	0	0	0
Nov.	281	143	138	623	402	221	21	14	7	9	5	4	No Report		
Dec.	120	48	72	173	90	83	77	38	39	4	1	3	No Report		
Totals	3,183	1,613	1,570	3,916	2,108	1,808	2,600	1,204	1,396	1,313	728	585	85	27	58
Sex Ratio in Per Cent	50.67	49.32		53.88	46.16		46.31	53.69		55.44	44.55		31.76	68.24	

Total Number 11,097
Males 5,680 = 51.185%
Females 5,417 = 48.814%

Table 11

Samples Taken Monthly in Each Area

Number of Samples	Area M-2, M-3			Area M-4, M-5			Area M-6, M-7			Area M-8, M-9			Gulf Area 20		
	Trawl	Net	Seine	Trawl	Net	Seine	Trawl	Net	Seine	Trawl	Net	Seine	Trawl	Net	Seine
September, 1961	3		2	8	3	3	7			10	2				
October	8	3	4	10	2	3	8	4	1	11	6				
November	10	4	2	9	1	6	3	2	2	12	3				
December	12	2	4	15	2	7	23		1	11	6				
January, 1962	4		2	14		6	21		2	9	2				
February	6	1	2	24	3	2	17		3	14	6				
March	6	1	4	28	3	3	18	3	1	11	4		1		
April	9	3	3	24	1	5	14	3	3	11	3			2	
May	5	3	10	19	2	12	17		6	11	2				
June	3		4	22	7	8	25	1	2	11				2	
July	2	2	3	22	8	15	20	3	3	11	3				
August	7	4	5	22	3	22	22		6	6	3		1		29
September	8		3	13	7	11	22		10	12	1		1		7
October	6		6	25	10	26	21		7	11			6		2
November	7		4	18	4	18	24			9			1		
December	3		2	17	7	8	23	5	6	6	3		2		
Totals	99	23	60	290	63	149	285	21	53	166	44		16		38
Total Samples Taken	182			502			359			226			38		

Trawl Samples	878
Trammel or Gill Net Samples	151
Minnow Seine Samples	278
Total	1,307

