

JOB REPORT

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Project No. MF-R-4

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Project Name: Analysis of Populations of Sports and Commercial Fin-fish and Factors Which Affect these Populations in the Coastal Bays of Texas.

Period Covered: September 1, 1961 - December 31, 1962

Job No. 3

Populations Studies of the Sports and Commercial Fin-fish and Forage Species of the Matagorda Bay System

Abstract: Following the winter freeze of 1962 fish catches were at a low level. Tag returns suggest little redfish and drum movement.

Objective: To determine the population fluctuations of the food and game fish and forage species of the Matagorda Bay system.

Procedures: Forage samples were collected monthly with a ten foot trawl of one and one-fourth inch stretched mesh and a one-fourth inch mesh liner. The trawl was towed for 15 minutes at each station each month. To enhance these data additional notes were recorded during routine shrimp and juvenile fish sampling. Average length in millimeters, weights by species, and total sample weights (less non-forage items) were measured.

Juvenile fish populations were sampled (monthly) with a sixty foot nylon seine, 6 feet deep of 3/4 inch stretched mesh. The seine was hauled for about 100 feet to cover slightly less than 6,000 square feet of bay bottom. Lengths of small game fish were measured in millimeters. Notes on small sport fish taken in the shrimp bar seine were also noted. ¹

Adult sport fish were sampled monthly with a 1200 foot trammel net, 40 inches deep of 3 inch stretched web mesh and 12 inch stretched outer mesh. The net was set by the strike method and enclosed approximately 4.0 acres. Lengths and weights of all game fish caught were measured.

Jaw tags were applied to all game fish that appeared active at capture. The tagging procedure was described by Schultz (1960-1961).

Water temperatures were recorded in centigrade and salinities were measured by hydrometer.

All sampling stations are shown in Figure I.

Fish measurements referred to in this report are in standard length.

¹ The bar seine is described in Job Report No. 4, Project MS-R-4

Findings: Texas coastal bays were exposed to a fall hurricane, severe winter freeze, unusual strong winds, and a drought in 1961 and 1962. Of these, the January freeze seemed to have the strongest impact on fish stocks since small fish kills were observed and landings were low. Later, in warm months sport fishing improved; however the affects of the past abnormal season seems to be reflected in the poor commercial catches of the current season.

Forage

Changes in relative abundance and seasonal succession of several species are shown in Figure II. This method of plotting monthly average deviations from an average catch per unit effort was modified from Chin and Inglis (1960). Menhaden, mullet and pinfish trends are based on sixty foot seine data. All others are from trawl data. The croaker (Micropogon undulatus) dominated winter samples. During spring and summer shrimp and anchovies were dominant. The species selected from seine data apparently are not as vulnerable to the trawl as other species but play an important role as food for larger fishes and, for this reason, are included.

Winter forage samples from the primary (Matagorda) bay were relatively heavy. Samples from secondary bays increased in weight with the spring warming accompanied by the recruitment of juvenile shrimp from the nurseries and other species until a July peak was reached. Table I compares average monthly weights of secondary and primary trawl stations. The weights of primary bay forage samples show a decrease in May and later follow the general trend set by secondary stations. The drop off starting in August reflects commercial shrimping since intensive trawling was observed near one secondary and one primary station. In late fall, when water temperatures dropped below 20°C, sample weights reached an extreme low.

Juvenile Game Fish

Most sample sizes of juvenile game fish collected by bar and sixty-foot seine were small. At present it is not known whether this is the result of a reduction of spawners (during the freeze), sampling techniques, or other limiting factors. In general all of the sampling stations may not serve as nurseries. Powderhorn Lake and Keller Bay are important trout and sheepshead nurseries. Well Point appears to be an important nursery for whiting; while the Tres Palacios River station is an important flounder and trout nursery.

The first 1962 year-class spotted seatrout were taken by bar seine in July at Powderhorn Lake. The size range was 16 to 56 mm. A few small trout taken prior to July were assumed to be of the 1961 class. During this sampling period a total of 187 young trout were taken, of which, 59 per cent were found in salinities over 15 ppt. (Table 2). The largest single collection, 17 trout, was taken in October by bar seine in Keller Bay. The size range was 17 to 51 mm. When the waters cooled in November, small trout were found only at the Tres Palacios River station.

Usually, juvenile flounder are available in this area during winter months; however none were found before the Tres Palacios River station was established in April. At this time the largest collection, 19 flounder, was taken in the sixty foot seine in nearly fresh water. The size range was 45 to 250 mm.

Juvenile sheepshead, like trout, appear to favor higher salinities. Throughout the sampling period a total of 56 (26 to 127 mm) was taken. Of these, 44 were taken in salinities over 15 ppt (Table 2). The largest single collection of 23 (32 to 41 mm) was taken by sixty foot seine at the Keller Bay station in July.

Only 23 drum (58-141 mm) were taken by sixty foot seine during the sampling period. Fifteen of these were taken in salinities less than 10 ppt. (Table 2). This does not agree with an observation made by Frisbie (1962) based on data presented by Gunter (1945) "that the occurrence of (P. cromis) in low salinity waters in Texas is an uncommon occurrence."

Nine redfish (47 to 198 mm) were taken from February through June. All were from water salinities less than 10 ppt. (Table 2).

Zero year-class whiting occurred from May through October. Of 37 (53 to 157 mm in length) specimens all but one were found at Well Point over hard sand and scattered shell bottom. None were found in salinities less than 15 ppt. (Table 2).

Small lady-fish were collected in Powderhorn Lake in July and August. One sixty foot seine haul in July produced 13 (98 to 177 mm in length). This species had disappeared from the station by September.

One gray snapper (58 mm in length) was caught in the sixty foot seine at Powderhorn Lake in October. This was the only specimen taken.

Game Fish

Adult game fish samples indicate that drum were more available to the trammel net than other species. In Table 3 total monthly catches, based on trammel net samples, are shown. Although many of these fish are immature (mainly redfish and drum), they are available to the sport and commercial fisheries and are included in this section.

As a rule, sample sizes this small do not warrant lengthy comment; however the poor fishing following the freeze is well illustrated.

Tagging

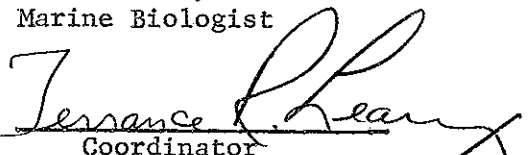
Redfish and drum tag returns suggest little coastwise movement. This observation, although based on few returns, supports findings by Simmons and Breuer (1962) in Region V and Hutton, Ingle, and Topp (1961 in Florida. Numbers of fish tagged, numbers recovered, and sizes tagged by species are offered in Table 4. Data at release and recapture are shown in Table 5. The faster rate of capture of tagged redfish (13 per cent) suggests heavier exploitation. For confirmation further tagging is required.

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Table 1. Summary of forage trawl data.

Secondary bay				Primary bay		
Month	Mean sample weight (oz)	*Mean Sal. (ppt)	*Mean Temp. °C	Mean sample weight	Mean Sal. (ppt)	Mean Temp. °C
1961 Oct.	30	19.16	23	--	--	--
Nov.	24	13.40	15	24	16.04	23
Dec.	--	14.82	13	--	17.15	14
1962 Jan.	N*	14.53	10	N*	18.09	10
Feb.	10	18.63	21	64	19.09	18
Mar.	10	18.79	12	64	18.58	13
Apr.	22	18.15	22	56	19.71	22
May	52	16.58	24	15	20.19	25
June	38	22.29	28	31	20.52	27
July	88	19.38	30	52	19.67	30
Aug.	22	19.46	29	36	20.46	30
Sept.	23	19.66	30	24	22.72	30
Oct.	16	20.11	26	19	20.97	22
Nov.	13	20.06	17	23	21.13	18
Dec.	4	20.31	19	8	21.43	19

*N = negligible

*Salinities and temperatures recorded on collecting dates.

Table 2. Salinity-catch relationship of juvenile game fish.
(sixty-foot and bar seine data combined)

Species	Salinity range (ppt)			
	0-4.99	5-9.99	10-14.99	15-or over
Spotted Seatrout				
No.	24	15	25	111
Size range (mm)	16-195	46-264	20-125	19-134
Sheepshead				
No.	7	4	1	44
Size range	35-124	35-126	95	26-127
Black drum				
No.	9	6	0	8
Size range	60-180	58-154		80-141
Southern Flounder				
No.	29	9	0	4
Size range	47-280	64-147		49-98
Redfish				
No.	8	1	0	0
Size range	100-198	165		
Whiting				
No.	0	0	0	35
Size range				19-153
Lady-fish				
No.	1	8	0	13
Size range	177	98-132		120-173

Table 3. Summary of game fish caught at trammel-net stations.

	Month														
	1961			1962											
Species	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Spotted seatrout															
No.	8	34	0	29	0	12	0	8	7	2	1	1	1	0	5
Weight (lb)	6	0	0	29	0	14	0	5	6	3	1	2	1	0	10
Redfish															
No.	1	0	0	0	0	1	0	0	6	7	0	5	47	8	3
Weight	1	0	0	0	0	2	0	0	13	7	0	10	55	0	5
Black drum															
No.	4	11	0	0	4	1	0	1	8	30	35	25	45	8	18
Weight	2	0	0	0	5	1	0	1	4	13	17	19	14	4	10
So. flounder															
No.	0	0	0	0	0	0	0	1	4	1	0	1	2	2	0
Weight	0	0	0	0	0	0	0	0	3	2	0	2	0	0	0
Sheepshead															
No.	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0
Weight	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Croaker															
No.	0	4	0	0	0	0	0	2	8	3	1	5	0	0	0
Weight	0	0	0	0	0	0	0	0	3	2	1	2	0	0	0
Total No. samples	1	3	0	1	1	3	0	2	3	3	3	3	3	3	3
Total Fish	13	51	0	29	4	14	0	12	34	43	37	37	95	18	26

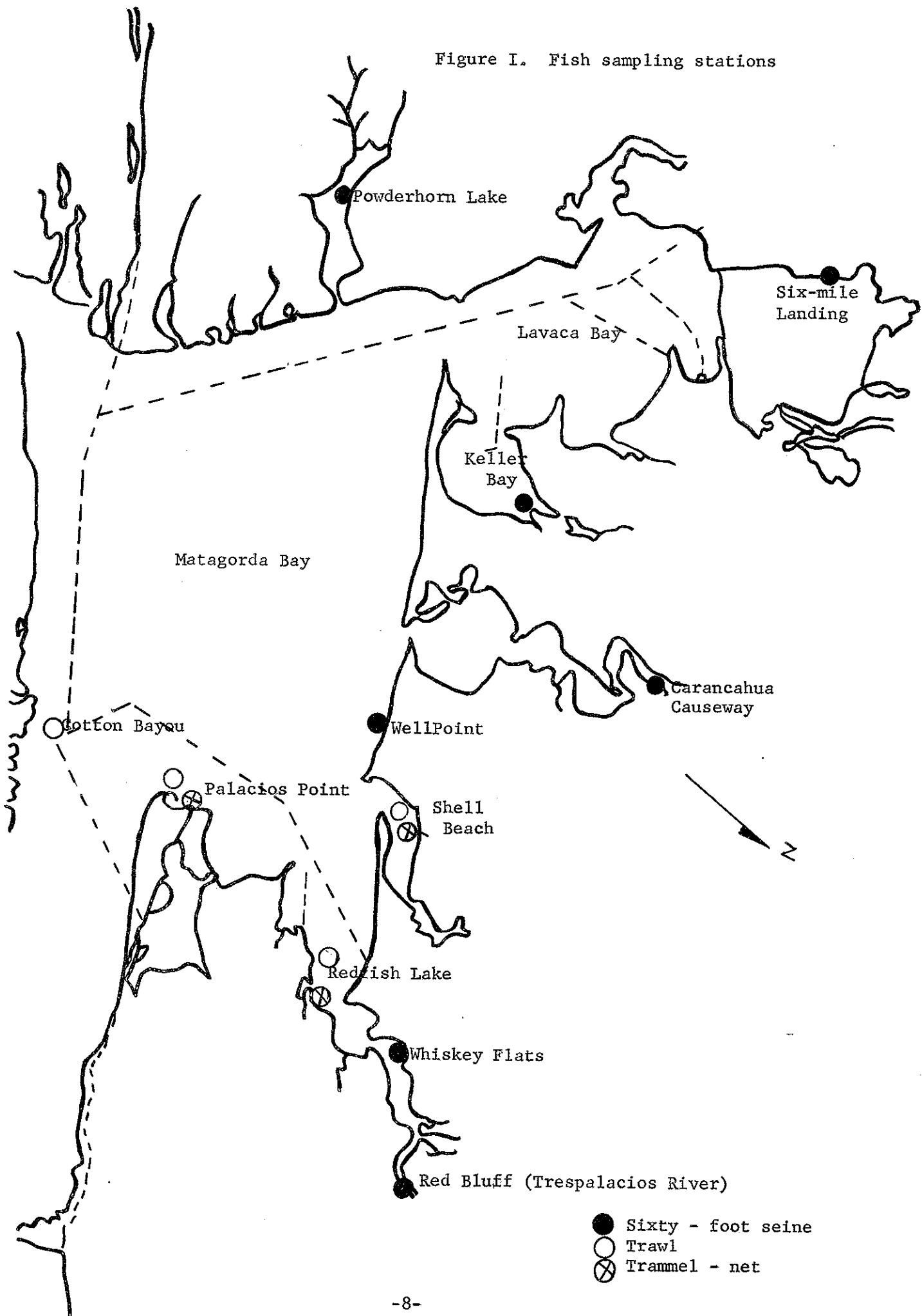
Table 4. Summary of tagging data

Species	No. Released	No. Returned	Size range Tagged (mm)	Size range Returned (mm)
Drum	263	14	82-348	165-248
Redfish	46	6	205-480	246-480
Sea-trout	20	1	185-525	218
Flounder	11	1	135-330	135
Croaker	9	0	191-240	--
Sheeps-head	3	0	126-145	--
Totals	352	22	-----	----

Table 5. Individual tag return data

Species	Place Tagged	No. days free	No. miles traveled	Direction	Length at tagging (mm)
Drum	Redfish Lake	104	6	East	190
	"	19	5	North	220
	Shell Bch.	53	2	"	200
		33	0	--	212
		58	15	North	188
		44	0	--	165
		80	15	North	201
		17	0	--	184
		86	1	--	190
		30	5	North	191
	Palacios Point	51	12	"	177
		32	6	West	248
		33	5	North	193
	College Port	27	8	North	195
Redfish	Redfish Lake	14	5	East	275
		6	11	North	260
		80	5	"	268
		27	5	"	272
	Shell Bch.	45	12	South	480
		8	0	--	246
Flounder	Red Bluff	42	0	--	135
Spotted Seatrout	"	40	0	--	218

Figure I. Fish sampling stations



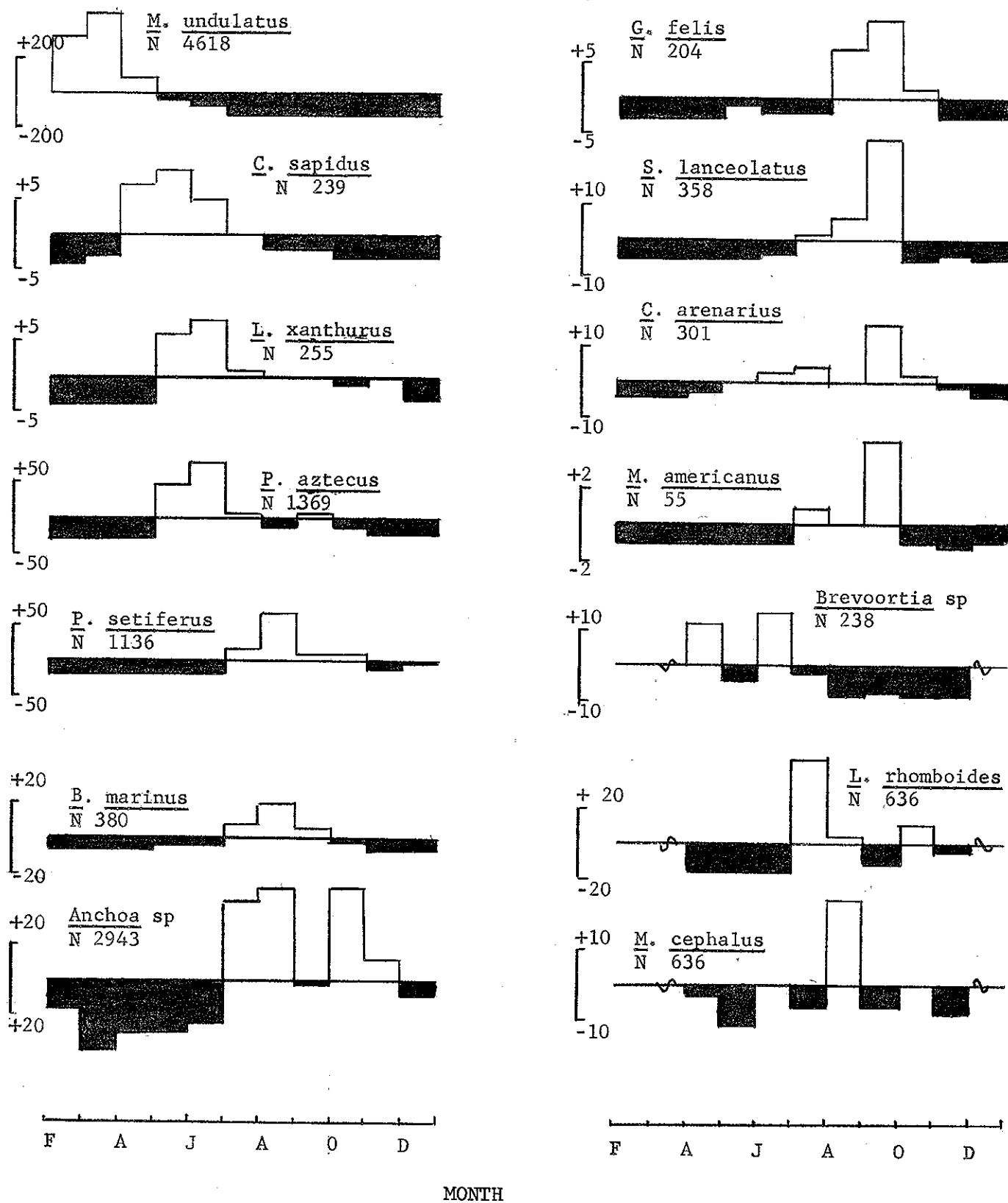


Figure II. Seasonal trends of selected species. Ordinate is deviation from average catch per unit effort.

