

APPENDIX A.—LENGTH-FREQUENCY RECORDS

Most of the evidence upon which the conclusions of this paper rest consist of the results of tagging experiments and of the length composition of the mackerel stock as it is known from the measurement of samples from the commercial catch. The tagging results are recorded in appendix B. In this appendix will be given the basic records of size composition.

COMMERCIAL CATCH

From the statistics of 1927 to 1930 it may be estimated that the offshore fleet accounts for approximately 70 percent of the total catch and that miscellaneous alongshore fisheries, mainly inshore small-boat gill nets, pound nets, and traps, account for the remainder (Sette and Needler 1934: 16 and 23). Of the offshore fleet's catch, about 90 percent is taken by purse seiners and 10 percent by drift-gill-netters (Sette and Needler 1934: 23).

Purse-seine vessels, known as "seiners," are relatively large, averaging in 1929 about 35 net tons (register measure), and they carry crews of about 12 men, while the drift-gill-netters, known as "netters," are smaller, averaging below 20 net tons, and carry about 7 men. As might be expected, the seiner catches normally are larger than the netters' catches. Seiners fish throughout the "mackerel season" while netters typically fish only in spring and fall.

During this investigation Gloucester was the home port for most of the vessels of both fleets, with a few fishing out of Boston. Although based on Gloucester, the fleet delivered most of its catch to other ports. In a typical season about one-third of the seiner fleet sailed early in April to engage in the "southern" fishery off the Virginia capes, landing their early catches at Cape May, Wildwood, and sometimes Atlantic City, N. J. By May nearly the entire fleet was out and the fishing was off the New Jersey-Long Island coast, with most of the catch landed at New York. Toward the end of May the fishing area was mainly off the southern New England coast with some of the catch going to New York and some to Boston. At this time a portion of the fleet customarily sailed for the Nova Scotian coast ("Cape Shore"). These vessels brought their fares back to Boston and rarely made more than one Cape Shore trip. By mid-June the entire fleet was

usually fishing in the Gulf of Maine and landing the fish at Boston and Gloucester. Boston usually received mackerel most regularly, with fares going to Gloucester for salting and canning mainly when the fresh-fish market and freezers were glutted with mackerel.

SAMPLING THE CATCH

With one man regularly available to sample the catch, it was possible to cover the entire range of the vessel fishery by starting at Cape May in April, shifting to New York as soon as landings were substantial there and, finally, to Boston as soon as a substantial portion of the landings were made there. Since it was not always possible to anticipate the shift of landings from one port to another, sometimes there was a gap of several days in the sampling series. On the other hand, it was possible sometimes to have samples taken at several ports simultaneously when extra employees were available.

Sampling was done daily, and samples were drawn from as many fares as time permitted. Often samples were taken from every fare arriving at the port, though when landings were numerous this was not possible. On the average, samples were taken from about 800 seiner catches and from about 200 netter catches each season. This was equivalent to about 28 percent of the total number of seiner catches and about 24 percent of the total number of netter catches per season.

In taking a sample, first the skipper or a responsible crew member of the vessel was questioned as to the date, time, and locality of catch, and the number of sets made. Then, as the mackerel were unloaded, a number of mackerel, taken at random, were measured. The standard number for a sample was 20 fish, but when opportunity afforded and special purposes were in view, 40, 50, or 100 fish were measured.

In addition to his sampling of the vessel fishery, the regular sampler was often able to take measurements of trap-caught mackerel from known sources shipped overland to the principal ports; also, at Woods Hole, Mass., Montauk, N. Y., and occasionally other alongshore localities, trap and pound-net mackerel were measured by personnel primarily engaged in other duties. The coverage of this

pound-net and trap fishery was far less thorough and less consistent than the vessel fishery. It varied from 8 samples containing 300 fish in the season of minimum sampling to 250 samples containing 13,000 fish in the season of maximum sampling during the 10 years included in this investigation.

MEASURING THE FISH

Measurements were taken on a measuring board having a nose block at one end and a measuring scale inlaid along the middle of the board. Since it was often necessary to employ the measuring board in places where it could not be set on a horizontal surface, additional beveled blocks were set along the longitudinal margins of the board to form a trough that not only prevented the fish from sliding off the board but also gave some assurance that the fish was correctly positioned on the board. In measuring, the fish was laid on the board, after flexing when rigor mortis was present, so that the snout was lightly pressed against the nose piece and the longitudinal axis of the body lay along the graduated scale. The latter was graduated in half-centimeters and offset one-quarter centimeter from the nose block. By reading to the first graduation mark unobscured by the tail, a measurement was obtained which gives the straight-line distance from tip of the snout to the tip of rays at the middle of the fork of the tail to the nearest half centimeter. The length therefore corresponds to the measurement which Ricker and Merriman (1945: 185) have named "median length" and for which they recognize also the alternative designations of midcaudal length or fork length.

To avoid personal bias in favor of whole or half-centimeter marks, the measuring scale had uniform graduation marks and they were serially numbered. In addition to avoiding bias, this had the advantage of giving two-digit numbers for all listings and computations, the data being divided by two for conversion to centimeters only at the final stage of work.

SUMMARIZING THE DATA

Data on the locality of catch were received from the fishermen in terms of distance and bearing from headlands. For purposes of portraying the distribution of catches, they were plotted on mercator projection charts and summarized by 10-minute rectangles of latitude and longitude. But such fine divisions were not practical for summarizing the length-frequency records, so the much coarser pattern

of statistical areas adopted by the North American Council on Fishery Investigations was used to classify the samples by catching locality. This system designates the larger regions by Roman numerals and their subdivisions by capital letters. Since the North American Council had not subdivided its area XXIII, we have divided it into subareas for the purposes of this investigation. The North American Council statistical areas and subareas as they existed at the time of this investigation, and our own subareas for area XXIII are shown in figure 1 for mackerel fishing waters. Some of the North American Council's subarea boundaries have since been revised but not in places materially affecting the locality designations used in this report.

For purposes of summarizing the records by periods of time, two basic units were used: 5-day periods and half-month periods. In 31-day months the final "5-day" period of a month actually contained the 6 days running from the 26th to the 31st, inclusive, and the final half-month contained 16 days running from the 16th to the 31st, inclusive. In 1933 and 1934 the purse-seine fleet operated under a system of limitations intended to curtail the landings. This system affected the activities of the fleet by time units of calendar weeks, and for these two seasons our data were summarized by calendar week and calendar biweekly units of time.

DATA INCLUDED

In the present study of migrations by the method of size-composition comparisons, use is made of the length-frequency distribution in geographical units of statistical subareas and in time units of 5-day periods (weekly periods in 1933 and 1934). The tables in this appendix are intended to give the source data and should be in the same units. However, to save space, the data have been combined by 10-day periods in certain instances where the frequency curves were similar in successive 5-day periods. Furthermore, to conserve space it has been necessary to omit certain entire categories of data. These were selected so as to minimize the loss of evidence significant to migrations. Omitted are:

1. All samples from pound-net and trap catches. These were taken intermittently, at only a few points along the coast and are not adapted to systematic portrayal of size-composition changes in time and space. Insofar as comparable place and time records are available, the size composition of mackerel catches of traps and pound nets in spring is

similar to that of the purse-seine catches in spring. In summer, however, the pound nets and trap catches lack the adult sizes of mackerel.

2. All samples from spring and summer drift-gill-net catches. These differ from the purse-seine catches slightly. Because the differences may be due to mesh selection, it is doubtful whether or not they represent a true difference in the population sampled by this fishery.

3. All samples of yearling and younger mackerel, where occurring unmixed with adult mackerel, in summer and autumn catches. These are to be presented in detail in a report to be prepared on the subject of growth rates.

4. All samples from the summer purse-seine fishery; however, a summary table of length-frequencies for the summer-fishery samples as a whole is given in table 24.

5. All samples prior to May 1 of each year. The mackerel catches prior to May 1 were so nearly identical in size composition with those from the first half of May that the latter serve to give the early-spring composition.

The remaining data cover the seasons, spring and fall, when evidence of migrations is given by changes in size composition. Table 20 gives a list, by date and statistical subareas, of number of fish measured; and table 21 gives the length frequencies of these measurements, by date groups and statistical subareas, for May and June of each year. The corresponding data for the fall fishery are given in tables 22 and 23. For the year 1933 a discrepancy will be noted between the numbers of fish listed in tables 22 and 23. This is due to the omission from table 23 of mackerel under 32 centimeters.

TABLE 20.—Numbers of mackerel from purse-seine catches measured in May and June from statistical areas XXII and XXIII, by date and statistical subarea

1926¹

Date	Area XXIII				Area XXII												
	C	B	B ²	A	R	R ²	Q	Q ²	P	P ²	O	G	G ²	E	E ²	D ²	
May 3	40																
May 4	160																
May 5	140																
May 6	80																
May 7	² 320	40															
May 8	² 180	100															
May 10	² 40	280															
May 11		280															
May 12		300															
May 13		40															
May 15				60													
May 17		20	200	60													
May 18		60	80														
May 19		20	80	20													
May 20			240														
May 21			120														
May 22		20	80														
May 24			180														
May 25			40														
May 28						60				20							
May 29						40											
June 1						20		120		100						80	
June 2																40	
June 3																100	
June 4																140	
June 5																79	
June 7																120	
June 8																20	
June 9																140	
June 10															80	80	
June 11										40				200	80		80
June 12							40							20	80		
June 14		20						60			20				200		20
June 15										20						40	
June 16								80									
June 17								40			40					40	
June 18								120									
June 19						40		140		40							
June 21						80				20							
June 22								120		20			100				
June 24						40						100				20	
June 25						200							40			40	
June 26												80					
June 28												300	20			60	
June 29												240	20				
June 30						20						40				20	

¹ In addition to the numbers listed in the table for 1926, there were 620 mackerel measured from drift-gill-net catches in area XXIII during the period from May 1 to 15 that were unclassified as to date and subarea and 20 each from purse-seine catches on May 7, 8, and 10 that were unclassified as to subarea.

² From drift-gill-net catches.

³ Includes 20 fish not classified by statistical subarea.

TABLE 20.—Numbers of mackerel from purse-seine catches measured in May and June from statistical areas XXII and XXIII, by date and statistical subarea—Continued

1927

Date	Area XXIII				Area XXII					Date	Area XXIII				Area XXII				
	D	C	B	A	S	R	Q	P	O		D	C	B	A	S	R	Q	P	O
May 1	160	60								June 1									40
May 2	140	460								June 2					20	100	20		20
May 3	20	140								June 3					20	420			20
May 4		240	100							June 4						220			40
May 5		60	20							June 5						300			20
May 6		140	260							June 6						20			
May 7		54	99							June 7						180			
May 9		20	376	26						June 8						120			
May 10			139							June 9						160			80
May 11			100							June 10			20	20		200	40		120
May 12			60							June 11				60		160			60
May 13			60							June 12				100		240			40
May 14			20							June 13						20			
May 17										June 14			120		20	280			160
May 20					100					June 15				140		200			100
May 21				40	80					June 18						100			440
May 22						40				June 22						40	100		360
May 23					80			20	20	June 23						80			
May 24						80				June 24					60	60			* 20
May 25					20					June 25					40	160			
May 26										June 27				60	20	* 180			
May 27										June 28				40		200			
May 28										June 29					160	40			
May 31								20	40	June 30				60		180	20		* 20

* Includes 39 not classified by subarea.
 † Includes 20 not classified by subarea.
 ‡ From XXII D.
 § Includes 40 not classified by subarea.

1928

Date	Area XXIII			Area XXII				Date	Area XXIII			Area XXII				
	C	B	A	R	Q	P	O		C	B	A	R	Q	P	O	
May 7	20	20						June 2					60	20		
May 8		140						June 5					120			
May 10		40						June 6					100	60		
May 11		80						June 9					200	60		
May 14		238	20					June 11					160	40		
May 15		240						June 12					260	40		
May 16		160	40					June 13				20	140	60		
May 17		296	100					June 14					143			
May 18		240	180					June 15					80	100		
May 19		180	20					June 16					100	100		
May 21		100	80					June 18					240	100		20
May 22		20	140					June 19					260	20		20
May 23			120					June 20					60	20		
May 24		20	186			20		June 21					180	40		
May 25			140			20		June 25					260	40		80
May 26				40		80		June 26					180	40		
May 28				120		60		June 27					80	40		
May 29				109				June 28					120	40		
May 31				20		100	60	June 29					80	160	40	
June 1						140		June 30					140	60	20	

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TABLE 20.—Numbers of mackerel from purse-seine catches measured in May and June from statistical areas XXII and XXIII, by date and statistical subarea—Continued

1929

Date	Area XXIII			Area XXII					Date	Area XXIII			Area XXII				
	C	B	A	Q	O	H	G	E		C	B	A	Q	O	H	G	E
May 1	320								June 10				233				
May 2	353								June 11				40				
May 3	75								June 12				201				40
May 4	⁸ 30								June 13				80				20
May 6		206	20						June 14				153				
May 7	60	90							June 15				174				⁹ 64
May 8		72							June 17				95				95
May 9		180	20						June 18			¹⁰ 227	60				
May 10		140	140						June 19			113	104				20
May 11		80	40						June 20				60		25		20
May 13		20	100						June 21				108	20		45	
May 15			20						June 22				40			120	
May 24			175						June 24				40		40	63	136
May 25			71						June 25				40		20	126	90
May 27			65						June 26							¹¹ 175	
June 4				104					June 27							95	126
June 5				260					June 28							196	40
June 6				343	40				June 29							¹² 225	
June 7				92	40												

⁸ From subarea XXIII D.
⁹ Includes 32 from XXII D.
¹⁰ Includes 167 from XXII R.
¹¹ Includes some fish from adjacent portion of subarea O.
¹² Includes some fish from adjacent portion of subarea H.

1930

Date	Area XXIII			Area XXII					Date	Area XXIII			Area XXII					
	C	B	A	R	Q	O	H	G		E	C	B	A	R	Q	O	H	G
May 1	¹³ 398								June 5					252				
May 2	40								June 6				20	264				
May 3	36								June 7					134				
May 5	20								June 9				36	248				
May 6	20								June 10					¹⁵ 172				
May 7	52								June 12					257				
May 9		96							June 13					220				
May 10		36							June 14					40				
May 12			25						June 17					180				
May 19			22		¹⁴ 40				June 18					285				
May 20			124	25	91				June 19					100				
May 21					60				June 20				20	40				135
May 22					80				June 21					184				
May 23					65				June 23					100	135	102		70
May 24					25				June 24					50	¹⁶ 140		60	20
May 26					20				June 25						30		175	
May 29					50				June 26						¹⁸ 76		137	20
June 2					263				June 27						¹⁸ 20	45	186	
June 3					76				June 28						20	45	40	20
June 4					140				June 30						36	120	60	

¹³ Includes 25 from XXIII D.
¹⁴ Includes 20 from XXIII S.
¹⁵ Includes 32 from XXIII S.
¹⁶ Includes 20 from XXIII P.

TABLE 20.—Numbers of mackerel from purse-seine catches measured in May and June from statistical areas XXII and XXIII, by date and statistical subarea—Continued

1931

Date	Area XXIII				Area XXII				Date	Area XXIII				Area XXII			
	D	C	B	A	S	Q	O	H		D	C	B	A	S	Q	O	H
May 1	100								May 31								
May 2	310								June 1					72			
May 4	220								June 2					80		40	
May 5	80								June 3					208			
May 6	120								June 4					120			
May 7	17 190	20	50						June 5					65			
May 8	190								June 6					40			
May 9	17 20	40							June 7					276			
May 11			100	40					June 8					60			
May 12			120	20					June 13					100			
May 13			140						June 15					389			
May 14			100	20					June 16					15			
May 15				147					June 17					40			
May 16				123					June 18					18 30			
May 17				54			37		June 19					210			
May 18				60					June 20					200			
May 19							72		June 22					18 20			
May 20				101					June 22					18 40			
May 21				43					June 23					80			
May 22					80				June 24					200			
May 23				80	22			52	June 25					140			
May 27								95	June 26					120			70
May 28								57	June 27					80		19 60	20 120
May 29								75	June 29							20	40
									June 30					60			20

¹⁷ Includes 20 not classified by subarea.
¹⁸ From XXII R.
¹⁹ Includes 20 from XXII P.
²⁰ Includes 60 from XXII G.

1932

Date	Area XXIII				Area XXII					Date	Area XXIII				Area XXII				
	D	C	B	A	S	Q	O	G	E		D	C	B	A	S	Q	O	G	E
May 1	74									May 30									
May 2	80	75								May 31					75			25	
May 3		185								June 1					180			85	
May 4		177	124							June 2								235	
May 5		561	25							June 3					80			450	
May 6		80	100							June 4					30			220	
May 7		20	20							June 5					25				
May 9		20	330	20						June 6					140			85	90
May 10			40							June 7					215			105	
May 12				20						June 8					75			40	
May 15				20						June 9								30	
May 16				155						June 11								200	
May 17				40						June 13								100	
May 18										June 14								40	
May 19										June 18								320	22 40
May 20				25						June 21								140	
May 22						11 40				June 22					23 320			20	
May 24						48				June 24					290			20	
May 25						99				June 27									20
May 26							109			June 28									20
May 28						73				June 29									20
May 29						25				June 30									180
						50													40

²¹ Includes 20 from XXII R.
²² From XXII F.
²³ Includes 50 from XXII P.
²⁴ From XXII H.

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TABLE 20.—Numbers of mackerel from purse-seine catches measured in May and June from statistical areas XXII and XXIII, by date and statistical subarea—Continued

1933

Date	Area XXIII			Area XXII				Date	Area XXIII			Area XXII			
	D	C	B	Q	O	G	E		D	C	B	Q	O	G	E
May 1		160						June 7				100			30
May 2	40	85						June 10				100			
May 3	80	80						June 14			50	170			
May 4		140						June 15			60	180			20
May 5		130						June 16			20	100			60
May 6			25					June 19				40			80
May 8			76					June 20			170	60			
May 10			25					June 21				90			70
May 15			110					June 22			60				
May 18				110				June 23							20
May 22				110				June 24				20			
May 31				40				June 26				20			120
June 1				225				June 27					30		190
June 3				50	100			June 28				50	90		80
June 5				60	383			June 29				80			30
June 6					170			June 30							40

1934

Date	Area XXIII			Area XXII					Date	Area XXIII			Area XXII				
	C	B	A	S	Q	O	G	E		C	B	A	S	Q	O	G	E
May 3	²⁵ 590	100							June 6				²⁸ 1175				
May 7	731	390	100						June 12								140
May 8	200	20							June 13				150	120			
May 9	50	600							June 14					100			
May 10		512							June 15				320				
May 11		94							June 16				80	100	40		
May 12			100						June 18				220				50
May 14		150	330						June 19				252				120
May 15		80	360						June 20				80				
May 17		100	50		150				June 21				60				
May 18				31	381				June 22				160				
May 19				²⁶ 80	150				June 23				100				
May 22					250				June 25				160		100		
May 23					100	101			June 26				200		120		
May 24					110	100			June 27				280		90		
May 25					350	60			June 28				80				40
May 26					300	20			June 29				40				
May 29					²⁷ 1370	80											

²⁵ Includes some from May 2 and 4.
²⁶ From XXII R.
²⁷ Includes all samples from May 28 to June 2.
²⁸ Includes all samples from June 4 to 9.

1935

Date	Area XXIII		Area XXII				Date	Area XXIII		Area XXII			
	B	A	S	Q	H	E		B	A	S	Q	H	E
May 1	40						May 31				151		
May 2	590						June 1				302		
May 3	539						June 3				303		
May 4	300						June 4				250		
May 6	460						June 5				154		
May 7	540						June 6				302		
May 8	490						June 7				252		
May 9	330						June 8				99		
May 10	240						June 10				351		
May 11	160						June 11				50		
May 13	200						June 12				200		
May 14		190					June 13				200		
May 20				50			June 17				350		
May 22				400			June 18				403		
May 23				101			June 19				202		
May 24				90			June 21						203
May 25				99			June 22				51	76	102
May 27	50			50			June 24			²⁹ 51			304
May 28				450			June 25					³⁰ 50	303
May 29				400			June 26						962
				51									

²⁹ From XXII R.
³⁰ From XXII G.

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas

[All are from catches by purse seines except those noted for 1926 which are by drift gill nets. For region number see table 19]

Length, centimeters	May 1926					June 1926													
	1-15	16-20	21-25	26-30		1-5				6-10	11-15				16-20	21-25	26-30		
	(1)	B	B	P	R	E	P	Q	R	E	D	E	P	R	E	E	E	G	
29.0	1																		
34.5																			
35.0		1																1	
35.5	4																		
36.0	12	4	3					3	1									4	
36.5	35	16	11			1		5		3								5	
37.0	38	39	34			1		5		6								5	
37.5	94	72	46					6		1								2	
38.0	119	106	68					16		10								4	
38.5	97	93	56	1		1		14	3	13								4	
39.0	77	79	47	1		2		4		12								9	
39.5	38	44	33			2		5		20								6	
40.0	24	26	7	1		2		6		11								3	
40.5	22	7	10	1		1		4		19								3	
41.0	4	4	3			3		1		17								3	
41.5	6	2	3	2		2		1		14								2	
42.0	5	1	3	2		3		1		11								1	
42.5	2	6	2	1		1		1		7									
43.0	1	6	6	2		3		2		5									
43.5		4	7	1		4		3		1									
44.0	11	4	7	2		10		3		3									
44.5	1	7	5	1		12		2	2	7									
45.0	7	10	5	3		10		6	10	13									
45.5	2	19	5	3		21		6	9	5									
46.0	10	10	15	1		10		4	8	10									
46.5	6	10	18	2		15		7	7	10									
47.0	2	8	8	2		9		4	2	10									
47.5		3	8	2		8		2	2	5									
48.0		9	6	2		9		4	7	10									
48.5	1	5	1	4		1		1	6	2									
49.0		1		1		1		1	3	1									
49.5				1		1		1	1	3									
50.0				1		2		1	1	1									
50.5																			
51.5		1		1				1											
Total	620	600	420	20	100	439	100	120	20	360	140	360	60	40	40	60	80	40	

Length, centimeters	May 1926					June 1926														
	1-10		11-20		20-31	1-10				11-15				16-20				21-30		
	B	C ¹	A	B	B	E	B	E	O	Q	O	P	Q	R	G ²	O ³	R ⁴			
33.0																				
33.5																				
34.0																				
34.5	1																			
35.0																				
35.5	2	11	3																	
36.0	9	39	26																	
36.5	33	97	48																	
37.0	69	160	24																	
37.5	85	178	111																	
38.0	97	178	140																	
38.5	56	139	103																	
39.0	26	53	10																	
39.5	16	21	2																	
40.0	6	8	2																	
40.5	1	7	2																	
41.0	1	1	1																	
41.5		5	1																	
42.0		3	2																	
42.5	2	3	1																	
43.0		6																		
43.5																				
44.0	1	2	2																	
44.5	1	4	1																	
45.0	2	3	5																	
45.5	3	4	2																	
46.0	1	4	6																	
46.5	1	4	4																	
47.0	2	5	3																	
47.5	1	3	2																	
48.0	1	1	3																	
48.5	1	1	1																	
49.0	1	1	1																	
49.5	1	3	1																	
50.0																				
50.5																				
51.0																				
51.5																				
Total	420	960	140	720	20	80	20	220	20	60	40	60	380	40	700	240	460			

¹ All subareas.

² Includes 60 fish not classified by subarea.

³ Includes 40 fish from subarea P.

⁴ Includes 120 fish from subarea Q.

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1928										June 1928										
	1-10		11-20		21-31						1-2		5-10		11-20				21-30		
	B	C	A	B	A	B	P	Q	R	P	Q	P	Q	O	P	Q	R	O	P	Q	
20.5				1																	
21.5				2																	
22.0				5																	
22.5				5													1				
23.0				9													4				
23.5				5													7				
24.0				4													11				
24.5				1													6				
25.0				2													5				
25.5				1													3				
26.0				1													3				
27.0				2													1				
36.0																				1	
36.5			1																		
37.0				2		1							2		1	2	1				
37.5			2	2	1				1						5			5		5	
38.0	6	1	15	8	3			2			1	4	5		10	34	7	9	17	17	
38.5	9	1	17	21	8			10	2	2	7	5	20	4	34	76		19	58	58	
39.0	25	2	37	166	37	20	2	13	15		8	11	51	4	61	200	8	16	47	148	
39.5	39	3	46	193	99	20	3	18	18	2	21	32	89	12	106	285	3	22	81	232	
40.0	43	3	64	276	112	26	3	25	27	4	17	17	82	12	100	325	3	39	97	224	
40.5	32	4	67	250	109	21	5	36	33	3	27	21	78	6	72	233	2	30	77	177	
41.0	21	2	47	167	82	20	11	36	37	1	22	9	51	2	63	116	1	14	41	103	
41.5	12	2	26	99	64	11	5	44	31		31	9	21		19	70	2	6	30	53	
42.0	1		11	52	28	3	9	26	16	3	22	5	7		8	26		3	11	13	
42.5	3		7	20	20	2	11	13	17	2	16	3	7		3	13			1	2	
43.0	1	1	4	10	15	1	2	20	7		13	3	2		1	5				1	
43.5	1		3	4	11		3	6	13		5	1	1		1	1		1		2	
44.0		1	1	5	4	2		4	7	1	1					3		2			
44.5	2			3	5	1		2	3	2	3					2					
45.0			3	5	7			5	6							1					
45.5	1		2	10	6			3	5												
46.0	2		3	5	4			3	5			2								1	
46.5	1		5	9	5	1	1	4	9					1	1					1	
47.0	1		1	16	5		2	3	8		1	1			2						
47.5			1	15	3			1	9												
48.0			3	4	4			3	1		2									1	
48.5			4	3	2				8												
49.0			1	3	3		1		7		1									1	
49.5			1	1	2				1												
50.0				1				1	1												
50.5			1					1	1												
51.0								1	1												
51.5				1																	
52.0				1														1			
Total	200	20	360	1,434	660	140	60	280	289	20	200	120	420	40	480	1,443	20	140	420	1,040	

MIGRATIONS AND HABITS OF THE ATLANTIC MACKEREL

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1929						June 1929																
	1-10				11-20		21-31	1-10		11-15			16-20						21-30				
	A	B	C	D	A	B	A	O	Q	D	E	Q	E ⁸	E ⁹	H	O	Q	R	E	G ¹⁰	H	O	
19.5																							
20.0		5																	1				
20.5		6																	1				
21.0		8																					
21.5		3																	3		1		
22.0		3																					
22.5		1																	12		6		
23.0																			22		2		
23.5																			35		6		
24.0																			40		9		1
24.5																			22		26		2
25.0			1																9		36		1
25.5		4																	5		26		2
26.0		9																	2		36		3
26.5			17																2		25		5
27.0			22		1														2		3		1
27.5			18		3																4		
28.0			7		2																3		
28.5			6																		7		
29.0																			1		18		1
29.5																			2		2		2
30.0			1																1		29		7
30.5																			1		46		5
31.0																					25		2
31.5																					18		
32.0																					4		
32.5								1													2		
33.0																					2		
33.5			3		1																1		
34.0			7																		2		
34.5			9																		1		
35.0			13		2																2		
35.5			7																		3		
36.0		1	5																		14		1
36.5			3																		10		4
37.0																					11		1
37.5																					4		
38.0																					1		
38.5			1																		10		
39.0		1	4																		3		2
39.5		4	5		1	5															8		6
40.0		6	25		1	4															5		
40.5		14	64		1	8	10														13		10
41.0		32	101		1	18	12														20		20
41.5		27	110		3	29	14														58		44
42.0		33	110		2	26	23														62		38
42.5		26	76		3	29	8														74		41
43.0		15	64		5	18	6														108		17
43.5		6	29		5	18	6														38		10
44.0		2	20		7	7	8														64		7
44.5		1	7		6	4	10														29		6
45.0		1	4		1	5	2														18		1
45.5		3	5		2	2	1														5		2
46.0		1	6		1	2	1														2		
46.5		1	4		2	2	1														3		
47.0		2	5		1	2	1														7		1
47.5		1	7		1	1	1														2		
48.0		2	3		2	1	1														1		
48.5			5																		2		
49.0			1		1																1		
49.5		1	4		1	1															1		
50.0		1	2		1																4		
50.5		1	1																		1		
51.0					1																		
53.0																							
Total	180	688	808	30	160	100	311	80	1,032	32	92	648	95	40	25	224	268	167	392	1,045	80	228	

⁸ June 17.

⁹ June 19 and 20.

¹⁰ Includes some samples from adjacent positions of subareas H and O.

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1930								June 1930													
	1-10			11-20				21-26	27-31	1-10			11-20				21-30					
	B	C	D	A	Q	R	S	Q	Q	Q	R	S	E	Q	R	E	G	H	O	P	Q	
23.5														1								1
24.0														5								1
24.5														6								2
25.0														11								11
25.5														16								11
26.0														12								3
26.5														13								5
27.0														2								5
27.5														6								5
28.0														4								2
28.5														4								1
29.0														2								
29.5														6								
30.0														2								
30.5														1								
31.0														1								
31.5														1								
32.0														2								1
32.5														6								2
33.0														9								7
33.5														30								1
34.0														103								2
34.5														169								3
35.0														223								23
35.5														6								34
36.0														7								52
36.5														3								60
37.0														3								37
37.5														3								23
38.0														1								6
38.5														6								7
39.0														5								3
39.5														3								1
40.0														1								1
40.5														3								2
41.0														8								4
41.5														1								9
42.0														11								11
42.5														3								4
43.0														4								5
43.5														2								3
44.0														3								1
44.5														7								
45.0														1								
45.5														3								
46.0														1								1
46.5														4								2
47.0														1								
47.5														2								
48.0														1								
48.5														1								
49.0														1								
49.5														1								
50.0														1								
50.5														1								
51.0														1								
Total	132	541	25	171	111	25	20	250	50	1,517	56	32	135	1,122	20	130	658	312	397	60	334	

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1931									June 1931												
	1-10			11-20			21-31			1-10			11-20			21-30						
	B	C	D ¹¹	A	B	Q	A	Q	S	O	Q	S	Q	R	S	G	H	O	P	Q	R	
18.0																						
19.0																						
19.5																						
20.0																						
20.5																						
21.0																						
21.5																						
22.0																						
22.5																						
23.0																						
23.5																						
24.0																						
25.5																						
27.0																						
27.5																						
28.0																						
28.5																						
29.0																						
29.5																						
30.0																						
31.5																						
32.0																						
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35.5																						
36.0																						
36.5																						
37.0																						
37.5																						
38.0																						
38.5																						
39.0																						
39.5																						
40.0																						
40.5																						
41.0																						
41.5																						
42.0																						
42.5																						
43.0																						
43.5																						
44.0																						
44.5																						
45.0																						
45.5																						
46.0																						
46.5																						
47.0																						
47.5																						
48.0																						
48.5																						
49.0																						
49.5																						
50.0																						
50.5																						
51.5																						
Total	50	60	1,230	565	460	109	123	351	102	40	944	225	1,214	50	40	60	190	60	20	880	40	

¹¹ Includes 40 fish for which subarea was not reported.

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1932									June 1932													
	1-10				11-20			21-31		1-5			6-10			11-20		21-30					
	A	B	C	D	A	Q	R	O	Q ¹³	O ¹³	Q ¹²	S	O ¹³	Q	S	F	O	E	G	H	O	P	
22.5				1																			
23.0				1																			
23.5				1																			
24.0				1																			
24.5				1																			
25.0				1																			1
25.5				1																			3
26.0				1																			4
26.5				2																			4
27.0				6																			7
27.5				12																			14
28.0				25																			14
28.5				30																			16
29.0				21																			23
29.5				37																			37
30.0				48																			28
30.5				51																			31
31.0				47																			24
31.5				36																			11
32.0				27																			13
32.5				18																			11
33.0				5																			3
33.5				2																			1
34.0				1																			
34.5				2																			
35.0				1																			
35.5				1																			
36.0				1																			
36.5				2																			
37.0				1																			
37.5				1																			
38.0				1																			
38.5				3																			
39.0				7																			
39.5				12																			
40.0				22																			
40.5				18																			
41.0				21																			
41.5				19																			
42.0				46																			
42.5				63																			
43.0				98																			
43.5				112																			
44.0				100																			
44.5				69																			
45.0				46																			
45.5				16																			
46.0				10																			
46.5				2																			
47.0				4																			
47.5				1																			
48.0				4																			
48.5				2																			
49.0				1																			
49.5				1																			
50.0																							
50.5																							
Total	80	639	1,098	154	260	70	20	134	525	1,055	135	25	255	230	430	40	600	260	40	20	560	50	

¹³ 1 sample of 25 large fish taken on May 31 is omitted from the May 21-31 column and included in the June 1-10 column.

¹⁴ 2 samples of 65 large fish taken on June 6 are included with the June 1-5 and excluded from June 6-10 column.

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1933						June 1933											
	1-10			11-15	16-20	21-25	26-31	1-10			11-20			21-30				
	B	C	D	B	Q	Q	Q	E	O	Q	E	O	Q	E	G	O	Q	
29.0	1																	
29.5	1	2	1															
30.0	1	2	3															
30.5		4	6					1	2	2								
31.0	1	12	14				1	1	27	9								
31.5	2	13	14				2	1	60	27								
32.0	2	17	14				4	1	62	36								
32.5	3	26	11				2	1	101	34								
33.0	5	34	19				1	1	74	23								
33.5	9	28	14				6	3	62	22								
34.0	3	35	11				3	1	51	12								
34.5	3	26	5				1	1	40	15								
35.0	3	28	5				5	1	13	2								
35.5	1	14	3				8		8	1								
36.0	3	13	4				2		8	4								
36.5		11	1				1		2	1								
37.0		4	1				2		2	2								
37.5							1		2	5								
38.0		1					3		2	2								
38.5	1	5					1		2	1								
39.0	2	3					1		3	3								
39.5	1	4					3		3	1								
40.0	4	7					5		10	6								
40.5	4	15					3		6	8								
41.0	10	13					2		21	10								
41.5	7	26					3		49	3								
42.0	7	13					5		26	15								
42.5	6	26					2		49	24								
43.0	10	40					3		39	15								
43.5	6	48					5		54	23								
44.0	6	36					4		29	13								
44.5	4	40					3		30	14								
45.0	4	26					4		19	7								
45.5	2	18					5		9	1								
46.0	2	6					3		6	5								
46.5	3	3					3		2	2								
47.0		1					2		3	2								
47.5	1	1					1		3	1								
48.0		3					2		1	5								
48.5	1	1					1		3	2								
49.0		2					1			2								
49.5		1					1		1	1								
Total	126	595	120	110	110	110	40	30	853	335	160	550	300	550	120	260	60	

TABLE 21.—Length frequency of mackerel in May and June 1926 to 1935, inclusive, by time periods and by statistical subareas—Continued

Length, centimeters	May 1935						June 1935							
	1-10		11-20		21-31		1-10	11-20	21-30					
	B	A	B	Q	B	Q ¹⁵	S	Q ¹⁶	Q	E ¹⁷	G	H	Q	R
25.0									1					
25.5									1					
26.0										1				
26.5													1	
27.0								2		2				
27.5								1	2	1				
28.0								1					2	
28.5									1	1				
29.0										1				
31.0								9	2	1			1	
31.5								20	7	3				
32.0								54	46	21	1	2	2	2
32.5						3	3	98	76	49			11	3
33.0						2	1	132	132	115	3	5	11	4
33.5						8	2	109	154	120	3	4	11	12
34.0						7		108	148	143	1	6	4	6
34.5						8		65	82	115	4	7	2	8
35.0						8	3	28	48	82	1	5	2	4
35.5	2			1				23	13	30	3			1
36.0	2				27	1		41	14	17			3	
36.5	15		1	1	1	3		68	17	18	1			
37.0	51	4			5	68		123	34	25		2		1
37.5	138	7	11	2	6	201	13	179	54	46	4	6		
38.0	288	11	19	1	7	268	18	229	95	92	3	6		
38.5	382	10	21	5	4	229	25	214	102	104	5	6		4
39.0	407	16	20	6	2	143	22	147	102	148	2	5		
39.5	274	7	24	6	4	97	20	91	60	101	1	4		4
40.0	171	4	20	3	3	50	3	51	27	76	1	1		
40.5	86	4	9	1	1	24	4	18	12	32		1		
41.0	47	1	9	3	1	28	6	13	2	36		2		
41.5	51	8	5	1		27	5	6		25	2			
42.0	89	9	7	3		32	8	11	13	27		1		
42.5	100	5	11	2	1	26	10	10	7	33		1		
43.0	181	10	13	2		26	10	19	29	50	2			
43.5	208	14	22	1	6	42	13	37	23	63	3		1	
44.0	257	22	42	2	3	37	12	29	29	80	3	2		1
44.5	246	24	37	2	1	43	15	18	29	61	3	1		
45.0	214	12	32	1	3	44	16	17	23	49		1		1
45.5	153	10	25	1	1	54	7	15	12	57	2	3		
46.0	97	8	15			30	5	14	7	28		1		
46.5	43	2	10	4		22	6	5		11				
47.0	19	1	2		1	9	4	5		5				
47.5	4	1		1		5				2				
48.0	1		3			7				1				
48.5	2			1		5			1					
49.0						1			1	1				
49.5	1								2					
50.0														
Total	3,529	190	360	50	50	1,742	251	2,013	1,405	1,874	50	76	51	51

¹⁵ Includes 90 fish for which the subarea was not reported.¹⁶ Excludes 66 small (less than 26 centimeters) fish taken June 6 and 7.¹⁷ Includes some fish from area G.

TABLE 22.—Numbers of individuals measured in samples of catches in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII

Date	By purse seines				By drift-gill-nets
	D	E	G	P	E
Sept. 1			80		
Sept. 2		60	40		
Sept. 3		300	80		
Sept. 7		80	140		
Sept. 8		60	80		
Sept. 9			60		
Sept. 10			100		
Sept. 11		80	40		
Sept. 13		20	180		
Sept. 15		80			
Sept. 16		60			
Sept. 17		140	20		
Sept. 23		80			
Sept. 24	20		60		
Sept. 25			20		
Sept. 27		40			
Sept. 28	20	160	140		
Sept. 29		280	40		
Sept. 30		80	260		
Oct. 1			300		
Oct. 2			100		
Oct. 4			40		
Oct. 5			420		
Oct. 6			140	20	
Oct. 9			140		
Oct. 11			20		
Oct. 13					
Oct. 14			40		
Oct. 15		140	40	40	
Oct. 28		180	20		
Oct. 29		60			
Oct. 30		40	40		
Nov. 1		80			
Nov. 2		80			
Nov. 3		40			
Nov. 4		40			
Nov. 5		40			
Nov. 6		40	40		
Nov. 8		40	240		
Nov. 9			160		
Nov. 11			80		
Nov. 15			240		
Nov. 29			100		
Nov. 30			120		60
Dec. 1					80
Dec. 11					193

TABLE 22.—Numbers of individuals measured in samples of catches in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued.

Date	By purse seines					By drift-gill-nets
	E	G	H	O	P	E
Dec. 12						180
Dec. 13						40
Dec. 14						140
Dec. 15						80
Dec. 16						120
Dec. 17						160
Dec. 19						80
Dec. 22						180
Dec. 23						260
Dec. 24						20

Date	By purse seines					By drift-gill-nets
	E	G	H	O	P	E
Sept. 1		100				
Sept. 2		220				
Sept. 6	100	80	20			
Sept. 7		200	40			
Sept. 8		120		20		
Sept. 14	40	120			40	
Sept. 15	20	60				
Sept. 17		100				
Sept. 19		100	20		20	
Sept. 20		100				
Sept. 22	160	100				
Sept. 23			160			
Sept. 24		40	40			
Sept. 26			140			
Sept. 27			80			
Sept. 28			90			
Sept. 29			200			
Oct. 4			260			
Oct. 5			140			
Oct. 8			100			
Oct. 17						100
Oct. 18	180					
Oct. 27	80					100
Oct. 28	120	100				
Nov. 3		100				

Date	By purse seines					By drift-gill-nets
	E	G	H	P	Q	E
Sept. 4			100			
Sept. 6	20		40			
Sept. 7			140			
Sept. 10	40		140			
Sept. 14			40			
Sept. 20			100			
Sept. 22		285				
Sept. 24		40				
Sept. 25			40	80		
Oct. 5					90	
Oct. 10					80	
Oct. 22						60
Nov. 9						190
Nov. 14						80
Nov. 15						620
Nov. 16						460
Nov. 19						160
Nov. 22						360
Nov. 23						130
Nov. 26						60
Nov. 30						120
Dec. 3						20
Dec. 4						200
Dec. 5						80

Date	By purse seines				By drift-gill-nets
	D	E	G	H	E
Aug. 23			105	60	
Aug. 24			20		
Aug. 26			239		
Aug. 27			210		
Aug. 28			141		
Aug. 30			140		
Sept. 16		40	39		
Sept. 18					
Sept. 19		20			
Sept. 23		30			
Sept. 27		15			60
Sept. 30		11			
Oct. 7		29			
Oct. 21					100
Oct. 22					110
Nov. 4					30
Nov. 5					215
Nov. 6					162
Nov. 7					220
Nov. 8					160
Nov. 13					210
Nov. 14					223

TABLE 22.—Numbers of individuals measured in samples of catches in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued.

Date	1930									By drift-gill-nets
	By purse seines									
	C	D	E	G	H	O	P	Q	E	
Aug. 11.		245		90						
Aug. 12.		100					40			
Aug. 14.				30			100			
Aug. 15.				20		70	126			
Aug. 16.				20		20	60			
Aug. 18.			80	80			45			
Aug. 19.			20			40	20	100		
Aug. 20.						48	56			
Aug. 21.							40			
Aug. 29.							60			
Aug. 30.							20			
Sept. 2.				40						
Sept. 3.			40	20		20				
Sept. 8.		210								
Sept. 12.			25							
Sept. 15.			40							
Sept. 16.					45					
Sept. 17.			65							
Sept. 20.				80						
Sept. 22.				20						
Sept. 23.				60						
Sept. 24.				200						
Sept. 26.				20			40		20	
Sept. 29.							100			
Sept. 30.							40			
Oct. 1.							294			
Oct. 13.									30	
Oct. 16.									20	
Oct. 24.			126						58	
Oct. 29.									60	
Oct. 31.									103	
Nov. 3.									140	
Nov. 4.									140	
Nov. 5.									120	
Nov. 10.									150	
Nov. 11.									80	
Nov. 12.									40	
Nov. 14.									214	
Nov. 20.									40	
Nov. 21.									390	
Nov. 22.									195	
Nov. 24.									153	
Nov. 28.									60	
Nov. 29.									80	
Dec. 1.									210	
Dec. 3.									80	
Dec. 4.									140	

Date	1931					By drift-gill-nets
	By purse seines					
	C	D	E	G	E	
Aug. 11.	60	20				
Aug. 12.	60					
Aug. 13.	100					
Aug. 15.	40					
Aug. 17.	105	120				
Aug. 18.	140	40				
Aug. 19.	100	20				
Aug. 22.	140					
Aug. 24.	220					
Aug. 25.	230					
Aug. 26.	20	100				
Aug. 27.	140					
Aug. 28.	20	80				
Aug. 29.	40					
Aug. 31.	40					
Sept. 1.	75					
Sept. 4.	20					
Sept. 8.	130					
Sept. 9.	160					
Sept. 10.	180					
Sept. 11.	250		40			
Sept. 21.	190	40				
Sept. 22.	80					
Sept. 23.				200		
Sept. 24.				140		
Sept. 28.				80		

TABLE 22.—Numbers of individuals measured in samples of catches in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued.

Date	1931				By drift-gill-nets
	By purse seines				
	G	D	E	G	E
Oct. 6.			120		
Oct. 13.		60	40	62	
Oct. 17.				180	
Oct. 22.			30		40
Oct. 23.					160
Oct. 27.					20
Nov. 10.					50
Nov. 12.					70
Nov. 15.					120
Nov. 16.					455
Nov. 17.					70
Nov. 18.					90
Nov. 22.					20
Nov. 23.					110
Nov. 24.					240
Nov. 25.					60
Nov. 28.					20
Nov. 29.					40
Nov. 30.					170
Dec. 1.					90
Dec. 3.					100
Dec. 4.					40
Dec. 7.					120

Date	1932			By drift-gill-nets
	By purse seine			
	C	D	E	E
Aug. 11.	20			
Aug. 12.	20	20		
Aug. 13.	240			
Aug. 15.	140			
Aug. 16.	60	40		
Aug. 17.		20		
Aug. 18.	20			
Aug. 20.		40		
Aug. 22.	83			
Aug. 23.		146		
Aug. 24.		40		
Aug. 25.		94		
Aug. 26.		51	56	
Aug. 27.		47		
Aug. 30.		70		
Aug. 31.		100		
Sept. 1.		60		
Sept. 8.			140	
Sept. 9.		40		
Sept. 12.			40	
Sept. 19.		20	20	
Sept. 20.		20		
Sept. 21.			20	
Sept. 27.				22
Sept. 28.		17		
Sept. 30.		47		20
Oct. 1.		20		
Nov. 7.				110
Nov. 12.				20
Nov. 14.				55
Nov. 15.				80
Nov. 16.				250
Nov. 17.				160
Nov. 18.				120
Nov. 21.				200
Nov. 22.				120
Nov. 23.				80
Nov. 25.				160
Nov. 26.				120
Nov. 29.				105
Nov. 30.				60
Dec. 2.				280
Dec. 5.				70
Dec. 6.				140
Dec. 7.				100
Dec. 8.				50
Dec. 9.				140
Dec. 10.				30
Dec. 14.				43

TABLE 22.—Numbers of individuals measured in samples of catches in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued.

1933

Date	Purse seines	By drift-gill-nets	Date	Purse seines	By drift-gill-nets
	E	E		E	E
Aug. 28	220		Oct. 19	120	
Aug. 29	218		Oct. 20	80	
Aug. 30	140		Oct. 21	40	
Aug. 31	180		Oct. 22	140	
Sept. 1	65		Oct. 24	180	
Sept. 5	160		Oct. 27	270	
Sept. 6	336		Oct. 28	120	
Sept. 7	90		Oct. 30	110	
Sept. 8	100		Oct. 31	210	40
Sept. 9	120		Nov. 1	40	
Sept. 11	60		Nov. 2	70	90
Sept. 12	20		Nov. 4		60
Sept. 13	160		Nov. 6		40
Sept. 14	180		Nov. 7		120
Sept. 15	30		Nov. 10		20
Sept. 20	100		Nov. 17		100
Sept. 21	290		Nov. 18		80
Sept. 22	220		Nov. 20		235
Sept. 23	160		Nov. 21		160
Sept. 25	120		Nov. 22		440
Sept. 26	140		Nov. 23		150
Sept. 27	100		Nov. 24		40
Sept. 28	230		Nov. 25		20
Sept. 29	110		Nov. 27		100
Sept. 30	160		Nov. 28		60
Oct. 2	180		Nov. 29		340
Oct. 3	160		Dec. 1		260
Oct. 4	220		Dec. 2		35
Oct. 9	180		Dec. 4		26
Oct. 10	280		Dec. 5		235
Oct. 11	380		Dec. 6		189
Oct. 12	170		Dec. 7		70
Oct. 13	40		Dec. 8		190
Oct. 14	100		Dec. 9		40
Oct. 16	280		Dec. 11		35
Oct. 18	140		Dec. 14		40

1934

Date	By purse seines				By drift-gill-nets
	D	E	G	H	
Sept. 21	100	50			
Sept. 22		140			
Sept. 24		20	80		
Sept. 25			261		
Sept. 26		210			
Sept. 27		100			
Sept. 28			223		
Sept. 29		40	40		
Oct. 1		141			
Oct. 5			108	100	
Oct. 6		40			
Oct. 8		40			
Oct. 11		200			
Oct. 13		40			
Oct. 15	20				
Oct. 17		240			
Oct. 18		145			

TABLE 22.—Numbers of individuals measured in samples of catches in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued.

1934

Date	By purse seines				By drift-gill-nets
	D	E	G	H	
Nov. 13					190
Nov. 18					97
Nov. 19					273
Nov. 20					100
Nov. 21					135
Nov. 26					167
Nov. 28					126
Nov. 30					60
Dec. 5					61

1935

Date	By purse seines				By drift-gill-nets
	E	O	Q	R	
Sept. 3	229		105		
Sept. 4	100		217		
Sept. 5	116				
Sept. 9	87		50		
Sept. 10	60				
Sept. 11	74				
Sept. 12	127				
Sept. 13	35				
Sept. 18	348				
Sept. 19	68				
Sept. 20	116	70			
Sept. 23	73	63			
Sept. 24		177			
Sept. 25	267	241			
Sept. 26		543			
Sept. 28	75				
Sept. 30			149		
Oct. 1	393				
Oct. 2	83		50		
Oct. 3	332		195		
Oct. 4			319		
Oct. 5	331				
Oct. 7	246				
Oct. 17	180				
Oct. 19	364				
Oct. 21			458		
Oct. 22			194		
Oct. 24			910		
Oct. 26			375		
Oct. 28			378		
Oct. 29			760	158	
Oct. 30			751	59	
Oct. 31				146	
Nov. 4			588		58
Nov. 9			455		
Nov. 12					163
Nov. 20					119
Nov. 22					240
Nov. 26-29					1,292
Dec. 2-4					796
Dec. 11-13					668
Dec. 16-17					266

MIGRATIONS AND HABITS OF THE ATLANTIC MACKEREL

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII
1926

Length, centimeters	Purse seines																		Drift-gill-nets		
	September—						October—						November—						Nov. 30 to Dec. 1	Dec. 11	
	1-10		11-20		21-30		1-10		11-20		21-31		1-10		11-20		21-30				
	E	G	E	G	D	E	G	G	P	E	G	P	E	G	E	G	G	G	E	E	
31.0																					
31.5		1																			
32.0			2			1	1														
32.5	1		2	1																	
33.0	4		1			4	1	3													
33.5			1	1		4	3														
34.0	1		1	1		5	2	1													
34.5		1	3			4		1	1					1							
35.0	9	3	4	1		7	1	3		1											
35.5	10	5	6	5		20	4	16		1											
36.0	28	14	13	11	1	25	14	22	2	2	1										
36.5	29	30	31	11	4	39	30	69		3	6										
37.0	39	69	40	24	2	61	57	120	4	3	6										
37.5	53	115	42	55	6	89	99	210	3	7	14	4		1							
38.0	74	109	65	59	8	98	125	256	5	16	23	7	8	2	2						
38.5	74	103	72	32	9	84	122	202	2	24	14	10	15	4	15	13					
39.0	73	72	44	28	7	73	76	127	2	17	18	6	31	8	30	29	6		2	1	
39.5	39	34	27	6		21	26	50		15	8	2	45	9	23	53	33		9	7	
40.0	31	14	13	1	2	13	16	24		14	3	2	35	9	70	81	55		26	6	
40.5	14	5	3	1		5	9	7		14	2		29	11	49	50	39		19	9	
41.0	4	1	3			1	6			7	2		29	11	62	73	65		17	16	
41.5	4	1	4	2		1	1		3	1			29	1	49	50	39		30	9	
42.0		1	1			1	1		2	6	1		8	3	21	29	29		19	5	
42.5						1	1		2				7	3	10	12	8		7	7	
43.0						1	1		1	3			3		7	9	4		4	8	
43.5						1	1		1				1		4	5	1		4	4	
44.0	1								1	1	1			1	1	1	2		2	2	
44.5	1								2					3	2	1	3		3	7	
45.0	2								2					2	2	5	3		3	13	
45.5	1		1						2					1	1	3	7		6	15	
46.0									2						2	5	8		8	20	
46.5	1				1		1		1		1		1		2	2	2		5	23	
47.0	1								1				1		1	3	3		4	14	
47.5		1				1			1				1		3	2	2		1	7	
48.0		2					1		1								2		1	3	
48.5								5									1		1	3	
49.0	1																			4	
49.5		1							1		1								1		
50.0			1																	2	
51.0																		1			
Total	500	580	380	240	40	560	600	1,140	20	140	100	40	280	60	360	440	320	220	140	193	

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued

1927

Length, centimeters	Purse seines														Drift-gill-nets					
	September—										October—				Nov. 1-10	October—		December—		
	1-10			11-20				21-30			1-10	11-20	21-31			11-20	21-31			
	E	G	H	O	E	G	H	P	E	G	H	H	E	E	G	G	E	E	E	E
32.0	2																			
32.5	1																			
33.0	5	1																		
33.5																				
34.0	2																			
34.5	1																			
35.0																				
35.5		1																		
36.0	1	1																		
36.5	5	4																		
37.0	2	17																		
37.5	8	33																		
38.0	11	73																		
38.5	16	93																		
39.0	11	127																		
39.5	12	122																		
40.0	9	92																		
40.5	7	65																		
41.0	2	34																		
41.5	2	15																		
42.0	2	5																		
42.5		5																		
43.0		5																		
43.5		5																		
44.0	1	4																		
44.5		4																		
45.0		3																		
45.5		1																		
46.0		2																		
46.5		2																		
47.0		1																		
47.5																				
48.0		2																		
48.5																				
49.0																				
49.5		1																		
50.0																				
50.5																				
51.0																				
51.5																				
52.0																				
Total	100	720	60	20	60	380	120	60	160	140	710	500	180	200	100	100	100	100	800	460

1928

Length, centimeters	Purse seines							Drift-gill-nets													
	September—						Oct. 1-10	Oct. 21-31	November—			Dec. 1-10									
	1-10		11-20		21-30				1-10	11-20	21-30										
	E	H	H	G	H	P	Q	E	E	E	E										
37.0							1														
38.0							3				2										
38.5							5				4										
39.0							8				9										
39.5							2				27										
40.0							6				50										
40.5							1				39										
41.0							8				37										
41.5							4				31										
42.0							6				21										
42.5							8				12										
43.0							4				1										
43.5							2				5										
44.0							2				2										
44.5							5				4										
45.0							2				3										
45.5							3				4										
46.0											2										
46.5											2										
47.0											2										
47.5											1										
48.0											3										
48.5											2										
49.0											1										
49.5											1										
50.0											2										
51.0																					
51.5																					
54.0											1										
Total		60	420	140	325	40	260	170	60	190	1,320	670	300								

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued

1929

Length, centimeters	Purse seines						Drift-gill-nets				
	August—		September—				Oct. 1-10	Sept. 21-30	Oct. 21-31	November—	
	21-31		11-20		21-30					1-10	11-20
	G	H	D	E	G	E	F	E	E	E	
30.0										1	
32.5	1										
33.0	5										
33.5	2										
34.0	6										
34.5	4										
35.0	6										
35.5	1					1					
36.0	10					1					
36.5	29		1			1			1		
37.0	48	1				1					
37.5	73	1				1					1
38.0	70	1	3			2				3	
38.5	46	1	3			1	5		2	1	
39.0	33		3		6	2	2			5	
39.5	23		3		3	1	2		1	13	2
40.0	2		1		2	3			5	10	2
40.5	37	3	1		2		3		1	7	1
41.0	74	3	1		3				2	8	4
41.5	90	10	6		4	1			4	15	6
42.0	81	7	3		9	3	1		7	36	6
42.5	42	5	6		10	3	3		8	57	23
43.0	28	4	2		3	2	2		16	95	37
43.5	25	4	1		2	2	4		28	125	51
44.0	7				4	4	1		8	99	65
44.5	5				5	1	1		28	125	71
45.0	6	3	1		2	1	2		25	99	61
45.5	1				5	2	1		15	91	48
46.0	4	2			2	1			19	40	32
46.5	5	1			3		1		6	20	11
47.0	3	2			1				2	8	6
47.5	3		1		1				1	12	3
48.0	3	2			1				3	8	6
48.5	3	3			1				1	6	3
49.0	4	3								3	
49.5	5								1	2	
51.0	1	2									
52.0	1									1	
Total	855	60	40	50	39	26	29	60	210	787	433

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued

1930—BY PURSE SEINES

Length, centimeters:	August—						September—						October—					
	11-20					21-31	1-10				11-20		21-30		1-10	21-30		
	D	E	G	O	P	Q	P	D	E	G	O	E	G	H	G	P	P	E
30.0																	1	
30.5																	3	
31.0																	2	
31.5																	2	
32.0																	2	
32.5																	6	
33.0																	4	
33.5																	4	
34.0																	5	
34.5																	2	
35.0																	6	
35.5																	6	
36.0																	6	
36.5																	6	
37.0																	6	
37.5																	7	
38.0																	5	
38.5																	5	
39.0																	7	
39.5																	9	
40.0																	4	
40.5																	7	
41.0																	4	
41.5																	7	
42.0																	3	
42.5																	4	
43.0																	7	
43.5																	10	
44.0																	11	
44.5																	10	
45.0																	5	
45.5																	4	
46.0																	3	
46.5																	3	
47.0																	1	
47.5																	1	
48.0																	1	
48.5																	1	
49.0																	1	
49.5																	1	
50.0																	1	
50.5																	1	
51.0																	1	
51.5																	1	
Total	345	100	240	178	447	100	120	210	40	60	20	130	80	45	300	180	294	126

1930—BY DRIFT-GILL-NETS (SUBAREA E)

Length, centimeters	Sept. 21-30	October—		November—			Dec. 1-10	Length, centimeters	Sept. 21-30	October—		November—			Dec. 1-10
		11-20	21-31	1-10	11-19	20-30				11-20	21-31	1-10	11-19	20-30	
34.0	1			1				44.0		2	14	40	21	92	45
34.5								44.5	1	2	19	31	9	98	68
35.0								45.0	1	2	20	34	9	109	56
35.5								45.5	7	1	9	16	6	84	30
36.0								46.0		1	10	15	5	51	20
36.5								46.5			1	7	7	26	15
37.0								47.0		1	4	3	3	19	15
37.5	1	1	11	24	34	31	7	47.5			1	2	21	4	
38.0		5	22	62	41	33	9	48.0					10	5	
38.5	1	5	18	76	45	54	15	48.5				1	3	5	
39.0		4	11	48	49	47	10	49.0					5	2	
39.5	1	4	4	21	19	18	9	49.5				1	2	2	
40.0		2	3	12	5	19	3	50.0				1	1	2	
40.5		1		8	7	9	2	50.5				1		2	
41.0		1	3	5	8	9		51.0						2	
41.5			2	6	4	10	3	51.5						2	
42.0	2	1	9	31	9	23	8	52.0						1	
42.5	1	5	13	22	11	30	10	52.5						1	
43.0	2	3	11	29	9	33	29							1	
43.5		1	18	35	9	64	47							1	
Total									20	50	221	550	334	918	430

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued

1931

Length, centimeters	Purse seines													Drift-gill-nets					
	August—				September—						October—			Oct. 21-30	November—		Dec. 1-10		
	11-20		21-31		1-10	11-20			21-30			1-10	11-20		21-30	10-20		21-30	
	C	D	C	D	C	C	E	C	D	E	E	D	E	G	G	E	E	E	E
30.5																			
32.5																			
33.0										1									
33.5																			
34.0																			
34.5																			
35.0	1		1							1									
35.5		1																	
36.0	3		3		2	1													
36.5	4	1	13	2	5	1				2									
37.0	7	2	17	1	11	7				2									
37.5	6	5	17	2	7	4				5									
38.0	21	4	26	10	17	4				4									
38.5	29	9	38	16	33	12				17									
39.0	54	21	100	19	59	24				3									
39.5	60	30	109	26	85	38				8									
40.0	66	23	112	21	96	35				8									
40.5	47	25	78	23	49	23				2									
41.0	21	6	36	12	33	15				2									
41.5	12	9	24	2	19	9				4									
42.0	22	9	21	4	10	7				1									
42.5	27	7	26	4	22	12				5									
43.0	39	10	32	8	17	9				1									
43.5	41	14	46	5	23	9				1									
44.0	42	4	44	7	23	13				2									
44.5	26	6	34	3	15	8				2									
45.0	29	4	29	5	12	7				1									
45.5	16	2	16	1	11	4				1									
46.0	14	4	18	1	5	8				3									
46.5	5		1	3	4	4				1									
47.0	2	1	3	1	1	2				1									
47.5	3	1	2	1	2	1				1									
48.0	3	2	1	1	2	2				1									
48.5	1																		
49.0	2				1	1				1									
49.5																			
50.0																			
50.5					1														
51.0										1									
52.0					1														
Total	605	200	850	180	565	250	40	270	40	420	120	60	40	242	30	220	855	660	350

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—Continued

1932

Length, centimeters	Purse seines											Drift-gill-nets					
	August—					September—						Sept. 21-30	November—			December—	
	11-20		21-31			1-10		11-20		21-30 ¹			1-10	11-20	21-30	1-10	11-20
	C	D	C	D	E	D	E	D	E	D	E	E	E	E	E	E	
33.0				1													
34.0																1	
34.5																	
35.0		1		1	1									3	1	1	
35.5				1											2		
36.0				1										1		1	
36.5	1	1		1											2		
37.0				2										1		1	
37.5				2													
38.0	1			1					2		1			3	1		
38.5	2	2		5		1	1		2	2	1		2	2	2		
39.0	10	4	1	11	1			3	3	3			3	5	8		
39.5	9	7	1	21	3	2	1	4	4	3			2	12	17	5	
40.0	22	8	1	32	2	7	5	1	7	8	1		2	38	34	14	
40.5	33	11	6	38	8	2	9	5	6	11			3	59	63	25	
41.0	43	14	6	52	3	5	14	3	6	5	1		3	12	50	68	
41.5	27	8	6	40	4	7	17	1	2	1	4		4	10	48	46	
42.0	25	9	8	35	2	11	8	1	5	5	4		1	6	36	36	
42.5	39	3	8	47	5	4	11	7	4	4	1		3	4	24	23	
43.0	40	13	7	55	8	11	23	3	3	11	3		5	37	37	24	
43.5	61	8	11	40	2	9	14	4	9	11	1		4	7	30	33	
44.0	54	14	11	56	9	10	15	4	1	8	3		6	6	39	62	
44.5	43	6	8	49	4	5	15	1	4	5	1		7	7	61	80	
45.0	32	5	3	24	1	11	5	2	2	1	1		7	7	49	94	
45.5	27	2	3	15		2	6		2	6			1	3	53	92	
46.0	16	3	1	11	1	2	2	1	1	4			3	3	50	59	
46.5	5		1	3	1	2	1			4			2	2	36	37	
47.0	4	1	1		1	2	1		1					15	24	38	
47.5	4		1	1	1	1	1						1	9	15	22	
48.0							2							6	13	13	
48.5	1			1										7	4	10	
49.0														7	3	6	
49.5	1													2	1	10	
50.0														1		3	
50.5														1		2	
51.0														1			
51.5														1		1	
Total	500	120	83	548	56	100	140	40	60	84	20	42	110	685	845	810	43

¹ Includes 1 sample of 20 mackerel landed Oct. 1 from subarea D.

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive, by gear, by time periods, and by statistical subareas of area XXII—
Continued

1933

Length, centimeters	Purse seines								Drift-gill-nets									
	Aug. 27 to Sept. 2	September—				October—				Oct. 29 to Nov. 4	Oct. 29 to Nov. 4	November—				December—		
		3-9	10-16	17-23	24-30	1-7	8-14	15-21	22-28			5-11	12-20	21-25	26-30	1-5	6-10	11-14
32.0	1		1															
32.5	3	5																
33.0	11	14	2	4	5	3	6	7	16	2								
33.5	30	31	14	8	20	8	21	22	22	6								
34.0	69	55	30	30	45	32	67	62	57	11	6							
34.5	99	94	58	68	70	53	119	99	98	13	5							
35.0	126	111	70	128	162	96	192	137	126	24	11							
35.5	102	108	69	144	192	122	256	116	129	19	18							
36.0	67	65	64	117	134	106	183	95	81	12	16							
36.5	42	54	32	107	115	75	136	56	52	7	25							
37.0	19	16	19	64	57	30	65	24	38	6	25							
37.5	11	3	6	23	25	22	29	10	9	4	11							
38.0	3	2	4	8	9	4	10	10	7		9							
38.5	3	2	4	9	3	4		1			6							
39.0	4	1	1	1		3					7							
39.5	1	3	2	1	1				1		1							
40.0	6	6	2	1	1	1					1							
40.5	12	17	3	3	1		2				4							
41.0	12	18	6	3	1		3				3							
41.5	24	27	10	3	1		6				6							
42.0	35	21	15	6			2				7							
42.5	38	30	8	6	3		4		1		3							
43.0	34	27	5	7	2		7				6							
43.5	26	33	9	13			4				6							
44.0	24	24	3	6	3		5				5							
44.5	10	19	7	5	4		4				6							
45.0	3	6	4	2	2		3				1							
45.5	3	5	1	1							2							
46.0	1	1					1				5							
46.5		2									3							
47.0					1						3							
47.5		2		2							4							
48.0											1							
48.5	1	1									6							
49.0											4							
49.5											1							
50.0											3							
50.5											1							
51.0											1							
Total	820	804	449	770	858	555	1,136	639	641	106	185	171	415	806	500	556	489	75

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive by gear, by time periods, and by statistical subareas of area XXII—Continued

1934

Length, centimeters	Purse seines							Drift-gill-nets			
	September—			October—				November—		Dec. 5	
	21-30			1-10		11-20		13-21	26-30		
	D	E	G	E	G	H	D	E	E	E	E
29.0			1								
29.5									1		
30.5									2		
31.0									7	2	
31.5									7	1	
32.0					1				19	5	
32.5						1			4	3	
33.0	1			2					8	2	
33.5			1	4					4	1	
34.0			1						2	1	
34.5		3	5						8	1	
35.0		1	1	4			1	10	4	1	
35.5		14	1	7			1	38	3	1	
36.0	5	16	13	6			5	67	9	1	
36.5	5	41	24	25			9	115	9	2	3
37.0	5	46	19	28			10	91	27	4	1
37.5	7	62	52	24			10	81	35	7	4
38.0	10	71	60	23			18	61	47	13	7
38.5	12	68	41	24			13	36	75	23	6
39.0	17	59	68	18			11	29	107	41	4
39.5	9	35	43	21			7	27	90	30	5
40.0	1	38	38	8			4	27	65	25	
40.5	5	19	31	12			2	5	38	11	3
41.0	1	12	17	2		2	1	4	26	2	4
41.5	2	8	13	6		1	1	2	21	16	3
42.0	2	3	12	1		1	1		17	15	4
42.5	1	14	17	1			1		23	24	
43.0	1	8	18	1					29	27	1
43.5	1	9	18			1			32	18	
44.0	1	3	25			2			23	14	2
44.5	2	3	24			2			14	8	2
45.0	1	6	14	1					14	10	3
45.5	2	9	14	2					11	6	1
46.0	2	7	16	1					9	11	4
46.5	1	4	5			1	2		4	13	
47.0								2	5	6	1
47.5			2			1		1	3	5	2
48.0									1	1	1
48.5			2						2	2	
49.0									1		
49.5										1	
Total	100	560	604	221	108	100	20	625	795	353	61

TABLE 23.—Length frequencies of mackerel in the fall, 1926 to 1935 inclusive by gear, by time periods, and by statistical subareas of area XXII—Continued

1935

Length, centimeters	Purse seines													Drift-gill-nets				
	September—						October—						Nov. 1-10	November—			December—	
	1-10		11-20		21-30		1-10		11-20		21-31			1-10	11-20	21-30	1-10	11-20
	E	Q	E	O	E	O	Q	E	Q	E	Q	R	Q	E	E	E	E	E
23.0																		
25.0																		
26.0																		
27.0																		
27.5																		
28.0																		
28.5																		
29.0																		
29.5																		
30.0																		
30.5																		
31.0																		
31.5																		
32.0																		
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42.0																		
42.5																		
43.0																		
43.5																		
44.0																		
44.5																		
45.0																		
45.5																		
46.0																		
46.5																		
47.0																		
47.5																		
48.0																		
48.5																		
49.0																		
52.0																		
Total	592	372	768	70	415	1,024	149	1,385	564	544	3,826	363	1,043	58	282	1,532	796	934

TABLE 24.—Length composition of mackerel during the "summer" period, 1926 to 1935

Length, centimeters	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
	July 1— Aug. 31	July 1— Aug. 31	July 1— Aug. 31	July 1— Aug. 20	July 1— Aug. 10	July 1— Aug. 10	July 1— Aug. 10	June 25— Aug. 26	July 1— Aug. 20	July 1— Aug. 31
30.5							393			
31.0							472	3		
31.5							392	23		
32.0							423	50		129
32.5							293	153	123	146
33.0	2						219	337	163	317
33.5	18				9		137	605	268	700
34.0	32				32	2	101	974	347	1,170
34.5	45	2		4	60	45	45	1,055	410	1,438
35.0	74	3		10	169	13	38	998	575	1,416
35.5	115	6	1	8	342	29	12	763	653	971
36.0	186	21	3	12	572	52	7	537	816	528
36.5	431	76	5	27	680	72	10	248	958	260
37.0	759	233	13	49	612	89	15	150	1,142	135
37.5	1,325	541	27	43	375	77	14	67	888	158
38.0	1,642	1,146	67	41	222	81	4	26	770	238
38.5	1,477	1,843	223	24	129	69	13	23	484	302
39.0	860	2,124	571	20	85	107	10	27	379	324
39.5	394	1,717	1,089	56	40	135	16	19	175	255
40.0	183	1,118	1,791	203	46	146	31	23	125	174
40.5	64	495	1,832	482	109	158	60	23	110	110
41.0	33	227	1,470	841	205	119	58	30	70	57
41.5	20	87	961	1,003	367	182	53	43	97	38
42.0	15	31	505	1,023	674	319	67	66	120	49
42.5	10	18	207	669	684	448	79	100	161	101
43.0	3	13	91	386	614	485	92	118	221	115
43.5	4	9	53	157	457	422	101	119	259	154
44.0	2	8	18	74	263	319	109	104	279	183
44.5	6	12	25	33	103	175	74	91	214	156
45.0	7	11	12	23	45	82	38	69	163	141
45.5	1	7	13	18	28	36	19	23	73	93
46.0	6	8	16	24	14	24	11	20	43	68
46.5	3	9	12	16	8	11	2	7	22	22
47.0	3	7	15	16	24	9	5	6	10	9
47.5	1	4	19	12	12	3	2	2	9	3
48.0	3	5	15	9	23	8	-----	3	5	1
48.5	1	4	6	4	12	2	-----	4	3	1
49.0	-----	2	6	3	10	4	-----	2	1	1
49.5	4	-----	2	3	4	1	1	1	1	2
50.0	-----	-----	3	-----	8	2	-----	1	1	-----
50.5	-----	-----	1	-----	2	-----	2	-----	-----	1
51.0	-----	-----	-----	1	1	-----	-----	-----	-----	-----
51.5	-----	-----	-----	1	2	-----	-----	-----	-----	-----
52.0	1	-----	-----	-----	2	-----	-----	-----	-----	-----
Total	7,730	9,787	9,072	5,295	7,044	3,689	3,418	6,913	10,183	9,966