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Portuguese Research Report, 1967

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In 1967, the Portuguese fishing fleet of side and stern trawlers (otter trawls) and dory vessels (line trawls) took a total of 237,275 tons of cod from the ICNAF Area as shown below:

Subareas	1	2	3	4	Total
Side trawler	1,098	37,798	82,808	5,949	127,653
Stern trawler	1,139	15,524	17,294	1,510	35,467
Total	2,237	53,322	100,102	7,459	163,120
Line					
Dory vessel	60,474	-	13,681	-	74,155
TOTAL	62,711	53,322	113,783	7,459	237,275

This report presents the status of fisheries in the four subareas where the Portuguese fleet fished and includes observations made from commercial trawlers in Subareas 2 and 3, on lengths, ages, stage of maturity and probable age at first maturity. All samples were taken at random before discarding the undersized fish; for the age/length keys the same procedure is followed as in our report to the 1967 ICNAF Annual Meeting (Res.Doc.67/18).

Detailed information on the samples will be included in the Sampling Yearbook for 1967.

Subarea 1

A. Status of the Fisheries

I. Cod

As in 1966 the major fishery was carried out by the dory vessel fleet (60,474 tons). Catches by the otter trawler fleet totalled only 2,237 tons. Both fleets fished in Div.1B, 1C, 1D and 1E during the second, third and fourth quarters of 1967. Best catches were made in July in Div.1B (11,910 tons), in May in Div.1C (8,163 tons) and in July in Div.1D (7,911 tons) by the dory vessel fleet. Appendix Table I shows the catches (tons) by dory vessels and trawlers (side and stern) by division, by months.

Subarea 2

A. Status of the Fisheries

I. Cod

As in the previous year, only otter trawlers (side and stern) fished in this subarea. The total catch was 53,322 tons or 8,876 tons greater than the catch in 1966. The otter trawl fleet fished in Div.2H and 2J from January to December. Total catch by side trawlers was greater than that by stern trawlers (37,798 and 15,524 tons respectively. Appendix Table II presents the catches (tons) made by side and stern trawlers, by divisions and by months.

Samples for biological study were obtained in Div.2J from 25 April to 27 May as follows:

<u>Sample Group</u>	<u>Sample numbers</u>	<u>Date</u>	<u>Depth (m)</u>	<u>No Lengths</u>	<u>No Aged</u>
Div.2J					
A	1-2-3-4-5	25-30 April	200	650	300
B	6-7-8-9-10 11	1-27 May	180-400	725	625

a) Lengths (Fig. 1)

Lengths ranged from 22 to 91 cm classes. Mean lengths for sample group A - 49.4 and for sample group B - 51.6 cm.

b) Ages (Fig. 1)

In April as well as in May, the most important age-groups were V and VI (1962 and 1961 year-classes). The respective mean ages were for A - 6.05 and for B - 6.41 years.

c) Growth

Growth is shown in the following table of average lengths (figures in brackets are numbers of fishes for each quarter of the year).

<u>Year-class</u>	<u>Age-group</u>	<u>Div.2J</u>		
		<u>2nd Quarter</u>		
		<u>April</u>	<u>May</u>	
1964	III	32.2	28.7	(3)
1963	IV	38.7	38.1	(70)
1962	V	44.7	45.2	(250)
1961	VI	49.0	50.0	(267)
1960	VII	55.5	56.2	(122)
1959	VIII	60.0	60.0	(91)
1958	IX	65.3	64.0	(39)
1957	X	65.6	65.0	(43)
1956	XI	67.1	67.7	(22)
1955	XII	79.2	74.3	(9)
1954	XIII	66.6	66.9	(2)
1953	XIV	67.0	75.5	(2)
1952	XV	73.0	78.3	(2)
1951	XVI	73.0	73.0	(1)
1950	XVII	76.0	76.0	(1)
1949	XVIII	76.0	-	(1)
1948	XIX	-	-	-
1947	XX	-	76.0	(1)

d) Stage of maturity (Fig. 2)

In Div.2J in April, about 40% of the males and 70% of the females were in the resting or recovering stage, while about 16% of the males and about 30% of the females were in the developing one. The spawning stage was observed in about 25% of the males and 10% of the females. The post-spawning stage was detected also in the males and females but only in a significant percentage (10%) in the males.

In the same division, in May, the resting or recovering stage was observed in about 70% of the females and about 40% of the males. In the females only the post-spawning appeared with some intensity (about 10%), while in the males the developing, spawning and post-spawning stages were observed about 30%, 6% and 12% respectively.

e) Age at first maturity

		Div.2J														
1st spawn.		♂♂					♀♀									
Age-group	VI	VII	VIII	θ	?	Total	VI	VII	VIII	IX	X	θ	?	Total		
III												3		3		
IV				38		38						32		32		
V				108		108						142		142		
VI				111	1	112	6					149		155		
VII	6			49		55	4	4				58	1	67		
VIII	1	7	1	20		29	6	16				36	4	62		
IX	2	5	2	7	3	19		5	4			9	2	20		
X	1	8	3	1	3	16	3	8	10			3	2	26		
XI		1	2	1	2	6		1	7	3		3	1	15		
XII					1	1		3	3			1	1	8		
XIII						-		1	1					2		
XIV						-			2					2		
XV			1			1				1				1		
XVI						-				1				1		
XVII		1				1								-		
XX											1			1		
No. observed						386										537

θ - Unknown including immature fish; ? - Doubtful first maturity

Subarea 3

A. Status of the Fisheries

I. Cod

The catches in this subarea during 1967 totalled 113,783 tons, a considerable increase over the preceding year, which totalled 68,709 tons. The 1967 total includes catches by line trawl (13,681 tons), by side trawl (82,808 tons) and stern trawl (17,294 tons).

The Portuguese fleet fished in all divisions of the subarea in all months of the year. The dory vessels fished only during the second and third quarters. The best catch was made by the side trawlers (82,808 tons), followed by the stern trawlers (17,294 tons), and the smallest catch by the line trawlers (13,681 tons).

Best catches were made in Div.3L with a total (line and trawl) of 78,684 tons, and the lowest were made in Div.30 with only 49 tons, fished exclusively by line vessels.

The highest catch by trawlers (side and stern trawlers) occurred also in Div.3L (66,908 tons) and the lower catches by trawlers (except Div.30 with only 49 tons caught by line vessels) was in Div.3Ps (807 tons). In the line fishery the best catch was made in Div.3L (11,776 tons), and the lowest one was from 30, 49 tons. There are no records of catches by line in Div.3K, 3M and 3Ps.

Appendix Table III presents the results of the 1967 catches by line and otter trawl by month.

Samples for biological study were obtained only in Div.3L, from 19 March to 22 July as follows:

<u>Sample Group</u>	<u>Sample numbers</u>	<u>Date</u>	<u>Depth (m)</u>	<u>No Lengths</u>	<u>No Aged</u>
Div.3L					
A	4-5-6-7-8	19-28 March	150	550	250
B	10-11-12-13-15	4-15 April	150-200	475	300
C	16-17-18-19-21	11-24 May	150-300	1,130	475
	22-23-24-25				
D	26-27-28-29-30	1-30 June	150-300	1,550	500
	31-32-33-34-37				
	38-39-40				
E	41-42-43-44-45	3-22 July	200-300	1,450	472
	46-47-48-49-50				
	51-52				

a) Lengths (Fig. 3)

Lengths ranged from 22 to 133 cm classes. Mean lengths were A - 53.3, B - 52.7, C - 57.4, D - 57.2, E - 53.8 cm.

b) Ages (Fig. 3)

In Div.3L we observed ages from 3 to 19 years with a marked predominance of the V and VI age-groups (1962, 1961 year-classes).

In all divisions the IV, VII and VIII age-groups (1963, 1960 and 1959 year-classes) were also important.

Mean ages were: A - 5.9, B - 5.8, C - 6.2, D - 6.3, E - 5.7 years.

c) Growth

Growth is shown in the following table of average lengths (figures in brackets are numbers of fishes for each quarter of the year).

Year-class	Age-group	Div.3L					
		1st Quarter		2nd Quarter			3rd Quarter
		March	April	May	June	July	
1964	III	30.3 (5)	34.4	37.1	33.0 (14)	36.3 (14)	
1963	IV	38.8 (29)	40.1	40.2	39.6 (142)	40.1 (56)	
1962	V	47.6 (73)	47.5	49.2	48.5 (386)	49.8 (162)	
1961	VI	55.9 (50)	57.7	55.7	56.3 (383)	56.8 (147)	
1960	VII	62.5 (20)	61.7	62.2	62.8 (167)	62.4 (40)	
1959	VIII	67.1 (26)	68.2	67.8	68.0 (84)	67.3 (26)	
1958	IX	76.7 (32)	75.3	76.5	75.2 (50)	70.7 (11)	
1957	X	81.1 (5)	78.8	85.1	84.9 (26)	76.2 (11)	
1956	XI	81.5 (2)	79.0	81.0	80.6 (5)	93.0 (2)	
1955	XII	-	87.3	91.8	93.5 (10)	-	
1954	XIII	81.3 (4)	100.4	101.0	96.7 (4)	-	
1953	XIV	-	106.0	104.5	104.9 (2)	100.0 (2)	
1952	XV	102.0 (3)	82.0	82.0	82.0 (1)	100.0 (1)	
1951	XVI	94.0 (1)	-	-	-	-	
1950	XVII	-	-	-	-	-	
1949	XVIII	-	-	-	-	-	
1948	XIX	-	-	130.0	- (1)	-	

d) Stage of maturity (Fig. 4)

The observation of the stages of maturity during 1967 in the first, second and third quarters gave us the following percentages of different stages in males and females. The most important one was in the females, the recovering or resting, with percentages higher than 70% in all months; yet in the females the developing stage appears in March, with about 20% and in the other months with lower percentages. The spawning stage only in June (in the females) presents a reasonable percentage (about 12%), while in the other months the respective percentages are lower. Finally, in the females, the post-spawning stage only is represented with a significant percentage in June and July.

In the males we can also see that in all months the recovering or resting stages appear always with a significant percentage, higher than 40%. The developing stage was also observed in the males with about 20% in March, 14% in April, more or less 30% in May, about 40% in June and July.

More frequent than in females the stage of spawning appears in the males with the following percentages: about 24% in March, 10% in April, 14% in May, 16% in June and about 4% in July. The post-spawning stage was detected only in reasonable percentages, about 6%, in May and June and 12% in July.

e) Age at first maturity

Div. 3L

Age-group	♂♂							♀♀								
	VI	VII	VIII	IX	X	θ	?	Total	VI	VII	VIII	IX	X	θ	?	Total
III	-	-	-	-	-	18	-	18						15		15
IV						132		132						95		95
V						319		319						302		302
VI						282		282	7					291		298
VII	2	2				110	1	115	1	7				104		112
VIII	2	12				50	2	66	2	10	5			52	1	70
IX	1	7	4			30	2	44	2	13	8			23	3	49
X		2	3			9	6	20		7	4			9	2	22
XI		1	1			3		5			1			2	1	4
XII		2	1	1	1	1	2	8			1			5		6
XIII												2			2	4
XIV				1				1					1		1	2
XV								2			1	1			1	3
XVI								1								1
XVII																
XVIII																
XIX															1	1
No. observed								1,014								983

Subarea 4

A. Status of the Fisheries

I. Cod

In 1967, as in 1966, only the otter trawler fleet operated in this subarea. It caught a total of 7,459 tons which is a decrease from the 1966 catch of 10,830 tons. The side and stern trawlers fished in all months of the first quarter and also in April and September. The best catch was 3,681 tons which was made in January (2,382 tons by side trawlers and 1,299 tons by stern trawlers). The best catch was obtained from Div.4R and the smallest from 4Vn, with 6,180 tons and 85 tons respectively.

Appendix Table IV presents the catches obtained from side and stern trawl, by month and by divisions.

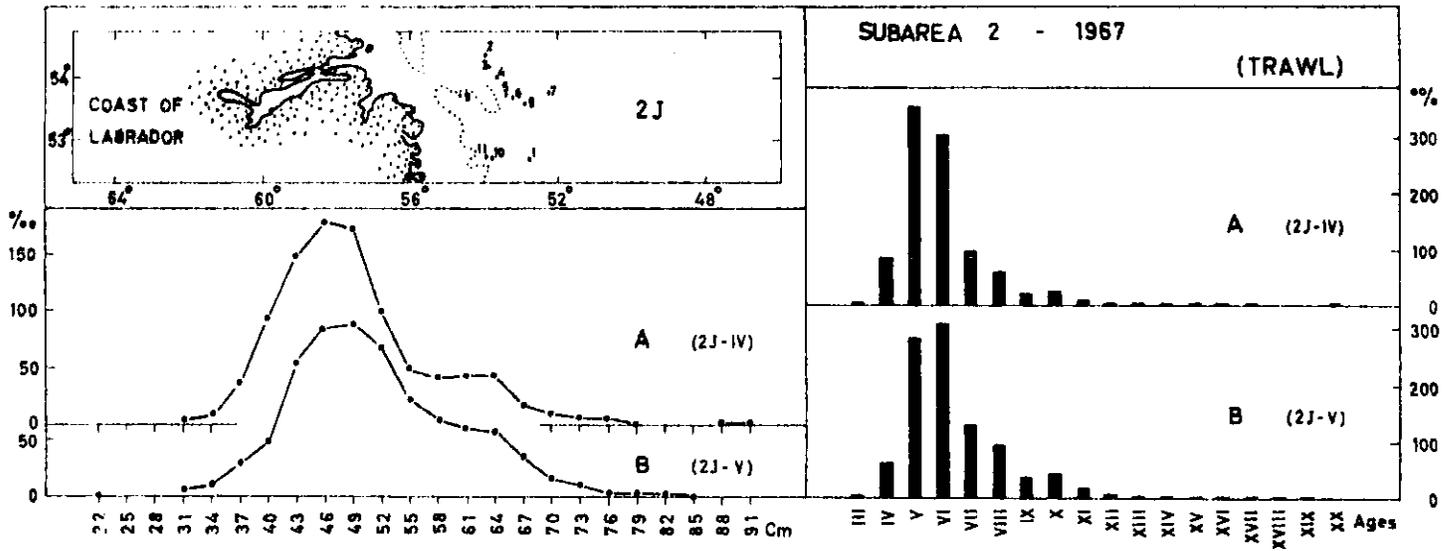
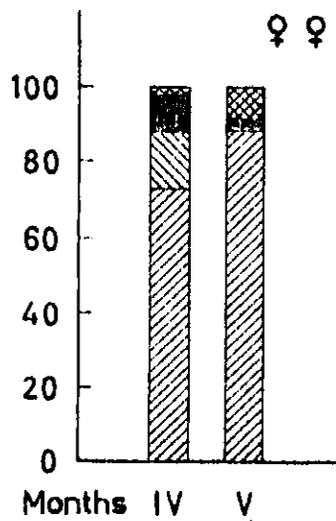
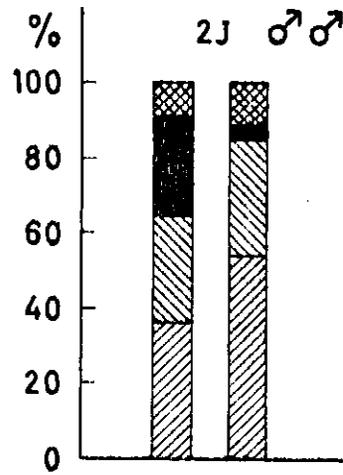


Fig. 1



- Post-spawning
- Spawning
- Developing
- Resting or recovering

Fig. 2

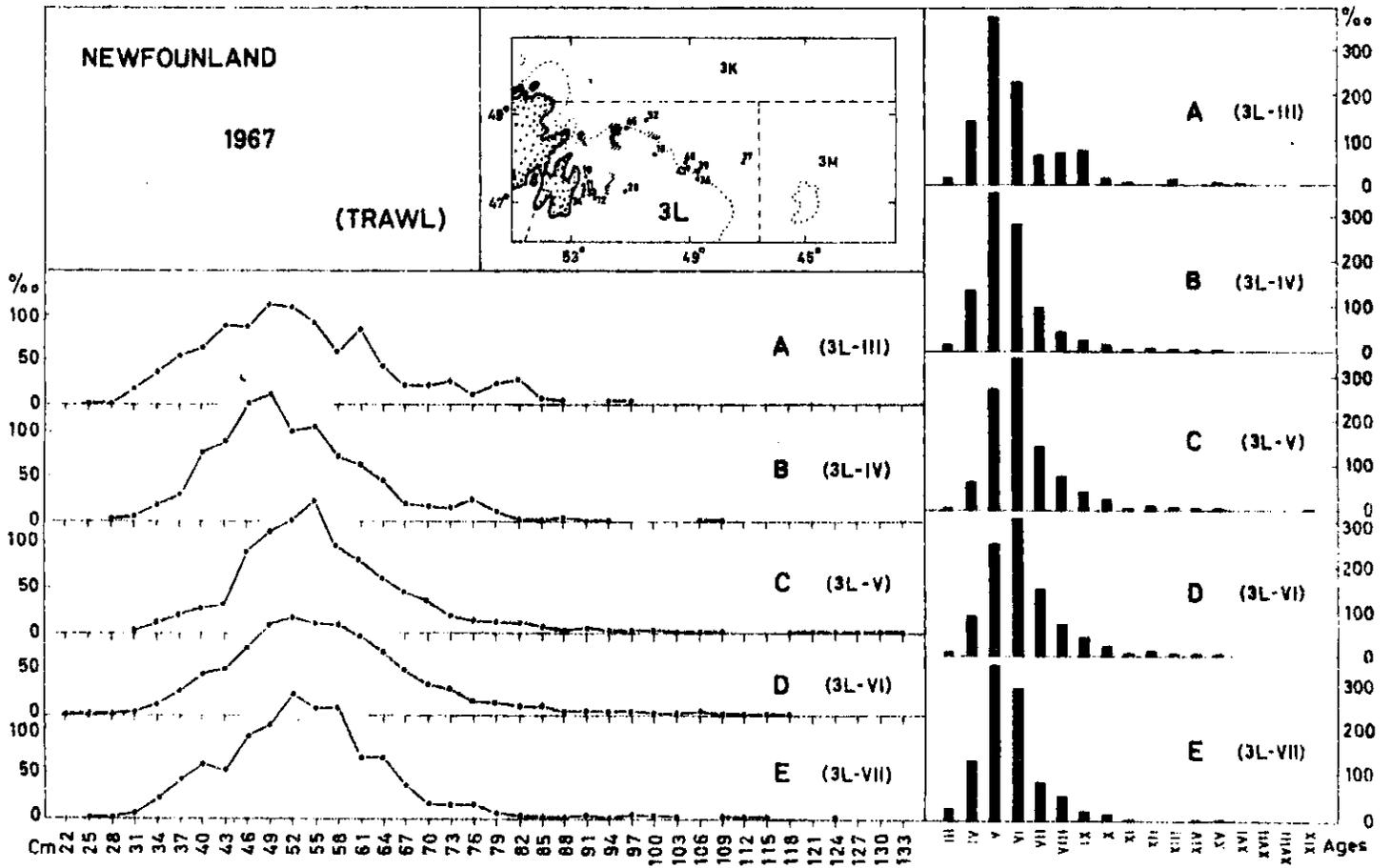


Fig. 3

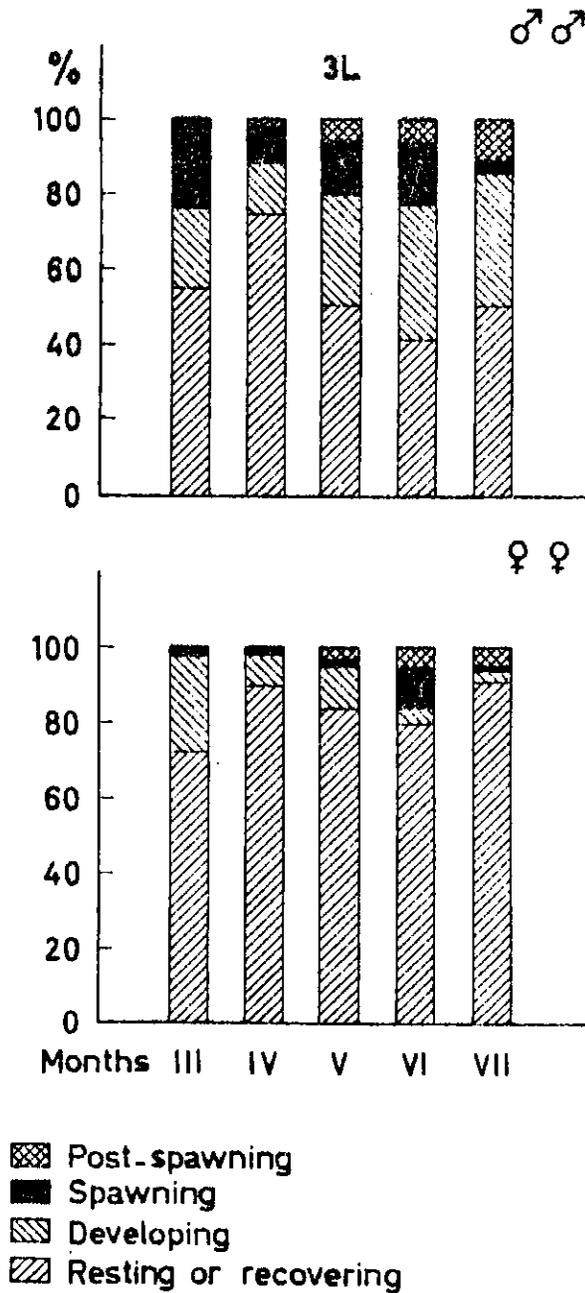


Fig. 4

Appendix Table I. DV = dory vessel; OTsi = side trawler; OTst = stern trawler

Div.	Gear	May	June	July	Aug	Sept	Dec	Total
1B	DV	-	404	11,910	8,891	843	-	22,048
	OTsi	5	-	-	-	-	-	5
	OTst	338	-	-	-	-	-	338
	Total OT	343	-	-	-	-	-	343
	DV and OT	343	404	11,910	8,891	843	-	22,391
1C	DV	8,163	8,013	2,722	2,515	279	-	21,692
	OTsi	90	-	-	-	-	-	90
	OTst	29	-	-	-	-	24	53
	Total OT	119	-	-	-	-	24	143
	DV and OT	8,282	8,013	2,722	2,515	279	24	21,835
1D	DV	835	4,969	7,911	2,635	384	-	16,734
	OTsi	990	-	-	-	-	-	990
	OTst	737	-	-	-	-	11	748
	Total OT	1,727	-	-	-	-	11	1,738
	DV and OT	2,562	4,969	7,911	2,635	384	11	18,472
1E	DV	-	-	-	-	-	-	-
	OTsi	13	-	-	-	-	-	13
	Total OT	13	-	-	-	-	-	13
	DV and OT	13	-	-	-	-	-	13
T	DV	8,998	13,386	22,543	14,041	1,506	-	60,474
O	OTsi	1,098	-	-	-	-	-	1,098
T	OTst	1,104	-	-	-	-	35	1,139
A	Total OT	2,202	-	-	-	-	35	2,237
L	DV and OT	11,200	13,386	22,543	14,041	1,506	35	62,711

Appendix Table II.

Div.	Gear	Jan	Feb	Mar	Apr	May	Jun	Sep	Oct	Nov	Dec	Total
2H	OTsi	75	-	230	924	27	-	-	-	-	29	1,285
	OTst	282	-	-	181	-	-	-	161	351	4,217	5,192
	Total OT	357	-	230	1,105	27	-	-	161	351	4,246	6,477
2J	OTsi	655	7,794	2,155	4,965	11,161	246	620	7,329	933	655	36,513
	OTst	3,561	2,311	194	864	916	-	-	423	330	1,733	10,332
	Total OT	4,216	10,105	2,349	5,829	12,077	246	620	7,752	1,263	2,388	46,845
T o t a l	OTsi	730	7,794	2,385	5,889	11,188	246	620	7,329	933	684	37,798
	OTst	3,843	2,311	194	1,045	916	-	-	584	681	5,950	15,524
	Total OT	4,573	10,105	2,579	6,934	12,104	246	620	7,913	1,614	6,634	53,322

Div.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	NOV.	Dec.	TOTAL
Line dory vessel	-	-	-	-	-	-	-	-	-	-	-	-	-
Side trawl	-	671	701	102	109	441	297	-	2,919	1,262	2,907	606	9,600
Stern trawl	10	216	42	272	-	-	-	321	636	299	995	24	2,815
Total trawl	10	887	243	374	109	441	297	406	3,555	1,561	3,902	630	12,415
TOTAL (Line + Trawl)	10	887	243	374	109	441	297	406	3,555	1,561	3,902	630	12,415
Line dory vessel	-	-	-	42	460	1,232	1,854	3,739	4,449	-	-	-	11,776
Side trawl	-	29	3,853	8,412	9,505	11,186	7,611	4,301	6,318	1,710	1,853	114	54,892
Stern trawl	-	51	746	1,255	45	2,927	4,591	542	799	618	442	-	12,016
Total trawl	-	80	4,599	9,667	9,550	14,113	12,202	4,843	7,117	2,328	2,295	114	66,908
TOTAL (Line + Trawl)	-	80	4,599	9,709	10,010	15,345	14,056	8,582	11,566	2,328	2,295	114	78,584
Line dory vessel	-	-	-	-	-	-	-	-	-	-	-	-	-
Side trawl	-	3	4,582	38	-	1,946	259	3,198	236	70	1	-	10,333
Stern trawl	-	-	287	-	-	108	-	-	-	-	-	-	395
Total trawl	-	3	4,869	38	-	2,054	259	3,198	236	70	1	-	10,728
TOTAL (Line + Trawl)	-	3	4,869	38	-	2,054	259	3,198	236	70	1	-	10,728
Line dory vessel	-	-	-	223	690	-	-	186	584	-	-	-	1,683
Side trawl	-	-	159	4	-	215	81	5,621	-	5	-	-	6,085
Stern trawl	-	-	-	-	-	66	-	1,820	-	-	-	-	1,886
Total trawl	-	-	159	4	-	281	81	7,441	-	5	-	-	7,971
TOTAL (Line + Trawl)	-	-	159	227	690	281	81	7,627	584	5	-	-	9,654
Line dory vessel	-	-	-	15	34	-	-	-	-	-	-	-	49
Side trawl	-	-	-	-	-	-	-	-	-	-	-	-	-
Stern trawl	-	-	-	-	-	-	-	-	-	-	-	-	-
Total trawl	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL (Line + Trawl)	-	-	-	15	34	-	-	-	-	-	-	-	49
Line dory vessel	-	-	-	-	-	-	-	-	173	-	-	-	173
Side trawl	4	41	1,202	26	-	-	-	-	-	-	-	-	1,275
Stern trawl	-	-	-	-	-	-	-	-	-	-	-	-	-
Total trawl	4	41	1,202	26	-	-	-	-	-	-	-	-	1,275
TOTAL (Line + Trawl)	4	41	1,202	26	-	-	-	-	173	-	-	-	1,446
Line dory vessel	-	-	-	-	-	-	-	-	-	-	-	-	-
Side trawl	-	1	611	13	-	-	-	-	-	-	-	-	625
Stern trawl	-	-	182	-	-	-	-	-	-	-	-	-	182
Total trawl	-	1	793	13	-	-	-	-	-	-	-	-	807
TOTAL (Line + Trawl)	-	1	793	13	-	-	-	-	-	-	-	-	807
Line dory vessel	-	-	-	280	1,184	1,232	1,854	3,925	5,206	-	-	-	13,681
Side trawl	4	745	10,608	8,595	9,614	13,788	8,248	13,205	9,473	3,047	4,761	720	82,808
Stern trawl	10	267	1,257	1,527	45	3,101	4,591	2,683	1,435	917	1,437	24	17,294
Total trawl	14	1,012	11,865	10,122	9,659	16,889	12,839	15,888	10,908	3,964	6,198	744	100,102
TOTAL (Line + Trawl)	14	1,012	11,865	10,402	10,843	18,121	14,693	19,813	16,114	3,964	6,198	744	113,783

Appendix Table IV.

Div.	Gear	Jan	Feb	Mar	Apr	Sep	Total
4R	OTsi	2,382	875	1,639	845	7	5,748
	OTst	221	139	-	72	-	432
	Total OT	2,603	1,014	1,639	917	7	6,180
4S	OTsi	-	14	-	-	-	14
	OTst	1,078	-	-	-	-	1,078
	Total OT	1,078	14	-	-	-	1,092
4Vn	OTsi	-	-	-	85	-	85
	OTst	-	-	-	-	-	-
	Total OT	-	-	-	85	-	85
4W	OTsi	-	-	-	102	-	102
	OTst	-	-	-	-	-	-
	Total OT	-	-	-	102	-	102
T o t a l	OTsi	2,382	889	1,639	1,032	7	5,949
	OTst	1,299	139	-	72	-	1,510
	Total OT	3,681	1,028	1,639	1,104	7	7,459