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A review of catch, effort and estimated removals at age
for the 1980 silver hake fishery on the Scotian Shelf

by

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FISHING PATTERNS AND CPUE

The 1980 Scotian Shelf silver hake fishery opened on April 15 with the bulk of the USSR and Cuban fleets arriving between April 20 - 27. Currently, there are 1 Bulgarian, 3 Cuban, and 26 Soviet vessels fishing silver hake on the Scotian Shelf. Observer coverage (days) of these fleets are 85% for the Soviet and 100% for both the Cuban and Bulgarian.

Since 1977, directed effort for silver hake has been to the seaward side of the small mesh gear line. Observations for 1980 indicate that the major fishing effort is concentrated within a small area, with depths ranging from 180 - 400 m. Both the Cuban and Soviet fleets are fishing predominantly in areas 4WJ and 4WL, with minimal excursions by the USSR into NAFO Division 4X (Fig. 1). These areas coincide with previously reported observations from 1977 to 1979 (Waldron 1978, 1979, and Waldron and Sinclair 1980).

Waldron and Sinclair (1980) reported 1979 monthly catch rates for directed silver hake fisheries from sets where silver hake comprised 60% or more of the catch. Waldron (1979) reported that this criteria was derived using the Chikuni (1976) method of plotting C/F against C/O composition. When this selection criteria of 60% was used, it accounted for 87.6% by weight of the total observed silver hake catch. Catch rates for May 1979 were reported as 2010 kg/hr for the USSR in the area seaward of the small mesh gear line. Data collected for the period May 1 to May 20, 1980 shows that the catch rate is 1150 kg/hr for the USSR and 393 kg/hr for the Cuban directed silver hake fisheries (Table 1).

Final observed catch and effort for the 1979 Scotian Shelf foreign fisheries are presented in Appendix 1. Subsamples of the 1979 observed data indicated that the yearly catch rates for the Cuban and Soviet silver hake fisheries were 1535 and 1882 kg/hr respectively (Waldron and Sinclair 1980). Analysis of the complete observed data set indicates that silver hake catch rates are 1533 and 1983 kg/hr for Cuba and the Soviet Union respectively.

Since 1977, the overall silver hake catch rate has increased from 1154 to 1873 (Fig. 2, Table 2). Catch rates from observations taken in the area seaward of the small mesh gear line have also increased for all countries. Yearly catch rates for the Soviet fleet seaward of the small mesh gear line were 1340, 1375, and 1882 kg/hr for the years 1977 to 1979. Comparison of 1979 and 1980 reported catch and effort, to May 20, shows that the 1980 fishery has a catch per day which is 5 tons lower than that in 1979 (16 compared to 21 tons/day).

REMOVALS AT AGE

A total of 39 silver hake length samples were taken from the 1980 foreign silver hake fishery. Removals-at-age were calculated using a 1979 age-length key from Clay (1980) and samples obtained from the 1980 fishery (Table 3).

The 1980 fishery has been capturing predominantly two- and three-year-old silver hake from the 1978 and 1977 year-classes. Removals-at-age expressed as percentages show that since 1976, the fishery has been concentrating on ages two to four as opposed to ages one and two prior to 1976. (Fig. 3, Table 4).

Removals for April and May 1980 suggest a higher percentage of one-year-olds in the catch. Data collected from the 1979 observer program also shows that during the months of April and May, age one fish contribute substantially more to the catch than they do later on in the fishery. Based upon these observations, there is no indication that the 1978 or 1979 year-classes will contribute substantially to the 1980 fishery.

OBSERVATIONS ON REDUCTION

Data from the 1980 observer program suggested that from 10 to 30% of certain silver hake catches in area 4WJ were sent to reduction. Length frequencies from fish destined to be reduced were not available. However, samples taken directly from the fish holds compared to those taken from fish destined for human consumption may infer the size ranges sent to reduction (Fig. 4, Table 5).

Observations from the 1980 Cuban and Soviet silver hake fishery indicate that 4.6 and 1.5% by weight of the silver hake caught were sent to reduction. Using data reported to Canadian authorities by previously mentioned fleets, it is suggested that of the 8682 t of silver hake caught, approximately 139 t (2%) were reduced. If it can be assumed that these fish were predominantly 10 to 20 cm in length (one-year-old fish), reduced fish would represent 4% of the total numbers removed.

It would appear that there is some size selection criteria for ages 2 and older fish destined for production.

SUMMARY

Since 1977, silver hake catch rates have increased from 1340 to 1983 kg/hr. Although the 1980 available data indicates that the catch rate has dropped compared to the same period in 1979, there is potential room for observed increases during the last half of May.

Comparison of removals at age prior to and after 1976 shows a shift from catch predominantly of one- and two-year-old to those of two- and three-year-old silver hake. Age one silver hake contribute proportionally more to catches during the early part of the season. This infers that the 1980 data presented does not suggest that the 1979 year-class will contribute significantly to the fishery.

The estimated removals to reduction suggest a size selection of one-year-old fish amounting to 4% of the total numbers removed at age.

Chikuni, S. (1976). Problems in monitoring abundance in multispecies multi-gear groundfish fisheries in the Bering Sea. In: Monitoring of fish stock abundance: The use of catch and effort data. FAO/UN Fish. Tech. Pap. 155: 23-26.

Clay, D. and D. Beanlands. 1980. Silver hake (*Merluccius bilinearis*) in NAFO Div. 4VWX: A stock assessment and estimate of the total allowable catch (TAC) for 1981. NAFO SCR. Doc. 80/87 14 p.

Waldron, D. E. MS. 1978. Catch compositions during the 1977 Scotian Shelf international fishery with emphasis on the silver hake and squid (*Illex*) fisheries. ICNAF Res. Doc. 78/II/9. 23 p.

Waldron, D. E. MS. 1979. Preliminary results of a Joint International observer program to evaluate the silver hake small mesh gear line in ICNAF Division 4VWX. ICNAF Res. Doc. 79/II/17. 37 p.

Waldron, D. and A. Sinclair. 1980. Observations on the Squid (*Illex illecebrosus*) and Silver hake (*Merluccius bilinearis*) fisheries on the Scotian Shelf in 1979. NAFO SCR. Doc. 80/18. 21 p.

Table 1. Observed catch (kg), effort (hrs), and bycatch ratios for the 4WX silver hake fisheries.

COUNTRY	AREA	Month	Σ HRS	C/E S. Hake (kg/hr)	Haddock	S. hake	Squid	Argent.	Cod	Am. Plaice	Halibut	Redfish	Mackerel	Pollack
Cuba	4W	Apr	173.7	342	4735	59353	30	385	1231	48	323	36	4623	14840
		May	561.08	393	6640	220214	4882	190	4986	262	1976	6728	8039	18222
	ALL	ALL	734.81	381	11375	279567	4912	575	6217	310	2299	6764	12662	33062
USSR	Cuban ratio to S. hake	ALL	-	-	.041	1.000	.018	.002	.022	.001	.008	.024	.045	.118
	4W	Apr.	604.2	1076	30	650030	1	878	857	641	2161	1324	2916	55531
		May	2066.3	1150	7015	2376480	1228	2672	12083	1101	1907	4798	45708	175099
USSR	4X	May	8.6	1134	70	9750	0	930	130	0	0	0	40	1780
	ALL	ALL	2800.5	1081	7045	3026510	2159	3590	13010	1742	13818	7902	48632	220630
	S. hake	ALL	-	-	.002	1.000	.001	.001	.034	.001	.005	.003	.016	.073

Table 2. Yearly directed Silver hake CPUE (kg/hr) for the Scotian Shelf Fisheries.

COUNTRY	1977			1978			1979					
	Landward ¹	Seaward ¹	Extended ¹	All	Landward	Seaward	Extended ¹	All	Landward	Seaward	Extended ¹	All
BULGARIA ²	-	-	-	-	-	-	-	-	-	-	-	1558
CUBA	-	-	-	-	894	1127	609	-	1098	2464	1535	1491
USSR	-	-	-	-	1340	2052	1375	-	1770	2317	1882	-
ALL	1019	925	457	1154	1723	1293	1516	1574	2419	1813	1491	1873

1. Data for some countries not available at time of publication.

2. Bulgaria was not sampled in 1977. Data for 1979, other than by total area, is not available at time of publication.

3 Revised from 1979 data.

Table 3. Estimated removals-at-age and biomass from samples collected during the 1980 Scotian Shelf silver hake fishery.

AGE	PROCESSED			TOTAL		
	Removals at age ('000)	%	Biomass (t)	Removals at age ('000)	%	Biomass (t)
1	1518	4	126	7184	15	452
2	10698	28	1576	15865	33	2189
3	12127	32	2362	13390	28	2494
4	7015	19	1649	6416	13	1442
5	3999	11	1066	3190	7	810
6	1838	5	573	1272	3	372
7	447	1	154	277	1	89
8	125	*	43	75	*	24
9	85	*	30	46	*	15
10+	6	*	1	3	*	
Σ	37858		7530	47718		7834

* indicates percentages less than 1.

Table 4. Percentage Age Composition for the Scotian Shelf Silver Hake fishery.¹

AGE/YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1	15	24	38	12	15	22	24	1	10	4	15
2	60	45	47	72	59	55	59	27	32	21	33
3	17	19	7	5	23	8	11	48	31	30	28
4	5	8	5	5	1	9	5	18	15	20	13
5	2	2	2	5	1	6	1	4	7	13	7
6	1	*	1	1	*	1	*	*	3	7	3
7	*	1	*	1	*	*	*	*	1	2	1
8	*	*	*	*	*	*	*	*	1	1	*
9	*	*	*	*	*	*	*	*	*	1	*
10	*	*	*	*	*	*	*	*	*	*	*

¹ 1970-1979 calculated from Clay 1980.

* - indicates percentages that are less than 1.

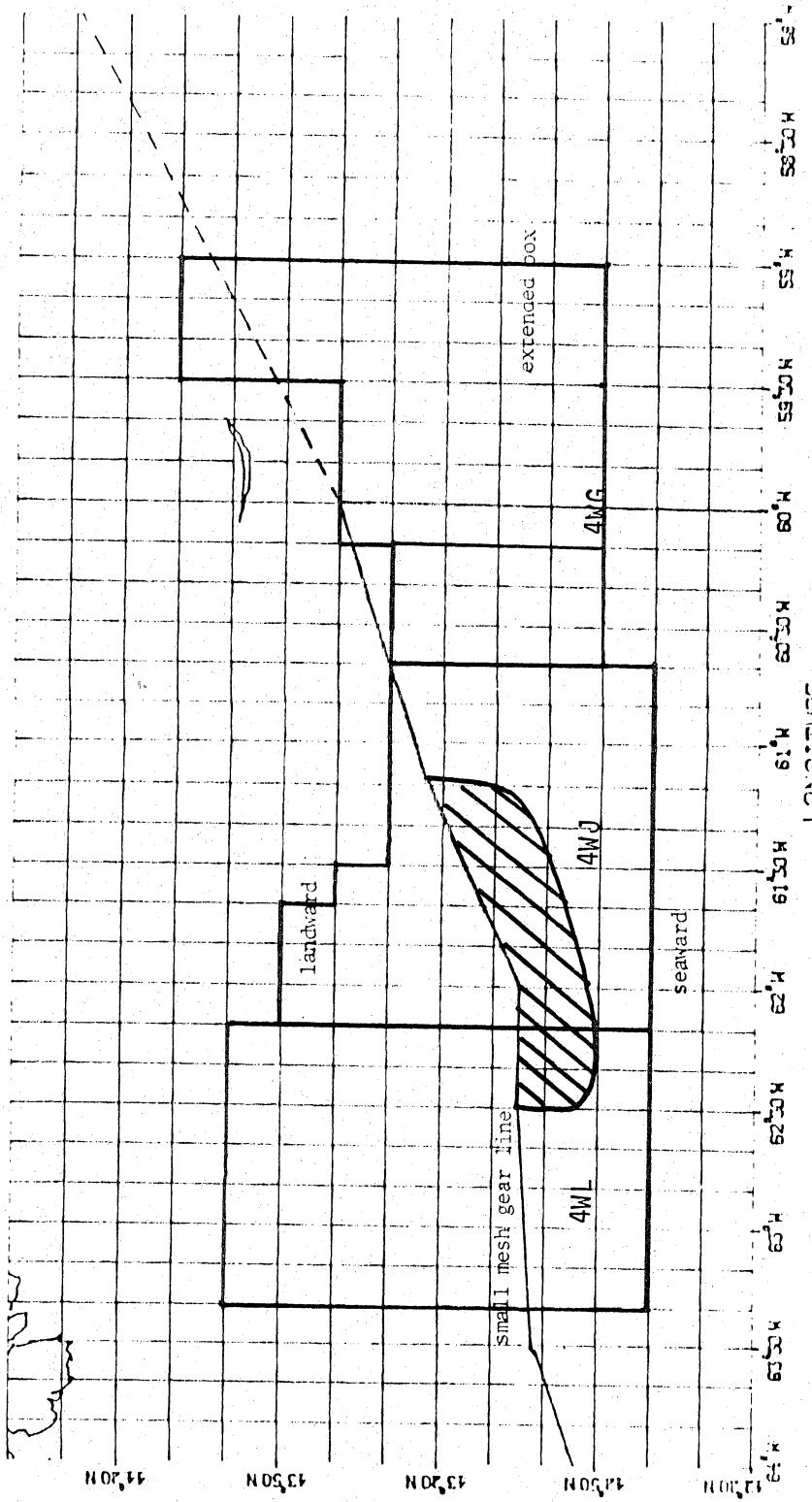


Figure 1. Areas observed during the 1978 Scotian Shelf Silver Hake and Squid fishery.

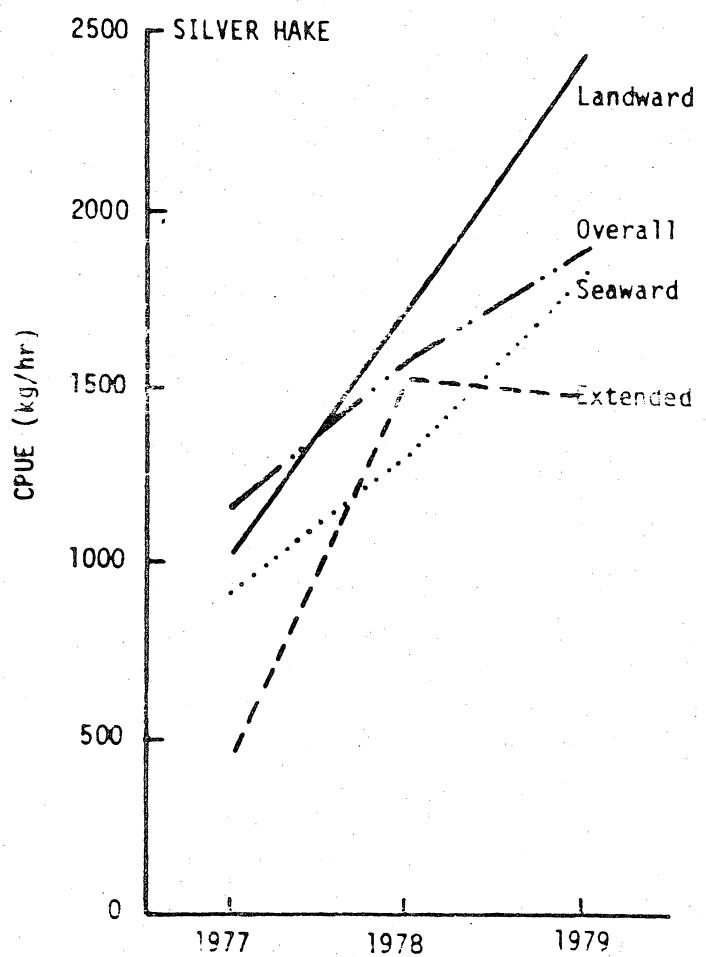


Fig. 2. 1977-1979 directed silver hake catch per unit effort by major area.

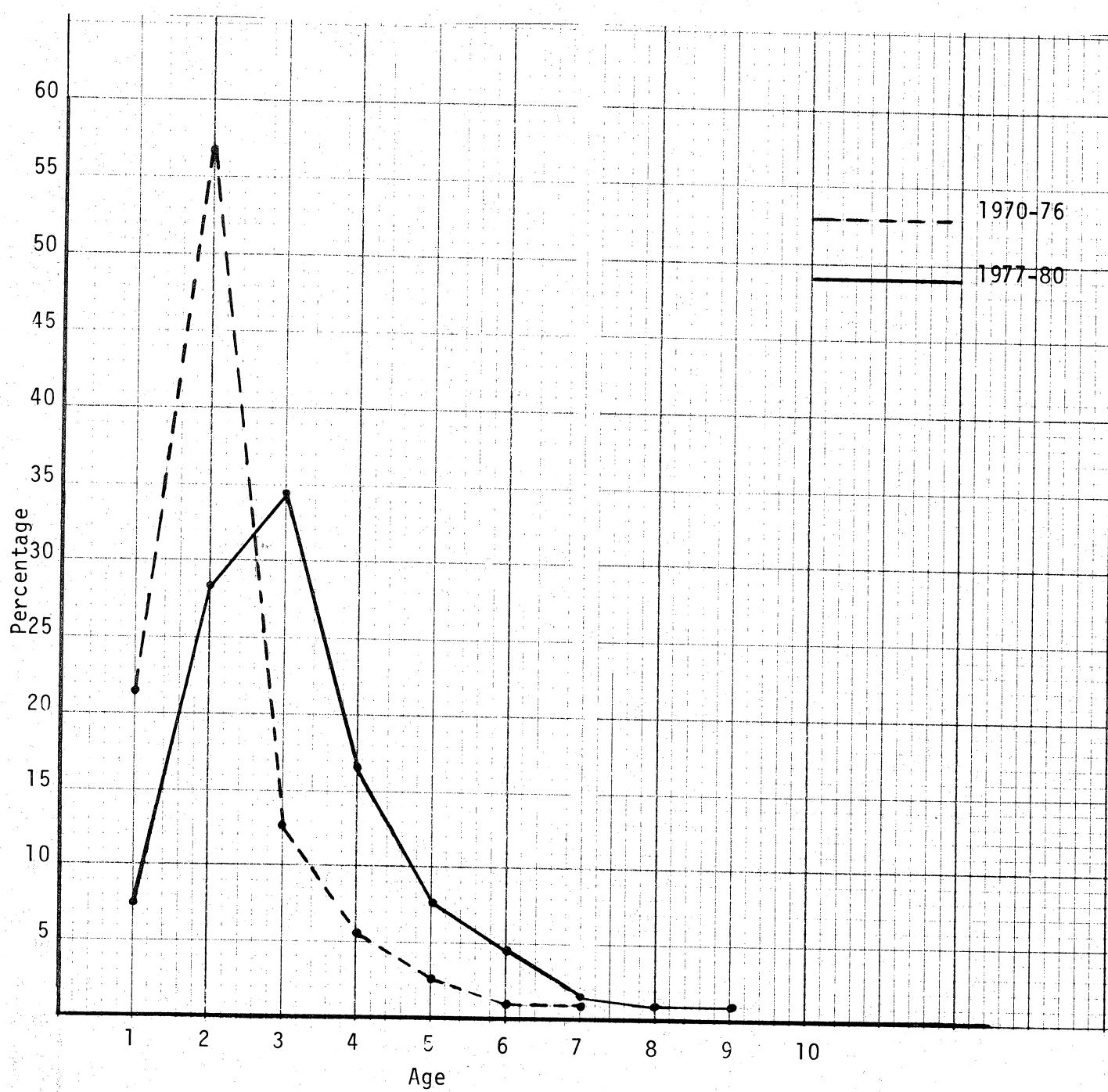


Fig. 3. Average removals-at-age expressed in percentages for the Scotian Shelf silver hake fishery.

Calculated removals-at-length

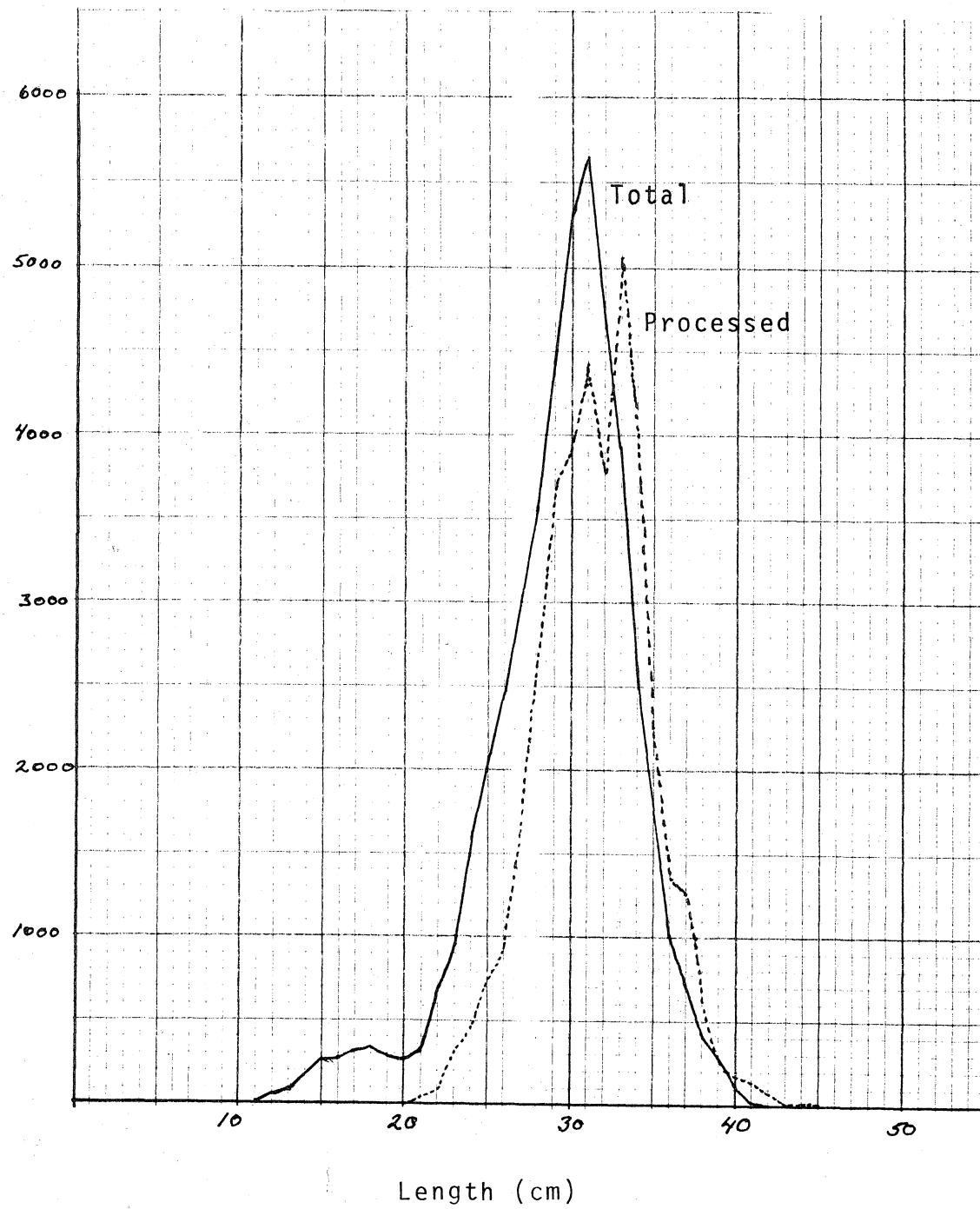


Fig. 4. Removals at length from the 1980 Silver Hake
Scotian Shelf fishery.

CATCH COMPOSITION (KG) MAIN SPECIES AND EFFORT 1979 INTERNATIONAL OBSERVER DATA

COUNTRY: BULGARIA		DIVISION : ALL		GEAR TYPE: ALL		MESH SIZE: ALL				
HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLOCK	MACKEREL	WITCH	OTHER
SILVERHAKE	27540.	3710675.	373612.	5.	713.	1208.	67185.	3084.	3442.	4305.
CATCH/DAY	162.0	21827.5	2197.7	0	4.2	7.1	395.2	18.1	20.2	63.
CATCH/HOUR	11.6	1558.5	156.9	0	.3	.5	28.2	1.3	1.4	55689.
DAYS	170	HOURS	2381.3							
SQUID	1295.	57682.	835715.	0.	254.	38.	3105.	0.	60.	131.
CATCH/DAY	38.1	1696.5	24579.9	0.0	7.5	1.1	91.3	0.0	1.8	5.
CATCH/HOUR	5.0	132.1	1914.0	0.0	.6	.1	7.1	0.0	.1	4104.
DAYS	34	HOURS	436.6							
ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	120.7
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0							
SILVERHAKE										
SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0							
MIXED										
FISHERY	17.	2060.	5230.	0.	75.	2.	4265.	17.	5.	439.
CATCH/DAY	2.8	343.3	871.7	0.0	12.5	.3	710.8	2.8	.8	0.
CATCH/HOUR	.4	49.0	124.3	0.0	1.8	.0	101.4	.4	.1	73.1
DAYS	6	HOURS	42.1							10.4
TOTAL										
CATCH	28852.	3770417.	1214557.	5.	1042.	1248.	74555.	3101.	3507.	68.
CATCH/DAY	137.4	17954.4	5783.6	0	5.0	5.9	355.0	14.8	16.7	60231.
CATCH/HOUR	10.1	1318.3	424.7	0	.4	.4	26.1	1.1	1.2	3
DAYS	210	HOURS	2860.0							286.8

Appendix I.

CATCH COMPOSITION (KG) MAIN SPECIES

AND EFFORT 1979 INTERNATIONAL OBSERVER DATA

COUNTRY: CUBA

DIVISION : ALL

GEAR TYPE: ALL

MESH SIZE: ALL

	HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM.	PLAICE	YELLOWTAIL	COD	REDISH	POLLOCK	MACKEREL	WITCH	OTHER
SILVERHAKE	13546.	1530958.	152661.	85.	73.	8.	3277.	3204.	19530.	56791.	55.	800R.
CATCH/DAY	145.7	16461.9	1641.5	.9	.8	.1	35.2	34.5	210.0	610.7	.6	86.1
CATCH/HOUR	13.6	1532.6	152.8	.1	.1	.0	3.3	3.2	19.6	56.9	.1	8.0
DAYS	93	HOURS	998.9									

	SQUID	1053.	129893.	2002127.	100.	1.	75.	2310.	0.	13520.	2510.	0.	10044.
CATCH/DAY	9.2	1129.5	17409.8	.9	.0	.7	20.1	20.2	0.0	117.6	21.8	0.0	87.3
CATCH/HOUR	1.0	125.3	1931.5	.1	.0	.1			0.0	13.0	2.4	0.0	9.7
DAYS	115	HOURS	1036.5										

	ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0										

	SILVERHAKE	SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0										

	MIXED FISHERY	2455.	1225.	20790.	0.	0.	0.	65.	0.	20650.	0.	0.	1260.
CATCH/DAY	487.0	245.0	4158.0	0.0	0.0	0.0	0.0	13.0	0.0	4130.0	0.0	0.0	252.0
CATCH/HOUR	86.9	43.7	742.2	0.0	0.0	0.0	0.0	2.3	0.0	737.2	0.0	0.0	45.0
DAYS	5	HOURS	28.0										

	TOTAL CATCH	17034.	16662076.	2175578.	185.	74.	83.	5652.	3204.	53700.	59301.	55.	19312.
CATCH/DAY	80.0	7803.2	10214.0	.9	.3	.4	.0	26.5	15.0	252.1	278.4	.3	90.7
CATCH/HOUR	8.3	605.5	1054.3	.1	.0	.0	.0	2.7	1.6	26.0	28.7	.0	9.4
DAYS	213	HOURS	2063.5										

CATCH COMPOSITION (KG)

1979 INTERNATIONAL OBSERVER DATA

COUNTRY: FED.REPUB.

MAIN SPECIES

AND EFFORT

DIVISION : ALL

GEAR TYPE: ALL

MESH SIZE: ALL

	HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLOCK	MACKEREL	WITCH	OTHER
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0
SQUID	51.	9482.	844150.	0.	6.	0.	98.	0.	5114.	0.	0.
CATCH/DAY	1.0	305.9	27230.6	0.0	.2	0.0	3.2	0.0	165.0	0.0	0.0
CATCH/HOUR	.1	39.5	3512.6	0.0	.0	0.0	.4	0.0	21.3	0.0	0.0
DAYS	31		240.3								

	ARGENTINE	SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.
ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0

	SILVERHAKE	SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0

	MIXED	FISHERY	0.	0.	0.	0.	0.	0.	0.	0.	0.
MIXED	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FISHERY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0

	TOTAL	CATCH	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH	31.	9482.	844150.	0.	6.	0.	98.	0.	5114.	0.	0.
CATCH/DAY	1.0	305.9	27230.6	0.0	.2	0.0	3.2	0.0	165.0	0.0	0.0
CATCH/HOUR	.1	39.5	3512.6	0.0	.0	0.0	.4	0.0	21.3	0.0	0.0
DAYS	31		240.3								

COUNTRY: FRANCE-MET DIVISION : ALL MAIN SPECIES AND EFFORT

1979 INTERNATIONAL OBSERVER DATA

			GEAR TYPE: ALL						MESH SIZE: ALL			OTHER		
			SILVERHAKE	SQUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLOCK	MACKEREL	WITCH			
SILVERHAKE	0.	1600.	800.	0.	0.	400.	0.	0.	0.	0.	0.	0.	100.	
CATCH/DAY	0.0	1600.0	800.0	0.0	0.0	400.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
CATCH/HOUR	0.0	94.1	47.1	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	5.9	
DAYS	1	HOURS	17.0											
SQUID	190.	26765.	1372270.	0.	8.	0.	2010.	0.	0.	0.	0.	0.	2984.	
CATCH/DAY	3.0	418.2	21441.7	0.0	.1	0.0	31.4	0.0	0.0	0.0	0.0	0.0	46.6	
CATCH/HOUR	.2	27.2	1394.8	0.0	.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	3.0	
DAYS	64	HOURS	983.9											
ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DAYS	0	HOURS	0.0											
SILVERHAKE														
SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
DAYS	0	HOURS	0.0											
MIXED FISHERY	1960.	0.	0.	0.	4035.	0.	846470.	10730.	3210.	0.	0.	0.	7240.	
CATCH/DAY	32.1	0.0	0.0	0.0	66.1	0.0	13876.6	175.9	52.6	0.0	0.0	0.0	116.7	
CATCH/HOUR	2.3	0.0	0.0	0.0	4.7	0.0	981.4	12.4	3.7	0.0	0.0	0.0	8.4	
DAYS	61	HOURS	862.5											
TOTAL CATCH	2150.	28365.	1373070.	0.	4043.	0.	848880.	10730.	3210.	0.	0.	0.	10324.	
CATCH/DAY	17.1	225.1	10997.4	0.0	32.1	0.0	6737.1	85.2	25.5	0.0	0.0	0.0	81.9	
CATCH/HOUR	1.2	15.2	736.9	0.0	2.2	0.0	455.6	5.8	1.7	0.0	0.0	0.0	5.5	
DAYS	126	HOURS	1863.4											

CATCH COMPOSITION (KG) MAIN SPECIES AND EFFORT

COUNTRY: ITALY DIVISION : ALL

GEAR TYPE: ALL

MESH SIZE: ALL

1979 INTERNATIONAL OBSERVER DATA

	HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLACK	MACKEREL	WITCH	OTHER
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0
SQUID	2.	2059.	1220880.	19.	247.	0.	597.	29.	13.	0.	4513.
CATCH/DAY	0.0	27.1	16064.2	0.3	3.3	0.0	7.9	0.4	0.2	0.0	59.4
CATCH/HOUR	0.0	3.7	2178.9	0.0	0.4	0.0	1.1	0.1	0.0	0.3	8.1
DAYS	76	560.3	560.3								
HOURS											
ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0
MIXED											
FISHERY	0.	4150.	0.	0.	8950.	0.	27500.	0.	0.	100.	17650.
CATCH/DAY	0.0	1383.3	0.0	0.0	2983.3	0.0	9166.7	0.0	0.0	33.3	5883.3
CATCH/HOUR	0.0	171.8	0.0	0.0	370.4	0.0	1138.2	0.0	0.0	4.1	730.5
DAYS	3	24.2	0	0							
TOTAL											
CATCH	2.	6209.	1220880.	19.	9197.	0.	597.	27529.	13.	0.	251.
CATCH/DAY	0.0	78.6	15454.2	0.2	116.4	0.0	7.6	348.5	0.2	0.0	3.2
CATCH/HOUR	0.0	10.6	2088.8	0.0	15.7	0.0	47.1	1.0	0.0	0.0	280.5
DAYS	79	584.5	584.5								37.9

CATCH COMPOSITION (KG) MAIN SPECIES AND EFFORT

COUNTRY: JAPAN DIVISION : ALL

	HADDOCK	SILVERHAKE	SQUID	ARGENTINE AN.	PLAICE	YELLOWTAIL	GEAR TYPE: ALL	MESH SIZE: ALL
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0	0.0	0.0	0.0	0.0	0.0

SQUID	3298.	32127.	3411161.	33144.	692.	0.	1105.	117.
CATCH/DAY	13.6	132.2	14037.7	136.4	2.8	0.0	4.5	.5
CATCH/HOUR	1.6	15.8	1678.1	16.3	.3	0.0	.5	.1
DAYS	243	HOURS	2032.7					

ARGENTINE	11229.	5264.	176371.	52507.	3.	0.	946.	197.
CATCH/DAY	181.1	84.9	2844.7	8911.4	.0	0.0	15.3	3.2
CATCH/HOUR	18.2	8.5	285.6	894.7	.0	0.0	1.5	.3
DAYS	62	HOURS	617.6					

SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0					

MIXED FISHERY	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	161	HOURS	2493.1					

TOTAL CATCH	14527.	37391.	3587532.	585651.	695.	0.	2051.	314.
CATCH/DAY	51.2	80.2	7698.6	1256.8	1.5	0.0	4.4	.7
CATCH/HOUR	2.8	7.3	697.5	113.9	.1	0.0	.4	.1
DAYS	466	HOURS	5143.4					

1979 INTERNATIONAL OBSERVER DATA

COUNTRY: POLAND DIVISION: ALL GEAR TYPE: ALL MESH SIZE: ALL

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161•3
14•3

CATCH COMPOSITION (KG)

MAIN SPECIES AND EFFORT

1979 INTERNATIONAL OBSERVER DATA

COUNTRY: PORTUGAL

DIVISION : ALL

GEAR TYPE: ALL

MESH SIZE: ALL

HADDOCK SILVERHAKE SQUID ARGENTINE AN. PLAIC T. YELLOWTAIL COD REDFISH POLLACK MACKEREL WITCH OTHER

SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	HOURS	0.0							

SQUID	0.	1610.	846960.	0.	111.	0.	25.	0.	2.	0.	1.
CATCH/DAY	0.0	37.4	19696.7	0.0	2.6	0.0	.6	0.0	0.0	0.0	11.6
CATCH/HOUR	0.0	3.5	1862.3	0.0	.2	0.0	.1	0.0	0.0	0.0	1.1
DAYS	43		HOURS	454.8							

ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	HOURS	0.0							

SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	HOURS	0.0							

MIXED FISHERY	0.	0.	10.	0.	65.	0.	4265.	200.	0.	0.	325.
CATCH/DAY	0.0	0.0	1.7	0.0	10.8	0.0	714.2	33.3	0.0	0.0	325.
CATCH/HOUR	0.0	0.0	1	0.0	.9	0.0	57.6	2.7	0.0	0.0	8745.
DAYS	6		HOURS	74.4							

TOTAL CATCH	0.	1610.	846970.	0.	176.	0.	4310.	200.	2.	0.	326.
CATCH/DAY	0.0	32.9	17285.1	0.0	3.6	0.0	88.0	4.1	0	0.0	326.
CATCH/HOUR	0.0	3.0	1600.5	0.0	.3	0.0	8.1	.4	0	0.0	9242.
DAYS	49		HOURS	529.2							

TOTAL CATCH	0.	1610.	846970.	0.	176.	0.	4310.	200.	2.	0.	326.
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CATCH/DAY	0.0	32.9	17285.1	0.0	3.6	0.0	88.0	4.1	0	0.0	326.
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CATCH/HOUR	0.0	3.0	1600.5	0.0	.3	0.0	8.1	.4	0	0.0	9242.
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DAYS	49		HOURS	529.2							
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CATCH COMPOSITION (KG)			MAIN SPECIES AND EFFORT			1979 INTERNATIONAL OBSERVER DATA						
COUNTRY: ROMANIA			DIVISION : ALL			GEAR TYPE: ALL			MESH SIZE: ALL			
	HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLOCK	MACKEREL	WITCH	OTHER	
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
SQUID	0.	278.	436470.	0.	0.	0.	0.	0.	0.	0.	0.	4000.
CATCH/DAY	0.0	17.4	27279.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.0
CATCH/HOUR	0.0	2.1	3340.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.6
DAYS	16	16	130.7									
ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
SILVERHAKE												
SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
MIXED FISHERY	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CATCH	0.	278.	436470.	0.	0.	0.	0.	0.	0.	0.	0.	4000.
CATCH/DAY	0.0	17.4	27279.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.0
CATCH/HOUR	0.0	2.1	3340.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.6
DAYS	16	16	130.7									

CATCH COMPOSITION (KG) MAIN SPECIES AND EFFORT

COUNTRY: SOVIET SOC DIVISION : ALL

	HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLACK	MACKEREL	WITCH	OTHER
SILVERHAKE	94795.	19638075.	2006831.	59037.	4915.	2094.	168047.	20180.	287310.	93885.	453.
CATCH/DAY	122.5	25372.2	2592.8	76.3	6.4	2.7	217.1	26.1	371.2	121.3	.6
CATCH/HOUR	9.6	1983.8	202.7	6.0	.5	.2	17.0	2.0	29.0	9.5	.0
DAYS	774	HOURS	9899.4								217.6

	SQUID	2535.	310065.	2557911.	3780.	960.	408.	26721.	306.	5714.	562.
CATCH/DAY	22.2	2719.9	22437.8	33.2	8.4	3.6	234.4	2.7	50.1	4.9	.5
CATCH/HOUR	2.2	265.0	2186.5	3.2	.8	.3	22.8	.3	4.9	.5	.0
DAYS	114	HOURS	1169.8								73.4

	ARGENTINE	252.	25.	8800.	18875.	0.	0.	90.	0.	10.	0.
CATCH/DAY	63.0	6.3	2200.0	4718.8	0.0	0.0	22.5	0.0	2.5	0.0	.0
CATCH/HOUR	12.0	1.2	417.5	895.4	0.0	0.0	4.3	0.0	.5	0.0	.0
DAYS	4	HOURS	21.1								47.

	SILVERHAKE	SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0.0								0.0

	MIXED FISHERY	50.	21181.	0.	0.	0.	0.	0.	584.	29100.	287.
CATCH/DAY	25.0	10590.5	0.0	0.0	0.0	0.0	0.0	0.0	292.0	14550.0	143.5
CATCH/HOUR	2.5	1067.6	0.0	0.0	0.0	0.0	0.0	0.0	29.4	1466.7	14.5
DAYS	2	HOURS	19.8								364.5

	TOTAL CATCH	97632.	19969346.	4573542.	81692.	5875.	2502.	194858.	21070.	322134.	94734.
CATCH/DAY	109.2	22337.1	5115.8	91.4	6.6	2.8	218.0	23.6	360.3	106.0	.5
CATCH/HOUR	8.8	1797.4	411.7	7.4	.5	.2	17.5	1.9	29.0	8.5	.0
DAYS	894	HOURS	1110.2								250.5

1979 INTERNATIONAL OBSERVER DATA

CATCH COMPOSITION (KG) MAIN SPECIES AND EFFORT

COUNTRY: SPAIN	DIVISION : ALL	GEAR TYPE: ALL	MESH SIZE: ALL									
			HADDOCK	SILVERHAKE	SQUID	ARGENTINE AM.	PLAICE	YELLOWTAIL	COD	REDFISH	POLLOCK	MACKEREL
SILVERHAKE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
SQUID	15.	4978.	921521.	0.	54.	3.	4610.	2.	0.	0.	0.	1.
CATCH/DAY	*2	52.4	9700.2	0.0	*6	0	48.5	0	0.0	0.0	0.0	28.8
CATCH/HOUR	.0	6.7	1231.6	0.0	.1	.0	6.2	.0	0.0	0.0	0.0	3.7
DAYS	95	HOURS	748.3									
ARGENTINE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
SILVERHAKE												
SQUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
MIXED												
FISHERY	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL												
CATCH	15.	4978.	921521.	0.	54.	3.	4610.	2.	0.	0.	0.	1.
CATCH/DAY	*2	52.4	9700.2	0.0	*6	0	48.5	0	0.0	0.0	0.0	28.8
CATCH/HOUR	.0	6.7	1231.6	0.0	.1	.0	6.2	.0	0.0	0.0	0.0	3.7
DAYS	95	HOURS	748.3									

CATCH COMPOSITION (KG) MAIN SPECIES AND EFFORT

1979 INTERNATIONAL OBSERVER DATA

COUNTRY: ALL DIVISION : ALL GEAR TYPE: ALL MESH SIZE: ALL

	HADDOCK	SILVERHAKE	SOUID	ARGENTINE AM. PLAICE	YELLOWTAIL	COD	REDFISH	POLLOCK	MACKEREL	WITCH	OTHER	
SILVERHAKE	135881.	24881308.	2533904.	59127.	5701.	3310.	238909.	26468.	310282.	154981.	571.	278634.
CATCH/DAY	130.9	23970.4	2441.1	57.0	5.5	3.2	230.2	25.5	298.9	149.3	.6	268.4
CATCH/HOUR	10.2	1871.3	190.6	4.4	.4	.2	18.0	2.0	23.3	11.7	.0	21.0
DAYS	1038	HOURS	13296.6									

	SOUID	8499.	583746.	20033894.	37043.	2333.	5224.	40726.	454.	25174.	5203.	183.	74980.
CATCH/DAY	8.5	582.6	19993.9	37.0	2.3	.5	40.6	.5	25.1	3.2	.3	.2	74.8
CATCH/HOUR	.9	60.1	2062.2	3.8	.2	.1	4.2	.0	2.6	.3	.0	.0	7.7
DAYS	1002	HOURS	9714.8										

	ARGENTINE	5289.	185171.	571382.	3.	0.	1036.	197.	1449.	8.	0.	0.	5345.
CATCH/DAY	174.0	80.1	2805.6	8657.3	.0	0.0	15.7	3.0	22.0	.1	0.0	0.0	81.0
CATCH/HOUR	18.0	8.3	289.9	894.7	.0	0.0	1.6	.3	2.3	.0	0.0	0.0	8.4
DAYS	66	HOURS	638.6										

	SILVERHAKE	SOUID	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CATCH/DAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATCH/HOUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAYS	0	HOURS	0										

	MIXED FISHERY	4462.	28616.	26030.	0.	13125.	2.	855085.	39031.	52965.	1910.	425.	312222.
CATCH/DAY	18.3	117.3	106.7	0.0	53.8	.0	3504.4	160.0	217.1	7.8	1.7	1279.6	
CATCH/HOUR	1.3	8.1	7.3	0.0	3.7	.0	241.3	11.0	14.9	.5	.1	88.1	
DAYS	244	HOURS	3544.1										

	TOTAL CATCH	160323.	25498960.	22778999.	667552.	21161.	3836.	1135756.	66150.	389870.	160102.	1180.	671185.
CATCH/DAY	68.2	10850.6	9693.2	284.1	9.0	1.6	483.3	28.1	165.9	68.1	.5	285.6	
CATCH/HOUR	5.9	937.7	837.6	24.5	.8	.1	41.8	2.4	14.3	5.9	.0	24.7	
DAYS	2350	HOURS	27194.1										