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Scotian Shelf Silver Hake: 1989 Commercial Fishery Description

by

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1989 Foreign Fishery

Distribution of fishery

The 1989 Scotian Shelf silver hake fishery began on March 15 with 2 Cuban and 2 Soviet vessels operating under an experimental permit. The normal fishing season began on April 1 and lasted until late July, 1989. In total, there were 9 Cuban and 43 Soviet fishing vessels active during the fishery.

The fishery began in the vicinity of Dawson Canyon and spread east and west along the shelf break in area 4W (Figure 1, a&b). Spatial distribution of the fishery reached a maximum in June, although the largest concentrations of vessels were always in the vicinity of Verril and Dawson Canyons. Fishing effort was primarily concentrated in area 4W, although both the USSR and Cuba expanded into area 4X in June (Figure 1, a&b).

Catch

The total catch of silver hake by the foreign fleets was 85,752t or 63.52% of the 135,000t TAC assigned by Canada (Table 1). Over 50% of the 1989 silver hake catch was taken by the middle of May (Figure 2a). Weekly catch of silver hake peaked in mid April for the USSR, late May for Cuba (Figure 2b). Past the end of June, additional effort expended by the fleets resulted in minimal catch.

Effort

Of the two countries fishing in 1989, the USSR accounted for 77.4% of the hours fished, while Cuba accounted for 22.6% of the 24,165 hours observed (Figure 3, a&b). This distribution is similar to that observed in previous years.

Weekly effort by the USSR displayed two peaks, one early in April and another early in June (Figure 4). Fishing effort by Cuba peaked in late May (week 21). Effort decreased steadily through July, with the fishery ending in week 31 (Figure 4).

Catch per unit of effort for silver hake peaked in March at nearly 18 tons per hour for the Soviet fleet and 12 tons per hour for Cuban fleet (Figure 5). In addition, peak catch rates were observed in mid April and early July. Overall, catch rates systematically decline from March until the end of the fishery in August.

With the exception of one week in early July, the Cuban catch rates closely matched those of the USSR.

By-Catch

By-catch of regulated species is always of major concern in the foreign silver hake fishery. Firm by-catch regulations are in place and enforced by the presence of Canadian observers. In 1987 and subsequent years there has been 100% Observer coverage on all foreign fleets fishing off Nova Scotia.

Overall, by-catch in the silver hake fishery was relatively low. Percentage by-catch by species, for the fishing period are presented in Figure 6, a&b. The haddock by-catch by Cuba was the only category which exceeded the regulated level.

Examination of incidental catch by week suggests that by-catch increases as the availability of silver hake decreases (Figure 7 a&b). The by-catch of haddock in the Cuban fishery rises above the 1% level beginning in late April, and continues to exceed this limit until the end of the season. Cod by-catch followed a similar trend, although levels stayed below the regulated percentage.

Similarly, the weekly by-catch of haddock in the Soviet fleet was slightly above the regulated 1% level in the later part of April. However, in total the haddock by-catch by the USSR was below 1%. As observed in the Cuban fishery, pollock and cod by-catch levels were below the regulated levels.

1989 Domestic Fishery

Fleet Activity And Catch Distribution

The 1989 domestic fishery was conducted on an experimental basis during the month of April (13 days) and early May (2 days). The major area of concentration was along the Scotian Shelf edge, amongst the foreign fleets (Figure 8).

Two experiments were conducted; the first consisted of codend transfers between < 65' domestic vessels and a Soviet commercial trawler, using bottom otter trawls. For the second experiment, the domestic vessels worked together in pair trawling, with codend transfers to the same Soviet vessel.

Catch and By-Catch

The species catch was primarily silver hake (291 tons). Complete details of by-catch are not available at this time because of difficulties in correlating observed catch aboard the

domestic vessel and that reported for the same catch aboard the receiving vessel. The available information is presented in Table 2.

For the period studied, silver hake made up 91.4% of the total catch. The other species made up approximately 10% of the total catch. The foreign fishery catch composition during the same time period was very similar (Figure 9 a&b).

Catch Rates

The Observed catch rates for the single vessel experiment were below that observed in the foreign fleet, as presented in Table 3.

Length Composition of Catch

Silver Hake

Historically, the catch of silver hake in the 4VWX fishery has targeted primarily on one or two age classes, and this pattern has remained consistent in 1989. In the foreign catch a modal length of 30 cm was predominant in all months of the fishery (Figure 10). This represents the catch of age 3 fish. A smaller, second peak was seen in June and July. This is indicative of age two fish reaching a size where they are recruited to the fishery. The size distribution of silver hake in the domestic fishery (April) very closely resembles the foreign fishery, with a modal length of 29-30 cm. (Figure 11).

Haddock

By-catch of this species by foreign vessels is of concern for the overall management of the fishery, and high by-catch of this species has prompted the closure of the fishery in the past. Size distribution of the catch was seen to vary over the course of the fishery (Figure 12). In the early months of the fishery a modal length of 31 cm (age 2) predominated in the catch, with additional peaks at 20 (age 1) and 48 (age 3) cm. However, from June to the finish of the fishery, higher proportions of age 1 fish were seen. Large haddock (40+ cm) generally occurred in small proportions, except for May. Again, the size distribution of the haddock by-catch for the domestic silver hake fishery in April very closely mirrors that of the foreign fishery (Figure 13).

Cod

The distribution of this species was also seen to change over the course of the fishery (Figure 14). In April the majority of cod in the catch were greater than 45 cm in length. However, from May on the length distribution shifted substantially towards the smaller length groups, with a modal length of 35-45 cm.

Pollock

A peak of 41-42 cm fish was seen for all months of the fishery, representing age 2-3 fish (Figure 15). Larger fish (55+ cm) were a high proportion during April, but declined steadily through the fishery and were totally absent in July. The distribution of this species in the domestic fishery differed from that of the foreign in that the modal length was slightly higher (Figure 16).

Redfish

The size distribution of this species resembled that of pollock over the course of the fishery (Figure 17). Larger size classes predominated in the early months of the fishery, but were gradually supplanted by smaller fish by July.

No length frequency samples were available from the domestic fishery for comparison.

Table 1. Catch and effort expended in the 1989 silver hake fishery (cont.).

Country	Month	Week of Year	Effort (hours)						Catch (m.t.)		
				Silver hake	Cod	Haddock	Pollock	Redfish	Flounder		
USSR	March	10			0.309439	1.371315	3.711126				
		11	11.41	13.116	0.126	0.06	0.048	0.5	0.015		
		12	46.5	205.904	0.13	0.053	2	1.333	0.116		
		13	30.48	562.8	0	0	0	1.443	0.01		
		14	476.48	3126.58	0.052	0	0.372	21.246	1.497		
	April	15	1600.03	8867.986	6.304	4.519	57.937	72.413	8.466		
		16	1776.23	7891.45	9.202	17.073	344.772	14.436	2.781		
		17	1194.13	9535.946	2.254	12.043	162.233	66.038	0.416		
		18	1311.69	7648.242	38.892	176.817	230.762	11.151	8.492		
	May	19	1398.42	5001.146	19.078	59.999	501.052	17.019	5.833		
		20	1003.54	2508.719	5.311	25.775	101.409	14.87	1.175		
		21	992.41	3055.087	4.915	34.623	50.814	3.379	4.534		
		22	1746.95	3620.134	10.421	28.716	93.679	5.842	5.039		
	June	23	1829.41	6061.869	12.466	37.795	73.671	6.394	6.417		
		24	1374.35	4214.181	13.844	33.038	49.079	0.456	0.806		
		25	880.97	1499.944	15.539	22.081	23.439	0.019	1.104		
		26	1106.16	2672.724	14.857	22.991	26.753	0.618	1.207		
	July	27	582.49	3021.376	2.612	8.585	2.082	0.064	0.043		
		28	623.06	472.138	1.064	5.456	19.87	0.438	2.338		
		29	390.57	156.056	15.61	18.683	1.605	0.21	3.984		
		30	318.41	262.557	0.978	3.608	1.55	0.282	2.359		
	August	31	12.49	1.875	0.125	1.325	2.8	0.005	0.155		
		Sum		18693.69	70397.95	173.655	511.915	1743.127	238.151	56.632	

Country	Month	Week of Year	Effort (hours)						Catch (m.t.)		
				Silver hake	Cod	Haddock	Pollock	Redfish	Flounder		
Cuba	March	11									
		12									
		13	13.24	152.61	0.71	3.3	0.08	0.675	0.015		
	April	14	116	603.033	0.697	0.05	2.48	8.73	0.371		
		15	192.3	1003.584	1.386	0.522	24.644	22.554	0.536		
		16	286.94	1179.144	1.581	3.062	51.994	7.47	0.46		
		17	201.64	1409.139	0.373	1.682	31.222	3.786	0.284		
	May	18	263.68	1590.404	7.089	39.972	50.104	0.831	2.563		
		19	556.66	1739.877	5.799	31.894	123.045	2.251	3.215		
		20	512.57	1190.054	1.227	10.985	36.051	1.561	1.409		
		21	620.69	1987.916	2.43	28.3	69.115	0.557	3.753		
	June	22	609.29	880.52	7.214	16.975	112.498	0.793	2.287		
		23	518.84	833.074	10.968	30.773	10.607	0.375	3.925		
		24	345.9	700.845	3.244	13.395	28.019	0.073	0.311		
		25	390.86	816.359	0.766	7.005	3.55	0.011	0.66		
	July	26	266.15	588.026	1.583	6.194	2.859	0.072	0.403		
		27	352.77	532.824	0.97	8.941	15.607	0.301	1.361		
		28	223.21	146.824	1.455	7.505	7.94	0.084	1.244		
		29	39.01	22.642	0.59	3.503	20.298	0.05	0.818		
	Sum		5470.74	15354.23	47.512	210.555	569.815	50.124	22.797		

Table 2. Breakdown of catch (tons) by week for the 1989 Canadian silver hake fishery.

Domestic Weekly Catches				
Week	Silver hake	Cod	Haddock	Pollock
15	34.345	.070	.195	.298
16	191.860	.038	.413	9.121
17	45.738	.030	.500	13.433
19 ¹	19.550	.050	2.667	.332
Total	291.493	.188	3.775	23.184

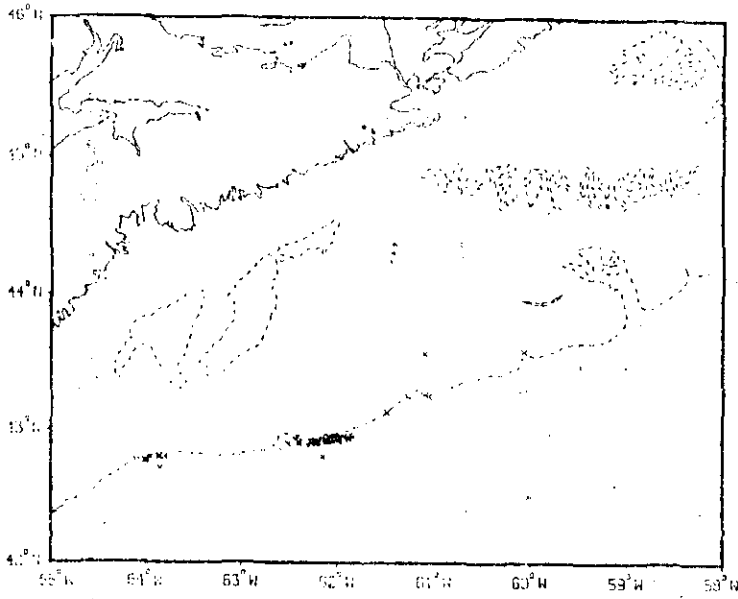
¹ Pair trawling experiment

Table 3. Weekly catch per unit of effort (tons/hour) for the 1989 Canadian silver hake fishery. Catch rates from the foreign fishery for vessels fishing in similar areas at the same time are provided for comparison purposes.

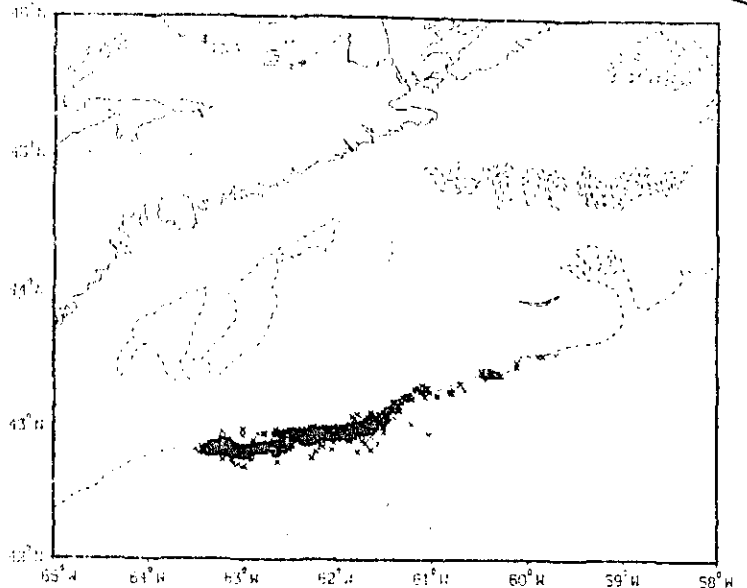
Week	Domestic CPUE	Foreign CPUE
15	0.5	4.5
16	1.1	6.6
17	0.6	3.0
19 ¹	1.2	4.7

¹ Pair trawling experiment

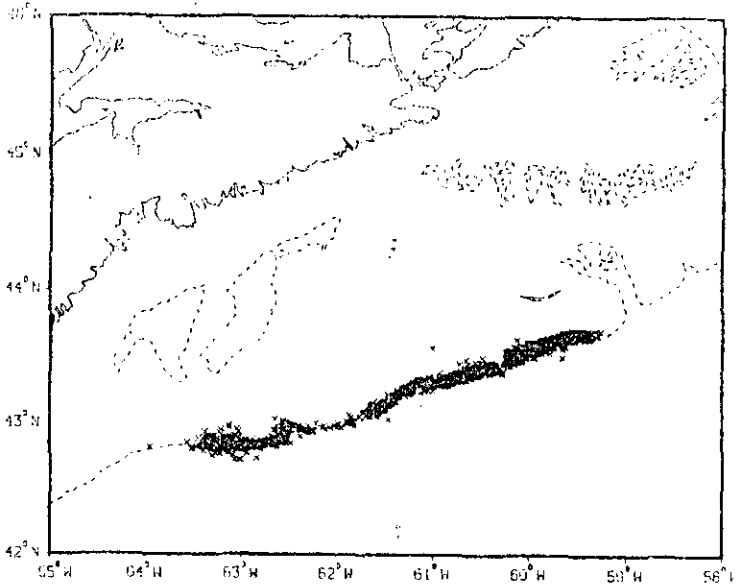
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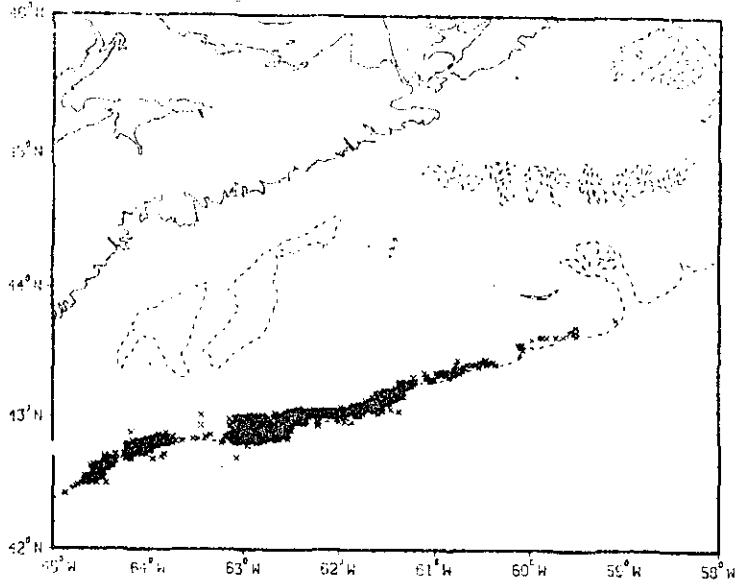
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MAY 1989



JUNE 1989



JULY 1989

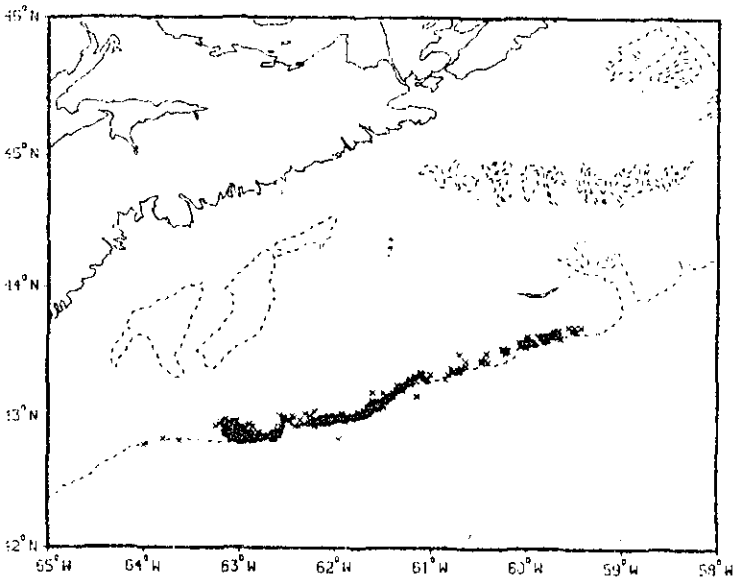


Figure 1a. Distribution of fishing locations by the USSR in 1989.

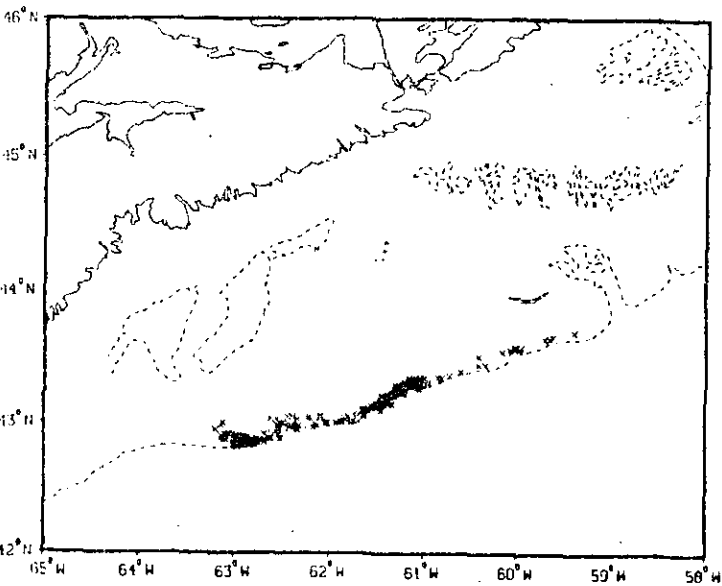
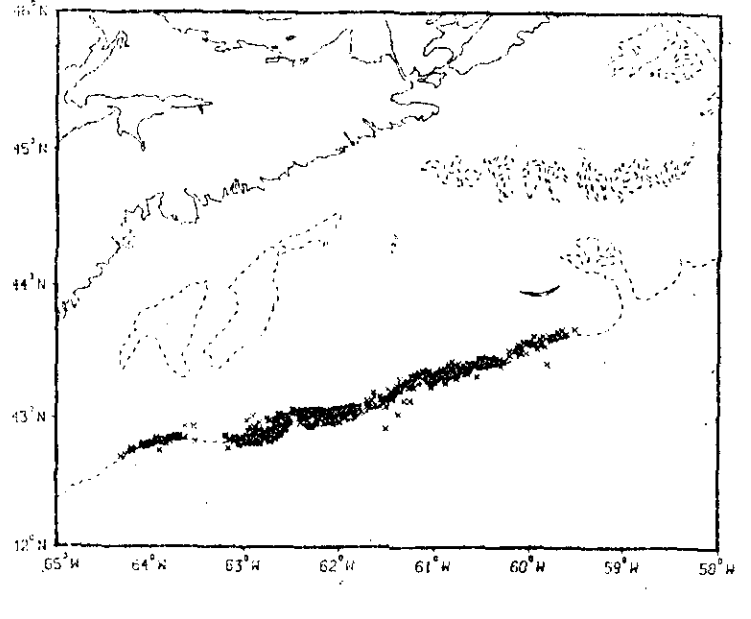
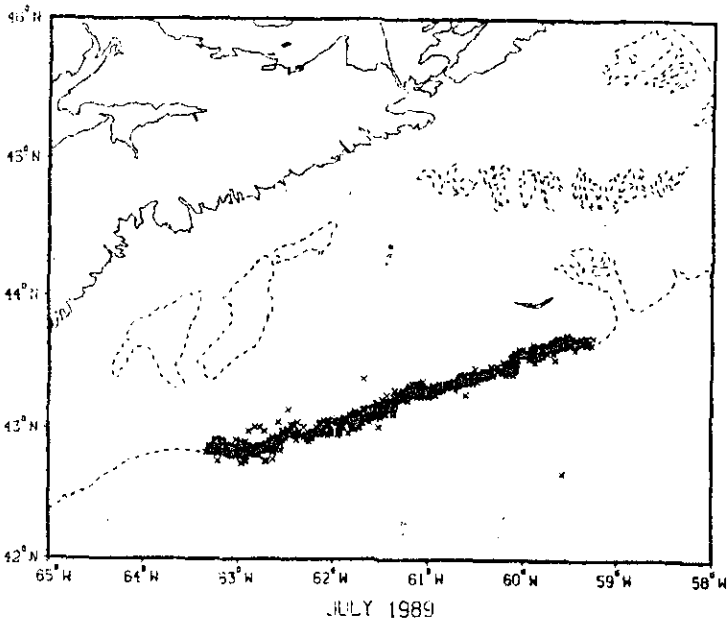
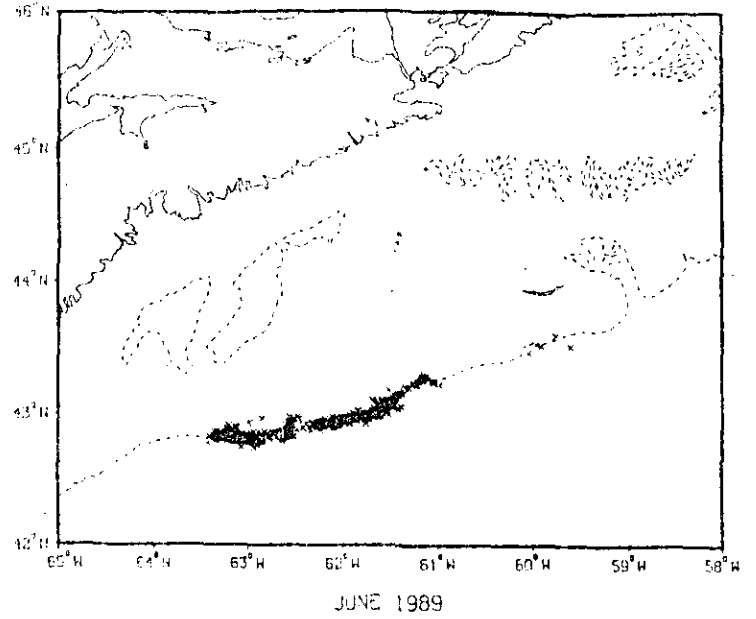
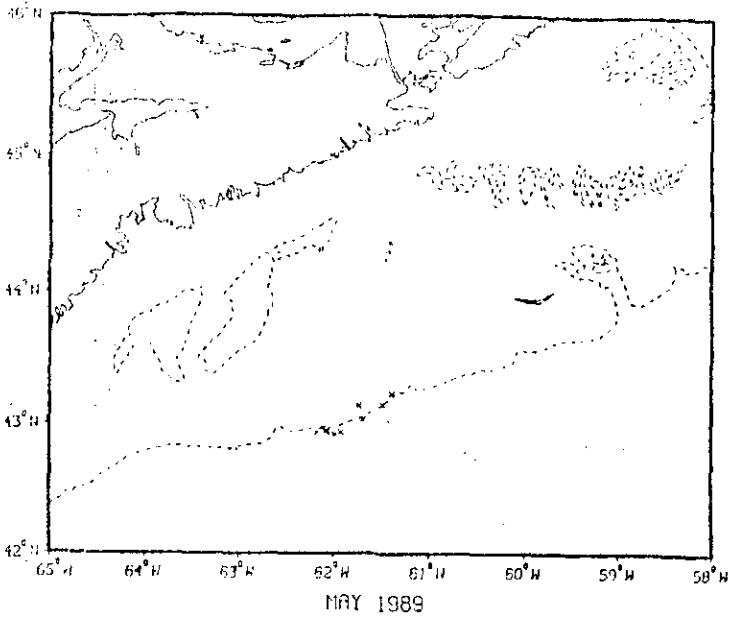


Figure 1b. Distribution of fishing locations by Cuba in 1989.

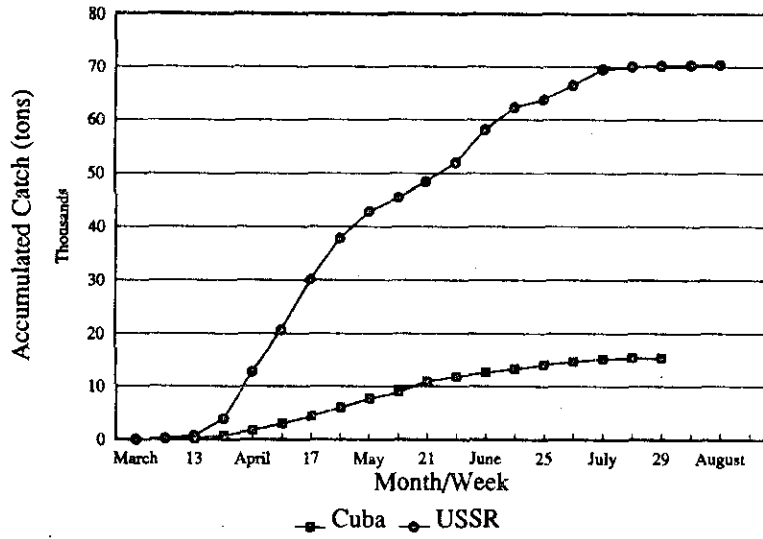


Figure 2a: Observed 1989 accumulated catch of silver hake.

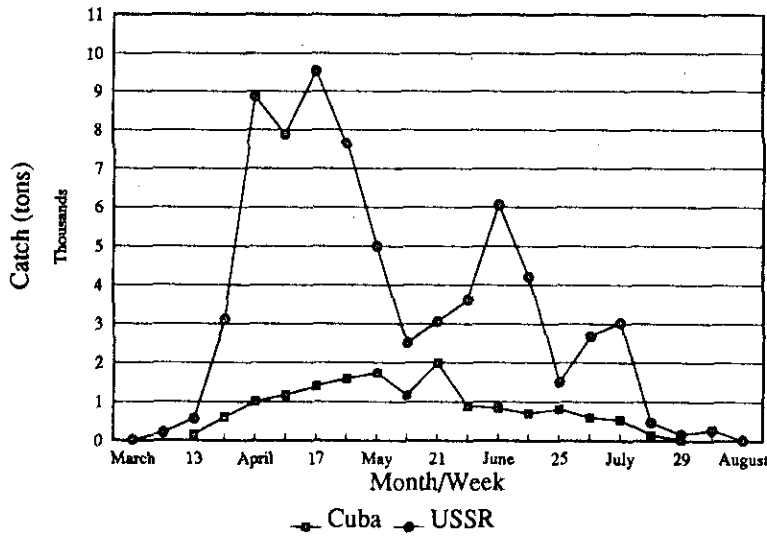


Figure 2b: Observed 1989 foreign directed silver hake catch.

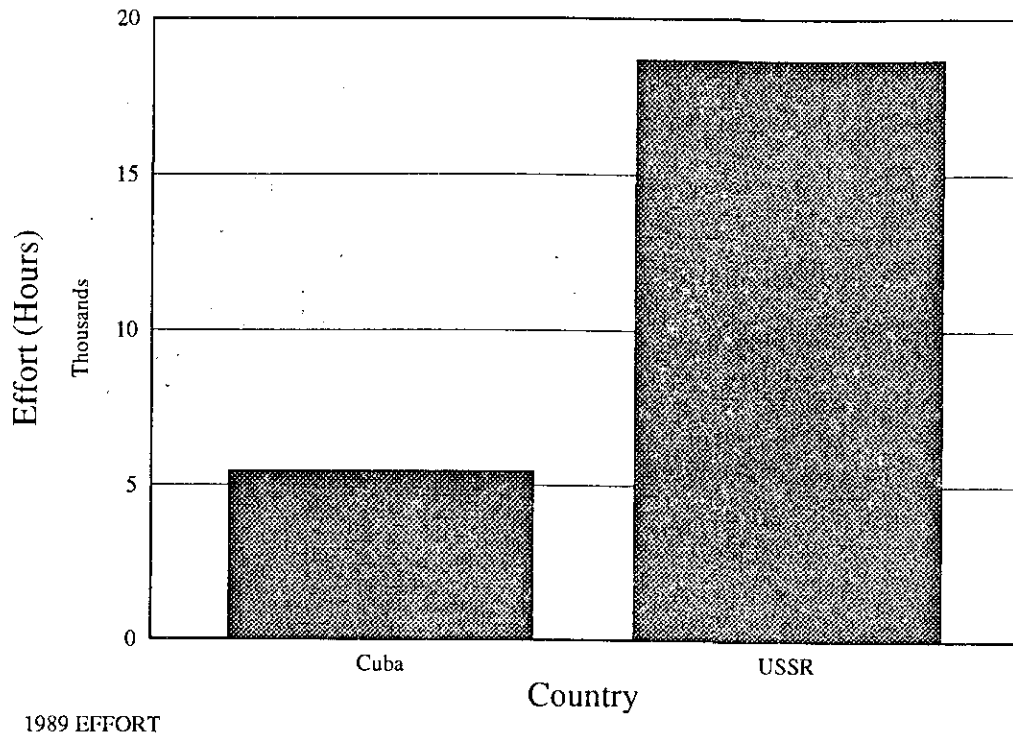
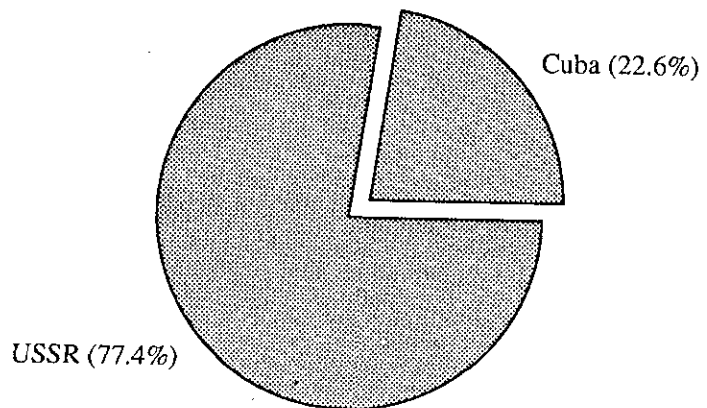


Figure 3a: Total effort, foreign Scotian Shelf silver hake fishery.



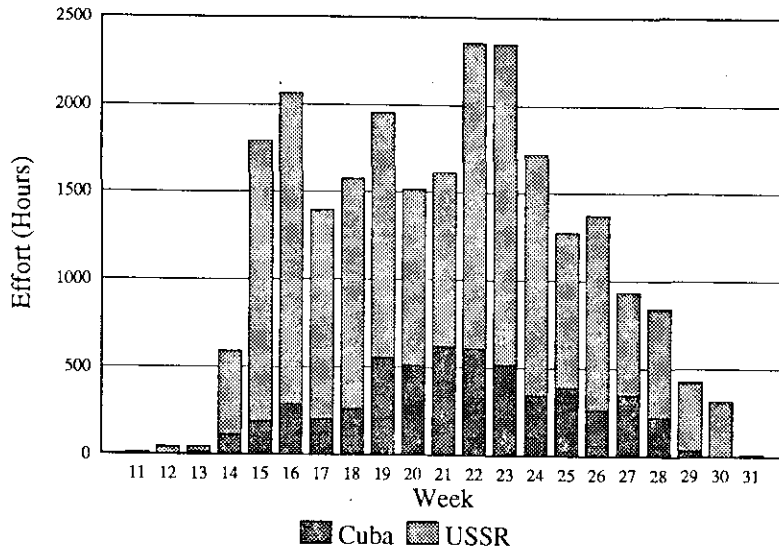
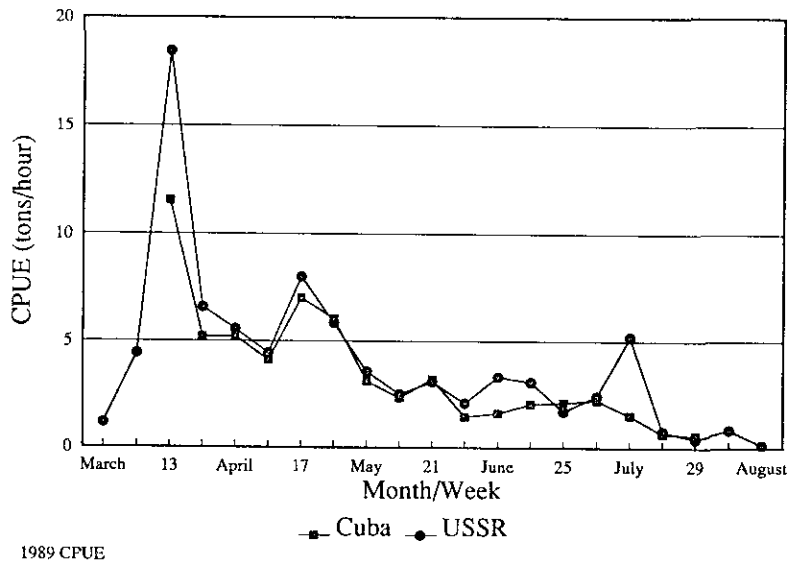


Figure 4: Fishing effort by week, 1989 foreign silver hake fishery.



1989 CPUE

Figure 5: CPUE for Cuba and the USSR, 1989 silver hake fishery.

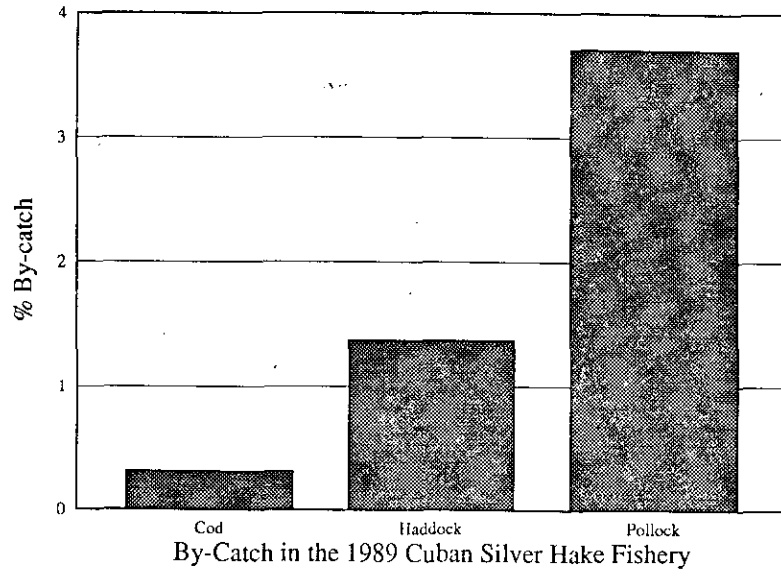


Figure 6a:

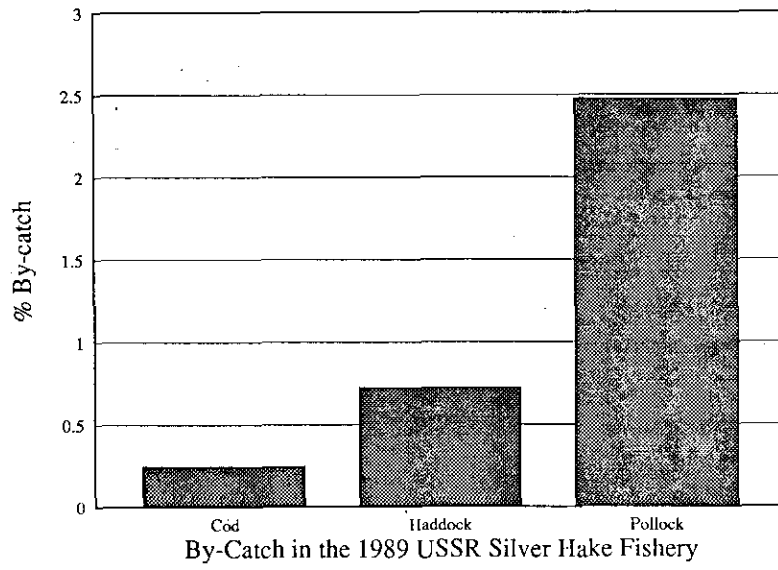


Figure 6b.

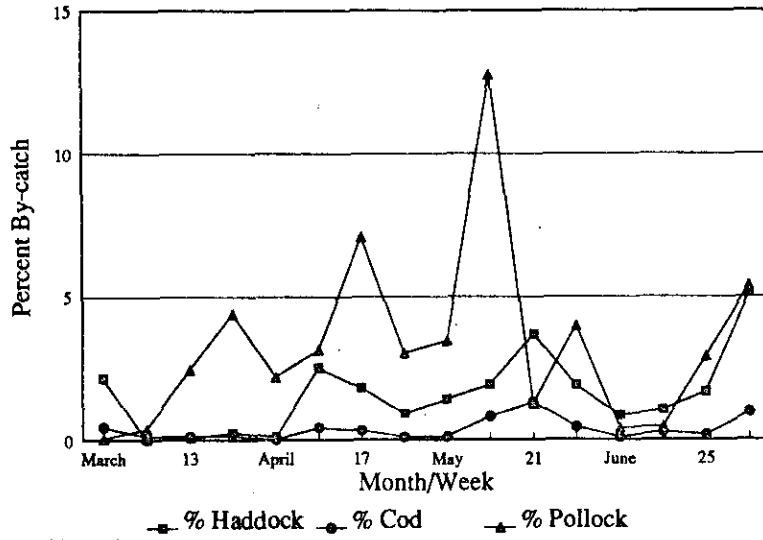


Figure 7a: Observed percent by-catch in the 1989 Cuban silver hake fishery.

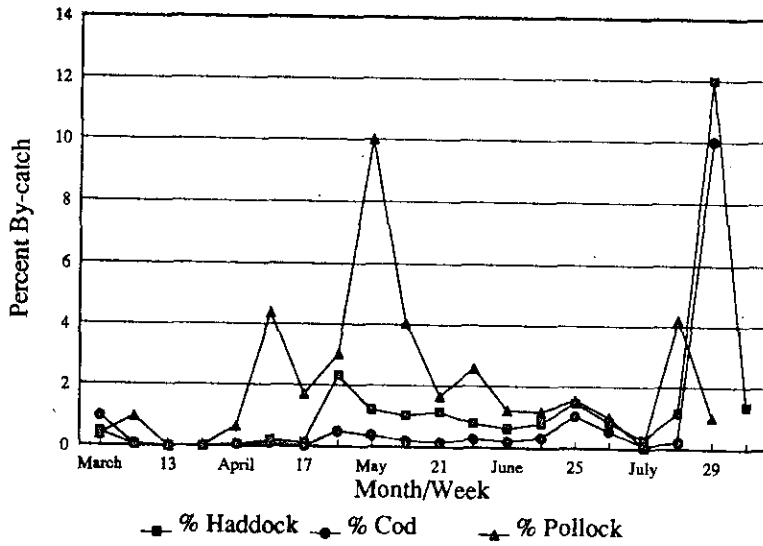


Figure 7b: Observed percent by-catch in the 1989 USSR silver hake fishery.

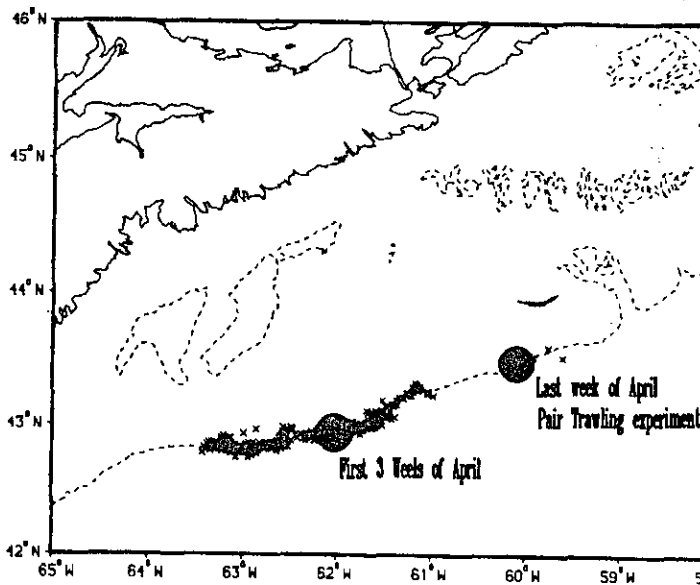


Figure 8. Map showing distribution of foreign (x) and domestic (circles) during the month of April 1989.

Domestic Fleet

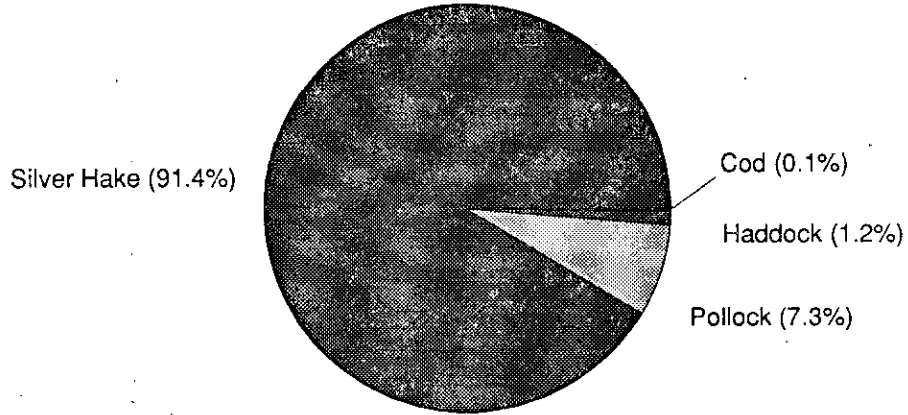


Figure 9a. Catch composition, 1989 domestic silver hake fishery.

Foreign Fleet

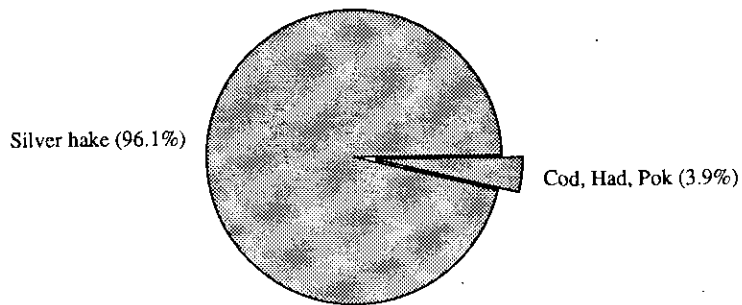


Figure 9b. Catch composition, 1989 foreign silver hake fishery.

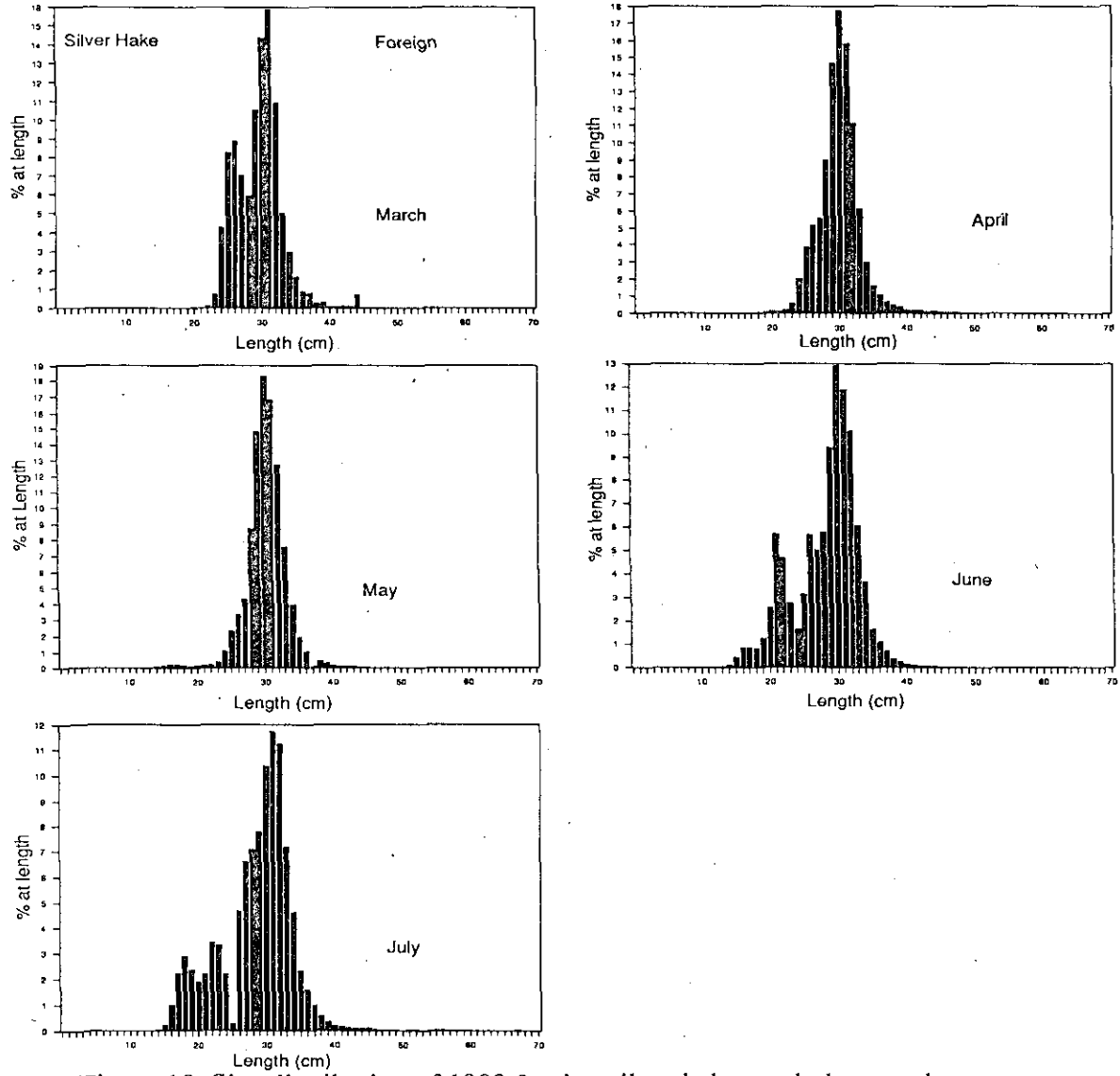


Figure 10. Size distribution of 1989 foreign silver hake catch, by month.

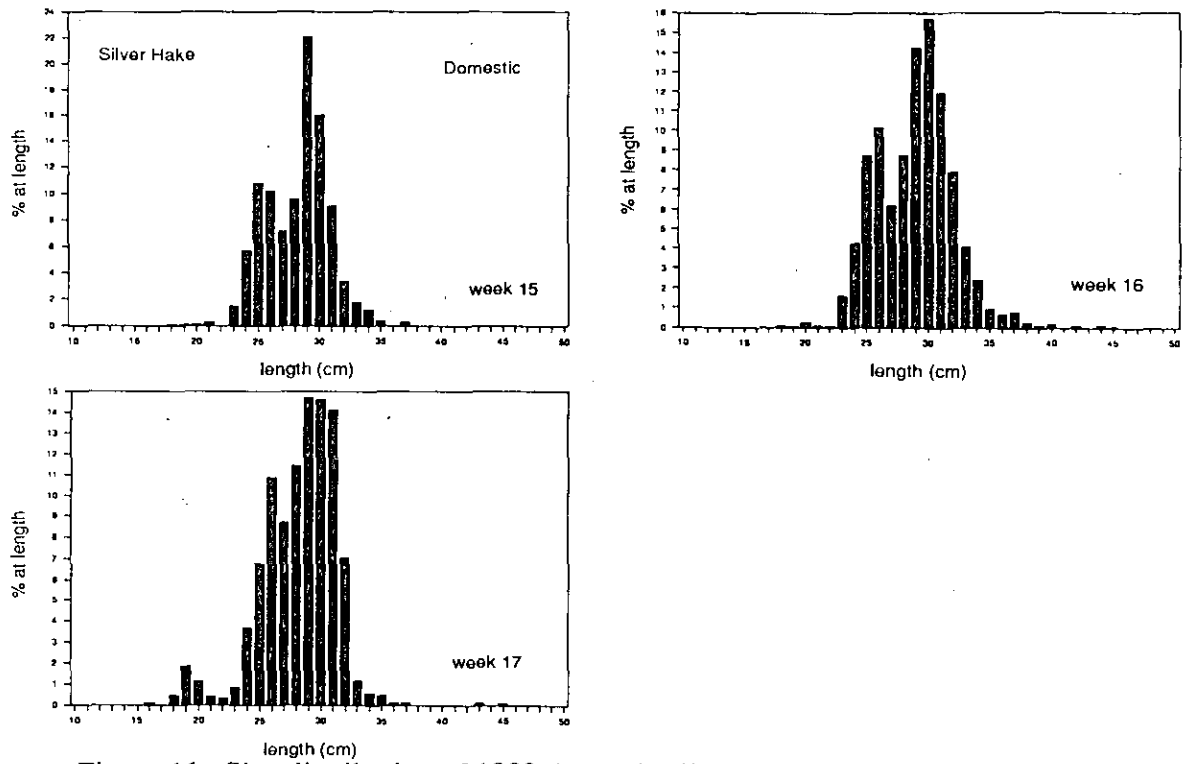


Figure 11. Size distribution of 1989 domestic silver hake catch, by week.

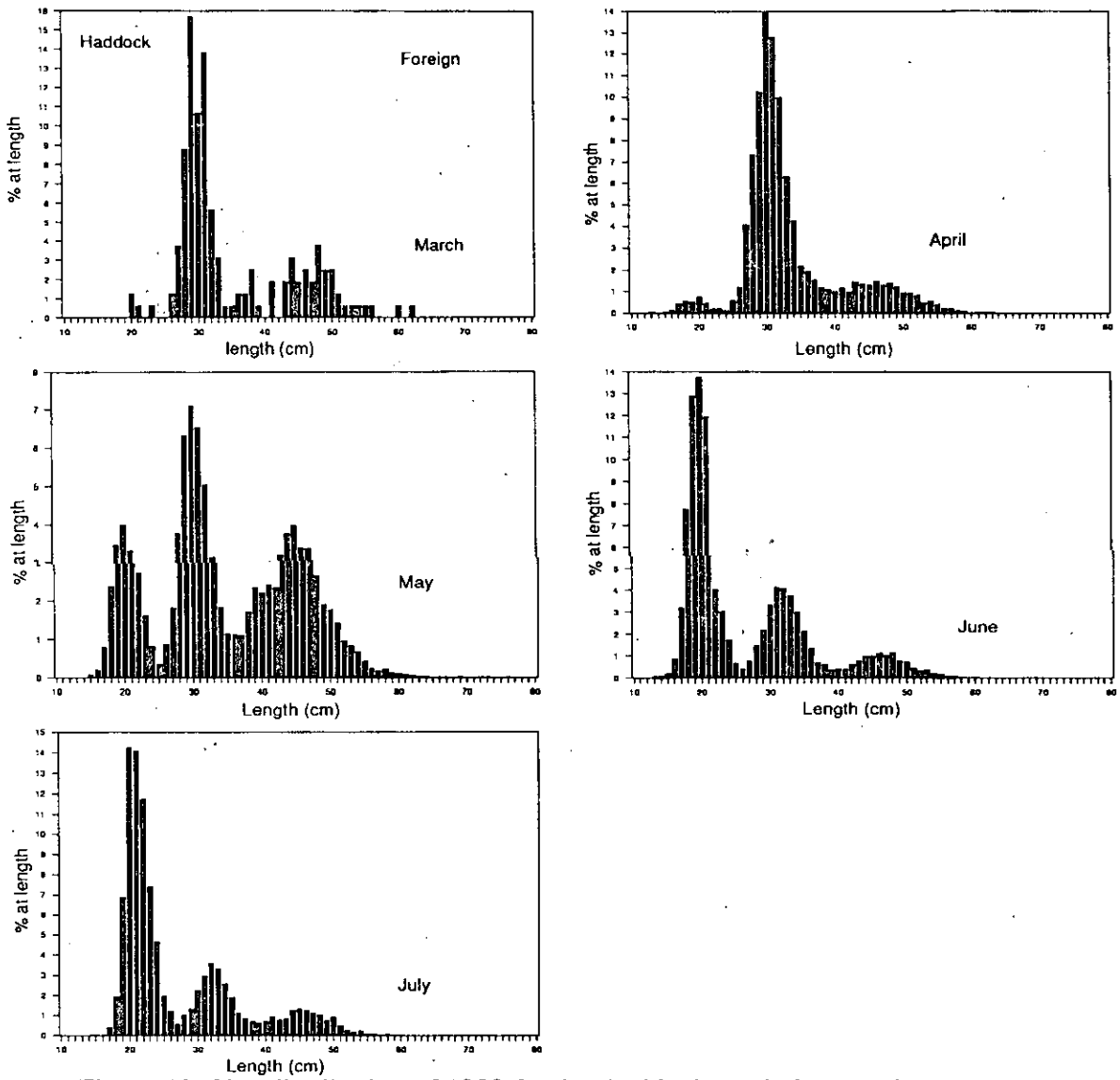


Figure 12. Size distribution of 1989 foreign haddock catch, by month.

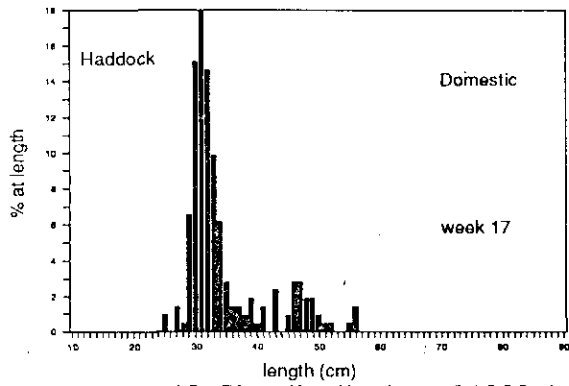


Figure 13. Size distribution of 1989 domestic haddock catch, by week.

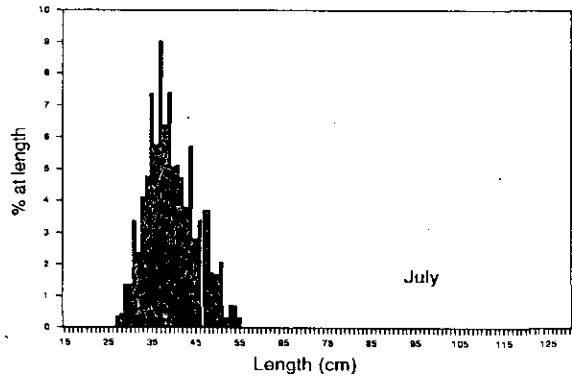
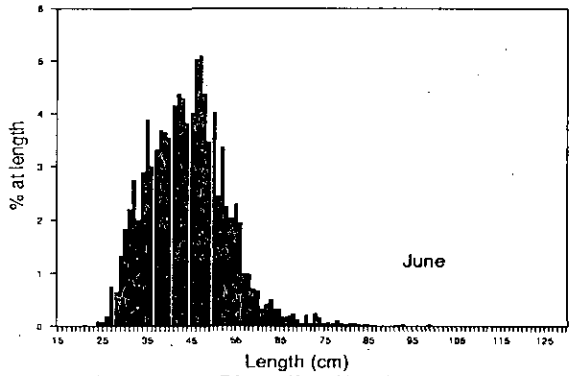
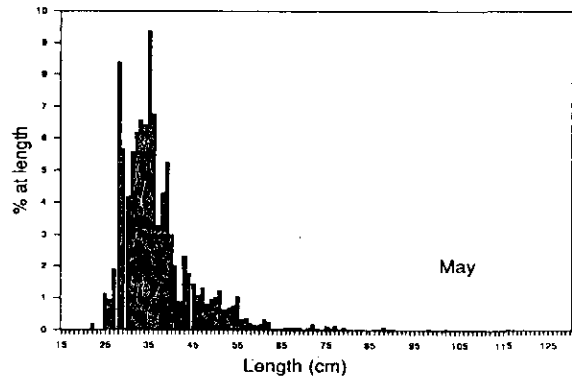
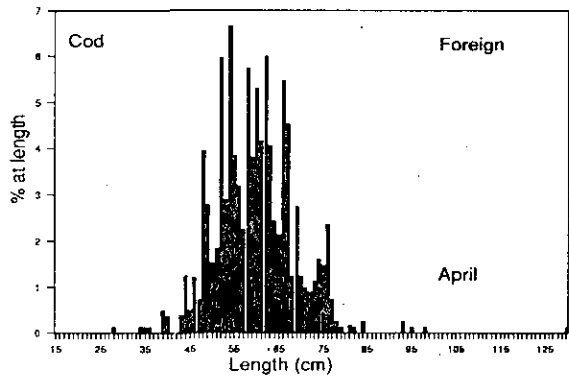


Figure 14. Size distribution of 1989 foreign cod catch, by month.

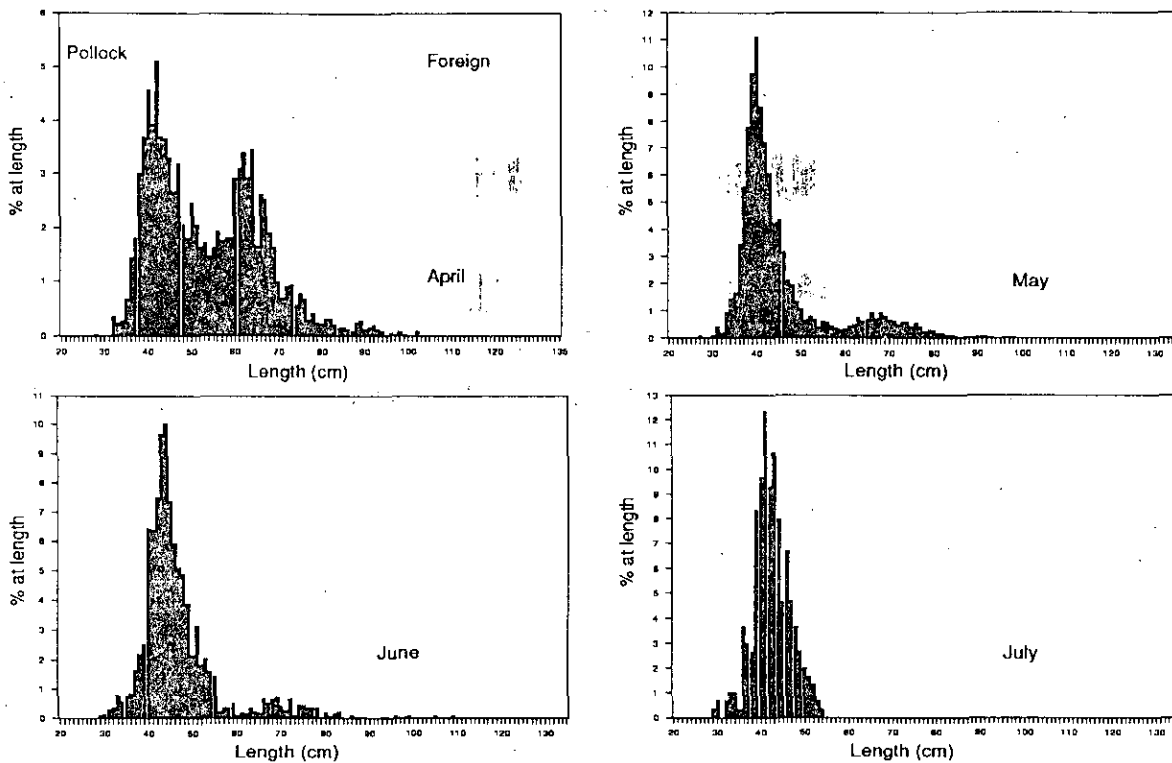


Figure 15. Size distribution of 1989 foreign pollock catch, by month.

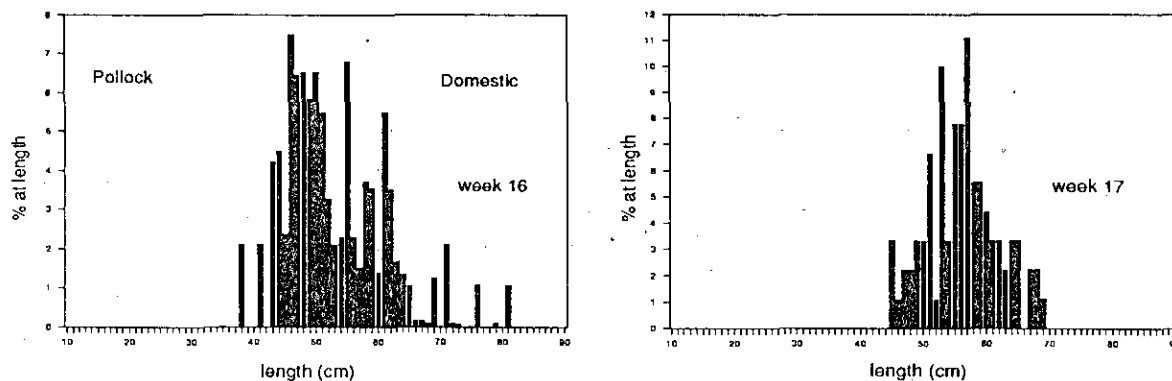


Figure 16. Size distribution of 1989 domestic pollock catch, by week.

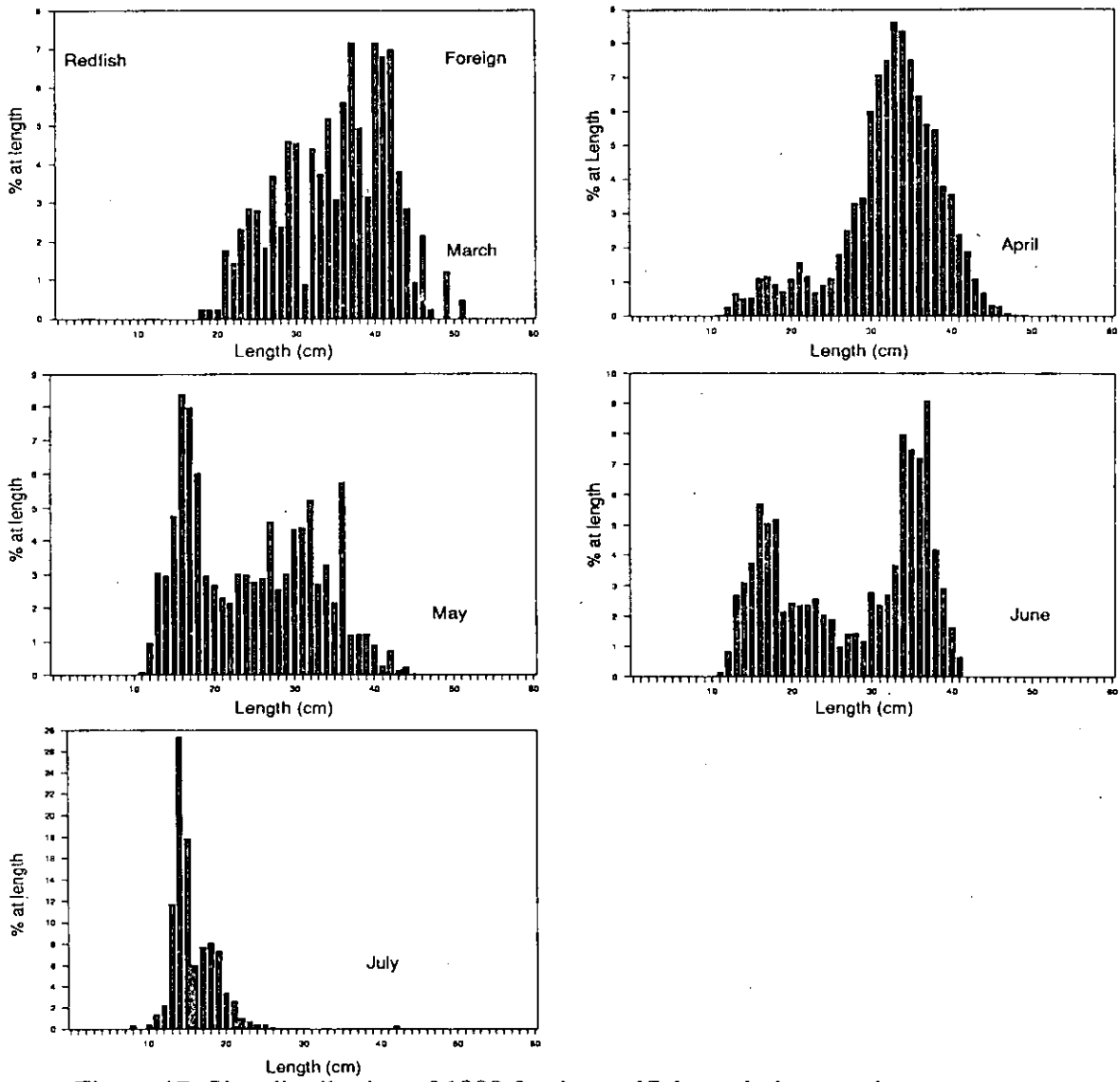


Figure 17. Size distribution of 1989 foreign redfish catch, by month.