

International Council for the
Exploration of the Sea

C.M. 1963
Gadoid Fish Committee
No. 68 ←

Features of Cod Distribution in the Southern
Part of the Barents Sea (Area I) in 1962

by

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In 1962 the distribution of cod in the southern part of the Barents Sea was characterized by the following features:-

The migration paths on which immature cod feeding on capelin moved to the southern coast lay more easterly in 1962 than in 1961. In April the mass migration of the "capelin" cod (loddetorsk) to the Murman coast was observed. The sector of the coast extending from the Varangerfjord up to 38°E appeared to be an area of successful trawl fishery. 4-5 years old cod of 40-60 cm in length predominated in the catches.

Long ago the Soviet ichthyologists predicted that in 1962 the "capelin" cod would migrate to the shores chiefly following easterly paths. At present it may be taken for granted that temperature conditions on the Kola hydrological section in November and the natural basis of fishery near the Murman coast in March/April of the next calendar year are in good agreement. The Figure shows the comparison of water temperature in the 50-200 m layer and the importance for the fishery of the above-mentioned sector of the coast extending from the Varangerfjord up to the meridian of 38°. In this report the term "fishery importance" means a catch taken in the area under question in percentage of the catch from the whole southern part of the Barents Sea (excluding the Thor Iversen's Bank and some eastern areas). In the Figure the fishery importance is shown with a dotted line, water temperature - with a solid one.

It is evident from the Figure that, as a rule, the higher the water temperature is in November the greater is the fishery importance of the Murman coast in the next spring; 1953 is the only not quite comprehensible exception. The Figure also shows that the spring of 1962 was preceded by conditions which were more favourable to the easterly migrations of "capelin" cod than the previous year. It should be added that the natural basis of the spring fishery of "capelin" cod (and also of capelin) near the northern coast of Norway, on the contrary, is the better the colder the preceding winter. The migrations of capelin and "capelin" cod to the shores of Norway were rather less intensive in 1962 than in 1961 (Table 1).

Table 1 Catches of groundfish (mainly cod) taken by the Soviet trawling fleet in March/April in 1961 and 1962.

Year	Finmarken coast		Murman coast	
	in 1000 t	Fishery importance of area (%)	in 1000 t	Fishery importance of area (%)
1961	31.5	69.5	2.5	5.6
1962	14.7	13.5	9.3	8.5

Approximately up to the middle of May immature cod continued moving to the west which is confirmed by the data on the following tagged specimens (Table 2). The data on the most characteristic migrations of the only few specimens are given in Tables 2 and 3. A total of more than 30,000 tagged fish (mainly cod) were released by the Soviet ichthyologists in 1962 into the Barents Sea, and about 400 specimens of those fishes were recaptured by 1st January 1963.

As is well known, in summer the cod migrate to the east following two paths:-
 1) along the coast, following the coastal branch of the warm current, 2) across the areas of the open sea (including the Skolpen Bank and Goose Bank) following the main branch of this current. The investigations showed that, as a rule, the cod choose the first path in the hydrologically cold years and the second one in the moderately warm and warm years. The fishery importance of the coastal and off-shore areas may be predicted by using the following formulas deduced from the analysis of the materials for many years:

$$y = -35.3x + 149.8 \dots(1)$$

where x is the water temperature in the 50-200 m layer on the Kola hydrological section in May, and y - fishery importance of the coastal areas in June/September. The correlation coefficient between the compared values $r = -0.66 \pm 0.17$; relation of the correlation coefficient to its probable error $\left(\frac{r}{E}\right) = 6.4$, i.e., the correlation is undoubtedly correct.

$$y = 27.4x - 50.8 \dots\dots\dots(2)$$

where x is the water temperature in the 50-200 m on the Kola hydrological section in May and y is the fishery importance of the areas of the open sea (from the Skolpen Bank up to the Goose Bank) in June/September. The correlation coefficient is $r = 0.56 \pm 0.17$.

In May 1962 the water temperature in the 50-200 m layer of the Kola section was 3.11° which is very close to the long-term mean. So it could be predicted in beforehand that in the summer of 1962 cod would migrate to the east, chiefly following the main branch of the current. The expected fishery importance of the off-shore areas was calculated according to the formula (2) and gave 35%. It actually reached 39%; the error formed 6% of the amplitude of the predicted index.

The length composition of cod in the off-shore areas in the summer of 1962 was the following:-

Length in cm	20	25	30	35	40	45	50	55	60
No. of spec. (%)	0.3	1.4	5.0	12.0	17.6	18.2	15.0	10.6	7.7
Length in cm	65	70	75	80	85	90	95	100	105
No. of spec. (%)	5.1	2.8	1.8	1.0	0.7	0.4	0.3	0.1	

As in summer many cod moved to the east following the main branch of the current; there was every reason to expect its mass return migration during the winter months. In fact, in the winter of 1962/63 the fishery importance of the central areas increased remarkably. For instance, in December 1962 the Soviet trawling fleet caught about 18,000 t of groundfish, mainly cod, on the Goose Bank. Despite the persisting storms and severe frost which hampered the fishery, the average monthly catch per one-hour trawling was rather large - above 1.1 t.

Table 2 Movements of tagged cod

Liberated				Captured		
Date	Latitude (N)	Longitude (E)	Length of cod (cm)	Date	Latitude (N)	Longitude (E)
May 6	69°45'	40°45'	65	May 22	70°10'	38°00'
April 12	69°10'	37°00'	53	May 20	69°25'	35°00'
April 12	69°10'	37°00'	56	May 25	70°10'	35°45'
April 12	69°10'	37°00'	55	May 26	70°05'	35°45'
April 12	69°10'	37°00'	56	May 28	70°35'	35°00'

Cod migration towards the east began in the second half of May (Table 3).

Table 3 Movements of tagged cod

Liberated				Captured			
Date	Latitude (N)	Longitude (E)	Length of cod (cm)	Date	Latitude (N)	Longitude (E)	Average rate (mile/24 hours)
June 8	70°55'	35°05'	36	July 10	70°35'	38°45'	2.5
June 15	70°25'	34°15'	47	July 15	69°55'	33°15'	3.0
May 9	69°55'	37°15'	62	July 21	69°55'	40°15'	1.0
June 8	70°00'	37°00'	56	July 19	69°25'	40°30'	2.5
May 23	69°45'	37°15'	45	July 28	69°40'	38°45'	0.6
June 20	70°55'	32°45'	58	July 28	70°17'	40°18'	4.0
July 10	70°35'	38°45'	74	July 31	70°15'	40°00'	2.0

