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Estimation of stock size and allowable catch of silver hake  
at Nova Scotia in Division 4VWX for 1978

by

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In this report the silver hake stock size is estimated for Division 4VWX from the data on the total catch, the catch by age groups, the catch per effort and mean weights by age groups. In 1977 the stock size will be 227 thous. tons. At  $F_{0.1}$  for the three year olds and older, and  $F = 0.126$  for the two year olds, then 76 thous. tons can be taken in 1978.

Material and Methods

From the USSR catches, and age determinations from complete otoliths (Res.Doc. 76/XII/157) the catch by age groups in Div. 4VWX was calculated by countries and constituted 89335 thous. tons in 1976. It is below the quota of 100 thous. tons set for 1976. The original value of  $F$  for the virtual population analysis was calculated based on the silver hake catches per hauling hour by BMRT in 1975-1976. The value of  $F = 0.191$  for the two year olds was taken in 1976 from the virtual population analysis, and  $F = 0.126$  was assumed for 1977 and 1978 from the data of Working Paper 76/XII/144. The mean weights by age groups were taken from the previous papers. The stock size for 1976 was determined with regard for the correction to a difference between the observed stock size and calculated one.

Results

As is evident from the calculations given in table 1, in 1976 the stock size at age two and older was  $245514 \times 10^5$  in

numbers or 206 thous. tons. If the two year old fish abundance in 1977 is assumed to be at the level of the average long term data of  $10^9$  sp. number at the value of  $F = 0.126$  for the two year olds, and  $F = 1.060$  for the three year olds or older, then of 70 thous. tons is set. To provide this catch the fishing mortality rate should be 0.600 for the three year olds or older, if  $F = 0.126$  for the two year olds.

Provided that the two year old fish abundance is at the level of the average data of  $10^9$  sp. number the stock size in 1978 will be 227 thous. tons, that is 56 thous. tons lower than in 1977. In 1978 at  $F = 0.126$  for the two year olds, and  $F_{0.1} = 0.700$  for the three year olds the allowable catch will be 76 thous. tons. The catch quota of around 76-80 thous. tons can be recommended for 1978. When considering this figure one should keep in mind that the total catch by countries is usually below the set quota. In 1976, for example, the total catch was 89.3 thous. tons at the quota set at 100 thous. tons.

The comparison of the abundance indices shows a high level of the silver hake stock size at the end of 1976 (table 2). So in 1976 the abundance of one year old fish of the 1975 year class appeared to be lower than that of the 1974 year class, but higher compared with that of the 1972, 1973 and 1974 year classes. The total abundance was also lower than in 1975, but higher than that in 1972, 1973 and 1976.

#### References

1. Noskov A.S., 1976. Estimation of stock size and allowable catch of silver hake on the Nov. Scotia Shelf in ICMF Division 4W, Res. Doc. 76/VI/57.
2. Noskov A.S. The assessment of the silver hake stocks at Nova Scotia in Div. 4V Res.Doc. 76/XII/157.
3. ICMF Working Paper 76/XII/144.

Table 1. The catches and stocks of silver hake ( $10^5$  sp. number and thous. tons) in Div. 4VWX in 1976-1978

Age								Total at age 2+	
	1	2	3	4	5	6	7	$10^5$ sp. number	thous. tons
C <sub>76</sub>	415	2697	1768	582	214	35	17	5315	86
F <sub>76</sub>	0.053	0.191	1.060	1.060	1.060	1.060	1.060		
N <sub>76</sub>	10375	19688	3288	1083	398	65	32	24554	206
N <sub>77</sub>	-	(10000)	9883	691	227	84	21	20906	283
F <sub>77</sub>	-	0.126	0.600	0.600	0.600	0.600	0.600		
C <sub>77</sub>	-	930	3597	252	83	31	8	4901	73
N <sub>78</sub>	-	(10000)	5370	3291	230	76	13	18980	227
F <sub>78</sub>	-	0.126	0.700	0.700	0.700	0.700	0.700		
C <sub>78</sub>	-	930	2191	1343	94	36	5	4599	76
Wt. kg	0.063	0.095	0.151	0.214	0.319	0.478	0.590		227

C - catch

N - stock

F - fishing mortality

Wt. kg- mean weight

Table 2. The silver hake catches (in numbers) per 30 min. hauling by the "hake" trawl in 1972-1976

Age groups	Years				
	1972	1973	1974	1975	1976
0	99.8	0.8	46.8	0.4	-
I	11.6	244.0	153.4	900.5	382
All groups	902.8	873.0	1342.0	2629.2	1508

