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An Update of Biomass Estimates for Cod in NAFO Div. 2J+3KL
Beyond the Canadian 200-mile Fishery Zone

by

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Introduction

This document provides an update of information presented at last years meeting (Baird and Bowering, 1986), in response to the Fisheries Commission request, of the proportion of biomass of the Div. 2J3KL cod stock occurring in the Regulatory Area. More recent data include biomass estimates from research vessel surveys conducted by Canada during spring and autumn of 1986. The area in square nautical miles by depth zone in Div. 3L is presented in Table 1 while the total area of Div. 2J, 3K, and 3L are given in Table 2. Only in Div. 3L does the surveyed area extend beyond 200 miles (Fig 1) and this area is about 9% of the divisional total. The percentage area beyond 200 miles for the entire surveyed stock area (Div. 2J3KL) is about 3.5%. The proportion of area outside the fishery zone for survey strata which overlap the 200 mile boundary were estimated, as was done last year, from planimeter readings and these proportions were applied to biomass totals for appropriate strata.

Results

Estimates of cod biomass outside the 200 mile fishery zone in Div. 3L by strata from surveys conducted during spring are presented in Table 3. There was no survey coverage for depths beyond 200 fathoms for 1977-82 and 1986, but examination of 1985 survey results indicate that biomass in these depth zones is minimal at this time of year. Biomass estimated beyond 200 miles from surveys conducted during autumn and winter is presented in Table 4. Average percentage biomass outside 200 miles is consistent during spring and autumn at about 3%. During winter a portion of this stock migrates to the slope areas of the Grand Bank and this percentage increases to about 25%. Only during autumn were surveys conducted in all three divisions (2J, 3K and 3L) in the same year, and the average percentage biomass outside 200 miles for the entire stock area estimated from these survey results is about 1%. The inclusion of the 1986 spring and autumn survey results resulted in only marginal differences in the average percentages estimated last year. An average divisional breakdown of biomass, estimated from surveys conducted during autumn (Table 7) indicates that 42%, 31%, and 27% of the biomass for this stock occurs in Div. 2J, 3K and 3L respectively.

Conclusions

With the average seasonal percentages of cod biomass occurring in the Regulatory Area changing only marginally with the inclusion of recent survey results the conclusions reported at last years meeting (NAFO, Scientific Council Reports, 1986, pp 79-80) remain unchanged. These conclusions were:

"Assuming that the relative distribution among divisions in autumn is similar to that during winter, when the maximum proportion of biomass in Div. 3L occurs within the Regulatory Area (25%), the maximum proportion of the entire Div. 2J+3KL cod stock estimated to occur in the Regulatory Area is less than 10% in winter and less than 5%, on average, throughout the year.

References

Baird, J.W. and W.R. Bowering. 1986. Biomass estimates for cod and Greenland halibut beyond the Canadian 200-mile economic zone in NAFO Div. 2J+3KL. NAFO SCR Doc. 86/51. Ser. No. N1168. 6 p.

NAFO Scientific Council Reports. 1986. pp 79-80.

Table 1. Proportion of area (square nautical miles) outside the 200 mile fishery zone in NAFO Div. 3L by depth range.

Depth (fm)	Depth (m)	Area Total	Area Outside	% Outside
31-50	56-91	8552	0	0
51-100	92-183	17452	933	5
101-150	184-274	6918	791	11
151-200	275-366	3855	768	20
201-300	367-549	1142	636	56
301-400	550-732	804	554	69
Unstratified shoreward		3542	0	0
Total		42265	3682	9

Table 2. Area in square nautical miles in Div. 2J, 3K, and 3L.

Division	Survey area (mi ²) (0-750m)	Percentage
2J	27,633	26
3K	36,545	34
3L	42,265	40
Total	106,443	100

Table 3. Estimates of cod biomass outside the 200 mi. fishery zone in Division 3L by strata and depth zone from surveys conducted in the spring over the period 1977-86. The number of successful sets is in parenthesis.

Strata	Depth zone (fath)	% Area outside 200 mi. zone	ATC 262 (102) 1977	ATC 276 (94) 1978	ATC 290 (141) 1979	ATC 304-305 (115) 1980	ATC 317-318 (77) 1981	ATC 329 (103) 1982	WT 28-30 (221) 1985	WT 48 (211) 1986	
385	51-100	5	21	4	56	314	21	0	104	21	
390	"	55	278	437	1,169	1,539	275	119	144	223	
389	101-150	62	833	659	681	4,292	296	1,031	3,825	558	
391	"	100	634	356	1,048	2,064	1,212	95	429	826	
387	151-200	37	45	68	170	95	90	871	7,952	2,425	
388	"	99	1,169	179	346	107	188	1,308	343	1,556	
392	"	100	30	66	189	0	128	256	2,237	435	
729	201-300	100							35	-	
731	"	100							36	-	
733	"	50							158	-	
730	301-400	100	not surveyed beyond 200 fathoms							0	-
732	"	100							0	-	
734	"	67							0	-	
Biomass outside 200 miles			3,010	1,769	3,659	8,411	2,210	3,680	15,263	6,044	
Total 3L biomass			70,877	78,118	129,116	139,030	218,214	140,578	267,515	239,857	
% outside 200 miles			4.3	2.3	2.8	6.1	1.0	2.6	5.7	2.5	

Table 4. Estimates of cod biomass outside the 200 mile fishery zone in Division 3L by strata and depth zone from surveys conducted in fall and winter during the periods 1981-86 and 1985-86 respectively. The number of successful sets is in parenthesis.

Strata	Depth zone (fath)	% Area outside 200 mi. zone	Fall surveys							Winter surveys	
			ATC 323-325 (96)	ATC 333-334 (120)	WT 7-9 (125)	WT 16-18 (208)	WT 37-39 (231)	AN 72 (142)	WT 22-24 (182)	WT 42-44 (206)	
			1981	1982	1983	1984	1985	1986	1985	1986	
385	51-100	5	2	2	51	94	5	55	566	21	
390	"	55	5	32	469	622	5	19	2,941	21	
389	101-150	62	- ^a	2,125	-	1,697	1,563	1,068	22,223	1,055	
391	"	100	-	487	159	79	325	370	2,710	92	
387	151-200	37	494	3,410	-	2,762	1,501	7,483	20,034	8,592	
388	"	99	-	456	-	610	1,892	-	21,940	2,133	
392	"	100	-	220	109	68	106	11	2,182	902	
729	201-300	100	-	-	-	59	0	0	0	178	
731	"	100	-	-	-	49	146	-	546	-	
733	"	50	-	-	-	483	150	-	2,629	728	
730	301-400	100	-	-	-	0	0	-	0	-	
732	"	100	-	-	-	0	0	-	0	-	
734	"	67	-	-	-	0	0	-	20	-	
Biomass outside 200 miles			501	6,732	788	6,523	5,693	9,006	75,800	13,722	
Total 3L biomass			109,706	87,997	131,267	191,701	165,417	190,731	318,563	51,164	
% Outside 200 miles			0.5	7.7	0.6	3.4	3.4	4.7	23.8	26.8	

Table 5. Cod biomass distribution in NAFO Division 3L in relation to the 200 mi. fishery zone from Canadian research vessel surveys.

	1977	1978	1979	1980	1881	1982	1983	1984	1985	1986	Avg.
<u>Spring</u>											
Biomass outside 200 mi	3,010	1,769	3,659	8,411	2,210	3,680			15,263	6,044	
Total 3L	70,877	78,118	129,116	139,030	218,214	140,578			267,515	239,857	
% Outside	4.3	2.3	2.8	6.1	1.0	2.6			5.7	2.5	3.4
<u>Fall</u>											
Biomass outside 200 mi					501	6,732	788	6,523	5,693	9,006	
Total 3L					109,706	87,997	131,267	191,701	165,417	190,731	
% Outside					0.5	7.7	0.6	3.4	3.4	4.7	3.4
<u>Winter</u>											
Biomass outside									75,800	13,772	
Total 3L									318,563	51,164	
% Outside									23.8	26.8	25.3

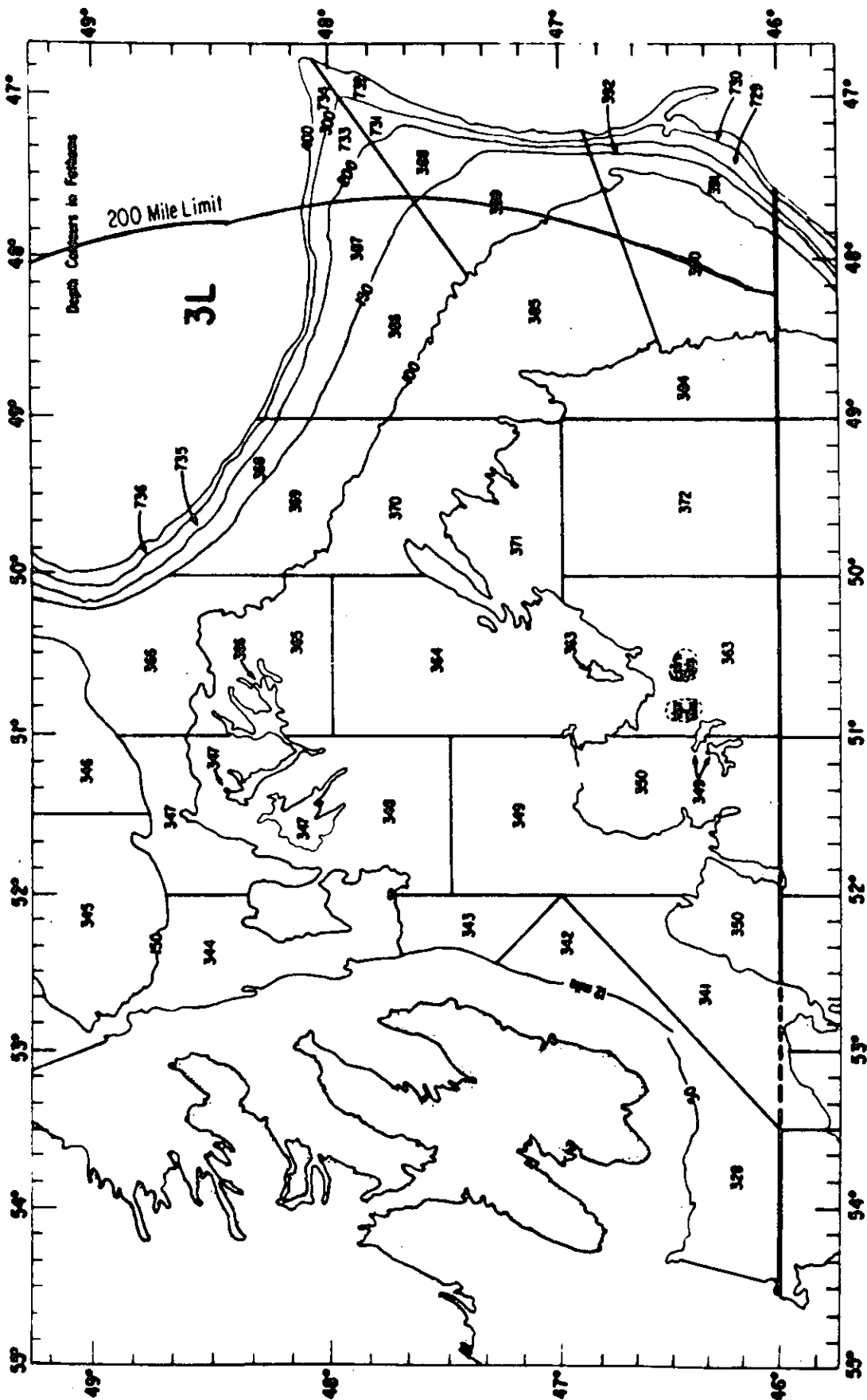


Fig. 1. Stratification scheme for NAFO Div. 3L relative to the 200 mi. economic zone.