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Biomass and Age Compositions derived from RV Surveys for Cod
in Div. 3NO Relative to the Canadian 200-Mile Fishery Boundary

by

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Introduction

For the period since 1978, catches of cod in Div. 3NO have been obtained predominately by Canada and Spain. The Canadian catch has been taken primarily by otter trawlers and in recent years, mainly from inside the 200-mile line. Spanish catches, almost entirely by pair trawlers, have been taken only from the area outside the 200-mile line since 1981. During recent years it has been observed that the commercial age composition in the area outside 200 miles is comprised of proportionately more younger fish than those from the area inside. This paper reviews available Canadian RV survey data in the area in Div. 3NO relative to the 200-mile fishery boundary including comparisons of estimated biomass and age compositions inside and out.

RV Survey Coverage

The surveyed area within depths from 31 to 200 fathoms in Div. 3N and 3O is 16682 and 17902 square nautical miles respectively for a total of 34584 (Table 1). In Div. 3N 6340 square miles or 38% of the divisional total is on the seaward side of the Canadian 200-mile fishery zone while for Div. 3O only 637 square nautical miles or 4% of the divisional area is outside 200 miles. The area outside 200 miles to 200 fathoms is 20% of the total surveyed area in Div. 3NO. Areas were obtained using the method described in Baird and Bowering, 1986.

Surveys have been conducted by Canada since 1971 in Div. 3N with the exception of 1983 while in Div. 3O surveys have been conducted since 1973 with the exception of 1974 and 1983. Only data for the years 1973, 1977-80, 1982, 1984-89 were examined in this document because of the incomplete coverage of strata in the remaining years.

Results and Discussion

For the surveys indicated, it was found (Table 2) that a higher percentage of the total 3NO biomass occurred outside the 200-mile line in the earlier years (6-29% from 1973 to 1982) than in the later period (3-10% from 1984 to 1989).

Comparisons of percent survey catch at age indicated similar age compositions both inside and outside the 200-mile line from 1973 to 1982 (with the exception of 1978) and a preponderance of younger ages outside of 200 miles from 1984 to 1989.

This data would suggest that there has been a change in age structure in the areas (inside and outside of 200 miles) within the survey period. This could result from factors such as an increase in absolute abundance of younger fish outside the line, a seasonal change in age distribution pattern, or increased mortality on older age groups outside of 200 miles.

Research surveys by Canada and the USSR indicate that there has been no increase in absolute abundance of young fish in recent years. In both surveys ages 3 and 4 were most numerous in 1989 but in both the total abundance is low, being at or near the lowest in the time series. It is not known if there

is a seasonal change in age structure relative to the 200-mile line. More than one half of the total commercial 3NO catches in recent years has been from outside of 200 miles, where Canadian surveys indicate that 3-10% of the total biomass exists.

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. 2J3KL. NAFO SCR Doc. 86/51. Ser. No. N1168, 6 p.

Table 1. Proportion of area (square nautical miles) outside 200 miles for surveyed area to 200 fathoms in Div. 3NO.

Strata Outside	3N			Strata	3O		
	Area	% Outside	Area Outside		Area	% outside	Area outside
357	164	100	164	353	1282	21	269
358	225	100	225	354	474	52	246
359	421	100	421	355	103	72	74
360	2992	93	2783	356	61	77	47
374	931	23	214				
375	1593	17	271				
376	1499	89	1334				
377	100	100	100				
378	139	100	139				
379	106	100	106				
380	116	83	96				
381	182	79	144				
382	647	53	343				
Total			6340				637
	Total Area 3N -		16682				
	Area Outside -		6340				
	Percentage -		38%				
	Total Area 3O -		17902				
	Area Outside -		637				
	Percentage -		4%				

Table 2. Estimates of cod biomass outside the 200-mile fishery zone in Div. 3N and 3O by stratum from surveys conducted in the spring for the years indicated over the period 1973 to 1989.

Strata	% Area Outside 200-mile	1973	1977	1978	1979	1980	1982	1984	1985	1986	1987	1988	1989
<u>Div. 3N</u>													
357	100	1383	29	-	52	332	92	0	2102	259	-	18	22
358	100	1772	383	-	483	1054	236	182	122	547	1803	229	486
359	110	258	147	-	190	478	208	71	0	134	43	44	21
360	93	-	3757	2029	1317	1317	1616	7326	8520	1809	1192	459	1118
374	23	63	287	305	110	0	545	1917	202	177	243	927	112
375	17	177	923	612	612	549	1010	409	3141	2480	1366	2807	3418
376	89	717	8608	91	773	761	2	934	348	1676	2560	3964	663
377	100	14	1380	130	22	287	22	29	13	54	328	0	9
378	100	404	687	90	281	939	303	133	470	256	73	96	81
379	100	1828	50	0	601	178	179	129	324	365	4	15	22
380	83	1093	43	-	376	47	-	186	703	112	377	150	146
381	79	1885	2115	350	155	337	1727	378	1220	590	65	213	31
382	53	9	502	1174	117	225	28	0	13	48	6	4	222
Biomass outside 200 miles		8886	18911	4781	5089	6504	5968	11694	17178	8507	8060	8926	6351
Total 3N biomass		20096	41546	30722	11692	20736	31104	92725	82515	95280	121091	60982	59425
% Biomass outside		44	46	16	44	31	19	13	21	9	7	15	11
<u>Div. 3O</u>													
353	21	686	55	18	330	0	99	0	1277	200	2018	131	498
354	52	228	4	-	18	142	65	254	114	94	1133	276	13
355	72	55	-	-	17	264	97	0	97	9	82	14	140
356	77	8	-	-	9	38	-	0	0	25	5	79	57
Biomass outside 200 miles		977	59	18	374	444	261	254	1488	328	3238	500	708
Total 3O biomass		25681	24261	20646	76966	15733	25478	125339	97223	92699	280807	119157	74595
% Biomass outside		4	.2	0	.5	3	1	.2	2	.4	1	.4	.9
<u>Div. 3NO</u>													
Biomass outside 200 miles		9863	18970	4799	5463	6948	6229	11948	18666	8835	11298	9426	7059
Total 3NO biomass		45777	65807	51368	88658	36469	56582	218064	179738	187979	401898	180139	134020
% Biomass outside		22	29	9	6	19	11	5	10	5	3	5	5

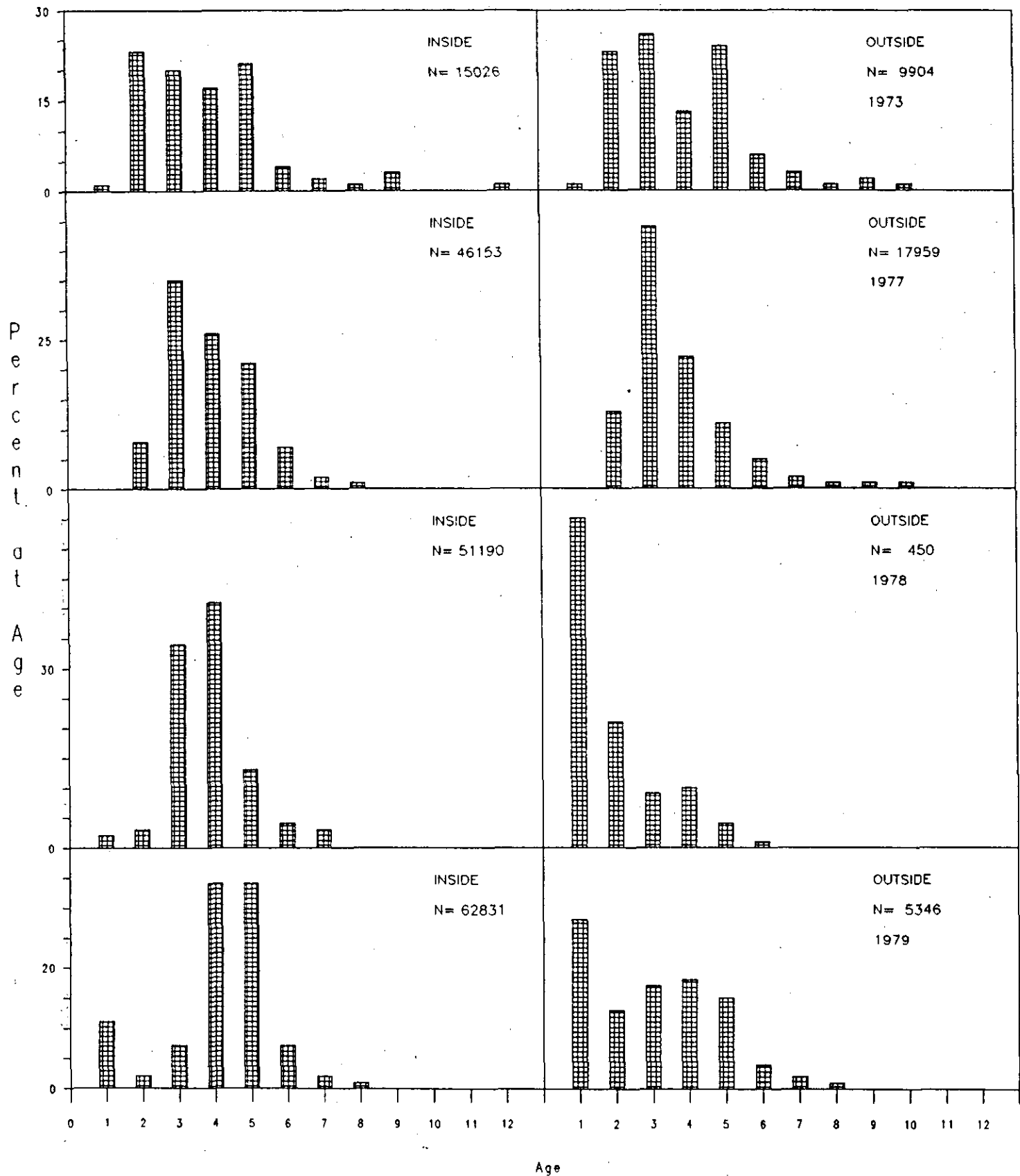


Figure 1. Percent age composition for Divisions 3NO inside and outside the 200 mile limit as derived from the 1973-1979 spring RV surveys.

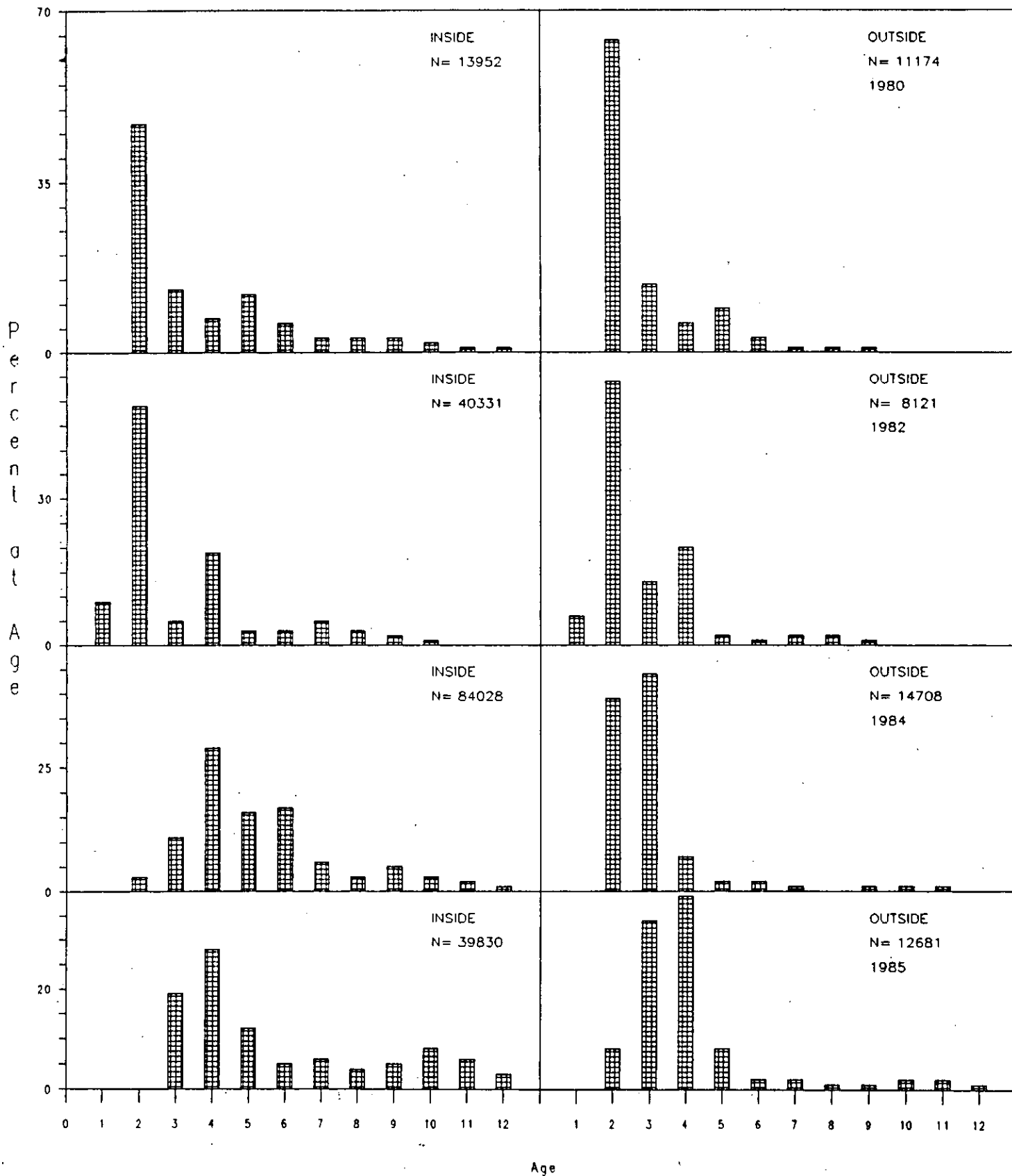


Figure 2 Percent age composition for Divisions 3NO inside and outside the 200 mile limit as derived from the 1980-1985 spring RV surveys.

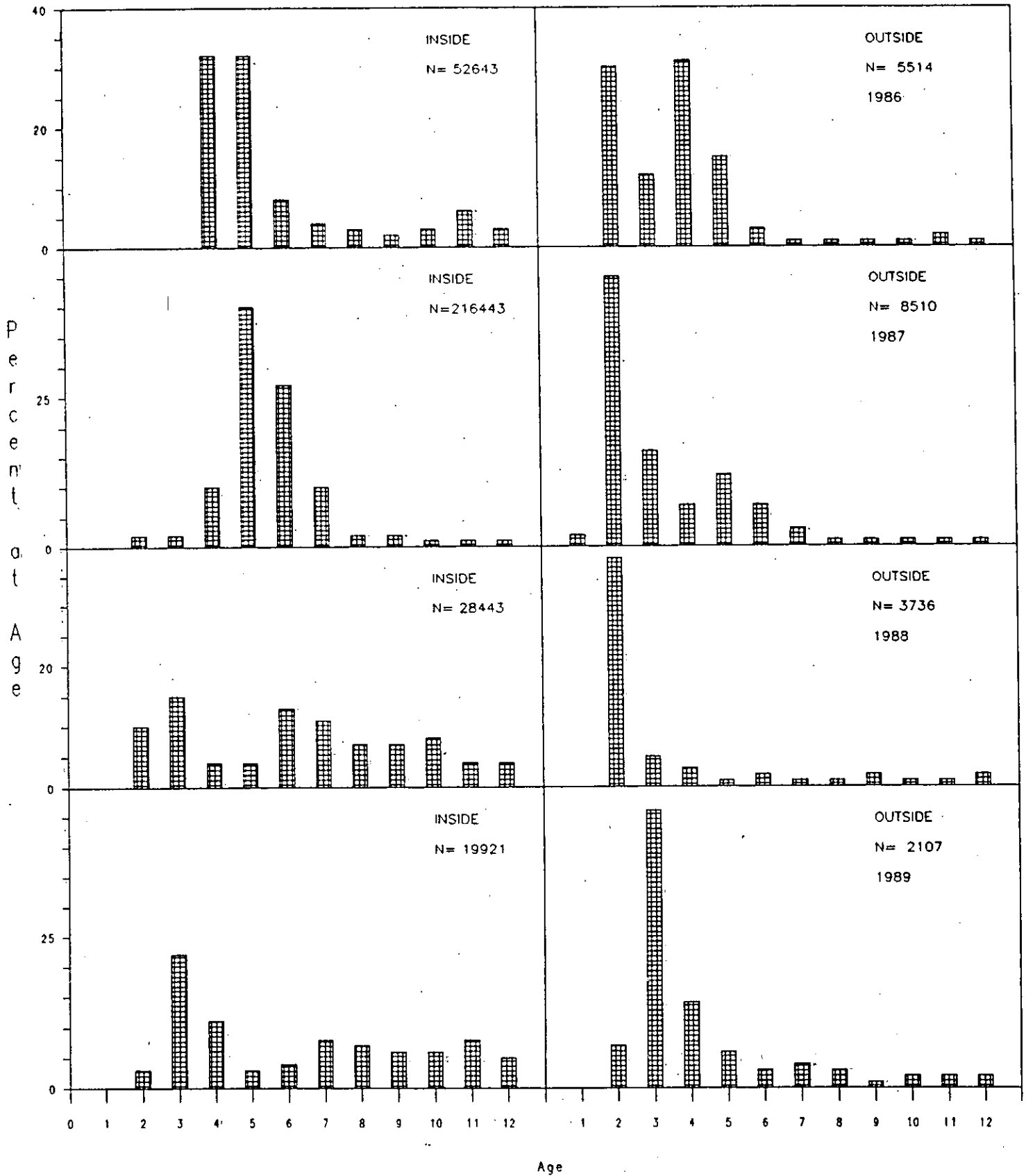


Figure 3. Percent age composition for Divisions 3NO inside and outside the 200 mile limit as derived from the 1986-1989 spring RV surveys.