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Redfish in NAFO Division 3LN

by

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Introduction

Nominal Catches and TACs

The average reported catch from Div. 3LN from 1959 to 1985 was about 22,000 t ranging between 10,000 t and 45,000 t (Table 1, Fig. 1). Catches increased sharply from about 21,000 t in 1985, peaked at a historical high of 79,000 t in 1987 and declined to about 27,000 t in 1992. Catches in 1993 and 1994 could not be estimated precisely because of discrepancies in the available sources of information, however, the likely amount is between 18,600 t and 24,000 t for 1993 and 3,600 t to 7,700 t for 1994. Since 1994, catches continued to decline to the lowest historically for this fishery at 453 tons in 1996.

From 1980 to 1990 the TAC each year for this stock has been 25,000 t. The TAC was reduced to 14,000 for 1991 and was maintained at that level to 1995. The TAC was reduced in 1996 and maintained in 1997 at 11,000 tons. The estimated catches for 1994-1996 are below their corresponding TACs and represents first time since 1985 that the TAC was not exceeded. In some years catches have been double (1988) and even triple (1987) the agreed TAC.

Description of the Fishery

In the early 1980's the former USSR, Cuba and Canada were the primary fleets directing for redfish (Table 2a,b). The rapid expansion of the fishery in 1986 was due primarily to the entry of EU-Portugal, taking about 21,000 t. In 1987 various non-Contracting parties (NCP), most notably South Korea, Panama and Caymen Islands began to fish in the regulatory area accounting for a catch of about 24,000 t. In the period from 1988 to 1994 non-Contracting parties had taken between 1,000 t and 19,000 t annually, however, NCPs did not fish in Div. 3LN since 1994.

Information from surveillance sources indicate that during the 1980s most of the Div. 3LN catch was taken in the vicinity of the Div. 3N and Div. 3O border in addition to the slopes of the Grand Bank in Div. 3L. The fishery of the early 1990s changed for the Baltic fleets in that a considerable amount of activity occurred in the 'Beothuk knoll' area which is southwest of the Flemish Cap at the Div. 3M, Div. 3L and Div. 3N border. In 1993 activity increased in the southwest portion of Div. 3N but in 1994 fleets from the Baltic countries returned home early in the year because of a poor fishery in this area and have not directed for redfish since. In addition Cuba has not fished since 1993 , EU/Portugal has directed predominantly to Div. 3O redfish and other species in the NAFO Regulatory Area since 1994. Russia has also reduced its directed effort in 1996. The reasons for the reduced effort in recent years was varied amongst the fleets involved. The Russian fleet has been affected by economical problems, the Baltic countries have reduced their fleet and have directed to shrimp in Div. 3M. Portugal, as mentioned previously, have directed to other fisheries (Div. 3O) and species (Greenland halibut) because of insufficient quota

in Div. 3LN. Cuba has not fished in recent years because of poor yields with the current regulated mesh size of 130 mm. The Canadian fleet has not fished in this area recently because of poor yields.

The monthly pattern of the catches in recent years (Table 3a,b) reveals the fishery is conducted during the first half of the year in Div. 3L but mostly from April to September in Div. 3N. Catches for each division by gear since 1983 (Table 4) shows the bottom trawl is the predominant gear in the fishery in the 1980s. In recent years midwater trawling accounts for the greatest proportion of the catch.

Commercial Fishery Data

Catch and Effort

Catch and effort data from the 1959 to 1992 ICNAF/NAFO Statistical Bulletins were obtained and combined with provisional 1993-1995 NAFO data. Only those data where redfish comprised more than 50% of the total catch were selected for further analysis as these were considered to be redfish directed.

The catch/effort data were analyzed with a multiplicative model (Gavaris 1980) to derive a standardized catch rate series in tons per hour and additional series utilizing effort in days fished. Effects included in the model were a combination country-gear-tonnage class category type (CGT), NAFO division, month, and a category type representing the amount of bycatch associated with each observation, consistent with previous years assessments (eg. see Power MS 1995).

In the usual practise, catch or effort data of less than 10 units were eliminated prior to analysis. Category types where there was less than five samples in the database, except the year category type, were also eliminated. However, for the analysis utilizing the effort in terms of days fished catch less than 10 tons or effort less than an arbitrarily chosen 5 days were eliminated prior to analysis. For all analyses an unweighted regression was run because of unknown percentages of prorating prior to 1984. Standardized catch rate indicess were derived separately for Div. 3L and Div. 3N.

The regression for Div. 3L using effort in hours is significant ($p < .05$), accounting for 58% of the total variation in catch rates (Table 5). All category types were significant. Although the year category type is significant, only the estimated coefficients for 1991 and 1993 are statistically different from 1959 (within 2 s.e.). The standardized catch rate series (Table 9, Fig. 2a) shows much interannual variability especially prior to 1974. There is a slight trend of increase from 1974 to 1986 followed by a decline to 1991 except for an intermittent increase in 1989. The catch rate increased sharply in 1992 and again in 1993 to the highest observed in the time series followed by a sharp decline in 1994 to the second lowest observed historically. Each of the last two years estimates are associated with large variability. The fluctuations in the series since 1991 are too dramatic to be explained by the dynamics of such a long lived species as redfish.

The regression for Div. 3N using effort in hours fished is significant ($p < .05$), accounting for 55% of the total variability in the CPUE data (Table 6). All category types were significant, except the month category. For the year category type only seven of the estimated coefficients are different from 1959 (within 2 s.e.), four of these are in the recent period 1990-1993. The standardized catch rate series (Table 10, Fig. 2b) shows much within year variability over time, especially for the period prior to 1976. There is a general trend of increase from 1976 to one of the highest rates in the series in 1980 followed by a decline to 1986. Catch rate increased sharply in 1987 and has since declined to one of the lowest rates in the series in 1993. The provisional data suggest an increase in 1994 and again in 1995 to the level of the 1987 catch rate. The last two points in the series have higher variability than those from 1987 to 1993.

Analyses incorporating effort measured in days fished were conducted on the premise that such a unit of effort may reflect time searching for concentrations of redfish.

The regression for Div. 3L using effort in days fished was significant ($p < .05$), accounting

for 60% of the total variation in the CPUE data (Table 7). All category types were significant, except month. For the year category type only seven of the estimated coefficients are different from 1959 (within 2 s.e.), four of these occurring from 1990 to 1994. The standardized catch rate series (Table 11, Fig. 3a) shows much interannual variability throughout the series especially prior to 1976. There is a trend of successive increases from 1978 to 1982 followed by a decrease to 1985. Catch rate increased again in 1986 to about the level of the 1982 rate and except for an intermittent increase in 1989 decreased systematically to the second lowest rate on record in 1991. Catch rate increased again in 1992 but has declined to the lowest rate historically in 1994.

The regression utilizing effort as days fished for Div. 3N was significant ($p < .05$), accounting for 68% of the total variability in CPUE (Table 8). Only the month category type was not significant. The catch rate series has much interannual variability associated with the mean (Table 12, Fig. 3b) particularly prior to 1980 but there is an indication of stability. From 1980 to 1985 there is a trend of decline followed by successive increases to 1987 and a subsequent declined to one of the lowest rates in the series in 1993. Catch rate increased substantially in 1994 and again in 1995. There is very high variability associated with the 1994 and 1995 estimates.

Catch rate indices for Div. 3L and Div. 3N are not considered reflective of year to year changes in population abundance (see NAFO Sci. Coun. Rep., 1996, p. 72), although they may be indicative of trends over longer periods of time. Because of the limited number of observations and high variability in recent years no judgement can be rendered from the recent data in the series. In any event, these indices of abundance are of little value in determining current stock status.

A catch rate series based on logbook information (Alpoim et al., MS 1997) suggests stability in Div. 3L from 1988 to 1993. There was no directed effort in Div. 3L in since 1993. The data for Div. 3N suggests an increase from 1991 to 1994. There was no directed effort in Div. 3N since 1994. It is uncertain whether these are representative of trends in the population or simply reflect the experience of the Portuguese fleet.

Commercial fishery sampling

Limited trawl sampling as bycatch from a 1996 Portuguese fishery in Div. 3L (Alpoim et al., MS 1997) suggested the catches were dominated by lengths between 29cm-35cm (mean length of 31.2cm), with two modes at 30cm and 33cm based on samples obtained in February, March, April and December. Sampling of the 1996 Div. 3N Portuguese trawl fishery for February and June indicates that dominant lengths of redfish in the catches sampled were between 28cm to 32cm (mean length of 31.2cm) with a mode at 31cm.

Research Survey Data

Abundance Indices

Stratified-random surveys have been conducted by Canada in Div. 3L in various years and seasons from 1978 to 1996 in which strata up to a maximum of 732 m (400 fathoms) were sampled. Although these surveys were conducted at various times of the year throughout the period, they provide an indication of relative abundance and dynamics of the population. The design of the surveys was based on a stratification scheme down to 732 metres (400 fathoms) for Div. 3LN (Fig. 4). Recently the stratification scheme has been updated to include depths out to 1464 metres (800 fathoms) but only the 1994 and 1996 autumn surveys have had some sampling of stations over 732 metres (400 fathoms). Up until the autumn of 1995 these surveys were conducted with an Engels 145 high lift otter trawl with a small mesh liner (29mm) in the codend and tows planned for 30 minute duration. Starting with the autumn 1995 survey in Div. 3LN, a Campelen 1800 survey gear was adopted with a 12mm liner in the codend and 15 minute tows utilizing SCANMAR. Data from comparative fishing trials between the Engels trawl and protocol, and, the Campelen trawl and protocol were not available prior to this assessment to convert the pre-autumn 1995 data of the Engels into Campelen equivalents. Data from similar trials (Warren MS 1996) suggest that the Campelen trawl and protocol catches larger numbers of smaller sized fish (generally <20 cm) than the Engels trawl and protocol.

Mean number and mean weight (kg) per standard tow show large fluctuations between some adjacent years (Table 13-15, Fig. 5). There are also rather large changes in stratum by stratum density estimates in adjacent years where seasons can be compared. Although it is difficult to interpret year to year changes in the estimates, in general, the data suggest that the survey biomass index from spring 1992 up to spring 1995 is at its lowest level (average 4,500 t) relative to the time period prior to 1986 (average 103,000 t). The survey indices since spring 1995 are not directly comparable because of the change in survey gear. The autumn 1995 index at 50,000 t is highly the result of a single large catch in one stratum (about 45,000 t of this estimate is due to this relatively large catch). Regardless of this caveat, the 1995 estimate is still lower than the unconverted estimates prior to the mid-1980s. The 1996 spring and autumn indices were at 17,000 t and 5,000 t respectively.

Stratified-random surveys have also been conducted in spring and autumn by Canada in Div 3N from 1991-1997 that also cover to the extent of the stratification (732 m or 400 fathoms). The Campelen trawl and protocol were also utilized on these surveys beginning in the autumn of 1995. Mean number and weight per tow (Table 16-18, Fig. 6) are considerably higher than in Div 3L but there are relatively greater variability in these estimates as well. The source of this variability is unclear but is likely due to availability to the trawl gear rather than real changes in population abundance and therefore the interpretation of these data in terms of year to year trends is difficult. The average survey biomass index for the 1991 to spring 1995 period is about 14,000 t. The Campelen surveys beginning in autumn 1995 have produced four biomass indices of 41,000 t, 6,000 t, 11,000 t and 6,000 t . About 28,000 t of the fall 1995 estimate of 41,000 t occurred in a single stratum due to a large catch. On average, these survey biomass estimates (16,000 t) are within the range of the unconverted estimates of the surveys prior to the Campelen surveys.

A comparison of the Canadian and Russian bottom trawl surveys in Div. 3L (Fig. 7) indicate a similar trend of decline in density estimates from 1984 to 1990 and both indices have remained at this relatively low level to 1994. The Canadian index continued to be relatively low to autumn 1996 except for the spike observed in autumn 1995. The situation is unclear for Div. 3N (Fig. 8). The Russian surveys indicate relatively low mean weight per tow from 1989-1991 with a dramatic rise in 1993. This large increase in 1993 relative to 1991 was highly influenced by the trawling conducted in one stratum (see Vaskov (1994), Table 2) which accounted for 70% of the biomass but only represents about 9% of the area surveyed. There have been no Russian surveys conducted in Div. 3L since 1994 or 3N since 1993.

Recruitment

Length distributions in terms of mean number per tow at length and corresponding age distributions in number per thousand from the regular spring and autumn Canadian surveys in Div. 3L indicate there has been relatively poor recruitment over the time period covered by the surveys (Fig. 9). The 1996 spring and autumn distributions were dominated by fish between 19cm-25cm which would be in the range of 10-12 years old. There is no sign of any good recruitment in the recent surveys up to autumn 1996.

Length distributions and age distributions from spring and autumn Canadian surveys in Div. 3N from 1991-1997 (Fig. 10) show different compositions compared with Div. 3L for each corresponding seasonal survey, generally being composed of size groups that are much smaller. There was a relatively good pulse of recruitment picked up in the 1991 autumn survey in the range of 12-14 cm (1986-1987 year classes) that could be tracked through to the 1995 spring survey at about 19 cm. This mode is also reflected in the 1997 spring survey which has a peak at 21 cm. There is no sign of any good year classes subsequent to this in the surveys.

State of the Stock

It is not possible to provide an estimate of the absolute size of the stock in Div. 3LN. Based on the available data the stock appears to be at a very low level. The most recent relatively good year-classes, those of 1986-87, are recruiting to the spawning stock biomass (SSB). These same year-classes will make up the greatest proportion of the SSB in the near future. Because of the slow growth of redfish, it will be 8-10 years before any future recruitment will contribute to SSB.

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Table 1. Summary of nominal catches (t) of redfish in Divisions 3LN (provisional for 1993-1995).

YEAR	3L	3N	TOTAL	TAC
1959	34,107	10,478	44,585	
1960	10,015	16,547	26,562	
1961	8,349	14,826	23,175	
1962	3,425	18,009	21,439 [a]	
1963	8,191	12,906	27,362 [a]	
1964	3,898	4,206	10,261 [a]	
1965	18,772	4,694	23,466	
1966	6,927	10,047	16,974	
1967	7,684	19,504	27,188	
1968	2,378	15,265	17,660 [a]	
1969	2,344	22,356	24,750 [a]	
1970	1,029	13,359	14,419 [a]	
1971	10,043	24,310	34,370 [a]	
1972	3,095	25,838	28,933	
1973	4,709	28,588	33,297	
1974	11,419	10,867	22,286	28,000
1975	3,838	14,033	17,871	20,000
1976	15,971	4,541	20,513	20,000
1977	13,452	3,064	16,516	16,000
1978	6,318	5,725	12,043	16,000
1979	5,584	8,483	14,067	18,000
1980	4,367	11,663	16,030	25,000
1981	9,407	14,873	24,280	25,000
1982	7,870	13,677	21,547	25,000
1983	8,657	11,090	19,747	25,000
1984	2,696	12,065	14,761	25,000
1985	3,677	16,880	20,557	25,000
1986	27,833	14,972	42,805	25,000
1987	30,342	40,949	79,031 [b]	25,000
1988	22,317	23,049	53,266 [b]	25,000
1989	18,947	12,902	33,649 [b]	25,000
1990	15,538	9,217	29,105 [b]	25,000
1991	8,892	12,723	25,815 [b]	14,000
1992	4,630	10,153	27,283 [b]	14,000
1993	5,897	9,077	18,599-24,017 [b,c]	14,000
1994	379	2,274	3,828-7,654 [b,c,d]	14,000
1995	291	1,697	1,988 [d]	14,000
1996	113	340	453 [d]	11,000
1997				11,000

[a] Includes catch that could not be identified by division.
[b] Includes estimates of unreported catch.
[c] Catch could not be precisely estimated due to discrepancies in figures from available sources.
[d] Provisional.

Table 2a. Nominal reported catches (t) of redfish in Division 3L by country and year since 1983.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 [b]	1995 [b]	1996 [b]
Canada (M)	2,663	52	342	2,597	2,352	5,042	1,095	73	37	86	-	-	3	-
Canada (N)	3,800	1,229	1,716	2,235	2,159	1,444	489	947	362	656	6	-	-	-
EU/Germany	586	938	981	540	696	694	742	646	1151	1,455	-	-	-	-
Japan	-	105	129	135	114	152	114	151	84	67	37	82	47	72
EU/Portugal	91	48	4	13,469	19,858	9,867	5,408	4,820	5,099	769	-	4	-	39
EU/Spain	347	91	192	199	335	94	109	837	681	625	29	128	241	2
Russia	1,168	232	309	8,658	4,459	5,004	10,037	7,003	1,032	571	2,407	22	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-	676	-	-	-
Latvia	-	-	-	-	-	-	-	-	-	-	2,156	55	-	-
Estonia	-	-	-	-	-	-	-	-	-	-	-	88	-	-
South Korea					364	20	952	1,061	420	370	586	-	-	-
Others [a]	2	1	4	-	5	-	1	-	26	31	-	-	-	-
TOTAL	8,657	2,696	3,677	27,833	30,342	22,317	18,947	15,538	8,892	4,630	5,897	379	291	113

[a] Others include France (M), France (SP), Poland, EEC-UK.
[b] Provisional

Table 2b. Nominal reported catches (t) of redfish in Division 3N by country and year since 1983.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 [b]	1995 [b]	1996 [b]
Canada (M)	-	13	311	-	-	1	22	-	-	-	-	110	-	-
Canada (N)	1	2	82	17	21	4	4	11		1	40	-	-	-
EEC/Portugal	-	365	890	8,273	7,854	2,147	600	1,235	3,275	1,149	255	60	78	199
Japan	-	81	-	12	51	-	39	4	4	1	-	-	-	-
EEC/Spain	875	239	2,881	1,393	132	581	224	416	956	119	7	106	200	107
Russia	7,844	9,045	10,576	2,227	14,397	6,735	941	359	4,821	3,009	3,212	1,998	1,419	34
Lithuania	-	-	-	-	-	-	-	-	-	-	1,116	-	-	-
Latvia	-	-	-	-	-	-	-	-	-	-	1,247	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	-	1,926	-	-	-
Cuba	2,370	2,320	2,055	2,429	2,433	2,483	2,869	2,456	1,378	1,308	1,152	-	-	-
South Korea				617	16,053	11,098	8,203	4,640	2,276	4,560	122	-	-	-
Others [a]	-	-	85	4	8	-	-	96	13	6	-	-	-	-
TOTAL	11,090	12,065	16,880	14,972	40,949	23,049	12,902	9,217	12,723	10,153	9,077	2,274	1,697	340

[a] Others include France (M), USA, EEC-Germany, Denmark (Greenland).
[b] Provisional.

Table 3a. Nominal reported catches (t) of redfish in Division 3L by month and year since 1983.

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Total
1983	1,304	496	672	1,080	934	708	274	642	562	1,070	799	116	8,657
1984	243	135	168	360	76	161	49	57	1,002	318	46	81	2,696
1985	481	120	177	331	215	165	41	78	354	866	441	408	3,677
1986	423	845	3,470	7,266	3,662	503	975	2,196	544	3,964	2,166	1,819	27,833
1987	2,439	1,631	5,306	1,423	1,765	75	1,233	3,877	3,285	4,215	3,712	1,381	30,342
1988	2,856	1,623	865	1,466	471	1,213	2,776	4,800	1,628	1,869	682	2,068	22,317
1989	786	4,497	4,301	1,140	1,628	501	1,730	1,311	832	1,151	1,002	68	18,947
1990	269	331	297	831	578	1,717	3,061	3,683	1,911	1,611	1,056	193	15,538
1991	328	901	642	821	685	503	613	296	229	692	2,123	1,059	8,892
1992	417	203	137	1,479	1,487	246	15	9	26	30	480	101	4,630
1993	1	9	676	2,721	2,479	2	1	5	1	-	1	1	5,897
1994 [a]	-	-	34	147	13	3	1	2	-	19	27	133	379
1995 [a]	77	65	25	54	44	15	-	-	-	2	-	9	291

[a] Provisional

Table 3b. Nominal reported catches (t) of redfish in Division 3N by month and year since 1983.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1983	869	609	2,029	2,186	1,226	675	1,121	1,266	303	376	208	222	11,090
1984	4,562	1,763	1,821	676	67	74	1,694	1,014	156	93	131	14	12,065
1985	1,110	2,169	2,181	4,213	1,668	420	1,665	676	784	541	230	1,223	16,880
1986	392	665	406	534	454	915	4,392	81	1,196	110	4,131	1,696	14,972
1987	3,787	3,118	1,885	2,203	2,698	2,383	4,339	6,280	7,287	2,431	1,004	3,534	40,949
1988	662	648	815	841	952	1,295	2,327	4,505	3,390	1,419	3,453	2,742	23,049
1989	576	151	274	380	278	1,183	928	4,109	2,085	1,515	1,164	259	12,902
1990	220	366	537	9	1,003	1,679	1,236	1,716	619	754	858	220	9,217
1991	387	91	15	122	312	670	3,241	2,229	1698	2,013	1,085	860	12,723
1992	274	638	87	65	104	2,285	2,352	1,626	432	702	926	662	10,153
1993	228	286	430	2,184	4,095	1,224	164	52	270	12	48	84	9,077
1994 [a]	151	53	5	68	595	723	302	-	1	28	310	38	2,274
1995 [a]	63	80	1	10	147	313	358	251	338	-	48	88	1,697

[a] Provisional

Table 4. Nominal reported catches by gear type for redfish in Divisions 3L and 3N since 1983.

	Division 3L					Division 3N				
Year	Bottom trawl	Midwater trawl	Gillnets	Misc.	Total	Bottom trawl	MW trawl	Gillnets	Misc.	Total
1983	7,760	308	238	351	8,657	7,050	3,165		875	11,090
1984	2,151	237	218	90	2,696	3,287	8,767		11	12,065
1985	3,092	307	128	150	3,677	10,232	6,453		195	16,880
1986	18,964	8,624	122	123	27,833	10,423	3,405		1,144	14,972
1987	25,294	4,441	276	331	30,342	32,391	8,527		31	40,949
1988	15,435	6,722	105	55	22,317	16,740	6,269	17	23	23,049
1989	7,542	10,922	449	34	18,947	9,131	3,746		25	12,902
1990	7,851	7,537	136	14	15,538	6,511	2,675	10	21	9,217
1991	7,322	1,422	71	77	8,892	11,028	1,628	-	67	12,723
1992	3,538	949	67	76	4,630	8,553	1,518	6	76	10,153
1993	652	5,245	-	-	5,897	3,532	5,441	-	104	9,077
1994 [a]	361	18	-	-	379	276	1,998	-	-	2,274
1995 [a]	291	-	-	-	291	278	1,419	-	-	1,697

[a] Provisional

Table 5. ANOVA results and regression coefficients from a multiplicative model utilized to derive a standardized catch rate series for Redfish in Div. 3L. Effort is measured in hours fished (1993-94 based on preliminary data).

REGRESSION OF MULTIPLICATIVE MODEL

MULTIPLE R..... 0.762

MULTIPLE R SQUARED..... 0.581

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	3.528E1	3.528E1	
REGRESSION	80	1.688E2	2.110E0	8.677
Country¦Gear¦TC	30	6.740E1	2.247E0	9.241
Month	11	1.137E1	1.034E0	4.252
Bycatch PCT	4	1.587E1	3.968E0	16.322
Year	35	3.253E1	9.294E-1	3.823
RESIDUALS	500	1.216E2	2.431E-1	
TOTAL	581	3.256E2		

REGRESSION COEFFICIENTS

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
Country¦Gear¦TC	3125	INTERCEPT	0.306	0.180	581
Month	7				
Bycatch PCT	95				
Year	59				
(1)	2114	1	-0.714	0.209	9
	2125	2	-0.128	0.199	8
	2155	3	-0.081	0.225	6
	3114	4	-0.521	0.186	15
	3124	5	-0.004	0.178	9
	3154	6	-0.515	0.244	5
	3155	7	0.222	0.124	27
	10127	8	-0.631	0.242	5
	11115	9	-0.520	0.217	10
	11116	10	-0.426	0.225	8
	11125	11	0.037	0.121	22
	11126	12	-0.093	0.212	11
	11127	13	-0.081	0.140	20
	11155	14	-0.462	0.235	5
	14126	15	-0.365	0.191	8
	14127	16	0.366	0.194	14
	16127	17	-0.125	0.184	27
	17116	18	-0.946	0.250	5
	17126	19	-0.750	0.224	6
	17127	20	0.193	0.184	9
	20114	21	-1.361	0.201	11
	20116	22	-0.305	0.223	11
	20127	23	0.225	0.091	67
	20145	24	1.195	0.353	12
	20157	25	0.481	0.088	62
	25126	26	-0.290	0.163	13
	25127	27	0.640	0.162	13
	27125	28	0.098	0.097	37
	27126	29	0.381	0.216	6
	27157	30	1.060	0.209	7
(2)	1	31	-0.029	0.112	40
	2	32	0.019	0.109	41
	3	33	0.253	0.099	54
	4	34	0.339	0.099	56
	5	35	0.156	0.103	47
	6	36	-0.119	0.095	59
	8	37	-0.146	0.098	54
	9	38	-0.014	0.103	45
	10	39	-0.160	0.100	52
	11	40	-0.047	0.104	46
	12	41	0.035	0.124	26
(3)	55	42	-0.572	0.112	28
	65	43	-0.597	0.088	46
	75	44	-0.293	0.077	67
	85	45	-0.085	0.064	102
(4)	60	46	0.156	0.208	13
	61	47	0.444	0.267	7
	62	48	0.113	0.244	10
	63	49	0.325	0.253	9
	64	50	0.590	0.346	3
	65	51	0.443	0.295	5
	66	52	-0.002	0.227	13
	67	53	0.297	0.224	19
	68	54	0.097	0.270	7
	69	55	0.147	0.245	7
	70	56	0.324	0.251	8
	71	57	0.253	0.242	12
	72	58	0.101	0.259	6
	73	59	0.441	0.330	3
	74	60	-0.419	0.344	15
	75	61	0.050	0.265	6
	76	62	-0.076	0.175	32
	77	63	-0.167	0.181	33
	78	64	-0.361	0.184	27
	79	65	0.046	0.197	24
	80	66	0.002	0.200	18
	81	67	0.029	0.199	18
	82	68	0.073	0.189	25
	83	69	0.139	0.191	21
	84	70	-0.014	0.207	15
	85	71	0.141	0.200	19
	86	72	0.182	0.186	31
	87	73	0.007	0.196	21
	88	74	-0.129	0.182	36
	89	75	0.213	0.197	23
	90	76	-0.365	0.184	29
	91	77	-0.745	0.188	22
	92	78	0.225	0.223	12
	93	79	0.916	0.254	7
	94	80	-0.375	0.528	1

Table 6. ANOVA results and regression coefficients from a multiplicative model utilized to derive a standardized catch rate series for Redfish in Div. 3N. Effort is measured in hours fished (1993-1995 based on preliminary data).

REGRESSION OF MULTIPLICATIVE MODEL

MULTIPLE R..... 0.739

MULTIPLE R SQUARED..... 0.546

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	4.936E1	4.936E1	
REGRESSION	70	1.041E2	1.488E0	6.616
Country¦Gear¦TC	19	2.865E1	1.508E0	6.705
Month	11	2.899E0	2.635E-1	1.172 (NS)
Bycatch PCT	4	1.406E1	3.515E0	15.633
Year	36	3.094E1	8.594E-1	3.822
RESIDUALS	385	8.658E1	2.249E-1	
TOTAL	456	2.401E2		

REGRESSION COEFFICIENTS

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
Country¦Gear¦TC	3125	INTERCEPT	0.092	0.165	456
Month	7				
Bycatch PCT	95				
Year	59				
(1)	2114	1	-0.304	0.173	17
	3114	2	-0.059	0.142	59
	3124	3	0.060	0.227	6
	4127	4	0.416	0.166	18
	4157	5	0.660	0.152	32
	11115	6	-0.456	0.280	5
	14127	7	0.497	0.266	5
	16127	8	-0.171	0.248	5
	17126	9	0.080	0.269	5
	20114	10	-0.953	0.226	8
	20116	11	-0.057	0.222	8
	20127	12	0.559	0.122	90
	20156	13	0.284	0.219	10
	20157	14	0.744	0.132	65
	25126	15	0.447	0.185	17
	25127	16	0.893	0.151	46
	27125	17	0.256	0.223	7
	34127	18	1.450	0.257	11
	34157	19	0.703	0.270	13
(2)	1	20	-0.082	0.108	36
	2	21	-0.028	0.115	31
	3	22	-0.085	0.112	33
	4	23	0.105	0.126	25
	5	24	0.044	0.114	28
	6	25	0.114	0.101	40
	8	26	0.020	0.091	56
	9	27	-0.047	0.092	58
	10	28	-0.150	0.108	33
	11	29	-0.080	0.112	31
	12	30	-0.260	0.122	24
(3)	55	31	-0.576	0.105	35
	65	32	-0.565	0.083	48
	75	33	-0.388	0.083	55
	85	34	-0.170	0.075	64
(4)	60	35	0.249	0.255	5
	61	36	0.206	0.200	11
	62	37	0.298	0.180	16
	63	38	0.187	0.221	8
	64	39	0.168	0.232	8
	65	40	0.436	0.240	7
	66	41	0.523	0.178	17
	67	42	0.444	0.277	6
	68	43	-0.316	0.287	4
	69	44	0.086	0.218	8
	70	45	0.106	0.216	8
	71	46	0.022	0.307	3
	72	47	0.124	0.199	10
	73	48	0.271	0.232	8
	74	49	0.527	0.234	7
	75	50	0.353	0.243	6
	76	51	-0.182	0.207	9
	77	52	-0.063	0.243	6
	78	53	-0.030	0.218	8
	79	54	0.126	0.175	17
	80	55	0.438	0.175	16
	81	56	0.289	0.183	17
	82	57	0.326	0.174	17
	83	58	0.172	0.182	15
	84	59	-0.203	0.189	14
	85	60	-0.187	0.189	15
	86	61	-0.191	0.197	12
	87	62	0.225	0.157	39
	88	63	-0.091	0.172	24
	89	64	-0.264	0.179	24
	90	65	-0.674	0.186	13
	91	66	-0.642	0.188	14
	92	67	-0.486	0.215	12
	93	68	-0.808	0.251	12
	94	69	-0.402	0.308	8
	95	70	0.153	0.278	8

Table 7. ANOVA results and regression coefficients from a multiplicative model utilized to derive a standardized catch rate series for Redfish in Div. 3L. Effort is measured in days fished (1993-1994 based on preliminary data).

REGRESSION OF MULTIPLICATIVE MODEL

MULTIPLE R..... 0.777

MULTIPLE R SQUARED..... 0.603

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	2.868E3	2.868E3	
REGRESSION	75	1.057E2	1.410E0	7.162
ountry¦Gear¦TC	25	5.109E1	2.044E0	10.381
Month	11	3.208E0	2.917E-1	1.482 (NS)
Bycatch PCT	4	7.396E0	1.849E0	9.393
Year	35	2.563E1	7.323E-1	3.720
RESIDUALS	353	6.949E1	1.969E-1	
TOTAL	429	3.043E3		

REGRESSION COEFFICIENTS

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
ountry¦Gear¦TC	3125	INTERCEPT	2.975	0.178	429
Month	7				
Bycatch PCT	95				
Year	59				
(1)	2114	1	0.675	0.217	7
	2125	2	0.257	0.199	7
	2155	3	0.258	0.228	5
	3114	4	0.614	0.197	11
	3124	5	0.333	0.183	7
	3155	6	0.296	0.130	24
	10125	7	0.090	0.209	8
	10126	8	0.048	0.181	14
	11115	9	0.544	0.221	9
	11125	10	0.181	0.123	18
	11126	11	0.175	0.251	10
	11127	12	0.354	0.150	15
	11155	13	0.897	0.218	5
	14126	14	0.486	0.190	7
	16127	15	0.202	0.173	24
	17126	16	0.227	0.130	20
	17127	17	0.543	0.224	5
	20114	18	1.599	0.224	8
	20116	19	0.841	0.225	8
	20127	20	0.268	0.112	46
	20145	21	0.874	0.523	12
	20157	22	0.595	0.102	42
	25127	23	0.787	0.209	6
	27125	24	0.136	0.105	27
	27157	25	0.475	0.227	5
(2)	1	26	0.316	0.118	29
	2	27	0.315	0.123	23
	3	28	0.014	0.106	40
	4	29	0.005	0.108	40
	5	30	0.056	0.119	28
(2)	6	31	-0.119	0.102	41
	8	32	-0.078	0.102	42
	9	33	-0.099	0.104	37
	10	34	-0.113	0.103	44
	11	35	-0.162	0.111	33
	12	36	-0.158	0.119	26
(3)	55	37	-0.473	0.113	25
	65	38	-0.471	0.096	39
	75	39	-0.324	0.079	63
	85	40	-0.090	0.070	82
(4)	60	41	0.051	0.190	13
	61	42	0.098	0.195	15
	62	43	0.048	0.216	10
	63	44	0.313	0.250	6
	64	45	0.484	0.313	3
	65	46	-0.056	0.287	4
	66	47	-0.183	0.215	12
	67	48	0.148	0.241	12
	68	49	-0.084	0.259	6
	69	50	-0.109	0.250	5
	70	51	-0.652	0.312	3
	71	52	0.087	0.375	3
	72	53	-0.608	0.269	4
	73	54	0.043	0.342	2
	74	55	-0.804	0.506	13
	75	56	-0.368	0.306	3
	76	57	-0.103	0.163	25
	77	58	-0.140	0.170	27
	78	59	-0.553	0.175	19
	79	60	-0.224	0.204	12
	80	61	-0.110	0.209	11
	81	62	-0.024	0.202	13
	82	63	0.115	0.197	15
	83	64	0.101	0.196	13
	84	65	-0.166	0.229	8
	85	66	-0.263	0.206	12
	86	67	0.038	0.181	27
	87	68	-0.075	0.184	24
	88	69	-0.214	0.181	28
	89	70	-0.035	0.208	12
	90	71	-0.489	0.196	18
	91	72	-0.933	0.183	14
	92	73	-0.137	0.228	7
	93	74	-0.580	0.255	6
	94	75	-2.410	0.467	1

Table 8. ANOVA results and regression coefficients from a multiplicative model utilized to derive a standardized catch rate series for Redfish in Div. 3N. Effort is measured in days fished (1993-1995 based on preliminary data).

REGRESSION OF MULTIPLICATIVE MODEL

MULTIPLE R..... 0.825

MULTIPLE R SQUARED..... 0.681

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	3.111E3	3.111E3	
REGRESSION	65	1.397E2	2.149E0	11.300
Country¦Gear¦TC	15	8.031E1	5.354E0	28.159
Month	11	1.682E0	1.529E 1	0.804 (NS)
Bycatch PCT	4	5.093E0	1.273E0	6.696
Year	35	2.958E1	8.453E 1	4.446
RESIDUALS	344	6.541E1	1.901E 1	
TOTAL	410	3.316E3		

REGRESSION COEFFICIENTS

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
Country¦Gear¦TC	3125	INTERCEPT	2.293	0.222	410
Month	7				
Bycatch PCT	95				
Year	59				
(1)	2114	1	0.192	0.219	13
	3114	2	0.007	0.192	46
	4127	3	0.053	0.221	15
	4157	4	0.609	0.215	28
	17126	5	0.320	0.221	25
	20114	6	1.438	0.285	6
	20126	7	0.218	0.287	5
	20127	8	0.511	0.189	75
	20156	9	0.344	0.293	6
	20157	10	0.778	0.200	53
	22114	11	1.248	0.206	50
	25126	12	0.138	0.235	17
	25127	13	0.671	0.213	41
	34127	14	1.575	0.280	8
	34157	15	0.192	0.380	12
(2)	1	16	0.184	0.109	34
	2	17	0.114	0.109	33
	3	18	0.117	0.110	33
	4	19	0.031	0.117	27
	5	20	0.260	0.114	28
	6	21	0.052	0.105	33
	8	22	0.069	0.093	50
	9	23	0.059	0.096	45
	10	24	0.031	0.112	28
	11	25	0.019	0.112	27
	12	26	0.158	0.115	26
(3)	55	27	0.385	0.097	35
	65	28	0.383	0.091	38
	75	29	0.133	0.083	47
	85	30	0.068	0.081	44
(4)	60	31	0.829	0.167	12
	51	32	0.152	0.144	22
	62	33	0.231	0.184	12
	63	34	0.009	0.148	19
	64	35	0.038	0.169	12
	65	36	0.161	0.235	5
	66	37	0.383	0.223	6
	68	38	0.214	0.312	3
	69	39	0.421	0.235	7
	70	40	0.502	0.234	7
	71	41	0.341	0.291	3
	72	42	0.457	0.209	9
	73	43	0.271	0.355	2
	74	44	1.466	0.474	1
	75	45	0.603	0.259	5
	76	46	0.071	0.213	7
	77	47	0.393	0.284	4
	78	48	0.085	0.260	5
	79	49	0.508	0.211	9
	80	50	0.598	0.208	10
	81	51	0.441	0.210	12
	82	52	0.337	0.196	15
	83	53	0.335	0.204	13
	84	54	0.038	0.218	10
	85	55	0.359	0.193	19
	86	56	0.094	0.220	10
	87	57	0.461	0.181	45
	88	58	0.163	0.190	29
	89	59	0.141	0.202	20
	90	60	0.359	0.224	9
	91	61	0.080	0.208	13
	92	62	0.210	0.227	12
	93	63	0.468	0.230	12
	94	64	0.465	0.405	7
	95	65	0.621	0.358	6

Table 9. Standardized catch rate series for Div. 3L redfish from a multiplicative model utilizing hours fished as a measure of effort.

PREDICTED CATCH RATE

	LN TRANSFORM		RETRANSFORMED			
YEAR	MEAN	S.E.	MEAN	S.E.	CATCH	EFFORT
1959	0.3057	0.0323	1.509	0.269	34107	22604
1960	0.4617	0.0362	1.760	0.332	10015	5690
1961	0.7492	0.0654	2.312	0.582	8349	3610
1962	0.4183	0.0528	1.671	0.379	3425	2049
1963	0.6309	0.0580	2.062	0.490	8191	3973
1964	0.8954	0.1127	2.614	0.854	3898	1491
1965	0.7486	0.0818	2.292	0.643	18772	8190
1966	0.3037	0.0387	1.501	0.293	6927	4615
1967	0.6025	0.0362	2.026	0.383	7684	3793
1968	0.4027	0.0544	1.644	0.379	2378	1446
1969	0.4525	0.0508	1.731	0.386	2344	1354
1970	0.6302	0.0556	2.063	0.480	1029	499
1971	0.5584	0.0466	1.929	0.412	10043	5207
1972	0.4067	0.0565	1.649	0.387	3095	1877
1973	0.7468	0.1004	2.267	0.701	4709	2078
1974	-0.1128	0.1014	0.959	0.298	11419	11907
1975	0.3559	0.0521	1.571	0.354	3838	2443
1976	0.2298	0.0175	1.409	0.186	15971	11335
1977	0.1384	0.0173	1.286	0.169	13452	10461
1978	-0.0553	0.0168	1.060	0.137	6318	5961
1979	0.3513	0.0219	1.588	0.234	5584	3517
1980	0.3076	0.0210	1.520	0.219	4367	2873
1981	0.3348	0.0206	1.563	0.223	9407	6020
1982	0.3783	0.0160	1.636	0.206	7870	4812
1983	0.4446	0.0186	1.745	0.237	8657	4960
1984	0.2919	0.0237	1.495	0.229	2696	1804
1985	0.4462	0.0198	1.747	0.245	3677	2104
1986	0.4875	0.0149	1.826	0.222	27833	15247
1987	0.3124	0.0186	1.529	0.208	34212	22369
1988	0.1770	0.0149	1.338	0.163	26267	19629
1989	0.5186	0.0202	1.878	0.266	19847	10567
1990	-0.0593	0.0159	1.056	0.133	17713	16774
1991	-0.4388	0.0195	0.721	0.100	8892	12329
1992	0.5305	0.0333	1.888	0.342	4630	2452
1993	1.2217	0.0476	3.742	0.808	5897	1576
1994	-0.0692	0.2614	0.925	0.444	379	410

AVERAGE C.V. FOR THE RETRANSFORMED MEAN: 0.197

Table 10. Standardized catch rate series for Div. 3N redfish from a multiplicative model utilizing hours fished as a measure of effort.

PREDICTED CATCH RATE

	LN TRANSFORM		RETRANSFORMED			
YEAR	MEAN	S.E.	MEAN	S.E.	CATCH	EFFORT
1959	0.0916	0.0271	1.210	0.198	10478	8659
1960	0.3401	0.0691	1.519	0.393	16547	10892
1961	0.2980	0.0436	1.475	0.305	14826	10049
1962	0.3897	0.0350	1.624	0.302	18009	11090
1963	0.2784	0.0519	1.441	0.324	12906	8958
1964	0.2600	0.0565	1.411	0.331	4206	2981
1965	0.5278	0.0611	1.840	0.449	4694	2551
1966	0.6148	0.0252	2.044	0.323	10047	4915
1967	0.5355	0.0708	1.845	0.483	19504	10569
1968	-0.2245	0.0705	0.863	0.225	15265	17684
1969	0.1779	0.0463	1.307	0.278	22356	17109
1970	0.1975	0.0464	1.332	0.284	13359	10026
1971	0.1140	0.0946	1.196	0.360	24310	20320
1972	0.2155	0.0397	1.361	0.269	25838	18982
1973	0.3629	0.0466	1.572	0.336	28588	18186
1974	0.6183	0.0536	2.022	0.463	10867	5374
1975	0.4451	0.0568	1.698	0.399	14033	8265
1976	-0.0901	0.0434	1.001	0.206	4541	4537
1977	0.0285	0.0572	1.119	0.264	3064	2738
1978	0.0620	0.0483	1.162	0.253	5725	4925
1979	0.2173	0.0252	1.374	0.217	8483	6176
1980	0.5294	0.0297	1.872	0.321	11663	6229
1981	0.3806	0.0295	1.614	0.275	14873	9216
1982	0.4172	0.0268	1.676	0.273	13677	8160
1983	0.2635	0.0316	1.434	0.253	11090	7734
1984	-0.1114	0.0351	0.984	0.183	12065	12263
1985	-0.0950	0.0328	1.001	0.180	16880	16858
1986	-0.0993	0.0381	0.994	0.193	14972	15057
1987	0.3167	0.0235	1.518	0.232	44819	29517
1988	0.0006	0.0284	1.104	0.185	26999	24453
1989	-0.1728	0.0307	0.927	0.162	13802	14884
1990	-0.5820	0.0325	0.615	0.110	11392	18513
1991	-0.5503	0.0346	0.635	0.117	12723	20052
1992	-0.3941	0.0443	0.738	0.154	10153	13755
1993	-0.7159	0.0619	0.530	0.130	9077	17116
1994	-0.3104	0.0910	0.784	0.231	2274	2900
1995	0.2450	0.0747	1.378	0.370	1697	1232

AVERAGE C.V. FOR THE RETRANSFORMED MEAN: 0.209

Table 11. Standardized catch rate series for Div. 3L redfish from a multiplicative model utilizing days fished as a measure of effort.

PREDICTED CATCH RATE

	LN TRANSFORM		RETRANSFORMED			
YEAR	MEAN	S.E.	MEAN	S.E.	CATCH	EFFORT
1959	2.9754	0.0315	21.291	3.757	34107	1602
1960	3.0264	0.0378	22.335	4.310	10015	448
1961	3.0731	0.0405	23.371	4.664	8349	357
1962	3.0237	0.0482	22.159	4.815	3425	155
1963	3.2883	0.0631	28.655	7.097	8191	286
1964	3.4597	0.0968	33.444	10.174	3898	117
1965	2.9195	0.0849	19.603	5.601	18772	958
1966	2.7924	0.0400	17.655	3.502	6927	392
1967	3.1233	0.0516	24.437	5.486	7684	314
1968	2.8909	0.0531	19.356	4.407	2378	123
1969	2.8668	0.0579	18.850	4.479	2344	124
1970	2.3235	0.1024	10.707	3.345	1029	96
1971	3.0628	0.1377	22.033	7.911	10043	456
1972	2.3673	0.0706	11.366	2.972	3095	272
1973	3.0184	0.1215	21.247	7.196	4709	222
1974	2.1711	0.2595	8.496	4.067	11419	1344
1975	2.6078	0.0815	14.377	4.028	3838	267
1976	2.8726	0.0203	19.321	2.741	15971	827
1977	2.8349	0.0199	18.609	2.618	13452	723
1978	2.4221	0.0207	12.311	1.764	6318	513
1979	2.7509	0.0286	17.036	2.863	5584	328
1980	2.8654	0.0277	19.110	3.163	4367	229
1981	2.9509	0.0244	20.850	3.244	9407	451
1982	3.0904	0.0193	24.032	3.331	7870	327
1983	3.0765	0.0222	23.666	3.512	8657	366
1984	2.8095	0.0339	18.014	3.295	2696	150
1985	2.7121	0.0242	16.423	2.544	3677	224
1986	3.0137	0.0155	22.301	2.774	27833	1248
1987	2.9000	0.0182	19.877	2.675	34212	1721
1988	2.7619	0.0174	17.320	2.276	26267	1517
1989	2.9403	0.0268	20.606	3.354	19847	963
1990	2.4869	0.0221	13.125	1.944	17713	1350
1991	2.0426	0.0235	8.411	1.285	8892	1057
1992	2.8387	0.0449	18.447	3.869	4630	251
1993	2.3956	0.0505	11.811	2.625	5897	499
1994	0.5657	0.2212	1.739	0.776	379	218

AVERAGE C.V. FOR THE RETRANSFORMED MEAN: 0.217

Table 12. Standardized catch rate series for Div. 3N redfish from a multiplicative model utilizing days fished as a measure of effort.

PREDICTED CATCH RATE

	LN TRANSFORM		RETRANSFORMED			
YEAR	MEAN	S.E.	MEAN	S.E.	CATCH	EFFORT
1959	2.2927	0.0493	10.626	2.335	10478	986
1960	3.1220	0.0582	24.243	5.772	16547	683
1961	2.4446	0.0498	12.367	2.728	14826	1199
1962	2.5239	0.0569	13.339	3.142	18009	1350
1963	2.2835	0.0519	10.515	2.369	12906	1227
1964	2.3308	0.0594	10.983	2.642	4206	383
1965	2.4541	0.0860	12.260	3.525	4694	383
1966	2.6762	0.0527	15.566	3.532	10047	645
1968	2.5065	0.0805	12.955	3.609	15265	1178
1969	2.7139	0.0726	16.004	4.242	22356	1397
1970	2.7949	0.0742	17.340	4.643	13359	770
1971	2.6337	0.1037	14.543	4.570	24310	1672
1972	2.7499	0.0553	16.735	3.889	25838	1544
1973	2.5638	0.1415	13.305	4.840	28588	2149
1974	0.8268	0.2379	2.232	1.028	10867	4869
1975	2.8960	0.0849	19.082	5.450	14033	735
1976	2.2220	0.0603	9.846	2.385	4541	461
1977	2.6856	0.0941	15.390	4.618	3064	199
1978	2.3776	0.0834	11.372	3.222	5725	503
1979	2.8011	0.0413	17.739	3.571	8483	478
1980	2.8907	0.0566	19.253	4.522	11663	606
1981	2.7336	0.0577	16.445	3.900	14873	904
1982	2.6298	0.0492	14.886	3.267	13677	919
1983	2.6274	0.0535	14.819	3.386	11090	748
1984	2.2544	0.0614	10.165	2.484	12065	1187
1985	1.9341	0.0526	7.411	1.681	16880	2278
1986	2.3867	0.0634	11.592	2.877	14972	1292
1987	2.7534	0.0468	16.866	3.612	44819	2657
1988	2.4553	0.0505	12.496	2.776	26999	2161
1989	2.4339	0.0552	12.202	2.832	13802	1131
1990	1.9340	0.0643	7.368	1.841	11392	1546
1991	2.2124	0.0571	9.768	2.305	12723	1303
1992	2.0825	0.0652	8.543	2.149	10153	1188
1993	1.8244	0.0661	6.597	1.671	9077	1376
1994	2.7573	0.1796	15.840	6.431	2274	144
1995	2.9132	0.1429	18.857	6.891	1697	90

AVERAGE C.V. FOR THE RETRANSFORMED MEAN: 0.263

Table 13. Mean number per standard tow from various Canadian surveys in Div. 3L where strata greater than 366 m (200 fath.) were sampled. Dashes (-) represent unsampled strata. Number of successful sets in brackets. The gear utilized was an Engels 145 otter trawl with a small mesh liner in the codend. G.A. = Gadus Atlantica, W.T. = Wilfred Templeman, A.N. = Alfred Needler.

Stratum	Depth Range (M)	Area (sq. n.) mi	Aug 16-Aug 29 1978-Q3 (G.A. 12)	Sep 4-Sep 10 1979-Q3 (G.A. 25)	May 8-May 13 1980-Q2 (G.A. 36)	Sep 18-Sep 26 1981-Q3 (G.A. 55)	Jul 26-Sep 3 1984-Q3 (W.T. 16-18)	Jan 10-Feb 11 1985-Q1 (W.T. 22-24)	Apr 17-May 26 1985-Q2 (W.T. 28-30)	Jul 27-Aug 25 1985-Q3 (W.T. 32-34)	Oct 9-Nov 18 1985-Q4 (W.T. 37-39)
347	184-274	983	131.67 (3)	0.00 (2)	0.00 (4)	3.96 (4)	0.00 (6)	0.00 (5)	0.40 (5)	0.00 (3)	0.00 (5)
366	184-274	1394	197.00 (3)	13.50 (2)	9.83 (6)	47.67 (6)	13.91 (11)	0.00 (5)	1.33 (6)	17.40 (5)	17.22 (9)
369	184-274	961	0.00 (3)	1.00 (2)	0.25 (4)	13.75 (4)	0.43 (7)	0.00 (5)	0.20 (5)	0.17 (6)	0.00 (6)
386	184-274	983	115.67 (3)	11.50 (2)	2.00 (4)	11.00 (4)	23.13 (8)	0.00 (5)	0.40 (5)	19.60 (5)	0.60 (5)
389	184-274	821	0.33 (3)	0.00 (1)	29.50 (2)	4.00 (3)	21.67 (6)	4.00 (4)	0.20 (5)	1.75 (4)	7.40 (5)
391	184-274	282	0.00 (2)	19.00 (2)	4.00 (2)	1.50 (2)	0.50 (2)	0.00 (2)	0.00 (2)	0.00 (2)	12.50 (2)
345	275-366	1432	68.50 (2)	96.75 (4)	12.00 (4)	46.60 (5)	37.80 (7)	3.33 (3)	3.20 (5)	62.29 (7)	5.11 (9)
346	275-366	865	206.00 (2)	126.75 (4)	27.00 (2)	70.33 (3)	263.33 (6)	10.00 (4)	20.00 (2)	91.33 (3)	84.40 (5)
368	275-366	334	2,709.00 (2)	140.00 (3)	24.00 (2)	526.50 (2)	4,379.50 (2)	405.00 (2)	14.50 (2)	320.50 (2)	351.50 (2)
387	275-366	718	532.00 (2)	595.40 (5)	23.67 (3)	1,748.67 (3)	4,678.00 (3)	102.00 (4)	11.33 (6)	1,807.33 (3)	628.00 (4)
388	275-366	361	1,240.50 (2)	2,326.33 (3)	4.50 (2)	464.50 (2)	195.00 (2)	16.00 (3)	20.00 (2)	397.00 (2)	78.00 (2)
392	275-366	145	-	818.00 (3)	27.33 (3)	536.50 (2)	2,811.00 (2)	4.00 (2)	10.00 (2)	131.50 (2)	1,398.50 (2)
729	367-549	186	-	488.00 (3)	77.00 (1)	1,050.00 (2)	448.00 (2)	3,406.00 (2)	24.50 (2)	1,231.00 (2)	2,720.50 (2)
731	367-549	216	486.00 (2)	457.00 (3)	325.50 (2)	176.00 (2)	257.00 (2)	80.67 (3)	63.00 (2)	257.00 (2)	502.00 (2)
733	367-549	468	817.00 (2)	1,300.67 (3)	43.67 (3)	1,420.50 (2)	480.00 (4)	1,921.67 (3)	1,147.53 (3)	1,699.50 (2)	727.00 (3)
735	367-549	272	810.50 (2)	452.67 (3)	39.00 (2)	768.00 (2)	723.33 (3)	10.50 (2)	52.50 (2)	282.00 (2)	232.00 (2)
730	550-731	170	1,135.00 (2)	399.33 (3)	295.00 (2)	496.50 (2)	100.50 (2)	816.00 (2)	8,926.00 (2)	347.00 (2)	37.50 (2)
732	550-731	231	85.50 (2)	54.00 (2)	104.00 (2)	53.00 (2)	90.00 (2)	416.00 (2)	141.50 (2)	48.00 (2)	39.00 (2)
734	550-731	228	1,435.50 (2)	535.67 (3)	1,756.00 (2)	760.50 (2)	557.00 (3)	195.50 (2)	366.00 (2)	912.00 (2)	540.00 (2)
736	550-731	175	163.50 (2)	270.33 (3)	119.00 (1)	84.00 (2)	17.00 (1)	-	532.50 (2)	26.50 (2)	222.00 (2)
737	732-914	227	-	-	-	-	-	-	-	-	-
741	732-914	223	-	-	-	-	-	-	-	-	-
745	732-914	348	-	-	-	-	-	-	-	-	-
748	732-914	159	-	-	-	-	-	-	-	-	-
Upper (95% CI)a			653.40	544.20	266.40	680.10	1,078.50	302.20	1,909.10	465.20	290.30
Weighted mean (by area) (incl. strata with 1 set)			349.30	257.30	64.50	293.50	567.50	174.70	208.70	286.80	187.90
Lower (95% CI)a			45.20	11.03	-139.6	-93.2	73.94	47.20	-1491.7	108.50	85.50
Abundance of surveyed area (millions)			285.60	216.80	54.30	247.30	478.20	144.90	175.90	241.70	158.30

a - Confidence interval of mean for those strata with at least two sets.

Table 13. Mean number , Div. 3L (continued)

Stratum	Depth Range (M)	Area (sq. n.) mi	Jan 22-Feb 27 1986-Q1 (W.T.42-44)	Nov13-Nov 30 1986-Q4 (A.N. 72)	Jan 17-Jan 25 1990-Q1 (W.T. 90)	Aug 7-Aug 19 1990-Q3 (W.T. 98)	Oct 18-Nov 18 1990-Q4 (W.T. 101)	May 11- May 2 1991-Q2 (W.T. 106-7)	Aug 4- Aug 11 1991-Q3 (W.T. 109)	Nov 10- Dec 2 1991-Q4 (W.T. 114-5)	May 13-June 7 1992-Q2 (W.T 120-2)
									0.3		
347	184-274	983	1.50 (4)	0.00 (4)	0.50 (4)	1.93 (4)	0.00 (2)	0.25 (2)	0.00 (3)	0.00 (4)	0.00 (4)
366	184-274	1394	1.50 (2)	5.50 (4)	1.00 (5)	9.00 (4)	0.00 (6)	-	0.33 (3)	0.19 (21)	0.33 (6)
369	184-274	961	0.00 (3)	4.24 (3)	0.00 (4)	2.50 (4)	0.00 (4)	0.00 (2)	6.50 (4)	0.56 (9)	0.00 (4)
386	184-274	983	0.86 (7)	4.10 (4)	5.50 (4)	1.29 (7)	2.00 (4)	0.67 (3)	1.00 (3)	0.00 (3)	0.00 (4)
389	184-274	821	1.50 (4)	2.25 (4)	0.00 (3)	5.33 (3)	1.00 (3)	1.67 (3)	0.33 (3)	0.00 (3)	0.00 (3)
391	184-274	282	0.00 (3)	18.00 (2)	0.50 (5)	1.00 (5)	0.00 (2)	0.00 (3)	5.67 (3)	0.00 (3)	2.50 (2)
345	275-366	1432	1.33 (3)	6.68 (4)	0.40 (5)	16.33 (6)	1.00 (5)	0.67 (3)	4.50 (4)	0.25 (4)	0.00 (6)
346	275-366	865	4.25 (4)	22.13 (3)	14.67 (3)	247.66 (7)	67.00 (3)	-	30.00 (4)	6.80 (15)	1.75 (4)
368	275-366	334	7.00 (1)	24.90 (2)	21.00 (2)	1,728.57 (7)	57.50 (2)	-	409.75 (4)	31.17 (6)	12.00 (2)
387	275-366	718	12.00 (4)	6.00 (2)	135.00 (3)	297.70 (10)	89.67 (3)	45.00 (3)	189.40 (5)	13.00 (5)	8.00 (3)
388	275-366	361	15.67 (3)	-	13.00 (2)	183.86 (7)	16.00 (2)	13.53 (3)	50.33 (3)	12.33 (3)	2.00 (2)
392	275-366	145	9.67 (3)	359.50 (2)	4.00 (2)	146.56 (9)	9.00 (2)	2.50 (2)	350.67 (3)	4.67 (3)	3.50 (2)
729	367-549	186	2,690.00 (2)	1,491.22 (2)	206.50 (2)	328.43 (7)	206.50 (2)	19.00 (2)	190.00 (2)	142.00 (3)	59.50 (2)
731	367-549	216	153.00 (1)	220.80 (1)	68.00 (2)	166.83 (6)	275.50 (2)	27.50 (2)	244.00 (3)	41.00 (3)	26.00 (2)
733	367-549	468	452.07 (2)	-	72.00 (2)	490.87 (9)	216.00 (2)	16.00 (2)	611.00 (4)	340.00 (3)	53.00 (2)
735	367-549	272	-	153.50 (2)	223.00 (2)	603.51 (6)	195.00 (1)	-	106.82 (3)	125.67 (3)	76.50 (2)
730	550-731	170	1,822.50 (1)	-	109.50 (2)	183.52 (4)	42.00 (1)	178.00 (2)	222.33 (3)	348.50 (2)	113.50 (2)
732	550-731	231	1,694.00 (1)	-	68.00 (2)	59.44 (9)	193.00 (2)	300.00 (2)	96.67 (3)	39.00 (2)	214.50 (2)
734	550-731	228	451.00 (2)	-	142.93 (2)	271.60 (5)	42.00 (2)	231.60 (2)	59.67 (3)	16.00 (2)	140.00 (2)
736	550-731	175	-	24.74 (2)	208.50 (2)	93.50 (6)	281.00 (2)	-	12.67 (3)	51.00 (2)	60.50 (2)
737	732-914	227	-	-	-	-	-	-	-	-	-
741	732-914	223	-	-	-	-	-	-	-	-	-
745	732-914	348	-	-	-	-	-	-	-	-	-
748	732-914	159	-	-	-	-	-	-	-	-	-
Upper (95% CI)a			466.00	66.30	62.50	263.80	63.10	123.20	94.90	58.30	38.60
Weighted mean (by area) (*incl. strata with 1 set*)			146.40	49.90	33.90	156.20	45.90	25.70	76.90	30.40	16.70
Lower (95% CI)a			-294.7	25.80	5.30	48.60	21.30	-71.9	58.80	2.50	-5.2
Abundance of surveyed area (millions)			118.50	36.60	28.60	131.60	38.70	15.80	64.80	25.60	14.10

a - Confidence interval of mean for those strata with at least two sets.

Table 13. Mean number , Div. 3L (continued)

Stratum	Depth Range (M)	Area (sq. n.) mi	Nov 5-Nov 29 1992-Q4 (W.T 129-30)	May 18-Jun 10 1993-Q2 (W.T 137-8)	Aug 5-Aug 15 1993-Q3 (G.A. 223)	Nov 12- Dec 4 1993-Q4 (W.T. 145-6)	May 22-Jun 10 1994-Q2 (W.T. 153-54)	Nov 8-Dec 7 1994-Q4 (W.T. 161-62)	May 27-Jun 14 1995-Q2 (W.T. 169-70)
347	184-274	983	0.00 (2)	0.00 (4)	0.00 (3)	0.00 (4)	0.00 (4)	0.00 (8)	0.00 (4)
366	184-274	1394	1.00 (24)	0.00 (7)	2.50 (2)	0.21 (14)	0.20 (5)	0.10 (10)	0.00 (5)
369	184-274	961	0.00 (8)	0.00 (5)	0.00 (3)	0.14 (7)	0.33 (3)	0.00 (3)	0.00 (3)
386	184-274	983	0.00 (3)	0.20 (5)	0.00 (3)	0.00 (3)	0.00 (4)	0.00 (3)	0.00 (4)
389	184-274	821	0.67 (3)	0.00 (4)	1.00 (3)	0.00 (3)	0.00 (3)	0.00 (3)	2.25 (4)
391	184-274	282	0.00 (3)	0.00 (2)	0.33 (3)	1.00 (3)	0.00 (2)	1.67 (3)	2.00 (2)
345	275-366	1432	0.25 (4)	0.00 (2)	1.67 (3)	0.00 (3)	0.60 (5)	0.00 (8)	0.00 (5)
346	275-366	865	2.64 (14)	2.25 (6)	5.33 (3)	5.09 (11)	1.83 (3)	0.29 (7)	0.67 (3)
368	275-366	334	18.20 (10)	9.50 (4)	25.00 (3)	5.63 (8)	3.50 (2)	0.50 (12)	2.00 (2)
387	275-366	718	10.00 (3)	6.07 (2)	51.33 (3)	2.33 (3)	1.00 (3)	3.22 (9)	7.33 (3)
388	275-366	361	20.00 (3)	1.50 (3)	11.00 (3)	6.67 (3)	0.00 (2)	2.86 (7)	5.00 (2)
392	275-366	145	3.33 (3)	1.50 (2)	21.00 (3)	4.67 (3)	0.00 (2)	4.67 (3)	27.50 (2)
729	367-549	186	296.50 (3)	31.50 (2)	210.33 (3)	172.67 (3)	18.50 (2)	800.67 (9)	48.00 (2)
731	367-549	216	205.00 (3)	26.00 (3)	170.00 (3)	21.67 (3)	41.00 (2)	35.50 (7)	24.50 (2)
733	367-549	468	210.00 (3)	20.67 (2)	215.67 (3)	18.67 (3)	20.50 (2)	40.89 (9)	7.50 (2)
735	367-549	272	222.33 (3)	14.50 (2)	35.00 (3)	31.00 (3)	34.00 (2)	11.20 (11)	22.00 (2)
730	550-731	170	69.50 (2)	249.00 (2)	50.33 (3)	332.00 (3)	35.00 (2)	114.33 (3)	72.00 (2)
732	550-731	231	198.00 (2)	401.00 (2)	93.67 (3)	18.00 (2)	53.00 (2)	98.67 (3)	54.50 (2)
734	550-731	228	108.00 (2)	19.06 (2)	20.67 (3)	70.50 (2)	43.38 (2)	44.87 (3)	106.50 (2)
736	550-731	175	45.50 (2)	40.50 (2)	11.67 (3)	24.67 (3)	23.00 (2)	25.43 (7)	41.50 (2)
737	732-914	227	-	-	-	-	5.50 (2)	-	-
741	732-914	223	-	-	-	-	1.50 (2)	-	-
745	732-914	348	-	-	-	-	0.50 (2)	-	-
748	732-914	159	-	-	-	-	1.00 (2)	-	-
Upper (95% CI)a			49.80	117.90	41.60	24.65	8.80	39.30	10.54
Weighted mean (by area) (incl. strata with 1 set)			33.30	16.20	25.60	13.10	5.90	21.50	8.45
Lower (95% CI)a			16.80	-85.5	9.50	1.50	2.80	3.60	6.36
Abundance of surveyed area (millions)			28.10	13.70	21.50	11.00	5.30	18.10	7.10

a - Confidence interval of mean for those strata with at least two sets.

Table 14. Mean weight (kg) per standard tow from various Canadian surveys in Div. 3L where strata greater than 366 m (200 fath.) were sampled. Dashes (-) represent unsampled strata. Number of successful sets in brackets. The gear utilized was an Engels 145 otter trawl with a small mesh liner in the codend. G.A. = Gadus Atlantica, W.T. = Wilfred Templeman, A.N. = Alfred Needler.

Stratum	Depth Range (M)	Area (sq. n.) mi	Aug 16-Aug 29 1978-Q3 (G.A. 12)	Sep 4-Sep 10 1979-Q3 (G.A. 25)	May 8-May 13 1980-Q2 (G.A. 36)	Sep 18-Sep 26 1981-Q3 (G.A. 55)	Jul 26-Sep 3 1984-Q3 (W.T. 16-18)	Jan 10-Feb 11 1985-Q1 (W.T. 22-24)	Apr 17-May 26 1985-Q2 (W.T. 28-30)	Jul 27-Aug 25 1985-Q3 (W.T. 32-34)	Oct 9-Nov 18 1985-Q4 (W.T. 37-39)
347	184-274	983	42.52 (3)	0.00 (2)	0.00 (4)	1.32 (4)	0.00 (6)	0.00 (5)	0.00 (5)	0.00 (3)	0.00 (5)
366	184-274	1394	35.42 (3)	1.82 (2)	2.00 (6)	25.01 (6)	1.14 (11)	0.00 (5)	0.05 (6)	4.00 (5)	5.33 (9)
369	184-274	961	0.00 (3)	0.80 (2)	0.25 (4)	2.40 (4)	0.00 (7)	0.00 (5)	0.20 (5)	0.17 (6)	0.00 (6)
386	184-274	983	62.99 (3)	11.32 (2)	1.25 (4)	8.50 (4)	14.18 (8)	0.00 (5)	0.21 (5)	15.30 (5)	0.44 (5)
389	184-274	821	0.03 (3)	0.00 (1)	9.25 (2)	2.33 (3)	8.83 (6)	0.50 (4)	0.01 (5)	0.63 (4)	1.46 (5)
391	184-274	282	0.00 (2)	6.39 (2)	0.75 (2)	0.08 (2)	0.03 (2)	0.00 (2)	0.00 (2)	0.00 (2)	4.00 (2)
345	275-366	1432	51.08 (2)	78.92 (4)	8.50 (4)	35.80 (5)	31.10 (7)	0.83 (3)	3.14 (5)	44.41 (7)	3.32 (9)
346	275-366	865	151.18 (2)	80.88 (4)	14.75 (2)	64.83 (3)	163.33 (6)	5.80 (4)	18.25 (2)	67.50 (3)	61.50 (5)
368	275-366	334	1,154.53 (2)	61.72 (3)	7.25 (2)	176.75 (2)	1,915.75 (2)	2.00 (2)	5.35 (2)	181.75 (2)	151.50 (2)
387	275-366	718	203.16 (2)	286.77 (5)	6.83 (3)	572.00 (3)	1,972.33 (3)	71.50 (4)	4.68 (6)	633.03 (3)	279.17 (4)
388	275-366	361	262.18 (2)	562.10 (3)	1.10 (2)	145.50 (2)	63.00 (2)	14.17 (3)	7.65 (2)	130.50 (2)	30.75 (2)
392	275-366	145	-	304.24 (3)	7.50 (3)	146.75 (2)	1,118.44 (2)	1.40 (2)	1.50 (2)	45.75 (2)	451.50 (2)
729	367-549	186	-	199.53 (3)	24.00 (1)	413.50 (2)	203.43 (2)	1,249.00 (2)	7.25 (2)	560.00 (2)	1,213.50 (2)
731	367-549	216	289.42 (2)	255.57 (3)	112.25 (2)	69.00 (2)	120.00 (2)	29.17 (3)	16.00 (2)	121.50 (2)	275.50 (2)
733	367-549	468	460.96 (2)	647.34 (3)	18.83 (3)	754.00 (2)	280.63 (4)	895.28 (3)	623.43 (3)	1,023.50 (2)	353.76 (3)
735	367-549	272	603.98 (2)	252.05 (3)	14.50 (2)	348.00 (2)	442.00 (3)	4.50 (2)	20.50 (2)	186.00 (2)	127.75 (2)
730	550-731	170	509.74 (2)	238.85 (3)	96.75 (2)	263.25 (2)	57.25 (2)	408.00 (2)	4,710.00 (2)	195.50 (2)	19.75 (2)
732	550-731	231	47.44 (2)	29.94 (2)	30.25 (2)	30.50 (2)	49.25 (2)	217.50 (2)	56.00 (2)	33.00 (2)	22.00 (2)
734	550-731	228	1,084.93 (2)	357.43 (3)	1,187.45 (2)	430.64 (2)	350.00 (3)	119.75 (2)	146.75 (2)	598.50 (2)	387.13 (2)
736	550-731	175	61.59 (2)	116.73 (3)	28.00 (1)	42.25 (2)	11.00 (1)	-	152.00 (2)	17.25 (2)	107.75 (2)
737	732-914	227	-	-	-	-	-	-	-	-	-
741	732-914	223	-	-	-	-	-	-	-	-	-
745	732-914	348	-	-	-	-	-	-	-	-	-
748	732-914	159	-	-	-	-	-	-	-	-	-
Upper (95% CI)a			252.90	164.50	185.30	246.60	536.80	111.30	1,008.10	264.90	278.70
Weighted mean (by area) (incl. strata with 1 set)			163.50	114.60	34.40	124.40	255.50	78.70	107.30	138.30	88.80
Lower (95% CI)a			74.13	82.80	-115.9	3.20	-18.1	46.10	-793.4	11.70	-101.1
Survey biomass index (tons)			133724	96536	29001	104817	215259	65282	90432	116543	74828

a - Confidence interval of mean for those strata with at least two sets.

Table 14. Mean weight , Div. 3L (continued)

Stratum	Depth Range (M)	Area (sq. n.) mi	Jan 22-Feb 27 1986-Q1 (W.T.42-44)	Nov13-Nov 30 1986-Q4 (A.N. 72)	Jan 17-Jan 25 1990-Q1 (W.T. 90)	Aug 7-Aug 19 1990-Q3 (W.T. 98)	Oct 18-Nov 18 1990-Q4 (W.T. 101)	May 11- May 29 1991-Q2 (W.T. 106-7)	Aug 4- Aug 11 1991-Q3 (W.T. 109)	Nov 10- Dec 2 1991-Q4 (W.T. 114-5)	May 13-June 7 1992-Q2 (W.T 120-2)
									0.3		
347	184-274	983	0.08 (4)	0.00 (4)	0.06 (4)	0.63 (4)	0.00 (2)	0.00 (2)	0.00 (3)	0.00 (4)	0.00 (4)
366	184-274	1394	0.01 (2)	2.13 (4)	0.04 (5)	2.56 (4)	0.00 (6)	-	0.10 (3)	0.03 (21)	0.08 (6)
369	184-274	961	0.00 (3)	0.71 (3)	0.00 (4)	0.79 (4)	0.00 (4)	0.00 (2)	3.27 (4)	0.12 (9)	0.00 (4)
386	184-274	983	0.45 (7)	0.34 (4)	3.21 (4)	0.09 (7)	0.05 (4)	0.02 (3)	0.20 (3)	0.00 (3)	0.00 (4)
389	184-274	821	0.15 (4)	0.84 (4)	0.00 (3)	0.85 (3)	0.54 (3)	0.07 (3)	0.22 (3)	0.00 (3)	0.00 (3)
391	184-274	282	0.00 (3)	3.50 (2)	0.01 (5)	0.26 (5)	0.00 (2)	0.00 (3)	1.40 (3)	0.00 (3)	0.40 (2)
345	275-366	1432	0.04 (3)	5.21 (4)	0.02 (5)	8.66 (6)	0.53 (5)	0.07 (3)	2.13 (4)	0.12 (4)	0.00 (6)
346	275-366	865	1.08 (4)	16.80 (3)	3.22 (3)	172.19 (7)	38.98 (3)	-	11.46 (4)	2.59 (15)	0.50 (4)
368	275-366	334	1.70 (1)	7.25 (2)	5.10 (2)	737.95 (7)	14.25 (2)	-	153.78 (4)	6.80 (6)	4.70 (2)
387	275-366	718	8.00 (4)	3.10 (2)	75.92 (3)	115.68 (10)	35.05 (3)	12.73 (3)	61.37 (5)	6.08 (5)	2.47 (3)
388	275-366	361	5.33 (3)	-	2.85 (2)	47.46 (7)	3.30 (2)	1.56 (3)	8.13 (3)	1.67 (3)	0.30 (2)
392	275-366	145	4.10 (3)	113.25 (2)	2.08 (2)	35.49 (9)	2.32 (2)	0.48 (2)	133.63 (3)	0.56 (3)	1.63 (2)
729	367-549	186	1,118.30 (2)	480.88 (2)	121.20 (2)	175.09 (7)	94.00 (2)	4.45 (2)	86.38 (2)	40.88 (3)	13.70 (2)
731	367-549	216	69.00 (1)	105.60 (1)	18.38 (2)	66.18 (6)	116.86 (2)	5.47 (2)	78.32 (3)	9.65 (3)	6.75 (2)
733	367-549	468	238.22 (2)	-	30.00 (2)	314.42 (9)	59.60 (2)	5.83 (2)	282.51 (4)	100.25 (3)	16.83 (2)
735	367-549	272	-	63.50 (2)	51.22 (2)	417.61 (6)	70.45 (1)	-	47.01 (3)	30.17 (3)	20.88 (2)
730	550-731	170	767.81 (1)	-	59.68 (2)	107.15 (4)	25.90 (1)	45.30 (2)	120.32 (3)	247.68 (2)	41.40 (2)
732	550-731	231	850.50 (1)	-	37.75 (2)	31.32 (9)	118.85 (2)	56.35 (2)	44.95 (3)	19.08 (2)	71.70 (2)
734	550-731	228	296.90 (2)	-	80.68 (2)	164.97 (5)	23.00 (2)	43.29 (2)	37.08 (3)	11.00 (2)	51.63 (2)
736	550-731	175	-	14.38 (2)	65.63 (2)	51.32 (6)	156.25 (2)	-	6.43 (3)	22.02 (2)	17.38 (2)
737	732-914	227	-	-	-	-	-	-	-	-	-
741	732-914	223	-	-	-	-	-	-	-	-	-
745	732-914	348	-	-	-	-	-	-	-	-	-
748	732-914	159	-	-	-	-	-	-	-	-	-
Upper (95% CI)a			202.70	24.80	31.90	130.00	29.90	11.70	40.80	19.80	12.50
Weighted mean (by area) (incl. strata with 1 set)			68.60	18.50	14.90	80.10	19.70	5.53	31.50	11.40	5.40
Lower (95% CI)a			-121.9	8.30	-2.1	30.10	6.60	-0.6	22.10	2.90	-1.7
Survey biomass index (tons)			55514	13568	12525	67453	16563	3399	26510	9576	4528

a - Confidence interval of mean for those strata with at least two sets.

Table 14. Mean weight , Div. 3L (continued)

Stratum	Depth Range (M)	Area (sq. n.) mi	Nov 5-Nov 29 1992-Q4 (W.T 129-30)	May 18-Jun 10 1993-Q2 (W.T 137-8)	Aug 5-Aug 15 1993-Q3 (G.A. 223)	Nov 12- Dec 4 1993-Q4 (W.T. 145-6)	May 22-Jun 10 1994-Q2 (W.T. 153-54)	Nov 8-Dec 7 1994-Q4 (W.T. 161-62)	May 27-Jun 14 1995-Q2 (W.T. 169-70)
347	184-274	983	0.00 (2)	0.00 (4)	0.00 (3)	0.00 (4)	0.00 (4)	0.00 (8)	0.00 (4)
366	184-274	1394	0.28 (24)	0.00 (7)	0.70 (2)	0.06 (14)	0.08 (5)	0.04 (10)	0.00 (5)
369	184-274	961	0.00 (8)	0.00 (5)	0.00 (3)	0.03 (7)	0.06 (3)	0.00 (3)	0.00 (3)
386	184-274	983	0.00 (3)	0.09 (5)	0.00 (3)	0.00 (3)	0.00 (4)	0.00 (3)	0.00 (4)
389	184-274	821	0.03 (3)	0.00 (4)	0.14 (3)	0.00 (3)	0.00 (3)	0.00 (3)	0.59 (4)
391	184-274	282	0.00 (3)	0.00 (2)	0.22 (3)	0.53 (3)	0.00 (2)	0.78 (3)	0.17 (2)
345	275-366	1432	0.19 (4)	0.00 (2)	0.48 (3)	0.00 (3)	0.23 (5)	0.00 (8)	0.00 (5)
346	275-366	865	0.83 (14)	0.52 (6)	1.43 (3)	1.94 (11)	0.56 (3)	0.09 (7)	0.30 (3)
368	275-366	334	4.60 (10)	3.25 (4)	6.77 (3)	1.04 (8)	0.63 (2)	0.10 (12)	0.16 (2)
387	275-366	718	2.43 (3)	2.36 (2)	14.45 (3)	0.68 (3)	0.17 (3)	0.78 (9)	1.22 (3)
388	275-366	361	3.27 (3)	0.49 (3)	3.28 (3)	2.33 (3)	0.00 (2)	0.81 (7)	0.50 (2)
392	275-366	145	0.55 (3)	0.36 (2)	3.45 (3)	1.56 (3)	0.00 (2)	2.11 (3)	2.40 (2)
729	367-549	186	89.72 (3)	6.75 (2)	60.22 (3)	55.12 (3)	3.82 (2)	235.73 (9)	8.10 (2)
731	367-549	216	46.25 (3)	7.25 (3)	59.72 (3)	5.08 (3)	9.53 (2)	6.88 (7)	4.68 (2)
733	367-549	468	68.35 (3)	6.68 (2)	68.48 (3)	4.92 (3)	5.30 (2)	10.54 (9)	1.23 (2)
735	367-549	272	79.35 (3)	3.90 (2)	7.60 (3)	5.32 (3)	5.95 (2)	2.43 (11)	3.65 (2)
730	550-731	170	36.53 (2)	43.95 (2)	23.32 (3)	168.46 (3)	10.15 (2)	45.77 (3)	23.13 (2)
732	550-731	231	67.80 (2)	90.90 (2)	45.27 (3)	4.57 (2)	13.15 (2)	31.68 (3)	16.55 (2)
734	550-731	228	43.58 (2)	7.93 (2)	11.35 (3)	21.03 (2)	12.29 (2)	16.53 (3)	31.52 (2)
736	550-731	175	13.60 (2)	13.60 (2)	6.43 (3)	6.35 (3)	5.40 (2)	8.25 (7)	12.10 (2)
737	732-914	227	-	-	-	-	1.98 (2)	-	-
741	732-914	223	-	-	-	-	0.65 (2)	-	-
745	732-914	348	-	-	-	-	0.43 (2)	-	-
748	732-914	159	-	-	-	-	0.32 (2)	-	-
Upper (95% CI)a			16.20	24.90	14.80	10.70	2.10	12.00	2.58
Weighted mean (by area) (incl. strata with 1 set)			10.70	3.90	8.40	4.90	1.40	6.50	2.08
Lower (95% CI)a			5.30	-17.2	1.90	-1.0	0.70	1.00	1.58
Survey biomass index (tons)			9037	3243	7037	4095	1313	5463	1756

a - Confidence interval of mean for those strata with at least two sets.

Table 15. Mean number and weight per standard tow from Canadian surveys in Div. 3L (autumn 1995 to 1996) where strata greater than 366 m (200 fath. were sampled. Dashes (-) represent unsampled strata. Number of successful sets in brackets. The gear utilized was a Campelen 1800 survey trawl with a small mesh liner in the codend. WT = WilfredTempleman, AN = Alfred Needler, T=Teleost.

Stratum	Depth Range (M)	Area (sq. n.) mi	Oct 3-Nov23 1995-Q4 (WT176) (WT178-179)	May-June 1996-Q2 (WT 189-191)	Sep-Nov 1996-Q4 (WT196-198) (T41)	Oct 3-Nov23 1995-Q4 (WT176) (WT178-179)	May-June 1996-Q2 (WT 189-191)	Sep-Nov 1996-Q4 (WT196-198) (T41)
347	184-274	983	0.00 (4)	0.00 (4)	0.00 (3)	0.00 (4)	0.00 (4)	0.00 (3)
366	184-274	1394	0.60 (5)	0.18 (5)	1.60 (5)	0.09 (5)	0.00 (5)	0.03 (5)
369	184-274	961	14.52 (3)	0.00 (4)	0.00 (2)	1.82 (3)	0.00 (4)	0.00 (2)
386	184-274	983	4.25 (4)	0.50 (4)	0.00 (3)	0.65 (4)	0.02 (4)	0.00 (3)
389	184-274	821	3.33 (3)	0.00 (4)	8.33 (3)	0.57 (3)	0.00 (4)	0.26 (3)
391	184-274	282	3.67 (2)	0.00 (2)	0.44 (2)	1.32 (2)	0.00 (2)	0.00 (2)
345	275-366	1432	0.71 (7)	0.80 (6)	0.86 (5)	0.06 (7)	0.19 (6)	0.15 (5)
346	275-366	865	1.00 (3)	1.50 (4)	1.00 (3)	0.17 (3)	0.09 (4)	0.17 (3)
368	275-366	334	38.00 (2)	22.33 (3)	0.30 (3)	5.33 (2)	3.03 (3)	0.00 (3)
387	275-366	718	12.67 (3)	9.81 (3)	8.33 (2)	1.75 (3)	2.37 (3)	0.55 (2)
388	275-366	361	8.00 (2)	5.00 (3)	14.00 (2)	1.29 (2)	0.40 (3)	2.17 (2)
392	275-366	145	38.61 (2)	69.00 (2)	40.44 (2)	3.06 (2)	7.28 (2)	4.44 (2)
729	367-549	186	145.00 (2)	688.50 (2)	214.67 (2)	24.97 (2)	140.25 (2)	35.53 (2)
731	367-549	216	123.22 (2)	278.73 (3)	138.00 (1)	17.53 (2)	43.53 (3)	24.75 (1)
733	367-549	468	1,625.50 (2)	441.52 (3)	22.41 (3)	702.57 (2)	79.86 (3)	4.13 (3)
735	367-549	272	28.50 (2)	164.44 (3)	139.31 (2)	4.45 (2)	17.80 (3)	28.98 (2)
730	550-731	170	72.11 (2)	282.33 (2)	21.16 (2)	24.21 (2)	88.44 (2)	8.88 (2)
732	550-731	231	67.72 (2)	43.47 (2)	10.80 (2)	15.11 (2)	12.77 (2)	4.08 (2)
734	550-731	228	58.40 (2)	295.28 (2)	61.70 (2)	19.99 (2)	85.49 (2)	23.63 (2)
736	550-731	175	73.33 (2)	61.70 (2)	78.80 (2)	16.76 (2)	16.22 (2)	32.52 (2)
737	732-914	227	41.50 (2)	-	5.50 (2)	13.07 (2)	-	2.58 (2)
741	732-914	223	-	-	2.50 (2)	-	-	0.53 (2)
745	732-914	348	-	-	0.00 (2)	-	-	0.00 (2)
748	732-914	159	-	-	17.00 (2)	-	-	6.30 (2)
Upper (95% CI)a			892.7	87.94	19.46	388.2	20.0	5.1
Weighted mean (by area) (incl. strata with 1 set)			82.1	53.9	15.2	31.8	10.9	3.2
Lower (95% CI)a			-728.5	19.9	6.5	-324.6	1.8	0.7
Abundance of surveyed area (millions)			129.4	83.3	21.3			
Survey biomass index (tons)						50078	16825	4691

a - Confidence interval of mean for those strata with at least two sets.

Table 16. Mean number per standard tow from various Canadian surveys in Div. 3N where strata greater than 366 m (200 fath.) were sampled. Dashes (-) represent unsampled strata. Number of successful sets in brackets. The gear utilized was an Engels 145 otter trawl with a small mesh liner in the codend. G.A. = Gadus Atlantica, W.T. = Wilfred Templeman, A.N. = Alfred Needler.

Stratum	Depth Range (M)	Area (sq. n.) mi	May 3-11 1991-Q2 (W.T. 106)	Aug 11-18 1991-Q3 (W.T.109)	Oct 27-Nov 10 1991-Q4 (W.T. 113-4)	May 2-13 1992-Q2 (W.T.119-20)	Oct 26-Nov 5 1992-Q4 (W.T. 128-9)	May 5-18 1993-Q2 (W.T.136-7)	Aug 15-20 1993-Q3 (G.A.233)	Nov 1-12 1993-Q4 (W.T.144-5)	May 14-22 1994-Q2 (W.T.153)	Oct 29-Dec 13 1994-Q4 (W.T.160-61)	May 13-27 1995-Q2 (W.T.168-69)
382	093-183	647	0.50 (2)	0.00 (3)	0.00 (3)	0.00 (3)	0.00 (2)	0.00 (2)	0.00 (3)	0.00 (2)	0.00 (2)	0.00 (2)	0.00 (2)
377	093-183	100	0.00 (2)	0.00 (2)	0.00 (1)	0.00 (2)	0.00 (2)	0.00 (2)	2.00 (3)	0.50 (2)	0.00 (2)	0.50 (2)	0.00 (2)
359	093-183	421	0.50 (2)	26.25 (4)	0.00 (2)	0.00 (2)	0.00 (2)	0.00 (2)	0.33 (3)	0.00 (2)	0.00 (2)	1.50 (2)	0.00 (2)
381	185-274	182	0.50 (2)	5.00 (3)	1.00 (2)	1.00 (2)	-	0.00 (2)	2.00 (4)	3.00 (2)	0.00 (2)	0.00 (2)	0.00 (2)
378	185-274	139	5.33 (3)	13.00 (3)	177.00 (2)	7.50 (2)	1.50 (2)	1.00 (2)	4.33 (3)	3.00 (2)	0.50 (2)	1.50 (2)	1.69 (2)
358	185-274	225	9.00 (2)	677.00 (3)	1,867.50 (2)	6.00 (2)	18,258.00 (2)	526.00 (2)	6,700.75 (4)	4.50 (2)	12.50 (2)	143.00 (2)	1.50 (2)
380	275-366	116	1.00 (2)	3,856.00 (2)	197.00 (2)	0.00 (2)	-	4.00 (2)	318.00 (2)	2.50 (2)	2.00 (2)	0.00 (2)	11.50 (2)
379	275-366	106	30.00 (2)	6,305.20 (2)	57.00 (1)	6.50 (2)	94.50 (2)	10.00 (2)	982.00 (3)	156.50 (2)	25.50 (2)	50.00 (2)	22.50 (2)
357	275-366	164	101.50 (2)	2,649.00 (2)	2,380.00 (2)	105.00 (2)	4,188.00 (2)	176.00 (2)	545.33 (3)	113.50 (2)	94.50 (2)	2,253.00 (2)	96.50 (2)
727	367-549	160	15.50 (2)	121.44 (4)	-	9.00 (2)	-	32.00 (2)	1,551.05 (3)	195.50 (2)	36.50 (2)	128.00 (2)	73.50 (2)
725	367-549	105	148.00 (2)	502.67 (3)	378.33 (1)	219.00 (1)	2,083.70 (2)	72.00 (2)	746.00 (3)	296.50 (2)	28.50 (2)	418.00 (2)	30.00 (2)
723	367-549	155	158.00 (2)	328.00 (1)	170.00 (2)	236.50 (2)	-	266.50 (2)	1,517.57 (4)	1,509.00 (2)	78.50 (2)	1,268.00 (2)	72.00 (2)
728	550-731	156	72.50 (2)	66.50 (4)	-	85.00 (2)	-	1,203.73 (2)	100.67 (3)	31.00 (1)	38.00 (3)	9.29 (2)	123.00 (2)
726	550-731	72	402.00 (2)	91.00 (2)	74.00 (1)	89.50 (2)	-	93.25 (2)	362.50 (2)	79.50 (2)	34.85 (2)	252.50 (2)	103.50 (2)
724	550-731	124	446.85 (2)	61.00 (1)	34.76 (2)	80.50 (2)	-	194.50 (2)	783.75 (4)	676.00 (2)	66.00 (2)	1,305.00 (2)	141.50 (2)
760	732-914	154	-	-	-	-	-	-	-	-	3.69 (2)	-	-
756	732-914	106	-	-	-	-	-	-	-	-	5.50 (2)	-	-
752	732-914	134	-	-	-	-	-	-	-	-	1.50 (2)	-	-
Upper (95% CI)a			134.6	2,964.8	850.2	55.1	23,024.8	1,090.0	1,969.9	767.7	28.1	1,703.1	55.1
Weighted mean (by area) (incl. strata with 1 set)			56.2	648.9	367.7	38.5	2,634.5	146.8	849.6	149.1	18.5	234.6	31.5
Lower (95% CI)a			-22.2	-1572.3	-32.2	8.70	-17755.9	-796.5	-270.7	-456	8.9	-733.8	7.88
Abundance of surveyed area (millions)			12.1	139.9	70.6	6.6	377.1	31.6	182.2	31.8	4.5	81.4	6.8

a - Confidence interval of mean for those strata with at least two sets.

Table 17. Mean weight (kg) per standard tow from various Canadian surveys in Div. 3N where strata greater than 366 m (200 fath.) were sampled. Dashes (-) represent unsampled strata. Number of successful sets in brackets. The gear utilized was an Engels 145 otter trawl with a small mesh liner in the codend. G.A. = Gadus Atlantica, W.T. = Wilfred Templeman, A.N. = Alfred Needler.

Stratum	Depth Range (M)	Area (sq. n.) mi	May 3-11 1991-Q2 (W.T. 106)	Aug 11-18 1991-Q3 (W.T.109)	Oct 27-Nov 10 1991-Q4 (W.T. 113-4)	May 2-13 1992-Q2 (W.T.119-20)	Oct 26-Nov 5 1992-Q4 (W.T. 128-9)	May 5-18 1993-Q2 (W.T.136-7)	Aug 15-20 1993-Q3 (G.A.233)	Nov 1-12 1993-Q4 (W.T.144-5)	May 14-22 1994-Q2 (W.T.153)	Oct 29-Dec 13 1994-Q4 (W.T.160-61)	May 13-27 1995-Q2 (W.T.168-69)
382	093-183	647	0.16 (2)	0.00 (3)	0.00 (3)	0.00 (3)	0.00 (2)	0.00 (2)	0.00 (3)	0.00 (2)	0.00 (2)	0.00 (2)	0.00 (3)
377	093-183	100	0.00 (2)	0.00 (2)	0.00 (1)	0.00 (2)	0.00 (2)	0.00 (2)	0.37 (3)	0.25 (2)	0.00 (2)	0.13 (2)	0.00 (2)
359	093-183	421	0.00 (2)	0.60 (4)	0.00 (2)	0.00 (2)	0.00 (2)	0.00 (2)	0.06 (3)	0.00 (2)	0.00 (2)	1.20 (2)	0.00 (2)
381	185-274	182	0.13 (2)	0.97 (3)	0.09 (2)	0.17 (2)	-	0.00 (2)	0.58 (4)	1.00 (2)	0.00 (2)	0.00 (2)	0.00 (2)
378	185-274	139	0.88 (3)	3.68 (3)	57.39 (2)	1.10 (2)	0.38 (2)	0.30 (2)	1.41 (3)	0.80 (2)	0.07 (2)	0.10 (2)	0.20 (2)
358	185-274	225	0.18 (2)	106.19 (3)	132.02 (2)	0.30 (2)	2,176.10 (2)	54.13 (2)	547.29 (4)	0.90 (2)	0.72 (2)	12.23 (2)	0.12 (2)
380	275-366	116	0.03 (2)	1,041.38 (2)	53.54 (2)	0.00 (2)	-	0.68 (2)	62.67 (2)	0.18 (2)	0.12 (2)	0.00 (2)	1.50 (2)
379	275-366	106	3.14 (2)	949.58 (2)	7.25 (1)	0.73 (2)	13.28 (2)	1.30 (2)	212.93 (3)	23.95 (2)	2.67 (2)	7.58 (2)	2.55 (2)
357	275-366	164	11.13 (2)	576.92 (2)	324.18 (2)	5.95 (2)	674.36 (2)	23.48 (2)	95.47 (3)	14.05 (2)	9.60 (2)	301.35 (2)	10.88 (2)
727	367-549	160	2.85 (2)	40.73 (4)	-	1.20 (2)	-	4.54 (2)	558.06 (3)	43.95 (2)	6.97 (2)	32.20 (2)	13.43 (2)
725	367-549	105	18.78 (2)	177.22 (3)	127.50 (1)	27.05 (1)	589.09 (2)	14.52 (2)	246.24 (3)	79.54 (2)	5.22 (2)	112.40 (2)	4.33 (2)
723	367-549	155	19.05 (2)	188.85 (1)	46.42 (2)	31.20 (2)	-	74.20 (2)	605.24 (4)	291.95 (2)	13.45 (2)	375.87 (2)	11.25 (2)
728	550-731	156	22.20 (2)	30.75 (4)	-	23.95 (2)	-	513.79 (2)	40.93 (3)	11.25 (1)	10.37 (3)	3.65 (2)	34.80 (2)
726	550-731	72	97.75 (2)	41.17 (2)	40.05 (1)	26.80 (2)	-	20.99 (2)	180.50 (2)	30.17 (2)	9.24 (2)	116.92 (2)	16.76 (2)
724	550-731	124	76.18 (2)	36.10 (1)	26.17 (2)	18.33 (2)	-	82.08 (2)	314.30 (4)	281.02 (2)	23.30 (2)	383.55 (2)	27.75 (2)
760	732-914	154	-	-	-	-	-	-	-	-	1.52 (2)	-	-
756	732-914	106	-	-	-	-	-	-	-	-	2.38 (2)	-	-
752	732-914	134	-	-	-	-	-	-	-	-	0.50 (2)	-	-
Upper (95% CI)a			24.4	729.9	160.7	10.3	2,769.5	392.8	250.4	72.1	4.4	136.0	9.2
Weighted mean (by area) (incl. strata with 1 set)			9.7	141.7	48.7	6.0	348.0	42.4	151.9	36.5	3.5	64.5	5.8
Lower (95% CI)a			-5.1	-442.0	-61.7	0.0	-2073.6	-308	53.5	3.8	2.6	-7.0	2.4
Survey biomass index (tons)			2085	30552	9350	1071	49807	9148	32752	7735	864	13907	1254

a - Confidence interval of mean for those strata with at least two sets.

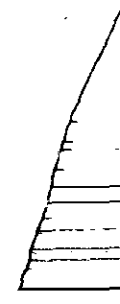

Table 18. Mean number and weight per standard tow from Canadian surveys in Div. 3N (autumn 1995 to spring 1997) where strata greater than 366 m (200 fath.) were sampled. Dashes (-) represent unsampled strata. Number of successful sets in brackets. The gear utilized was a Campelen 1800 survey trawl with a small mesh liner in the codend. WT = WilfredTempleman, AN = Alfred Needler, T=Teleost.

Stratum	Depth Range (M)	Area (sq. n.) mi	Sep28-Oct26 1995-Q4 (WT176-177)	May22-May30 1996-Q2 (WT189)	Nov25-Dec13 1996-Q4 (AN253) (T41-42)	May-Jun 1997-Q2 (WT205-206)	Sep28-Oct26 1995-Q4 (WT176-177)	May22-May30 1996-Q2 (WT189)	Nov25-Dec13 1996-Q4 (AN253) (T41-42)	May-Jun 1997-Q2 (WT205-206)
357	275-366	164	10297.78 (2)	197.33 (2)	858.22 (2)	245.50 (2)	1,230.70 (2)	30.56 (2)	175.24 (2)	23.67 (2)
358	185-274	225	425.78 (2)	152.00 (2)	74.83 (2)	144.50 (2)	39.93 (2)	7.45 (2)	4.98 (2)	9.78 (2)
359	093-183	421	0.00 (2)	0.00 (2)	3.11 (2)	3.50 (2)	0.00 (2)	0.00 (2)	0.67 (2)	0.45 (2)
377	093-183	100	2.00 (2)	0.50 (2)	0.00 (2)	0.50 (2)	0.28 (2)	0.09 (2)	0.00 (2)	0.14 (2)
378	185-274	139	1.00 (2)	62.00 (2)	3.00 (2)	11.00 (2)	0.47 (2)	8.57 (2)	0.38 (2)	1.47 (2)
379	275-366	106	548.89 (2)	569.00 (2)	25.78 (2)	152.50 (2)	59.05 (2)	65.43 (2)	3.96 (2)	19.83 (2)
380	275-366	116	733.78 (2)	47.50 (2)	17.09 (2)	72.00 (2)	117.53 (2)	4.63 (2)	1.13 (2)	9.43 (2)
381	185-274	182	0.50 (2)	8.44 (2)	4.40 (2)	0.50 (2)	0.00 (2)	0.16 (2)	1.48 (2)	0.00 (2)
382	093-183	647	1.00 (2)	0.00 (2)	0.00 (2)	0.00 (2)	0.14 (2)	0.00 (2)	0.00 (2)	0.00 (2)
723	367-549	155	791.00 (2)	252.31 (2)	420.00 (2)	366.00 (2)	197.07 (2)	32.63 (2)	66.11 (2)	40.28 (2)
724	550-731	124	120.86 (2)	120.56 (2)	339.56 (2)	233.00 (2)	46.19 (2)	37.54 (2)	96.44 (2)	33.63 (2)
725	367-549	105	293.80 (2)	455.00 (2)	136.50 (2)	490.40 (2)	46.88 (2)	78.18 (2)	24.23 (2)	76.49 (2)
726	550-731	72	322.00 (2)	208.61 (2)	906.00 (2)	546.00 (2)	113.38 (2)	71.41 (2)	272.98 (2)	138.67 (2)
727	367-549	160	329.80 (2)	166.06 (2)	48.50 (2)	248.00 (2)	35.86 (2)	19.32 (2)	8.85 (2)	48.67 (2)
728	550-731	156	243.07 (2)	62.39 (2)	157.00 (2)	-	60.99 (2)	12.70 (2)	32.97 (2)	-
752	732-914	134	-	-			-	-	-	
756	732-914	106	-	-			-	-	-	
760	732-914	154	-	-			-	-	-	
Upper (95% CI)a			7503.4	169.1	673.1	215.8	910.5	27.2	158.2	30.3
Weighted mean (by area) (incl. strata with 1 set)			770.0	103.0	133.7	116.6	102.9	15.2	28.5	16.9
Lower (95% CI)a			-5963.4	36.8	-405.8	17.3	-704.7	3.1	-101.1	3.5
Abundance of surveyed area (millions)			304.2	40.7	52.8	43.5				
Survey biomass index (tons)							40650	5987	11277	6314

a - Confidence interval of mean for those strata with at least two sets.

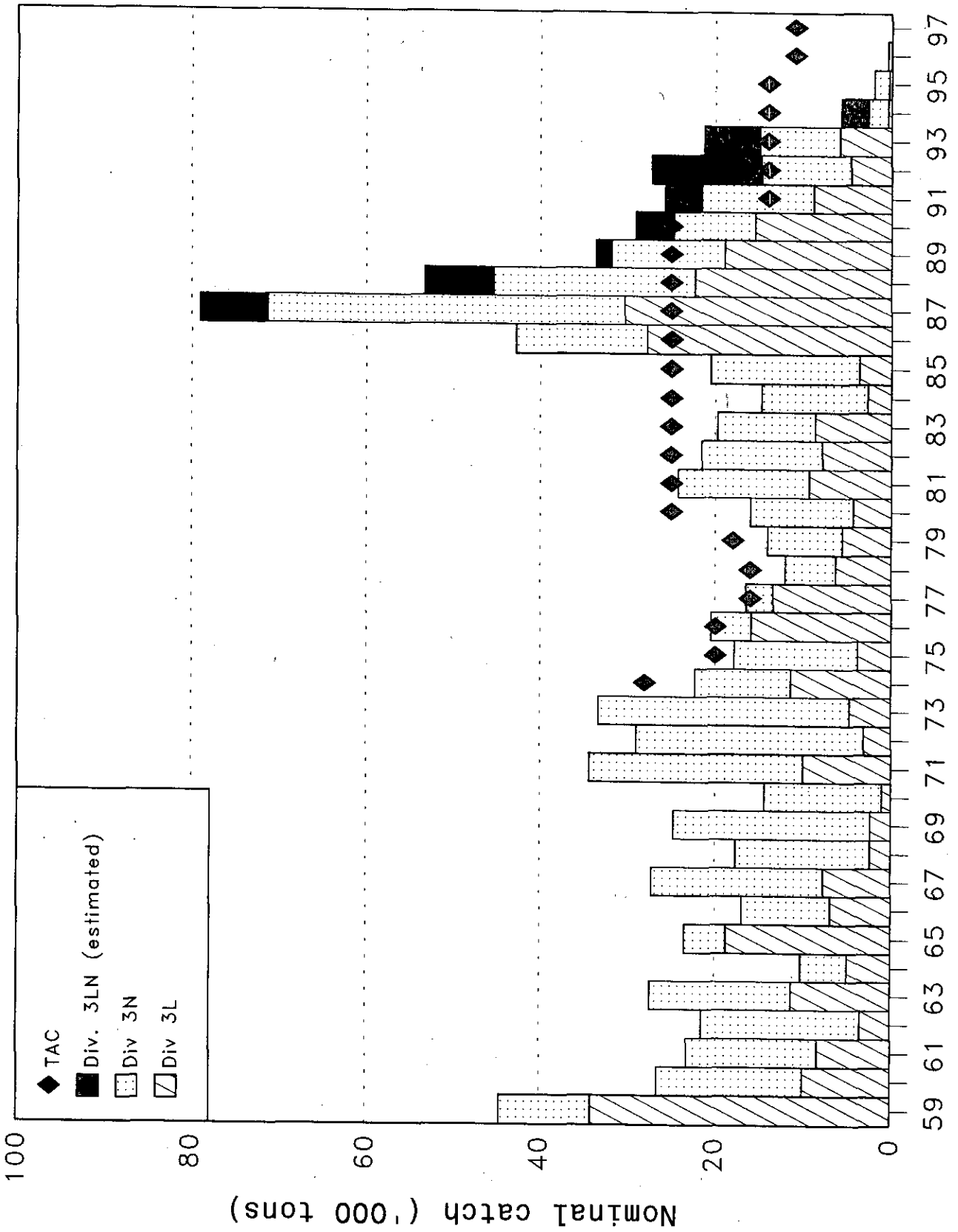

Fig. 1. Nominal catches and TACs of redfish in Div. 3LN (1994-96 are provisional)

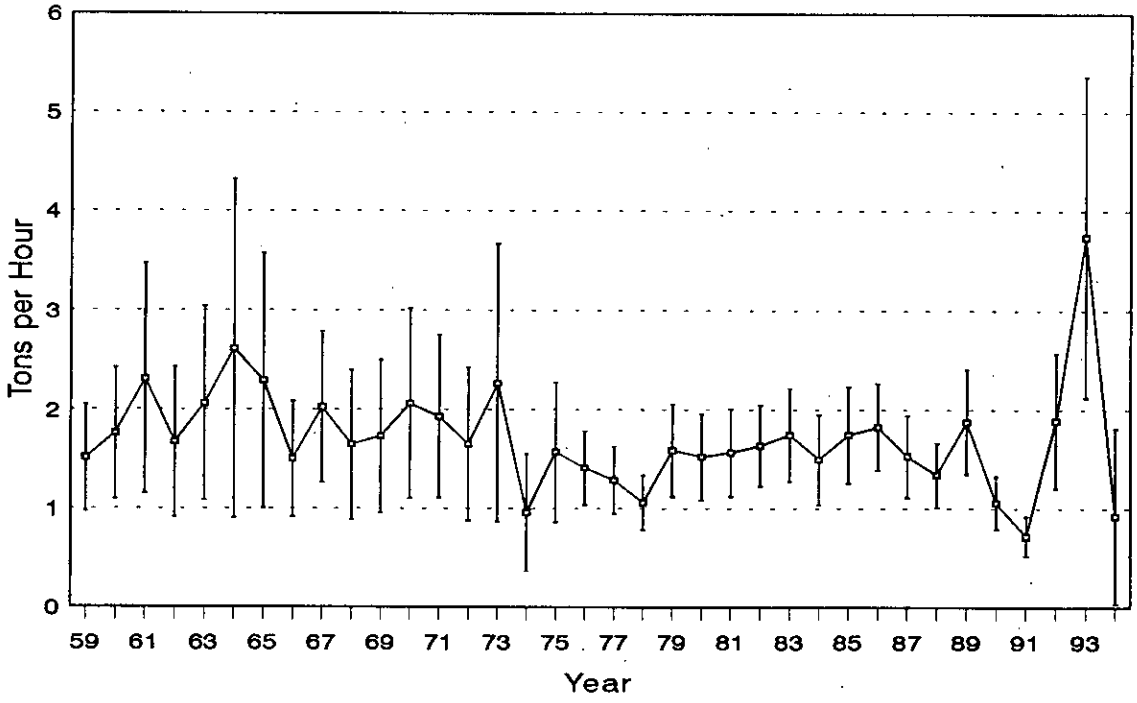

Fig. 2a. Standardized CPUE and approximate 95% confidence interval for Div. 3L redfish based on effort in hours fished for 1959-1994.

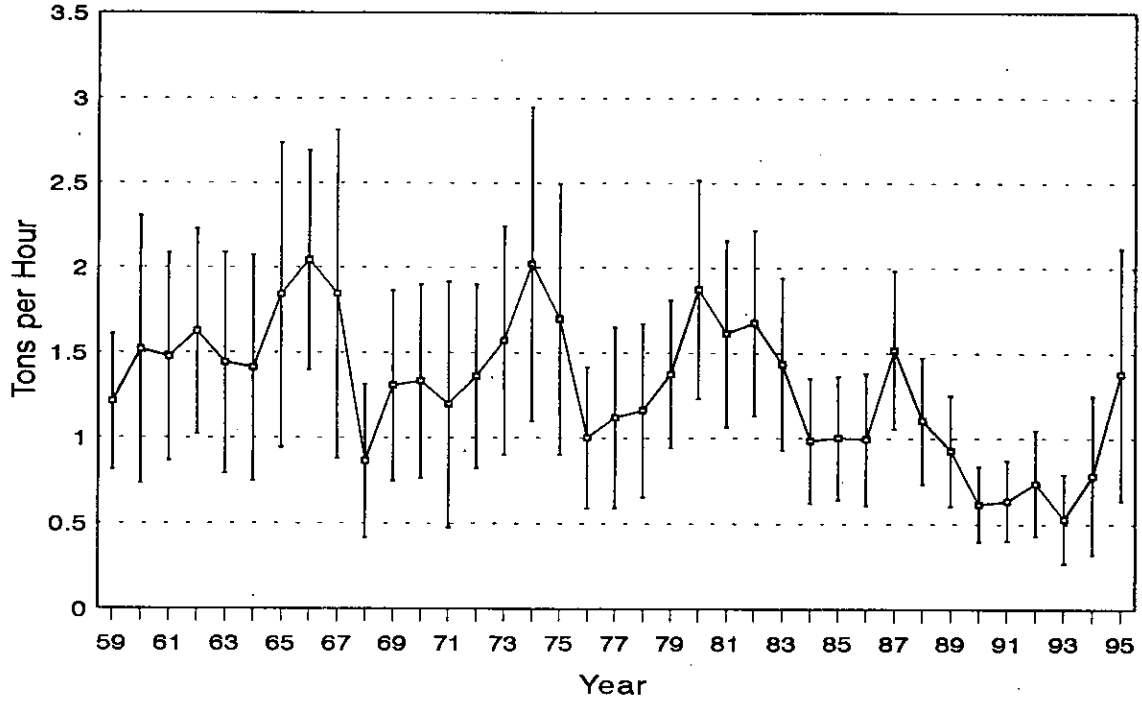

Fig. 2b. Standardized CPUE and approximate 95% confidence interval for Div. 3N redfish based on effort in hours fished for 1959-1995.

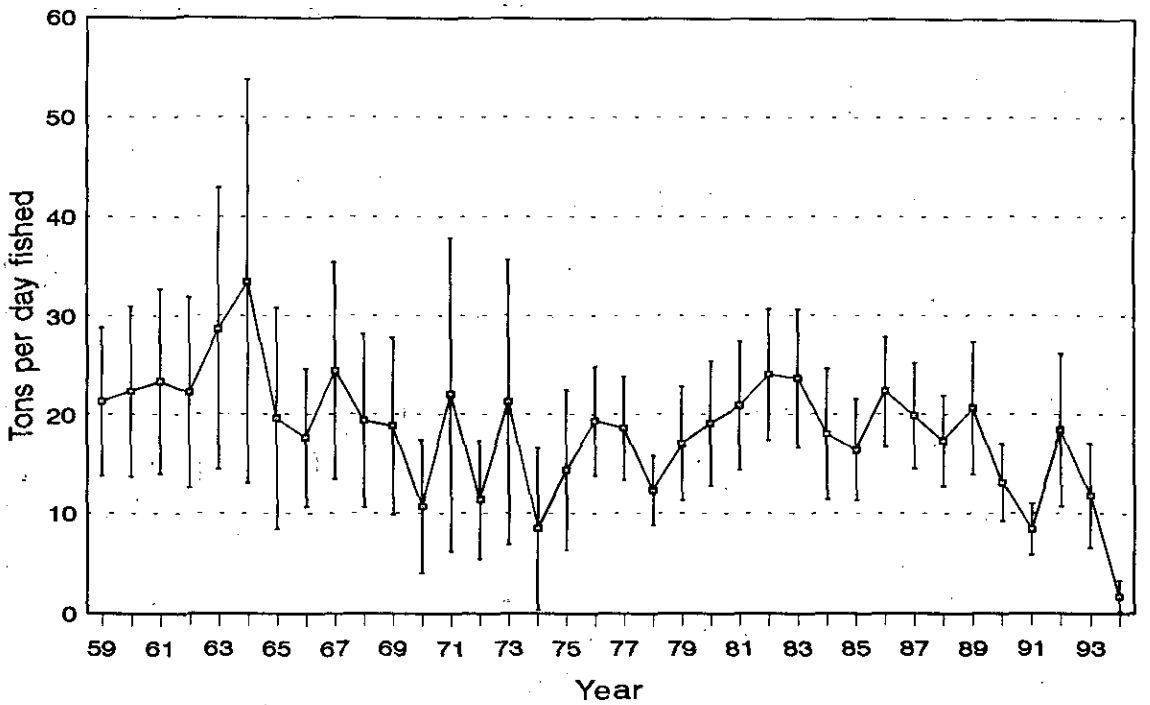

Fig. 3a. Standardized CPUE and approximate 95% confidence interval for Div. 3L redfish based on effort in days fished for 1959-1994.

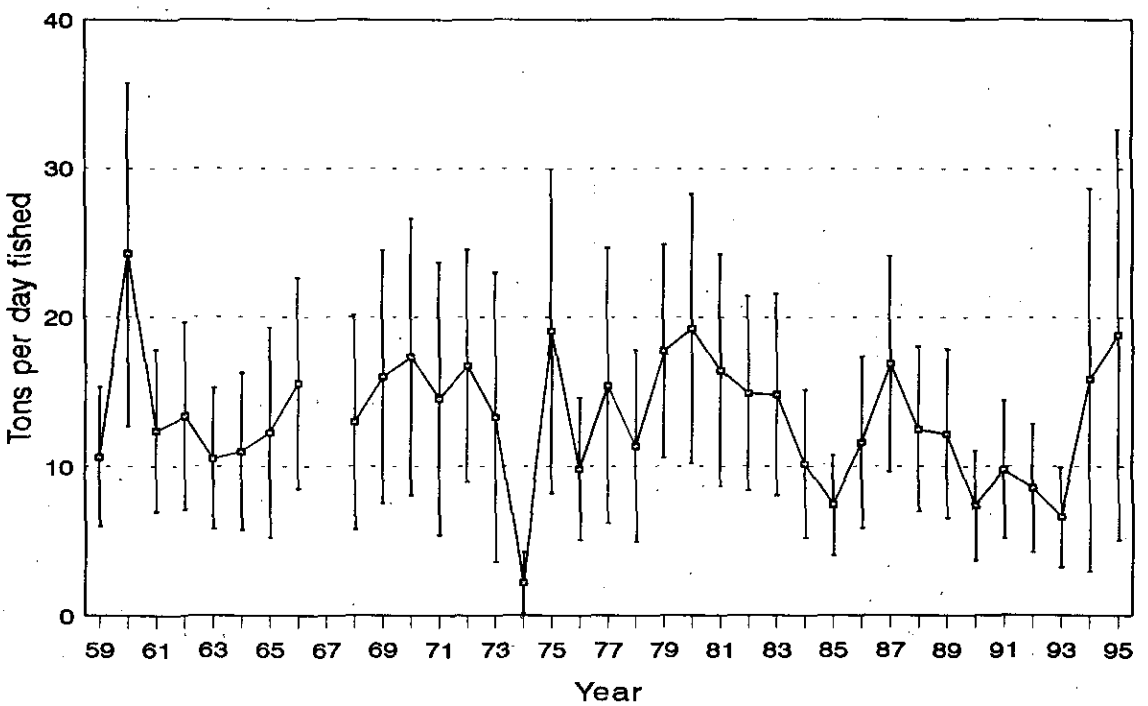

Fig. 3b. Standardized CPUE and approximate 95% confidence interval for Div. 3N redfish based on effort in days fished for 1959-1995

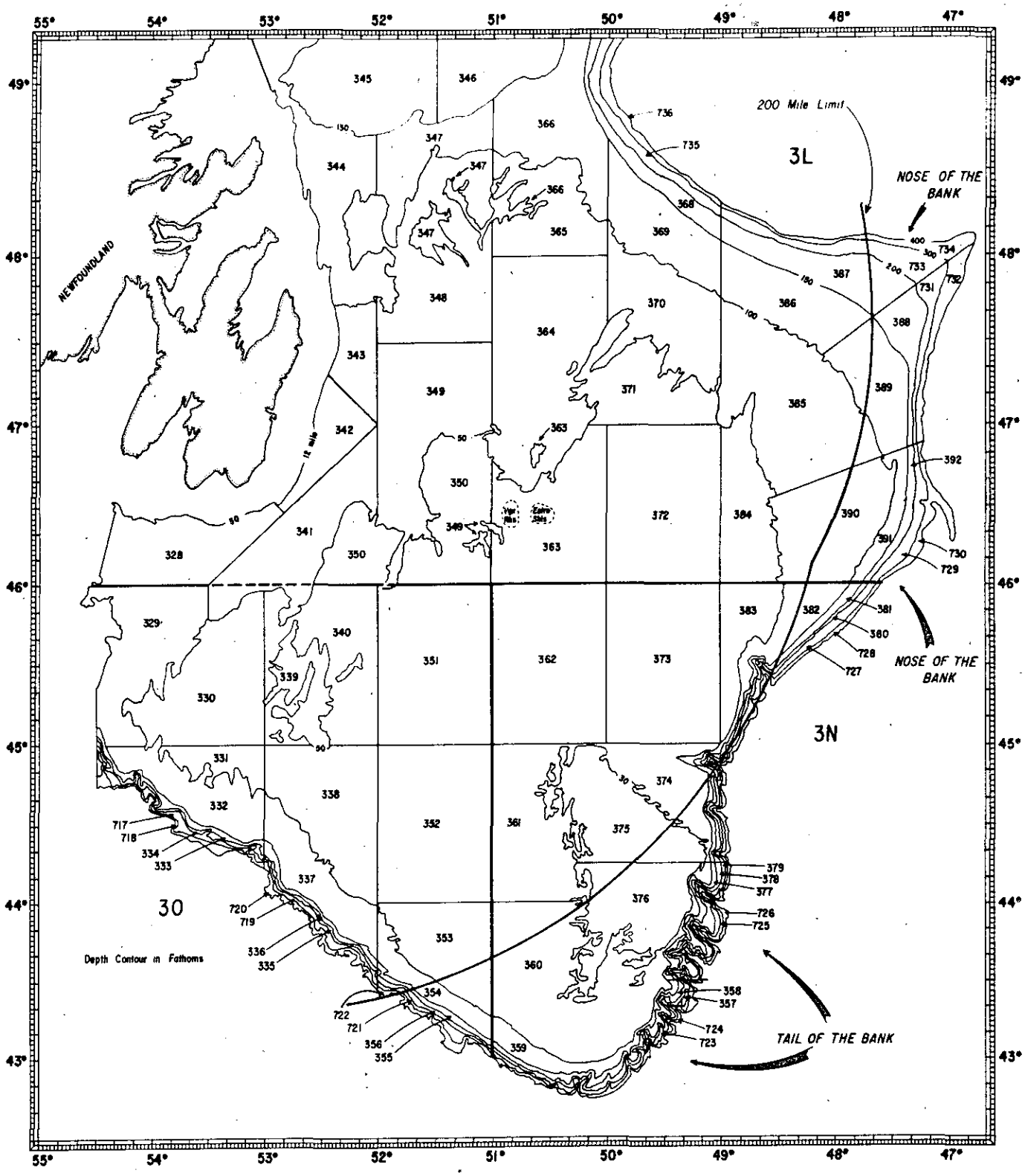

Fig. 4. Stratification scheme for NAFO Divisions 3LNO covering depths to 732 m (400 fathoms) showing the boundary line between the Canadian 200 mile exclusive economic zone and the NAFO Regulatory area

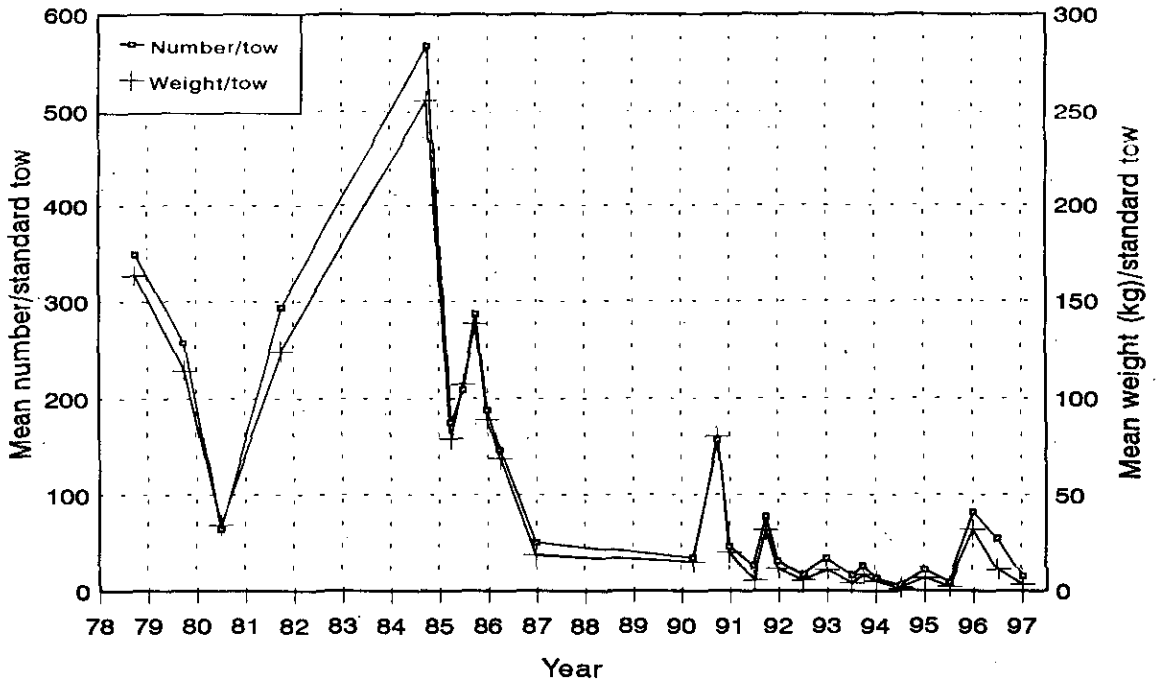

Fig 5. Stratified mean number and weight (kg) per tow in Div. 3L from various Canadian surveys where strata greater than 366 m were covered. Surveys up to spring 1995 used an Engels trawl and those from autumn 1995 onwards surveys used a Campelen trawl.

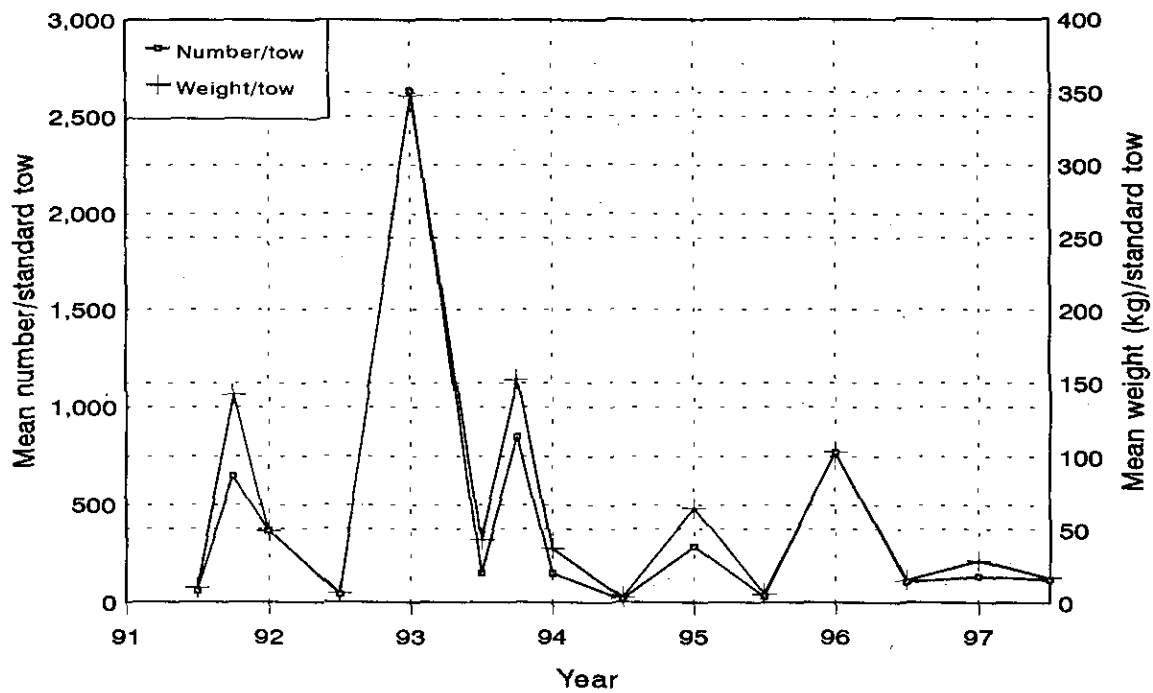

Fig 6. Stratified mean number and weight (kg) tow from Canadian surveys in Div. 3N for 1991-1997 where strata greater than 366 m were surveyed. Surveys up to spring 1995 used an Engels trawl and those from 1995 autumn onwards used a Campelen trawl.

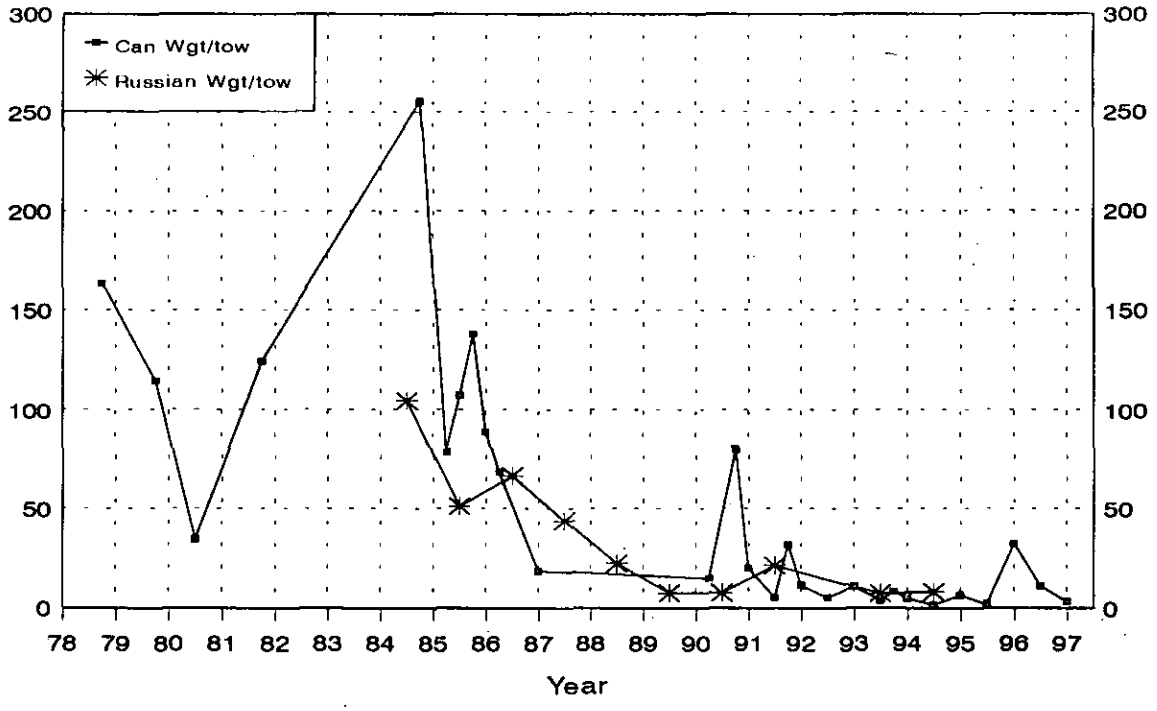

Fig 7. Stratified mean weight (kg) per tow in Div. 3L from Canadian and Russian surveys since 1978.

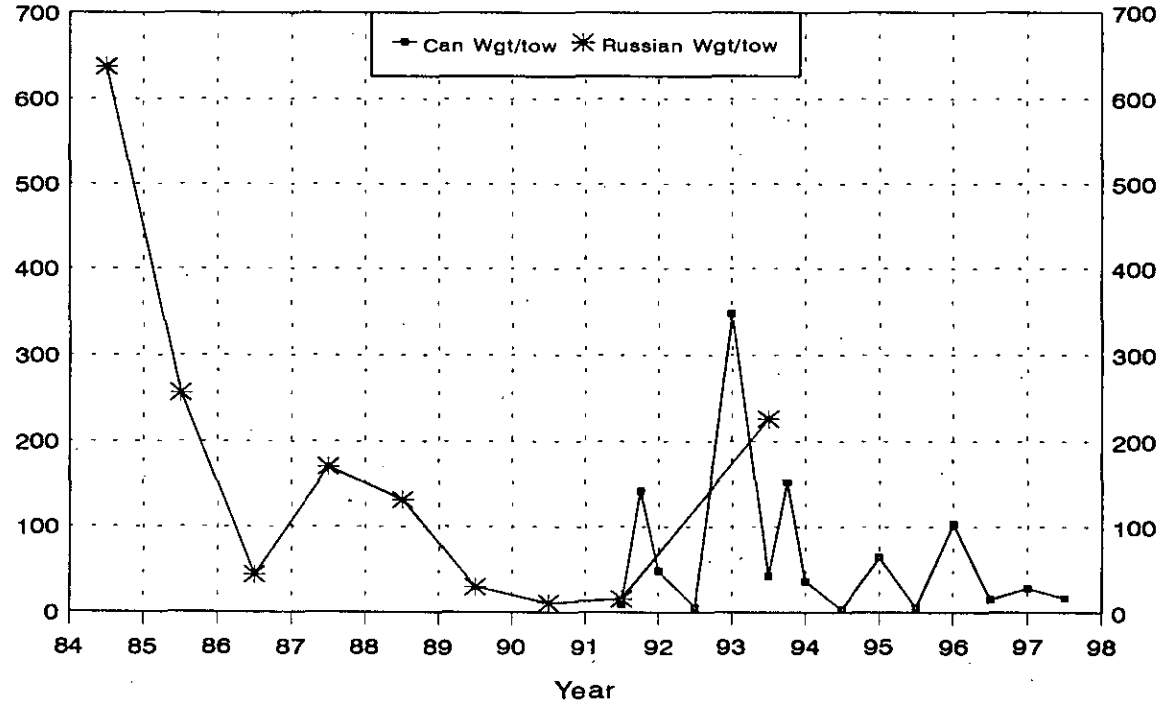

Fig 8. Stratified mean weight (kg) per tow in Div. 3N from Canadian and Russian surveys since 1984.

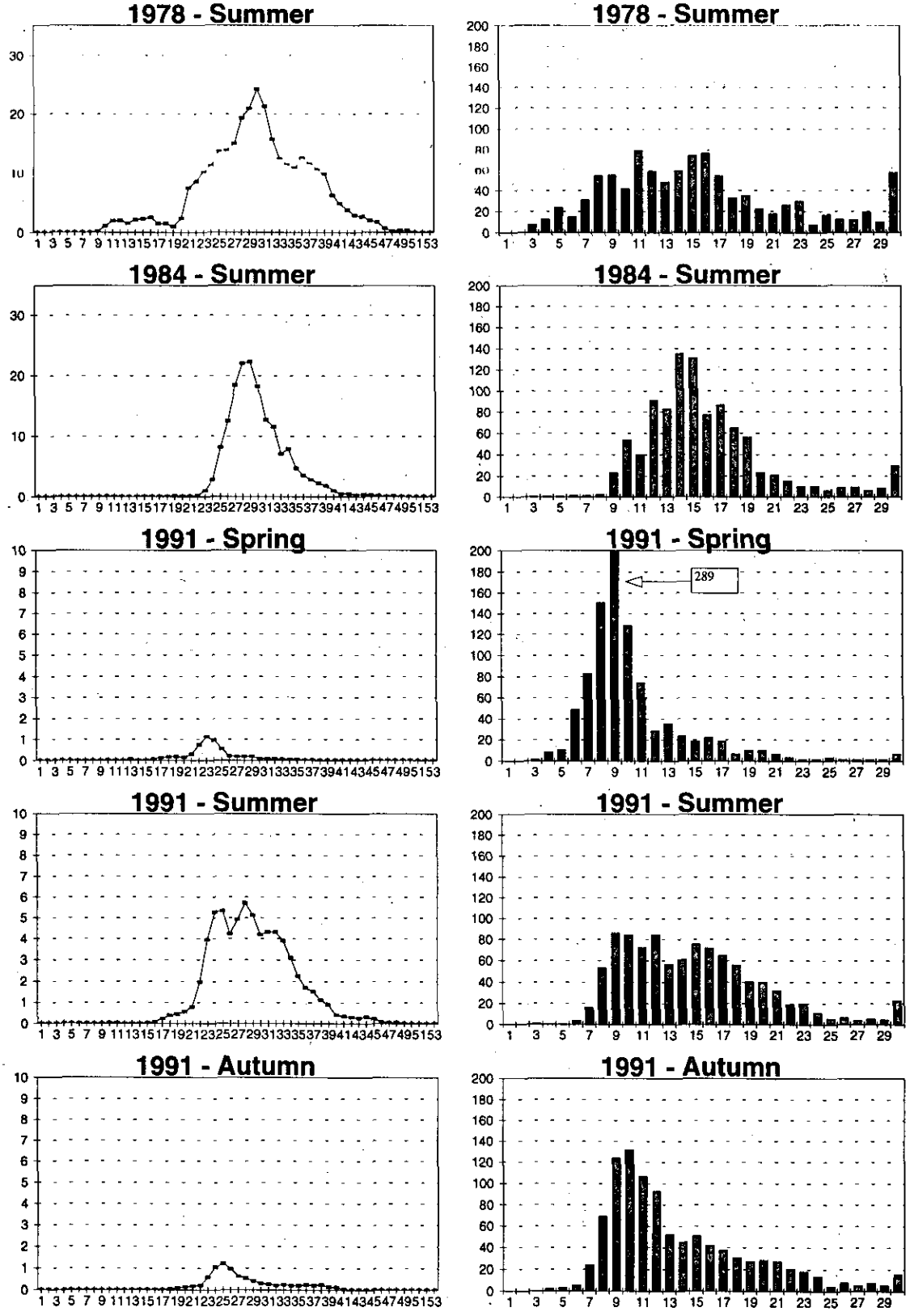

Fig. 9 . Length frequencies and corresponding age distribution from stratified-random research surveys to Div. 3L from 1978-1995. Plotted above are mean number per standard tow (left) and corresponding number per thousand age distribution (right). X-axis is forklength in centimetres for left plot, and age in years for right plot.

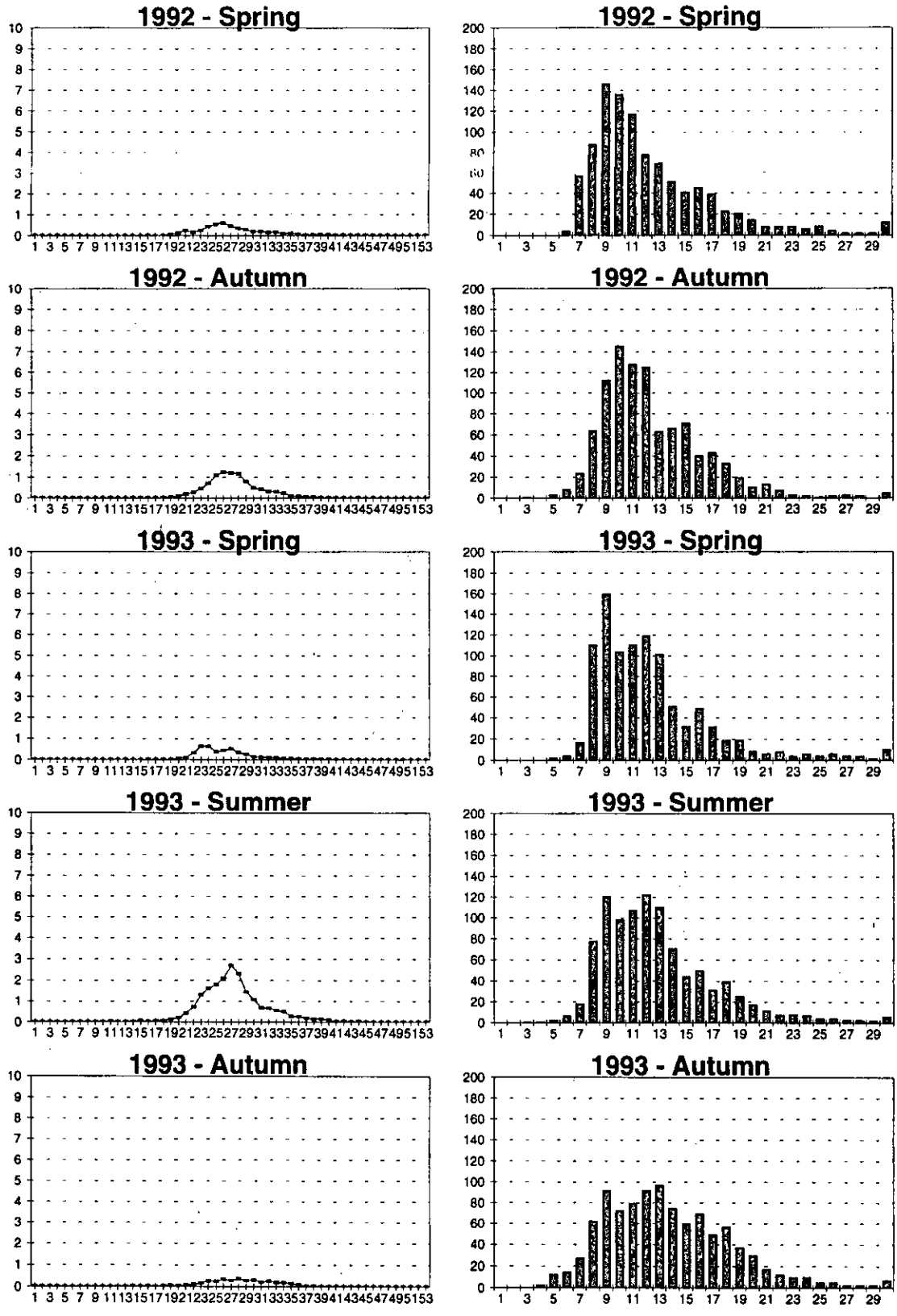

Fig. 9. Div 3L (continued)

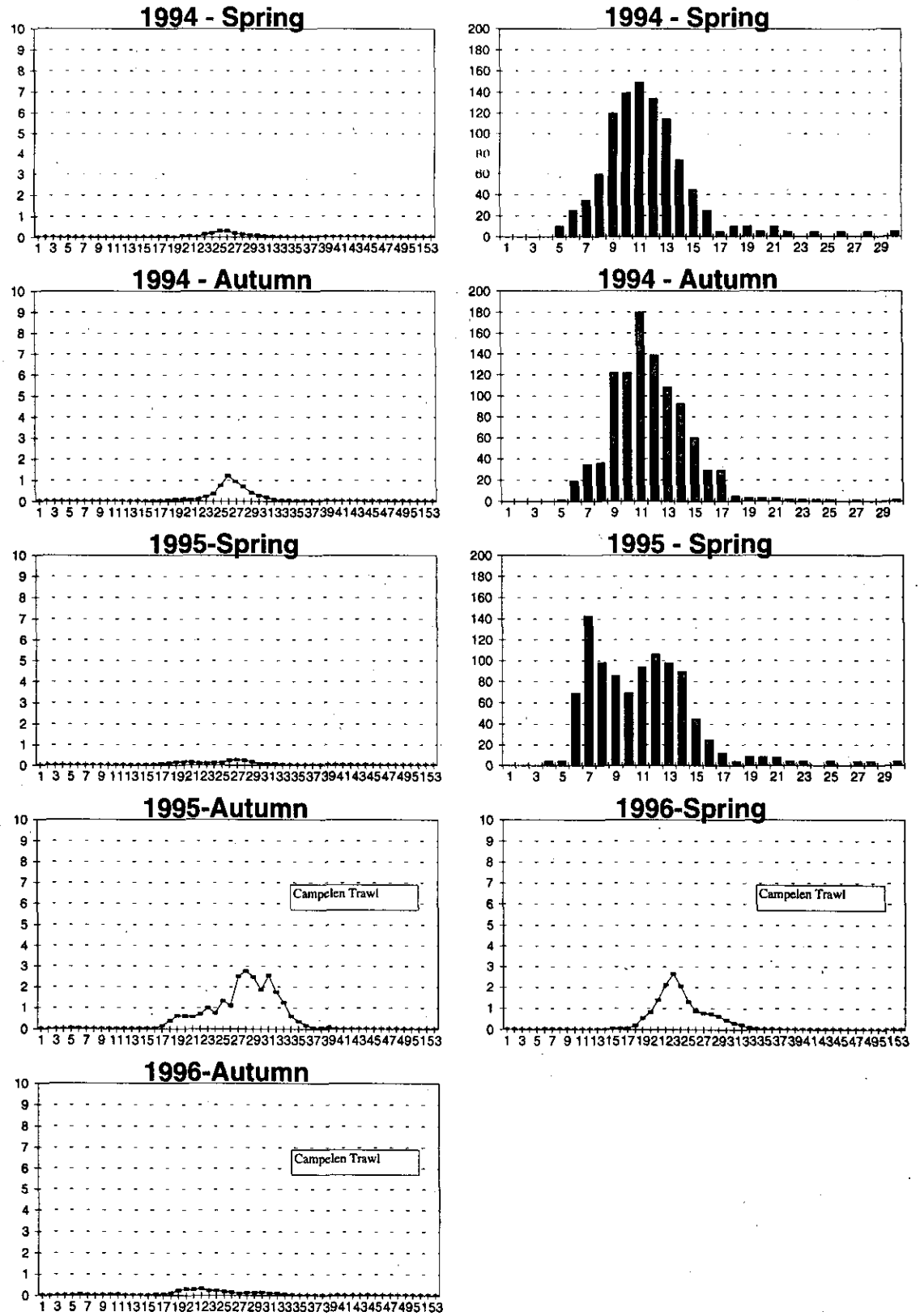

Fig. 9. Div 3L (continued)

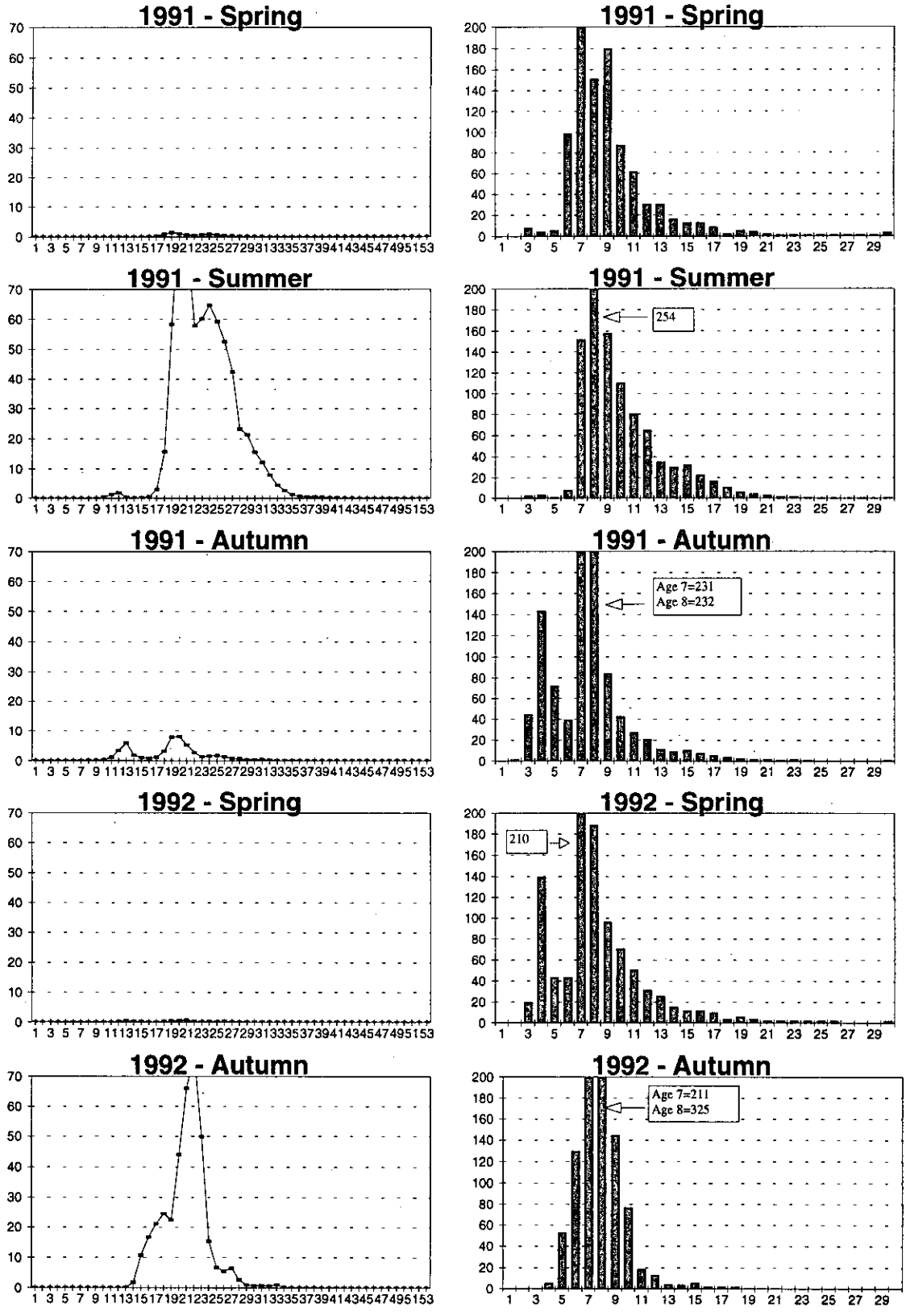

Fig. 10. Length frequencies and corresponding age distribution from stratified-random research surveys to Div. 3N from 1991-1994. Plotted above are mean number per standard tow (left) and corresponding number per thousand age distribution (right). X-axis is forklength in centimetres for left plot, and age in years for right plot.

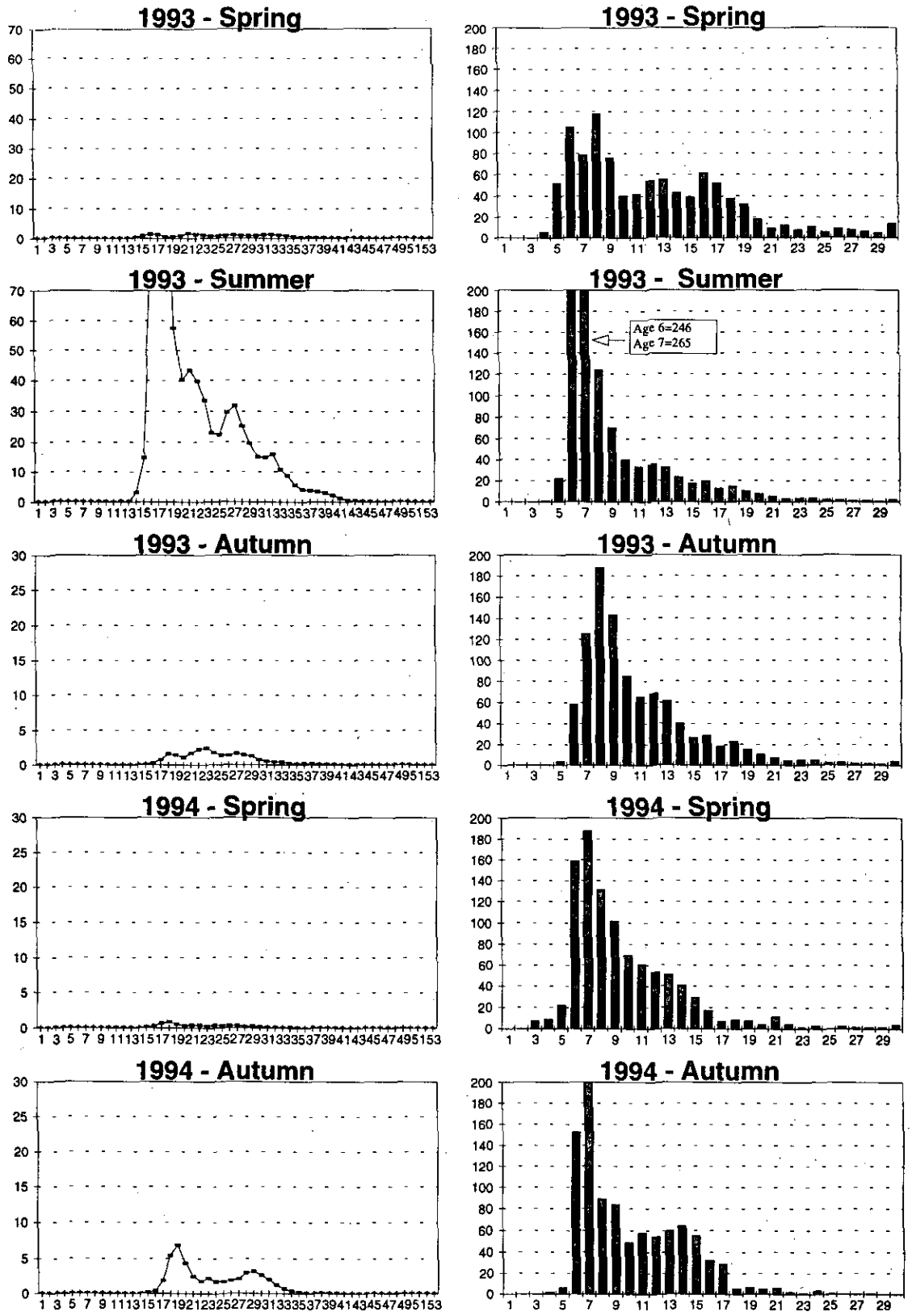

Fig. 10. Div. 3N (continued)

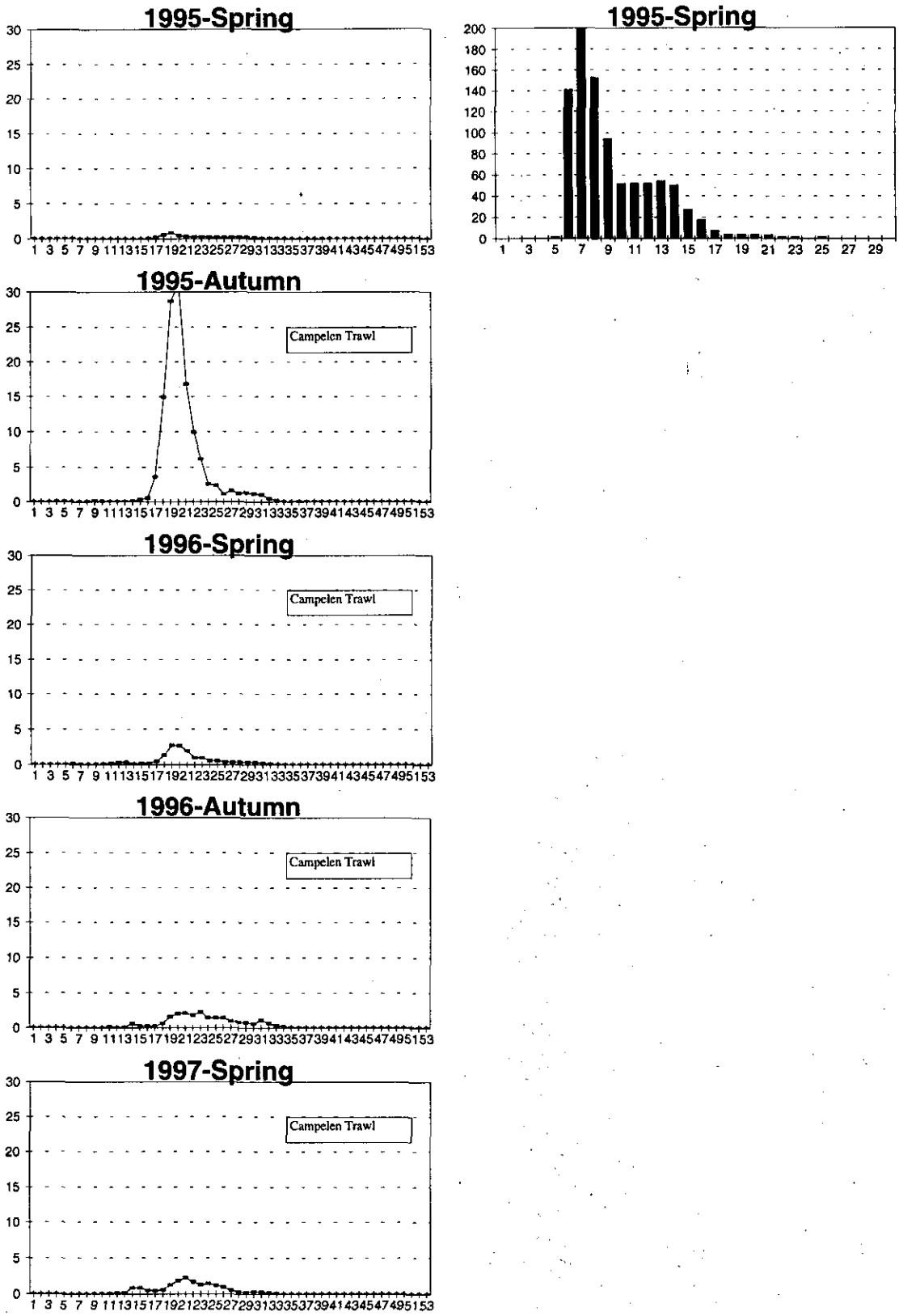

Fig. 10. Div. 3N (continued)