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**Biomass and population biology as observed from  
research surveys in the southern Gulf of St. Lawrence:  
cod, white hake, haddock, plaice, herring, and redfish**

by

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Les Documents de recherche sont publiés dans la langue officielle utilisée par les auteurs dans le manuscrit envoyé au secrétariat.

**ABSTRACT**

Sixteen year summaries are presented for these six major commercial species. Qualitative biomass estimates show long term trends and population composition by age provides an indication of year to year variation. Maps are provided to show areas of long term concentration.

**RESUME**

Pour ces six espèces commerciales majeures on présente des résumés annuels pour un intervalle de 16 ans. Des estimations qualitatives de la biomasse révèlent les tendances à long terme et la composition des populations par groupes d'âges fournit des indices quant aux variations d'une année à l'autre. On présente des cartes indiquant les zones de concentration à long terme.

## INTRODUCTION

Ongoing annual research vessel surveys have been conducted in the southern Gulf of St. Lawrence since 1970. This annual stratified random survey was intended to give a qualitative estimate of changes in stock abundance of the southern Gulf cod and plaice stocks and provide basic biological data on all species in the southern Gulf. The general methodology for these surveys has been outlined previously by Halliday and Koeller (1981). The survey has followed a stratified random design based on 24 strata covering the majority of the area of the southern Gulf (Fig. 1). In addition to the stratified random survey stations (referred to as "Experiment Type" 1), a long term experiment using 13 fixed stations (referred to as "Experiment Type" 2) was conducted to test the hypothesis that a fixed station survey design would provide a better index of abundance with less variance than the stratified random design. Since 1977 when analytical assessments were first routinely begun, the abundance indices of the stratified random surveys have been important in calibrating Virtual Population Analysis models. All of these survey data have provided biomass estimates for assessment purposes and biological data to aid in the understanding of the behaviour and inter-relationships of species.

This survey series using the RV E.E.Prince began in 1970 and ended in 1985. The series ended with the comparative fishing experiment with the RV Lady Hammond. This report is a summary of the biomass and growth data of six important commercial fish species (cod, white hake, haddock, plaice, herring, and redfish) from these 16 years of surveys.

## METHODS

The southern Gulf research surveys are conducted during the month of September each year. Limitations of the RV E.E.Prince required that fishing was carried out only during daylight hours. Between 50 and 70 sets were completed each year, the range was due mainly to stormy weather and mechanical breakdowns. Approximately 2 to 3 stations were fished in each strata. The number of sets fished was increased in 1984 and 1985, these additional sets were distributed relatively evenly throughout the survey area.

Strata 21 in the Northumberland Strait (Figure 1) was often not completed due to large amounts of lobster gear set at that time of the year. Sets were sometimes missed in strata 15, 25, and 39 due to depths being beyond the capacity of the vessel. The first year, 1970, was only a half survey (two week - 13 strata).

Abundance was calculated by both weight and numbers for the six major commercial species. The weight and numbers of fish in each tow are standardized to the level that would have been caught if the tow had covered 1.75 nautical miles. This value is then averaged with the other sets within the strata and multiplied by the number of 'trawlable units' within the strata. (A trawlable

unit is the area 'swept' by the trawl during a tow - distance towed times width of trawl.) The values for all 24 strata in the Gulf are then summed to give the abundance index as the minimum trawlable biomass. Population numbers at age are calculated in a similar manner using age by age numbers. These calculations were carried out with the computer software RVAN.

### Notes on RVAN (Research Vessel Analysis)

A suite of programs written in 1984 were tested in 1985 and were used for the 1986 analysis. These programs are written in TURBO PASCAL and can be run on either 8 or 16 bit microcomputers. The output from these programs is similar in format to earlier analysis programs (STRAT\*) used with this data by the Martimes region of the Department of Fisheries and Oceans for earlier reports (Koeller, MS1980; Koeller and LeGresley, 1981). Comparative runs with the analysed data for Atlantic cod show variations of less than one percent for most years of data - this difference is probably due to imperfect metric/imperial conversions (Validation Report, Smith et al, unpublished). The entire RVAN package uses metric units while parts of the STRAT system used imperial units.

## RESULTS

### Atlantic cod Gadus morhua

The original strata were selected and the survey designed primarily to monitor the NAFO divisions 4T(Apr-Dec) and Vn(Jan-May) cod stock. Assessment of this stock has utilized the Gulf research survey data more than any other stock in the southern Gulf of St. Lawrence. The stock biomass by weight (Table 1 and Figure 2a) and numbers (Table 2 and Figure 2b) shows a steady increase between 1975 and 1981 with some variability since; this is consistent with trends in the fishery. The 16 year mean biomass by strata (Tables 1 and 2) show 8 strata make up over 3/4 of the total biomass and 4 strata over 50% (Figure 3). This stock biomass is estimated from data taken from both fixed and stratified random stations (Experiment Types 1 and 2).

The catch per unit effort (CPUE) for cod by weight (Table 3 and Figure 4a) and numbers (Table 3 and Figure 4b) shows the same trend as the population biomass. This CPUE is estimated from data

\* STRAT was a suite of analysis programs written in FORTRAN IV that ran on the HP3000 computer at the St. Andrews Biological Station until 1985. These have subsequently been replaced by a new series of programs referred to as STRAP (Smith and Sommerton, 1981) which carry out the same calculations.

derived from random stations only (Experiment Type 1). The historical weight at age shows considerable annual variability over age 10 (Table 4), however the 16 year mean shows a smooth curve up to age 15 (Figure 5).

Cod population numbers at age (Table 5a) and the percent composition (Table 5b) indicate that over the period 1970 to 1985 the 3 and 4 year olds comprised nearly 50% of the population. The percent composition of the last three years (Figure 6) shows the progression of the 1980 year class through the population - this year class is the dominant contributor to the fishery at this time.

It should be noted that the population numbers at age (Table 5a) do not add up to the biomass estimates in numbers (Table 2). This is due to several reasons. The first is that the data comes from different sources (Experiment Types) and the second is that the biomass estimates are corrected for missing data (strata). Using past convention the age length keys (otolith collections) are taken from "Experiment Types 1 and 2" (both random and fixed stations) and the length frequencies (from which the actual numbers are calculated are taken only from "Experiment Type 1" (random stations). The biomass estimates are taken from "Experiment Types 1 and 2" with the missing strata replaced by interpolated values - see footnote on Table 1a (this is true for all species).

#### **White Hake**                      **Urophycis tenuis**

White hake is an important inshore stock which was not assessed analytically until 1985. A major reason for this lack of analysis was the low level of commercial sampling and concern that the research vessel surveys did not adequately cover the area of distribution. The stock biomass by weight (Table 6 and Figure 7a) and numbers (Table 7 and Figure 7b) show one stratum makes up over 30% of the biomass with, 3 strata contributing 50% and 6 strata over 75% (Figure 8). These two estimates of stock size agree reasonably well with the landings of the past 15 years.

The CPUE for white hake by weight (Table 3 and Figure 9a) and numbers (Table 3 and Figure 9b) show the same trend over time as the biomass estimates. The historical weight at age (Table 8) is highly variable by year above age 7. This is probably due to the differential growth of males and females and the small sample size of fish over this age. The 16 year average (Figure 10) shows a smooth weight-at-age curve up to age 13.

The research vessel population numbers at age (Table 9) and the percent composition (Table 10) indicate that over the 16 years the 3, 4, and 5 year olds have comprised over 60% of the total population. Closer study of the percent composition by year shows a shift in population from 2 year olds (not recruited to the commercial fishery) in 1974 and 1975 (Figure 11a) to 3, 4, and 5 year olds in 1977 to 1979 (Figure 11b). The record high landings of 1980 to 1982 are coincident with over 30% of the population

being comprised of 5 year olds (Figure 12a). The subsequent drop in landings over the last three years coincides with the decline in modal age of the population, dropping steadily until 1985 by which time nearly 40% of the population was composed of 3 year olds (Figure 12b).

#### American plaice

#### Hippoglossoides platessoides

The research surveys have been one of the major tools in the annual appraisal of this stock - due to severe discard problems analytical techniques have not given acceptable results in the past. The stock biomass shows a steady decline in weight (Table 11 and Figure 13a) and numbers (Table 12 and Figure 13b) since 1980, this follows a relatively stable period from 1977 to 1980. The mean biomass of the past 16 years indicates one stratum has contributed over 30% to the biomass with 3 strata making up over 50% and 6 strata comprising over 75% of the biomass (Figure 14).

The CPUE for American plaice by weight (Table 3 and Figure 15a) and numbers (Table 3 and Figure 15b) show a steadily declining stock abundance since 1977 or 1979. As landings from this stock are affected by discard rates and the economics of the cod fishery it is difficult to relate commercial landings to these data series. The historical weight at age (Table 13) up to the age of 15 to 20 is quite stable despite the differential growth of males and females. The 16 year average is smooth to the age of 22 years (Figure 16). [Table 13 shows an apparent anomaly in the weights at age in 1985 - the weights are considerably heavier than those for the previous two years. This may indicate a problem with the ageing and requires further investigation.]

The population at age of American plaice (Table 14a) and the percent composition (Table 14b) show 5 age classes (4 to 8) contributing significantly to the population. The percent composition indicates that 1973 to 1977 may have been a series of years with poor recruitment - having the greatest effect on the fishery between 1981 and 1983. The percent composition in the last three years (Figure 17) indicates the 5 to 10 year olds are all large contributors to the population - with decreasing numbers of older fish in 1985.

#### Haddock

#### Melanogrammus aeglefinus

After World War II, haddock was an important stock in the southern Gulf, even up until 1960 over 2,000 tonnes per annum were being landed. This stock had all but disappeared over the past two decades. However during the past 2 or 3 years there has been considerable anecdotal information to indicate an increase in abundance. The landings have also shown a substantial rise from 100 to 200 tonnes per annum to 500+ tonnes in 1985. The population biomass by weight (Table 15 and Figure 18a) and numbers (Table 16 and Figure 18b) agree with these trends; removing the 1985 point to improve the pre 1985 scale indicates a substantial increase in abundance since 1980 (Figure 19a and 19b).

The distribution of biomass (Table 15) indicates over 2/3 of the total biomass is from one strata and 2 strata comprise over 75% (Figure 20). This population is considered by many to be a part of the Scotian Shelf (NAFO Division 4V) haddock stock complex.

**Atlantic herring**                      **Clupea harengus harengus**

The southern Gulf herring has been a controversial stock for many years. This was in part due to the difficulty in assessing this stock complex without fishery independent estimates of abundance. Groundfish trawl surveys have not been considered suitable to monitor pelagic stocks, however, herring are caught in substantial numbers (at least 1000 to 3000 fish per cruise) in this survey and the biomass by weight (Table 17 and Figure 21a) and numbers (Table 18 and Figure 21b) shows a similar trend to the September to December seiner CPUE. The correlation coefficient between "Experiment Types 1 and 2" RV CPUE and the seiner CPUE is 0.64.

It was noted that there appeared to be a large discrepancy between the 1985 herring biomass estimate from "Experiment Type 1" and the "Experiment Types 1 and 2" combined. A comparison was made between the biomass estimated from "Experiment Type" 1 sets and that estimated from both "Experiment Types 1 and 2" sets. The biomass by weight and numbers had correlation coefficients of 0.91 and 0.90 respectively, leaving out the suspect 1985 point the values rose to 0.96 and 0.95 respectively. The variation in the 1985 data was caused by one large catch at a fixed station in that year.

The RV stock biomass (Table 17) indicates two strata make up over 20% each of this stock with 3 strata contributing over 50% and 5 strata making up over 75% of the biomass (Figure 22).

**Atlantic redfish**                      **Sebastes spp**

Redfish in the southern Gulf are assessed as a part of the 4RST stock complex and as such this survey covers only the southern fringe of the population along the Laurentian Channel. Redfish are often considered to be poorly sampled by stratified random survey design. This is due to the limited number of sets normally carried out and the contagious (patchy) nature of redfish distribution. The biomass estimates by weight (Table 19 and Figure 23a) and numbers (Table 20 and Figure 23b) from this survey are highly variable from year to year but appear to be relatively stable over the 16 year period with a slight overall downward trend.

Redfish are generally a deep water species and thus would only be expected on the slopes in the northern portion of the survey area, one stratum makes up over 50% and two strata make up over 75% of the biomass (Figure 24).

## DISCLAIMER

All data used in this report should be considered as provisional. Editing of current data is in progress and of historic data is proposed. Few significant errors are expected to be found in the proposed editing as every effort has been made in the past to maintain a high standard of recording, coding and data entry.

## ACKNOWLEDGEMENTS

Any data base such as this requires dedicated work by many "generations" of staff in the field, office and on the computer. This data set was initially collected and edited by the Maritimes Region of the Department of Fisheries and Oceans, since 1983 it has been the responsibility of the Gulf Region of the Department.

## REFERENCES

- Halliday, R.G., and P.A. Koeller. (1981) A history of Canadian groundfish trawling surveys and data usage in ICNAF Divisions 4TVWX. IN: W.G. Doubleday and D. Rivard (Ed.). Bottom trawl surveys. Can. Spec. Publ. Fish. Aquat. Sci. 58:27-41.
- Koeller, P.A. (MS1980) Biomass estimates from Canadian research vessel surveys on the Scotian Shelf and in the Gulf of St. Lawrence from 1970 to 1979. CAFSAC Res. Doc. 80/18.
- Koeller, P.A., and M. LeGresley (1981) Abundance and distribution of finfish and squid from E.E. Prince trawl surveys in the southern Gulf of St. Lawrence, 1970-79. Can. Tech. Rep. Fish. Aquat. Sci. 1028: iv +56p.
- Smith, S.J., and G.D. Somerton (1981) STRAP: A user-oriented computer analysis system for groundfish research trawl survey data. Can. Tech. Rep. Fish. Aquat. Sci. 1030: iv +66p.



TABLE 1. Biomass estimates in kilograms of southern Gulf cod (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Atlantic cod		TABLE: Biomass - kg										EXP. TYPE: 1&2
Stratum	YEARS											
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979		
415	2733629	1327763	1959766	221294	1220041	0	0	1445786	0	122941		
416	11857641	11250993	8398049	12319530	14221433	2856305	1924221	7350391	9488327	20801475		
417	17612945	5751243	890508	3243501	2901120	2875237	4461714	5283023	9039601	7067342		
418	2362941	4401004	2768781	4358220	1502616	2412494	1989316	5242174	4911006	5291690		
419	4022695	5249276	2853136	2443786	9963710	512147	5310003	4091005	10855503	11023890		
420	8698729	2261397	10339765	11133060	6585974	1259314	9280845	3266959	16713155	12993674		
421	4832626	1707842	4496353	686127	457848	1332547	33634	1648899	4213416	5740853		
422	28905608	11886837	27599777	15740974	6629422	16980012	21017782	17793630	38805946	40079636		
423	15625196	14485723	6860382	12562400	5377904	1340055	9998265	7070557	48776726	37572140		
424	7642228	1642324	4077092	1054332	2570323	3494656	1743944	3608114	28401783	20081302		
425	187028	711674	39103	0	325858	1277363	78206	193215	0	0		
426	1531518	655578	2484365	796910	2037335	130647	355885	474881	1579998	6344390		
427	291662	5939577	1409700	300500	2553895	0	127135	2737370	2733122	4301746		
428	1015560	17553	1121434	305064	142617	673696	1214075	268456	2418222	7039631		
429	9030350	2483958	3424667	10732347	9598823	8678733	2325246	9445467	4777200	15341098		
431	6171457	4681011	685026	1891502	5299993	3815082	3185371	7631995	6610903	13499163		
432	315323	326395	5389417	105501	0	191807	0	0	98083	52311		
433	2611498	221211	613993	72443	2683949	3410698	871333	18442761	1946111	6158442		
434	3672857	206703	5323421	118519	222497	481446	394098	453935	829272	5284905		
435	2437292	620814	515079	717434	490481	2452407	4382187	931606	870885	975565		
436	3532296	1423137	519922	280955	676373	104057	496211	195873	544300	2341290		
437	1693483	35844	529176	207101	19117	1649530	1280099	845173	787273	2030520		
438	962937	709312	1290919	199512	723405	0	495152	336050	874475	2289869		
439	672790	0	672424	378915	741291	116854	0	854493	4217689	747681		
# Strata	13	24	24	24	24	24	24	24	22	24		
Biomass	138420290	77997169	94261255	79869927	76946025	56045087	70964722	99611813	199492997	227181554		

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 1. continued

SPECIES: Atlantic cod		TABLE: Biomass - kg					EXP. TYPE: 1&2			
Stratum	YEARS						No.	Mean	Stratum	
	1980	1981	1982	1983	1984	1985	Years	Biomass		
415	368823	848249	138309	1126320	298747	613300	16	776498	415	
416	25028572	19767399	16925538	30667793	19990441	33350266	16	15387398	416	
417	19545452	49207130	5147619	14097512	25734197	15922521	16	11798792	417	
418	3010938	7646177	6107635	7886719	3586714	7162559	16	4415062	418	
419	6685920	6736571	3141217	15823866	2172500	2733123	16	5851147	419	
420	2723470	4877156	1328770	15075814	4461179	4540148	16	7221213	420	
421	570184	8222589	1537806	3373871	1322166	1085686	15	2578903	421	
422	26799677	44563492	10655721	13349039	14118804	25562943	16	22530581	422	
423	55936337	88428157	34106179	32998498	17079489	28475737	16	26043359	423	
424	16688504	42185195	106184560	8224547	10438695	150972189	15	25563112	424	
425	1094883	102645	0	0	0	0	15	250623	425	
426	4139507	14680265	8065483	11248093	6666560	9996629	16	4449253	426	
427	5348489	4050718	38971659	10840108	976626	7809252	16	5524472	427	
428	1084149	7156790	3440236	3927059	5297780	4623653	15	2484123	428	
429	14008355	29846511	19216507	15021541	15689091	9645817	15	11204107	429	
431	17093412	13139773	16401939	16692120	10393356	5126878	15	8269936	431	
432	72654	31760	13078	0	149599	14743	15	422542	432	
433	227865	10284948	1548477	753411	3920225	2224400	15	3499485	433	
434	6103364	7532282	5314251	19085474	10869363	12855421	15	4921738	434	
435	9054059	2335023	293962	4991189	11101455	10087261	15	3266044	435	
436	4407406	6871435	6778223	2830359	14307077	30425210	15	4733383	436	
437	3978183	3200050	9738029	3357475	4163730	2794310	15	2269318	437	
438	3198550	2960666	1305272	2934000	1540904	824812	15	1290365	438	
439	0	3736025	258308	866092	242164	920223	15	901559	439	
† Strata	24	24	24	23	24	24			† Strata	
Biomass	227168753	378411006	296618778	235170900	184520862	367767081		175653014	Biomass	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 2. Biomass estimates in numbers of southern Gulf cod (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Atlantic cod		TABLE: Numbers										EXP. TYPE: 1&2
Stratum	YEARS											
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979		
415	1483970	510678	1013712	73765	301242	0	0	855669	0	73765		
416	7982881	6209900	6157916	7105904	9690758	1834481	1252100	5730649	6284981	19193243		
417	13814995	4058763	521086	1728198	2079210	1838508	5830342	6591939	13609472	10936931		
418	2219387	3392034	3942082	7258205	2381361	2978903	3433378	7319369	7752886	9061944		
419	3551702	2749308	2513477	1821503	11946186	208373	9111669	5302455	18352345	31121046		
420	8118751	1727108	4230241	8750784	4773313	1261446	9801495	6405265	28614052	20331218		
421	3379298	1461196	2769919	1741788	816817	1878907	302703	1952111	4563967	5392252		
422	25044461	13131630	26674939	14059287	10280037	20588119	48392964	45579141	56675478	63032786		
423	18973452	9160929	6700941	8047063	2170486	1340055	6355486	12780560	39514257	46657971		
424	4152689	1505464	1920847	648820	1197821	1251781	1728254	3348706	30480308	20731811		
425	57789	465325	39103	0	57351	656930	39103	64405	0	0		
426	1308218	599386	2193487	338857	864499	43549	170450	215955	743062	3192264		
427	194441	3718692	923597	338063	798830	0	254270	2434858	2017645	3929877		
428	885623	61435	1560256	1266248	241352	696264	1945445	474960	3399520	9672563		
429	8461798	1973170	3751017	11544353	8964436	8242067	4590449	16979879	3648340	19326958		
431	5689141	4760930	730694	2402988	5511824	3262848	4315663	13893938	9351007	15720308		
432	256740	425302	3878973	278406	0	1360088	0	0	147125	383615		
433	1595079	663633	618491	72443	3065230	2999476	1887553	8349866	2095224	5066186		
434	3326298	422891	4580618	417704	356958	841385	835653	1238005	1372215	6328440		
435	2837940	628526	1053902	909866	1603319	6346954	13549855	1030320	566952	724925		
436	2597932	1784277	397243	312172	572315	312172	545179	391745	392944	1873032		
437	812998	35844	362217	178425	19117	864529	3486382	150924	170750	1155773		
438	464401	518101	935343	53528	531800	0	195073	218690	480413	2206797		
439	237865	0	856469	72174	715729	38951	0	219101	2085413	134199		
# Strata	13	24	24	24	24	24	24	24	22	24		
Numbers	117447849	59964432	78326570	69420544	68939991	58845786	118023466	141528510	232318355	296247904		

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 2. continued

SPECIES: Atlantic cod

TABLE: Numbers

EXP. TYPE: 1&amp;2

Stratum	YEARS						No.	Mean	Stratum
	1980	1981	1982	1983	1984	1985	Years	Numbers	
415	122941	469720	55323	758365	132776	182304	16	377139	415
416	22567016	18319310	28646503	39104676	23076938	39565786	16	15170190	416
417	20295057	50129417	5704988	26625901	42135260	22669226	16	14285706	417
418	3385641	7943265	7199745	11615007	6259073	10670474	16	6050797	418
419	9096904	7084857	5067210	12745706	2712126	4256413	16	7977580	419
420	2870118	5510810	1229259	16813172	4228019	3998073	16	8041445	420
421	1407195	9682289	3918321	5463799	1916496	10534222	15	3573830	421
422	31867732	68857131	14536227	27911883	21309580	59132334	16	34192108	422
423	74345015	88786621	52344039	45296002	29677726	42083448	16	30264628	423
424	17283306	54887268	94119380	16748692	14842313	183350397	15	28012366	424
425	273721	68430	0	0	0	0	15	107635	425
426	2940736	10016296	6690642	12381553	6212204	6666292	16	3411091	426
427	5940725	3133342	35580074	16333077	676126	9636461	16	5369380	427
428	1621061	6757861	7315423	6954932	5090337	8295828	15	3514944	428
429	20438546	33686681	20112314	33716550	21054934	14966081	15	14466098	429
431	20245539	17118135	22169052	24364236	12966474	7038101	15	10596305	431
432	58123	31760	52311	0	744821	33793	15	478191	432
433	114939	7111525	4783074	1629976	4400676	3081239	15	2970913	433
434	6985295	11244885	7684801	17222711	17247325	19021194	15	6195393	434
435	13550951	2390549	261300	8038961	18343839	12734671	15	5285802	435
436	7330260	5486438	4914856	2289261	14617333	33603250	15	4838776	436
437	2854408	1629042	6303437	2831137	1955369	1417638	15	1514249	437
438	2347953	1792150	644049	2231476	664997	554741	15	864969	438
439	0	1713139	161443	360872	48433	444774	15	443035	439
# Strata	24	24	24	23	24	24			# Strata
Numbers	267943182	413850921	329495771	331437945	250313175	493936740		208002571	Numbers

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 3. Catch per unit of effort in numbers of fish and kilograms per tow calculated from the September survey of the RV E.E.Prince.

Research Vessel CATCH PER UNIT EFFORT							
NUMBERS / TOW				WEIGHT kg / TOW			
YEARS	SPECIES			Atlantic cod	White hake	American plaice	YEARS
	Atlantic cod	White hake	American plaice				
1970	78.20	.60	193.00	99.10	1.70	34.40	1970
1971	32.10	2.70	151.50	39.40	2.20	29.10	1971
1972	34.10	1.50	128.00	38.20	3.00	30.50	1972
1973	34.40	5.70	132.40	39.50	7.30	37.10	1973
1974	30.10	10.40	313.30	35.70	13.00	57.70	1974
1975	26.40	8.40	295.00	27.10	5.30	59.50	1975
1976	59.50	7.10	523.40	34.80	4.20	95.00	1976
1977	50.00	3.50	601.90	43.70	3.20	85.50	1977
1978	77.30	10.00	321.00	77.00	11.00	62.40	1978
1979	136.20	7.50	492.10	107.40	9.60	92.70	1979
1980	133.80	6.80	304.10	113.80	9.70	55.70	1980
1981	226.30	12.30	352.20	202.70	19.50	57.10	1981
1982	159.80	3.70	164.10	146.20	5.20	35.10	1982
1983	166.10	3.30	210.70	117.40	4.00	39.20	1983
1984	121.90	5.60	111.50	90.50	6.80	23.00	1984
1985	232.60	8.30	131.20	173.80	6.50	27.60	1985

TABLE 4. Weight at age of southern Gulf cod (NAFO division 4T) as calculated from September surveys on the RV E.E. Prince.

SPECIES: Atlantic cod		TABLE: Weight-at-Age									EXP. TYPE: 1&2
Age	YEARS										
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
0											
1	47	42	45	63	50		211	56	50		
2	170	132	128	144	189	104	138	132	149	110	
3	433	404	403	360	456	313	290	360	341	270	
4	791	757	773	739	774	777	744	733	807	618	
5	1210	1164	1264	1223	1210	1270	1344	1401	1302	1145	
6	1834	1451	1577	1645	1754	1796	1960	1939	2050	1668	
7	2755	2032	2048	2069	2251	2393	2563	2670	2600	2329	
8	3913	2992	2794	2544	2458	2778	3169	4230	3383	2847	
9	4475	4458	3898	2992	2611	3252	3546	3886	5029	3597	
10	5122	6078	4317	5404	3552	4230	4053	5984	6825	6273	
11	4004	5969	5906	5200	5200	4693	5964	5328	6375	6927	
12	4977	4780	8662	8656	6298	5425	4900	6269	9333	5911	
13	5417	4800	5767	4350	9520	10633	6050	8171		10967	
14	10257	4600	10950	3242		9700	4300		7500	6667	
15	7150	7383	6050	4600	4200	9900		15333	10300	14100	
16	25000	15900			28000		5600	17250		19000	
17		18876		4600	9200			17500			
18		17333	21500	12700							
19				18000							
20					24000						
21								19500			
22											
23											
24											
25				36365							
# Ages	16	18	17	19	16	15	15	17	14	17	

TABLE 4. continued

SPECIES: Atlantic cod

TABLE: Weight-at-Age

EXP. TYPE: 1&amp;2

Age	1980	1981	1982	1983	1984	1985	No. Years	Mean Weight g	Age
0	0	0	0	50	0	10	9	7	0
1	63	58	57	56	89	54	16	59	1
2	116	111	189	118	115	144	16	137	2
3	328	279	501	335	273	328	16	355	3
4	589	589	893	697	564	621	16	717	4
5	985	882	1110	1156	944	1015	16	1164	5
6	1486	1335	1469	1380	1396	1450	16	1637	6
7	2009	1804	1781	1747	1657	2041	16	2172	7
8	3352	2388	2044	2036	1759	2254	16	2809	8
9	3925	3529	3817	2870	2273	2610	16	3548	9
10	4785	4360	5268	6539	2856	2484	16	4883	10
11	5929	6317	6706	7331	4125	3480	16	5591	11
12	6650	8867	10800	8000	5858	3300	16	6793	12
13	8600	12800	9800	0	9000	11500	15	7765	13
14	9627	10325			17750		11	8629	14
15	7200	13500			9000	21250	13	9997	15
16	5000	12900	19500		9667	14250	11	15642	16
17		14980	12200		21000		7	14051	17
18							3	17178	18
19		25000					3	14333	19
20		21000			14000				20
21									21
22									22
23									23
24									24
25									25
# Ages	17	19	16	14	18	16			# Ages

TABLE 5a. Population numbers at age (000's) of southern Gulf cod (NAFO division 4T) derived from September surveys on the RV E.E. Prince.

SPECIES: Atlantic cod                      TABLE: Pop numbers (x000)    EXP. TYPE: 1&2; 1

AGE	YEARS									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0				43				21		278
1	42	119	1479	146	160	806	6050	1105	2366	337
2	6945	1149	4195	9499	4673	10987	14850	20639	9711	43894
3	15093	12514	9200	18830	20452	8267	64271	30628	43942	44550
4	14775	15144	24563	8731	14345	12511	16153	25823	47345	94472
5	18085	14387	10177	13901	5555	10489	10815	10107	26758	57644
6	15983	11178	8458	6551	6704	3693	4559	5360	8143	23502
7	4766	7066	5767	4641	2902	2639	1206	3058	4594	6137
8	2036	1718	3345	3494	2044	1768	895	1317	1569	2518
9	1756	328	622	2211	2055	820	503	970	627	1258
10	362	387	471	620	882	598	475	622	785	336
11	589	216	407	146	356	712	417	504	910	370
12	472	174	128	424	175	168	124	405	110	310
13	495	9	66	60	377	91	125	492		93
14	387	164	33	98		0	35		242	89
15+	334	144	132	27	296	0	39	226	58	124
0+	82120	64697	69043	69422	60976	53549	120517	101277	147160	275912

SPECIES: Atlantic cod                      TABLE: Pop numbers (x000)    EXP. TYPE: 1&2; 1

AGE	1980	1981	1982	1983	1984	1985	AGE
0	486	386	431	232	527	255	0
1	1977	9555	5339	9613	646	8462	1
2	9331	41526	68487	37249	14767	27620	2
3	64799	38540	51257	137358	38124	65385	3
4	48661	114948	37710	53349	92968	62849	4
5	84714	95243	77032	19333	44997	104828	5
6	41587	92946	37802	33736	14330	32956	6
7	15001	39109	28748	19280	18601	7839	7
8	2495	21071	13644	15351	7655	9127	8
9	1211	2786	1969	3870	8915	3222	9
10	506	1163	675	1129	2780	2972	10
11	121	514	249	477	654	550	11
12	24	209	88	129	81	64	12
13	15	126	73	74	109	33	13
14	94	99			59		14
15+	45	278	137	0	121	32	15
0+	271067	458499	323641	331180	245334	326194	0+



TABLE 5b. Population composition of the population numbers at age (Table 5a) for southern Gulf cod as derived from September surveys on the RV E.E. Prince.

SPECIES: Atlantic cod                      TABLE: Pop. % composition    EXP. TYPE: 1&2

AGE	YEARS									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0	.00	.00	.00	.06	.00	.00	.00	.02	.00	.10
1	.05	.18	2.14	.21	.26	1.51	5.02	1.09	1.61	.12
2	8.46	1.78	6.08	13.68	7.66	20.52	12.32	20.38	6.60	15.91
3	18.38	19.34	13.33	27.12	33.54	15.44	53.33	30.24	29.86	16.15
4	17.99	23.41	35.58	12.58	23.53	23.36	13.40	25.50	32.17	34.24
5	22.02	22.24	14.74	20.02	9.11	19.59	8.97	9.98	18.18	20.89
6	19.46	17.28	12.25	9.44	10.99	6.90	3.78	5.29	5.53	8.52
7	5.80	10.92	8.35	6.69	4.76	4.93	1.00	3.02	3.12	2.22
8	2.48	2.66	4.84	5.03	3.35	3.30	.74	1.30	1.07	.91
9	2.14	.51	.90	3.18	3.37	1.53	.42	.96	.43	.46
10	.44	.60	.68	.89	1.45	1.12	.39	.61	.53	.12
11	.72	.33	.59	.21	.58	1.33	.35	.50	.62	.13
12	.57	.27	.19	.61	.29	.31	.10	.40	.07	.11
13	.60	.01	.10	.09	.62	.17	.10	.49	.00	.03
14	.47	.25	.05	.14	.00	.00	.03	.00	.16	.03
15+	.41	.22	.19	.04	.49	.00	.03	.22	.04	.04

SPECIES: Atlantic cod                      TABLE: Pop. % composition    EXP. TYPE: 1&2

AGE	1980	1981	1982	1983	1984	1985	MEAN	AGE
0	.18	.08	.13	.07	.21	.08	.06	0
1	.73	2.08	1.65	2.90	.26	2.59	1.40	1
2	3.44	9.06	21.16	11.25	6.02	8.47	10.80	2
3	23.91	8.41	15.84	41.48	15.54	20.04	23.87	3
4	17.95	25.07	11.65	16.11	37.89	19.27	23.11	4
5	31.25	20.77	23.80	5.84	18.34	32.14	18.62	5
6	15.34	20.27	11.68	10.19	5.84	10.10	10.80	6
7	5.53	8.53	8.88	5.82	7.58	2.40	5.60	7
8	.92	4.60	4.22	4.64	3.12	2.80	2.87	8
9	.45	.61	.61	1.17	3.63	.99	1.33	9
10	.19	.25	.21	.34	1.13	.91	.62	10
11	.04	.11	.08	.14	.27	.17	.39	11
12	.01	.05	.03	.04	.03	.02	.19	12
13	.01	.03	.02	.02	.04	.01	.15	13
14	.03	.02	.00	.00	.02	.00	.08	14
15+	.02	.06	.04	.00	.05	.01	.12	15+

TABLE 6. Biomass estimates in kilograms of southern Gulf white hake (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: White hake		TABLE: Biomass - kg									EXP. TYPE: 1&2
Stratum	YEARS										
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
415	78104	193520	219434	147529	1095771	1094528	965646	2777528	1117007	3011125	
416	16266	0	28096	0	82019	0	0	0	0	0	
417	0	10734	0	0	0	0	0	0	12672	0	
418	0	0	12680	0	0	11412	322229	26336	293885	132142	
419	533265	0	0	36662	487599	0	278017	95544	481184	42772	
420	344631	805823	1171774	2480233	3007920	406544	1308486	703546	8049354	1937554	
421	239861	163497	3116158	343063	428829	349416	2287089	141499	568369	1206749	
422	420381	28447	0	0	0	497251	72065	48044	207548	982974	
423	0	0	0	0	0	93007	0	0	0	0	
424	0	0	0	0	0	0	0	0	0	0	
425	575123	392333	186825	201689	881120	620434	782059	805061	1240867	547441	
426	0	0	0	0	0	22477	37462	0	0	0	
427	0	0	0	0	0	0	0	0	0	0	
428	0	0	0	0	0	0	0	41301	3452	0	
429	317314	0	361973	0	0	382083	0	0	0	196500	
431	8336	0	0	0	0	0	0	0	0	45668	
432	3533	368156	720424	276208	536877	3413297	46157	308054	539458	501571	
433	1007083	958581	152936	11002398	19970608	528810	2376143	813943	4779251	5057238	
434	11304	225494	0	0	88036	38974	0	0	0	0	
435	108448	0	0	0	0	401023	0	832893	259122	1110524	
436	0	0	0	0	0	0	0	0	0	0	
437	184959	318037	42652	0	485797	528389	445225	472295	1820895	128139	
438	3436	0	0	0	0	0	0	0	0	0	
439	210686	1042518	180436	340929	109916	1964603	0	566923	119288	5298049	
# Strata	14	24	24	24	24	24	24	24	22	24	
Biomass	4062729	4507140	6193388	14828711	27174492	10352248	8920578	7622967	19492352	20198446	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 6. continued

SPECIES: White hake			TABLE: Biomass - kg				EXP. TYPE: 1&2		
Stratum	YEARS		1982	1983	1984	1985	No.	Mean	Stratum
	1980	1981					Years	Biomass	
415	1809945	1713174	865417	1555131	1828835	1751382	16	1264005	415
416	261625	20604	68969	20604	677537	14717	16	74402	416
417	0	114050	0	0	0	0	16	8591	417
418	1190680	182053	145003	322732	6521	313837	16	184969	418
419	810415	21386	556034	45288	76989	57742	16	219556	419
420	1793824	7627988	237071	649934	372045	257111	16	1947115	420
421	1046661	2217299	3336272	708687	1035359	1057098	15	1169148	421
422	3992429	0	894042	432392	137267	77213	16	486878	422
423	0	0	0	0	0	0	16	5813	423
424	0	0	0	0	0	0	16	0	424
425	1185452	6843018	1881830	1819042	1407981	1523145	16	1269894	425
426	112385	0	0	0	203363	0	16	23480	426
427	0	0	0	0	0	0	16	0	427
428	0	0	0	0	0	0	16	2797	428
429	2590692	5894989	0	57794	56143	0	16	616093	429
431	102754	86530	0	0	0	0	15	15663	431
432	472253	170011	26156	381401	112688	287527	15	544016	432
433	3735095	8252508	929086	325995	4173101	3911402	15	4464473	433
434	150329	73846	0	110769	39177	25055	15	50112	434
435	0	1756382	32662	740349	204437	1874009	15	480760	435
436	0	0	0	0	0	0	15	0	436
437	351927	451298	1430901	709439	3016147	2097905	15	819936	437
438	0	48661	25762	0	15367	138685	15	15232	438
439	889148	766853	354224	956310	669090	751515	15	933987	439
# Strata	24	24	24	23	24	24			# Strata
Biomass	20495614	36240650	10783429	8835867	14032047	14138343		14596921	Biomass

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 7. Biomass estimates in numbers of southern Gulf white hake (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: White hake		TABLE: Numbers									EXP. TYPE: 1&2
Stratum	YEARS										
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
415	78104	125430	438868	147529	1110527	1826334	1569174	4380550	974746	3427678	
416	16266	0	28096	0	82019	0	0	0	0	0	
417	0	10734	0	0	0	0	0	0	6336	0	
418	0	0	12680	0	0	11412	295376	26336	146942	48052	
419	348717	0	0	36662	230968	0	149702	64158	346452	21386	
420	115243	317851	451917	1069192	998459	143148	598320	346300	4116154	1101883	
421	95590	82216	1062543	157237	245045	174708	2858861	115510	413514	718706	
422	60054	28447	0	0	0	259435	36033	24022	103774	472522	
423	0	0	0	0	0	93007	0	0	0	0	
424	0	0	0	0	0	0	0	0	0	0	
425	436210	1091842	482270	259314	1702282	1386852	1485913	1127085	1201764	374565	
426	0	0	0	0	0	67431	56192	0	0	0	
427	0	0	0	0	0	0	0	0	0	0	
428	0	0	0	0	0	0	0	20650	184	0	
429	117823	0	155131	0	0	218333	0	0	0	131000	
431	1244	0	0	0	0	0	0	0	0	45668	
432	187695	564872	347976	634473	1775823	9341886	184627	988098	1986929	1574461	
433	586160	958581	76468	8535180	13979114	326395	6458327	603509	7478572	5552268	
434	4231	75165	0	0	88036	38974	0	0	0	0	
435	21542	0	0	0	0	277631	0	185087	37017	370175	
436	0	0	0	0	0	0	0	0	0	0	
437	113265	531800	87929	0	634235	705904	803669	412285	1161358	156538	
438	2984	0	0	0	0	0	0	0	0	0	
439	111691	1776291	198479	712247	263286	1772281	0	731249	119288	2698644	
# Strata	14	24	24	24	24	24	24	24	22	24	
Numbers	2296819	5563229	3342357	11551834	21109794	16643731	14496194	9024839	18093030	16693546	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 7. continued

SPECIES: White hake			TABLE: Numbers				EXP. TYPE: 1&2		
Stratum	YEARS						No.	Mean	Stratum
	1980	1981	1982	1983	1984	1985	Years	Numbers	
415	1624629	1252983	742915	1498398	2007451	1662865	16	1429261	415
416	288216	20604	44244	20604	557960	14717	16	67045	416
417	0	79835	0	0	0	0	16	6057	417
418	895863	69289	32223	129395	6521	38041	16	107008	418
419	465988	21386	278017	22644	30796	19247	16	127258	419
420	1057963	3213816	79024	214571	168346	216402	16	888037	420
421	1324606	1389911	2192728	435798	514227	370291	15	781046	421
422	1747221	0	384997	192174	11439	30885	16	209438	422
423	0	0	0	0	0	0	16	5813	423
424	0	0	0	0	0	0	15	0	424
425	811099	6192931	1265958	1651929	864141	1609583	15	1371484	425
426	112385	0	0	0	310396	0	16	34150	426
427	0	0	0	0	0	0	16	0	427
428	0	0	0	0	0	0	15	1302	428
429	862918	3193119	0	57794	28071	0	16	297762	429
431	51377	43265	0	0	0	0	15	9354	431
432	921256	439039	65389	1081042	292485	979463	15	1411855	432
433	3127258	5775347	808649	108665	2995015	9358164	15	4409434	433
434	100219	36923	0	73846	39177	25055	15	31826	434
435	0	698461	65325	277631	68146	451150	15	162042	435
436	0	0	0	0	0	0	15	0	436
437	351927	367320	1398991	683991	3248143	2235696	15	851986	437
438	0	48661	17175	0	15367	255473	15	22445	438
439	638543	1040514	431147	866092	464596	889549	15	840147	439
# Strata	24	24	24	23	24	24			# Strata
Numbers	14381468	23883404	7806782	7314574	11622277	18156581		13064749	Numbers

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 8. Weight at age of southern Gulf white hake (NAFO division 4T) as calculated from September surveys on the RV E.E. Prince.

SPECIES: White hake		TABLE: Weight-at-Age									EXP. TYPE: 1&2
Age	YEARS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0											
1	0	0	175	325	325	242	242	88	106		
2	312	312	355	270	270	322	322	267	207	325	
3	387	387	684	388	388	535	535	511	427	527	
4	608	608	896	1058	1058	954	954	730	1036	860	
5	1506	1506	1858	1448	1448	1419	1419	1288	1480	1427	
6	2313	2313	2308	2288	2288	1675	1675	1648	1911	1903	
7	2650	2650	2520	2725	2725	2514	2514	1685	2662	2250	
8	2150	2150	3014	4675	4675	2500	2500	2467	3625	2686	
9	3300	3300	3133	5733	5733			4333	2000	3200	
10	2625	2625	6275	3400	3400	3100	3100	1800	2057	3925	
11	9500	9500	3175	4800	4800	4767	4767	9800		5100	
12			3400	3150	3150			4500	7200	2617	
13			4200								
14				4000	4000			2000			
15											
16						13000	13000				
17											
18											
19											
# Ages	11	11	13	13	13	11	11	13	11	11	

SPECIES: White hake		TABLE: Weight-at-Age						EXP. TYPE: 1&2		
Age	YEARS	1980	1981	1982	1983	1984	1985	No. Years	Mean Weight g	Age
0						175	19	2	97	0
1	250	75	75	114	183	86	86	15	152	1
2	349	317	302	352	283	207	207	16	298	2
3	488	574	544	685	556	436	436	16	503	3
4	950	1233	976	1126	978	789	789	16	926	4
5	1373	1664	1506	1868	1521	1310	1310	16	1503	5
6	1845	2302	2035	2131	2223	1823	1823	16	2043	6
7	2462	2916	2598	2989	2657	2329	2329	16	2553	7
8	3242	3208	2525	4900	3477	2646	2646	16	3153	8
9	3408	3275	3167	3900	3054	3542	3542	14	3648	9
10	5540	2500		6000	5140	3632	3632	15	3675	10
11	3800	3400	2400		3467	4125	4125	14	5243	11
12	11000	10267	3150		5475	10250	10250	11	5833	12
13			9000			9600	9600	3	7600	13
14						12000	12000	4	5500	14
15	2700	5000				14000	14000	3	7233	15
16								2	13000	16
17		11500						1	11500	17
18								0		18
19		12500						1	12500	19
# Ages	13	15	12	10	13	16				# Ages

TABLE 9. Population numbers at age (000's) of southern Gulf white hake (NAFO division 4T) derived from September surveys on the RV E.E. Prince.

SPECIES: White hake                      TABLE: Pop numbers (x000)    EXP. TYPE: 1&2;1

AGE	YEARS									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0										
1	0	70	0	49	167	659	627	35	109	
2	1	1010	301	590	3408	6939	6106	588	4050	482
3	53	2013	303	1166	3502	4609	4290	2088	2826	3521
4	74	987	547	3571	4924	2138	1669	2422	4931	3515
5	187	830	525	3913	3597	1397	935	934	4223	3407
6	73	94	469	1382	2751	700	400	303	1853	2686
7	50	199	156	512	1716	292	146	322	602	997
8	19	66	245	123	470	79	32	84	111	344
9	47	45	147	72	85			102	44	33
10	57	82	89	56	245	58	44	27	139	40
11	60	37	35	40	112	120	51	31		54
12			42	58	189			104	37	129
13+	0	0	0	19	5	0	0	45	0	0
0+	621	5433	2859	11551	21170	16991	14300	7085	18925	15208

SPECIES: White hake                      TABLE: Pop numbers (x000)    EXP. TYPE: 1&2;1

AGE	1980	1981	1982	1983	1984	1985	AGE
0					32	68	0
1	25	91	31	234	98	187	1
2	551	1284	337	1394	1079	3201	2
3	1889	3667	1180	1390	2602	6780	3
4	3548	6631	1672	1452	3070	4029	4
5	4466	6183	2318	858	2544	1238	5
6	1715	4496	817	545	1151	675	6
7	830	1258	714	288	591	493	7
8	445	812	211	130	359	258	8
9	156	202	194	139	120	272	9
10	189	62		17	127	162	10
11	31	27	27		23	50	11
12	0	104	43		23	65	12
13+	28	93	0	0	0	49	13
0+	13873	24910	7544	6447	11819	17527	0+

TABLE 10. Population composition of the population numbers at age (Table 9) for southern Gulf white hake as derived from September surveys on the RV E.E. Prince.

SPECIES: White hake                      TABLE: Pop. % composition    EXP.TYPE: 1&2

AGE	YEARS									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1	.00	1.29	.00	.42	.79	3.88	4.38	.49	.58	.00
2	.16	18.59	10.53	5.11	16.10	40.84	42.70	8.30	21.40	3.17
3	8.53	37.05	10.60	10.09	16.54	27.13	30.00	29.47	14.93	23.15
4	11.92	18.17	19.13	30.92	23.26	12.58	11.67	34.18	26.06	23.11
5	30.11	15.28	18.36	33.88	16.99	8.22	6.54	13.18	22.31	22.40
6	11.76	1.73	16.40	11.96	12.99	4.12	2.80	4.29	9.79	17.66
7	8.95	3.66	5.46	4.43	8.11	1.72	1.02	4.54	3.18	6.56
8	3.06	1.21	8.57	1.06	2.22	.46	.22	1.19	.59	2.26
9	7.57	.83	5.14	.62	.40	.00	.00	1.44	.23	.22
10	9.18	1.51	3.11	.48	1.16	.34	.31	.38	.73	.26
11	9.66	.68	1.22	.35	.53	.71	.36	.44	.00	.36
12	.00	.00	1.47	.50	.89	.00	.00	1.47	.20	.85
13+	.00	.00	.00	.16	.02	.00	.00	.64	.00	.00

SPECIES: White hake                      TABLE: Pop. % composition    EXP.TYPE: 1&2

AGE	YEARS							MEAN	AGE
	1980	1981	1982	1983	1984	1985			
0	.00	.00	.00	.00	.27	.39	.04	0	
1	.18	.37	.41	3.63	.83	1.07	1.14	1	
2	3.97	5.15	4.47	21.62	9.13	18.26	14.34	2	
3	13.62	14.72	15.64	21.56	22.02	38.68	20.86	3	
4	25.57	26.62	22.16	22.52	25.98	22.99	22.30	4	
5	32.19	24.82	30.73	13.31	21.52	7.06	19.81	5	
6	12.36	18.05	10.83	8.45	9.74	3.85	9.80	6	
7	5.98	5.05	9.46	4.47	5.00	2.81	4.97	7	
8	3.21	3.26	2.80	2.02	3.04	1.47	2.29	8	
9	1.12	.81	2.57	2.16	1.02	1.55	1.61	9	
10	1.36	.25	.00	.26	1.07	.92	1.33	10	
11	.22	.11	.36	.00	.19	.29	.97	11	
12	.00	.42	.57	.00	.19	.37	.43	12	
13+	.20	.37	.00	.00	.00	.28	.10	13+	



TABLE 11. Biomass estimates in kilograms of southern Gulf American plaice (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: American plaice		TABLE: Biomass - kg										EXP. TYPE: 1&2	
Stratum	YEARS												
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979			
415	0	57339	26035	0	165799	139765	0	0	331941	24588			
416	3377009	1132688	3298164	2720708	4130385	9442556	13165439	5821549	15838181	15834147			
417	1612358	1025919	680883	2024579	4342822	3492028	6421660	5485125	4803108	5477019			
418	986961	2546009	967432	1630687	1217309	1249944	5964217	4620004	1008457	1281178			
419	6642599	3221743	2739916	5388292	4189506	2741492	9736893	11906937	11745693	13093823			
420	83728	201511	850740	864283	427600	350453	222128	1522524	96893	377966			
421	246942	201802	0	208062	578221	436770	0	499579	564965	884048			
422	7861831	11679893	7515635	9304669	11730181	15575449	40372519	36288695	6103750	27633239			
423	12137429	7254555	32438447	32090825	48739313	19338642	43577710	58909787	70333573	41163928			
424	788919	91240	2627041	2727069	2688858	6177174	11145551	14892882	7581380	28571713			
425	24406	152067	0	29813	57351	218977	234618	32202	0	0			
426	261574	206039	483916	643658	167136	625140	9103169	2111071	551347	709095			
427	777766	3563746	437493	175292	114119	556318	3877610	2833289	651084	1262519			
428	272412	96541	828886	2467729	76794	6150197	2413522	722766	1334993	1810719			
429	5035325	3680181	7221074	4135161	14092206	25428961	13749515	14905074	3800706	25567426			
431	1068871	6975848	274010	502352	2877109	4213184	7192772	2127610	2653065	2042623			
432	5095	0	14531	0	13766	21796	0	17437	11889	0			
433	2999755	7196732	2226569	6218767	4096186	9643759	7857088	14932879	2777974	15000092			
434	2909735	5101796	1155471	3043674	14887696	6577474	14983986	3946141	4697391	9526275			
435	112671	188943	555262	162466	148070	269919	277631	283801	241588	104112			
436	404990	1083420	1349459	124869	1488020	520287	750845	3574675	940154	280955			
437	364457	1545653	30390	402367	928299	39103	1735534	641426	79509	840115			
438	38599	26907	378517	194646	92544	82322	64028	151137	42460	167882			
439	15941	69167	0	0	115028	17041	87640	60253	70295	37215			
#Strata	13	24	24	24	24	24	24	24	22	24			
Biomass	48029374	57299739	66099871	75058968	117364318	113308751	192934075	186286843	136260396	191690677			

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 11. continued

SPECIES: American plaice			TABLE: Biomass - kg				EXP. TYPE: 1&2		
Stratum	YEARS		1982	1983	1984	1985	No. Years	Mean Biomass	Stratum
	1980	1981							
415	26035	27662	27662	230731	63227	52699	16	1173473	415
416	7919373	3287685	1973769	3050188	937138	2342746	16	94271725	416
417	3600703	3576364	4393844	3813604	6004602	5957302	16	62711920	417
418	1509273	593826	2301195	3318286	2045628	1251274	16	32491680	418
419	7415293	4387173	6721475	5363783	3216757	4900741	16	103412116	419
420	96893	222254	24878	441582	360261	84632	16	6228326	420
421	571772	552433	775443	366977	836482	1686728	15	8410224	421
422	9976304	17232935	9969546	9973274	8186397	11773273	16	241177590	422
423	46914554	27514904	15125384	10843368	7017810	7807003	16	481207232	423
424	10507746	5259732	3869063	1723798	864173	399740	15	99916079	424
425	0	73318	34215	72992	0	28813	15	957772	425
426	131116	79606	292200	134196	131651	35589	16	15666503	426
427	665692	91000	45910	0	0	261686	16	15313524	427
428	309757	351058	547237	150795	319143	530766	15	18383315	428
429	2092333	21158867	11661546	13330813	3593136	3958162	15	173410486	429
431	4185710	1502815	1366828	1202299	2575920	1184374	15	41945390	431
432	0	0	0	29152	71519	14743	15	199928	432
433	5552335	16650507	3406650	6768627	6364785	6025815	15	117718520	433
434	10708447	5900288	11015951	8990739	4178740	6562096	15	114185900	434
435	98632	200187	0	518245	296560	963446	15	4421533	435
436	3043099	90061	621122	832459	631778	156730	15	15892923	436
437	1394346	254666	1468775	3766091	439124	372409	15	14302264	437
438	113895	79395	42937	17175	7683	14598	15	1514725	438
439	0	35085	0	36087	51124	30674	15	625550	439
#Strata	24	24	24	23	24	24			#Strata
Biomass	116833308	109121821	75685630	74608284	48193638	56396029		1665538699	Biomass

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 12. Biomass estimates in numbers of southern Gulf American plaice (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: American Plaice		TABLE: Numbers					EXP. TYPE: 1&2			
Stratum	YEARS									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
415	0	80633	26035	0	1007127	605646	0	0	331941	73765
416	21539447	3772705	14035141	9499212	13830058	35381923	40925108	23296930	24688250	47732034
417	7948486	6355646	2500257	9533711	20985096	17780317	28702314	34007010	21787289	25910133
418	4668620	15579451	5771029	6124586	9574896	8968344	31498616	36323868	4843875	7015544
419	23547430	117585076	14718559	25065930	16033040	18176190	52873593	68346950	4875491	78488653
420	381948	246291	3104152	2094404	778882	934542	267325	6663284	528982	1109374
421	1196650	1244445	0	481242	3131850	1785200	0	1718204	1625126	1817942
422	58352246	69637693	46943484	55235112	94307412	70393710	293717168	273791150	34600263	176238232
423	79242064	25441526	128283389	71611130	232904924	102960931	233691455	477463412	397840349	280655456
424	3912583	319341	13189818	13817828	17536843	21423683	34151730	100021371	233499	133329029
425	134730	456201	0	57625	205942	1569332	547441	96607	0	0
426	735430	1442272	1675195	3279593	1927832	3132727	20609501	11959066	1102693	3580259
427	1555531	3512098	1215259	704298	448604	1839091	9153702	7525924	1967562	1264814
428	247336	131647	1082428	1858541	120676	3571594	1711406	1032523	233499	1256417
429	134797	14206947	26122384	19421676	68946633	145218679	86983833	81780446	29399323	116875535
431	6180085	38629755	639358	1644062	5978696	24676595	26304997	12088693	6270002	8153885
432	46899	0	72654	0	289088	261555	0	17437	35667	0
433	21315746	37133960	10039800	25358734	20523941	57166617	54816095	102624338	11421044	50051369
434	22962192	31052368	3755281	17347912	89877090	42452104	84326701	32832921	25367475	41309758
435	245031	219791	451150	364005	185087	886877	749604	549092	709177	173519
436	1909925	2423924	2389302	499475	9517777	3329834	2641016	11017834	1501918	811647
437	2536290	13310105	30390	3436964	8711169	117309	8827572	2397531	288058	5073247
438	224744	45227	761204	720190	709067	286847	304348	994984	272886	404238
439	134730	702698	0	0	278623	51124	262921	290308	332303	111645
#Strata	13	24	24	24	24	24	24	24	22	24
Numbers	257152940	383529800	276806269	268156230	617810353	562970771	1013066446	1286839883	570256673	983436495

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 12. continued

SPECIES: American Plaice		TABLE: Numbers					EXP. TYPE: 1&2		
Stratum	YEARS		1982	1983	1984	1985	No. Years	Mean Numbers	Stratum
	1980	1981							
415	52069	82985	55323	1103432	221294	94840	16	233443	415
416	24949649	19606701	11256296	20066418	5560821	14251671	16	20774523	416
417	23432020	20212502	23593653	17644998	27196203	31216420	16	19925379	417
418	10502143	3089635	12461921	15330597	12172861	7007678	16	11933354	418
419	44289157	30646053	35917058	49318495	18351470	31766371	16	39374970	419
420	687414	469204	24878	1110174	536183	371739	16	1206799	420
421	1588256	2486368	3027964	164587	2880038	4259793	15	1712973	421
422	53652651	114953495	67523438	50493760	57565693	66212383	16	98851118	422
423	274719264	187889282	71676669	46587520	39485749	27539547	16	167374542	423
424	47047545	40324609	7132244	14902316	3996048	1040168	15	28273666	424
425	0	107533	34215	109488	0	28813	15	209245	425
426	842886	330130	1798157	791869	325381	380235	16	3369577	426
427	1873119	169702	45910	0	0	261686	15	1971081	427
428	423334	263293	545946	181912	303186	286976	15	828170	428
429	9779088	140675909	35209393	90790497	11850331	16416337	15	55863238	429
431	8579950	6783120	7872157	4921018	10419645	3611529	15	10708059	431
432	0	0	0	182199	390734	14743	15	81260	432
433	25909044	78549754	18082773	31384887	22317923	29148684	15	36933193	433
434	66119777	29313132	63821443	45138309	17499419	28692371	15	39785943	434
435	191785	344847	0	740349	257440	781664	15	424558	435
436	12431382	223936	1177813	1456803	1492862	563198	15	3309274	436
437	8799796	779701	5549609	7980728	1546516	1512602	15	4394558	437
438	523826	579456	231858	103048	15367	102189	15	389407	438
439	0	69167	0	54131	51124	153371	15	155759	439
#Strata	24	24	24	23	24	24			#Strata
Numbers	616394155	677950514	367038718	401627433	234436288	265714918		548084087	Numbers

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 13. Weight at age of southern Gulf American plaice (NAFO division 4T) as calculated from September surveys on the RV E.E. Prince.

SPECIES: American plaice		TABLE: Weight-at-Age					EXP. TYPE: 1&2			
Age	YEARS									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0										
1	25	25	20	0	0	0		0		0
2	35	35	19	55	57	0	0	0	0	0
3	45	45	33	66	61	54	57	54	56	200
4	74	74	75	86	66	71	80	69	71	74
5	124	124	123	119	104	108	105	96	110	76
6	161	161	186	160	159	181	175	149	128	110
7	228	228	239	211	206	246	242	222	184	152
8	291	291	318	265	277	306	323	331	265	216
9	352	352	448	344	358	343	400	403	385	301
10	443	443	488	429	493	443	445	493	456	369
11	509	509	611	481	596	514	616	604	613	490
12	646	646	844	577	725	799	692	745	649	534
13	706	706	900	704	799	723	923	887	813	726
14	923	923	1409	843	1094	1012	1089	1039	1143	892
15	965	965	1362	1005	1199	1592	1177	1402	1232	1265
16	1391	1391	1757	1391	1354	1606	1792	1563	1754	1382
17	1763	1763	1519	1330	1156	1387	1617	1542	1740	1746
18	2479	2479	1967	1403	1453	1900	2383	1925	1887	1920
19	1958	1958	1675	1856	1995	1944	2700	1767	2186	2282
20	1831	1831	2800	2970	1750	2329	2500	2350	2383	2111
21				2406	2275	2500	1508	2800		2308
22	1975	1975		2600	3300	2350	3100		2950	3000
23			725	2100	2175			2025		2662
24				2938			3900			1450
25						2400				
26					2500					
27										
# Ages	21	21	21	24	24	23	22	22	20	24

TABLE 13. continued

SPECIES: American plaice

TABLE: Weight-at-Age

EXP. TYPE: 1&amp;2

Age	YEARS						No. Years	Mean Weight	Age
	1980	1981	1982	1983	1984	1985			
0				0	336	10	3	115	0
1	0	0	0	0	0	9	14	6	1
2	0	100	57	113	50	25	16	34	2
3	66	69	58	70	117	54	16	69	3
4	86	82	74	81	84	94	16	78	4
5	121	102	108	101	106	165	16	112	5
6	129	135	138	140	140	214	16	154	6
7	186	170	174	150	177	271	16	205	7
8	248	234	212	176	229	302	16	268	8
9	328	289	276	220	276	393	16	342	9
10	413	362	361	254	303	500	16	418	10
11	555	447	486	334	391	695	16	528	11
12	702	660	691	434	466	703	16	657	12
13	903	742	804	609	571	1012	16	783	13
14	1195	956	1039	828	790	1132	16	1019	14
15	1451	1200	1116	877	966	1173	16	1184	15
16	1730	1283	1469	1145	1245	1540	16	1487	16
17	1579	1300	1400	1234	1256	2053	16	1524	17
18	2458	1817	1433	1379	1598	2113	16	1912	18
19	2069	2070	2080	1429	1775	1979	16	1983	19
20	2550	1125	2150	2350	2259	2813	16	2256	20
21	1800		2800	1592	2104	2650	11	2249	21
22	3250	2150	2462	2800	2833		13	2673	22
23			2825		2450	2400	8	2170	23
24		1925			2325	1950	7	2415	24
25			3400				2	2900	25
26			2100				2	2350	26
27		1837					1	1837	27
# Ages	22	23	25	24	25	24			# Ages

TABLE 14a. Population numbers at age (000's) of southern Gulf American plaice (NAFO division 4T) derived from September surveys on the RV E.E. Prince.

SPECIES: American plaice		TABLE: Pop numbers (x000) EXP. TYPE: 1&2;1									
AGE	YEARS										
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
0											
1	1712	1400	1168	993	922	545		798		91	
2	7583	9461	9176	8034	18636	5156	5884	6330	1370	1540	
3	11847	29328	16496	26276	64798	25644	59064	90135	10840	7665	
4	23252	48966	37843	36639	130876	95818	197121	257387	88004	74345	
5	36113	47123	36774	42518	110123	178900	289252	351432	116372	204063	
6	40425	49001	41201	33039	90010	91299	228064	205926	129669	184374	
7	35818	50664	47279	27779	59184	70624	109035	137253	119445	207198	
8	20593	30873	32534	30751	45718	44750	47745	60472	79187	155869	
9	6777	10686	14796	24065	51049	31999	42812	24545	26009	71746	
10	4265	7477	8706	10710	31185	21557	29827	16484	16810	36973	
11	4215	6626	4124	5678	13942	16541	20120	9753	8860	20607	
12	3296	4261	3968	4354	4542	4844	13297	6670	4511	11130	
13	2119	3132	2063	3561	3788	2699	7914	4138	4929	6802	
14	1650	2656	1320	4032	3844	2085	4112	2399	1612	6267	
15	1001	1631	578	2183	2743	1245	1782	1338	1493	3312	
16	761	1373	724	1663	1399	1207	1547	364	577	2411	
17	707	1201	179	1512	679	166	1616	500	341	592	
18	506	528	185	663	602	1223	616	146	143	771	
19	44	137	62	1854	194	647	49	671	149	425	
20+	168	406	64	1895	398	1033	741	133	295	1140	
0+	202852	306930	259240	268199	634632	597982	1060598	1176874	610616	997321	
AGE	1980	1981	1982	1983	1984	1985	AGE				
0				234	1057	121	0				
1	2974	3103	1897	3253	232	2744	1				
2	8019	16483	15544	13245	2981	16234	2				
3	39574	33644	16299	32618	5507	25547	3				
4	90164	81909	20459	39158	25687	36722	4				
5	101957	110050	39081	48014	34635	43951	5				
6	127198	130221	33794	46659	32686	37678	6				
7	89620	141124	50576	34716	29538	33274	7				
8	72035	81895	69446	55741	27711	32255	8				
9	37257	55238	36334	52904	25492	16492	9				
10	19601	28891	24191	30605	30225	10129	10				
11	11868	13128	10192	30417	11219	5625	11				
12	6570	6356	4473	15541	9618	3391	12				
13	4614	3659	2310	6473	4536	1646	13				
14	2415	2297	2481	3167	1717	1255	14				
15	1014	1656	1391	2529	1724	645	15				
16	512	1457	1402	1365	693	729	16				
17	406	468	1082	1355	585	411	17				
18	126	191	437	999	564	240	18				
19	160	402	576	365	436	270	19				
20+	197	422	491	643	654	274	20				
0+	616281	712594	332456	420001	247497	269633	0+				

TABLE 14b. Population composition of the population numbers at age (Table 14a) for southern Gulf American plaice as derived from September surveys on the RV E.E. Prince.

SPECIES: American plaice		TABLE: Pop. % composition EXP. TYPE: 1&2,1									
AGE	YEARS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
0		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1		.84	.46	.45	.37	.15	.09	.00	.07	.00	.01
2		3.74	3.08	3.54	3.00	2.94	.86	.55	.54	.22	.15
3		5.84	9.56	6.36	9.80	10.21	4.29	5.57	7.66	1.78	.77
4		11.46	15.95	14.60	13.66	20.62	16.02	18.59	21.87	14.41	7.45
5		17.80	15.35	14.19	15.85	17.35	29.92	27.27	29.86	19.06	20.46
6		19.93	15.96	15.89	12.32	14.18	15.27	21.50	17.50	21.24	18.49
7		17.66	16.51	18.24	10.36	9.33	11.81	10.28	11.66	19.56	20.78
8		10.15	10.06	12.55	11.47	7.20	7.48	4.50	5.14	12.97	15.63
9		3.34	3.48	5.71	8.97	8.04	5.35	4.04	2.09	4.26	7.19
10		2.10	2.44	3.36	3.99	4.91	3.60	2.81	1.40	2.75	3.71
11		2.08	2.16	1.59	2.12	2.20	2.77	1.90	.83	1.45	2.07
12		1.62	1.39	1.53	1.62	.72	.81	1.25	.57	.74	1.12
13		1.04	1.02	.80	1.33	.60	.45	.75	.35	.81	.68
14		.81	.87	.51	1.50	.61	.35	.39	.20	.26	.63
15		.49	.53	.22	.81	.43	.21	.17	.11	.24	.33
16		.38	.45	.28	.62	.22	.20	.15	.03	.09	.24
17		.35	.39	.07	.56	.11	.03	.15	.04	.06	.06
18		.25	.17	.07	.25	.09	.20	.06	.01	.02	.08
19		.02	.04	.02	.69	.03	.11	.00	.06	.02	.04
20+		.08	.13	.02	.71	.06	.17	.07	.01	.05	.11

SPECIES: American plaice		TABLE: Pop. % composition EXP. TYPE: 1&2,1							AGE
AGE	1980	1981	1982	1983	1984	1985	MEAN	AGE	
0	.00	.00	.00	.06	.43	.04	.03	0	
1	.48	.44	.57	.77	.09	1.02	.36	1	
2	1.30	2.31	4.68	3.15	1.20	6.02	2.33	2	
3	6.42	4.72	4.90	7.77	2.23	9.47	6.08	3	
4	14.63	11.49	6.15	9.32	10.38	13.62	13.77	4	
5	16.54	15.44	11.76	11.43	13.99	16.30	18.29	5	
6	20.64	18.27	10.16	11.11	13.21	13.97	16.23	6	
7	14.54	19.80	15.21	8.27	11.93	12.34	14.27	7	
8	11.69	11.49	20.89	13.27	11.20	11.96	11.10	8	
9	6.05	7.75	10.93	12.60	10.30	6.12	6.64	9	
10	3.18	4.05	7.28	7.29	12.21	3.76	4.30	10	
11	1.93	1.84	3.07	7.24	4.53	2.09	2.49	11	
12	1.07	.89	1.35	3.70	3.89	1.26	1.47	12	
13	.75	.51	.69	1.54	1.83	.61	.86	13	
14	.39	.32	.75	.75	.69	.47	.59	14	
15	.16	.23	.42	.60	.70	.24	.37	15	
16	.08	.20	.42	.32	.28	.27	.27	16	
17	.07	.07	.33	.32	.24	.15	.19	17	
18	.02	.03	.13	.24	.23	.09	.12	18	
19	.03	.06	.17	.09	.18	.10	.10	19	
20+	.03	.06	.15	.15	.26	.10	.14	20+	



TABLE 15. Biomass estimates in kilograms of southern Gulf haddock (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Haddock		TABLE: Biomass - kg									EXP. TYPE: 1&2
Stratum	YEARS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
415	0	0	0	0	0	0	0	0	0	0	0
416	18180	47547	0	0	0	71321	0	0	0	0	0
417	12672	0	0	0	0	0	0	0	0	0	0
418	0	0	0	0	0	0	0	0	0	0	0
419	0	0	0	0	0	0	0	0	0	0	0
420	0	0	0	47979	0	0	93292	0	0	0	0
421	0	0	0	0	0	0	0	0	0	0	0
422	0	0	0	0	0	0	0	0	0	0	0
423	0	0	0	0	0	0	0	0	0	0	0
424	0	0	0	0	0	0	0	0	116	0	0
425	816	27372	0	0	0	36496	0	0	0	0	0
426	0	0	0	0	0	0	18731	0	0	168577	0
427	0	0	0	0	0	0	0	0	0	0	0
428	0	0	0	0	0	0	0	0	0	0	0
429	0	0	0	0	0	0	0	0	0	0	0
431	0	0	0	0	0	0	0	0	0	0	0
432	0	0	0	0	0	0	0	0	0	0	0
433	639	0	0	0	0	0	0	0	0	0	0
434	920	0	0	0	0	0	0	0	0	0	0
435	194633	0	69408	0	0	69408	0	0	0	1079676	0
436	4459	0	0	0	0	0	0	0	0	0	0
437	36989	17922	118114	324989	0	76506	29430	0	57351	12468	0
438	12070	19465	0	0	0	0	15367	26907	17175	0	0
439	5409	0	0	0	0	0	61348	0	19171	0	0
# Strata	14	24	24	24	24	24	24	24	24	22	24
Biomass	286787	112306	187522	372968	71321	182410	218168	26907	93813	1260721	0

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 15. continued

SPECIES: Haddock		TABLE: Biomass - kg					EXP. TYPE: 1&2			
Stratum	YEARS	1980	1981	1982	1983	1984	1985	No. Years	Mean Biomass	Stratum
415	0	0	0	0	0	0	0	16	0	415
416	0	0	0	20604	0	0	0	16	9853	416
417	0	0	0	13418	0	0	0	16	1631	417
418	0	0	0	8056	0	8152	0	16	1013	418
419	0	0	0	0	0	0	0	16	0	419
420	23568	54329	184389	531764	161613	70705	0	16	72977	420
421	0	0	0	0	0	0	0	15	0	421
422	0	0	0	48044	0	0	0	16	3003	422
423	0	0	0	0	0	66434	0	16	4152	423
424	0	0	0	0	0	27649	0	15	1735	424
425	0	0	0	0	0	0	0	15	4043	425
426	0	21072	0	17745	406726	363378	0	16	62264	426
427	0	0	0	0	0	0	0	16	0	427
428	0	0	0	0	0	0	0	15	0	428
429	0	0	0	0	0	0	0	15	0	429
431	0	0	0	0	0	0	0	15	0	431
432	0	0	0	0	0	0	0	15	0	432
433	0	0	34411	0	0	15641	0	15	3168	433
434	0	0	0	72000	0	0	0	15	4557	434
435	0	27763	32662	1172220	706697	12076950	0	15	964339	435
436	0	138743	43814	0	0	166492	0	15	22094	436
437	26069	184343	668448	170067	541757	667854	0	15	183269	437
438	0	0	8587	15539	345368	496347	0	15	59802	438
439	0	0	0	36087	306741	0	0	15	26797	439
# Strata	24	24	24	23	24	24				# Strata
Biomass	49637	426250	972311	2105544	2468902	13959602			1424698	Biomass

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 16. Biomass estimates in numbers of southern Gulf haddock (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Haddock		TABLE: Numbers									EXP. TYPE: 1&2
Stratum	YEARS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
415	0	0	0	0	0	0	0	0	0	0	0
416	18180	23774	0	0	35661	0	0	0	0	0	0
417	12672	0	0	0	0	0	0	0	0	0	0
418	0	0	0	0	0	0	0	0	0	0	0
419	0	0	0	0	0	0	0	0	0	0	0
420	0	0	0	23989	0	0	93292	0	0	0	0
421	0	0	0	0	0	0	0	0	0	0	0
422	0	0	0	0	0	0	0	0	0	0	0
423	0	0	0	0	0	0	0	0	0	0	0
424	0	0	0	0	0	0	0	0	218	0	0
425	1287	54744	0	0	0	72992	0	0	0	0	0
426	0	0	0	0	0	0	37462	0	0	120412	0
427	0	0	0	0	0	0	0	0	0	0	0
428	0	0	0	0	0	0	0	0	0	0	0
429	0	0	0	0	0	0	0	0	0	0	0
431	0	0	0	0	0	0	0	0	0	0	0
432	0	0	0	0	0	0	0	0	0	0	0
433	504	0	0	0	0	0	0	0	0	0	0
434	725	0	0	0	0	0	0	0	0	0	0
435	111612	0	34704	0	0	34704	0	0	0	709502	0
436	2305	0	0	0	0	0	0	0	0	0	0
437	41561	17922	269038	152936	0	87840	29430	0	86027	12468	0
438	9794	9732	0	0	0	0	23050	35494	51524	0	0
439	3020	0	0	0	0	0	20449	0	19171	0	0
# Strata	14	24	24	24	24	24	24	24	24	22	24
Numbers	201660	106172	303742	176925	35661	195536	203683	35494	156940	842382	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 16. continued

SPECIES: Haddock		TABLE: Numbers					EXP. TYPE: 1&2		
Stratum	1980	1981	1982	1983	1984	1985	No. Years	Mean Numbers	Stratum
415	0	0	0	0	0	0	16	0	415
416	0	0	0	20604	0	0	16	6139	416
417	0	0	0	13418	0	0	16	1631	417
418	0	0	0	16111	0	8152	16	1516	418
419	0	0	0	0	0	0	16	0	419
420	23568	80670	421460	699690	129627	70705	16	96438	420
421	0	0	0	0	0	0	15	0	421
422	0	0	0	72065	0	0	16	4504	422
423	0	0	0	0	0	66434	16	4152	423
424	0	0	0	0	0	27649	15	1742	424
425	0	0	0	0	0	0	15	8064	425
426	0	21072	0	17745	610089	464524	16	79457	426
427	0	0	0	0	0	0	16	0	427
428	0	0	0	0	0	0	15	0	428
429	0	0	0	0	0	0	15	0	429
431	0	0	0	0	0	0	15	0	431
432	0	0	0	0	0	0	15	0	432
433	0	0	34411	0	0	15641	15	3160	433
434	0	0	0	72000	0	0	15	4545	434
435	0	27763	65325	1665786	595645	7947188	15	699514	435
436	0	46248	43814	0	0	138743	15	14444	436
437	13034	182977	1488467	841024	440962	503994	15	260480	437
438	0	0	8587	31078	353052	459851	15	61385	438
439	0	0	0	18044	242164	0	15	18928	439
# Strata	24	24	24	23	24	24			# Strata
Numbers	36602	358730	2062064	3467565	2371539	9702881		1266099	Numbers

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 17. Biomass estimates in kilograms of southern Gulf herring (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Gulf herring		TABLE: Biomass - kg					EXP. TYPE: 1&2			
Stratum	YEARS		Year							
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
415	0	0	0	0	0	0	0	0	0	0
416	16266	18180	28096	51510	0	0	0	0	0	0
417	38762	11405	1164416	20872	681260	4171150	518813	1605333	0	0
418	243262	16303	6149946	706293	79886	57061	362507	3733130	0	48052
419	230968	24059	543454	18331	1424304	0	942239	157250	866131	63032
420	1395616	1791205	1628630	792315	4026251	38939	6671707	160213	253302	237312
421	1214352	1683551	1432607	1397665	15047	109590	0	649741	224625	263895
422	8388190	15153237	3193836	647223	389471	13961559	1035001	931444	288261	453262
423	2511192	0	379779	0	97902	0	0	0	0	0
424	379596	0	0	0	0	0	0	0	54209	0
425	6410	0	0	0	18248	0	0	0	0	0
426	0	0	0	0	0	0	0	0	0	0
427	0	9916511	0	0	0	0	0	0	0	0
428	515189	0	0	0	0	0	43982	0	75136	0
429	3878873	4961336	422302	0	0	457135	780540	1103866	0	0
431	870965	964745	0	328812	186538	0	4521171	3948973	0	0
432	422809	0	0	323830	0	17437	0	0	60931	3086353
433	4467163	3170692	161932	6873598	0	43013	325995	416898	31646287	0
434	202457	150329	41267	43846	43846	0	41267	0	0	0
435	74430	0	0	38193	210537	0	0	0	0	0
436	9939	100997	0	0	0	0	0	0	0	0
437	8026	43991	0	0	16868	0	0	0	0	0
438	14075	128810	0	0	0	0	0	0	0	0
439	2592	0	0	0	0	0	0	0	0	0
# Strata	13	24	24	24	24	24	24	24	22	24
Biomass	24891131	38135351	15146265	11242488	7190158	18855884	15243122	12706848	33468882	4151906

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 17. continued

SPECIES: Gulf herring		TABLE: Biomass - kg					EXP. TYPE: 1&2		
Stratum	YEARS	1981	1982	1983	1984	1985	No. Years	Mean Biomass	Stratum
415	0	0	0	0	64807	0	16	4050	415
416	0	0	0	0	0	117736	16	14487	416
417	9124	11405	0	13418	0	10862	16	516051	417
418	45649	9510	16167	224665	163032	956457	16	800745	418
419	40521	177198	129574	94821	477334	37578	16	326675	419
420	24878	27988	395119	972037	11052780	8390383	16	2366167	420
421	30177	0	32699	79909	3481273	1008089	15	726451	421
422	1139463	28826	294729	0	2791153	9632059	16	3645482	422
423	77506	0	73427	0	0	136189	16	204750	423
424	0	0	0	0	24011	0	15	28613	424
425	0	0	0	0	0	57625	15	5143	425
426	0	0	0	0	10703	221023	16	14483	426
427	0	0	0	0	0	41319	16	622364	427
428	0	0	0	0	0	0	15	39638	428
429	49125	0	54583	54583	15530488	13031028	15	2520241	429
431	48355	0	48355	135472	0	126550	15	698746	431
432	0	0	1150844	137661	206733	20687	15	339205	432
433	0	217330	0	0	7256476	2762319	15	3583856	433
434	0	0	38974	0	57478	1979334	15	162425	434
435	0	0	0	0	493426	138816	15	59713	435
436	0	0	0	0	16649	0	15	7974	436
437	0	0	20483	0	0	13655	15	6439	437
438	0	0	0	8587	0	29197	15	11292	438
439	0	0	0	0	0	30674	15	2079	439
# Strata	24	24	24	23	24	24			# Strata
Biomass	1464798	472257	2254954	1721153	41626343	38741580			16707070 Biomass

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 18. Biomass estimates in numbers of southern Gulf herring (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Gulf herring		TABLE: Numbers										EXP. TYPE: 1&2
Stratum	YEARS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
415	0	0	0	0	0	0	0	0	0	0	0	
416	48799	18180	56192	51510	0	0	0	0	0	0	0	
417	92433	22810	3633986	31606	2007285	13534136	1583775	5334485	0	0	0	
418	955027	16303	25974479	2407989	243462	152164	1624570	17791512	0	168181	0	
419	2155703	96237	7948022	18331	6556929	0	6589386	610128	3849469	357933	0	
420	9212383	7743231	8814854	3563752	15709224	116818	25258127	1129454	1438392	651164	0	
421	6329323	8306579	10822377	3907110	60187	347828	0	7511007	1837839	3181399	0	
422	36974096	60892084	13865330	2330658	1655250	40939011	3018917	3565431	967734	1620951	0	
423	9347215	0	1154838	0	97902	0	0	0	0	0	0	
424	1527531	0	0	0	0	0	0	0	218477	0	0	
425	20374	0	0	0	72992	0	0	0	0	0	0	
426	0	0	0	0	0	0	0	0	0	0	0	
427	0	29749533	0	0	0	0	0	0	0	0	0	
428	1958172	0	0	0	0	0	117019	0	292350	0	0	
429	18635270	19175460	1318616	0	0	1350935	2112371	3427185	0	0	0	
431	2796976	3510758	0	1260448	573314	0	12227713	11782446	0	0	0	
432	5229142	0	0	1469692	0	52311	0	0	616736	32397991	0	
433	27534930	16664565	485797	81822668	0	129040	5397032	2954018	149112626	0	0	
434	856762	526152	82534	43846	43846	0	41267	0	0	0	0	
435	260952	0	0	117516	522872	0	0	0	0	0	0	
436	12606	100997	0	0	0	0	0	0	0	0	0	
437	13046	87982	0	0	16868	0	0	0	0	0	0	
438	41270	343493	0	0	0	0	0	0	0	0	0	
439	4319	0	0	0	0	0	0	0	0	0	0	
# Strata	13	24	24	24	24	24	24	24	24	22	24	
Biomass	124006329	147254364	74157025	97025126	27560131	56622243	57970177	54105666	158333623	38377619	0	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 18. continued

SPECIES: Gulf herring		TABLE: Numbers					EXP. TYPE: 1&2		
Stratum	YEARS 1980	1981	1982	1983	1984	1985	No. Years	Mean Numbers	Stratum
415	0	0	0	0	64807	0	16	4050	415
416	0	0	0	0	0	353209	16	32993	416
417	27372	45620	0	26835	0	10862	16	1646950	417
418	145506	9510	16167	1300551	639087	3689968	16	3445905	418
419	101302	690460	474265	407591	3587705	75156	16	2094914	419
420	99511	111950	1422428	5049385	44097487	30144099	16	9660141	420
421	622596	0	96230	561870	13855578	14678209	15	4507383	421
422	5188953	86478	989480	0	10733831	38102500	16	13808169	422
423	232518	0	73427	0	0	202623	16	694283	423
424	0	0	0	0	24011	0	15	110626	424
425	0	0	0	0	0	144064	15	14839	425
426	0	0	0	0	21407	591893	16	38331	426
427	0	0	0	0	0	41319	16	1861928	427
428	0	0	0	0	0	0	15	147971	428
429	196500	0	109166	54583	69994569	58381072	15	10922233	429
431	48355	0	48355	219567	0	126550	15	2037155	431
432	0	0	18701208	1183882	915407	371291	15	3808604	432
433	0	5723027	0	0	22250642	8803200	15	20054847	433
434	0	0	38974	0	208044	8142830	15	624016	434
435	0	0	0	0	1757909	381743	15	190062	435
436	0	0	0	0	33298	0	15	9181	436
437	0	0	20483	0	0	13655	15	9502	437
438	0	0	0	8587	0	87591	15	30059	438
439	0	0	0	0	0	46011	15	3146	439
# Strata	24	24	24	23	24	24			# Strata
Biomass	6662613	6667045	21990183	8812851	168183782	164387845		75757289	Biomass

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.



TABLE 19. Biomass estimates in kilograms of southern Gulf redfish (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES: Redfish		TABLE: Biomass - kg										EXP. TYPE: 1&2
Stratum	YEARS											
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979		
415	12340383	6306963	34730852	31689272	35377811	8637994	8992575	48597282	27840867	47046111		
416	593079	2536095	492776	991562	927175	0	94960	2266427	153572	16266		
417	12672	0	0	0	0	0	0	11405	0	0		
418	0	0	0	0	0	0	0	0	0	0		
419	0	0	22644	0	0	0	0	0	0	0		
420	0	0	0	0	0	0	0	0	0	0		
421	0	0	0	0	0	0	0	0	0	0		
422	0	0	0	0	0	0	18016	0	0	27717		
423	0	0	0	0	0	0	0	0	0	0		
424	0	0	0	0	93580	0	0	0	6569	0		
425	4157527	8093010	9089266	17974045	10784597	7043747	3050031	3799888	2763276	1227082		
426	0	0	0	0	1371671	22477	37462	19833	178494	0		
427	0	0	0	0	0	0	0	0	0	0		
428	0	0	0	0	21941	0	0	0	1189	0		
429	0	0	0	0	0	0	0	0	0	0		
431	0	0	0	0	0	0	0	0	0	0		
432	0	0	0	0	0	0	0	0	0	0		
433	0	0	0	0	0	0	0	0	0	0		
434	2062	0	0	0	0	38974	0	0	0	0		
435	0	0	0	0	0	0	0	0	0	0		
436	7751	0	55497	0	0	0	0	0	0	0		
437	41501	63108	45482	50979	19117	689847	14338	15092	129040	13034		
438	63244	38929	10427	0	29979	0	15794	8587	8587	0		
439	2796560	13817379	1569792	1653363	1610390	4418531	43820	6764735	1399506	9474012		
# Strata	13	24	24	24	24	24	24	24	22	24		
Biomass	20014780	30855484	46016736	52359221	50236261	20851570	12266996	61483249	32481099	57804222		

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 19. continued

SPECIES: Redfish		TABLE: Biomass - kg					EXP. TYPE: 1&2			
Stratum	YEARE	1980	1981	1982	1983	1984	1985	No. Years	Mean Biomass	Stratum
415	9461053	20323426	4295471	11500660	7683637	20259974	16	20880271	415	
416	76293	82416	64848	1338168	3848511	45700	16	845491	416	
417	0	0	17890	0	8295	14256	16	4032	417	
418	0	0	0	0	0	0	16	0	418	
419	0	0	0	0	0	0	16	1415	419	
420	0	0	0	0	0	0	16	0	420	
421	0	0	0	0	0	0	15	0	421	
422	0	0	0	0	0	0	16	2858	422	
423	0	0	0	0	0	0	16	0	423	
424	0	0	0	0	0	27649	15	7987	424	
425	17811974	27328082	5816565	17385588	5937099	19060916	15	10082668	425	
426	1217502	856934	41208	0	1626904	492620	16	366569	426	
427	0	0	91820	0	525876	0	16	38606	427	
428	0	0	0	0	0	0	15	1446	428	
429	0	0	0	0	0	0	15	0	429	
431	0	0	0	0	0	0	15	0	431	
432	0	0	0	0	0	0	15	0	432	
433	0	0	0	0	0	0	15	0	433	
434	0	0	38974	0	0	0	15	5001	434	
435	0	0	0	0	0	0	15	0	435	
436	0	0	43814	41623	126851	25226	15	18798	436	
437	0	42331	165369	68689	75535	176894	15	100647	437	
438	0	12165	1064827	22491	660771	518245	15	153378	438	
439	13226953	20656902	7185147	5034161	6194016	12668404	15	6782104	439	
# Strata	24	24	24	23	24	24			# Strata	
Biomass	40793775	69302256	18825933	35391380	26687495	53289884		39291271	Biomass	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 20. Biomass estimates in numbers of southern Gulf redfish (NAFO division 4T) as derived from September surveys on the RV E.E.Prince.

SPECIES:	TABLE: Numbers										EXP. TYPE: 1&2
	YEARS										
Stratum	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	
415	33350277	13756859	59841273	56213542	64595021	17508147	20761382	75753622	38173180	79549231	
416	1826920	5770097	1356422	2240672	2674542	0	170468	5357009	258489	16266	
417	12672	0	0	0	0	0	0	11405	0	0	
418	0	0	0	0	0	0	0	0	0	0	
419	0	0	22644	0	0	0	0	0	0	0	
420	0	0	0	0	0	0	0	0	0	0	
421	0	0	0	0	0	0	0	0	0	0	
422	0	0	0	0	0	0	18016	0	0	27717	
423	0	0	0	0	0	0	0	0	0	0	
424	0	0	0	0	280739	0	0	0	4613	0	
425	13075183	19644024	17101028	34070180	30641080	17007181	5044282	7148941	4882656	2699920	
426	0	0	0	0	6230153	2135311	18731	19833	198326	0	
427	0	0	0	0	0	0	0	0	0	0	
428	0	0	0	0	32912	0	0	0	452	0	
429	0	0	0	0	0	0	0	0	0	0	
431	0	0	0	0	0	0	0	0	0	0	
432	0	0	0	0	0	0	0	0	0	0	
433	0	0	0	0	0	0	0	0	0	0	
434	2877	0	0	0	0	38974	0	0	0	0	
435	0	0	0	0	0	0	0	0	0	0	
436	26247	0	166492	0	0	0	0	0	0	0	
437	357560	375932	190008	1644062	38234	3213783	57351	15092	1003643	13034	
438	348558	379559	20855	0	78206	0	70004	8587	25762	0	
439	87099343	74110031	17009090	8714104	20623910	15935926	43820	14578414	1216313	17806767	
# Strata	13	24	24	24	24	24	24	24	22	24	
Numbers	136099636	114036502	95727812	102882560	125194797	55839322	26184054	102892903	45763434	100112935	

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

TABLE 20. continued

SPECIES: Redfish		TABLE: Numbers					EXP. TYPE: 1&2		
Stratum	YEARS 1980	1981	1982	1983	1984	1985	No. Years	Mean Numbers	Stratum
415	16587633	30471573	8464488	22285262	14768200	34946505	16	36690387	415
416	117237	494493	288021	2471381	6633714	234698	16	1869402	416
417	0	0	17890	0	8295	14256	16	4032	417
418	0	0	0	0	0	0	16	0	418
419	0	0	0	0	0	0	16	1415	419
420	0	0	0	0	0	0	16	0	420
421	0	0	0	0	0	0	15	0	421
422	0	0	0	0	0	0	16	2858	422
423	0	0	0	0	0	0	16	0	423
424	0	0	0	0	0	55297	15	21291	424
425	55432473	58317179	11530486	31761209	9549492	49466182	15	22960718	425
426	1798157	2369446	198546	0	5009151	2671012	16	1290542	426
427	0	0	229549	0	826376	0	16	65995	427
428	0	0	0	0	0	0	15	2085	428
429	0	0	0	0	0	0	15	0	429
431	0	0	0	0	0	0	15	0	431
432	0	0	0	0	0	0	15	0	432
433	0	0	0	0	0	0	15	0	433
434	0	0	38974	0	0	0	15	5052	434
435	0	0	0	0	0	0	15	0	435
436	0	0	43814	332983	142707	25226	15	46092	436
437	0	70323	825409	660612	722253	859024	15	627895	437
438	0	72992	3761245	577395	1851697	2598522	15	612086	438
439	24685634	58317881	14507045	16185099	11135954	23481024	15	36941597	439
# Strata	24	24	24	23	24	24			# Strata
Numbers	98621134	150113887	39905467	74273941	50647839	114351746		101141448	Numbers

NOTE: 1: 1970 strata 425, 429 to 439 missing  
 2: 1978 strata 424 and 428 missing  
 3: 1983 strata 421 missing

Missing stratum values have been interpolated by taking the mean of that stratum in the remaining years for which data are available multiplied by the percentage of the total of that years sampled strata over the 16 year total of the means of the same strata.

Figure 1. Stratification scheme used for the southern Gulf of St. Lawrence research surveys carried out in September of each year on the RV E.E. Prince.

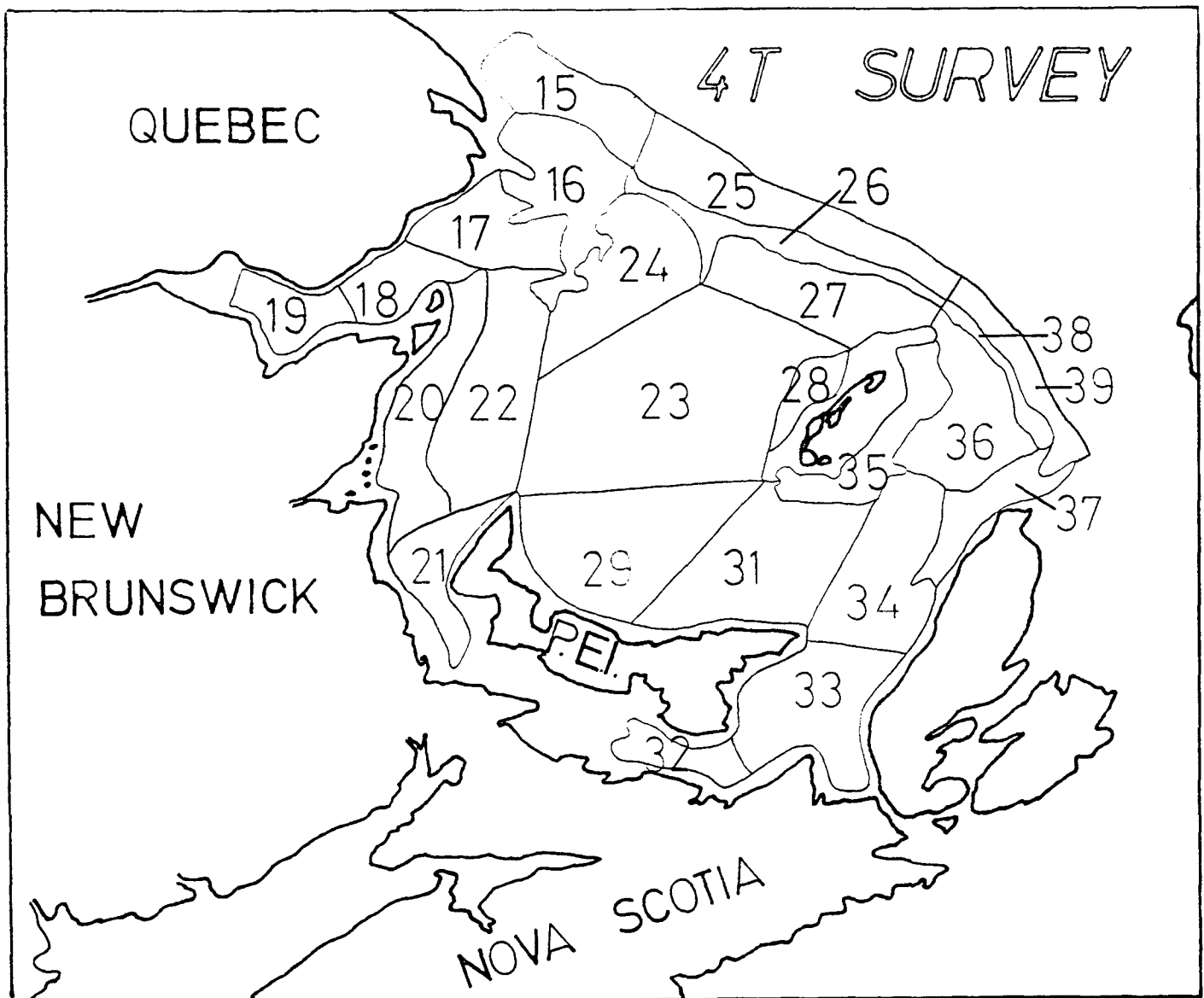


Figure 2. Population biomass in numbers and weight of Atlantic cod as estimated from September surveys in the southern Gulf of St. Lawrence.

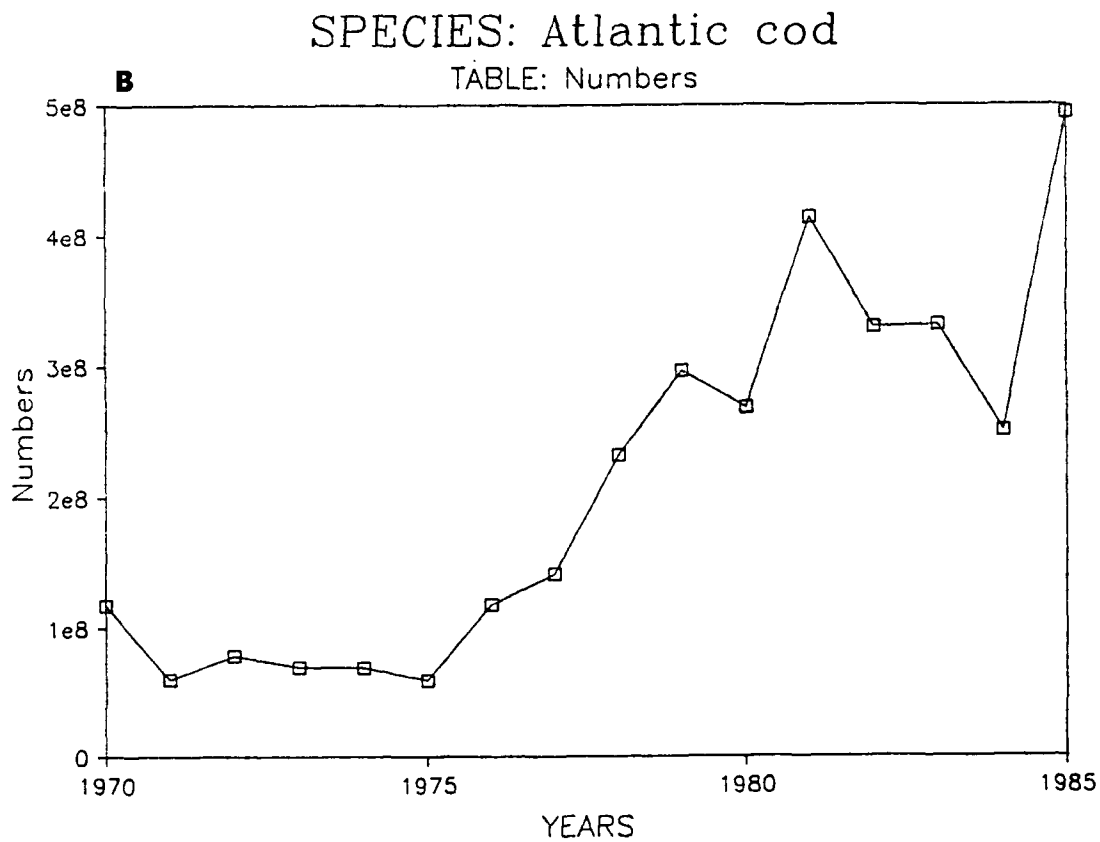
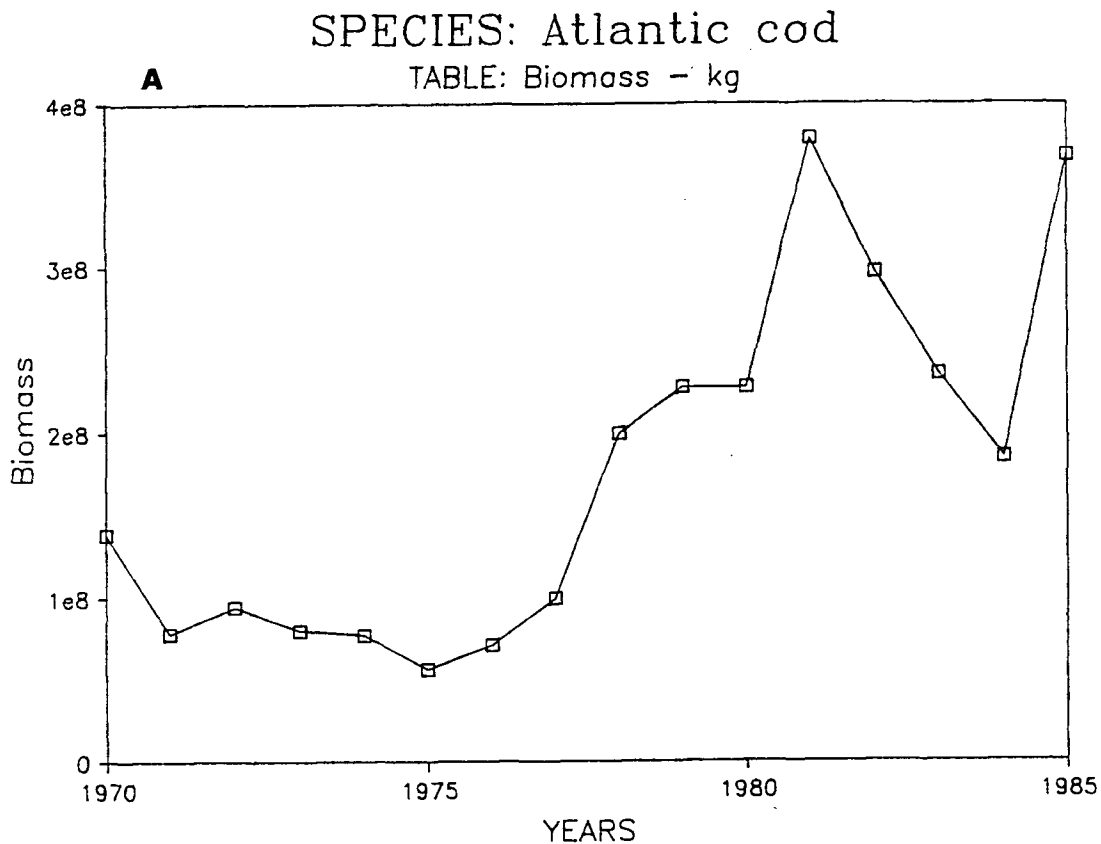


Figure 3. Distribution of Atlantic cod in September as determined from 16 years of research surveys on the RV E.E. Prince. The dark outlined strata represent over 50% of the biomass and the total stippled area over 75% of the biomass.

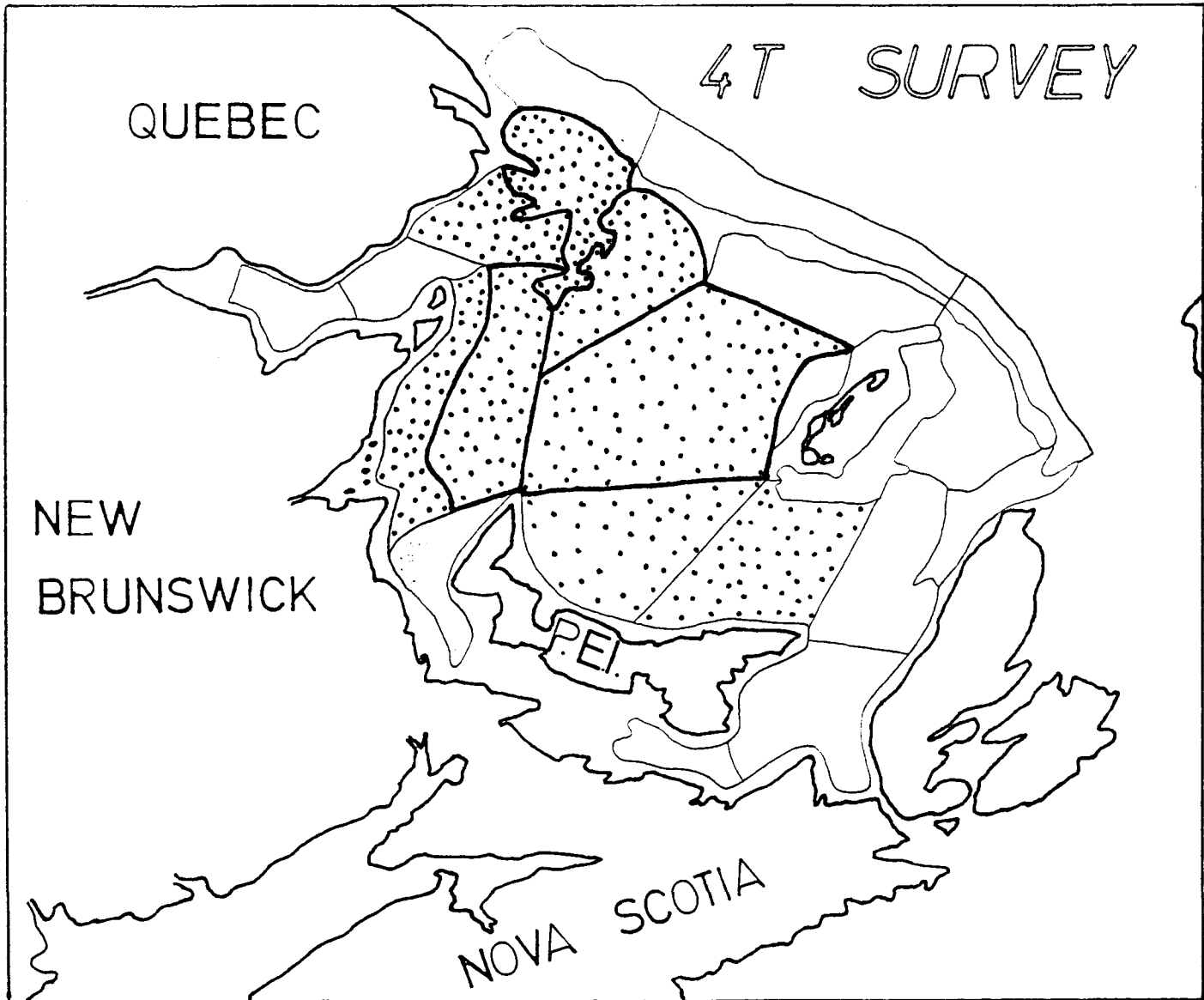
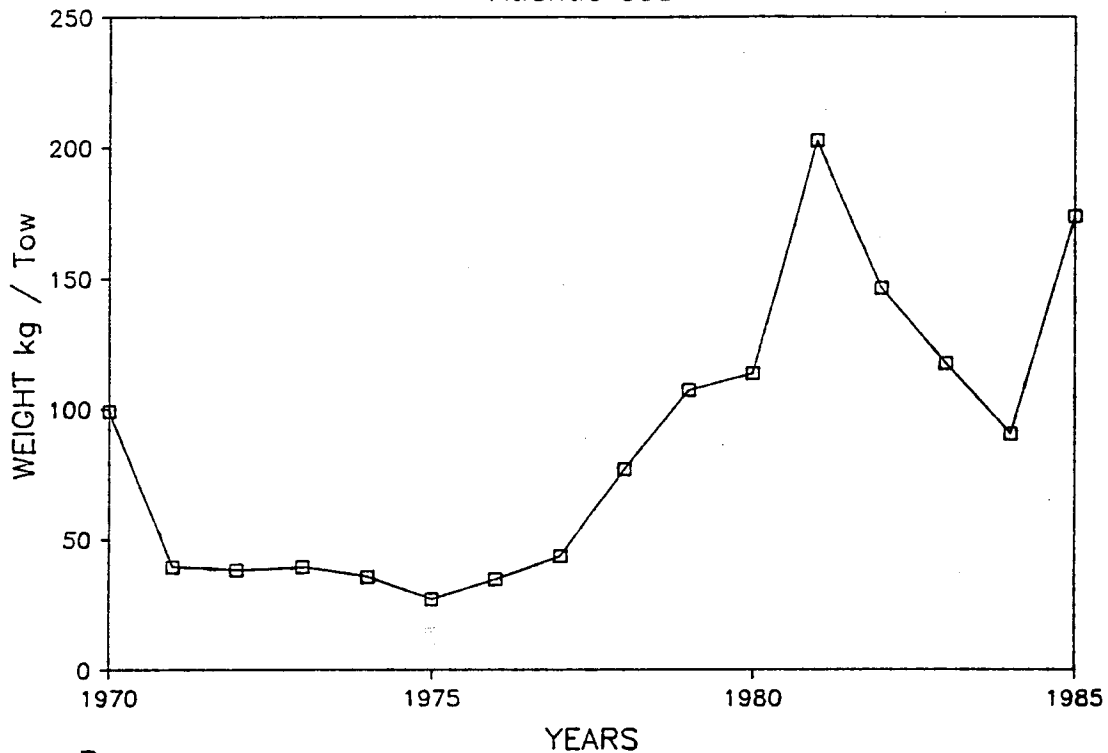


Figure 4. Catch per unit effort in weight and numbers per tow of Atlantic cod derived from the September research surveys of the southern Gulf of St. Lawrence on the RV E.E. Prince.

**A**

### Research Vessel CATCH PER UNIT EFFORT

Atlantic cod

**B**

### Research Vessel CATCH PER UNIT EFFORT

Atlantic cod

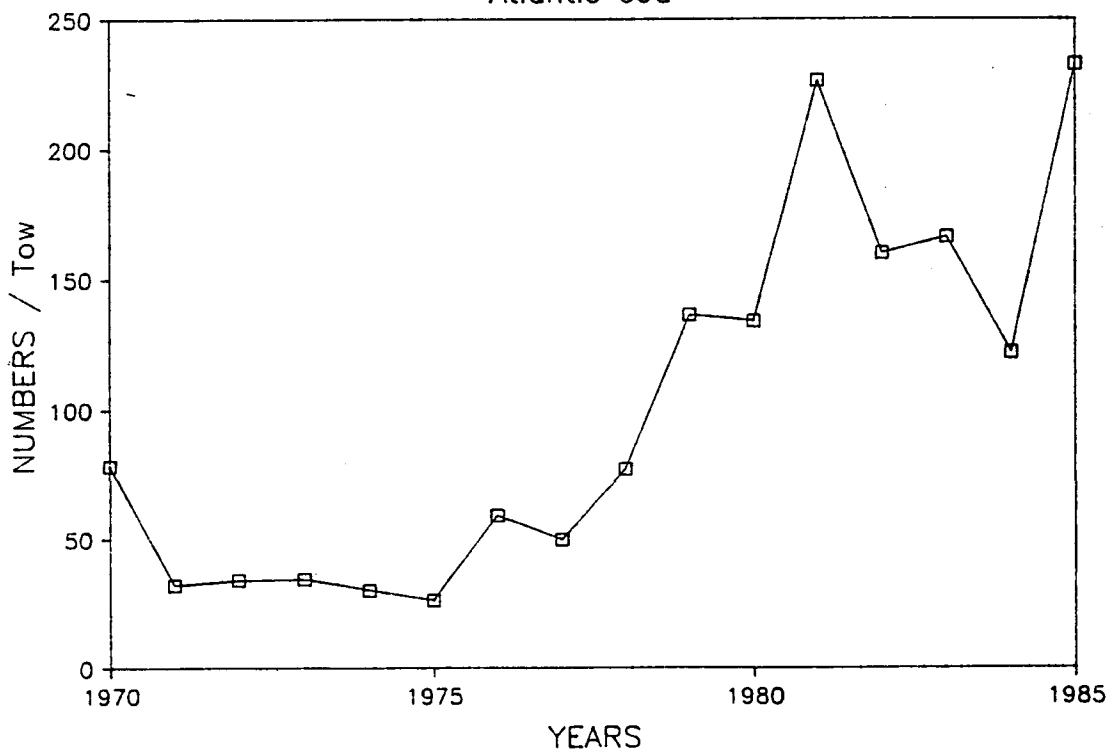




Figure 5. Weight at age of Atlantic cod in September as calculated from data collected over 16 years in the southern Gulf of St. Lawrence on the RV E.E. Prince.

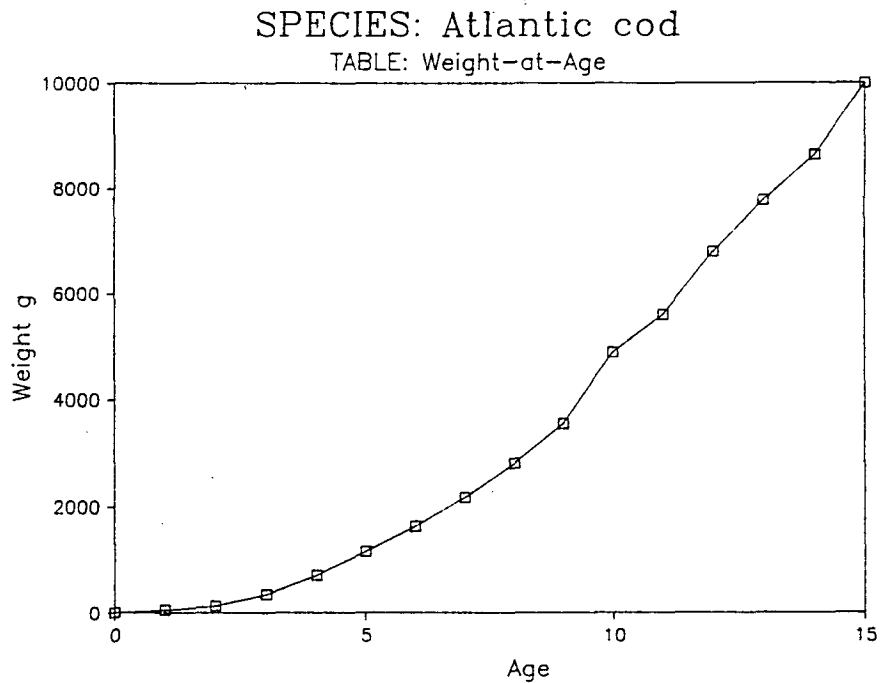


Figure 6. Atlantic cod population composition (%) in September for 1983 to 1985 from research surveys in the southern Gulf of St. Lawrence on the RV E.E. Prince.

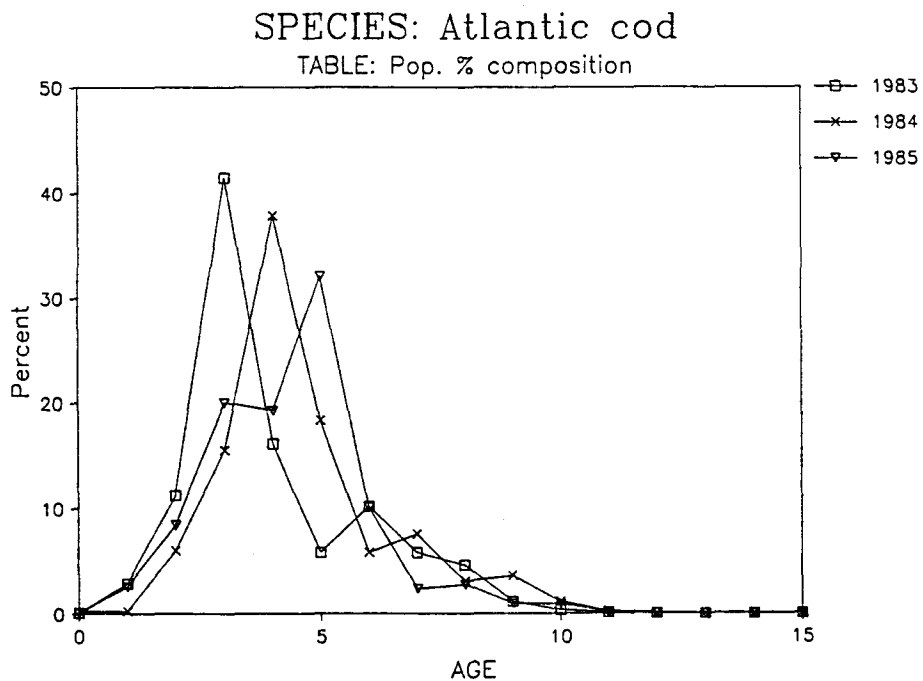


Figure 7. Population biomass in numbers and weight of white hake as estimated from September surveys in the southern Gulf of St. Lawrence.

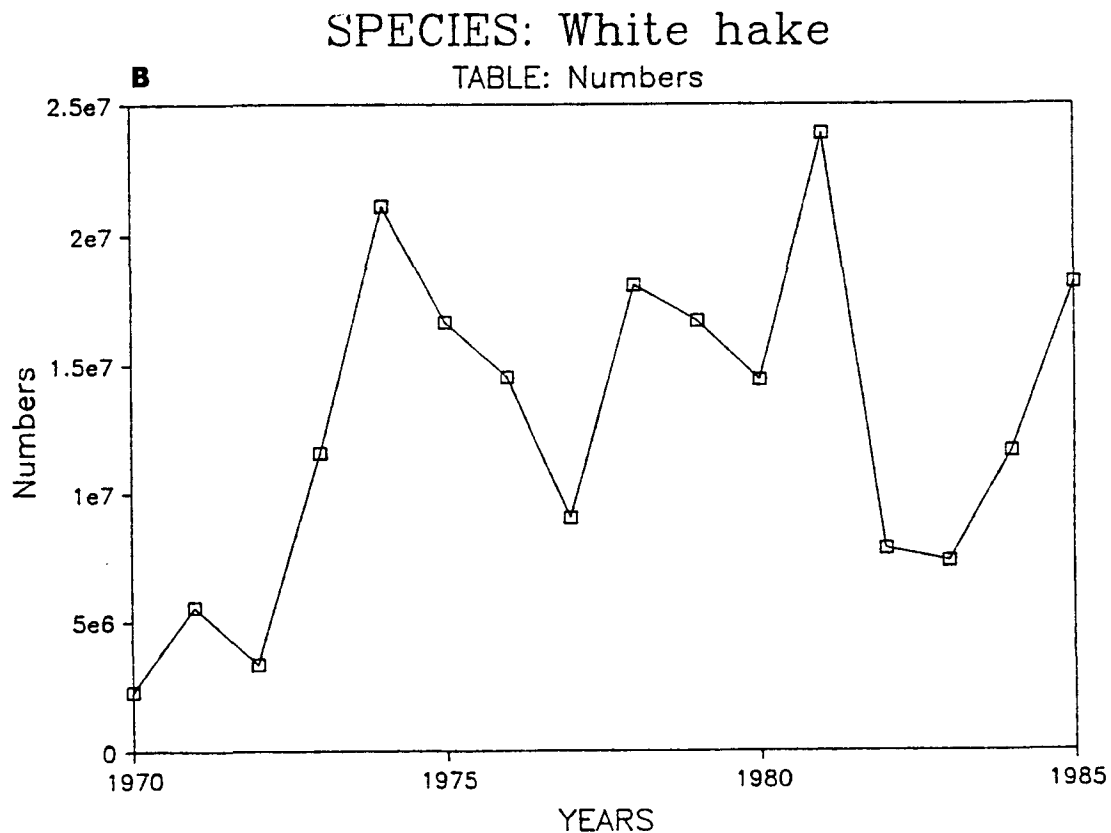
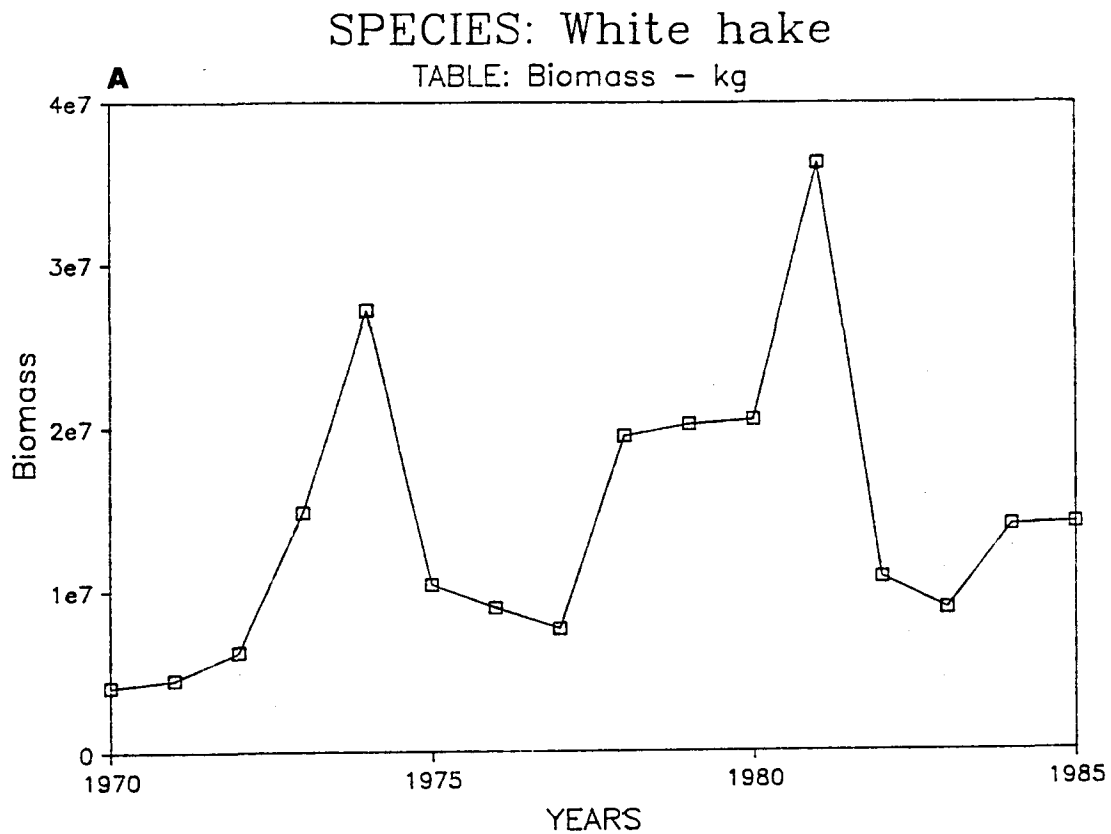


Figure 8. Distribution of white hake in September as determined from 16 years of research surveys on the RV E.E. Prince. The dark outlined strata represent over 50% of the biomass and the total stippled area over 75% of the biomass.

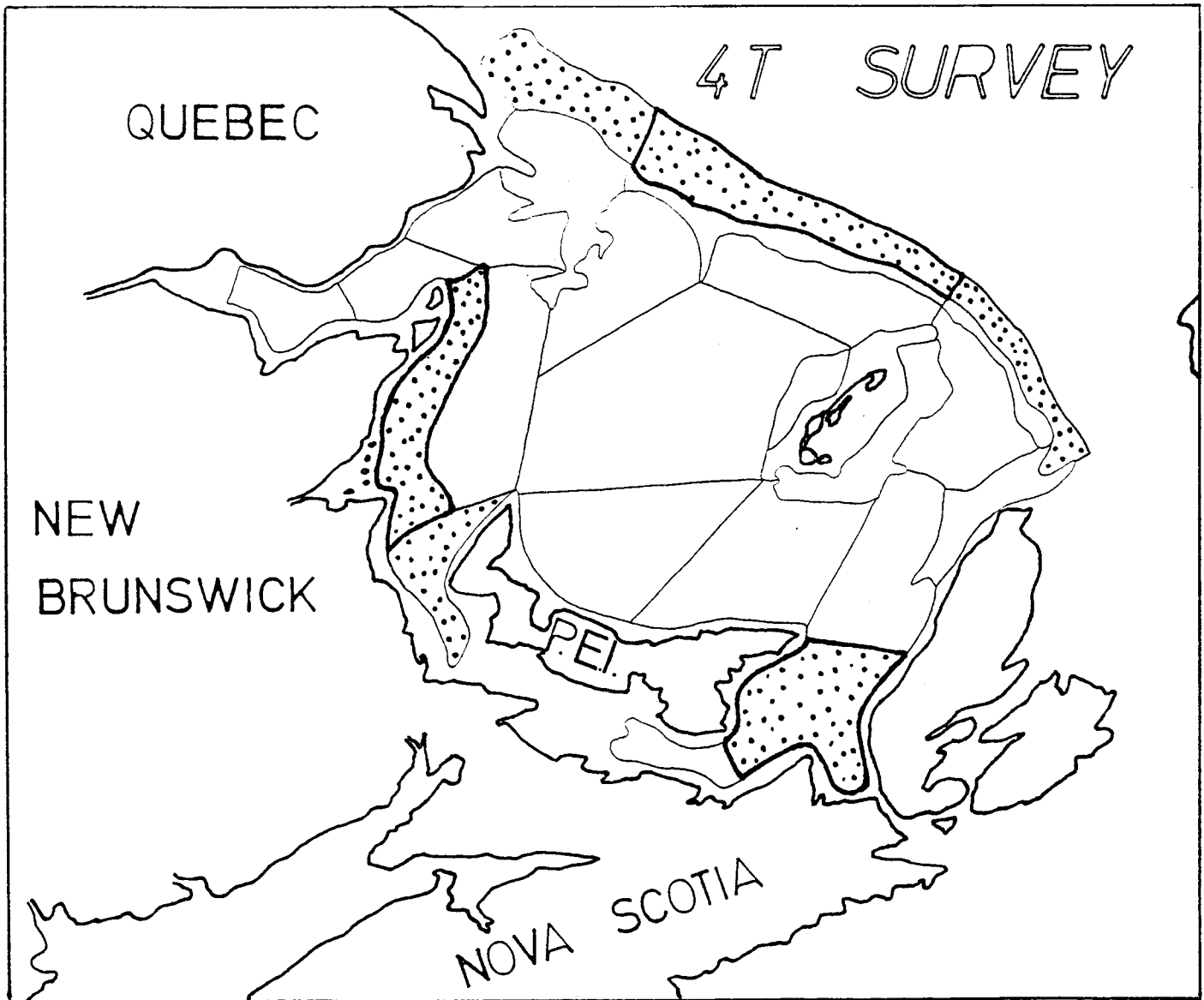
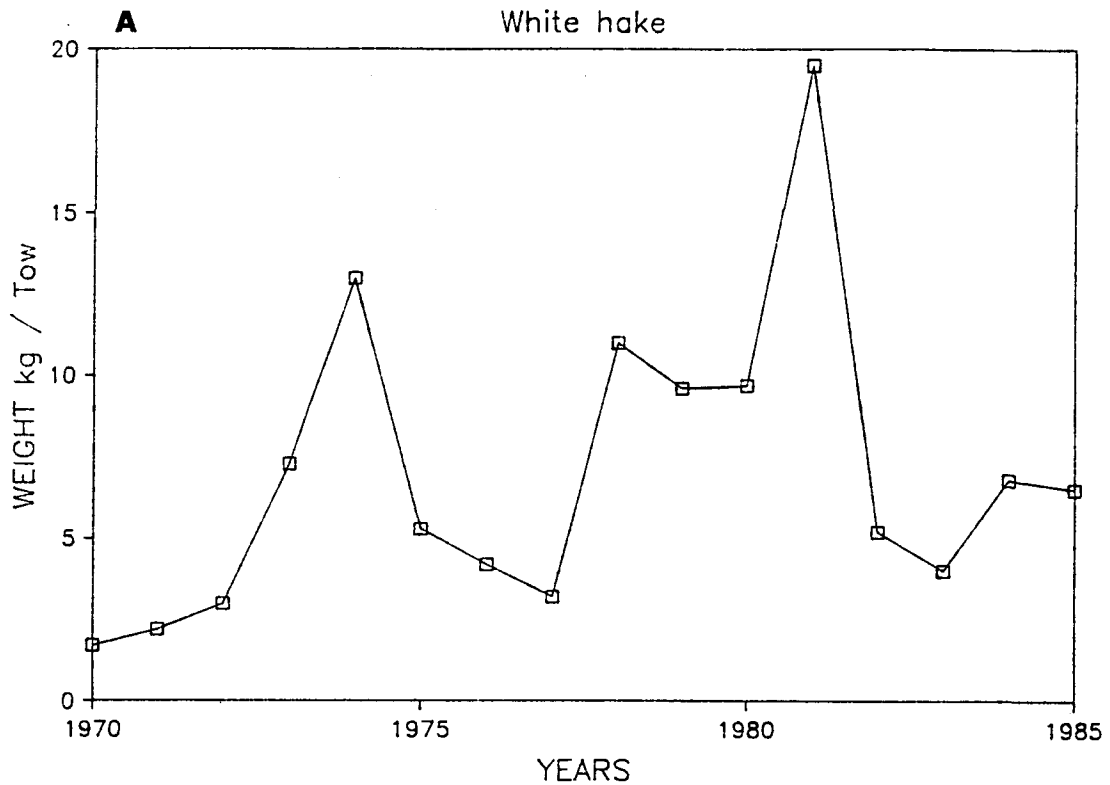


Figure 9. Catch per unit effort in weight and numbers per tow of white hake derived from the September research surveys of the southern Gulf of St. Lawrence on the RV E.E. Prince.

## Research Vessel CATCH PER UNIT EFFORT



## Research Vessel CATCH PER UNIT EFFORT

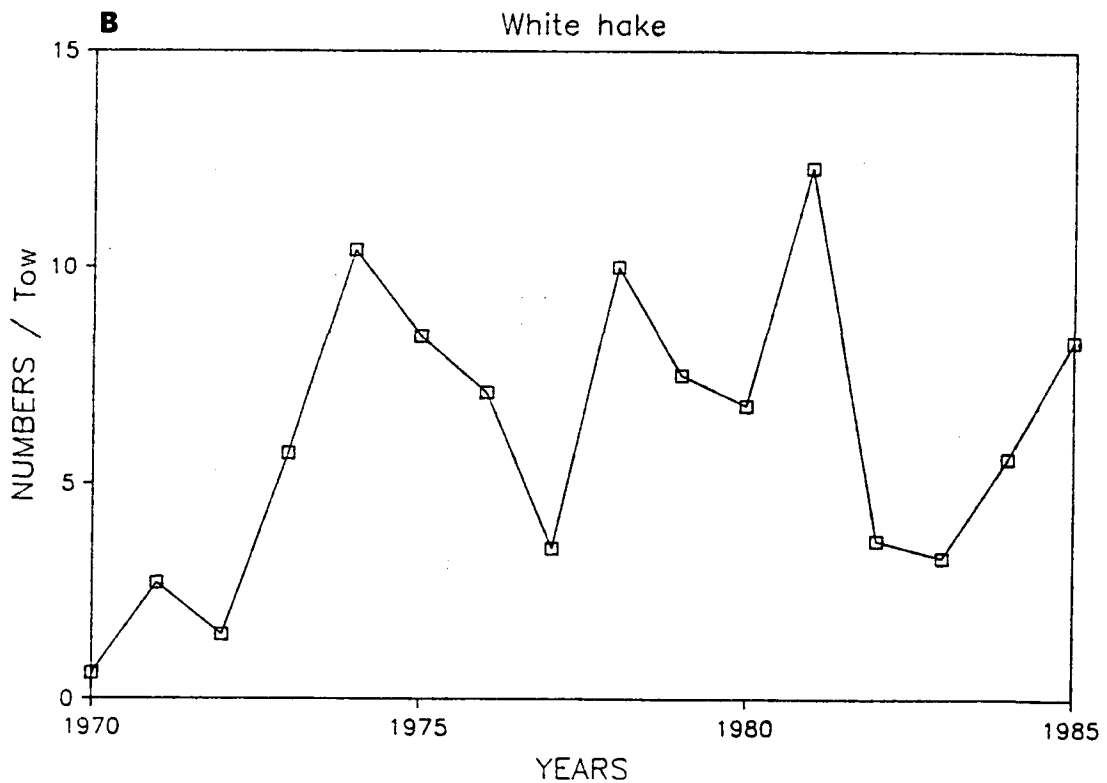


Figure 10. Weight at age of white hake in September as calculated from data collected over 16 years in the southern Gulf of St. Lawrence on the RV E.E. Prince.

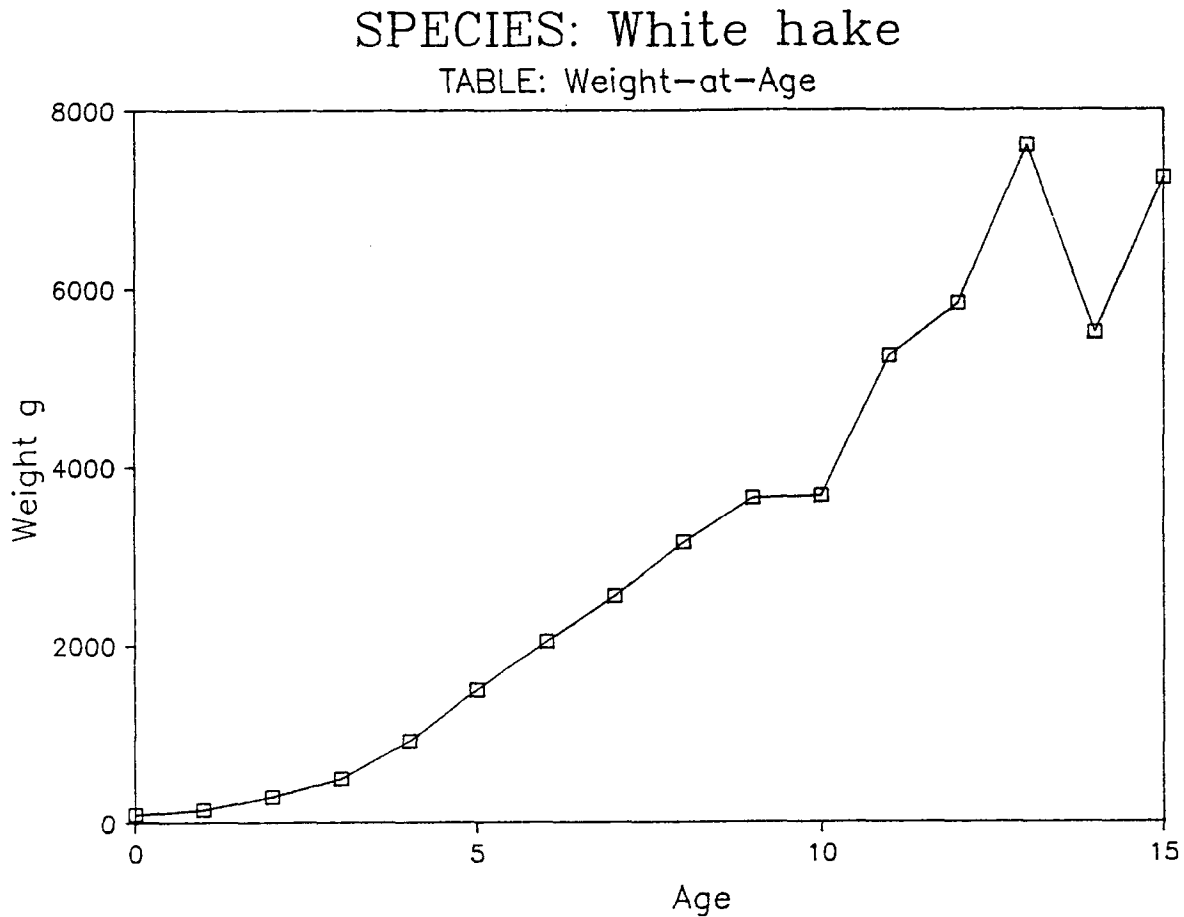


Figure 11. White hake population composition (%) in September for 1974 to 1979 from research surveys in the southern Gulf of St. Lawrence on the RV E.E. Prince.

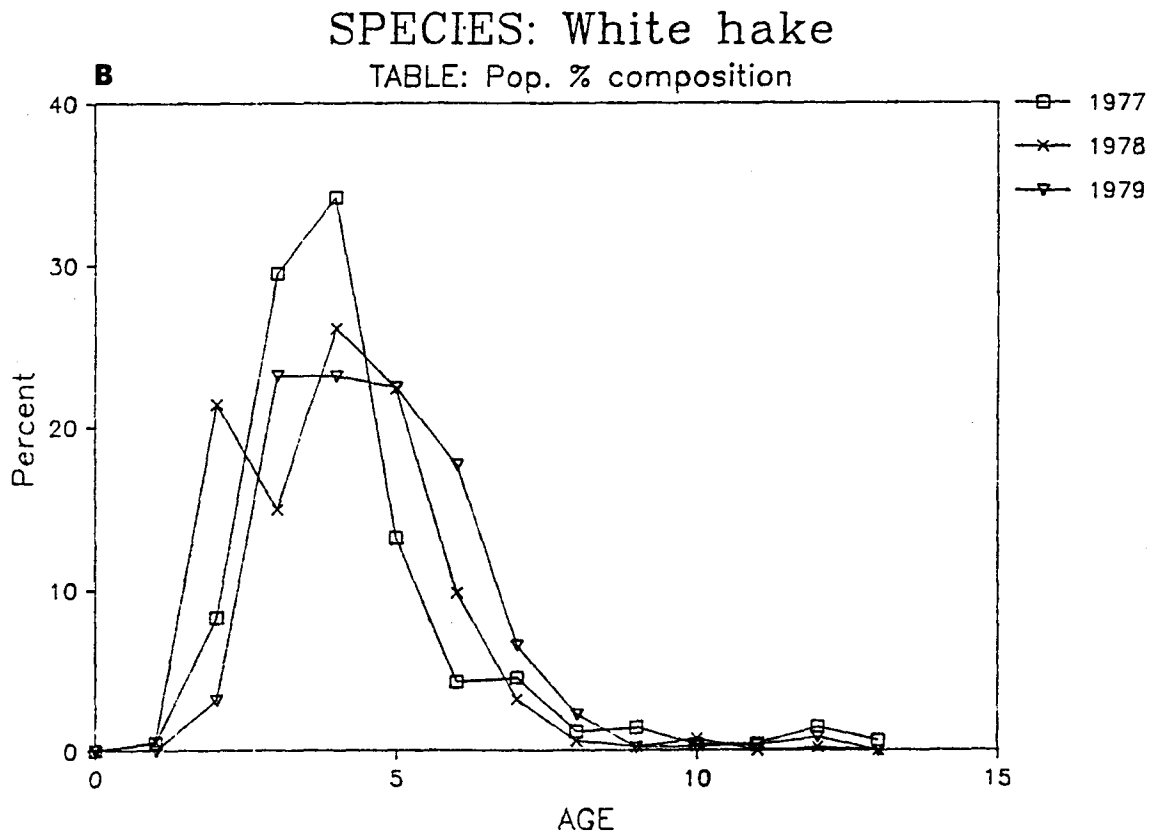
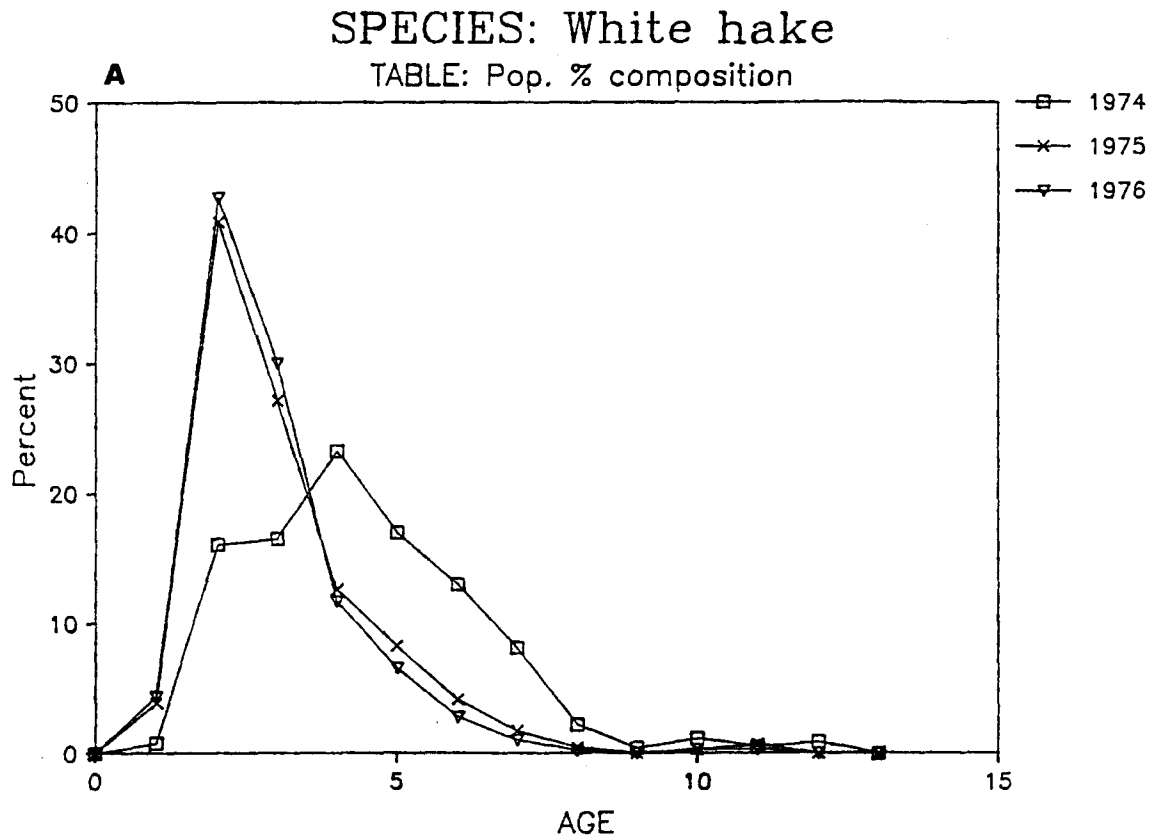


Figure 12. White hake population composition (%) in September for 1980 to 1985 from research surveys in the southern Gulf of St. Lawrence on the RV E.E. Prince.

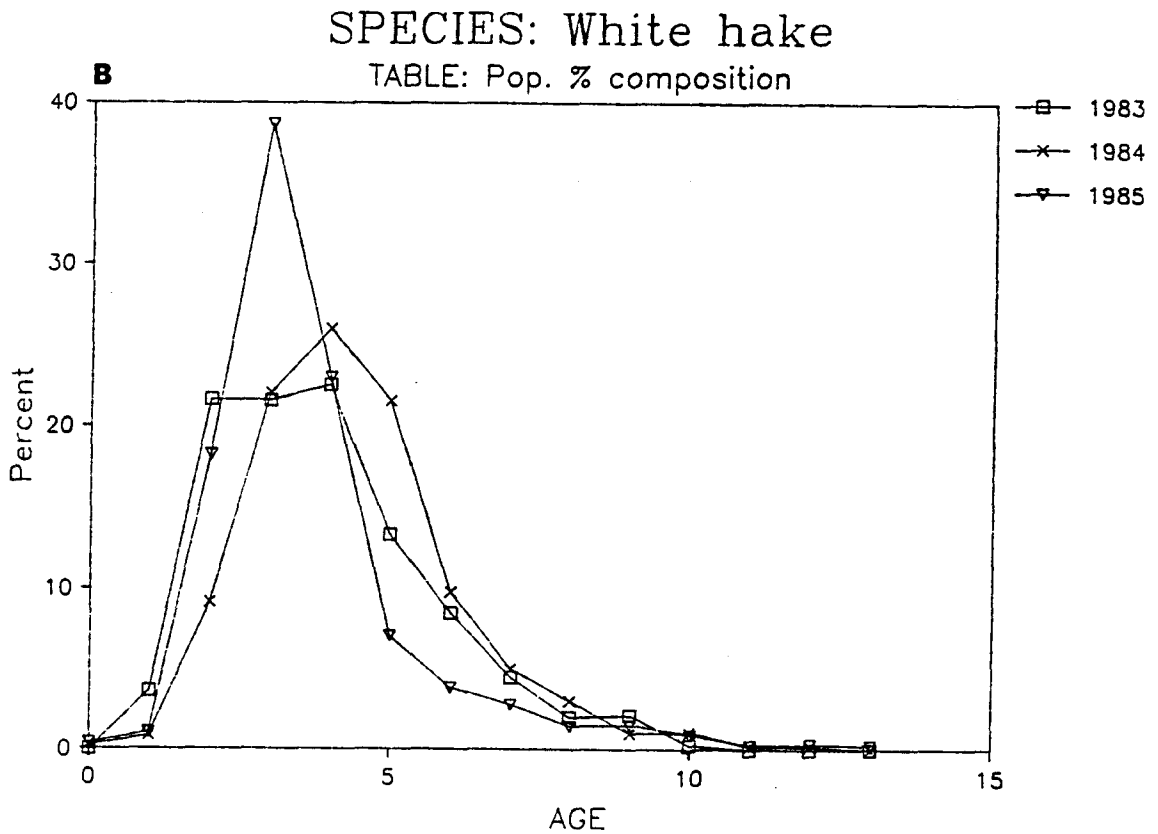
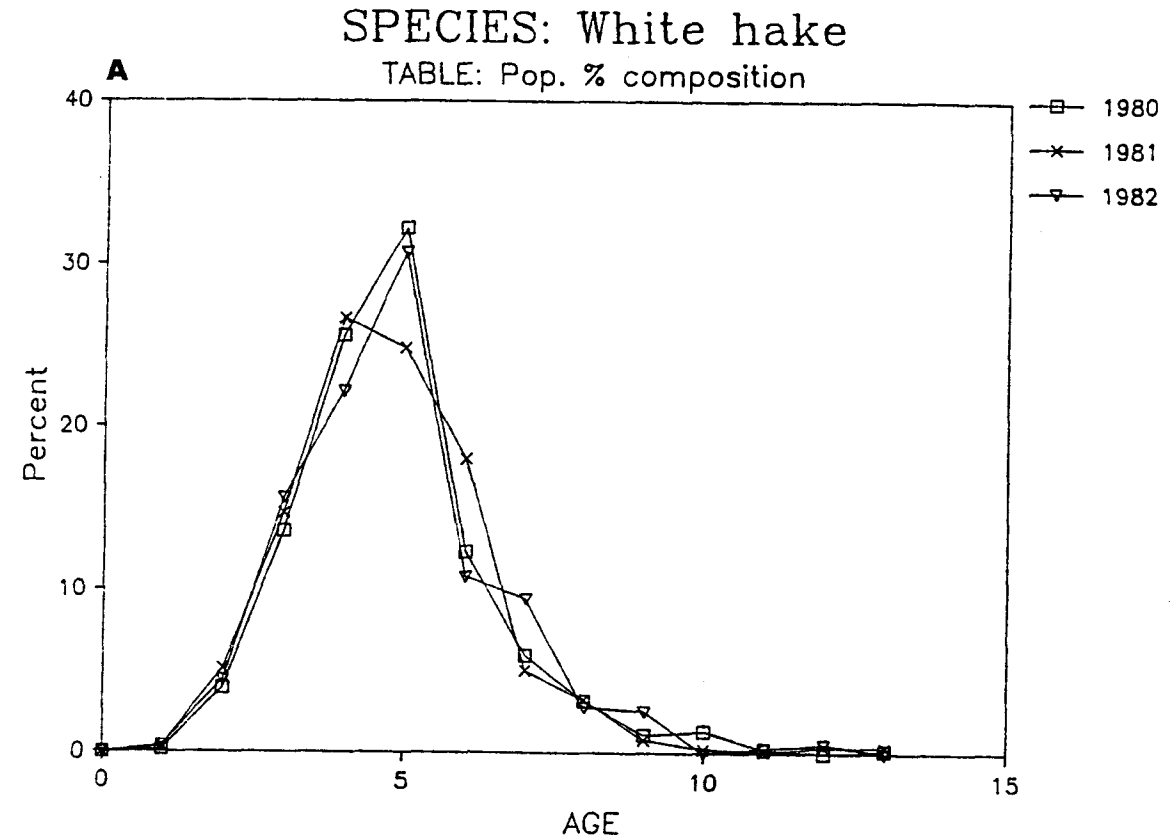


Figure 13. Population biomass in numbers and weight of American plaice as estimated from September surveys in the southern Gulf of St. Lawrence.

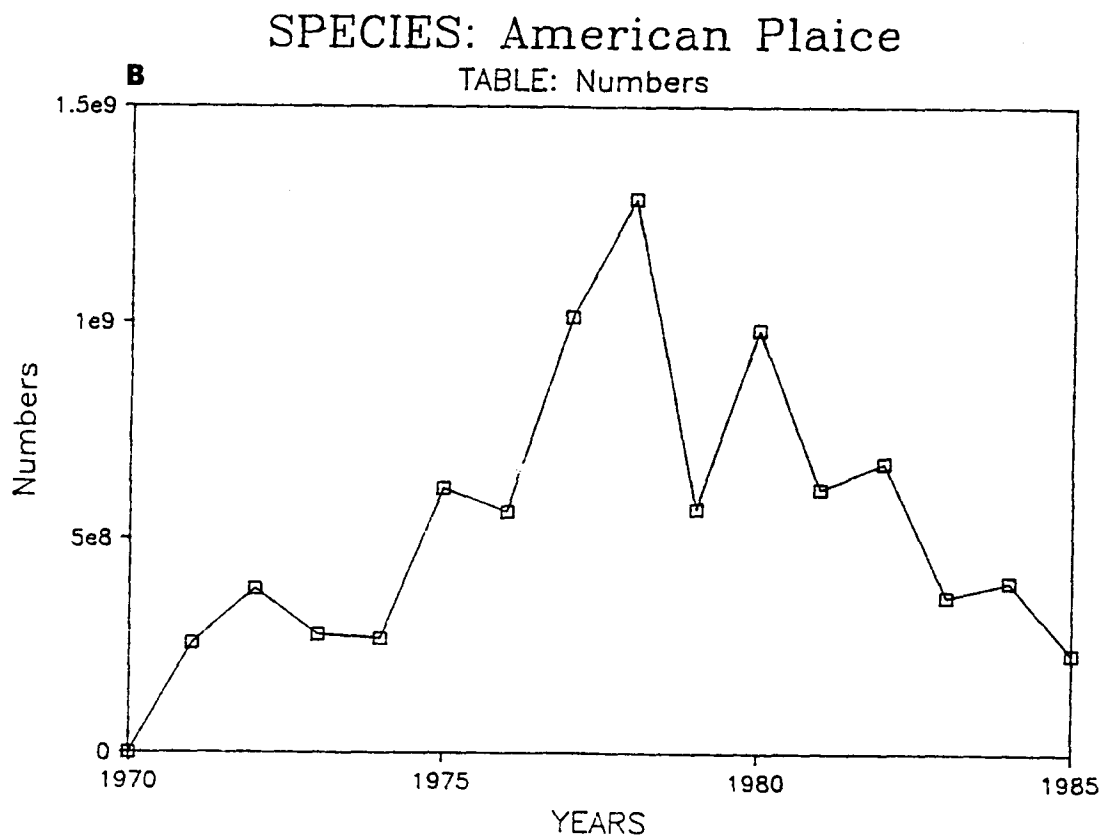
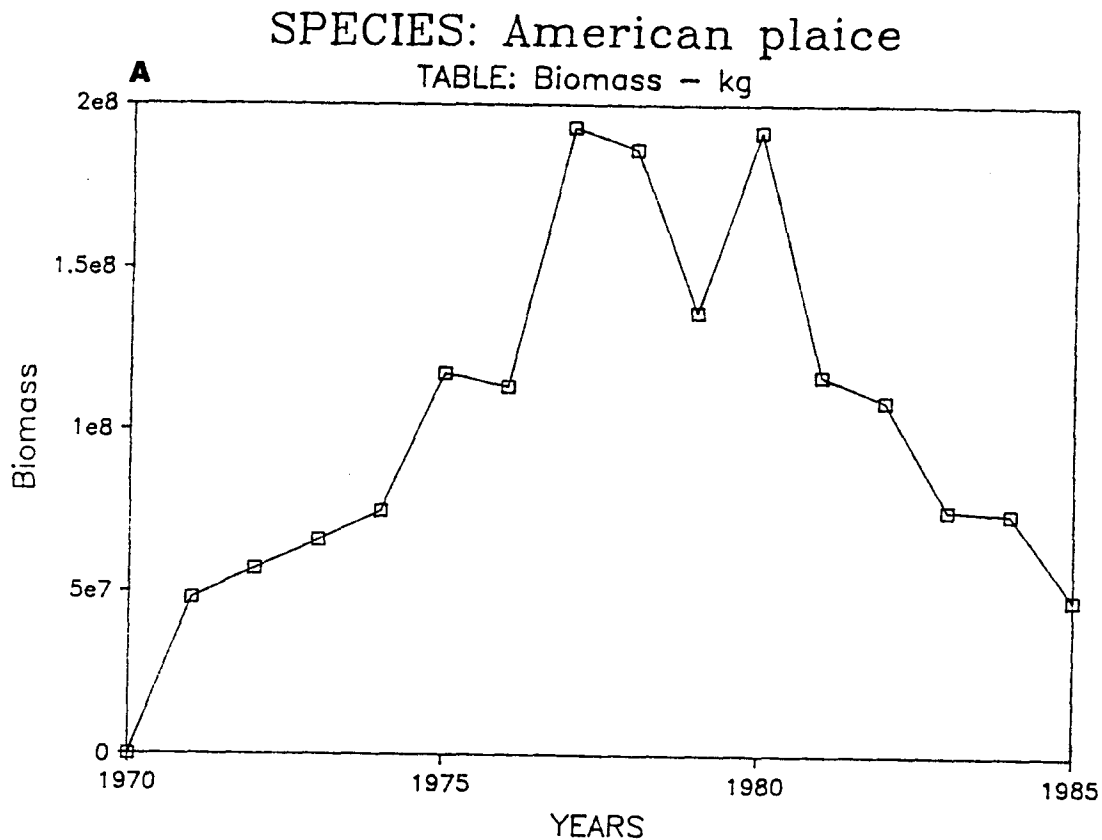




Figure 14. Distribution of American plaice in September as determined from 16 years of research surveys on the RV E.E. Prince. The dark outlined strata represent over 50% of the biomass and the total stippled area over 75% of the biomass.

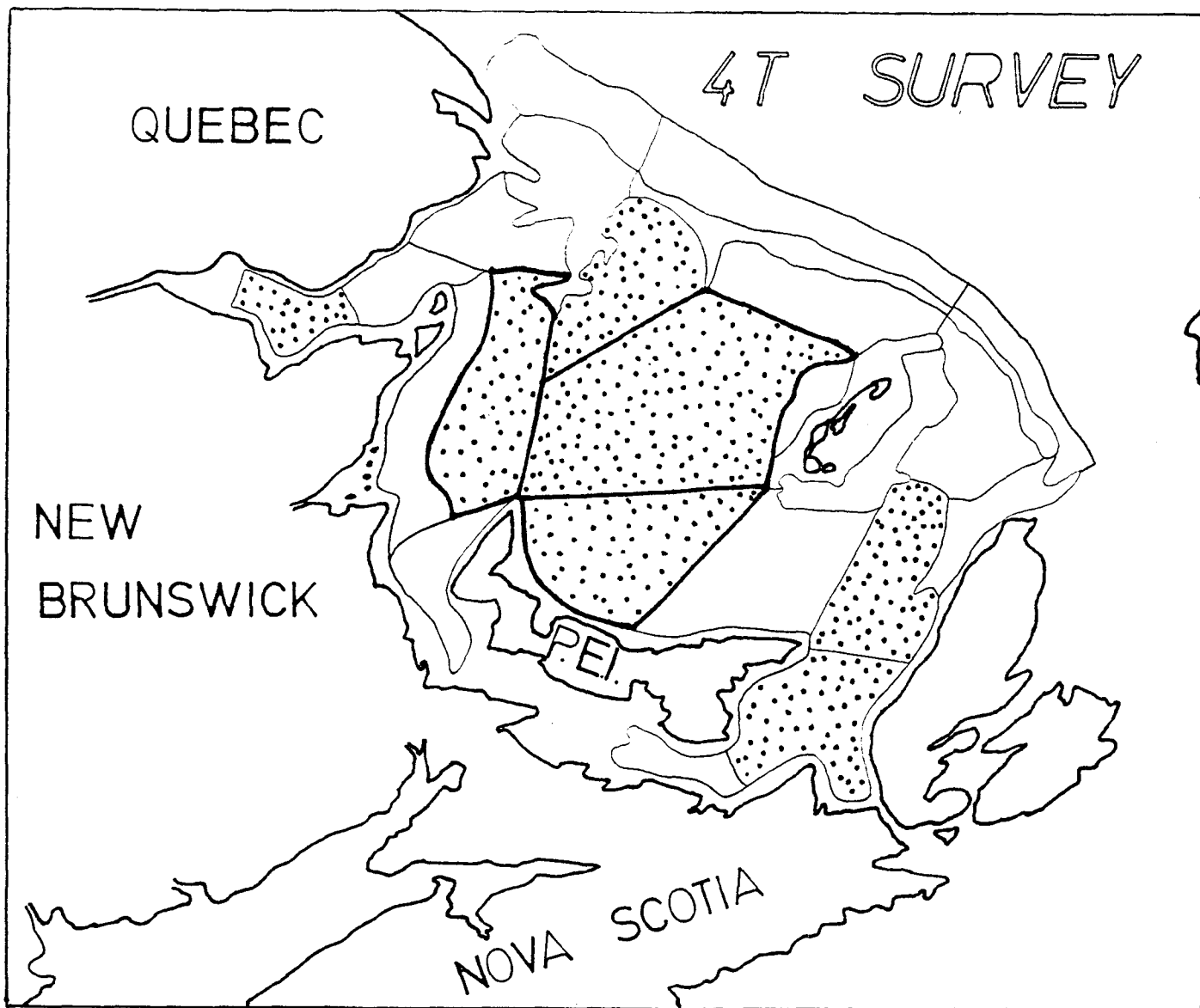
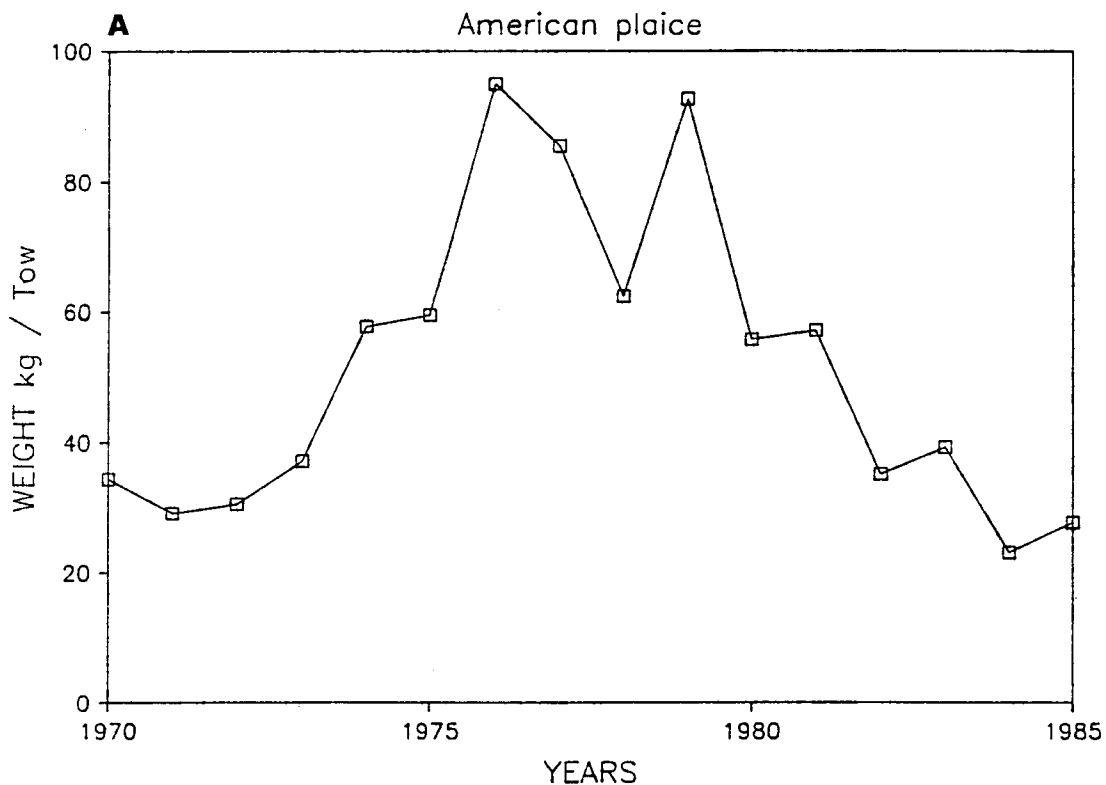


Figure 15. Catch per unit effort in weight and numbers per tow of American plaice derived from the September research surveys of the southern Gulf of St. Lawrence on the RV E.E. Prince.

### Research Vessel CATCH PER UNIT EFFORT



### Research Vessel CATCH PER UNIT EFFORT

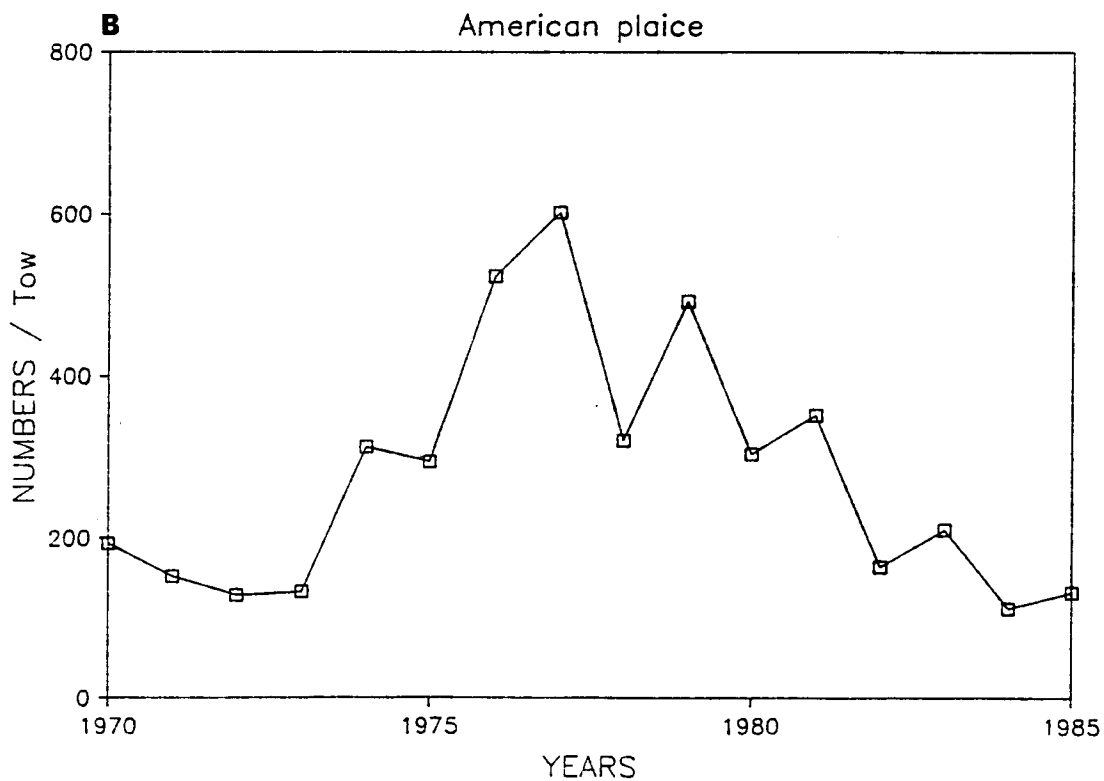


Figure 16. Weight at age of American plaice in September as calculated from data collected over 16 years in the southern Gulf of St. Lawrence on the RV E.E. Prince.

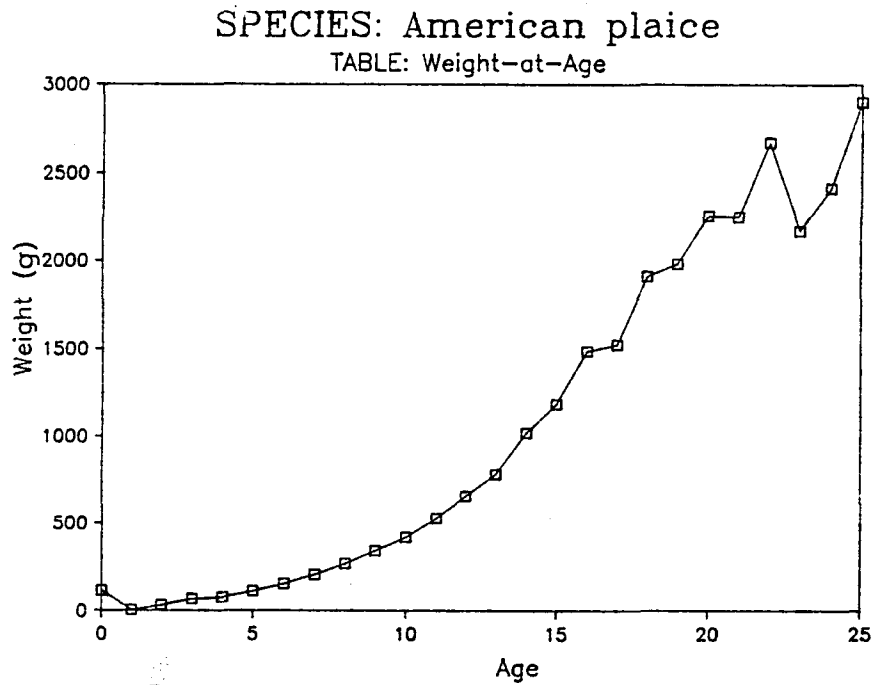


Figure 17. American plaice population composition (%) in September for 1983 to 1985 from research surveys in the southern Gulf of St. Lawrence on the RV E.E. Prince.

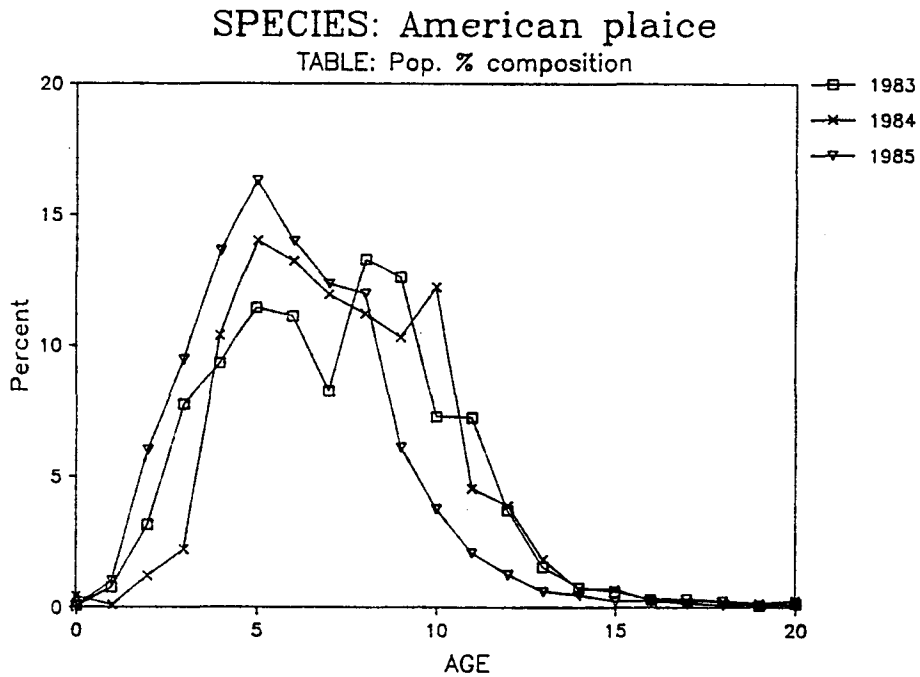


Figure 18. Population biomass in numbers and weight of haddock as estimated from September surveys in the southern Gulf of St. Lawrence.

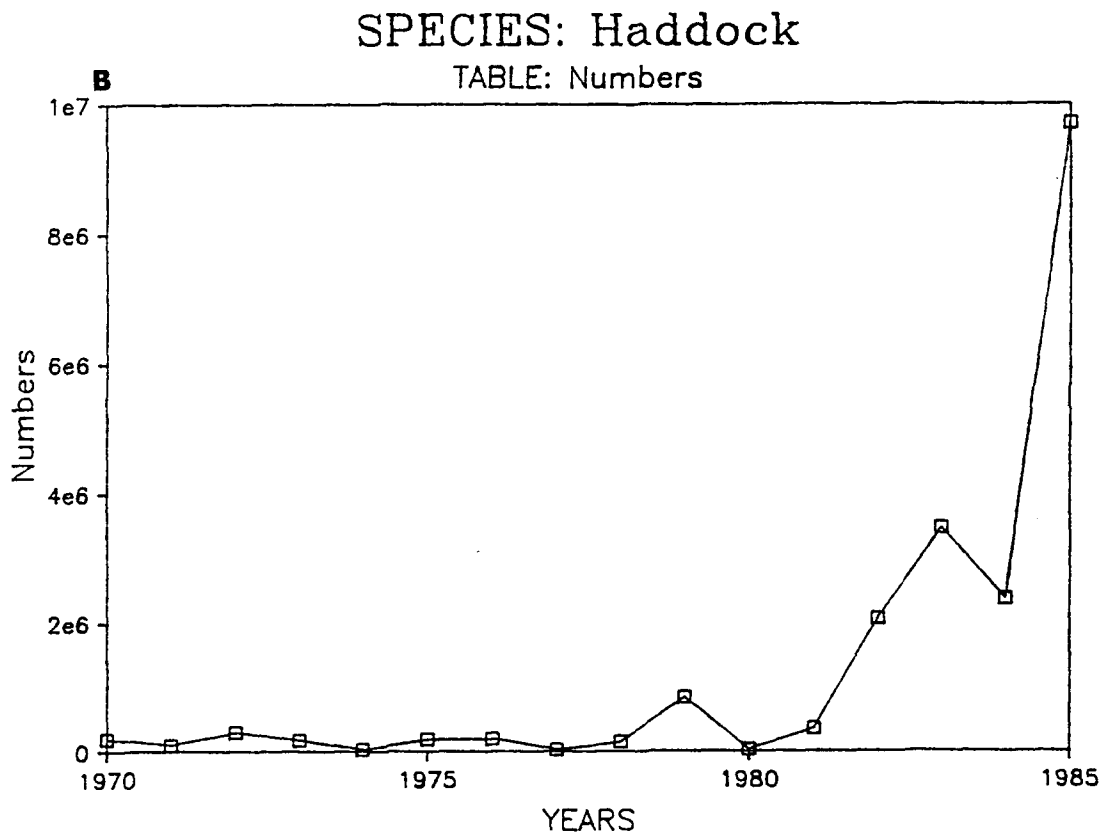
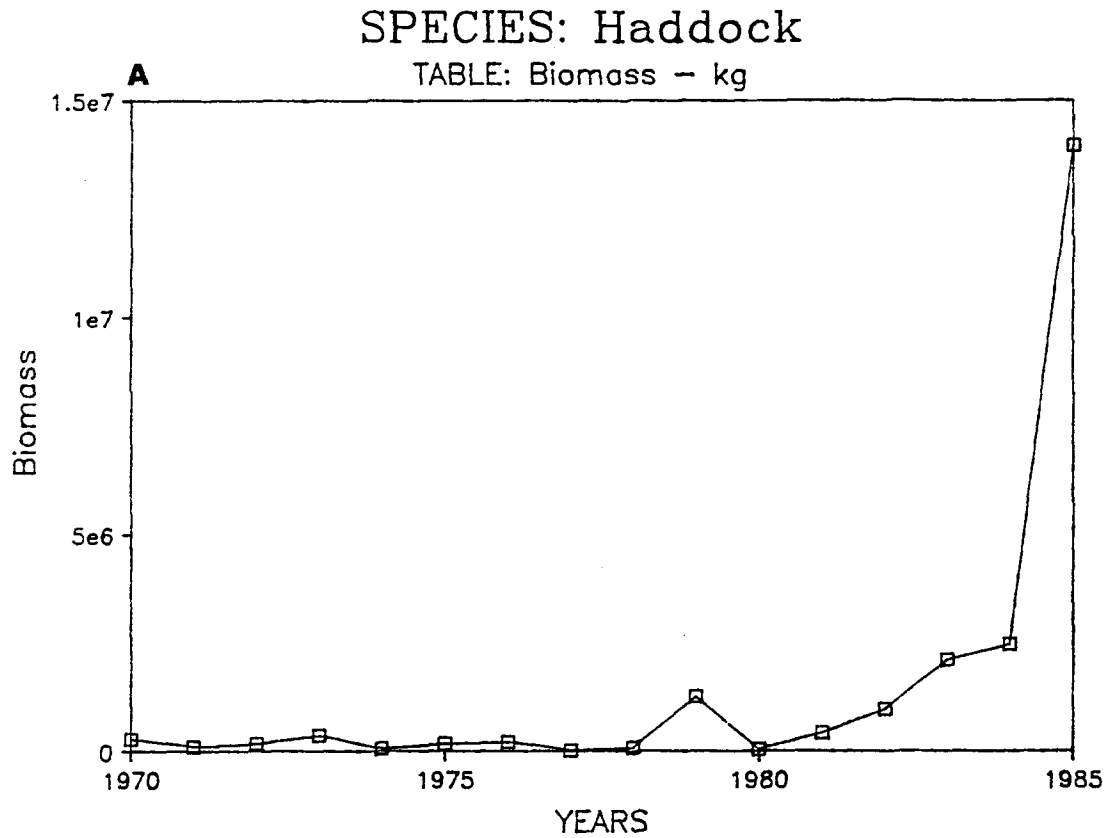


Figure 19. Population biomass in numbers and weight of haddock as estimated from September surveys in the southern Gulf of St. Lawrence. The 1985 has been removed to enhance the scale for the earlier years.

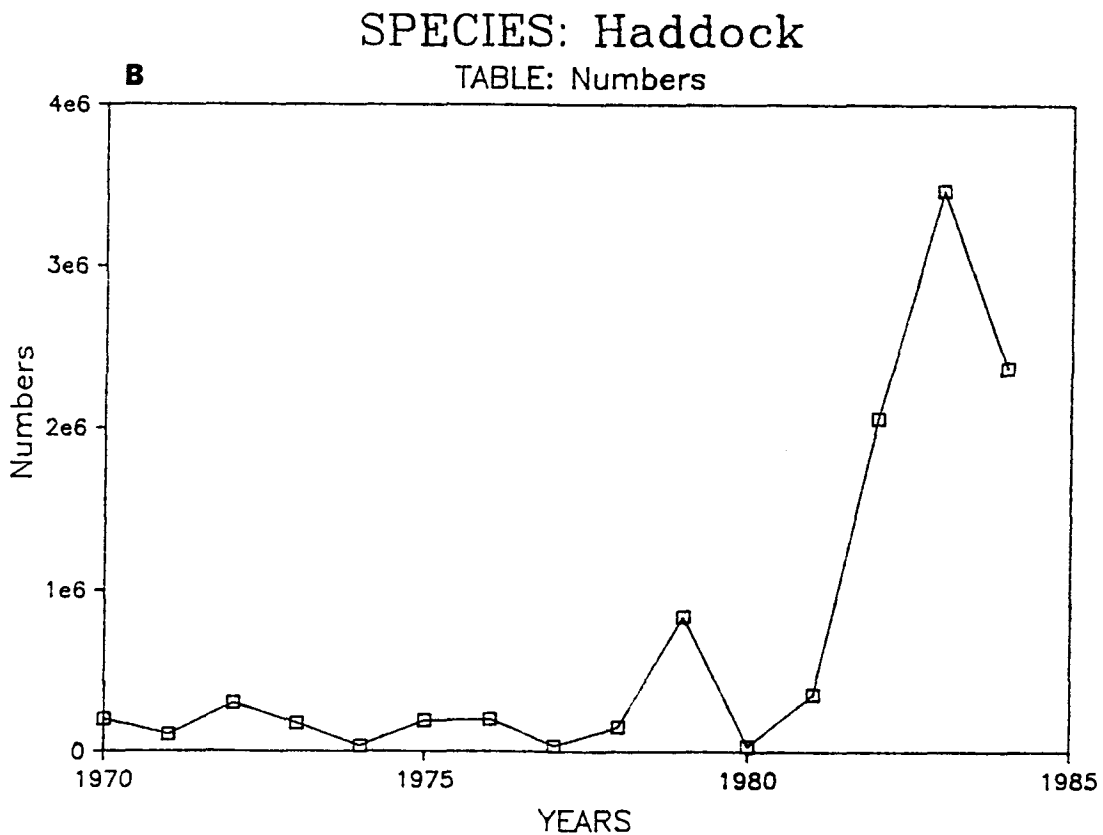
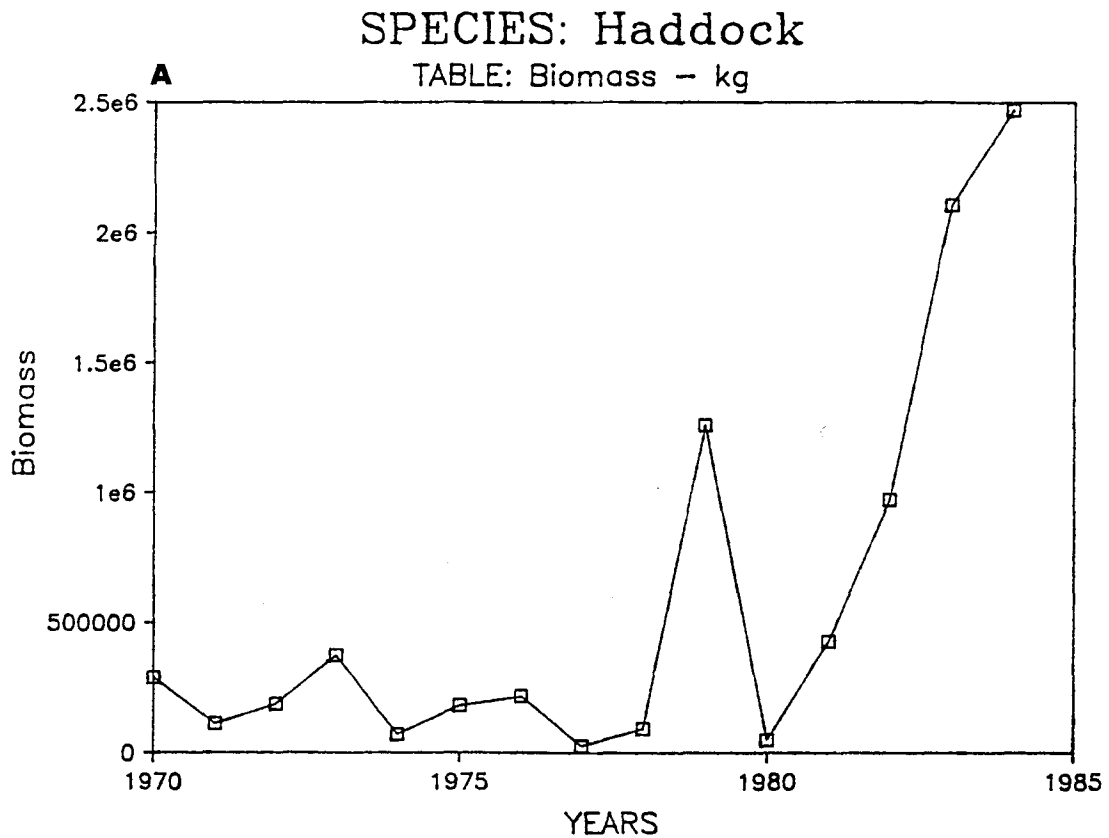


Figure 20. Distribution of haddock in September as determined from 16 years of research surveys on the RV E.E. Prince. The dark outlined strata represent over 50% of the biomass and the total stippled area over 75% of the biomass.

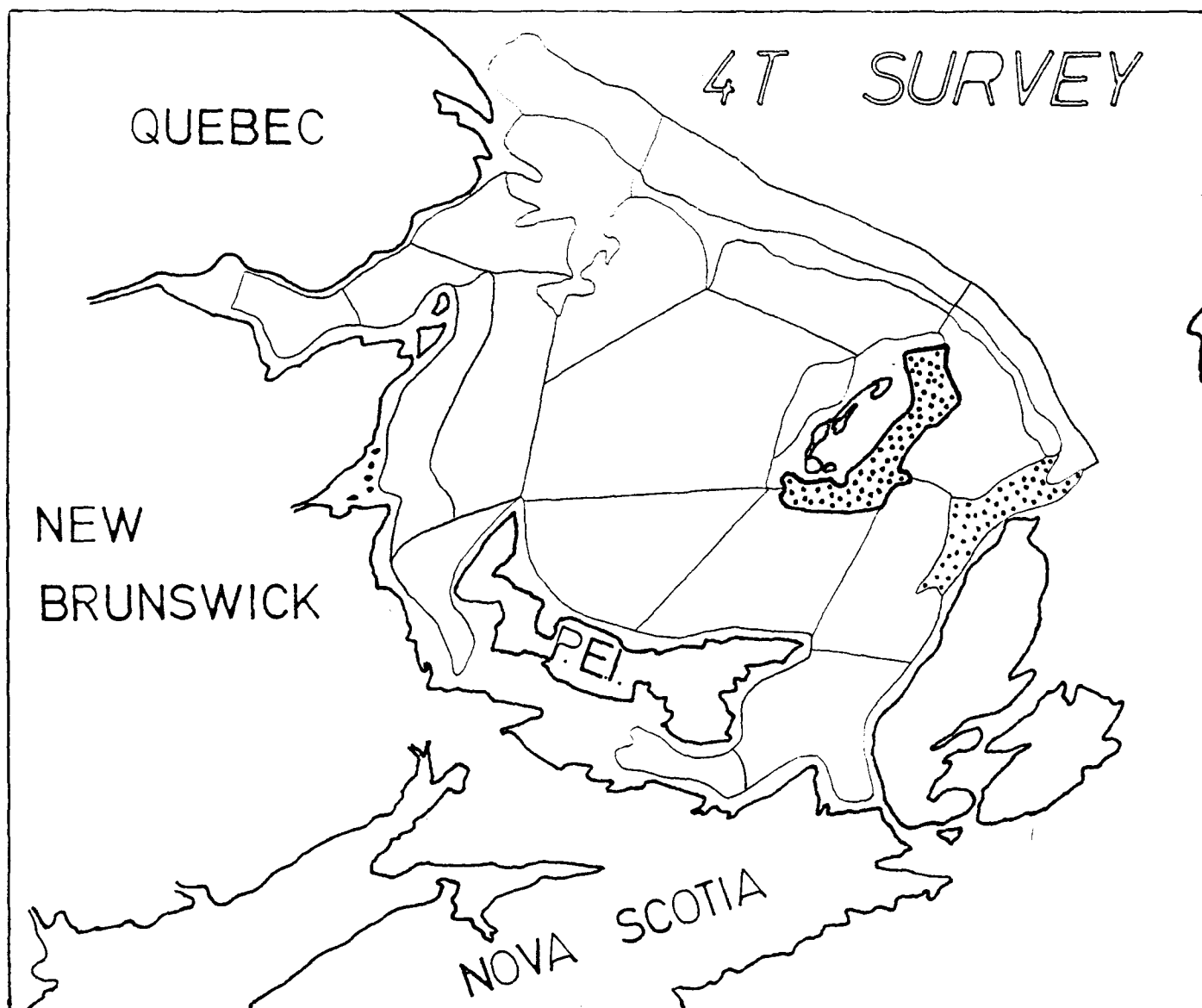
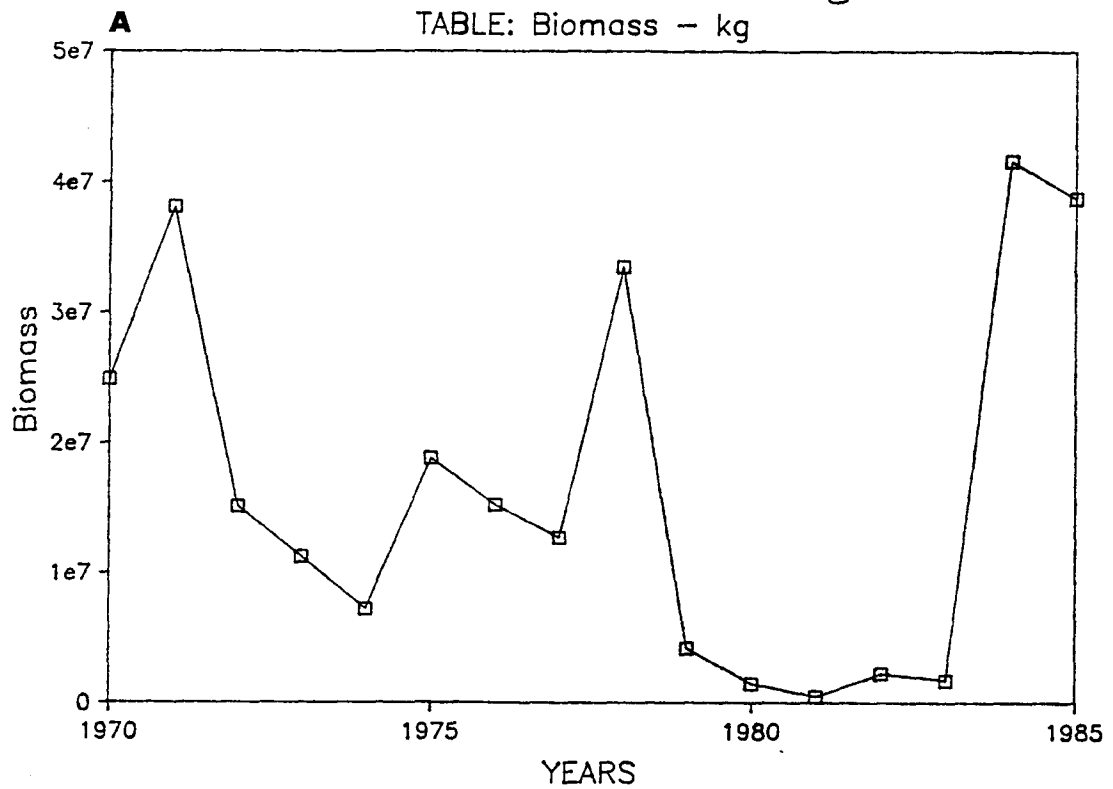


Figure 21. Population biomass in numbers and weight of Gulf herring as estimated from September surveys in the southern Gulf of St. Lawrence.

SPECIES: Gulf herring



SPECIES: Gulf herring

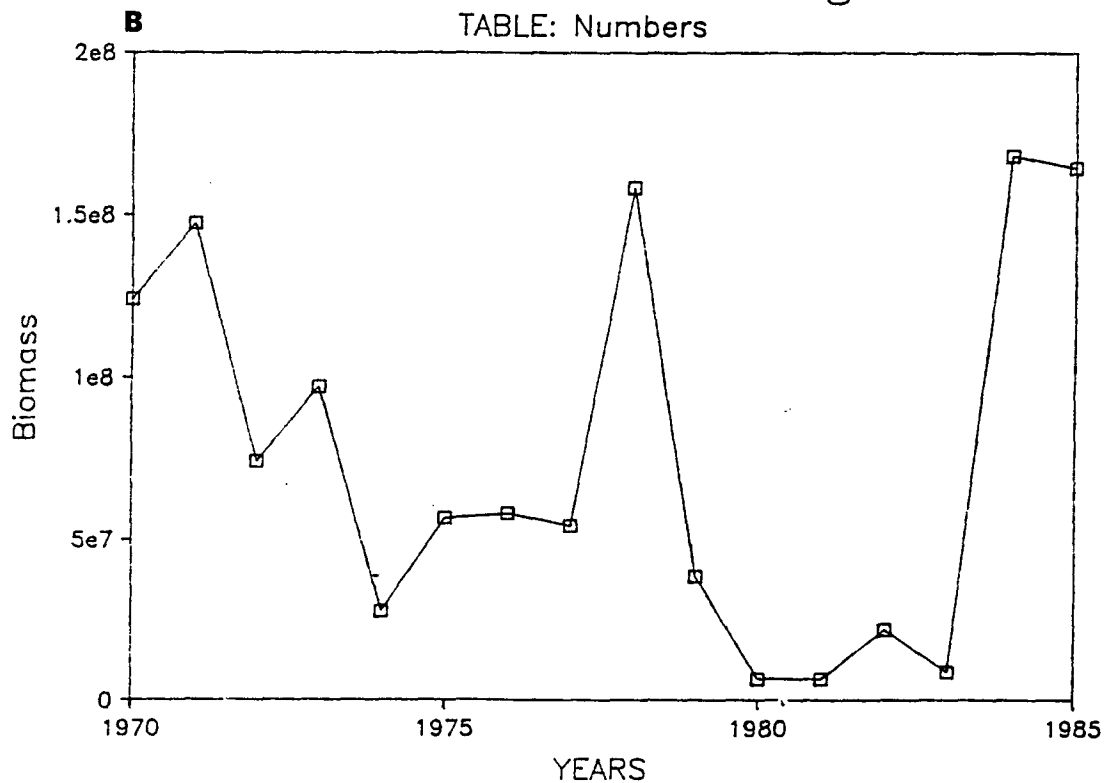


Figure 22. Distribution of Gulf herring in September as determined from 16 years of research surveys on the RV E.E. Prince. The dark outlined strata represent over 50% of the biomass and the total stippled area over 75% of the biomass.

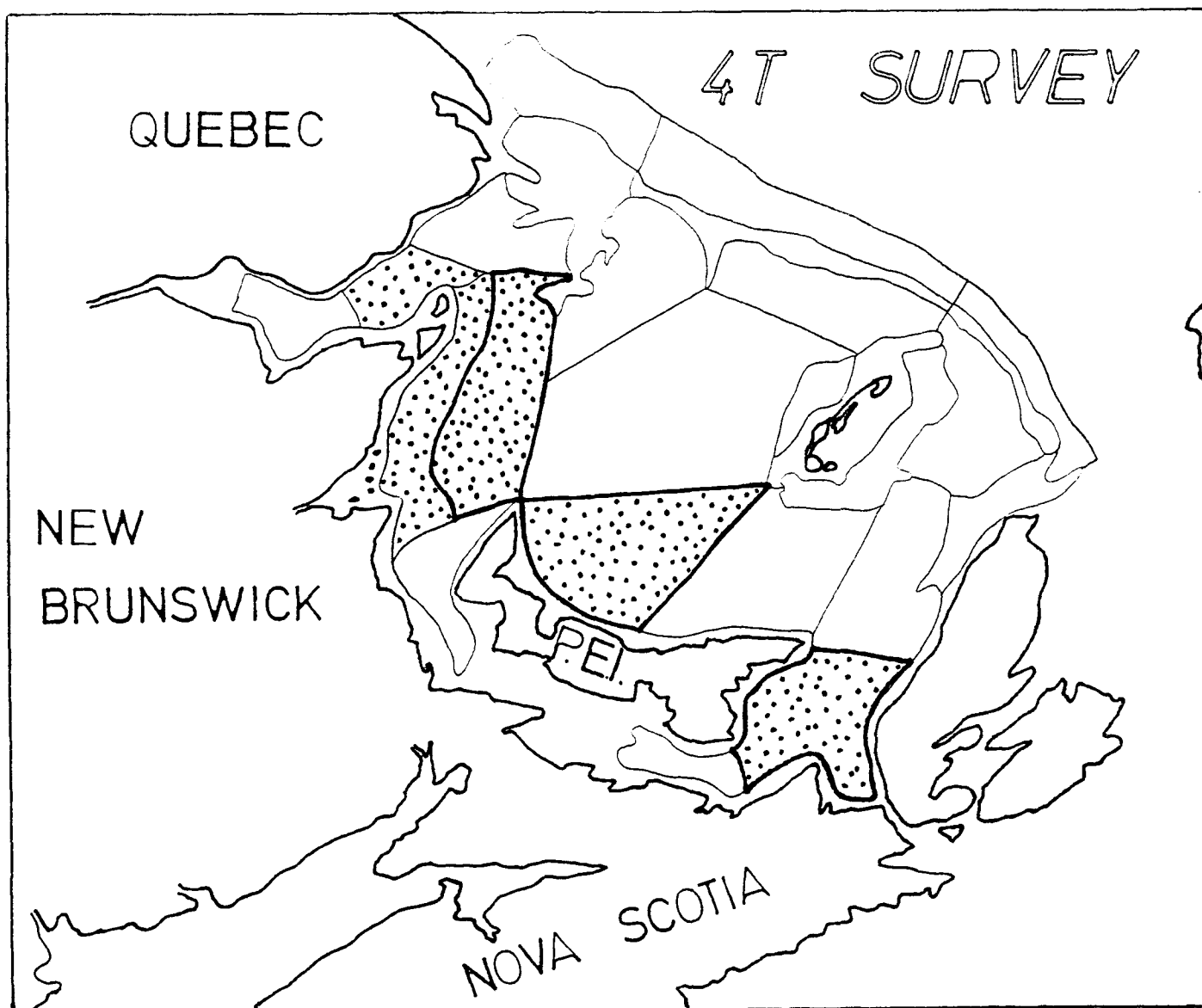




Figure 23. Population biomass in numbers and weight of redfish as estimated from September surveys in the southern Gulf of St. Lawrence.

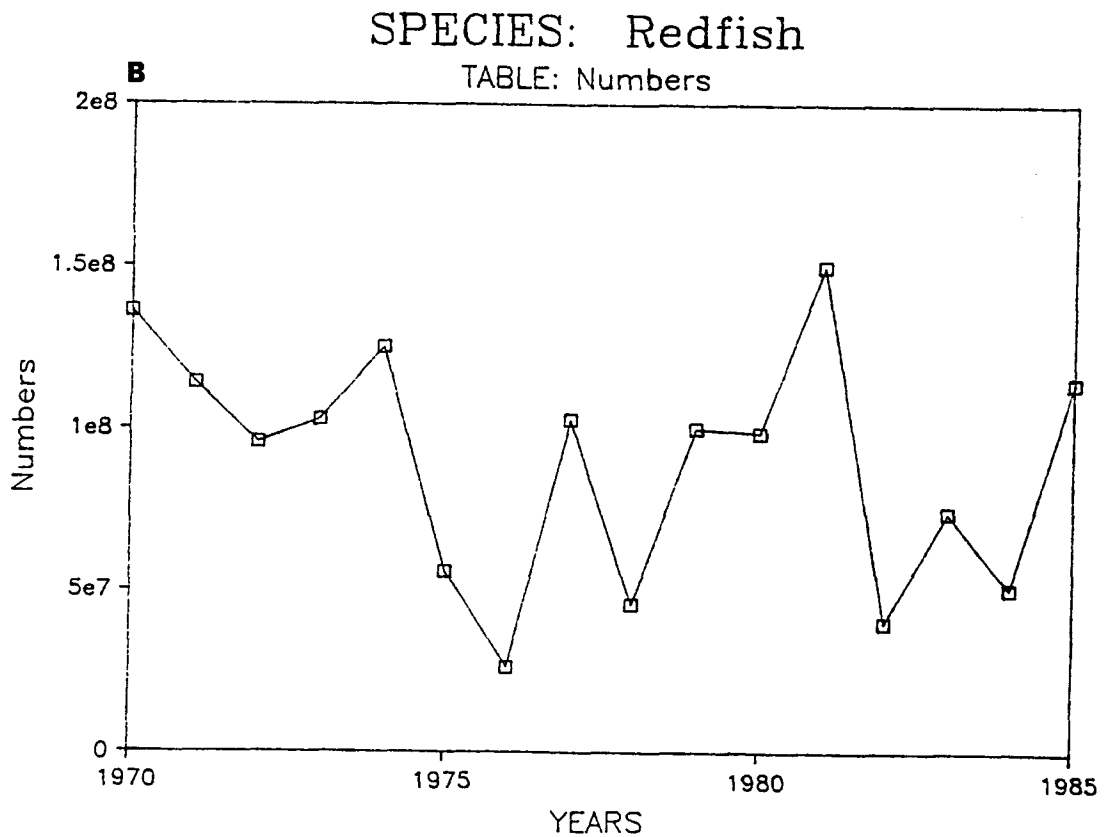
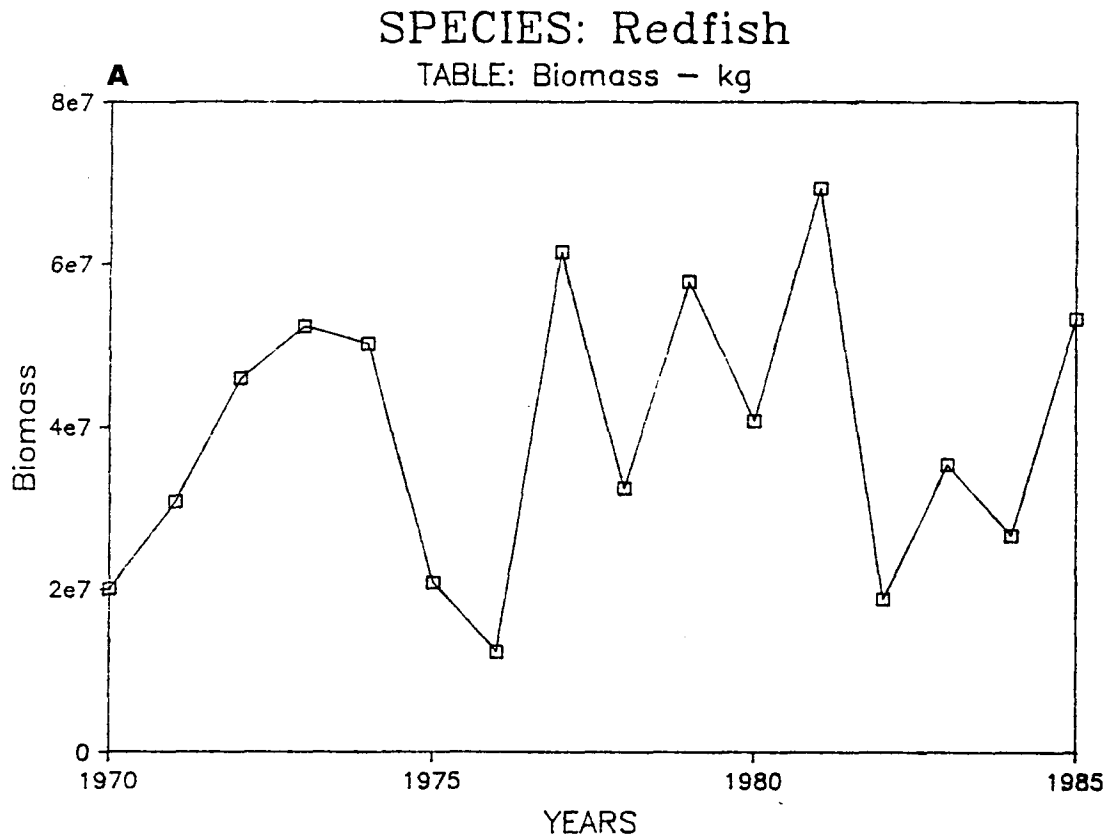


Figure 24. Distribution of redfish in September as determined from 16 years of research surveys on the RV E.E. Prince. The dark outlined strata represent over 50% of the biomass and the total stippled area over 75% of the biomass.

