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Georges Bank Atlantic Cod

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Term of Reference 4

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1.0 Background

This stock was last assessed and peer reviewed in August 2005 (Mayo and Terceiro 2005, O'Brien *et al*. 2006). The assessment was conducted using VPA with landings only, i.e. discards and recreational landings were not included in the catch at age. For terminal year 2004, total commercial landings were 4,583 mt and fully recruited F (ages 4-8, unweighted average) was estimated to be 0.24 (19% exploitation), the lowest F in the time series (1978-2004). Spawning stock biomass was 22,564 mt in 2004, 30% higher than the time series low in 1994. Since 1991, recruiting year classes had all been below the long term average (14 million age 1 fish) with the 2000 and 2001 year classes being the lowest in the time series. The 2003 year class, however, was estimated to be above average (21 million age 1 fish). The NEFSC spring and autumn bottom trawl survey indices continued to remain near record low values. The most recent above average autumn recruitment index of age 1 fish had occurred in 1988.

In 2002, biological reference points (BRPs) were developed for Georges Bank cod (NEFSC 2002) based on landings only, using a Beverton-Holt stock-recruit relationship with an assumed prior for the unfished recruitment as :

F_{MSY} = 0.175,
MSY = 35,200 mt and
SSB_{MSY} = 217,000 mt.

The current April 2008 assessment, with terminal year 2006, includes landings, commercial discards, and recreational catch in the catch at age as recommended by the GARM II panel (Mayo and Terceiro 2005).

2.0 Fishery

Georges Bank Atlantic cod is a transboundary stock that is harvested by both US and Canadian fishing fleets. US cod landings are generally highest in the second calendar quarter (April-June) and are taken predominantly from the western part (statistical areas (SA) 521-522, 525-526, 537-539, and Subarea 6) of Georges Bank throughout the year (Figure A1). The majority of the landings from the eastern part (SA 561-562) of Georges Bank are taken in the first and second calendar quarter (January to June). US landings are taken primarily by otter trawl gear and gill net gear. Since 1994, the Canadian fishery for Georges Bank cod has been open from June-December, and since 2005, June to the following February. Landings are taken primarily by long line and otter trawl.

Commercial Landings
Total commercial landings of GB cod taken by US, Canada, and Distant Water Fleets (DWF) are available from 1893-2006 (Table A1, Fig. A2) and total catch is available from 1978-2006 (Table A1, Fig. A3). US commercial landings from 1994 to 2007 have been revised using the allocation scheme described at the GARM III data meeting. Total commercial landings of Georges Bank cod were 3,790 mt in 2006, a 12% increase from 2005. The US accounted for 75% of the total landings and Canada the remaining 25%.

Commercial Discards
Estimates of cod discarded in the US Georges Bank otter trawl, gillnet, and scallop fisheries were derived using the NEFSC Observer data and applying the Standardized By-Catch Reporting Methodology (SBRM) from 1989-2006 (Wigley *et al*. 2007). Discards at age were estimated annually by applying combined survey and commercial age-length keys to observer length frequency data. Estimates of discards from 1978-1988 were hindcasted using a survey filter method (O'Brien and Esteves 2001, Mayo *et al*. 1992, see GARM III BRP WP 4.5). Canadian discards from the groundfish and scallop fisheries were estimated from 1997-2006. In 2006 the US and Canadian fleets each discarded, coincidentally, 355 mt of Georges Bank cod in the otter trawl, gillnet, and scallop fisheries for a total of 710 mt. Discarded cod represent 11% of total US catch, and 25% of total Canadian catch in 2006 (Table A1, Fig. A3)

Recreational Catch and Discards
US recreational catch and landings of Georges Bank cod were re-estimated using revised data provided by NOAA MRFSS from 1981-2006 (Table A2). Sampling of recreational landings is not sufficient to estimate the landings at age, however, a review of available samples indicated a length range similar to that in the NEFSC survey. A combined commercial and survey age-length key, with autumn survey length frequencies were applied to estimated numbers of recreational fish landed to obtain the landings at age. Recreational landings represent between 2-15% of the total US catch of cod during 1981-2006. In 2006, recreational landings represented 2% of the total US cod catch (Table A1,Fig A3).

Total Catch
Total commercial catch of Georges Bank cod was 4,579 mt in 2006, a 5% increase from 4,381 mt caught in 2005. US catches accounted for 68% and Canadian catches accounted for 32% of the total catches. Total discards accounted for 16% of the catch (Table A1, Figure A3).

3.0 Research Bottom Trawl Surveys

Biomass and abundance indices
NEFSC spring and autumn survey biomass and abundance indices generally declined from the mid-1970s to the mid-1990s. Since about 1990 the indices have fluctuated without trend and continue to remain below the long term average (Table A3, Figure A4-A5).

The recruitment indices for age 1 from the NEFSC 2007 autumn bottom trawl survey indicate that the last above average year class occurred in 1988. The 1999, 2001, 2003, and 2005 year classes, although below average, are stronger than the very weak 2000, 2002, and 2004 year classes (Fig. A6). The Canadian 2007 spring survey indices of abundance indicate that the 2003 year class was above average as both one and two year old fish (Fig. A7). The 2005 Canadian indices are not directly comparable to other years since the survey did not cover all of the Georges Bank strata.

Maturity ogives
Logistic regression analysis was used to estimate female maturity ogives from NEFSC spring research survey data for 1970- 2007. The number of samples taken each year, by sex, over the time series is not consistently high and does not allow for reliable annual estimates, so the data was smoothed by using a 3-year moving average. For example, the 1990 ogive was estimated by combining data from 1989-1991 and estimating one ogive, and then the 1991 ogive was estimated by combining data from 1990-1992 and so forth, for the time series. This means that the first year, 1970, only as two years of data (1970, 1971) and the last year, 2007, also has only 2 years of data (2006 and 2007). Confidence limits for proportion mature at age were estimated at the 95% level using the approximate variance for large samples (Ashton 1972, O'Brien et al. 1993) and inverse 95% confidence limits for A_{50} (median age at maturity) were estimated within the SAS PROBIT procedure (SAS) (Figure A8).

Mean Length and Weight
Mean length and weight at age were estimated from the NEFSC autumn research bottom trawl surveys, 1970-2007. Mean weights at age were estimated using an historical length-weight equation prior to 1992. Annual length-weight parameters were estimated using data collected on autumn NEFSC surveys from 1992-2007. No trend is apparent in the younger ages, but ages 3-5 show a possible trend since the mid-1990s in both length and weight (Fig. A9). Length and weight trend together suggesting there is on change in condition for Georges Bank cod.

4.0 Assessment

Based on advise from the GARM III Model review panel, both a VPA and ASAP model were run to assess the current status of the stock. The current formulations of the two models are preliminary and the final assessment model formulation may change by the August GARM meeting, however, the results represent the likely range from which the final BRPs will be determined.

VPA

Input data and Analyses
The ADAPT calibration method (Parrack 1986, Gavaris 1988, Conser and Powers 1990) was used to derive estimates of instantaneous fishing mortality in 2006 and beginning year stock sizes in 2007. A conditional non-parametric bootstrap procedure (Efron 1982) was used to evaluate the precision of fishing mortality and spawning stock biomass. A retrospective analysis was performed for terminal year fishing mortality, spawning stock biomass, and age 1 recruitment.

The base ADAPT formulation provided stock size estimates for ages 1-8 in 2006 and corresponding F estimates for ages 1-7 in 2005. Assuming full recruitment at age 5, the F on ages 8 and 9 in the terminal year was estimated as the average of the F on ages 5-7. The F on age 9 in all years prior to the terminal year was derived from weighted estimates of Z for ages 5-8. For all years, the F on age 9 was applied to the 10+ age group. Spawning stock size estimates

were estimated with female maturity ogives (3-year moving window) derived from NEFSC spring research survey data for 1978- 2006 as described above.

The catch at age (1-10+) includes US and Canadian landings and discards, and US recreational landings from 1978-2006 (Tables A4-A9). The indices of abundance used to calibrate the VPA included the NEFSC 1978-2007 spring survey indices for ages 1-8 (Table A10a), the NEFSC 1977-2006 autumn survey indices for ages 0-5 (Table A10b) and the Canadian 1986-1992 and 1995-2007 spring survey indices for ages 1-8 (Table A10c). The NEFSC spring survey was dis-aggregated into two series based on the use of the Yankee #36 or #41 trawls. The NEFSC employed the #41 trawl during 1973 to 1981. The spring indices were split into a series from 1978-1981 for the #41 trawl and a series from 1982-2005 for the #36 trawl. The autumn survey indices were shifted forward one age and one year to match cohorts in the spring survey in the subsequent year. Given the moderately strong retrospective pattern seen in preliminary runs, all survey time series were split between 1993 and 1994. Although no distinct mechanism (e.g. change in reporting and sampling systems, closed areas, life-history or environmental effect) is apparent as to why the surveys should be split at that time, the result is a weaker retrospective pattern, as seen in some of the other GARM stocks (GB yellowtail flounder, witch flounder). In this VPA assessment fully recruited F shifts from age 4, as seen in previous assessments, to fully recruited F at age 5. This is due, in part, to increases in minimum mesh size requirements to 6.5 inch square or diamond mesh that were invoked in May 2002. Prior to 2002, mesh requirements had been 6.5 inch square or 6.0 inch diamond mesh, since 1999.

VPA Diagnostics

The ADAPT calibration results for estimates of stock size were more precise for ages 2-8, with CVs ranging from 0.26 to 0.36, than for age 1 with a CV=0.44 (Appendix A1).

Pre-1994 spring NEFSC residuals show a pattern of a block of positive residuals and then a block of negative residuals for some but not all ages, but this is less apparent in the post-1994 spring residuals. The pre-1994 DFO residuals show a similar block pattern as the pre-NEFSC, but in the opposite direction of negative to positive, whereas the post-1994 residuals do not show a pattern. The autumn NEFSC residuals show no persistent pattern pre- or post-1994 (Figure A10a-10g).

VPA Assessment Results

Fully recruited fishing mortality (unweighted, ages 5-8) was estimated at 0.31 in 2006 (Table 11, Figure A11), a 40% decline from 2005, and nearly equivalent to the lowest F in the time series (F_{1978} =0.30). Spawning stock biomass in 2006 was estimated at 17,622 mt, a 38% increase from 2005, however, 2% less than the previous minimum of 18,000 mt in 1995 (Table A11, Figure A12). Recruitment (millions of age 1 fish) of the 2003 year class (11.1 million age 1 fish), and 2005 year class (10.0 million age 1 fish) are estimated to be similar to the 1998 year class (12.6 million age 1 fish) (Table A11, Fig.A12). The survival ratio of recruits to spawning stock biomass indicates a trend of higher survival with larger year classes; however, after 1991 the magnitude of the relatively larger year classes is much lower compared to the year classes in the earlier time period (Figure A13). Stock mean weights at age show no trend for ages 1-4, but show a decline in ages 5-8 in the last 7 to 10 years (Fig. A14).

Precision of F and Stock Biomass Estimates
The distribution of F estimates from the bootstrap analysis (Appendix A2) ranged from 0.17 to 0.56 with an 80% probability that F in 2006 was between 0.25 and 0.41 (Fig.A15). The distribution of SSB estimates from the bootstrap analysis ranged from 12,058 mt to 28,754 mt with an 80% probability that SSB in 2004 was between 14,928 mt to 21,378 mt (Fig. A15).

Retrospective Analysis
The strong retrospective pattern present in the previous assessment (O'Brien *et al.* 2002) is not as evident with the split-survey model formulation (Fig.A16-A18). Relative to terminal year (TY) 2006, estimates of fishing mortality are about 20% different with the exception of TY 2005 and TY 1996 (Fig.A16). SSB estimates show a more varied pattern than F with the relative difference to TY 2006 being 25% or less (Fig.A17). The retrospective pattern of estimates of age 1 fish shows a couple of extreme values, particularly TY 2003. The relative difference of age 1 fish to TY 2006 varies between 10%-50% excluding 1998, 2002, 2003 (Fig.A18).

ASAP

The ASAP forward projection model was run as an alternative model to the VPA. The ability to include additional catch and survey indices when no age composition data is available can provide additional information on stock productivity. At the GARM III Model review the Panel suggested running a forward projecting model with catch data back to 1930 and survey indices back to 1963.

Input data and Analyses
The GB cod catch at age (1-10+) was disaggregated into two fleets: US catch (commercial landings and discards and recreational landings) and Canadian catch (landings and discards) from 1978-2006 (Tables A4-A8). The same indices of abundance used to calibrate the VPA were applied in ASAP.

Several exploratory runs were conducted that included catch data back to 1930, survey indices back to 1963, and splitting and not splitting the survey time series at 1994. Including the additional catch data back to 1930 did not influence the results when compared to a run with catch and survey indices back to 1963. Splitting the survey indices at age at 1994 as described above introduced more retrospective than an unsplit survey series. The final model presented here includes catch from 1963-2006, survey biomass indices from spring (1968-2007) and autumn (1963-2006), with no split in the survey indices at age. The selectivity for each fleet is by age, and there are four selectivity blocks, with a break at 1985 when the Hague Line was invoked.

ASAP Assessment Results
ASAP results show that fully recruited F occurs at age 4, instead of age 5 as in the VPA, however, for comparison to the VPA, the results are presented for F averaged from ages 5-8. Fully recruited F (ages 5-8) in 2006 was estimated to be 0.27, 13% lower than VPA, and SSB in

2006 was estimated at 18,479 mt, 5% higher than VPA (Fig. A19). Recruitment (millions of age 1 fish) of the 2003 year class (7.6 million age 1 fish) and 2005 year class (6.1 million age 1 fish) are both about 35% less than that estimated by the VPA.

The standardized residuals of observed and predicted survey indices did not show a pattern in any of the ages for the three surveys.

ASAP produced estimates of BRPs, which will be discussed below.

Retrospective Analysis
There was a retrospective pattern in F (ages 5-8,unweighted) of overestimation with a very strong high flyer in 2001 (Fig. A20). The SSB retrospective shows the opposite pattern of consistently underestimating the SSB (Fig. A21). The retrospective pattern in recruitment also is generally one of underestimation, with a very high positive value in 2004 (Fig.A22). The pattern in the retrospective of F and SSB is opposite of that seen in the VPA in previous assessments (O'Brien *et al.* 2006).

5.0 Biological Reference Points

Yield per Recruit Analysis
A yield per recruit (YPR) analysis was conducted to provide an estimate of $F_{40\%}$ using the methods of Thompson and Bell (1934) (Fig. 23). Input data for catch and stock weights (ages 1-10+) were derived from an average of the most recent five years (2002-2006). The partial recruitment (PR) was based on a normalized geometric mean of 2002-2006 fishing mortality from the VPA and the maturity ogive was estimated annually as a 3 year moving average as described above (Table A12).

The estimated biological reference points of $F_{0.1}$=0.22 , F_{max} = 0.50 and $F_{40\%}$ = 0.25 are higher than those estimated by the Working Group on Re-Evaluation of Biological Reference Points: $F_{0.1}$=0.169 , F_{max} = 0.331 and $F_{40\%}$ = 0.167 (NEFSC 2002)

Age-structured Production Model Reference Points

VPA
Maximum sustainable yield (MSY) reference points were derived from an age-structured production model (Sissenwine and Shepherd 1987) using a Beverton-Holt stock recruit relationship with an assumed prior for the unfished recruitment (Fig.A24). The prior on unfished recruitment was set at the 90%tile of the observed recruitments. The ln(Rmax) and steepness (0.84) were the same as applied by the Working Group on Re-Evaluation of Biological Reference Points (NEFSC 2002). The input data for catch weights, stock weights, PR, and maturity ogives were the same as described in the YPR analysis (Table A12). SSB and recruitment at age one were obtained from the VPA.

The BRPs were estimated as:

F_{MSY} = 0.225
MSY = 33,984 mt and
SSB_{MSY} = 174,292 mt.

ASAP
MSY reference points were estimated internally by ASAP using a Beverton-Holt stock recruit relationship with an assumed prior for the unfished recruitment. Steepness was estimated at 0.71. The BRPs were estimated as:

F_{MSY} = 0.17
MSY = 17,428 mt and
SSB_{MSY} = 107,622 mt.

Stochastic MSY estimates
Alternative estimates of MSY and SSB_{MSY} were obtained from projection analyses using the $F_{40\%}$ and F_{MSY} estimates derived above from YPR, VPA and ASAP. All projections were run to 100 years. The catch weights, stock weights, and maturity vector were the same as described for the YPR. The PR vector for the VPA projection was also the same as in the YPR analysis, however, for the ASAP projection the PR was re-estimated using data output from ASAP (Table A12). In the non-parametric projection with $F_{40\%}$ from YPR, recruitment was estimated using an empirical cumulative distribution function (CDF) of age 1 recruits estimated in the VPA. For the parametric projections with F_{MSY} from the VPA and ASAP, recruitment was estimated from a Beverton-Holt with lognormal error. The resulting BRPs (Table A13) range between the following values:

MSY : 17,500 mt – 52,700 mt
SSB_{MSY} : 93,700 mt – 274,000.

6.0 Summary

Fishing mortality on Georges Bank Atlantic cod in 2006 is estimated to be about 0.3 (0.31 in VPA, 0.27 in ASAP), the lowest value since 1978. SSB is about 18,000 mt (17,622 mt - VPA, 18, 479 mt -ASAP), 20% of the estimated SSB in 1980, the beginning of the time series.

Results of the two models are similar, and the differences in F and SSB from the VPA and ASAP formulations are relatively small on a percentage basis. The ASAP provides additional information on stock productivity in the calculation of BRP by modeling survey and catch indices prior to the start of the catch at age, however, the retrospective pattern was more pronounced than that in the VPA formulation. Given the diagnostic results of the ASAP and VPA model formulations, the VPA appears to be most appropriate model to go forward with estimation of BRPs.

BRPs, estimated from VPA and ASAP results, and from projection analysis with $F_{40\%}$ and F_{MSY} estimates, ranged between the following values:

F_{MSY} : 0.17- 0.25
MSY : 17,500 mt – 52,700 mt
SSB_{MSY} : 93,700 mt – 274,000 mt.

7.0 References

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Table A1. Commercial landings (metric tons, live) of Atlantic cod from the Georges Bank and South (NAFO Division 5Z and Subarea 6) stock, 1960-2006).

	Country										
	USA			Canada						Total	Total
Year	Landings	Discards	Rec.	Landings	Discards	USSR	Spain	Poland	Other	Landings	Catch
1960	10834			19		-	-	-	-	10853	10853
1961	14453			223		55	-	-	-	14731	14731
1962	15637			2404		5302	-	143	-	23486	23486
1963	14139			7832		5217	-	-	1	27189	27189
1964	12325			7108		5428	18	48	238	25165	25165
1965	11410			10598		14415	59	1851	-	38333	38333
1966	11990			15601		16830	8375	269	69	53134	53134
1967	13157			8232		511	14730	-	122	36752	36752
1968	15279			9127		1459	14622	2611	38	43136	43136
1969	16782			5997		646	13597	798	119	37939	37939
1970	14899			2583		364	6874	784	148	25652	25652
1971	16178			2979		1270	7460	256	36	28179	28179
1972	13406			2545		1878	6704	271	255	25059	25059
1973	16202			3220		2977	5980	430	114	28923	28923
1974	18377			1374		476	6370	566	168	27331	27331
1975	16017			1847		2403	4044	481	216	25008	25008
1976	14906			2328		933	1633	90	36	19926	19926
1977	21138			6173		54	2	-	-	27367	27367
1978	26579	298		8783		-	-	-	-	35362	35659
1979	32645	537		5979		-	-	-	-	38624	39161
1980	40053	569		8060		-	-	-	-	48113	48682
1981	33849	1033	4162	8496		-	-	-	-	42345	47539
1982	39333	985	2955	17816		-	-	-	-	57149	61090
1983	36756	656	3865	12132		-	-	-	-	48888	53409
1984	32915	98	994	5758		-	-	-	-	38673	39765
1985	26828	349	4678	10442		-	-	-	-	37270	42298
1986	17490	457	425	8503		-	-	-	-	25993	26876
1987	19035	266	970	11842		-	-	-	-	30877	32113
1988	26310	323	2587	12757		-	-	-	-	39067	41977
1989	25056	866	507	7912		-	-	-	-	32967	34340
1990	28110	618	1339	14345		-	-	-	-	42455	44412
1991	24219	428	657	13457		-	-	-	-	37676	38762
1992	16899	311	350	11669		-	-	-	-	28569	29230
1993	14590	376	1127	8527		-	-	-	-	23117	24620
1994	9737	185	544	5276		-	-	-	-	15013	15741
1995	7028	110	826	1099		-	-	-	-	8127	9063
1996	7259	138	367	1912	42	-	-	-	-	9171	9719
1997	7545	125	715	2917	479	-	-	-	-	10462	11782
1998	7044	130	434	1908	372	-	-	-	-	8952	9888
1999	8319	125	387	1825	328	-	-	-	-	10144	10985
2000	7612	201	309	1585	62	-	-	-	-	9196	9769
2001	10746	374	205	2144	117	-	-	-	-	12889	13585
2002	9470	169	237	1275	76	-	-	-	-	10745	11226
2003	6856	327	203	1316	191	-	-	-	-	8172	8893
2004	3507	166	345	2166	98	-	-	-	-	5672	6281
2005	2754	521	243	630	233					3384	4381
2006	2694	355	79	1097	355					3790	4579
2007											

Table A2. Estimated numbers (000s) and weight (mt,live) of Atlantic cod caught by marine recreational fishers from the Georges Bank and South stock during 1981-2006. The data has been revised by MRFSS since GARM II and includes new site registers.

	Catch		Landed	
Year	Numbers 000s	Weight* mt	Numbers 000s	Weight* mt
1981	1740.5	3841.4	1684.4	3717.6
1982	1548.2	6820.1	1495.1	6586.1
1983	1839.8	5501.8	1676.1	5012.4
1984	483.0	1293.8	452.7	1212.6
1985	1980.9	8498.9	1890.7	8111.6
1986	357.4	924.1	295.1	763.0
1987	503.2	960.7	461.5	881.1
1988	1362.2	3993.1	1132.0	3318.1
1989	560.1	1865.5	393.0	1309.1
1990	583.7	1438.0	455.2	1121.6
1991	465.9	1838.9	373.1	1472.6
1992	289.8	639.1	204.2	450.4
1993	1176.3	2886.0	761.9	1869.4
1994	603.2	1879.5	288.9	900.2
1995	798.7	2033.4	510.7	1300.3
1996	247.6	802.5	149.7	485.1
1997	543.8	1378.9	328.2	832.0
1998	581.6	1633.1	271.2	761.5
1999	233.4	793.4	126.2	429.2
2000	581.0	1409.3	288.3	699.2
2001	168.6	376.5	99.3	221.7
2002	146.5	442.4	93.1	281.1
2003	162.4	711.6	94.2	412.9
2004	245.2	470.2	130.1	249.5
2005	511.2	1237.5	141.8	343.3
2006	79.4	316.9	39.6	158.2

* Weight as estimated by MRFSS, re-estimated in assessment

Table A3. Standardized stratified mean catch per tow in numbers and weight (kg)for Atlantic cod in NEFSC offshore spring and autumn research vessel bottom trawl surveys on Georges Bank (Strata 13-25), 1963 - 2005. [1,2,3]

	Spring		Autumn	
Year	No/Tow	Wt/Tow	No/Tow	Wt/Tow
1963	-	-	4.37	17.8
1964	-	-	2.79	11.4
1965	-	-	4.25	11.8
1966	-	-	4.90	8.1
1967	-	-	10.33	13.6
1968	4.73	12.7	3.31	8.6
1969	4.63	17.8	2.24	8.0
1970	4.34	15.8	5.12	12.6
1971	3.39	14.3	3.19	9.8
1972	9.16	19.3	13.09	22.9
1973	57.81	94.5	12.28	30.9
1974	14.74	36.4	3.49	8.2
1975	6.89	26.1	6.41	14.1
1976	7.06	18.6	10.43	17.7
1977	6.19	15.3	5.44	12.5
1978	12.31	31.2	8.59	23.3
1979	5.00	16.2	5.95	16.5
1980	7.68	24.1	2.91	6.7
1981	10.44	26.1	9.20	20.3
1982	32.96	101.9	3.34	6.1
1983	7.70	23.5	4.14	6.1
1984	4.08	15.3	4.73	10.0
1985	7.03	21.7	2.31	3.1
1986	5.04	16.7	2.99	3.7
1987	3.24	9.9	2.33	4.4
1988	5.87	13.5	3.07	5.6
1989	4.80	10.9	4.84	4.7
1990	4.79	11.7	4.78	11.5
1991	4.31	8.9	0.96	1.4
1992	2.67	7.4	1.72	3.0
1993	2.40	7.0	2.15	2.2
1994	0.95	1.2	1.82	3.3
1995	3.29	8.4	3.62	5.6
1996	2.70	7.5	1.10	2.7
1997	2.32	5.2	0.87	1.9
1998	4.36	11.7	1.87	2.8
1999	2.15	4.7	1.02	3.0
2000	3.57	8.2	1.31	1.4
2001	1.86	5.5	1.05	2.1
2002	2.08	5.0	4.70	11.3
2003	1.98	4.2	1.25	2.1
2004	5.38	14.3	4.21	5.9
2005	1.96	4.5	1.02	1.6
2006	3.17	6.1	1.44	2.7
2007	3.37	5.1	0.59	1.1
Mean 1963-20	7.0	17.7	4.0	8.5

[1] During 1963-1984, BMV oval doors used in spring and autumn surveys; since 1985, Portuguese polyvalent doors used in both surveys. Adjustments have been made to the 1963-1984 catch per tow data to standardize these data to polyvalent door equivalents. Conversion coefficients of 1.56 (numbers) and 1.62 (weight) were used in this standardization (NEFC 1991).

[2] Spring surveys during 1980-1982, 1989-1991 and 1994 and autumn surveys during 1977-1981,1989-1991,and1993 were accomplished with the R/V Delaware II; in all other years, the surveys were accomplished using the R/V Albatross IV. Adjustments have been made to the R/V Delaware II catch per tow data to standardize these to R/V Albatross IV equivalents. Conversion coefficients of 0.79 (numbers) and 0.67 (weight) were used in this standardization (NEFC 1991)

[3] Spring surveys during 1973-1981 were accomplished with a '41 Yankee' trawl; in all other years,spring surveys were accomplished with a 36 Yankee' trawl. No adjustments have been made to the catch per tow data for these gear differences.

Table A4. Commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of USA commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					USA Commercial Landings in Numbers (000's) at Age						
1978	0	291	6012	1767	687	102	185	11	30	4	9088
1979	48	1542	611	3809	903	395	142	295	9	32	7785
1980	102	3092	4761	328	2045	858	386	59	125	4	11760
1981	39	2853	3725	2016	171	902	295	90	135	43	10269
1982	428	7565	2817	1750	1228	130	447	95	50	59	14568
1983	88	3461	5638	1374	881	658	85	155	56	82	12477
1984	70	1342	3275	2864	571	422	374	39	145	84	9186
1985	126	4159	1636	1032	1343	314	191	154	16	75	9045
1986	134	1142	3194	467	375	390	56	50	44	24	5877
1987	19	4873	814	1380	204	163	154	34	21	18	7679
1988	0	1679	5492	695	1059	149	88	90	17	24	9293
1989	0	1649	2633	3291	254	352	49	28	23	3	8283
1990	0	4647	3313	1279	1401	126	122	16	9	8	10920
1991	43	1164	2842	1841	830	562	65	42	12	6	7406
1992	1	2307	1333	761	939	256	177	19	15	3	5811
1993	0	769	3118	608	288	283	83	71	16	3	5238
1994	0.0	226	1108	1345	201	59	96	29	14	4	3081
1995	0.0	341	1007	570	310	28	19	19	5	1	2300
1996	0.0	211	753	947	191	137	8	9	10	0	2266
1997	0.0	399	539	674	566	75	60	11	6	3	2331
1998	8.2	693	979	349	259	190	24	8	2	0	2511
1999	0.0	256	1664	607	211	86	113	15	2.0	0.2	2953
2000	9	722	628	866	206	58	30	29	2	0	2550
2001	1	508	2301	616	457	111	34	15	11	1	4054
2002	0	32	1001	1293	310	285	68	13	8	5	3015
2003	0	74	279	650	707	117	95	17	4	2	1946
2004	0	30	272	153	228	158	34	26	6	3	911
2005	0	22	96	358	100	77	55	8	4	2	721
2006	0	12	440	129	185	29	14	13	2	2	825
2007											
					USA Commercial Landings in Weight (Tons) at Age						
1978	0	377	14847	6355	2804	546	1229	76	304	41	26579
1979	42	2202	1262	16766	4550	2886	1373	3042	89	435	32645
1980	84	4610	11660	1236	11661	5825	3244	566	1112	54	40053
1981	41	4285	8895	7035	847	6534	2558	893	1960	801	33849
1982	283	10616	7596	6543	6604	864	4299	959	667	902	39333
1983	94	5119	13773	4792	4312	4282	722	1668	645	1,350	36756
1984	72	2151	8080	10435	2887	2823	3279	396	1614	1178	32915
1985	118	5857	3475	4051	6910	2009	1563	1603	194	1048	26828
1986	126	1638	7325	1606	2036	2796	508	510	594	351	17490
1987	16	6849	2014	5556	1147	1290	1309	338	240	275	19035
1988		2533	12755	2313	5556	1021	733	851	201	347	26310
1989		2750	5861	11937	1288	2274	406	262	241	37	25056
1990		7087	7638	4488	6723	782	1013	175	101	102	28110
1991	50	1799	6990	6616	4246	3412	498	383	137	88	24219
1992	1	3423	3094	2961	4202	1571	1251	174	165	59	16899
1993	0	1171	6787	2020	1526	1625	638	629	150	43	14590
1994		306	2306	4594	965	427	670	261	140	67	9737
1995		511	2006	2152	1627	231	175	234	66	27	7028
1996	0	320	1820	3021	910	900	79	94	113	2	7259
1997		628	1260	2377	2219	429	447	83	68	34	7545
1998	4.4	1020	2204	1241	1241	1059	192	57	23	2	7044
1999		394	3528	1997	988	504	759	127	22	2	8319
2000	10	1227	1536	3034	978	341	225	242	18	0.2	7612
2001	0	781	5197	1809	1908	599	220	117	101	13	10746
2002		60	2166	3846	1225	1485	439	105	80	63	9470
2003		152	663	1945	2785	570	560	123	37	22	6856
2004		61	744	507	921	791	195	197	56	34	3507
2005		41	246	1226	410	386	313	65	40	29	2754
2006		24	1,110	464	748	138	89	89	14	18	2694
2007											

Table A4 - continued. Commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of USA commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Mean
					USA Commercial Landings Mean Weight (kg) at Age						
1978	0.582	1.297	2.470	3.597	4.078	5.331	6.651	7.086	10.139	11.288	2.925
1979	0.868	1.428	2.065	4.402	5.041	7.309	9.702	10.310	9.874	13.568	4.194
1980	0.824	1.491	2.450	3.766	5.703	6.789	8.403	9.517	8.918	12.946	3.406
1981	1.071	1.502	2.388	3.489	4.958	7.247	8.662	9.881	14.572	18.590	3.296
1982	0.661	1.403	2.697	3.738	5.378	6.624	9.625	10.108	13.254	15.415	2.700
1983	1.066	1.479	2.442	3.487	4.895	6.506	8.544	10.774	11.586	16.505	2.945
1984	1.026	1.603	2.468	3.643	5.056	6.689	8.759	10.099	11.168	14.101	3.583
1985	0.935	1.408	2.124	3.926	5.147	6.406	8.190	10.423	12.459	14.012	2.966
1986	0.945	1.434	2.293	3.440	5.434	7.160	9.020	10.099	13.347	14.863	2.976
1987	0.857	1.406	2.474	4.027	5.634	7.910	8.507	9.888	11.670	14.828	2.479
1988	0.000	1.508	2.322	3.329	5.245	6.853	8.350	9.452	11.541	14.755	2.831
1989	0.000	1.668	2.226	3.627	5.066	6.454	8.260	9.348	10.640	10.811	3.025
1990	0.000	1.525	2.305	3.509	4.799	6.200	8.317	11.255	11.547	12.581	2.574
1991	1.174	1.546	2.460	3.594	5.116	6.073	7.667	9.080	11.005	14.979	3.270
1992	1.016	1.484	2.321	3.893	4.477	6.127	7.070	9.323	10.818	17.028	2.908
1993	0.866	1.523	2.177	3.323	5.303	5.741	7.671	8.813	9.617	15.320	2.785
1994	0.000	1.354	2.081	3.415	4.809	7.280	6.983	9.174	9.972	18.039	3.160
1995	0.000	1.499	1.992	3.773	5.253	8.397	9.268	12.303	12.152	19.118	3.056
1996	0.000	1.517	2.418	3.192	4.755	6.555	10.069	10.166	11.114	9.283	3.203
1997	0.000	1.577	2.337	3.529	3.919	5.727	7.473	7.856	11.241	12.006	3.236
1998	0.536	1.473	2.250	3.558	4.799	5.581	7.884	7.587	12.382	10.299	2.804
1999	0.000	1.542	2.119	3.291	4.686	5.851	6.739	8.700	10.792	10.671	2.817
2000	1.177	1.699	2.447	3.504	4.755	5.853	7.488	8.271	7.890	10.789	2.985
2001	0.727	1.539	2.258	2.938	4.174	5.407	6.479	7.785	9.334	10.907	2.650
2002	0.000	1.834	2.165	2.974	3.948	5.221	6.510	8.076	9.425	12.166	3.141
2003	0.000	2.048	2.378	2.992	3.937	4.879	5.927	7.079	8.708	10.994	3.524
2004	0.000	2.020	2.735	3.306	4.037	4.998	5.673	7.655	8.668	11.827	3.847
2005	0.000	1.811	2.569	3.426	4.118	5.033	5.737	8.174	9.189	12.260	3.821
2006	0.000	2.080	2.524	3.594	4.048	4.706	6.129	7.039	8.013	10.197	3.264
2007											
					USA Commercial Landings Mean Length (cm) at Age						
1978	39.0	50.2	61.5	69.2	71.6	78.8	85.3	87.7	97.7	100.7	64.2
1979	44.3	51.9	57.7	74.2	77.9	88.2	97.8	99.6	98.5	108.8	71.0
1980	43.3	52.5	61.3	70.9	81.4	86.6	92.5	95.1	94.5	107.7	66.0
1981	47.4	52.4	60.9	69.0	77.7	88.3	94.0	97.9	111.7	120.7	64.9
1982	39.7	51.6	63.2	70.1	79.6	85.3	97.1	98.5	107.9	113.1	60.5
1983	47.5	52.5	61.4	68.6	77.1	84.9	93.1	100.6	103.0	116.0	63.2
1984	46.9	53.7	61.7	70.1	78.0	86.0	94.0	98.6	102.0	109.5	67.7
1985	45.4	51.6	58.5	72.0	78.7	84.7	91.8	99.7	105.5	109.7	62.5
1986	45.6	51.7	60.2	68.1	79.6	88.0	95.0	98.6	108.1	111.8	63.2
1987	44.2	51.6	61.6	72.5	81.3	91.3	93.1	97.9	103.4	111.7	59.4
1988		53.0	60.6	67.4	78.9	86.5	92.4	96.4	102.8	111.3	63.1
1989		54.7	59.8	69.9	77.9	84.2	91.3	96.6	100.6	101.3	64.8
1990		53.2	60.2	68.9	76.4	83.1	91.8	102.2	103.3	106.4	61.1
1991	49.0	53.3	61.7	69.3	78.1	82.5	89.5	93.3	100.8	111.3	66.1
1992	46.8	52.7	60.9	72.1	75.5	83.5	88.7	96.3	102.8	119.1	63.6
1993	45.0	53.0	59.7	68.5	79.9	82.1	91.7	95.7	98.5	112.2	63.2
1994		51.3	58.6	69.0	77.7	89.2	89.0	97.6	100.0	121.4	66.0
1995		52.7	57.9	71.0	80.8	93.3	97.6	106.5	106.8	121.9	64.8
1996		53.1	61.5	67.5	76.9	87.2	96.9	100.9	103.0	99.0	66.5
1997		53.6	60.9	69.6	72.2	83.3	91.2	92.5	104.6	107.2	66.7
1998	38.1	52.4	60.3	70.8	78.5	82.9	93.1	92.0	107.8	102.3	63.5
1999		53.4	59.3	69.0	77.9	83.8	88.3	95.7	102.5	103.6	64.2
2000	48.9	54.8	62.1	70.1	77.6	83.6	90.8	94.6	93.7		65.2
2001	42.0	53.1	60.3	65.8	74.0	81.2	86.4	91.9	98.4	103.3	62.8
2002		56.4	59.4	66.4	72.8	80.0	86.3	92.6	97.6	107.2	66.6
2003		58.3	61.4	66.5	73.1	78.3	84.0	89.1	94.9	103.2	69.7
2004		58.2	64.0	68.9	73.9	79.5	82.9	92.0	95.5	106.2	71.6
2005		56.1	63.0	69.6	74.7	79.7	83.1	93.9	96.9	106.7	71.6
2006		58.7	62.3	70.6	73.8	77.4	85.0	89.0	90.8	100.4	67.6
2007											

Table A5. Discards at age (thousands of fish; metric tons) and mean weight (kg) at age of USA commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					USA Commercial Discards in Numbers (000's) at Age						
1978	150	65	120	9	8	0	0	0	0	0	352
1979	231	330	15	13	2	0	0	0	0	0	591
1980	237	371	73	3	0	0	0	0	0	0	683
1981	578	529	62	0	0	0	0	0	0	0	1169
1982	206	676	54	21	0	0	0	0	0	0	957
1983	171	378	103	3	0	0	0	0	0	0	655
1984	58	87	11	0	0	0	0	0	0	0	156
1985	12	289	14	0	0	0	0	0	0	0	315
1986	439	168	35	17	0	0	0	0	0	0	661
1987	16	190	54	5	1	0	0	0	0	0	266
1988	76	206	70	8	0	0	0	0	0	0	360
1989	715	521	89	5	0	0	0	0	0	0	1331
1990	43	444	119	12	4	0	0	0	0	0	623
1991	80	223	47	16	4	3	0	1	0	0	373
1992	37	247	9	3	3	1	1	0	0	0	301
1993	18	273	65	2	2	2	0	1	0	0	363
1994	43.3	126	27	6	1	0	0	0	0	0	203
1995	11.1	67	31	3	1	0	0	0	0	0	113
1996	34.6	28	19	10	2	1	0	0	0	0	96
1997	56.1	53	12	6	4	0	0	0	0	0	132
1998	15.7	25	16	6	3	1	0	0	0	0	68
1999	35.3	42	31	5	0	0	0	0	0.0	0.0	114
2000	12	66	21	17	3	1	0	0	0	0	121
2001	7	178	103	9	7	2	0	0	0	0	307
2002	13	36	63	14	2	0	0	0	0	0	128
2003	9	90	37	35	13	2	1	0	0	0	189
2004	19	28	65	3	3	2	0	0	0	0	120
2005	8	232	59	47	4	3	2	0	0	0	356
2006	17	33	179	9	11	1	0	0	0	0	250
2007											
					USA Commercial Discards in Weight (Tons) at Age						
1978	86	60	129	12	9	0	0	0	0	0	298
1979	152	349	18	16	3	0	0	0	0	0	537
1980	135	337	93	4	0	0	0	0	0	0	569
1981	374	581	78	0	0	0	0	0	0	0	1033
1982	139	757	64	26	0	0	0	0	0	0	985
1983	116	417	118	5	0	0	0	0	0	0	656
1984	27	61	9	0	0	0	0	0	0	0	98
1985	6	324	20	0	0	0	0	0	0	0	349
1986	285	117	37	18	0	0	0	0	0	0	457
1987	10	186	63	6	2	0	0	0	0	0	266
1988	47	185	83	9	0	0	0	0	0	0	323
1989	292	456	99	15	1	2	0	0	0	0	865
1990	23	412	140	24	17	1	0	0	0	0	618
1991	54	226	62	39	21	17	1	8	0	0	428
1992	25	231	15	11	18	6	5	0	1	0	311
1993	7	251	74	8	12	14	4	5	1	0	376
1994	19	109	37	15	2	1	1	0	0	0	185
1995	4	58	34	11	2	0	0	0	0	0	110
1996	17	25	37	40	12	8	.	0	0	0	138
1997	31	49	23	13	9	0	0	0	0	0	125
1998	9.5	25	42	24	14	7	1	0	8	0	130
1999	18.0	34	55	16	2	0	0	0	0	0	125
2000	7	64	47	61	16	4	1	0	0	0	201
2001	6	152	129	28	42	12	3	2	1	0	374
2002	7	39	95	24	4	1	0	0	0	0	169
2003	6	101	65	85	52	8	7	2	0	0	327
2004	7	32	94	9	13	9	2	1	0	0	166
2005	4	236	102	133	18	15	10	2	1	0	521
2006	7	34	264	21	24	2	1	1	0	1	355
2007											

Table A5 - continued. Discards at age (thousands of fish; metric tons) and mean weight (kg) at age of USA commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age									
Year	1	2	3	4	5	6	7	8	9	10+
	USA Commercial Discards Mean Weight (kg) at Age									
1978	0.577	0.927	1.076	1.386	1.111	0.000	0.000	0.000	0.000	0.000
1979	0.658	1.059	1.185	1.209	1.242	0.000	0.000	0.000	0.000	0.000
1980	0.567	0.910	1.276	1.484	0.000	0.000	0.000	0.000	0.000	0.000
1981	0.648	1.097	1.257	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1982	0.675	1.119	1.184	1.261	0.000	0.000	0.000	0.000	0.000	0.000
1983	0.677	1.104	1.148	1.484	0.000	0.000	0.000	0.000	0.000	0.000
1984	0.474	0.699	0.835	1.484	0.000	0.000	0.000	0.000	0.000	0.000
1985	0.474	1.119	1.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1986	0.648	0.694	1.049	1.059	0.000	0.000	0.000	0.000	0.000	0.000
1987	0.610	0.980	1.177	1.028	1.484	0.000	0.000	0.000	0.000	0.000
1988	0.615	0.900	1.178	1.093	0.000	0.000	0.000	0.000	0.000	0.000
1989	0.408	0.874	1.114	3.114	5.035	6.119	6.193	6.974	0.000	0.000
1990	0.524	0.929	1.181	1.964	3.875	4.159	4.536	6.273	0.000	0.000
1991	0.676	1.015	1.332	2.446	5.868	6.615	5.989	13.874	0.000	0.000
1992	0.685	0.934	1.579	3.263	5.997	7.374	8.146	8.107	9.389	0.000
1993	0.387	0.916	1.137	4.400	7.288	7.648	8.614	8.866	9.465	6.735
1994	0.441	0.867	1.355	2.656	4.480	6.420	6.356	6.974	0.000	0.000
1995	0.402	0.866	1.089	3.698	4.614	4.639	4.109	0.000	0.000	0.000
1996	0.499	0.874	1.886	3.856	5.526	6.628	0.000	0.000	5.213	0.000
1997	0.549	0.927	1.812	2.297	2.193	2.831	3.319	0.000	0.000	0.000
1998	0.603	1.011	2.590	3.910	4.583	5.176	6.309	7.987	16.634	0.000
1999	0.512	0.804	1.785	3.200	3.536	3.767	4.124	0.000	0.000	0.000
2000	0.542	0.964	2.231	3.555	4.882	5.383	6.052	5.608	0.000	0.000
2001	0.805	0.851	1.256	3.169	5.719	6.456	7.211	6.998	7.323	0.000
2002	0.522	1.083	1.502	1.735	1.622	4.044	4.215	3.780	5.213	0.000
2003	0.647	1.117	1.733	2.421	3.861	4.801	6.287	10.006	9.444	11.374
2004	0.359	1.154	1.439	2.777	3.786	4.865	5.792	8.059	7.990	10.056
2005	0.431	1.018	1.720	2.799	3.954	4.666	6.119	9.771	10.247	10.781
2006	0.431	1.010	1.480	2.276	2.199	3.125	5.130	7.728	3.713	16.125
2007										

Table A6. Recreational landings at age (thousands of fish; metric tons) and mean weight (kg) at age of USA commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1981-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					USA Recreational Landings in Numbers (000's) at Age						
1978											0
1979											0
1980											0
1981	601	382	341	163	12	122	35	22	0	7	1684
1982	136	929	202	109	68	3	38	7	3	0	1495
1983	340	599	507	91	74	34	0	3	0	28	1676
1984	153	92	82	88	12	15	4	1	4	2	453
1985	34	849	388	275	258	44	31	5	3	4	1891
1986	176	46	49	7	6	7	0	1	3	1	295
1987	55	297	46	44	4	8	6	0	1	2	462
1988	239	238	476	51	100	7	3	18	0	0	1132
1989	176	124	29	51	6	5	1	0	0	0	393
1990	22	131	166	54	65	9	6	1	0	2	455
1991	135	59	86	60	23	8	2	0	0	0	373
1992	30	110	32	11	10	4	2	1	0	0	199
1993	277	241	177	21	15	7	3	0	10	3	755
1994	45.8	113	66	43	11	5	3	1	1	0	288
1995	20.6	203	226	32	18	4	1	0	0	0	503
1996	29.1	22	47	36	8	7	0	0	0	0	150
1997	66.5	123	42	48	37	4	5	0	0	0	326
1998	39.2	128	62	18	12	5	0	1	0	0	265
1999	9.0	17	34	36	16	5	5	0	1.9	0.0	124
2000	92	121	29	29	8	2	0	0	0	0	280
2001	4	23	55	6	9	1	0	0	0	0	98
2002	9	11	25	37	5	5	1	0	0	0	93
2003	7	29	16	19	16	2	2	0	0	0	92
2004	30	6	28	22	21	14	3	4	0	0	129
2005	3	76	16	32	7	3	3	0	0	0	141
2006	9	5	14	3	6	1	1	0	0	0	40
2007											
					USA Recreational Landings in Weight (Tons) at Age						
1978	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0
1981	299	572	879	664	55	1096	302	206	0	90	4162
1982	73	1335	437	320	311	16	366	63	35	0	2955
1983	189	822	1509	333	340	195	0	24	0	454	3865
1984	52	70	249	346	55	106	34	9	44	29	994
1985	15	1116	834	848	1160	293	273	49	38	52	4678
1986	93	34	104	23	39	53	1	10	42	25	425
1987	25	463	120	188	22	58	48	0	5	40	970
1988	105	230	1153	196	593	41	23	246	0	0	2587
1989	96	130	62	157	24	23	9	2	6	0	507
1990	10	165	437	216	358	61	40	10	4	38	1339
1991	61	67	242	184	73	23	8	0	0	0	657
1992	15	140	74	40	42	21	13	4	0	0	350
1993	74	191	432	74	65	48	34	0	175	34	1127
1994	23	109	159	164	46	19	7	8	8	0	544
1995	8	250	375	88	90	12	4	0	0	0	826
1996	13	31	113	112	46	50	1	2	0	0	367
1997	34	159	112	175	170	19	45	1	0	0	715
1998	25.2	164	130	51	41	20	0	3	0	0	434
1999	5.2	21	79	145	72	27	21	1	16	0	387
2000	27	105	53	88	31	5	1	0	0	0	309
2001	1	34	115	21	29	4	1	0	0	0	205
2002	3	13	59	113	19	25	4	0	0	0	237
2003	4	31	34	56	59	6	13	1	0	0	203
2004	10	7	55	73	79	65	24	25	3	4	345
2005	2	70	29	82	33	12	14	2	0	0	243
2006	4	4	25	7	19	5	15	2	0	0	79
2007											

Table A6 - continued. Discards at age (thousands of fish; metric tons) and mean weight (kg) at age of USA commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1981-2006.

	Age									
Year	1	2	3	4	5	6	7	8	9	10+
					USA Recreational Landings Mean Weight (kg) at Age					
1978										
1979										
1980										
1981	0.497	1.497	2.580	4.070	4.608	8.963	8.720	9.583	0.000	12.351
1982	0.537	1.437	2.163	2.921	4.591	5.839	9.512	9.342	10.619	0.000
1983	0.557	1.372	2.973	3.671	4.623	5.701	0.000	7.181	0.000	16.211
1984	0.342	0.756	3.052	3.943	4.600	6.959	8.629	13.780	9.824	13.029
1985	0.453	1.315	2.152	3.078	4.497	6.675	8.684	10.084	11.956	13.353
1986	0.527	0.747	2.134	3.343	7.017	7.701	6.959	11.624	16.623	21.883
1987	0.457	1.558	2.614	4.283	5.587	7.414	7.516	0.000	9.095	26.331
1988	0.440	0.968	2.420	3.802	5.916	6.059	9.095	13.737	0.000	0.000
1989	0.543	1.042	2.119	3.093	4.052	5.052	7.178	8.255	11.590	0.000
1990	0.448	1.267	2.631	4.030	5.515	6.636	7.126	9.990	9.095	17.518
1991	0.451	1.137	2.818	3.063	3.138	3.021	3.780	0.000	0.000	0.000
1992	0.513	1.267	2.356	3.738	4.189	5.595	5.568	7.469	0.000	0.000
1993	0.268	0.794	2.437	3.493	4.289	7.261	9.990	0.000	17.072	9.990
1994	0.495	0.965	2.434	3.832	4.068	4.086	2.405	14.559	14.559	0.000
1995	0.393	1.234	1.659	2.715	5.051	3.274	6.051	0.000	0.000	0.000
1996	0.454	1.399	2.380	3.160	5.936	6.775	2.898	5.415	0.000	0.000
1997	0.509	1.287	2.693	3.630	4.608	4.952	8.582	4.281	0.000	0.000
1998	0.642	1.285	2.074	2.907	3.458	3.954	0.000	4.814	0.000	0.000
1999	0.584	1.203	2.303	4.016	4.568	5.376	4.686	3.780	8.529	0.000
2000	0.291	0.864	1.861	3.023	4.028	2.818	4.826	0.000	0.000	0.000
2001	0.255	1.500	2.090	3.265	3.392	4.348	5.621	0.000	0.000	0.000
2002	0.400	1.189	2.336	3.096	3.942	4.747	5.521	0.000	0.000	0.000
2003	0.557	1.059	2.173	2.876	3.667	2.766	5.486	5.415	0.000	0.000
2004	0.316	1.190	1.988	3.267	3.837	4.637	7.081	5.941	7.469	10.301
2005	0.507	0.918	1.777	2.549	4.452	4.137	4.124	6.735	0.000	0.000
2006	0.397	0.753	1.733	2.431	3.141	3.447	13.837	5.137	4.281	0.000
2007										

Table A7. Landings at age (thousands of fish; metric tons) and mean weight (kg) at age of Canadian commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					Canadian Commercial Landings in Numbers (000's) at Age						
1978	2	61	1977	654	201	76	56	12	12	7	3058
1979	0	371	328	763	302	55	18	9	4	3	1853
1980	1	776	1122	214	420	125	32	11	14	10	2725
1981	2	146	611	506	135	382	87	51	21	16	1957
1982	6	1287	1362	1108	744	164	222	97	21	26	5037
1983	27	744	2505	1212	201	54	10	17	12	3	4785
1984	0	26	118	376	341	123	72	19	18	39	1132
1985	4	2147	904	383	497	139	45	38	9	11	4177
1986	19	238	1298	369	145	218	29	19	9	3	2347
1987	14	2596	602	741	91	79	117	22	15	6	4283
1988	10	229	2330	320	416	68	60	110	29	29	3601
1989	0	314	281	908	123	177	31	23	37	18	1912
1990	7	340	1776	619	802	95	102	8	14	30	3793
1991	11	493	512	1242	585	516	74	47	15	20	3515
1992	70	1784	899	291	544	186	175	25	21	7	4002
1993	4	252	1069	594	171	244	91	69	17	15	2526
1994	2	140	340	594	213	34	47	22	16	2	1410
1995	0	39	164	64	54	10	2	1	1	0	335
1996	1	25	163	269	52	36	9	2	1	0	558
1997	3	90	129	251	230	60	26	7	4	1	801
1998	0	58	202	97	91	74	13	7	3	2	547
1999	1	30	236	170	48	28	23	7	1	3	547
2000	0	30	59	231	93	25	15	9	2	1	465
2001	0.1	10	197	114	210	61	18	9	3	0	622
2002	0	3	38	150	42	75	14	5	2	1	330
2003	0.2	5	67	80	141	28	38	9	2	1	371
2004	3	14	132	153	134	129	33	22	4	1	625
2005	0	6	12	83	24	18	21	8	4	1	178
2006	0	3	113	44	125	32	14	14	2	1	348
2007											
					Canadian Commercial Landings in Weight (Tons) at Age						
1978	1	84	4816	1911	788	470	371	122	113	107	8783
1979		509	525	2842	1398	342	169	105	47	42	5979
1980	1	1042	2722	692	2099	809	228	133	177	157	8060
1981	2	199	1433	1779	704	2638	801	497	220	224	8496
1982	4	1858	3165	4228	3860	1074	2028	914	266	418	17816
1983	24	1084	5519	3854	876	335	80	176	147	37	12132
1984		38	292	1427	1620	743	622	202	195	620	5758
1985	3	3019	1775	1388	2370	895	368	369	94	160	10442
1986	14	374	3734	1458	811	1565	250	180	89	28	8503
1987	9	4185	1556	3302	557	596	1113	243	189	93	11842
1988	8	296	5867	1249	2378	455	555	1177	334	437	12757
1989		411	662	3771	673	1207	231	247	432	276	7912
1990	6	616	5021	2290	4187	632	875	90	183	445	14345
1991	12	866	1425	4281	2593	2885	527	451	127	291	13457
1992	80	2769	2301	1038	2492	1101	1245	241	265	138	11669
1993	3	392	2488	1851	768	1429	638	623	153	183	8527
1994	2	203	817	2270	1023	243	370	196	128	23	5276
1995		57	409	241	286	63	22	10	10	0	1099
1996	1	38	384	898	272	229	62	17	11	0	1912
1997	3	138	292	821	979	351	213	60	47	13	2917
1998		86	480	310	389	431	91	58	33	30	1908
1999	1	47	540	600	200	177	156	56	9	41	1825
2000	0	44	126	710	393	123	93	66	17	13	1585
2001	0	15	445	338	840	312	94	72	28	0	2144
2002		4	86	461	181	379	94	41	18	11	1275
2003	0.1	7	142	213	529	122	216	62	15	9	1316
2004	2	19	268	437	462	589	181	162	39	7	2166
2005		7	21	210	89	89	108	60	34	12	630
2006	0	3	212	108	435	148	87	80	13	11	1097
2007											

Table A7 - continued. Landings at age (thousands of fish; metric tons) and mean weight (kg) at age of Canadian commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					Canadian Commercial Landings Mean Weight (kg) at Age						
1978	0.707	1.376	2.436	2.922	3.918	6.187	6.625	10.148	9.429	15.262	2.872
1979	0.000	1.371	1.601	3.725	4.630	6.222	9.365	11.638	11.699	14.064	3.227
1980	0.567	1.343	2.426	3.235	4.997	6.468	7.119	12.135	12.652	15.721	2.958
1981	0.839	1.362	2.345	3.516	5.216	6.905	9.204	9.747	10.465	13.993	4.341
1982	0.652	1.444	2.324	3.816	5.188	6.550	9.137	9.418	12.667	16.092	3.537
1983	0.904	1.457	2.203	3.180	4.357	6.203	8.042	10.368	12.222	12.270	2.535
1984	0.000	1.477	2.473	3.794	4.751	6.043	8.633	10.622	10.807	15.897	5.087
1985	0.686	1.406	1.964	3.625	4.768	6.440	8.181	9.718	10.499	14.537	2.500
1986	0.723	1.572	2.877	3.952	5.592	7.179	8.612	9.453	9.934	9.437	3.623
1987	0.661	1.612	2.584	4.456	6.125	7.540	9.510	11.031	12.629	15.444	2.765
1988	0.786	1.294	2.518	3.904	5.716	6.694	9.251	10.700	11.531	15.065	3.543
1989	0.000	1.310	2.356	4.153	5.471	6.820	7.459	10.757	11.680	15.356	4.138
1990	0.831	1.812	2.827	3.699	5.221	6.657	8.582	11.227	13.080	14.821	3.782
1991	1.051	1.756	2.783	3.447	4.432	5.591	7.116	9.604	8.457	14.550	3.828
1992	1.148	1.552	2.559	3.568	4.581	5.921	7.112	9.626	12.603	19.714	2.916
1993	0.872	1.557	2.327	3.116	4.489	5.858	7.006	9.035	8.974	12.173	3.376
1994	0.906	1.453	2.404	3.822	4.805	7.141	7.869	8.914	7.970	11.637	3.742
1995	0.906	1.472	2.495	3.759	5.298	6.313	10.903	10.181	10.175		3.279
1996	1.034	1.538	2.358	3.337	5.237	6.358	6.916	8.455	10.594		3.427
1997	0.954	1.536	2.264	3.269	4.257	5.855	8.190	8.546	11.825	12.688	3.641
1998	0.626	1.484	2.375	3.195	4.274	5.828	6.991	8.298	10.984	14.840	3.487
1999	0.799	1.554	2.288	3.527	4.162	6.304	6.768	8.003	9.390	13.572	3.336
2000	0.866	1.458	2.128	3.075	4.230	4.923	6.200	7.344	8.254	12.863	3.408
2001	0.880	1.468	2.261	2.963	4.001	5.119	5.219	7.967	9.218		3.446
2002	0.551	1.421	2.265	3.073	4.301	5.054	6.721	8.277	8.790	10.755	3.863
2003	0.524	1.344	2.119	2.658	3.755	4.363	5.693	6.902	7.610	9.391	3.546
2004	0.700	1.370	2.032	2.852	3.450	4.570	5.500	7.350	9.030	8.860	3.468
2005	0.000	1.248	1.676	2.517	3.766	4.842	5.215	7.114	8.407	9.796	3.539
2006	0.048	1.102	1.872	2.430	3.493	4.564	6.340	5.917	7.321	7.646	3.156
2007											

Table A8. Discards at age (thousands of fish; metric tons) and mean weight (kg) at age of Canadian commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					Canadian Commercial Discards in Numbers (000's) at Age						
1978	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1979	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1981	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1982	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1983	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1984	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1986	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1987	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1988	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1989	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1991	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1992	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1993	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1994	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
1996	0.07	1.24	3.77	8.41	2.80	2.01	0.77	0.13	0.17	0.05	19
1997	0.32	19.43	27.20	41.70	45.74	8.81	3.26	1.11	0.09	0.06	148
1998	0.02	14.66	50.09	24.84	21.38	14.88	2.81	0.86	0.28	0.71	131
1999	0.44	8.71	55.11	34.36	11.58	6.57	3.56	0.39	0.17	0.16	121
2000	0.06	2.62	4.06	12.93	5.88	2.42	0.90	0.45	0.02	0.04	29
2001	0.26	0.94	11.41	6.43	15.46	5.82	2.26	1.45	0.96	0.24	45
2002	0.04	0.41	2.49	11.28	3.69	6.51	2.37	0.77	0.15	0.26	28
2003	0.22	0.35	4.48	15.11	32.20	7.28	6.36	1.57	0.24	0.00	68
2004	0.35	0.96	4.34	16.48	7.39	5.95	2.54	0.39	0.74	0.12	39
2005	0.75	18.90	16.00	55.80	9.18	4.86	4.78	1.07	0.36	0.06	112
2006	4.70	14.17	81.24	22.18	38.65	7.06	1.85	1.79	0.21	0.18	172
2007											
					Canadian Commercial Discards in Weight (Tons) at Age						
1978	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1979	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1980	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1982	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1983	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1985	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1986	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1987	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1988	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1989	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1990	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1991	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1992	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1993	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1994	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1995	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
1996	0.009	0.696	4.757	15.032	8.126	7.782	3.345	0.635	0.895	0.292	42
1997	0.294	27.184	58.041	128.854	183.577	47.016	24.650	8.935	0.476	0.358	479
1998	0.015	19.243	108.086	67.431	78.894	72.053	14.479	5.656	2.430	4.067	372
1999	0.343	12.400	117.570	102.092	41.015	30.444	18.731	2.943	1.258	1.536	328
2000	0.008	1.473	5.123	23.091	17.048	9.363	3.872	2.221	0.114	0.184	62
2001	0.034	0.526	14.396	11.495	44.858	22.525	9.783	7.132	5.122	1.037	117
2002	0.005	0.233	3.137	20.153	10.691	25.216	10.252	3.789	0.782	1.623	76
2003	0.028	0.199	5.657	26.992	93.420	28.209	27.485	7.759	1.303	0.000	191
2004	0.045	0.538	5.479	29.433	21.426	23.035	10.974	1.918	3.946	0.744	98
2005	0.091	14.061	22.899	119.134	27.885	20.186	20.142	5.424	2.744	0.434	233
2006	0.636	7.637	129.950	46.359	118.358	28.348	10.901	9.988	1.370	1.454	355
2007											

Table A8 - continued. Discards at age (thousands of fish; metric tons) and mean weight (kg) at age of Canadian commercial landings of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age									
Year	1	2	3	4	5	6	7	8	9	10+
	Canadian Commercial Discards Mean Weight (kg) at Age									
1978	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1979	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1980	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1982	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1983	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1985	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1986	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1987	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1988	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1989	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1990	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1991	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1992	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1993	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1994	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1995	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1996	0.128	0.562	1.262	1.786	2.901	3.872	4.322	4.934	5.353	5.912
1997	0.907	1.399	2.134	3.090	4.014	5.339	7.561	8.049	5.353	5.913
1998	0.629	1.312	2.158	2.714	3.691	4.843	5.144	6.585	8.728	5.741
1999	0.773	1.424	2.133	2.971	3.542	4.633	5.257	7.576	7.380	9.472
2000	0.128	0.562	1.262	1.786	2.901	3.872	4.322	4.934	5.353	5.159
2001	0.128	0.562	1.262	1.786	2.901	3.872	4.322	4.934	5.353	4.327
2002	0.128	0.562	1.262	1.786	2.901	3.872	4.322	4.934	5.353	6.232
2003	0.128	0.562	1.262	1.786	2.901	3.872	4.322	4.934	5.353	0.000
2004	0.128	0.562	1.262	1.786	2.901	3.872	4.322	4.934	5.353	6.392
2005	0.120	0.744	1.431	2.135	3.039	4.158	4.211	5.069	7.635	7.608
2006	0.135	0.539	1.600	2.090	3.063	4.013	5.902	5.586	6.520	8.014
2007										

Table A9. Catch at age (thousands of fish; metric tons) and mean weight (kg) at age of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Total
					Catch in Numbers (000's) at Age						
1978	152	417	8109	2430	897	178	241	23	42	11	12499
1979	279	2243	954	4585	1207	450	160	304	13	35	10229
1980	340	4239	5955	545	2465	983	418	70	139	14	15168
1981	1,219	3911	4738	2685	318	1406	417	163	156	66	15079
1982	775	10457	4434	2988	2040	297	707	199	75	85	22057
1983	626	5182	8753	2680	1155	746	95	175	68	113	19593
1984	281	1548	3486	3328	924	560	450	59	167	125	10928
1985	176	7444	2942	1690	2098	496	267	197	28	90	15428
1986	768	1594	4576	860	525	615	86	70	56	28	9179
1987	104	7956	1515	2170	300	250	277	56	36	26	12691
1988	325	2352	8368	1074	1576	224	150	218	46	53	14386
1989	891	2609	3033	4254	383	534	81	51	60	21	11919
1990	72	5561	5373	1964	2272	231	229	25	23	40	15791
1991	270	1938	3486	3159	1442	1088	141	90	27	26	11667
1992	138	4448	2273	1066	1496	447	355	44	36	10	10313
1993	299	1535	4429	1225	475	536	178	141	43	21	8883
1994	91.1	605	1541	1987	426	98	146	51	31	6	4981
1995	31.7	649	1427	670	382	41	21	20	6	1	3251
1996	64.7	287	987	1270	256	184	18	12	11	0	3089
1997	125.9	684	749	1021	883	148	94	19	10	4	3738
1998	63.1	919	1310	494	386	285	40	16	6	3	3522
1999	45.7	354	2020	852	287	126	144	22	5.0	3.4	3859
2000	113	942	741	1156	316	88	46	39	4	1	3446
2001	12	720	2667	752	699	180	55	26	15	1	5126
2002	22	83	1129	1505	363	371	85	19	11	6	3594
2003	17	199	403	800	910	156	142	28	7	3	2665
2004	52	79	501	349	394	309	74	53	12	4	1825
2005	12	355	199	577	144	106	85	18	9	4	1509
2006	31	67	827	207	365	71	31	28	4	3	1635
2007											
					Catch in Weight (Tons) at Age						
1978	88	522	19793	8279	3600	1016	1600	197	418	149	35661
1979	194	3060	1804	19625	5951	3227	1542	3147	135	476	39162
1980	219	5990	14476	1933	13759	6634	3473	699	1289	212	48684
1981	417	5064	10405	8814	1552	9172	3359	1391	2180	1,116	43471
1982	426	13229	10826	10796	10464	1938	6329	1872	932	1,321	58132
1983	234	6621	19407	8651	5187	4617	803	1843	792	1,838	49993
1984	100	2250	8382	11861	4507	3566	3900	598	1809	1828	38801
1985	126	9197	5271	5439	9281	2904	1931	1973	288	1260	37671
1986	425	2129	11097	3083	2847	4361	758	689	682	405	26475
1987	35	11220	3632	8864	1706	1885	2422	580	430	406	31182
1988	55	3014	18703	3571	7934	1476	1288	2029	536	784	39389
1989	292	3617	6622	15722	1963	3483	637	509	674	312	33832
1990	28	8117	12798	6801	10927	1415	1888	265	285	586	43112
1991	116	2891	8477	10936	6860	6313	1025	841	264	381	38106
1992	107	6423	5409	4010	6712	2678	2501	414	431	196	28882
1993	11	1814	9349	3879	2304	3069	1279	1258	305	260	23527
1994	21	619	3161	6878	1991	671	1042	459	267	89	15196
1995	4	626	2449	2404	1916	294	196	244	75	27	8236
1996	18	384	2246	3974	1203	1144	144	111	124	2	9350
1997	34	843	1632	3340	3390	827	685	152	116	47	11066
1998	13.9	1151	2833	1642	1722	1570	298	121	66	36	9453
1999	19.2	487	4239	2715	1230	711	933	186	32	44	10597
2000	17	1336	1714	3828	1405	477	323	311	34	13.0	9459
2001	6	948	5784	2186	2836	946	327	198	134	13	13379
2002	7	103	2350	4350	1421	1890	544	150	98	76	10989
2003	6	260	875	2270	3460	728	811	195	54	31	8690
2004	9	112	1111	983	1418	1411	389	362	99	46	5939
2005	4	298	391	1688	545	510	452	133	78	42	4141
2006	8	68	1,716	639	1,326	316	187	180	28	31	4500
2007											

Table A9 - continued. Catch at age (thousands of fish; metric tons) and mean weight (kg) at age of Atlantic cod from the Georges Bank and South stock (NAFO Division 5Z and Subarea 6), 1978-2006.

	Age										
Year	1	2	3	4	5	6	7	8	9	10+	Mean
					Catch Mean Weight (kg) at Age						
1978	0.579	1.251	2.441	3.407	4.014	5.696	6.645	8.708	9.936	13.887	2.853
1979	0.694	1.364	1.892	4.280	4.931	7.176	9.664	10.350	10.438	13.611	3.829
1980	0.644	1.413	2.431	3.546	5.583	6.748	8.305	9.926	9.295	14.900	3.210
1981	0.587	1.441	2.381	3.529	5.055	7.303	8.780	9.800	14.018	16.799	3.153
1982	0.643	1.393	2.540	3.720	5.282	6.576	9.466	9.745	12.972	15.623	2.770
1983	0.676	1.436	2.389	3.352	4.784	6.447	8.491	10.667	11.699	16.319	2.726
1984	0.540	1.499	2.476	3.668	4.937	6.554	8.738	10.309	11.093	14.643	3.639
1985	0.806	1.385	2.075	3.720	4.977	6.439	8.247	10.279	11.765	14.047	2.742
1986	0.674	1.357	2.448	3.611	5.494	7.173	8.877	9.944	12.947	14.562	2.928
1987	0.582	1.468	2.476	4.171	5.768	7.777	8.908	10.336	12.027	15.642	2.530
1988	0.492	1.379	2.373	3.506	5.412	6.781	8.722	10.433	11.535	14.926	2.918
1989	0.435	1.436	2.204	3.732	5.181	6.563	7.937	9.976	11.287	14.651	2.881
1990	0.531	1.489	2.463	3.573	4.967	6.402	8.404	11.191	12.425	14.512	2.813
1991	0.658	1.526	2.501	3.520	4.809	5.825	7.318	9.385	9.615	14.649	3.322
1992	0.886	1.475	2.413	3.801	4.516	6.039	7.083	9.473	11.847	18.836	2.834
1993	0.284	1.306	2.208	3.227	4.984	5.820	7.378	8.922	11.135	12.228	2.772
1994	0.478	1.203	2.154	3.544	4.787	7.074	7.176	9.116	9.003	15.762	3.160
1995	0.396	1.349	1.978	3.721	5.249	7.430	9.327	12.197	11.841	19.118	2.788
1996	0.487	1.442	2.391	3.218	4.875	6.496	8.101	9.699	10.975	8.621	3.146
1997	0.538	1.464	2.328	3.445	4.033	5.734	7.734	8.090	11.420	12.087	3.152
1998	0.619	1.432	2.261	3.425	4.571	5.576	7.399	7.753	11.820	12.310	2.807
1999	0.535	1.436	2.138	3.355	4.543	5.867	6.641	8.406	9.562	13.201	2.847
2000	0.388	1.529	2.386	3.387	4.549	5.472	6.996	8.013	8.049	12.597	2.834
2001	0.601	1.365	2.212	2.937	4.101	5.265	5.980	7.681	9.043	9.737	2.650
2002	0.474	1.402	2.134	2.966	3.963	5.157	6.475	8.000	9.249	11.708	3.123
2003	0.601	1.461	2.255	2.908	3.866	4.710	5.789	6.918	8.251	10.448	3.337
2004	0.351	1.520	2.328	3.027	3.803	4.781	5.616	7.368	8.555	10.973	3.442
2005	0.431	1.036	2.106	3.069	4.004	4.925	5.467	7.496	8.785	11.371	2.905
2006	0.376	1.082	2.105	3.110	3.683	4.536	6.462	6.393	7.521	9.065	2.800
2007											

Table A10a. Standardized (for vessel and door changes) stratified mean catch per tow at age (numbers) of Atlantic cod in NEFSC offshore spring and autumn bottom trawl surveys on Georges Bank (Strata 13-25), 1963 - 2007.

	AGE											
Year	0	1	2	3	4	5	6	7	8	9	10+	No./tow
SPRING												
1968	0.513	0.136	1.615	0.825	0.665	0.385	0.246	0.140	0.083	0.056	0.058	4.722
1969	0.000	0.123	0.546	1.780	0.888	0.451	0.326	0.215	0.128	0.072	0.112	4.641
1970	0.000	0.338	0.804	0.430	1.241	0.162	0.844	0.263	0.058	0.056	0.147	4.342
1971	0.000	0.206	0.860	0.438	0.254	0.570	0.114	0.324	0.365	0.128	0.132	3.391
1972	0.056	3.000	1.838	2.732	0.445	0.166	0.323	0.084	0.285	0.071	0.158	9.159
1973	0.056	0.546	42.258	6.344	6.387	0.657	0.515	0.367	0.058	0.217	0.404	57.808
1974	0.000	0.444	4.558	5.971	0.761	1.988	0.442	0.100	0.265	0.064	0.144	14.735
1975	0.000	0.064	0.327	2.092	2.941	0.377	0.744	0.084	0.115	0.147	0.000	6.890
1976	0.111	1.298	1.955	0.915	0.661	1.607	0.153	0.261	0.029	0.000	0.068	7.058
1977	0.000	0.044	3.389	1.084	0.553	0.267	0.717	0.052	0.066	0.000	0.021	6.193
1978	3.312	0.372	0.192	5.531	0.972	0.778	0.142	0.712	0.065	0.141	0.096	12.312
1979	0.108	0.428	1.298	0.275	1.852	0.547	0.236	0.084	0.139	0.013	0.022	5.000
1980	0.105	0.031	2.217	2.690	0.212	1.705	0.374	0.186	0.031	0.030	0.096	7.676
1981	0.301	2.302	1.852	2.811	1.685	0.106	0.879	0.258	0.132	0.000	0.113	10.438
1982	0.169	0.508	5.435	9.502	8.324	6.208	0.293	1.866	0.369	0.082	0.203	32.958
1983	0.081	0.332	1.952	3.017	0.796	0.697	0.443	0.027	0.219	0.000	0.138	7.701
1984	0.000	0.402	0.431	0.761	1.238	0.422	0.400	0.209	0.000	0.215	0.000	4.078
1985	0.244	0.111	2.653	0.663	1.110	1.412	0.265	0.192	0.180	0.037	0.161	7.029
1986	0.092	0.872	0.409	1.844	0.365	0.540	0.618	0.062	0.125	0.101	0.015	5.044
1987	0.000	0.020	1.613	0.378	0.763	0.062	0.179	0.136	0.033	0.027	0.025	3.235
1988	0.180	0.720	0.609	3.150	0.409	0.644	0.064	0.037	0.049	0.000	0.007	5.868
1989	0.000	0.310	1.410	0.666	1.583	0.235	0.351	0.051	0.040	0.055	0.093	4.794
1990	0.042	0.173	0.922	1.737	0.674	0.912	0.130	0.143	0.013	0.016	0.027	4.790
1991	0.195	1.027	0.528	0.689	0.929	0.479	0.328	0.054	0.041	0.000	0.045	4.313
1992	0.000	0.123	1.252	0.468	0.168	0.273	0.142	0.159	0.020	0.037	0.028	2.670
1993	0.110	0.009	0.399	1.306	0.205	0.090	0.138	0.029	0.034	0.021	0.055	2.396
1994	0.030	0.125	0.272	0.200	0.217	0.033	0.006	0.044	0.000	0.019	0.000	0.945
1995	0.482	0.050	0.382	0.854	0.534	0.599	0.107	0.234	0.028	0.022	0.000	3.290
1996	0.000	0.073	0.214	0.736	1.247	0.174	0.209	0.028	0.018	0.000	0.000	2.699
1997	0.302	0.291	0.437	0.170	0.489	0.422	0.050	0.134	0.020	0.000	0.000	2.315
1998	0.018	0.111	0.665	1.298	0.848	0.755	0.533	0.102	0.031	0.000	0.000	4.360
1999	0.067	0.212	0.291	0.609	0.510	0.238	0.119	0.064	0.031	0.007	0.000	2.148
2000	0.053	0.221	0.807	0.830	1.141	0.370	0.102	0.026	0.020	0.000	0.000	3.569
2001	0.000	0.061	0.235	0.794	0.160	0.383	0.177	0.023	0.018	0.012	0.000	1.862
2002	0.018	0.065	0.093	0.383	0.993	0.239	0.225	0.039	0.000	0.000	0.028	2.083
2003	0.000	0.016	0.213	0.271	0.623	0.696	0.064	0.080	0.012	0.000	0.000	1.975
2004	0.000	0.637	0.058	0.579	1.407	1.354	0.893	0.179	0.261	0.013	0.000	5.380
2005	0.0614	0.0119	0.4838	0.1378	0.631	0.2744	0.2053	0.1274	0.0298	0		1.9628
2006	0.0127	0.1786	0.231	1.3059	0.3319	0.7234	0.2128	0.1213	0.0539	0	0	3.1715
2007	0.000	0.125	0.639	0.3756	1.7937	0.1809	0.2092	0.0309	0.0181	0	0	3.3724
average	0.269	0.403	1.130	1.666	1.175	0.705	0.313	0.183	0.094	0.066	0.096	6.959

Table A10b. Standardized (for vessel and door changes) stratified mean catch per tow at age (numbers) of Atlantic cod in NEFSC offshore spring and autumn bottom trawl surveys on Georges Bank (Strata 13-25), 1963 - 2004.

	AGE											
Year	0	1	2	3	4	5	6	7	8	9	10+	No./tow
AUTUMN												
1963	0.019	0.719	0.778	0.920	0.897	0.354	0.326	0.175	0.103	0.014	0.069	4.374
1964	0.009	0.640	0.699	0.588	0.538	0.145	0.136	0.062	0.050	0.030	0.083	2.980
1965	0.173	1.299	0.998	0.707	0.484	0.167	0.179	0.112	0.081	0.023	0.023	4.246
1966	1.025	1.693	1.000	0.515	0.264	0.100	0.095	0.062	0.039	0.002	0.017	4.812
1967	0.072	7.596	1.334	0.523	0.406	0.133	0.133	0.055	0.051	0.012	0.070	10.385
1968	0.070	0.314	1.611	0.783	0.271	0.073	0.067	0.027	0.023	0.008	0.048	3.295
1969	0.000	0.343	0.622	0.626	0.331	0.094	0.061	0.019	0.023	0.022	0.059	2.200
1970	0.434	1.699	1.361	0.532	0.696	0.153	0.000	0.033	0.055	0.055	0.098	5.116
1971	0.400	0.602	0.617	0.408	0.310	0.478	0.164	0.042	0.090	0.000	0.075	3.186
1972	0.948	7.473	1.191	1.841	0.399	0.241	0.568	0.116	0.204	0.021	0.084	13.085
1973	0.203	1.748	6.060	1.164	2.039	0.210	0.225	0.175	0.062	0.137	0.253	12.276
1974	0.461	0.410	0.667	1.509	0.161	0.089	0.112	0.000	0.059	0.021	0.000	3.489
1975	2.377	0.992	0.421	0.628	1.682	0.111	0.156	0.000	0.000	0.000	0.037	6.406
1976	0.000	6.144	2.073	0.762	0.275	0.738	0.054	0.269	0.037	0.052	0.021	10.425
1977	0.152	0.237	3.434	0.691	0.253	0.173	0.394	0.007	0.027	0.000	0.077	5.444
1978	0.395	1.845	0.391	4.058	0.964	0.336	0.165	0.343	0.050	0.030	0.014	8.590
1979	0.115	1.625	1.677	0.162	1.687	0.321	0.184	0.031	0.113	0.010	0.025	5.948
1980	0.280	0.820	0.564	0.774	0.053	0.265	0.057	0.067	0.027	0.000	0.000	2.905
1981	0.261	3.525	2.250	1.559	0.589	0.054	0.579	0.057	0.064	0.018	0.083	9.039
1982	0.362	0.577	1.910	0.242	0.068	0.115	0.000	0.031	0.033	0.000	0.000	3.337
1983	1.283	0.850	1.089	0.740	0.069	0.033	0.004	0.010	0.015	0.000	0.044	4.136
1984	0.179	1.909	0.682	0.929	0.825	0.024	0.059	0.039	0.000	0.039	0.044	4.728
1985	1.002	0.181	0.843	0.067	0.106	0.077	0.028	0.000	0.000	0.000	0.003	2.306
1986	0.076	2.279	0.129	0.329	0.008	0.049	0.073	0.016	0.000	0.007	0.022	2.987
1987	0.204	0.414	1.353	0.108	0.200	0.028	0.012	0.000	0.000	0.000	0.007	2.325
1988	0.550	0.875	0.437	0.904	0.060	0.194	0.000	0.011	0.039	0.000	0.000	3.069
1989	0.251	2.798	1.046	0.161	0.507	0.055	0.015	0.007	0.000	0.000	0.000	4.841
1990	0.157	0.364	1.624	1.814	0.412	0.286	0.069	0.022	0.011	0.000	0.022	4.781
1991	0.041	0.408	0.175	0.274	0.031	0.029	0.000	0.000	0.000	0.000	0.000	0.957
1992	0.035	0.412	0.949	0.174	0.100	0.044	0.010	0.000	0.000	0.000	0.000	1.724
1993	0.178	0.970	0.532	0.383	0.017	0.025	0.022	0.000	0.000	0.022	0.000	2.149
1994	0.067	0.406	0.664	0.433	0.153	0.068	0.021	0.000	0.006	0.000	0.000	1.819
1995	0.160	0.245	1.811	1.249	0.087	0.054	0.011	0.000	0.000	0.000	0.000	3.616
1996	0.022	0.240	0.196	0.414	0.143	0.060	0.027	0.000	0.000	0.000	0.000	1.101
1997	0.006	0.236	0.321	0.109	0.129	0.049	0.009	0.007	0.000	0.000	0.000	0.867
1998	0.070	0.336	1.026	0.352	0.041	0.035	0.004	0.000	0.004	0.000	0.000	1.867
1999	0.070	0.140	0.154	0.310	0.255	0.087	0.000	0.000	0.000	0.000	0.000	1.016
2000	0.020	0.571	0.538	0.071	0.079	0.031	0.000	0.000	0.000	0.000	0.000	1.308
2001	0.028	0.047	0.381	0.459	0.059	0.055	0.008	0.008	0.000	0.000	0.000	1.045
2002	0.234	0.478	0.707	1.396	1.627	0.118	0.131	0.012	0.000	0.000	0.000	4.703
2003	0.327	0.166	0.309	0.201	0.156	0.082	0.000	0.007	0.000	0.000	0.000	1.248
2004	1.6853	0.7448	0.1358	0.7101	0.252	0.3215	0.2524	0.0647	0.0195	0.000	0.000	4.210
2005	0.0521	0.0553	0.5794	0.1289	0.1756	0.0259	0	0.0069	0	0	0	1.024
2006	0.0994	0.4325	0.1618	0.5142	0.0338	0.1248	0.0147	0.0377	0.0097	0.0097	0	1.438
2007	0.075	0.115	0.207	0.050	0.130	0.006	0.007	0.000	0.000	0.000	0.000	
average	0.340	1.244	1.016	0.695	0.400	0.140	0.120	0.060	0.050	0.028	0.056	4.109

Table A10c. Stratified mean catch per tow at age (numbers) of Atlantic cod in Canadian spring bottom trawl survey,1986-2007

	AGE										
Year	1	2	3	4	5	6	7	8	9	10+	No./ tow
SPRING											
1986	0.60	2.27	2.81	0.37	0.65	0.44	0.26	0.04	0.07	0.03	7.54
1987	0.25	2.13	0.93	1.09	0.34	0.12	0.22	0.08	0.03	0.07	5.26
1988	0.28	1.01	4.66	0.58	1.02	0.13	0.08	0.17	0.04	0.07	8.04
1989	1.63	2.78	1.38	2.85	0.36	0.42	0.05	0.10	0.12	0.06	9.75
1990	0.42	2.44	3.78	2.08	3.87	0.42	0.93	0.12	0.12	0.35	14.53
1991	1.18	1.16	1.84	2.15	1.05	1.31	0.16	0.22	0.03	0.09	9.19
1992	0.11	2.86	1.77	0.80	0.98	0.60	0.43	0.12	0.07	0.02	7.76
*1993	0.05	0.60	2.83	1.04	0.62	1.23	0.44	0.42	0.07	0.12	7.42
*1994	0.02	0.80	0.89	1.65	0.60	0.23	0.45	0.11	0.15	0.04	4.94
1995	0.07	0.67	1.50	0.86	0.60	0.19	0.04	0.05	0.02	0.02	4.02
1996	0.14	0.49	2.31	4.02	1.09	0.79	0.33	0.08	0.11	0.03	9.39
1997	0.32	0.53	0.55	1.25	1.23	0.27	0.06	0.03	0.02	0.01	4.27
1998	0.01	0.67	0.95	0.35	0.35	0.28	0.07	0.02	0.00	0.02	2.72
1999	0.33	0.32	1.49	1.09	0.41	0.26	0.15	0.01	0.02	0.01	4.09
2000	0.10	0.44	1.05	3.92	1.71	0.78	0.40	0.24	0.01	0.03	8.68
2001	0.00	0.06	0.64	0.42	1.11	0.52	0.26	0.17	0.16	0.06	3.40
2002	0.01	0.09	0.57	2.05	0.68	1.22	0.40	0.17	0.05	0.08	5.32
2003	0.00	0.02	0.30	0.65	1.21	0.32	0.34	0.16	0.01	0.00	3.01
2004	0.54	0.10	0.39	0.42	0.45	0.39	0.07	0.12	0.02	0.01	2.50
**2005	0.02	1.34	0.47	2.91	1.13	0.51	0.41	0.01	0.05	0.01	6.86
2006	0.00	0.04	1.41	0.66	1.63	0.70	0.20	0.18	0.08	0.05	4.95
2007	0.14	0.52	0.94	2.94	0.39	0.60	0.10	0.08	0.04	0.00	5.75
average	0.30	1.04	1.56	1.53	0.97	0.52	0.28	0.12	0.06	0.06	6.41

** not used in VPA calibration; entire Bank not surveyed*

***R/V Teleost (R/V Needler indices not used since entire GB not surveyed)*

R/V Needler'05	*0.05*	*2.04*	*2.78*	*14.18*	*3.42*	*1.59*	*1.45*	*0.12*	*0.15*	*0.02*	*25.80*

Table A11. Estimates of beginning year stock size (thousands of fish), instantaneous fishing mortality (F), spawning stock biomass (mt), and female percent mature (3-year moving window) of Georges Bank cod, estimated from virtual population analysis (VPA), calibrated using the commercial catch at age ADAPT formulation, 1978-2006.

Stock Numbers (Jan 1) in thousands

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	28707	25945	22912	45887	19865	11306	29024	9613	44500	17893	24841	17831	10149	19306	7407
2	4707.3	23366	20990	18452	36468	15564	8691	23509	7711	35740	14556	20045	13794	8245	15563
3	25333	3478.1	17108	13372	11590	20470	8097	5723	12571	4880	22108	9800	14061	6318	5008
4	7678.9	13468	1991.3	8670	6702.4	5519	8934	3513	2063	6193	2635	10608	5302	6701	2071
5	2966	4107.6	6916.5	1141	4689.1	2818	2127	4334	1368	920	3126	1197	4878	2582	2667
6	1260.3	1623.7	2279.8	3454.5	648.75	2016	1274	915.8	1677	650	484.5	1154	636	1965	831.5
7	1233	871.17	925.51	987.81	1570.5	265.8	982.1	542.1	307.8	821.5	308.4	196.8	468.1	314.1	641
8	80.01	792.91	569.69	384.23	435.91	654	132.9	401.9	205.5	175.2	424	118.4	88.32	178.6	131
9	174.17	45.174	376.94	402.95	168.89	179.5	378.3	56.17	153.6	105.1	93.11	152.9	51.16	50.21	66.3
10+	44.316	122.07	38.592	172.17	191.5	298.4	282.9	181.7	76.29	75.54	105.3	54.11	88.92	47.47	18.97
Total	72183	73819	74109	92923	82330	59091	59924	48790	70634	67453	68682	61157	49518	45708	34403

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	9857	6311	3930	6681	10670	5005	12570	6418	2701	4708	2098	11126	2300	10047	8956
2	5940	7800	5085	3189	5411	8622	4041	10250	5152	2201	3835	1703	9062	1873	8197
3	8748	3484	5841	3578	2352	3814	6231	2989	7542	3570	1727	2960	1323	7099	1473
4	2070	3214	1475	3499	2043	1253	1948	3290	1782	3785	1910	1052	1972	904	5067
5	745	607	868	610	1727	763	584	833	1658	787	1753	848	548	1097	553
6	853	189	121	369	270	627	281	222	400	732	320	624	343	319	571
7	283	223	68	62	138	90	259	117	103	166	269	123	236	186	198
8	209	74	54	36	35	30	37	84	55	36	60	93	35	117	124
9	68	46	15	26	19	12	10	11	34	22	13	24	29	13	70
10+	33	9	3	1	7	6	7	3	3	13	6	9	12	14	16
Total	28806	21956	17459	18050	22673	20222	25968	24218	19430	16020	11990	18561	15862	21668	25226

Fishing Mortality

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	0.006	0.012	0.016	0.030	0.044	0.063	0.011	0.020	0.019	0.006	0.015	0.057	0.008	0.016	0.021
2	0.103	0.112	0.251	0.265	0.377	0.453	0.218	0.426	0.258	0.280	0.196	0.155	0.581	0.299	0.376
3	0.432	0.358	0.480	0.491	0.542	0.629	0.635	0.820	0.508	0.416	0.534	0.414	0.541	0.916	0.684
4	0.426	0.466	0.357	0.415	0.667	0.753	0.523	0.743	0.608	0.484	0.589	0.577	0.519	0.721	0.822
5	0.403	0.389	0.494	0.365	0.644	0.594	0.643	0.750	0.544	0.441	0.796	0.432	0.709	0.933	0.940
6	0.169	0.362	0.636	0.588	0.692	0.519	0.654	0.890	0.513	0.546	0.701	0.703	0.505	0.920	0.878
7	0.242	0.225	0.679	0.618	0.676	0.493	0.693	0.770	0.364	0.461	0.757	0.601	0.764	0.675	0.921
8	0.372	0.544	0.146	0.622	0.687	0.347	0.661	0.762	0.470	0.432	0.820	0.639	0.365	0.791	0.460
9	0.308	0.377	0.515	0.548	0.658	0.532	0.657	0.772	0.509	0.473	0.785	0.563	0.684	0.905	0.906
10+	0.308	0.377	0.515	0.548	0.658	0.532	0.657	0.772	0.509	0.473	0.785	0.563	0.684	0.905	0.906
F 5-8	0.30	0.38	0.49	0.55	0.67	0.49	0.66	0.79	0.47	0.47	0.77	0.59	0.59	0.83	0.80

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1	0.034	0.016	0.009	0.011	0.013	0.014	0.004	0.020	0.005	0.005	0.009	0.005	0.006	0.003
2	0.333	0.089	0.151	0.104	0.150	0.125	0.101	0.107	0.167	0.042	0.059	0.052	0.044	0.040
3	0.801	0.659	0.312	0.360	0.429	0.472	0.439	0.317	0.489	0.426	0.296	0.206	0.181	0.137
4	1.027	1.109	0.684	0.506	0.785	0.564	0.649	0.485	0.617	0.570	0.611	0.451	0.386	0.290
5	1.173	1.413	0.655	0.615	0.813	0.799	0.765	0.535	0.617	0.700	0.833	0.705	0.341	0.453
6	1.140	0.826	0.468	0.782	0.903	0.685	0.671	0.567	0.678	0.803	0.758	0.774	0.413	0.279
7	1.144	1.229	0.426	0.380	1.336	0.674	0.925	0.563	0.859	0.810	0.860	1.051	0.504	0.204
8	1.306	1.380	0.526	0.432	0.896	0.878	1.034	0.700	0.722	0.839	0.711	0.953	0.815	0.312
9	1.168	1.246	0.611	0.646	0.852	0.744	0.782	0.553	0.640	0.756	0.822	0.765	0.405	0.312
10+	1.168	1.246	0.611	0.646	0.852	0.744	0.782	0.553	0.640	0.756	0.822	0.765	0.405	0.312
F 5-8	1.19	1.21	0.52	0.55	0.99	0.76	0.85	0.59	0.72	0.79	0.79	0.87	0.52	0.31

Table A11 continued. Estimates of beginning year stock size (thousands of fish), instantaneous fishing mortality (F), spawning stock biomass (mt), and female percent mature (3-year moving window) of Georges Bank cod, estimated from virtual population analysis (VPA), calibrated using the commercial catch at age ADAPT formulation, 1978-2006.

SSB at start of spawning season

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Age															
1	1150	1462	571	1347	574	491	851	633	4699	1437	1656	682	522	899	313
2	2004	7884	5785	5428	11982	6170	3592	9164	5004	21658	7690	8257	5457	3210	6544
3	35299	3755	20586	15961	16654	27970	11426	7578	19132	7506	33226	13111	20802	8707	7712
4	19008	36617	4466	21546	16921	13462	22975	9021	4887	17481	6672	26901	12935	16585	5330
5	8055	15111	29814	4353	17589	10413	7519	15806	5464	3773	12579	4545	18049	8861	8793
6	5182	7935	11440	19341	3223	10435	6185	4305	8895	3752	2607	5919	3256	8769	3744
7	6100	6022	6171	6634	11284	1769	6351	3390	2118	5881	2165	1263	2961	1858	3415
8	579	5809	5267	3022	3478	5998	1077	3245	1664	1510	3449	960	758	1345	977
9	1489	391	3282	4196	1651	1696	3567	526	1574	1028	863	1461	492	433	581
10+	565	1509	510	2553	2593	4311	3590	2171	987	1056	1333	698	1114	578	297
Total	79431	86495	87892	84381	85949	82715	67133	55839	54424	65082	72240	63797	66346	51245	37706

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Age														
1	39	35	16	145	272	235	346	77	41	49	69	132	30	81
2	2105	1911	1502	1237	2456	4017	2028	4228	1516	795	1222	515	1627	430
3	12027	4963	7858	5502	3686	5770	9214	4721	11623	5051	2290	4030	1755	8620
4	4660	7228	3604	7848	4976	3085	4658	7818	4117	8528	4031	2391	4637	2110
5	2581	1822	3246	2267	5256	2562	1961	2880	5391	2310	4947	2426	1744	3308
6	3498	945	645	1830	1188	2567	1257	976	1689	2849	1178	2281	1341	1256
7	1509	1138	496	437	759	504	1306	663	496	819	1229	512	1071	981
8	1292	465	444	310	234	193	240	528	344	208	348	501	192	632
9	553	326	138	260	170	97	74	79	253	156	87	159	214	88
10+	325	106	56	4	75	64	76	30	26	132	50	80	125	116
Total	28589	18939	18005	19840	19072	19094	21160	22000	25496	20897	15451	13027	12736	17622

Percent mature (females)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Age															
1	11	12	6	8	7	10	9	11	24	22	24	17	17	11	6
2	44	40	30	33	40	46	44	50	67	66	63	52	56	47	47
3	84	77	74	73	85	86	86	89	93	93	91	85	89	86	93
4	97	94	95	94	98	98	98	99	99	99	98	97	98	98	99
5	100	99	99	99	100	100	100	100	100	100	100	99	100	100	100
6+	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Age															
1	3	2	2	8	8	12	9	6	4	4	9	6	5	4	7
2	36	44	39	54	57	56	56	48	43	41	40	33	31	35	40
3	90	98	95	94	95	93	94	93	94	92	81	79	79	87	86
4	99	100	100	100	100	99	100	99	100	100	97	97	97	99	98
5	100	100	100	100	100	100	100	100	100	100	99	100	100	100	100
6+	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table A12. Input data for yield-per-recruit and projection analysis. Selectivity and mean weight estimated as an average of 2002-2006 data, and proportion mature estimated from a five-year moving average, 2002-2006.

Age	VPA selectivity	ASAP selectivity	Stock weight	Catch weight	Spawning stock weight	Proportion mature
1	0.00	0.01	0.266	0.447	0.266	0.06
2	0.08	0.13	0.774	1.300	0.774	0.36
3	0.38	0.73	1.721	2.185	1.721	0.83
4	0.74	1.00	2.583	3.016	2.583	0.98
5	1.00	1.00	3.390	3.864	3.390	1
6	1.00	1.00	4.314	4.822	4.314	1
7	1.00	1.00	5.360	5.962	5.360	1
8	1.00	1.00	6.426	7.235	6.426	1
9	1.00	1.00	7.866	8.472	7.866	1
10	1.00	1.00	10.514	10.713	10.514	1

Table A13. Biological reference points as esimated by YPR, VPA, ASAP, and projection analysis from the current assessment, 1978-2006 ,and the BRPs derived by BRP working group (NEFSC 2002).

Model	F40%	Fmsy	SSBmsy	MSY	alpha	beta	steepness
YPR							
Proj. (emp)	0.251		93,723	19,836			
VPA							
B-H		0.225	174,292	33,983	32.982	60.9238	0.84
Proj.(B-H)		0.225	274,211	52,714	32.982	60.9238	0.84
ASAP							
internal		0.17	107,622	17,428	20286	48833	0.71
Proj.		0.17	187,510	30,962	20286	48833	0.71
BRP WG 2002		0.18	217,000	35,200	28.2855	77.6945	0.84

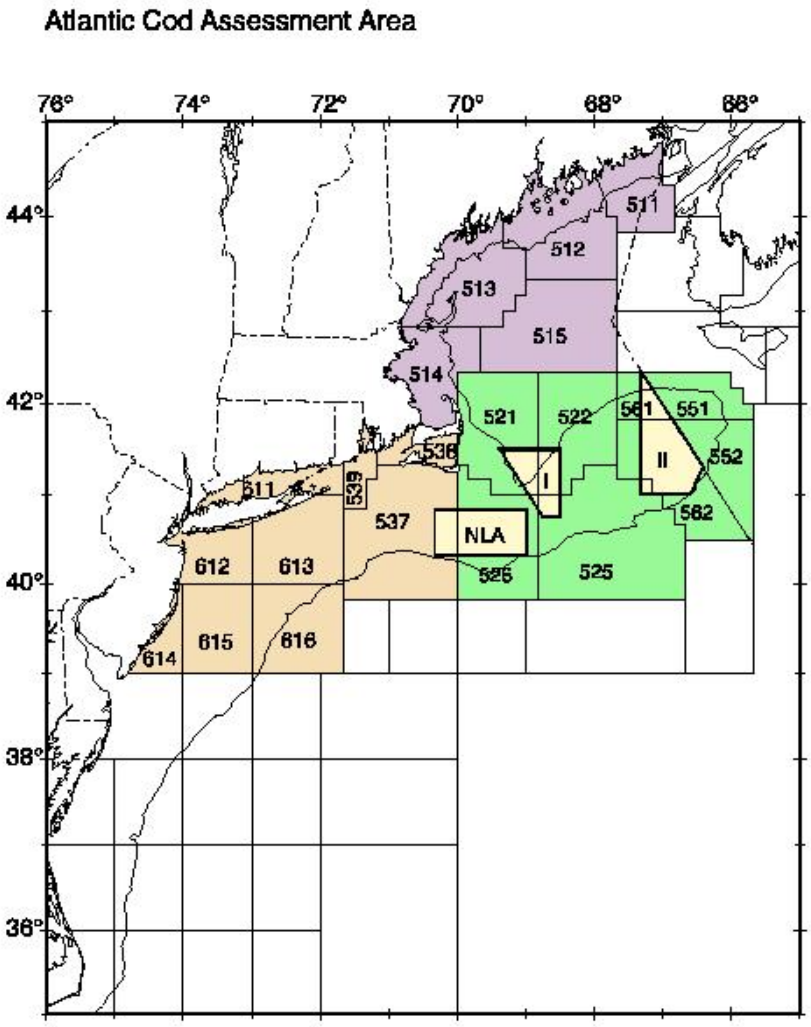

Figure A1. The Georges Bank cod stock area includes Georges Bank (statistical areas (SA) 521-522,525-526, 561-562,551-552, and south (SA 536-539, and Subarea 6 (SA >=611).

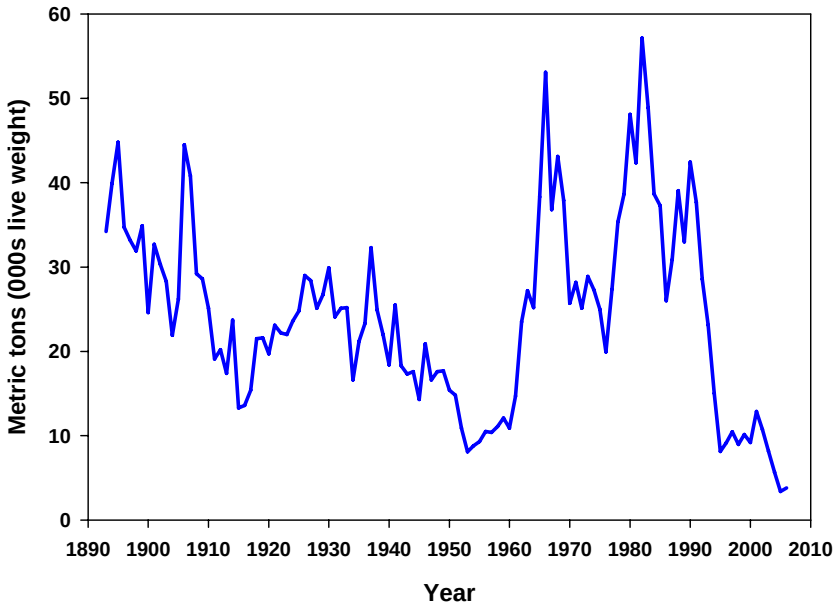

Figure A2. Total commercial landings of Georges Bank cod (NAFO Division 5Z and Subarea 6), 1893-2006.

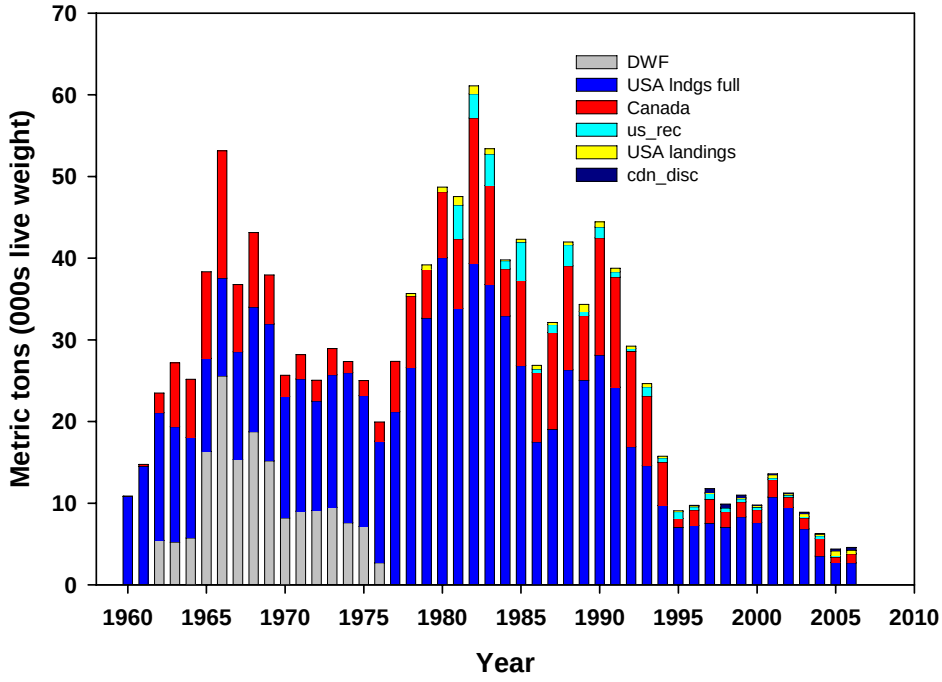

Figure A3. Total catch of Georges Bank Atlantic cod including USA commercial landings, discards, and recreational landings and Canadian landings and discards, 1960-2006.

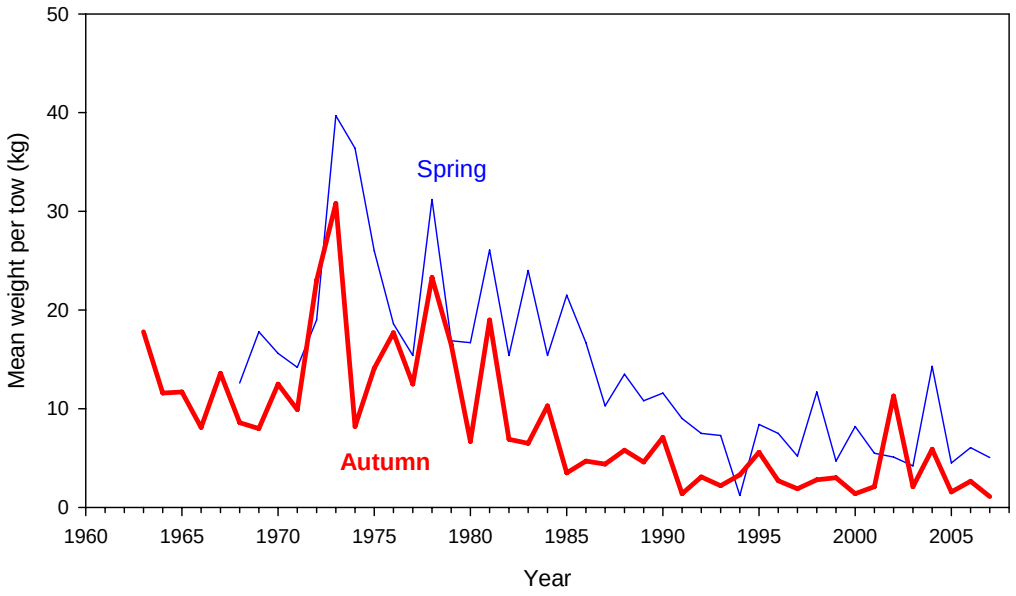

Figure A4. Standardized stratified mean catch per tow (kg) of Atlantic cod in NEFSC spring and autumn research vessel bottom trawl surveys on Georges Bank, 1963-2007.

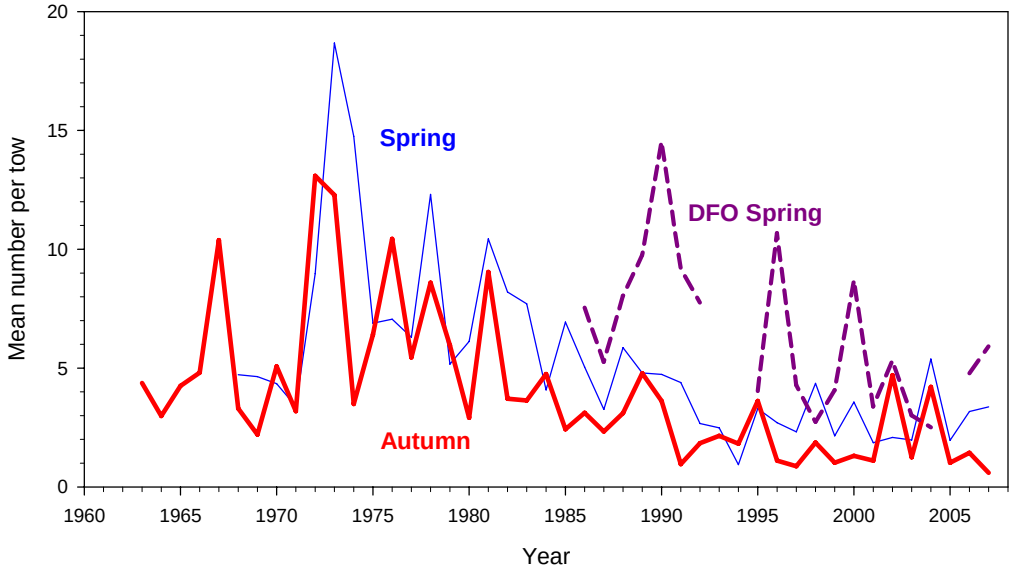

Figure A5. Standardized stratified mean number per tow of Atlantic cod in NEFSC and DFO spring and NEFSC autumn research vessel bottom trawl surveys on Georges Bank, 1963-2007.

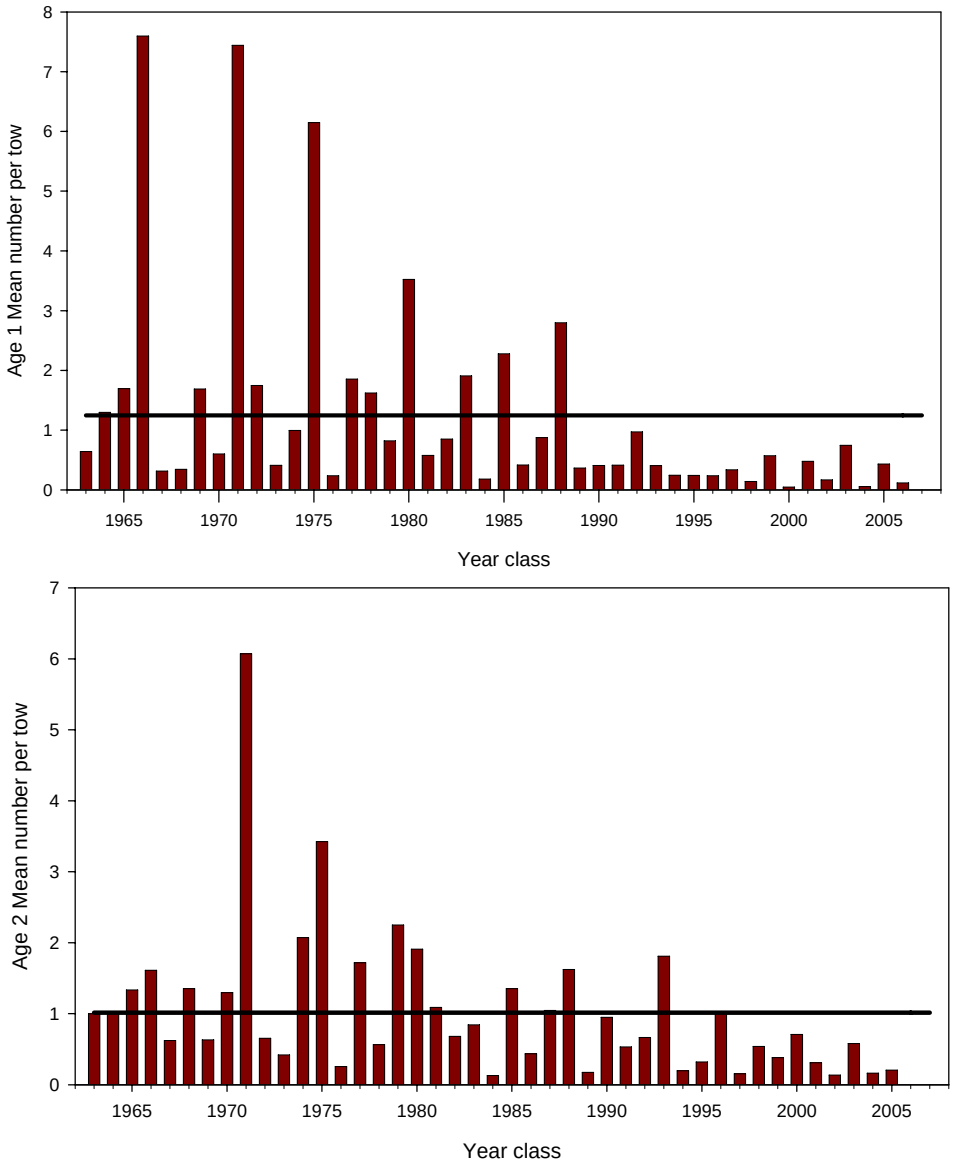

Figure A6. Relative year class strength of age 1 and age 2 Georges Bank cod based on standardized catch (number) per tow indices from NEFSC autumn research vessel bottom trawl surveys, 1963-2007. Horizontal line represents the time series average.

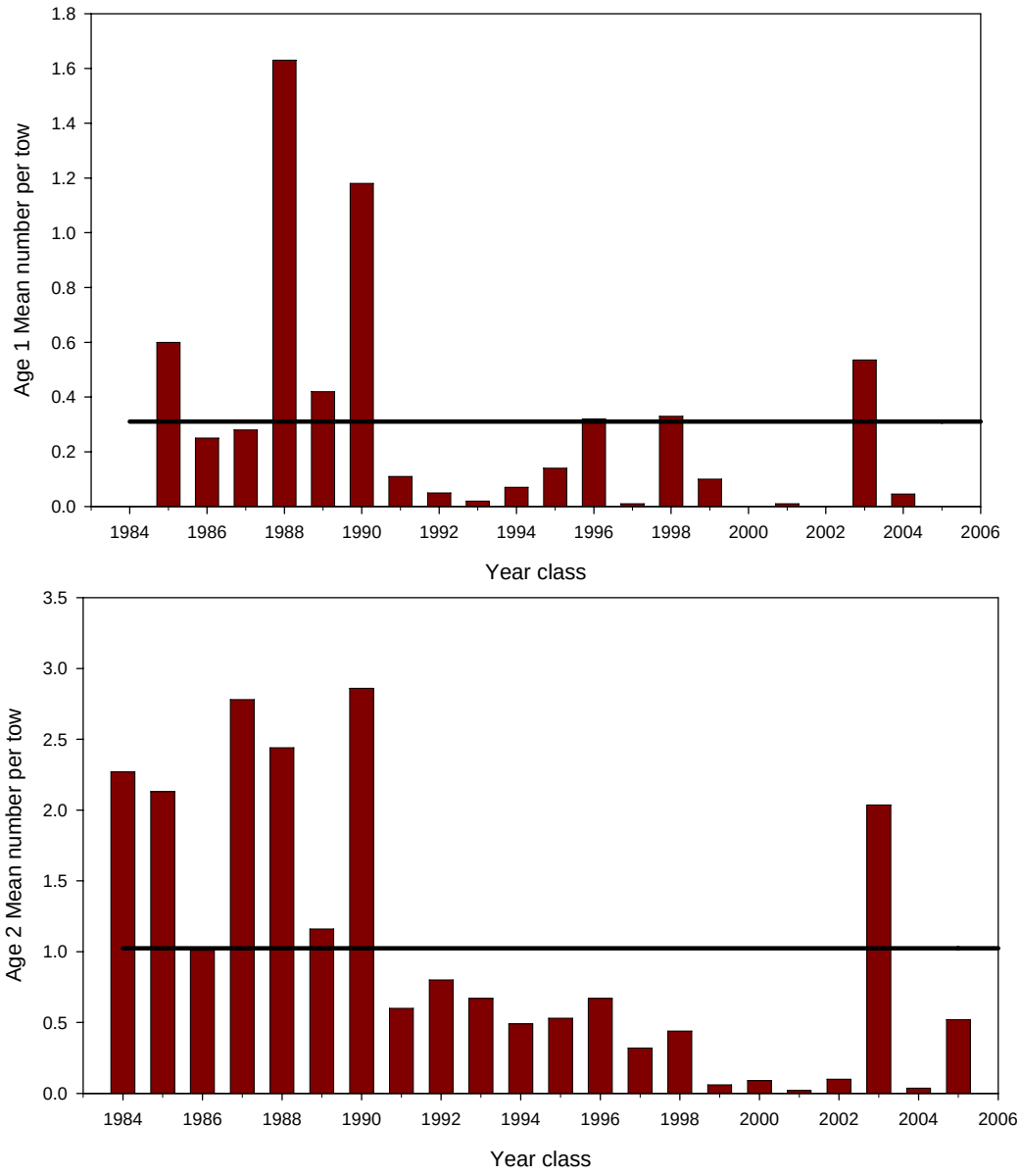

Figure A7. Relative year class strength of age 1 and age 2 Georges Bank cod based on catch (number) per tow indices from DFO spring research vessel bottom trawl surveys, 1986-2007. Horizontal line represents the time series average.

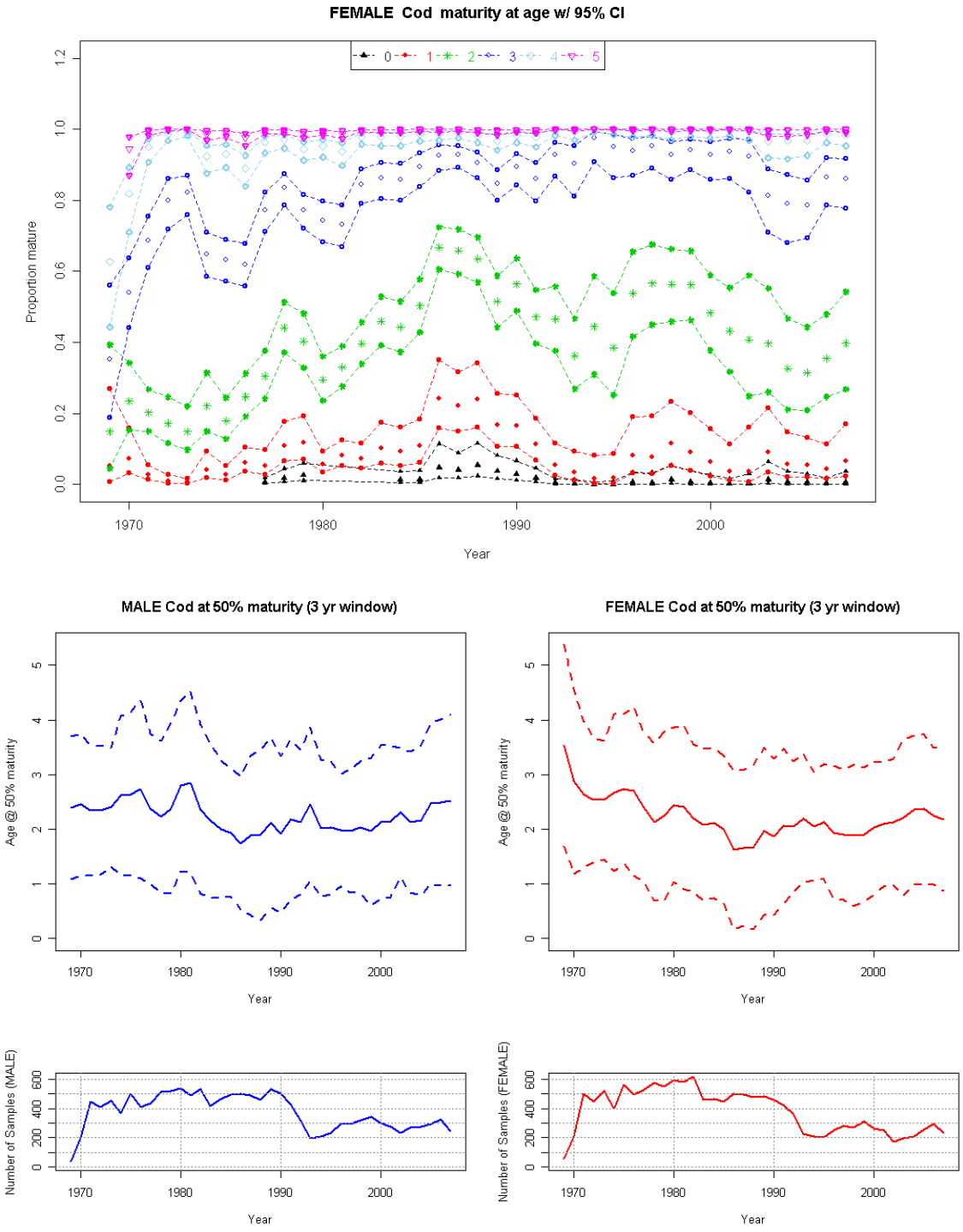

Figure A8. Proportion mature at age with 95% confidence intervals for female Georges Bank cod using a 3-year moving window for ages 1-5 (upper panel), median age at maturity (A50) for males (middle left panel) and females (middle right panel) with 95% confidence intervals, and number of samples in the combined 3-year moving average for males (lower left panel) and females (lower right panel).

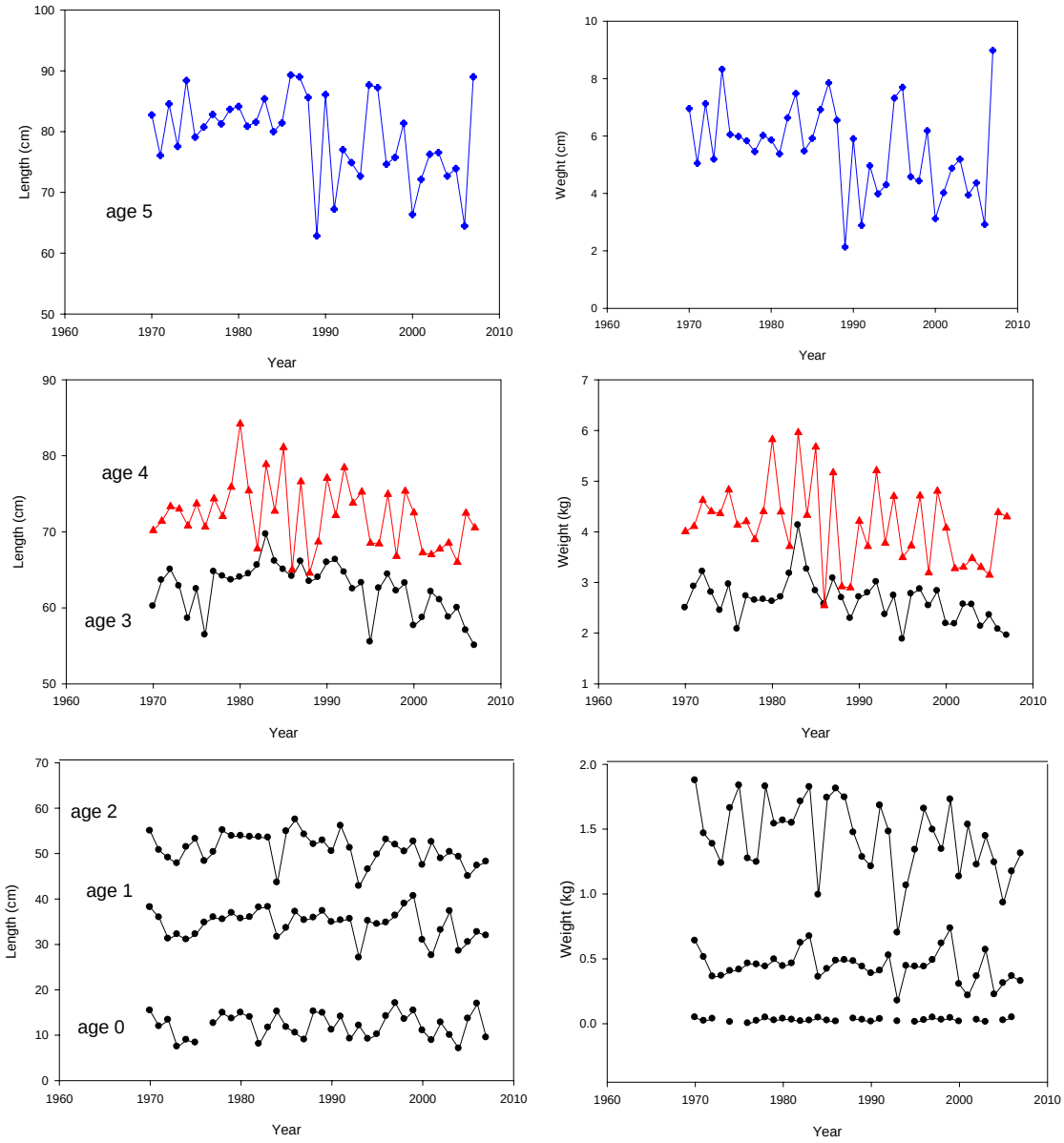

Figure A9. Mean length (left panel) and mean weight (right panels) at ages 0-5 for Georges Bank cod from autumn NEFSC surveys, 1970-2007.

Figure A10a. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages1-8 from the NEFSC spring survey (#41 Yankee trawl), for 1978-1981. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom.

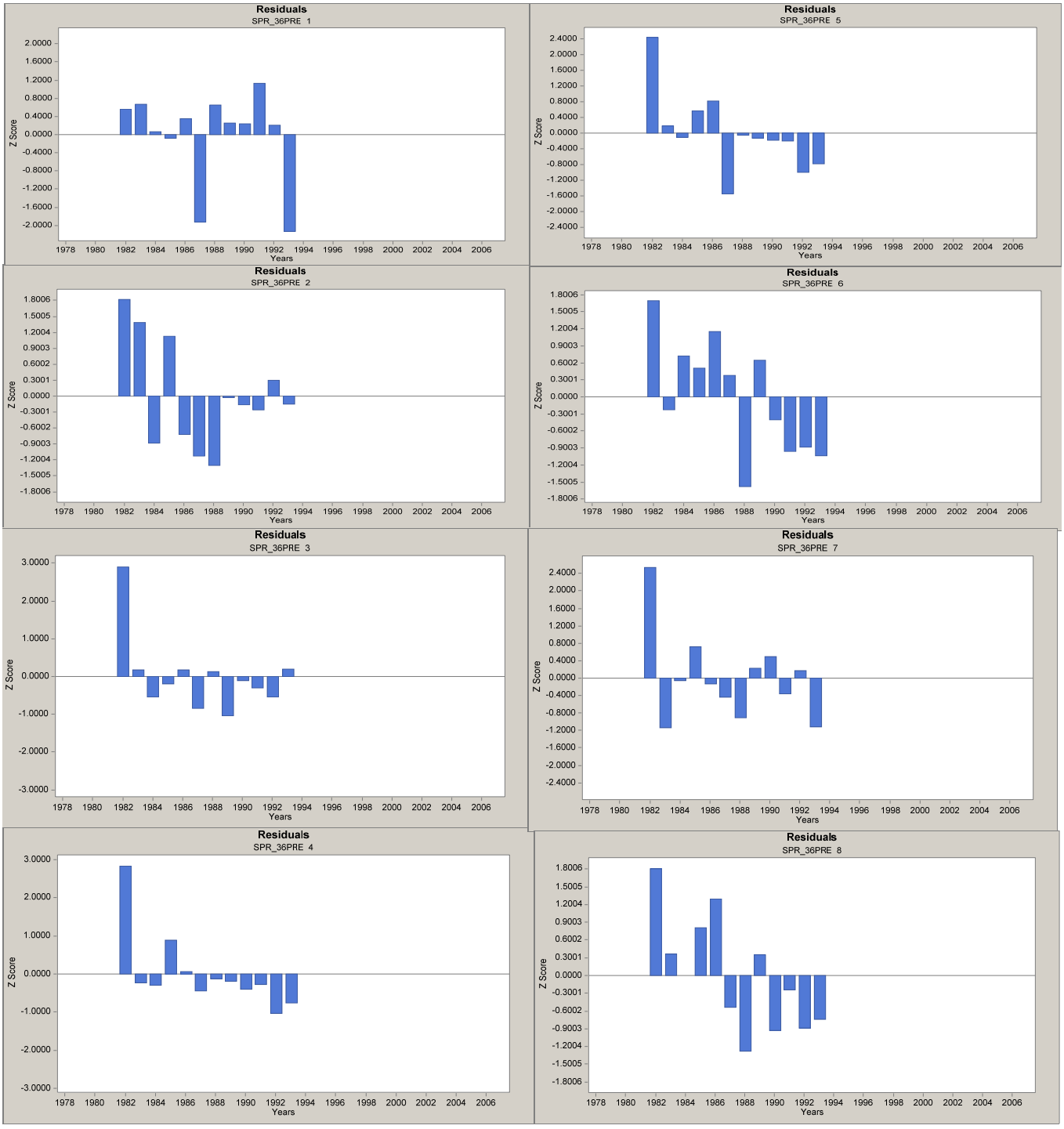

Figure A10b. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages1-8 from the NEFSC spring survey (#36 Yankee trawl), for pre-split years:1982-1993. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom.

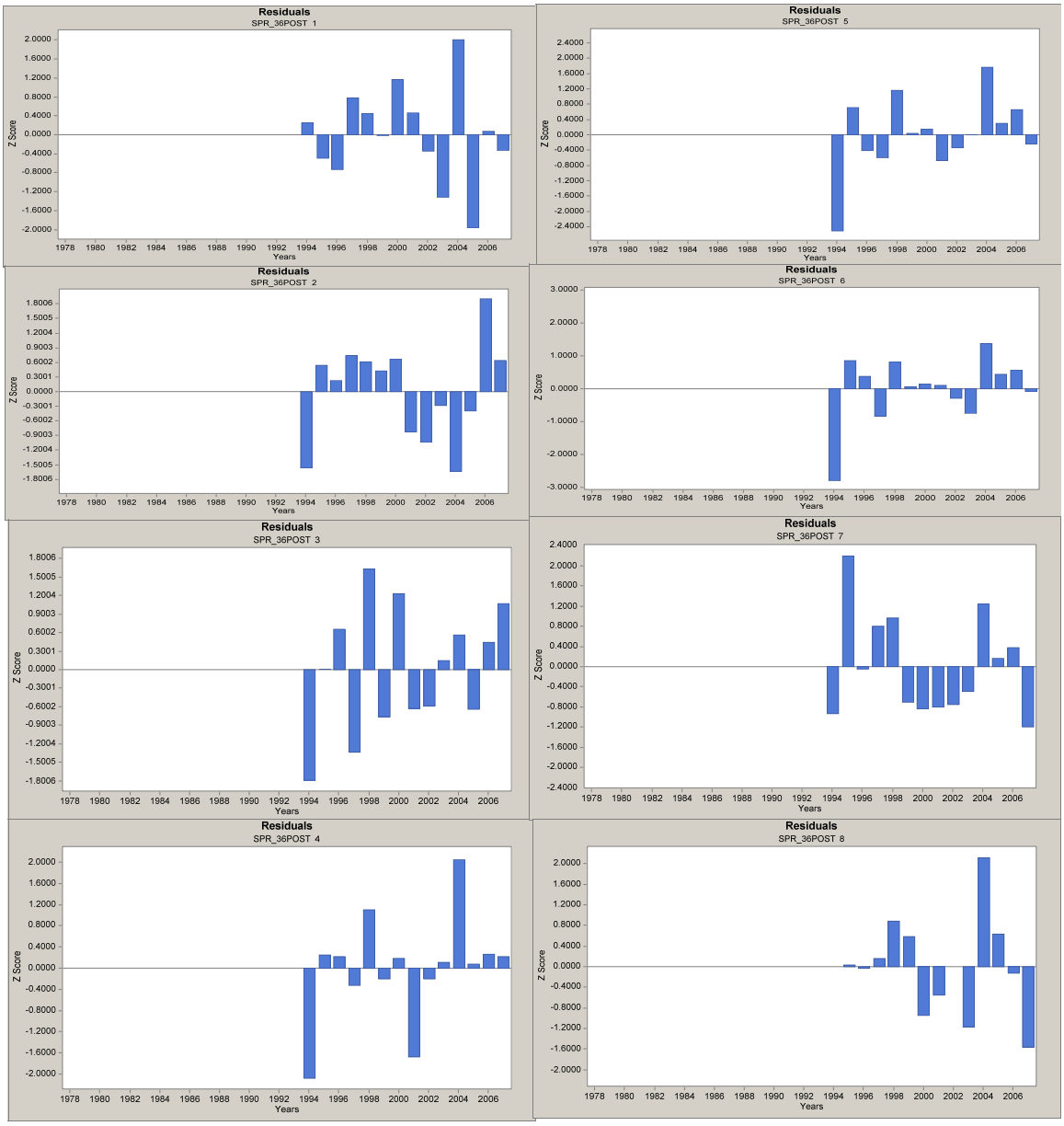

Figure A10c. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages1-8 from the NEFSC spring survey (#36 Yankee trawl), for post-split years:1994-2007. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom.

Figure A10d. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages1-8 from the DFO spring survey, for pre-split years: 1986-1993. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom.

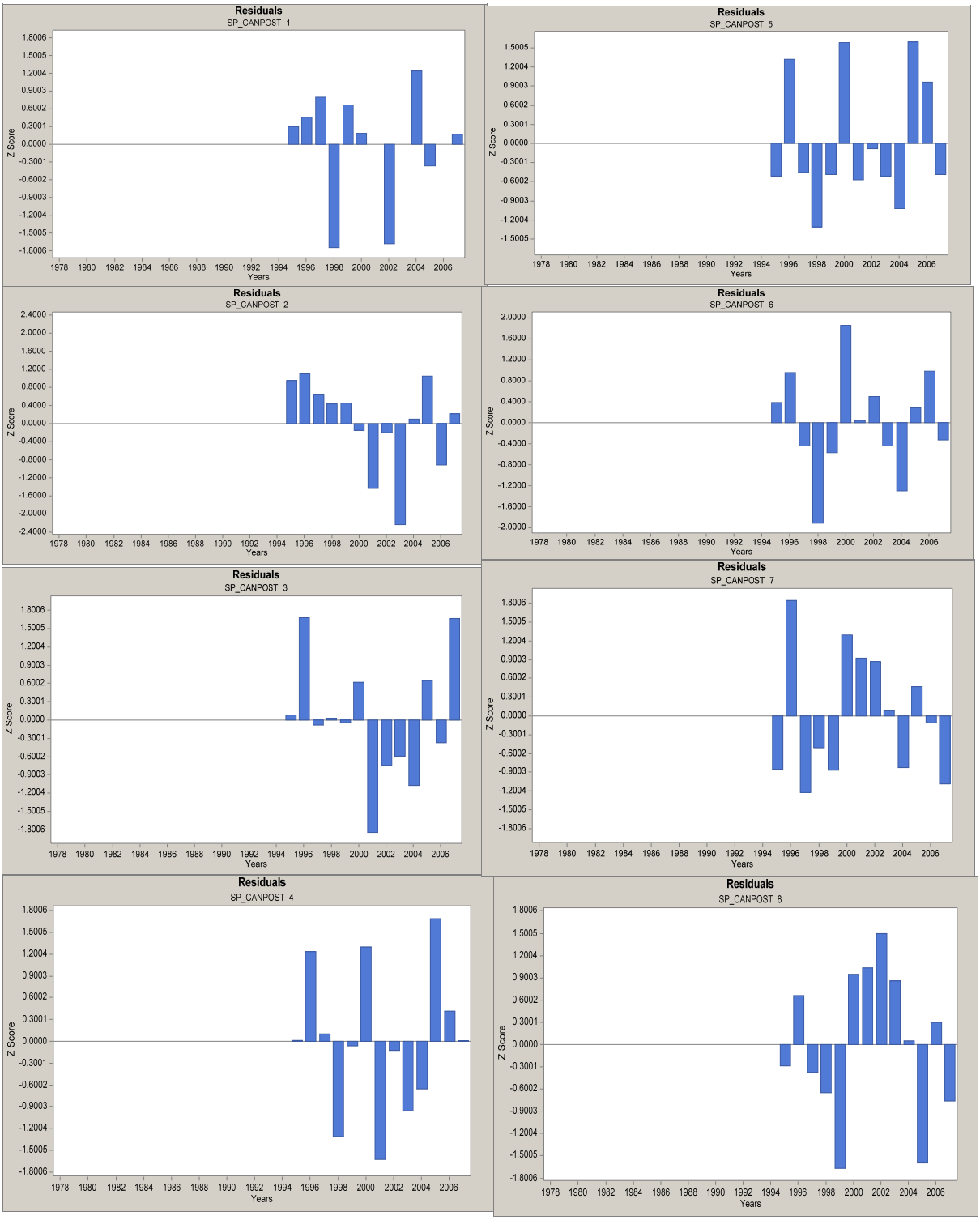

Figure A10e. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages1-8 from the DFO spring survey, for post-split years:1994-2007. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom.

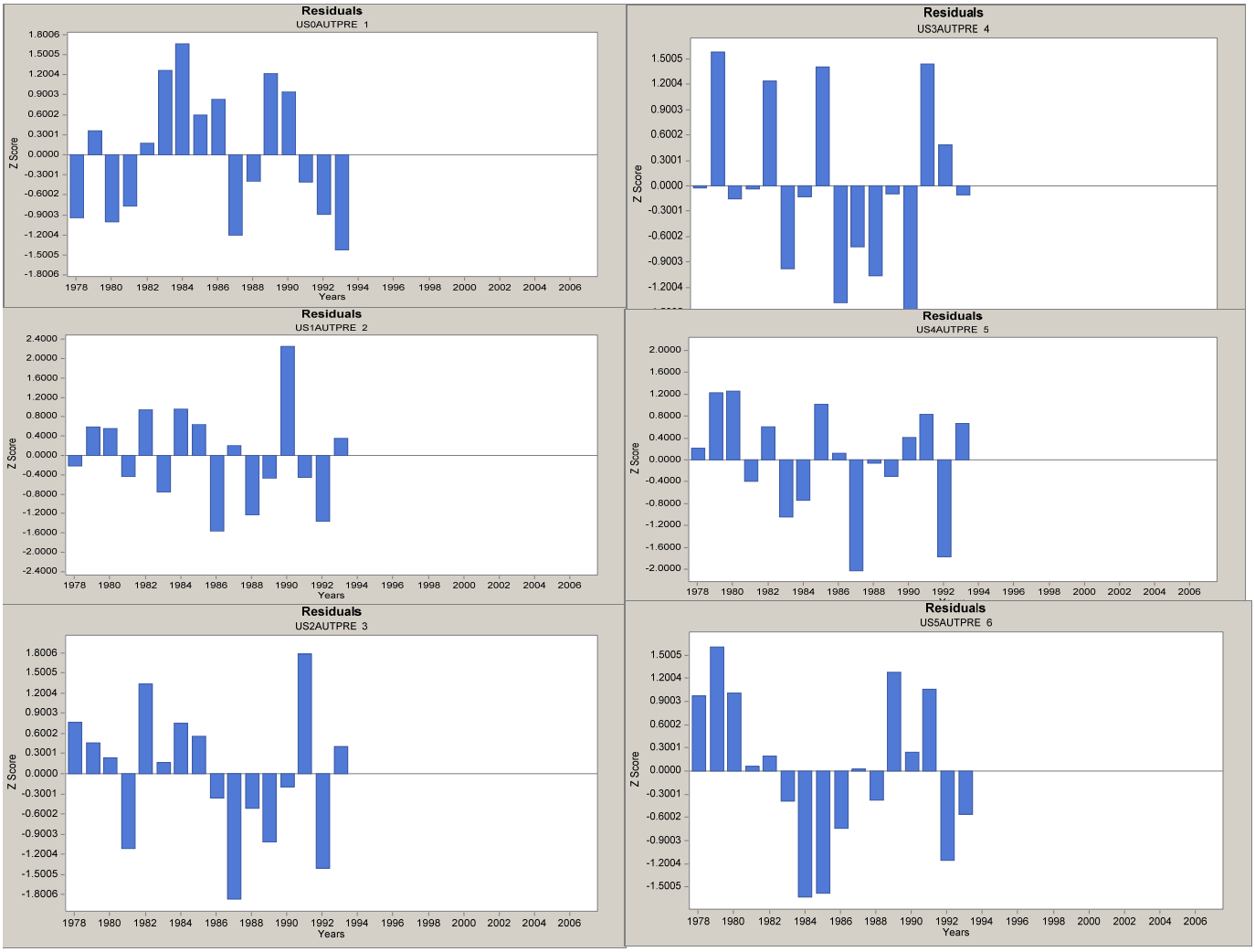

Figure A10f. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages 0-5 (lagged to 1-6) from the NEFSC autumn survey, for pre-split years: 1978-1993. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom.

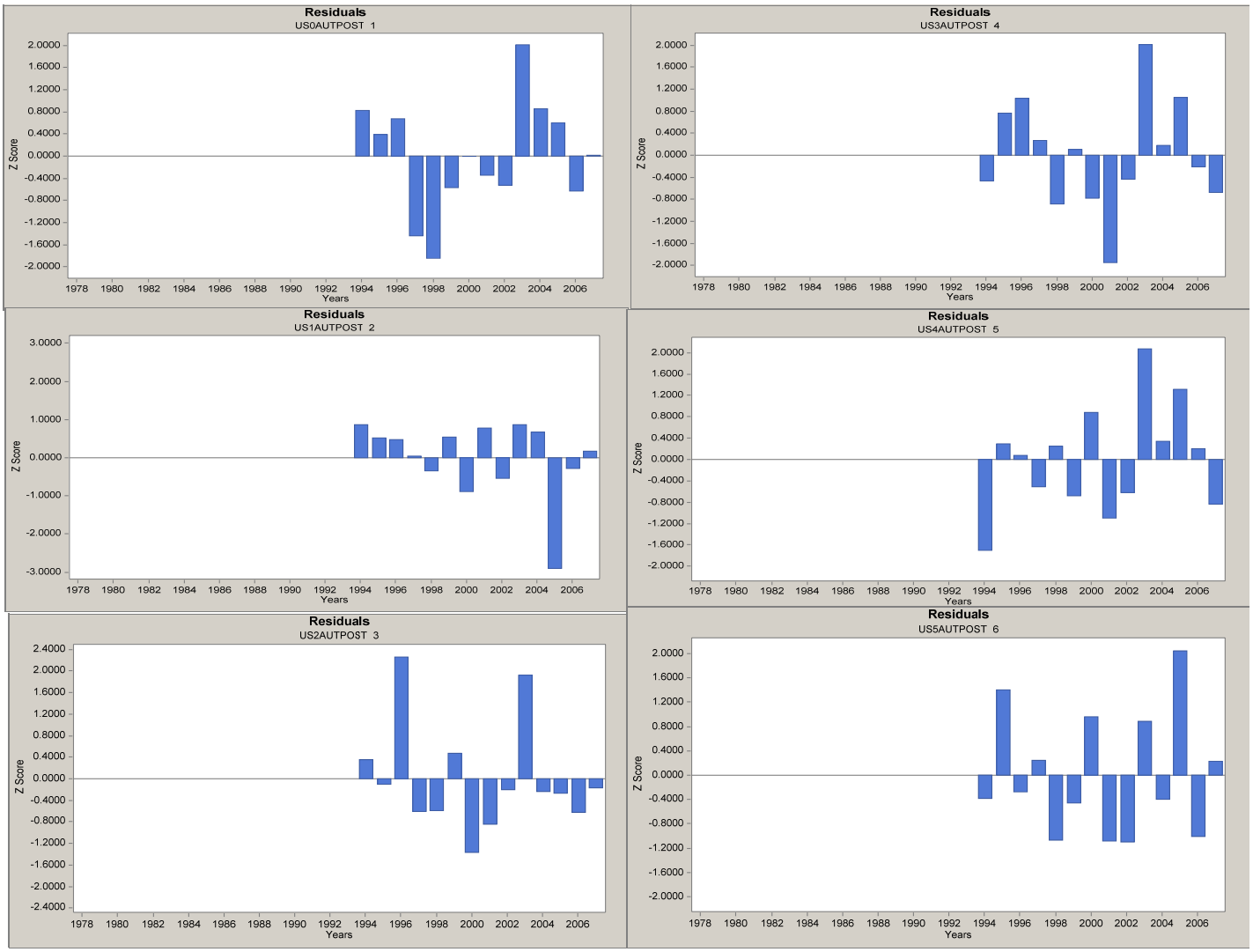

Figure A10g. Residual plots (Z-score: (observed-mean)/std.error) of abundance indices for ages 0-5 (lagged to 1-6) from the NEFSC autumn survey, for post-split years: 1994-2007. Left column has ages 1 to 4, top to bottom, and right column as ages 5 to 8, top to bottom

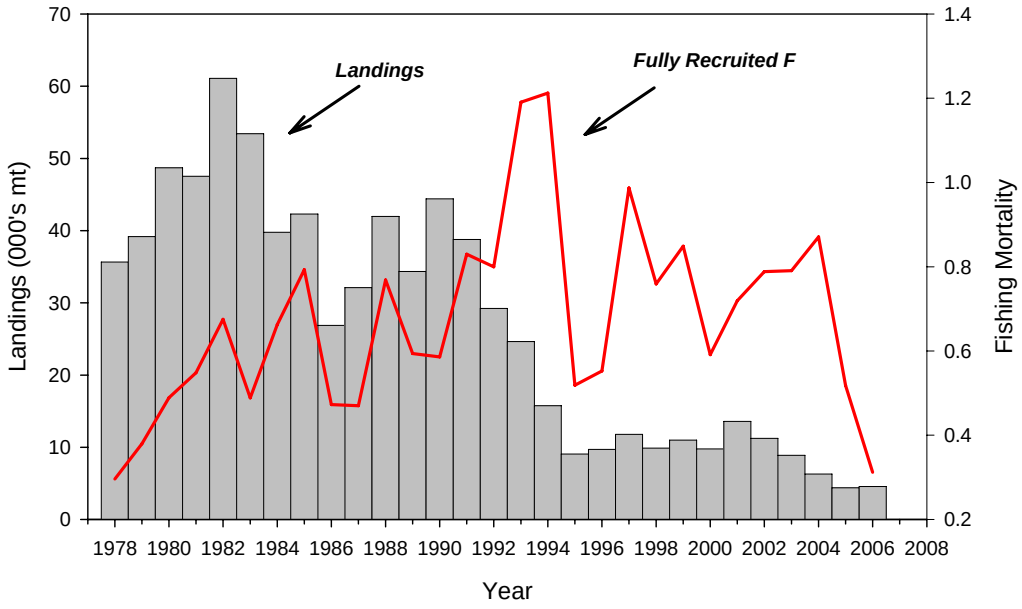

Figure A11. Trends in total catch and fishing mortality (ages 5-8) for Georges Bank cod, 1978-2006.

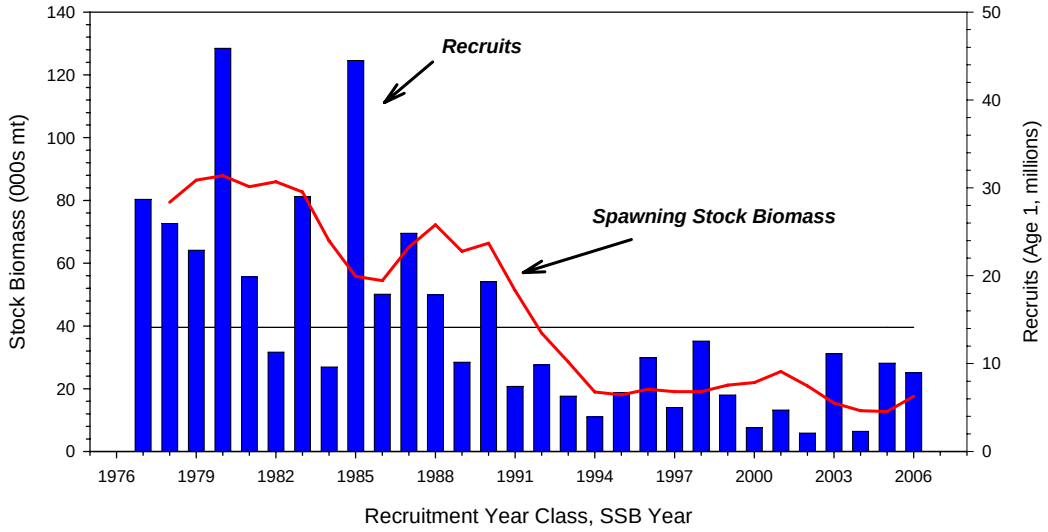

Figure A12. Trends in stock biomass and recruitment for Georges Bank Atlantic cod, 1978-2006. Horizontal line is the average recruitment for the time series.

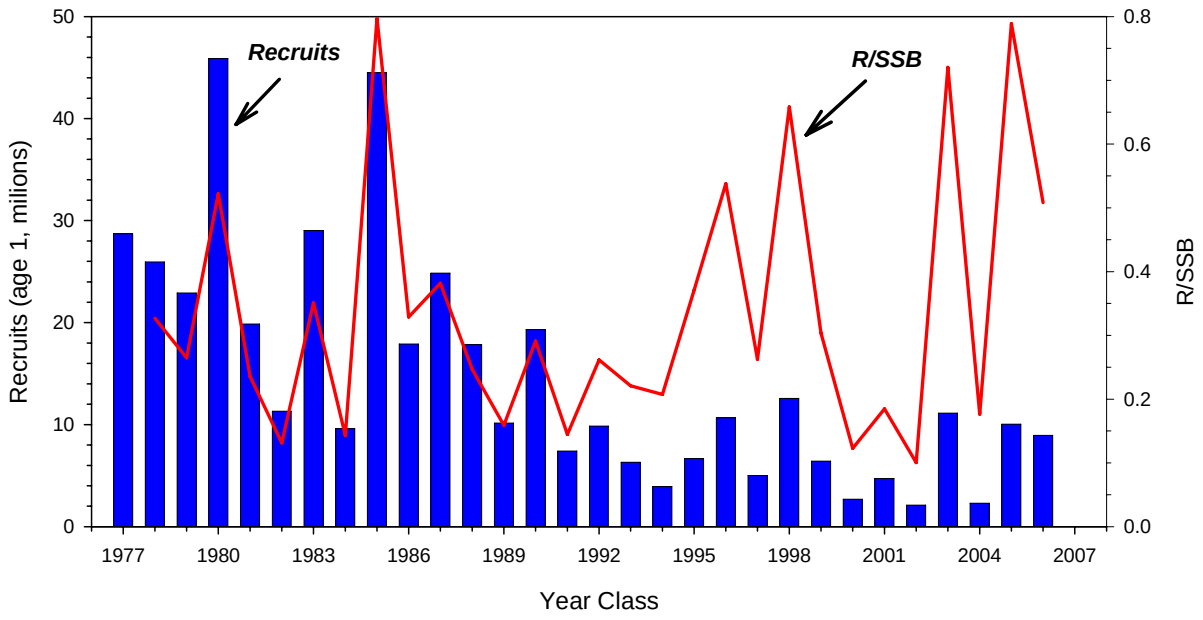

Figure A13. Trends in recruitment and recruitment/SSB survival ratio for Georges Bank cod, 1978-2006.

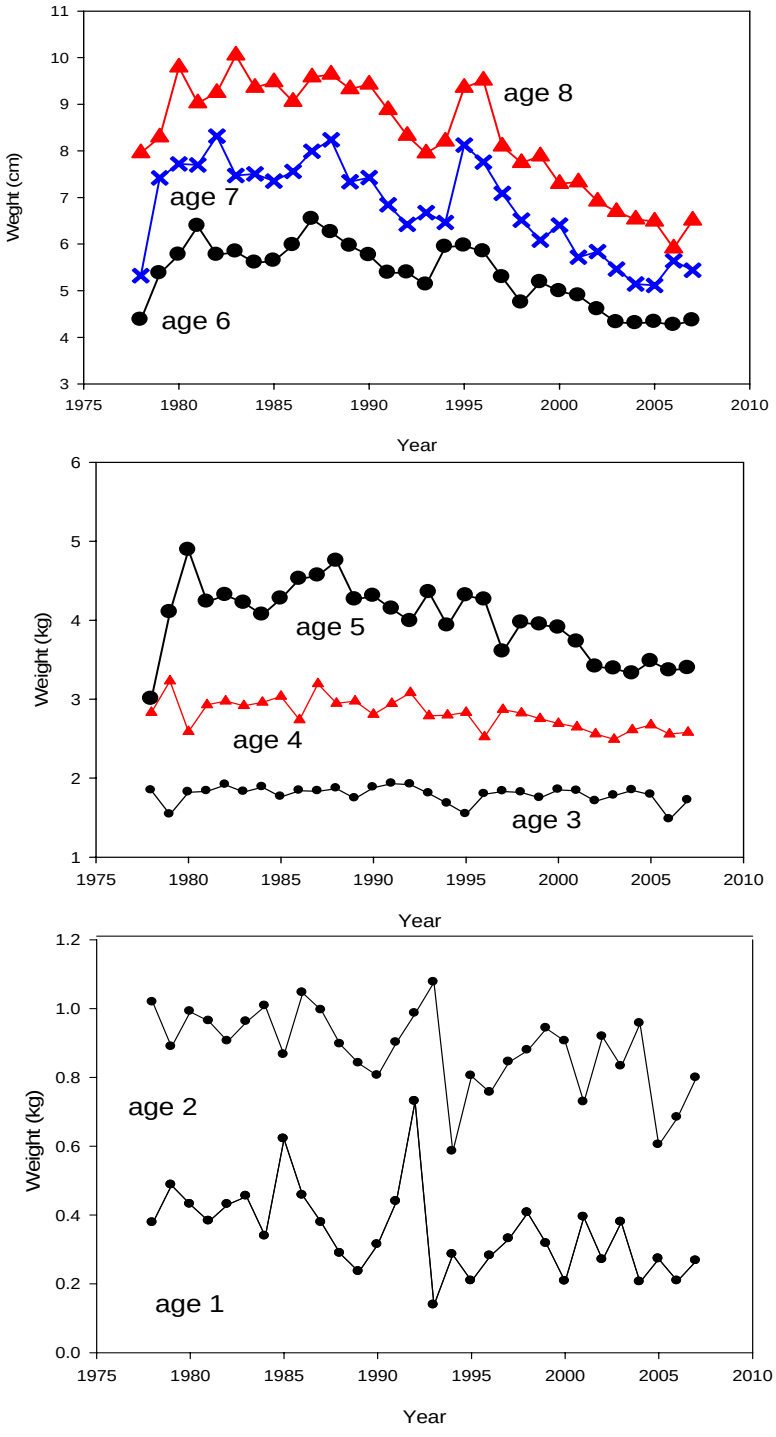

Figure A14. Mean Jan. 1 weight at ages 1-8 for Georges Bank cod, 1978-2007.

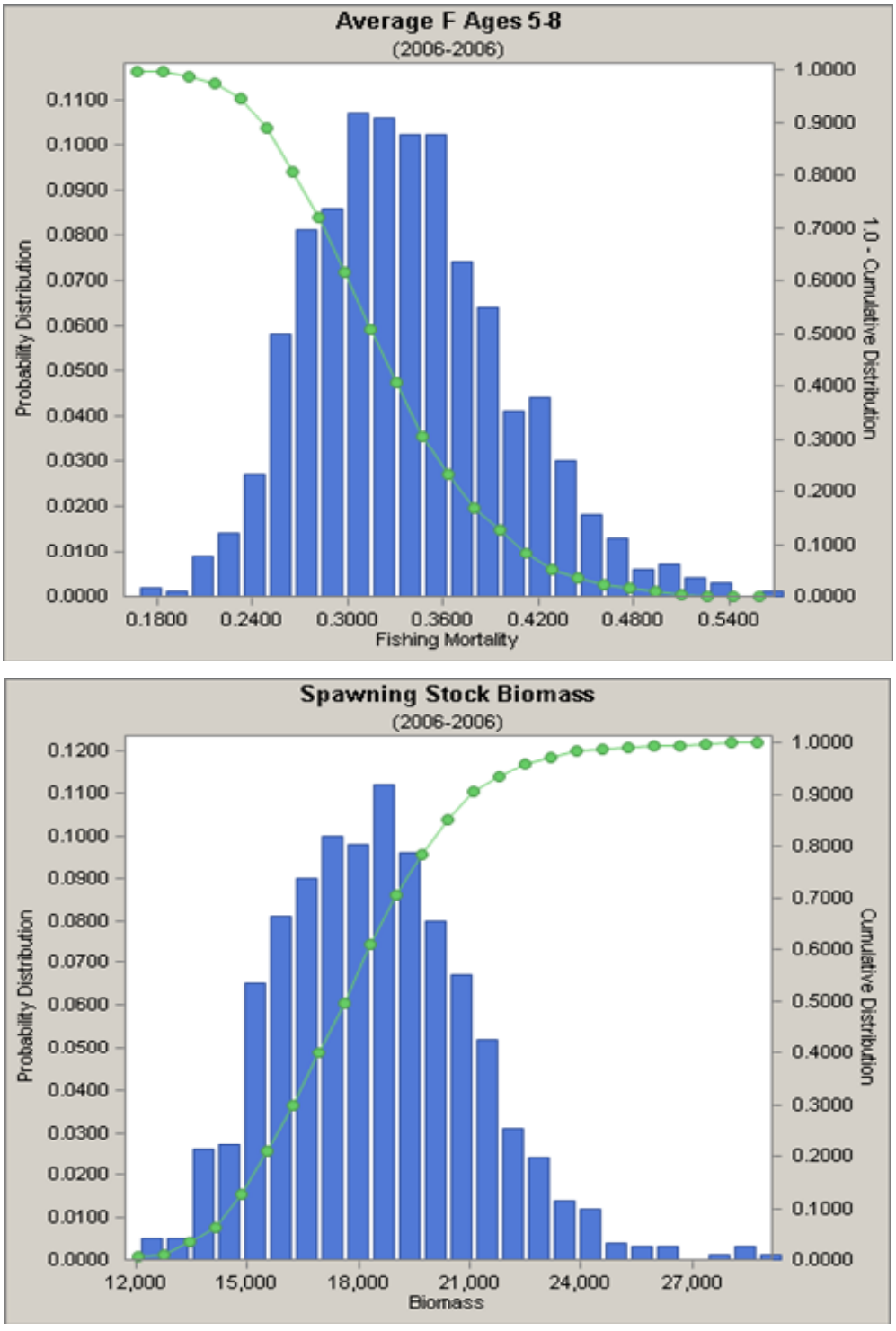

Figure A15. Precision of fishing mortality estimates on fully recruited ages (5-8) and SSB for Georges Bank cod, 2006.

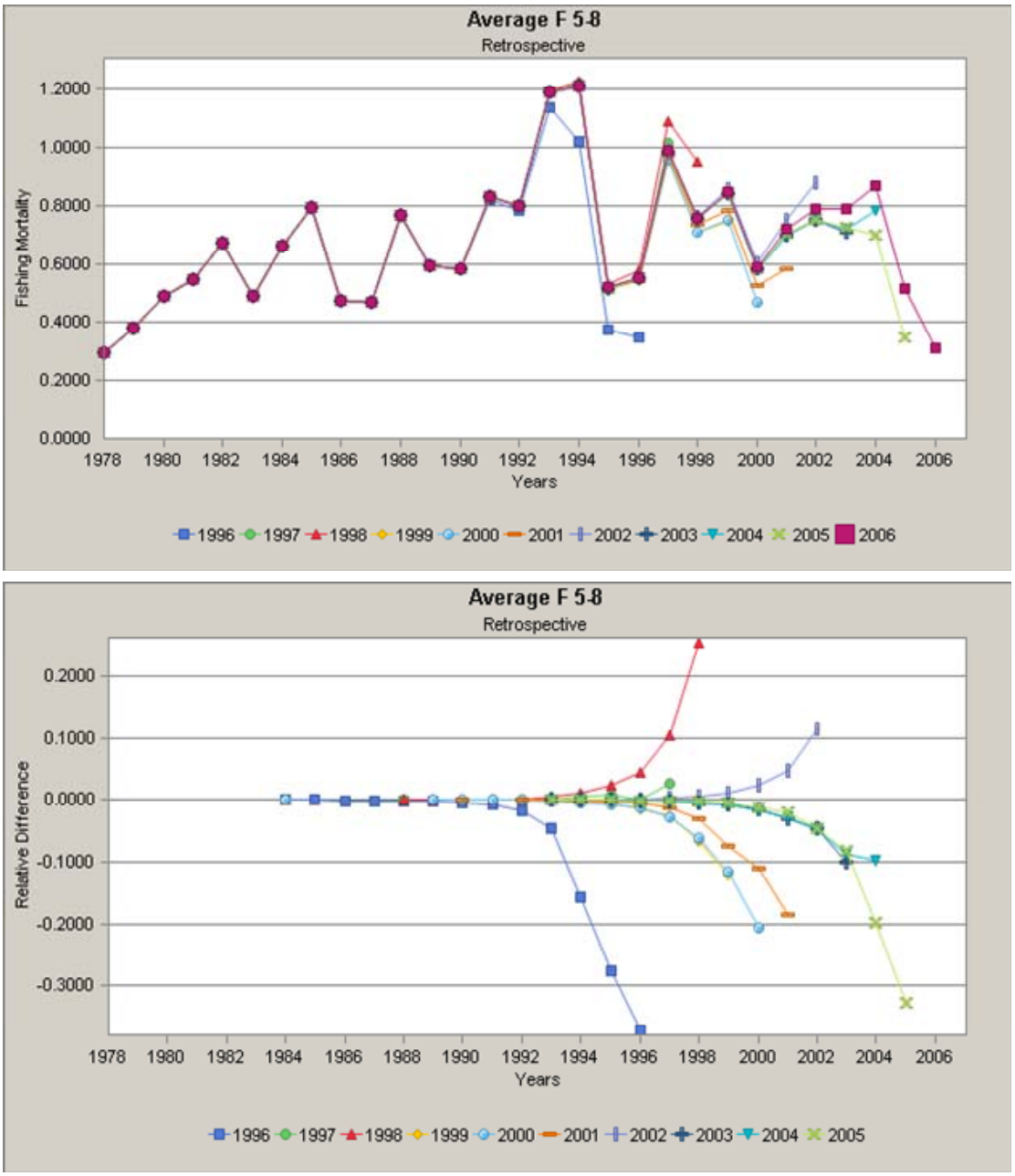

Figure A16. VPA retrospective analysis of fishing mortality (average F, ages 5-8, unweighted) and the relative difference to the terminal year estimate.

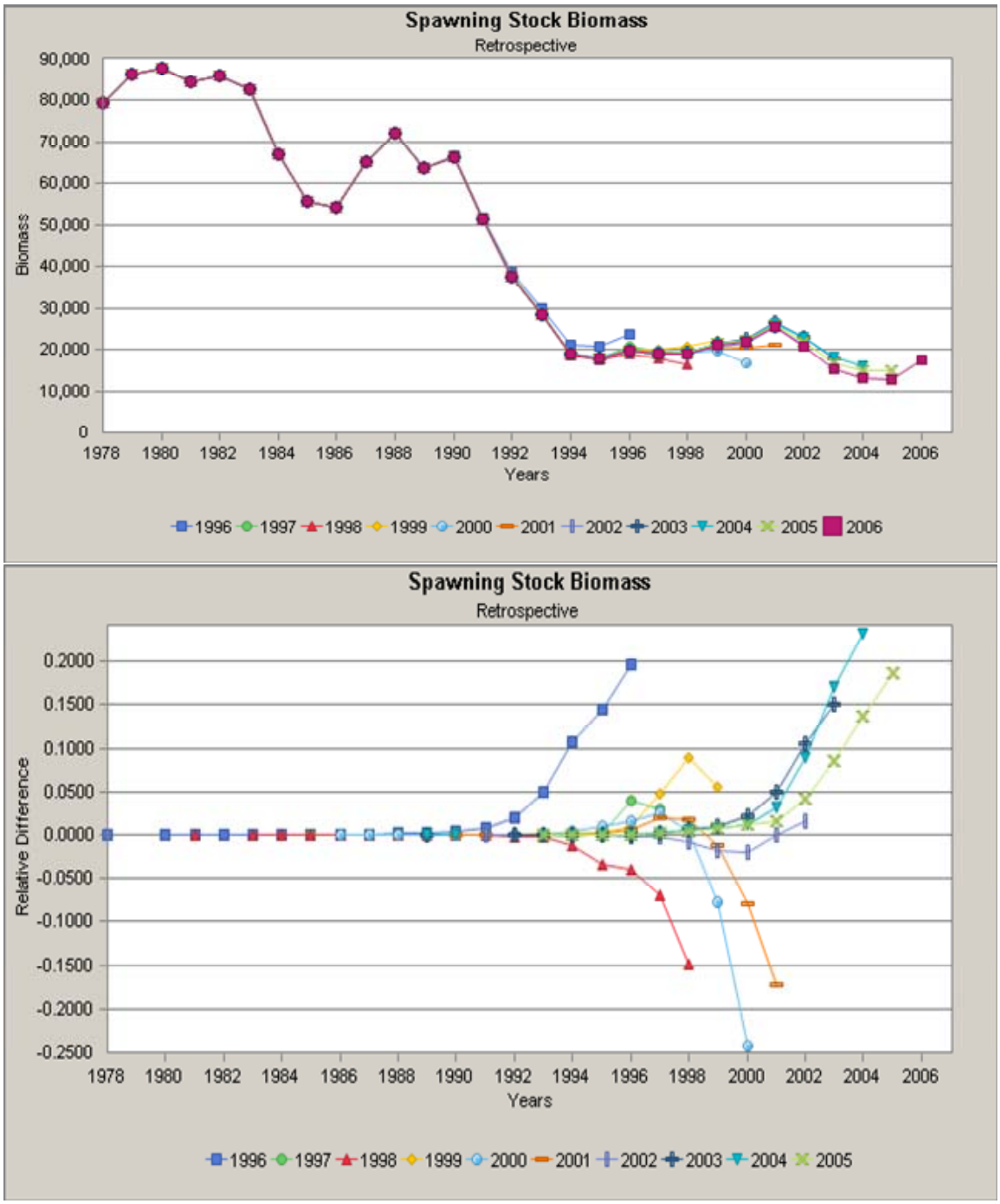

Figure A17. VPA retrospective analysis of spawning stock biomass (SSB) and the relative difference to the terminal year estimate.

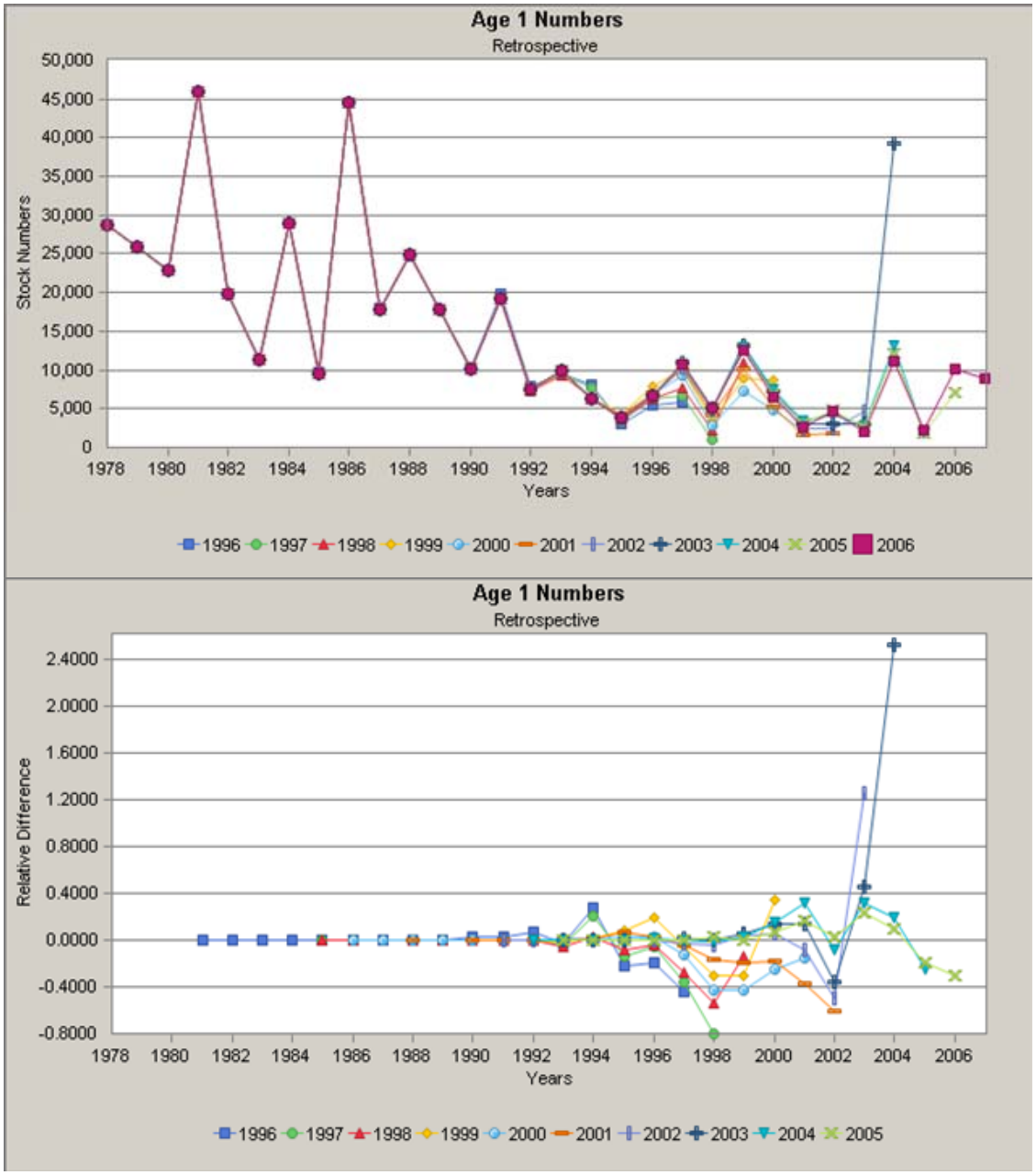

Figure A18. VPA retrospective analysis of recruits at age 1 (millions) and the relative difference to the terminal year estimate.

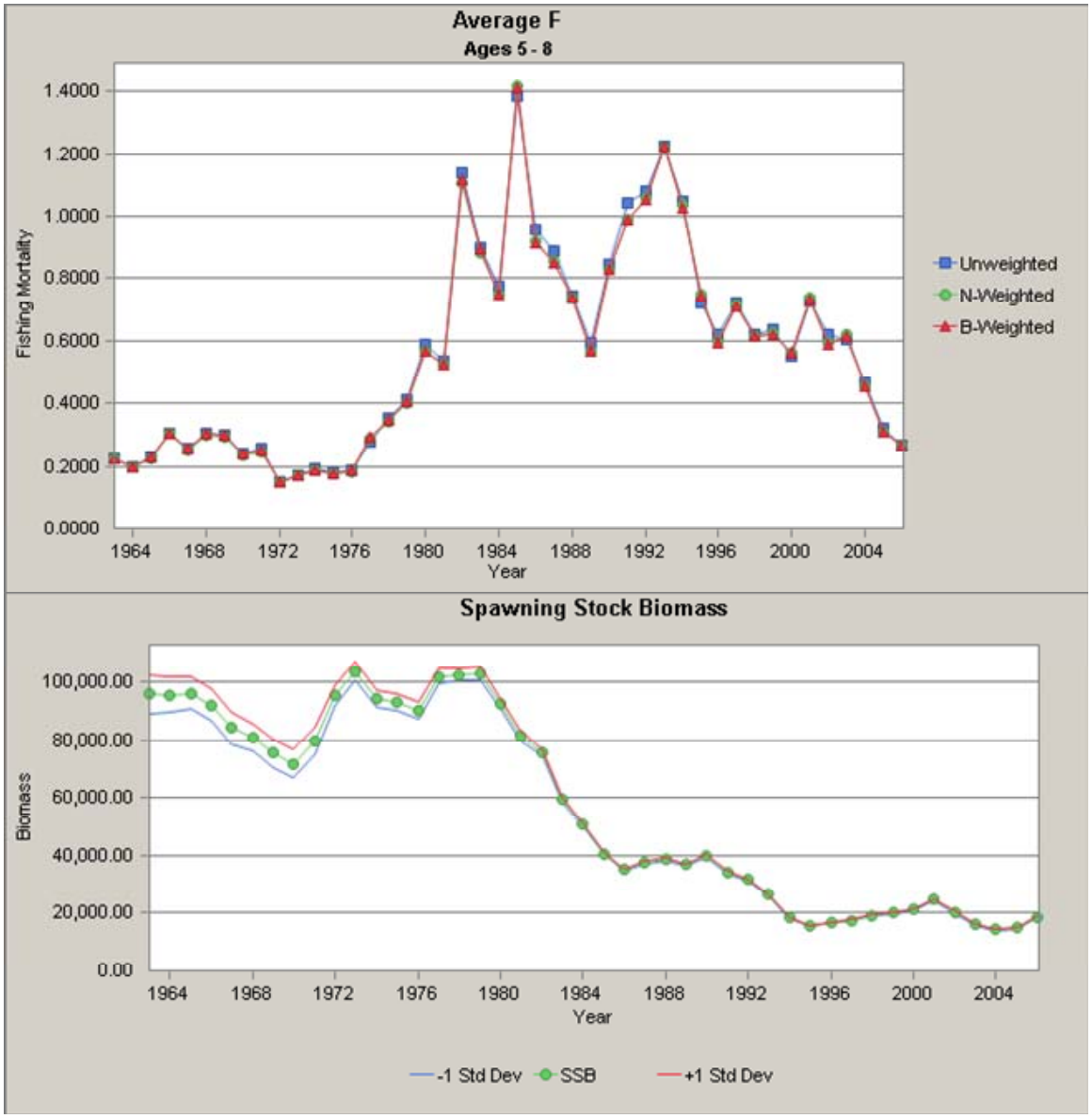

Figure A19. Fishing mortality (ages 5-8, unweighted) and spawning stock biomass as estimated by ASAP.

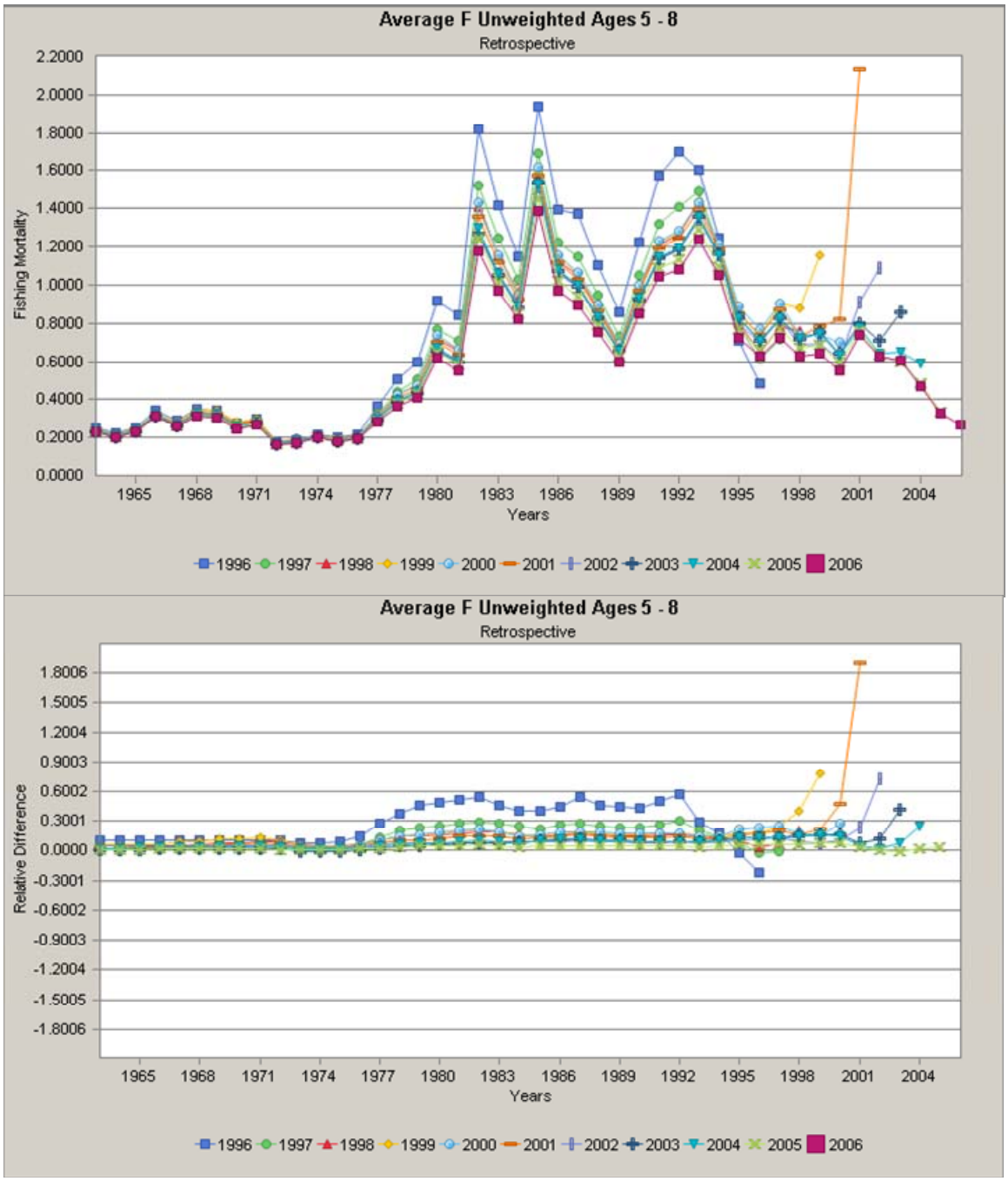

Figure A20. ASAP retrospective analysis of fishing mortality (average F, ages 5-8, unweighted) and relative difference to the terminal year estimate.

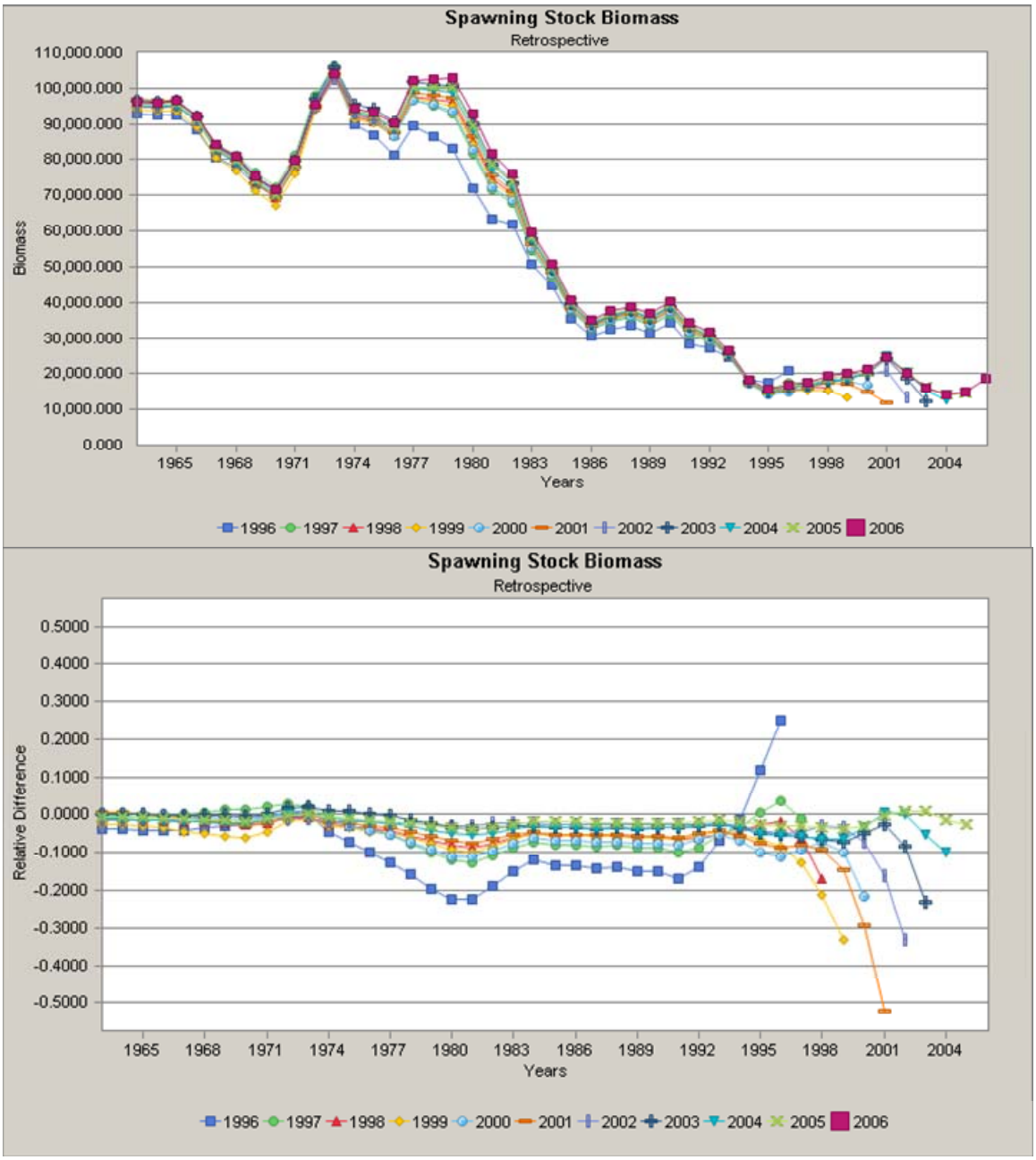

Figure A21. ASAP retrospective analysis of spawning stock biomass (SSB) and the relative difference to the terminal year estimate.

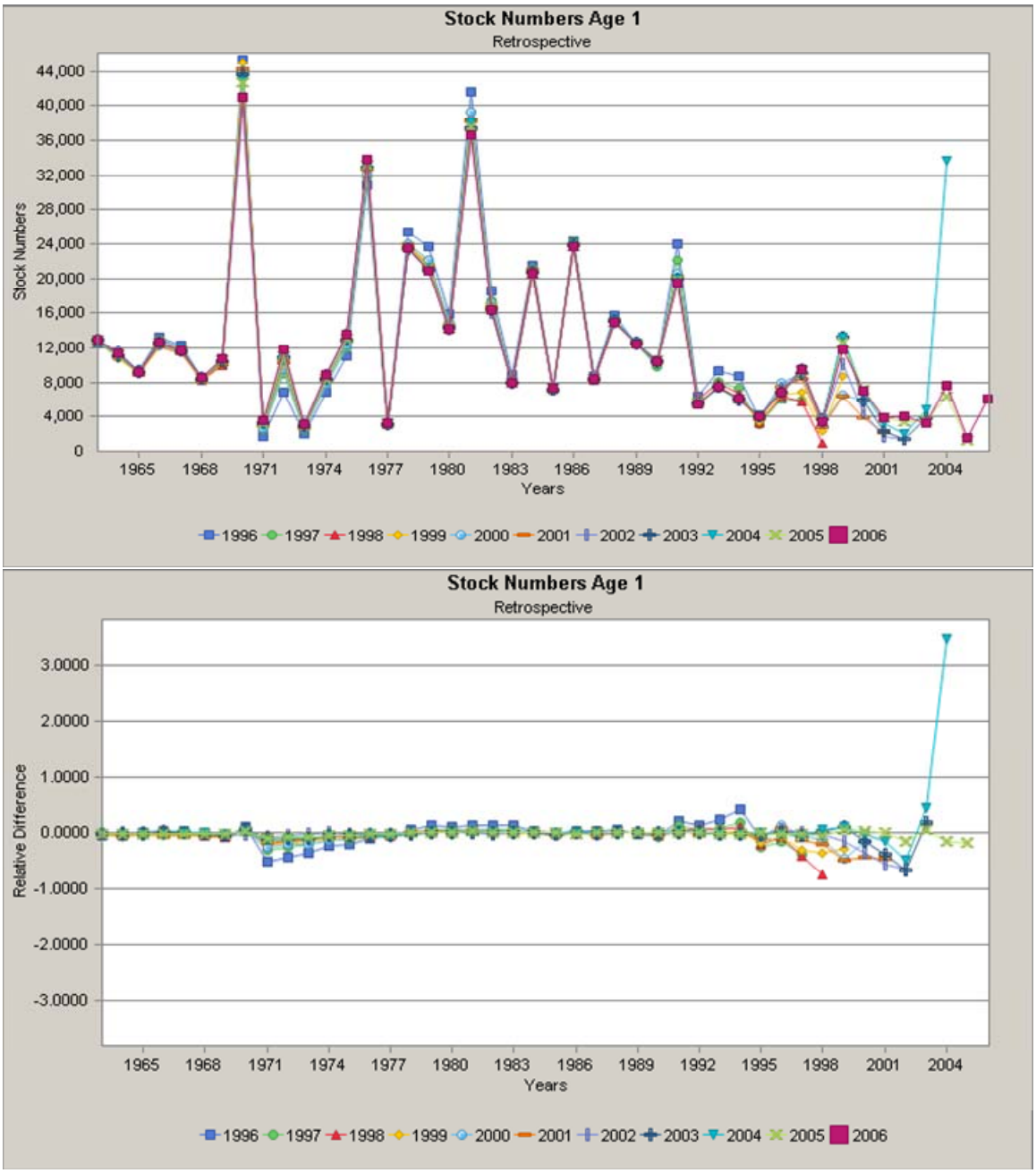

Figure A22. ASAP retrospective analysis of recruits at age 1 (millions) and the relative difference to the terminal year estimate.

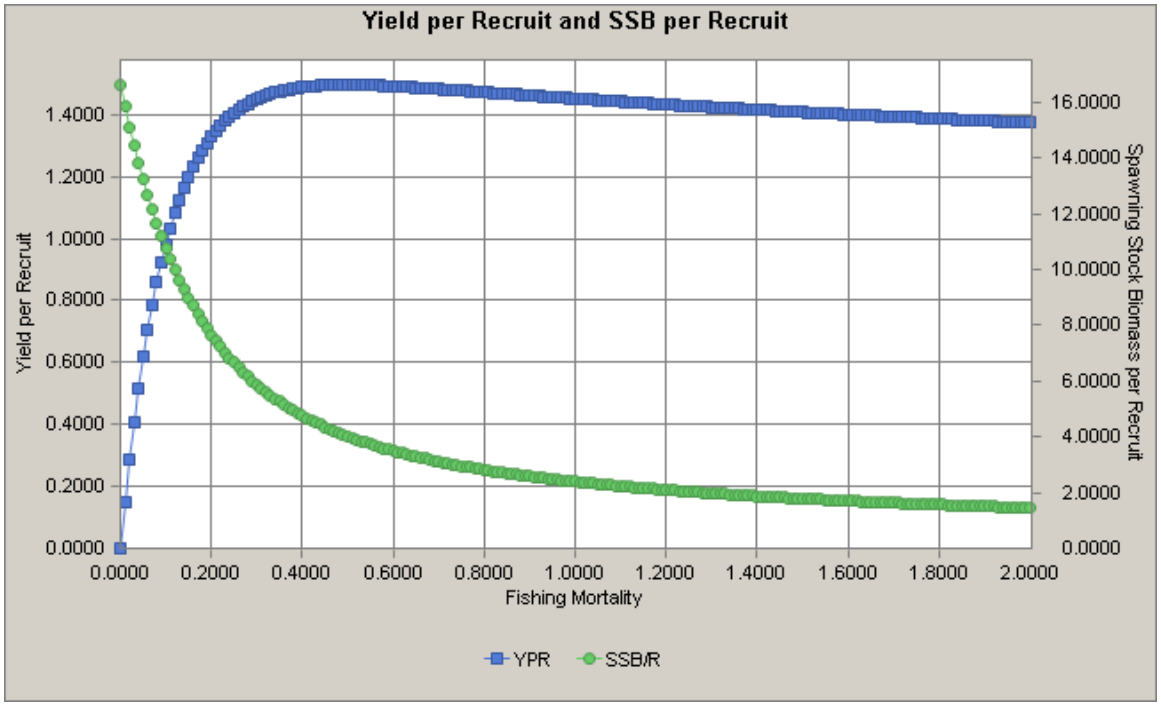

Figure A23. Yield-per-recruit and Spawning stock biomass per recruit for Georges Bank Atlantic cod.

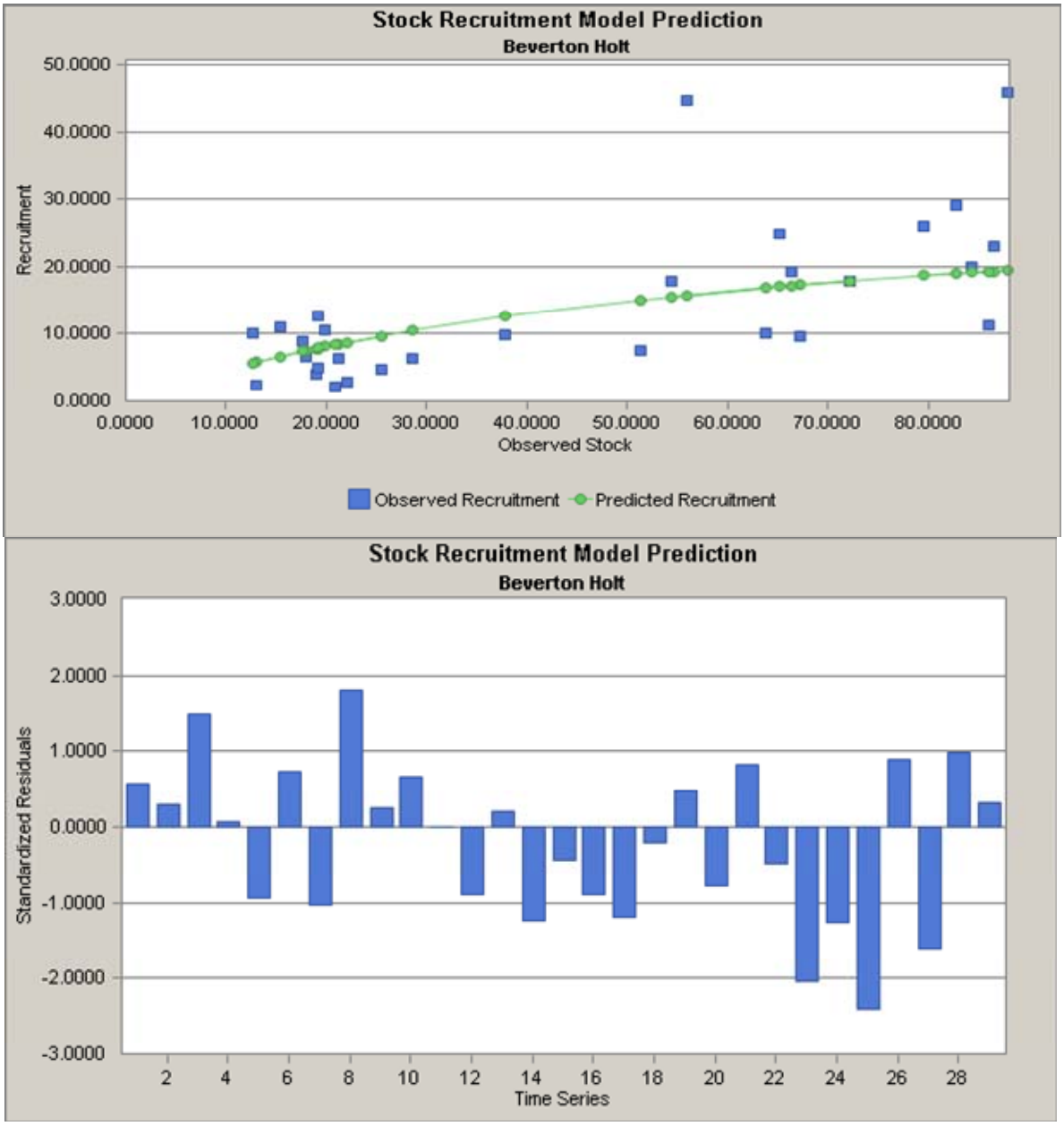

Figure A24. Spawning stock and recruits at age 1 (upper panel) and standardized residuals from Beverton-Holt model predictions for Georges Bank cod, 1978-2006.

Appendix A1.

Full Listing of ADAPT VPA Calibration Output and Diagnostics for Georges Bank Cod

```
VPA Version 2.7.1

 Model ID: Georges Bank   Cod - spr 2008 Assessment TY 2006


 Input File: C:\LOB\GBCOD\ASSESS_2008\VPA\FINAL_RUN\CAA_BASE_SPLIT_59.DAT
 Date of Run: 12-APR-2008                          Time of Run: 19:25


 Levenburg-Marquardt Algorithm Completed     7 Iterations
 Residual Sum of Squares =     307.856

 Number of Residuals     =    574
 Number of Parameters    =      8
 Degrees of Freedom      =    566
 Mean Squared Residual   =     0.543915
 Standard Deviation      =     0.737506


 Number of Years =    29
 Number of Ages  =    10
 First Year      =  1978
 Youngest Age    =     1
 Oldest True Age =     9

 Number of Survey Indices Available        =    52
 Number of Survey Indices Used in Estimate =    52


 VPA Classic Method - Auto Estimated Q's


 Stock Numbers Predicted in Terminal Year Plus One (2007)
 Age    Stock Predicted     Std. Error      CV

   1           8956.479   0.399500E+04   0.446046E+00
   2           8197.469   0.282846E+04   0.345040E+00
   3           1472.924   0.390923E+03   0.265406E+00
   4           5066.898   0.127688E+04   0.252004E+00
   5            553.380   0.155055E+03   0.280195E+00
   6            570.995   0.178300E+03   0.312261E+00
   7            197.744   0.651467E+02   0.329450E+00
   8            124.178   0.454356E+02   0.365892E+00

 Catchability Values for Each Survey Used in Estimate
 INDEX     Catchability    Std. Error      CV

   1       0.126603E-04   0.462267E-05   0.365131E+00
   2       0.712168E-04   0.836463E-05   0.117453E+00
   3       0.131712E-03   0.240336E-04   0.182470E+00
   4       0.169502E-03   0.346018E-04   0.204138E+00
   5       0.214936E-03   0.464164E-04   0.215955E+00
   6       0.239206E-03   0.259733E-04   0.108581E+00
   7       0.219598E-03   0.422628E-04   0.192455E+00
   8       0.265209E-03   0.515335E-04   0.194313E+00
```

9	0.169927E-04	0.275879E-05	0.162351E+00
10	0.617127E-04	0.601507E-05	0.974690E-01
11	0.145760E-03	0.203374E-04	0.139527E+00
12	0.302830E-03	0.586855E-04	0.193790E+00
13	0.395248E-03	0.832365E-04	0.210593E+00
14	0.399371E-03	0.992030E-04	0.248398E+00
15	0.465326E-03	0.113948E-03	0.244879E+00
16	0.511558E-03	0.119015E-03	0.232653E+00
17	0.109929E-04	0.831091E-05	0.756024E+00
18	0.699871E-04	0.162331E-04	0.231944E+00
19	0.154559E-03	0.363288E-04	0.235048E+00
20	0.137780E-03	0.173979E-04	0.126273E+00
21	0.168085E-03	0.420630E-04	0.250248E+00
22	0.161445E-03	0.275608E-04	0.170713E+00
23	0.232144E-03	0.860071E-04	0.370490E+00
24	0.227119E-03	0.129648E-03	0.570839E+00
25	0.256432E-04	0.825752E-05	0.322016E+00
26	0.133911E-03	0.284025E-04	0.212100E+00
27	0.230900E-03	0.263975E-04	0.114325E+00
28	0.264575E-03	0.338425E-04	0.127913E+00
29	0.412806E-03	0.504776E-04	0.122279E+00
30	0.395084E-03	0.818611E-04	0.207199E+00
31	0.518829E-03	0.150511E-03	0.290098E+00
32	0.644429E-03	0.170781E-03	0.265011E+00
33	0.128710E-04	0.434248E-05	0.337385E+00
34	0.503937E-04	0.142418E-04	0.282612E+00
35	0.244911E-03	0.391546E-04	0.159873E+00
36	0.579482E-03	0.890123E-04	0.153607E+00
37	0.902988E-03	0.129908E-03	0.143864E+00
38	0.127116E-02	0.192973E-03	0.151809E+00
39	0.118307E-02	0.268454E-03	0.226913E+00
40	0.121385E-02	0.305925E-03	0.252029E+00
41	0.113918E-04	0.233132E-05	0.204649E+00
42	0.568085E-04	0.805962E-05	0.141874E+00
43	0.842080E-04	0.131653E-04	0.156343E+00
44	0.915080E-04	0.172686E-04	0.188711E+00
45	0.685152E-04	0.172532E-04	0.251816E+00
46	0.735534E-04	0.118675E-04	0.161345E+00
47	0.108642E-04	0.337419E-05	0.310580E+00
48	0.419238E-04	0.140989E-04	0.336298E+00
49	0.121708E-03	0.205566E-04	0.168902E+00
50	0.166950E-03	0.328386E-04	0.196698E+00
51	0.133413E-03	0.334334E-04	0.250600E+00
52	0.181906E-03	0.390952E-04	0.214920E+00

```
 -- Non-Linear Least Squares Fit --

 Default Tolerances Used

 Scaled Gradient Tolerance      =    6.055454E-06
 Scaled Step Tolerance          =    3.666853E-11
 Relative Function Tolerance    =    3.666853E-11
 Absolute Function Tolerance    =    4.930381E-32


 VPA Method Options

 - Catchability Values Estimated as an Analytic Function of N
 - Catch Equation Used in Cohort Solution
 - Plus Group Backward Calculation Method Used
 - Rivard Weights Used for JAN-1 Biomass
 - Rivard Weights Used for SSB Biomass
 - Rivard Weights Calculation Used  5 Years for Terminal Year Plus One

 - Heincke Rule Used in F-Oldest Calculation
 - F-Oldest Calculation in Years Prior to Terminal Year
   Uses Stock Sizes in Ages  5 to  9
 - Calculation of Population of Age 1 In Year 2007
   =  Stock Estimate

 Stock Estimates

 Age   1
 Age   2
 Age   3
 Age   4
 Age   5
 Age   6
 Age   7
 Age   8

 Full F in Terminal Year               =   0.3120

 F in Oldest True Age in Terminal Year =   0.3120

 Full F Calculated Using Classic Method

 Age  Input Partial  Calc Partial   Fishing     Used In
      Recruitment    Recruitment    Mortality   Full F    Comments

   1      0.000          0.008       0.0034      NO      Stock Estimate in
T+1
   2      0.080          0.089       0.0401      NO      Stock Estimate in
T+1
   3      0.380          0.303       0.1372      NO      Stock Estimate in
T+1
   4      0.740          0.641       0.2905      NO      Stock Estimate in
T+1
   5      1.000          1.000       0.4532      YES     Stock Estimate in
T+1
   6      1.000          0.615       0.2789      YES     Stock Estimate in
T+1
```

7	1.000	0.450	0.2041	YES	Stock Estimate in T+1
8	1.000	0.689	0.3120	NO	Input PR * Full F
9	1.000	0.689	0.3120		Input PR * Full F

Catch At Age - Input Data

AGE	1978	1979	1980	1981	1982
1	151.6	279.2	339.9	1219.2	775.4
2	416.8	2242.7	4238.7	3910.7	10457.1
3	8109.1	953.6	5955.4	4738.2	4434.4
4	2429.6	4585.0	545.0	2685.5	2988.0
5	896.8	1206.9	2464.6	317.9	2039.8
6	178.4	449.8	983.0	1406.0	297.1
7	240.8	159.5	418.1	417.0	707.2
8	22.6	304.1	70.4	162.9	198.6
9	42.1	12.9	138.7	155.5	74.6
10	10.7	35.0	14.2	66.4	84.6

AGE	1983	1984	1985	1986	1987
1	626.2	280.9	176.1	768.3	103.8
2	5181.7	1547.7	7443.7	1594.1	7956.1
3	8753.3	3485.7	2942.2	4576.3	1515.5
4	2680.4	3328.4	1690.1	860.2	2170.1
5	1155.3	923.9	2097.7	525.3	299.7
6	746.4	560.2	496.5	615.4	249.9
7	94.6	450.3	267.2	85.5	277.3
8	175.0	58.9	196.8	70.4	56.1
9	67.7	167.0	27.7	56.0	36.2
10	112.6	124.9	89.7	27.8	26.0

AGE	1988	1989	1990	1991	1992
1	324.9	891.5	71.8	269.8	137.9
2	2352.1	2608.6	5561.1	1938.4	4448.1
3	8368.3	3032.8	5373.4	3486.3	2272.9
4	1074.1	4254.4	1964.0	3158.8	1065.9
5	1575.6	383.5	2272.1	1441.7	1495.7
6	223.8	534.2	230.6	1087.8	446.9
7	150.3	81.4	229.4	141.2	355.0
8	218.0	51.2	24.6	89.6	44.1
9	46.5	60.2	23.2	27.5	36.4
10	52.5	21.3	40.4	26.0	10.4

Catch At Age - Input Data

AGE	1993	1994	1995	1996	1997
1	299.2	91.1	31.7	64.7	125.9
2	1534.9	605.0	649.4	287.2	684.2
3	4429.4	1541.3	1427.4	986.6	749.3
4	1224.8	1987.3	669.7	1269.8	1020.6
5	475.3	425.6	382.3	256.3	882.9
6	535.6	97.6	41.2	183.8	147.7
7	178.0	146.1	21.4	17.9	94.4
8	141.0	51.1	20.0	11.6	18.9
9	43.1	30.5	6.4	11.3	10.1
10	21.2	5.6	1.4	0.3	3.9

AGE	1998	1999	2000	2001	2002
1	63.1	45.7	113.3	11.7	22.2
2	918.6	353.8	942.1	719.5	82.7
3	1310.1	2020.0	740.7	2667.1	1129.4
4	494.2	852.3	1156.1	751.6	1504.6
5	385.6	286.6	315.7	698.7	363.3
6	285.2	125.8	88.0	180.4	371.4
7	40.2	143.8	46.3	54.8	84.7
8	16.0	22.2	38.8	25.8	18.7
9	5.6	5.0	4.2	14.8	10.6
10	2.9	3.4	1.0	1.3	6.5

AGE	2003	2004	2005	2006
1	16.7	52.1	11.9	31.3
2	199.1	78.6	355.0	66.8
3	403.4	501.0	199.4	826.9
4	799.9	348.7	576.6	207.5
5	910.1	393.5	144.4	365.1
6	155.9	308.6	105.9	70.7
7	142.4	73.6	85.3	31.2
8	28.2	52.6	18.0	28.5
9	6.5	11.9	8.9	3.8
10	2.9	4.2	3.7	3.4

Weight At Age - Input Data

AGE	1978	1979	1980	1981	1982
1	0.5787	0.6942	0.6438	0.5873	0.6430
2	1.2513	1.3643	1.4133	1.4411	1.3928
3	2.4408	1.8920	2.4308	2.3815	2.5397
4	3.4074	4.2804	3.5465	3.5294	3.7201
5	4.0144	4.9312	5.5826	5.0546	5.2823
6	5.6957	7.1757	6.7481	7.3032	6.5758
7	6.6453	9.6642	8.3051	8.7797	9.4656
8	8.7084	10.3497	9.9256	9.7997	9.7448
9	9.9364	10.4378	9.2950	14.0178	12.9721
10	13.8870	13.6108	14.8999	16.7990	15.6229

AGE	1983	1984	1985	1986	1987
1	0.6763	0.5405	0.8055	0.6738	0.5817
2	1.4363	1.4991	1.3855	1.3568	1.4684
3	2.3895	2.4762	2.0750	2.4477	2.4763
4	3.3518	3.6676	3.7198	3.6106	4.1715
5	4.7839	4.9374	4.9774	5.4941	5.7677
6	6.4468	6.5544	6.4394	7.1726	7.7772
7	8.4913	8.7376	8.2465	8.8770	8.9078
8	10.6665	10.3090	10.2787	9.9439	10.3361
9	11.6989	11.0933	11.7651	12.9472	12.0274
10	16.3190	14.6426	14.0475	14.5623	15.6415

AGE	1988	1989	1990	1991	1992
1	0.4918	0.4347	0.5311	0.6575	0.8860
2	1.3794	1.4362	1.4893	1.5260	1.4754
3	2.3728	2.2041	2.4630	2.5009	2.4126
4	3.5065	3.7324	3.5732	3.5204	3.8006
5	5.4118	5.1806	4.9668	4.8087	4.5157
6	6.7808	6.5629	6.4025	5.8247	6.0392
7	8.7219	7.9373	8.4042	7.3178	7.0825
8	10.4333	9.9761	11.1911	9.3846	9.4727
9	11.5348	11.2867	12.4247	9.6151	11.8468
10	14.9262	14.6514	14.5119	14.6490	18.8362

Weight At Age - Input Data

AGE	1993	1994	1995	1996	1997
1	0.2837	0.4784	0.3961	0.4867	0.5385
2	1.3063	1.2029	1.3492	1.4422	1.4639
3	2.2082	2.1542	1.9778	2.3910	2.3280
4	3.2271	3.5437	3.7206	3.2180	3.4447
5	4.9843	4.7869	5.2487	4.8754	4.0327
6	5.8198	7.0742	7.4303	6.4963	5.7339
7	7.3782	7.1761	9.3273	8.1007	7.7343
8	8.9218	9.1164	12.1972	9.6991	8.0901
9	11.1348	9.0029	11.8414	10.9747	11.4196
10	12.2279	15.7618	19.1176	8.6207	12.0867

AGE	1998	1999	2000	2001	2002
1	0.6186	0.5349	0.3876	0.6006	0.4735
2	1.4325	1.4356	1.5292	1.3653	1.4019
3	2.2614	2.1376	2.3863	2.2118	2.1337
4	3.4254	3.3550	3.3875	2.9372	2.9663
5	4.5713	4.5434	4.5494	4.1007	3.9627
6	5.5756	5.8670	5.4719	5.2650	5.1566
7	7.3994	6.6406	6.9963	5.9799	6.4747
8	7.7535	8.4061	8.0126	7.6805	8.0004
9	11.8203	9.5624	8.0492	9.0432	9.2486
10	12.3102	13.2010	12.5970	9.7372	11.7081

AGE	2003	2004	2005	2006
1	0.6014	0.3514	0.4309	0.3765
2	1.4614	1.5199	1.0355	1.0816
3	2.2548	2.3278	2.1059	2.1050
4	2.9076	3.0269	3.0690	3.1100
5	3.8660	3.8029	4.0035	3.6833
6	4.7096	4.7807	4.9248	4.5359
7	5.7887	5.6155	5.4670	6.4623
8	6.9178	7.3680	7.4957	6.3932
9	8.2507	8.5553	8.7855	7.5209
10	10.4478	10.9725	11.3707	9.0650

JAN-1 Weights at Age - Input Data

AGE	1978	1979	1980	1981	1982
1	0.3769	0.4865	0.4303	0.3814	0.4302
2	1.0176	0.8885	0.9905	0.9632	0.9044
3	1.8431	1.5387	1.8211	1.8346	1.9131
4	2.8324	3.2323	2.5904	2.9290	2.9765
5	3.0026	4.0991	4.8883	4.2339	4.3178
6	4.3726	5.3671	5.7686	6.3852	5.7652
7	5.3249	7.4192	7.7198	7.6972	8.3144
8	7.9543	8.2932	9.7940	9.0215	9.2497
9	9.3022	9.5340	9.8082	11.7956	11.2749
10	13.8870	13.6108	14.8999	16.7990	15.6229

AGE	1983	1984	1985	1986	1987
1	0.4542	0.3376	0.6206	0.4564	0.3777
2	0.9610	1.0069	0.8654	1.0454	0.9947
3	1.8243	1.8859	1.7637	1.8415	1.8330
4	2.9176	2.9604	3.0350	2.7372	3.1954
5	4.2186	4.0681	4.2726	4.5207	4.5634
6	5.8356	5.5996	5.6386	5.9750	6.5367
7	7.4724	7.5053	7.3519	7.5606	7.9933
8	10.0481	9.3561	9.4769	9.0555	9.5788
9	10.6772	10.8778	11.0130	11.5361	10.9362
10	16.3190	14.6426	14.0475	14.5623	15.6415

AGE	1988	1989	1990	1991	1992
1	0.2878	0.2349	0.3133	0.4389	0.7297
2	0.8958	0.8404	0.8046	0.9003	0.9849
3	1.8666	1.7437	1.8808	1.9299	1.9188
4	2.9467	2.9759	2.8064	2.9446	3.0830
5	4.7514	4.2621	4.3056	4.1452	3.9871
6	6.2538	5.9596	5.7592	5.3787	5.3889
7	8.2360	7.3363	7.4267	6.8449	6.4229
8	9.6404	9.3279	9.4248	8.8809	8.3258
9	10.9190	10.8516	11.1333	10.3732	10.5441
10	14.9262	14.6514	14.5119	14.6490	18.8362

JAN-1 Weights at Age - Input Data

AGE	1993	1994	1995	1996	1997
1	0.1378	0.2849	0.2076	0.2806	0.3302
2	1.0758	0.5842	0.8034	0.7558	0.8441
3	1.8050	1.6775	1.5424	1.7961	1.8323
4	2.7903	2.7974	2.8311	2.5228	2.8699
5	4.3524	3.9304	4.3128	4.2590	3.6024
6	5.1264	5.9380	5.9639	5.8393	5.2873
7	6.6752	6.4625	8.1230	7.7583	7.0883
8	7.9491	8.2014	9.3557	9.5114	8.0954
9	10.2702	8.9623	10.3899	11.5698	10.5243
10	12.2279	15.7618	19.1176	8.6207	12.0867

AGE	1998	1999	2000	2001	2002
1	0.4061	0.3164	0.2065	0.3931	0.2695
2	0.8783	0.9424	0.9044	0.7275	0.9176
3	1.8195	1.7499	1.8509	1.8391	1.7068
4	2.8239	2.7545	2.6909	2.6475	2.5614
5	3.9682	3.9450	3.9068	3.7271	3.4116
6	4.7418	5.1788	4.9861	4.8941	4.5984
7	6.5136	6.0848	6.4068	5.7203	5.8386
8	7.7439	7.8867	7.2944	7.3304	6.9168
9	9.7789	8.6106	8.2257	8.5123	8.4282
10	12.3102	13.2010	12.5970	9.7372	11.7081

AGE	2003	2004	2005	2006	2007
1	0.3783	0.2047	0.2720	0.2076	0.2664
2	0.8318	0.9561	0.6032	0.6827	0.7983
3	1.7779	1.8444	1.7891	1.4764	1.7189
4	2.4908	2.6125	2.6728	2.5592	2.5793
5	3.3864	3.3253	3.4811	3.3621	3.3933
6	4.3200	4.2991	4.3276	4.2614	4.3613
7	5.4635	5.1426	5.1123	5.6414	5.4397
8	6.6926	6.5308	6.4878	5.9120	6.5080
9	8.1246	7.6931	8.0456	7.5083	7.9599
10	10.4478	10.9725	11.3707	9.0650	10.7128

SSB Weight At Age - Input Data

AGE	1978	1979	1980	1981	1982
1	0.3769	0.4865	0.4303	0.3814	0.4302
2	1.0176	0.8885	0.9905	0.9632	0.9044
3	1.8431	1.5387	1.8211	1.8346	1.9131
4	2.8324	3.2323	2.5904	2.9290	2.9765
5	3.0026	4.0991	4.8883	4.2339	4.3178
6	4.3726	5.3671	5.7686	6.3852	5.7652
7	5.3249	7.4192	7.7198	7.6972	8.3144
8	7.9543	8.2932	9.7940	9.0215	9.2497
9	9.3022	9.5340	9.8082	11.7956	11.2749
10	13.8870	13.6108	14.8999	16.7990	15.6229

AGE	1983	1984	1985	1986	1987
1	0.4542	0.3376	0.6206	0.4564	0.3777
2	0.9610	1.0069	0.8654	1.0454	0.9947
3	1.8243	1.8859	1.7637	1.8415	1.8330
4	2.9176	2.9604	3.0350	2.7372	3.1954
5	4.2186	4.0681	4.2726	4.5207	4.5634
6	5.8356	5.5996	5.6386	5.9750	6.5367
7	7.4724	7.5053	7.3519	7.5606	7.9933
8	10.0481	9.3561	9.4769	9.0555	9.5788
9	10.6772	10.8778	11.0130	11.5361	10.9362
10	16.3190	14.6426	14.0475	14.5623	15.6415

AGE	1988	1989	1990	1991	1992
1	0.2878	0.2349	0.3133	0.4389	0.7297
2	0.8958	0.8404	0.8046	0.9003	0.9849
3	1.8666	1.7437	1.8808	1.9299	1.9188
4	2.9467	2.9759	2.8064	2.9446	3.0830
5	4.7514	4.2621	4.3056	4.1452	3.9871
6	6.2538	5.9596	5.7592	5.3787	5.3889
7	8.2360	7.3363	7.4267	6.8449	6.4229
8	9.6404	9.3279	9.4248	8.8809	8.3258
9	10.9190	10.8516	11.1333	10.3732	10.5441
10	14.9262	14.6514	14.5119	14.6490	18.8362

SSB Weight At Age - Input Data

AGE	1993	1994	1995	1996	1997
1	0.1378	0.2849	0.2076	0.2806	0.3302
2	1.0758	0.5842	0.8034	0.7558	0.8441
3	1.8050	1.6775	1.5424	1.7961	1.8323
4	2.7903	2.7974	2.8311	2.5228	2.8699
5	4.3524	3.9304	4.3128	4.2590	3.6024
6	5.1264	5.9380	5.9639	5.8393	5.2873
7	6.6752	6.4625	8.1230	7.7583	7.0883
8	7.9491	8.2014	9.3557	9.5114	8.0954
9	10.2702	8.9623	10.3899	11.5698	10.5243
10	12.2279	15.7618	19.1176	8.6207	12.0867

AGE	1998	1999	2000	2001	2002
1	0.4061	0.3164	0.2065	0.3931	0.2695
2	0.8783	0.9424	0.9044	0.7275	0.9176
3	1.8195	1.7499	1.8509	1.8391	1.7068
4	2.8239	2.7545	2.6909	2.6475	2.5614
5	3.9682	3.9450	3.9068	3.7271	3.4116
6	4.7418	5.1788	4.9861	4.8941	4.5984
7	6.5136	6.0848	6.4068	5.7203	5.8386
8	7.7439	7.8867	7.2944	7.3304	6.9168
9	9.7789	8.6106	8.2257	8.5123	8.4282
10	12.3102	13.2010	12.5970	9.7372	11.7081

AGE	2003	2004	2005	2006
1	0.3783	0.2047	0.2720	0.2076
2	0.8318	0.9561	0.6032	0.6827
3	1.7779	1.8444	1.7891	1.4764
4	2.4908	2.6125	2.6728	2.5592
5	3.3864	3.3253	3.4811	3.3621
6	4.3200	4.2991	4.3276	4.2614
7	5.4635	5.1426	5.1123	5.6414
8	6.6926	6.5308	6.4878	5.9120
9	8.1246	7.6931	8.0456	7.5083
10	10.4478	10.9725	11.3707	9.0650

Natural Mortality - Input Data

AGE	1978	1979	1980	1981	1982
1	0.2000	0.2000	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000	0.2000	0.2000
7	0.2000	0.2000	0.2000	0.2000	0.2000
8	0.2000	0.2000	0.2000	0.2000	0.2000
9	0.2000	0.2000	0.2000	0.2000	0.2000
10	0.2000	0.2000	0.2000	0.2000	0.2000

AGE	1983	1984	1985	1986	1987
1	0.2000	0.2000	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000	0.2000	0.2000
7	0.2000	0.2000	0.2000	0.2000	0.2000
8	0.2000	0.2000	0.2000	0.2000	0.2000
9	0.2000	0.2000	0.2000	0.2000	0.2000
10	0.2000	0.2000	0.2000	0.2000	0.2000

AGE	1988	1989	1990	1991	1992
1	0.2000	0.2000	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000	0.2000	0.2000
7	0.2000	0.2000	0.2000	0.2000	0.2000
8	0.2000	0.2000	0.2000	0.2000	0.2000
9	0.2000	0.2000	0.2000	0.2000	0.2000
10	0.2000	0.2000	0.2000	0.2000	0.2000

Natural Mortality - Input Data

AGE	1993	1994	1995	1996	1997
1	0.2000	0.2000	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000	0.2000	0.2000
7	0.2000	0.2000	0.2000	0.2000	0.2000
8	0.2000	0.2000	0.2000	0.2000	0.2000
9	0.2000	0.2000	0.2000	0.2000	0.2000
10	0.2000	0.2000	0.2000	0.2000	0.2000

AGE	1998	1999	2000	2001	2002
1	0.2000	0.2000	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000	0.2000	0.2000
7	0.2000	0.2000	0.2000	0.2000	0.2000
8	0.2000	0.2000	0.2000	0.2000	0.2000
9	0.2000	0.2000	0.2000	0.2000	0.2000
10	0.2000	0.2000	0.2000	0.2000	0.2000

AGE	2003	2004	2005	2006
1	0.2000	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000	0.2000
7	0.2000	0.2000	0.2000	0.2000
8	0.2000	0.2000	0.2000	0.2000
9	0.2000	0.2000	0.2000	0.2000
10	0.2000	0.2000	0.2000	0.2000

Proportion of Natural Mortality Before Spawning = 0.1667
Proportion of Fishing Mortality Before Spawning = 0.1667

Maturity - Input Data

AGE	1978	1979	1980	1981	1982
1	0.1100	0.1200	0.0600	0.0800	0.0700
2	0.4400	0.4000	0.3000	0.3300	0.4000
3	0.8400	0.7700	0.7400	0.7300	0.8500
4	0.9700	0.9400	0.9500	0.9400	0.9800
5	1.0000	0.9900	0.9900	0.9900	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.0000	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1983	1984	1985	1986	1987
1	0.1000	0.0900	0.1100	0.2400	0.2200
2	0.4600	0.4400	0.5000	0.6700	0.6600
3	0.8600	0.8600	0.8900	0.9300	0.9300
4	0.9800	0.9800	0.9900	0.9900	0.9900
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.0000	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1988	1989	1990	1991	1992
1	0.2400	0.1700	0.1700	0.1100	0.0600
2	0.6300	0.5200	0.5600	0.4700	0.4700
3	0.9100	0.8500	0.8900	0.8600	0.9300
4	0.9800	0.9700	0.9800	0.9800	0.9900
5	1.0000	0.9900	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.0000	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	1.0000

Maturity - Input Data

AGE	1993	1994	1995	1996	1997
1	0.0300	0.0200	0.0200	0.0800	0.0800
2	0.3600	0.4400	0.3900	0.5400	0.5700
3	0.9000	0.9800	0.9500	0.9400	0.9500
4	0.9900	1.0000	1.0000	1.0000	1.0000
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.0000	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1998	1999	2000	2001	2002
1	0.1200	0.0900	0.0600	0.0400	0.0400
2	0.5600	0.5600	0.4800	0.4300	0.4100
3	0.9300	0.9400	0.9300	0.9400	0.9200
4	0.9900	1.0000	0.9900	1.0000	1.0000
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.0000	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	2003	2004	2005	2006
1	0.0900	0.0600	0.0500	0.0400
2	0.4000	0.3300	0.3100	0.3500
3	0.8100	0.7900	0.7900	0.8700
4	0.9700	0.9700	0.9700	0.9900
5	0.9900	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000
7	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000

Input Partial Recruitment

AGE	
1	0.0000
2	0.0800
3	0.3800
4	0.7400
5	1.0000
6	1.0000
7	1.0000
8	1.0000
9	1.0000

Input F-Plus Ratio

YEAR	
1978	1.0000
1979	1.0000
1980	1.0000
1981	1.0000
1982	1.0000
1983	1.0000
1984	1.0000
1985	1.0000
1986	1.0000
1987	1.0000
1988	1.0000
1989	1.0000
1990	1.0000
1991	1.0000
1992	1.0000
1993	1.0000
1994	1.0000
1995	1.0000
1996	1.0000
1997	1.0000
1998	1.0000
1999	1.0000
2000	1.0000
2001	1.0000
2002	1.0000
2003	1.0000
2004	1.0000
2005	1.0000
2006	1.0000

SURVEY - INPUT DATA

INDEX	1	2	3	4	5
SURVEY TAG	spr_36pr	spr_36pr	spr_36pr	spr_36pr	spr_36pr
AGE	1	2	3	4	5
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.0000	0.0000	0.0000	0.0000
1979	0.0000	0.0000	0.0000	0.0000	0.0000
1980	0.0000	0.0000	0.0000	0.0000	0.0000
1981	0.0000	0.0000	0.0000	0.0000	0.0000
1982	0.5079	5.4354	9.5019	8.3244	6.2080
1983	0.3315	1.9518	3.0170	0.7962	0.6970
1984	0.4022	0.4310	0.7607	1.2382	0.4223
1985	0.1111	2.6531	0.6633	1.1103	1.4123
1986	0.8715	0.4090	1.8444	0.3652	0.5400
1987	0.0197	1.6125	0.3784	0.7633	0.0621
1988	0.7202	0.6088	3.1496	0.4088	0.6435
1989	0.3104	1.4104	0.6664	1.5831	0.2351
1990	0.1734	0.9215	1.7371	0.6742	0.9119
1991	1.0266	0.5278	0.6887	0.9289	0.4788
1992	0.1227	1.2524	0.4682	0.1681	0.2729
1993	0.0085	0.3988	1.3061	0.2053	0.0895
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.0000	0.0000	0.0000	0.0000	0.0000
1996	0.0000	0.0000	0.0000	0.0000	0.0000
1997	0.0000	0.0000	0.0000	0.0000	0.0000
1998	0.0000	0.0000	0.0000	0.0000	0.0000
1999	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000
2001	0.0000	0.0000	0.0000	0.0000	0.0000
2002	0.0000	0.0000	0.0000	0.0000	0.0000
2003	0.0000	0.0000	0.0000	0.0000	0.0000
2004	0.0000	0.0000	0.0000	0.0000	0.0000
2005	0.0000	0.0000	0.0000	0.0000	0.0000
2006	0.0000	0.0000	0.0000	0.0000	0.0000
2007	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	6	7	8	9	10
SURVEY TAG	spr_36pr	spr_36pr	spr_36pr	spr_36po	spr_36po
AGE	6	7	8	1	2
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.0000	0.0000	0.0000	0.0000
1979	0.0000	0.0000	0.0000	0.0000	0.0000
1980	0.0000	0.0000	0.0000	0.0000	0.0000
1981	0.0000	0.0000	0.0000	0.0000	0.0000
1982	0.2929	1.8657	0.3685	0.0000	0.0000
1983	0.4431	0.0272	0.2186	0.0000	0.0000
1984	0.4004	0.2088	0.0000	0.0000	0.0000
1985	0.2654	0.1919	0.1799	0.0000	0.0000
1986	0.6179	0.0617	0.1251	0.0000	0.0000
1987	0.1794	0.1355	0.0328	0.0000	0.0000
1988	0.0640	0.0370	0.0492	0.0000	0.0000
1989	0.3511	0.0505	0.0395	0.0000	0.0000
1990	0.1304	0.1431	0.0129	0.0000	0.0000
1991	0.3281	0.0541	0.0406	0.0000	0.0000
1992	0.1424	0.1587	0.0196	0.0000	0.0000
1993	0.1382	0.0293	0.0344	0.0000	0.0000
1994	0.0000	0.0000	0.0000	0.1248	0.2724
1995	0.0000	0.0000	0.0000	0.0495	0.3817
1996	0.0000	0.0000	0.0000	0.0730	0.2139
1997	0.0000	0.0000	0.0000	0.2908	0.4371
1998	0.0000	0.0000	0.0000	0.1113	0.6652
1999	0.0000	0.0000	0.0000	0.2123	0.2909
2000	0.0000	0.0000	0.0000	0.2207	0.8066
2001	0.0000	0.0000	0.0000	0.0610	0.2350
2002	0.0000	0.0000	0.0000	0.0650	0.0930
2003	0.0000	0.0000	0.0000	0.0160	0.2130
2004	0.0000	0.0000	0.0000	0.6370	0.0580
2005	0.0000	0.0000	0.0000	0.0119	0.4838
2006	0.0000	0.0000	0.0000	0.1786	0.2310
2007	0.0000	0.0000	0.0000	0.1250	0.6390

SURVEY - INPUT DATA

INDEX	11	12	13	14	15
SURVEY TAG	spr_36po	spr_36po	spr_36po	spr_36po	spr_36po
AGE	3	4	5	6	7
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.0000	0.0000	0.0000	0.0000
1979	0.0000	0.0000	0.0000	0.0000	0.0000
1980	0.0000	0.0000	0.0000	0.0000	0.0000
1981	0.0000	0.0000	0.0000	0.0000	0.0000
1982	0.0000	0.0000	0.0000	0.0000	0.0000
1983	0.0000	0.0000	0.0000	0.0000	0.0000
1984	0.0000	0.0000	0.0000	0.0000	0.0000
1985	0.0000	0.0000	0.0000	0.0000	0.0000
1986	0.0000	0.0000	0.0000	0.0000	0.0000
1987	0.0000	0.0000	0.0000	0.0000	0.0000
1988	0.0000	0.0000	0.0000	0.0000	0.0000
1989	0.0000	0.0000	0.0000	0.0000	0.0000
1990	0.0000	0.0000	0.0000	0.0000	0.0000
1991	0.0000	0.0000	0.0000	0.0000	0.0000
1992	0.0000	0.0000	0.0000	0.0000	0.0000
1993	0.0000	0.0000	0.0000	0.0000	0.0000
1994	0.2000	0.2165	0.0332	0.0057	0.0441
1995	0.8539	0.5340	0.5990	0.1067	0.2336
1996	0.7362	1.2472	0.1742	0.2085	0.0277
1997	0.1702	0.4886	0.4223	0.0498	0.1339
1998	1.2980	0.8478	0.7549	0.5326	0.1016
1999	0.6090	0.5097	0.2382	0.1193	0.0636
2000	0.8298	1.1411	0.3703	0.1024	0.0255
2001	0.7940	0.1600	0.3830	0.1770	0.0230
2002	0.3830	0.9930	0.2390	0.2250	0.0390
2003	0.2710	0.6230	0.6960	0.0640	0.0800
2004	0.5790	1.4070	1.3540	0.8930	0.1790
2005	0.1378	0.6310	0.2744	0.2053	0.1274
2006	1.3059	0.3319	0.7234	0.2128	0.1213
2007	0.3756	1.7937	0.1809	0.2092	0.0309

SURVEY - INPUT DATA

INDEX	16	17	18	19	20
SURVEY TAG	spr_36po	spr_41	spr_41	spr_41	spr_41
AGE	8	1	2	3	4
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.3717	0.1918	5.5309	0.9715
1979	0.0000	0.4283	1.2977	0.2751	1.8515
1980	0.0000	0.0312	2.2170	2.6896	0.2123
1981	0.0000	2.3022	1.8522	2.8108	1.6849
1982	0.0000	0.0000	0.0000	0.0000	0.0000
1983	0.0000	0.0000	0.0000	0.0000	0.0000
1984	0.0000	0.0000	0.0000	0.0000	0.0000
1985	0.0000	0.0000	0.0000	0.0000	0.0000
1986	0.0000	0.0000	0.0000	0.0000	0.0000
1987	0.0000	0.0000	0.0000	0.0000	0.0000
1988	0.0000	0.0000	0.0000	0.0000	0.0000
1989	0.0000	0.0000	0.0000	0.0000	0.0000
1990	0.0000	0.0000	0.0000	0.0000	0.0000
1991	0.0000	0.0000	0.0000	0.0000	0.0000
1992	0.0000	0.0000	0.0000	0.0000	0.0000
1993	0.0000	0.0000	0.0000	0.0000	0.0000
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.0280	0.0000	0.0000	0.0000	0.0000
1996	0.0181	0.0000	0.0000	0.0000	0.0000
1997	0.0201	0.0000	0.0000	0.0000	0.0000
1998	0.0309	0.0000	0.0000	0.0000	0.0000
1999	0.0305	0.0000	0.0000	0.0000	0.0000
2000	0.0201	0.0000	0.0000	0.0000	0.0000
2001	0.0180	0.0000	0.0000	0.0000	0.0000
2002	0.0000	0.0000	0.0000	0.0000	0.0000
2003	0.0120	0.0000	0.0000	0.0000	0.0000
2004	0.2610	0.0000	0.0000	0.0000	0.0000
2005	0.0298	0.0000	0.0000	0.0000	0.0000
2006	0.0539	0.0000	0.0000	0.0000	0.0000
2007	0.0181	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	21	22	23	24	25
SURVEY TAG	spr_41	spr_41	spr_41	spr_41	sp_can_p
AGE	5	6	7	8	1
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.7776	0.1416	0.7123	0.0651	0.0000
1979	0.5466	0.2355	0.0836	0.1386	0.0000
1980	1.7050	0.3737	0.1855	0.0310	0.0000
1981	0.1059	0.8786	0.2582	0.1321	0.0000
1982	0.0000	0.0000	0.0000	0.0000	0.0000
1983	0.0000	0.0000	0.0000	0.0000	0.0000
1984	0.0000	0.0000	0.0000	0.0000	0.0000
1985	0.0000	0.0000	0.0000	0.0000	0.0000
1986	0.0000	0.0000	0.0000	0.0000	0.6000
1987	0.0000	0.0000	0.0000	0.0000	0.2500
1988	0.0000	0.0000	0.0000	0.0000	0.2800
1989	0.0000	0.0000	0.0000	0.0000	1.6300
1990	0.0000	0.0000	0.0000	0.0000	0.4200
1991	0.0000	0.0000	0.0000	0.0000	1.1800
1992	0.0000	0.0000	0.0000	0.0000	0.1100
1993	0.0000	0.0000	0.0000	0.0000	0.0000
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.0000	0.0000	0.0000	0.0000	0.0000
1996	0.0000	0.0000	0.0000	0.0000	0.0000
1997	0.0000	0.0000	0.0000	0.0000	0.0000
1998	0.0000	0.0000	0.0000	0.0000	0.0000
1999	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000
2001	0.0000	0.0000	0.0000	0.0000	0.0000
2002	0.0000	0.0000	0.0000	0.0000	0.0000
2003	0.0000	0.0000	0.0000	0.0000	0.0000
2004	0.0000	0.0000	0.0000	0.0000	0.0000
2005	0.0000	0.0000	0.0000	0.0000	0.0000
2006	0.0000	0.0000	0.0000	0.0000	0.0000
2007	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	26	27	28	29	30
SURVEY TAG	sp_can_p	sp_can_p	sp_can_p	sp_can_p	sp_can_p
AGE	2	3	4	5	6
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.0000	0.0000	0.0000	0.0000
1979	0.0000	0.0000	0.0000	0.0000	0.0000
1980	0.0000	0.0000	0.0000	0.0000	0.0000
1981	0.0000	0.0000	0.0000	0.0000	0.0000
1982	0.0000	0.0000	0.0000	0.0000	0.0000
1983	0.0000	0.0000	0.0000	0.0000	0.0000
1984	0.0000	0.0000	0.0000	0.0000	0.0000
1985	0.0000	0.0000	0.0000	0.0000	0.0000
1986	2.2700	2.8100	0.3700	0.6500	0.4400
1987	2.1300	0.9300	1.0900	0.3400	0.1200
1988	1.0100	4.6600	0.5800	1.0200	0.1300
1989	2.7800	1.3800	2.8500	0.3600	0.4200
1990	2.4400	3.7800	2.0800	3.8700	0.4200
1991	1.1600	1.8400	2.1500	1.0500	1.3100
1992	2.8600	1.7700	0.8000	0.9800	0.6000
1993	0.0000	0.0000	0.0000	0.0000	0.0000
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.0000	0.0000	0.0000	0.0000	0.0000
1996	0.0000	0.0000	0.0000	0.0000	0.0000
1997	0.0000	0.0000	0.0000	0.0000	0.0000
1998	0.0000	0.0000	0.0000	0.0000	0.0000
1999	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000
2001	0.0000	0.0000	0.0000	0.0000	0.0000
2002	0.0000	0.0000	0.0000	0.0000	0.0000
2003	0.0000	0.0000	0.0000	0.0000	0.0000
2004	0.0000	0.0000	0.0000	0.0000	0.0000
2005	0.0000	0.0000	0.0000	0.0000	0.0000
2006	0.0000	0.0000	0.0000	0.0000	0.0000
2007	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	31	32	33	34	35
SURVEY TAG	sp_can_p	sp_can_p	sp_canpo	sp_canpo	sp_canpo
AGE	7	8	1	2	3
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.0000	0.0000	0.0000	0.0000
1979	0.0000	0.0000	0.0000	0.0000	0.0000
1980	0.0000	0.0000	0.0000	0.0000	0.0000
1981	0.0000	0.0000	0.0000	0.0000	0.0000
1982	0.0000	0.0000	0.0000	0.0000	0.0000
1983	0.0000	0.0000	0.0000	0.0000	0.0000
1984	0.0000	0.0000	0.0000	0.0000	0.0000
1985	0.0000	0.0000	0.0000	0.0000	0.0000
1986	0.2600	0.0400	0.0000	0.0000	0.0000
1987	0.2200	0.0800	0.0000	0.0000	0.0000
1988	0.0800	0.1700	0.0000	0.0000	0.0000
1989	0.0500	0.1000	0.0000	0.0000	0.0000
1990	0.9300	0.1200	0.0000	0.0000	0.0000
1991	0.1600	0.2200	0.0000	0.0000	0.0000
1992	0.4300	0.1200	0.0000	0.0000	0.0000
1993	0.0000	0.0000	0.0000	0.0000	0.0000
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.0000	0.0000	0.0700	0.6700	1.5000
1996	0.0000	0.0000	0.1400	0.4900	2.3100
1997	0.0000	0.0000	0.3200	0.5300	0.5500
1998	0.0000	0.0000	0.0100	0.6700	0.9500
1999	0.0000	0.0000	0.3300	0.3200	1.4900
2000	0.0000	0.0000	0.1000	0.4400	1.0500
2001	0.0000	0.0000	0.0000	0.0600	0.6400
2002	0.0000	0.0000	0.0100	0.0900	0.5700
2003	0.0000	0.0000	0.0000	0.0200	0.3000
2004	0.0000	0.0000	0.5356	0.0956	0.3920
2005	0.0000	0.0000	0.0200	1.3400	0.4700
2006	0.0000	0.0000	0.0000	0.0370	1.4060
2007	0.0000	0.0000	0.1374	0.5192	0.9445

SURVEY - INPUT DATA

INDEX	36	37	38	39	40
SURVEY TAG	sp_canpo	sp_canpo	sp_canpo	sp_canpo	sp_canpo
AGE	4	5	6	7	8
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.0000	0.0000	0.0000	0.0000	0.0000
1979	0.0000	0.0000	0.0000	0.0000	0.0000
1980	0.0000	0.0000	0.0000	0.0000	0.0000
1981	0.0000	0.0000	0.0000	0.0000	0.0000
1982	0.0000	0.0000	0.0000	0.0000	0.0000
1983	0.0000	0.0000	0.0000	0.0000	0.0000
1984	0.0000	0.0000	0.0000	0.0000	0.0000
1985	0.0000	0.0000	0.0000	0.0000	0.0000
1986	0.0000	0.0000	0.0000	0.0000	0.0000
1987	0.0000	0.0000	0.0000	0.0000	0.0000
1988	0.0000	0.0000	0.0000	0.0000	0.0000
1989	0.0000	0.0000	0.0000	0.0000	0.0000
1990	0.0000	0.0000	0.0000	0.0000	0.0000
1991	0.0000	0.0000	0.0000	0.0000	0.0000
1992	0.0000	0.0000	0.0000	0.0000	0.0000
1993	0.0000	0.0000	0.0000	0.0000	0.0000
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.8600	0.6000	0.1900	0.0400	0.0500
1996	4.0200	1.0900	0.7900	0.3300	0.0800
1997	1.2500	1.2300	0.2700	0.0600	0.0300
1998	0.3500	0.3500	0.2800	0.0700	0.0200
1999	1.0900	0.4100	0.2600	0.1500	0.0100
2000	3.9200	1.7100	0.7800	0.4000	0.2400
2001	0.4200	1.1100	0.5200	0.2600	0.1700
2002	2.0500	0.6800	1.2200	0.4000	0.1700
2003	0.6500	1.2100	0.3200	0.3400	0.1600
2004	0.4232	0.4509	0.3876	0.0738	0.1175
2005	2.9100	1.1300	0.5100	0.4100	0.0100
2006	0.6580	1.6320	0.6980	0.2010	0.1850
2007	2.9389	0.3878	0.6048	0.0963	0.0757

SURVEY - INPUT DATA

INDEX	41	42	43	44	45
SURVEY TAG	us0autpr	us1autpr	us2autpr	us3autpr	us4autpr
AGE	1	2	3	4	5
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.1516	0.2368	3.4335	0.6908	0.2528
1979	0.3953	1.8454	0.3912	4.0577	0.9636
1980	0.1145	1.6251	1.6770	0.1621	1.6865
1981	0.2797	0.8199	0.5636	0.7739	0.0525
1982	0.2610	3.5250	2.2500	1.5590	0.5890
1983	0.3620	0.5773	1.9095	0.2418	0.0678
1984	1.2829	0.8495	1.0893	0.7402	0.0691
1985	0.1791	1.9091	0.6818	0.9287	0.8251
1986	1.0019	0.1813	0.8426	0.0667	0.1055
1987	0.0761	2.2789	0.1285	0.3290	0.0082
1988	0.2037	0.4137	1.3528	0.1080	0.2003
1989	0.5495	0.8747	0.4370	0.9038	0.0600
1990	0.2508	2.7984	1.0464	0.1611	0.5071
1991	0.1571	0.3636	1.6244	1.8141	0.4124
1992	0.0405	0.4076	0.1752	0.2742	0.0305
1993	0.0351	0.4124	0.9489	0.1743	0.1000
1994	0.0000	0.0000	0.0000	0.0000	0.0000
1995	0.0000	0.0000	0.0000	0.0000	0.0000
1996	0.0000	0.0000	0.0000	0.0000	0.0000
1997	0.0000	0.0000	0.0000	0.0000	0.0000
1998	0.0000	0.0000	0.0000	0.0000	0.0000
1999	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000
2001	0.0000	0.0000	0.0000	0.0000	0.0000
2002	0.0000	0.0000	0.0000	0.0000	0.0000
2003	0.0000	0.0000	0.0000	0.0000	0.0000
2004	0.0000	0.0000	0.0000	0.0000	0.0000
2005	0.0000	0.0000	0.0000	0.0000	0.0000
2006	0.0000	0.0000	0.0000	0.0000	0.0000
2007	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	46	47	48	49	50
SURVEY TAG	us5autpr	us0autpo	us1autpo	us2autpo	us3autpo
AGE	6	1	2	3	4
TIME	JAN-1	JAN-1	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	1	1
1978	0.1731	0.0000	0.0000	0.0000	0.0000
1979	0.3355	0.0000	0.0000	0.0000	0.0000
1980	0.3206	0.0000	0.0000	0.0000	0.0000
1981	0.2648	0.0000	0.0000	0.0000	0.0000
1982	0.0540	0.0000	0.0000	0.0000	0.0000
1983	0.1152	0.0000	0.0000	0.0000	0.0000
1984	0.0328	0.0000	0.0000	0.0000	0.0000
1985	0.0242	0.0000	0.0000	0.0000	0.0000
1986	0.0766	0.0000	0.0000	0.0000	0.0000
1987	0.0487	0.0000	0.0000	0.0000	0.0000
1988	0.0280	0.0000	0.0000	0.0000	0.0000
1989	0.1937	0.0000	0.0000	0.0000	0.0000
1990	0.0547	0.0000	0.0000	0.0000	0.0000
1991	0.2855	0.0000	0.0000	0.0000	0.0000
1992	0.0290	0.0000	0.0000	0.0000	0.0000
1993	0.0437	0.0000	0.0000	0.0000	0.0000
1994	0.0000	0.1784	0.9699	0.5316	0.3826
1995	0.0000	0.0668	0.4056	0.6643	0.4334
1996	0.0000	0.1599	0.2447	1.8106	1.2485
1997	0.0000	0.0216	0.2399	0.1958	0.4144
1998	0.0000	0.0064	0.2362	0.3209	0.1093
1999	0.0000	0.0701	0.3355	1.0262	0.3518
2000	0.0000	0.0701	0.1397	0.1542	0.3096
2001	0.0000	0.0195	0.5710	0.5378	0.0705
2002	0.0000	0.0280	0.0470	0.3810	0.4590
2003	0.0000	0.2340	0.4780	0.7070	1.3960
2004	0.0000	0.3269	0.1663	0.3092	0.2005
2005	0.0000	0.0500	0.0100	0.1358	0.7101
2006	0.0000	0.0521	0.0553	0.5794	0.1289
2007	0.0000	0.0994	0.4325	0.1618	0.5142

SURVEY - INPUT DATA

INDEX	51	52			
SURVEY TAG	us4autpo	us5autpo			
AGE	5	6	NUMBERS	NUMBERS	NUMBERS
TIME	JAN-1	JAN-1	NUMBERS	NUMBERS	NUMBERS
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1			

1978	0.0000	0.0000
1979	0.0000	0.0000
1980	0.0000	0.0000
1981	0.0000	0.0000
1982	0.0000	0.0000
1983	0.0000	0.0000
1984	0.0000	0.0000
1985	0.0000	0.0000
1986	0.0000	0.0000
1987	0.0000	0.0000
1988	0.0000	0.0000
1989	0.0000	0.0000
1990	0.0000	0.0000
1991	0.0000	0.0000
1992	0.0000	0.0000
1993	0.0000	0.0000
1994	0.0165	0.0253
1995	0.1534	0.0679
1996	0.0872	0.0541
1997	0.1430	0.0597
1998	0.1292	0.0486
1999	0.0411	0.0354
2000	0.2549	0.0871
2001	0.0788	0.0306
2002	0.0590	0.0550
2003	1.6270	0.1180
2004	0.1556	0.0824
2005	0.2520	0.3215
2006	0.1756	0.0259
2007	0.0338	0.1248

Additional Output Files

Population File	C:\LOB\GBCOD\ASSESS_2008\VPA\FINAL_RUN\CAA_BASE_SPLIT_59.PP2
Auxilliary File	C:\LOB\GBCOD\ASSESS_2008\VPA\FINAL_RUN\CAA_BASE_SPLIT_59.AUX
Covariance File	C:\LOB\GBCOD\ASSESS_2008\VPA\FINAL_RUN\CAA_BASE_SPLIT_59.CV
Residuals File	C:\LOB\GBCOD\ASSESS_2008\VPA\FINAL_RUN\CAA_BASE_SPLIT_59.RSD
Log File	C:\LOB\GBCOD\ASSESS_2008\VPA\FINAL_RUN\CAA_BASE_SPLIT_59.LOG

Estimation Results

JAN-1 Population Numbers

AGE	1978	1979	1980	1981	1982
1	28707.	25945.	22912.	45887.	19865.
2	4707.	23366.	20990.	18452.	36468.
3	25333.	3478.	17108.	13372.	11590.
4	7679.	13468.	1991.	8670.	6702.
5	2966.	4108.	6916.	1141.	4689.
6	1260.	1624.	2280.	3454.	649.
7	1233.	871.	926.	988.	1570.
8	80.	793.	570.	384.	436.
9	174.	45.	377.	403.	169.
10	44.	122.	39.	172.	192.
Total	72183.	73819.	74109.	92923.	82330.

AGE	1983	1984	1985	1986	1987
1	11306.	29024.	9613.	44500.	17893.
2	15564.	8691.	23509.	7711.	35740.
3	20470.	8097.	5723.	12571.	4880.
4	5519.	8934.	3513.	2063.	6193.
5	2818.	2127.	4334.	1368.	920.
6	2016.	1274.	916.	1677.	650.
7	266.	982.	542.	308.	822.
8	654.	133.	402.	205.	175.
9	180.	378.	56.	154.	105.
10	298.	283.	182.	76.	76.
Total	59091.	59924.	48790.	70634.	67453.

AGE	1988	1989	1990	1991	1992
1	24841.	17831.	10149.	19306.	7407.
2	14556.	20045.	13794.	8245.	15563.
3	22108.	9800.	14061.	6318.	5008.
4	2635.	10608.	5302.	6701.	2071.
5	3126.	1197.	4878.	2582.	2667.
6	484.	1154.	636.	1965.	832.
7	308.	197.	468.	314.	641.
8	424.	118.	88.	179.	131.
9	93.	153.	51.	50.	66.
10	105.	54.	89.	47.	19.
Total	68682.	61157.	49518.	45708.	34403.

JAN-1 Population Numbers

AGE	1993	1994	1995	1996	1997
1	9857.	6311.	3930.	6681.	10670.
2	5940.	7800.	5085.	3189.	5411.
3	8748.	3484.	5841.	3578.	2352.
4	2070.	3214.	1475.	3499.	2043.
5	745.	607.	868.	610.	1727.
6	853.	189.	121.	369.	270.
7	283.	223.	68.	62.	138.
8	209.	74.	54.	36.	35.
9	68.	46.	15.	26.	19.
10	33.	9.	3.	1.	7.
Total	28806.	21956.	17459.	18050.	22673.

AGE	1998	1999	2000	2001	2002
1	5005.	12570.	6418.	2701.	4708.
2	8622.	4041.	10250.	5152.	2201.
3	3814.	6231.	2989.	7542.	3570.
4	1253.	1948.	3290.	1782.	3785.
5	763.	584.	833.	1658.	787.
6	627.	281.	222.	400.	732.
7	90.	259.	117.	103.	166.
8	30.	37.	84.	55.	36.
9	12.	10.	11.	34.	22.
10	6.	7.	3.	3.	13.
Total	20222.	25968.	24218.	19430.	16020.

AGE	2003	2004	2005	2006	2007
1	2098.	11126.	2300.	10047.	8956.
2	3835.	1703.	9062.	1873.	8197.
3	1727.	2960.	1323.	7099.	1473.
4	1910.	1052.	1972.	904.	5067.
5	1753.	848.	548.	1097.	553.
6	320.	624.	343.	319.	571.
7	269.	123.	236.	186.	198.
8	60.	93.	35.	117.	124.
9	13.	24.	29.	13.	70.
10	6.	9.	12.	14.	16.
Total	11990.	18561.	15862.	21668.	25226.

Fishing Mortality Calculated

AGE	1978	1979	1980	1981	1982
1	0.0058	0.0119	0.0165	0.0297	0.0440
2	0.1026	0.1117	0.2509	0.2650	0.3775
3	0.4318	0.3577	0.4797	0.4907	0.5419
4	0.4256	0.4664	0.3569	0.4146	0.6665
5	0.4025	0.3887	0.4942	0.3646	0.6441
6	0.1693	0.3621	0.6364	0.5883	0.6924
7	0.2415	0.2248	0.6791	0.6180	0.6760
8	0.3716	0.5436	0.1463	0.6220	0.6872
9	0.3080	0.3773	0.5151	0.5482	0.6576
10	0.3080	0.3773	0.5151	0.5482	0.6576

AGE	1983	1984	1985	1986	1987
1	0.0630	0.0107	0.0204	0.0192	0.0064
2	0.4535	0.2179	0.4260	0.2576	0.2803
3	0.6291	0.6349	0.8202	0.5080	0.4160
4	0.7534	0.5234	0.7430	0.6077	0.4837
5	0.5941	0.6428	0.7497	0.5444	0.4413
6	0.5192	0.6542	0.8904	0.5134	0.5455
7	0.4932	0.6934	0.7702	0.3635	0.4613
8	0.3475	0.6611	0.7622	0.4699	0.4320
9	0.5321	0.6573	0.7719	0.5086	0.4725
10	0.5321	0.6573	0.7719	0.5086	0.4725

AGE	1988	1989	1990	1991	1992
1	0.0145	0.0567	0.0078	0.0155	0.0208
2	0.1957	0.1546	0.5808	0.2986	0.3760
3	0.5344	0.4142	0.5411	0.9156	0.6835
4	0.5894	0.5768	0.5195	0.7214	0.8218
5	0.7961	0.4323	0.7092	0.9332	0.9399
6	0.7007	0.7025	0.5055	0.9203	0.8784
7	0.7572	0.6015	0.7636	0.6747	0.9211
8	0.8201	0.6392	0.3648	0.7910	0.4602
9	0.7845	0.5628	0.6839	0.9047	0.9064
10	0.7845	0.5628	0.6839	0.9047	0.9064

Fishing Mortality Calculated

AGE	1993	1994	1995	1996	1997
1	0.0340	0.0161	0.0089	0.0107	0.0131
2	0.3335	0.0893	0.1515	0.1045	0.1498
3	0.8014	0.6594	0.3123	0.3602	0.4293
4	1.0274	1.1089	0.6837	0.5059	0.7853
5	1.1726	1.4135	0.6553	0.6146	0.8129
6	1.1396	0.8259	0.4676	0.7819	0.9031
7	1.1442	1.2292	0.4256	0.3804	1.3356
8	1.3063	1.3803	0.5258	0.4321	0.8961
9	1.1675	1.2463	0.6114	0.6459	0.8516
10	1.1675	1.2463	0.6114	0.6459	0.8516

AGE	1998	1999	2000	2001	2002
1	0.0140	0.0040	0.0197	0.0048	0.0052
2	0.1248	0.1014	0.1067	0.1668	0.0423
3	0.4717	0.4387	0.3174	0.4894	0.4256
4	0.5639	0.6492	0.4855	0.6174	0.5700
5	0.7995	0.7651	0.5350	0.6169	0.7004
6	0.6850	0.6714	0.5665	0.6783	0.8033
7	0.6736	0.9249	0.5634	0.8593	0.8099
8	0.8779	1.0336	0.6998	0.7221	0.8394
9	0.7442	0.7820	0.5534	0.6404	0.7563
10	0.7442	0.7820	0.5534	0.6404	0.7563

AGE	2003	2004	2005	2006
1	0.0088	0.0052	0.0057	0.0034
2	0.0589	0.0522	0.0442	0.0401
3	0.2963	0.2059	0.1813	0.1372
4	0.6115	0.4513	0.3864	0.2905
5	0.8327	0.7049	0.3409	0.4532
6	0.7579	0.7740	0.4127	0.2789
7	0.8600	1.0511	0.5042	0.2041
8	0.7114	0.9526	0.8148	0.3120
9	0.8222	0.7647	0.4053	0.3120
10	0.8222	0.7647	0.4053	0.3120

Average Fishing Mortality For Ages 1- 8

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1978	0.2689	0.2306	0.3437	0.4047
1979	0.3084	0.1800	0.3261	0.3503
1980	0.3825	0.2733	0.4178	0.4168
1981	0.4241	0.2134	0.4010	0.3913
1982	0.5412	0.3687	0.5241	0.4800
1983	0.4816	0.4757	0.5595	0.5716
1984	0.5048	0.2530	0.4926	0.5272
1985	0.6478	0.4594	0.6295	0.6018
1986	0.4105	0.1746	0.3596	0.4331
1987	0.3833	0.2434	0.3559	0.3430
1988	0.5510	0.2918	0.5175	0.5091
1989	0.4472	0.2594	0.4363	0.4044
1990	0.4990	0.4582	0.5701	0.5767
1991	0.6588	0.3936	0.6888	0.7376
1992	0.6377	0.4376	0.6295	0.6088
1993	0.8699	0.4841	0.8370	0.7809
1994	0.8403	0.3675	0.7914	0.8509
1995	0.4038	0.2477	0.4060	0.3983
1996	0.3988	0.2312	0.4246	0.4358
1997	0.6657	0.2397	0.5554	0.5965
1998	0.5263	0.2365	0.4199	0.4432
1999	0.5736	0.2070	0.4437	0.5026
2000	0.4117	0.1844	0.3351	0.3404
2001	0.5194	0.3654	0.5001	0.4909
2002	0.5245	0.3189	0.5234	0.5532
2003	0.5172	0.3258	0.5501	0.6172
2004	0.5247	0.1365	0.4120	0.5024
2005	0.3363	0.1195	0.2569	0.2841
2006	0.2149	0.0927	0.2026	0.2315

Average Fishing Mortality For Ages 2- 8

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1978	0.3064	0.3797	0.3822	0.4096
1979	0.3507	0.2714	0.3628	0.3599
1980	0.4348	0.3892	0.4517	0.4261
1981	0.4805	0.3948	0.4625	0.4236
1982	0.6122	0.4725	0.5594	0.4960
1983	0.5414	0.5744	0.5848	0.5886
1984	0.5754	0.4855	0.5557	0.5412
1985	0.7374	0.5678	0.6796	0.6086
1986	0.4664	0.4416	0.4803	0.4712
1987	0.4372	0.3293	0.3851	0.3458
1988	0.6277	0.4497	0.5590	0.5206
1989	0.5030	0.3432	0.4561	0.4327
1990	0.5692	0.5747	0.5920	0.5793
1991	0.7507	0.6711	0.7775	0.7548
1992	0.7258	0.5523	0.6933	0.6168
1993	0.9893	0.7195	0.8649	0.8071
1994	0.9581	0.5098	0.8473	0.8666
1995	0.4603	0.3172	0.4203	0.4022
1996	0.4542	0.3610	0.4580	0.4450
1997	0.7589	0.4416	0.6362	0.6169
1998	0.5995	0.3097	0.4531	0.4510
1999	0.6549	0.3977	0.5117	0.5086
2000	0.4678	0.2438	0.3494	0.3513
2001	0.5929	0.4237	0.5169	0.4921
2002	0.5987	0.4499	0.5496	0.5567
2003	0.5898	0.3931	0.5714	0.6210
2004	0.5989	0.3339	0.4679	0.5171
2005	0.3835	0.1389	0.2657	0.2864
2006	0.2451	0.1701	0.2225	0.2360

Average Fishing Mortality For Ages 3- 8

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1978	0.3404	0.4135	0.3971	0.4204
1979	0.3906	0.4247	0.4224	0.4325
1980	0.4654	0.4867	0.4951	0.4972
1981	0.5164	0.4803	0.5025	0.4873
1982	0.6514	0.6077	0.6315	0.6122
1983	0.5561	0.6337	0.6078	0.6400
1984	0.6350	0.5934	0.6004	0.5980
1985	0.7893	0.7837	0.7783	0.7853
1986	0.5011	0.5196	0.5168	0.5218
1987	0.4633	0.4576	0.4671	0.4599
1988	0.6997	0.5768	0.6235	0.5864
1989	0.5611	0.5071	0.5365	0.5197
1990	0.5673	0.5714	0.5938	0.5785
1991	0.8260	0.8411	0.8399	0.8488
1992	0.7842	0.7941	0.8272	0.8054
1993	1.0986	0.8971	0.9686	0.9112
1994	1.1028	0.9307	1.0167	0.9773
1995	0.5117	0.4172	0.4790	0.4657
1996	0.5125	0.4613	0.4989	0.4808
1997	0.8604	0.6821	0.7526	0.7266
1998	0.6786	0.5522	0.5968	0.5694
1999	0.7472	0.5259	0.5831	0.5504
2000	0.5279	0.4303	0.4612	0.4478
2001	0.6639	0.5384	0.5642	0.5455
2002	0.6914	0.5488	0.5941	0.5689
2003	0.6783	0.6053	0.6675	0.6669
2004	0.6900	0.4181	0.5132	0.5389
2005	0.4400	0.3315	0.3628	0.3625
2006	0.2793	0.1952	0.2344	0.2446

Average Fishing Mortality For Ages 4- 8

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1978	0.3221	0.3785	0.3597	0.3959
1979	0.3971	0.4358	0.4266	0.4432
1980	0.4626	0.4961	0.5026	0.5205
1981	0.5215	0.4709	0.5070	0.4841
1982	0.6733	0.6619	0.6641	0.6622
1983	0.5415	0.6420	0.5913	0.6597
1984	0.6350	0.5684	0.5901	0.5738
1985	0.7831	0.7622	0.7683	0.7637
1986	0.4998	0.5457	0.5247	0.5512
1987	0.4728	0.4807	0.4796	0.4816
1988	0.7327	0.7111	0.7374	0.7208
1989	0.5905	0.5756	0.5819	0.5800
1990	0.5725	0.6089	0.6256	0.6212
1991	0.8081	0.8011	0.8193	0.8095
1992	0.8043	0.8815	0.8789	0.8867
1993	1.1580	1.0984	1.1245	1.1015
1994	1.1915	1.1503	1.1603	1.1582
1995	0.5516	0.6540	0.6339	0.6586
1996	0.5430	0.5404	0.5608	0.5493
1997	0.9466	0.8232	0.8469	0.8296
1998	0.7200	0.6634	0.6807	0.6743
1999	0.8089	0.7006	0.7263	0.7081
2000	0.5700	0.5045	0.5157	0.5066
2001	0.6988	0.6310	0.6391	0.6329
2002	0.7446	0.6286	0.6546	0.6380
2003	0.7547	0.7292	0.7492	0.7403
2004	0.7868	0.6472	0.6899	0.6806
2005	0.4918	0.3950	0.4054	0.4014
2006	0.3077	0.3520	0.3464	0.3708

Average Fishing Mortality For Ages 5- 8

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1978	0.2962	0.3132	0.2933	0.3420
1979	0.3798	0.3802	0.3817	0.3930
1980	0.4890	0.5220	0.5152	0.5431
1981	0.5482	0.5526	0.5689	0.5652
1982	0.6749	0.6578	0.6629	0.6581
1983	0.4885	0.5352	0.5102	0.5441
1984	0.6629	0.6575	0.6623	0.6580
1985	0.7931	0.7731	0.7769	0.7751
1986	0.4728	0.5098	0.5017	0.5137
1987	0.4700	0.4734	0.4748	0.4765
1988	0.7685	0.7851	0.7843	0.7860
1989	0.5939	0.5710	0.5928	0.5929
1990	0.5858	0.6870	0.6801	0.6936
1991	0.8298	0.9070	0.8965	0.9103
1992	0.7999	0.9104	0.8968	0.9163
1993	1.1907	1.1687	1.1748	1.1697
1994	1.2122	1.2720	1.2433	1.2941
1995	0.5186	0.6146	0.5961	0.6225
1996	0.5523	0.6523	0.6478	0.6666
1997	0.9869	0.8588	0.8875	0.8691
1998	0.7590	0.7460	0.7414	0.7493
1999	0.8488	0.7868	0.7997	0.7948
2000	0.5912	0.5542	0.5624	0.5564
2001	0.7191	0.6419	0.6504	0.6451
2002	0.7882	0.7577	0.7674	0.7602
2003	0.7905	0.8228	0.8205	0.8237
2004	0.8707	0.7693	0.7871	0.7771
2005	0.5181	0.4095	0.4261	0.4259
2006	0.3120	0.3843	0.3654	0.4045

Average Fishing Mortality For Ages 6- 8

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1978	0.2608	0.2102	0.2167	0.2190
1979	0.3768	0.3695	0.3762	0.3985
1980	0.4872	0.5729	0.5425	0.6250
1981	0.6094	0.5971	0.5986	0.5973
1982	0.6852	0.6818	0.6811	0.6819
1983	0.4533	0.4786	0.4611	0.4872
1984	0.6695	0.6707	0.6731	0.6710
1985	0.8076	0.8277	0.8158	0.8307
1986	0.4490	0.4883	0.4832	0.4928
1987	0.4796	0.4914	0.4860	0.4946
1988	0.7594	0.7566	0.7661	0.7590
1989	0.6477	0.6839	0.6796	0.6853
1990	0.5446	0.5964	0.6034	0.6205
1991	0.7953	0.8795	0.8691	0.8852
1992	0.7532	0.8613	0.8495	0.8745
1993	1.1967	1.1665	1.1757	1.1681
1994	1.1451	1.0954	1.1153	1.1220
1995	0.4730	0.4687	0.4710	0.4708
1996	0.5315	0.7015	0.6767	0.7292
1997	1.0449	1.0376	1.0600	1.0590
1998	0.7455	0.6913	0.6950	0.6927
1999	0.8767	0.8086	0.8237	0.8239
2000	0.6099	0.5921	0.5986	0.5955
2001	0.7532	0.7161	0.7205	0.7206
2002	0.8175	0.8059	0.8066	0.8059
2003	0.7764	0.7958	0.7982	0.7984
2004	0.9259	0.8343	0.8463	0.8425
2005	0.5772	0.4708	0.4818	0.4845
2006	0.2650	0.2627	0.2609	0.2682

Back Calculated Partial Recruitment

AGE	1978	1979	1980	1981	1982
1	0.0135	0.0220	0.0243	0.0478	0.0635
2	0.2377	0.2055	0.3694	0.4261	0.5452
3	1.0000	0.6580	0.7064	0.7889	0.7827
4	0.9857	0.8579	0.5255	0.6666	0.9627
5	0.9322	0.7151	0.7278	0.5862	0.9303
6	0.3921	0.6661	0.9371	0.9458	1.0000
7	0.5593	0.4134	1.0000	0.9937	0.9764
8	0.8607	1.0000	0.2154	1.0000	0.9926
9	0.7134	0.6940	0.7586	0.8813	0.9498
10	0.7134	0.6940	0.7586	0.8813	0.9498

AGE	1983	1984	1985	1986	1987
1	0.0836	0.0155	0.0229	0.0316	0.0118
2	0.6019	0.3142	0.4784	0.4240	0.5139
3	0.8350	0.9157	0.9211	0.8359	0.7626
4	1.0000	0.7549	0.8345	1.0000	0.8868
5	0.7886	0.9271	0.8420	0.8958	0.8089
6	0.6891	0.9435	1.0000	0.8449	1.0000
7	0.6547	1.0000	0.8650	0.5983	0.8456
8	0.4612	0.9534	0.8560	0.7733	0.7919
9	0.7063	0.9481	0.8669	0.8369	0.8662
10	0.7063	0.9481	0.8669	0.8369	0.8662

AGE	1988	1989	1990	1991	1992
1	0.0177	0.0807	0.0103	0.0166	0.0221
2	0.2386	0.2200	0.7606	0.3200	0.4000
3	0.6516	0.5896	0.7086	0.9812	0.7272
4	0.7186	0.8211	0.6803	0.7731	0.8743
5	0.9707	0.6153	0.9288	1.0000	1.0000
6	0.8544	1.0000	0.6620	0.9862	0.9346
7	0.9233	0.8562	1.0000	0.7230	0.9800
8	1.0000	0.9098	0.4777	0.8477	0.4897
9	0.9566	0.8010	0.8957	0.9695	0.9643
10	0.9566	0.8010	0.8957	0.9695	0.9643

Back Calculated Partial Recruitment

AGE	1993	1994	1995	1996	1997
1	0.0261	0.0114	0.0131	0.0137	0.0098
2	0.2553	0.0632	0.2215	0.1336	0.1122
3	0.6135	0.4665	0.4568	0.4606	0.3214
4	0.7865	0.7846	1.0000	0.6470	0.5880
5	0.8976	1.0000	0.9583	0.7860	0.6086
6	0.8724	0.5843	0.6839	1.0000	0.6762
7	0.8760	0.8696	0.6224	0.4865	1.0000
8	1.0000	0.9765	0.7691	0.5527	0.6709
9	0.8938	0.8818	0.8941	0.8261	0.6376
10	0.8938	0.8818	0.8941	0.8261	0.6376

AGE	1998	1999	2000	2001	2002
1	0.0160	0.0039	0.0281	0.0056	0.0062
2	0.1421	0.0981	0.1525	0.1941	0.0504
3	0.5373	0.4244	0.4536	0.5696	0.5070
4	0.6423	0.6281	0.6938	0.7185	0.6791
5	0.9107	0.7402	0.7645	0.7179	0.8345
6	0.7803	0.6496	0.8096	0.7893	0.9570
7	0.7673	0.8948	0.8051	1.0000	0.9649
8	1.0000	1.0000	1.0000	0.8403	1.0000
9	0.8477	0.7566	0.7909	0.7453	0.9010
10	0.8477	0.7566	0.7909	0.7453	0.9010

AGE	2003	2004	2005	2006
1	0.0103	0.0049	0.0070	0.0076
2	0.0685	0.0497	0.0542	0.0885
3	0.3445	0.1959	0.2225	0.3028
4	0.7110	0.4293	0.4742	0.6410
5	0.9683	0.6706	0.4184	1.0000
6	0.8813	0.7364	0.5064	0.6154
7	1.0000	1.0000	0.6188	0.4503
8	0.8272	0.9063	1.0000	0.6886
9	0.9560	0.7275	0.4974	0.6886
10	0.9560	0.7275	0.4974	0.6886

JAN-1 Biomass

AGE	1978	1979	1980	1981	1982
1	10820.	12622.	9859.	17501.	8546.
2	4790.	20761.	20790.	17773.	32982.
3	46691.	5352.	31156.	24532.	22173.
4	21750.	43531.	5158.	25394.	19950.
5	8906.	16837.	33810.	4831.	20247.
6	5511.	8714.	13151.	22057.	3740.
7	6566.	6463.	7145.	7603.	13058.
8	636.	6576.	5579.	3466.	4032.
9	1620.	431.	3697.	4753.	1904.
10	615.	1661.	575.	2892.	2992.
Total	107905.	122949.	130921.	130804.	129623.

AGE	1983	1984	1985	1986	1987
1	5135.	9799.	5966.	20310.	6758.
2	14957.	8751.	20345.	8061.	35551.
3	37344.	15270.	10093.	23150.	8944.
4	16103.	26449.	10663.	5648.	19789.
5	11887.	8654.	18517.	6186.	4198.
6	11764.	7132.	5164.	10018.	4249.
7	1986.	7371.	3985.	2327.	6567.
8	6572.	1243.	3809.	1861.	1678.
9	1917.	4115.	619.	1771.	1150.
10	4870.	4142.	2553.	1111.	1182.
Total	112535.	92925.	81714.	80442.	90065.

AGE	1988	1989	1990	1991	1992
1	7149.	4189.	3180.	8473.	5405.
2	13039.	16846.	11099.	7423.	15328.
3	41266.	17088.	26446.	12194.	9609.
4	7766.	31567.	14880.	19733.	6384.
5	14852.	5101.	21003.	10704.	10633.
6	3030.	6880.	3663.	10570.	4481.
7	2540.	1444.	3477.	2150.	4117.
8	4088.	1105.	832.	1586.	1090.
9	1017.	1659.	570.	521.	699.
10	1571.	793.	1290.	695.	357.
Total	96318.	86670.	86440.	74049.	58103.

JAN-1 Biomass

AGE	1993	1994	1995	1996	1997
1	1358.	1798.	816.	1875.	3523.
2	6390.	4557.	4085.	2410.	4568.
3	15791.	5844.	9009.	6426.	4309.
4	5775.	8990.	4177.	8828.	5864.
5	3244.	2384.	3744.	2596.	6223.
6	4373.	1122.	721.	2155.	1427.
7	1888.	1444.	550.	481.	980.
8	1661.	605.	501.	345.	281.
9	695.	415.	158.	300.	203.
10	408.	134.	65.	5.	89.
Total	41583.	27294.	23823.	25420.	27467.

AGE	1998	1999	2000	2001	2002
1	2033.	3977.	1325.	1062.	1269.
2	7573.	3808.	9270.	3748.	2020.
3	6939.	10903.	5533.	13871.	6093.
4	3540.	5366.	8853.	4718.	9696.
5	3027.	2304.	3256.	6178.	2684.
6	2975.	1454.	1109.	1956.	3368.
7	584.	1575.	753.	591.	969.
8	231.	295.	613.	401.	248.
9	113.	87.	90.	291.	184.
10	74.	89.	34.	30.	155.
Total	27088.	29860.	30835.	32846.	26685.

AGE	2003	2004	2005	2006	2007
1	794.	2277.	626.	2086.	2386.
2	3190.	1628.	5466.	1278.	6544.
3	3071.	5459.	2367.	10481.	2532.
4	4757.	2747.	5271.	2313.	13069.
5	5935.	2821.	1909.	3689.	1878.
6	1381.	2683.	1485.	1360.	2490.
7	1467.	631.	1204.	1049.	1076.
8	405.	608.	228.	689.	808.
9	103.	187.	236.	96.	556.
10	59.	94.	138.	127.	171.
Total	21162.	19135.	18932.	23168.	31510.

Mean Biomass

AGE	1978	1979	1980	1981	1982
1	15014.	16230.	13263.	24078.	11334.
2	5082.	27388.	23878.	21265.	38586.
3	45837.	5044.	30178.	22996.	20781.
4	19450.	42080.	5415.	22860.	16677.
5	8944.	15309.	27839.	4407.	16728.
6	6002.	8913.	10424.	17455.	2822.
7	6624.	6860.	5114.	5923.	9903.
8	531.	5789.	4779.	2567.	2816.
9	1357.	358.	2503.	3977.	1471.
10	483.	1262.	411.	2036.	2009.
Total	109324.	129234.	123805.	127564.	123127.

AGE	1983	1984	1985	1986	1987
1	6723.	14145.	6949.	26925.	9405.
2	16412.	10650.	24209.	8396.	41674.
3	33248.	13594.	7443.	22051.	9021.
4	11925.	23323.	8461.	5111.	18713.
5	9303.	7097.	13927.	5302.	3917.
6	9268.	5613.	3590.	8598.	3563.
7	1628.	5674.	2861.	2089.	5354.
8	5372.	918.	2653.	1489.	1342.
9	1489.	2818.	423.	1424.	921.
10	3453.	2781.	1633.	796.	860.
Total	98821.	86614.	72151.	82180.	94770.

AGE	1988	1989	1990	1991	1992
1	10995.	6836.	4867.	11419.	5889.
2	16582.	24238.	14260.	9907.	17454.
3	37158.	16139.	24460.	9522.	8023.
4	6391.	27528.	13509.	15415.	4930.
5	10710.	4595.	15913.	7429.	7186.
6	2166.	4990.	2921.	6884.	3073.
7	1731.	1075.	2525.	1532.	2730.
8	2773.	800.	755.	1064.	908.
9	683.	1207.	422.	292.	475.
10	1000.	555.	857.	421.	216.
Total	90190.	87963.	80488.	63886.	50882.

Mean Biomass

AGE	1993	1994	1995	1996	1997
1	2493.	2715.	1405.	2932.	5175.
2	6013.	8148.	5784.	3965.	6684.
3	12204.	5035.	9039.	6550.	4063.
4	3847.	6351.	3644.	8077.	4477.
5	2021.	1441.	3062.	2033.	4380.
6	2735.	836.	655.	1527.	938.
7	1148.	853.	470.	381.	546.
8	963.	338.	464.	260.	170.
9	411.	220.	123.	192.	136.
10	223.	71.	44.	3.	55.
Total	32057.	26008.	24691.	25920.	26624.

AGE	1998	1999	2000	2001	2002
1	2787.	6082.	2233.	1467.	2015.
2	10546.	5009.	13498.	5888.	2740.
3	6281.	9843.	5569.	12053.	5663.
4	3002.	4405.	8066.	3576.	7830.
5	2205.	1702.	2685.	4645.	2056.
6	2321.	1099.	850.	1400.	2384.
7	442.	1032.	575.	381.	677.
8	141.	181.	444.	275.	178.
9	89.	62.	62.	209.	130.
10	48.	57.	24.	20.	100.
Total	27862.	29471.	34006.	29915.	23773.

AGE	2003	2004	2005	2006
1	1139.	3535.	896.	3423.
2	4937.	2288.	8326.	1801.
3	3070.	5663.	2317.	12685.
4	3804.	2339.	4580.	2221.
5	4225.	2123.	1695.	2968.
6	969.	1906.	1264.	1151.
7	958.	393.	925.	989.
8	275.	407.	165.	583.
9	65.	133.	194.	75.
10	37.	60.	104.	99.
Total	19479.	18847.	20465.	25993.

Spawning Stock Biomass

AGE	1978	1979	1980	1981	1982
1	1150.	1462.	571.	1347.	574.
2	2004.	7884.	5785.	5428.	11982.
3	35299.	3755.	20586.	15961.	16654.
4	19008.	36617.	4466.	21546.	16921.
5	8055.	15111.	29814.	4353.	17589.
6	5182.	7935.	11440.	19341.	3223.
7	6100.	6022.	6171.	6634.	11284.
8	579.	5809.	5267.	3022.	3478.
9	1489.	391.	3282.	4196.	1651.
10	565.	1509.	510.	2553.	2593.
Total	79430.	86495.	87891.	84382.	85949.

AGE	1983	1984	1985	1986	1987
1	491.	851.	633.	4699.	1437.
2	6170.	3592.	9164.	5004.	21658.
3	27970.	11426.	7578.	19132.	7506.
4	13462.	22975.	9021.	4887.	17481.
5	10413.	7519.	15806.	5464.	3773.
6	10435.	6185.	4305.	8895.	3752.
7	1769.	6351.	3390.	2118.	5881.
8	5998.	1077.	3245.	1664.	1510.
9	1696.	3567.	526.	1574.	1028.
10	4311.	3590.	2171.	987.	1056.
Total	82717.	67134.	55840.	54425.	65082.

AGE	1988	1989	1990	1991	1992
1	1656.	682.	522.	899.	313.
2	7690.	8257.	5457.	3210.	6544.
3	33226.	13111.	20802.	8707.	7712.
4	6672.	26901.	12935.	16585.	5330.
5	12579.	4545.	18049.	8861.	8793.
6	2607.	5919.	3256.	8769.	3744.
7	2165.	1263.	2961.	1858.	3415.
8	3449.	960.	758.	1345.	977.
9	863.	1461.	492.	433.	581.
10	1333.	698.	1114.	578.	297.
Total	72241.	63797.	66344.	51247.	37707.

Spawning Stock Biomass

AGE	1993	1994	1995	1996	1997
1	39.	35.	16.	145.	272.
2	2105.	1911.	1502.	1237.	2456.
3	12027.	4963.	7858.	5502.	3686.
4	4660.	7228.	3604.	7848.	4976.
5	2581.	1822.	3246.	2267.	5256.
6	3498.	945.	645.	1830.	1188.
7	1509.	1138.	496.	437.	759.
8	1292.	465.	444.	310.	234.
9	553.	326.	138.	260.	170.
10	325.	106.	56.	4.	75.
Total	28588.	18938.	18005.	19839.	19071.

AGE	1998	1999	2000	2001	2002
1	235.	346.	77.	41.	49.
2	4017.	2028.	4228.	1516.	795.
3	5770.	9214.	4721.	11623.	5051.
4	3085.	4658.	7818.	4117.	8528.
5	2562.	1961.	2880.	5391.	2310.
6	2567.	1257.	976.	1689.	2849.
7	504.	1306.	663.	496.	819.
8	193.	240.	528.	344.	208.
9	97.	74.	79.	253.	156.
10	64.	76.	30.	26.	132.
Total	19094.	21161.	21998.	25497.	20898.

AGE	2003	2004	2005	2006
1	69.	132.	30.	81.
2	1222.	515.	1627.	430.
3	2290.	4030.	1755.	8620.
4	4031.	2391.	4637.	2110.
5	4947.	2426.	1744.	3308.
6	1178.	2281.	1341.	1256.
7	1229.	512.	1071.	981.
8	348.	501.	192.	632.
9	87.	159.	214.	88.
10	50.	80.	125.	116.
Total	15450.	13027.	12737.	17622.

Catch Biomass

AGE	1978	1979	1980	1981	1982
1	88.	194.	219.	716.	499.
2	522.	3060.	5991.	5636.	14565.
3	19793.	1804.	14476.	11284.	11262.
4	8279.	19626.	1933.	9478.	11116.
5	3600.	5951.	13759.	1607.	10775.
6	1016.	3227.	6634.	10268.	1954.
7	1600.	1542.	3473.	3661.	6694.
8	197.	3147.	699.	1597.	1935.
9	418.	135.	1289.	2180.	967.
10	149.	476.	212.	1116.	1321.
Total	35661.	39162.	48684.	47543.	61088.

AGE	1983	1984	1985	1986	1987
1	423.	152.	142.	518.	60.
2	7443.	2320.	10313.	2163.	11683.
3	20916.	8631.	6105.	11201.	3753.
4	8984.	12207.	6287.	3106.	9052.
5	5527.	4562.	10441.	2886.	1728.
6	4812.	3672.	3197.	4414.	1944.
7	803.	3934.	2204.	759.	2470.
8	1867.	607.	2022.	700.	580.
9	792.	1852.	326.	724.	435.
10	1838.	1828.	1260.	405.	406.
Total	53404.	39766.	42298.	26876.	32112.

AGE	1988	1989	1990	1991	1992
1	160.	388.	38.	177.	122.
2	3244.	3746.	8282.	2958.	6563.
3	19856.	6685.	13235.	8719.	5484.
4	3766.	15879.	7018.	11120.	4051.
5	8527.	1987.	11285.	6933.	6754.
6	1517.	3506.	1477.	6336.	2699.
7	1311.	646.	1928.	1034.	2514.
8	2274.	511.	275.	841.	418.
9	536.	679.	289.	264.	431.
10	784.	312.	586.	381.	196.
Total	41976.	34339.	44413.	38763.	29231.

Catch Biomass

AGE	1993	1994	1995	1996	1997
1	85.	44.	13.	32.	68.
2	2005.	728.	876.	414.	1002.
3	9781.	3320.	2823.	2359.	1744.
4	3953.	7042.	2492.	4086.	3516.
5	2369.	2037.	2007.	1249.	3560.
6	3117.	690.	306.	1194.	847.
7	1313.	1049.	200.	145.	730.
8	1258.	466.	244.	113.	153.
9	479.	275.	75.	124.	116.
10	260.	89.	27.	2.	47.
Total	24620.	15740.	9063.	9718.	11782.

AGE	1998	1999	2000	2001	2002
1	39.	24.	44.	7.	11.
2	1316.	508.	1441.	982.	116.
3	2963.	4318.	1768.	5899.	2410.
4	1693.	2860.	3916.	2208.	4463.
5	1763.	1302.	1436.	2865.	1440.
6	1590.	738.	482.	950.	1915.
7	298.	955.	324.	328.	548.
8	124.	187.	311.	198.	150.
9	66.	48.	34.	134.	98.
10	36.	44.	13.	13.	76.
Total	9887.	10984.	9768.	13584.	11226.

AGE	2003	2004	2005	2006
1	10.	18.	5.	12.
2	291.	119.	368.	72.
3	910.	1166.	420.	1741.
4	2326.	1056.	1769.	645.
5	3518.	1496.	578.	1345.
6	734.	1476.	522.	321.
7	824.	413.	466.	202.
8	195.	388.	135.	182.
9	54.	102.	78.	28.
10	31.	46.	42.	31.
Total	8893.	6280.	4383.	4579.

Catch Numbers

AGE	1978	1979	1980	1981	1982
1	151.6	279.2	339.9	1219.2	775.4
2	416.8	2242.7	4238.7	3910.7	10457.1
3	8109.1	953.6	5955.4	4738.2	4434.4
4	2429.6	4585.0	545.0	2685.5	2988.0
5	896.8	1206.9	2464.6	317.9	2039.8
6	178.4	449.8	983.0	1406.0	297.1
7	240.8	159.5	418.1	417.0	707.2
8	22.6	304.1	70.4	162.9	198.6
9	42.1	12.9	138.7	155.5	74.6
10	10.7	35.0	14.2	66.4	84.6
Total	12498.5	10228.6	15168.1	15079.2	22056.8

AGE	1983	1984	1985	1986	1987
1	626.2	280.9	176.1	768.3	103.8
2	5181.7	1547.7	7443.7	1594.1	7956.1
3	8753.3	3485.7	2942.2	4576.3	1515.5
4	2680.4	3328.4	1690.1	860.2	2170.1
5	1155.3	923.9	2097.7	525.3	299.7
6	746.4	560.2	496.5	615.4	249.9
7	94.6	450.3	267.2	85.5	277.3
8	175.0	58.9	196.8	70.4	56.1
9	67.7	167.0	27.7	56.0	36.2
10	112.6	124.9	89.7	27.8	26.0
Total	19593.2	10927.8	15427.8	9179.3	12690.6

AGE	1988	1989	1990	1991	1992
1	324.9	891.5	71.8	269.8	137.9
2	2352.1	2608.6	5561.1	1938.4	4448.1
3	8368.3	3032.8	5373.4	3486.3	2272.9
4	1074.1	4254.4	1964.0	3158.8	1065.9
5	1575.6	383.5	2272.1	1441.7	1495.7
6	223.8	534.2	230.6	1087.8	446.9
7	150.3	81.4	229.4	141.2	355.0
8	218.0	51.2	24.6	89.6	44.1
9	46.5	60.2	23.2	27.5	36.4
10	52.5	21.3	40.4	26.0	10.4
Total	14386.1	11919.0	15790.7	11667.1	10313.3

Catch Numbers

AGE	1993	1994	1995	1996	1997
1	299.2	91.1	31.7	64.7	125.9
2	1534.9	605.0	649.4	287.2	684.2
3	4429.4	1541.3	1427.4	986.6	749.3
4	1224.8	1987.3	669.7	1269.8	1020.6
5	475.3	425.6	382.3	256.3	882.9
6	535.6	97.6	41.2	183.8	147.7
7	178.0	146.1	21.4	17.9	94.4
8	141.0	51.1	20.0	11.6	18.9
9	43.1	30.5	6.4	11.3	10.1
10	21.2	5.6	1.4	0.3	3.9
Total	8882.5	4981.2	3251.0	3089.4	3737.8

AGE	1998	1999	2000	2001	2002
1	63.1	45.7	113.3	11.7	22.2
2	918.6	353.8	942.1	719.5	82.7
3	1310.1	2020.0	740.7	2667.1	1129.4
4	494.2	852.3	1156.1	751.6	1504.6
5	385.6	286.6	315.7	698.7	363.3
6	285.2	125.8	88.0	180.4	371.4
7	40.2	143.8	46.3	54.8	84.7
8	16.0	22.2	38.8	25.8	18.7
9	5.6	5.0	4.2	14.8	10.6
10	2.9	3.4	1.0	1.3	6.5
Total	3521.5	3858.7	3446.3	5125.7	3594.1

AGE	2003	2004	2005	2006
1	16.7	52.1	11.9	31.3
2	199.1	78.6	355.0	66.8
3	403.4	501.0	199.4	826.9
4	799.9	348.7	576.6	207.5
5	910.1	393.5	144.4	365.1
6	155.9	308.6	105.9	70.7
7	142.4	73.6	85.3	31.2
8	28.2	52.6	18.0	28.5
9	6.5	11.9	8.9	3.8
10	2.9	4.2	3.7	3.4
Total	2665.2	1824.8	1509.1	1635.2

Surplus Production

Average Adjustment Factor (Delta) = 1.0000

Year	Biomass	Delta Biomass	Catch Biomass	Surplus Production
1978	107904.550	15044.714	35660.757	50705.471
1979	122949.263	7972.011	39162.221	47134.232
1980	130921.274	-117.412	48684.058	48566.645
1981	130803.862	-1180.598	47542.520	46361.922
1982	129623.264	-17088.175	61087.900	43999.726
1983	112535.089	-19610.000	53404.478	33794.478
1984	92925.089	-11210.852	39766.125	28555.272
1985	81714.237	-1272.391	42298.233	41025.842
1986	80441.846	9623.348	26875.986	36499.334
1987	90065.194	6253.137	32111.575	38364.711
1988	96318.330	-9648.391	41976.477	32328.086
1989	86669.939	-230.122	34338.895	34108.773
1990	86439.817	-12390.943	44412.804	32021.861
1991	74048.874	-15945.864	38762.984	22817.120
1992	58103.010	-16519.551	29231.205	12711.654
1993	41583.459	-14289.609	24620.116	10330.506
1994	27293.850	-3470.350	15739.617	12269.267
1995	23823.500	1596.444	9062.779	10659.223
1996	25419.943	2047.021	9717.622	11764.643
1997	27466.964	-379.387	11781.909	11402.522
1998	27087.578	2771.953	9886.657	12658.611
1999	29859.531	975.257	10984.259	11959.516
2000	30834.788	2011.301	9768.097	11779.397
2001	32846.089	-6160.779	13583.837	7423.058
2002	26685.310	-5523.088	11225.613	5702.525
2003	21162.223	-2027.550	8893.031	6865.482
2004	19134.673	-202.899	6280.316	6077.417
2005	18931.773	4235.815	4383.195	8619.010
2006	23167.588	8342.345	4578.633	12920.977
2007	31509.933			

Summary of Survey Indices Used in the Estimate

INDEX	Survey Tag	Age	Time	Type	Catchability	Std. Error	CV
1	spr_36pr	1	JAN-1	NUMBER	0.1266E-04	0.4623E-05	0.3651E+00
2	spr_36pr	2	JAN-1	NUMBER	0.7122E-04	0.8365E-05	0.1175E+00
3	spr_36pr	3	JAN-1	NUMBER	0.1317E-03	0.2403E-04	0.1825E+00
4	spr_36pr	4	JAN-1	NUMBER	0.1695E-03	0.3460E-04	0.2041E+00
5	spr_36pr	5	JAN-1	NUMBER	0.2149E-03	0.4642E-04	0.2160E+00
6	spr_36pr	6	JAN-1	NUMBER	0.2392E-03	0.2597E-04	0.1086E+00
7	spr_36pr	7	JAN-1	NUMBER	0.2196E-03	0.4226E-04	0.1925E+00
8	spr_36pr	8	JAN-1	NUMBER	0.2652E-03	0.5153E-04	0.1943E+00
9	spr_36po	1	JAN-1	NUMBER	0.1699E-04	0.2759E-05	0.1624E+00
10	spr_36po	2	JAN-1	NUMBER	0.6171E-04	0.6015E-05	0.9747E-01
11	spr_36po	3	JAN-1	NUMBER	0.1458E-03	0.2034E-04	0.1395E+00
12	spr_36po	4	JAN-1	NUMBER	0.3028E-03	0.5869E-04	0.1938E+00
13	spr_36po	5	JAN-1	NUMBER	0.3952E-03	0.8324E-04	0.2106E+00
14	spr_36po	6	JAN-1	NUMBER	0.3994E-03	0.9920E-04	0.2484E+00
15	spr_36po	7	JAN-1	NUMBER	0.4653E-03	0.1139E-03	0.2449E+00
16	spr_36po	8	JAN-1	NUMBER	0.5116E-03	0.1190E-03	0.2327E+00
17	spr_41	1	JAN-1	NUMBER	0.1099E-04	0.8311E-05	0.7560E+00
18	spr_41	2	JAN-1	NUMBER	0.6999E-04	0.1623E-04	0.2319E+00
19	spr_41	3	JAN-1	NUMBER	0.1546E-03	0.3633E-04	0.2350E+00
20	spr_41	4	JAN-1	NUMBER	0.1378E-03	0.1740E-04	0.1263E+00
21	spr_41	5	JAN-1	NUMBER	0.1681E-03	0.4206E-04	0.2502E+00
22	spr_41	6	JAN-1	NUMBER	0.1614E-03	0.2756E-04	0.1707E+00
23	spr_41	7	JAN-1	NUMBER	0.2321E-03	0.8601E-04	0.3705E+00
24	spr_41	8	JAN-1	NUMBER	0.2271E-03	0.1296E-03	0.5708E+00
25	sp_can_p	1	JAN-1	NUMBER	0.2564E-04	0.8258E-05	0.3220E+00
26	sp_can_p	2	JAN-1	NUMBER	0.1339E-03	0.2840E-04	0.2121E+00
27	sp_can_p	3	JAN-1	NUMBER	0.2309E-03	0.2640E-04	0.1143E+00
28	sp_can_p	4	JAN-1	NUMBER	0.2646E-03	0.3384E-04	0.1279E+00
29	sp_can_p	5	JAN-1	NUMBER	0.4128E-03	0.5048E-04	0.1223E+00
30	sp_can_p	6	JAN-1	NUMBER	0.3951E-03	0.8186E-04	0.2072E+00
31	sp_can_p	7	JAN-1	NUMBER	0.5188E-03	0.1505E-03	0.2901E+00
32	sp_can_p	8	JAN-1	NUMBER	0.6444E-03	0.1708E-03	0.2650E+00
33	sp_canpo	1	JAN-1	NUMBER	0.1287E-04	0.4342E-05	0.3374E+00
34	sp_canpo	2	JAN-1	NUMBER	0.5039E-04	0.1424E-04	0.2826E+00
35	sp_canpo	3	JAN-1	NUMBER	0.2449E-03	0.3915E-04	0.1599E+00
36	sp_canpo	4	JAN-1	NUMBER	0.5795E-03	0.8901E-04	0.1536E+00
37	sp_canpo	5	JAN-1	NUMBER	0.9030E-03	0.1299E-03	0.1439E+00
38	sp_canpo	6	JAN-1	NUMBER	0.1271E-02	0.1930E-03	0.1518E+00
39	sp_canpo	7	JAN-1	NUMBER	0.1183E-02	0.2685E-03	0.2269E+00
40	sp_canpo	8	JAN-1	NUMBER	0.1214E-02	0.3059E-03	0.2520E+00
41	us0autpr	1	JAN-1	NUMBER	0.1139E-04	0.2331E-05	0.2046E+00
42	us1autpr	2	JAN-1	NUMBER	0.5681E-04	0.8060E-05	0.1419E+00
43	us2autpr	3	JAN-1	NUMBER	0.8421E-04	0.1317E-04	0.1563E+00
44	us3autpr	4	JAN-1	NUMBER	0.9151E-04	0.1727E-04	0.1887E+00
45	us4autpr	5	JAN-1	NUMBER	0.6852E-04	0.1725E-04	0.2518E+00
46	us5autpr	6	JAN-1	NUMBER	0.7355E-04	0.1187E-04	0.1613E+00
47	us0autpo	1	JAN-1	NUMBER	0.1086E-04	0.3374E-05	0.3106E+00
48	us1autpo	2	JAN-1	NUMBER	0.4192E-04	0.1410E-04	0.3363E+00
49	us2autpo	3	JAN-1	NUMBER	0.1217E-03	0.2056E-04	0.1689E+00
50	us3autpo	4	JAN-1	NUMBER	0.1669E-03	0.3284E-04	0.1967E+00
51	us4autpo	5	JAN-1	NUMBER	0.1334E-03	0.3343E-04	0.2506E+00
52	us5autpo	6	JAN-1	NUMBER	0.1819E-03	0.3910E-04	0.2149E+00

Survey Index: 1 Tag: spr_36pr AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.126603E-04 % Variance Contribution = 5.7164
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.363434E+00	N/A
1979	N/A	0.328469E+00	N/A
1980	N/A	0.290075E+00	N/A
1981	N/A	0.580941E+00	N/A
1982	0.507900E+00	0.251497E+00	0.702855E+00
1983	0.331500E+00	0.143136E+00	0.839835E+00
1984	0.402200E+00	0.367457E+00	0.903432E-01
1985	0.111100E+00	0.121699E+00	-0.911224E-01
1986	0.871500E+00	0.563388E+00	0.436248E+00
1987	0.197000E-01	0.226534E+00	-0.244228E+01
1988	0.720200E+00	0.314498E+00	0.828551E+00
1989	0.310400E+00	0.225749E+00	0.318440E+00
1990	0.173400E+00	0.128492E+00	0.299731E+00
1991	0.102660E+01	0.244418E+00	0.143513E+01
1992	0.122700E+00	0.937714E-01	0.268882E+00
1993	0.850000E-02	0.124796E+00	-0.268661E+01
1994	N/A	0.798977E-01	N/A
1995	N/A	0.497550E-01	N/A
1996	N/A	0.845798E-01	N/A
1997	N/A	0.135081E+00	N/A
1998	N/A	0.633682E-01	N/A
1999	N/A	0.159134E+00	N/A
2000	N/A	0.812514E-01	N/A
2001	N/A	0.341967E-01	N/A
2002	N/A	0.596048E-01	N/A
2003	N/A	0.265651E-01	N/A
2004	N/A	0.140858E+00	N/A
2005	N/A	0.291244E-01	N/A
2006	N/A	0.127197E+00	N/A
2007	N/A	0.113392E+00	N/A

Survey Index: 2 Tag: spr_36pr AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.712168E-04 % Variance Contribution = 0.5915
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.335238E+00	N/A
1979	N/A	0.166406E+01	N/A
1980	N/A	0.149482E+01	N/A
1981	N/A	0.131409E+01	N/A
1982	0.543540E+01	0.259715E+01	0.738519E+00
1983	0.195180E+01	0.110843E+01	0.565808E+00
1984	0.431000E+00	0.618975E+00	-0.361956E+00
1985	0.265310E+01	0.167427E+01	0.460353E+00

1986	0.409000E+00	0.549168E+00	-0.294689E+00
1987	0.161250E+01	0.254529E+01	-0.456457E+00
1988	0.608800E+00	0.103663E+01	-0.532242E+00
1989	0.141040E+01	0.142753E+01	-0.120739E-01
1990	0.921500E+00	0.982397E+00	-0.639927E-01
1991	0.527800E+00	0.587158E+00	-0.106576E+00
1992	0.125240E+01	0.110832E+01	0.122213E+00
1993	0.398800E+00	0.422997E+00	-0.589059E-01
1994	N/A	0.555511E+00	N/A
1995	N/A	0.362111E+00	N/A
1996	N/A	0.227107E+00	N/A
1997	N/A	0.385372E+00	N/A
1998	N/A	0.614023E+00	N/A
1999	N/A	0.287785E+00	N/A
2000	N/A	0.729960E+00	N/A
2001	N/A	0.366922E+00	N/A
2002	N/A	0.156744E+00	N/A
2003	N/A	0.273082E+00	N/A
2004	N/A	0.121270E+00	N/A
2005	N/A	0.645378E+00	N/A
2006	N/A	0.133366E+00	N/A
2007	N/A	0.583798E+00	N/A

Survey Index: 3 Tag: spr_36pr AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.131712E-03 % Variance Contribution = 1.4276
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.333662E+01	N/A
1979	N/A	0.458109E+00	N/A
1980	N/A	0.225338E+01	N/A
1981	N/A	0.176124E+01	N/A
1982	0.950190E+01	0.152655E+01	0.182848E+01
1983	0.301700E+01	0.269620E+01	0.112420E+00
1984	0.760700E+00	0.106648E+01	-0.337879E+00
1985	0.663300E+00	0.753771E+00	-0.127861E+00
1986	0.184440E+01	0.165576E+01	0.107895E+00
1987	0.378400E+00	0.642694E+00	-0.529716E+00
1988	0.314960E+01	0.291187E+01	0.784804E-01
1989	0.666400E+00	0.129073E+01	-0.661074E+00
1990	0.173710E+01	0.185200E+01	-0.640515E-01
1991	0.688700E+00	0.832208E+00	-0.189276E+00
1992	0.468200E+00	0.659586E+00	-0.342717E+00
1993	0.130610E+01	0.115228E+01	0.125301E+00
1994	N/A	0.458886E+00	N/A
1995	N/A	0.769279E+00	N/A
1996	N/A	0.471236E+00	N/A
1997	N/A	0.309775E+00	N/A
1998	N/A	0.502329E+00	N/A
1999	N/A	0.820688E+00	N/A
2000	N/A	0.393738E+00	N/A
2001	N/A	0.993416E+00	N/A
2002	N/A	0.470225E+00	N/A
2003	N/A	0.227506E+00	N/A
2004	N/A	0.389838E+00	N/A

2005	N/A	0.174284E+00	N/A
2006	N/A	0.935025E+00	N/A
2007	N/A	0.194002E+00	N/A

Survey Index: 4 Tag: spr_36pr AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.169502E-03 % Variance Contribution = 1.7868
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.130159E+01	N/A
1979	N/A	0.228278E+01	N/A
1980	N/A	0.337531E+00	N/A
1981	N/A	0.146958E+01	N/A
1982	0.832440E+01	0.113607E+01	0.199161E+01
1983	0.796200E+00	0.935500E+00	-0.161231E+00
1984	0.123820E+01	0.151436E+01	-0.201336E+00
1985	0.111030E+01	0.595524E+00	0.622943E+00
1986	0.365200E+00	0.349724E+00	0.433021E-01
1987	0.763300E+00	0.104973E+01	-0.318634E+00
1988	0.408800E+00	0.446714E+00	-0.886922E-01
1989	0.158310E+01	0.179799E+01	-0.127285E+00
1990	0.674200E+00	0.898756E+00	-0.287485E+00
1991	0.928900E+00	0.113590E+01	-0.201183E+00
1992	0.168100E+00	0.350973E+00	-0.736150E+00
1993	0.205300E+00	0.350841E+00	-0.535861E+00
1994	N/A	0.544739E+00	N/A
1995	N/A	0.250056E+00	N/A
1996	N/A	0.593107E+00	N/A
1997	N/A	0.346351E+00	N/A
1998	N/A	0.212466E+00	N/A
1999	N/A	0.330234E+00	N/A
2000	N/A	0.557642E+00	N/A
2001	N/A	0.302033E+00	N/A
2002	N/A	0.641606E+00	N/A
2003	N/A	0.323727E+00	N/A
2004	N/A	0.178238E+00	N/A
2005	N/A	0.334299E+00	N/A
2006	N/A	0.153184E+00	N/A
2007	N/A	0.858848E+00	N/A

Survey Index: 5 Tag: spr_36pr AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.214936E-03 % Variance Contribution = 1.9996
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.637505E+00	N/A
1979	N/A	0.882870E+00	N/A
1980	N/A	0.148659E+01	N/A
1981	N/A	0.245239E+00	N/A
1982	0.620800E+01	0.100786E+01	0.181801E+01
1983	0.697000E+00	0.605648E+00	0.140486E+00

1984	0.422300E+00	0.457205E+00	-0.794168E-01
1985	0.141230E+01	0.931533E+00	0.416143E+00
1986	0.540000E+00	0.294095E+00	0.607666E+00
1987	0.621000E-01	0.197737E+00	-0.115819E+01
1988	0.643500E+00	0.671835E+00	-0.430913E-01
1989	0.235100E+00	0.257243E+00	-0.900111E-01
1990	0.911900E+00	0.104846E+01	-0.139548E+00
1991	0.478800E+00	0.555015E+00	-0.147713E+00
1992	0.272900E+00	0.573219E+00	-0.742162E+00
1993	0.895000E-01	0.160197E+00	-0.582166E+00
1994	N/A	0.130379E+00	N/A
1995	N/A	0.186575E+00	N/A
1996	N/A	0.131029E+00	N/A
1997	N/A	0.371275E+00	N/A
1998	N/A	0.163956E+00	N/A
1999	N/A	0.125510E+00	N/A
2000	N/A	0.179119E+00	N/A
2001	N/A	0.356272E+00	N/A
2002	N/A	0.169122E+00	N/A
2003	N/A	0.376706E+00	N/A
2004	N/A	0.182349E+00	N/A
2005	N/A	0.117839E+00	N/A
2006	N/A	0.235835E+00	N/A
2007	N/A	0.118941E+00	N/A

Survey Index: 6 Tag: spr_36pr AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.239206E-03 % Variance Contribution = 0.5055
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.301480E+00	N/A
1979	N/A	0.388395E+00	N/A
1980	N/A	0.545346E+00	N/A
1981	N/A	0.826328E+00	N/A
1982	0.292900E+00	0.155185E+00	0.635214E+00
1983	0.443100E+00	0.482236E+00	-0.846371E-01
1984	0.400400E+00	0.304651E+00	0.273297E+00
1985	0.265400E+00	0.219055E+00	0.191917E+00
1986	0.617900E+00	0.401064E+00	0.432207E+00
1987	0.179400E+00	0.155480E+00	0.143098E+00
1988	0.640000E-01	0.115893E+00	-0.593786E+00
1989	0.351100E+00	0.276134E+00	0.240183E+00
1990	0.130400E+00	0.152125E+00	-0.154098E+00
1991	0.328100E+00	0.470068E+00	-0.359558E+00
1992	0.142400E+00	0.198904E+00	-0.334184E+00
1993	0.138200E+00	0.204048E+00	-0.389653E+00
1994	N/A	0.451877E-01	N/A
1995	N/A	0.289039E-01	N/A
1996	N/A	0.882837E-01	N/A
1997	N/A	0.645760E-01	N/A
1998	N/A	0.150056E+00	N/A
1999	N/A	0.671610E-01	N/A
2000	N/A	0.532097E-01	N/A
2001	N/A	0.955882E-01	N/A
2002	N/A	0.175180E+00	N/A

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2003     N/A              0.764919E-01     N/A
2004     N/A              0.149263E+00     N/A
2005     N/A              0.821045E-01     N/A
2006     N/A              0.763562E-01     N/A
2007     N/A              0.136585E+00     N/A

Survey Index:    7 Tag:         spr_36pr AGE =  7
Time = JAN-1           Type = NUMBER
Catchability =    0.219598E-03   % Variance Contribution =     1.5881
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.270775E+00     N/A
1979     N/A              0.191308E+00     N/A
1980     N/A              0.203241E+00     N/A
1981     N/A              0.216921E+00     N/A
1982     0.186570E+01     0.344877E+00      0.168820E+01
1983     0.272000E-01     0.583656E-01     -0.763509E+00
1984     0.208800E+00     0.215664E+00     -0.323436E-01
1985     0.191900E+00     0.119042E+00      0.477494E+00
1986     0.617000E-01     0.675855E-01     -0.911092E-01
1987     0.135500E+00     0.180404E+00     -0.286226E+00
1988     0.370000E-01     0.677267E-01     -0.604562E+00
1989     0.505000E-01     0.432260E-01      0.155532E+00
1990     0.143100E+00     0.102804E+00      0.330716E+00
1991     0.541000E-01     0.689718E-01     -0.242863E+00
1992     0.158700E+00     0.140758E+00      0.119975E+00
1993     0.293000E-01     0.621092E-01     -0.751307E+00
1994     N/A              0.490677E-01     N/A
1995     N/A              0.148714E-01     N/A
1996     N/A              0.136106E-01     N/A
1997     N/A              0.303601E-01     N/A
1998     N/A              0.196725E-01     N/A
1999     N/A              0.568538E-01     N/A
2000     N/A              0.257937E-01     N/A
2001     N/A              0.226964E-01     N/A
2002     N/A              0.364612E-01     N/A
2003     N/A              0.589667E-01     N/A
2004     N/A              0.269436E-01     N/A
2005     N/A              0.517368E-01     N/A
2006     N/A              0.408460E-01     N/A
2007     N/A              0.434242E-01     N/A

Survey Index:    8 Tag:         spr_36pr AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.265209E-03   % Variance Contribution =     1.3491
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.212194E-01     N/A
1979     N/A              0.210288E+00     N/A
1980     N/A              0.151086E+00     N/A
1981     N/A              0.101901E+00     N/A
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1982	0.368500E+00	0.115608E+00	0.115924E+01
1983	0.218600E+00	0.173452E+00	0.231342E+00
1984	N/A	0.352407E-01	N/A
1985	0.179900E+00	0.106599E+00	0.523325E+00
1986	0.125100E+00	0.544895E-01	0.831105E+00
1987	0.328000E-01	0.464588E-01	-0.348137E+00
1988	0.492000E-01	0.112462E+00	-0.826719E+00
1989	0.395000E-01	0.314054E-01	0.229320E+00
1990	0.129000E-01	0.234222E-01	-0.596455E+00
1991	0.406000E-01	0.473693E-01	-0.154206E+00
1992	0.196000E-01	0.347345E-01	-0.572205E+00
1993	0.344000E-01	0.554045E-01	-0.476605E+00
1994	N/A	0.195578E-01	N/A
1995	N/A	0.141926E-01	N/A
1996	N/A	0.960784E-02	N/A
1997	N/A	0.919941E-02	N/A
1998	N/A	0.789499E-02	N/A
1999	N/A	0.991814E-02	N/A
2000	N/A	0.222935E-01	N/A
2001	N/A	0.145190E-01	N/A
2002	N/A	0.950317E-02	N/A
2003	N/A	0.160402E-01	N/A
2004	N/A	0.246721E-01	N/A
2005	N/A	0.931237E-02	N/A
2006	N/A	0.308988E-01	N/A
2007	N/A	0.329330E-01	N/A

Survey Index: 9 Tag: spr_36po AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.169927E-04 % Variance Contribution = 1.5582
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.487802E+00	N/A
1979	N/A	0.440872E+00	N/A
1980	N/A	0.389339E+00	N/A
1981	N/A	0.779741E+00	N/A
1982	N/A	0.337559E+00	N/A
1983	N/A	0.192117E+00	N/A
1984	N/A	0.493202E+00	N/A
1985	N/A	0.163345E+00	N/A
1986	N/A	0.756180E+00	N/A
1987	N/A	0.304055E+00	N/A
1988	N/A	0.422120E+00	N/A
1989	N/A	0.303000E+00	N/A
1990	N/A	0.172463E+00	N/A
1991	N/A	0.328059E+00	N/A
1992	N/A	0.125860E+00	N/A
1993	N/A	0.167501E+00	N/A
1994	0.124800E+00	0.107239E+00	0.151654E+00
1995	0.495000E-01	0.667813E-01	-0.299450E+00
1996	0.730000E-01	0.113523E+00	-0.441549E+00
1997	0.290800E+00	0.181306E+00	0.472449E+00
1998	0.111300E+00	0.850530E-01	0.268955E+00
1999	0.212300E+00	0.213590E+00	-0.605911E-02
2000	0.220700E+00	0.109056E+00	0.704945E+00

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2001     0.610000E-01     0.458989E-01     0.284433E+00
2002     0.650000E-01     0.800017E-01    -0.207660E+00
2003     0.160000E-01     0.356558E-01    -0.801322E+00
2004     0.637000E+00     0.189060E+00     0.121470E+01
2005     0.119000E-01     0.390908E-01    -0.118935E+01
2006     0.178600E+00     0.170725E+00     0.450969E-01
2007     0.125000E+00     0.152195E+00    -0.196847E+00

Survey Index:   10 Tag:         spr_36po AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.617127E-04   % Variance Contribution =     0.5616
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.290499E+00     N/A
1979     N/A              0.144198E+01     N/A
1980     N/A              0.129533E+01     N/A
1981     N/A              0.113872E+01     N/A
1982     N/A              0.225055E+01     N/A
1983     N/A              0.960505E+00     N/A
1984     N/A              0.536370E+00     N/A
1985     N/A              0.145083E+01     N/A
1986     N/A              0.475880E+00     N/A
1987     N/A              0.220561E+01     N/A
1988     N/A              0.898290E+00     N/A
1989     N/A              0.123702E+01     N/A
1990     N/A              0.851293E+00     N/A
1991     N/A              0.508799E+00     N/A
1992     N/A              0.960414E+00     N/A
1993     N/A              0.366547E+00     N/A
1994     0.272400E+00     0.481376E+00    -0.569376E+00
1995     0.381700E+00     0.313786E+00     0.195924E+00
1996     0.213900E+00     0.196799E+00     0.833250E-01
1997     0.437100E+00     0.333943E+00     0.269193E+00
1998     0.665200E+00     0.532079E+00     0.223295E+00
1999     0.290900E+00     0.249379E+00     0.154005E+00
2000     0.806600E+00     0.632544E+00     0.243078E+00
2001     0.235000E+00     0.317955E+00    -0.302324E+00
2002     0.930000E-01     0.135826E+00    -0.378775E+00
2003     0.213000E+00     0.236638E+00    -0.105240E+00
2004     0.580000E-01     0.105086E+00    -0.594333E+00
2005     0.483800E+00     0.559250E+00    -0.144924E+00
2006     0.231000E+00     0.115567E+00     0.692563E+00
2007     0.639000E+00     0.505888E+00     0.233589E+00

Survey Index:   11 Tag:         spr_36po AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.145760E-03   % Variance Contribution =     1.1509
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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1978     N/A              0.369248E+01     N/A
1979     N/A              0.506968E+00     N/A
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1980	N/A	0.249371E+01	N/A
1981	N/A	0.194908E+01	N/A
1982	N/A	0.168937E+01	N/A
1983	N/A	0.298376E+01	N/A
1984	N/A	0.118022E+01	N/A
1985	N/A	0.834163E+00	N/A
1986	N/A	0.183235E+01	N/A
1987	N/A	0.711239E+00	N/A
1988	N/A	0.322243E+01	N/A
1989	N/A	0.142839E+01	N/A
1990	N/A	0.204953E+01	N/A
1991	N/A	0.920965E+00	N/A
1992	N/A	0.729933E+00	N/A
1993	N/A	0.127518E+01	N/A
1994	0.200000E+00	0.507827E+00	-0.931824E+00
1995	0.853900E+00	0.851325E+00	0.302066E-02
1996	0.736200E+00	0.521495E+00	0.344802E+00
1997	0.170200E+00	0.342813E+00	-0.700211E+00
1998	0.129800E+01	0.555904E+00	0.847984E+00
1999	0.609000E+00	0.908217E+00	-0.399665E+00
2000	0.829800E+00	0.435731E+00	0.644159E+00
2001	0.794000E+00	0.109937E+01	-0.325406E+00
2002	0.383000E+00	0.520376E+00	-0.306516E+00
2003	0.271000E+00	0.251771E+00	0.736001E-01
2004	0.579000E+00	0.431415E+00	0.294232E+00
2005	0.137800E+00	0.192872E+00	-0.336224E+00
2006	0.130590E+01	0.103475E+01	0.232735E+00
2007	0.375600E+00	0.214693E+00	0.559316E+00

Survey Index: 12 Tag: spr_36po AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.302830E-03 % Variance Contribution = 2.2202
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.232540E+01	N/A
1979	N/A	0.407840E+01	N/A
1980	N/A	0.603030E+00	N/A
1981	N/A	0.262553E+01	N/A
1982	N/A	0.202970E+01	N/A
1983	N/A	0.167135E+01	N/A
1984	N/A	0.270555E+01	N/A
1985	N/A	0.106396E+01	N/A
1986	N/A	0.624812E+00	N/A
1987	N/A	0.187543E+01	N/A
1988	N/A	0.798094E+00	N/A
1989	N/A	0.321227E+01	N/A
1990	N/A	0.160571E+01	N/A
1991	N/A	0.202940E+01	N/A
1992	N/A	0.627045E+00	N/A
1993	N/A	0.626809E+00	N/A
1994	0.216500E+00	0.973225E+00	-0.150302E+01
1995	0.534000E+00	0.446747E+00	0.178403E+00
1996	0.124720E+01	0.105964E+01	0.162972E+00
1997	0.488600E+00	0.618786E+00	-0.236216E+00
1998	0.847800E+00	0.379590E+00	0.803553E+00

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1999     0.509700E+00     0.589993E+00    -0.146288E+00
2000     0.114110E+01     0.996278E+00     0.135722E+00
2001     0.160000E+00     0.539609E+00    -0.121567E+01
2002     0.993000E+00     0.114629E+01    -0.143553E+00
2003     0.623000E+00     0.578367E+00     0.743379E-01
2004     0.140700E+01     0.318439E+00     0.148578E+01
2005     0.631000E+00     0.597254E+00     0.549630E-01
2006     0.331900E+00     0.273678E+00     0.192883E+00
2007     0.179370E+01     0.153441E+01     0.156135E+00

Survey Index:   13 Tag:         spr_36po AGE =  5
Time = JAN-1           Type = NUMBER
Catchability =    0.395248E-03   % Variance Contribution =     2.6219
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
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```
1978     N/A              0.117232E+01     N/A
1979     N/A              0.162352E+01     N/A
1980     N/A              0.273372E+01     N/A
1981     N/A              0.450972E+00     N/A
1982     N/A              0.185337E+01     N/A
1983     N/A              0.111373E+01     N/A
1984     N/A              0.840761E+00     N/A
1985     N/A              0.171301E+01     N/A
1986     N/A              0.540815E+00     N/A
1987     N/A              0.363622E+00     N/A
1988     N/A              0.123545E+01     N/A
1989     N/A              0.473048E+00     N/A
1990     N/A              0.192803E+01     N/A
1991     N/A              0.102062E+01     N/A
1992     N/A              0.105410E+01     N/A
1993     N/A              0.294588E+00     N/A
1994     0.332000E-01     0.239756E+00    -0.197707E+01
1995     0.599000E+00     0.343095E+00     0.557253E+00
1996     0.174200E+00     0.240950E+00    -0.324386E+00
1997     0.422300E+00     0.682742E+00    -0.480401E+00
1998     0.754900E+00     0.301501E+00     0.917810E+00
1999     0.238200E+00     0.230802E+00     0.315513E-01
2000     0.370300E+00     0.329385E+00     0.117087E+00
2001     0.383000E+00     0.655152E+00    -0.536833E+00
2002     0.239000E+00     0.311000E+00    -0.263330E+00
2003     0.696000E+00     0.692729E+00     0.471148E-02
2004     0.135400E+01     0.335324E+00     0.139572E+01
2005     0.274400E+00     0.216696E+00     0.236091E+00
2006     0.723400E+00     0.433680E+00     0.511655E+00
2007     0.180900E+00     0.218722E+00    -0.189859E+00

Survey Index:   14 Tag:         spr_36po AGE =  6
Time = JAN-1           Type = NUMBER
Catchability =    0.399371E-03   % Variance Contribution =     3.6477
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
```

1978	N/A	0.503342E+00	N/A
1979	N/A	0.648452E+00	N/A
1980	N/A	0.910493E+00	N/A
1981	N/A	0.137961E+01	N/A
1982	N/A	0.259092E+00	N/A
1983	N/A	0.805126E+00	N/A
1984	N/A	0.508636E+00	N/A
1985	N/A	0.365727E+00	N/A
1986	N/A	0.669604E+00	N/A
1987	N/A	0.259585E+00	N/A
1988	N/A	0.193492E+00	N/A
1989	N/A	0.461026E+00	N/A
1990	N/A	0.253984E+00	N/A
1991	N/A	0.784811E+00	N/A
1992	N/A	0.332085E+00	N/A
1993	N/A	0.340672E+00	N/A
1994	0.570000E-02	0.754440E-01	-0.258293E+01
1995	0.106700E+00	0.482571E-01	0.793479E+00
1996	0.208500E+00	0.147396E+00	0.346817E+00
1997	0.498000E-01	0.107814E+00	-0.772393E+00
1998	0.532600E+00	0.250530E+00	0.754194E+00
1999	0.119300E+00	0.112130E+00	0.619831E-01
2000	0.102400E+00	0.888372E-01	0.142081E+00
2001	0.177000E+00	0.159591E+00	0.103534E+00
2002	0.225000E+00	0.292474E+00	-0.262277E+00
2003	0.640000E-01	0.127709E+00	-0.690867E+00
2004	0.893000E+00	0.249205E+00	0.127631E+01
2005	0.205300E+00	0.137079E+00	0.403913E+00
2006	0.212800E+00	0.127482E+00	0.512377E+00
2007	0.209200E+00	0.228039E+00	-0.862250E-01

Survey Index: 15 Tag: spr_36po AGE = 7
Time = JAN-1 Type = NUMBER
Catchability = 0.465326E-03 % Variance Contribution = 3.5451
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.573769E+00	N/A
1979	N/A	0.405379E+00	N/A
1980	N/A	0.430664E+00	N/A
1981	N/A	0.459653E+00	N/A
1982	N/A	0.730790E+00	N/A
1983	N/A	0.123676E+00	N/A
1984	N/A	0.456989E+00	N/A
1985	N/A	0.252249E+00	N/A
1986	N/A	0.143213E+00	N/A
1987	N/A	0.382273E+00	N/A
1988	N/A	0.143512E+00	N/A
1989	N/A	0.915952E-01	N/A
1990	N/A	0.217841E+00	N/A
1991	N/A	0.146150E+00	N/A
1992	N/A	0.298264E+00	N/A
1993	N/A	0.131609E+00	N/A
1994	0.441000E-01	0.103974E+00	-0.857680E+00
1995	0.233600E+00	0.315123E-01	0.200323E+01
1996	0.277000E-01	0.288407E-01	-0.403540E-01

1997	0.133900E+00	0.643326E-01	0.733026E+00
1998	0.101600E+00	0.416859E-01	0.890882E+00
1999	0.636000E-01	0.120472E+00	-0.638807E+00
2000	0.255000E-01	0.546564E-01	-0.762388E+00
2001	0.230000E-01	0.480933E-01	-0.737648E+00
2002	0.390000E-01	0.772609E-01	-0.683626E+00
2003	0.800000E-01	0.124950E+00	-0.445885E+00
2004	0.179000E+00	0.570930E-01	0.114270E+01
2005	0.127400E+00	0.109630E+00	0.150224E+00
2006	0.121300E+00	0.865522E-01	0.337519E+00
2007	0.309000E-01	0.920153E-01	-0.109120E+01

Survey Index: 16 Tag: spr_36po AGE = 8
Time = JAN-1 Type = NUMBER
Catchability = 0.511558E-03 % Variance Contribution = 2.3208
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.409297E-01	N/A
1979	N/A	0.405621E+00	N/A
1980	N/A	0.291427E+00	N/A
1981	N/A	0.196556E+00	N/A
1982	N/A	0.222994E+00	N/A
1983	N/A	0.334569E+00	N/A
1984	N/A	0.679751E-01	N/A
1985	N/A	0.205617E+00	N/A
1986	N/A	0.105104E+00	N/A
1987	N/A	0.896136E-01	N/A
1988	N/A	0.216926E+00	N/A
1989	N/A	0.605774E-01	N/A
1990	N/A	0.451786E-01	N/A
1991	N/A	0.913699E-01	N/A
1992	N/A	0.669989E-01	N/A
1993	N/A	0.106869E+00	N/A
1994	N/A	0.377247E-01	N/A
1995	0.280000E-01	0.273758E-01	0.225440E-01
1996	0.181000E-01	0.185324E-01	-0.236085E-01
1997	0.201000E-01	0.177446E-01	0.124639E+00
1998	0.309000E-01	0.152285E-01	0.707587E+00
1999	0.305000E-01	0.191309E-01	0.466420E+00
2000	0.201000E-01	0.430016E-01	-0.760516E+00
2001	0.180000E-01	0.280054E-01	-0.442024E+00
2002	N/A	0.183305E-01	N/A
2003	0.120000E-01	0.309398E-01	-0.947135E+00
2004	0.261000E+00	0.475896E-01	0.170191E+01
2005	0.298000E-01	0.179625E-01	0.506224E+00
2006	0.539000E-01	0.596002E-01	-0.100529E+00
2007	0.181000E-01	0.635240E-01	-0.125551E+01

Survey Index: 17 Tag: spr_41 AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.109929E-04 % Variance Contribution = 2.2279
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.371700E+00	0.315569E+00	0.163710E+00
1979	0.428300E+00	0.285209E+00	0.406601E+00
1980	0.312000E-01	0.251872E+00	-0.208850E+01
1981	0.230220E+01	0.504430E+00	0.151819E+01
1982	N/A	0.218374E+00	N/A
1983	N/A	0.124284E+00	N/A
1984	N/A	0.319062E+00	N/A
1985	N/A	0.105671E+00	N/A
1986	N/A	0.489189E+00	N/A
1987	N/A	0.196699E+00	N/A
1988	N/A	0.273078E+00	N/A
1989	N/A	0.196017E+00	N/A
1990	N/A	0.111570E+00	N/A
1991	N/A	0.212228E+00	N/A
1992	N/A	0.814216E-01	N/A
1993	N/A	0.108360E+00	N/A
1994	N/A	0.693750E-01	N/A
1995	N/A	0.432022E-01	N/A
1996	N/A	0.734405E-01	N/A
1997	N/A	0.117291E+00	N/A
1998	N/A	0.550225E-01	N/A
1999	N/A	0.138176E+00	N/A
2000	N/A	0.705504E-01	N/A
2001	N/A	0.296929E-01	N/A
2002	N/A	0.517547E-01	N/A
2003	N/A	0.230664E-01	N/A
2004	N/A	0.122307E+00	N/A
2005	N/A	0.252886E-01	N/A
2006	N/A	0.110445E+00	N/A
2007	N/A	0.984579E-01	N/A

Survey Index: 18 Tag: spr_41 AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.699871E-04 % Variance Contribution = 0.2097
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.191800E+00	0.329449E+00	-0.540969E+00
1979	0.129770E+01	0.163532E+01	-0.231246E+00
1980	0.221700E+01	0.146901E+01	0.411568E+00
1981	0.185220E+01	0.129140E+01	0.360648E+00
1982	N/A	0.255230E+01	N/A
1983	N/A	0.108929E+01	N/A
1984	N/A	0.608287E+00	N/A
1985	N/A	0.164536E+01	N/A
1986	N/A	0.539685E+00	N/A
1987	N/A	0.250134E+01	N/A

1988	N/A	0.101873E+01	N/A
1989	N/A	0.140288E+01	N/A
1990	N/A	0.965434E+00	N/A
1991	N/A	0.577019E+00	N/A
1992	N/A	0.108919E+01	N/A
1993	N/A	0.415693E+00	N/A
1994	N/A	0.545918E+00	N/A
1995	N/A	0.355858E+00	N/A
1996	N/A	0.223186E+00	N/A
1997	N/A	0.378718E+00	N/A
1998	N/A	0.603421E+00	N/A
1999	N/A	0.282816E+00	N/A
2000	N/A	0.717356E+00	N/A
2001	N/A	0.360586E+00	N/A
2002	N/A	0.154038E+00	N/A
2003	N/A	0.268367E+00	N/A
2004	N/A	0.119176E+00	N/A
2005	N/A	0.634234E+00	N/A
2006	N/A	0.131063E+00	N/A
2007	N/A	0.573717E+00	N/A

Survey Index: 19 Tag: spr_41 AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.154559E-03 % Variance Contribution = 0.2154
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.553090E+01	0.391539E+01	0.345435E+00
1979	0.275100E+00	0.537573E+00	-0.669930E+00
1980	0.268960E+01	0.264426E+01	0.170022E-01
1981	0.281080E+01	0.206675E+01	0.307493E+00
1982	N/A	0.179135E+01	N/A
1983	N/A	0.316388E+01	N/A
1984	N/A	0.125147E+01	N/A
1985	N/A	0.884520E+00	N/A
1986	N/A	0.194297E+01	N/A
1987	N/A	0.754176E+00	N/A
1988	N/A	0.341696E+01	N/A
1989	N/A	0.151462E+01	N/A
1990	N/A	0.217325E+01	N/A
1991	N/A	0.976563E+00	N/A
1992	N/A	0.773999E+00	N/A
1993	N/A	0.135216E+01	N/A
1994	N/A	0.538484E+00	N/A
1995	N/A	0.902718E+00	N/A
1996	N/A	0.552977E+00	N/A
1997	N/A	0.363508E+00	N/A
1998	N/A	0.589464E+00	N/A
1999	N/A	0.963045E+00	N/A
2000	N/A	0.462036E+00	N/A
2001	N/A	0.116573E+01	N/A
2002	N/A	0.551790E+00	N/A
2003	N/A	0.266970E+00	N/A
2004	N/A	0.457459E+00	N/A
2005	N/A	0.204516E+00	N/A
2006	N/A	0.109721E+01	N/A

2007 N/A 0.227654E+00 N/A

Survey Index: 20 Tag: spr_41 AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.137780E-03 % Variance Contribution = 0.0622
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.971500E+00	0.105800E+01	-0.852917E-01
1979	0.185150E+01	0.185557E+01	-0.219349E-02
1980	0.212300E+00	0.274363E+00	-0.256452E+00
1981	0.168490E+01	0.119455E+01	0.343937E+00
1982	N/A	0.923460E+00	N/A
1983	N/A	0.760423E+00	N/A
1984	N/A	0.123095E+01	N/A
1985	N/A	0.484073E+00	N/A
1986	N/A	0.284273E+00	N/A
1987	N/A	0.853272E+00	N/A
1988	N/A	0.363112E+00	N/A
1989	N/A	0.146150E+01	N/A
1990	N/A	0.730555E+00	N/A
1991	N/A	0.923322E+00	N/A
1992	N/A	0.285289E+00	N/A
1993	N/A	0.285182E+00	N/A
1994	N/A	0.442792E+00	N/A
1995	N/A	0.203258E+00	N/A
1996	N/A	0.482108E+00	N/A
1997	N/A	0.281532E+00	N/A
1998	N/A	0.172704E+00	N/A
1999	N/A	0.268431E+00	N/A
2000	N/A	0.453281E+00	N/A
2001	N/A	0.245508E+00	N/A
2002	N/A	0.521531E+00	N/A
2003	N/A	0.263142E+00	N/A
2004	N/A	0.144881E+00	N/A
2005	N/A	0.271735E+00	N/A
2006	N/A	0.124516E+00	N/A
2007	N/A	0.698116E+00	N/A

Survey Index: 21 Tag: spr_41 AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.168085E-03 % Variance Contribution = 0.2441
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.777600E+00	0.498545E+00	0.444518E+00
1979	0.546600E+00	0.690427E+00	-0.233593E+00
1980	0.170500E+01	0.116256E+01	0.382945E+00
1981	0.105900E+00	0.191783E+00	-0.593869E+00
1982	N/A	0.788175E+00	N/A
1983	N/A	0.473633E+00	N/A
1984	N/A	0.357547E+00	N/A
1985	N/A	0.728483E+00	N/A

1986	N/A	0.229990E+00	N/A
1987	N/A	0.154636E+00	N/A
1988	N/A	0.525393E+00	N/A
1989	N/A	0.201171E+00	N/A
1990	N/A	0.819924E+00	N/A
1991	N/A	0.434036E+00	N/A
1992	N/A	0.448272E+00	N/A
1993	N/A	0.125278E+00	N/A
1994	N/A	0.101960E+00	N/A
1995	N/A	0.145907E+00	N/A
1996	N/A	0.102468E+00	N/A
1997	N/A	0.290347E+00	N/A
1998	N/A	0.128218E+00	N/A
1999	N/A	0.981521E-01	N/A
2000	N/A	0.140076E+00	N/A
2001	N/A	0.278614E+00	N/A
2002	N/A	0.132258E+00	N/A
2003	N/A	0.294594E+00	N/A
2004	N/A	0.142602E+00	N/A
2005	N/A	0.921533E-01	N/A
2006	N/A	0.184429E+00	N/A
2007	N/A	0.930151E-01	N/A

Survey Index: 22 Tag: spr_41 AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.161445E-03 % Variance Contribution = 0.1136
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.141600E+00	0.203475E+00	-0.362539E+00
1979	0.235500E+00	0.262136E+00	-0.107152E+00
1980	0.373700E+00	0.368065E+00	0.151925E-01
1981	0.878600E+00	0.557706E+00	0.454498E+00
1982	N/A	0.104738E+00	N/A
1983	N/A	0.325471E+00	N/A
1984	N/A	0.205616E+00	N/A
1985	N/A	0.147845E+00	N/A
1986	N/A	0.270686E+00	N/A
1987	N/A	0.104937E+00	N/A
1988	N/A	0.782188E-01	N/A
1989	N/A	0.186369E+00	N/A
1990	N/A	0.102673E+00	N/A
1991	N/A	0.317259E+00	N/A
1992	N/A	0.134245E+00	N/A
1993	N/A	0.137716E+00	N/A
1994	N/A	0.304981E-01	N/A
1995	N/A	0.195078E-01	N/A
1996	N/A	0.595846E-01	N/A
1997	N/A	0.435837E-01	N/A
1998	N/A	0.101276E+00	N/A
1999	N/A	0.453284E-01	N/A
2000	N/A	0.359123E-01	N/A
2001	N/A	0.645145E-01	N/A
2002	N/A	0.118232E+00	N/A
2003	N/A	0.516260E-01	N/A
2004	N/A	0.100741E+00	N/A

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2005     N/A              0.554141E-01     N/A
2006     N/A              0.515344E-01     N/A
2007     N/A              0.921844E-01     N/A

Survey Index:   23 Tag:         spr_41   AGE =  7
Time = JAN-1           Type = NUMBER
Catchability =    0.232144E-03   % Variance Contribution =     0.5350
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     0.712300E+00     0.286245E+00     0.911651E+00
1979     0.836000E-01     0.202237E+00    -0.883399E+00
1980     0.185500E+00     0.214852E+00    -0.146894E+00
1981     0.258200E+00     0.229314E+00     0.118641E+00
1982     N/A              0.364580E+00     N/A
1983     N/A              0.617001E-01     N/A
1984     N/A              0.227985E+00     N/A
1985     N/A              0.125843E+00     N/A
1986     N/A              0.714467E-01     N/A
1987     N/A              0.190710E+00     N/A
1988     N/A              0.715960E-01     N/A
1989     N/A              0.456955E-01     N/A
1990     N/A              0.108678E+00     N/A
1991     N/A              0.729122E-01     N/A
1992     N/A              0.148799E+00     N/A
1993     N/A              0.656576E-01     N/A
1994     N/A              0.518710E-01     N/A
1995     N/A              0.157210E-01     N/A
1996     N/A              0.143882E-01     N/A
1997     N/A              0.320946E-01     N/A
1998     N/A              0.207965E-01     N/A
1999     N/A              0.601019E-01     N/A
2000     N/A              0.272673E-01     N/A
2001     N/A              0.239930E-01     N/A
2002     N/A              0.385443E-01     N/A
2003     N/A              0.623356E-01     N/A
2004     N/A              0.284829E-01     N/A
2005     N/A              0.546926E-01     N/A
2006     N/A              0.431796E-01     N/A
2007     N/A              0.459051E-01     N/A

Survey Index:   24 Tag:         spr_41   AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.227119E-03   % Variance Contribution =     1.2702
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     0.651000E-01     0.181718E-01     0.127606E+01
1979     0.138600E+00     0.180086E+00    -0.261840E+00
1980     0.310000E-01     0.129386E+00    -0.142881E+01
1981     0.132100E+00     0.872659E-01     0.414599E+00
1982     N/A              0.990040E-01     N/A
1983     N/A              0.148540E+00     N/A
```

1984	N/A	0.301793E-01	N/A
1985	N/A	0.912890E-01	N/A
1986	N/A	0.466635E-01	N/A
1987	N/A	0.397862E-01	N/A
1988	N/A	0.963095E-01	N/A
1989	N/A	0.268949E-01	N/A
1990	N/A	0.200582E-01	N/A
1991	N/A	0.405659E-01	N/A
1992	N/A	0.297458E-01	N/A
1993	N/A	0.474471E-01	N/A
1994	N/A	0.167488E-01	N/A
1995	N/A	0.121542E-01	N/A
1996	N/A	0.822792E-02	N/A
1997	N/A	0.787816E-02	N/A
1998	N/A	0.676108E-02	N/A
1999	N/A	0.849366E-02	N/A
2000	N/A	0.190916E-01	N/A
2001	N/A	0.124337E-01	N/A
2002	N/A	0.813829E-02	N/A
2003	N/A	0.137365E-01	N/A
2004	N/A	0.211286E-01	N/A
2005	N/A	0.797489E-02	N/A
2006	N/A	0.264610E-01	N/A
2007	N/A	0.282031E-01	N/A

Survey Index: 25 Tag: sp_can_p AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.256432E-04 % Variance Contribution = 1.4147
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.736128E+00	N/A
1979	N/A	0.665307E+00	N/A
1980	N/A	0.587541E+00	N/A
1981	N/A	0.117668E+01	N/A
1982	N/A	0.509401E+00	N/A
1983	N/A	0.289918E+00	N/A
1984	N/A	0.744276E+00	N/A
1985	N/A	0.246499E+00	N/A
1986	0.600000E+00	0.114113E+01	-0.642844E+00
1987	0.250000E+00	0.458841E+00	-0.607242E+00
1988	0.280000E+00	0.637009E+00	-0.821995E+00
1989	0.163000E+01	0.457249E+00	0.127111E+01
1990	0.420000E+00	0.260259E+00	0.478578E+00
1991	0.118000E+01	0.495064E+00	0.868582E+00
1992	0.110000E+00	0.189932E+00	-0.546186E+00
1993	N/A	0.252771E+00	N/A
1994	N/A	0.161831E+00	N/A
1995	N/A	0.100778E+00	N/A
1996	N/A	0.171315E+00	N/A
1997	N/A	0.273604E+00	N/A
1998	N/A	0.128351E+00	N/A
1999	N/A	0.322323E+00	N/A
2000	N/A	0.164573E+00	N/A
2001	N/A	0.692646E-01	N/A
2002	N/A	0.120728E+00	N/A

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2003     N/A              0.538071E-01     N/A
2004     N/A              0.285305E+00     N/A
2005     N/A              0.589908E-01     N/A
2006     N/A              0.257636E+00     N/A
2007     N/A              0.229673E+00     N/A

Survey Index:   26 Tag:         sp_can_p AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.133911E-03   % Variance Contribution =     0.6137
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.630355E+00     N/A
1979     N/A              0.312896E+01     N/A
1980     N/A              0.281074E+01     N/A
1981     N/A              0.247091E+01     N/A
1982     N/A              0.488348E+01     N/A
1983     N/A              0.208420E+01     N/A
1984     N/A              0.116387E+01     N/A
1985     N/A              0.314816E+01     N/A
1986     0.227000E+01     0.103261E+01      0.787688E+00
1987     0.213000E+01     0.478595E+01     -0.809564E+00
1988     0.101000E+01     0.194920E+01     -0.657469E+00
1989     0.278000E+01     0.268422E+01      0.350609E-01
1990     0.244000E+01     0.184722E+01      0.278315E+00
1991     0.116000E+01     0.110405E+01      0.494391E-01
1992     0.286000E+01     0.208401E+01      0.316530E+00
1993     N/A              0.795371E+00     N/A
1994     N/A              0.104454E+01     N/A
1995     N/A              0.680885E+00     N/A
1996     N/A              0.427035E+00     N/A
1997     N/A              0.724623E+00     N/A
1998     N/A              0.115456E+01     N/A
1999     N/A              0.541129E+00     N/A
2000     N/A              0.137256E+01     N/A
2001     N/A              0.689931E+00     N/A
2002     N/A              0.294729E+00     N/A
2003     N/A              0.513482E+00     N/A
2004     N/A              0.228026E+00     N/A
2005     N/A              0.121352E+01     N/A
2006     N/A              0.250770E+00     N/A
2007     N/A              0.109773E+01     N/A

Survey Index:   27 Tag:         sp_can_p AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.230900E-03   % Variance Contribution =     0.1783
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.584931E+01     N/A
1979     N/A              0.803094E+00     N/A
1980     N/A              0.395032E+01     N/A
1981     N/A              0.308757E+01     N/A
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1982	N/A	0.267615E+01	N/A
1983	N/A	0.472661E+01	N/A
1984	N/A	0.186961E+01	N/A
1985	N/A	0.132141E+01	N/A
1986	0.281000E+01	0.290265E+01	-0.324397E-01
1987	0.930000E+00	0.112668E+01	-0.191848E+00
1988	0.466000E+01	0.510469E+01	-0.911443E-01
1989	0.138000E+01	0.226273E+01	-0.494490E+00
1990	0.378000E+01	0.324668E+01	0.152091E+00
1991	0.184000E+01	0.145891E+01	0.232074E+00
1992	0.177000E+01	0.115630E+01	0.425757E+00
1993	N/A	0.202002E+01	N/A
1994	N/A	0.804456E+00	N/A
1995	N/A	0.134859E+01	N/A
1996	N/A	0.826107E+00	N/A
1997	N/A	0.543055E+00	N/A
1998	N/A	0.880615E+00	N/A
1999	N/A	0.143872E+01	N/A
2000	N/A	0.690248E+00	N/A
2001	N/A	0.174152E+01	N/A
2002	N/A	0.824334E+00	N/A
2003	N/A	0.398833E+00	N/A
2004	N/A	0.683410E+00	N/A
2005	N/A	0.305531E+00	N/A
2006	N/A	0.163916E+01	N/A
2007	N/A	0.340098E+00	N/A

Survey Index: 28 Tag: sp_can_p AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.264575E-03 % Variance Contribution = 0.2232
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.203164E+01	N/A
1979	N/A	0.356319E+01	N/A
1980	N/A	0.526851E+00	N/A
1981	N/A	0.229386E+01	N/A
1982	N/A	0.177329E+01	N/A
1983	N/A	0.146022E+01	N/A
1984	N/A	0.236376E+01	N/A
1985	N/A	0.929551E+00	N/A
1986	0.370000E+00	0.545882E+00	-0.388900E+00
1987	0.109000E+01	0.163851E+01	-0.407612E+00
1988	0.580000E+00	0.697274E+00	-0.184150E+00
1989	0.285000E+01	0.280648E+01	0.153893E-01
1990	0.208000E+01	0.140286E+01	0.393852E+00
1991	0.215000E+01	0.177303E+01	0.192779E+00
1992	0.800000E+00	0.547832E+00	0.378642E+00
1993	N/A	0.547627E+00	N/A
1994	N/A	0.850281E+00	N/A
1995	N/A	0.390311E+00	N/A
1996	N/A	0.925779E+00	N/A
1997	N/A	0.540617E+00	N/A
1998	N/A	0.331638E+00	N/A
1999	N/A	0.515461E+00	N/A
2000	N/A	0.870422E+00	N/A

2001	N/A	0.471442E+00	N/A
2002	N/A	0.100148E+01	N/A
2003	N/A	0.505304E+00	N/A
2004	N/A	0.278212E+00	N/A
2005	N/A	0.521805E+00	N/A
2006	N/A	0.239105E+00	N/A
2007	N/A	0.134057E+01	N/A

Survey Index: 29 Tag: sp_can_p AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.412806E-03 % Variance Contribution = 0.2040
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.122439E+01	N/A
1979	N/A	0.169564E+01	N/A
1980	N/A	0.285515E+01	N/A
1981	N/A	0.471006E+00	N/A
1982	N/A	0.193570E+01	N/A
1983	N/A	0.116321E+01	N/A
1984	N/A	0.878109E+00	N/A
1985	N/A	0.178910E+01	N/A
1986	0.650000E+00	0.564839E+00	0.140431E+00
1987	0.340000E+00	0.379775E+00	-0.110633E+00
1988	0.102000E+01	0.129033E+01	-0.235094E+00
1989	0.360000E+00	0.494062E+00	-0.316556E+00
1990	0.387000E+01	0.201368E+01	0.653293E+00
1991	0.105000E+01	0.106596E+01	-0.150884E-01
1992	0.980000E+00	0.110092E+01	-0.116353E+00
1993	N/A	0.307675E+00	N/A
1994	N/A	0.250407E+00	N/A
1995	N/A	0.358336E+00	N/A
1996	N/A	0.251654E+00	N/A
1997	N/A	0.713071E+00	N/A
1998	N/A	0.314895E+00	N/A
1999	N/A	0.241055E+00	N/A
2000	N/A	0.344017E+00	N/A
2001	N/A	0.684256E+00	N/A
2002	N/A	0.324815E+00	N/A
2003	N/A	0.723501E+00	N/A
2004	N/A	0.350220E+00	N/A
2005	N/A	0.226322E+00	N/A
2006	N/A	0.452945E+00	N/A
2007	N/A	0.228439E+00	N/A

Survey Index: 30 Tag: sp_can_p AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.395084E-03 % Variance Contribution = 0.5857
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.497939E+00	N/A
1979	N/A	0.641492E+00	N/A

1980	N/A	0.900720E+00	N/A
1981	N/A	0.136480E+01	N/A
1982	N/A	0.256311E+00	N/A
1983	N/A	0.796484E+00	N/A
1984	N/A	0.503177E+00	N/A
1985	N/A	0.361801E+00	N/A
1986	0.440000E+00	0.662416E+00	-0.409120E+00
1987	0.120000E+00	0.256799E+00	-0.760803E+00
1988	0.130000E+00	0.191415E+00	-0.386909E+00
1989	0.420000E+00	0.456077E+00	-0.824075E-01
1990	0.420000E+00	0.251258E+00	0.513776E+00
1991	0.131000E+01	0.776387E+00	0.523131E+00
1992	0.600000E+00	0.328520E+00	0.602332E+00
1993	N/A	0.337015E+00	N/A
1994	N/A	0.746343E-01	N/A
1995	N/A	0.477391E-01	N/A
1996	N/A	0.145814E+00	N/A
1997	N/A	0.106657E+00	N/A
1998	N/A	0.247840E+00	N/A
1999	N/A	0.110926E+00	N/A
2000	N/A	0.878837E-01	N/A
2001	N/A	0.157878E+00	N/A
2002	N/A	0.289335E+00	N/A
2003	N/A	0.126338E+00	N/A
2004	N/A	0.246531E+00	N/A
2005	N/A	0.135608E+00	N/A
2006	N/A	0.126114E+00	N/A
2007	N/A	0.225591E+00	N/A

Survey Index: 31 Tag: sp_can_p AGE = 7
Time = JAN-1 Type = NUMBER
Catchability = 0.518829E-03 % Variance Contribution = 1.1481
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.639741E+00	N/A
1979	N/A	0.451989E+00	N/A
1980	N/A	0.480182E+00	N/A
1981	N/A	0.512505E+00	N/A
1982	N/A	0.814817E+00	N/A
1983	N/A	0.137896E+00	N/A
1984	N/A	0.509533E+00	N/A
1985	N/A	0.281253E+00	N/A
1986	0.260000E+00	0.159679E+00	0.487513E+00
1987	0.220000E+00	0.426227E+00	-0.661345E+00
1988	0.800000E-01	0.160013E+00	-0.693228E+00
1989	0.500000E-01	0.102127E+00	-0.714193E+00
1990	0.930000E+00	0.242889E+00	0.134258E+01
1991	0.160000E+00	0.162955E+00	-0.182983E-01
1992	0.430000E+00	0.332558E+00	0.256970E+00
1993	N/A	0.146741E+00	N/A
1994	N/A	0.115929E+00	N/A
1995	N/A	0.351356E-01	N/A
1996	N/A	0.321568E-01	N/A
1997	N/A	0.717296E-01	N/A
1998	N/A	0.464789E-01	N/A

1999	N/A	0.134324E+00	N/A
2000	N/A	0.609408E-01	N/A
2001	N/A	0.536231E-01	N/A
2002	N/A	0.861444E-01	N/A
2003	N/A	0.139317E+00	N/A
2004	N/A	0.636576E-01	N/A
2005	N/A	0.122235E+00	N/A
2006	N/A	0.965040E-01	N/A
2007	N/A	0.102595E+00	N/A

Survey Index: 32 Tag: sp_can_p AGE = 8
Time = JAN-1 Type = NUMBER
Catchability = 0.644429E-03 % Variance Contribution = 0.9581
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.515608E-01	N/A
1979	N/A	0.510977E+00	N/A
1980	N/A	0.367122E+00	N/A
1981	N/A	0.247609E+00	N/A
1982	N/A	0.280915E+00	N/A
1983	N/A	0.421470E+00	N/A
1984	N/A	0.856310E-01	N/A
1985	N/A	0.259024E+00	N/A
1986	0.400000E-01	0.132404E+00	-0.119698E+01
1987	0.800000E-01	0.112890E+00	-0.344386E+00
1988	0.170000E+00	0.273270E+00	-0.474661E+00
1989	0.100000E+00	0.763118E-01	0.270343E+00
1990	0.120000E+00	0.569133E-01	0.745962E+00
1991	0.220000E+00	0.115102E+00	0.647807E+00
1992	0.120000E+00	0.844012E-01	0.351911E+00
1993	N/A	0.134627E+00	N/A
1994	N/A	0.475233E-01	N/A
1995	N/A	0.344864E-01	N/A
1996	N/A	0.233460E-01	N/A
1997	N/A	0.223536E-01	N/A
1998	N/A	0.191840E-01	N/A
1999	N/A	0.241000E-01	N/A
2000	N/A	0.541708E-01	N/A
2001	N/A	0.352795E-01	N/A
2002	N/A	0.230917E-01	N/A
2003	N/A	0.389761E-01	N/A
2004	N/A	0.599506E-01	N/A
2005	N/A	0.226280E-01	N/A
2006	N/A	0.750808E-01	N/A
2007	N/A	0.800237E-01	N/A

Survey Index: 33 Tag: sp_canpo AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.128710E-04 % Variance Contribution = 3.3277
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.369482E+00	N/A
1979	N/A	0.333936E+00	N/A
1980	N/A	0.294903E+00	N/A
1981	N/A	0.590609E+00	N/A
1982	N/A	0.255682E+00	N/A
1983	N/A	0.145518E+00	N/A
1984	N/A	0.373572E+00	N/A
1985	N/A	0.123725E+00	N/A
1986	N/A	0.572764E+00	N/A
1987	N/A	0.230304E+00	N/A
1988	N/A	0.319732E+00	N/A
1989	N/A	0.229506E+00	N/A
1990	N/A	0.130631E+00	N/A
1991	N/A	0.248486E+00	N/A
1992	N/A	0.953320E-01	N/A
1993	N/A	0.126873E+00	N/A
1994	N/A	0.812274E-01	N/A
1995	0.700000E-01	0.505830E-01	0.324879E+00
1996	0.140000E+00	0.859875E-01	0.487441E+00
1997	0.320000E+00	0.137329E+00	0.845940E+00
1998	0.100000E-01	0.644228E-01	-0.186288E+01
1999	0.330000E+00	0.161783E+00	0.712840E+00
2000	0.100000E+00	0.826036E-01	0.191117E+00
2001	N/A	0.347658E-01	N/A
2002	0.100000E-01	0.605967E-01	-0.180166E+01
2003	N/A	0.270072E-01	N/A
2004	0.535600E+00	0.143202E+00	0.131913E+01
2005	0.200000E-01	0.296091E-01	-0.392349E+00
2006	N/A	0.129314E+00	N/A
2007	0.137400E+00	0.115279E+00	0.175542E+00

Survey Index: 34 Tag: sp_canpo AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.503937E-04 % Variance Contribution = 4.0472
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.237217E+00	N/A
1979	N/A	0.117750E+01	N/A
1980	N/A	0.105775E+01	N/A
1981	N/A	0.929862E+00	N/A
1982	N/A	0.183777E+01	N/A
1983	N/A	0.784334E+00	N/A
1984	N/A	0.437992E+00	N/A
1985	N/A	0.118473E+01	N/A
1986	N/A	0.388596E+00	N/A
1987	N/A	0.180107E+01	N/A

1988	N/A	0.733530E+00	N/A
1989	N/A	0.101013E+01	N/A
1990	N/A	0.695153E+00	N/A
1991	N/A	0.415478E+00	N/A
1992	N/A	0.784260E+00	N/A
1993	N/A	0.299317E+00	N/A
1994	N/A	0.393084E+00	N/A
1995	0.670000E+00	0.256233E+00	0.961191E+00
1996	0.490000E+00	0.160703E+00	0.111485E+01
1997	0.530000E+00	0.272693E+00	0.664532E+00
1998	0.670000E+00	0.434488E+00	0.433109E+00
1999	0.320000E+00	0.203639E+00	0.451971E+00
2000	0.440000E+00	0.516526E+00	-0.160351E+00
2001	0.600000E-01	0.259637E+00	-0.146494E+01
2002	0.900000E-01	0.110913E+00	-0.208941E+00
2003	0.200000E-01	0.193235E+00	-0.226818E+01
2004	0.956000E-01	0.858114E-01	0.108021E+00
2005	0.134000E+01	0.456675E+00	0.107645E+01
2006	0.370000E-01	0.943706E-01	-0.936312E+00
2007	0.519200E+00	0.413101E+00	0.228598E+00

Survey Index: 35 Tag: sp_canpo AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.244911E-03 % Variance Contribution = 1.2952
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.620425E+01	N/A
1979	N/A	0.851826E+00	N/A
1980	N/A	0.419003E+01	N/A
1981	N/A	0.327492E+01	N/A
1982	N/A	0.283854E+01	N/A
1983	N/A	0.501342E+01	N/A
1984	N/A	0.198306E+01	N/A
1985	N/A	0.140159E+01	N/A
1986	N/A	0.307878E+01	N/A
1987	N/A	0.119505E+01	N/A
1988	N/A	0.541445E+01	N/A
1989	N/A	0.240004E+01	N/A
1990	N/A	0.344369E+01	N/A
1991	N/A	0.154744E+01	N/A
1992	N/A	0.122646E+01	N/A
1993	N/A	0.214260E+01	N/A
1994	N/A	0.853271E+00	N/A
1995	0.150000E+01	0.143043E+01	0.474918E-01
1996	0.231000E+01	0.876235E+00	0.969368E+00
1997	0.550000E+00	0.576008E+00	-0.462025E-01
1998	0.950000E+00	0.934052E+00	0.169304E-01
1999	0.149000E+01	0.152602E+01	-0.238874E-01
2000	0.105000E+01	0.732132E+00	0.360584E+00
2001	0.640000E+00	0.184720E+01	-0.105996E+01
2002	0.570000E+00	0.874355E+00	-0.427850E+00
2003	0.300000E+00	0.423035E+00	-0.343671E+00
2004	0.392000E+00	0.724880E+00	-0.614744E+00
2005	0.470000E+00	0.324071E+00	0.371770E+00
2006	0.140600E+01	0.173862E+01	-0.212344E+00

2007 0.944500E+00 0.360735E+00 0.962511E+00

Survey Index: 36 Tag: sp_canpo AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.579482E-03 % Variance Contribution = 1.1956
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.444979E+01	N/A
1979	N/A	0.780425E+01	N/A
1980	N/A	0.115393E+01	N/A
1981	N/A	0.502411E+01	N/A
1982	N/A	0.388394E+01	N/A
1983	N/A	0.319823E+01	N/A
1984	N/A	0.517721E+01	N/A
1985	N/A	0.203594E+01	N/A
1986	N/A	0.119561E+01	N/A
1987	N/A	0.358874E+01	N/A
1988	N/A	0.152720E+01	N/A
1989	N/A	0.614686E+01	N/A
1990	N/A	0.307261E+01	N/A
1991	N/A	0.388336E+01	N/A
1992	N/A	0.119989E+01	N/A
1993	N/A	0.119943E+01	N/A
1994	N/A	0.186232E+01	N/A
1995	0.860000E+00	0.854876E+00	0.597600E-02
1996	0.402000E+01	0.202768E+01	0.684390E+00
1997	0.125000E+01	0.118408E+01	0.541753E-01
1998	0.350000E+00	0.726367E+00	-0.730122E+00
1999	0.109000E+01	0.112898E+01	-0.351407E-01
2000	0.392000E+01	0.190643E+01	0.720857E+00
2001	0.420000E+00	0.103257E+01	-0.899554E+00
2002	0.205000E+01	0.219348E+01	-0.676517E-01
2003	0.650000E+00	0.110674E+01	-0.532200E+00
2004	0.423200E+00	0.609351E+00	-0.364549E+00
2005	0.291000E+01	0.114288E+01	0.934602E+00
2006	0.658000E+00	0.523697E+00	0.228291E+00
2007	0.293890E+01	0.293618E+01	0.926491E-03

Survey Index: 37 Tag: sp_canpo AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.902988E-03 % Variance Contribution = 1.0488
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.267828E+01	N/A
1979	N/A	0.370911E+01	N/A
1980	N/A	0.624548E+01	N/A
1981	N/A	0.103030E+01	N/A
1982	N/A	0.423423E+01	N/A
1983	N/A	0.254445E+01	N/A
1984	N/A	0.192081E+01	N/A
1985	N/A	0.391356E+01	N/A

1986	N/A	0.123555E+01	N/A
1987	N/A	0.830734E+00	N/A
1988	N/A	0.282251E+01	N/A
1989	N/A	0.108073E+01	N/A
1990	N/A	0.440479E+01	N/A
1991	N/A	0.233173E+01	N/A
1992	N/A	0.240821E+01	N/A
1993	N/A	0.673020E+00	N/A
1994	N/A	0.547749E+00	N/A
1995	0.600000E+00	0.783839E+00	-0.267274E+00
1996	0.109000E+01	0.550477E+00	0.683148E+00
1997	0.123000E+01	0.155980E+01	-0.237544E+00
1998	0.350000E+00	0.688814E+00	-0.677038E+00
1999	0.410000E+00	0.527292E+00	-0.251598E+00
2000	0.171000E+01	0.752516E+00	0.820827E+00
2001	0.111000E+01	0.149677E+01	-0.298948E+00
2002	0.680000E+00	0.710514E+00	-0.438961E-01
2003	0.121000E+01	0.158262E+01	-0.268458E+00
2004	0.450900E+00	0.766086E+00	-0.530049E+00
2005	0.113000E+01	0.495066E+00	0.825282E+00
2006	0.163200E+01	0.990790E+00	0.499058E+00
2007	0.387800E+00	0.499696E+00	-0.253509E+00

Survey Index: 38 Tag: sp_canpo AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.127116E-02 % Variance Contribution = 1.1678
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.160209E+01	N/A
1979	N/A	0.206396E+01	N/A
1980	N/A	0.289801E+01	N/A
1981	N/A	0.439117E+01	N/A
1982	N/A	0.824664E+00	N/A
1983	N/A	0.256264E+01	N/A
1984	N/A	0.161894E+01	N/A
1985	N/A	0.116407E+01	N/A
1986	N/A	0.213128E+01	N/A
1987	N/A	0.826235E+00	N/A
1988	N/A	0.615865E+00	N/A
1989	N/A	0.146740E+01	N/A
1990	N/A	0.808406E+00	N/A
1991	N/A	0.249798E+01	N/A
1992	N/A	0.105699E+01	N/A
1993	N/A	0.108433E+01	N/A
1994	N/A	0.240131E+00	N/A
1995	0.190000E+00	0.153598E+00	0.212688E+00
1996	0.790000E+00	0.469147E+00	0.521117E+00
1997	0.270000E+00	0.343162E+00	-0.239780E+00
1998	0.280000E+00	0.797411E+00	-0.104658E+01
1999	0.260000E+00	0.356899E+00	-0.316770E+00
2000	0.780000E+00	0.282760E+00	0.101469E+01
2001	0.520000E+00	0.507963E+00	0.234198E-01
2002	0.122000E+01	0.930918E+00	0.270435E+00
2003	0.320000E+00	0.406484E+00	-0.239223E+00
2004	0.387600E+00	0.793197E+00	-0.716098E+00

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2005     0.510000E+00     0.436310E+00     0.156058E+00
2006     0.698000E+00     0.405763E+00     0.542450E+00
2007     0.604800E+00     0.725825E+00    -0.182412E+00

Survey Index:   39 Tag:         sp_canpo AGE =  7
Time = JAN-1           Type = NUMBER
Catchability =    0.118307E-02   % Variance Contribution =     2.6091
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.145878E+01     N/A
1979     N/A              0.103066E+01     N/A
1980     N/A              0.109494E+01     N/A
1981     N/A              0.116865E+01     N/A
1982     N/A              0.185800E+01     N/A
1983     N/A              0.314440E+00     N/A
1984     N/A              0.116187E+01     N/A
1985     N/A              0.641332E+00     N/A
1986     N/A              0.364111E+00     N/A
1987     N/A              0.971911E+00     N/A
1988     N/A              0.364872E+00     N/A
1989     N/A              0.232877E+00     N/A
1990     N/A              0.553851E+00     N/A
1991     N/A              0.371580E+00     N/A
1992     N/A              0.758322E+00     N/A
1993     N/A              0.334609E+00     N/A
1994     N/A              0.264349E+00     N/A
1995     0.400000E-01     0.801186E-01    -0.694628E+00
1996     0.330000E+00     0.733260E-01     0.150418E+01
1997     0.600000E-01     0.163563E+00    -0.100285E+01
1998     0.700000E-01     0.105984E+00    -0.414796E+00
1999     0.150000E+00     0.306295E+00    -0.713915E+00
2000     0.400000E+00     0.138961E+00     0.105727E+01
2001     0.260000E+00     0.122275E+00     0.754410E+00
2002     0.400000E+00     0.196432E+00     0.711148E+00
2003     0.340000E+00     0.317679E+00     0.679051E-01
2004     0.738000E-01     0.145156E+00    -0.676453E+00
2005     0.410000E+00     0.278728E+00     0.385920E+00
2006     0.201000E+00     0.220055E+00    -0.905715E-01
2007     0.963000E-01     0.233945E+00    -0.887616E+00

Survey Index:   40 Tag:         sp_canpo AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.121385E-02   % Variance Contribution =     3.2187
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     N/A              0.971199E-01     N/A
1979     N/A              0.962476E+00     N/A
1980     N/A              0.691511E+00     N/A
1981     N/A              0.466397E+00     N/A
1982     N/A              0.529132E+00     N/A
1983     N/A              0.793881E+00     N/A
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1984	N/A	0.161295E+00	N/A
1985	N/A	0.487899E+00	N/A
1986	N/A	0.249396E+00	N/A
1987	N/A	0.212639E+00	N/A
1988	N/A	0.514731E+00	N/A
1989	N/A	0.143741E+00	N/A
1990	N/A	0.107202E+00	N/A
1991	N/A	0.216807E+00	N/A
1992	N/A	0.158978E+00	N/A
1993	N/A	0.253584E+00	N/A
1994	N/A	0.895149E-01	N/A
1995	0.500000E-01	0.649587E-01	-0.261728E+00
1996	0.800000E-01	0.439745E-01	0.598416E+00
1997	0.300000E-01	0.421052E-01	-0.338974E+00
1998	0.200000E-01	0.361349E-01	-0.591528E+00
1999	0.100000E-01	0.453948E-01	-0.151281E+01
2000	0.240000E+00	0.102036E+00	0.855312E+00
2001	0.170000E+00	0.664524E-01	0.939312E+00
2002	0.170000E+00	0.434955E-01	0.136314E+01
2003	0.160000E+00	0.734153E-01	0.779041E+00
2004	0.117500E+00	0.112923E+00	0.397329E-01
2005	0.100000E-01	0.426222E-01	-0.144979E+01
2006	0.185000E+00	0.141422E+00	0.268606E+00
2007	0.757000E-01	0.150733E+00	-0.688729E+00

Survey Index: 41 Tag: us0autpr AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.113918E-04 % Variance Contribution = 3.2650
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.151600E+00	0.327020E+00	-0.768777E+00
1979	0.395300E+00	0.295559E+00	0.290777E+00
1980	0.114500E+00	0.261012E+00	-0.823990E+00
1981	0.279700E+00	0.522735E+00	-0.625357E+00
1982	0.261000E+00	0.226298E+00	0.142666E+00
1983	0.362000E+00	0.128795E+00	0.103343E+01
1984	0.128290E+01	0.330640E+00	0.135585E+01
1985	0.179100E+00	0.109506E+00	0.491966E+00
1986	0.100190E+01	0.506940E+00	0.681260E+00
1987	0.761000E-01	0.203837E+00	-0.985274E+00
1988	0.203700E+00	0.282988E+00	-0.328755E+00
1989	0.549500E+00	0.203130E+00	0.995162E+00
1990	0.250800E+00	0.115618E+00	0.774360E+00
1991	0.157100E+00	0.219929E+00	-0.336424E+00
1992	0.405000E-01	0.843762E-01	-0.733984E+00
1993	0.351000E-01	0.112292E+00	-0.116290E+01
1994	N/A	0.718925E-01	N/A
1995	N/A	0.447699E-01	N/A
1996	N/A	0.761056E-01	N/A
1997	N/A	0.121547E+00	N/A
1998	N/A	0.570192E-01	N/A
1999	N/A	0.143190E+00	N/A
2000	N/A	0.731106E-01	N/A
2001	N/A	0.307704E-01	N/A
2002	N/A	0.536328E-01	N/A

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2003     N/A              0.239035E-01     N/A
2004     N/A              0.126745E+00     N/A
2005     N/A              0.262063E-01     N/A
2006     N/A              0.114453E+00     N/A
2007     N/A              0.102031E+00     N/A

Survey Index:   42 Tag:         us1autpr AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.568085E-04   % Variance Contribution =     1.5692
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     0.236800E+00     0.267413E+00    -0.121580E+00
1979     0.184540E+01     0.132739E+01     0.329483E+00
1980     0.162510E+01     0.119239E+01     0.309608E+00
1981     0.819900E+00     0.104823E+01    -0.245673E+00
1982     0.352500E+01     0.207170E+01     0.531510E+00
1983     0.577300E+00     0.884175E+00    -0.426293E+00
1984     0.849500E+00     0.493745E+00     0.542628E+00
1985     0.190910E+01     0.133553E+01     0.357300E+00
1986     0.181300E+00     0.438062E+00    -0.882207E+00
1987     0.227890E+01     0.203033E+01     0.115494E+00
1988     0.413700E+00     0.826904E+00    -0.692547E+00
1989     0.874700E+00     0.113872E+01    -0.263777E+00
1990     0.279840E+01     0.783641E+00     0.127285E+01
1991     0.363600E+00     0.468366E+00    -0.253195E+00
1992     0.407600E+00     0.884091E+00    -0.774274E+00
1993     0.412400E+00     0.337418E+00     0.200672E+00
1994     N/A              0.443121E+00     N/A
1995     N/A              0.288850E+00     N/A
1996     N/A              0.181160E+00     N/A
1997     N/A              0.307405E+00     N/A
1998     N/A              0.489796E+00     N/A
1999     N/A              0.229561E+00     N/A
2000     N/A              0.582277E+00     N/A
2001     N/A              0.292687E+00     N/A
2002     N/A              0.125032E+00     N/A
2003     N/A              0.217833E+00     N/A
2004     N/A              0.967346E-01     N/A
2005     N/A              0.514807E+00     N/A
2006     N/A              0.106383E+00     N/A
2007     N/A              0.465686E+00     N/A

Survey Index:   43 Tag:         us2autpr AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.842080E-04   % Variance Contribution =     1.9055
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     0.343350E+01     0.213321E+01     0.475952E+00
1979     0.391200E+00     0.292884E+00     0.289442E+00
1980     0.167700E+01     0.144066E+01     0.151903E+00
1981     0.563600E+00     0.112602E+01    -0.692100E+00
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1982	0.225000E+01	0.975976E+00	0.835248E+00
1983	0.190950E+01	0.172377E+01	0.102328E+00
1984	0.108930E+01	0.681836E+00	0.468502E+00
1985	0.681800E+00	0.481910E+00	0.346978E+00
1986	0.842600E+00	0.105858E+01	-0.228192E+00
1987	0.128500E+00	0.410895E+00	-0.116241E+01
1988	0.135280E+01	0.186165E+01	-0.319289E+00
1989	0.437000E+00	0.825207E+00	-0.635701E+00
1990	0.104640E+01	0.118405E+01	-0.123583E+00
1991	0.162440E+01	0.532058E+00	0.111614E+01
1992	0.175200E+00	0.421695E+00	-0.878355E+00
1993	0.948900E+00	0.736692E+00	0.253134E+00
1994	N/A	0.293381E+00	N/A
1995	N/A	0.491825E+00	N/A
1996	N/A	0.301277E+00	N/A
1997	N/A	0.198049E+00	N/A
1998	N/A	0.321156E+00	N/A
1999	N/A	0.524693E+00	N/A
2000	N/A	0.251730E+00	N/A
2001	N/A	0.635124E+00	N/A
2002	N/A	0.300630E+00	N/A
2003	N/A	0.145452E+00	N/A
2004	N/A	0.249236E+00	N/A
2005	N/A	0.111426E+00	N/A
2006	N/A	0.597792E+00	N/A
2007	N/A	0.124032E+00	N/A

Survey Index: 44 Tag: us3autpr AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.915080E-04 % Variance Contribution = 2.7763
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	0.690800E+00	0.702680E+00	-0.170519E-01
1979	0.405770E+01	0.123239E+01	0.119166E+01
1980	0.162100E+00	0.182221E+00	-0.117008E+00
1981	0.773900E+00	0.793373E+00	-0.248512E-01
1982	0.155900E+01	0.613326E+00	0.932903E+00
1983	0.241800E+00	0.505043E+00	-0.736533E+00
1984	0.740200E+00	0.817551E+00	-0.993927E-01
1985	0.928700E+00	0.321502E+00	0.106078E+01
1986	0.667000E-01	0.188803E+00	-0.104050E+01
1987	0.329000E+00	0.566710E+00	-0.543790E+00
1988	0.108000E+00	0.241165E+00	-0.803350E+00
1989	0.903800E+00	0.970671E+00	-0.713796E-01
1990	0.161100E+00	0.485206E+00	-0.110255E+01
1991	0.181410E+01	0.613234E+00	0.108460E+01
1992	0.274200E+00	0.189478E+00	0.369586E+00
1993	0.174300E+00	0.189407E+00	-0.831184E-01
1994	N/A	0.294085E+00	N/A
1995	N/A	0.134996E+00	N/A
1996	N/A	0.320198E+00	N/A
1997	N/A	0.186982E+00	N/A
1998	N/A	0.114703E+00	N/A
1999	N/A	0.178282E+00	N/A
2000	N/A	0.301051E+00	N/A

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2001     N/A              0.163057E+00     N/A
2002     N/A              0.346380E+00     N/A
2003     N/A              0.174769E+00     N/A
2004     N/A              0.962246E-01     N/A
2005     N/A              0.180476E+00     N/A
2006     N/A              0.826988E-01     N/A
2007     N/A              0.463662E+00     N/A

Survey Index:   45 Tag:         us4autpr AGE =  5
Time = JAN-1           Type = NUMBER
Catchability =    0.685152E-04   % Variance Contribution =     4.9434
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     0.252800E+00     0.203218E+00     0.218321E+00
1979     0.963600E+00     0.281433E+00     0.123078E+01
1980     0.168650E+01     0.473882E+00     0.126945E+01
1981     0.525000E-01     0.781749E-01    -0.398135E+00
1982     0.589000E+00     0.321277E+00     0.606123E+00
1983     0.678000E-01     0.193063E+00    -0.104645E+01
1984     0.691000E-01     0.145744E+00    -0.746294E+00
1985     0.825100E+00     0.296945E+00     0.102196E+01
1986     0.105500E+00     0.937488E-01     0.118092E+00
1987     0.820000E-02     0.630329E-01    -0.203952E+01
1988     0.200300E+00     0.214161E+00    -0.669134E-01
1989     0.600000E-01     0.820016E-01    -0.312394E+00
1990     0.507100E+00     0.334219E+00     0.416913E+00
1991     0.412400E+00     0.176923E+00     0.846282E+00
1992     0.305000E-01     0.182725E+00    -0.179026E+01
1993     0.100000E+00     0.510661E-01     0.672049E+00
1994     N/A              0.415611E-01     N/A
1995     N/A              0.594747E-01     N/A
1996     N/A              0.417681E-01     N/A
1997     N/A              0.118352E+00     N/A
1998     N/A              0.522645E-01     N/A
1999     N/A              0.400089E-01     N/A
2000     N/A              0.570980E-01     N/A
2001     N/A              0.113569E+00     N/A
2002     N/A              0.539110E-01     N/A
2003     N/A              0.120083E+00     N/A
2004     N/A              0.581276E-01     N/A
2005     N/A              0.375637E-01     N/A
2006     N/A              0.751773E-01     N/A
2007     N/A              0.379149E-01     N/A

Survey Index:   46 Tag:         us5autpr AGE =  6
Time = JAN-1           Type = NUMBER
Catchability =    0.735534E-04   % Variance Contribution =     2.0294
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------

1978     0.173100E+00     0.927022E-01     0.624478E+00
1979     0.335500E+00     0.119428E+00     0.103291E+01
```

1980	0.320600E+00	0.167688E+00	0.648086E+00
1981	0.264800E+00	0.254088E+00	0.412957E-01
1982	0.540000E-01	0.477178E-01	0.123679E+00
1983	0.115200E+00	0.148283E+00	-0.252451E+00
1984	0.328000E-01	0.936772E-01	-0.104943E+01
1985	0.242000E-01	0.673571E-01	-0.102366E+01
1986	0.766000E-01	0.123323E+00	-0.476211E+00
1987	0.487000E-01	0.478087E-01	0.184713E-01
1988	0.280000E-01	0.356360E-01	-0.241152E+00
1989	0.193700E+00	0.849086E-01	0.824735E+00
1990	0.547000E-01	0.467770E-01	0.156471E+00
1991	0.285500E+00	0.144541E+00	0.680678E+00
1992	0.290000E-01	0.611611E-01	-0.746216E+00
1993	0.437000E-01	0.627427E-01	-0.361694E+00
1994	N/A	0.138948E-01	N/A
1995	N/A	0.888766E-02	N/A
1996	N/A	0.271464E-01	N/A
1997	N/A	0.198565E-01	N/A
1998	N/A	0.461408E-01	N/A
1999	N/A	0.206513E-01	N/A
2000	N/A	0.163614E-01	N/A
2001	N/A	0.293924E-01	N/A
2002	N/A	0.538660E-01	N/A
2003	N/A	0.235205E-01	N/A
2004	N/A	0.458970E-01	N/A
2005	N/A	0.252463E-01	N/A
2006	N/A	0.234788E-01	N/A
2007	N/A	0.419987E-01	N/A

Survey Index: 47 Tag: us0autpo AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.108642E-04 % Variance Contribution = 5.7026
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.311873E+00	N/A
1979	N/A	0.281869E+00	N/A
1980	N/A	0.248922E+00	N/A
1981	N/A	0.498522E+00	N/A
1982	N/A	0.215817E+00	N/A
1983	N/A	0.122829E+00	N/A
1984	N/A	0.315325E+00	N/A
1985	N/A	0.104434E+00	N/A
1986	N/A	0.483459E+00	N/A
1987	N/A	0.194396E+00	N/A
1988	N/A	0.269880E+00	N/A
1989	N/A	0.193721E+00	N/A
1990	N/A	0.110263E+00	N/A
1991	N/A	0.209742E+00	N/A
1992	N/A	0.804680E-01	N/A
1993	N/A	0.107091E+00	N/A
1994	0.178400E+00	0.685625E-01	0.956283E+00
1995	0.668000E-01	0.426962E-01	0.447594E+00
1996	0.159900E+00	0.725804E-01	0.789854E+00
1997	0.216000E-01	0.115917E+00	-0.168018E+01
1998	0.640000E-02	0.543781E-01	-0.213966E+01

1999	0.701000E-01	0.136558E+00	-0.666824E+00
2000	0.701000E-01	0.697241E-01	0.537612E-02
2001	0.195000E-01	0.293452E-01	-0.408713E+00
2002	0.280000E-01	0.511486E-01	-0.602530E+00
2003	0.234000E+00	0.227963E-01	0.232872E+01
2004	0.326900E+00	0.120874E+00	0.994902E+00
2005	0.500000E-01	0.249925E-01	0.693448E+00
2006	0.521000E-01	0.109152E+00	-0.739574E+00
2007	0.994000E-01	0.973047E-01	0.213046E-01

Survey Index: 48 Tag: us1autpo AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.419238E-04 % Variance Contribution = 6.6861
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.197347E+00	N/A
1979	N/A	0.979594E+00	N/A
1980	N/A	0.879968E+00	N/A
1981	N/A	0.773577E+00	N/A
1982	N/A	0.152889E+01	N/A
1983	N/A	0.652509E+00	N/A
1984	N/A	0.364377E+00	N/A
1985	N/A	0.985605E+00	N/A
1986	N/A	0.323284E+00	N/A
1987	N/A	0.149836E+01	N/A
1988	N/A	0.610243E+00	N/A
1989	N/A	0.840358E+00	N/A
1990	N/A	0.578316E+00	N/A
1991	N/A	0.345647E+00	N/A
1992	N/A	0.652447E+00	N/A
1993	N/A	0.249010E+00	N/A
1994	0.969900E+00	0.327017E+00	0.108718E+01
1995	0.405600E+00	0.213167E+00	0.643292E+00
1996	0.244700E+00	0.133693E+00	0.604484E+00
1997	0.239900E+00	0.226860E+00	0.558879E-01
1998	0.236200E+00	0.361462E+00	-0.425479E+00
1999	0.335500E+00	0.169413E+00	0.683283E+00
2000	0.139700E+00	0.429712E+00	-0.112362E+01
2001	0.571000E+00	0.215999E+00	0.972115E+00
2002	0.470000E-01	0.922719E-01	-0.674592E+00
2003	0.478000E+00	0.160757E+00	0.108971E+01
2004	0.166300E+00	0.713888E-01	0.845653E+00
2005	0.100000E-01	0.379920E+00	-0.363738E+01
2006	0.553000E-01	0.785095E-01	-0.350446E+00
2007	0.432500E+00	0.343669E+00	0.229902E+00

Survey Index: 49 Tag: us2autpo AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.121708E-03 % Variance Contribution = 1.6865
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.308318E+01	N/A
1979	N/A	0.423312E+00	N/A
1980	N/A	0.208222E+01	N/A
1981	N/A	0.162746E+01	N/A
1982	N/A	0.141060E+01	N/A
1983	N/A	0.249140E+01	N/A
1984	N/A	0.985472E+00	N/A
1985	N/A	0.696516E+00	N/A
1986	N/A	0.152999E+01	N/A
1987	N/A	0.593876E+00	N/A
1988	N/A	0.269069E+01	N/A
1989	N/A	0.119269E+01	N/A
1990	N/A	0.171133E+01	N/A
1991	N/A	0.768995E+00	N/A
1992	N/A	0.609485E+00	N/A
1993	N/A	0.106476E+01	N/A
1994	0.531600E+00	0.424030E+00	0.226088E+00
1995	0.664300E+00	0.710846E+00	-0.677215E-01
1996	0.181060E+01	0.435442E+00	0.142505E+01
1997	0.195800E+00	0.286245E+00	-0.379754E+00
1998	0.320900E+00	0.464173E+00	-0.369129E+00
1999	0.102620E+01	0.758350E+00	0.302472E+00
2000	0.154200E+00	0.363830E+00	-0.858437E+00
2001	0.537800E+00	0.917958E+00	-0.534665E+00
2002	0.381000E+00	0.434507E+00	-0.131413E+00
2003	0.707000E+00	0.210225E+00	0.121285E+01
2004	0.309200E+00	0.360226E+00	-0.152744E+00
2005	0.135800E+00	0.161046E+00	-0.170506E+00
2006	0.579400E+00	0.864002E+00	-0.399582E+00
2007	0.161800E+00	0.179266E+00	-0.102510E+00

Survey Index: 50 Tag: us3autpo AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.166950E-03 % Variance Contribution = 2.2873
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.128199E+01	N/A
1979	N/A	0.224841E+01	N/A
1980	N/A	0.332449E+00	N/A
1981	N/A	0.144745E+01	N/A
1982	N/A	0.111897E+01	N/A
1983	N/A	0.921414E+00	N/A
1984	N/A	0.149156E+01	N/A
1985	N/A	0.586557E+00	N/A
1986	N/A	0.344458E+00	N/A
1987	N/A	0.103392E+01	N/A

1988	N/A	0.439988E+00	N/A
1989	N/A	0.177092E+01	N/A
1990	N/A	0.885223E+00	N/A
1991	N/A	0.111880E+01	N/A
1992	N/A	0.345688E+00	N/A
1993	N/A	0.345558E+00	N/A
1994	0.382600E+00	0.536537E+00	-0.338145E+00
1995	0.433400E+00	0.246291E+00	0.565148E+00
1996	0.124850E+01	0.584177E+00	0.759495E+00
1997	0.414400E+00	0.341136E+00	0.194552E+00
1998	0.109300E+00	0.209267E+00	-0.649515E+00
1999	0.351800E+00	0.325262E+00	0.784328E-01
2000	0.309600E+00	0.549246E+00	-0.573265E+00
2001	0.705000E-01	0.297485E+00	-0.143975E+01
2002	0.459000E+00	0.631945E+00	-0.319753E+00
2003	0.139600E+01	0.318852E+00	0.147664E+01
2004	0.200500E+00	0.175555E+00	0.132864E+00
2005	0.710100E+00	0.329265E+00	0.768543E+00
2006	0.128900E+00	0.150878E+00	-0.157433E+00
2007	0.514200E+00	0.845916E+00	-0.497808E+00

Survey Index: 51 Tag: us4autpo AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.133413E-03 % Variance Contribution = 3.7127
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.395707E+00	N/A
1979	N/A	0.548008E+00	N/A
1980	N/A	0.922747E+00	N/A
1981	N/A	0.152223E+00	N/A
1982	N/A	0.625592E+00	N/A
1983	N/A	0.375933E+00	N/A
1984	N/A	0.283793E+00	N/A
1985	N/A	0.578214E+00	N/A
1986	N/A	0.182548E+00	N/A
1987	N/A	0.122738E+00	N/A
1988	N/A	0.417016E+00	N/A
1989	N/A	0.159674E+00	N/A
1990	N/A	0.650792E+00	N/A
1991	N/A	0.344505E+00	N/A
1992	N/A	0.355804E+00	N/A
1993	N/A	0.994362E-01	N/A
1994	0.165000E-01	0.809280E-01	-0.159020E+01
1995	0.153400E+00	0.115809E+00	0.281103E+00
1996	0.872000E-01	0.813310E-01	0.696769E-01
1997	0.143000E+00	0.230455E+00	-0.477210E+00
1998	0.129200E+00	0.101770E+00	0.238649E+00
1999	0.411000E-01	0.779055E-01	-0.639489E+00
2000	0.254900E+00	0.111181E+00	0.829707E+00
2001	0.788000E-01	0.221142E+00	-0.103189E+01
2002	0.590000E-01	0.104976E+00	-0.576193E+00
2003	0.162700E+01	0.233826E+00	0.193992E+01
2004	0.155600E+00	0.113186E+00	0.318252E+00

2005	0.252000E+00	0.731442E-01	0.123700E+01
2006	0.175600E+00	0.146386E+00	0.181964E+00
2007	0.338000E-01	0.738282E-01	-0.781280E+00

Survey Index: 52 Tag: us5autpo AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.181906E-03 % Variance Contribution = 2.7307
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1978	N/A	0.229263E+00	N/A
1979	N/A	0.295357E+00	N/A
1980	N/A	0.414712E+00	N/A
1981	N/A	0.628387E+00	N/A
1982	N/A	0.118011E+00	N/A
1983	N/A	0.366719E+00	N/A
1984	N/A	0.231674E+00	N/A
1985	N/A	0.166582E+00	N/A
1986	N/A	0.304992E+00	N/A
1987	N/A	0.118236E+00	N/A
1988	N/A	0.881318E-01	N/A
1989	N/A	0.209988E+00	N/A
1990	N/A	0.115685E+00	N/A
1991	N/A	0.357466E+00	N/A
1992	N/A	0.151258E+00	N/A
1993	N/A	0.155170E+00	N/A
1994	0.253000E-01	0.343633E-01	-0.306185E+00
1995	0.679000E-01	0.219802E-01	0.112790E+01
1996	0.541000E-01	0.671360E-01	-0.215886E+00
1997	0.597000E-01	0.491072E-01	0.195325E+00
1998	0.486000E-01	0.114111E+00	-0.853552E+00
1999	0.354000E-01	0.510730E-01	-0.366545E+00
2000	0.871000E-01	0.404637E-01	0.766652E+00
2001	0.306000E-01	0.726907E-01	-0.865214E+00
2002	0.550000E-01	0.133217E+00	-0.884643E+00
2003	0.118000E+00	0.581688E-01	0.707336E+00
2004	0.824000E-01	0.113508E+00	-0.320291E+00
2005	0.321500E+00	0.624370E-01	0.163884E+01
2006	0.259000E-01	0.580656E-01	-0.807331E+00
2007	0.124800E+00	0.103867E+00	0.183598E+00

Retrospective Summary

Average Fishing Mortality
Ages = 5 - 8

	1978	1979	1980	1981	1982
1996	0.2962	0.3798	0.4890	0.5482	0.6749
1997	0.2962	0.3798	0.4890	0.5482	0.6749
1998	0.2962	0.3798	0.4890	0.5482	0.6749
1999	0.2962	0.3798	0.4890	0.5482	0.6749
2000	0.2962	0.3798	0.4890	0.5482	0.6749
2001	0.2962	0.3798	0.4890	0.5482	0.6749
2002	0.2962	0.3798	0.4890	0.5482	0.6749
2003	0.2962	0.3798	0.4890	0.5482	0.6749
2004	0.2962	0.3798	0.4890	0.5482	0.6749
2005	0.2962	0.3798	0.4890	0.5482	0.6749
2006	0.2962	0.3798	0.4890	0.5482	0.6749

	1983	1984	1985	1986	1987
1996	0.4885	0.6628	0.7930	0.4726	0.4697
1997	0.4885	0.6629	0.7931	0.4728	0.4700
1998	0.4885	0.6629	0.7931	0.4728	0.4700
1999	0.4885	0.6628	0.7931	0.4728	0.4700
2000	0.4885	0.6628	0.7931	0.4728	0.4700
2001	0.4885	0.6629	0.7931	0.4728	0.4700
2002	0.4885	0.6629	0.7931	0.4728	0.4700
2003	0.4885	0.6629	0.7931	0.4728	0.4700
2004	0.4885	0.6629	0.7931	0.4728	0.4700
2005	0.4885	0.6629	0.7931	0.4728	0.4700
2006	0.4885	0.6629	0.7931	0.4728	0.4700

	1988	1989	1990	1991	1992
1996	0.7677	0.5925	0.5833	0.8231	0.7860
1997	0.7686	0.5939	0.5858	0.8299	0.8000
1998	0.7686	0.5940	0.5860	0.8303	0.8009
1999	0.7685	0.5939	0.5857	0.8297	0.7996
2000	0.7685	0.5938	0.5857	0.8296	0.7996
2001	0.7685	0.5939	0.5857	0.8298	0.7998
2002	0.7685	0.5939	0.5858	0.8298	0.7999
2003	0.7685	0.5939	0.5858	0.8298	0.7999
2004	0.7685	0.5939	0.5858	0.8298	0.7999
2005	0.7685	0.5939	0.5858	0.8298	0.7999
2006	0.7685	0.5939	0.5858	0.8298	0.7999

	1993	1994	1995	1996	1997
1996	1.1371	1.0232	0.3759	0.3468	
1997	1.1924	1.2187	0.5225	0.5526	1.0138
1998	1.1971	1.2257	0.5309	0.5772	1.0912
1999	1.1901	1.2095	0.5158	0.5446	0.9625

2000	1.1890	1.2074	0.5144	0.5458	0.9599
2001	1.1904	1.2110	0.5172	0.5494	0.9757
2002	1.1908	1.2126	0.5189	0.5528	0.9893
2003	1.1906	1.2120	0.5184	0.5519	0.9854
2004	1.1906	1.2120	0.5184	0.5519	0.9855
2005	1.1906	1.2120	0.5184	0.5520	0.9859
2006	1.1907	1.2122	0.5186	0.5523	0.9869

	1998	1999	2000	2001	2002
1996					
1997					
1998	0.9530				
1999	0.7091	0.7473			
2000	0.7127	0.7515	0.4693		
2001	0.7355	0.7854	0.5262	0.5856	
2002	0.7639	0.8583	0.6050	0.7538	0.8786
2003	0.7564	0.8423	0.5824	0.6976	0.7513
2004	0.7567	0.8421	0.5811	0.6984	0.7504
2005	0.7569	0.8444	0.5848	0.7050	0.7515
2006	0.7590	0.8488	0.5912	0.7191	0.7882

	2003	2004	2005	2006
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003	0.7120			
2004	0.7207	0.7858		
2005	0.7256	0.6988	0.3481	
2006	0.7905	0.8707	0.5181	0.3120

Spawning Stock Biomass

	1978	1979	1980	1981	1982
1996	79431.	86495.	87892.	84383.	85952.
1997	79430.	86495.	87891.	84382.	85949.
1998	79430.	86495.	87891.	84381.	85949.
1999	79430.	86495.	87891.	84382.	85949.
2000	79430.	86495.	87891.	84382.	85949.
2001	79430.	86495.	87891.	84382.	85949.
2002	79430.	86495.	87891.	84382.	85949.
2003	79430.	86495.	87891.	84382.	85949.
2004	79430.	86495.	87891.	84382.	85949.
2005	79430.	86495.	87891.	84382.	85949.
2006	79430.	86495.	87891.	84382.	85949.

	1983	1984	1985	1986	1987

1996	82721.	67140.	55849.	54445.	65124.
1997	82717.	67134.	55839.	54425.	65081.
1998	82716.	67133.	55839.	54423.	65078.
1999	82717.	67134.	55840.	54425.	65082.
2000	82717.	67134.	55840.	54426.	65083.
2001	82717.	67134.	55840.	54425.	65082.
2002	82717.	67134.	55840.	54425.	65082.
2003	82717.	67134.	55840.	54425.	65082.
2004	82717.	67134.	55840.	54425.	65082.
2005	82717.	67134.	55840.	54425.	65082.
2006	82717.	67134.	55840.	54425.	65082.

	1988	1989	1990	1991	1992
1996	72319.	63920.	66554.	51609.	38485.
1997	72239.	63796.	66342.	51240.	37695.
1998	72235.	63789.	66327.	51217.	37663.
1999	72242.	63799.	66348.	51252.	37718.
2000	72243.	63800.	66349.	51255.	37722.
2001	72241.	63798.	66346.	51249.	37712.
2002	72241.	63797.	66344.	51246.	37705.
2003	72241.	63798.	66344.	51247.	37708.
2004	72241.	63798.	66345.	51247.	37707.
2005	72241.	63797.	66344.	51247.	37707.
2006	72241.	63797.	66344.	51247.	37707.

	1993	1994	1995	1996	1997
1996	29985.	20972.	20594.	23745.	
1997	28590.	18909.	18036.	20642.	19642.
1998	28513.	18707.	17389.	19045.	17758.
1999	28616.	18983.	18030.	20051.	19988.
2000	28612.	18995.	18179.	20167.	19562.
2001	28599.	18955.	18026.	19969.	19452.
2002	28586.	18934.	17990.	19808.	19023.
2003	28589.	18941.	18014.	19856.	19104.
2004	28589.	18941.	18012.	19852.	19113.
2005	28589.	18940.	18010.	19851.	19096.
2006	28588.	18938.	18005.	19839.	19071.

	1998	1999	2000	2001	2002
1996					
1997					
1998	16238.				
1999	20785.	22347.			
2000	19173.	19513.	16663.		
2001	19446.	20911.	20231.	21081.	
2002	18945.	20776.	21567.	25495.	21222.
2003	19192.	21384.	22474.	26736.	23079.
2004	19200.	21319.	22271.	26290.	22776.
2005	19159.	21320.	22266.	25896.	21770.
2006	19094.	21161.	21998.	25497.	20898.

	2003	2004	2005	2006

1996					
1997					
1998					
1999					
2000					
2001					
2002					
2003	17777.				
2004	18086.	16039.			
2005	16754.	14806.	15100.		
2006	15450.	13027.	12737.	17622.	

Total Population Numbers

	1978	1979	1980	1981	1982
1996	72184.	73820.	74109.	92925.	82333.
1997	72183.	73819.	74109.	92923.	82330.
1998	72183.	73819.	74108.	92923.	82330.
1999	72183.	73819.	74109.	92923.	82330.
2000	72183.	73819.	74109.	92923.	82330.
2001	72183.	73819.	74109.	92923.	82330.
2002	72183.	73819.	74109.	92923.	82330.
2003	72183.	73819.	74109.	92923.	82330.
2004	72183.	73819.	74109.	92923.	82330.
2005	72183.	73819.	74109.	92923.	82330.
2006	72183.	73819.	74109.	92923.	82330.

	1983	1984	1985	1986	1987
1996	59094.	59930.	48803.	70675.	67511.
1997	59091.	59924.	48790.	70632.	67452.
1998	59091.	59923.	48788.	70631.	67450.
1999	59091.	59924.	48790.	70634.	67454.
2000	59091.	59924.	48790.	70635.	67454.
2001	59091.	59924.	48790.	70634.	67453.
2002	59091.	59924.	48790.	70634.	67453.
2003	59091.	59924.	48790.	70634.	67453.
2004	59091.	59924.	48790.	70634.	67453.
2005	59091.	59924.	48790.	70634.	67453.
2006	59091.	59924.	48790.	70634.	67453.

	1988	1989	1990	1991	1992
1996	68783.	61271.	49844.	46505.	35506.
1997	68683.	61153.	49504.	45712.	34445.
1998	68675.	61139.	49500.	45687.	34325.
1999	68685.	61158.	49520.	45720.	34449.
2000	68683.	61161.	49524.	45719.	34419.
2001	68683.	61157.	49519.	45715.	34416.
2002	68681.	61156.	49517.	45707.	34402.
2003	68682.	61157.	49518.	45709.	34404.

2004	68682.	61157.	49518.	45708.	34405.
2005	68682.	61157.	49518.	45708.	34404.
2006	68682.	61157.	49518.	45708.	34403.

	1993	1994	1995	1996	1997
1996	29449.	24234.	18462.	17603.	17583.
1997	28479.	22970.	17723.	17850.	18609.
1998	28209.	21660.	16908.	17272.	19104.
1999	28759.	22019.	17802.	19596.	23407.
2000	28942.	22150.	17705.	18388.	21674.
2001	28802.	21990.	17728.	18415.	22452.
2002	28796.	21935.	17438.	18037.	22415.
2003	28813.	21965.	17476.	18064.	22853.
2004	28811.	21962.	17468.	18120.	22782.
2005	28810.	21965.	17467.	18074.	22747.
2006	28806.	21956.	17459.	18050.	22673.

	1998	1999	2000	2001	2002
1996					
1997	12905.				
1998	14582.	19672.			
1999	19274.	21425.	22711.		
2000	17287.	18201.	16283.	12528.	
2001	19231.	22739.	20433.	15326.	9795.
2002	19795.	26204.	24796.	19679.	13867.
2003	20337.	26716.	25728.	21028.	15638.
2004	20257.	26345.	25524.	21332.	17174.
2005	20416.	26085.	24756.	20300.	16886.
2006	20222.	25968.	24218.	19430.	16020.

	2003	2004	2005	2006	2007
1996					
1997					
1998					
1999					
2000					
2001					
2002	12864.				
2003	12619.	47135.			
2004	13581.	21982.	18082.		
2005	13170.	20563.	17038.	19639.	
2006	11990.	18561.	15862.	21668.	25226.

Age 1 Population

	1978	1979	1980	1981	1982
1996	28707.	25945.	22912.	45888.	19866.
1997	28707.	25945.	22912.	45887.	19865.
1998	28707.	25945.	22912.	45887.	19865.

1999	28707.	25945.	22912.	45887.	19865.
2000	28707.	25945.	22912.	45887.	19865.
2001	28707.	25945.	22912.	45887.	19865.
2002	28707.	25945.	22912.	45887.	19865.
2003	28707.	25945.	22912.	45887.	19865.
2004	28707.	25945.	22912.	45887.	19865.
2005	28707.	25945.	22912.	45887.	19865.
2006	28707.	25945.	22912.	45887.	19865.

	1983	1984	1985	1986	1987
1996	11307.	29028.	9620.	44531.	17918.
1997	11306.	29024.	9612.	44499.	17893.
1998	11306.	29024.	9611.	44499.	17893.
1999	11306.	29024.	9613.	44501.	17894.
2000	11306.	29024.	9613.	44501.	17894.
2001	11306.	29024.	9613.	44500.	17893.
2002	11306.	29024.	9613.	44500.	17893.
2003	11306.	29024.	9613.	44500.	17893.
2004	11306.	29024.	9613.	44500.	17893.
2005	11306.	29024.	9613.	44500.	17893.
2006	11306.	29024.	9613.	44500.	17893.

	1988	1989	1990	1991	1992
1996	24895.	17862.	10382.	19836.	7858.
1997	24844.	17827.	10138.	19321.	7445.
1998	24837.	17819.	10147.	19299.	7345.
1999	24844.	17830.	10150.	19316.	7443.
2000	24842.	17834.	10153.	19311.	7413.
2001	24842.	17831.	10150.	19312.	7414.
2002	24841.	17831.	10149.	19305.	7406.
2003	24841.	17831.	10149.	19306.	7407.
2004	24841.	17831.	10149.	19306.	7408.
2005	24841.	17831.	10149.	19306.	7407.
2006	24841.	17831.	10149.	19306.	7407.

	1993	1994	1995	1996	1997
1996	9599.	8069.	3081.	5419.	5942.
1997	9496.	7592.	3364.	6265.	6771.
1998	9324.	6503.	3621.	6353.	7737.
1999	9772.	6413.	4222.	7946.	10138.
2000	9980.	6394.	4017.	6818.	9394.
2001	9842.	6348.	4172.	6825.	10150.
2002	9848.	6298.	3926.	6686.	10422.
2003	9864.	6314.	3940.	6681.	10838.
2004	9861.	6312.	3935.	6744.	10721.
2005	9860.	6316.	3931.	6698.	10724.
2006	9857.	6311.	3930.	6681.	10670.

	1998	1999	2000	2001	2002

1996					
1997	1014.				
1998	2283.	10887.			
1999	3457.	8806.	8629.		
2000	2890.	7207.	4841.	2283.	
2001	4196.	10152.	5278.	1695.	1826.
2002	4790.	13155.	6802.	2476.	2350.
2003	4973.	13224.	7316.	3062.	3021.
2004	4952.	12918.	7415.	3534.	4306.
2005	5139.	12527.	6860.	3130.	4862.
2006	5005.	12570.	6418.	2701.	4708.

2003	2004	2005	2006	2007

1996					
1997					
1998					
1999					
2000					
2001					
2002	4728.				
2003	3044.	39192.			
2004	2747.	13249.	1728.		
2005	2572.	12162.	1842.	7049.	
2006	2098.	11126.	2300.	10047.	8956.

In the Retrospective Analysis
The Following Survey Indices Have Predicted
Index Value Set to Zero in Terminal Year + 1

--- None ---

Plus Group Diagnostic Report

Calculation Method Selected = Backward

Year	Population Backward	Population Forward	F Forward	F Backward	Ratio
1978	44.	44.	0.308033	0.308033	1.000000
1979	122.	131.	0.345280	0.377272	1.092655
1980	39.	102.	0.167061	0.515135	3.083519
1981	172.	255.	0.337151	0.548146	1.625816
1982	192.	340.	0.319231	0.657579	2.059887
1983	298.	274.	0.596914	0.532089	0.891400
1984	283.	210.	1.038485	0.657283	0.632925
1985	182.	221.	0.585268	0.771758	1.318641
1986	76.	122.	0.287504	0.508394	1.768300
1987	76.	151.	0.210250	0.472213	2.245962
1988	105.	154.	0.468825	0.783806	1.671853
1989	54.	114.	0.230877	0.561281	2.431080
1990	89.	145.	0.363309	0.681150	1.874848
1991	48.	104.	0.320622	0.897653	2.799721
1992	19.	79.	0.157268	0.891965	5.671629
1993	34.	77.	0.357741	1.121293	3.134369
1994	10.	63.	0.103767	1.013559	9.767687
1995	4.	62.	0.025588	0.434814	16.992766
1996	1.	60.	0.004660	0.346751	74.412165
1997	21.	70.	N/A	N/A	

APPENDIX A2

Precision Estimates of 2006 Fishing Mortality and Spawning Stock Biomass for Georges Bank Cod

Bootstrap Summary Report

Number of Bootstrap Repetitions Requested = 1000
Number of Bootstrap Repetitions Completed = 1000
Bootstrap Output Variable: Stock Estimates (2007)

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
N 1	8956.	10497.	6786.	0.6465
N 2	8197.	8950.	3876.	0.4331
N 3	1473.	1528.	468.	0.3065
N 4	5067.	5209.	1372.	0.2633
N 5	553.	576.	163.	0.2822
N 6	571.	599.	198.	0.3316
N 7	198.	201.	69.	0.3429
N 8	124.	133.	53.	0.3989

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
N 1	1540.	220.	17.1950	7416.	0.9151
N 2	752.	125.	9.1788	7445.	0.5207
N 3	55.	15.	3.7441	1418.	0.3303
N 4	142.	44.	2.7956	4925.	0.2785
N 5	23.	5.	4.0937	531.	0.3062
N 6	28.	6.	4.8197	543.	0.3652
N 7	3.	2.	1.4759	195.	0.3532
N 8	9.	2.	6.8831	116.	0.4579

	LOWER 80. % CI	UPPER 80. % CI
N 1	4286.	18750.
N 2	4741.	14110.
N 3	982.	2153.
N 4	3587.	7016.
N 5	382.	801.
N 6	367.	855.
N 7	117.	292.
N 8	73.	204.

Bootstrap Output Variable: Catchability Estimates

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
Q 1	0.126603E-04	0.135061E-04	0.496001E-05	0.3672
Q 2	0.712168E-04	0.719236E-04	0.780108E-05	0.1085
Q 3	0.131712E-03	0.134333E-03	0.235574E-04	0.1754
Q 4	0.169502E-03	0.172683E-03	0.319258E-04	0.1849
Q 5	0.214936E-03	0.216195E-03	0.456757E-04	0.2113
Q 6	0.239206E-03	0.240790E-03	0.242771E-04	0.1008
Q 7	0.219598E-03	0.224811E-03	0.407388E-04	0.1812
Q 8	0.265209E-03	0.274061E-03	0.519012E-04	0.1894
Q 9	0.169927E-04	0.171572E-04	0.284858E-05	0.1660
Q 10	0.617127E-04	0.619714E-04	0.640091E-05	0.1033
Q 11	0.145760E-03	0.146614E-03	0.202463E-04	0.1381
Q 12	0.302830E-03	0.310287E-03	0.599746E-04	0.1933
Q 13	0.395248E-03	0.403309E-03	0.825592E-04	0.2047
Q 14	0.399371E-03	0.414976E-03	0.104372E-03	0.2515
Q 15	0.465326E-03	0.475962E-03	0.113141E-03	0.2377
Q 16	0.511558E-03	0.525584E-03	0.122877E-03	0.2338
Q 17	0.109929E-04	0.143364E-04	0.117189E-04	0.8174
Q 18	0.699871E-04	0.714717E-04	0.161228E-04	0.2256
Q 19	0.154559E-03	0.155947E-03	0.369344E-04	0.2368
Q 20	0.137780E-03	0.139302E-03	0.177560E-04	0.1275
Q 21	0.168085E-03	0.171804E-03	0.432900E-04	0.2520
Q 22	0.161445E-03	0.164360E-03	0.283564E-04	0.1725
Q 23	0.232144E-03	0.249889E-03	0.909722E-04	0.3641
Q 24	0.227119E-03	0.267450E-03	0.157334E-03	0.5883
Q 25	0.256432E-04	0.264661E-04	0.840299E-05	0.3175
Q 26	0.133911E-03	0.137292E-03	0.300992E-04	0.2192
Q 27	0.230900E-03	0.232049E-03	0.256896E-04	0.1107
Q 28	0.264575E-03	0.266239E-03	0.324600E-04	0.1219
Q 29	0.412806E-03	0.416664E-03	0.492955E-04	0.1183
Q 30	0.395084E-03	0.407277E-03	0.814845E-04	0.2001
Q 31	0.518829E-03	0.538473E-03	0.156457E-03	0.2906
Q 32	0.644429E-03	0.667766E-03	0.170803E-03	0.2558
Q 33	0.128710E-04	0.134853E-04	0.479611E-05	0.3557
Q 34	0.503937E-04	0.531042E-04	0.151662E-04	0.2856
Q 35	0.244911E-03	0.248650E-03	0.403024E-04	0.1621
Q 36	0.579482E-03	0.591006E-03	0.897924E-04	0.1519
Q 37	0.902988E-03	0.914609E-03	0.132215E-03	0.1446
Q 38	0.127116E-02	0.129649E-02	0.202688E-03	0.1563
Q 39	0.118307E-02	0.122573E-02	0.273981E-03	0.2235
Q 40	0.121385E-02	0.124093E-02	0.317559E-03	0.2559
Q 41	0.113918E-04	0.116938E-04	0.236900E-05	0.2026
Q 42	0.568085E-04	0.572896E-04	0.770473E-05	0.1345
Q 43	0.842080E-04	0.850747E-04	0.127315E-04	0.1497
Q 44	0.915080E-04	0.934906E-04	0.170041E-04	0.1819
Q 45	0.685152E-04	0.701331E-04	0.172302E-04	0.2457
Q 46	0.735534E-04	0.747184E-04	0.113991E-04	0.1526
Q 47	0.108642E-04	0.114001E-04	0.339513E-05	0.2978
Q 48	0.419238E-04	0.435598E-04	0.136539E-04	0.3135
Q 49	0.121708E-03	0.122937E-03	0.209330E-04	0.1703
Q 50	0.166950E-03	0.169454E-03	0.326496E-04	0.1927
Q 51	0.133413E-03	0.136805E-03	0.339187E-04	0.2479
Q 52	0.181906E-03	0.184568E-03	0.372689E-04	0.2019

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
Q 1	0.8458E-06	0.1591E-06	6.6805	0.1181E-04	0.4198
Q 2	0.7068E-06	0.2477E-06	0.9925	0.7051E-04	0.1106
Q 3	0.2621E-05	0.7496E-06	1.9899	0.1291E-03	0.1825
Q 4	0.3181E-05	0.1015E-05	1.8769	0.1663E-03	0.1920
Q 5	0.1260E-05	0.1445E-05	0.5861	0.2137E-03	0.2138
Q 6	0.1584E-05	0.7693E-06	0.6621	0.2376E-03	0.1022
Q 7	0.5212E-05	0.1299E-05	2.3736	0.2144E-03	0.1900
Q 8	0.8851E-05	0.1665E-05	3.3376	0.2564E-03	0.2025
Q 9	0.1645E-06	0.9023E-07	0.9680	0.1683E-04	0.1693
Q 10	0.2587E-06	0.2026E-06	0.4192	0.6145E-04	0.1042
Q 11	0.8546E-06	0.6408E-06	0.5863	0.1449E-03	0.1397
Q 12	0.7457E-05	0.1911E-05	2.4626	0.2954E-03	0.2030
Q 13	0.8061E-05	0.2623E-05	2.0395	0.3872E-03	0.2132
Q 14	0.1560E-04	0.3337E-05	3.9074	0.3838E-03	0.2720
Q 15	0.1064E-04	0.3594E-05	2.2859	0.4547E-03	0.2488
Q 16	0.1403E-04	0.3911E-05	2.7420	0.4975E-03	0.2470
Q 17	0.3344E-05	0.3854E-06	30.4153	0.7649E-05	1.5320
Q 18	0.1485E-05	0.5120E-06	2.1212	0.6850E-04	0.2354
Q 19	0.1387E-05	0.1169E-05	0.8977	0.1532E-03	0.2411
Q 20	0.1522E-05	0.5636E-06	1.1047	0.1363E-03	0.1303
Q 21	0.3719E-05	0.1374E-05	2.2125	0.1644E-03	0.2634
Q 22	0.2915E-05	0.9014E-06	1.8055	0.1585E-03	0.1789
Q 23	0.1774E-04	0.2931E-05	7.6440	0.2144E-03	0.4243
Q 24	0.4033E-04	0.5136E-05	17.7577	0.1868E-03	0.8423
Q 25	0.8229E-06	0.2670E-06	3.2090	0.2482E-04	0.3386
Q 26	0.3381E-05	0.9578E-06	2.5248	0.1305E-03	0.2306
Q 27	0.1149E-05	0.8132E-06	0.4978	0.2298E-03	0.1118
Q 28	0.1664E-05	0.1028E-05	0.6289	0.2629E-03	0.1235
Q 29	0.3858E-05	0.1564E-05	0.9346	0.4089E-03	0.1205
Q 30	0.1219E-04	0.2605E-05	3.0861	0.3829E-03	0.2128
Q 31	0.1964E-04	0.4986E-05	3.7863	0.4992E-03	0.3134
Q 32	0.2334E-04	0.5452E-05	3.6213	0.6211E-03	0.2750
Q 33	0.6143E-06	0.1529E-06	4.7725	0.1226E-04	0.3913
Q 34	0.2711E-05	0.4872E-06	5.3787	0.4768E-04	0.3181
Q 35	0.3739E-05	0.1280E-05	1.5266	0.2412E-03	0.1671
Q 36	0.1152E-04	0.2863E-05	1.9887	0.5680E-03	0.1581
Q 37	0.1162E-04	0.4197E-05	1.2870	0.8914E-03	0.1483
Q 38	0.2533E-04	0.6459E-05	1.9929	0.1246E-02	0.1627
Q 39	0.4266E-04	0.8769E-05	3.6057	0.1140E-02	0.2402
Q 40	0.2709E-04	0.1008E-04	2.2314	0.1187E-02	0.2676
Q 41	0.3019E-06	0.7552E-07	2.6505	0.1109E-04	0.2136
Q 42	0.4812E-06	0.2441E-06	0.8470	0.5633E-04	0.1368
Q 43	0.8668E-06	0.4035E-06	1.0293	0.8334E-04	0.1528
Q 44	0.1983E-05	0.5414E-06	2.1666	0.8953E-04	0.1899
Q 45	0.1618E-05	0.5473E-06	2.3614	0.6690E-04	0.2576
Q 46	0.1165E-05	0.3624E-06	1.5839	0.7239E-04	0.1575
Q 47	0.5359E-06	0.1087E-06	4.9328	0.1033E-04	0.3287
Q 48	0.1636E-05	0.4349E-06	3.9022	0.4029E-04	0.3389
Q 49	0.1230E-05	0.6631E-06	1.0104	0.1205E-03	0.1737
Q 50	0.2504E-05	0.1036E-05	1.5002	0.1644E-03	0.1985
Q 51	0.3392E-05	0.1078E-05	2.5423	0.1300E-03	0.2609
Q 52	0.2662E-05	0.1182E-05	1.4634	0.1792E-03	0.2079

	LOWER 80. % CI	UPPER 80. % CI
Q 1	0.799621E-05	0.201184E-04
Q 2	0.621174E-04	0.813300E-04
Q 3	0.104090E-03	0.165075E-03
Q 4	0.133870E-03	0.214121E-03
Q 5	0.161376E-03	0.274603E-03
Q 6	0.210298E-03	0.271705E-03
Q 7	0.176366E-03	0.280446E-03
Q 8	0.211781E-03	0.343460E-03
Q 9	0.136315E-04	0.207489E-04
Q 10	0.536939E-04	0.705096E-04
Q 11	0.121736E-03	0.173103E-03
Q 12	0.240884E-03	0.387306E-03
Q 13	0.302433E-03	0.513938E-03
Q 14	0.296610E-03	0.547164E-03
Q 15	0.346194E-03	0.622883E-03
Q 16	0.386335E-03	0.686736E-03
Q 17	0.474132E-05	0.259699E-04
Q 18	0.521324E-04	0.924081E-04
Q 19	0.113401E-03	0.204128E-03
Q 20	0.116810E-03	0.163492E-03
Q 21	0.122438E-03	0.229716E-03
Q 22	0.131005E-03	0.201568E-03
Q 23	0.145839E-03	0.363075E-03
Q 24	0.119175E-03	0.469693E-03
Q 25	0.174903E-04	0.376178E-04
Q 26	0.102885E-03	0.175680E-03
Q 27	0.200591E-03	0.264352E-03
Q 28	0.225081E-03	0.309638E-03
Q 29	0.355506E-03	0.481860E-03
Q 30	0.308542E-03	0.512530E-03
Q 31	0.358616E-03	0.747559E-03
Q 32	0.473630E-03	0.886795E-03
Q 33	0.818860E-05	0.195583E-04
Q 34	0.350827E-04	0.730401E-04
Q 35	0.201255E-03	0.303996E-03
Q 36	0.480655E-03	0.707258E-03
Q 37	0.761381E-03	0.109350E-02
Q 38	0.105180E-02	0.157496E-02
Q 39	0.894972E-03	0.158829E-02
Q 40	0.880096E-03	0.166207E-02
Q 41	0.893425E-05	0.149141E-04
Q 42	0.479569E-04	0.677955E-04
Q 43	0.689556E-04	0.102495E-03
Q 44	0.733802E-04	0.115873E-03
Q 45	0.487919E-04	0.926673E-04
Q 46	0.610067E-04	0.896926E-04
Q 47	0.753690E-05	0.160615E-04
Q 48	0.273310E-04	0.610723E-04
Q 49	0.973716E-04	0.150046E-03
Q 50	0.131055E-03	0.211571E-03
Q 51	0.981245E-04	0.181689E-03
Q 52	0.139026E-03	0.231128E-03

Bootstrap Output Variable: Fishing Mortality (2006)

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
AGE 1	0.0034	0.0038	0.001648	0.4376
AGE 2	0.0401	0.0422	0.012515	0.2968
AGE 3	0.1372	0.1417	0.034202	0.2413
AGE 4	0.2905	0.2981	0.075212	0.2523
AGE 5	0.4532	0.4675	0.122624	0.2623
AGE 6	0.2789	0.3011	0.093558	0.3107
AGE 7	0.2041	0.2186	0.083351	0.3812
AGE 8	0.3120	0.3291	0.061810	0.1878
AGE 9	0.3120	0.3291	0.061810	0.1878
AGE 10	0.3120	0.3291	0.061810	0.1878

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
AGE 1	0.000324	0.000053	9.4175	0.0031	0.5285
AGE 2	0.002051	0.000401	5.1117	0.0381	0.3288
AGE 3	0.004496	0.001091	3.2761	0.1327	0.2577
AGE 4	0.007625	0.002391	2.6248	0.2829	0.2659
AGE 5	0.014368	0.003904	3.1707	0.4388	0.2795
AGE 6	0.022262	0.003041	7.9829	0.2566	0.3646
AGE 7	0.014583	0.002676	7.1467	0.1895	0.4399
AGE 8	0.017071	0.002028	5.4710	0.2950	0.2096
AGE 9	0.017071	0.002028	5.4710	0.2950	0.2096
AGE 10	0.017071	0.002028	5.4710	0.2950	0.2096

	LOWER 80. % CI	UPPER 80. % CI
AGE 1	0.001999	0.005943
AGE 2	0.027598	0.059468
AGE 3	0.100956	0.188453
AGE 4	0.209517	0.396379
AGE 5	0.324637	0.635677
AGE 6	0.196909	0.430246
AGE 7	0.128964	0.323842
AGE 8	0.253919	0.412620
AGE 9	0.253919	0.412620
AGE 10	0.253919	0.412620

Bootstrap Output Variable: Average F (2006) AGES 5 - 8

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
AVG F	0.3120	0.3291	0.061810	0.1878
N WTD	0.3843	0.3899	0.079511	0.2039
B WTD	0.3654	0.3702	0.072425	0.1956
C WTD	0.4045	0.4202	0.095990	0.2285

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
AVG F	0.017071	0.002028	5.4710	0.2950	0.2096
N WTD	0.005668	0.002521	1.4749	0.3786	0.2100
B WTD	0.004779	0.002295	1.3079	0.3606	0.2008
C WTD	0.015664	0.003076	3.8725	0.3888	0.2469

	LOWER 80. % CI	UPPER 80. % CI
AVG F	0.253919	0.412620
N WTD	0.293483	0.497923
B WTD	0.282124	0.470401
C WTD	0.307139	0.550562

Bootstrap Output Variable: Biomass

JAN-1 Biomass (2007) Mean Biomass & SSB (2006)

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
JAN-1	31510.	33238.	5783.	0.1740
MEAN	25993.	26955.	4148.	0.1539
SSB	17622.	18096.	2599.	0.1436

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
JAN-1	1729.	191.	5.4856	29781.	0.1942
MEAN	962.	135.	3.7014	25031.	0.1657
SSB	474.	84.	2.6893	17148.	0.1515

	LOWER 80. % CI	UPPER 80. % CI
JAN-1	26096.	41076.
MEAN	21775.	32225.
SSB	14928.	21378.