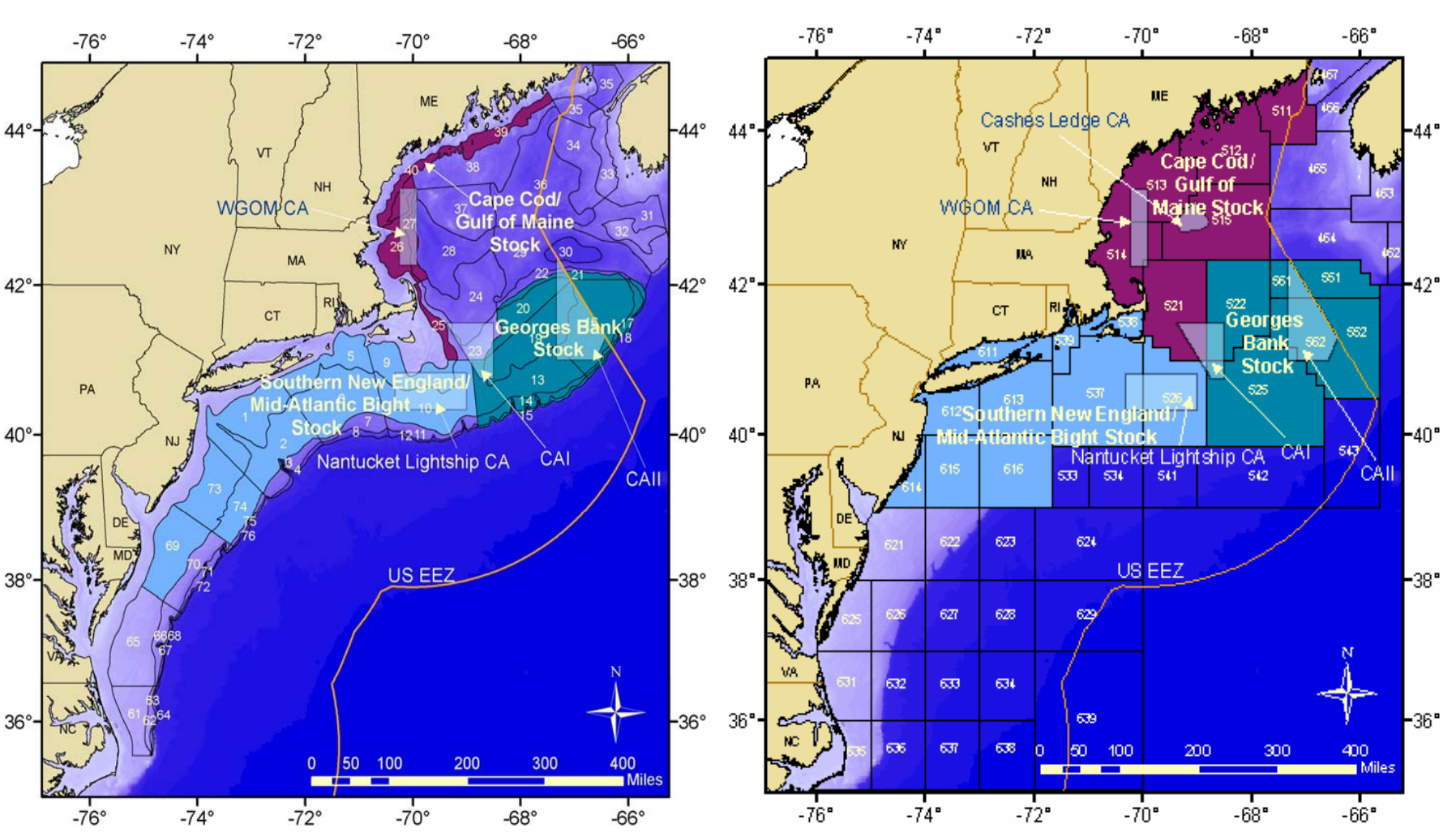
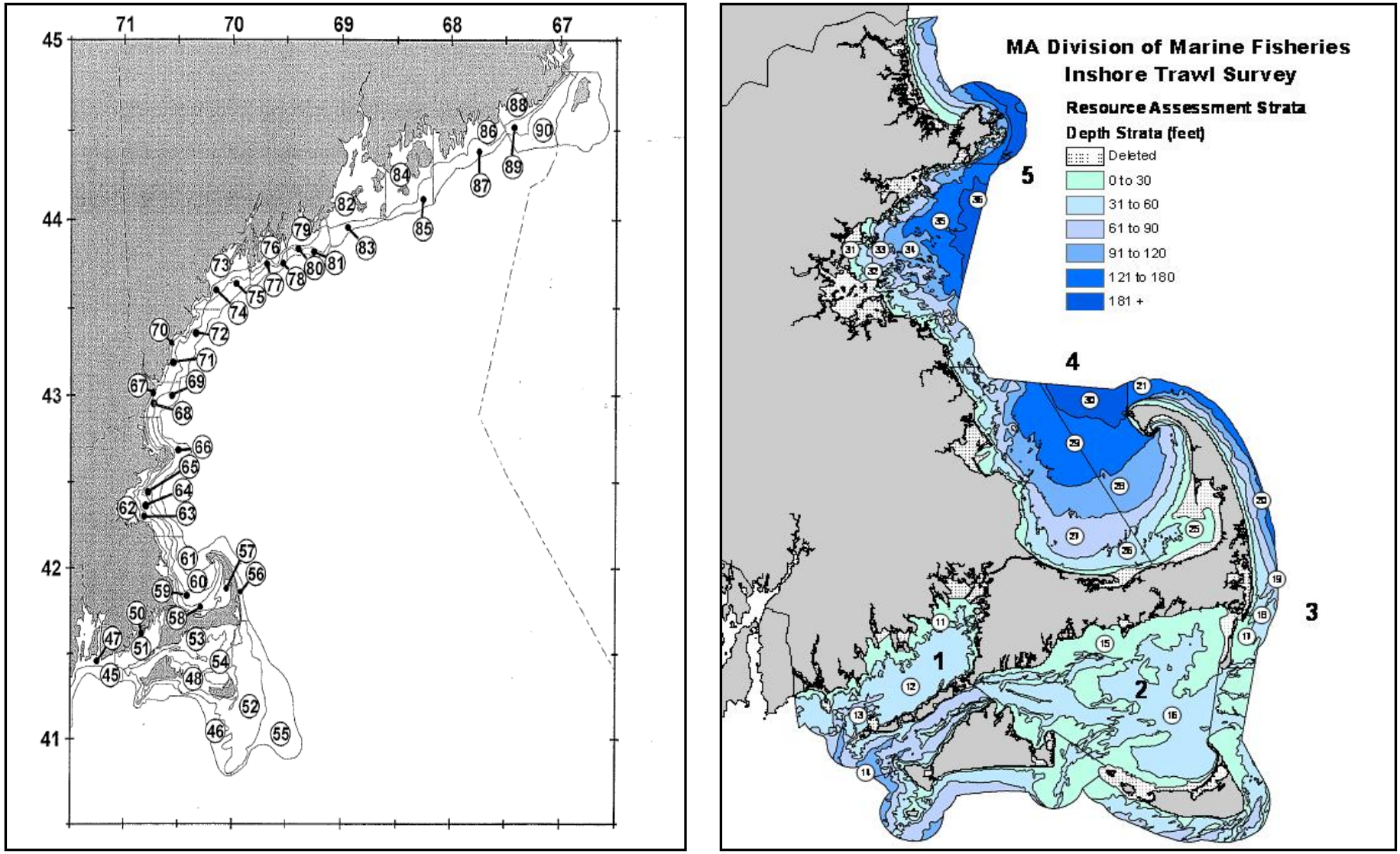
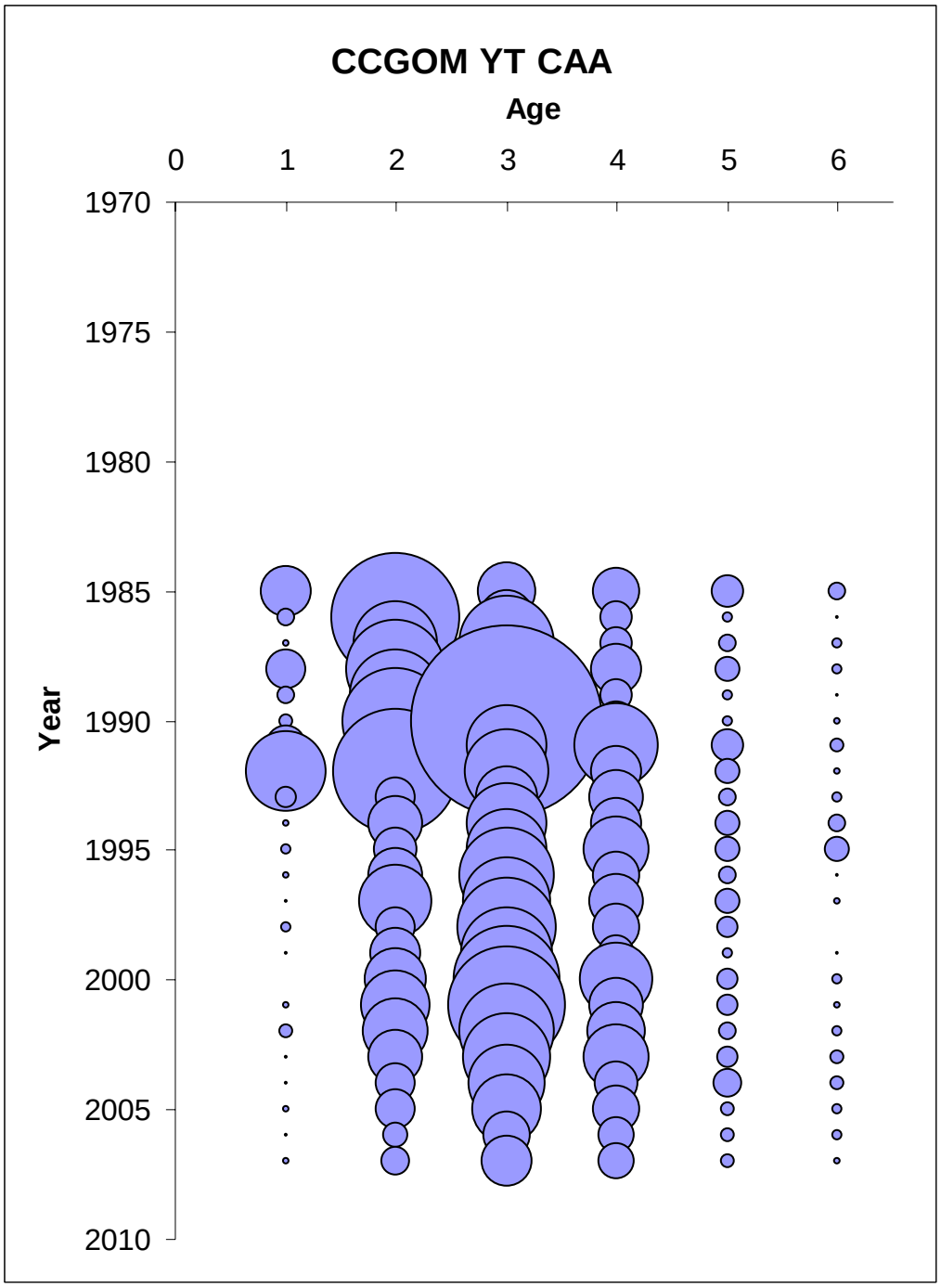
Appendix E. Cape Cod-Gulf of Maine yellowtail flounder
by Chris Legault, Larry Alade, Steve Cadrin, Jeremy King, and Sally Sherman



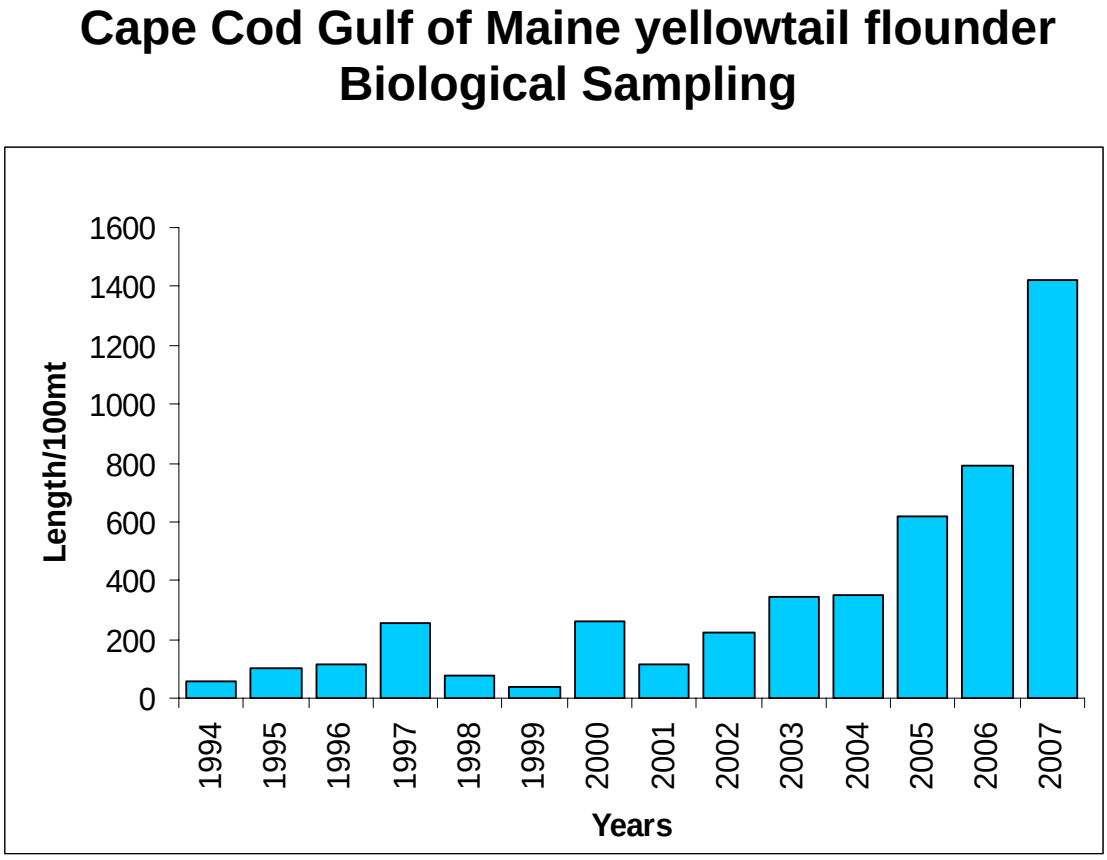
Appendix Figure E.1. Offshore Survey strata (25-27, 39, 40) used by NEFSC to estimate spring and fall (Stratum 27 excluded from the fall series) survey indices [Left] and the commercial statistical areas [Right] for all three yellowtail flounder stocks.



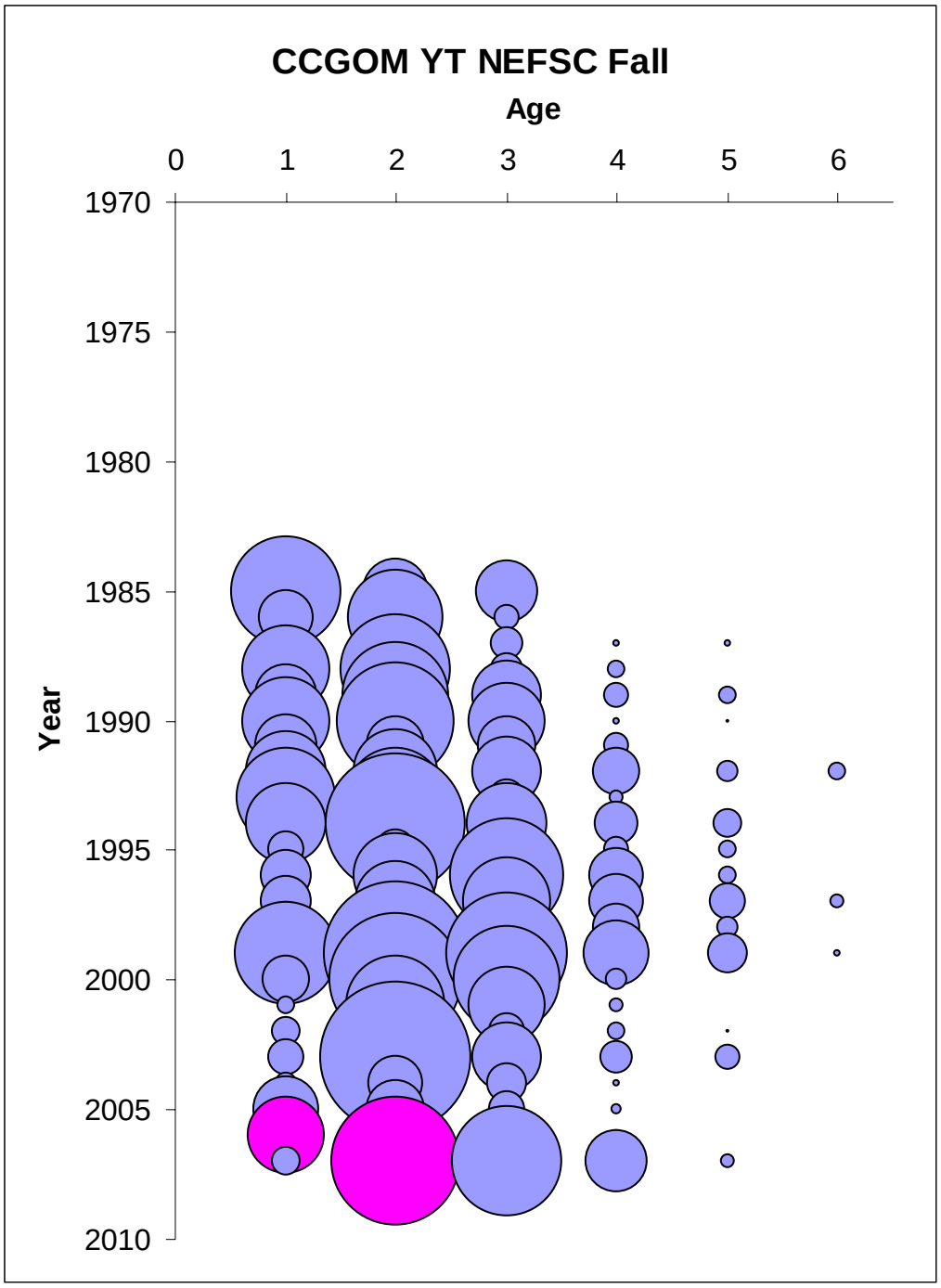
Appendix Figure E.2. Northeast Fisheries Science Center (NEFSC) Inshore Survey strata (56-66) to the left and Massachusetts Division of Marine Fisheries (MADMF) survey strata (17-36) to the right, used for estimating both spring and fall survey indices for the Cape Cod-Gulf of Maine yellowtail flounder stock.



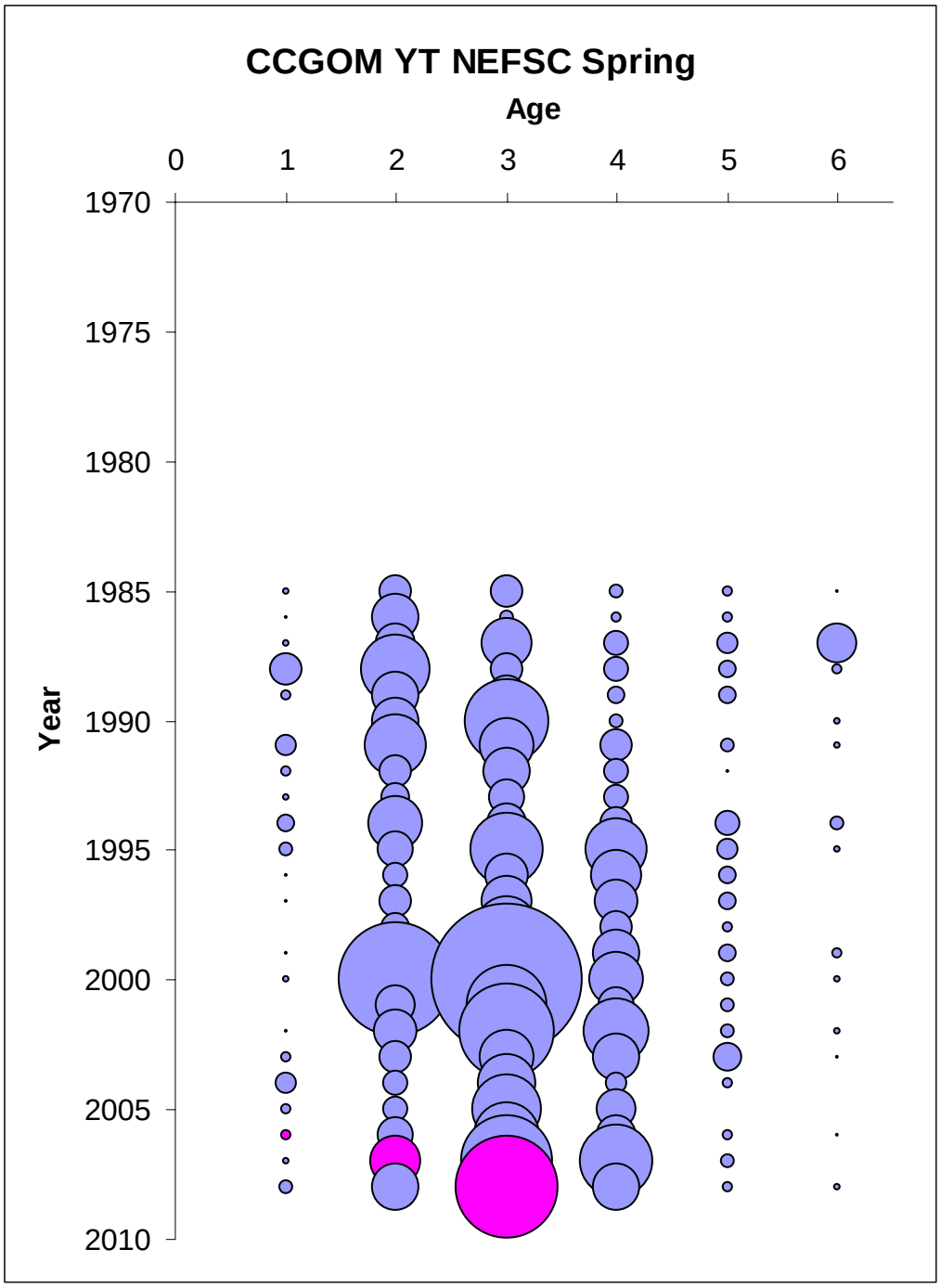
Appendix Figure E.3 Catch at age bubble plot for Cape Cod-Gulf of Maine yellowtail flounder.



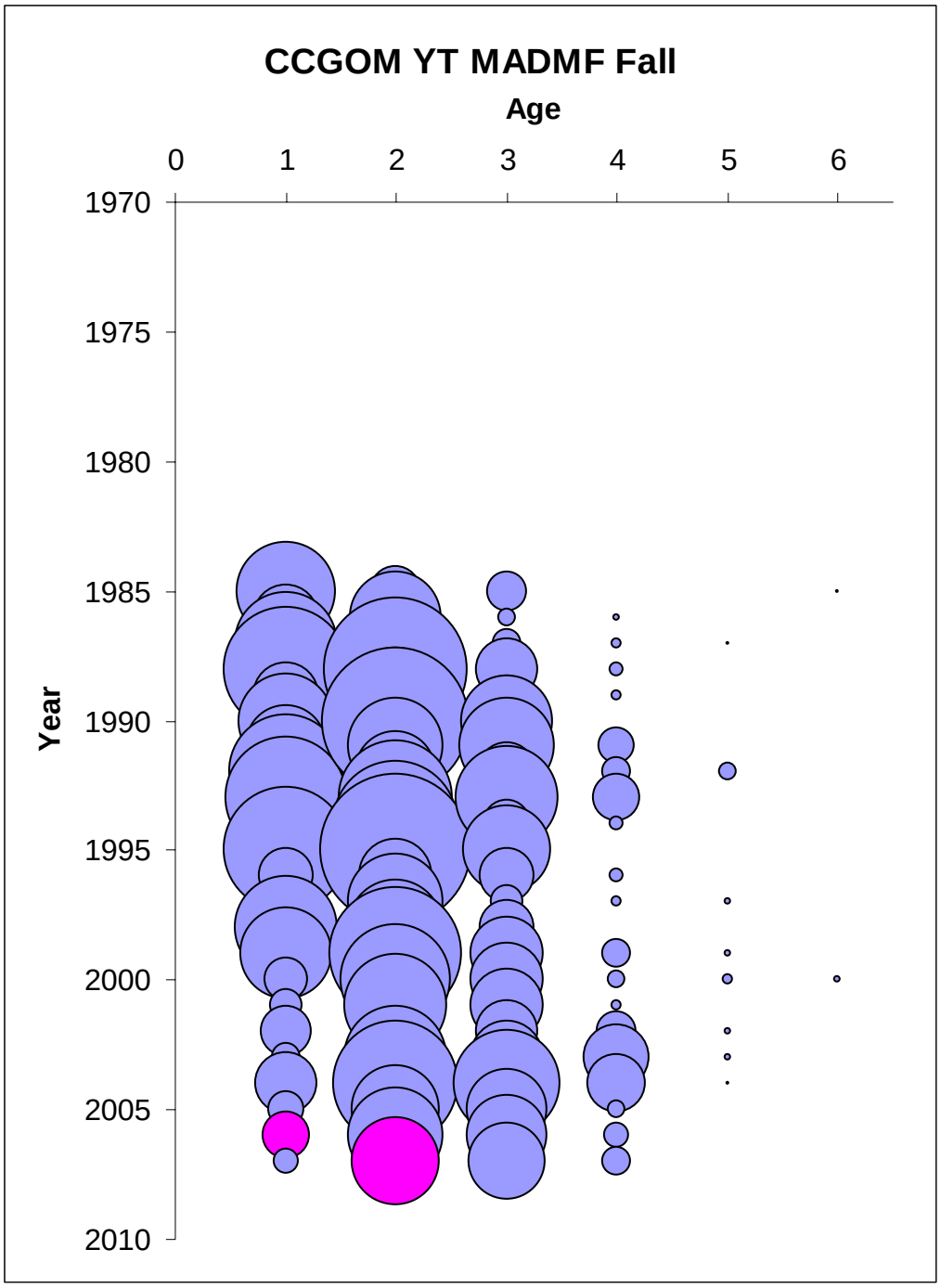
Appendix Figure E.4. Biological sampling for Cape Cod-Gulf of Maine yellowtail flounder.



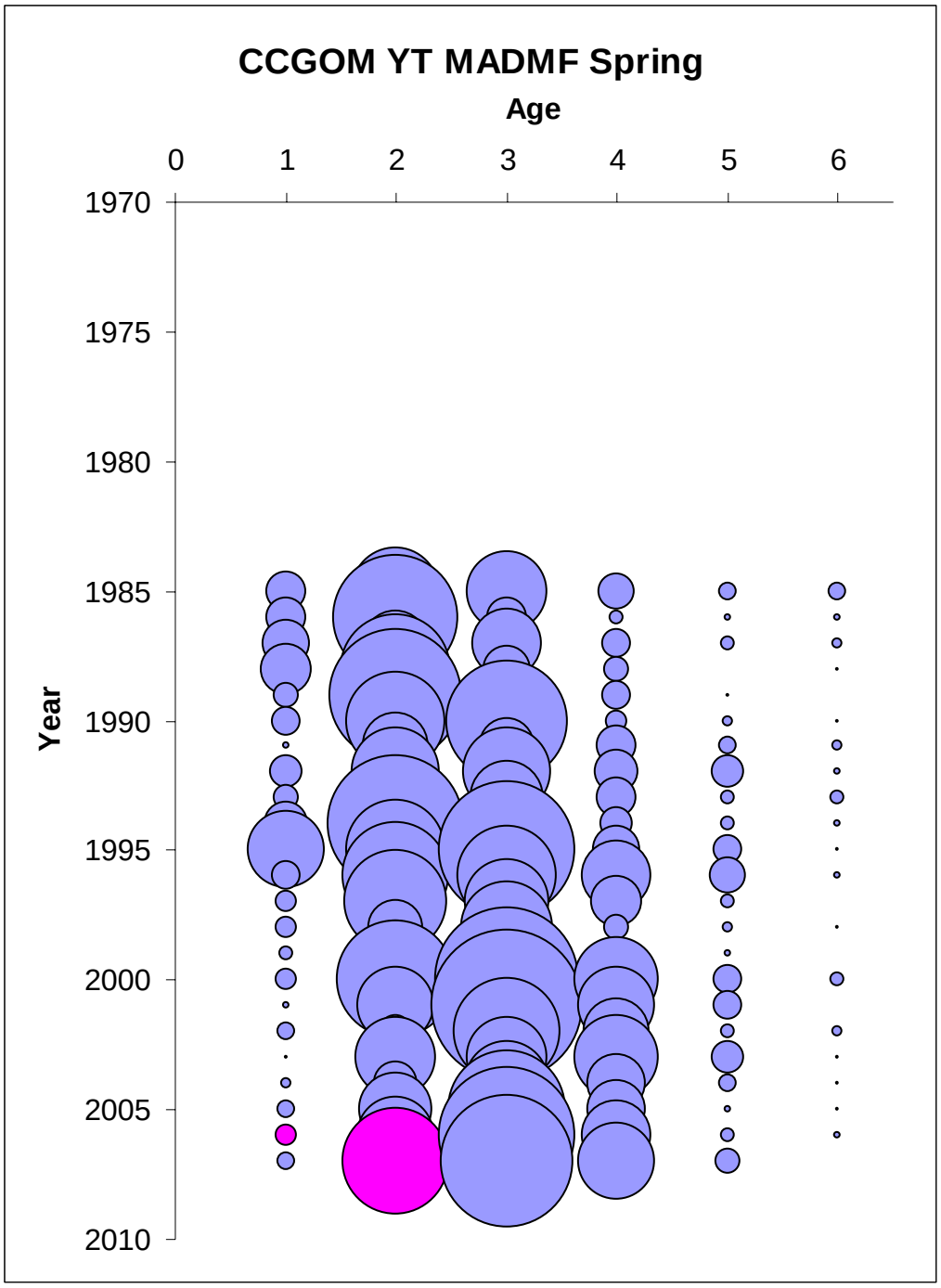
Appendix Figure E.5.a Survey bubble plot for CCGOM yellowtail NEFSC Fall survey. Note the 2005 year class is highlighted in pink.



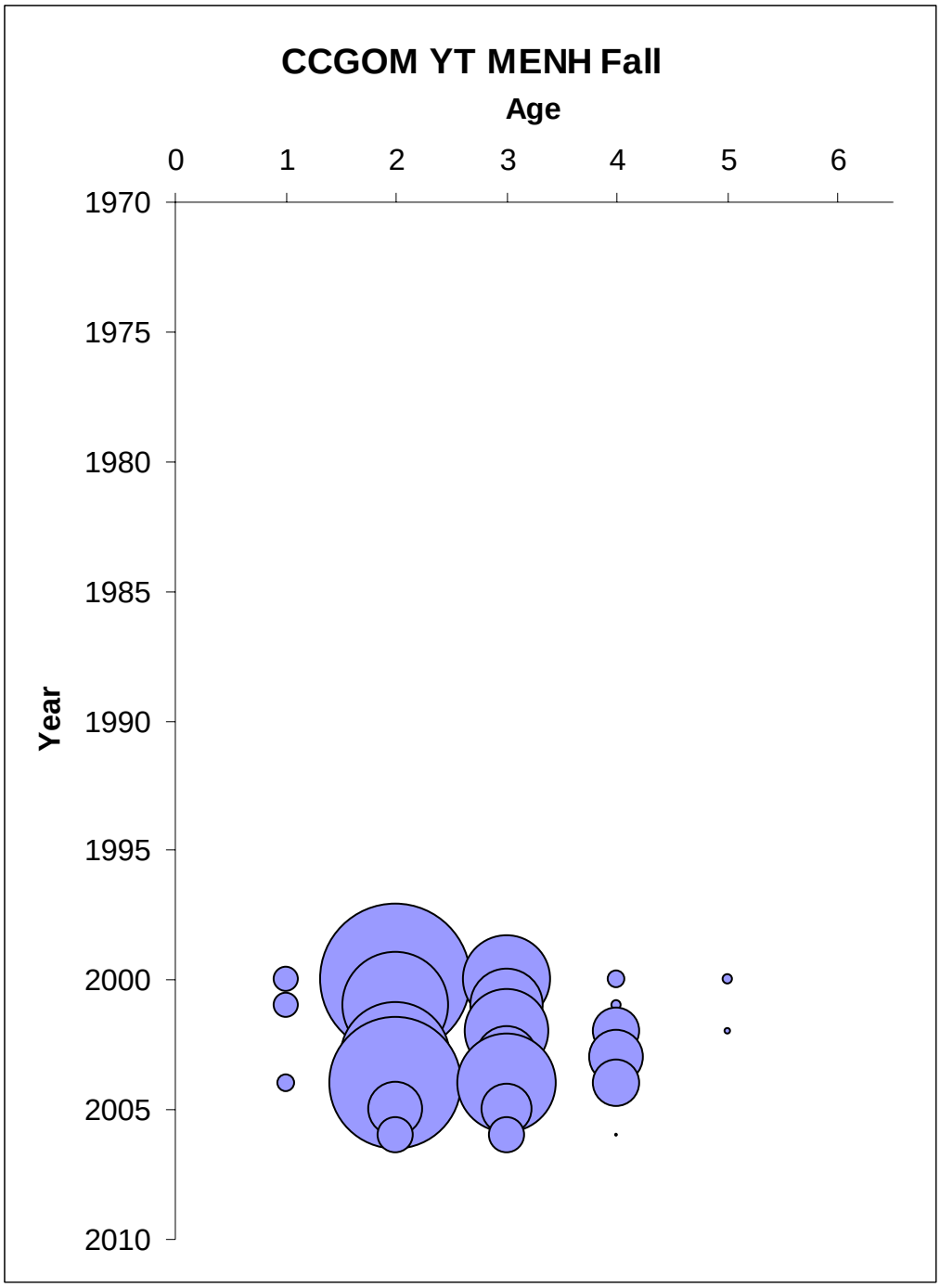
Appendix Figure E.5.b Survey bubble plot for CCGOM yellowtail NEFSC Spring survey. Note the 2005 year class is highlighted in pink.



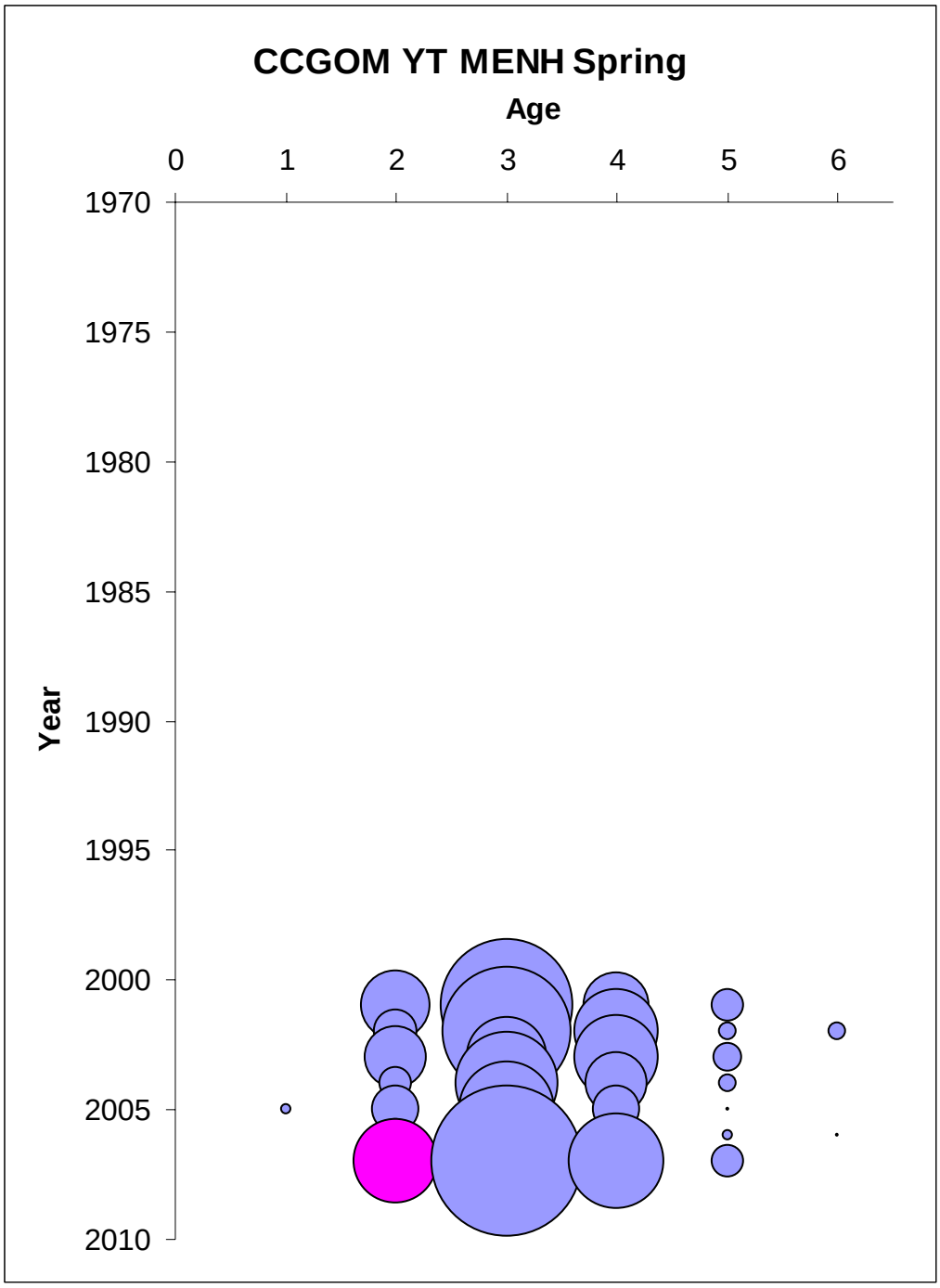
Appendix Figure E.5.c Survey bubble plot for CCGOM yellowtail MADMF Fall survey. Note the 2005 year class is highlighted in pink.



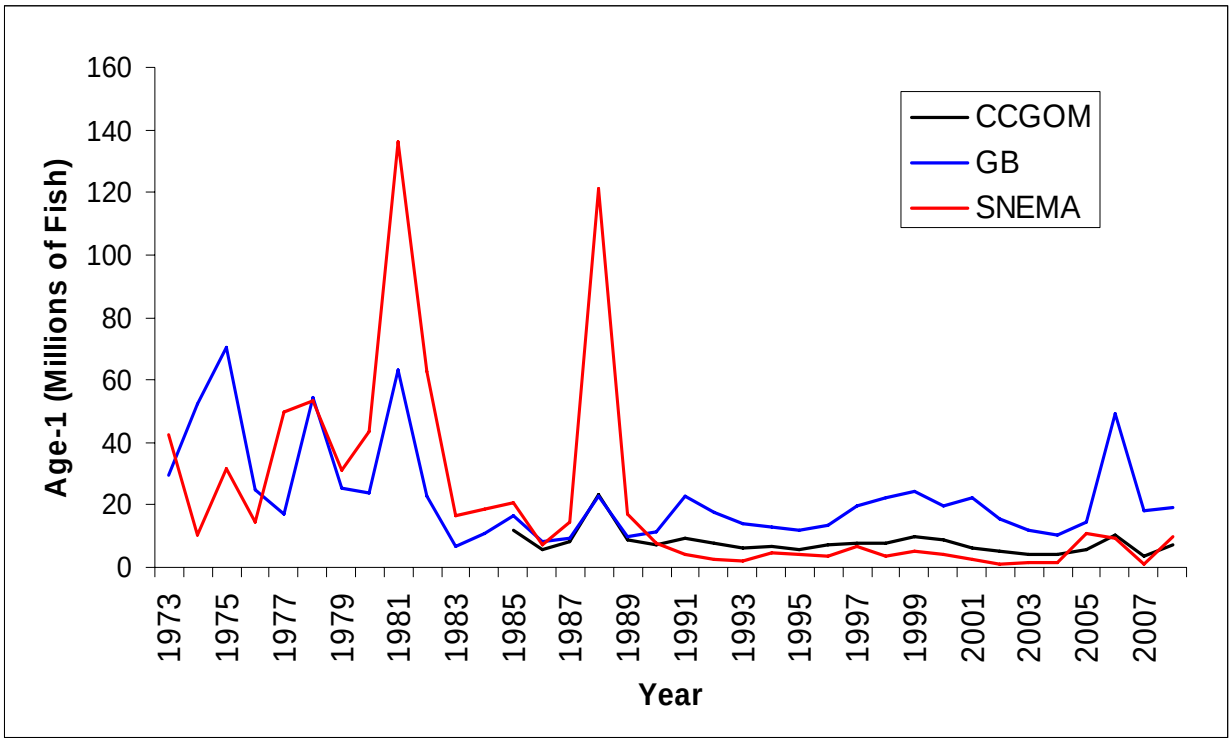
Appendix Figure E.5.d Survey bubble plot for CCGOM yellowtail MADMF Spring survey. Note the 2005 year class is highlighted in pink.



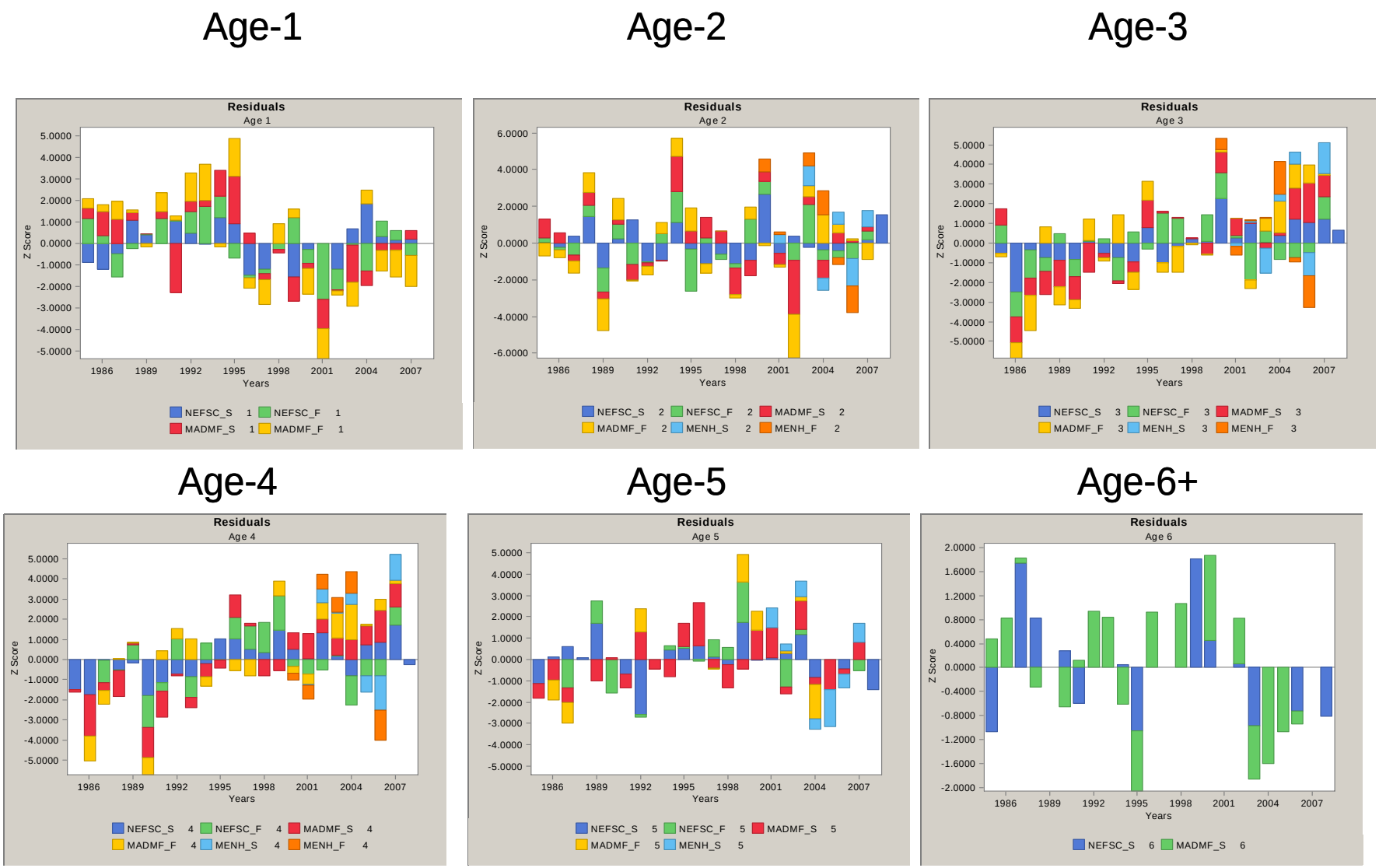
Appendix Figure E.5.e Survey bubble plot for CCGOM yellowtail MENH Fall survey. Note the 2005 year class is highlighted in pink.



Appendix Figure E.5.f Survey bubble plot for CCGOM yellowtail MENH Spring survey. Note the 2005 year class is highlighted in pink.



Appendix Figure E.6. Comparison of recruitment trends from the three yellowtail flounder stocks.



Appendix Figure E.7. Standardized residuals for all indices by age.

Appendix VPA Output Report

```
VPA Version 2.8.0

Model ID: ccgom using new data for GARM2008 Biological Reference Points Meeting


Input File:
C:\WORKING\ASSESSMENTS\GARM3THEFINALE\YTASSESSMENTS\CCGOM\VPA\6PLUS\CCGOM6PLUS_R
Date of Run: 08-JUL-2008                        Time of Run: 21:04


Levenburg-Marquardt Algorithm Completed     4 Iterations
Residual Sum of Squares =     427.053

Number of Residuals     =    507
Number of Parameters    =      4
Degrees of Freedom      =    503
Mean Squared Residual   =     0.849013
Standard Deviation      =     0.921419


Number of Years =    23
Number of Ages  =     6
First Year      =  1985
Youngest Age    =     1
Oldest True Age =     5

Number of Survey Indices Available        =    36
Number of Survey Indices Used in Estimate =    29


VPA Classic Method - Auto Estimated Q's


Stock Numbers Predicted in Terminal Year Plus One (2008)
Age    Stock Predicted     Std. Error      CV

  2           2885.567   0.122086E+04   0.423091E+00
  3           6574.688   0.203245E+04   0.309132E+00
  4           2295.446   0.692206E+03   0.301556E+00
  5            615.057   0.189449E+03   0.308019E+00

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

  1       0.428830E-02   0.110359E-02   0.257350E+00
  2       0.904027E-01   0.113937E-01   0.126032E+00
  3       0.282809E+00   0.412935E-01   0.146012E+00
  4       0.348440E+00   0.571812E-01   0.164106E+00
  5       0.413448E+00   0.950862E-01   0.229983E+00
  6       0.392500E+00   0.154293E+00   0.393104E+00
  7       0.586332E-01   0.963225E-02   0.164280E+00
  8       0.205993E+00   0.280670E-01   0.136252E+00
  9       0.231381E+00   0.344197E-01   0.148758E+00
 10       0.165885E+00   0.485054E-01   0.292403E+00
 11       0.548869E+00   0.215644E+00   0.392888E+00
 13       0.234298E-01   0.560606E-02   0.239271E+00
 14       0.340915E+00   0.440577E-01   0.129234E+00
 15       0.662967E+00   0.872223E-01   0.131564E+00
 16       0.587346E+00   0.978967E-01   0.166677E+00
 17       0.503147E+00   0.835408E-01   0.166037E+00
 18       0.349937E+00   0.992091E-01   0.283505E+00
 19       0.105901E+00   0.182217E-01   0.172064E+00
 20       0.305596E+00   0.447090E-01   0.146301E+00
 21       0.301859E+00   0.511952E-01   0.169600E+00
```

```
 22       0.134206E+00   0.426887E-01   0.318084E+00
 23       0.122468E+00   0.499577E-01   0.407925E+00
 26       0.661209E-04   0.121755E-04   0.184140E+00
 27       0.403312E-03   0.581534E-04   0.144190E+00
 28       0.500465E-03   0.864105E-04   0.172661E+00
 29       0.220345E-03   0.101714E-03   0.461614E+00
 32       0.134794E-03   0.521699E-04   0.387034E+00
 33       0.189250E-03   0.416766E-04   0.220220E+00
 34       0.805163E-04   0.601412E-04   0.746945E+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 Calculation Used  3 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  4 to  5
 - Calculation of Population of Age 1 In Year 2008
   =  Geometric Mean of First Age Populations
      Year Range Applied =  1985 to  2007

 Stock Estimates

 Age   2
 Age   3
 Age   4
 Age   5

 Full F in Terminal Year               =   0.3603

 F in Oldest True Age in Terminal Year =   0.3603

 Full F Calculated Using Classic Method

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

   1      0.010          0.009       0.0044      NO      Stock Estimate in T+1
   2      0.100          0.079       0.0369      NO      Stock Estimate in T+1
   3      1.000          0.538       0.2522      YES     Stock Estimate in T+1
   4      1.000          1.000       0.4684      YES     Stock Estimate in T+1
   5      1.000          0.769       0.3603              Input PR * Full F
```

Catch At Age - Input Data

AGE	1985	1986	1987	1988	1989
1	686.0	95.0	19.0	452.0	118.0
2	1245.0	4225.0	1885.0	2582.0	2297.0
3	907.0	785.0	2331.0	1503.0	1812.0
4	635.0	304.0	309.0	744.0	298.0
5	329.0	40.0	116.0	199.0	38.0
6	121.0	8.0	53.0	41.0	9.0

AGE	1990	1991	1992	1993	1994
1	84.0	465.0	1709.0	159.0	19.0
2	2897.0	1372.0	3979.0	425.0	817.0
3	9400.0	1765.0	1961.0	1074.0	1697.0
4	493.0	1953.0	731.0	795.0	716.0
5	35.0	298.0	191.0	111.0	210.0
6	28.0	74.0	14.0	54.0	109.0

AGE	1995	1996	1997	1998	1999
1	37.0	26.0	8.0	38.0	9.0
2	526.0	787.0	1480.0	495.0	743.0
3	1777.0	2428.0	2007.0	2512.0	2292.0
4	1188.0	645.0	847.0	650.0	397.0
5	178.0	104.0	180.0	152.0	32.0
6	170.0	9.0	20.0	3.0	7.0

AGE	2000	2001	2002	2003	2004
1	2.0	20.0	58.0	10.0	13.0
2	1114.0	1342.0	1204.0	859.0	475.0
3	2981.0	3721.0	2449.0	2122.0	1594.0
4	1408.0	849.0	905.0	1200.0	571.0
5	133.0	145.0	109.0	152.0	243.0
6	35.0	24.0	34.0	70.0	75.0

AGE	2005	2006	2007
1	15.0	7.0	14.0
2	494.0	189.0	274.0
3	1262.0	662.0	732.0
4	585.0	390.0	410.0
5	82.0	84.0	71.0
6	48.0	54.0	14.0

Weight At Age - Input Data

AGE	1985	1986	1987	1988	1989
1	0.1320	0.1030	0.0560	0.1230	0.1290
2	0.2660	0.2500	0.2320	0.2060	0.2700
3	0.3570	0.4280	0.3930	0.3380	0.3830
4	0.4890	0.5340	0.5480	0.5230	0.6500
5	0.6000	0.7300	0.6520	0.6960	0.9280
6	0.7860	0.9960	0.9160	0.8410	1.3170

AGE	1990	1991	1992	1993	1994
1	0.0790	0.1240	0.0530	0.0890	0.0890
2	0.2540	0.2360	0.1350	0.1600	0.1740
3	0.3700	0.3420	0.3250	0.3580	0.3540
4	0.5500	0.5170	0.4980	0.4180	0.5120
5	0.8240	0.7370	0.6020	0.7370	0.6740
6	0.9700	1.0210	1.1690	0.9990	0.9040

AGE	1995	1996	1997	1998	1999
1	0.0550	0.1090	0.1450	0.0790	0.1480
2	0.3070	0.2660	0.2780	0.2090	0.3440
3	0.3400	0.3830	0.3690	0.3930	0.4060
4	0.4220	0.4620	0.4780	0.6090	0.6040
5	0.6430	0.6090	0.6150	0.8560	0.6010
6	0.7900	1.2660	0.8650	0.7070	0.8010

AGE	2000	2001	2002	2003	2004
1	0.1010	0.2260	0.2180	0.0870	0.0770
2	0.3490	0.3440	0.3620	0.3220	0.2510
3	0.4320	0.4120	0.4400	0.4150	0.3720
4	0.5660	0.5730	0.5650	0.5350	0.4600
5	0.6230	0.7650	0.7740	0.6720	0.6090
6	0.8350	0.8980	1.0420	0.9450	0.8310

AGE	2005	2006	2007
1	0.0620	0.1060	0.0360
2	0.2610	0.3050	0.2820
3	0.3690	0.3920	0.3970
4	0.5140	0.4780	0.4920
5	0.6940	0.7810	0.6300
6	0.9210	0.9260	0.8550

JAN-1 Weights at Age - Input Data

AGE	1985	1986	1987	1988	1989
1	0.0959	0.0686	0.0292	0.0830	0.0919
2	0.2097	0.1817	0.1546	0.1074	0.1822
3	0.2919	0.3374	0.3134	0.2800	0.2809
4	0.4002	0.4366	0.4843	0.4534	0.4687
5	0.5417	0.5975	0.5901	0.6176	0.6967
6	0.7860	0.9960	0.9160	0.8410	1.3170

AGE	1990	1991	1992	1993	1994
1	0.0457	0.1188	0.0305	0.0637	0.0479
2	0.1810	0.1365	0.1294	0.0921	0.1244
3	0.3161	0.2947	0.2769	0.2198	0.2380
4	0.4590	0.4374	0.4127	0.3686	0.4281
5	0.7318	0.6367	0.5579	0.6058	0.5308
6	0.9700	1.0210	1.1690	0.9990	0.9040

AGE	1995	1996	1997	1998	1999
1	0.0250	0.0683	0.1208	0.0379	0.0964
2	0.1653	0.1210	0.1741	0.1741	0.1649
3	0.2432	0.3429	0.3133	0.3305	0.2913
4	0.3865	0.3963	0.4279	0.4740	0.4872
5	0.5738	0.5069	0.5330	0.6397	0.6050
6	0.7900	1.2660	0.8650	0.7070	0.8010

AGE	2000	2001	2002	2003	2004
1	0.0547	0.1786	0.1794	0.0512	0.0418
2	0.2273	0.1864	0.2860	0.2649	0.1478
3	0.3855	0.3792	0.3891	0.3876	0.3461
4	0.4794	0.4975	0.4825	0.4852	0.4369
5	0.6134	0.6580	0.6660	0.6162	0.5708
6	0.8350	0.8980	1.0420	0.9450	0.8310

AGE	2005	2006	2007	2008
1	0.0280	0.0650	0.0075	0.0335
2	0.1418	0.1375	0.1729	0.1507
3	0.3043	0.3199	0.3480	0.3241
4	0.4373	0.4200	0.4392	0.4321
5	0.5650	0.6336	0.5488	0.5825
6	0.9210	0.9260	0.8550	0.9007

SSB Weight At Age - Input Data

AGE	1985	1986	1987	1988	1989
1	0.1320	0.1030	0.0560	0.1230	0.1290
2	0.2660	0.2500	0.2320	0.2060	0.2700
3	0.3570	0.4280	0.3930	0.3380	0.3830
4	0.4890	0.5340	0.5480	0.5230	0.6500
5	0.6000	0.7300	0.6520	0.6960	0.9280
6	0.7860	0.9960	0.9160	0.8410	1.3170

AGE	1990	1991	1992	1993	1994
1	0.0790	0.1240	0.0530	0.0890	0.0890
2	0.2540	0.2360	0.1350	0.1600	0.1740
3	0.3700	0.3420	0.3250	0.3580	0.3540
4	0.5500	0.5170	0.4980	0.4180	0.5120
5	0.8240	0.7370	0.6020	0.7370	0.6740
6	0.9700	1.0210	1.1690	0.9990	0.9040

AGE	1995	1996	1997	1998	1999
1	0.0550	0.1090	0.1450	0.0790	0.1480
2	0.3070	0.2660	0.2780	0.2090	0.3440
3	0.3400	0.3830	0.3690	0.3930	0.4060
4	0.4220	0.4620	0.4780	0.6090	0.6040
5	0.6430	0.6090	0.6150	0.8560	0.6010
6	0.7900	1.2660	0.8650	0.7070	0.8010

AGE	2000	2001	2002	2003	2004
1	0.1010	0.2260	0.2180	0.0870	0.0770
2	0.3490	0.3440	0.3620	0.3220	0.2510
3	0.4320	0.4120	0.4400	0.4150	0.3720
4	0.5660	0.5730	0.5650	0.5350	0.4600
5	0.6230	0.7650	0.7740	0.6720	0.6090
6	0.8350	0.8980	1.0420	0.9450	0.8310

AGE	2005	2006	2007
1	0.0620	0.1060	0.0360
2	0.2610	0.3050	0.2820
3	0.3690	0.3920	0.3970
4	0.5140	0.4780	0.4920
5	0.6940	0.7810	0.6300
6	0.9210	0.9260	0.8550

Natural Mortality - Input Data

AGE	1985	1986	1987	1988	1989
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

AGE	1990	1991	1992	1993	1994
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

AGE	1995	1996	1997	1998	1999
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

AGE	2000	2001	2002	2003	2004
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

AGE	2005	2006	2007
1	0.2000	0.2000	0.2000
2	0.2000	0.2000	0.2000
3	0.2000	0.2000	0.2000
4	0.2000	0.2000	0.2000
5	0.2000	0.2000	0.2000
6	0.2000	0.2000	0.2000

Proportion of Natural Mortality Before Spawning = 0.4167
Proportion of Fishing Mortality Before Spawning = 0.4167

Maturity - Input Data

AGE	1985	1986	1987	1988	1989
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.1710	0.1710	0.1710	0.1710	0.1710
3	0.8330	0.8330	0.8330	0.8330	0.8330
4	0.9770	0.9770	0.9770	0.9770	0.9770
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1990	1991	1992	1993	1994
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.1710	0.1710	0.1710	0.1710	0.1710
3	0.8330	0.8330	0.8330	0.8330	0.8330
4	0.9770	0.9770	0.9770	0.9770	0.9770
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1995	1996	1997	1998	1999
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.1710	0.1710	0.1710	0.1710	0.1710
3	0.8330	0.8330	0.8330	0.8330	0.8330
4	0.9770	0.9770	0.9770	0.9770	0.9770
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	2000	2001	2002	2003	2004
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.1710	0.1710	0.1710	0.1710	0.1710
3	0.8330	0.8330	0.8330	0.8330	0.8330
4	0.9770	0.9770	0.9770	0.9770	0.9770
5	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	2005	2006	2007
1	0.0000	0.0000	0.0000
2	0.1710	0.1710	0.1710
3	0.8330	0.8330	0.8330
4	0.9770	0.9770	0.9770
5	1.0000	1.0000	1.0000
6	1.0000	1.0000	1.0000

Input Partial Recruitment

AGE	
1	0.0100
2	0.1000
3	1.0000
4	1.0000
5	1.0000

Input F-Plus Ratio

YEAR	
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
2007	1.0000

SURVEY - INPUT DATA

INDEX	1	2	3	4	5
SURVEY TAG	NEFSC_S	NEFSC_S	NEFSC_S	NEFSC_S	NEFSC_S
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
1985	18.1030	310.9470	333.9900	80.6700	49.9070
1986	6.2530	692.5290	76.4630	52.8020	38.4050
1987	20.4570	524.5110	773.5080	208.8550	177.0110
1988	345.6470	1459.2440	355.9140	197.8160	103.5980
1989	58.1680	714.8390	473.2140	122.1250	127.2580
1990	0.0000	727.5380	2025.3260	81.7120	0.0000
1991	136.7150	1167.4030	945.6560	327.1200	74.1090
1992	59.6730	352.9810	708.2390	192.3740	7.0250
1993	24.5480	253.0500	403.3900	217.3080	0.0000
1994	113.8260	863.0170	517.7180	310.4070	197.9320
1995	70.3650	401.2280	1535.4760	1163.6200	157.3260
1996	5.7130	211.0550	552.1090	775.2840	129.2650
1997	8.1440	360.3530	781.4210	596.4580	111.2010
1998	0.0000	279.7210	1135.6370	347.9240	55.3880

1999	6.7930	327.1580	1402.3500	715.2640	128.1850
2000	26.8640	3717.7030	6558.6090	911.5350	64.3050
2001	0.0000	463.4490	1882.7820	397.4070	83.3340
2002	5.7510	603.2900	2729.2800	1258.9580	82.2530
2003	36.0890	333.2570	928.3640	678.6340	303.8840
2004	141.6940	230.3540	1010.0770	138.3750	54.1920
2005	34.2750	224.6800	1474.6060	495.6400	0.0000
2006	51.9920	429.4440	1319.6730	465.9580	36.6300
2007	19.4540	836.8090	2410.1880	1648.8390	82.4840
2008	90.0500	670.6830	3017.4540	656.2080	56.8940

SURVEY - INPUT DATA

INDEX	6	7	8	9	10
SURVEY TAG	NEFSC_S	NEFSC_F	NEFSC_F	NEFSC_F	NEFSC_F
AGE	6	1	2	3	4
TIME	JAN-1	MEAN	MEAN	MEAN	MEAN
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	0	0	0	0
1985	12.7370	1481.9910	568.3090	483.1240	0.0000
1986	0.0000	398.4850	1108.1160	97.4740	0.0000
1987	487.2250	181.5650	436.4130	160.7840	14.6050
1988	59.4030	1006.1060	1475.7180	142.5120	43.2040
1989	0.0000	474.0200	1408.5800	609.2610	83.7700
1990	32.6150	957.0150	1695.7260	785.8080	12.4500
1991	15.4390	503.0050	449.1530	448.2520	90.7830
1992	0.0000	810.3210	887.2390	604.1460	304.9680
1993	0.0000	1215.5620	1232.5160	164.1940	27.0550
1994	66.6210	795.3300	2370.1630	835.2530	265.0780
1995	18.4500	179.3460	218.1750	345.6950	91.1040
1996	0.0000	340.4840	935.0750	1585.1910	379.3440
1997	0.0000	337.4920	799.7690	950.4520	403.1180
1998	0.0000	328.6130	959.8460	385.0060	317.0960
1999	56.7010	1324.0380	2602.5560	1777.7590	543.9890
2000	32.1520	287.8540	2183.9010	1443.3550	73.5720
2001	0.0000	43.3330	1227.9470	730.0580	30.4000
2002	19.9940	128.4530	458.0310	180.3430	48.8980
2003	9.7650	192.0210	2822.8220	593.9480	139.6160
2004	0.0000	76.1780	371.3020	202.0580	7.8490
2005	0.0000	533.6620	425.2180	174.6170	21.2000
2006	12.9300	780.3070	487.2410	273.8280	21.9720
2007	0.0000	119.8640	2095.6590	1539.5100	490.7480
2008	17.7550	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	11	12	13	14	15
SURVEY TAG	NEFSC_F	NEFSC_F	MADMF_S	MADMF_S	MADMF_S
AGE	5	6	1	2	3
TIME	MEAN	MEAN	JAN-1	JAN-1	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	0	0	1	1	1
1985	0.0000	0.0000	497.0250	2105.0030	1908.8820
1986	0.0000	0.0000	501.8520	4329.5450	464.1090
1987	11.8710	0.0000	680.9680	1275.2300	1346.4370
1988	0.0000	0.0000	813.9460	3487.8670	665.1130
1989	57.9050	0.0000	203.3910	4952.9930	910.6080
1990	2.6700	0.0000	260.0330	2752.1500	4106.4600
1991	0.0000	0.0000	15.7170	1211.2920	822.4220
1992	58.9030	45.8100	323.1760	2204.7650	2112.4920
1993	0.0000	0.0000	188.2490	1625.2320	1489.0710
1994	114.0090	0.0000	607.6480	5237.6300	1739.8600
1995	55.0740	0.0000	1659.0530	2801.7700	5042.3860
1996	42.9140	0.0000	290.0960	3230.8240	2758.7060
1997	187.6780	37.0270	133.0880	2988.6480	2082.4010
1998	75.2130	0.0000	157.7480	841.1020	2369.4250
1999	228.1470	8.7180	65.0630	1290.6180	2134.1890
2000	0.0000	0.0000	158.4610	3766.1960	5789.4590
2001	0.0000	0.0000	32.1750	1681.2430	6305.2450
2002	6.2090	0.0000	115.7800	296.3500	3236.0910
2003	81.2280	0.0000	12.6720	1873.4150	1796.0640
2004	0.0000	0.0000	42.3510	608.1690	1987.8790
2005	0.0000	0.0000	92.1360	1537.7320	3878.1360
2006	0.0000	0.0000	167.2660	1648.8760	5099.9610
2007	40.1160	0.0000	127.1360	3237.1610	4743.1840
2008	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	16	17	18	19	20
SURVEY TAG	MADMF_S	MADMF_S	MADMF_S	MADMF_F	MADMF_F
AGE	4	5	6	1	2
TIME	JAN-1	JAN-1	JAN-1	MEAN	MEAN
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	1	1	1	0	0
1985	411.8830	120.1970	92.1910	1564.3110	447.5140
1986	68.4920	19.2010	15.2510	712.4570	1357.0800
1987	267.2470	69.3420	40.6780	1605.8940	629.5920
1988	183.7780	0.0000	11.1910	2457.5290	3083.3080
1989	252.1060	12.0420	0.0000	723.3600	1431.1860
1990	176.7290	37.9630	8.9970	1425.3250	3273.5870
1991	509.6970	111.9130	36.8650	1030.9690	1409.6080
1992	559.5370	359.5750	20.7370	1968.5960	993.4730
1993	495.4610	62.1560	79.9020	2301.7830	1998.6590
1994	357.3800	81.9870	26.5240	562.1700	2375.2950
1995	635.8460	253.8890	5.7330	2356.2310	3484.5480
1996	1418.9890	393.6150	14.6470	468.3060	815.5100
1997	724.2240	87.2260	0.0000	274.7080	1410.2660
1998	228.6260	38.6760	4.4160	1617.7710	1438.8480

1999	239.7620	17.8290	0.0000	1296.7350	2669.8890
2000	1941.1660	238.9120	82.7000	317.0860	1825.2490
2001	1739.2570	280.3030	0.0000	188.3590	1638.2610
2002	1244.8380	58.5070	40.7060	427.2710	178.8690
2003	1977.8950	301.6710	11.9040	151.0820	1612.4220
2004	978.5240	124.1460	5.0740	638.1770	2381.7410
2005	1018.2970	19.0090	6.3640	242.0940	1165.0450
2006	1370.3840	60.4820	25.1530	343.2540	1370.3840
2007	1731.2200	182.7090	0.0000	105.0550	1206.4640
2008	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	21	22	23	24	25
SURVEY TAG	MADMF_F	MADMF_F	MADMF_F	MADMF_F	MENH_S
AGE	3	4	5	6	1
TIME	MEAN	MEAN	MEAN	MEAN	JAN-1
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	0	0	0	0	1
1985	282.6900	0.0000	0.0000	4.8820	-999.0000
1986	55.5450	9.1070	1.9750	0.0000	-999.0000
1987	135.1180	19.3930	5.4580	0.0000	-999.0000
1988	622.6800	41.2820	0.0000	0.0000	-999.0000
1989	263.3520	28.3350	0.0000	0.0000	-999.0000
1990	1327.7580	1.5910	0.0000	0.0000	-999.0000
1991	1379.0510	235.1270	0.0000	0.0000	-999.0000
1992	569.5490	129.3310	55.5720	0.0000	-999.0000
1993	1591.3700	393.0120	0.0000	0.0000	-999.0000
1994	349.2340	36.0700	0.0000	0.0000	-999.0000
1995	1235.5120	0.0000	0.0000	0.0000	-999.0000
1996	463.4230	32.8330	0.0000	0.0000	-999.0000
1997	171.2710	21.6970	12.5900	0.0000	-999.0000
1998	464.0270	0.0000	0.0000	0.0000	-999.0000
1999	846.4780	134.7890	16.5130	0.0000	-999.0000
2000	808.5150	56.1480	23.8640	8.5850	-999.0000
2001	868.5860	29.6790	0.0000	0.0000	0.0000
2002	626.3550	250.7340	9.9300	0.0000	0.0000
2003	856.7370	655.8150	15.9910	0.0000	0.0000
2004	1743.5910	522.5620	2.5240	0.0000	0.0000
2005	1046.9880	56.2310	0.0000	0.0000	0.0210
2006	1044.4370	111.9950	0.0000	0.0000	0.0000
2007	931.7840	155.7180	0.0000	0.0000	0.0000
2008	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	26	27	28	29	30
SURVEY TAG	MENH_S	MENH_S	MENH_S	MENH_S	MENH_S
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
1985	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1986	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1987	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1988	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1989	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1990	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1991	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1992	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1993	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1994	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1995	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1996	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1997	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1998	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1999	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
2000	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
2001	0.5990	2.0870	0.5350	0.1320	0.0000
2002	0.2260	1.9810	0.8450	0.0480	0.0410
2003	0.4730	0.8050	0.8500	0.1140	0.0000
2004	0.1510	1.2410	0.4920	0.0390	0.0000
2005	0.2870	1.1070	0.2800	0.0030	0.0000
2006	0.1480	0.5600	0.1520	0.0140	0.0030
2007	0.8590	2.6610	1.0710	0.1290	0.0000
2008	0.0000	0.0000	0.0000	0.0000	0.0000

SURVEY - INPUT DATA

INDEX	31	32	33	34	35
SURVEY TAG	MENH_F	MENH_F	MENH_F	MENH_F	MENH_F
AGE	1	2	3	4	5
TIME	MEAN	MEAN	MEAN	MEAN	MEAN
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	0	0	0	0	0
1985	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1986	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1987	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1988	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1989	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1990	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1991	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1992	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1993	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1994	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1995	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1996	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1997	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000
1998	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000

```
    1999     -999.0000   -999.0000   -999.0000   -999.0000   -999.0000
    2000        0.0530      1.7990      0.6400      0.0300      0.0100
    2001        0.0620      0.9070      0.4190      0.0110      0.0000
    2002        0.0000      0.2020      0.5600      0.1770      0.0050
    2003        0.0000      0.9500      0.3340      0.2580      0.0000
    2004        0.0320      1.3740      0.7800      0.1840      0.0000
    2005        0.0000      0.2520      0.2120      0.0000      0.0000
    2006        0.0000      0.1210      0.1200      0.0020      0.0000
    2007     -999.0000   -999.0000   -999.0000   -999.0000   -999.0000
    2008        0.0000      0.0000      0.0000      0.0000      0.0000

INDEX            36

SURVEY TAG     MENH_F

AGE                6      NUMBERS     NUMBERS     NUMBERS     NUMBERS
TIME            MEAN      NUMBERS     NUMBERS     NUMBERS     NUMBERS
TYPE           NUMBERS     NUMBERS     NUMBERS     NUMBERS     NUMBERS
RETRO FLAG         0
```

```
    1985     -999.0000
    1986     -999.0000
    1987     -999.0000
    1988     -999.0000
    1989     -999.0000
    1990     -999.0000
    1991     -999.0000
    1992     -999.0000
    1993     -999.0000
    1994     -999.0000
    1995     -999.0000
    1996     -999.0000
    1997     -999.0000
    1998     -999.0000
    1999     -999.0000
    2000        0.0000
    2001        0.0000
    2002        0.0000
    2003        0.0000
    2004        0.0000
    2005        0.0000
    2006        0.0000
    2007     -999.0000
    2008        0.0000

     Additional Output Files

Population File C:\WORKING\ASSESSMENTS\GARM3THEFINALE\YTASSESSMENTS\CCGOM\VPA\6P
Auxilliary File C:\WORKING\ASSESSMENTS\GARM3THEFINALE\YTASSESSMENTS\CCGOM\VPA\6P
Covariance File C:\WORKING\ASSESSMENTS\GARM3THEFINALE\YTASSESSMENTS\CCGOM\VPA\6P
Residuals File  C:\WORKING\ASSESSMENTS\GARM3THEFINALE\YTASSESSMENTS\CCGOM\VPA\6P
Log File        C:\WORKING\ASSESSMENTS\GARM3THEFINALE\YTASSESSMENTS\CCGOM\VPA\6P
```

Estimation Results

JAN-1 Population Numbers

AGE	1985	1986	1987	1988	1989
1	11698.	5778.	8201.	23080.	8673.
2	3324.	8959.	4645.	6697.	18488.
3	1736.	1607.	3563.	2116.	3172.
4	777.	613.	615.	853.	406.
5	403.	81.	231.	228.	52.
6	148.	16.	106.	47.	12.
Total	18086.	17053.	17360.	33021.	30803.

AGE	1990	1991	1992	1993	1994
1	7361.	9443.	7880.	5956.	6707.
2	6994.	5951.	7311.	4915.	4733.
3	13067.	3135.	3639.	2444.	3640.
4	985.	2407.	997.	1233.	1041.
5	70.	367.	261.	172.	305.
6	56.	91.	19.	84.	158.
Total	28534.	21394.	20107.	14804.	16585.

AGE	1995	1996	1997	1998	1999
1	5709.	7197.	7558.	7842.	9755.
2	5474.	4641.	5869.	6181.	6386.
3	3139.	4007.	3091.	3475.	4614.
4	1465.	990.	1125.	753.	630.
5	220.	160.	239.	176.	51.
6	210.	14.	27.	3.	11.
Total	16217.	17008.	17909.	18430.	21446.

AGE	2000	2001	2002	2003	2004
1	8849.	6428.	5264.	3905.	3947.
2	7978.	7243.	5245.	4257.	3188.
3	4559.	5528.	4722.	3212.	2713.
4	1733.	1092.	1235.	1684.	751.
5	164.	187.	149.	213.	320.
6	43.	31.	46.	98.	99.
Total	23325.	20509.	16661.	13370.	11018.

AGE	2005	2006	2007	2008
1	5653.	10185.	3540.	7211.
2	3220.	4615.	8332.	2886.
3	2182.	2191.	3608.	6575.
4	805.	665.	1200.	2295.
5	113.	143.	198.	615.
6	66.	92.	51.	142.
Total	12040.	17892.	16929.	19724.

Fishing Mortality Calculated

AGE	1985	1986	1987	1988	1989
1	0.0668	0.0183	0.0026	0.0218	0.0151
2	0.5270	0.7220	0.5860	0.5474	0.1470
3	0.8406	0.7600	1.2296	1.4506	0.9688
4	2.0651	0.7766	0.7919	2.6014	1.5589
5	2.0651	0.7766	0.7919	2.6014	1.5589
6	2.0651	0.7766	0.7919	2.6014	1.5589

AGE	1990	1991	1992	1993	1994
1	0.0127	0.0558	0.2721	0.0299	0.0031
2	0.6023	0.2919	0.8958	0.1001	0.2105
3	1.4919	0.9456	0.8820	0.6533	0.7100
4	0.7872	2.0232	1.5562	1.1960	1.3564
5	0.7872	2.0232	1.5562	1.1960	1.3564
6	0.7872	2.0232	1.5562	1.1960	1.3564

AGE	1995	1996	1997	1998	1999
1	0.0072	0.0040	0.0012	0.0054	0.0010
2	0.1119	0.2064	0.3240	0.0924	0.1371
3	0.9542	1.0700	1.2124	1.5078	0.7790
4	2.0172	1.2204	1.6551	2.4965	1.1474
5	2.0172	1.2204	1.6551	2.4965	1.1474
6	2.0172	1.2204	1.6551	2.4965	1.1474

AGE	2000	2001	2002	2003	2004
1	0.0002	0.0034	0.0122	0.0028	0.0036
2	0.1668	0.2277	0.2904	0.2506	0.1790
3	1.2287	1.2991	0.8312	1.2530	1.0151
4	2.0291	1.7941	1.5559	1.4616	1.6958
5	2.0291	1.7941	1.5559	1.4616	1.6958
6	2.0291	1.7941	1.5559	1.4616	1.6958

AGE	2005	2006	2007
1	0.0029	0.0008	0.0044
2	0.1848	0.0462	0.0369
3	0.9883	0.4021	0.2522
4	1.5262	1.0118	0.4684
5	1.5262	1.0118	0.3603
6	1.5262	1.0118	0.3603

Average Fishing Mortality For Ages 4- 5

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1985	2.0651	2.0651	2.0651	2.0651
1986	0.7766	0.7766	0.7766	0.7766
1987	0.7919	0.7919	0.7919	0.7919
1988	2.6014	2.6014	2.6014	2.6014
1989	1.5589	1.5589	1.5589	1.5589
1990	0.7872	0.7872	0.7872	0.7872
1991	2.0232	2.0232	2.0232	2.0232
1992	1.5562	1.5562	1.5562	1.5562
1993	1.1960	1.1960	1.1960	1.1960
1994	1.3564	1.3564	1.3564	1.3564
1995	2.0172	2.0172	2.0172	2.0172
1996	1.2204	1.2204	1.2204	1.2204
1997	1.6551	1.6551	1.6551	1.6551
1998	2.4965	2.4965	2.4965	2.4965
1999	1.1474	1.1474	1.1474	1.1474
2000	2.0291	2.0291	2.0291	2.0291
2001	1.7941	1.7941	1.7941	1.7941
2002	1.5559	1.5559	1.5559	1.5559
2003	1.4616	1.4616	1.4616	1.4616
2004	1.6958	1.6958	1.6958	1.6958
2005	1.5262	1.5262	1.5262	1.5262
2006	1.0118	1.0118	1.0118	1.0118
2007	0.4144	0.4531	0.4500	0.4525

Back Calculated Partial Recruitment

AGE	1985	1986	1987	1988	1989
1	0.0324	0.0236	0.0021	0.0084	0.0097
2	0.2552	0.9297	0.4766	0.2104	0.0943
3	0.4071	0.9787	1.0000	0.5576	0.6215
4	1.0000	1.0000	0.6440	1.0000	1.0000
5	1.0000	1.0000	0.6440	1.0000	1.0000
6	1.0000	1.0000	0.6440	1.0000	1.0000

AGE	1990	1991	1992	1993	1994
1	0.0085	0.0276	0.1748	0.0250	0.0023
2	0.4037	0.1443	0.5756	0.0837	0.1552
3	1.0000	0.4674	0.5667	0.5463	0.5234
4	0.5276	1.0000	1.0000	1.0000	1.0000
5	0.5276	1.0000	1.0000	1.0000	1.0000
6	0.5276	1.0000	1.0000	1.0000	1.0000

AGE	1995	1996	1997	1998	1999
1	0.0036	0.0033	0.0007	0.0021	0.0009
2	0.0555	0.1691	0.1958	0.0370	0.1195
3	0.4730	0.8767	0.7325	0.6040	0.6789
4	1.0000	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

AGE	2000	2001	2002	2003	2004
1	0.0001	0.0019	0.0079	0.0019	0.0021
2	0.0822	0.1269	0.1867	0.1715	0.1056
3	0.6055	0.7241	0.5342	0.8573	0.5986
4	1.0000	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

AGE	2005	2006	2007
1	0.0019	0.0007	0.0093
2	0.1211	0.0457	0.0788
3	0.6476	0.3974	0.5384
4	1.0000	1.0000	1.0000
5	1.0000	1.0000	0.7692
6	1.0000	1.0000	0.7692

JAN-1 Biomass

AGE	1985	1986	1987	1988	1989
1	1122.	396.	239.	1916.	797.
2	697.	1628.	718.	719.	3369.
3	507.	542.	1117.	593.	891.
4	311.	268.	298.	387.	190.
5	218.	48.	136.	141.	36.
6	116.	16.	97.	40.	16.
Total	2971.	2898.	2605.	3795.	5299.

AGE	1990	1991	1992	1993	1994
1	336.	1122.	240.	379.	321.
2	1266.	812.	946.	453.	589.
3	4130.	924.	1008.	537.	866.
4	452.	1053.	412.	455.	446.
5	51.	234.	145.	104.	162.
6	54.	93.	22.	84.	143.
Total	6291.	4238.	2773.	2012.	2527.

AGE	1995	1996	1997	1998	1999
1	143.	492.	913.	297.	940.
2	905.	562.	1022.	1076.	1053.
3	763.	1374.	968.	1149.	1344.
4	566.	392.	482.	357.	307.
5	126.	81.	127.	113.	31.
6	166.	17.	23.	2.	9.
Total	2669.	2918.	3535.	2994.	3684.

AGE	2000	2001	2002	2003	2004
1	484.	1148.	944.	200.	165.
2	1813.	1350.	1500.	1128.	471.
3	1757.	2096.	1837.	1245.	939.
4	831.	543.	596.	817.	328.
5	100.	123.	99.	131.	182.
6	36.	28.	48.	93.	82.
Total	5022.	5288.	5025.	3614.	2168.

AGE	2005	2006	2007	2008
1	158.	662.	27.	242.
2	457.	635.	1441.	435.
3	664.	701.	1256.	2131.
4	352.	279.	527.	992.
5	64.	91.	109.	358.
6	61.	85.	43.	128.
Total	1756.	2453.	3402.	4285.

Mean Biomass

AGE	1985	1986	1987	1988	1989
1	1355.	535.	416.	2546.	1007.
2	628.	1463.	746.	972.	4218.
3	385.	442.	745.	350.	716.
4	150.	209.	214.	150.	124.
5	96.	38.	96.	53.	23.
6	46.	10.	61.	13.	8.
Total	2661.	2697.	2278.	4084.	6095.

AGE	1990	1991	1992	1993	1994
1	524.	1033.	333.	474.	540.
2	1222.	1109.	600.	679.	675.
3	2331.	638.	723.	589.	846.
4	344.	499.	234.	278.	270.
5	37.	109.	74.	68.	104.
6	35.	37.	11.	45.	73.
Total	4492.	3426.	1973.	2133.	2509.

AGE	1995	1996	1997	1998	1999
1	284.	710.	993.	560.	1308.
2	1444.	1014.	1270.	1120.	1865.
3	633.	869.	611.	655.	1195.
4	249.	244.	245.	159.	209.
5	57.	52.	67.	52.	17.
6	67.	9.	10.	1.	5.
Total	2732.	2899.	3195.	2546.	4598.

AGE	2000	2001	2002	2003	2004
1	810.	1315.	1034.	308.	275.
2	2331.	2027.	1501.	1104.	666.
3	1048.	1180.	1296.	703.	584.
4	393.	271.	329.	439.	155.
5	41.	62.	54.	70.	87.
6	14.	12.	23.	45.	37.
Total	4637.	4867.	4237.	2668.	1804.

AGE	2005	2006	2007
1	317.	978.	115.
2	698.	1248.	2092.
3	471.	645.	1152.
4	197.	184.	431.
5	37.	65.	95.
6	29.	49.	33.
Total	1749.	3170.	3919.

Spawning Stock Biomass

AGE	1985	1986	1987	1988	1989
1	0.	0.	0.	0.	0.
2	112.	261.	133.	173.	739.
3	335.	384.	643.	300.	622.
4	144.	213.	218.	136.	124.
5	94.	39.	100.	49.	23.
6	45.	11.	64.	12.	8.
Total	730.	908.	1157.	670.	1515.

AGE	1990	1991	1992	1993	1994
1	0.	0.	0.	0.	0.
2	217.	196.	107.	119.	119.
3	1990.	554.	628.	511.	735.
4	351.	481.	233.	282.	272.
5	38.	107.	75.	71.	108.
6	36.	37.	11.	47.	75.
Total	2633.	1375.	1054.	1029.	1308.

AGE	1995	1996	1997	1998	1999
1	0.	0.	0.	0.	0.
2	252.	178.	224.	196.	326.
3	550.	753.	527.	558.	1038.
4	240.	247.	243.	146.	212.
5	56.	54.	68.	49.	17.
6	66.	10.	11.	1.	5.
Total	1164.	1242.	1073.	949.	1599.

AGE	2000	2001	2002	2003	2004
1	0.	0.	0.	0.	0.
2	409.	356.	265.	194.	117.
3	904.	1016.	1126.	606.	507.
4	379.	266.	328.	440.	153.
5	40.	62.	55.	72.	88.
6	14.	12.	23.	46.	37.
Total	1746.	1713.	1797.	1359.	902.

AGE	2005	2006	2007
1	0.	0.	0.
2	122.	217.	364.
3	409.	557.	988.
4	197.	187.	437.
5	38.	68.	99.
6	30.	51.	34.
Total	796.	1080.	1922.

Catch Biomass

AGE	1985	1986	1987	1988	1989
1	91.	10.	1.	56.	15.
2	331.	1056.	437.	532.	620.
3	324.	336.	916.	508.	694.
4	311.	162.	169.	389.	194.
5	197.	29.	76.	139.	35.
6	95.	8.	49.	34.	12.
Total	1349.	1602.	1648.	1658.	1570.

AGE	1990	1991	1992	1993	1994
1	7.	58.	91.	14.	2.
2	736.	324.	537.	68.	142.
3	3478.	604.	637.	384.	601.
4	271.	1010.	364.	332.	367.
5	29.	220.	115.	82.	142.
6	27.	76.	16.	54.	99.
Total	4548.	2290.	1760.	935.	1351.

AGE	1995	1996	1997	1998	1999
1	2.	3.	1.	3.	1.
2	161.	209.	411.	103.	256.
3	604.	930.	741.	987.	931.
4	501.	298.	405.	396.	240.
5	114.	63.	111.	130.	19.
6	134.	11.	17.	2.	6.
Total	1518.	1515.	1686.	1622.	1452.

AGE	2000	2001	2002	2003	2004
1	0.	5.	13.	1.	1.
2	389.	462.	436.	277.	119.
3	1288.	1533.	1078.	881.	593.
4	797.	486.	511.	642.	263.
5	83.	111.	84.	102.	148.
6	29.	22.	35.	66.	62.
Total	2586.	2618.	2157.	1968.	1186.

AGE	2005	2006	2007
1	1.	1.	1.
2	129.	58.	77.
3	466.	260.	291.
4	301.	186.	202.
5	57.	66.	45.
6	44.	50.	12.
Total	997.	620.	627.

Catch Numbers

AGE	1985	1986	1987	1988	1989
1	686.0	95.0	19.0	452.0	118.0
2	1245.0	4225.0	1885.0	2582.0	2297.0
3	907.0	785.0	2331.0	1503.0	1812.0
4	635.0	304.0	309.0	744.0	298.0
5	329.0	40.0	116.0	199.0	38.0
6	121.0	8.0	53.0	41.0	9.0
Total	3923.0	5457.0	4713.0	5521.0	4572.0

AGE	1990	1991	1992	1993	1994
1	84.0	465.0	1709.0	159.0	19.0
2	2897.0	1372.0	3979.0	425.0	817.0
3	9400.0	1765.0	1961.0	1074.0	1697.0
4	493.0	1953.0	731.0	795.0	716.0
5	35.0	298.0	191.0	111.0	210.0
6	28.0	74.0	14.0	54.0	109.0
Total	12937.0	5927.0	8585.0	2618.0	3568.0

AGE	1995	1996	1997	1998	1999
1	37.0	26.0	8.0	38.0	9.0
2	526.0	787.0	1480.0	495.0	743.0
3	1777.0	2428.0	2007.0	2512.0	2292.0
4	1188.0	645.0	847.0	650.0	397.0
5	178.0	104.0	180.0	152.0	32.0
6	170.0	9.0	20.0	3.0	7.0
Total	3876.0	3999.0	4542.0	3850.0	3480.0

AGE	2000	2001	2002	2003	2004
1	2.0	20.0	58.0	10.0	13.0
2	1114.0	1342.0	1204.0	859.0	475.0
3	2981.0	3721.0	2449.0	2122.0	1594.0
4	1408.0	849.0	905.0	1200.0	571.0
5	133.0	145.0	109.0	152.0	243.0
6	35.0	24.0	34.0	70.0	75.0
Total	5673.0	6101.0	4759.0	4413.0	2971.0

AGE	2005	2006	2007
1	15.0	7.0	14.0
2	494.0	189.0	274.0
3	1262.0	662.0	732.0
4	585.0	390.0	410.0
5	82.0	84.0	71.0
6	48.0	54.0	14.0
Total	2486.0	1386.0	1515.0

Surplus Production

Average Adjustment Factor (Delta) = 1.0000

Year	Biomass	Delta Biomass	Catch Biomass	Surplus Production
1985	2971.240	-72.963	1348.542	1275.579
1986	2898.276	-293.185	1601.519	1308.334
1987	2605.091	1189.554	1647.979	2837.533
1988	3794.645	1504.423	1657.599	3162.022
1989	5299.069	991.551	1570.225	2561.776
1990	6290.620	-2052.948	4547.624	2494.676
1991	4237.672	-1464.426	2289.963	825.537
1992	2773.245	-761.449	1760.453	999.004
1993	2011.796	515.692	934.706	1450.398
1994	2527.488	141.546	1351.255	1492.801
1995	2669.034	248.779	1517.787	1766.566
1996	2917.813	617.328	1514.820	2132.148
1997	3535.141	-541.443	1686.049	1144.606
1998	2993.698	690.167	1621.756	2311.923
1999	3683.865	1338.299	1452.103	2790.402
2000	5022.164	266.308	2585.792	2852.100
2001	5288.471	-263.555	2618.174	2354.619
2002	5024.917	-1410.978	2157.171	746.193
2003	3613.938	-1446.130	1968.392	522.262
2004	2167.808	-412.252	1186.166	773.914
2005	1755.557	697.422	997.348	1694.770
2006	2452.978	948.936	619.919	1568.855
2007	3401.915	883.430	626.796	1510.226
2008	4285.345			

Summary of Survey Indices Used in the Estimate

INDEX	Survey Tag	Age	Time	Type	Catchability	Std. Error	CV
1	NEFSC_S	1	JAN-1	NUMBER	0.4288E-02	0.1104E-02	0.2573E+00
2	NEFSC_S	2	JAN-1	NUMBER	0.9040E-01	0.1139E-01	0.1260E+00
3	NEFSC_S	3	JAN-1	NUMBER	0.2828E+00	0.4129E-01	0.1460E+00
4	NEFSC_S	4	JAN-1	NUMBER	0.3484E+00	0.5718E-01	0.1641E+00
5	NEFSC_S	5	JAN-1	NUMBER	0.4134E+00	0.9509E-01	0.2300E+00
6	NEFSC_S	6	JAN-1	NUMBER	0.3925E+00	0.1543E+00	0.3931E+00
7	NEFSC_F	1	MEAN	NUMBER	0.5863E-01	0.9632E-02	0.1643E+00
8	NEFSC_F	2	MEAN	NUMBER	0.2060E+00	0.2807E-01	0.1363E+00
9	NEFSC_F	3	MEAN	NUMBER	0.2314E+00	0.3442E-01	0.1488E+00
10	NEFSC_F	4	MEAN	NUMBER	0.1659E+00	0.4851E-01	0.2924E+00
11	NEFSC_F	5	MEAN	NUMBER	0.5489E+00	0.2156E+00	0.3929E+00
13	MADMF_S	1	JAN-1	NUMBER	0.2343E-01	0.5606E-02	0.2393E+00
14	MADMF_S	2	JAN-1	NUMBER	0.3409E+00	0.4406E-01	0.1292E+00
15	MADMF_S	3	JAN-1	NUMBER	0.6630E+00	0.8722E-01	0.1316E+00
16	MADMF_S	4	JAN-1	NUMBER	0.5873E+00	0.9790E-01	0.1667E+00
17	MADMF_S	5	JAN-1	NUMBER	0.5031E+00	0.8354E-01	0.1660E+00
18	MADMF_S	6	JAN-1	NUMBER	0.3499E+00	0.9921E-01	0.2835E+00
19	MADMF_F	1	MEAN	NUMBER	0.1059E+00	0.1822E-01	0.1721E+00
20	MADMF_F	2	MEAN	NUMBER	0.3056E+00	0.4471E-01	0.1463E+00
21	MADMF_F	3	MEAN	NUMBER	0.3019E+00	0.5120E-01	0.1696E+00
22	MADMF_F	4	MEAN	NUMBER	0.1342E+00	0.4269E-01	0.3181E+00
23	MADMF_F	5	MEAN	NUMBER	0.1225E+00	0.4996E-01	0.4079E+00
26	MENH_S	2	JAN-1	NUMBER	0.6612E-04	0.1218E-04	0.1841E+00
27	MENH_S	3	JAN-1	NUMBER	0.4033E-03	0.5815E-04	0.1442E+00
28	MENH_S	4	JAN-1	NUMBER	0.5005E-03	0.8641E-04	0.1727E+00
29	MENH_S	5	JAN-1	NUMBER	0.2203E-03	0.1017E-03	0.4616E+00
32	MENH_F	2	MEAN	NUMBER	0.1348E-03	0.5217E-04	0.3870E+00
33	MENH_F	3	MEAN	NUMBER	0.1893E-03	0.4168E-04	0.2202E+00
34	MENH_F	4	MEAN	NUMBER	0.8052E-04	0.6014E-04	0.7469E+00

Survey Index: 1 Tag: NEFSC_S AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.428830E-02 % Variance Contribution = 5.8932
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.181030E+02	0.501646E+02	-0.101923E+01
1986	0.625300E+01	0.247773E+02	-0.137687E+01
1987	0.204570E+02	0.351662E+02	-0.541761E+00
1988	0.345647E+03	0.989729E+02	0.125057E+01
1989	0.581680E+02	0.371928E+02	0.447220E+00
1990	N/A	0.315677E+02	N/A
1991	0.136715E+03	0.404927E+02	0.121678E+01
1992	0.596730E+02	0.337908E+02	0.568692E+00
1993	0.245480E+02	0.255403E+02	-0.396282E-01
1994	0.113826E+03	0.287599E+02	0.137569E+01
1995	0.703650E+02	0.244814E+02	0.105578E+01
1996	0.571300E+01	0.308618E+02	-0.168677E+01
1997	0.814400E+01	0.324103E+02	-0.138119E+01
1998	N/A	0.336267E+02	N/A
1999	0.679300E+01	0.418302E+02	-0.181773E+01
2000	0.268640E+02	0.379451E+02	-0.345353E+00
2001	N/A	0.275666E+02	N/A
2002	0.575100E+01	0.225738E+02	-0.136742E+01
2003	0.360890E+02	0.167461E+02	0.767821E+00
2004	0.141694E+03	0.169265E+02	0.212479E+01
2005	0.342750E+02	0.242436E+02	0.346262E+00
2006	0.519920E+02	0.436764E+02	0.174282E+00
2007	0.194540E+02	0.151801E+02	0.248069E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 2 Tag: NEFSC_S AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.904027E-01 % Variance Contribution = 2.0532
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.310947E+03	0.300519E+03	0.341103E-01
1986	0.692529E+03	0.809877E+03	-0.156532E+00
1987	0.524511E+03	0.419897E+03	0.222456E+00
1988	0.145924E+04	0.605413E+03	0.879763E+00
1989	0.714839E+03	0.167136E+04	-0.849336E+00
1990	0.727538E+03	0.632309E+03	0.140288E+00
1991	0.116740E+04	0.537996E+03	0.774685E+00
1992	0.352981E+03	0.660960E+03	-0.627279E+00
1993	0.253050E+03	0.444291E+03	-0.562893E+00
1994	0.863017E+03	0.427845E+03	0.701674E+00
1995	0.401228E+03	0.494840E+03	-0.209706E+00
1996	0.211055E+03	0.419525E+03	-0.687005E+00
1997	0.360353E+03	0.530548E+03	-0.386826E+00
1998	0.279721E+03	0.558744E+03	-0.691898E+00
1999	0.327158E+03	0.577290E+03	-0.567902E+00
2000	0.371770E+04	0.721250E+03	0.163988E+01
2001	0.463449E+03	0.654764E+03	-0.345579E+00
2002	0.603290E+03	0.474164E+03	0.240845E+00
2003	0.333257E+03	0.384886E+03	-0.144032E+00
2004	0.230354E+03	0.288220E+03	-0.224105E+00
2005	0.224680E+03	0.291088E+03	-0.258950E+00
2006	0.429444E+03	0.417217E+03	0.288839E-01
2007	0.836809E+03	0.753278E+03	0.105162E+00
2008	0.670683E+03	0.260863E+03	0.944301E+00

Survey Index: 3 Tag: NEFSC_S AGE = 3

Time = JAN-1 Type = NUMBER
Catchability = 0.282809E+00 % Variance Contribution = 2.7557
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.333990E+03	0.490966E+03	-0.385263E+00
1986	0.764630E+02	0.454406E+03	-0.178218E+01
1987	0.773508E+03	0.100768E+04	-0.264474E+00
1988	0.355914E+03	0.598540E+03	-0.519804E+00
1989	0.473214E+03	0.896934E+03	-0.639434E+00
1990	0.202533E+04	0.369540E+04	-0.601357E+00
1991	0.945656E+03	0.886729E+03	0.643400E-01
1992	0.708239E+03	0.102913E+04	-0.373691E+00
1993	0.403390E+03	0.691164E+03	-0.538473E+00
1994	0.517718E+03	0.102955E+04	-0.687443E+00
1995	0.153548E+04	0.887828E+03	0.547817E+00
1996	0.552109E+03	0.113328E+04	-0.719129E+00
1997	0.781421E+03	0.874144E+03	-0.112131E+00
1998	0.113564E+04	0.982799E+03	0.144544E+00
1999	0.140235E+04	0.130482E+04	0.720842E-01
2000	0.655861E+04	0.128920E+04	0.162675E+01
2001	0.188278E+04	0.156350E+04	0.185825E+00
2002	0.272928E+04	0.133547E+04	0.714754E+00
2003	0.928364E+03	0.908347E+03	0.217973E-01
2004	0.101008E+04	0.767252E+03	0.274966E+00
2005	0.147461E+04	0.617215E+03	0.870928E+00
2006	0.131967E+04	0.619736E+03	0.755846E+00
2007	0.241019E+04	0.102035E+04	0.859557E+00
2008	0.301745E+04	0.185938E+04	0.484171E+00

Survey Index: 4 Tag: NEFSC_S AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.348440E+00 % Variance Contribution = 3.4810
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.806700E+02	0.270804E+03	-0.121103E+01
1986	0.528020E+02	0.213677E+03	-0.139792E+01
1987	0.208855E+03	0.214358E+03	-0.260054E-01
1988	0.197816E+03	0.297218E+03	-0.407129E+00
1989	0.122125E+03	0.141535E+03	-0.147499E+00
1990	0.817120E+02	0.343377E+03	-0.143563E+01
1991	0.327120E+03	0.838555E+03	-0.941353E+00
1992	0.192374E+03	0.347444E+03	-0.591162E+00
1993	0.217308E+03	0.429734E+03	-0.681850E+00
1994	0.310407E+03	0.362773E+03	-0.155892E+00
1995	0.116362E+04	0.510602E+03	0.823700E+00
1996	0.775284E+03	0.344909E+03	0.809949E+00
1997	0.596458E+03	0.392134E+03	0.419404E+00
1998	0.347924E+03	0.262323E+03	0.282408E+00
1999	0.715264E+03	0.219494E+03	0.118133E+01
2000	0.911535E+03	0.603967E+03	0.411611E+00
2001	0.397407E+03	0.380616E+03	0.431705E-01
2002	0.125896E+04	0.430193E+03	0.107381E+01
2003	0.678634E+03	0.586732E+03	0.145514E+00
2004	0.138375E+03	0.261737E+03	-0.637373E+00
2005	0.495640E+03	0.280462E+03	0.569412E+00
2006	0.465958E+03	0.231735E+03	0.698499E+00
2007	0.164884E+04	0.418164E+03	0.137195E+01
2008	0.656208E+03	0.799825E+03	-0.197916E+00

Survey Index: 5 Tag: NEFSC_S AGE = 5
Time = JAN-1 Type = NUMBER

```
Catchability =    0.413448E+00   % Variance Contribution =     5.2019
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
-------------------------------------------------------------------------

1985     0.499070E+02     0.166483E+03    -0.120473E+01
1986     0.384050E+02     0.333609E+02     0.140804E+00
1987     0.177011E+03     0.954842E+02     0.617251E+00
1988     0.103598E+03     0.943297E+02     0.937219E-01
1989     0.127258E+03     0.214153E+02     0.178211E+01
1990     N/A              0.289258E+02     N/A
1991     0.741090E+02     0.151823E+03    -0.717181E+00
1992     0.702500E+01     0.107719E+03    -0.273005E+01
1993     N/A              0.711949E+02     N/A
1994     0.197932E+03     0.126251E+03     0.449653E+00
1995     0.157326E+03     0.907778E+02     0.549905E+00
1996     0.129265E+03     0.659889E+02     0.672377E+00
1997     0.111201E+03     0.988820E+02     0.117412E+00
1998     0.553880E+02     0.727880E+02    -0.273188E+00
1999     0.128185E+03     0.209930E+02     0.180928E+01
2000     0.643050E+02     0.676948E+02    -0.513715E-01
2001     0.833340E+02     0.771330E+02     0.773252E-01
2002     0.822530E+02     0.614801E+02     0.291086E+00
2003     0.303884E+03     0.881851E+02     0.123721E+01
2004     0.541920E+02     0.132169E+03    -0.891545E+00
2005     N/A              0.466472E+02     N/A
2006     0.366300E+02     0.592244E+02    -0.480466E+00
2007     0.824840E+02     0.818512E+02     0.770083E-02
2008     0.568940E+02     0.254294E+03    -0.149730E+01

Survey Index:    6 Tag:         NEFSC_S  AGE =  6
Time = JAN-1           Type = NUMBER
Catchability =    0.392500E+00   % Variance Contribution =     5.6449
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
-------------------------------------------------------------------------

1985     0.127370E+02     0.581269E+02    -0.151812E+01
1986     N/A              0.633411E+01     N/A
1987     0.487225E+03     0.414159E+02     0.246506E+01
1988     0.594030E+02     0.184500E+02     0.116928E+01
1989     N/A              0.481504E+01     N/A
1990     0.326150E+02     0.219682E+02     0.395177E+00
1991     0.154390E+02     0.357909E+02    -0.840796E+00
1992     N/A              0.749561E+01     N/A
1993     N/A              0.328804E+02     N/A
1994     0.666210E+02     0.622099E+02     0.685058E-01
1995     0.184500E+02     0.823051E+02    -0.149537E+01
1996     N/A              0.542124E+01     N/A
1997     N/A              0.104302E+02     N/A
1998     N/A              0.136381E+01     N/A
1999     0.567010E+02     0.435955E+01     0.256542E+01
2000     0.321520E+02     0.169118E+02     0.642464E+00
2001     N/A              0.121200E+02     N/A
2002     0.199940E+02     0.182056E+02     0.937026E-01
2003     0.976500E+01     0.385539E+02    -0.137325E+01
2004     N/A              0.387259E+02     N/A
2005     N/A              0.259221E+02     N/A
2006     0.129300E+02     0.361437E+02    -0.102795E+01
2007     N/A              0.199195E+02     N/A
2008     0.177550E+02     0.557452E+02    -0.114412E+01

Survey Index:    7 Tag:         NEFSC_F  AGE =  1
Time = MEAN            Type = NUMBER
Catchability =    0.586332E-01   % Variance Contribution =     3.1977
```

Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.148199E+04	0.602014E+03	0.900862E+00
1986	0.398485E+03	0.304348E+03	0.269497E+00
1987	0.181565E+03	0.435253E+03	-0.874313E+00
1988	0.100611E+04	0.121365E+04	-0.187546E+00
1989	0.474020E+03	0.457553E+03	0.353561E-01
1990	0.957015E+03	0.388812E+03	0.900723E+00
1991	0.503005E+03	0.488506E+03	0.292487E-01
1992	0.810321E+03	0.368272E+03	0.788608E+00
1993	0.121556E+04	0.311977E+03	0.136003E+01
1994	0.795330E+03	0.355863E+03	0.804211E+00
1995	0.179346E+03	0.302332E+03	-0.522210E+00
1996	0.340484E+03	0.381712E+03	-0.114299E+00
1997	0.337492E+03	0.401412E+03	-0.173446E+00
1998	0.328613E+03	0.415636E+03	-0.234929E+00
1999	0.132404E+04	0.518119E+03	0.938236E+00
2000	0.287854E+03	0.470172E+03	-0.490644E+00
2001	0.433330E+02	0.341048E+03	-0.206311E+01
2002	0.128453E+03	0.278095E+03	-0.772400E+00
2003	0.192021E+03	0.207240E+03	-0.762730E-01
2004	0.761780E+02	0.209391E+03	-0.101113E+01
2005	0.533662E+03	0.300010E+03	0.575947E+00
2006	0.780307E+03	0.541054E+03	0.366168E+00
2007	0.119864E+03	0.187720E+03	-0.448591E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 8 Tag: NEFSC_F AGE = 2
Time = MEAN Type = NUMBER
Catchability = 0.205993E+00 % Variance Contribution = 2.1997
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.568309E+03	0.486626E+03	0.155169E+00
1986	0.110812E+04	0.120548E+04	-0.842183E-01
1987	0.436413E+03	0.662607E+03	-0.417593E+00
1988	0.147572E+04	0.971591E+03	0.417965E+00
1989	0.140858E+04	0.321779E+04	-0.826113E+00
1990	0.169573E+04	0.990745E+03	0.537409E+00
1991	0.449153E+03	0.968300E+03	-0.768178E+00
1992	0.887239E+03	0.914974E+03	-0.307815E-01
1993	0.123252E+04	0.874581E+03	0.343068E+00
1994	0.237016E+04	0.799590E+03	0.108662E+01
1995	0.218175E+03	0.968669E+03	-0.149063E+01
1996	0.935075E+03	0.785542E+03	0.174252E+00
1997	0.799769E+03	0.940951E+03	-0.162568E+00
1998	0.959846E+03	0.110393E+04	-0.139861E+00
1999	0.260256E+04	0.111668E+04	0.846138E+00
2000	0.218390E+04	0.137575E+04	0.462116E+00
2001	0.122795E+04	0.121389E+04	0.115111E-01
2002	0.458031E+03	0.853982E+03	-0.622973E+00
2003	0.282282E+04	0.706022E+03	0.138585E+01
2004	0.371302E+03	0.546627E+03	-0.386751E+00
2005	0.425218E+03	0.550563E+03	-0.258340E+00
2006	0.487241E+03	0.842689E+03	-0.547839E+00
2007	0.209566E+04	0.152824E+04	0.315751E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 9 Tag: NEFSC_F AGE = 3
Time = MEAN Type = NUMBER
Catchability = 0.231381E+00 % Variance Contribution = 2.6220
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.483124E+03	0.249656E+03	0.660188E+00
1986	0.974740E+02	0.238979E+03	-0.896791E+00
1987	0.160784E+03	0.438623E+03	-0.100358E+01
1988	0.142512E+03	0.239732E+03	-0.520094E+00
1989	0.609261E+03	0.432743E+03	0.342104E+00
1990	0.785808E+03	0.145790E+04	-0.618039E+00
1991	0.448252E+03	0.431867E+03	0.372376E-01
1992	0.604146E+03	0.514440E+03	0.160737E+00
1993	0.164194E+03	0.380383E+03	-0.840131E+00
1994	0.835253E+03	0.553049E+03	0.412288E+00
1995	0.345695E+03	0.430901E+03	-0.220322E+00
1996	0.158519E+04	0.525057E+03	0.110495E+01
1997	0.950452E+03	0.383038E+03	0.908805E+00
1998	0.385006E+03	0.385487E+03	-0.124917E-02
1999	0.177776E+04	0.680778E+03	0.959872E+00
2000	0.144336E+04	0.561369E+03	0.944347E+00
2001	0.730058E+03	0.662720E+03	0.967711E-01
2002	0.180343E+03	0.681754E+03	-0.132981E+01
2003	0.593948E+03	0.391857E+03	0.415895E+00
2004	0.202058E+03	0.363344E+03	-0.586796E+00
2005	0.174617E+03	0.295454E+03	-0.525919E+00
2006	0.273828E+03	0.380921E+03	-0.330091E+00
2007	0.153951E+04	0.671558E+03	0.829619E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 10 Tag: NEFSC_F AGE = 4
Time = MEAN Type = NUMBER
Catchability = 0.165885E+00 % Variance Contribution = 8.4087
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.510089E+02	N/A
1986	N/A	0.649383E+02	N/A
1987	0.146050E+02	0.647273E+02	-0.148882E+01
1988	0.432040E+02	0.474427E+02	-0.935895E-01
1989	0.837700E+02	0.317112E+02	0.971404E+00
1990	0.124500E+02	0.103892E+03	-0.212163E+01
1991	0.907830E+02	0.160128E+03	-0.567504E+00
1992	0.304968E+03	0.779196E+02	0.136453E+01
1993	0.270550E+02	0.110270E+03	-0.140506E+01
1994	0.265078E+03	0.875638E+02	0.110766E+01
1995	0.911040E+02	0.976972E+02	-0.698714E-01
1996	0.379344E+03	0.876716E+02	0.146485E+01
1997	0.403118E+03	0.848911E+02	0.155786E+01
1998	0.317096E+03	0.431915E+02	0.199356E+01
1999	0.543989E+03	0.573972E+02	0.224893E+01
2000	0.735720E+02	0.115111E+03	-0.447634E+00
2001	0.304000E+02	0.784981E+02	-0.948631E+00
2002	0.488980E+02	0.964908E+02	-0.679711E+00
2003	0.139616E+03	0.136199E+03	0.247783E-01
2004	0.784900E+01	0.558562E+02	-0.196239E+01
2005	0.212000E+02	0.635859E+02	-0.109839E+01
2006	0.219720E+02	0.639434E+02	-0.106823E+01
2007	0.490748E+03	0.145188E+03	0.121790E+01
2008	N/A	0.000000E+00	N/A

Survey Index: 11 Tag: NEFSC_F AGE = 5
Time = MEAN Type = NUMBER
Catchability = 0.548869E+00 % Variance Contribution = 5.6387
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.874437E+02	N/A
1986	N/A	0.282714E+02	N/A
1987	0.118710E+02	0.803984E+02	-0.191290E+01
1988	N/A	0.419865E+02	N/A
1989	0.579050E+02	0.133795E+02	0.146508E+01
1990	0.267000E+01	0.244042E+02	-0.221268E+01
1991	N/A	0.808430E+02	N/A
1992	0.589030E+02	0.673632E+02	-0.134207E+00
1993	N/A	0.509418E+02	N/A
1994	0.114009E+03	0.849750E+02	0.293921E+00
1995	0.550740E+02	0.484335E+02	0.128485E+00
1996	0.429140E+02	0.467728E+02	-0.861029E-01
1997	0.187678E+03	0.596914E+02	0.114554E+01
1998	0.752130E+02	0.334187E+02	0.811210E+00
1999	0.228147E+03	0.153077E+02	0.270163E+01
2000	N/A	0.359771E+02	N/A
2001	N/A	0.443588E+02	N/A
2002	0.620900E+01	0.384524E+02	-0.182342E+01
2003	0.812280E+02	0.570817E+02	0.352777E+00
2004	N/A	0.786505E+02	N/A
2005	N/A	0.294903E+02	N/A
2006	N/A	0.455691E+02	N/A
2007	0.401160E+02	0.831890E+02	-0.729340E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 13 Tag: MADMF_S AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.234298E-01 % Variance Contribution = 6.7834
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.497025E+03	0.274082E+03	0.595212E+00
1986	0.501852E+03	0.135375E+03	0.131026E+01
1987	0.680968E+03	0.192136E+03	0.126531E+01
1988	0.813946E+03	0.540753E+03	0.408931E+00
1989	0.203391E+03	0.203209E+03	0.897570E-03
1990	0.260033E+03	0.172475E+03	0.410556E+00
1991	0.157170E+02	0.221238E+03	-0.264450E+01
1992	0.323176E+03	0.184621E+03	0.559892E+00
1993	0.188249E+03	0.139543E+03	0.299389E+00
1994	0.607648E+03	0.157134E+03	0.135250E+01
1995	0.165905E+04	0.133758E+03	0.251797E+01
1996	0.290096E+03	0.168618E+03	0.542575E+00
1997	0.133088E+03	0.177078E+03	-0.285582E+00
1998	0.157748E+03	0.183725E+03	-0.152441E+00
1999	0.650630E+02	0.228546E+03	-0.125638E+01
2000	0.158461E+03	0.207319E+03	-0.268750E+00
2001	0.321750E+02	0.150615E+03	-0.154353E+01
2002	0.115780E+03	0.123335E+03	-0.632160E-01
2003	0.126720E+02	0.914951E+02	-0.197689E+01
2004	0.423510E+02	0.924808E+02	-0.781009E+00
2005	0.921360E+02	0.132459E+03	-0.363006E+00
2006	0.167266E+03	0.238633E+03	-0.355340E+00
2007	0.127136E+03	0.829387E+02	0.427156E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 14 Tag: MADMF_S AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.340915E+00 % Variance Contribution = 1.9789
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.210500E+04	0.113328E+04	0.619200E+00
1986	0.432955E+04	0.305410E+04	0.348976E+00
1987	0.127523E+04	0.158346E+04	-0.216488E+00
1988	0.348787E+04	0.228306E+04	0.423775E+00
1989	0.495299E+04	0.630282E+04	-0.241006E+00
1990	0.275215E+04	0.238448E+04	0.143400E+00
1991	0.121129E+04	0.202882E+04	-0.515769E+00
1992	0.220476E+04	0.249253E+04	-0.122677E+00
1993	0.162523E+04	0.167545E+04	-0.304335E-01
1994	0.523763E+04	0.161343E+04	0.117750E+01
1995	0.280177E+04	0.186608E+04	0.406412E+00
1996	0.323082E+04	0.158206E+04	0.714009E+00
1997	0.298865E+04	0.200073E+04	0.401307E+00
1998	0.841102E+03	0.210706E+04	-0.918338E+00
1999	0.129062E+04	0.217700E+04	-0.522829E+00
2000	0.376620E+04	0.271989E+04	0.325475E+00
2001	0.168124E+04	0.246917E+04	-0.384347E+00
2002	0.296350E+03	0.178811E+04	-0.179737E+01
2003	0.187341E+04	0.145143E+04	0.255213E+00
2004	0.608169E+03	0.108690E+04	-0.580629E+00
2005	0.153773E+04	0.109772E+04	0.337077E+00
2006	0.164888E+04	0.157336E+04	0.468819E-01
2007	0.323716E+04	0.284067E+04	0.130658E+00
2008	N/A	0.983734E+03	N/A

Survey Index: 15 Tag: MADMF_S AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.662967E+00 % Variance Contribution = 2.0509
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.190888E+04	0.115093E+04	0.505943E+00
1986	0.464109E+03	0.106523E+04	-0.830826E+00
1987	0.134644E+04	0.236224E+04	-0.562148E+00
1988	0.665113E+03	0.140311E+04	-0.746491E+00
1989	0.910608E+03	0.210262E+04	-0.836825E+00
1990	0.410646E+04	0.866284E+04	-0.746481E+00
1991	0.822422E+03	0.207869E+04	-0.927240E+00
1992	0.211249E+04	0.241252E+04	-0.132805E+00
1993	0.148907E+04	0.162024E+04	-0.844244E-01
1994	0.173986E+04	0.241349E+04	-0.327269E+00
1995	0.504239E+04	0.208127E+04	0.884901E+00
1996	0.275871E+04	0.265667E+04	0.376873E-01
1997	0.208240E+04	0.204919E+04	0.160768E-01
1998	0.236943E+04	0.230390E+04	0.280426E-01
1999	0.213419E+04	0.305879E+04	-0.359934E+00
2000	0.578946E+04	0.302219E+04	0.650058E+00
2001	0.630524E+04	0.366519E+04	0.542501E+00
2002	0.323609E+04	0.313065E+04	0.331266E-01
2003	0.179606E+04	0.212937E+04	-0.170229E+00
2004	0.198788E+04	0.179861E+04	0.100053E+00
2005	0.387814E+04	0.144689E+04	0.985937E+00
2006	0.509996E+04	0.145280E+04	0.125574E+01
2007	0.474318E+04	0.239194E+04	0.684606E+00
2008	N/A	0.435880E+04	N/A

Survey Index: 16 Tag: MADMF_S AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.587346E+00 % Variance Contribution = 3.2917
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.411883E+03	0.456478E+03	-0.102802E+00
1986	0.684920E+02	0.360183E+03	-0.165990E+01
1987	0.267247E+03	0.361330E+03	-0.301620E+00
1988	0.183778E+03	0.501004E+03	-0.100288E+01
1989	0.252106E+03	0.238577E+03	0.551578E-01
1990	0.176729E+03	0.578812E+03	-0.118636E+01
1991	0.509697E+03	0.141351E+04	-0.102001E+01
1992	0.559537E+03	0.585667E+03	-0.456414E-01
1993	0.495461E+03	0.724378E+03	-0.379825E+00
1994	0.357380E+03	0.611506E+03	-0.537124E+00
1995	0.635846E+03	0.860693E+03	-0.302782E+00
1996	0.141899E+04	0.581393E+03	0.892273E+00
1997	0.724224E+03	0.660999E+03	0.913486E-01
1998	0.228626E+03	0.442183E+03	-0.659636E+00
1999	0.239762E+03	0.369989E+03	-0.433825E+00
2000	0.194117E+04	0.101807E+04	0.645378E+00
2001	0.173926E+04	0.641582E+03	0.997276E+00
2002	0.124484E+04	0.725152E+03	0.540379E+00
2003	0.197789E+04	0.989021E+03	0.693073E+00
2004	0.978524E+03	0.441195E+03	0.796558E+00
2005	0.101830E+04	0.472759E+03	0.767301E+00
2006	0.137038E+04	0.390623E+03	0.125510E+01
2007	0.173122E+04	0.704876E+03	0.898560E+00
2008	N/A	0.134822E+04	N/A

Survey Index: 17 Tag: MADMF_S AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.503147E+00 % Variance Contribution = 2.9824
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.120197E+03	0.202602E+03	-0.522110E+00
1986	0.192010E+02	0.405986E+02	-0.748771E+00
1987	0.693420E+02	0.116200E+03	-0.516259E+00
1988	N/A	0.114795E+03	N/A
1989	0.120420E+02	0.260613E+02	-0.772052E+00
1990	0.379630E+02	0.352014E+02	0.755275E-01
1991	0.111913E+03	0.184762E+03	-0.501346E+00
1992	0.359575E+03	0.131089E+03	0.100904E+01
1993	0.621560E+02	0.866407E+02	-0.332123E+00
1994	0.819870E+02	0.153641E+03	-0.628059E+00
1995	0.253889E+03	0.110472E+03	0.832133E+00
1996	0.393615E+03	0.803054E+02	0.158954E+01
1997	0.872260E+02	0.120335E+03	-0.321774E+00
1998	0.386760E+02	0.885795E+02	-0.828681E+00
1999	0.178290E+02	0.255475E+02	-0.359714E+00
2000	0.238912E+03	0.823813E+02	0.106474E+01
2001	0.280303E+03	0.938672E+02	0.109399E+01
2002	0.585070E+02	0.748183E+02	-0.245917E+00
2003	0.301671E+03	0.107317E+03	0.103355E+01
2004	0.124146E+03	0.160843E+03	-0.258970E+00
2005	0.190090E+02	0.567673E+02	-0.109405E+01
2006	0.604820E+02	0.720732E+02	-0.175337E+00
2007	0.182709E+03	0.996090E+02	0.606642E+00
2008	N/A	0.309464E+03	N/A

Survey Index: 18 Tag: MADMF_S AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.349937E+00 % Variance Contribution = 5.7592
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.921910E+02	0.518236E+02	0.576016E+00
1986	0.152510E+02	0.564724E+01	0.993479E+00
1987	0.406780E+02	0.369248E+02	0.968040E-01
1988	0.111910E+02	0.164493E+02	-0.385174E+00
1989	N/A	0.429290E+01	N/A
1990	0.899700E+01	0.195859E+02	-0.777921E+00
1991	0.368650E+02	0.319097E+02	0.144352E+00
1992	0.207370E+02	0.668278E+01	0.113238E+01
1993	0.799020E+02	0.293149E+02	0.100271E+01
1994	0.265240E+02	0.554639E+02	-0.737682E+00
1995	0.573300E+01	0.733799E+02	-0.254941E+01
1996	0.146470E+02	0.483336E+01	0.110869E+01
1997	N/A	0.929916E+01	N/A
1998	0.441600E+01	0.121592E+01	0.128973E+01
1999	N/A	0.388680E+01	N/A
2000	0.827000E+02	0.150779E+02	0.170199E+01
2001	N/A	0.108057E+02	N/A
2002	0.407060E+02	0.162314E+02	0.919428E+00
2003	0.119040E+02	0.343731E+02	-0.106040E+01
2004	0.507400E+01	0.345265E+02	-0.191760E+01
2005	0.636400E+01	0.231111E+02	-0.128966E+01
2006	0.251530E+02	0.322243E+02	-0.247744E+00
2007	N/A	0.177594E+02	N/A
2008	N/A	0.497002E+02	N/A

Survey Index: 19 Tag: MADMF_F AGE = 1
Time = MEAN Type = NUMBER
Catchability = 0.105901E+00 % Variance Contribution = 3.5079
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.156431E+04	0.108733E+04	0.363722E+00
1986	0.712457E+03	0.549700E+03	0.259348E+00
1987	0.160589E+04	0.786133E+03	0.714310E+00
1988	0.245753E+04	0.219204E+04	0.114324E+00
1989	0.723360E+03	0.826411E+03	-0.133185E+00
1990	0.142533E+04	0.702254E+03	0.707860E+00
1991	0.103097E+04	0.882316E+03	0.155704E+00
1992	0.196860E+04	0.665156E+03	0.108505E+01
1993	0.230178E+04	0.563478E+03	0.140731E+01
1994	0.562170E+03	0.642743E+03	-0.133941E+00
1995	0.235623E+04	0.546058E+03	0.146209E+01
1996	0.468306E+03	0.689431E+03	-0.386744E+00
1997	0.274708E+03	0.725011E+03	-0.970478E+00
1998	0.161777E+04	0.750702E+03	0.767796E+00
1999	0.129673E+04	0.935802E+03	0.326201E+00
2000	0.317086E+03	0.849201E+03	-0.985123E+00
2001	0.188359E+03	0.615984E+03	-0.118487E+01
2002	0.427271E+03	0.502282E+03	-0.161744E+00
2003	0.151082E+03	0.374307E+03	-0.907254E+00
2004	0.638177E+03	0.378191E+03	0.523215E+00
2005	0.242094E+03	0.541864E+03	-0.805688E+00
2006	0.343254E+03	0.977226E+03	-0.104625E+01
2007	0.105055E+03	0.339050E+03	-0.117166E+01
2008	N/A	0.000000E+00	N/A

Survey Index: 20 Tag: MADMF_F AGE = 2
Time = MEAN Type = NUMBER
Catchability = 0.305596E+00 % Variance Contribution = 2.5361
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.447514E+03	0.721923E+03	-0.478211E+00
1986	0.135708E+04	0.178836E+04	-0.275966E+00
1987	0.629592E+03	0.982994E+03	-0.445532E+00
1988	0.308331E+04	0.144138E+04	0.760402E+00
1989	0.143119E+04	0.477368E+04	-0.120461E+01
1990	0.327359E+04	0.146980E+04	0.800762E+00
1991	0.140961E+04	0.143650E+04	-0.188966E-01
1992	0.993473E+03	0.135739E+04	-0.312111E+00
1993	0.199866E+04	0.129746E+04	0.432065E+00
1994	0.237530E+04	0.118621E+04	0.694356E+00
1995	0.348455E+04	0.143705E+04	0.885749E+00
1996	0.815510E+03	0.116537E+04	-0.356983E+00
1997	0.141027E+04	0.139593E+04	0.102209E-01
1998	0.143885E+04	0.163771E+04	-0.129457E+00
1999	0.266989E+04	0.165662E+04	0.477259E+00
2000	0.182525E+04	0.204096E+04	-0.111702E+00
2001	0.163826E+04	0.180084E+04	-0.946191E-01
2002	0.178869E+03	0.126690E+04	-0.195768E+01
2003	0.161242E+04	0.104740E+04	0.431425E+00
2004	0.238174E+04	0.810936E+03	0.107740E+01
2005	0.116505E+04	0.816775E+03	0.355151E+00
2006	0.137038E+04	0.125015E+04	0.918261E-01
2007	0.120646E+04	0.226718E+04	-0.630845E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 21 Tag: MADMF_F AGE = 3
Time = MEAN Type = NUMBER
Catchability = 0.301859E+00 % Variance Contribution = 3.4082
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	0.282690E+03	0.325701E+03	-0.141629E+00
1986	0.555450E+02	0.311772E+03	-0.172508E+01
1987	0.135118E+03	0.572227E+03	-0.144339E+01
1988	0.622680E+03	0.312753E+03	0.688618E+00
1989	0.263352E+03	0.564555E+03	-0.762546E+00
1990	0.132776E+04	0.190197E+04	-0.359399E+00
1991	0.137905E+04	0.563413E+03	0.895138E+00
1992	0.569549E+03	0.671137E+03	-0.164129E+00
1993	0.159137E+04	0.496247E+03	0.116528E+01
1994	0.349234E+03	0.721506E+03	-0.725599E+00
1995	0.123551E+04	0.562153E+03	0.787467E+00
1996	0.463423E+03	0.684987E+03	-0.390760E+00
1997	0.171271E+03	0.499710E+03	-0.107078E+01
1998	0.464027E+03	0.502906E+03	-0.804600E-01
1999	0.846478E+03	0.888142E+03	-0.480471E-01
2000	0.808515E+03	0.732360E+03	0.989266E-01
2001	0.868586E+03	0.864583E+03	0.461909E-02
2002	0.626355E+03	0.889414E+03	-0.350646E+00
2003	0.856737E+03	0.511216E+03	0.516339E+00
2004	0.174359E+04	0.474018E+03	0.130246E+01
2005	0.104699E+04	0.385449E+03	0.999264E+00
2006	0.104444E+04	0.496948E+03	0.742748E+00
2007	0.931784E+03	0.876113E+03	0.616059E-01
2008	N/A	0.000000E+00	N/A

Survey Index: 22 Tag: MADMF_F AGE = 4
Time = MEAN Type = NUMBER
Catchability = 0.134206E+00 % Variance Contribution = 9.0029
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.412676E+02	N/A
1986	0.910700E+01	0.525369E+02	-0.175247E+01
1987	0.193930E+02	0.523662E+02	-0.993349E+00
1988	0.412820E+02	0.383825E+02	0.728261E-01
1989	0.283350E+02	0.256553E+02	0.993490E-01
1990	0.159100E+01	0.840516E+02	-0.396707E+01
1991	0.235127E+03	0.129548E+03	0.596072E+00
1992	0.129331E+03	0.630391E+02	0.718620E+00
1993	0.393012E+03	0.892116E+02	0.148283E+01
1994	0.360700E+02	0.708415E+02	-0.674984E+00
1995	N/A	0.790398E+02	N/A
1996	0.328330E+02	0.709288E+02	-0.770242E+00
1997	0.216970E+02	0.686793E+02	-0.115227E+01
1998	N/A	0.349431E+02	N/A
1999	0.134789E+03	0.464359E+02	0.106564E+01
2000	0.561480E+02	0.931281E+02	-0.505985E+00
2001	0.296790E+02	0.635071E+02	-0.760712E+00
2002	0.250734E+03	0.780637E+02	0.116687E+01
2003	0.655815E+03	0.110189E+03	0.178368E+01
2004	0.522562E+03	0.451892E+02	0.244789E+01
2005	0.562310E+02	0.514428E+02	0.889985E-01
2006	0.111995E+03	0.517320E+02	0.772378E+00
2007	0.155718E+03	0.117461E+03	0.281939E+00
2008	N/A	0.000000E+00	N/A

Survey Index: 23 Tag: MADMF_F AGE = 5
Time = MEAN Type = NUMBER
Catchability = 0.122468E+00 % Variance Contribution = 2.8055
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.195111E+02	N/A
1986	0.197500E+01	0.630813E+01	-0.116127E+01
1987	0.545800E+01	0.179391E+02	-0.118990E+01
1988	N/A	0.936834E+01	N/A
1989	N/A	0.298534E+01	N/A
1990	N/A	0.544524E+01	N/A
1991	N/A	0.180383E+02	N/A
1992	0.555720E+02	0.150306E+02	0.130759E+01
1993	N/A	0.113665E+02	N/A
1994	N/A	0.189602E+02	N/A
1995	N/A	0.108068E+02	N/A
1996	N/A	0.104363E+02	N/A
1997	0.125900E+02	0.133188E+02	-0.562724E-01
1998	N/A	0.745662E+01	N/A
1999	0.165130E+02	0.341557E+01	0.157580E+01
2000	0.238640E+02	0.802749E+01	0.108950E+01
2001	N/A	0.989766E+01	N/A
2002	0.993000E+01	0.857980E+01	0.146150E+00
2003	0.159910E+02	0.127365E+02	0.227555E+00
2004	0.252400E+01	0.175491E+02	-0.193916E+01
2005	N/A	0.658009E+01	N/A
2006	N/A	0.101677E+02	N/A
2007	N/A	0.185617E+02	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 26 Tag: MENH_S AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.661209E-04 % Variance Contribution = 0.3335
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.219801E+00	N/A
1986	N/A	0.592347E+00	N/A
1987	N/A	0.307114E+00	N/A
1988	N/A	0.442801E+00	N/A
1989	N/A	0.122244E+01	N/A
1990	N/A	0.462473E+00	N/A
1991	N/A	0.393492E+00	N/A
1992	N/A	0.483428E+00	N/A
1993	N/A	0.324956E+00	N/A
1994	N/A	0.312927E+00	N/A
1995	N/A	0.361928E+00	N/A
1996	N/A	0.306842E+00	N/A
1997	N/A	0.388045E+00	N/A
1998	N/A	0.408667E+00	N/A
1999	N/A	0.422232E+00	N/A
2000	N/A	0.527525E+00	N/A
2001	0.599000E+00	0.478897E+00	0.223776E+00
2002	0.226000E+00	0.346805E+00	-0.428228E+00
2003	0.473000E+00	0.281507E+00	0.518939E+00
2004	0.151000E+00	0.210805E+00	-0.333653E+00
2005	0.287000E+00	0.212903E+00	0.298645E+00
2006	0.148000E+00	0.305154E+00	-0.723605E+00
2007	0.859000E+00	0.550950E+00	0.444125E+00
2008	N/A	0.190796E+00	N/A

Survey Index: 27 Tag: MENH_S AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.403312E-03 % Variance Contribution = 0.2045
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.700164E+00	N/A
1986	N/A	0.648026E+00	N/A
1987	N/A	0.143705E+01	N/A
1988	N/A	0.853575E+00	N/A
1989	N/A	0.127911E+01	N/A
1990	N/A	0.526999E+01	N/A
1991	N/A	0.126456E+01	N/A
1992	N/A	0.146764E+01	N/A
1993	N/A	0.985666E+00	N/A
1994	N/A	0.146823E+01	N/A
1995	N/A	0.126613E+01	N/A
1996	N/A	0.161617E+01	N/A
1997	N/A	0.124661E+01	N/A
1998	N/A	0.140157E+01	N/A
1999	N/A	0.186080E+01	N/A
2000	N/A	0.183853E+01	N/A
2001	0.208700E+01	0.222970E+01	-0.661379E-01
2002	0.198100E+01	0.190451E+01	0.393773E-01
2003	0.805000E+00	0.129539E+01	-0.475724E+00
2004	0.124100E+01	0.109417E+01	0.125917E+00
2005	0.110700E+01	0.880208E+00	0.229251E+00
2006	0.560000E+00	0.883803E+00	-0.456297E+00
2007	0.266100E+01	0.145512E+01	0.603614E+00
2008	N/A	0.265165E+01	N/A

Survey Index: 28 Tag: MENH_S AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.500465E-03 % Variance Contribution = 0.2932

Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.388955E+00	N/A
1986	N/A	0.306904E+00	N/A
1987	N/A	0.307882E+00	N/A
1988	N/A	0.426894E+00	N/A
1989	N/A	0.203286E+00	N/A
1990	N/A	0.493193E+00	N/A
1991	N/A	0.120442E+01	N/A
1992	N/A	0.499034E+00	N/A
1993	N/A	0.617227E+00	N/A
1994	N/A	0.521051E+00	N/A
1995	N/A	0.733378E+00	N/A
1996	N/A	0.495393E+00	N/A
1997	N/A	0.563223E+00	N/A
1998	N/A	0.376775E+00	N/A
1999	N/A	0.315259E+00	N/A
2000	N/A	0.867477E+00	N/A
2001	0.535000E+00	0.546679E+00	-0.215944E-01
2002	0.845000E+00	0.617887E+00	0.313032E+00
2003	0.850000E+00	0.842724E+00	0.859729E-02
2004	0.492000E+00	0.375933E+00	0.269068E+00
2005	0.280000E+00	0.402828E+00	-0.363719E+00
2006	0.152000E+00	0.332842E+00	-0.783787E+00
2007	0.107100E+01	0.600609E+00	0.578403E+00
2008	N/A	0.114879E+01	N/A

Survey Index: 29 Tag: MENH_S AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.220345E-03 % Variance Contribution = 2.0957
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.887262E-01	N/A
1986	N/A	0.177795E-01	N/A
1987	N/A	0.508878E-01	N/A
1988	N/A	0.502725E-01	N/A
1989	N/A	0.114131E-01	N/A
1990	N/A	0.154159E-01	N/A
1991	N/A	0.809135E-01	N/A
1992	N/A	0.574085E-01	N/A
1993	N/A	0.379429E-01	N/A
1994	N/A	0.672847E-01	N/A
1995	N/A	0.483795E-01	N/A
1996	N/A	0.351684E-01	N/A
1997	N/A	0.526986E-01	N/A
1998	N/A	0.387920E-01	N/A
1999	N/A	0.111881E-01	N/A
2000	N/A	0.360776E-01	N/A
2001	0.132000E+00	0.411076E-01	0.116661E+01
2002	0.480000E-01	0.327655E-01	0.381825E+00
2003	0.114000E+00	0.469978E-01	0.886098E+00
2004	0.390000E-01	0.704385E-01	-0.591179E+00
2005	0.300000E-02	0.248603E-01	-0.211466E+01
2006	0.140000E-01	0.315633E-01	-0.812938E+00
2007	0.129000E+00	0.436222E-01	0.108425E+01
2008	N/A	0.135525E+00	N/A

Survey Index: 32 Tag: MENH_F AGE = 2
Time = MEAN Type = NUMBER
Catchability = 0.134794E-03 % Variance Contribution = 1.4732
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.318431E+00	N/A
1986	N/A	0.788824E+00	N/A
1987	N/A	0.433586E+00	N/A
1988	N/A	0.635774E+00	N/A
1989	N/A	0.210561E+01	N/A
1990	N/A	0.648308E+00	N/A
1991	N/A	0.633620E+00	N/A
1992	N/A	0.598726E+00	N/A
1993	N/A	0.572294E+00	N/A
1994	N/A	0.523223E+00	N/A
1995	N/A	0.633862E+00	N/A
1996	N/A	0.514031E+00	N/A
1997	N/A	0.615724E+00	N/A
1998	N/A	0.722373E+00	N/A
1999	N/A	0.730712E+00	N/A
2000	0.179900E+01	0.900238E+00	0.692327E+00
2001	0.907000E+00	0.794328E+00	0.132646E+00
2002	0.202000E+00	0.558815E+00	-0.101755E+01
2003	0.950000E+00	0.461995E+00	0.720908E+00
2004	0.137400E+01	0.357693E+00	0.134581E+01
2005	0.252000E+00	0.360269E+00	-0.357421E+00
2006	0.121000E+00	0.551425E+00	-0.151672E+01
2007	N/A	0.100003E+01	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 33 Tag: MENH_F AGE = 3
Time = MEAN Type = NUMBER
Catchability = 0.189250E-03 % Variance Contribution = 0.4770
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.204198E+00	N/A
1986	N/A	0.195465E+00	N/A
1987	N/A	0.358757E+00	N/A
1988	N/A	0.196080E+00	N/A
1989	N/A	0.353947E+00	N/A
1990	N/A	0.119244E+01	N/A
1991	N/A	0.353231E+00	N/A
1992	N/A	0.420769E+00	N/A
1993	N/A	0.311122E+00	N/A
1994	N/A	0.452348E+00	N/A
1995	N/A	0.352441E+00	N/A
1996	N/A	0.429453E+00	N/A
1997	N/A	0.313293E+00	N/A
1998	N/A	0.315296E+00	N/A
1999	N/A	0.556820E+00	N/A
2000	0.640000E+00	0.459153E+00	0.332085E+00
2001	0.419000E+00	0.542050E+00	-0.257487E+00
2002	0.560000E+00	0.557618E+00	0.426276E-02
2003	0.334000E+00	0.320506E+00	0.412388E-01
2004	0.780000E+00	0.297185E+00	0.964938E+00
2005	0.212000E+00	0.241657E+00	-0.130933E+00
2006	0.120000E+00	0.311561E+00	-0.954104E+00
2007	N/A	0.549279E+00	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 34 Tag: MENH_F AGE = 4
Time = MEAN Type = NUMBER
Catchability = 0.805163E-04 % Variance Contribution = 3.9194
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1985	N/A	0.247583E-01	N/A
1986	N/A	0.315193E-01	N/A
1987	N/A	0.314169E-01	N/A
1988	N/A	0.230274E-01	N/A
1989	N/A	0.153918E-01	N/A
1990	N/A	0.504264E-01	N/A
1991	N/A	0.777219E-01	N/A
1992	N/A	0.378200E-01	N/A
1993	N/A	0.535221E-01	N/A
1994	N/A	0.425011E-01	N/A
1995	N/A	0.474196E-01	N/A
1996	N/A	0.425534E-01	N/A
1997	N/A	0.412038E-01	N/A
1998	N/A	0.209640E-01	N/A
1999	N/A	0.278590E-01	N/A
2000	0.300000E-01	0.558718E-01	-0.621862E+00
2001	0.110000E-01	0.381008E-01	-0.124234E+01
2002	0.177000E+00	0.468340E-01	0.132954E+01
2003	0.258000E+00	0.661073E-01	0.136168E+01
2004	0.184000E+00	0.271111E-01	0.191499E+01
2005	N/A	0.308629E-01	N/A
2006	0.200000E-02	0.310364E-01	-0.274201E+01
2007	N/A	0.704703E-01	N/A
2008	N/A	0.000000E+00	N/A

Retrospective Summary

Average Fishing Mortality
Ages = 4 - 5

	1985	1986	1987	1988	1989
2000	2.0651	0.7766	0.7919	2.6014	1.5589
2001	2.0651	0.7766	0.7919	2.6014	1.5589
2002	2.0651	0.7766	0.7919	2.6014	1.5589
2003	2.0651	0.7766	0.7919	2.6014	1.5589
2004	2.0651	0.7766	0.7919	2.6014	1.5589
2005	2.0651	0.7766	0.7919	2.6014	1.5589
2006	2.0651	0.7766	0.7919	2.6014	1.5589
2007	2.0651	0.7766	0.7919	2.6014	1.5589

	1990	1991	1992	1993	1994
2000	0.7872	2.0232	1.5562	1.1959	1.3564
2001	0.7872	2.0232	1.5562	1.1960	1.3564
2002	0.7872	2.0232	1.5562	1.1960	1.3564
2003	0.7872	2.0232	1.5562	1.1960	1.3564
2004	0.7872	2.0232	1.5562	1.1960	1.3564
2005	0.7872	2.0232	1.5562	1.1960	1.3564
2006	0.7872	2.0232	1.5562	1.1960	1.3564
2007	0.7872	2.0232	1.5562	1.1960	1.3564

	1995	1996	1997	1998	1999
2000	2.0165	1.2187	1.6454	2.3832	0.9267
2001	2.0172	1.2205	1.6554	2.4999	1.1553
2002	2.0172	1.2204	1.6551	2.4963	1.1471
2003	2.0172	1.2204	1.6551	2.4966	1.1476
2004	2.0172	1.2204	1.6551	2.4966	1.1478
2005	2.0172	1.2204	1.6551	2.4965	1.1474
2006	2.0172	1.2204	1.6551	2.4965	1.1474
2007	2.0172	1.2204	1.6551	2.4965	1.1474

	2000	2001	2002	2003	2004
2000	0.8876				
2001	2.1027	1.4728			
2002	2.0263	1.7791	1.2118		
2003	2.0313	1.8067	1.6116	1.6662	
2004	2.0325	1.8129	1.6408	1.8980	2.6370
2005	2.0295	1.7965	1.5662	1.5045	1.9693
2006	2.0291	1.7946	1.5576	1.4688	1.7367
2007	2.0291	1.7941	1.5559	1.4616	1.6958

	2005	2006	2007
2000			
2001			
2002			
2003			
2004			
2005	1.7047		
2006	1.7192	0.9288	
2007	1.5262	1.0118	0.4144

Spawning Stock Biomass

	1985	1986	1987	1988	1989
2000	730.	908.	1157.	670.	1515.
2001	730.	908.	1157.	670.	1515.
2002	730.	908.	1157.	670.	1515.
2003	730.	908.	1157.	670.	1515.
2004	730.	908.	1157.	670.	1515.
2005	730.	908.	1157.	670.	1515.
2006	730.	908.	1157.	670.	1515.
2007	730.	908.	1157.	670.	1515.

	1990	1991	1992	1993	1994
2000	2633.	1375.	1054.	1029.	1308.
2001	2633.	1375.	1054.	1029.	1308.
2002	2633.	1375.	1054.	1029.	1308.
2003	2633.	1375.	1054.	1029.	1308.
2004	2633.	1375.	1054.	1029.	1308.
2005	2633.	1375.	1054.	1029.	1308.
2006	2633.	1375.	1054.	1029.	1308.
2007	2633.	1375.	1054.	1029.	1308.

	1995	1996	1997	1998	1999
2000	1164.	1244.	1085.	1041.	2077.
2001	1164.	1242.	1072.	947.	1592.
2002	1164.	1242.	1073.	949.	1599.
2003	1164.	1242.	1073.	949.	1598.
2004	1164.	1242.	1073.	949.	1598.
2005	1164.	1242.	1073.	949.	1598.
2006	1164.	1242.	1073.	949.	1599.
2007	1164.	1242.	1073.	949.	1599.

	2000	2001	2002	2003	2004
2000	2921.				
2001	1813.	2034.			
2002	1758.	1743.	1592.		
2003	1743.	1693.	1711.	1162.	
2004	1741.	1682.	1685.	1190.	936.
2005	1746.	1709.	1781.	1316.	844.
2006	1746.	1712.	1795.	1350.	877.
2007	1746.	1713.	1797.	1359.	902.

	2005	2006	2007
2000			
2001			
2002			
2003			
2004			
2005	889.		
2006	781.	1279.	
2007	796.	1080.	1922.

Total Population Numbers

	1985	1986	1987	1988	1989
2000	18086.	17053.	17360.	33021.	30803.
2001	18086.	17053.	17360.	33021.	30803.
2002	18086.	17053.	17360.	33021.	30803.
2003	18086.	17053.	17360.	33021.	30803.
2004	18086.	17053.	17360.	33021.	30803.
2005	18086.	17053.	17360.	33021.	30803.
2006	18086.	17053.	17360.	33021.	30803.
2007	18086.	17053.	17360.	33021.	30803.

	1990	1991	1992	1993	1994
2000	28534.	21394.	20107.	14805.	16591.
2001	28534.	21394.	20107.	14804.	16584.
2002	28534.	21394.	20107.	14804.	16585.
2003	28534.	21394.	20107.	14804.	16585.
2004	28534.	21394.	20107.	14804.	16585.
2005	28534.	21394.	20107.	14804.	16585.
2006	28534.	21394.	20107.	14804.	16585.
2007	28534.	21394.	20107.	14804.	16585.

	1995	1996	1997	1998	1999
2000	16239.	17186.	19520.	21983.	25513.
2001	16216.	17003.	17867.	18472.	22911.
2002	16217.	17008.	17910.	18438.	21659.
2003	16217.	17008.	17907.	18423.	21406.
2004	16217.	17008.	17907.	18420.	21386.
2005	16217.	17008.	17908.	18428.	21438.
2006	16217.	17008.	17909.	18429.	21445.
2007	16217.	17008.	17909.	18430.	21446.

	2000	2001	2002	2003	2004
2000	22722.	21837.			
2001	22995.	15440.	14758.		
2002	22924.	16949.	12098.	13184.	
2003	23109.	19780.	16720.	11858.	13293.
2004	22959.	19974.	16983.	14003.	12377.
2005	23278.	20394.	16411.	13755.	12228.
2006	23317.	20489.	16571.	13213.	11942.
2007	23325.	20509.	16661.	13370.	11018.

	2005	2006	2007	2008
2000				
2001				
2002				
2003				
2004	15142.			
2005	12473.	15427.		
2006	12590.	18200.	21185.	
2007	12040.	17892.	16929.	19724.

Age 1 Population

	1985	1986	1987	1988	1989
2000	11698.	5778.	8201.	23080.	8673.
2001	11698.	5778.	8201.	23080.	8673.
2002	11698.	5778.	8201.	23080.	8673.
2003	11698.	5778.	8201.	23080.	8673.
2004	11698.	5778.	8201.	23080.	8673.
2005	11698.	5778.	8201.	23080.	8673.
2006	11698.	5778.	8201.	23080.	8673.
2007	11698.	5778.	8201.	23080.	8673.

	1990	1991	1992	1993	1994
2000	7361.	9443.	7880.	5957.	6712.
2001	7361.	9443.	7880.	5956.	6706.
2002	7361.	9443.	7880.	5956.	6707.
2003	7361.	9443.	7880.	5956.	6707.
2004	7361.	9443.	7880.	5956.	6707.
2005	7361.	9443.	7880.	5956.	6707.
2006	7361.	9443.	7880.	5956.	6707.
2007	7361.	9443.	7880.	5956.	6707.

	1995	1996	1997	1998	1999
2000	5726.	7356.	9024.	10077.	10916.
2001	5708.	7192.	7521.	7917.	11186.
2002	5709.	7197.	7559.	7848.	9961.
2003	5709.	7197.	7557.	7836.	9720.
2004	5709.	7197.	7556.	7833.	9702.
2005	5709.	7197.	7558.	7840.	9748.
2006	5709.	7197.	7558.	7841.	9753.
2007	5709.	7197.	7558.	7842.	9755.

	2000	2001	2002	2003	2004
2000	4907.	8291.			
2001	7318.	1623.	7521.		
2002	8273.	3197.	3611.	7499.	
2003	8665.	5876.	5919.	2345.	7484.
2004	8531.	6193.	6024.	4278.	4758.
2005	8808.	6351.	5109.	4495.	4842.
2006	8841.	6415.	5191.	3822.	5000.
2007	8849.	6428.	5264.	3905.	3947.

	2005	2006	2007	2008
2000				
2001				
2002				
2003				
2004	7559.			
2005	5071.	7404.		
2006	5446.	10011.	7497.	
2007	5653.	10185.	3540.	7211.

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

7	NEFSC_F	1
8	NEFSC_F	2
9	NEFSC_F	3
10	NEFSC_F	4
11	NEFSC_F	5
19	MADMF_F	1
20	MADMF_F	2
21	MADMF_F	3
22	MADMF_F	4
23	MADMF_F	5
32	MENH_F	2
33	MENH_F	3
34	MENH_F	4

Plus Group Diagnostic Report

Calculation Method Selected = Backward

Year	Population Backward	Population Forward	F Forward	F Backward	Ratio
1985	148.	148.	2.065062	2.065076	1.000007
1986	16.	57.	0.167157	0.776571	4.645765
1987	106.	70.	1.679518	0.791916	0.471514
1988	47.	96.	0.625021	2.601429	4.162144
1989	12.	56.	0.194222	1.558876	8.026244
1990	56.	47.	1.049754	0.787178	0.749869
1991	91.	90.	2.078124	2.023215	0.973578
1992	19.	40.	0.479173	1.556243	3.247765
1993	84.	65.	2.133503	1.195943	0.560553
1994	159.	133.	2.078124	1.356350	0.652680
1995	210.	208.	2.078124	2.016532	0.970362
1996	14.	25.	0.498768	1.218703	2.443428
1997	27.	51.	0.558001	1.645354	2.948657
1998	4.	62.	0.054967	2.383208	43.357246
1999	13.	61.	0.134164	0.926671	6.906985
2000	67.	63.	0.935291	0.847839	0.906497
2001	105.	101.	N/A	N/A	

Warning **** Infeasible Mass Balance in Plus Group
Year = 1987