

Appendix C:

Table 1: Base VPA Results for Gulf of Maine Cod, 1982-2007.

Table 2: Bootstrap Results from the Base VPA for Gulf of Maine Cod.

Table 3: Retrospective Analyses from the Base VPA for Gulf of Maine Cod, 2000-2007

**Appendix C: Table 1. Base VPA Output Results for Gulf of Maine Cod**

VPA Version 2.7.1

**Model ID: GoM Cod 2008 VPA Update GARMIII TY2007 11+**

Input File: C:\ALLWORK\ASSESS\GARMIIIAUG2008WG\ASSMT\_MTG\GOMCOD\VPA\FINALS\GMCOD2008\_GARMIII  
 Date of Run: 17-JUL-2008 Time of Run: 13:23

Levenburg-Marquardt Algorithm Completed 21 Iterations  
 Residual Sum of Squares = 279.707

Number of Residuals = 508  
 Number of Parameters = 9  
 Degrees of Freedom = 499  
 Mean Squared Residual = 0.560535  
 Standard Deviation = 0.748689

Number of Years = 26  
 Number of Ages = 11  
 First Year = 1982  
 Youngest Age = 1  
 Oldest True Age = 10

Number of Survey Indices Available = 25  
 Number of Survey Indices Used in Estimate = 23

VPA Classic Method - Auto Estimated Q's

**Stock Numbers Predicted in Terminal Year Plus One (2008)**

Age	Stock Predicted	Std. Error	CV
2	3936.752	0.173583E+04	0.440929E+00
3	16020.398	0.499998E+04	0.312101E+00
4	3542.738	0.930299E+03	0.262593E+00
5	3970.448	0.103469E+04	0.260597E+00
6	201.340	0.776978E+02	0.385903E+00
7	251.280	0.110401E+03	0.439357E+00
8	29.920	0.163265E+02	0.545679E+00
9	46.873	0.324104E+02	0.691456E+00
10	71.277	0.516470E+02	0.724592E+00

**Catchability Values for Each Survey Used in Estimate**

INDEX	Catchability	Std. Error	CV
1	0.639060E-04	0.988283E-05	0.154646E+00
2	0.131940E-03	0.141520E-04	0.107261E+00
3	0.225008E-03	0.228294E-04	0.101460E+00
4	0.293998E-03	0.386906E-04	0.131602E+00
5	0.382779E-03	0.641901E-04	0.167695E+00
6	0.566609E-03	0.109588E-03	0.193411E+00
7	0.511812E-03	0.139644E-03	0.272843E+00
8	0.533836E-04	0.687041E-05	0.128699E+00
9	0.113582E-03	0.128656E-04	0.113272E+00
10	0.223833E-03	0.225992E-04	0.100965E+00
11	0.370258E-03	0.463840E-04	0.125275E+00
12	0.478237E-03	0.565335E-04	0.118212E+00
13	0.451154E-03	0.836411E-04	0.185394E+00
14	0.566767E-03	0.129170E-03	0.227906E+00
15	0.710558E-03	0.107424E-03	0.151183E+00
16	0.544643E-03	0.474923E-04	0.871988E-01
17	0.453706E-03	0.562280E-04	0.123930E+00
19	0.122958E-03	0.367937E-04	0.299238E+00
21	0.245830E-05	0.690050E-06	0.280702E+00
22	0.140563E-04	0.164576E-05	0.117084E+00
23	0.231650E-04	0.128111E-05	0.553035E-01
24	0.229116E-04	0.123947E-05	0.540979E-01
25	0.218712E-04	0.246650E-05	0.112774E+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
- Pope Approximation 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 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 5 to 9
- Calculation of Population of Age 1 In Year 2008  
 = Set to Zero

**Stock Estimates**

Age 2  
 Age 3  
 Age 4  
 Age 5  
 Age 6  
 Age 7  
 Age 8  
 Age 9  
 Age 10

Full F in Terminal Year = 0.6492  
 F in Oldest True Age in Terminal Year = 0.4888

**Full F Calculated Using Classic Method**

Age	Input Partial Recruitment	Calc Partial Recruitment	Fishing Mortality	Used In Full F	Comments
1	0.000	0.000	0.0000	NO	Stock Estimate in T+1
2	0.002	0.001	0.0004	NO	Stock Estimate in T+1
3	0.162	0.060	0.0388	NO	Stock Estimate in T+1
4	0.682	0.290	0.1880	NO	Stock Estimate in T+1
5	0.900	0.754	0.4892	NO	Stock Estimate in T+1
6	1.000	1.000	0.6492	YES	Stock Estimate in T+1
7	0.826	0.352	0.2288	NO	Stock Estimate in T+1
8	0.733	0.572	0.3714	NO	Stock Estimate in T+1
9	0.772	0.229	0.1484	NO	Stock Estimate in T+1
10	0.753	0.753	0.4888		Input PR * Full F

**Catch at Age - Input Data**

AGE	1982	1983	1984	1985	1986
1	71.4	11.3	24.7	44.3	12.8
2	1980.9	1324.4	801.5	1064.5	186.0
3	2420.3	2917.6	1581.5	2187.8	2756.8
4	1422.1	1189.0	1636.5	1137.1	929.6
5	747.1	687.2	470.1	667.5	277.0
6	77.1	452.6	207.6	133.2	199.9
7	97.7	50.0	78.4	78.5	45.7
8	65.6	65.4	19.3	32.1	30.2
9	41.0	25.2	15.0	4.0	35.6
10	4.0	11.8	11.6	11.0	8.0
11	33.0	19.4	18.4	11.0	59.5
AGE	1987	1988	1989	1990	1991
1	96.3	2.4	3.8	0.0	0.0
2	889.6	549.1	519.5	253.6	438.5
3	1321.0	2128.0	2280.6	4125.6	1341.1
4	1505.8	1117.1	1715.7	2455.9	4910.7
5	346.4	428.8	488.0	523.3	930.6
6	91.5	49.3	92.8	176.6	158.8
7	83.7	11.2	41.2	27.0	46.8
8	13.9	17.9	6.4	30.0	30.0
9	13.6	1.0	3.0	10.0	7.9
10	10.3	2.0	5.0	15.0	1.3
11	3.0	1.0	7.0	17.0	1.0
AGE	1992	1993	1994	1995	1996
1	0.0	0.0	0.9	18.1	0.0
2	338.3	127.8	54.0	277.0	90.0
3	587.1	2031.8	1488.2	1169.9	630.7
4	531.9	783.0	1216.6	1192.0	1936.7
5	2188.4	139.4	330.9	232.5	384.3
6	219.1	473.8	71.0	28.6	36.9
7	65.3	29.2	85.7	13.9	4.5
8	7.4	6.0	29.5	18.4	0.5
9	12.0	2.0	6.7	0.8	1.3
10	3.0	0.0	0.6	1.6	0.0
11	0.0	0.0	1.2	0.2	0.0
AGE	1997	1998	1999	2000	2001
1	0.0	0.0	1.2	0.0	0.0
2	85.4	107.5	22.1	201.1	147.2
3	495.2	482.4	647.2	534.0	1183.5
4	455.5	594.8	568.0	828.3	685.5
5	852.4	158.7	272.6	190.3	378.0
6	71.4	191.4	58.0	98.9	109.1
7	5.0	26.2	79.2	16.1	59.8
8	2.6	3.9	7.9	7.1	8.9
9	0.3	0.4	0.0	0.0	13.3
10	0.7	1.1	4.4	0.0	1.2
11	0.1	0.4	0.0	0.0	0.5
AGE	2002	2003	2004	2005	2006
1	0.0	0.0	0.0	0.0	0.0
2	3.0	16.4	0.9	7.5	1.6
3	259.5	118.6	357.8	134.1	177.4
4	884.3	442.9	249.9	813.8	281.3
5	346.0	766.1	409.6	95.2	449.3
6	203.5	231.4	266.0	265.3	32.5
7	81.0	103.3	74.6	120.9	97.2
8	35.5	39.9	36.9	32.5	48.0
9	9.5	21.7	19.3	19.2	18.2
10	9.4	9.9	11.3	8.1	10.8
11	0.6	7.4	3.5	8.3	8.8

AGE 2007

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1	0.0
2	7.9
3	154.8
4	907.5
5	140.4
6	253.8
7	8.5
8	23.3
9	12.6
10	6.7
11	7.5

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**Catch Weights at Age - Input Data**

AGE	1982	1983	1984	1985	1986
1	0.6440	0.4460	0.5060	0.4660	0.3990
2	1.1110	1.0620	1.0200	0.9950	1.1220
3	1.6190	1.6100	1.6130	1.6010	1.7960
4	2.6980	2.4400	2.6980	2.7750	2.8860
5	4.7180	3.7510	3.6600	4.3850	4.5540
6	6.5770	6.0250	5.8080	5.4240	6.0200
7	8.7400	5.7750	8.0700	7.8590	8.1200
8	9.7630	10.3910	9.7410	11.3120	10.8450
9	12.9510	9.9510	12.8450	12.7500	13.5720
10	10.2500	12.8550	13.9870	12.8180	13.6400
11	18.5760	18.1250	14.9620	13.8180	19.5780

AGE	1987	1988	1989	1990	1991
1	0.2060	0.3180	0.6800	0.4160	0.4160
2	0.9520	0.9640	1.1990	1.0820	1.1820
3	1.5460	1.7380	1.7220	1.6860	1.5420
4	3.1310	2.3780	2.9340	2.3000	2.4330
5	4.8110	5.0970	3.8440	4.1870	4.0060
6	7.1610	6.4500	4.3090	7.4070	7.4210
7	9.5210	8.9190	9.0180	10.7410	9.6890
8	10.0530	11.0220	11.0340	11.8000	12.3000
9	13.1950	11.0000	14.3330	15.3000	14.0030
10	13.1320	18.0000	17.4000	14.2670	25.6720
11	13.3330	14.0000	23.2860	20.5880	17.0000

AGE	1992	1993	1994	1995	1996
1	0.4160	0.4160	0.1320	0.2740	0.5880
2	1.5540	1.1890	1.3830	1.4150	1.5430
3	1.9500	1.8210	1.8080	1.7970	2.1430
4	2.7410	2.3980	2.9620	2.6620	2.3100
5	3.0800	4.2250	3.3470	5.0510	3.4860
6	4.9910	6.0990	6.2800	5.5780	7.3530
7	9.4890	10.0220	7.1850	10.7600	10.4260
8	12.0270	13.1670	10.4480	11.4920	13.9120
9	13.4170	13.5000	10.3310	18.8930	14.7240
10	16.3330	14.7850	18.5420	20.0640	14.7850
11	17.5760	17.5760	20.6370	20.3470	17.5760

AGE	1997	1998	1999	2000	2001
1	0.4160	0.4170	0.3340	0.4160	0.4160
2	1.7740	1.3730	1.3410	1.6190	1.7680
3	2.2160	2.0720	1.8350	2.2840	2.3870
4	3.0460	2.8460	2.5650	3.4230	3.1940
5	3.1240	4.1350	3.8430	4.4320	4.7320
6	4.7910	4.2240	5.7730	5.7070	6.2960
7	8.4050	5.1770	7.2010	6.0130	7.2660
8	11.5470	11.3130	9.9150	8.5210	8.3510
9	14.7260	18.8930	12.8700	12.8700	8.6430
10	15.8140	14.9530	13.4020	14.7850	12.4140
11	21.8740	20.3470	17.5760	17.5760	24.4180

AGE	2002	2003	2004	2005	2006
1	0.4160	0.4160	0.4160	0.4160	0.4160
2	1.3570	1.9290	1.4740	1.5740	2.3030
3	2.4580	2.4090	2.3400	2.0580	2.4250
4	3.2690	3.0580	3.2240	2.8330	3.2610
5	4.0260	3.9980	3.6470	4.3070	3.7510

6	5.8860	5.2890	5.2590	4.5090	4.8450
7	6.7020	7.5220	6.8890	6.2390	5.5140
8	11.5140	8.7600	9.3960	7.8350	7.6100
9	10.1740	10.8340	11.7750	10.4400	9.6540
10	10.6620	12.2690	12.9440	13.4280	12.1620
11	14.3330	13.0740	13.2600	14.3820	15.6640

AGE 2007

1	0.4160
2	2.0270
3	2.5260
4	3.2220
5	3.9270
6	4.7940
7	6.3620
8	7.0750
9	10.1060
10	11.7210
11	14.3140

**JAN-1 Weights at Age - Input Data**

AGE	1982	1983	1984	1985	1986
1	0.5015	0.2949	0.3608	0.3003	0.2583
2	0.9229	0.8270	0.6745	0.7096	0.7231
3	1.3188	1.3374	1.3088	1.2779	1.3368
4	2.2882	1.9876	2.0842	2.1157	2.1495
5	4.1750	3.1812	2.9884	3.4396	3.5549
6	7.0188	5.3316	4.6675	4.4555	5.1379
7	8.0156	6.1630	6.9729	6.7561	6.6365
8	9.6703	9.5298	7.5003	9.5545	9.2321
9	12.9993	9.8566	11.5530	11.1444	12.3906
10	11.5216	12.9029	11.7977	12.8315	13.1875
11	18.5760	18.1250	14.9620	13.8180	19.5780

AGE	1987	1988	1989	1990	1991
1	0.0952	0.1638	0.5391	0.2468	0.2152
2	0.6163	0.4456	0.6175	0.8578	0.7012
3	1.3170	1.2863	1.2884	1.4218	1.2917
4	2.3713	1.9174	2.2582	1.9901	2.0253
5	3.7262	3.9948	3.0234	3.5049	3.0354
6	5.7106	5.5705	4.6865	5.3360	5.5742
7	7.5708	7.9918	7.6267	6.8032	8.4715
8	9.0350	10.2441	9.9203	10.3156	11.4941
9	11.9624	10.5159	12.5689	12.9931	12.8544
10	13.3502	15.4114	13.8347	14.3000	19.8187
11	13.3330	14.0000	23.2860	20.5880	17.0000

AGE	1992	1993	1994	1995	1996
1	0.2461	0.2282	0.0403	0.1155	0.3385
2	0.8040	0.7033	0.7585	0.4322	0.6502
3	1.5182	1.6822	1.4662	1.5765	1.7414
4	2.0559	2.1624	2.3225	2.1938	2.0374
5	2.7375	3.4030	2.8330	3.8680	3.0463
6	4.4715	4.3342	5.1510	4.3208	6.0943
7	8.3915	7.0725	6.6198	8.2203	7.6260
8	10.7949	11.1777	10.2328	9.0868	12.2349
9	12.8464	12.7422	11.6631	14.0497	13.0080
10	15.1232	14.0844	15.8214	14.3973	16.7133
11	17.5760	17.5760	20.6370	20.3470	17.5760

AGE	1997	1998	1999	2000	2001
1	0.2290	0.2325	0.1517	0.2018	0.2303
2	1.0213	0.7558	0.7478	0.7354	0.8576
3	1.8491	1.9172	1.5873	1.7501	1.9658
4	2.5549	2.5113	2.3054	2.5062	2.7009
5	2.6863	3.5490	3.3071	3.3717	4.0246
6	4.0867	3.6326	4.8858	4.6832	5.2824
7	7.8614	4.9803	5.5152	5.8918	6.4395
8	10.9722	9.7512	7.1645	7.8332	7.0862
9	14.3132	14.7702	12.0664	11.2963	8.5818
10	15.2593	14.8391	15.9124	13.7943	12.6399
11	21.8740	20.3470	17.5760	17.5760	24.4180

AGE 2002 2003 2004 2005 2006

1	0.1932	0.2210	0.2139	0.1768	0.1885
2	0.7513	0.8958	0.7831	0.8092	0.9788
3	2.0846	1.8080	2.1246	1.7417	1.9537
4	2.7934	2.7416	2.7869	2.5747	2.5906
5	3.5860	3.6152	3.3395	3.7264	3.2598
6	5.2776	4.6145	4.5854	4.0552	4.5681
7	6.4958	6.6539	6.0362	5.7281	4.9862
8	9.1466	7.6622	8.4069	7.3468	6.8905
9	9.2175	11.1688	10.1562	9.9043	8.6971
10	9.5996	11.1725	11.8421	12.5744	11.2682
11	14.3330	13.0740	13.2600	14.3820	15.6640

AGE	2007	2008
1	0.1885	0.1846
2	0.9183	0.9021
3	2.4119	2.0358
4	2.7952	2.6535
5	3.5785	3.5216
6	4.2406	4.2879
7	5.5519	5.4221
8	6.2459	6.8277
9	8.7696	9.1237
10	10.6374	11.4933
11	14.3140	14.7867

### SSB Weights at Age - Input Data

AGE	1982	1983	1984	1985	1986
1	0.5015	0.2949	0.3608	0.3003	0.2583
2	0.9229	0.8270	0.6745	0.7096	0.7231
3	1.3188	1.3374	1.3088	1.2779	1.3368
4	2.2882	1.9876	2.0842	2.1157	2.1495
5	4.1750	3.1812	2.9884	3.4396	3.5549
6	7.0188	5.3316	4.6675	4.4555	5.1379
7	8.0156	6.1630	6.9729	6.7561	6.6365
8	9.6703	9.5298	7.5003	9.5545	9.2321
9	12.9993	9.8566	11.5530	11.1444	12.3906
10	11.5216	12.9029	11.7977	12.8315	13.1875
11	18.5760	18.1250	14.9620	13.8180	19.5780

AGE	1987	1988	1989	1990	1991
1	0.0952	0.1638	0.5391	0.2468	0.2152
2	0.6163	0.4456	0.6175	0.8578	0.7012
3	1.3170	1.2863	1.2884	1.4218	1.2917
4	2.3713	1.9174	2.2582	1.9901	2.0253
5	3.7262	3.9948	3.0234	3.5049	3.0354
6	5.7106	5.5705	4.6865	5.3360	5.5742
7	7.5708	7.9918	7.6267	6.8032	8.4715
8	9.0350	10.2441	9.9203	10.3156	11.4941
9	11.9624	10.5159	12.5689	12.9931	12.8544
10	13.3502	15.4114	13.8347	14.3000	19.8187
11	13.3330	14.0000	23.2860	20.5880	17.0000

AGE	1992	1993	1994	1995	1996
1	0.2461	0.2282	0.0403	0.1155	0.3385
2	0.8040	0.7033	0.7585	0.4322	0.6502
3	1.5182	1.6822	1.4662	1.5765	1.7414
4	2.0559	2.1624	2.3225	2.1938	2.0374
5	2.7375	3.4030	2.8330	3.8680	3.0463
6	4.4715	4.3342	5.1510	4.3208	6.0943
7	8.3915	7.0725	6.6198	8.2203	7.6260
8	10.7949	11.1777	10.2328	9.0868	12.2349
9	12.8464	12.7422	11.6631	14.0497	13.0080
10	15.1232	14.0844	15.8214	14.3973	16.7133
11	17.5760	17.5760	20.6370	20.3470	17.5760

AGE	1997	1998	1999	2000	2001
1	0.2290	0.2325	0.1517	0.2018	0.2303
2	1.0213	0.7558	0.7478	0.7354	0.8576
3	1.8491	1.9172	1.5873	1.7501	1.9658
4	2.5549	2.5113	2.3054	2.5062	2.7009
5	2.6863	3.5490	3.3071	3.3717	4.0246
6	4.0867	3.6326	4.8858	4.6832	5.2824

7	7.8614	4.9803	5.5152	5.8918	6.4395
8	10.9722	9.7512	7.1645	7.8332	7.0862
9	14.3132	14.7702	12.0664	11.2963	8.5818
10	15.2593	14.8391	15.9124	13.7943	12.6399
11	21.8740	20.3470	17.5760	17.5760	24.4180

AGE	2002	2003	2004	2005	2006
1	0.1932	0.2210	0.2139	0.1768	0.1885
2	0.7513	0.8958	0.7831	0.8092	0.9788
3	2.0846	1.8080	2.1246	1.7417	1.9537
4	2.7934	2.7416	2.7869	2.5747	2.5906
5	3.5860	3.6152	3.3395	3.7264	3.2598
6	5.2776	4.6145	4.5854	4.0552	4.5681
7	6.4958	6.6539	6.0362	5.7281	4.9862
8	9.1466	7.6622	8.4069	7.3468	6.8905
9	9.2175	11.1688	10.1562	9.9043	8.6971
10	9.5996	11.1725	11.8421	12.5744	11.2682
11	14.3330	13.0740	13.2600	14.3820	15.6640

AGE 2007

1	0.1885
2	0.9183
3	2.4119
4	2.7952
5	3.5785
6	4.2406
7	5.5519
8	6.2459
9	8.7696
10	10.6374
11	14.3140

### Natural Mortality - Input Data

AGE	1982	1983	1984	1985	1986
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
11	0.2000	0.2000	0.2000	0.2000	0.2000

AGE 1987 1988 1989 1990 1991

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
11	0.2000	0.2000	0.2000	0.2000	0.2000

AGE 1992 1993 1994 1995 1996

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
11	0.2000	0.2000	0.2000	0.2000	0.2000

AGE 1997 1998 1999 2000 2001



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
11	0.2000	0.2000	0.2000	0.2000	0.2000

AGE	2002	2003	2004	2005	2006
-----	------	------	------	------	------

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
11	0.2000	0.2000	0.2000	0.2000	0.2000

AGE	2007
-----	------

1	0.2000
2	0.2000
3	0.2000
4	0.2000
5	0.2000
6	0.2000
7	0.2000
8	0.2000
9	0.2000
10	0.2000
11	0.2000

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

### Maturity - Input Data

AGE	1982	1983	1984	1985	1986
1	0.1100	0.0700	0.0100	0.0100	0.0700
2	0.3200	0.2600	0.2100	0.3600	0.5900
3	0.6400	0.6100	0.8500	0.9600	0.9700
4	0.8700	0.8800	0.9900	1.0000	1.0000
5	0.9600	0.9700	1.0000	1.0000	1.0000
6	0.9900	0.9900	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
11	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1987	1988	1989	1990	1991
-----	------	------	------	------	------

1	0.0300	0.0400	0.0700	0.3000	0.1000
2	0.3900	0.4200	0.3500	0.5100	0.2600
3	0.9300	0.9200	0.8100	0.7200	0.5300
4	1.0000	0.9900	0.9700	0.8600	0.7900
5	1.0000	1.0000	1.0000	0.9400	0.9200
6	1.0000	1.0000	1.0000	0.9700	0.9700
7	1.0000	1.0000	1.0000	0.9900	0.9900
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
11	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1992	1993	1994	1995	1996
-----	------	------	------	------	------

1	0.0600	0.0600	0.0100	0.0000	0.0300
2	0.1900	0.2200	0.1900	0.1500	0.3300
3	0.4700	0.5700	0.8200	0.9300	0.9000
4	0.7800	0.8700	0.9900	1.0000	0.9900
5	0.9300	0.9700	1.0000	1.0000	1.0000

6	0.9800	0.9900	1.0000	1.0000	1.0000
7	0.9900	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
11	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	1997	1998	1999	2000	2001
1	0.0100	0.0600	0.0900	0.1400	0.0900
2	0.1600	0.3600	0.3400	0.3900	0.2800
3	0.7900	0.8200	0.7200	0.7100	0.6100
4	0.9900	0.9700	0.9300	0.9100	0.8600
5	1.0000	1.0000	0.9800	0.9700	0.9600
6	1.0000	1.0000	1.0000	0.9900	0.9900
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
11	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	2002	2003	2004	2005	2006
1	0.1900	0.1500	0.1300	0.0300	0.1200
2	0.4100	0.3800	0.3000	0.1100	0.3200
3	0.6800	0.6700	0.5500	0.3400	0.6300
4	0.8600	0.8700	0.7700	0.6900	0.8600
5	0.9500	0.9600	0.9000	0.9000	0.9600
6	0.9800	0.9900	0.9600	0.9800	0.9900
7	0.9900	1.0000	0.9900	0.9900	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
11	1.0000	1.0000	1.0000	1.0000	1.0000

AGE	2007
1	0.0800
2	0.3400
3	0.7600
4	0.9500
5	0.9900
6	1.0000
7	1.0000
8	1.0000
9	1.0000
10	1.0000
11	1.0000

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**Input Partial Recruitment**

AGE	
1	0.0000
2	0.0021
3	0.1618
4	0.6821
5	0.9004
6	1.0000
7	0.8264
8	0.7333
9	0.7720
10	0.7530

**Input F-Plus Ratio**

YEAR	
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
2007	1.0000

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**SURVEY - INPUT DATA**

INDEX	1	2	3	4	5
SURVEY TAG	WHSpr	WHSpr	WHSpr	WHSpr	WHSpr
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
1982	1.0065	0.4764	0.6554	0.9877	0.0873
1983	0.9486	0.9968	0.4647	0.4042	0.2118
1984	1.3120	1.0226	0.8233	0.2118	0.0467
1985	0.2308	0.6617	0.6625	0.6617	0.1031
1986	0.2478	0.7540	0.2369	0.0912	0.0349
1987	0.4602	0.1991	0.2307	0.0744	0.0000
1988	0.9234	0.8229	0.2179	0.2535	0.0915
1989	0.6048	0.7230	0.6001	0.0908	0.0627
1990	0.2076	1.3654	0.6370	0.1020	0.0321
1991	0.0678	0.2339	1.7167	0.2993	0.0200
1992	0.2255	0.2424	0.2819	1.3281	0.2264
1993	0.4965	0.7993	0.3343	0.0906	0.4842
1994	0.3156	0.3875	0.2150	0.0942	0.0493
1995	0.1792	1.1161	0.3717	0.1454	0.0283
1996	0.0215	0.5927	1.3307	0.4032	0.0593
1997	0.1316	0.3991	0.2643	0.8756	0.2424
1998	0.2236	0.3301	0.5166	0.1415	0.4210
1999	0.3443	0.7133	0.3445	0.3150	0.1337
2000	0.7247	0.4385	0.4570	0.1071	0.1006
2001	0.3234	0.7161	0.4972	0.3539	0.0635
2002	0.0453	0.5244	1.6012	0.6142	0.3619
2003	0.8305	0.0630	0.7077	1.0889	0.3946
2004	0.0446	0.2213	0.1181	0.1908	0.2316
2005	0.7265	0.1014	0.6076	0.0154	0.1498
2006	0.2300	0.4300	0.0600	0.2000	0.0200
2007	3.4500	2.9300	4.4800	0.5000	0.8400
2008	1.0986	3.2112	1.3566	0.9393	0.0584

  

INDEX	6	7	8	9	10
SURVEY TAG	WHSpr	WHSpr	WHAut	WHAut	WHAut
AGE	7	8	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
1982	0.1120	0.0000	0.6179	0.4188	0.5394

1983	0.0680	0.0160	0.8426	3.3527	2.2748
1984	0.1000	0.0000	0.3168	0.9155	0.8277
1985	0.0910	0.0520	0.4323	0.4258	0.6307
1986	0.0380	0.0000	0.5256	0.9567	0.6094
1987	0.0660	0.0080	0.3920	0.4010	0.6565
1988	0.0650	0.0000	0.5782	1.3796	0.5921
1989	0.0140	0.0000	1.9375	2.3134	0.9896
1990	0.0180	0.0000	0.1495	2.4065	1.5017
1991	0.0180	0.0000	0.0447	0.1868	1.8293
1992	0.0690	0.0000	0.1435	0.1390	0.2233
1993	0.0550	0.0230	0.2910	0.4458	0.1400
1994	0.1270	0.0270	0.1977	0.5678	0.3602
1995	0.0000	0.0110	0.2071	0.8831	0.8260
1996	0.0000	0.0000	0.0680	0.2845	1.2284
1997	0.1200	0.0000	0.1242	0.3826	0.1883
1998	0.0230	0.0370	0.2968	0.0855	0.1769
1999	0.2730	0.0000	0.0966	0.3203	0.1147
2000	0.0240	0.0220	0.4307	0.3672	0.5857
2001	0.0980	0.0550	0.5326	0.9837	0.3936
2002	0.1640	0.0570	0.0340	0.1410	0.7524
2003	0.3210	0.1030	0.2691	0.0805	0.3637
2004	0.0140	0.0140	0.4546	0.1976	0.1848
2005	0.1297	0.0142	0.5700	0.1700	0.5400
2006	0.1314	0.0729	0.1533	0.3806	0.0796
2007	0.0652	0.0384	1.2514	0.5802	1.0331
2008	0.0806	0.0000	0.1456	0.8310	0.3840

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**SURVEY - INPUT DATA**

INDEX	11	12	13	14	15
SURVEY TAG	WHAut	WHAut	WHAut	WHAut	MASpr
AGE	5	6	7	8	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
1982	0.4047	0.1205	0.0760	0.0290	7.1700
1983	1.0892	0.2092	0.0000	0.0000	14.6100
1984	0.1970	0.2270	0.2100	0.0000	5.1500
1985	0.3871	0.2140	0.1630	0.0790	2.7700
1986	0.2482	0.1820	0.0750	0.0000	11.6800
1987	0.3417	0.0727	0.0410	0.0000	4.7100
1988	0.2429	0.0751	0.0000	0.0000	6.3500
1989	0.4434	0.0990	0.0650	0.0330	20.5100
1990	0.2926	0.1605	0.0330	0.0000	5.4500
1991	0.5978	0.2589	0.0520	0.0100	2.6900
1992	0.6334	0.0811	0.0000	0.0230	5.1300
1993	0.0355	0.3498	0.1040	0.0080	6.1100
1994	0.0336	0.0000	0.0300	0.0000	4.0700
1995	0.0854	0.0511	0.0000	0.0450	1.9200
1996	0.3252	0.0821	0.0110	0.0000	0.5200
1997	0.5421	0.0616	0.0000	0.0000	0.9800
1998	0.1728	0.1402	0.0000	0.0000	0.8300
1999	0.1923	0.0387	0.0310	0.0000	2.3900
2000	0.2433	0.1320	0.0160	0.0060	7.0200
2001	0.5071	0.1343	0.0100	0.0000	4.5000
2002	0.4690	0.3368	0.1220	0.0840	0.2600
2003	2.7972	1.0958	0.6270	0.0510	12.7000
2004	0.5287	0.4498	0.0730	0.0770	1.5600
2005	0.2400	0.2500	0.1680	0.0680	7.1500
2006	0.4495	0.0221	0.0923	0.0824	3.6700
2007	0.2475	0.2857	0.0339	0.0496	3.3600
2008	0.5283	0.0226	0.0690	0.0000	0.0000
INDEX	16	17	18	19	20
SURVEY TAG	MASpr	MASpr	MAAut	MAAut	MAAut

AGE	3	4	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
1982	2.4100	0.8700	1.4500	6.2000	1.2500
1983	2.8600	1.5000	4.5900	1.1400	0.3100
1984	2.0700	0.7000	1.2700	0.2800	0.1000
1985	2.2700	0.4500	10.3000	0.1600	0.0700
1986	1.2300	0.6800	2.6500	0.1900	0.0200
1987	2.9600	0.2200	1.8000	0.5500	0.3700
1988	2.4500	1.4500	311.7200	1.4000	0.0200
1989	8.7600	1.0600	5.5300	3.1000	0.2400
1990	14.7500	2.3100	3.9400	0.0200	0.1000
1991	1.5700	3.6600	7.8100	4.2200	0.3100
1992	3.6700	0.7500	5.0400	2.0000	0.3600
1993	2.5500	0.9000	26.4200	0.9900	0.0400
1994	1.7500	0.4900	49.4300	1.5300	0.3600
1995	2.7600	0.7800	40.0100	5.3600	3.4500
1996	1.0800	1.4900	2.9300	0.8000	0.4100
1997	0.9300	0.1700	6.9000	0.0800	0.0100
1998	0.7000	0.7500	1.4300	0.0300	0.0000
1999	2.3100	0.7800	3.2700	0.6400	0.3200
2000	2.8900	2.2000	7.3300	0.5900	0.0700
2001	4.9700	3.5200	0.0500	0.4000	0.1700
2002	1.2300	1.4100	49.1900	0.0100	0.1300
2003	0.2800	1.4300	0.9600	1.0900	0.1300
2004	2.5800	0.4600	120.1700	1.6000	0.1400
2005	0.5700	2.0700	44.6700	9.9400	0.9200
2006	3.3800	0.5400	39.4700	0.6100	0.2400
2007	1.8400	1.7500	2.0800	4.3500	0.4200
2008	0.0000	0.0000	7.6100	0.1600	0.1300

**SURVEY - INPUT DATA**

INDEX	21	22	23	24	25
SURVEY TAG	CM_CPE	CM_CPE	CM_CPE	CM_CPE	CM_CPE
AGE	2	3	4	5	6
TIME	MEAN	MEAN	MEAN	MEAN	MEAN
TYPE	NUMBERS	NUMBERS	NUMBERS	NUMBERS	NUMBERS
RETRO FLAG	0	0	0	0	0
1982	0.0743	0.0738	0.0450	0.0217	0.0027
1983	0.0477	0.1099	0.0422	0.0209	0.0123
1984	0.0331	0.0448	0.0442	0.0118	0.0055
1985	0.0137	0.0423	0.0289	0.0179	0.0036
1986	0.0041	0.0688	0.0226	0.0066	0.0043
1987	0.0074	0.0186	0.0260	0.0057	0.0018
1988	0.0146	0.0492	0.0242	0.0093	0.0015
1989	0.0170	0.0637	0.0397	0.0106	0.0023
1990	0.0110	0.1595	0.0782	0.0122	0.0051
1991	0.0194	0.0404	0.1355	0.0217	0.0039
1992	0.0149	0.0173	0.0138	0.0515	0.0052
1993	0.0027	0.0500	0.0232	0.0041	0.0140
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
2008	0.0000	0.0000	0.0000	0.0000	0.0000

**Additional Output Files**

Population File C:\ALLWORK\ASSESS\GARMIIIAUG2008WG\ASSMT\_MTG\GOMCOD\VPA\FINALS\G  
 Auxilliary File C:\ALLWORK\ASSESS\GARMIIIAUG2008WG\ASSMT\_MTG\GOMCOD\VPA\FINALS\G  
 Covariance File C:\ALLWORK\ASSESS\GARMIIIAUG2008WG\ASSMT\_MTG\GOMCOD\VPA\FINALS\G  
 Residuals File C:\ALLWORK\ASSESS\GARMIIIAUG2008WG\ASSMT\_MTG\GOMCOD\VPA\FINALS\G  
 Log File C:\ALLWORK\ASSESS\GARMIIIAUG2008WG\ASSMT\_MTG\GOMCOD\VPA\FINALS\G

**Estimation Results JAN-1 Population Numbers**

AGE	1982	1983	1984	1985	1986
1	7857.	7929.	10674.	6679.	10260.
2	11123.	6368.	6481.	8717.	5428.
3	5520.	7314.	4015.	4581.	6174.
4	3128.	2329.	3348.	1856.	1771.
5	1767.	1274.	831.	1261.	491.
6	226.	771.	421.	255.	428.
7	260.	116.	222.	157.	88.
8	140.	124.	49.	111.	58.
9	71.	55.	42.	23.	62.
10	10.	21.	22.	21.	15.
11	79.	35.	36.	21.	113.
Total	30180.	26336.	26143.	23683.	24888.

AGE	1987	1988	1989	1990	1991
1	12744.	24612.	4254.	4135.	6975.
2	8388.	10347.	20148.	3480.	3386.
3	4276.	6063.	7974.	16026.	2620.
4	2560.	2306.	3038.	4465.	9388.
5	609.	734.	877.	935.	1434.
6	151.	185.	213.	276.	292.
7	170.	41.	107.	90.	66.
8	31.	63.	24.	50.	49.
9	20.	13.	35.	14.	14.
10	18.	4.	10.	26.	2.
11	5.	2.	13.	30.	2.
Total	28973.	44369.	36694.	29528.	24228.

AGE	1992	1993	1994	1995	1996
1	6340.	9123.	3180.	3805.	3545.
2	5711.	5191.	7469.	2603.	3099.
3	2375.	4369.	4134.	6066.	1880.
4	931.	1414.	1739.	2038.	3908.
5	3243.	281.	449.	323.	590.
6	332.	675.	104.	68.	54.
7	96.	73.	124.	21.	30.
8	12.	19.	34.	24.	5.
9	13.	3.	10.	1.	3.
10	4.	0.	1.	2.	0.
11	0.	0.	2.	0.	0.
Total	19057.	21148.	17245.	14951.	13113.

AGE	1997	1998	1999	2000	2001
1	5245.	4458.	7847.	4016.	1187.
2	2902.	4294.	3650.	6424.	3288.
3	2455.	2299.	3419.	2969.	5077.
4	969.	1562.	1446.	2213.	1947.
5	1447.	381.	741.	670.	1063.
6	135.	414.	168.	360.	376.
7	11.	46.	166.	85.	205.
8	20.	4.	14.	64.	55.
9	3.	14.	0.	4.	46.
10	1.	2.	11.	0.	4.
11	0.	1.	0.	0.	2.
Total	13190.	13477.	17462.	16805.	13250.

AGE	2002	2003	2004	2005	2006
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1	4953.	1681.	10966.	6713.	23910.
2	972.	4055.	1377.	8979.	5496.
3	2559.	793.	3305.	1126.	7344.
4	3086.	1860.	542.	2382.	801.
5	974.	1726.	1122.	218.	1214.
6	528.	484.	720.	548.	92.
7	209.	248.	187.	349.	209.
8	114.	98.	110.	86.	176.
9	37.	61.	44.	56.	41.
10	25.	22.	30.	19.	29.
11	2.	16.	9.	19.	23.
Total	13459.	11046.	18414.	20495.	39336.

AGE	2007	2008
1	4808.	0.
2	19576.	3937.
3	4498.	16020.
4	5852.	3543.
5	401.	3970.
6	587.	201.
7	46.	251.
8	83.	30.
9	101.	47.
10	17.	71.
11	21.	19.
Total	35992.	28090.

### Fishing Mortality Calculated

AGE	1982	1983	1984	1985	1986
1	0.0101	0.0016	0.0026	0.0074	0.0014
2	0.2192	0.2612	0.1470	0.1450	0.0386
3	0.6628	0.5814	0.5714	0.7503	0.6802
4	0.6981	0.8305	0.7769	1.1299	0.8676
5	0.6295	0.9064	0.9811	0.8800	0.9766
6	0.4723	1.0461	0.7862	0.8605	0.7259
7	0.5377	0.6505	0.4954	0.8028	0.8481
8	0.7294	0.8727	0.5657	0.3866	0.8646
9	1.0140	0.7010	0.4948	0.2139	1.0200
10	0.6088	0.9342	0.8265	0.8317	0.8523
11	0.6088	0.9342	0.8265	0.8317	0.8523
AGE	1987	1988	1989	1990	1991
1	0.0084	0.0001	0.0010	0.0000	0.0000
2	0.1247	0.0604	0.0289	0.0840	0.1545
3	0.4177	0.4909	0.3799	0.3348	0.8343
4	1.0499	0.7667	0.9783	0.9361	0.8630
5	0.9906	1.0384	0.9547	0.9634	1.2635
6	1.1023	0.3485	0.6584	1.2250	0.9179
7	0.7884	0.3576	0.5545	0.4021	1.5057
8	0.6852	0.3761	0.3568	1.0760	1.1140
9	1.4099	0.0904	0.0981	1.7050	0.9720
10	0.9568	0.7939	0.8422	0.9642	1.2033
11	0.9568	0.7939	0.8422	0.9642	1.2033
AGE	1992	1993	1994	1995	1996
1	0.0000	0.0000	0.0003	0.0053	0.0000
2	0.0677	0.0276	0.0080	0.1251	0.0326
3	0.3191	0.7214	0.5072	0.2397	0.4631
4	0.9977	0.9473	1.4838	1.0395	0.7934
5	1.3696	0.7941	1.6866	1.5888	1.2721
6	1.3085	1.4954	1.4035	0.6248	1.4090
7	1.4079	0.5791	1.4467	1.3241	0.1825
8	1.1311	0.4254	3.4380	1.9107	0.1292
9	8.8324	1.1807	1.2844	6.1427	0.6870
10	1.3641	1.1501	1.6321	1.3635	1.1851
11	1.3641	1.1501	1.6321	1.3635	1.1851
AGE	1997	1998	1999	2000	2001
1	0.0000	0.0000	0.0002	0.0000	0.0000
2	0.0331	0.0281	0.0067	0.0352	0.0507
3	0.2522	0.2638	0.2347	0.2216	0.2979
4	0.7331	0.5461	0.5695	0.5337	0.4927
5	1.0524	0.6167	0.5220	0.3769	0.4994

6	0.8742	0.7161	0.4791	0.3620	0.3864
7	0.7168	0.9838	0.7526	0.2337	0.3888
8	0.1523	6.4333	0.9591	0.1311	0.1957
9	0.1066	0.0314	0.2164	0.0002	0.3866
10	1.0156	0.6873	0.5515	0.3465	0.4486
11	1.0156	0.6873	0.5515	0.3465	0.4486

AGE	2002	2003	2004	2005	2006
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0034	0.0045	0.0007	0.0009	0.0003
3	0.1189	0.1807	0.1274	0.1411	0.0271
4	0.3808	0.3053	0.7125	0.4741	0.4914
5	0.4985	0.6741	0.5164	0.6606	0.5260
6	0.5550	0.7507	0.5245	0.7653	0.4948
7	0.5582	0.6163	0.5806	0.4825	0.7225
8	0.4224	0.5975	0.4648	0.5426	0.3577
9	0.3310	0.4983	0.6597	0.4716	0.6789
10	0.5163	0.6793	0.5218	0.6406	0.5272
11	0.5163	0.6793	0.5218	0.6406	0.5272
AGE	2007				

1	0.0000
2	0.0004
3	0.0388
4	0.1880
5	0.4892
6	0.6492
7	0.2288
8	0.3714
9	0.1484
10	0.4888
11	0.4888

**Average Fishing Mortality For Ages 5 - 7**

Year	Average F	N Weighted	Biomass Wtd	Catch Wtd
1982	0.5465	0.6031	0.5896	0.6066
1983	0.8677	0.9426	0.9506	0.9488
1984	0.7543	0.8523	0.7919	0.8772
1985	0.8478	0.8698	0.8641	0.8702
1986	0.8502	0.8588	0.8383	0.8695
1987	0.9605	0.9719	0.9537	0.9778
1988	0.5815	0.8761	0.8204	0.9533
1989	0.7225	0.8662	0.8154	0.8839
1990	0.8635	0.9800	0.9711	1.0061
1991	1.2290	1.2161	1.1983	1.2252
1992	1.3620	1.3651	1.3643	1.3652
1993	0.9562	1.2385	1.2349	1.3016
1994	1.5123	1.5992	1.5540	1.6032
1995	1.1792	1.4161	1.3970	1.4752
1996	0.9545	1.2348	1.1860	1.2724
1997	0.8811	1.0350	1.0243	1.0369
1998	0.7722	0.6858	0.6925	0.6928
1999	0.5846	0.5508	0.5638	0.5605
2000	0.3242	0.3611	0.3550	0.3645
2001	0.4249	0.4598	0.4506	0.4648
2002	0.5373	0.5233	0.5298	0.5244
2003	0.6804	0.6834	0.6816	0.6848
2004	0.5405	0.5252	0.5285	0.5256
2005	0.6362	0.6564	0.6361	0.6736
2006	0.5811	0.5512	0.5613	0.5572
2007	0.4557	0.5685	0.5686	0.5845



### Back Calculated Partial Recruitment

AGE	1982	1983	1984	1985	1986
1	0.0100	0.0015	0.0026	0.0065	0.0014
2	0.2162	0.2497	0.1498	0.1283	0.0378
3	0.6537	0.5557	0.5824	0.6641	0.6669
4	0.6884	0.7939	0.7918	1.0000	0.8506
5	0.6208	0.8665	1.0000	0.7789	0.9575
6	0.4658	1.0000	0.8013	0.7616	0.7116
7	0.5303	0.6218	0.5050	0.7105	0.8314
8	0.7194	0.8342	0.5766	0.3422	0.8477
9	1.0000	0.6700	0.5043	0.1893	1.0000
10	0.6004	0.8930	0.8424	0.7361	0.8356
11	0.6004	0.8930	0.8424	0.7361	0.8356
AGE	1987	1988	1989	1990	1991
1	0.0059	0.0001	0.0010	0.0000	0.0000
2	0.0884	0.0582	0.0296	0.0493	0.1026
3	0.2962	0.4727	0.3883	0.1964	0.5541
4	0.7446	0.7384	1.0000	0.5490	0.5731
5	0.7026	1.0000	0.9758	0.5650	0.8392
6	0.7818	0.3356	0.6730	0.7185	0.6096
7	0.5592	0.3444	0.5668	0.2358	1.0000
8	0.4860	0.3622	0.3647	0.6311	0.7399
9	1.0000	0.0871	0.1003	1.0000	0.6455
10	0.6786	0.7645	0.8608	0.5655	0.7992
11	0.6786	0.7645	0.8608	0.5655	0.7992
AGE	1992	1993	1994	1995	1996
1	0.0000	0.0000	0.0001	0.0009	0.0000
2	0.0077	0.0184	0.0023	0.0204	0.0232
3	0.0361	0.4824	0.1475	0.0390	0.3287
4	0.1130	0.6335	0.4316	0.1692	0.5631
5	0.1551	0.5310	0.4906	0.2587	0.9028
6	0.1481	1.0000	0.4082	0.1017	1.0000
7	0.1594	0.3872	0.4208	0.2156	0.1295
8	0.1281	0.2845	1.0000	0.3111	0.0917
9	1.0000	0.7896	0.3736	1.0000	0.4875
10	0.1544	0.7691	0.4747	0.2220	0.8411
11	0.1544	0.7691	0.4747	0.2220	0.8411
AGE	1997	1998	1999	2000	2001
1	0.0000	0.0000	0.0002	0.0000	0.0000
2	0.0314	0.0044	0.0070	0.0660	0.1016
3	0.2396	0.0410	0.2448	0.4153	0.5965
4	0.6966	0.0849	0.5938	1.0000	0.9866
5	1.0000	0.0959	0.5442	0.7062	1.0000
6	0.8307	0.1113	0.4995	0.6782	0.7738
7	0.6812	0.1529	0.7847	0.4378	0.7784
8	0.1447	1.0000	1.0000	0.2457	0.3918
9	0.1013	0.0049	0.2256	0.0005	0.7741
10	0.9651	0.1068	0.5751	0.6493	0.8982
11	0.9651	0.1068	0.5751	0.6493	0.8982
AGE	2002	2003	2004	2005	2006
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0061	0.0060	0.0010	0.0012	0.0004
3	0.2129	0.2407	0.1788	0.1844	0.0374
4	0.6822	0.4067	1.0000	0.6195	0.6801
5	0.8931	0.8980	0.7248	0.8632	0.7280
6	0.9943	1.0000	0.7361	1.0000	0.6848
7	1.0000	0.8209	0.8148	0.6305	1.0000
8	0.7566	0.7959	0.6523	0.7090	0.4951
9	0.5929	0.6637	0.9258	0.6162	0.9396
10	0.9249	0.9049	0.7324	0.8370	0.7296
11	0.9249	0.9049	0.7324	0.8370	0.7296
AGE	2007				
1	0.0000				
2	0.0007				
3	0.0597				
4	0.2896				
5	0.7536				
6	1.0000				

7	0.3524
8	0.5722
9	0.2286
10	0.7530
11	0.7530

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**JAN-1 Biomass**

AGE	1982	1983	1984	1985	1986
1	3940.	2338.	3851.	2006.	2650.
2	10265.	5266.	4372.	6186.	3925.
3	7279.	9782.	5255.	5854.	8253.
4	7157.	4629.	6978.	3928.	3807.
5	7379.	4053.	2484.	4336.	1746.
6	1589.	4111.	1967.	1137.	2199.
7	2081.	712.	1546.	1062.	586.
8	1354.	1183.	370.	1057.	532.
9	924.	545.	491.	256.	762.
10	110.	273.	265.	272.	200.
11	1468.	629.	533.	293.	2210.
Total	43548.	33522.	28112.	26386.	26871.

  

AGE	1987	1988	1989	1990	1991
1	1213.	4031.	2294.	1021.	1501.
2	5170.	4611.	12442.	2985.	2374.
3	5631.	7799.	10274.	22786.	3384.
4	6071.	4421.	6861.	8887.	19014.
5	2269.	2931.	2651.	3278.	4352.
6	865.	1031.	997.	1475.	1629.
7	1284.	329.	816.	613.	563.
8	280.	647.	234.	519.	567.
9	238.	134.	446.	175.	181.
10	243.	61.	132.	377.	40.
11	71.	28.	312.	614.	26.
Total	23334.	26023.	37458.	42729.	33630.

  

AGE	1992	1993	1994	1995	1996
1	1560.	2082.	128.	439.	1200.
2	4591.	3651.	5665.	1125.	2015.
3	3606.	7350.	6061.	9564.	3274.
4	1914.	3057.	4039.	4471.	7962.
5	8877.	957.	1271.	1249.	1798.
6	1484.	2925.	536.	294.	329.
7	802.	519.	820.	172.	227.
8	130.	214.	345.	217.	56.
9	170.	41.	119.	12.	38.
10	66.	0.	13.	33.	0.
11	0.	0.	33.	6.	0.
Total	23202.	20795.	19031.	17583.	16899.

  

AGE	1997	1998	1999	2000	2001
1	1201.	1037.	1190.	810.	273.
2	2964.	3246.	2730.	4724.	2820.
3	4540.	4408.	5426.	5195.	9981.
4	2475.	3923.	3333.	5547.	5259.
5	3888.	1352.	2450.	2258.	4277.
6	553.	1503.	823.	1686.	1987.
7	85.	230.	913.	503.	1321.
8	223.	42.	101.	500.	392.
9	47.	211.	0.	50.	393.
10	18.	36.	181.	0.	46.
11	4.	18.	0.	0.	37.
Total	15999.	16006.	17147.	21274.	26787.

  

AGE	2002	2003	2004	2005	2006
1	957.	372.	2346.	1187.	4507.
2	730.	3632.	1078.	7265.	5379.
3	5334.	1434.	7022.	1962.	14348.
4	8620.	5100.	1510.	6133.	2074.
5	3493.	6242.	3748.	811.	3957.
6	2787.	2235.	3303.	2223.	420.
7	1359.	1651.	1130.	1999.	1041.
8	1042.	751.	922.	630.	1215.
9	343.	683.	449.	559.	355.
10	245.	245.	360.	235.	325.

11	23.	214.	125.	276.	368.
Total	24934.	22558.	21993.	23280.	33992.
AGE	2007	2008			
1	906.	0.			
2	17977.	3551.			
3	10849.	32614.			
4	16359.	9401.			
5	1435.	13982.			
6	2491.	863.			
7	255.	1362.			
8	518.	204.			
9	886.	428.			
10	180.	819.			
11	304.	283.			
Total	52161.	63509.			

### Mean Biomass

AGE	1982	1983	1984	1985	1986
1	4564.	3203.	4889.	2811.	3708.
2	10094.	5418.	5586.	7336.	5418.
3	5987.	8172.	4514.	4734.	7373.
4	5569.	3547.	5766.	2849.	3142.
5	5667.	2891.	1785.	3380.	1315.
6	1084.	2656.	1556.	853.	1681.
7	1605.	449.	1290.	780.	444.
8	890.	791.	336.	947.	385.
9	533.	363.	393.	240.	482.
10	67.	162.	196.	170.	128.
11	1007.	376.	333.	183.	1367.
Total	37067.	28028.	26644.	24281.	25443.
AGE	1987	1988	1989	1990	1991
1	2370.	7093.	2621.	1559.	2630.
2	6819.	8781.	21592.	3278.	3370.
3	4932.	7609.	10420.	20928.	2517.
4	4576.	3514.	5237.	6138.	14065.
5	1713.	2144.	1999.	2314.	3016.
6	606.	919.	615.	1091.	1306.
7	1026.	281.	677.	727.	309.
8	207.	529.	199.	335.	338.
9	130.	122.	440.	92.	116.
10	141.	45.	103.	222.	28.
11	42.	18.	194.	363.	14.
Total	22561.	31056.	44098.	37048.	27708.
AGE	1992	1993	1994	1995	1996
1	2390.	3440.	380.	942.	1889.
2	7786.	5520.	9326.	3144.	4266.
3	3613.	5199.	5358.	8820.	2946.
4	1488.	2016.	2491.	3110.	5723.
5	5039.	753.	675.	759.	1077.
6	855.	1982.	325.	258.	197.
7	451.	511.	436.	116.	258.
8	80.	187.	94.	114.	54.
9	20.	23.	55.	3.	28.
10	36.	0.	7.	24.	0.
11	0.	0.	15.	3.	0.
Total	21758.	19631.	19164.	17294.	16438.
AGE	1997	1998	1999	2000	2001
1	1978.	1685.	2375.	1514.	448.
2	4593.	5272.	4422.	9267.	5142.
3	4377.	3812.	5088.	5532.	9546.
4	1919.	3133.	2587.	5368.	4487.
5	2578.	1077.	2028.	2256.	3617.
6	398.	1144.	706.	1571.	1792.
7	59.	140.	768.	417.	1127.
8	198.	7.	83.	463.	382.
9	42.	241.	0.	52.	300.
10	11.	24.	107.	0.	33.
11	2.	12.	0.	0.	27.
Total	16154.	16548.	18164.	26440.	26901.
AGE	2002	2003	2004	2005	2006

1	1867.	634.	4135.	2531.	9015.
2	1193.	7074.	1838.	12803.	11470.
3	5386.	1589.	6595.	1964.	15933.
4	7652.	4466.	1146.	4910.	1885.
5	2822.	4602.	2922.	628.	3238.
6	2182.	1653.	2695.	1585.	321.
7	983.	1276.	895.	1578.	752.
8	976.	592.	753.	474.	1029.
9	294.	477.	349.	429.	262.
10	194.	179.	280.	170.	249.
11	17.	142.	89.	186.	261.
Total	23566.	22683.	21698.	27259.	44415.

AGE 2007

1	1813.
2	35957.
3	10108.
4	15629.
5	1138.
6	1898.
7	238.
8	447.
9	862.
10	144.
11	220.
Total	68452.

### Spawning Stock Biomass

AGE	1982	1983	1984	1985	1986
1	419.	158.	37.	19.	179.
2	3063.	1268.	866.	2102.	2226.
3	4035.	5238.	3928.	4797.	6913.
4	5361.	3431.	5870.	3147.	3186.
5	6169.	3270.	2040.	3621.	1435.
6	1406.	3307.	1669.	952.	1885.
7	1840.	618.	1377.	898.	492.
8	1160.	989.	326.	959.	446.
9	755.	469.	437.	239.	622.
10	96.	226.	223.	229.	168.
11	1283.	521.	449.	247.	1854.
Total	25587.	19494.	17223.	17211.	19406.

AGE	1987	1988	1989	1990	1991
1	35.	156.	155.	296.	145.
2	1910.	1854.	4192.	1452.	582.
3	4725.	6394.	7555.	15007.	1509.
4	4929.	3725.	5469.	6324.	12582.
5	1861.	2384.	2187.	2538.	3137.
6	696.	941.	864.	1128.	1311.
7	1089.	300.	719.	549.	420.
8	241.	587.	213.	420.	456.
9	182.	128.	424.	128.	148.
10	200.	52.	111.	310.	32.
11	58.	24.	262.	506.	21.
Total	15926.	16546.	22151.	28657.	20342.

AGE	1992	1993	1994	1995	1996
1	91.	121.	1.	0.	35.
2	834.	773.	1040.	160.	640.
3	1554.	3593.	4418.	8266.	2639.
4	1223.	2196.	3020.	3637.	6680.
5	6355.	786.	928.	927.	1406.
6	1131.	2183.	410.	256.	252.
7	607.	456.	623.	133.	213.
8	104.	193.	188.	153.	53.
9	38.	32.	93.	4.	32.
10	51.	0.	9.	26.	0.
11	0.	0.	24.	5.	0.
Total	11988.	10334.	10755.	13566.	11949.

AGE	1997	1998	1999	2000	2001
1	12.	60.	104.	110.	24.
2	456.	1125.	897.	1771.	757.
3	3326.	3345.	3634.	3438.	5603.
4	2098.	3361.	2727.	4467.	4030.

5	3155.	1180.	2129.	1990.	3654.
6	463.	1290.	735.	1519.	1784.
7	73.	189.	779.	468.	1198.
8	210.	14.	84.	473.	367.
9	45.	203.	0.	49.	357.
10	15.	31.	159.	0.	41.
11	3.	15.	0.	0.	33.
Total	9856.	10814.	11246.	14285.	17848.

AGE	2002	2003	2004	2005	2006
1	176.	54.	295.	34.	523.
2	289.	1334.	313.	773.	1665.
3	3440.	902.	3657.	630.	8704.
4	6729.	4079.	999.	3782.	1590.
5	2953.	5179.	2993.	632.	3366.
6	2408.	1889.	2810.	1855.	371.
7	1186.	1441.	982.	1767.	893.
8	939.	658.	826.	557.	1108.
9	314.	608.	389.	500.	307.
10	217.	211.	319.	204.	288.
11	21.	185.	111.	239.	326.
Total	18673.	16539.	13693.	10974.	19139.

AGE	2007
1	70.
2	5911.
3	7924.
4	14568.
5	1267.
6	2162.
7	237.
8	471.
9	836.
10	161.
11	271.
Total	33877.

### Catch Biomass

AGE	1982	1983	1984	1985	1986
1	46.	5.	12.	21.	5.
2	2201.	1407.	818.	1059.	209.
3	3918.	4697.	2551.	3503.	4951.
4	3837.	2901.	4415.	3155.	2683.
5	3525.	2578.	1721.	2927.	1261.
6	507.	2727.	1206.	722.	1203.
7	854.	289.	633.	617.	371.
8	640.	680.	188.	363.	328.
9	531.	251.	193.	51.	483.
10	41.	152.	162.	141.	109.
11	613.	352.	275.	152.	1165.
Total	16713.	16037.	12173.	12711.	12768.

AGE	1987	1988	1989	1990	1991
1	20.	1.	3.	0.	0.
2	847.	529.	623.	274.	518.
3	2042.	3698.	3927.	6956.	2068.
4	4715.	2656.	5034.	5649.	11948.
5	1667.	2186.	1876.	2191.	3728.
6	655.	318.	400.	1308.	1178.
7	797.	100.	372.	290.	453.
8	140.	197.	71.	354.	369.
9	179.	11.	43.	153.	111.
10	135.	36.	87.	214.	33.
11	40.	14.	163.	350.	17.
Total	11237.	9747.	12597.	17739.	20424.

AGE	1992	1993	1994	1995	1996
1	0.	0.	0.	5.	0.
2	526.	152.	75.	392.	139.
3	1145.	3700.	2691.	2102.	1352.
4	1458.	1878.	3604.	3173.	4474.
5	6740.	589.	1108.	1174.	1340.
6	1094.	2890.	446.	160.	271.
7	620.	293.	616.	150.	47.
8	89.	79.	308.	211.	7.

9	161.	27.	69.	15.	19.
10	49.	0.	11.	32.	0.
11	0.	0.	25.	4.	0.
Total	11881.	9607.	8952.	7419.	7648.
AGE	1997	1998	1999	2000	2001
1	0.	0.	0.	0.	0.
2	151.	148.	30.	326.	260.
3	1097.	1000.	1188.	1220.	2825.
4	1387.	1693.	1457.	2835.	2189.
5	2663.	656.	1048.	843.	1789.
6	342.	808.	335.	564.	687.
7	42.	136.	570.	97.	435.
8	30.	44.	78.	60.	74.
9	4.	8.	0.	0.	115.
10	11.	16.	59.	0.	15.
11	2.	8.	0.	0.	12.
Total	5731.	4517.	4765.	5946.	8401.
AGE	2002	2003	2004	2005	2006
1	0.	0.	0.	0.	0.
2	4.	32.	1.	12.	4.
3	638.	286.	837.	276.	430.
4	2891.	1354.	806.	2305.	917.
5	1393.	3063.	1494.	410.	1685.
6	1198.	1224.	1399.	1196.	157.
7	543.	777.	514.	754.	536.
8	409.	350.	347.	255.	365.
9	97.	235.	227.	200.	176.
10	100.	121.	146.	109.	131.
11	9.	97.	46.	119.	138.
Total	7281.	7538.	5818.	5637.	4540.
AGE	2007				
1	0.				
2	16.				
3	391.				
4	2924.				
5	551.				
6	1217.				
7	54.				
8	165.				
9	127.				
10	79.				
11	107.				
Total	5631.				

### Catch Numbers

AGE	1982	1983	1984	1985	1986
1	71.4	11.3	24.7	44.3	12.8
2	1980.9	1324.4	801.5	1064.5	186.0
3	2420.3	2917.6	1581.5	2187.8	2756.8
4	1422.1	1189.0	1636.5	1137.1	929.6
5	747.1	687.2	470.1	667.5	277.0
6	77.1	452.6	207.6	133.2	199.9
7	97.7	50.0	78.4	78.5	45.7
8	65.6	65.4	19.3	32.1	30.2
9	41.0	25.2	15.0	4.0	35.6
10	4.0	11.8	11.6	11.0	8.0
11	33.0	19.4	18.4	11.0	59.5
Total	6960.2	6753.9	4864.6	5371.0	4541.1
AGE	1987	1988	1989	1990	1991
1	96.3	2.4	3.8	0.0	0.0
2	889.6	549.1	519.5	253.6	438.5
3	1321.0	2128.0	2280.6	4125.6	1341.1
4	1505.8	1117.1	1715.7	2455.9	4910.7
5	346.4	428.8	488.0	523.3	930.6
6	91.5	49.3	92.8	176.6	158.8
7	83.7	11.2	41.2	27.0	46.8
8	13.9	17.9	6.4	30.0	30.0
9	13.6	1.0	3.0	10.0	7.9
10	10.3	2.0	5.0	15.0	1.3
11	3.0	1.0	7.0	17.0	1.0
Total	4375.1	4307.8	5163.0	7634.0	7866.7

AGE	1992	1993	1994	1995	1996
1	0.0	0.0	0.9	18.1	0.0
2	338.3	127.8	54.0	277.0	90.0
3	587.1	2031.8	1488.2	1169.9	630.7
4	531.9	783.0	1216.6	1192.0	1936.7
5	2188.4	139.4	330.9	232.5	384.3
6	219.1	473.8	71.0	28.6	36.9
7	65.3	29.2	85.7	13.9	4.5
8	7.4	6.0	29.5	18.4	0.5
9	12.0	2.0	6.7	0.8	1.3
10	3.0	0.0	0.6	1.6	0.0
11	0.0	0.0	1.2	0.2	0.0
Total	3952.5	3593.0	3285.3	2953.0	3084.9
AGE	1997	1998	1999	2000	2001
1	0.0	0.0	1.2	0.0	0.0
2	85.4	107.5	22.1	201.1	147.2
3	495.2	482.4	647.2	534.0	1183.5
4	455.5	594.8	568.0	828.3	685.5
5	852.4	158.7	272.6	190.3	378.0
6	71.4	191.4	58.0	98.9	109.1
7	5.0	26.2	79.2	16.1	59.8
8	2.6	3.9	7.9	7.1	8.9
9	0.3	0.4	0.0	0.0	13.3
10	0.7	1.1	4.4	0.0	1.2
11	0.1	0.4	0.0	0.0	0.5
Total	1968.6	1566.8	1660.6	1875.8	2587.0
AGE	2002	2003	2004	2005	2006
1	0.0	0.0	0.0	0.0	0.0
2	3.0	16.4	0.9	7.5	1.6
3	259.5	118.6	357.8	134.1	177.4
4	884.3	442.9	249.9	813.8	281.3
5	346.0	766.1	409.6	95.2	449.3
6	203.5	231.4	266.0	265.3	32.5
7	81.0	103.3	74.6	120.9	97.2
8	35.5	39.9	36.9	32.5	48.0
9	9.5	21.7	19.3	19.2	18.2
10	9.4	9.9	11.3	8.1	10.8
11	0.6	7.4	3.5	8.3	8.8
Total	1832.3	1757.6	1429.8	1504.9	1125.1
AGE	2007				
1	0.0				
2	7.9				
3	154.8				
4	907.5				
5	140.4				
6	253.8				
7	8.5				
8	23.3				
9	12.6				
10	6.7				
11	7.5				
Total	1523.0				

### Surplus Production

Average Adjustment Factor (Delta) = 1.0000

Year	Biomass	Delta Biomass	Catch Biomass	Surplus Production
1982	43548.026	-10025.750	16713.307	6687.557
1983	33522.276	-5409.948	16037.051	10627.104
1984	28112.328	-1726.717	12173.486	10446.769
1985	26385.612	485.726	12711.449	13197.175
1986	26871.338	-3537.308	12768.471	9231.163
1987	23334.030	2688.560	11236.780	13925.340
1988	26022.590	11435.443	9746.789	21182.231
1989	37458.032	5271.009	12597.429	17868.438
1990	42729.041	-9098.808	17738.869	8640.060

1991	33630.233	-10428.550	20423.898	9995.348
1992	23201.683	-2406.842	11880.954	9474.111
1993	20794.841	-1764.240	9606.844	7842.605
1994	19030.601	-1447.956	8951.516	7503.559
1995	17582.645	-683.721	7418.520	6734.799
1996	16898.923	-899.757	7648.280	6748.523
1997	15999.167	6.556	5731.013	5737.569
1998	16005.723	1141.654	4516.532	5658.186
1999	17147.377	4126.627	4764.652	8891.279
2000	21274.004	5513.172	5945.694	11458.866
2001	26787.176	-1853.416	8401.230	6547.813
2002	24933.760	-2375.296	7280.581	4905.285
2003	22558.464	-565.860	7538.329	6972.469
2004	21992.604	1287.872	5817.528	7105.401
2005	23280.477	10711.086	5637.061	16348.146
2006	33991.562	18168.941	4540.123	22709.064
2007	52160.503	11348.568	5631.217	16979.785
2008	63509.071			

Summary of Survey Indices Used in the Estimate

INDEX	Survey Tag	Age	Time	Type	Catchability	Std. Error	CV
1	WHSpr	2	JAN-1	NUMBER	0.6391E-04	0.9883E-05	0.1546E+00
2	WHSpr	3	JAN-1	NUMBER	0.1319E-03	0.1415E-04	0.1073E+00
3	WHSpr	4	JAN-1	NUMBER	0.2250E-03	0.2283E-04	0.1015E+00
4	WHSpr	5	JAN-1	NUMBER	0.2940E-03	0.3869E-04	0.1316E+00
5	WHSpr	6	JAN-1	NUMBER	0.3828E-03	0.6419E-04	0.1677E+00
6	WHSpr	7	JAN-1	NUMBER	0.5666E-03	0.1096E-03	0.1934E+00
7	WHSpr	8	JAN-1	NUMBER	0.5118E-03	0.1396E-03	0.2728E+00
8	WHAut	2	JAN-1	NUMBER	0.5338E-04	0.6870E-05	0.1287E+00
9	WHAut	3	JAN-1	NUMBER	0.1136E-03	0.1287E-04	0.1133E+00
10	WHAut	4	JAN-1	NUMBER	0.2238E-03	0.2260E-04	0.1010E+00
11	WHAut	5	JAN-1	NUMBER	0.3703E-03	0.4638E-04	0.1253E+00
12	WHAut	6	JAN-1	NUMBER	0.4782E-03	0.5653E-04	0.1182E+00
13	WHAut	7	JAN-1	NUMBER	0.4512E-03	0.8364E-04	0.1854E+00
14	WHAut	8	JAN-1	NUMBER	0.5668E-03	0.1292E-03	0.2279E+00
15	MASpr	2	JAN-1	NUMBER	0.7106E-03	0.1074E-03	0.1512E+00
16	MASpr	3	JAN-1	NUMBER	0.5446E-03	0.4749E-04	0.8720E-01
17	MASpr	4	JAN-1	NUMBER	0.4537E-03	0.5623E-04	0.1239E+00
19	MAAut	2	JAN-1	NUMBER	0.1230E-03	0.3679E-04	0.2992E+00
21	CM_CPE	2	MEAN	NUMBER	0.2458E-05	0.6900E-06	0.2807E+00
22	CM_CPE	3	MEAN	NUMBER	0.1406E-04	0.1646E-05	0.1171E+00
23	CM_CPE	4	MEAN	NUMBER	0.2317E-04	0.1281E-05	0.5530E-01
24	CM_CPE	5	MEAN	NUMBER	0.2291E-04	0.1239E-05	0.5410E-01
25	CM_CPE	6	MEAN	NUMBER	0.2187E-04	0.2466E-05	0.1128E+00

Survey Index: 1 Tag: WHSpr AGE = 2  
Time = JAN-1 Type = NUMBER  
Catchability = 0.639060E-04 % Variance Contribution = 6.0022  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.100650E+01	0.710799E+00	0.347845E+00
1983	0.948600E+00	0.406955E+00	0.846285E+00
1984	0.131200E+01	0.414194E+00	0.115297E+01
1985	0.230800E+00	0.557076E+00	-0.881151E+00
1986	0.247800E+00	0.346899E+00	-0.336413E+00
1987	0.460200E+00	0.536073E+00	-0.152610E+00
1988	0.923400E+00	0.661229E+00	0.333963E+00
1989	0.604800E+00	0.128761E+01	-0.755643E+00
1990	0.207600E+00	0.222378E+00	-0.687655E-01
1991	0.678000E-01	0.216374E+00	-0.116045E+01
1992	0.225500E+00	0.364946E+00	-0.481430E+00



1993	0.496500E+00	0.331710E+00	0.403323E+00
1994	0.315600E+00	0.477323E+00	-0.413717E+00
1995	0.179200E+00	0.166337E+00	0.744872E-01
1996	0.215000E-01	0.198014E+00	-0.222029E+01
1997	0.131600E+00	0.185482E+00	-0.343192E+00
1998	0.223600E+00	0.274436E+00	-0.204860E+00
1999	0.344300E+00	0.233272E+00	0.389310E+00
2000	0.724700E+00	0.410507E+00	0.568365E+00
2001	0.323400E+00	0.210131E+00	0.431157E+00
2002	0.453000E-01	0.621130E-01	-0.315648E+00
2003	0.830500E+00	0.259133E+00	0.116469E+01
2004	0.446000E-01	0.879742E-01	-0.679310E+00
2005	0.726500E+00	0.573787E+00	0.235981E+00
2006	0.230000E+00	0.351219E+00	-0.423332E+00
2007	0.345000E+01	0.125103E+01	0.101441E+01
2008	0.109860E+01	0.251582E+00	0.147402E+01

Survey Index: 2 Tag: WHSpr AGE = 3  
Time = JAN-1 Type = NUMBER  
Catchability = 0.131940E-03 % Variance Contribution = 2.8875  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.476400E+00	0.728272E+00	-0.424417E+00
1983	0.996800E+00	0.965009E+00	0.324129E-01
1984	0.102260E+01	0.529782E+00	0.657637E+00
1985	0.661700E+00	0.604445E+00	0.905019E-01
1986	0.754000E+00	0.814568E+00	-0.772658E-01
1987	0.199100E+00	0.564175E+00	-0.104156E+01
1988	0.822900E+00	0.799946E+00	0.282904E-01
1989	0.723000E+00	0.105215E+01	-0.375184E+00
1990	0.136540E+01	0.211448E+01	-0.437363E+00
1991	0.233900E+00	0.345620E+00	-0.390447E+00
1992	0.242400E+00	0.313398E+00	-0.256884E+00
1993	0.799300E+00	0.576498E+00	0.326764E+00
1994	0.387500E+00	0.545448E+00	-0.341891E+00
1995	0.111610E+01	0.800395E+00	0.332491E+00
1996	0.592700E+00	0.248098E+00	0.870866E+00
1997	0.399100E+00	0.323968E+00	0.208567E+00
1998	0.330100E+00	0.303334E+00	0.845609E-01
1999	0.713300E+00	0.451059E+00	0.458304E+00
2000	0.438500E+00	0.391672E+00	0.112936E+00
2001	0.716100E+00	0.669891E+00	0.667046E-01
2002	0.524400E+00	0.337622E+00	0.440328E+00
2003	0.630000E-01	0.104634E+00	-0.507337E+00
2004	0.221300E+00	0.436067E+00	-0.678277E+00
2005	0.101400E+00	0.148600E+00	-0.382182E+00
2006	0.430000E+00	0.969003E+00	-0.812483E+00
2007	0.293000E+01	0.593492E+00	0.159673E+01
2008	0.321120E+01	0.211373E+01	0.418189E+00

Survey Index: 3 Tag: WHSpr AGE = 4  
Time = JAN-1 Type = NUMBER  
Catchability = 0.225008E-03 % Variance Contribution = 2.5836  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.655400E+00	0.703819E+00	-0.712760E-01
1983	0.464700E+00	0.524085E+00	-0.120261E+00
1984	0.823300E+00	0.753380E+00	0.887512E-01
1985	0.662500E+00	0.417720E+00	0.461208E+00
1986	0.236900E+00	0.398528E+00	-0.520139E+00
1987	0.230700E+00	0.576066E+00	-0.915104E+00
1988	0.217900E+00	0.518778E+00	-0.867439E+00

1989	0.600100E+00	0.683671E+00	-0.130380E+00
1990	0.637000E+00	0.100474E+01	-0.455718E+00
1991	0.171670E+01	0.211239E+01	-0.207415E+00
1992	0.281900E+00	0.209529E+00	0.296690E+00
1993	0.334300E+00	0.318050E+00	0.498311E-01
1994	0.215000E+00	0.391268E+00	-0.598755E+00
1995	0.371700E+00	0.458588E+00	-0.210066E+00
1996	0.133070E+01	0.879362E+00	0.414264E+00
1997	0.264300E+00	0.217998E+00	0.192599E+00
1998	0.516600E+00	0.351519E+00	0.385006E+00
1999	0.344500E+00	0.325315E+00	0.573012E-01
2000	0.457000E+00	0.498022E+00	-0.859616E-01
2001	0.497200E+00	0.438150E+00	0.126431E+00
2002	0.160120E+01	0.694378E+00	0.835492E+00
2003	0.707700E+00	0.418570E+00	0.525175E+00
2004	0.118100E+00	0.121949E+00	-0.320709E-01
2005	0.607600E+00	0.536011E+00	0.125362E+00
2006	0.600000E-01	0.180179E+00	-0.109961E+01
2007	0.448000E+01	0.131685E+01	0.122438E+01
2008	0.135660E+01	0.797144E+00	0.531701E+00

Survey Index: 4 Tag: WHSpr AGE = 5  
Time = JAN-1 Type = NUMBER  
Catchability = 0.293998E-03 % Variance Contribution = 4.3467  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.987700E+00	0.519630E+00	0.642261E+00
1983	0.404200E+00	0.374612E+00	0.760188E-01
1984	0.211800E+00	0.244348E+00	-0.142951E+00
1985	0.661700E+00	0.370595E+00	0.579702E+00
1986	0.912000E-01	0.144370E+00	-0.459325E+00
1987	0.744000E-01	0.179037E+00	-0.878139E+00
1988	0.253500E+00	0.215680E+00	0.161567E+00
1989	0.908000E-01	0.257798E+00	-0.104352E+01
1990	0.102000E+00	0.274954E+00	-0.991631E+00
1991	0.299300E+00	0.421518E+00	-0.342417E+00
1992	0.132810E+01	0.953406E+00	0.331464E+00
1993	0.906000E-01	0.826501E-01	0.918379E-01
1994	0.942000E-01	0.131944E+00	-0.336956E+00
1995	0.145400E+00	0.949236E-01	0.426416E+00
1996	0.403200E+00	0.173484E+00	0.843345E+00
1997	0.875600E+00	0.425507E+00	0.721628E+00
1998	0.141500E+00	0.112034E+00	0.233500E+00
1999	0.315000E+00	0.217813E+00	0.368937E+00
2000	0.107100E+00	0.196910E+00	-0.608983E+00
2001	0.353900E+00	0.312421E+00	0.124663E+00
2002	0.614200E+00	0.286360E+00	0.763072E+00
2003	0.108890E+01	0.507578E+00	0.763274E+00
2004	0.190800E+00	0.329950E+00	-0.547717E+00
2005	0.154000E-01	0.639780E-01	-0.142417E+01
2006	0.200000E+00	0.356917E+00	-0.579186E+00
2007	0.500000E+00	0.117918E+00	0.144462E+01
2008	0.939300E+00	0.116730E+01	-0.217316E+00

Survey Index: 5 Tag: WHSpr AGE = 6  
Time = JAN-1 Type = NUMBER  
Catchability = 0.382779E-03 % Variance Contribution = 6.5351  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.873000E-01	0.866418E-01	0.756783E-02
1983	0.211800E+00	0.295150E+00	-0.331842E+00

1984	0.467000E-01	0.161312E+00	-0.123959E+01
1985	0.103100E+00	0.976474E-01	0.543368E-01
1986	0.349000E-01	0.163853E+00	-0.154648E+01
1987	N/A	0.579545E-01	N/A
1988	0.915000E-01	0.708719E-01	0.255464E+00
1989	0.627000E-01	0.813926E-01	-0.260923E+00
1990	0.321000E-01	0.105784E+00	-0.119255E+01
1991	0.200000E-01	0.111846E+00	-0.172139E+01
1992	0.226400E+00	0.127010E+00	0.578037E+00
1993	0.484200E+00	0.258344E+00	0.628205E+00
1994	0.493000E-01	0.398210E-01	0.213530E+00
1995	0.283000E-01	0.260400E-01	0.832277E-01
1996	0.593000E-01	0.206587E-01	0.105447E+01
1997	0.242400E+00	0.518259E-01	0.154270E+01
1998	0.421000E+00	0.158347E+00	0.977847E+00
1999	0.133700E+00	0.644584E-01	0.729578E+00
2000	0.100600E+00	0.137766E+00	-0.314404E+00
2001	0.635000E-01	0.143989E+00	-0.818698E+00
2002	0.361900E+00	0.202110E+00	0.582556E+00
2003	0.7534600E+00	0.185413E+00	0.755288E+00
2004	0.231600E+00	0.275722E+00	-0.174380E+00
2005	0.149800E+00	0.209851E+00	-0.337097E+00
2006	0.200000E-01	0.352258E-01	-0.566047E+00
2007	0.840000E+00	0.224846E+00	0.131798E+01
2008	0.584000E-01	0.770687E-01	-0.277382E+00

Survey Index: 6 Tag: WHSpr AGE = 7  
Time = JAN-1 Type = NUMBER  
Catchability = 0.566609E-03 % Variance Contribution = 8.0244  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.112000E+00	0.147101E+00	-0.272622E+00
1983	0.680000E-01	0.654754E-01	0.378336E-01
1984	0.100000E+00	0.125658E+00	-0.228392E+00
1985	0.910000E-01	0.890640E-01	0.215047E-01
1986	0.380000E-01	0.500514E-01	-0.275465E+00
1987	0.660000E-01	0.960915E-01	-0.375647E+00
1988	0.650000E-01	0.233256E-01	0.102484E+01
1989	0.140000E-01	0.606162E-01	-0.146550E+01
1990	0.180000E-01	0.510645E-01	-0.104272E+01
1991	0.180000E-01	0.376623E-01	-0.738287E+00
1992	0.690000E-01	0.541349E-01	0.242628E+00
1993	0.550000E-01	0.415969E-01	0.279308E+00
1994	0.127000E+00	0.701825E-01	0.593088E+00
1995	N/A	0.118593E-01	N/A
1996	N/A	0.168957E-01	N/A
1997	0.120000E+00	0.611869E-02	0.297614E+01
1998	0.230000E-01	0.262033E-01	-0.130392E+00
1999	0.273000E+00	0.937761E-01	0.106856E+01
2000	0.240000E-01	0.483830E-01	-0.701095E+00
2001	0.980000E-01	0.116258E+00	-0.170841E+00
2002	0.164000E+00	0.118570E+00	0.324362E+00
2003	0.321000E+00	0.140611E+00	0.825446E+00
2004	0.140000E-01	0.106071E+00	-0.202505E+01
2005	0.129700E+00	0.197780E+00	-0.421929E+00
2006	0.131400E+00	0.118308E+00	0.104954E+00
2007	0.652000E-01	0.260288E-01	0.918257E+00
2008	0.806000E-01	0.142377E+00	-0.568982E+00

Survey Index: 7 Tag: WHSpr AGE = 8  
 Time = JAN-1 Type = NUMBER  
 Catchability = 0.511812E-03 % Variance Contribution = 5.5891  
 Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	N/A	0.716573E-01	N/A
1983	0.160000E-01	0.635433E-01	-0.137913E+01
1984	N/A	0.252670E-01	N/A
1985	0.520000E-01	0.566227E-01	-0.851666E-01
1986	N/A	0.295134E-01	N/A
1987	0.800000E-02	0.158516E-01	-0.683828E+00
1988	N/A	0.323025E-01	N/A
1989	N/A	0.120637E-01	N/A
1990	N/A	0.257487E-01	N/A
1991	N/A	0.252609E-01	N/A
1992	N/A	0.617975E-02	N/A
1993	0.230000E-01	0.979461E-02	0.853662E+00
1994	0.270000E-01	0.172403E-01	0.448589E+00
1995	0.110000E-01	0.122153E-01	-0.104793E+00
1996	N/A	0.233333E-02	N/A
1997	N/A	0.104113E-01	N/A
1998	0.370000E-01	0.220955E-02	0.281813E+01
1999	N/A	0.724529E-02	N/A
2000	0.220000E-01	0.326741E-01	-0.395540E+00
2001	0.550000E-01	0.283257E-01	0.663565E+00
2002	0.570000E-01	0.582846E-01	-0.222870E-01
2003	0.103000E+00	0.501770E-01	0.719173E+00
2004	0.140000E-01	0.561498E-01	-0.138897E+01
2005	0.142000E-01	0.438969E-01	-0.112860E+01
2006	0.729000E-01	0.902784E-01	-0.213810E+00
2007	0.384000E-01	0.424809E-01	-0.100996E+00
2008	N/A	0.153132E-01	N/A

Survey Index: 8 Tag: WHAut AGE = 2  
 Time = JAN-1 Type = NUMBER  
 Catchability = 0.533836E-04 % Variance Contribution = 4.1570  
 Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.617900E+00	0.593763E+00	0.398469E-01
1983	0.842600E+00	0.339948E+00	0.907700E+00
1984	0.316800E+00	0.345995E+00	-0.881533E-01
1985	0.432300E+00	0.465351E+00	-0.736728E-01
1986	0.525600E+00	0.289781E+00	0.595416E+00
1987	0.392000E+00	0.447806E+00	-0.133099E+00
1988	0.578200E+00	0.552354E+00	0.457300E-01
1989	0.193750E+01	0.107560E+01	0.588523E+00
1990	0.149500E+00	0.185762E+00	-0.217172E+00
1991	0.447000E-01	0.180747E+00	-0.139713E+01
1992	0.143500E+00	0.304856E+00	-0.753505E+00
1993	0.291000E+00	0.277092E+00	0.489726E-01
1994	0.197700E+00	0.398729E+00	-0.701532E+00
1995	0.207100E+00	0.138949E+00	0.399096E+00
1996	0.680000E-01	0.165410E+00	-0.888921E+00
1997	0.124200E+00	0.154942E+00	-0.221156E+00
1998	0.296800E+00	0.229249E+00	0.258249E+00
1999	0.966000E-01	0.194862E+00	-0.701715E+00
2000	0.430700E+00	0.342915E+00	0.227929E+00
2001	0.532600E+00	0.175532E+00	0.110995E+01
2002	0.340000E-01	0.518858E-01	-0.422685E+00
2003	0.269100E+00	0.216466E+00	0.217651E+00
2004	0.454600E+00	0.734888E-01	0.182228E+01
2005	0.570000E+00	0.479310E+00	0.173289E+00

2006	0.153300E+00	0.293389E+00	-0.649104E+00
2007	0.125140E+01	0.104504E+01	0.180205E+00
2008	0.145600E+00	0.210158E+00	-0.366997E+00

Survey Index: 9 Tag: WHAut AGE = 3  
Time = JAN-1 Type = NUMBER  
Catchability = 0.113582E-03 % Variance Contribution = 3.2202  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.418800E+00	0.626938E+00	-0.403454E+00
1983	0.335270E+01	0.830735E+00	0.139521E+01
1984	0.915500E+00	0.456067E+00	0.696831E+00
1985	0.425800E+00	0.520341E+00	-0.200514E+00
1986	0.956700E+00	0.701227E+00	0.310658E+00
1987	0.401000E+00	0.485674E+00	-0.191576E+00
1988	0.137960E+01	0.688639E+00	0.694831E+00
1989	0.231340E+01	0.905753E+00	0.937707E+00
1990	0.240650E+01	0.182027E+01	0.279189E+00
1991	0.186800E+00	0.297530E+00	-0.465475E+00
1992	0.139000E+00	0.269791E+00	-0.663173E+00
1993	0.445800E+00	0.496283E+00	-0.107275E+00
1994	0.567800E+00	0.469552E+00	0.189989E+00
1995	0.883100E+00	0.689026E+00	0.248160E+00
1996	0.284500E+00	0.213577E+00	0.286737E+00
1997	0.382600E+00	0.278890E+00	0.316172E+00
1998	0.855000E-01	0.261127E+00	-0.111649E+01
1999	0.320300E+00	0.388297E+00	-0.192513E+00
2000	0.367200E+00	0.337173E+00	0.853095E-01
2001	0.983700E+00	0.576681E+00	0.534032E+00
2002	0.141000E+00	0.290644E+00	-0.723340E+00
2003	0.805000E-01	0.900753E-01	-0.112388E+00
2004	0.197600E+00	0.375392E+00	-0.641725E+00
2005	0.170000E+00	0.127923E+00	0.284370E+00
2006	0.380600E+00	0.834173E+00	-0.784692E+00
2007	0.580200E+00	0.510912E+00	0.127176E+00
2008	0.831000E+00	0.181962E+01	-0.783754E+00

Survey Index: 10 Tag: WHAut AGE = 4  
Time = JAN-1 Type = NUMBER  
Catchability = 0.223833E-03 % Variance Contribution = 2.5584  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.539400E+00	0.700144E+00	-0.260829E+00
1983	0.227480E+01	0.521348E+00	0.147323E+01
1984	0.827700E+00	0.749446E+00	0.993165E-01
1985	0.630700E+00	0.415539E+00	0.417253E+00
1986	0.609400E+00	0.396447E+00	0.429933E+00
1987	0.656500E+00	0.573058E+00	0.135936E+00
1988	0.592100E+00	0.516069E+00	0.137435E+00
1989	0.989600E+00	0.680101E+00	0.375060E+00
1990	0.150170E+01	0.999498E+00	0.407100E+00
1991	0.182930E+01	0.210136E+01	-0.138650E+00
1992	0.223300E+00	0.208435E+00	0.688890E-01
1993	0.140000E+00	0.316389E+00	-0.815330E+00
1994	0.360200E+00	0.389225E+00	-0.774982E-01
1995	0.826000E+00	0.456194E+00	0.593677E+00
1996	0.122840E+01	0.874770E+00	0.339506E+00
1997	0.188300E+00	0.216860E+00	-0.141214E+00
1998	0.176900E+00	0.349683E+00	-0.681443E+00
1999	0.114700E+00	0.323616E+00	-0.103724E+01
2000	0.585700E+00	0.495422E+00	0.167398E+00

2001	0.393600E+00	0.435862E+00	-0.101991E+00
2002	0.752400E+00	0.690752E+00	0.854870E-01
2003	0.363700E+00	0.416385E+00	-0.135280E+00
2004	0.184800E+00	0.121312E+00	0.420907E+00
2005	0.540000E+00	0.533212E+00	0.126500E-01
2006	0.796000E-01	0.179239E+00	-0.811704E+00
2007	0.103310E+01	0.130997E+01	-0.237443E+00
2008	0.384000E+00	0.792982E+00	-0.725158E+00

Survey Index: 11 Tag: WHAut AGE = 5  
Time = JAN-1 Type = NUMBER  
Catchability = 0.370258E-03 % Variance Contribution = 3.9388  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.404700E+00	0.654418E+00	-0.480600E+00
1983	0.108920E+01	0.471783E+00	0.836679E+00
1984	0.197000E+00	0.307730E+00	-0.446019E+00
1985	0.387100E+00	0.466724E+00	-0.187056E+00
1986	0.248200E+00	0.181818E+00	0.311227E+00
1987	0.341700E+00	0.225478E+00	0.415710E+00
1988	0.242900E+00	0.271626E+00	-0.111776E+00
1989	0.443400E+00	0.324668E+00	0.311669E+00
1990	0.292600E+00	0.346275E+00	-0.168426E+00
1991	0.597800E+00	0.530856E+00	0.118765E+00
1992	0.633400E+00	0.120071E+01	-0.639567E+00
1993	0.355000E-01	0.104089E+00	-0.107571E+01
1994	0.336000E-01	0.166169E+00	-0.159848E+01
1995	0.854000E-01	0.119546E+00	-0.336355E+00
1996	0.325200E+00	0.218485E+00	0.397724E+00
1997	0.542100E+00	0.535880E+00	0.115407E-01
1998	0.172800E+00	0.141094E+00	0.202706E+00
1999	0.192300E+00	0.274311E+00	-0.355207E+00
2000	0.243300E+00	0.247987E+00	-0.190795E-01
2001	0.507100E+00	0.393460E+00	0.253728E+00
2002	0.469000E+00	0.360639E+00	0.262726E+00
2003	0.279720E+01	0.639239E+00	0.147610E+01
2004	0.528700E+00	0.415537E+00	0.240850E+00
2005	0.240000E+00	0.805733E-01	0.109147E+01
2006	0.449500E+00	0.449498E+00	0.419220E-05
2007	0.247500E+00	0.148504E+00	0.510796E+00
2008	0.528300E+00	0.147009E+01	-0.102342E+01

Survey Index: 12 Tag: WHAut AGE = 6  
Time = JAN-1 Type = NUMBER  
Catchability = 0.478237E-03 % Variance Contribution = 3.2474  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.120500E+00	0.108249E+00	0.107218E+00
1983	0.209200E+00	0.368755E+00	-0.566843E+00
1984	0.227000E+00	0.201540E+00	0.118962E+00
1985	0.214000E+00	0.121999E+00	0.561964E+00
1986	0.182000E+00	0.204715E+00	-0.117612E+00
1987	0.727000E-01	0.724073E-01	0.403470E-02
1988	0.751000E-01	0.885462E-01	-0.164703E+00
1989	0.990000E-01	0.101691E+00	-0.268141E-01
1990	0.160500E+00	0.132165E+00	0.194241E+00
1991	0.258900E+00	0.139739E+00	0.616666E+00
1992	0.811000E-01	0.158684E+00	-0.671232E+00
1993	0.349800E+00	0.322771E+00	0.804195E-01
1994	N/A	0.497516E-01	N/A
1995	0.511000E-01	0.325339E-01	0.451501E+00

1996	0.821000E-01	0.258107E-01	0.115715E+01
1997	0.616000E-01	0.647504E-01	-0.498781E-01
1998	0.140200E+00	0.197835E+00	-0.344366E+00
1999	0.387000E-01	0.805332E-01	-0.732830E+00
2000	0.132000E+00	0.172122E+00	-0.265404E+00
2001	0.134300E+00	0.179897E+00	-0.292311E+00
2002	0.336800E+00	0.252513E+00	0.288028E+00
2003	0.109580E+01	0.231651E+00	0.155401E+01
2004	0.449800E+00	0.344482E+00	0.266762E+00
2005	0.250000E+00	0.262184E+00	-0.475867E-01
2006	0.221000E-01	0.440105E-01	-0.688851E+00
2007	0.285700E+00	0.280919E+00	0.168753E-01
2008	0.226000E-01	0.962883E-01	-0.144940E+01

Survey Index: 13 Tag: WHAut AGE = 7  
Time = JAN-1 Type = NUMBER  
Catchability = 0.451154E-03 % Variance Contribution = 5.1610  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.760000E-01	0.117127E+00	-0.432526E+00
1983	N/A	0.521337E-01	N/A
1984	0.210000E+00	0.100053E+00	0.741407E+00
1985	0.163000E+00	0.709158E-01	0.832257E+00
1986	0.750000E-01	0.398527E-01	0.632299E+00
1987	0.410000E-01	0.765114E-01	-0.623868E+00
1988	N/A	0.185726E-01	N/A
1989	0.650000E-01	0.482647E-01	0.297687E+00
1990	0.330000E-01	0.406593E-01	-0.208720E+00
1991	0.520000E-01	0.299880E-01	0.550447E+00
1992	N/A	0.431041E-01	N/A
1993	0.104000E+00	0.331209E-01	0.114423E+01
1994	0.300000E-01	0.558817E-01	-0.622040E+00
1995	N/A	0.944275E-02	N/A
1996	0.110000E-01	0.134530E-01	-0.201304E+00
1997	N/A	0.487191E-02	N/A
1998	N/A	0.208640E-01	N/A
1999	0.310000E-01	0.746677E-01	-0.879061E+00
2000	0.160000E-01	0.385242E-01	-0.878698E+00
2001	0.100000E-01	0.925683E-01	-0.222536E+01
2002	0.122000E+00	0.944096E-01	0.256378E+00
2003	0.627000E+00	0.111959E+00	0.172281E+01
2004	0.730000E-01	0.844571E-01	-0.145784E+00
2005	0.168000E+00	0.157479E+00	0.646722E-01
2006	0.923000E-01	0.942010E-01	-0.203867E-01
2007	0.339000E-01	0.207250E-01	0.492075E+00
2008	0.690000E-01	0.113366E+00	-0.496513E+00

Survey Index: 14 Tag: WHAut AGE = 8  
Time = JAN-1 Type = NUMBER  
Catchability = 0.566767E-03 % Variance Contribution = 3.3797  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.290000E-01	0.793514E-01	-0.100659E+01
1983	N/A	0.703661E-01	N/A
1984	N/A	0.279800E-01	N/A
1985	0.790000E-01	0.627025E-01	0.231047E+00
1986	N/A	0.326824E-01	N/A
1987	N/A	0.175536E-01	N/A
1988	N/A	0.357710E-01	N/A
1989	0.330000E-01	0.133590E-01	0.904319E+00
1990	N/A	0.285135E-01	N/A
1991	0.100000E-01	0.279732E-01	-0.102866E+01

1992	0.230000E-01	0.684329E-02	0.121223E+01
1993	0.800000E-02	0.108463E-01	-0.304381E+00
1994	N/A	0.190914E-01	N/A
1995	0.450000E-01	0.135269E-01	0.120198E+01
1996	N/A	0.258387E-02	N/A
1997	N/A	0.115292E-01	N/A
1998	N/A	0.244679E-02	N/A
1999	N/A	0.802324E-02	N/A
2000	0.600000E-02	0.361824E-01	-0.179681E+01
2001	N/A	0.313671E-01	N/A
2002	0.840000E-01	0.645428E-01	0.263488E+00
2003	0.510000E-01	0.555646E-01	-0.857210E-01
2004	0.770000E-01	0.621788E-01	0.213791E+00
2005	0.680000E-01	0.486102E-01	0.335674E+00
2006	0.824000E-01	0.999719E-01	-0.193304E+00
2007	0.496000E-01	0.470422E-01	0.529461E-01
2008	N/A	0.169574E-01	N/A

Survey Index: 15 Tag: MASpr AGE = 2  
Time = JAN-1 Type = NUMBER  
Catchability = 0.710558E-03 % Variance Contribution = 5.3115  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.717000E+01	0.790323E+01	-0.973656E-01
1983	0.146100E+02	0.452485E+01	0.117212E+01
1984	0.515000E+01	0.460534E+01	0.111781E+00
1985	0.277000E+01	0.619402E+01	-0.804737E+00
1986	0.116800E+02	0.385710E+01	0.110796E+01
1987	0.471000E+01	0.596049E+01	-0.235465E+00
1988	0.635000E+01	0.735207E+01	-0.146526E+00
1989	0.205100E+02	0.143166E+02	0.359490E+00
1990	0.545000E+01	0.247258E+01	0.790355E+00
1991	0.269000E+01	0.240582E+01	0.111650E+00
1992	0.513000E+01	0.405776E+01	0.234474E+00
1993	0.611000E+01	0.368821E+01	0.504785E+00
1994	0.407000E+01	0.530725E+01	-0.265432E+00
1995	0.192000E+01	0.184947E+01	0.374282E-01
1996	0.520000E+00	0.220168E+01	-0.144315E+01
1997	0.980000E+00	0.206234E+01	-0.744044E+00
1998	0.830000E+00	0.305140E+01	-0.130193E+01
1999	0.239000E+01	0.259370E+01	-0.817915E-01
2000	0.702000E+01	0.456434E+01	0.430489E+00
2001	0.450000E+01	0.233641E+01	0.655462E+00
2002	0.260000E+00	0.690622E+00	-0.976910E+00
2003	0.127000E+02	0.288125E+01	0.148338E+01
2004	0.156000E+01	0.978167E+00	0.466761E+00
2005	0.715000E+01	0.637981E+01	0.113973E+00
2006	0.367000E+01	0.390514E+01	-0.621009E-01
2007	0.336000E+01	0.139099E+02	-0.142066E+01
2008	N/A	0.279729E+01	N/A

Survey Index: 16 Tag: MASpr AGE = 3  
Time = JAN-1 Type = NUMBER  
Catchability = 0.544643E-03 % Variance Contribution = 1.7670  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.241000E+01	0.300628E+01	-0.221075E+00
1983	0.286000E+01	0.398352E+01	-0.331343E+00
1984	0.207000E+01	0.218692E+01	-0.549455E-01
1985	0.227000E+01	0.249512E+01	-0.945583E-01
1986	0.123000E+01	0.336250E+01	-0.100567E+01



1987	0.296000E+01	0.232889E+01	0.239797E+00
1988	0.245000E+01	0.330214E+01	-0.298484E+00
1989	0.876000E+01	0.434324E+01	0.701575E+00
1990	0.147500E+02	0.872850E+01	0.524649E+00
1991	0.157000E+01	0.142671E+01	0.957073E-01
1992	0.367000E+01	0.129369E+01	0.104269E+01
1993	0.255000E+01	0.237976E+01	0.690935E-01
1994	0.175000E+01	0.225159E+01	-0.252019E+00
1995	0.276000E+01	0.330400E+01	-0.179902E+00
1996	0.108000E+01	0.102414E+01	0.531105E-01
1997	0.930000E+00	0.133733E+01	-0.363243E+00
1998	0.700000E+00	0.125215E+01	-0.581537E+00
1999	0.231000E+01	0.186195E+01	0.215622E+00
2000	0.289000E+01	0.161680E+01	0.580805E+00
2001	0.497000E+01	0.276528E+01	0.586277E+00
2002	0.123000E+01	0.139369E+01	-0.124940E+00
2003	0.280000E+00	0.431926E+00	-0.433466E+00
2004	0.258000E+01	0.180007E+01	0.359965E+00
2005	0.570000E+00	0.613413E+00	-0.734015E-01
2006	0.338000E+01	0.400001E+01	-0.168420E+00
2007	0.184000E+01	0.244991E+01	-0.286285E+00
2008	N/A	0.872540E+01	N/A

Survey Index: 17 Tag: MASpr AGE = 4  
Time = JAN-1 Type = NUMBER  
Catchability = 0.453706E-03 % Variance Contribution = 3.5692  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.870000E+00	0.141918E+01	-0.489343E+00
1983	0.150000E+01	0.105676E+01	0.350253E+00
1984	0.700000E+00	0.151912E+01	-0.774803E+00
1985	0.450000E+00	0.842292E+00	-0.626879E+00
1986	0.680000E+00	0.803591E+00	-0.166998E+00
1987	0.220000E+00	0.116158E+01	-0.166391E+01
1988	0.145000E+01	0.104606E+01	0.326529E+00
1989	0.106000E+01	0.137855E+01	-0.262766E+00
1990	0.231000E+01	0.202597E+01	0.131201E+00
1991	0.366000E+01	0.425942E+01	-0.151669E+00
1992	0.750000E+00	0.422495E+00	0.573897E+00
1993	0.900000E+00	0.641316E+00	0.338873E+00
1994	0.490000E+00	0.788953E+00	-0.476302E+00
1995	0.780000E+00	0.924698E+00	-0.170173E+00
1996	0.149000E+01	0.177315E+01	-0.173979E+00
1997	0.170000E+00	0.439571E+00	-0.950001E+00
1998	0.750000E+00	0.708803E+00	0.564961E-01
1999	0.780000E+00	0.655965E+00	0.173187E+00
2000	0.220000E+01	0.100421E+01	0.784254E+00
2001	0.352000E+01	0.883486E+00	0.138234E+01
2002	0.141000E+01	0.140014E+01	0.701462E-02
2003	0.143000E+01	0.844005E+00	0.527271E+00
2004	0.460000E+00	0.245898E+00	0.626310E+00
2005	0.207000E+01	0.108081E+01	0.649835E+00
2006	0.540000E+00	0.363314E+00	0.396302E+00
2007	0.175000E+01	0.265530E+01	-0.416941E+00
2008	N/A	0.160736E+01	N/A

Survey Index: 19 Tag: MAAut AGE = 2  
 Time = JAN-1 Type = NUMBER  
 Catchability = 0.122958E-03 % Variance Contribution = 22.4734  
 Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.620000E+01	0.136761E+01	0.151149E+01
1983	0.114000E+01	0.782999E+00	0.375653E+00
1984	0.280000E+00	0.796927E+00	-0.104597E+01
1985	0.160000E+00	0.107184E+01	-0.190196E+01
1986	0.190000E+00	0.667449E+00	-0.125644E+01
1987	0.550000E+00	0.103143E+01	-0.628782E+00
1988	0.140000E+01	0.127223E+01	0.956991E-01
1989	0.310000E+01	0.247741E+01	0.224188E+00
1990	0.200000E-01	0.427865E+00	-0.306308E+01
1991	0.422000E+01	0.416314E+00	0.231615E+01
1992	0.200000E+01	0.702172E+00	0.104672E+01
1993	0.990000E+00	0.638224E+00	0.439016E+00
1994	0.153000E+01	0.918390E+00	0.510401E+00
1995	0.536000E+01	0.320039E+00	0.281828E+01
1996	0.800000E+00	0.380988E+00	0.741845E+00
1997	0.800000E-01	0.356876E+00	-0.149536E+01
1998	0.300000E-01	0.528027E+00	-0.286795E+01
1999	0.640000E+00	0.448825E+00	0.354836E+00
2000	0.590000E+00	0.789833E+00	-0.291699E+00
2001	0.400000E+00	0.404302E+00	-0.106976E-01
2002	0.100000E-01	0.119508E+00	-0.248080E+01
2003	0.109000E+01	0.498583E+00	0.782162E+00
2004	0.160000E+01	0.169266E+00	0.224629E+01
2005	0.994000E+01	0.110399E+01	0.219764E+01
2006	0.610000E+00	0.675761E+00	-0.102381E+00
2007	0.435000E+01	0.240704E+01	0.591780E+00
2008	0.160000E+00	0.484055E+00	-0.110702E+01

Survey Index: 21 Tag: CM\_CPE AGE = 2  
 Time = MEAN Type = NUMBER  
 Catchability = 0.245830E-05 % Variance Contribution = 3.7184  
 Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.743000E-01	0.223352E-01	0.120195E+01
1983	0.477000E-01	0.125412E-01	0.133591E+01
1984	0.331000E-01	0.134627E-01	0.899610E+00
1985	0.137000E-01	0.181238E-01	-0.279829E+00
1986	0.410000E-02	0.118717E-01	-0.106317E+01
1987	0.740000E-02	0.176086E-01	-0.866906E+00
1988	0.146000E-01	0.223933E-01	-0.427740E+00
1989	0.170000E-01	0.442708E-01	-0.957113E+00
1990	0.110000E-01	0.744697E-02	0.390088E+00
1991	0.194000E-01	0.700807E-02	0.101821E+01
1992	0.149000E-01	0.123165E-01	0.190425E+00
1993	0.270000E-02	0.114122E-01	-0.144143E+01
1994	N/A	0.165774E-01	N/A
1995	N/A	0.546252E-02	N/A
1996	N/A	0.679601E-02	N/A
1997	N/A	0.636459E-02	N/A
1998	N/A	0.943961E-02	N/A
1999	N/A	0.810664E-02	N/A
2000	N/A	0.140715E-01	N/A
2001	N/A	0.714947E-02	N/A
2002	N/A	0.216199E-02	N/A
2003	N/A	0.901510E-02	N/A
2004	N/A	0.306613E-02	N/A

2005	N/A	0.199960E-01	N/A
2006	N/A	0.122433E-01	N/A
2007	N/A	0.436076E-01	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 22 Tag: CM\_CPE AGE = 3  
Time = MEAN Type = NUMBER  
Catchability = 0.140563E-04 % Variance Contribution = 0.6469  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.738000E-01	0.519778E-01	0.350541E+00
1983	0.109900E+00	0.713423E-01	0.432082E+00
1984	0.448000E-01	0.393360E-01	0.130068E+00
1985	0.423000E-01	0.415634E-01	0.175677E-01
1986	0.688000E-01	0.577049E-01	0.175861E+00
1987	0.186000E-01	0.448396E-01	-0.879930E+00
1988	0.492000E-01	0.615373E-01	-0.223750E+00
1989	0.637000E-01	0.850584E-01	-0.289154E+00
1990	0.159500E+00	0.174475E+00	-0.897392E-01
1991	0.404000E-01	0.229452E-01	0.565723E+00
1992	0.173000E-01	0.260461E-01	-0.409160E+00
1993	0.500000E-01	0.401303E-01	0.219891E+00
1994	N/A	0.416566E-01	N/A
1995	N/A	0.689939E-01	N/A
1996	N/A	0.193218E-01	N/A
1997	N/A	0.277652E-01	N/A
1998	N/A	0.258572E-01	N/A
1999	N/A	0.389707E-01	N/A
2000	N/A	0.340461E-01	N/A
2001	N/A	0.562158E-01	N/A
2002	N/A	0.307978E-01	N/A
2003	N/A	0.927102E-02	N/A
2004	N/A	0.396172E-01	N/A
2005	N/A	0.134136E-01	N/A
2006	N/A	0.923518E-01	N/A
2007	N/A	0.562457E-01	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 23 Tag: CM\_CPE AGE = 4  
Time = MEAN Type = NUMBER  
Catchability = 0.231650E-04 % Variance Contribution = 0.1443  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.450000E-01	0.478168E-01	-0.607149E-01
1983	0.422000E-01	0.336756E-01	0.225646E+00
1984	0.442000E-01	0.495054E-01	-0.113356E+00
1985	0.289000E-01	0.237841E-01	0.194823E+00
1986	0.226000E-01	0.252171E-01	-0.109574E+00
1987	0.260000E-01	0.338541E-01	-0.263964E+00
1988	0.242000E-01	0.342353E-01	-0.346903E+00
1989	0.397000E-01	0.413480E-01	-0.406733E-01
1990	0.782000E-01	0.618167E-01	0.235096E+00
1991	0.135500E+00	0.133920E+00	0.117317E-01
1992	0.138000E-01	0.125736E-01	0.930706E-01
1993	0.232000E-01	0.194789E-01	0.174818E+00
1994	N/A	0.194817E-01	N/A
1995	N/A	0.270618E-01	N/A
1996	N/A	0.573865E-01	N/A
1997	N/A	0.145917E-01	N/A
1998	N/A	0.255037E-01	N/A
1999	N/A	0.233620E-01	N/A
2000	N/A	0.363291E-01	N/A

2001	N/A	0.325446E-01	N/A
2002	N/A	0.542248E-01	N/A
2003	N/A	0.338284E-01	N/A
2004	N/A	0.823436E-02	N/A
2005	N/A	0.401443E-01	N/A
2006	N/A	0.133912E-01	N/A
2007	N/A	0.112368E+00	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 24 Tag: CM\_CPE AGE = 5  
Time = MEAN Type = NUMBER  
Catchability = 0.229116E-04 % Variance Contribution = 0.1381  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.217000E-01	0.275207E-01	-0.237626E+00
1983	0.209000E-01	0.176589E-01	0.168507E+00
1984	0.118000E-01	0.111738E-01	0.545269E-01
1985	0.179000E-01	0.176601E-01	0.134932E-01
1986	0.660000E-02	0.661394E-02	-0.211032E-02
1987	0.570000E-02	0.815593E-02	-0.358279E+00
1988	0.930000E-02	0.963858E-02	-0.357593E-01
1989	0.106000E-01	0.119158E-01	-0.117011E+00
1990	0.122000E-01	0.126640E-01	-0.373282E-01
1991	0.217000E-01	0.172514E-01	0.229419E+00
1992	0.515000E-01	0.374843E-01	0.317659E+00
1993	0.410000E-02	0.408155E-02	0.450955E-02
1994	N/A	0.462407E-02	N/A
1995	N/A	0.344415E-02	N/A
1996	N/A	0.707689E-02	N/A
1997	N/A	0.189098E-01	N/A
1998	N/A	0.596659E-02	N/A
1999	N/A	0.120896E-01	N/A
2000	N/A	0.116604E-01	N/A
2001	N/A	0.175142E-01	N/A
2002	N/A	0.160594E-01	N/A
2003	N/A	0.263716E-01	N/A
2004	N/A	0.183585E-01	N/A
2005	N/A	0.334331E-02	N/A
2006	N/A	0.197757E-01	N/A
2007	N/A	0.664047E-02	N/A
2008	N/A	0.000000E+00	N/A

Survey Index: 25 Tag: CM\_CPE AGE = 6  
Time = MEAN Type = NUMBER  
Catchability = 0.218712E-04 % Variance Contribution = 0.6002  
Residual = LN(Observed) - LN(Predicted)

Year	Observed	Predicted	Residual
1982	0.270000E-02	0.360420E-02	-0.288849E+00
1983	0.123000E-01	0.964092E-02	0.243583E+00
1984	0.550000E-02	0.586004E-02	-0.634079E-01
1985	0.360000E-02	0.343923E-02	0.456871E-01
1986	0.430000E-02	0.610563E-02	-0.350596E+00
1987	0.180000E-02	0.185134E-02	-0.281215E-01
1988	0.150000E-02	0.311688E-02	-0.731367E+00
1989	0.230000E-02	0.312149E-02	-0.305403E+00
1990	0.510000E-02	0.322153E-02	0.459384E+00
1991	0.390000E-02	0.384759E-02	0.135296E-01
1992	0.520000E-02	0.374652E-02	0.327830E+00
1993	0.140000E-01	0.710875E-02	0.677731E+00
1994	N/A	0.113347E-02	N/A
1995	N/A	0.101323E-02	N/A
1996	N/A	0.586834E-03	N/A

1997	N/A	0.181507E-02	N/A
1998	N/A	0.592501E-02	N/A
1999	N/A	0.267336E-02	N/A
2000	N/A	0.602197E-02	N/A
2001	N/A	0.622466E-02	N/A
2002	N/A	0.810640E-02	N/A
2003	N/A	0.683689E-02	N/A
2004	N/A	0.112083E-01	N/A
2005	N/A	0.769048E-02	N/A
2006	N/A	0.145083E-02	N/A
2007	N/A	0.865748E-02	N/A
2008	N/A	0.000000E+00	N/A

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**Plus Group Diagnostic Report**

Calculation Method Selected = Backward

Year	Population Backward	Population Forward	F Forward	F Backward	Ratio
1982	79.	79.	0.608762	0.608767	1.000008
1983	35.	39.	0.766578	0.934198	1.218659
1984	36.	22.	2.291808	0.826495	0.360630
1985	21.	13.	2.078124	0.831755	0.400243
1986	113.	73.	2.078124	0.852354	0.410155
1987	5.	6.	0.850480	0.956793	1.125004
1988	2.	8.	0.154090	0.793893	5.152153
1989	13.	9.	2.078124	0.842203	0.405271
1990	30.	21.	2.078124	0.964334	0.464041
1991	2.	8.	0.141677	1.203395	8.493906
1992	0.	6.	0.000172	1.364201	7931.037707
1993	0.	6.	0.000179	1.151373	6429.218887
1994	2.	5.	0.302683	1.679343	5.548194
1995	0.	3.	0.072010	1.408175	19.555209
1996	0.	3.	0.000384	1.075723	2801.841399
1997	0.	2.	0.047990	1.074636	22.392985
1998	1.	2.	0.227801	0.769676	3.378726
1999	0.	2.	0.000490	0.810592	1655.235816
2000	0.	5.	0.000221	0.640350	2892.159780
2001	0.	4.	N/A	N/A	

Warning \*\*\*\* Infeasible Mass Balance in Plus Group  
Year = 1986  
Year = 1989  
Year = 1990  
Year = 1994  
Year = 1997

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**Appendix C: Table 2. Bootstrap Summary Report for Gulf of Maine Cod**

Number of Bootstrap Repetitions Requested = 1000  
 Number of Bootstrap Repetitions Completed = 1000

**Bootstrap Output Variable: Stock Estimates (2008)**

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
N 2	3937.	4778.	3549.	0.7428
N 3	16020.	17071.	6345.	0.3717
N 4	3543.	3648.	986.	0.2703
N 5	3970.	4078.	1050.	0.2575
N 6	201.	214.	80.	0.3741
N 7	251.	270.	126.	0.4652
N 8	30.	34.	19.	0.5717
N 9	47.	56.	45.	0.7909
N 10	71.	86.	70.	0.8079

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
N 2	841.	115.	21.3697	3095.	1.1466
N 3	1050.	203.	6.5570	14970.	0.4239
N 4	105.	31.	2.9687	3438.	0.2868
N 5	107.	33.	2.6968	3863.	0.2718
N 6	13.	3.	6.5231	188.	0.4263
N 7	19.	4.	7.4963	232.	0.5406
N 8	4.	1.	13.6268	26.	0.7521
N 9	9.	1.	20.1704	37.	1.1906
N 10	15.	2.	21.1718	56.	1.2418

	LOWER 80. % CI	UPPER 80. % CI
N 2	1677.	8603.
N 3	10069.	25149.
N 4	2521.	4978.
N 5	2832.	5454.
N 6	124.	328.
N 7	121.	439.
N 8	12.	60.
N 9	9.	110.
N 10	8.	179.

**Bootstrap Output Variable: Catchability Estimates**

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
Q 1	0.639060E-04	0.647586E-04	0.101782E-04	0.1572
Q 2	0.131940E-03	0.133998E-03	0.145121E-04	0.1083
Q 3	0.225008E-03	0.225360E-03	0.233256E-04	0.1035
Q 4	0.293998E-03	0.295308E-03	0.383110E-04	0.1297
Q 5	0.382779E-03	0.386695E-03	0.603680E-04	0.1561
Q 6	0.566609E-03	0.571598E-03	0.110028E-03	0.1925
Q 7	0.511812E-03	0.524087E-03	0.139158E-03	0.2655
Q 8	0.533836E-04	0.535169E-04	0.726587E-05	0.1358
Q 9	0.113582E-03	0.114677E-03	0.129450E-04	0.1129
Q 10	0.223833E-03	0.223325E-03	0.225948E-04	0.1012
Q 11	0.370258E-03	0.372882E-03	0.441525E-04	0.1184
Q 12	0.478237E-03	0.480790E-03	0.575817E-04	0.1198
Q 13	0.451154E-03	0.460422E-03	0.853109E-04	0.1853
Q 14	0.566767E-03	0.586741E-03	0.137955E-03	0.2351
Q 15	0.710558E-03	0.715248E-03	0.110880E-03	0.1550
Q 16	0.544643E-03	0.546052E-03	0.476591E-04	0.0873
Q 17	0.453706E-03	0.455707E-03	0.552238E-04	0.1212
Q 19	0.122958E-03	0.128903E-03	0.390116E-04	0.3026
Q 21	0.245830E-05	0.251662E-05	0.718337E-06	0.2854
Q 22	0.140563E-04	0.141456E-04	0.162997E-05	0.1152
Q 23	0.231650E-04	0.232271E-04	0.126746E-05	0.0546
Q 24	0.229116E-04	0.229085E-04	0.120903E-05	0.0528
Q 25	0.218712E-04	0.220098E-04	0.250055E-05	0.1136

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
Q 1	0.8525E-06	0.3230E-06	1.3340	0.6305E-04	0.1614
Q 2	0.2058E-05	0.4635E-06	1.5600	0.1299E-03	0.1117
Q 3	0.3524E-06	0.7377E-06	0.1566	0.2247E-03	0.1038
Q 4	0.1310E-05	0.1212E-05	0.4455	0.2927E-03	0.1309
Q 5	0.3917E-05	0.1913E-05	1.0232	0.3789E-03	0.1593
Q 6	0.4988E-05	0.3483E-05	0.8803	0.5616E-03	0.1959
Q 7	0.1227E-04	0.4418E-05	2.3983	0.4995E-03	0.2786
Q 8	0.1332E-06	0.2298E-06	0.2496	0.5325E-04	0.1364
Q 9	0.1096E-05	0.4108E-06	0.9645	0.1125E-03	0.1151
Q 10	-0.5082E-06	0.7147E-06	-0.2270	0.2243E-03	0.1007
Q 11	0.2624E-05	0.1399E-05	0.7086	0.3676E-03	0.1201
Q 12	0.2554E-05	0.1823E-05	0.5339	0.4757E-03	0.1211
Q 13	0.9268E-05	0.2714E-05	2.0543	0.4419E-03	0.1931
Q 14	0.1997E-04	0.4408E-05	3.5242	0.5468E-03	0.2523
Q 15	0.4690E-05	0.3509E-05	0.6600	0.7059E-03	0.1571
Q 16	0.1409E-05	0.1508E-05	0.2587	0.5432E-03	0.0877
Q 17	0.2001E-05	0.1747E-05	0.4410	0.4517E-03	0.1223
Q 19	0.5945E-05	0.1248E-05	4.8350	0.1170E-03	0.3334
Q 21	0.5832E-07	0.2279E-07	2.3723	0.2400E-05	0.2993
Q 22	0.8937E-07	0.5162E-07	0.6358	0.1397E-04	0.1167
Q 23	0.6213E-07	0.4013E-07	0.2682	0.2310E-04	0.0549
Q 24	-0.3153E-08	0.3823E-07	-0.0138	0.2291E-04	0.0528
Q 25	0.1386E-06	0.7920E-07	0.6336	0.2173E-04	0.1151

	LOWER 80. % CI	UPPER 80. % CI
Q 1	0.528038E-04	0.777431E-04
Q 2	0.116065E-03	0.153541E-03
Q 3	0.195847E-03	0.256823E-03
Q 4	0.251091E-03	0.347007E-03
Q 5	0.311452E-03	0.463932E-03
Q 6	0.435944E-03	0.713003E-03
Q 7	0.363137E-03	0.705006E-03
Q 8	0.448692E-04	0.627867E-04
Q 9	0.991114E-04	0.131147E-03
Q 10	0.195500E-03	0.251712E-03
Q 11	0.317280E-03	0.430807E-03
Q 12	0.407507E-03	0.551218E-03
Q 13	0.359008E-03	0.576648E-03
Q 14	0.425972E-03	0.768331E-03
Q 15	0.581905E-03	0.849728E-03
Q 16	0.486698E-03	0.606425E-03
Q 17	0.386956E-03	0.528414E-03
Q 19	0.842248E-04	0.174946E-03
Q 21	0.167670E-05	0.346849E-05
Q 22	0.121995E-04	0.162474E-04
Q 23	0.216791E-04	0.248333E-04

Q 24 0.213895E-04 0.245191E-04  
 Q 25 0.190392E-04 0.252692E-04

**Bootstrap Output Variable: Fishing Mortality (2007)**

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
AGE 1	0.0000	0.0000	0.000000	0.7193
AGE 2	0.0004	0.0005	0.000180	0.3776
AGE 3	0.0388	0.0403	0.010717	0.2657
AGE 4	0.1880	0.1940	0.047462	0.2446
AGE 5	0.4892	0.5077	0.151260	0.2979
AGE 6	0.6492	0.7011	0.268324	0.3827
AGE 7	0.2288	0.2890	0.246963	0.8546
AGE 8	0.3714	0.5913	0.645212	1.0911
AGE 9	0.1484	0.3630	0.603834	1.6637
AGE 10	0.4888	0.5279	0.202048	0.3827
AGE 11	0.4888	0.5279	0.202048	0.3827

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
AGE 1	0.000000	0.000000	25.9547	0.0000	1.2235
AGE 2	0.000031	0.000006	6.9738	0.0004	0.4343
AGE 3	0.001556	0.000342	4.0140	0.0372	0.2880
AGE 4	0.006058	0.001513	3.2227	0.1819	0.2609
AGE 5	0.018527	0.004819	3.7875	0.4706	0.3214
AGE 6	0.051977	0.008643	8.0070	0.5972	0.4493
AGE 7	0.060197	0.008039	26.3126	0.1686	1.4650
AGE 8	0.219925	0.021557	59.2126	0.1515	4.2591
AGE 9	0.214574	0.020266	144.6129	-0.0662	-9.1219
AGE 10	0.039139	0.006508	8.0070	0.4497	0.4493
AGE 11	0.039139	0.006508	8.0070	0.4497	0.4493

	LOWER 80. % CI	UPPER 80. % CI
AGE 1	0.000000	0.000001
AGE 2	0.000284	0.000710
AGE 3	0.027715	0.053995
AGE 4	0.140155	0.254509
AGE 5	0.325552	0.702242
AGE 6	0.420262	1.058058
AGE 7	0.120909	0.499303
AGE 8	0.174605	1.208743
AGE 9	0.061730	0.855144
AGE 10	0.316457	0.796718
AGE 11	0.316457	0.796718



**Bootstrap Output Variable: Average F (2007) AGES 5 - 7**

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
AVG F	0.4557	0.4993	0.136083	0.2726
N WTD	0.5685	0.5810	0.147049	0.2531
B WTD	0.5686	0.5816	0.150324	0.2584
C WTD	0.5845	0.6250	0.178702	0.2859

  

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
AVG F	0.043567	0.004519	9.5605	0.4121	0.3302
N WTD	0.012503	0.004667	2.1994	0.5560	0.2645
B WTD	0.013043	0.004772	2.2939	0.5556	0.2706
C WTD	0.040489	0.005794	6.9270	0.5440	0.3285

  

	LOWER 80. % CI	UPPER 80. % CI
AVG F	0.355693	0.669985
N WTD	0.411017	0.781374
B WTD	0.408325	0.786745
C WTD	0.428986	0.863827

**Bootstrap Output Variable: Biomass**

JAN-1 Biomass (2008) Mean Biomass & SSB (2007)

	NLLS Estimate	Bootstrap Mean	Bootstrap Std Error	C.V. For NLLS Soln.
JAN-1	64636.	68657.	14733.	0.2146
MEAN	68452.	72310.	15634.	0.2162
SSB	33877.	35256.	5061.	0.1435

  

	Bias Estimate	Bias Std. Error	Per Cent Bias	NLLS Estimate Corrected For Bias	C.V. For Corrected Estimate
JAN-1	4021.	483.	6.2205	60615.	0.2431
MEAN	3857.	509.	5.6350	64595.	0.2420
SSB	1379.	166.	4.0692	32499.	0.1557

  

	LOWER 80. % CI	UPPER 80. % CI
JAN-1	51410.	87543.
MEAN	54179.	91739.
SSB	29133.	41747.

Appendix C: Table 3. Retrospective Summary for Gulf of Maine Cod

Average Fishing Mortality  
Ages = 5 - 7

	1982	1983	1984	1985	1986	
2000	0.5465	0.8677	0.7543	0.8478	0.8502	
2001	0.5465	0.8677	0.7543	0.8478	0.8502	
2002	0.5465	0.8677	0.7543	0.8478	0.8502	
2003	0.5465	0.8677	0.7543	0.8478	0.8502	
2004	0.5465	0.8677	0.7543	0.8478	0.8502	
2005	0.5465	0.8677	0.7543	0.8478	0.8502	
2006	0.5465	0.8677	0.7543	0.8478	0.8502	
2007	0.5465	0.8677	0.7543	0.8478	0.8502	
	1987	1988	1989	1990	1991	
2000	0.9605	0.5815	0.7225	0.8636	1.2294	
2001	0.9605	0.5815	0.7225	0.8636	1.2293	
2002	0.9605	0.5815	0.7225	0.8635	1.2291	
2003	0.9605	0.5815	0.7225	0.8635	1.2291	
2004	0.9605	0.5815	0.7225	0.8635	1.2290	
2005	0.9605	0.5815	0.7225	0.8635	1.2290	
2006	0.9605	0.5815	0.7225	0.8635	1.2290	
2007	0.9605	0.5815	0.7225	0.8635	1.2290	
	1992	1993	1994	1995	1996	
2000	1.3627	0.9571	1.5425	1.2239	0.9161	
2001	1.3625	0.9573	1.5339	1.2157	0.9634	
2002	1.3622	0.9561	1.5204	1.1878	0.9567	
2003	1.3622	0.9560	1.5177	1.1824	0.9581	
2004	1.3620	0.9562	1.5125	1.1795	0.9547	
2005	1.3620	0.9562	1.5129	1.1805	0.9547	
2006	1.3620	0.9562	1.5126	1.1798	0.9544	
2007	1.3620	0.9562	1.5123	1.1792	0.9545	
	1997	1998	1999	2000	2001	
2000	0.8377	0.7034	0.9794	0.6104		
2001	0.9143	0.8529	0.8262	0.4132	0.5330	
2002	0.8658	0.7592	0.6060	0.3896	0.4672	
2003	0.8847	0.7648	0.6037	0.3519	0.4961	
2004	0.8827	0.7733	0.5875	0.3281	0.4329	
2005	0.8822	0.7751	0.5902	0.3273	0.4269	
2006	0.8812	0.7724	0.5870	0.3253	0.4212	
2007	0.8811	0.7722	0.5846	0.3242	0.4249	
	2002	2003	2004	2005	2006	2007
2000						
2001						
2002	0.4124					
2003	0.5813	0.6681				
2004	0.5697	0.7016	0.5905			
2005	0.5559	0.7256	0.6259	0.7789		
2006	0.5399	0.6962	0.5950	0.6406	0.5204	
2007	0.5373	0.6804	0.5405	0.6362	0.5811	0.4557

**Spawning Stock Biomass (mt)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	
2000	25587.	19494.	17223.	17211.	19406.	
2001	25587.	19494.	17223.	17211.	19406.	
2002	25587.	19494.	17223.	17211.	19406.	
2003	25587.	19494.	17223.	17211.	19406.	
2004	25587.	19494.	17223.	17211.	19406.	
2005	25587.	19494.	17223.	17211.	19406.	
2006	25587.	19494.	17223.	17211.	19406.	
2007	25587.	19494.	17223.	17211.	19406.	
	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	
2000	15926.	16545.	22151.	28655.	20339.	
2001	15926.	16545.	22151.	28655.	20340.	
2002	15926.	16545.	22151.	28657.	20341.	
2003	15926.	16546.	22151.	28657.	20342.	
2004	15926.	16546.	22151.	28657.	20342.	
2005	15926.	16546.	22151.	28657.	20342.	
2006	15926.	16546.	22151.	28657.	20342.	
2007	15926.	16546.	22151.	28657.	20342.	
	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	
2000	11980.	10322.	10777.	13478.	11705.	
2001	11981.	10317.	10715.	13398.	11662.	
2002	11986.	10329.	10755.	13618.	11931.	
2003	11986.	10329.	10746.	13549.	11943.	
2004	11988.	10333.	10754.	13559.	11945.	
2005	11988.	10333.	10754.	13560.	11938.	
2006	11988.	10334.	10754.	13563.	11945.	
2007	11988.	10334.	10755.	13566.	11949.	
	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	
2000	9131.	9363.	9755.	14042.		
2001	9324.	10068.	10821.	15431.	21475.	
2002	9657.	10652.	11773.	16946.	24018.	
2003	9717.	10561.	10951.	14173.	18544.	
2004	9843.	10759.	11163.	14180.	17858.	
2005	9838.	10781.	11189.	14139.	17624.	
2006	9848.	10813.	11253.	14254.	17787.	
2007	9856.	10814.	11246.	14285.	17848.	
	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>
2000						
2001						
2002	28693.					
2003	20609.	19609.				
2004	18896.	17307.	15989.			
2005	18427.	16431.	14089.	11691.		
2006	18623.	16760.	14633.	12359.	23403.	
2007	18673.	16539.	13693.	10974.	19139.	33877.

**Total Population Numbers (000s)**

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>		
2000	30180.	26336.	26143.	23683.	24887.		
2001	30180.	26336.	26143.	23683.	24888.		
2002	30180.	26336.	26143.	23683.	24888.		
2003	30180.	26336.	26143.	23683.	24888.		
2004	30180.	26336.	26143.	23683.	24888.		
2005	30180.	26336.	26143.	23683.	24888.		
2006	30180.	26336.	26143.	23683.	24888.		
2007	30180.	26336.	26143.	23683.	24888.		
	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>		
2000	28973.	44369.	36693.	29511.	24213.		
2001	28973.	44369.	36692.	29517.	24218.		
2002	28973.	44369.	36694.	29523.	24223.		
2003	28973.	44369.	36694.	29524.	24224.		
2004	28973.	44369.	36694.	29528.	24228.		
2005	28973.	44369.	36694.	29528.	24228.		
2006	28973.	44369.	36694.	29528.	24228.		
2007	28973.	44369.	36694.	29528.	24228.		
	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>		
2000	19138.	21034.	17098.	14371.	12093.		
2001	19048.	20992.	17068.	14585.	12614.		
2002	19056.	21210.	17252.	14746.	12884.		
2003	19053.	21133.	17279.	14801.	12935.		
2004	19057.	21141.	17245.	14946.	13064.		
2005	19057.	21143.	17237.	14941.	13090.		
2006	19057.	21146.	17242.	14946.	13107.		
2007	19057.	21148.	17245.	14951.	13113.		
	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>		
2000	12119.	13858.	20971.	23393.	17455.		
2001	13018.	14774.	21508.	21509.	16376.		
2002	13744.	15306.	23309.	23087.	17810.		
2003	13035.	13170.	18732.	18600.	14407.		
2004	13154.	13306.	17668.	17029.	13255.		
2005	13184.	13334.	17312.	16718.	13046.		
2006	13237.	13419.	17396.	16748.	13203.		
2007	13190.	13477.	17462.	16805.	13250.		
	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
2000							
2001	11067.						
2002	26285.	19865.					
2003	17077.	17114.	12418.				
2004	15583.	14068.	32769.	25539.			
2005	14224.	12041.	21034.	20889.	15743.		
2006	14567.	12623.	21874.	23736.	45200.	35989.	
2007	13459.	11046.	18414.	20495.	39336.	35992.	28090.

**Age 1 Recruitment Population Numbers (000s)**

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	1982	1983	1984	1985	1986		
2000	7857.	7929.	10674.	6679.	10260.		
2001	7857.	7929.	10674.	6679.	10260.		
2002	7857.	7929.	10674.	6679.	10260.		
2003	7857.	7929.	10674.	6679.	10260.		
2004	7857.	7929.	10674.	6679.	10260.		
2005	7857.	7929.	10674.	6679.	10260.		
2006	7857.	7929.	10674.	6679.	10260.		
2007	7857.	7929.	10674.	6679.	10260.		
	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>		
2000	12744.	24612.	4253.	4119.	6975.		
2001	12744.	24612.	4253.	4125.	6975.		
2002	12744.	24612.	4254.	4130.	6975.		
2003	12744.	24612.	4255.	4131.	6975.		
2004	12744.	24612.	4254.	4135.	6975.		
2005	12744.	24612.	4254.	4135.	6975.		
2006	12744.	24612.	4254.	4135.	6975.		
2007	12744.	24612.	4254.	4135.	6975.		
	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>		
2000	6432.	8943.	3126.	3345.	3000.		
2001	6338.	8975.	3131.	3583.	3345.		
2002	6343.	9185.	3137.	3593.	3484.		
2003	6339.	9110.	3227.	3627.	3490.		
2004	6340.	9116.	3185.	3800.	3500.		
2005	6340.	9117.	3177.	3802.	3529.		
2006	6340.	9121.	3179.	3802.	3542.		
2007	6340.	9123.	3180.	3805.	3545.		
	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>		
2000	5009.	5716.	11044.	7729.	0.		
2001	5482.	5896.	10831.	5406.	461.		
2002	5987.	5834.	12196.	5510.	603.		
2003	5236.	4278.	9369.	4770.	875.		
2004	5249.	4317.	8193.	4071.	1008.		
2005	5258.	4321.	7814.	4052.	1054.		
2006	5298.	4362.	7828.	4013.	1187.		
2007	5245.	4458.	7847.	4016.	1187.		
	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
2000							
2001	0.						
2002	14045.	0.					
2003	7623.	4786.	0.				
2004	7073.	2963.	22845.	0.			
2005	5884.	2050.	12772.	4959.	0.		
2006	6099.	2351.	13136.	7120.	27113.	0.	
2007	4953.	1681.	10966.	6713.	23910.	4808.	0.

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

21	CM_CPE	2
22	CM_CPE	3
23	CM_CPE	4
24	CM_CPE	5
25	CM_CPE	6