## Appendix A. Georges Bank Atlantic cod

**by Loretta O'Brien , Nina Shepherd, Michele Traver, Jiashen Tang, and Betty Holmes**

Appendix A. Table A1a. USA Western GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
| | | | | | | | | | | | | | | | | | |
| | | USA Western Georges Bank Commercial Landings in Numbers (000's) at Age | | | | | | | | | | | | | | | |
| 1978 | 0 | 2420 | 44757 | 12479 | 4832 | 119 | 1085 | 0 | 167 | 0 | 0 | 0 | 0 | 0 | 0 | | 65858 |
| 1979 | 446 | 11762 | 3927 | 29906 | 6053 | 2600 | 795 | 2389 | 0 | 199 | 76 | 0 | 0 | 0 | 0 | | 58153 |
| 1980 | 991 | 27575 | 40830 | 2202 | 15313 | 6194 | 3112 | 463 | 1016 | 0 | 0 | 0 | 0 | 0 | 0 | | 97696 |
| 1981 | 280 | 22100 | 26729 | 12750 | 725 | 6858 | 2012 | 349 | 1004 | 208 | 69 | 0 | 0 | 0 | 0 | | 73083 |
| 1982 | 4189 | 60994 | 22453 | 13481 | 8064 | 861 | 2730 | 425 | 301 | 168 | 175 | 41 | 6 | 11 | 0 | | 113899 |
| 1983 | 811 | 30197 | 44466 | 9118 | 5905 | 4651 | 548 | 964 | 220 | 115 | 71 | 82 | 65 | 13 | 0 | | 97227 |
| 1984 | 610 | 11025 | 25222 | 18232 | 2683 | 1921 | 1814 | 177 | 865 | 127 | 92 | 126 | 56 | 7 | 0 | | 62957 |
| 1985 | 1218 | 33734 | 11473 | 7479 | 8751 | 1904 | 1216 | 899 | 71 | 371 | 62 | 24 | 20 | 8 | 0 | | 67231 |
| 1986 | 1300 | 9266 | 22568 | 2697 | 1852 | 1713 | 256 | 243 | 274 | 25 | 75 | 26 | 15 | 5 | 0 | | 40315 |
| 1987 | 187 | 37643 | 5653 | 9809 | 1365 | 1111 | 940 | 182 | 122 | 112 | 4 | 11 | 4 | 0 | 0 | | 57144 |
| 1988 | 0 | 16050 | 39917 | 3542 | 6069 | 803 | 422 | 367 | 82 | 86 | 51 | 0 | 0 | 0 | 0 | | 67388 |
| 1989 | 0 | 14326 | 21689 | 22508 | 1635 | 1812 | 282 | 147 | 58 | 0 | 0 | 0 | 0 | 0 | 0 | | 62457 |
| 1990 | 0 | 43914 | 23420 | 9495 | 8676 | 697 | 627 | 105 | 60 | 29 | 0 | 13 | 0 | 0 | 0 | | 87035 |
| 1991 | 376 | 9564 | 24991 | 12324 | 5115 | 2981 | 273 | 222 | 71 | 13 | 6 | 7 | 0 | 0 | 0 | | 55943 |
| 1992 | 0 | 16627 | 8835 | 5993 | 6030 | 1481 | 793 | 120 | 88 | 5 | 7 | 0 | 8 | 0 | 0 | | 39986 |
| 1993 | 0 | 5878 | 24097 | 3255 | 1822 | 1725 | 482 | 482 | 99 | 4 | 0 | 0 | 0 | 0 | 0 | | 37844 |
| 1994 | 0 | 2022 | 9831 | 11956 | 1598 | 522 | 855 | 238 | 107 | 0 | 29 | 0 | 0 | 0 | 0 | | 27158 |
| 1995 | 0 | 3231 | 9293 | 5353 | 2604 | 212 | 166 | 174 | 38 | 6 | 6 | 0 | 0 | 0 | 0 | | 21083 |
| 1996 | 0 | 1986 | 6884 | 8310 | 1675 | 1148 | 53 | 81 | 88 | 0 | 0 | 0 | 0 | 0 | 0 | | 20225 |
| 1997 | 0 | 3849 | 5120 | 6328 | 4922 | 601 | 511 | 79 | 55 | 17 | 5 | 0 | 0 | 0 | 0 | | 21488 |
| 1998 | 81 | 6770 | 9287 | 3094 | 2122 | 1449 | 186 | 41 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | | 23037 |
| 1999 | 0 | 2369 | 15126 | 4815 | 1600 | 581 | 842 | 85 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | | 25427 |
| 2000 | 88 | 7013 | 5831 | 7303 | 1530 | 449 | 221 | 251 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | | 22702 |
| 2001 | 5 | 4961 | 20580 | 5200 | 2809 | 702 | 214 | 74 | 73 | 4 | 1 | 0 | 0 | 0 | 0 | | 34623 |
| 2002 | 0 | 290 | 9032 | 9958 | 2432 | 2059 | 517 | 90 | 51 | 26 | 8 | 1 | 0 | 0 | 0 | | 24464 |
| 2003 | 0 | 723 | 2186 | 5058 | 4635 | 671 | 480 | 82 | 24 | 12 | 1 | 0 | 0 | 0 | 0 | | 13872 |
| 2004 | 0 | 284 | 2383 | 834 | 1469 | 1003 | 178 | 156 | 42 | 13 | 5 | 4 | 2 | 0 | 0 | | 6374 |
| 2005 | 0 | 223 | 943 | 3425 | 866 | 714 | 442 | 66 | 36 | 11 | 9 | 1 | 0 | 0 | 0 | | 6735 |
| 2006 | 0 | 117 | 4343 | 1232 | 1679 | 216 | 121 | 112 | 13 | 11 | 3 | 1 | 0 | 1 | 0 | | 7850 |
| 2007 | 0 | 1289 | 1652 | 7207 | 410 | 484 | 50 | 33 | 22 | 2 | 4 | 0 | 0 | 0 | 0 | | 11152 |

Appendix A. Table A1a.continued. USA Western GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
| | | | | | USA Western Georges Bank Commercial Landings in Weight (Tons) at Age | | | | | | | | | | | | |
| 1978 | 0 | 313 | 11740 | 4838 | 1968 | 71 | 817 | 0 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | | 19954 |
| 1979 | 38 | 1686 | 926 | 13959 | 3141 | 1928 | 781 | 2508 | 0 | 287 | 83 | 0 | 0 | 0 | 0 | | 25348 |
| 1980 | 82 | 4174 | 10210 | 895 | 8980 | 4309 | 2676 | 431 | 897 | 0 | 0 | 0 | 0 | 0 | 0 | | 32610 |
| 1981 | 31 | 3448 | 6843 | 4830 | 434 | 5130 | 1795 | 374 | 1513 | 403 | 155 | 0 | 0 | 0 | 0 | | 24937 |
| 1982 | 277 | 8798 | 6338 | 5152 | 4514 | 563 | 2811 | 451 | 421 | 245 | 253 | 62 | 15 | 25 | 0 | | 29878 |
| 1983 | 87 | 4420 | 10967 | 3343 | 3023 | 3102 | 504 | 1068 | 256 | 165 | 128 | 139 | 139 | 27 | 0 | | 27362 |
| 1984 | 61 | 1762 | 6358 | 7000 | 1486 | 1410 | 1655 | 199 | 953 | 149 | 139 | 200 | 100 | 15 | 0 | | 21486 |
| 1985 | 114 | 4802 | 2593 | 3154 | 4745 | 1274 | 1002 | 967 | 99 | 485 | 105 | 38 | 41 | 20 | 0 | | 19454 |
| 1986 | 123 | 1387 | 5382 | 1072 | 1172 | 1339 | 253 | 262 | 374 | 34 | 108 | 42 | 35 | 12 | 0 | | 11579 |
| 1987 | 16 | 5334 | 1465 | 4070 | 806 | 913 | 806 | 192 | 152 | 171 | 9 | 24 | 9 | 0 | 0 | | 13961 |
| 1988 | 0 | 2432 | 9522 | 1358 | 3353 | 615 | 394 | 381 | 110 | 127 | 100 | 0 | 0 | 0 | 0 | | 18388 |
| 1989 | 0 | 2403 | 4958 | 8808 | 889 | 1323 | 273 | 136 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | | 18873 |
| 1990 | 0 | 6731 | 5755 | 3545 | 4416 | 448 | 551 | 130 | 72 | 39 | 0 | 20 | 0 | 0 | 0 | | 21696 |
| 1991 | 44 | 1471 | 6203 | 4777 | 2849 | 1960 | 215 | 209 | 95 | 24 | 13 | 17 | 0 | 0 | 0 | | 17867 |
| 1992 | 0 | 2489 | 2122 | 2465 | 2861 | 1001 | 626 | 120 | 102 | 8 | 14 | 0 | 18 | 0 | 0 | | 11819 |
| 1993 | 0 | 909 | 5347 | 1242 | 1068 | 1055 | 392 | 454 | 92 | 12 | 0 | 0 | 0 | 0 | 0 | | 10563 |
| 1994 | 0 | 273 | 2070 | 4155 | 811 | 387 | 598 | 221 | 110 | 0 | 55 | 0 | 0 | 0 | 0 | | 8668 |
| 1995 | 0 | 487 | 1862 | 2035 | 1395 | 190 | 152 | 217 | 49 | 9 | 15 | 0 | 0 | 0 | 0 | | 6406 |
| 1996 | 0 | 303 | 1687 | 2690 | 810 | 773 | 63 | 84 | 99 | 0 | 0 | 0 | 0 | 0 | 0 | | 6508 |
| 1997 | 0 | 609 | 1212 | 2269 | 1939 | 355 | 392 | 64 | 62 | 20 | 7 | 0 | 0 | 0 | 0 | | 6926 |
| 1998 | 4 | 998 | 2105 | 1117 | 1052 | 829 | 154 | 32 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | | 6300 |
| 1999 | 0 | 369 | 3260 | 1624 | 780 | 360 | 593 | 86 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | | 7083 |
| 2000 | 10 | 1198 | 1450 | 2663 | 778 | 281 | 183 | 218 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | | 6788 |
| 2001 | 0 | 766 | 4769 | 1577 | 1368 | 414 | 153 | 67 | 72 | 5 | 3 | 0 | 0 | 0 | 0 | | 9191 |
| 2002 | 0 | 55 | 1980 | 3028 | 969 | 1112 | 343 | 72 | 55 | 33 | 10 | 1 | 0 | 0 | 0 | | 7652 |
| 2003 | 0 | 149 | 535 | 1553 | 1945 | 357 | 311 | 62 | 23 | 14 | 2 | 0 | 0 | 0 | 0 | | 4951 |
| 2004 | 0 | 58 | 677 | 310 | 631 | 520 | 112 | 124 | 38 | 15 | 8 | 5 | 3 | 0 | 0 | | 2500 |
| 2005 | 0 | 40 | 243 | 1182 | 366 | 365 | 265 | 56 | 36 | 12 | 13 | 1 | 0 | 0 | 0 | | 2580 |
| 2006 | 0 | 24 | 1097 | 448 | 691 | 113 | 76 | 82 | 12 | 12 | 3 | 1 | 1 | 1 | 0 | | 2559 |
| 2007 | 0 | 262 | 418 | 2330 | 166 | 219 | 26 | 23 | 15 | 2 | 3 | 0 | 0 | 0 | 0 | | 3462 |

Appendix A. Table A1a.continued. USA Western GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Average |
| | | | | | | | | | | | | | | | | | |
| | | USA Western Georges Bank Commercial Landings Mean Weight (kg) at Age | | | | | | | | | | | | | | | |
| 1978 | 0 | 1.296 | 2.623 | 3.877 | 4.071 | 5.998 | 7.533 | 0 | 12.614 | 0 | 0 | 0 | 0 | 0 | 0 | | 3.03 |
| 1979 | 0.861 | 1.434 | 2.357 | 4.668 | 5.19 | 7.416 | 9.823 | 10.498 | 0 | 14.414 | 10.939 | 0 | 0 | 0 | 0 | | 4.359 |
| 1980 | 0.824 | 1.514 | 2.501 | 4.068 | 5.864 | 6.956 | 8.601 | 9.295 | 8.827 | 0 | 0 | 0 | 0 | 0 | 0 | | 3.338 |
| 1981 | 1.091 | 1.56 | 2.56 | 3.788 | 5.988 | 7.481 | 8.925 | 10.718 | 15.072 | 19.393 | 22.4 | 0 | 0 | 0 | 0 | | 3.412 |
| 1982 | 0.661 | 1.442 | 2.823 | 3.821 | 5.598 | 6.535 | 10.299 | 10.607 | 14.013 | 14.641 | 14.449 | 15.268 | 24.028 | 22.4 | 0 | | 2.623 |
| 1983 | 1.069 | 1.464 | 2.466 | 3.666 | 5.119 | 6.669 | 9.207 | 11.076 | 11.668 | 14.33 | 17.884 | 17.004 | 21.173 | 20.494 | 0 | | 2.814 |
| 1984 | 1.003 | 1.598 | 2.521 | 3.839 | 5.54 | 7.339 | 9.122 | 11.287 | 11.019 | 11.737 | 15.143 | 15.831 | 17.803 | 22.4 | 0 | | 3.413 |
| 1985 | 0.935 | 1.423 | 2.26 | 4.216 | 5.423 | 6.689 | 8.244 | 10.755 | 13.879 | 13.065 | 17.14 | 15.654 | 20.181 | 23.879 | 0 | | 2.894 |
| 1986 | 0.946 | 1.497 | 2.385 | 3.974 | 6.325 | 7.816 | 9.893 | 10.785 | 13.615 | 13.844 | 14.34 | 15.939 | 24.183 | 23.344 | 0 | | 2.872 |
| 1987 | 0.857 | 1.417 | 2.591 | 4.15 | 5.91 | 8.217 | 8.58 | 10.528 | 12.424 | 15.203 | 22.4 | 21.887 | 20.847 | 0 | 0 | | 2.443 |
| 1988 | 0 | 1.515 | 2.385 | 3.835 | 5.524 | 7.661 | 9.332 | 10.398 | 13.492 | 14.734 | 19.77 | 0 | 0 | 0 | 0 | | 2.729 |
| 1989 | 0 | 1.677 | 2.286 | 3.913 | 5.438 | 7.3 | 9.669 | 9.271 | 12.956 | 0 | 0 | 0 | 0 | 0 | 0 | | 3.022 |
| 1990 | 0 | 1.533 | 2.457 | 3.733 | 5.09 | 6.431 | 8.785 | 12.371 | 12.173 | 13.391 | 0 | 15.36 | 0 | 0 | 0 | | 2.493 |
| 1991 | 1.158 | 1.538 | 2.482 | 3.876 | 5.569 | 6.573 | 7.868 | 9.418 | 13.346 | 18.597 | 22.4 | 24.028 | 0 | 0 | 0 | | 3.194 |
| 1992 | 0 | 1.497 | 2.402 | 4.113 | 4.745 | 6.758 | 7.9 | 9.999 | 11.612 | 15.398 | 19.272 | 0 | 22.191 | 0 | 0 | | 2.956 |
| 1993 | 0 | 1.546 | 2.219 | 3.816 | 5.861 | 6.117 | 8.127 | 9.417 | 9.302 | 31.885 | 0 | 0 | 0 | 0 | 0 | | 2.791 |
| 1994 | 0 | 1.351 | 2.105 | 3.475 | 5.071 | 7.425 | 7.001 | 9.28 | 10.207 | 0 | 18.723 | 0 | 0 | 0 | 0 | | 3.192 |
| 1995 | 0 | 1.507 | 2.004 | 3.802 | 5.358 | 8.96 | 9.132 | 12.483 | 12.777 | 14.233 | 24.154 | 0 | 0 | 0 | 0 | | 3.039 |
| 1996 | 0 | 1.524 | 2.45 | 3.237 | 4.836 | 6.735 | 11.876 | 10.313 | 11.241 | 0 | 0 | 0 | 0 | 0 | 0 | | 3.218 |
| 1997 | 0 | 1.583 | 2.366 | 3.586 | 3.939 | 5.901 | 7.667 | 8.026 | 11.301 | 11.277 | 15.43 | 0 | 0 | 0 | 0 | | 3.223 |
| 1998 | 0.536 | 1.475 | 2.266 | 3.611 | 4.96 | 5.721 | 8.285 | 7.8 | 15.398 | 0 | 0 | 0 | 0 | 0 | 0 | | 2.735 |
| 1999 | 0 | 1.558 | 2.155 | 3.373 | 4.874 | 6.188 | 7.04 | 10.056 | 14.816 | 0 | 0 | 0 | 0 | 0 | 0 | | 2.786 |
| 2000 | 1.177 | 1.708 | 2.486 | 3.646 | 5.088 | 6.265 | 8.27 | 8.684 | 8.457 | 0 | 0 | 0 | 0 | 0 | 0 | | 2.99 |
| 2001 | 0.727 | 1.544 | 2.317 | 3.032 | 4.869 | 5.891 | 7.187 | 9.126 | 9.854 | 12.176 | 17.917 | 0 | 0 | 0 | 0 | | 2.655 |
| 2002 | 0 | 1.883 | 2.192 | 3.04 | 3.982 | 5.403 | 6.632 | 7.948 | 10.68 | 12.768 | 12.144 | 13.129 | 0 | 0 | 0 | | 3.128 |
| 2003 | 0 | 2.057 | 2.449 | 3.07 | 4.197 | 5.325 | 6.485 | 7.527 | 9.576 | 11.72 | 15.108 | 0 | 0 | 0 | 0 | | 3.569 |
| 2004 | 0 | 2.034 | 2.842 | 3.713 | 4.292 | 5.187 | 6.298 | 7.952 | 9.23 | 11.451 | 14.713 | 11.8 | 16.086 | 0 | 0 | | 3.922 |
| 2005 | 0 | 1.811 | 2.58 | 3.453 | 4.224 | 5.107 | 5.993 | 8.586 | 9.902 | 11.798 | 13.905 | 19.274 | 0 | 0 | 0 | | 3.832 |
| 2006 | 0 | 2.08 | 2.527 | 3.638 | 4.119 | 5.21 | 6.319 | 7.303 | 8.931 | 10.118 | 8.935 | 10.505 | 16.568 | 18.822 | 0 | | 3.259 |
| 2007 | 0 | 2.035 | 2.532 | 3.233 | 4.046 | 4.521 | 5.312 | 7.001 | 6.802 | 11.497 | 7.057 | 0 | 0 | 0 | 0 | | 3.104 |

Appendix A. Table A1a.continued. USA Western GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Average |
| | | USA Western Georges Bank Commercial Landings Mean Length (cm) at Age | | | | | | | | | | | | | | | |
| 1978 | 0.0 | 50.2 | 62.7 | 71.0 | 71.2 | 79.8 | 89.4 | 0.0 | 106.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 65.0 |
| 1979 | 44.2 | 52.0 | 60.4 | 75.7 | 78.6 | 88.7 | 98.2 | 100.3 | 0.0 | 110.9 | 102.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 72.0 |
| 1980 | 43.3 | 52.8 | 61.7 | 72.9 | 82.2 | 87.3 | 93.2 | 94.0 | 94.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 65.6 |
| 1981 | 47.6 | 53.1 | 62.4 | 70.9 | 83.1 | 89.3 | 95.1 | 100.6 | 113.2 | 123.0 | 129.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 65.8 |
| 1982 | 39.7 | 52.0 | 64.2 | 70.5 | 80.6 | 84.6 | 99.3 | 100.0 | 110.0 | 111.7 | 110.5 | 111.7 | 132.0 | 129.0 | 0.0 | | 60.1 |
| 1983 | 47.5 | 52.4 | 61.5 | 69.5 | 78.3 | 85.6 | 95.7 | 101.6 | 102.8 | 110.8 | 119.2 | 117.4 | 126.1 | 124.5 | 0.0 | | 62.4 |
| 1984 | 46.5 | 53.6 | 62.0 | 71.3 | 80.3 | 88.9 | 95.2 | 102.4 | 101.6 | 103.4 | 112.0 | 114.7 | 118.4 | 129.0 | 0.0 | | 66.6 |
| 1985 | 45.5 | 51.8 | 59.5 | 73.8 | 80.1 | 85.9 | 92.0 | 100.8 | 109.6 | 107.3 | 117.9 | 114.2 | 124.5 | 131.6 | 0.0 | | 62.0 |
| 1986 | 45.6 | 52.5 | 61.0 | 72.1 | 84.6 | 90.8 | 98.3 | 101.1 | 108.8 | 109.8 | 110.8 | 115.2 | 132.0 | 130.2 | 0.0 | | 62.6 |
| 1987 | 44.2 | 51.8 | 62.6 | 73.3 | 82.6 | 92.5 | 93.2 | 99.9 | 105.8 | 113.2 | 129.0 | 127.8 | 126.0 | 0.0 | 0.0 | | 59.1 |
| 1988 | 0.0 | 53.1 | 61.0 | 70.9 | 80.2 | 90.1 | 95.8 | 99.5 | 108.4 | 112.0 | 123.8 | 0.0 | 0.0 | 0.0 | 0.0 | | 62.3 |
| 1989 | 0.0 | 54.8 | 60.3 | 71.7 | 80.0 | 88.2 | 97.5 | 96.3 | 107.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 64.8 |
| 1990 | 0.0 | 53.3 | 61.5 | 70.3 | 78.0 | 84.2 | 93.6 | 105.7 | 105.1 | 108.7 | 0.0 | 114.0 | 0.0 | 0.0 | 0.0 | | 60.5 |
| 1991 | 48.8 | 53.2 | 61.8 | 71.1 | 80.5 | 84.9 | 89.7 | 93.2 | 108.6 | 121.4 | 129.0 | 132.0 | 0.0 | 0.0 | 0.0 | | 65.6 |
| 1992 | 0.0 | 52.7 | 61.4 | 73.4 | 76.9 | 85.6 | 92.2 | 98.2 | 104.9 | 117.0 | 120.0 | 0.0 | 132.0 | 0.0 | 0.0 | | 63.7 |
| 1993 | 0.0 | 53.1 | 59.9 | 71.7 | 82.7 | 83.5 | 93.5 | 98.0 | 97.8 | 141.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 63.1 |
| 1994 | 0.0 | 51.3 | 58.8 | 69.4 | 79.4 | 89.9 | 89.1 | 98.1 | 101.1 | 0.0 | 122.8 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.2 |
| 1995 | 0.0 | 52.8 | 57.9 | 71.1 | 81.3 | 95.1 | 97.1 | 106.9 | 108.6 | 114.0 | 129.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 64.6 |
| 1996 | 0.0 | 53.2 | 61.7 | 67.7 | 77.2 | 88.0 | 102.6 | 101.5 | 103.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.6 |
| 1997 | 0.0 | 53.6 | 61.2 | 70.0 | 72.1 | 84.2 | 92.0 | 93.1 | 104.8 | 105.3 | 117.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.6 |
| 1998 | 38.1 | 52.4 | 60.4 | 71.1 | 79.4 | 83.5 | 94.8 | 93.1 | 117.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 63.0 |
| 1999 | 0.0 | 53.5 | 59.6 | 69.4 | 79.1 | 85.4 | 89.6 | 100.5 | 115.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 63.9 |
| 2000 | 48.9 | 54.9 | 62.4 | 71.1 | 79.3 | 85.6 | 94.1 | 96.4 | 96.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 65.1 |
| 2001 | 42.0 | 53.2 | 60.8 | 66.5 | 78.3 | 83.7 | 90.0 | 96.7 | 100.2 | 107.5 | 123.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 62.8 |
| 2002 | 0.0 | 56.9 | 59.6 | 66.8 | 72.8 | 80.8 | 86.8 | 91.7 | 101.8 | 109.2 | 107.0 | 111.0 | 0.0 | 0.0 | 0.0 | | 66.4 |
| 2003 | 0.0 | 58.3 | 61.8 | 66.8 | 74.4 | 80.4 | 86.6 | 90.8 | 97.9 | 106.0 | 111.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 69.7 |
| 2004 | 0.0 | 58.2 | 64.7 | 71.1 | 75.2 | 80.3 | 85.8 | 93.1 | 97.5 | 105.5 | 114.5 | 106.1 | 118.3 | 0.0 | 0.0 | | 71.8 |
| 2005 | 0.0 | 56.1 | 63.1 | 69.7 | 75.3 | 80.1 | 84.3 | 95.8 | 99.9 | 104.9 | 112.9 | 126.0 | 0.0 | 0.0 | 0.0 | | 71.6 |
| 2006 | 0.0 | 58.7 | 62.3 | 70.9 | 74.2 | 80.2 | 85.8 | 90.2 | 94.2 | 100.6 | 96.8 | 99.3 | 119.0 | 125.0 | 0.0 | | 67.5 |
| 2007 | 0.0 | 58.2 | 62.8 | 68.1 | 73.1 | 75.8 | 80.0 | 87.6 | 86.6 | 104.8 | 85.3 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.8 |

Appendix A. Table A1b. USA Eastern GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
| | | | | | | | | | | | | | | | | | |
| | | | USA Eastern Georges Bank Commercial Landings in Numbers (000's) at Age | | | | | | | | | | | | | | |
| 1978 | 0.34 | 367 | 12834 | 4446 | 1752 | 862 | 685 | 102 | 121 | 24 | 7 | 2 | 0 | 0.47 | 2 | | 21204 |
| 1979 | 21 | 3231 | 2011 | 7127 | 2723 | 1238 | 581 | 480 | 87 | 18 | 9 | 5 | 0 | 4 | 0 | | 17536 |
| 1980 | 0 | 2596 | 5626 | 1002 | 4639 | 2179 | 656 | 117 | 201 | 34 | 7 | 0 | 0 | 0 | 0 | | 17056 |
| 1981 | 96 | 5731 | 9602 | 6916 | 942 | 1937 | 869 | 533 | 308 | 114 | 20 | 10 | 0 | 0 | 0 | | 27077 |
| 1982 | 0 | 13029 | 5110 | 3644 | 3953 | 415 | 1642 | 503 | 191 | 63 | 48 | 31 | 25 | 5 | 0 | | 28659 |
| 1983 | 50 | 3650 | 10674 | 4323 | 2709 | 1786 | 279 | 549 | 325 | 136 | 161 | 100 | 14 | 35 | 6 | | 24797 |
| 1984 | 75 | 2041 | 6661 | 9655 | 2877 | 2188 | 1830 | 205 | 542 | 231 | 100 | 41 | 21 | 9 | 0 | 4 | 26481 |
| 1985 | 10 | 6670 | 4425 | 2544 | 4294 | 1143 | 638 | 596 | 80 | 176 | 24 | 29 | 8 | 5 | 0 | | 20640 |
| 1986 | 23 | 2021 | 9006 | 1918 | 1852 | 2147 | 301 | 256 | 165 | 15 | 61 | 12 | 0 | 0 | 0 | | 17777 |
| 1987 | 0 | 10379 | 2367 | 3787 | 641 | 496 | 577 | 154 | 81 | 41 | 6 | 4 | 0 | 0 | 0 | | 18533 |
| 1988 | 0 | 574 | 14450 | 3337 | 4418 | 672 | 447 | 525 | 91 | 60 | 29 | 5 | 1 | 0 | 1 | | 24609 |
| 1989 | 0 | 2151 | 4624 | 10375 | 906 | 1709 | 209 | 133 | 169 | 24 | 8 | 1 | 0 | 0 | 0 | | 20310 |
| 1990 | 0 | 2573 | 9722 | 3301 | 5338 | 564 | 591 | 51 | 28 | 37 | 0 | 3 | 0 | 0 | 0 | | 22208 |
| 1991 | 53 | 2080 | 3437 | 6090 | 3186 | 2638 | 377 | 199 | 54 | 20 | 3 | 8 | 0 | 0 | 3 | | 18148 |
| 1992 | 13 | 6451 | 4502 | 1618 | 3361 | 1084 | 977 | 66 | 65 | 5 | 9 | 0 | 0 | 0 | 0 | | 18150 |
| 1993 | 3 | 1812 | 7087 | 2825 | 1055 | 1107 | 349 | 232 | 58 | 20 | 4 | 0 | 0 | 0 | 0 | | 14553 |
| 1994 | 0 | 224 | 1184 | 1411 | 396 | 61 | 100 | 46 | 32 | 3 | 3 | 0 | 1 | 0 | 0 | | 3461 |
| 1995 | 0 | 140 | 663 | 288 | 461 | 60 | 20 | 14 | 15 | 1 | 1 | 0 | 0 | 0 | 0 | | 1664 |
| 1996 | 0 | 99 | 567 | 1056 | 219 | 211 | 24 | 10 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | | 2201 |
| 1997 | 0 | 100 | 220 | 348 | 687 | 141 | 82 | 26 | 5 | 3 | 3 | 0 | 0 | 0 | 0 | | 1615 |
| 1998 | 0 | 100 | 424 | 364 | 441 | 433 | 55 | 34 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | | 1864 |
| 1999 | 0 | 175 | 1428 | 1222 | 497 | 275 | 278 | 60 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | | 3948 |
| 2000 | 0 | 165 | 410 | 1307 | 516 | 129 | 78 | 40 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2652 |
| 2001 | 0 | 80 | 2270 | 915 | 1730 | 398 | 123 | 76 | 34 | 4 | 1 | 1 | 0 | 0 | 0 | | 5633 |
| 2002 | 0 | 29 | 793 | 2740 | 615 | 735 | 146 | 37 | 32 | 11 | 3 | 2 | 0 | 0 | 0 | | 5143 |
| 2003 | 0 | 14 | 574 | 1379 | 2368 | 485 | 456 | 90 | 18 | 5 | 1 | 0 | 0 | 0 | 0 | | 5390 |
| 2004 | 0 | 18 | 339 | 700 | 815 | 579 | 166 | 101 | 23 | 3 | 2 | 0 | 0 | 0 | 0 | | 2746 |
| 2005 | 0 | 0 | 13 | 152 | 130 | 52 | 104 | 14 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | | 475 |
| 2006 | 0 | 0 | 58 | 59 | 170 | 78 | 24 | 15 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | | 409 |
| 2007 | 0 | 3 | 29 | 509 | 28 | 133 | 5 | 6 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | | 718 |

Appendix A. Table A1b continued. USA Eastern GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
| | | | | | USA Eastern Georges Bank Commercial Landings in Weight (Tons) at Age | | | | | | | | | | | | |
| 1978 | 0 | 48 | 2484 | 1250 | 718 | 452 | 360 | 72 | 82 | 22 | 11 | 3 | 0 | 1 | 3 | | 5502 |
| 1979 | 2 | 454 | 301 | 2342 | 1282 | 877 | 554 | 450 | 86 | 26 | 11 | 9 | 0 | 7 | 0 | | 6408 |
| 1980 | 0 | 324 | 1168 | 311 | 2399 | 1375 | 490 | 122 | 188 | 43 | 10 | 0 | 0 | 0 | 0 | | 6418 |
| 1981 | 10 | 731 | 1833 | 2032 | 392 | 1243 | 699 | 497 | 398 | 165 | 38 | 20 | 0 | 0 | 0 | | 8092 |
| 1982 | 0 | 1591 | 1095 | 1251 | 1948 | 283 | 1396 | 488 | 231 | 91 | 73 | 61 | 47 | 11 | 0 | | 8565 |
| 1983 | 5 | 586 | 2502 | 1344 | 1194 | 1086 | 202 | 563 | 375 | 182 | 260 | 163 | 31 | 70 | 17 | | 8572 |
| 1984 | 9 | 332 | 1509 | 3159 | 1324 | 1338 | 1537 | 186 | 618 | 282 | 128 | 68 | 39 | 20 | 0 | 7 | 10550 |
| 1985 | 1 | 888 | 783 | 782 | 1968 | 678 | 516 | 591 | 89 | 223 | 38 | 44 | 16 | 8 | 0 | | 6641 |
| 1986 | 2 | 231 | 1859 | 516 | 841 | 1425 | 249 | 242 | 213 | 23 | 72 | 21 | 0 | 0 | 0 | | 5696 |
| 1987 | 0 | 1415 | 520 | 1405 | 324 | 358 | 484 | 141 | 85 | 43 | 8 | 7 | 0 | 0 | 0 | | 4793 |
| 1988 | 0 | 75 | 3105 | 931 | 2148 | 396 | 332 | 461 | 89 | 71 | 33 | 10 | 2 | 0 | 2 | | 7645 |
| 1989 | 0 | 345 | 898 | 3120 | 398 | 950 | 133 | 125 | 166 | 25 | 10 | 2 | 0 | 0 | 0 | | 6182 |
| 1990 | 0 | 359 | 1886 | 945 | 2310 | 334 | 462 | 45 | 29 | 41 | 1 | 3 | 0 | 0 | 0 | | 6414 |
| 1991 | 7 | 329 | 790 | 1841 | 1399 | 1454 | 283 | 174 | 43 | 20 | 4 | 8 | 0 | 0 | 3 | | 6353 |
| 1992 | 1 | 936 | 973 | 498 | 1343 | 571 | 625 | 53 | 63 | 7 | 12 | 0 | 0 | 0 | 0 | | 5080 |
| 1993 | 0 | 263 | 1441 | 778 | 458 | 571 | 246 | 175 | 58 | 22 | 10 | 0 | 0 | 0 | 0 | | 4019 |
| 1994 | 0 | 31 | 223 | 411 | 149 | 37 | 68 | 39 | 30 | 3 | 5 | 0 | 3 | 0 | 0 | | 997 |
| 1995 | 0 | 18 | 121 | 94 | 215 | 39 | 21 | 14 | 16 | 1 | 1 | 0 | 0 | 0 | 0 | | 540 |
| 1996 | 0 | 14 | 115 | 300 | 91 | 118 | 15 | 9 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | | 674 |
| 1997 | 0 | 13 | 36 | 87 | 259 | 70 | 51 | 19 | 6 | 3 | 3 | 0 | 0 | 0 | 0 | | 549 |
| 1998 | 0 | 14 | 80 | 113 | 178 | 222 | 36 | 25 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | | 678 |
| 1999 | 0 | 23 | 249 | 362 | 203 | 141 | 162 | 40 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | | 1193 |
| 2000 | 0 | 22 | 78 | 354 | 194 | 57 | 41 | 23 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 771 |
| 2001 | 0 | 10 | 391 | 220 | 527 | 181 | 65 | 50 | 28 | 3 | 1 | 1 | 0 | 0 | 0 | | 1479 |
| 2002 | 0 | 4 | 148 | 749 | 235 | 346 | 89 | 31 | 24 | 11 | 5 | 2 | 0 | 0 | 0 | | 1641 |
| 2003 | 0 | 2 | 121 | 373 | 811 | 207 | 243 | 60 | 13 | 4 | 1 | 0 | 0 | 0 | 0 | | 1838 |
| 2004 | 0 | 3 | 67 | 198 | 291 | 271 | 83 | 73 | 18 | 2 | 2 | 0 | 0 | 0 | 0 | | 1007 |
| 2005 | 0 | 0 | 2 | 43 | 44 | 21 | 48 | 9 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | | 174 |
| 2006 | 0 | 0 | 13 | 16 | 57 | 26 | 12 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | | 134 |
| 2007 | 0 | 1 | 5 | 141 | 9 | 50 | 3 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | | 216 |

Appendix A. Table A1b continued. USA Eastern GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Average |
| | | | | | | USA Eastern Georges Bank Commercial Landings Mean Weight (kg) at Age | | | | | | | | | | | |
| 1978 | 0.582 | 1.307 | 1.935 | 2.812 | 4.099 | 5.239 | 5.255 | 7.086 | 6.723 | 9.172 | 15.742 | 15.59 | 0 | 11.95 | 16.63 | | 2.595 |
| 1979 | 1.025 | 1.406 | 1.496 | 3.286 | 4.71 | 7.083 | 9.537 | 9.377 | 9.874 | 13.923 | 11.951 | 16.28 | 0 | 20.11 | 0 | | 3.654 |
| 1980 | 0 | 1.25 | 2.076 | 3.102 | 5.171 | 6.314 | 7.466 | 10.394 | 9.379 | 12.696 | 14.159 | 0 | 0 | 0 | 0 | | 3.763 |
| 1981 | 1.013 | 1.276 | 1.909 | 2.938 | 4.166 | 6.418 | 8.052 | 9.333 | 12.944 | 14.483 | 19.369 | 20.85 | 0 | 0 | 0 | | 2.988 |
| 1982 | 0 | 1.221 | 2.143 | 3.432 | 4.928 | 6.808 | 8.504 | 9.686 | 12.057 | 14.48 | 15.121 | 19.32 | 18.76 | 24.36 | 0 | | 2.989 |
| 1983 | 1.015 | 1.605 | 2.344 | 3.109 | 4.406 | 6.08 | 7.243 | 10.243 | 11.531 | 13.35 | 16.085 | 16.25 | 22.4 | 20.22 | 27.52 | | 3.457 |
| 1984 | 1.217 | 1.628 | 2.265 | 3.272 | 4.604 | 6.118 | 8.399 | 9.074 | 11.406 | 12.172 | 12.865 | 16.45 | 18.57 | 22.23 | 0 | 20.85 | 3.984 |
| 1985 | 0.9 | 1.331 | 1.771 | 3.075 | 4.585 | 5.935 | 8.087 | 9.923 | 11.199 | 12.656 | 15.774 | 15.3 | 20.85 | 17.96 | 0 | | 3.218 |
| 1986 | 0.877 | 1.146 | 2.064 | 2.689 | 4.542 | 6.636 | 8.277 | 9.448 | 12.903 | 15.224 | 11.914 | 17.28 | 0 | 0 | 0 | | 3.204 |
| 1987 | 0 | 1.364 | 2.196 | 3.71 | 5.047 | 7.221 | 8.389 | 9.131 | 10.535 | 10.628 | 12.888 | 17.3 | 0 | 0 | 0 | | 2.586 |
| 1988 | 0 | 1.315 | 2.149 | 2.791 | 4.861 | 5.888 | 7.422 | 8.79 | 9.783 | 11.822 | 11.209 | 18.78 | 20.11 | 0 | 14.16 | | 3.107 |
| 1989 | 0 | 1.606 | 1.943 | 3.007 | 4.396 | 5.556 | 6.358 | 9.434 | 9.845 | 10.329 | 11.891 | 13.75 | 0 | 0 | 0 | | 3.044 |
| 1990 | 0 | 1.396 | 1.94 | 2.863 | 4.327 | 5.914 | 7.821 | 8.956 | 10.205 | 11.078 | 13.024 | 11.24 | 0 | 0 | 0 | | 2.888 |
| 1991 | 1.29 | 1.583 | 2.298 | 3.024 | 4.39 | 5.509 | 7.521 | 8.702 | 7.928 | 10.382 | 12.344 | 9.503 | 0 | 0 | 11.23 | | 3.5 |
| 1992 | 1.016 | 1.451 | 2.162 | 3.077 | 3.995 | 5.265 | 6.396 | 8.094 | 9.742 | 13.175 | 13.74 | 0 | 0 | 0 | 0 | | 2.799 |
| 1993 | 0.866 | 1.45 | 2.034 | 2.755 | 4.338 | 5.156 | 7.042 | 7.558 | 10.156 | 10.633 | 22.191 | 0 | 0 | 0 | 0 | | 2.762 |
| 1994 | 0 | 1.382 | 1.88 | 2.909 | 3.754 | 6.037 | 6.832 | 8.623 | 9.188 | 13.136 | 14.95 | 0 | 22.19 | 0 | 0 | | 2.881 |
| 1995 | 0 | 1.306 | 1.831 | 3.242 | 4.657 | 6.409 | 10.4 | 10.069 | 10.57 | 16.626 | 20.698 | 0 | 0 | 0 | 0 | | 3.248 |
| 1996 | 0.902 | 1.377 | 2.023 | 2.839 | 4.137 | 5.576 | 6.078 | 8.978 | 10.182 | 9.283 | 12.702 | 0 | 0 | 0 | 0 | | 3.062 |
| 1997 | 0 | 1.34 | 1.656 | 2.488 | 3.776 | 4.983 | 6.261 | 7.34 | 10.579 | 9.804 | 12.635 | 16.63 | 0 | 0 | 0 | | 3.398 |
| 1998 | 0 | 1.35 | 1.894 | 3.105 | 4.026 | 5.113 | 6.529 | 7.33 | 9.97 | 10.299 | 11.095 | 10.16 | 0 | 0 | 0 | | 3.637 |
| 1999 | 0 | 1.323 | 1.743 | 2.966 | 4.079 | 5.139 | 5.826 | 6.778 | 7.499 | 10.671 | 0 | 0 | 0 | 0 | 0 | | 3.023 |
| 2000 | 0 | 1.329 | 1.894 | 2.708 | 3.768 | 4.42 | 5.273 | 5.681 | 6.378 | 0 | 7.682 | 0 | 0 | 0 | 0 | 0 | 2.908 |
| 2001 | 0 | 1.252 | 1.721 | 2.402 | 3.046 | 4.552 | 5.248 | 6.479 | 8.218 | 9.063 | 7.824 | 9.283 | 0 | 0 | 0 | | 2.625 |
| 2002 | 0 | 1.349 | 1.863 | 2.732 | 3.816 | 4.711 | 6.079 | 8.387 | 7.426 | 10.332 | 13.567 | 11.94 | 0 | 0 | 0 | | 3.19 |
| 2003 | 0 | 1.591 | 2.108 | 2.704 | 3.427 | 4.263 | 5.34 | 6.671 | 7.55 | 8.41 | 11.08 | 0 | 0 | 0 | 0 | | 3.41 |
| 2004 | 0 | 1.801 | 1.986 | 2.821 | 3.576 | 4.671 | 5.003 | 7.195 | 7.641 | 7.686 | 9.057 | 11.1 | 0 | 0 | 0 | | 3.665 |
| 2005 | 0 | 1.327 | 1.781 | 2.807 | 3.412 | 4.024 | 4.648 | 6.229 | 5.981 | 6.681 | 0 | 0 | 8.457 | 0 | 0 | | 3.661 |
| 2006 | 0 | 0 | 2.298 | 2.667 | 3.35 | 3.31 | 5.172 | 5.069 | 5.029 | 6.277 | 9.283 | 5.911 | 0 | 0 | 0 | | 3.275 |
| 2007 | 0 | 1.48 | 1.744 | 2.765 | 3.259 | 3.773 | 6.481 | 6.189 | 6.067 | 7.865 | 8.457 | 0 | 0 | 0 | 0 | | 3.011 |

Appendix A. Table A1b continued. USA Eastern GB commercial landings at age (thousands of fish; metric tons) and mean weight (kg) and mean length (cm) at age of of Atlantic cod, 1978-2007.

| | Age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Average |
| | | USA Eastern Georges Bank Commercial Landings Mean Length (cm) at Age | | | | | | | | | | | | | | | |
| 1978 | 39.0 | 50.4 | 57.4 | 64.1 | 72.7 | 78.6 | 78.8 | 87.7 | 85.6 | 94.0 | 114.8 | 114.3 | 0.0 | 105.0 | 117.0 | | 61.8 |
| 1979 | 46.9 | 51.7 | 52.6 | 67.9 | 76.3 | 87.2 | 97.2 | 96.5 | 98.5 | 110.3 | 105.0 | 116.1 | 0.0 | 124.5 | 0.0 | | 67.8 |
| 1980 | 0.0 | 49.8 | 58.4 | 66.5 | 78.9 | 84.5 | 89.0 | 99.5 | 96.3 | 107.0 | 111.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 68.5 |
| 1981 | 46.7 | 49.6 | 56.5 | 65.5 | 73.6 | 85.1 | 91.6 | 96.2 | 106.8 | 110.8 | 123.0 | 126.0 | 0.0 | 0.0 | 0.0 | | 62.7 |
| 1982 | 0.0 | 49.5 | 58.8 | 68.8 | 77.7 | 86.8 | 93.3 | 97.2 | 104.6 | 111.4 | 113.0 | 122.5 | 120.9 | 132.0 | 0.0 | | 62.1 |
| 1983 | 46.7 | 54.0 | 60.8 | 66.7 | 74.6 | 83.2 | 88.1 | 98.7 | 103.1 | 108.3 | 115.6 | 115.4 | 129.0 | 124.6 | 138.0 | | 66.6 |
| 1984 | 49.6 | 54.2 | 60.3 | 67.8 | 75.9 | 83.5 | 92.8 | 95.4 | 102.7 | 104.9 | 105.8 | 115.5 | 120.7 | 127.9 | 0.0 | 126.0 | 70.3 |
| 1985 | 45.0 | 50.9 | 55.7 | 66.6 | 75.8 | 82.7 | 91.5 | 97.9 | 102.0 | 106.1 | 114.5 | 113.7 | 126.0 | 120.0 | 0.0 | | 64.3 |
| 1986 | 44.5 | 48.3 | 58.3 | 62.4 | 74.6 | 85.8 | 92.2 | 96.3 | 106.9 | 113.3 | 104.2 | 118.0 | 0.0 | 0.0 | 0.0 | | 64.4 |
| 1987 | 0.0 | 51.2 | 59.4 | 70.5 | 78.6 | 88.6 | 93.0 | 95.6 | 99.8 | 100.2 | 106.7 | 118.5 | 0.0 | 0.0 | 0.0 | | 60.2 |
| 1988 | 0.0 | 50.7 | 59.2 | 63.8 | 77.2 | 82.2 | 89.2 | 94.3 | 97.8 | 103.8 | 101.0 | 121.3 | 124.5 | 0.0 | 111.0 | | 65.1 |
| 1989 | 0.0 | 54.1 | 57.5 | 66.0 | 74.2 | 79.9 | 82.8 | 96.8 | 98.3 | 99.8 | 104.8 | 109.9 | 0.0 | 0.0 | 0.0 | | 65.0 |
| 1990 | 0.0 | 51.6 | 57.2 | 64.8 | 73.9 | 81.8 | 90.0 | 95.1 | 99.4 | 102.3 | 108.0 | 102.9 | 0.0 | 0.0 | 0.0 | | 63.4 |
| 1991 | 50.5 | 53.9 | 60.6 | 65.7 | 74.3 | 79.8 | 89.4 | 93.4 | 90.5 | 99.9 | 105.8 | 97.0 | 0.0 | 0.0 | 102.7 | | 67.8 |
| 1992 | 46.8 | 52.7 | 60.0 | 67.2 | 73.1 | 80.6 | 85.8 | 92.9 | 99.9 | 111.0 | 112.5 | 0.0 | 0.0 | 0.0 | 0.0 | | 63.4 |
| 1993 | 45.0 | 52.8 | 58.9 | 64.9 | 75.2 | 79.8 | 89.3 | 90.9 | 99.7 | 102.5 | 132.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 63.6 |
| 1994 | 0.0 | 51.5 | 57.5 | 65.7 | 71.1 | 83.6 | 87.9 | 94.6 | 96.4 | 110.4 | 115.1 | 0.0 | 132.0 | 0.0 | 0.0 | | 64.3 |
| 1995 | 0.0 | 51.3 | 57.1 | 68.7 | 78.1 | 86.9 | 102.3 | 101.2 | 102.2 | 120.0 | 129.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.9 |
| 1996 | 45.0 | 51.9 | 58.7 | 65.8 | 74.5 | 83.0 | 84.3 | 96.7 | 100.9 | 99.0 | 105.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.4 |
| 1997 | 0.0 | 51.7 | 55.5 | 63.0 | 72.7 | 79.7 | 86.2 | 90.7 | 102.9 | 99.5 | 109.2 | 120.0 | 0.0 | 0.0 | 0.0 | | 68.8 |
| 1998 | 0.0 | 52.1 | 57.8 | 67.9 | 74.2 | 80.6 | 87.1 | 90.7 | 100.4 | 102.3 | 105.0 | 102.0 | 0.0 | 0.0 | 0.0 | | 70.4 |
| 1999 | 0.0 | 51.9 | 56.4 | 67.0 | 74.2 | 80.4 | 84.3 | 88.8 | 91.9 | 103.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 66.0 |
| 2000 | 0.0 | 52.0 | 57.9 | 64.9 | 72.5 | 76.5 | 81.5 | 83.5 | 87.4 | 0.0 | 93.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 65.9 |
| 2001 | 0.0 | 50.2 | 56.1 | 62.3 | 67.2 | 76.8 | 80.1 | 87.1 | 94.5 | 97.9 | 92.4 | 99.0 | 0.0 | 0.0 | 0.0 | | 63.1 |
| 2002 | 0.0 | 52.1 | 57.6 | 65.0 | 72.5 | 77.8 | 84.7 | 94.6 | 90.9 | 101.4 | 111.9 | 107.1 | 0.0 | 0.0 | 0.0 | | 67.6 |
| 2003 | 0.0 | 54.6 | 60.2 | 65.4 | 70.5 | 75.5 | 81.3 | 87.5 | 90.9 | 94.6 | 104.8 | 0.0 | 0.0 | 0.0 | 0.0 | | 69.8 |
| 2004 | 0.0 | 57.4 | 59.1 | 66.2 | 71.4 | 78.0 | 79.8 | 90.3 | 91.8 | 92.6 | 97.7 | 105.0 | 0.0 | 0.0 | 0.0 | | 71.3 |
| 2005 | 0.0 | 52.1 | 57.3 | 66.3 | 70.5 | 74.1 | 77.9 | 85.2 | 83.1 | 88.3 | 0.0 | 0.0 | 96.0 | 0.0 | 0.0 | | 71.5 |
| 2006 | 0.0 | 0.0 | 62.1 | 65.1 | 69.9 | 69.6 | 81.1 | 79.6 | 79.8 | 87.0 | 99.0 | 85.3 | 0.0 | 0.0 | 0.0 | | 69.2 |
| 2007 | 0.0 | 54.0 | 57.0 | 65.9 | 68.6 | 72.6 | 87.6 | 85.8 | 85.1 | 93.3 | 96.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 67.3 |

**Appendix A. Table A2. BASE MODEL VPA output and diagnostics for GB cod**.

```
 VPA Version 2.7.1

 Model ID: Georges Bank   Cod - spr 2008 Assessment TY 2007


 Input File:
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CORR_DFO2004_AU
G1
 Date of Run: 01-AUG-2008                          Time of Run: 11:40


 Levenburg-Marquardt Algorithm Completed     7 Iterations
 Residual Sum of Squares =     383.740

 Number of Residuals     =    595
 Number of Parameters    =      8
 Degrees of Freedom      =    587
 Mean Squared Residual   =     0.653730
 Standard Deviation      =     0.808536


 Number of Years =    30
 Number of Ages  =    10
 First Year      =  1978
 Youngest Age    =     1
 Oldest True Age =     9

 Number of Survey Indices Available        =    30
 Number of Survey Indices Used in Estimate =    30


 VPA Classic Method - Auto Estimated Q's


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

   1           5158.350   0.246246E+04   0.477374E+00
   2           5777.533   0.195206E+04   0.337870E+00
   3           4312.780   0.134212E+04   0.311197E+00
   4           1201.636   0.348563E+03   0.290074E+00
   5           4150.462   0.112909E+04   0.272039E+00
   6            348.414   0.977986E+02   0.280697E+00
   7            566.199   0.170298E+03   0.300775E+00
   8            218.540   0.684464E+02   0.313198E+00

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

   1       0.219439E-01   0.434391E-02   0.197955E+00
   2       0.919973E-01   0.727614E-02   0.790908E-01
   3       0.186189E+00   0.193080E-01   0.103701E+00
   4       0.316089E+00   0.450858E-01   0.142637E+00
```

```
  5       0.402164E+00   0.624872E-01   0.155377E+00
  6       0.408966E+00   0.614000E-01   0.150135E+00
  7       0.427224E+00   0.771050E-01   0.180479E+00
  8       0.517786E+00   0.835569E-01   0.161374E+00
  9       0.141338E-01   0.106855E-01   0.756029E+00
 10       0.899870E-01   0.208708E-01   0.231931E+00
 11       0.198731E+00   0.467107E-01   0.235044E+00
 12       0.177261E+00   0.223604E-01   0.126144E+00
 13       0.216299E+00   0.540535E-01   0.249901E+00
 14       0.207689E+00   0.355707E-01   0.171269E+00
 15       0.300243E+00   0.112587E+00   0.374986E+00
 16       0.291472E+00   0.165071E+00   0.566335E+00
 17       0.209249E-01   0.562393E-02   0.268767E+00
 18       0.981470E-01   0.209510E-01   0.213466E+00
 19       0.327191E+00   0.335557E-01   0.102557E+00
 20       0.615292E+00   0.779107E-01   0.126624E+00
 21       0.949463E+00   0.112662E+00   0.118658E+00
 22       0.112928E+01   0.189453E+00   0.167763E+00
 23       0.121718E+01   0.235660E+00   0.193612E+00
 24       0.128152E+01   0.264935E+00   0.206735E+00
 25       0.172164E-01   0.366082E-02   0.212636E+00
 26       0.746671E-01   0.874968E-02   0.117182E+00
 27       0.131211E+00   0.152631E-01   0.116325E+00
 28       0.158575E+00   0.229384E-01   0.144654E+00
 29       0.122922E+00   0.223467E-01   0.181795E+00
 30       0.143092E+00   0.233551E-01   0.163218E+00


-- Non-Linear Least Squares Fit --

Default Tolerances Used

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


VPA Method Options

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

- Heincke Rule Used in F-Oldest Calculation
- F-Oldest Calculation in Years Prior to Terminal Year
  Uses Stock Sizes in Ages  5 to  8
- Calculation of Population of Age 1 In Year 2008
  =  Stock Estimate

Stock Estimates

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

Full F in Terminal Year = 0.1407

F in Oldest True Age in Terminal Year = 0.1407

Full F Calculated Using Classic Method

| Age | Input Partial Recruitment | Calc Partial Recruitment | Fishing Mortality | Used In Full F | Comments |
|---|---|---|---|---|---|
| 1 | 0.010 | 0.006 | 0.0017 | NO | Stock Estimate in T+1 |
| 2 | 0.110 | 0.403 | 0.1044 | NO | Stock Estimate in T+1 |
| 3 | 0.390 | 1.000 | 0.2591 | NO | Stock Estimate in T+1 |
| 4 | 0.730 | 0.876 | 0.2271 | NO | Stock Estimate in T+1 |
| 5 | 1.000 | 0.658 | 0.1705 | YES | Stock Estimate in T+1 |
| 6 | 1.000 | 0.721 | 0.1869 | YES | Stock Estimate in T+1 |
| 7 | 1.000 | 0.250 | 0.0647 | YES | Stock Estimate in T+1 |
| 8 | 1.000 | 0.543 | 0.1407 | NO | Input PR * Full F |
| 9 | 1.000 | 0.543 | 0.1407 | | Input PR * Full F |

Catch At Age - Input Data

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 151.6 | 279.2 | 339.9 | 1219.2 | 775.4 |
| 2 | 416.8 | 2242.7 | 4238.7 | 3910.7 | 10457.1 |
| 3 | 8109.1 | 953.6 | 5955.4 | 4738.2 | 4434.4 |
| 4 | 2429.6 | 4585.0 | 544.9 | 2685.5 | 2988.0 |
| 5 | 896.8 | 1206.9 | 2464.6 | 317.9 | 2039.8 |
| 6 | 178.4 | 449.8 | 983.0 | 1406.0 | 297.1 |
| 7 | 240.8 | 159.5 | 418.1 | 417.0 | 707.2 |
| 8 | 22.6 | 304.1 | 70.4 | 162.9 | 198.6 |
| 9 | 42.1 | 12.9 | 138.7 | 155.5 | 74.6 |
| 10 | 10.7 | 35.0 | 14.2 | 66.4 | 84.6 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 626.2 | 280.9 | 176.0 | 768.3 | 103.8 |
| 2 | 5181.7 | 1547.7 | 7443.7 | 1594.1 | 7956.1 |
| 3 | 8753.3 | 3485.7 | 2942.2 | 4576.3 | 1515.5 |
| 4 | 2680.4 | 3328.4 | 1690.1 | 860.2 | 2170.1 |
| 5 | 1155.3 | 923.9 | 2097.7 | 525.3 | 299.7 |
| 6 | 746.4 | 560.2 | 496.5 | 615.4 | 249.9 |
| 7 | 94.6 | 450.3 | 267.2 | 85.5 | 277.3 |
| 8 | 175.0 | 58.9 | 196.8 | 70.4 | 56.1 |
| 9 | 67.7 | 167.0 | 27.7 | 56.0 | 36.2 |
| 10 | 112.6 | 124.9 | 89.7 | 27.8 | 26.0 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 324.9 | 891.5 | 71.8 | 278.7 | 191.7 |
| 2 | 2352.1 | 2608.6 | 5561.1 | 1963.0 | 4808.4 |
| 3 | 8368.3 | 3032.8 | 5373.4 | 3491.4 | 2286.3 |
| 4 | 1074.1 | 4254.4 | 1964.0 | 3160.5 | 1070.7 |
| 5 | 1575.6 | 383.5 | 2272.1 | 1442.1 | 1500.0 |
| 6 | 223.8 | 534.2 | 230.6 | 1088.0 | 448.1 |
| 7 | 150.3 | 81.4 | 229.4 | 141.3 | 356.0 |
| 8 | 218.0 | 51.2 | 24.6 | 89.7 | 44.1 |
| 9 | 46.5 | 60.2 | 23.2 | 27.5 | 36.4 |
| 10 | 52.5 | 21.3 | 40.4 | 26.0 | 10.4 |

Catch At Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 299.2 | 94.4 | 32.3 | 64.9 | 126.9 |
| 2 | 1534.9 | 614.6 | 652.8 | 287.3 | 685.2 |
| 3 | 4429.4 | 1543.4 | 1429.0 | 986.6 | 749.6 |
| 4 | 1224.8 | 1987.7 | 669.9 | 1269.8 | 1020.7 |
| 5 | 475.3 | 425.6 | 382.3 | 256.3 | 882.9 |
| 6 | 535.6 | 97.6 | 41.2 | 183.8 | 147.7 |
| 7 | 178.0 | 146.2 | 21.4 | 17.9 | 94.4 |
| 8 | 141.0 | 51.2 | 20.0 | 11.6 | 18.9 |
| 9 | 43.1 | 30.5 | 6.4 | 11.3 | 10.1 |
| 10 | 21.2 | 5.6 | 1.4 | 0.3 | 3.9 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 63.3 | 47.7 | 113.5 | 11.7 | 33.6 |
| 2 | 918.9 | 356.3 | 943.2 | 719.8 | 113.0 |
| 3 | 1310.3 | 2021.8 | 741.1 | 2667.3 | 1182.7 |
| 4 | 494.3 | 852.6 | 1156.4 | 751.6 | 1516.2 |
| 5 | 385.6 | 286.6 | 315.8 | 698.7 | 365.4 |
| 6 | 285.2 | 125.8 | 88.0 | 180.4 | 371.5 |
| 7 | 40.2 | 143.8 | 46.3 | 54.8 | 84.7 |
| 8 | 16.0 | 22.2 | 38.8 | 25.8 | 18.7 |
| 9 | 5.6 | 5.0 | 4.2 | 14.8 | 10.6 |
| 10 | 2.9 | 3.4 | 1.0 | 1.3 | 6.5 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 17.0 | 50.5 | 12.3 | 32.8 | 10.6 |
| 2 | 201.3 | 69.4 | 364.1 | 69.7 | 526.1 |
| 3 | 404.4 | 434.3 | 201.8 | 842.8 | 395.2 |
| 4 | 800.7 | 260.1 | 578.4 | 208.3 | 1175.8 |
| 5 | 910.4 | 313.6 | 144.5 | 366.1 | 71.9 |
| 6 | 156.0 | 253.0 | 106.0 | 70.8 | 129.2 |
| 7 | 142.4 | 58.2 | 85.3 | 31.2 | 16.2 |
| 8 | 28.2 | 49.2 | 18.0 | 28.5 | 10.4 |
| 9 | 6.5 | 11.8 | 8.9 | 3.8 | 8.6 |
| 10 | 2.9 | 5.0 | 3.7 | 3.4 | 1.1 |

Weight At Age - Input Data

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

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

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.4918 | 0.4347 | 0.5311 | 0.6581 | 0.8296 |
| 2 | 1.3794 | 1.4362 | 1.4893 | 1.5196 | 1.4349 |
| 3 | 2.3728 | 2.2041 | 2.4630 | 2.4992 | 2.4077 |
| 4 | 3.5065 | 3.7324 | 3.5732 | 3.5198 | 3.7982 |
| 5 | 5.4118 | 5.1806 | 4.9668 | 4.8089 | 4.5200 |
| 6 | 6.7808 | 6.5629 | 6.4025 | 5.8249 | 6.0428 |
| 7 | 8.7219 | 7.9373 | 8.4042 | 7.3177 | 7.0854 |
| 8 | 10.4333 | 9.9761 | 11.1911 | 9.3877 | 9.4720 |
| 9 | 11.5348 | 11.2867 | 12.4247 | 9.6151 | 11.8412 |
| 10 | 14.9262 | 14.6514 | 14.5119 | 14.6490 | 18.8362 |

Weight At Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.2837 | 0.4771 | 0.3963 | 0.4867 | 0.5385 |
| 2 | 1.3063 | 1.1976 | 1.3467 | 1.4419 | 1.4631 |
| 3 | 2.2082 | 2.1531 | 1.9769 | 2.3910 | 2.3278 |
| 4 | 3.2271 | 3.5435 | 3.7206 | 3.2180 | 3.4446 |
| 5 | 4.9843 | 4.7869 | 5.2487 | 4.8754 | 4.0326 |
| 6 | 5.8198 | 7.0741 | 7.4302 | 6.4963 | 5.7339 |
| 7 | 7.3782 | 7.1760 | 9.3273 | 8.1007 | 7.7343 |
| 8 | 8.9218 | 9.1163 | 12.1972 | 9.6991 | 8.0901 |
| 9 | 11.1348 | 9.0029 | 11.8414 | 10.9742 | 11.4196 |
| 10 | 12.2279 | 15.7618 | 19.1176 | 8.6207 | 12.0867 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.6185 | 0.5340 | 0.3879 | 0.6008 | 0.4900 |
| 2 | 1.4324 | 1.4313 | 1.5286 | 1.3651 | 1.3165 |
| 3 | 2.2614 | 2.1372 | 2.3862 | 2.2118 | 2.1052 |
| 4 | 3.4254 | 3.3549 | 3.3875 | 2.9372 | 2.9569 |
| 5 | 4.5713 | 4.5433 | 4.5495 | 4.1007 | 3.9493 |
| 6 | 5.5756 | 5.8669 | 5.4719 | 5.2650 | 5.1562 |
| 7 | 7.3994 | 6.6406 | 6.9962 | 5.9799 | 6.4745 |
| 8 | 7.7535 | 8.4061 | 8.0125 | 7.6805 | 8.0004 |
| 9 | 11.8255 | 9.5624 | 8.0492 | 9.0431 | 9.2479 |
| 10 | 12.3102 | 13.2010 | 12.5970 | 9.7372 | 11.7081 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.6020 | 0.3318 | 0.4309 | 0.3791 | 0.4225 |
| 2 | 1.4576 | 1.5332 | 1.0351 | 1.0785 | 1.4203 |
| 3 | 2.2536 | 2.3640 | 2.1015 | 2.0931 | 1.9169 |
| 4 | 2.9071 | 3.0802 | 3.0681 | 3.1067 | 2.8988 |
| 5 | 3.8660 | 3.8831 | 4.0035 | 3.6792 | 3.6265 |
| 6 | 4.7097 | 4.8244 | 4.9245 | 4.5349 | 4.1726 |
| 7 | 5.7888 | 5.6511 | 5.4675 | 6.4617 | 5.9316 |
| 8 | 6.9183 | 7.3709 | 7.4969 | 6.3936 | 6.9569 |
| 9 | 8.2509 | 8.5524 | 8.7863 | 7.5189 | 6.9220 |
| 10 | 10.4481 | 11.1003 | 11.3704 | 9.0737 | 9.0701 |

JAN-1 Weights at Age - Input Data

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

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

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.2878 | 0.2349 | 0.3140 | 0.4457 | 0.6611 |
| 2 | 0.8958 | 0.8404 | 0.8046 | 0.8984 | 0.9718 |
| 3 | 1.8666 | 1.7437 | 1.8808 | 1.9293 | 1.9128 |
| 4 | 2.9467 | 2.9759 | 2.8064 | 2.9444 | 3.0810 |
| 5 | 4.7514 | 4.2621 | 4.3056 | 4.1453 | 3.9887 |
| 6 | 6.2538 | 5.9596 | 5.7592 | 5.3788 | 5.3907 |
| 7 | 8.2360 | 7.3363 | 7.4267 | 6.8448 | 6.4243 |
| 8 | 9.6404 | 9.3279 | 9.4248 | 8.8823 | 8.3255 |
| 9 | 10.9190 | 10.8516 | 11.1333 | 10.3732 | 10.5433 |
| 10 | 14.9262 | 14.6514 | 14.5119 | 14.6490 | 18.8362 |

JAN-1 Weights at Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.1381 | 0.2840 | 0.2078 | 0.2807 | 0.3302 |
| 2 | 1.0410 | 0.5829 | 0.8016 | 0.7559 | 0.8439 |
| 3 | 1.7800 | 1.6771 | 1.5387 | 1.7944 | 1.8321 |
| 4 | 2.7875 | 2.7973 | 2.8303 | 2.5222 | 2.8699 |
| 5 | 4.3510 | 3.9304 | 4.3126 | 4.2590 | 3.6023 |
| 6 | 5.1289 | 5.9380 | 5.9639 | 5.8393 | 5.2873 |
| 7 | 6.6772 | 6.4624 | 8.1229 | 7.7582 | 7.0883 |
| 8 | 7.9508 | 8.2013 | 9.3556 | 9.5114 | 8.0954 |
| 9 | 10.2698 | 8.9623 | 10.3899 | 11.5696 | 10.5243 |
| 10 | 12.2279 | 15.7618 | 19.1176 | 8.6207 | 12.0867 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.4066 | 0.3156 | 0.2068 | 0.4059 | 0.2841 |
| 2 | 0.8783 | 0.9409 | 0.9035 | 0.7277 | 0.8894 |
| 3 | 1.8190 | 1.7497 | 1.8481 | 1.8387 | 1.6952 |
| 4 | 2.8238 | 2.7544 | 2.6907 | 2.6474 | 2.5574 |
| 5 | 3.9682 | 3.9449 | 3.9068 | 3.7271 | 3.4059 |
| 6 | 4.7417 | 5.1787 | 4.9860 | 4.8942 | 4.5983 |
| 7 | 6.5136 | 6.0848 | 6.4067 | 5.7203 | 5.8385 |
| 8 | 7.7439 | 7.8867 | 7.2944 | 7.3304 | 6.9168 |
| 9 | 9.7811 | 8.6106 | 8.2257 | 8.5122 | 8.4278 |
| 10 | 12.3102 | 13.2010 | 12.5970 | 9.7372 | 11.7081 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.3772 | 0.1879 | 0.2724 | 0.1959 | 0.2433 |
| 2 | 0.8451 | 0.9607 | 0.5860 | 0.6817 | 0.7338 |
| 3 | 1.7225 | 1.8563 | 1.7950 | 1.4719 | 1.4378 |
| 4 | 2.4739 | 2.6347 | 2.6931 | 2.5551 | 2.4632 |
| 5 | 3.3810 | 3.3598 | 3.5116 | 3.3598 | 3.3566 |
| 6 | 4.3128 | 4.3187 | 4.3729 | 4.2609 | 3.9181 |
| 7 | 5.4634 | 5.1590 | 5.1359 | 5.6410 | 5.1864 |
| 8 | 6.6927 | 6.5321 | 6.5089 | 5.9124 | 6.7047 |
| 9 | 8.1247 | 7.6921 | 8.0475 | 7.5079 | 6.6526 |
| 10 | 10.4481 | 11.1003 | 11.3704 | 9.0737 | 9.0701 |

JAN-1 Weights at Age - Input Data

| AGE | 2008 |
|---|---|
| 1 | 0.2553 |
| 2 | 0.7615 |
| 3 | 1.6567 |
| 4 | 2.5640 |
| 5 | 3.3938 |
| 6 | 4.2367 |
| 7 | 5.3171 |
| 8 | 6.4702 |
| 9 | 7.6050 |
| 10 | 10.2125 |

SSB Weight At Age - Input Data

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

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

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.2878 | 0.2349 | 0.3140 | 0.4457 | 0.6611 |
| 2 | 0.8958 | 0.8404 | 0.8046 | 0.8984 | 0.9718 |
| 3 | 1.8666 | 1.7437 | 1.8808 | 1.9293 | 1.9128 |
| 4 | 2.9467 | 2.9759 | 2.8064 | 2.9444 | 3.0810 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 4.7514 | 4.2621 | 4.3056 | 4.1453 | 3.9887 |
| 6 | 6.2538 | 5.9596 | 5.7592 | 5.3788 | 5.3907 |
| 7 | 8.2360 | 7.3363 | 7.4267 | 6.8448 | 6.4243 |
| 8 | 9.6404 | 9.3279 | 9.4248 | 8.8823 | 8.3255 |
| 9 | 10.9190 | 10.8516 | 11.1333 | 10.3732 | 10.5433 |
| 10 | 14.9262 | 14.6514 | 14.5119 | 14.6490 | 18.8362 |

SSB Weight At Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.1381 | 0.2840 | 0.2078 | 0.2807 | 0.3302 |
| 2 | 1.0410 | 0.5829 | 0.8016 | 0.7559 | 0.8439 |
| 3 | 1.7800 | 1.6771 | 1.5387 | 1.7944 | 1.8321 |
| 4 | 2.7875 | 2.7973 | 2.8303 | 2.5222 | 2.8699 |
| 5 | 4.3510 | 3.9304 | 4.3126 | 4.2590 | 3.6023 |
| 6 | 5.1289 | 5.9380 | 5.9639 | 5.8393 | 5.2873 |
| 7 | 6.6772 | 6.4624 | 8.1229 | 7.7582 | 7.0883 |
| 8 | 7.9508 | 8.2013 | 9.3556 | 9.5114 | 8.0954 |
| 9 | 10.2698 | 8.9623 | 10.3899 | 11.5696 | 10.5243 |
| 10 | 12.2279 | 15.7618 | 19.1176 | 8.6207 | 12.0867 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.4066 | 0.3156 | 0.2068 | 0.4059 | 0.2841 |
| 2 | 0.8783 | 0.9409 | 0.9035 | 0.7277 | 0.8894 |
| 3 | 1.8190 | 1.7497 | 1.8481 | 1.8387 | 1.6952 |
| 4 | 2.8238 | 2.7544 | 2.6907 | 2.6474 | 2.5574 |
| 5 | 3.9682 | 3.9449 | 3.9068 | 3.7271 | 3.4059 |
| 6 | 4.7417 | 5.1787 | 4.9860 | 4.8942 | 4.5983 |
| 7 | 6.5136 | 6.0848 | 6.4067 | 5.7203 | 5.8385 |
| 8 | 7.7439 | 7.8867 | 7.2944 | 7.3304 | 6.9168 |
| 9 | 9.7811 | 8.6106 | 8.2257 | 8.5122 | 8.4278 |
| 10 | 12.3102 | 13.2010 | 12.5970 | 9.7372 | 11.7081 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.3772 | 0.1879 | 0.2724 | 0.1959 | 0.2433 |
| 2 | 0.8451 | 0.9607 | 0.5860 | 0.6817 | 0.7338 |
| 3 | 1.7225 | 1.8563 | 1.7950 | 1.4719 | 1.4378 |
| 4 | 2.4739 | 2.6347 | 2.6931 | 2.5551 | 2.4632 |
| 5 | 3.3810 | 3.3598 | 3.5116 | 3.3598 | 3.3566 |
| 6 | 4.3128 | 4.3187 | 4.3729 | 4.2609 | 3.9181 |
| 7 | 5.4634 | 5.1590 | 5.1359 | 5.6410 | 5.1864 |
| 8 | 6.6927 | 6.5321 | 6.5089 | 5.9124 | 6.7047 |
| 9 | 8.1247 | 7.6921 | 8.0475 | 7.5079 | 6.6526 |
| 10 | 10.4481 | 11.1003 | 11.3704 | 9.0737 | 9.0701 |

Natural Mortality - Input Data

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

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

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

Natural Mortality - Input Data

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

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

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 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 |

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

Maturity - Input Data

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 0.0800 | 0.0700 | 0.0900 | 0.0900 | 0.0800 |
| 2 | 0.3300 | 0.3400 | 0.3800 | 0.3800 | 0.3600 |
| 3 | 0.7500 | 0.7800 | 0.7900 | 0.7900 | 0.7900 |
| 4 | 0.9500 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| 5 | 0.9900 | 0.9900 | 0.9900 | 0.9900 | 0.9900 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 0.0800 | 0.1300 | 0.1800 | 0.1600 | 0.2000 |
| 2 | 0.4100 | 0.4900 | 0.5900 | 0.5800 | 0.5900 |
| 3 | 0.8500 | 0.8700 | 0.9100 | 0.9100 | 0.8900 |
| 4 | 0.9800 | 0.9800 | 0.9900 | 0.9900 | 0.9800 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.2500 | 0.2000 | 0.1200 | 0.1300 | 0.0900 |
| 2 | 0.6400 | 0.6100 | 0.4600 | 0.5300 | 0.4700 |
| 3 | 0.9000 | 0.9100 | 0.8500 | 0.8900 | 0.8900 |
| 4 | 0.9800 | 0.9800 | 0.9700 | 0.9800 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Maturity - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.0400 | 0.0400 | 0.0400 | 0.0500 | 0.1000 |
| 2 | 0.4300 | 0.4100 | 0.5000 | 0.4800 | 0.5700 |
| 3 | 0.9300 | 0.9200 | 0.9600 | 0.9500 | 0.9400 |
| 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.0900 | 0.0700 | 0.0700 | 0.0800 | 0.0700 |
| 2 | 0.5600 | 0.5100 | 0.5100 | 0.5000 | 0.4300 |
| 3 | 0.9400 | 0.9300 | 0.9400 | 0.9300 | 0.8800 |
| 4 | 1.0000 | 0.9900 | 1.0000 | 0.9900 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.0400 | 0.0700 | 0.0600 | 0.0500 | 0.0400 |
| 2 | 0.3300 | 0.3800 | 0.3600 | 0.3500 | 0.3700 |
| 3 | 0.8400 | 0.8300 | 0.8300 | 0.8400 | 0.8900 |
| 4 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Input Partial Recruitment

| AGE | |
|---|---|
| 1 | 0.0100 |
| 2 | 0.1100 |
| 3 | 0.3900 |
| 4 | 0.7300 |
| 5 | 1.0000 |
| 6 | 1.0000 |
| 7 | 1.0000 |
| 8 | 1.0000 |
| 9 | 1.0000 |

Input F-Plus Ratio

| YEAR | |
|---|---|
| 1978 | 1.0000 |
| 1979 | 1.0000 |
| 1980 | 1.0000 |
| 1981 | 1.0000 |
| 1982 | 1.0000 |
| 1983 | 1.0000 |
| 1984 | 1.0000 |
| 1985 | 1.0000 |
| 1986 | 1.0000 |
| 1987 | 1.0000 |
| 1988 | 1.0000 |
| 1989 | 1.0000 |
| 1990 | 1.0000 |
| 1991 | 1.0000 |
| 1992 | 1.0000 |
| 1993 | 1.0000 |
| 1994 | 1.0000 |
| 1995 | 1.0000 |
| 1996 | 1.0000 |
| 1997 | 1.0000 |
| 1998 | 1.0000 |
| 1999 | 1.0000 |
| 2000 | 1.0000 |
| 2001 | 1.0000 |
| 2002 | 1.0000 |
| 2003 | 1.0000 |
| 2004 | 1.0000 |
| 2005 | 1.0000 |
| 2006 | 1.0000 |
| 2007 | 1.0000 |

SURVEY - INPUT DATA

| INDEX | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_36 | spr_36 | spr_36 | spr_36 | spr_36 |
| AGE | 1 | 2 | 3 | 4 | 5 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 693.8277 | 7425.1446 | 12980.2741 | 11371.7250 | 8480.5714 |
| 1983 | 452.8527 | 2666.2982 | 4121.4375 | 1087.6661 | 952.1518 |
| 1984 | 549.4339 | 588.7768 | 1039.1705 | 1691.4696 | 576.8920 |
| 1985 | 151.7705 | 3624.3241 | 906.1152 | 1516.7491 | 1929.3027 |
| 1986 | 1190.5313 | 558.7232 | 2519.5821 | 498.8893 | 737.6786 |
| 1987 | 26.9116 | 2202.7902 | 516.9214 | 1042.7223 | 84.8330 |
| 1988 | 983.8446 | 831.6643 | 4302.5786 | 558.4500 | 879.0670 |
| 1989 | 424.0286 | 1926.7071 | 910.3500 | 2162.6277 | 321.1634 |
| 1990 | 236.8768 | 1258.8348 | 2373.0027 | 921.0054 | 1245.7205 |
| 1991 | 1402.4089 | 721.0125 | 940.8134 | 1268.9438 | 654.0750 |
| 1992 | 167.6170 | 1710.8679 | 639.5946 | 229.6366 | 372.8009 |
| 1993 | 11.6116 | 544.7893 | 1784.2259 | 280.4545 | 122.2634 |
| 1994 | 170.4857 | 372.1179 | 273.2143 | 295.7545 | 45.3536 |
| 1995 | 67.6205 | 521.4295 | 1166.4884 | 729.4821 | 818.2768 |
| 1996 | 99.7232 | 292.2027 | 1005.7018 | 1703.7643 | 237.9696 |
| 1997 | 397.2536 | 597.1098 | 232.5054 | 667.4625 | 576.8920 |
| 1998 | 152.0438 | 908.7107 | 1773.1607 | 1158.1554 | 1031.2473 |
| 1999 | 290.0170 | 397.3902 | 831.9375 | 696.2866 | 325.3982 |
| 2000 | 301.4920 | 1101.8732 | 1133.5661 | 1558.8241 | 505.8563 |
| 2001 | 82.9205 | 320.4804 | 1084.2509 | 218.8446 | 522.7955 |
| 2002 | 88.3848 | 126.9080 | 523.6152 | 1356.5089 | 327.0375 |
| 2003 | 22.4036 | 290.7000 | 370.4786 | 850.3795 | 951.3321 |
| 2004 | 870.0509 | 79.2321 | 790.8188 | 1921.3795 | 1849.5241 |
| 2005 | 16.2563 | 660.9054 | 188.2446 | 861.9911 | 374.8500 |
| 2006 | 243.9804 | 315.5625 | 1783.9527 | 453.3991 | 988.2161 |
| 2007 | 170.8955 | 872.7830 | 513.0964 | 2450.3223 | 247.1223 |
| 2008 | 864.1768 | 1136.0250 | 790.2723 | 479.9009 | 1312.2482 |

SURVEY - INPUT DATA

| INDEX | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_36 | spr_36 | spr_36 | spr_41 | spr_41 |
| AGE | 6 | 7 | 8 | 1 | 2 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 477.9000 | 246.6000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 550.6714 | 1668.4714 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 40.1143 | 2850.4286 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 2959.9714 | 2381.4000 |
| 1982 | 400.1223 | 2548.6795 | 503.3973 | 0.0000 | 0.0000 |
| 1983 | 605.3063 | 37.1571 | 298.6232 | 0.0000 | 0.0000 |
| 1984 | 546.9750 | 285.2357 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 362.5554 | 262.1491 | 245.7563 | 0.0000 | 0.0000 |
| 1986 | 844.0955 | 84.2866 | 170.8955 | 0.0000 | 0.0000 |
| 1987 | 245.0732 | 185.1027 | 44.8071 | 0.0000 | 0.0000 |
| 1988 | 87.4286 | 50.5446 | 67.2107 | 0.0000 | 0.0000 |
| 1989 | 479.6277 | 68.9866 | 53.9598 | 0.0000 | 0.0000 |
| 1990 | 178.1357 | 195.4848 | 17.6223 | 0.0000 | 0.0000 |
| 1991 | 448.2080 | 73.9045 | 55.4625 | 0.0000 | 0.0000 |
| 1992 | 194.5286 | 216.7955 | 26.7750 | 0.0000 | 0.0000 |
| 1993 | 188.7911 | 40.0259 | 46.9929 | 0.0000 | 0.0000 |
| 1994 | 7.7866 | 60.2438 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 145.7598 | 319.1143 | 38.2500 | 0.0000 | 0.0000 |
| 1996 | 284.8259 | 37.8402 | 24.7259 | 0.0000 | 0.0000 |
| 1997 | 68.0304 | 182.9170 | 27.4580 | 0.0000 | 0.0000 |
| 1998 | 727.5696 | 138.7929 | 42.2116 | 0.0000 | 0.0000 |
| 1999 | 162.9723 | 86.8821 | 41.6652 | 0.0000 | 0.0000 |
| 2000 | 139.8857 | 34.8348 | 27.4580 | 0.0000 | 0.0000 |
| 2001 | 241.2482 | 31.5563 | 24.1795 | 0.0000 | 0.0000 |
| 2002 | 306.9563 | 53.2768 | 0.0000 | 0.0000 | 0.0000 |
| 2003 | 87.5652 | 108.6027 | 16.8027 | 0.0000 | 0.0000 |
| 2004 | 1219.2188 | 243.9804 | 356.8179 | 0.0000 | 0.0000 |
| 2005 | 280.4545 | 174.0375 | 40.7089 | 0.0000 | 0.0000 |
| 2006 | 290.7000 | 165.7045 | 73.6313 | 0.0000 | 0.0000 |
| 2007 | 285.7821 | 42.2116 | 24.7259 | 0.0000 | 0.0000 |
| 2008 | 51.6375 | 61.4732 | 0.0000 | 0.0000 | 0.0000 |

SURVEY - INPUT DATA

| INDEX | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_41 | spr_41 | spr_41 | spr_41 | spr_41 |
| AGE | 3 | 4 | 5 | 6 | 7 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 7111.1571 | 1249.0714 | 999.7714 | 182.0571 | 915.8143 |
| 1979 | 353.7000 | 2380.5000 | 702.7714 | 302.7857 | 107.4857 |
| 1980 | 3458.0571 | 272.9571 | 2192.1429 | 480.4714 | 238.5000 |
| 1981 | 3613.8857 | 2166.3000 | 136.1571 | 1129.6286 | 331.9714 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1987 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1988 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1989 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1990 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1991 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1992 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 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 |

SURVEY - INPUT DATA

| INDEX | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_41 | sp_can | sp_can | sp_can | sp_can |
| AGE | 8 | 1 | 2 | 3 | 4 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 83.7000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 178.2000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 39.8571 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 169.8429 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 844.4316 | 3194.7662 | 3954.7547 | 520.7328 |
| 1987 | 0.0000 | 351.8465 | 2997.7322 | 1308.8690 | 1534.0507 |
| 1988 | 0.0000 | 394.0681 | 1421.4599 | 6558.4188 | 816.2839 |
| 1989 | 0.0000 | 2294.0392 | 3912.5331 | 1942.1927 | 4011.0501 |
| 1990 | 0.0000 | 591.1021 | 3434.0218 | 5319.9191 | 2927.3629 |
| 1991 | 0.0000 | 1660.7155 | 1632.5678 | 2589.5902 | 3025.8799 |
| 1992 | 0.0000 | 154.8125 | 4025.1240 | 2491.0732 | 1125.9088 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 98.5170 | 942.9486 | 2111.0790 | 1210.3520 |
| 1996 | 0.0000 | 197.0340 | 689.6191 | 3251.0617 | 5657.6917 |
| 1997 | 0.0000 | 450.3635 | 745.9146 | 774.0623 | 1759.2325 |
| 1998 | 0.0000 | 14.0739 | 942.9486 | 1337.0167 | 492.5851 |
| 1999 | 0.0000 | 464.4374 | 450.3635 | 2097.0051 | 1534.0507 |
| 2000 | 0.0000 | 140.7386 | 619.2498 | 1477.7553 | 5516.9531 |
| 2001 | 0.0000 | 0.0000 | 84.4432 | 900.7270 | 591.1021 |
| 2002 | 0.0000 | 12.8934 | 121.7457 | 805.6169 | 2887.0783 |
| 2003 | 0.0000 | 0.0000 | 31.3603 | 419.1448 | 912.1602 |
| 2004 | 0.0000 | 753.7760 | 134.4987 | 551.7156 | 595.5775 |
| 2005 | 0.0000 | 34.4185 | 1880.0260 | 661.9957 | 4092.5096 |
| 2006 | 0.0000 | 0.0000 | 52.7756 | 1978.5841 | 925.6215 |
| 2007 | 0.0000 | 193.3181 | 730.7096 | 1329.3200 | 4136.1066 |
| 2008 | 0.0000 | 12.2714 | 454.9284 | 1259.8226 | 835.7757 |

SURVEY - INPUT DATA

| INDEX | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|
| SURVEY TAG | sp_can | sp_can | sp_can | sp_can | us0aut |
| AGE | 5 | 6 | 7 | 8 | 1 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 207.0964 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 540.0080 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 156.4152 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 382.0902 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 356.5446 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 494.5179 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1752.5330 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 244.6634 |
| 1986 | 914.8009 | 619.2498 | 365.9204 | 56.2954 | 1368.6670 |
| 1987 | 478.5112 | 168.8863 | 309.6249 | 112.5909 | 103.9580 |
| 1988 | 1435.5337 | 182.9602 | 112.5909 | 239.2556 | 278.2688 |
| 1989 | 506.6590 | 591.1021 | 70.3693 | 140.7386 | 750.6563 |
| 1990 | 5446.5838 | 591.1021 | 1308.8690 | 168.8863 | 342.6107 |
| 1991 | 1477.7553 | 1843.6757 | 225.1818 | 309.6249 | 214.6098 |
| 1992 | 1379.2383 | 844.4316 | 605.1760 | 168.8863 | 55.3259 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 47.9491 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 243.7071 |
| 1995 | 844.4316 | 267.4033 | 56.2954 | 70.3693 | 91.2536 |
| 1996 | 1534.0507 | 1111.8349 | 464.4374 | 112.5909 | 218.4348 |
| 1997 | 1731.0848 | 379.9942 | 84.4432 | 42.2216 | 29.5071 |
| 1998 | 492.5851 | 394.0681 | 98.5170 | 28.1477 | 8.7429 |
| 1999 | 577.0283 | 365.9204 | 211.1079 | 14.0739 | 95.7616 |
| 2000 | 2406.6301 | 1097.7611 | 562.9544 | 337.7726 | 95.7616 |
| 2001 | 1562.1985 | 731.8407 | 365.9204 | 239.2556 | 26.6384 |
| 2002 | 961.5430 | 1718.1603 | 563.8122 | 232.3755 | 38.7964 |
| 2003 | 1706.7639 | 447.1511 | 474.4035 | 227.5985 | 319.6607 |
| 2004 | 634.6213 | 545.4536 | 103.8278 | 165.3542 | 446.5688 |
| 2005 | 1591.4896 | 721.6604 | 583.5206 | 18.8549 | 2302.2402 |
| 2006 | 2297.1633 | 982.6574 | 283.5685 | 260.2498 | 71.1723 |
| 2007 | 545.8412 | 851.2446 | 135.4739 | 106.6092 | 135.7875 |
| 2008 | 3069.2880 | 196.4960 | 396.5004 | 41.2168 | 102.3188 |

SURVEY - INPUT DATA

| INDEX | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|
| SURVEY TAG | us1aut | us2aut | us3aut | us4aut | us5aut |
| AGE | 2 | 3 | 4 | 5 | 6 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 323.4857 | 4690.4063 | 943.6821 | 345.3429 | 236.4670 |
| 1979 | 2520.9482 | 534.4071 | 5543.1080 | 1316.3464 | 458.3170 |
| 1980 | 2220.0027 | 2290.9018 | 221.4402 | 2303.8795 | 437.9625 |
| 1981 | 1120.0420 | 769.9179 | 1057.2027 | 71.7188 | 361.7357 |
| 1982 | 4815.4018 | 3073.6607 | 2129.7054 | 804.6161 | 73.7679 |
| 1983 | 788.6330 | 2608.5134 | 330.3161 | 92.6196 | 157.3714 |
| 1984 | 1160.4777 | 1488.0616 | 1011.1661 | 94.3955 | 44.8071 |
| 1985 | 2607.9670 | 931.3875 | 1268.6705 | 1127.1455 | 33.0589 |
| 1986 | 247.6688 | 1151.0518 | 91.1170 | 144.1205 | 104.6411 |
| 1987 | 3113.1402 | 175.5402 | 449.4375 | 11.2018 | 66.5277 |
| 1988 | 565.1438 | 1848.0214 | 147.5357 | 273.6241 | 38.2500 |
| 1989 | 1194.9027 | 596.9732 | 1234.6554 | 81.9643 | 264.6080 |
| 1990 | 3822.8143 | 1429.4571 | 220.0741 | 692.7348 | 74.7241 |
| 1991 | 496.7036 | 2219.0464 | 2478.1902 | 563.3679 | 390.0134 |
| 1992 | 556.8107 | 239.3357 | 374.5768 | 41.6652 | 39.6161 |
| 1993 | 563.3679 | 1296.2652 | 238.1063 | 136.6071 | 59.6973 |
| 1994 | 1324.9527 | 726.2036 | 522.6589 | 22.5402 | 34.5616 |
| 1995 | 554.0786 | 907.4813 | 592.0554 | 209.5554 | 92.7563 |
| 1996 | 334.2777 | 2473.4089 | 1705.5402 | 119.1214 | 73.9045 |
| 1997 | 327.7205 | 267.4768 | 566.1000 | 195.3482 | 81.5545 |
| 1998 | 322.6661 | 438.3723 | 149.3116 | 176.4964 | 66.3911 |
| 1999 | 458.3170 | 1401.8625 | 480.5839 | 56.1455 | 48.3589 |
| 2000 | 190.8402 | 210.6482 | 422.9357 | 348.2116 | 118.9848 |
| 2001 | 780.0268 | 734.6732 | 96.3080 | 107.6464 | 41.8018 |
| 2002 | 64.3420 | 520.2000 | 627.0268 | 81.1446 | 74.5875 |
| 2003 | 652.9821 | 965.8125 | 1907.0357 | 2222.5982 | 161.1964 |
| 2004 | 227.1777 | 422.3893 | 273.8973 | 212.5607 | 112.5643 |
| 2005 | 1017.4500 | 185.5125 | 970.0473 | 344.2500 | 439.1920 |
| 2006 | 75.5438 | 791.5018 | 176.0866 | 239.8821 | 35.3813 |
| 2007 | 590.8259 | 221.0304 | 702.4339 | 46.1732 | 170.4857 |
| 2008 | 156.6884 | 282.5036 | 68.8500 | 177.9991 | 8.7429 |

Additional Output Files

Population File
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO
Auxilliary File
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO
Covariance File
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO
Residuals File
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO

Log File
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO

Bootstrap Files

Bootstrap Stock Numbers
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO
Bootstrap Fishing Mortality
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO
Bootstrap Biomass
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO
Bootstrap Catchability
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10_PLUS_SVSWEPT\10P_SVSWEPT_CO

Estimation Results

JAN-1 Population Numbers

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 28705. | 25943. | 22914. | 45891. | 19863. |
| 2 | 4707. | 23365. | 20988. | 18453. | 36471. |
| 3 | 25333. | 3478. | 17107. | 13370. | 11591. |
| 4 | 7660. | 13468. | 1991. | 8669. | 6701. |
| 5 | 2967. | 4093. | 6916. | 1141. | 4688. |
| 6 | 1264. | 1624. | 2267. | 3454. | 649. |
| 7 | 1212. | 874. | 926. | 978. | 1570. |
| 8 | 82. | 776. | 572. | 385. | 428. |
| 9 | 174. | 47. | 363. | 405. | 169. |
| 10 | 44. | 127. | 37. | 173. | 192. |
| Total | 72148. | 73793. | 74082. | 92919. | 82323. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 11305. | 29021. | 9615. | 44505. | 17898. |
| 2 | 15562. | 8691. | 23506. | 7713. | 35744. |
| 3 | 20473. | 8096. | 5723. | 12569. | 4881. |
| 4 | 5520. | 8936. | 3512. | 2063. | 6191. |
| 5 | 2817. | 2128. | 4336. | 1367. | 920. |
| 6 | 2015. | 1273. | 916. | 1678. | 649. |
| 7 | 266. | 982. | 541. | 308. | 823. |
| 8 | 654. | 133. | 402. | 205. | 176. |
| 9 | 173. | 378. | 56. | 153. | 105. |
| 10 | 288. | 283. | 182. | 76. | 75. |
| Total | 59073. | 59920. | 48789. | 70638. | 67462. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 24854. | 17849. | 10204. | 19796. | 7470. |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 14560. | 20056. | 13809. | 8290. | 15956. |
| 3 | 22111. | 9803. | 14070. | 6330. | 5023. |
| 4 | 2637. | 10610. | 5305. | 6709. | 2076. |
| 5 | 3124. | 1198. | 4880. | 2584. | 2671. |
| 6 | 484. | 1153. | 637. | 1967. | 833. |
| 7 | 308. | 197. | 467. | 315. | 642. |
| 8 | 425. | 118. | 88. | 178. | 132. |
| 9 | 93. | 154. | 51. | 50. | 66. |
| 10 | 105. | 54. | 88. | 47. | 19. |
| Total | 68702. | 61191. | 49599. | 46266. | 34887. |

JAN-1 Population Numbers

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 9873. | 6318. | 3928. | 6690. | 10672. |
| 2 | 5943. | 7814. | 5088. | 3187. | 5419. |
| 3 | 8749. | 3487. | 5843. | 3577. | 2350. |
| 4 | 2070. | 3214. | 1476. | 3500. | 2043. |
| 5 | 745. | 607. | 868. | 610. | 1728. |
| 6 | 853. | 189. | 121. | 369. | 270. |
| 7 | 283. | 223. | 68. | 62. | 138. |
| 8 | 209. | 74. | 53. | 36. | 35. |
| 9 | 68. | 46. | 15. | 26. | 19. |
| 10 | 34. | 9. | 3. | 1. | 7. |
| Total | 28827. | 21980. | 17463. | 18057. | 22681. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 4976. | 12399. | 6159. | 2858. | 5338. |
| 2 | 8623. | 4017. | 10108. | 4940. | 2330. |
| 3 | 3819. | 6231. | 2967. | 7425. | 3396. |
| 4 | 1252. | 1952. | 3289. | 1764. | 3690. |
| 5 | 762. | 582. | 836. | 1656. | 772. |
| 6 | 628. | 280. | 221. | 402. | 731. |
| 7 | 90. | 259. | 117. | 102. | 168. |
| 8 | 30. | 37. | 84. | 54. | 35. |
| 9 | 12. | 10. | 11. | 34. | 22. |
| 10 | 6. | 7. | 3. | 3. | 13. |
| Total | 20196. | 25776. | 23796. | 19240. | 16495. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 1983. | 13523. | 2945. | 7178. | 7068. |
| 2 | 4340. | 1608. | 11026. | 2400. | 5847. |
| 3 | 1805. | 3372. | 1254. | 8698. | 1902. |
| 4 | 1721. | 1115. | 2369. | 845. | 6362. |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 1665. | 694. | 679. | 1420. | 505. |
| 6 | 306. | 553. | 288. | 426. | 834. |
| 7 | 268. | 111. | 226. | 141. | 285. |
| 8 | 62. | 92. | 39. | 109. | 87. |
| 9 | 12. | 26. | 32. | 16. | 64. |
| 10 | 5. | 11. | 13. | 14. | 9. |
| Total | 12167. | 21104. | 18871. | 21247. | 22962. |

JAN-1 Population Numbers

| AGE | 2008 |
|---|---|
| 1 | 5158. |
| 2 | 5778. |
| 3 | 4313. |
| 4 | 1202. |
| 5 | 4150. |
| 6 | 348. |
| 7 | 566. |
| 8 | 219. |
| 9 | 62. |
| 10 | 52. |
| Total | 21848. |

Fishing Mortality Calculated

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 0.0058 | 0.0119 | 0.0165 | 0.0297 | 0.0440 |
| 2 | 0.1026 | 0.1117 | 0.2509 | 0.2650 | 0.3774 |
| 3 | 0.4318 | 0.3577 | 0.4797 | 0.4908 | 0.5419 |
| 4 | 0.4269 | 0.4664 | 0.3569 | 0.4147 | 0.6667 |
| 5 | 0.4024 | 0.3905 | 0.4942 | 0.3647 | 0.6443 |
| 6 | 0.1688 | 0.3620 | 0.6411 | 0.5883 | 0.6924 |
| 7 | 0.2463 | 0.2239 | 0.6785 | 0.6268 | 0.6760 |
| 8 | 0.3601 | 0.5597 | 0.1456 | 0.6208 | 0.7059 |
| 9 | 0.3083 | 0.3598 | 0.5414 | 0.5446 | 0.6558 |
| 10 | 0.3083 | 0.3598 | 0.5414 | 0.5446 | 0.6558 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 0.0630 | 0.0107 | 0.0204 | 0.0192 | 0.0064 |
| 2 | 0.4535 | 0.2179 | 0.4261 | 0.2575 | 0.2803 |
| 3 | 0.6290 | 0.6351 | 0.8203 | 0.5081 | 0.4158 |
| 4 | 0.7533 | 0.5232 | 0.7433 | 0.6078 | 0.4840 |
| 5 | 0.5944 | 0.6425 | 0.7493 | 0.5448 | 0.4415 |
| 6 | 0.5194 | 0.6547 | 0.8897 | 0.5129 | 0.5462 |
| 7 | 0.4937 | 0.6939 | 0.7714 | 0.3628 | 0.4606 |
| 8 | 0.3474 | 0.6618 | 0.7637 | 0.4717 | 0.4309 |
| 9 | 0.5587 | 0.6574 | 0.7723 | 0.5108 | 0.4756 |
| 10 | 0.5587 | 0.6574 | 0.7723 | 0.5108 | 0.4756 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.0145 | 0.0566 | 0.0078 | 0.0157 | 0.0287 |
| 2 | 0.1956 | 0.1545 | 0.5800 | 0.3011 | 0.4009 |
| 3 | 0.5343 | 0.4140 | 0.5406 | 0.9151 | 0.6864 |
| 4 | 0.5889 | 0.5766 | 0.5192 | 0.7209 | 0.8244 |
| 5 | 0.7968 | 0.4318 | 0.7087 | 0.9323 | 0.9419 |
| 6 | 0.7013 | 0.7038 | 0.5044 | 0.9192 | 0.8797 |
| 7 | 0.7592 | 0.6020 | 0.7662 | 0.6727 | 0.9223 |
| 8 | 0.8176 | 0.6421 | 0.3653 | 0.7979 | 0.4573 |
| 9 | 0.7815 | 0.5595 | 0.6891 | 0.9081 | 0.9261 |
| 10 | 0.7815 | 0.5595 | 0.6891 | 0.9081 | 0.9261 |

Fishing Mortality Calculated

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.0340 | 0.0166 | 0.0091 | 0.0108 | 0.0132 |
| 2 | 0.3332 | 0.0906 | 0.1522 | 0.1046 | 0.1499 |
| 3 | 0.8014 | 0.6599 | 0.3126 | 0.3602 | 0.4299 |
| 4 | 1.0271 | 1.1091 | 0.6837 | 0.5058 | 0.7857 |
| 5 | 1.1730 | 1.4127 | 0.6553 | 0.6145 | 0.8127 |
| 6 | 1.1405 | 0.8272 | 0.4666 | 0.7819 | 0.9028 |
| 7 | 1.1436 | 1.2329 | 0.4261 | 0.3798 | 1.3371 |
| 8 | 1.3043 | 1.3802 | 0.5289 | 0.4333 | 0.8935 |
| 9 | 1.1537 | 1.2382 | 0.6158 | 0.6541 | 0.8508 |
| 10 | 1.1537 | 1.2382 | 0.6158 | 0.6541 | 0.8508 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.0141 | 0.0043 | 0.0205 | 0.0045 | 0.0070 |
| 2 | 0.1248 | 0.1028 | 0.1084 | 0.1747 | 0.0550 |
| 3 | 0.4710 | 0.4391 | 0.3203 | 0.4993 | 0.4800 |
| 4 | 0.5650 | 0.6476 | 0.4859 | 0.6262 | 0.5959 |
| 5 | 0.8003 | 0.7680 | 0.5326 | 0.6175 | 0.7257 |
| 6 | 0.6848 | 0.6727 | 0.5704 | 0.6726 | 0.8055 |
| 7 | 0.6721 | 0.9245 | 0.5658 | 0.8724 | 0.7964 |
| 8 | 0.8806 | 1.0292 | 0.6990 | 0.7266 | 0.8687 |
| 9 | 0.7418 | 0.7765 | 0.5429 | 0.6384 | 0.7670 |
| 10 | 0.7418 | 0.7765 | 0.5429 | 0.6384 | 0.7670 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.0095 | 0.0041 | 0.0046 | 0.0051 | 0.0017 |
| 2 | 0.0525 | 0.0488 | 0.0371 | 0.0326 | 0.1044 |
| 3 | 0.2823 | 0.1529 | 0.1948 | 0.1128 | 0.2591 |
| 4 | 0.7083 | 0.2960 | 0.3119 | 0.3155 | 0.2271 |
| 5 | 0.9027 | 0.6794 | 0.2664 | 0.3325 | 0.1705 |
| 6 | 0.8102 | 0.6919 | 0.5154 | 0.2020 | 0.1869 |
| 7 | 0.8651 | 0.8409 | 0.5308 | 0.2789 | 0.0647 |
| 8 | 0.6852 | 0.8695 | 0.6915 | 0.3379 | 0.1407 |
| 9 | 0.8851 | 0.6969 | 0.3688 | 0.2993 | 0.1407 |
| 10 | 0.8851 | 0.6969 | 0.3688 | 0.2993 | 0.1407 |

Average Fishing Mortality For Ages 5- 8

| Year | Average F | N Weighted | Biomass Wtd | Catch Wtd |
|---|---|---|---|---|
| 1978 | 0.2944 | 0.3141 | 0.2944 | 0.3425 |
| 1979 | 0.3840 | 0.3823 | 0.3842 | 0.3962 |
| 1980 | 0.4898 | 0.5227 | 0.5158 | 0.5442 |
| 1981 | 0.5501 | 0.5539 | 0.5704 | 0.5667 |
| 1982 | 0.6796 | 0.6589 | 0.6647 | 0.6594 |
| 1983 | 0.4887 | 0.5354 | 0.5104 | 0.5443 |
| 1984 | 0.6633 | 0.6577 | 0.6626 | 0.6581 |
| 1985 | 0.7935 | 0.7729 | 0.7769 | 0.7749 |
| 1986 | 0.4730 | 0.5098 | 0.5017 | 0.5137 |
| 1987 | 0.4698 | 0.4734 | 0.4746 | 0.4765 |
| 1988 | 0.7687 | 0.7855 | 0.7846 | 0.7864 |
| 1989 | 0.5949 | 0.5713 | 0.5934 | 0.5936 |
| 1990 | 0.5862 | 0.6867 | 0.6799 | 0.6933 |
| 1991 | 0.8305 | 0.9063 | 0.8959 | 0.9095 |
| 1992 | 0.8003 | 0.9119 | 0.8981 | 0.9179 |
| 1993 | 1.1903 | 1.1689 | 1.1748 | 1.1699 |
| 1994 | 1.2133 | 1.2726 | 1.2443 | 1.2946 |
| 1995 | 0.5192 | 0.6147 | 0.5963 | 0.6226 |
| 1996 | 0.5524 | 0.6522 | 0.6477 | 0.6666 |
| 1997 | 0.9866 | 0.8586 | 0.8874 | 0.8690 |
| 1998 | 0.7595 | 0.7463 | 0.7416 | 0.7497 |
| 1999 | 0.8486 | 0.7884 | 0.8010 | 0.7962 |
| 2000 | 0.5919 | 0.5535 | 0.5620 | 0.5558 |
| 2001 | 0.7223 | 0.6420 | 0.6505 | 0.6454 |
| 2002 | 0.7991 | 0.7698 | 0.7773 | 0.7713 |
| 2003 | 0.8158 | 0.8802 | 0.8725 | 0.8818 |
| 2004 | 0.7705 | 0.7087 | 0.7197 | 0.7120 |
| 2005 | 0.5010 | 0.3868 | 0.4106 | 0.4264 |
| 2006 | 0.2878 | 0.3027 | 0.2981 | 0.3109 |
| 2007 | 0.1407 | 0.1594 | 0.1534 | 0.1709 |

Average Fishing Mortality For Ages 6- 8

| Year | Average F | N Weighted | Biomass Wtd | Catch Wtd |
|---|---|---|---|---|
| 1978 | 0.2584 | 0.2117 | 0.2183 | 0.2208 |
| 1979 | 0.3819 | 0.3720 | 0.3794 | 0.4037 |
| 1980 | 0.4884 | 0.5750 | 0.5440 | 0.6280 |
| 1981 | 0.6120 | 0.5987 | 0.6005 | 0.5990 |
| 1982 | 0.6914 | 0.6848 | 0.6846 | 0.6850 |
| 1983 | 0.4535 | 0.4788 | 0.4613 | 0.4874 |
| 1984 | 0.6702 | 0.6712 | 0.6736 | 0.6716 |
| 1985 | 0.8083 | 0.8280 | 0.8163 | 0.8310 |
| 1986 | 0.4491 | 0.4879 | 0.4829 | 0.4925 |
| 1987 | 0.4793 | 0.4912 | 0.4857 | 0.4944 |
| 1988 | 0.7594 | 0.7566 | 0.7658 | 0.7589 |
| 1989 | 0.6493 | 0.6852 | 0.6810 | 0.6867 |
| 1990 | 0.5453 | 0.5967 | 0.6039 | 0.6213 |
| 1991 | 0.7966 | 0.8789 | 0.8687 | 0.8846 |
| 1992 | 0.7531 | 0.8621 | 0.8502 | 0.8756 |
| 1993 | 1.1961 | 1.1666 | 1.1756 | 1.1682 |
| 1994 | 1.1468 | 1.0976 | 1.1175 | 1.1243 |
| 1995 | 0.4739 | 0.4690 | 0.4716 | 0.4712 |
| 1996 | 0.5317 | 0.7015 | 0.6767 | 0.7292 |
| 1997 | 1.0445 | 1.0376 | 1.0601 | 1.0593 |
| 1998 | 0.7458 | 0.6911 | 0.6947 | 0.6925 |
| 1999 | 0.8755 | 0.8089 | 0.8238 | 0.8239 |
| 2000 | 0.6117 | 0.5947 | 0.6010 | 0.5980 |
| 2001 | 0.7572 | 0.7145 | 0.7196 | 0.7199 |
| 2002 | 0.8235 | 0.8063 | 0.8069 | 0.8064 |
| 2003 | 0.7869 | 0.8211 | 0.8191 | 0.8234 |
| 2004 | 0.8008 | 0.7355 | 0.7460 | 0.7403 |
| 2005 | 0.5793 | 0.5342 | 0.5389 | 0.5368 |
| 2006 | 0.2729 | 0.2399 | 0.2477 | 0.2500 |
| 2007 | 0.1308 | 0.1547 | 0.1480 | 0.1711 |

Average Fishing Mortality For Ages 7- 8

| Year | Average F | N Weighted | Biomass Wtd | Catch Wtd |
|---|---|---|---|---|
| 1978 | 0.3032 | 0.2535 | 0.2568 | 0.2561 |
| 1979 | 0.3918 | 0.3818 | 0.3911 | 0.4442 |
| 1980 | 0.4120 | 0.4750 | 0.4443 | 0.6017 |
| 1981 | 0.6238 | 0.6251 | 0.6249 | 0.6251 |
| 1982 | 0.6909 | 0.6824 | 0.6829 | 0.6825 |
| 1983 | 0.4206 | 0.3897 | 0.3814 | 0.3988 |
| 1984 | 0.6779 | 0.6901 | 0.6893 | 0.6902 |
| 1985 | 0.7676 | 0.7681 | 0.7676 | 0.7681 |
| 1986 | 0.4172 | 0.4063 | 0.4111 | 0.4120 |
| 1987 | 0.4458 | 0.4554 | 0.4546 | 0.4556 |
| 1988 | 0.7884 | 0.7931 | 0.7953 | 0.7938 |
| 1989 | 0.6220 | 0.6170 | 0.6193 | 0.6175 |
| 1990 | 0.5657 | 0.7025 | 0.6887 | 0.7274 |
| 1991 | 0.7353 | 0.7178 | 0.7256 | 0.7213 |
| 1992 | 0.6898 | 0.8433 | 0.8248 | 0.8711 |
| 1993 | 1.2239 | 1.2119 | 1.2188 | 1.2146 |
| 1994 | 1.3066 | 1.2695 | 1.2764 | 1.2711 |
| 1995 | 0.4775 | 0.4714 | 0.4750 | 0.4758 |
| 1996 | 0.4065 | 0.3995 | 0.4021 | 0.4008 |
| 1997 | 1.1153 | 1.2480 | 1.2381 | 1.2631 |
| 1998 | 0.7763 | 0.7240 | 0.7310 | 0.7314 |
| 1999 | 0.9769 | 0.9377 | 0.9410 | 0.9385 |
| 2000 | 0.6324 | 0.6215 | 0.6257 | 0.6265 |
| 2001 | 0.7995 | 0.8218 | 0.8133 | 0.8257 |
| 2002 | 0.8325 | 0.8089 | 0.8107 | 0.8095 |
| 2003 | 0.7752 | 0.8313 | 0.8254 | 0.8354 |
| 2004 | 0.8552 | 0.8539 | 0.8556 | 0.8540 |
| 2005 | 0.6112 | 0.5546 | 0.5598 | 0.5588 |
| 2006 | 0.3084 | 0.3046 | 0.3053 | 0.3070 |
| 2007 | 0.1027 | 0.0826 | 0.0863 | 0.0944 |

Back Calculated Partial Recruitment

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 0.0135 | 0.0213 | 0.0243 | 0.0474 | 0.0623 |
| 2 | 0.2377 | 0.1996 | 0.3698 | 0.4228 | 0.5347 |
| 3 | 1.0000 | 0.6391 | 0.7070 | 0.7830 | 0.7676 |
| 4 | 0.9886 | 0.8332 | 0.5260 | 0.6616 | 0.9444 |
| 5 | 0.9319 | 0.6976 | 0.7284 | 0.5819 | 0.9127 |
| 6 | 0.3909 | 0.6467 | 0.9449 | 0.9386 | 0.9809 |
| 7 | 0.5705 | 0.4000 | 1.0000 | 1.0000 | 0.9576 |
| 8 | 0.8339 | 1.0000 | 0.2145 | 0.9905 | 1.0000 |
| 9 | 0.7139 | 0.6428 | 0.7979 | 0.8689 | 0.9291 |
| 10 | 0.7139 | 0.6428 | 0.7979 | 0.8689 | 0.9291 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 0.0836 | 0.0155 | 0.0229 | 0.0316 | 0.0118 |
| 2 | 0.6021 | 0.3140 | 0.4789 | 0.4237 | 0.5132 |
| 3 | 0.8350 | 0.9152 | 0.9220 | 0.8359 | 0.7613 |
| 4 | 1.0000 | 0.7540 | 0.8355 | 1.0000 | 0.8861 |
| 5 | 0.7891 | 0.9259 | 0.8422 | 0.8963 | 0.8083 |
| 6 | 0.6895 | 0.9435 | 1.0000 | 0.8438 | 1.0000 |
| 7 | 0.6554 | 1.0000 | 0.8671 | 0.5969 | 0.8433 |
| 8 | 0.4613 | 0.9537 | 0.8584 | 0.7760 | 0.7890 |
| 9 | 0.7417 | 0.9473 | 0.8681 | 0.8404 | 0.8707 |
| 10 | 0.7417 | 0.9473 | 0.8681 | 0.8404 | 0.8707 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.0178 | 0.0805 | 0.0102 | 0.0168 | 0.0305 |
| 2 | 0.2392 | 0.2195 | 0.7570 | 0.3229 | 0.4256 |
| 3 | 0.6534 | 0.5882 | 0.7056 | 0.9815 | 0.7287 |
| 4 | 0.7203 | 0.8193 | 0.6776 | 0.7732 | 0.8753 |
| 5 | 0.9745 | 0.6135 | 0.9249 | 1.0000 | 1.0000 |
| 6 | 0.8578 | 1.0000 | 0.6583 | 0.9860 | 0.9340 |
| 7 | 0.9286 | 0.8553 | 1.0000 | 0.7215 | 0.9792 |
| 8 | 1.0000 | 0.9123 | 0.4767 | 0.8558 | 0.4856 |
| 9 | 0.9558 | 0.7949 | 0.8994 | 0.9740 | 0.9832 |
| 10 | 0.9558 | 0.7949 | 0.8994 | 0.9740 | 0.9832 |

Back Calculated Partial Recruitment

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.0261 | 0.0118 | 0.0133 | 0.0138 | 0.0099 |
| 2 | 0.2555 | 0.0642 | 0.2226 | 0.1337 | 0.1121 |
| 3 | 0.6144 | 0.4671 | 0.4572 | 0.4607 | 0.3215 |
| 4 | 0.7875 | 0.7851 | 1.0000 | 0.6469 | 0.5876 |
| 5 | 0.8993 | 1.0000 | 0.9584 | 0.7858 | 0.6078 |
| 6 | 0.8744 | 0.5856 | 0.6824 | 1.0000 | 0.6752 |
| 7 | 0.8768 | 0.8727 | 0.6231 | 0.4857 | 1.0000 |
| 8 | 1.0000 | 0.9770 | 0.7736 | 0.5542 | 0.6682 |
| 9 | 0.8846 | 0.8765 | 0.9007 | 0.8365 | 0.6362 |
| 10 | 0.8846 | 0.8765 | 0.9007 | 0.8365 | 0.6362 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.0160 | 0.0041 | 0.0294 | 0.0052 | 0.0080 |
| 2 | 0.1417 | 0.0999 | 0.1551 | 0.2003 | 0.0633 |
| 3 | 0.5348 | 0.4266 | 0.4582 | 0.5724 | 0.5525 |
| 4 | 0.6416 | 0.6292 | 0.6951 | 0.7177 | 0.6860 |
| 5 | 0.9089 | 0.7462 | 0.7619 | 0.7078 | 0.8354 |
| 6 | 0.7776 | 0.6536 | 0.8160 | 0.7710 | 0.9273 |
| 7 | 0.7632 | 0.8982 | 0.8093 | 1.0000 | 0.9168 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 0.8328 | 1.0000 |
| 9 | 0.8424 | 0.7544 | 0.7766 | 0.7317 | 0.8830 |
| 10 | 0.8424 | 0.7544 | 0.7766 | 0.7317 | 0.8830 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.0105 | 0.0047 | 0.0067 | 0.0150 | 0.0064 |
| 2 | 0.0581 | 0.0561 | 0.0536 | 0.0963 | 0.4027 |
| 3 | 0.3128 | 0.1758 | 0.2817 | 0.3340 | 1.0000 |
| 4 | 0.7846 | 0.3405 | 0.4511 | 0.9337 | 0.8763 |
| 5 | 1.0000 | 0.7814 | 0.3853 | 0.9842 | 0.6579 |
| 6 | 0.8975 | 0.7957 | 0.7453 | 0.5978 | 0.7212 |
| 7 | 0.9584 | 0.9671 | 0.7676 | 0.8254 | 0.2499 |
| 8 | 0.7591 | 1.0000 | 1.0000 | 1.0000 | 0.5430 |
| 9 | 0.9804 | 0.8014 | 0.5333 | 0.8859 | 0.5430 |
| 10 | 0.9804 | 0.8014 | 0.5333 | 0.8859 | 0.5430 |

JAN-1 Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 10819. | 12621. | 9860. | 17503. | 8545. |
| 2 | 4790. | 20760. | 20788. | 17774. | 32985. |
| 3 | 46691. | 5351. | 31154. | 24529. | 22175. |
| 4 | 21697. | 43531. | 5158. | 25392. | 19946. |
| 5 | 8908. | 16776. | 33810. | 4830. | 20244. |
| 6 | 5526. | 8718. | 13080. | 22058. | 3739. |
| 7 | 6453. | 6485. | 7149. | 7527. | 13058. |
| 8 | 652. | 6432. | 5603. | 3470. | 3957. |
| 9 | 1621. | 446. | 3558. | 4776. | 1909. |
| 10 | 615. | 1729. | 553. | 2905. | 2999. |
| Total | 107772. | 122849. | 130713. | 130763. | 129555. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 5135. | 9797. | 5967. | 20312. | 6760. |
| 2 | 14955. | 8751. | 20342. | 8064. | 35555. |
| 3 | 37349. | 15268. | 10093. | 23145. | 8947. |
| 4 | 16105. | 26455. | 10660. | 5647. | 19783. |
| 5 | 11883. | 8656. | 18524. | 6182. | 4197. |
| 6 | 11761. | 7127. | 5167. | 10026. | 4244. |
| 7 | 1985. | 7367. | 3981. | 2330. | 6575. |
| 8 | 6572. | 1242. | 3805. | 1856. | 1681. |
| 9 | 1846. | 4115. | 618. | 1767. | 1145. |
| 10 | 4693. | 4143. | 2551. | 1107. | 1176. |
| Total | 112284. | 92921. | 81708. | 80435. | 90064. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 7153. | 4193. | 3204. | 8823. | 4939. |
| 2 | 13043. | 16855. | 11111. | 7447. | 15506. |
| 3 | 41273. | 17093. | 26462. | 12213. | 9607. |
| 4 | 7770. | 31575. | 14888. | 19753. | 6395. |
| 5 | 14844. | 5106. | 21013. | 10713. | 10655. |
| 6 | 3028. | 6871. | 3668. | 10580. | 4490. |
| 7 | 2536. | 1442. | 3468. | 2155. | 4126. |
| 8 | 4096. | 1100. | 831. | 1578. | 1095. |
| 9 | 1020. | 1667. | 566. | 520. | 691. |
| 10 | 1574. | 796. | 1284. | 694. | 353. |
| Total | 96337. | 86699. | 86495. | 74476. | 57856. |

JAN-1 Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 1364. | 1794. | 816. | 1878. | 3524. |
| 2 | 6187. | 4555. | 4078. | 2409. | 4573. |
| 3 | 15573. | 5848. | 8990. | 6419. | 4306. |
| 4 | 5770. | 8991. | 4176. | 8827. | 5863. |
| 5 | 3242. | 2385. | 3743. | 2597. | 6224. |
| 6 | 4373. | 1121. | 721. | 2155. | 1428. |
| 7 | 1889. | 1442. | 549. | 482. | 980. |
| 8 | 1662. | 605. | 498. | 344. | 282. |
| 9 | 700. | 416. | 158. | 297. | 202. |
| 10 | 410. | 134. | 64. | 6. | 90. |
| Total | 41171. | 27292. | 23795. | 25413. | 27469. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 2023. | 3913. | 1274. | 1160. | 1517. |
| 2 | 7573. | 3780. | 9133. | 3595. | 2072. |
| 3 | 6947. | 10903. | 5484. | 13653. | 5757. |
| 4 | 3535. | 5377. | 8849. | 4669. | 9436. |
| 5 | 3025. | 2298. | 3268. | 6173. | 2629. |
| 6 | 2976. | 1452. | 1103. | 1968. | 3363. |
| 7 | 584. | 1576. | 750. | 586. | 981. |
| 8 | 230. | 296. | 614. | 399. | 242. |
| 9 | 114. | 87. | 90. | 291. | 182. |
| 10 | 74. | 91. | 33. | 29. | 155. |
| Total | 27081. | 29772. | 30598. | 32524. | 26334. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 748. | 2541. | 802. | 1406. | 1720. |
| 2 | 3668. | 1545. | 6461. | 1636. | 4291. |
| 3 | 3110. | 6259. | 2251. | 12803. | 2734. |
| 4 | 4257. | 2936. | 6380. | 2159. | 15670. |
| 5 | 5628. | 2331. | 2383. | 4771. | 1694. |
| 6 | 1319. | 2387. | 1259. | 1814. | 3266. |
| 7 | 1462. | 575. | 1163. | 794. | 1477. |
| 8 | 415. | 602. | 256. | 645. | 585. |
| 9 | 98. | 197. | 255. | 121. | 424. |
| 10 | 56. | 121. | 150. | 131. | 84. |
| Total | 20760. | 19494. | 21360. | 26280. | 31945. |

JAN-1 Biomass

| AGE | 2008 |
|---|---|
| 1 | 1317. |
| 2 | 4400. |
| 3 | 7145. |
| 4 | 3081. |
| 5 | 14086. |
| 6 | 1476. |
| 7 | 3011. |
| 8 | 1414. |
| 9 | 472. |
| 10 | 530. |
| Total | 36930. |

Mean Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 15013. | 16229. | 13264. | 24080. | 11333. |
| 2 | 5082. | 27387. | 23876. | 21266. | 38590. |
| 3 | 45837. | 5044. | 30176. | 22993. | 20784. |
| 4 | 19392. | 42080. | 5415. | 22857. | 16673. |
| 5 | 8946. | 15241. | 27839. | 4406. | 16724. |
| 6 | 6020. | 8917. | 10347. | 17455. | 2821. |
| 7 | 6496. | 6885. | 5118. | 5841. | 9903. |
| 8 | 547. | 5623. | 4801. | 2571. | 2742. |
| 9 | 1357. | 374. | 2381. | 4003. | 1476. |
| 10 | 482. | 1324. | 391. | 2048. | 2015. |
| Total | 109174. | 129103. | 123607. | 127520. | 123060. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 6723. | 14143. | 6951. | 26928. | 9407. |
| 2 | 16410. | 10649. | 24205. | 8398. | 41679. |
| 3 | 33254. | 13591. | 7443. | 22045. | 9025. |
| 4 | 11927. | 23330. | 8458. | 5110. | 18705. |
| 5 | 9298. | 7100. | 13935. | 5297. | 3915. |
| 6 | 9264. | 5608. | 3594. | 8606. | 3558. |
| 7 | 1627. | 5670. | 2856. | 2092. | 5363. |
| 8 | 5372. | 917. | 2649. | 1484. | 1346. |
| 9 | 1418. | 2818. | 422. | 1419. | 916. |
| 10 | 3289. | 2782. | 1632. | 793. | 855. |
| Total | 98582. | 86608. | 72144. | 82173. | 94769. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 11001. | 6843. | 4893. | 11719. | 5540. |
| 2 | 16587. | 24252. | 14280. | 9908. | 17210. |
| 3 | 37166. | 16145. | 24480. | 9535. | 8020. |
| 4 | 6395. | 27538. | 13518. | 15432. | 4933. |
| 5 | 10701. | 4601. | 15924. | 7439. | 7198. |
| 6 | 2164. | 4981. | 2927. | 6894. | 3078. |
| 7 | 1727. | 1073. | 2516. | 1537. | 2735. |
| 8 | 2782. | 795. | 754. | 1055. | 913. |
| 9 | 686. | 1214. | 418. | 291. | 465. |
| 10 | 1003. | 558. | 851. | 419. | 212. |
| Total | 90212. | 88002. | 80560. | 64231. | 50304. |

Mean Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 2498. | 2710. | 1405. | 2936. | 5175. |
| 2 | 6017. | 8120. | 5775. | 3961. | 6690. |
| 3 | 12205. | 5036. | 9038. | 6548. | 4059. |
| 4 | 3848. | 6351. | 3645. | 8078. | 4475. |
| 5 | 2020. | 1442. | 3062. | 2034. | 4381. |
| 6 | 2733. | 835. | 656. | 1527. | 938. |
| 7 | 1148. | 851. | 468. | 382. | 546. |
| 8 | 965. | 338. | 461. | 260. | 171. |
| 9 | 416. | 222. | 123. | 190. | 136. |
| 10 | 225. | 71. | 43. | 4. | 55. |
| Total | 32075. | 25976. | 24677. | 25919. | 26626. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 2771. | 5989. | 2144. | 1553. | 2363. |
| 2 | 10546. | 4961. | 13296. | 5624. | 2707. |
| 3 | 6291. | 9840. | 5521. | 11815. | 5187. |
| 4 | 2997. | 4417. | 8062. | 3526. | 7523. |
| 5 | 2202. | 1695. | 2698. | 4640. | 1988. |
| 6 | 2322. | 1097. | 844. | 1412. | 2378. |
| 7 | 443. | 1033. | 573. | 376. | 689. |
| 8 | 141. | 181. | 445. | 273. | 172. |
| 9 | 89. | 62. | 62. | 210. | 128. |
| 10 | 48. | 58. | 23. | 20. | 99. |
| Total | 27850. | 29332. | 33667. | 29447. | 23235. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 1077. | 4059. | 1147. | 2460. | 2705. |
| 2 | 5591. | 2183. | 10161. | 2309. | 7160. |
| 3 | 3228. | 6716. | 2177. | 15634. | 2923. |

| | | | | | |
|---|---|---|---|---|---|
| 4 | 3286. | 2706. | 5689. | 2051. | 15009. |
| 5 | 3899. | 1792. | 2171. | 4050. | 1529. |
| 6 | 907. | 1764. | 1013. | 1590. | 2885. |
| 7 | 953. | 391. | 879. | 723. | 1484. |
| 8 | 285. | 417. | 195. | 539. | 514. |
| 9 | 61. | 145. | 212. | 95. | 374. |
| 10 | 34. | 80. | 114. | 103. | 71. |
| Total | 19320. | 20253. | 23759. | 29556. | 34654. |

Spawning Stock Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 836. | 853. | 856. | 1516. | 656. |
| 2 | 1503. | 6701. | 7328. | 6250. | 10785. |
| 3 | 31517. | 3803. | 21975. | 17270. | 15480. |
| 4 | 18567. | 37396. | 4512. | 22002. | 16572. |
| 5 | 7977. | 15051. | 29814. | 4352. | 17410. |
| 6 | 5197. | 7938. | 11369. | 19341. | 3223. |
| 7 | 5990. | 6042. | 6175. | 6557. | 11284. |
| 8 | 594. | 5667. | 5289. | 3026. | 3402. |
| 9 | 1489. | 407. | 3145. | 4219. | 1655. |
| 10 | 565. | 1575. | 489. | 2566. | 2600. |
| Total | 74235. | 85433. | 90951. | 87101. | 83067. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 393. | 1230. | 1035. | 3133. | 1306. |
| 2 | 5499. | 3999. | 10813. | 4333. | 19363. |
| 3 | 27649. | 11557. | 7748. | 18717. | 7186. |
| 4 | 13464. | 22981. | 9017. | 4886. | 17298. |
| 5 | 10409. | 7522. | 15813. | 5460. | 3771. |
| 6 | 10432. | 6181. | 4308. | 8903. | 3748. |
| 7 | 1769. | 6347. | 3385. | 2121. | 5890. |
| 8 | 5999. | 1076. | 3240. | 1659. | 1514. |
| 9 | 1627. | 3567. | 525. | 1570. | 1023. |
| 10 | 4135. | 3591. | 2170. | 984. | 1051. |
| Total | 81375. | 68051. | 58056. | 51766. | 62150 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 1725. | 803. | 371. | 1107. | 428. |
| 2 | 7815. | 9691. | 4488. | 3631. | 6593. |
| 3 | 32866. | 14041. | 19881. | 9025. | 7376. |
| 4 | 6676. | 27186. | 12810. | 16603. | 5337. |
| 5 | 12571. | 4596. | 18059. | 8870. | 8808. |
| 6 | 2606. | 5910. | 3262. | 8779. | 3750. |
| 7 | 2161. | 1262. | 2952. | 1863. | 3422. |
| 8 | 3457. | 956. | 756. | 1336. | 982. |
| 9 | 866. | 1468. | 488. | 432. | 572. |
| 10 | 1336. | 701. | 1107. | 577. | 292. |
| Total | 72080. | 66616. | 64174. | 52224. | 37561. |

Spawning Stock Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 52. | 69. | 32. | 91. | 340. |
| 2 | 2434. | 1779. | 1923. | 1099. | 2459. |
| 3 | 12256. | 4661. | 7924. | 5554. | 3644. |
| 4 | 4703. | 7228. | 3604. | 7847. | 4925. |
| 5 | 2579. | 1823. | 3246. | 2267. | 5257. |
| 6 | 3498. | 945. | 646. | 1830. | 1188. |
| 7 | 1510. | 1136. | 495. | 437. | 758. |
| 8 | 1294. | 465. | 441. | 309. | 235. |
| 9 | 559. | 328. | 138. | 258. | 169. |
| 10 | 327. | 106. | 55. | 5. | 75. |
| Total | 29212. | 18540. | 18503. | 19697. | 19050. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 176. | 265. | 86. | 90. | 103. |
| 2 | 4018. | 1833. | 4424. | 1689. | 854. |
| 3 | 5839. | 9115. | 4727. | 11300. | 4523. |
| 4 | 3112. | 4622. | 7893. | 4028. | 8181. |
| 5 | 2560. | 1955. | 2892. | 5387. | 2253. |
| 6 | 2568. | 1255. | 970. | 1701. | 2844. |
| 7 | 505. | 1307. | 660. | 490. | 831. |
| 8 | 192. | 241. | 528. | 342. | 203. |
| 9 | 97. | 74. | 80. | 253. | 155. |
| 10 | 63. | 77. | 29. | 25. | 132. |
| Total | 19130. | 20744. | 22290. | 25305. | 20078. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 29. | 172. | 47. | 68. | 67. |
| 2 | 1161. | 563. | 2236. | 551. | 1509. |
| 3 | 2410. | 4898. | 1749. | 10208. | 2254. |
| 4 | 3585. | 2649. | 5741. | 1942. | 14448. |
| 5 | 4683. | 2013. | 2205. | 4365. | 1592. |
| 6 | 1115. | 2057. | 1118. | 1696. | 3062. |
| 7 | 1224. | 483. | 1030. | 733. | 1413. |
| 8 | 358. | 504. | 221. | 590. | 552. |
| 9 | 82. | 170. | 232. | 111. | 400. |
| 10 | 47. | 104. | 136. | 120. | 79. |
| Total | 14694. | 13613. | 14714. | 20385. | 25377. |

Catch Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 88. | 194. | 219. | 716. | 499. |
| 2 | 522. | 3060. | 5991. | 5636. | 14565. |
| 3 | 19793. | 1804. | 14476. | 11284. | 11262. |
| 4 | 8279. | 19626. | 1932. | 9478. | 11116. |
| 5 | 3600. | 5951. | 13759. | 1607. | 10775. |
| 6 | 1016. | 3228. | 6633. | 10268. | 1954. |
| 7 | 1600. | 1541. | 3472. | 3661. | 6694. |
| 8 | 197. | 3147. | 699. | 1596. | 1935. |
| 9 | 418. | 135. | 1289. | 2180. | 968. |
| 10 | 149. | 476. | 212. | 1115. | 1322. |
| Total | 35661. | 39162. | 48682. | 47542. | 61088. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 423. | 152. | 142. | 518. | 60. |
| 2 | 7442. | 2320. | 10313. | 2163. | 11683. |
| 3 | 20916. | 8631. | 6105. | 11201. | 3753. |
| 4 | 8984. | 12207. | 6287. | 3106. | 9053. |
| 5 | 5527. | 4562. | 10441. | 2886. | 1729. |
| 6 | 4812. | 3672. | 3197. | 4414. | 1944. |
| 7 | 803. | 3935. | 2203. | 759. | 2470. |
| 8 | 1867. | 607. | 2023. | 700. | 580. |
| 9 | 792. | 1853. | 326. | 725. | 435. |
| 10 | 1838. | 1829. | 1260. | 405. | 407. |
| Total | 53404. | 39767. | 42297. | 26877. | 32113. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 160. | 388. | 38. | 183. | 159. |
| 2 | 3244. | 3746. | 8282. | 2983. | 6900. |
| 3 | 19856. | 6685. | 13235. | 8726. | 5505. |
| 4 | 3766. | 15879. | 7018. | 11124. | 4067. |
| 5 | 8527. | 1987. | 11285. | 6935. | 6780. |
| 6 | 1518. | 3506. | 1476. | 6337. | 2708. |
| 7 | 1311. | 646. | 1928. | 1034. | 2522. |
| 8 | 2274. | 511. | 275. | 842. | 418. |
| 9 | 536. | 679. | 288. | 264. | 431. |
| 10 | 784. | 312. | 586. | 381. | 196. |
| Total | 41977. | 34339. | 44412. | 38810. | 29685. |

Catch Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 85. | 45. | 13. | 32. | 68. |
| 2 | 2005. | 736. | 879. | 414. | 1003. |
| 3 | 9781. | 3323. | 2825. | 2359. | 1745. |
| 4 | 3953. | 7043. | 2492. | 4086. | 3516. |
| 5 | 2369. | 2037. | 2007. | 1250. | 3560. |
| 6 | 3117. | 690. | 306. | 1194. | 847. |
| 7 | 1313. | 1049. | 200. | 145. | 730. |
| 8 | 1258. | 467. | 244. | 113. | 153. |
| 9 | 480. | 275. | 76. | 124. | 115. |
| 10 | 259. | 88. | 27. | 3. | 47. |
| Total | 24620. | 15754. | 9068. | 9719. | 11784. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 39. | 25. | 44. | 7. | 16. |
| 2 | 1316. | 510. | 1442. | 983. | 149. |
| 3 | 2963. | 4321. | 1768. | 5900. | 2490. |
| 4 | 1693. | 2860. | 3917. | 2208. | 4483. |
| 5 | 1763. | 1302. | 1437. | 2865. | 1443. |
| 6 | 1590. | 738. | 482. | 950. | 1916. |
| 7 | 297. | 955. | 324. | 328. | 548. |
| 8 | 124. | 187. | 311. | 198. | 150. |
| 9 | 66. | 48. | 34. | 134. | 98. |
| 10 | 36. | 45. | 13. | 13. | 76. |
| Total | 9888. | 10991. | 9771. | 13584. | 11369. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 10. | 17. | 5. | 12. | 4. |
| 2 | 293. | 106. | 377. | 75. | 747. |
| 3 | 911. | 1027. | 424. | 1764. | 758. |
| 4 | 2328. | 801. | 1775. | 647. | 3408. |
| 5 | 3520. | 1218. | 579. | 1347. | 261. |
| 6 | 735. | 1221. | 522. | 321. | 539. |
| 7 | 824. | 329. | 466. | 202. | 96. |
| 8 | 195. | 363. | 135. | 182. | 72. |
| 9 | 54. | 101. | 78. | 29. | 60. |
| 10 | 30. | 56. | 42. | 31. | 10. |
| Total | 8900. | 5238. | 4403. | 4610. | 5955. |

Catch Numbers

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 151.6 | 279.2 | 339.9 | 1219.2 | 775.4 |
| 2 | 416.8 | 2242.7 | 4238.7 | 3910.7 | 10457.1 |
| 3 | 8109.1 | 953.6 | 5955.4 | 4738.2 | 4434.4 |
| 4 | 2429.6 | 4585.0 | 544.9 | 2685.5 | 2988.0 |
| 5 | 896.8 | 1206.9 | 2464.6 | 317.9 | 2039.8 |
| 6 | 178.4 | 449.8 | 983.0 | 1406.0 | 297.1 |
| 7 | 240.8 | 159.5 | 418.1 | 417.0 | 707.2 |
| 8 | 22.6 | 304.1 | 70.4 | 162.9 | 198.6 |
| 9 | 42.1 | 12.9 | 138.7 | 155.5 | 74.6 |
| 10 | 10.7 | 35.0 | 14.2 | 66.4 | 84.6 |
| Total | 12498.5 | 10228.7 | 15167.9 | 15079.3 | 22056.8 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 626.2 | 280.9 | 176.0 | 768.3 | 103.8 |
| 2 | 5181.7 | 1547.7 | 7443.7 | 1594.1 | 7956.1 |
| 3 | 8753.3 | 3485.7 | 2942.2 | 4576.3 | 1515.5 |
| 4 | 2680.4 | 3328.4 | 1690.1 | 860.2 | 2170.1 |
| 5 | 1155.3 | 923.9 | 2097.7 | 525.3 | 299.7 |
| 6 | 746.4 | 560.2 | 496.5 | 615.4 | 249.9 |
| 7 | 94.6 | 450.3 | 267.2 | 85.5 | 277.3 |
| 8 | 175.0 | 58.9 | 196.8 | 70.4 | 56.1 |
| 9 | 67.7 | 167.0 | 27.7 | 56.0 | 36.2 |
| 10 | 112.6 | 124.9 | 89.7 | 27.8 | 26.0 |
| Total | 19593.2 | 10927.9 | 15427.6 | 9179.3 | 12690.7 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 324.9 | 891.5 | 71.8 | 278.7 | 191.7 |
| 2 | 2352.1 | 2608.6 | 5561.1 | 1963.0 | 4808.4 |
| 3 | 8368.3 | 3032.8 | 5373.4 | 3491.4 | 2286.3 |
| 4 | 1074.1 | 4254.4 | 1964.0 | 3160.5 | 1070.7 |
| 5 | 1575.6 | 383.5 | 2272.1 | 1442.1 | 1500.0 |
| 6 | 223.8 | 534.2 | 230.6 | 1088.0 | 448.1 |
| 7 | 150.3 | 81.4 | 229.4 | 141.3 | 356.0 |
| 8 | 218.0 | 51.2 | 24.6 | 89.7 | 44.1 |
| 9 | 46.5 | 60.2 | 23.2 | 27.5 | 36.4 |
| 10 | 52.5 | 21.3 | 40.4 | 26.0 | 10.4 |
| Total | 14386.1 | 11919.1 | 15790.6 | 11708.2 | 10752.1 |

Catch Numbers

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 299.2 | 94.4 | 32.3 | 64.9 | 126.9 |
| 2 | 1534.9 | 614.6 | 652.8 | 287.3 | 685.2 |
| 3 | 4429.4 | 1543.4 | 1429.0 | 986.6 | 749.6 |
| 4 | 1224.8 | 1987.7 | 669.9 | 1269.8 | 1020.7 |
| 5 | 475.3 | 425.6 | 382.3 | 256.3 | 882.9 |
| 6 | 535.6 | 97.6 | 41.2 | 183.8 | 147.7 |
| 7 | 178.0 | 146.2 | 21.4 | 17.9 | 94.4 |
| 8 | 141.0 | 51.2 | 20.0 | 11.6 | 18.9 |
| 9 | 43.1 | 30.5 | 6.4 | 11.3 | 10.1 |
| 10 | 21.2 | 5.6 | 1.4 | 0.3 | 3.9 |
| Total | 8882.5 | 4996.8 | 3256.7 | 3089.8 | 3740.3 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 63.3 | 47.7 | 113.5 | 11.7 | 33.6 |
| 2 | 918.9 | 356.3 | 943.2 | 719.8 | 113.0 |
| 3 | 1310.3 | 2021.8 | 741.1 | 2667.3 | 1182.7 |
| 4 | 494.3 | 852.6 | 1156.4 | 751.6 | 1516.2 |
| 5 | 385.6 | 286.6 | 315.8 | 698.7 | 365.4 |
| 6 | 285.2 | 125.8 | 88.0 | 180.4 | 371.5 |
| 7 | 40.2 | 143.8 | 46.3 | 54.8 | 84.7 |
| 8 | 16.0 | 22.2 | 38.8 | 25.8 | 18.7 |
| 9 | 5.6 | 5.0 | 4.2 | 14.8 | 10.6 |
| 10 | 2.9 | 3.4 | 1.0 | 1.3 | 6.5 |
| Total | 3522.3 | 3865.2 | 3448.3 | 5126.2 | 3702.9 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 17.0 | 50.5 | 12.3 | 32.8 | 10.6 |
| 2 | 201.3 | 69.4 | 364.1 | 69.7 | 526.1 |
| 3 | 404.4 | 434.3 | 201.8 | 842.8 | 395.2 |
| 4 | 800.7 | 260.1 | 578.4 | 208.3 | 1175.8 |
| 5 | 910.4 | 313.6 | 144.5 | 366.1 | 71.9 |
| 6 | 156.0 | 253.0 | 106.0 | 70.8 | 129.2 |
| 7 | 142.4 | 58.2 | 85.3 | 31.2 | 16.2 |
| 8 | 28.2 | 49.2 | 18.0 | 28.5 | 10.4 |
| 9 | 6.5 | 11.8 | 8.9 | 3.8 | 8.6 |
| 10 | 2.9 | 5.0 | 3.7 | 3.4 | 1.1 |
| Total | 2669.8 | 1505.2 | 1523.0 | 1657.4 | 2345.1 |

Surplus Production

Average Adjustment Factor (Delta) = 1.0000

| Year | Biomass | Delta Biomass | Catch Biomass | Surplus Production |
|---|---|---|---|---|
| 1978 | 107771.534 | 15077.374 | 35660.721 | 50738.095 |
| 1979 | 122848.908 | 7864.015 | 39162.286 | 47026.301 |
| 1980 | 130712.923 | 50.259 | 48682.434 | 48732.694 |
| 1981 | 130763.183 | -1207.795 | 47541.857 | 46334.062 |
| 1982 | 129555.388 | -17271.698 | 61088.247 | 43816.549 |
| 1983 | 112283.690 | -19362.222 | 53404.330 | 34042.108 |
| 1984 | 92921.468 | -11213.851 | 39767.136 | 28553.284 |
| 1985 | 81707.616 | -1272.242 | 42297.434 | 41025.193 |
| 1986 | 80435.375 | 9628.756 | 26876.781 | 36505.537 |
| 1987 | 90064.131 | 6272.381 | 32112.683 | 38385.065 |
| 1988 | 96336.512 | -9637.748 | 41976.636 | 32338.888 |
| 1989 | 86698.764 | -203.999 | 34338.791 | 34134.792 |
| 1990 | 86494.764 | -12018.565 | 44411.969 | 32393.405 |
| 1991 | 74476.200 | -16619.991 | 38810.185 | 22190.193 |
| 1992 | 57856.208 | -16685.047 | 29684.877 | 12999.830 |
| 1993 | 41171.161 | -13879.167 | 24620.033 | 10740.867 |
| 1994 | 27291.994 | -3497.010 | 15754.070 | 12257.060 |
| 1995 | 23794.985 | 1618.018 | 9068.146 | 10686.164 |
| 1996 | 25413.002 | 2056.393 | 9718.713 | 11775.106 |
| 1997 | 27469.395 | -388.372 | 11784.450 | 11396.079 |
| 1998 | 27081.024 | 2690.824 | 9887.960 | 12578.784 |
| 1999 | 29771.848 | 825.652 | 10991.218 | 11816.870 |
| 2000 | 30597.500 | 1926.115 | 9770.992 | 11697.107 |
| 2001 | 32523.616 | -6190.113 | 13584.079 | 7393.966 |
| 2002 | 26333.503 | -5573.083 | 11369.031 | 5795.948 |
| 2003 | 20760.420 | -1266.742 | 8900.391 | 7633.649 |
| 2004 | 19493.678 | 1866.809 | 5237.603 | 7104.412 |
| 2005 | 21360.488 | 4919.513 | 4402.945 | 9322.458 |
| 2006 | 26280.000 | 5664.618 | 4610.067 | 10274.685 |
| 2007 | 31944.618 | 4985.780 | 5955.462 | 10941.242 |
| 2008 | 36930.398 | | | |

Summary of Survey Indices Used in the Estimate

| INDEX | Survey Tag | Age | Time | Type | Catchability | Std. Error | CV |
|---|---|---|---|---|---|---|---|
| 1 | spr_36 | 1 | JAN-1 | NUMBER | 0.2194E-01 | 0.4344E-02 | 0.1980E+00 |
| 2 | spr_36 | 2 | JAN-1 | NUMBER | 0.9200E-01 | 0.7276E-02 | 0.7909E-01 |
| 3 | spr_36 | 3 | JAN-1 | NUMBER | 0.1862E+00 | 0.1931E-01 | 0.1037E+00 |
| 4 | spr_36 | 4 | JAN-1 | NUMBER | 0.3161E+00 | 0.4509E-01 | 0.1426E+00 |
| 5 | spr_36 | 5 | JAN-1 | NUMBER | 0.4022E+00 | 0.6249E-01 | 0.1554E+00 |
| 6 | spr_36 | 6 | JAN-1 | NUMBER | 0.4090E+00 | 0.6140E-01 | 0.1501E+00 |
| 7 | spr_36 | 7 | JAN-1 | NUMBER | 0.4272E+00 | 0.7710E-01 | 0.1805E+00 |
| 8 | spr_36 | 8 | JAN-1 | NUMBER | 0.5178E+00 | 0.8356E-01 | 0.1614E+00 |
| 9 | spr_41 | 1 | JAN-1 | NUMBER | 0.1413E-01 | 0.1069E-01 | 0.7560E+00 |
| 10 | spr_41 | 2 | JAN-1 | NUMBER | 0.8999E-01 | 0.2087E-01 | 0.2319E+00 |
| 11 | spr_41 | 3 | JAN-1 | NUMBER | 0.1987E+00 | 0.4671E-01 | 0.2350E+00 |
| 12 | spr_41 | 4 | JAN-1 | NUMBER | 0.1773E+00 | 0.2236E-01 | 0.1261E+00 |
| 13 | spr_41 | 5 | JAN-1 | NUMBER | 0.2163E+00 | 0.5405E-01 | 0.2499E+00 |
| 14 | spr_41 | 6 | JAN-1 | NUMBER | 0.2077E+00 | 0.3557E-01 | 0.1713E+00 |
| 15 | spr_41 | 7 | JAN-1 | NUMBER | 0.3002E+00 | 0.1126E+00 | 0.3750E+00 |
| 16 | spr_41 | 8 | JAN-1 | NUMBER | 0.2915E+00 | 0.1651E+00 | 0.5663E+00 |
| 17 | sp_can | 1 | JAN-1 | NUMBER | 0.2092E-01 | 0.5624E-02 | 0.2688E+00 |
| 18 | sp_can | 2 | JAN-1 | NUMBER | 0.9815E-01 | 0.2095E-01 | 0.2135E+00 |
| 19 | sp_can | 3 | JAN-1 | NUMBER | 0.3272E+00 | 0.3356E-01 | 0.1026E+00 |
| 20 | sp_can | 4 | JAN-1 | NUMBER | 0.6153E+00 | 0.7791E-01 | 0.1266E+00 |
| 21 | sp_can | 5 | JAN-1 | NUMBER | 0.9495E+00 | 0.1127E+00 | 0.1187E+00 |
| 22 | sp_can | 6 | JAN-1 | NUMBER | 0.1129E+01 | 0.1895E+00 | 0.1678E+00 |
| 23 | sp_can | 7 | JAN-1 | NUMBER | 0.1217E+01 | 0.2357E+00 | 0.1936E+00 |
| 24 | sp_can | 8 | JAN-1 | NUMBER | 0.1282E+01 | 0.2649E+00 | 0.2067E+00 |
| 25 | us0aut | 1 | JAN-1 | NUMBER | 0.1722E-01 | 0.3661E-02 | 0.2126E+00 |
| 26 | us1aut | 2 | JAN-1 | NUMBER | 0.7467E-01 | 0.8750E-02 | 0.1172E+00 |
| 27 | us2aut | 3 | JAN-1 | NUMBER | 0.1312E+00 | 0.1526E-01 | 0.1163E+00 |
| 28 | us3aut | 4 | JAN-1 | NUMBER | 0.1586E+00 | 0.2294E-01 | 0.1447E+00 |
| 29 | us4aut | 5 | JAN-1 | NUMBER | 0.1229E+00 | 0.2235E-01 | 0.1818E+00 |
| 30 | us5aut | 6 | JAN-1 | NUMBER | 0.1431E+00 | 0.2336E-01 | 0.1632E+00 |

Survey Index: 1 Tag: spr_36 AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.219439E-01 % Variance Contribution = 7.1686
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.629901E+03 | N/A |
| 1979 | N/A | 0.569281E+03 | N/A |
| 1980 | N/A | 0.502813E+03 | N/A |
| 1981 | N/A | 0.100702E+04 | N/A |
| 1982 | 0.693828E+03 | 0.435869E+03 | 0.464881E+00 |
| 1983 | 0.452853E+03 | 0.248083E+03 | 0.601803E+00 |
| 1984 | 0.549434E+03 | 0.636826E+03 | -0.147609E+00 |
| 1985 | 0.151770E+03 | 0.210997E+03 | -0.329473E+00 |
| 1986 | 0.119053E+04 | 0.976626E+03 | 0.198052E+00 |
| 1987 | 0.269116E+02 | 0.392754E+03 | -0.268063E+01 |

| | | | |
|---|---|---|---|
| 1988 | 0.983845E+03 | 0.545403E+03 | 0.589944E+00 |
| 1989 | 0.424029E+03 | 0.391672E+03 | 0.793757E-01 |
| 1990 | 0.236877E+03 | 0.223922E+03 | 0.562433E-01 |
| 1991 | 0.140241E+04 | 0.434410E+03 | 0.117196E+01 |
| 1992 | 0.167617E+03 | 0.163924E+03 | 0.222766E-01 |
| 1993 | 0.116116E+02 | 0.216663E+03 | -0.292634E+01 |
| 1994 | 0.170486E+03 | 0.138644E+03 | 0.206745E+00 |
| 1995 | 0.676205E+02 | 0.861973E+02 | -0.242727E+00 |
| 1996 | 0.997232E+02 | 0.146805E+03 | -0.386707E+00 |
| 1997 | 0.397254E+03 | 0.234179E+03 | 0.528488E+00 |
| 1998 | 0.152044E+03 | 0.109196E+03 | 0.331027E+00 |
| 1999 | 0.290017E+03 | 0.272079E+03 | 0.638480E-01 |
| 2000 | 0.301492E+03 | 0.135147E+03 | 0.802378E+00 |
| 2001 | 0.829205E+02 | 0.627228E+02 | 0.279157E+00 |
| 2002 | 0.883848E+02 | 0.117140E+03 | -0.281673E+00 |
| 2003 | 0.224036E+02 | 0.435161E+02 | -0.663908E+00 |
| 2004 | 0.870051E+03 | 0.296740E+03 | 0.107570E+01 |
| 2005 | 0.162563E+02 | 0.646176E+02 | -0.138001E+01 |
| 2006 | 0.243980E+03 | 0.157510E+03 | 0.437598E+00 |
| 2007 | 0.170895E+03 | 0.155108E+03 | 0.969288E-01 |
| 2008 | 0.864177E+03 | 0.113194E+03 | 0.203267E+01 |

Survey Index:  2 Tag:  spr_36  AGE =  2
Time = JAN-1  Type = NUMBER
Catchability =  0.919973E-01  % Variance Contribution =  1.1443
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.433026E+03 | N/A |
| 1979 | N/A | 0.214949E+04 | N/A |
| 1980 | N/A | 0.193082E+04 | N/A |
| 1981 | N/A | 0.169763E+04 | N/A |
| 1982 | 0.742514E+04 | 0.335525E+04 | 0.794345E+00 |
| 1983 | 0.266630E+04 | 0.143170E+04 | 0.621829E+00 |
| 1984 | 0.588777E+03 | 0.799543E+03 | -0.305993E+00 |
| 1985 | 0.362432E+04 | 0.216252E+04 | 0.516393E+00 |
| 1986 | 0.558723E+03 | 0.709610E+03 | -0.239061E+00 |
| 1987 | 0.220279E+04 | 0.328837E+04 | -0.400667E+00 |
| 1988 | 0.831664E+03 | 0.133947E+04 | -0.476604E+00 |
| 1989 | 0.192671E+04 | 0.184506E+04 | 0.432995E-01 |
| 1990 | 0.125883E+04 | 0.127037E+04 | -0.912143E-02 |
| 1991 | 0.721013E+03 | 0.762630E+03 | -0.561161E-01 |
| 1992 | 0.171087E+04 | 0.146793E+04 | 0.153150E+00 |
| 1993 | 0.544789E+03 | 0.546735E+03 | -0.356575E-02 |
| 1994 | 0.372118E+03 | 0.718830E+03 | -0.658415E+00 |
| 1995 | 0.521429E+03 | 0.468042E+03 | 0.108017E+00 |
| 1996 | 0.292203E+03 | 0.293182E+03 | -0.334671E-02 |
| 1997 | 0.597110E+03 | 0.498505E+03 | 0.180487E+00 |
| 1998 | 0.908711E+03 | 0.793261E+03 | 0.135875E+00 |
| 1999 | 0.397390E+03 | 0.369547E+03 | 0.726405E-01 |
| 2000 | 0.110187E+04 | 0.929927E+03 | 0.169660E+00 |
| 2001 | 0.320480E+03 | 0.454454E+03 | -0.349277E+00 |
| 2002 | 0.126908E+03 | 0.214320E+03 | -0.524006E+00 |
| 2003 | 0.290700E+03 | 0.399284E+03 | -0.317381E+00 |
| 2004 | 0.792321E+02 | 0.147953E+03 | -0.624515E+00 |
| 2005 | 0.660905E+03 | 0.101434E+04 | -0.428386E+00 |
| 2006 | 0.315562E+03 | 0.220773E+03 | 0.357221E+00 |
| 2007 | 0.872783E+03 | 0.537917E+03 | 0.483983E+00 |
| 2008 | 0.113603E+04 | 0.531517E+03 | 0.759555E+00 |

Survey Index:  3 Tag:  spr_36  AGE =  3
Time = JAN-1  Type = NUMBER
Catchability =  0.186189E+00  % Variance Contribution =  1.9673
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.471667E+04 | N/A |
| 1979 | N/A | 0.647539E+03 | N/A |
| 1980 | N/A | 0.318520E+04 | N/A |
| 1981 | N/A | 0.248941E+04 | N/A |
| 1982 | 0.129803E+05 | 0.215811E+04 | 0.179420E+01 |
| 1983 | 0.412144E+04 | 0.381182E+04 | 0.780942E-01 |
| 1984 | 0.103917E+04 | 0.150732E+04 | -0.371914E+00 |
| 1985 | 0.906115E+03 | 0.106547E+04 | -0.162005E+00 |

| | | | |
|---|---|---|---|
| 1986 | 0.251958E+04 | 0.234013E+04 | 0.738855E-01 |
| 1987 | 0.516921E+03 | 0.908851E+03 | -0.564291E+00 |
| 1988 | 0.430258E+04 | 0.411688E+04 | 0.441184E-01 |
| 1989 | 0.910350E+03 | 0.182518E+04 | -0.695607E+00 |
| 1990 | 0.237300E+04 | 0.261964E+04 | -0.988808E-01 |
| 1991 | 0.940813E+03 | 0.117859E+04 | -0.225326E+00 |
| 1992 | 0.639595E+03 | 0.935161E+03 | -0.379884E+00 |
| 1993 | 0.178423E+04 | 0.162897E+04 | 0.910342E-01 |
| 1994 | 0.273214E+03 | 0.649205E+03 | -0.865492E+00 |
| 1995 | 0.116649E+04 | 0.108788E+04 | 0.697642E-01 |
| 1996 | 0.100570E+04 | 0.666025E+03 | 0.412114E+00 |
| 1997 | 0.232505E+03 | 0.437564E+03 | -0.632309E+00 |
| 1998 | 0.177316E+04 | 0.711063E+03 | 0.913758E+00 |
| 1999 | 0.831938E+03 | 0.116020E+04 | -0.332589E+00 |
| 2000 | 0.113357E+04 | 0.552513E+03 | 0.718646E+00 |
| 2001 | 0.108425E+04 | 0.138253E+04 | -0.243027E+00 |
| 2002 | 0.523615E+03 | 0.632316E+03 | -0.188632E+00 |
| 2003 | 0.370479E+03 | 0.336138E+03 | 0.972743E-01 |
| 2004 | 0.790819E+03 | 0.627784E+03 | 0.230873E+00 |
| 2005 | 0.188245E+03 | 0.233488E+03 | -0.215388E+00 |
| 2006 | 0.178395E+04 | 0.161956E+04 | 0.966774E-01 |
| 2007 | 0.513096E+03 | 0.354103E+03 | 0.370876E+00 |
| 2008 | 0.790272E+03 | 0.802993E+03 | -0.159690E-01 |

Survey Index: 4 Tag: spr_36 AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.316089E+00 % Variance Contribution = 3.7219
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.242136E+04 | N/A |
| 1979 | N/A | 0.425697E+04 | N/A |
| 1980 | N/A | 0.629366E+03 | N/A |
| 1981 | N/A | 0.274021E+04 | N/A |
| 1982 | 0.113717E+05 | 0.211816E+04 | 0.168058E+01 |
| 1983 | 0.108767E+04 | 0.174476E+04 | -0.472583E+00 |
| 1984 | 0.169147E+04 | 0.282464E+04 | -0.512783E+00 |
| 1985 | 0.151675E+04 | 0.111018E+04 | 0.312051E+00 |
| 1986 | 0.498889E+03 | 0.652071E+03 | -0.267770E+00 |
| 1987 | 0.104272E+04 | 0.195689E+04 | -0.629522E+00 |
| 1988 | 0.558450E+03 | 0.833493E+03 | -0.400461E+00 |
| 1989 | 0.216263E+04 | 0.335380E+04 | -0.438769E+00 |
| 1990 | 0.921005E+03 | 0.167685E+04 | -0.599206E+00 |
| 1991 | 0.126894E+04 | 0.212050E+04 | -0.513469E+00 |
| 1992 | 0.229637E+03 | 0.656061E+03 | -0.104975E+01 |
| 1993 | 0.280454E+03 | 0.654340E+03 | -0.847215E+00 |
| 1994 | 0.295755E+03 | 0.101596E+04 | -0.123406E+01 |
| 1995 | 0.729482E+03 | 0.466430E+03 | 0.447226E+00 |
| 1996 | 0.170376E+04 | 0.110617E+04 | 0.431932E+00 |
| 1997 | 0.667462E+03 | 0.645705E+03 | 0.331410E-01 |
| 1998 | 0.115816E+04 | 0.395670E+03 | 0.107400E+01 |
| 1999 | 0.696287E+03 | 0.617105E+03 | 0.120722E+00 |
| 2000 | 0.155882E+04 | 0.103950E+04 | 0.405195E+00 |
| 2001 | 0.218845E+03 | 0.557473E+03 | -0.935052E+00 |
| 2002 | 0.135651E+04 | 0.116630E+04 | 0.151080E+00 |

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2003     0.850380E+03     0.543852E+03     0.447005E+00
2004     0.192138E+04     0.352281E+03     0.169637E+01
2005     0.861991E+03     0.748876E+03     0.140671E+00
2006     0.453399E+03     0.267099E+03     0.529152E+00
2007     0.245032E+04     0.201089E+04     0.197642E+00
2008     0.479901E+03     0.379823E+03     0.233874E+00

Survey Index:    5 Tag:         spr_36   AGE =  5
Time = JAN-1           Type = NUMBER
Catchability =    0.402164E+00   % Variance Contribution =     4.4165
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
_____________________________________________________________________

1978     N/A              0.119316E+04     N/A
1979     N/A              0.164587E+04     N/A
1980     N/A              0.278155E+04     N/A
1981     N/A              0.458814E+03     N/A
1982     0.848057E+04     0.188551E+04     0.150358E+01
1983     0.952152E+03     0.113281E+04    -0.173731E+00
1984     0.576892E+03     0.855716E+03    -0.394284E+00
1985     0.192930E+04     0.174363E+04     0.101187E+00
1986     0.737679E+03     0.549920E+03     0.293736E+00
1987     0.848330E+02     0.369872E+03    -0.147247E+01
1988     0.879067E+03     0.125638E+04    -0.357130E+00
1989     0.321163E+03     0.481806E+03    -0.405591E+00
1990     0.124572E+04     0.196268E+04    -0.454595E+00
1991     0.654075E+03     0.103935E+04    -0.463129E+00
1992     0.372801E+03     0.107426E+04    -0.105835E+01
1993     0.122263E+03     0.299661E+03    -0.896473E+00
1994     0.453536E+02     0.244043E+03    -0.168285E+01
1995     0.818277E+03     0.349092E+03     0.851866E+00
1996     0.237970E+03     0.245232E+03    -0.300622E-01
1997     0.576892E+03     0.694826E+03    -0.186007E+00
1998     0.103125E+04     0.306567E+03     0.121309E+01
1999     0.325398E+03     0.234259E+03     0.328623E+00
2000     0.505856E+03     0.336379E+03     0.408013E+00
2001     0.522795E+03     0.666086E+03    -0.242228E+00
2002     0.327038E+03     0.310469E+03     0.519894E-01
2003     0.951332E+03     0.669490E+03     0.351347E+00
2004     0.184952E+04     0.279009E+03     0.189144E+01
2005     0.374850E+03     0.272933E+03     0.317299E+00
2006     0.988216E+03     0.571052E+03     0.548421E+00
2007     0.247122E+03     0.202956E+03     0.196896E+00
2008     0.131225E+04     0.166917E+04    -0.240583E+00
```

Survey Index:  6 Tag:  spr_36  AGE =  6
Time = JAN-1  Type = NUMBER
Catchability =  0.408966E+00  % Variance Contribution =  4.1235
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.516862E+03 | N/A |
| 1979 | N/A | 0.664295E+03 | N/A |
| 1980 | N/A | 0.927325E+03 | N/A |
| 1981 | N/A | 0.141277E+04 | N/A |
| 1982 | 0.400122E+03 | 0.265264E+03 | 0.411044E+00 |
| 1983 | 0.605306E+03 | 0.824229E+03 | -0.308714E+00 |
| 1984 | 0.546975E+03 | 0.520515E+03 | 0.495839E-01 |
| 1985 | 0.362555E+03 | 0.374729E+03 | -0.330267E-01 |
| 1986 | 0.844096E+03 | 0.686242E+03 | 0.207035E+00 |
| 1987 | 0.245073E+03 | 0.265528E+03 | -0.801644E-01 |
| 1988 | 0.874286E+02 | 0.198035E+03 | -0.817621E+00 |
| 1989 | 0.479628E+03 | 0.471524E+03 | 0.170410E-01 |
| 1990 | 0.178136E+03 | 0.260474E+03 | -0.379956E+00 |
| 1991 | 0.448208E+03 | 0.804430E+03 | -0.584877E+00 |
| 1992 | 0.194529E+03 | 0.340640E+03 | -0.560246E+00 |
| 1993 | 0.188791E+03 | 0.348724E+03 | -0.613638E+00 |
| 1994 | 0.778660E+01 | 0.772038E+02 | -0.229404E+01 |
| 1995 | 0.145760E+03 | 0.494726E+02 | 0.108054E+01 |
| 1996 | 0.284826E+03 | 0.150930E+03 | 0.635065E+00 |
| 1997 | 0.680304E+02 | 0.110445E+03 | -0.484560E+00 |
| 1998 | 0.727570E+03 | 0.256647E+03 | 0.104201E+01 |
| 1999 | 0.162972E+03 | 0.114647E+03 | 0.351720E+00 |
| 2000 | 0.139886E+03 | 0.904873E+02 | 0.435616E+00 |
| 2001 | 0.241248E+03 | 0.164418E+03 | 0.383413E+00 |
| 2002 | 0.306956E+03 | 0.299063E+03 | 0.260502E-01 |
| 2003 | 0.875652E+02 | 0.125102E+03 | -0.356744E+00 |
| 2004 | 0.121922E+04 | 0.226003E+03 | 0.168542E+01 |
| 2005 | 0.280454E+03 | 0.117751E+03 | 0.867840E+00 |
| 2006 | 0.290700E+03 | 0.174091E+03 | 0.512714E+00 |
| 2007 | 0.285782E+03 | 0.340941E+03 | -0.176479E+00 |
| 2008 | 0.516375E+02 | 0.142489E+03 | -0.101502E+01 |

Survey Index:  7 Tag:  spr_36  AGE =  7
Time = JAN-1  Type = NUMBER
Catchability =  0.427224E+00  % Variance Contribution =  5.9587
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.517738E+03 | N/A |
| 1979 | N/A | 0.373407E+03 | N/A |
| 1980 | N/A | 0.395609E+03 | N/A |
| 1981 | N/A | 0.417749E+03 | N/A |
| 1982 | 0.254868E+04 | 0.670954E+03 | 0.133463E+01 |
| 1983 | 0.371571E+02 | 0.113517E+03 | -0.111680E+01 |
| 1984 | 0.285236E+03 | 0.419358E+03 | -0.385408E+00 |
| 1985 | 0.262149E+03 | 0.231313E+03 | 0.125142E+00 |
| 1986 | 0.842866E+02 | 0.131658E+03 | -0.445982E+00 |

| | | | |
|---|---|---|---|
| 1987 | 0.185103E+03 | 0.351439E+03 | -0.641124E+00 |
| 1988 | 0.505446E+02 | 0.131526E+03 | -0.956345E+00 |
| 1989 | 0.689866E+02 | 0.839973E+02 | -0.196872E+00 |
| 1990 | 0.195485E+03 | 0.199499E+03 | -0.203288E-01 |
| 1991 | 0.739045E+02 | 0.134524E+03 | -0.598966E+00 |
| 1992 | 0.216796E+03 | 0.274393E+03 | -0.235605E+00 |
| 1993 | 0.400259E+02 | 0.120883E+03 | -0.110530E+01 |
| 1994 | 0.602438E+02 | 0.953431E+02 | -0.459083E+00 |
| 1995 | 0.319114E+03 | 0.288724E+02 | 0.240266E+01 |
| 1996 | 0.378402E+02 | 0.265352E+02 | 0.354898E+00 |
| 1997 | 0.182917E+03 | 0.590595E+02 | 0.113049E+01 |
| 1998 | 0.138793E+03 | 0.382960E+02 | 0.128764E+01 |
| 1999 | 0.868821E+02 | 0.110674E+03 | -0.242038E+00 |
| 2000 | 0.348348E+02 | 0.500415E+02 | -0.362236E+00 |
| 2001 | 0.315563E+02 | 0.437492E+02 | -0.326701E+00 |
| 2002 | 0.532768E+02 | 0.717704E+02 | -0.297971E+00 |
| 2003 | 0.108603E+03 | 0.114295E+03 | -0.510902E-01 |
| 2004 | 0.243980E+03 | 0.475882E+02 | 0.163450E+01 |
| 2005 | 0.174037E+03 | 0.967652E+02 | 0.586983E+00 |
| 2006 | 0.165704E+03 | 0.601494E+02 | 0.101338E+01 |
| 2007 | 0.422116E+02 | 0.121665E+03 | -0.105858E+01 |
| 2008 | 0.614732E+02 | 0.241894E+03 | -0.136990E+01 |

Survey Index: 8 Tag: spr_36 AGE = 8
Time = JAN-1 Type = NUMBER
Catchability = 0.517786E+00 % Variance Contribution = 3.4338
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.424445E+02 | N/A |
| 1979 | N/A | 0.401573E+03 | N/A |
| 1980 | N/A | 0.296199E+03 | N/A |
| 1981 | N/A | 0.199172E+03 | N/A |
| 1982 | 0.503397E+03 | 0.221488E+03 | 0.821012E+00 |
| 1983 | 0.298623E+03 | 0.338660E+03 | -0.125813E+00 |
| 1984 | N/A | 0.687540E+02 | N/A |
| 1985 | 0.245756E+03 | 0.207895E+03 | 0.167306E+00 |
| 1986 | 0.170895E+03 | 0.106124E+03 | 0.476443E+00 |
| 1987 | 0.448071E+02 | 0.908907E+02 | -0.707291E+00 |
| 1988 | 0.672107E+02 | 0.220010E+03 | -0.118584E+01 |
| 1989 | 0.539598E+02 | 0.610824E+02 | -0.123985E+00 |
| 1990 | 0.176223E+02 | 0.456522E+02 | -0.951887E+00 |
| 1991 | 0.554625E+02 | 0.920049E+02 | -0.506135E+00 |
| 1992 | 0.267750E+02 | 0.681236E+02 | -0.933855E+00 |
| 1993 | 0.469929E+02 | 0.108255E+03 | -0.834493E+00 |
| 1994 | N/A | 0.382234E+02 | N/A |
| 1995 | 0.382500E+02 | 0.275734E+02 | 0.327294E+00 |
| 1996 | 0.247259E+02 | 0.187106E+02 | 0.278764E+00 |
| 1997 | 0.274580E+02 | 0.180107E+02 | 0.421694E+00 |
| 1998 | 0.422116E+02 | 0.153890E+02 | 0.100904E+01 |
| 1999 | 0.416652E+02 | 0.194048E+02 | 0.764146E+00 |
| 2000 | 0.274580E+02 | 0.435692E+02 | -0.461693E+00 |
| 2001 | 0.241795E+02 | 0.282009E+02 | -0.153848E+00 |
| 2002 | N/A | 0.181436E+02 | N/A |
| 2003 | 0.168027E+02 | 0.321143E+02 | -0.647762E+00 |
| 2004 | 0.356818E+03 | 0.477458E+02 | 0.201133E+01 |

| | | | |
|---|---|---|---|
| 2005 | 0.407089E+02 | 0.203667E+02 | 0.692547E+00 |
| 2006 | 0.736313E+02 | 0.564696E+02 | 0.265367E+00 |
| 2007 | 0.247259E+02 | 0.451595E+02 | -0.602348E+00 |
| 2008 | N/A | 0.113157E+03 | N/A |

Survey Index: 9 Tag: spr_41 AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.141338E-01 % Variance Contribution = 1.7874
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.477900E+03 | 0.405710E+03 | 0.163763E+00 |
| 1979 | 0.550671E+03 | 0.366665E+03 | 0.406688E+00 |
| 1980 | 0.401143E+02 | 0.323854E+03 | -0.208856E+01 |
| 1981 | 0.295997E+04 | 0.648606E+03 | 0.151811E+01 |
| 1982 | N/A | 0.280737E+03 | N/A |
| 1983 | N/A | 0.159787E+03 | N/A |
| 1984 | N/A | 0.410170E+03 | N/A |
| 1985 | N/A | 0.135900E+03 | N/A |
| 1986 | N/A | 0.629030E+03 | N/A |
| 1987 | N/A | 0.252967E+03 | N/A |
| 1988 | N/A | 0.351286E+03 | N/A |
| 1989 | N/A | 0.252270E+03 | N/A |
| 1990 | N/A | 0.144225E+03 | N/A |
| 1991 | N/A | 0.279797E+03 | N/A |
| 1992 | N/A | 0.105581E+03 | N/A |
| 1993 | N/A | 0.139549E+03 | N/A |
| 1994 | N/A | 0.892983E+02 | N/A |
| 1995 | N/A | 0.555184E+02 | N/A |
| 1996 | N/A | 0.945549E+02 | N/A |
| 1997 | N/A | 0.150831E+03 | N/A |
| 1998 | N/A | 0.703313E+02 | N/A |
| 1999 | N/A | 0.175242E+03 | N/A |
| 2000 | N/A | 0.870463E+02 | N/A |
| 2001 | N/A | 0.403988E+02 | N/A |
| 2002 | N/A | 0.754484E+02 | N/A |
| 2003 | N/A | 0.280280E+02 | N/A |
| 2004 | N/A | 0.191126E+03 | N/A |
| 2005 | N/A | 0.416192E+02 | N/A |
| 2006 | N/A | 0.101450E+03 | N/A |
| 2007 | N/A | 0.999029E+02 | N/A |
| 2008 | N/A | 0.729069E+02 | N/A |

Survey Index:  10 Tag:  spr_41  AGE =  2
Time = JAN-1  Type = NUMBER
Catchability =  0.899870E-01  % Variance Contribution =  0.1682
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.246600E+03 | 0.423564E+03 | -0.540937E+00 |
| 1979 | 0.166847E+04 | 0.210252E+04 | -0.231231E+00 |
| 1980 | 0.285043E+04 | 0.188863E+04 | 0.411618E+00 |
| 1981 | 0.238140E+04 | 0.166053E+04 | 0.360549E+00 |
| 1982 | N/A | 0.328194E+04 | N/A |
| 1983 | N/A | 0.140041E+04 | N/A |
| 1984 | N/A | 0.782072E+03 | N/A |
| 1985 | N/A | 0.211527E+04 | N/A |
| 1986 | N/A | 0.694104E+03 | N/A |
| 1987 | N/A | 0.321651E+04 | N/A |
| 1988 | N/A | 0.131021E+04 | N/A |
| 1989 | N/A | 0.180474E+04 | N/A |
| 1990 | N/A | 0.124261E+04 | N/A |
| 1991 | N/A | 0.745965E+03 | N/A |
| 1992 | N/A | 0.143585E+04 | N/A |
| 1993 | N/A | 0.534788E+03 | N/A |
| 1994 | N/A | 0.703123E+03 | N/A |
| 1995 | N/A | 0.457814E+03 | N/A |
| 1996 | N/A | 0.286776E+03 | N/A |
| 1997 | N/A | 0.487612E+03 | N/A |
| 1998 | N/A | 0.775927E+03 | N/A |
| 1999 | N/A | 0.361472E+03 | N/A |
| 2000 | N/A | 0.909607E+03 | N/A |
| 2001 | N/A | 0.444524E+03 | N/A |
| 2002 | N/A | 0.209636E+03 | N/A |
| 2003 | N/A | 0.390559E+03 | N/A |
| 2004 | N/A | 0.144720E+03 | N/A |
| 2005 | N/A | 0.992178E+03 | N/A |
| 2006 | N/A | 0.215949E+03 | N/A |
| 2007 | N/A | 0.526163E+03 | N/A |
| 2008 | N/A | 0.519903E+03 | N/A |

Survey Index:  11 Tag:  spr_41  AGE =  3
Time = JAN-1  Type = NUMBER
Catchability =  0.198731E+00  % Variance Contribution =  0.1728
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.711116E+04 | 0.503439E+04 | 0.345372E+00 |
| 1979 | 0.353700E+03 | 0.691159E+03 | -0.669921E+00 |
| 1980 | 0.345806E+04 | 0.339976E+04 | 0.170022E-01 |
| 1981 | 0.361389E+04 | 0.265710E+04 | 0.307547E+00 |
| 1982 | N/A | 0.230348E+04 | N/A |
| 1983 | N/A | 0.406860E+04 | N/A |
| 1984 | N/A | 0.160886E+04 | N/A |
| 1985 | N/A | 0.113724E+04 | N/A |

| | | | |
|---|---|---|---|
| 1986 | N/A | 0.249777E+04 | N/A |
| 1987 | N/A | 0.970074E+03 | N/A |
| 1988 | N/A | 0.439420E+04 | N/A |
| 1989 | N/A | 0.194813E+04 | N/A |
| 1990 | N/A | 0.279610E+04 | N/A |
| 1991 | N/A | 0.125798E+04 | N/A |
| 1992 | N/A | 0.998155E+03 | N/A |
| 1993 | N/A | 0.173871E+04 | N/A |
| 1994 | N/A | 0.692937E+03 | N/A |
| 1995 | N/A | 0.116117E+04 | N/A |
| 1996 | N/A | 0.710890E+03 | N/A |
| 1997 | N/A | 0.467039E+03 | N/A |
| 1998 | N/A | 0.758962E+03 | N/A |
| 1999 | N/A | 0.123835E+04 | N/A |
| 2000 | N/A | 0.589732E+03 | N/A |
| 2001 | N/A | 0.147566E+04 | N/A |
| 2002 | N/A | 0.674910E+03 | N/A |
| 2003 | N/A | 0.358781E+03 | N/A |
| 2004 | N/A | 0.670073E+03 | N/A |
| 2005 | N/A | 0.249216E+03 | N/A |
| 2006 | N/A | 0.172866E+04 | N/A |
| 2007 | N/A | 0.377956E+03 | N/A |
| 2008 | N/A | 0.857085E+03 | N/A |

Survey Index:  12 Tag:  spr_41  AGE =  4
Time = JAN-1  Type = NUMBER
Catchability =  0.177261E+00  % Variance Contribution =  0.0498
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.124907E+04 | 0.135789E+04 | -0.835318E-01 |
| 1979 | 0.238050E+04 | 0.238729E+04 | -0.284902E-02 |
| 1980 | 0.272957E+03 | 0.352946E+03 | -0.257001E+00 |
| 1981 | 0.216630E+04 | 0.153670E+04 | 0.343382E+00 |
| 1982 | N/A | 0.118786E+04 | N/A |
| 1983 | N/A | 0.978455E+03 | N/A |
| 1984 | N/A | 0.158405E+04 | N/A |
| 1985 | N/A | 0.622583E+03 | N/A |
| 1986 | N/A | 0.365679E+03 | N/A |
| 1987 | N/A | 0.109742E+04 | N/A |
| 1988 | N/A | 0.467420E+03 | N/A |
| 1989 | N/A | 0.188080E+04 | N/A |
| 1990 | N/A | 0.940372E+03 | N/A |
| 1991 | N/A | 0.118917E+04 | N/A |
| 1992 | N/A | 0.367917E+03 | N/A |
| 1993 | N/A | 0.366951E+03 | N/A |
| 1994 | N/A | 0.569748E+03 | N/A |
| 1995 | N/A | 0.261573E+03 | N/A |
| 1996 | N/A | 0.620339E+03 | N/A |
| 1997 | N/A | 0.362109E+03 | N/A |
| 1998 | N/A | 0.221891E+03 | N/A |
| 1999 | N/A | 0.346070E+03 | N/A |
| 2000 | N/A | 0.582946E+03 | N/A |
| 2001 | N/A | 0.312629E+03 | N/A |
| 2002 | N/A | 0.654056E+03 | N/A |
| 2003 | N/A | 0.304990E+03 | N/A |

| | | | |
|---|---|---|---|
| 2004 | N/A | 0.197558E+03 | N/A |
| 2005 | N/A | 0.419967E+03 | N/A |
| 2006 | N/A | 0.149788E+03 | N/A |
| 2007 | N/A | 0.112770E+04 | N/A |
| 2008 | N/A | 0.213004E+03 | N/A |

Survey Index: 13 Tag: spr_41 AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.216299E+00 % Variance Contribution = 0.1953
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.999771E+03 | 0.641727E+03 | 0.443364E+00 |
| 1979 | 0.702771E+03 | 0.885211E+03 | -0.230795E+00 |
| 1980 | 0.219214E+04 | 0.149602E+04 | 0.382068E+00 |
| 1981 | 0.136157E+03 | 0.246768E+03 | -0.594637E+00 |
| 1982 | N/A | 0.101410E+04 | N/A |
| 1983 | N/A | 0.609268E+03 | N/A |
| 1984 | N/A | 0.460237E+03 | N/A |
| 1985 | N/A | 0.937793E+03 | N/A |
| 1986 | N/A | 0.295768E+03 | N/A |
| 1987 | N/A | 0.198931E+03 | N/A |
| 1988 | N/A | 0.675730E+03 | N/A |
| 1989 | N/A | 0.259133E+03 | N/A |
| 1990 | N/A | 0.105560E+04 | N/A |
| 1991 | N/A | 0.559003E+03 | N/A |
| 1992 | N/A | 0.577780E+03 | N/A |
| 1993 | N/A | 0.161169E+03 | N/A |
| 1994 | N/A | 0.131256E+03 | N/A |
| 1995 | N/A | 0.187755E+03 | N/A |
| 1996 | N/A | 0.131895E+03 | N/A |
| 1997 | N/A | 0.373704E+03 | N/A |
| 1998 | N/A | 0.164883E+03 | N/A |
| 1999 | N/A | 0.125993E+03 | N/A |
| 2000 | N/A | 0.180918E+03 | N/A |
| 2001 | N/A | 0.358247E+03 | N/A |
| 2002 | N/A | 0.166982E+03 | N/A |
| 2003 | N/A | 0.360077E+03 | N/A |
| 2004 | N/A | 0.150062E+03 | N/A |
| 2005 | N/A | 0.146794E+03 | N/A |
| 2006 | N/A | 0.307134E+03 | N/A |
| 2007 | N/A | 0.109157E+03 | N/A |
| 2008 | N/A | 0.897742E+03 | N/A |

Survey Index:  14 Tag:  spr_41  AGE =  6
Time = JAN-1  Type = NUMBER
Catchability =  0.207689E+00  % Variance Contribution =  0.0917
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.182057E+03 | 0.262483E+03 | -0.365866E+00 |
| 1979 | 0.302786E+03 | 0.337355E+03 | -0.108111E+00 |
| 1980 | 0.480471E+03 | 0.470932E+03 | 0.200532E-01 |
| 1981 | 0.112963E+04 | 0.717462E+03 | 0.453924E+00 |
| 1982 | N/A | 0.134712E+03 | N/A |
| 1983 | N/A | 0.418576E+03 | N/A |
| 1984 | N/A | 0.264338E+03 | N/A |
| 1985 | N/A | 0.190302E+03 | N/A |
| 1986 | N/A | 0.348501E+03 | N/A |
| 1987 | N/A | 0.134846E+03 | N/A |
| 1988 | N/A | 0.100570E+03 | N/A |
| 1989 | N/A | 0.239458E+03 | N/A |
| 1990 | N/A | 0.132279E+03 | N/A |
| 1991 | N/A | 0.408522E+03 | N/A |
| 1992 | N/A | 0.172990E+03 | N/A |
| 1993 | N/A | 0.177096E+03 | N/A |
| 1994 | N/A | 0.392072E+02 | N/A |
| 1995 | N/A | 0.251241E+02 | N/A |
| 1996 | N/A | 0.766480E+02 | N/A |
| 1997 | N/A | 0.560882E+02 | N/A |
| 1998 | N/A | 0.130335E+03 | N/A |
| 1999 | N/A | 0.582225E+02 | N/A |
| 2000 | N/A | 0.459530E+02 | N/A |
| 2001 | N/A | 0.834981E+02 | N/A |
| 2002 | N/A | 0.151876E+03 | N/A |
| 2003 | N/A | 0.635317E+02 | N/A |
| 2004 | N/A | 0.114773E+03 | N/A |
| 2005 | N/A | 0.597986E+02 | N/A |
| 2006 | N/A | 0.884103E+02 | N/A |
| 2007 | N/A | 0.173143E+03 | N/A |
| 2008 | N/A | 0.723618E+02 | N/A |

Survey Index:  15 Tag:  spr_41  AGE =  7
Time = JAN-1  Type = NUMBER
Catchability =  0.300243E+00  % Variance Contribution =  0.4397
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.915814E+03 | 0.363855E+03 | 0.923058E+00 |
| 1979 | 0.107486E+03 | 0.262422E+03 | -0.892596E+00 |
| 1980 | 0.238500E+03 | 0.278025E+03 | -0.153343E+00 |
| 1981 | 0.331971E+03 | 0.293585E+03 | 0.122881E+00 |
| 1982 | N/A | 0.471532E+03 | N/A |
| 1983 | N/A | 0.797775E+02 | N/A |
| 1984 | N/A | 0.294715E+03 | N/A |
| 1985 | N/A | 0.162562E+03 | N/A |
| 1986 | N/A | 0.925261E+02 | N/A |

| | | | |
|---|---|---|---|
| 1987 | N/A | 0.246983E+03 | N/A |
| 1988 | N/A | 0.924333E+02 | N/A |
| 1989 | N/A | 0.590315E+02 | N/A |
| 1990 | N/A | 0.140204E+03 | N/A |
| 1991 | N/A | 0.945403E+02 | N/A |
| 1992 | N/A | 0.192837E+03 | N/A |
| 1993 | N/A | 0.849539E+02 | N/A |
| 1994 | N/A | 0.670051E+02 | N/A |
| 1995 | N/A | 0.202909E+02 | N/A |
| 1996 | N/A | 0.186484E+02 | N/A |
| 1997 | N/A | 0.415057E+02 | N/A |
| 1998 | N/A | 0.269136E+02 | N/A |
| 1999 | N/A | 0.777793E+02 | N/A |
| 2000 | N/A | 0.351681E+02 | N/A |
| 2001 | N/A | 0.307460E+02 | N/A |
| 2002 | N/A | 0.504386E+02 | N/A |
| 2003 | N/A | 0.803243E+02 | N/A |
| 2004 | N/A | 0.334440E+02 | N/A |
| 2005 | N/A | 0.680045E+02 | N/A |
| 2006 | N/A | 0.422717E+02 | N/A |
| 2007 | N/A | 0.855034E+02 | N/A |
| 2008 | N/A | 0.169998E+03 | N/A |

Survey Index: 16 Tag: spr_41 AGE = 8
Time = JAN-1 Type = NUMBER
Catchability = 0.291472E+00 % Variance Contribution = 1.0030
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.837000E+02 | 0.238929E+02 | 0.125366E+01 |
| 1979 | 0.178200E+03 | 0.226054E+03 | -0.237867E+00 |
| 1980 | 0.398571E+02 | 0.166737E+03 | -0.143111E+01 |
| 1981 | 0.169843E+03 | 0.112118E+03 | 0.415324E+00 |
| 1982 | N/A | 0.124680E+03 | N/A |
| 1983 | N/A | 0.190639E+03 | N/A |
| 1984 | N/A | 0.387030E+02 | N/A |
| 1985 | N/A | 0.117028E+03 | N/A |
| 1986 | N/A | 0.597394E+02 | N/A |
| 1987 | N/A | 0.511642E+02 | N/A |
| 1988 | N/A | 0.123848E+03 | N/A |
| 1989 | N/A | 0.343846E+02 | N/A |
| 1990 | N/A | 0.256986E+02 | N/A |
| 1991 | N/A | 0.517915E+02 | N/A |
| 1992 | N/A | 0.383482E+02 | N/A |
| 1993 | N/A | 0.609389E+02 | N/A |
| 1994 | N/A | 0.215168E+02 | N/A |
| 1995 | N/A | 0.155216E+02 | N/A |
| 1996 | N/A | 0.105326E+02 | N/A |
| 1997 | N/A | 0.101386E+02 | N/A |
| 1998 | N/A | 0.866276E+01 | N/A |
| 1999 | N/A | 0.109234E+02 | N/A |
| 2000 | N/A | 0.245260E+02 | N/A |
| 2001 | N/A | 0.158749E+02 | N/A |
| 2002 | N/A | 0.102134E+02 | N/A |
| 2003 | N/A | 0.180778E+02 | N/A |

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2004     N/A              0.268771E+02     N/A
2005     N/A              0.114648E+02     N/A
2006     N/A              0.317879E+02     N/A
2007     N/A              0.254212E+02     N/A
2008     N/A              0.636984E+02     N/A

Survey Index:   17 Tag:         sp_can   AGE =  1
Time = JAN-1           Type = NUMBER
Catchability =    0.209249E-01   % Variance Contribution =     5.7602
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.600650E+03     N/A
1979     N/A              0.542845E+03     N/A
1980     N/A              0.479463E+03     N/A
1981     N/A              0.960256E+03     N/A
1982     N/A              0.415628E+03     N/A
1983     N/A              0.236563E+03     N/A
1984     N/A              0.607253E+03     N/A
1985     N/A              0.201198E+03     N/A
1986     0.844432E+03     0.931273E+03    -0.978887E-01
1987     0.351846E+03     0.374515E+03    -0.624372E-01
1988     0.394068E+03     0.520075E+03    -0.277450E+00
1989     0.229404E+04     0.373484E+03     0.181520E+01
1990     0.591102E+03     0.213523E+03     0.101824E+01
1991     0.166072E+04     0.414237E+03     0.138857E+01
1992     0.154812E+03     0.156312E+03    -0.963945E-02
1993     N/A              0.206602E+03     N/A
1994     N/A              0.132205E+03     N/A
1995     0.985170E+02     0.821945E+02     0.181141E+00
1996     0.197034E+03     0.139988E+03     0.341822E+00
1997     0.450363E+03     0.223305E+03     0.701519E+00
1998     0.140739E+02     0.104125E+03    -0.200127E+01
1999     0.464437E+03     0.259444E+03     0.582286E+00
2000     0.140739E+03     0.128871E+03     0.880899E-01
2001     N/A              0.598101E+02     N/A
2002     0.128934E+02     0.111701E+03    -0.215911E+01
2003     N/A              0.414953E+02     N/A
2004     0.753776E+03     0.282960E+03     0.979790E+00
2005     0.344185E+02     0.616168E+02    -0.582341E+00
2006     N/A              0.150196E+03     N/A
2007     0.193318E+03     0.147905E+03     0.267764E+00
2008     0.122714E+02     0.107938E+03    -0.217429E+01

Survey Index:   18 Tag:         sp_can   AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.981470E-01   % Variance Contribution =     4.9873
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.461972E+03     N/A
1979     N/A              0.229318E+04     N/A
```

| | | | |
|---|---|---|---|
| 1980 | N/A | 0.205989E+04 | N/A |
| 1981 | N/A | 0.181111E+04 | N/A |
| 1982 | N/A | 0.357954E+04 | N/A |
| 1983 | N/A | 0.152740E+04 | N/A |
| 1984 | N/A | 0.852989E+03 | N/A |
| 1985 | N/A | 0.230708E+04 | N/A |
| 1986 | 0.319477E+04 | 0.757045E+03 | 0.143985E+01 |
| 1987 | 0.299773E+04 | 0.350819E+04 | -0.157243E+00 |
| 1988 | 0.142146E+04 | 0.142901E+04 | -0.530002E-02 |
| 1989 | 0.391253E+04 | 0.196840E+04 | 0.686965E+00 |
| 1990 | 0.343402E+04 | 0.135529E+04 | 0.929717E+00 |
| 1991 | 0.163257E+04 | 0.813609E+03 | 0.696430E+00 |
| 1992 | 0.402512E+04 | 0.156605E+04 | 0.943998E+00 |
| 1993 | N/A | 0.583283E+03 | N/A |
| 1994 | N/A | 0.766882E+03 | N/A |
| 1995 | 0.942949E+03 | 0.499329E+03 | 0.635747E+00 |
| 1996 | 0.689619E+03 | 0.312780E+03 | 0.790638E+00 |
| 1997 | 0.745915E+03 | 0.531829E+03 | 0.338290E+00 |
| 1998 | 0.942949E+03 | 0.846287E+03 | 0.108153E+00 |
| 1999 | 0.450363E+03 | 0.394250E+03 | 0.133070E+00 |
| 2000 | 0.619250E+03 | 0.992090E+03 | -0.471305E+00 |
| 2001 | 0.844432E+02 | 0.484833E+03 | -0.174773E+01 |
| 2002 | 0.121746E+03 | 0.228646E+03 | -0.630241E+00 |
| 2003 | 0.313603E+02 | 0.425975E+03 | -0.260884E+01 |
| 2004 | 0.134499E+03 | 0.157843E+03 | -0.160049E+00 |
| 2005 | 0.188003E+04 | 0.108215E+04 | 0.552337E+00 |
| 2006 | 0.527756E+02 | 0.235531E+03 | -0.149579E+01 |
| 2007 | 0.730710E+03 | 0.573875E+03 | 0.241605E+00 |
| 2008 | 0.454928E+03 | 0.567047E+03 | -0.220303E+00 |

Survey Index:  19 Tag:  sp_can  AGE =  3
Time = JAN-1  Type = NUMBER
Catchability =  0.327191E+00  % Variance Contribution =  1.1512
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.828862E+04 | N/A |
| 1979 | N/A | 0.113792E+04 | N/A |
| 1980 | N/A | 0.559736E+04 | N/A |
| 1981 | N/A | 0.437466E+04 | N/A |
| 1982 | N/A | 0.379245E+04 | N/A |
| 1983 | N/A | 0.669854E+04 | N/A |
| 1984 | N/A | 0.264883E+04 | N/A |
| 1985 | N/A | 0.187236E+04 | N/A |
| 1986 | 0.395475E+04 | 0.411233E+04 | -0.390703E-01 |
| 1987 | 0.130887E+04 | 0.159713E+04 | -0.199044E+00 |
| 1988 | 0.655842E+04 | 0.723462E+04 | -0.981279E-01 |
| 1989 | 0.194219E+04 | 0.320741E+04 | -0.501645E+00 |
| 1990 | 0.531992E+04 | 0.460351E+04 | 0.144640E+00 |
| 1991 | 0.258959E+04 | 0.207114E+04 | 0.223403E+00 |
| 1992 | 0.249107E+04 | 0.164336E+04 | 0.415969E+00 |
| 1993 | N/A | 0.286260E+04 | N/A |
| 1994 | N/A | 0.114085E+04 | N/A |
| 1995 | 0.211108E+04 | 0.191174E+04 | 0.991842E-01 |
| 1996 | 0.325106E+04 | 0.117041E+04 | 0.102163E+01 |

| | | | |
|---|---|---|---|
| 1997 | 0.774062E+03 | 0.768933E+03 | 0.664815E-02 |
| 1998 | 0.133702E+04 | 0.124955E+04 | 0.676540E-01 |
| 1999 | 0.209701E+04 | 0.203882E+04 | 0.281383E-01 |
| 2000 | 0.147776E+04 | 0.970934E+03 | 0.420021E+00 |
| 2001 | 0.900727E+03 | 0.242953E+04 | -0.992251E+00 |
| 2002 | 0.805617E+03 | 0.111117E+04 | -0.321562E+00 |
| 2003 | 0.419145E+03 | 0.590697E+03 | -0.343086E+00 |
| 2004 | 0.551716E+03 | 0.110321E+04 | -0.692945E+00 |
| 2005 | 0.661996E+03 | 0.410309E+03 | 0.478347E+00 |
| 2006 | 0.197858E+04 | 0.284606E+04 | -0.363554E+00 |
| 2007 | 0.132932E+04 | 0.622267E+03 | 0.759053E+00 |
| 2008 | 0.125982E+04 | 0.141110E+04 | -0.113402E+00 |

Survey Index: 20 Tag: sp_can AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.615292E+00 % Variance Contribution = 1.7549
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.471337E+04 | N/A |
| 1979 | N/A | 0.828653E+04 | N/A |
| 1980 | N/A | 0.122511E+04 | N/A |
| 1981 | N/A | 0.533404E+04 | N/A |
| 1982 | N/A | 0.412317E+04 | N/A |
| 1983 | N/A | 0.339632E+04 | N/A |
| 1984 | N/A | 0.549839E+04 | N/A |
| 1985 | N/A | 0.216105E+04 | N/A |
| 1986 | 0.520733E+03 | 0.126931E+04 | -0.890991E+00 |
| 1987 | 0.153405E+04 | 0.380925E+04 | -0.909520E+00 |
| 1988 | 0.816284E+03 | 0.162246E+04 | -0.686938E+00 |
| 1989 | 0.401105E+04 | 0.652844E+04 | -0.487115E+00 |
| 1990 | 0.292736E+04 | 0.326412E+04 | -0.108889E+00 |
| 1991 | 0.302588E+04 | 0.412773E+04 | -0.310527E+00 |
| 1992 | 0.112591E+04 | 0.127707E+04 | -0.125982E+00 |
| 1993 | N/A | 0.127372E+04 | N/A |
| 1994 | N/A | 0.197765E+04 | N/A |
| 1995 | 0.121035E+04 | 0.907944E+03 | 0.287484E+00 |
| 1996 | 0.565769E+04 | 0.215326E+04 | 0.966034E+00 |
| 1997 | 0.175923E+04 | 0.125692E+04 | 0.336216E+00 |
| 1998 | 0.492585E+03 | 0.770204E+03 | -0.446988E+00 |
| 1999 | 0.153405E+04 | 0.120124E+04 | 0.244553E+00 |
| 2000 | 0.551695E+04 | 0.202346E+04 | 0.100301E+01 |
| 2001 | 0.591102E+03 | 0.108517E+04 | -0.607499E+00 |
| 2002 | 0.288708E+04 | 0.227029E+04 | 0.240336E+00 |
| 2003 | 0.912160E+03 | 0.105865E+04 | -0.148936E+00 |
| 2004 | 0.595577E+03 | 0.685744E+03 | -0.140973E+00 |
| 2005 | 0.409251E+04 | 0.145775E+04 | 0.103227E+01 |
| 2006 | 0.925621E+03 | 0.519930E+03 | 0.576770E+00 |
| 2007 | 0.413611E+04 | 0.391436E+04 | 0.551031E-01 |
| 2008 | 0.835776E+03 | 0.739357E+03 | 0.122580E+00 |

Survey Index: 21 Tag: sp_can AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.949463E+00 % Variance Contribution = 1.5410
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.281691E+04 | N/A |
| 1979 | N/A | 0.388570E+04 | N/A |
| 1980 | N/A | 0.656692E+04 | N/A |
| 1981 | N/A | 0.108321E+04 | N/A |
| 1982 | N/A | 0.445147E+04 | N/A |
| 1983 | N/A | 0.267443E+04 | N/A |
| 1984 | N/A | 0.202025E+04 | N/A |
| 1985 | N/A | 0.411652E+04 | N/A |
| 1986 | 0.914801E+03 | 0.129830E+04 | -0.350102E+00 |
| 1987 | 0.478511E+03 | 0.873224E+03 | -0.601512E+00 |
| 1988 | 0.143553E+04 | 0.296617E+04 | -0.725735E+00 |
| 1989 | 0.506659E+03 | 0.113749E+04 | -0.808738E+00 |
| 1990 | 0.544658E+04 | 0.463365E+04 | 0.161644E+00 |
| 1991 | 0.147776E+04 | 0.245379E+04 | -0.507108E+00 |
| 1992 | 0.137924E+04 | 0.253621E+04 | -0.609140E+00 |
| 1993 | N/A | 0.707464E+03 | N/A |
| 1994 | N/A | 0.576156E+03 | N/A |
| 1995 | 0.844432E+03 | 0.824164E+03 | 0.242937E-01 |
| 1996 | 0.153405E+04 | 0.578964E+03 | 0.974426E+00 |
| 1997 | 0.173108E+04 | 0.164040E+04 | 0.538060E-01 |
| 1998 | 0.492585E+03 | 0.723769E+03 | -0.384805E+00 |
| 1999 | 0.577028E+03 | 0.553058E+03 | 0.424293E-01 |
| 2000 | 0.240663E+04 | 0.794152E+03 | 0.110871E+01 |
| 2001 | 0.156220E+04 | 0.157255E+04 | -0.660507E-02 |
| 2002 | 0.961543E+03 | 0.732982E+03 | 0.271418E+00 |
| 2003 | 0.170676E+04 | 0.158059E+04 | 0.768030E-01 |
| 2004 | 0.634621E+03 | 0.658708E+03 | -0.372520E-01 |
| 2005 | 0.159149E+04 | 0.644363E+03 | 0.904163E+00 |
| 2006 | 0.229716E+04 | 0.134819E+04 | 0.532914E+00 |
| 2007 | 0.545841E+03 | 0.479154E+03 | 0.130305E+00 |
| 2008 | 0.306929E+04 | 0.394071E+04 | -0.249915E+00 |

Survey Index: 22 Tag: sp_can AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.112928E+01 % Variance Contribution = 3.0804
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.142722E+04 | N/A |
| 1979 | N/A | 0.183433E+04 | N/A |
| 1980 | N/A | 0.256064E+04 | N/A |
| 1981 | N/A | 0.390111E+04 | N/A |
| 1982 | N/A | 0.732478E+03 | N/A |
| 1983 | N/A | 0.227596E+04 | N/A |
| 1984 | N/A | 0.143731E+04 | N/A |
| 1985 | N/A | 0.103475E+04 | N/A |
| 1986 | 0.619250E+03 | 0.189493E+04 | -0.111843E+01 |
| 1987 | 0.168886E+03 | 0.733207E+03 | -0.146820E+01 |
| 1988 | 0.182960E+03 | 0.546837E+03 | -0.109488E+01 |
| 1989 | 0.591102E+03 | 0.130202E+04 | -0.789687E+00 |
| 1990 | 0.591102E+03 | 0.719250E+03 | -0.196220E+00 |
| 1991 | 0.184368E+04 | 0.222128E+04 | -0.186324E+00 |

| | | | |
|---|---|---|---|
| 1992 | 0.844432E+03 | 0.940613E+03 | -0.107868E+00 |
| 1993 | N/A | 0.962935E+03 | N/A |
| 1994 | N/A | 0.213184E+03 | N/A |
| 1995 | 0.267403E+03 | 0.136609E+03 | 0.671633E+00 |
| 1996 | 0.111183E+04 | 0.416764E+03 | 0.981247E+00 |
| 1997 | 0.379994E+03 | 0.304972E+03 | 0.219935E+00 |
| 1998 | 0.394068E+03 | 0.708683E+03 | -0.586884E+00 |
| 1999 | 0.365920E+03 | 0.316577E+03 | 0.144849E+00 |
| 2000 | 0.109776E+04 | 0.249864E+03 | 0.148011E+01 |
| 2001 | 0.731841E+03 | 0.454010E+03 | 0.477443E+00 |
| 2002 | 0.171816E+04 | 0.825808E+03 | 0.732647E+00 |
| 2003 | 0.447151E+03 | 0.345445E+03 | 0.258062E+00 |
| 2004 | 0.545454E+03 | 0.624065E+03 | -0.134636E+00 |
| 2005 | 0.721660E+03 | 0.325147E+03 | 0.797277E+00 |
| 2006 | 0.982657E+03 | 0.480720E+03 | 0.714976E+00 |
| 2007 | 0.851245E+03 | 0.941445E+03 | -0.100716E+00 |
| 2008 | 0.196496E+03 | 0.393458E+03 | -0.694333E+00 |

Survey Index: 23 Tag: sp_can AGE = 7
Time = JAN-1 Type = NUMBER
Catchability = 0.121718E+01 % Variance Contribution = 4.1028
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.147506E+04 | N/A |
| 1979 | N/A | 0.106385E+04 | N/A |
| 1980 | N/A | 0.112711E+04 | N/A |
| 1981 | N/A | 0.119019E+04 | N/A |
| 1982 | N/A | 0.191158E+04 | N/A |
| 1983 | N/A | 0.323416E+03 | N/A |
| 1984 | N/A | 0.119477E+04 | N/A |
| 1985 | N/A | 0.659020E+03 | N/A |
| 1986 | 0.365920E+03 | 0.375098E+03 | -0.247723E-01 |
| 1987 | 0.309625E+03 | 0.100126E+04 | -0.117366E+01 |
| 1988 | 0.112591E+03 | 0.374722E+03 | -0.120242E+01 |
| 1989 | 0.703693E+02 | 0.239312E+03 | -0.122401E+01 |
| 1990 | 0.130887E+04 | 0.568382E+03 | 0.834124E+00 |
| 1991 | 0.225182E+03 | 0.383264E+03 | -0.531815E+00 |
| 1992 | 0.605176E+03 | 0.781756E+03 | -0.256023E+00 |
| 1993 | N/A | 0.344401E+03 | N/A |
| 1994 | N/A | 0.271637E+03 | N/A |
| 1995 | 0.562954E+02 | 0.822586E+02 | -0.379256E+00 |
| 1996 | 0.464437E+03 | 0.756000E+02 | 0.181537E+01 |
| 1997 | 0.844432E+02 | 0.168263E+03 | -0.689450E+00 |
| 1998 | 0.985170E+02 | 0.109107E+03 | -0.102100E+00 |
| 1999 | 0.211108E+03 | 0.315315E+03 | -0.401203E+00 |
| 2000 | 0.562954E+03 | 0.142570E+03 | 0.137336E+01 |
| 2001 | 0.365920E+03 | 0.124643E+03 | 0.107696E+01 |
| 2002 | 0.563812E+03 | 0.204477E+03 | 0.101427E+01 |
| 2003 | 0.474404E+03 | 0.325632E+03 | 0.376289E+00 |
| 2004 | 0.103828E+03 | 0.135581E+03 | -0.266834E+00 |
| 2005 | 0.583521E+03 | 0.275688E+03 | 0.749810E+00 |
| 2006 | 0.283568E+03 | 0.171368E+03 | 0.503640E+00 |
| 2007 | 0.135474E+03 | 0.346628E+03 | -0.939474E+00 |
| 2008 | 0.396500E+03 | 0.689165E+03 | -0.552804E+00 |

Survey Index:  24 Tag:  sp_can  AGE =  8
Time = JAN-1  Type = NUMBER
Catchability =  0.128152E+01  % Variance Contribution =  4.6778
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.105050E+03 | N/A |
| 1979 | N/A | 0.993891E+03 | N/A |
| 1980 | N/A | 0.733091E+03 | N/A |
| 1981 | N/A | 0.492948E+03 | N/A |
| 1982 | N/A | 0.548181E+03 | N/A |
| 1983 | N/A | 0.838180E+03 | N/A |
| 1984 | N/A | 0.170165E+03 | N/A |
| 1985 | N/A | 0.514539E+03 | N/A |
| 1986 | 0.562954E+02 | 0.262656E+03 | -0.154023E+01 |
| 1987 | 0.112591E+03 | 0.224954E+03 | -0.692134E+00 |
| 1988 | 0.239256E+03 | 0.544524E+03 | -0.822379E+00 |
| 1989 | 0.140739E+03 | 0.151178E+03 | -0.715569E-01 |
| 1990 | 0.168886E+03 | 0.112989E+03 | 0.401936E+00 |
| 1991 | 0.309625E+03 | 0.227711E+03 | 0.307283E+00 |
| 1992 | 0.168886E+03 | 0.168605E+03 | 0.166526E-02 |
| 1993 | N/A | 0.267930E+03 | N/A |
| 1994 | N/A | 0.946027E+02 | N/A |
| 1995 | 0.703693E+02 | 0.682438E+02 | 0.306702E-01 |
| 1996 | 0.112591E+03 | 0.463085E+02 | 0.888436E+00 |
| 1997 | 0.422216E+02 | 0.445762E+02 | -0.542687E-01 |
| 1998 | 0.281477E+02 | 0.380876E+02 | -0.302422E+00 |
| 1999 | 0.140739E+02 | 0.480267E+02 | -0.122744E+01 |
| 2000 | 0.337773E+03 | 0.107833E+03 | 0.114179E+01 |
| 2001 | 0.239256E+03 | 0.697970E+02 | 0.123194E+01 |
| 2002 | 0.232375E+03 | 0.449052E+02 | 0.164380E+01 |
| 2003 | 0.227599E+03 | 0.794826E+02 | 0.105204E+01 |
| 2004 | 0.165354E+03 | 0.118170E+03 | 0.335962E+00 |
| 2005 | 0.188549E+02 | 0.504074E+02 | -0.983364E+00 |
| 2006 | 0.260250E+03 | 0.139762E+03 | 0.621702E+00 |
| 2007 | 0.106609E+03 | 0.111769E+03 | -0.472670E-01 |
| 2008 | 0.412168E+02 | 0.280063E+03 | -0.191617E+01 |

Survey Index:  25 Tag:  us0aut  AGE =  1
Time = JAN-1  Type = NUMBER
Catchability =  0.172164E-01  % Variance Contribution =  10.9577
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.207096E+03 | 0.494197E+03 | -0.869750E+00 |
| 1979 | 0.540008E+03 | 0.446637E+03 | 0.189839E+00 |
| 1980 | 0.156415E+03 | 0.394488E+03 | -0.925075E+00 |
| 1981 | 0.382090E+03 | 0.790070E+03 | -0.726465E+00 |
| 1982 | 0.356545E+03 | 0.341967E+03 | 0.417457E-01 |
| 1983 | 0.494518E+03 | 0.194637E+03 | 0.932448E+00 |
| 1984 | 0.175253E+04 | 0.499630E+03 | 0.125495E+01 |
| 1985 | 0.244663E+03 | 0.165540E+03 | 0.390670E+00 |
| 1986 | 0.136867E+04 | 0.766224E+03 | 0.580118E+00 |
| 1987 | 0.103958E+03 | 0.308140E+03 | -0.108657E+01 |
| 1988 | 0.278269E+03 | 0.427902E+03 | -0.430308E+00 |
| 1989 | 0.750656E+03 | 0.307291E+03 | 0.893152E+00 |
| 1990 | 0.342611E+03 | 0.175681E+03 | 0.667927E+00 |
| 1991 | 0.214610E+03 | 0.340822E+03 | -0.462538E+00 |
| 1992 | 0.553259E+02 | 0.128609E+03 | -0.843535E+00 |
| 1993 | 0.479491E+02 | 0.169986E+03 | -0.126557E+01 |
| 1994 | 0.243707E+03 | 0.108775E+03 | 0.806689E+00 |
| 1995 | 0.912536E+02 | 0.676272E+02 | 0.299633E+00 |
| 1996 | 0.218435E+03 | 0.115178E+03 | 0.640012E+00 |
| 1997 | 0.295071E+02 | 0.183728E+03 | -0.182883E+01 |
| 1998 | 0.874290E+01 | 0.856708E+02 | -0.228227E+01 |
| 1999 | 0.957616E+02 | 0.213463E+03 | -0.801601E+00 |
| 2000 | 0.957616E+02 | 0.106031E+03 | -0.101874E+00 |
| 2001 | 0.266384E+02 | 0.492100E+02 | -0.613743E+00 |
| 2002 | 0.387964E+02 | 0.919039E+02 | -0.862416E+00 |
| 2003 | 0.319661E+03 | 0.341411E+02 | 0.223676E+01 |
| 2004 | 0.446569E+03 | 0.232811E+03 | 0.651366E+00 |
| 2005 | 0.230224E+04 | 0.506965E+02 | 0.381578E+01 |
| 2006 | 0.711723E+02 | 0.123577E+03 | -0.551757E+00 |
| 2007 | 0.135787E+03 | 0.121692E+03 | 0.109597E+00 |
| 2008 | 0.102319E+03 | 0.888081E+02 | 0.141615E+00 |

Survey Index:  26 Tag:  us1aut  AGE =  2
Time = JAN-1  Type = NUMBER
Catchability =  0.746671E-01  % Variance Contribution =  3.3279
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.323486E+03 | 0.351454E+03 | -0.829237E-01 |
| 1979 | 0.252095E+04 | 0.174458E+04 | 0.368122E+00 |
| 1980 | 0.222000E+04 | 0.156710E+04 | 0.348283E+00 |
| 1981 | 0.112004E+04 | 0.137784E+04 | -0.207148E+00 |
| 1982 | 0.481540E+04 | 0.272320E+04 | 0.570011E+00 |
| 1983 | 0.788633E+03 | 0.116200E+04 | -0.387597E+00 |
| 1984 | 0.116048E+04 | 0.648927E+03 | 0.581266E+00 |
| 1985 | 0.260797E+04 | 0.175515E+04 | 0.396015E+00 |
| 1986 | 0.247669E+03 | 0.575936E+03 | -0.843904E+00 |
| 1987 | 0.311314E+04 | 0.266892E+04 | 0.153959E+00 |
| 1988 | 0.565144E+03 | 0.108715E+04 | -0.654233E+00 |

| | | | |
|---|---|---|---|
| 1989 | 0.119490E+04 | 0.149749E+04 | -0.225729E+00 |
| 1990 | 0.382281E+04 | 0.103106E+04 | 0.131040E+01 |
| 1991 | 0.496704E+03 | 0.618968E+03 | -0.220060E+00 |
| 1992 | 0.556811E+03 | 0.119140E+04 | -0.760661E+00 |
| 1993 | 0.563368E+03 | 0.443743E+03 | 0.238687E+00 |
| 1994 | 0.132495E+04 | 0.583419E+03 | 0.820226E+00 |
| 1995 | 0.554079E+03 | 0.379873E+03 | 0.377469E+00 |
| 1996 | 0.334278E+03 | 0.237953E+03 | 0.339897E+00 |
| 1997 | 0.327721E+03 | 0.404598E+03 | -0.210734E+00 |
| 1998 | 0.322666E+03 | 0.643829E+03 | -0.690814E+00 |
| 1999 | 0.458317E+03 | 0.299933E+03 | 0.424002E+00 |
| 2000 | 0.190840E+03 | 0.754750E+03 | -0.137495E+01 |
| 2001 | 0.780027E+03 | 0.368846E+03 | 0.748950E+00 |
| 2002 | 0.643420E+02 | 0.173947E+03 | -0.994536E+00 |
| 2003 | 0.652982E+03 | 0.324068E+03 | 0.700596E+00 |
| 2004 | 0.227178E+03 | 0.120082E+03 | 0.637555E+00 |
| 2005 | 0.101745E+04 | 0.823264E+03 | 0.211778E+00 |
| 2006 | 0.755438E+02 | 0.179185E+03 | -0.863704E+00 |
| 2007 | 0.590826E+03 | 0.436586E+03 | 0.302536E+00 |
| 2008 | 0.156688E+03 | 0.431392E+03 | -0.101276E+01 |

Survey Index: 27 Tag: us2aut AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.131211E+00 % Variance Contribution = 3.2794
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.469041E+04 | 0.332391E+04 | 0.344377E+00 |
| 1979 | 0.534407E+03 | 0.456331E+03 | 0.157939E+00 |
| 1980 | 0.229090E+04 | 0.224466E+04 | 0.203913E-01 |
| 1981 | 0.769918E+03 | 0.175433E+04 | -0.823558E+00 |
| 1982 | 0.307366E+04 | 0.152085E+04 | 0.703597E+00 |
| 1983 | 0.260851E+04 | 0.268625E+04 | -0.293673E-01 |
| 1984 | 0.148806E+04 | 0.106224E+04 | 0.337098E+00 |
| 1985 | 0.931388E+03 | 0.750854E+03 | 0.215464E+00 |
| 1986 | 0.115105E+04 | 0.164913E+04 | -0.359571E+00 |
| 1987 | 0.175540E+03 | 0.640482E+03 | -0.129435E+01 |
| 1988 | 0.184802E+04 | 0.290123E+04 | -0.451021E+00 |
| 1989 | 0.596973E+03 | 0.128624E+04 | -0.767604E+00 |
| 1990 | 0.142946E+04 | 0.184610E+04 | -0.255782E+00 |
| 1991 | 0.221905E+04 | 0.830569E+03 | 0.982722E+00 |
| 1992 | 0.239336E+03 | 0.659023E+03 | -0.101289E+01 |
| 1993 | 0.129627E+04 | 0.114796E+04 | 0.121497E+00 |
| 1994 | 0.726204E+03 | 0.457505E+03 | 0.462042E+00 |
| 1995 | 0.907481E+03 | 0.766649E+03 | 0.168644E+00 |
| 1996 | 0.247341E+04 | 0.469359E+03 | 0.166199E+01 |
| 1997 | 0.267477E+03 | 0.308358E+03 | -0.142230E+00 |
| 1998 | 0.438372E+03 | 0.501098E+03 | -0.133732E+00 |
| 1999 | 0.140186E+04 | 0.817610E+03 | 0.539171E+00 |
| 2000 | 0.210648E+03 | 0.389365E+03 | -0.614328E+00 |
| 2001 | 0.734673E+03 | 0.974293E+03 | -0.282286E+00 |
| 2002 | 0.520200E+03 | 0.445603E+03 | 0.154784E+00 |
| 2003 | 0.965812E+03 | 0.236882E+03 | 0.140541E+01 |
| 2004 | 0.422389E+03 | 0.442410E+03 | -0.463086E-01 |
| 2005 | 0.185512E+03 | 0.164543E+03 | 0.119952E+00 |

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2006     0.791502E+03     0.114133E+04    -0.366017E+00
2007     0.221030E+03     0.249542E+03    -0.121328E+00
2008     0.282504E+03     0.565883E+03    -0.694695E+00

Survey Index:   28 Tag:         us3aut   AGE =  4
Time = JAN-1           Type = NUMBER
Catchability =    0.158575E+00   % Variance Contribution =     5.0712
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
_____________________________________________________________________

1978     0.943682E+03     0.121474E+04    -0.252498E+00
1979     0.554311E+04     0.213562E+04     0.953796E+00
1980     0.221440E+03     0.315739E+03    -0.354763E+00
1981     0.105720E+04     0.137470E+04    -0.262612E+00
1982     0.212971E+04     0.106263E+04     0.695234E+00
1983     0.330316E+03     0.875307E+03    -0.974525E+00
1984     0.101117E+04     0.141706E+04    -0.337479E+00
1985     0.126867E+04     0.556951E+03     0.823248E+00
1986     0.911170E+02     0.327130E+03    -0.127821E+01
1987     0.449438E+03     0.981729E+03    -0.781318E+00
1988     0.147536E+03     0.418145E+03    -0.104176E+01
1989     0.123466E+04     0.168253E+04    -0.309504E+00
1990     0.220074E+03     0.841238E+03    -0.134091E+01
1991     0.247819E+04     0.106381E+04     0.845672E+00
1992     0.374577E+03     0.329131E+03     0.129341E+00
1993     0.238106E+03     0.328268E+03    -0.321112E+00
1994     0.522659E+03     0.509685E+03     0.251356E-01
1995     0.592055E+03     0.233998E+03     0.928289E+00
1996     0.170554E+04     0.554943E+03     0.112277E+01
1997     0.566100E+03     0.323936E+03     0.558226E+00
1998     0.149312E+03     0.198499E+03    -0.284748E+00
1999     0.480584E+03     0.309588E+03     0.439760E+00
2000     0.422936E+03     0.521492E+03    -0.209474E+00
2001     0.963080E+02     0.279672E+03    -0.106606E+01
2002     0.627027E+03     0.585106E+03     0.691969E-01
2003     0.190704E+04     0.272838E+03     0.194443E+01
2004     0.273897E+03     0.176732E+03     0.438121E+00
2005     0.970047E+03     0.375694E+03     0.948569E+00
2006     0.176087E+03     0.133998E+03     0.273153E+00
2007     0.702434E+03     0.100882E+04    -0.361984E+00
2008     0.688500E+02     0.190549E+03    -0.101798E+01
```

Survey Index:  29 Tag:  us4aut  AGE =  5
Time = JAN-1  Type = NUMBER
Catchability =  0.122922E+00  % Variance Contribution =  8.0096
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.345343E+03 | 0.364691E+03 | -0.545130E-01 |
| 1979 | 0.131635E+04 | 0.503063E+03 | 0.961900E+00 |
| 1980 | 0.230388E+04 | 0.850186E+03 | 0.996895E+00 |
| 1981 | 0.717188E+02 | 0.140237E+03 | -0.670582E+00 |
| 1982 | 0.804616E+03 | 0.576309E+03 | 0.333721E+00 |
| 1983 | 0.926196E+02 | 0.346245E+03 | -0.131865E+01 |
| 1984 | 0.943955E+02 | 0.261551E+03 | -0.101914E+01 |
| 1985 | 0.112715E+04 | 0.532945E+03 | 0.749026E+00 |
| 1986 | 0.144120E+03 | 0.168084E+03 | -0.153813E+00 |
| 1987 | 0.112018E+02 | 0.113052E+03 | -0.231177E+01 |
| 1988 | 0.273624E+03 | 0.384015E+03 | -0.338927E+00 |
| 1989 | 0.819643E+02 | 0.147265E+03 | -0.585948E+00 |
| 1990 | 0.692735E+03 | 0.599895E+03 | 0.143892E+00 |
| 1991 | 0.563368E+03 | 0.317679E+03 | 0.572891E+00 |
| 1992 | 0.416652E+02 | 0.328351E+03 | -0.206442E+01 |
| 1993 | 0.136607E+03 | 0.915918E+02 | 0.399767E+00 |
| 1994 | 0.225402E+02 | 0.745921E+02 | -0.119673E+01 |
| 1995 | 0.209555E+03 | 0.106700E+03 | 0.674963E+00 |
| 1996 | 0.119121E+03 | 0.749556E+02 | 0.463247E+00 |
| 1997 | 0.195348E+03 | 0.212375E+03 | -0.835692E-01 |
| 1998 | 0.176496E+03 | 0.937027E+02 | 0.633173E+00 |
| 1999 | 0.561455E+02 | 0.716016E+02 | -0.243171E+00 |
| 2000 | 0.348212E+03 | 0.102815E+03 | 0.121988E+01 |
| 2001 | 0.107646E+03 | 0.203590E+03 | -0.637258E+00 |
| 2002 | 0.811446E+02 | 0.948955E+02 | -0.156544E+00 |
| 2003 | 0.222260E+04 | 0.204631E+03 | 0.238523E+01 |
| 2004 | 0.212561E+03 | 0.852796E+02 | 0.913292E+00 |
| 2005 | 0.344250E+03 | 0.834225E+02 | 0.141745E+01 |
| 2006 | 0.239882E+03 | 0.174543E+03 | 0.317976E+00 |
| 2007 | 0.461732E+02 | 0.620337E+02 | -0.295279E+00 |
| 2008 | 0.177999E+03 | 0.510184E+03 | -0.105299E+01 |

Survey Index:  30 Tag:  us5aut  AGE =  6
Time = JAN-1  Type = NUMBER
Catchability =  0.143092E+00  % Variance Contribution =  6.4563
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.236467E+03 | 0.180843E+03 | 0.268179E+00 |
| 1979 | 0.458317E+03 | 0.232428E+03 | 0.678982E+00 |
| 1980 | 0.437962E+03 | 0.324458E+03 | 0.299976E+00 |
| 1981 | 0.361736E+03 | 0.494310E+03 | -0.312249E+00 |
| 1982 | 0.737679E+02 | 0.928123E+02 | -0.229656E+00 |
| 1983 | 0.157371E+03 | 0.288387E+03 | -0.605693E+00 |
| 1984 | 0.448071E+02 | 0.182121E+03 | -0.140231E+01 |
| 1985 | 0.330589E+02 | 0.131113E+03 | -0.137777E+01 |
| 1986 | 0.104641E+03 | 0.240107E+03 | -0.830548E+00 |

| | | | |
|---|---|---|---|
| 1987 | 0.665277E+02 | 0.929047E+02 | -0.333956E+00 |
| 1988 | 0.382500E+02 | 0.692898E+02 | -0.594154E+00 |
| 1989 | 0.264608E+03 | 0.164980E+03 | 0.472427E+00 |
| 1990 | 0.747241E+02 | 0.911362E+02 | -0.198552E+00 |
| 1991 | 0.390013E+03 | 0.281459E+03 | 0.326194E+00 |
| 1992 | 0.396161E+02 | 0.119185E+03 | -0.110144E+01 |
| 1993 | 0.596973E+02 | 0.122014E+03 | -0.714846E+00 |
| 1994 | 0.345616E+02 | 0.270126E+02 | 0.246441E+00 |
| 1995 | 0.927563E+02 | 0.173098E+02 | 0.167870E+01 |
| 1996 | 0.739045E+02 | 0.528082E+02 | 0.336107E+00 |
| 1997 | 0.815545E+02 | 0.386431E+02 | 0.746903E+00 |
| 1998 | 0.663911E+02 | 0.897972E+02 | -0.301991E+00 |
| 1999 | 0.483589E+02 | 0.401135E+02 | 0.186936E+00 |
| 2000 | 0.118985E+03 | 0.316603E+02 | 0.132393E+01 |
| 2001 | 0.418018E+02 | 0.575277E+02 | -0.319327E+00 |
| 2002 | 0.745875E+02 | 0.104638E+03 | -0.338536E+00 |
| 2003 | 0.161196E+03 | 0.437714E+02 | 0.130364E+01 |
| 2004 | 0.112564E+03 | 0.790753E+02 | 0.353124E+00 |
| 2005 | 0.439192E+03 | 0.411994E+02 | 0.236651E+01 |
| 2006 | 0.353813E+02 | 0.609121E+02 | -0.543248E+00 |
| 2007 | 0.170486E+03 | 0.119291E+03 | 0.357089E+00 |
| 2008 | 0.874290E+01 | 0.498551E+02 | -0.174088E+01 |

Bootstrap Summary Report

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 1 | 5158. | 6533. | 4768. | 0.7298 |
| N 2 | 5778. | 6266. | 2534. | 0.4044 |
| N 3 | 4313. | 4506. | 1340. | 0.2974 |
| N 4 | 1202. | 1248. | 338. | 0.2705 |
| N 5 | 4150. | 4291. | 1102. | 0.2569 |
| N 6 | 348. | 366. | 102. | 0.2794 |
| N 7 | 566. | 591. | 173. | 0.2934 |
| N 8 | 219. | 225. | 71. | 0.3143 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| N 1 | 1375. | 157. | 26.6579 | 3783. | 1.2603 |
| N 2 | 489. | 82. | 8.4565 | 5289. | 0.4792 |
| N 3 | 194. | 43. | 4.4871 | 4119. | 0.3254 |
| N 4 | 47. | 11. | 3.8994 | 1155. | 0.2925 |
| N 5 | 141. | 35. | 3.3966 | 4009. | 0.2749 |
| N 6 | 17. | 3. | 4.9691 | 331. | 0.3086 |
| N 7 | 24. | 6. | 4.3101 | 542. | 0.3198 |
| N 8 | 6. | 2. | 2.8435 | 212. | 0.3327 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| N 1 | 2262. | 12026. |
| N 2 | 3513. | 9413. |
| N 3 | 2952. | 6223. |
| N 4 | 873. | 1747. |
| N 5 | 3037. | 5708. |
| N 6 | 248. | 498. |
| N 7 | 378. | 829. |
| N 8 | 139. | 320. |

Bootstrap Output Variable: Catchability Estimates

| | NLLS Estimate | Bootstrap Mean | Bootstrap Std Error | C.V. For NLLS Soln. |
|---|---|---|---|---|
| Q 1 | 0.219439E-01 | 0.224593E-01 | 0.453637E-02 | 0.2020 |
| Q 2 | 0.919973E-01 | 0.918516E-01 | 0.740087E-02 | 0.0806 |
| Q 3 | 0.186189E+00 | 0.186801E+00 | 0.193689E-01 | 0.1037 |
| Q 4 | 0.316089E+00 | 0.318776E+00 | 0.461832E-01 | 0.1449 |
| Q 5 | 0.402164E+00 | 0.405661E+00 | 0.630944E-01 | 0.1555 |
| Q 6 | 0.408966E+00 | 0.411188E+00 | 0.605475E-01 | 0.1473 |
| Q 7 | 0.427224E+00 | 0.434695E+00 | 0.805680E-01 | 0.1853 |
| Q 8 | 0.517786E+00 | 0.522703E+00 | 0.856230E-01 | 0.1638 |
| Q 9 | 0.141338E-01 | 0.187569E-01 | 0.153604E-01 | 0.8189 |
| Q 10 | 0.899870E-01 | 0.908999E-01 | 0.203578E-01 | 0.2240 |
| Q 11 | 0.198731E+00 | 0.205097E+00 | 0.478757E-01 | 0.2334 |
| Q 12 | 0.177261E+00 | 0.178899E+00 | 0.226346E-01 | 0.1265 |
| Q 13 | 0.216299E+00 | 0.223388E+00 | 0.550011E-01 | 0.2462 |
| Q 14 | 0.207689E+00 | 0.209908E+00 | 0.352836E-01 | 0.1681 |
| Q 15 | 0.300243E+00 | 0.322393E+00 | 0.124785E+00 | 0.3871 |
| Q 16 | 0.291472E+00 | 0.340999E+00 | 0.192048E+00 | 0.5632 |
| Q 17 | 0.209249E-01 | 0.214531E-01 | 0.589108E-02 | 0.2746 |
| Q 18 | 0.981470E-01 | 0.990854E-01 | 0.214245E-01 | 0.2162 |
| Q 19 | 0.327191E+00 | 0.327519E+00 | 0.339873E-01 | 0.1038 |
| Q 20 | 0.615292E+00 | 0.621553E+00 | 0.782073E-01 | 0.1258 |
| Q 21 | 0.949463E+00 | 0.957399E+00 | 0.112465E+00 | 0.1175 |
| Q 22 | 0.112928E+01 | 0.114260E+01 | 0.190599E+00 | 0.1668 |
| Q 23 | 0.121718E+01 | 0.123764E+01 | 0.248911E+00 | 0.2011 |
| Q 24 | 0.128152E+01 | 0.129879E+01 | 0.274911E+00 | 0.2117 |
| Q 25 | 0.172164E-01 | 0.175862E-01 | 0.371772E-02 | 0.2114 |
| Q 26 | 0.746671E-01 | 0.753834E-01 | 0.859667E-02 | 0.1140 |
| Q 27 | 0.131211E+00 | 0.132257E+00 | 0.151867E-01 | 0.1148 |
| Q 28 | 0.158575E+00 | 0.159982E+00 | 0.228937E-01 | 0.1431 |
| Q 29 | 0.122922E+00 | 0.124354E+00 | 0.224444E-01 | 0.1805 |
| Q 30 | 0.143092E+00 | 0.145093E+00 | 0.237031E-01 | 0.1634 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| Q 1 | 0.5154E-03 | 0.1444E-03 | 2.3488 | 0.2143E-01 | 0.2117 |
| Q 2 | -0.1457E-03 | 0.2341E-03 | -0.1583 | 0.9214E-01 | 0.0803 |
| Q 3 | 0.6121E-03 | 0.6128E-03 | 0.3288 | 0.1856E+00 | 0.1044 |
| Q 4 | 0.2687E-02 | 0.1463E-02 | 0.8502 | 0.3134E+00 | 0.1474 |
| Q 5 | 0.3497E-02 | 0.1998E-02 | 0.8695 | 0.3987E+00 | 0.1583 |
| Q 6 | 0.2222E-02 | 0.1916E-02 | 0.5433 | 0.4067E+00 | 0.1489 |
| Q 7 | 0.7471E-02 | 0.2559E-02 | 1.7488 | 0.4198E+00 | 0.1919 |
| Q 8 | 0.4917E-02 | 0.2712E-02 | 0.9496 | 0.5129E+00 | 0.1669 |
| Q 9 | 0.4623E-02 | 0.5073E-03 | 32.7102 | 0.9511E-02 | 1.6151 |
| Q 10 | 0.9128E-03 | 0.6444E-03 | 1.0144 | 0.8907E-01 | 0.2285 |
| Q 11 | 0.6365E-02 | 0.1527E-02 | 3.2030 | 0.1924E+00 | 0.2489 |
| Q 12 | 0.1638E-02 | 0.7176E-03 | 0.9241 | 0.1756E+00 | 0.1289 |
| Q 13 | 0.7089E-02 | 0.1754E-02 | 3.2772 | 0.2092E+00 | 0.2629 |
| Q 14 | 0.2218E-02 | 0.1118E-02 | 1.0681 | 0.2055E+00 | 0.1717 |
| Q 15 | 0.2215E-01 | 0.4008E-02 | 7.3772 | 0.2781E+00 | 0.4487 |
| Q 16 | 0.4953E-01 | 0.6272E-02 | 16.9918 | 0.2419E+00 | 0.7938 |
| Q 17 | 0.5282E-03 | 0.1870E-03 | 2.5244 | 0.2040E-01 | 0.2888 |
| Q 18 | 0.9385E-03 | 0.6782E-03 | 0.9562 | 0.9721E-01 | 0.2204 |
| Q 19 | 0.3276E-03 | 0.1075E-02 | 0.1001 | 0.3269E+00 | 0.1040 |
| Q 20 | 0.6261E-02 | 0.2481E-02 | 1.0175 | 0.6090E+00 | 0.1284 |
| Q 21 | 0.7936E-02 | 0.3565E-02 | 0.8359 | 0.9415E+00 | 0.1194 |
| Q 22 | 0.1332E-01 | 0.6042E-02 | 1.1792 | 0.1116E+01 | 0.1708 |
| Q 23 | 0.2046E-01 | 0.7898E-02 | 1.6808 | 0.1197E+01 | 0.2080 |
| Q 24 | 0.1728E-01 | 0.8711E-02 | 1.3481 | 0.1264E+01 | 0.2175 |
| Q 25 | 0.3698E-03 | 0.1181E-03 | 2.1481 | 0.1685E-01 | 0.2207 |
| Q 26 | 0.7163E-03 | 0.2728E-03 | 0.9593 | 0.7395E-01 | 0.1162 |
| Q 27 | 0.1046E-02 | 0.4814E-03 | 0.7972 | 0.1302E+00 | 0.1167 |
| Q 28 | 0.1408E-02 | 0.7253E-03 | 0.8877 | 0.1572E+00 | 0.1457 |
| Q 29 | 0.1432E-02 | 0.7112E-03 | 1.1650 | 0.1215E+00 | 0.1847 |
| Q 30 | 0.2001E-02 | 0.7522E-03 | 1.3984 | 0.1411E+00 | 0.1680 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| Q 1 | 0.171080E-01 | 0.284747E-01 |
| Q 2 | 0.824644E-01 | 0.101632E+00 |
| Q 3 | 0.162848E+00 | 0.211664E+00 |
| Q 4 | 0.261463E+00 | 0.379759E+00 |
| Q 5 | 0.328721E+00 | 0.483634E+00 |
| Q 6 | 0.340594E+00 | 0.492365E+00 |
| Q 7 | 0.337448E+00 | 0.537725E+00 |
| Q 8 | 0.421175E+00 | 0.634985E+00 |
| Q 9 | 0.553354E-02 | 0.371053E-01 |
| Q 10 | 0.667041E-01 | 0.117456E+00 |
| Q 11 | 0.150990E+00 | 0.267690E+00 |
| Q 12 | 0.150555E+00 | 0.208511E+00 |
| Q 13 | 0.161493E+00 | 0.297084E+00 |
| Q 14 | 0.166932E+00 | 0.258730E+00 |
| Q 15 | 0.188704E+00 | 0.478061E+00 |
| Q 16 | 0.159412E+00 | 0.573340E+00 |
| Q 17 | 0.145844E-01 | 0.292114E-01 |
| Q 18 | 0.735690E-01 | 0.127626E+00 |
| Q 19 | 0.284556E+00 | 0.370216E+00 |
| Q 20 | 0.528958E+00 | 0.725873E+00 |
| Q 21 | 0.816656E+00 | 0.110392E+01 |
| Q 22 | 0.894573E+00 | 0.138485E+01 |
| Q 23 | 0.936371E+00 | 0.155873E+01 |
| Q 24 | 0.978545E+00 | 0.164180E+01 |
| Q 25 | 0.130753E-01 | 0.225537E-01 |
| Q 26 | 0.643867E-01 | 0.868744E-01 |
| Q 27 | 0.112881E+00 | 0.152329E+00 |
| Q 28 | 0.131884E+00 | 0.190578E+00 |
| Q 29 | 0.968790E-01 | 0.154540E+00 |
| Q 30 | 0.115862E+00 | 0.177230E+00 |

Bootstrap Output Variable: Fishing Mortality (2007)

| | NLLS Estimate | Bootstrap Mean | Bootstrap Std Error | C.V. For NLLS Soln. |
|---|---|---|---|---|
| AGE 1 | 0.0017 | 0.0018 | 0.000684 | 0.3877 |
| AGE 2 | 0.1044 | 0.1080 | 0.030238 | 0.2801 |
| AGE 3 | 0.2591 | 0.2646 | 0.061457 | 0.2323 |
| AGE 4 | 0.2271 | 0.2321 | 0.053591 | 0.2309 |
| AGE 5 | 0.1705 | 0.1738 | 0.044442 | 0.2557 |
| AGE 6 | 0.1869 | 0.1939 | 0.056194 | 0.2898 |
| AGE 7 | 0.0647 | 0.0694 | 0.023411 | 0.3371 |
| AGE 8 | 0.1407 | 0.1457 | 0.025088 | 0.1721 |
| AGE 9 | 0.1407 | 0.1457 | 0.025088 | 0.1721 |
| AGE 10 | 0.1407 | 0.1457 | 0.025088 | 0.1721 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| AGE 1 | 0.000109 | 0.000022 | 6.6054 | 0.0015 | 0.4425 |
| AGE 2 | 0.003606 | 0.000963 | 3.4554 | 0.1008 | 0.3001 |
| AGE 3 | 0.005418 | 0.001951 | 2.0909 | 0.2537 | 0.2422 |
| AGE 4 | 0.005021 | 0.001702 | 2.2111 | 0.2221 | 0.2413 |
| AGE 5 | 0.003348 | 0.001409 | 1.9636 | 0.1671 | 0.2659 |
| AGE 6 | 0.007042 | 0.001791 | 3.7681 | 0.1798 | 0.3125 |
| AGE 7 | 0.004697 | 0.000755 | 7.2536 | 0.0601 | 0.3898 |
| AGE 8 | 0.005029 | 0.000809 | 3.5739 | 0.1357 | 0.1849 |
| AGE 9 | 0.005029 | 0.000809 | 3.5739 | 0.1357 | 0.1849 |
| AGE 10 | 0.005029 | 0.000809 | 3.5739 | 0.1357 | 0.1849 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| AGE 1 | 0.001016 | 0.002715 |
| AGE 2 | 0.073390 | 0.148701 |
| AGE 3 | 0.185377 | 0.341005 |
| AGE 4 | 0.170090 | 0.298353 |
| AGE 5 | 0.121952 | 0.231915 |
| AGE 6 | 0.131244 | 0.266855 |
| AGE 7 | 0.044370 | 0.099813 |
| AGE 8 | 0.116780 | 0.180193 |
| AGE 9 | 0.116780 | 0.180193 |
| AGE 10 | 0.116780 | 0.180193 |

Bootstrap Output Variable: Average F (2007) AGES 5 - 8

| | NLLS Estimate | Bootstrap Mean | Bootstrap Std Error | C.V. For NLLS Soln. |
|---|---|---|---|---|
| AVG F | 0.1407 | 0.1457 | 0.025088 | 0.1721 |
| N WTD | 0.1594 | 0.1587 | 0.028073 | 0.1769 |
| B WTD | 0.1534 | 0.1531 | 0.027092 | 0.1769 |
| C WTD | 0.1709 | 0.1765 | 0.035695 | 0.2022 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| AVG F | 0.005029 | 0.000809 | 3.5739 | 0.1357 | 0.1849 |
| N WTD | -0.000626 | 0.000888 | -0.3929 | 0.1600 | 0.1755 |
| B WTD | -0.000282 | 0.000857 | -0.1841 | 0.1537 | 0.1763 |
| C WTD | 0.005617 | 0.001143 | 3.2863 | 0.1653 | 0.2159 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| AVG F | 0.116780 | 0.180193 |
| N WTD | 0.127188 | 0.197961 |
| B WTD | 0.122381 | 0.191581 |
| C WTD | 0.136571 | 0.225136 |

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 | 36930. | 38830. | 5418. | 0.1395 |
| MEAN | 34654. | 35969. | 4702. | 0.1307 |
| SSB | 25377. | 26151. | 3597. | 0.1375 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| JAN-1 | 1899. | 182. | 5.1430 | 35031. | 0.1547 |
| MEAN | 1315. | 154. | 3.7961 | 33338. | 0.1410 |
| SSB | 774. | 116. | 3.0489 | 24604. | 0.1462 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| JAN-1 | 32236. | 45859. |
| MEAN | 30122. | 42067. |
| SSB | 21956. | 30777. |

Plus Group Diagnostic Report

Calculation Method Selected = Backward

| Year | Population Backward | Population Forward | F Forward | F Backward | Ratio |
|---|---|---|---|---|---|
| 1978 | 44. | 44. | 0.308259 | 0.308259 | 1.000000 |
| 1979 | 127. | 131. | 0.345514 | 0.359798 | 1.041340 |
| 1980 | 37. | 103. | 0.164657 | 0.541372 | 3.287884 |
| 1981 | 173. | 244. | 0.353951 | 0.544585 | 1.538590 |
| 1982 | 192. | 333. | 0.327151 | 0.655849 | 2.004726 |
| 1983 | 288. | 268. | 0.613105 | 0.558734 | 0.911319 |
| 1984 | 283. | 200. | 1.129093 | 0.657374 | 0.582214 |
| 1985 | 182. | 213. | 0.614331 | 0.772296 | 1.257135 |
| 1986 | 76. | 116. | 0.306033 | 0.510816 | 1.669156 |
| 1987 | 75. | 145. | 0.219497 | 0.475565 | 2.166617 |
| 1988 | 105. | 149. | 0.488756 | 0.781516 | 1.598990 |
| 1989 | 54. | 110. | 0.240156 | 0.559486 | 2.329678 |
| 1990 | 88. | 142. | 0.372456 | 0.689136 | 1.850247 |
| 1991 | 47. | 101. | 0.330944 | 0.908100 | 2.743969 |
| 1992 | 19. | 76. | 0.162994 | 0.926052 | 5.681498 |
| 1993 | 34. | 74. | 0.376019 | 1.153678 | 3.068139 |
| 1994 | 9. | 59. | 0.109812 | 1.238141 | 11.275120 |
| 1995 | 3. | 55. | 0.028722 | 0.615783 | 21.439721 |
| 1996 | 1. | 50. | 0.006627 | 0.653998 | 98.684231 |
| 1997 | 7. | 52. | 0.086785 | 0.850348 | 9.798357 |
| 1998 | 6. | 46. | 0.072801 | 0.741049 | 10.179071 |
| 1999 | 7. | 39. | 0.100418 | 0.774912 | 7.716849 |
| 2000 | 3. | 33. | 0.034158 | 0.539928 | 15.806849 |
| 2001 | 3. | 31. | 0.046971 | 0.632341 | 13.462251 |
| 2002 | 13. | 39. | 0.200182 | 0.754275 | 3.767954 |
| 2003 | 6. | 35. | 0.096275 | 0.850605 | 8.835135 |
| 2004 | 12. | 30. | 0.201696 | 0.636083 | 3.153673 |
| 2005 | 15. | 32. | 0.135933 | 0.311373 | 2.290637 |
| 2006 | 17. | 45. | 0.087321 | 0.243865 | 2.792736 |
| 2007 | 12. | 46. | 0.026732 | 0.105152 | 3.933531 |
| 2008 | 70. | 98. | N/A | N/A | |

**Appendix A.Table A3. SPLIT MODEL VPA output and diagnostics for GB cod.**

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 VPA Version 2.8.0

 Model ID: Georges Bank   Cod - spr 2008 Assessment TY 2008 sv swept split


 Input File: C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-
SPLT_AUG_CORR_DFO.DAT
 Date of Run: 05-AUG-2008                          Time of Run: 12:24


 Levenburg-Marquardt Algorithm Completed     9 Iterations
 Residual Sum of Squares =     323.853

 Number of Residuals     =    595
 Number of Parameters    =      8
 Degrees of Freedom      =    587
 Mean Squared Residual   =     0.551709
 Standard Deviation      =     0.742771


 Number of Years =    30
 Number of Ages  =    10
 First Year      =  1978
 Youngest Age    =     1
 Oldest True Age =     9

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


 VPA Classic Method - Auto Estimated Q's


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

   1           4874.666   0.218662E+04   0.448568E+00
   2           5751.749   0.182760E+04   0.317747E+00
   3           3851.720   0.113398E+04   0.294410E+00
   4            970.307   0.274066E+03   0.282453E+00
   5           2929.571   0.803594E+03   0.274304E+00
   6            157.359   0.498832E+02   0.317002E+00
   7            237.651   0.866388E+02   0.364564E+00
   8             80.692   0.313443E+02   0.388442E+00

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

   1       0.178394E-01   0.601117E-02   0.336960E+00
   2       0.918544E-01   0.111156E-01   0.121014E+00
   3       0.168705E+00   0.303091E-01   0.179657E+00
   4       0.215614E+00   0.433017E-01   0.200829E+00
   5       0.264241E+00   0.594130E-01   0.224844E+00
```

| | | | |
|---|---|---|---|
| 6 | 0.278657E+00 | 0.523770E-01 | 0.187962E+00 |
| 7 | 0.297561E+00 | 0.527492E-01 | 0.177272E+00 |
| 8 | 0.363074E+00 | 0.710421E-01 | 0.195668E+00 |
| 9 | 0.292985E-01 | 0.628344E-02 | 0.214463E+00 |
| 10 | 0.101150E+00 | 0.921209E-02 | 0.910737E-01 |
| 11 | 0.225276E+00 | 0.256921E-01 | 0.114047E+00 |
| 12 | 0.506259E+00 | 0.867519E-01 | 0.171359E+00 |
| 13 | 0.688799E+00 | 0.113946E+00 | 0.165426E+00 |
| 14 | 0.701770E+00 | 0.122594E+00 | 0.174693E+00 |
| 15 | 0.723118E+00 | 0.181470E+00 | 0.250954E+00 |
| 16 | 0.816798E+00 | 0.174300E+00 | 0.213394E+00 |
| 17 | 0.141338E-01 | 0.106855E-01 | 0.756029E+00 |
| 18 | 0.899870E-01 | 0.208708E-01 | 0.231931E+00 |
| 19 | 0.198731E+00 | 0.467107E-01 | 0.235044E+00 |
| 20 | 0.177261E+00 | 0.223604E-01 | 0.126144E+00 |
| 21 | 0.216299E+00 | 0.540535E-01 | 0.249901E+00 |
| 22 | 0.207689E+00 | 0.355707E-01 | 0.171269E+00 |
| 23 | 0.300243E+00 | 0.112587E+00 | 0.374986E+00 |
| 24 | 0.291472E+00 | 0.165071E+00 | 0.566335E+00 |
| 25 | 0.358799E-01 | 0.115005E-01 | 0.320529E+00 |
| 26 | 0.187587E+00 | 0.396148E-01 | 0.211181E+00 |
| 27 | 0.324684E+00 | 0.370155E-01 | 0.114005E+00 |
| 28 | 0.372132E+00 | 0.475039E-01 | 0.127653E+00 |
| 29 | 0.580779E+00 | 0.710335E-01 | 0.122307E+00 |
| 30 | 0.555873E+00 | 0.114979E+00 | 0.206844E+00 |
| 31 | 0.730017E+00 | 0.211842E+00 | 0.290188E+00 |
| 32 | 0.644843E-03 | 0.171054E-03 | 0.265264E+00 |
| 33 | 0.158633E-01 | 0.567279E-02 | 0.357605E+00 |
| 34 | 0.779414E-01 | 0.200113E-01 | 0.256748E+00 |
| 35 | 0.362628E+00 | 0.527704E-01 | 0.145522E+00 |
| 36 | 0.888325E+00 | 0.130864E+00 | 0.147315E+00 |
| 37 | 0.140774E+01 | 0.199374E+00 | 0.141627E+00 |
| 38 | 0.193422E+01 | 0.294172E+00 | 0.152088E+00 |
| 39 | 0.190133E+01 | 0.391504E+00 | 0.205911E+00 |
| 40 | 0.127804E-02 | 0.320091E-03 | 0.250454E+00 |
| 41 | 0.163752E-01 | 0.327145E-02 | 0.199780E+00 |
| 42 | 0.811005E-01 | 0.114794E-01 | 0.141545E+00 |
| 43 | 0.119082E+00 | 0.179800E-01 | 0.150989E+00 |
| 44 | 0.126944E+00 | 0.225861E-01 | 0.177922E+00 |
| 45 | 0.886514E-01 | 0.215241E-01 | 0.242795E+00 |
| 46 | 0.104097E+00 | 0.162056E-01 | 0.155678E+00 |
| 47 | 0.201548E-01 | 0.859432E-02 | 0.426415E+00 |
| 48 | 0.741493E-01 | 0.152083E-01 | 0.205104E+00 |
| 49 | 0.162972E+00 | 0.301554E-01 | 0.185035E+00 |
| 50 | 0.233271E+00 | 0.520419E-01 | 0.223096E+00 |
| 51 | 0.211986E+00 | 0.510959E-01 | 0.241035E+00 |
| 52 | 0.253043E+00 | 0.646169E-01 | 0.255360E+00 |

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-- Non-Linear Least Squares Fit --
Default Tolerances Used

Scaled Gradient Tolerance      =    6.055454E-06
Scaled Step Tolerance          =    3.666853E-11
Relative Function Tolerance    =    3.666853E-11
Absolute Function Tolerance    =    4.930381E-32
VPA Method Options
- Catchability Values Estimated as an Analytic Function of N
- Catch Equation Used in Cohort Solution
- Plus Group Backward Calculation Method Used
- Rivard Weights Used for JAN-1 Biomass
- Rivard Weights Used for SSB Biomass
- Rivard Weights Calculation Used  5 Years for Terminal Year Plus One

- Heincke Rule Used in F-Oldest Calculation
- F-Oldest Calculation in Years Prior to Terminal Year
  Uses Stock Sizes in Ages  5 to  8
- Calculation of Population of Age 1 In Year 2008
  =  Stock Estimate
Stock Estimates

Age   1
Age   2
Age   3
Age   4
Age   5
Age   6
Age   7
Age   8
Full F in Terminal Year               =   0.3025

F in Oldest True Age in Terminal Year =   0.3025

Full F Calculated Using Classic Method

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

   1      0.010          0.004       0.0017      NO      Stock Estimate in
T+1
   2      0.100          0.292       0.1161      NO      Stock Estimate in
T+1
   3      0.390          0.785       0.3119      NO      Stock Estimate in
T+1
   4      0.740          0.775       0.3080      NO      Stock Estimate in
T+1
   5      1.000          0.865       0.3439      YES     Stock Estimate in
T+1
   6      1.000          1.000       0.3973      YES     Stock Estimate in
T+1
   7      1.000          0.418       0.1662      YES     Stock Estimate in
T+1
   8      1.000          0.761       0.3025      NO      Input PR * Full F
   9      1.000          0.761       0.3025              Input PR * Full F
```

Catch At Age - Input Data

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 151.6 | 279.2 | 339.9 | 1219.2 | 775.4 |
| 2 | 416.8 | 2242.7 | 4238.7 | 3910.7 | 10457.1 |
| 3 | 8109.1 | 953.6 | 5955.4 | 4738.2 | 4434.4 |
| 4 | 2429.6 | 4585.0 | 544.9 | 2685.5 | 2988.0 |
| 5 | 896.8 | 1206.9 | 2464.6 | 317.9 | 2039.8 |
| 6 | 178.4 | 449.8 | 983.0 | 1406.0 | 297.1 |
| 7 | 240.8 | 159.5 | 418.1 | 417.0 | 707.2 |
| 8 | 22.6 | 304.1 | 70.4 | 162.9 | 198.6 |
| 9 | 42.1 | 12.9 | 138.7 | 155.5 | 74.6 |
| 10 | 10.7 | 35.0 | 14.2 | 66.4 | 84.6 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 626.2 | 280.9 | 176.0 | 768.3 | 103.8 |
| 2 | 5181.7 | 1547.7 | 7443.7 | 1594.1 | 7956.1 |
| 3 | 8753.3 | 3485.7 | 2942.2 | 4576.3 | 1515.5 |
| 4 | 2680.4 | 3328.4 | 1690.1 | 860.2 | 2170.1 |
| 5 | 1155.3 | 923.9 | 2097.7 | 525.3 | 299.7 |
| 6 | 746.4 | 560.2 | 496.5 | 615.4 | 249.9 |
| 7 | 94.6 | 450.3 | 267.2 | 85.5 | 277.3 |
| 8 | 175.0 | 58.9 | 196.8 | 70.4 | 56.1 |
| 9 | 67.7 | 167.0 | 27.7 | 56.0 | 36.2 |
| 10 | 112.6 | 124.9 | 89.7 | 27.8 | 26.0 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 324.9 | 891.5 | 71.8 | 278.7 | 191.7 |
| 2 | 2352.1 | 2608.6 | 5561.1 | 1963.0 | 4808.4 |
| 3 | 8368.3 | 3032.8 | 5373.4 | 3491.4 | 2286.3 |
| 4 | 1074.1 | 4254.4 | 1964.0 | 3160.5 | 1070.7 |
| 5 | 1575.6 | 383.5 | 2272.1 | 1442.1 | 1500.0 |
| 6 | 223.8 | 534.2 | 230.6 | 1088.0 | 448.1 |
| 7 | 150.3 | 81.4 | 229.4 | 141.3 | 356.0 |
| 8 | 218.0 | 51.2 | 24.6 | 89.7 | 44.1 |
| 9 | 46.5 | 60.2 | 23.2 | 27.5 | 36.4 |
| 10 | 52.5 | 21.3 | 40.4 | 26.0 | 10.4 |

Catch At Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 299.2 | 94.4 | 32.3 | 64.9 | 126.9 |
| 2 | 1534.9 | 614.6 | 652.8 | 287.3 | 685.2 |
| 3 | 4429.4 | 1543.4 | 1429.0 | 986.6 | 749.6 |
| 4 | 1224.8 | 1987.7 | 669.9 | 1269.8 | 1020.7 |
| 5 | 475.3 | 425.6 | 382.3 | 256.3 | 882.9 |
| 6 | 535.6 | 97.6 | 41.2 | 183.8 | 147.7 |
| 7 | 178.0 | 146.2 | 21.4 | 17.9 | 94.4 |
| 8 | 141.0 | 51.2 | 20.0 | 11.6 | 18.9 |
| 9 | 43.1 | 30.5 | 6.4 | 11.3 | 10.1 |
| 10 | 21.2 | 5.6 | 1.4 | 0.3 | 3.9 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 63.3 | 47.7 | 113.5 | 11.7 | 33.6 |
| 2 | 918.9 | 356.3 | 943.2 | 719.8 | 113.0 |
| 3 | 1310.3 | 2021.8 | 741.1 | 2667.3 | 1182.7 |
| 4 | 494.3 | 852.6 | 1156.4 | 751.6 | 1516.2 |
| 5 | 385.6 | 286.6 | 315.8 | 698.7 | 365.4 |
| 6 | 285.2 | 125.8 | 88.0 | 180.4 | 371.5 |
| 7 | 40.2 | 143.8 | 46.3 | 54.8 | 84.7 |
| 8 | 16.0 | 22.2 | 38.8 | 25.8 | 18.7 |
| 9 | 5.6 | 5.0 | 4.2 | 14.8 | 10.6 |
| 10 | 2.9 | 3.4 | 1.0 | 1.3 | 6.5 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 17.0 | 50.5 | 12.3 | 32.8 | 10.6 |
| 2 | 201.3 | 69.4 | 364.1 | 69.7 | 526.1 |
| 3 | 404.4 | 434.3 | 201.8 | 842.8 | 395.2 |
| 4 | 800.7 | 260.1 | 578.4 | 208.3 | 1175.8 |
| 5 | 910.4 | 313.6 | 144.5 | 366.1 | 71.9 |
| 6 | 156.0 | 253.0 | 106.0 | 70.8 | 129.2 |
| 7 | 142.4 | 58.2 | 85.3 | 31.2 | 16.2 |
| 8 | 28.2 | 49.2 | 18.0 | 28.5 | 10.4 |
| 9 | 6.5 | 11.8 | 8.9 | 3.8 | 8.6 |
| 10 | 2.9 | 5.0 | 3.7 | 3.4 | 1.1 |

Weight At Age - Input Data

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

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

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.4918 | 0.4347 | 0.5311 | 0.6581 | 0.8296 |
| 2 | 1.3794 | 1.4362 | 1.4893 | 1.5196 | 1.4349 |
| 3 | 2.3728 | 2.2041 | 2.4630 | 2.4992 | 2.4077 |
| 4 | 3.5065 | 3.7324 | 3.5732 | 3.5198 | 3.7982 |
| 5 | 5.4118 | 5.1806 | 4.9668 | 4.8089 | 4.5200 |
| 6 | 6.7808 | 6.5629 | 6.4025 | 5.8249 | 6.0428 |
| 7 | 8.7219 | 7.9373 | 8.4042 | 7.3177 | 7.0854 |
| 8 | 10.4333 | 9.9761 | 11.1911 | 9.3877 | 9.4720 |
| 9 | 11.5348 | 11.2867 | 12.4247 | 9.6151 | 11.8412 |
| 10 | 14.9262 | 14.6514 | 14.5119 | 14.6490 | 18.8362 |

Weight At Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.2837 | 0.4771 | 0.3963 | 0.4867 | 0.5385 |
| 2 | 1.3063 | 1.1976 | 1.3467 | 1.4419 | 1.4631 |
| 3 | 2.2082 | 2.1531 | 1.9769 | 2.3910 | 2.3278 |
| 4 | 3.2271 | 3.5435 | 3.7206 | 3.2180 | 3.4446 |
| 5 | 4.9843 | 4.7869 | 5.2487 | 4.8754 | 4.0326 |
| 6 | 5.8198 | 7.0741 | 7.4302 | 6.4963 | 5.7339 |
| 7 | 7.3782 | 7.1760 | 9.3273 | 8.1007 | 7.7343 |
| 8 | 8.9218 | 9.1163 | 12.1972 | 9.6991 | 8.0901 |
| 9 | 11.1348 | 9.0029 | 11.8414 | 10.9742 | 11.4196 |
| 10 | 12.2279 | 15.7618 | 19.1176 | 8.6207 | 12.0867 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.6185 | 0.5340 | 0.3879 | 0.6008 | 0.4900 |
| 2 | 1.4324 | 1.4313 | 1.5286 | 1.3651 | 1.3165 |
| 3 | 2.2614 | 2.1372 | 2.3862 | 2.2118 | 2.1052 |
| 4 | 3.4254 | 3.3549 | 3.3875 | 2.9372 | 2.9569 |
| 5 | 4.5713 | 4.5433 | 4.5495 | 4.1007 | 3.9493 |
| 6 | 5.5756 | 5.8669 | 5.4719 | 5.2650 | 5.1562 |
| 7 | 7.3994 | 6.6406 | 6.9962 | 5.9799 | 6.4745 |
| 8 | 7.7535 | 8.4061 | 8.0125 | 7.6805 | 8.0004 |
| 9 | 11.8255 | 9.5624 | 8.0492 | 9.0431 | 9.2479 |
| 10 | 12.3102 | 13.2010 | 12.5970 | 9.7372 | 11.7081 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.6020 | 0.3318 | 0.4309 | 0.3791 | 0.4225 |
| 2 | 1.4576 | 1.5332 | 1.0351 | 1.0785 | 1.4203 |
| 3 | 2.2536 | 2.3640 | 2.1015 | 2.0931 | 1.9169 |
| 4 | 2.9071 | 3.0802 | 3.0681 | 3.1067 | 2.8988 |
| 5 | 3.8660 | 3.8831 | 4.0035 | 3.6792 | 3.6265 |
| 6 | 4.7097 | 4.8244 | 4.9245 | 4.5349 | 4.1726 |
| 7 | 5.7888 | 5.6511 | 5.4675 | 6.4617 | 5.9316 |
| 8 | 6.9183 | 7.3709 | 7.4969 | 6.3936 | 6.9569 |
| 9 | 8.2509 | 8.5524 | 8.7863 | 7.5189 | 6.9220 |
| 10 | 10.4481 | 11.1003 | 11.3704 | 9.0737 | 9.0701 |

JAN-1 Weights at Age - Input Data

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

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

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.2878 | 0.2349 | 0.3140 | 0.4457 | 0.6611 |
| 2 | 0.8958 | 0.8404 | 0.8046 | 0.8984 | 0.9718 |
| 3 | 1.8666 | 1.7437 | 1.8808 | 1.9293 | 1.9128 |
| 4 | 2.9467 | 2.9759 | 2.8064 | 2.9444 | 3.0810 |
| 5 | 4.7514 | 4.2621 | 4.3056 | 4.1453 | 3.9887 |
| 6 | 6.2538 | 5.9596 | 5.7592 | 5.3788 | 5.3907 |
| 7 | 8.2360 | 7.3363 | 7.4267 | 6.8448 | 6.4243 |
| 8 | 9.6404 | 9.3279 | 9.4248 | 8.8823 | 8.3255 |
| 9 | 10.9190 | 10.8516 | 11.1333 | 10.3732 | 10.5433 |
| 10 | 14.9262 | 14.6514 | 14.5119 | 14.6490 | 18.8362 |

JAN-1 Weights at Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.1381 | 0.2840 | 0.2078 | 0.2807 | 0.3302 |
| 2 | 1.0410 | 0.5829 | 0.8016 | 0.7559 | 0.8439 |
| 3 | 1.7800 | 1.6771 | 1.5387 | 1.7944 | 1.8321 |
| 4 | 2.7875 | 2.7973 | 2.8303 | 2.5222 | 2.8699 |
| 5 | 4.3510 | 3.9304 | 4.3126 | 4.2590 | 3.6023 |
| 6 | 5.1289 | 5.9380 | 5.9639 | 5.8393 | 5.2873 |
| 7 | 6.6772 | 6.4624 | 8.1229 | 7.7582 | 7.0883 |
| 8 | 7.9508 | 8.2013 | 9.3556 | 9.5114 | 8.0954 |
| 9 | 10.2698 | 8.9623 | 10.3899 | 11.5696 | 10.5243 |
| 10 | 12.2279 | 15.7618 | 19.1176 | 8.6207 | 12.0867 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.4066 | 0.3156 | 0.2068 | 0.4059 | 0.2841 |
| 2 | 0.8783 | 0.9409 | 0.9035 | 0.7277 | 0.8894 |
| 3 | 1.8190 | 1.7497 | 1.8481 | 1.8387 | 1.6952 |
| 4 | 2.8238 | 2.7544 | 2.6907 | 2.6474 | 2.5574 |
| 5 | 3.9682 | 3.9449 | 3.9068 | 3.7271 | 3.4059 |
| 6 | 4.7417 | 5.1787 | 4.9860 | 4.8942 | 4.5983 |
| 7 | 6.5136 | 6.0848 | 6.4067 | 5.7203 | 5.8385 |
| 8 | 7.7439 | 7.8867 | 7.2944 | 7.3304 | 6.9168 |
| 9 | 9.7811 | 8.6106 | 8.2257 | 8.5122 | 8.4278 |
| 10 | 12.3102 | 13.2010 | 12.5970 | 9.7372 | 11.7081 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.3772 | 0.1879 | 0.2724 | 0.1959 | 0.2433 |
| 2 | 0.8451 | 0.9607 | 0.5860 | 0.6817 | 0.7338 |
| 3 | 1.7225 | 1.8563 | 1.7950 | 1.4719 | 1.4378 |
| 4 | 2.4739 | 2.6347 | 2.6931 | 2.5551 | 2.4632 |
| 5 | 3.3810 | 3.3598 | 3.5116 | 3.3598 | 3.3566 |
| 6 | 4.3128 | 4.3187 | 4.3729 | 4.2609 | 3.9181 |
| 7 | 5.4634 | 5.1590 | 5.1359 | 5.6410 | 5.1864 |
| 8 | 6.6927 | 6.5321 | 6.5089 | 5.9124 | 6.7047 |
| 9 | 8.1247 | 7.6921 | 8.0475 | 7.5079 | 6.6526 |
| 10 | 10.4481 | 11.1003 | 11.3704 | 9.0737 | 9.0701 |

JAN-1 Weights at Age - Input Data

| AGE | 2008 |
|---|---|
| 1 | 0.2553 |
| 2 | 0.7615 |
| 3 | 1.6567 |
| 4 | 2.5640 |
| 5 | 3.3938 |
| 6 | 4.2367 |
| 7 | 5.3171 |
| 8 | 6.4702 |
| 9 | 7.6050 |
| 10 | 10.2125 |

SSB Weight At Age - Input Data

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

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

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.2878 | 0.2349 | 0.3140 | 0.4457 | 0.6611 |
| 2 | 0.8958 | 0.8404 | 0.8046 | 0.8984 | 0.9718 |
| 3 | 1.8666 | 1.7437 | 1.8808 | 1.9293 | 1.9128 |
| 4 | 2.9467 | 2.9759 | 2.8064 | 2.9444 | 3.0810 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 4.7514 | 4.2621 | 4.3056 | 4.1453 | 3.9887 |
| 6 | 6.2538 | 5.9596 | 5.7592 | 5.3788 | 5.3907 |
| 7 | 8.2360 | 7.3363 | 7.4267 | 6.8448 | 6.4243 |
| 8 | 9.6404 | 9.3279 | 9.4248 | 8.8823 | 8.3255 |
| 9 | 10.9190 | 10.8516 | 11.1333 | 10.3732 | 10.5433 |
| 10 | 14.9262 | 14.6514 | 14.5119 | 14.6490 | 18.8362 |

SSB Weight At Age - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.1381 | 0.2840 | 0.2078 | 0.2807 | 0.3302 |
| 2 | 1.0410 | 0.5829 | 0.8016 | 0.7559 | 0.8439 |
| 3 | 1.7800 | 1.6771 | 1.5387 | 1.7944 | 1.8321 |
| 4 | 2.7875 | 2.7973 | 2.8303 | 2.5222 | 2.8699 |
| 5 | 4.3510 | 3.9304 | 4.3126 | 4.2590 | 3.6023 |
| 6 | 5.1289 | 5.9380 | 5.9639 | 5.8393 | 5.2873 |
| 7 | 6.6772 | 6.4624 | 8.1229 | 7.7582 | 7.0883 |
| 8 | 7.9508 | 8.2013 | 9.3556 | 9.5114 | 8.0954 |
| 9 | 10.2698 | 8.9623 | 10.3899 | 11.5696 | 10.5243 |
| 10 | 12.2279 | 15.7618 | 19.1176 | 8.6207 | 12.0867 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.4066 | 0.3156 | 0.2068 | 0.4059 | 0.2841 |
| 2 | 0.8783 | 0.9409 | 0.9035 | 0.7277 | 0.8894 |
| 3 | 1.8190 | 1.7497 | 1.8481 | 1.8387 | 1.6952 |
| 4 | 2.8238 | 2.7544 | 2.6907 | 2.6474 | 2.5574 |
| 5 | 3.9682 | 3.9449 | 3.9068 | 3.7271 | 3.4059 |
| 6 | 4.7417 | 5.1787 | 4.9860 | 4.8942 | 4.5983 |
| 7 | 6.5136 | 6.0848 | 6.4067 | 5.7203 | 5.8385 |
| 8 | 7.7439 | 7.8867 | 7.2944 | 7.3304 | 6.9168 |
| 9 | 9.7811 | 8.6106 | 8.2257 | 8.5122 | 8.4278 |
| 10 | 12.3102 | 13.2010 | 12.5970 | 9.7372 | 11.7081 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.3772 | 0.1879 | 0.2724 | 0.1959 | 0.2433 |
| 2 | 0.8451 | 0.9607 | 0.5860 | 0.6817 | 0.7338 |
| 3 | 1.7225 | 1.8563 | 1.7950 | 1.4719 | 1.4378 |
| 4 | 2.4739 | 2.6347 | 2.6931 | 2.5551 | 2.4632 |
| 5 | 3.3810 | 3.3598 | 3.5116 | 3.3598 | 3.3566 |
| 6 | 4.3128 | 4.3187 | 4.3729 | 4.2609 | 3.9181 |
| 7 | 5.4634 | 5.1590 | 5.1359 | 5.6410 | 5.1864 |
| 8 | 6.6927 | 6.5321 | 6.5089 | 5.9124 | 6.7047 |
| 9 | 8.1247 | 7.6921 | 8.0475 | 7.5079 | 6.6526 |
| 10 | 10.4481 | 11.1003 | 11.3704 | 9.0737 | 9.0701 |

Natural Mortality - Input Data

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

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

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

Natural Mortality - Input Data

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

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

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 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 |

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

Maturity - Input Data

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 0.0800 | 0.0700 | 0.0900 | 0.0900 | 0.0800 |
| 2 | 0.3300 | 0.3400 | 0.3800 | 0.3800 | 0.3600 |
| 3 | 0.7500 | 0.7800 | 0.7900 | 0.7900 | 0.7900 |
| 4 | 0.9500 | 0.9600 | 0.9600 | 0.9600 | 0.9600 |
| 5 | 0.9900 | 0.9900 | 0.9900 | 0.9900 | 0.9900 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 0.0800 | 0.1300 | 0.1800 | 0.1600 | 0.2000 |
| 2 | 0.4100 | 0.4900 | 0.5900 | 0.5800 | 0.5900 |
| 3 | 0.8500 | 0.8700 | 0.9100 | 0.9100 | 0.8900 |
| 4 | 0.9800 | 0.9800 | 0.9900 | 0.9900 | 0.9800 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.2500 | 0.2000 | 0.1200 | 0.1300 | 0.0900 |
| 2 | 0.6400 | 0.6100 | 0.4600 | 0.5300 | 0.4700 |
| 3 | 0.9000 | 0.9100 | 0.8500 | 0.8900 | 0.8900 |
| 4 | 0.9800 | 0.9800 | 0.9700 | 0.9800 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Maturity - Input Data

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.0400 | 0.0400 | 0.0400 | 0.0500 | 0.1000 |
| 2 | 0.4300 | 0.4100 | 0.5000 | 0.4800 | 0.5700 |
| 3 | 0.9300 | 0.9200 | 0.9600 | 0.9500 | 0.9400 |
| 4 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.0900 | 0.0700 | 0.0700 | 0.0800 | 0.0700 |
| 2 | 0.5600 | 0.5100 | 0.5100 | 0.5000 | 0.4300 |
| 3 | 0.9400 | 0.9300 | 0.9400 | 0.9300 | 0.8800 |
| 4 | 1.0000 | 0.9900 | 1.0000 | 0.9900 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.0400 | 0.0700 | 0.0600 | 0.0500 | 0.0400 |
| 2 | 0.3300 | 0.3800 | 0.3600 | 0.3500 | 0.3700 |
| 3 | 0.8400 | 0.8300 | 0.8300 | 0.8400 | 0.8900 |
| 4 | 0.9800 | 0.9800 | 0.9800 | 0.9800 | 0.9900 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 7 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 10 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Input Partial Recruitment

| AGE | |
|---|---|
| 1 | 0.0100 |
| 2 | 0.1000 |
| 3 | 0.3900 |
| 4 | 0.7400 |
| 5 | 1.0000 |
| 6 | 1.0000 |
| 7 | 1.0000 |
| 8 | 1.0000 |
| 9 | 1.0000 |

Input F-Plus Ratio

| YEAR | |
|---|---|
| 1978 | 1.0000 |
| 1979 | 1.0000 |
| 1980 | 1.0000 |
| 1981 | 1.0000 |
| 1982 | 1.0000 |
| 1983 | 1.0000 |
| 1984 | 1.0000 |
| 1985 | 1.0000 |
| 1986 | 1.0000 |
| 1987 | 1.0000 |
| 1988 | 1.0000 |
| 1989 | 1.0000 |
| 1990 | 1.0000 |
| 1991 | 1.0000 |
| 1992 | 1.0000 |
| 1993 | 1.0000 |
| 1994 | 1.0000 |
| 1995 | 1.0000 |
| 1996 | 1.0000 |
| 1997 | 1.0000 |
| 1998 | 1.0000 |
| 1999 | 1.0000 |
| 2000 | 1.0000 |
| 2001 | 1.0000 |
| 2002 | 1.0000 |
| 2003 | 1.0000 |
| 2004 | 1.0000 |
| 2005 | 1.0000 |
| 2006 | 1.0000 |
| 2007 | 1.0000 |

SURVEY - INPUT DATA

| INDEX | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_36pr | spr_36pr | spr_36pr | spr_36pr | spr_36pr |
| AGE | 1 | 2 | 3 | 4 | 5 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 693.8277 | 7425.1446 | 12980.2741 | 11371.7250 | 8480.5714 |
| 1983 | 452.8527 | 2666.2982 | 4121.4375 | 1087.6661 | 952.1518 |
| 1984 | 549.4339 | 588.7768 | 1039.1705 | 1691.4696 | 576.8920 |
| 1985 | 151.7705 | 3624.3241 | 906.1152 | 1516.7491 | 1929.3027 |
| 1986 | 1190.5313 | 558.7232 | 2519.5821 | 498.8893 | 737.6786 |
| 1987 | 26.9116 | 2202.7902 | 516.9214 | 1042.7223 | 84.8330 |
| 1988 | 983.8446 | 831.6643 | 4302.5786 | 558.4500 | 879.0670 |
| 1989 | 424.0286 | 1926.7071 | 910.3500 | 2162.6277 | 321.1634 |
| 1990 | 236.8768 | 1258.8348 | 2373.0027 | 921.0054 | 1245.7205 |
| 1991 | 1402.4089 | 721.0125 | 940.8134 | 1268.9438 | 654.0750 |
| 1992 | 167.6170 | 1710.8679 | 639.5946 | 229.6366 | 372.8009 |
| 1993 | 11.6116 | 544.7893 | 1784.2259 | 280.4545 | 122.2634 |
| 1994 | 170.4857 | 372.1179 | 273.2143 | 295.7545 | 45.3536 |
| 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 |

SURVEY - INPUT DATA

| INDEX | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_36pr | spr_36pr | spr_36pr | spr_36po | spr_36po |
| AGE | 6 | 7 | 8 | 1 | 2 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 400.1223 | 2548.6795 | 503.3973 | 0.0000 | 0.0000 |
| 1983 | 605.3063 | 37.1571 | 298.6232 | 0.0000 | 0.0000 |
| 1984 | 546.9750 | 285.2357 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 362.5554 | 262.1491 | 245.7563 | 0.0000 | 0.0000 |
| 1986 | 844.0955 | 84.2866 | 170.8955 | 0.0000 | 0.0000 |
| 1987 | 245.0732 | 185.1027 | 44.8071 | 0.0000 | 0.0000 |
| 1988 | 87.4286 | 50.5446 | 67.2107 | 0.0000 | 0.0000 |
| 1989 | 479.6277 | 68.9866 | 53.9598 | 0.0000 | 0.0000 |
| 1990 | 178.1357 | 195.4848 | 17.6223 | 0.0000 | 0.0000 |
| 1991 | 448.2080 | 73.9045 | 55.4625 | 0.0000 | 0.0000 |
| 1992 | 194.5286 | 216.7955 | 26.7750 | 0.0000 | 0.0000 |
| 1993 | 188.7911 | 40.0259 | 46.9929 | 0.0000 | 0.0000 |
| 1994 | 7.7866 | 60.2438 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 0.0000 | 0.0000 | 67.6205 | 521.4295 |
| 1996 | 0.0000 | 0.0000 | 0.0000 | 99.7232 | 292.2027 |
| 1997 | 0.0000 | 0.0000 | 0.0000 | 397.2536 | 597.1098 |
| 1998 | 0.0000 | 0.0000 | 0.0000 | 152.0438 | 908.7107 |
| 1999 | 0.0000 | 0.0000 | 0.0000 | 290.0170 | 397.3902 |
| 2000 | 0.0000 | 0.0000 | 0.0000 | 301.4920 | 1101.8732 |
| 2001 | 0.0000 | 0.0000 | 0.0000 | 82.9205 | 320.4804 |
| 2002 | 0.0000 | 0.0000 | 0.0000 | 88.3848 | 126.9080 |
| 2003 | 0.0000 | 0.0000 | 0.0000 | 22.4036 | 290.7000 |
| 2004 | 0.0000 | 0.0000 | 0.0000 | 870.0509 | 79.2321 |
| 2005 | 0.0000 | 0.0000 | 0.0000 | 16.2563 | 660.9054 |
| 2006 | 0.0000 | 0.0000 | 0.0000 | 243.9804 | 315.5625 |
| 2007 | 0.0000 | 0.0000 | 0.0000 | 170.8955 | 872.7830 |
| 2008 | 0.0000 | 0.0000 | 0.0000 | 864.1768 | 1136.0250 |

SURVEY - INPUT DATA

| INDEX | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_36po | spr_36po | spr_36po | spr_36po | spr_36po |
| AGE | 3 | 4 | 5 | 6 | 7 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1987 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1988 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1989 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1990 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1991 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1992 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 1166.4884 | 729.4821 | 818.2768 | 145.7598 | 319.1143 |
| 1996 | 1005.7018 | 1703.7643 | 237.9696 | 284.8259 | 37.8402 |
| 1997 | 232.5054 | 667.4625 | 576.8920 | 68.0304 | 182.9170 |
| 1998 | 1773.1607 | 1158.1554 | 1031.2473 | 727.5696 | 138.7929 |
| 1999 | 831.9375 | 696.2866 | 325.3982 | 162.9723 | 86.8821 |
| 2000 | 1133.5661 | 1558.8241 | 505.8563 | 139.8857 | 34.8348 |
| 2001 | 1084.2509 | 218.8446 | 522.7955 | 241.2482 | 31.5563 |
| 2002 | 523.6152 | 1356.5089 | 327.0375 | 306.9563 | 53.2768 |
| 2003 | 370.4786 | 850.3795 | 951.3321 | 87.5652 | 108.6027 |
| 2004 | 790.8188 | 1921.3795 | 1849.5241 | 1219.2188 | 243.9804 |
| 2005 | 188.2446 | 861.9911 | 374.8500 | 280.4545 | 174.0375 |
| 2006 | 1783.9527 | 453.3991 | 988.2161 | 290.7000 | 165.7045 |
| 2007 | 513.0964 | 2450.3223 | 247.1223 | 285.7821 | 42.2116 |
| 2008 | 790.2723 | 479.9009 | 1312.2482 | 51.6375 | 61.4732 |

SURVEY - INPUT DATA

| INDEX | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_36po | spr_41 | spr_41 | spr_41 | spr_41 |
| AGE | 8 | 1 | 2 | 3 | 4 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 477.9000 | 246.6000 | 7111.1571 | 1249.0714 |
| 1979 | 0.0000 | 550.6714 | 1668.4714 | 353.7000 | 2380.5000 |
| 1980 | 0.0000 | 40.1143 | 2850.4286 | 3458.0571 | 272.9571 |
| 1981 | 0.0000 | 2959.9714 | 2381.4000 | 3613.8857 | 2166.3000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1987 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1988 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1989 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1990 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1991 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1992 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 38.2500 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1996 | 24.7259 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1997 | 27.4580 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1998 | 42.2116 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1999 | 41.6652 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2000 | 27.4580 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2001 | 24.1795 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2003 | 16.8027 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2004 | 356.8179 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2005 | 40.7089 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2006 | 73.6313 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2007 | 24.7259 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2008 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

SURVEY - INPUT DATA

| INDEX | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|
| SURVEY TAG | spr_41 | spr_41 | spr_41 | spr_41 | sp_can_p |
| AGE | 5 | 6 | 7 | 8 | 1 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 999.7714 | 182.0571 | 915.8143 | 83.7000 | 0.0000 |
| 1979 | 702.7714 | 302.7857 | 107.4857 | 178.2000 | 0.0000 |
| 1980 | 2192.1429 | 480.4714 | 238.5000 | 39.8571 | 0.0000 |
| 1981 | 136.1571 | 1129.6286 | 331.9714 | 169.8429 | 0.0000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 844.4316 |
| 1987 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 351.8465 |
| 1988 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 394.0681 |
| 1989 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 2294.0392 |
| 1990 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 591.1021 |
| 1991 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1660.7155 |
| 1992 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 154.8125 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1996 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1997 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1998 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1999 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2001 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2006 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2007 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2008 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

SURVEY - INPUT DATA

| INDEX | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|
| SURVEY TAG | sp_can_p | sp_can_p | sp_can_p | sp_can_p | sp_can_p |
| AGE | 2 | 3 | 4 | 5 | 6 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 3194.7662 | 3954.7547 | 520.7328 | 914.8009 | 619.2498 |
| 1987 | 2997.7322 | 1308.8690 | 1534.0507 | 478.5112 | 168.8863 |
| 1988 | 1421.4599 | 6558.4188 | 816.2839 | 1435.5337 | 182.9602 |
| 1989 | 3912.5331 | 1942.1927 | 4011.0501 | 506.6590 | 591.1021 |
| 1990 | 3434.0218 | 5319.9191 | 2927.3629 | 5446.5838 | 591.1021 |
| 1991 | 1632.5678 | 2589.5902 | 3025.8799 | 1477.7553 | 1843.6757 |
| 1992 | 4025.1240 | 2491.0732 | 1125.9088 | 1379.2383 | 844.4316 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1996 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1997 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1998 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1999 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2001 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2006 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2007 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2008 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

SURVEY - INPUT DATA

| INDEX | 31 | 32 | 33 | 34 | 35 |
|---|---|---|---|---|---|
| SURVEY TAG | sp_can_p | sp_can_p | sp_canpo | sp_canpo | sp_canpo |
| AGE | 7 | 8 | 1 | 2 | 3 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 365.9204 | 0.0400 | 0.0000 | 0.0000 | 0.0000 |
| 1987 | 309.6249 | 0.0800 | 0.0000 | 0.0000 | 0.0000 |
| 1988 | 112.5909 | 0.1700 | 0.0000 | 0.0000 | 0.0000 |
| 1989 | 70.3693 | 0.1000 | 0.0000 | 0.0000 | 0.0000 |
| 1990 | 1308.8690 | 0.1200 | 0.0000 | 0.0000 | 0.0000 |
| 1991 | 225.1818 | 0.2200 | 0.0000 | 0.0000 | 0.0000 |
| 1992 | 605.1760 | 0.1200 | 0.0000 | 0.0000 | 0.0000 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 0.0000 | 98.5170 | 942.9486 | 2111.0790 |
| 1996 | 0.0000 | 0.0000 | 197.0340 | 689.6191 | 3251.0617 |
| 1997 | 0.0000 | 0.0000 | 450.3635 | 745.9146 | 774.0623 |
| 1998 | 0.0000 | 0.0000 | 14.0739 | 942.9486 | 1337.0167 |
| 1999 | 0.0000 | 0.0000 | 464.4374 | 450.3635 | 2097.0051 |
| 2000 | 0.0000 | 0.0000 | 140.7386 | 619.2498 | 1477.7553 |
| 2001 | 0.0000 | 0.0000 | 0.0000 | 84.4432 | 900.7270 |
| 2002 | 0.0000 | 0.0000 | 12.8934 | 121.7457 | 805.6169 |
| 2003 | 0.0000 | 0.0000 | 0.0000 | 31.3603 | 419.1448 |
| 2004 | 0.0000 | 0.0000 | 753.7760 | 134.4987 | 551.7156 |
| 2005 | 0.0000 | 0.0000 | 34.4185 | 1880.0260 | 661.9957 |
| 2006 | 0.0000 | 0.0000 | 0.0000 | 52.7756 | 1978.5841 |
| 2007 | 0.0000 | 0.0000 | 193.3181 | 730.7096 | 1329.3200 |
| 2008 | 0.0000 | 0.0000 | 12.2714 | 454.9284 | 1259.8226 |

SURVEY - INPUT DATA

| INDEX | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|
| SURVEY TAG | sp_canpo | sp_canpo | sp_canpo | sp_canpo | sp_canpo |
| AGE | 4 | 5 | 6 | 7 | 8 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1987 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1988 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1989 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1990 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1991 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1992 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1993 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 1210.3520 | 844.4316 | 267.4033 | 56.2954 | 0.0500 |
| 1996 | 5657.6917 | 1534.0507 | 1111.8349 | 464.4374 | 0.0800 |
| 1997 | 1759.2325 | 1731.0848 | 379.9942 | 84.4432 | 0.0300 |
| 1998 | 492.5851 | 492.5851 | 394.0681 | 98.5170 | 0.0200 |
| 1999 | 1534.0507 | 577.0283 | 365.9204 | 211.1079 | 0.0100 |
| 2000 | 5516.9531 | 2406.6301 | 1097.7611 | 562.9544 | 0.2400 |
| 2001 | 591.1021 | 1562.1985 | 731.8407 | 365.9204 | 0.1700 |
| 2002 | 2887.0783 | 961.5430 | 1718.1603 | 563.8122 | 0.1700 |
| 2003 | 912.1602 | 1706.7639 | 447.1511 | 474.4035 | 0.1600 |
| 2004 | 595.5775 | 634.6213 | 545.4536 | 103.8278 | 0.1175 |
| 2005 | 4092.5096 | 1591.4896 | 721.6604 | 583.5206 | 0.0100 |
| 2006 | 925.6215 | 2297.1633 | 982.6574 | 283.5685 | 0.1850 |
| 2007 | 4136.1066 | 545.8412 | 851.2446 | 135.4739 | 0.0757 |
| 2008 | 835.7757 | 3069.2880 | 196.4960 | 396.5004 | 0.0300 |

SURVEY - INPUT DATA

| INDEX | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|
| SURVEY TAG | us0autpr | us1autpr | us2autpr | us3autpr | us4autpr |
| AGE | 1 | 2 | 3 | 4 | 5 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 207.0964 | 323.4857 | 4690.4063 | 943.6821 | 345.3429 |
| 1979 | 540.0080 | 2520.9482 | 534.4071 | 5543.1080 | 1316.3464 |
| 1980 | 156.4152 | 2220.0027 | 2290.9018 | 221.4402 | 2303.8795 |
| 1981 | 382.0902 | 1120.0420 | 769.9179 | 1057.2027 | 71.7188 |
| 1982 | 356.5446 | 4815.4018 | 3073.6607 | 2129.7054 | 804.6161 |
| 1983 | 494.5179 | 788.6330 | 2608.5134 | 330.3161 | 92.6196 |
| 1984 | 1752.5330 | 1160.4777 | 1488.0616 | 1011.1661 | 94.3955 |
| 1985 | 244.6634 | 2607.9670 | 931.3875 | 1268.6705 | 1127.1455 |
| 1986 | 1368.6670 | 247.6688 | 1151.0518 | 91.1170 | 144.1205 |
| 1987 | 103.9580 | 3113.1402 | 175.5402 | 449.4375 | 11.2018 |
| 1988 | 278.2688 | 565.1438 | 1848.0214 | 147.5357 | 273.6241 |
| 1989 | 750.6563 | 1194.9027 | 596.9732 | 1234.6554 | 81.9643 |
| 1990 | 342.6107 | 3822.8143 | 1429.4571 | 220.0741 | 692.7348 |
| 1991 | 214.6098 | 496.7036 | 2219.0464 | 2478.1902 | 563.3679 |
| 1992 | 55.3259 | 556.8107 | 239.3357 | 374.5768 | 41.6652 |
| 1993 | 47.9491 | 563.3679 | 1296.2652 | 238.1063 | 136.6071 |
| 1994 | 243.7071 | 1324.9527 | 726.2036 | 522.6589 | 22.5402 |
| 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 |

SURVEY - INPUT DATA

| INDEX | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|
| SURVEY TAG | us5autpr | us0autpo | us1autpo | us2autpo | us3autpo |
| AGE | 6 | 1 | 2 | 3 | 4 |
| TIME | JAN-1 | JAN-1 | JAN-1 | JAN-1 | JAN-1 |
| TYPE | NUMBERS | NUMBERS | NUMBERS | NUMBERS | NUMBERS |
| RETRO FLAG | 1 | 1 | 1 | 1 | 1 |
| 1978 | 236.4670 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1979 | 458.3170 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1980 | 437.9625 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1981 | 361.7357 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1982 | 73.7679 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1983 | 157.3714 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1984 | 44.8071 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1985 | 33.0589 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1986 | 104.6411 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1987 | 66.5277 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1988 | 38.2500 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1989 | 264.6080 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1990 | 74.7241 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1991 | 390.0134 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1992 | 39.6161 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1993 | 59.6973 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1994 | 34.5616 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 1995 | 0.0000 | 91.2536 | 554.0786 | 907.4813 | 592.0554 |
| 1996 | 0.0000 | 218.4348 | 334.2777 | 2473.4089 | 1705.5402 |
| 1997 | 0.0000 | 29.5071 | 327.7205 | 267.4768 | 566.1000 |
| 1998 | 0.0000 | 8.7429 | 322.6661 | 438.3723 | 149.3116 |
| 1999 | 0.0000 | 95.7616 | 458.3170 | 1401.8625 | 480.5839 |
| 2000 | 0.0000 | 95.7616 | 190.8402 | 210.6482 | 422.9357 |
| 2001 | 0.0000 | 26.6384 | 780.0268 | 734.6732 | 96.3080 |
| 2002 | 0.0000 | 38.7964 | 64.3420 | 520.2000 | 627.0268 |
| 2003 | 0.0000 | 319.6607 | 652.9821 | 965.8125 | 1907.0357 |
| 2004 | 0.0000 | 446.5688 | 227.1777 | 422.3893 | 273.8973 |
| 2005 | 0.0000 | 2302.2402 | 1017.4500 | 185.5125 | 970.0473 |
| 2006 | 0.0000 | 71.1723 | 75.5438 | 791.5018 | 176.0866 |
| 2007 | 0.0000 | 135.7875 | 590.8259 | 221.0304 | 702.4339 |
| 2008 | 0.0000 | 102.3188 | 156.6884 | 282.5036 | 68.8500 |

SURVEY - INPUT DATA

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

| | | |
|---|---|---|
| 1978 | 0.0000 | 0.0000 |
| 1979 | 0.0000 | 0.0000 |
| 1980 | 0.0000 | 0.0000 |
| 1981 | 0.0000 | 0.0000 |
| 1982 | 0.0000 | 0.0000 |
| 1983 | 0.0000 | 0.0000 |
| 1984 | 0.0000 | 0.0000 |
| 1985 | 0.0000 | 0.0000 |
| 1986 | 0.0000 | 0.0000 |
| 1987 | 0.0000 | 0.0000 |
| 1988 | 0.0000 | 0.0000 |
| 1989 | 0.0000 | 0.0000 |
| 1990 | 0.0000 | 0.0000 |
| 1991 | 0.0000 | 0.0000 |
| 1992 | 0.0000 | 0.0000 |
| 1993 | 0.0000 | 0.0000 |
| 1994 | 0.0000 | 0.0000 |
| 1995 | 209.5554 | 92.7563 |
| 1996 | 119.1214 | 73.9045 |
| 1997 | 195.3482 | 81.5545 |
| 1998 | 176.4964 | 66.3911 |
| 1999 | 56.1455 | 48.3589 |
| 2000 | 348.2116 | 118.9848 |
| 2001 | 107.6464 | 41.8018 |
| 2002 | 81.1446 | 74.5875 |
| 2003 | 2222.5982 | 161.1964 |
| 2004 | 212.5607 | 112.5643 |
| 2005 | 344.2500 | 439.1920 |
| 2006 | 239.8821 | 35.3813 |
| 2007 | 46.1732 | 170.4857 |
| 2008 | 177.9991 | 8.7429 |

Additional Output Files

Population File C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A
Auxilliary File C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A
Covariance File C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A
Residuals File  C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A

Log File C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A

Bootstrap Files

Bootstrap Stock Numbers
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A
Bootstrap Fishing Mortality
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A
Bootstrap Biomass
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A
Bootstrap Catchability
C:\LOB\GBCOD\ASSESS_2008\VPA\TY07\10P_SWPT_SPLIT\10P-SWPT-SPLT_A

## Estimation Results

### JAN-1 Population Numbers

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 28705. | 25943. | 22914. | 45891. | 19863. |
| 2 | 4707. | 23365. | 20988. | 18453. | 36471. |
| 3 | 25333. | 3478. | 17107. | 13370. | 11591. |
| 4 | 7660. | 13468. | 1991. | 8669. | 6701. |
| 5 | 2967. | 4093. | 6916. | 1141. | 4688. |
| 6 | 1264. | 1624. | 2267. | 3454. | 649. |
| 7 | 1212. | 874. | 926. | 978. | 1570. |
| 8 | 82. | 776. | 572. | 385. | 428. |
| 9 | 174. | 47. | 363. | 405. | 169. |
| 10 | 44. | 127. | 37. | 173. | 192. |
| Total | 72148. | 73793. | 74082. | 92919. | 82323. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 11305. | 29021. | 9615. | 44505. | 17898. |
| 2 | 15562. | 8691. | 23506. | 7713. | 35744. |
| 3 | 20473. | 8096. | 5723. | 12569. | 4881. |
| 4 | 5520. | 8936. | 3512. | 2063. | 6191. |
| 5 | 2817. | 2128. | 4336. | 1367. | 920. |
| 6 | 2015. | 1273. | 916. | 1678. | 649. |
| 7 | 266. | 982. | 541. | 308. | 823. |
| 8 | 654. | 133. | 402. | 205. | 176. |
| 9 | 173. | 378. | 56. | 153. | 105. |
| 10 | 288. | 283. | 182. | 76. | 75. |
| Total | 59073. | 59920. | 48789. | 70638. | 67462. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | 24854. | 17849. | 10204. | 19796. | 7470. |
| 2 | 14560. | 20056. | 13809. | 8290. | 15956. |
| 3 | 22111. | 9803. | 14070. | 6330. | 5023. |
| 4 | 2637. | 10610. | 5305. | 6709. | 2076. |
| 5 | 3124. | 1198. | 4880. | 2584. | 2671. |
| 6 | 484. | 1153. | 637. | 1967. | 833. |
| 7 | 308. | 197. | 467. | 315. | 642. |
| 8 | 425. | 118. | 88. | 178. | 132. |
| 9 | 93. | 154. | 51. | 50. | 66. |
| 10 | 105. | 54. | 88. | 47. | 19. |
| Total | 68702. | 61191. | 49599. | 46266. | 34886. |

JAN-1 Population Numbers

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 9871. | 6316. | 3925. | 6675. | 10621. |
| 2 | 5943. | 7812. | 5086. | 3185. | 5407. |
| 3 | 8749. | 3487. | 5841. | 3575. | 2348. |
| 4 | 2070. | 3214. | 1475. | 3498. | 2041. |
| 5 | 745. | 607. | 868. | 610. | 1727. |
| 6 | 853. | 189. | 121. | 369. | 270. |
| 7 | 283. | 223. | 68. | 62. | 138. |
| 8 | 209. | 74. | 53. | 36. | 35. |
| 9 | 68. | 46. | 15. | 26. | 19. |
| 10 | 34. | 9. | 3. | 1. | 7. |
| Total | 28824. | 21975. | 17456. | 18037. | 22614. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 4944. | 12234. | 5977. | 2295. | 4239. |
| 2 | 8581. | 3991. | 9973. | 4791. | 1868. |
| 3 | 3809. | 6197. | 2946. | 7315. | 3274. |
| 4 | 1250. | 1944. | 3261. | 1746. | 3600. |
| 5 | 761. | 581. | 830. | 1634. | 758. |
| 6 | 627. | 279. | 220. | 397. | 713. |
| 7 | 90. | 258. | 116. | 102. | 164. |
| 8 | 30. | 37. | 84. | 54. | 34. |
| 9 | 12. | 10. | 11. | 34. | 21. |
| 10 | 6. | 7. | 3. | 3. | 13. |
| Total | 20110. | 25540. | 23421. | 18370. | 14685. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | 1461. | 10802. | 2523. | 6490. | 7037. |
| 2 | 3441. | 1181. | 8798. | 2054. | 5284. |
| 3 | 1428. | 2635. | 904. | 6874. | 1619. |
| 4 | 1621. | 806. | 1767. | 559. | 4869. |
| 5 | 1591. | 613. | 427. | 928. | 271. |
| 6 | 294. | 493. | 223. | 220. | 432. |
| 7 | 253. | 102. | 179. | 88. | 116. |
| 8 | 59. | 80. | 32. | 70. | 44. |
| 9 | 11. | 23. | 22. | 10. | 32. |
| 10 | 5. | 10. | 9. | 9. | 5. |
| Total | 10164. | 16745. | 14882. | 17301. | 19708. |

JAN-1 Population Numbers

| AGE | 2008 |
|---|---|
| 1 | 4875. |
| 2 | 5752. |
| 3 | 3852. |
| 4 | 970. |
| 5 | 2930. |
| 6 | 157. |
| 7 | 238. |
| 8 | 81. |
| 9 | 26. |
| 10 | 22. |
| Total | 18902. |

Fishing Mortality Calculated

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 0.0058 | 0.0119 | 0.0165 | 0.0297 | 0.0440 |
| 2 | 0.1026 | 0.1117 | 0.2509 | 0.2650 | 0.3774 |
| 3 | 0.4318 | 0.3577 | 0.4797 | 0.4908 | 0.5419 |
| 4 | 0.4269 | 0.4664 | 0.3569 | 0.4147 | 0.6667 |
| 5 | 0.4024 | 0.3905 | 0.4942 | 0.3647 | 0.6443 |
| 6 | 0.1688 | 0.3620 | 0.6411 | 0.5883 | 0.6924 |
| 7 | 0.2463 | 0.2239 | 0.6785 | 0.6268 | 0.6760 |
| 8 | 0.3601 | 0.5597 | 0.1456 | 0.6208 | 0.7059 |
| 9 | 0.3083 | 0.3598 | 0.5414 | 0.5446 | 0.6558 |
| 10 | 0.3083 | 0.3598 | 0.5414 | 0.5446 | 0.6558 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 0.0630 | 0.0107 | 0.0204 | 0.0192 | 0.0064 |
| 2 | 0.4535 | 0.2179 | 0.4261 | 0.2575 | 0.2803 |
| 3 | 0.6290 | 0.6351 | 0.8203 | 0.5081 | 0.4158 |
| 4 | 0.7533 | 0.5232 | 0.7433 | 0.6078 | 0.4840 |
| 5 | 0.5944 | 0.6425 | 0.7493 | 0.5448 | 0.4415 |
| 6 | 0.5194 | 0.6547 | 0.8897 | 0.5129 | 0.5462 |
| 7 | 0.4937 | 0.6939 | 0.7714 | 0.3628 | 0.4606 |
| 8 | 0.3474 | 0.6618 | 0.7637 | 0.4717 | 0.4309 |
| 9 | 0.5587 | 0.6574 | 0.7723 | 0.5108 | 0.4756 |
| 10 | 0.5587 | 0.6574 | 0.7723 | 0.5108 | 0.4756 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.0145 | 0.0566 | 0.0078 | 0.0157 | 0.0287 |
| 2 | 0.1956 | 0.1545 | 0.5800 | 0.3011 | 0.4009 |
| 3 | 0.5343 | 0.4140 | 0.5406 | 0.9151 | 0.6864 |
| 4 | 0.5889 | 0.5766 | 0.5192 | 0.7209 | 0.8245 |
| 5 | 0.7968 | 0.4318 | 0.7087 | 0.9323 | 0.9419 |
| 6 | 0.7013 | 0.7038 | 0.5044 | 0.9193 | 0.8797 |
| 7 | 0.7592 | 0.6020 | 0.7662 | 0.6727 | 0.9223 |
| 8 | 0.8176 | 0.6421 | 0.3653 | 0.7979 | 0.4573 |
| 9 | 0.7815 | 0.5595 | 0.6891 | 0.9081 | 0.9261 |
| 10 | 0.7815 | 0.5595 | 0.6891 | 0.9081 | 0.9261 |

Fishing Mortality Calculated

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.0340 | 0.0166 | 0.0091 | 0.0108 | 0.0133 |
| 2 | 0.3332 | 0.0907 | 0.1523 | 0.1047 | 0.1502 |
| 3 | 0.8014 | 0.6600 | 0.3127 | 0.3604 | 0.4303 |
| 4 | 1.0272 | 1.1091 | 0.6839 | 0.5061 | 0.7865 |
| 5 | 1.1730 | 1.4129 | 0.6554 | 0.6147 | 0.8135 |
| 6 | 1.1405 | 0.8274 | 0.4668 | 0.7821 | 0.9036 |
| 7 | 1.1436 | 1.2330 | 0.4262 | 0.3799 | 1.3379 |
| 8 | 1.3043 | 1.3803 | 0.5290 | 0.4335 | 0.8944 |
| 9 | 1.1537 | 1.2384 | 0.6159 | 0.6543 | 0.8515 |
| 10 | 1.1537 | 1.2384 | 0.6159 | 0.6543 | 0.8515 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.0142 | 0.0043 | 0.0212 | 0.0056 | 0.0088 |
| 2 | 0.1255 | 0.1035 | 0.1100 | 0.1806 | 0.0690 |
| 3 | 0.4725 | 0.4421 | 0.3230 | 0.5091 | 0.5029 |
| 4 | 0.5659 | 0.6513 | 0.4912 | 0.6348 | 0.6162 |
| 5 | 0.8021 | 0.7704 | 0.5380 | 0.6293 | 0.7456 |
| 6 | 0.6861 | 0.6757 | 0.5739 | 0.6852 | 0.8374 |
| 7 | 0.6733 | 0.9285 | 0.5704 | 0.8835 | 0.8281 |
| 8 | 0.8821 | 1.0337 | 0.7057 | 0.7381 | 0.8951 |
| 9 | 0.7434 | 0.7794 | 0.5479 | 0.6503 | 0.7929 |
| 10 | 0.7434 | 0.7794 | 0.5479 | 0.6503 | 0.7929 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.0129 | 0.0052 | 0.0054 | 0.0056 | 0.0017 |
| 2 | 0.0667 | 0.0670 | 0.0467 | 0.0381 | 0.1161 |
| 3 | 0.3719 | 0.2000 | 0.2811 | 0.1450 | 0.3119 |
| 4 | 0.7723 | 0.4362 | 0.4441 | 0.5236 | 0.3080 |
| 5 | 0.9709 | 0.8136 | 0.4635 | 0.5645 | 0.3439 |
| 6 | 0.8593 | 0.8168 | 0.7325 | 0.4354 | 0.3973 |
| 7 | 0.9477 | 0.9661 | 0.7358 | 0.4941 | 0.1662 |
| 8 | 0.7441 | 1.0957 | 0.9542 | 0.5883 | 0.3025 |
| 9 | 0.9521 | 0.8269 | 0.5855 | 0.5353 | 0.3025 |
| 10 | 0.9521 | 0.8269 | 0.5855 | 0.5353 | 0.3025 |

Average Fishing Mortality For Ages 5- 8

| Year | Average F | N Weighted | Biomass Wtd | Catch Wtd |
|---|---|---|---|---|
| 1978 | 0.2944 | 0.3141 | 0.2944 | 0.3425 |
| 1979 | 0.3840 | 0.3823 | 0.3842 | 0.3962 |
| 1980 | 0.4898 | 0.5227 | 0.5158 | 0.5442 |
| 1981 | 0.5501 | 0.5539 | 0.5704 | 0.5667 |
| 1982 | 0.6796 | 0.6589 | 0.6647 | 0.6594 |
| 1983 | 0.4887 | 0.5354 | 0.5104 | 0.5443 |
| 1984 | 0.6633 | 0.6577 | 0.6626 | 0.6581 |
| 1985 | 0.7935 | 0.7729 | 0.7769 | 0.7749 |
| 1986 | 0.4730 | 0.5098 | 0.5017 | 0.5137 |
| 1987 | 0.4698 | 0.4734 | 0.4746 | 0.4765 |
| 1988 | 0.7687 | 0.7855 | 0.7846 | 0.7864 |
| 1989 | 0.5949 | 0.5713 | 0.5934 | 0.5936 |
| 1990 | 0.5862 | 0.6867 | 0.6799 | 0.6933 |
| 1991 | 0.8305 | 0.9063 | 0.8960 | 0.9095 |
| 1992 | 0.8003 | 0.9119 | 0.8982 | 0.9180 |
| 1993 | 1.1904 | 1.1689 | 1.1749 | 1.1699 |
| 1994 | 1.2134 | 1.2728 | 1.2444 | 1.2948 |
| 1995 | 0.5193 | 0.6148 | 0.5964 | 0.6227 |
| 1996 | 0.5526 | 0.6525 | 0.6479 | 0.6668 |
| 1997 | 0.9873 | 0.8594 | 0.8881 | 0.8697 |
| 1998 | 0.7609 | 0.7478 | 0.7431 | 0.7512 |
| 1999 | 0.8521 | 0.7914 | 0.8041 | 0.7992 |
| 2000 | 0.5970 | 0.5586 | 0.5671 | 0.5609 |
| 2001 | 0.7340 | 0.6539 | 0.6625 | 0.6572 |
| 2002 | 0.8265 | 0.7960 | 0.8045 | 0.7978 |
| 2003 | 0.8805 | 0.9473 | 0.9397 | 0.9490 |
| 2004 | 0.9231 | 0.8445 | 0.8584 | 0.8486 |
| 2005 | 0.7215 | 0.6079 | 0.6340 | 0.6347 |
| 2006 | 0.5206 | 0.5393 | 0.5351 | 0.5431 |
| 2007 | 0.3025 | 0.3446 | 0.3356 | 0.3597 |

Back Calculated Partial Recruitment

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 0.0135 | 0.0213 | 0.0243 | 0.0474 | 0.0623 |
| 2 | 0.2377 | 0.1996 | 0.3698 | 0.4228 | 0.5347 |
| 3 | 1.0000 | 0.6391 | 0.7070 | 0.7830 | 0.7676 |
| 4 | 0.9886 | 0.8332 | 0.5260 | 0.6616 | 0.9444 |
| 5 | 0.9319 | 0.6976 | 0.7284 | 0.5819 | 0.9127 |
| 6 | 0.3909 | 0.6467 | 0.9449 | 0.9386 | 0.9809 |
| 7 | 0.5705 | 0.4000 | 1.0000 | 1.0000 | 0.9576 |
| 8 | 0.8339 | 1.0000 | 0.2145 | 0.9905 | 1.0000 |
| 9 | 0.7139 | 0.6428 | 0.7979 | 0.8689 | 0.9291 |
| 10 | 0.7139 | 0.6428 | 0.7979 | 0.8689 | 0.9291 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 0.0836 | 0.0155 | 0.0229 | 0.0316 | 0.0118 |
| 2 | 0.6021 | 0.3140 | 0.4789 | 0.4237 | 0.5132 |
| 3 | 0.8350 | 0.9152 | 0.9220 | 0.8359 | 0.7613 |
| 4 | 1.0000 | 0.7540 | 0.8355 | 1.0000 | 0.8861 |
| 5 | 0.7891 | 0.9259 | 0.8422 | 0.8963 | 0.8083 |
| 6 | 0.6895 | 0.9435 | 1.0000 | 0.8438 | 1.0000 |
| 7 | 0.6554 | 1.0000 | 0.8671 | 0.5969 | 0.8433 |
| 8 | 0.4613 | 0.9537 | 0.8584 | 0.7760 | 0.7890 |
| 9 | 0.7417 | 0.9473 | 0.8681 | 0.8404 | 0.8707 |
| 10 | 0.7417 | 0.9473 | 0.8681 | 0.8404 | 0.8707 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 0.0178 | 0.0805 | 0.0102 | 0.0168 | 0.0305 |
| 2 | 0.2392 | 0.2195 | 0.7570 | 0.3229 | 0.4256 |
| 3 | 0.6534 | 0.5882 | 0.7056 | 0.9815 | 0.7287 |
| 4 | 0.7203 | 0.8193 | 0.6776 | 0.7732 | 0.8753 |
| 5 | 0.9745 | 0.6135 | 0.9249 | 1.0000 | 1.0000 |
| 6 | 0.8578 | 1.0000 | 0.6583 | 0.9860 | 0.9340 |
| 7 | 0.9286 | 0.8553 | 1.0000 | 0.7215 | 0.9792 |
| 8 | 1.0000 | 0.9123 | 0.4767 | 0.8558 | 0.4856 |
| 9 | 0.9558 | 0.7949 | 0.8994 | 0.9740 | 0.9832 |
| 10 | 0.9558 | 0.7949 | 0.8994 | 0.9740 | 0.9832 |

Back Calculated Partial Recruitment

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 0.0261 | 0.0118 | 0.0133 | 0.0138 | 0.0099 |
| 2 | 0.2555 | 0.0642 | 0.2227 | 0.1338 | 0.1123 |
| 3 | 0.6144 | 0.4671 | 0.4572 | 0.4609 | 0.3216 |
| 4 | 0.7875 | 0.7850 | 1.0000 | 0.6471 | 0.5879 |
| 5 | 0.8994 | 1.0000 | 0.9583 | 0.7860 | 0.6080 |
| 6 | 0.8744 | 0.5856 | 0.6825 | 1.0000 | 0.6754 |
| 7 | 0.8768 | 0.8727 | 0.6232 | 0.4858 | 1.0000 |
| 8 | 1.0000 | 0.9769 | 0.7736 | 0.5543 | 0.6685 |
| 9 | 0.8846 | 0.8765 | 0.9006 | 0.8367 | 0.6364 |
| 10 | 0.8846 | 0.8765 | 0.9006 | 0.8367 | 0.6364 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 0.0161 | 0.0042 | 0.0300 | 0.0064 | 0.0098 |
| 2 | 0.1422 | 0.1001 | 0.1559 | 0.2045 | 0.0771 |
| 3 | 0.5357 | 0.4277 | 0.4578 | 0.5762 | 0.5618 |
| 4 | 0.6416 | 0.6301 | 0.6960 | 0.7185 | 0.6884 |
| 5 | 0.9093 | 0.7453 | 0.7624 | 0.7123 | 0.8329 |
| 6 | 0.7778 | 0.6537 | 0.8132 | 0.7756 | 0.9355 |
| 7 | 0.7633 | 0.8982 | 0.8083 | 1.0000 | 0.9251 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 0.8354 | 1.0000 |
| 9 | 0.8427 | 0.7540 | 0.7764 | 0.7361 | 0.8857 |
| 10 | 0.8427 | 0.7540 | 0.7764 | 0.7361 | 0.8857 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 0.0133 | 0.0047 | 0.0057 | 0.0095 | 0.0042 |
| 2 | 0.0686 | 0.0611 | 0.0489 | 0.0648 | 0.2923 |
| 3 | 0.3830 | 0.1825 | 0.2946 | 0.2464 | 0.7850 |
| 4 | 0.7954 | 0.3981 | 0.4654 | 0.8900 | 0.7751 |
| 5 | 1.0000 | 0.7426 | 0.4857 | 0.9596 | 0.8654 |
| 6 | 0.8850 | 0.7455 | 0.7677 | 0.7401 | 1.0000 |
| 7 | 0.9761 | 0.8818 | 0.7711 | 0.8399 | 0.4184 |
| 8 | 0.7664 | 1.0000 | 1.0000 | 1.0000 | 0.7613 |
| 9 | 0.9806 | 0.7547 | 0.6136 | 0.9098 | 0.7613 |
| 10 | 0.9806 | 0.7547 | 0.6136 | 0.9098 | 0.7613 |

JAN-1 Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 10819. | 12621. | 9860. | 17503. | 8545. |
| 2 | 4790. | 20760. | 20788. | 17774. | 32985. |
| 3 | 46691. | 5351. | 31154. | 24529. | 22175. |
| 4 | 21697. | 43531. | 5158. | 25392. | 19946. |
| 5 | 8908. | 16776. | 33810. | 4830. | 20244. |
| 6 | 5526. | 8718. | 13080. | 22058. | 3739. |
| 7 | 6453. | 6485. | 7149. | 7527. | 13058. |
| 8 | 652. | 6432. | 5603. | 3470. | 3957. |
| 9 | 1621. | 446. | 3558. | 4776. | 1909. |
| 10 | 615. | 1729. | 553. | 2905. | 2999. |
| Total | 107772. | 122849. | 130713. | 130763. | 129555. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 5135. | 9797. | 5967. | 20312. | 6760. |
| 2 | 14955. | 8751. | 20342. | 8064. | 35555. |
| 3 | 37349. | 15268. | 10093. | 23145. | 8947. |
| 4 | 16105. | 26455. | 10660. | 5647. | 19783. |
| 5 | 11883. | 8656. | 18524. | 6182. | 4197. |
| 6 | 11761. | 7127. | 5167. | 10026. | 4244. |
| 7 | 1985. | 7367. | 3981. | 2330. | 6575. |
| 8 | 6572. | 1242. | 3805. | 1856. | 1681. |
| 9 | 1846. | 4115. | 618. | 1767. | 1145. |
| 10 | 4693. | 4143. | 2551. | 1107. | 1176. |
| Total | 112284. | 92921. | 81708. | 80435. | 90064. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 7153. | 4193. | 3204. | 8823. | 4938. |
| 2 | 13043. | 16855. | 11111. | 7447. | 15506. |
| 3 | 41273. | 17093. | 26462. | 12212. | 9607. |
| 4 | 7770. | 31575. | 14888. | 19753. | 6395. |
| 5 | 14844. | 5106. | 21013. | 10713. | 10655. |
| 6 | 3028. | 6871. | 3668. | 10580. | 4490. |
| 7 | 2536. | 1442. | 3468. | 2155. | 4126. |
| 8 | 4096. | 1100. | 831. | 1578. | 1095. |
| 9 | 1020. | 1667. | 566. | 520. | 691. |
| 10 | 1574. | 796. | 1284. | 694. | 353. |
| Total | 96336. | 86699. | 86495. | 74476. | 57855. |

JAN-1 Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 1363. | 1794. | 816. | 1874. | 3507. |
| 2 | 6186. | 4553. | 4077. | 2407. | 4563. |
| 3 | 15573. | 5847. | 8988. | 6416. | 4302. |
| 4 | 5770. | 8991. | 4176. | 8823. | 5859. |
| 5 | 3242. | 2385. | 3743. | 2596. | 6220. |
| 6 | 4373. | 1121. | 721. | 2155. | 1427. |
| 7 | 1889. | 1442. | 549. | 482. | 980. |
| 8 | 1662. | 605. | 498. | 344. | 281. |
| 9 | 700. | 416. | 158. | 297. | 202. |
| 10 | 410. | 134. | 64. | 6. | 89. |
| Total | 41170. | 27289. | 23789. | 25400. | 27430. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 2010. | 3861. | 1236. | 932. | 1204. |
| 2 | 7537. | 3755. | 9011. | 3486. | 1662. |
| 3 | 6929. | 10843. | 5445. | 13450. | 5550. |
| 4 | 3530. | 5356. | 8774. | 4623. | 9206. |
| 5 | 3021. | 2293. | 3243. | 6089. | 2581. |
| 6 | 2972. | 1447. | 1098. | 1942. | 3278. |
| 7 | 583. | 1572. | 746. | 581. | 956. |
| 8 | 230. | 295. | 610. | 395. | 238. |
| 9 | 114. | 87. | 90. | 288. | 178. |
| 10 | 74. | 90. | 33. | 29. | 151. |
| Total | 27000. | 29599. | 30284. | 31814. | 25004. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 551. | 2030. | 687. | 1271. | 1712. |
| 2 | 2908. | 1135. | 5156. | 1400. | 3877. |
| 3 | 2459. | 4892. | 1623. | 10119. | 2328. |
| 4 | 4011. | 2123. | 4758. | 1428. | 11993. |
| 5 | 5380. | 2060. | 1498. | 3117. | 910. |
| 6 | 1270. | 2131. | 973. | 936. | 1692. |
| 7 | 1380. | 527. | 917. | 494. | 604. |
| 8 | 392. | 524. | 207. | 414. | 293. |
| 9 | 93. | 175. | 177. | 75. | 212. |
| 10 | 54. | 108. | 104. | 81. | 42. |
| Total | 18498. | 15704. | 16099. | 19336. | 23663. |

JAN-1 Biomass

| AGE | 2008 |
|---|---|
| 1 | 1245. |
| 2 | 4380. |
| 3 | 6381. |
| 4 | 2488. |
| 5 | 9942. |
| 6 | 667. |
| 7 | 1264. |
| 8 | 522. |
| 9 | 201. |
| 10 | 225. |
| Total | 27315. |

Mean Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 15013. | 16229. | 13264. | 24080. | 11333. |
| 2 | 5082. | 27387. | 23876. | 21266. | 38590. |
| 3 | 45837. | 5044. | 30176. | 22993. | 20784. |
| 4 | 19392. | 42080. | 5415. | 22857. | 16673. |
| 5 | 8946. | 15241. | 27839. | 4406. | 16724. |
| 6 | 6020. | 8917. | 10347. | 17455. | 2821. |
| 7 | 6496. | 6885. | 5118. | 5841. | 9903. |
| 8 | 547. | 5623. | 4801. | 2571. | 2742. |
| 9 | 1357. | 374. | 2381. | 4003. | 1476. |
| 10 | 482. | 1324. | 391. | 2048. | 2015. |
| Total | 109174. | 129103. | 123607. | 127520. | 123060. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 6723. | 14143. | 6951. | 26928. | 9407. |
| 2 | 16410. | 10649. | 24205. | 8398. | 41679. |
| 3 | 33254. | 13591. | 7443. | 22045. | 9025. |
| 4 | 11927. | 23330. | 8458. | 5110. | 18705. |
| 5 | 9298. | 7100. | 13935. | 5297. | 3915. |
| 6 | 9264. | 5608. | 3594. | 8606. | 3558. |
| 7 | 1627. | 5670. | 2856. | 2092. | 5363. |
| 8 | 5372. | 917. | 2649. | 1484. | 1346. |
| 9 | 1418. | 2818. | 422. | 1419. | 916. |
| 10 | 3289. | 2782. | 1632. | 793. | 855. |
| Total | 98582. | 86608. | 72144. | 82173. | 94769. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 11001. | 6843. | 4893. | 11719. | 5539. |
| 2 | 16587. | 24252. | 14280. | 9908. | 17210. |
| 3 | 37166. | 16145. | 24480. | 9535. | 8020. |
| 4 | 6395. | 27538. | 13518. | 15432. | 4933. |
| 5 | 10701. | 4601. | 15924. | 7438. | 7198. |
| 6 | 2164. | 4981. | 2927. | 6894. | 3078. |
| 7 | 1727. | 1073. | 2516. | 1537. | 2735. |
| 8 | 2782. | 795. | 754. | 1055. | 913. |
| 9 | 686. | 1214. | 418. | 291. | 465. |
| 10 | 1003. | 558. | 851. | 419. | 212. |
| Total | 90212. | 88002. | 80559. | 64230. | 50303. |

Mean Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 2497. | 2709. | 1404. | 2929. | 5151. |
| 2 | 6017. | 8118. | 5772. | 3958. | 6674. |
| 3 | 12205. | 5035. | 9035. | 6545. | 4055. |
| 4 | 3848. | 6350. | 3645. | 8074. | 4470. |
| 5 | 2020. | 1442. | 3062. | 2033. | 4377. |
| 6 | 2733. | 834. | 656. | 1527. | 937. |
| 7 | 1148. | 851. | 468. | 382. | 546. |
| 8 | 964. | 338. | 461. | 260. | 171. |
| 9 | 416. | 222. | 123. | 190. | 135. |
| 10 | 225. | 71. | 43. | 4. | 55. |
| Total | 32073. | 25972. | 24669. | 25901. | 26571. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 2753. | 5909. | 2080. | 1246. | 1875. |
| 2 | 10492. | 4927. | 13108. | 5439. | 2157. |
| 3 | 6271. | 9773. | 5474. | 11589. | 4951. |
| 4 | 2992. | 4392. | 7975. | 3478. | 7275. |
| 5 | 2198. | 1690. | 2670. | 4553. | 1936. |
| 6 | 2318. | 1092. | 839. | 1386. | 2288. |
| 7 | 442. | 1028. | 568. | 371. | 662. |
| 8 | 141. | 181. | 441. | 268. | 167. |
| 9 | 89. | 61. | 62. | 206. | 124. |
| 10 | 48. | 58. | 23. | 19. | 96. |
| Total | 27742. | 29111. | 33240. | 28556. | 21530. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 792. | 3240. | 983. | 2224. | 2692. |
| 2 | 4402. | 1589. | 8070. | 1971. | 6434. |
| 3 | 2451. | 5135. | 1509. | 12170. | 2429. |
| 4 | 3014. | 1837. | 3996. | 1236. | 11066. |
| 5 | 3625. | 1496. | 1248. | 2386. | 758. |
| 6 | 855. | 1494. | 713. | 737. | 1357. |
| 7 | 870. | 340. | 634. | 408. | 578. |
| 8 | 262. | 331. | 141. | 310. | 239. |
| 9 | 56. | 122. | 134. | 53. | 173. |
| 10 | 32. | 67. | 72. | 58. | 33. |
| Total | 16359. | 15652. | 17499. | 21553. | 25760. |

Spawning Stock Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 836. | 853. | 856. | 1516. | 656. |
| 2 | 1503. | 6701. | 7328. | 6250. | 10785. |
| 3 | 31517. | 3803. | 21975. | 17270. | 15480. |
| 4 | 18567. | 37396. | 4512. | 22002. | 16572. |
| 5 | 7977. | 15051. | 29814. | 4352. | 17410. |
| 6 | 5197. | 7938. | 11369. | 19341. | 3223. |
| 7 | 5990. | 6042. | 6175. | 6557. | 11284. |
| 8 | 594. | 5667. | 5289. | 3026. | 3402. |
| 9 | 1489. | 407. | 3145. | 4219. | 1655. |
| 10 | 565. | 1575. | 489. | 2566. | 2600. |
| Total | 74235. | 85433. | 90951. | 87101. | 83067. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 393. | 1230. | 1035. | 3133. | 1306. |
| 2 | 5499. | 3999. | 10813. | 4333. | 19363. |
| 3 | 27649. | 11557. | 7748. | 18717. | 7186. |
| 4 | 13464. | 22981. | 9017. | 4886. | 17298. |
| 5 | 10409. | 7522. | 15813. | 5460. | 3771. |
| 6 | 10432. | 6181. | 4308. | 8903. | 3748. |
| 7 | 1769. | 6347. | 3385. | 2121. | 5890. |
| 8 | 5999. | 1076. | 3240. | 1659. | 1514. |
| 9 | 1627. | 3567. | 525. | 1570. | 1023. |
| 10 | 4135. | 3591. | 2170. | 984. | 1051. |
| Total | 81375. | 68051. | 58056. | 51766. | 62150. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 1725. | 803. | 371. | 1107. | 428. |
| 2 | 7815. | 9691. | 4488. | 3631. | 6593. |
| 3 | 32866. | 14041. | 19881. | 9025. | 7376. |
| 4 | 6676. | 27186. | 12810. | 16603. | 5337. |
| 5 | 12571. | 4596. | 18059. | 8870. | 8808. |
| 6 | 2606. | 5910. | 3262. | 8779. | 3750. |
| 7 | 2161. | 1262. | 2952. | 1863. | 3422. |
| 8 | 3457. | 956. | 756. | 1336. | 982. |
| 9 | 866. | 1468. | 488. | 432. | 572. |
| 10 | 1336. | 701. | 1107. | 577. | 292. |
| Total | 72080. | 66616. | 64173. | 52224. | 37560. |

Spawning Stock Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 52. | 69. | 32. | 90. | 338. |
| 2 | 2434. | 1779. | 1922. | 1098. | 2453. |
| 3 | 12256. | 4661. | 7922. | 5551. | 3641. |
| 4 | 4703. | 7228. | 3604. | 7844. | 4921. |
| 5 | 2579. | 1823. | 3246. | 2267. | 5253. |
| 6 | 3498. | 944. | 645. | 1829. | 1187. |
| 7 | 1510. | 1136. | 494. | 437. | 758. |
| 8 | 1294. | 465. | 441. | 309. | 234. |
| 9 | 559. | 328. | 138. | 258. | 169. |
| 10 | 327. | 106. | 55. | 5. | 75. |
| Total | 29211. | 18538. | 18499. | 19689. | 19030. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 175. | 261. | 83. | 72. | 81. |
| 2 | 3998. | 1821. | 4364. | 1636. | 683. |
| 3 | 5823. | 9061. | 4691. | 11114. | 4344. |
| 4 | 3107. | 4601. | 7819. | 3982. | 7954. |
| 5 | 2556. | 1950. | 2867. | 5303. | 2205. |
| 6 | 2564. | 1251. | 965. | 1675. | 2757. |
| 7 | 504. | 1302. | 656. | 485. | 805. |
| 8 | 192. | 240. | 524. | 338. | 198. |
| 9 | 97. | 74. | 79. | 250. | 151. |
| 10 | 63. | 77. | 29. | 25. | 128. |
| Total | 19078. | 20637. | 22078. | 24880. | 19308. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 21. | 137. | 40. | 61. | 66. |
| 2 | 918. | 412. | 1781. | 471. | 1361. |
| 3 | 1878. | 3798. | 1243. | 8025. | 1902. |
| 4 | 3342. | 1872. | 4188. | 1241. | 10909. |
| 5 | 4426. | 1740. | 1341. | 2744. | 831. |
| 6 | 1064. | 1799. | 833. | 842. | 1532. |
| 7 | 1140. | 434. | 784. | 440. | 568. |
| 8 | 335. | 422. | 171. | 363. | 270. |
| 9 | 77. | 148. | 155. | 67. | 195. |
| 10 | 44. | 91. | 91. | 72. | 39. |
| Total | 13246. | 10852. | 10627. | 14325. | 17672. |

Catch Biomass

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 88. | 194. | 219. | 716. | 499. |
| 2 | 522. | 3060. | 5991. | 5636. | 14565. |
| 3 | 19793. | 1804. | 14476. | 11284. | 11262. |
| 4 | 8279. | 19626. | 1932. | 9478. | 11116. |
| 5 | 3600. | 5951. | 13759. | 1607. | 10775. |
| 6 | 1016. | 3228. | 6633. | 10268. | 1954. |
| 7 | 1600. | 1541. | 3472. | 3661. | 6694. |
| 8 | 197. | 3147. | 699. | 1596. | 1935. |
| 9 | 418. | 135. | 1289. | 2180. | 968. |
| 10 | 149. | 476. | 212. | 1115. | 1322. |
| Total | 35661. | 39162. | 48682. | 47542. | 61088. |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 423. | 152. | 142. | 518. | 60. |
| 2 | 7442. | 2320. | 10313. | 2163. | 11683. |
| 3 | 20916. | 8631. | 6105. | 11201. | 3753. |
| 4 | 8984. | 12207. | 6287. | 3106. | 9053. |
| 5 | 5527. | 4562. | 10441. | 2886. | 1729. |
| 6 | 4812. | 3672. | 3197. | 4414. | 1944. |
| 7 | 803. | 3935. | 2203. | 759. | 2470. |
| 8 | 1867. | 607. | 2023. | 700. | 580. |
| 9 | 792. | 1853. | 326. | 725. | 435. |
| 10 | 1838. | 1829. | 1260. | 405. | 407. |
| Total | 53404. | 39767. | 42297. | 26877. | 32113. |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 160. | 388. | 38. | 183. | 159. |
| 2 | 3244. | 3746. | 8282. | 2983. | 6900. |
| 3 | 19856. | 6685. | 13235. | 8726. | 5505. |
| 4 | 3766. | 15879. | 7018. | 11124. | 4067. |
| 5 | 8527. | 1987. | 11285. | 6935. | 6780. |
| 6 | 1518. | 3506. | 1476. | 6337. | 2708. |
| 7 | 1311. | 646. | 1928. | 1034. | 2522. |
| 8 | 2274. | 511. | 275. | 842. | 418. |
| 9 | 536. | 679. | 288. | 264. | 431. |
| 10 | 784. | 312. | 586. | 381. | 196. |
| Total | 41977. | 34339. | 44412. | 38810. | 29685. |

Catch Biomass

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 85. | 45. | 13. | 32. | 68. |
| 2 | 2005. | 736. | 879. | 414. | 1003. |
| 3 | 9781. | 3323. | 2825. | 2359. | 1745. |
| 4 | 3953. | 7043. | 2492. | 4086. | 3516. |
| 5 | 2369. | 2037. | 2007. | 1250. | 3560. |
| 6 | 3117. | 690. | 306. | 1194. | 847. |
| 7 | 1313. | 1049. | 200. | 145. | 730. |
| 8 | 1258. | 467. | 244. | 113. | 153. |
| 9 | 480. | 275. | 76. | 124. | 115. |
| 10 | 259. | 88. | 27. | 3. | 47. |
| Total | 24620. | 15754. | 9068. | 9719. | 11784. |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 39. | 25. | 44. | 7. | 16. |
| 2 | 1316. | 510. | 1442. | 983. | 149. |
| 3 | 2963. | 4321. | 1768. | 5900. | 2490. |
| 4 | 1693. | 2860. | 3917. | 2208. | 4483. |
| 5 | 1763. | 1302. | 1437. | 2865. | 1443. |
| 6 | 1590. | 738. | 482. | 950. | 1916. |
| 7 | 297. | 955. | 324. | 328. | 548. |
| 8 | 124. | 187. | 311. | 198. | 150. |
| 9 | 66. | 48. | 34. | 134. | 98. |
| 10 | 36. | 45. | 13. | 13. | 76. |
| Total | 9888. | 10991. | 9771. | 13584. | 11369. |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 10. | 17. | 5. | 12. | 4. |
| 2 | 293. | 106. | 377. | 75. | 747. |
| 3 | 911. | 1027. | 424. | 1764. | 758. |
| 4 | 2328. | 801. | 1775. | 647. | 3408. |
| 5 | 3520. | 1218. | 579. | 1347. | 261. |
| 6 | 735. | 1221. | 522. | 321. | 539. |
| 7 | 824. | 329. | 466. | 202. | 96. |
| 8 | 195. | 363. | 135. | 182. | 72. |
| 9 | 54. | 101. | 78. | 29. | 60. |
| 10 | 30. | 56. | 42. | 31. | 10. |
| Total | 8900. | 5238. | 4403. | 4610. | 5955. |

Catch Numbers

| AGE | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|
| 1 | 151.6 | 279.2 | 339.9 | 1219.2 | 775.4 |
| 2 | 416.8 | 2242.7 | 4238.7 | 3910.7 | 10457.1 |
| 3 | 8109.1 | 953.6 | 5955.4 | 4738.2 | 4434.4 |
| 4 | 2429.6 | 4585.0 | 544.9 | 2685.5 | 2988.0 |
| 5 | 896.8 | 1206.9 | 2464.6 | 317.9 | 2039.8 |
| 6 | 178.4 | 449.8 | 983.0 | 1406.0 | 297.1 |
| 7 | 240.8 | 159.5 | 418.1 | 417.0 | 707.2 |
| 8 | 22.6 | 304.1 | 70.4 | 162.9 | 198.6 |
| 9 | 42.1 | 12.9 | 138.7 | 155.5 | 74.6 |
| 10 | 10.7 | 35.0 | 14.2 | 66.4 | 84.6 |
| Total | 12498.5 | 10228.7 | 15167.9 | 15079.3 | 22056.8 |

| AGE | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|
| 1 | 626.2 | 280.9 | 176.0 | 768.3 | 103.8 |
| 2 | 5181.7 | 1547.7 | 7443.7 | 1594.1 | 7956.1 |
| 3 | 8753.3 | 3485.7 | 2942.2 | 4576.3 | 1515.5 |
| 4 | 2680.4 | 3328.4 | 1690.1 | 860.2 | 2170.1 |
| 5 | 1155.3 | 923.9 | 2097.7 | 525.3 | 299.7 |
| 6 | 746.4 | 560.2 | 496.5 | 615.4 | 249.9 |
| 7 | 94.6 | 450.3 | 267.2 | 85.5 | 277.3 |
| 8 | 175.0 | 58.9 | 196.8 | 70.4 | 56.1 |
| 9 | 67.7 | 167.0 | 27.7 | 56.0 | 36.2 |
| 10 | 112.6 | 124.9 | 89.7 | 27.8 | 26.0 |
| Total | 19593.2 | 10927.9 | 15427.6 | 9179.3 | 12690.7 |

| AGE | 1988 | 1989 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|
| 1 | 324.9 | 891.5 | 71.8 | 278.7 | 191.7 |
| 2 | 2352.1 | 2608.6 | 5561.1 | 1963.0 | 4808.4 |
| 3 | 8368.3 | 3032.8 | 5373.4 | 3491.4 | 2286.3 |
| 4 | 1074.1 | 4254.4 | 1964.0 | 3160.5 | 1070.7 |
| 5 | 1575.6 | 383.5 | 2272.1 | 1442.1 | 1500.0 |
| 6 | 223.8 | 534.2 | 230.6 | 1088.0 | 448.1 |
| 7 | 150.3 | 81.4 | 229.4 | 141.3 | 356.0 |
| 8 | 218.0 | 51.2 | 24.6 | 89.7 | 44.1 |
| 9 | 46.5 | 60.2 | 23.2 | 27.5 | 36.4 |
| 10 | 52.5 | 21.3 | 40.4 | 26.0 | 10.4 |
| Total | 14386.1 | 11919.1 | 15790.6 | 11708.2 | 10752.1 |

Catch Numbers

| AGE | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|
| 1 | 299.2 | 94.4 | 32.3 | 64.9 | 126.9 |
| 2 | 1534.9 | 614.6 | 652.8 | 287.3 | 685.2 |
| 3 | 4429.4 | 1543.4 | 1429.0 | 986.6 | 749.6 |
| 4 | 1224.8 | 1987.7 | 669.9 | 1269.8 | 1020.7 |
| 5 | 475.3 | 425.6 | 382.3 | 256.3 | 882.9 |
| 6 | 535.6 | 97.6 | 41.2 | 183.8 | 147.7 |
| 7 | 178.0 | 146.2 | 21.4 | 17.9 | 94.4 |
| 8 | 141.0 | 51.2 | 20.0 | 11.6 | 18.9 |
| 9 | 43.1 | 30.5 | 6.4 | 11.3 | 10.1 |
| 10 | 21.2 | 5.6 | 1.4 | 0.3 | 3.9 |
| Total | 8882.5 | 4996.8 | 3256.7 | 3089.8 | 3740.3 |

| AGE | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| 1 | 63.3 | 47.7 | 113.5 | 11.7 | 33.6 |
| 2 | 918.9 | 356.3 | 943.2 | 719.8 | 113.0 |
| 3 | 1310.3 | 2021.8 | 741.1 | 2667.3 | 1182.7 |
| 4 | 494.3 | 852.6 | 1156.4 | 751.6 | 1516.2 |
| 5 | 385.6 | 286.6 | 315.8 | 698.7 | 365.4 |
| 6 | 285.2 | 125.8 | 88.0 | 180.4 | 371.5 |
| 7 | 40.2 | 143.8 | 46.3 | 54.8 | 84.7 |
| 8 | 16.0 | 22.2 | 38.8 | 25.8 | 18.7 |
| 9 | 5.6 | 5.0 | 4.2 | 14.8 | 10.6 |
| 10 | 2.9 | 3.4 | 1.0 | 1.3 | 6.5 |
| Total | 3522.3 | 3865.2 | 3448.3 | 5126.2 | 3702.9 |

| AGE | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| 1 | 17.0 | 50.5 | 12.3 | 32.8 | 10.6 |
| 2 | 201.3 | 69.4 | 364.1 | 69.7 | 526.1 |
| 3 | 404.4 | 434.3 | 201.8 | 842.8 | 395.2 |
| 4 | 800.7 | 260.1 | 578.4 | 208.3 | 1175.8 |
| 5 | 910.4 | 313.6 | 144.5 | 366.1 | 71.9 |
| 6 | 156.0 | 253.0 | 106.0 | 70.8 | 129.2 |
| 7 | 142.4 | 58.2 | 85.3 | 31.2 | 16.2 |
| 8 | 28.2 | 49.2 | 18.0 | 28.5 | 10.4 |
| 9 | 6.5 | 11.8 | 8.9 | 3.8 | 8.6 |
| 10 | 2.9 | 5.0 | 3.7 | 3.4 | 1.1 |
| Total | 2669.8 | 1505.2 | 1523.0 | 1657.4 | 2345.1 |

Surplus Production

Average Adjustment Factor (Delta) = 1.0000

| Year | Biomass | Delta Biomass | Catch Biomass | Surplus Production |
|---|---|---|---|---|
| 1978 | 107771.534 | 15077.374 | 35660.721 | 50738.095 |
| 1979 | 122848.908 | 7864.015 | 39162.286 | 47026.301 |
| 1980 | 130712.922 | 50.259 | 48682.434 | 48732.693 |
| 1981 | 130763.181 | -1207.795 | 47541.857 | 46334.062 |
| 1982 | 129555.386 | -17271.699 | 61088.247 | 43816.548 |
| 1983 | 112283.687 | -19362.224 | 53404.330 | 34042.106 |
| 1984 | 92921.463 | -11213.858 | 39767.136 | 28553.278 |
| 1985 | 81707.605 | -1272.252 | 42297.434 | 41025.182 |
| 1986 | 80435.353 | 9628.743 | 26876.781 | 36505.524 |
| 1987 | 90064.095 | 6272.358 | 32112.683 | 38385.042 |
| 1988 | 96336.453 | -9637.788 | 41976.636 | 32338.849 |
| 1989 | 86698.666 | -204.079 | 34338.791 | 34134.713 |
| 1990 | 86494.587 | -12018.713 | 44411.969 | 32393.257 |
| 1991 | 74475.874 | -16620.379 | 38810.185 | 22189.806 |
| 1992 | 57855.495 | -16685.545 | 29684.877 | 12999.332 |
| 1993 | 41169.950 | -13880.833 | 24620.033 | 10739.201 |
| 1994 | 27289.117 | -3500.057 | 15754.070 | 12254.013 |
| 1995 | 23789.060 | 1610.467 | 9068.146 | 10678.613 |
| 1996 | 25399.527 | 2030.589 | 9718.713 | 11749.303 |
| 1997 | 27430.116 | -430.234 | 11784.450 | 11354.216 |
| 1998 | 26999.882 | 2599.052 | 9887.960 | 12487.012 |
| 1999 | 29598.934 | 684.951 | 10991.218 | 11676.169 |
| 2000 | 30283.885 | 1529.855 | 9770.992 | 11300.847 |
| 2001 | 31813.740 | -6809.653 | 13584.079 | 6774.425 |
| 2002 | 25004.087 | -6506.016 | 11369.031 | 4863.015 |
| 2003 | 18498.071 | -2794.267 | 8900.391 | 6106.124 |
| 2004 | 15703.804 | 394.698 | 5237.603 | 5632.301 |
| 2005 | 16098.502 | 3237.519 | 4402.945 | 7640.464 |
| 2006 | 19336.021 | 4326.664 | 4610.067 | 8936.731 |
| 2007 | 23662.684 | 3652.084 | 5955.462 | 9607.545 |
| 2008 | 27314.768 | | | |

Summary of Survey Indices Used in the Estimate

| INDEX | Survey Tag | Age | Time | Type | Catchability | Std. Error | CV |
|---|---|---|---|---|---|---|---|
| 1 | spr_36pr | 1 | JAN-1 | NUMBER | 0.1784E-01 | 0.6011E-02 | 0.3370E+00 |
| 2 | spr_36pr | 2 | JAN-1 | NUMBER | 0.9185E-01 | 0.1112E-01 | 0.1210E+00 |
| 3 | spr_36pr | 3 | JAN-1 | NUMBER | 0.1687E+00 | 0.3031E-01 | 0.1797E+00 |
| 4 | spr_36pr | 4 | JAN-1 | NUMBER | 0.2156E+00 | 0.4330E-01 | 0.2008E+00 |
| 5 | spr_36pr | 5 | JAN-1 | NUMBER | 0.2642E+00 | 0.5941E-01 | 0.2248E+00 |
| 6 | spr_36pr | 6 | JAN-1 | NUMBER | 0.2787E+00 | 0.5238E-01 | 0.1880E+00 |
| 7 | spr_36pr | 7 | JAN-1 | NUMBER | 0.2976E+00 | 0.5275E-01 | 0.1773E+00 |
| 8 | spr_36pr | 8 | JAN-1 | NUMBER | 0.3631E+00 | 0.7104E-01 | 0.1957E+00 |
| 9 | spr_36po | 1 | JAN-1 | NUMBER | 0.2930E-01 | 0.6283E-02 | 0.2145E+00 |
| 10 | spr_36po | 2 | JAN-1 | NUMBER | 0.1011E+00 | 0.9212E-02 | 0.9107E-01 |
| 11 | spr_36po | 3 | JAN-1 | NUMBER | 0.2253E+00 | 0.2569E-01 | 0.1140E+00 |
| 12 | spr_36po | 4 | JAN-1 | NUMBER | 0.5063E+00 | 0.8675E-01 | 0.1714E+00 |
| 13 | spr_36po | 5 | JAN-1 | NUMBER | 0.6888E+00 | 0.1139E+00 | 0.1654E+00 |
| 14 | spr_36po | 6 | JAN-1 | NUMBER | 0.7018E+00 | 0.1226E+00 | 0.1747E+00 |
| 15 | spr_36po | 7 | JAN-1 | NUMBER | 0.7231E+00 | 0.1815E+00 | 0.2510E+00 |
| 16 | spr_36po | 8 | JAN-1 | NUMBER | 0.8168E+00 | 0.1743E+00 | 0.2134E+00 |
| 17 | spr_41 | 1 | JAN-1 | NUMBER | 0.1413E-01 | 0.1069E-01 | 0.7560E+00 |
| 18 | spr_41 | 2 | JAN-1 | NUMBER | 0.8999E-01 | 0.2087E-01 | 0.2319E+00 |
| 19 | spr_41 | 3 | JAN-1 | NUMBER | 0.1987E+00 | 0.4671E-01 | 0.2350E+00 |
| 20 | spr_41 | 4 | JAN-1 | NUMBER | 0.1773E+00 | 0.2236E-01 | 0.1261E+00 |
| 21 | spr_41 | 5 | JAN-1 | NUMBER | 0.2163E+00 | 0.5405E-01 | 0.2499E+00 |
| 22 | spr_41 | 6 | JAN-1 | NUMBER | 0.2077E+00 | 0.3557E-01 | 0.1713E+00 |
| 23 | spr_41 | 7 | JAN-1 | NUMBER | 0.3002E+00 | 0.1126E+00 | 0.3750E+00 |
| 24 | spr_41 | 8 | JAN-1 | NUMBER | 0.2915E+00 | 0.1651E+00 | 0.5663E+00 |
| 25 | sp_can_p | 1 | JAN-1 | NUMBER | 0.3588E-01 | 0.1150E-01 | 0.3205E+00 |
| 26 | sp_can_p | 2 | JAN-1 | NUMBER | 0.1876E+00 | 0.3961E-01 | 0.2112E+00 |
| 27 | sp_can_p | 3 | JAN-1 | NUMBER | 0.3247E+00 | 0.3702E-01 | 0.1140E+00 |
| 28 | sp_can_p | 4 | JAN-1 | NUMBER | 0.3721E+00 | 0.4750E-01 | 0.1277E+00 |
| 29 | sp_can_p | 5 | JAN-1 | NUMBER | 0.5808E+00 | 0.7103E-01 | 0.1223E+00 |
| 30 | sp_can_p | 6 | JAN-1 | NUMBER | 0.5559E+00 | 0.1150E+00 | 0.2068E+00 |
| 31 | sp_can_p | 7 | JAN-1 | NUMBER | 0.7300E+00 | 0.2118E+00 | 0.2902E+00 |
| 32 | sp_can_p | 8 | JAN-1 | NUMBER | 0.6448E-03 | 0.1711E-03 | 0.2653E+00 |
| 33 | sp_canpo | 1 | JAN-1 | NUMBER | 0.1586E-01 | 0.5673E-02 | 0.3576E+00 |
| 34 | sp_canpo | 2 | JAN-1 | NUMBER | 0.7794E-01 | 0.2001E-01 | 0.2567E+00 |
| 35 | sp_canpo | 3 | JAN-1 | NUMBER | 0.3626E+00 | 0.5277E-01 | 0.1455E+00 |
| 36 | sp_canpo | 4 | JAN-1 | NUMBER | 0.8883E+00 | 0.1309E+00 | 0.1473E+00 |
| 37 | sp_canpo | 5 | JAN-1 | NUMBER | 0.1408E+01 | 0.1994E+00 | 0.1416E+00 |
| 38 | sp_canpo | 6 | JAN-1 | NUMBER | 0.1934E+01 | 0.2942E+00 | 0.1521E+00 |
| 39 | sp_canpo | 7 | JAN-1 | NUMBER | 0.1901E+01 | 0.3915E+00 | 0.2059E+00 |
| 40 | sp_canpo | 8 | JAN-1 | NUMBER | 0.1278E-02 | 0.3201E-03 | 0.2505E+00 |
| 41 | us0autpr | 1 | JAN-1 | NUMBER | 0.1638E-01 | 0.3271E-02 | 0.1998E+00 |
| 42 | us1autpr | 2 | JAN-1 | NUMBER | 0.8110E-01 | 0.1148E-01 | 0.1415E+00 |
| 43 | us2autpr | 3 | JAN-1 | NUMBER | 0.1191E+00 | 0.1798E-01 | 0.1510E+00 |
| 44 | us3autpr | 4 | JAN-1 | NUMBER | 0.1269E+00 | 0.2259E-01 | 0.1779E+00 |
| 45 | us4autpr | 5 | JAN-1 | NUMBER | 0.8865E-01 | 0.2152E-01 | 0.2428E+00 |
| 46 | us5autpr | 6 | JAN-1 | NUMBER | 0.1041E+00 | 0.1621E-01 | 0.1557E+00 |
| 47 | us0autpo | 1 | JAN-1 | NUMBER | 0.2015E-01 | 0.8594E-02 | 0.4264E+00 |
| 48 | us1autpo | 2 | JAN-1 | NUMBER | 0.7415E-01 | 0.1521E-01 | 0.2051E+00 |
| 49 | us2autpo | 3 | JAN-1 | NUMBER | 0.1630E+00 | 0.3016E-01 | 0.1850E+00 |
| 50 | us3autpo | 4 | JAN-1 | NUMBER | 0.2333E+00 | 0.5204E-01 | 0.2231E+00 |
| 51 | us4autpo | 5 | JAN-1 | NUMBER | 0.2120E+00 | 0.5110E-01 | 0.2410E+00 |
| 52 | us5autpo | 6 | JAN-1 | NUMBER | 0.2530E+00 | 0.6462E-01 | 0.2554E+00 |

Survey Index:  1 Tag:  spr_36pr AGE =  1
Time = JAN-1  Type = NUMBER
Catchability =  0.178394E-01  % Variance Contribution =  5.4693
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.512080E+03 | N/A |
| 1979 | N/A | 0.462799E+03 | N/A |
| 1980 | N/A | 0.408763E+03 | N/A |
| 1981 | N/A | 0.818660E+03 | N/A |
| 1982 | 0.693828E+03 | 0.354341E+03 | 0.671963E+00 |
| 1983 | 0.452853E+03 | 0.201680E+03 | 0.808885E+00 |
| 1984 | 0.549434E+03 | 0.517710E+03 | 0.594732E-01 |
| 1985 | 0.151770E+03 | 0.171530E+03 | -0.122390E+00 |
| 1986 | 0.119053E+04 | 0.793951E+03 | 0.405134E+00 |
| 1987 | 0.269116E+02 | 0.319290E+03 | -0.247354E+01 |
| 1988 | 0.983845E+03 | 0.443386E+03 | 0.797027E+00 |
| 1989 | 0.424029E+03 | 0.318410E+03 | 0.286461E+00 |
| 1990 | 0.236877E+03 | 0.182036E+03 | 0.263334E+00 |
| 1991 | 0.140241E+04 | 0.353152E+03 | 0.137905E+01 |
| 1992 | 0.167617E+03 | 0.133256E+03 | 0.229412E+00 |
| 1993 | 0.116116E+02 | 0.176095E+03 | -0.271902E+01 |
| 1994 | 0.170486E+03 | 0.112667E+03 | 0.414217E+00 |
| 1995 | N/A | 0.700245E+02 | N/A |
| 1996 | N/A | 0.119086E+03 | N/A |
| 1997 | N/A | 0.189472E+03 | N/A |
| 1998 | N/A | 0.882021E+02 | N/A |
| 1999 | N/A | 0.218245E+03 | N/A |
| 2000 | N/A | 0.106623E+03 | N/A |
| 2001 | N/A | 0.409422E+02 | N/A |
| 2002 | N/A | 0.756296E+02 | N/A |
| 2003 | N/A | 0.260685E+02 | N/A |
| 2004 | N/A | 0.192693E+03 | N/A |
| 2005 | N/A | 0.450014E+02 | N/A |
| 2006 | N/A | 0.115776E+03 | N/A |
| 2007 | N/A | 0.125534E+03 | N/A |
| 2008 | N/A | 0.869611E+02 | N/A |

Survey Index:  2 Tag:  spr_36pr AGE =  2
Time = JAN-1  Type = NUMBER
Catchability =  0.918544E-01  % Variance Contribution =  0.7054
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.432354E+03 | N/A |
| 1979 | N/A | 0.214616E+04 | N/A |
| 1980 | N/A | 0.192782E+04 | N/A |
| 1981 | N/A | 0.169499E+04 | N/A |
| 1982 | 0.742514E+04 | 0.335004E+04 | 0.795899E+00 |
| 1983 | 0.266630E+04 | 0.142948E+04 | 0.623383E+00 |

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1984     0.588777E+03     0.798301E+03    -0.304439E+00
1985     0.362432E+04     0.215916E+04     0.517947E+00
1986     0.558723E+03     0.708508E+03    -0.237507E+00
1987     0.220279E+04     0.328326E+04    -0.399113E+00
1988     0.831664E+03     0.133739E+04    -0.475049E+00
1989     0.192671E+04     0.184219E+04     0.448548E-01
1990     0.125883E+04     0.126839E+04    -0.756392E-02
1991     0.721013E+03     0.761439E+03    -0.545535E-01
1992     0.171087E+04     0.146564E+04     0.154711E+00
1993     0.544789E+03     0.545856E+03    -0.195628E-02
1994     0.372118E+03     0.717536E+03    -0.656613E+00
1995     N/A              0.467129E+03     N/A
1996     N/A              0.292517E+03     N/A
1997     N/A              0.496638E+03     N/A
1998     N/A              0.788213E+03     N/A
1999     N/A              0.366575E+03     N/A
2000     N/A              0.916079E+03     N/A
2001     N/A              0.440068E+03     N/A
2002     N/A              0.171626E+03     N/A
2003     N/A              0.316038E+03     N/A
2004     N/A              0.108484E+03     N/A
2005     N/A              0.808129E+03     N/A
2006     N/A              0.188688E+03     N/A
2007     N/A              0.485344E+03     N/A
2008     N/A              0.528324E+03     N/A

Survey Index:    3 Tag:         spr_36pr AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.168705E+00   % Variance Contribution =     1.5548
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
```

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```
1978     N/A              0.427374E+04     N/A
1979     N/A              0.586731E+03     N/A
1980     N/A              0.288609E+04     N/A
1981     N/A              0.225564E+04     N/A
1982     0.129803E+05     0.195545E+04     0.189281E+01
1983     0.412144E+04     0.345387E+04     0.176706E+00
1984     0.103917E+04     0.136578E+04    -0.273301E+00
1985     0.906115E+03     0.965416E+03    -0.633923E-01
1986     0.251958E+04     0.212038E+04     0.172498E+00
1987     0.516921E+03     0.823504E+03    -0.465678E+00
1988     0.430258E+04     0.373028E+04     0.142731E+00
1989     0.910350E+03     0.165379E+04    -0.596994E+00
1990     0.237300E+04     0.237364E+04    -0.267003E-03
1991     0.940813E+03     0.106790E+04    -0.126708E+00
1992     0.639595E+03     0.847334E+03    -0.281260E+00
1993     0.178423E+04     0.147599E+04     0.189657E+00
1994     0.273214E+03     0.588195E+03    -0.766803E+00
1995     N/A              0.985457E+03     N/A
1996     N/A              0.603202E+03     N/A
1997     N/A              0.396158E+03     N/A
1998     N/A              0.642647E+03     N/A
1999     N/A              0.104551E+04     N/A
```

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2000     N/A              0.497023E+03     N/A
2001     N/A              0.123406E+04     N/A
2002     N/A              0.552376E+03     N/A
2003     N/A              0.240878E+03     N/A
2004     N/A              0.444591E+03     N/A
2005     N/A              0.152560E+03     N/A
2006     N/A              0.115976E+04     N/A
2007     N/A              0.273120E+03     N/A
2008     N/A              0.649804E+03     N/A

Survey Index:    4 Tag:         spr_36pr AGE =  4
Time = JAN-1           Type = NUMBER
Catchability =    0.215614E+00   % Variance Contribution =     1.9428
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.165169E+04     N/A
1979     N/A              0.290382E+04     N/A
1980     N/A              0.429311E+03     N/A
1981     N/A              0.186919E+04     N/A
1982     0.113717E+05     0.144487E+04     0.206311E+01
1983     0.108767E+04     0.119016E+04    -0.900524E-01
1984     0.169147E+04     0.192678E+04    -0.130253E+00
1985     0.151675E+04     0.757288E+03     0.694581E+00
1986     0.498889E+03     0.444800E+03     0.114761E+00
1987     0.104272E+04     0.133486E+04    -0.246992E+00
1988     0.558450E+03     0.568553E+03    -0.179289E-01
1989     0.216263E+04     0.228773E+04    -0.562382E-01
1990     0.921005E+03     0.114383E+04    -0.216675E+00
1991     0.126894E+04     0.144646E+04    -0.130936E+00
1992     0.229637E+03     0.447514E+03    -0.667209E+00
1993     0.280454E+03     0.446337E+03    -0.464662E+00
1994     0.295755E+03     0.693005E+03    -0.851508E+00
1995     N/A              0.318120E+03     N/A
1996     N/A              0.754280E+03     N/A
1997     N/A              0.440166E+03     N/A
1998     N/A              0.269571E+03     N/A
1999     N/A              0.419235E+03     N/A
2000     N/A              0.703092E+03     N/A
2001     N/A              0.376504E+03     N/A
2002     N/A              0.776139E+03     N/A
2003     N/A              0.349550E+03     N/A
2004     N/A              0.173769E+03     N/A
2005     N/A              0.380896E+03     N/A
2006     N/A              0.120515E+03     N/A
2007     N/A              0.104980E+04     N/A
2008     N/A              0.209212E+03     N/A

Survey Index:    5 Tag:         spr_36pr AGE =  5
Time = JAN-1           Type = NUMBER
Catchability =    0.264241E+00   % Variance Contribution =     2.4352
Residual = LN(Observed) - LN(Predicted)
```

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.783962E+03 | N/A |
| 1979 | N/A | 0.108141E+04 | N/A |
| 1980 | N/A | 0.182761E+04 | N/A |
| 1981 | N/A | 0.301462E+03 | N/A |
| 1982 | 0.848057E+04 | 0.123887E+04 | 0.192358E+01 |
| 1983 | 0.952152E+03 | 0.744309E+03 | 0.246268E+00 |
| 1984 | 0.576892E+03 | 0.562246E+03 | 0.257159E-01 |
| 1985 | 0.192930E+04 | 0.114565E+04 | 0.521187E+00 |
| 1986 | 0.737679E+03 | 0.361323E+03 | 0.713735E+00 |
| 1987 | 0.848330E+02 | 0.243023E+03 | -0.105247E+01 |
| 1988 | 0.879067E+03 | 0.825502E+03 | 0.628697E-01 |
| 1989 | 0.321163E+03 | 0.316568E+03 | 0.144114E-01 |
| 1990 | 0.124572E+04 | 0.128957E+04 | -0.345941E-01 |
| 1991 | 0.654075E+03 | 0.682901E+03 | -0.431286E-01 |
| 1992 | 0.372801E+03 | 0.705838E+03 | -0.638342E+00 |
| 1993 | 0.122263E+03 | 0.196884E+03 | -0.476439E+00 |
| 1994 | 0.453536E+02 | 0.160338E+03 | -0.126279E+01 |
| 1995 | N/A | 0.229354E+03 | N/A |
| 1996 | N/A | 0.161082E+03 | N/A |
| 1997 | N/A | 0.456255E+03 | N/A |
| 1998 | N/A | 0.201140E+03 | N/A |
| 1999 | N/A | 0.153590E+03 | N/A |
| 2000 | N/A | 0.219310E+03 | N/A |
| 2001 | N/A | 0.431670E+03 | N/A |
| 2002 | N/A | 0.200239E+03 | N/A |
| 2003 | N/A | 0.420507E+03 | N/A |
| 2004 | N/A | 0.162015E+03 | N/A |
| 2005 | N/A | 0.112715E+03 | N/A |
| 2006 | N/A | 0.245131E+03 | N/A |
| 2007 | N/A | 0.716297E+02 | N/A |
| 2008 | N/A | 0.774113E+03 | N/A |

Survey Index: 6 Tag: spr_36pr AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.278657E+00 % Variance Contribution = 1.7018
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.352174E+03 | N/A |
| 1979 | N/A | 0.452630E+03 | N/A |
| 1980 | N/A | 0.631851E+03 | N/A |
| 1981 | N/A | 0.962621E+03 | N/A |
| 1982 | 0.400122E+03 | 0.180743E+03 | 0.794694E+00 |
| 1983 | 0.605306E+03 | 0.561605E+03 | 0.749358E-01 |
| 1984 | 0.546975E+03 | 0.354663E+03 | 0.433234E+00 |
| 1985 | 0.362555E+03 | 0.255329E+03 | 0.350623E+00 |
| 1986 | 0.844096E+03 | 0.467585E+03 | 0.590685E+00 |
| 1987 | 0.245073E+03 | 0.180923E+03 | 0.303486E+00 |
| 1988 | 0.874286E+02 | 0.134935E+03 | -0.433971E+00 |
| 1989 | 0.479628E+03 | 0.321282E+03 | 0.400691E+00 |

| | | | |
|---|---|---|---|
| 1990 | 0.178136E+03 | 0.177478E+03 | 0.369799E-02 |
| 1991 | 0.448208E+03 | 0.548113E+03 | -0.201224E+00 |
| 1992 | 0.194529E+03 | 0.232101E+03 | -0.176592E+00 |
| 1993 | 0.188791E+03 | 0.237606E+03 | -0.229974E+00 |
| 1994 | 0.778660E+01 | 0.525986E+02 | -0.191029E+01 |
| 1995 | N/A | 0.337007E+02 | N/A |
| 1996 | N/A | 0.102825E+03 | N/A |
| 1997 | N/A | 0.752134E+02 | N/A |
| 1998 | N/A | 0.174633E+03 | N/A |
| 1999 | N/A | 0.778703E+02 | N/A |
| 2000 | N/A | 0.613743E+02 | N/A |
| 2001 | N/A | 0.110563E+03 | N/A |
| 2002 | N/A | 0.198643E+03 | N/A |
| 2003 | N/A | 0.820283E+02 | N/A |
| 2004 | N/A | 0.137503E+03 | N/A |
| 2005 | N/A | 0.620035E+02 | N/A |
| 2006 | N/A | 0.612222E+02 | N/A |
| 2007 | N/A | 0.120347E+03 | N/A |
| 2008 | N/A | 0.438493E+02 | N/A |

Survey Index: 7 Tag: spr_36pr AGE = 7
Time = JAN-1 Type = NUMBER
Catchability = 0.297561E+00 % Variance Contribution = 1.5138
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.360604E+03 | N/A |
| 1979 | N/A | 0.260077E+03 | N/A |
| 1980 | N/A | 0.275541E+03 | N/A |
| 1981 | N/A | 0.290962E+03 | N/A |
| 1982 | 0.254868E+04 | 0.467318E+03 | 0.169632E+01 |
| 1983 | 0.371571E+02 | 0.790646E+02 | -0.755111E+00 |
| 1984 | 0.285236E+03 | 0.292082E+03 | -0.237182E-01 |
| 1985 | 0.262149E+03 | 0.161109E+03 | 0.486832E+00 |
| 1986 | 0.842866E+02 | 0.916993E+02 | -0.842922E-01 |
| 1987 | 0.185103E+03 | 0.244776E+03 | -0.279434E+00 |
| 1988 | 0.505446E+02 | 0.916073E+02 | -0.594655E+00 |
| 1989 | 0.689866E+02 | 0.585039E+02 | 0.164819E+00 |
| 1990 | 0.195485E+03 | 0.138951E+03 | 0.341362E+00 |
| 1991 | 0.739045E+02 | 0.936948E+02 | -0.237269E+00 |
| 1992 | 0.216796E+03 | 0.191112E+03 | 0.126092E+00 |
| 1993 | 0.400259E+02 | 0.841940E+02 | -0.743597E+00 |
| 1994 | 0.602438E+02 | 0.664035E+02 | -0.973499E-01 |
| 1995 | N/A | 0.201046E+02 | N/A |
| 1996 | N/A | 0.184744E+02 | N/A |
| 1997 | N/A | 0.411231E+02 | N/A |
| 1998 | N/A | 0.266383E+02 | N/A |
| 1999 | N/A | 0.768777E+02 | N/A |
| 2000 | N/A | 0.346396E+02 | N/A |
| 2001 | N/A | 0.302269E+02 | N/A |
| 2002 | N/A | 0.487155E+02 | N/A |
| 2003 | N/A | 0.751719E+02 | N/A |
| 2004 | N/A | 0.303690E+02 | N/A |
| 2005 | N/A | 0.531161E+02 | N/A |

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2006     N/A              0.260568E+02     N/A
2007     N/A              0.346308E+02     N/A
2008     N/A              0.707155E+02     N/A

Survey Index:    8 Tag:         spr_36pr AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.363074E+00   % Variance Contribution =     1.3004
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.297623E+02     N/A
1979     N/A              0.281585E+03     N/A
1980     N/A              0.207696E+03     N/A
1981     N/A              0.139660E+03     N/A
1982     0.503397E+03     0.155309E+03     0.117597E+01
1983     0.298623E+03     0.237470E+03     0.229141E+00
1984     N/A              0.482106E+02     N/A
1985     0.245756E+03     0.145777E+03     0.522261E+00
1986     0.170895E+03     0.744148E+02     0.831398E+00
1987     0.448071E+02     0.637330E+02    -0.352336E+00
1988     0.672107E+02     0.154272E+03    -0.830886E+00
1989     0.539598E+02     0.428313E+02     0.230971E+00
1990     0.176223E+02     0.320115E+02    -0.596931E+00
1991     0.554625E+02     0.645142E+02    -0.151178E+00
1992     0.267750E+02     0.477680E+02    -0.578887E+00
1993     0.469929E+02     0.759075E+02    -0.479519E+00
1994     N/A              0.268018E+02     N/A
1995     N/A              0.193318E+02     N/A
1996     N/A              0.131150E+02     N/A
1997     N/A              0.126219E+02     N/A
1998     N/A              0.107794E+02     N/A
1999     N/A              0.135722E+02     N/A
2000     N/A              0.303475E+02     N/A
2001     N/A              0.195617E+02     N/A
2002     N/A              0.124814E+02     N/A
2003     N/A              0.212615E+02     N/A
2004     N/A              0.291097E+02     N/A
2005     N/A              0.115453E+02     N/A
2006     N/A              0.254226E+02     N/A
2007     N/A              0.158810E+02     N/A
2008     N/A              0.292973E+02     N/A

Survey Index:    9 Tag:         spr_36po AGE =  1
Time = JAN-1           Type = NUMBER
Catchability =    0.292985E-01   % Variance Contribution =     2.5848
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.841015E+03     N/A
1979     N/A              0.760078E+03     N/A
1980     N/A              0.671332E+03     N/A
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| | | | |
|---|---|---|---|
| 1981 | N/A | 0.134453E+04 | N/A |
| 1982 | N/A | 0.581953E+03 | N/A |
| 1983 | N/A | 0.331229E+03 | N/A |
| 1984 | N/A | 0.850261E+03 | N/A |
| 1985 | N/A | 0.281713E+03 | N/A |
| 1986 | N/A | 0.130394E+04 | N/A |
| 1987 | N/A | 0.524386E+03 | N/A |
| 1988 | N/A | 0.728195E+03 | N/A |
| 1989 | N/A | 0.522941E+03 | N/A |
| 1990 | N/A | 0.298967E+03 | N/A |
| 1991 | N/A | 0.580000E+03 | N/A |
| 1992 | N/A | 0.218852E+03 | N/A |
| 1993 | N/A | 0.289209E+03 | N/A |
| 1994 | N/A | 0.185038E+03 | N/A |
| 1995 | 0.676205E+02 | 0.115005E+03 | -0.531063E+00 |
| 1996 | 0.997232E+02 | 0.195581E+03 | -0.673578E+00 |
| 1997 | 0.397254E+03 | 0.311179E+03 | 0.244207E+00 |
| 1998 | 0.152044E+03 | 0.144859E+03 | 0.484103E-01 |
| 1999 | 0.290017E+03 | 0.358434E+03 | -0.211806E+00 |
| 2000 | 0.301492E+03 | 0.175112E+03 | 0.543315E+00 |
| 2001 | 0.829205E+02 | 0.672415E+02 | 0.209592E+00 |
| 2002 | 0.883848E+02 | 0.124210E+03 | -0.340275E+00 |
| 2003 | 0.224036E+02 | 0.428135E+02 | -0.647632E+00 |
| 2004 | 0.870051E+03 | 0.316469E+03 | 0.101133E+01 |
| 2005 | 0.162563E+02 | 0.739080E+02 | -0.151434E+01 |
| 2006 | 0.243980E+03 | 0.190144E+03 | 0.249306E+00 |
| 2007 | 0.170895E+03 | 0.206171E+03 | -0.187652E+00 |
| 2008 | 0.864177E+03 | 0.142821E+03 | 0.180019E+01 |

Survey Index: 10 Tag: spr_36po AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.101150E+00 % Variance Contribution = 0.4661
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.476107E+03 | N/A |
| 1979 | N/A | 0.236334E+04 | N/A |
| 1980 | N/A | 0.212291E+04 | N/A |
| 1981 | N/A | 0.186652E+04 | N/A |
| 1982 | N/A | 0.368906E+04 | N/A |
| 1983 | N/A | 0.157414E+04 | N/A |
| 1984 | N/A | 0.879087E+03 | N/A |
| 1985 | N/A | 0.237767E+04 | N/A |
| 1986 | N/A | 0.780207E+03 | N/A |
| 1987 | N/A | 0.361552E+04 | N/A |
| 1988 | N/A | 0.147273E+04 | N/A |
| 1989 | N/A | 0.202862E+04 | N/A |
| 1990 | N/A | 0.139675E+04 | N/A |
| 1991 | N/A | 0.838494E+03 | N/A |
| 1992 | N/A | 0.161396E+04 | N/A |
| 1993 | N/A | 0.601095E+03 | N/A |
| 1994 | N/A | 0.790149E+03 | N/A |
| 1995 | 0.521429E+03 | 0.514402E+03 | 0.135697E-01 |
| 1996 | 0.292203E+03 | 0.322119E+03 | -0.974731E-01 |

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1997     0.597110E+03     0.546897E+03     0.878413E-01
1998     0.908711E+03     0.867978E+03     0.458604E-01
1999     0.397390E+03     0.403671E+03    -0.156827E-01
2000     0.110187E+04     0.100878E+04     0.882662E-01
2001     0.320480E+03     0.484602E+03    -0.413506E+00
2002     0.126908E+03     0.188994E+03    -0.398254E+00
2003     0.290700E+03     0.348020E+03    -0.179968E+00
2004     0.792321E+02     0.119463E+03    -0.410622E+00
2005     0.660905E+03     0.889910E+03    -0.297509E+00
2006     0.315562E+03     0.207783E+03     0.417864E+00
2007     0.872783E+03     0.534460E+03     0.490430E+00
2008     0.113603E+04     0.581788E+03     0.669184E+00

Survey Index:   11 Tag:         spr_36po AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.225276E+00   % Variance Contribution =     0.7310
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.570683E+04     N/A
1979     N/A              0.783476E+03     N/A
1980     N/A              0.385386E+04     N/A
1981     N/A              0.301201E+04     N/A
1982     N/A              0.261116E+04     N/A
1983     N/A              0.461204E+04     N/A
1984     N/A              0.182376E+04     N/A
1985     N/A              0.128914E+04     N/A
1986     N/A              0.283139E+04     N/A
1987     N/A              0.109964E+04     N/A
1988     N/A              0.498113E+04     N/A
1989     N/A              0.220834E+04     N/A
1990     N/A              0.316957E+04     N/A
1991     N/A              0.142600E+04     N/A
1992     N/A              0.113146E+04     N/A
1993     N/A              0.197092E+04     N/A
1994     N/A              0.785431E+03     N/A
1995     0.116649E+04     0.131590E+04    -0.120526E+00
1996     0.100570E+04     0.805470E+03     0.222014E+00
1997     0.232505E+03     0.529000E+03    -0.822074E+00
1998     0.177316E+04     0.858141E+03     0.725750E+00
1999     0.831938E+03     0.139610E+04    -0.517678E+00
2000     0.113357E+04     0.663687E+03     0.535313E+00
2001     0.108425E+04     0.164786E+04    -0.418590E+00
2002     0.523615E+03     0.737601E+03    -0.342645E+00
2003     0.370479E+03     0.321650E+03     0.141333E+00
2004     0.790819E+03     0.593673E+03     0.286740E+00
2005     0.188245E+03     0.203717E+03    -0.789908E-01
2006     0.178395E+04     0.154866E+04     0.141444E+00
2007     0.513096E+03     0.364704E+03     0.341379E+00
2008     0.790272E+03     0.867699E+03    -0.934675E-01

Survey Index:   12 Tag:         spr_36po AGE =  4
Time = JAN-1           Type = NUMBER
Catchability =    0.506259E+00   % Variance Contribution =     1.6502
```

Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.387814E+04 | N/A |
| 1979 | N/A | 0.681812E+04 | N/A |
| 1980 | N/A | 0.100802E+04 | N/A |
| 1981 | N/A | 0.438883E+04 | N/A |
| 1982 | N/A | 0.339252E+04 | N/A |
| 1983 | N/A | 0.279447E+04 | N/A |
| 1984 | N/A | 0.452405E+04 | N/A |
| 1985 | N/A | 0.177810E+04 | N/A |
| 1986 | N/A | 0.104438E+04 | N/A |
| 1987 | N/A | 0.313423E+04 | N/A |
| 1988 | N/A | 0.133495E+04 | N/A |
| 1989 | N/A | 0.537156E+04 | N/A |
| 1990 | N/A | 0.268570E+04 | N/A |
| 1991 | N/A | 0.339627E+04 | N/A |
| 1992 | N/A | 0.105076E+04 | N/A |
| 1993 | N/A | 0.104799E+04 | N/A |
| 1994 | N/A | 0.162716E+04 | N/A |
| 1995 | 0.729482E+03 | 0.746942E+03 | -0.236520E-01 |
| 1996 | 0.170376E+04 | 0.177104E+04 | -0.387246E-01 |
| 1997 | 0.667462E+03 | 0.103350E+04 | -0.437225E+00 |
| 1998 | 0.115816E+04 | 0.632947E+03 | 0.604197E+00 |
| 1999 | 0.696287E+03 | 0.984357E+03 | -0.346227E+00 |
| 2000 | 0.155882E+04 | 0.165085E+04 | -0.573575E-01 |
| 2001 | 0.218845E+03 | 0.884026E+03 | -0.139612E+01 |
| 2002 | 0.135651E+04 | 0.182236E+04 | -0.295219E+00 |
| 2003 | 0.850380E+03 | 0.820738E+03 | 0.354789E-01 |
| 2004 | 0.192138E+04 | 0.408008E+03 | 0.154951E+01 |
| 2005 | 0.861991E+03 | 0.894338E+03 | -0.368391E-01 |
| 2006 | 0.453399E+03 | 0.282967E+03 | 0.471443E+00 |
| 2007 | 0.245032E+04 | 0.246491E+04 | -0.593506E-02 |
| 2008 | 0.479901E+03 | 0.491227E+03 | -0.233271E-01 |

Survey Index:  13 Tag:  spr_36po AGE =  5
Time = JAN-1  Type = NUMBER
Catchability =  0.688799E+00  % Variance Contribution =  1.5379
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.204356E+04 | N/A |
| 1979 | N/A | 0.281893E+04 | N/A |
| 1980 | N/A | 0.476405E+04 | N/A |
| 1981 | N/A | 0.785824E+03 | N/A |
| 1982 | N/A | 0.322937E+04 | N/A |
| 1983 | N/A | 0.194020E+04 | N/A |
| 1984 | N/A | 0.146561E+04 | N/A |
| 1985 | N/A | 0.298637E+04 | N/A |
| 1986 | N/A | 0.941864E+03 | N/A |
| 1987 | N/A | 0.633490E+03 | N/A |

| | | | |
|---|---|---|---|
| 1988 | N/A | 0.215184E+04 | N/A |
| 1989 | N/A | 0.825201E+03 | N/A |
| 1990 | N/A | 0.336153E+04 | N/A |
| 1991 | N/A | 0.178012E+04 | N/A |
| 1992 | N/A | 0.183991E+04 | N/A |
| 1993 | N/A | 0.513220E+03 | N/A |
| 1994 | N/A | 0.417953E+03 | N/A |
| 1995 | 0.818277E+03 | 0.597858E+03 | 0.313847E+00 |
| 1996 | 0.237970E+03 | 0.419894E+03 | -0.567859E+00 |
| 1997 | 0.576892E+03 | 0.118932E+04 | -0.723484E+00 |
| 1998 | 0.103125E+04 | 0.524313E+03 | 0.676436E+00 |
| 1999 | 0.325398E+03 | 0.400365E+03 | -0.207328E+00 |
| 2000 | 0.505856E+03 | 0.571678E+03 | -0.122323E+00 |
| 2001 | 0.522795E+03 | 0.112524E+04 | -0.766560E+00 |
| 2002 | 0.327038E+03 | 0.521964E+03 | -0.467524E+00 |
| 2003 | 0.951332E+03 | 0.109614E+04 | -0.141687E+00 |
| 2004 | 0.184952E+04 | 0.422326E+03 | 0.147691E+01 |
| 2005 | 0.374850E+03 | 0.293814E+03 | 0.243579E+00 |
| 2006 | 0.988216E+03 | 0.638986E+03 | 0.436019E+00 |
| 2007 | 0.247122E+03 | 0.186718E+03 | 0.280286E+00 |
| 2008 | 0.131225E+04 | 0.201789E+04 | -0.430308E+00 |

Survey Index: 14 Tag: spr_36po AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.701770E+00 % Variance Contribution = 1.7150
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.886915E+03 | N/A |
| 1979 | N/A | 0.113990E+04 | N/A |
| 1980 | N/A | 0.159125E+04 | N/A |
| 1981 | N/A | 0.242426E+04 | N/A |
| 1982 | N/A | 0.455183E+03 | N/A |
| 1983 | N/A | 0.141435E+04 | N/A |
| 1984 | N/A | 0.893184E+03 | N/A |
| 1985 | N/A | 0.643021E+03 | N/A |
| 1986 | N/A | 0.117756E+04 | N/A |
| 1987 | N/A | 0.455636E+03 | N/A |
| 1988 | N/A | 0.339820E+03 | N/A |
| 1989 | N/A | 0.809116E+03 | N/A |
| 1990 | N/A | 0.446961E+03 | N/A |
| 1991 | N/A | 0.138037E+04 | N/A |
| 1992 | N/A | 0.584522E+03 | N/A |
| 1993 | N/A | 0.598388E+03 | N/A |
| 1994 | N/A | 0.132464E+03 | N/A |
| 1995 | 0.145760E+03 | 0.848718E+02 | 0.540818E+00 |
| 1996 | 0.284826E+03 | 0.258955E+03 | 0.952237E-01 |
| 1997 | 0.680304E+02 | 0.189417E+03 | -0.102400E+01 |
| 1998 | 0.727570E+03 | 0.439796E+03 | 0.503398E+00 |
| 1999 | 0.162972E+03 | 0.196109E+03 | -0.185088E+00 |
| 2000 | 0.139886E+03 | 0.154565E+03 | -0.997887E-01 |
| 2001 | 0.241248E+03 | 0.278442E+03 | -0.143383E+00 |
| 2002 | 0.306956E+03 | 0.500262E+03 | -0.488427E+00 |
| 2003 | 0.875652E+02 | 0.206580E+03 | -0.858303E+00 |

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2004     0.121922E+04     0.346287E+03     0.125870E+01
2005     0.280454E+03     0.156150E+03     0.585597E+00
2006     0.290700E+03     0.154182E+03     0.634159E+00
2007     0.285782E+03     0.303082E+03    -0.587728E-01
2008     0.516375E+02     0.110430E+03    -0.760133E+00

Survey Index:   15 Tag:         spr_36po AGE =  7
Time = JAN-1           Type = NUMBER
Catchability =    0.723118E+00   % Variance Contribution =     3.5393
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.876323E+03     N/A
1979     N/A              0.632027E+03     N/A
1980     N/A              0.669607E+03     N/A
1981     N/A              0.707082E+03     N/A
1982     N/A              0.113566E+04     N/A
1983     N/A              0.192139E+03     N/A
1984     N/A              0.709804E+03     N/A
1985     N/A              0.391520E+03     N/A
1986     N/A              0.222844E+03     N/A
1987     N/A              0.594844E+03     N/A
1988     N/A              0.222620E+03     N/A
1989     N/A              0.142174E+03     N/A
1990     N/A              0.337672E+03     N/A
1991     N/A              0.227693E+03     N/A
1992     N/A              0.464433E+03     N/A
1993     N/A              0.204604E+03     N/A
1994     N/A              0.161371E+03     N/A
1995     0.319114E+03     0.488573E+02     0.187665E+01
1996     0.378402E+02     0.448957E+02    -0.170970E+00
1997     0.182917E+03     0.999355E+02     0.604508E+00
1998     0.138793E+03     0.647353E+02     0.762676E+00
1999     0.868821E+02     0.186825E+03    -0.765618E+00
2000     0.348348E+02     0.841796E+02    -0.882335E+00
2001     0.315563E+02     0.734561E+02    -0.844914E+00
2002     0.532768E+02     0.118386E+03    -0.798452E+00
2003     0.108603E+03     0.182679E+03    -0.520036E+00
2004     0.243980E+03     0.738014E+02     0.119571E+01
2005     0.174037E+03     0.129080E+03     0.298836E+00
2006     0.165704E+03     0.633221E+02     0.961972E+00
2007     0.422116E+02     0.841583E+02    -0.690004E+00
2008     0.614732E+02     0.171850E+03    -0.102802E+01

Survey Index:   16 Tag:         spr_36po AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.816798E+00   % Variance Contribution =     1.8560
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.669555E+02     N/A
```

| | | | |
|---|---|---|---|
| 1979 | N/A | 0.633475E+03 | N/A |
| 1980 | N/A | 0.467249E+03 | N/A |
| 1981 | N/A | 0.314189E+03 | N/A |
| 1982 | N/A | 0.349393E+03 | N/A |
| 1983 | N/A | 0.534230E+03 | N/A |
| 1984 | N/A | 0.108458E+03 | N/A |
| 1985 | N/A | 0.327951E+03 | N/A |
| 1986 | N/A | 0.167409E+03 | N/A |
| 1987 | N/A | 0.143378E+03 | N/A |
| 1988 | N/A | 0.347062E+03 | N/A |
| 1989 | N/A | 0.963563E+02 | N/A |
| 1990 | N/A | 0.720154E+02 | N/A |
| 1991 | N/A | 0.145136E+03 | N/A |
| 1992 | N/A | 0.107462E+03 | N/A |
| 1993 | N/A | 0.170767E+03 | N/A |
| 1994 | N/A | 0.602952E+02 | N/A |
| 1995 | 0.382500E+02 | 0.434902E+02 | -0.128393E+00 |
| 1996 | 0.247259E+02 | 0.295044E+02 | -0.176688E+00 |
| 1997 | 0.274580E+02 | 0.283950E+02 | -0.335569E-01 |
| 1998 | 0.422116E+02 | 0.242502E+02 | 0.554272E+00 |
| 1999 | 0.416652E+02 | 0.305331E+02 | 0.310855E+00 |
| 2000 | 0.274580E+02 | 0.682718E+02 | -0.910840E+00 |
| 2001 | 0.241795E+02 | 0.440075E+02 | -0.598854E+00 |
| 2002 | N/A | 0.280790E+02 | N/A |
| 2003 | 0.168027E+02 | 0.478314E+02 | -0.104614E+01 |
| 2004 | 0.356818E+03 | 0.654872E+02 | 0.169537E+01 |
| 2005 | 0.407089E+02 | 0.259731E+02 | 0.449385E+00 |
| 2006 | 0.736313E+02 | 0.571926E+02 | 0.252646E+00 |
| 2007 | 0.247259E+02 | 0.357269E+02 | -0.368054E+00 |
| 2008 | N/A | 0.659093E+02 | N/A |

Survey Index: 17 Tag: spr_41 AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.141338E-01 % Variance Contribution = 2.1179
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.477900E+03 | 0.405710E+03 | 0.163763E+00 |
| 1979 | 0.550671E+03 | 0.366665E+03 | 0.406688E+00 |
| 1980 | 0.401143E+02 | 0.323854E+03 | -0.208856E+01 |
| 1981 | 0.295997E+04 | 0.648606E+03 | 0.151811E+01 |
| 1982 | N/A | 0.280737E+03 | N/A |
| 1983 | N/A | 0.159787E+03 | N/A |
| 1984 | N/A | 0.410170E+03 | N/A |
| 1985 | N/A | 0.135900E+03 | N/A |
| 1986 | N/A | 0.629030E+03 | N/A |
| 1987 | N/A | 0.252967E+03 | N/A |
| 1988 | N/A | 0.351285E+03 | N/A |
| 1989 | N/A | 0.252269E+03 | N/A |
| 1990 | N/A | 0.144223E+03 | N/A |
| 1991 | N/A | 0.279795E+03 | N/A |
| 1992 | N/A | 0.105576E+03 | N/A |
| 1993 | N/A | 0.139516E+03 | N/A |
| 1994 | N/A | 0.892634E+02 | N/A |

| | | | |
|---|---|---|---|
| 1995 | N/A | 0.554789E+02 | N/A |
| 1996 | N/A | 0.943495E+02 | N/A |
| 1997 | N/A | 0.150114E+03 | N/A |
| 1998 | N/A | 0.698806E+02 | N/A |
| 1999 | N/A | 0.172911E+03 | N/A |
| 2000 | N/A | 0.844751E+02 | N/A |
| 2001 | N/A | 0.324376E+02 | N/A |
| 2002 | N/A | 0.599196E+02 | N/A |
| 2003 | N/A | 0.206535E+02 | N/A |
| 2004 | N/A | 0.152666E+03 | N/A |
| 2005 | N/A | 0.356536E+02 | N/A |
| 2006 | N/A | 0.917265E+02 | N/A |
| 2007 | N/A | 0.994578E+02 | N/A |
| 2008 | N/A | 0.688974E+02 | N/A |

Survey Index: 18 Tag: spr_41 AGE = 2
Time = JAN-1 Type = NUMBER
Catchability = 0.899870E-01 % Variance Contribution = 0.1993
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.246600E+03 | 0.423564E+03 | -0.540937E+00 |
| 1979 | 0.166847E+04 | 0.210252E+04 | -0.231231E+00 |
| 1980 | 0.285043E+04 | 0.188863E+04 | 0.411618E+00 |
| 1981 | 0.238140E+04 | 0.166053E+04 | 0.360549E+00 |
| 1982 | N/A | 0.328194E+04 | N/A |
| 1983 | N/A | 0.140041E+04 | N/A |
| 1984 | N/A | 0.782072E+03 | N/A |
| 1985 | N/A | 0.211527E+04 | N/A |
| 1986 | N/A | 0.694104E+03 | N/A |
| 1987 | N/A | 0.321651E+04 | N/A |
| 1988 | N/A | 0.131020E+04 | N/A |
| 1989 | N/A | 0.180474E+04 | N/A |
| 1990 | N/A | 0.124261E+04 | N/A |
| 1991 | N/A | 0.745959E+03 | N/A |
| 1992 | N/A | 0.143584E+04 | N/A |
| 1993 | N/A | 0.534759E+03 | N/A |
| 1994 | N/A | 0.702949E+03 | N/A |
| 1995 | N/A | 0.457633E+03 | N/A |
| 1996 | N/A | 0.286570E+03 | N/A |
| 1997 | N/A | 0.486541E+03 | N/A |
| 1998 | N/A | 0.772189E+03 | N/A |
| 1999 | N/A | 0.359123E+03 | N/A |
| 2000 | N/A | 0.897455E+03 | N/A |
| 2001 | N/A | 0.431121E+03 | N/A |
| 2002 | N/A | 0.168137E+03 | N/A |
| 2003 | N/A | 0.309613E+03 | N/A |
| 2004 | N/A | 0.106279E+03 | N/A |
| 2005 | N/A | 0.791700E+03 | N/A |
| 2006 | N/A | 0.184852E+03 | N/A |
| 2007 | N/A | 0.475477E+03 | N/A |
| 2008 | N/A | 0.517583E+03 | N/A |

Survey Index: 19 Tag: spr_41 AGE = 3

```
Time = JAN-1           Type = NUMBER
Catchability =    0.198731E+00   % Variance Contribution =     0.2047
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.711116E+04     0.503439E+04     0.345372E+00
1979     0.353700E+03     0.691159E+03    -0.669921E+00
1980     0.345806E+04     0.339976E+04     0.170022E-01
1981     0.361389E+04     0.265710E+04     0.307547E+00
1982     N/A              0.230348E+04     N/A
1983     N/A              0.406860E+04     N/A
1984     N/A              0.160886E+04     N/A
1985     N/A              0.113724E+04     N/A
1986     N/A              0.249777E+04     N/A
1987     N/A              0.970073E+03     N/A
1988     N/A              0.439420E+04     N/A
1989     N/A              0.194813E+04     N/A
1990     N/A              0.279610E+04     N/A
1991     N/A              0.125797E+04     N/A
1992     N/A              0.998144E+03     N/A
1993     N/A              0.173869E+04     N/A
1994     N/A              0.692883E+03     N/A
1995     N/A              0.116085E+04     N/A
1996     N/A              0.710561E+03     N/A
1997     N/A              0.466667E+03     N/A
1998     N/A              0.757026E+03     N/A
1999     N/A              0.123159E+04     N/A
2000     N/A              0.585485E+03     N/A
2001     N/A              0.145369E+04     N/A
2002     N/A              0.650689E+03     N/A
2003     N/A              0.283750E+03     N/A
2004     N/A              0.523720E+03     N/A
2005     N/A              0.179713E+03     N/A
2006     N/A              0.136618E+04     N/A
2007     N/A              0.321730E+03     N/A
2008     N/A              0.765458E+03     N/A

Survey Index:   20 Tag:         spr_41   AGE =  4
Time = JAN-1           Type = NUMBER
Catchability =    0.177261E+00   % Variance Contribution =     0.0590
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.124907E+04     0.135789E+04    -0.835318E-01
1979     0.238050E+04     0.238729E+04    -0.284902E-02
1980     0.272957E+03     0.352946E+03    -0.257001E+00
1981     0.216630E+04     0.153670E+04     0.343382E+00
1982     N/A              0.118786E+04     N/A
1983     N/A              0.978455E+03     N/A
1984     N/A              0.158405E+04     N/A
1985     N/A              0.622583E+03     N/A
```

| | | | |
|---|---|---|---|
| 1986 | N/A | 0.365679E+03 | N/A |
| 1987 | N/A | 0.109742E+04 | N/A |
| 1988 | N/A | 0.467420E+03 | N/A |
| 1989 | N/A | 0.188080E+04 | N/A |
| 1990 | N/A | 0.940371E+03 | N/A |
| 1991 | N/A | 0.118917E+04 | N/A |
| 1992 | N/A | 0.367911E+03 | N/A |
| 1993 | N/A | 0.366943E+03 | N/A |
| 1994 | N/A | 0.569735E+03 | N/A |
| 1995 | N/A | 0.261534E+03 | N/A |
| 1996 | N/A | 0.620110E+03 | N/A |
| 1997 | N/A | 0.361870E+03 | N/A |
| 1998 | N/A | 0.221620E+03 | N/A |
| 1999 | N/A | 0.344662E+03 | N/A |
| 2000 | N/A | 0.578027E+03 | N/A |
| 2001 | N/A | 0.309532E+03 | N/A |
| 2002 | N/A | 0.638081E+03 | N/A |
| 2003 | N/A | 0.287373E+03 | N/A |
| 2004 | N/A | 0.142860E+03 | N/A |
| 2005 | N/A | 0.313143E+03 | N/A |
| 2006 | N/A | 0.990779E+02 | N/A |
| 2007 | N/A | 0.863062E+03 | N/A |
| 2008 | N/A | 0.171998E+03 | N/A |

Survey Index: 21 Tag: spr_41 AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.216299E+00 % Variance Contribution = 0.2314
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.999771E+03 | 0.641727E+03 | 0.443364E+00 |
| 1979 | 0.702771E+03 | 0.885211E+03 | -0.230795E+00 |
| 1980 | 0.219214E+04 | 0.149602E+04 | 0.382068E+00 |
| 1981 | 0.136157E+03 | 0.246768E+03 | -0.594637E+00 |
| 1982 | N/A | 0.101410E+04 | N/A |
| 1983 | N/A | 0.609268E+03 | N/A |
| 1984 | N/A | 0.460237E+03 | N/A |
| 1985 | N/A | 0.937793E+03 | N/A |
| 1986 | N/A | 0.295768E+03 | N/A |
| 1987 | N/A | 0.198931E+03 | N/A |
| 1988 | N/A | 0.675730E+03 | N/A |
| 1989 | N/A | 0.259133E+03 | N/A |
| 1990 | N/A | 0.105560E+04 | N/A |
| 1991 | N/A | 0.559002E+03 | N/A |
| 1992 | N/A | 0.577777E+03 | N/A |
| 1993 | N/A | 0.161163E+03 | N/A |
| 1994 | N/A | 0.131247E+03 | N/A |
| 1995 | N/A | 0.187742E+03 | N/A |
| 1996 | N/A | 0.131857E+03 | N/A |
| 1997 | N/A | 0.373476E+03 | N/A |
| 1998 | N/A | 0.164647E+03 | N/A |
| 1999 | N/A | 0.125724E+03 | N/A |
| 2000 | N/A | 0.179521E+03 | N/A |
| 2001 | N/A | 0.353352E+03 | N/A |

```
2002     N/A              0.163909E+03     N/A
2003     N/A              0.344214E+03     N/A
2004     N/A              0.132620E+03     N/A
2005     N/A              0.922646E+02     N/A
2006     N/A              0.200657E+03     N/A
2007     N/A              0.586338E+02     N/A
2008     N/A              0.633664E+03     N/A

Survey Index:   22 Tag:         spr_41   AGE =  6
Time = JAN-1           Type = NUMBER
Catchability =    0.207689E+00   % Variance Contribution =     0.1087
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.182057E+03     0.262483E+03    -0.365866E+00
1979     0.302786E+03     0.337355E+03    -0.108111E+00
1980     0.480471E+03     0.470932E+03     0.200532E-01
1981     0.112963E+04     0.717462E+03     0.453924E+00
1982     N/A              0.134712E+03     N/A
1983     N/A              0.418576E+03     N/A
1984     N/A              0.264338E+03     N/A
1985     N/A              0.190302E+03     N/A
1986     N/A              0.348501E+03     N/A
1987     N/A              0.134846E+03     N/A
1988     N/A              0.100570E+03     N/A
1989     N/A              0.239458E+03     N/A
1990     N/A              0.132278E+03     N/A
1991     N/A              0.408520E+03     N/A
1992     N/A              0.172990E+03     N/A
1993     N/A              0.177093E+03     N/A
1994     N/A              0.392029E+02     N/A
1995     N/A              0.251179E+02     N/A
1996     N/A              0.766379E+02     N/A
1997     N/A              0.560581E+02     N/A
1998     N/A              0.130158E+03     N/A
1999     N/A              0.580384E+02     N/A
2000     N/A              0.457436E+02     N/A
2001     N/A              0.824050E+02     N/A
2002     N/A              0.148053E+03     N/A
2003     N/A              0.611374E+02     N/A
2004     N/A              0.102484E+03     N/A
2005     N/A              0.462126E+02     N/A
2006     N/A              0.456302E+02     N/A
2007     N/A              0.896972E+02     N/A
2008     N/A              0.326818E+02     N/A

Survey Index:   23 Tag:         spr_41   AGE =  7
Time = JAN-1           Type = NUMBER
Catchability =    0.300243E+00   % Variance Contribution =     0.5210
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

-------------------------------------------------------------------------------
```

```
1978     0.915814E+03     0.363855E+03     0.923058E+00
1979     0.107486E+03     0.262422E+03    -0.892596E+00
1980     0.238500E+03     0.278025E+03    -0.153343E+00
1981     0.331971E+03     0.293585E+03     0.122881E+00
1982     N/A              0.471532E+03     N/A
1983     N/A              0.797775E+02     N/A
1984     N/A              0.294715E+03     N/A
1985     N/A              0.162562E+03     N/A
1986     N/A              0.925261E+02     N/A
1987     N/A              0.246983E+03     N/A
1988     N/A              0.924333E+02     N/A
1989     N/A              0.590314E+02     N/A
1990     N/A              0.140204E+03     N/A
1991     N/A              0.945396E+02     N/A
1992     N/A              0.192836E+03     N/A
1993     N/A              0.849532E+02     N/A
1994     N/A              0.670022E+02     N/A
1995     N/A              0.202859E+02     N/A
1996     N/A              0.186410E+02     N/A
1997     N/A              0.414939E+02     N/A
1998     N/A              0.268785E+02     N/A
1999     N/A              0.775708E+02     N/A
2000     N/A              0.349519E+02     N/A
2001     N/A              0.304994E+02     N/A
2002     N/A              0.491548E+02     N/A
2003     N/A              0.758497E+02     N/A
2004     N/A              0.306428E+02     N/A
2005     N/A              0.535950E+02     N/A
2006     N/A              0.262917E+02     N/A
2007     N/A              0.349431E+02     N/A
2008     N/A              0.713531E+02     N/A

Survey Index:   24 Tag:         spr_41   AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.291472E+00   % Variance Contribution =     1.1884
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
```

---

```
1978     0.837000E+02     0.238929E+02     0.125366E+01
1979     0.178200E+03     0.226054E+03    -0.237867E+00
1980     0.398571E+02     0.166737E+03    -0.143111E+01
1981     0.169843E+03     0.112118E+03     0.415324E+00
1982     N/A              0.124680E+03     N/A
1983     N/A              0.190639E+03     N/A
1984     N/A              0.387030E+02     N/A
1985     N/A              0.117028E+03     N/A
1986     N/A              0.597394E+02     N/A
1987     N/A              0.511642E+02     N/A
1988     N/A              0.123848E+03     N/A
1989     N/A              0.343845E+02     N/A
1990     N/A              0.256985E+02     N/A
1991     N/A              0.517913E+02     N/A
1992     N/A              0.383476E+02     N/A
```

| | | | |
|---|---|---|---|
| 1993 | N/A | 0.609378E+02 | N/A |
| 1994 | N/A | 0.215162E+02 | N/A |
| 1995 | N/A | 0.155194E+02 | N/A |
| 1996 | N/A | 0.105286E+02 | N/A |
| 1997 | N/A | 0.101327E+02 | N/A |
| 1998 | N/A | 0.865361E+01 | N/A |
| 1999 | N/A | 0.108957E+02 | N/A |
| 2000 | N/A | 0.243626E+02 | N/A |
| 2001 | N/A | 0.157040E+02 | N/A |
| 2002 | N/A | 0.100199E+02 | N/A |
| 2003 | N/A | 0.170685E+02 | N/A |
| 2004 | N/A | 0.233689E+02 | N/A |
| 2005 | N/A | 0.926844E+01 | N/A |
| 2006 | N/A | 0.204090E+02 | N/A |
| 2007 | N/A | 0.127491E+02 | N/A |
| 2008 | N/A | 0.235196E+02 | N/A |

Survey Index: 25 Tag: sp_can_p AGE = 1
Time = JAN-1 Type = NUMBER
Catchability = 0.358799E-01 % Variance Contribution = 1.3324
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.102993E+04 | N/A |
| 1979 | N/A | 0.930816E+03 | N/A |
| 1980 | N/A | 0.822135E+03 | N/A |
| 1981 | N/A | 0.164655E+04 | N/A |
| 1982 | N/A | 0.712678E+03 | N/A |
| 1983 | N/A | 0.405634E+03 | N/A |
| 1984 | N/A | 0.104126E+04 | N/A |
| 1985 | N/A | 0.344995E+03 | N/A |
| 1986 | 0.844432E+03 | 0.159685E+04 | -0.637126E+00 |
| 1987 | 0.351846E+03 | 0.642180E+03 | -0.601674E+00 |
| 1988 | 0.394068E+03 | 0.891771E+03 | -0.816686E+00 |
| 1989 | 0.229404E+04 | 0.640410E+03 | 0.127596E+01 |
| 1990 | 0.591102E+03 | 0.366125E+03 | 0.479014E+00 |
| 1991 | 0.166072E+04 | 0.710287E+03 | 0.849335E+00 |
| 1992 | 0.154812E+03 | 0.268014E+03 | -0.548823E+00 |
| 1993 | N/A | 0.354175E+03 | N/A |
| 1994 | N/A | 0.226604E+03 | N/A |
| 1995 | N/A | 0.140839E+03 | N/A |
| 1996 | N/A | 0.239515E+03 | N/A |
| 1997 | N/A | 0.381080E+03 | N/A |
| 1998 | N/A | 0.177399E+03 | N/A |
| 1999 | N/A | 0.438950E+03 | N/A |
| 2000 | N/A | 0.214448E+03 | N/A |
| 2001 | N/A | 0.823461E+02 | N/A |
| 2002 | N/A | 0.152112E+03 | N/A |
| 2003 | N/A | 0.524308E+02 | N/A |
| 2004 | N/A | 0.387558E+03 | N/A |
| 2005 | N/A | 0.905101E+02 | N/A |
| 2006 | N/A | 0.232857E+03 | N/A |
| 2007 | N/A | 0.252483E+03 | N/A |
| 2008 | N/A | 0.174903E+03 | N/A |

```
Survey Index:   26 Tag:         sp_can_p AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.187587E+00   % Variance Contribution =     0.5784
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A             0.882961E+03     N/A
1979     N/A             0.438292E+04     N/A
1980     N/A             0.393704E+04     N/A
1981     N/A             0.346155E+04     N/A
1982     N/A             0.684153E+04     N/A
1983     N/A             0.291931E+04     N/A
1984     N/A             0.163031E+04     N/A
1985     N/A             0.440949E+04     N/A
1986     0.319477E+04    0.144693E+04     0.792071E+00
1987     0.299773E+04    0.670515E+04    -0.805019E+00
1988     0.142146E+04    0.273125E+04    -0.653076E+00
1989     0.391253E+04    0.376217E+04     0.391899E-01
1990     0.343402E+04    0.259034E+04     0.281944E+00
1991     0.163257E+04    0.155503E+04     0.486618E-01
1992     0.402512E+04    0.299315E+04     0.296228E+00
1993     N/A             0.111476E+04     N/A
1994     N/A             0.146537E+04     N/A
1995     N/A             0.953981E+03     N/A
1996     N/A             0.597384E+03     N/A
1997     N/A             0.101424E+04     N/A
1998     N/A             0.160970E+04     N/A
1999     N/A             0.748627E+03     N/A
2000     N/A             0.187084E+04     N/A
2001     N/A             0.898715E+03     N/A
2002     N/A             0.350498E+03     N/A
2003     N/A             0.645419E+03     N/A
2004     N/A             0.221549E+03     N/A
2005     N/A             0.165038E+04     N/A
2006     N/A             0.385343E+03     N/A
2007     N/A             0.991180E+03     N/A
2008     N/A             0.107895E+04     N/A

Survey Index:   27 Tag:         sp_can_p AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.324684E+00   % Variance Contribution =     0.1686
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A             0.822510E+04     N/A
1979     N/A             0.112920E+04     N/A
1980     N/A             0.555447E+04     N/A
1981     N/A             0.434113E+04     N/A
1982     N/A             0.376339E+04     N/A
1983     N/A             0.664720E+04     N/A
```

| | | | |
|---|---|---|---|
| 1984 | N/A | 0.262853E+04 | N/A |
| 1985 | N/A | 0.185801E+04 | N/A |
| 1986 | 0.395475E+04 | 0.408081E+04 | -0.313768E-01 |
| 1987 | 0.130887E+04 | 0.158489E+04 | -0.191350E+00 |
| 1988 | 0.655842E+04 | 0.717917E+04 | -0.904340E-01 |
| 1989 | 0.194219E+04 | 0.318282E+04 | -0.493951E+00 |
| 1990 | 0.531992E+04 | 0.456822E+04 | 0.152335E+00 |
| 1991 | 0.258959E+04 | 0.205525E+04 | 0.231102E+00 |
| 1992 | 0.249107E+04 | 0.163075E+04 | 0.423674E+00 |
| 1993 | N/A | 0.284064E+04 | N/A |
| 1994 | N/A | 0.113202E+04 | N/A |
| 1995 | N/A | 0.189658E+04 | N/A |
| 1996 | N/A | 0.116090E+04 | N/A |
| 1997 | N/A | 0.762433E+03 | N/A |
| 1998 | N/A | 0.123682E+04 | N/A |
| 1999 | N/A | 0.201216E+04 | N/A |
| 2000 | N/A | 0.956554E+03 | N/A |
| 2001 | N/A | 0.237502E+04 | N/A |
| 2002 | N/A | 0.106308E+04 | N/A |
| 2003 | N/A | 0.463585E+03 | N/A |
| 2004 | N/A | 0.855645E+03 | N/A |
| 2005 | N/A | 0.293612E+03 | N/A |
| 2006 | N/A | 0.223204E+04 | N/A |
| 2007 | N/A | 0.525637E+03 | N/A |
| 2008 | N/A | 0.125059E+04 | N/A |

Survey Index: 28 Tag: sp_can_p AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.372132E+00 % Variance Contribution = 0.2113
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.285067E+04 | N/A |
| 1979 | N/A | 0.501174E+04 | N/A |
| 1980 | N/A | 0.740954E+03 | N/A |
| 1981 | N/A | 0.322606E+04 | N/A |
| 1982 | N/A | 0.249371E+04 | N/A |
| 1983 | N/A | 0.205411E+04 | N/A |
| 1984 | N/A | 0.332546E+04 | N/A |
| 1985 | N/A | 0.130701E+04 | N/A |
| 1986 | 0.520733E+03 | 0.767685E+03 | -0.388143E+00 |
| 1987 | 0.153405E+04 | 0.230385E+04 | -0.406671E+00 |
| 1988 | 0.816284E+03 | 0.981272E+03 | -0.184088E+00 |
| 1989 | 0.401105E+04 | 0.394843E+04 | 0.157348E-01 |
| 1990 | 0.292736E+04 | 0.197416E+04 | 0.393960E+00 |
| 1991 | 0.302588E+04 | 0.249647E+04 | 0.192325E+00 |
| 1992 | 0.112591E+04 | 0.772370E+03 | 0.376882E+00 |
| 1993 | N/A | 0.770338E+03 | N/A |
| 1994 | N/A | 0.119607E+04 | N/A |
| 1995 | N/A | 0.549048E+03 | N/A |
| 1996 | N/A | 0.130182E+04 | N/A |
| 1997 | N/A | 0.759687E+03 | N/A |
| 1998 | N/A | 0.465255E+03 | N/A |
| 1999 | N/A | 0.723563E+03 | N/A |

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2000     N/A              0.121348E+04     N/A
2001     N/A              0.649814E+03     N/A
2002     N/A              0.133955E+04     N/A
2003     N/A              0.603293E+03     N/A
2004     N/A              0.299911E+03     N/A
2005     N/A              0.657394E+03     N/A
2006     N/A              0.207998E+03     N/A
2007     N/A              0.181186E+04     N/A
2008     N/A              0.361082E+03     N/A

Survey Index:   29 Tag:         sp_can_p AGE =  5
Time = JAN-1           Type = NUMBER
Catchability =    0.580779E+00   % Variance Contribution =     0.1940
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.172308E+04     N/A
1979     N/A              0.237686E+04     N/A
1980     N/A              0.401693E+04     N/A
1981     N/A              0.662589E+03     N/A
1982     N/A              0.272293E+04     N/A
1983     N/A              0.163593E+04     N/A
1984     N/A              0.123577E+04     N/A
1985     N/A              0.251804E+04     N/A
1986     0.914801E+03     0.794158E+03      0.141424E+00
1987     0.478511E+03     0.534144E+03     -0.109986E+00
1988     0.143553E+04     0.181438E+04     -0.234209E+00
1989     0.506659E+03     0.695790E+03     -0.317210E+00
1990     0.544658E+04     0.283436E+04      0.653171E+00
1991     0.147776E+04     0.150096E+04     -0.155807E-01
1992     0.137924E+04     0.155137E+04     -0.117609E+00
1993     N/A              0.432735E+03      N/A
1994     N/A              0.352408E+03      N/A
1995     N/A              0.504100E+03      N/A
1996     N/A              0.354045E+03      N/A
1997     N/A              0.100281E+04      N/A
1998     N/A              0.442089E+03      N/A
1999     N/A              0.337579E+03      N/A
2000     N/A              0.482026E+03      N/A
2001     N/A              0.948775E+03      N/A
2002     N/A              0.440108E+03      N/A
2003     N/A              0.924240E+03      N/A
2004     N/A              0.356095E+03      N/A
2005     N/A              0.247737E+03      N/A
2006     N/A              0.538778E+03      N/A
2007     N/A              0.157436E+03      N/A
2008     N/A              0.170143E+04      N/A

Survey Index:   30 Tag:         sp_can_p AGE =  6
Time = JAN-1           Type = NUMBER
Catchability =    0.555873E+00   % Variance Contribution =     0.5549
Residual = LN(Observed) - LN(Predicted)
```

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.702526E+03 | N/A |
| 1979 | N/A | 0.902919E+03 | N/A |
| 1980 | N/A | 0.126043E+04 | N/A |
| 1981 | N/A | 0.192026E+04 | N/A |
| 1982 | N/A | 0.360551E+03 | N/A |
| 1983 | N/A | 0.112030E+04 | N/A |
| 1984 | N/A | 0.707492E+03 | N/A |
| 1985 | N/A | 0.509337E+03 | N/A |
| 1986 | 0.619250E+03 | 0.932750E+03 | -0.409629E+00 |
| 1987 | 0.168886E+03 | 0.360910E+03 | -0.759402E+00 |
| 1988 | 0.182960E+03 | 0.269172E+03 | -0.386082E+00 |
| 1989 | 0.591102E+03 | 0.640901E+03 | -0.808866E-01 |
| 1990 | 0.591102E+03 | 0.354038E+03 | 0.512584E+00 |
| 1991 | 0.184368E+04 | 0.109339E+04 | 0.522479E+00 |
| 1992 | 0.844432E+03 | 0.463000E+03 | 0.600936E+00 |
| 1993 | N/A | 0.473983E+03 | N/A |
| 1994 | N/A | 0.104925E+03 | N/A |
| 1995 | N/A | 0.672270E+02 | N/A |
| 1996 | N/A | 0.205119E+03 | N/A |
| 1997 | N/A | 0.150038E+03 | N/A |
| 1998 | N/A | 0.348363E+03 | N/A |
| 1999 | N/A | 0.155338E+03 | N/A |
| 2000 | N/A | 0.122431E+03 | N/A |
| 2001 | N/A | 0.220554E+03 | N/A |
| 2002 | N/A | 0.396258E+03 | N/A |
| 2003 | N/A | 0.163632E+03 | N/A |
| 2004 | N/A | 0.274294E+03 | N/A |
| 2005 | N/A | 0.123686E+03 | N/A |
| 2006 | N/A | 0.122128E+03 | N/A |
| 2007 | N/A | 0.240071E+03 | N/A |
| 2008 | N/A | 0.874717E+02 | N/A |

Survey Index: 31 Tag: sp_can_p AGE = 7
Time = JAN-1 Type = NUMBER
Catchability = 0.730017E+00 % Variance Contribution = 1.0921
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.884683E+03 | N/A |
| 1979 | N/A | 0.638057E+03 | N/A |
| 1980 | N/A | 0.675996E+03 | N/A |
| 1981 | N/A | 0.713828E+03 | N/A |
| 1982 | N/A | 0.114649E+04 | N/A |
| 1983 | N/A | 0.193972E+03 | N/A |
| 1984 | N/A | 0.716576E+03 | N/A |
| 1985 | N/A | 0.395255E+03 | N/A |
| 1986 | 0.365920E+03 | 0.224970E+03 | 0.486450E+00 |
| 1987 | 0.309625E+03 | 0.600519E+03 | -0.662433E+00 |
| 1988 | 0.112591E+03 | 0.224744E+03 | -0.691200E+00 |
| 1989 | 0.703693E+02 | 0.143530E+03 | -0.712787E+00 |

| | | | |
|---|---|---|---|
| 1990 | 0.130887E+04 | 0.340894E+03 | 0.134535E+01 |
| 1991 | 0.225182E+03 | 0.229865E+03 | -0.205853E-01 |
| 1992 | 0.605176E+03 | 0.468864E+03 | 0.255207E+00 |
| 1993 | N/A | 0.206557E+03 | N/A |
| 1994 | N/A | 0.162910E+03 | N/A |
| 1995 | N/A | 0.493234E+02 | N/A |
| 1996 | N/A | 0.453240E+02 | N/A |
| 1997 | N/A | 0.100889E+03 | N/A |
| 1998 | N/A | 0.653529E+02 | N/A |
| 1999 | N/A | 0.188607E+03 | N/A |
| 2000 | N/A | 0.849827E+02 | N/A |
| 2001 | N/A | 0.741569E+02 | N/A |
| 2002 | N/A | 0.119516E+03 | N/A |
| 2003 | N/A | 0.184422E+03 | N/A |
| 2004 | N/A | 0.745055E+02 | N/A |
| 2005 | N/A | 0.130312E+03 | N/A |
| 2006 | N/A | 0.639262E+02 | N/A |
| 2007 | N/A | 0.849612E+02 | N/A |
| 2008 | N/A | 0.173489E+03 | N/A |

Survey Index: 32 Tag: sp_can_p AGE = 8
Time = JAN-1 Type = NUMBER
Catchability = 0.644843E-03 % Variance Contribution = 0.9126
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.528599E-01 | N/A |
| 1979 | N/A | 0.500114E+00 | N/A |
| 1980 | N/A | 0.368883E+00 | N/A |
| 1981 | N/A | 0.248046E+00 | N/A |
| 1982 | N/A | 0.275838E+00 | N/A |
| 1983 | N/A | 0.421762E+00 | N/A |
| 1984 | N/A | 0.856253E-01 | N/A |
| 1985 | N/A | 0.258910E+00 | N/A |
| 1986 | 0.400000E-01 | 0.132166E+00 | -0.119518E+01 |
| 1987 | 0.800000E-01 | 0.113194E+00 | -0.347077E+00 |
| 1988 | 0.170000E+00 | 0.273998E+00 | -0.477321E+00 |
| 1989 | 0.100000E+00 | 0.760712E-01 | 0.273501E+00 |
| 1990 | 0.120000E+00 | 0.568546E-01 | 0.746995E+00 |
| 1991 | 0.220000E+00 | 0.114581E+00 | 0.652342E+00 |
| 1992 | 0.120000E+00 | 0.848391E-01 | 0.346736E+00 |
| 1993 | N/A | 0.134817E+00 | N/A |
| 1994 | N/A | 0.476017E-01 | N/A |
| 1995 | N/A | 0.343346E-01 | N/A |
| 1996 | N/A | 0.232931E-01 | N/A |
| 1997 | N/A | 0.224173E-01 | N/A |
| 1998 | N/A | 0.191450E-01 | N/A |
| 1999 | N/A | 0.241052E-01 | N/A |
| 2000 | N/A | 0.538991E-01 | N/A |
| 2001 | N/A | 0.347429E-01 | N/A |
| 2002 | N/A | 0.221678E-01 | N/A |
| 2003 | N/A | 0.377618E-01 | N/A |
| 2004 | N/A | 0.517007E-01 | N/A |
| 2005 | N/A | 0.205052E-01 | N/A |

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2006     N/A              0.451523E-01     N/A
2007     N/A              0.282056E-01     N/A
2008     N/A              0.520339E-01     N/A

Survey Index:   33 Tag:         sp_canpo AGE =  1
Time = JAN-1           Type = NUMBER
Catchability =    0.158633E-01   % Variance Contribution =     4.3436
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.455356E+03     N/A
1979     N/A              0.411533E+03     N/A
1980     N/A              0.363483E+03     N/A
1981     N/A              0.727975E+03     N/A
1982     N/A              0.315090E+03     N/A
1983     N/A              0.179339E+03     N/A
1984     N/A              0.460362E+03     N/A
1985     N/A              0.152529E+03     N/A
1986     N/A              0.706002E+03     N/A
1987     N/A              0.283922E+03     N/A
1988     N/A              0.394271E+03     N/A
1989     N/A              0.283139E+03     N/A
1990     N/A              0.161872E+03     N/A
1991     N/A              0.314033E+03     N/A
1992     N/A              0.118495E+03     N/A
1993     N/A              0.156588E+03     N/A
1994     N/A              0.100186E+03     N/A
1995     0.985170E+02     0.622677E+02     0.458786E+00
1996     0.197034E+03     0.105895E+03     0.620930E+00
1997     0.450363E+03     0.168483E+03     0.983218E+00
1998     0.140739E+02     0.784317E+02    -0.171791E+01
1999     0.464437E+03     0.194069E+03     0.872612E+00
2000     0.140739E+03     0.948121E+02     0.395007E+00
2001     N/A              0.364069E+02     N/A
2002     0.128934E+02     0.672519E+02    -0.165173E+01
2003     N/A              0.231808E+02     N/A
2004     0.753776E+03     0.171348E+03     0.148140E+01
2005     0.344185E+02     0.400164E+02    -0.150696E+00
2006     N/A              0.102951E+03     N/A
2007     0.193318E+03     0.111628E+03     0.549163E+00
2008     0.122714E+02     0.773281E+02    -0.184079E+01

Survey Index:   34 Tag:         sp_canpo AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.779414E-01   % Variance Contribution =     3.7046
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.366866E+03     N/A
1979     N/A              0.182108E+04     N/A
1980     N/A              0.163582E+04     N/A
```

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1981     N/A              0.143826E+04     N/A
1982     N/A              0.284262E+04     N/A
1983     N/A              0.121296E+04     N/A
1984     N/A              0.677384E+03     N/A
1985     N/A              0.183212E+04     N/A
1986     N/A              0.601191E+03     N/A
1987     N/A              0.278595E+04     N/A
1988     N/A              0.113482E+04     N/A
1989     N/A              0.156316E+04     N/A
1990     N/A              0.107627E+04     N/A
1991     N/A              0.646105E+03     N/A
1992     N/A              0.124364E+04     N/A
1993     N/A              0.463176E+03     N/A
1994     N/A              0.608852E+03     N/A
1995     0.942949E+03     0.396374E+03     0.866653E+00
1996     0.689619E+03     0.248210E+03     0.102186E+01
1997     0.745915E+03     0.421413E+03     0.570997E+00
1998     0.942949E+03     0.668824E+03     0.343491E+00
1999     0.450363E+03     0.311051E+03     0.370100E+00
2000     0.619250E+03     0.777322E+03    -0.227346E+00
2001     0.844432E+02     0.373412E+03    -0.148660E+01
2002     0.121746E+03     0.145630E+03    -0.179136E+00
2003     0.313603E+02     0.268168E+03    -0.214607E+01
2004     0.134499E+03     0.920524E+02     0.379197E+00
2005     0.188003E+04     0.685723E+03     0.100857E+01
2006     0.527756E+02     0.160108E+03    -0.110980E+01
2007     0.730710E+03     0.411830E+03     0.573405E+00
2008     0.454928E+03     0.448299E+03     0.146790E-01

Survey Index:   35 Tag:         sp_canpo AGE =  3
Time = JAN-1           Type = NUMBER
Catchability =    0.362628E+00   % Variance Contribution =     1.1901
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

_____________________________________________________________________________

1978     N/A              0.918634E+04     N/A
1979     N/A              0.126117E+04     N/A
1980     N/A              0.620359E+04     N/A
1981     N/A              0.484846E+04     N/A
1982     N/A              0.420320E+04     N/A
1983     N/A              0.742403E+04     N/A
1984     N/A              0.293572E+04     N/A
1985     N/A              0.207514E+04     N/A
1986     N/A              0.455772E+04     N/A
1987     N/A              0.177011E+04     N/A
1988     N/A              0.801817E+04     N/A
1989     N/A              0.355479E+04     N/A
1990     N/A              0.510209E+04     N/A
1991     N/A              0.229544E+04     N/A
1992     N/A              0.182133E+04     N/A
1993     N/A              0.317261E+04     N/A
1994     N/A              0.126432E+04     N/A
1995     0.211108E+04     0.211822E+04    -0.337802E-02
1996     0.325106E+04     0.129657E+04     0.919257E+00
```

| | | | |
|---|---|---|---|
| 1997 | 0.774062E+03 | 0.851535E+03 | -0.953887E-01 |
| 1998 | 0.133702E+04 | 0.138136E+04 | -0.326260E-01 |
| 1999 | 0.209701E+04 | 0.224731E+04 | -0.692234E-01 |
| 2000 | 0.147776E+04 | 0.106834E+04 | 0.324415E+00 |
| 2001 | 0.900727E+03 | 0.265258E+04 | -0.108009E+01 |
| 2002 | 0.805617E+03 | 0.118732E+04 | -0.387847E+00 |
| 2003 | 0.419145E+03 | 0.517762E+03 | -0.211300E+00 |
| 2004 | 0.551716E+03 | 0.955641E+03 | -0.549349E+00 |
| 2005 | 0.661996E+03 | 0.327925E+03 | 0.702473E+00 |
| 2006 | 0.197858E+04 | 0.249289E+04 | -0.231060E+00 |
| 2007 | 0.132932E+04 | 0.587067E+03 | 0.817285E+00 |
| 2008 | 0.125982E+04 | 0.139674E+04 | -0.103172E+00 |

Survey Index: 36 Tag: sp_canpo AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.888325E+00 % Variance Contribution = 1.2196
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.680491E+04 | N/A |
| 1979 | N/A | 0.119636E+05 | N/A |
| 1980 | N/A | 0.176875E+04 | N/A |
| 1981 | N/A | 0.770101E+04 | N/A |
| 1982 | N/A | 0.595280E+04 | N/A |
| 1983 | N/A | 0.490342E+04 | N/A |
| 1984 | N/A | 0.793828E+04 | N/A |
| 1985 | N/A | 0.312000E+04 | N/A |
| 1986 | N/A | 0.183256E+04 | N/A |
| 1987 | N/A | 0.549958E+04 | N/A |
| 1988 | N/A | 0.234242E+04 | N/A |
| 1989 | N/A | 0.942540E+04 | N/A |
| 1990 | N/A | 0.471256E+04 | N/A |
| 1991 | N/A | 0.595938E+04 | N/A |
| 1992 | N/A | 0.184374E+04 | N/A |
| 1993 | N/A | 0.183889E+04 | N/A |
| 1994 | N/A | 0.285516E+04 | N/A |
| 1995 | 0.121035E+04 | 0.131065E+04 | -0.796090E-01 |
| 1996 | 0.565769E+04 | 0.310761E+04 | 0.599163E+00 |
| 1997 | 0.175923E+04 | 0.181347E+04 | -0.303637E-01 |
| 1998 | 0.492585E+03 | 0.111062E+04 | -0.813008E+00 |
| 1999 | 0.153405E+04 | 0.172724E+04 | -0.118610E+00 |
| 2000 | 0.551695E+04 | 0.289672E+04 | 0.644248E+00 |
| 2001 | 0.591102E+03 | 0.155119E+04 | -0.964786E+00 |
| 2002 | 0.288708E+04 | 0.319767E+04 | -0.102177E+00 |
| 2003 | 0.912160E+03 | 0.144014E+04 | -0.456677E+00 |
| 2004 | 0.595577E+03 | 0.715925E+03 | -0.184044E+00 |
| 2005 | 0.409251E+04 | 0.156928E+04 | 0.958541E+00 |
| 2006 | 0.925621E+03 | 0.496517E+03 | 0.622847E+00 |
| 2007 | 0.413611E+04 | 0.432513E+04 | -0.446883E-01 |
| 2008 | 0.835776E+03 | 0.861948E+03 | -0.308351E-01 |

Survey Index: 37 Tag: sp_canpo AGE = 5
Time = JAN-1 Type = NUMBER
Catchability = 0.140774E+01 % Variance Contribution = 1.1272

Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.417655E+04 | N/A |
| 1979 | N/A | 0.576122E+04 | N/A |
| 1980 | N/A | 0.973658E+04 | N/A |
| 1981 | N/A | 0.160604E+04 | N/A |
| 1982 | N/A | 0.660006E+04 | N/A |
| 1983 | N/A | 0.396530E+04 | N/A |
| 1984 | N/A | 0.299536E+04 | N/A |
| 1985 | N/A | 0.610344E+04 | N/A |
| 1986 | N/A | 0.192495E+04 | N/A |
| 1987 | N/A | 0.129470E+04 | N/A |
| 1988 | N/A | 0.439785E+04 | N/A |
| 1989 | N/A | 0.168651E+04 | N/A |
| 1990 | N/A | 0.687017E+04 | N/A |
| 1991 | N/A | 0.363815E+04 | N/A |
| 1992 | N/A | 0.376034E+04 | N/A |
| 1993 | N/A | 0.104890E+04 | N/A |
| 1994 | N/A | 0.854196E+03 | N/A |
| 1995 | 0.844432E+03 | 0.122188E+04 | -0.369482E+00 |
| 1996 | 0.153405E+04 | 0.858163E+03 | 0.580873E+00 |
| 1997 | 0.173108E+04 | 0.243069E+04 | -0.339428E+00 |
| 1998 | 0.492585E+03 | 0.107157E+04 | -0.777213E+00 |
| 1999 | 0.577028E+03 | 0.818251E+03 | -0.349278E+00 |
| 2000 | 0.240663E+04 | 0.116837E+04 | 0.722615E+00 |
| 2001 | 0.156220E+04 | 0.229972E+04 | -0.386693E+00 |
| 2002 | 0.961543E+03 | 0.106677E+04 | -0.103852E+00 |
| 2003 | 0.170676E+04 | 0.224025E+04 | -0.271987E+00 |
| 2004 | 0.634621E+03 | 0.863133E+03 | -0.307541E+00 |
| 2005 | 0.159149E+04 | 0.600486E+03 | 0.974687E+00 |
| 2006 | 0.229716E+04 | 0.130593E+04 | 0.564756E+00 |
| 2007 | 0.545841E+03 | 0.381606E+03 | 0.357939E+00 |
| 2008 | 0.306929E+04 | 0.412408E+04 | -0.295397E+00 |

Survey Index:  38 Tag:  sp_canpo AGE =  6
Time = JAN-1  Type = NUMBER
Catchability =  0.193422E+01  % Variance Contribution =  1.2999
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.244451E+04 | N/A |
| 1979 | N/A | 0.314180E+04 | N/A |
| 1980 | N/A | 0.438581E+04 | N/A |
| 1981 | N/A | 0.668175E+04 | N/A |
| 1982 | N/A | 0.125457E+04 | N/A |
| 1983 | N/A | 0.389821E+04 | N/A |
| 1984 | N/A | 0.246179E+04 | N/A |
| 1985 | N/A | 0.177229E+04 | N/A |
| 1986 | N/A | 0.324560E+04 | N/A |
| 1987 | N/A | 0.125582E+04 | N/A |

| | | | |
|---|---|---|---|
| 1988 | N/A | 0.936611E+03 | N/A |
| 1989 | N/A | 0.223008E+04 | N/A |
| 1990 | N/A | 0.123191E+04 | N/A |
| 1991 | N/A | 0.380456E+04 | N/A |
| 1992 | N/A | 0.161106E+04 | N/A |
| 1993 | N/A | 0.164927E+04 | N/A |
| 1994 | N/A | 0.365098E+03 | N/A |
| 1995 | 0.267403E+03 | 0.233923E+03 | 0.133765E+00 |
| 1996 | 0.111183E+04 | 0.713731E+03 | 0.443261E+00 |
| 1997 | 0.379994E+03 | 0.522071E+03 | -0.317647E+00 |
| 1998 | 0.394068E+03 | 0.121216E+04 | -0.112364E+01 |
| 1999 | 0.365920E+03 | 0.540514E+03 | -0.390104E+00 |
| 2000 | 0.109776E+04 | 0.426011E+03 | 0.946562E+00 |
| 2001 | 0.731841E+03 | 0.767440E+03 | -0.474979E-01 |
| 2002 | 0.171816E+04 | 0.137882E+04 | 0.220025E+00 |
| 2003 | 0.447151E+03 | 0.569375E+03 | -0.241642E+00 |
| 2004 | 0.545454E+03 | 0.954435E+03 | -0.559502E+00 |
| 2005 | 0.721660E+03 | 0.430379E+03 | 0.516889E+00 |
| 2006 | 0.982657E+03 | 0.424956E+03 | 0.838276E+00 |
| 2007 | 0.851245E+03 | 0.835353E+03 | 0.188456E-01 |
| 2008 | 0.196496E+03 | 0.304367E+03 | -0.437591E+00 |

Survey Index: 39 Tag: sp_canpo AGE = 7
Time = JAN-1 Type = NUMBER
Catchability = 0.190133E+01 % Variance Contribution = 2.3828
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.230416E+04 | N/A |
| 1979 | N/A | 0.166182E+04 | N/A |
| 1980 | N/A | 0.176063E+04 | N/A |
| 1981 | N/A | 0.185916E+04 | N/A |
| 1982 | N/A | 0.298603E+04 | N/A |
| 1983 | N/A | 0.505201E+03 | N/A |
| 1984 | N/A | 0.186632E+04 | N/A |
| 1985 | N/A | 0.102944E+04 | N/A |
| 1986 | N/A | 0.585933E+03 | N/A |
| 1987 | N/A | 0.156405E+04 | N/A |
| 1988 | N/A | 0.585345E+03 | N/A |
| 1989 | N/A | 0.373824E+03 | N/A |
| 1990 | N/A | 0.887857E+03 | N/A |
| 1991 | N/A | 0.598684E+03 | N/A |
| 1992 | N/A | 0.122116E+04 | N/A |
| 1993 | N/A | 0.537976E+03 | N/A |
| 1994 | N/A | 0.424300E+03 | N/A |
| 1995 | 0.562954E+02 | 0.128463E+03 | -0.825026E+00 |
| 1996 | 0.464437E+03 | 0.118046E+03 | 0.136975E+01 |
| 1997 | 0.844432E+02 | 0.262765E+03 | -0.113518E+01 |
| 1998 | 0.985170E+02 | 0.170212E+03 | -0.546813E+00 |
| 1999 | 0.211108E+03 | 0.491227E+03 | -0.844536E+00 |
| 2000 | 0.562954E+03 | 0.221337E+03 | 0.933511E+00 |
| 2001 | 0.365920E+03 | 0.193141E+03 | 0.638993E+00 |
| 2002 | 0.563812E+03 | 0.311279E+03 | 0.594033E+00 |
| 2003 | 0.474404E+03 | 0.480327E+03 | -0.124098E-01 |

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2004     0.103828E+03     0.194050E+03    -0.625380E+00
2005     0.583521E+03     0.339397E+03     0.541909E+00
2006     0.283568E+03     0.166496E+03     0.532484E+00
2007     0.135474E+03     0.221281E+03    -0.490656E+00
2008     0.396500E+03     0.451852E+03    -0.130678E+00

Survey Index:   40 Tag:         sp_canpo AGE =  8
Time = JAN-1           Type = NUMBER
Catchability =    0.127804E-02   % Variance Contribution =     3.5252
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     N/A              0.104765E+00     N/A
1979     N/A              0.991198E+00     N/A
1980     N/A              0.731104E+00     N/A
1981     N/A              0.491612E+00     N/A
1982     N/A              0.546696E+00     N/A
1983     N/A              0.835909E+00     N/A
1984     N/A              0.169704E+00     N/A
1985     N/A              0.513145E+00     N/A
1986     N/A              0.261945E+00     N/A
1987     N/A              0.224344E+00     N/A
1988     N/A              0.543048E+00     N/A
1989     N/A              0.150769E+00     N/A
1990     N/A              0.112683E+00     N/A
1991     N/A              0.227094E+00     N/A
1992     N/A              0.168146E+00     N/A
1993     N/A              0.267199E+00     N/A
1994     N/A              0.943439E-01     N/A
1995     0.500000E-01     0.680492E-01    -0.308208E+00
1996     0.800000E-01     0.461655E-01     0.549793E+00
1997     0.300000E-01     0.444297E-01    -0.392711E+00
1998     0.200000E-01     0.379442E-01    -0.640385E+00
1999     0.100000E-01     0.477752E-01    -0.156392E+01
2000     0.240000E+00     0.106825E+00     0.809447E+00
2001     0.170000E+00     0.688585E-01     0.903745E+00
2002     0.170000E+00     0.439352E-01     0.135308E+01
2003     0.160000E+00     0.748417E-01     0.759798E+00
2004     0.117500E+00     0.102468E+00     0.136890E+00
2005     0.100000E-01     0.406401E-01    -0.140217E+01
2006     0.185000E+00     0.894892E-01     0.726237E+00
2007     0.757000E-01     0.559019E-01     0.303179E+00
2008     0.300000E-01     0.103128E+00    -0.123478E+01

Survey Index:   41 Tag:         us0autpr AGE =  1
Time = JAN-1           Type = NUMBER
Catchability =    0.163752E-01   % Variance Contribution =     3.3522
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.207096E+03     0.470051E+03    -0.819657E+00
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1979     0.540008E+03     0.424815E+03     0.239931E+00
1980     0.156415E+03     0.375214E+03    -0.874982E+00
1981     0.382090E+03     0.751469E+03    -0.676373E+00
1982     0.356545E+03     0.325259E+03     0.918379E-01
1983     0.494518E+03     0.185127E+03     0.982541E+00
1984     0.175253E+04     0.475219E+03     0.130504E+01
1985     0.244663E+03     0.157452E+03     0.440763E+00
1986     0.136867E+04     0.728787E+03     0.630211E+00
1987     0.103958E+03     0.293085E+03    -0.103647E+01
1988     0.278269E+03     0.406995E+03    -0.380214E+00
1989     0.750656E+03     0.292277E+03     0.943247E+00
1990     0.342611E+03     0.167096E+03     0.718028E+00
1991     0.214610E+03     0.324168E+03    -0.412439E+00
1992     0.553259E+02     0.122319E+03    -0.793389E+00
1993     0.479491E+02     0.161642E+03    -0.121524E+01
1994     0.243707E+03     0.103420E+03     0.857172E+00
1995     N/A              0.642773E+02     N/A
1996     N/A              0.109312E+03     N/A
1997     N/A              0.173921E+03     N/A
1998     N/A              0.809629E+02     N/A
1999     N/A              0.200332E+03     N/A
2000     N/A              0.978720E+02     N/A
2001     N/A              0.375819E+02     N/A
2002     N/A              0.694223E+02     N/A
2003     N/A              0.239289E+02     N/A
2004     N/A              0.176878E+03     N/A
2005     N/A              0.413079E+02     N/A
2006     N/A              0.106273E+03     N/A
2007     N/A              0.115231E+03     N/A
2008     N/A              0.798238E+02     N/A

Survey Index:   42 Tag:         us1autpr AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.811005E-01   % Variance Contribution =     1.6827
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.323486E+03     0.381735E+03    -0.165573E+00
1979     0.252095E+04     0.189489E+04     0.285473E+00
1980     0.222000E+04     0.170212E+04     0.265634E+00
1981     0.112004E+04     0.149655E+04    -0.289797E+00
1982     0.481540E+04     0.295784E+04     0.487362E+00
1983     0.788633E+03     0.126212E+04    -0.470246E+00
1984     0.116048E+04     0.704839E+03     0.498617E+00
1985     0.260797E+04     0.190638E+04     0.313366E+00
1986     0.247669E+03     0.625558E+03    -0.926552E+00
1987     0.311314E+04     0.289887E+04     0.713103E-01
1988     0.565144E+03     0.118082E+04    -0.736882E+00
1989     0.119490E+04     0.162652E+04    -0.308377E+00
1990     0.382281E+04     0.111989E+04     0.122775E+01
1991     0.496704E+03     0.672293E+03    -0.302701E+00
1992     0.556811E+03     0.129405E+04    -0.843304E+00
1993     0.563368E+03     0.481950E+03     0.156093E+00
1994     0.132495E+04     0.633530E+03     0.737824E+00
```

| | | | |
|---|---|---|---|
| 1995 | N/A | 0.412440E+03 | N/A |
| 1996 | N/A | 0.258270E+03 | N/A |
| 1997 | N/A | 0.438494E+03 | N/A |
| 1998 | N/A | 0.695932E+03 | N/A |
| 1999 | N/A | 0.323658E+03 | N/A |
| 2000 | N/A | 0.808828E+03 | N/A |
| 2001 | N/A | 0.388547E+03 | N/A |
| 2002 | N/A | 0.151533E+03 | N/A |
| 2003 | N/A | 0.279037E+03 | N/A |
| 2004 | N/A | 0.957835E+02 | N/A |
| 2005 | N/A | 0.713517E+03 | N/A |
| 2006 | N/A | 0.166597E+03 | N/A |
| 2007 | N/A | 0.428522E+03 | N/A |
| 2008 | N/A | 0.466470E+03 | N/A |

Survey Index: 43 Tag: us2autpr AGE = 3
Time = JAN-1 Type = NUMBER
Catchability = 0.119082E+00 % Variance Contribution = 1.9147
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.469041E+04 | 0.301665E+04 | 0.441371E+00 |
| 1979 | 0.534407E+03 | 0.414148E+03 | 0.254934E+00 |
| 1980 | 0.229090E+04 | 0.203717E+04 | 0.117386E+00 |
| 1981 | 0.769918E+03 | 0.159216E+04 | -0.726563E+00 |
| 1982 | 0.307366E+04 | 0.138027E+04 | 0.800592E+00 |
| 1983 | 0.260851E+04 | 0.243794E+04 | 0.676275E-01 |
| 1984 | 0.148806E+04 | 0.964044E+03 | 0.434093E+00 |
| 1985 | 0.931388E+03 | 0.681445E+03 | 0.312459E+00 |
| 1986 | 0.115105E+04 | 0.149668E+04 | -0.262576E+00 |
| 1987 | 0.175540E+03 | 0.581276E+03 | -0.119736E+01 |
| 1988 | 0.184802E+04 | 0.263304E+04 | -0.354025E+00 |
| 1989 | 0.596973E+03 | 0.116734E+04 | -0.670609E+00 |
| 1990 | 0.142946E+04 | 0.167545E+04 | -0.158786E+00 |
| 1991 | 0.221905E+04 | 0.753787E+03 | 0.107972E+01 |
| 1992 | 0.239336E+03 | 0.598096E+03 | -0.915885E+00 |
| 1993 | 0.129627E+04 | 0.104184E+04 | 0.218502E+00 |
| 1994 | 0.726204E+03 | 0.415182E+03 | 0.559114E+00 |
| 1995 | N/A | 0.695592E+03 | N/A |
| 1996 | N/A | 0.425775E+03 | N/A |
| 1997 | N/A | 0.279631E+03 | N/A |
| 1998 | N/A | 0.453617E+03 | N/A |
| 1999 | N/A | 0.737982E+03 | N/A |
| 2000 | N/A | 0.350827E+03 | N/A |
| 2001 | N/A | 0.871067E+03 | N/A |
| 2002 | N/A | 0.389898E+03 | N/A |
| 2003 | N/A | 0.170025E+03 | N/A |
| 2004 | N/A | 0.313818E+03 | N/A |
| 2005 | N/A | 0.107686E+03 | N/A |
| 2006 | N/A | 0.818626E+03 | N/A |
| 2007 | N/A | 0.192784E+03 | N/A |
| 2008 | N/A | 0.458669E+03 | N/A |

Survey Index: 44 Tag: us3autpr AGE = 4

```
Time = JAN-1           Type = NUMBER
Catchability =    0.126944E+00   % Variance Contribution =     2.6588
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.943682E+03     0.972437E+03    -0.300155E-01
1979     0.554311E+04     0.170963E+04     0.117628E+01
1980     0.221440E+03     0.252758E+03    -0.132281E+00
1981     0.105720E+04     0.110049E+04    -0.401295E-01
1982     0.212971E+04     0.850669E+03     0.917716E+00
1983     0.330316E+03     0.700709E+03    -0.752042E+00
1984     0.101117E+04     0.113440E+04    -0.114997E+00
1985     0.126867E+04     0.445855E+03     0.104573E+01
1986     0.911170E+02     0.261877E+03    -0.105573E+01
1987     0.449438E+03     0.785902E+03    -0.558836E+00
1988     0.147536E+03     0.334737E+03    -0.819275E+00
1989     0.123466E+04     0.134691E+04    -0.870210E-01
1990     0.220074E+03     0.673435E+03    -0.111843E+01
1991     0.247819E+04     0.851609E+03     0.106816E+01
1992     0.374577E+03     0.263475E+03     0.351839E+00
1993     0.238106E+03     0.262782E+03    -0.986068E-01
1994     0.522659E+03     0.408009E+03     0.247641E+00
1995     N/A              0.187294E+03     N/A
1996     N/A              0.444084E+03     N/A
1997     N/A              0.259149E+03     N/A
1998     N/A              0.158710E+03     N/A
1999     N/A              0.246826E+03     N/A
2000     N/A              0.413947E+03     N/A
2001     N/A              0.221668E+03     N/A
2002     N/A              0.456954E+03     N/A
2003     N/A              0.205799E+03     N/A
2004     N/A              0.102307E+03     N/A
2005     N/A              0.224254E+03     N/A
2006     N/A              0.709534E+02     N/A
2007     N/A              0.618071E+03     N/A
2008     N/A              0.123174E+03     N/A

Survey Index:   45 Tag:         us4autpr AGE =  5
Time = JAN-1           Type = NUMBER
Catchability =    0.886514E-01   % Variance Contribution =     4.9511
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual

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

1978     0.345343E+03     0.263015E+03     0.272327E+00
1979     0.131635E+04     0.362808E+03     0.128874E+01
1980     0.230388E+04     0.613153E+03     0.132373E+01
1981     0.717188E+02     0.101139E+03    -0.343742E+00
1982     0.804616E+03     0.415633E+03     0.660562E+00
1983     0.926196E+02     0.249712E+03    -0.991806E+00
1984     0.943955E+02     0.188630E+03    -0.692296E+00
1985     0.112715E+04     0.384359E+03     0.107587E+01
```

| | | | |
|---|---|---|---|
| 1986 | 0.144120E+03 | 0.121222E+03 | 0.173027E+00 |
| 1987 | 0.112018E+02 | 0.815329E+02 | -0.198493E+01 |
| 1988 | 0.273624E+03 | 0.276951E+03 | -0.120861E-01 |
| 1989 | 0.819643E+02 | 0.106207E+03 | -0.259105E+00 |
| 1990 | 0.692735E+03 | 0.432643E+03 | 0.470734E+00 |
| 1991 | 0.563368E+03 | 0.229110E+03 | 0.899732E+00 |
| 1992 | 0.416652E+02 | 0.236805E+03 | -0.173757E+01 |
| 1993 | 0.136607E+03 | 0.660536E+02 | 0.726642E+00 |
| 1994 | 0.225402E+02 | 0.537923E+02 | -0.869831E+00 |
| 1995 | N/A | 0.769469E+02 | N/A |
| 1996 | N/A | 0.540421E+02 | N/A |
| 1997 | N/A | 0.153071E+03 | N/A |
| 1998 | N/A | 0.674813E+02 | N/A |
| 1999 | N/A | 0.515287E+02 | N/A |
| 2000 | N/A | 0.735774E+02 | N/A |
| 2001 | N/A | 0.144823E+03 | N/A |
| 2002 | N/A | 0.671790E+02 | N/A |
| 2003 | N/A | 0.141078E+03 | N/A |
| 2004 | N/A | 0.543551E+02 | N/A |
| 2005 | N/A | 0.378151E+02 | N/A |
| 2006 | N/A | 0.822402E+02 | N/A |
| 2007 | N/A | 0.240314E+02 | N/A |
| 2008 | N/A | 0.259710E+03 | N/A |

Survey Index: 46 Tag: us5autpr AGE = 6
Time = JAN-1 Type = NUMBER
Catchability = 0.104097E+00 % Variance Contribution = 2.0355
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | 0.236467E+03 | 0.131560E+03 | 0.586346E+00 |
| 1979 | 0.458317E+03 | 0.169087E+03 | 0.997149E+00 |
| 1980 | 0.437962E+03 | 0.236037E+03 | 0.618143E+00 |
| 1981 | 0.361736E+03 | 0.359601E+03 | 0.591760E-02 |
| 1982 | 0.737679E+02 | 0.675192E+02 | 0.885110E-01 |
| 1983 | 0.157371E+03 | 0.209796E+03 | -0.287527E+00 |
| 1984 | 0.448071E+02 | 0.132490E+03 | -0.108414E+01 |
| 1985 | 0.330589E+02 | 0.953821E+02 | -0.105960E+01 |
| 1986 | 0.104641E+03 | 0.174673E+03 | -0.512381E+00 |
| 1987 | 0.665277E+02 | 0.675865E+02 | -0.157893E-01 |
| 1988 | 0.382500E+02 | 0.504070E+02 | -0.275986E+00 |
| 1989 | 0.264608E+03 | 0.120020E+03 | 0.790594E+00 |
| 1990 | 0.747241E+02 | 0.662996E+02 | 0.119619E+00 |
| 1991 | 0.390013E+03 | 0.204756E+03 | 0.644364E+00 |
| 1992 | 0.396161E+02 | 0.867047E+02 | -0.783272E+00 |
| 1993 | 0.596973E+02 | 0.887614E+02 | -0.396665E+00 |
| 1994 | 0.345616E+02 | 0.196490E+02 | 0.564717E+00 |
| 1995 | N/A | 0.125894E+02 | N/A |
| 1996 | N/A | 0.384119E+02 | N/A |
| 1997 | N/A | 0.280971E+02 | N/A |
| 1998 | N/A | 0.652369E+02 | N/A |
| 1999 | N/A | 0.290896E+02 | N/A |
| 2000 | N/A | 0.229273E+02 | N/A |
| 2001 | N/A | 0.413025E+02 | N/A |

```
2002     N/A              0.742061E+02     N/A
2003     N/A              0.306429E+02     N/A
2004     N/A              0.513663E+02     N/A
2005     N/A              0.231623E+02     N/A
2006     N/A              0.228705E+02     N/A
2007     N/A              0.449574E+02     N/A
2008     N/A              0.163806E+02     N/A

Survey Index:   47 Tag:         us0autpo AGE =  1
Time = JAN-1           Type = NUMBER
Catchability =    0.201548E-01   % Variance Contribution =    10.2185
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
```

---

```
1978     N/A              0.578545E+03     N/A
1979     N/A              0.522867E+03     N/A
1980     N/A              0.461818E+03     N/A
1981     N/A              0.924917E+03     N/A
1982     N/A              0.400333E+03     N/A
1983     N/A              0.227857E+03     N/A
1984     N/A              0.584905E+03     N/A
1985     N/A              0.193794E+03     N/A
1986     N/A              0.897000E+03     N/A
1987     N/A              0.360732E+03     N/A
1988     N/A              0.500935E+03     N/A
1989     N/A              0.359738E+03     N/A
1990     N/A              0.205664E+03     N/A
1991     N/A              0.398989E+03     N/A
1992     N/A              0.150551E+03     N/A
1993     N/A              0.198951E+03     N/A
1994     N/A              0.127290E+03     N/A
1995     0.912536E+02     0.791133E+02      0.142762E+00
1996     0.218435E+03     0.134543E+03      0.484604E+00
1997     0.295071E+02     0.214064E+03     -0.198164E+01
1998     0.874290E+01     0.996501E+02     -0.243342E+01
1999     0.957616E+02     0.246572E+03     -0.945791E+00
2000     0.957616E+02     0.120462E+03     -0.229473E+00
2001     0.266384E+02     0.462563E+02     -0.551843E+00
2002     0.387964E+02     0.854458E+02     -0.789555E+00
2003     0.319661E+03     0.294520E+02      0.238450E+01
2004     0.446569E+03     0.217703E+03      0.718462E+00
2005     0.230224E+04     0.508423E+02      0.381291E+01
2006     0.711723E+02     0.130803E+03     -0.608585E+00
2007     0.135787E+03     0.141827E+03     -0.435200E-01
2008     0.102319E+03     0.982481E+02      0.405978E-01

Survey Index:   48 Tag:         us1autpo AGE =  2
Time = JAN-1           Type = NUMBER
Catchability =    0.741493E-01   % Variance Contribution =     2.3641
Residual = LN(Observed) - LN(Predicted)

Year      Observed        Predicted         Residual
```

---

| | | | |
|---|---|---|---|
| 1978 | N/A | 0.349017E+03 | N/A |
| 1979 | N/A | 0.173248E+04 | N/A |
| 1980 | N/A | 0.155623E+04 | N/A |
| 1981 | N/A | 0.136828E+04 | N/A |
| 1982 | N/A | 0.270432E+04 | N/A |
| 1983 | N/A | 0.115394E+04 | N/A |
| 1984 | N/A | 0.644427E+03 | N/A |
| 1985 | N/A | 0.174298E+04 | N/A |
| 1986 | N/A | 0.571941E+03 | N/A |
| 1987 | N/A | 0.265041E+04 | N/A |
| 1988 | N/A | 0.107961E+04 | N/A |
| 1989 | N/A | 0.148711E+04 | N/A |
| 1990 | N/A | 0.102391E+04 | N/A |
| 1991 | N/A | 0.614670E+03 | N/A |
| 1992 | N/A | 0.118313E+04 | N/A |
| 1993 | N/A | 0.440641E+03 | N/A |
| 1994 | N/A | 0.579230E+03 | N/A |
| 1995 | 0.554079E+03 | 0.377089E+03 | 0.384824E+00 |
| 1996 | 0.334278E+03 | 0.236134E+03 | 0.347573E+00 |
| 1997 | 0.327721E+03 | 0.400910E+03 | -0.201576E+00 |
| 1998 | 0.322666E+03 | 0.636283E+03 | -0.679026E+00 |
| 1999 | 0.458317E+03 | 0.295917E+03 | 0.437482E+00 |
| 2000 | 0.190840E+03 | 0.739503E+03 | -0.135454E+01 |
| 2001 | 0.780027E+03 | 0.355244E+03 | 0.786524E+00 |
| 2002 | 0.643420E+02 | 0.138545E+03 | -0.766981E+00 |
| 2003 | 0.652982E+03 | 0.255121E+03 | 0.939812E+00 |
| 2004 | 0.227178E+03 | 0.875738E+02 | 0.953251E+00 |
| 2005 | 0.101745E+04 | 0.652361E+03 | 0.444457E+00 |
| 2006 | 0.755438E+02 | 0.152318E+03 | -0.701258E+00 |
| 2007 | 0.590826E+03 | 0.391793E+03 | 0.410787E+00 |
| 2008 | 0.156688E+03 | 0.426488E+03 | -0.100133E+01 |

Survey Index:  49 Tag:  us2autpo AGE =  3
Time = JAN-1  Type = NUMBER
Catchability =  0.162972E+00  % Variance Contribution =  1.9241
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.412850E+04 | N/A |
| 1979 | N/A | 0.566792E+03 | N/A |
| 1980 | N/A | 0.278801E+04 | N/A |
| 1981 | N/A | 0.217898E+04 | N/A |
| 1982 | N/A | 0.188899E+04 | N/A |
| 1983 | N/A | 0.333649E+04 | N/A |
| 1984 | N/A | 0.131936E+04 | N/A |
| 1985 | N/A | 0.932606E+03 | N/A |
| 1986 | N/A | 0.204832E+04 | N/A |
| 1987 | N/A | 0.795518E+03 | N/A |
| 1988 | N/A | 0.360351E+04 | N/A |
| 1989 | N/A | 0.159758E+04 | N/A |
| 1990 | N/A | 0.229297E+04 | N/A |
| 1991 | N/A | 0.103161E+04 | N/A |
| 1992 | N/A | 0.818537E+03 | N/A |

| | | | |
|---|---|---|---|
| 1993 | N/A | 0.142583E+04 | N/A |
| 1994 | N/A | 0.568206E+03 | N/A |
| 1995 | 0.907481E+03 | 0.951967E+03 | -0.478571E-01 |
| 1996 | 0.247341E+04 | 0.582703E+03 | 0.144568E+01 |
| 1997 | 0.267477E+03 | 0.382695E+03 | -0.358206E+00 |
| 1998 | 0.438372E+03 | 0.620807E+03 | -0.347951E+00 |
| 1999 | 0.140186E+04 | 0.100998E+04 | 0.327870E+00 |
| 2000 | 0.210648E+03 | 0.480132E+03 | -0.823872E+00 |
| 2001 | 0.734673E+03 | 0.119212E+04 | -0.484060E+00 |
| 2002 | 0.520200E+03 | 0.533604E+03 | -0.254400E-01 |
| 2003 | 0.965812E+03 | 0.232692E+03 | 0.142326E+01 |
| 2004 | 0.422389E+03 | 0.429482E+03 | -0.166521E-01 |
| 2005 | 0.185512E+03 | 0.147376E+03 | 0.230138E+00 |
| 2006 | 0.791502E+03 | 0.112035E+04 | -0.347462E+00 |
| 2007 | 0.221030E+03 | 0.263838E+03 | -0.177035E+00 |
| 2008 | 0.282504E+03 | 0.627721E+03 | -0.798405E+00 |

Survey Index: 50 Tag: us3autpo AGE = 4
Time = JAN-1 Type = NUMBER
Catchability = 0.233271E+00 % Variance Contribution = 2.7971
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.178695E+04 | N/A |
| 1979 | N/A | 0.314161E+04 | N/A |
| 1980 | N/A | 0.464468E+03 | N/A |
| 1981 | N/A | 0.202226E+04 | N/A |
| 1982 | N/A | 0.156319E+04 | N/A |
| 1983 | N/A | 0.128762E+04 | N/A |
| 1984 | N/A | 0.208457E+04 | N/A |
| 1985 | N/A | 0.819302E+03 | N/A |
| 1986 | N/A | 0.481224E+03 | N/A |
| 1987 | N/A | 0.144417E+04 | N/A |
| 1988 | N/A | 0.615112E+03 | N/A |
| 1989 | N/A | 0.247508E+04 | N/A |
| 1990 | N/A | 0.123750E+04 | N/A |
| 1991 | N/A | 0.156491E+04 | N/A |
| 1992 | N/A | 0.484161E+03 | N/A |
| 1993 | N/A | 0.482887E+03 | N/A |
| 1994 | N/A | 0.749755E+03 | N/A |
| 1995 | 0.592055E+03 | 0.344171E+03 | 0.542461E+00 |
| 1996 | 0.170554E+04 | 0.816047E+03 | 0.737165E+00 |
| 1997 | 0.566100E+03 | 0.476211E+03 | 0.172910E+00 |
| 1998 | 0.149312E+03 | 0.291646E+03 | -0.669504E+00 |
| 1999 | 0.480584E+03 | 0.453566E+03 | 0.578607E-01 |
| 2000 | 0.422936E+03 | 0.760668E+03 | -0.586977E+00 |
| 2001 | 0.963080E+02 | 0.407336E+03 | -0.144209E+01 |
| 2002 | 0.627027E+03 | 0.839697E+03 | -0.292052E+00 |
| 2003 | 0.190704E+04 | 0.378175E+03 | 0.161795E+01 |
| 2004 | 0.273897E+03 | 0.187999E+03 | 0.376314E+00 |
| 2005 | 0.970047E+03 | 0.412088E+03 | 0.856108E+00 |
| 2006 | 0.176087E+03 | 0.130384E+03 | 0.300494E+00 |
| 2007 | 0.702434E+03 | 0.113577E+04 | -0.480511E+00 |
| 2008 | 0.688500E+02 | 0.226345E+03 | -0.119013E+01 |

Survey Index:  51 Tag:  us4autpo AGE =  5
Time = JAN-1  Type = NUMBER
Catchability =  0.211986E+00  % Variance Contribution =  3.2650
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.628928E+03 | N/A |
| 1979 | N/A | 0.867557E+03 | N/A |
| 1980 | N/A | 0.146619E+04 | N/A |
| 1981 | N/A | 0.241846E+03 | N/A |
| 1982 | N/A | 0.993874E+03 | N/A |
| 1983 | N/A | 0.597117E+03 | N/A |
| 1984 | N/A | 0.451058E+03 | N/A |
| 1985 | N/A | 0.919090E+03 | N/A |
| 1986 | N/A | 0.289869E+03 | N/A |
| 1987 | N/A | 0.194964E+03 | N/A |
| 1988 | N/A | 0.662253E+03 | N/A |
| 1989 | N/A | 0.253965E+03 | N/A |
| 1990 | N/A | 0.103455E+04 | N/A |
| 1991 | N/A | 0.547853E+03 | N/A |
| 1992 | N/A | 0.566254E+03 | N/A |
| 1993 | N/A | 0.157949E+03 | N/A |
| 1994 | N/A | 0.128630E+03 | N/A |
| 1995 | 0.209555E+03 | 0.183998E+03 | 0.130065E+00 |
| 1996 | 0.119121E+03 | 0.129227E+03 | -0.814277E-01 |
| 1997 | 0.195348E+03 | 0.366027E+03 | -0.627925E+00 |
| 1998 | 0.176496E+03 | 0.161363E+03 | 0.896428E-01 |
| 1999 | 0.561455E+02 | 0.123217E+03 | -0.786000E+00 |
| 2000 | 0.348212E+03 | 0.175940E+03 | 0.682665E+00 |
| 2001 | 0.107646E+03 | 0.346305E+03 | -0.116847E+01 |
| 2002 | 0.811446E+02 | 0.160640E+03 | -0.682935E+00 |
| 2003 | 0.222260E+04 | 0.337349E+03 | 0.188531E+01 |
| 2004 | 0.212561E+03 | 0.129976E+03 | 0.491882E+00 |
| 2005 | 0.344250E+03 | 0.904246E+02 | 0.133685E+01 |
| 2006 | 0.239882E+03 | 0.196655E+03 | 0.198696E+00 |
| 2007 | 0.461732E+02 | 0.574644E+02 | -0.218767E+00 |
| 2008 | 0.177999E+03 | 0.621027E+03 | -0.124960E+01 |

Survey Index:  52 Tag:  us5autpo AGE =  6
Time = JAN-1  Type = NUMBER
Catchability =  0.253043E+00  % Variance Contribution =  3.6646
Residual = LN(Observed) - LN(Predicted)

| Year | Observed | Predicted | Residual |
|---|---|---|---|
| 1978 | N/A | 0.319802E+03 | N/A |
| 1979 | N/A | 0.411024E+03 | N/A |
| 1980 | N/A | 0.573771E+03 | N/A |
| 1981 | N/A | 0.874135E+03 | N/A |
| 1982 | N/A | 0.164129E+03 | N/A |
| 1983 | N/A | 0.509981E+03 | N/A |

| | | | |
|---|---|---|---|
| 1984 | N/A | 0.322062E+03 | N/A |
| 1985 | N/A | 0.231859E+03 | N/A |
| 1986 | N/A | 0.424604E+03 | N/A |
| 1987 | N/A | 0.164292E+03 | N/A |
| 1988 | N/A | 0.122532E+03 | N/A |
| 1989 | N/A | 0.291749E+03 | N/A |
| 1990 | N/A | 0.161164E+03 | N/A |
| 1991 | N/A | 0.497729E+03 | N/A |
| 1992 | N/A | 0.210766E+03 | N/A |
| 1993 | N/A | 0.215765E+03 | N/A |
| 1994 | N/A | 0.477637E+02 | N/A |
| 1995 | 0.927563E+02 | 0.306029E+02 | 0.110888E+01 |
| 1996 | 0.739045E+02 | 0.933734E+02 | -0.233833E+00 |
| 1997 | 0.815545E+02 | 0.682996E+02 | 0.177367E+00 |
| 1998 | 0.663911E+02 | 0.158581E+03 | -0.870701E+00 |
| 1999 | 0.483589E+02 | 0.707124E+02 | -0.379970E+00 |
| 2000 | 0.118985E+03 | 0.557327E+02 | 0.758429E+00 |
| 2001 | 0.418018E+02 | 0.100400E+03 | -0.876222E+00 |
| 2002 | 0.745875E+02 | 0.180383E+03 | -0.883112E+00 |
| 2003 | 0.161196E+03 | 0.744881E+02 | 0.771984E+00 |
| 2004 | 0.112564E+03 | 0.124863E+03 | -0.103696E+00 |
| 2005 | 0.439192E+03 | 0.563041E+02 | 0.205417E+01 |
| 2006 | 0.353813E+02 | 0.555946E+02 | -0.451902E+00 |
| 2007 | 0.170486E+03 | 0.109285E+03 | 0.444697E+00 |
| 2008 | 0.874290E+01 | 0.398186E+02 | -0.151609E+01 |

Bootstrap Summary Report

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 1 | 4875. | 6694. | 5979. | 0.8932 |
| N 2 | 5752. | 6358. | 2707. | 0.4257 |
| N 3 | 3852. | 4065. | 1293. | 0.3181 |
| N 4 | 970. | 1003. | 303. | 0.3015 |
| N 5 | 2930. | 3019. | 841. | 0.2787 |
| N 6 | 157. | 165. | 50. | 0.3014 |
| N 7 | 238. | 251. | 96. | 0.3835 |
| N 8 | 81. | 85. | 36. | 0.4197 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| N 1 | 1819. | 198. | 37.3120 | 3056. | 1.9565 |
| N 2 | 606. | 88. | 10.5393 | 5146. | 0.5260 |
| N 3 | 214. | 41. | 5.5481 | 3638. | 0.3555 |
| N 4 | 33. | 10. | 3.4200 | 937. | 0.3228 |
| N 5 | 89. | 27. | 3.0394 | 2841. | 0.2961 |
| N 6 | 7. | 2. | 4.6315 | 150. | 0.3306 |
| N 7 | 13. | 3. | 5.5863 | 224. | 0.4289 |
| N 8 | 4. | 1. | 5.4608 | 76. | 0.4682 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| N 1 | 1954. | 13428. |
| N 2 | 3484. | 9918. |
| N 3 | 2596. | 5739. |
| N 4 | 653. | 1395. |
| N 5 | 2031. | 4074. |
| N 6 | 108. | 229. |
| N 7 | 138. | 379. |
| N 8 | 44. | 130. |

Bootstrap Output Variable: Catchability Estimates

| | NLLS Estimate | Bootstrap Mean | Bootstrap Std Error | C.V. For NLLS Soln. |
|---|---|---|---|---|
| Q 1 | 0.178394E-01 | 0.187930E-01 | 0.627300E-02 | 0.3338 |
| Q 2 | 0.918544E-01 | 0.923297E-01 | 0.108349E-01 | 0.1174 |
| Q 3 | 0.168705E+00 | 0.170720E+00 | 0.280406E-01 | 0.1642 |
| Q 4 | 0.215614E+00 | 0.218945E+00 | 0.436434E-01 | 0.1993 |
| Q 5 | 0.264241E+00 | 0.273535E+00 | 0.598480E-01 | 0.2188 |
| Q 6 | 0.278657E+00 | 0.282841E+00 | 0.530001E-01 | 0.1874 |
| Q 7 | 0.297561E+00 | 0.304346E+00 | 0.543058E-01 | 0.1784 |
| Q 8 | 0.363074E+00 | 0.364229E+00 | 0.660452E-01 | 0.1813 |
| Q 9 | 0.292985E-01 | 0.295983E-01 | 0.641135E-02 | 0.2166 |
| Q 10 | 0.101150E+00 | 0.101495E+00 | 0.986629E-02 | 0.0972 |
| Q 11 | 0.225276E+00 | 0.225825E+00 | 0.266989E-01 | 0.1182 |
| Q 12 | 0.506259E+00 | 0.512075E+00 | 0.850898E-01 | 0.1662 |
| Q 13 | 0.688799E+00 | 0.698933E+00 | 0.118738E+00 | 0.1699 |
| Q 14 | 0.701770E+00 | 0.711636E+00 | 0.121819E+00 | 0.1712 |
| Q 15 | 0.723118E+00 | 0.751632E+00 | 0.191788E+00 | 0.2552 |
| Q 16 | 0.816798E+00 | 0.830399E+00 | 0.170318E+00 | 0.2051 |
| Q 17 | 0.141338E-01 | 0.179475E-01 | 0.154487E-01 | 0.8608 |
| Q 18 | 0.899870E-01 | 0.918702E-01 | 0.202105E-01 | 0.2200 |
| Q 19 | 0.198731E+00 | 0.204879E+00 | 0.453433E-01 | 0.2213 |
| Q 20 | 0.177261E+00 | 0.177987E+00 | 0.220123E-01 | 0.1237 |
| Q 21 | 0.216299E+00 | 0.224095E+00 | 0.553287E-01 | 0.2469 |
| Q 22 | 0.207689E+00 | 0.210823E+00 | 0.352334E-01 | 0.1671 |
| Q 23 | 0.300243E+00 | 0.323287E+00 | 0.122228E+00 | 0.3781 |
| Q 24 | 0.291472E+00 | 0.338867E+00 | 0.202053E+00 | 0.5963 |
| Q 25 | 0.358799E-01 | 0.376050E-01 | 0.123109E-01 | 0.3274 |
| Q 26 | 0.187587E+00 | 0.191192E+00 | 0.383436E-01 | 0.2006 |
| Q 27 | 0.324684E+00 | 0.325478E+00 | 0.353214E-01 | 0.1085 |
| Q 28 | 0.372132E+00 | 0.373357E+00 | 0.465633E-01 | 0.1247 |
| Q 29 | 0.580779E+00 | 0.584819E+00 | 0.673329E-01 | 0.1151 |
| Q 30 | 0.555873E+00 | 0.565143E+00 | 0.117326E+00 | 0.2076 |
| Q 31 | 0.730017E+00 | 0.755580E+00 | 0.222638E+00 | 0.2947 |
| Q 32 | 0.644843E-03 | 0.657234E-03 | 0.169703E-03 | 0.2582 |
| Q 33 | 0.158633E-01 | 0.166693E-01 | 0.623586E-02 | 0.3741 |
| Q 34 | 0.779414E-01 | 0.816357E-01 | 0.211843E-01 | 0.2595 |
| Q 35 | 0.362628E+00 | 0.364545E+00 | 0.524685E-01 | 0.1439 |
| Q 36 | 0.888325E+00 | 0.893783E+00 | 0.130016E+00 | 0.1455 |
| Q 37 | 0.140774E+01 | 0.141534E+01 | 0.184223E+00 | 0.1302 |
| Q 38 | 0.193422E+01 | 0.195304E+01 | 0.293137E+00 | 0.1501 |
| Q 39 | 0.190133E+01 | 0.196087E+01 | 0.399811E+00 | 0.2039 |
| Q 40 | 0.127804E-02 | 0.129603E-02 | 0.300947E-03 | 0.2322 |
| Q 41 | 0.163752E-01 | 0.167592E-01 | 0.307154E-02 | 0.1833 |
| Q 42 | 0.811005E-01 | 0.818014E-01 | 0.110507E-01 | 0.1351 |
| Q 43 | 0.119082E+00 | 0.120320E+00 | 0.175370E-01 | 0.1458 |
| Q 44 | 0.126944E+00 | 0.128267E+00 | 0.225092E-01 | 0.1755 |
| Q 45 | 0.886514E-01 | 0.904213E-01 | 0.206588E-01 | 0.2285 |
| Q 46 | 0.104097E+00 | 0.105532E+00 | 0.157620E-01 | 0.1494 |
| Q 47 | 0.201548E-01 | 0.219539E-01 | 0.100801E-01 | 0.4591 |
| Q 48 | 0.741493E-01 | 0.754117E-01 | 0.151957E-01 | 0.2015 |
| Q 49 | 0.162972E+00 | 0.163349E+00 | 0.290142E-01 | 0.1776 |

| | | | | |
|---|---|---|---|---|
| Q 50 | 0.233271E+00 | 0.236413E+00 | 0.505131E-01 | 0.2137 |
| Q 51 | 0.211986E+00 | 0.217195E+00 | 0.523856E-01 | 0.2412 |
| Q 52 | 0.253043E+00 | 0.262837E+00 | 0.658035E-01 | 0.2504 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| Q 1 | 0.9536E-03 | 0.2007E-03 | 5.3453 | 0.1689E-01 | 0.3715 |
| Q 2 | 0.4753E-03 | 0.3430E-03 | 0.5175 | 0.9138E-01 | 0.1186 |
| Q 3 | 0.2015E-02 | 0.8890E-03 | 1.1946 | 0.1667E+00 | 0.1682 |
| Q 4 | 0.3330E-02 | 0.1384E-02 | 1.5445 | 0.2123E+00 | 0.2056 |
| Q 5 | 0.9294E-02 | 0.1915E-02 | 3.5171 | 0.2549E+00 | 0.2347 |
| Q 6 | 0.4184E-02 | 0.1681E-02 | 1.5013 | 0.2745E+00 | 0.1931 |
| Q 7 | 0.6786E-02 | 0.1731E-02 | 2.2805 | 0.2908E+00 | 0.1868 |
| Q 8 | 0.1155E-02 | 0.2089E-02 | 0.3181 | 0.3619E+00 | 0.1825 |
| Q 9 | 0.2997E-03 | 0.2030E-03 | 1.0231 | 0.2900E-01 | 0.2211 |
| Q 10 | 0.3451E-03 | 0.3122E-03 | 0.3412 | 0.1008E+00 | 0.0979 |
| Q 11 | 0.5493E-03 | 0.8445E-03 | 0.2438 | 0.2247E+00 | 0.1188 |
| Q 12 | 0.5815E-02 | 0.2697E-02 | 1.1487 | 0.5004E+00 | 0.1700 |
| Q 13 | 0.1013E-01 | 0.3768E-02 | 1.4713 | 0.6787E+00 | 0.1750 |
| Q 14 | 0.9866E-02 | 0.3865E-02 | 1.4059 | 0.6919E+00 | 0.1761 |
| Q 15 | 0.2851E-01 | 0.6132E-02 | 3.9432 | 0.6946E+00 | 0.2761 |
| Q 16 | 0.1360E-01 | 0.5403E-02 | 1.6651 | 0.8032E+00 | 0.2121 |
| Q 17 | 0.3814E-02 | 0.5032E-03 | 26.9833 | 0.1032E-01 | 1.4970 |
| Q 18 | 0.1883E-02 | 0.6419E-03 | 2.0928 | 0.8810E-01 | 0.2294 |
| Q 19 | 0.6147E-02 | 0.1447E-02 | 3.0934 | 0.1926E+00 | 0.2354 |
| Q 20 | 0.7258E-03 | 0.6965E-03 | 0.4094 | 0.1765E+00 | 0.1247 |
| Q 21 | 0.7796E-02 | 0.1767E-02 | 3.6042 | 0.2085E+00 | 0.2654 |
| Q 22 | 0.3133E-02 | 0.1119E-02 | 1.5087 | 0.2046E+00 | 0.1722 |
| Q 23 | 0.2304E-01 | 0.3933E-02 | 7.6749 | 0.2772E+00 | 0.4409 |
| Q 24 | 0.4740E-01 | 0.6563E-02 | 16.2606 | 0.2441E+00 | 0.8278 |
| Q 25 | 0.1725E-02 | 0.3931E-03 | 4.8079 | 0.3415E-01 | 0.3604 |
| Q 26 | 0.3605E-02 | 0.1218E-02 | 1.9216 | 0.1840E+00 | 0.2084 |
| Q 27 | 0.7940E-03 | 0.1117E-02 | 0.2446 | 0.3239E+00 | 0.1091 |
| Q 28 | 0.1225E-02 | 0.1473E-02 | 0.3292 | 0.3709E+00 | 0.1255 |
| Q 29 | 0.4040E-02 | 0.2133E-02 | 0.6956 | 0.5767E+00 | 0.1167 |
| Q 30 | 0.9271E-02 | 0.3722E-02 | 1.6678 | 0.5466E+00 | 0.2146 |
| Q 31 | 0.2556E-01 | 0.7087E-02 | 3.5017 | 0.7045E+00 | 0.3160 |
| Q 32 | 0.1239E-04 | 0.5381E-05 | 1.9215 | 0.6325E-03 | 0.2683 |
| Q 33 | 0.8060E-03 | 0.1988E-03 | 5.0809 | 0.1506E-01 | 0.4141 |
| Q 34 | 0.3694E-02 | 0.6800E-03 | 4.7399 | 0.7425E-01 | 0.2853 |
| Q 35 | 0.1917E-02 | 0.1660E-02 | 0.5286 | 0.3607E+00 | 0.1455 |
| Q 36 | 0.5458E-02 | 0.4115E-02 | 0.6144 | 0.8829E+00 | 0.1473 |
| Q 37 | 0.7601E-02 | 0.5831E-02 | 0.5400 | 0.1400E+01 | 0.1316 |
| Q 38 | 0.1883E-01 | 0.9289E-02 | 0.9734 | 0.1915E+01 | 0.1530 |
| Q 39 | 0.5954E-01 | 0.1278E-01 | 3.1314 | 0.1842E+01 | 0.2171 |
| Q 40 | 0.1799E-04 | 0.9534E-05 | 1.4075 | 0.1260E-02 | 0.2388 |
| Q 41 | 0.3840E-03 | 0.9789E-04 | 2.3450 | 0.1599E-01 | 0.1921 |
| Q 42 | 0.7009E-03 | 0.3502E-03 | 0.8643 | 0.8040E-01 | 0.1374 |
| Q 43 | 0.1238E-02 | 0.5560E-03 | 1.0399 | 0.1178E+00 | 0.1488 |
| Q 44 | 0.1324E-02 | 0.7130E-03 | 1.0429 | 0.1256E+00 | 0.1792 |
| Q 45 | 0.1770E-02 | 0.6557E-03 | 1.9965 | 0.8688E-01 | 0.2378 |
| Q 46 | 0.1435E-02 | 0.5005E-03 | 1.3789 | 0.1027E+00 | 0.1535 |
| Q 47 | 0.1799E-02 | 0.3238E-03 | 8.9262 | 0.1836E-01 | 0.5492 |

| | | | | | |
|---|---|---|---|---|---|
| Q 48 | 0.1262E-02 | 0.4822E-03 | 1.7024 | 0.7289E-01 | 0.2085 |
| Q 49 | 0.3777E-03 | 0.9176E-03 | 0.2318 | 0.1626E+00 | 0.1784 |
| Q 50 | 0.3142E-02 | 0.1600E-02 | 1.3470 | 0.2301E+00 | 0.2195 |
| Q 51 | 0.5210E-02 | 0.1665E-02 | 2.4576 | 0.2068E+00 | 0.2533 |
| Q 52 | 0.9794E-02 | 0.2104E-02 | 3.8705 | 0.2432E+00 | 0.2705 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| Q 1 | 0.119738E-01 | 0.268905E-01 |
| Q 2 | 0.787491E-01 | 0.106205E+00 |
| Q 3 | 0.135282E+00 | 0.208162E+00 |
| Q 4 | 0.166710E+00 | 0.276879E+00 |
| Q 5 | 0.203211E+00 | 0.354625E+00 |
| Q 6 | 0.218803E+00 | 0.351076E+00 |
| Q 7 | 0.241163E+00 | 0.376140E+00 |
| Q 8 | 0.284267E+00 | 0.450136E+00 |
| Q 9 | 0.220487E-01 | 0.382057E-01 |
| Q 10 | 0.891654E-01 | 0.113979E+00 |
| Q 11 | 0.192796E+00 | 0.260044E+00 |
| Q 12 | 0.409531E+00 | 0.630641E+00 |
| Q 13 | 0.555093E+00 | 0.868470E+00 |
| Q 14 | 0.565726E+00 | 0.881835E+00 |
| Q 15 | 0.525975E+00 | 0.100552E+01 |
| Q 16 | 0.625795E+00 | 0.105897E+01 |
| Q 17 | 0.527488E-02 | 0.362726E-01 |
| Q 18 | 0.675451E-01 | 0.119442E+00 |
| Q 19 | 0.151073E+00 | 0.264704E+00 |
| Q 20 | 0.151667E+00 | 0.207328E+00 |
| Q 21 | 0.161290E+00 | 0.297728E+00 |
| Q 22 | 0.169228E+00 | 0.257906E+00 |
| Q 23 | 0.185918E+00 | 0.486119E+00 |
| Q 24 | 0.144110E+00 | 0.577096E+00 |
| Q 25 | 0.243866E-01 | 0.536093E-01 |
| Q 26 | 0.145636E+00 | 0.242102E+00 |
| Q 27 | 0.281805E+00 | 0.374254E+00 |
| Q 28 | 0.316473E+00 | 0.434718E+00 |
| Q 29 | 0.500193E+00 | 0.674773E+00 |
| Q 30 | 0.428176E+00 | 0.724742E+00 |
| Q 31 | 0.504484E+00 | 0.106412E+01 |
| Q 32 | 0.450307E-03 | 0.895896E-03 |
| Q 33 | 0.972364E-02 | 0.248184E-01 |
| Q 34 | 0.569554E-01 | 0.110027E+00 |
| Q 35 | 0.302125E+00 | 0.435224E+00 |
| Q 36 | 0.731529E+00 | 0.106845E+01 |
| Q 37 | 0.117973E+01 | 0.165983E+01 |
| Q 38 | 0.159058E+01 | 0.233071E+01 |
| Q 39 | 0.149533E+01 | 0.249015E+01 |
| Q 40 | 0.931809E-03 | 0.169488E-02 |
| Q 41 | 0.130108E-01 | 0.207385E-01 |
| Q 42 | 0.679859E-01 | 0.963778E-01 |
| Q 43 | 0.999247E-01 | 0.142363E+00 |
| Q 44 | 0.100339E+00 | 0.158053E+00 |
| Q 45 | 0.657883E-01 | 0.117191E+00 |
| Q 46 | 0.873508E-01 | 0.126044E+00 |
| Q 47 | 0.115838E-01 | 0.346139E-01 |
| Q 48 | 0.573770E-01 | 0.959451E-01 |

| | | |
|---|---|---|
| Q 49 | 0.128922E+00 | 0.202014E+00 |
| Q 50 | 0.177210E+00 | 0.303958E+00 |
| Q 51 | 0.157548E+00 | 0.286259E+00 |
| Q 52 | 0.185426E+00 | 0.355102E+00 |

Bootstrap Output Variable: Fishing Mortality (2007)

| | NLLS Estimate | Bootstrap Mean | Bootstrap Std Error | C.V. For NLLS Soln. |
|---|---|---|---|---|
| AGE 1 | 0.0017 | 0.0018 | 0.000727 | 0.4096 |
| AGE 2 | 0.1161 | 0.1200 | 0.034663 | 0.2889 |
| AGE 3 | 0.3119 | 0.3232 | 0.081705 | 0.2528 |
| AGE 4 | 0.3080 | 0.3172 | 0.074404 | 0.2345 |
| AGE 5 | 0.3439 | 0.3520 | 0.086883 | 0.2468 |
| AGE 6 | 0.3973 | 0.4208 | 0.140749 | 0.3345 |
| AGE 7 | 0.1662 | 0.1848 | 0.079164 | 0.4283 |
| AGE 8 | 0.3025 | 0.3192 | 0.065865 | 0.2063 |
| AGE 9 | 0.3025 | 0.3192 | 0.065865 | 0.2063 |
| AGE 10 | 0.3025 | 0.3192 | 0.065865 | 0.2063 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| AGE 1 | 0.000111 | 0.000023 | 6.6776 | 0.0016 | 0.4682 |
| AGE 2 | 0.003842 | 0.001103 | 3.3082 | 0.1123 | 0.3087 |
| AGE 3 | 0.011255 | 0.002608 | 3.6084 | 0.3006 | 0.2718 |
| AGE 4 | 0.009239 | 0.002371 | 2.9997 | 0.2988 | 0.2490 |
| AGE 5 | 0.008150 | 0.002760 | 2.3699 | 0.3357 | 0.2588 |
| AGE 6 | 0.023443 | 0.004512 | 5.8998 | 0.3739 | 0.3764 |
| AGE 7 | 0.018574 | 0.002571 | 11.1729 | 0.1477 | 0.5361 |
| AGE 8 | 0.016722 | 0.002149 | 5.5282 | 0.2858 | 0.2305 |
| AGE 9 | 0.016722 | 0.002149 | 5.5282 | 0.2858 | 0.2305 |
| AGE 10 | 0.016722 | 0.002149 | 5.5282 | 0.2858 | 0.2305 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| AGE 1 | 0.000962 | 0.002744 |
| AGE 2 | 0.079354 | 0.167325 |
| AGE 3 | 0.226352 | 0.433711 |
| AGE 4 | 0.230071 | 0.417925 |
| AGE 5 | 0.248083 | 0.468221 |
| AGE 6 | 0.267313 | 0.606938 |
| AGE 7 | 0.105918 | 0.284319 |
| AGE 8 | 0.241887 | 0.406217 |
| AGE 9 | 0.241887 | 0.406217 |
| AGE 10 | 0.241887 | 0.406217 |

Bootstrap Output Variable: Average F (2007) AGES 5 - 8

| | NLLS Estimate | Bootstrap Mean | Bootstrap Std Error | C.V. For NLLS Soln. |
|---|---|---|---|---|
| AVG F | 0.3025 | 0.3192 | 0.065865 | 0.2063 |
| N WTD | 0.3446 | 0.3486 | 0.075233 | 0.2158 |
| B WTD | 0.3356 | 0.3403 | 0.074416 | 0.2187 |
| C WTD | 0.3597 | 0.3776 | 0.090018 | 0.2384 |

| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| AVG F | 0.016722 | 0.002149 | 5.5282 | 0.2858 | 0.2305 |
| N WTD | 0.003978 | 0.002382 | 1.1545 | 0.3406 | 0.2209 |
| B WTD | 0.004673 | 0.002358 | 1.3925 | 0.3309 | 0.2249 |
| C WTD | 0.017960 | 0.002903 | 4.9933 | 0.3417 | 0.2634 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| AVG F | 0.241887 | 0.406217 |
| N WTD | 0.257390 | 0.443835 |
| B WTD | 0.250281 | 0.437768 |
| C WTD | 0.273103 | 0.493857 |

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 | 27315. | 29117. | 4850. | 0.1666 |
| MEAN | 25760. | 26854. | 3963. | 0.1476 |
| SSB | 17672. | 18172. | 2716. | 0.1494 |

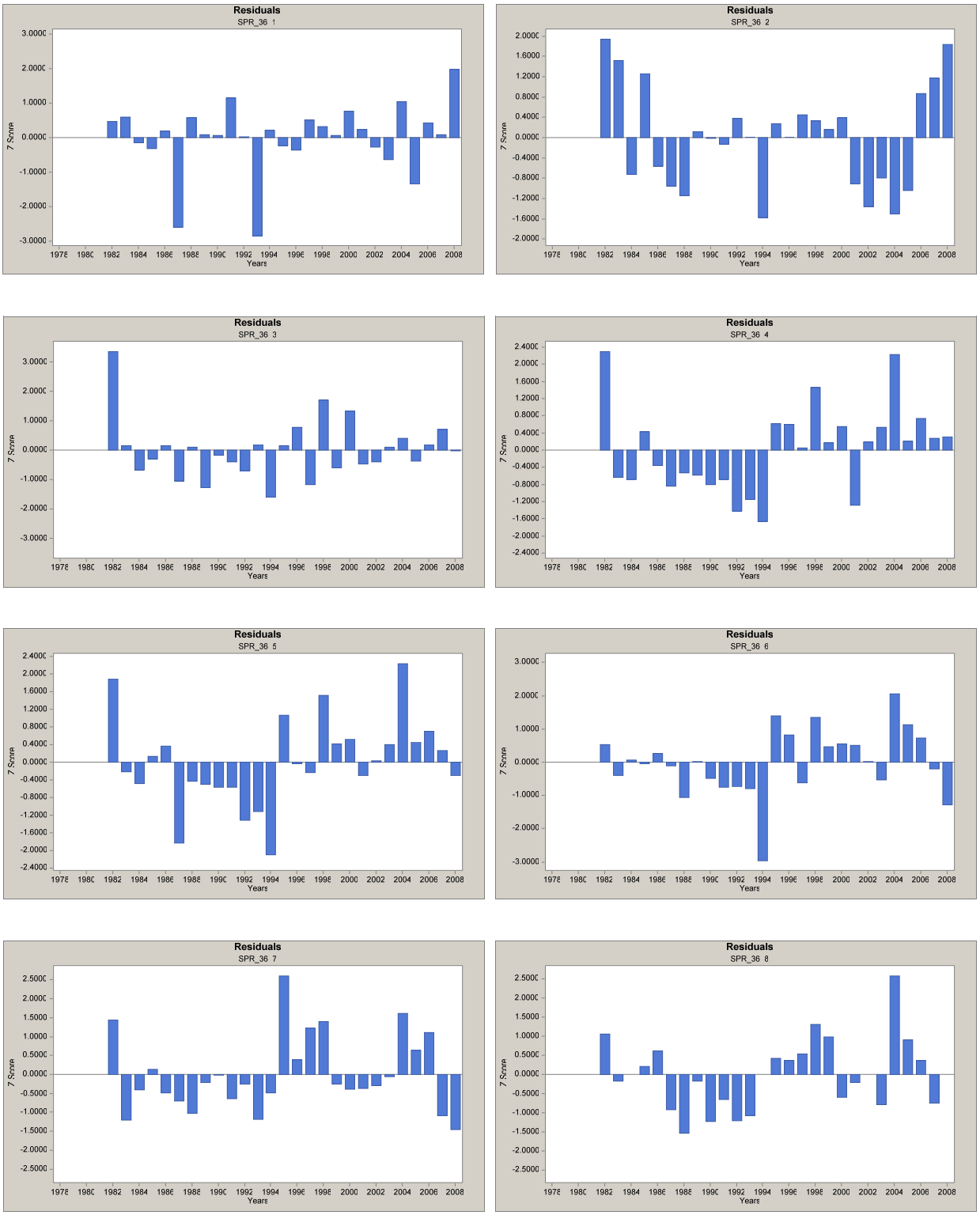
| | Bias Estimate | Bias Std. Error | Per Cent Bias | NLLS Estimate Corrected For Bias | C.V. For Corrected Estimate |
|---|---|---|---|---|---|
| JAN-1 | 1802. | 164. | 6.5972 | 25513. | 0.1901 |
| MEAN | 1094. | 130. | 4.2465 | 24666. | 0.1607 |
| SSB | 500. | 87. | 2.8292 | 17172. | 0.1581 |

| | LOWER 80. % CI | UPPER 80. % CI |
|---|---|---|
| JAN-1 | 22993. | 35591. |
| MEAN | 21852. | 32188. |
| SSB | 14956. | 21655. |

Plus Group Diagnostic Report

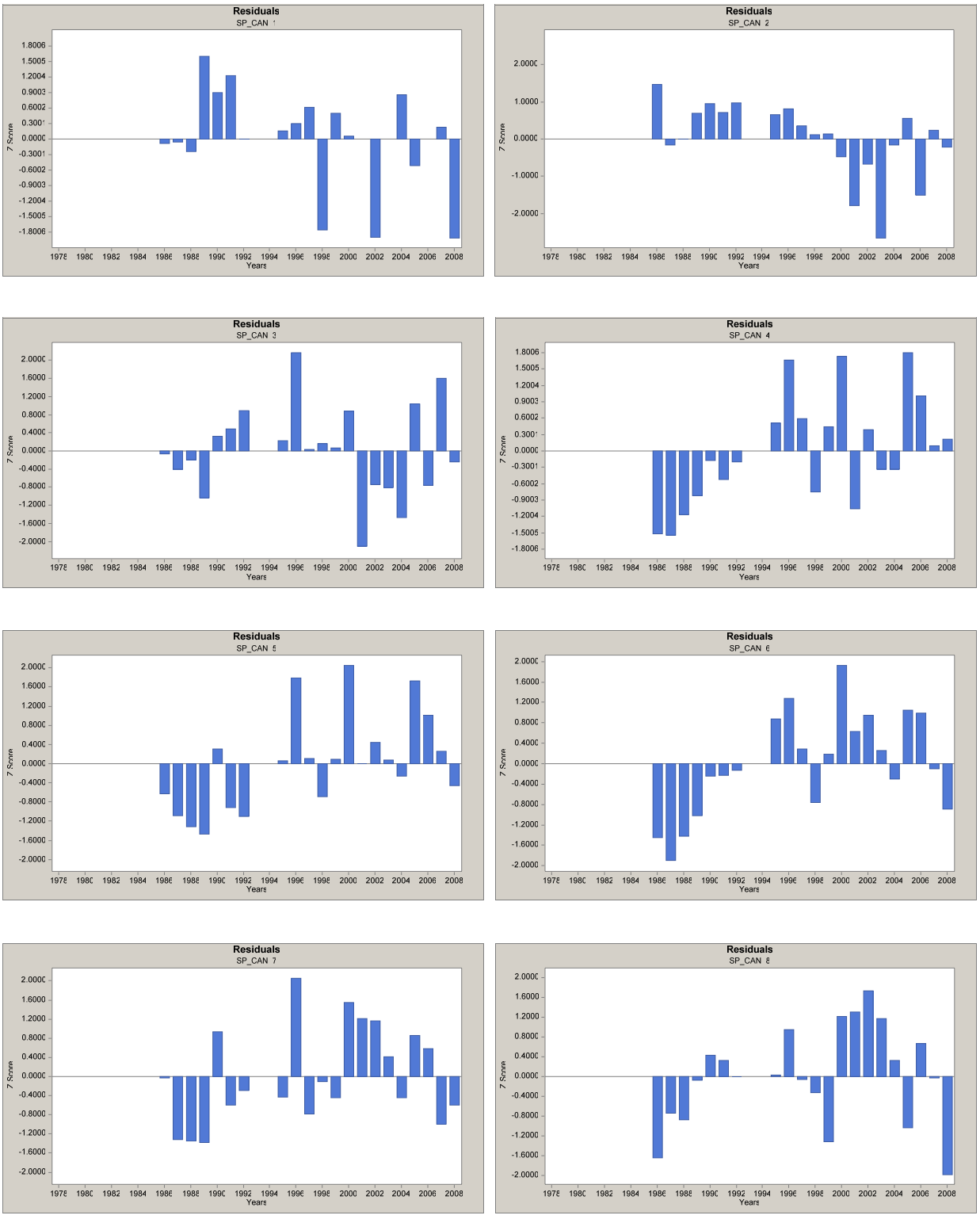
Calculation Method Selected = Backward

| Year | Population Backward | Population Forward | F Forward | F Backward | Ratio |
|---|---|---|---|---|---|
| 1978 | 44. | 44. | 0.308259 | 0.308259 | 1.000000 |
| 1979 | 127. | 131. | 0.345514 | 0.359798 | 1.041340 |
| 1980 | 37. | 103. | 0.164657 | 0.541372 | 3.287884 |
| 1981 | 173. | 244. | 0.353951 | 0.544585 | 1.538590 |
| 1982 | 192. | 333. | 0.327151 | 0.655849 | 2.004726 |
| 1983 | 288. | 268. | 0.613105 | 0.558734 | 0.911319 |
| 1984 | 283. | 200. | 1.129093 | 0.657374 | 0.582214 |
| 1985 | 182. | 213. | 0.614331 | 0.772297 | 1.257135 |
| 1986 | 76. | 116. | 0.306033 | 0.510817 | 1.669156 |
| 1987 | 75. | 145. | 0.219497 | 0.475565 | 2.166618 |
| 1988 | 105. | 149. | 0.488757 | 0.781517 | 1.598990 |
| 1989 | 54. | 110. | 0.240156 | 0.559488 | 2.329684 |
| 1990 | 88. | 142. | 0.372457 | 0.689139 | 1.850248 |
| 1991 | 47. | 101. | 0.330946 | 0.908106 | 2.743972 |
| 1992 | 19. | 76. | 0.162996 | 0.926066 | 5.681536 |
| 1993 | 34. | 74. | 0.376025 | 1.153756 | 3.068296 |
| 1994 | 9. | 59. | 0.109817 | 1.238415 | 11.277052 |
| 1995 | 3. | 55. | 0.028725 | 0.615929 | 21.442171 |
| 1996 | 1. | 50. | 0.006628 | 0.654373 | 98.725815 |
| 1997 | 7. | 52. | 0.086811 | 0.851678 | 9.810757 |
| 1998 | 6. | 45. | 0.072847 | 0.743661 | 10.208472 |
| 1999 | 7. | 39. | 0.100541 | 0.779848 | 7.756524 |
| 2000 | 3. | 33. | 0.034234 | 0.548413 | 16.019363 |
| 2001 | 3. | 31. | 0.047227 | 0.653113 | 13.829337 |
| 2002 | 13. | 39. | 0.204668 | 0.798154 | 3.899747 |
| 2003 | 5. | 34. | 0.100203 | 0.957827 | 9.558863 |
| 2004 | 10. | 28. | 0.215770 | 0.841706 | 3.900942 |
| 2005 | 8. | 27. | 0.165477 | 0.694653 | 4.197875 |
| 2006 | 8. | 26. | 0.152554 | 0.600590 | 3.936897 |
| 2007 | 4. | 23. | 0.054852 | 0.357014 | 6.508634 |
| 2008 | 20. | 35. | N/A | N/A | |

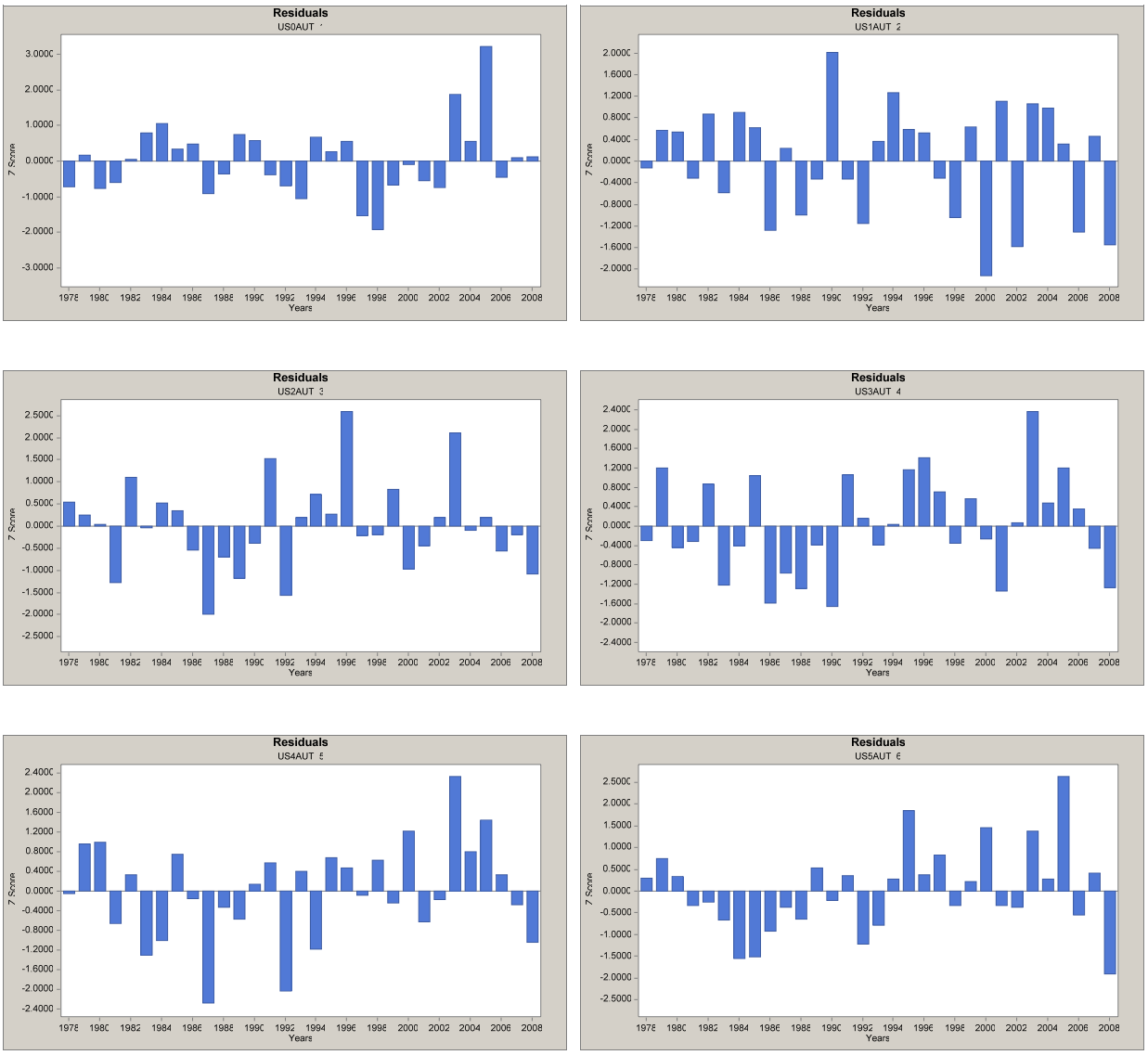



Appendix A. Figure A1a. Base VPA residuals for ages 1-8 for NEFSC spring survey, 1978-2008.

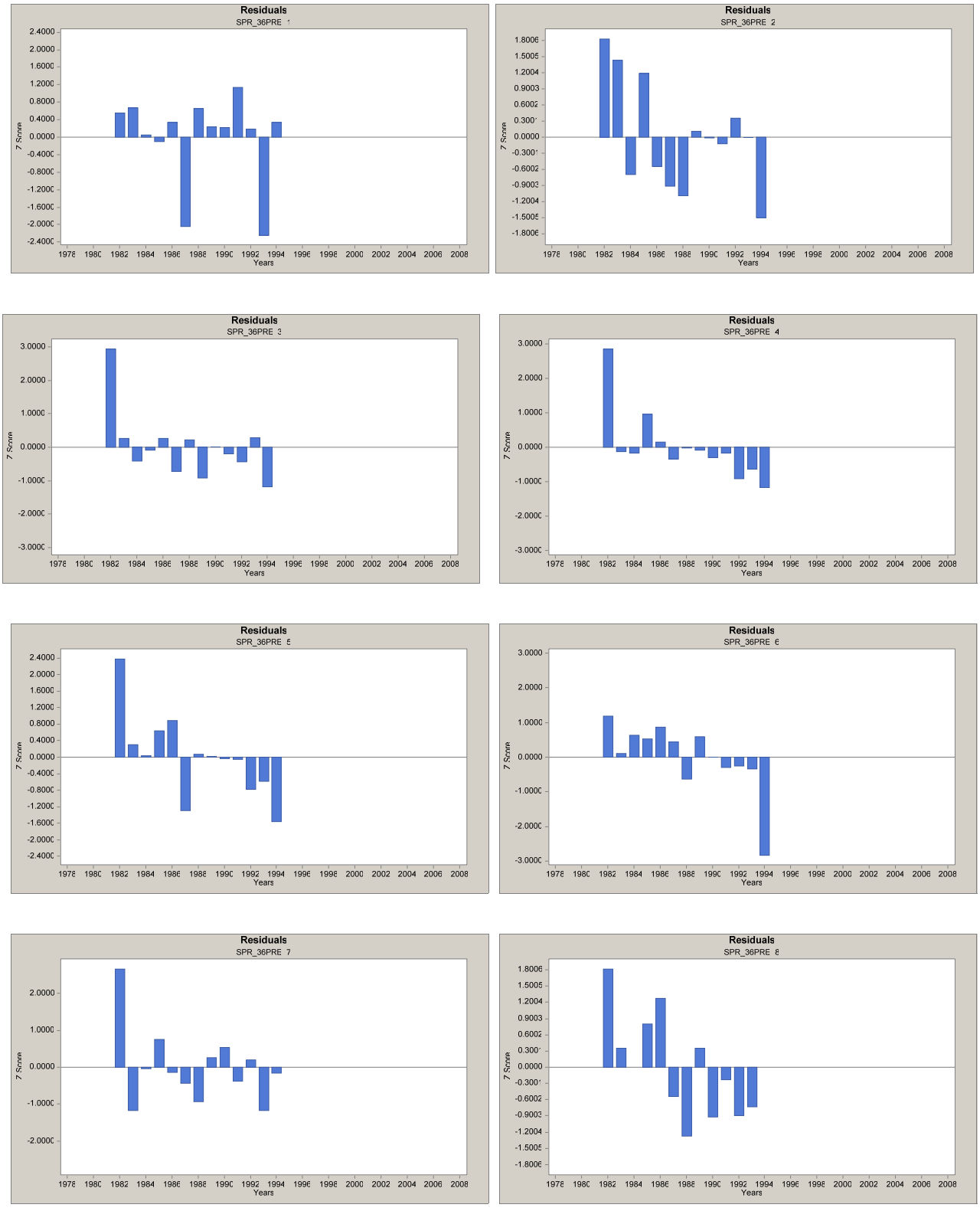

Appendix A. Figure A1b. Base VPA residuals for ages 1-8 for NEFSC spring survey, 1978-1981



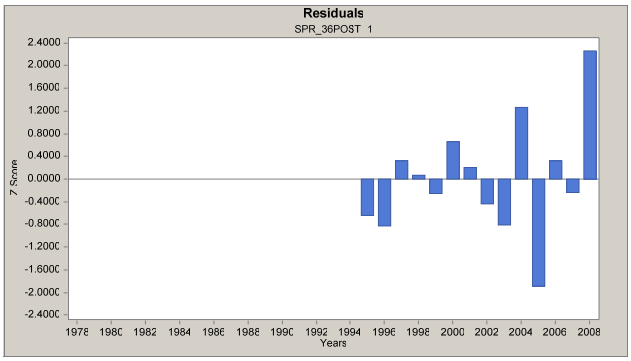

Appendix A. Figure A1c. Base VPA residuals for ages 1-8 for DFO spring survey, 1986-2008

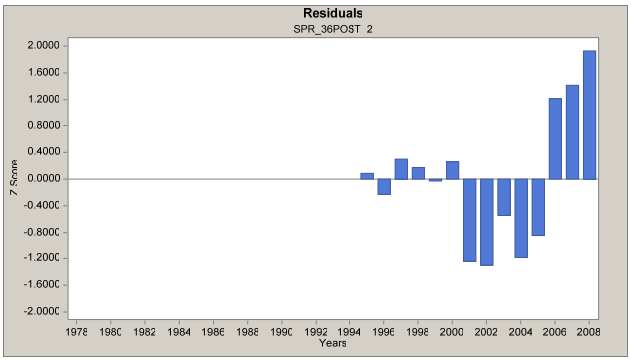


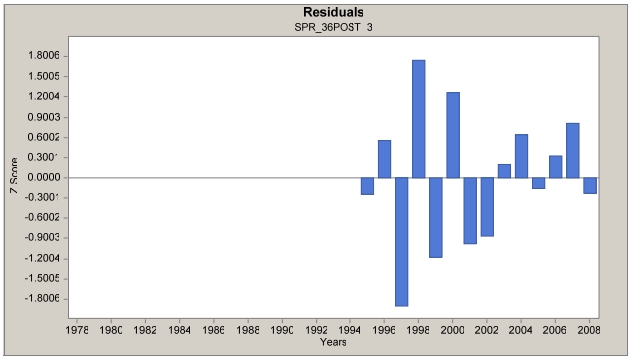

Appendix A. Figure A1d. Base VPA residuals for ages 1-6 for NEFSC autumn survey, 1978-2008.

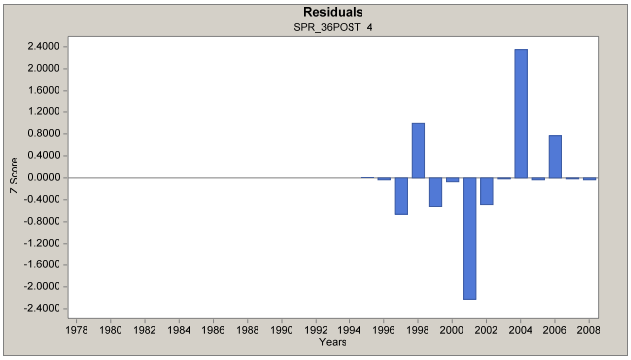


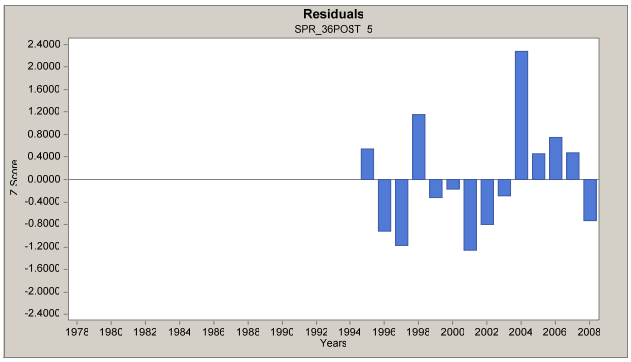

Appendix A. Figure A2a. Split survey VPA residual for ages 1-8 for NEFSC spring survey, 1982-1994.

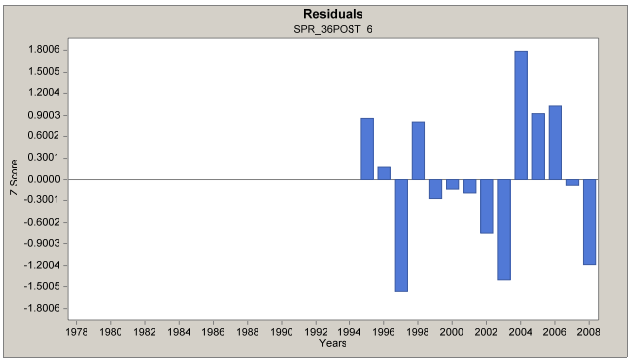


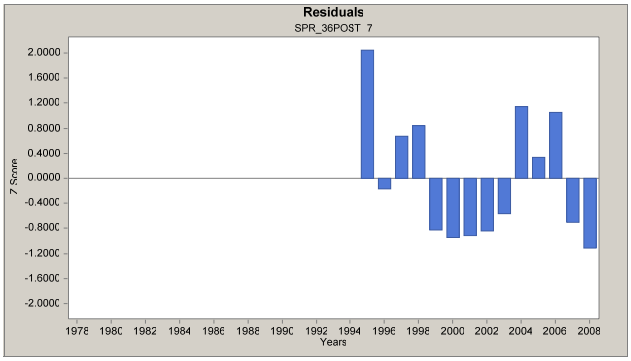



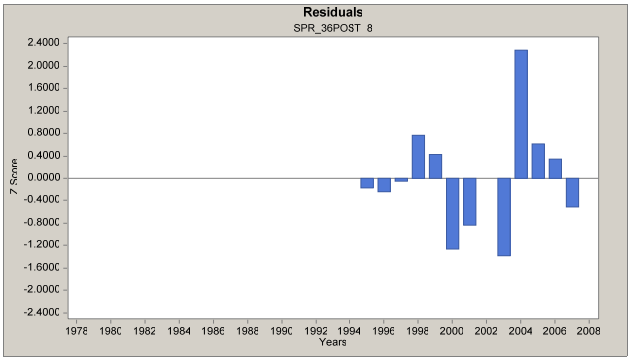



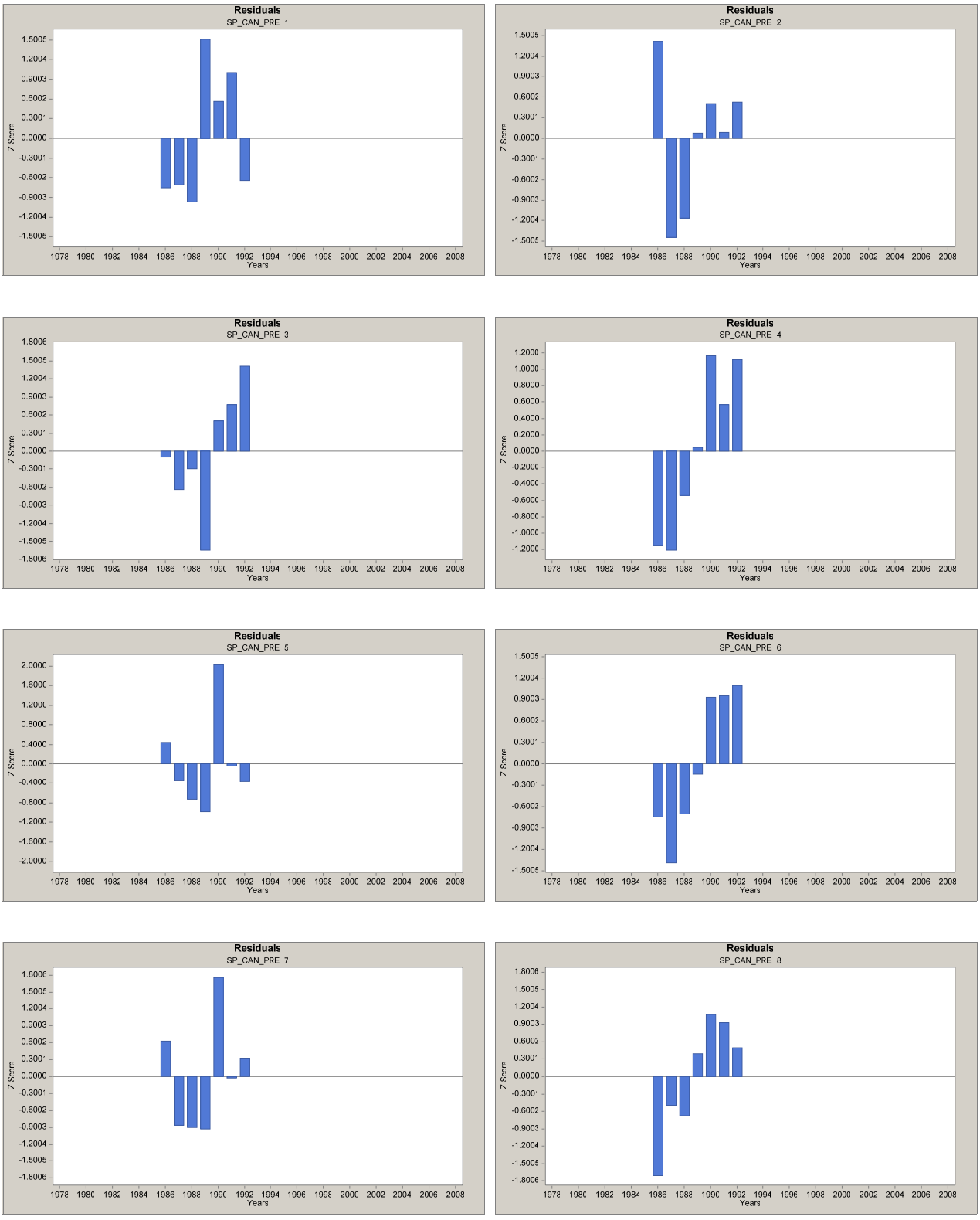



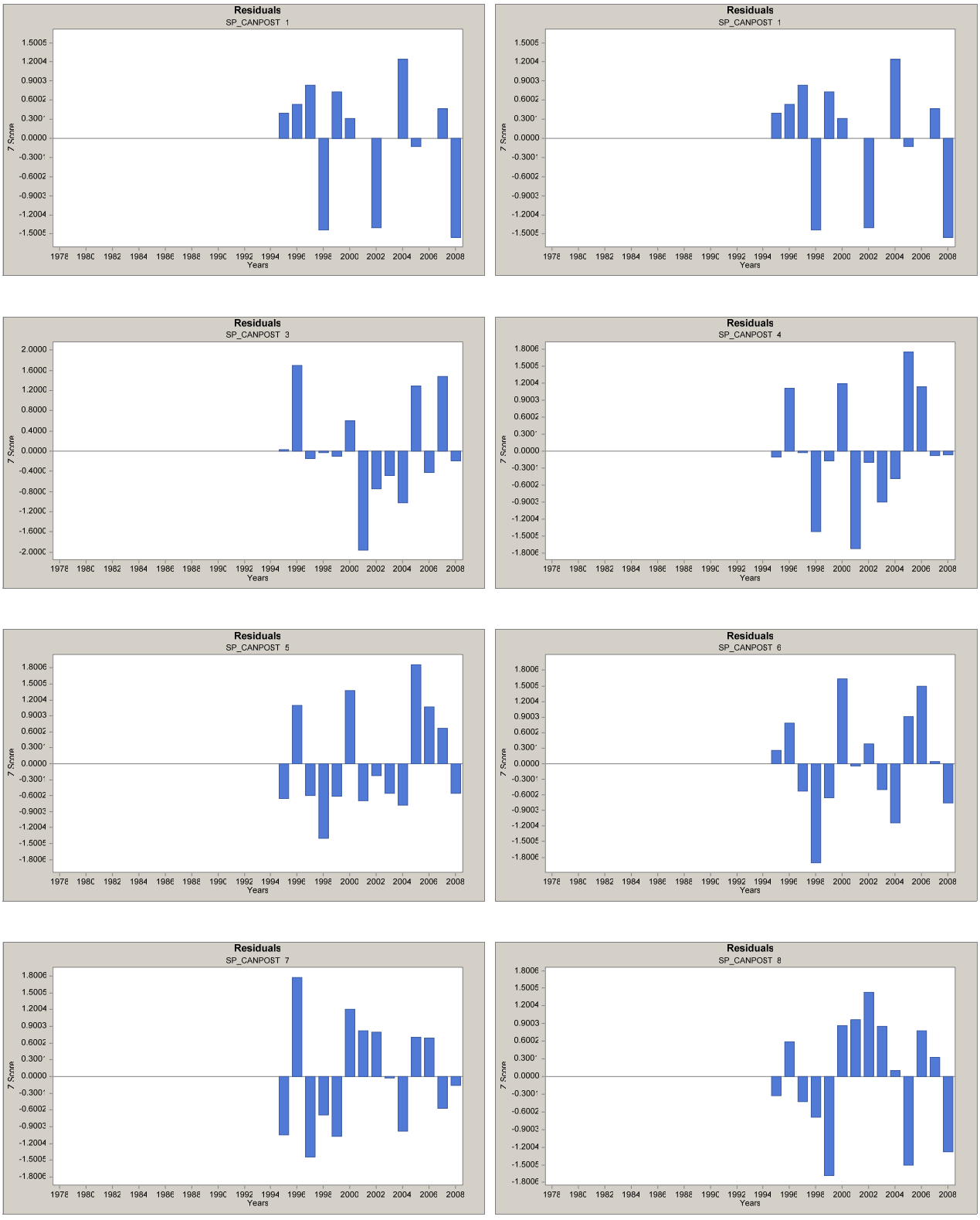



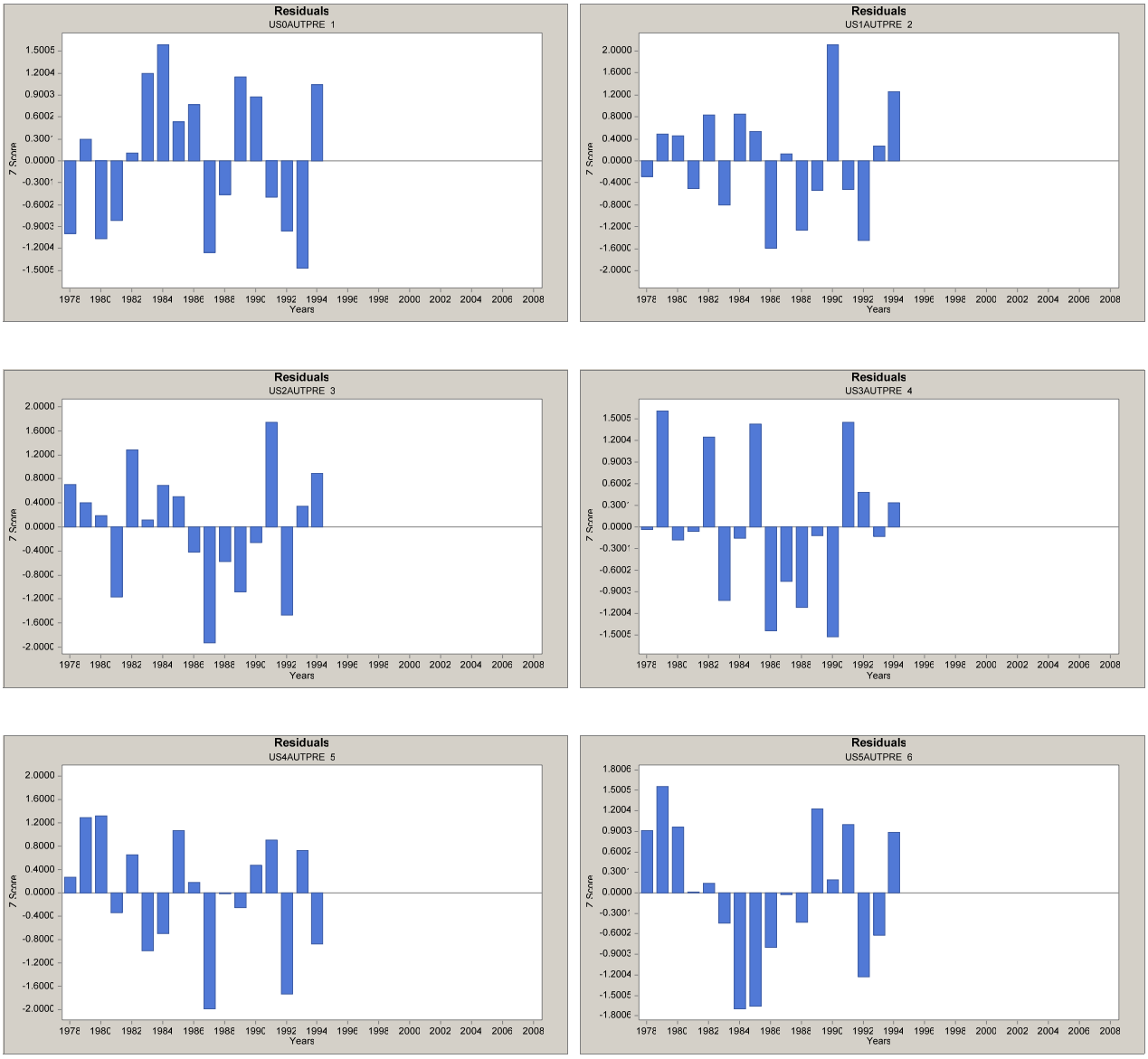

Appendix A. Figure A2b. Split survey VPA residual for ages 1-8 for NEFSC spring survey, 1995-2007.



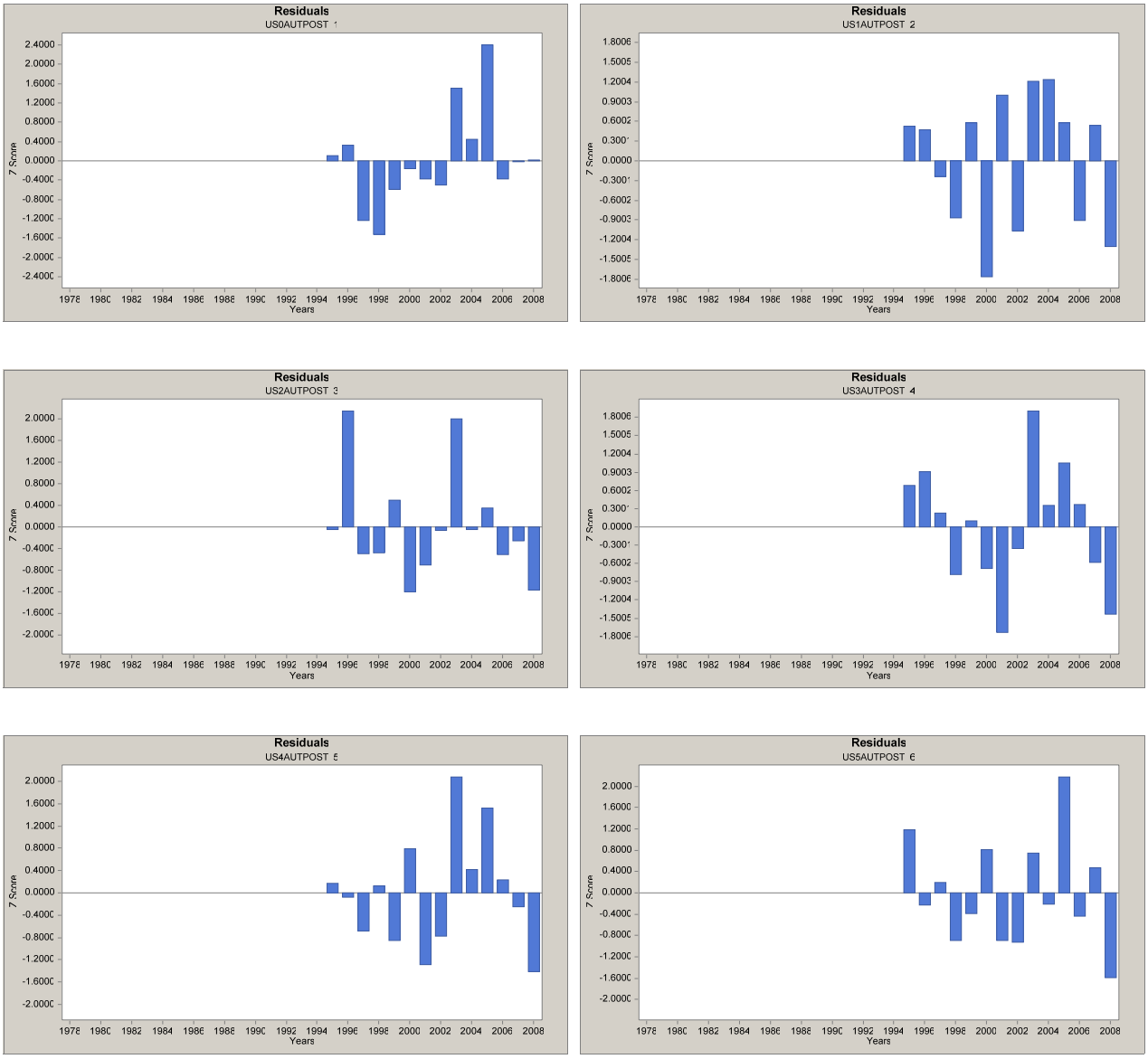

Appendix A. Figure A2c. Split survey VPA residual for ages 1-8 for DFO spring survey, 1986-1994.



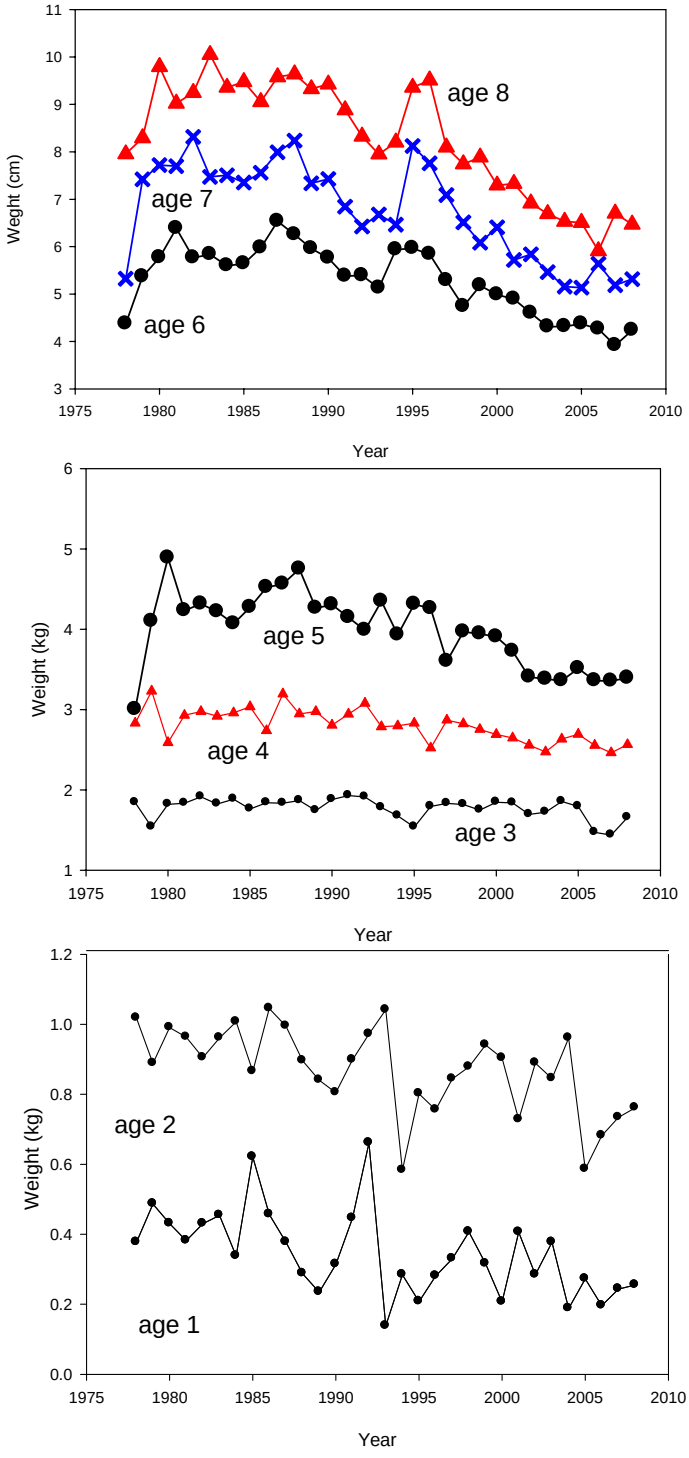

Appendix A. Figure A2d. Split survey VPA residual for ages 1-8 for DFO spring survey, 1995-2007.



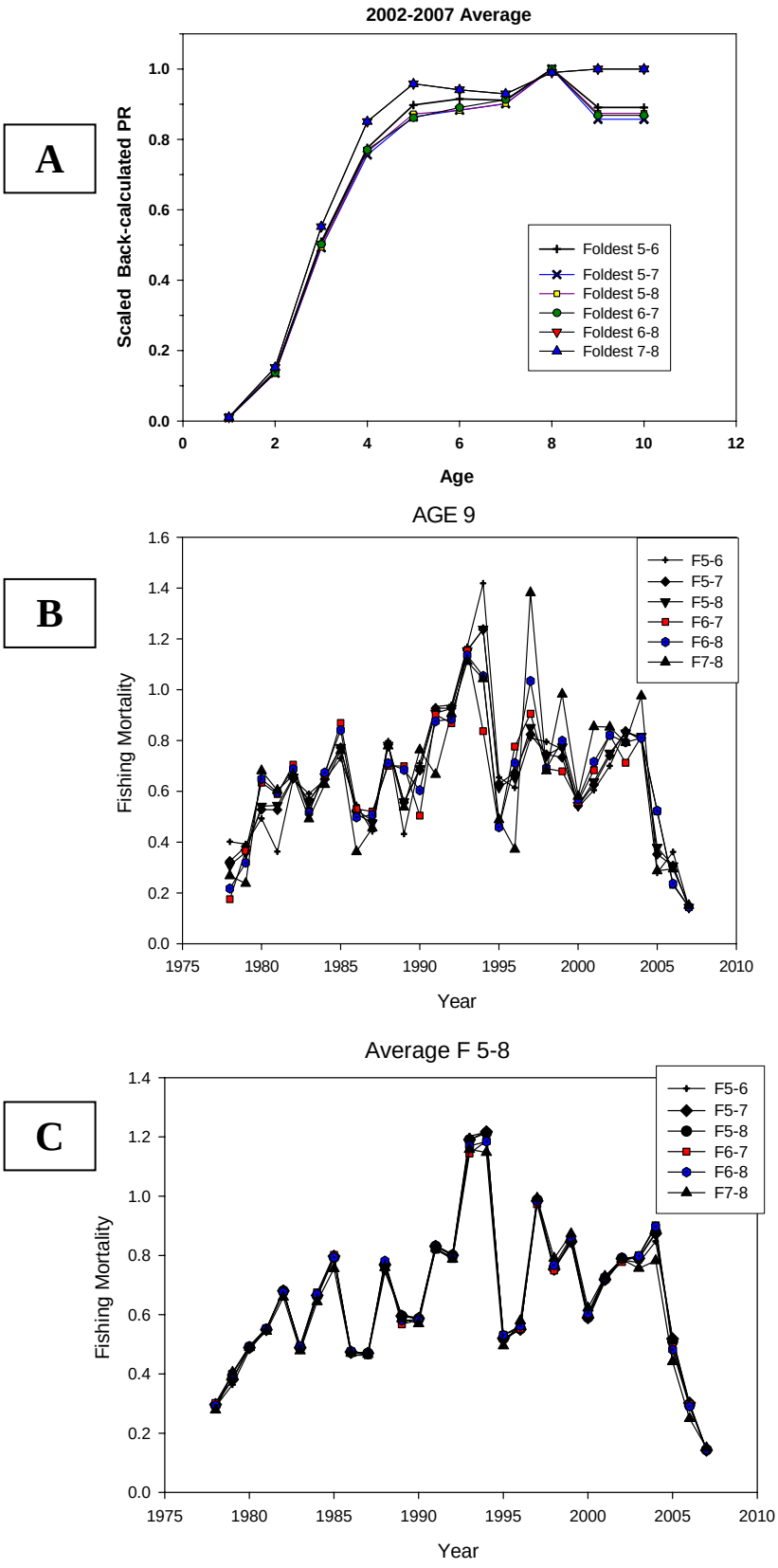

Appendix A. Figure A2e. Split survey VPA residual for ages 1-8 for NEFSC autumn survey, 1978-1994.



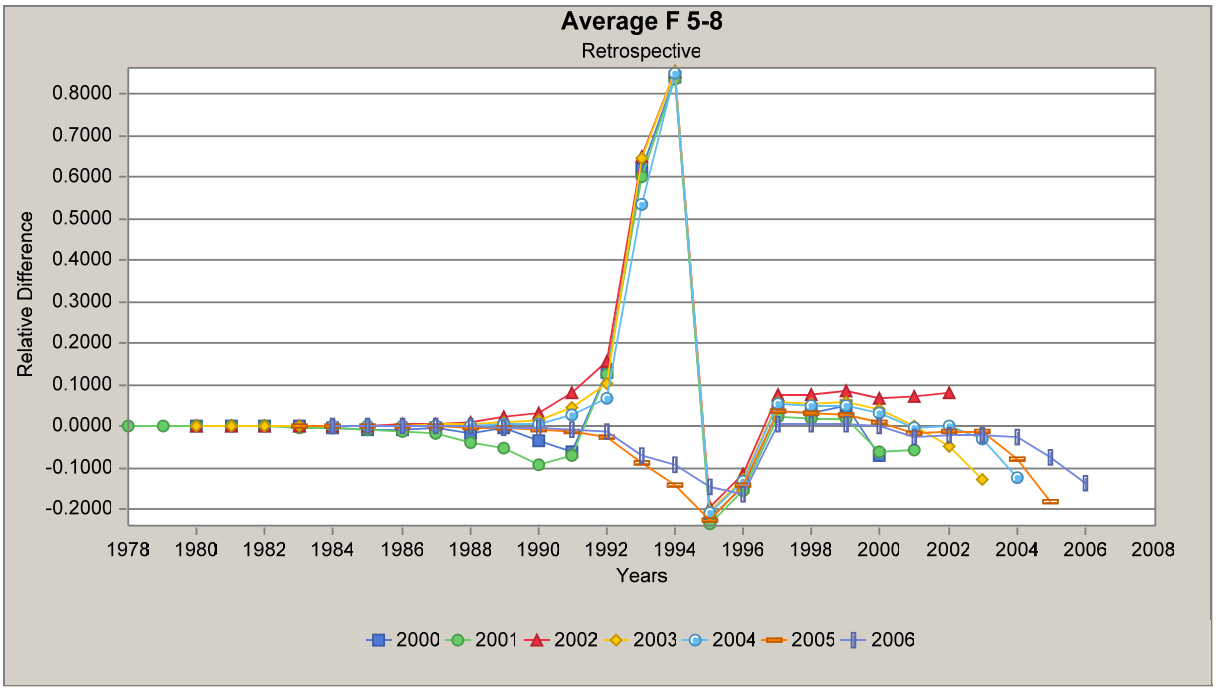

Appendix A. Figure A2f. Split survey VPA residual for ages 1-8 for NEFSC autumn survey, 1995-2007.



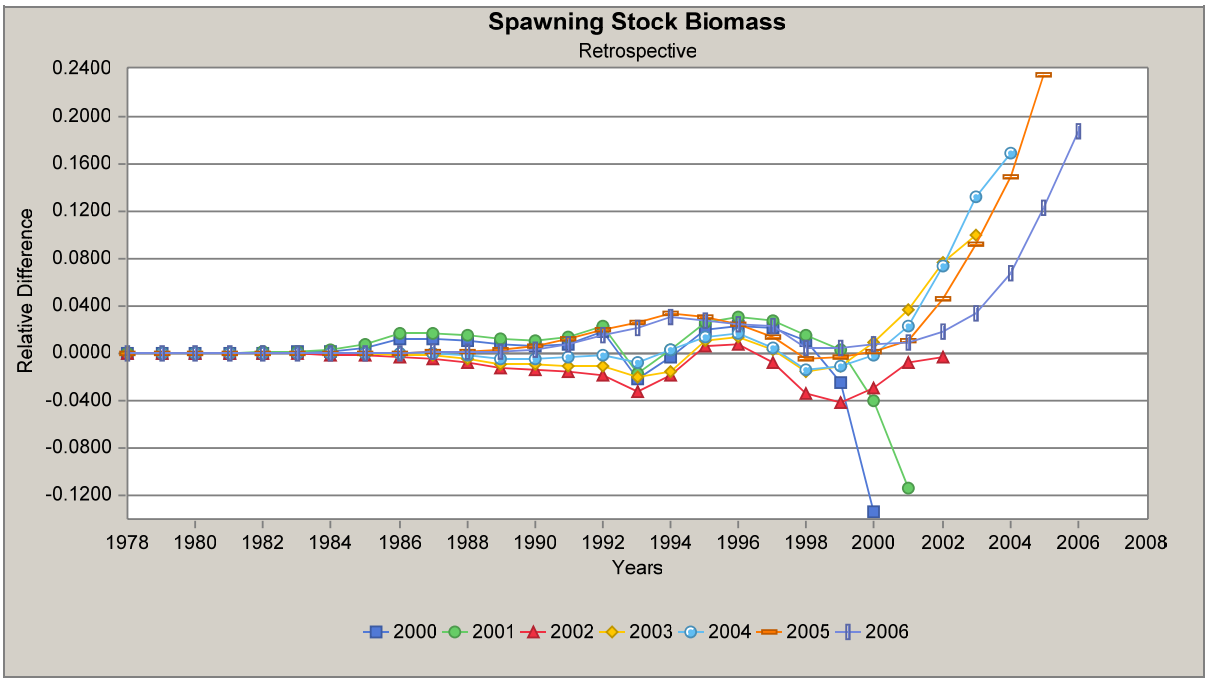

Appendix A. Figure A3. Stock mean weights for ages 1-8 for Georges Bank cod, 1978-2008, from revised August VPA.



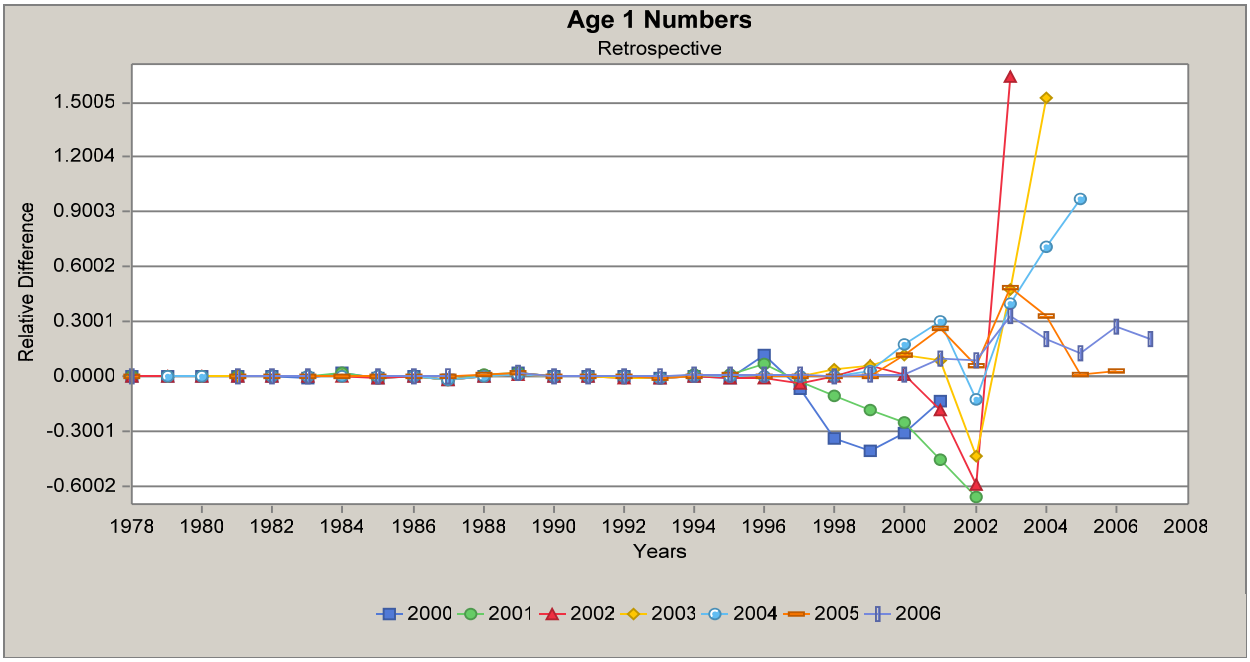

Appendix A. Figure A4. Sensitivity runs of BASE Model, with F on oldest age (9) estimated by averaging different age groups (5-6, 5-7, 5-8, 6-7, 6-8, and 7-8) and the effect on the partial recruitment (A), F on age 9 (B) , and F averaged over ages 5-8 (C), for each scenario.




Appendix A. Figure A5a. Retrospective analysis of relative difference to terminal year 2007 of Georges Bank Atlantic cod fishing mortality (ages 5-8, unweighted), based on around the corner ADAPT VPA, 2000-2007.



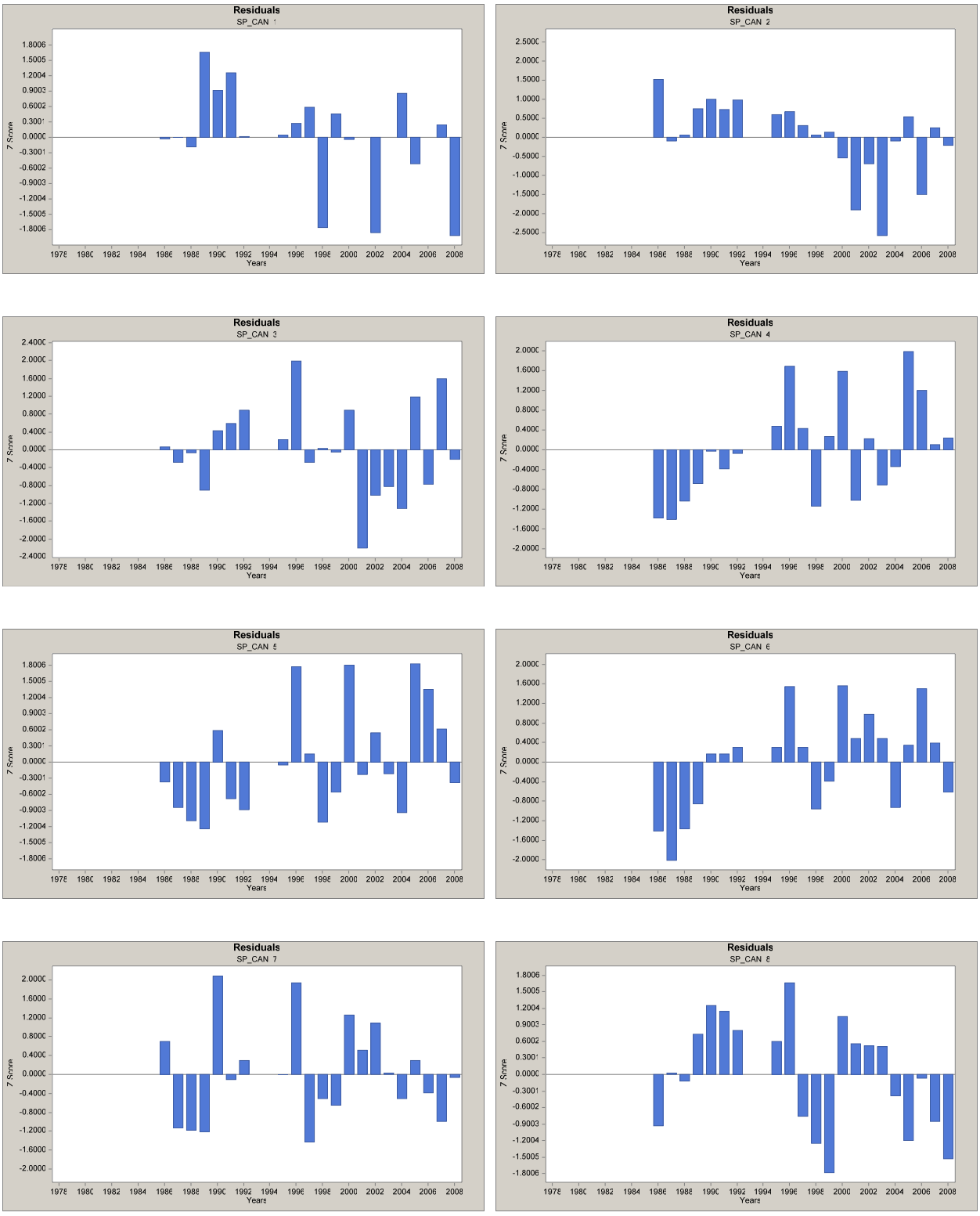

Appendix A. Figure A5b. Retrospective analysis of relative difference to terminal year 2007 of Georges Bank Atlantic cod spawning stock biomass, based on around the corner ADAPT VPA, 2000-2007



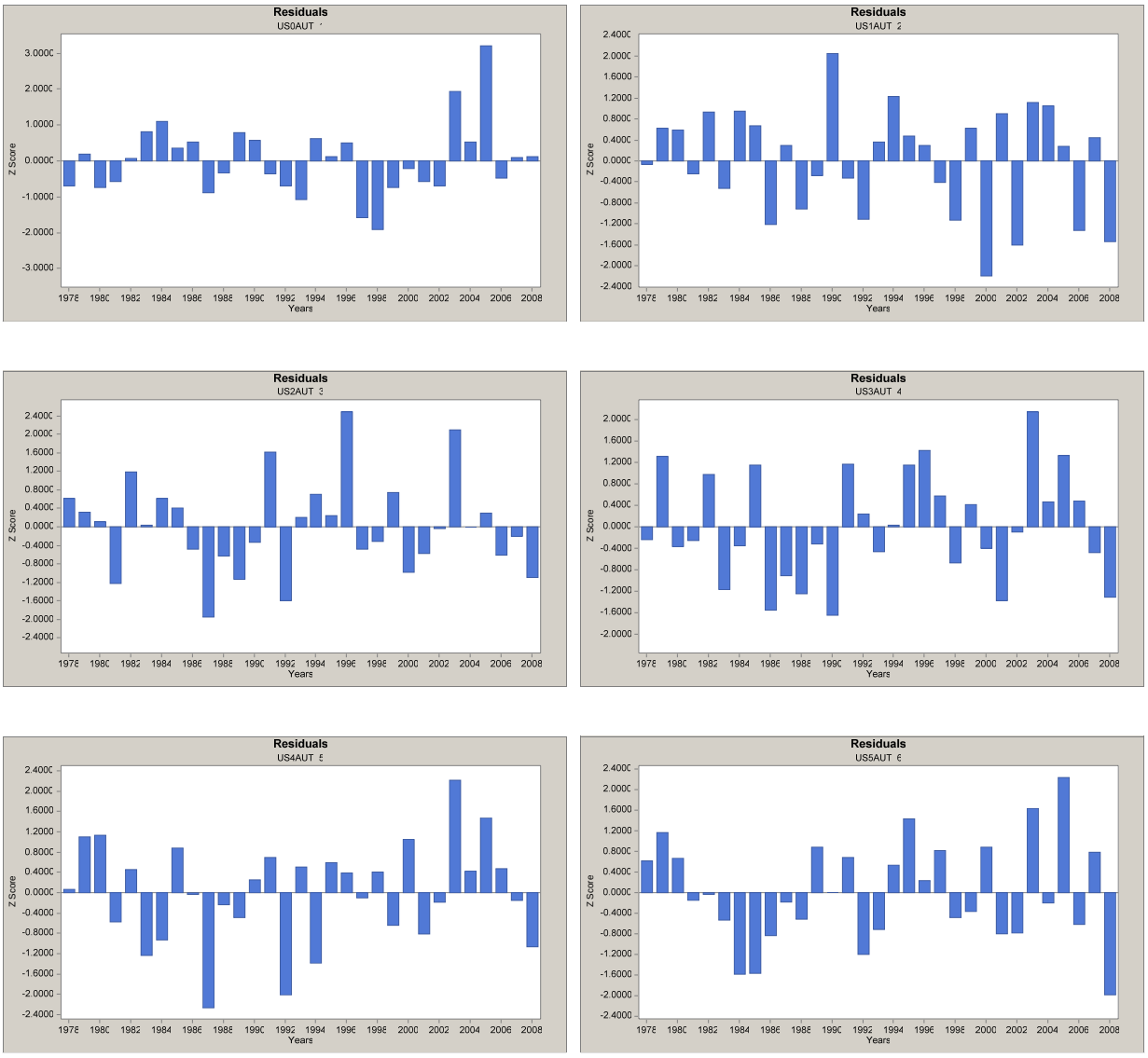

Appendix A. Figure A5c. Retrospective analysis of relative difference to terminal year 2007 of Georges Bank Atlantic cod age 1 recruitment based on around the corner ADAPT VPA, 2000-2007.


Appendix A. Figure A6a. Around the corner VPA residual for ages 1-8 for NEFSC spring survey, 1982-2008.


Appendix A. Figure A6b. Around the corner VPA residual for ages 1-8 for NEFSC spring survey, 1978-1981.




Appendix A. Figure A6c.Around the corner VPA residual for ages 1-8 for DFO spring survey, 1986-2008




Appendix A. Figure A6d. Around the corner VPA residual for ages 1-8 for NEFSC autumn survey, 1978-2008.