

WHAM output tables

Table 1. Parameter estimates, standard errors, and confidence intervals. Rounded to 3 decimal places.

| | Estimate | Std. Error | 95% CI lower | 95% CI upper |
|---------------------------------------|----------|------------|--------------|--------------|
| Index 1 fully selected q | 0.003 | 0.000 | 0.002 | 0.004 |
| Index 2 fully selected q | 0.000 | 0.000 | 0.000 | 0.000 |
| Index 3 fully selected q | 0.000 | 0.000 | 0.000 | 0.000 |
| Block 1: Mean Selectivity for age 1 | 0.112 | 0.022 | 0.075 | 0.163 |
| Block 1: Mean Selectivity for age 2 | 0.379 | 0.059 | 0.272 | 0.499 |
| Block 1: Mean Selectivity for age 3 | 0.650 | 0.071 | 0.501 | 0.774 |
| Block 1: Mean Selectivity for age 4 | 0.698 | 0.066 | 0.556 | 0.810 |
| Block 1: Mean Selectivity for age 5 | 0.688 | 0.068 | 0.543 | 0.803 |
| Block 1: Mean Selectivity for age 6 | 1.000 | — | — | — |
| Block 1: Mean Selectivity for age 7 | 1.000 | — | — | — |
| Block 1: Mean Selectivity for age 8 | 1.000 | — | — | — |
| Block 1: Mean Selectivity for age 9 | 1.000 | — | — | — |
| Block 1: Mean Selectivity for age 10+ | 1.000 | 0.000 | 0.000 | 1.000 |
| Block 2: Selectivity for age 1 | 1.000 | — | — | — |
| Block 2: Selectivity for age 2 | 1.000 | — | — | — |
| Block 2: Selectivity for age 3 | 1.000 | — | — | — |
| Block 2: Selectivity for age 4 | 1.000 | — | — | — |
| Block 2: Selectivity for age 5 | 1.000 | — | — | — |
| Block 2: Selectivity for age 6 | 1.000 | — | — | — |
| Block 2: Selectivity for age 7 | 1.000 | — | — | — |
| Block 2: Selectivity for age 8 | 1.000 | — | — | — |
| Block 2: Selectivity for age 9 | 1.000 | — | — | — |

Table 1. Parameter estimates, standard errors, and confidence intervals. Rounded to 3 decimal places. (continued)

| | Estimate | Std. Error | 95% CI lower | 95% CI upper |
|----------------------------------|----------|------------|--------------|--------------|
| Block 2: Selectivity for age 10+ | 1.000 | — | — | — |
| Block 3: Selectivity for age 1 | 0.000 | — | — | — |
| Block 3: Selectivity for age 2 | 0.000 | — | — | — |
| Block 3: Selectivity for age 3 | 1.000 | — | — | — |
| Block 3: Selectivity for age 4 | 0.469 | 0.208 | 0.147 | 0.819 |
| Block 3: Selectivity for age 5 | 0.203 | 0.092 | 0.078 | 0.436 |
| Block 3: Selectivity for age 6 | 0.191 | 0.068 | 0.090 | 0.358 |
| Block 3: Selectivity for age 7 | 0.000 | — | — | — |
| Block 3: Selectivity for age 8 | 0.000 | — | — | — |
| Block 3: Selectivity for age 9 | 0.000 | — | — | — |
| Block 3: Selectivity for age 10+ | 0.000 | — | — | — |
| Block 4: Selectivity for age 1 | 0.000 | — | — | — |
| Block 4: Selectivity for age 2 | 0.000 | — | — | — |
| Block 4: Selectivity for age 3 | 1.000 | — | — | — |
| Block 4: Selectivity for age 4 | 0.701 | 0.183 | 0.298 | 0.928 |
| Block 4: Selectivity for age 5 | 0.443 | 0.112 | 0.247 | 0.659 |
| Block 4: Selectivity for age 6 | 0.389 | 0.076 | 0.253 | 0.544 |
| Block 4: Selectivity for age 7 | 0.000 | — | — | — |
| Block 4: Selectivity for age 8 | 0.000 | — | — | — |
| Block 4: Selectivity for age 9 | 0.000 | — | — | — |
| Block 4: Selectivity for age 10+ | 0.000 | — | — | — |
| Block 1: Selectivity RE σ | 0.976 | 0.142 | 0.734 | 1.298 |

Table 1. Parameter estimates, standard errors, and confidence intervals. Rounded to 3 decimal places. (continued)

| | Estimate | Std. Error | 95% CI lower | 95% CI upper |
|---|----------|------------|--------------|--------------|
| Block 1: Selectivity RE AR1 ρ (year) | 0.285 | 0.197 | -0.127 | 0.613 |
| Fleet 1 age comp, logistic-normal: σ | 5.312 | 0.187 | 4.956 | 5.692 |
| Index 2 age comp, logistic-normal: σ | 8.145 | 1.060 | 6.311 | 10.512 |
| Index 3 age comp, logistic-normal: σ | 5.534 | 0.466 | 4.693 | 6.526 |

Table 2. Abundance at age (1000s).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|---------|---------|---------|---------|--------|--------|--------|--------|-------|-------|
| 1968 | 4145490 | 1849934 | 386180 | 100270 | 58433 | 46565 | 34738 | 13673 | 91274 | 997 |
| 1969 | 2133150 | 3283673 | 1381036 | 276476 | 71344 | 41630 | 32082 | 23933 | 9420 | 63572 |
| 1970 | 2700966 | 1713339 | 2501769 | 984604 | 194451 | 50327 | 26474 | 20401 | 15220 | 46417 |
| 1971 | 949368 | 2114884 | 1232667 | 1688741 | 658212 | 130258 | 31942 | 16803 | 12949 | 39121 |
| 1972 | 766754 | 742543 | 1467499 | 744651 | 993099 | 389345 | 63654 | 15610 | 8211 | 25445 |
| 1973 | 945210 | 605115 | 526133 | 894324 | 438974 | 589754 | 174172 | 28476 | 6983 | 15056 |
| 1974 | 1398400 | 672830 | 347889 | 266152 | 444549 | 219006 | 268888 | 79411 | 12983 | 10048 |
| 1975 | 1389554 | 978851 | 367171 | 162580 | 121725 | 204238 | 89929 | 110411 | 32608 | 9457 |
| 1976 | 175277 | 866281 | 472111 | 159641 | 69826 | 52412 | 83018 | 36554 | 44880 | 17098 |
| 1977 | 37634 | 119480 | 407694 | 164488 | 53040 | 23434 | 13390 | 21210 | 9339 | 15835 |
| 1978 | 19392 | 26998 | 74081 | 236613 | 94691 | 30585 | 12996 | 7426 | 11763 | 13961 |
| 1979 | 87465 | 15693 | 21076 | 54709 | 172458 | 69220 | 19685 | 8365 | 4780 | 16557 |
| 1980 | 21766 | 68754 | 11453 | 14580 | 37548 | 118560 | 45560 | 12957 | 5506 | 14043 |
| 1981 | 81333 | 17144 | 50845 | 8135 | 10298 | 26551 | 81377 | 31271 | 8893 | 13418 |
| 1982 | 271758 | 59178 | 11555 | 33430 | 5334 | 6756 | 17204 | 52728 | 20262 | 14457 |
| 1983 | 2400633 | 208815 | 41238 | 7591 | 21784 | 3482 | 4229 | 10770 | 33009 | 21735 |
| 1984 | 62209 | 1875202 | 151737 | 28688 | 5249 | 15083 | 2338 | 2839 | 7231 | 36753 |
| 1985 | 145140 | 50280 | 1454843 | 110154 | 20488 | 3762 | 9103 | 1411 | 1714 | 26544 |
| 1986 | 88853 | 115663 | 37617 | 1023226 | 76640 | 14288 | 2450 | 5928 | 919 | 18403 |
| 1987 | 86207 | 70331 | 85342 | 26166 | 705027 | 52914 | 9334 | 1601 | 3872 | 12622 |
| 1988 | 363501 | 66595 | 48736 | 54565 | 16528 | 446475 | 31334 | 5527 | 948 | 9767 |
| 1989 | 532722 | 286799 | 47825 | 31540 | 34626 | 10533 | 248690 | 17453 | 3079 | 5968 |
| 1990 | 107142 | 425590 | 212430 | 31540 | 20238 | 22354 | 5223 | 123319 | 8655 | 4486 |
| 1991 | 198489 | 81370 | 271692 | 114710 | 16544 | 10682 | 9834 | 2298 | 54249 | 5781 |
| 1992 | 196071 | 151611 | 53371 | 155386 | 64121 | 9293 | 5226 | 4812 | 1124 | 29372 |
| 1993 | 46176 | 156466 | 111377 | 34119 | 95904 | 39891 | 3905 | 2196 | 2022 | 12815 |
| 1994 | 142782 | 37018 | 116846 | 72999 | 21582 | 61159 | 15715 | 1538 | 865 | 5845 |
| 1995 | 88630 | 112369 | 26023 | 70645 | 42738 | 12726 | 27792 | 7141 | 699 | 3049 |
| 1996 | 314128 | 67907 | 75617 | 15825 | 42292 | 25671 | 6996 | 15279 | 3926 | 2061 |
| 1997 | 116867 | 230253 | 40004 | 37488 | 7637 | 20528 | 10699 | 2916 | 6368 | 2495 |
| 1998 | 45036 | 88343 | 141946 | 19649 | 17638 | 3627 | 7245 | 3776 | 1029 | 3128 |

Table 2. Abundance at age (1000s). (*continued*)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|---------|---------|---------|--------|--------|--------|-------|------|------|------|
| 1999 | 146301 | 33781 | 53657 | 69484 | 9253 | 8375 | 1339 | 2674 | 1394 | 1534 |
| 2000 | 1719966 | 109289 | 19627 | 22796 | 27697 | 3740 | 2091 | 334 | 667 | 731 |
| 2001 | 101053 | 1353152 | 74350 | 9681 | 10147 | 12630 | 101 | 56 | 9 | 38 |
| 2002 | 69802 | 81042 | 1011143 | 48586 | 6094 | 6442 | 4623 | 37 | 21 | 17 |
| 2003 | 206733 | 56086 | 61007 | 669355 | 30993 | 3921 | 2248 | 1613 | 13 | 13 |
| 2004 | 541738 | 153943 | 36604 | 37035 | 402477 | 18673 | 2251 | 1291 | 926 | 15 |
| 2005 | 188907 | 423112 | 102257 | 17817 | 16514 | 183117 | 2238 | 270 | 155 | 113 |
| 2006 | 592949 | 149780 | 300418 | 58707 | 9633 | 9052 | 39964 | 488 | 59 | 58 |
| 2007 | 111561 | 410531 | 69016 | 90871 | 16456 | 2745 | 1567 | 6918 | 85 | 20 |
| 2008 | 225417 | 73724 | 193644 | 26440 | 33822 | 6162 | 885 | 505 | 2231 | 34 |
| 2009 | 169471 | 160174 | 38318 | 75806 | 9870 | 12755 | 1742 | 250 | 143 | 640 |
| 2010 | 63354 | 105242 | 55851 | 8208 | 15010 | 1987 | 1622 | 222 | 32 | 100 |
| 2011 | 132612 | 27310 | 21320 | 7895 | 1109 | 2047 | 218 | 178 | 24 | 14 |
| 2012 | 118419 | 91483 | 11057 | 3757 | 1140 | 168 | 43 | 5 | 4 | 1 |
| 2013 | 56451 | 78270 | 36831 | 2756 | 862 | 266 | 23 | 6 | 1 | 1 |
| 2014 | 75844 | 40169 | 37597 | 10654 | 717 | 230 | 31 | 3 | 1 | 0 |
| 2015 | 144703 | 54361 | 20212 | 12436 | 3244 | 222 | 39 | 5 | 0 | 0 |
| 2016 | 255820 | 107986 | 29823 | 6410 | 3411 | 920 | 10 | 2 | 0 | 0 |
| 2017 | 30736 | 189778 | 60987 | 11933 | 2389 | 1291 | 202 | 2 | 0 | 0 |
| 2018 | 113082 | 23425 | 114553 | 24706 | 4364 | 894 | 148 | 23 | 0 | 0 |
| 2019 | 71678 | 83880 | 13262 | 46358 | 9339 | 1674 | 205 | 34 | 5 | 0 |
| 2020 | 86649 | 53060 | 48051 | 5720 | 18951 | 3862 | 479 | 59 | 10 | 2 |
| 2021 | 95699 | 59400 | 26072 | 18436 | 2114 | 7060 | 1170 | 145 | 18 | 3 |
| 2022 | 414364 | 68717 | 33358 | 12200 | 8393 | 968 | 2776 | 460 | 57 | 8 |

Table 3. Total fishing mortality at age.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1968 | 0.033 | 0.092 | 0.134 | 0.140 | 0.139 | 0.173 | 0.173 | 0.173 | 0.173 | 0.173 |
| 1969 | 0.019 | 0.072 | 0.138 | 0.152 | 0.149 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 |
| 1970 | 0.045 | 0.129 | 0.193 | 0.203 | 0.201 | 0.255 | 0.255 | 0.255 | 0.255 | 0.255 |

Table 3. Total fishing mortality at age. (*continued*)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1971 | 0.046 | 0.165 | 0.304 | 0.331 | 0.325 | 0.516 | 0.516 | 0.516 | 0.516 | 0.516 |
| 1972 | 0.037 | 0.145 | 0.295 | 0.328 | 0.321 | 0.604 | 0.604 | 0.604 | 0.604 | 0.604 |
| 1973 | 0.140 | 0.354 | 0.481 | 0.499 | 0.495 | 0.585 | 0.585 | 0.585 | 0.585 | 0.585 |
| 1974 | 0.157 | 0.406 | 0.561 | 0.582 | 0.578 | 0.690 | 0.690 | 0.690 | 0.690 | 0.690 |
| 1975 | 0.273 | 0.529 | 0.633 | 0.645 | 0.643 | 0.700 | 0.700 | 0.700 | 0.700 | 0.700 |
| 1976 | 0.183 | 0.554 | 0.854 | 0.902 | 0.892 | 1.165 | 1.165 | 1.165 | 1.165 | 1.165 |
| 1977 | 0.132 | 0.278 | 0.344 | 0.352 | 0.351 | 0.390 | 0.390 | 0.390 | 0.390 | 0.390 |
| 1978 | 0.012 | 0.048 | 0.103 | 0.116 | 0.113 | 0.241 | 0.241 | 0.241 | 0.241 | 0.241 |
| 1979 | 0.041 | 0.115 | 0.168 | 0.176 | 0.175 | 0.218 | 0.218 | 0.218 | 0.218 | 0.218 |
| 1980 | 0.039 | 0.102 | 0.142 | 0.148 | 0.147 | 0.176 | 0.176 | 0.176 | 0.176 | 0.176 |
| 1981 | 0.118 | 0.195 | 0.219 | 0.222 | 0.222 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 |
| 1982 | 0.063 | 0.161 | 0.220 | 0.228 | 0.227 | 0.268 | 0.268 | 0.268 | 0.268 | 0.268 |
| 1983 | 0.047 | 0.119 | 0.163 | 0.169 | 0.168 | 0.198 | 0.198 | 0.198 | 0.198 | 0.198 |
| 1984 | 0.013 | 0.054 | 0.120 | 0.137 | 0.133 | 0.305 | 0.305 | 0.305 | 0.305 | 0.305 |
| 1985 | 0.027 | 0.090 | 0.152 | 0.163 | 0.160 | 0.229 | 0.229 | 0.229 | 0.229 | 0.229 |
| 1986 | 0.034 | 0.104 | 0.163 | 0.172 | 0.170 | 0.226 | 0.226 | 0.226 | 0.226 | 0.226 |
| 1987 | 0.058 | 0.167 | 0.247 | 0.259 | 0.257 | 0.324 | 0.324 | 0.324 | 0.324 | 0.324 |
| 1988 | 0.037 | 0.131 | 0.235 | 0.255 | 0.251 | 0.385 | 0.385 | 0.385 | 0.385 | 0.385 |
| 1989 | 0.025 | 0.100 | 0.216 | 0.244 | 0.238 | 0.501 | 0.501 | 0.501 | 0.501 | 0.501 |
| 1990 | 0.075 | 0.249 | 0.416 | 0.445 | 0.439 | 0.621 | 0.621 | 0.621 | 0.621 | 0.621 |
| 1991 | 0.069 | 0.222 | 0.359 | 0.382 | 0.377 | 0.515 | 0.515 | 0.515 | 0.515 | 0.515 |
| 1992 | 0.026 | 0.108 | 0.247 | 0.283 | 0.275 | 0.667 | 0.667 | 0.667 | 0.667 | 0.667 |
| 1993 | 0.021 | 0.092 | 0.222 | 0.258 | 0.250 | 0.732 | 0.732 | 0.732 | 0.732 | 0.732 |
| 1994 | 0.040 | 0.152 | 0.303 | 0.335 | 0.328 | 0.589 | 0.589 | 0.589 | 0.589 | 0.589 |
| 1995 | 0.066 | 0.196 | 0.297 | 0.313 | 0.310 | 0.398 | 0.398 | 0.398 | 0.398 | 0.398 |
| 1996 | 0.111 | 0.329 | 0.502 | 0.529 | 0.523 | 0.675 | 0.675 | 0.675 | 0.675 | 0.675 |
| 1997 | 0.080 | 0.284 | 0.511 | 0.554 | 0.545 | 0.841 | 0.841 | 0.841 | 0.841 | 0.841 |
| 1998 | 0.088 | 0.299 | 0.514 | 0.553 | 0.545 | 0.797 | 0.797 | 0.797 | 0.797 | 0.797 |
| 1999 | 0.092 | 0.343 | 0.656 | 0.720 | 0.706 | 1.188 | 1.188 | 1.188 | 1.188 | 1.188 |
| 2000 | 0.040 | 0.185 | 0.507 | 0.609 | 0.585 | 3.414 | 3.414 | 3.414 | 3.414 | 3.414 |
| 2001 | 0.021 | 0.091 | 0.225 | 0.263 | 0.254 | 0.805 | 0.805 | 0.805 | 0.805 | 0.805 |

Table 3. Total fishing mortality at age. (*continued*)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2002 | 0.019 | 0.084 | 0.213 | 0.250 | 0.241 | 0.853 | 0.853 | 0.853 | 0.853 | 0.853 |
| 2003 | 0.095 | 0.227 | 0.299 | 0.309 | 0.307 | 0.355 | 0.355 | 0.355 | 0.355 | 0.355 |
| 2004 | 0.047 | 0.209 | 0.520 | 0.608 | 0.588 | 1.921 | 1.921 | 1.921 | 1.921 | 1.921 |
| 2005 | 0.032 | 0.142 | 0.355 | 0.415 | 0.401 | 1.322 | 1.322 | 1.322 | 1.322 | 1.322 |
| 2006 | 0.168 | 0.575 | 0.996 | 1.072 | 1.055 | 1.554 | 1.554 | 1.554 | 1.554 | 1.554 |
| 2007 | 0.214 | 0.551 | 0.759 | 0.788 | 0.782 | 0.932 | 0.932 | 0.932 | 0.932 | 0.932 |
| 2008 | 0.142 | 0.454 | 0.738 | 0.785 | 0.775 | 1.063 | 1.063 | 1.063 | 1.063 | 1.063 |
| 2009 | 0.276 | 0.854 | 1.341 | 1.419 | 1.403 | 1.862 | 1.862 | 1.862 | 1.862 | 1.862 |
| 2010 | 0.641 | 1.397 | 1.756 | 1.801 | 1.792 | 2.011 | 2.011 | 2.011 | 2.011 | 2.011 |
| 2011 | 0.171 | 0.704 | 1.536 | 1.735 | 1.690 | 3.652 | 3.652 | 3.652 | 3.652 | 3.652 |
| 2012 | 0.214 | 0.710 | 1.189 | 1.272 | 1.255 | 1.778 | 1.778 | 1.778 | 1.778 | 1.778 |
| 2013 | 0.140 | 0.533 | 1.040 | 1.146 | 1.123 | 1.951 | 1.951 | 1.951 | 1.951 | 1.951 |
| 2014 | 0.133 | 0.487 | 0.906 | 0.989 | 0.971 | 1.570 | 1.570 | 1.570 | 1.570 | 1.570 |
| 2015 | 0.093 | 0.400 | 0.948 | 1.094 | 1.061 | 2.887 | 2.887 | 2.887 | 2.887 | 2.887 |
| 2016 | 0.099 | 0.371 | 0.716 | 0.787 | 0.771 | 1.314 | 1.314 | 1.314 | 1.314 | 1.314 |
| 2017 | 0.072 | 0.305 | 0.704 | 0.806 | 0.783 | 1.964 | 1.964 | 1.964 | 1.964 | 1.964 |
| 2018 | 0.099 | 0.369 | 0.705 | 0.773 | 0.758 | 1.273 | 1.273 | 1.273 | 1.273 | 1.273 |
| 2019 | 0.101 | 0.357 | 0.641 | 0.695 | 0.683 | 1.051 | 1.051 | 1.051 | 1.051 | 1.051 |
| 2020 | 0.178 | 0.511 | 0.758 | 0.795 | 0.787 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 |
| 2021 | 0.131 | 0.377 | 0.559 | 0.587 | 0.581 | 0.733 | 0.733 | 0.733 | 0.733 | 0.733 |
| 2022 | 0.022 | 0.057 | 0.080 | 0.083 | 0.082 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 |