

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: a_{50} | 2.793 | 0.146 | 2.515 | 3.089 |
| Block 1: 1/slope (increasing) | 0.865 | 0.091 | 0.702 | 1.062 |
| 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 | — | — | — |
| 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 | 0.413 | 0.174 | 0.147 | 0.742 |
| Block 3: Selectivity for age 5 | 0.241 | 0.105 | 0.093 | 0.494 |
| Block 3: Selectivity for age 6 | 0.295 | 0.102 | 0.138 | 0.522 |
| Block 3: Selectivity for age 7 | 0.000 | — | — | — |

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 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 | 0.709 | 0.179 | 0.307 | 0.930 |
| Block 4: Selectivity for age 5 | 0.521 | 0.127 | 0.287 | 0.747 |
| Block 4: Selectivity for age 6 | 0.531 | 0.101 | 0.338 | 0.715 |
| 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 | — | — | — |
| Fleet 1 age comp, logistic-normal: σ | 13.608 | 0.463 | 12.730 | 14.546 |
| Index 2 age comp, logistic-normal: σ | 52.232 | 6.764 | 40.524 | 67.322 |
| Index 3 age comp, logistic-normal: σ | 14.878 | 1.342 | 12.467 | 17.754 |

Table 2. Abundance at age (1000s).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|---------|---------|---------|---------|---------|--------|--------|--------|-------|-------|
| 1968 | 4761165 | 1811038 | 299941 | 80068 | 45127 | 39463 | 31186 | 11323 | 86890 | 763 |
| 1969 | 2406910 | 3781914 | 1372383 | 211035 | 52761 | 28737 | 24803 | 19515 | 7075 | 54746 |
| 1970 | 2686093 | 1918195 | 2890186 | 981698 | 142396 | 34532 | 18590 | 15982 | 12559 | 39765 |
| 1971 | 823836 | 2124821 | 1438293 | 1991794 | 627971 | 87615 | 20933 | 11213 | 9624 | 31489 |
| 1972 | 649527 | 643464 | 1542315 | 930102 | 1163109 | 347695 | 47531 | 11278 | 6028 | 22083 |
| 1973 | 795710 | 507865 | 468349 | 1002762 | 547344 | 649771 | 190406 | 25855 | 6122 | 15245 |
| 1974 | 1038996 | 610905 | 352791 | 277886 | 517629 | 262741 | 303345 | 88062 | 11922 | 9841 |
| 1975 | 1052894 | 788205 | 411595 | 197154 | 131653 | 224990 | 110492 | 126157 | 36493 | 9007 |
| 1976 | 138366 | 778798 | 497802 | 202647 | 77905 | 46382 | 75855 | 36705 | 41710 | 15019 |
| 1977 | 35474 | 97373 | 433069 | 190986 | 56018 | 18150 | 10120 | 16190 | 7779 | 11993 |
| 1978 | 16264 | 27452 | 69029 | 267387 | 104372 | 28725 | 9082 | 5023 | 8014 | 9778 |
| 1979 | 71755 | 13074 | 21446 | 51552 | 191906 | 73371 | 20033 | 6317 | 3491 | 12360 |
| 1980 | 20893 | 57416 | 10095 | 15653 | 35805 | 129876 | 49165 | 13379 | 4214 | 10570 |
| 1981 | 88727 | 16762 | 44629 | 7465 | 11077 | 24762 | 89033 | 33604 | 9136 | 10092 |
| 1982 | 275171 | 70554 | 12737 | 31571 | 4957 | 7117 | 15711 | 56249 | 21201 | 12125 |
| 1983 | 2283617 | 217873 | 53028 | 8818 | 20329 | 3074 | 4349 | 9554 | 34153 | 20223 |
| 1984 | 57910 | 1807878 | 163697 | 36690 | 5673 | 12591 | 1876 | 2642 | 5794 | 32959 |
| 1985 | 122445 | 46260 | 1389968 | 118489 | 25180 | 3787 | 8315 | 1235 | 1737 | 25460 |
| 1986 | 83606 | 97266 | 35060 | 978194 | 78105 | 16041 | 2381 | 5205 | 772 | 16991 |
| 1987 | 76933 | 66716 | 74577 | 25241 | 666163 | 51669 | 10494 | 1552 | 3389 | 11558 |
| 1988 | 343264 | 60831 | 49968 | 51283 | 16096 | 408395 | 31202 | 6305 | 931 | 8960 |
| 1989 | 586135 | 268274 | 44224 | 32413 | 30079 | 8957 | 222749 | 16903 | 3408 | 5342 |
| 1990 | 112774 | 454785 | 191461 | 27666 | 18050 | 15763 | 4586 | 113160 | 8566 | 4430 |
| 1991 | 256442 | 84788 | 299454 | 102289 | 12289 | 7281 | 6129 | 1761 | 43279 | 4963 |
| 1992 | 146227 | 196283 | 58441 | 174982 | 51659 | 5752 | 3310 | 2759 | 790 | 21625 |
| 1993 | 43755 | 114223 | 142507 | 37810 | 102249 | 28625 | 3123 | 1785 | 1484 | 12049 |
| 1994 | 126813 | 34222 | 83196 | 92781 | 22294 | 57252 | 15713 | 1703 | 971 | 7358 |
| 1995 | 40353 | 98013 | 24182 | 51043 | 50246 | 11313 | 28335 | 7712 | 833 | 4072 |
| 1996 | 323873 | 31396 | 70442 | 15337 | 28989 | 26939 | 5933 | 14750 | 4005 | 2545 |
| 1997 | 84216 | 240893 | 20112 | 35659 | 6306 | 10694 | 9533 | 2070 | 5124 | 2272 |
| 1998 | 33210 | 61140 | 145050 | 9018 | 12324 | 1903 | 3063 | 2683 | 579 | 2066 |

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

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|---------|---------|--------|--------|--------|--------|-------|------|------|-----|
| 1999 | 88353 | 23727 | 35337 | 60022 | 2778 | 3255 | 474 | 748 | 651 | 640 |
| 2000 | 1643755 | 56717 | 10431 | 8555 | 8580 | 302 | 318 | 45 | 70 | 120 |
| 2001 | 143553 | 1239899 | 37660 | 5665 | 3891 | 3557 | 121 | 126 | 18 | 75 |
| 2002 | 109804 | 111169 | 880529 | 23333 | 3111 | 2007 | 1791 | 60 | 63 | 46 |
| 2003 | 346513 | 85320 | 79630 | 554820 | 13128 | 1650 | 1040 | 921 | 31 | 56 |
| 2004 | 615766 | 268969 | 60953 | 49915 | 309848 | 6903 | 848 | 530 | 469 | 44 |
| 2005 | 204811 | 460177 | 174399 | 31597 | 21235 | 118900 | 2546 | 309 | 192 | 186 |
| 2006 | 528992 | 149079 | 278938 | 79226 | 11126 | 6547 | 34837 | 733 | 88 | 108 |
| 2007 | 134876 | 367333 | 80117 | 100094 | 19900 | 2320 | 1271 | 6604 | 138 | 37 |
| 2008 | 216494 | 96543 | 213328 | 33467 | 31255 | 5338 | 587 | 315 | 1629 | 43 |
| 2009 | 81688 | 157955 | 58874 | 98062 | 11986 | 9826 | 1597 | 173 | 92 | 488 |
| 2010 | 49542 | 54704 | 77371 | 17617 | 18988 | 1849 | 1390 | 219 | 23 | 79 |
| 2011 | 134941 | 29465 | 19785 | 12779 | 1456 | 1094 | 93 | 67 | 10 | 5 |
| 2012 | 90475 | 87166 | 13163 | 4943 | 1911 | 167 | 113 | 9 | 7 | 1 |
| 2013 | 65663 | 57755 | 37778 | 3099 | 679 | 198 | 16 | 10 | 1 | 1 |
| 2014 | 73626 | 43621 | 27716 | 10859 | 566 | 98 | 26 | 2 | 1 | 0 |
| 2015 | 156598 | 50159 | 22325 | 9038 | 2378 | 101 | 16 | 4 | 0 | 0 |
| 2016 | 266317 | 108530 | 26822 | 7933 | 2239 | 488 | 19 | 3 | 1 | 0 |
| 2017 | 28779 | 190547 | 62960 | 11180 | 2470 | 598 | 123 | 5 | 1 | 0 |
| 2018 | 122748 | 20548 | 109951 | 25971 | 3429 | 649 | 148 | 30 | 1 | 0 |
| 2019 | 71484 | 88365 | 12109 | 47261 | 8448 | 964 | 173 | 39 | 8 | 0 |
| 2020 | 88683 | 52483 | 54759 | 5744 | 17706 | 2798 | 305 | 54 | 12 | 3 |
| 2021 | 96395 | 63338 | 30306 | 22620 | 1765 | 4663 | 695 | 74 | 13 | 3 |
| 2022 | 430476 | 71299 | 39999 | 14919 | 8936 | 622 | 1572 | 231 | 25 | 5 |

Table 3. Total fishing mortality at age.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1968 | 0.030 | 0.077 | 0.152 | 0.217 | 0.251 | 0.264 | 0.269 | 0.270 | 0.271 | 0.271 |
| 1969 | 0.027 | 0.069 | 0.135 | 0.193 | 0.224 | 0.236 | 0.239 | 0.241 | 0.241 | 0.241 |
| 1970 | 0.034 | 0.088 | 0.172 | 0.247 | 0.286 | 0.301 | 0.306 | 0.307 | 0.308 | 0.308 |

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

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1971 | 0.047 | 0.120 | 0.236 | 0.338 | 0.391 | 0.412 | 0.418 | 0.421 | 0.421 | 0.422 |
| 1972 | 0.046 | 0.118 | 0.231 | 0.330 | 0.382 | 0.402 | 0.409 | 0.411 | 0.412 | 0.412 |
| 1973 | 0.064 | 0.164 | 0.322 | 0.461 | 0.534 | 0.562 | 0.571 | 0.574 | 0.575 | 0.575 |
| 1974 | 0.076 | 0.195 | 0.382 | 0.547 | 0.633 | 0.666 | 0.677 | 0.681 | 0.682 | 0.682 |
| 1975 | 0.102 | 0.260 | 0.509 | 0.729 | 0.843 | 0.887 | 0.902 | 0.907 | 0.908 | 0.909 |
| 1976 | 0.151 | 0.387 | 0.758 | 1.086 | 1.257 | 1.322 | 1.344 | 1.352 | 1.354 | 1.354 |
| 1977 | 0.056 | 0.144 | 0.282 | 0.404 | 0.468 | 0.492 | 0.501 | 0.503 | 0.504 | 0.504 |
| 1978 | 0.018 | 0.047 | 0.092 | 0.132 | 0.152 | 0.160 | 0.163 | 0.164 | 0.164 | 0.164 |
| 1979 | 0.023 | 0.059 | 0.115 | 0.165 | 0.190 | 0.200 | 0.204 | 0.205 | 0.205 | 0.205 |
| 1980 | 0.020 | 0.052 | 0.102 | 0.146 | 0.169 | 0.178 | 0.181 | 0.181 | 0.182 | 0.182 |
| 1981 | 0.029 | 0.075 | 0.146 | 0.209 | 0.242 | 0.255 | 0.259 | 0.261 | 0.261 | 0.261 |
| 1982 | 0.033 | 0.086 | 0.168 | 0.240 | 0.278 | 0.292 | 0.297 | 0.299 | 0.299 | 0.300 |
| 1983 | 0.034 | 0.086 | 0.168 | 0.241 | 0.279 | 0.294 | 0.299 | 0.300 | 0.301 | 0.301 |
| 1984 | 0.025 | 0.063 | 0.123 | 0.176 | 0.204 | 0.215 | 0.219 | 0.220 | 0.220 | 0.220 |
| 1985 | 0.030 | 0.077 | 0.151 | 0.217 | 0.251 | 0.264 | 0.268 | 0.270 | 0.270 | 0.270 |
| 1986 | 0.026 | 0.066 | 0.129 | 0.184 | 0.213 | 0.224 | 0.228 | 0.229 | 0.230 | 0.230 |
| 1987 | 0.035 | 0.089 | 0.174 | 0.250 | 0.289 | 0.304 | 0.309 | 0.311 | 0.312 | 0.312 |
| 1988 | 0.046 | 0.119 | 0.233 | 0.334 | 0.386 | 0.406 | 0.413 | 0.415 | 0.416 | 0.416 |
| 1989 | 0.054 | 0.137 | 0.269 | 0.385 | 0.446 | 0.469 | 0.477 | 0.480 | 0.481 | 0.481 |
| 1990 | 0.085 | 0.218 | 0.427 | 0.611 | 0.708 | 0.745 | 0.757 | 0.761 | 0.762 | 0.763 |
| 1991 | 0.067 | 0.172 | 0.337 | 0.483 | 0.559 | 0.588 | 0.598 | 0.601 | 0.602 | 0.603 |
| 1992 | 0.047 | 0.120 | 0.235 | 0.337 | 0.390 | 0.411 | 0.418 | 0.420 | 0.421 | 0.421 |
| 1993 | 0.046 | 0.117 | 0.229 | 0.328 | 0.380 | 0.400 | 0.406 | 0.409 | 0.409 | 0.409 |
| 1994 | 0.058 | 0.147 | 0.289 | 0.413 | 0.478 | 0.503 | 0.512 | 0.514 | 0.515 | 0.516 |
| 1995 | 0.051 | 0.130 | 0.255 | 0.366 | 0.423 | 0.445 | 0.453 | 0.455 | 0.456 | 0.456 |
| 1996 | 0.096 | 0.245 | 0.481 | 0.689 | 0.797 | 0.839 | 0.853 | 0.857 | 0.859 | 0.859 |
| 1997 | 0.120 | 0.307 | 0.602 | 0.862 | 0.998 | 1.050 | 1.068 | 1.073 | 1.075 | 1.076 |
| 1998 | 0.136 | 0.348 | 0.682 | 0.977 | 1.131 | 1.190 | 1.210 | 1.217 | 1.219 | 1.219 |
| 1999 | 0.243 | 0.622 | 1.218 | 1.745 | 2.020 | 2.125 | 2.161 | 2.172 | 2.176 | 2.177 |
| 2000 | 0.082 | 0.209 | 0.410 | 0.588 | 0.681 | 0.716 | 0.728 | 0.732 | 0.733 | 0.733 |
| 2001 | 0.056 | 0.142 | 0.279 | 0.399 | 0.462 | 0.486 | 0.494 | 0.497 | 0.498 | 0.498 |

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

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2002 | 0.052 | 0.134 | 0.262 | 0.375 | 0.434 | 0.457 | 0.464 | 0.467 | 0.468 | 0.468 |
| 2003 | 0.053 | 0.136 | 0.267 | 0.383 | 0.443 | 0.466 | 0.474 | 0.476 | 0.477 | 0.477 |
| 2004 | 0.091 | 0.233 | 0.457 | 0.655 | 0.758 | 0.797 | 0.811 | 0.815 | 0.816 | 0.817 |
| 2005 | 0.118 | 0.301 | 0.589 | 0.844 | 0.977 | 1.028 | 1.045 | 1.050 | 1.052 | 1.053 |
| 2006 | 0.165 | 0.421 | 0.825 | 1.182 | 1.368 | 1.439 | 1.463 | 1.471 | 1.473 | 1.474 |
| 2007 | 0.134 | 0.343 | 0.673 | 0.964 | 1.116 | 1.174 | 1.194 | 1.200 | 1.202 | 1.202 |
| 2008 | 0.115 | 0.295 | 0.577 | 0.827 | 0.957 | 1.007 | 1.024 | 1.029 | 1.031 | 1.031 |
| 2009 | 0.201 | 0.514 | 1.007 | 1.442 | 1.669 | 1.756 | 1.785 | 1.795 | 1.798 | 1.799 |
| 2010 | 0.320 | 0.817 | 1.601 | 2.293 | 2.654 | 2.793 | 2.839 | 2.854 | 2.859 | 2.861 |
| 2011 | 0.237 | 0.606 | 1.187 | 1.700 | 1.968 | 2.071 | 2.105 | 2.117 | 2.120 | 2.121 |
| 2012 | 0.249 | 0.636 | 1.246 | 1.785 | 2.067 | 2.174 | 2.211 | 2.222 | 2.226 | 2.227 |
| 2013 | 0.209 | 0.534 | 1.047 | 1.499 | 1.735 | 1.826 | 1.856 | 1.866 | 1.869 | 1.870 |
| 2014 | 0.184 | 0.470 | 0.921 | 1.319 | 1.526 | 1.606 | 1.633 | 1.641 | 1.644 | 1.645 |
| 2015 | 0.167 | 0.426 | 0.835 | 1.196 | 1.384 | 1.456 | 1.480 | 1.488 | 1.491 | 1.491 |
| 2016 | 0.135 | 0.345 | 0.675 | 0.967 | 1.119 | 1.178 | 1.197 | 1.204 | 1.206 | 1.206 |
| 2017 | 0.137 | 0.350 | 0.686 | 0.982 | 1.137 | 1.196 | 1.216 | 1.222 | 1.224 | 1.225 |
| 2018 | 0.129 | 0.329 | 0.644 | 0.923 | 1.068 | 1.124 | 1.143 | 1.149 | 1.151 | 1.151 |
| 2019 | 0.109 | 0.279 | 0.546 | 0.782 | 0.905 | 0.952 | 0.968 | 0.973 | 0.975 | 0.975 |
| 2020 | 0.137 | 0.349 | 0.684 | 0.980 | 1.134 | 1.193 | 1.213 | 1.220 | 1.222 | 1.222 |
| 2021 | 0.102 | 0.260 | 0.509 | 0.729 | 0.843 | 0.887 | 0.902 | 0.907 | 0.909 | 0.909 |
| 2022 | 0.016 | 0.042 | 0.082 | 0.117 | 0.135 | 0.142 | 0.145 | 0.145 | 0.146 | 0.146 |