Appendix K1:

Model Comparisons for TCSAM02 Models B1, AG4, and AG1c

William Stockhausen

Population processes

Natural mortality

Natural Mortality

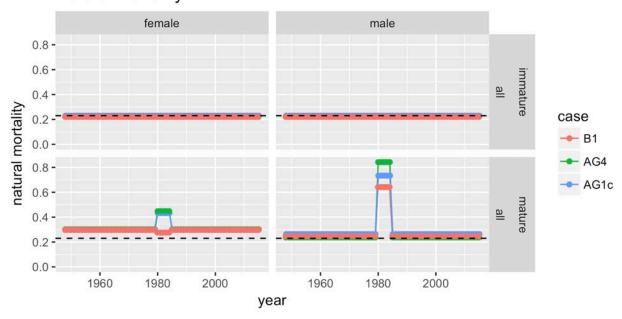


Figure 1. Estimated natural mortality rates, by year.

Probability of terminal molt

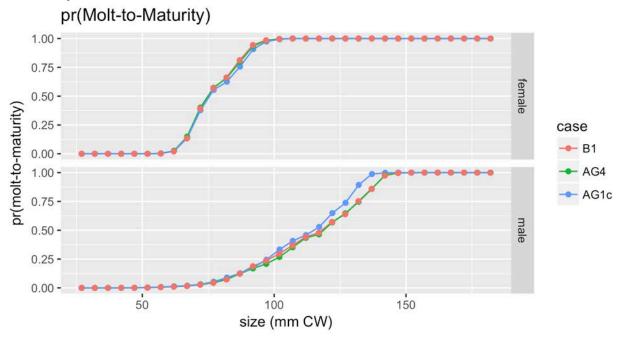


Figure 2. Probability of terminal molt.

Mean growth

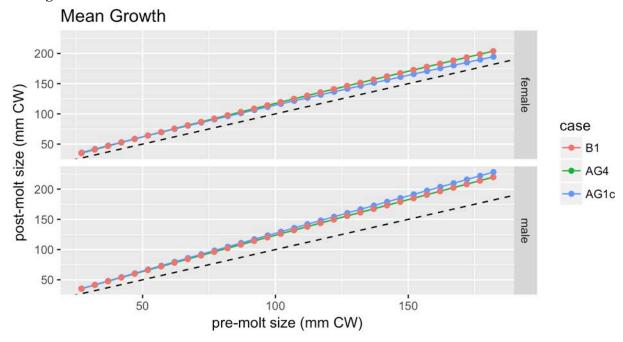


Figure 3. Mean growth.

Growth matrices

male growth: 1948-2015

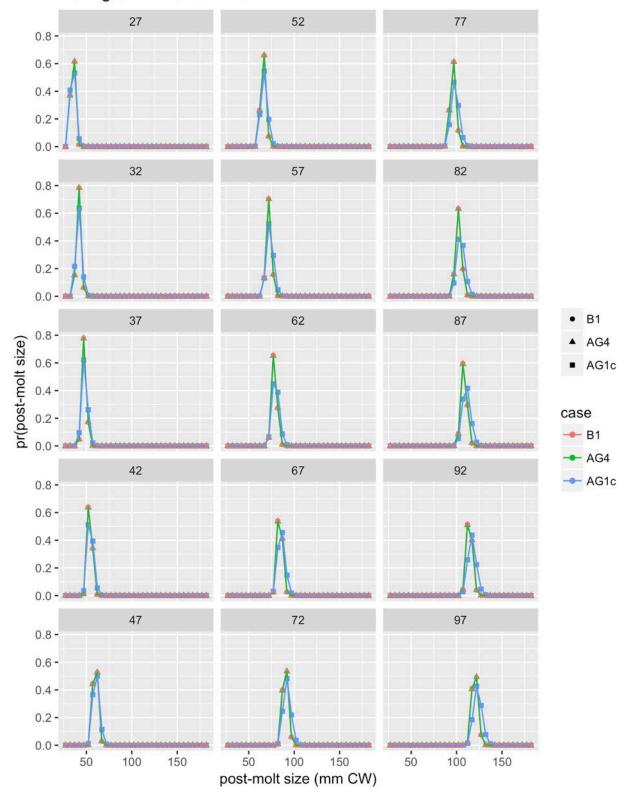


Figure 4. Growth matrices for males during 1948-2015, page 1.

male growth: 1948-2015 102 152 127 1.00 -0.75 -0.50 -0.25 -0.00 -107 132 157 1.00 -0.75 -0.50 -0.25 -0.00 -112 162 • B1 137 1.00 pr(post-molt size) AG4 0.75 -■ AG1c 0.50 case 0.25 -**→** B1 0.00 -- AG4 117 142 167 - AG1c 1.00 -0.75 -0.50 -0.25 -0.00 -172 122 147 1.00 -0.75 -0.50 -0.25 -0.00 -50 50 100 100 150 150 50 100 150 post-molt size (mm CW)

Figure 5. Growth matrices for males during 1948-2015, page 2.

male growth: 1948-2015

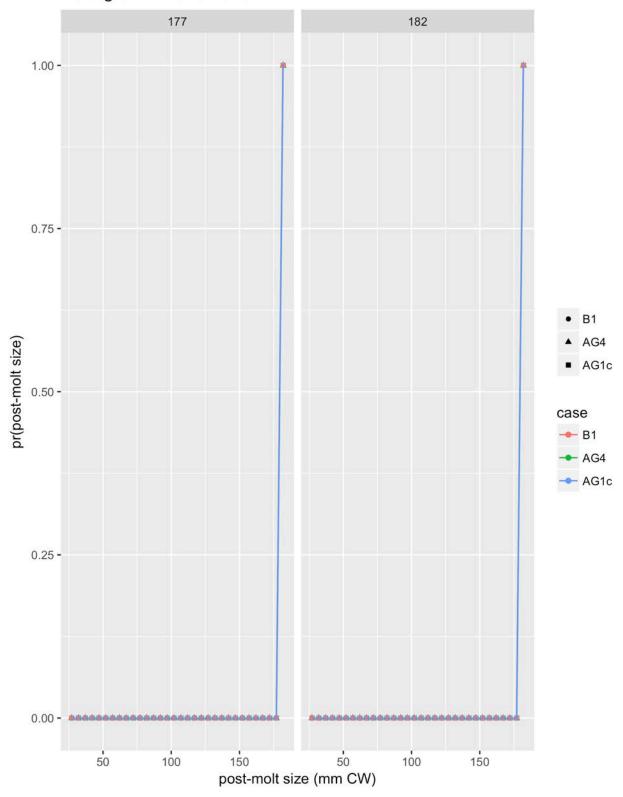


Figure 6. Growth matrices for males during 1948-2015, page 3.

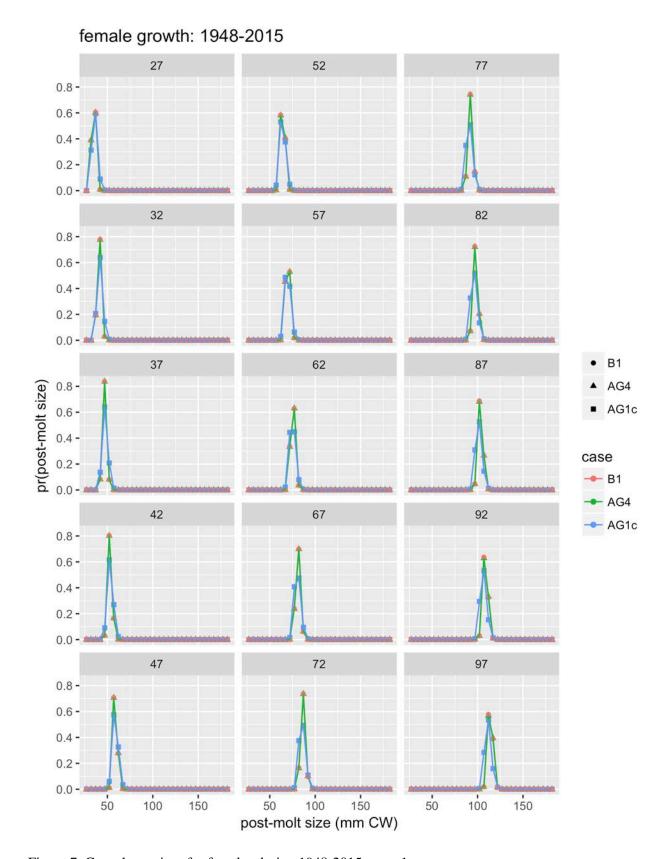


Figure 7. Growth matrices for females during 1948-2015, page 1.

female growth: 1948-2015 102 152 127 1.00 -0.75 -0.50 -0.25 -0.00 -107 132 157 1.00 -0.75 -0.50 -0.25 -0.00 -112 162 B1 137 1.00 pr(post-molt size) AG4 0.75 -■ AG1c 0.50 case 0.25 -**→** B1 0.00 -- AG4 117 142 167 - AG1c 1.00 -0.75 -0.50 -0.25 -0.00 -172 122 147 1.00 -0.75 -0.50 -0.25 -0.00 -100 50 50 100 150 150 50 100 150 post-molt size (mm CW)

Figure 8. Growth matrices for females during 1948-2015, page 2.

female growth: 1948-2015

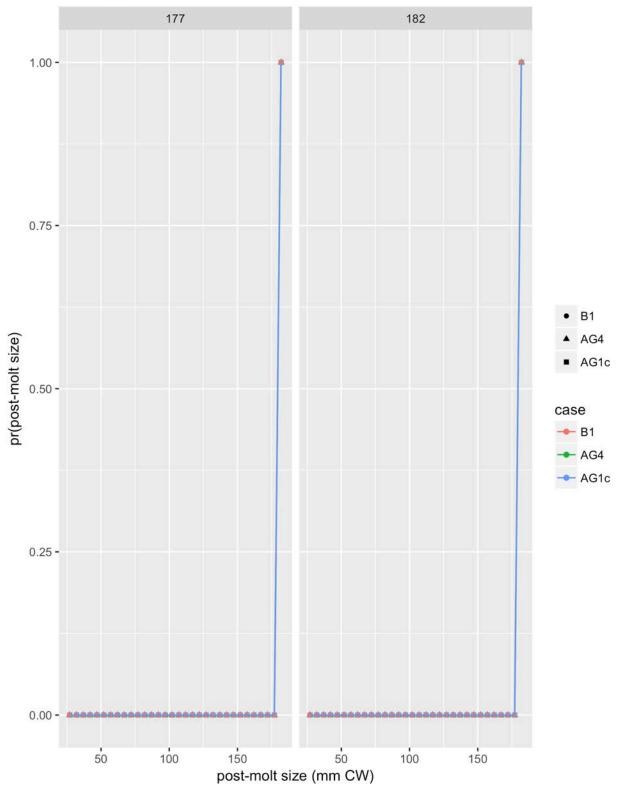


Figure 9. Growth matrices for females during 1948-2015, page 3.

Size distribution for recruits

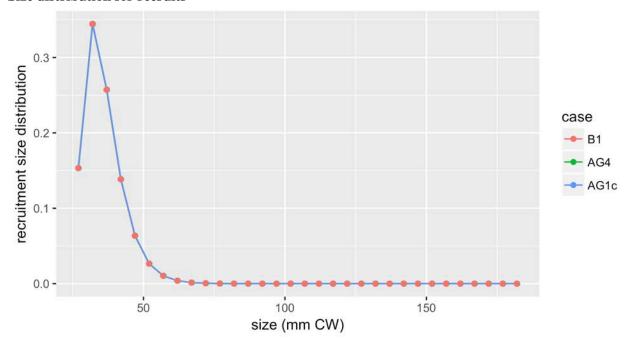


Figure 10. Size distribution for recruits.

Population results

Recruitment

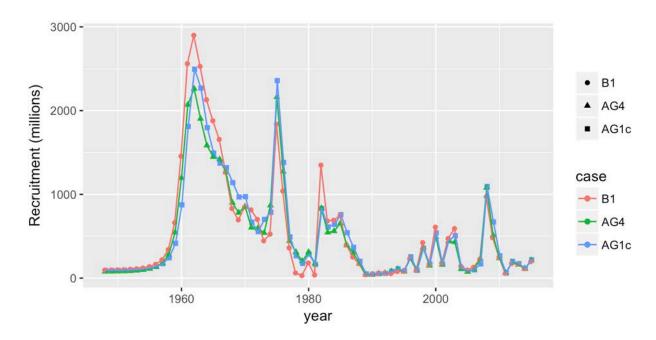


Figure 11. Estimated annual recruitment.

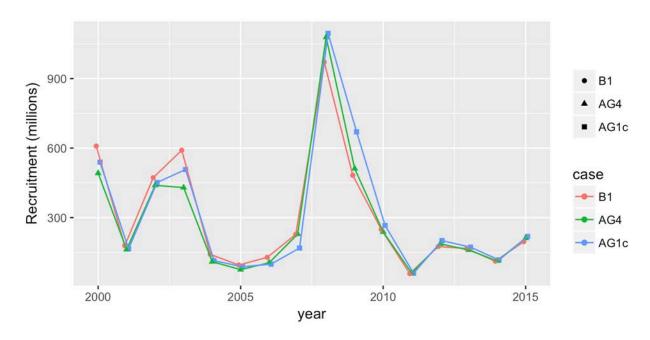


Figure 12. Estimated recent recruitment.

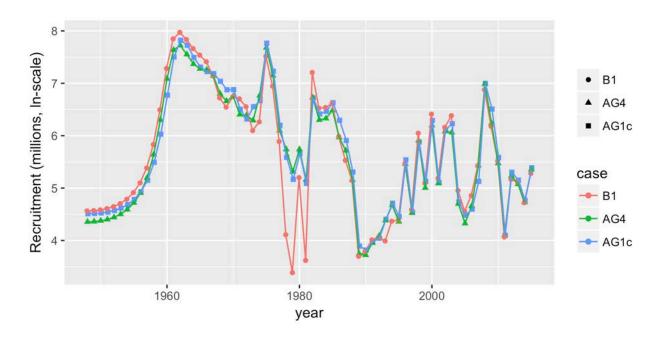


Figure 13. Estimated annual recruitment, on In-scale.

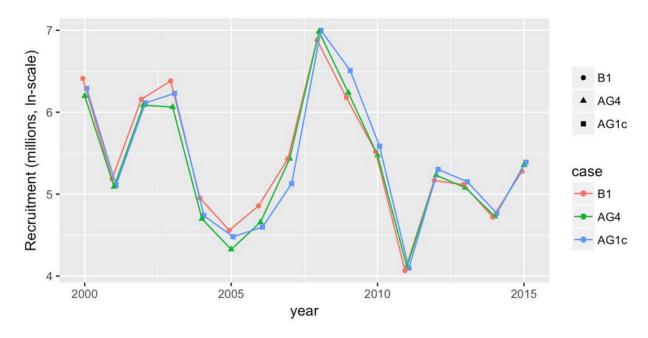


Figure 14. Estimated recent recruitment, on ln-scale.

Mature biomass

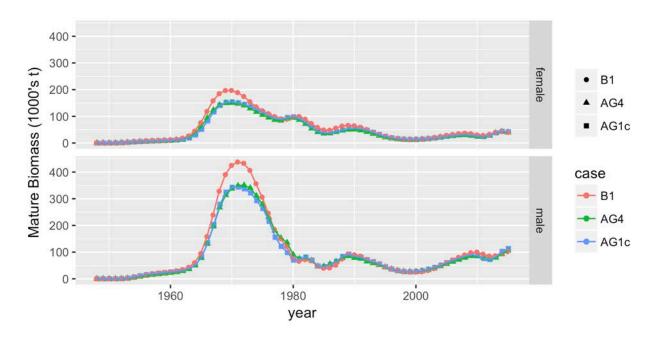


Figure 15. Estimated annual mature biomass.

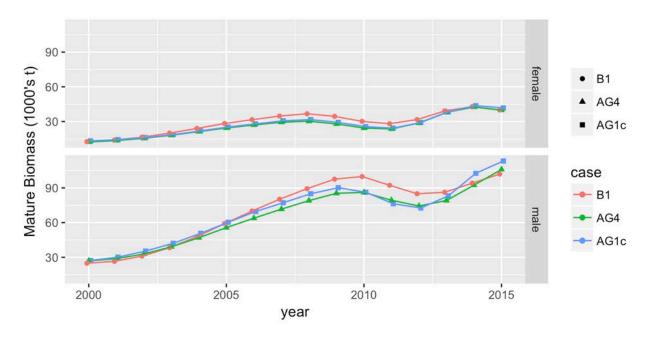


Figure 16. Estimated recent mature biomass.

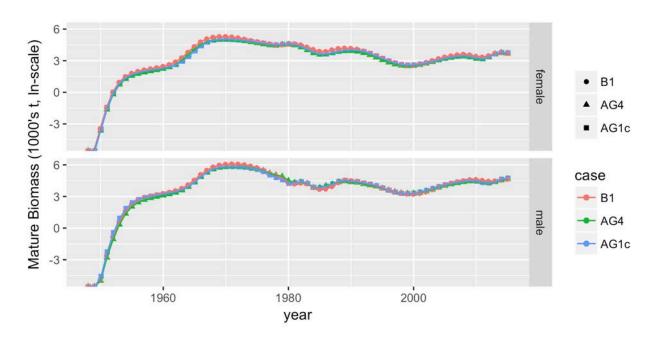


Figure 17. Estimated annual mature biomass, on ln-scale.

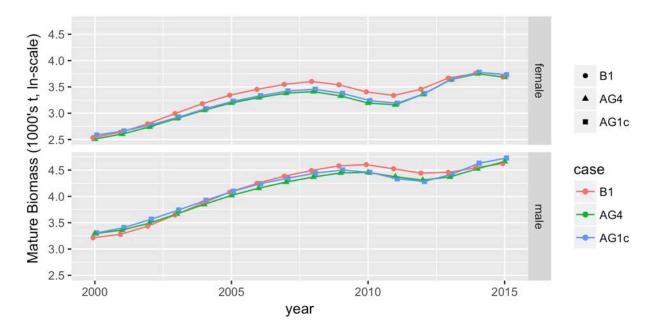


Figure 18. Estimated recent mature biomass, on ln-scale.

Population abundance

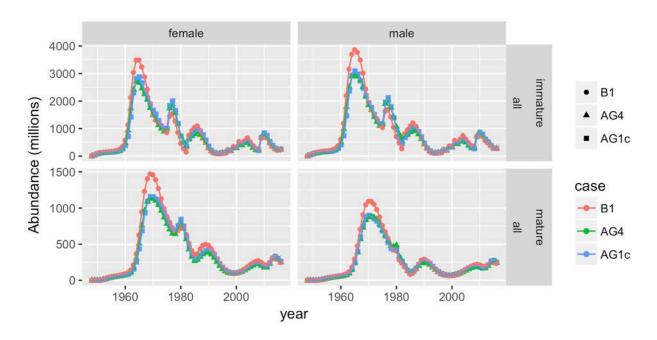


Figure 19. Population abundance trends.

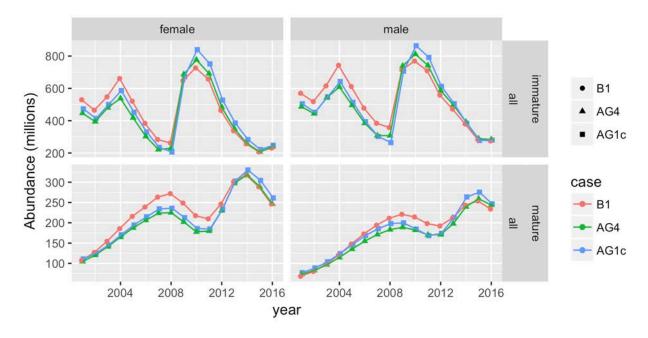


Figure 20. Recent population abundance trends.

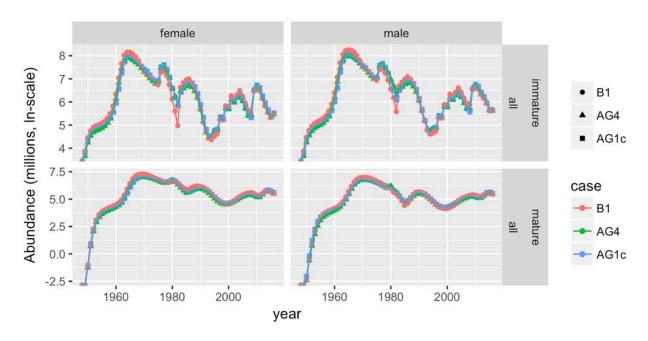


Figure 21. Ln-scale population abundance trends.

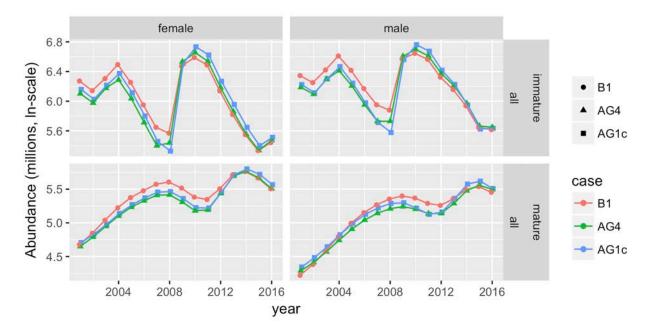


Figure 22. Recent ln-scale population abundance trends.

Biomass

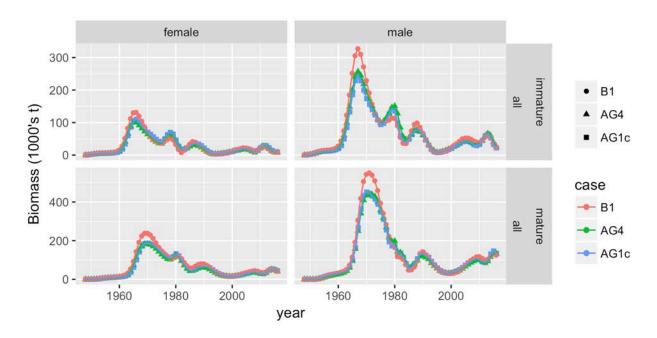


Figure 23. Population biomass trends.

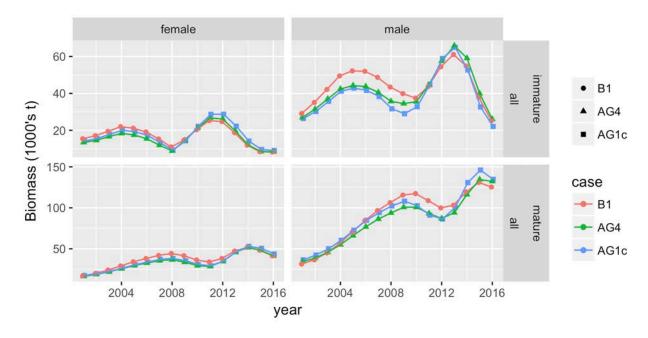


Figure 24. Recent population biomass trends.

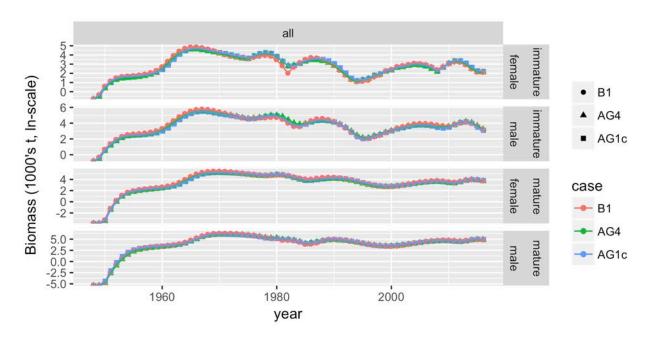


Figure 25. Ln-scale population biomass trends.

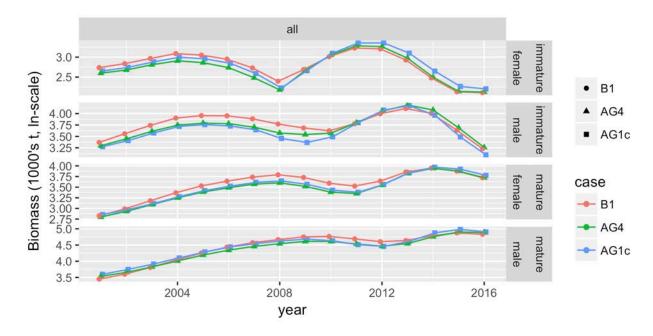


Figure 26. Recent ln-scale population biomass trends.

Surveys

Survey catchability

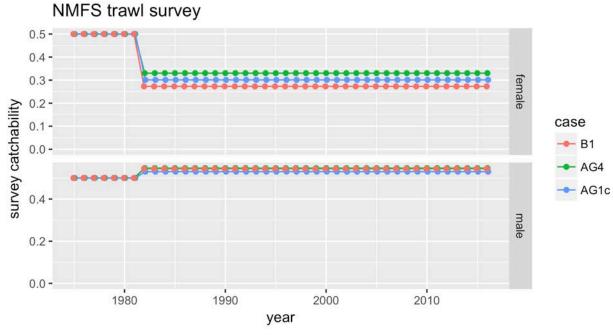
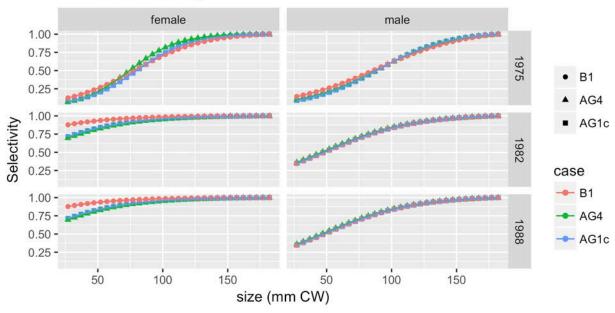


Figure 27. Survey catchabilities for NMFS trawl survey.

Survey selectivity functions

NMFS trawl survey



NMFS trawl survey.1

Survey abundance

NMFS trawl survey

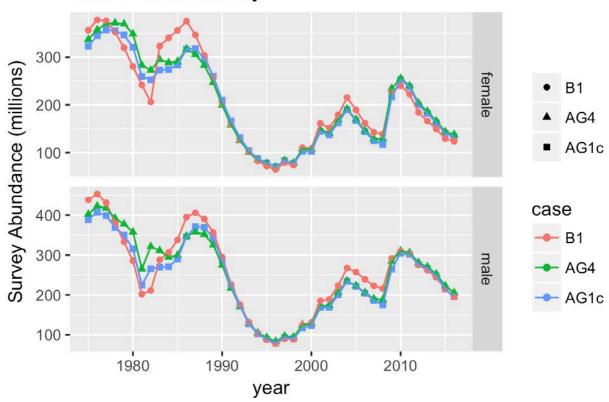


Figure 29. NMFS trawl survey catch abundance.

Survey biomass

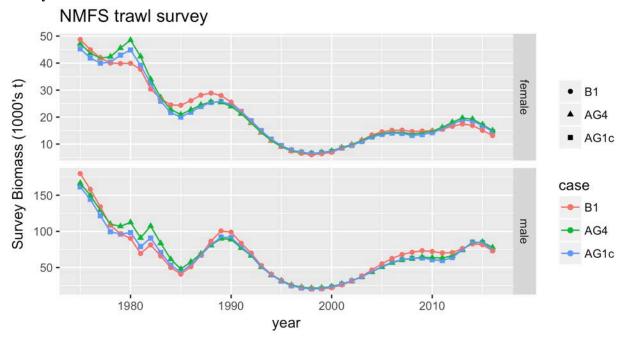


Figure 30. NMFS trawl survey catch biomass.

Survey size compositions

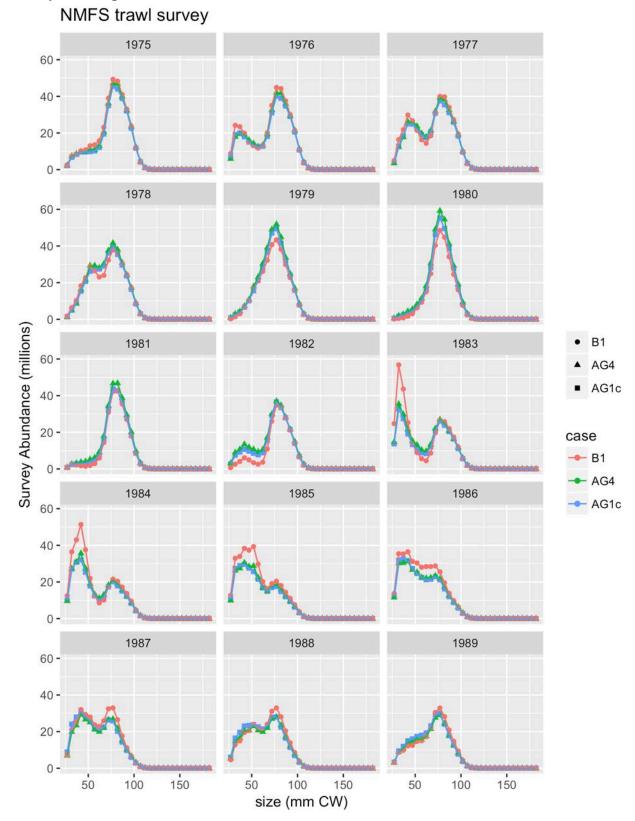


Figure 31. NMFS trawl survey catch abundance for female all all, (1 of 3).

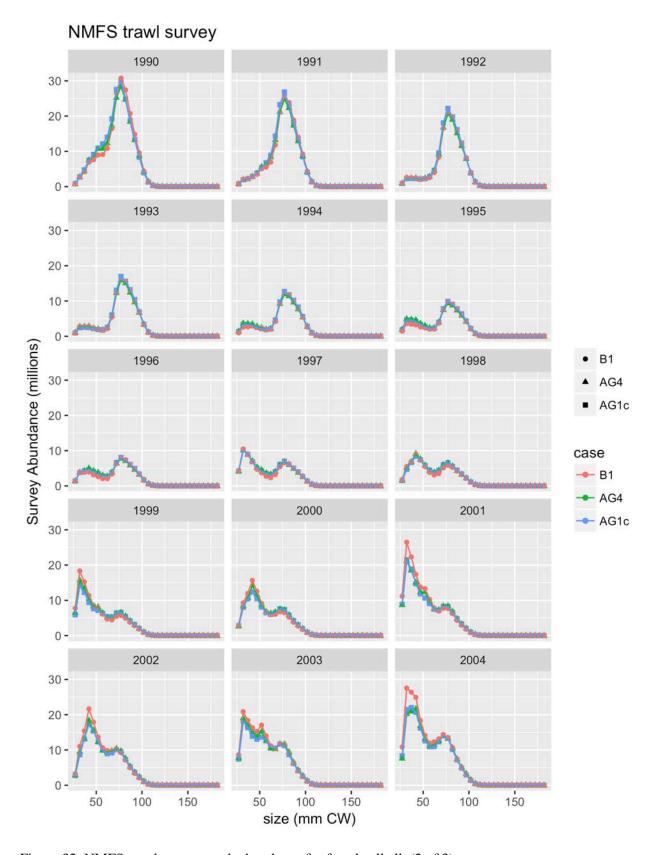


Figure 32. NMFS trawl survey catch abundance for female all all, (2 of 3).

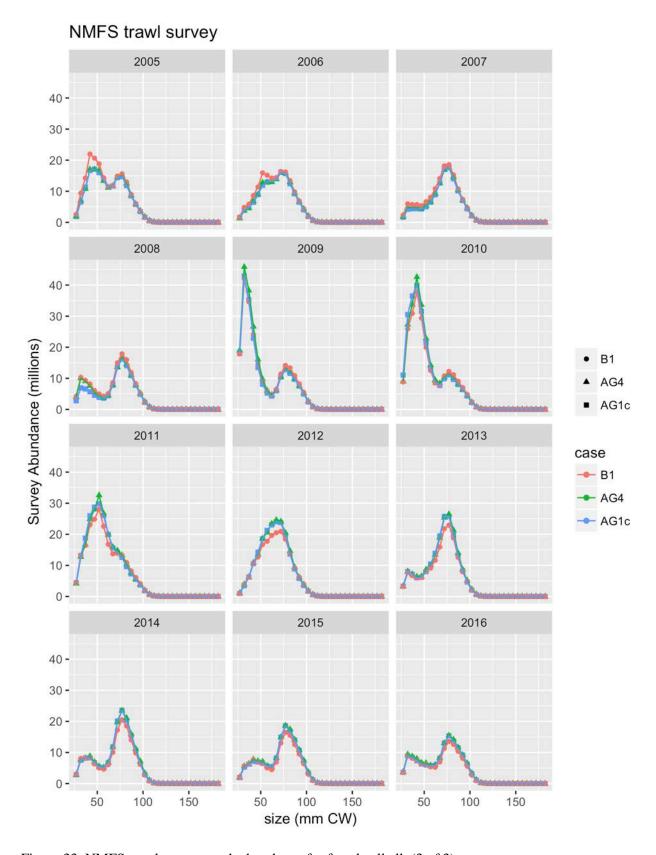


Figure 33. NMFS trawl survey catch abundance for female all all, (3 of 3).

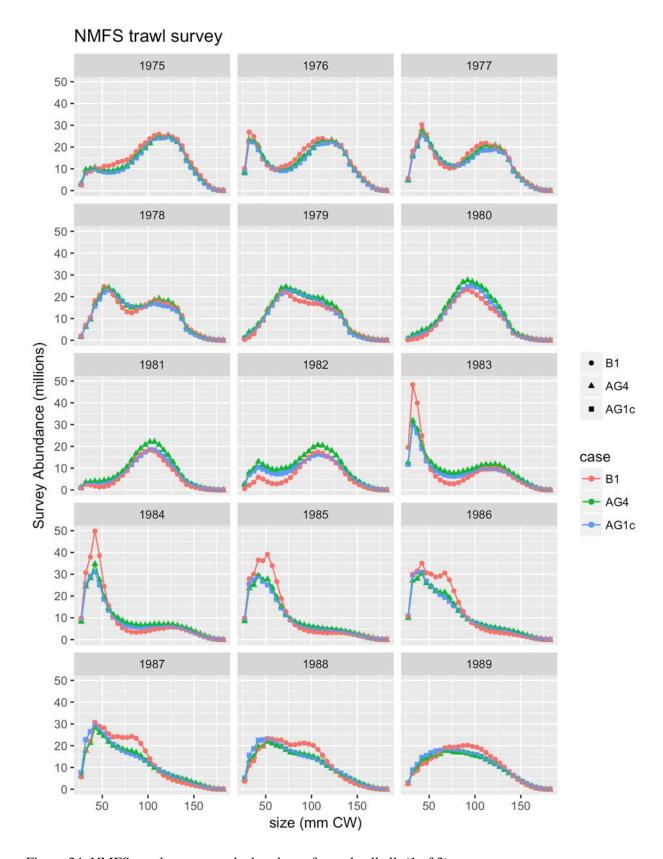


Figure 34. NMFS trawl survey catch abundance for male all all, (1 of 3).

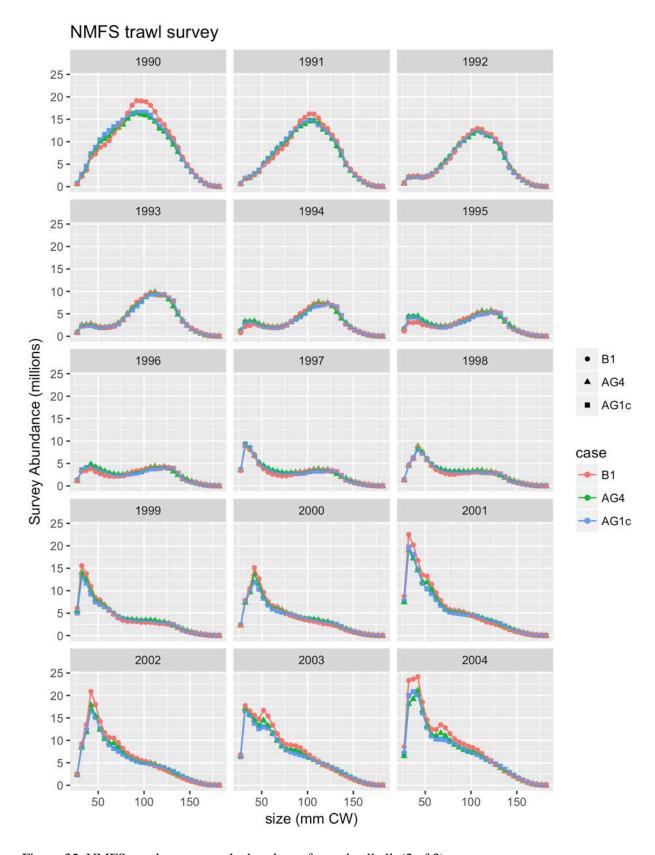


Figure 35. NMFS trawl survey catch abundance for male all all, (2 of 3).

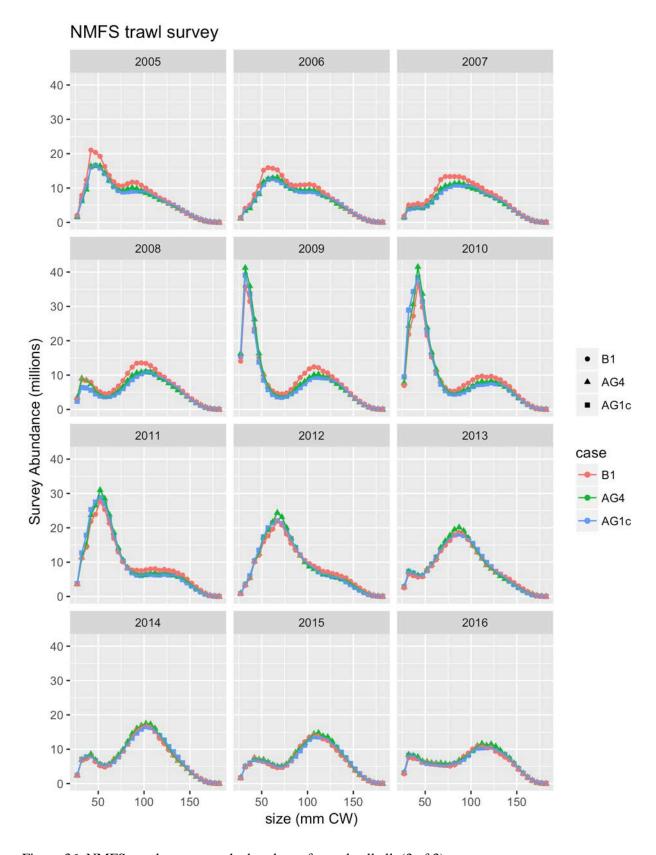


Figure 36. NMFS trawl survey catch abundance for male all all, (3 of 3).

Fisheries

Fishery catchability

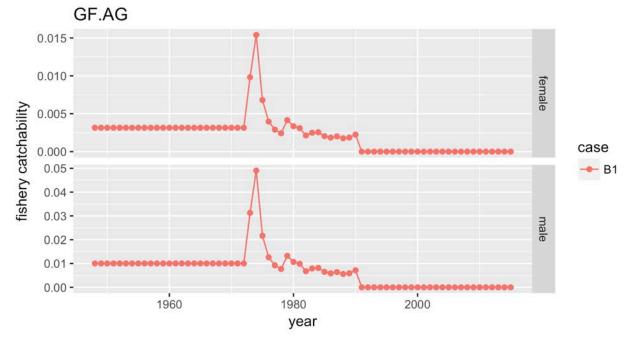


Figure 37. Fishery catchabilities for GF.AG.

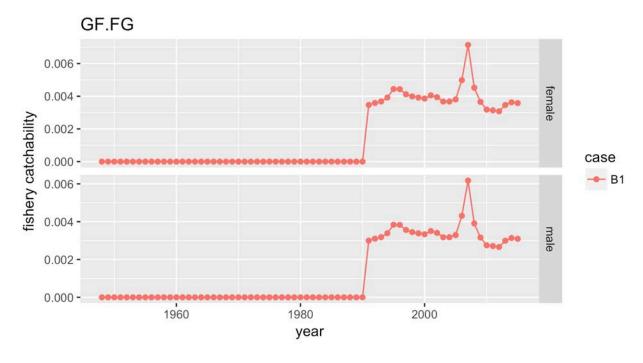


Figure 38. Fishery catchabilities for GF.FG.

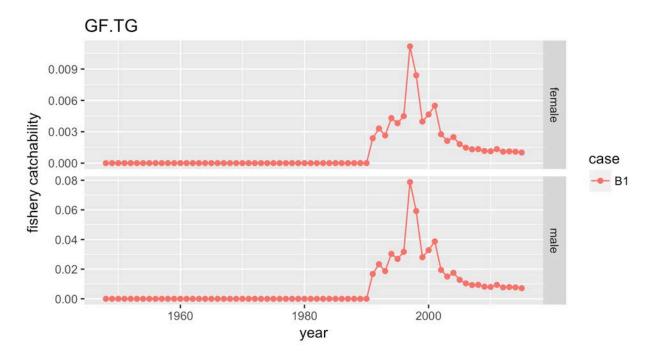


Figure 39. Fishery catchabilities for GF.TG.

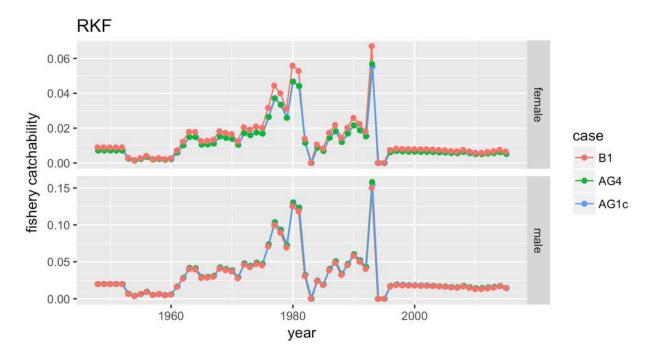


Figure 40. Fishery catchabilities for RKF.

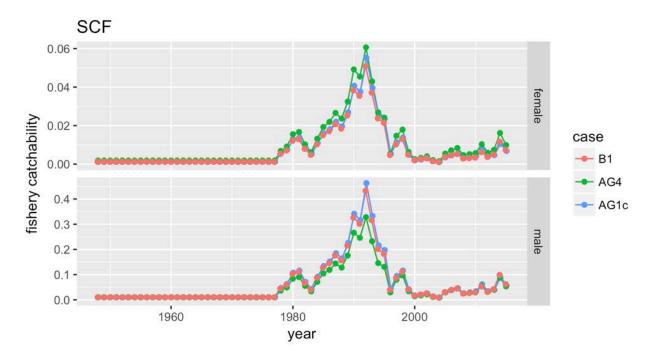


Figure 41. Fishery catchabilities for SCF.

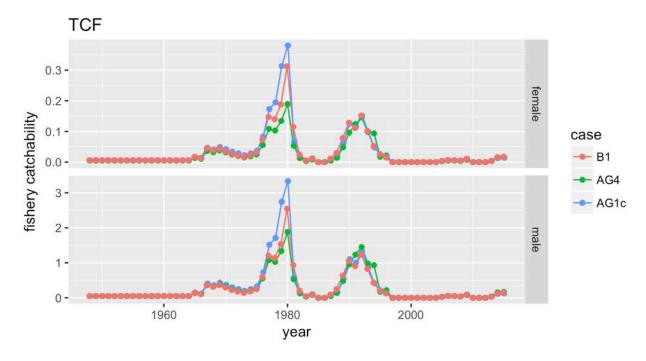


Figure 42. Fishery catchabilities for TCF.

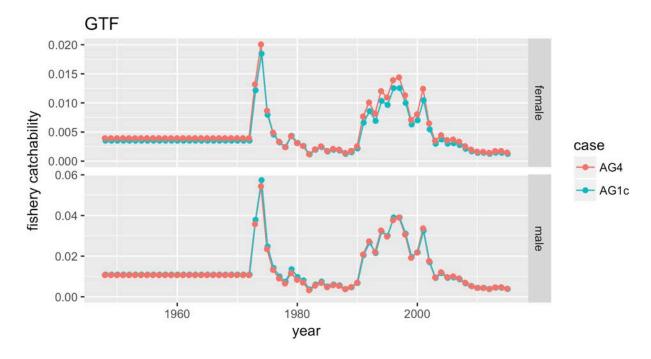


Figure 43. Fishery catchabilities for GTF.

Total selectivity functions

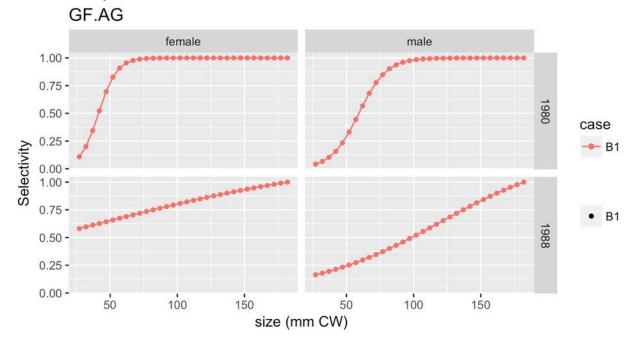


Figure 44. Selectivity functions for GF.AG(1 of 1).

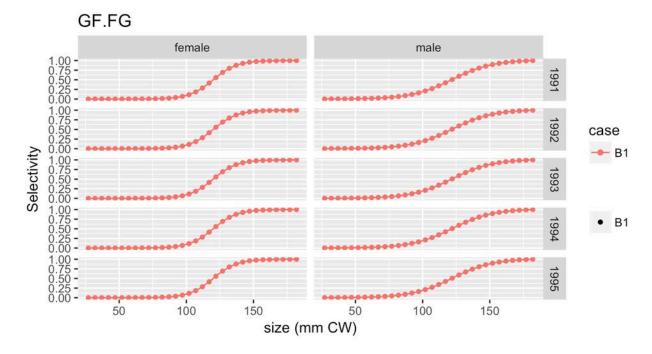


Figure 45. Selectivity functions for GF.FG(1 of 5).

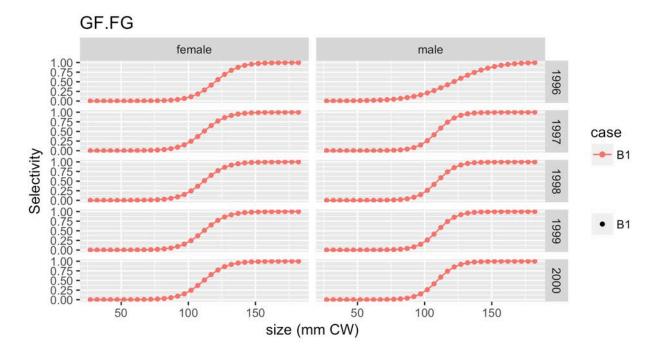


Figure 46. Selectivity functions for GF.FG(2 of 5).

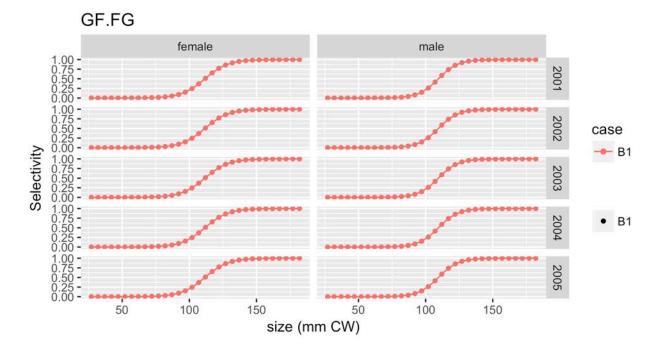


Figure 47. Selectivity functions for GF.FG(3 of 5).

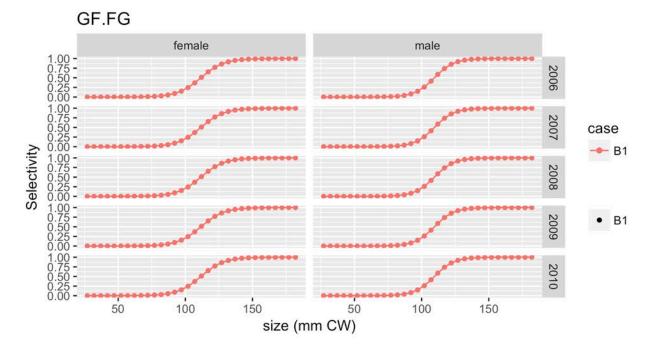


Figure 48. Selectivity functions for GF.FG(4 of 5).

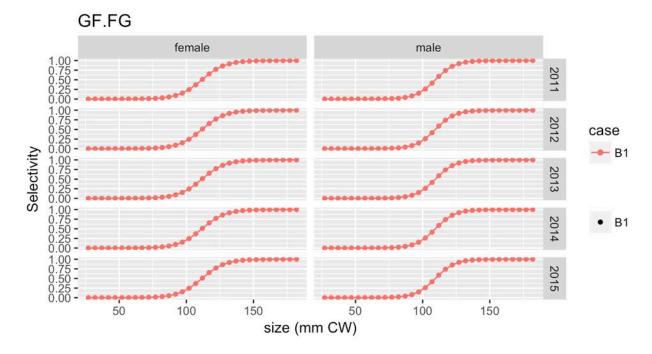


Figure 49. Selectivity functions for GF.FG(5 of 5).

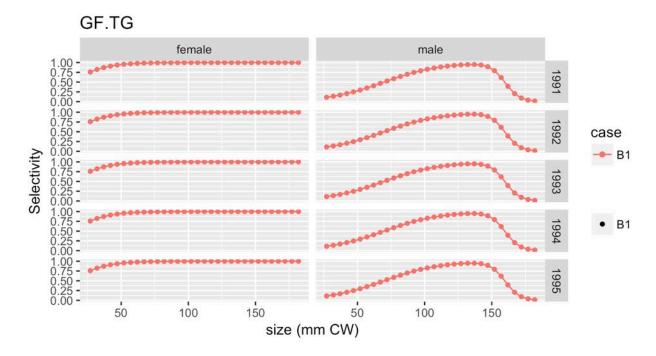


Figure 50. Selectivity functions for GF.TG(1 of 5).

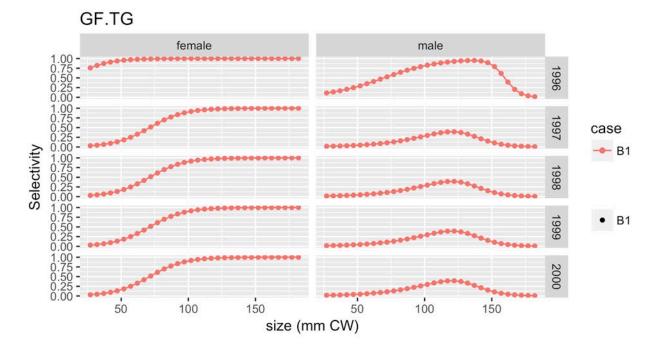


Figure 51. Selectivity functions for GF.TG(2 of 5).

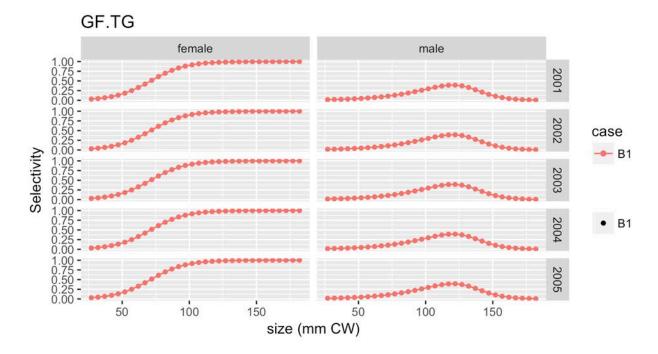


Figure 52. Selectivity functions for GF.TG(3 of 5).

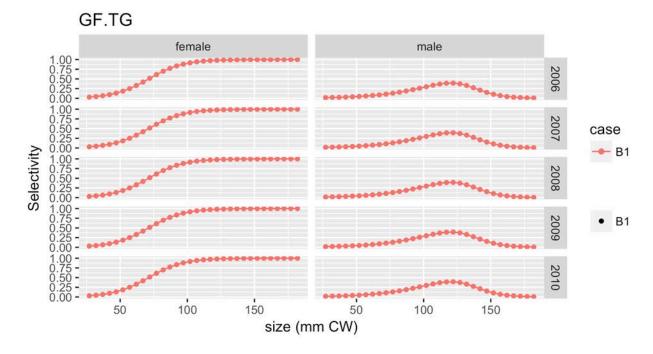


Figure 53. Selectivity functions for GF.TG(4 of 5).

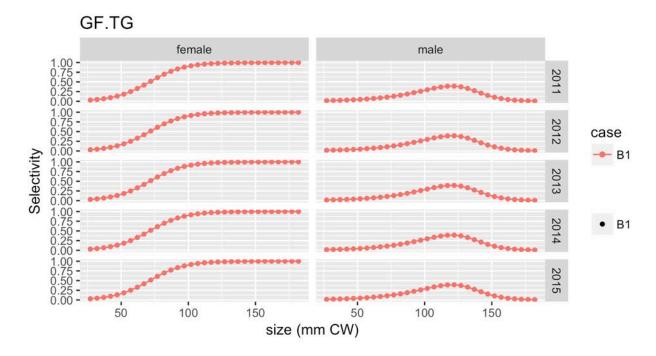


Figure 54. Selectivity functions for GF.TG(5 of 5).

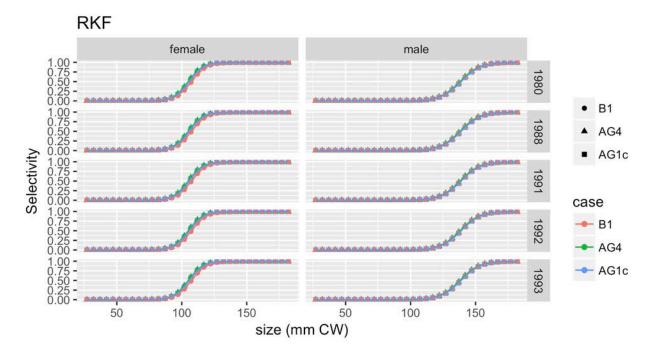


Figure 55. Selectivity functions for RKF(1 of 5).

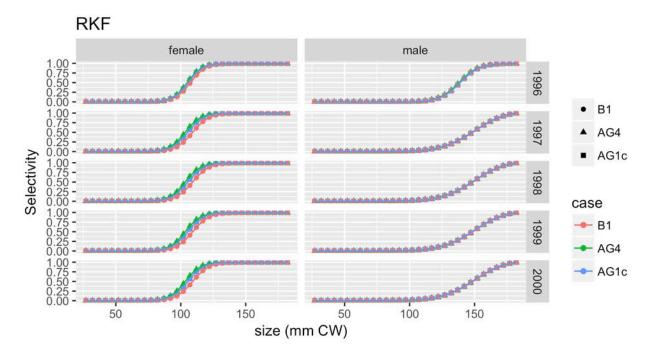


Figure 56. Selectivity functions for RKF(2 of 5).

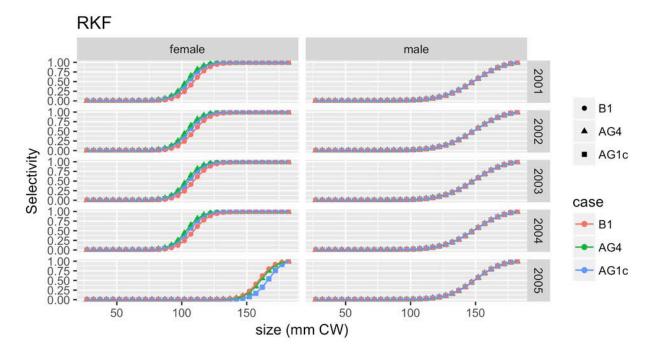


Figure 57. Selectivity functions for RKF(3 of 5).

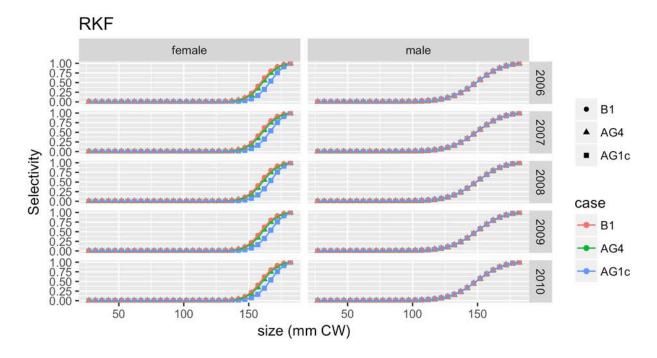


Figure 58. Selectivity functions for RKF(4 of 5).

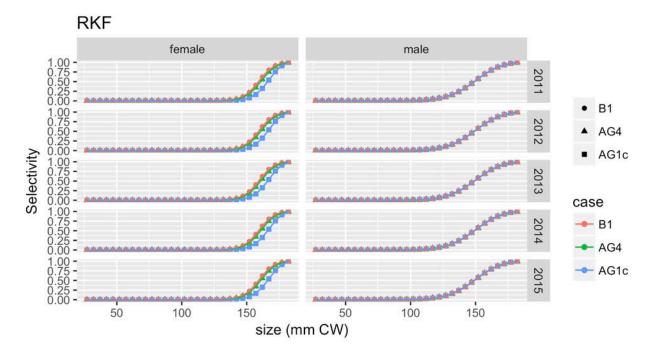


Figure 59. Selectivity functions for RKF(5 of 5).

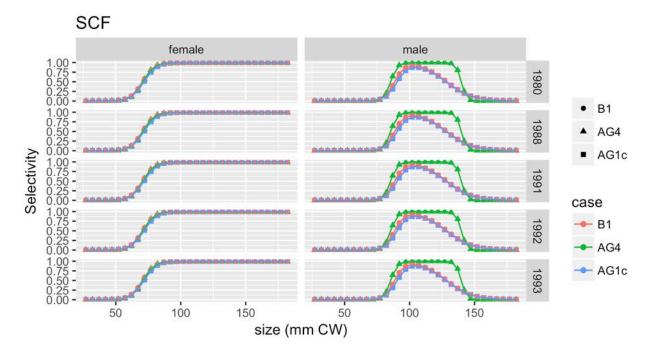


Figure 60. Selectivity functions for SCF(1 of 6).

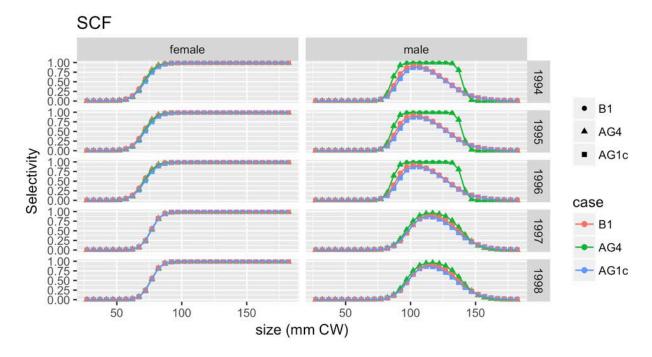


Figure 61. Selectivity functions for SCF(2 of 6).

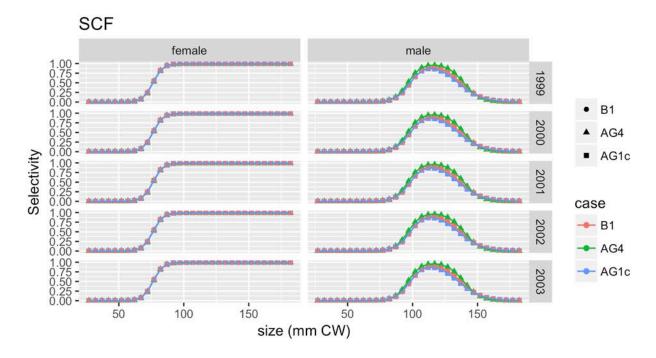


Figure 62. Selectivity functions for SCF(3 of 6).

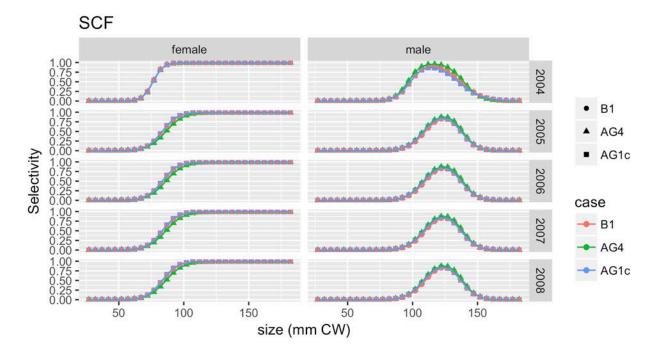


Figure 63. Selectivity functions for SCF(4 of 6).

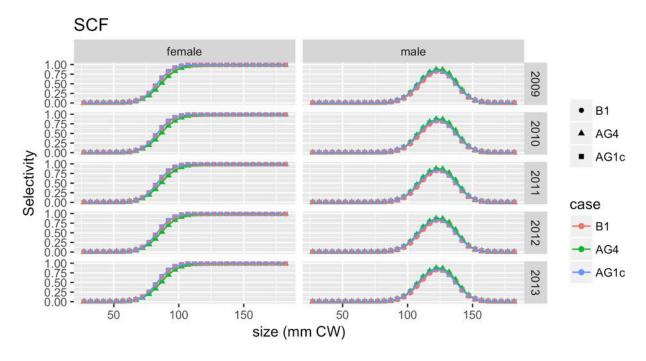


Figure 64. Selectivity functions for SCF(5 of 6).

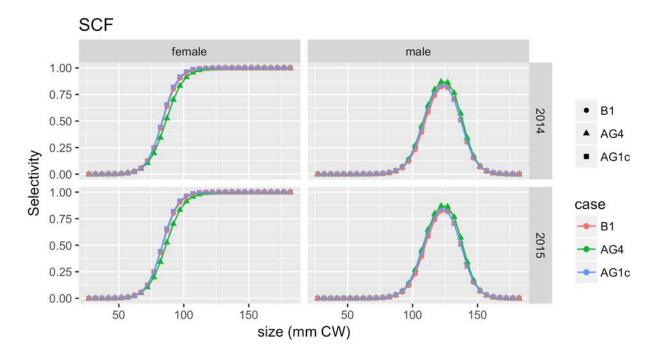


Figure 65. Selectivity functions for SCF(6 of 6).

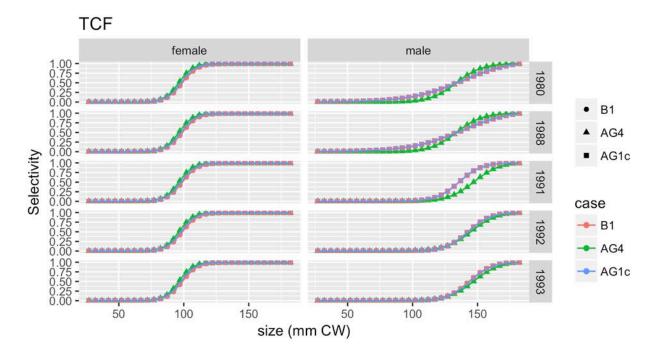


Figure 66. Selectivity functions for TCF(1 of 4).

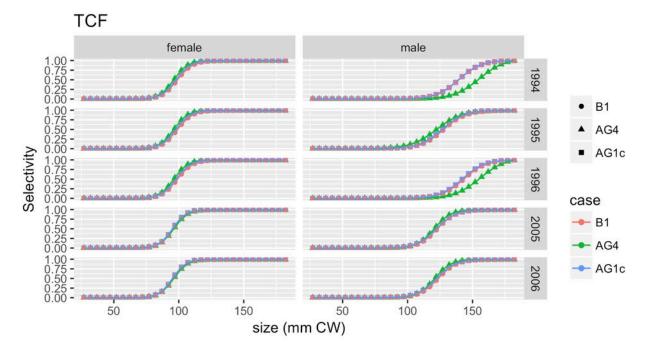


Figure 67. Selectivity functions for TCF(2 of 4).

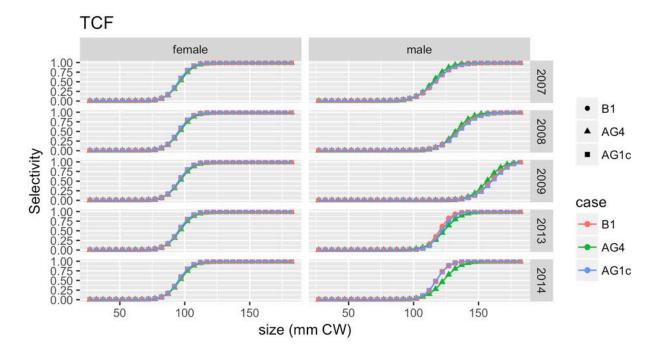


Figure 68. Selectivity functions for TCF(3 of 4).

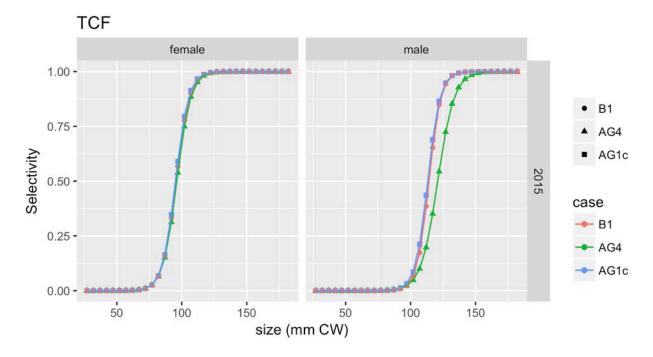


Figure 69. Selectivity functions for TCF(4 of 4).

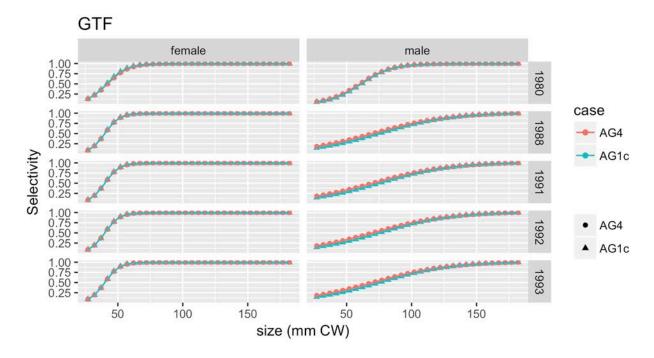


Figure 70. Selectivity functions for GTF(1 of 6).

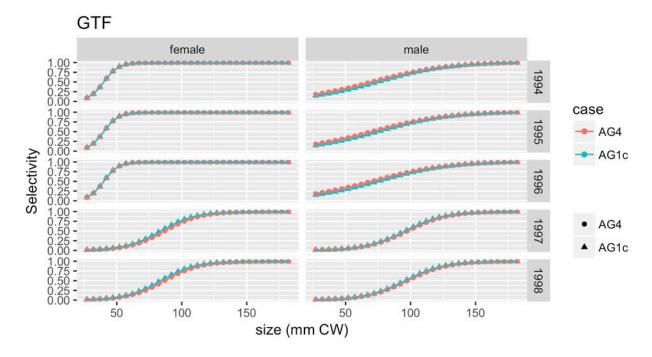


Figure 71. Selectivity functions for GTF(2 of 6).

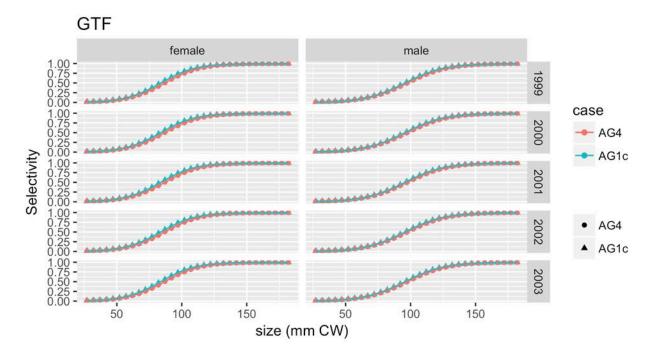


Figure 72. Selectivity functions for GTF(3 of 6).

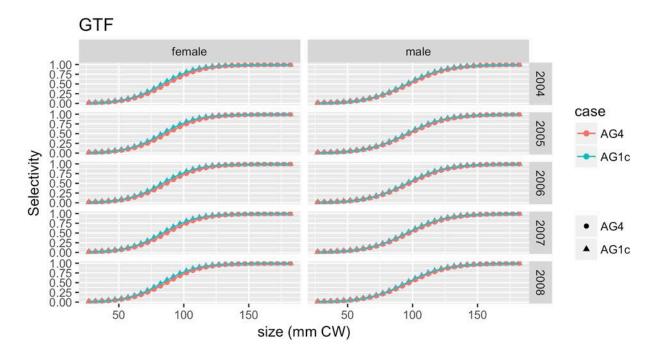


Figure 73. Selectivity functions for GTF(4 of 6).

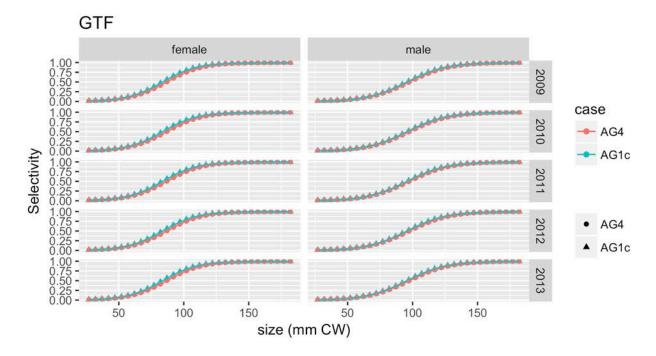


Figure 74. Selectivity functions for GTF(5 of 6).

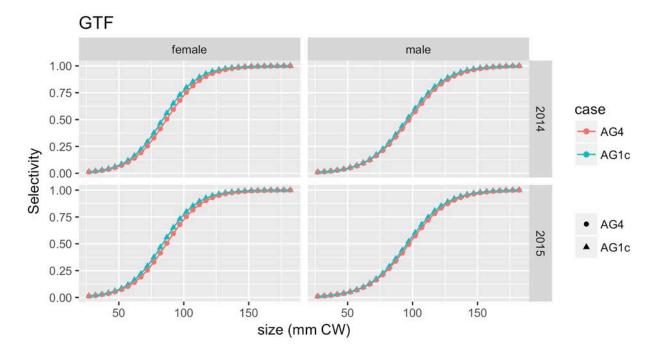


Figure 75. Selectivity functions for GTF(6 of 6).

Retention functions

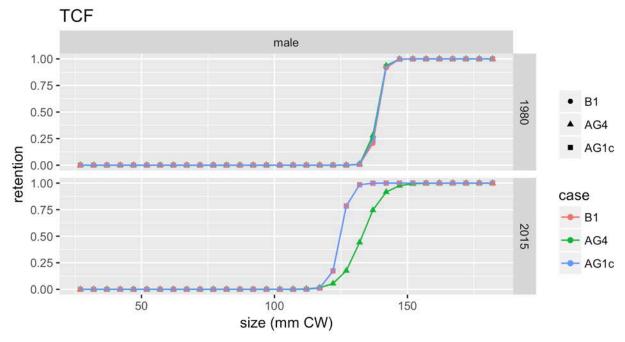


Figure 76. Retention functions for TCF(1 of 1).

Total catch abundance

GF.AG captured catch

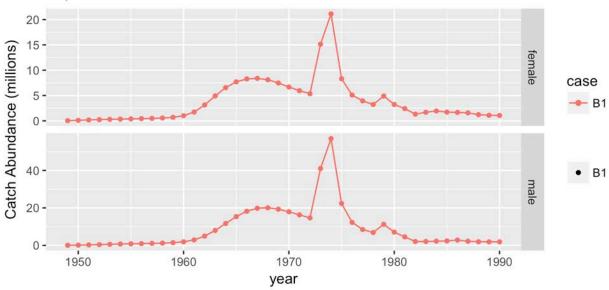


Figure 77. Predicted GF.AG captured catch abundance.

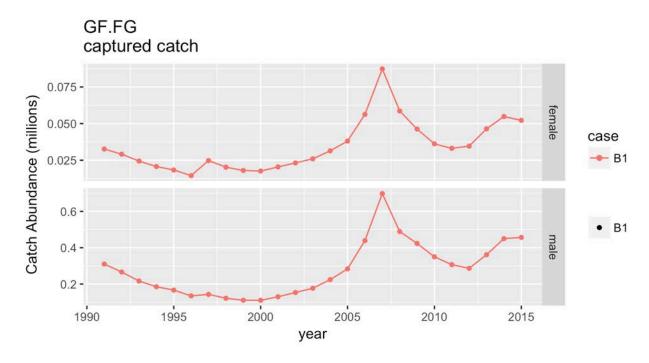


Figure 78. Predicted GF.FG captured catch abundance.

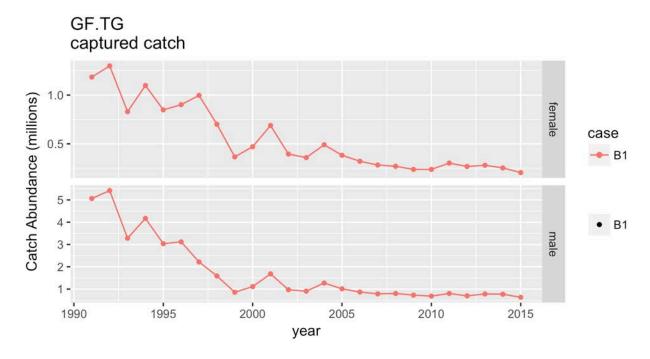


Figure 79. Predicted GF.TG captured catch abundance.

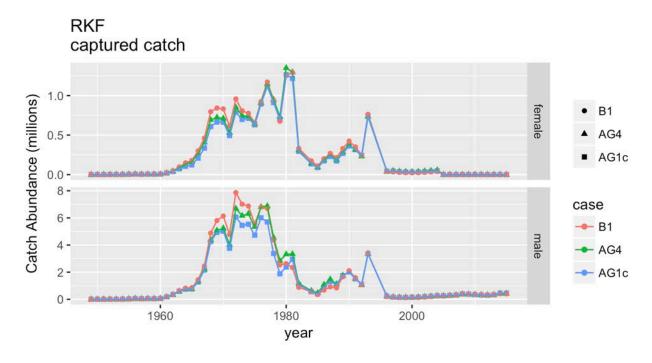


Figure 80. Predicted RKF captured catch abundance.

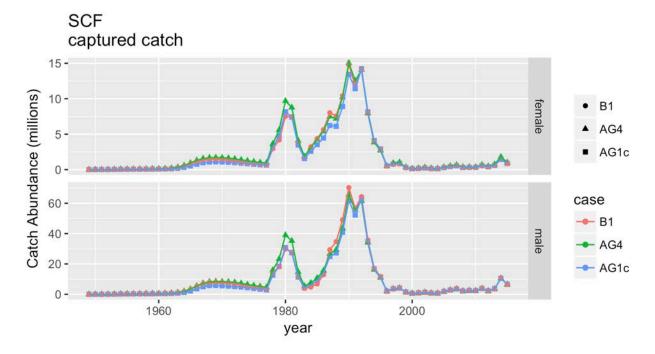


Figure 81. Predicted SCF captured catch abundance.

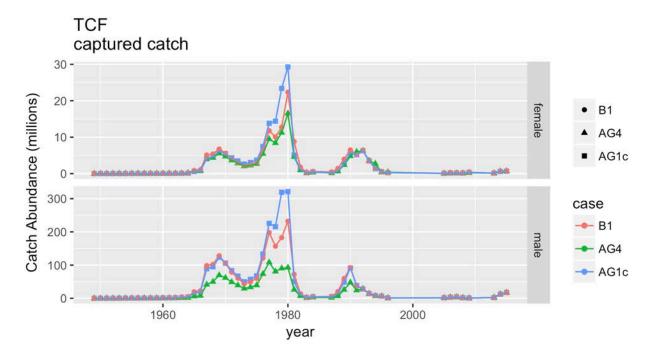


Figure 82. Predicted TCF captured catch abundance.

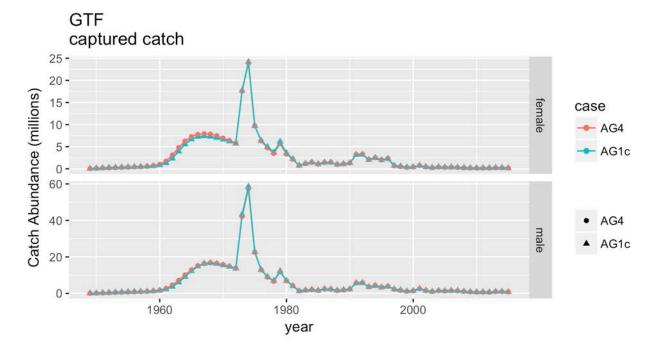


Figure 83. Predicted GTF captured catch abundance.

Total catch biomass

GF.AG captured catch

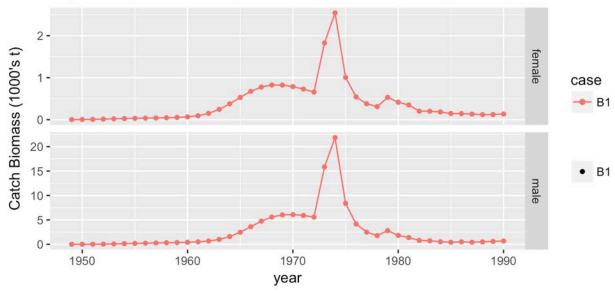


Figure 84. Predicted GF.AG captured catch biomass.

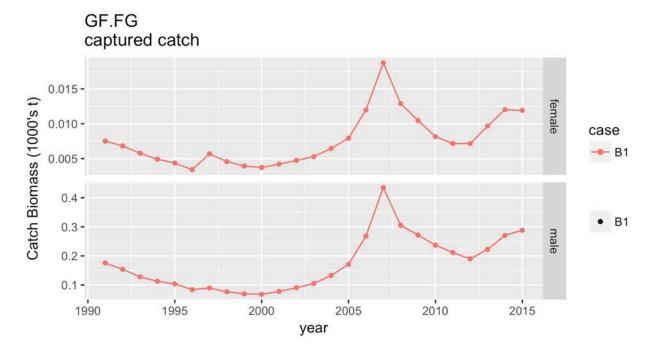


Figure 85. Predicted GF.FG captured catch biomass.

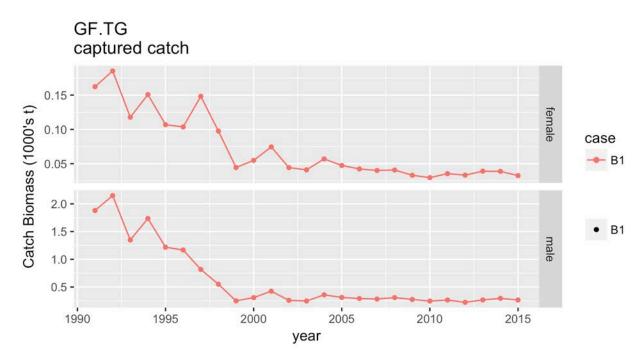


Figure 86. Predicted GF.TG captured catch biomass.

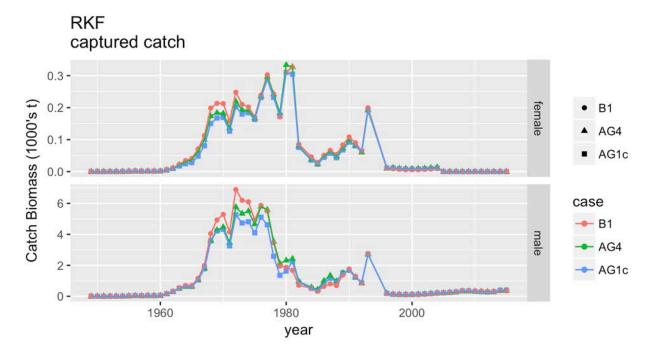


Figure 87. Predicted RKF captured catch biomass.

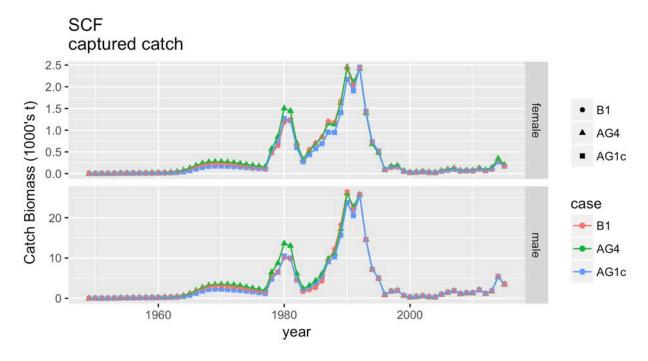


Figure 88. Predicted SCF captured catch biomass.

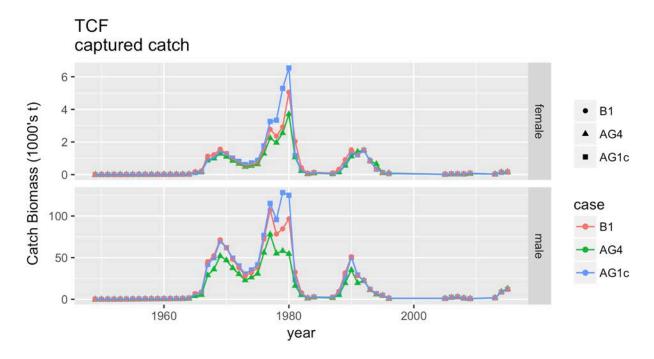


Figure 89. Predicted TCF captured catch biomass.

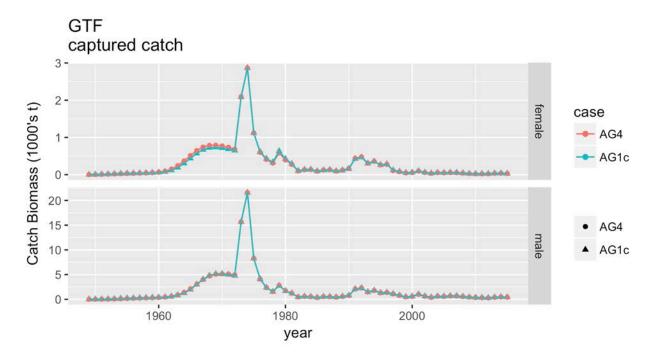


Figure 90. Predicted GTF captured catch biomass.

Retained catch abundance

TCF retained catch

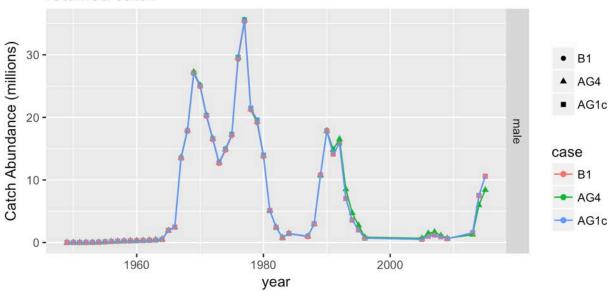


Figure 91. Predicted TCF retained catch abundance.

Retained catch biomass

TCF retained catch

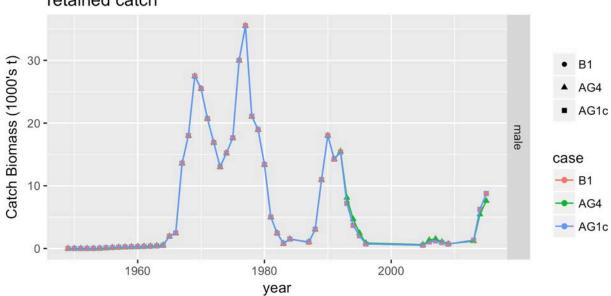


Figure 92. Predicted TCF retained catch biomass.

Total catch size compositions

GF.AG captured catch for female all all

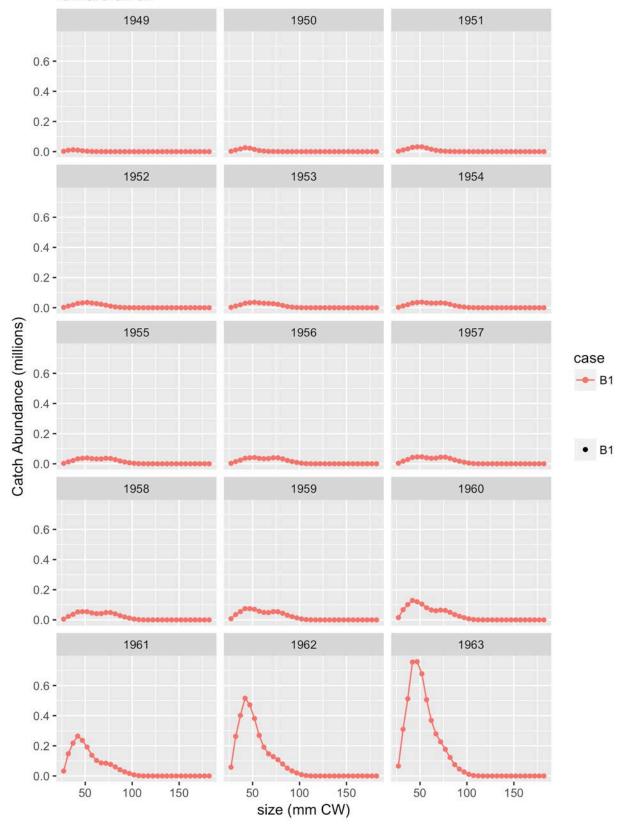
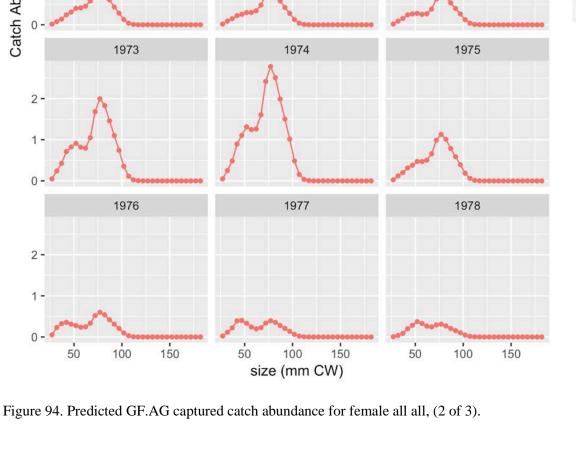


Figure 93. Predicted GF.AG captured catch abundance for female all all, (1 of 3).

GF.AG captured catch for female all all 1964 1965 1966 2 -1 -0 -1969 1967 1968 2-1 -Catch Abundance (millions) 1970 1971 1972 case **→** B1 • B1 1974 1975 1973 2 -



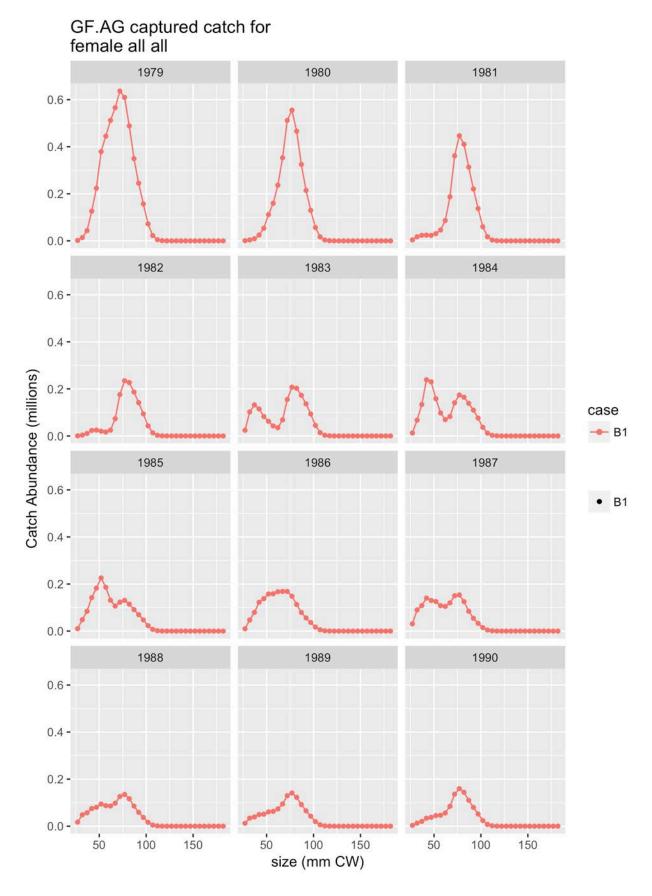


Figure 95. Predicted GF.AG captured catch abundance for female all all, (3 of 3).

GF.AG captured catch for male all all

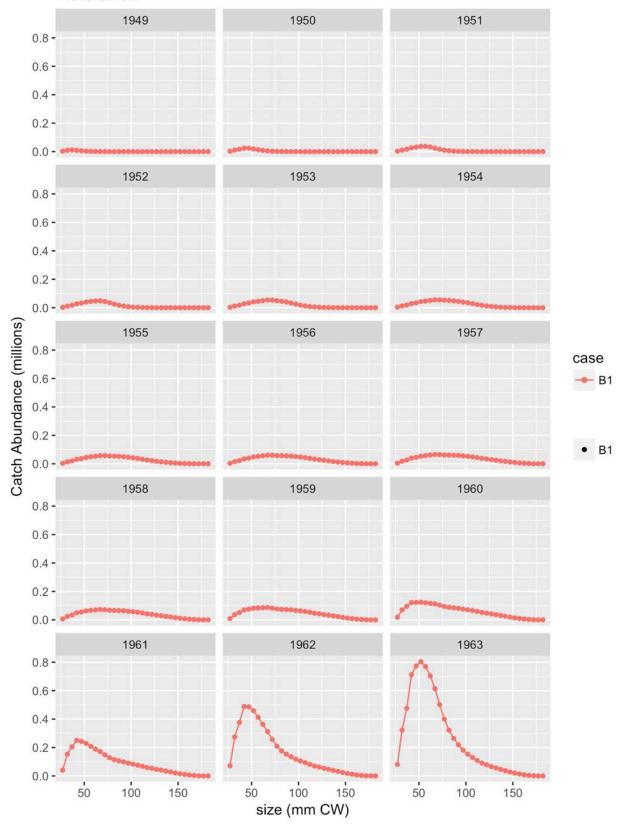


Figure 96. Predicted GF.AG captured catch abundance for male all all, (1 of 3).

GF.AG captured catch for male all all

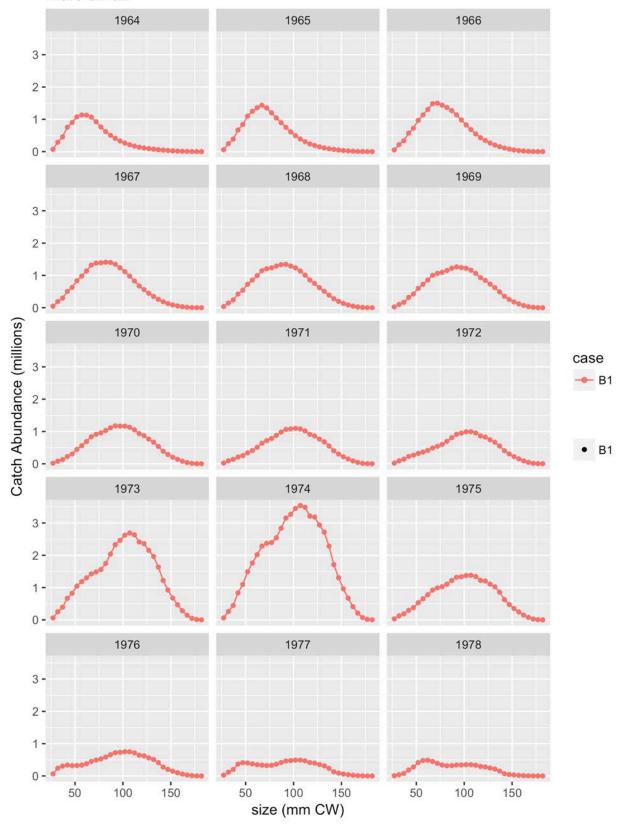


Figure 97. Predicted GF.AG captured catch abundance for male all all, (2 of 3).

GF.AG captured catch for male all all 1979 1980 1981 1.00 -0.75 -0.50 -0.25 -0.00 -1982 1983 1984 1.00 -0.75 -0.50 -Catch Abundance (millions) 0.25 case **→** B1 0.00 1985 1986 1987 1.00 -• B1 0.75 -0.50 -0.25 -0.00 -1988 1989 1990 1.00 -0.75 -0.50 -0.25 -0.00 -100 100 150 150 100 150 50 50 50 size (mm CW)

Figure 98. Predicted GF.AG captured catch abundance for male all all, (3 of 3).

GF.FG captured catch for female all all 1991 1992 1993 0.006 -0.004 -0.002 -0.000 1994 1995 1996 0.006 -0.004 -0.002 -0.000 Catch Abundance (millions) 1997 1998 1999 0.006 case **→** B1 0.004 -0.002 -• B1 0.000 -2000 2001 2002 0.006 -0.004 -0.002 -0.000 -2003 2004 2005 0.006 -0.004 -0.002 -0.000 -150 100 150 100 150 100 50 50 50 size (mm CW)

Figure 99. Predicted GF.FG captured catch abundance for female all all, (1 of 2).

GF.FG captured catch for female all all 2007 2006 0.015 -0.010 -0.005 -0.000 -2008 2009 0.015 -0.010 -0.005 -0.000 -Catch Abundance (millions) 2010 2011 0.015 case **→** B1 0.010 -0.005 -• B1 0.000 -2012 2013 0.015 -0.010 -0.005 -0.000 -2014 2015 0.015 -0.010 -0.005 -0.000 - ••• 100 150 50 100 150 50 size (mm CW)

Figure 100. Predicted GF.FG captured catch abundance for female all all, (2 of 2).

GF.FG captured catch for male all all 1991 1992 1993 0.03 -0.02 -0.01 -0.00 -1994 1995 1996 0.03 -0.02 -0.01 -0.00 Catch Abundance (millions) 1997 1998 1999 0.03 case **→** B1 0.02 -0.01 -• B1 0.00 -2000 2001 2002 0.03 -0.02 -0.01 -0.00 -2003 2004 2005 0.03 -0.02 -0.01 -0.00 -100 100 150 50 150 50 150 50 100 size (mm CW)

Figure 101. Predicted GF.FG captured catch abundance for male all all, (1 of 2).

GF.FG captured catch for male all all 2007 2006 0.08 -0.06 -0.04 -0.02 -0.00 -2008 2009 0.08 -0.06 -0.04 -0.02 -0.00 -Catch Abundance (millions) 2010 2011 0.08 case 0.06 -**→** B1 0.04 -0.02 -• B1 0.00 -2012 2013 0.08 -0.06 -0.04 -0.02 -0.00 -2014 2015 0.08 -0.06 -0.04 -0.02 -0.00 -50 100 150 50 100 150

Figure 102. Predicted GF.FG captured catch abundance for male all all, (2 of 2).

size (mm CW)

GF.TG captured catch for female all all 1991 1992 1993 0.20 -0.15 -0.10 -0.05 -0.00 1994 1995 1996 0.20 -0.15 -0.10 -0.05 -0.00 Catch Abundance (millions) 1997 1998 1999 0.20 case **→** B1 0.15 -0.10 -0.05 -• B1 0.00 -2000 2001 2002 0.20 -0.15 -0.10 -0.05 -0.00 -2003 2004 2005 0.20 -0.15 -0.10 -0.05 -0.00 -150 100 150 100 150 100 50 50 50 size (mm CW)

Figure 103. Predicted GF.TG captured catch abundance for female all all, (1 of 2).

GF.TG captured catch for female all all 2006 2007 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -2008 2009 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -Catch Abundance (millions) 2010 2011 0.05 case 0.04 -**→** B1 0.03 -0.02 -0.01 -• B1 0.00 -2012 2013 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -2014 2015 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -

Figure 104. Predicted GF.TG captured catch abundance for female all all, (2 of 2).

150

100

50

50

size (mm CW)

150

100

GF.TG captured catch for male all all 1991 1992 1993 0.4 -0.3 -0.2 -0.1 -0.0 -1995 1994 1996 0.4 -0.3 -0.2 -0.1 -0.0 Catch Abundance (millions) 1997 1998 1999 case 0.4 -**→** B1 0.3 -0.2 -0.1 -• B1 0.0 -2001 2000 2002 0.4 -0.3 -0.2 -0.1 -0.0 -2003 2004 2005 0.4 -0.3 -0.2 -0.1 -0.0 -100 100 150 50 150 50 100 150 50 size (mm CW)

Figure 105. Predicted GF.TG captured catch abundance for male all all, (1 of 2).

GF.TG captured catch for male all all 2006 2007 0.08 -0.06 -0.04 -0.02 -0.00 2008 2009 0.08 -0.06 -0.04 -0.02 -0.00 Catch Abundance (millions) 2010 2011 0.08 case 0.06 -**→** B1 0.04 -0.02 -• B1 0.00 2012 2013 0.08 -0.06 -0.04 -0.02 -0.00 -2014 2015 0.08 -0.06 -0.04 -0.02 -0.00 -100 100 150 50 150 50 size (mm CW)

Figure 106. Predicted GF.TG captured catch abundance for male all all, (2 of 2).

RKF captured catch for female all all

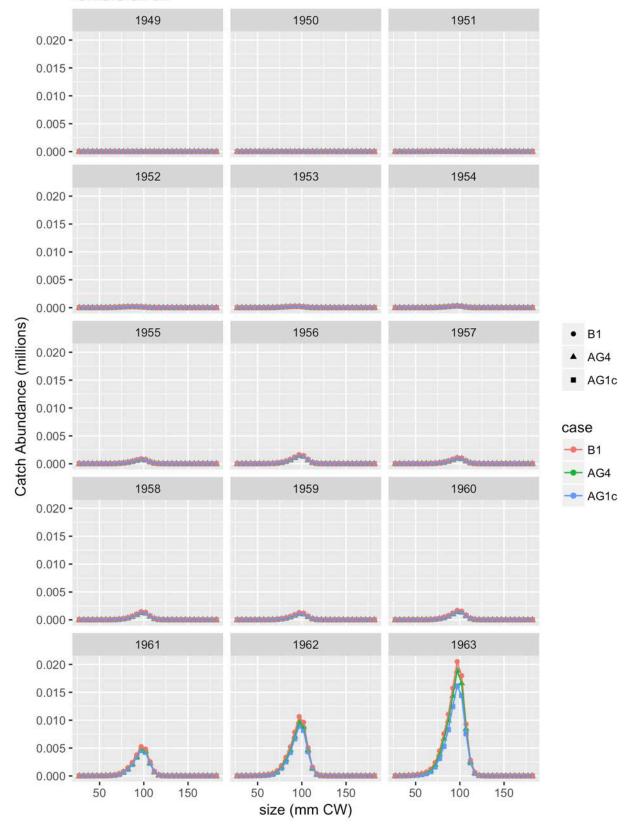


Figure 107. Predicted RKF captured catch abundance for female all all, (1 of 5).

RKF captured catch for female all all 1964 1965 1966 0.2 -0.1 -0.0 -1967 1968 1969 0.2 -0.1 -0.0 -Catch Abundance (millions) 1970 1971 1972 B1 AG4 AG1c 0.2 -0.1 case - B1 0.0 -- AG4 1973 1974 1975 - AG1c 0.2 -0.1 -0.0 -1978 1976 1977 0.2 -0.1 -0.0 -100 150 100 150 100 150 50 50 50 size (mm CW)

Figure 108. Predicted RKF captured catch abundance for female all all, (2 of 5).

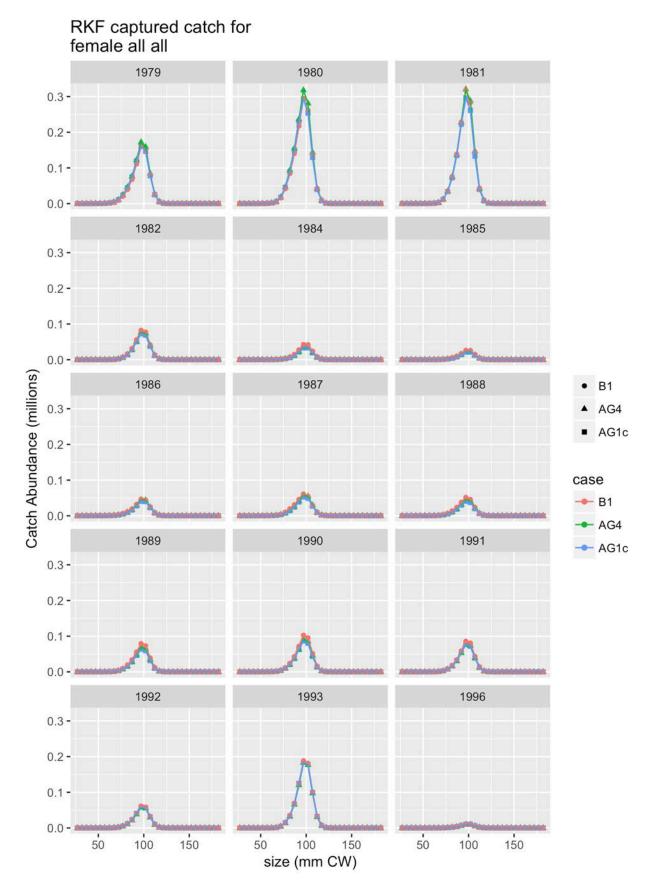


Figure 109. Predicted RKF captured catch abundance for female all all, (3 of 5).

RKF captured catch for female all all 1997 1998 1999 0.010 -0.005 -0.000 -2000 2001 2002 0.010 -0.005 -0.000 -Catch Abundance (millions) 2004 2003 2005 B1 AG4 0.010 -AG1c 0.005 case - B1 0.000 -AG4 2006 2007 2008 - AG1c 0.010 -0.005 -0.000 -2009 2010 2011 0.010 -0.005 -0.000 - 🐸 100 150 50 100 150 50 150 50 100 size (mm CW)

Figure 110. Predicted RKF captured catch abundance for female all all, (4 of 5).

RKF captured catch for female all all

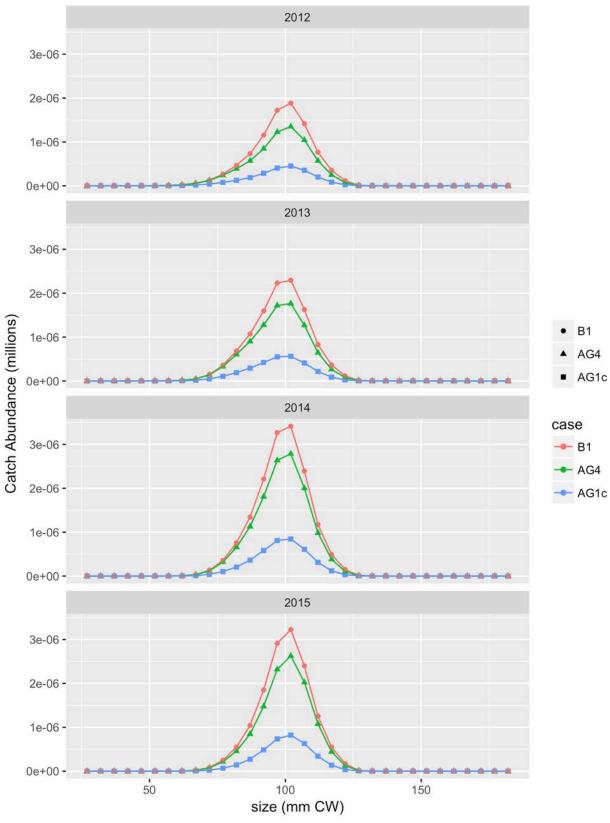


Figure 111. Predicted RKF captured catch abundance for female all all, (5 of 5).

RKF captured catch for male all all

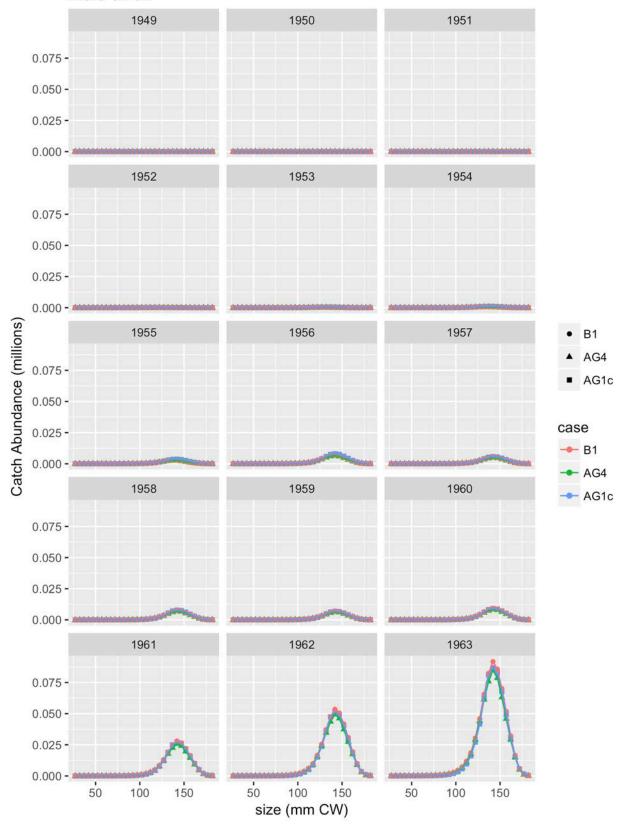


Figure 112. Predicted RKF captured catch abundance for male all all, (1 of 5).

RKF captured catch for male all all

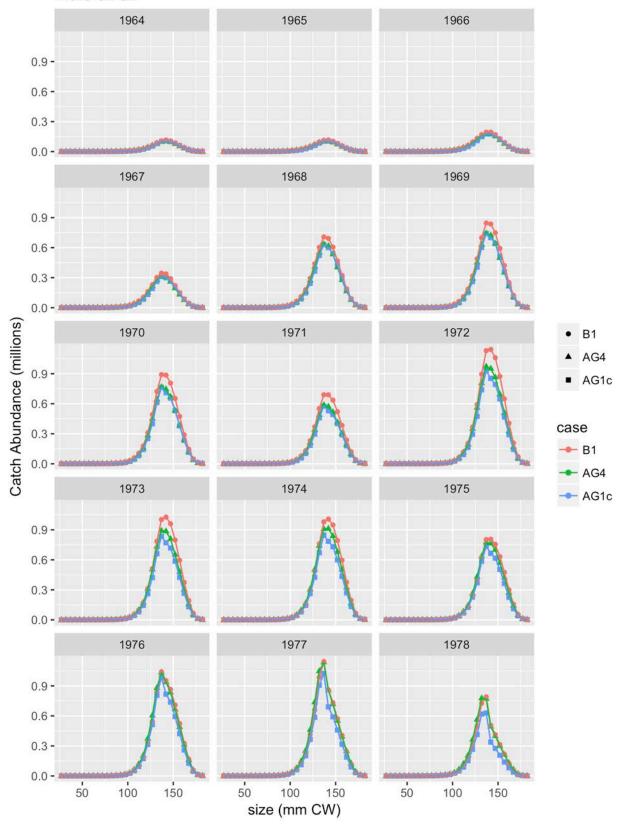


Figure 113. Predicted RKF captured catch abundance for male all all, (2 of 5).

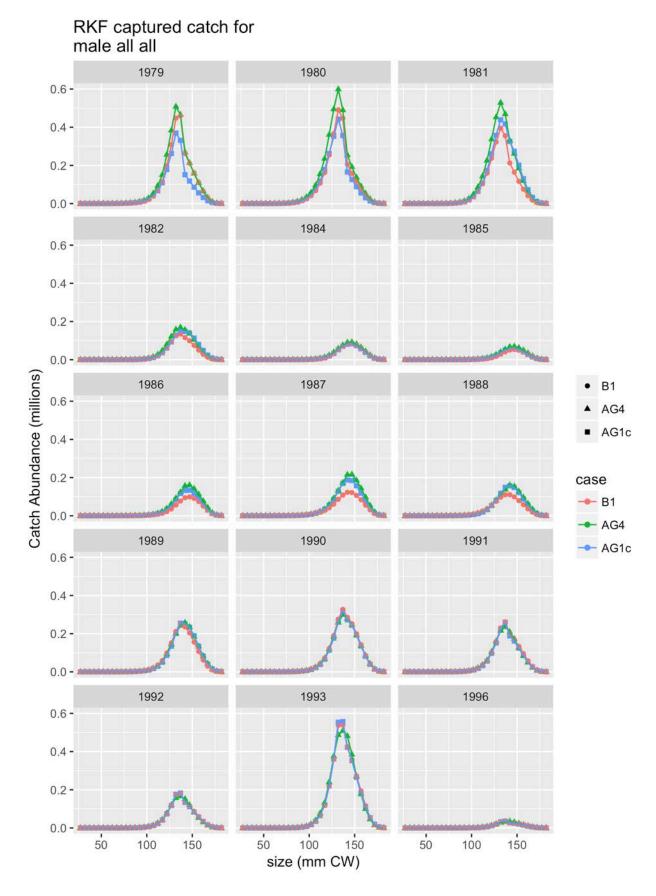


Figure 114. Predicted RKF captured catch abundance for male all all, (3 of 5).

RKF captured catch for male all all 1997 1998 1999 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -2000 2001 2002 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -Catch Abundance (millions) 2003 2004 2005 B1 0.05 -AG4 0.04 -■ AG1c 0.03 -0.02 case 0.01 -- B1 0.00 -- AG4 2006 2007 2008 - AG1c 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -2009 2010 2011 0.05 -0.04 -0.03 -0.02 -0.01 -0.00 -150 150 50 100 50 100 50 150 100 size (mm CW)

Figure 115. Predicted RKF captured catch abundance for male all all, (4 of 5).

RKF captured catch for male all all 2012 0.06 -0.04 -0.02 -0.00 -2013 0.06 -0.04 -Catch Abundance (millions) 0.02 -B1 AG4 ■ AG1c 0.00 2014 0.06 case **→** B1 - AG4 0.04 -- AG1c 0.02 -0.00 -2015 0.06 -0.04 -0.02 -0.00 -50 100 size (mm CW) 150

Figure 116. Predicted RKF captured catch abundance for male all all, (5 of 5).

SCF captured catch for female all all

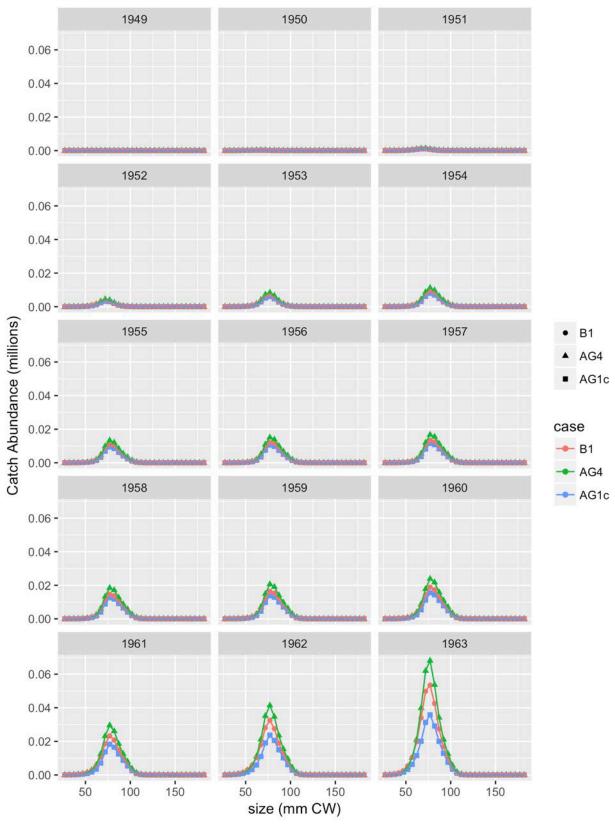


Figure 117. Predicted SCF captured catch abundance for female all all, (1 of 5).

SCF captured catch for female all all 1964 1965 1966 0.6 -0.4 -0.2 -0.0 -1967 1968 1969 0.6 -0.4 -0.2 -0.0 -Catch Abundance (millions) 1970 1972 1971 B1 AG4 0.6 -AG1c 0.4 case 0.2 -- B1 0.0 -- AG4 1973 1975 1974 - AG1c 0.6 -0.4 -0.2 -0.0 -1977 1976 1978 0.6 -0.4 -0.2 -0.0 -150 150 50 100 150 100 50 100 50

Figure 118. Predicted SCF captured catch abundance for female all all, (2 of 5).

size (mm CW)

SCF captured catch for female all all 1979 1980 1981 3 -2 -1 -0 -1982 1983 1984 3 -2 -1 -Catch Abundance (millions) 1987 1985 1986 B1 AG4 ■ AG1c case - B1 - AG4 1988 1989 1990 - AG1c 3 -2 -1 -0 -1992 1991 1993 3 -2-1 -0 - 🛎 100 150 o 100 150 size (mm CW) 150 150 50 50 100 50

Figure 119. Predicted SCF captured catch abundance for female all all, (3 of 5).

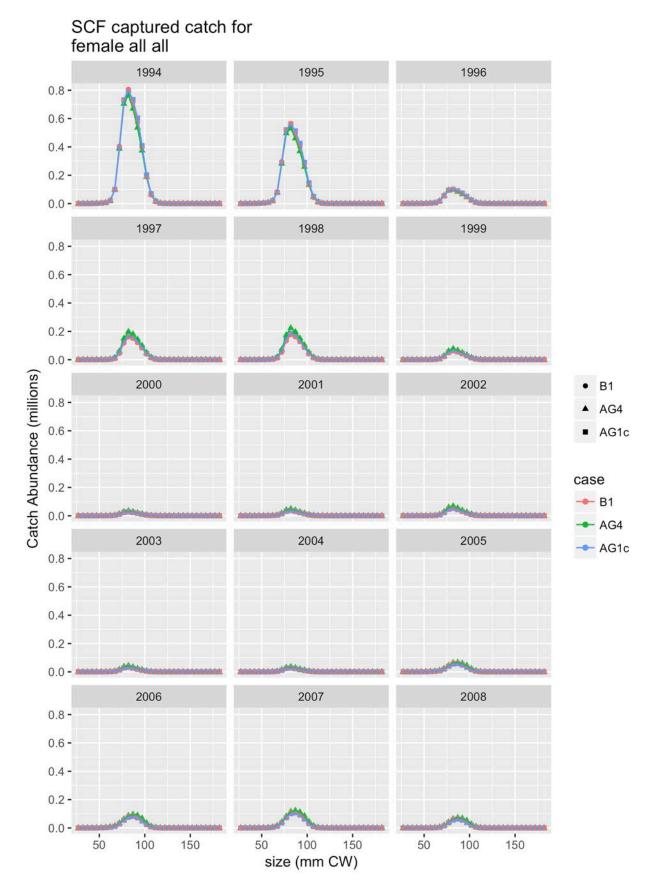


Figure 120. Predicted SCF captured catch abundance for female all all, (4 of 5).

SCF captured catch for female all all

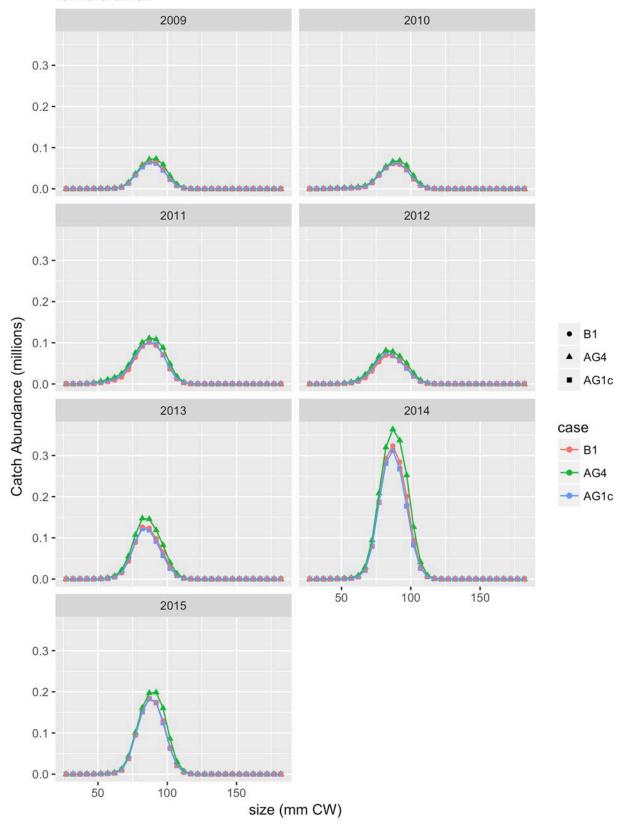


Figure 121. Predicted SCF captured catch abundance for female all all, (5 of 5).

SCF captured catch for male all all 1949 1950 1951 0.15 -0.10 -0.05 -0.00 -1952 1953 1954 0.15 -0.10 -0.05 -0.00 -Catch Abundance (millions) 1955 1956 1957 B1 AG4 0.15 -AG1c 0.10 case 0.05 -- B1 0.00 -AG4 1958 1959 1960 - AG1c 0.15 -0.10 -0.05 -0.00 -1961 1963 1962 0.15 -0.10 -0.05 -

Figure 122. Predicted SCF captured catch abundance for male all all, (1 of 5).

50

100

size (mm CW)

150

50

100

0.00 -

50

100

150

150

SCF captured catch for male all all 1964 1965 1966 1.5 -1.0 -0.5 -0.0 -1967 1968 1969 1.5 -1.0 -0.5 -0.0 -Catch Abundance (millions) 1970 1971 1972 B1 AG4 1.5 -AG1c 1.0 case 0.5 -- B1 0.0 -- AG4 1974 1973 1975 - AG1c 1.5 -1.0 -0.5 -0.0 -1976 1977 1978 1.5 -1.0 -0.5 -0.0 -100 100 100 150 50 150 50 50 150 size (mm CW)

Figure 123. Predicted SCF captured catch abundance for male all all, (2 of 5).

SCF captured catch for male all all 1979 1980 1981 10.0 -7.5 -5.0 -2.5 -0.0 -1983 1982 1984 10.0 -7.5 -5.0 -2.5 -0.0 -Catch Abundance (millions) 1986 1987 1985 B1 10.0 -AG4 7.5 -AG1c 5.0 case 2.5 -- B1 0.0 -- AG4 1990 1988 1989 - AG1c 10.0 -7.5 -5.0 -2.5 -0.0 -1991 1992 1993 10.0 -7.5 -5.0 -2.5 -0.0 -100 100 150 50 100 150 50 150 50 size (mm CW)

Figure 124. Predicted SCF captured catch abundance for male all all, (3 of 5).

SCF captured catch for male all all 1994 1995 1996 2.0 -1.5 -1.0 -0.5 -0.0 -1997 1998 1999 2.0 -1.5 -1.0 -0.5 -0.0 -Catch Abundance (millions) 2000 2002 2001 B1 AG4 2.0 -■ AG1c 1.5 -1.0 case 0.5 -- B1 0.0 -AG4 2003 2004 2005 - AG1c 2.0 -1.5 -1.0 -0.5 -0.0 -2006 2007 2008 2.0 -1.5 -1.0 -0.5 -0.0 -50 50 150 50 100 150 100 150 100 size (mm CW)

Figure 125. Predicted SCF captured catch abundance for male all all, (4 of 5).

SCF captured catch for male all all

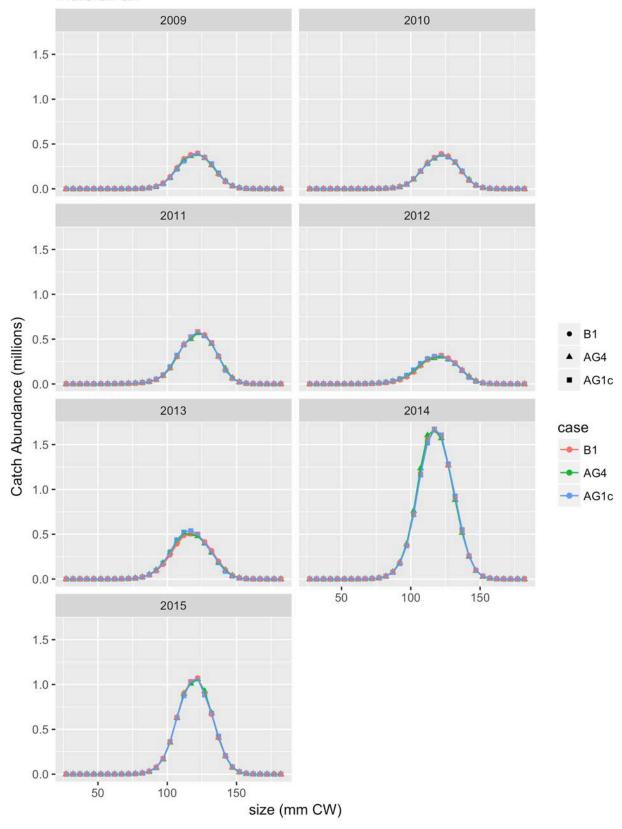


Figure 126. Predicted SCF captured catch abundance for male all all, (5 of 5).

TCF captured catch for female all all

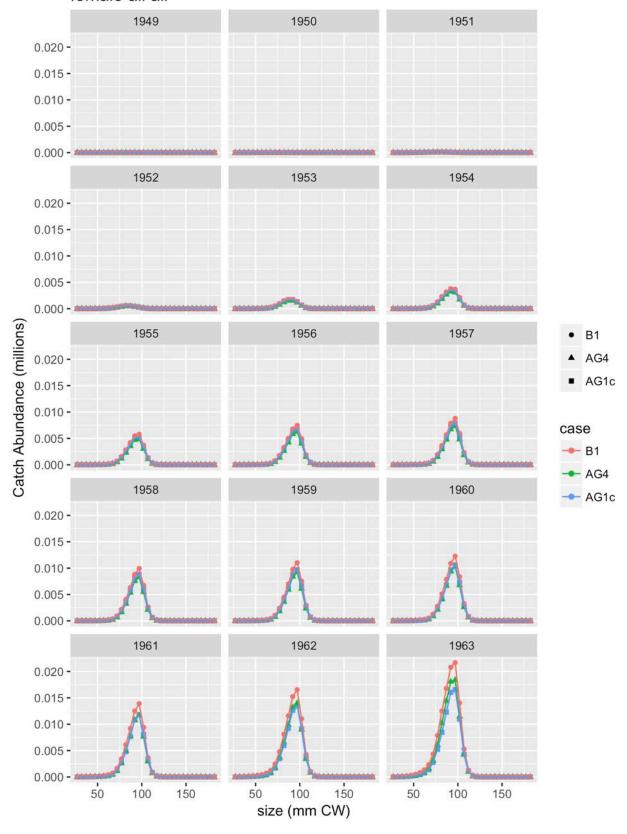


Figure 127. Predicted TCF captured catch abundance for female all all, (1 of 4).

TCF captured catch for female all all 1964 1965 1966 3 -2 -1 -1967 1968 1969 3 -2 -1 -Catch Abundance (millions) 1970 1972 1971 B1 AG4 AG1c case **→** B1 - AG4 1973 1974 1975 - AG1c 3 -2-1 -0 -1976 1977 1978 3 -

Figure 128. Predicted TCF captured catch abundance for female all all, (2 of 4).

50

0 100 150 size (mm CW)

150

100

50

150

2 -

1 -

0 -

50

100

150

TCF captured catch for female all all 1979 1980 1981 6 -4 -2-1982 1983 1984 6 -4 -2 -Catch Abundance (millions) 1989 1987 1988 B1 AG4 AG1c case - B1 - AG4 1990 1991 1992 - AG1c 6 -4 -2 -0 -1993 1994 1995 6 -4 -2-100 150 50 100 150 50 100 150 50 size (mm CW)

Figure 129. Predicted TCF captured catch abundance for female all all, (3 of 4).

TCF captured catch for female all all 1996 2005 0.20 -0.15 -0.10 -0.05 -0.00 -2006 2007 0.20 -0.15 -0.10 -0.05 -0.00 -Catch Abundance (millions) 2008 2009 B1 0.20 -AG4 0.15 -AG1c 0.10 case 0.05 -- B1 0.00 -AG4 2013 2014 - AG1c 0.20 0.15 -0.10 -0.05 -0.00 - ******** 150 100 50 2015 0.20 -0.15 -0.10 -0.05 -0.00 -

Figure 130. Predicted TCF captured catch abundance for female all all, (4 of 4).

150

size (mm CW)

50

100

TCF captured catch for male all all 1949 1950 1951 0.20 -0.15 -0.10 -0.05 -0.00 -1952 1953 1954 0.20 -0.15 -0.10 -0.05 -0.00 -Catch Abundance (millions) 1955 1956 1957 B1 0.20 -AG4 0.15 -AG1c 0.10 case 0.05 -- B1 0.00 -AG4 1958 1959 1960 - AG1c 0.20 -0.15 -0.10 -0.05 -0.00 -1963 1961 1962 0.20 -0.15 -0.10 -0.05 -0.00 -150 100 150 50 100 50 150 100 50 size (mm CW)

Figure 131. Predicted TCF captured catch abundance for male all all, (1 of 4).

TCF captured catch for male all all 1964 1965 1966 20 -15-10-5 -0 -1968 1967 1969 20 -15-10-5 -Catch Abundance (millions) 1970 1971 1972 B1 AG4 20 -AG1c 15 -10case 5 -**→** B1 - AG4 1975 1973 1974 - AG1c 20 -15-10-5 -0 -1977 1978 1976 20 -15-10-5 -0 100 150 size (mm CW) 150 150 100 100 50 150 50 50

Figure 132. Predicted TCF captured catch abundance for male all all, (2 of 4).

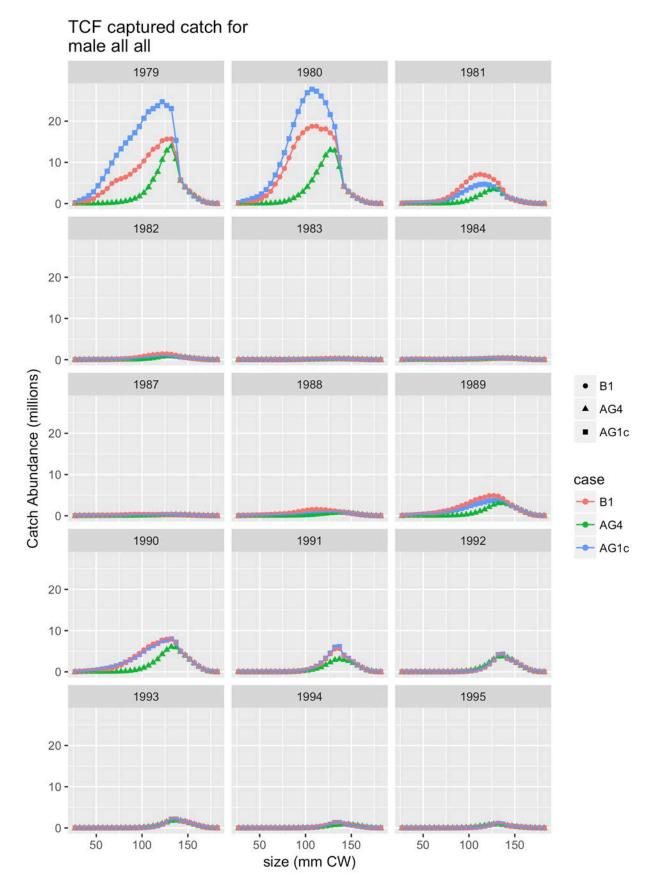


Figure 133. Predicted TCF captured catch abundance for male all all, (3 of 4).

TCF captured catch for male all all

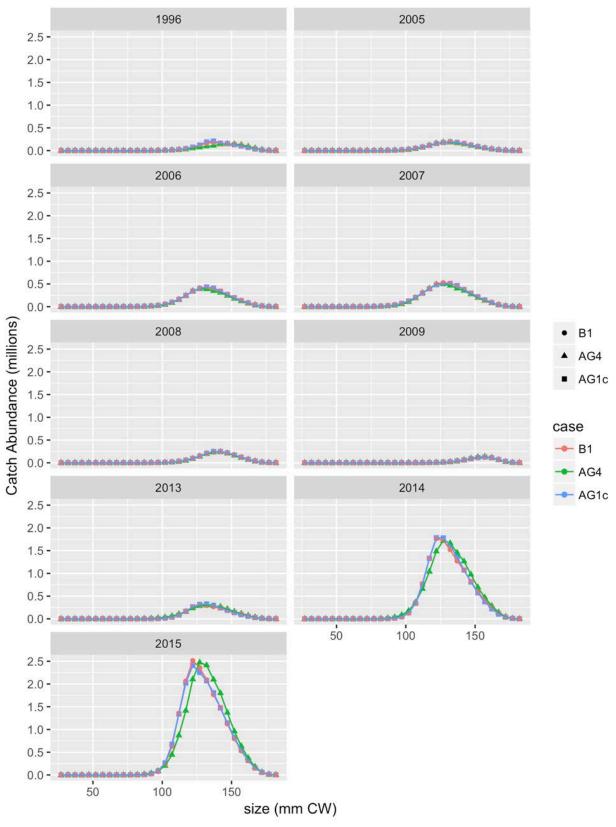


Figure 134. Predicted TCF captured catch abundance for male all all, (4 of 4).

GTF captured catch for female all all

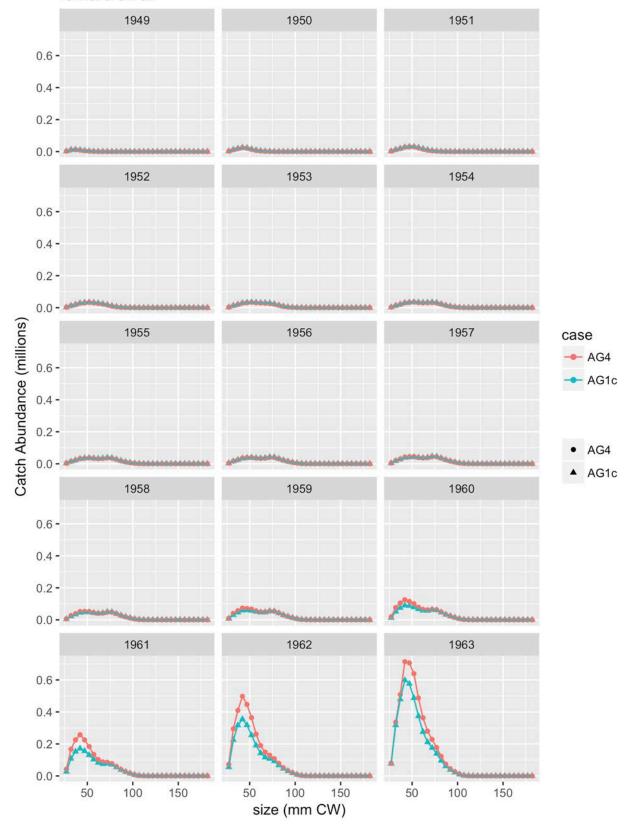


Figure 135. Predicted GTF captured catch abundance for female all all, (1 of 5).

GTF captured catch for female all all 1964 1965 1966 3 -2 -1 -0 -1967 1969 1968 3 -2 -Catch Abundance (millions) 1970 1971 1972 case - AG4 - AG1c AG4 ▲ AG1c 1974 1975 1973 3 -2 -0 -

Figure 136. Predicted GTF captured catch abundance for female all all, (2 of 5).

50

1977

0 100 150 size (mm CW)

150

50

1978

100

150

1976

100

150

3 -

2-

0 -

50

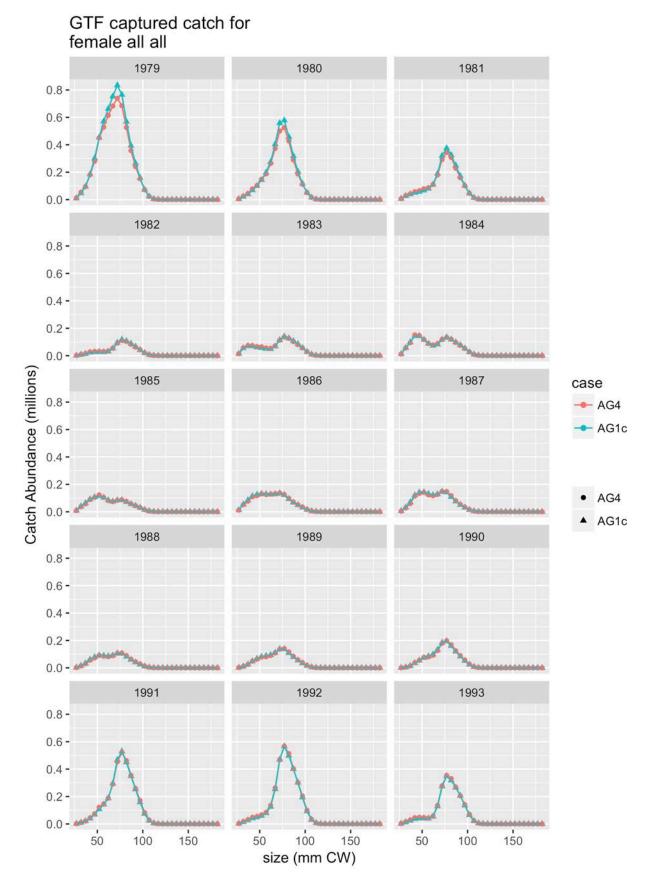


Figure 137. Predicted GTF captured catch abundance for female all all, (3 of 5).

GTF captured catch for female all all 1994 1995 1996 0.4 -0.3 -0.2 -0.1 -0.0 -1997 1998 1999 0.4 -0.3 -0.2 -0.1 -0.0 Catch Abundance (millions) 2002 2000 2001 case 0.4 ---- AG4 0.3 -- AG1c 0.2 -0.1 - AG4 0.0 -▲ AG1c 2003 2004 2005 0.4 -0.3 -0.2 -0.1 -0.0 -2006 2007 2008 0.4 -0.3 -0.2 -0.1 -0.0 -150 150 100 150 50 100 50 100 50 size (mm CW)

Figure 138. Predicted GTF captured catch abundance for female all all, (4 of 5).

GTF captured catch for female all all

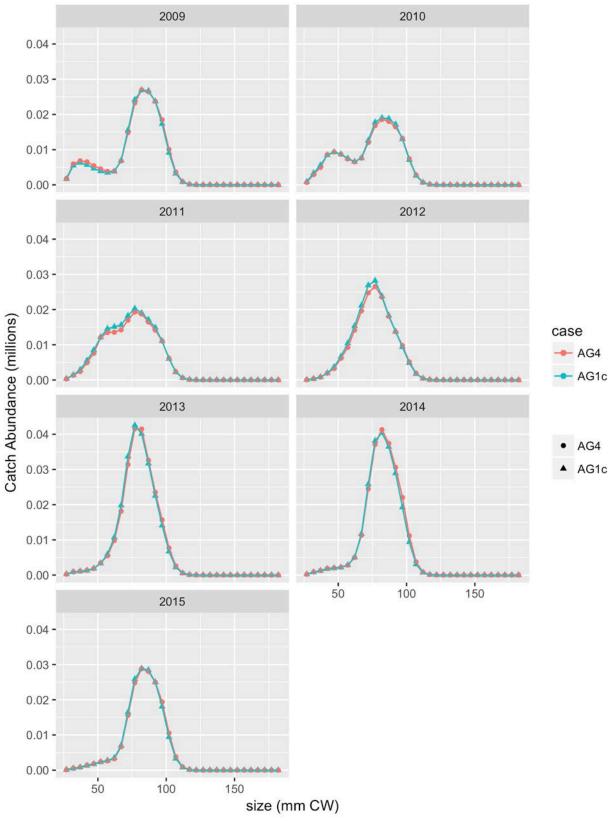


Figure 139. Predicted GTF captured catch abundance for female all all, (5 of 5).

GTF captured catch for male all all

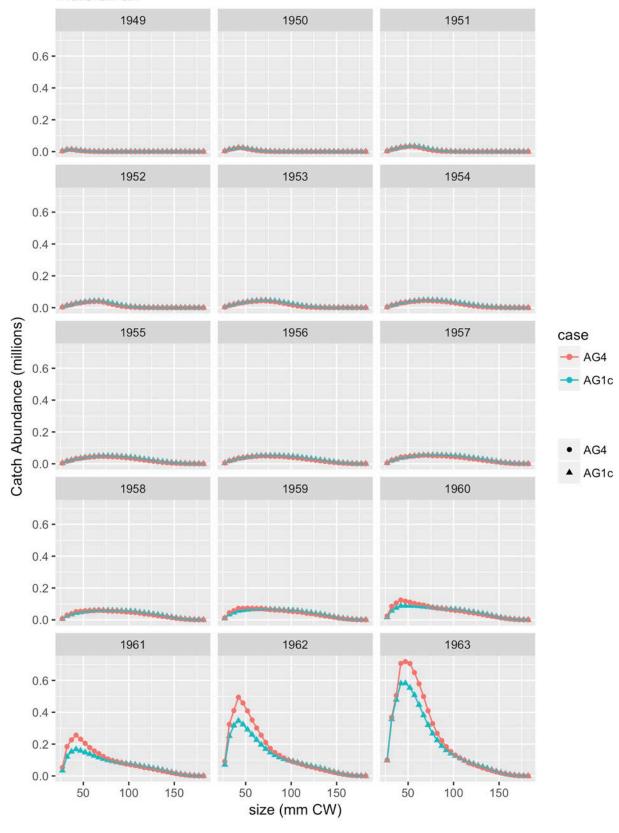


Figure 140. Predicted GTF captured catch abundance for male all all, (1 of 5).

GTF captured catch for male all all 1964 1966 1965 3 -2 -0 -1967 1968 1969 3 -2 -Catch Abundance (millions) 1970 1971 1972 case - AG4 - AG1c AG4 ▲ AG1c 1974 1973 1975 3 -2-0 -1976 1978 1977 3 -2-100 150 100 100 150 50 150 50 50

Figure 141. Predicted GTF captured catch abundance for male all all, (2 of 5).

size (mm CW)

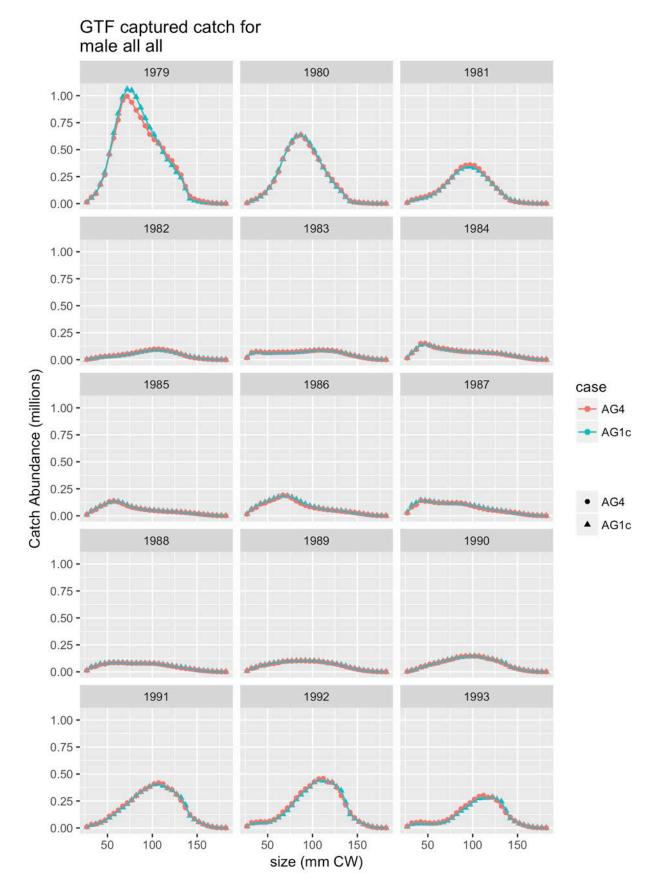


Figure 142. Predicted GTF captured catch abundance for male all all, (3 of 5).

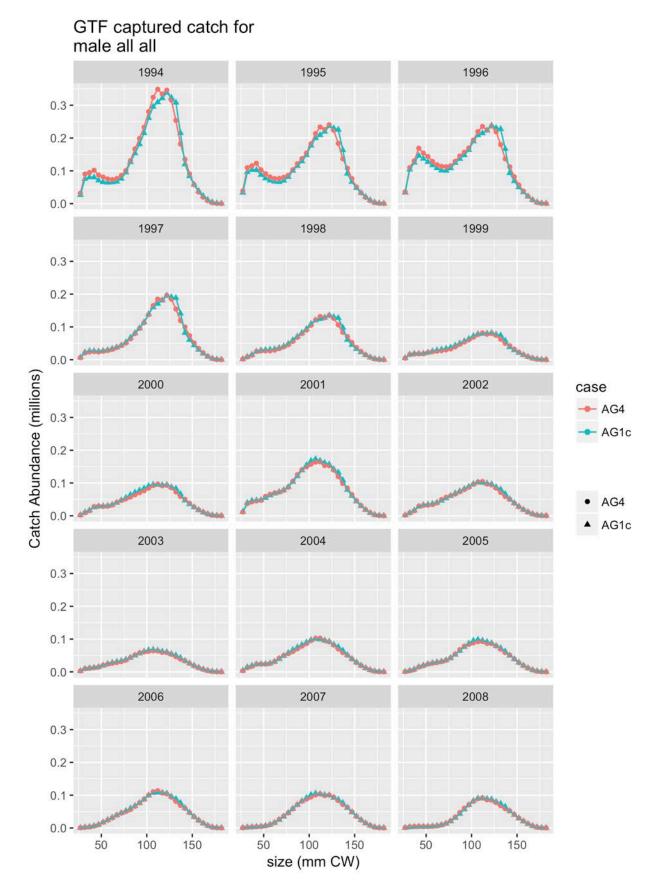


Figure 143. Predicted GTF captured catch abundance for male all all, (4 of 5).

GTF captured catch for male all all 2009 2010 0.100 -0.075 -0.050 -0.025 -0.000 -2011 2012 0.100 -0.075 -0.050 -Catch Abundance (millions) case 0.025 ---- AG4 - AG1c 0.000 -2013 2014 0.100 -AG4 0.075 -▲ AG1c 0.050 -0.025 -0.000 -100 150 50 2015 0.100 -0.075 -0.050 -0.025 -0.000 -150 100 50 size (mm CW)

Figure 144. Predicted GTF captured catch abundance for male all all, (5 of 5).

Retained catch size compositions

TCF retained catch for male all all

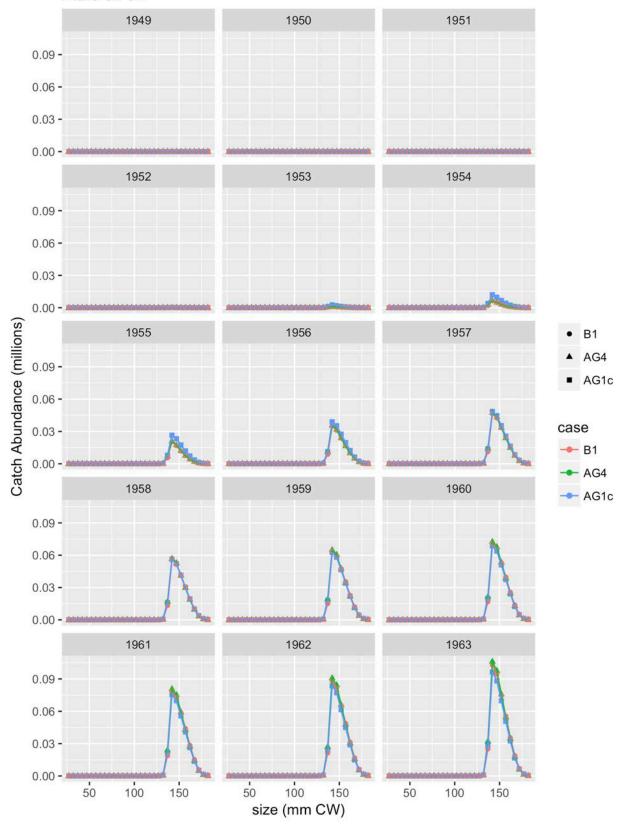


Figure 145. Predicted TCF retained catch abundance for male all all, (1 of 4).

TCF retained catch for male all all

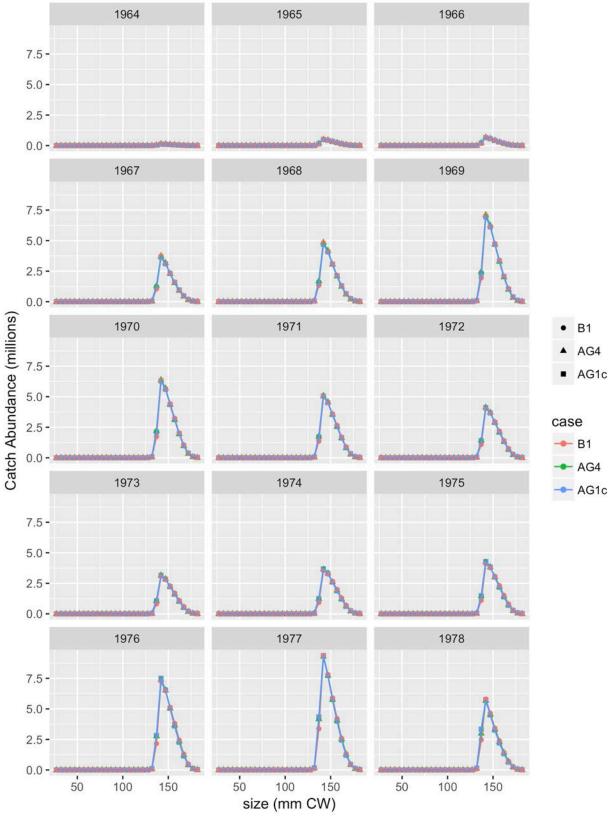


Figure 146. Predicted TCF retained catch abundance for male all all, (2 of 4).

TCF retained catch for male all all 1979 1980 1981 4 -2-1982 1983 1984 4 -2 -Catch Abundance (millions) 1987 1988 1989 B1 AG4 AG1c case - B1 - AG4 1990 1991 1992 - AG1c 4 -2 -0 -1993 1994 1995 4 -2 -100 50 100 150 50 100 150 50 150 size (mm CW)

Figure 147. Predicted TCF retained catch abundance for male all all, (3 of 4).

TCF retained catch for male all all

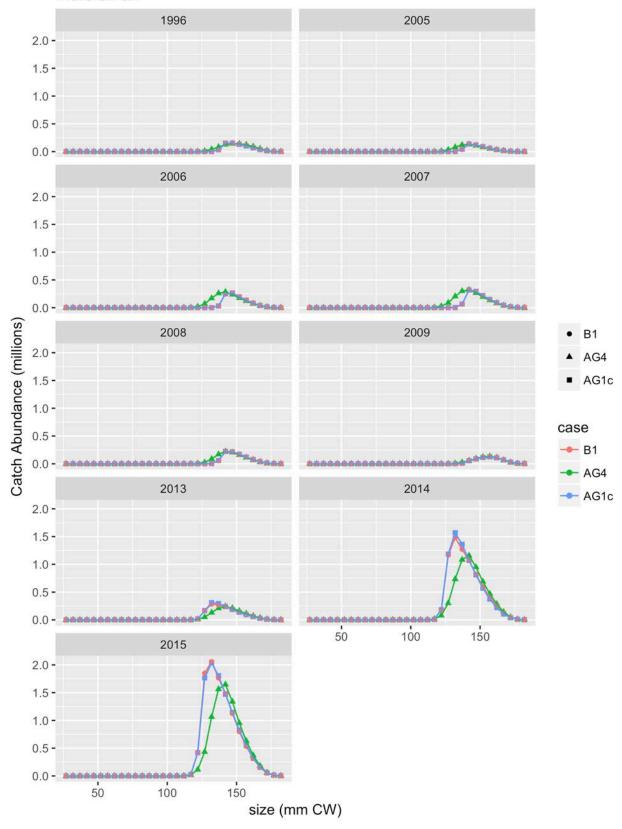


Figure 148. Predicted TCF retained catch abundance for male all all, (4 of 4).

Model fits

Survey biomass

NMFS trawl survey

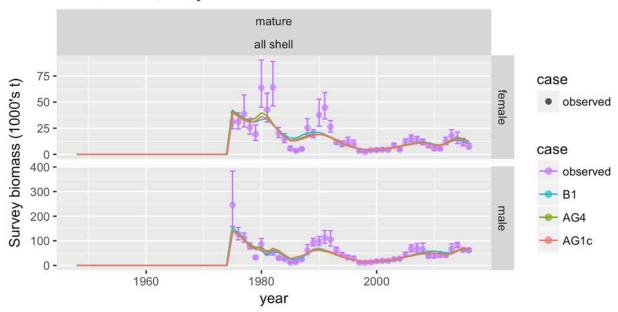
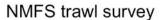


Figure 149. Comparison of observed and predicted survey biomass for NMFS trawl survey.



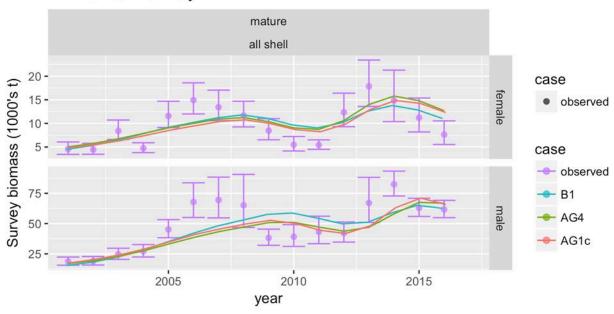


Figure 150. Comparison of observed and predicted survey biomass for NMFS trawl survey. Recent time period.

Mean survey size compositions

NMFS trawl survey

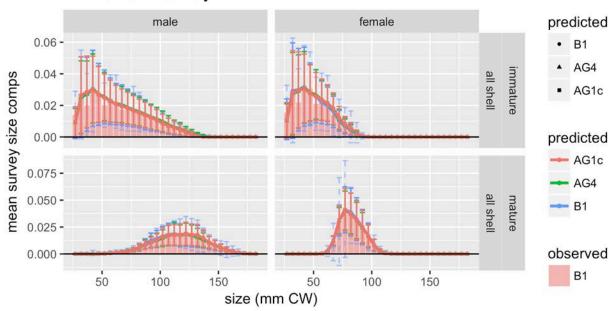


Figure 151. Comparison of observed and predicted &&xms mean survey size comps for NMFS trawl survey.

Survey size compositions

NMFS trawl survey: male, immature, all shell

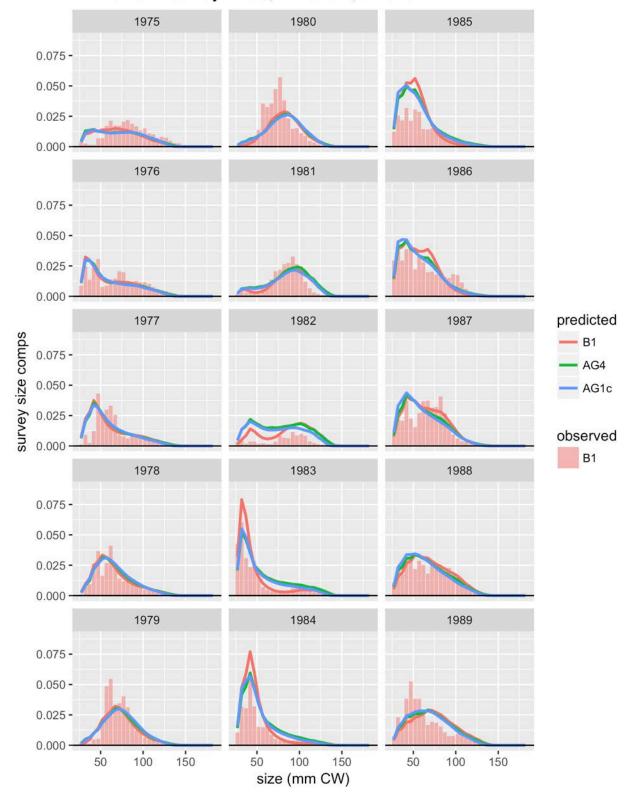


Figure 152. Comparison of observed and predicted male, immature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

NMFS trawl survey: male, immature, all shell 1990 1995 2000 0.075 -0.050 -0.025 -0.000 1991 1996 2001 0.075 -0.050 -0.025 -0.000 predicted 1992 1997 2002 survey size comps **B**1 0.075 -AG4 0.050 -AG1c 0.025 observed 0.000 B1 2003 1993 1998 0.075 -0.050 -0.025 -0.000 1994 1999 2004 0.075 -0.050 -0.025 -0.000 50 100 50 100 50 100 150 150 150 size (mm CW)

Figure 153. Comparison of observed and predicted male, immature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

NMFS trawl survey: male, immature, all shell 2010 2005 2015 0.075 -0.050 -0.025 -0.000 2006 2011 2016 0.075 -0.050 -0.025 -0.000 2012 predicted 2007 2017 survey size comps **B**1 0.075 -AG4 0.050 -AG1c 0.025 observed 0.000 B1 2013 2008 2018 0.075 -0.050 -0.025 -0.000 2009 2014 2019 0.075 -0.050 -0.025 -0.000 50 50 100 50 100 150 100 150 150 size (mm CW)

Figure 154. Comparison of observed and predicted male, immature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

NMFS trawl survey: male, mature, all shell 1975 1980 1985 0.04 -0.02 -0.00 -1976 1981 1986 0.04 -0.02 -0.00 predicted 1977 1982 1987 survey size comps **B**1 0.04 -AG4 - AG1c 0.02 observed 0.00 B1 1978 1983 1988 0.04 -0.02 -0.00 1984 1989 1979 0.04 -0.02 -0.00 100 50 100 50 150 50 150 100 150 size (mm CW)

Figure 155. Comparison of observed and predicted male, mature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

NMFS trawl survey: male, mature, all shell 1990 1995 2000 0.04 -0.02 -0.00 -1991 1996 2001 0.04 -0.02 -0.00 predicted 1992 1997 2002 survey size comps **B**1 0.04 -AG4 - AG1c 0.02 observed 0.00 B1 1993 2003 1998 0.04 -0.02 -0.00 1999 1994 2004 0.04 -0.02 -0.00 50 100 50 100 50 100 150 150 150 size (mm CW)

Figure 156. Comparison of observed and predicted male, mature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

NMFS trawl survey: male, mature, all shell 2005 2010 2015 0.04 -0.02 -0.00 -2006 2011 2016 0.04 -0.02 -0.00 2012 predicted 2007 2017 survey size comps **B**1 0.04 -AG4 - AG1c 0.02 observed 0.00 B1 2008 2013 2018 0.04 -0.02 -0.00 2009 2014 2019 0.04 -0.02 -0.00 50 100 50 50 100 150 150 100 150 size (mm CW)

Figure 157. Comparison of observed and predicted male, mature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

NMFS trawl survey: female, immature, all shell 1985 1975 1980 0.100 -0.075 -0.050 -0.025 -0.000 -1976 1981 1986 0.100 -0.075 -0.050 -0.025 -0.000 predicted 1977 1982 1987 survey size comps 0.100 -**B**1 0.075 -AG4 - AG1c 0.050 -0.025 observed 0.000 B1 1978 1983 1988 0.100 -0.075 -0.050 -0.025 -0.000 1979 1984 1989 0.100 -0.075 -0.050 -0.025 -0.000 50 50 50 150 100 100 150 100 150 size (mm CW)

Figure 158. Comparison of observed and predicted female, immature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

NMFS trawl survey: female, immature, all shell 1990 1995 2000 0.100 -0.075 -0.050 -0.025 -0.000 1991 1996 2001 0.100 -0.075 -0.050 -0.025 -0.000 predicted 1992 1997 2002 survey size comps 0.100 -- B1 0.075 -AG4 AG1c 0.050 -0.025 observed 0.000 B1 1993 1998 2003 0.100 -0.075 -0.050 -0.025 -0.000 -1994 1999 2004 0.100 -0.075 -0.050 -0.025 -0.000 50 50 50 100 100 150 100 150 150 size (mm CW)

Figure 159. Comparison of observed and predicted female, immature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

NMFS trawl survey: female, immature, all shell 2005 2010 2015 0.100 -0.075 -0.050 -0.025 -0.000 2006 2011 2016 0.100 -0.075 -0.050 -0.025 -0.000 predicted 2007 2012 2017 survey size comps 0.100 -- B1 0.075 -AG4 AG1c 0.050 -0.025 observed 0.000 B1 2008 2013 2018 0.100 -0.075 -0.050 -0.025 -0.000 2009 2014 2019 0.100 -0.075 -0.050 -0.025 -0.000 50 50 50 100 150 100 150 100 150 size (mm CW)

Figure 160. Comparison of observed and predicted female, immature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

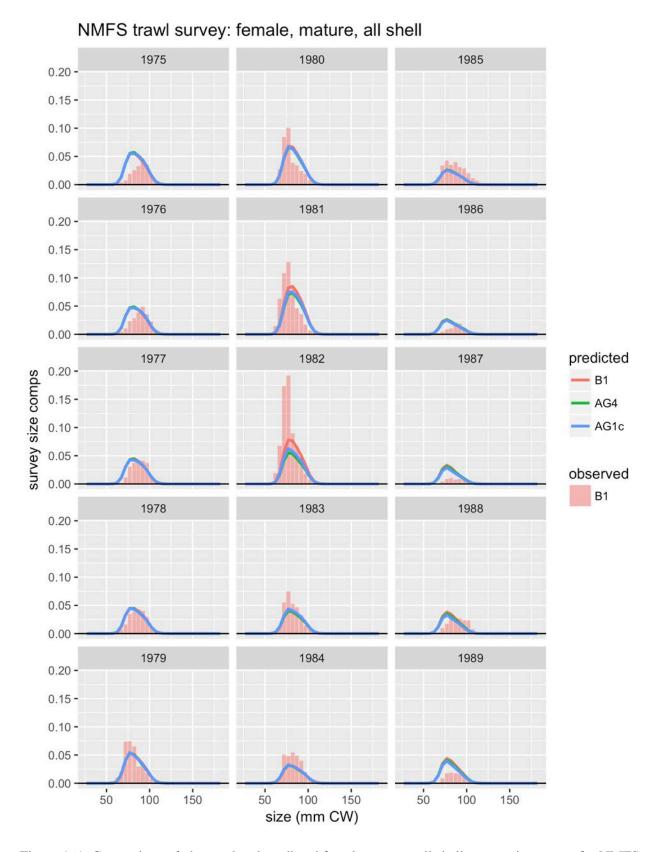


Figure 161. Comparison of observed and predicted female, mature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

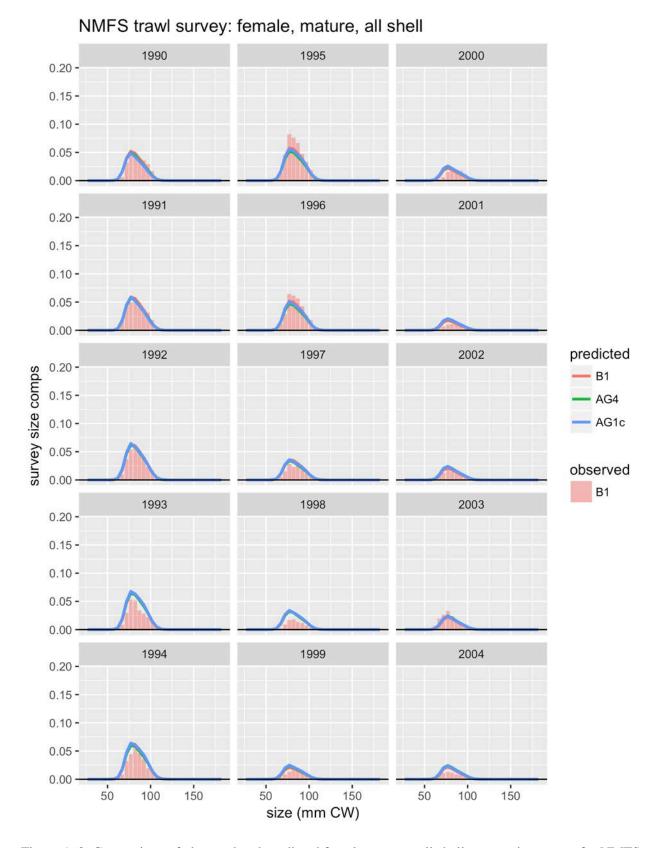


Figure 162. Comparison of observed and predicted female, mature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

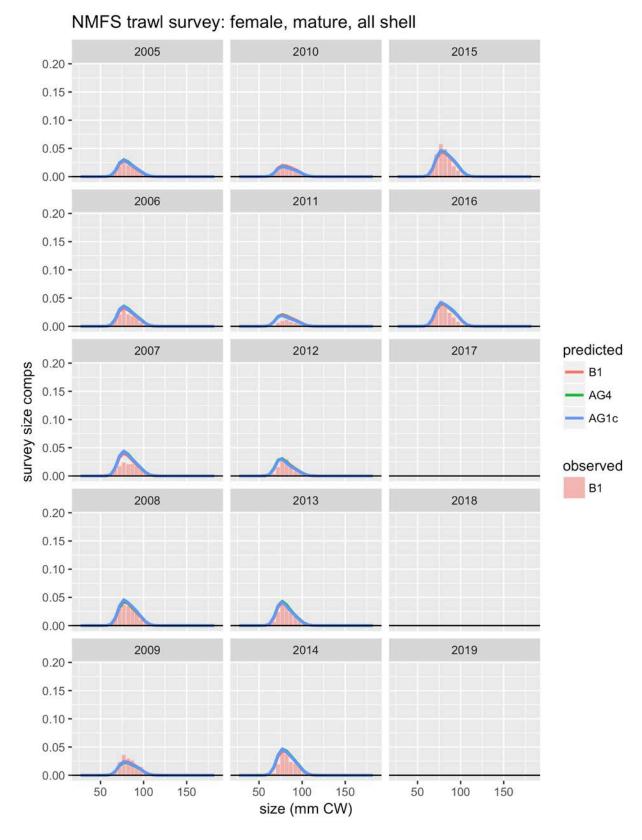


Figure 163. Comparison of observed and predicted female, mature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

Growth data GrowthData.1 125 **-**100 -75 **-**50 post-molt size (mm CW) case → AG1c 25 AG4 **-**− B1 125 **-**100 -75 **-**50 **-**

pre-molt size (mm CW)

80

100

Figure 164. Model fits to GrowthData.1.

40

25 **-**

20

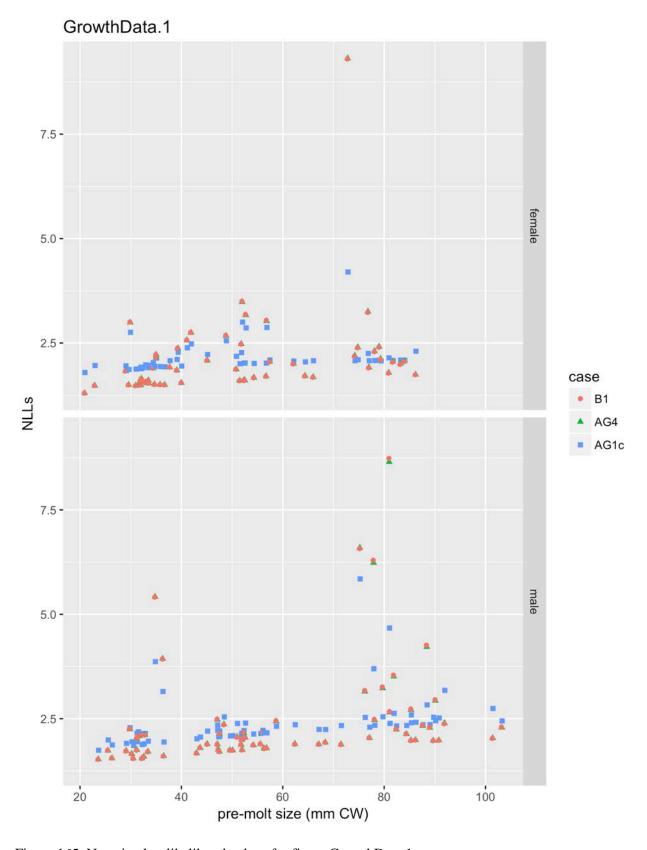


Figure 165. Negative log-likelihood values for fits to GrowthData.1.

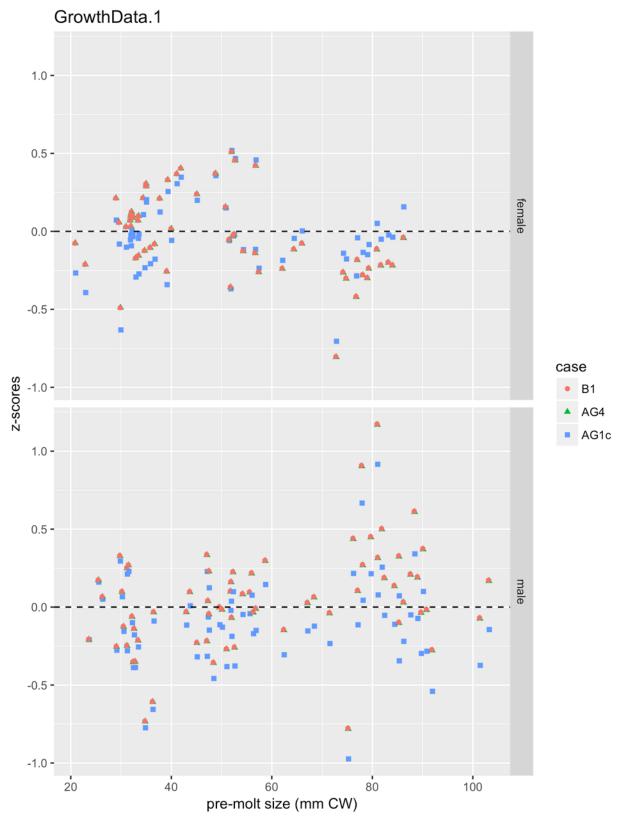


Figure 166.

Z-scores for fits to GrowthData.1.

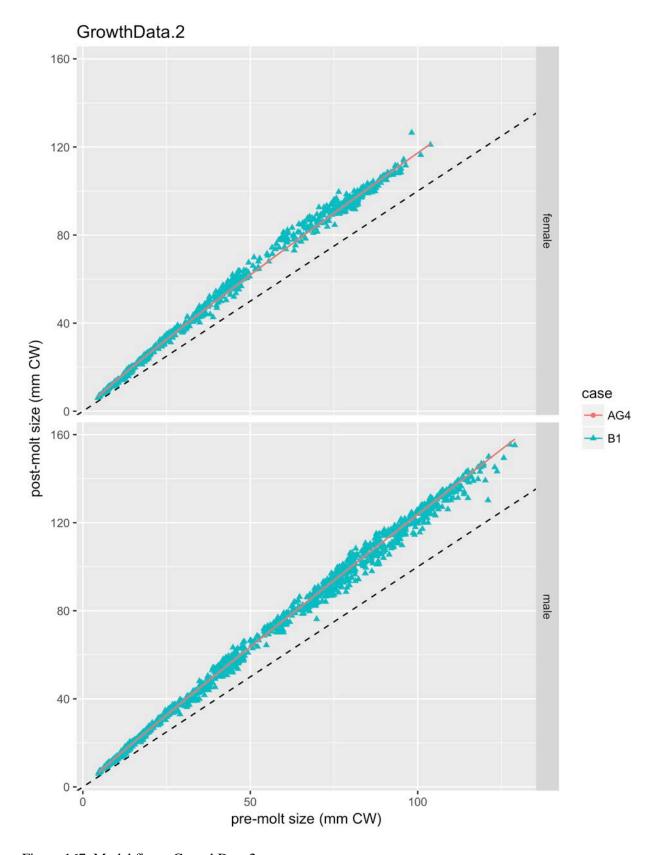


Figure 167. Model fits to GrowthData.2.

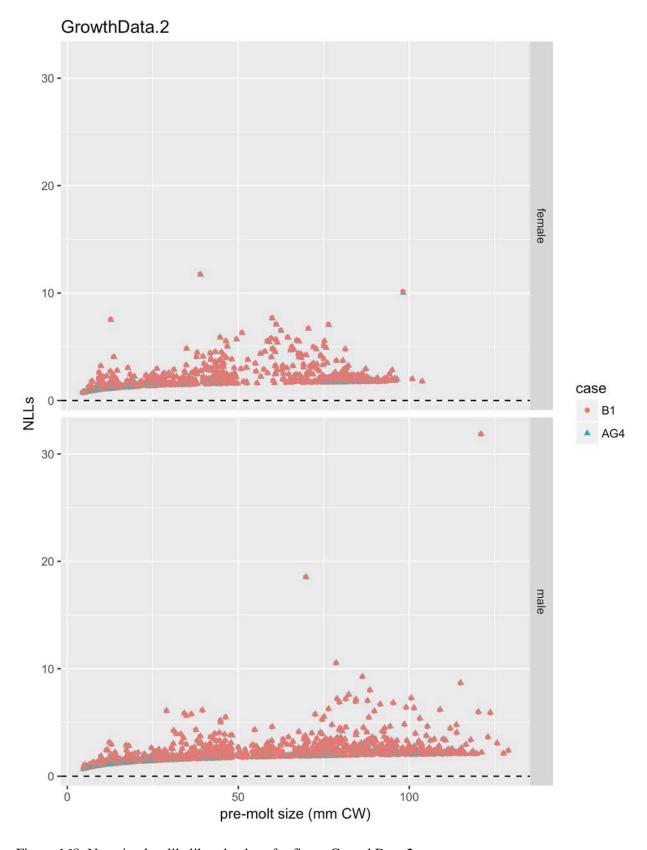
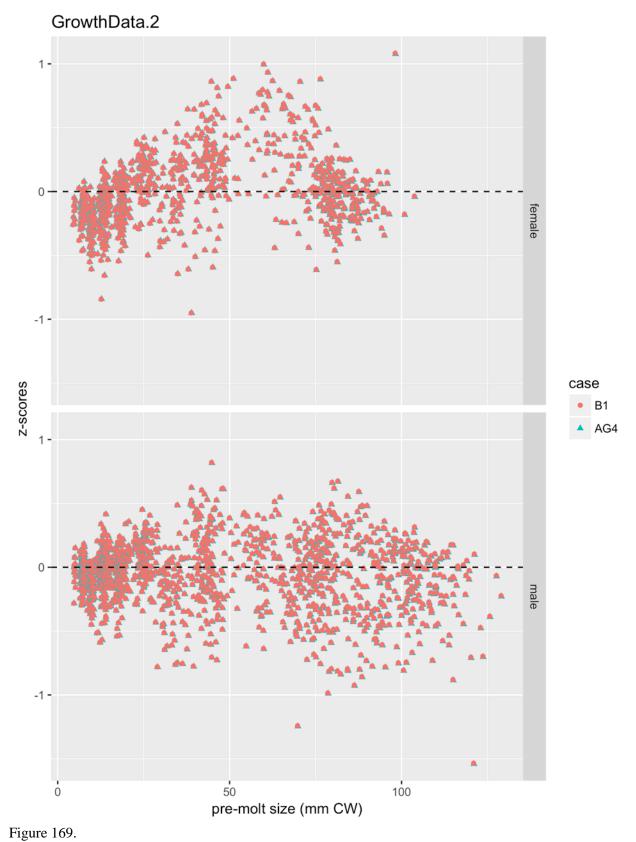


Figure 168. Negative log-likelihood values for fits to GrowthData.2.



Z-scores for fits to GrowthData.2.

Total fishery catch biomass

NOTE: Predicted and "observed" catch biomass for TCSAM2013 model results in the following plots always reflect "total catch mortality" biomass (even when "total capture" biomass was fit in the model), while TCSAM02 model results always reflect "total capture" biomass.

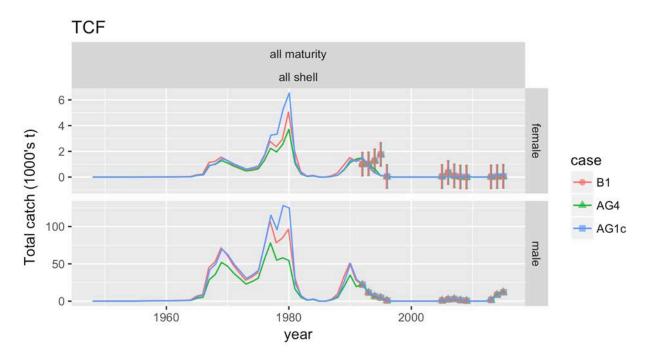


Figure 170. Comparison of observed and predicted total catch for TCF.

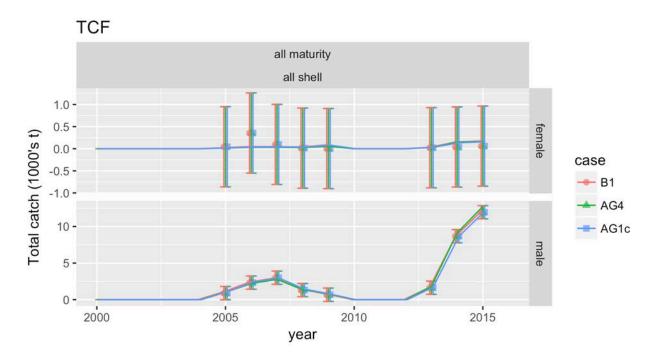


Figure 171. Comparison of observed and predicted total catch for TCF. Recent time period.

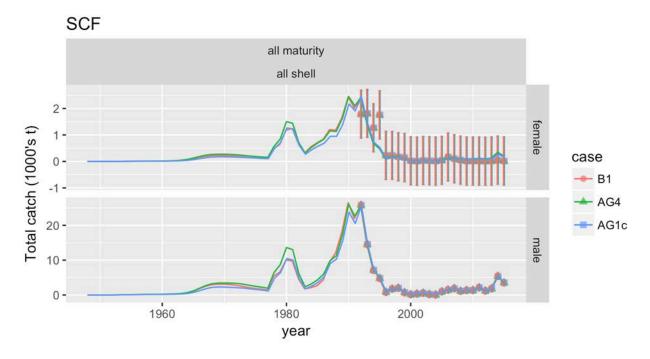


Figure 172. Comparison of observed and predicted total catch for SCF.

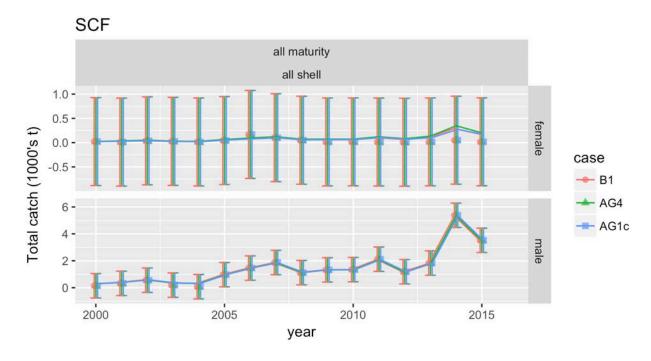


Figure 173. Comparison of observed and predicted total catch for SCF. Recent time period.

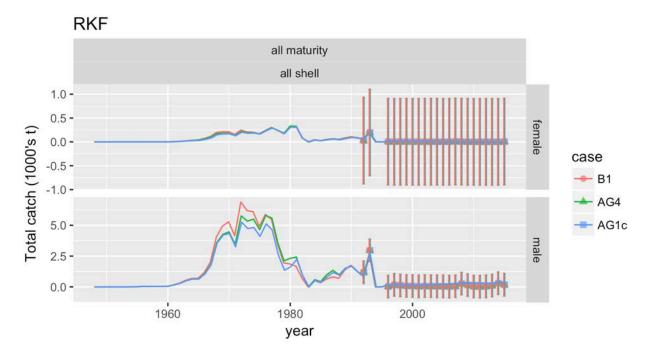


Figure 174. Comparison of observed and predicted total catch for RKF.

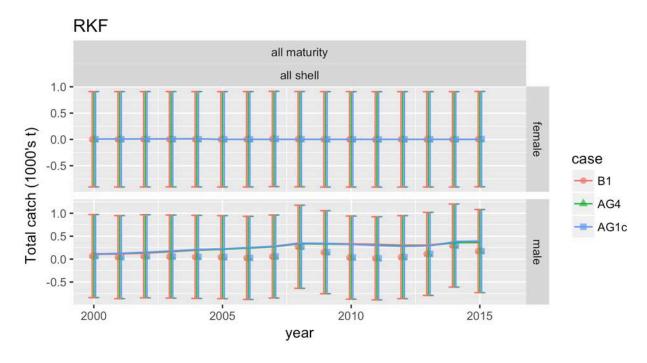


Figure 175. Comparison of observed and predicted total catch for RKF. Recent time period.

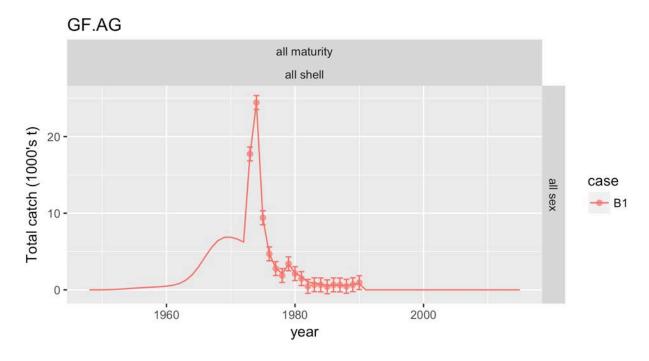


Figure 176. Comparison of observed and predicted total catch for GF.AG.

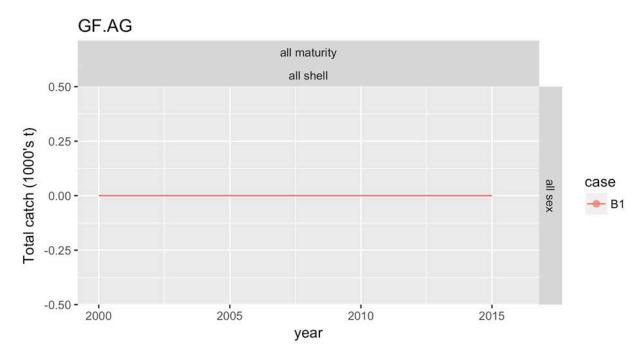


Figure 177. Comparison of observed and predicted total catch for GF.AG. Recent time period.

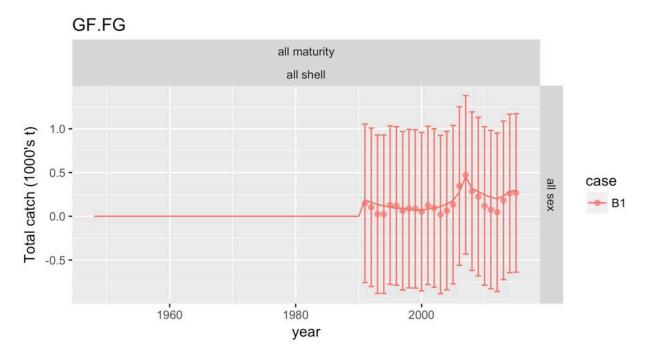


Figure 178. Comparison of observed and predicted total catch for GF.FG.

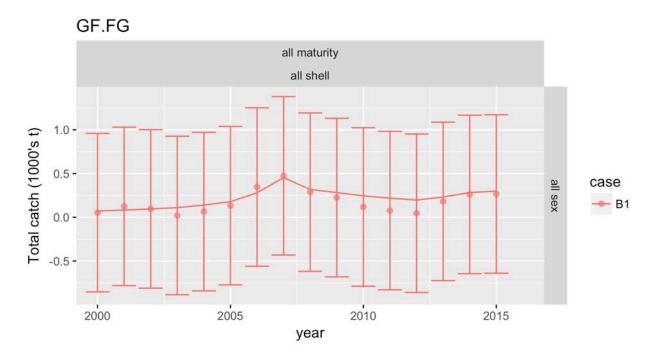


Figure 179. Comparison of observed and predicted total catch for GF.FG. Recent time period.

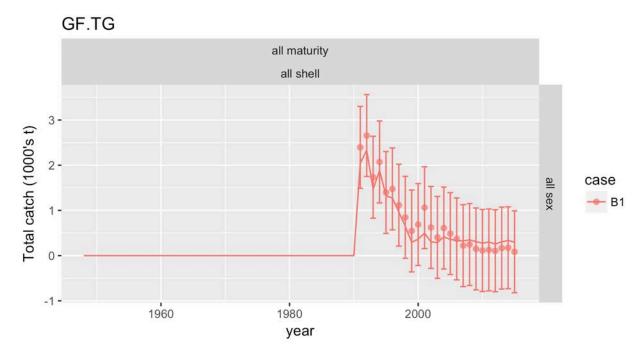


Figure 180. Comparison of observed and predicted total catch for GF.TG.

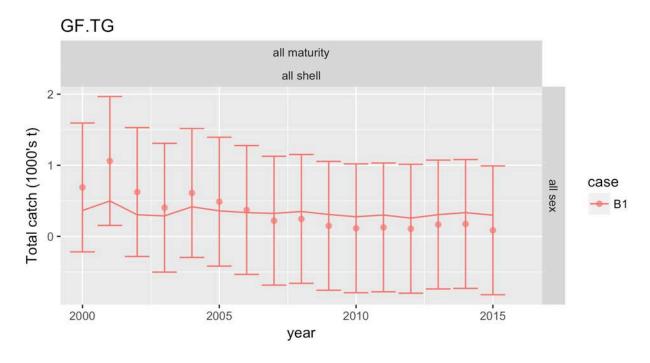


Figure 181. Comparison of observed and predicted total catch for GF.TG. Recent time period.

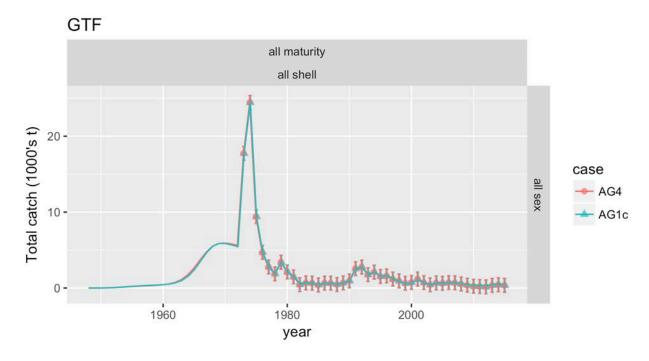


Figure 182. Comparison of observed and predicted total catch for GTF.

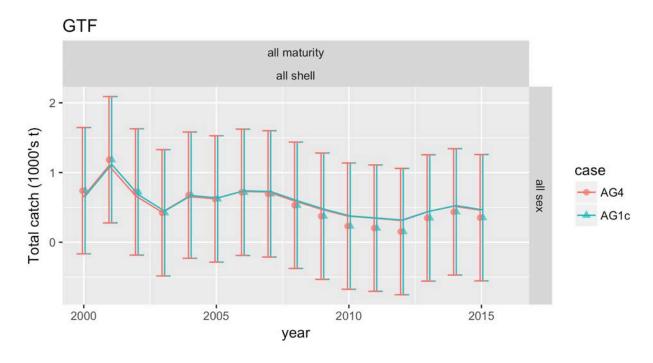


Figure 183. Comparison of observed and predicted total catch for GTF. Recent time period.

Total fishery mean size comps

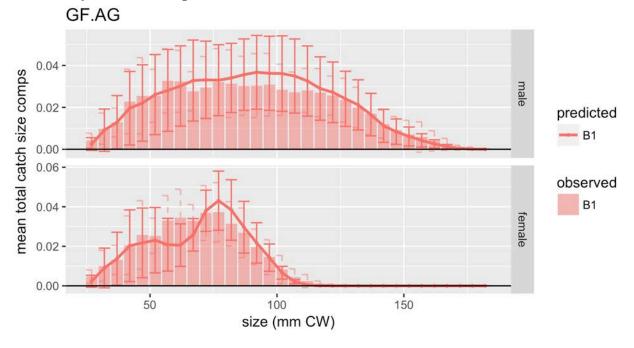


Figure 184. Comparison of observed and predicted &&xms mean total catch size comps for GF.AG.

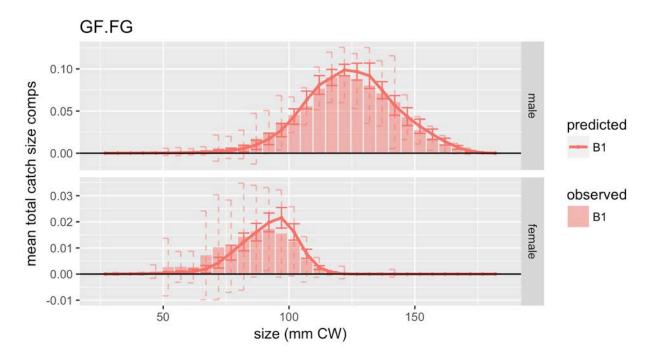


Figure 185. Comparison of observed and predicted &&xms mean total catch size comps for GF.FG.

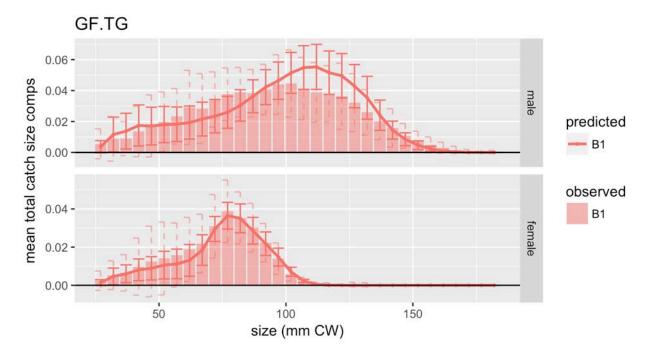


Figure 186. Comparison of observed and predicted &&xms mean total catch size comps for GF.TG.

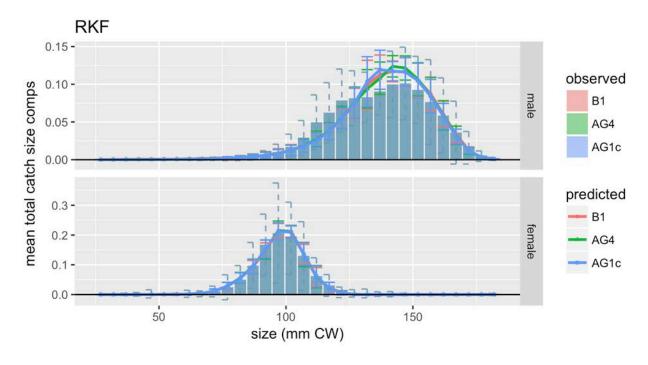


Figure 187. Comparison of observed and predicted &&xms mean total catch size comps for RKF.

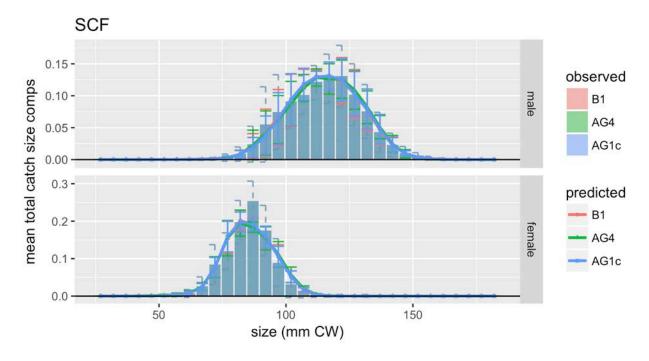


Figure 188. Comparison of observed and predicted &&xms mean total catch size comps for SCF.

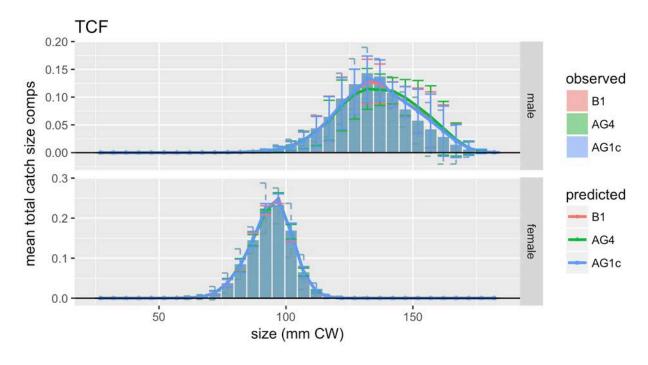


Figure 189. Comparison of observed and predicted &&xms mean total catch size comps for TCF.

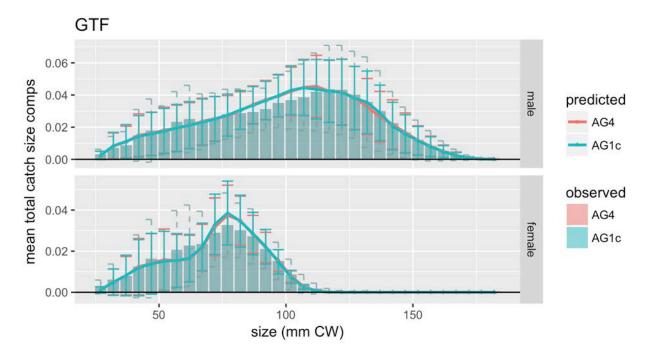


Figure 190. Comparison of observed and predicted &&xms mean total catch size comps for GTF.

Total fishery catch size comps

TCF: male, all maturity, all shell

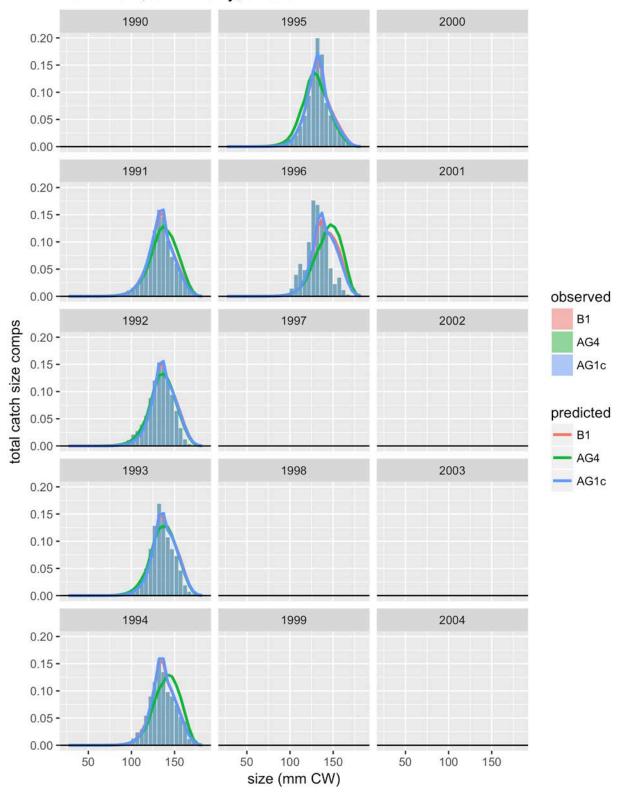


Figure 191. Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 1 of 2.

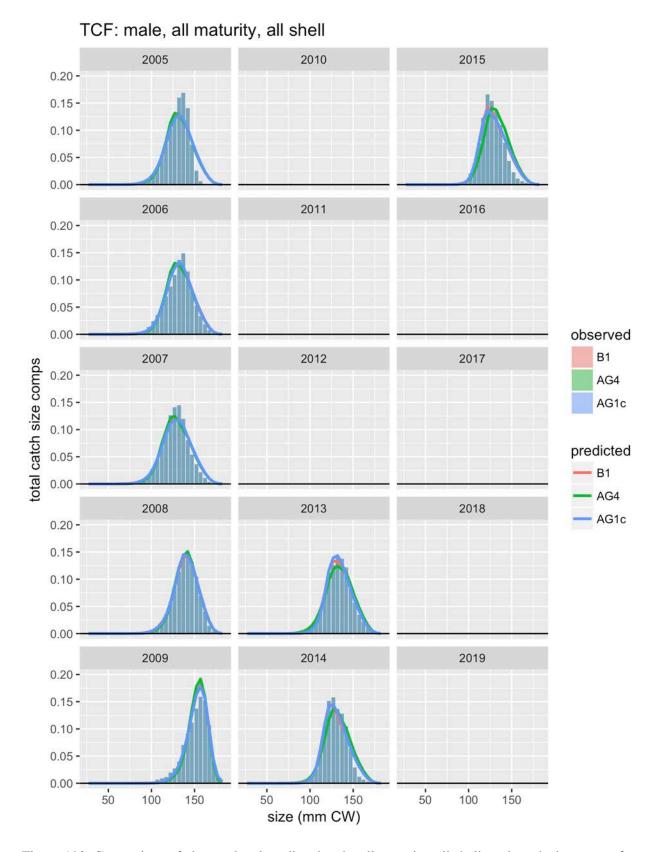


Figure 192. Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 2 of 2.

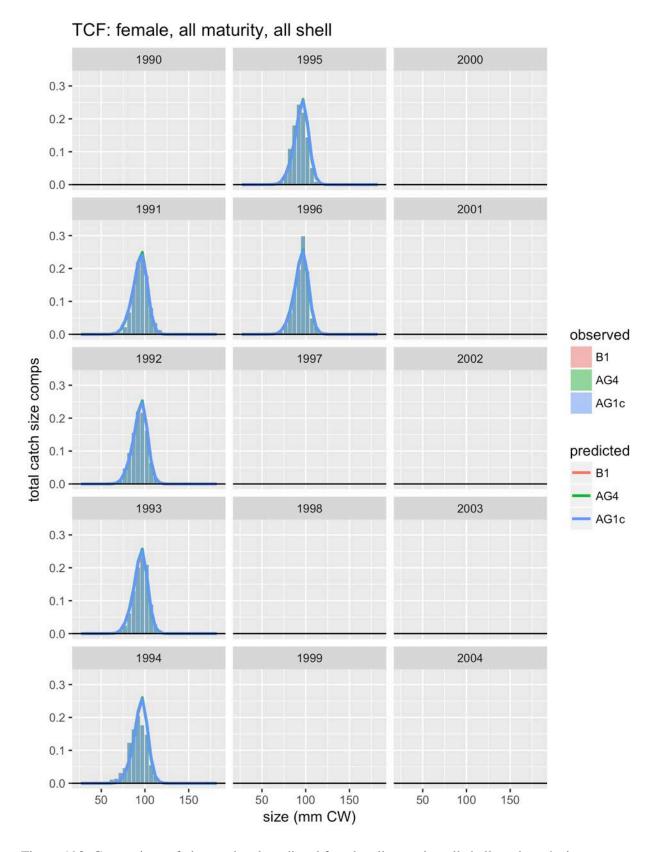


Figure 193. Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 1 of 2.

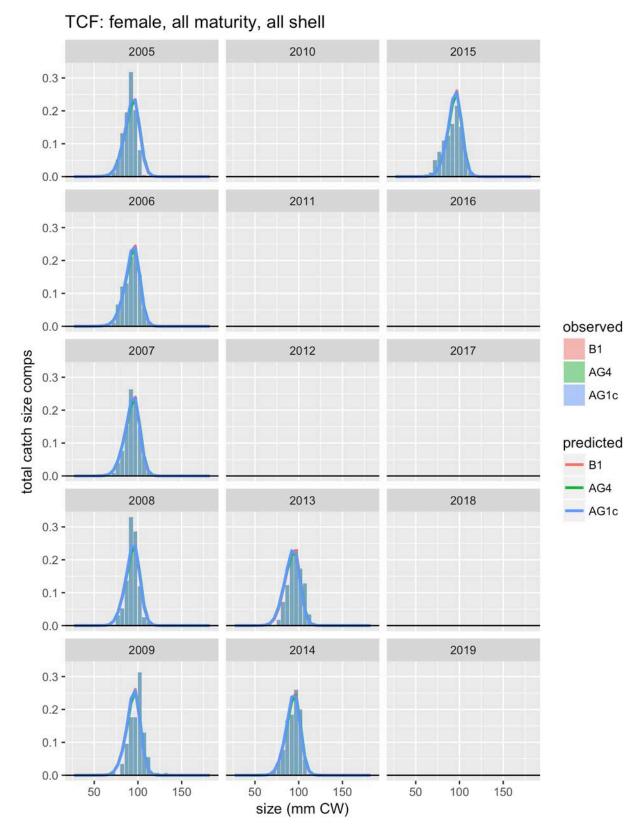


Figure 194. Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 2 of 2.

SCF: male, all maturity, all shell 1990 1995 2000 0.20 -0.15 -0.10 -0.05 -0.00 -1991 1996 2001 0.20 -0.15 -0.10 -0.05 -0.00 observed 2002 B1 1992 1997 total catch size comps 0.20 -AG4 0.15 -AG1c 0.10 predicted 0.05 -B1 0.00 AG4 1993 1998 2003 AG1c 0.20 -0.15 -0.10 -0.05 -0.00 1994 1999 2004 0.20 -0.15 -0.10 -0.05 -0.00 50 50 50 150 100 100 150 150 100 size (mm CW)

Figure 195. Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 1 of 2.

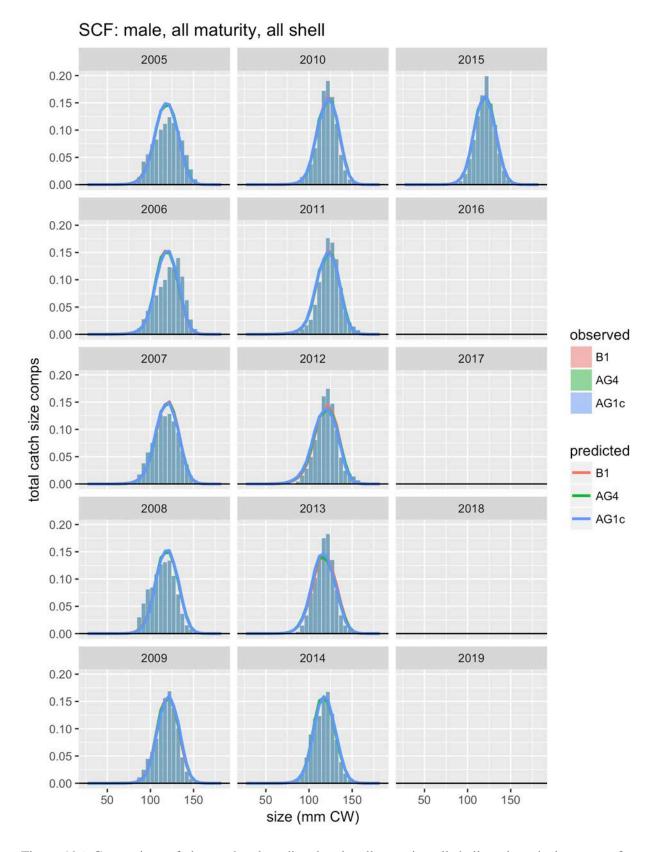


Figure 196. Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 2 of 2.

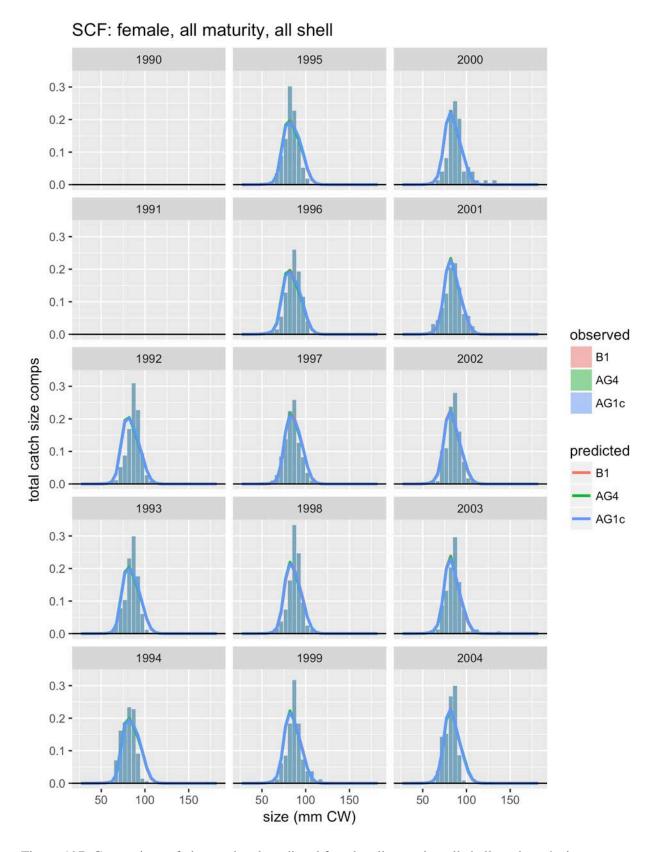


Figure 197. Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 1 of 2.

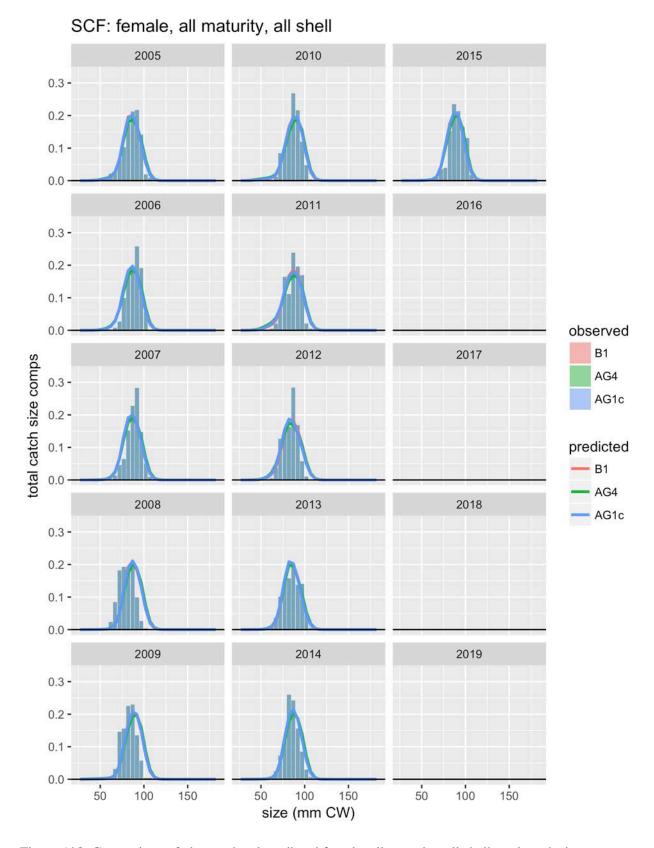


Figure 198. Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 2 of 2.

RKF: male, all maturity, all shell 1990 1995 2000 0.15 -0.10 -0.05 -0.00 -1991 1996 2001 0.15 -0.10 -0.05 -0.00 observed 2002 B1 1992 1997 total catch size comps AG4 0.15 -AG1c 0.10 -0.05 predicted B1 0.00 AG4 1993 2003 1998 AG1c 0.15 -0.10 -0.05 -0.00 1994 1999 2004 0.15 -0.10 -0.05 -0.00 50 100 150 50 50 100 150 150 100 size (mm CW)

Figure 199. Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 1 of 2.

RKF: male, all maturity, all shell 2005 2010 2015 0.15 -0.10 -0.05 -0.00 -2011 2006 2016 0.15 -0.10 -0.05 -0.00 observed 2007 2012 B1 2017 total catch size comps AG4 0.15 -AG1c 0.10 -0.05 predicted B1 0.00 AG4 2013 2008 2018 AG1c 0.15 -0.10 -0.05 -0.00 -2009 2014 2019 0.15 -0.10 -0.05 -0.00 50 50 100 50 100 100 150 150 150 size (mm CW)

Figure 200. Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 2 of 2.

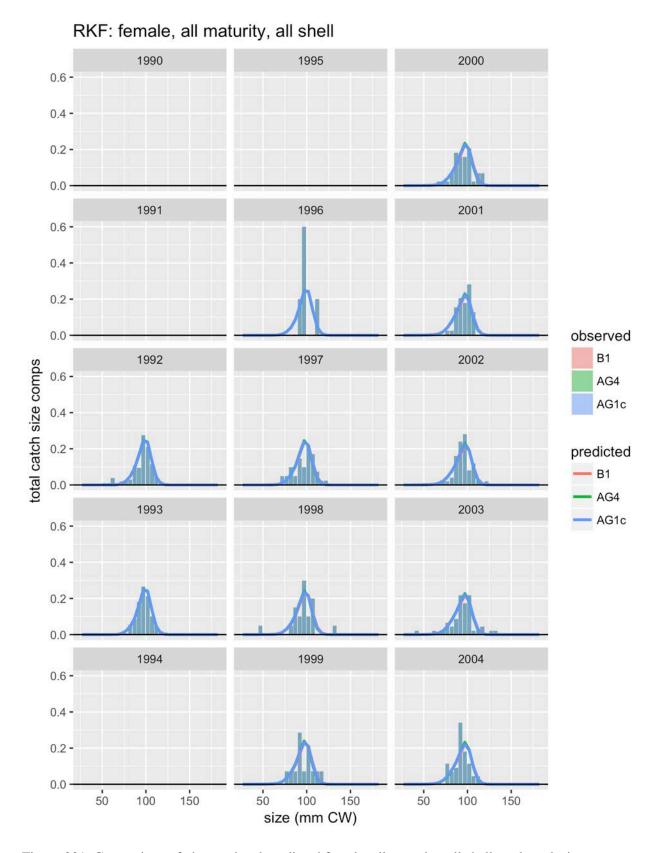


Figure 201. Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 1 of 2.

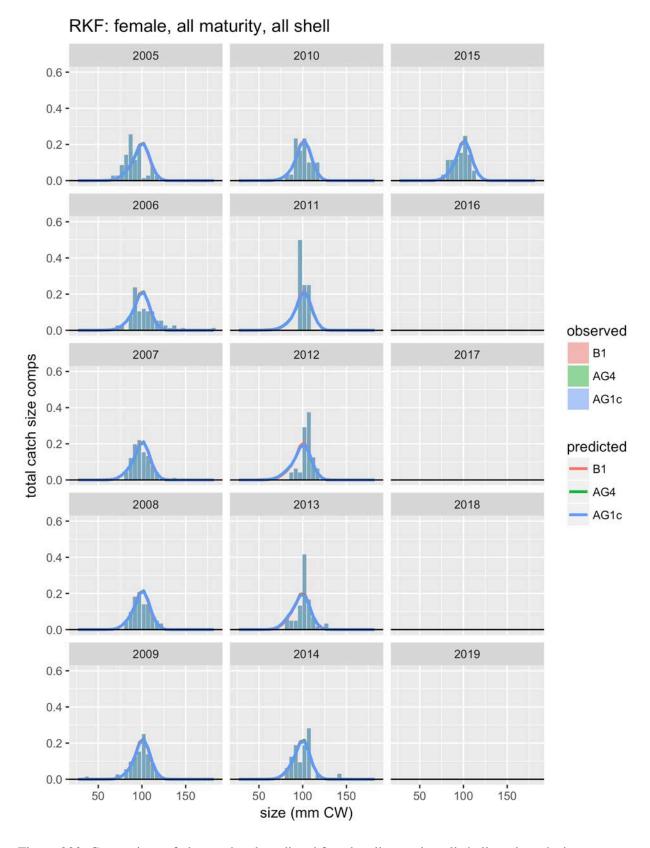


Figure 202. Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 2 of 2.

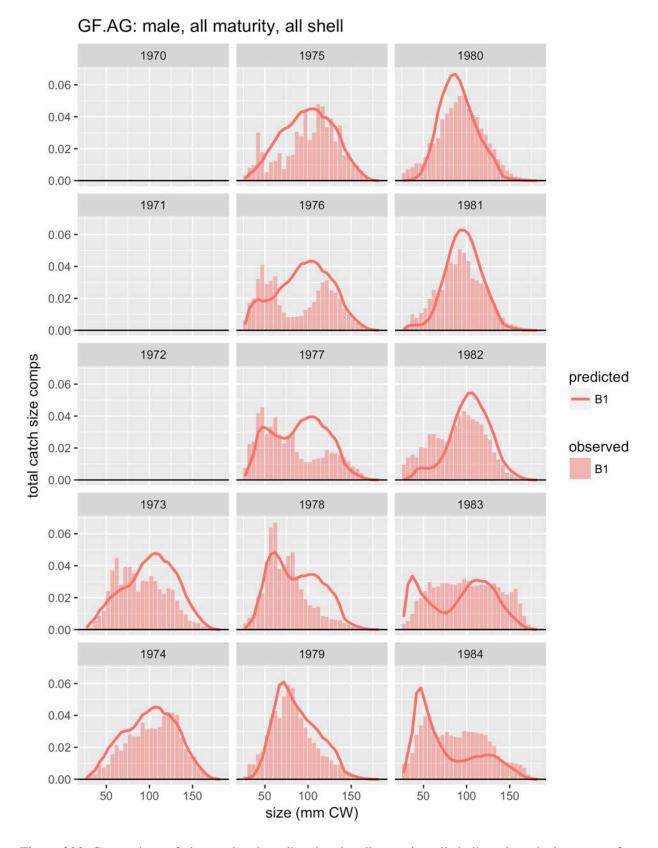


Figure 203. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF.AG. Page 1 of 2.

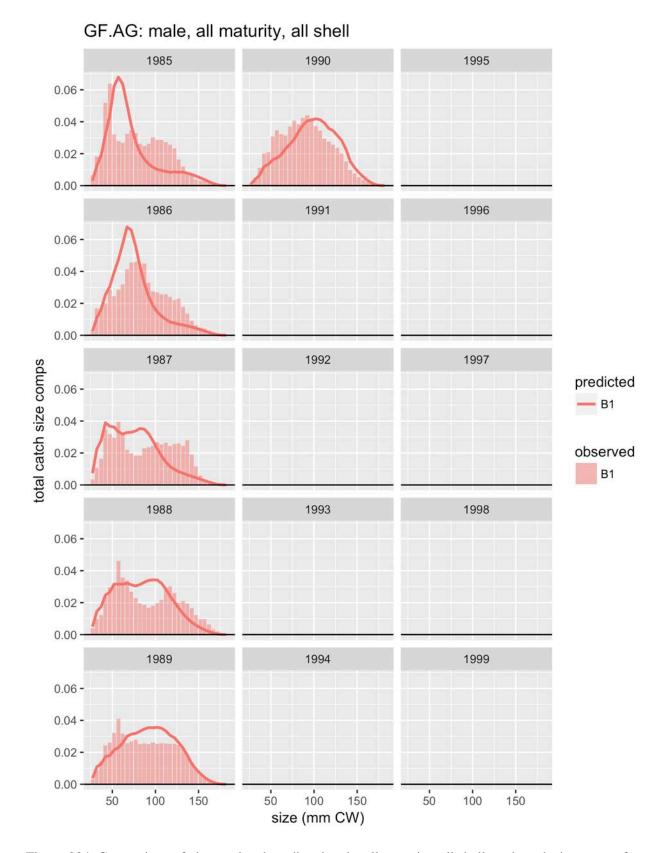


Figure 204. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF.AG. Page 2 of 2.

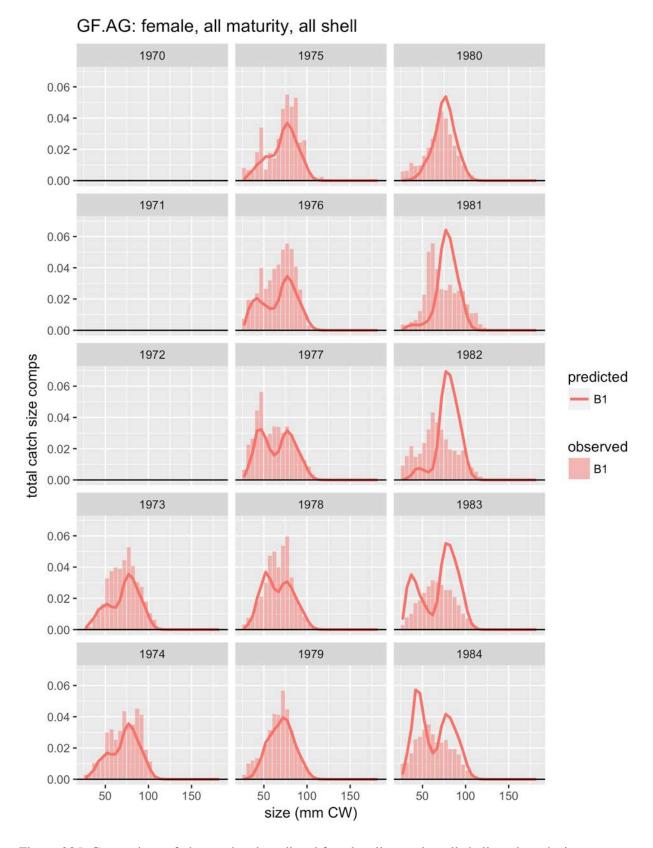


Figure 205. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF.AG. Page $1\ \text{of}\ 2$.

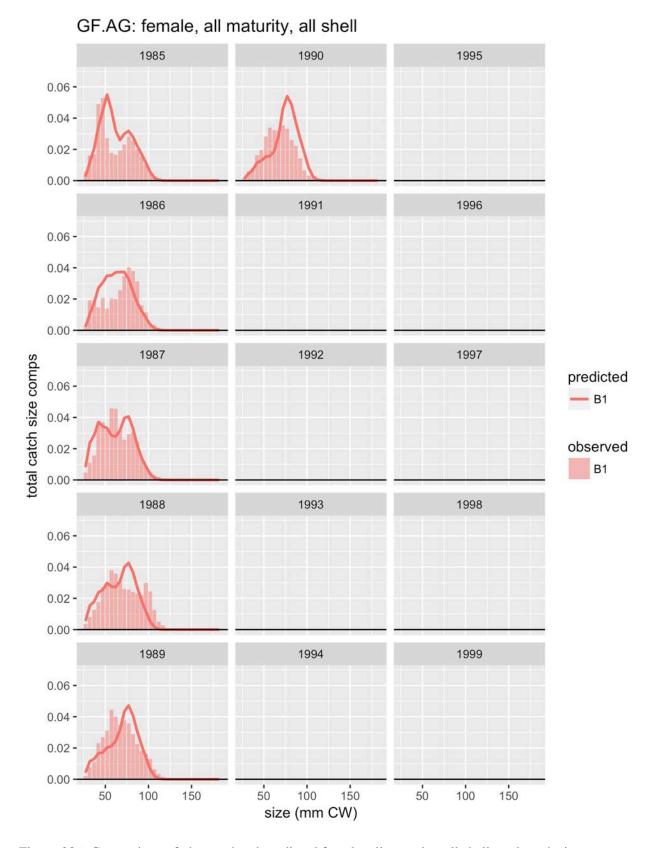


Figure 206. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF.AG. Page 2 of 2.

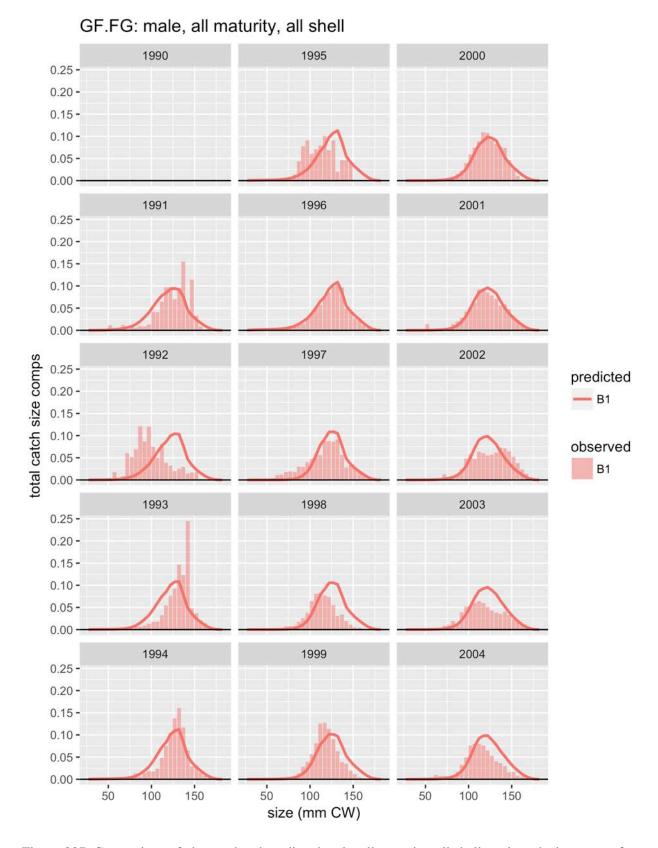


Figure 207. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF.FG. Page 1 of 2.

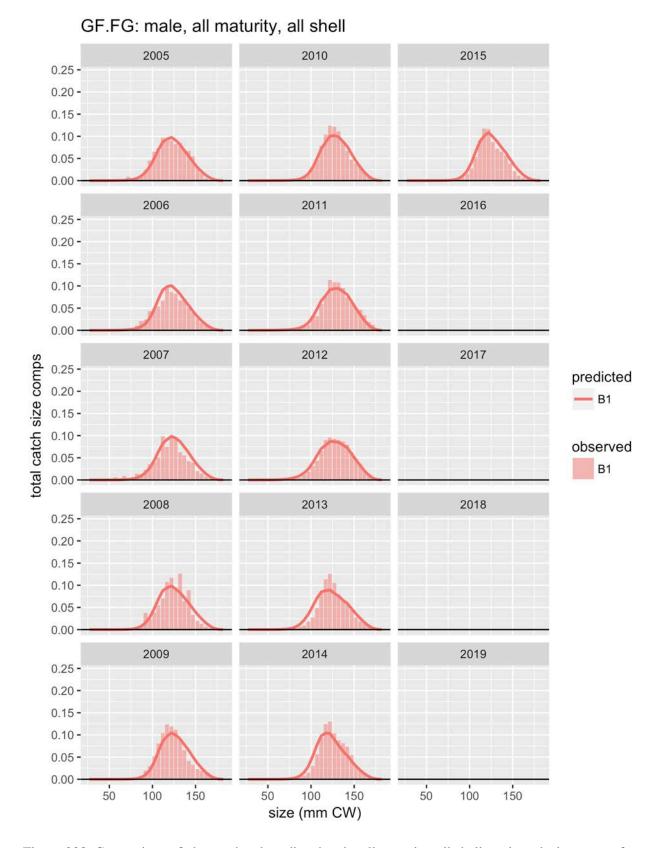


Figure 208. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF.FG. Page 2 of 2.

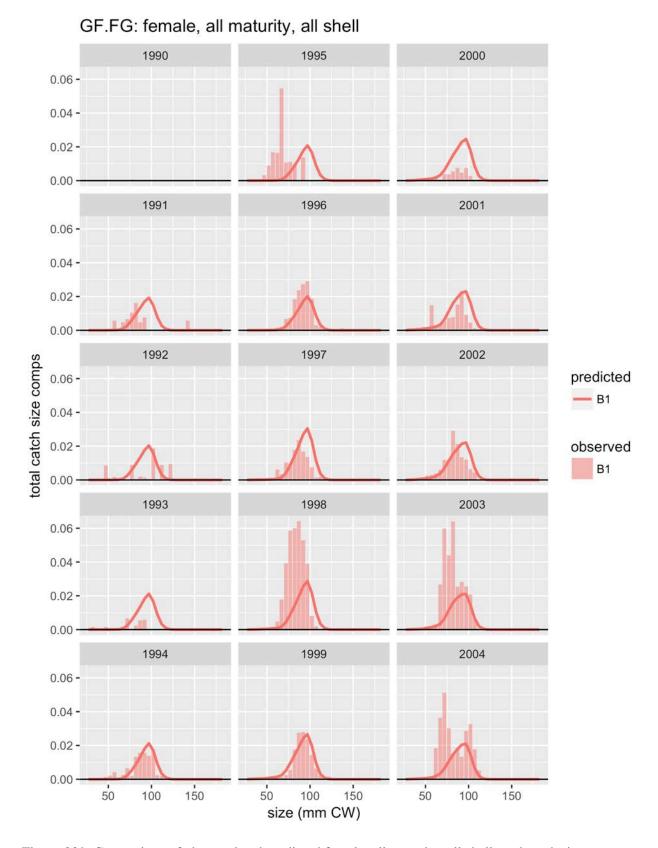


Figure 209. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF.FG. Page 1 of 2.

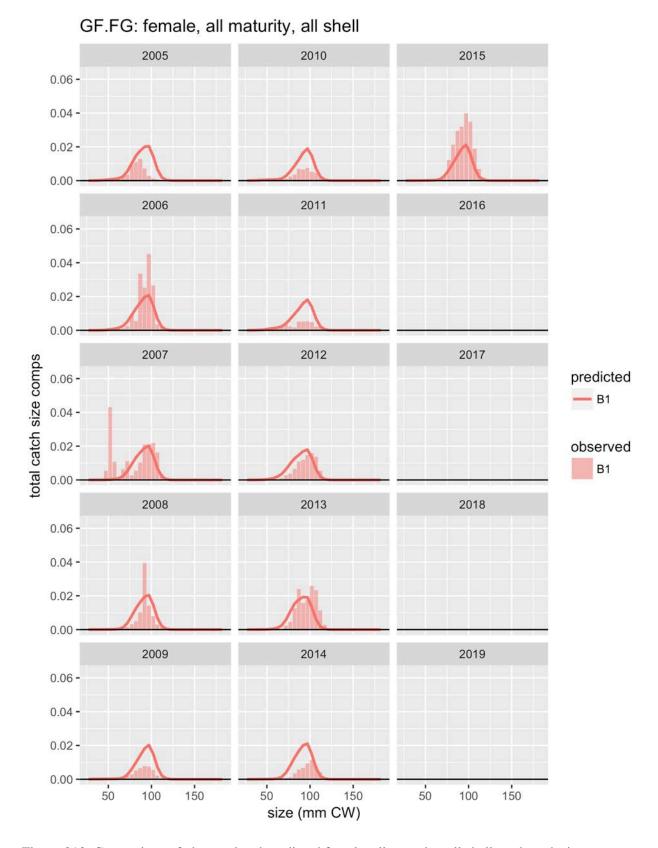


Figure 210. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF.FG. Page 2 of 2.

GF.TG: male, all maturity, all shell 1990 1995 2000 0.075 -0.050 -0.025 -0.000 -1991 1996 2001 0.075 -0.050 -0.025 -0.000 1992 1997 2002 total catch size comps predicted 0.075 -B1 0.050 observed 0.025 -B1 0.000 1993 1998 2003 0.075 -0.050 -0.025 -0.000 1994 1999 2004 0.075 -0.050 -0.025 -0.000 50 50 100 50 100 150 150 150 100 size (mm CW)

Figure 211. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF.TG. Page 1 of 2.

GF.TG: male, all maturity, all shell 2005 2010 2015 0.075 -0.050 -0.025 -0.000 2006 2011 2016 0.075 -0.050 -0.025 -0.000 2007 2012 2017 total catch size comps predicted 0.075 -B1 0.050 observed 0.025 -B1 0.000 2008 2013 2018 0.075 -0.050 -0.025 -0.000 2009 2014 2019 0.075 -0.050 -0.025 -0.000 50 50 100 50 100 100 150 150 150 size (mm CW)

Figure 212. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF.TG. Page 2 of 2.

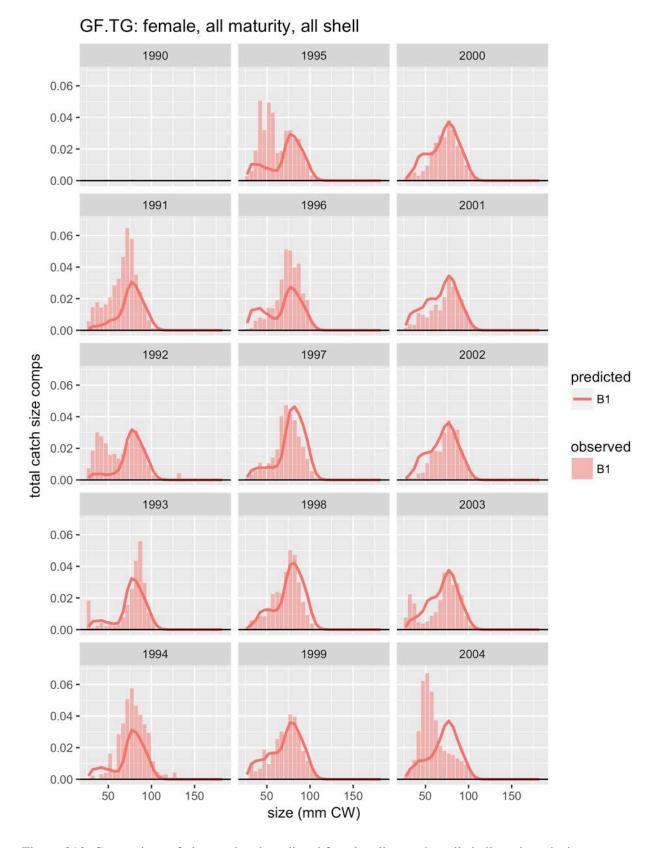


Figure 213. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF.TG. Page 1 of 2.

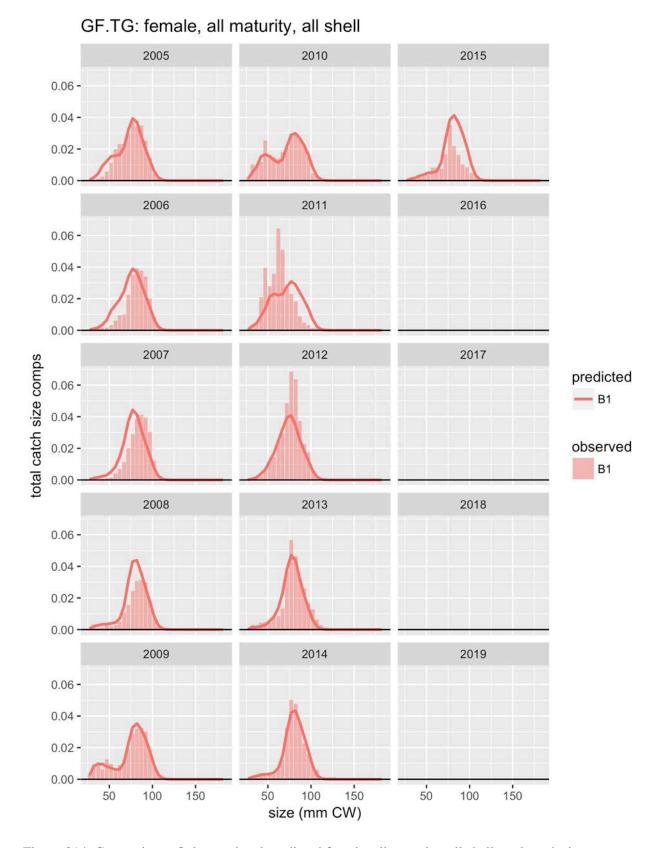


Figure 214. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF.TG. Page 2 of 2.

GTF: male, all maturity, all shell 1970 1975 1980 0.09 -0.06 -0.03 -0.00 -1971 1976 1981 0.09 -0.06 -0.03 -0.00 predicted 1972 1977 1982 total catch size comps AG4 0.09 -AG1c 0.06 -0.03 observed AG4 0.00 AG1c 1983 1973 1978 0.09 -0.06 -0.03 -0.00 1974 1979 1984 0.09 -0.06 -0.03 -0.00 100 50 50 50 100 100 150 150 150 size (mm CW)

Figure 215. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 1 of 4.

GTF: male, all maturity, all shell 1985 1990 1995 0.09 -0.06 -0.03 -0.00 1986 1991 1996 0.09 -0.06 -0.03 -0.00 1992 predicted 1987 1997 total catch size comps - AG4 0.09 -AG1c 0.06 -0.03 observed AG4 0.00 AG1c 1988 1993 1998 0.09 -0.06 -0.03 -0.00 1989 1994 1999 0.09 -0.06 -0.03 -0.00 100 50 150 100 100 150 50 150 50 size (mm CW)

Figure 216. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 2 of 4.

GTF: male, all maturity, all shell 2000 2005 2010 0.09 -0.06 -0.03 -0.00 2001 2006 2011 0.09 -0.06 -0.03 -0.00 predicted 2002 2007 2012 total catch size comps AG4 0.09 -AG1c 0.06 -0.03 observed AG4 0.00 AG1c 2003 2008 2013 0.09 -0.06 -0.03 -0.00 2009 2004 2014 0.09 -0.06 -0.03 -0.00 50 100 50 50 100 100 150 150 150 size (mm CW)

Figure 217. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 3 of 4.

GTF: male, all maturity, all shell 2015 2020 2025 0.09 -0.06 -0.03 -0.00 2016 2021 2026 0.09 -0.06 -0.03 -0.00 predicted 2017 2022 2027 total catch size comps AG4 0.09 -AG1c 0.06 -0.03 observed AG4 0.00 AG1c 2018 2023 2028 0.09 -0.06 -0.03 -0.00 -2024 2019 2029 0.09 -0.06 -0.03 -0.00 50 50 50 100 150 100 100 150 150 size (mm CW)

Figure 218. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 4 of 4.

GTF: female, all maturity, all shell 1970 1975 1980 0.06 -0.04 -0.02 -0.00 -1971 1976 1981 0.06 -0.04 -0.02 -0.00 predicted 1972 1977 1982 total catch size comps AG4 0.06 -AG1c 0.04 -0.02 observed AG4 0.00 AG1c 1973 1978 1983 0.06 -0.04 -0.02 -0.00 1984 1974 1979 0.06 -0.04 -0.02 -0.00 50 150 50 50 150 100 100 150 100 size (mm CW)

Figure 219. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 1 of 4.

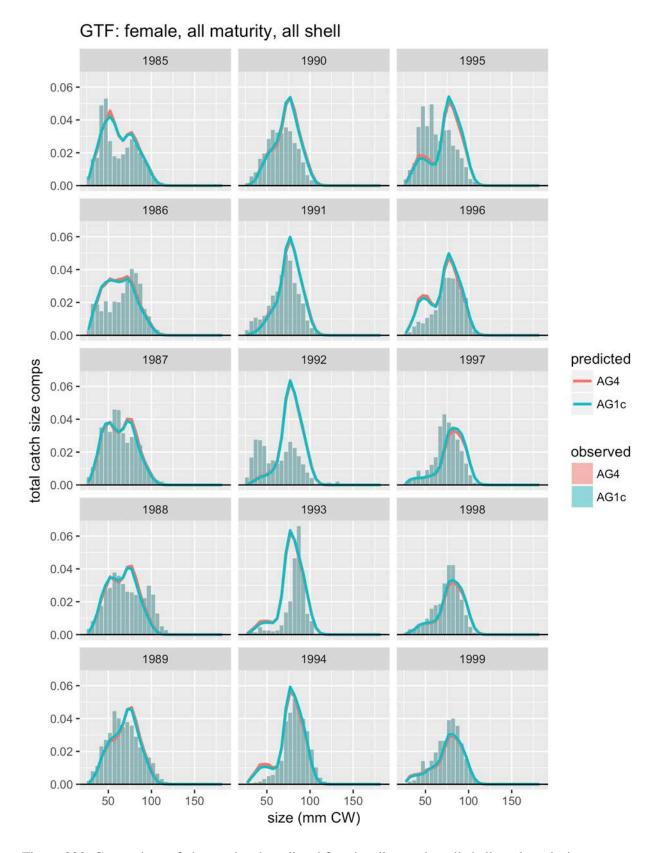


Figure 220. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 2 of 4.

GTF: female, all maturity, all shell 2000 2005 2010 0.06 -0.04 -0.02 -0.00 2001 2006 2011 0.06 -0.04 -0.02 -0.00 predicted 2002 2007 2012 total catch size comps AG4 0.06 -AG1c 0.04 -0.02 observed AG4 0.00 AG1c 2003 2013 2008 0.06 -0.04 -0.02 -0.00 2004 2009 2014 0.06 -0.04 -0.02 -0.00 50 150 50 150 50 100 100 150 100 size (mm CW)

Figure 221. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 3 of 4.

GTF: female, all maturity, all shell 2015 2020 2025 0.06 -0.04 -0.02 -0.00 -2016 2021 2026 0.06 -0.04 -0.02 -0.00 predicted 2017 2022 2027 total catch size comps AG4 0.06 -AG1c 0.04 -0.02 observed AG4 0.00 AG1c 2023 2028 2018 0.06 -0.04 -0.02 -0.00 -2024 2019 2029 0.06 -0.04 -0.02 -0.00 50 50 50 100 150 100 100 150 150

Figure 222. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 4 of 4.

size (mm CW)

Retained fishery catch biomass

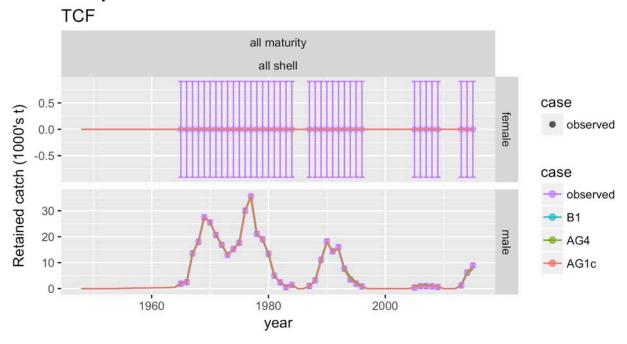


Figure 223. Comparison of observed and predicted retained catch mortality for TCF.

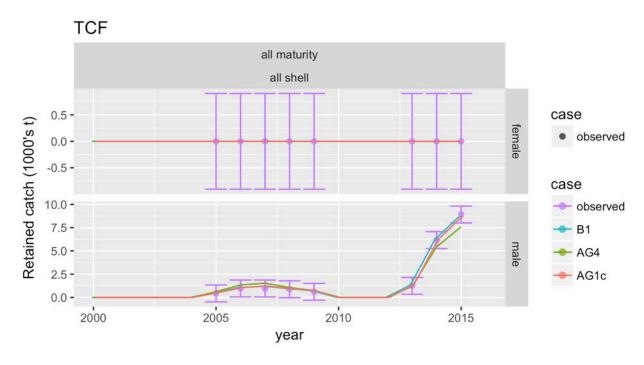


Figure 224. Comparison of observed and predicted retained catch mortality for TCF. Recent time period.

Mean retained fishery size compositions

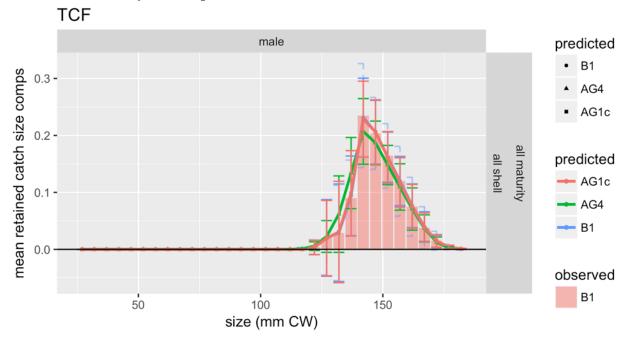


Figure 225. Comparison of observed and predicted &&xms mean retained catch size comps for TCF.

Retained fishery size compositions

TCF: male, all maturity, all shell

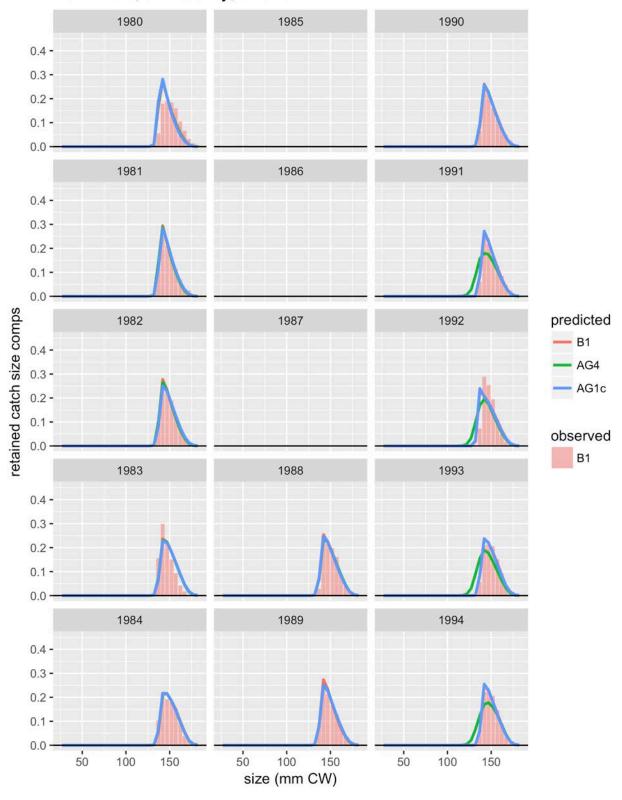


Figure 226. Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 1 of 3.

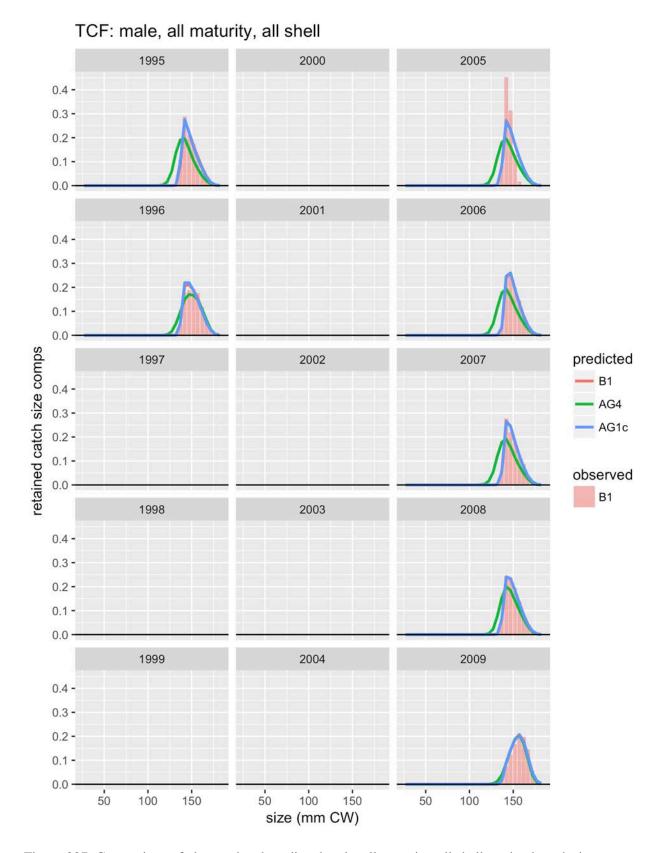


Figure 227. Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 2 of 3.

TCF: male, all maturity, all shell 2010 2015 2020 0.4 -0.3 -0.2 -0.1 -0.0 -2011 2016 2021 0.4 -0.3 -0.2 -0.1 -0.0 retained catch size comps 2012 predicted 2017 2022 **–** B1 0.4 -AG4 0.3 -- AG1c 0.2 -0.1 observed 0.0 B1 2023 2013 2018 0.4 -0.3 -0.2 -0.1 -0.0 -2014 2019 2024 0.4 -0.3 -0.2 -0.1 -0.0 50 50 50 100 150 100 150 100 150 size (mm CW)

Figure 228. Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 3 of 3.