Appendix D1: Model Comparisons for

TCSAM2013 Models B0, B1, B2, B3, B4, B5, B6

William Stockhausen

Results from TCSAM2013 models B0, B1, B2, B3, B4, B5 and B6 are illustrated in this appendix.

Population processes

Natural mortality

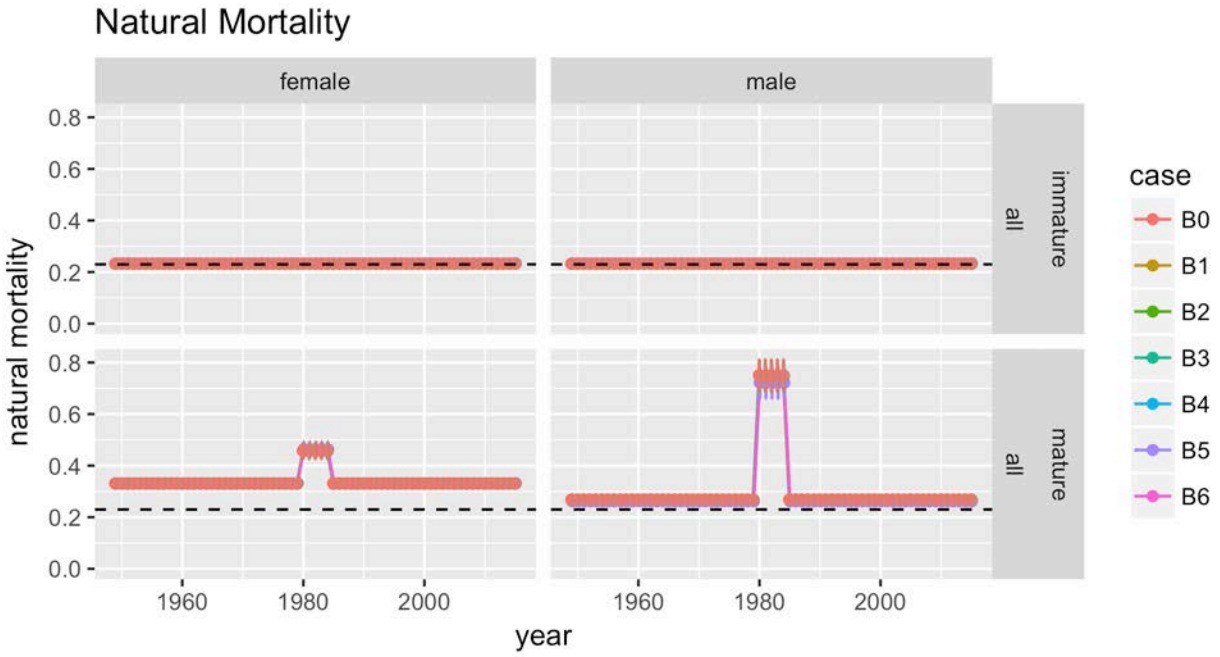


Figure 1. Estimated natural mortality rates, by year.

Probability of terminal molt

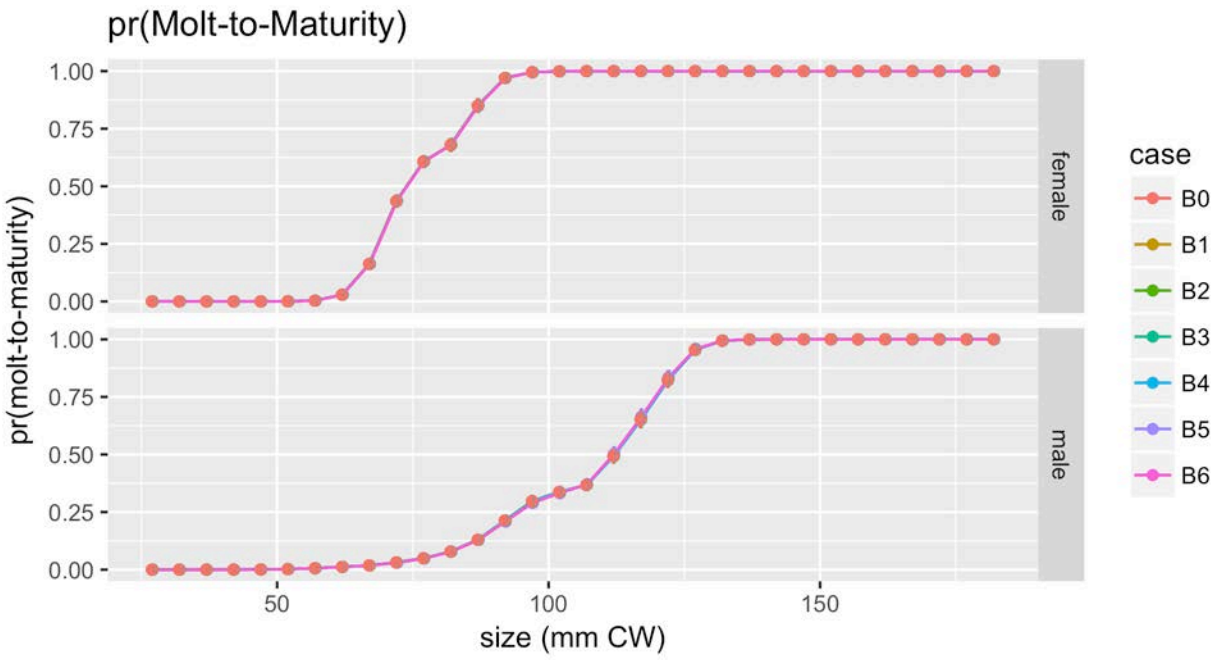


Figure 2. Probability of terminal molt.

Mean growth

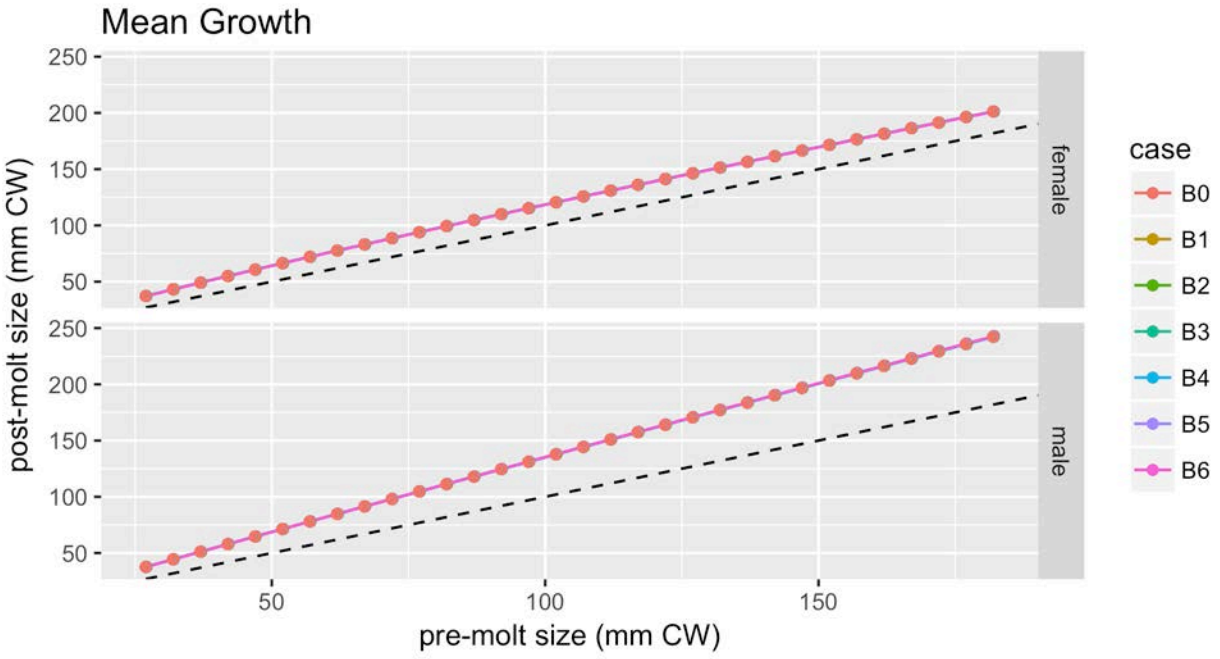


Figure 3. Mean growth.

Growth matrices

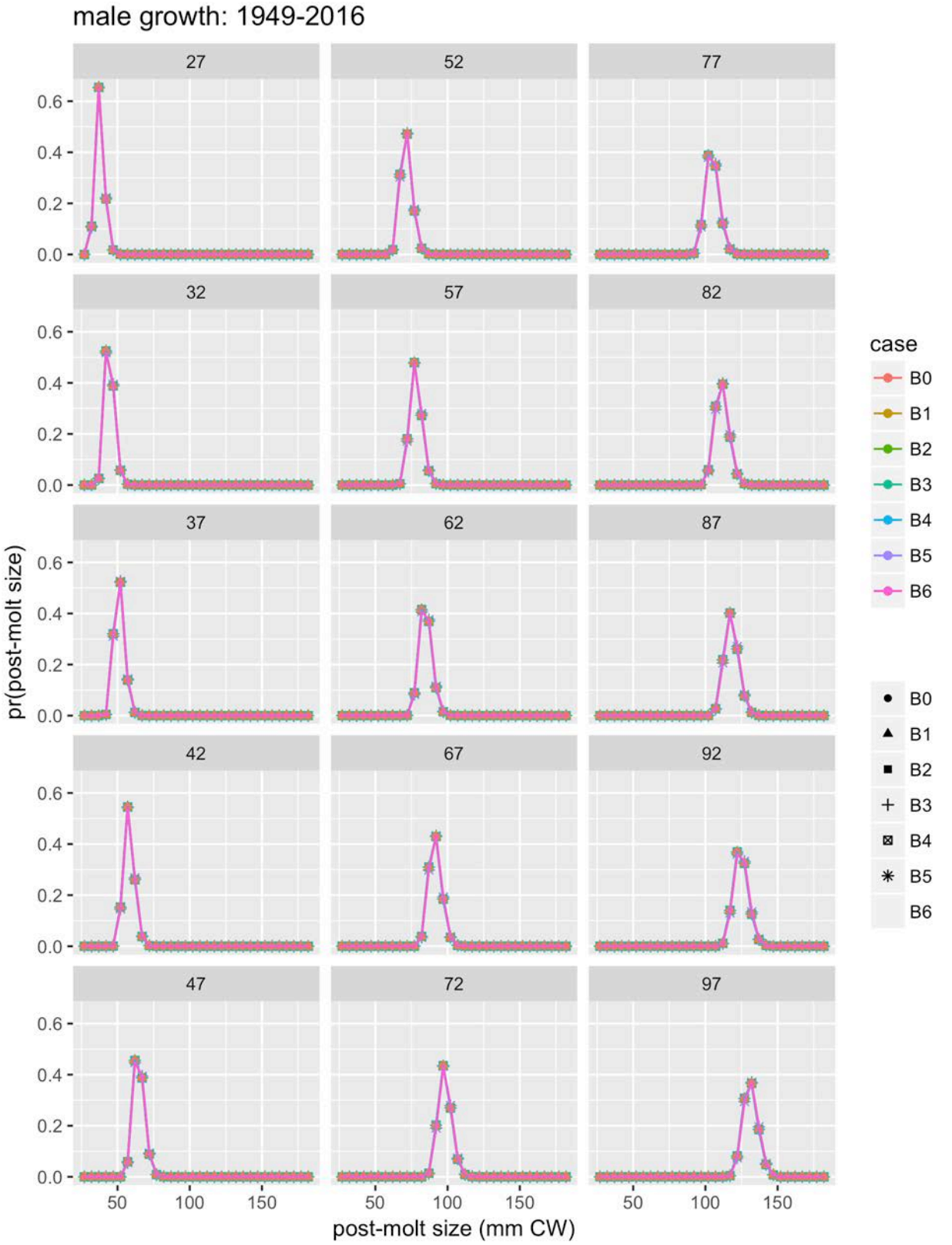


Figure 4. Growth matrices for males during 1949-2016, page 1.

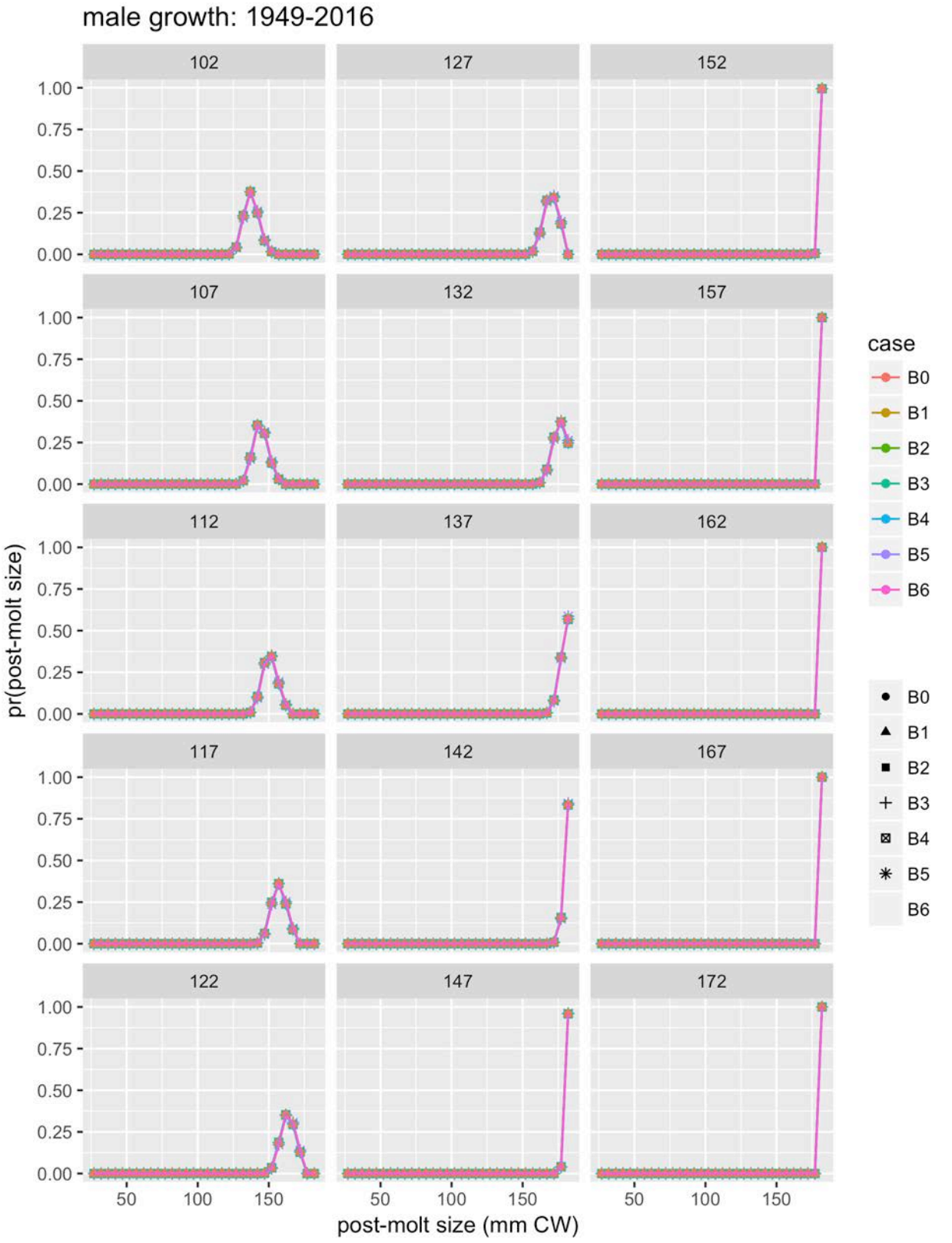


Figure 5. Growth matrices for males during 1949-2016, page 2.

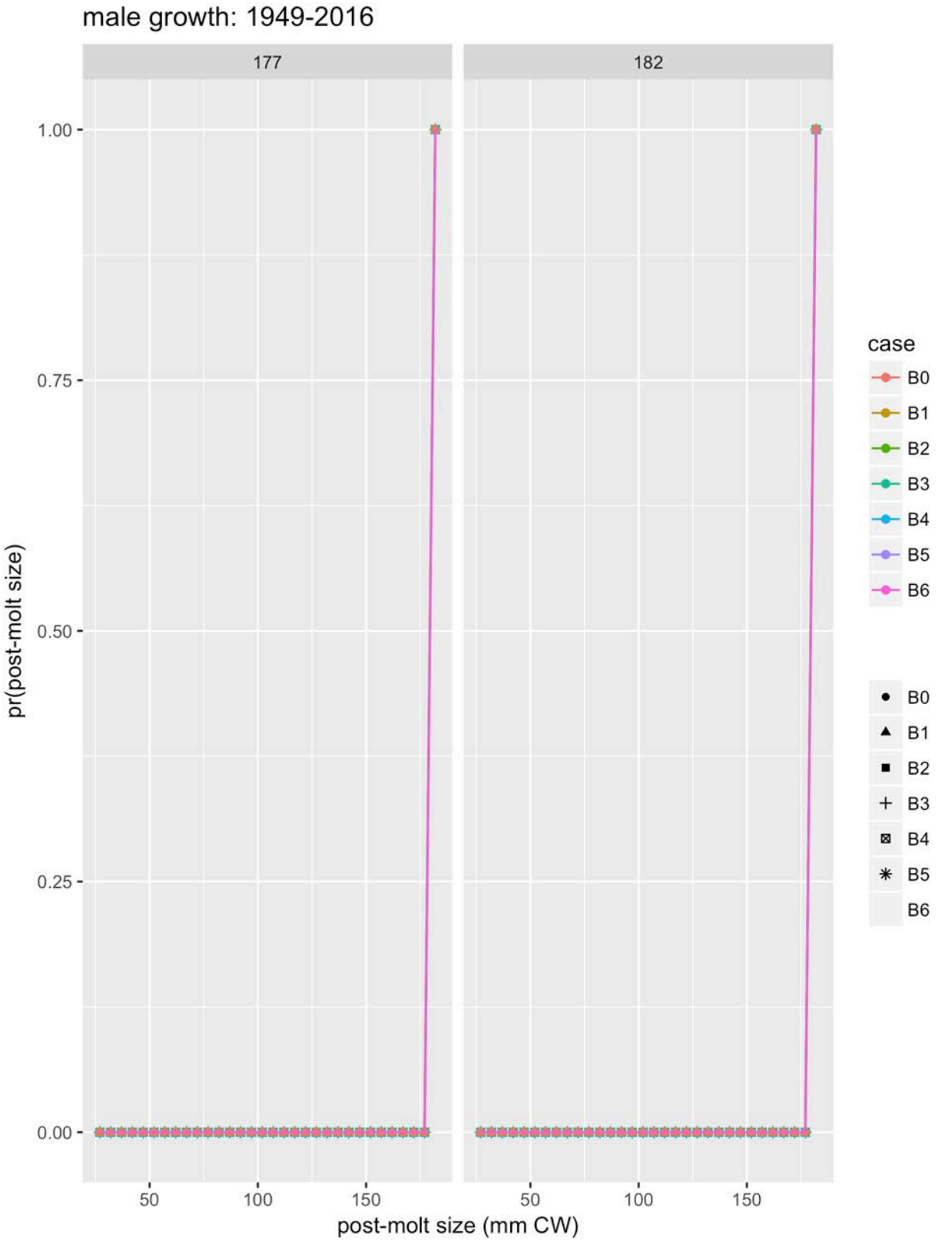


Figure 6. Growth matrices for males during 1949-2016, page 3.

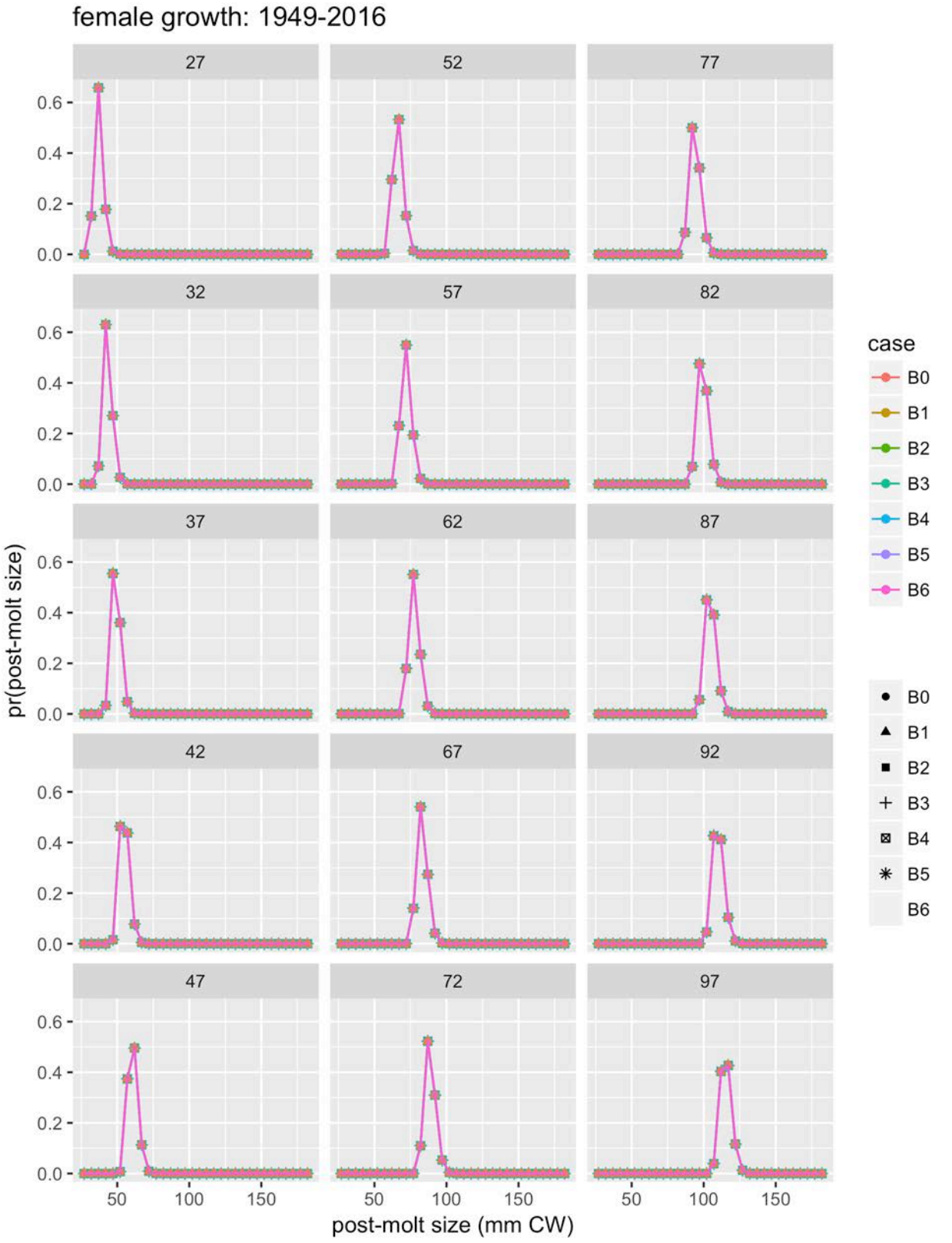


Figure 7. Growth matrices for females during 1949-2016, page 1.

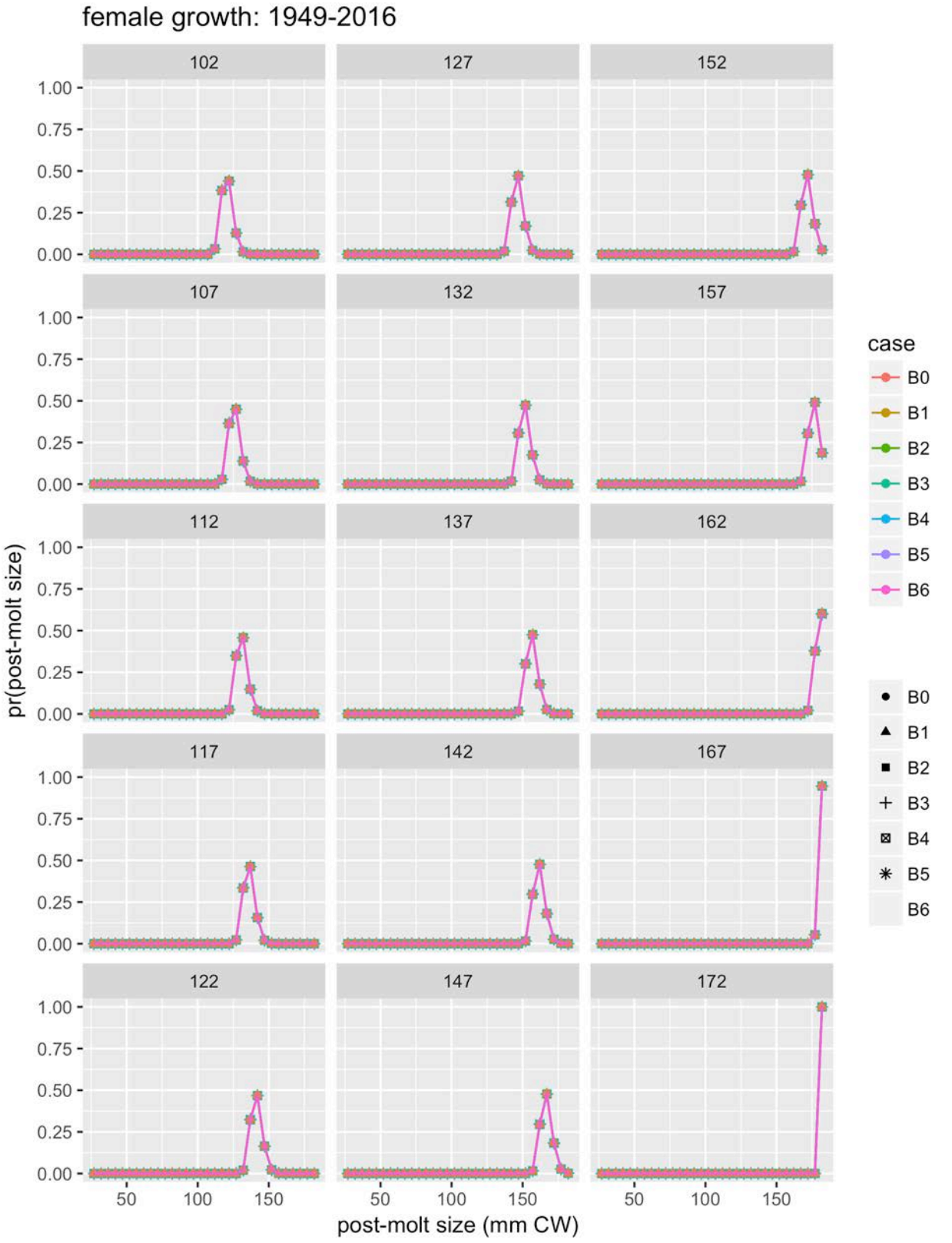


Figure 8. Growth matrices for females during 1949-2016, page 2.

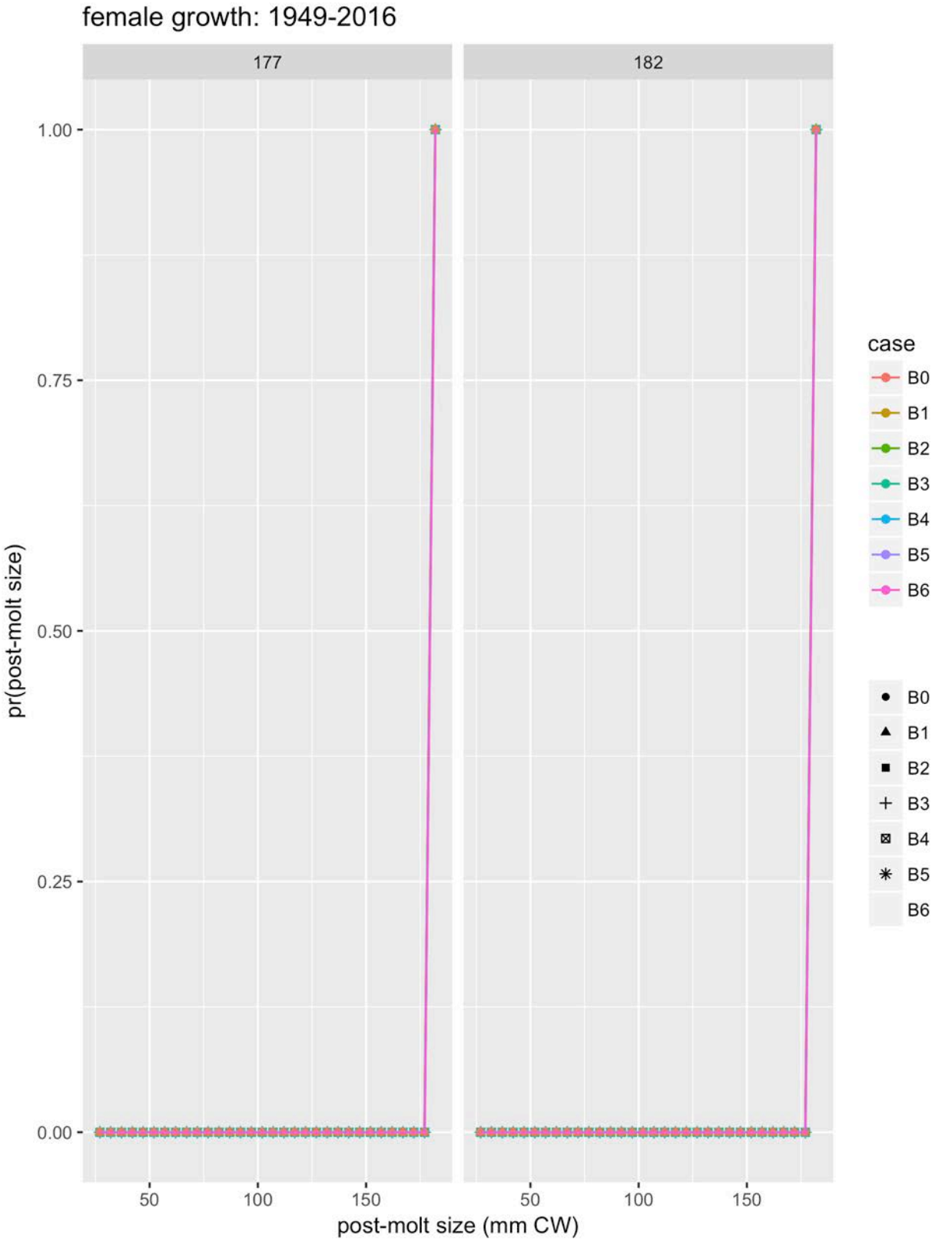


Figure 9. Growth matrices for females during 1949-2016, page 3.

Size distribution for recruits

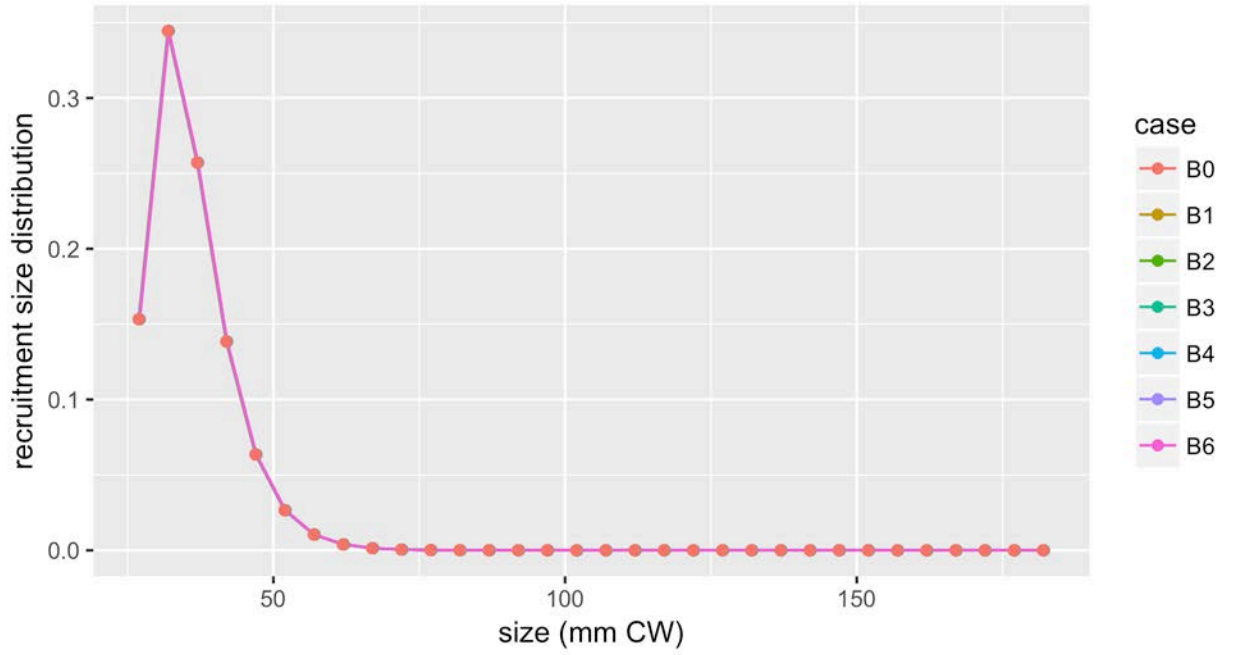


Figure 10. Size distribution for recruits.

Population results

Recruitment

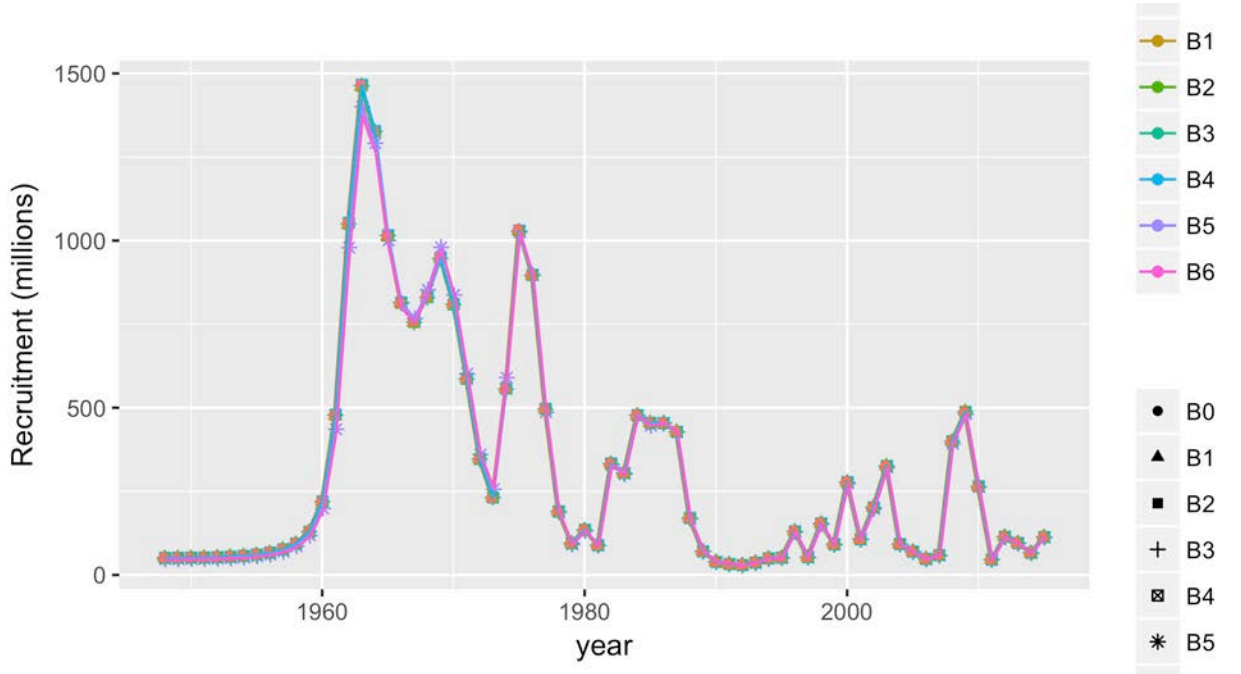


Figure 11. Estimated annual recruitment.

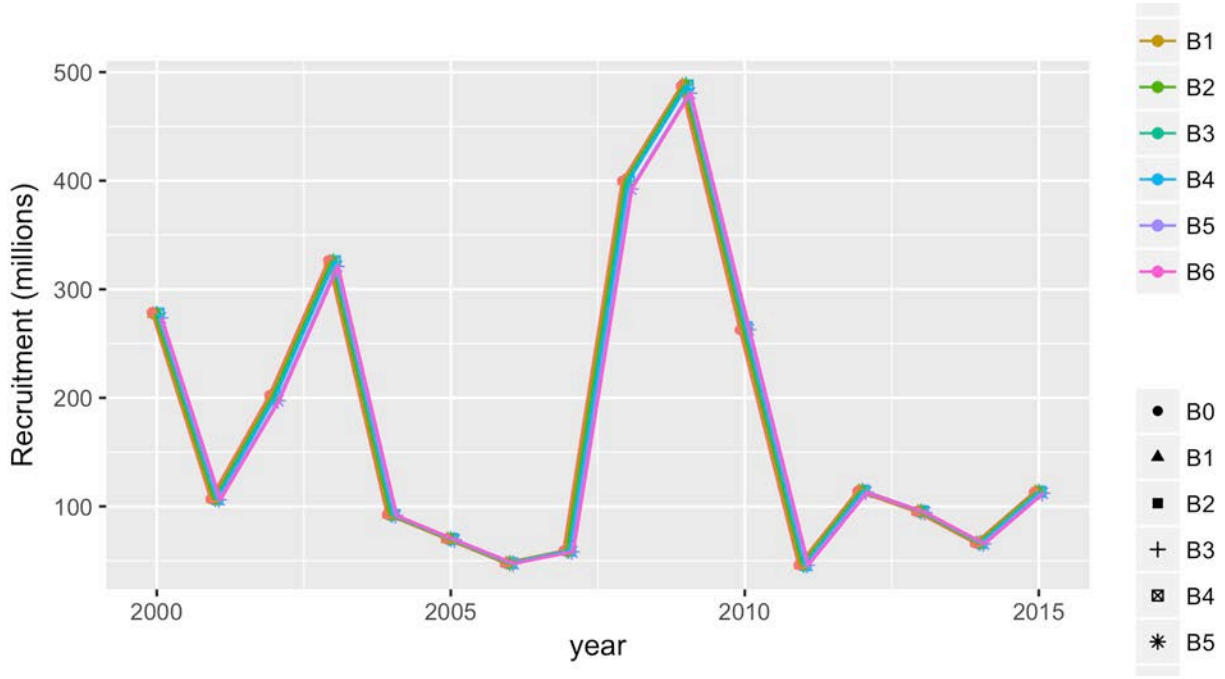


Figure 12. Estimated recent recruitment.

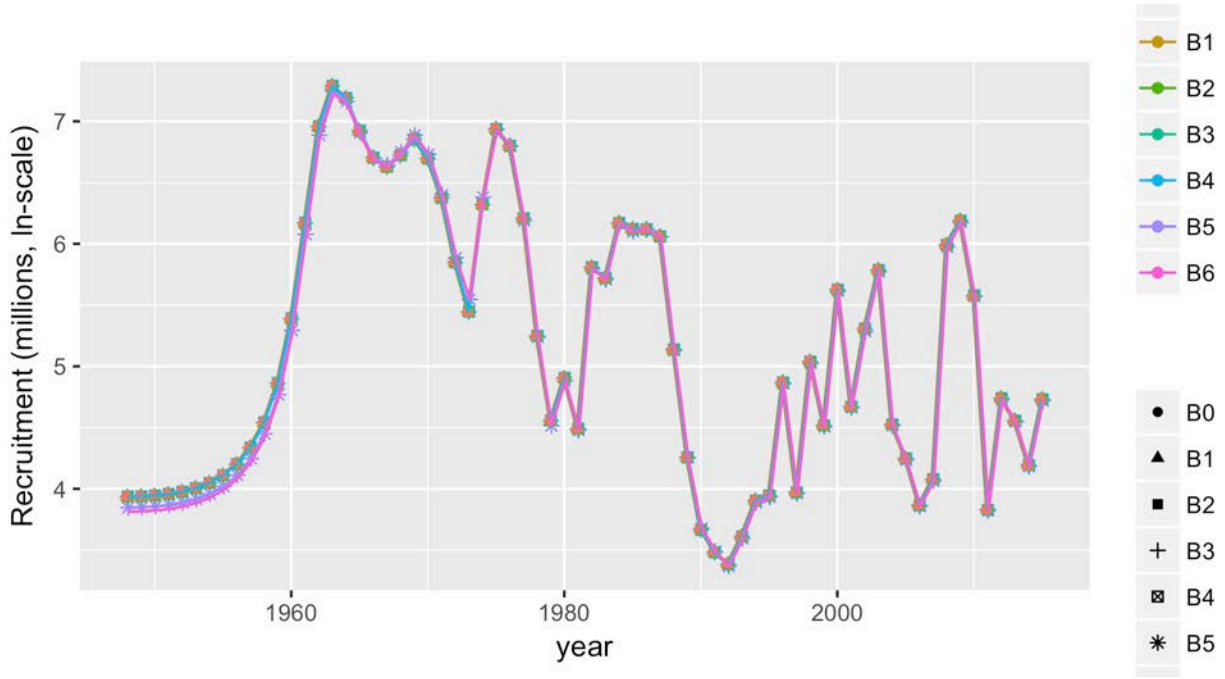


Figure 13. Estimated annual recruitment, on ln-scale.

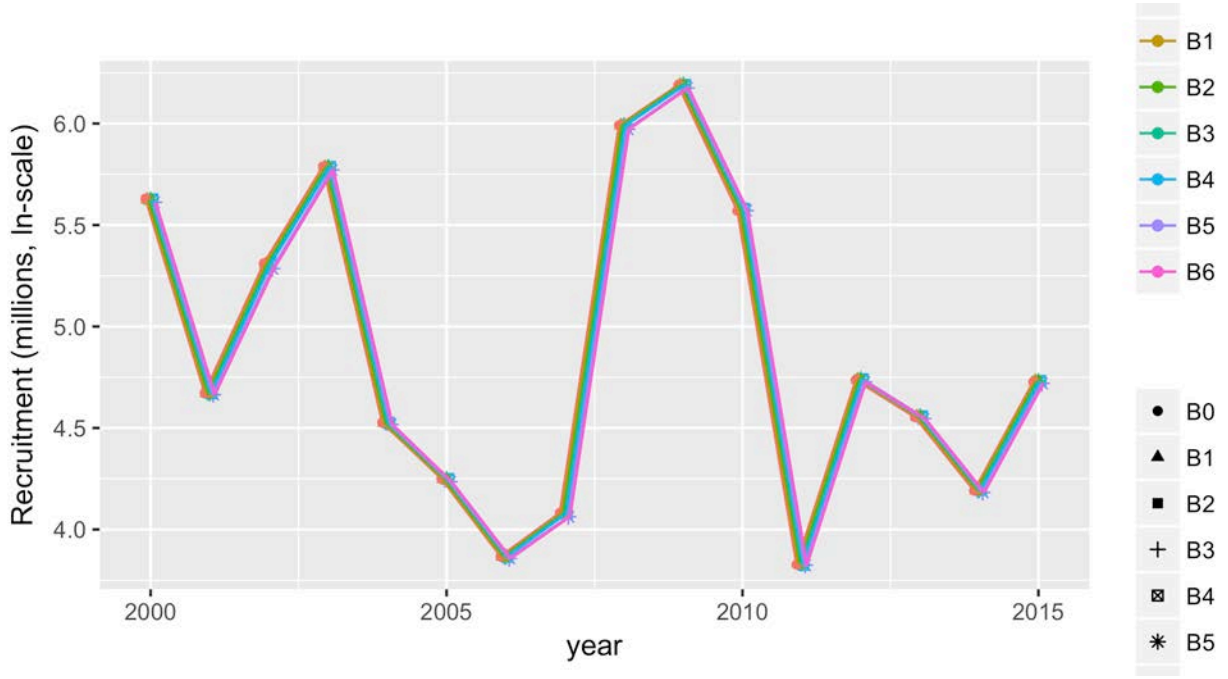


Figure 14. Estimated recent recruitment, on ln-scale.

Mature biomass

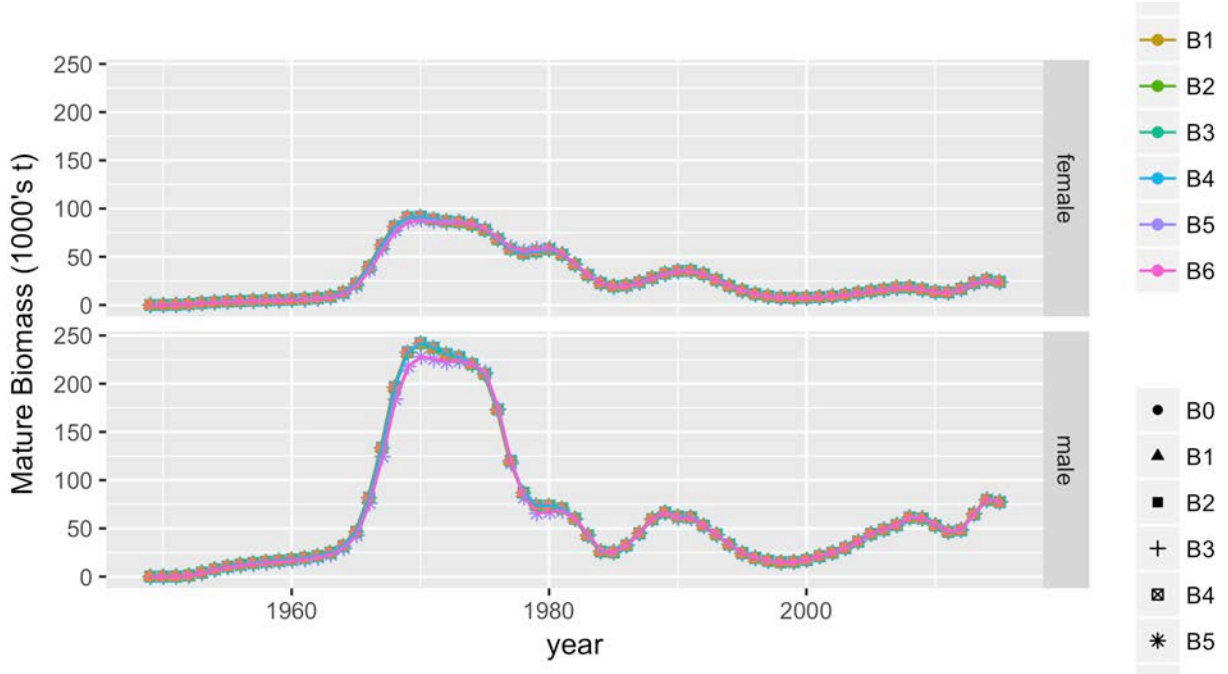


Figure 15. Estimated annual mature biomass.

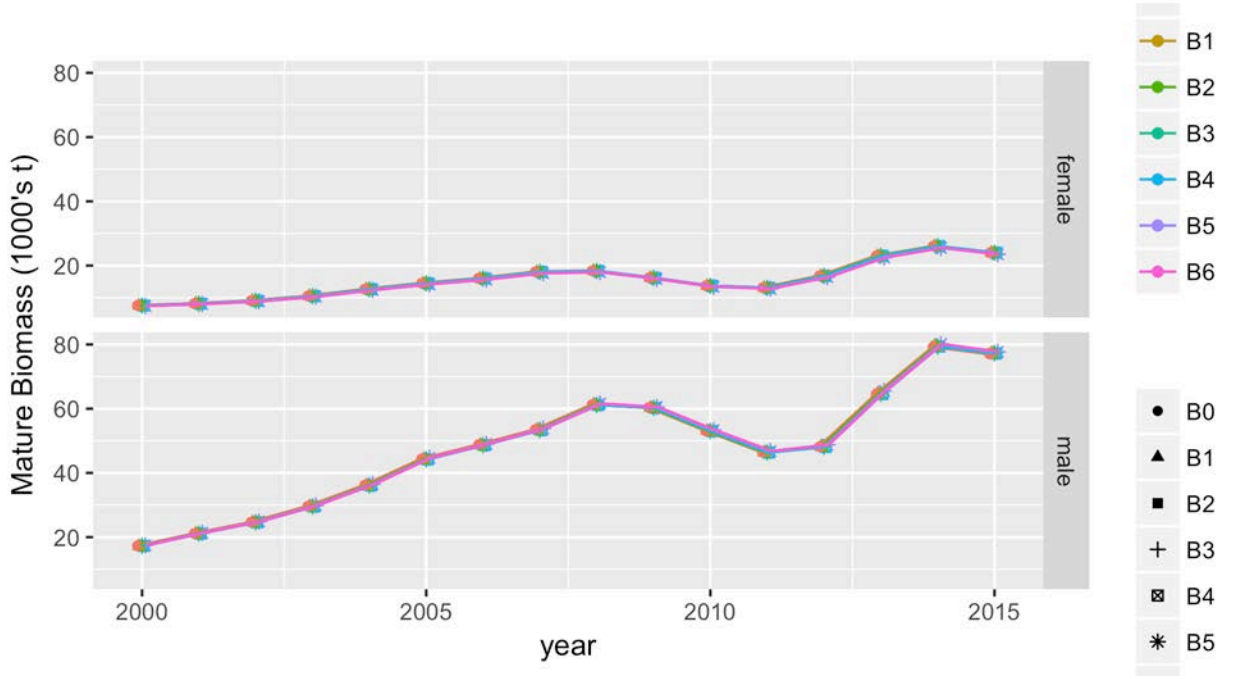


Figure 16. Estimated recent mature biomass.

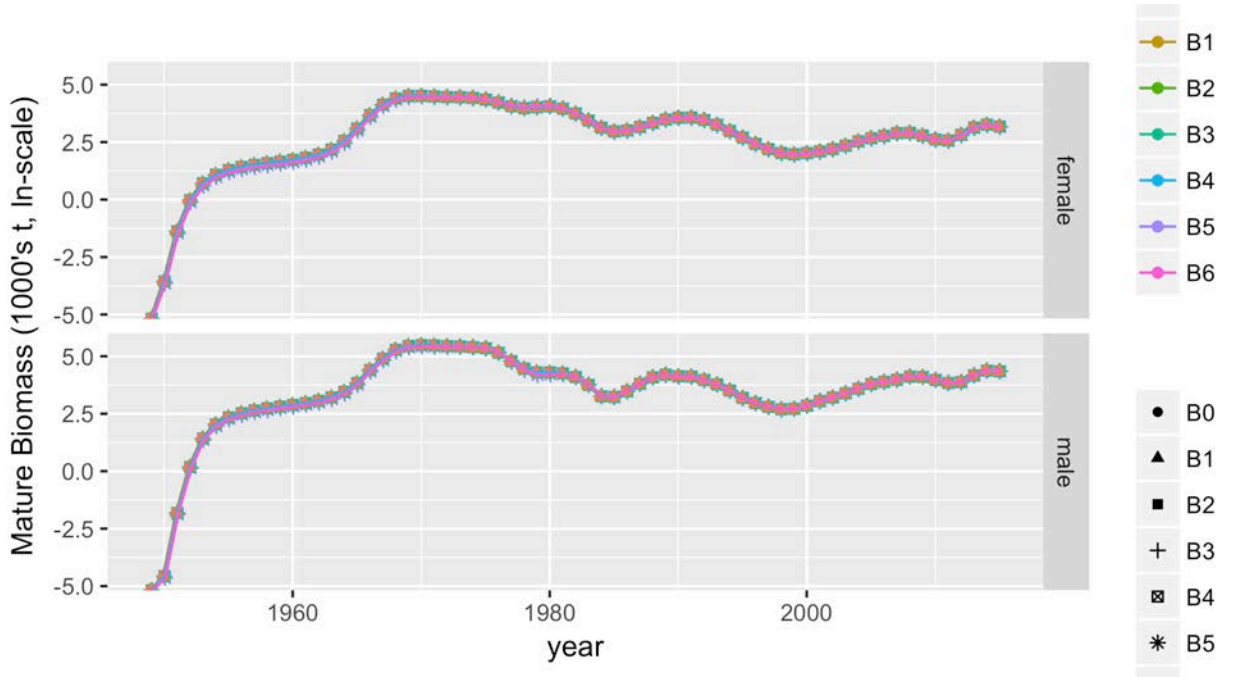


Figure 17. Estimated annual mature biomass, on ln-scale.

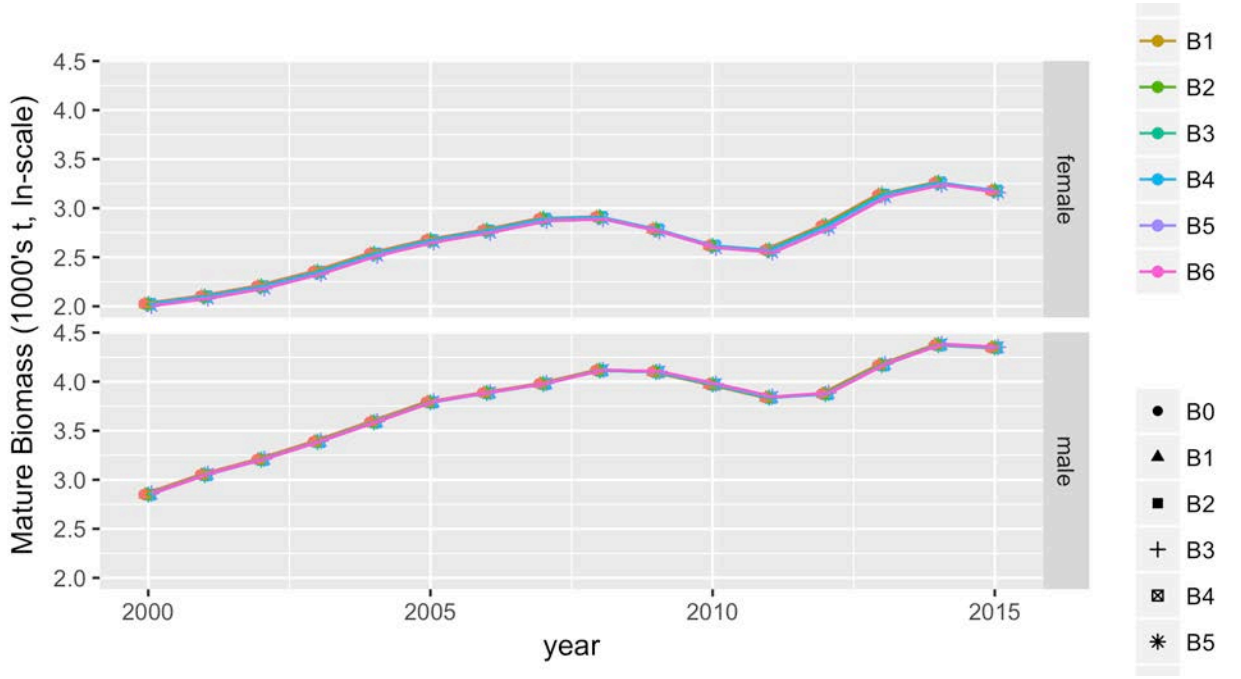


Figure 18. Estimated recent mature biomass, on ln-scale.

Population abundance

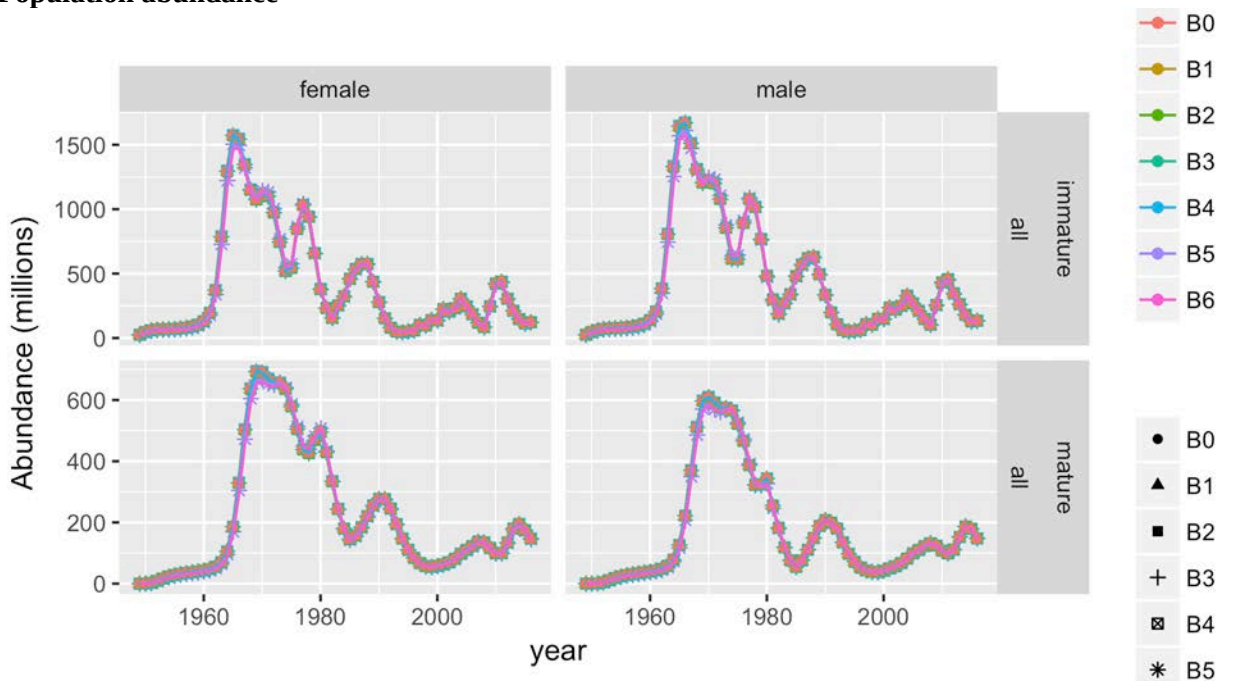


Figure 19. Population abundance trends.

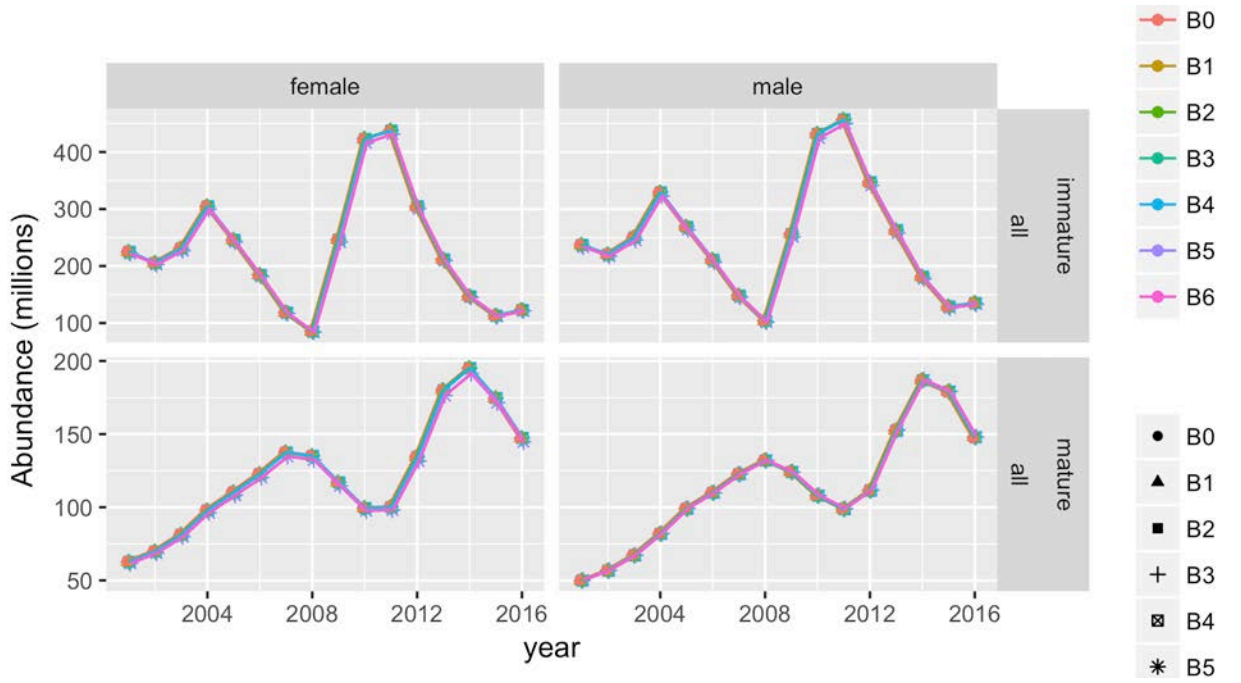


Figure 20. Recent population abundance trends.

Figure 21. Ln-scale population abundance trends.

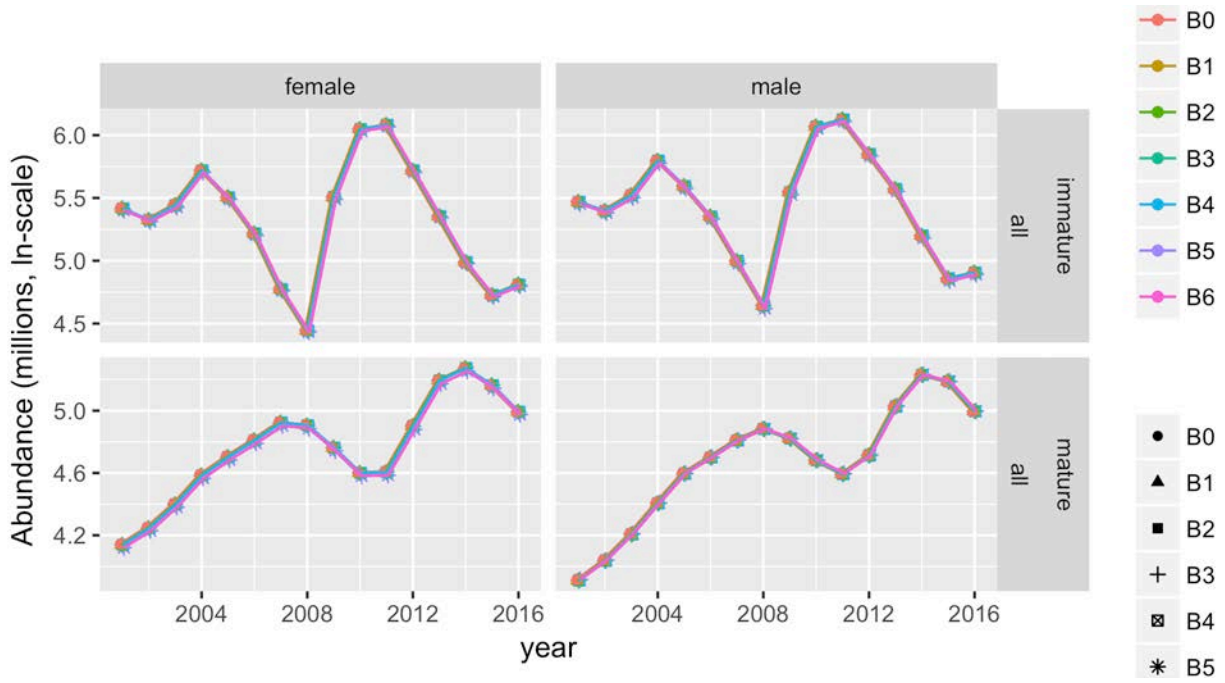


Figure 22. Recent ln-scale population abundance trends.

Biomass

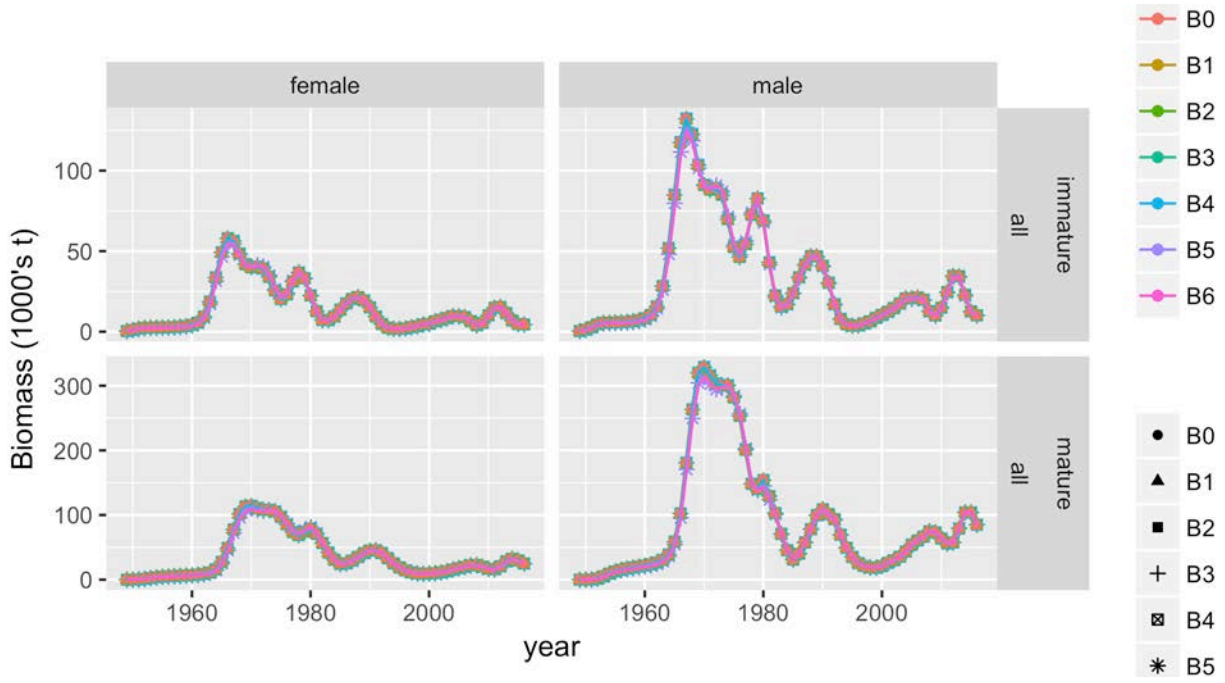


Figure 23. Population biomass trends.

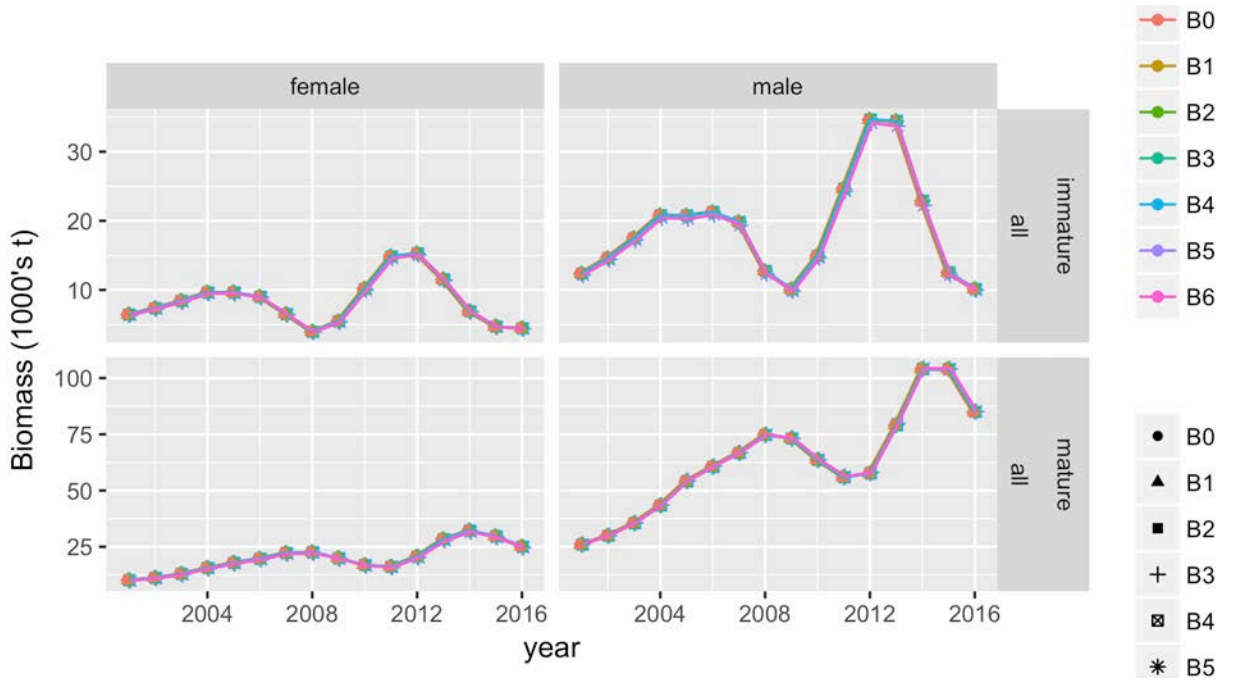


Figure 24. Recent population biomass trends.

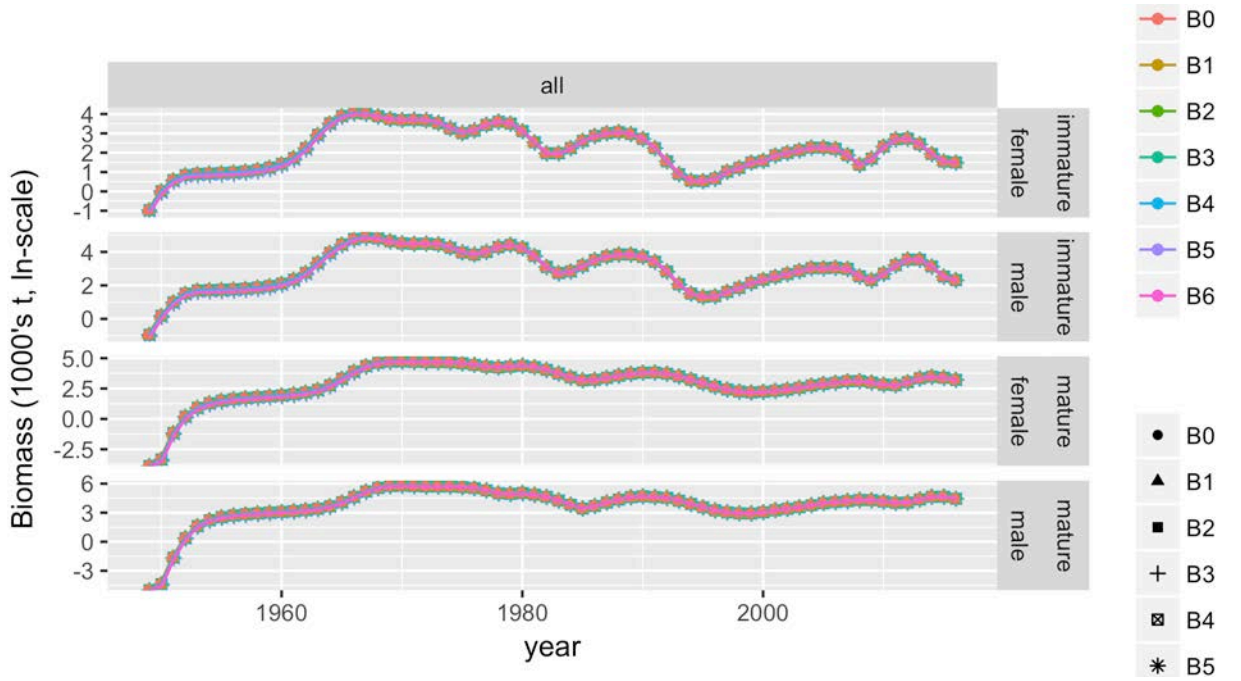


Figure 25. Ln-scale population biomass trends.

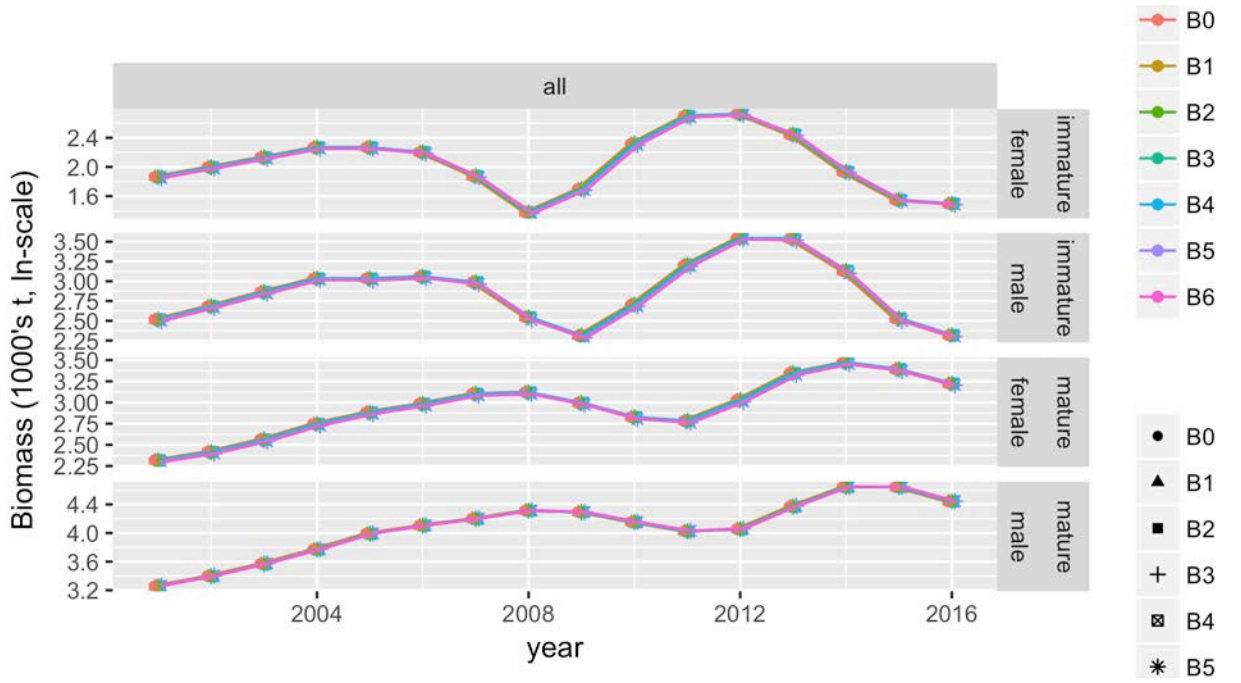


Figure 26. Recent ln-scale population biomass trends.

Surveys

Survey catchability

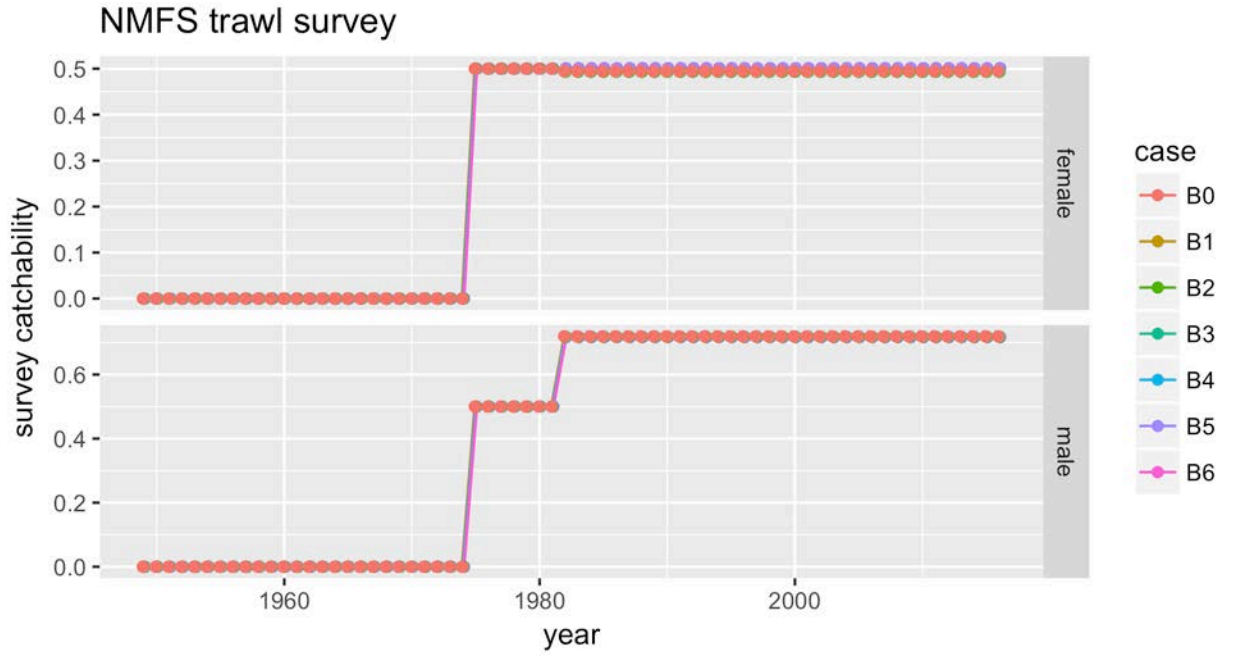
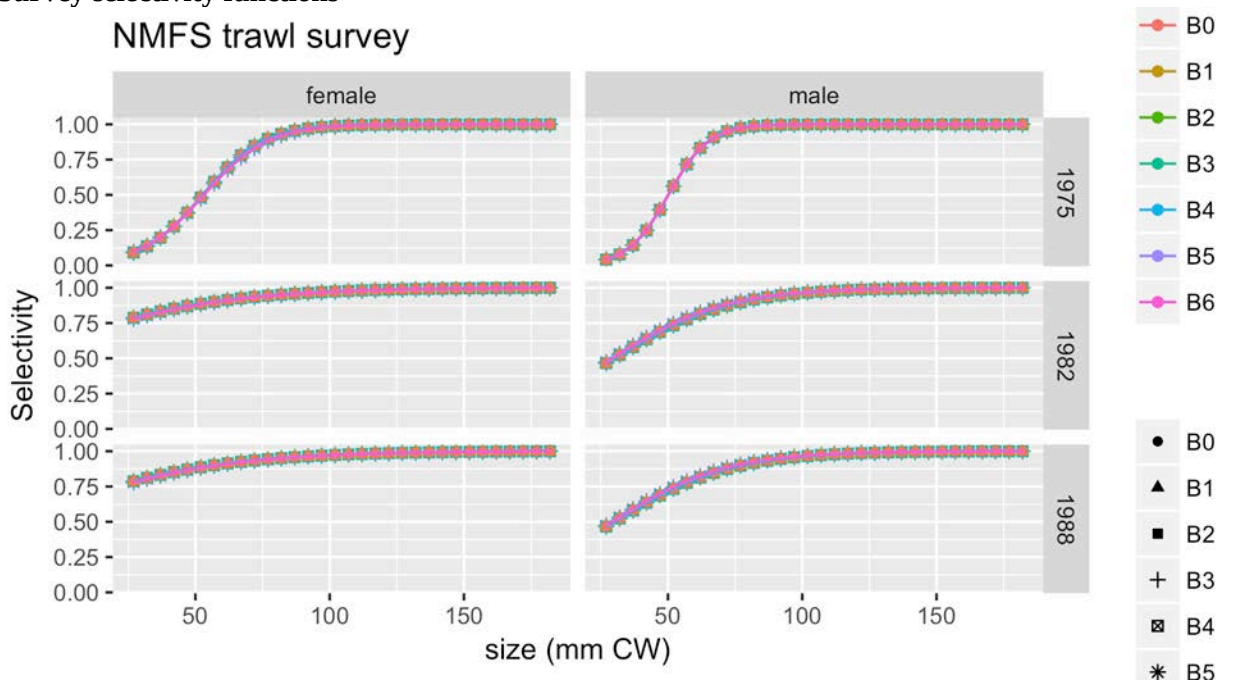


Figure 27. Survey catchabilities for NMFS trawl survey.

Survey selectivity functions



NMFS trawl survey.1

Survey abundance

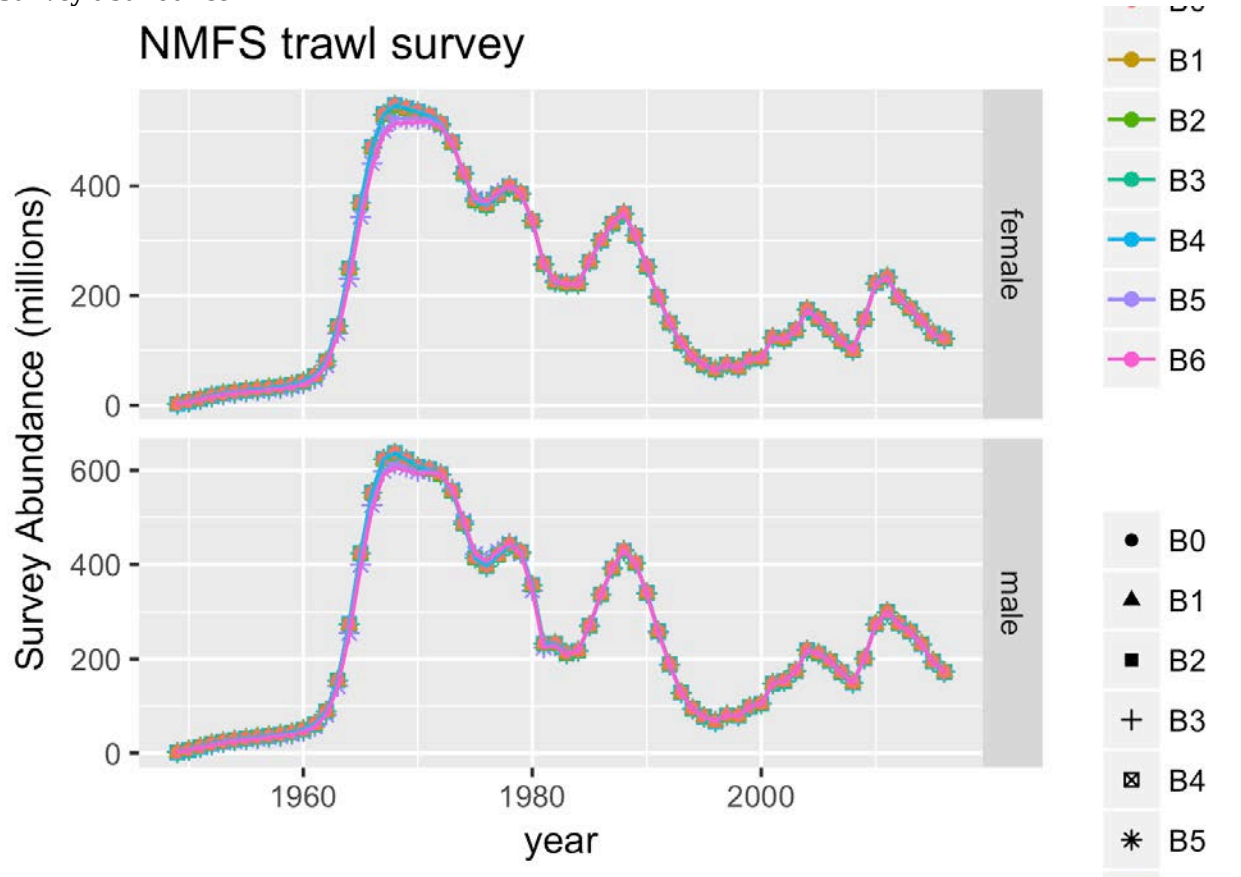


Figure 29. NMFS trawl survey catch abundance.

Survey biomass

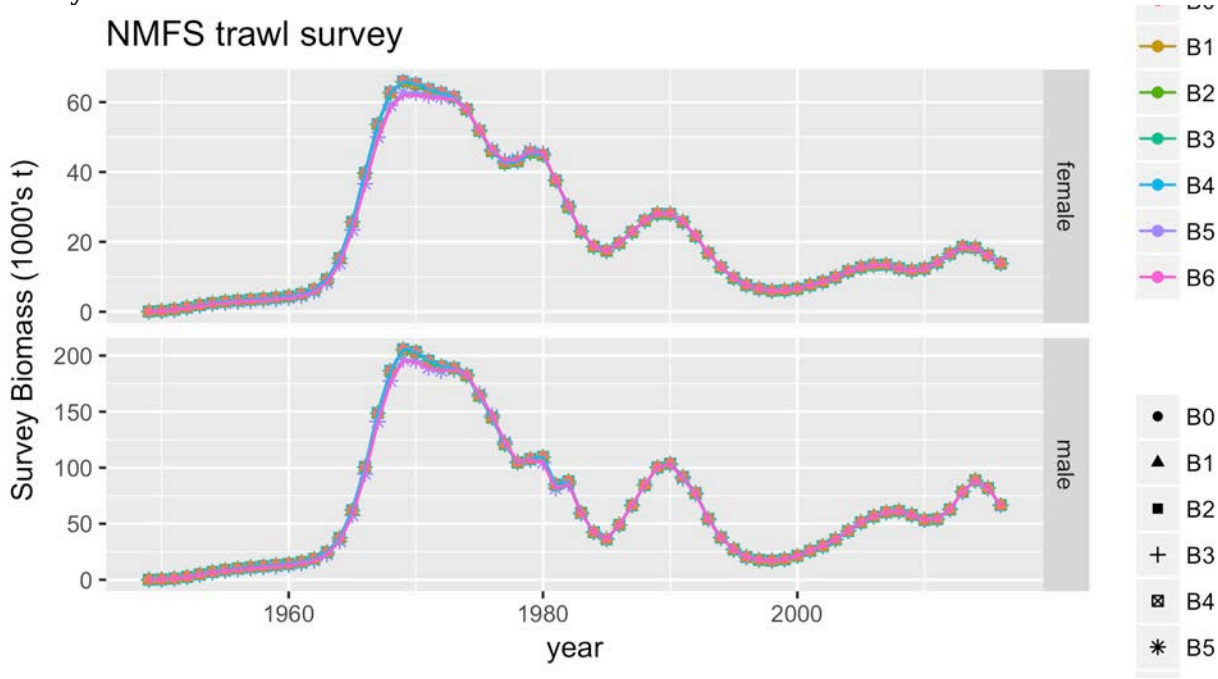


Figure 30. NMFS trawl survey catch biomass.

Survey size compositions

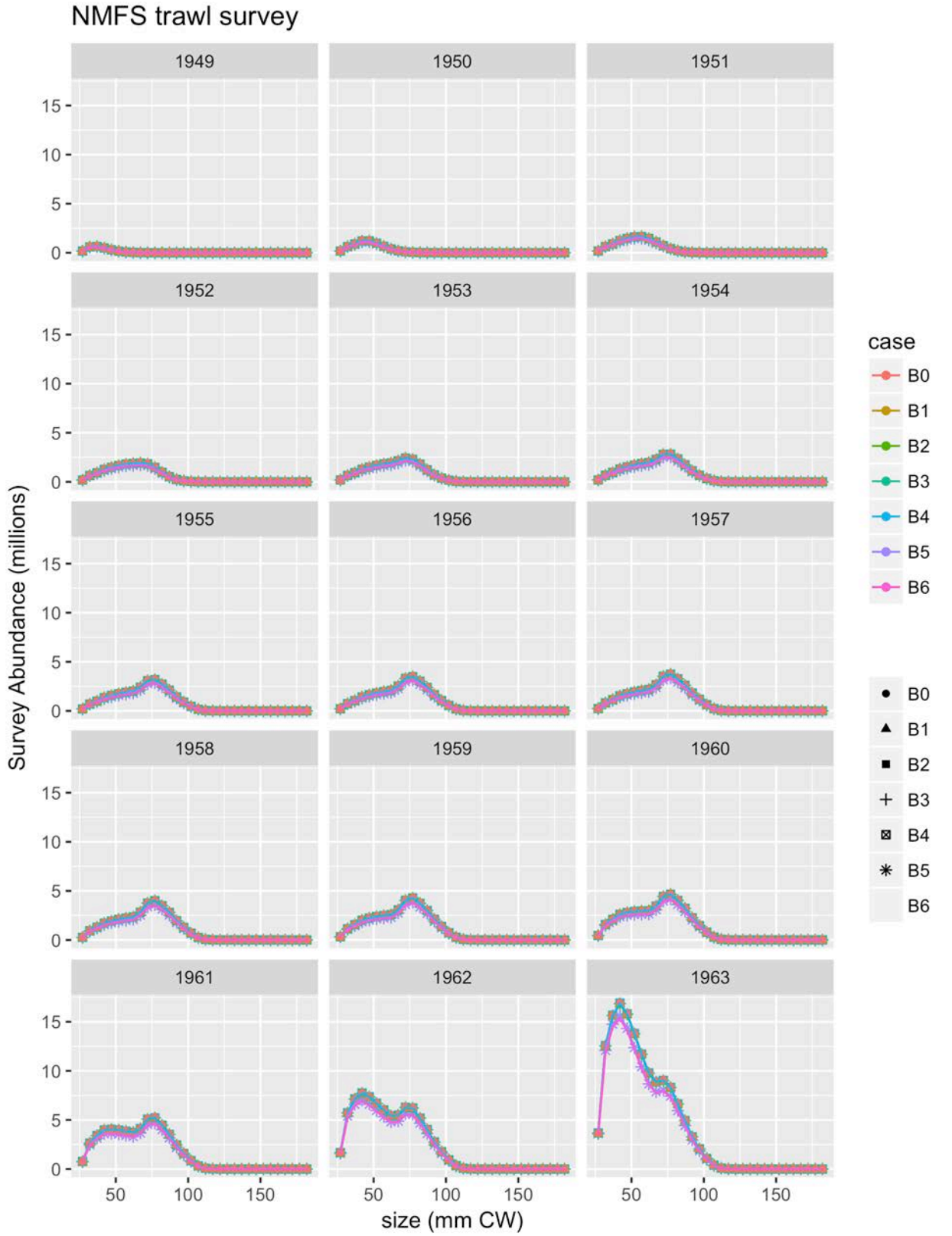


Figure 31. NMFS trawl survey catch abundance for female all all, (1 of 5).

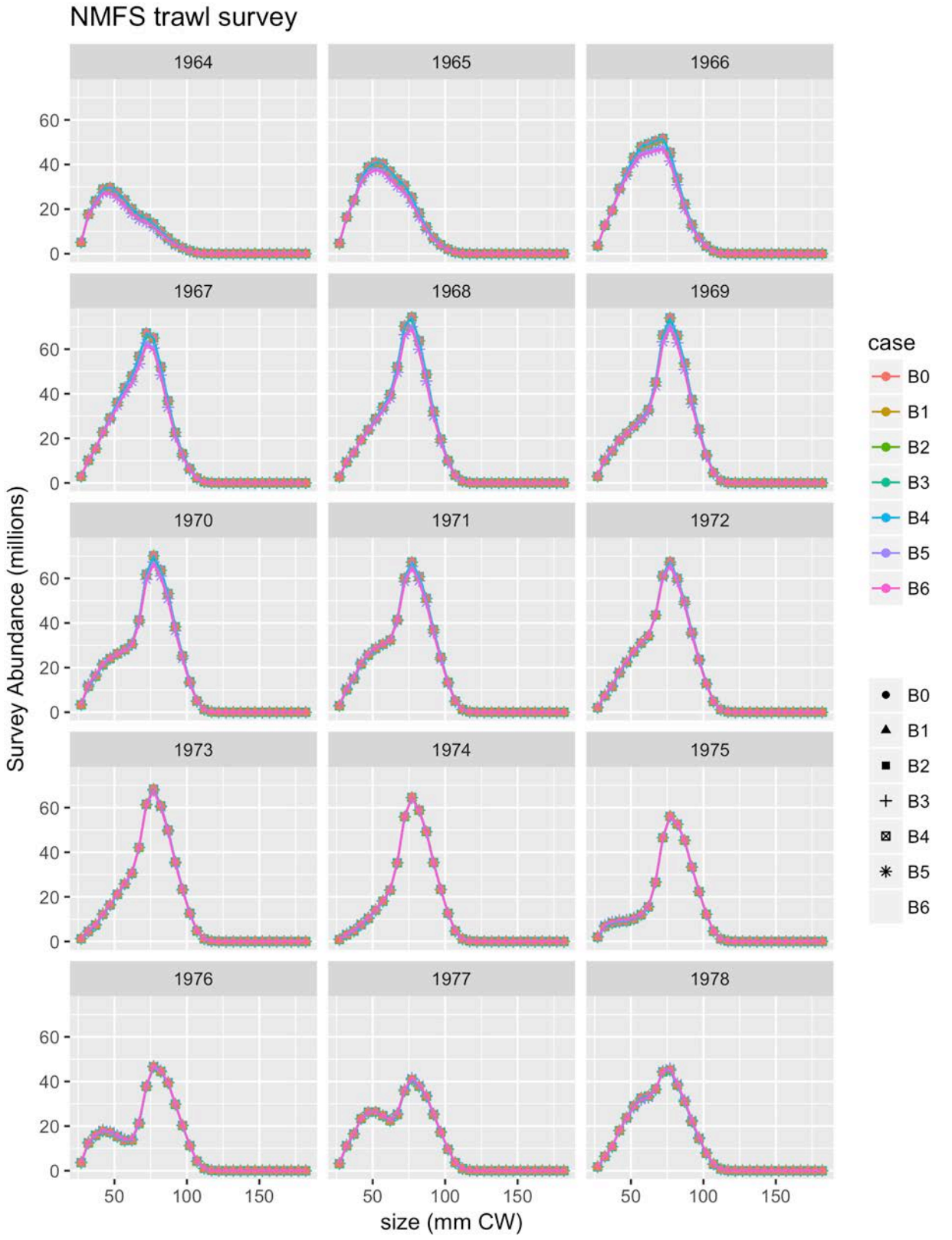


Figure 32. NMFS trawl survey catch abundance for female all all, (2 of 5).

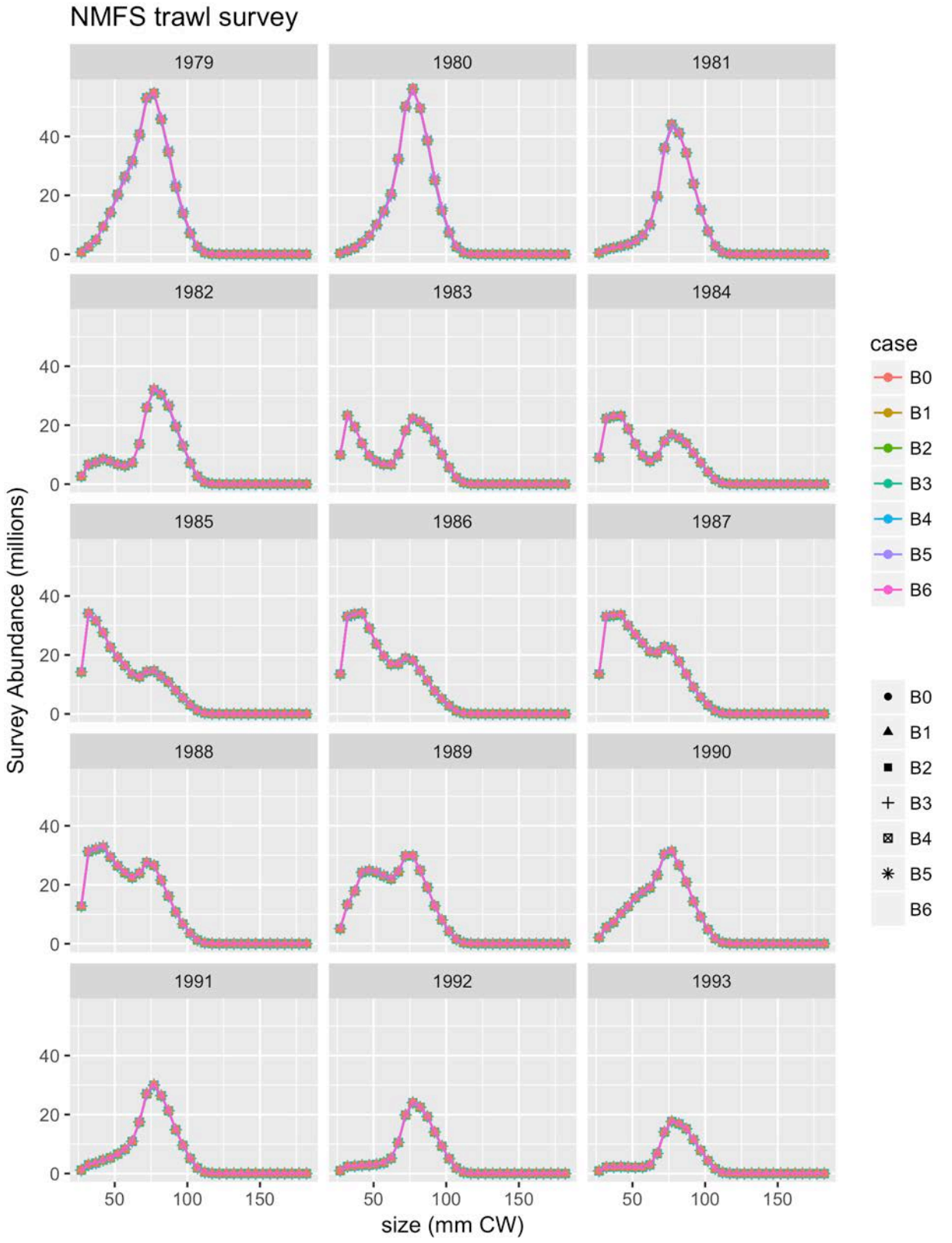


Figure 33. NMFS trawl survey catch abundance for female all all, (3 of 5).

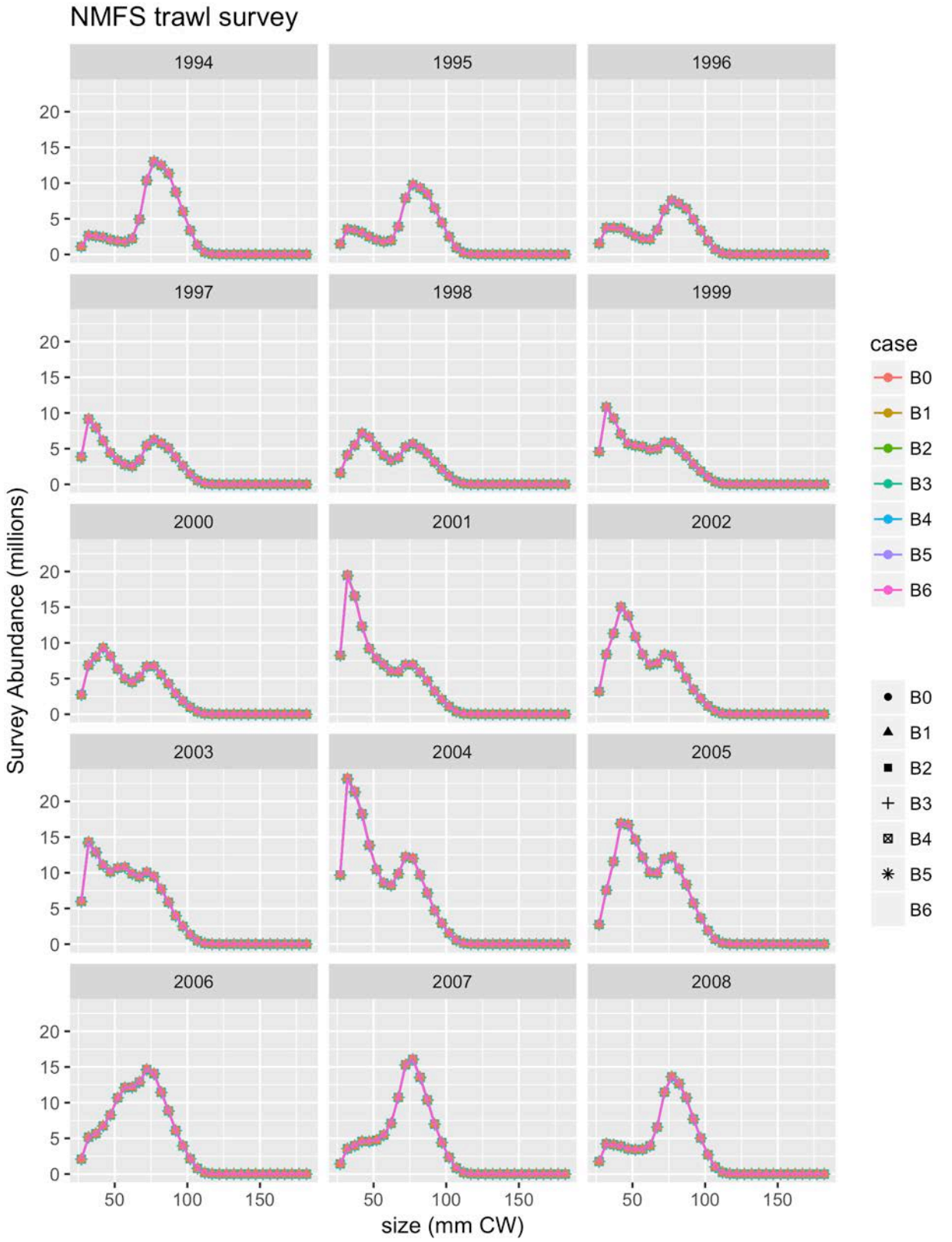


Figure 34. NMFS trawl survey catch abundance for female all all, (4 of 5).

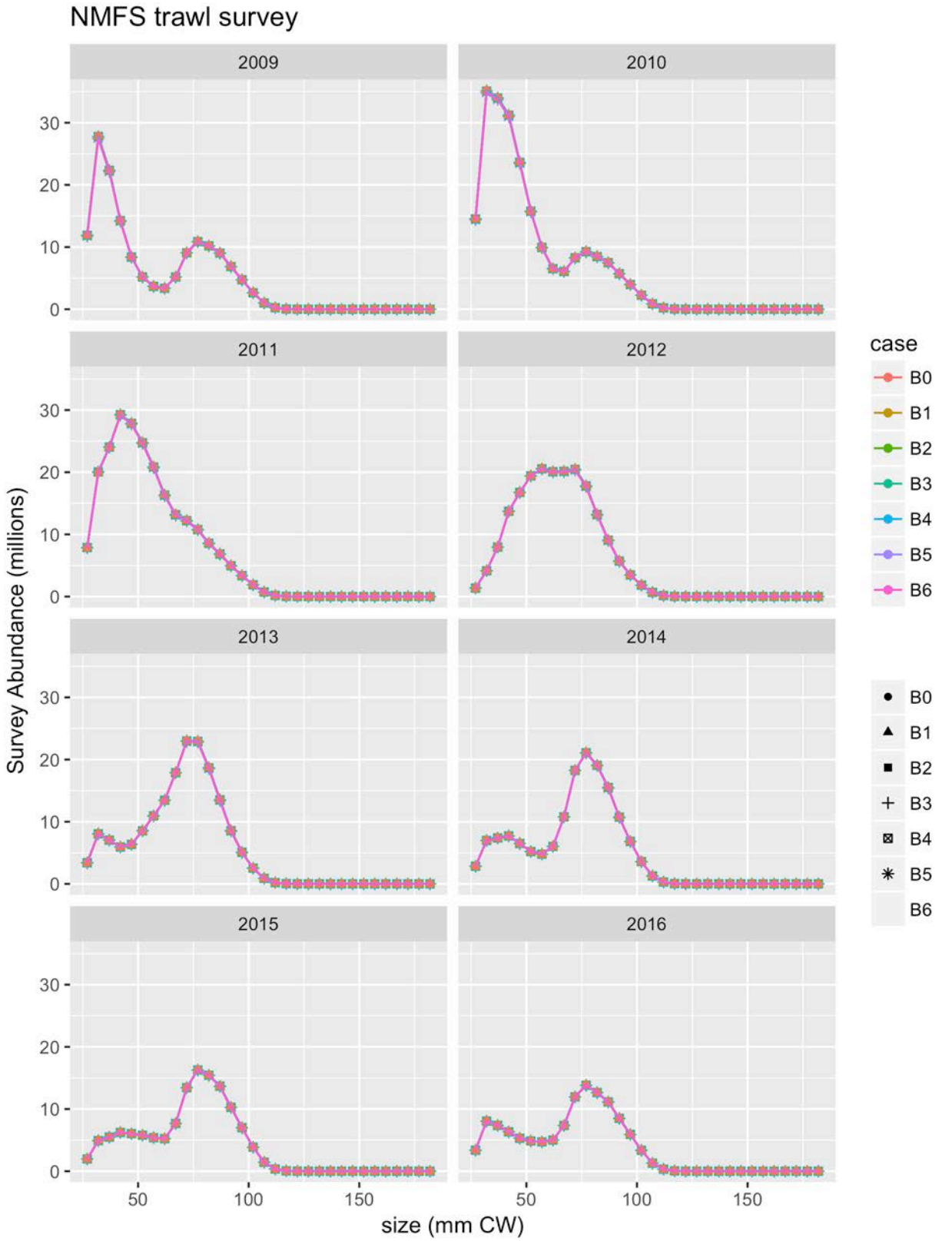


Figure 35. NMFS trawl survey catch abundance for female all all, (5 of 5).

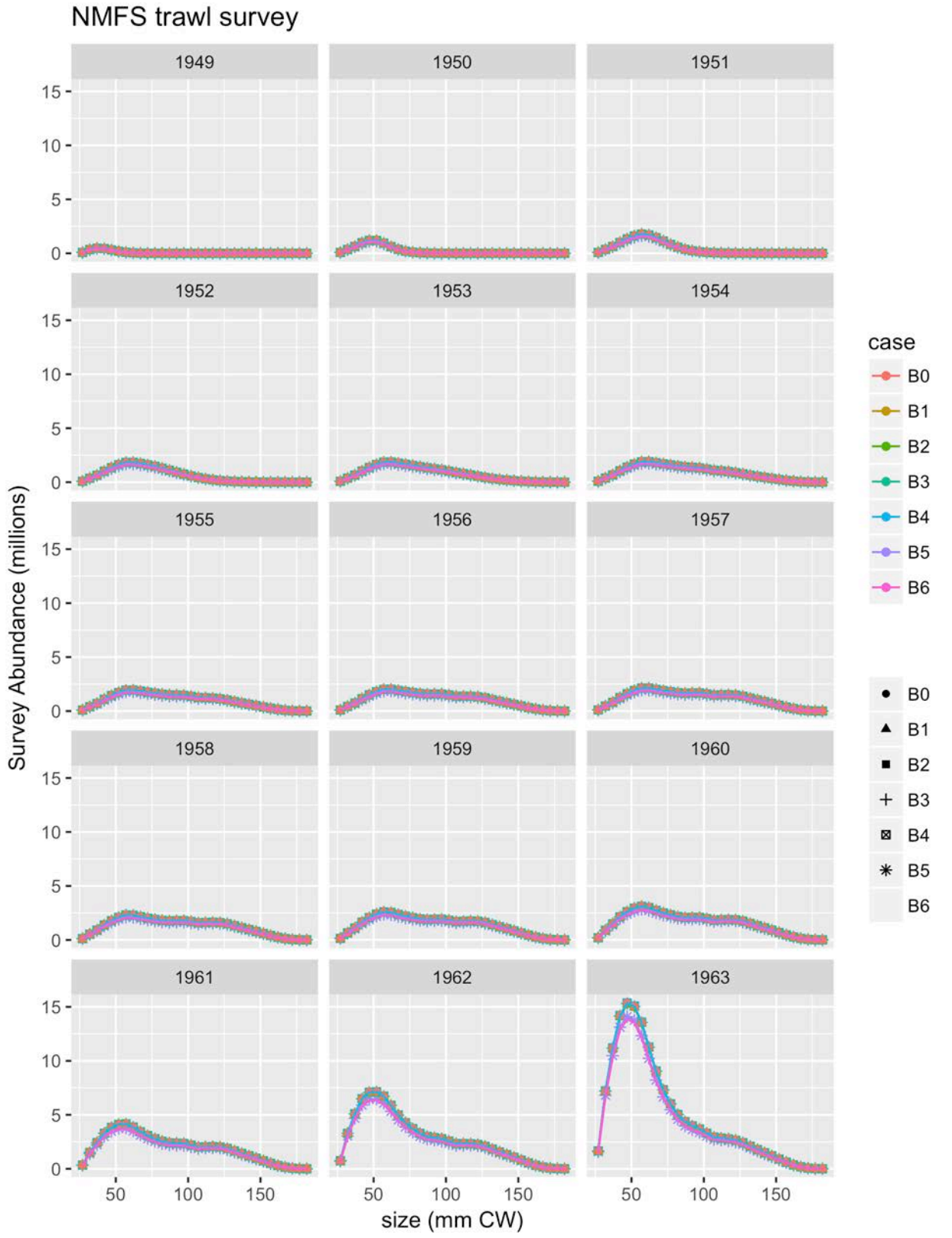


Figure 36. NMFS trawl survey catch abundance for male all all, (1 of 5).

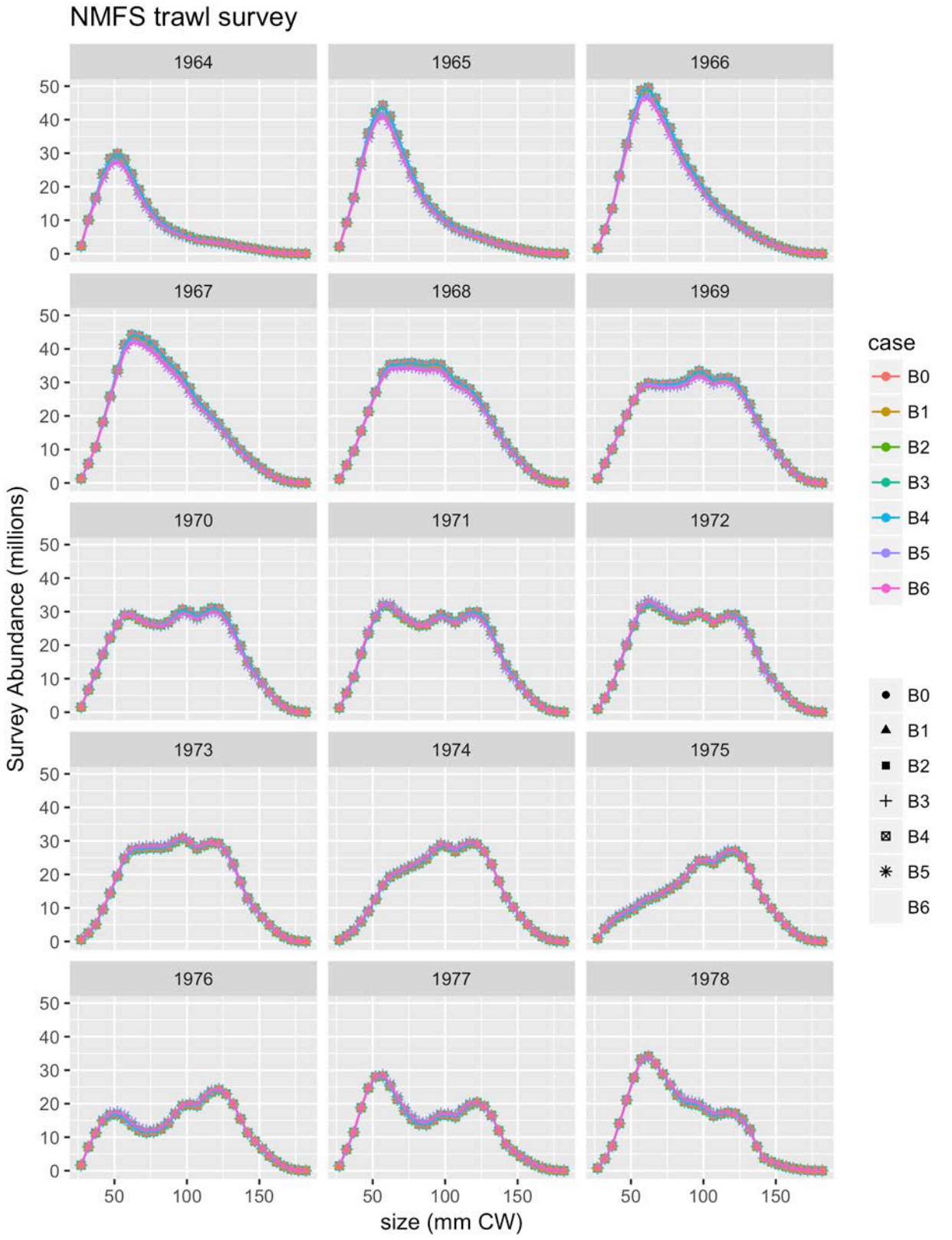


Figure 37. NMFS trawl survey catch abundance for male all all, (2 of 5).

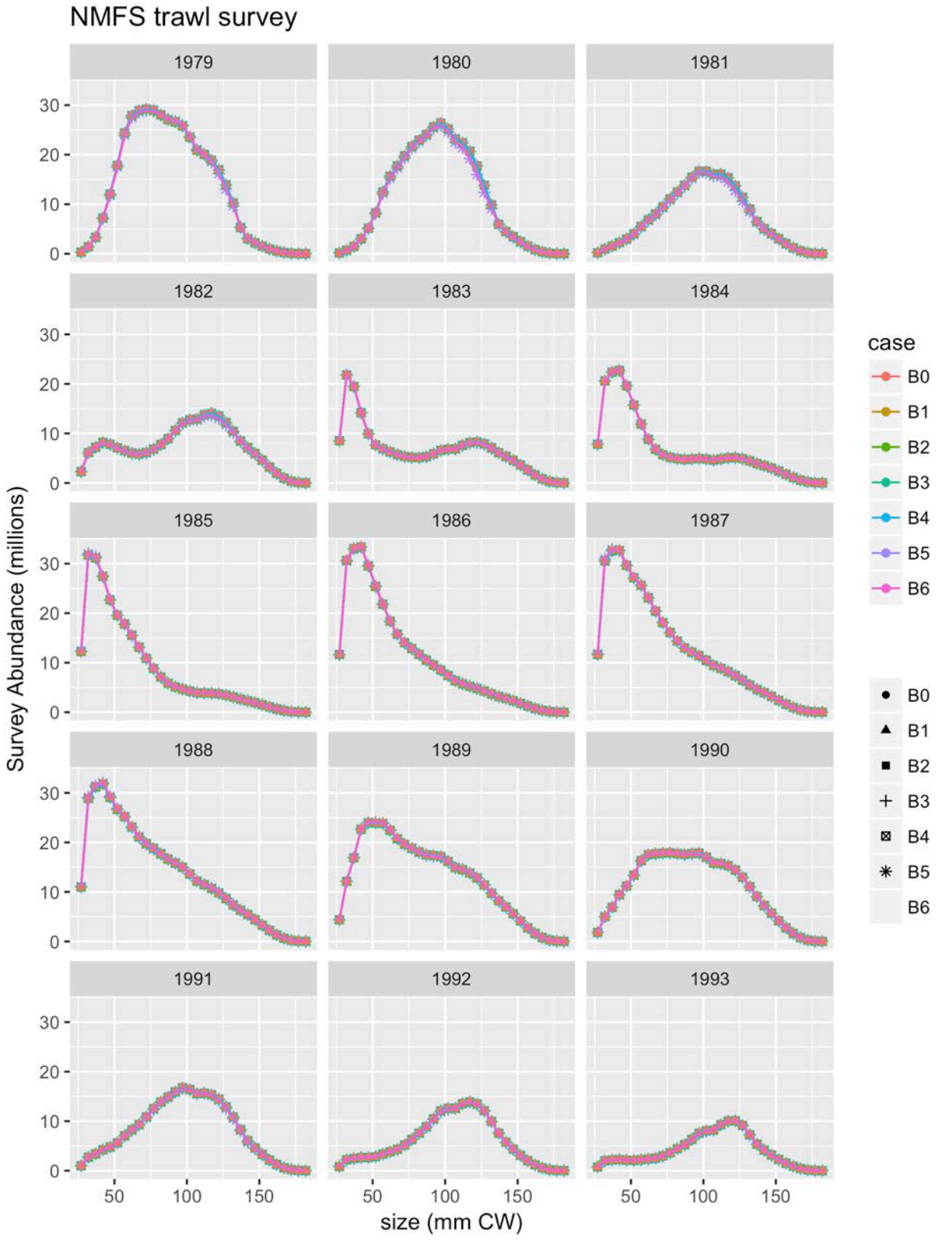


Figure 38. NMFS trawl survey catch abundance for male all all, (3 of 5).

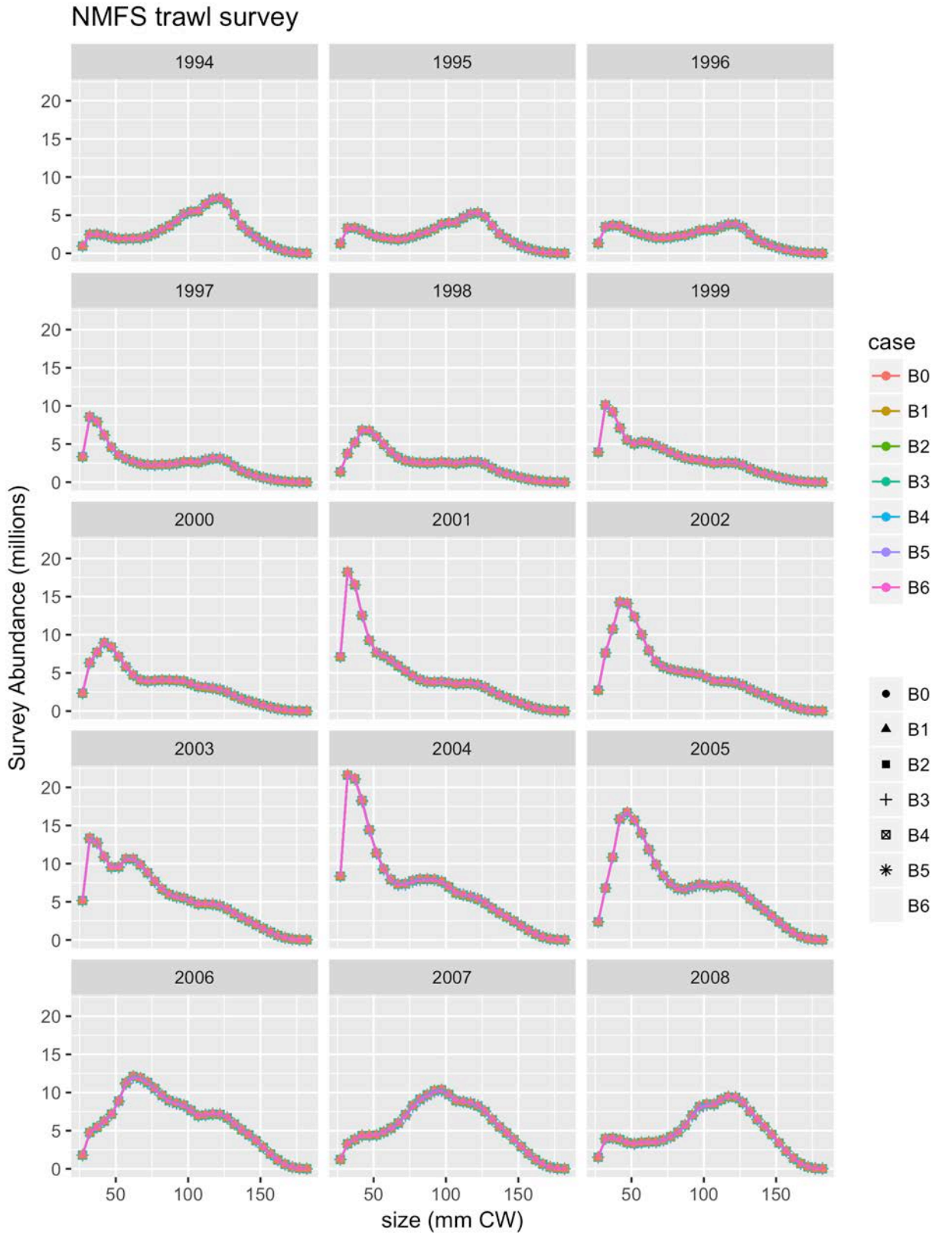


Figure 39. NMFS trawl survey catch abundance for male all all, (4 of 5).

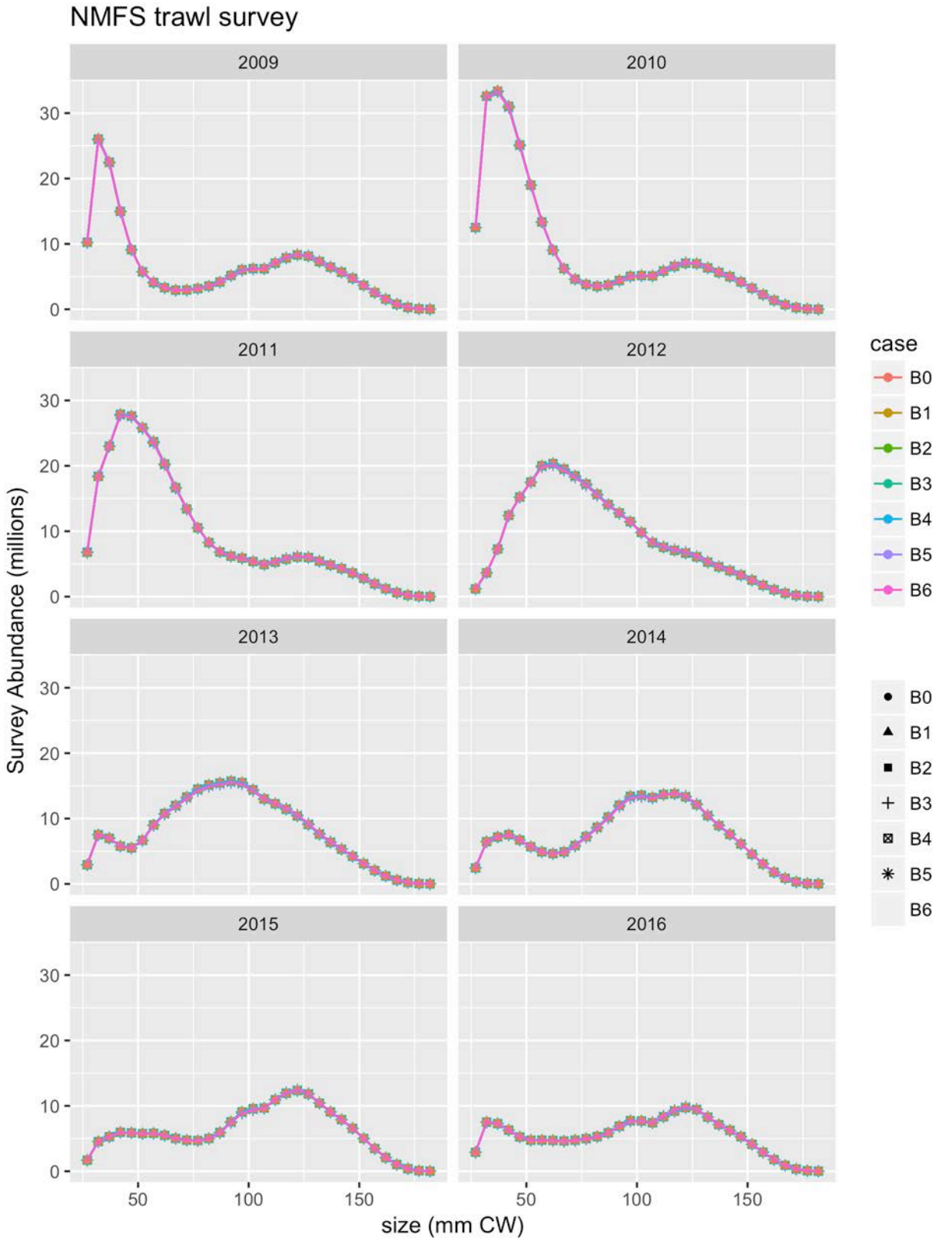


Figure 40. NMFS trawl survey catch abundance for male all all, (5 of 5).

Fisheries

Fishery catchability

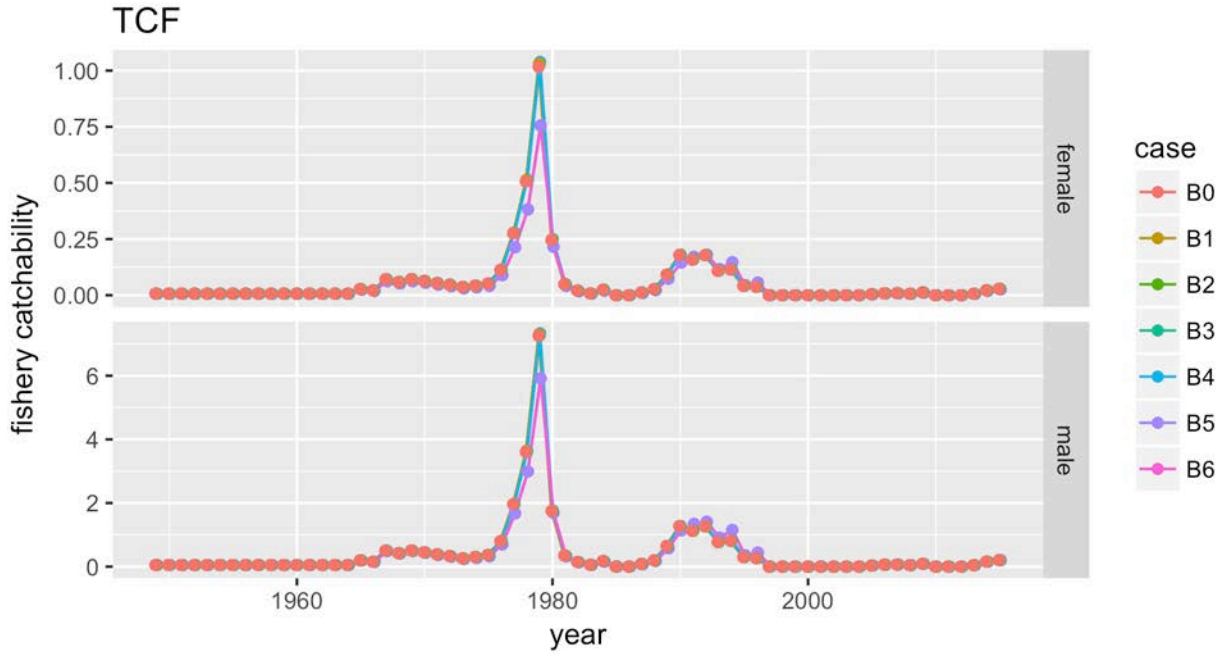


Figure 41. Fishery catchabilities for TCF.

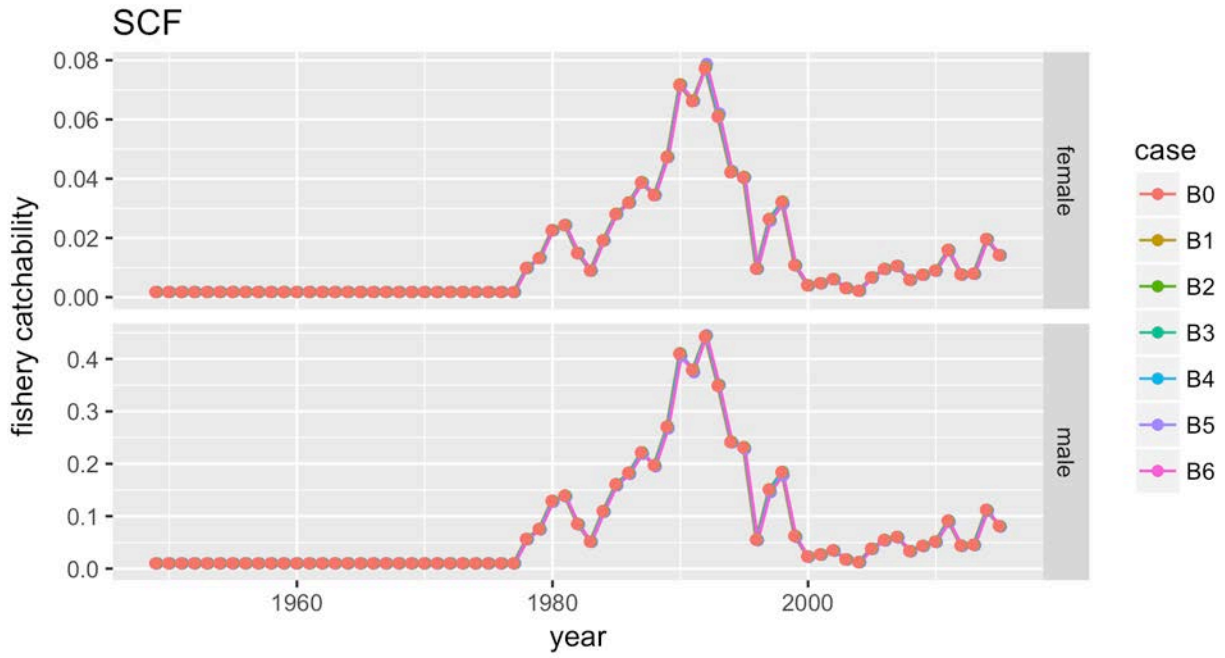


Figure 42. Fishery catchabilities for SCF.

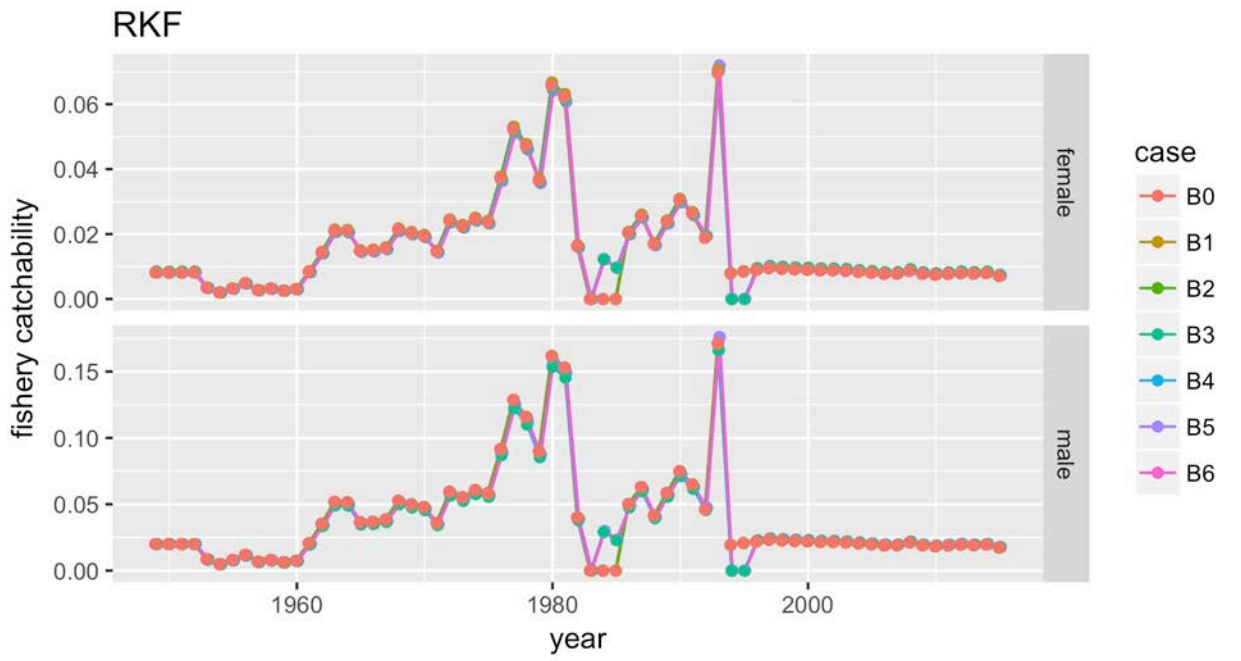


Figure 43. Fishery catchabilities for RKF.

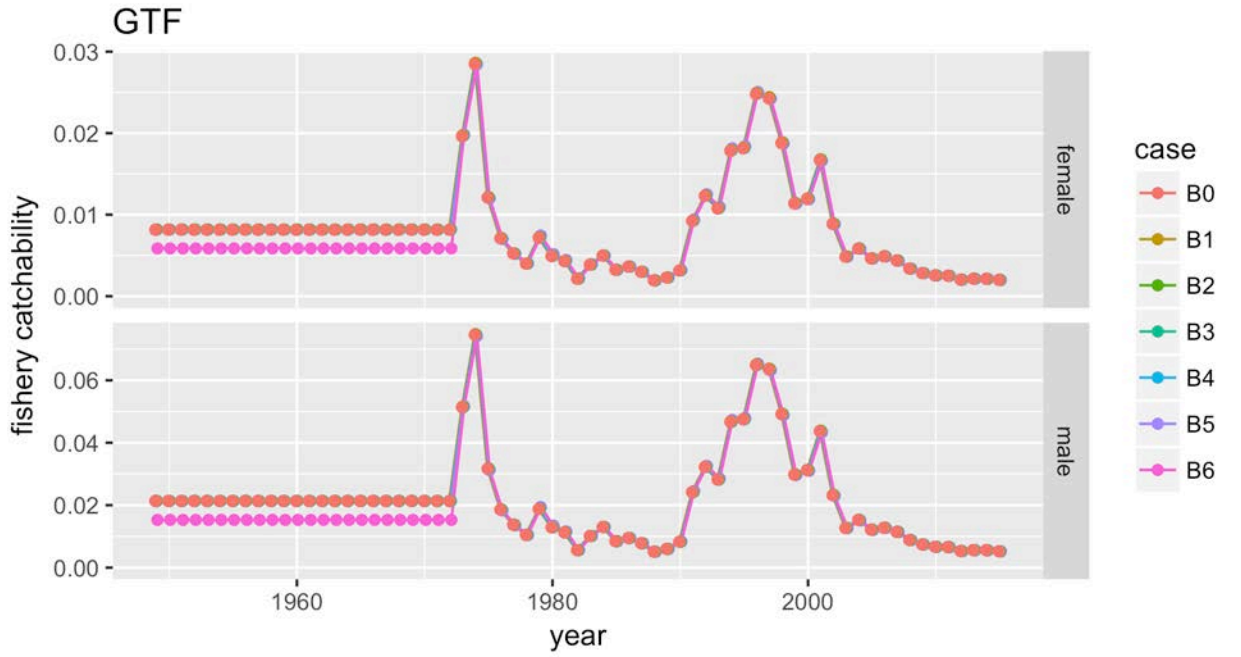


Figure 44. Fishery catchabilities for GTF.

Total selectivity functions

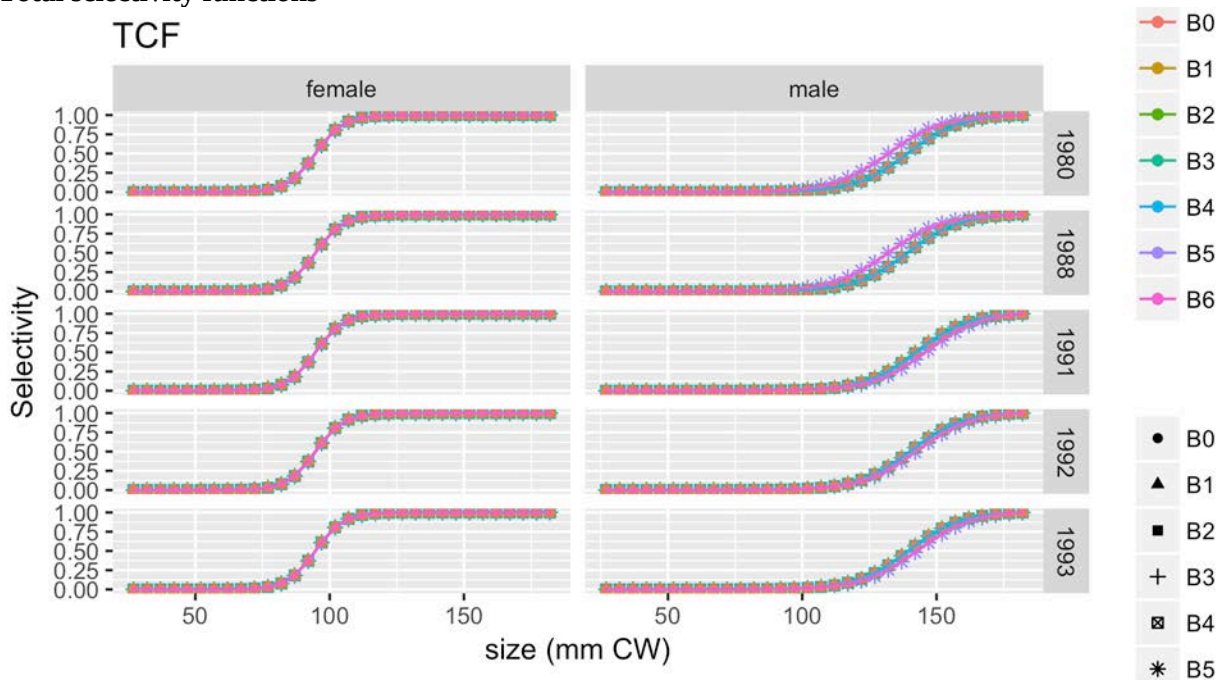


Figure 45. Selectivity functions for TCF(1 of 6).

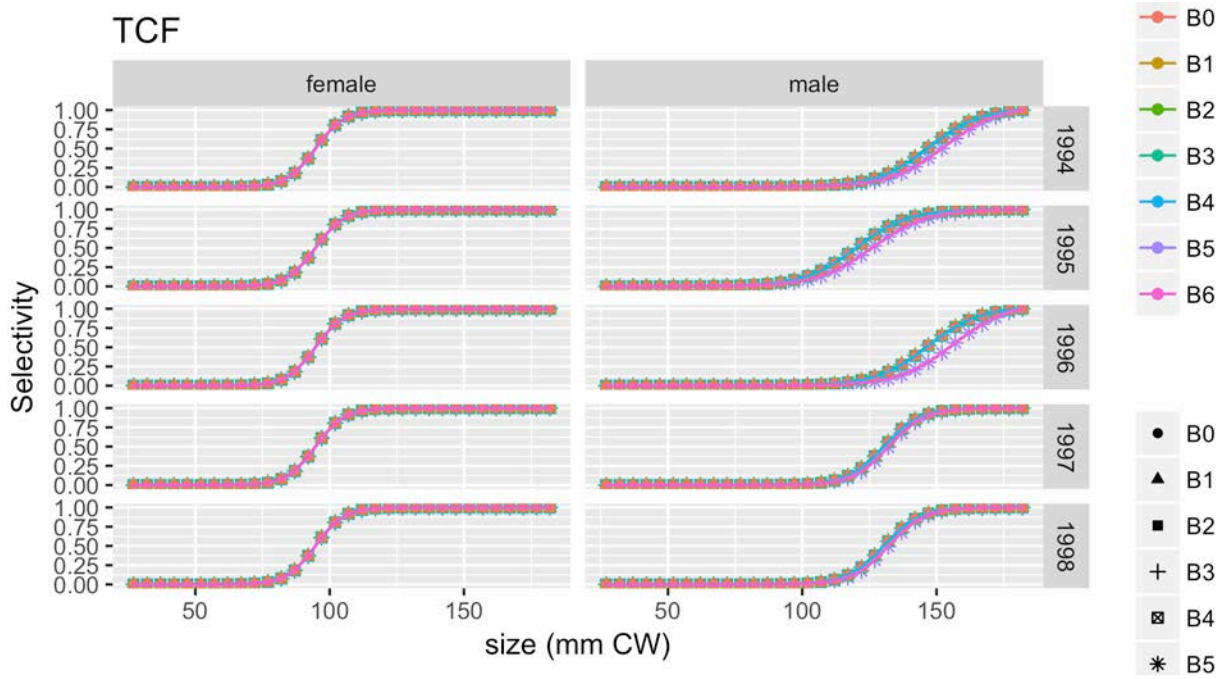


Figure 46. Selectivity functions for TCF(2 of 6).

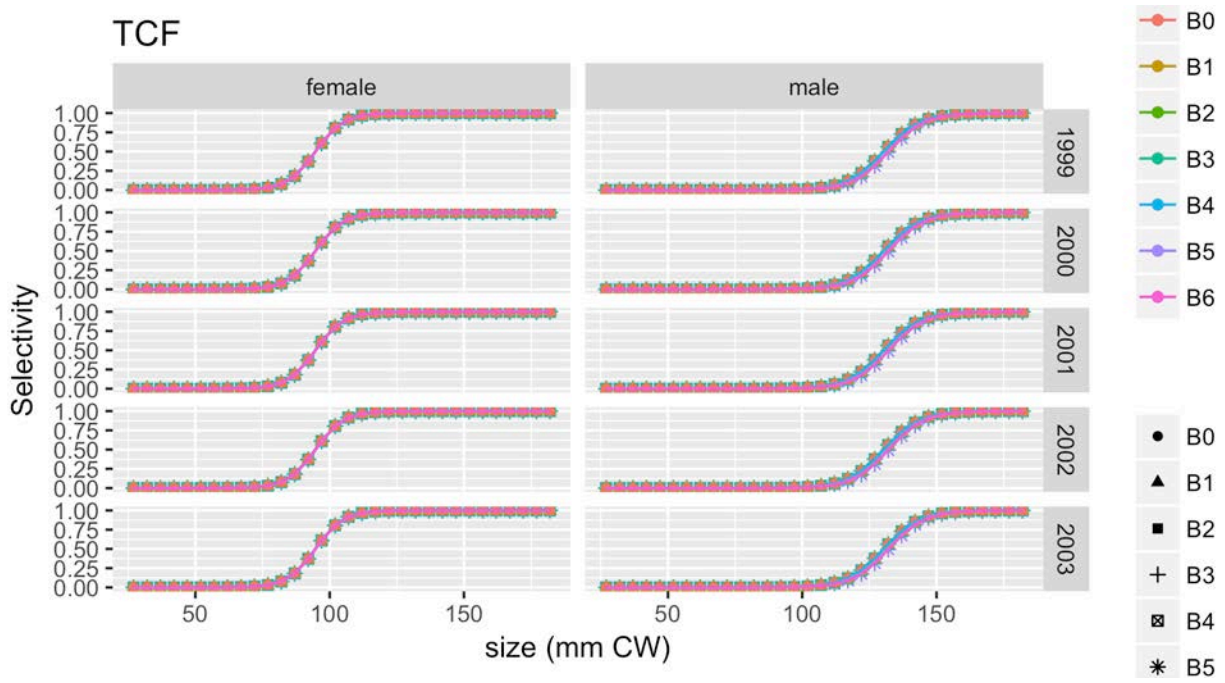


Figure 47. Selectivity functions for TCF(3 of 6).

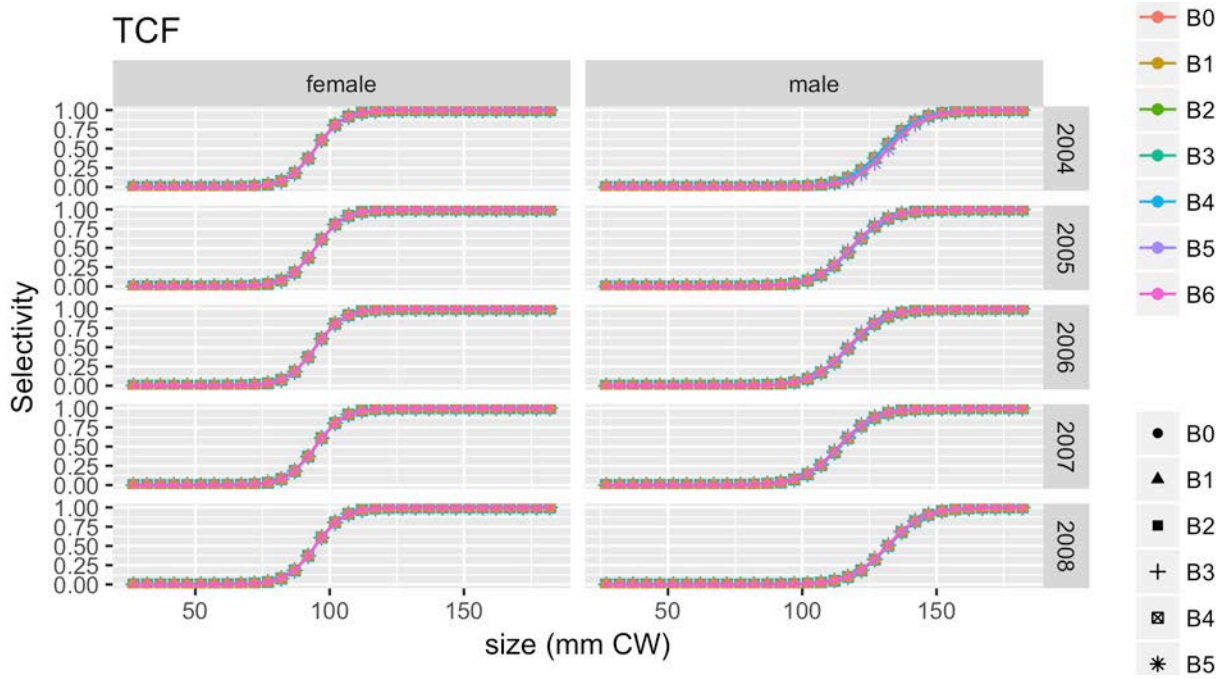


Figure 48. Selectivity functions for TCF(4 of 6).

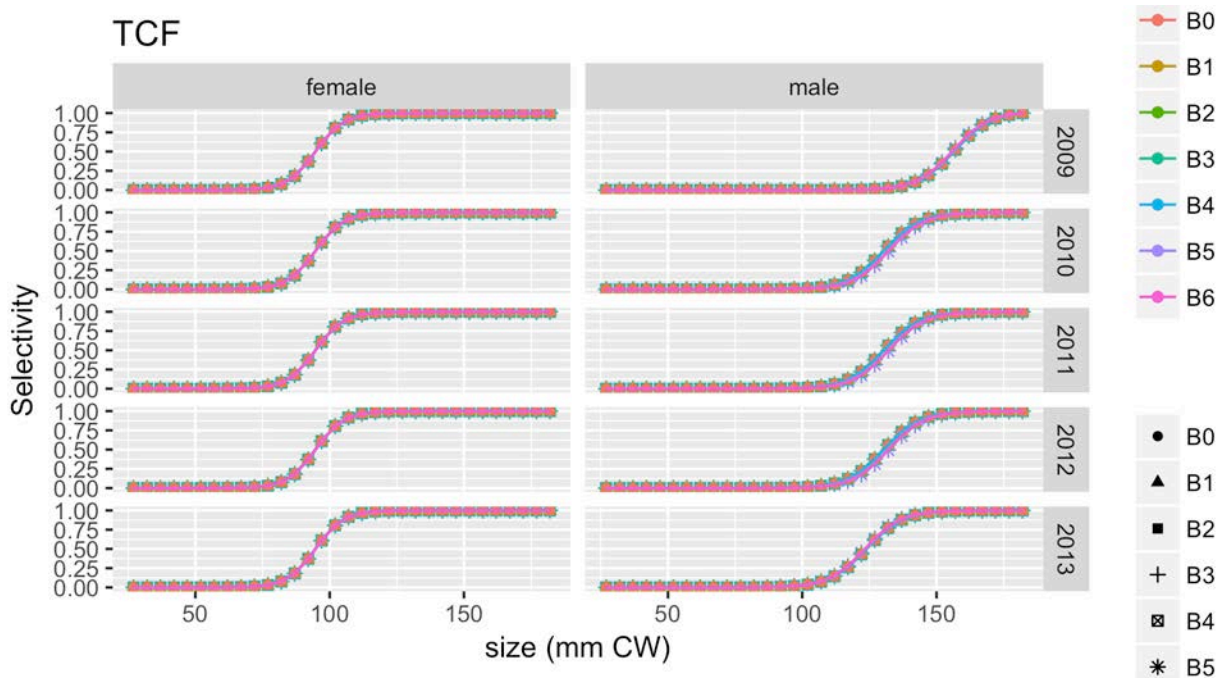


Figure 49. Selectivity functions for TCF(5 of 6).

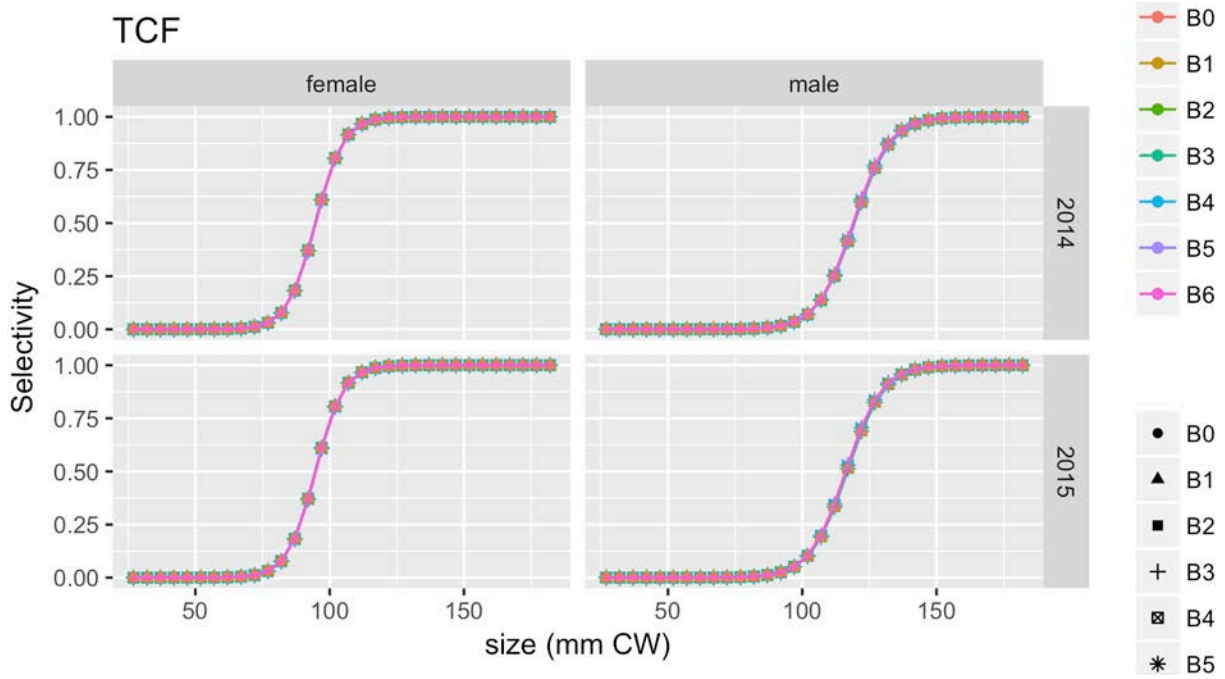


Figure 50. Selectivity functions for TCF(6 of 6).

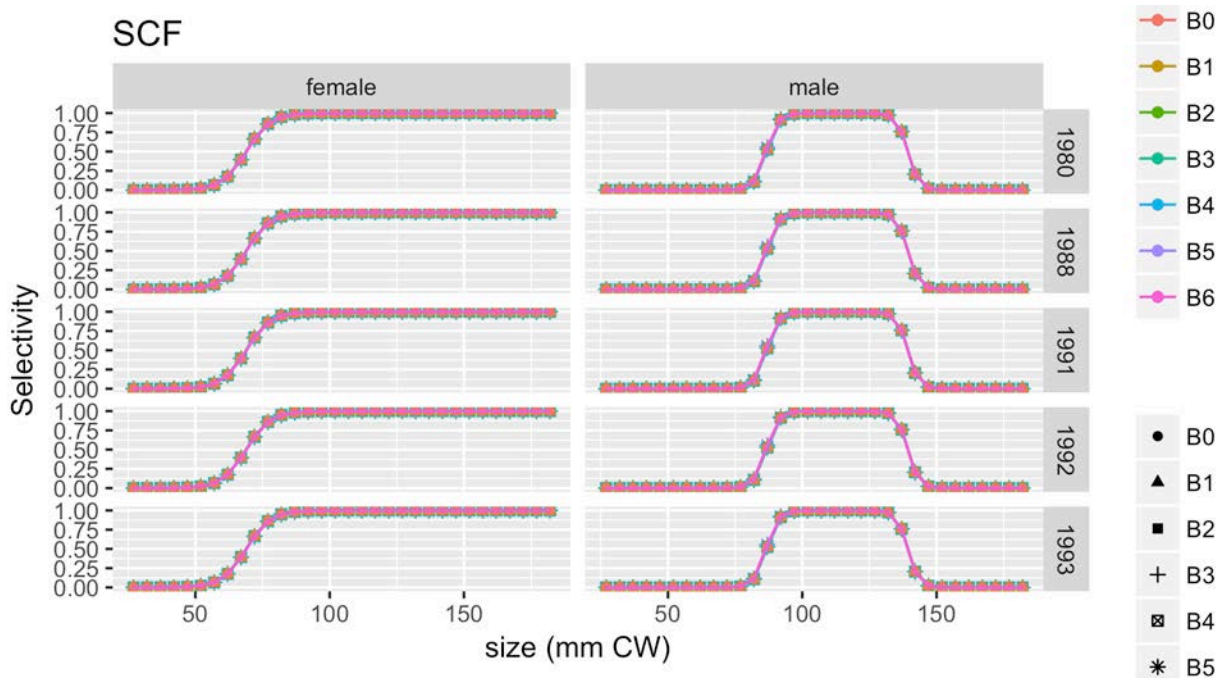


Figure 51. Selectivity functions for SCF(1 of 6).

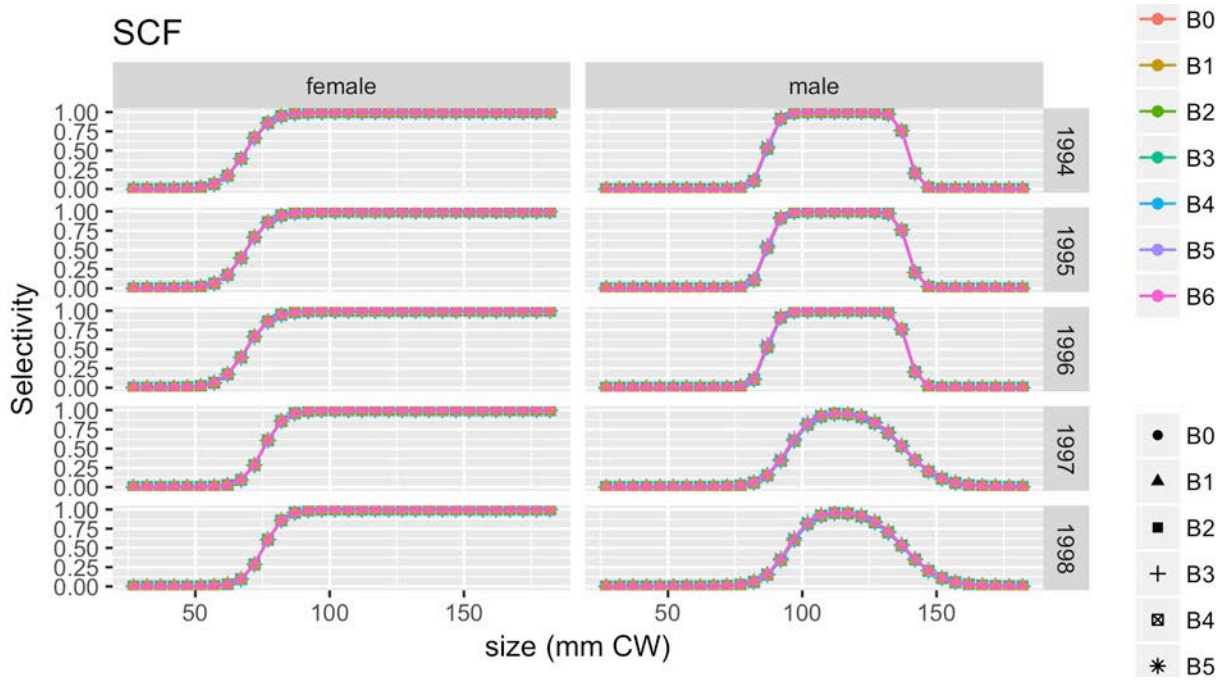


Figure 52. Selectivity functions for SCF(2 of 6).

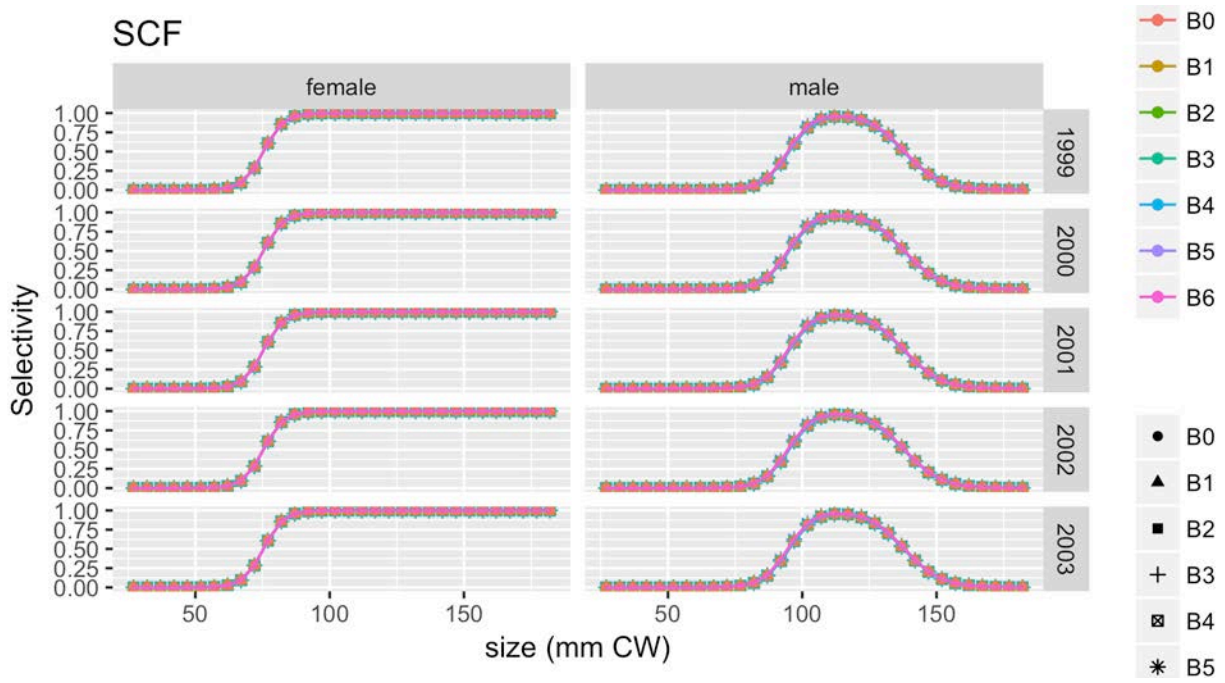


Figure 53. Selectivity functions for SCF(3 of 6).

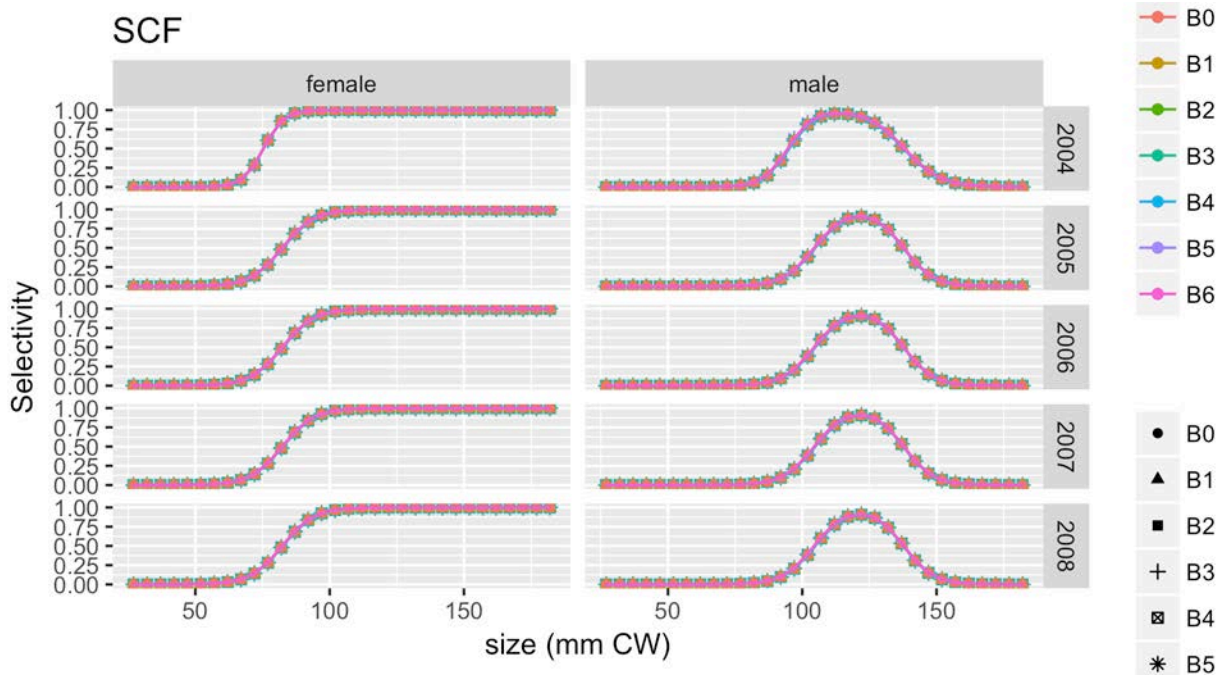


Figure 54. Selectivity functions for SCF(4 of 6).

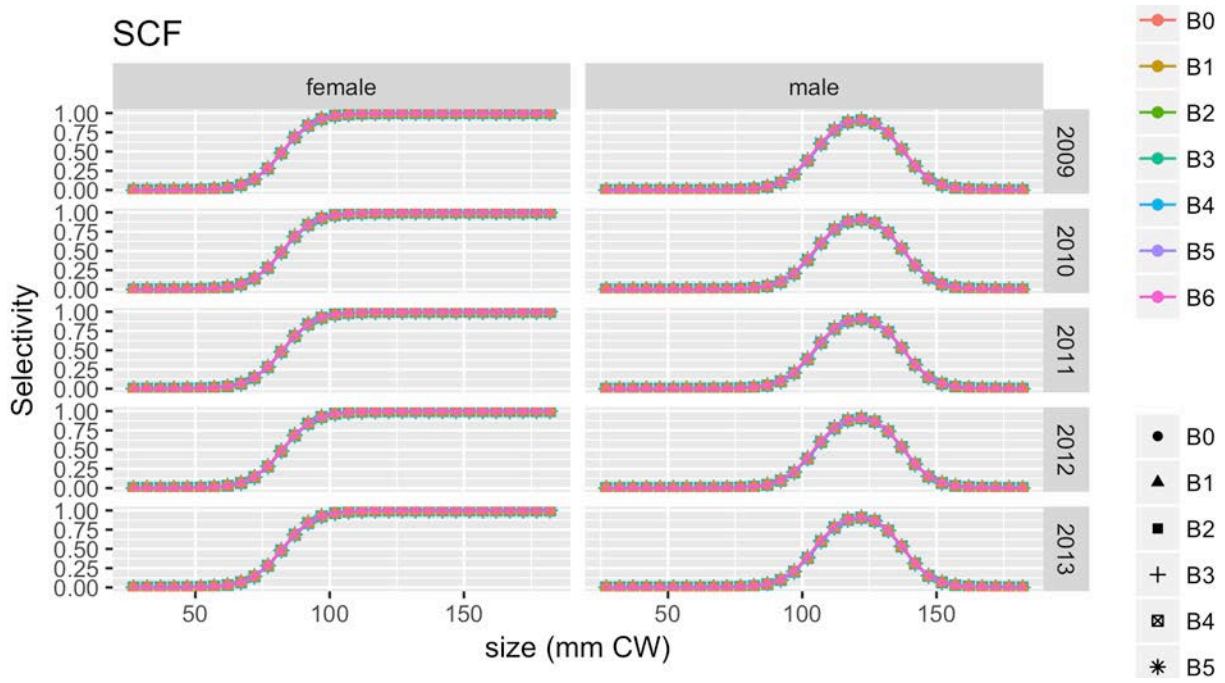


Figure 55. Selectivity functions for SCF(5 of 6).

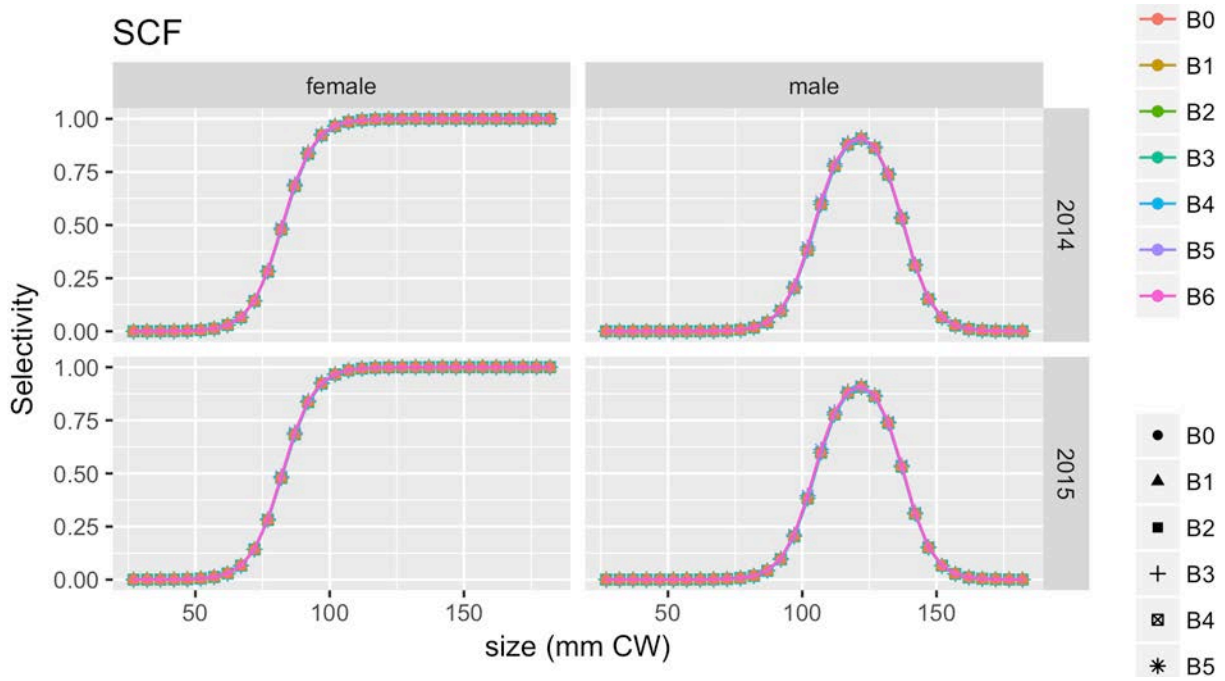


Figure 56. Selectivity functions for SCF(6 of 6).

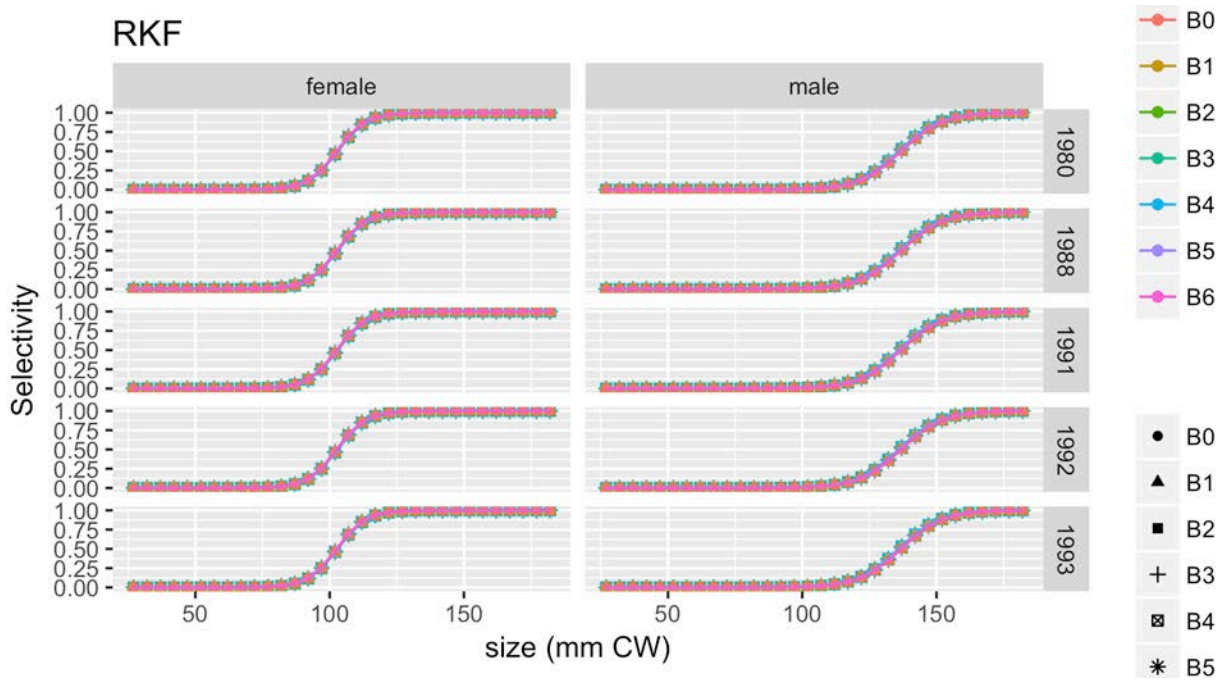


Figure 57. Selectivity functions for RKF(1 of 6).

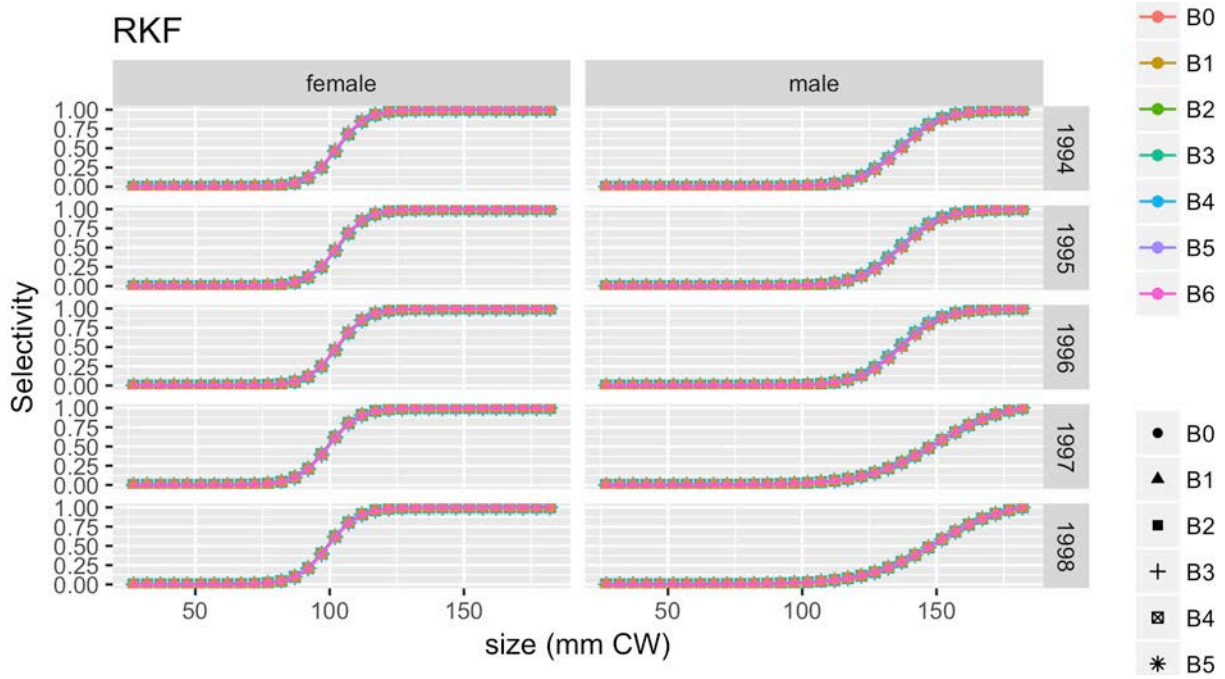


Figure 58. Selectivity functions for RKF(2 of 6).

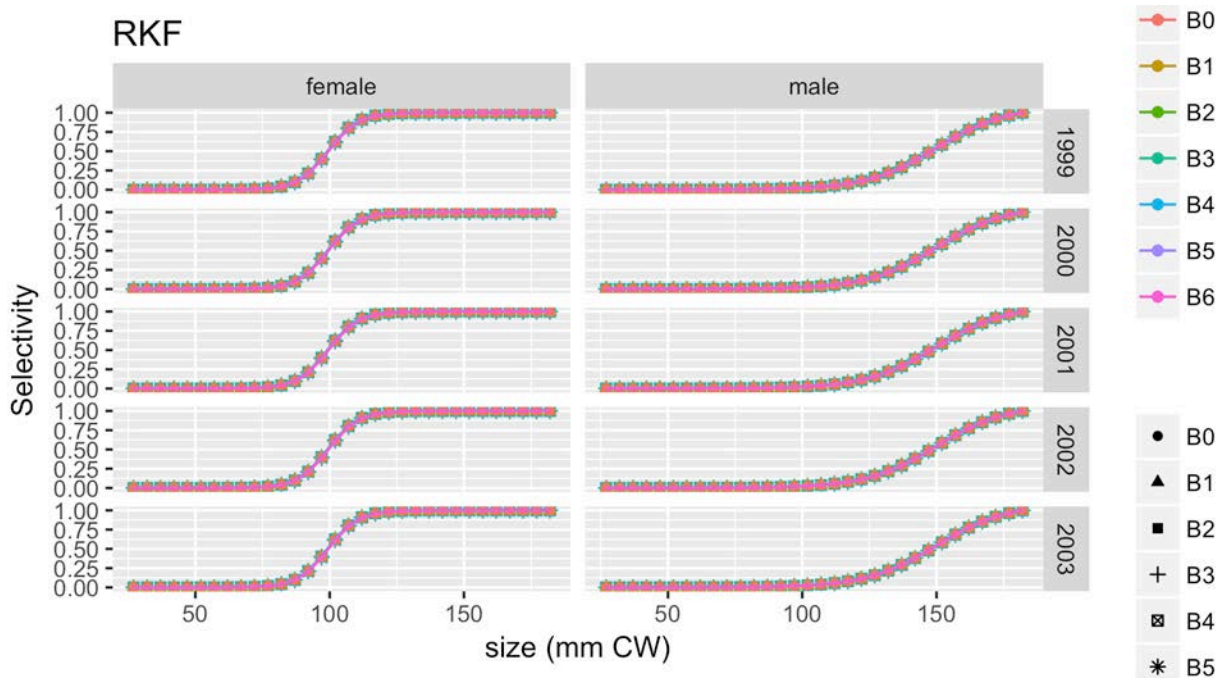


Figure 59. Selectivity functions for RKF(3 of 6).

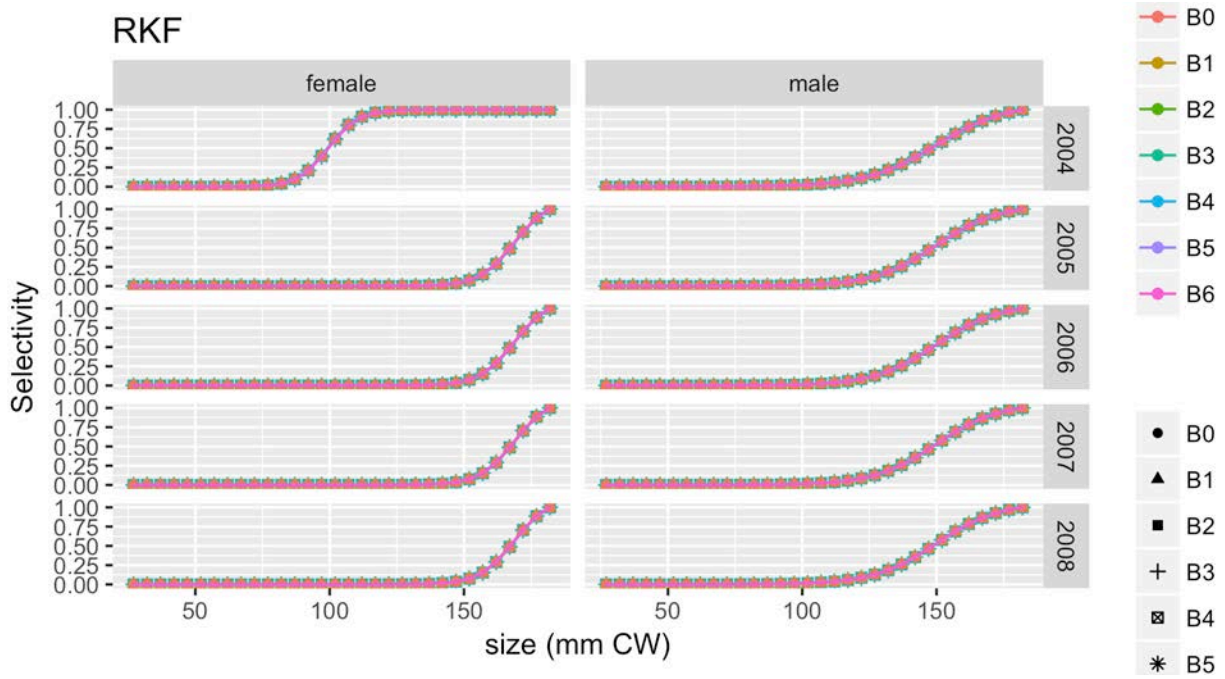


Figure 60. Selectivity functions for RKF(4 of 6).

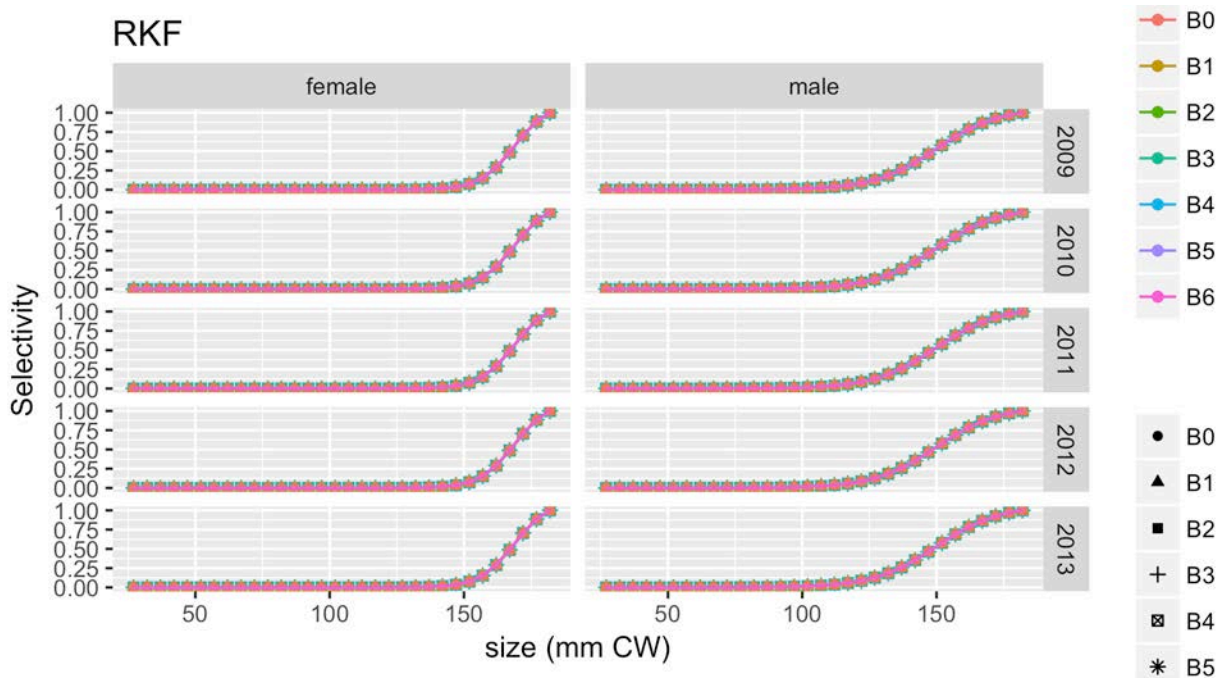


Figure 61. Selectivity functions for RKF(5 of 6).

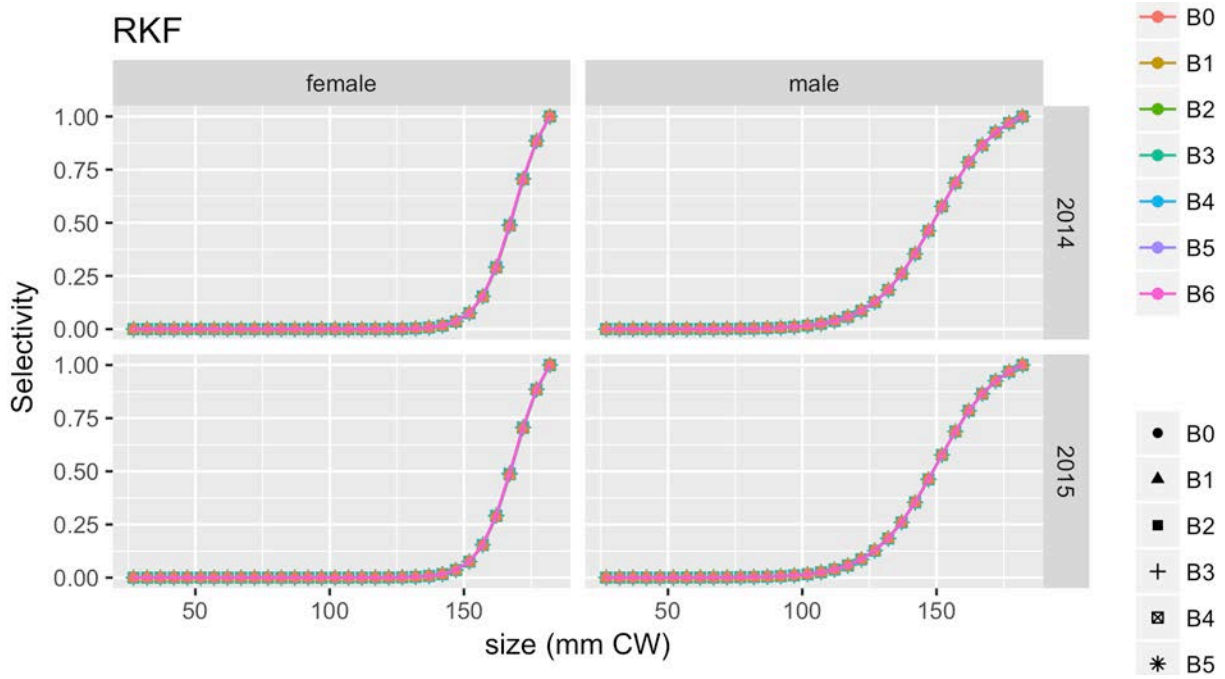


Figure 62. Selectivity functions for RKF(6 of 6).

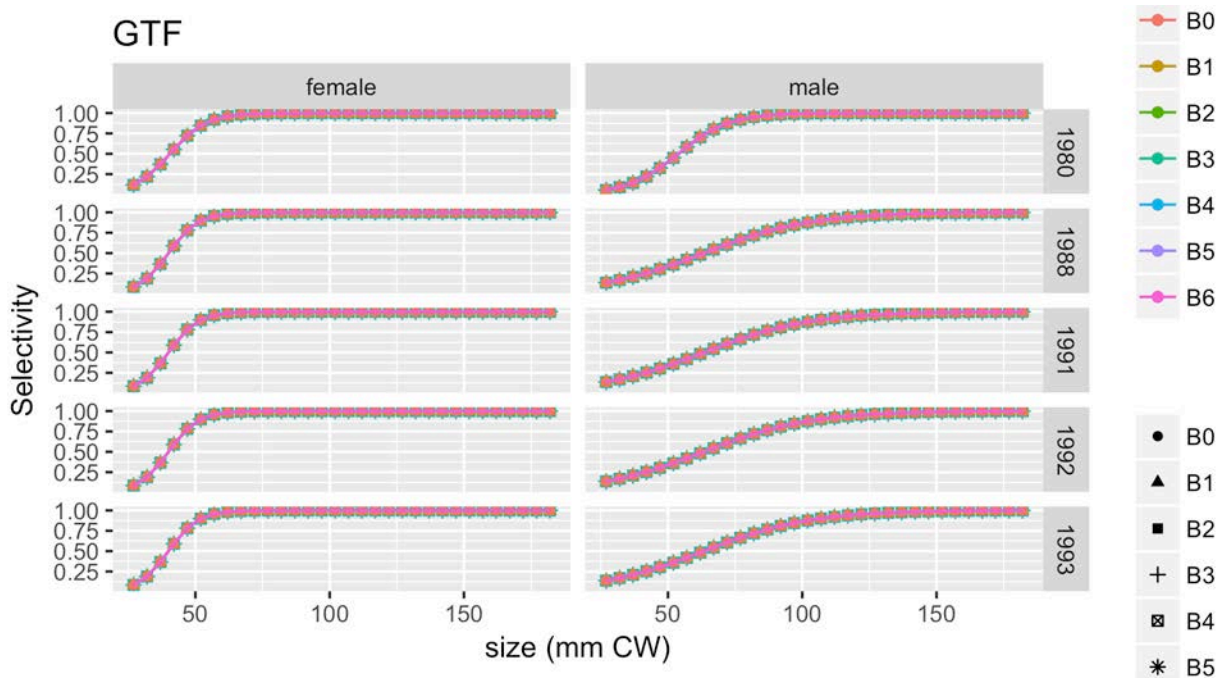


Figure 63. Selectivity functions for GTF(1 of 6).

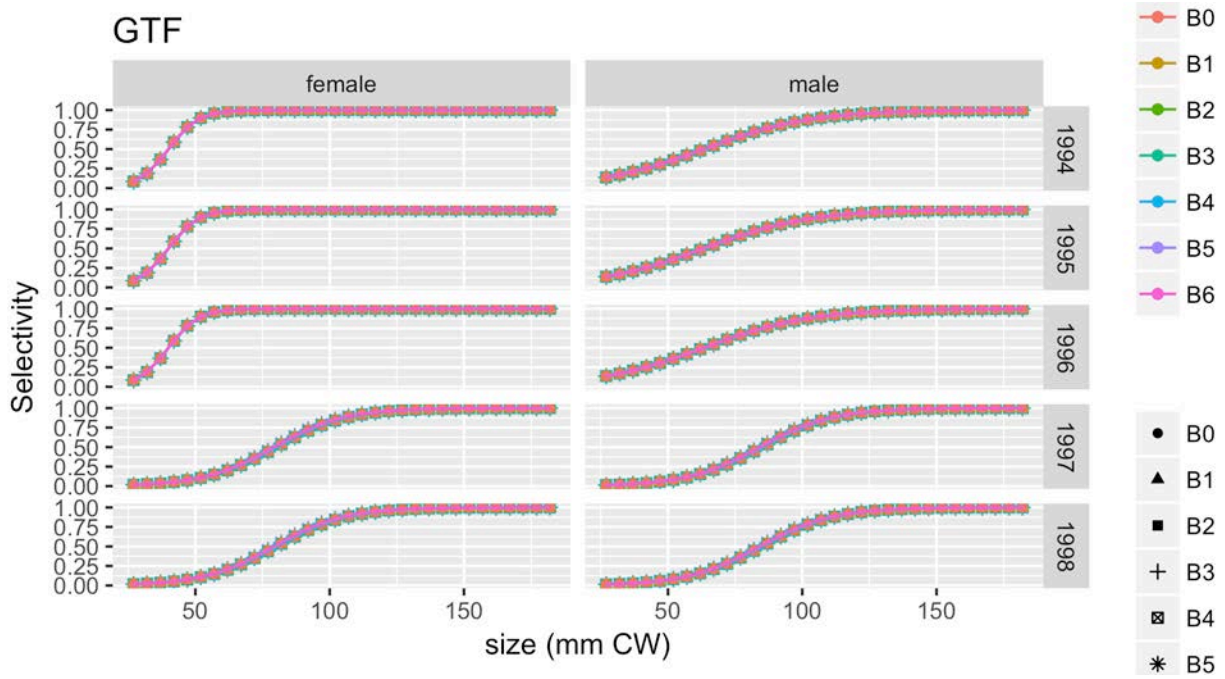


Figure 64. Selectivity functions for GTF(2 of 6).

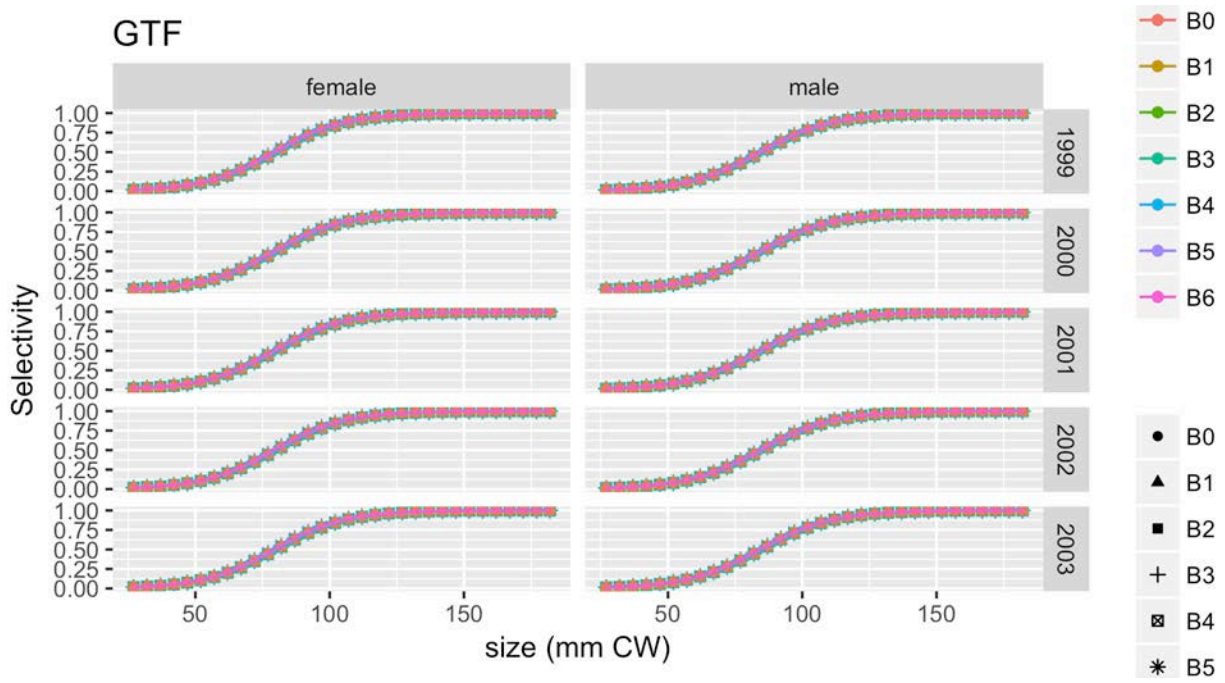


Figure 65. Selectivity functions for GTF(3 of 6).

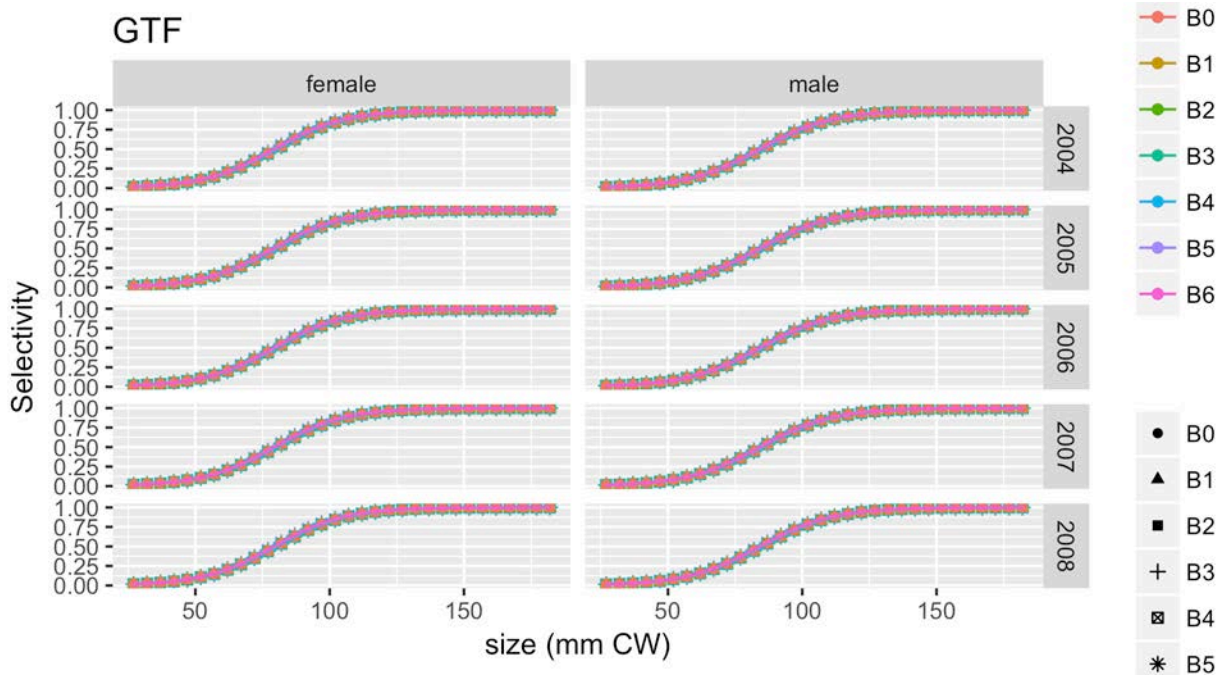


Figure 66. Selectivity functions for GTF(4 of 6).

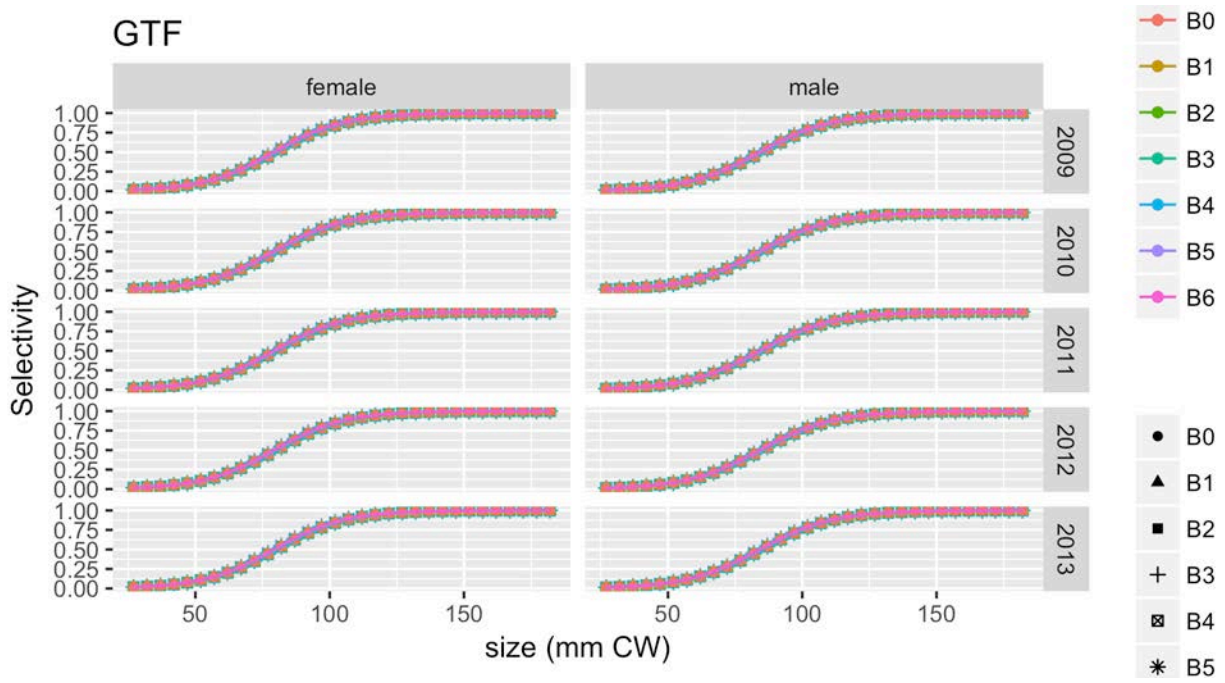


Figure 67. Selectivity functions for GTF(5 of 6).

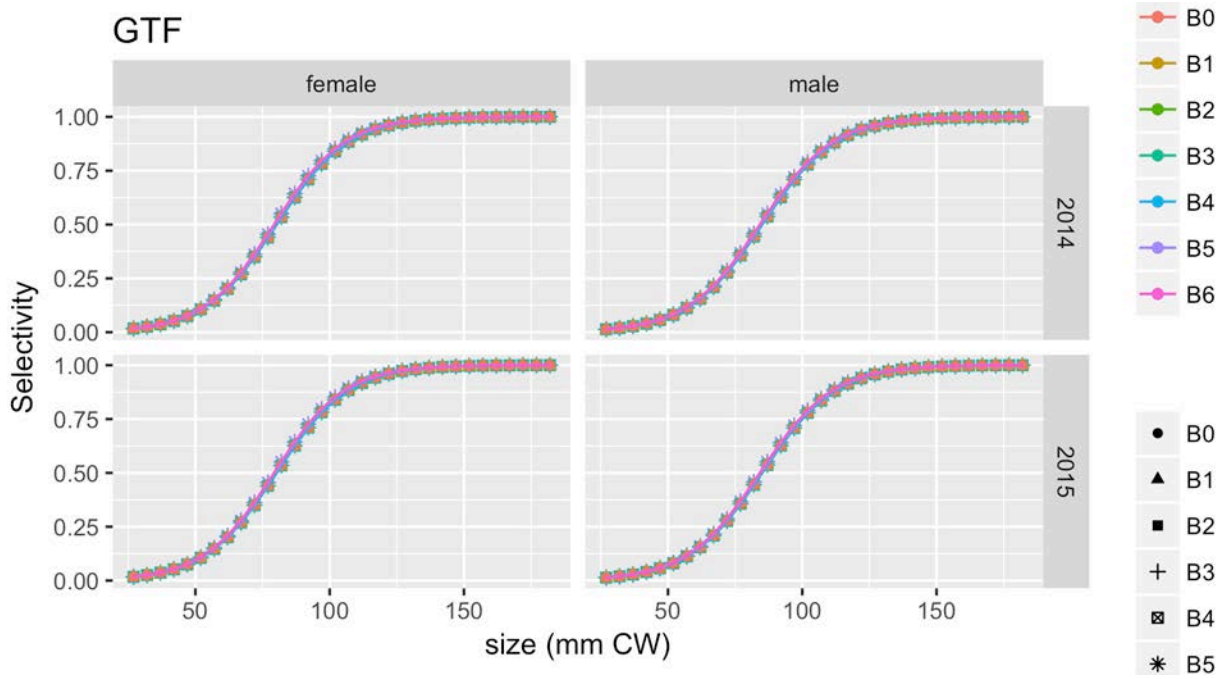


Figure 68. Selectivity functions for GTF(6 of 6).

Retention functions

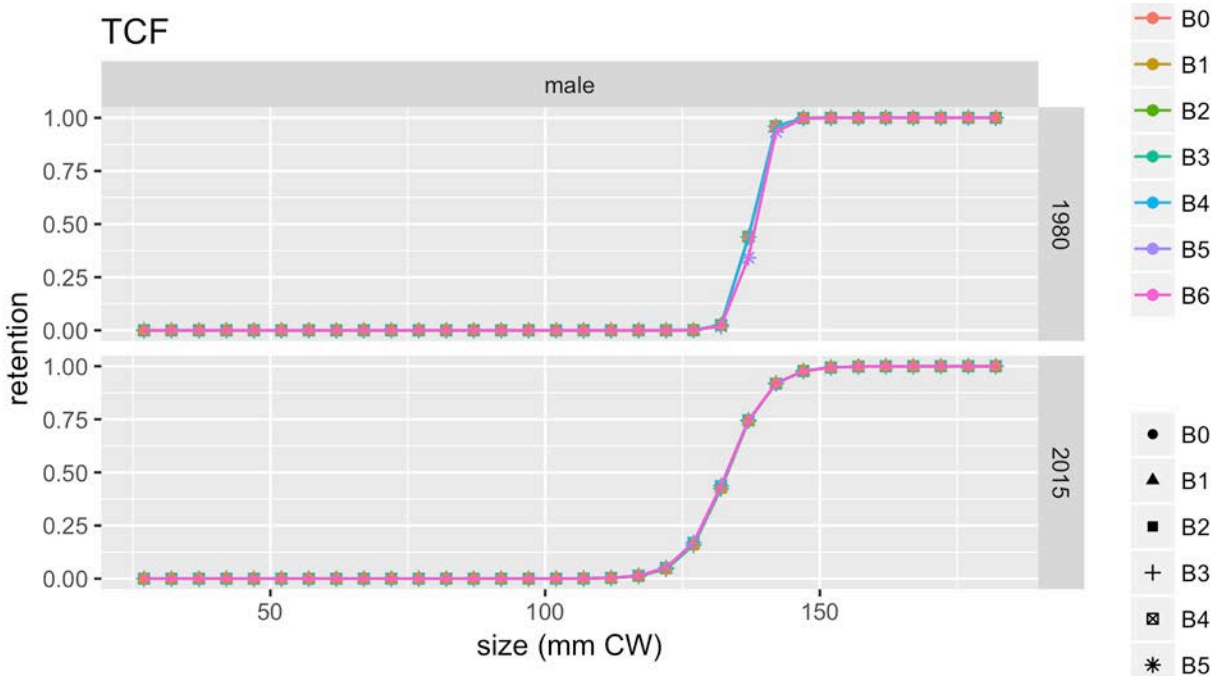


Figure 69. Retention functions for TCF(1 of 1).

Total catch abundance

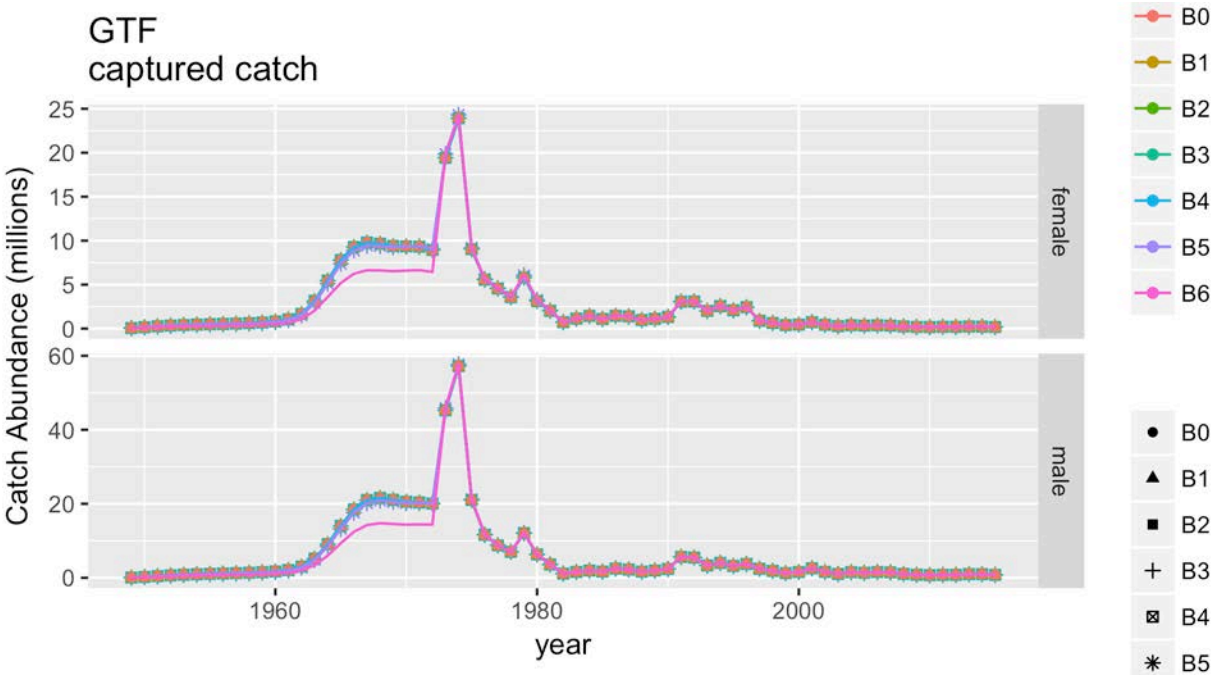


Figure 70. Predicted GTF captured catch abundance.

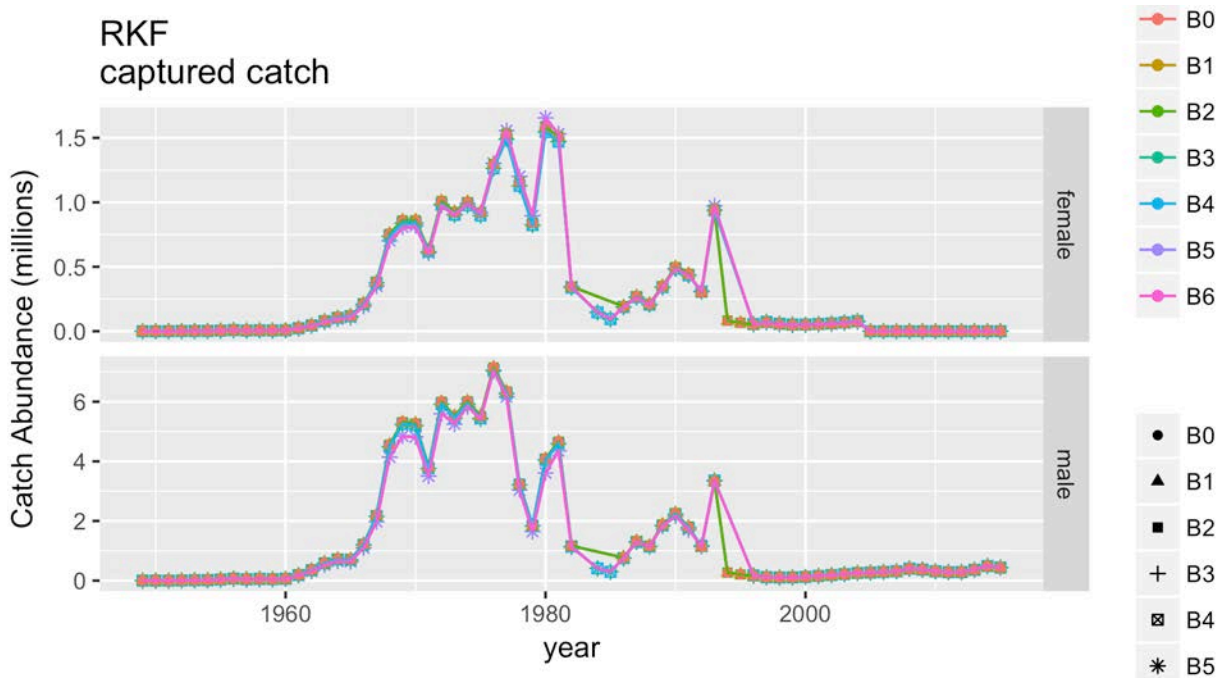


Figure 71. Predicted RKF captured catch abundance.

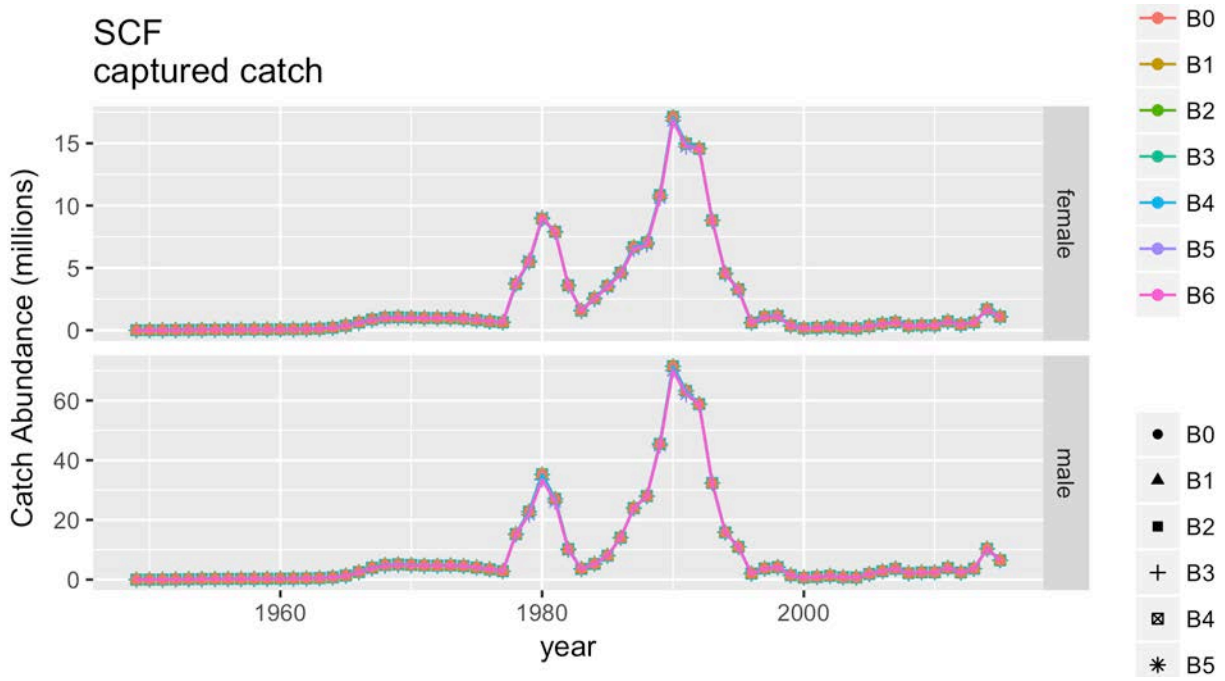


Figure 72. Predicted SCF captured catch abundance.

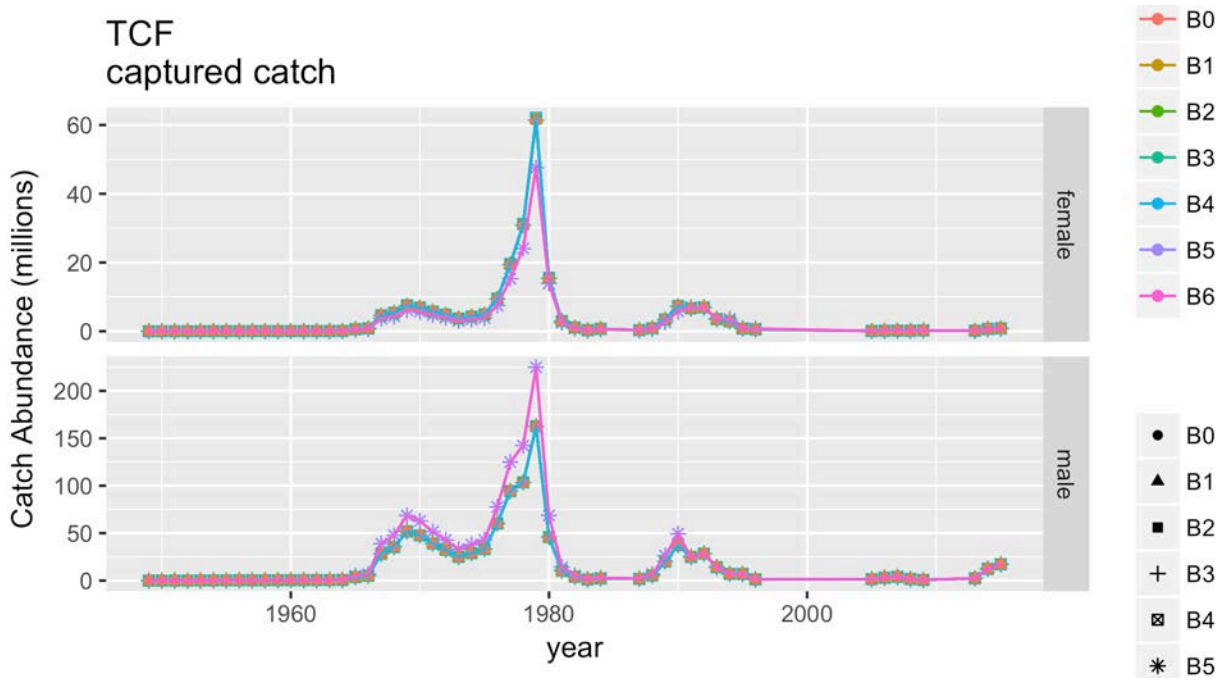


Figure 73. Predicted TCF captured catch abundance.

Total catch biomass

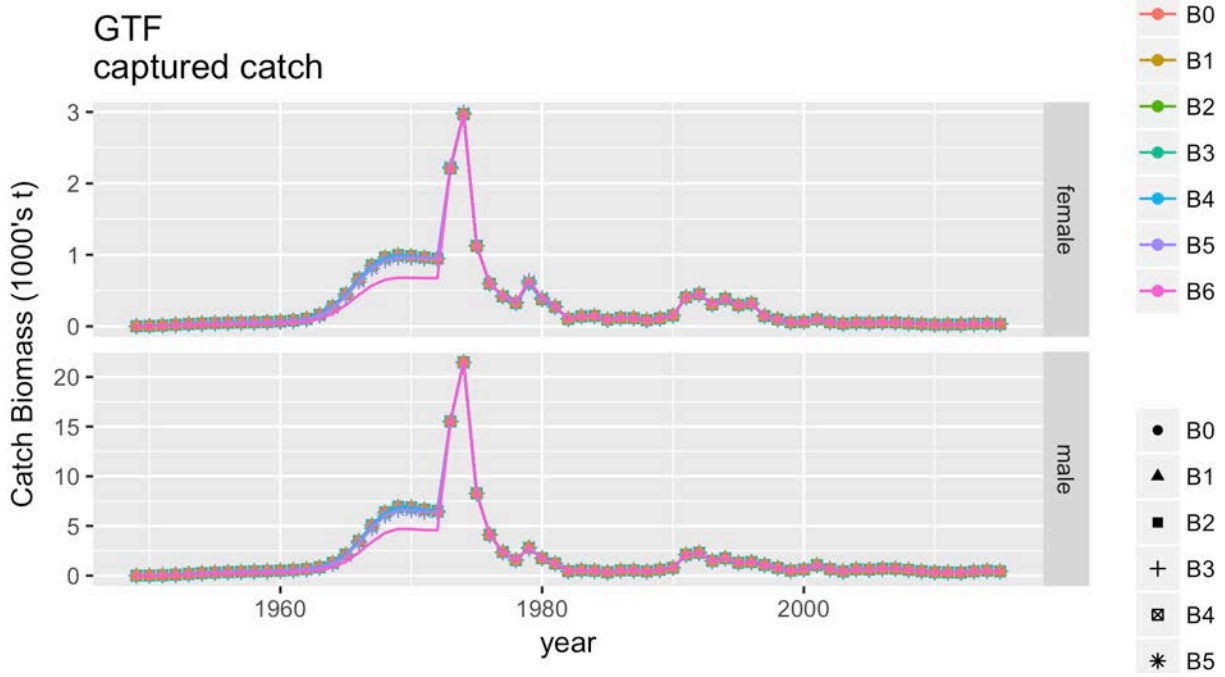


Figure 74. Predicted GTF captured catch biomass.

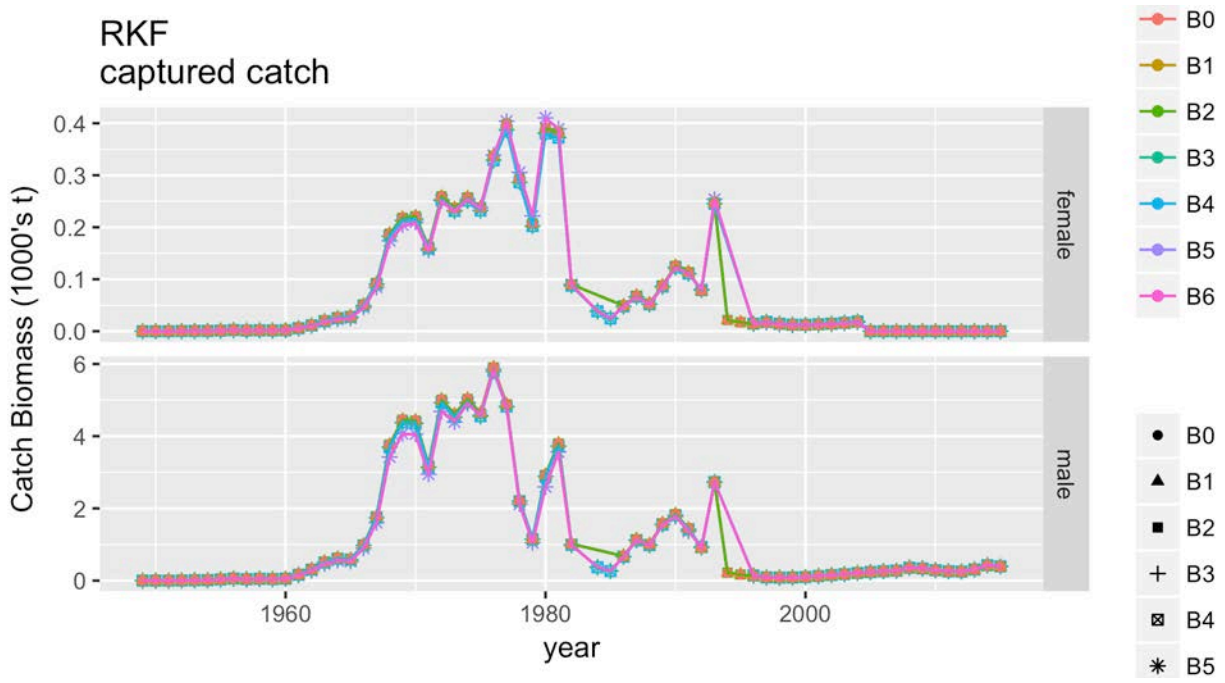


Figure 75. Predicted RKF captured catch biomass.

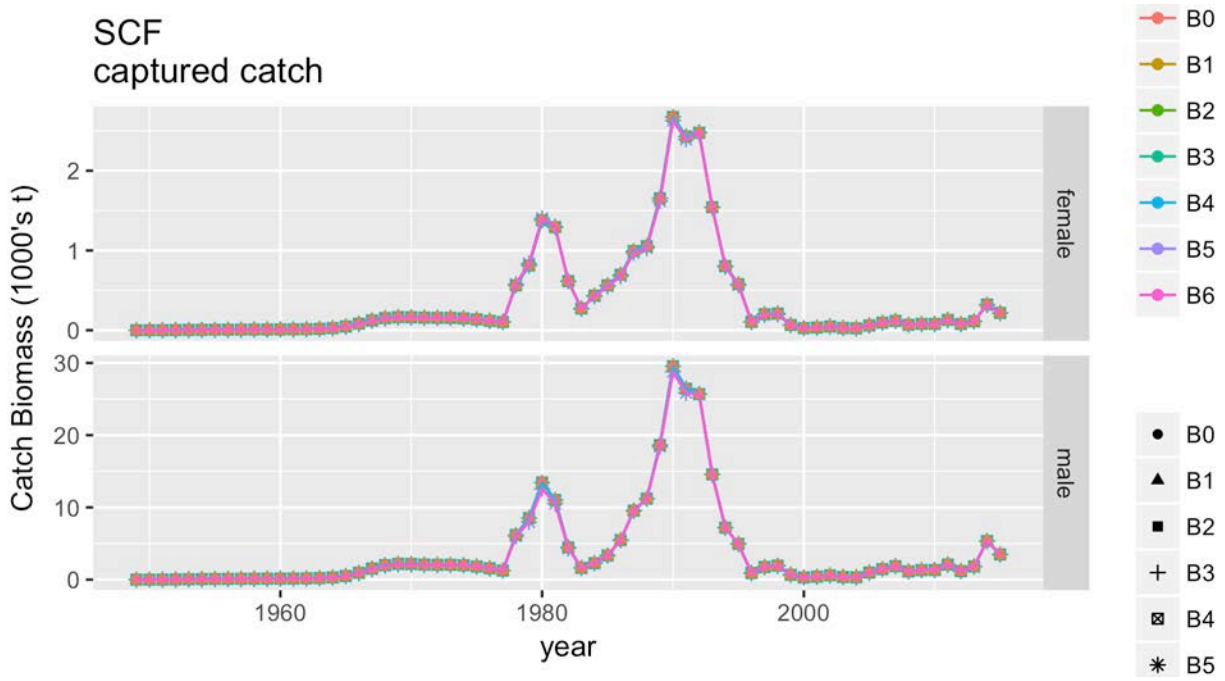


Figure 76. Predicted SCF captured catch biomass.

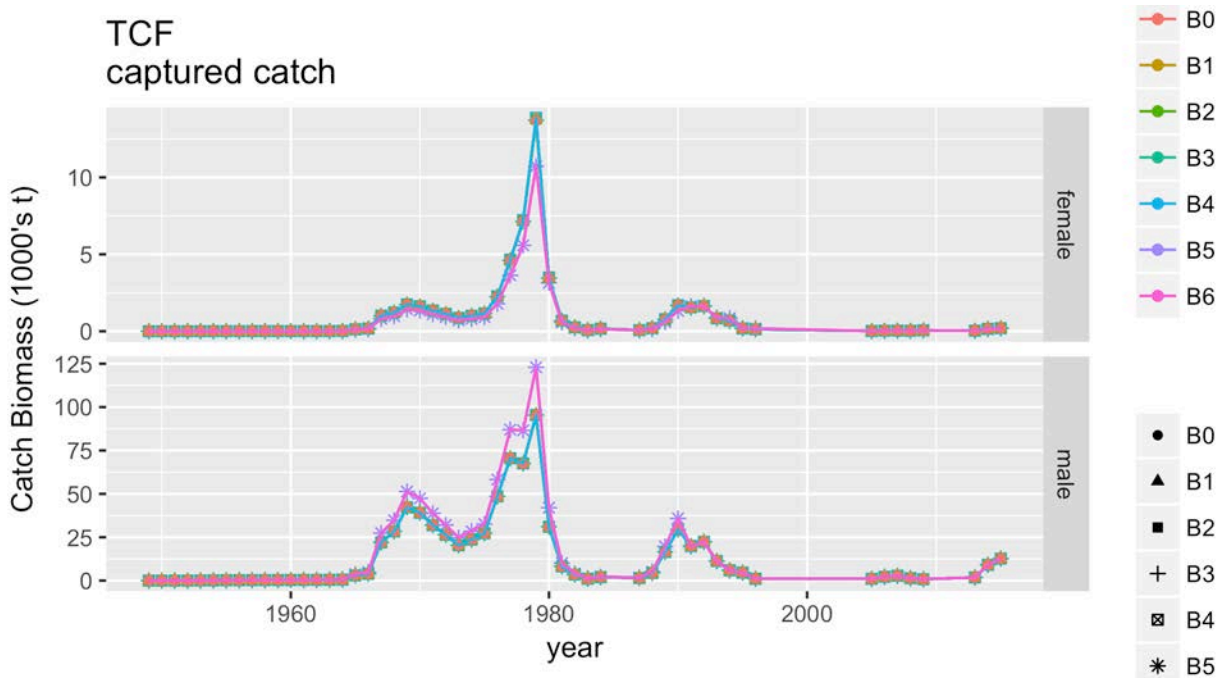


Figure 77. Predicted TCF captured catch biomass.

Retained catch abundance

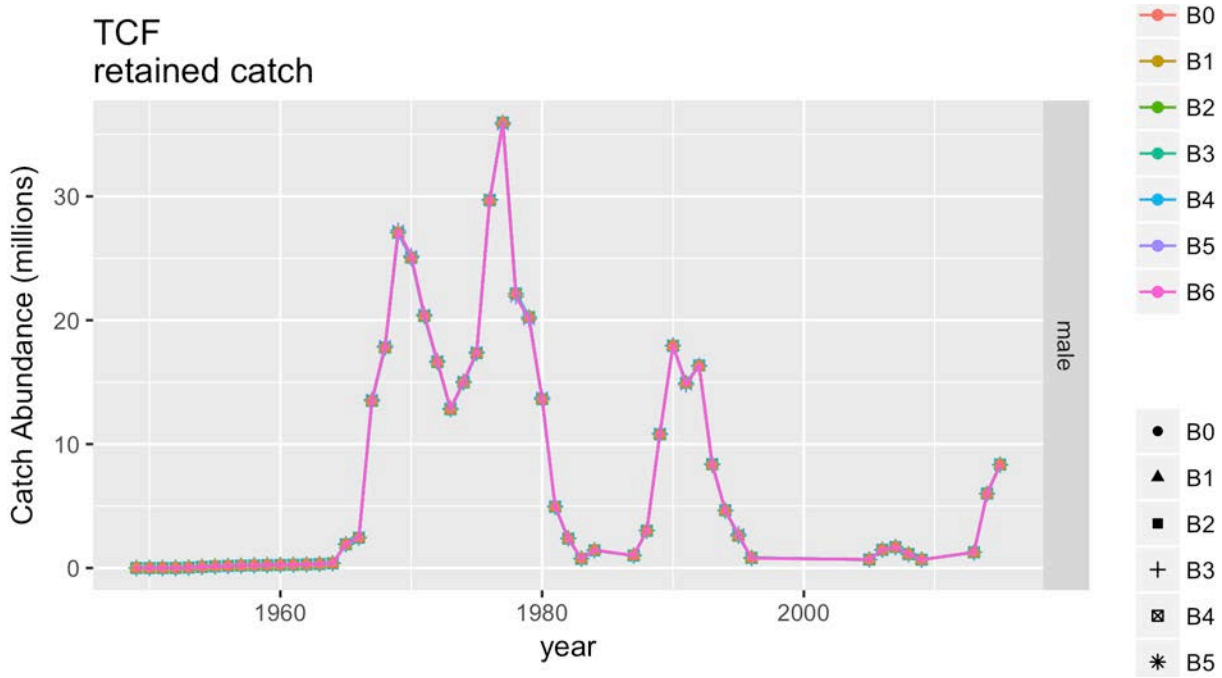


Figure 78. Predicted TCF retained catch abundance.

Retained catch biomass

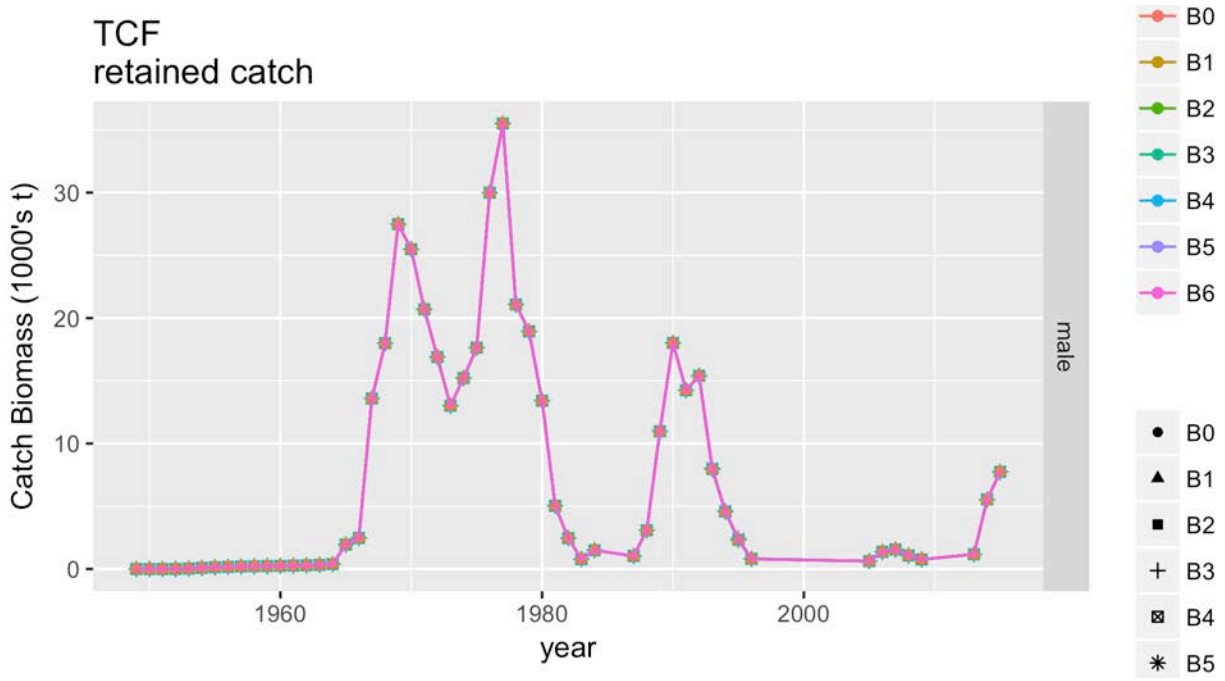


Figure 79. Predicted TCF retained catch biomass.

Total catch size compositions

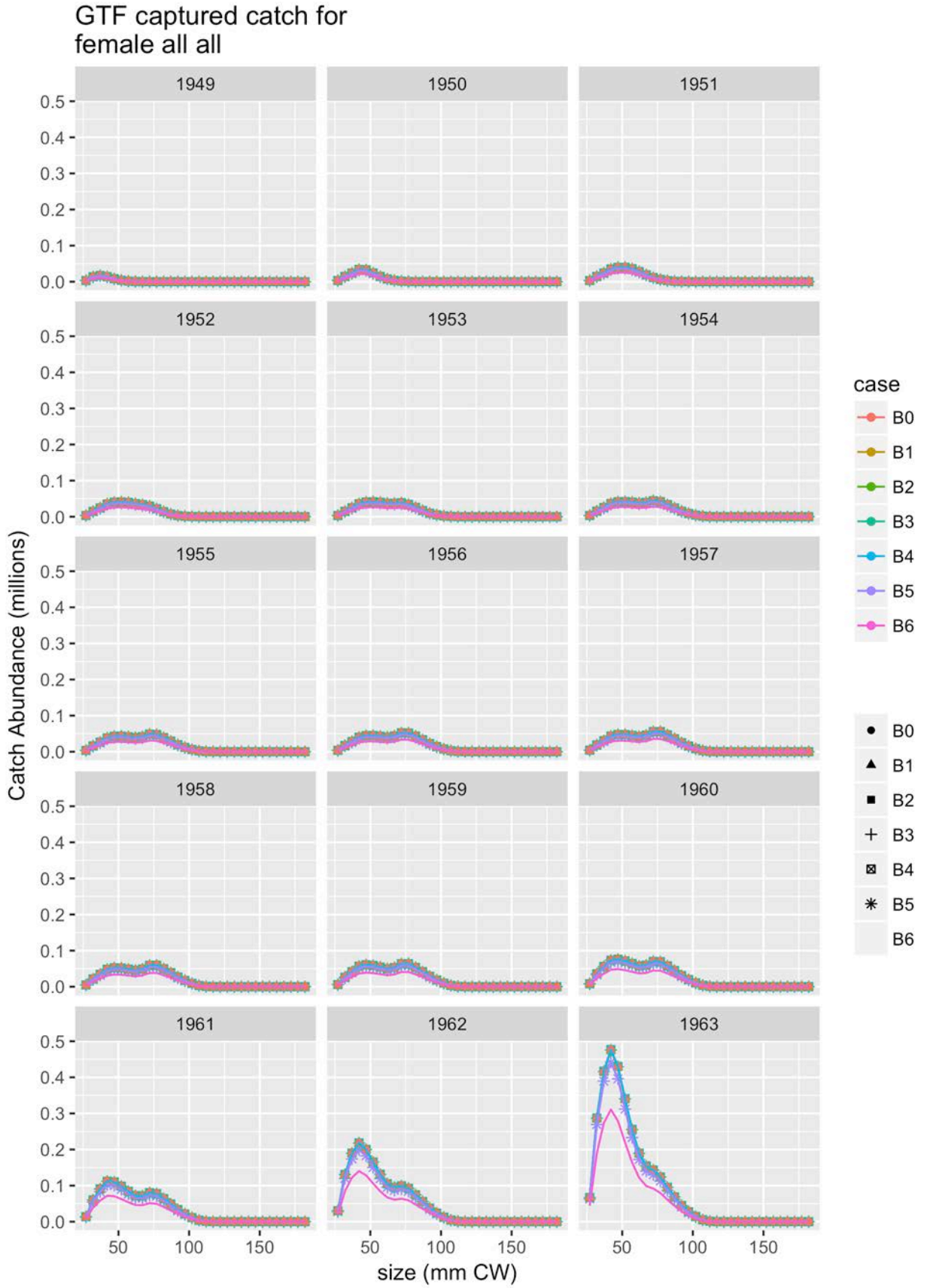


Figure 80. Predicted GTF captured catch abundance for female all all, (1 of 5).

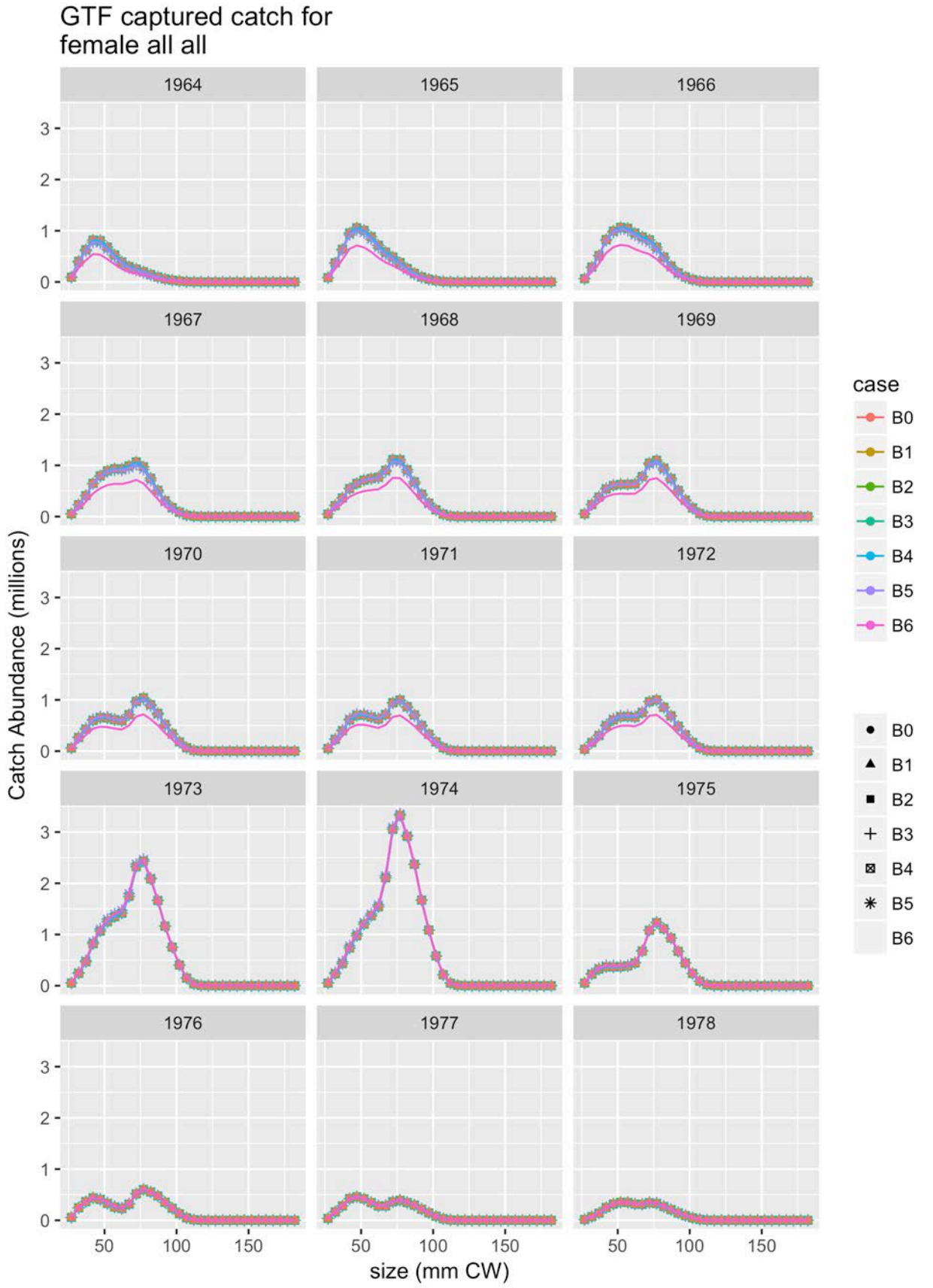


Figure 81. Predicted GTF captured catch abundance for female all all, (2 of 5).

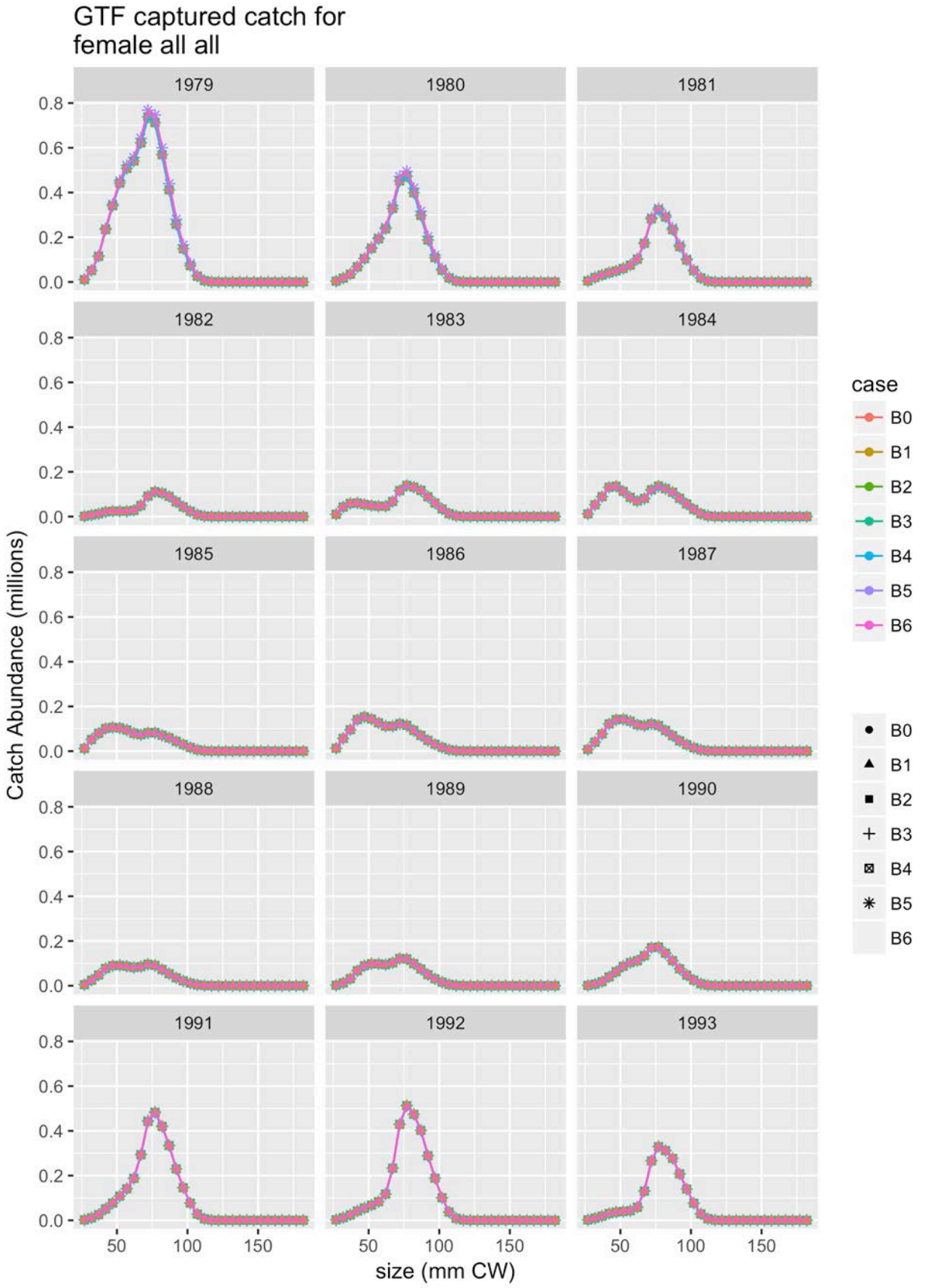


Figure 82. Predicted GTF captured catch abundance for female all all, (3 of 5).

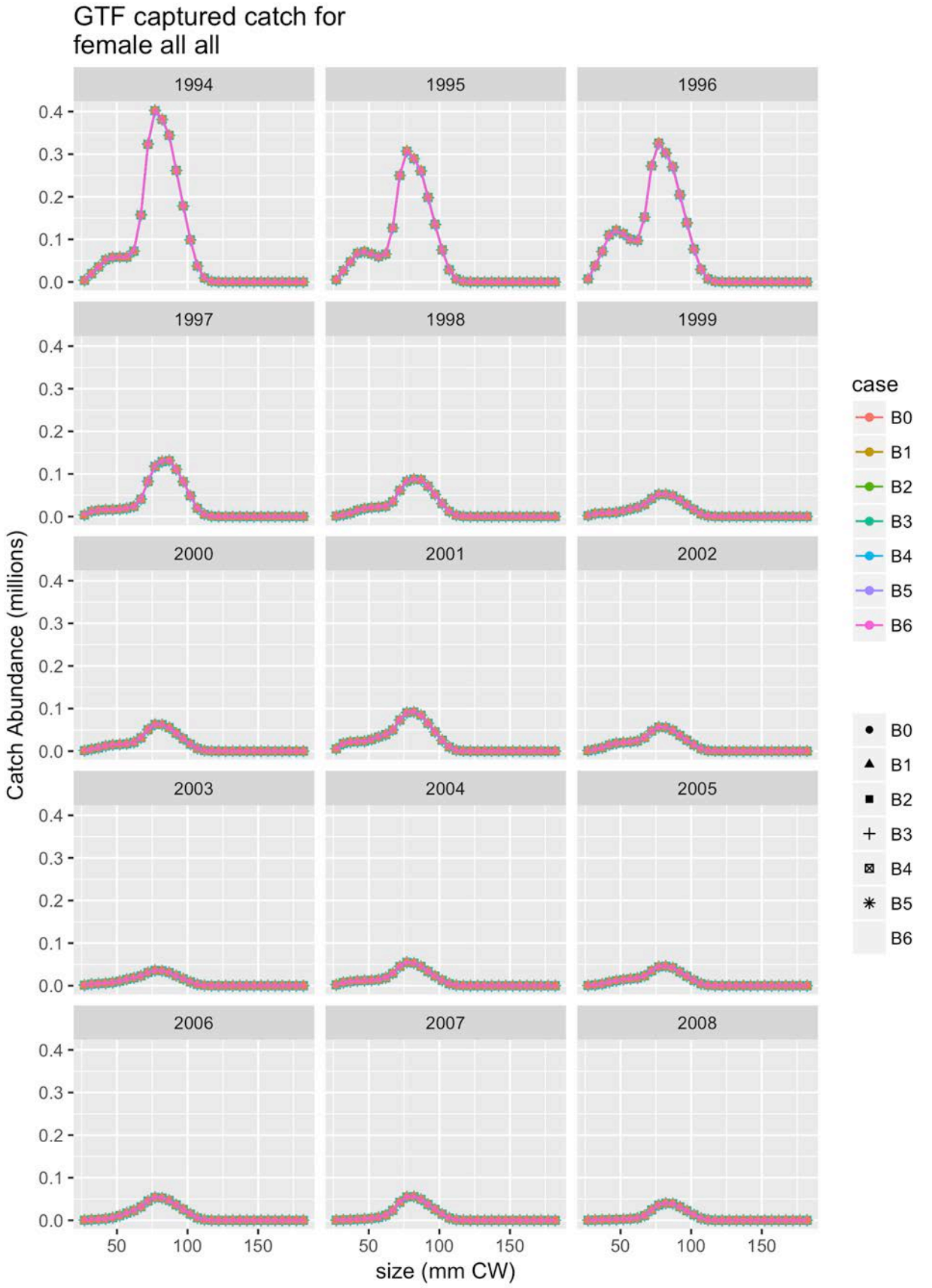


Figure 83. Predicted GTF captured catch abundance for female all all, (4 of 5).

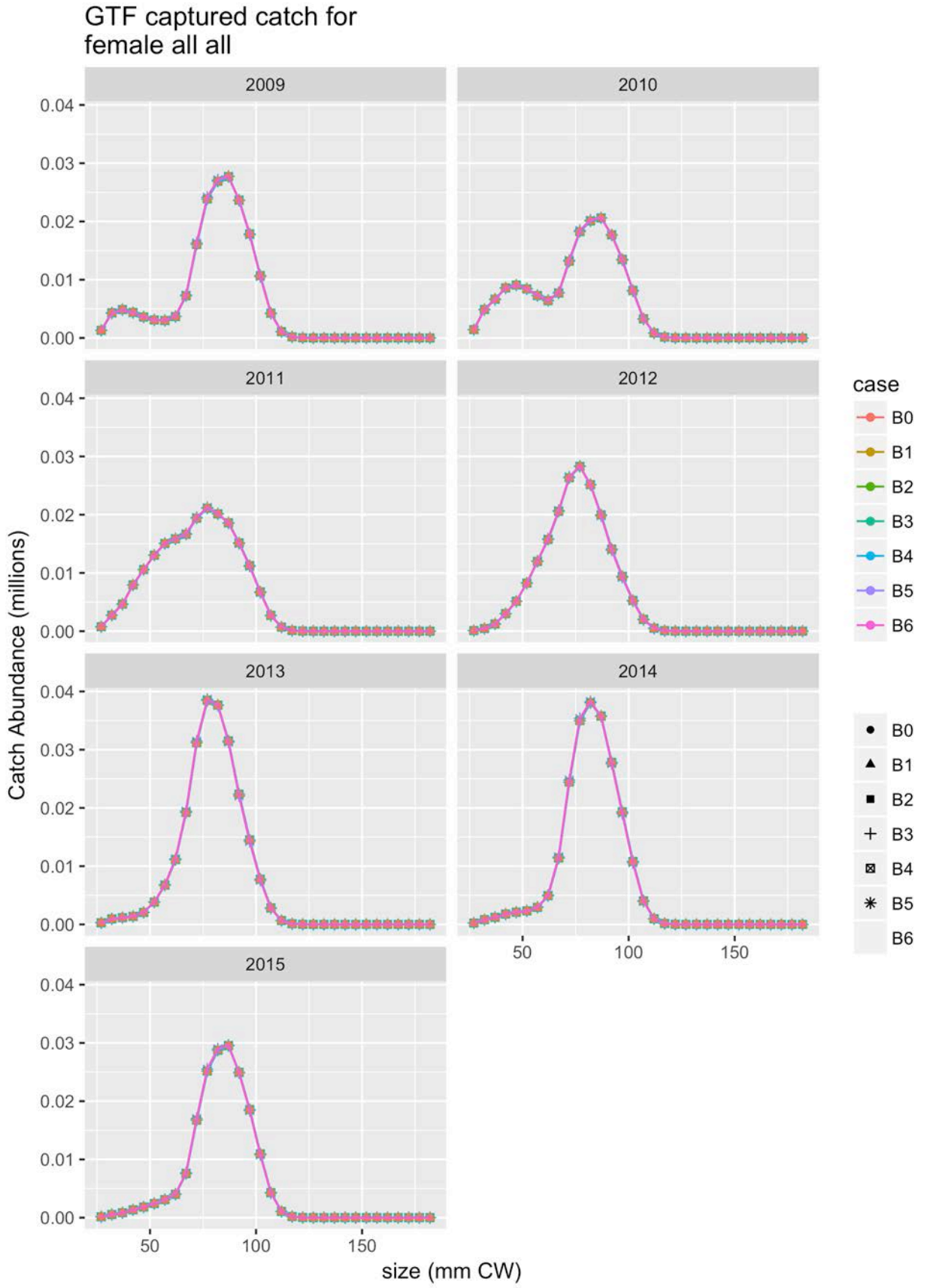


Figure 84. Predicted GTF captured catch abundance for female all all, (5 of 5).

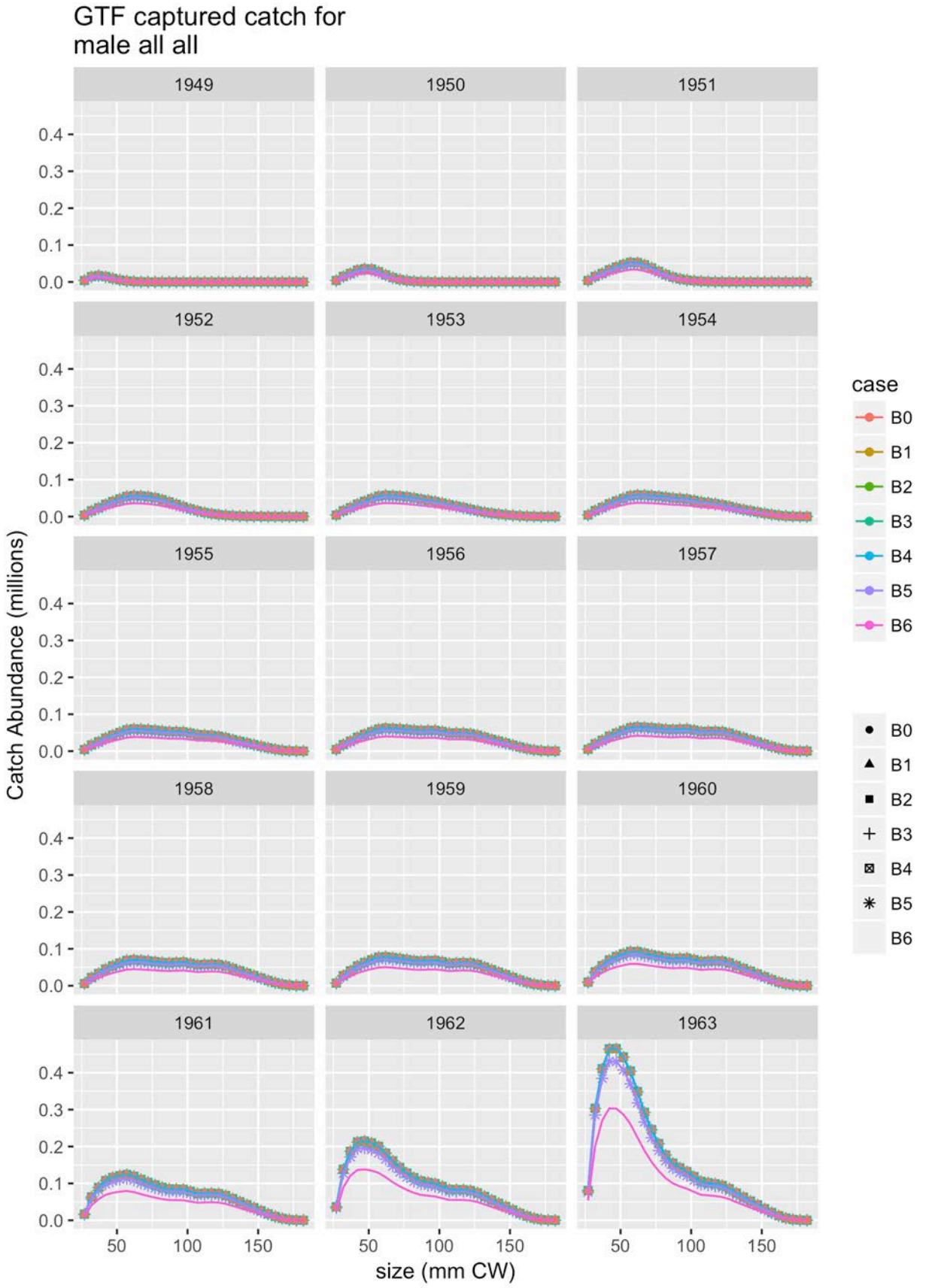


Figure 85. Predicted GTF captured catch abundance for male all all, (1 of 5).

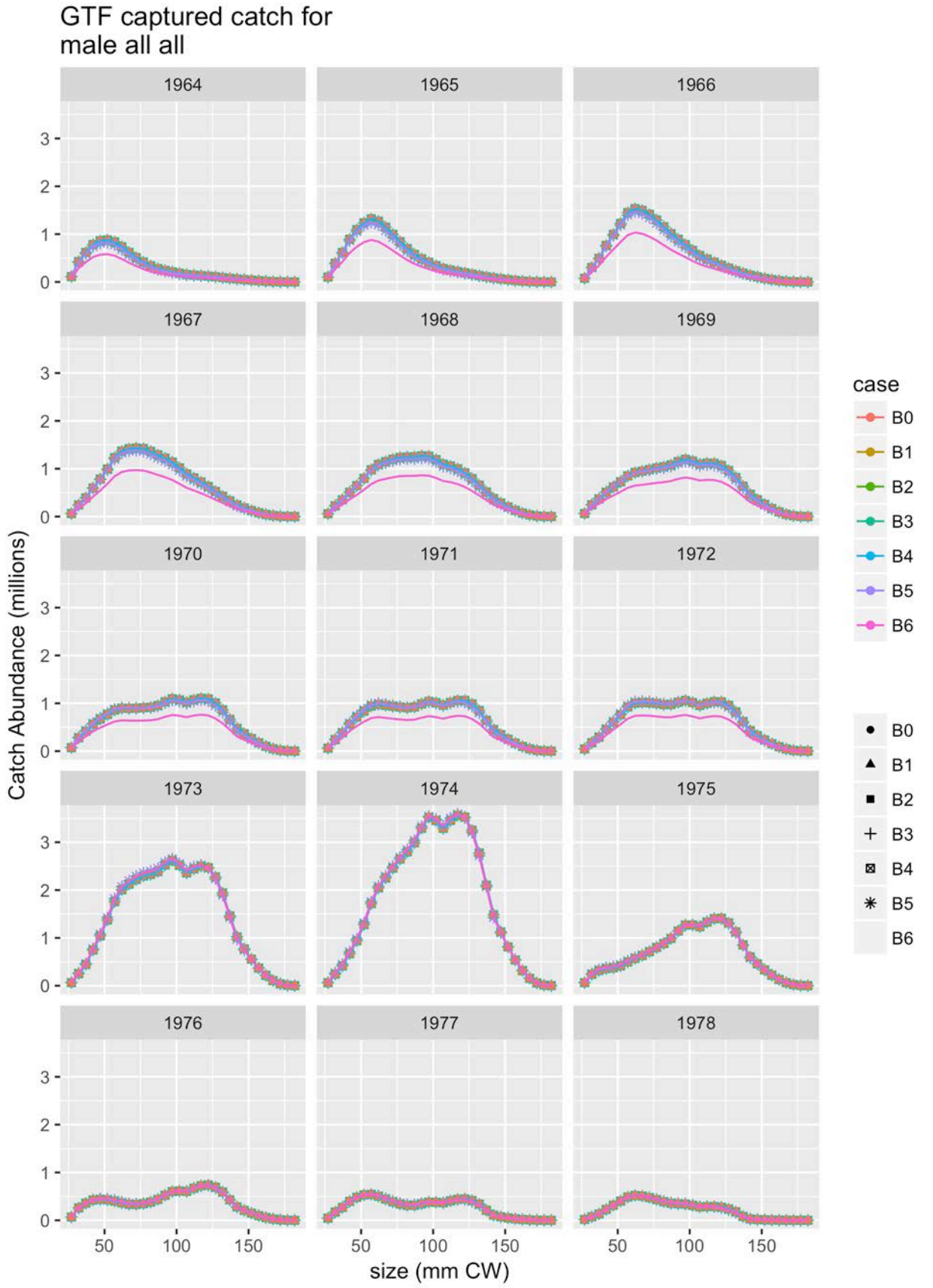


Figure 86. Predicted GTF captured catch abundance for male all all, (2 of 5).

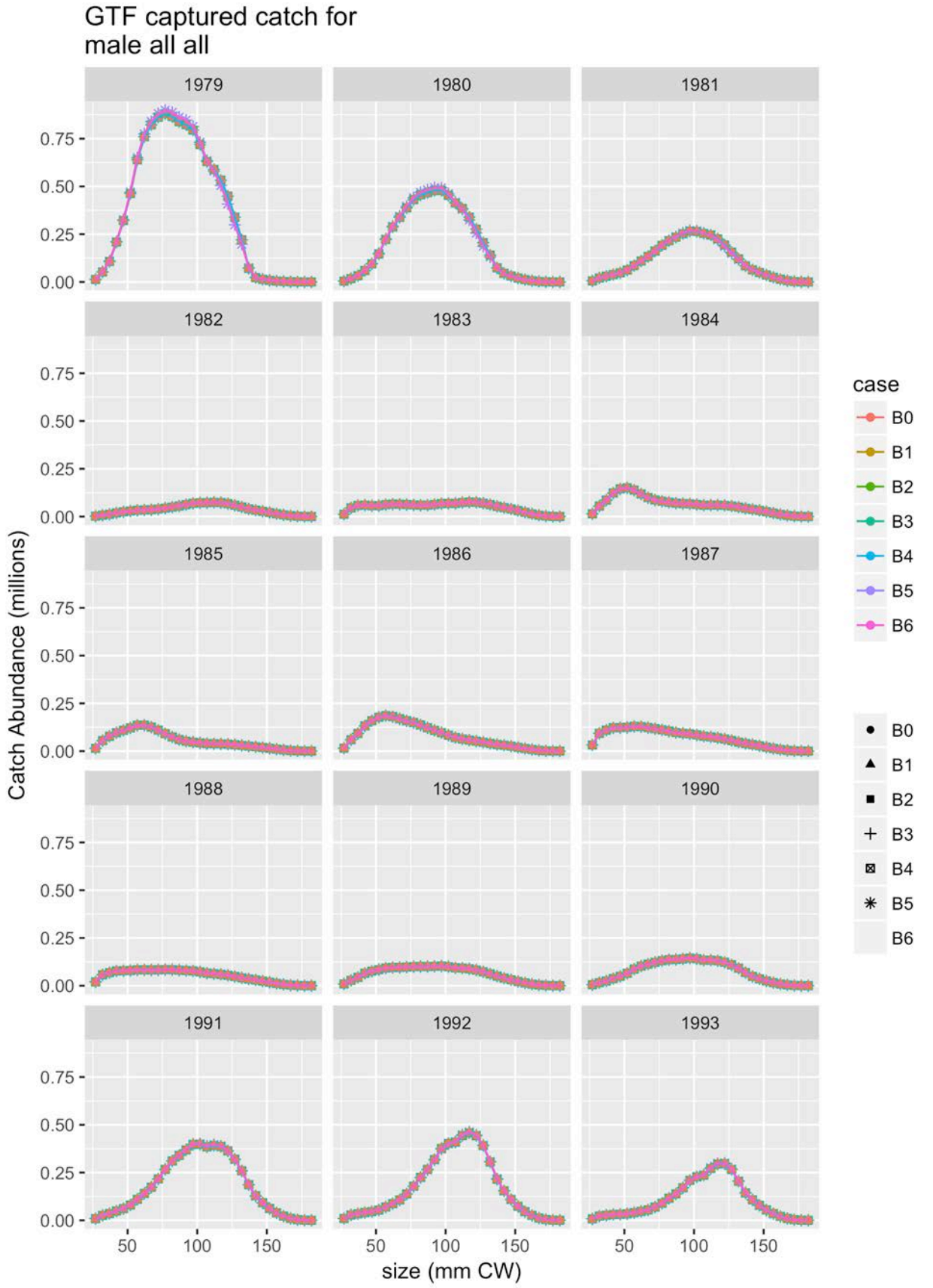


Figure 87. Predicted GTF captured catch abundance for male all all, (3 of 5).

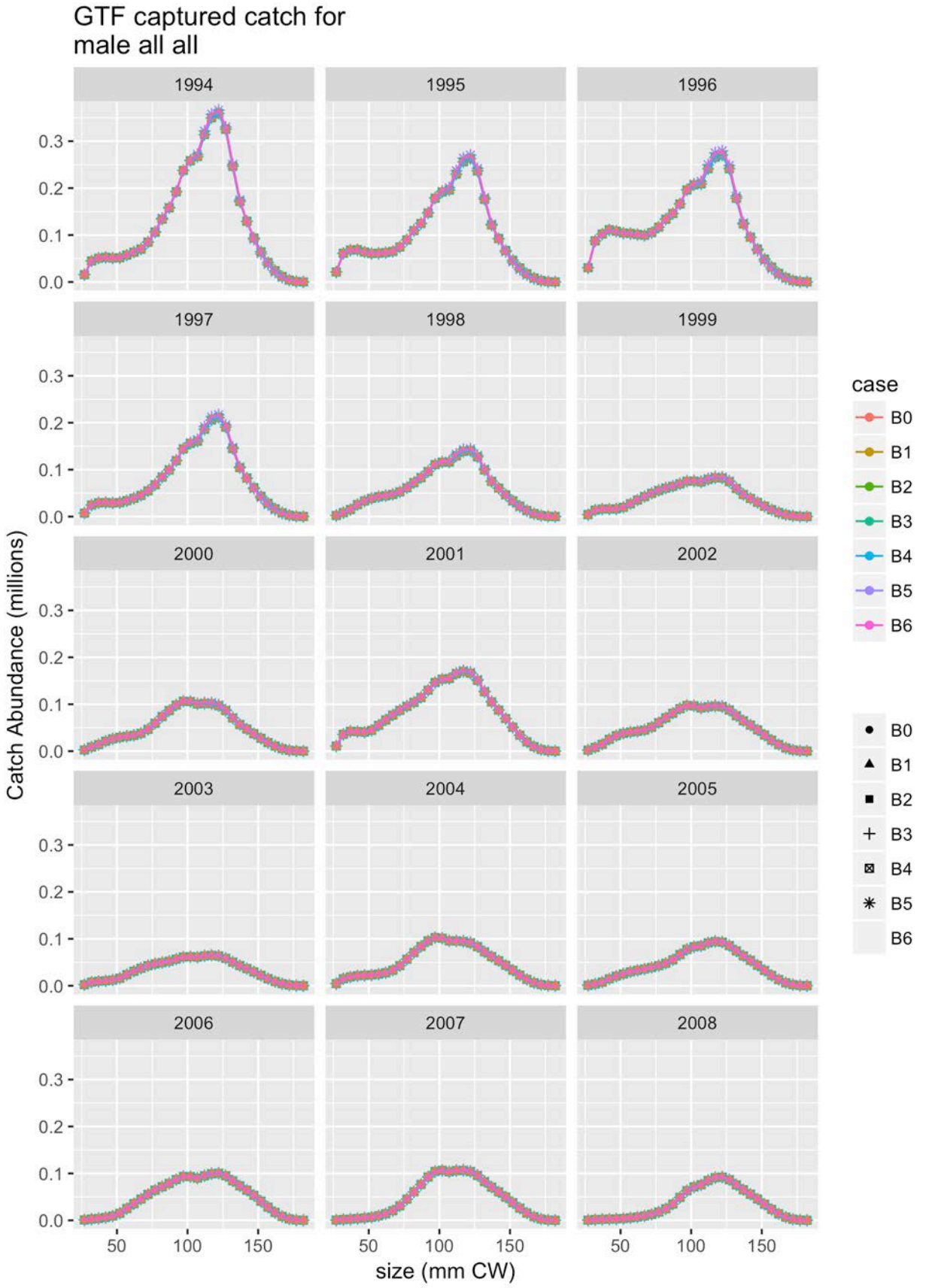


Figure 88. Predicted GTF captured catch abundance for male all all, (4 of 5).

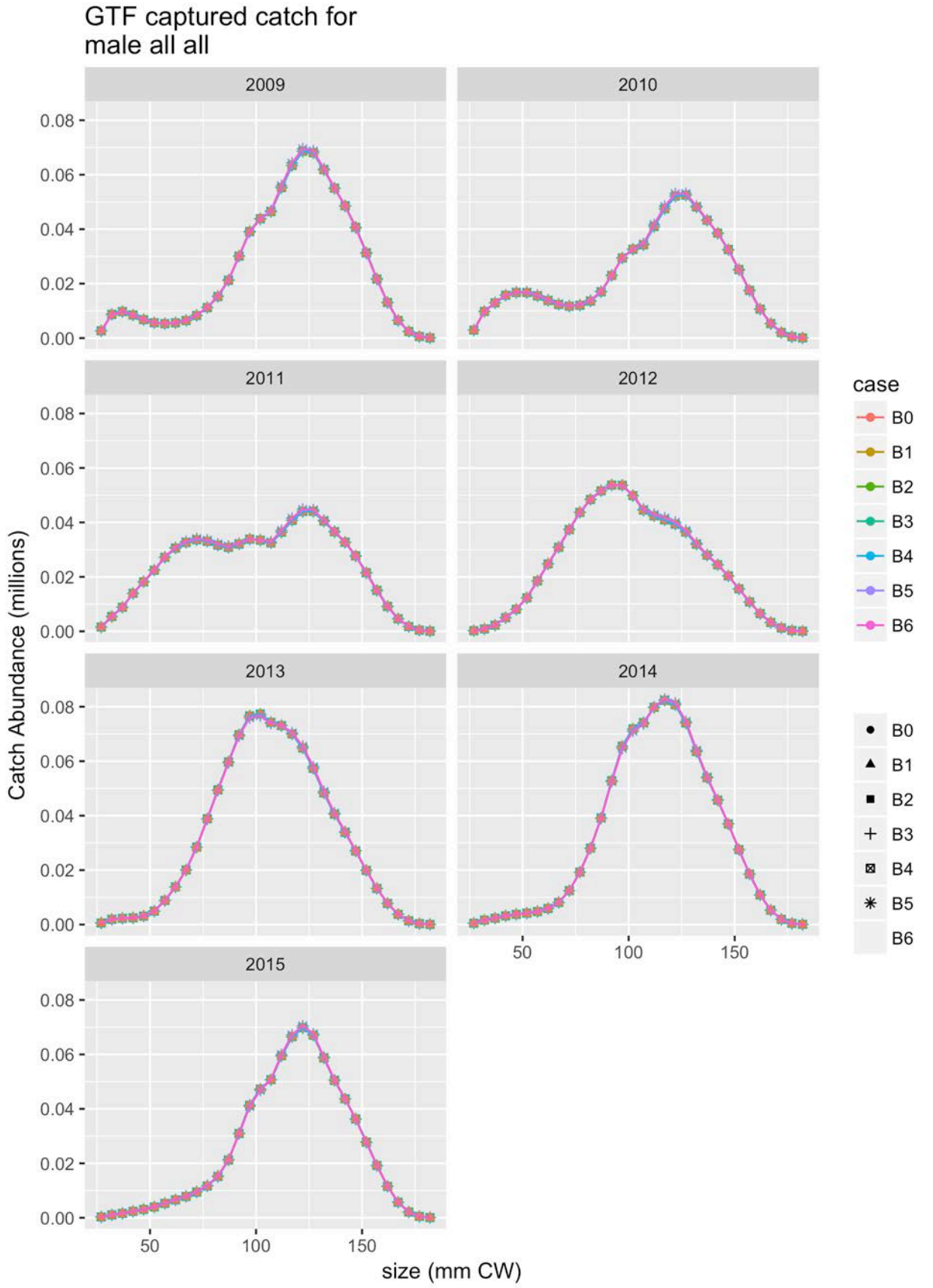


Figure 89. Predicted GTF captured catch abundance for male all all, (5 of 5).

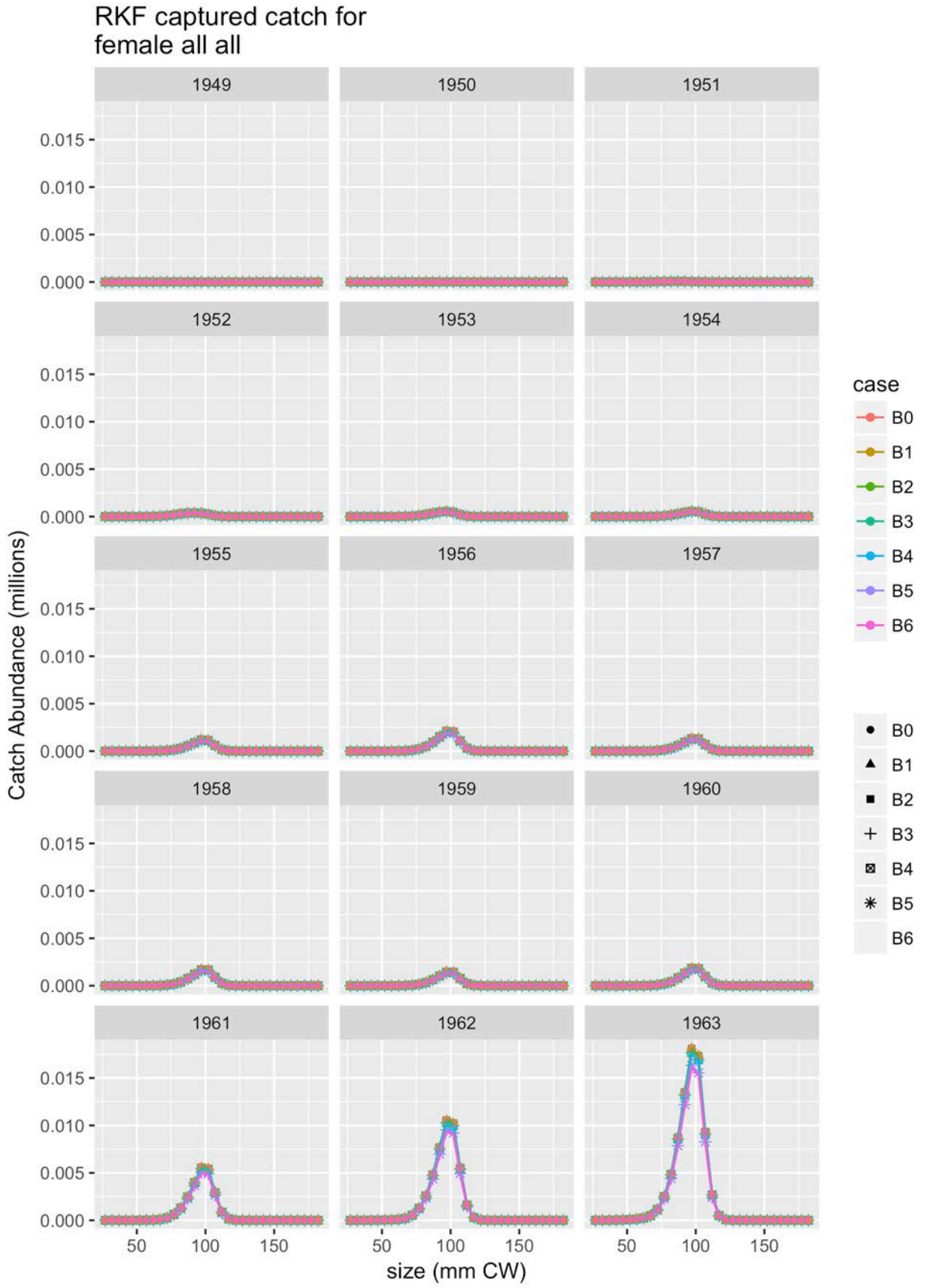


Figure 90. Predicted RKF captured catch abundance for female all all, (1 of 5).

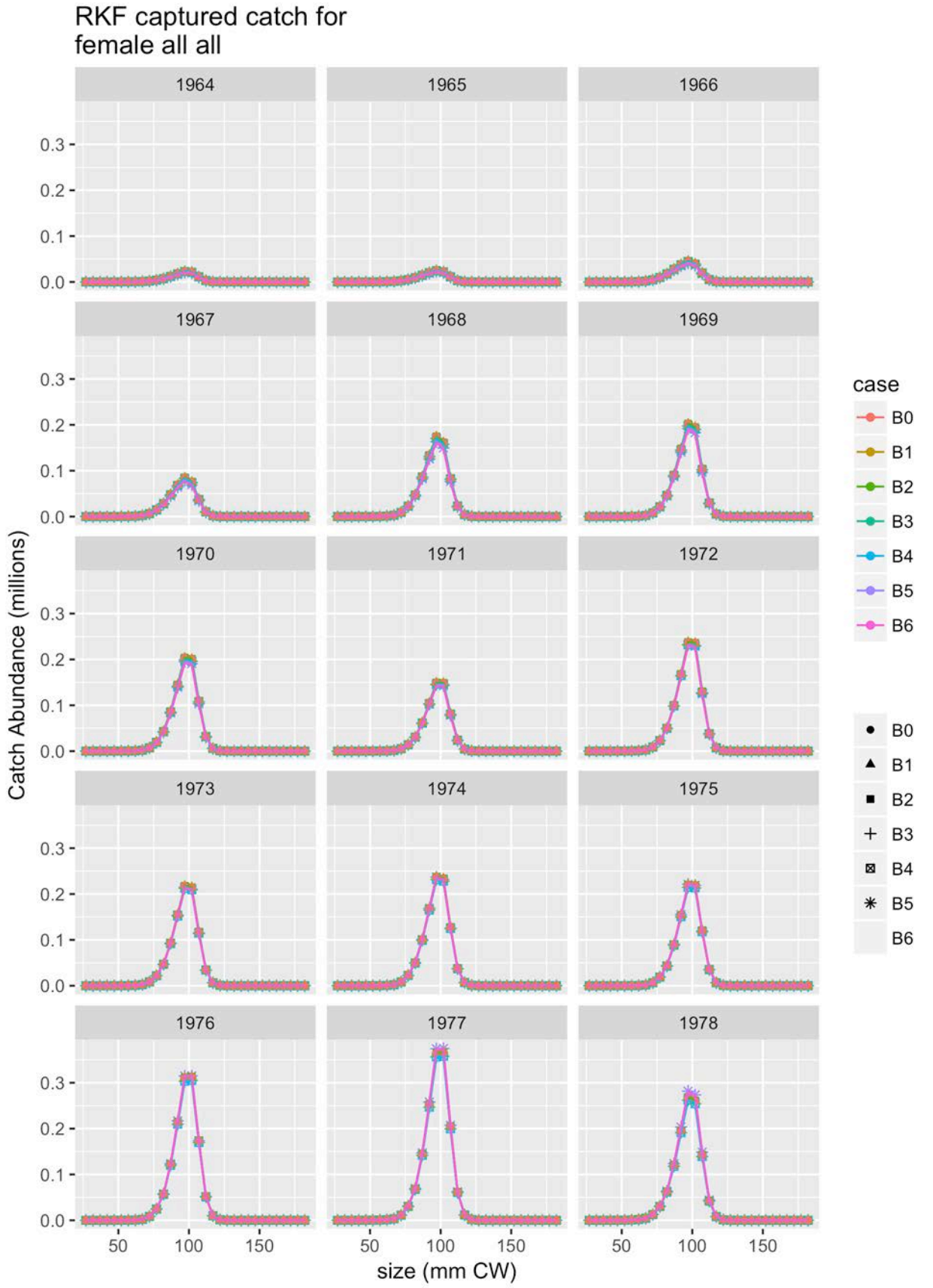


Figure 91. Predicted RKF captured catch abundance for female all all, (2 of 5).

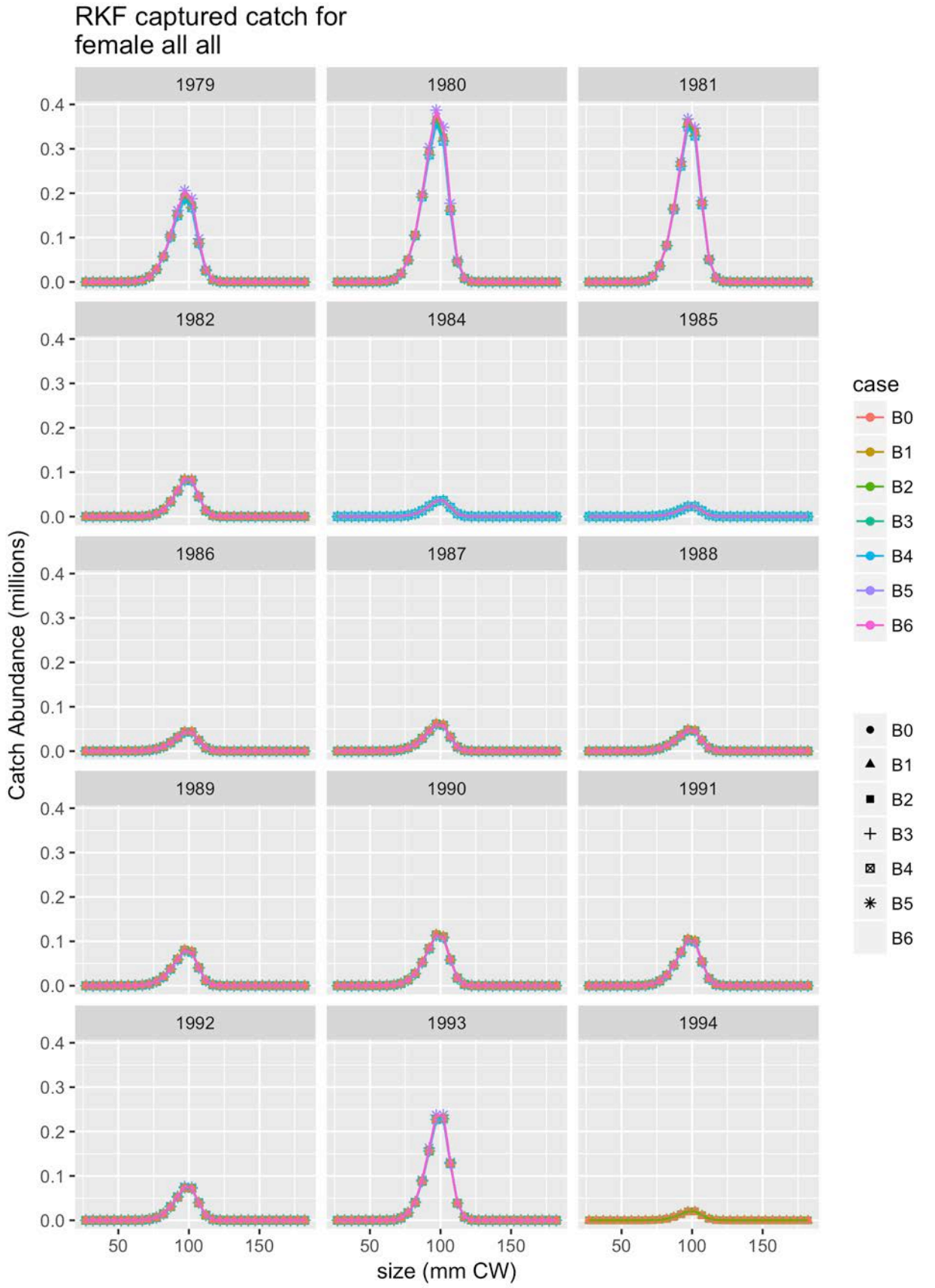


Figure 92. Predicted RKF captured catch abundance for female all all, (3 of 5).

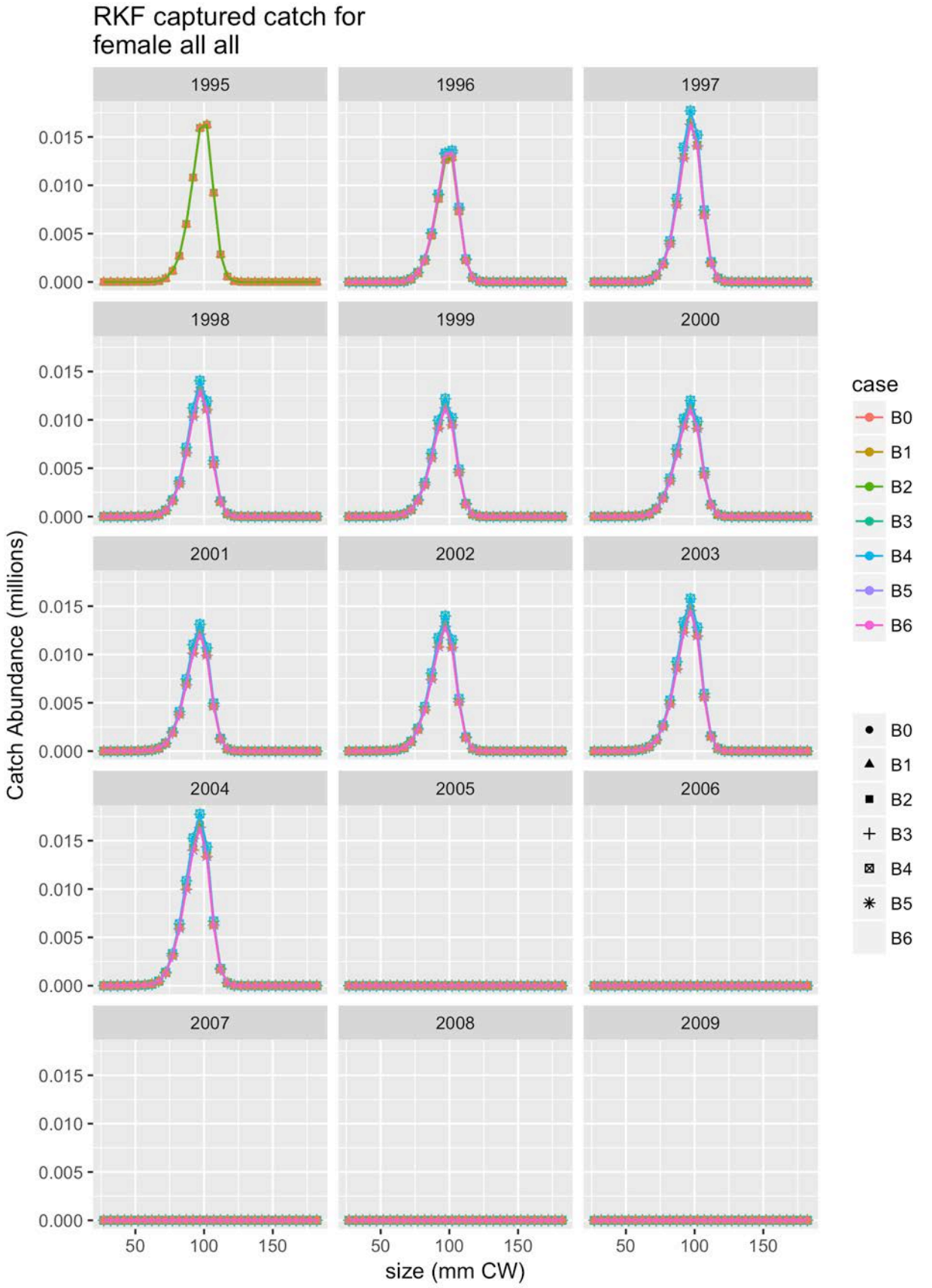


Figure 93. Predicted RKF captured catch abundance for female all all, (4 of 5).

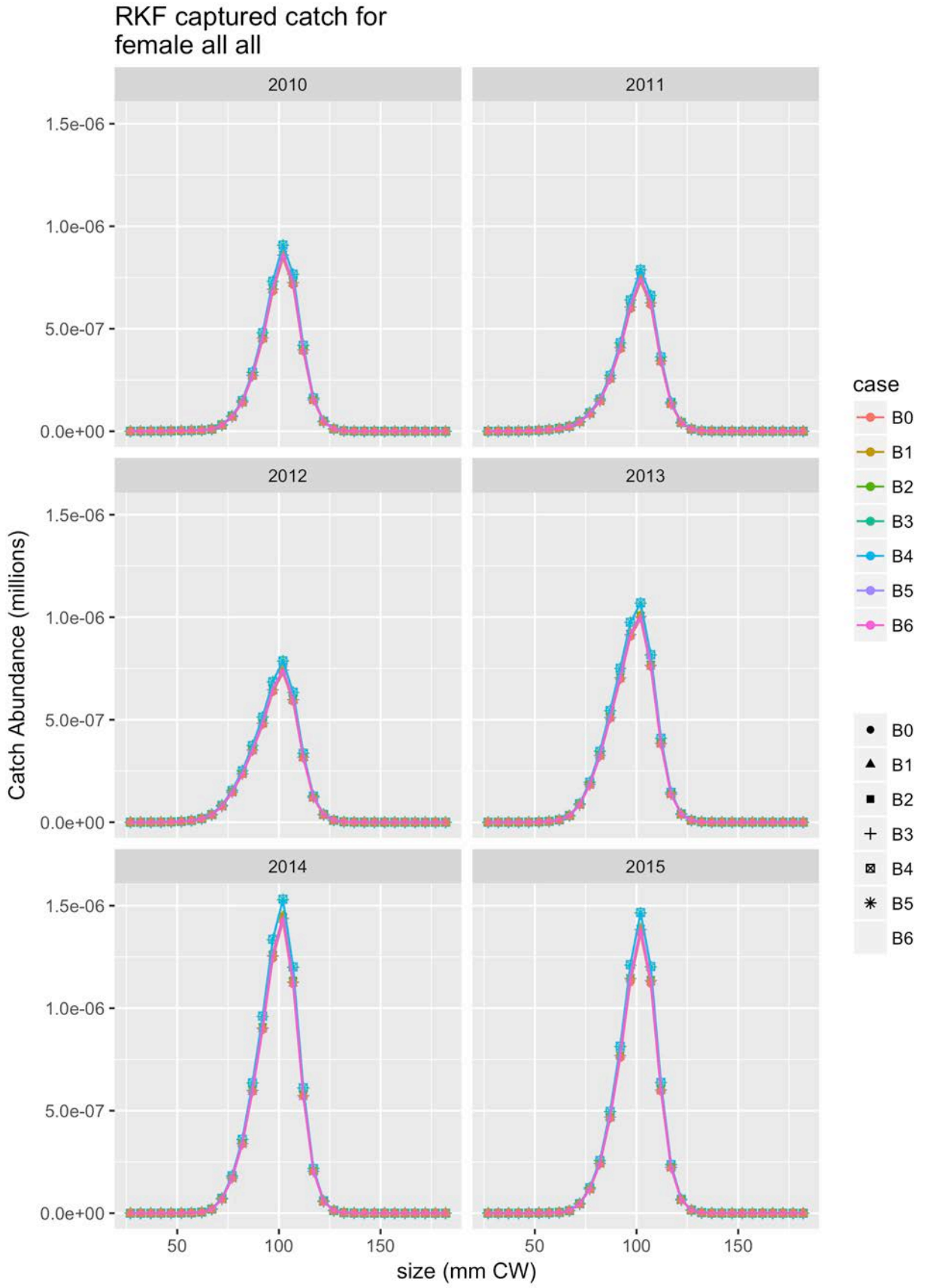


Figure 94. Predicted RKF captured catch abundance for female all all, (5 of 5).

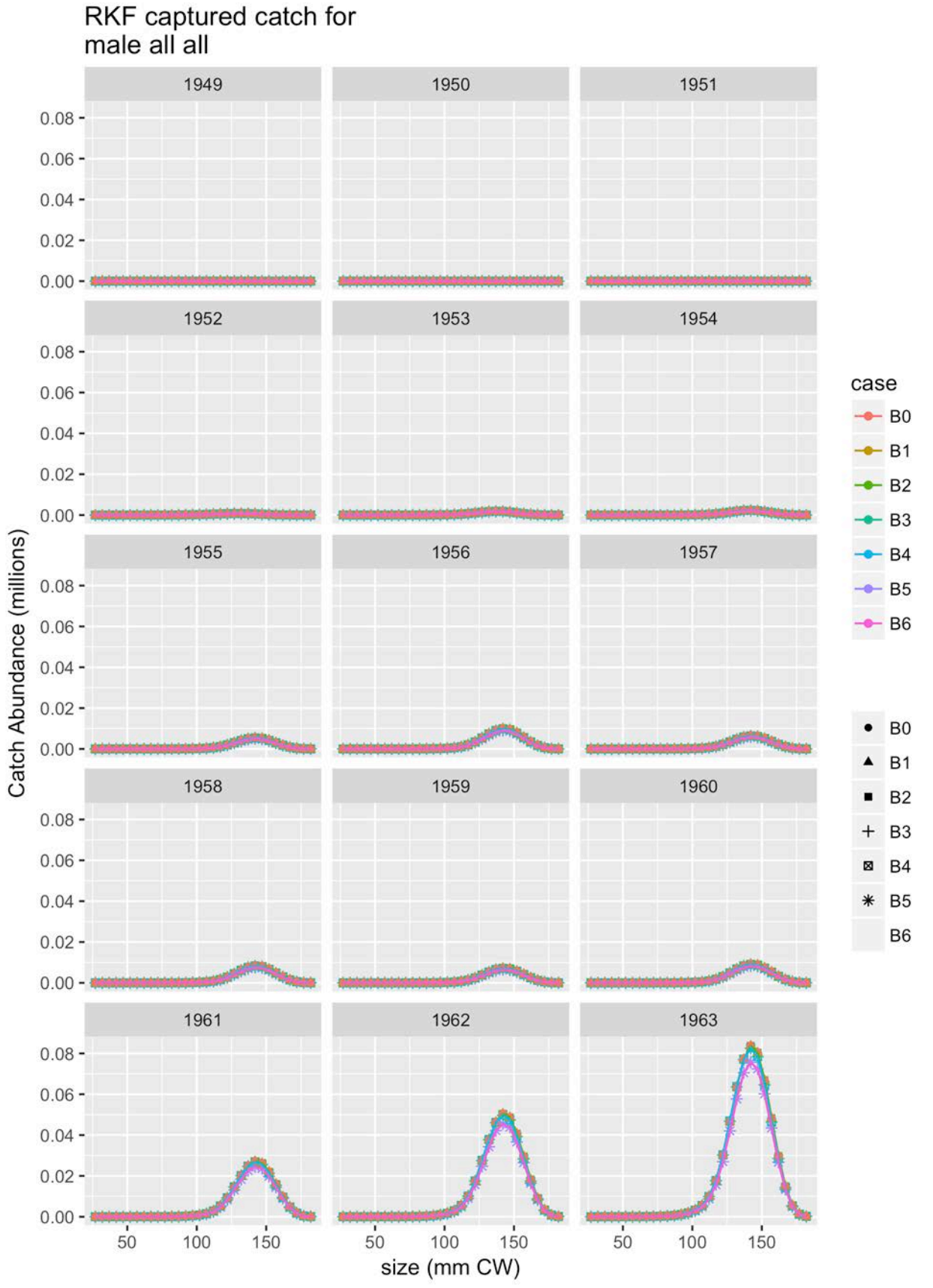


Figure 95. Predicted RKF captured catch abundance for male all all, (1 of 5).

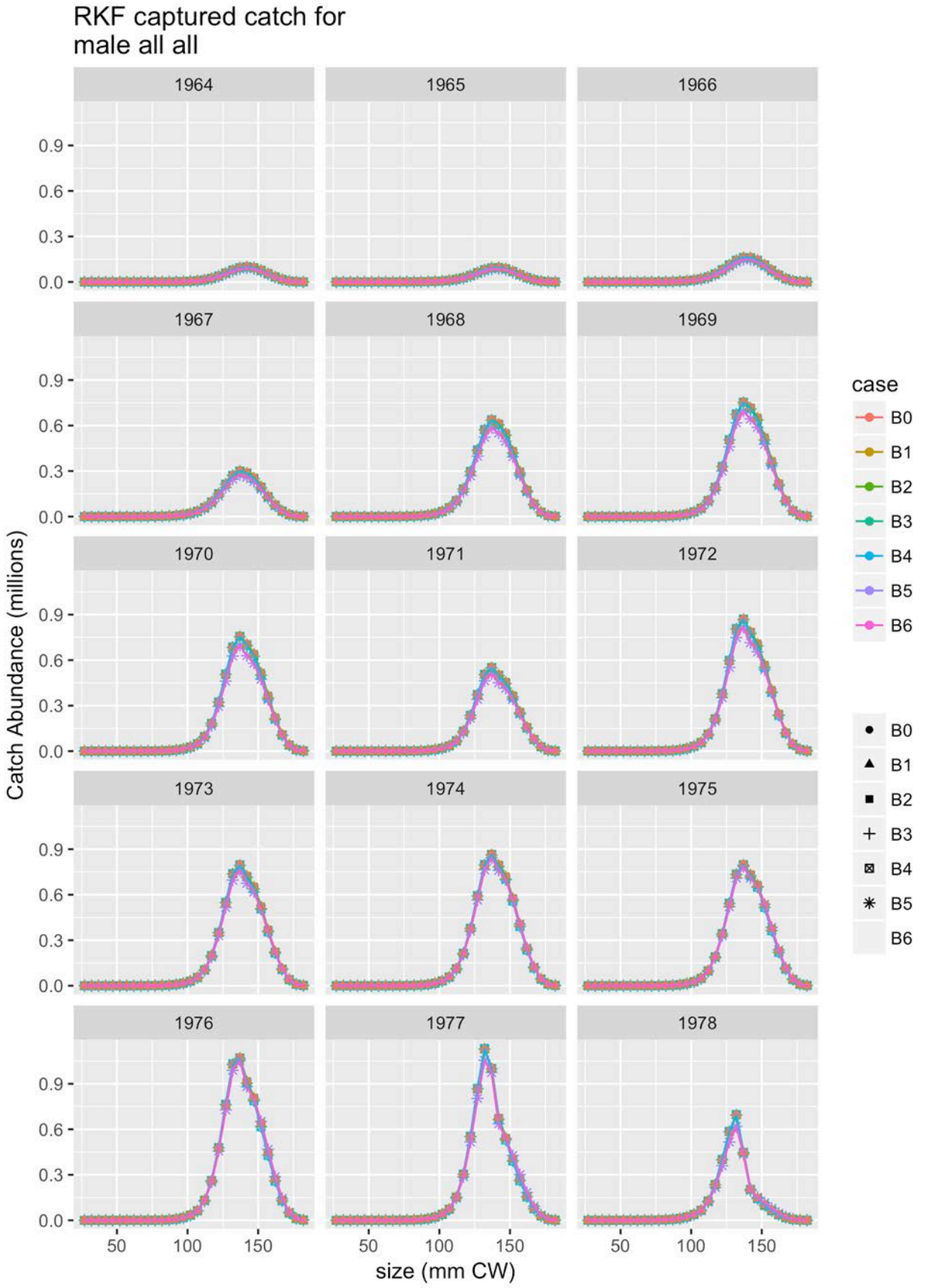


Figure 96. Predicted RKF captured catch abundance for male all all, (2 of 5).

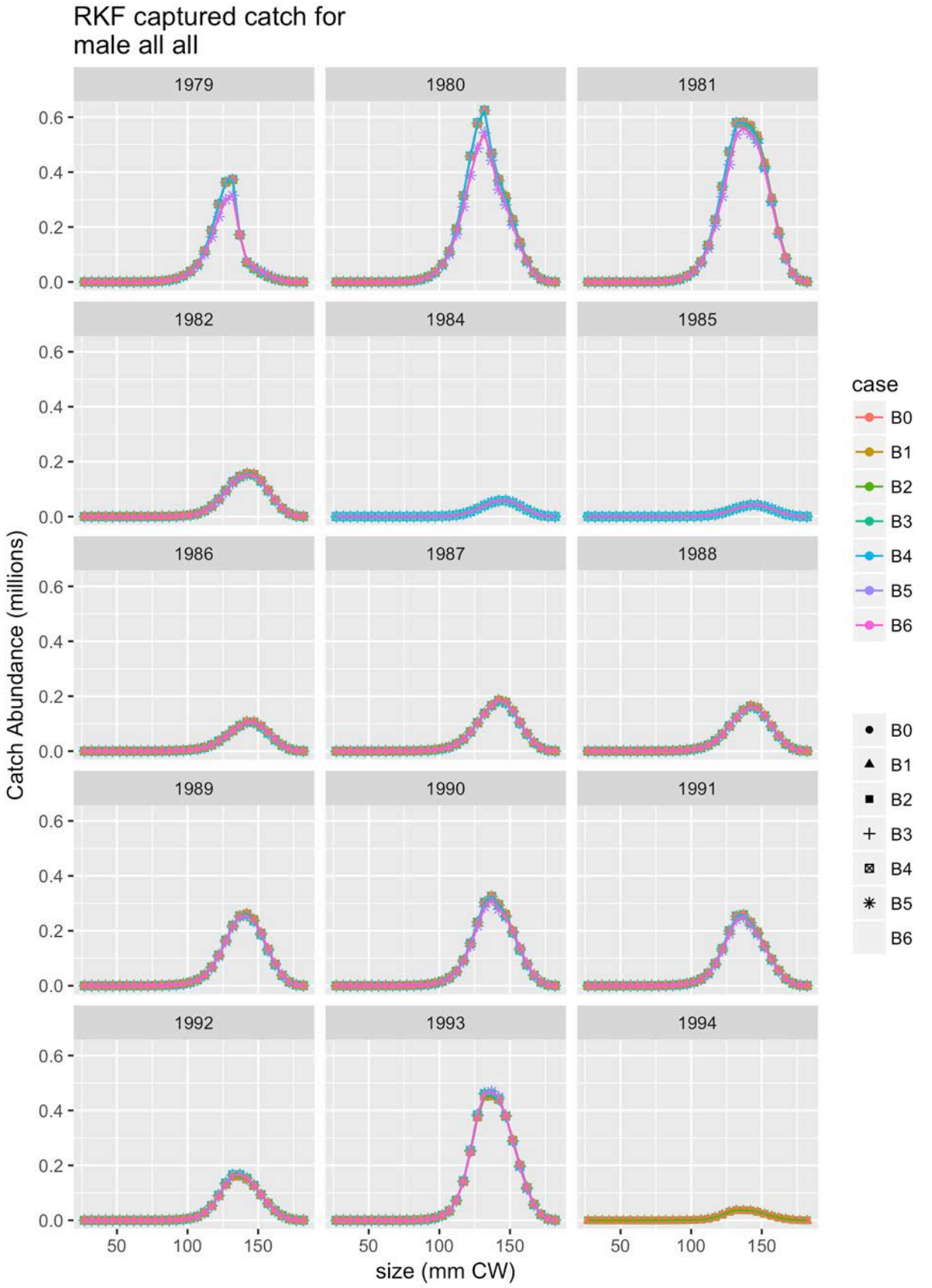


Figure 97. Predicted RKF captured catch abundance for male all all, (3 of 5).

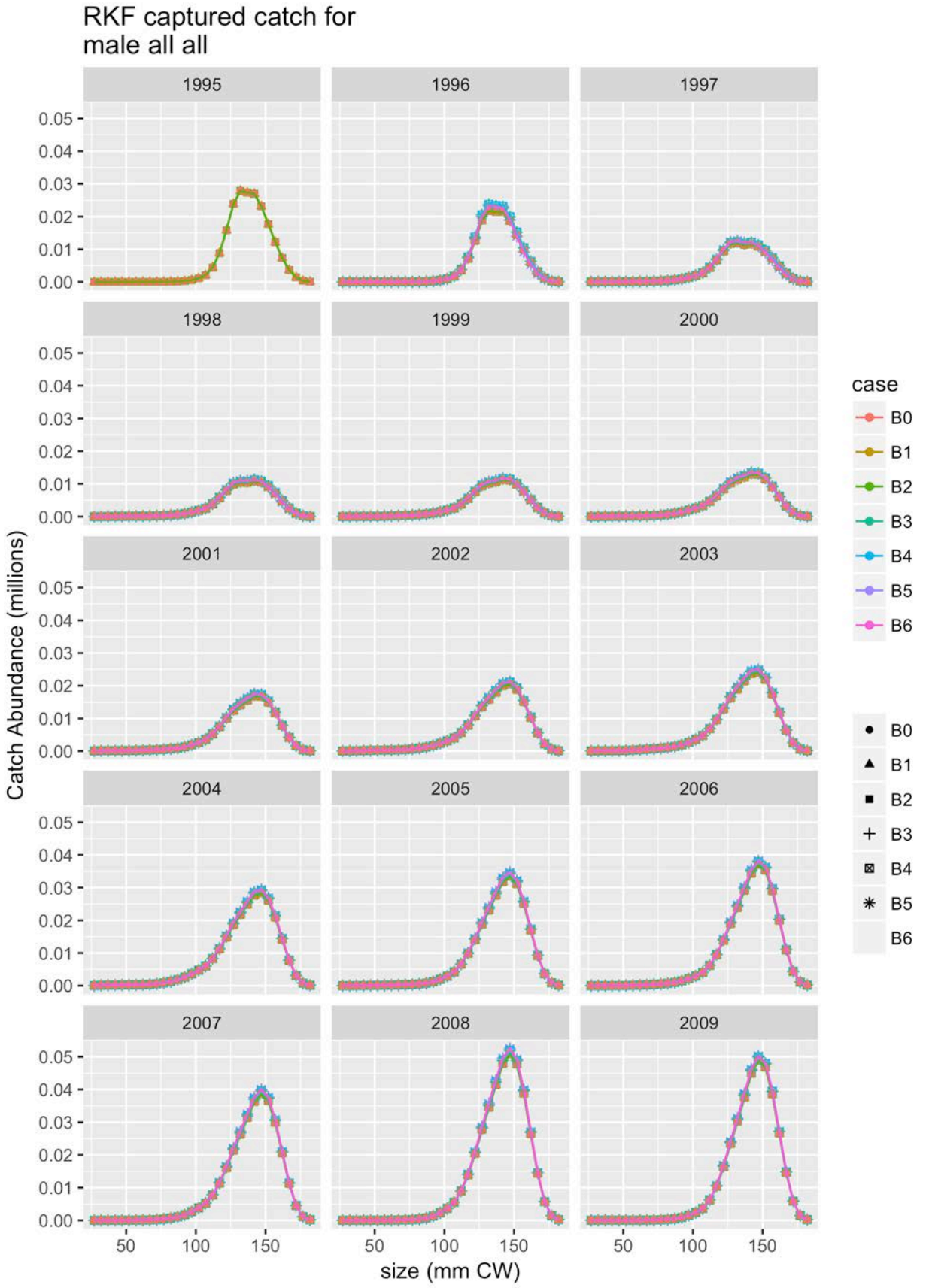


Figure 98. Predicted RKF captured catch abundance for male all all, (4 of 5).

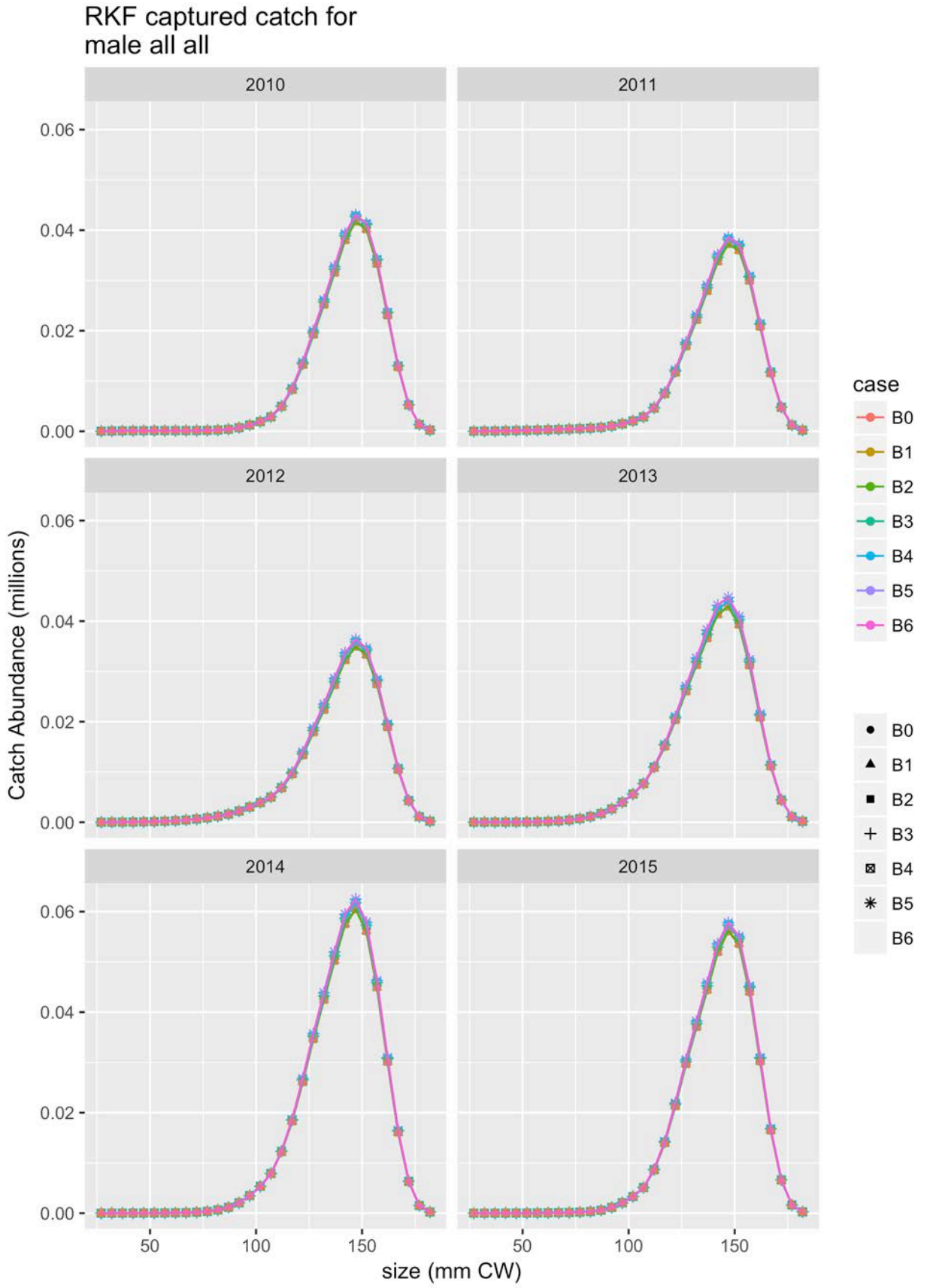


Figure 99. Predicted RKF captured catch abundance for male all all, (5 of 5).

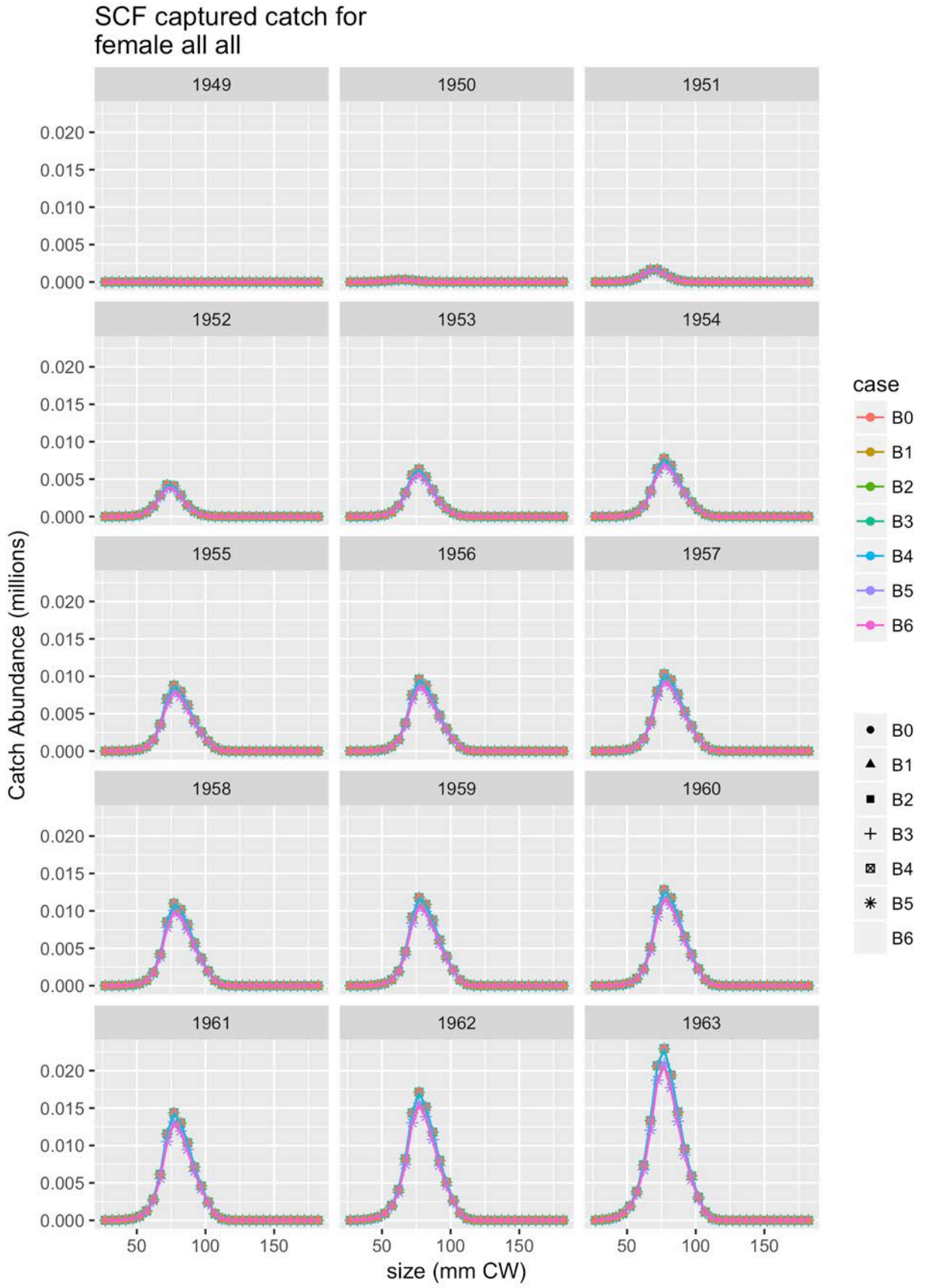


Figure 100. Predicted SCF captured catch abundance for female all all, (1 of 5).

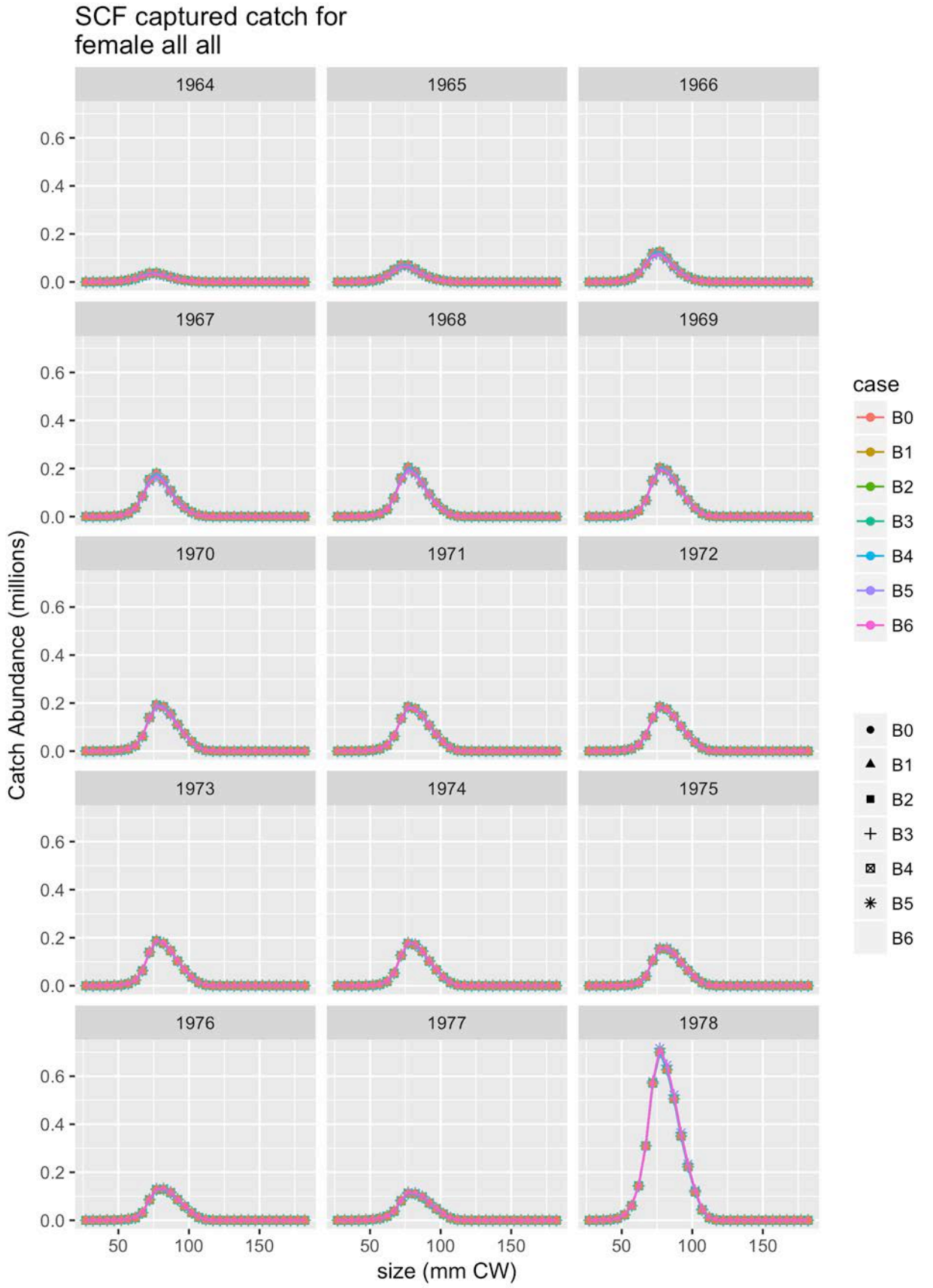


Figure 101. Predicted SCF captured catch abundance for female all all, (2 of 5).

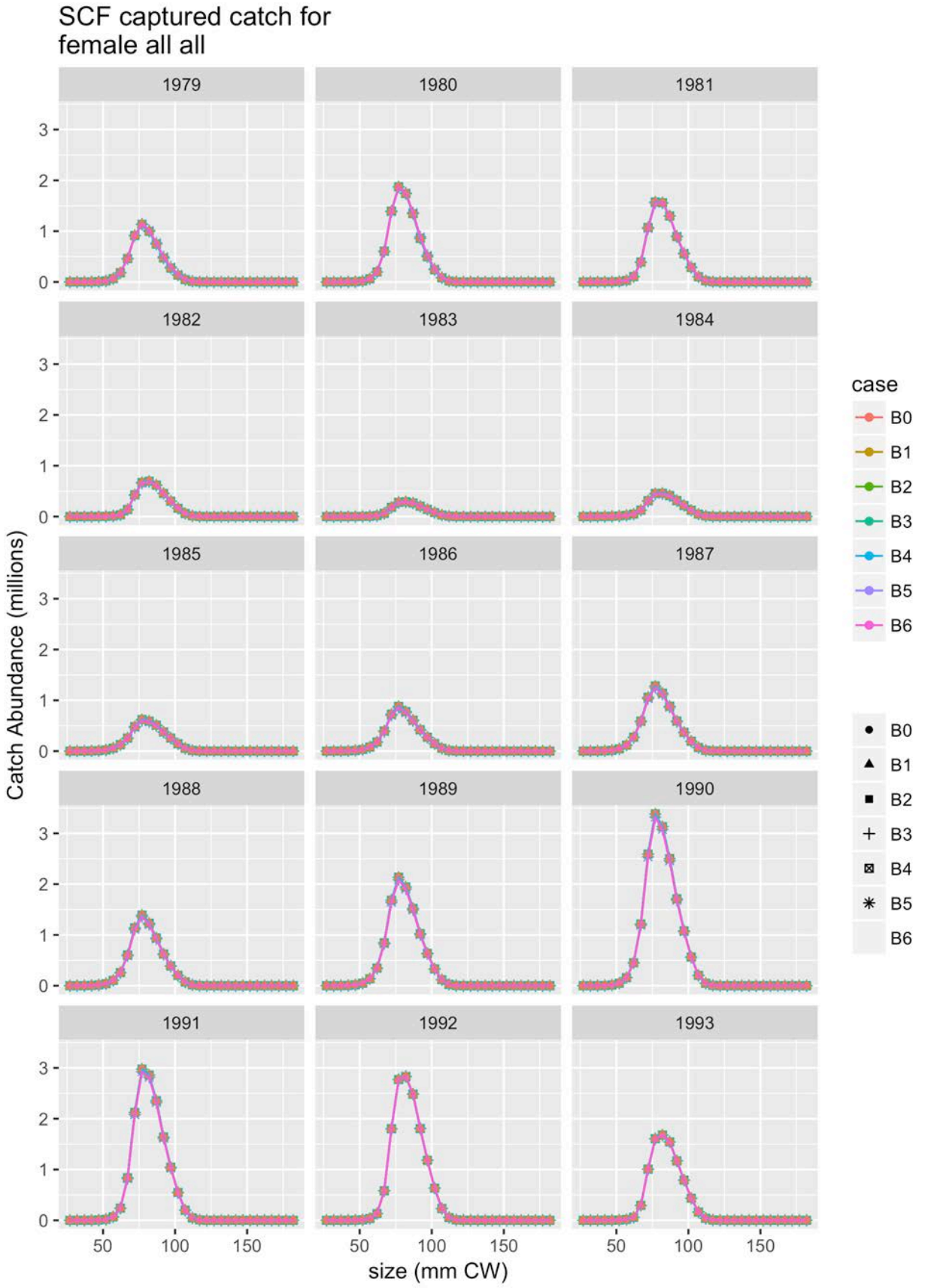


Figure 102. Predicted SCF captured catch abundance for female all all, (3 of 5).

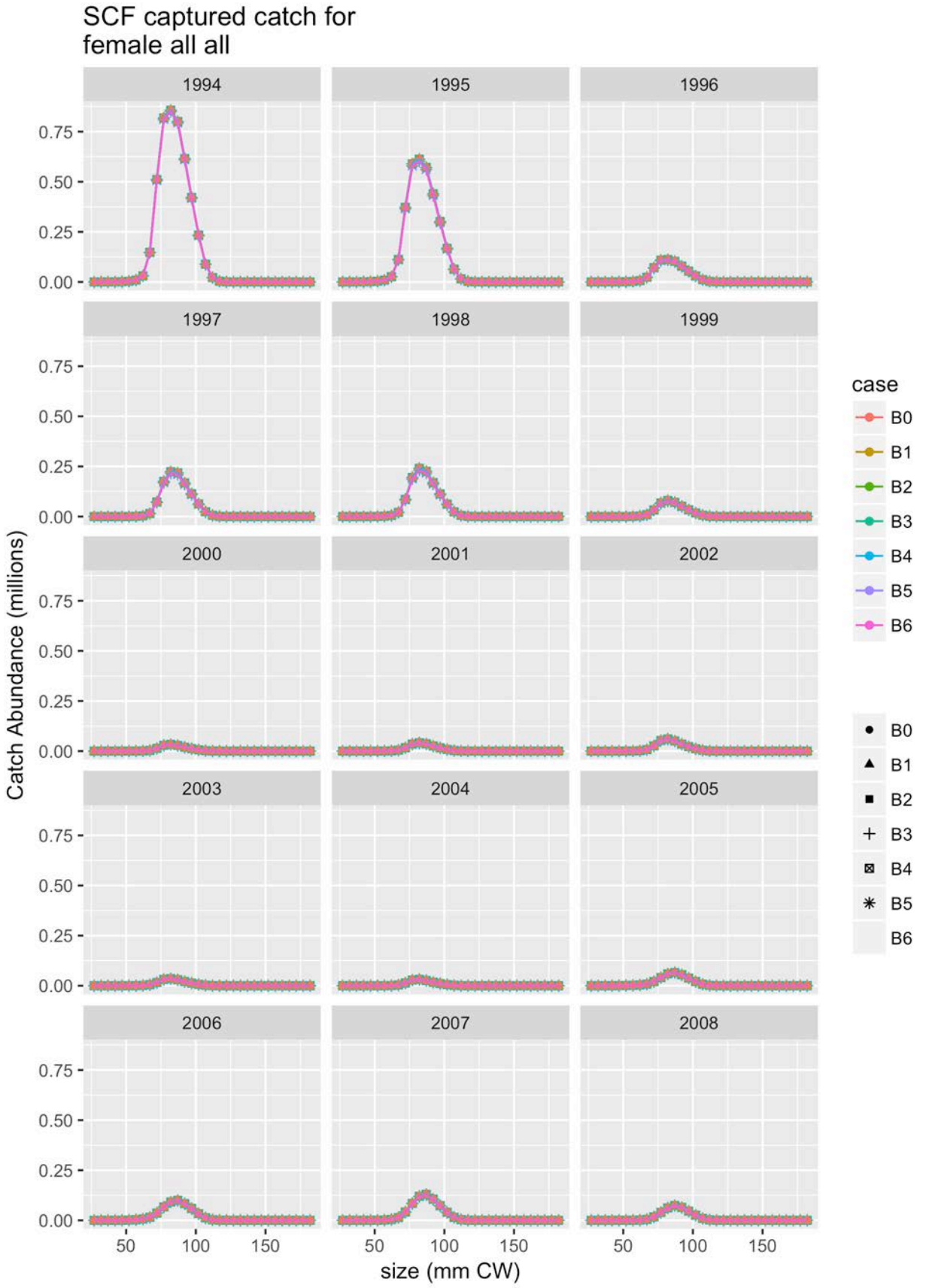


Figure 103. Predicted SCF captured catch abundance for female all all, (4 of 5).

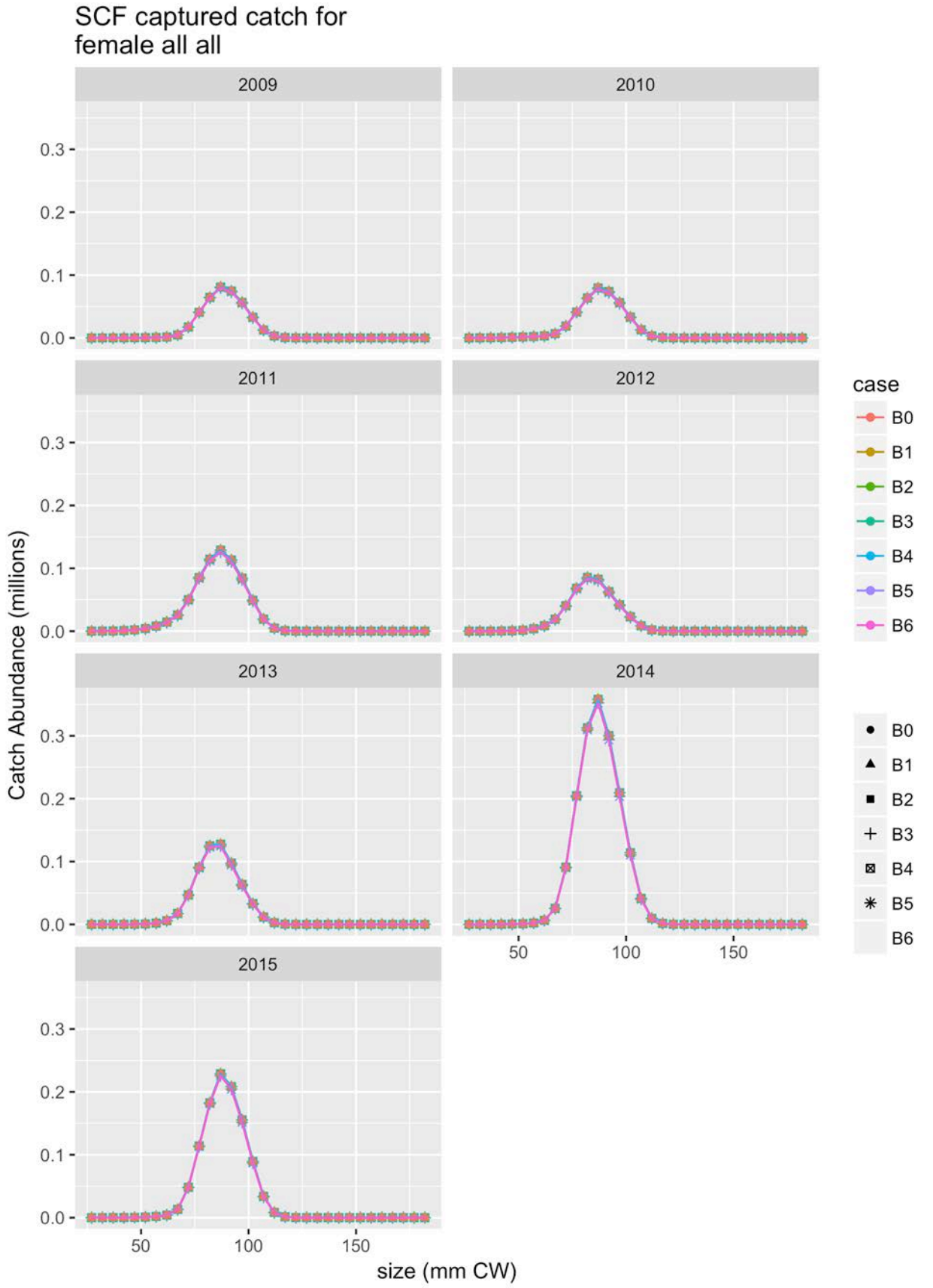


Figure 104. Predicted SCF captured catch abundance for female all all, (5 of 5).

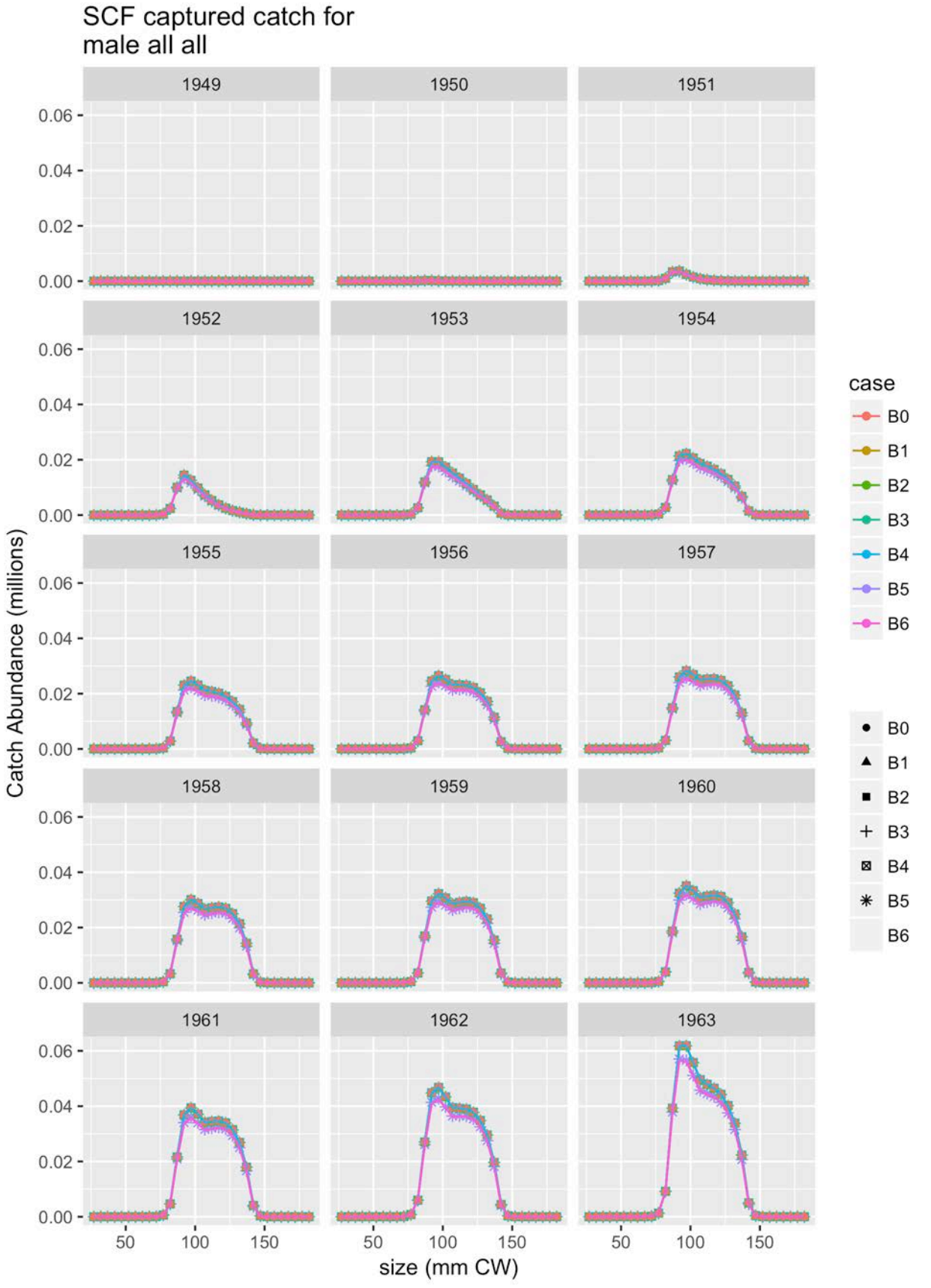


Figure 105. Predicted SCF captured catch abundance for male all all, (1 of 5).

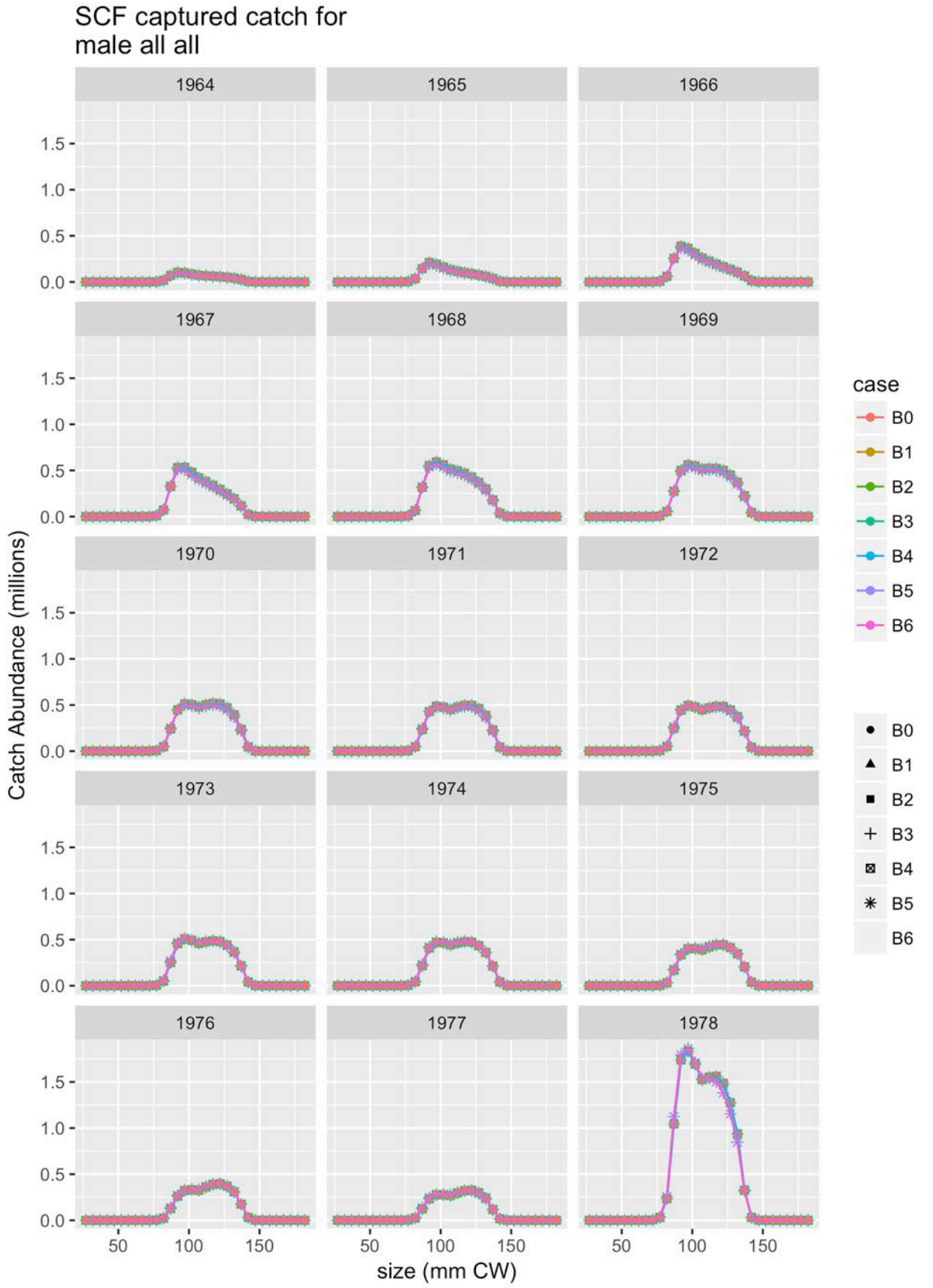


Figure 106. Predicted SCF captured catch abundance for male all all, (2 of 5).

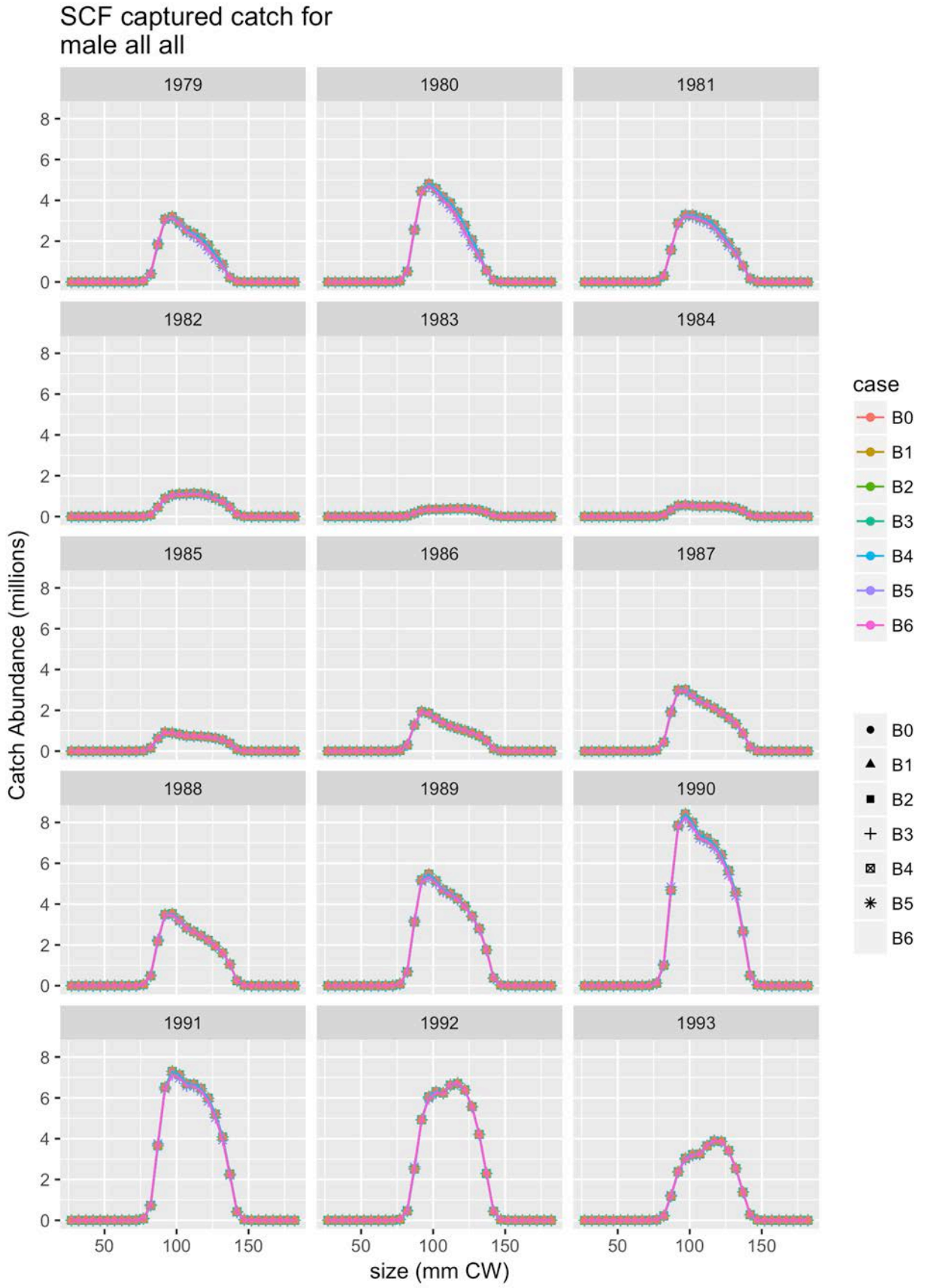


Figure 107. Predicted SCF captured catch abundance for male all all, (3 of 5).

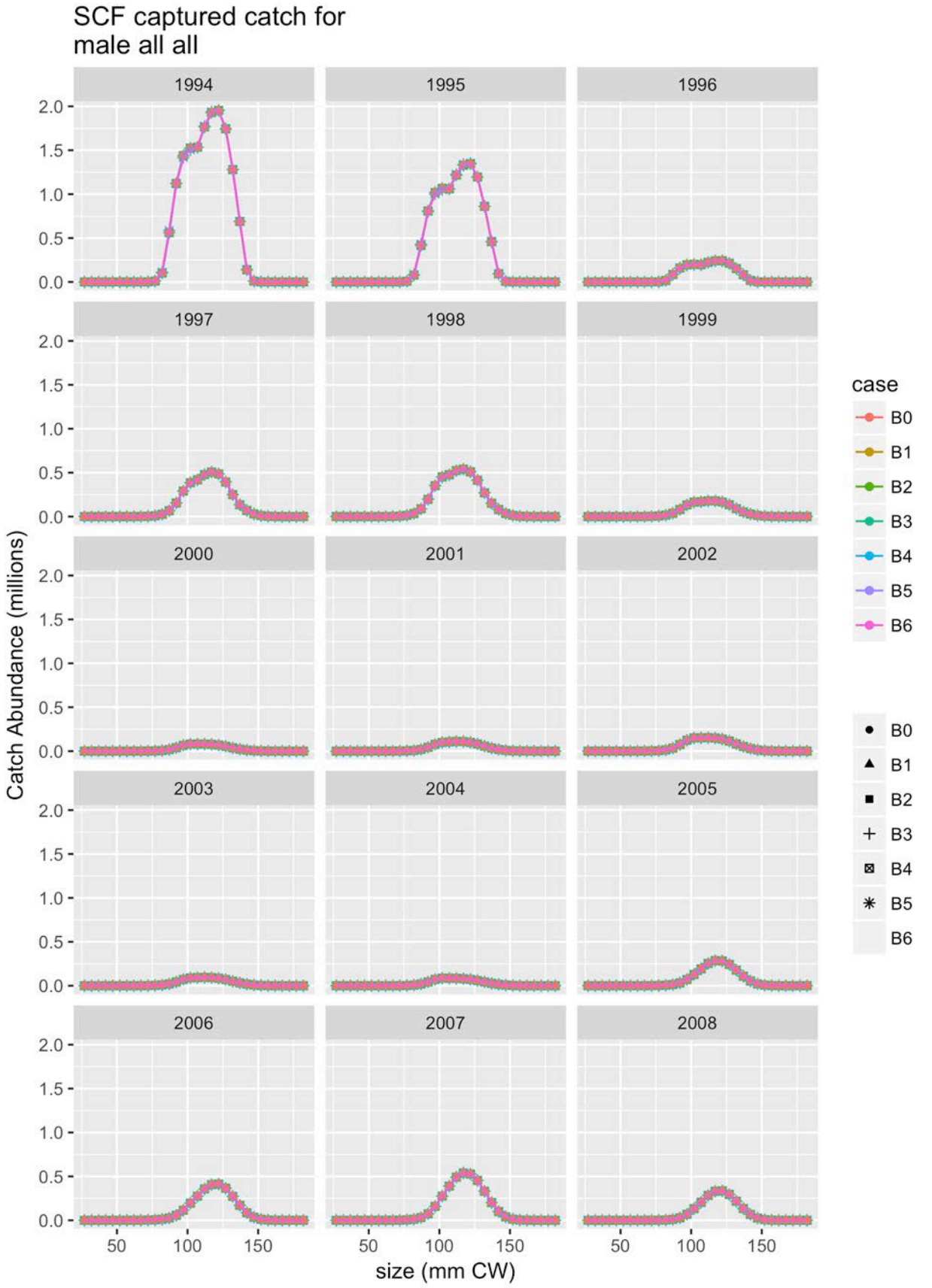


Figure 108. Predicted SCF captured catch abundance for male all all, (4 of 5).

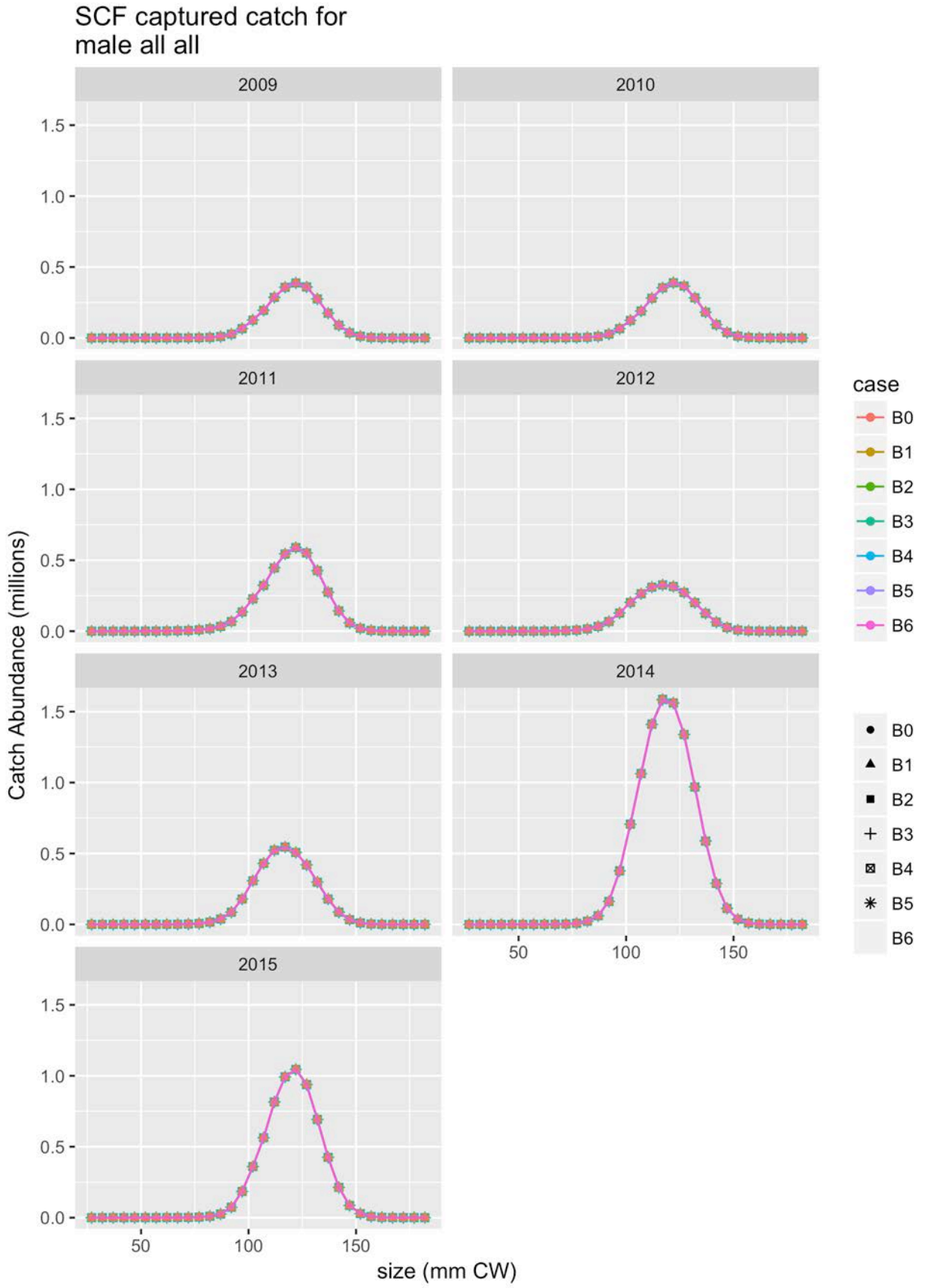


Figure 109. Predicted SCF captured catch abundance for male all all, (5 of 5).

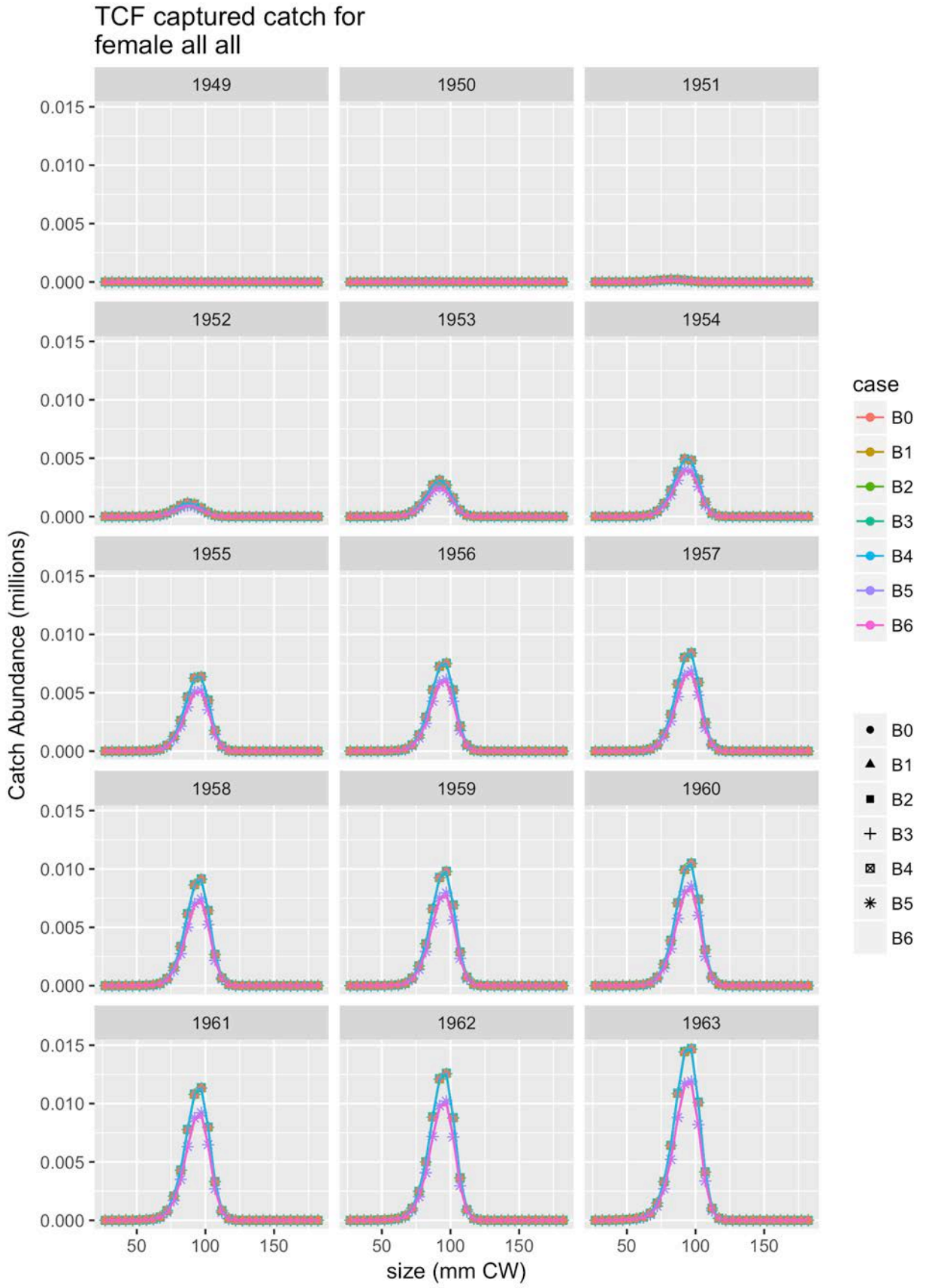


Figure 110. Predicted TCF captured catch abundance for female all all, (1 of 4).

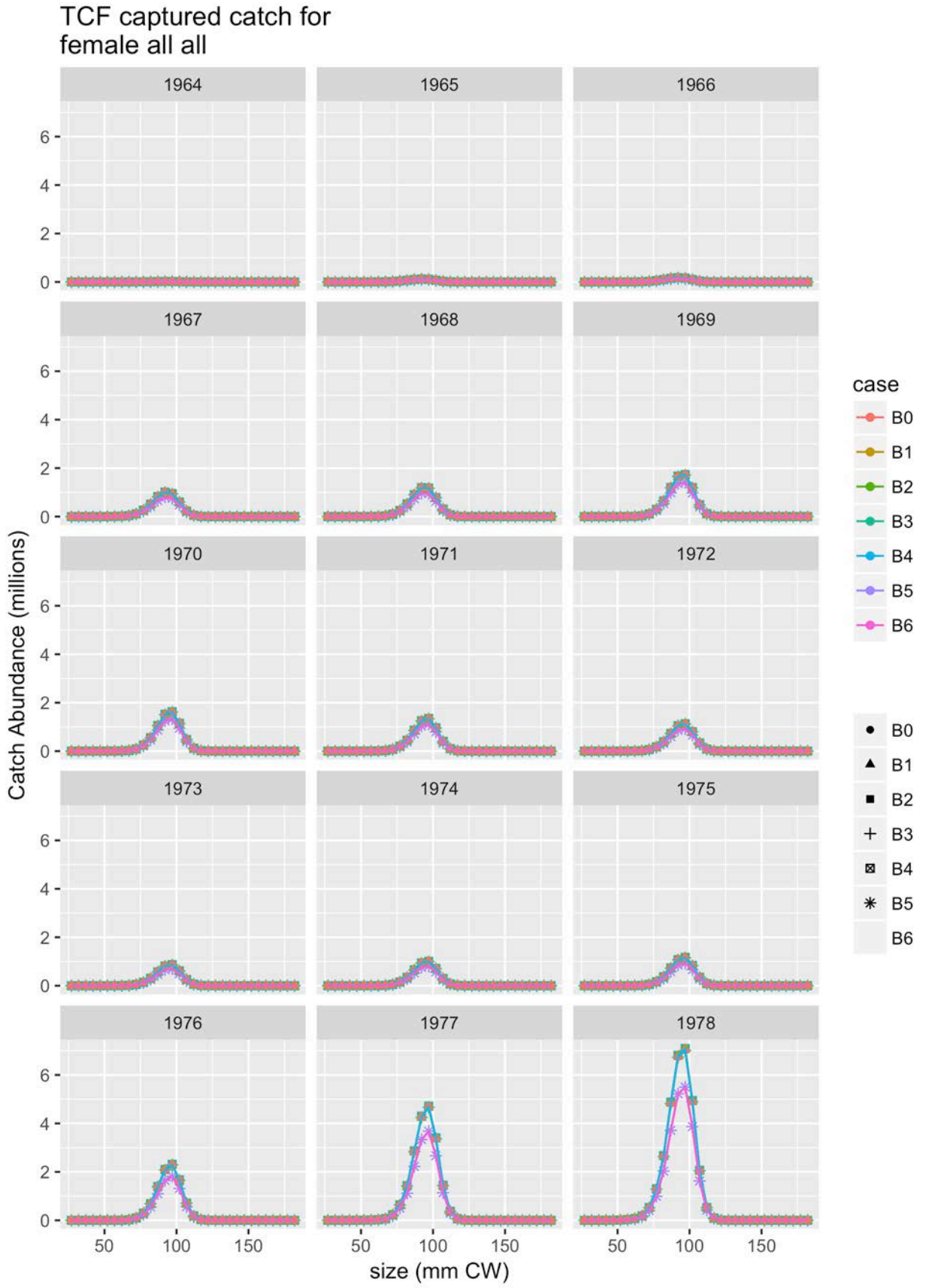


Figure 111. Predicted TCF captured catch abundance for female all all, (2 of 4).

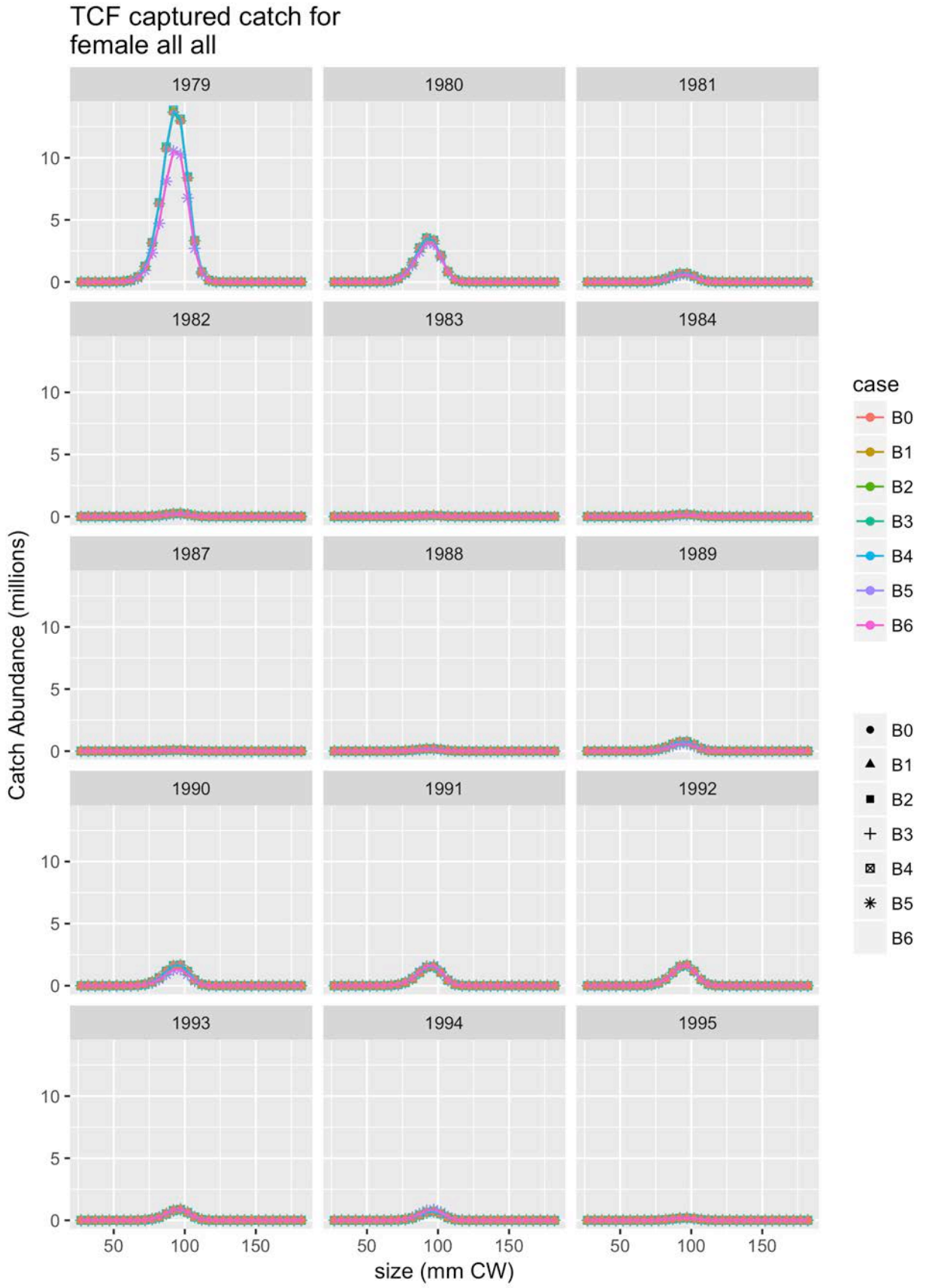


Figure 112. Predicted TCF captured catch abundance for female all all, (3 of 4).

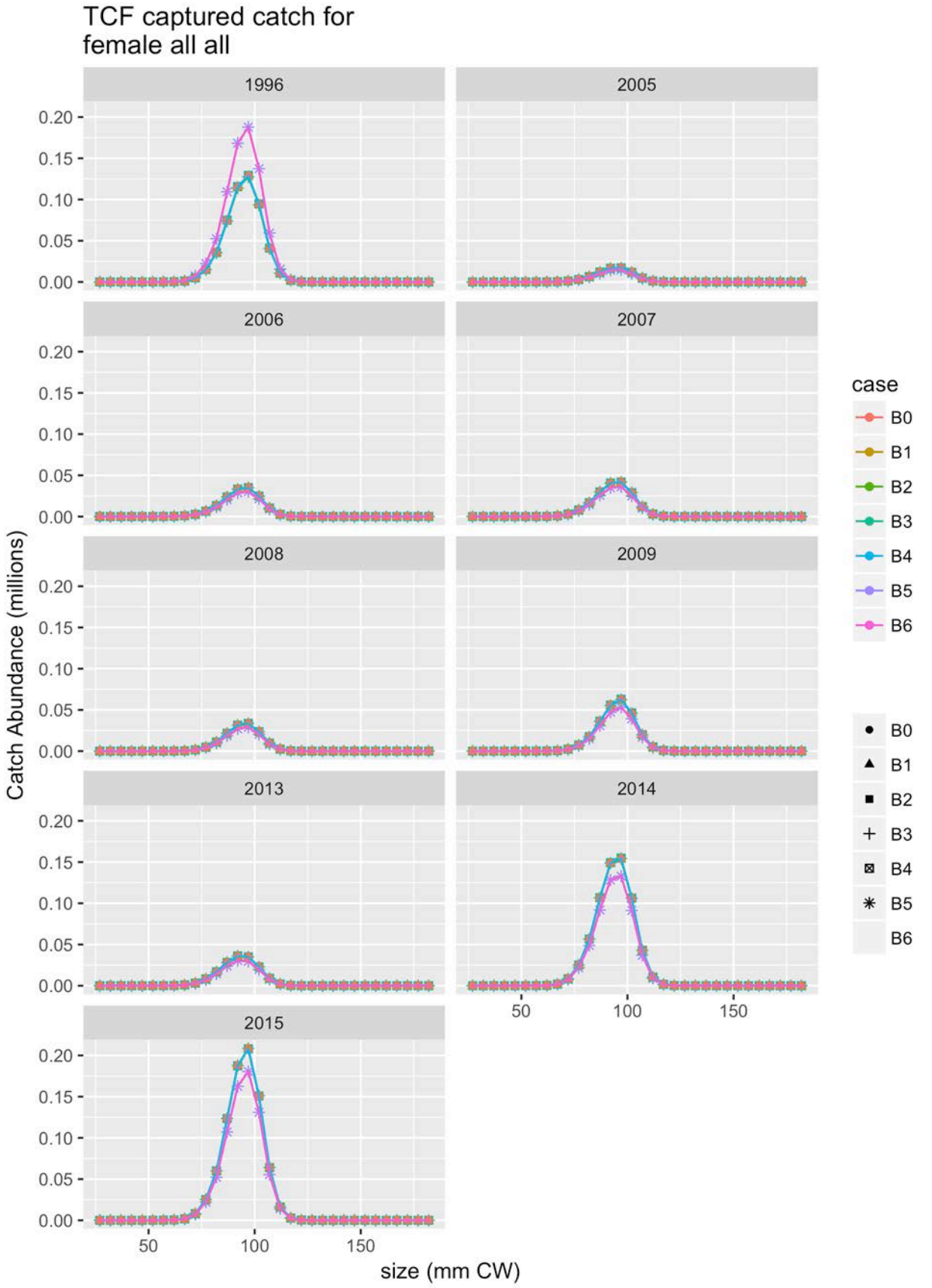


Figure 113. Predicted TCF captured catch abundance for female all all, (4 of 4).

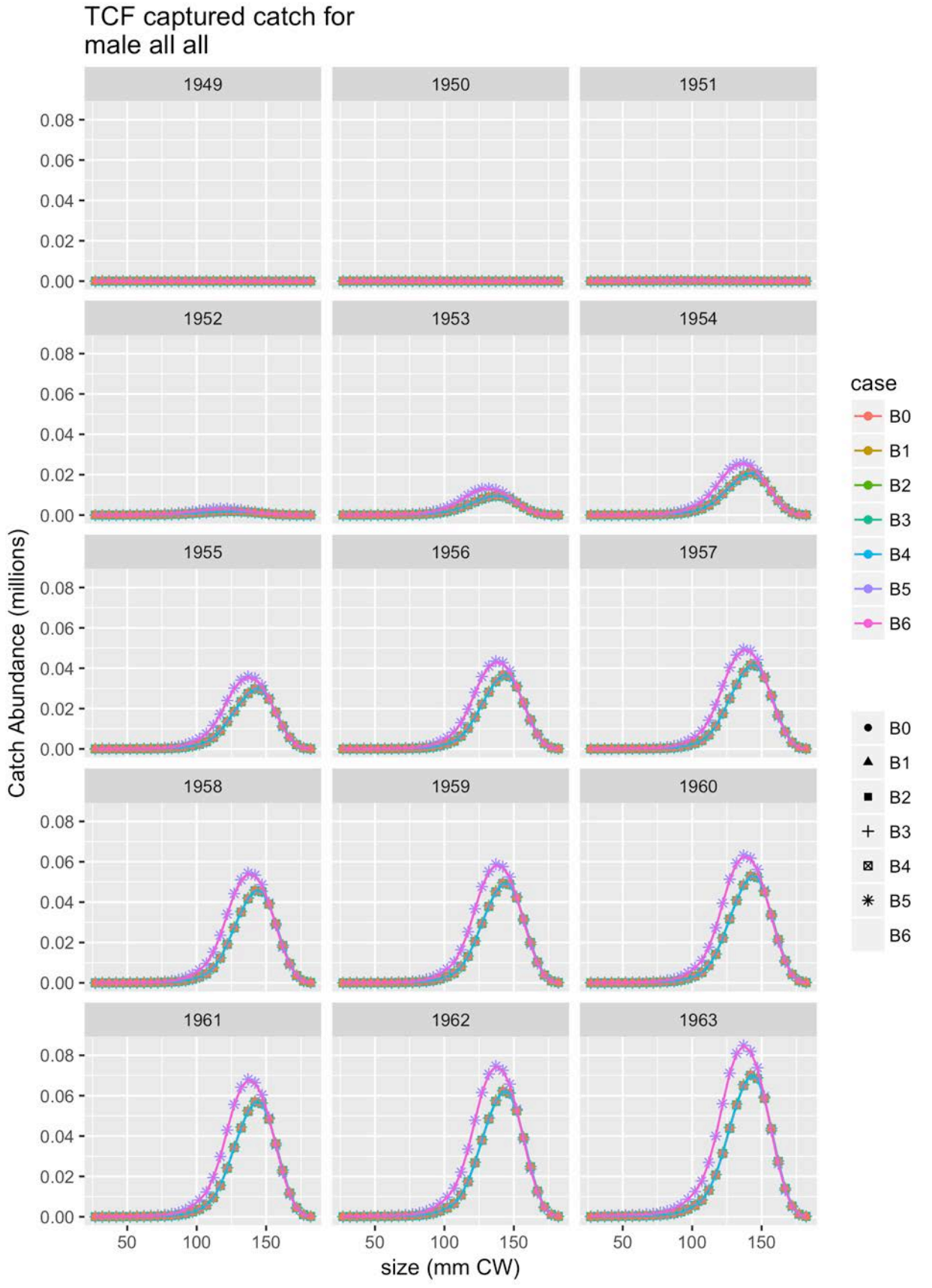


Figure 114. Predicted TCF captured catch abundance for male all all, (1 of 4).

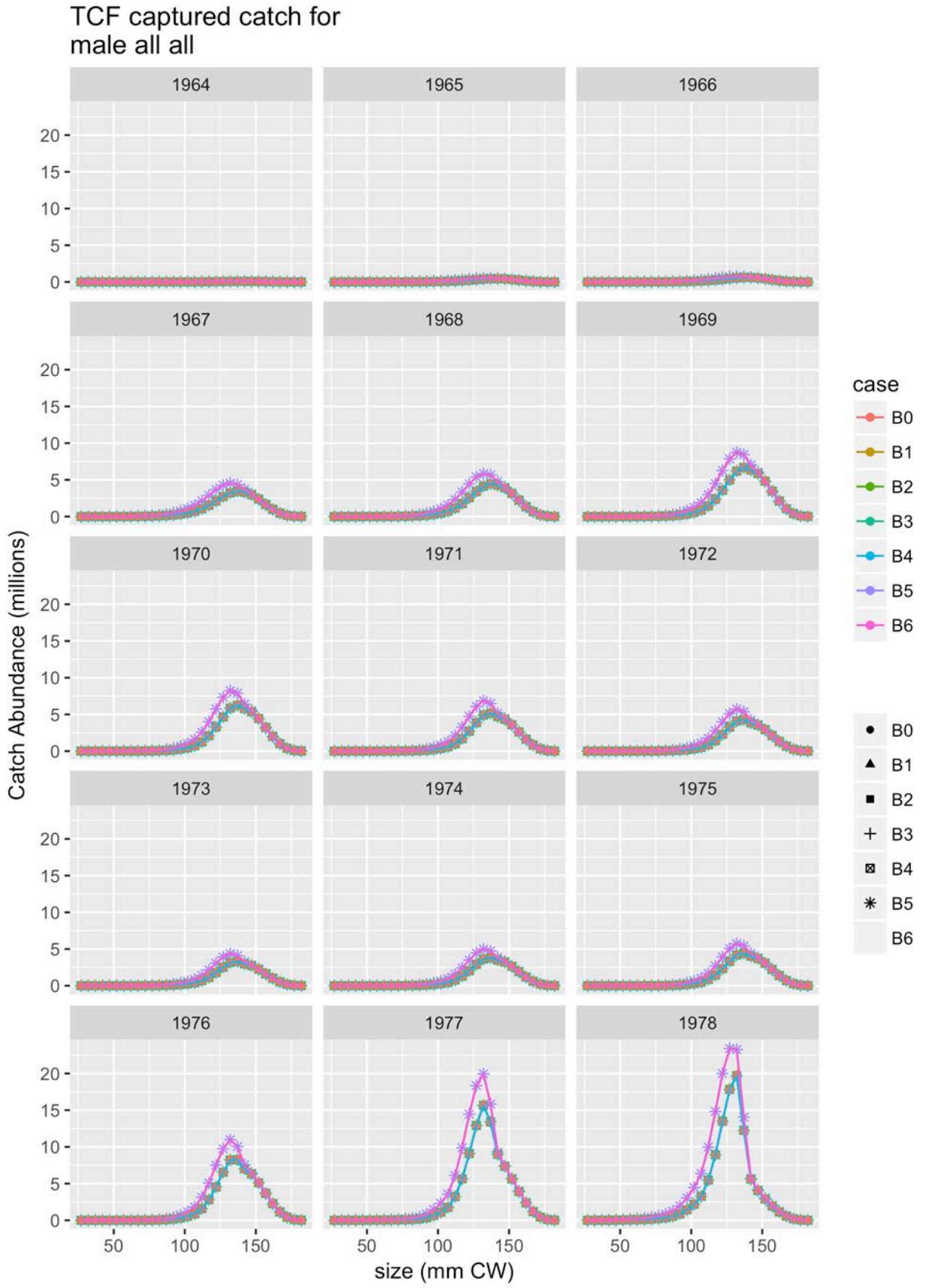


Figure 115. Predicted TCF captured catch abundance for male all all, (2 of 4).

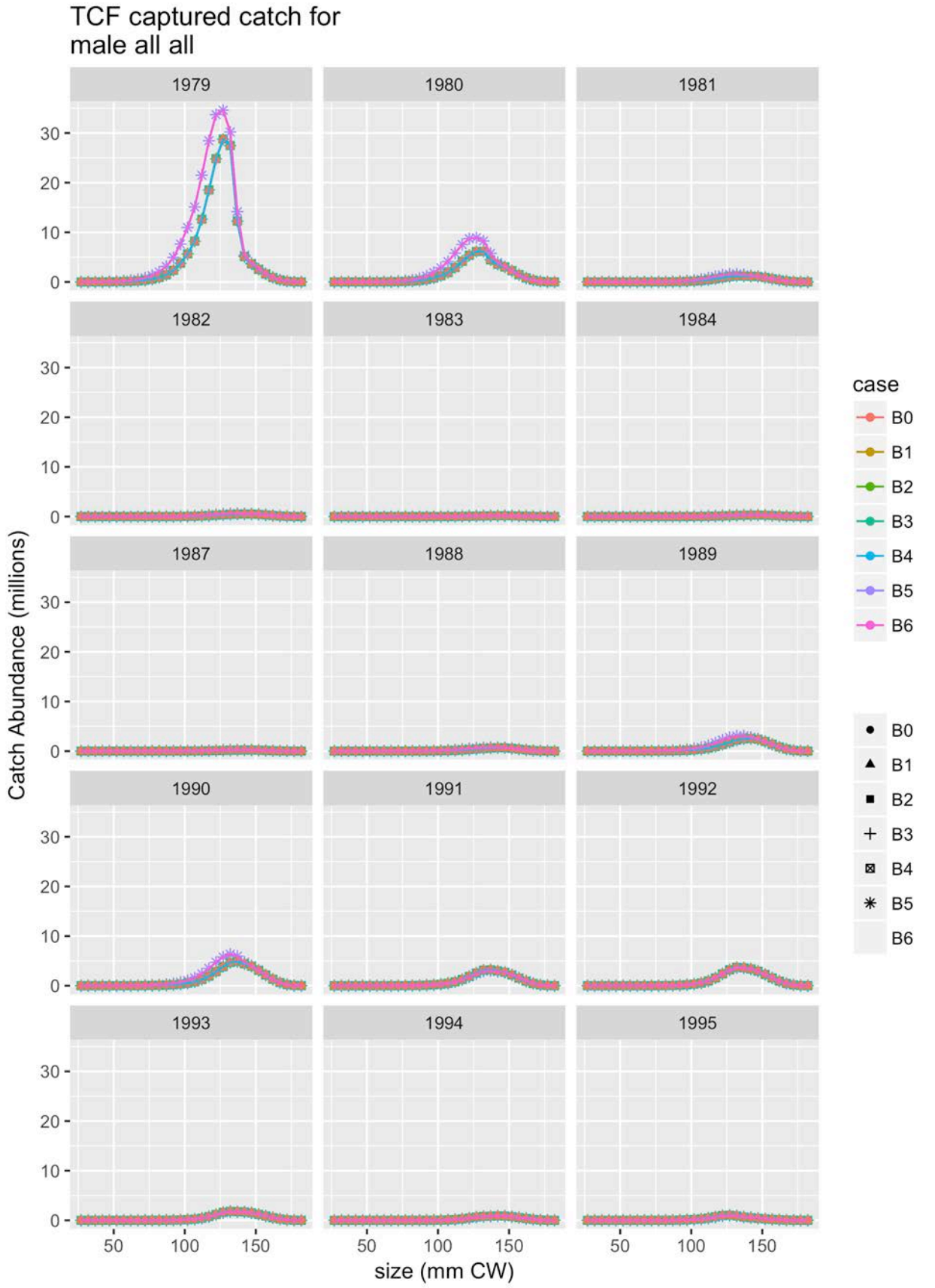


Figure 116. Predicted TCF captured catch abundance for male all all, (3 of 4).

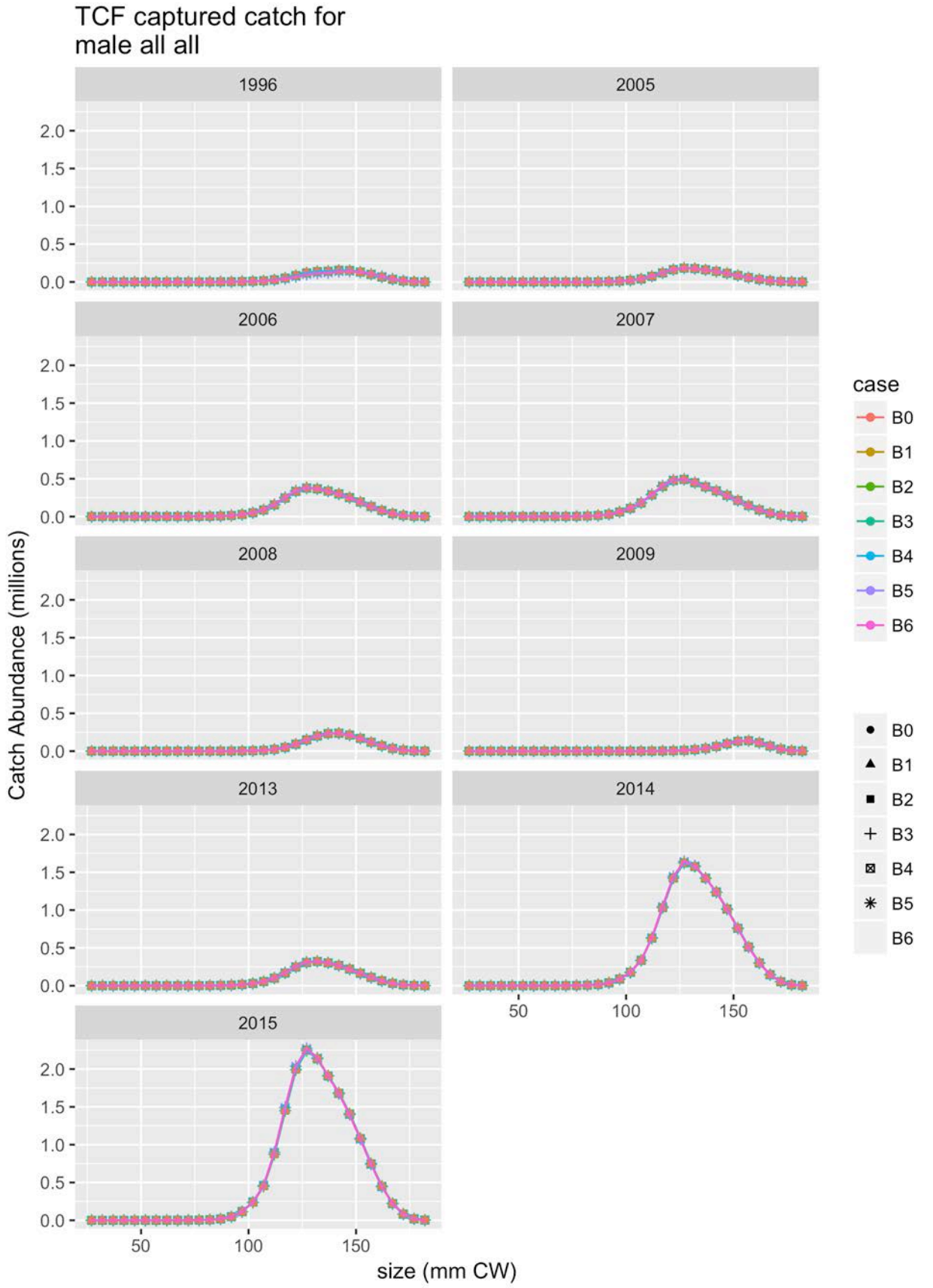


Figure 117. Predicted TCF captured catch abundance for male all all, (4 of 4).

Retained catch size compositions

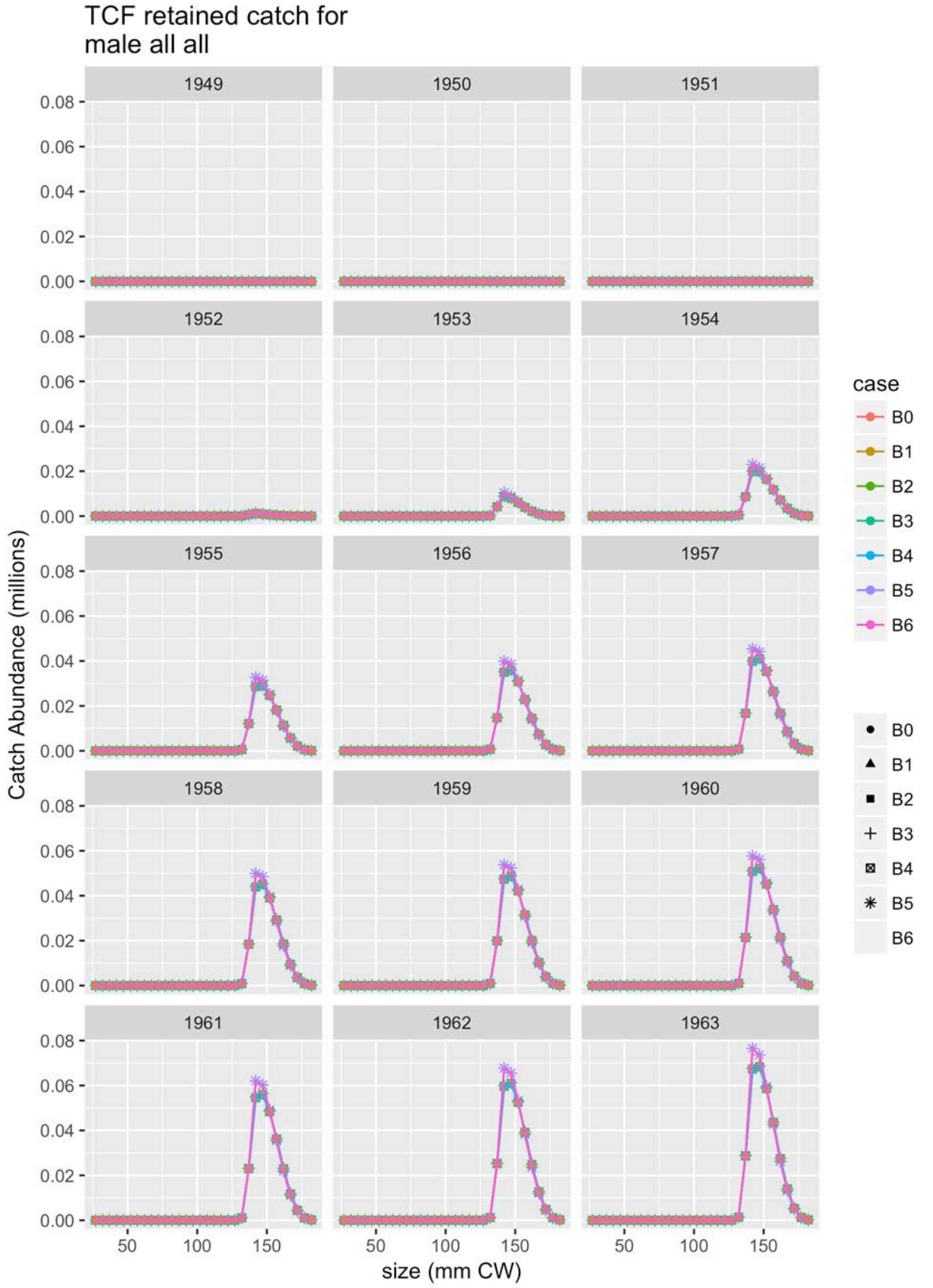


Figure 118. Predicted TCF retained catch abundance for male all all, (1 of 4).

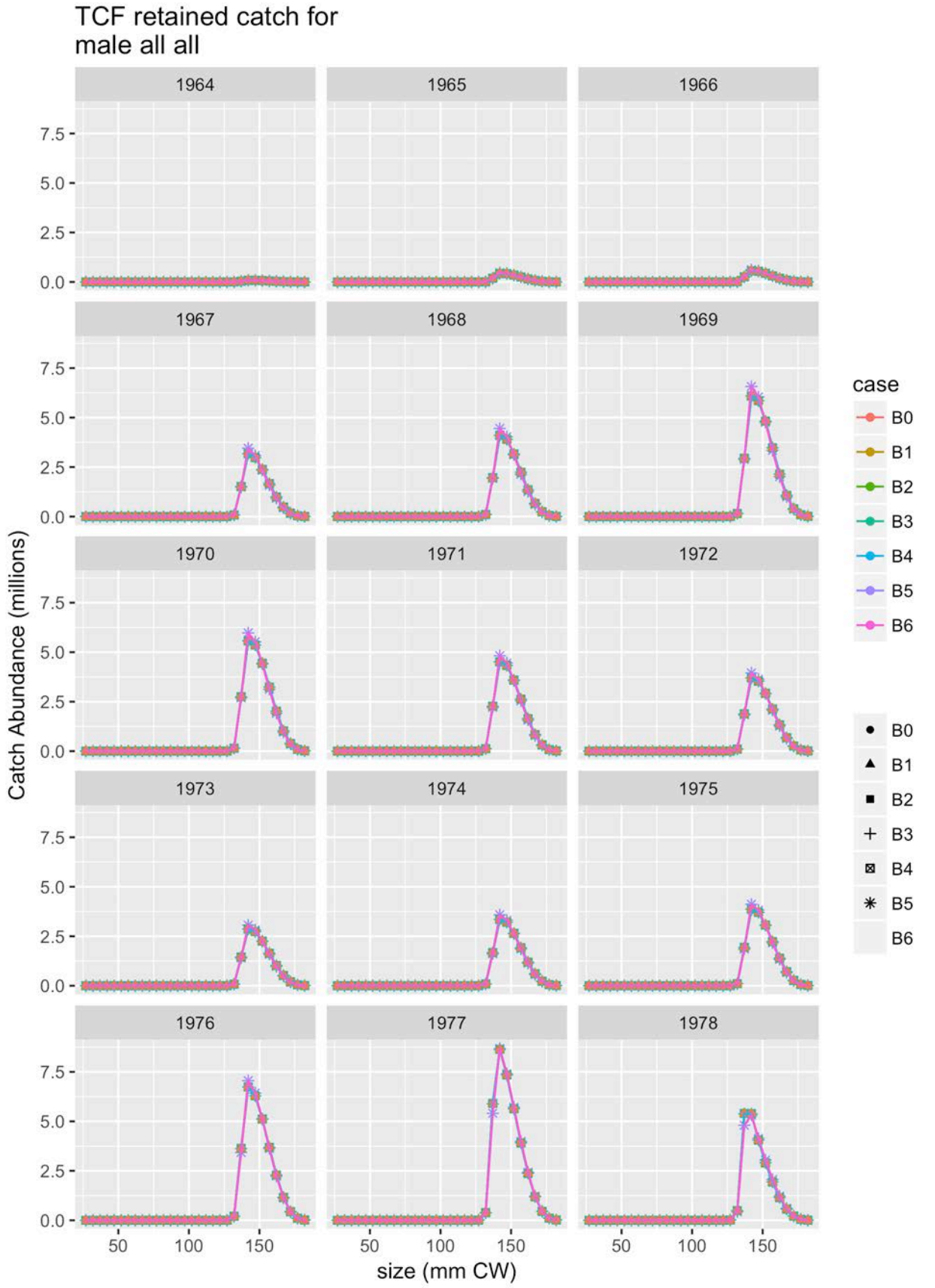


Figure 119. Predicted TCF retained catch abundance for male all all, (2 of 4).

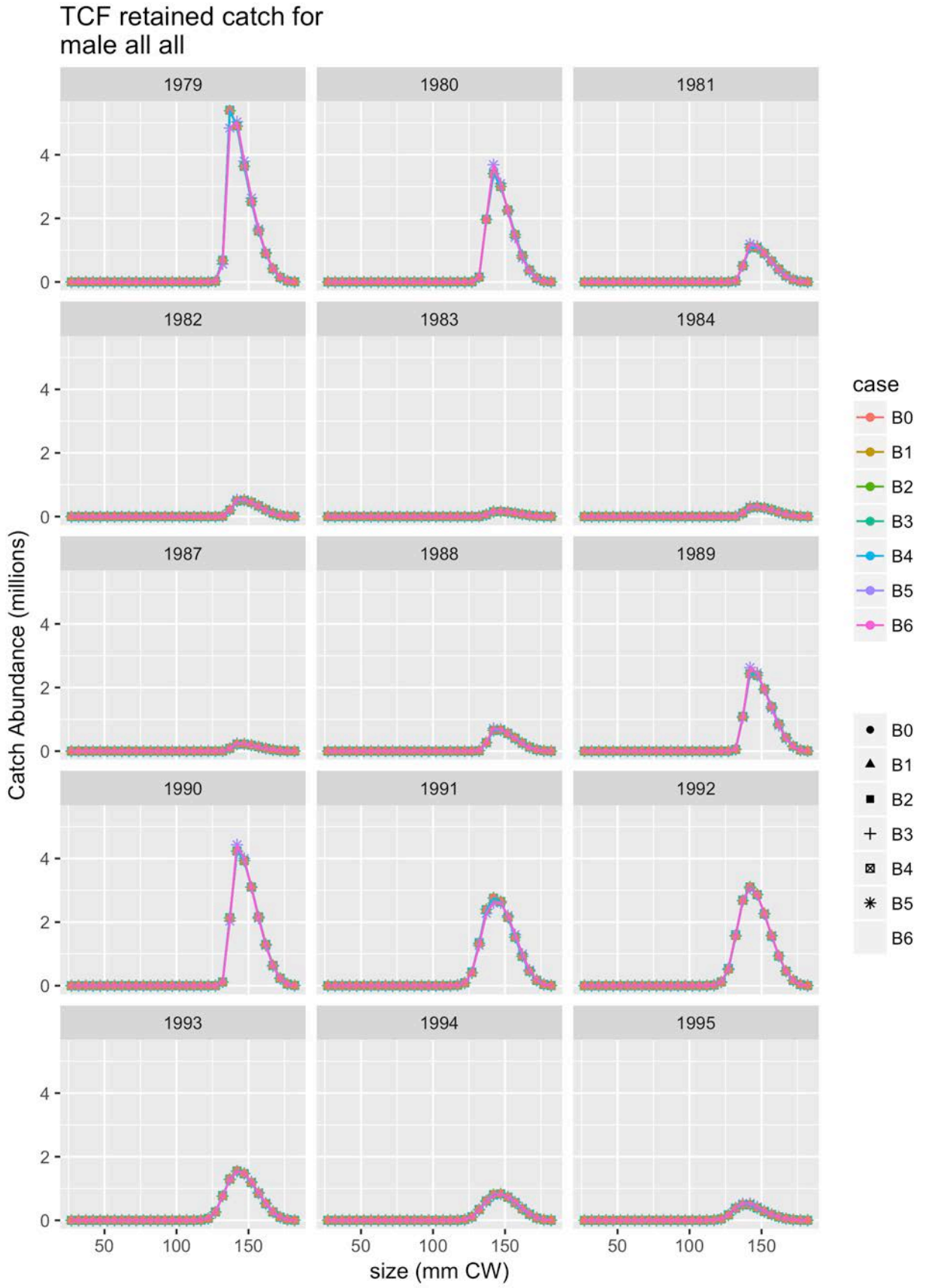


Figure 120. Predicted TCF retained catch abundance for male all all, (3 of 4).

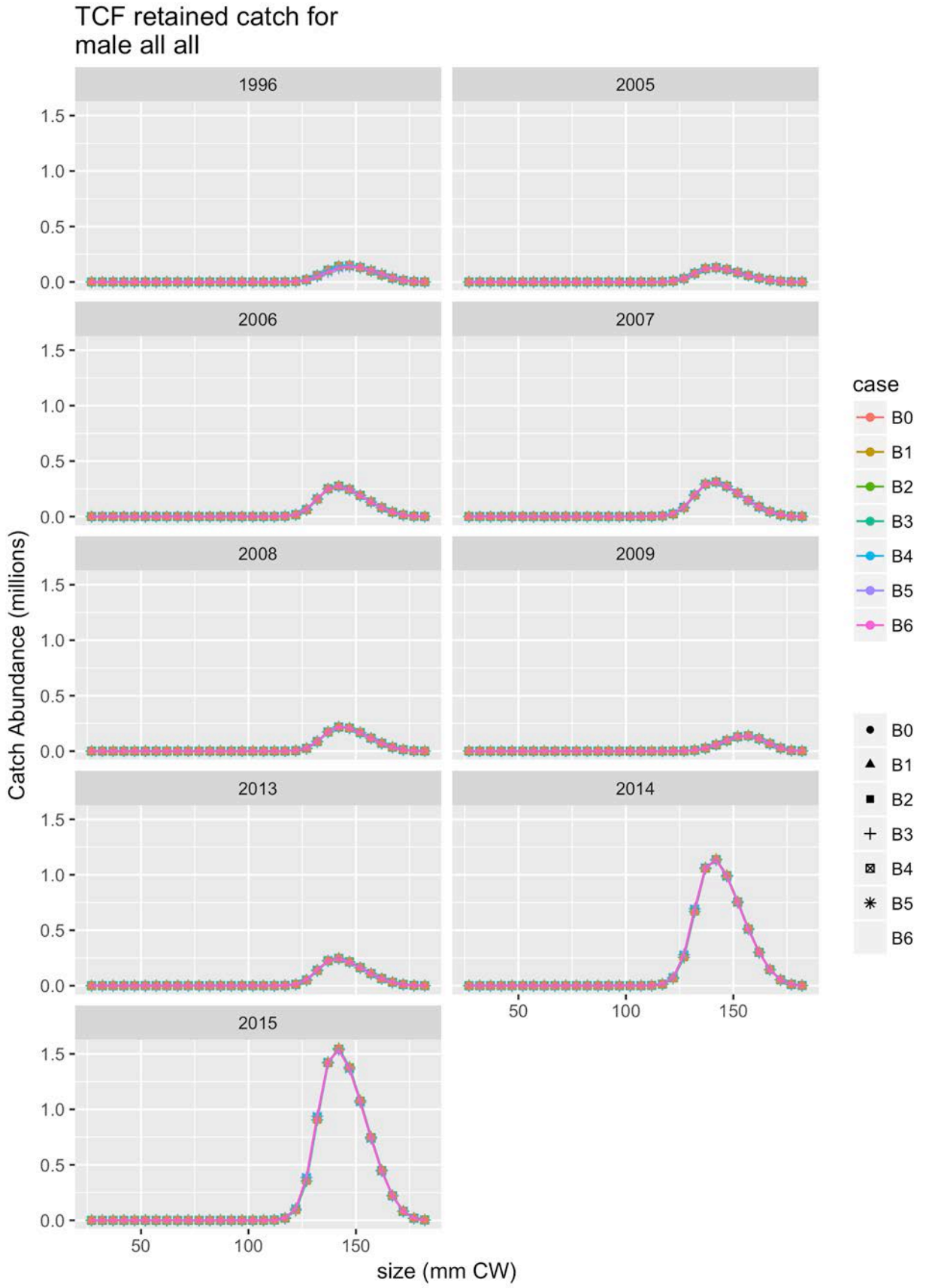


Figure 121. Predicted TCF retained catch abundance for male all all, (4 of 4).

Model fits

Survey biomass

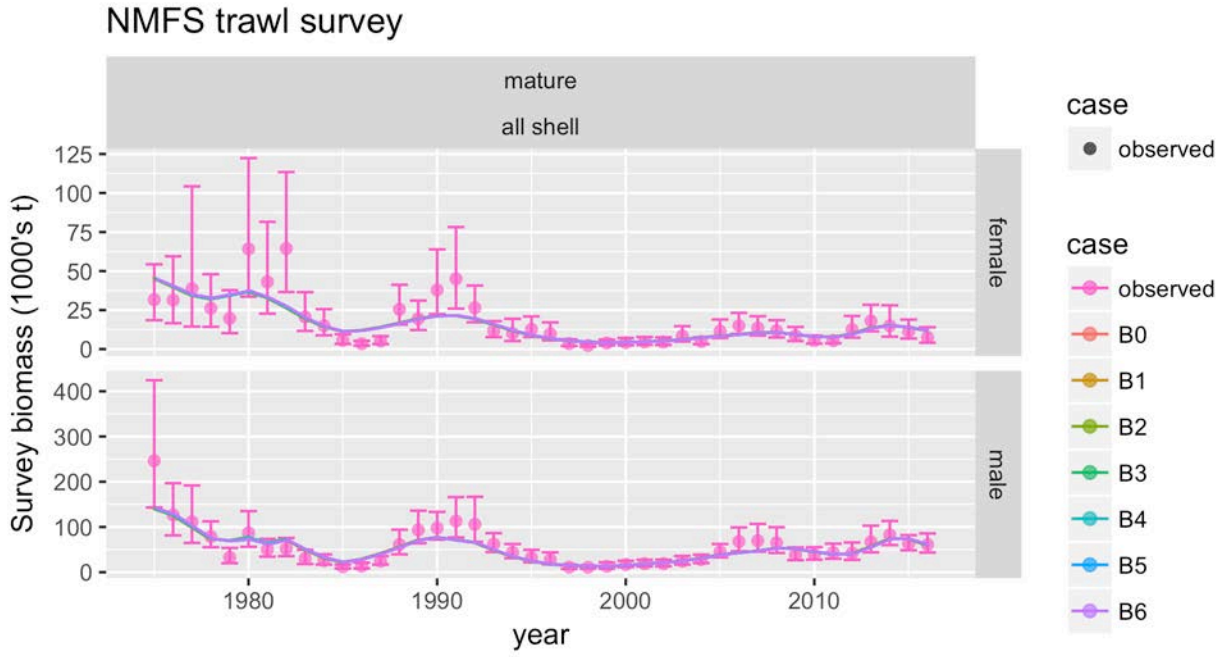


Figure 122. Comparison of observed and predicted survey biomass for NMFS trawl survey.

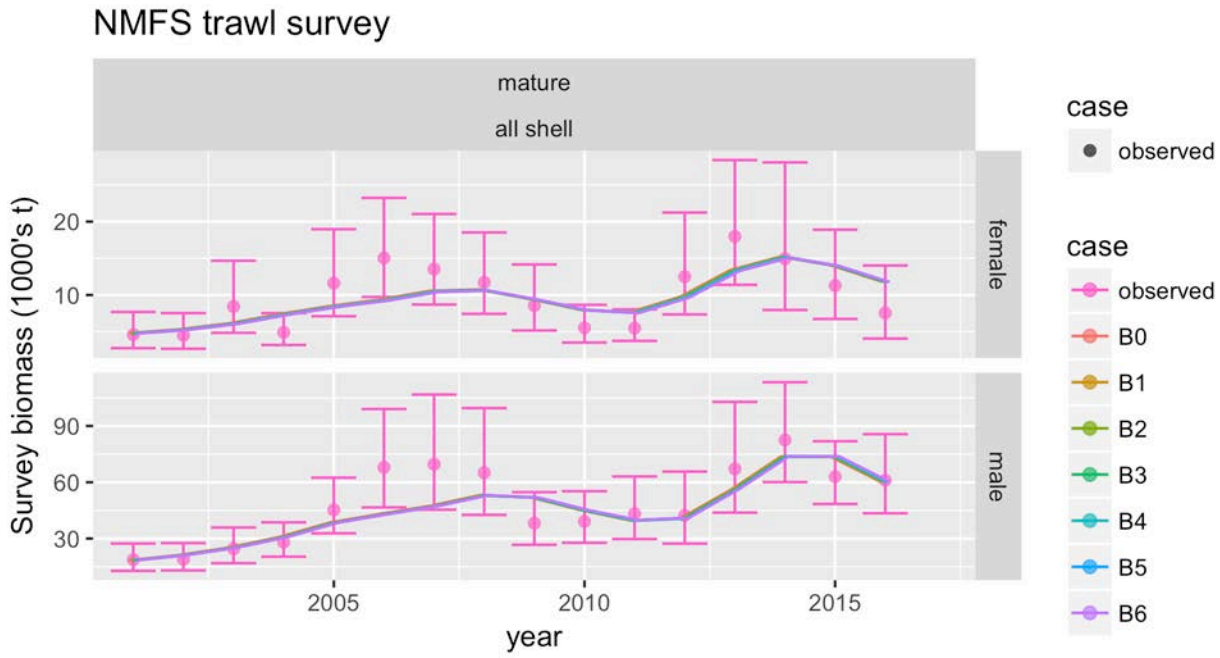


Figure 123. Comparison of observed and predicted survey biomass for NMFS trawl survey. Recent time period.

Mean survey size compositions

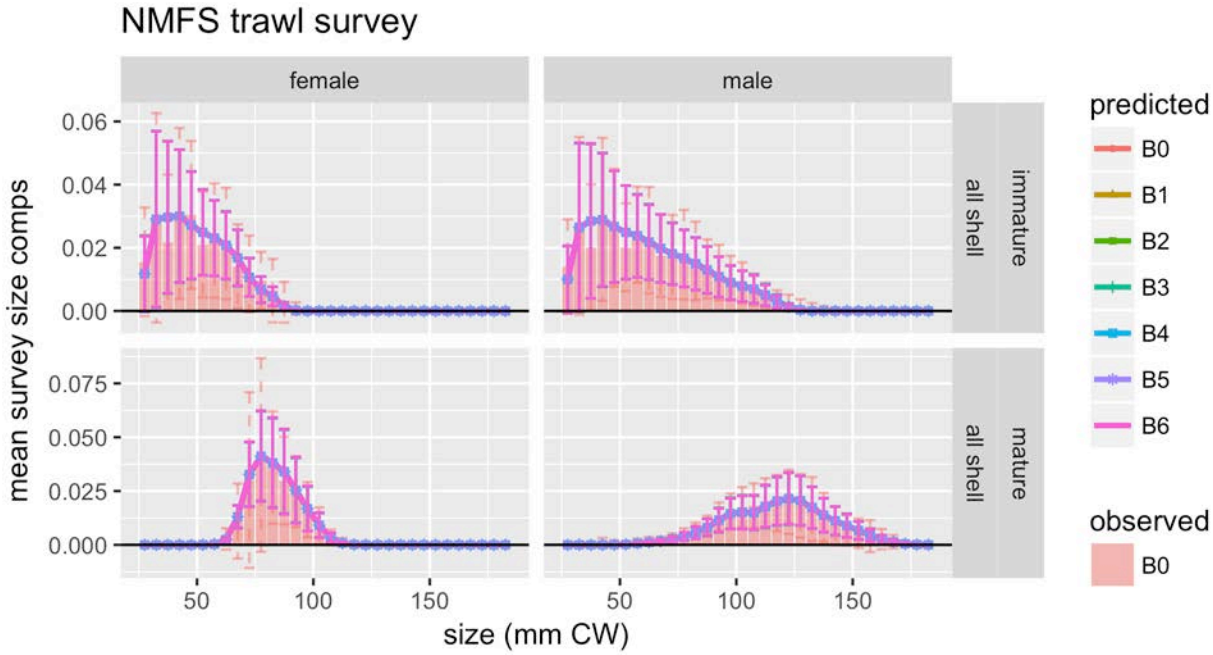


Figure 124. Comparison of observed and predicted &&xms mean survey size comps for NMFS trawl survey.

Survey size compositions

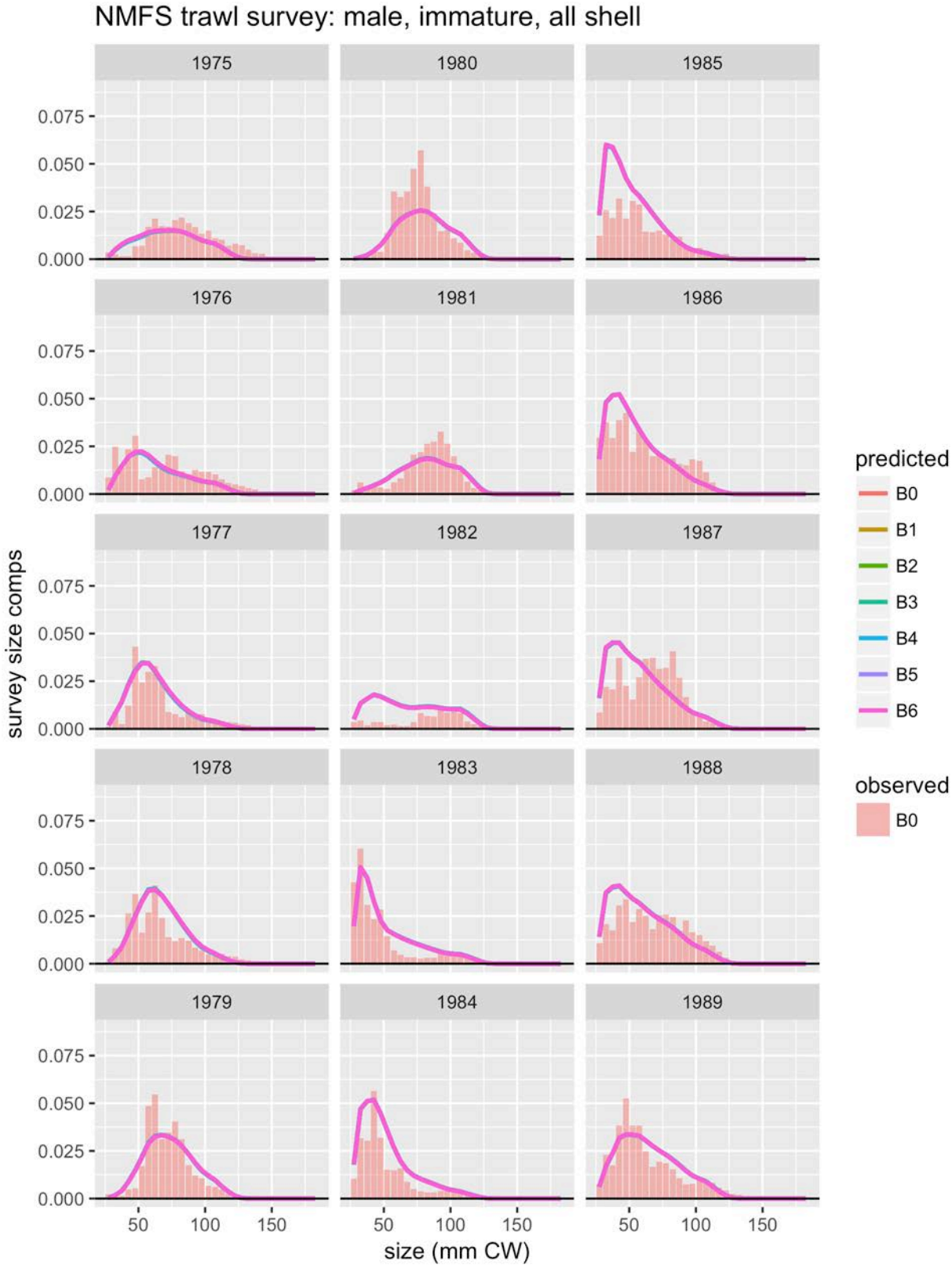


Figure 125. Comparison of observed and predicted male, immature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

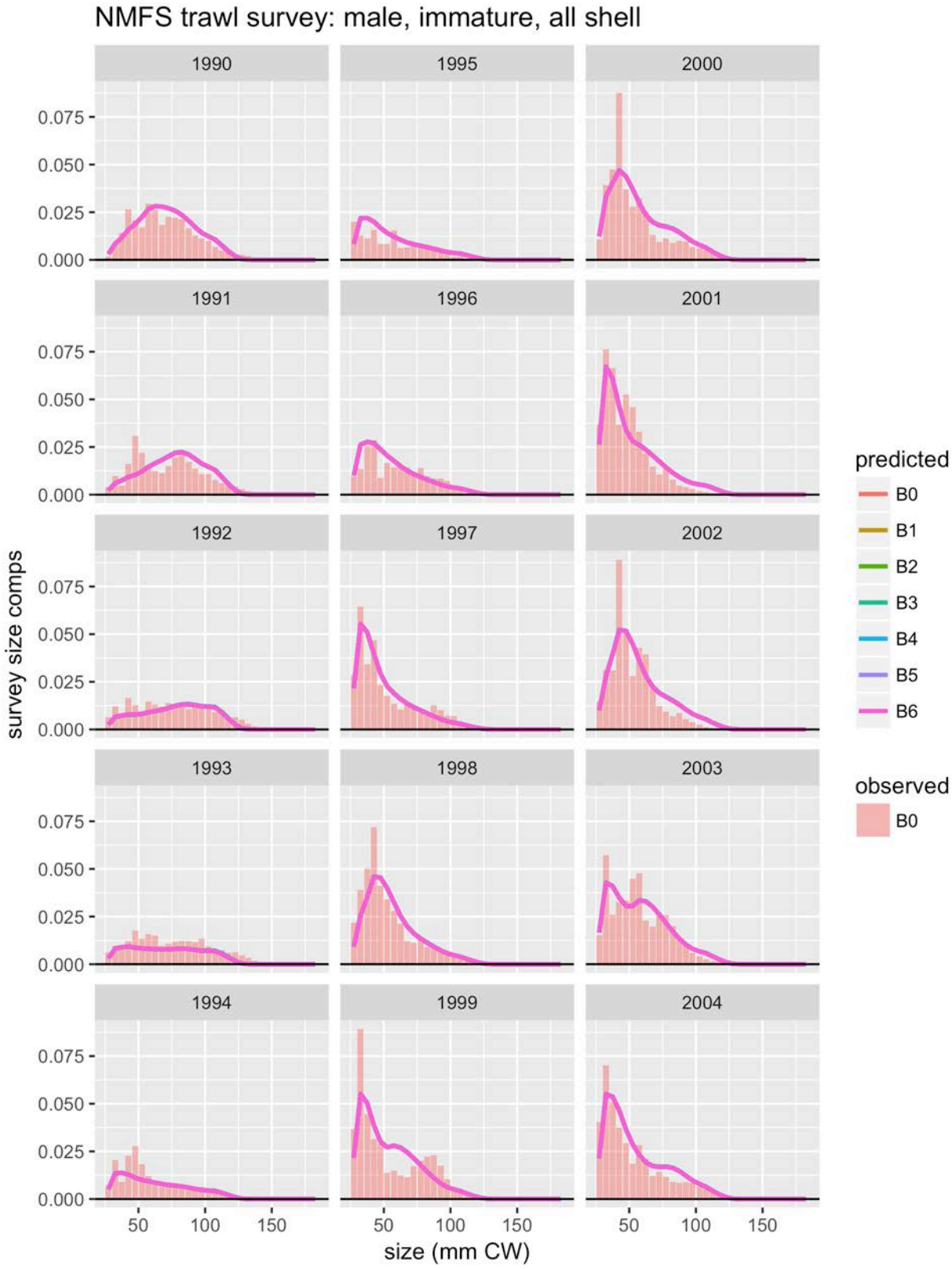


Figure 126. Comparison of observed and predicted male, immature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

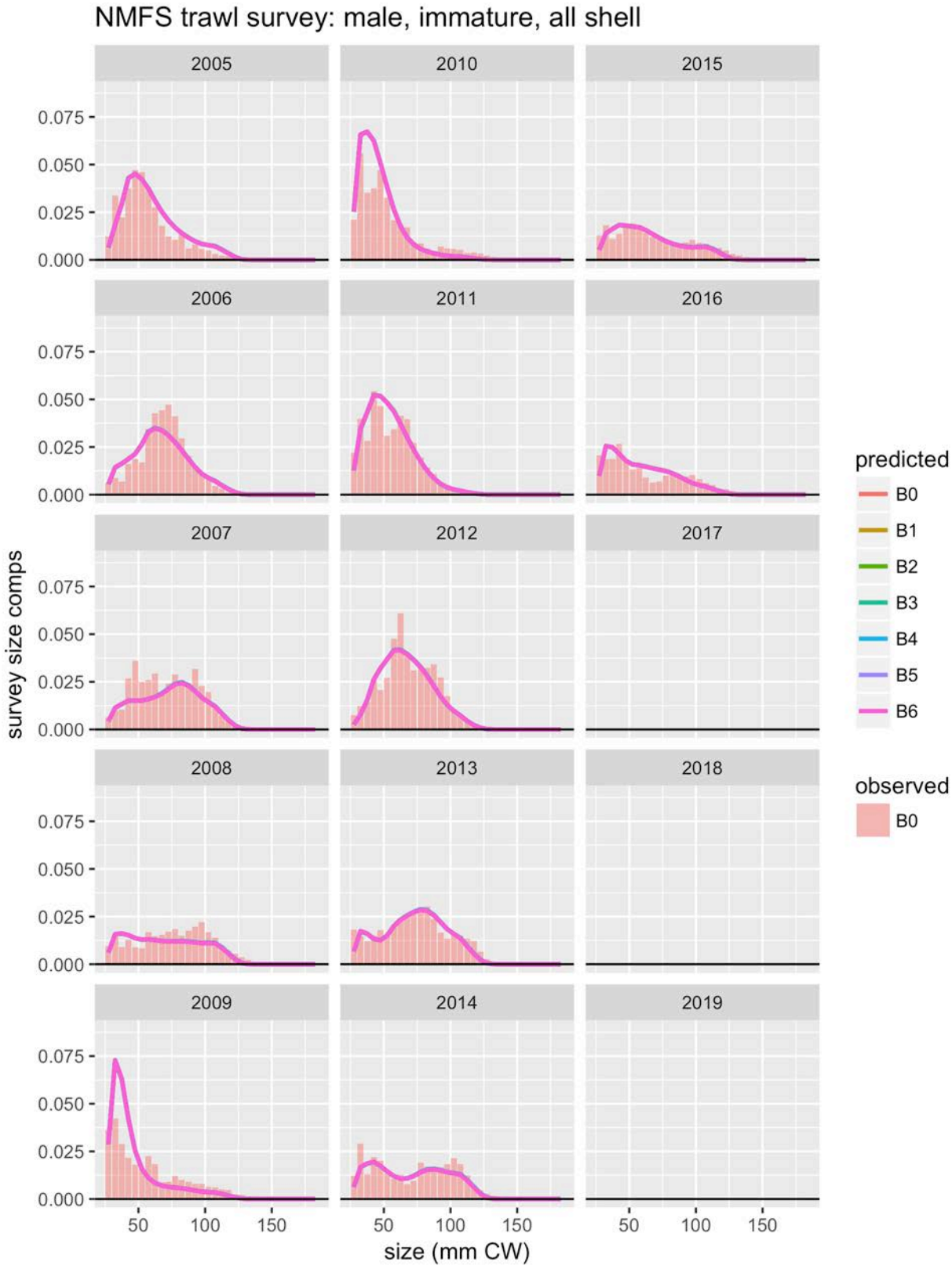


Figure 127. Comparison of observed and predicted male, immature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

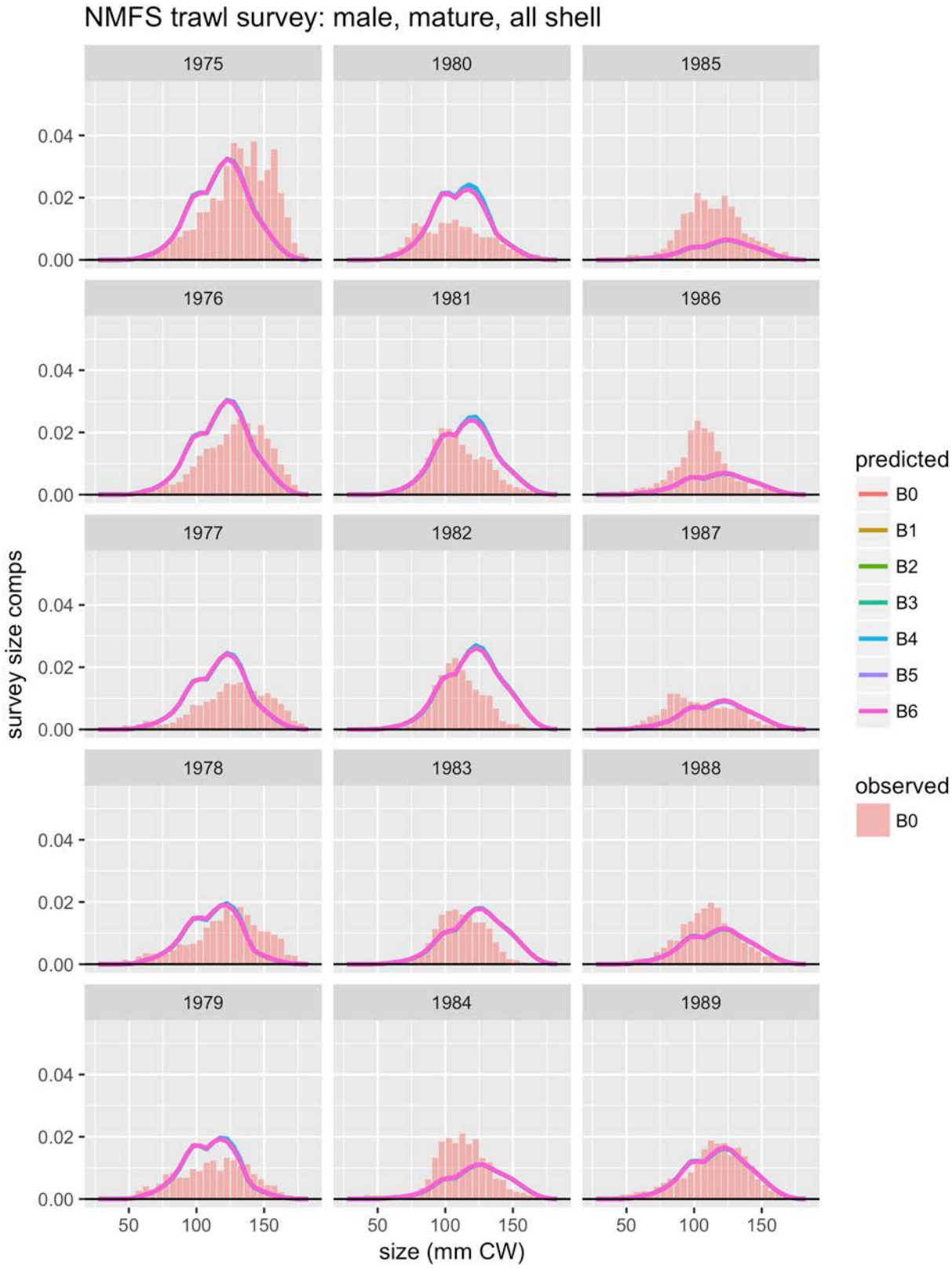


Figure 128. Comparison of observed and predicted male, mature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

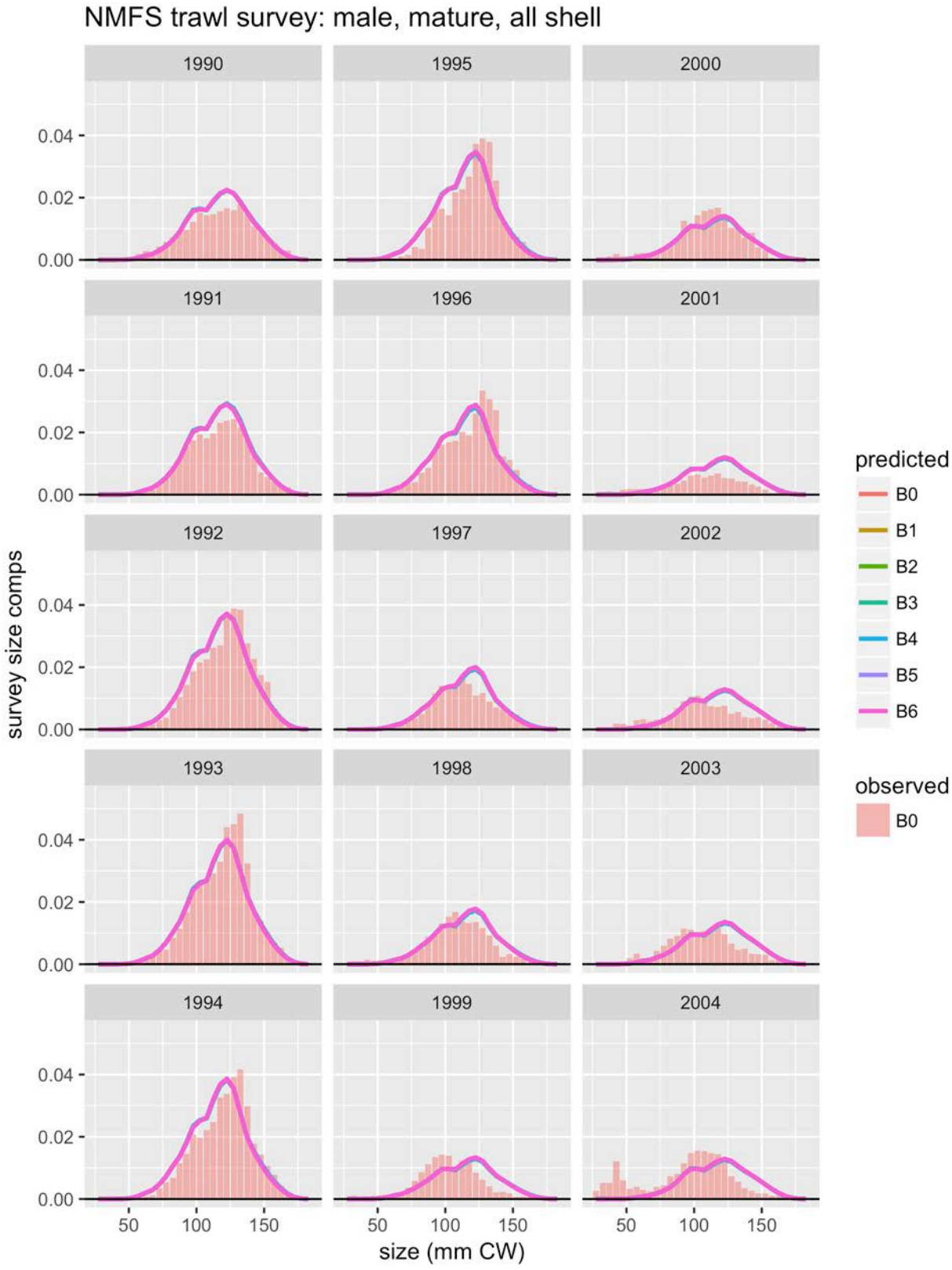


Figure 129. Comparison of observed and predicted male, mature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

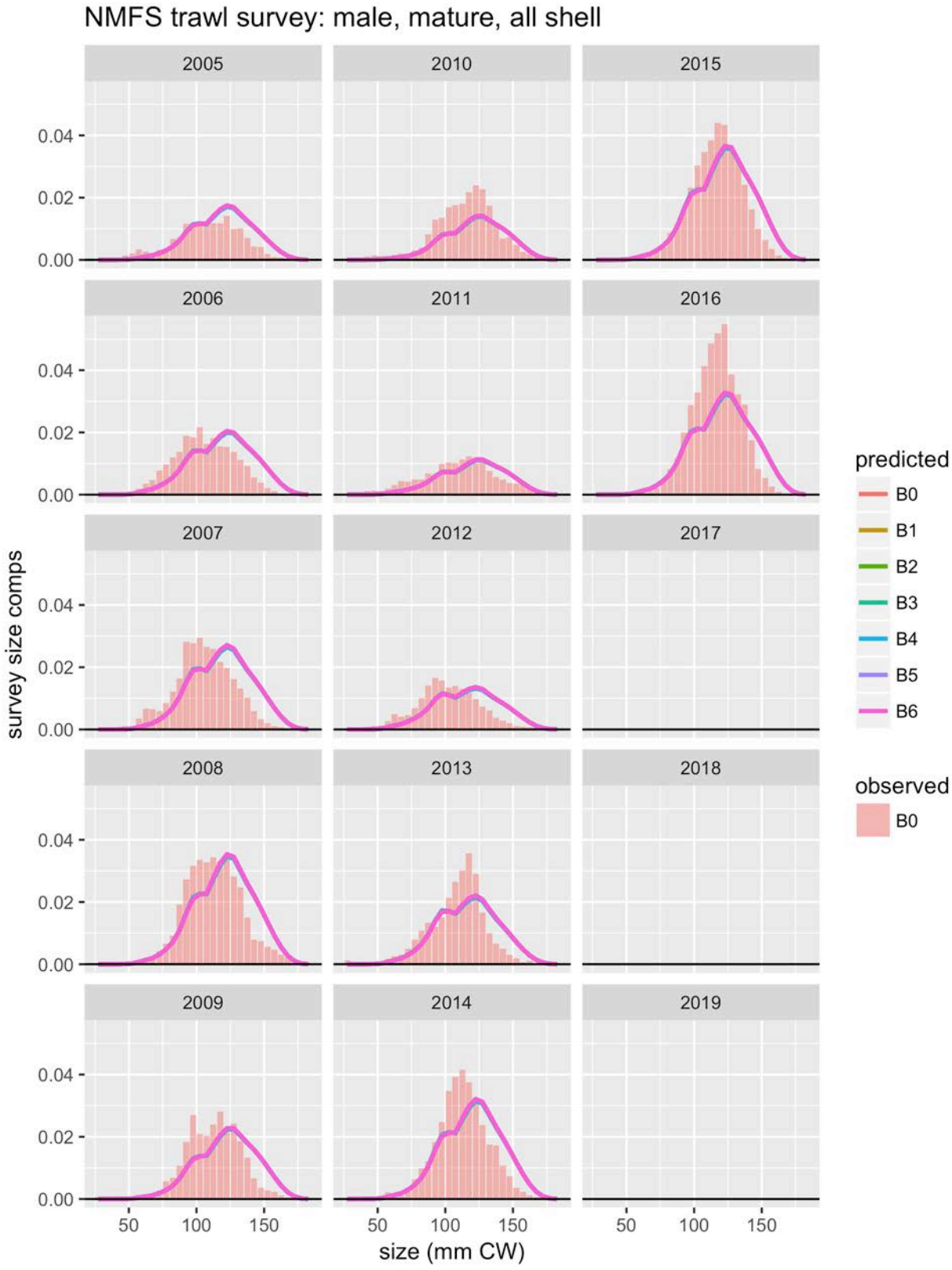


Figure 130. Comparison of observed and predicted male, mature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

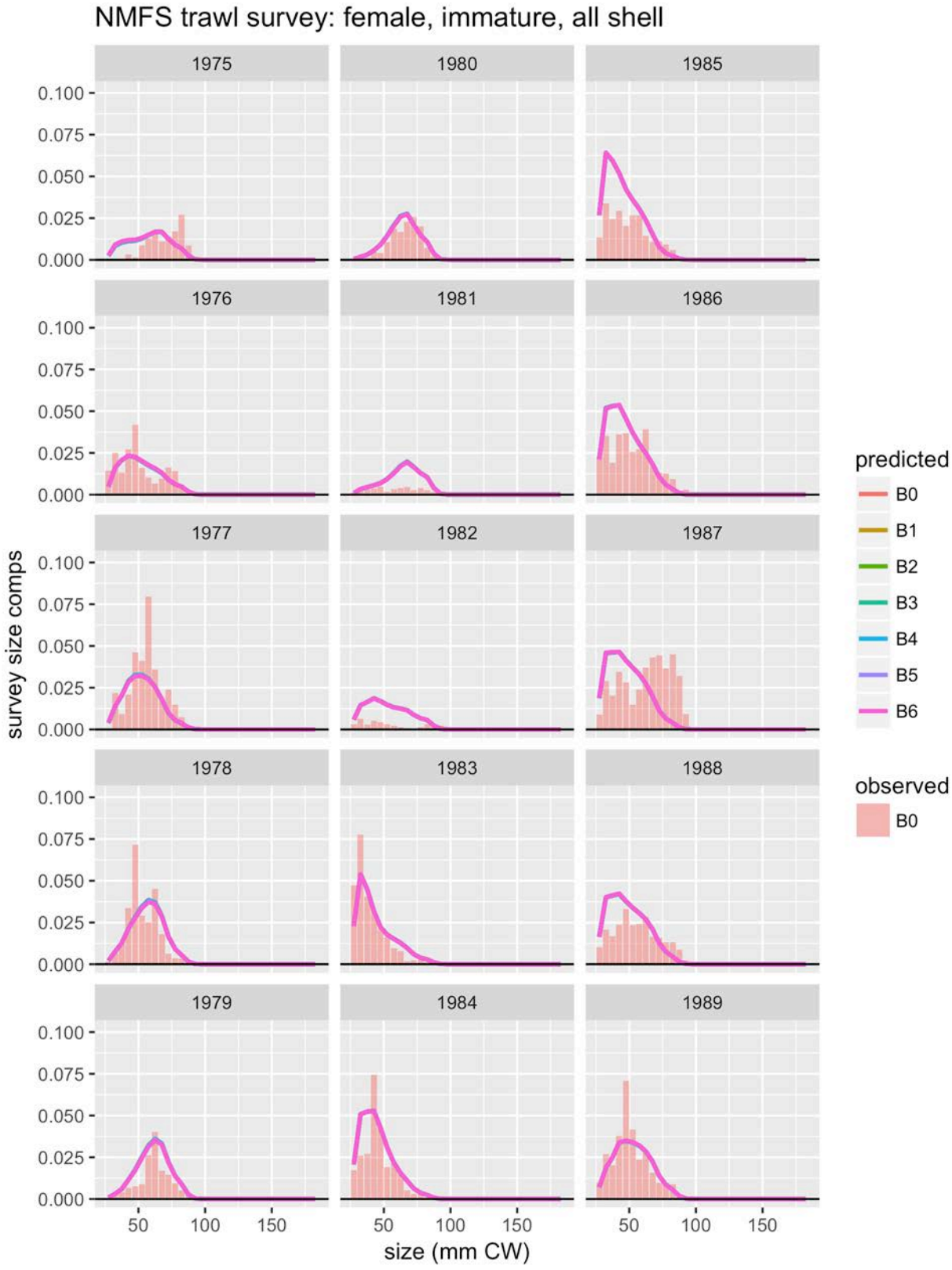


Figure 131. Comparison of observed and predicted female, immature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

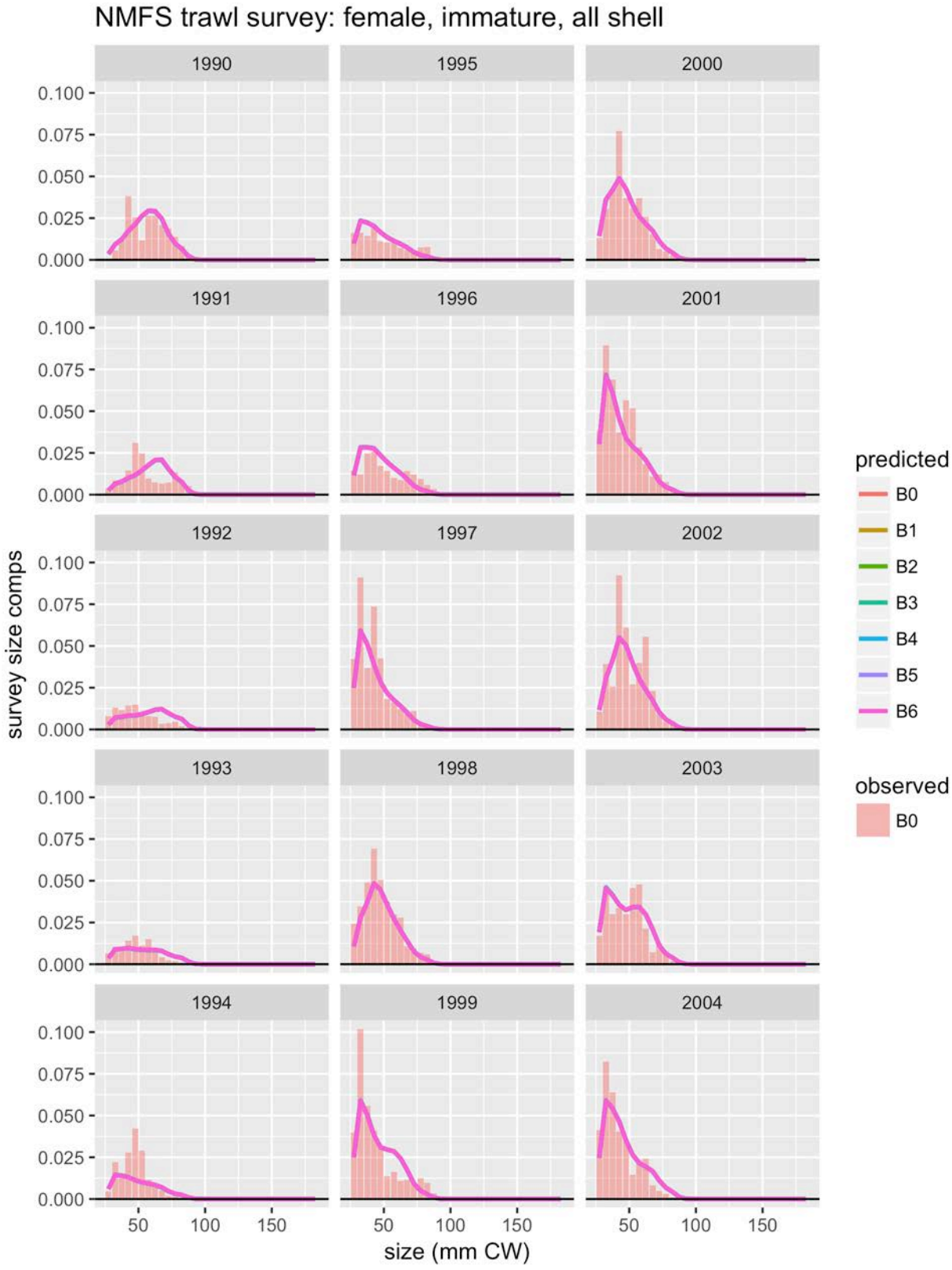


Figure 132. Comparison of observed and predicted female, immature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

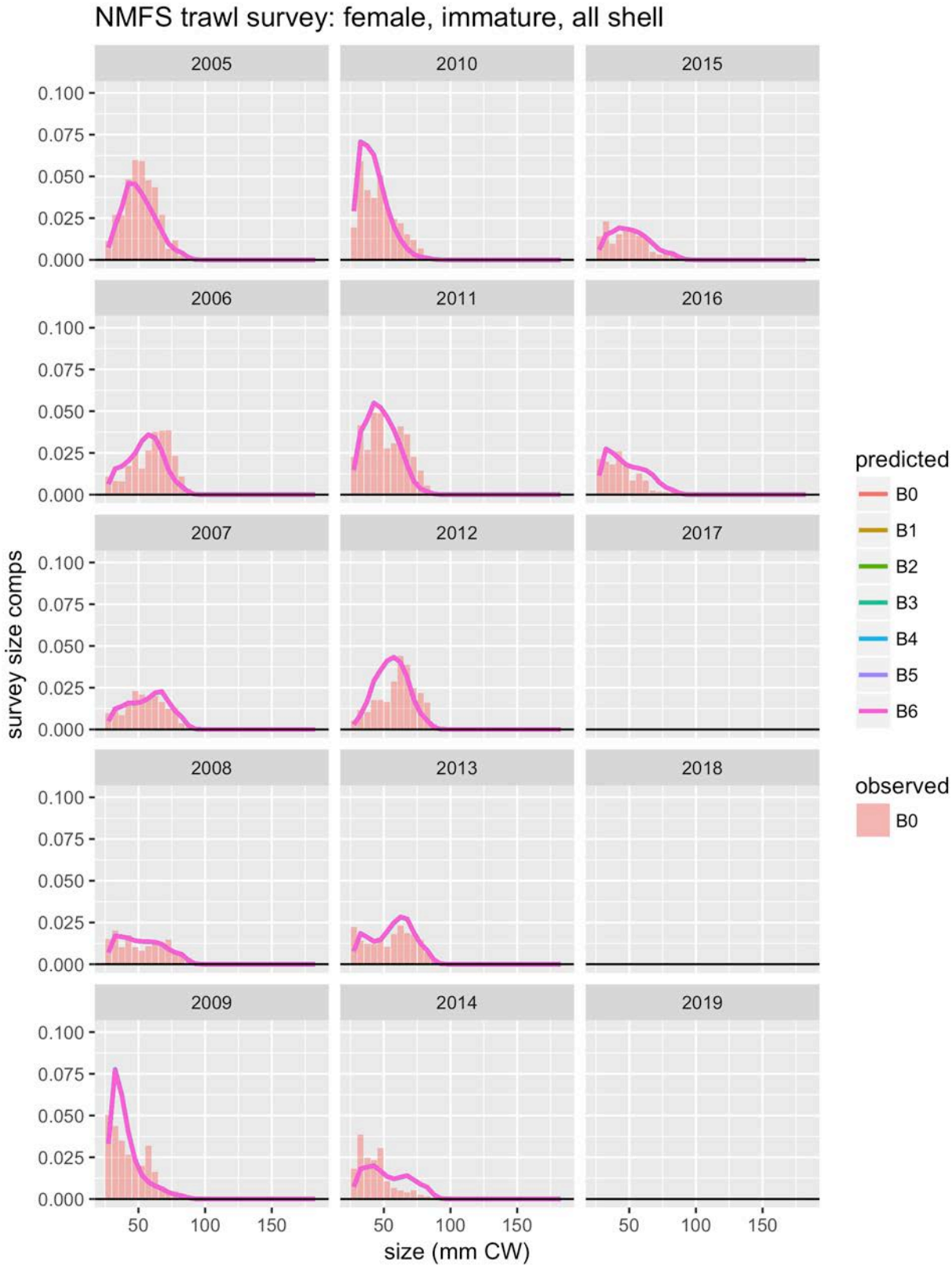


Figure 133. Comparison of observed and predicted female, immature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

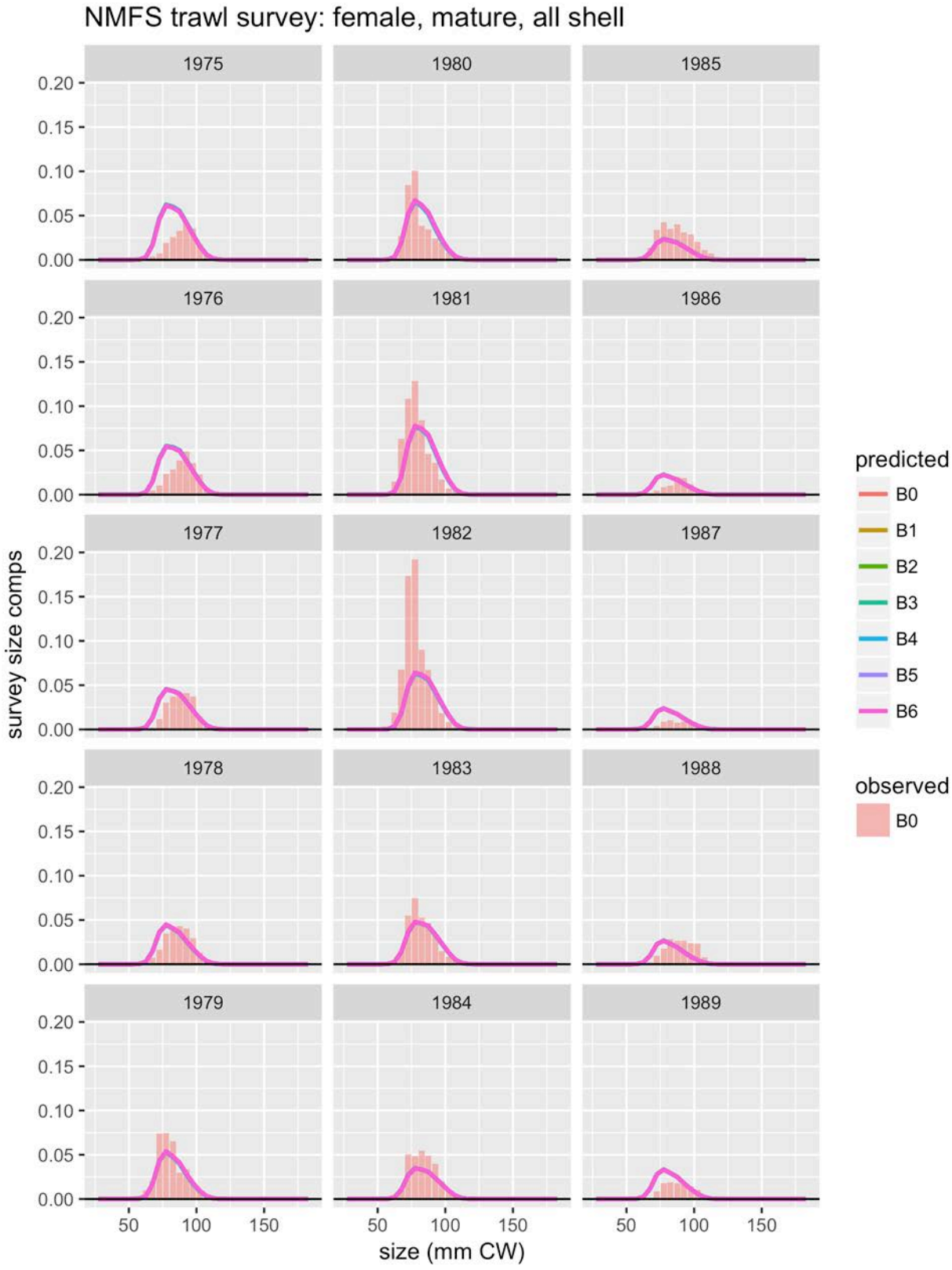


Figure 134. Comparison of observed and predicted female, mature, all shell survey size comps for NMFS trawl survey. Page 1 of 3.

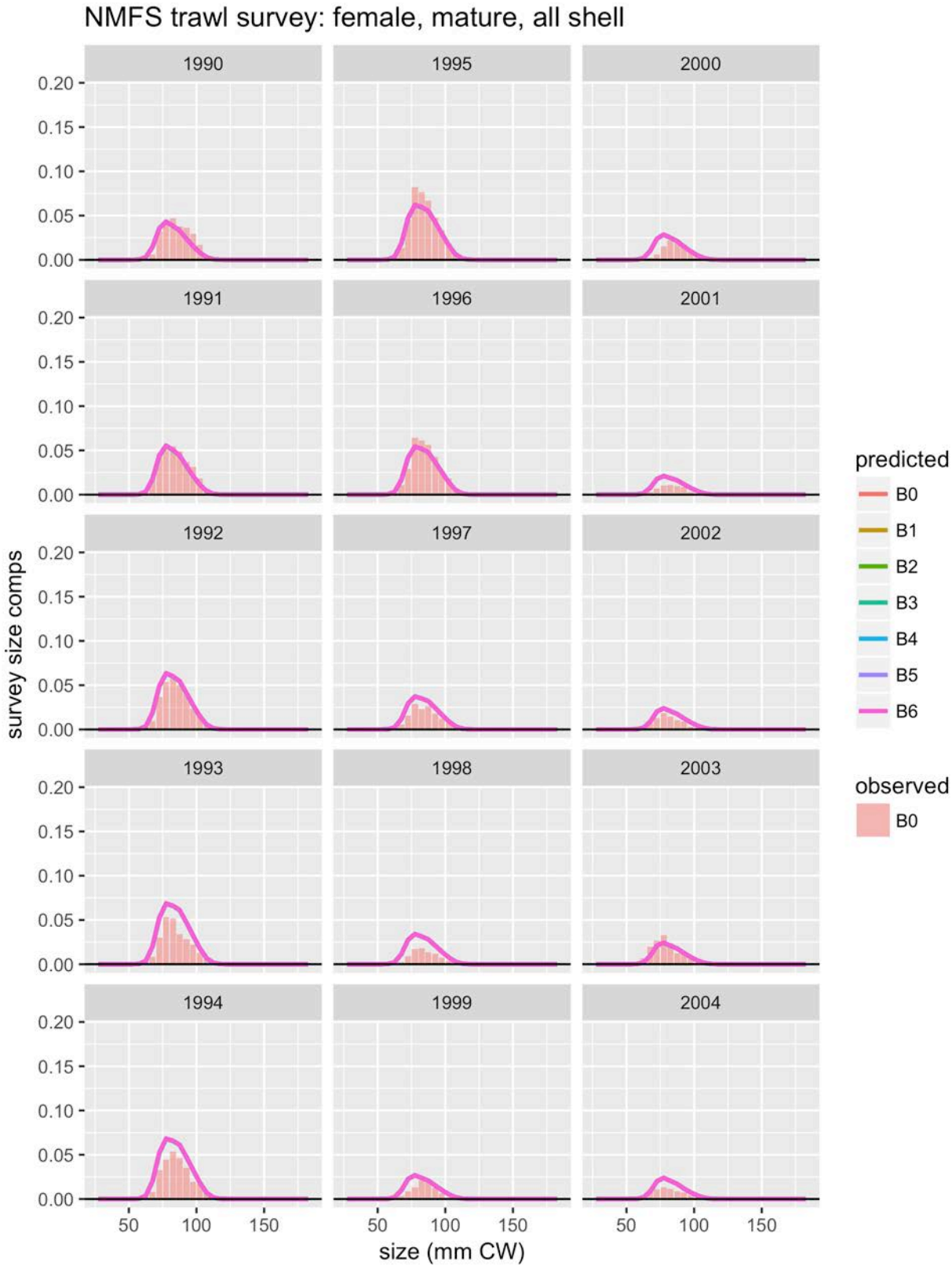


Figure 135. Comparison of observed and predicted female, mature, all shell survey size comps for NMFS trawl survey. Page 2 of 3.

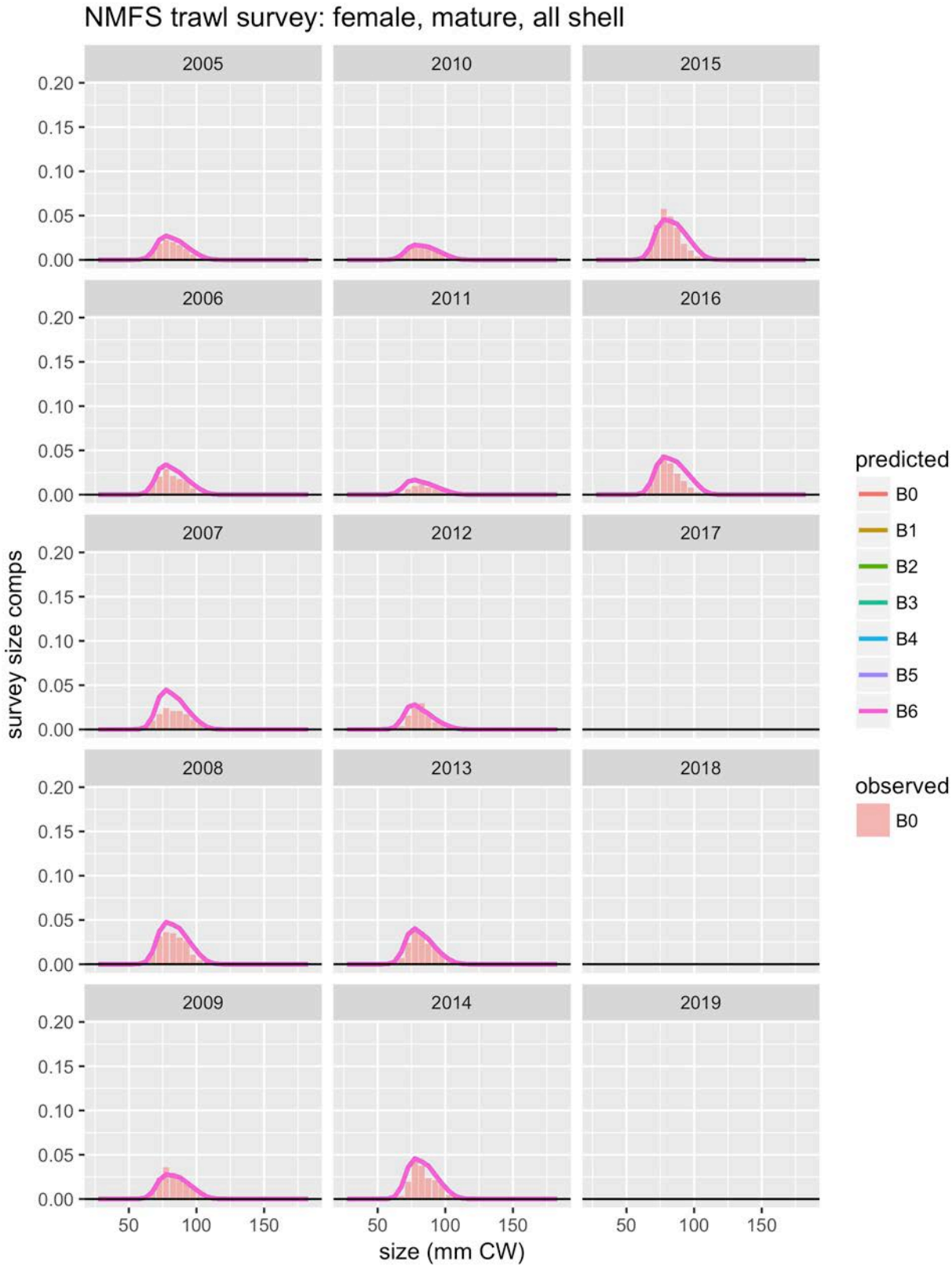


Figure 136. Comparison of observed and predicted female, mature, all shell survey size comps for NMFS trawl survey. Page 3 of 3.

Growth data
No fits to growth data.

No growth data fit.

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.

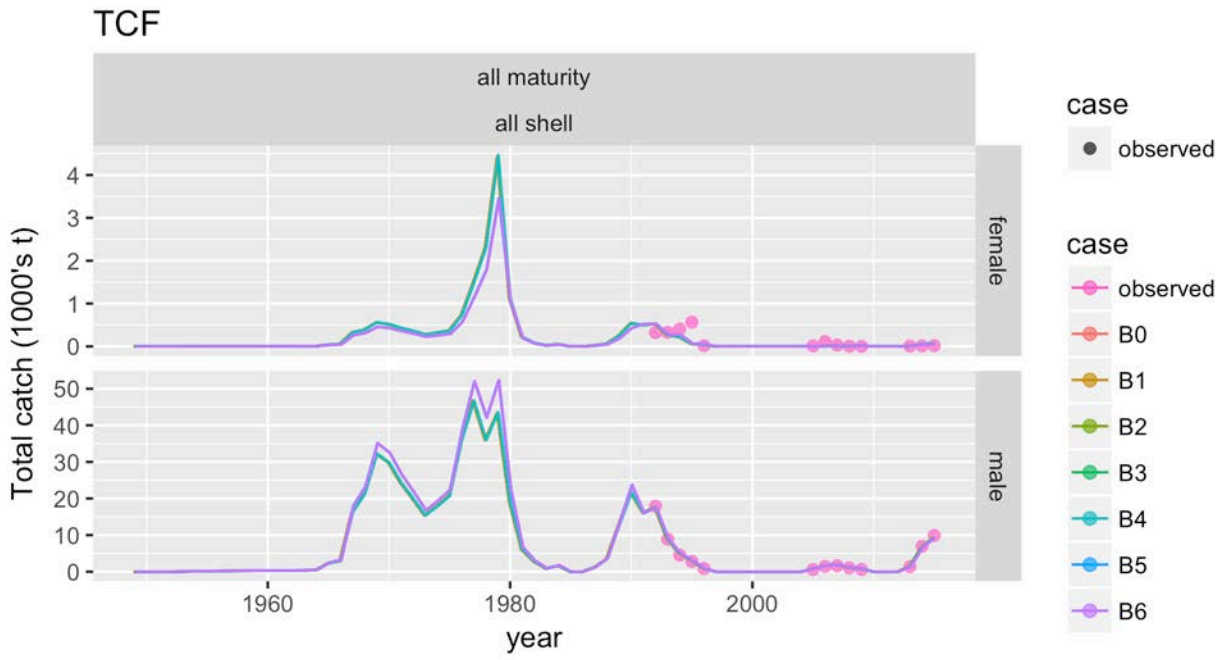


Figure 137. Comparison of observed and predicted total catch for TCF.

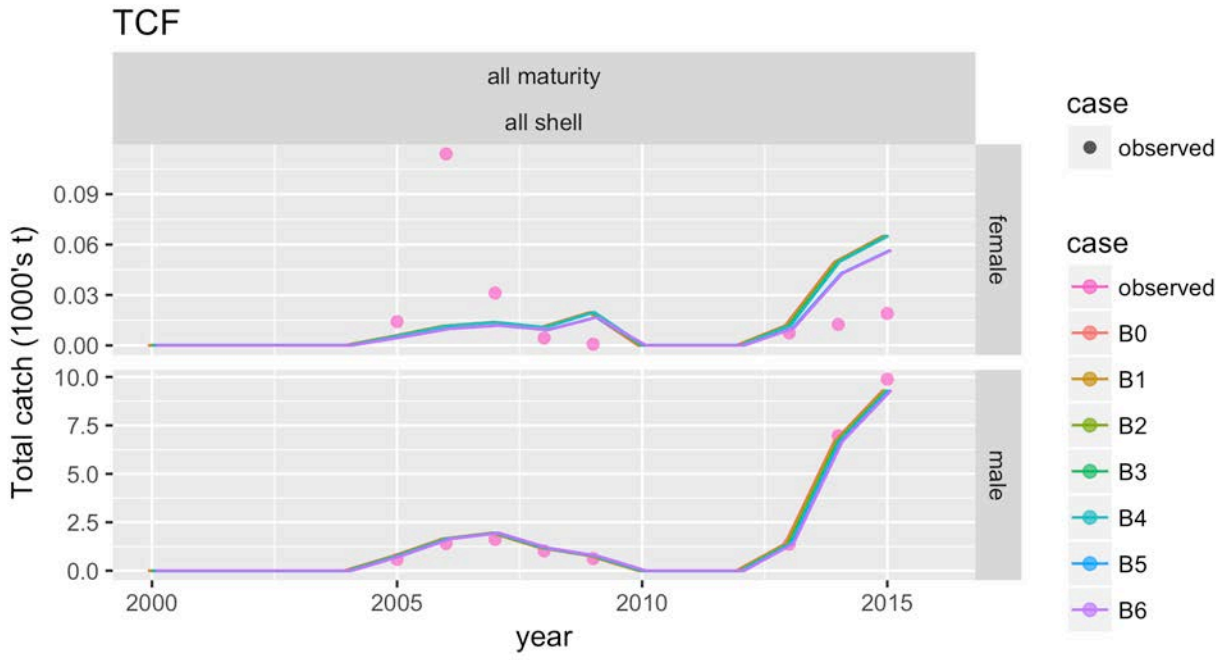


Figure 138. Comparison of observed and predicted total catch for TCF. Recent time period.

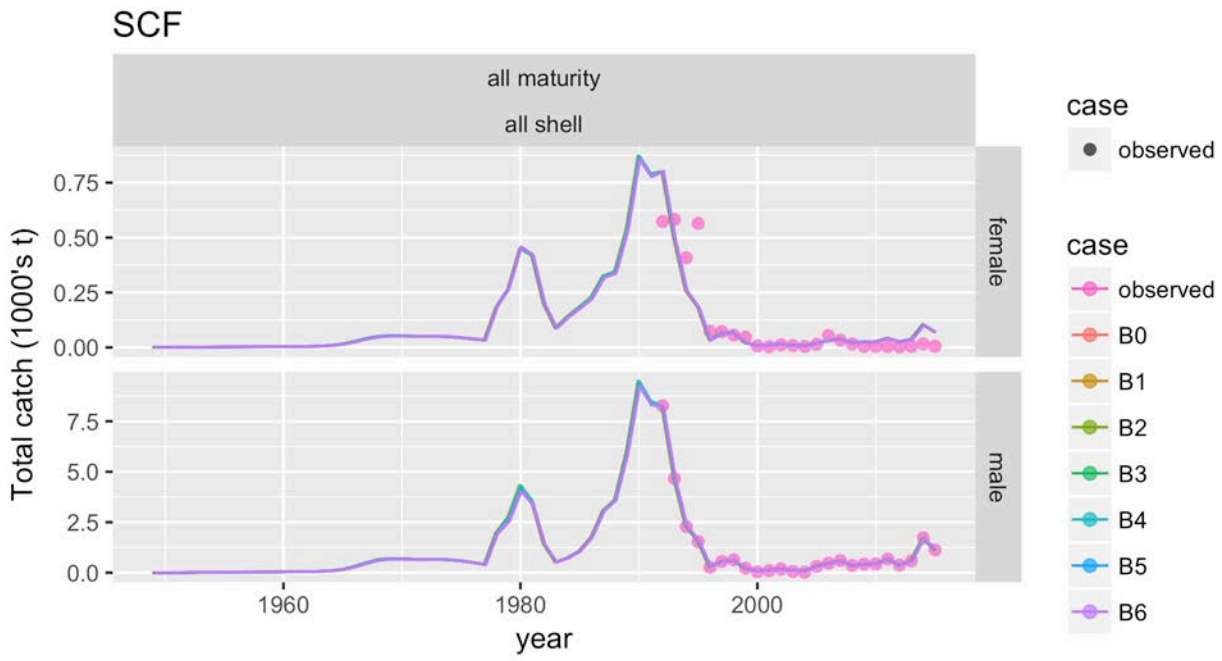


Figure 139. Comparison of observed and predicted total catch for SCF.

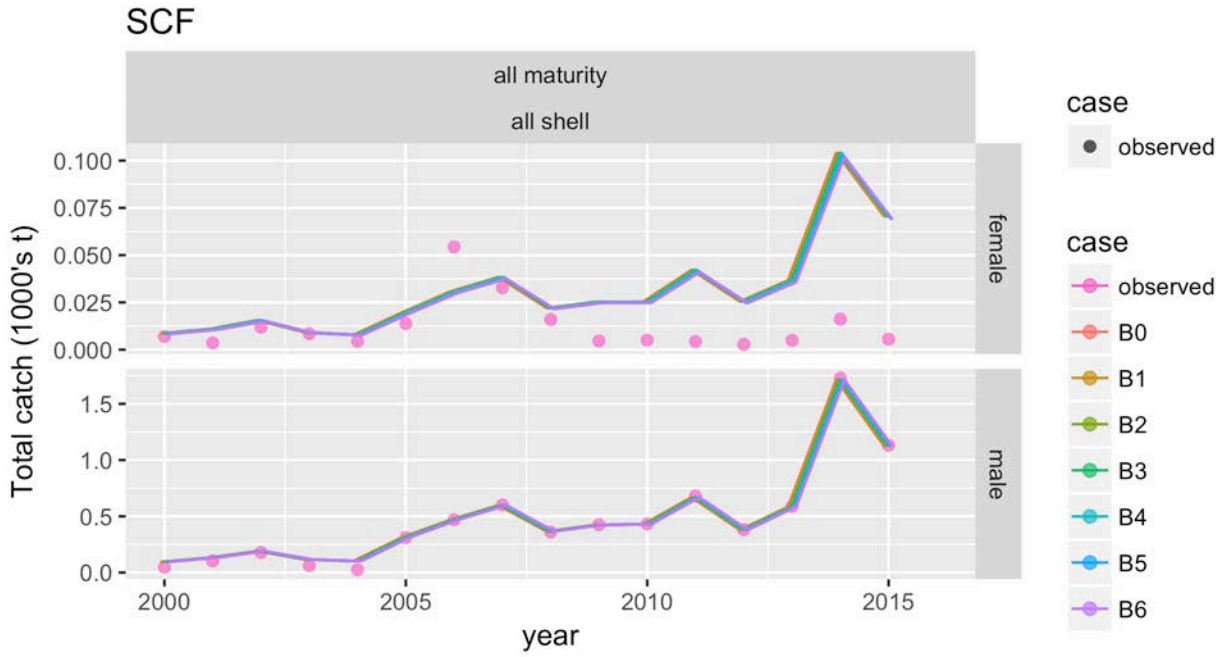


Figure 140. Comparison of observed and predicted total catch for SCF. Recent time period.

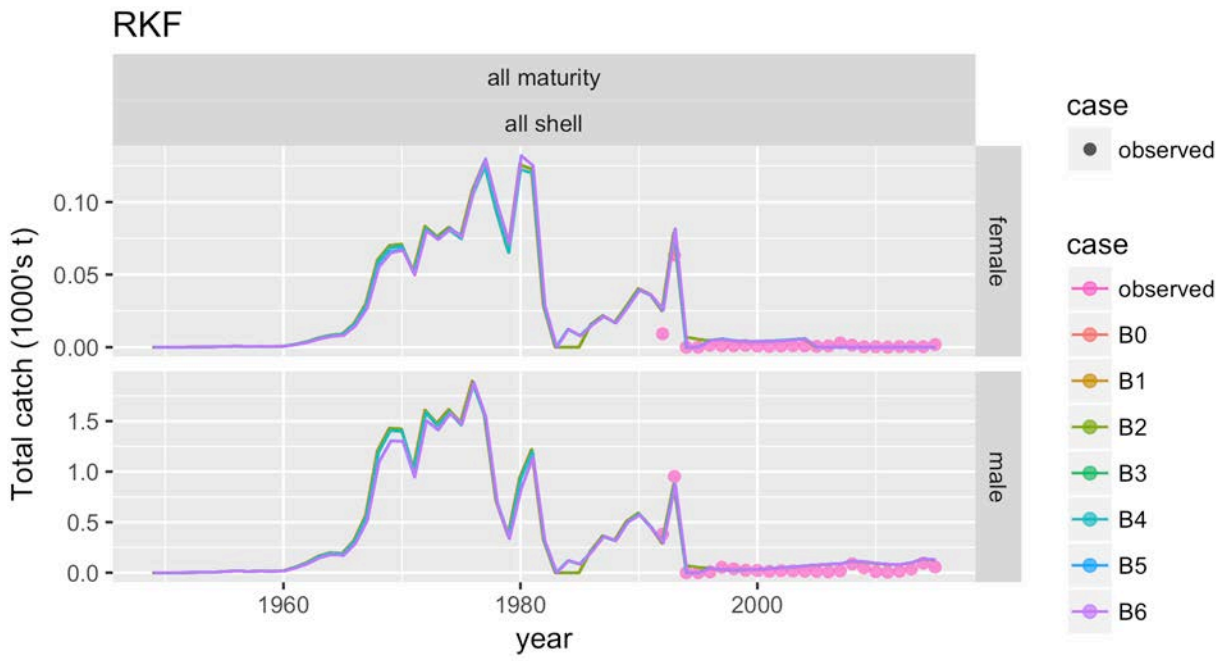


Figure 141. Comparison of observed and predicted total catch for RKF.

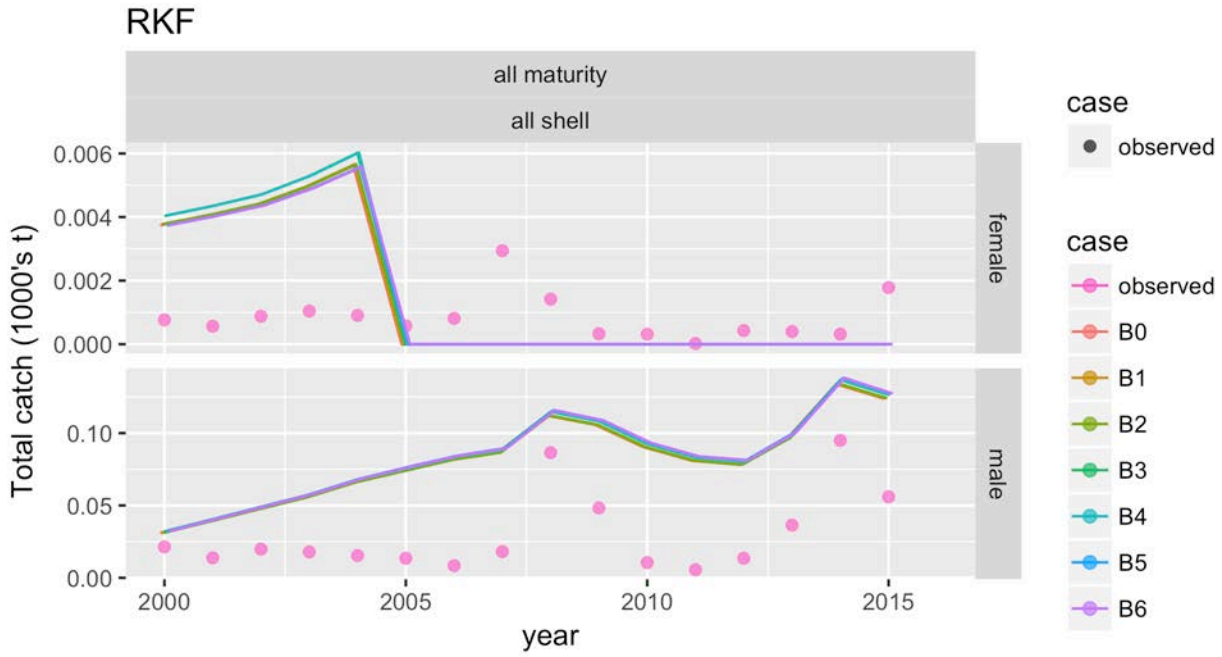


Figure 142. Comparison of observed and predicted total catch for RKF. Recent time period.

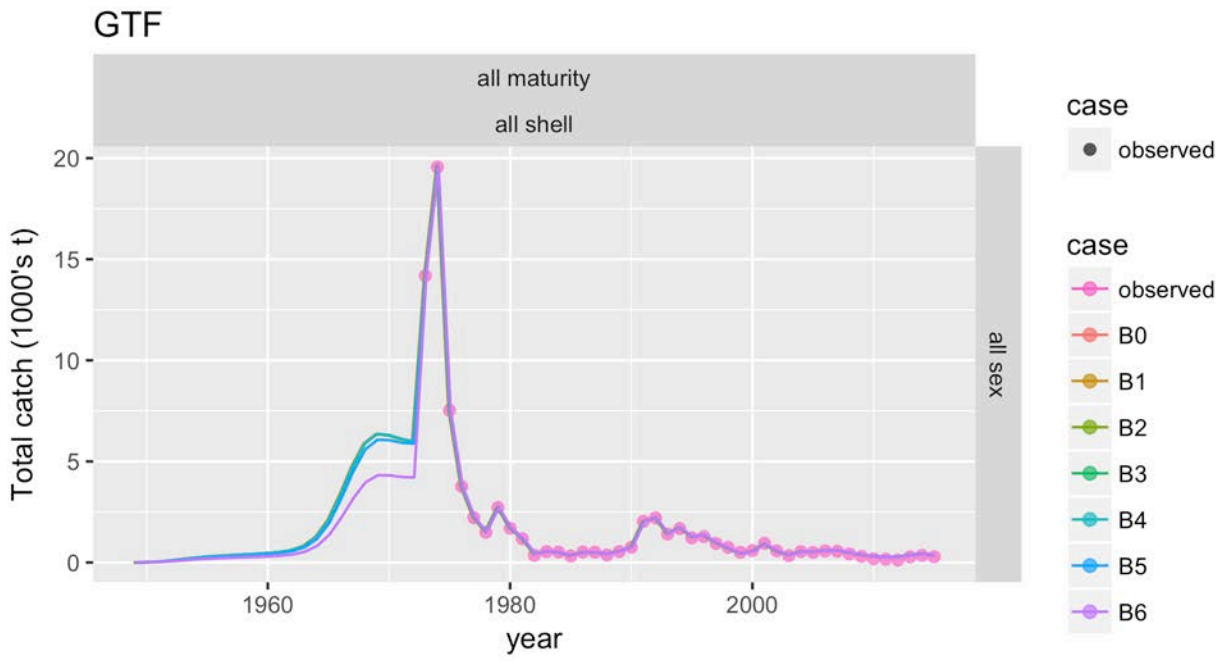


Figure 143. Comparison of observed and predicted total catch for GTF.

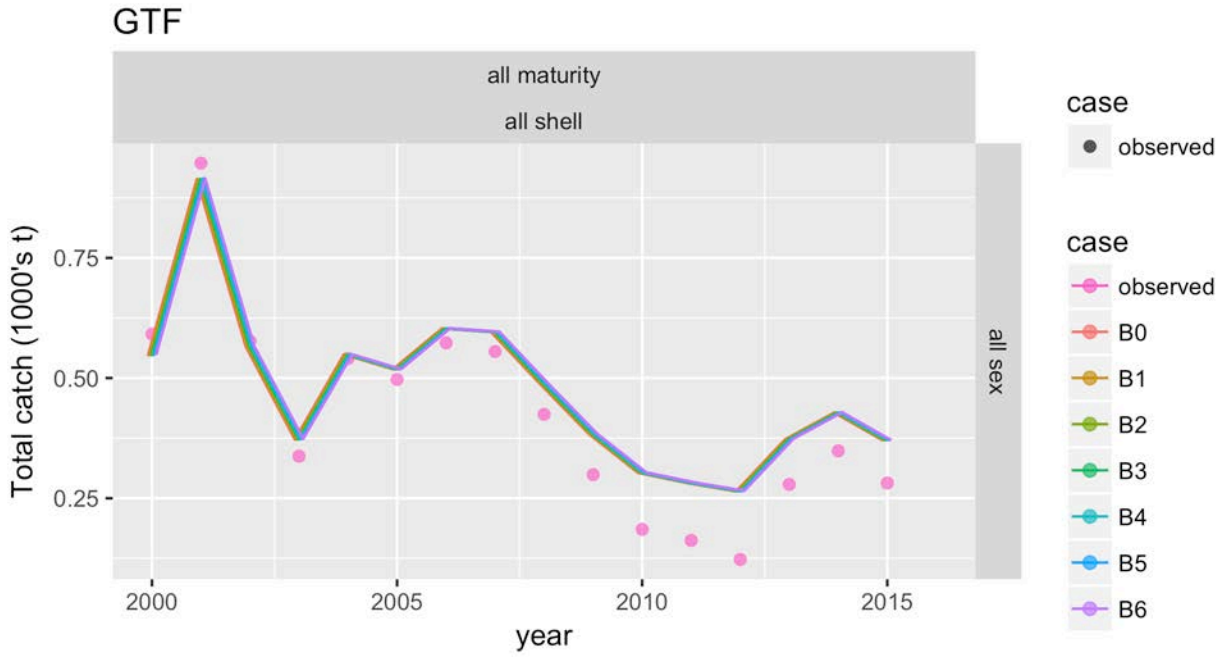


Figure 144. Comparison of observed and predicted total catch for GTF. Recent time period.

Total fishery mean size comps

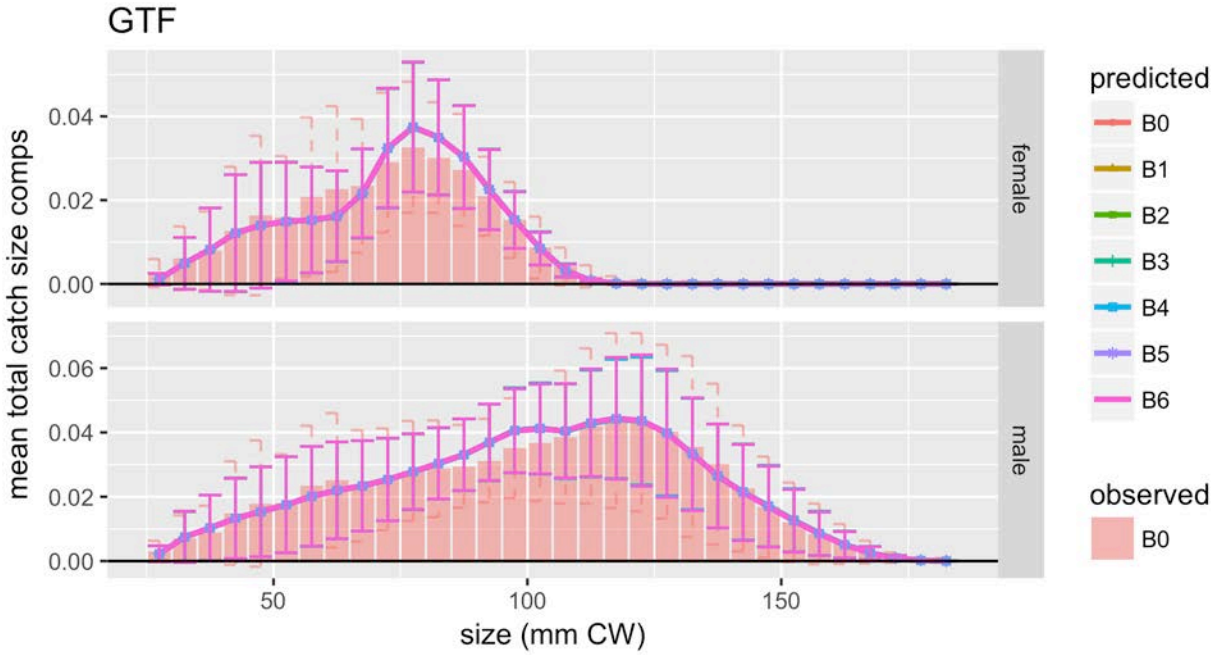


Figure 145. Comparison of observed and predicted &&xms mean total catch size comps for GTF.

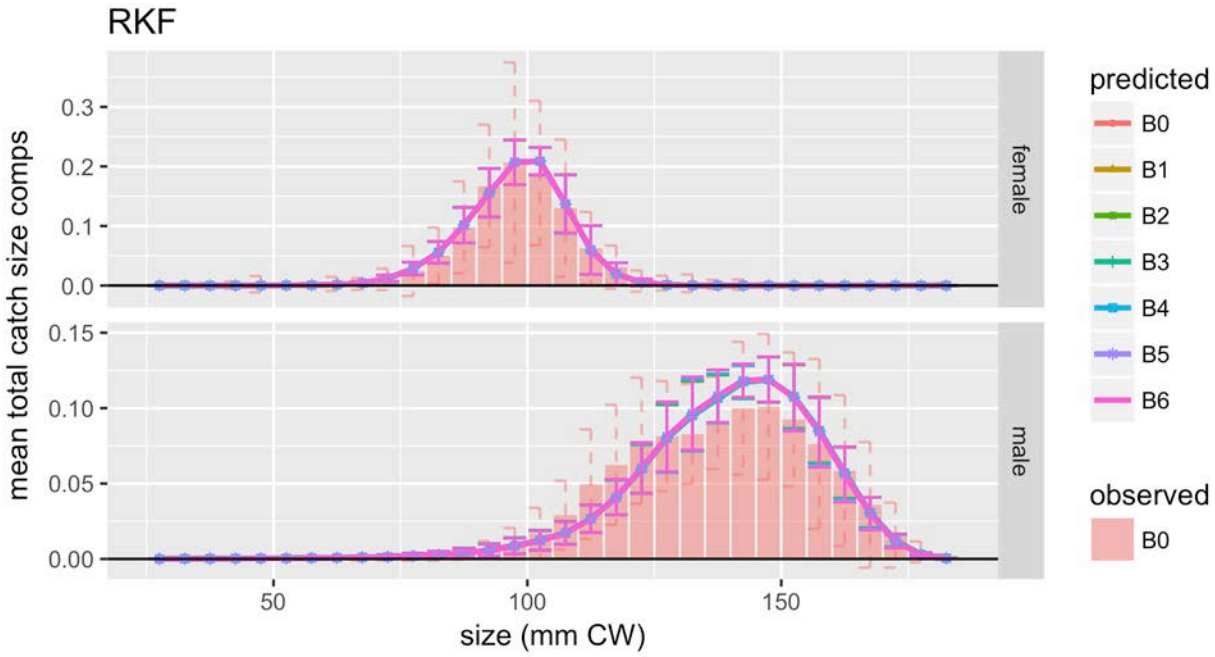


Figure 146. Comparison of observed and predicted &&xms mean total catch size comps for RKF.

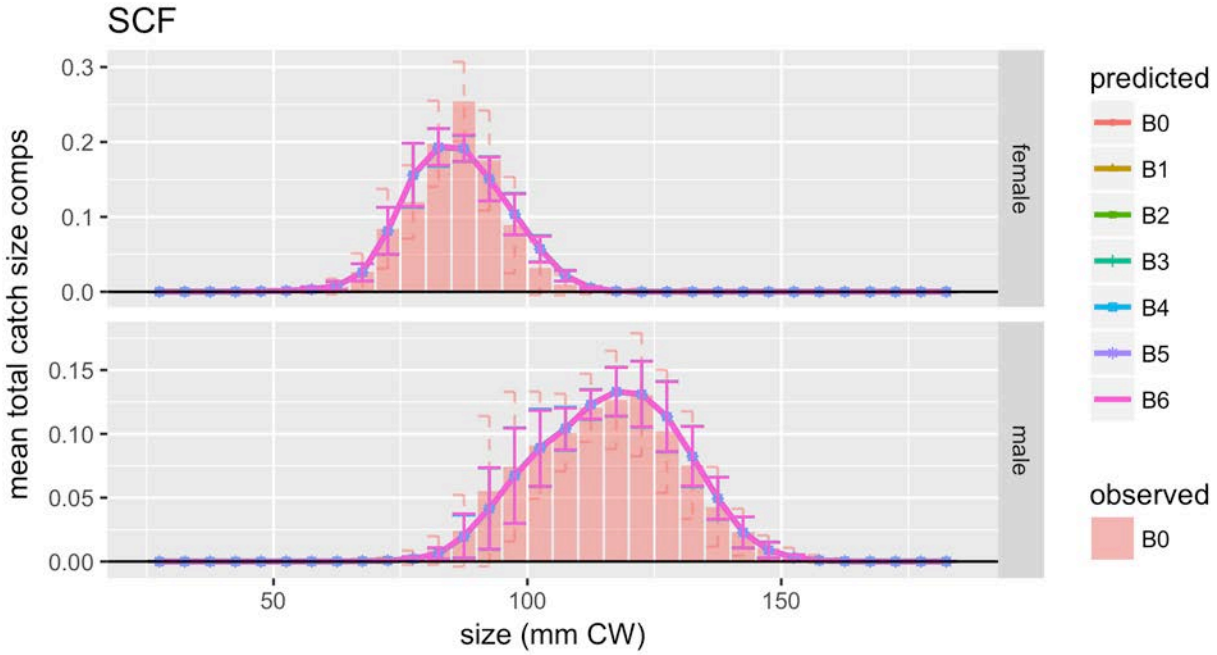


Figure 147. Comparison of observed and predicted &&xms mean total catch size comps for SCF.

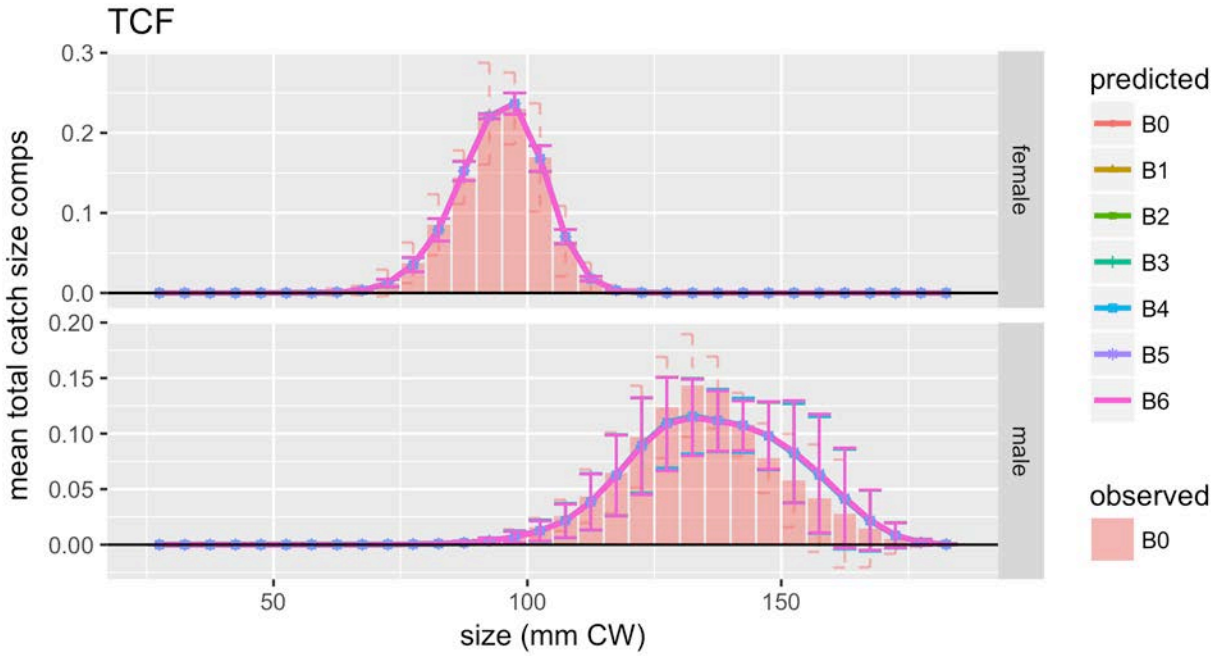


Figure 148. Comparison of observed and predicted &&xms mean total catch size comps for TCF.

Total fishery catch size comps

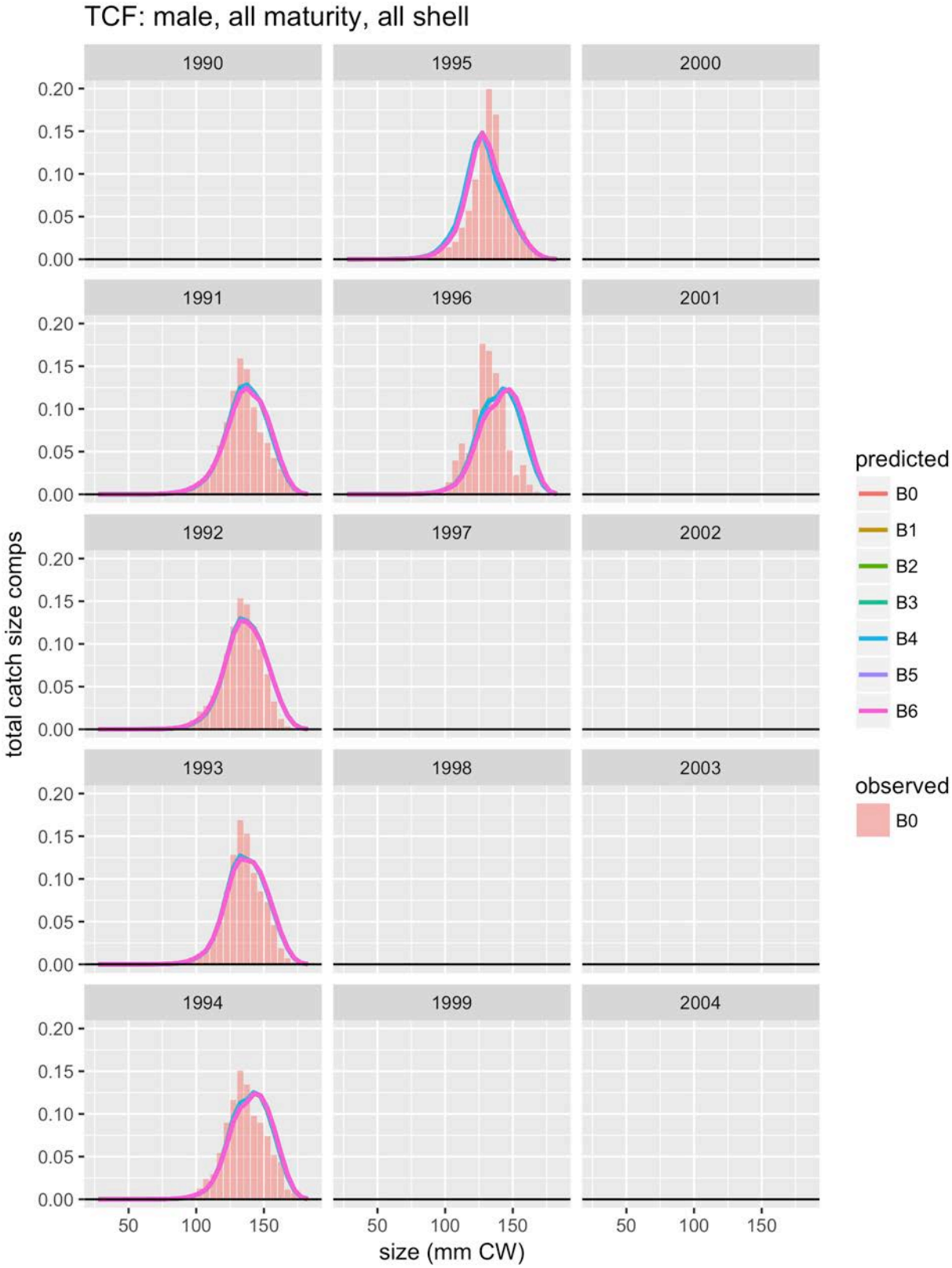


Figure 149. Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 1 of 2.

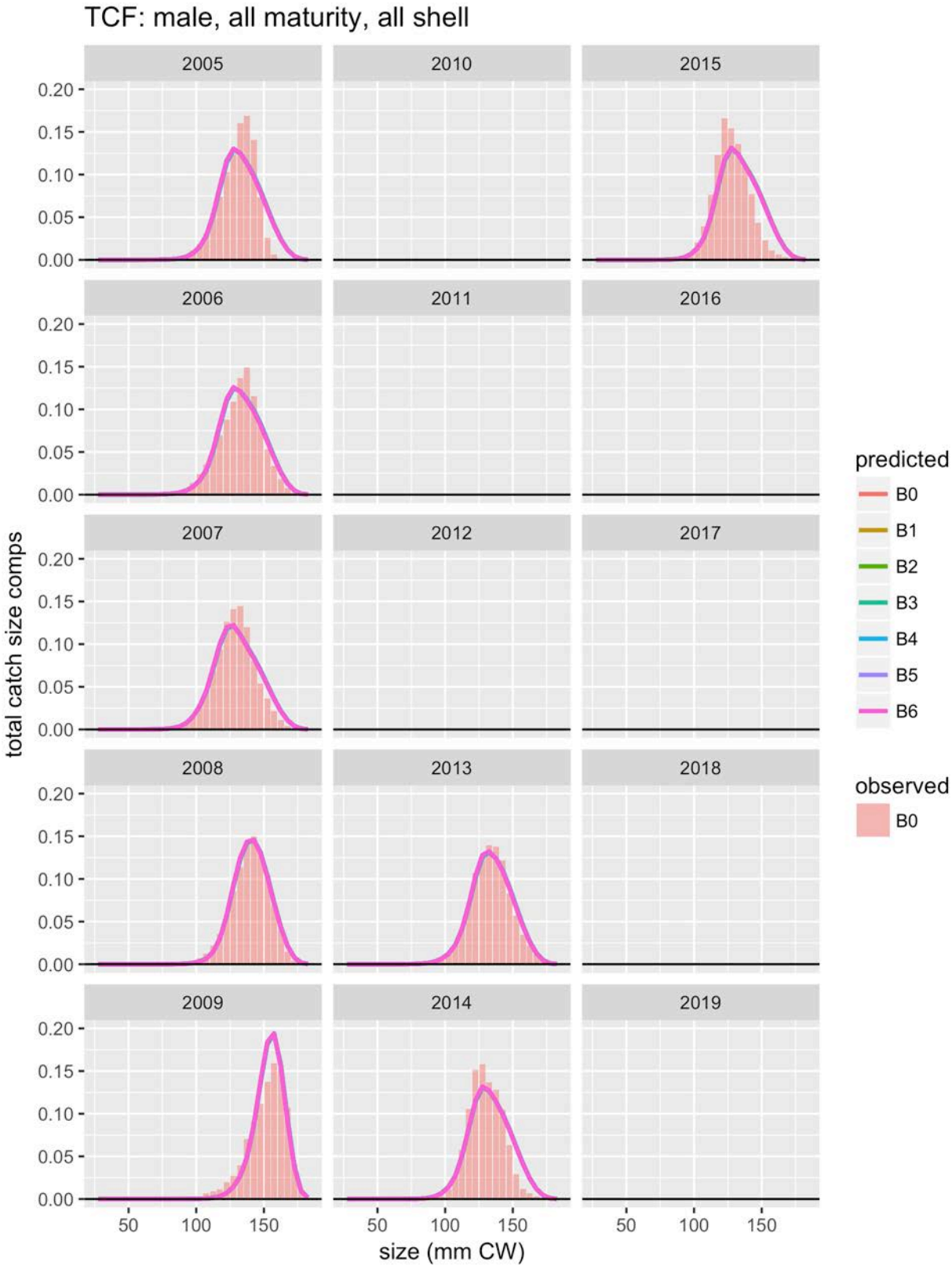


Figure 150. Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 2 of 2.

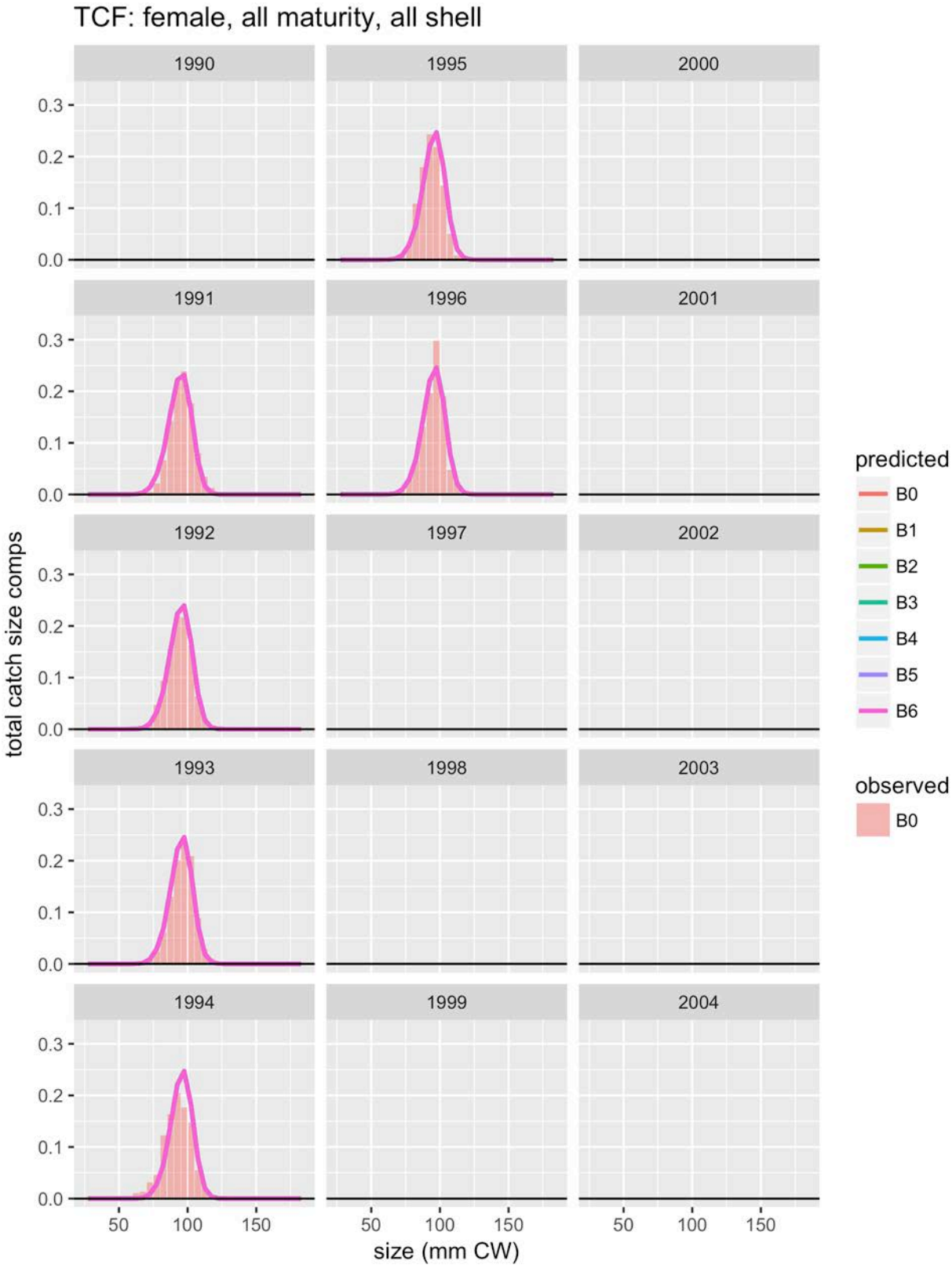


Figure 151. Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 1 of 2.

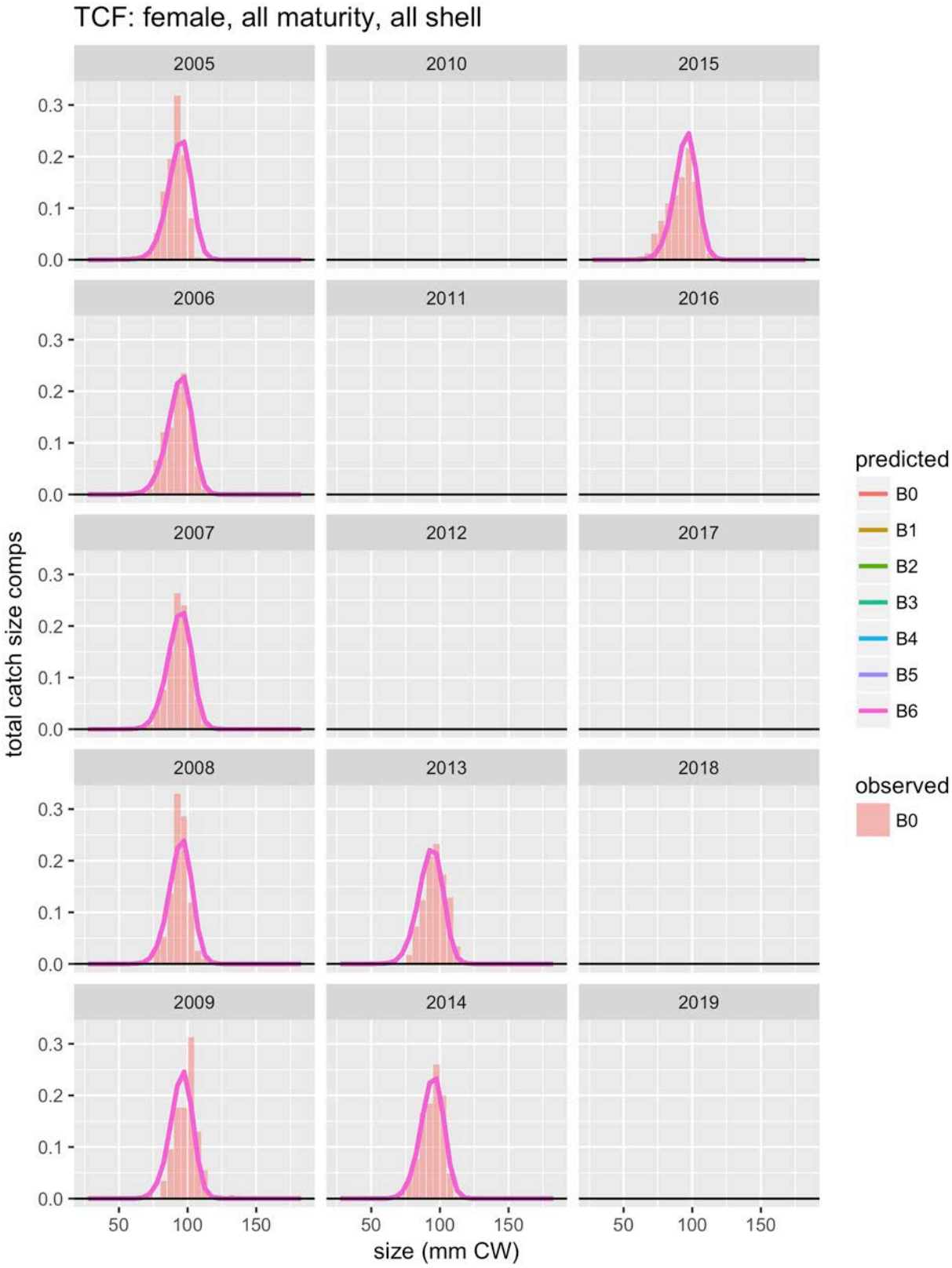


Figure 152. Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 2 of 2.

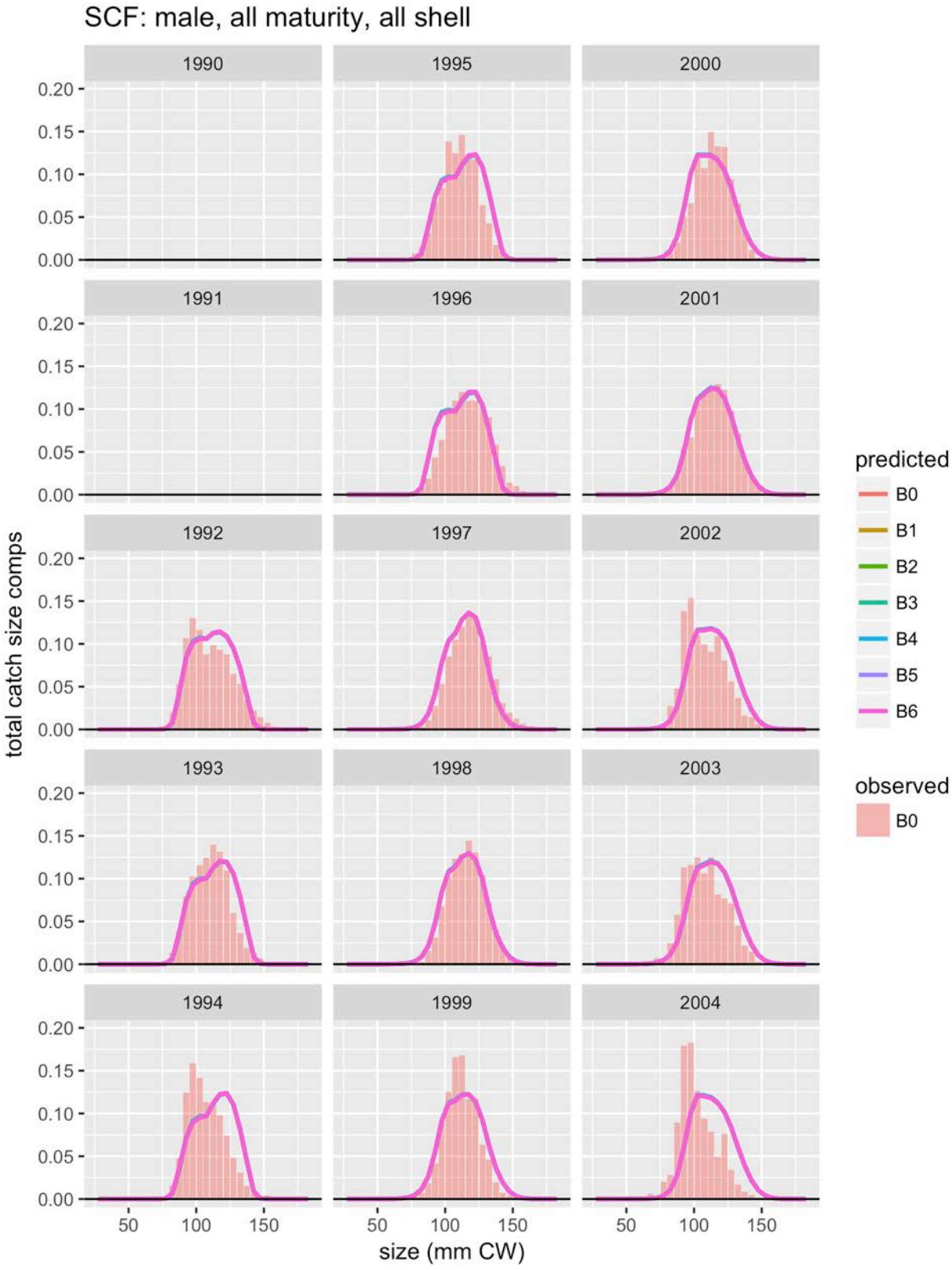


Figure 153. Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 1 of 2.

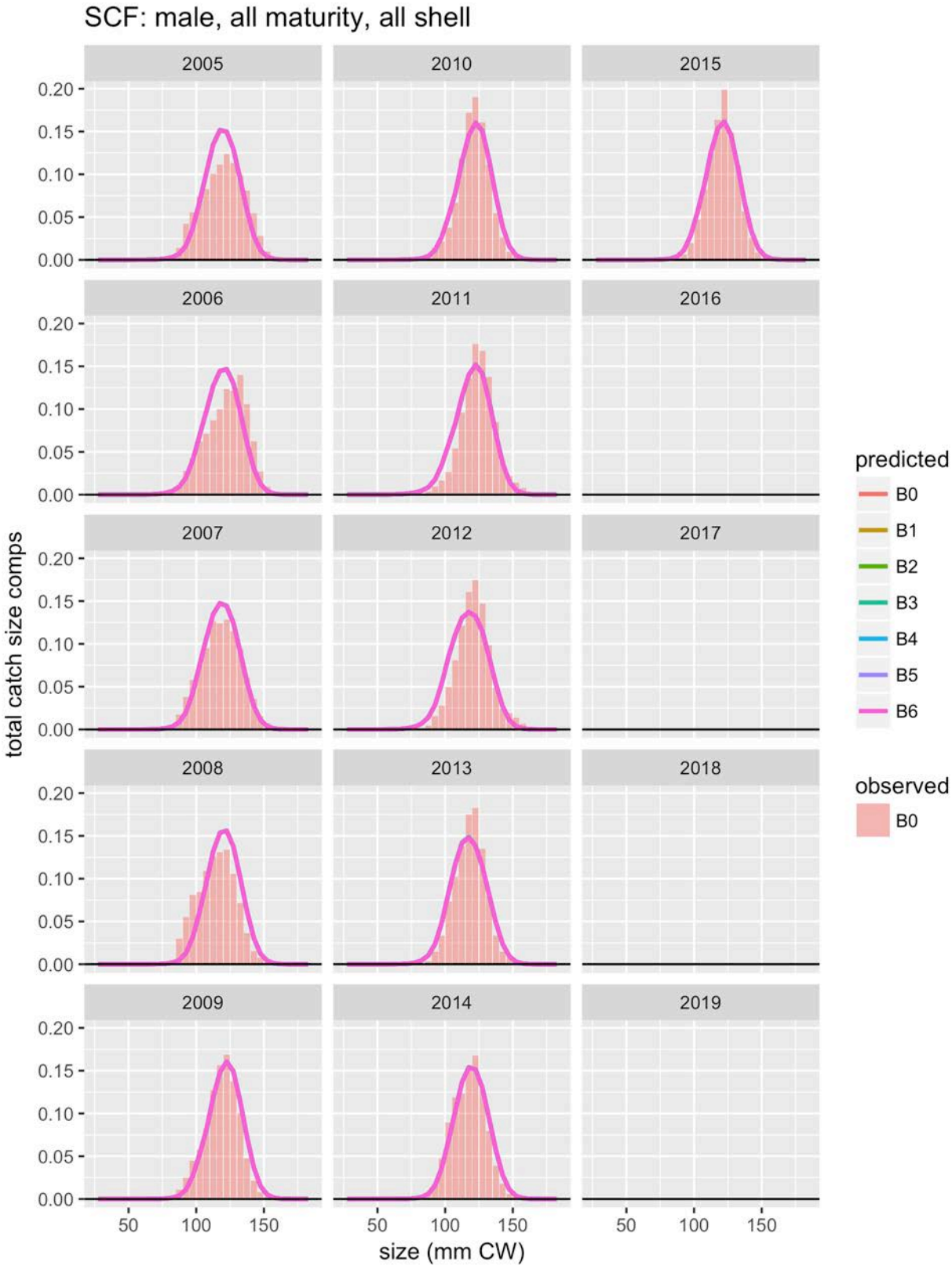


Figure 154. Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 2 of 2.

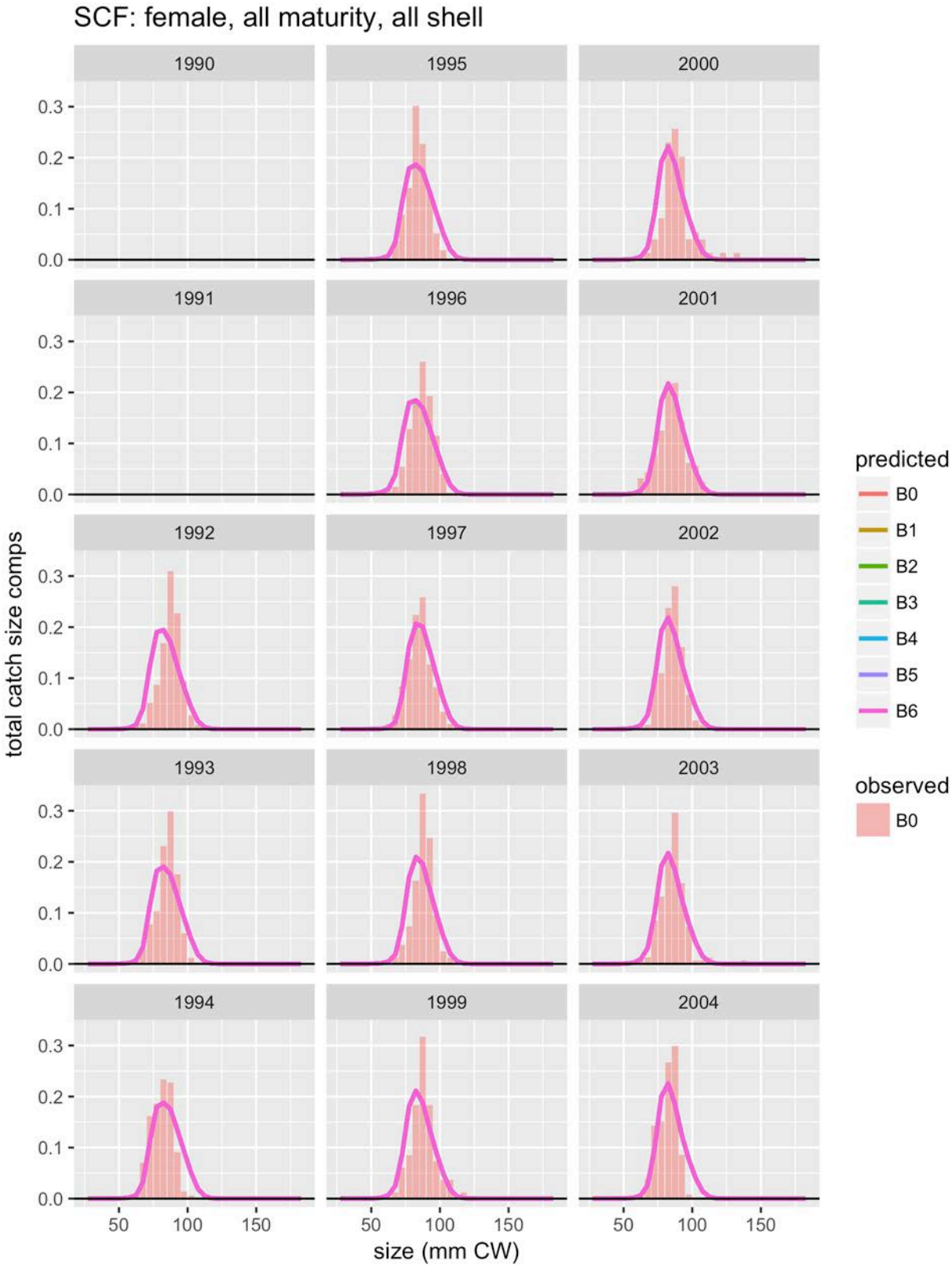


Figure 155. Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 1 of 2.

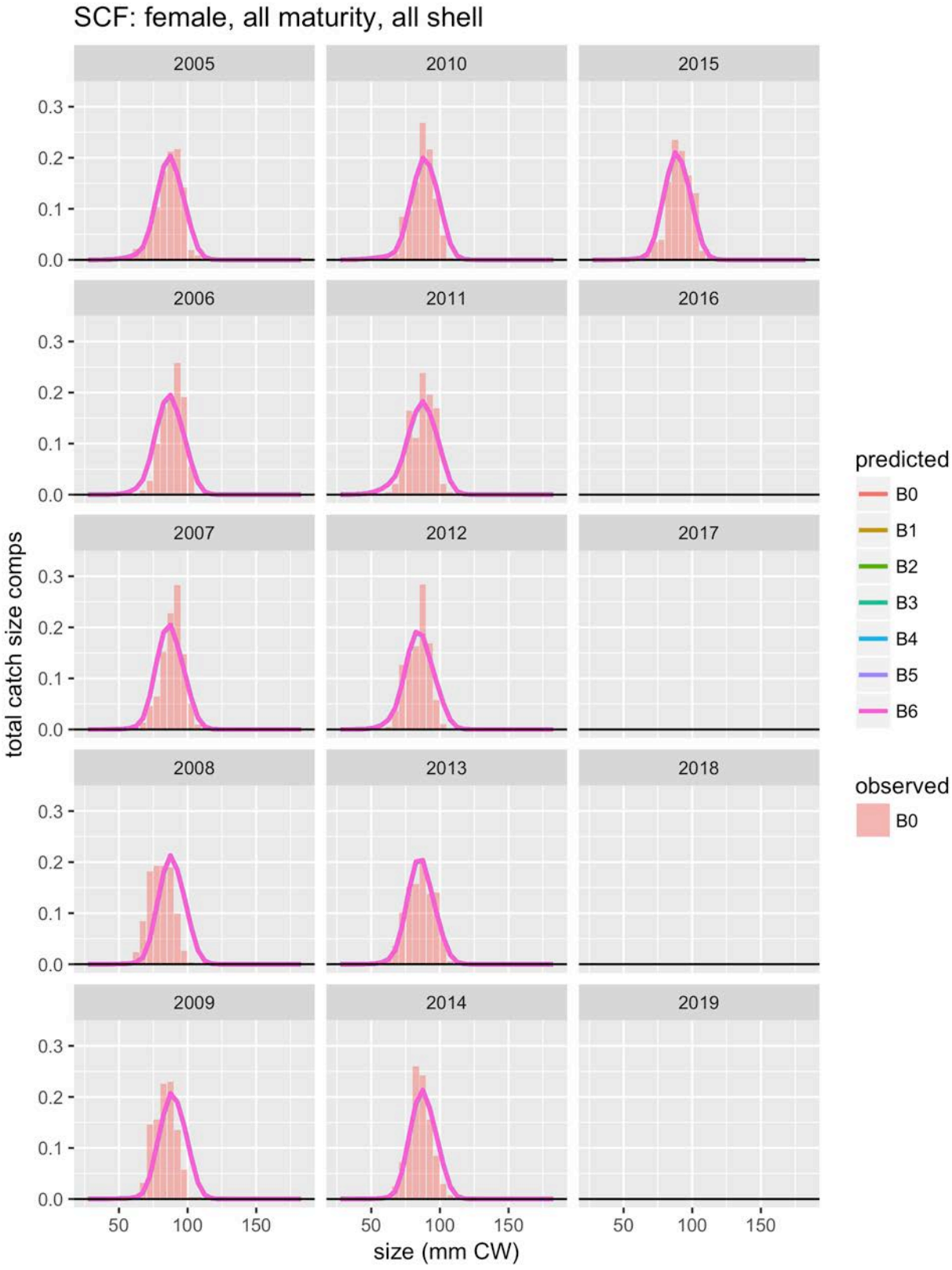


Figure 156. Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 2 of 2.

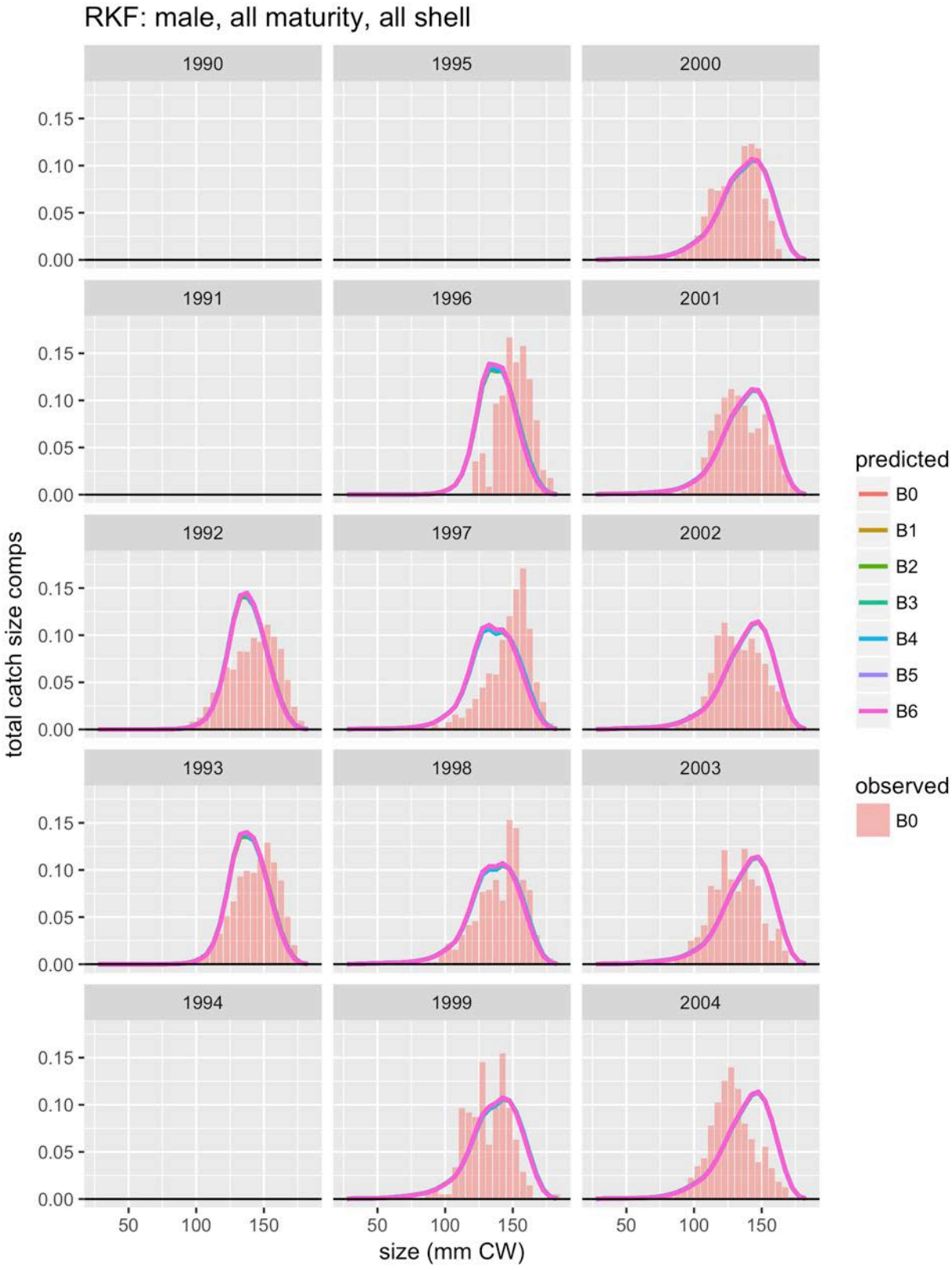


Figure 157. Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 1 of 2.

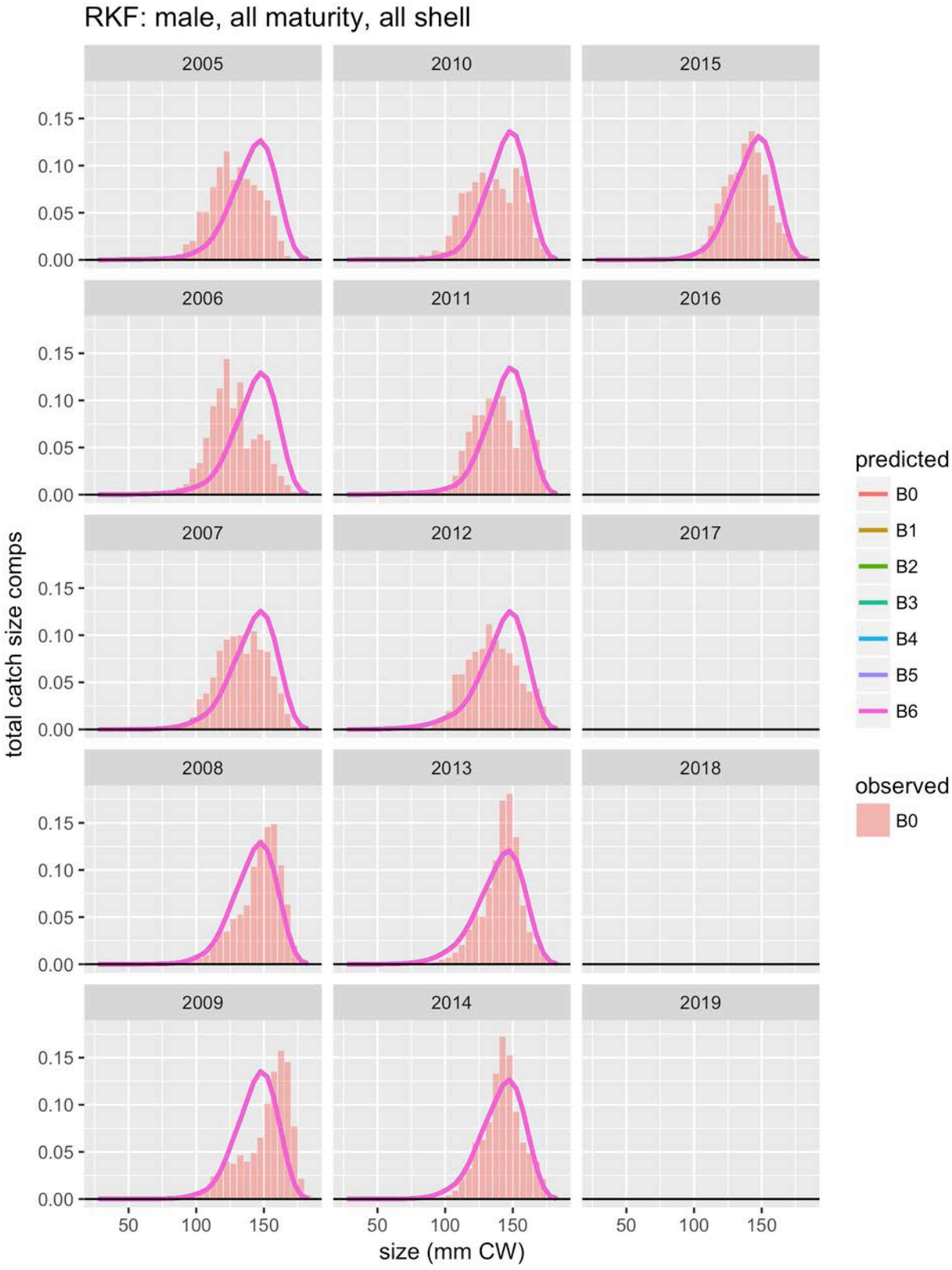


Figure 158. Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 2 of 2.

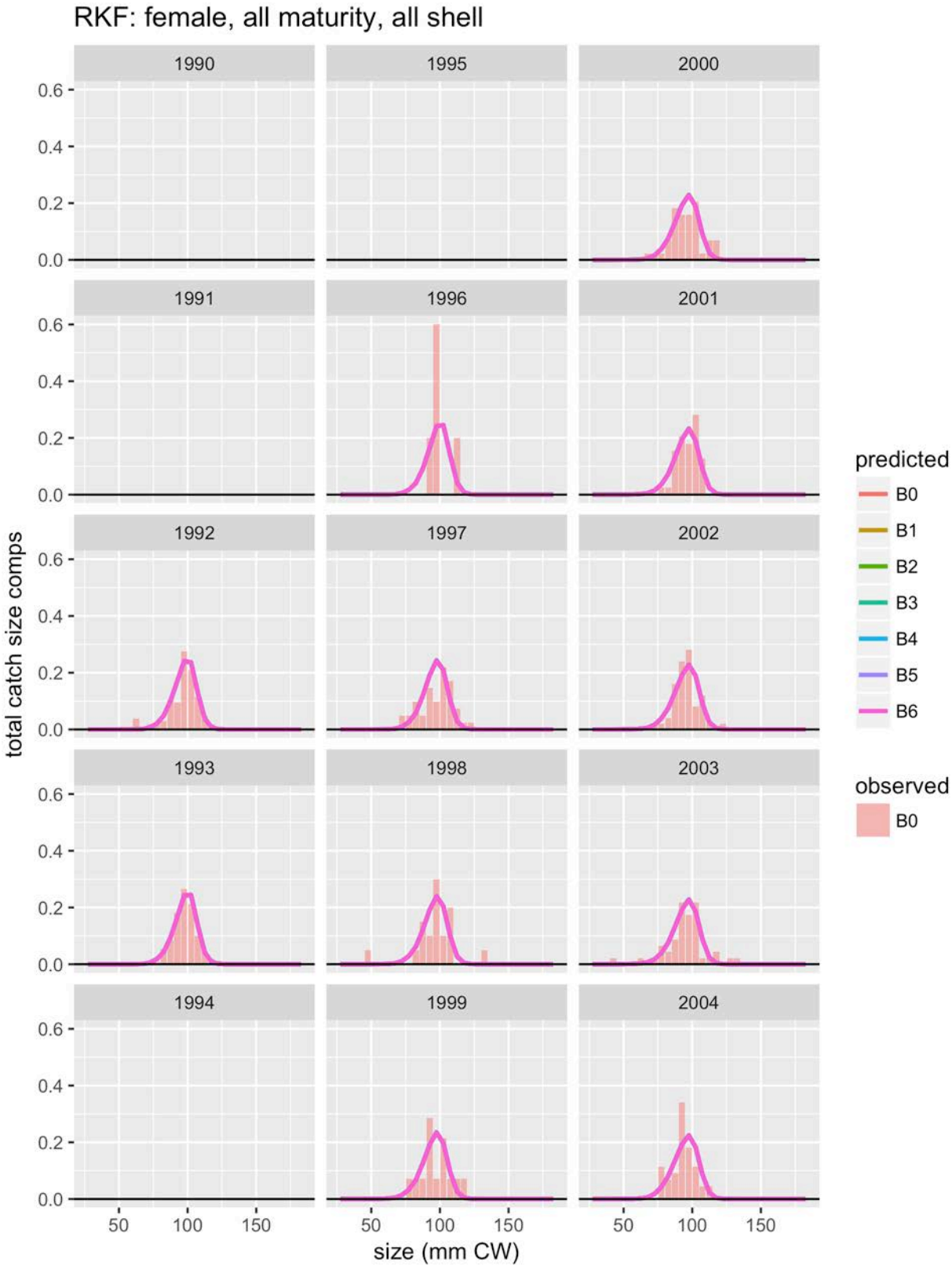


Figure 159. Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 1 of 2.

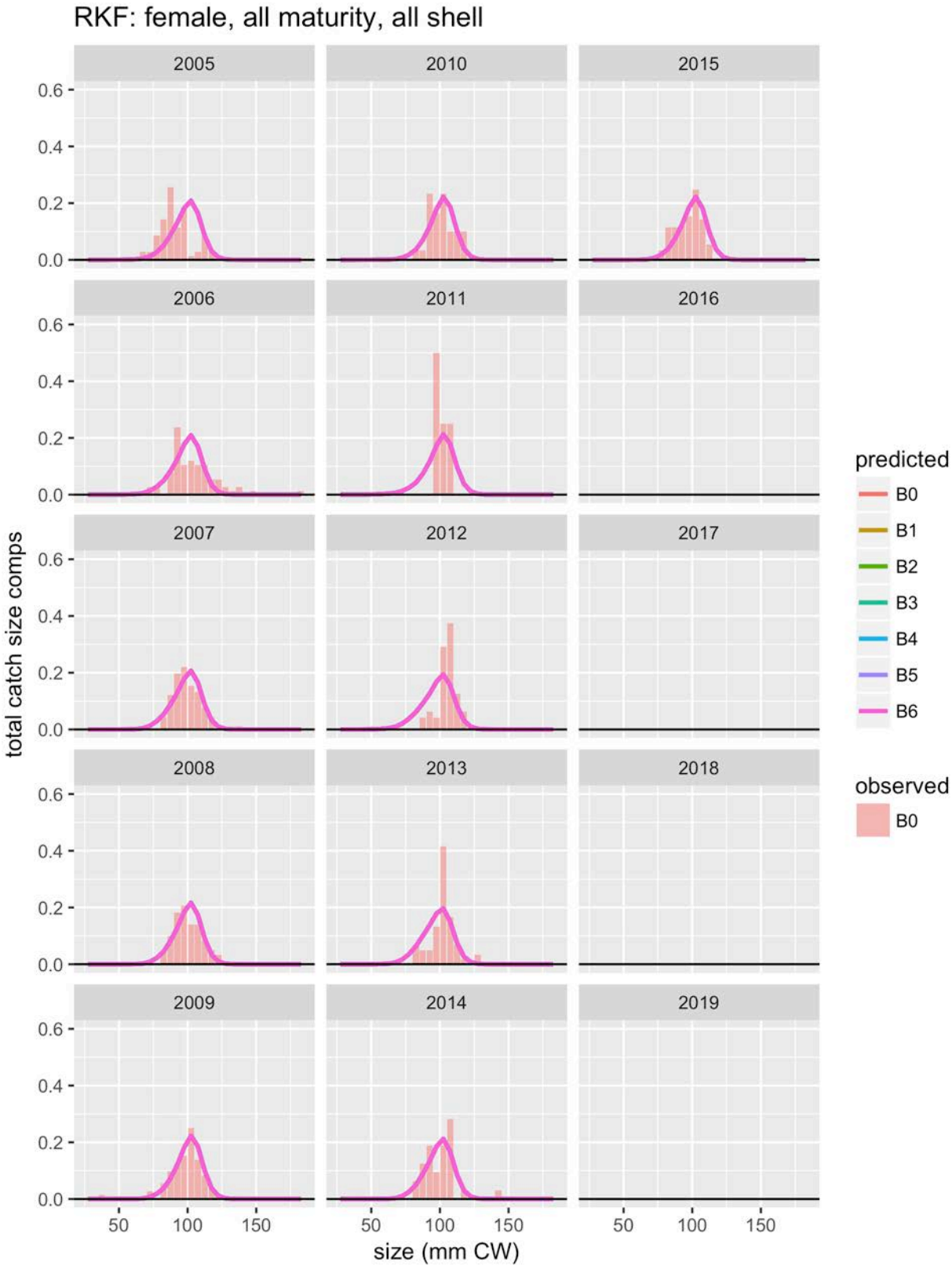


Figure 160. Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 2 of 2.

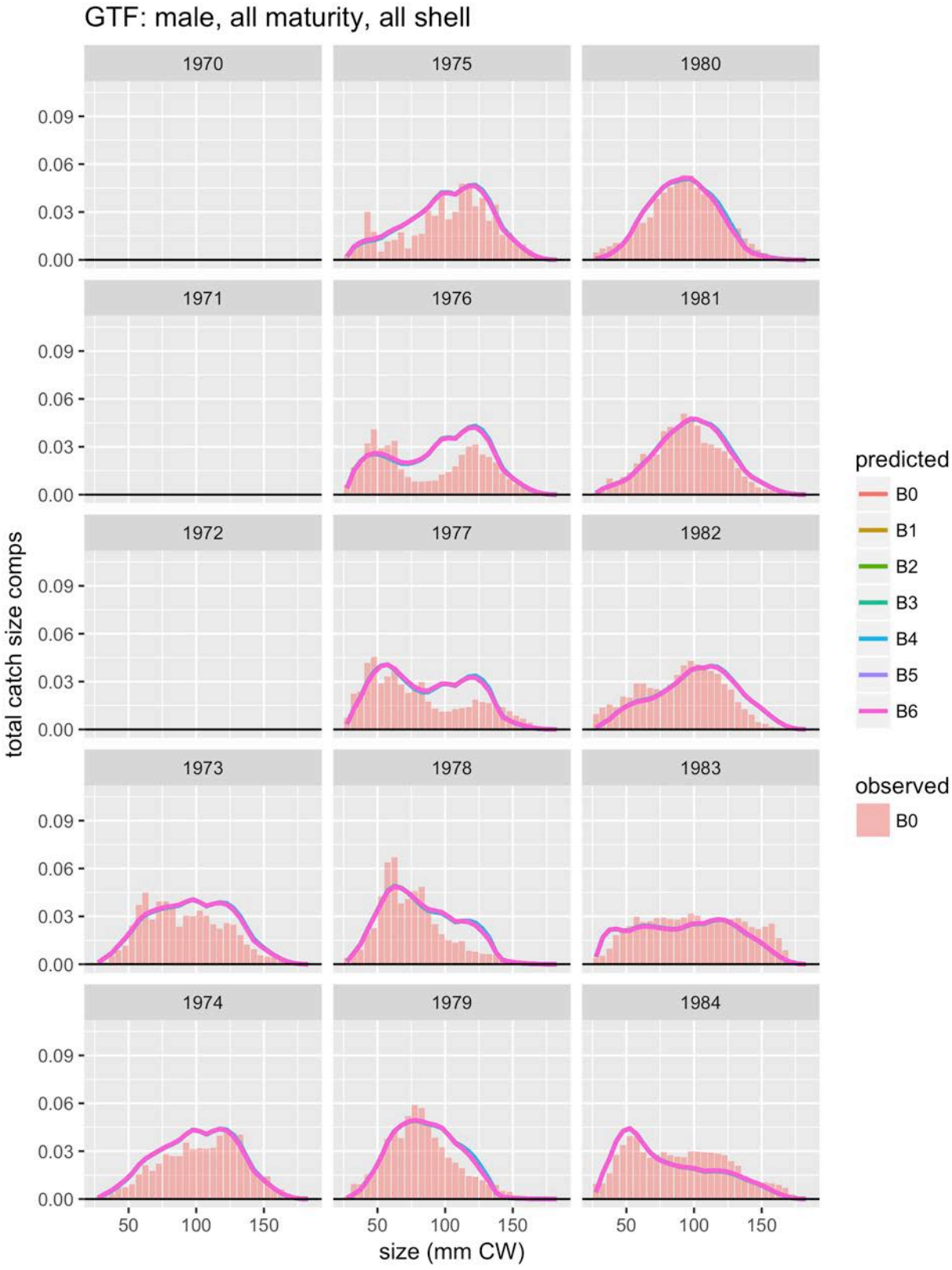


Figure 161. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 1 of 4.

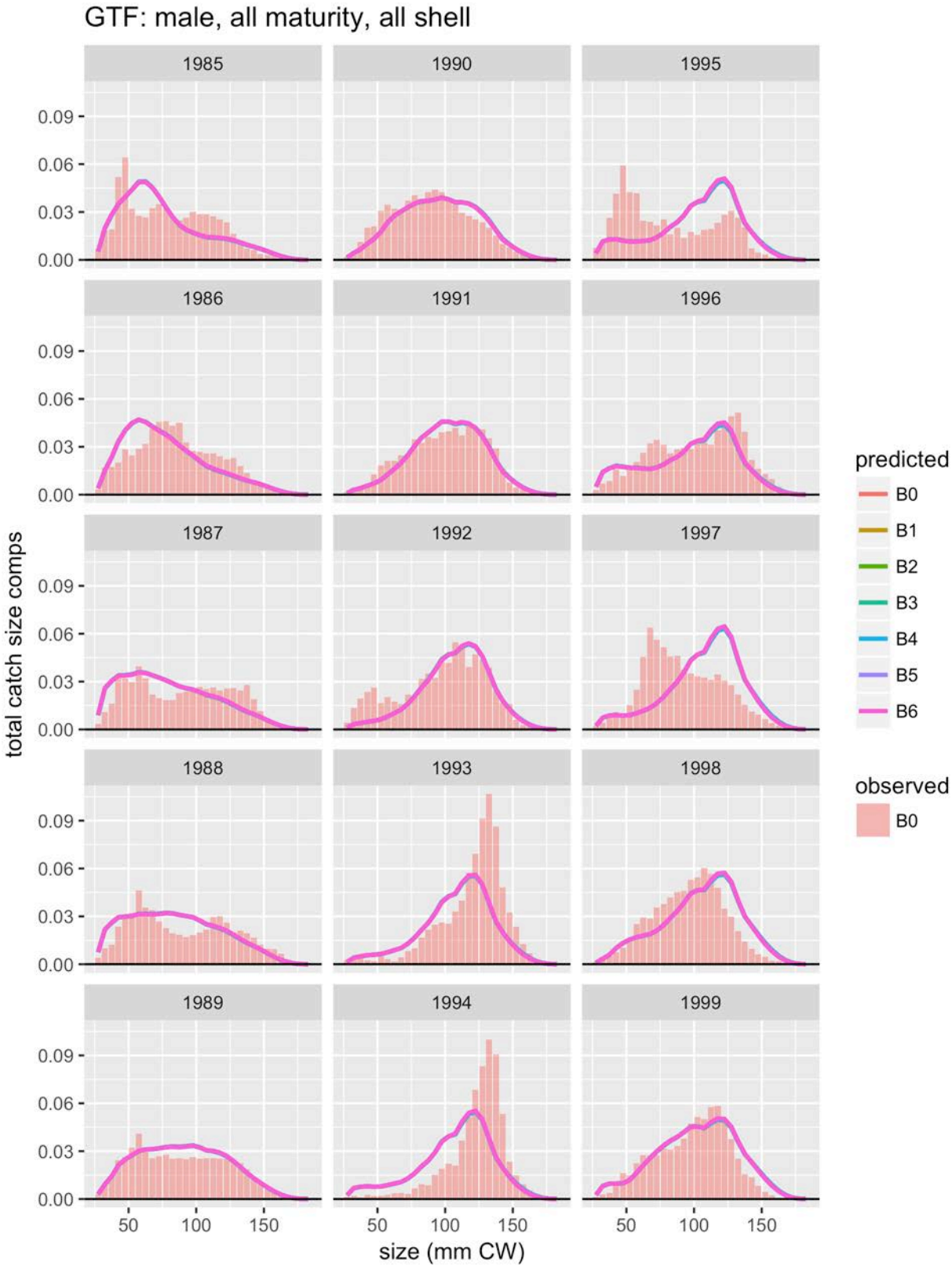


Figure 162. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 2 of 4.

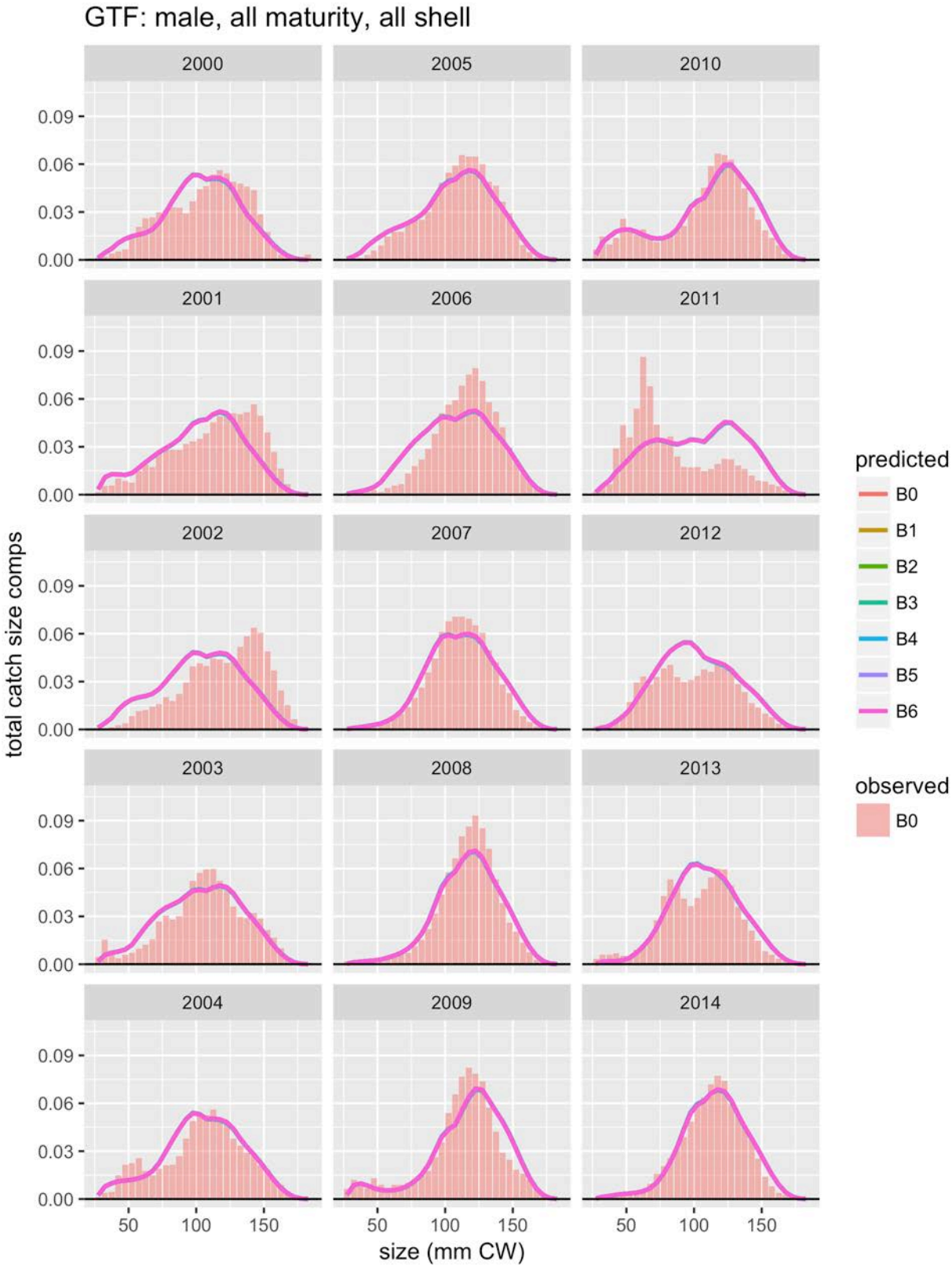


Figure 163. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 3 of 4.

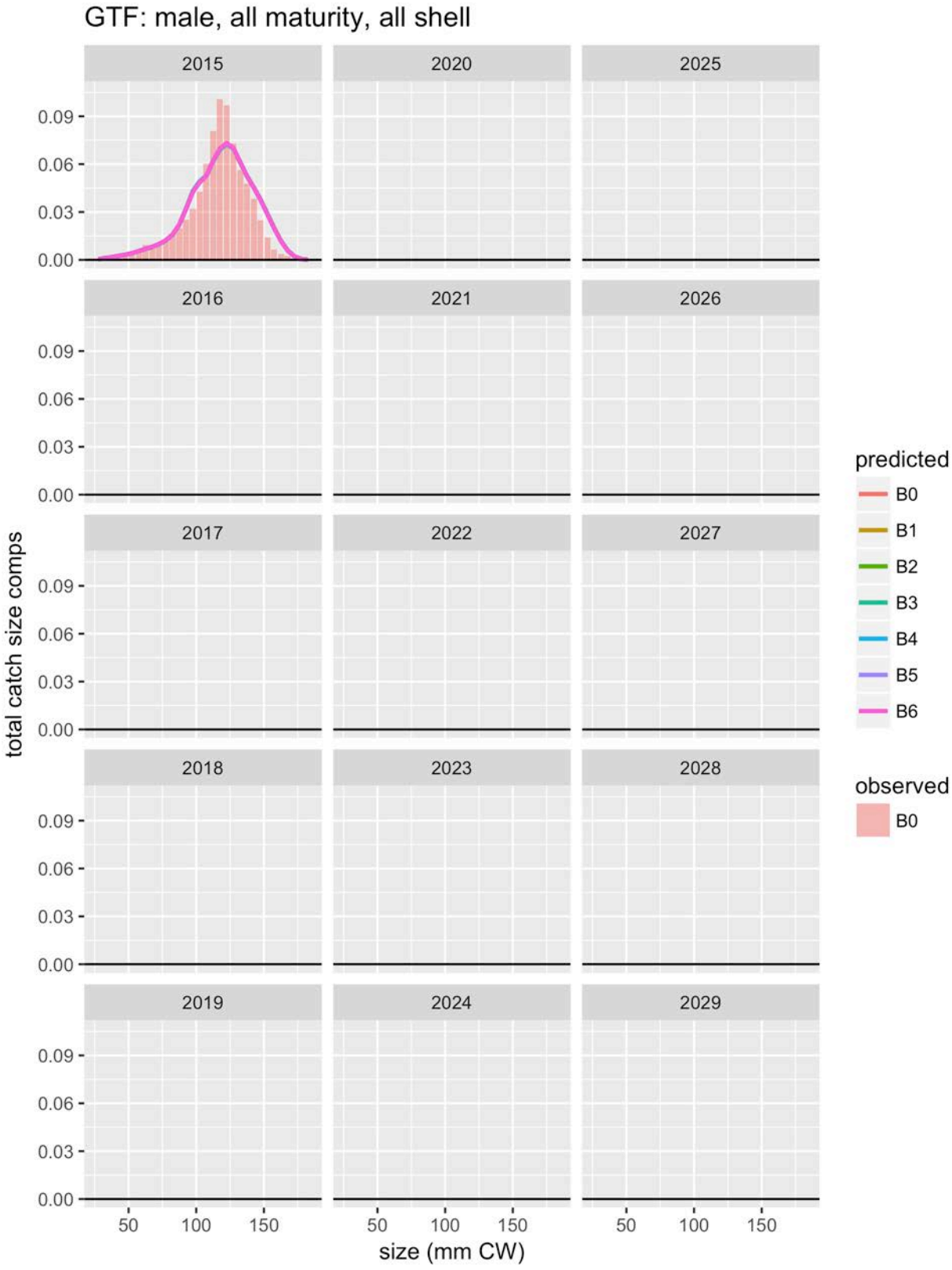


Figure 164. Comparison of observed and predicted male, all maturity, all shell total catch size comps for GTF. Page 4 of 4.

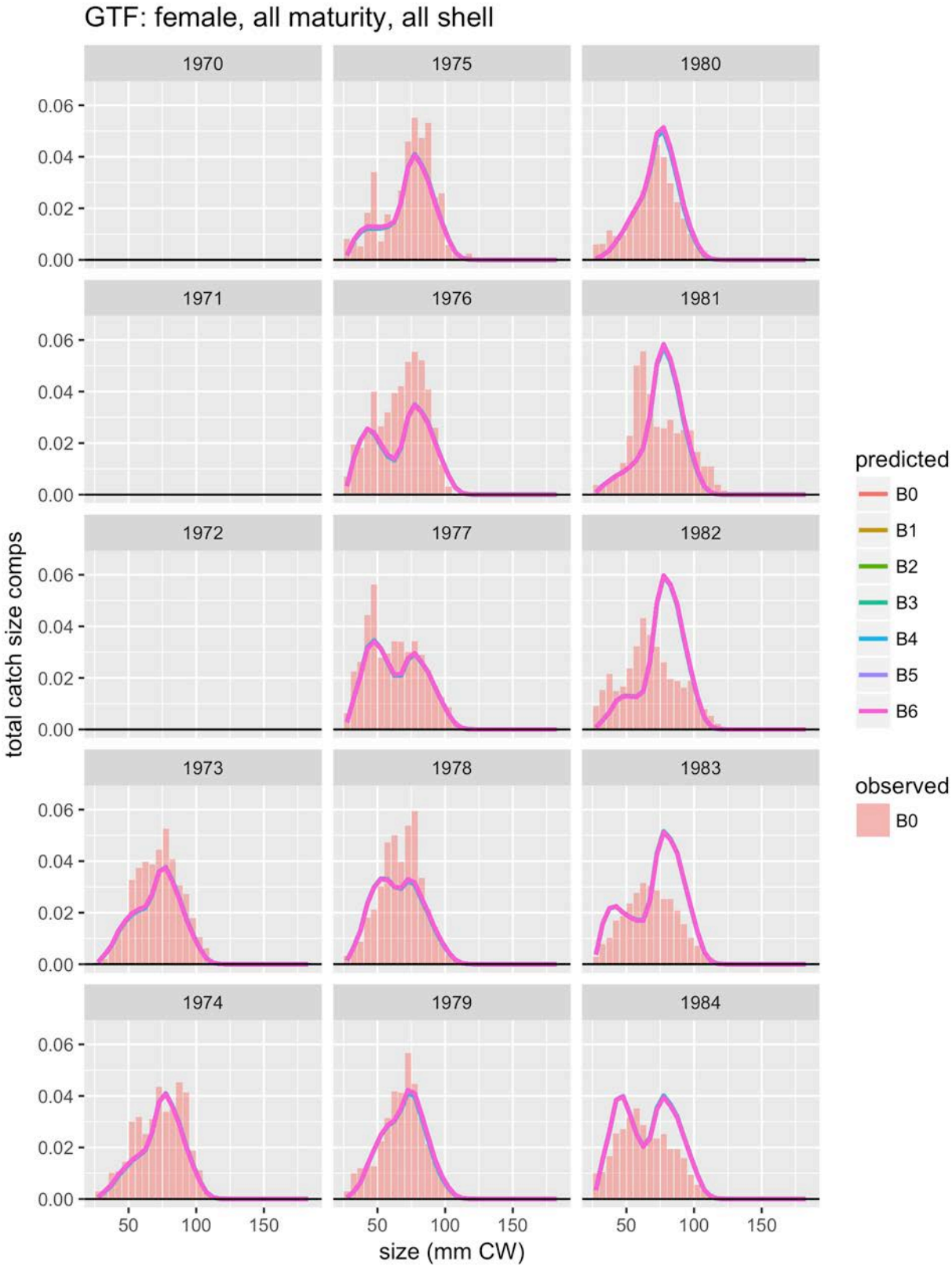


Figure 165. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 1 of 4.

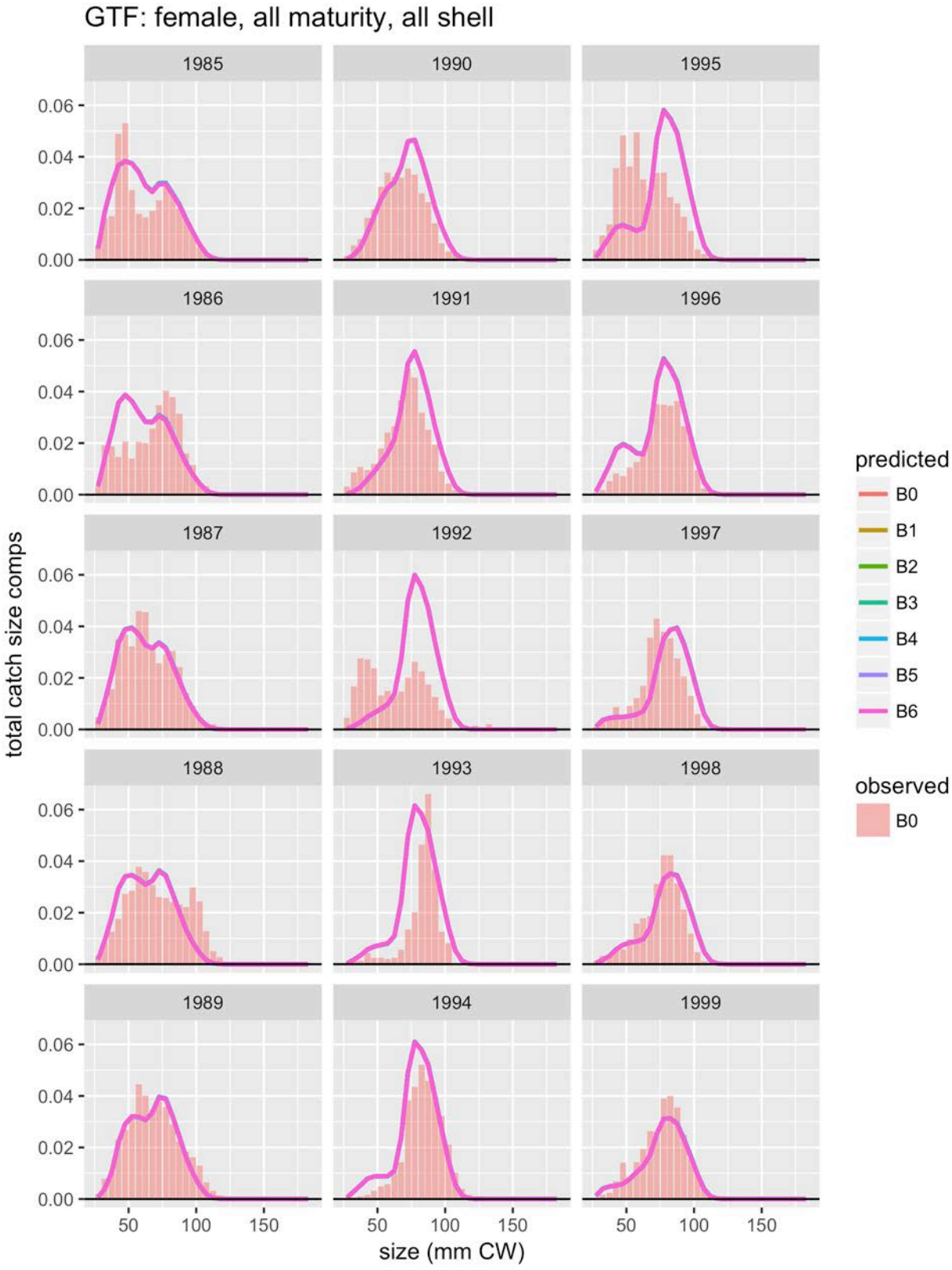


Figure 166. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 2 of 4.

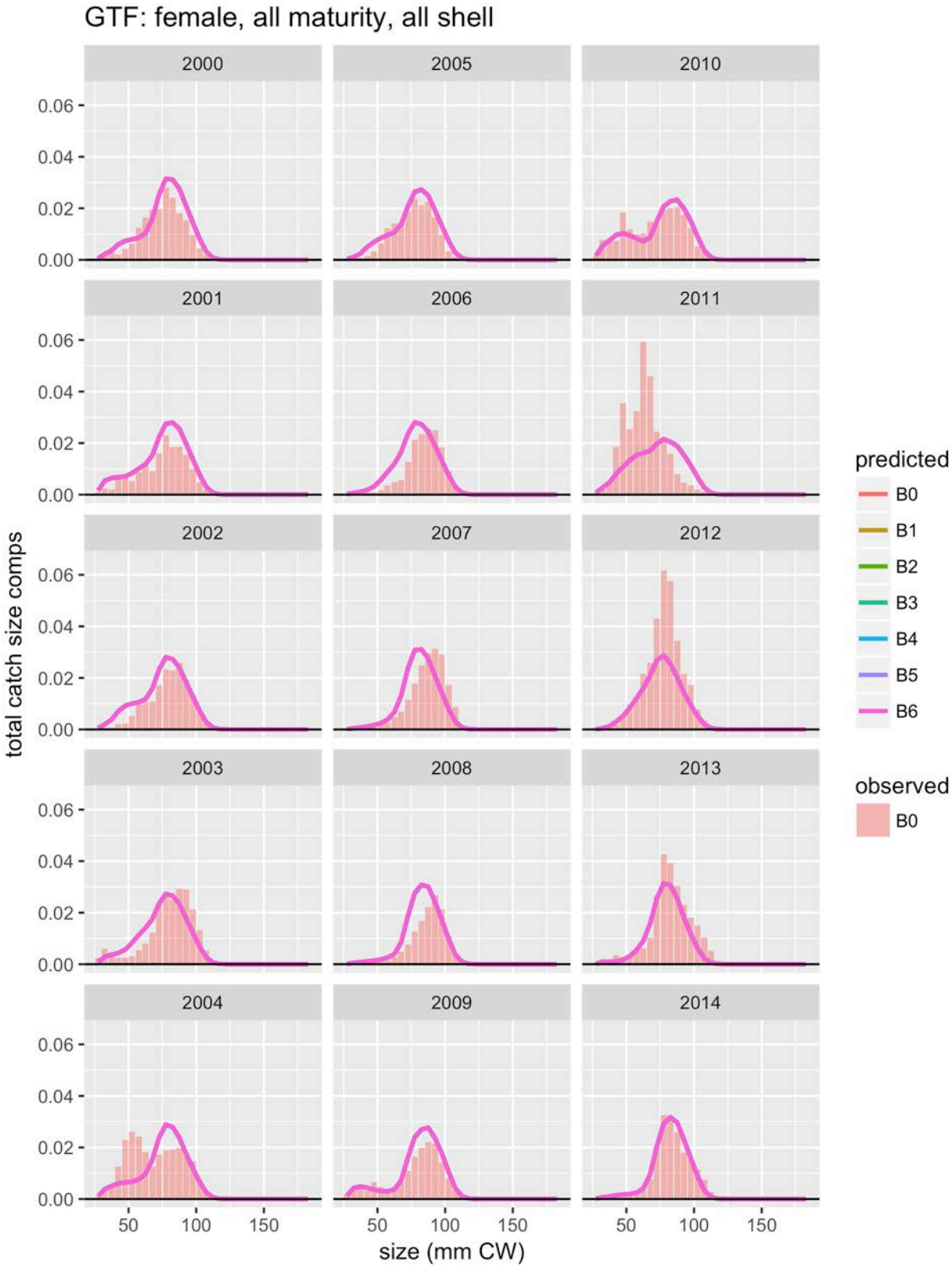


Figure 167. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 3 of 4.

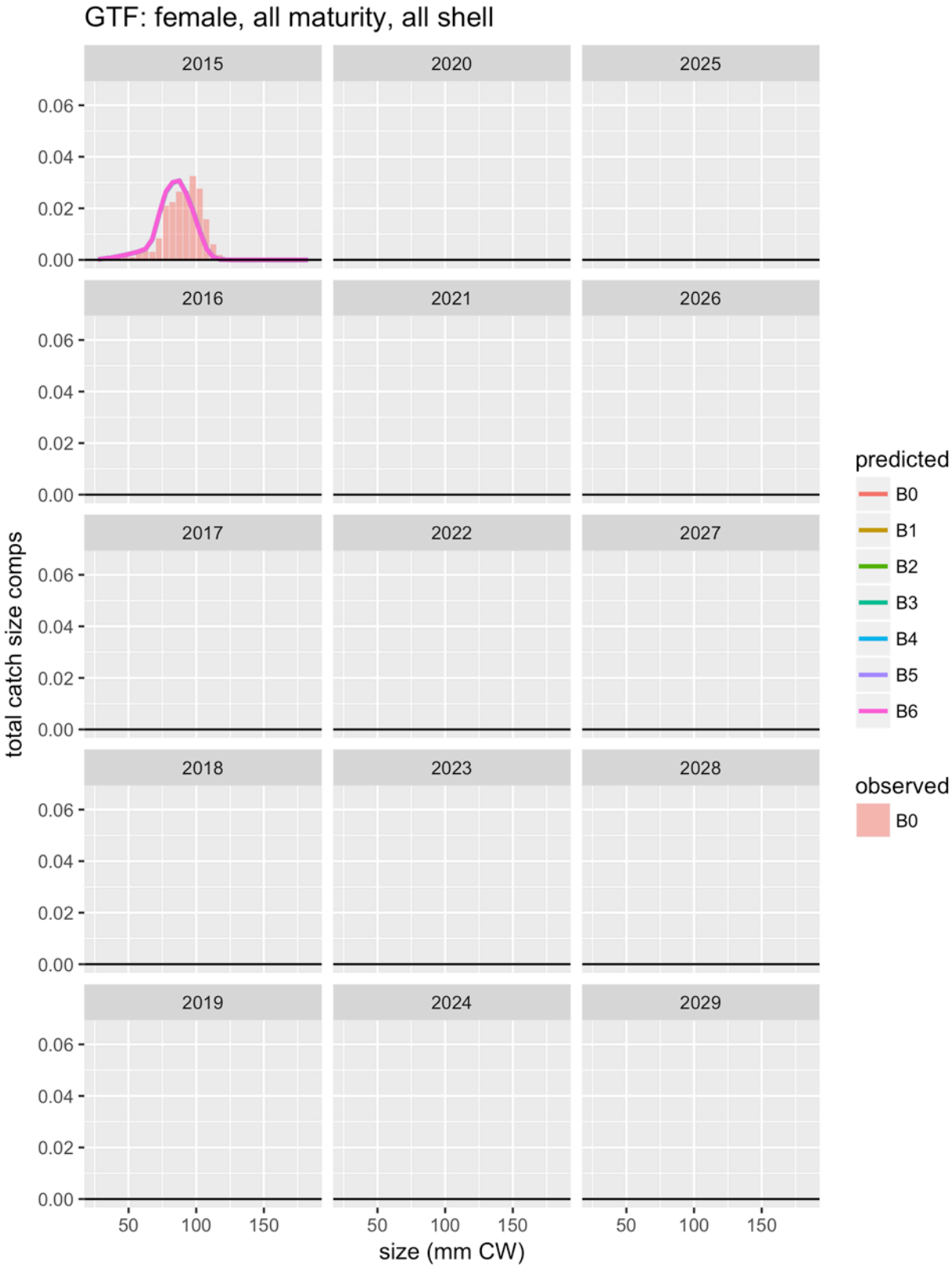


Figure 168. Comparison of observed and predicted female, all maturity, all shell total catch size comps for GTF. Page 4 of 4.

Retained fishery catch biomass

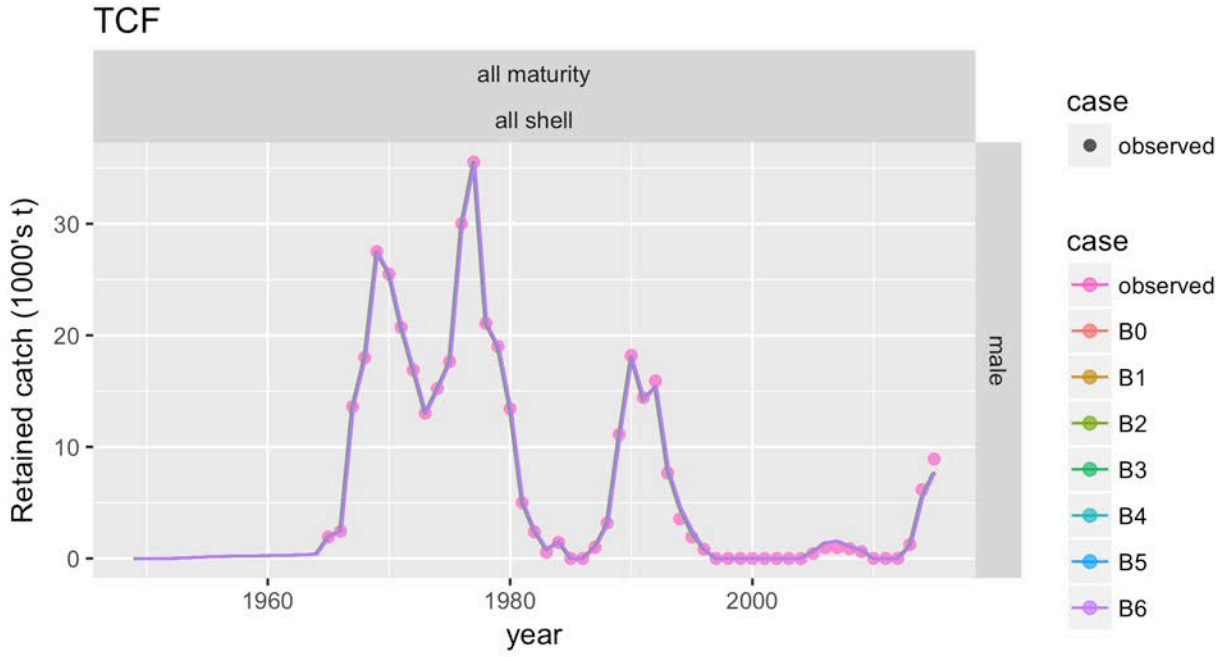


Figure 169. Comparison of observed and predicted retained catch mortality for TCF.

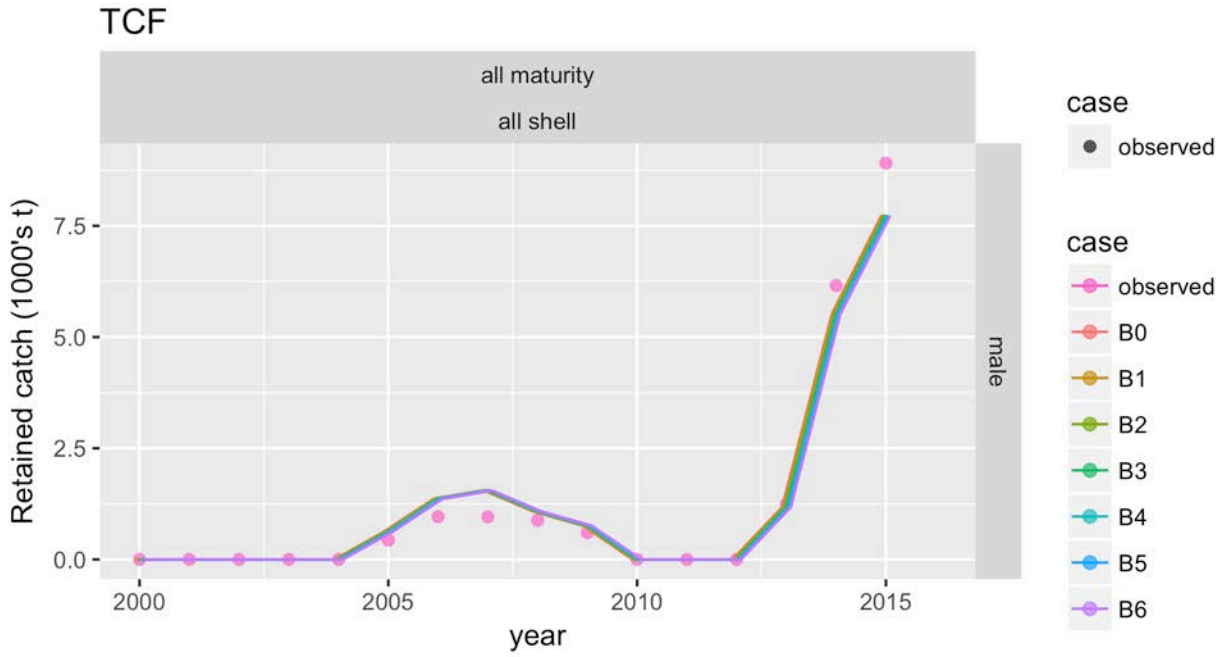


Figure 170. Comparison of observed and predicted retained catch mortality for TCF. Recent time period.

Mean retained fishery size compositions

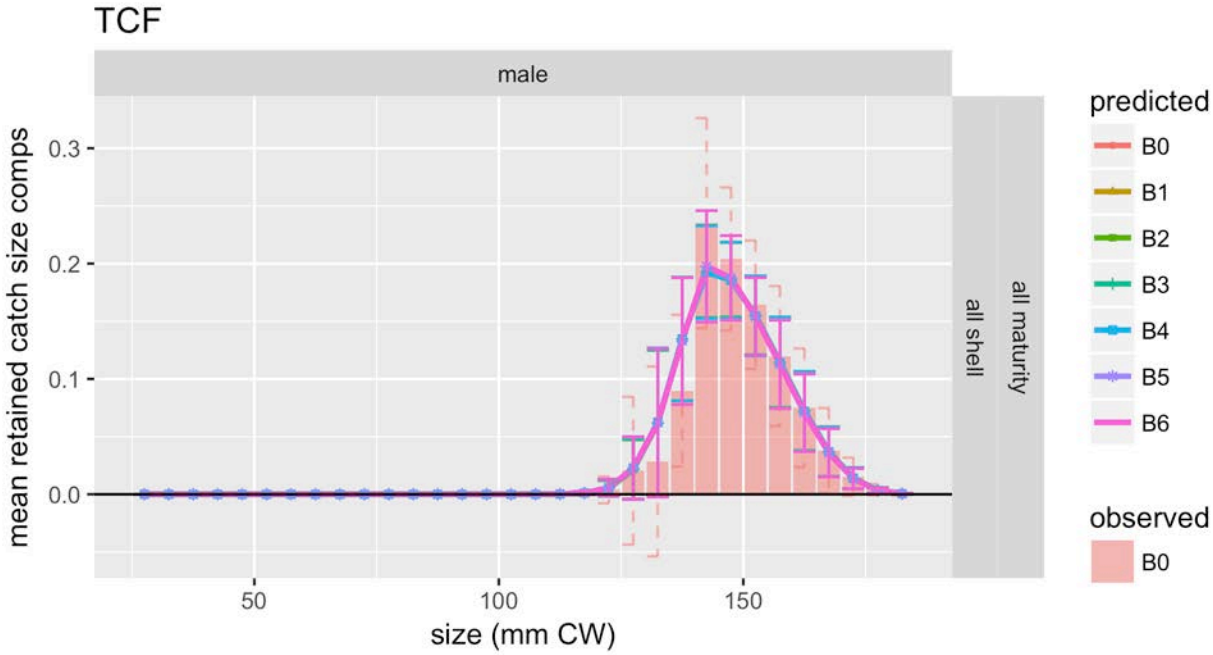


Figure 171. Comparison of observed and predicted &&xms mean retained catch size comps for TCF.

Retained fishery size compositions

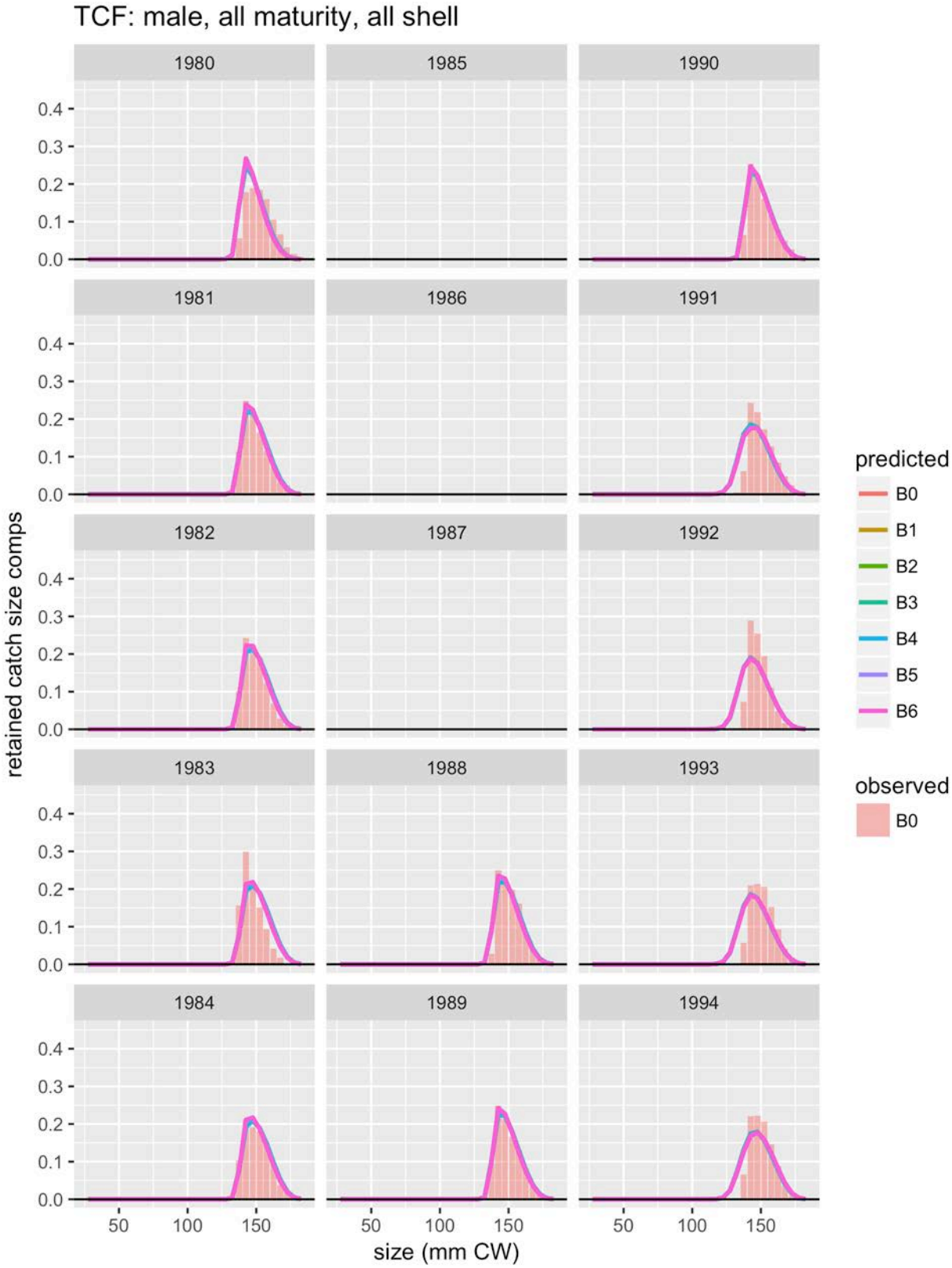


Figure 172. Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 1 of 3.

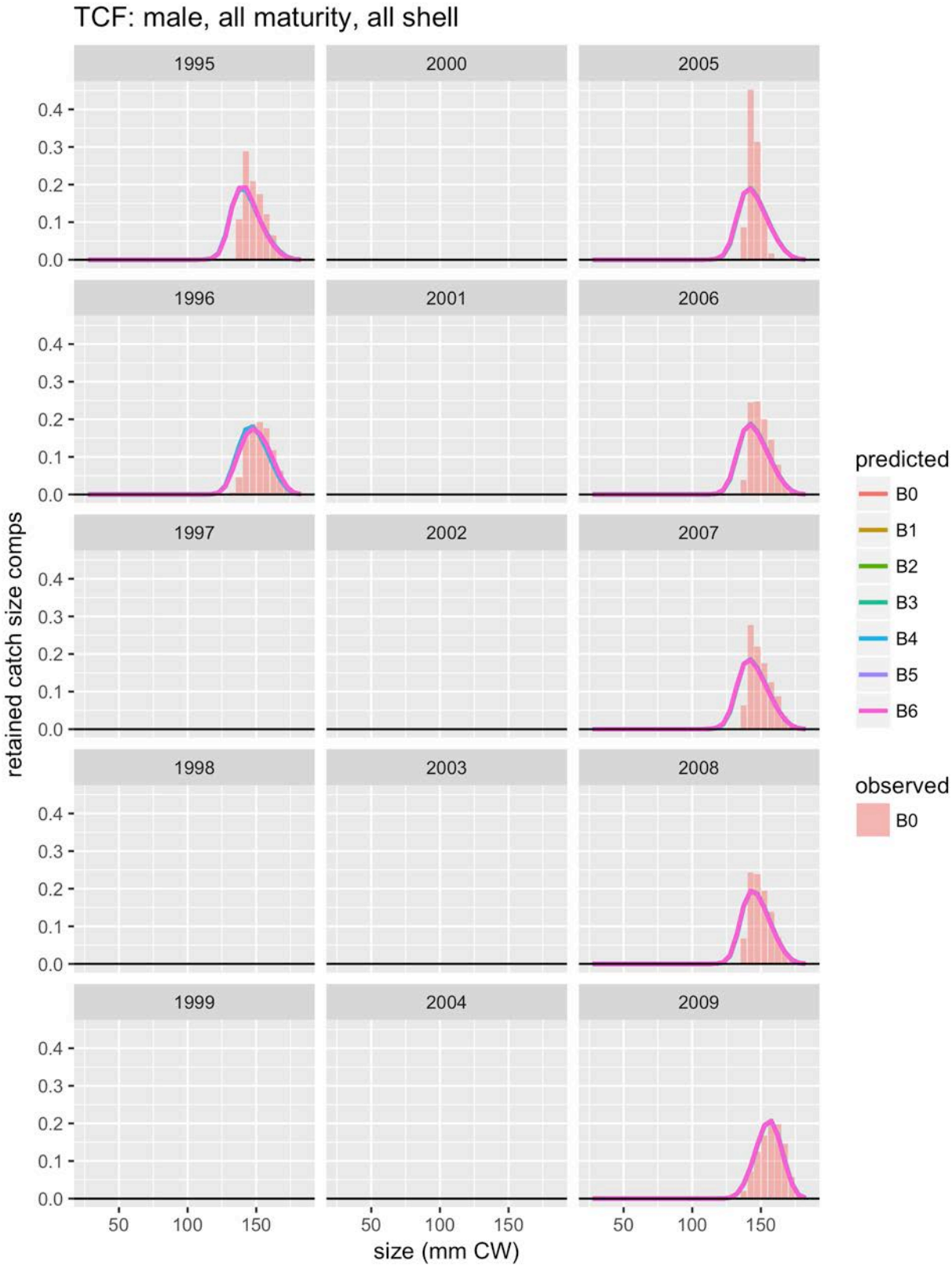


Figure 173. Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 2 of 3.

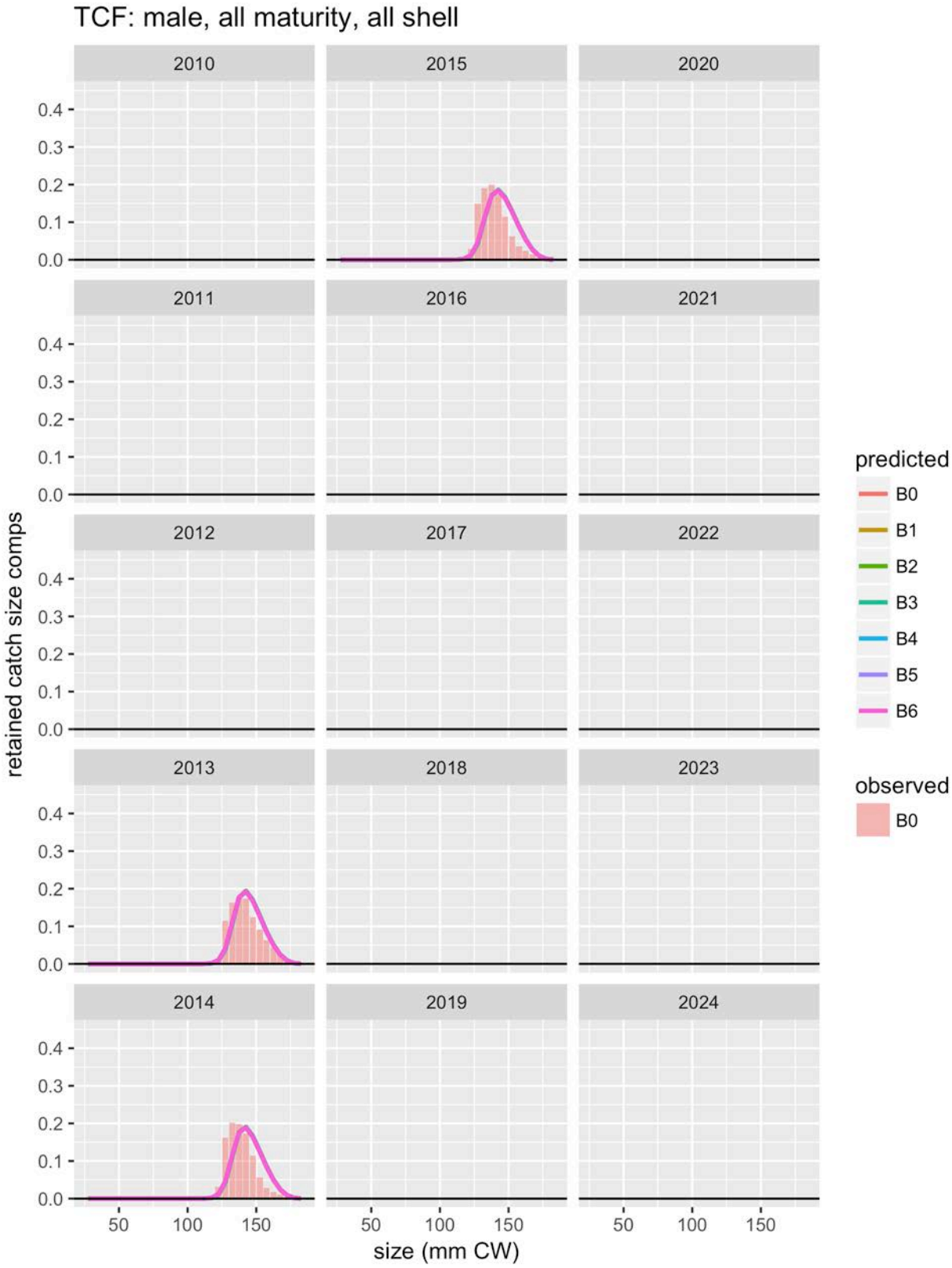


Figure 174. Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 3 of 3.