TCSAM2013 Model Results: Figures

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```
## Working dir = ' /Library/Frameworks/R.framework/Versions/3.2/Resources/library/rTCSAM2013/Rm
```

Input model cases

```
## 2015AMO: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/Ass
## Model C: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/Ass
```

case	path
2015AMO	'../Runs.2015AM/2015AMO'
Model C	'Runs.ModelC/2016/best'

Table 1. Model cases for comparison.
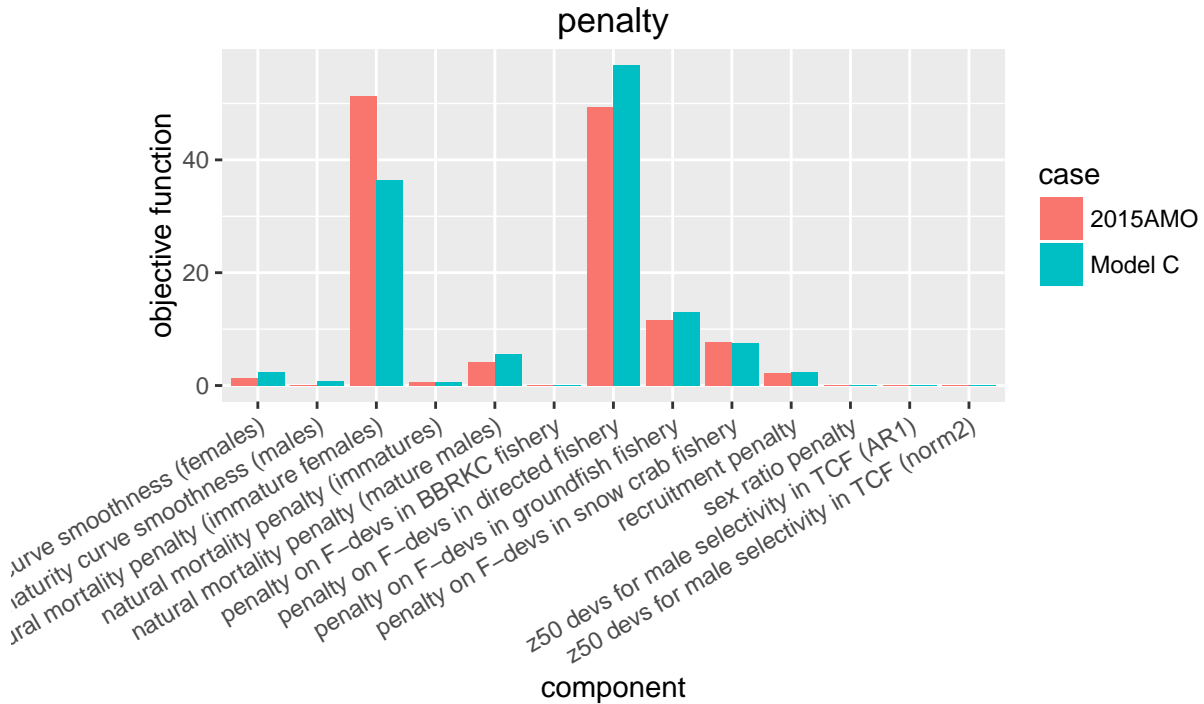
Objective function components

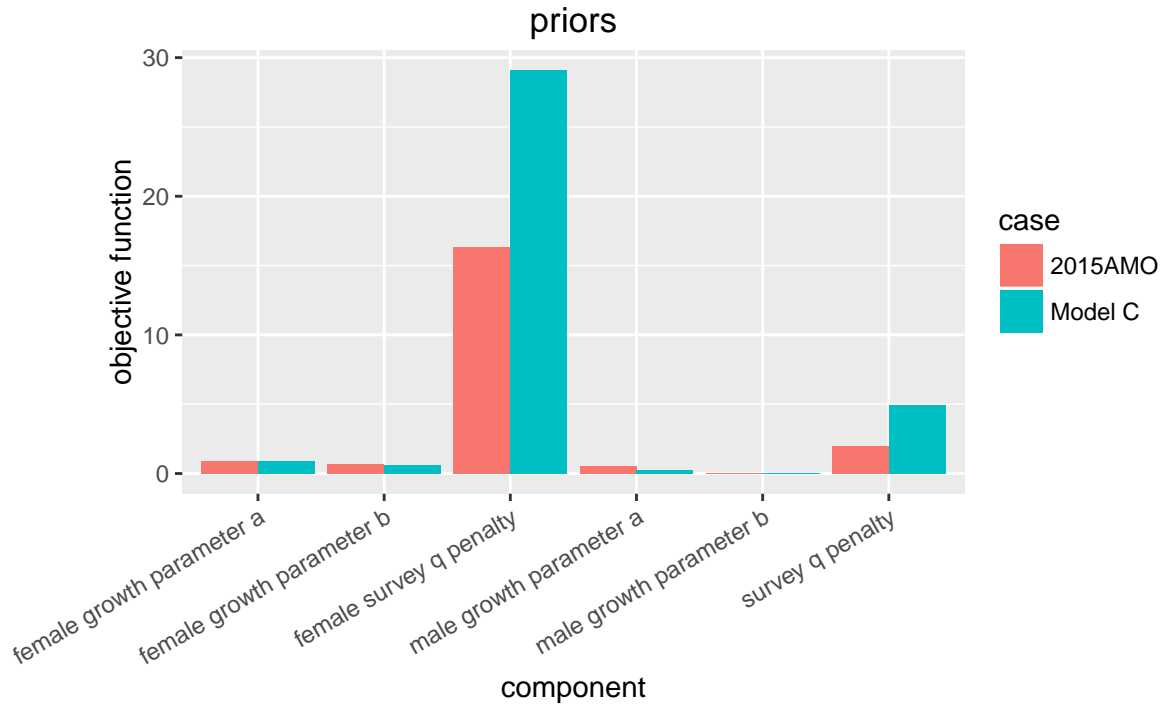Figure 1. Objective function components related to penalty.

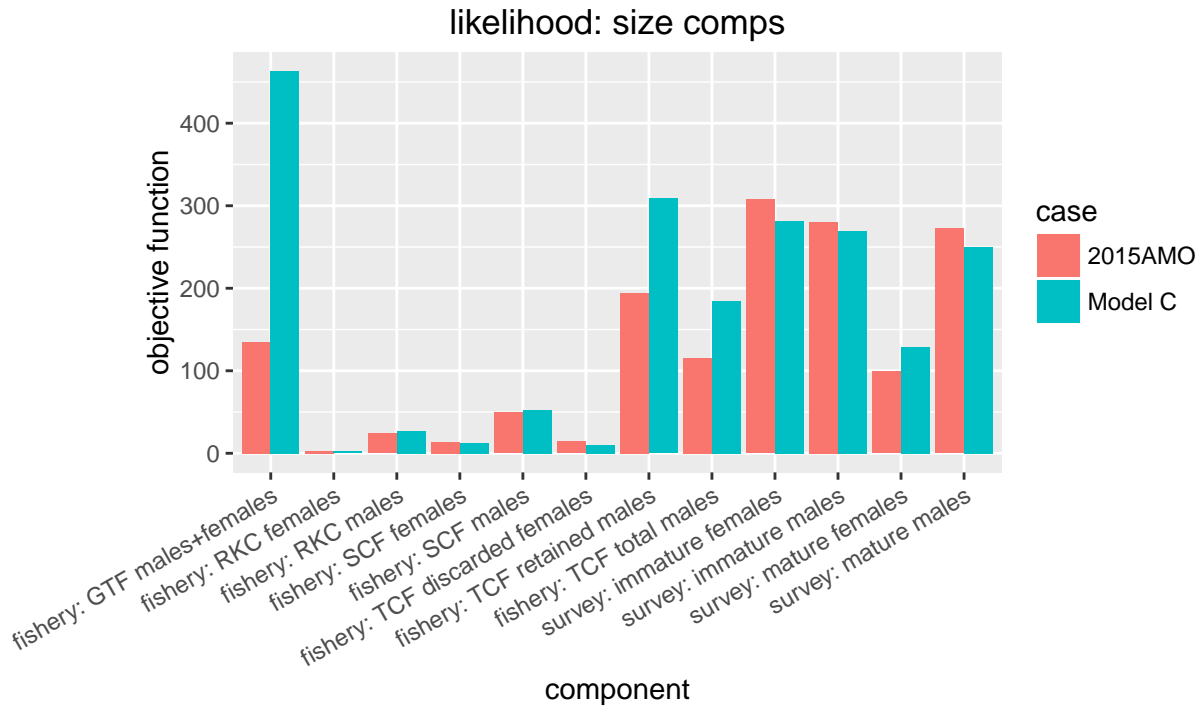Figure 2. Objective function components related to priors.

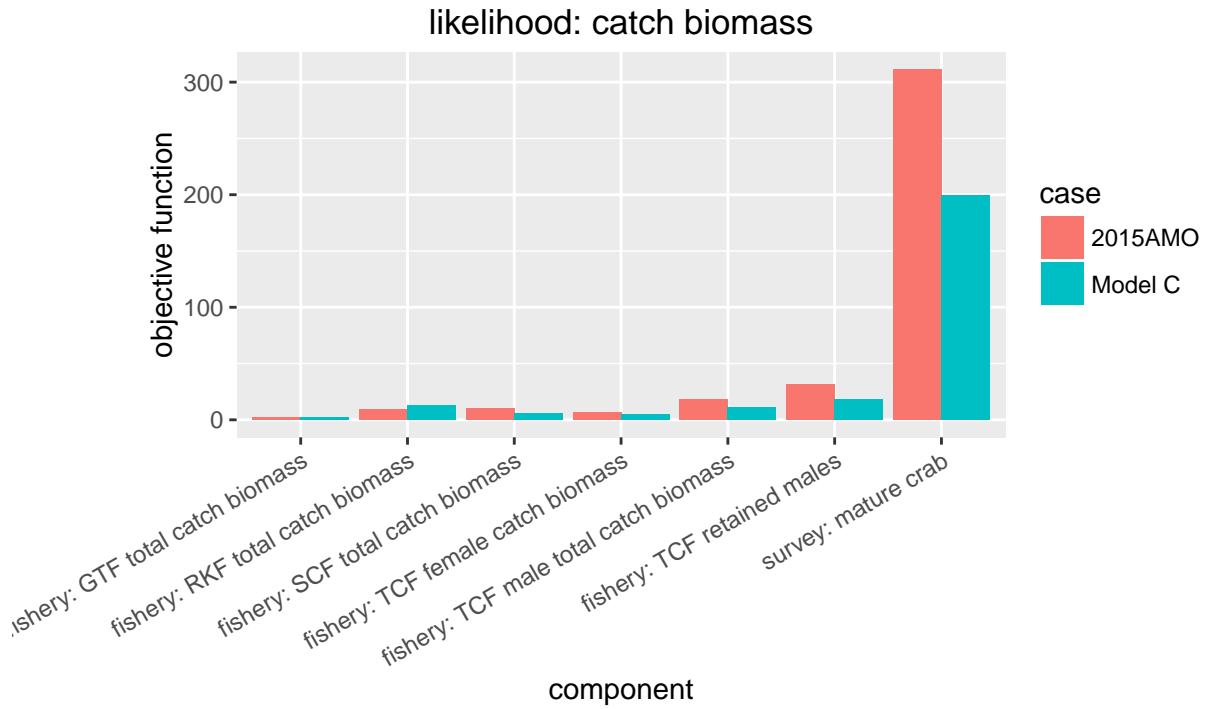Figure 3. Objective function components related to likelihood: size comps.

Figure 4. Objective function components related to likelihood: catch biomass.

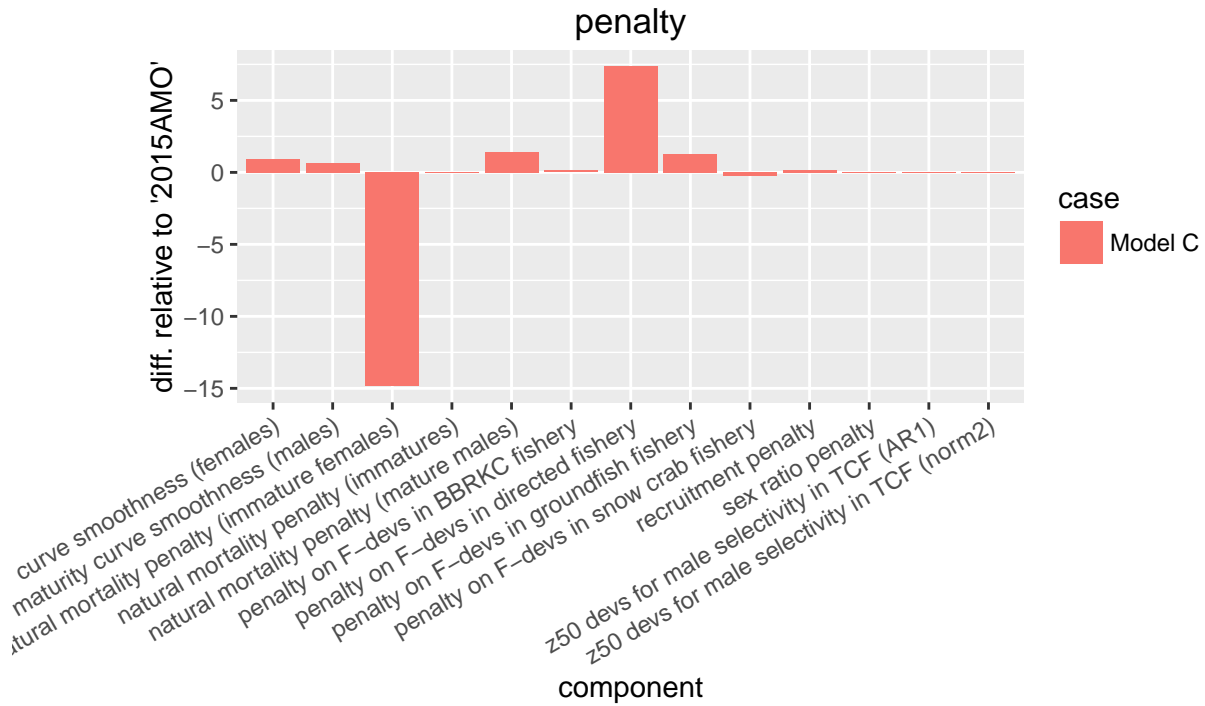# Objective function component differences

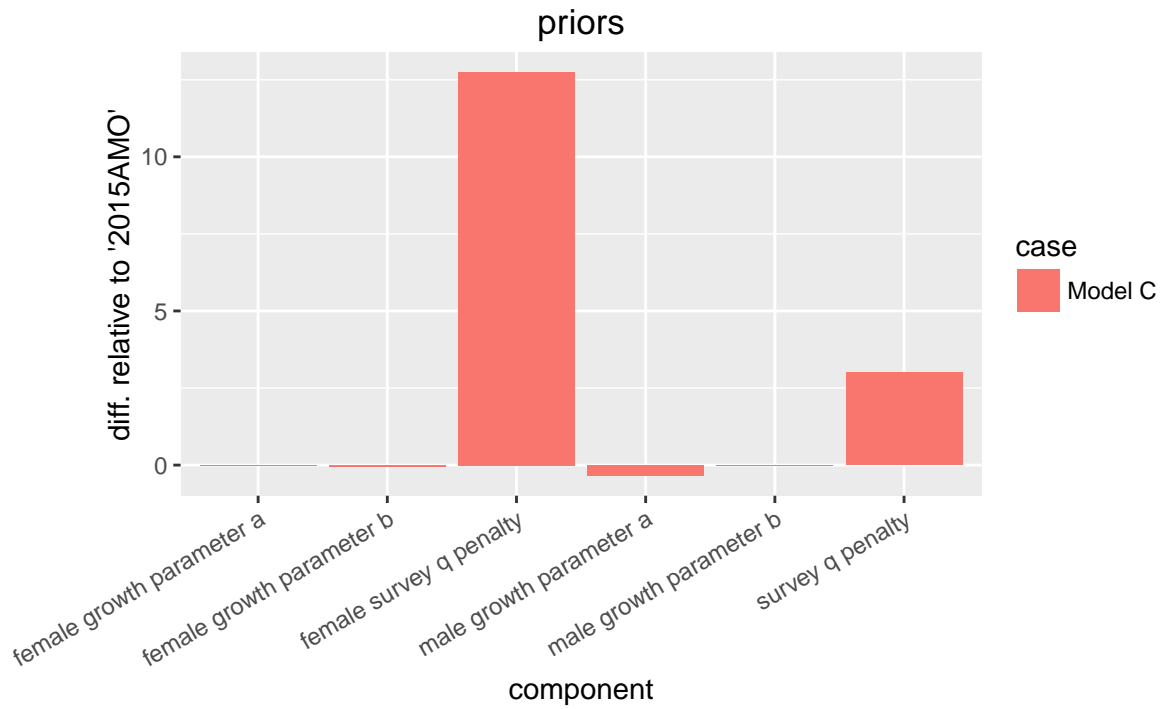

Figure 5. Objective function components related to penalty.

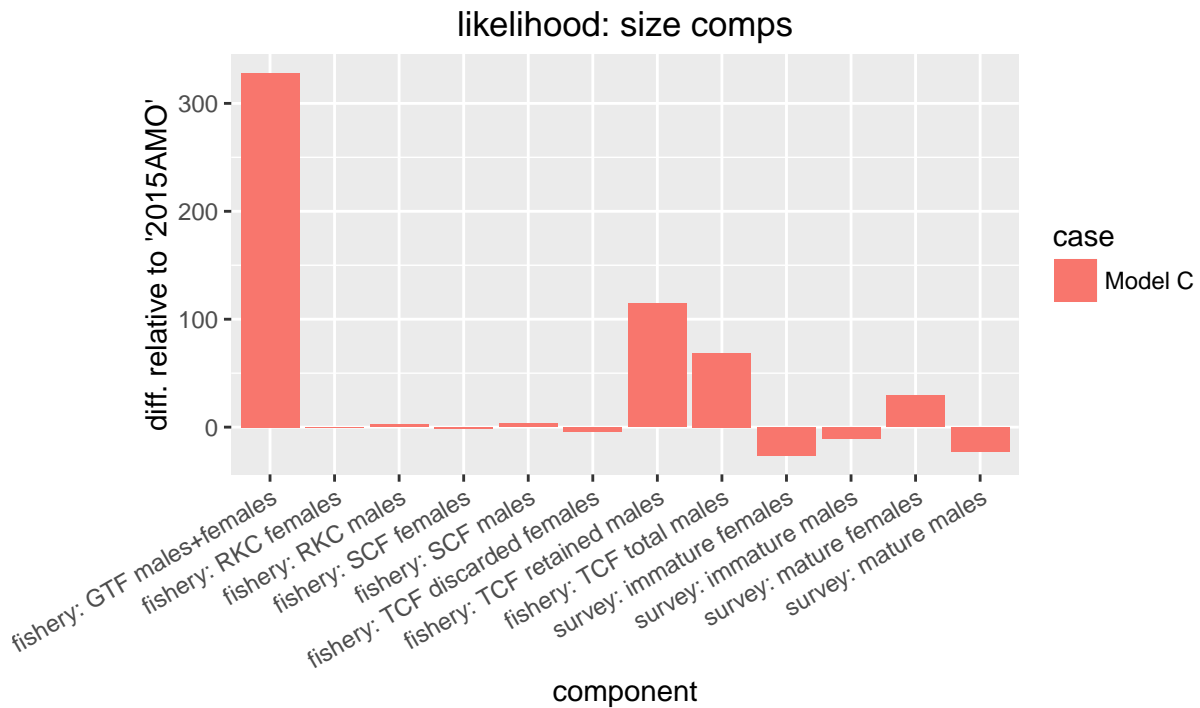Figure 6. Objective function components related to priors.

Figure 7. Objective function components related to likelihood: size comps.
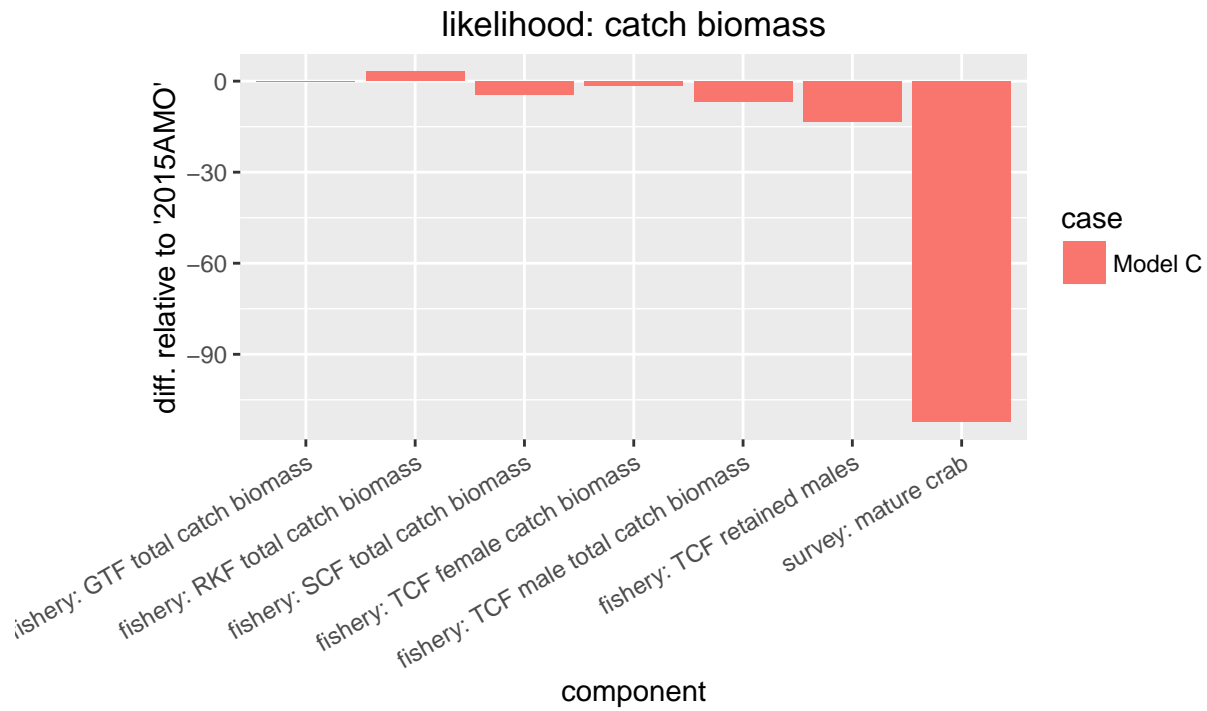
Figure 8. Objective function components related to likelihood: catch biomass.

Parameter estimates

If available, parameter confidence intervals are +/- one standard deviation. Triangles indicate initial prameter values, circles represent final parameter values. Dark grey shading indicates parameter bounds (if any).
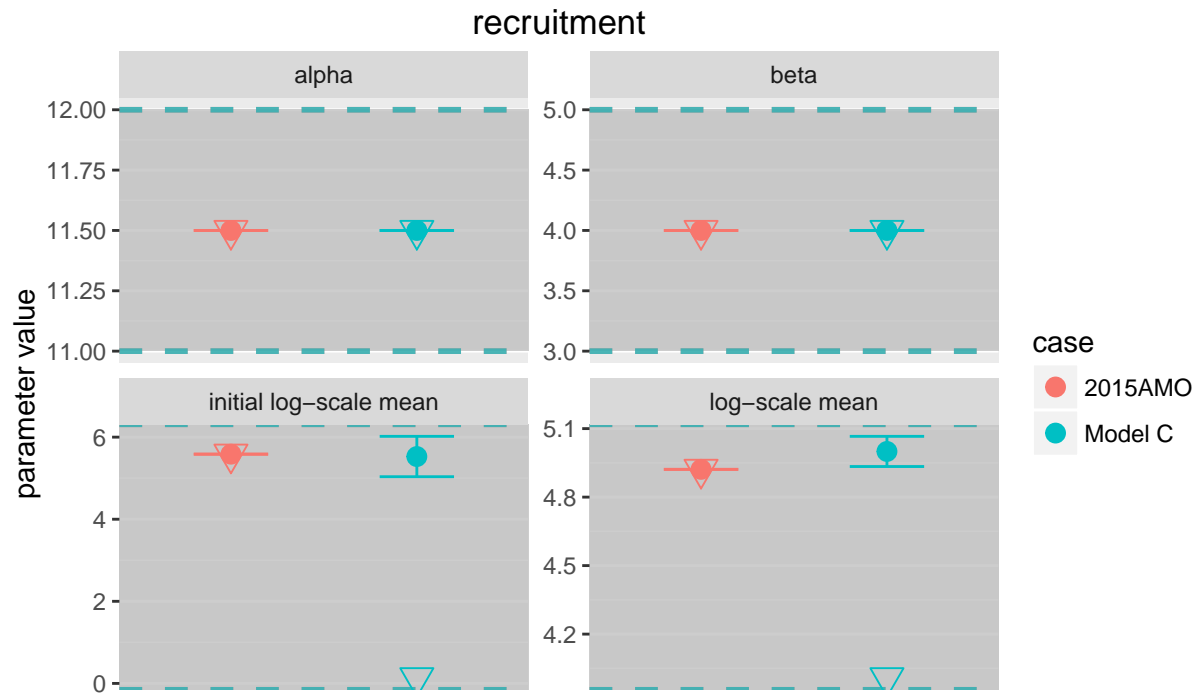
Extracting params info

Figure 9. Estimated population parameters for recruitment.
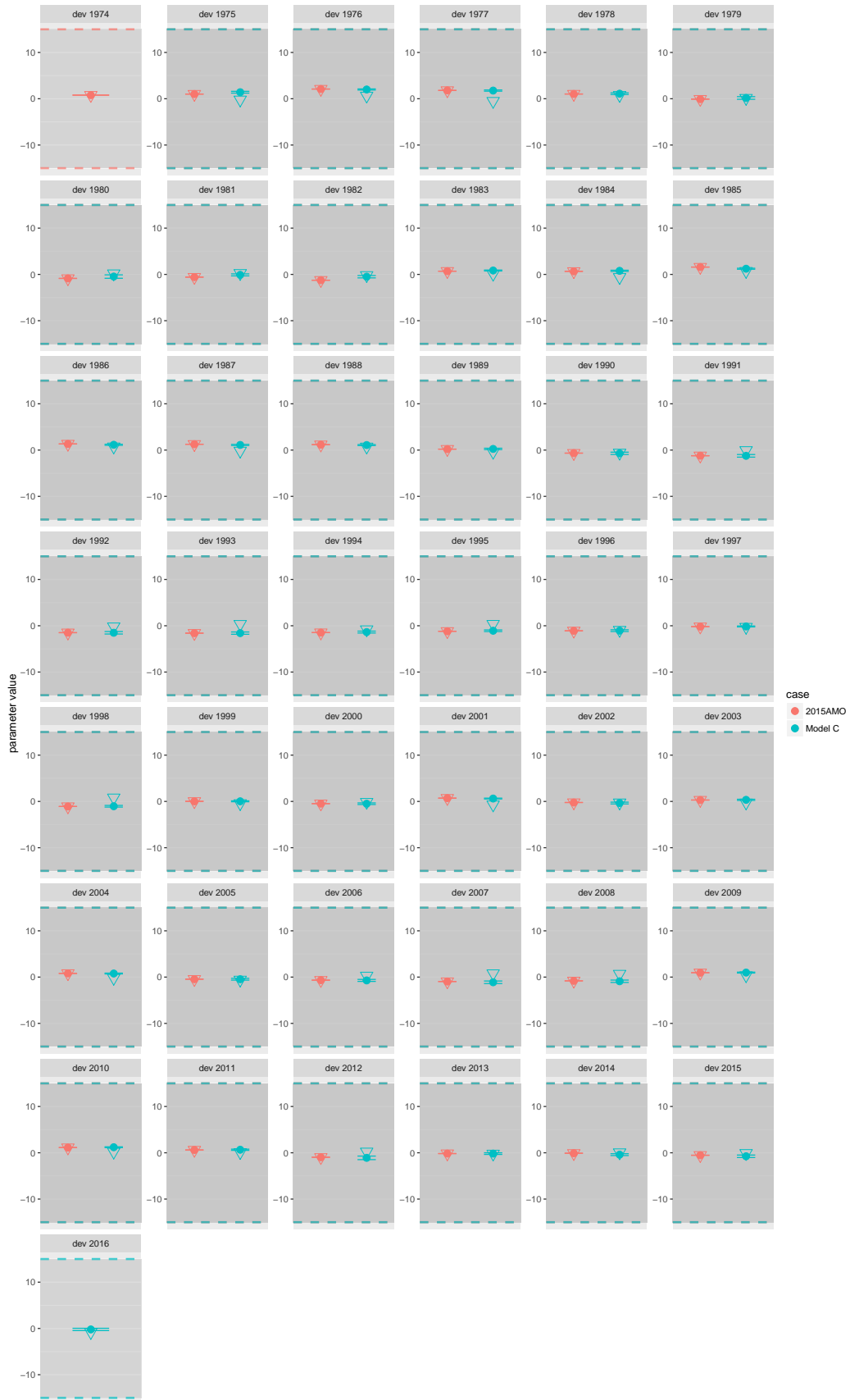
recruitment devs

Figure 10. Estimated population parameters for recruitment devs.
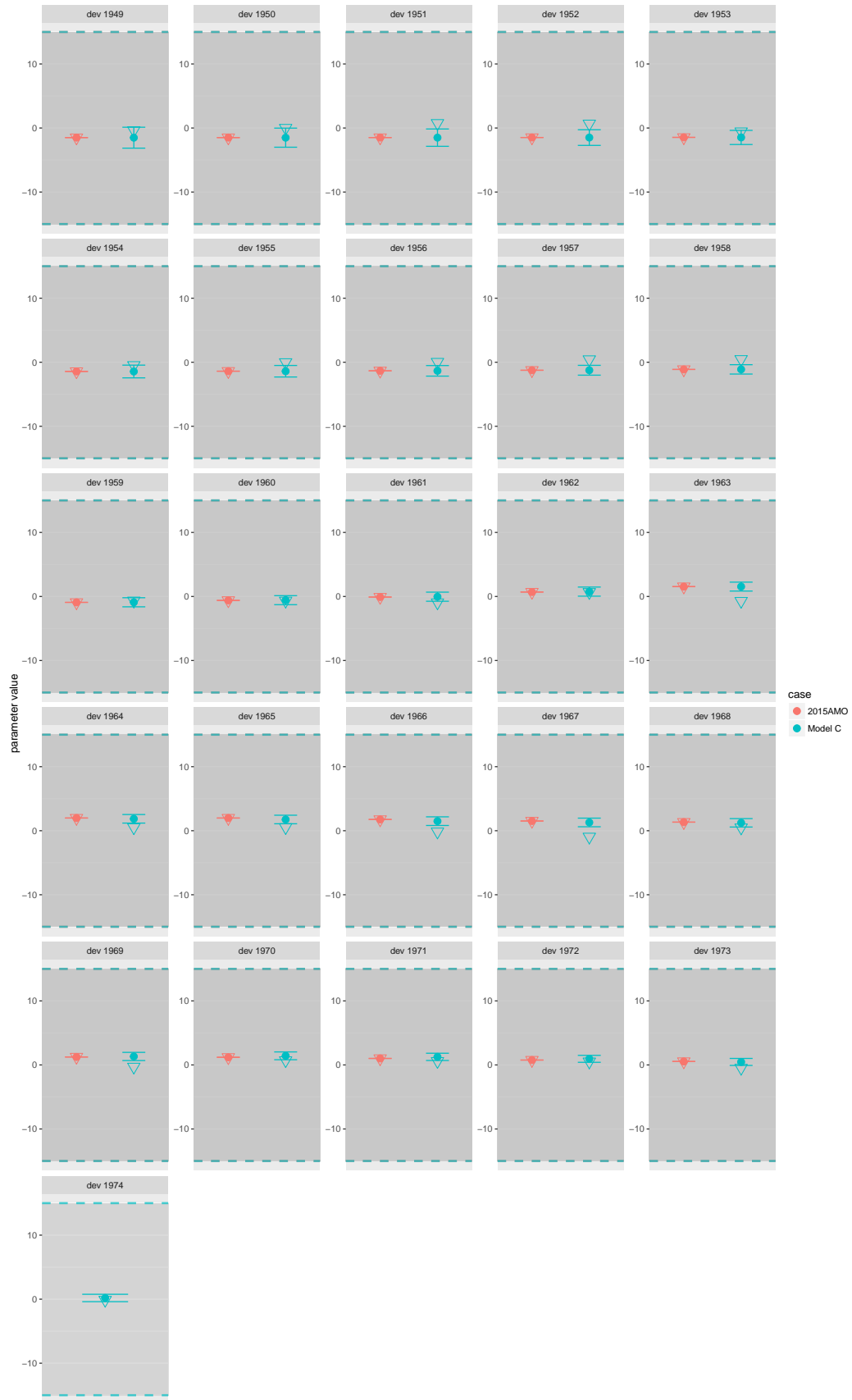
initial recruitment devs

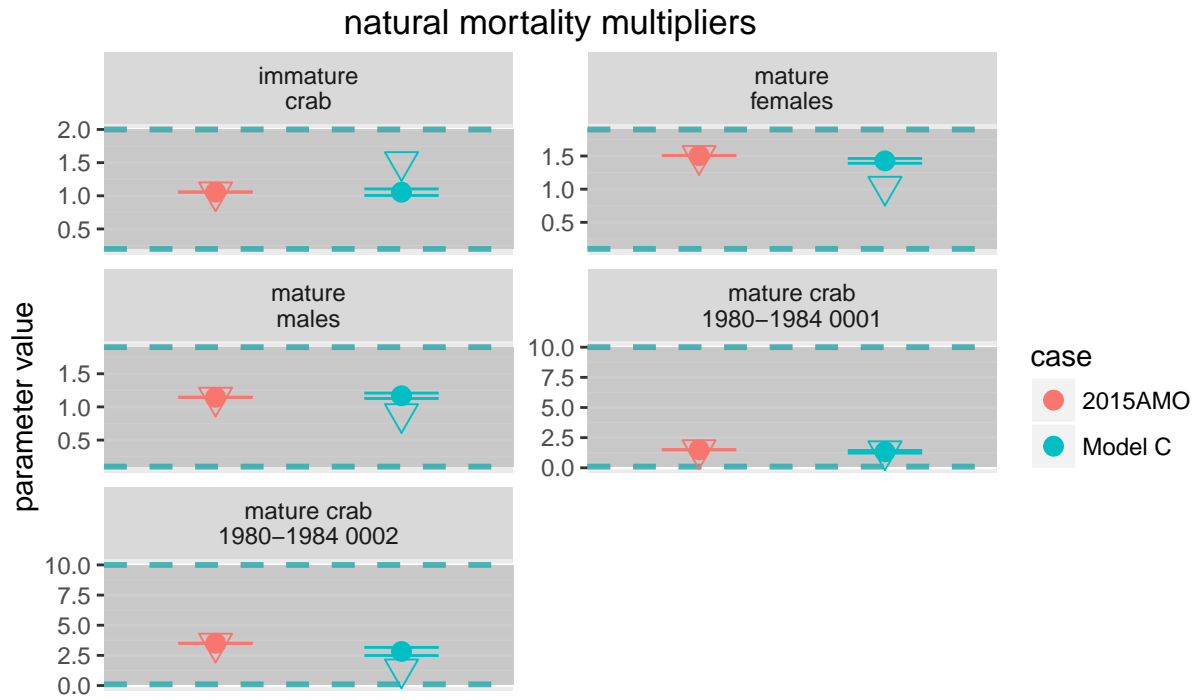Figure 11. Estimated population parameters for initial recruitment devs.

natural mortality multipliers

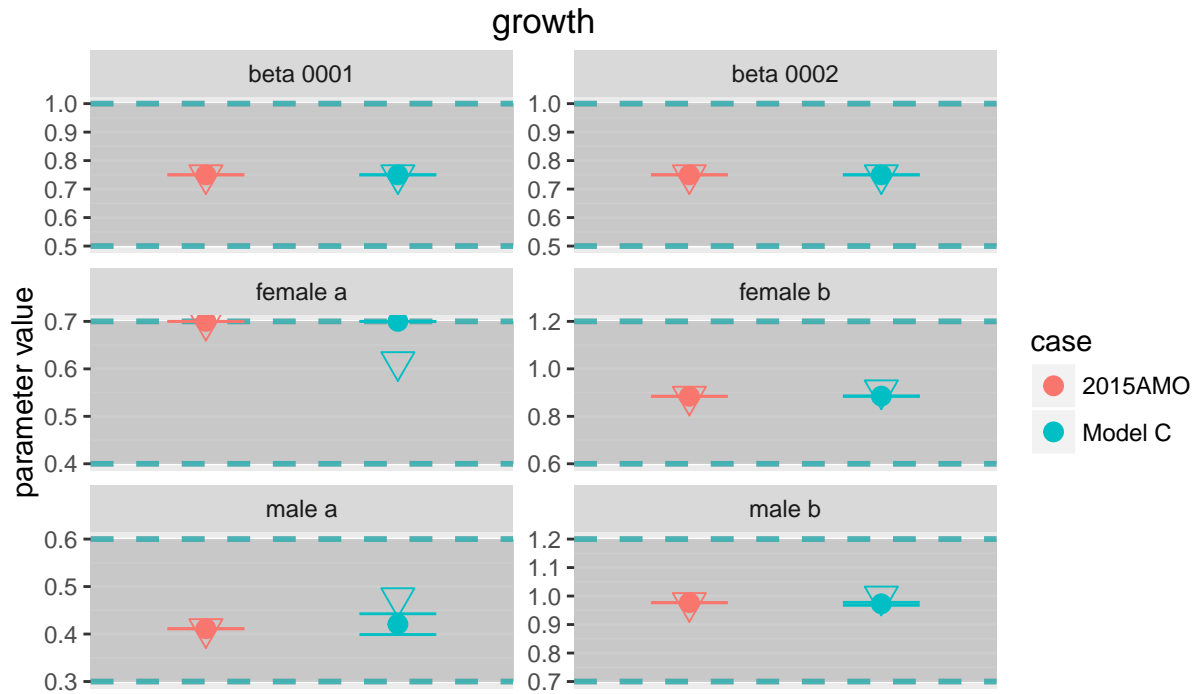Figure 12. Estimated population parameters for natural mortality multipliers.

growth
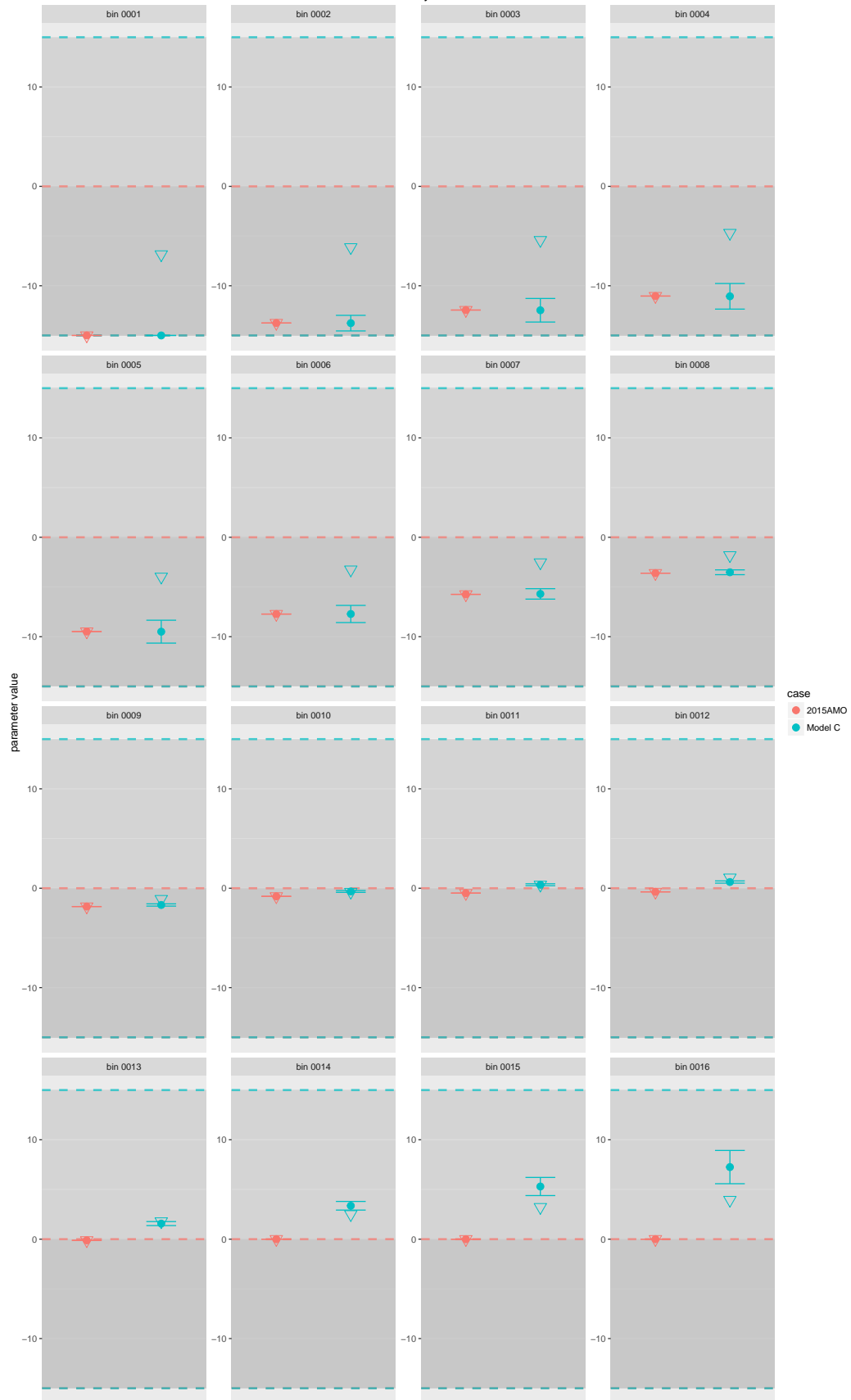

Figure 13. Estimated population parameters for growth.

molt–to–maturity: females

Figure 14. Estimated population parameters for molt-to-maturity: females.
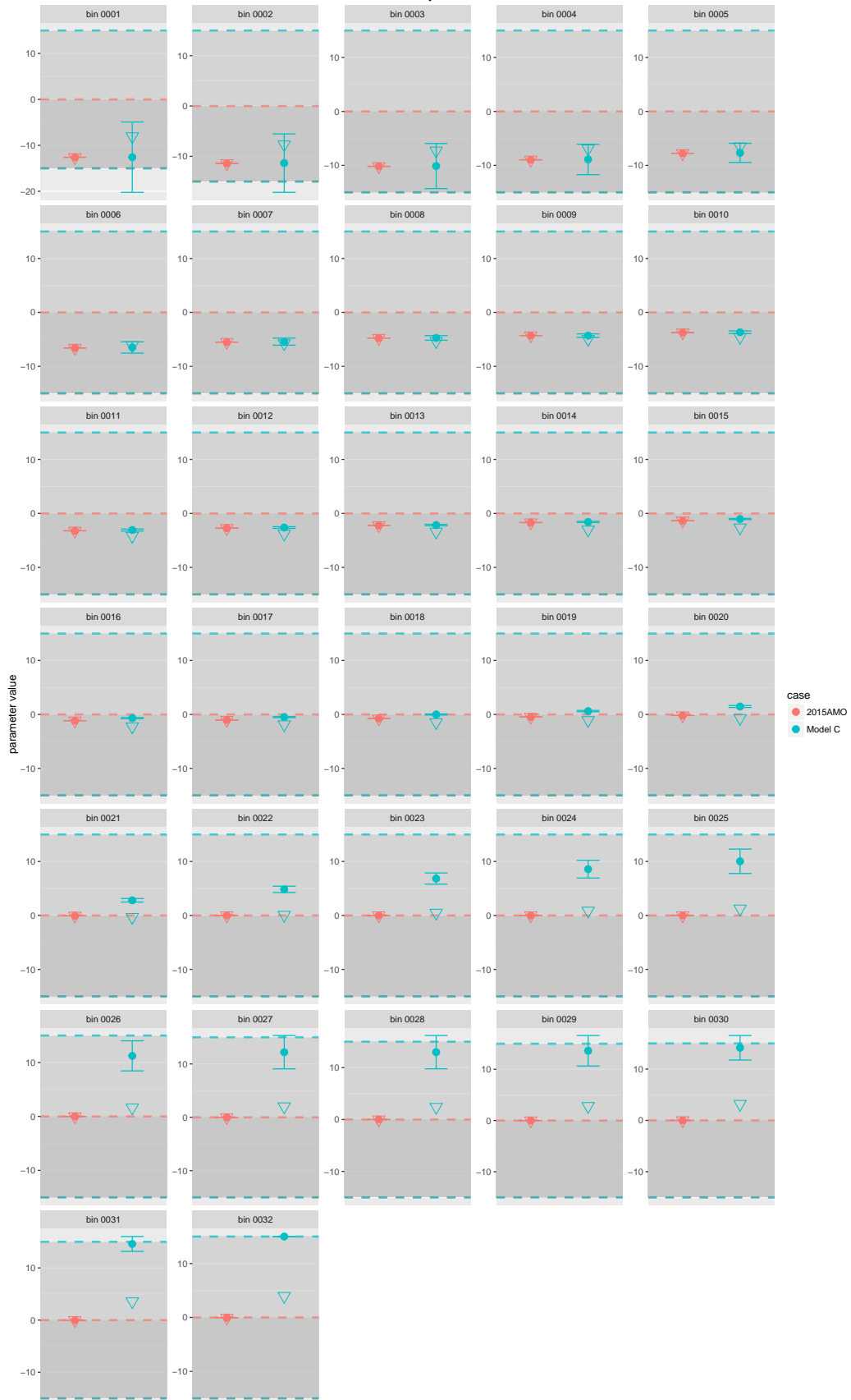
molt-to-maturity: males

Figure 15. Estimated population parameters for molt-to-maturity: males.
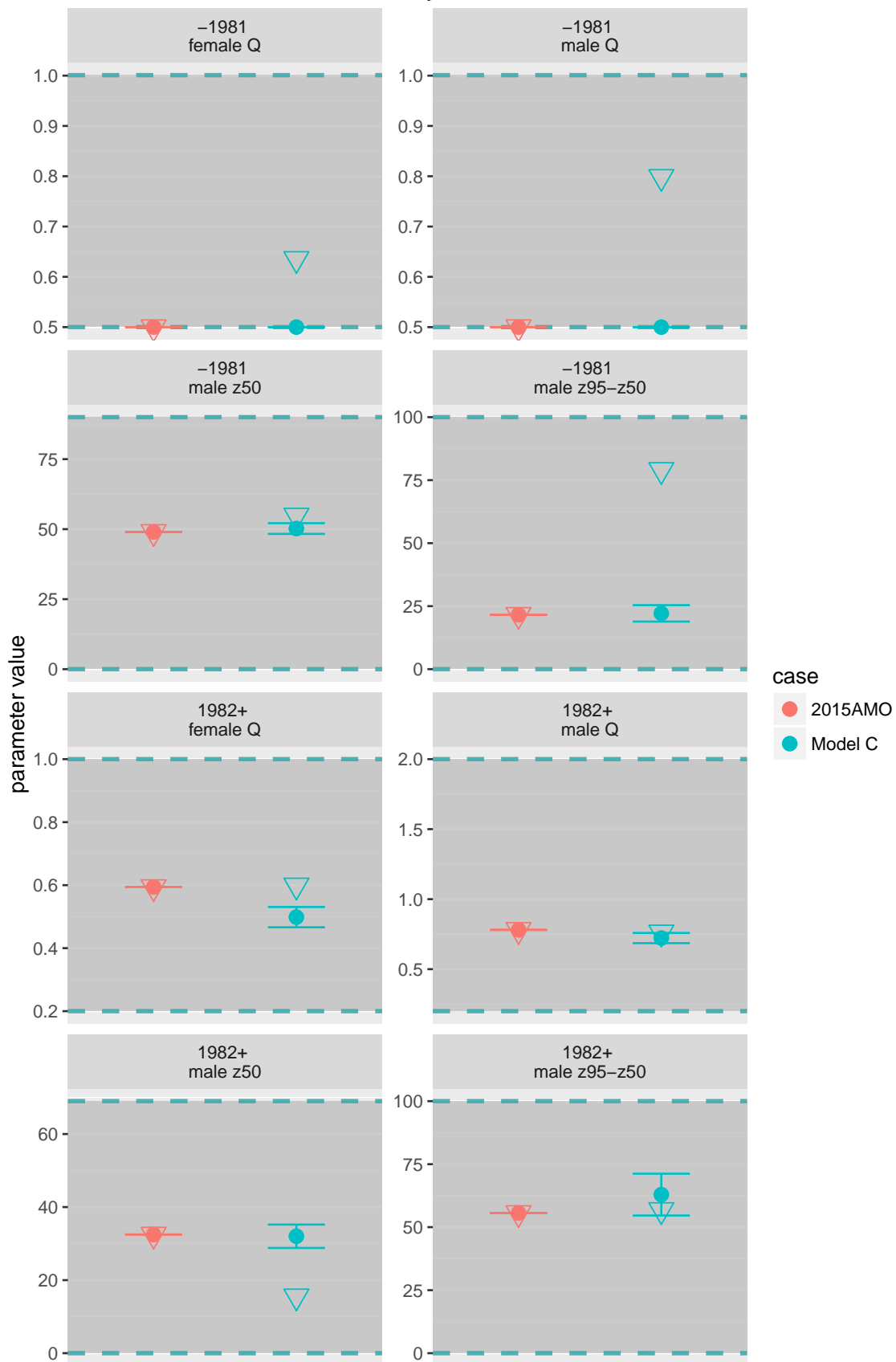
surveys

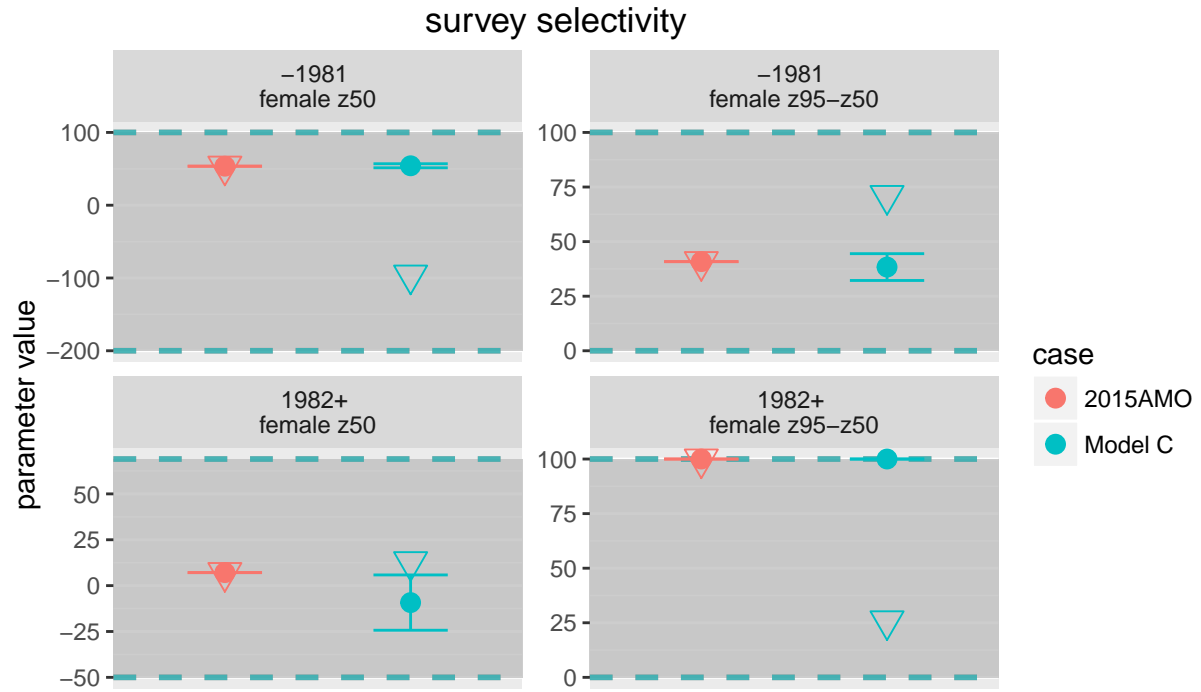Figure 16. Estimated surveys parameters for surveys.

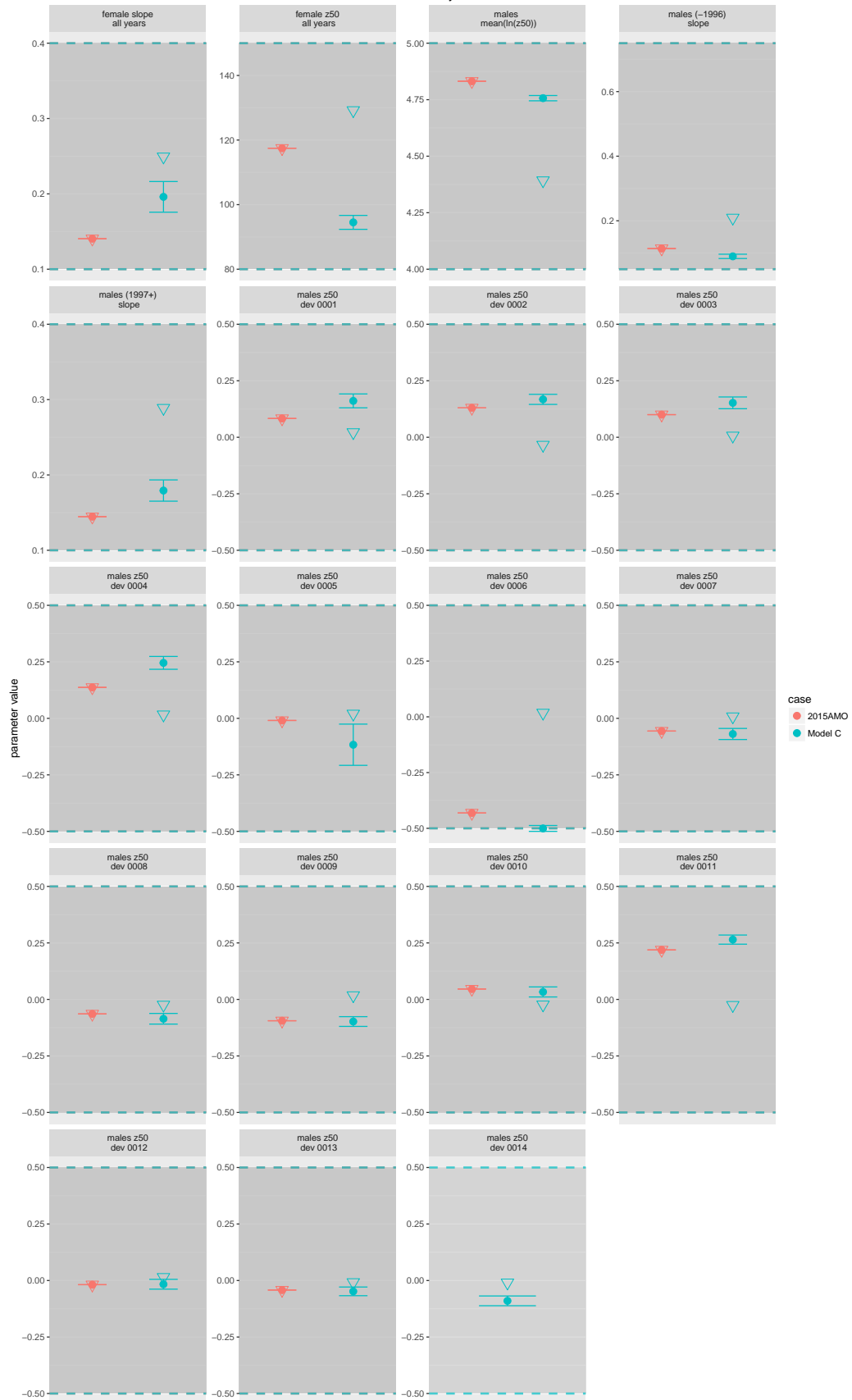Figure 17. Estimated surveys parameters for survey selectivity.

TCF selectivity

Figure 18. Estimated fisheries parameters for TCF selectivity.
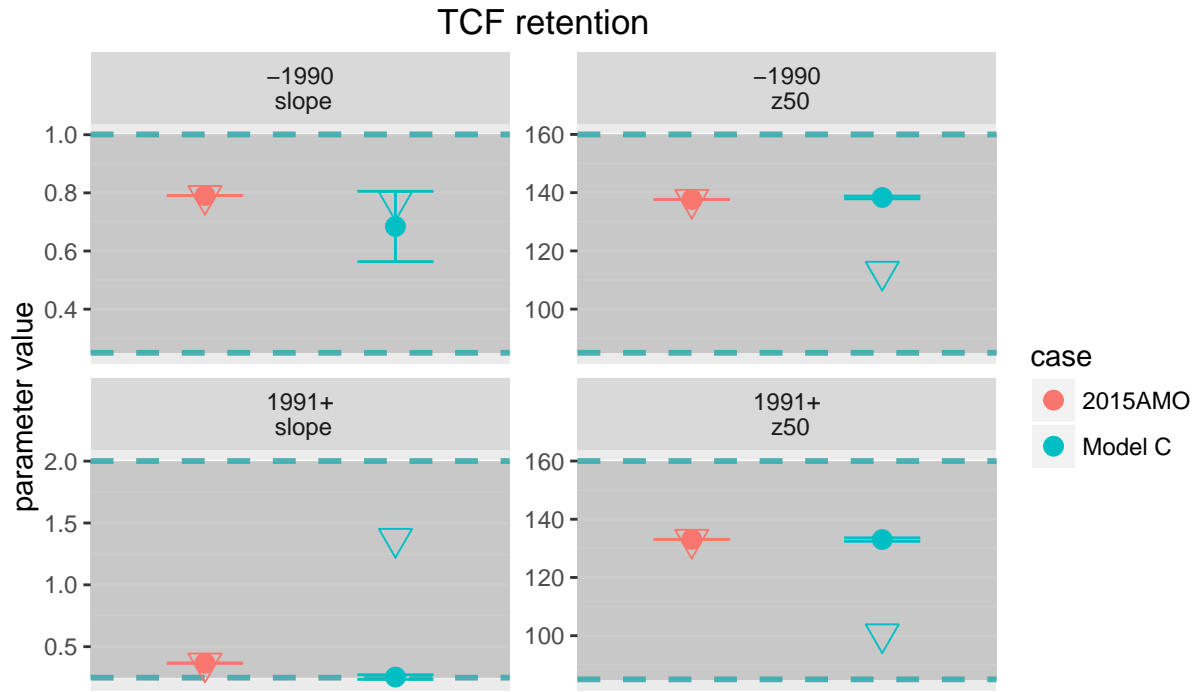
TCF retention

Figure 19. Estimated fisheries parameters for TCF retention.
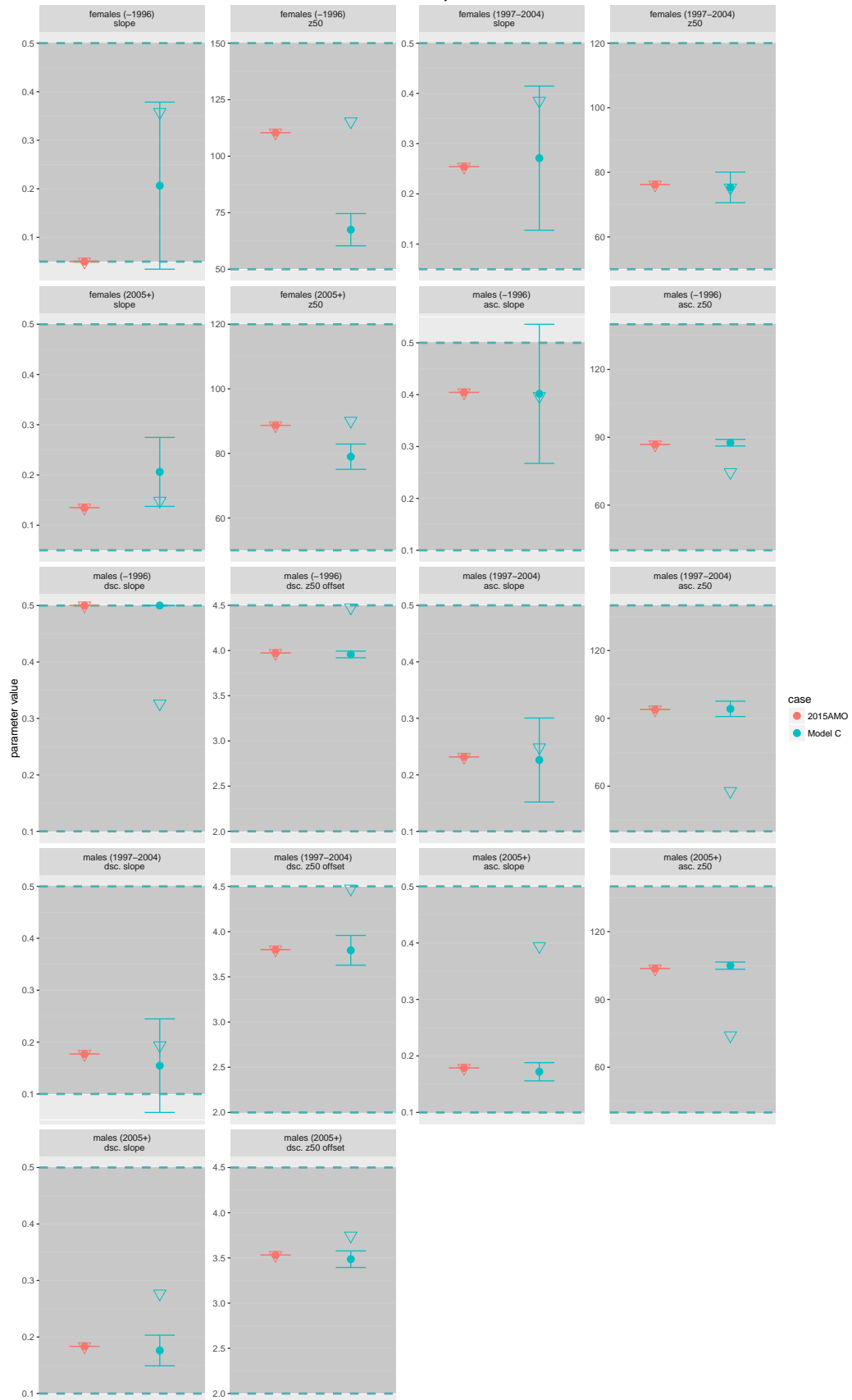
SCF selectivity

Figure 20. Estimated fisheries parameters for SCF selectivity.
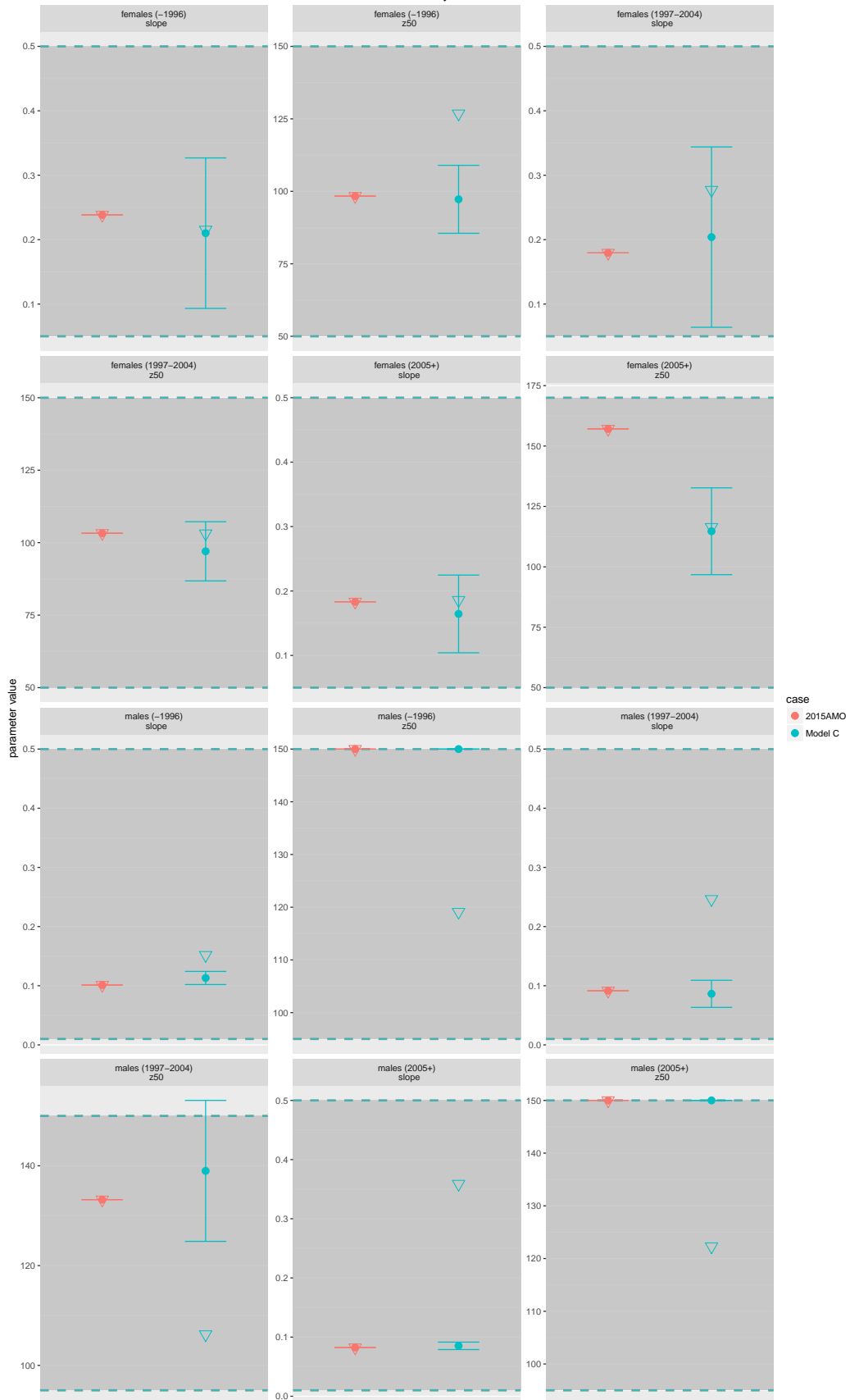
RKF selectivity

Figure 21. Estimated fisheries parameters for RKF selectivity.
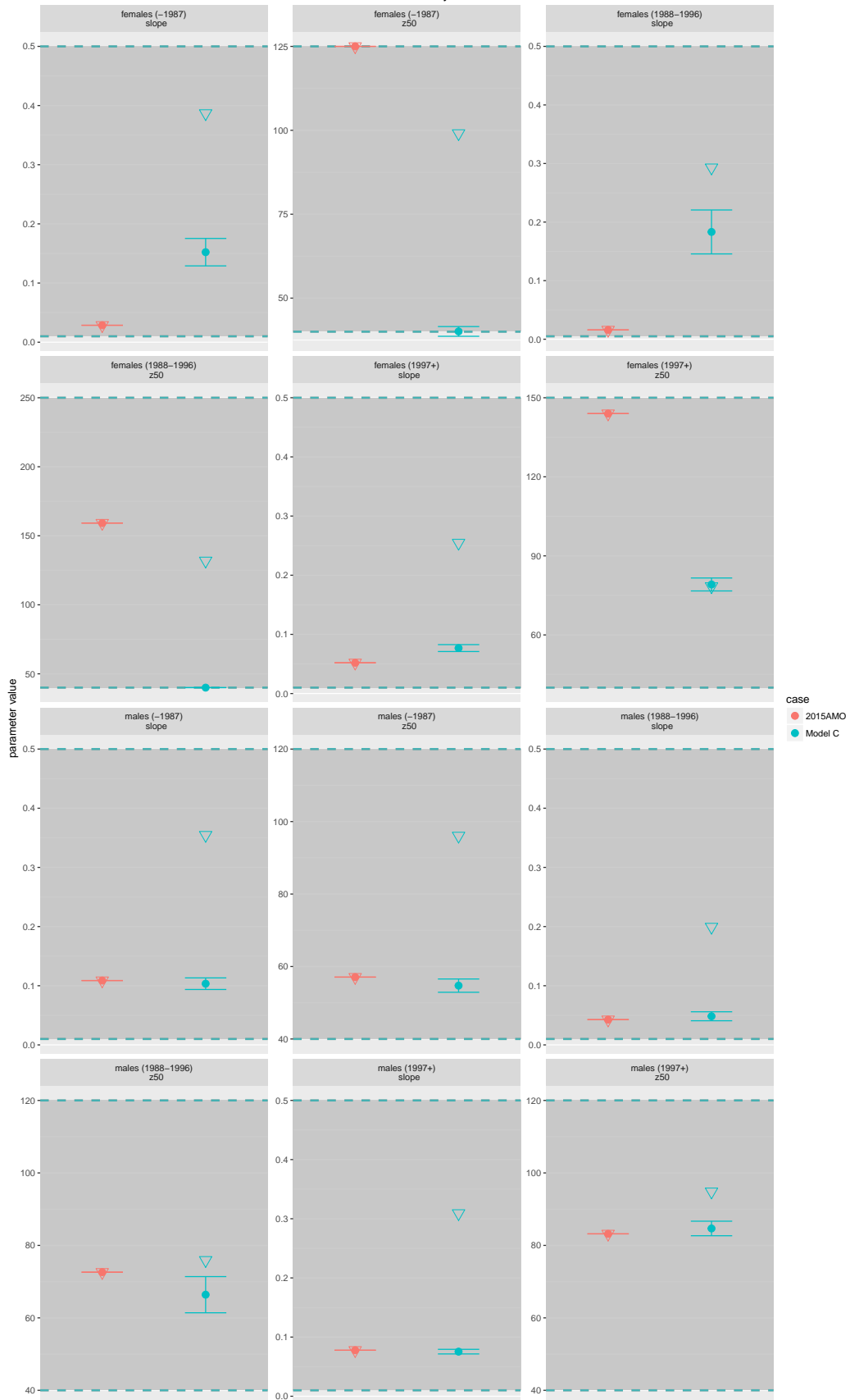
GTF selectivity

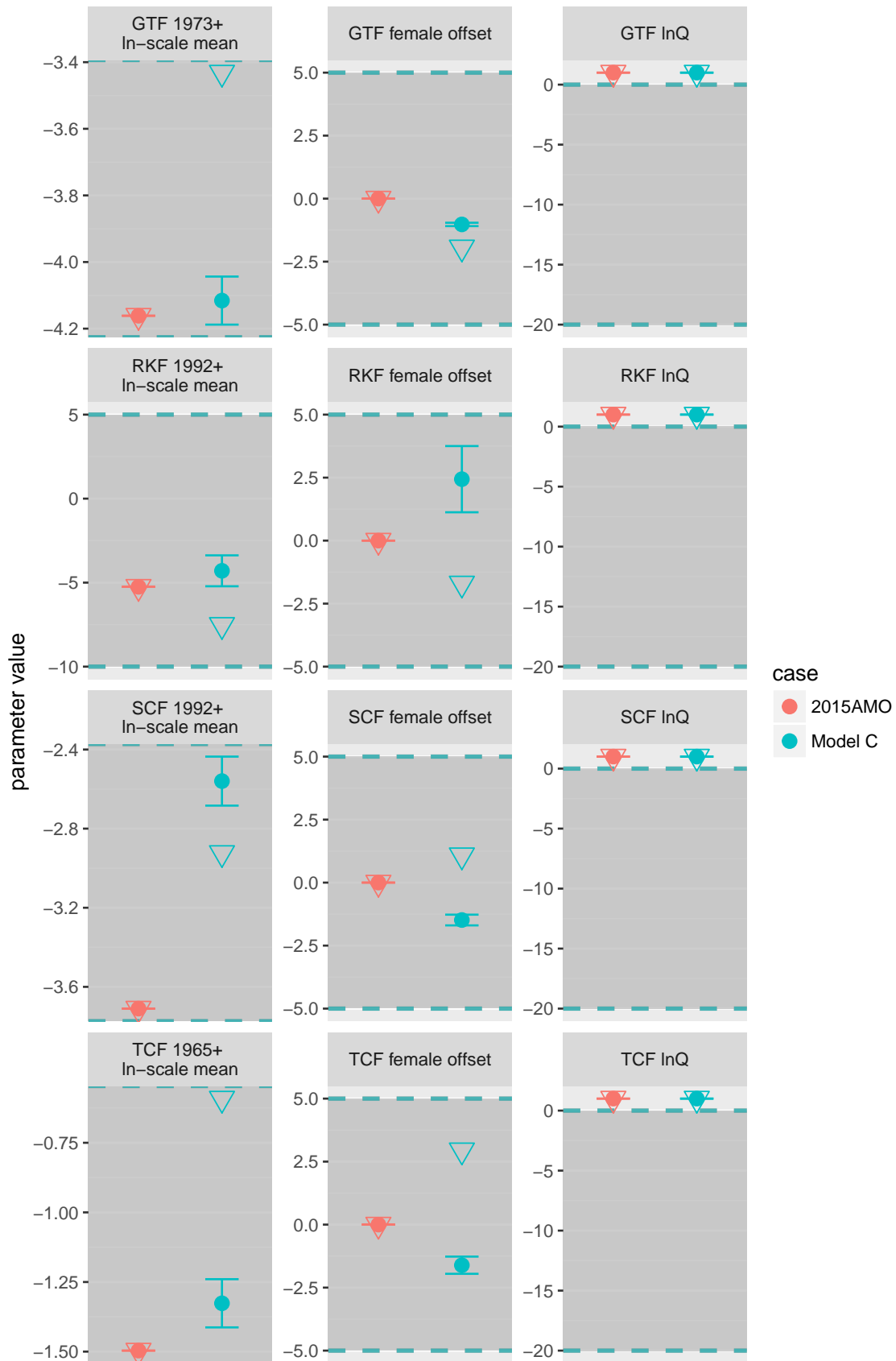Figure 22. Estimated fisheries parameters for GTF selectivity.

mortality/capture rate

Figure 23. Estimated fisheries parameters for mortality or capture rate.

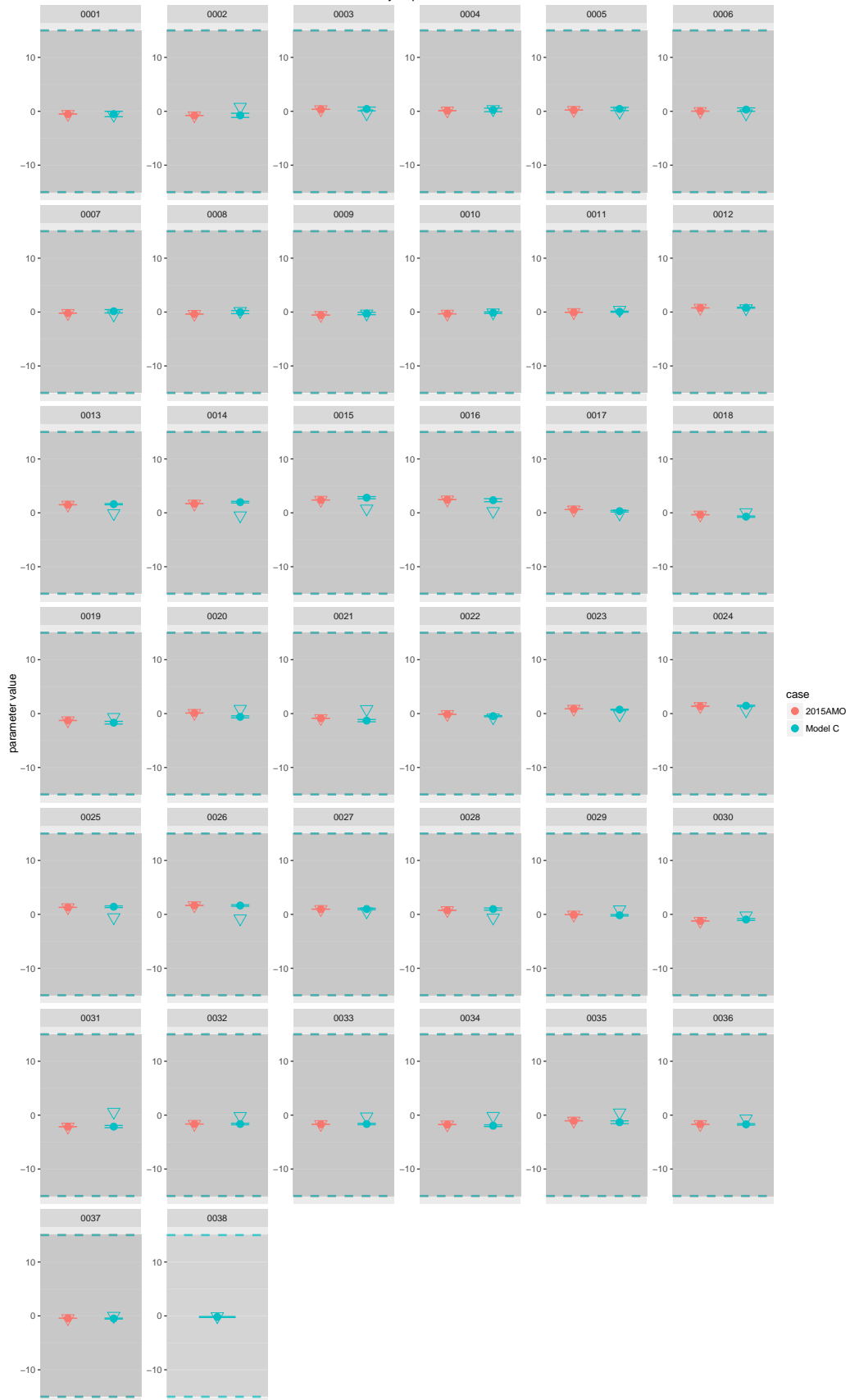TCF mortality/capture rate devs

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Figure 24. Estimated fisheries parameters for TCF mortality or capture rate devs.
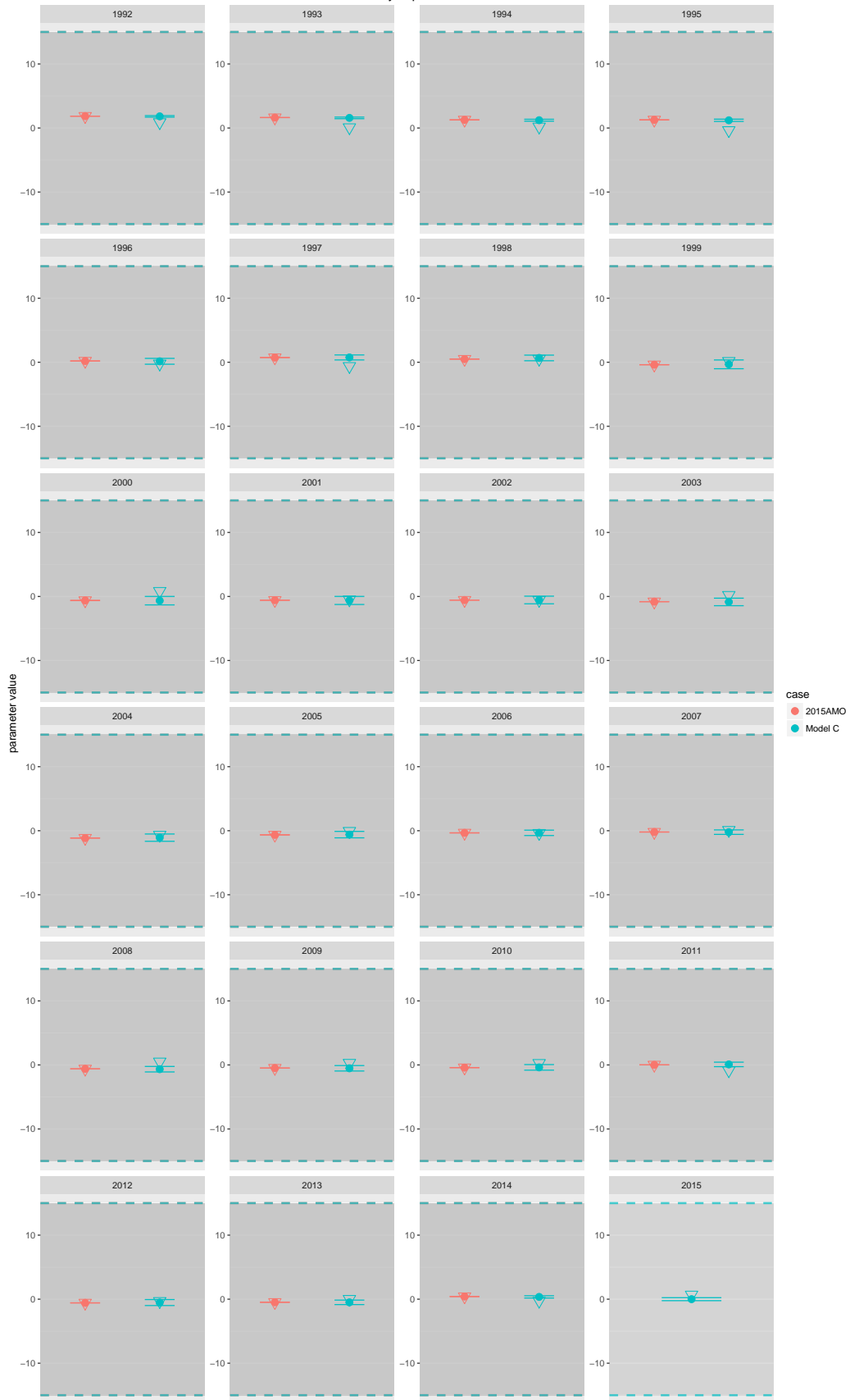
SCF mortality/capture rate devs

Figure 25. Estimated fisheries parameters for SCF mortality or capture rate devs.
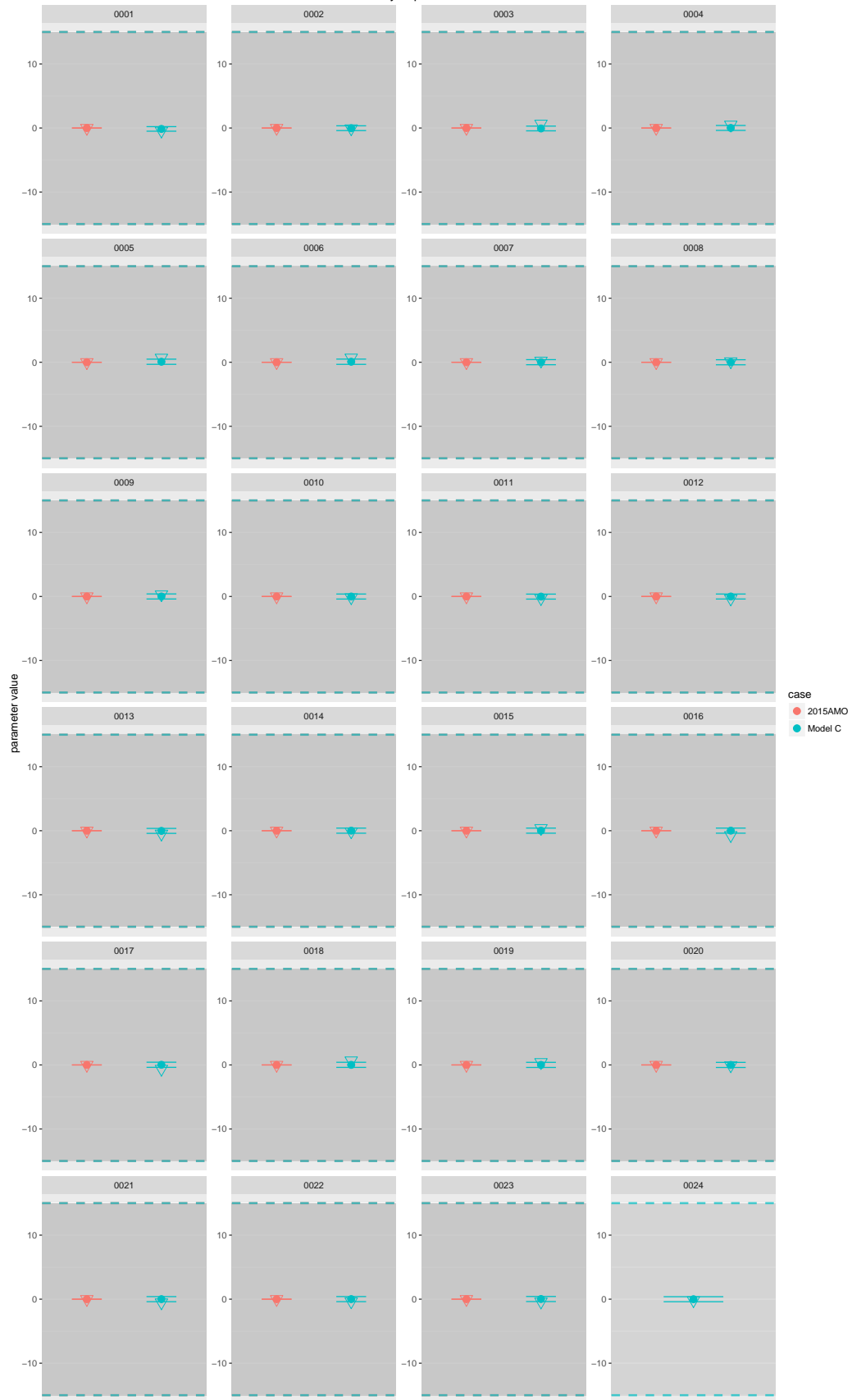
RKF mortality/capture rate devs

Figure 26. Estimated fisheries parameters for RKF mortality or capture rate devs.
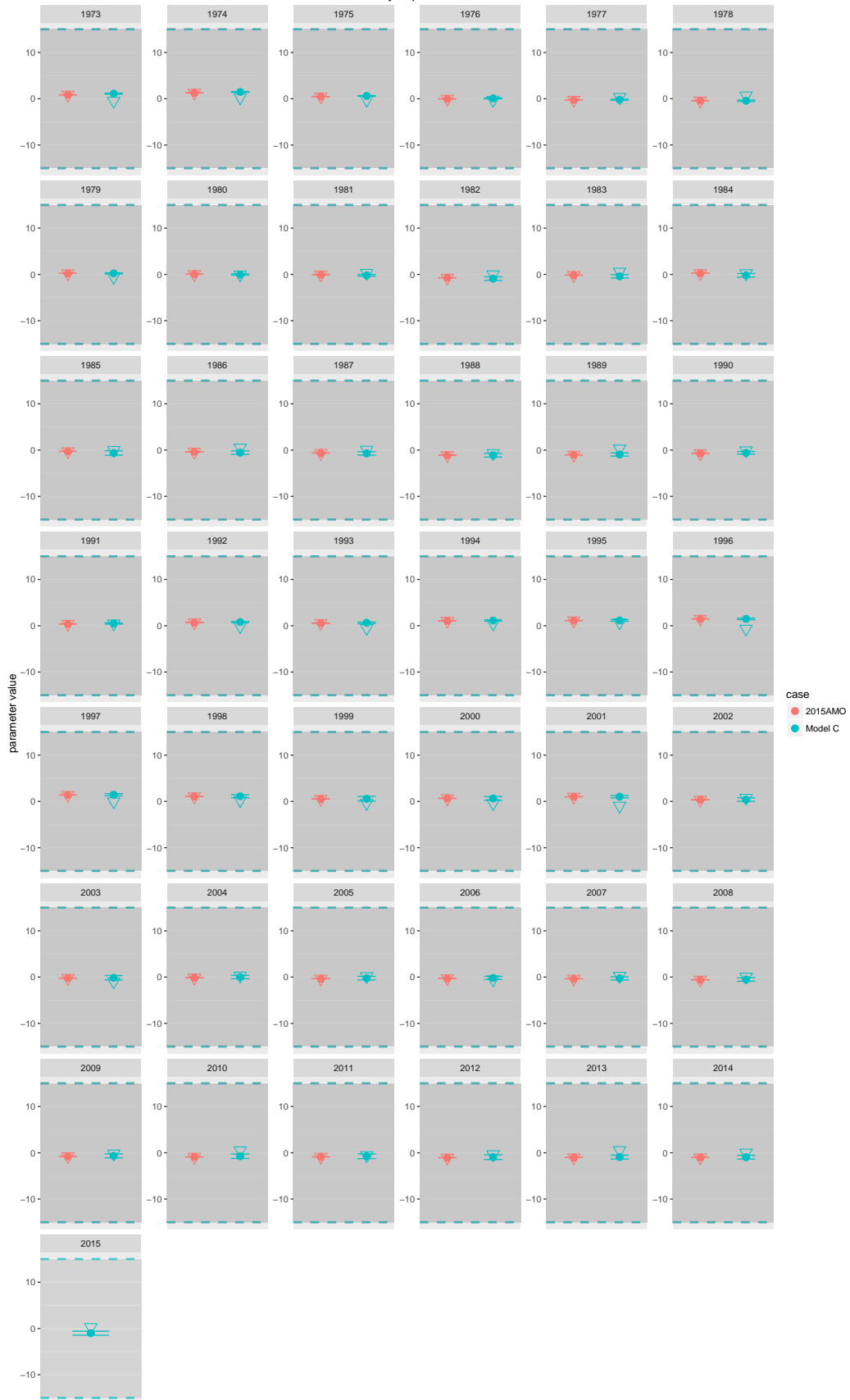
GTF mortality/capture rate devs

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Figure 27. Estimated fisheries parameters for GTF mortality or capture rate devs.
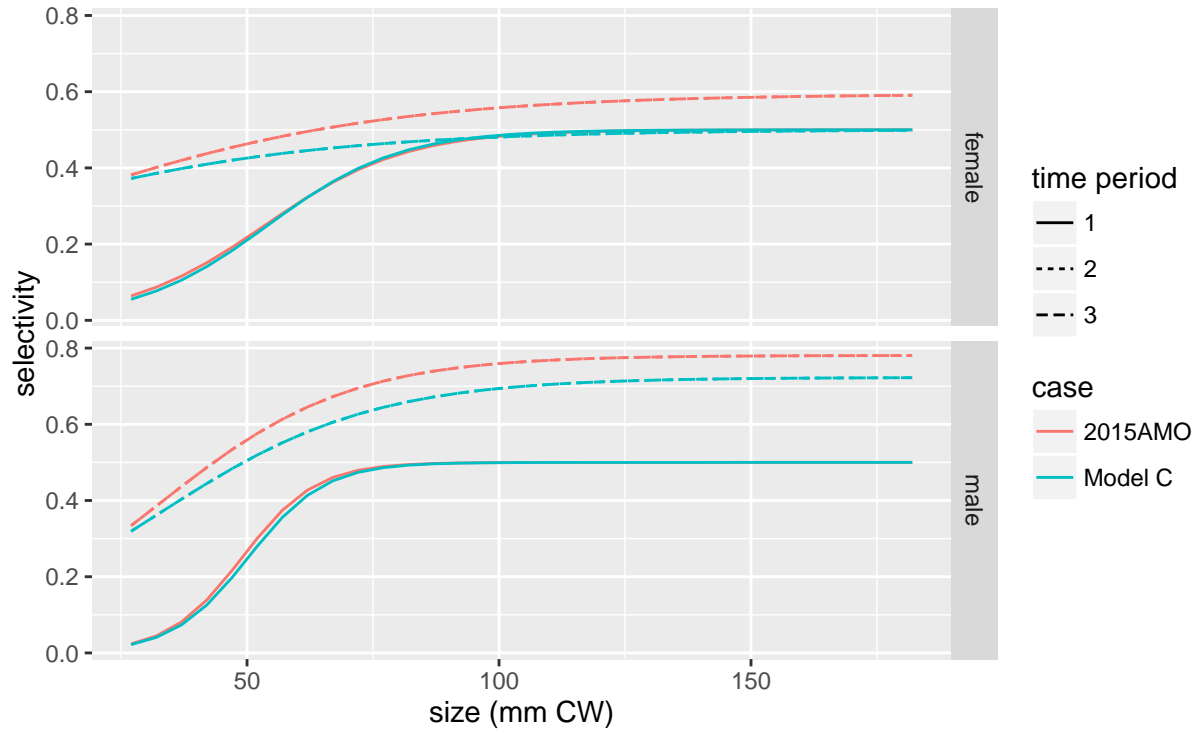
Survey selectivity functions

Figure 28. Estimated selectivity functions for the survey.

Fishery retention functions

Retained mortality or retention (GMacs FMM) functions for males in the directed fishery, pre-1991 and post-1990.
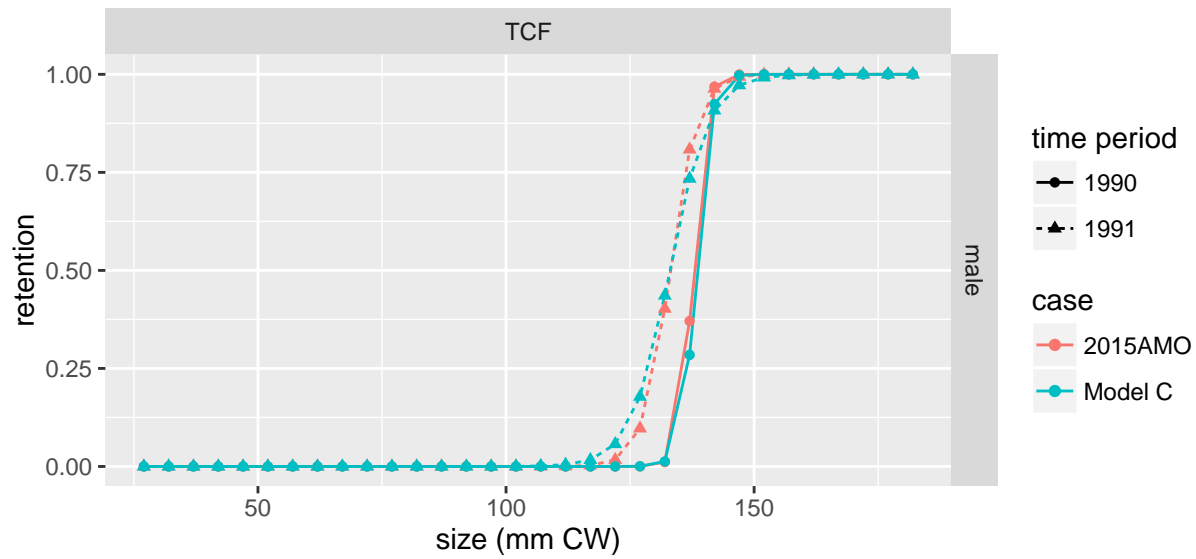
Figure 29. Estimated retention functions for total catch inTCF.

Fishery selectivity functions

Bycatch selectivity functions for females in the directed fishery and males and females in the snow crab, BBRKC fisheries, and groundfish fisheries. Capture and/or total fishing mortality selectivity functions for males in the directed fishery prior to 1991.
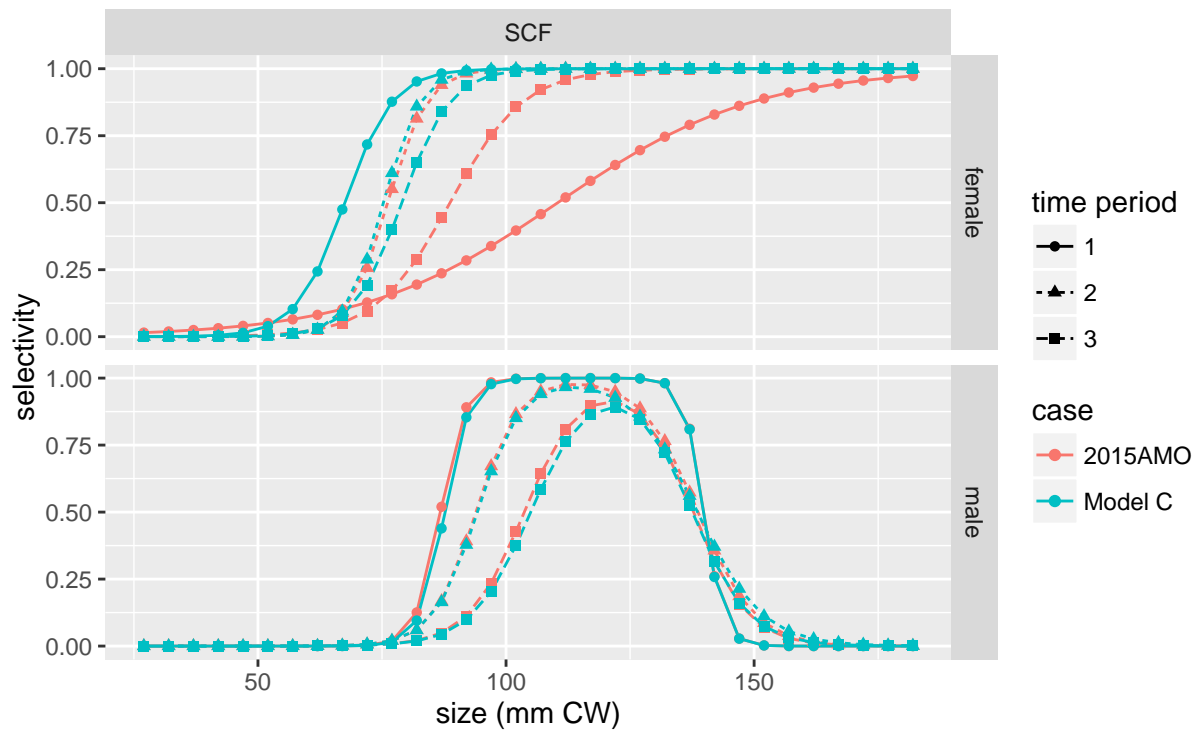

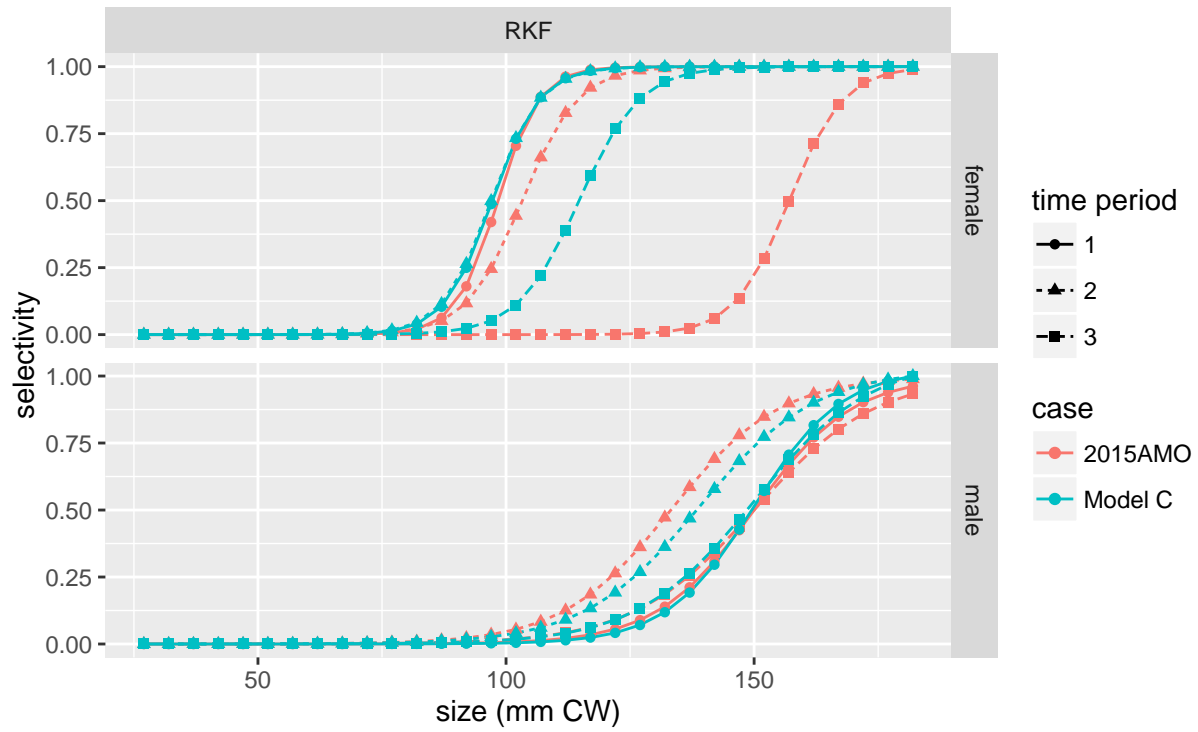Figure 30. Estimated selectivity functions for total catch inSCF.

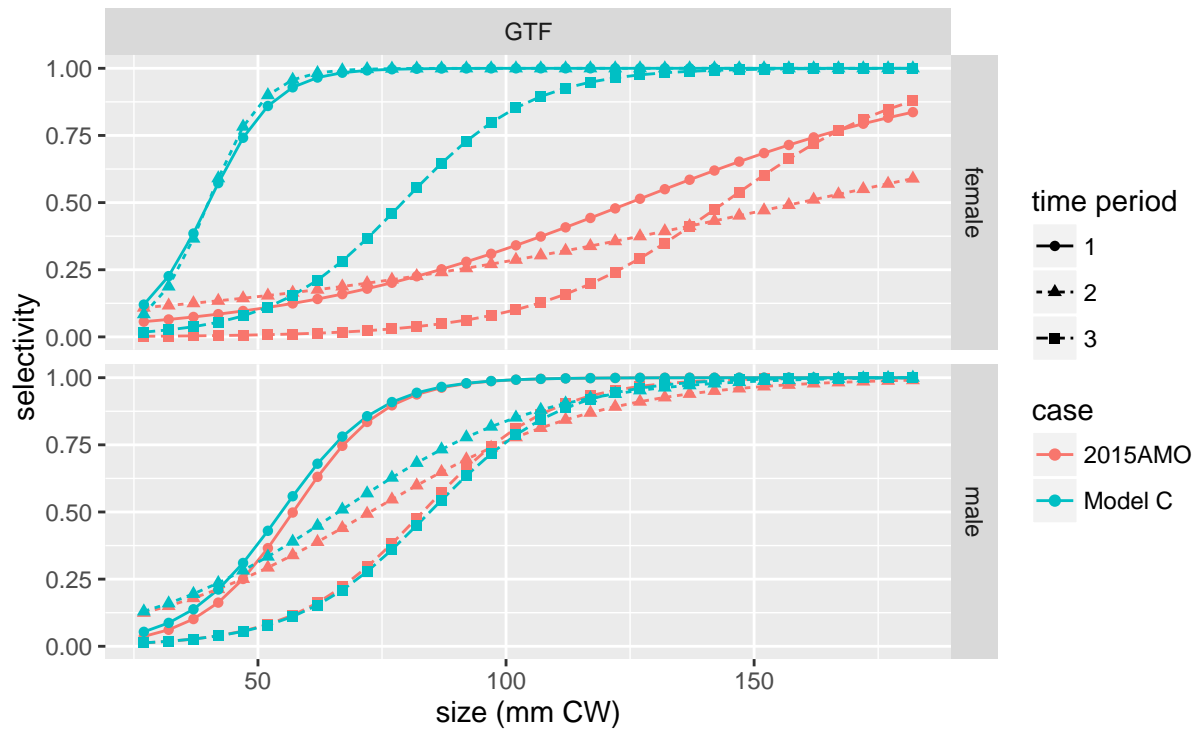Figure 31. Estimated selectivity functions for total catch inRKF.

Figure 32. Estimated selectivity functions for total catch inGTF.
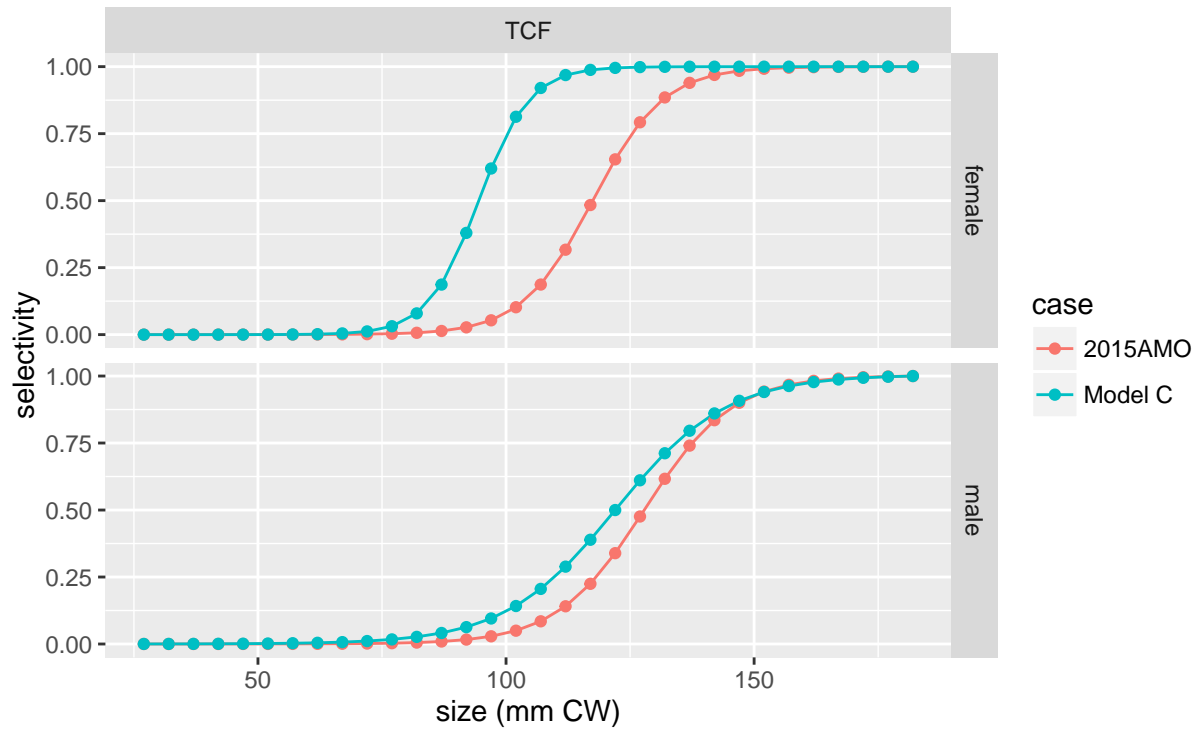
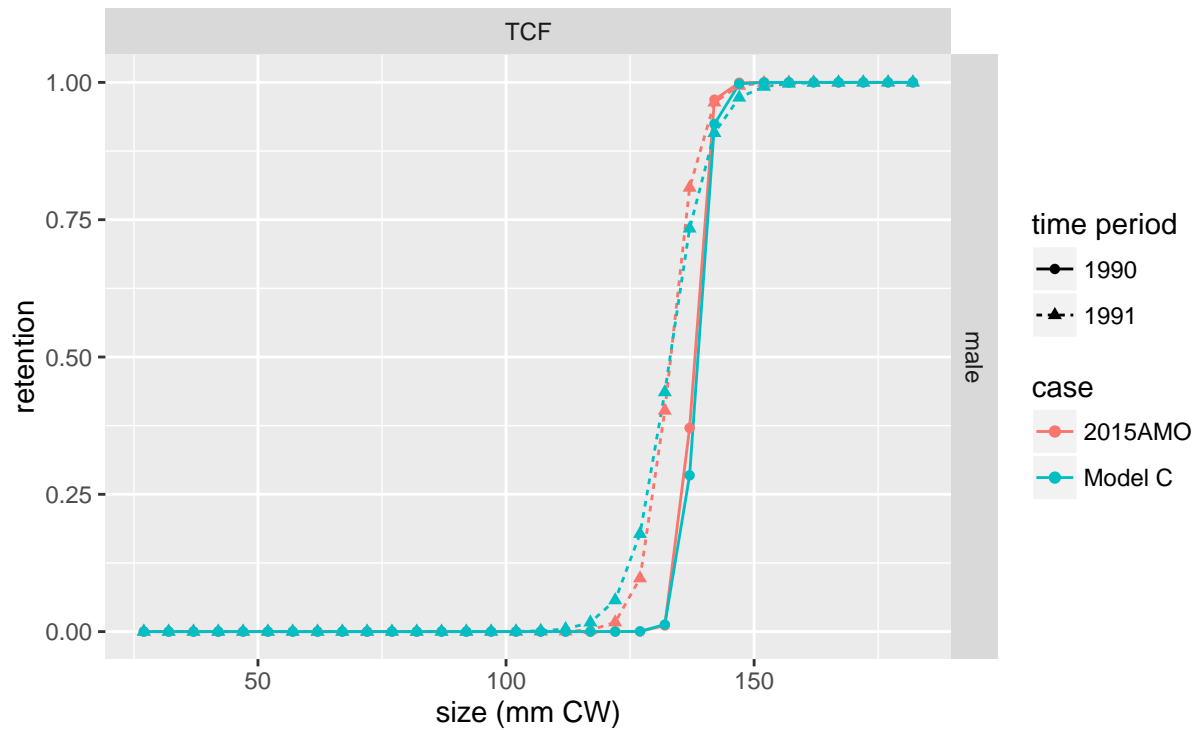Figure 33. Estimated selectivity functions for total catch inTCF.

Figure 34. Estimated retention functions for total catch inTCF.

Fishery selectivity functions

Annual male total-catch capture and/or fishing mortality selectivity functions for the directed fishery starting in 1991/92. The directed fishery was closed during 1997/98-2004/05 and 2010/11-2012/13. During these time periods, the "mean" selectivity function that forms the basis for the annual deviations is shown.
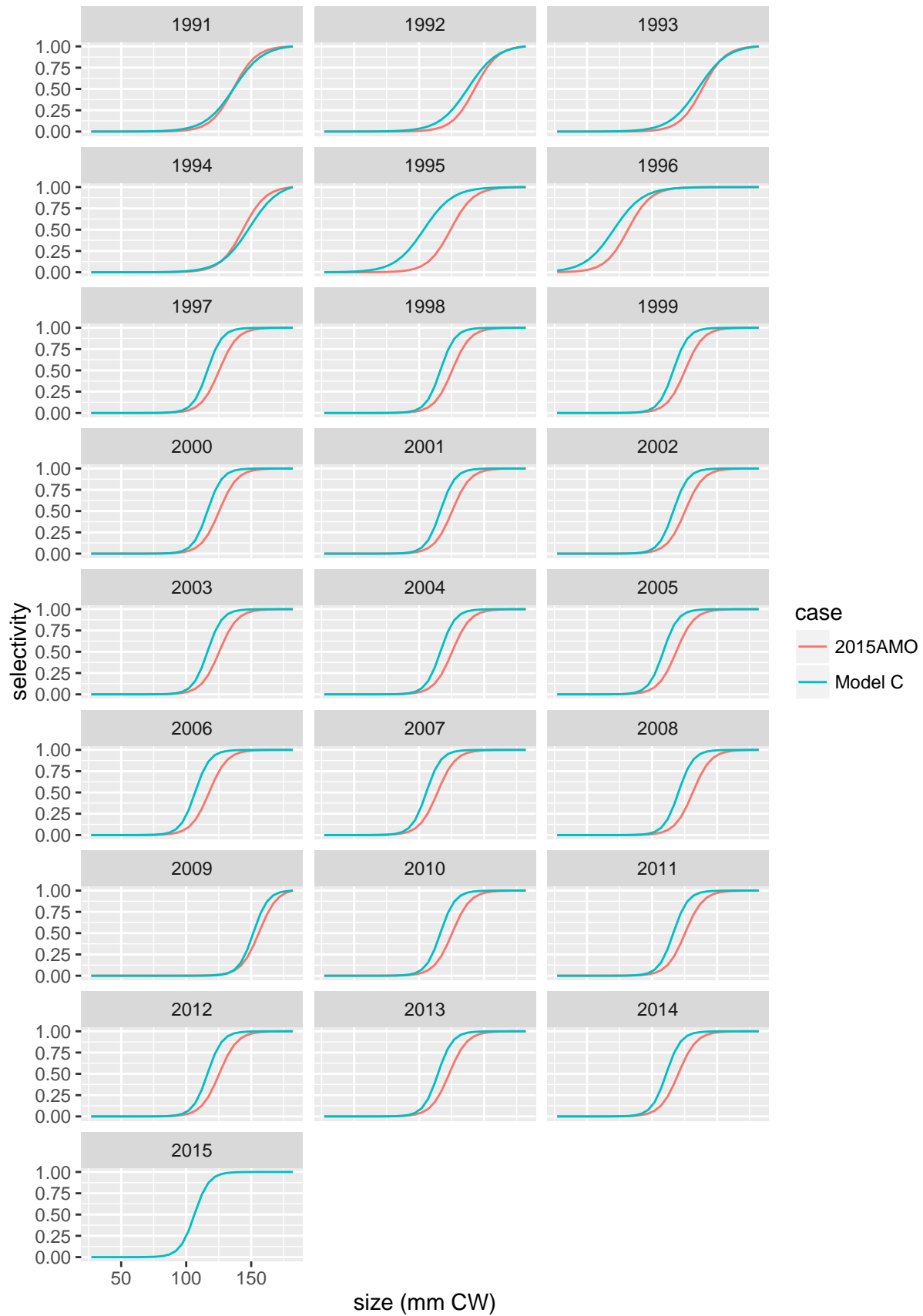
size (mm CW)

Figure 35. Estimated selectivity functions for total catch inTCF. Recent time period.

Population processes

Figure 36.Estimated natural mortality rates.
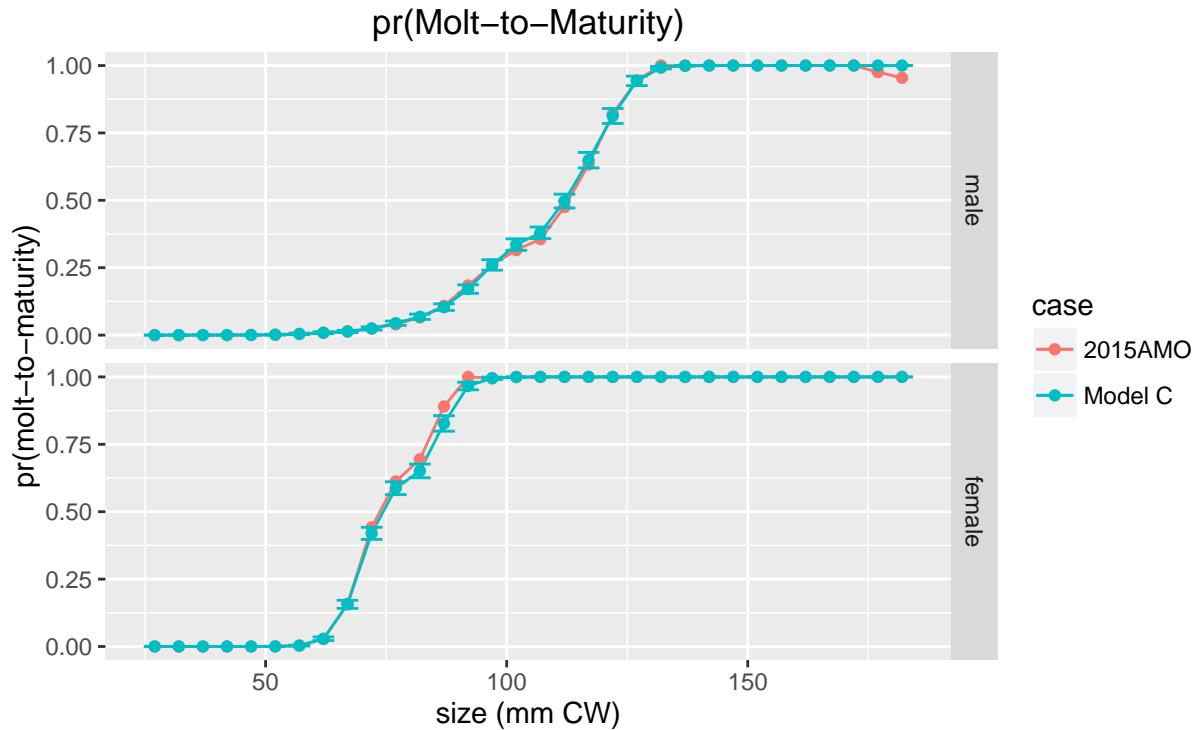
Figure 37. Estimated probabilities of molt-to-maturity at size (mm CW).
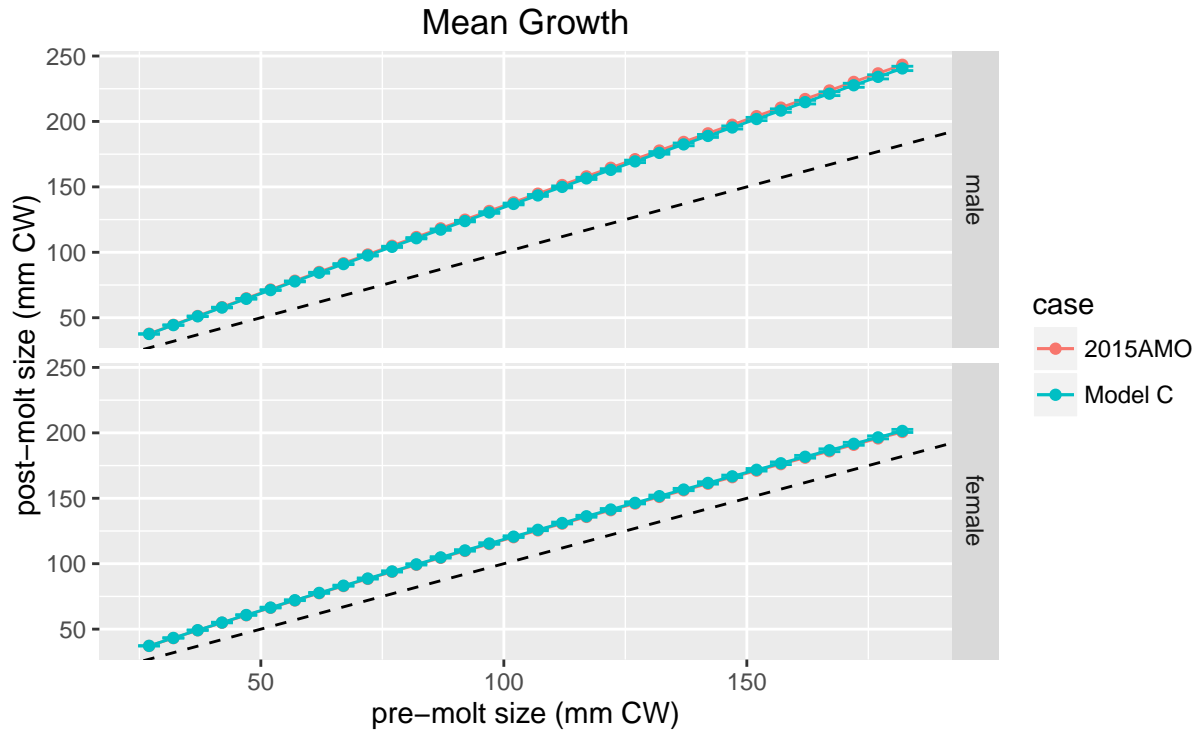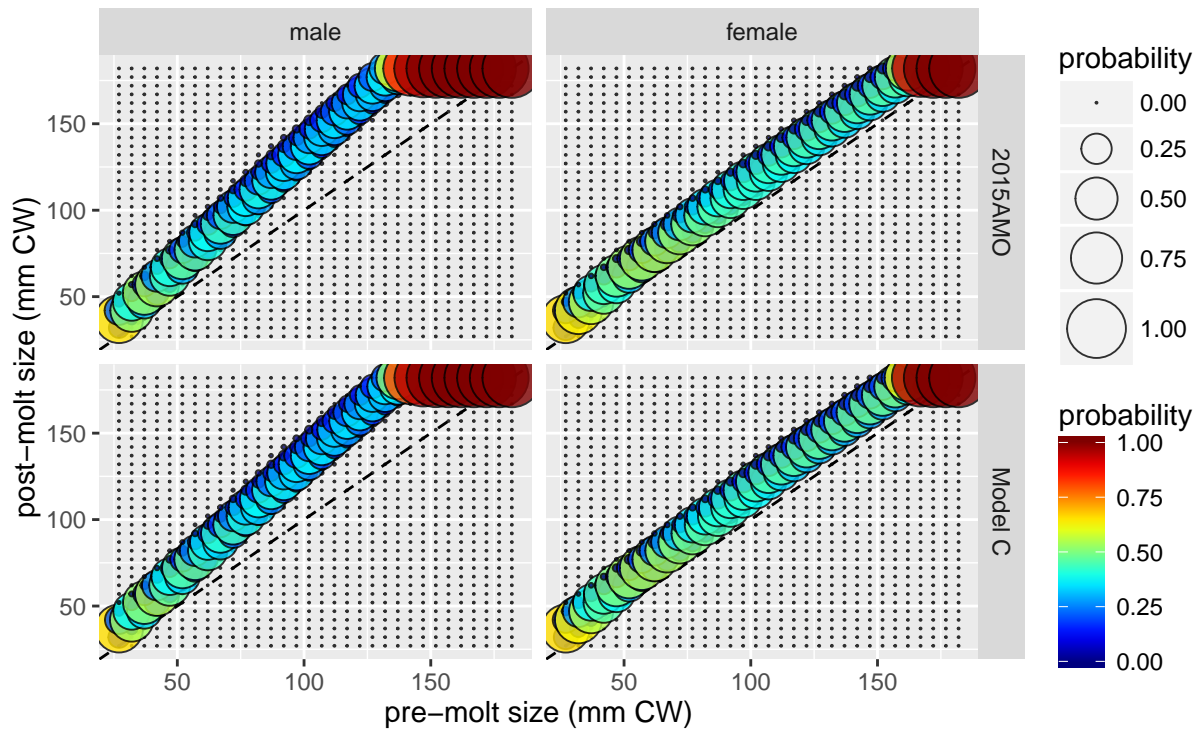

Figure 38. Estimated mean growth patterns.

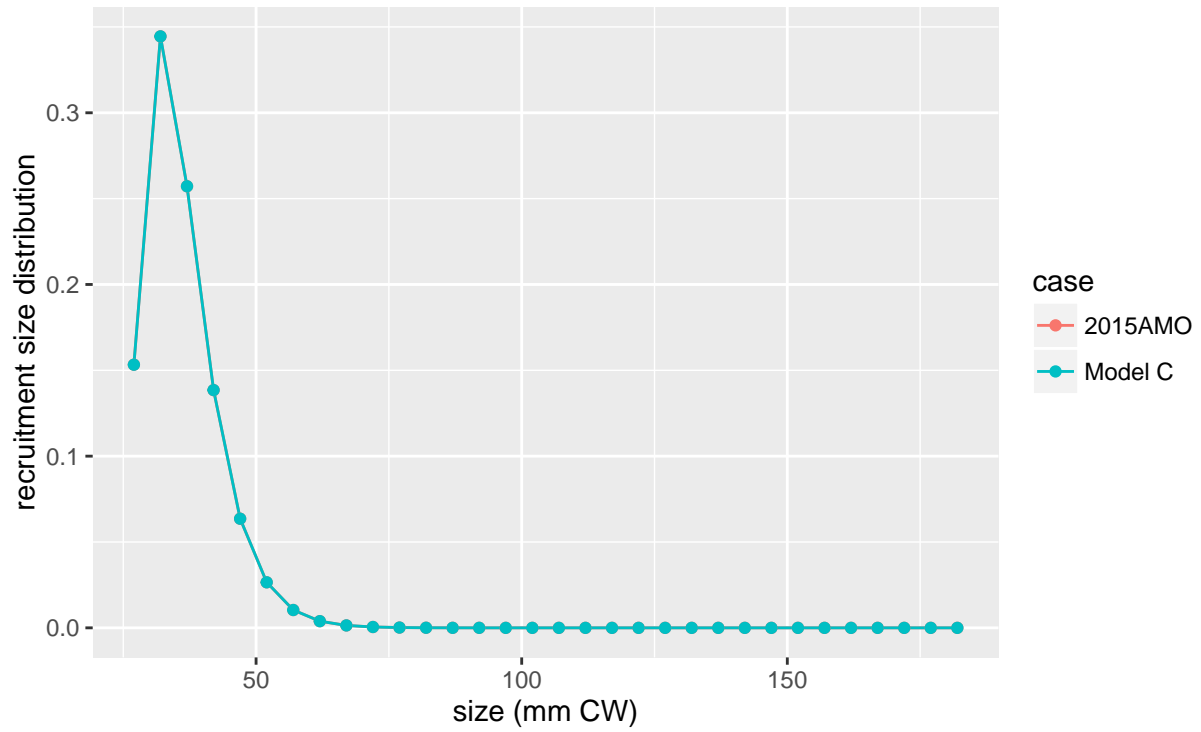Figure 39. Estimated growth transition matrix.

Figure 40. Estimated/assumed size distribution at recruitment to the model.
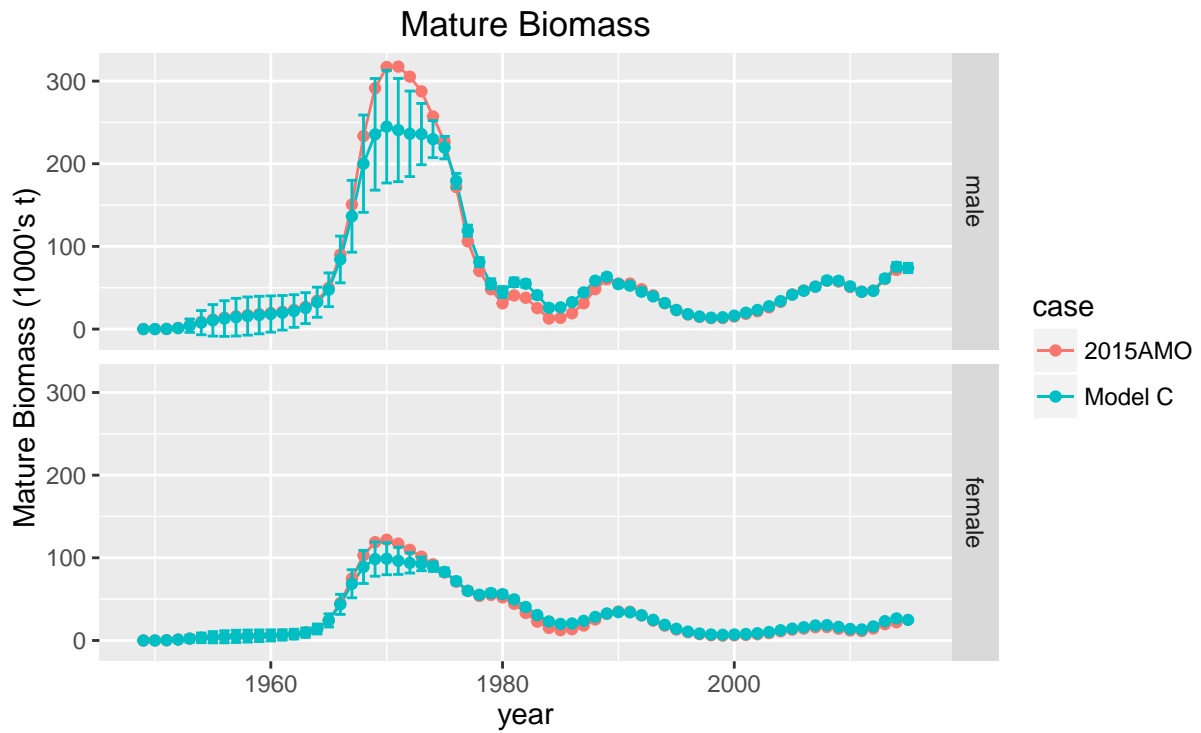
Population quantities

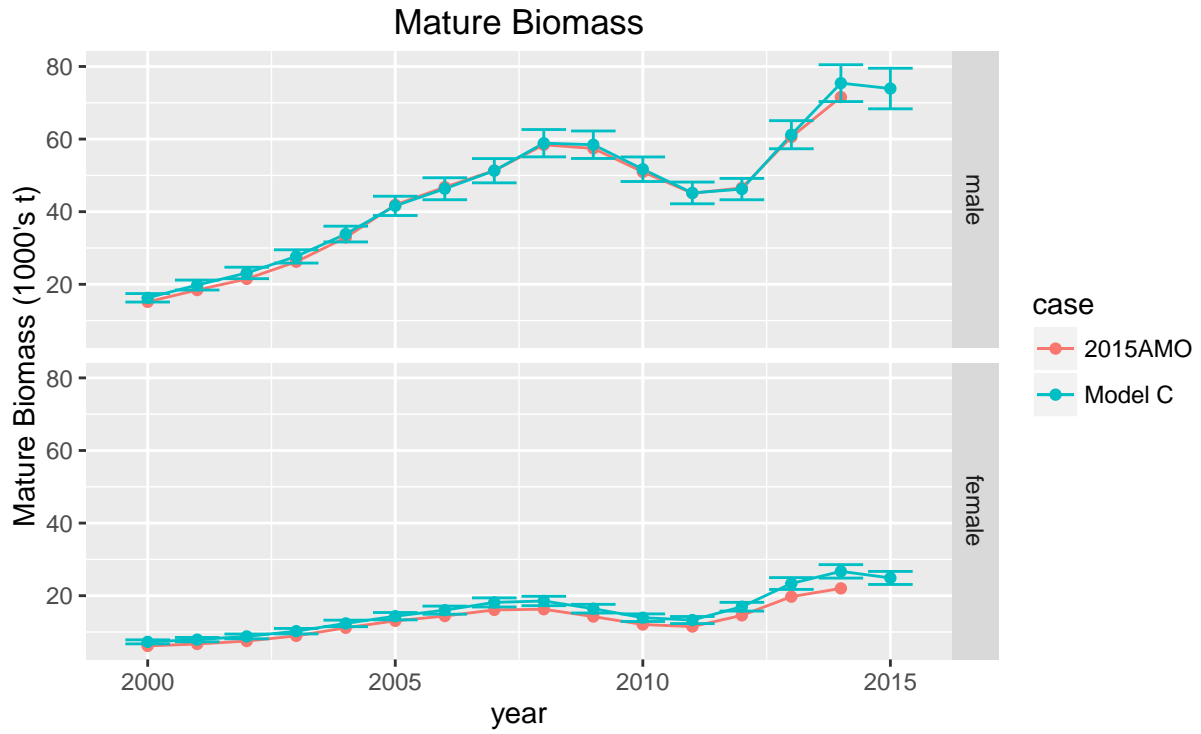Figure 41. Estimated mature biomass at mating time.

Figure 42. Estimated mature biomass at mating time (recent years only).

Figure 43. Estimated annual recruitment.

Recruitment

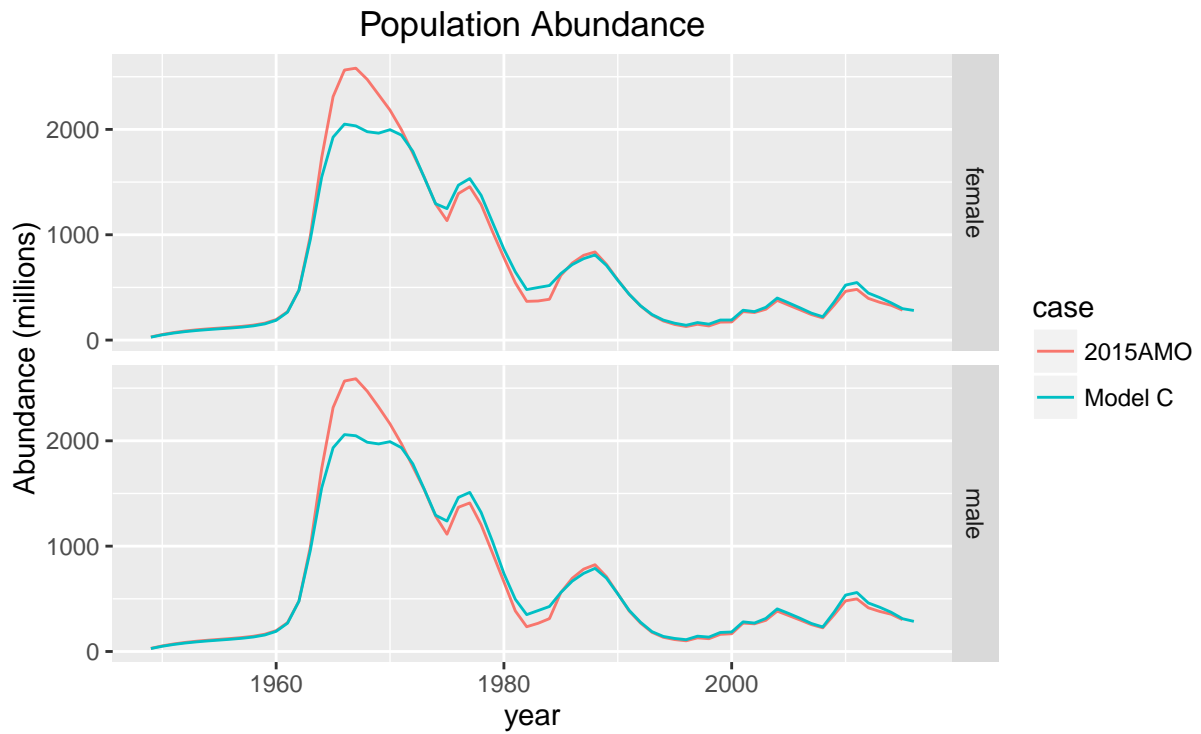Figure 44. Estimated annual recruitment (recent years only).

Population Abundance

Figure 45. Estimated annual abundance.
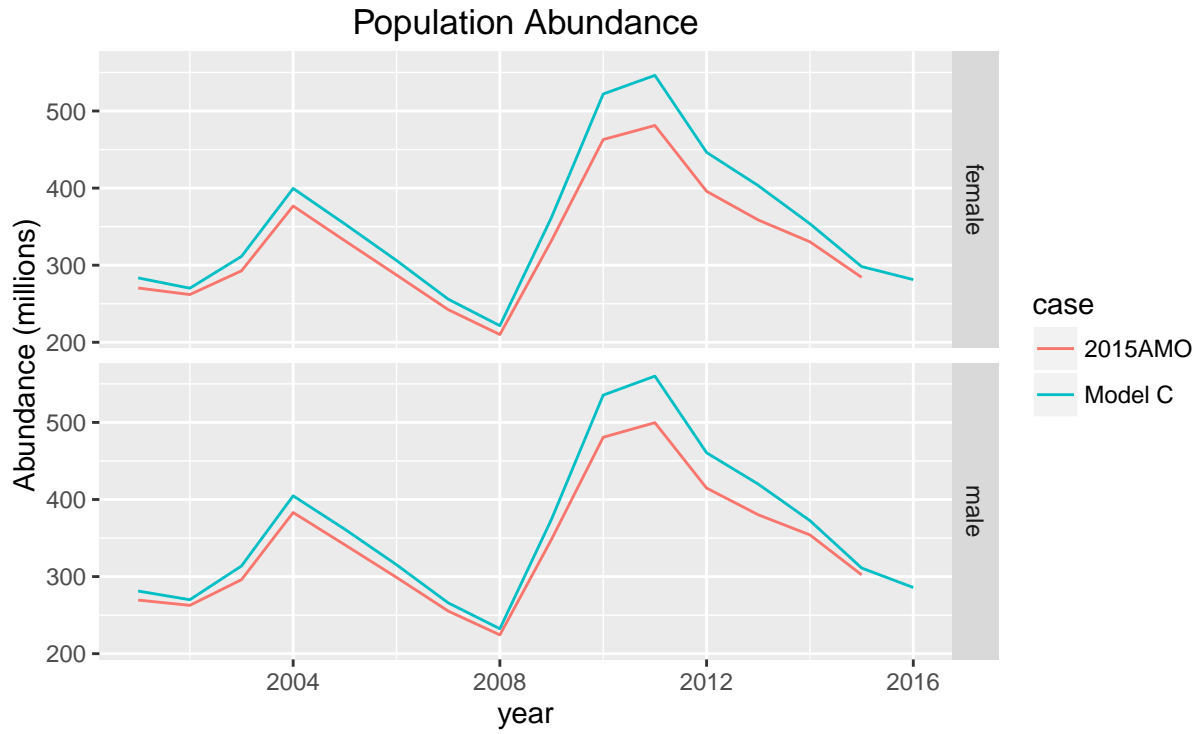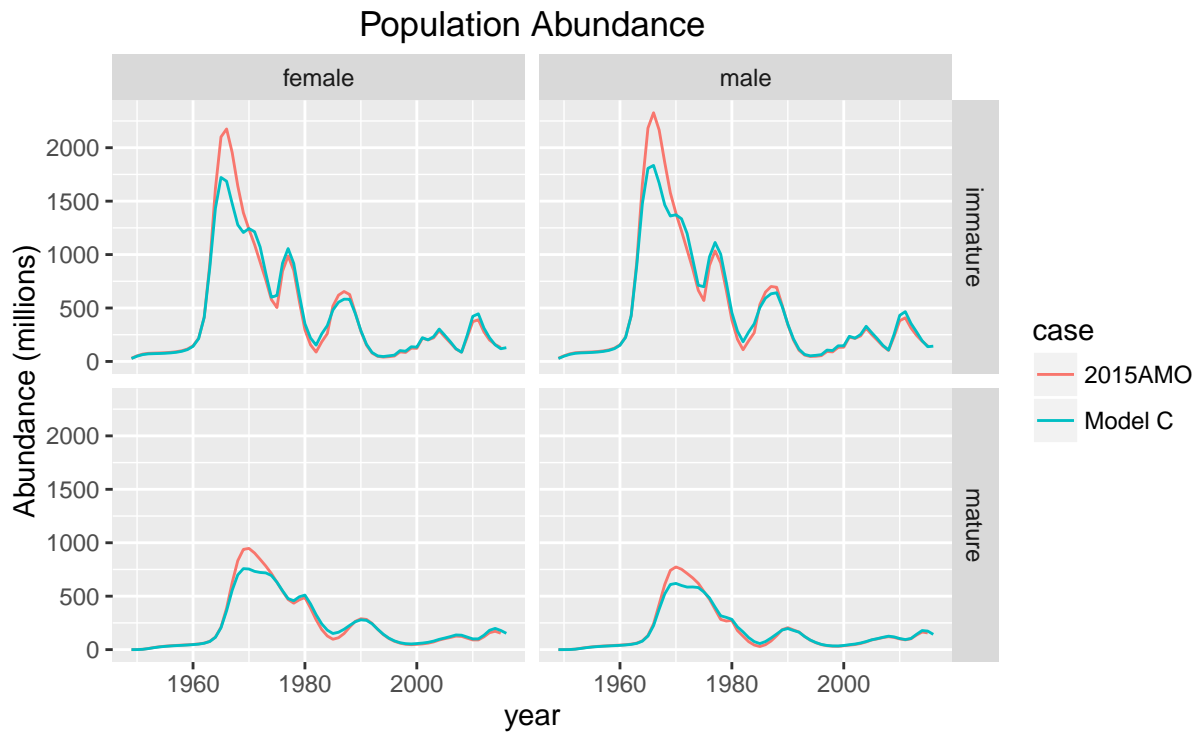
Figure 46. Estimated annual abundance (recent years only).

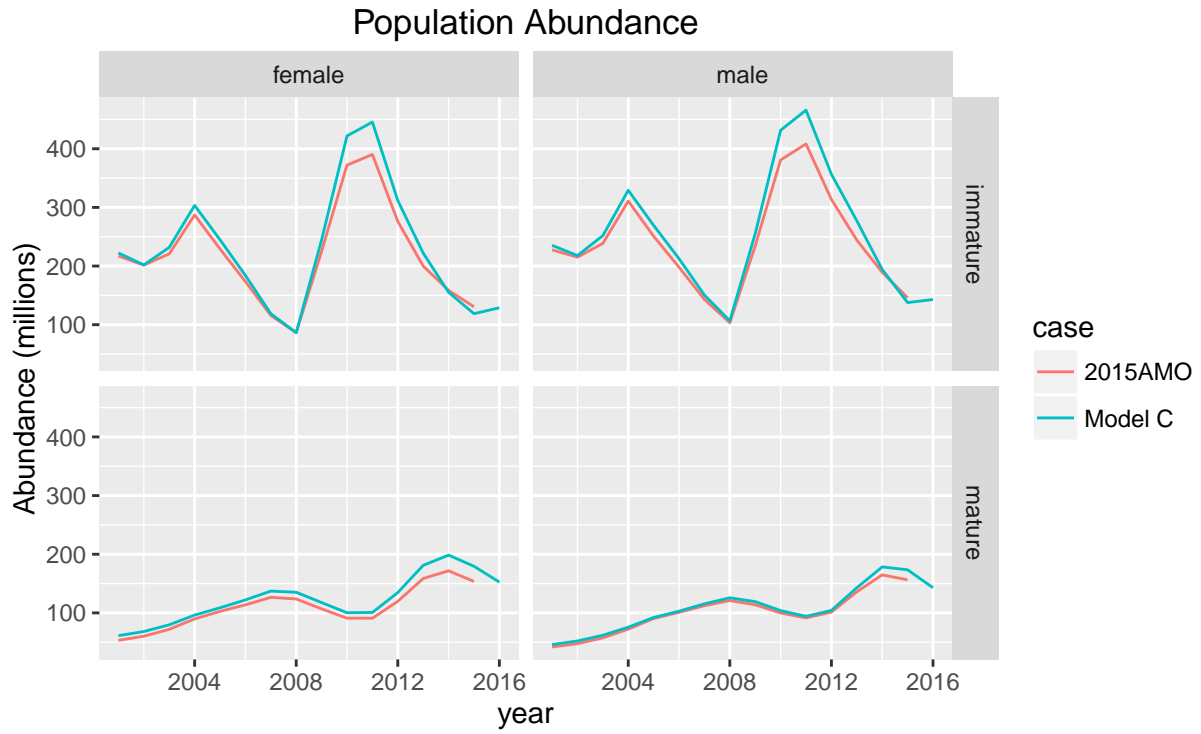Figure 47. Estimated annual abundance, by sex and maturity.

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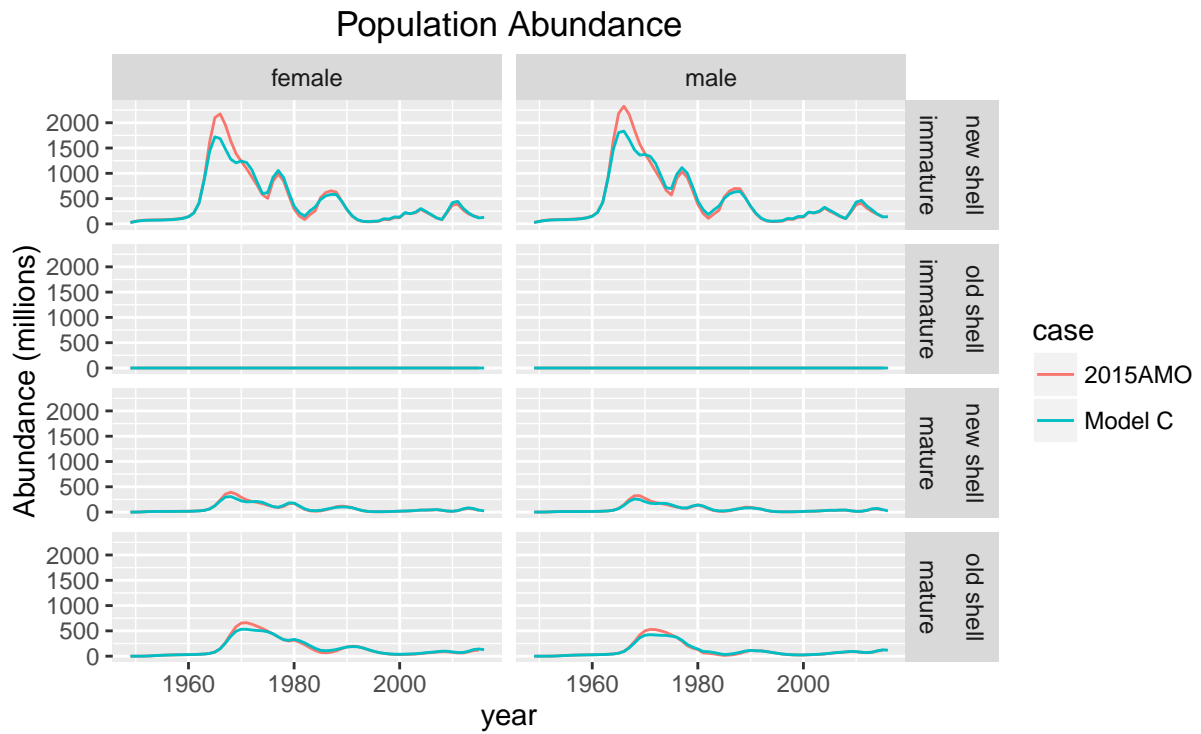Figure 48. Estimated annual abundance, by sex and maturity (recent years only).

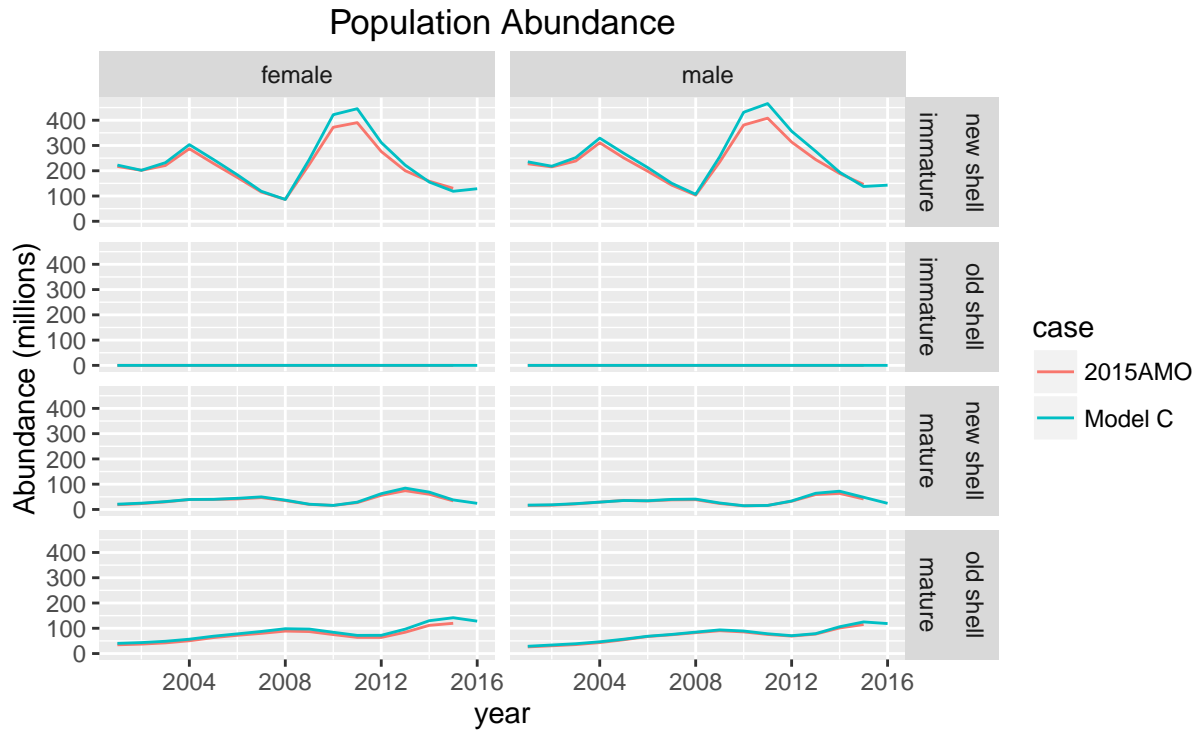Figure 49. Estimated annual abundance, by sex, maturity, and shell condition.

Figure 50. Estimated annual abundance, by sex, maturity, and shell condition (recent yeaers only).
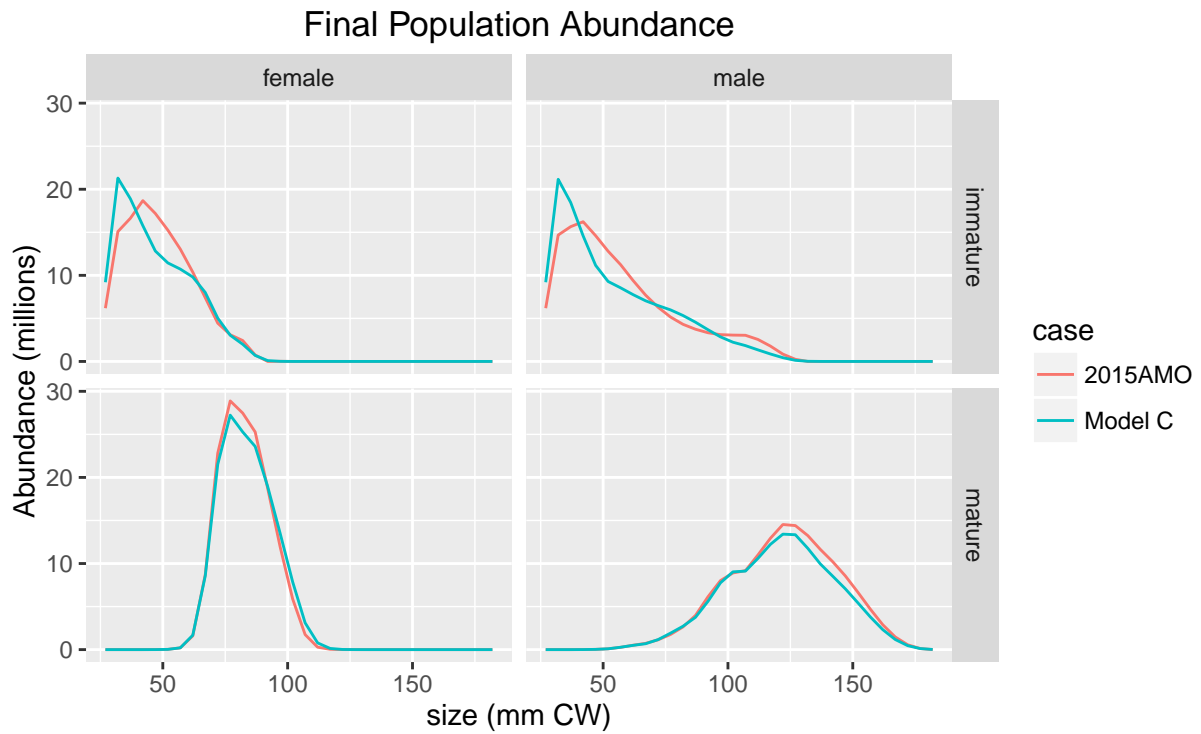

Figure 51. Estimated final abundance, by sex, maturity, shell condition and size.
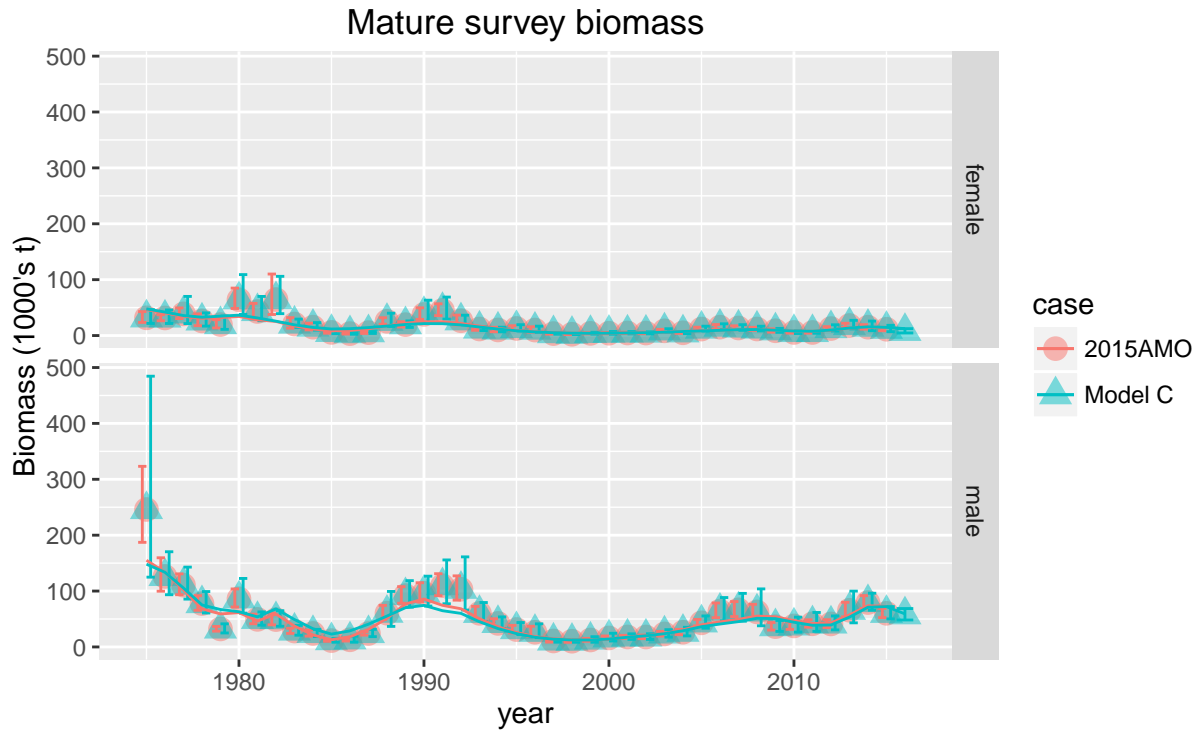
Survey quantities

Figure 52. Comparison of observed and predicted mature biomass from the survey.
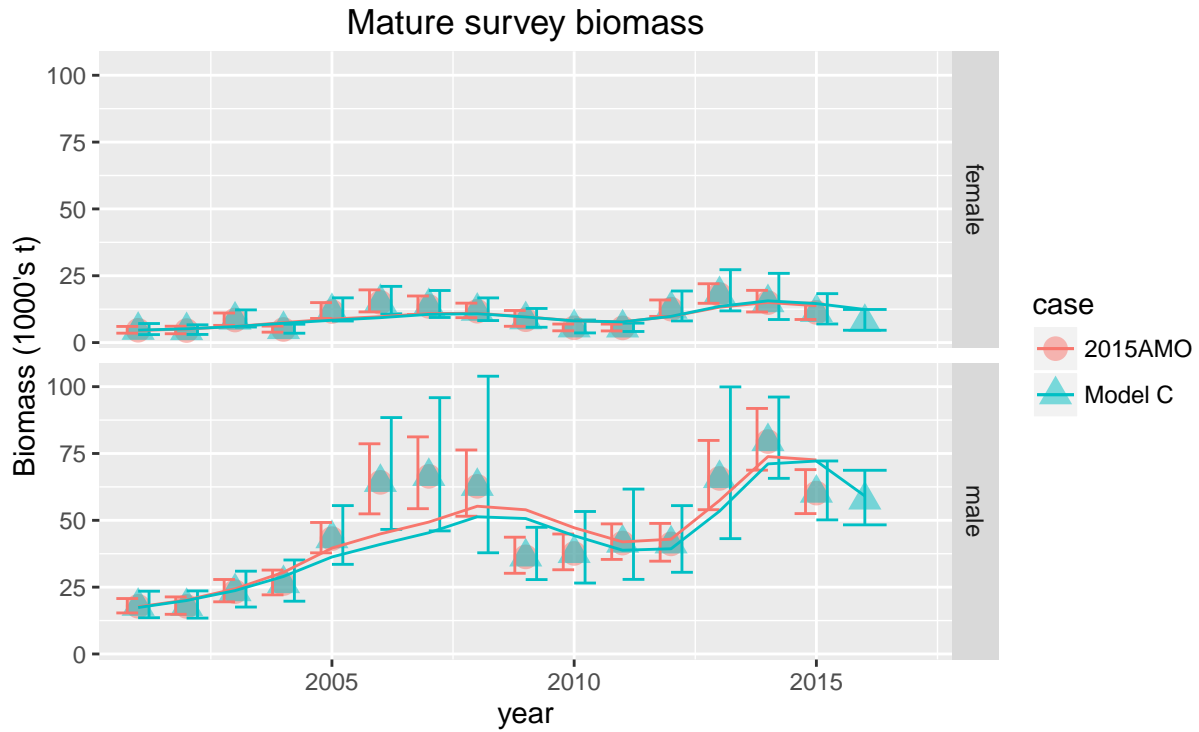

Figure 53. Comparison of observed and predicted mature biomass from the survey (zoomed to recent).
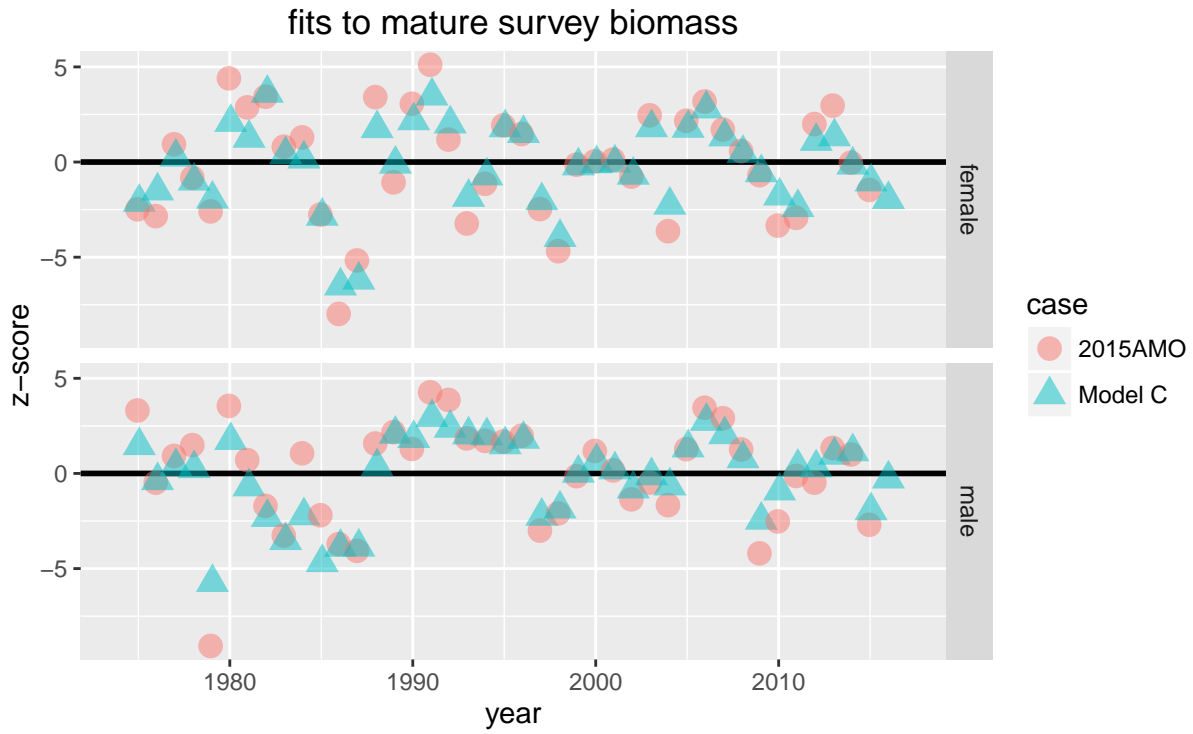
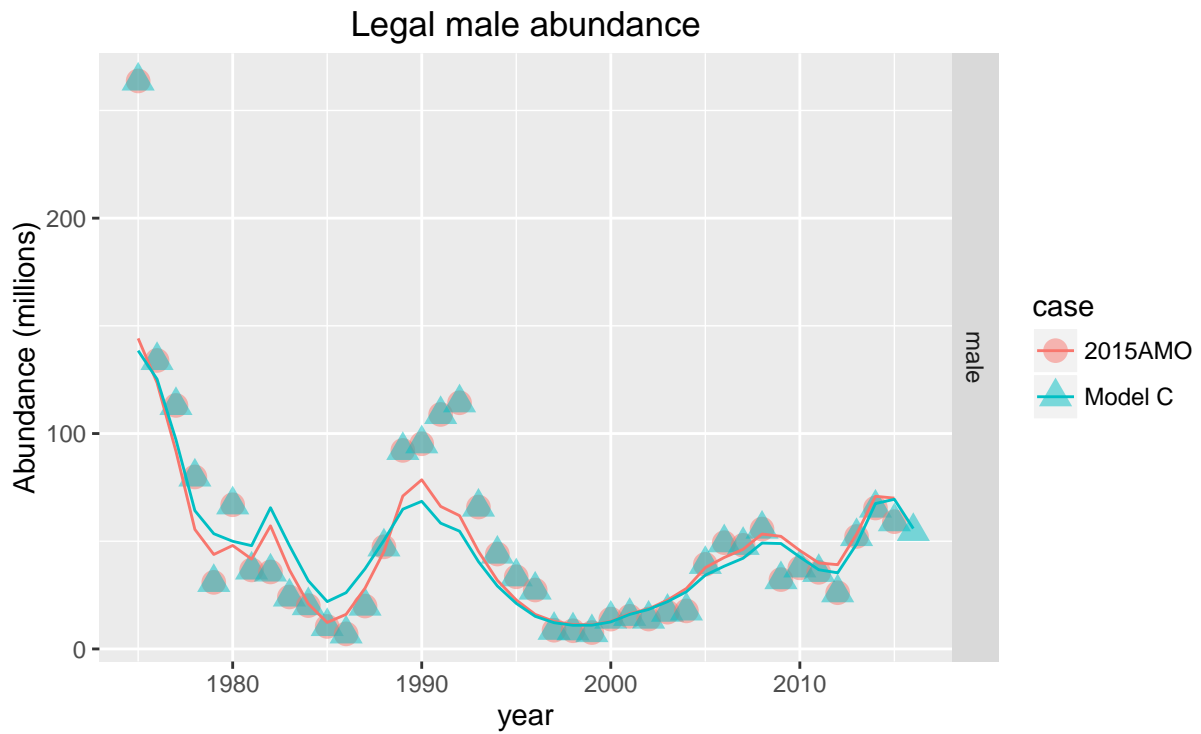Figure 54. Z-scores for mature biomass from the survey.

Figure 55. Comparison of observed and predicted legal male abundance from the survey.
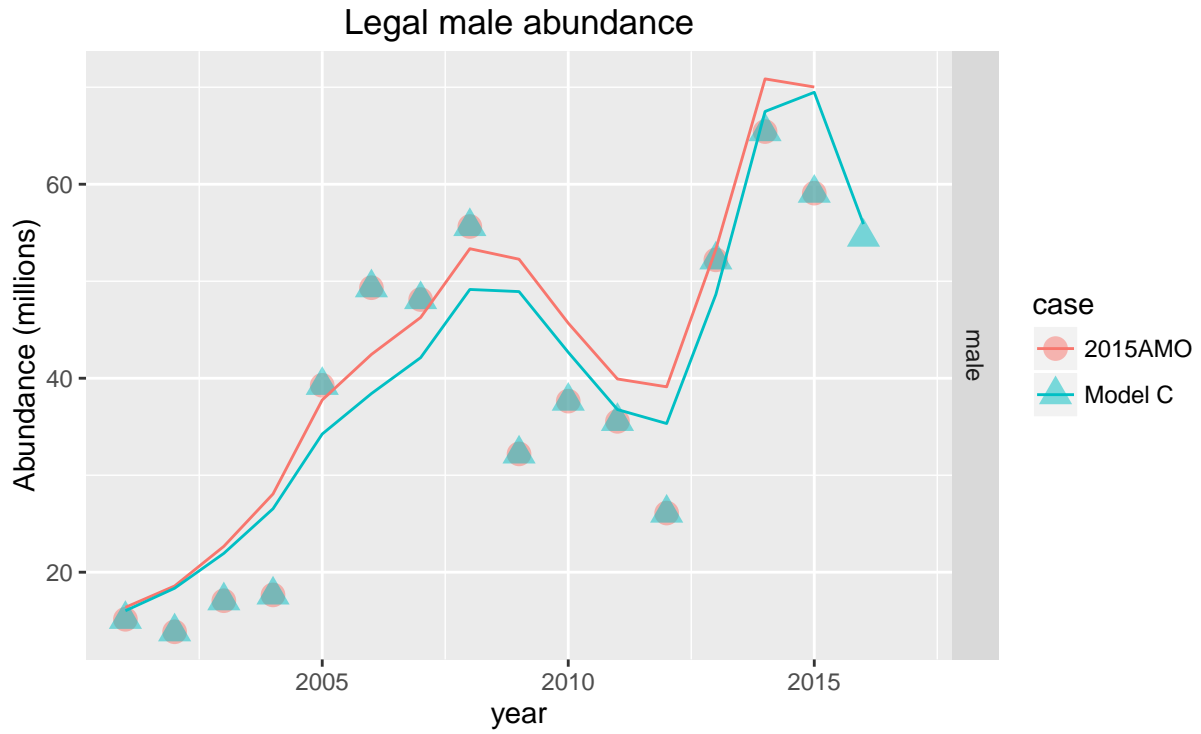
Figure 56. Comparison of observed and predicted legal male abundance from the survey (zoomed to recent).
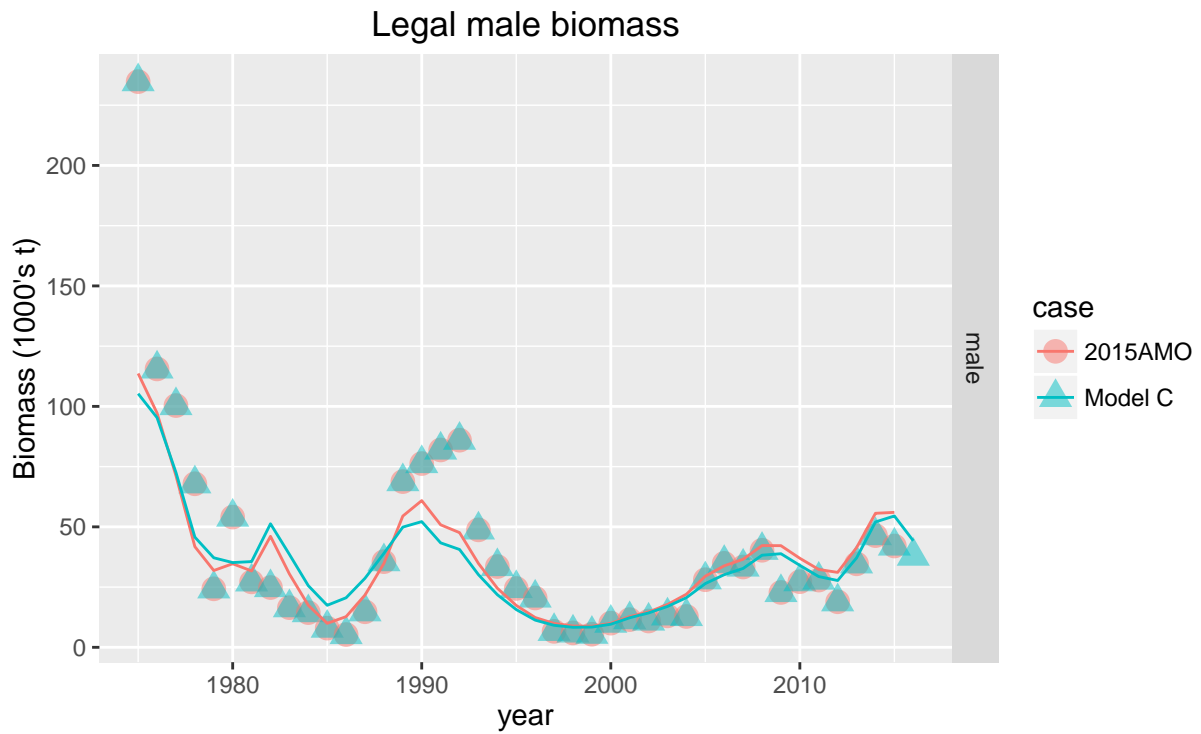

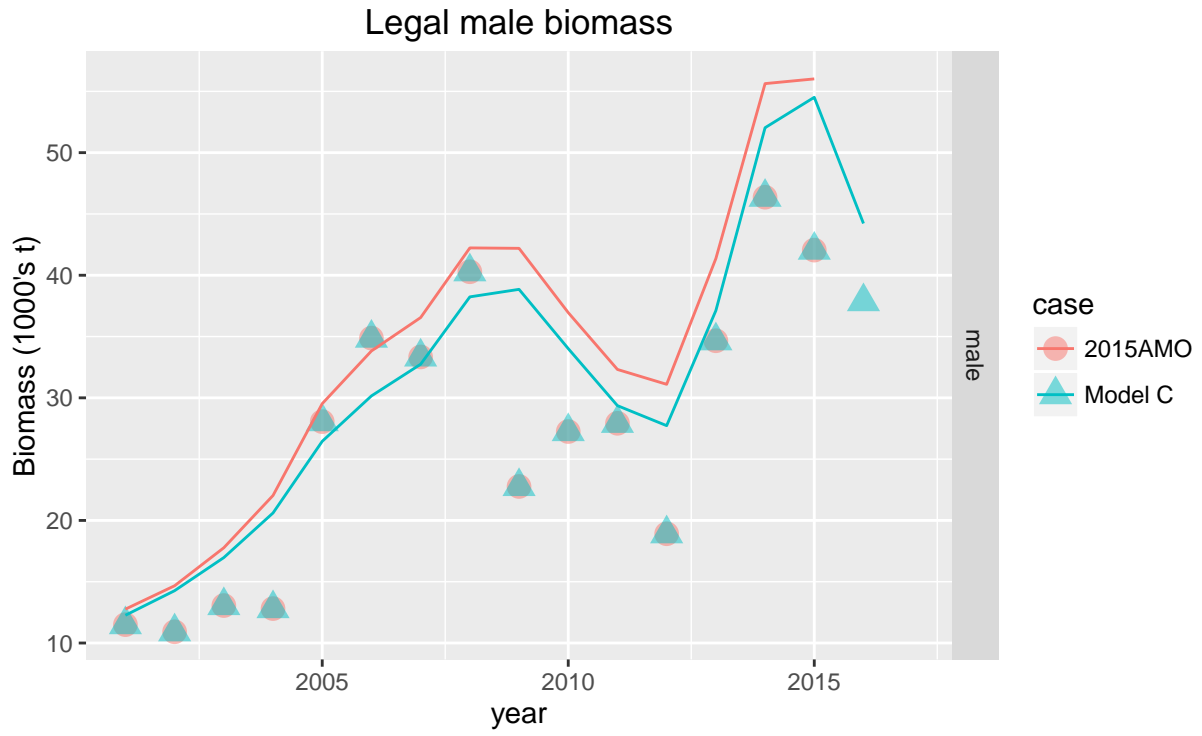Figure 57. Comparison of observed and predicted legal male biomass from the survey.

Figure 58. Comparison of observed and predicted legal male biomass from the survey (zoomed to recent).

Survey size comps

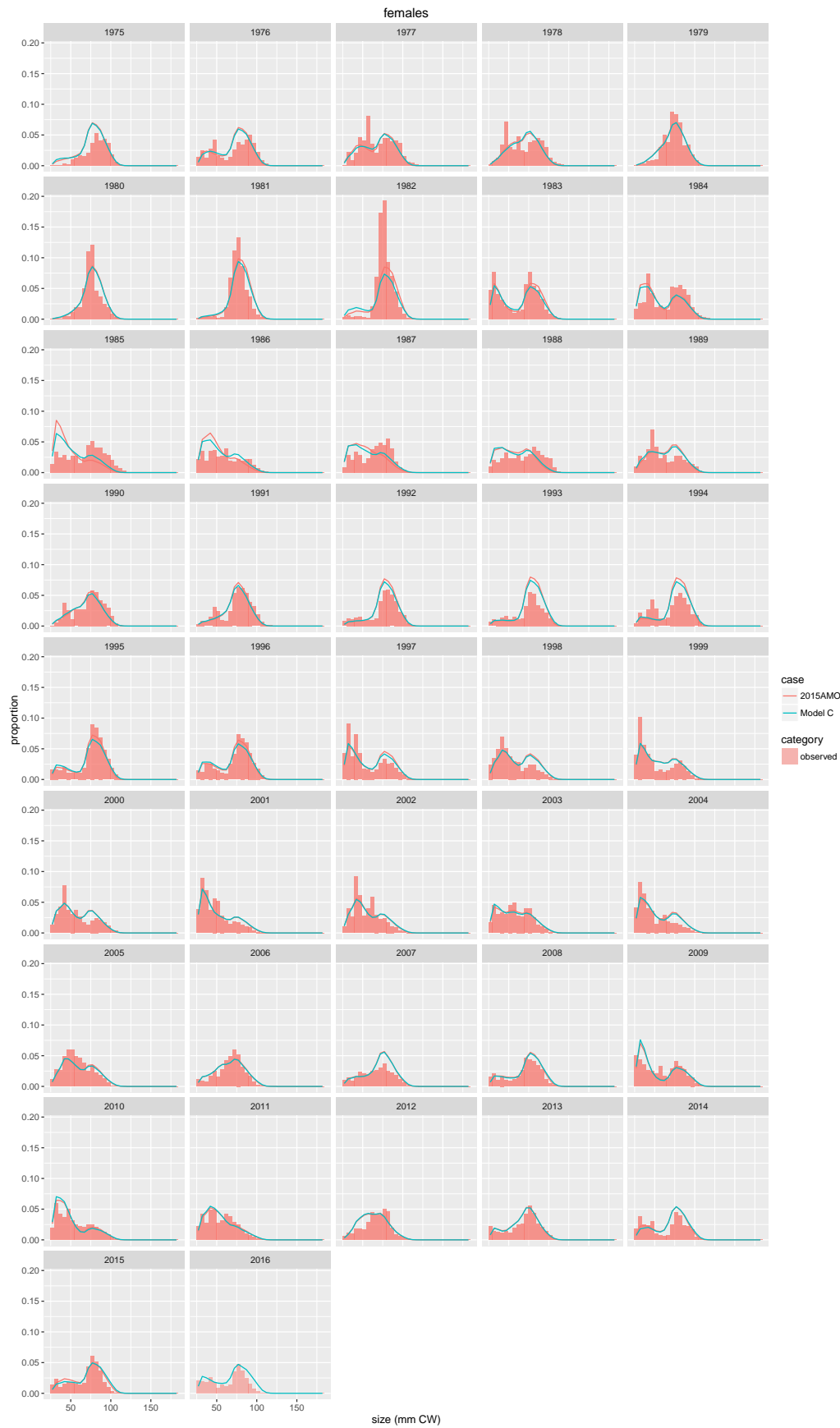Figure 59. Observed and predicted proportions-at-size for males from the survey.

females

size (mm CW)

proportion

case
— 2015AMO
— Model C

category
observed

Figure 60. Observed and predicted proportions-at-size for females from the survey.
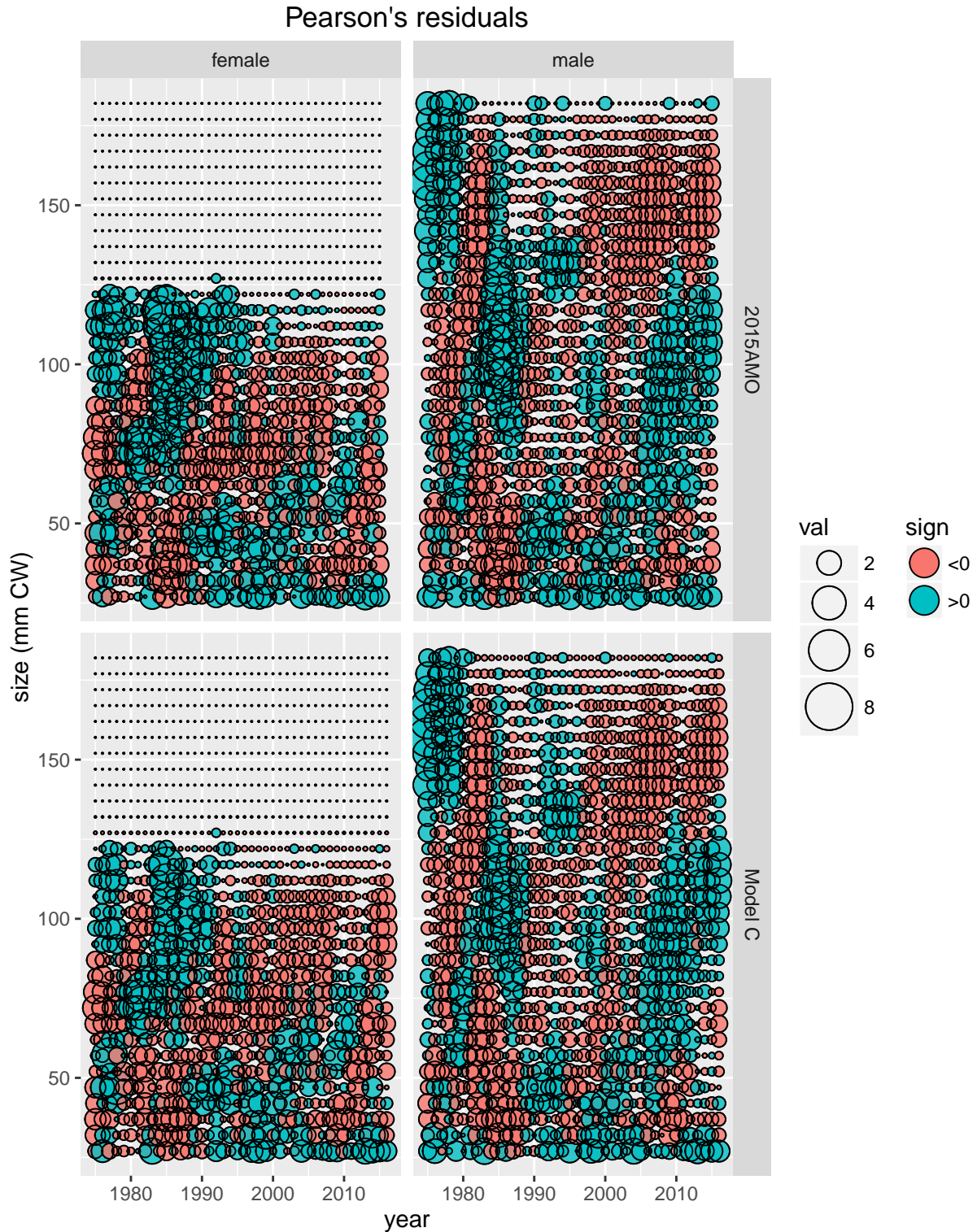
Pearson's residuals from survey size comps

Figure 61. Pearson's residuals for proportions-at-size from the survey.

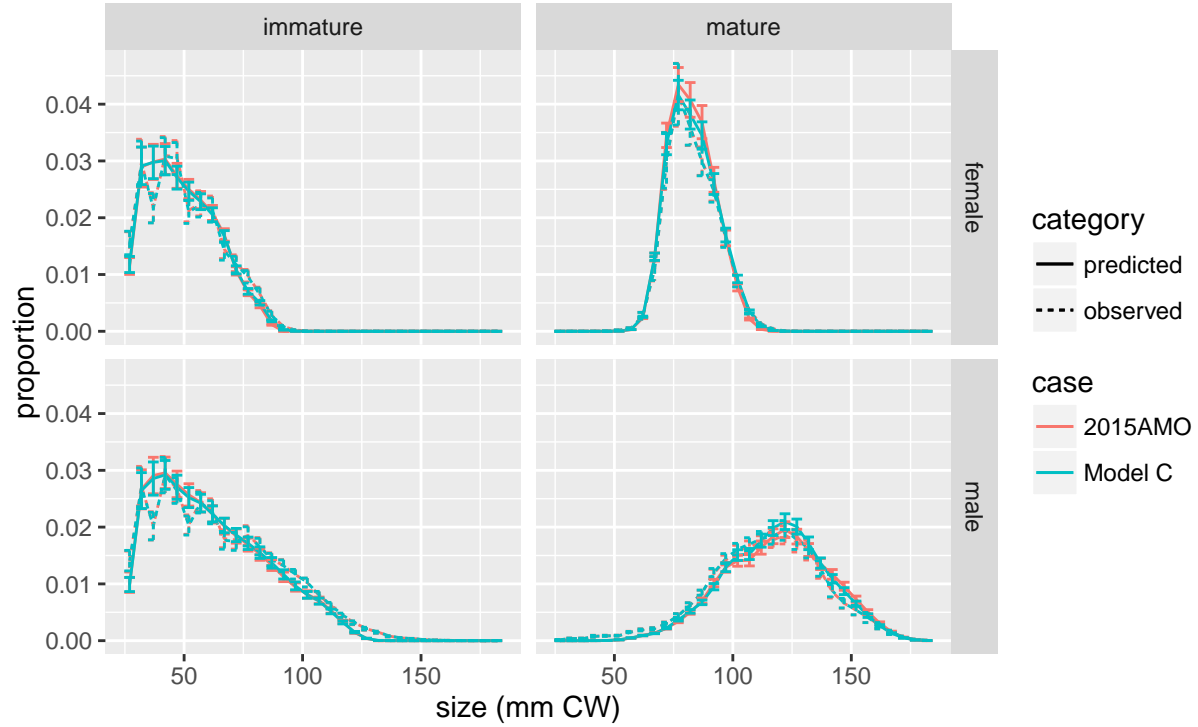## Survey mean size comps and effective sample sizes

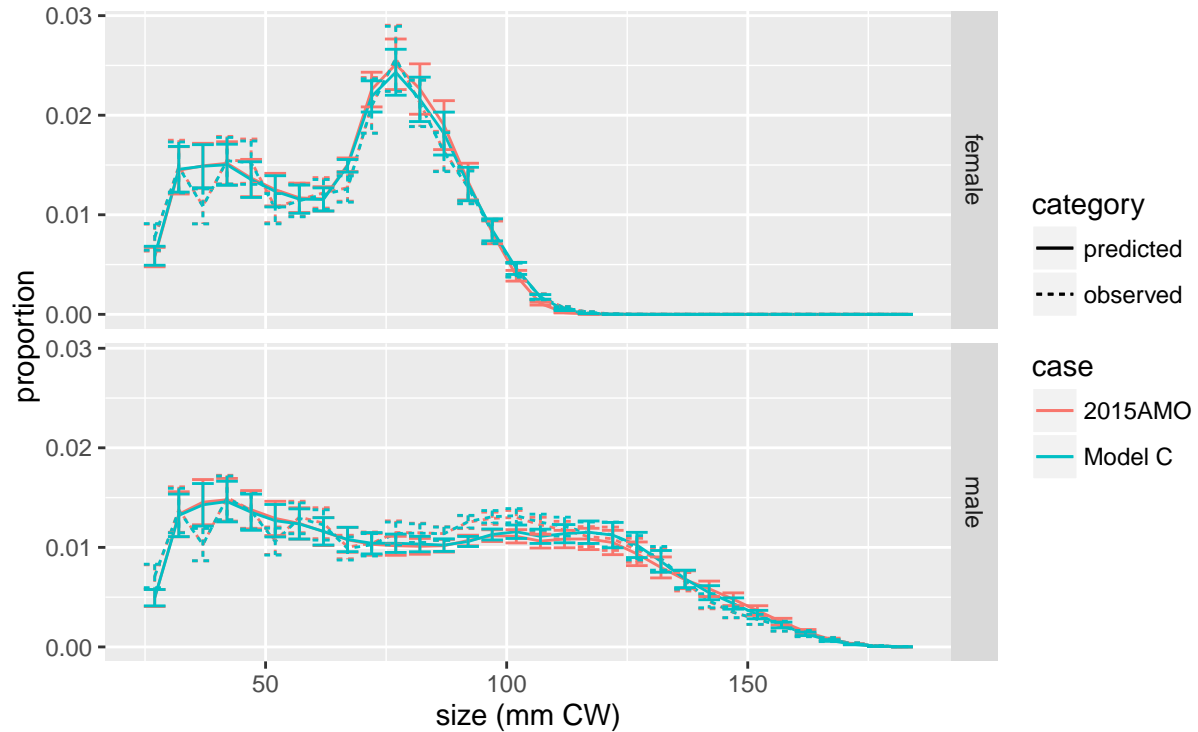Figure 62. Observed and predicted proportions-at-size from the survey by sex and maturity.

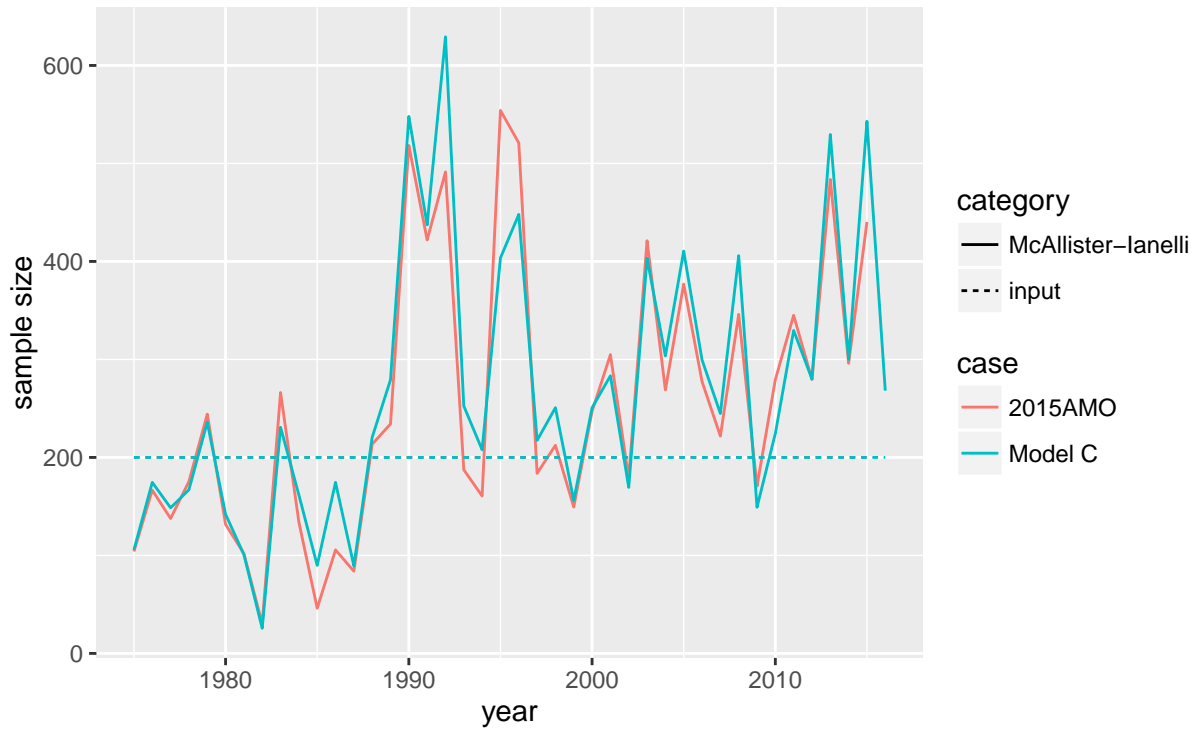Figure 63. Observed and predicted proportions-at-size from the survey by sex.

Figure 64. Input and effective sample sizes for proportions-at-size from the survey.
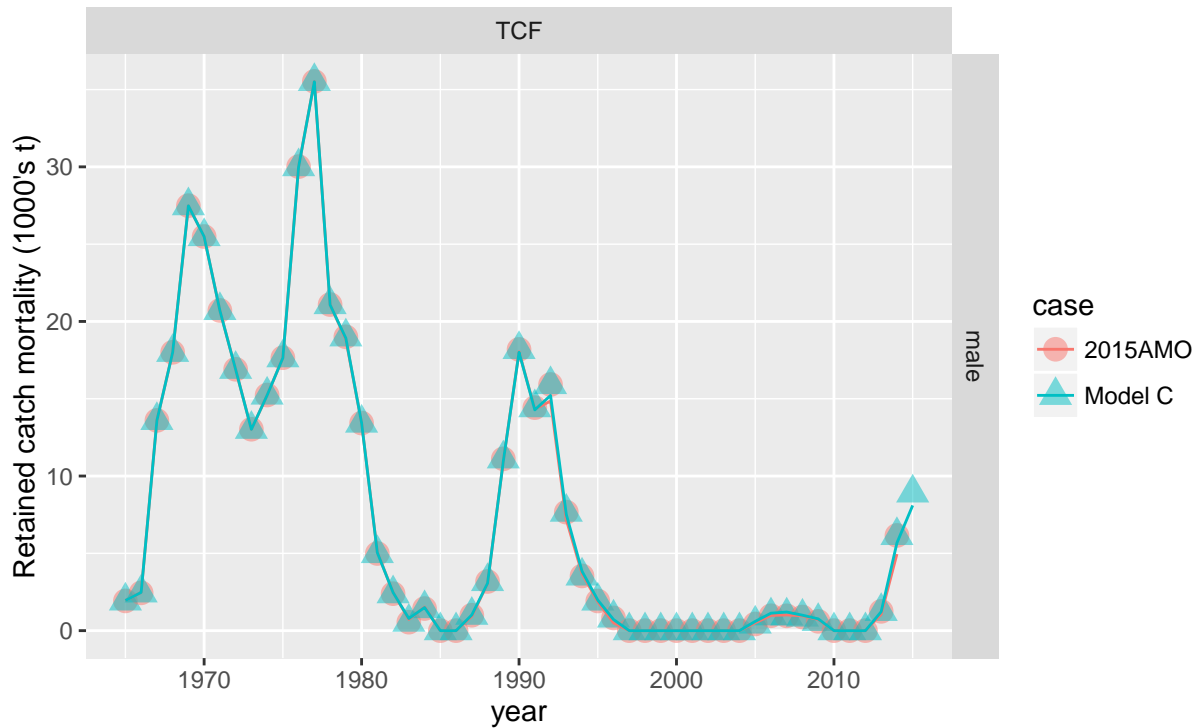
Fisheries quantities

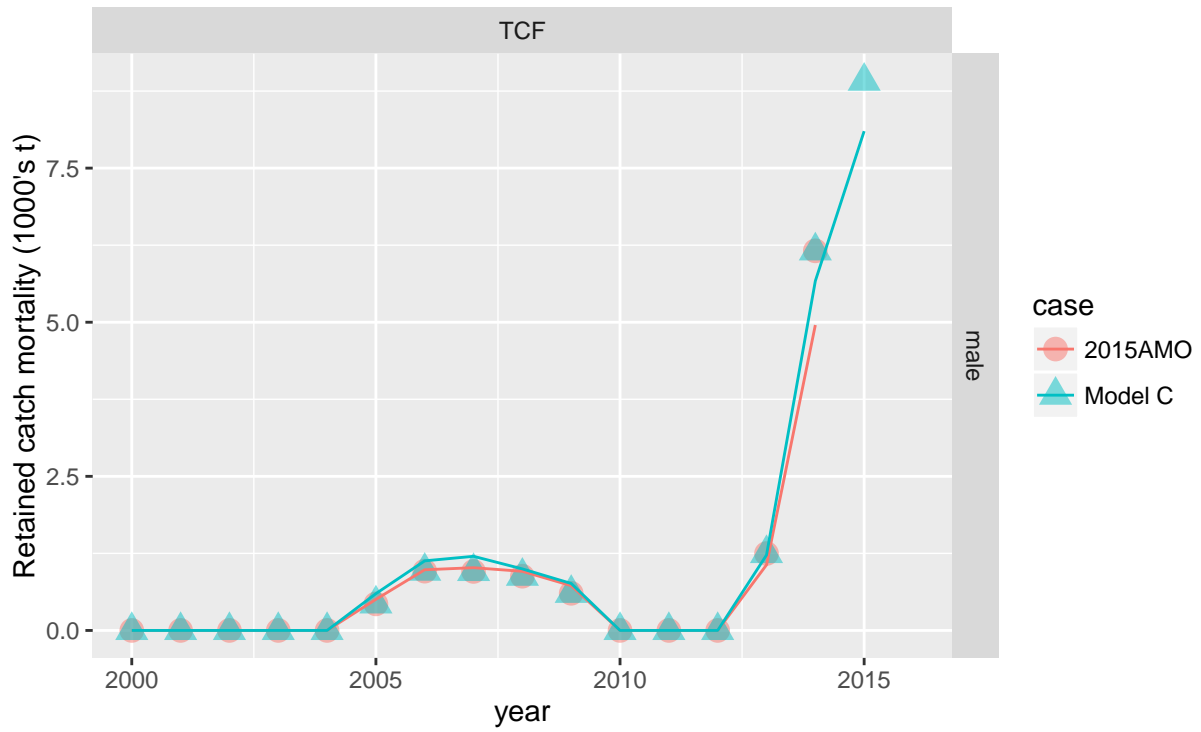Figure 65. Comparison of observed and predicted retained catch mortality.

Figure 66. Comparison of observed and predicted retained catch mortality. Recent time period.
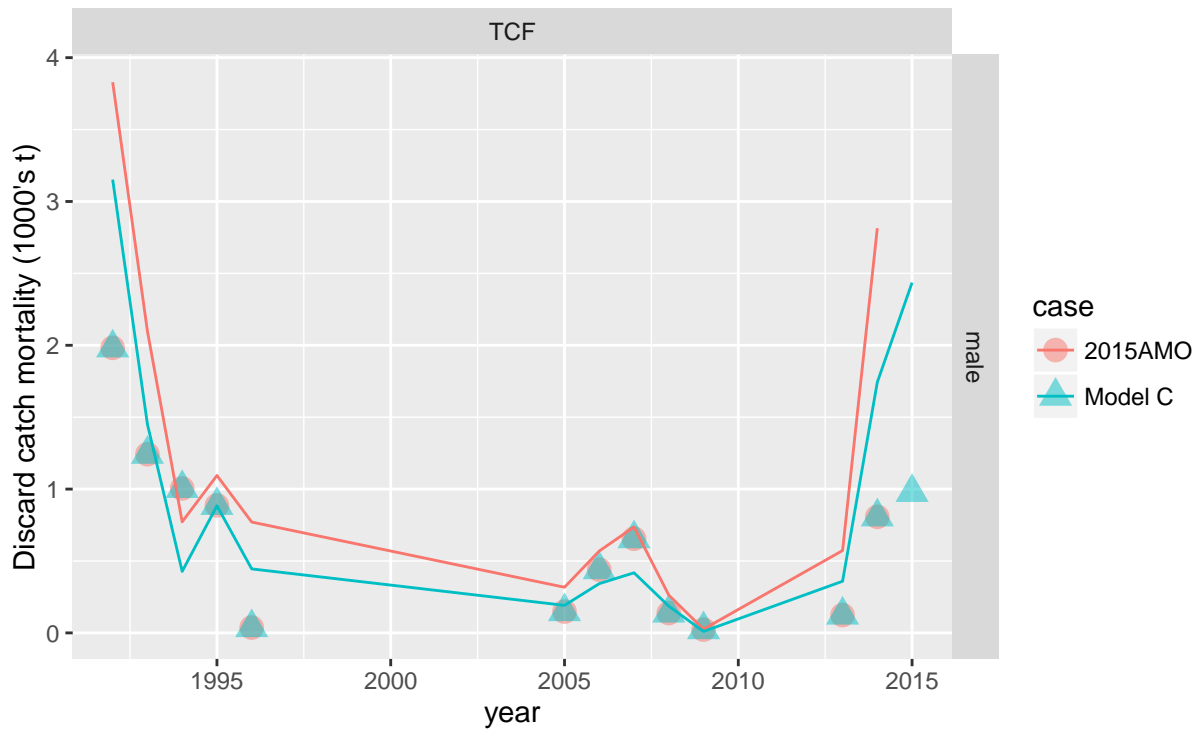

Figure 67. Comparison of observed and predicted discard catch mortality.

Figure 68. Comparison of observed and predicted discard catch mortality. Recent time period.
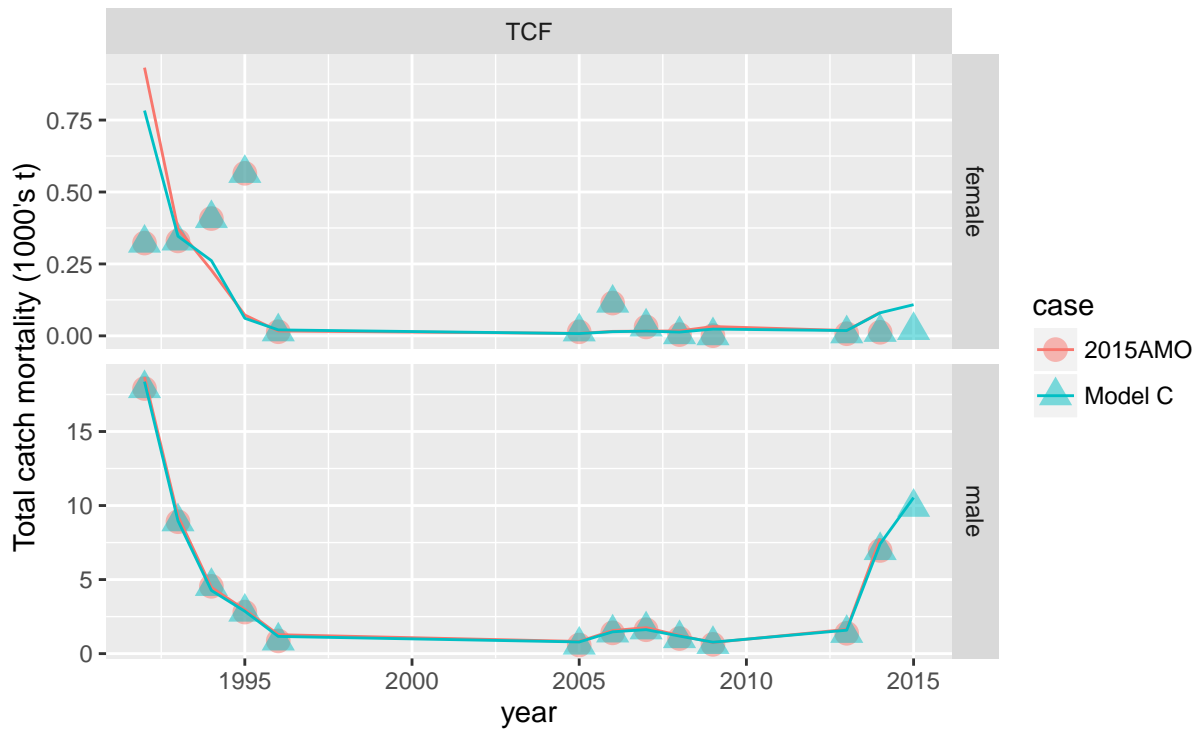

Figure 69. Comparison of observed and predicted total catch biomass for TCF.

Figure 70. Comparison of observed and predicted total catch biomass for TCF. Recent time period.

Figure 71. Comparison of observed and predicted total catch biomass for SCF.
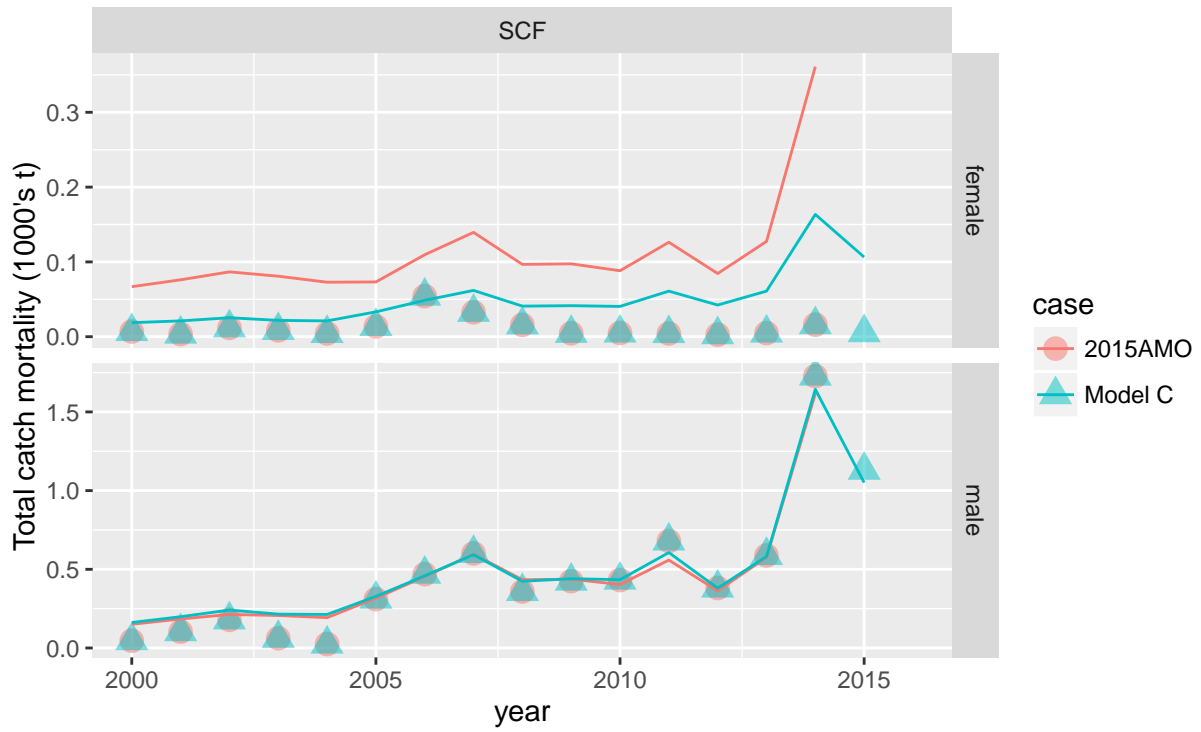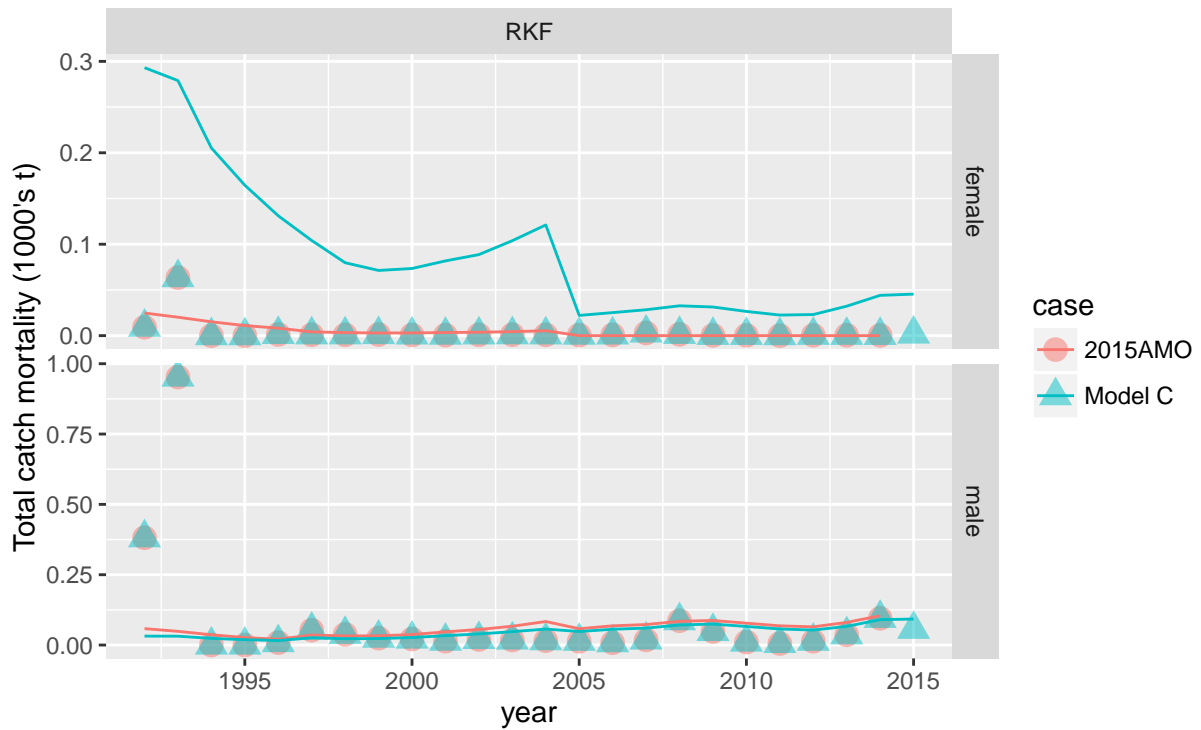
Figure 72. Comparison of observed and predicted total catch biomass for SCF. Recent time period.

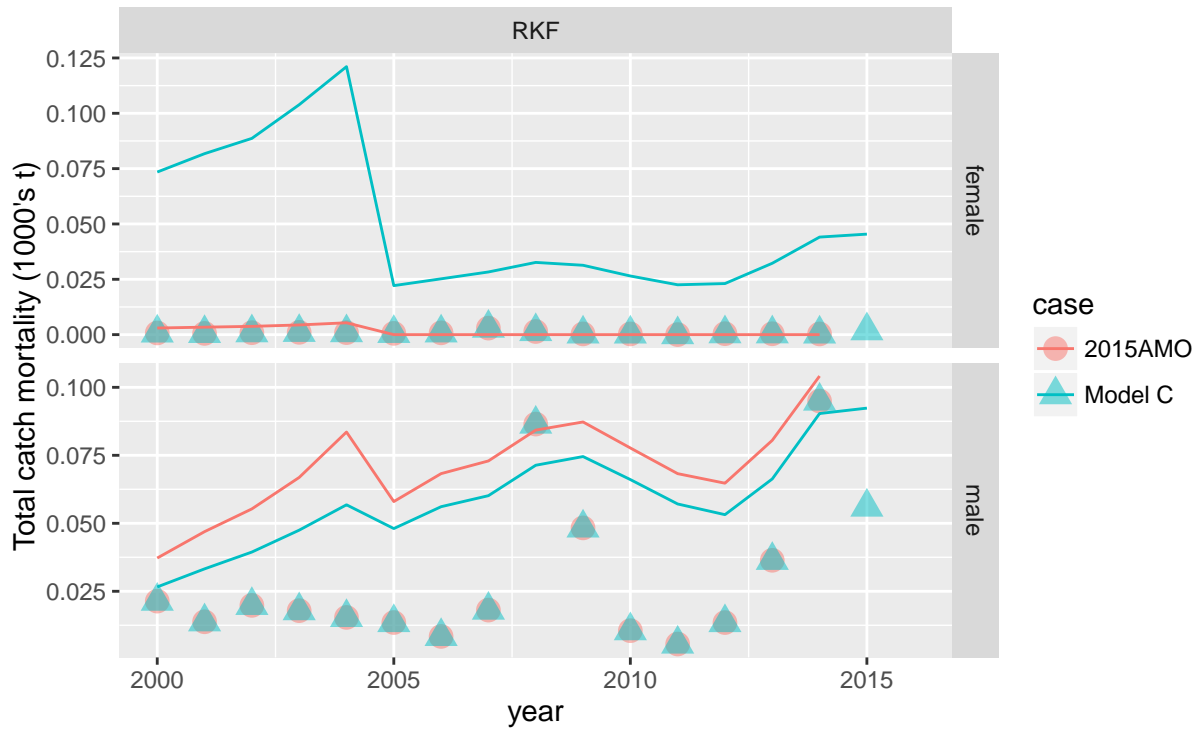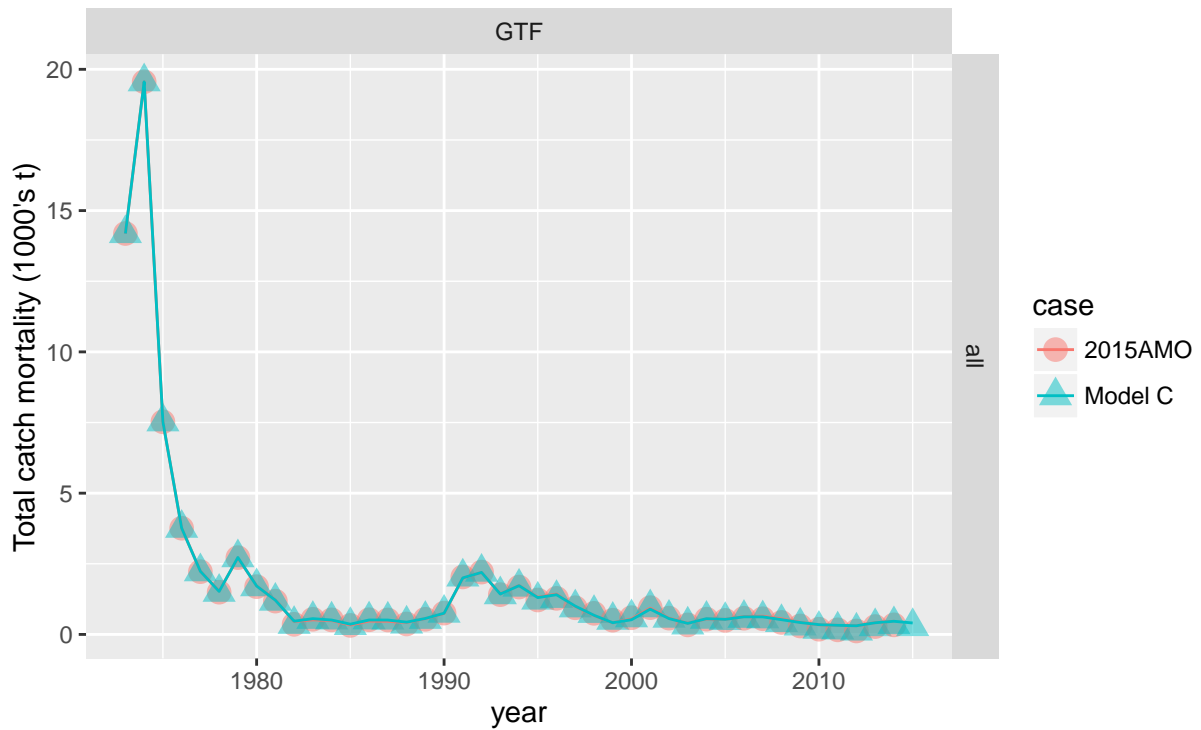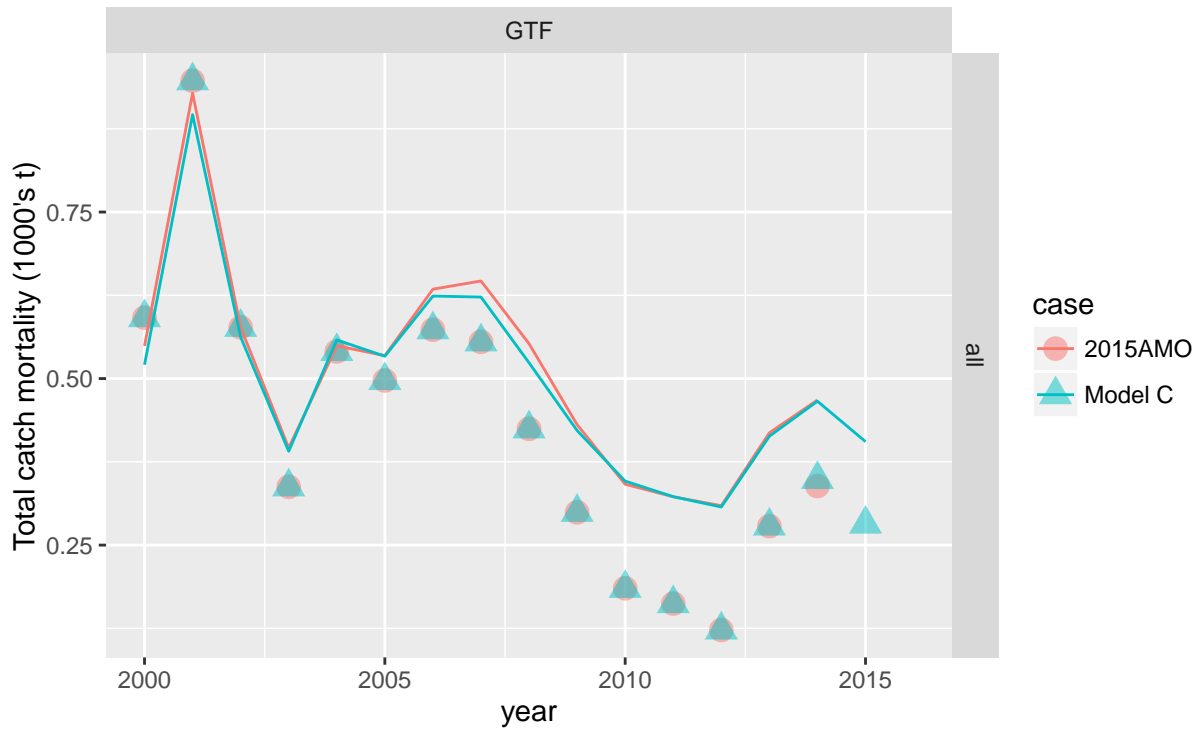Figure 73. Comparison of observed and predicted total catch biomass for RKF.

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Figure 74. Comparison of observed and predicted total catch biomass for RKF. Recent time period.

Figure 75. Comparison of observed and predicted total catch biomass for GTF.

Figure 76. Comparison of observed and predicted total catch biomass for GTF. Recent time period.
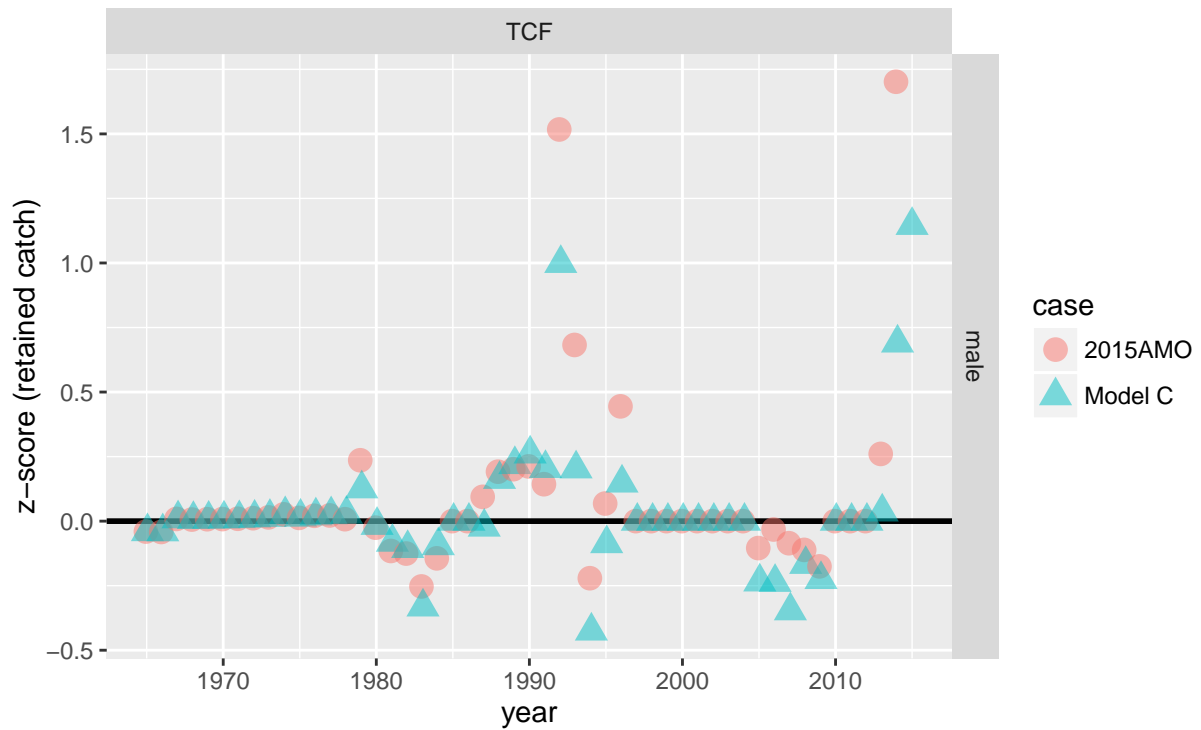

Figure 77. Z-scores for retained catch.

Figure 78. Z-scores for total catch in TCF.

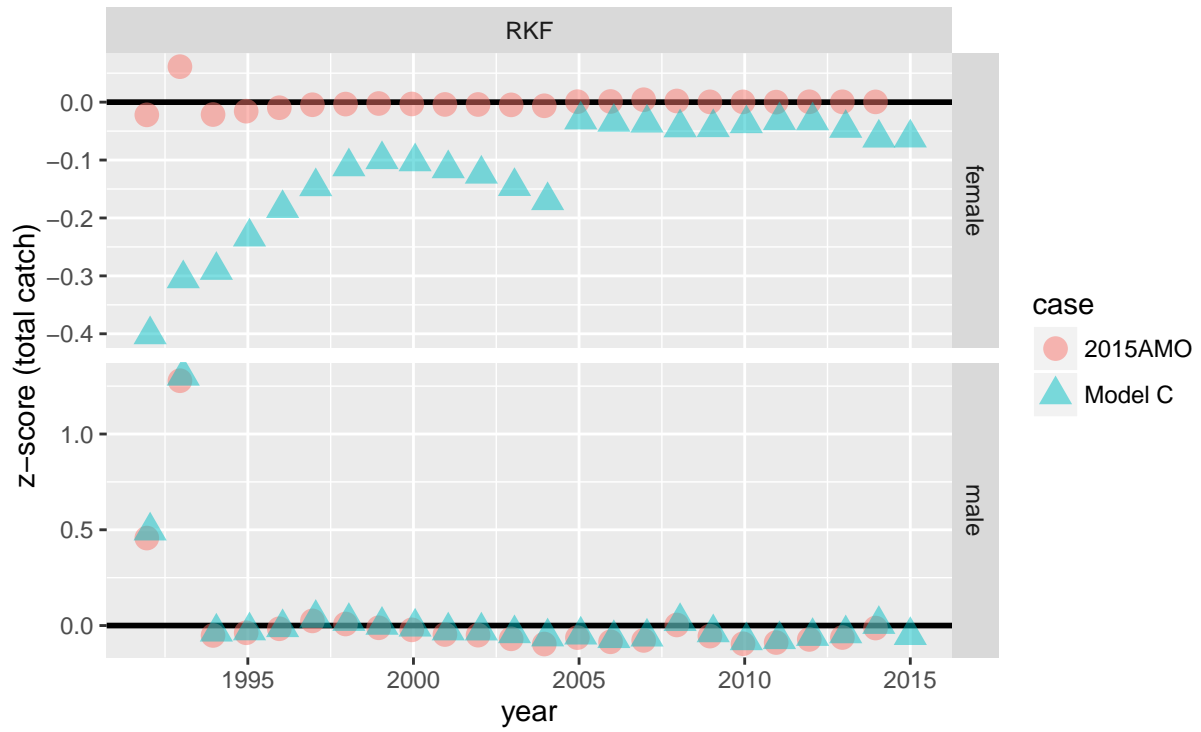Figure 79. Z-scores for total catch in SCF.

Figure 80. Z-scores for total catch in RKF.

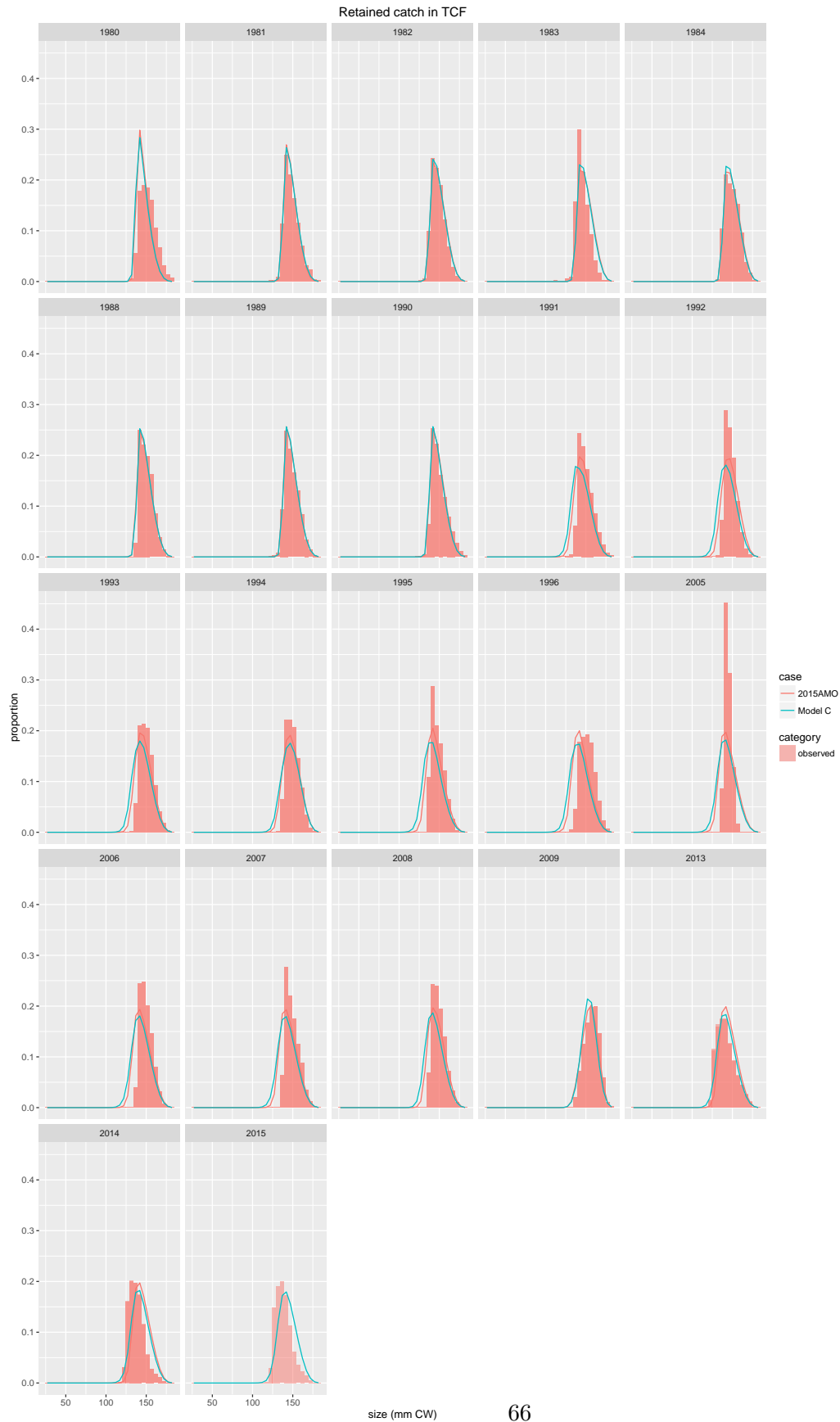Figure 81. Z-scores for total catch in GTF.

Fishery size comps

Retained catch in TCF

Figure 82. Observed proportions-at-size for retained catch in TCF.
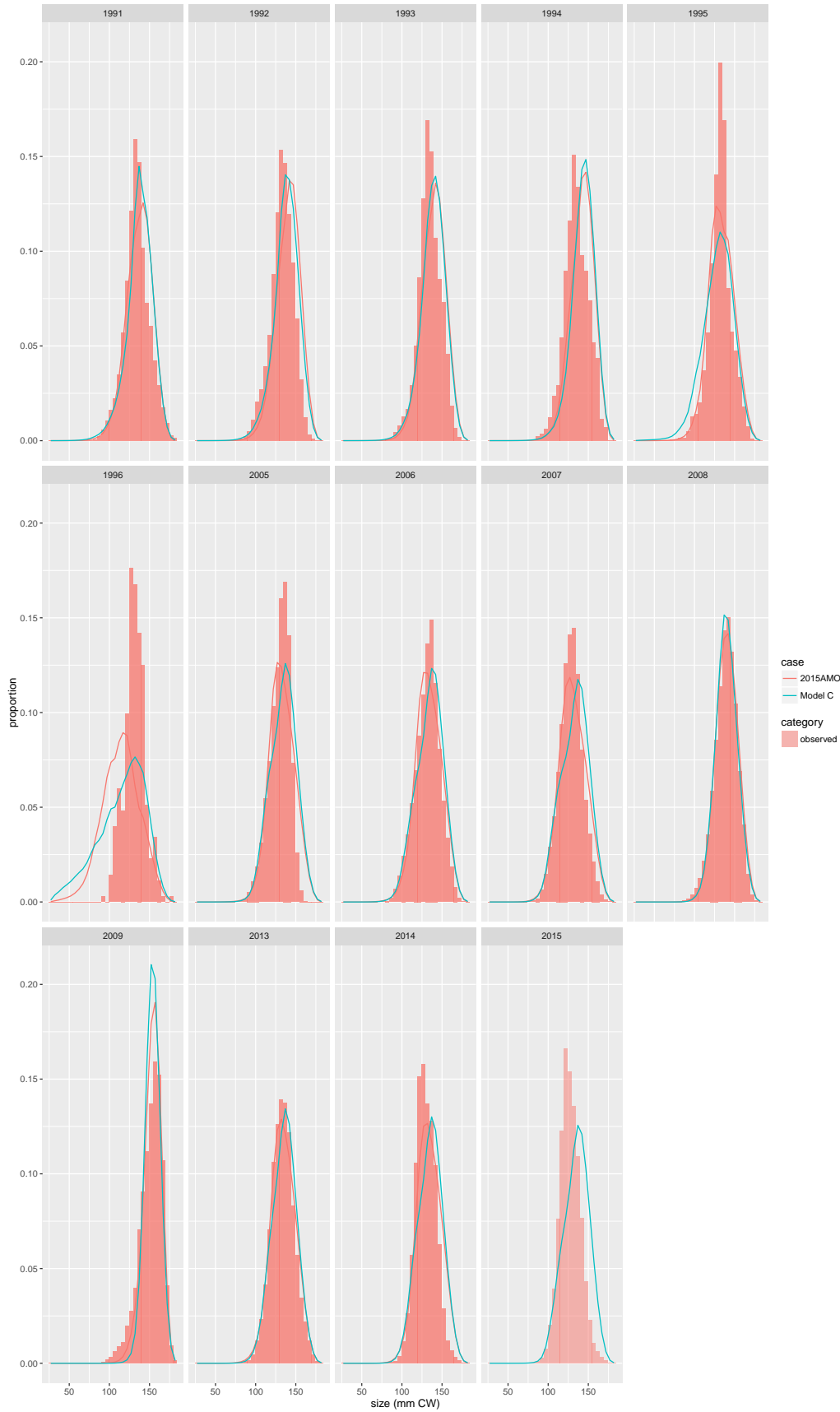
Male total catch in TCF

Figure 83. Observed and predicted proportions-at-size for male total catch in TCF.
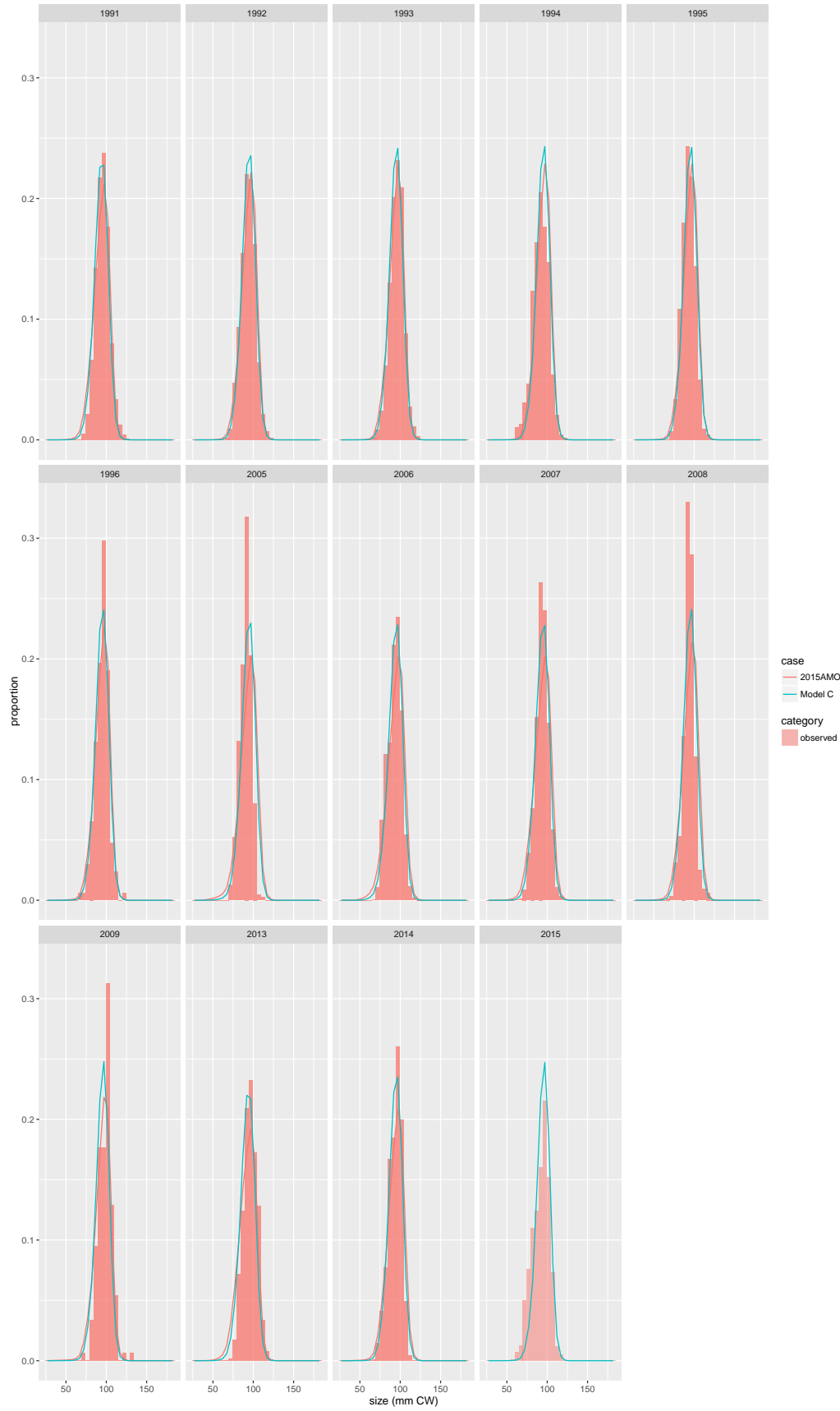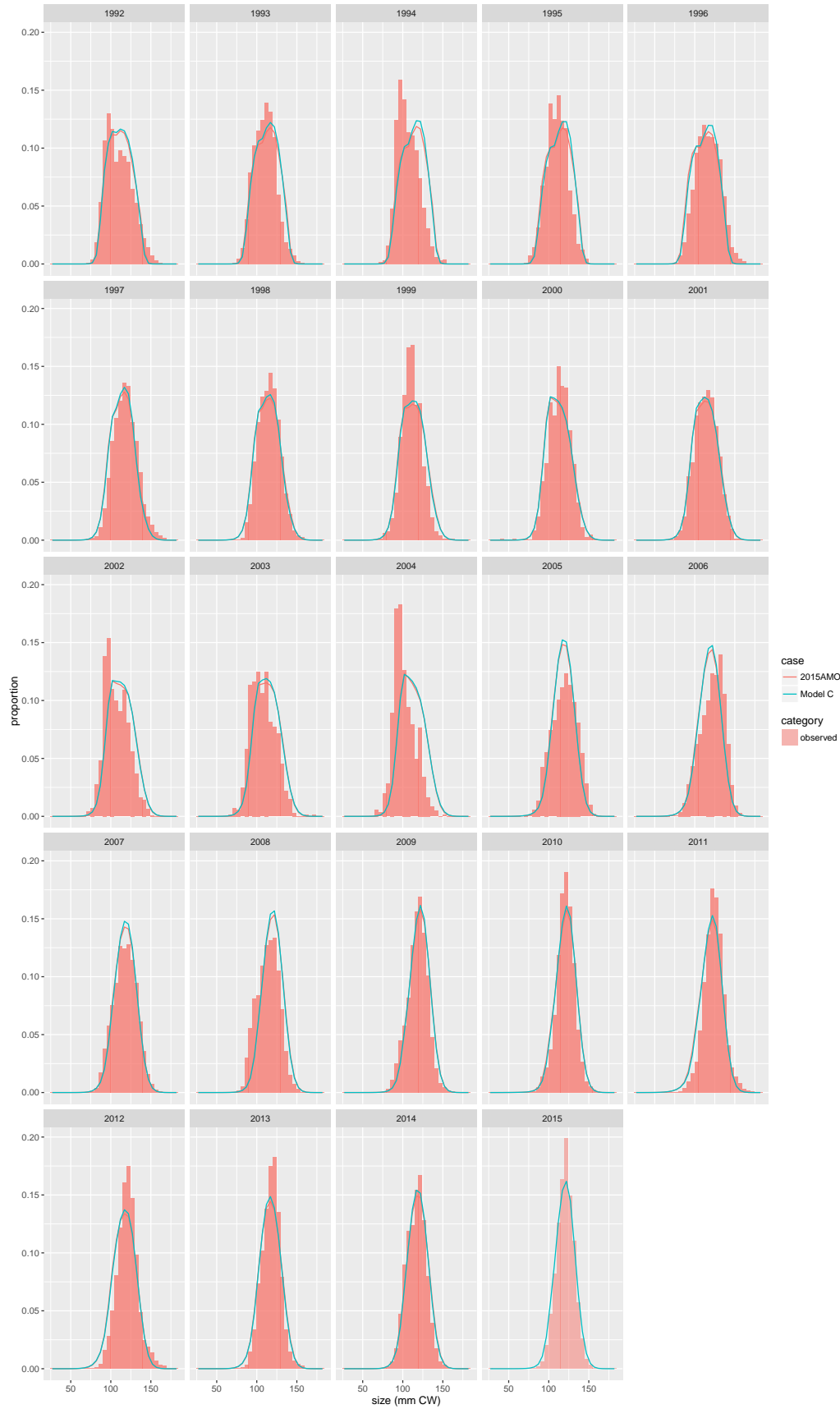
Female total catch in TCF

Figure 84. Observed and predicted proportions-at-size for female total catch in TCF.

Male total catch in SCF

Figure 85. Observed and predicted proportions-at-size for male total catch in SCF.
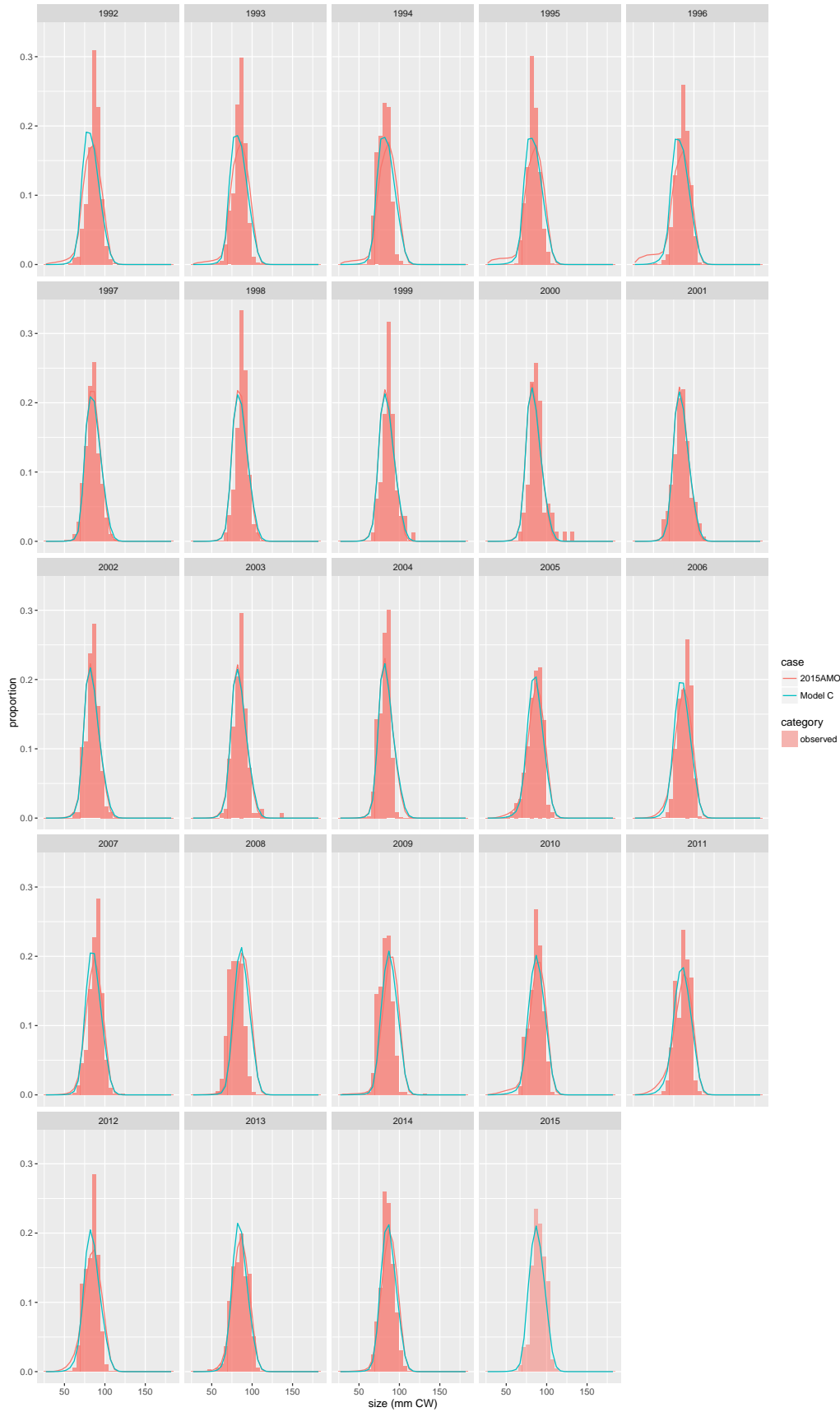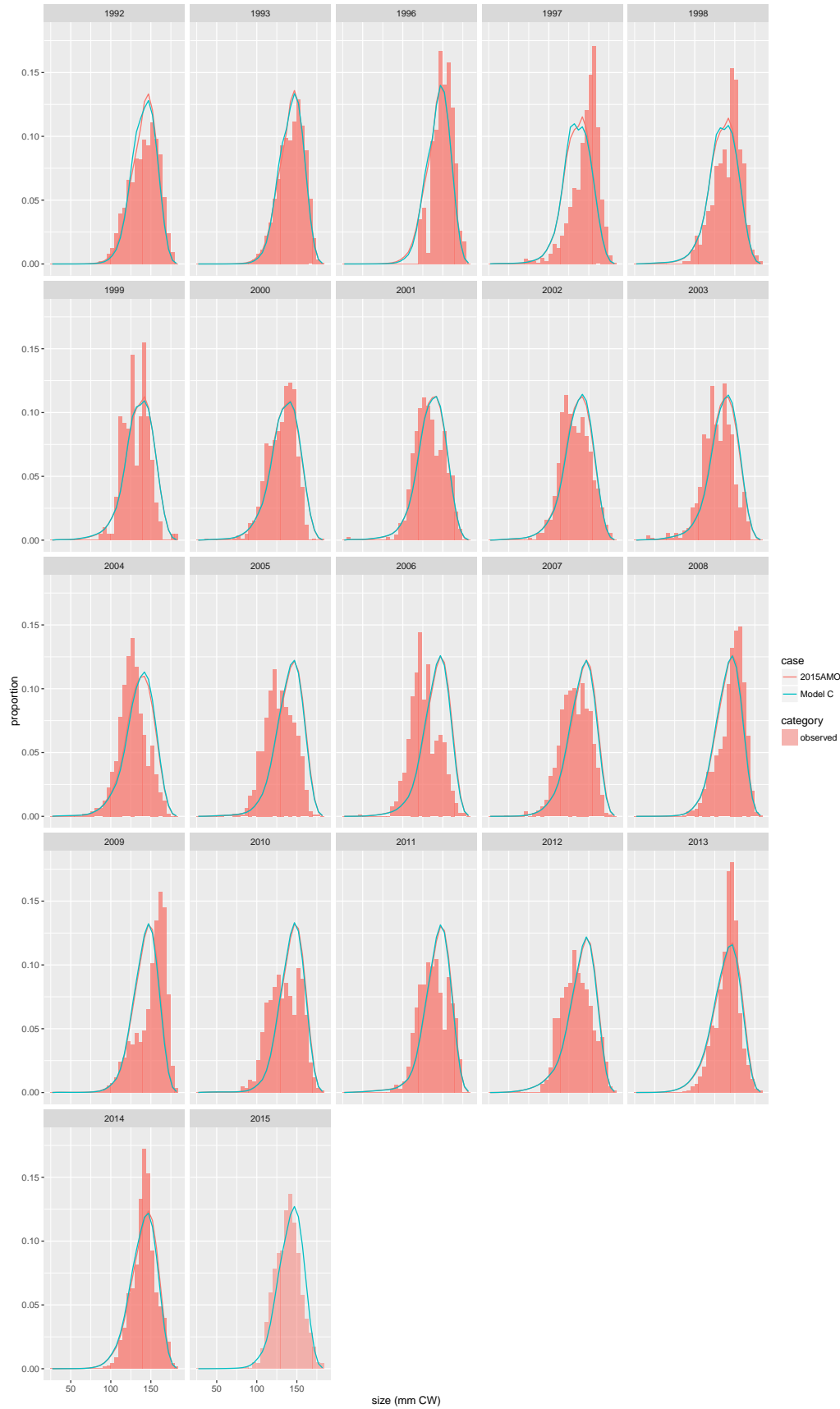
Female total catch in SCF

Figure 86. Observed and predicted proportions-at-size for female total catch in SCF.

Male total catch in RKF

Figure 87. Observed and predicted proportions-at-size for male total catch in RKF.
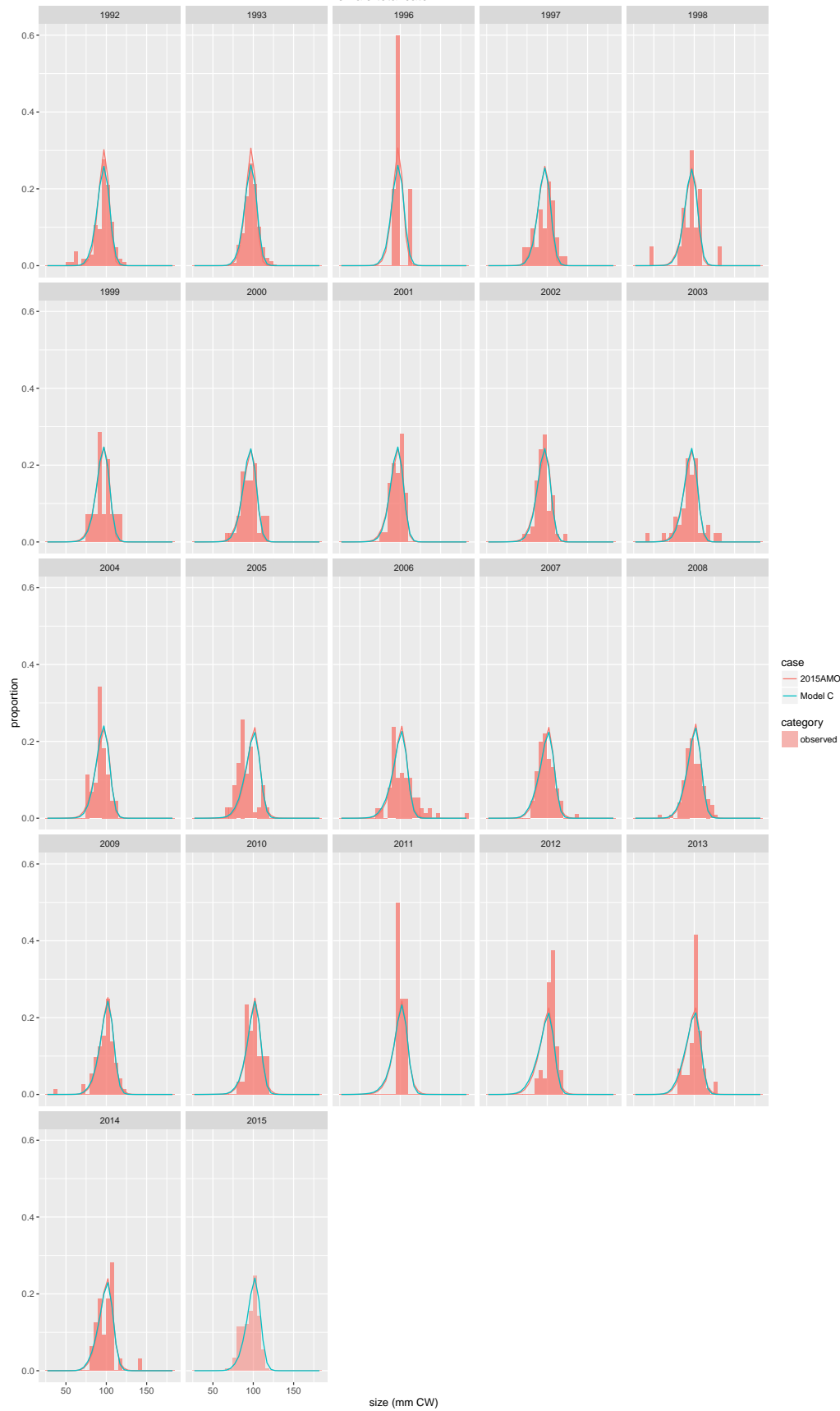
Female total catch in RKF

Figure 88. Observed and predicted proportions-at-size for female total catch in RKF.
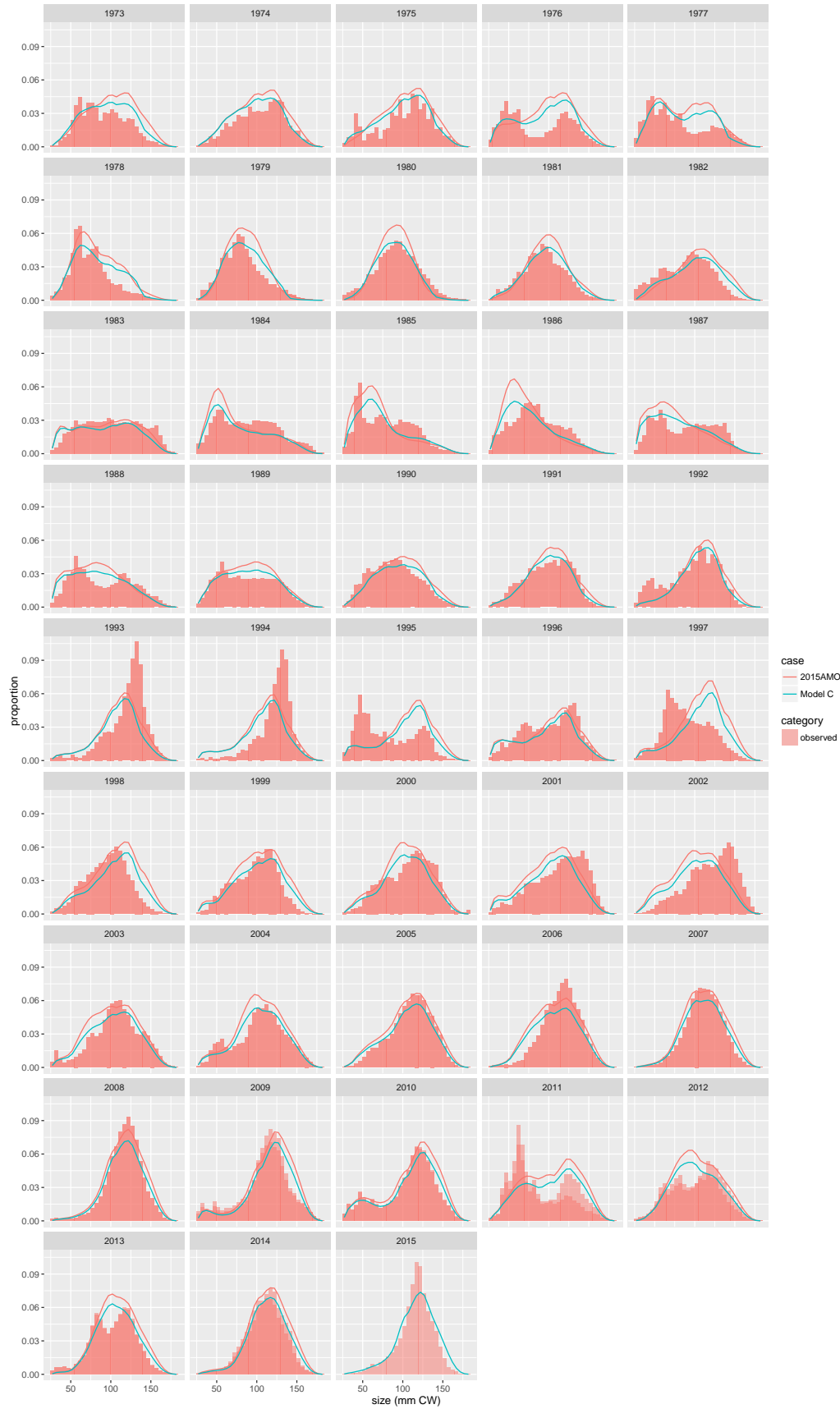
Male total catch in GTF

Figure 89. Observed and predicted proportions-at-size for male total catch in GTF.

Female total catch in GTF

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Figure 90. Observed and predicted proportions-at-size for female total catch in GTF.

Pearson's residuals from fishery size comps

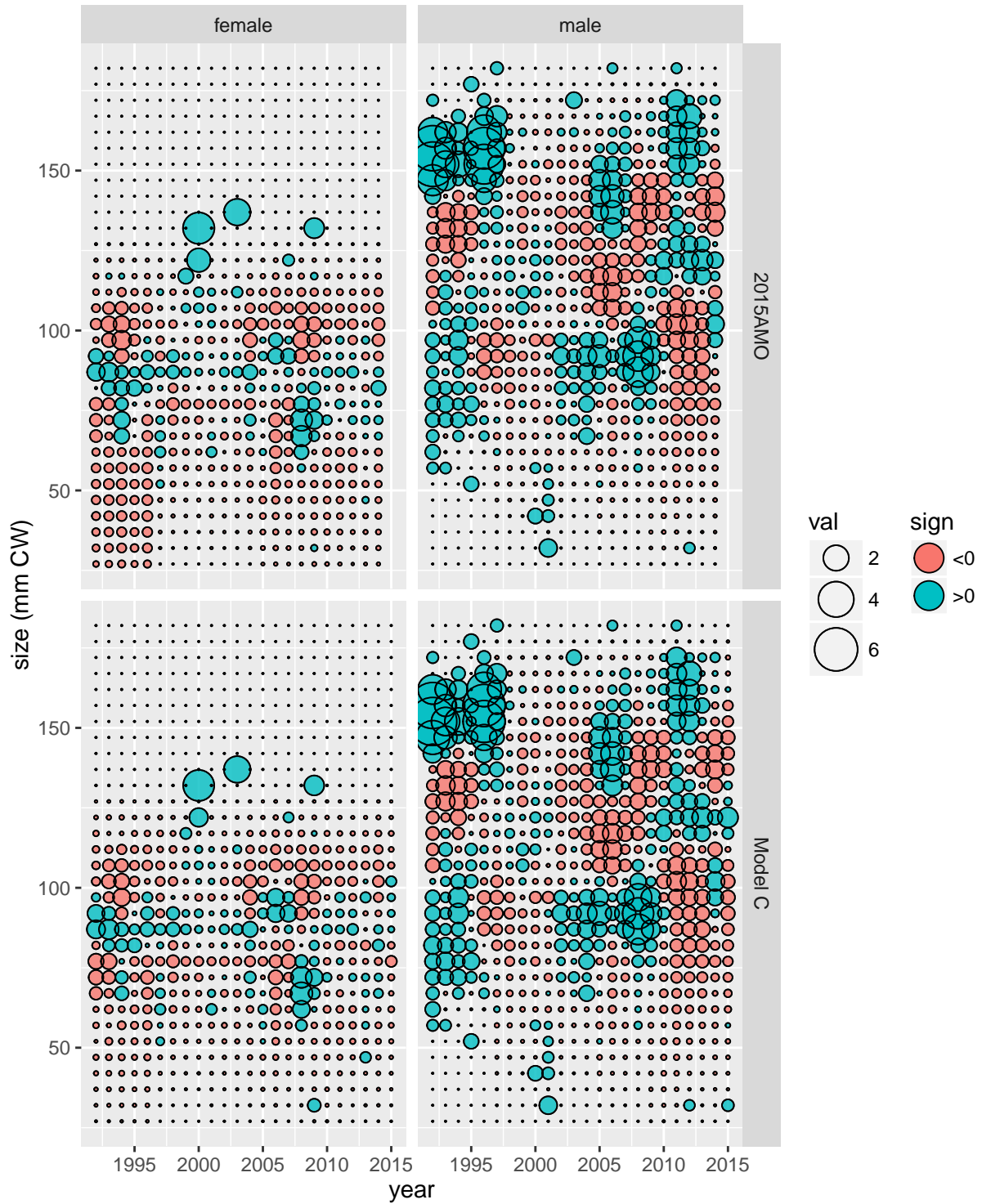TCF: retained catch Pearson's residuals
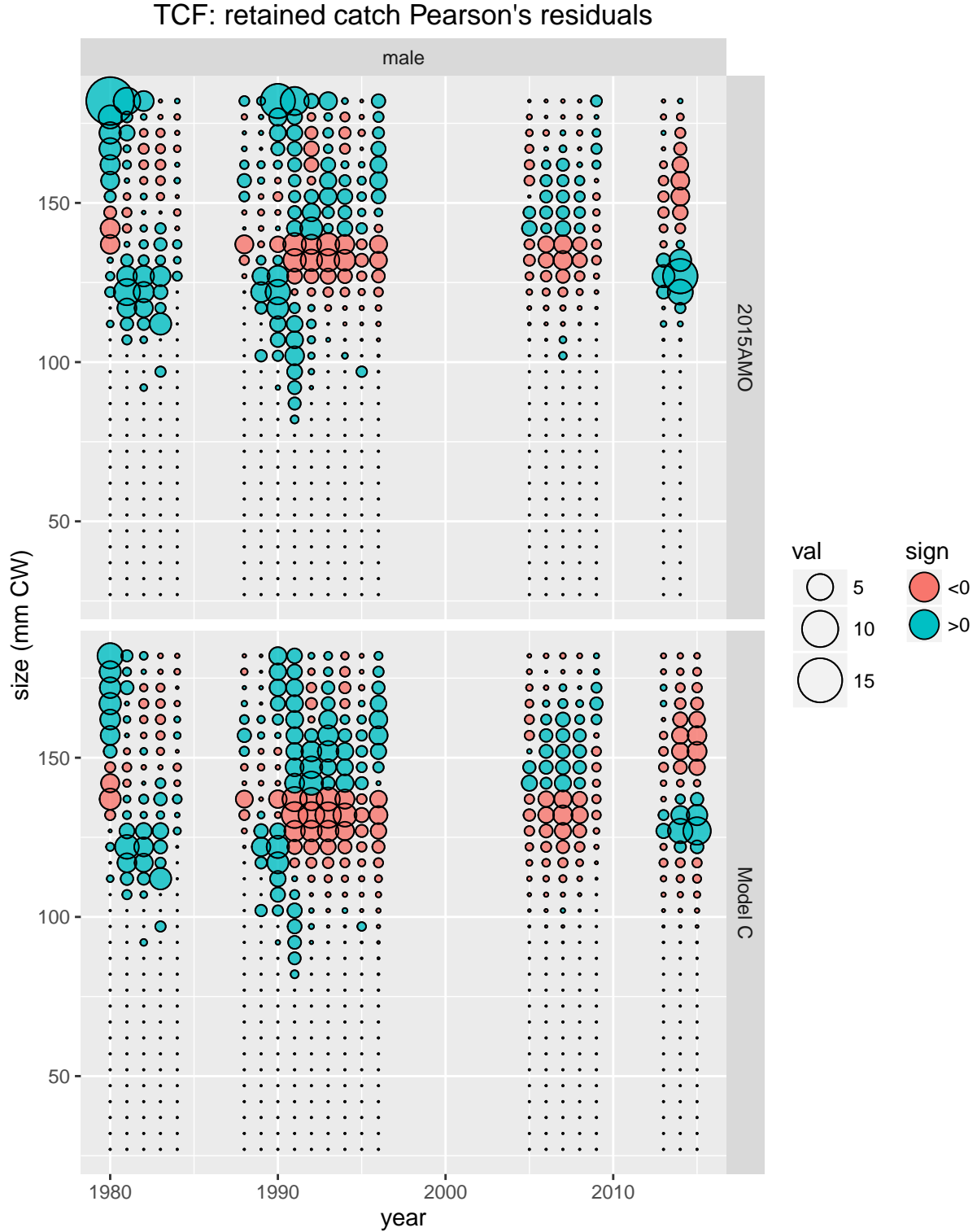
Figure 91. Pearson's residuals for retained catch proportions-at-size in TCF.
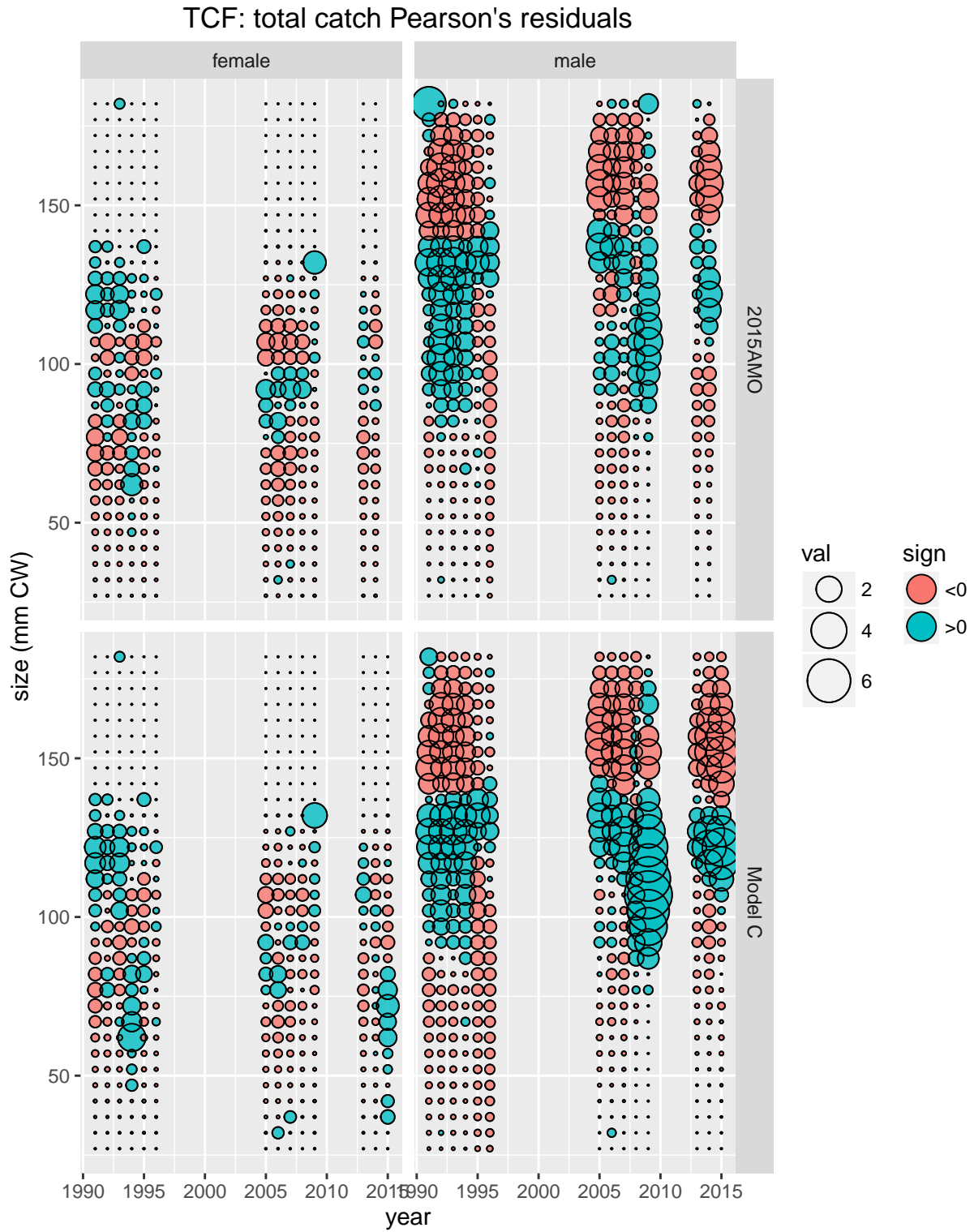
Figure 92. Pearson's residuals for total catch proportions-at-size in TCF.

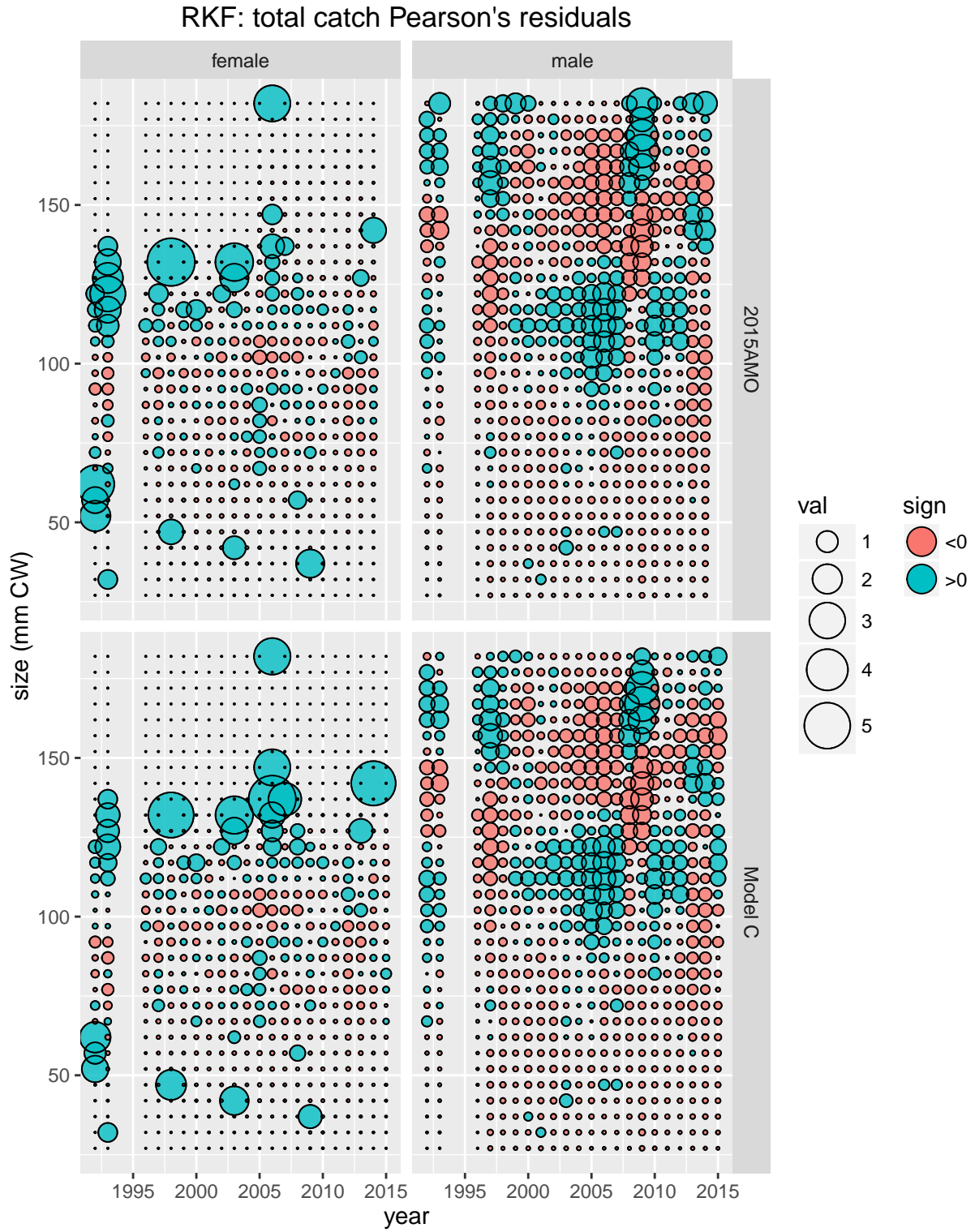Figure 93. Pearson's residuals for total catch proportions-at-size in SCF.

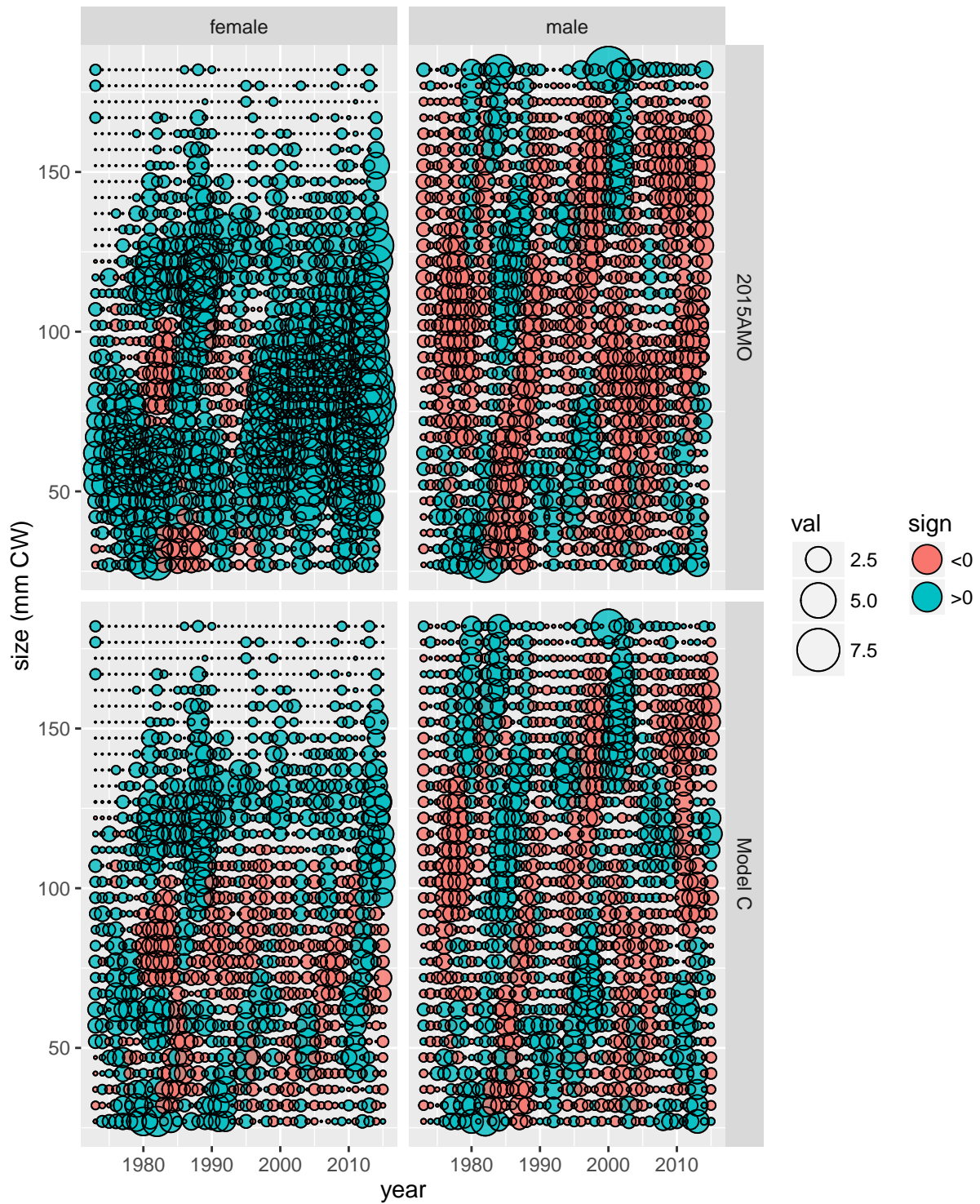Figure 94. Pearson's residuals for total catch proportions-at-size in RKF.

Figure 95. Pearson's residuals for total catch proportions-at-size in GTF.
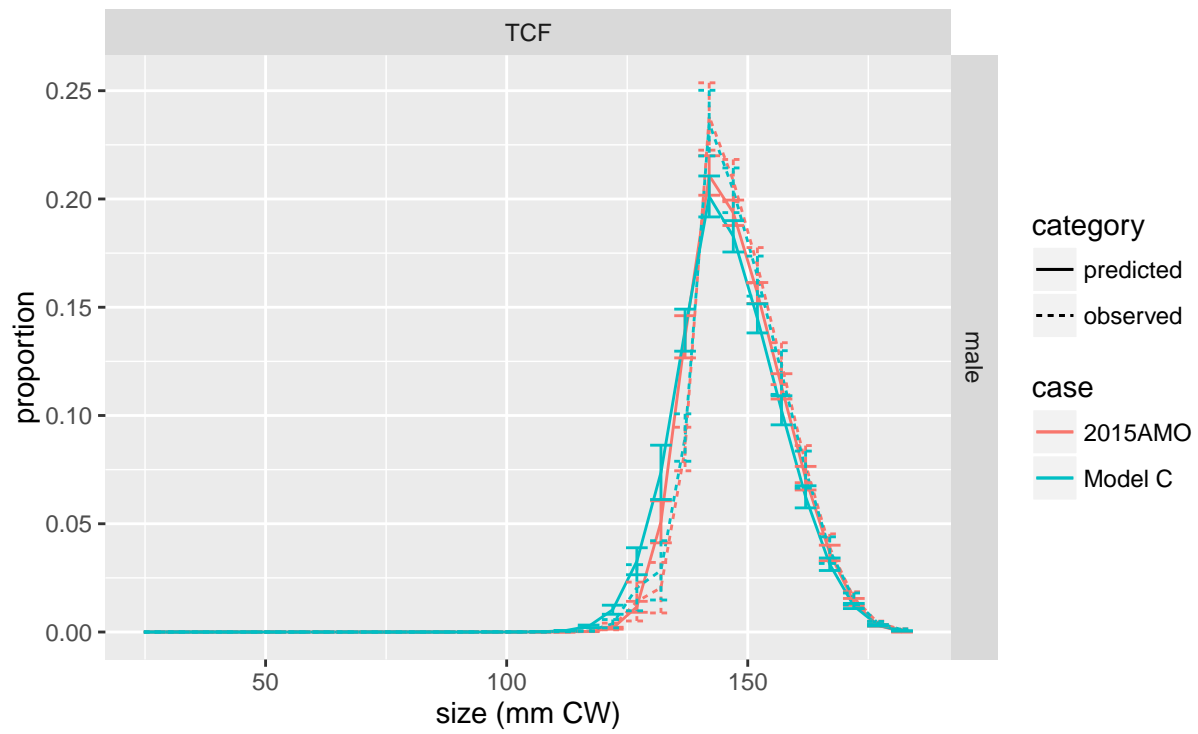
Fishery mean size comps and effective sample sizes

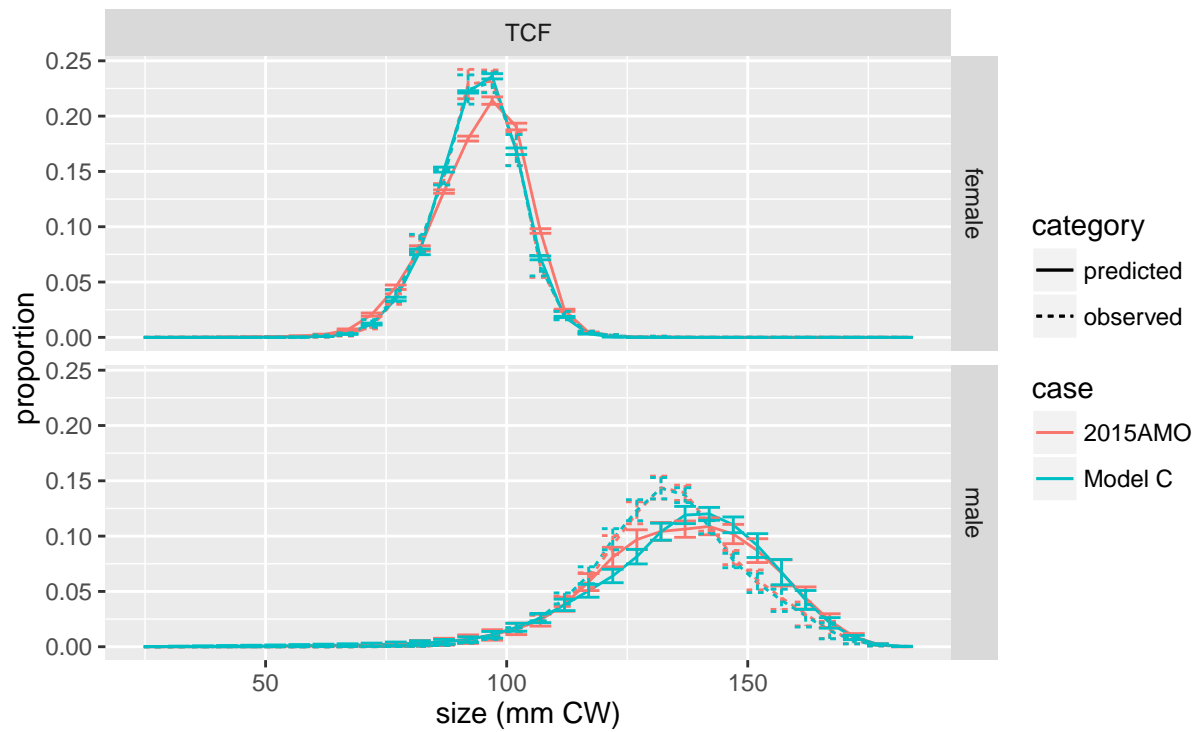Figure 96. Observed and predicted mean proportions-at-size for retained catch in TCF.

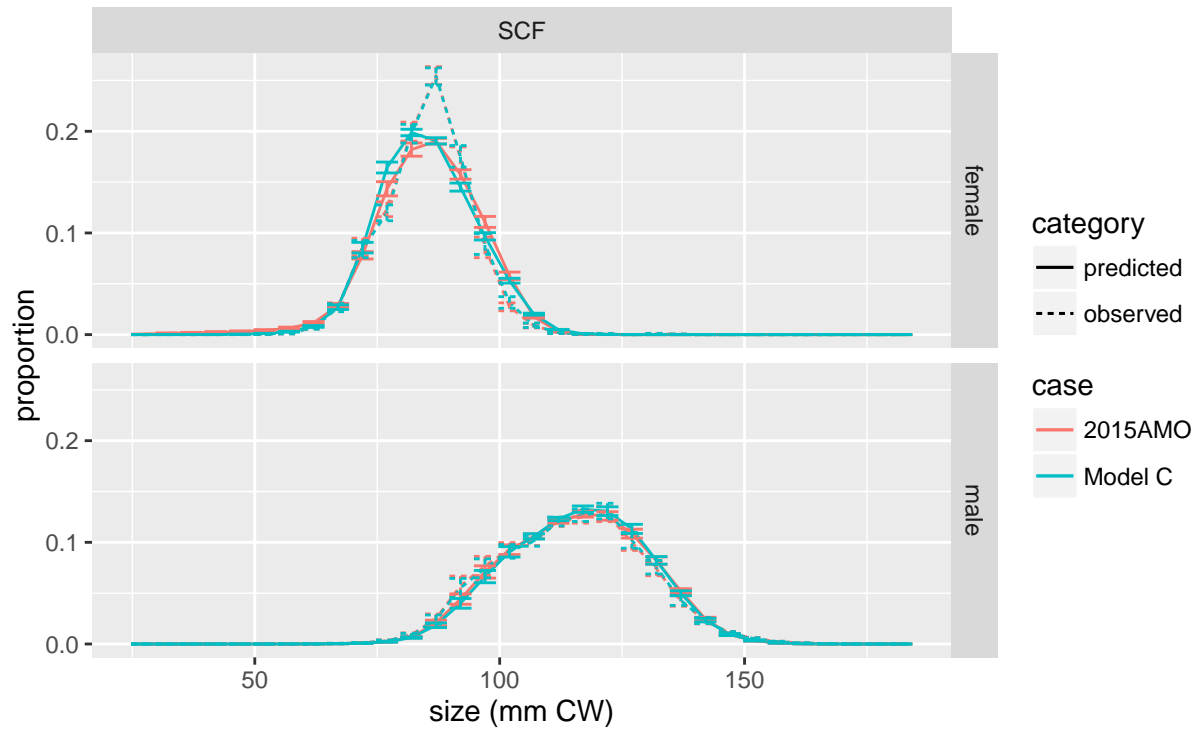Figure 97. Observed and predicted mean proportions-at-size for total catch in TCF.

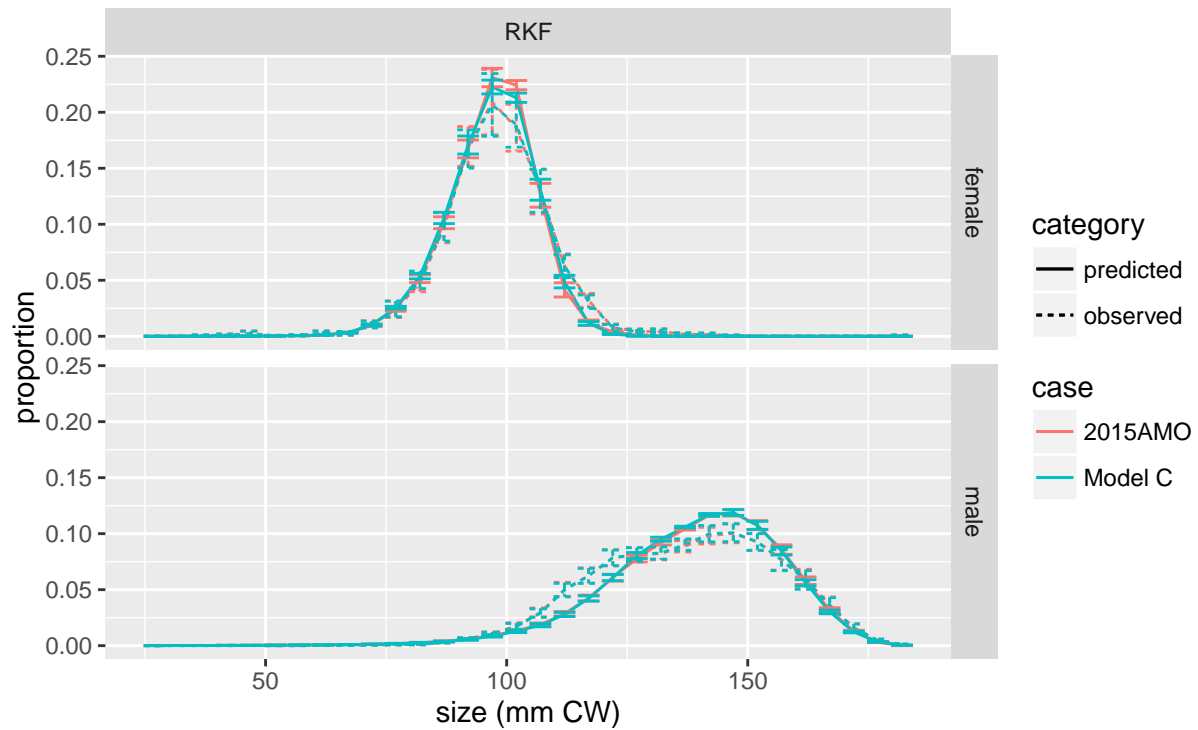Figure 98. Observed and predicted mean proportions-at-size for total catch in SCF.

Figure 99. Observed and predicted mean proportions-at-size for total catch in RKF.
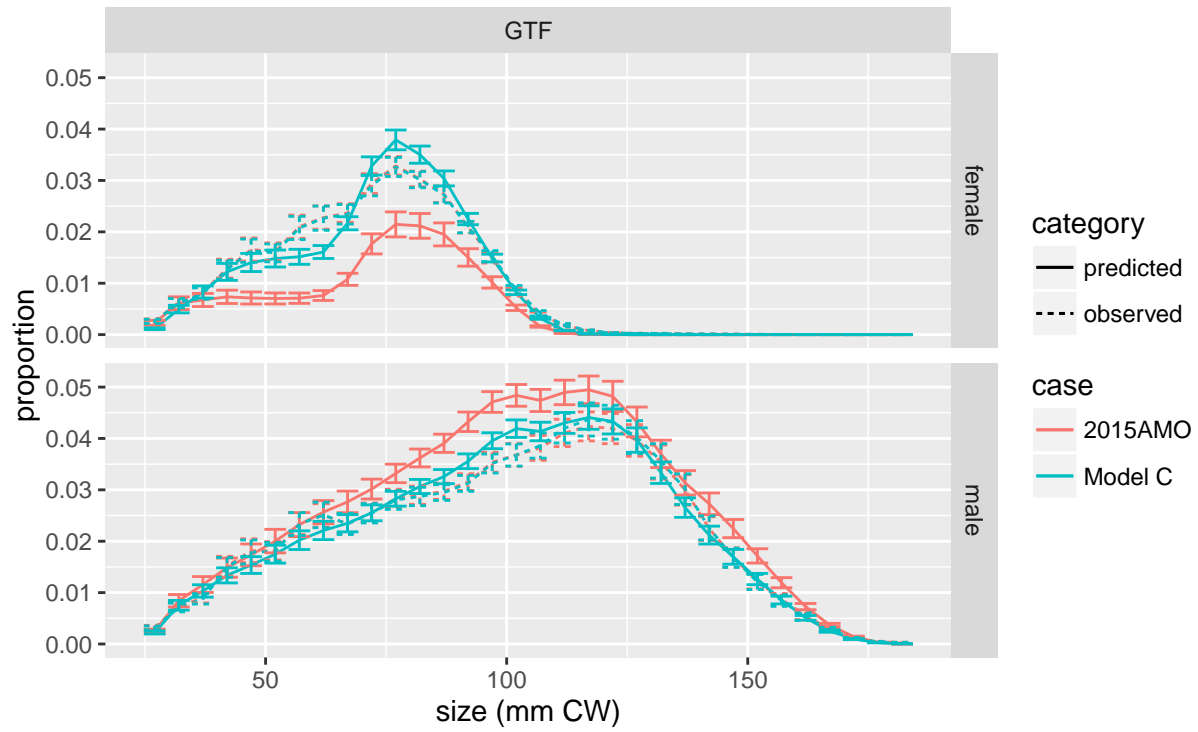
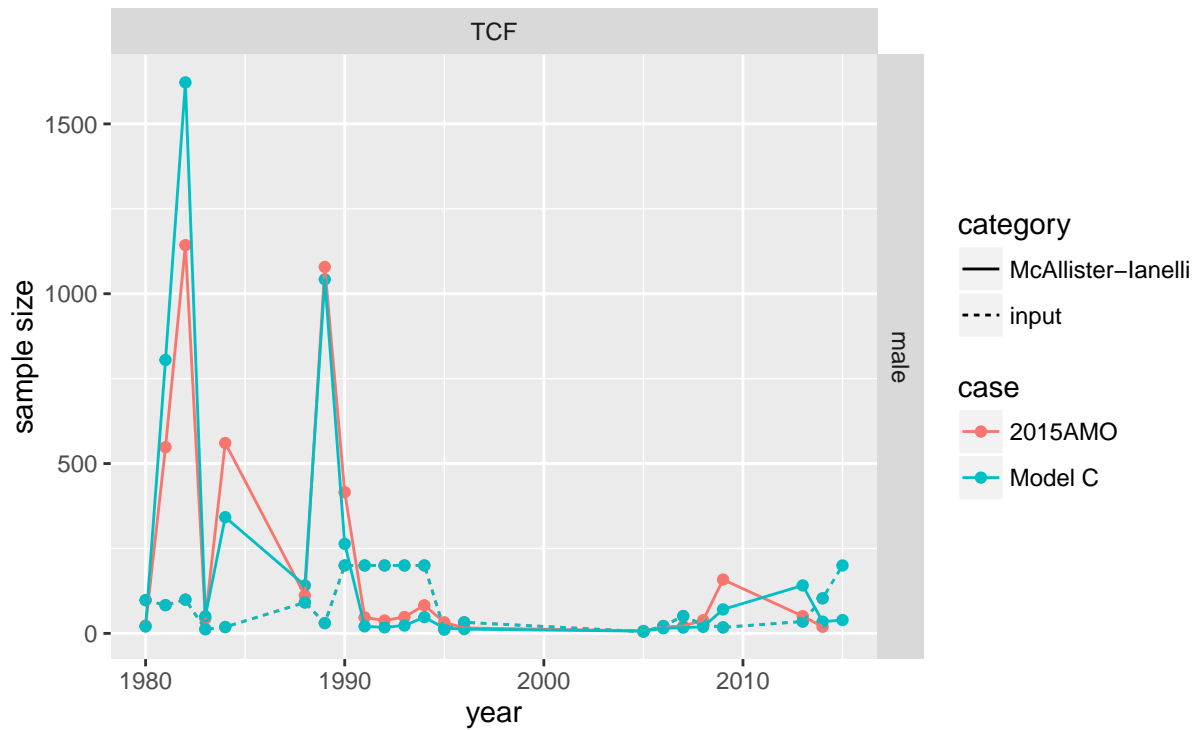Figure 100. Observed and predicted mean proportions-at-size for total catch in GTF.

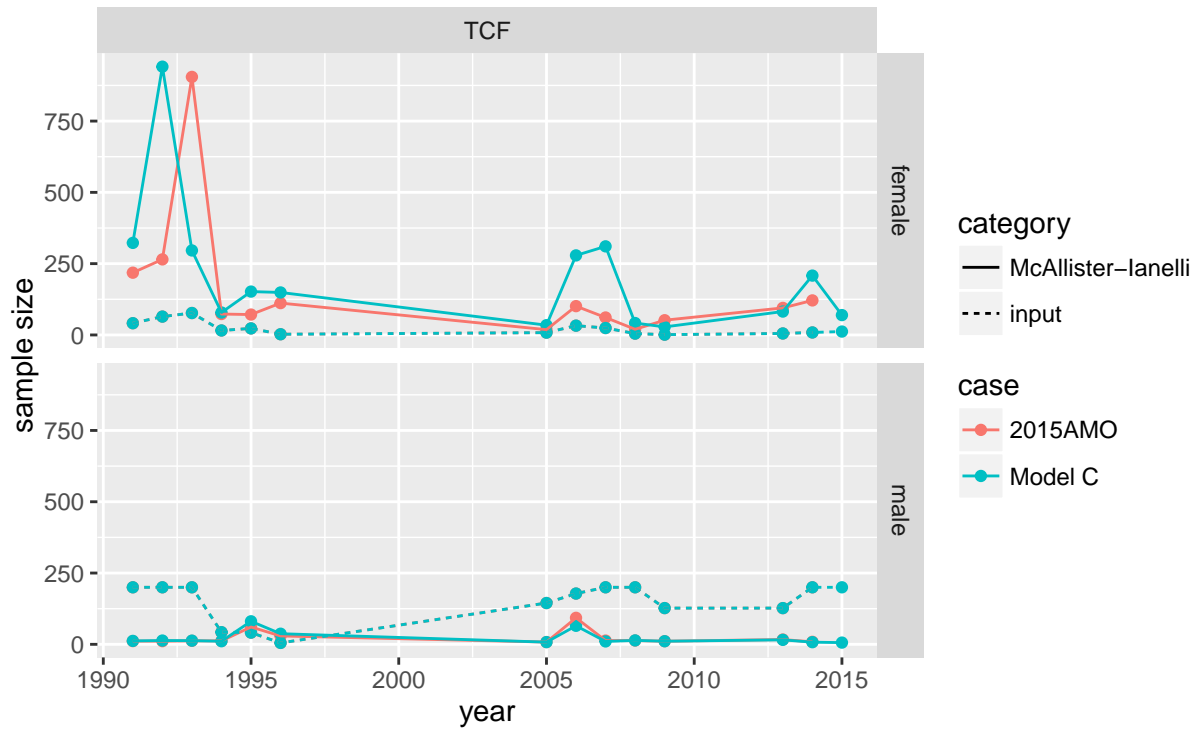Figure 101. Input and effective sample sizes for retained catch proportions-at-size inTCF.

Figure 102. Input and effective sample sizes for total catch proportions-at-size inTCF.

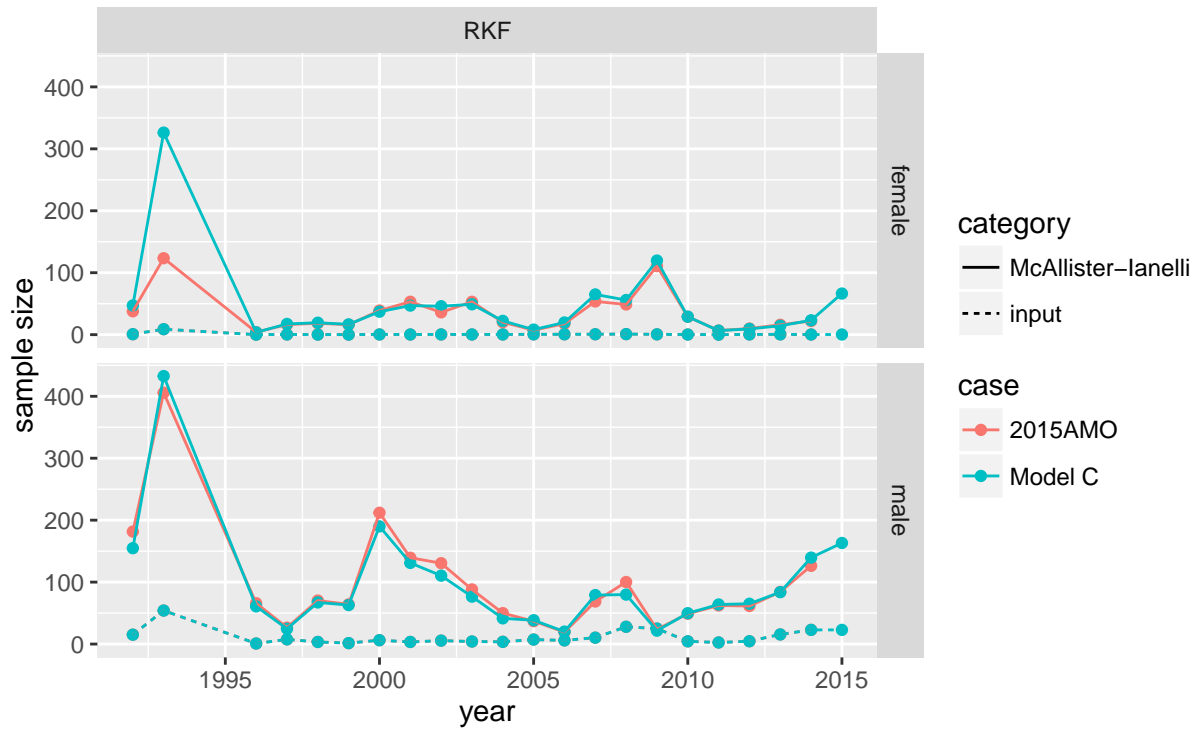Figure 103. Input and effective sample sizes for total catch proportions-at-size inSCF.

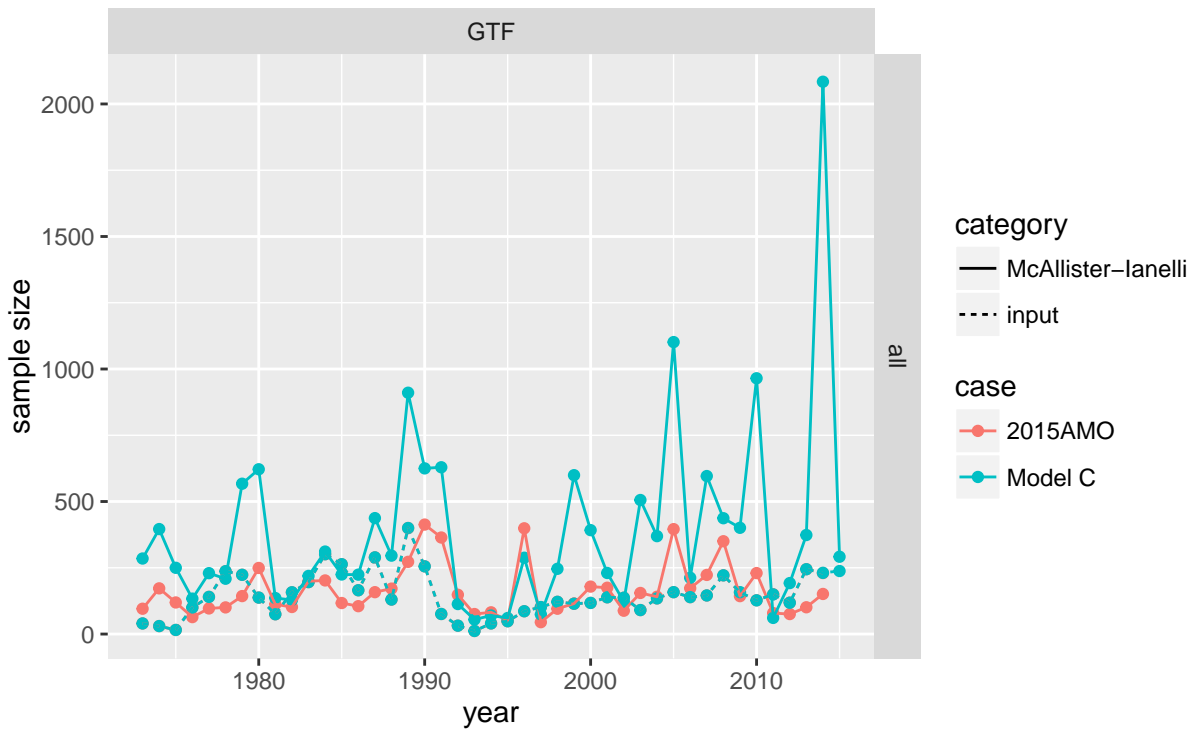Figure 104. Input and effective sample sizes for total catch proportions-at-size inRKF.

Figure 105. Input and effective sample sizes for total catch proportions-at-size inGTF.
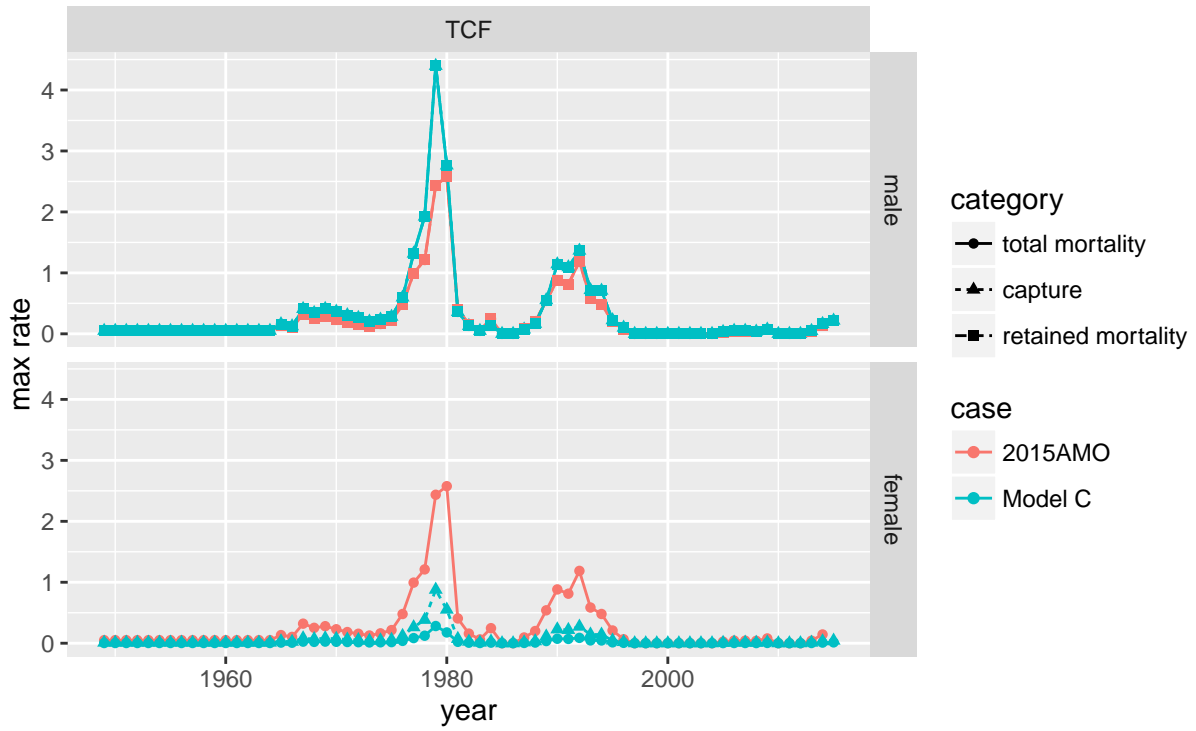
Fishery capture/mortality rates

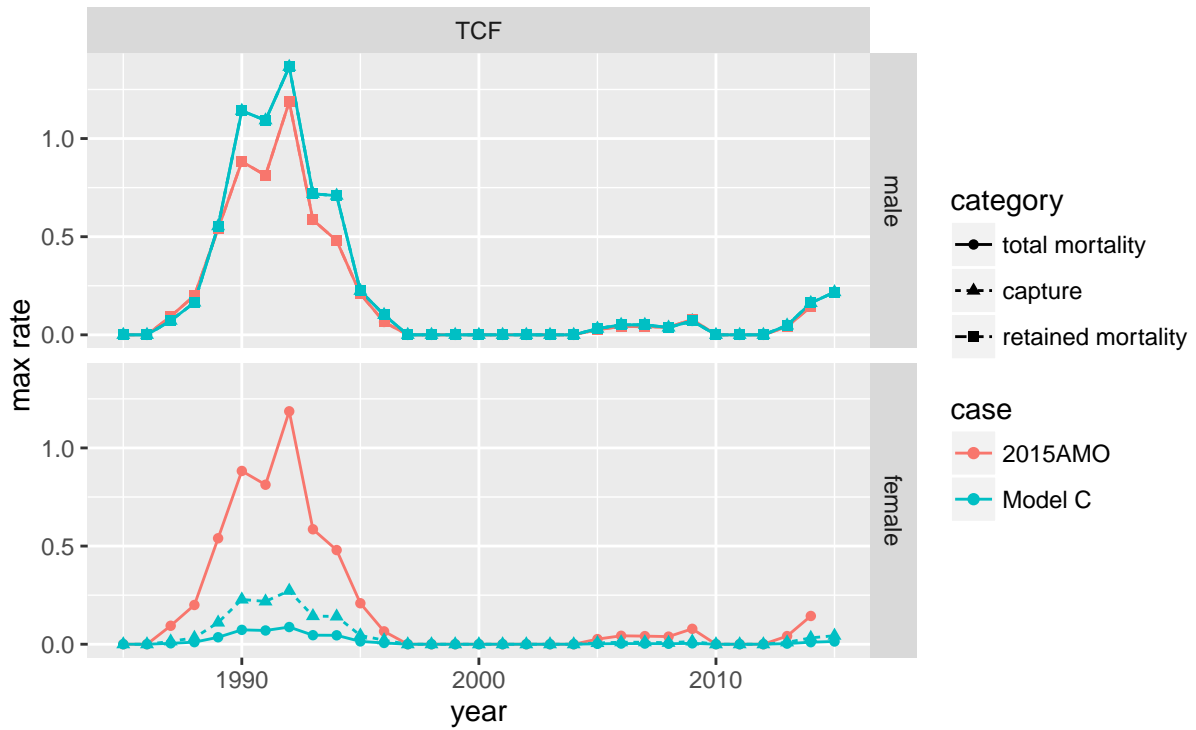Figure 106. Estimated max fishery rates in TCF.

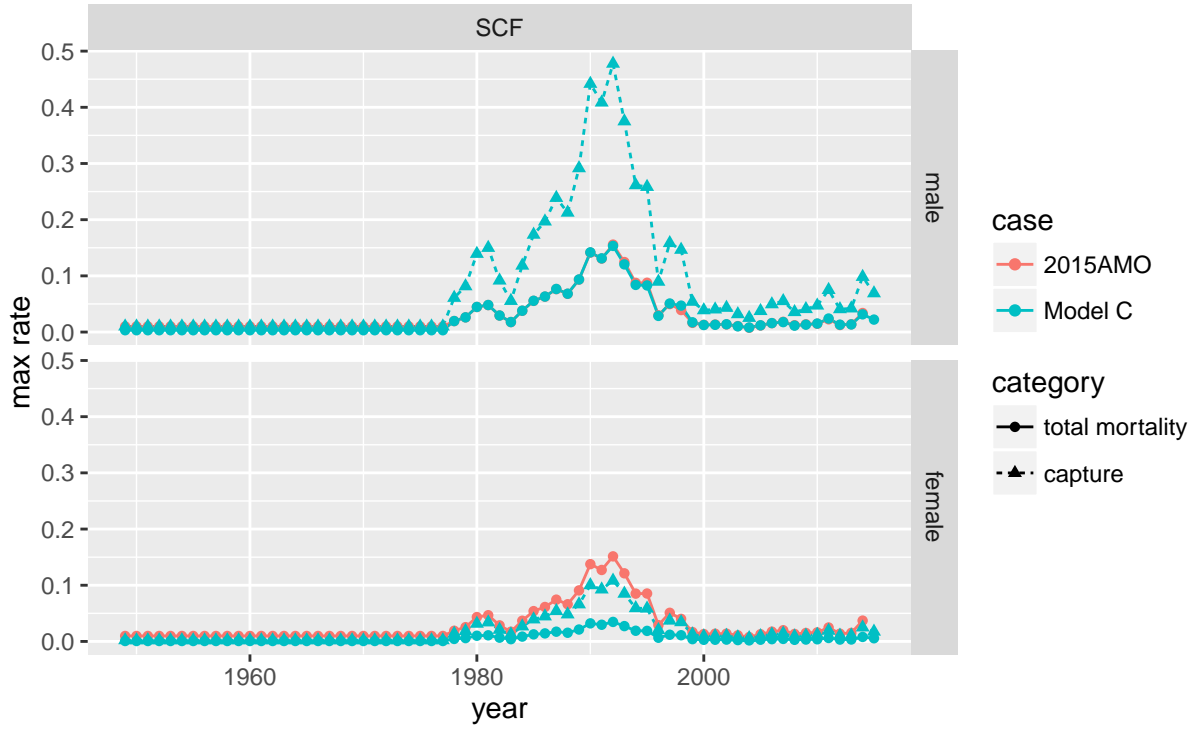Figure 107. Estimated max fishery rates in TCF (zoomed to recent years).

Figure 108. Estimated max fishery rates in SCF.

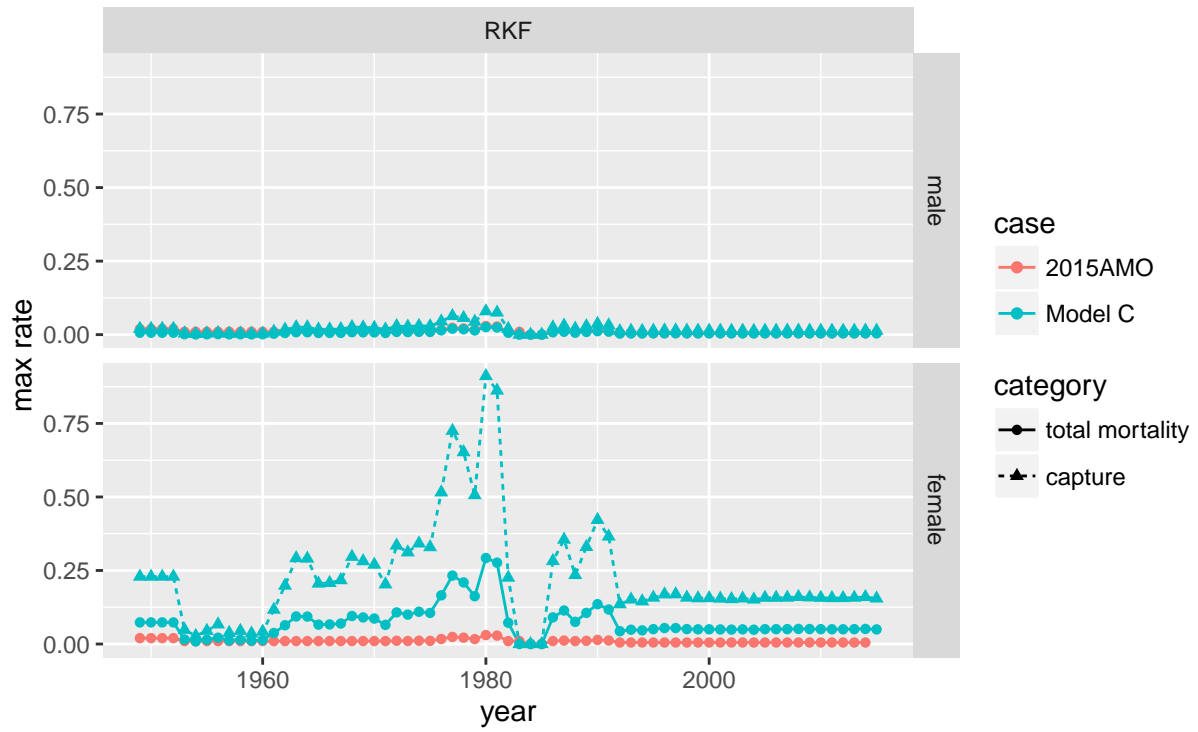Figure 109. Estimated max fishery rates in SCF (zoomed to recent years).

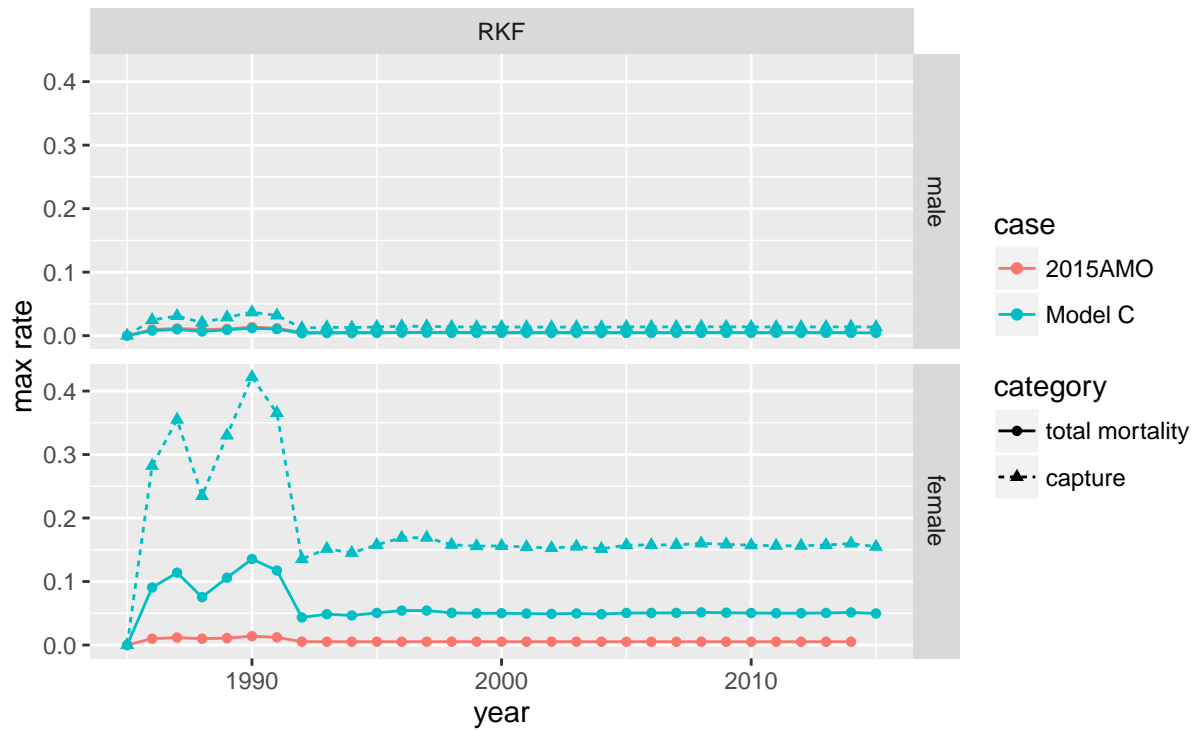Figure 110. Estimated max fishery rates in RKF.

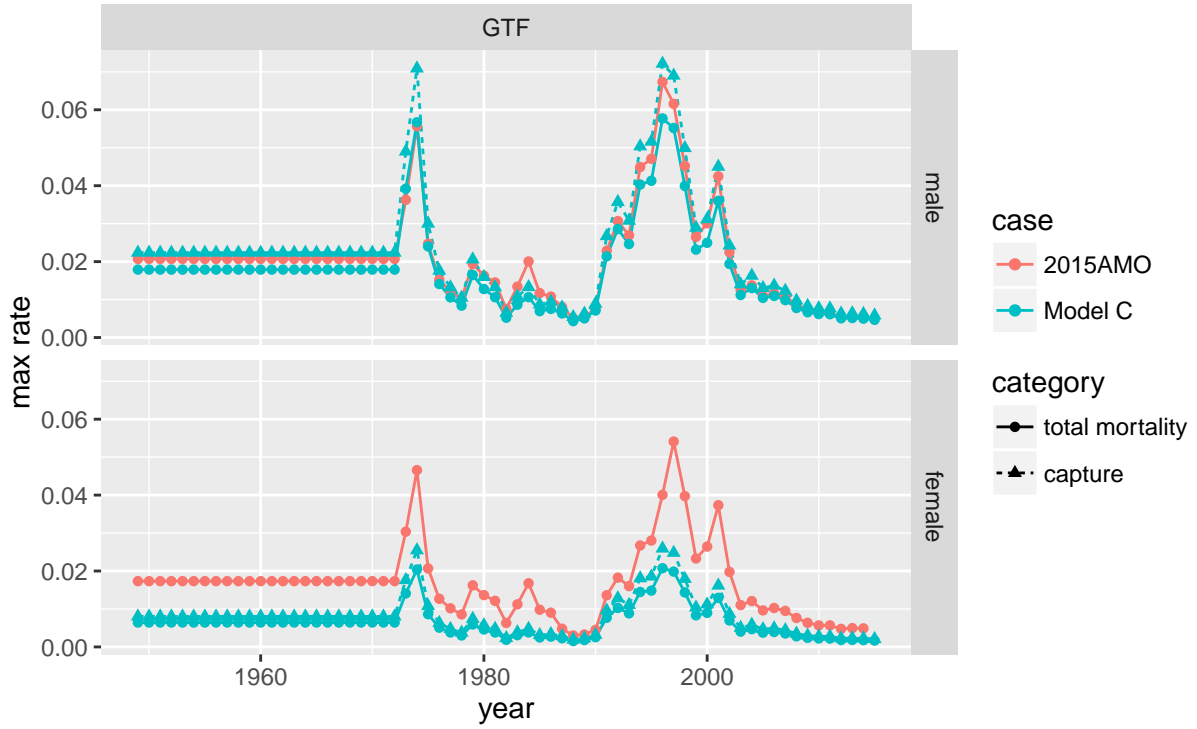Figure 111. Estimated max fishery rates in RKF (zoomed to recent years).
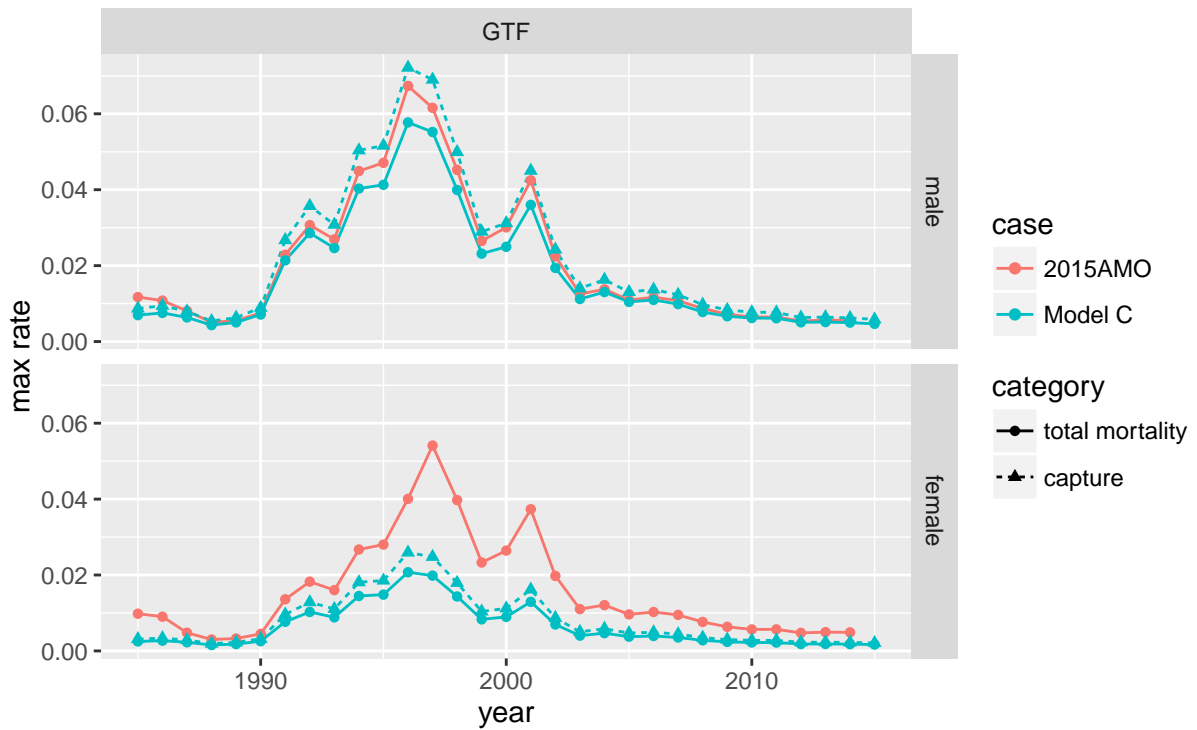
Figure 112. Estimated max fishery rates in GTF.

Figure 113. Estimated max fishery rates in GTF (zoomed to recent years).
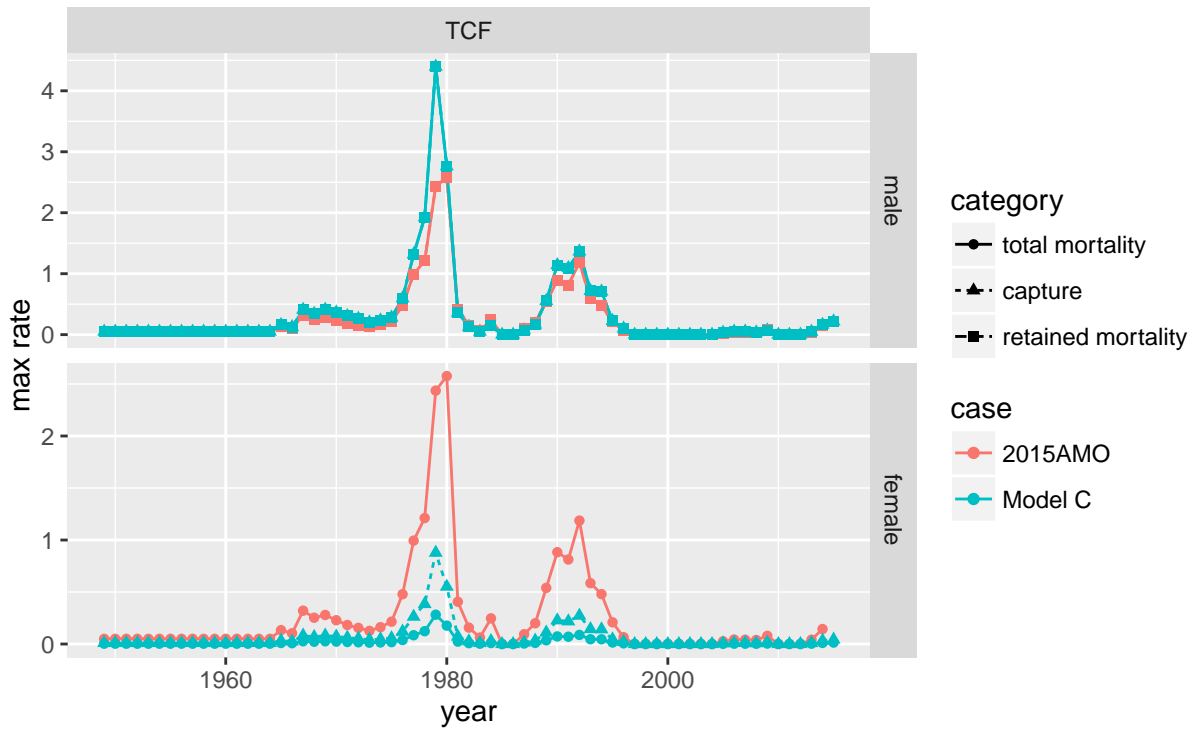
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Figure 114. Estimated max fishery rates in TCF. Y-axis scales differ.
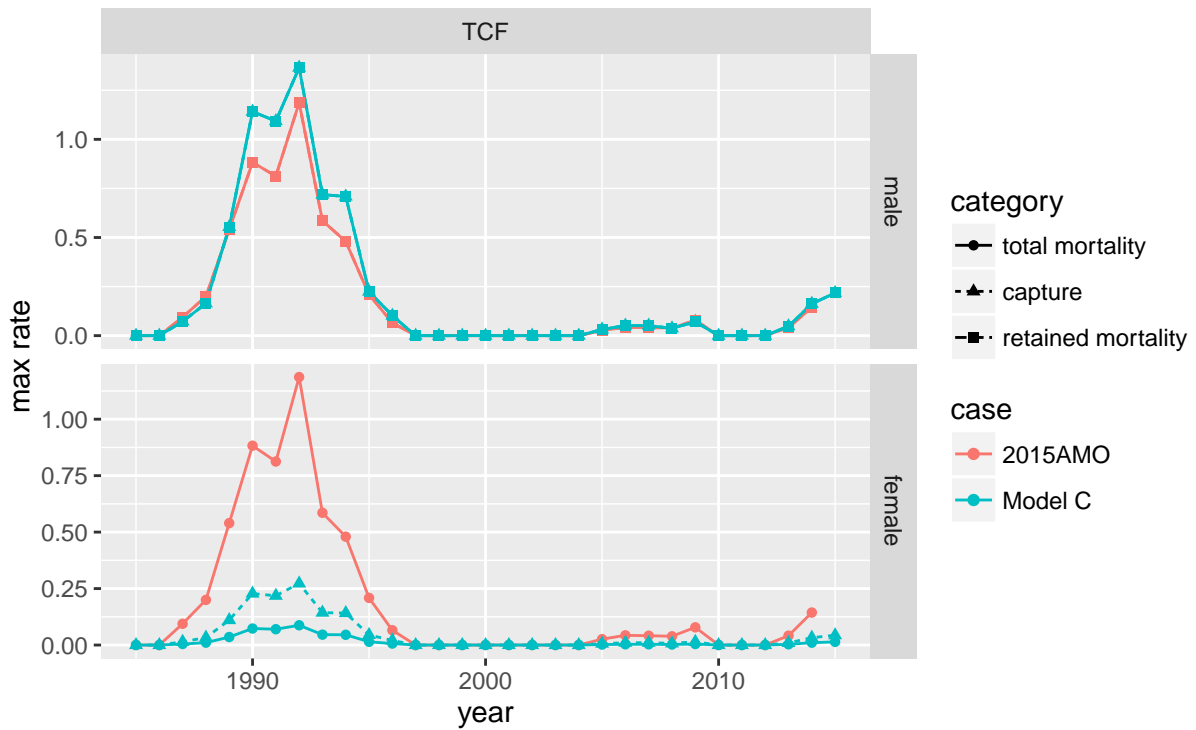

Figure 115. Estimated max fishery rates in TCF (zoomed to recent years). Y-axis scales differ.
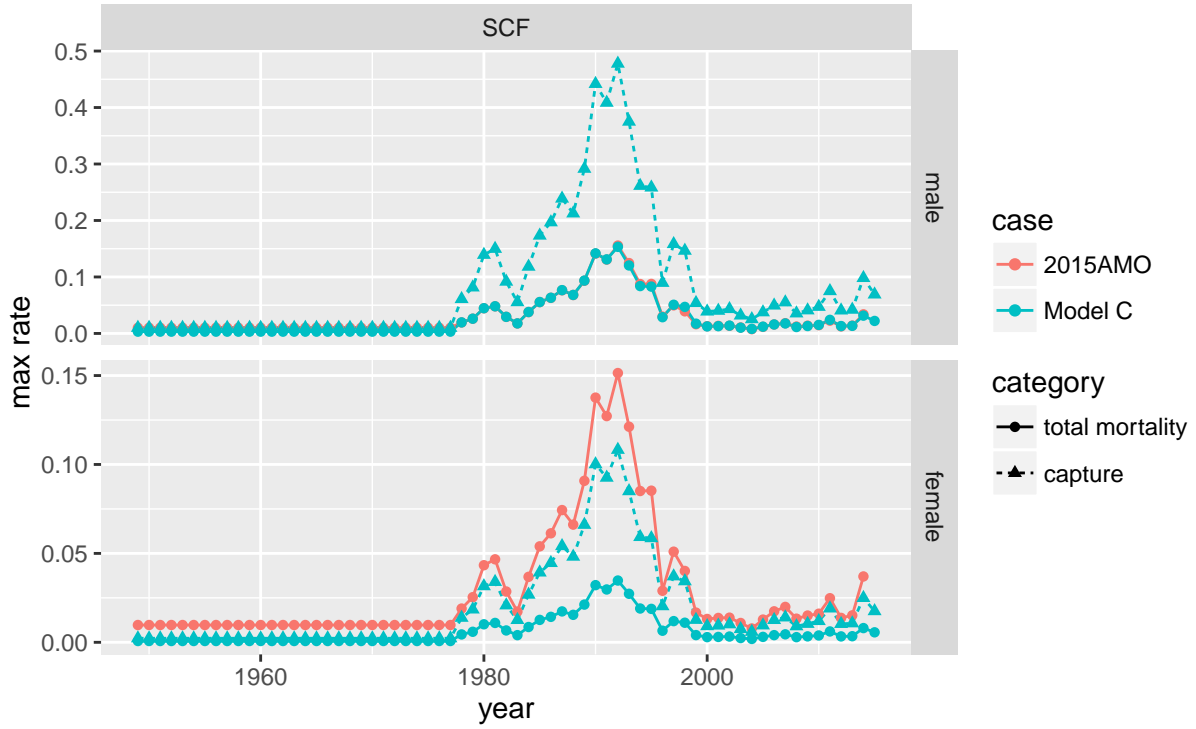
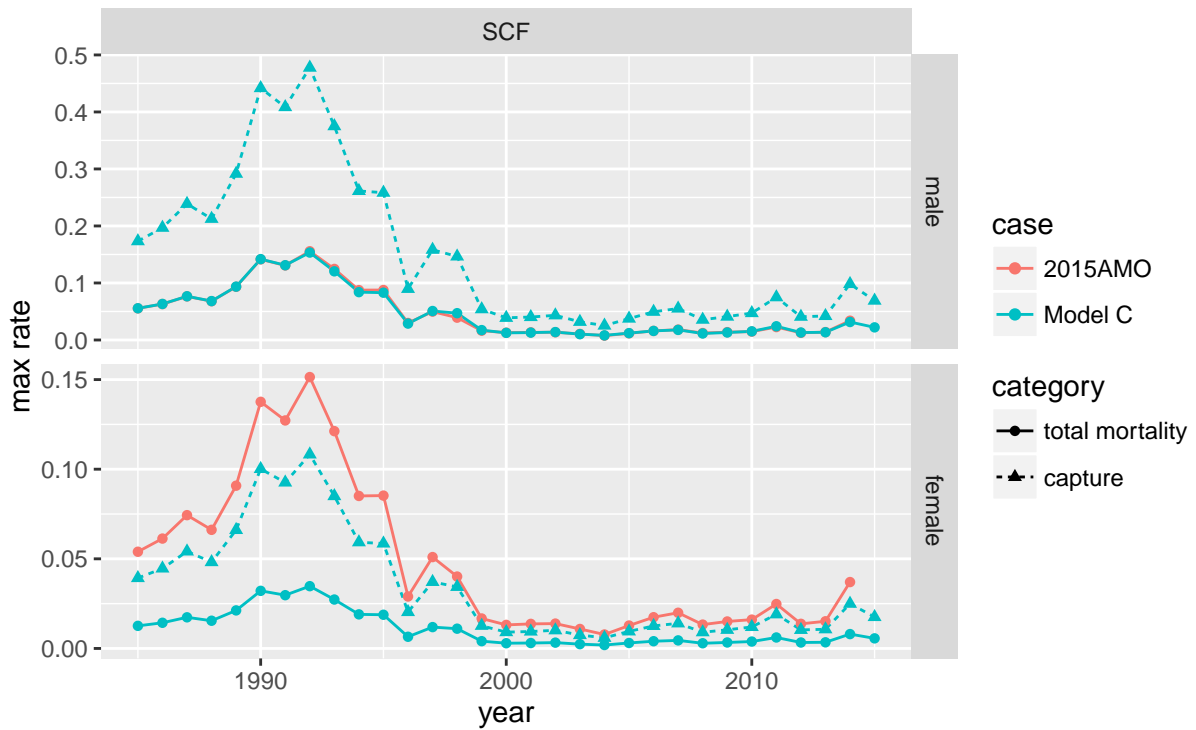Figure 116. Estimated max fishery rates in SCF. Y-axis scales differ.

Figure 117. Estimated max fishery rates in SCF (zoomed to recent years). Y-axis scales differ.
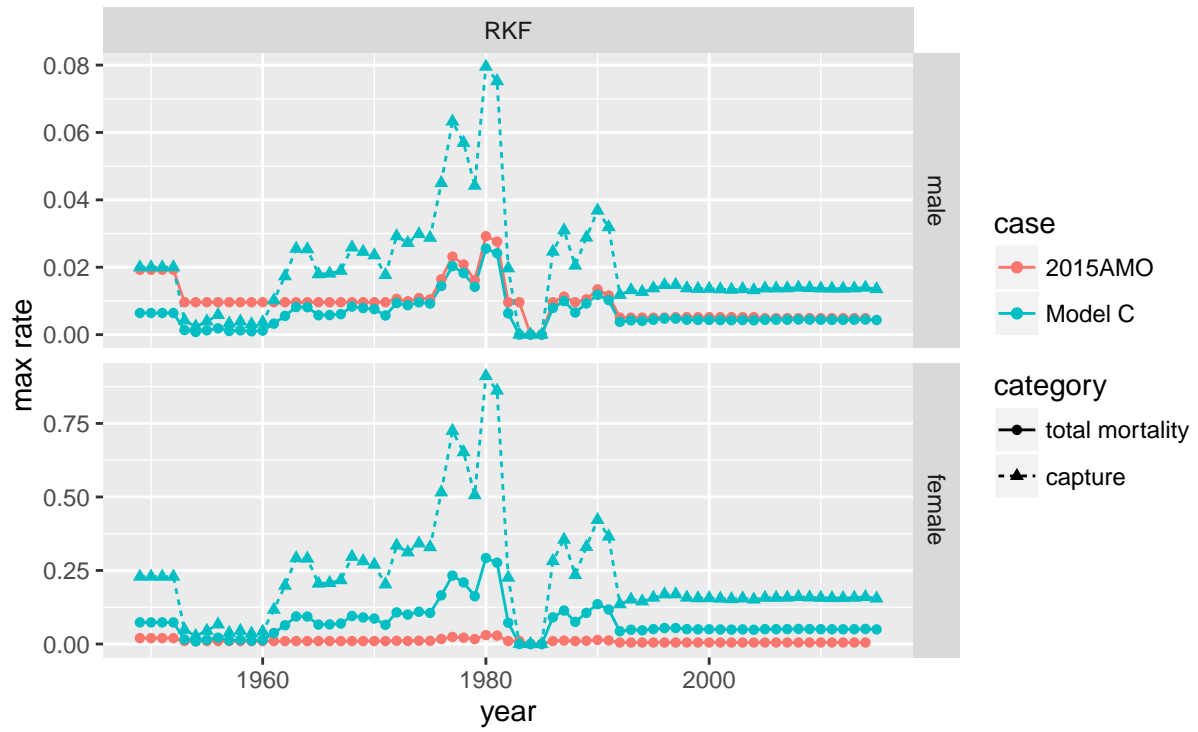
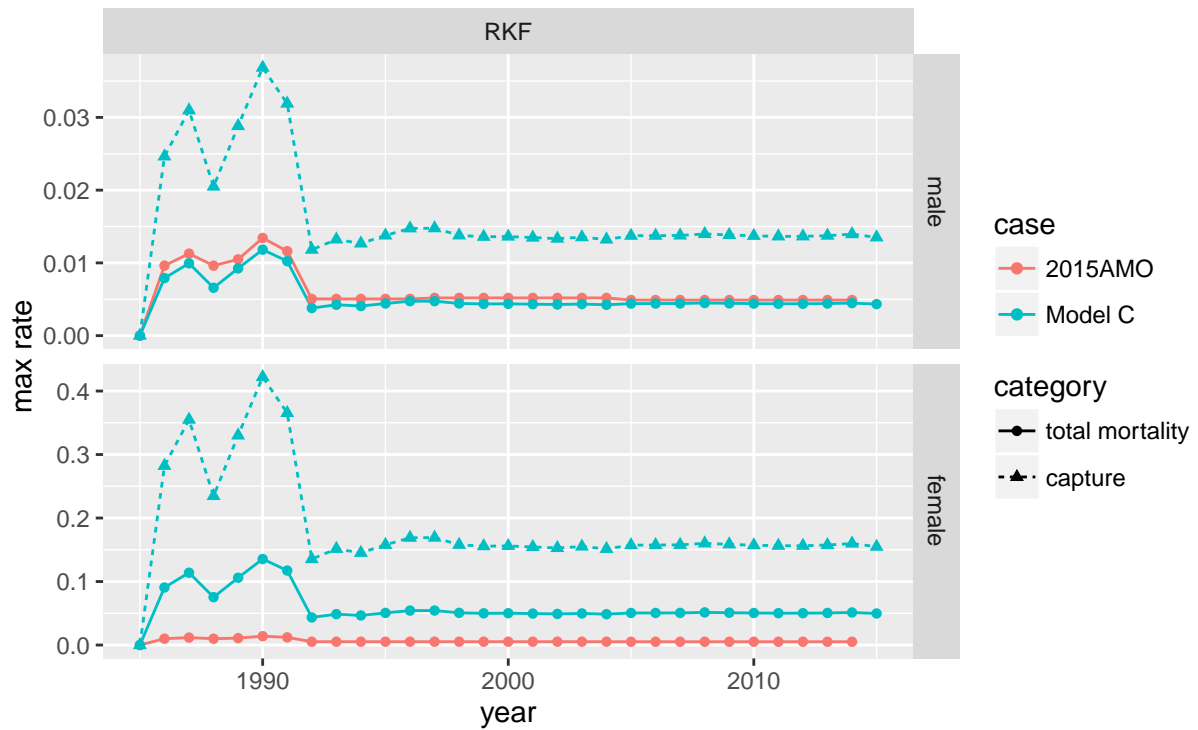Figure 118. Estimated max fishery rates in RKF. Y-axis scales differ.

Figure 119. Estimated max fishery rates in RKF (zoomed to recent years). Y-axis scales differ.
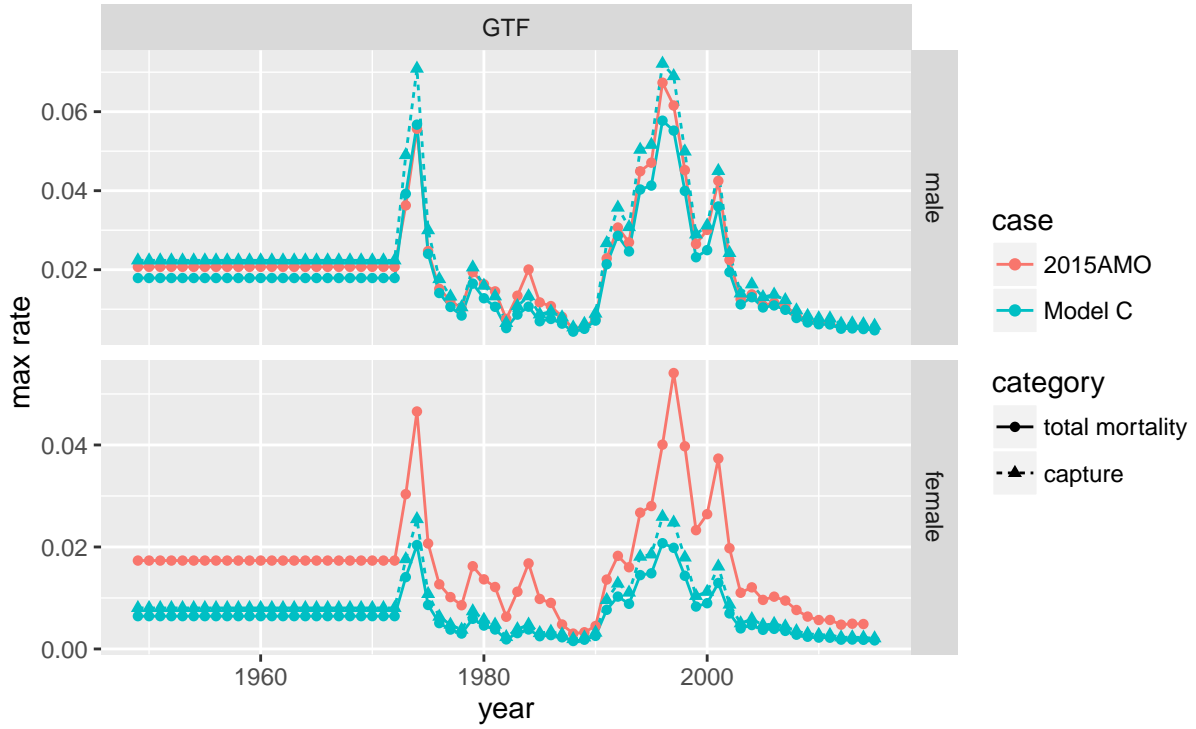
Figure 120. Estimated max fishery rates in GTF. Y-axis scales differ.

Figure 121. Estimated max fishery rates in GTF (zoomed to recent years). Y-axis scales differ.
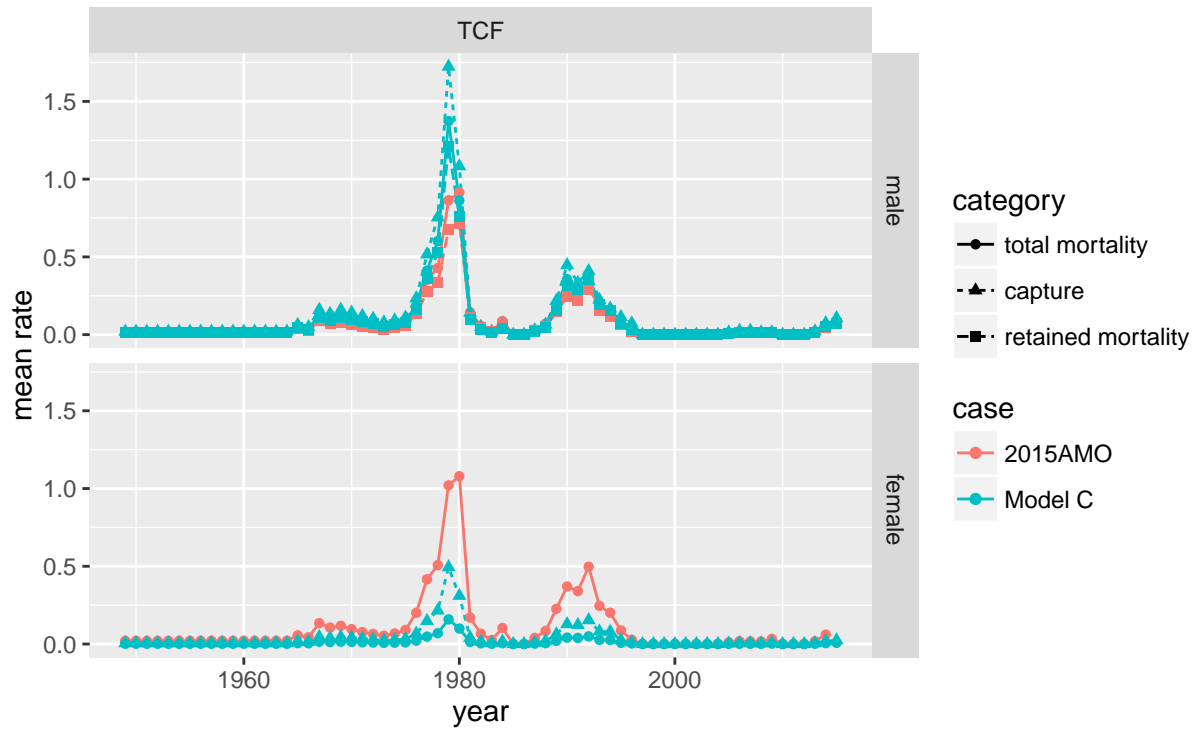
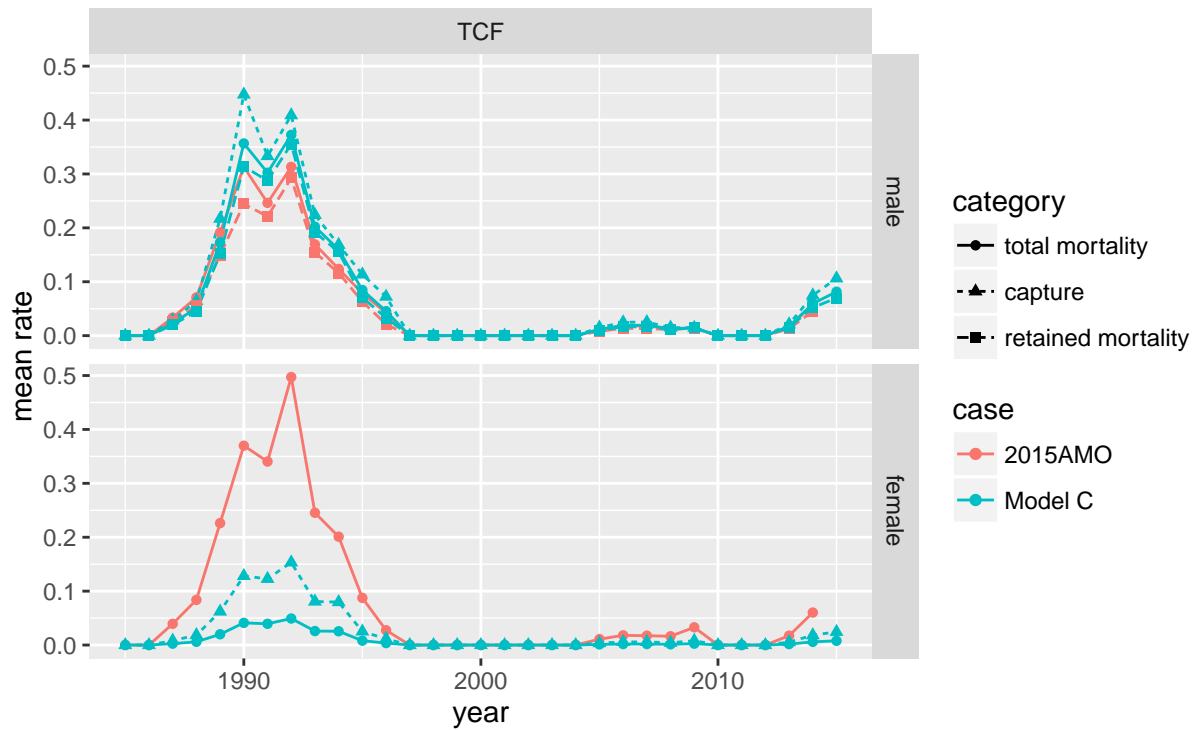Figure 122. Estimated mean fishery rates in TCF.

Figure 123. Estimated mean fishery rates in TCF (zoomed to recent years).
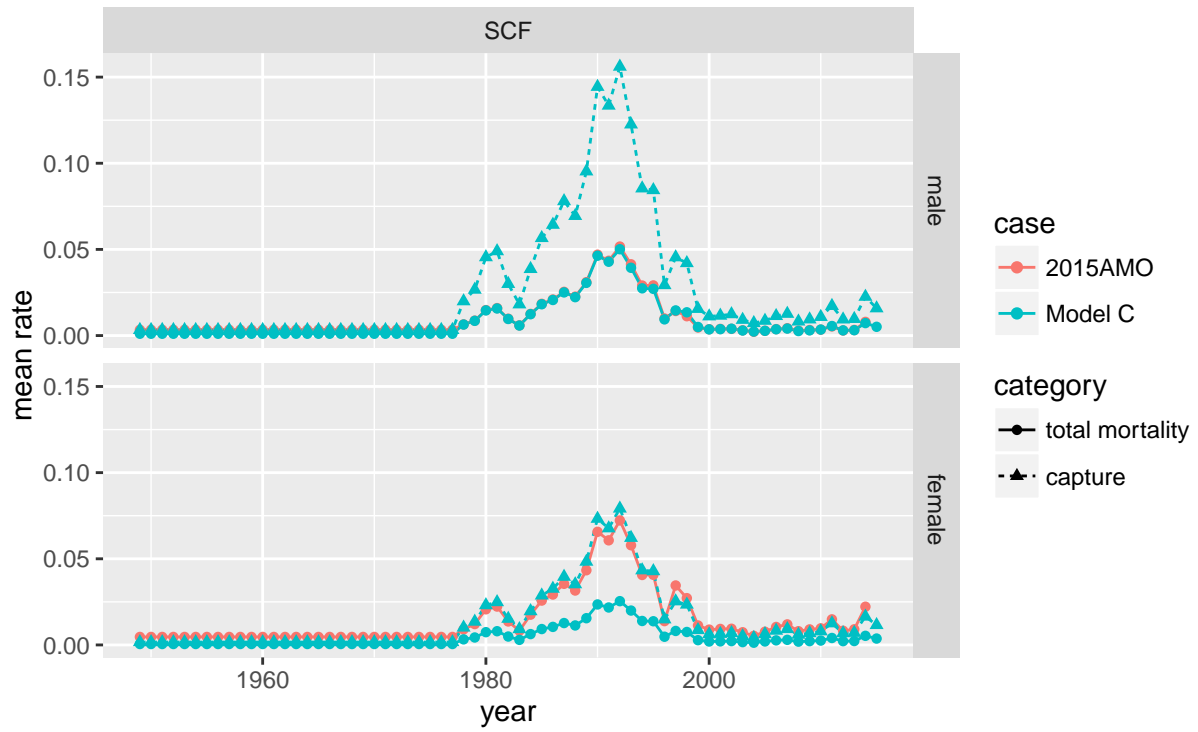
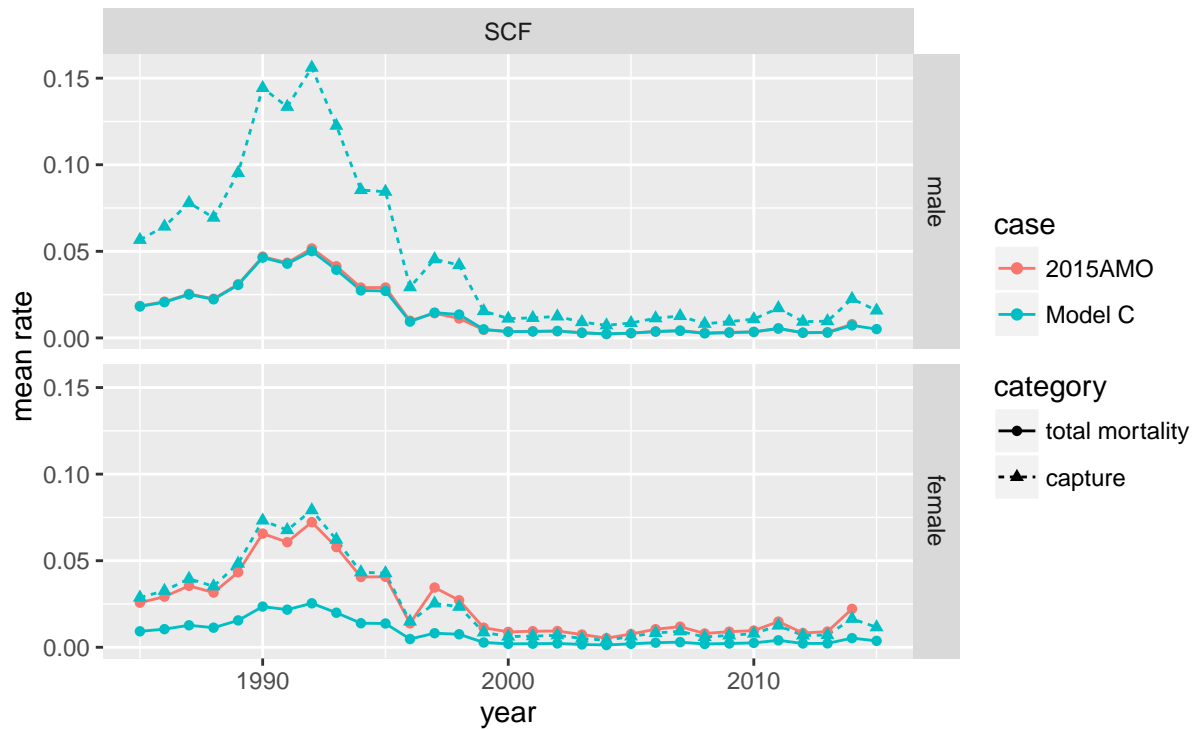Figure 124. Estimated mean fishery rates in SCF.

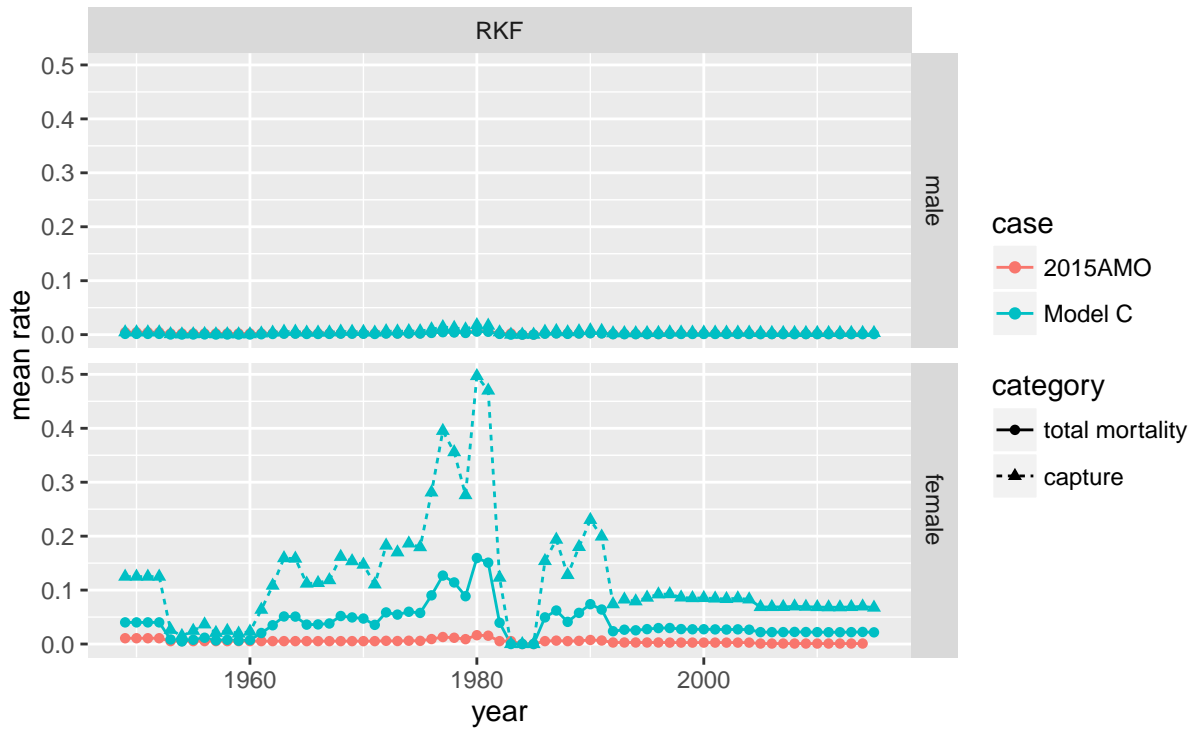Figure 125. Estimated mean fishery rates in SCF (zoomed to recent years).

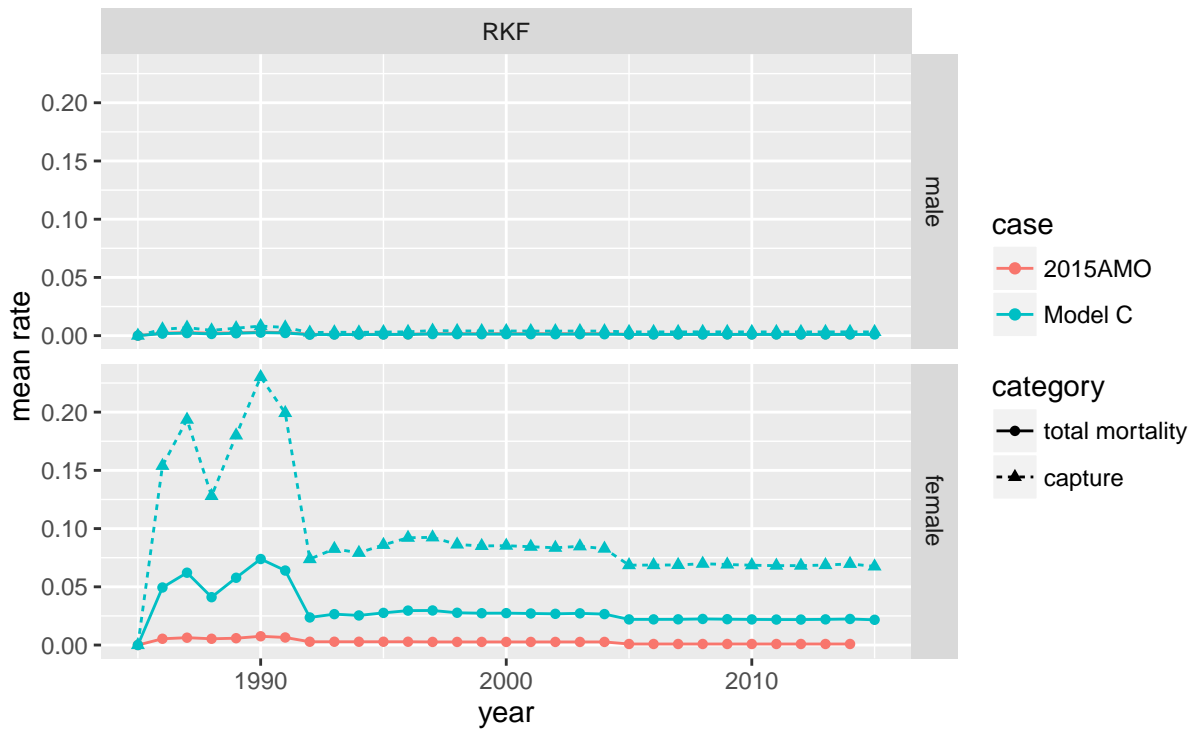Figure 126. Estimated mean fishery rates in RKF.

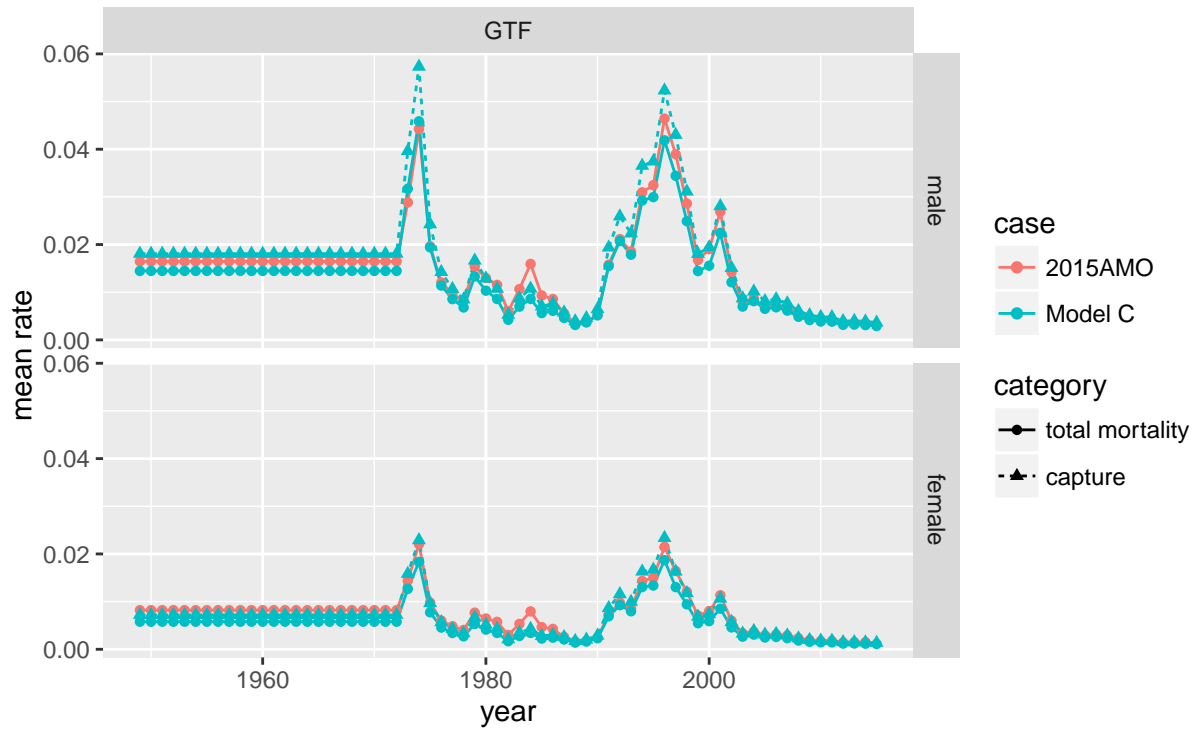Figure 127. Estimated mean fishery rates in RKF (zoomed to recent years).
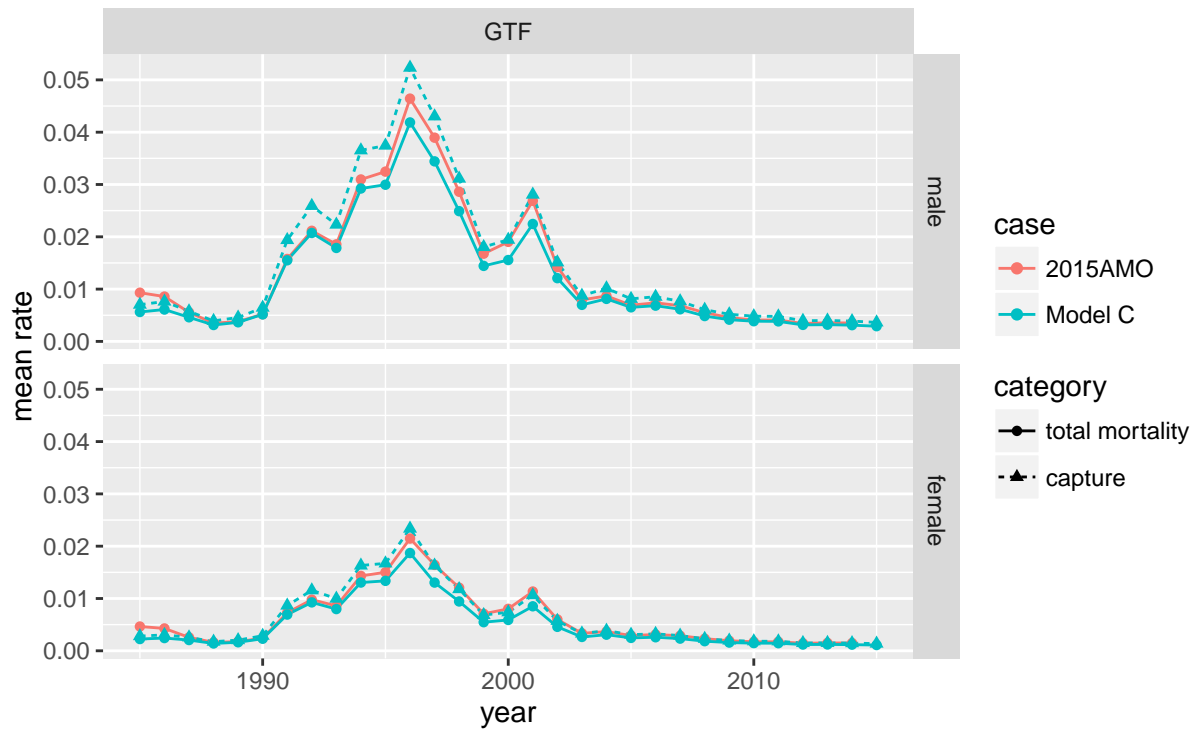
Figure 128. Estimated mean fishery rates in GTF.

Figure 129. Estimated mean fishery rates in GTF (zoomed to recent years).