Appendix D Model Comparisons: Fits to Fisheries Size Composition Data –20.07u vs 20.07

William Stockhausen

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Introduction

Fits to fishery retained catch and total catch size composition data available to the model(s) are presented in this section. Included are plots of mean fits to size compositions, Pearson's residuals as bubble plots, and effective sample sizes. Not all of the fits presented are necessarily included in the parameter optimization for each model; some fits to datasets for a particular model may be included for comparison purposes with other models which include those data in their optimization. The reader should consult the main assessment document to determine which fits are included in the optimization for any particular model.

Retained catch mean size compositions

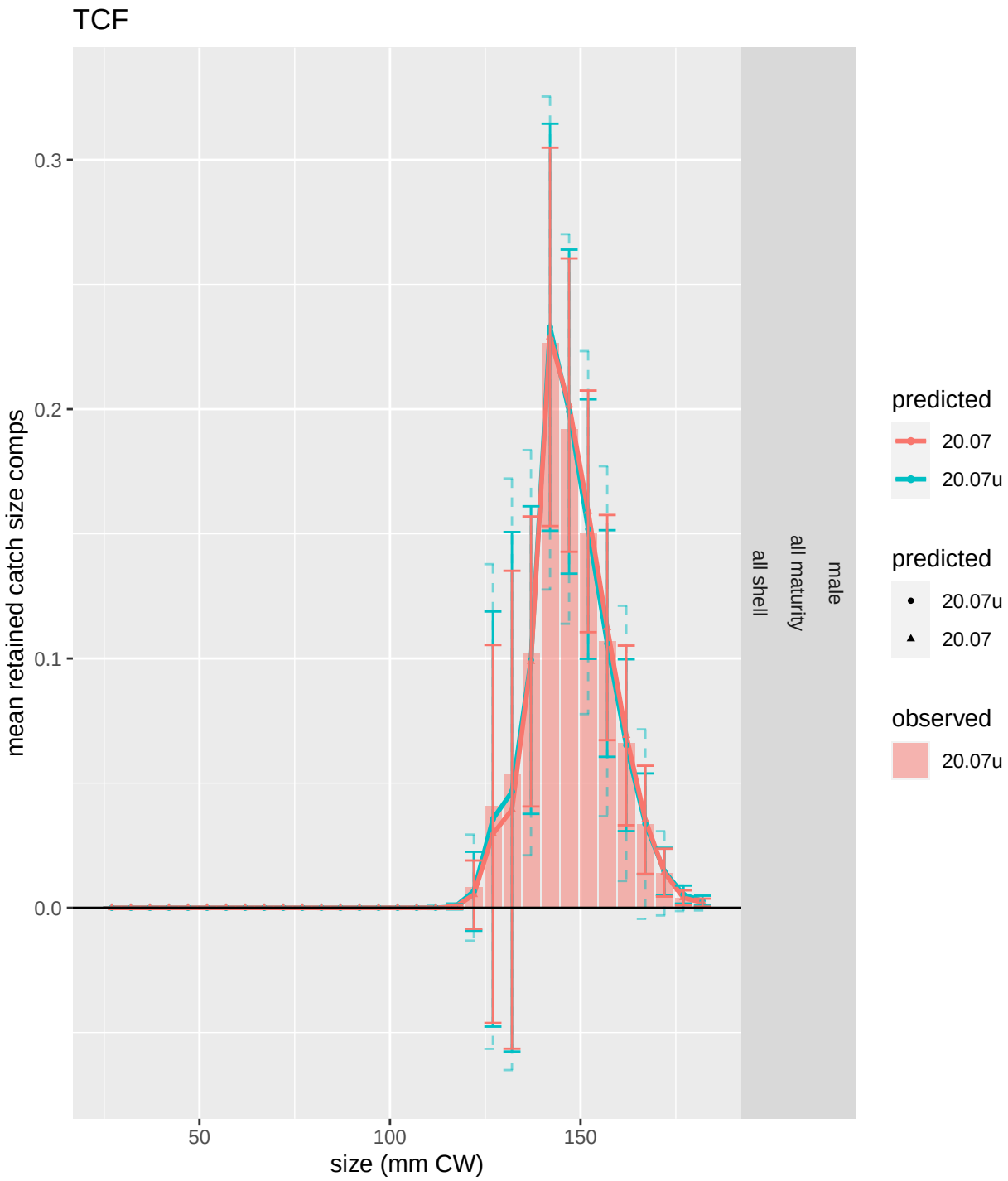

Figure 1: Comparison of observed and predicted mean retained catch size comps for TCF.

Total catch mean size compositions

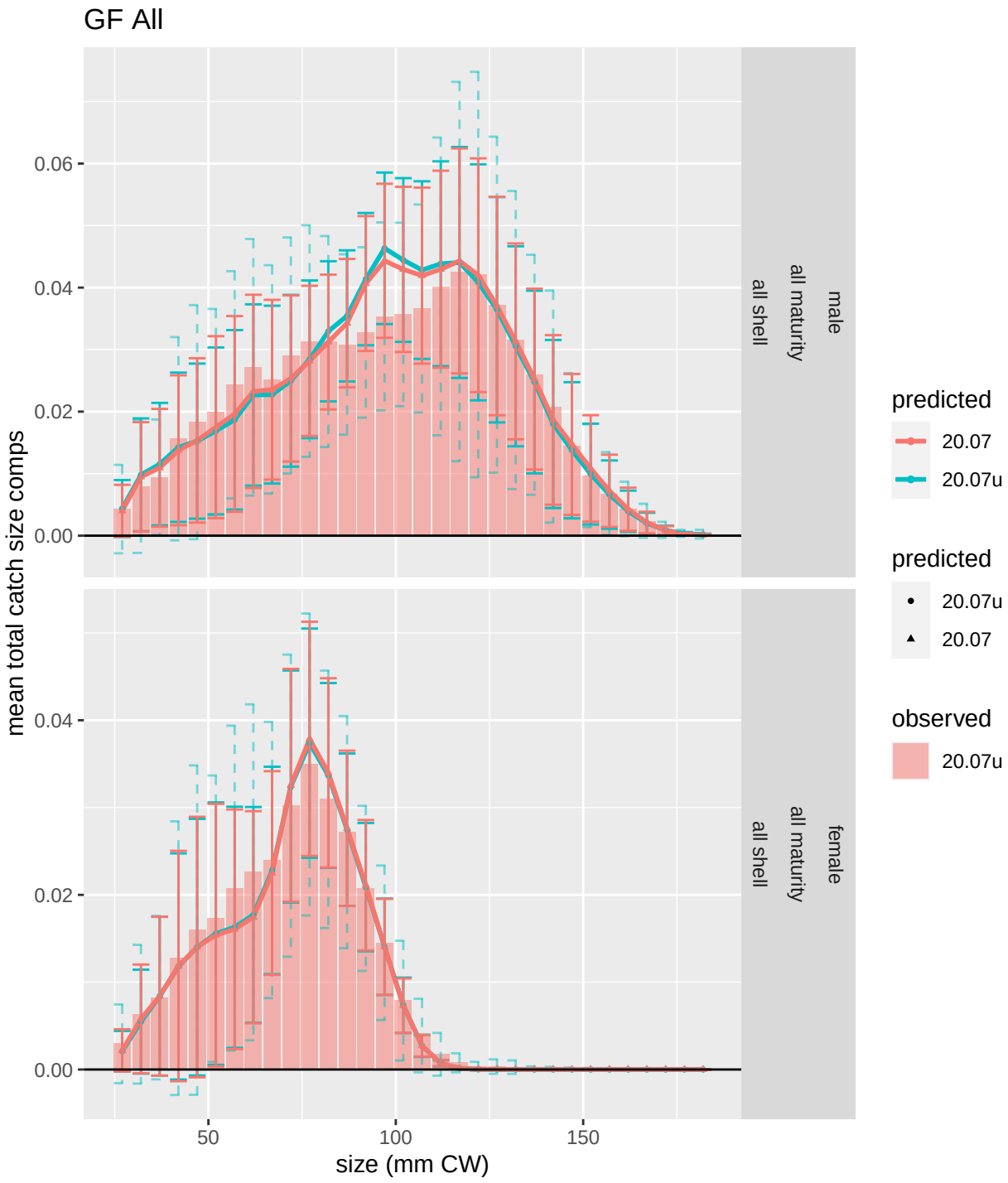

Figure 2: Comparison of observed and predicted mean total catch size comps for GF All.

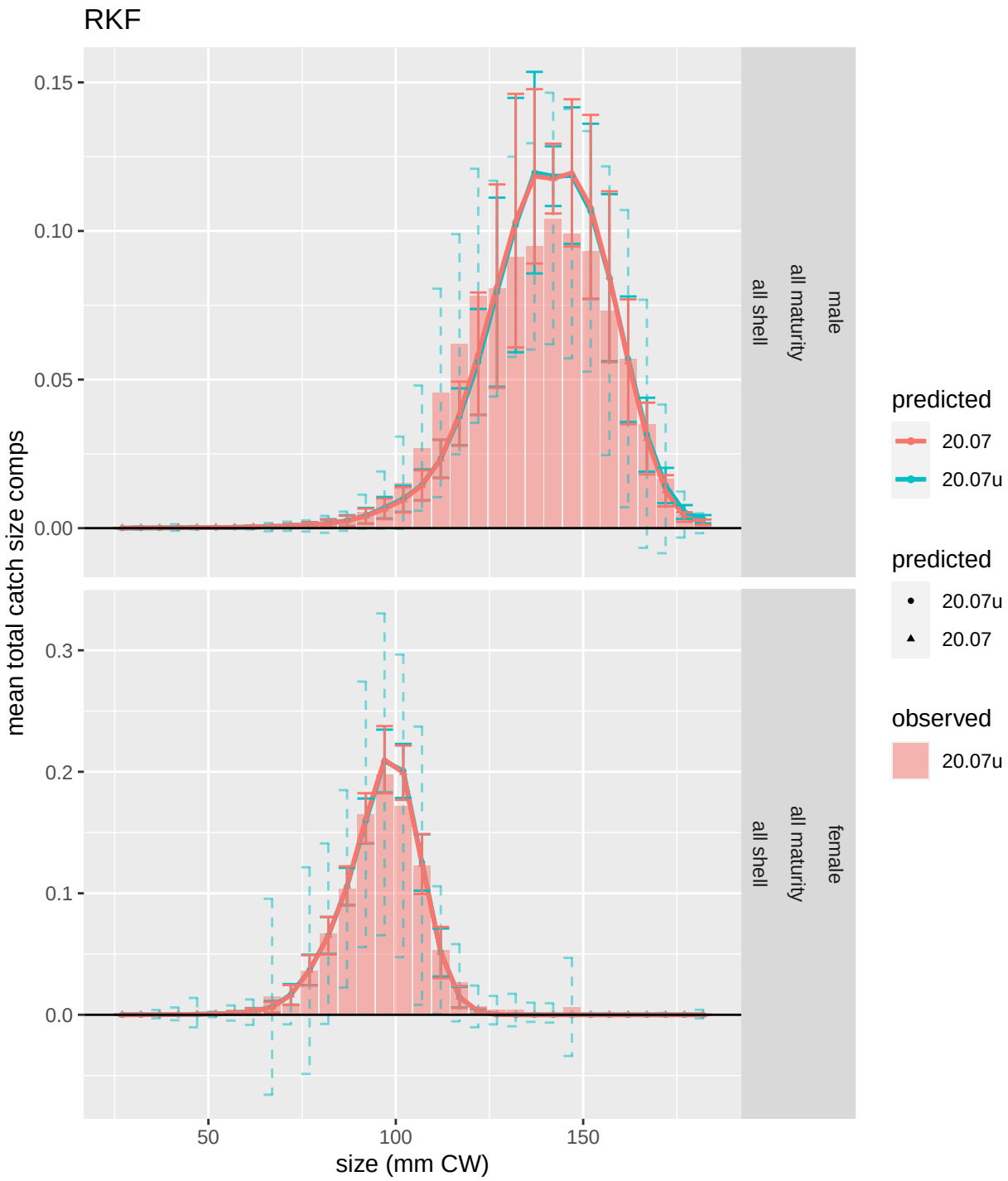

Figure 3: Comparison of observed and predicted mean total catch size comps for RKF.

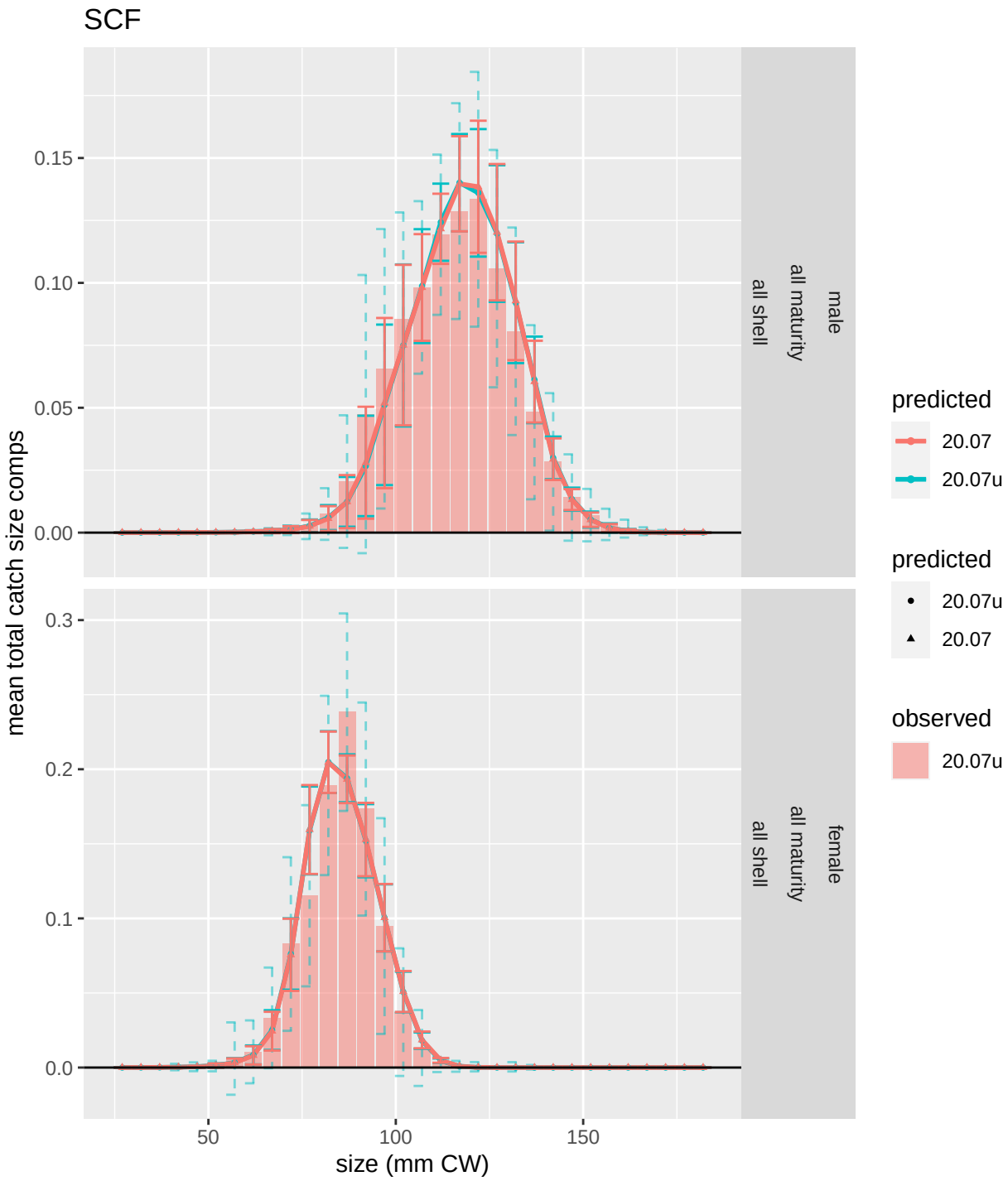

Figure 4: Comparison of observed and predicted mean total catch size comps for SCF.

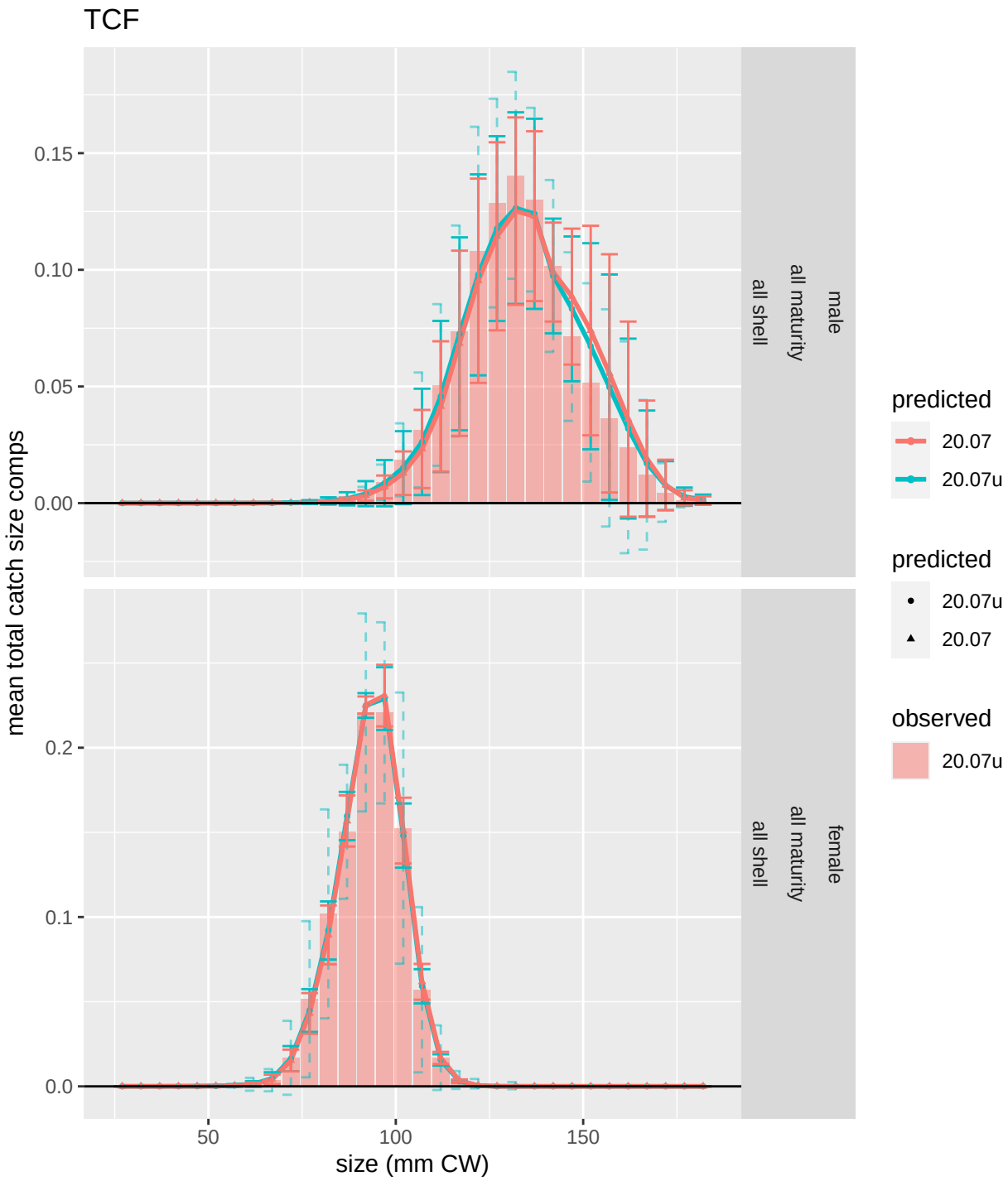

Figure 5: Comparison of observed and predicted mean total catch size comps for TCF.

Fishery retained catch size composition residuals

Pearson's residuals are plotted for fits to size composition data. Symbol areas reflect the size of each residual, Extreme values (residuals larger than 4 in scale) are indicated with a red "X" to facilitate identification.

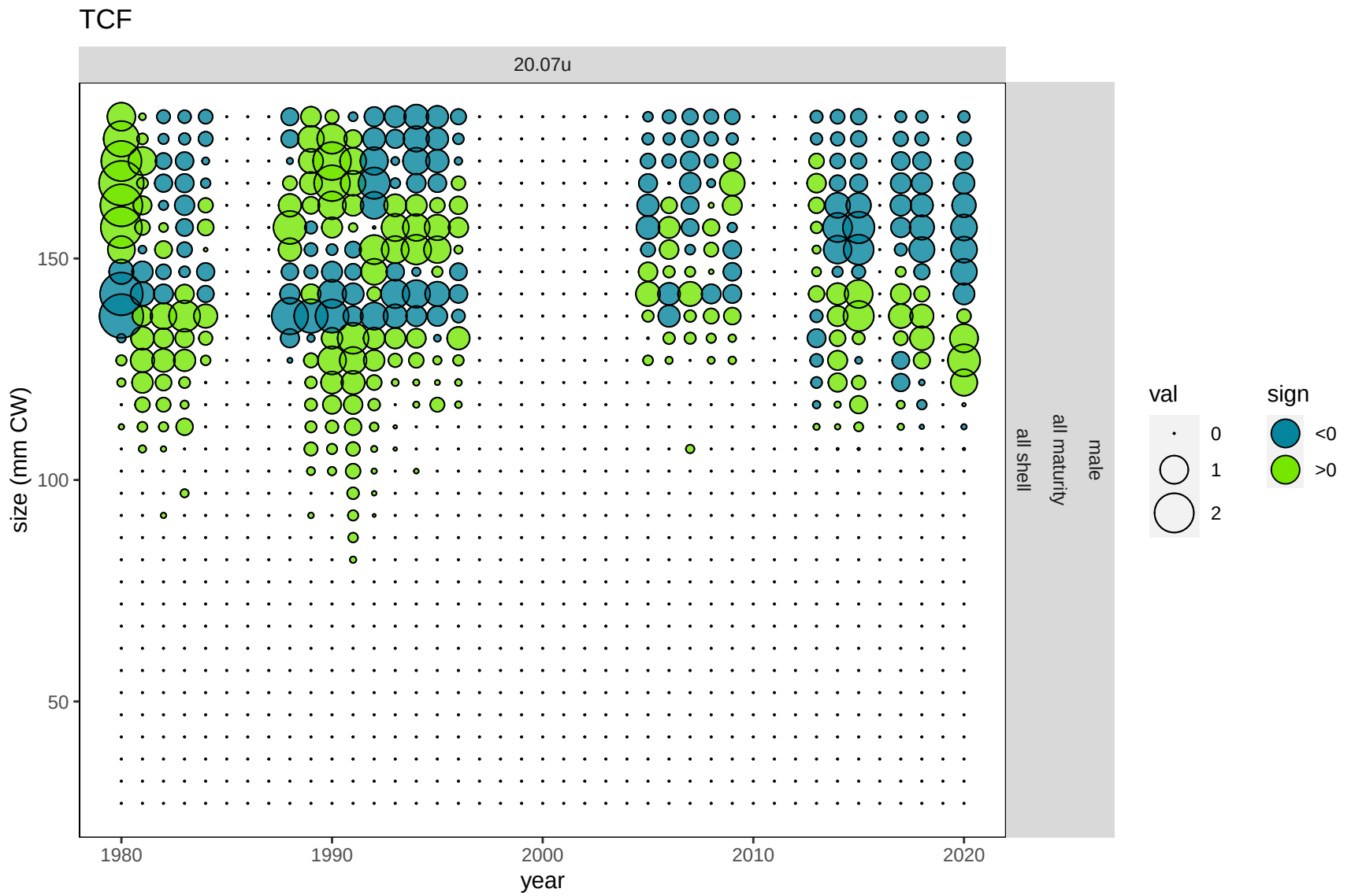

Figure 6: Pearson's residuals for male proportions-at-size from the TCF for scenario 20.07u.

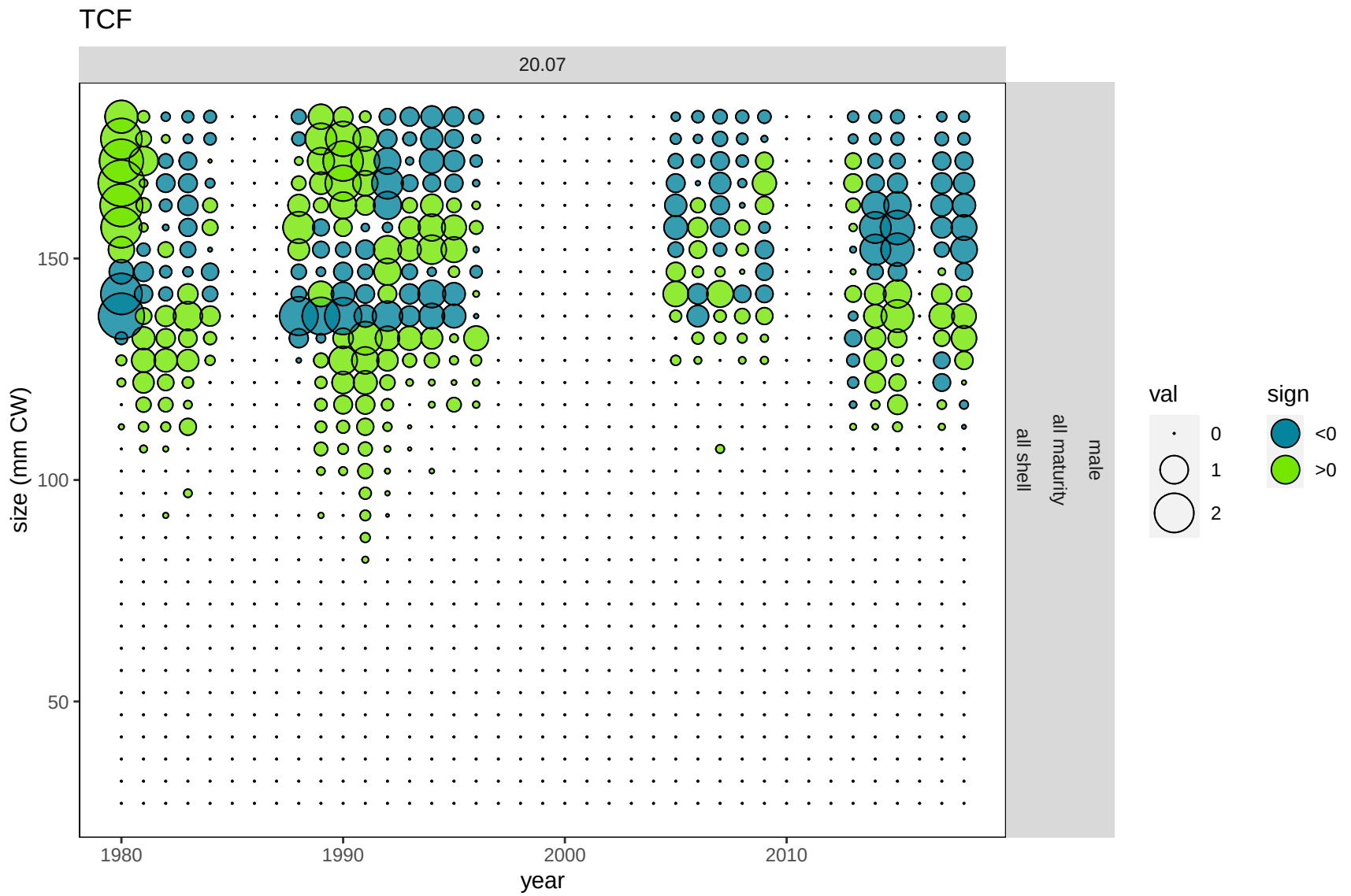

Figure 7: Pearson's residuals for male proportions-at-size from the TCF for scenario 20.07.

Effective Ns for retained catch size compositions

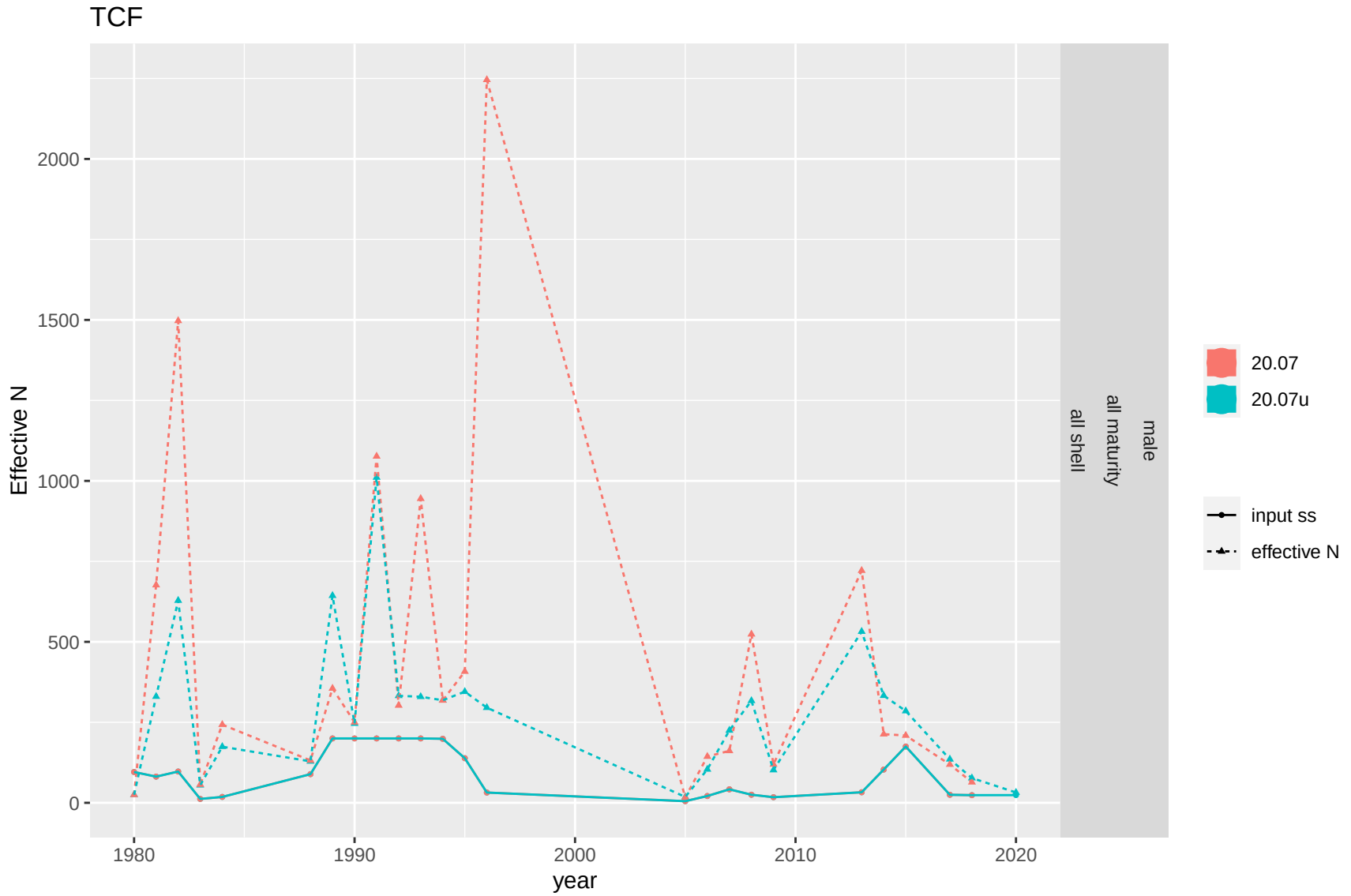

Figure 8: Input and effective sample sizes from retained catch size compositions from the TCF fishery.

Total catch size composition residuals

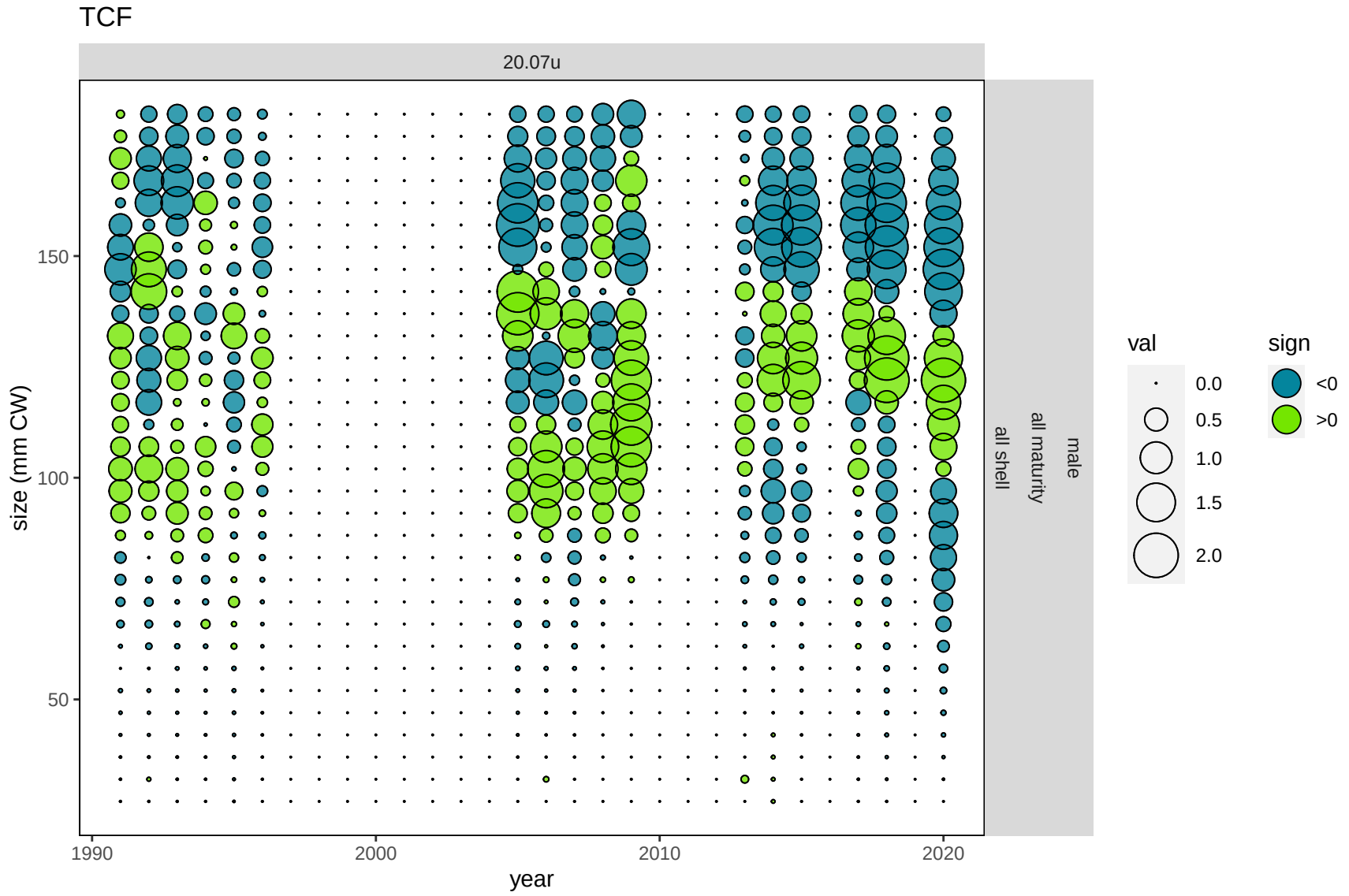

Figure 9: Pearson's residuals for male proportions-at-size from the TCF for scenario 20.07u.

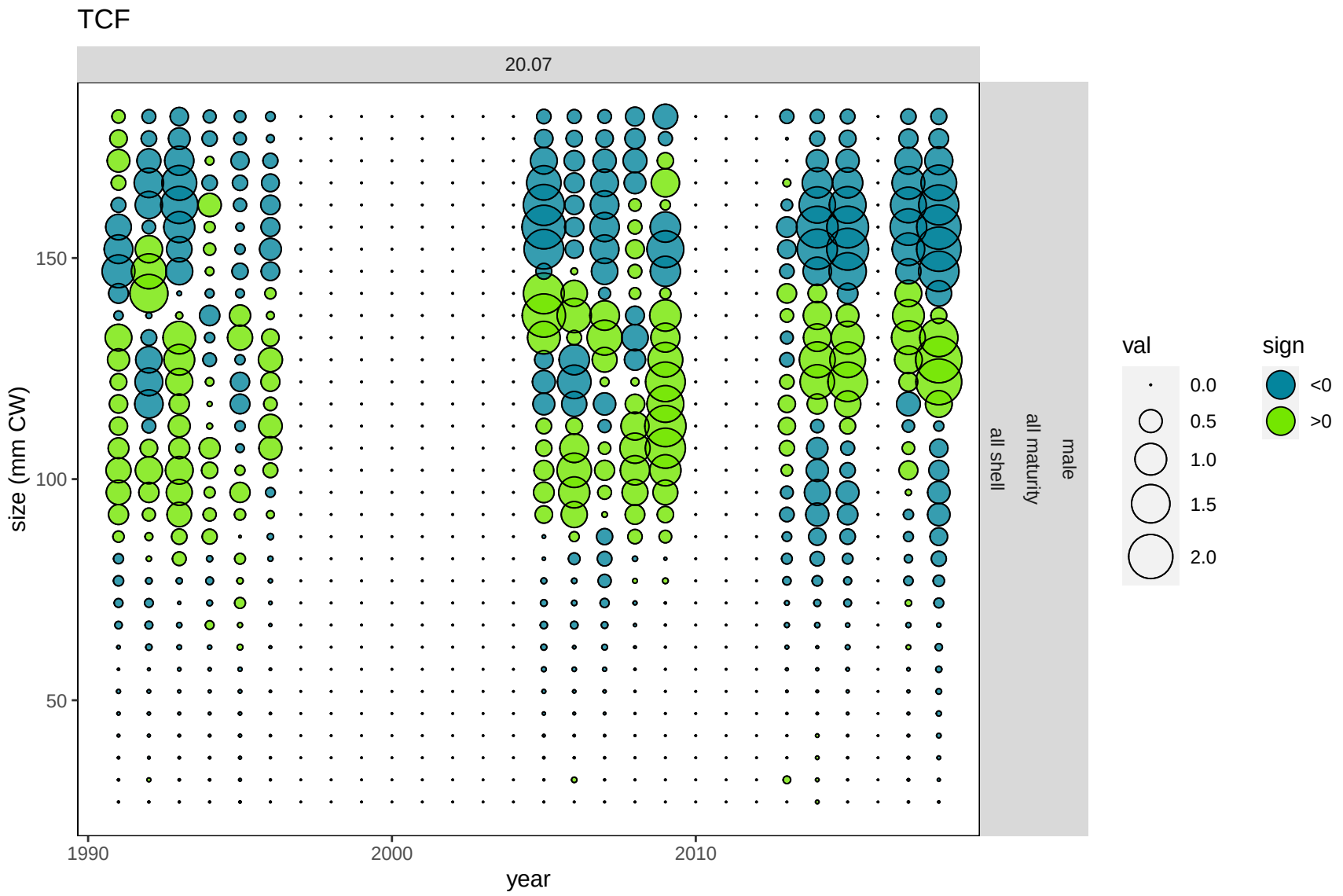

Figure 10: Pearson's residuals for male proportions-at-size from the TCF for scenario 20.07.

Figure 11: Pearson's residuals for female proportions-at-size from the TCF for scenario 20.07u.

Figure 12: Pearson's residuals for female proportions-at-size from the TCF for scenario 20.07.

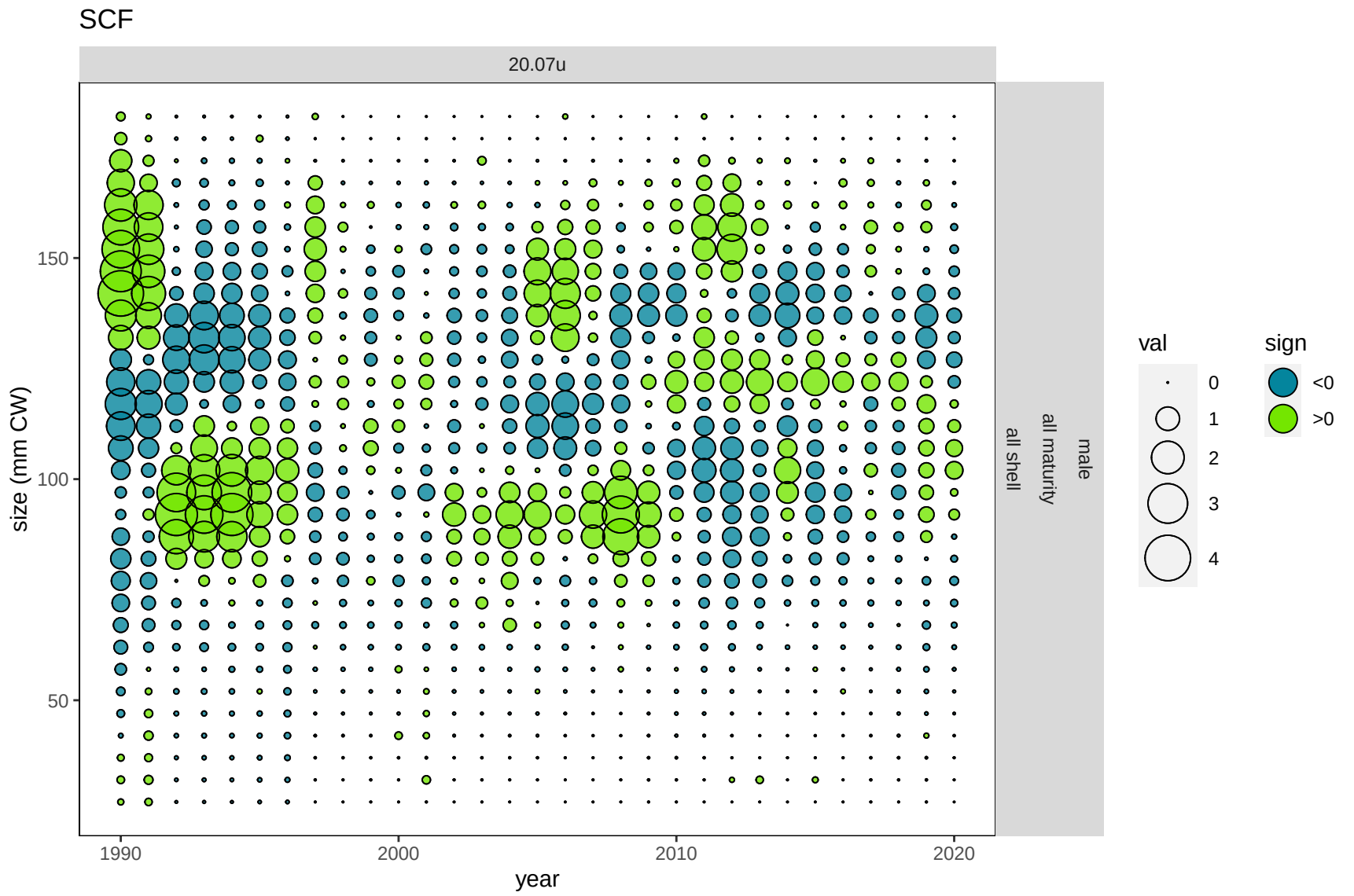

Figure 13: Pearson's residuals for male proportions-at-size from the SCF for scenario 20.07u.

Figure 14: Pearson's residuals for male proportions-at-size from the SCF for scenario 20.07.

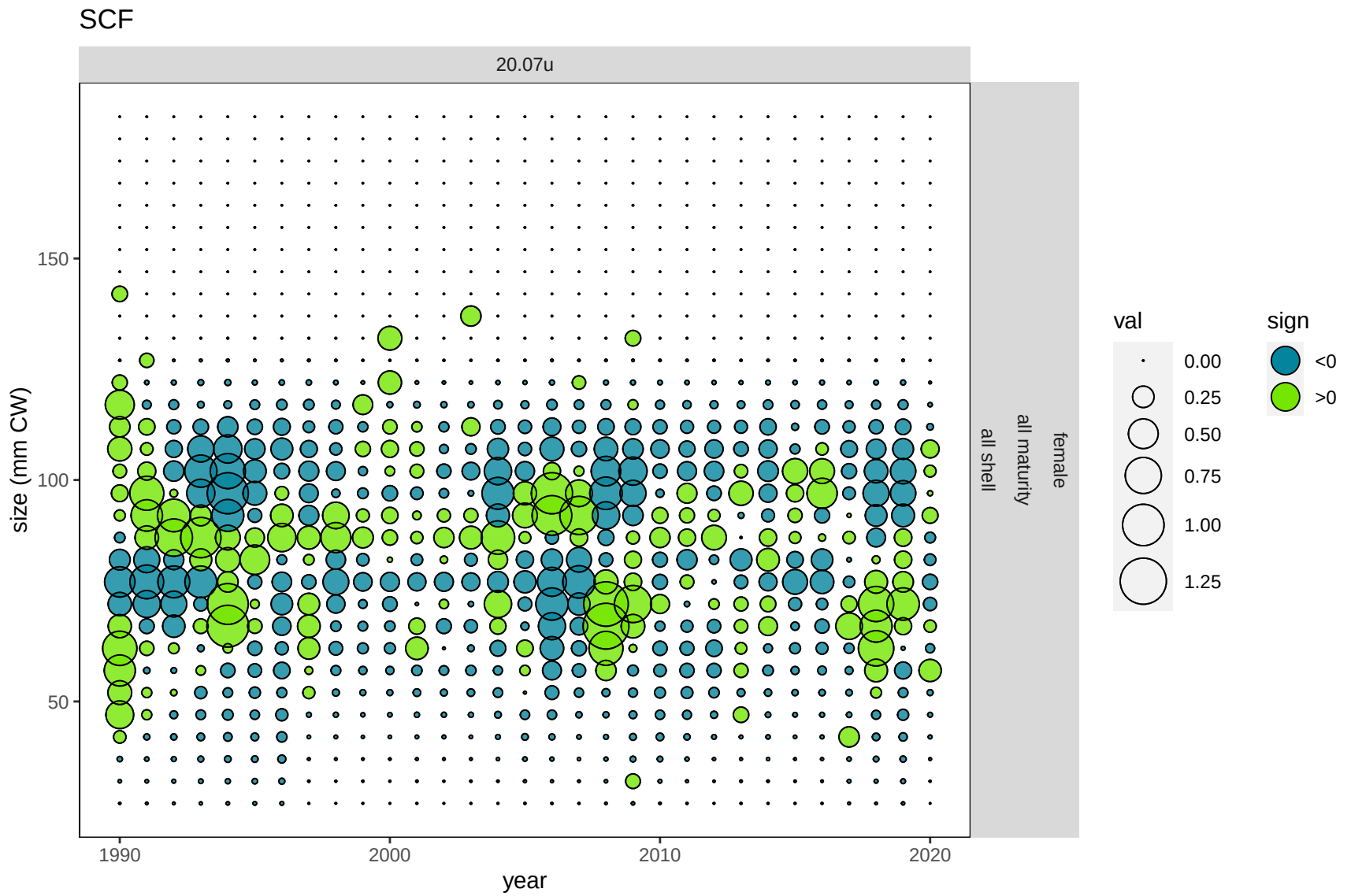

Figure 15: Pearson's residuals for female proportions-at-size from the SCF for scenario 20.07u.

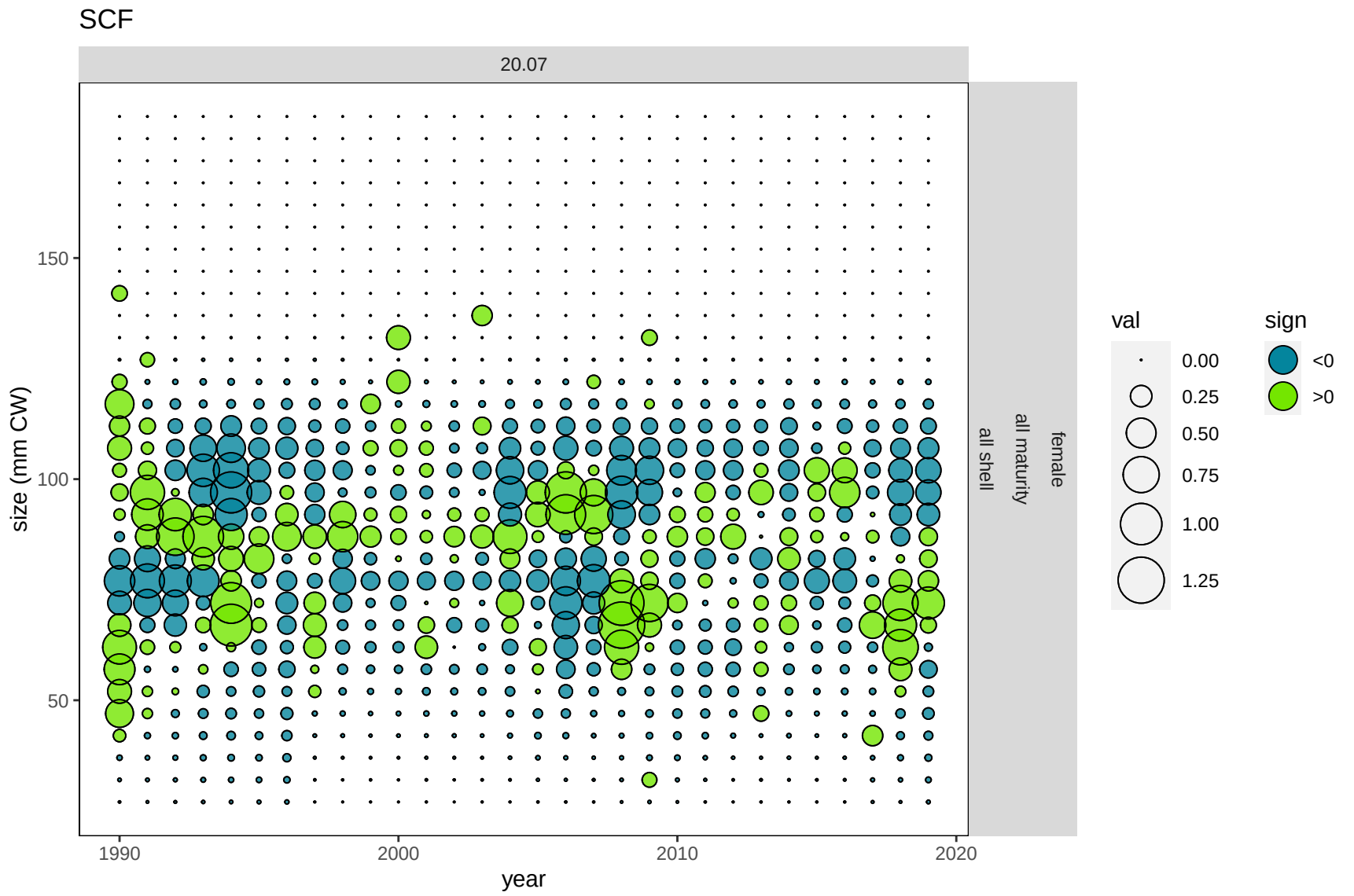

Figure 16: Pearson's residuals for female proportions-at-size from the SCF for scenario 20.07.

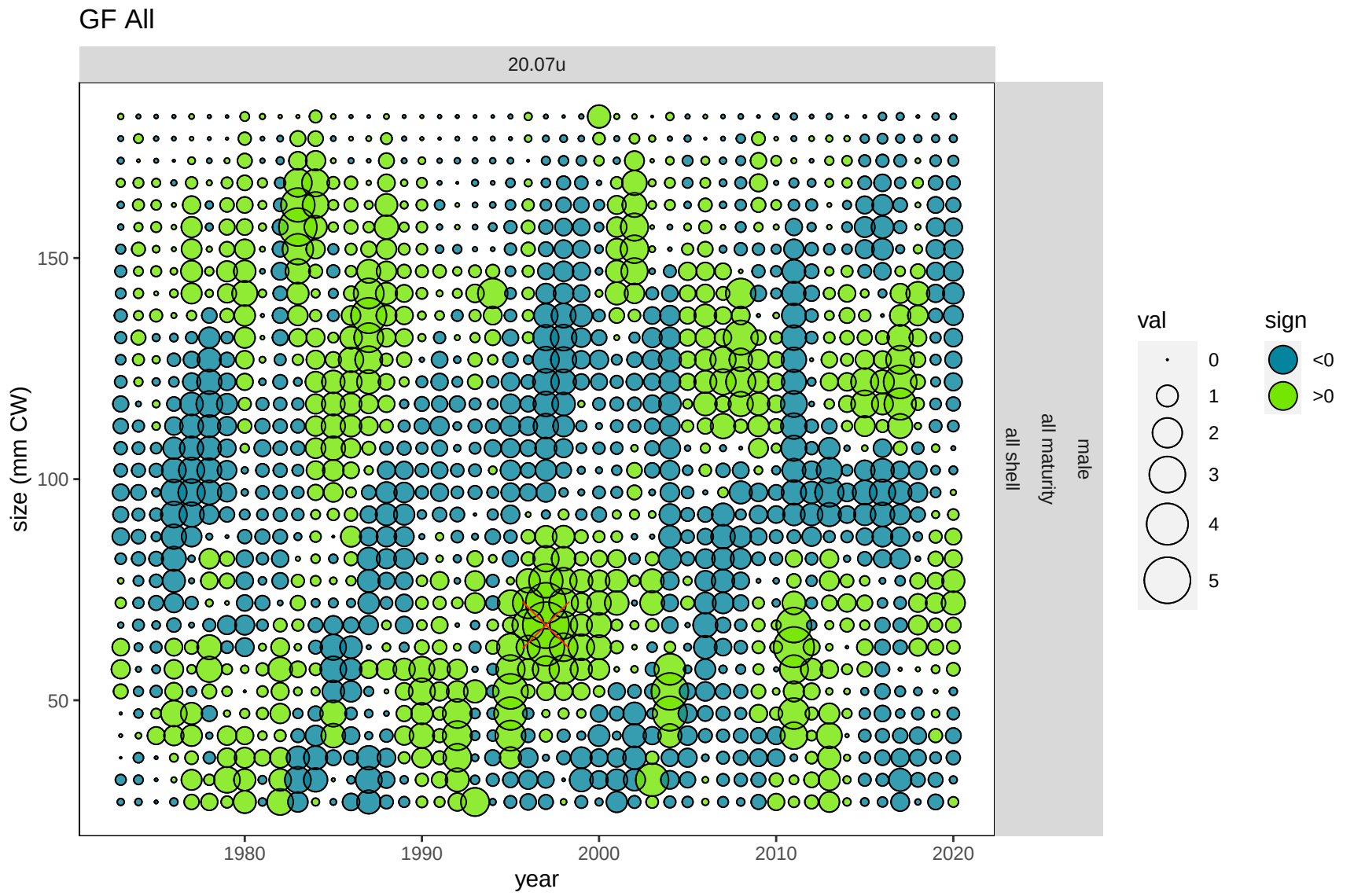

Figure 17: Pearson's residuals for male proportions-at-size from the GF All for scenario 20.07u.

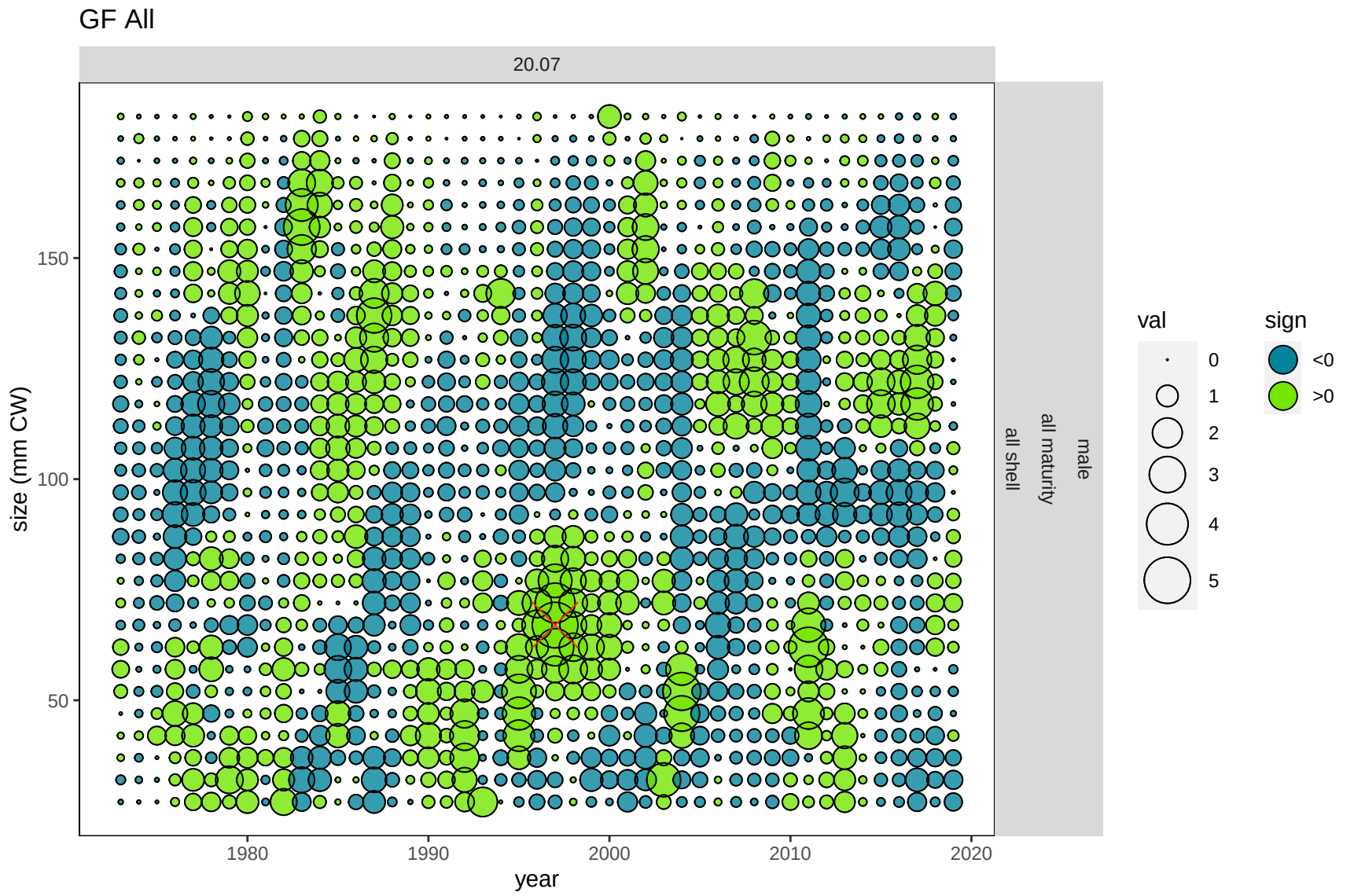

Figure 18: Pearson's residuals for male proportions-at-size from the GF All for scenario 20.07.

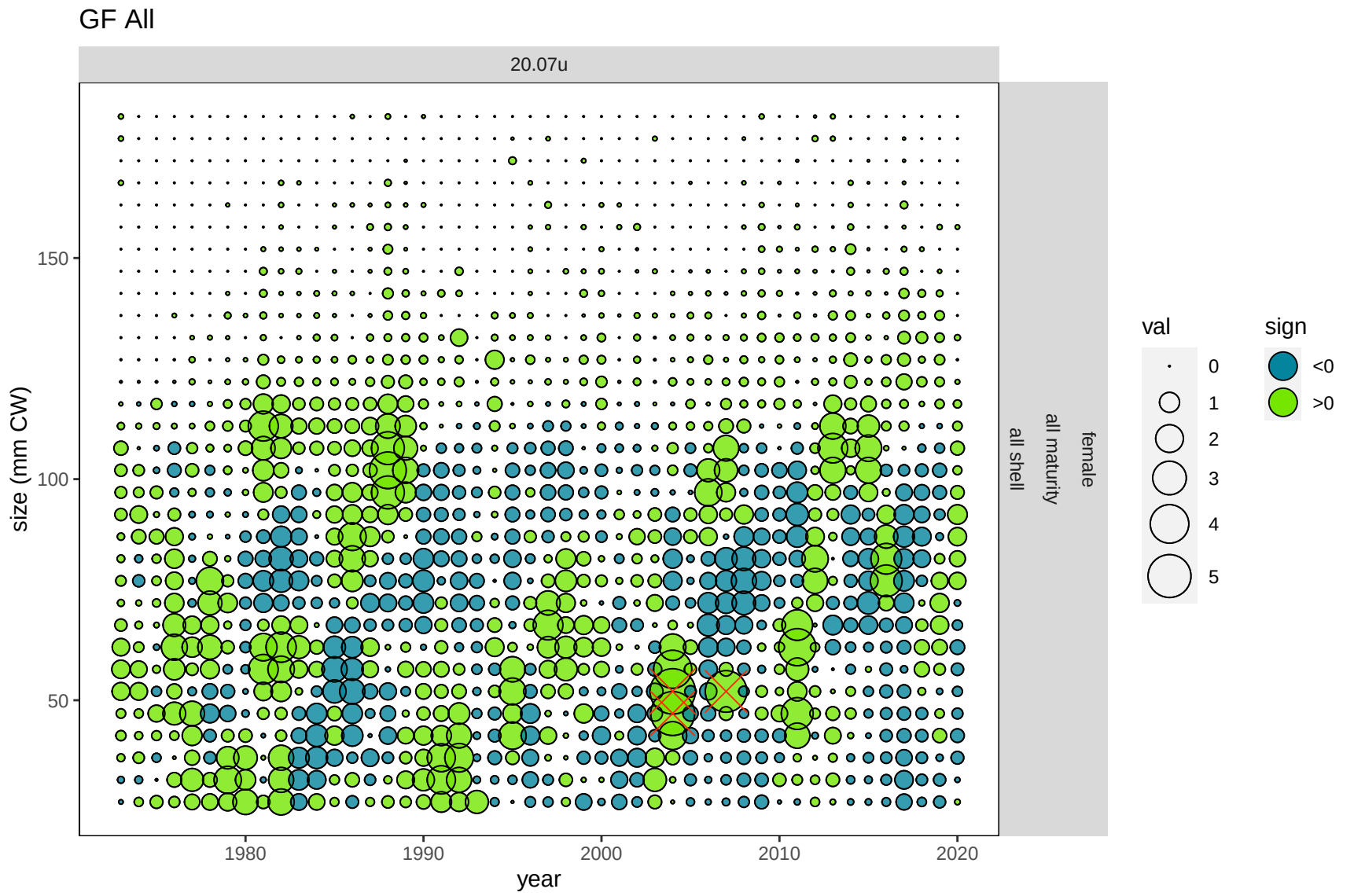

Figure 19: Pearson's residuals for female proportions-at-size from the GF All for scenario 20.07u.

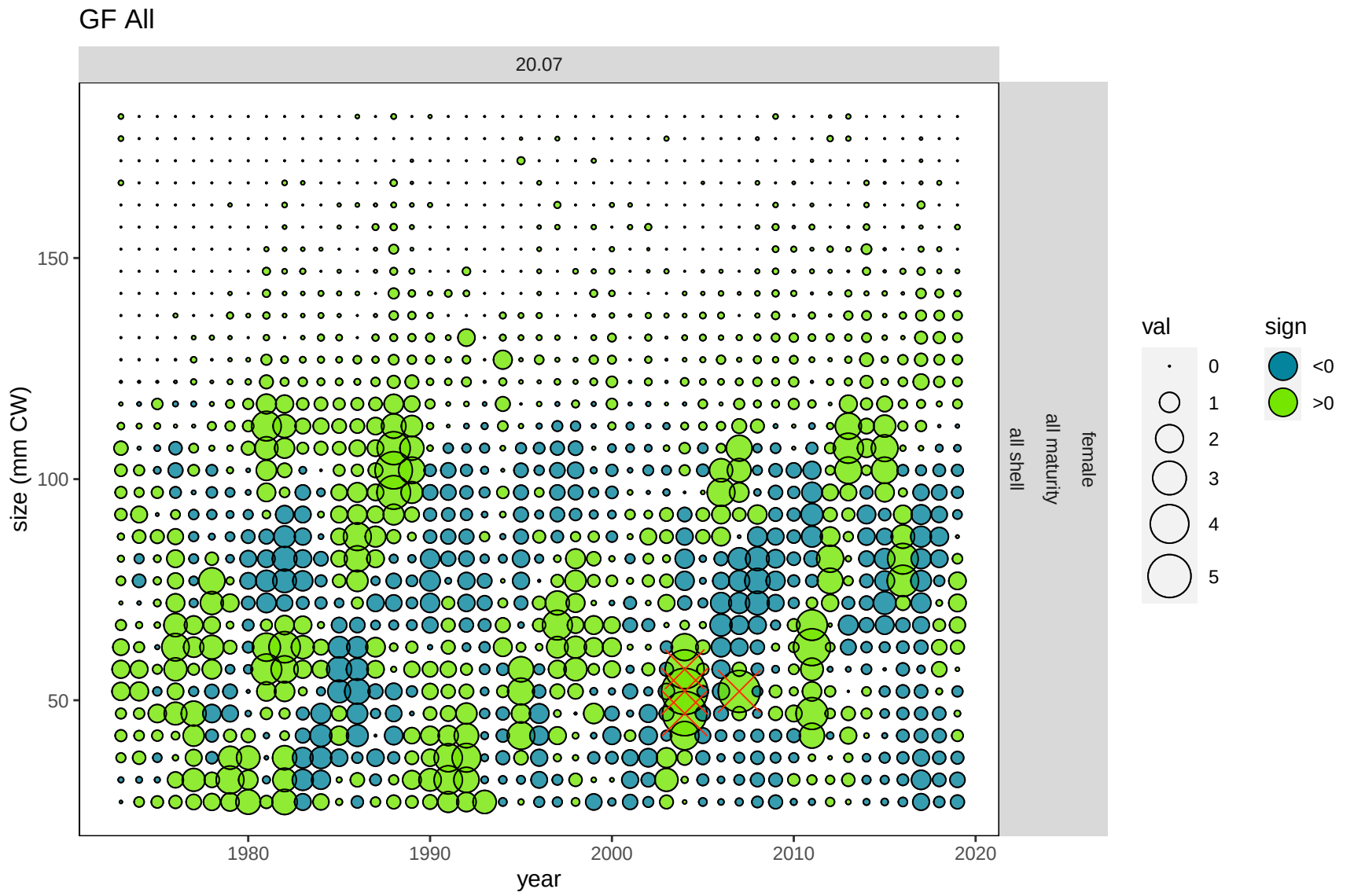

Figure 20: Pearson's residuals for female proportions-at-size from the GF All for scenario 20.07.

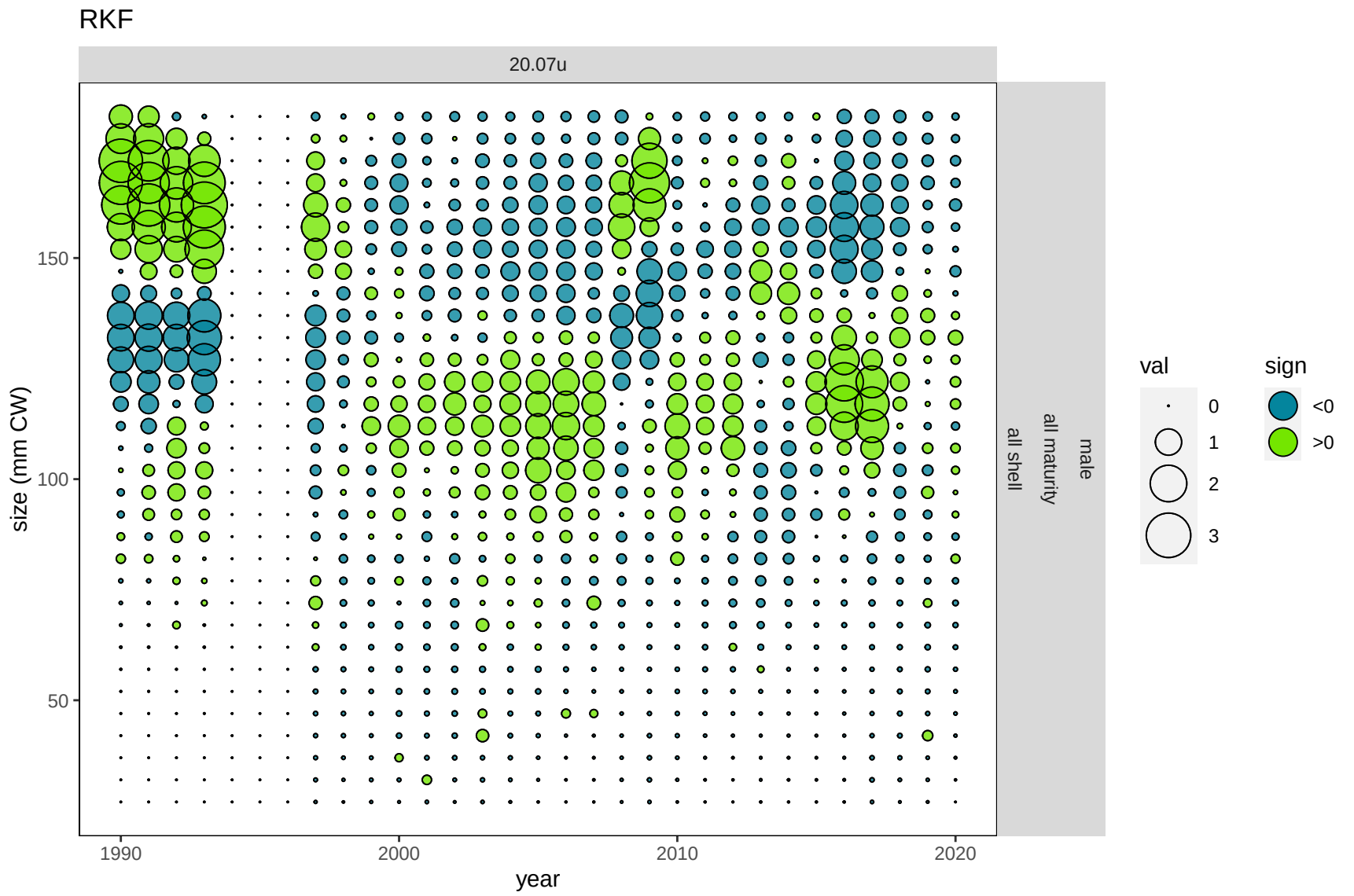

Figure 21: Pearson's residuals for male proportions-at-size from the RKF for scenario 20.07u.

Figure 22: Pearson's residuals for male proportions-at-size from the RKF for scenario 20.07.

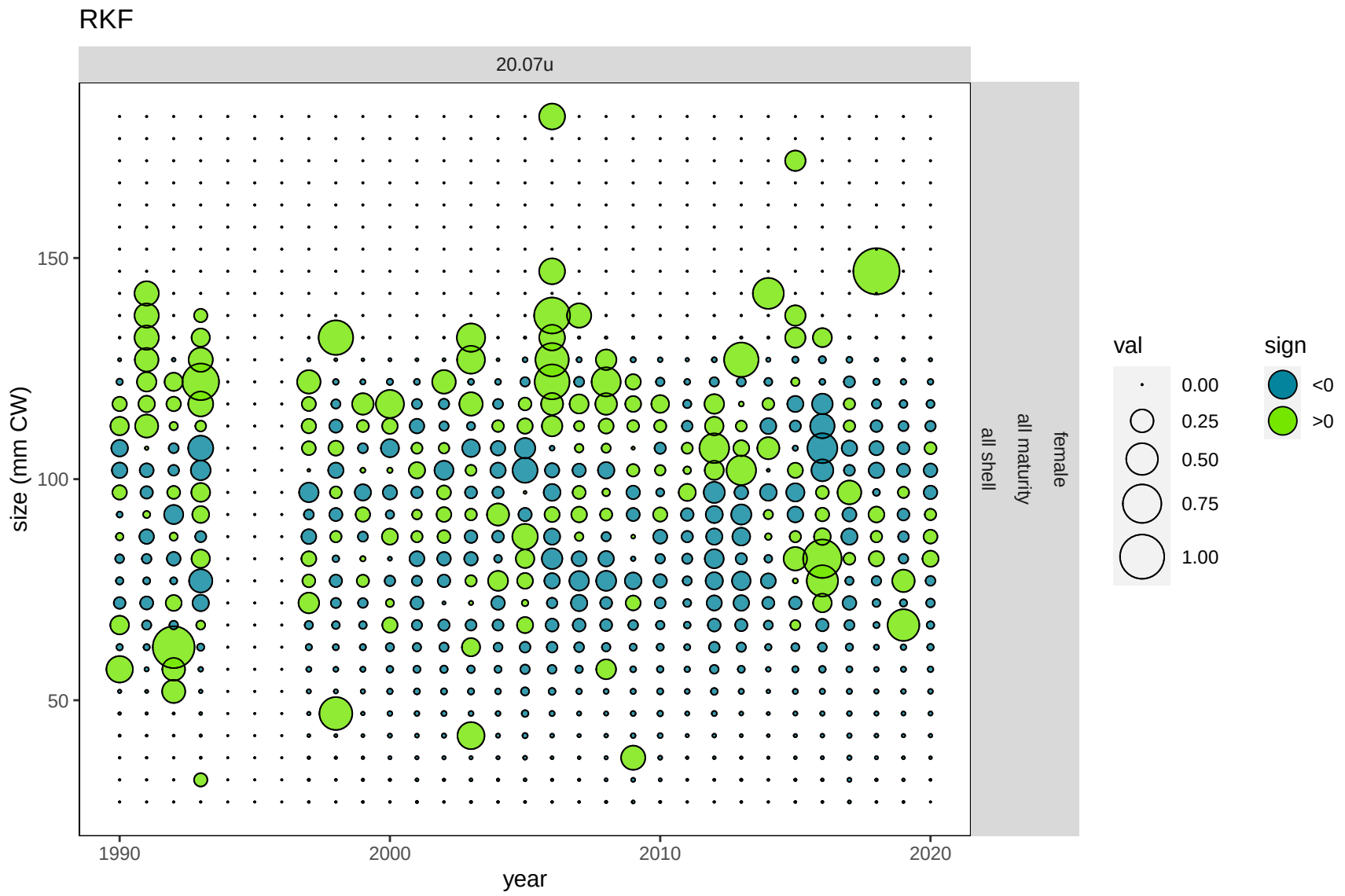

Figure 23: Pearson's residuals for female proportions-at-size from the RKF for scenario 20.07u.

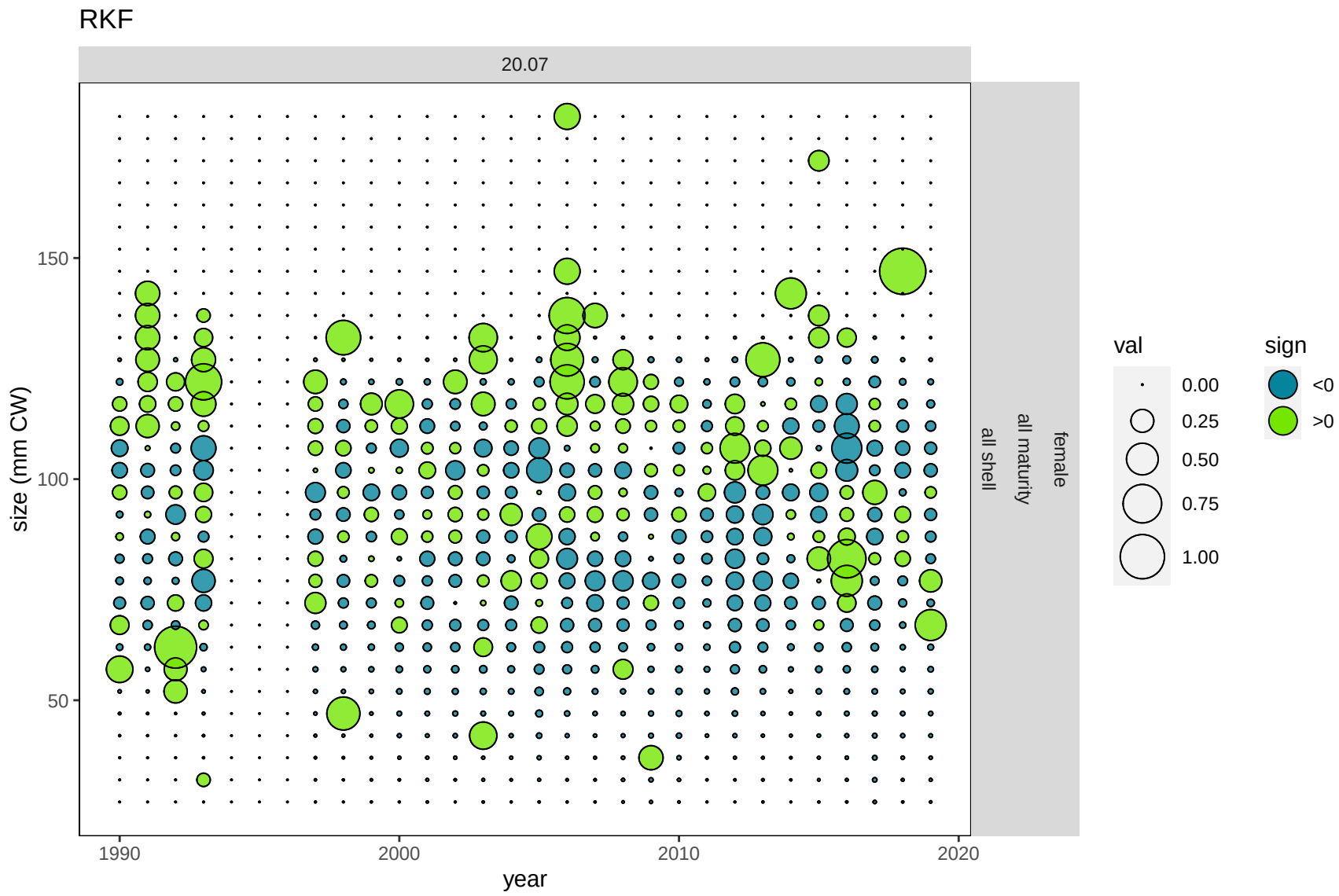

Figure 24: Pearson's residuals for female proportions-at-size from the RKF for scenario 20.07.

Effective Ns for total catch size compositions

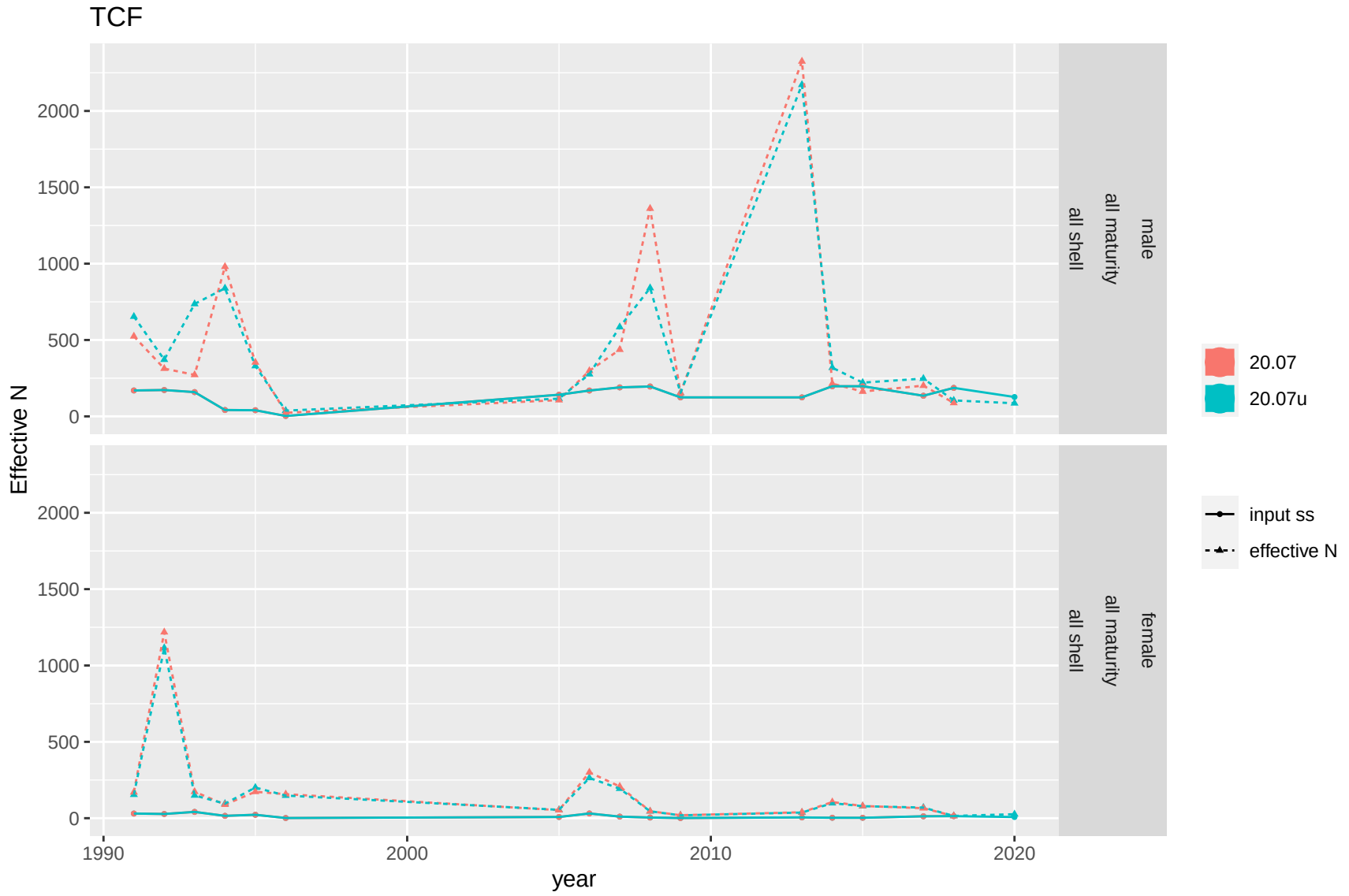

Figure 25: Input and effective sample sizes from total catch size compositions from the TCF fishery.

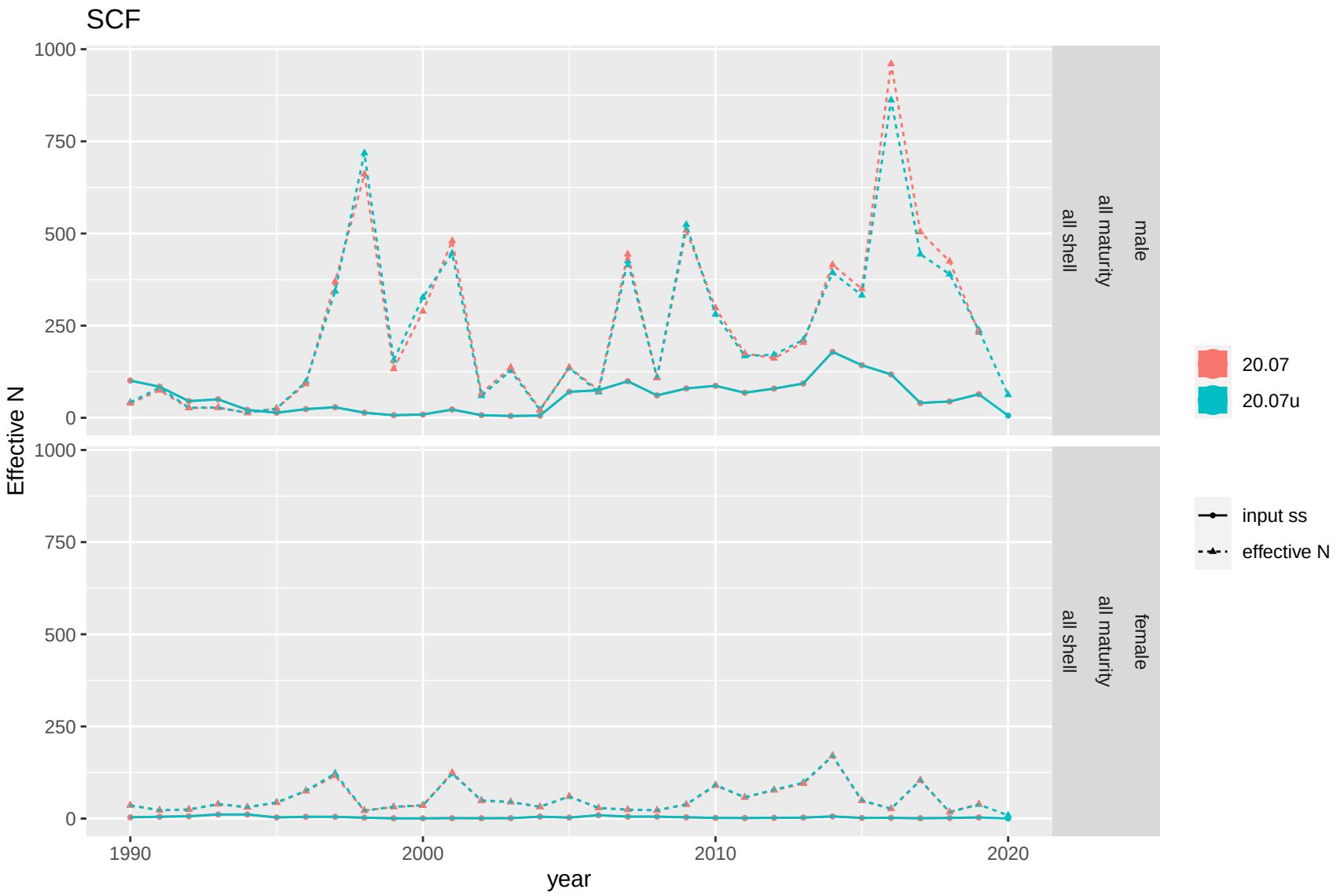

Figure 26: Input and effective sample sizes from total catch size compositions from the SCF fishery.

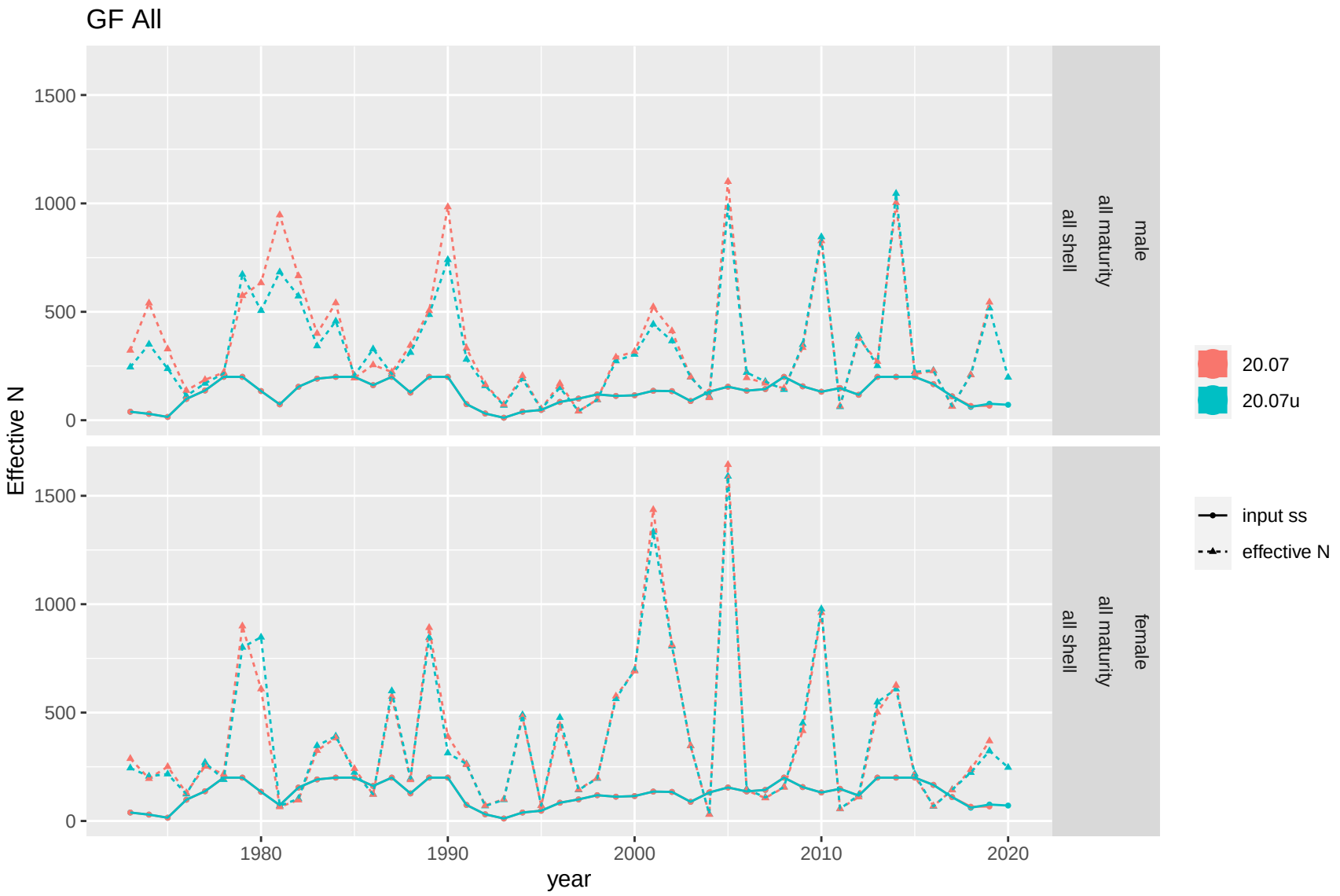

Figure 27: Input and effective sample sizes from total catch size compositions from the GF All fishery.

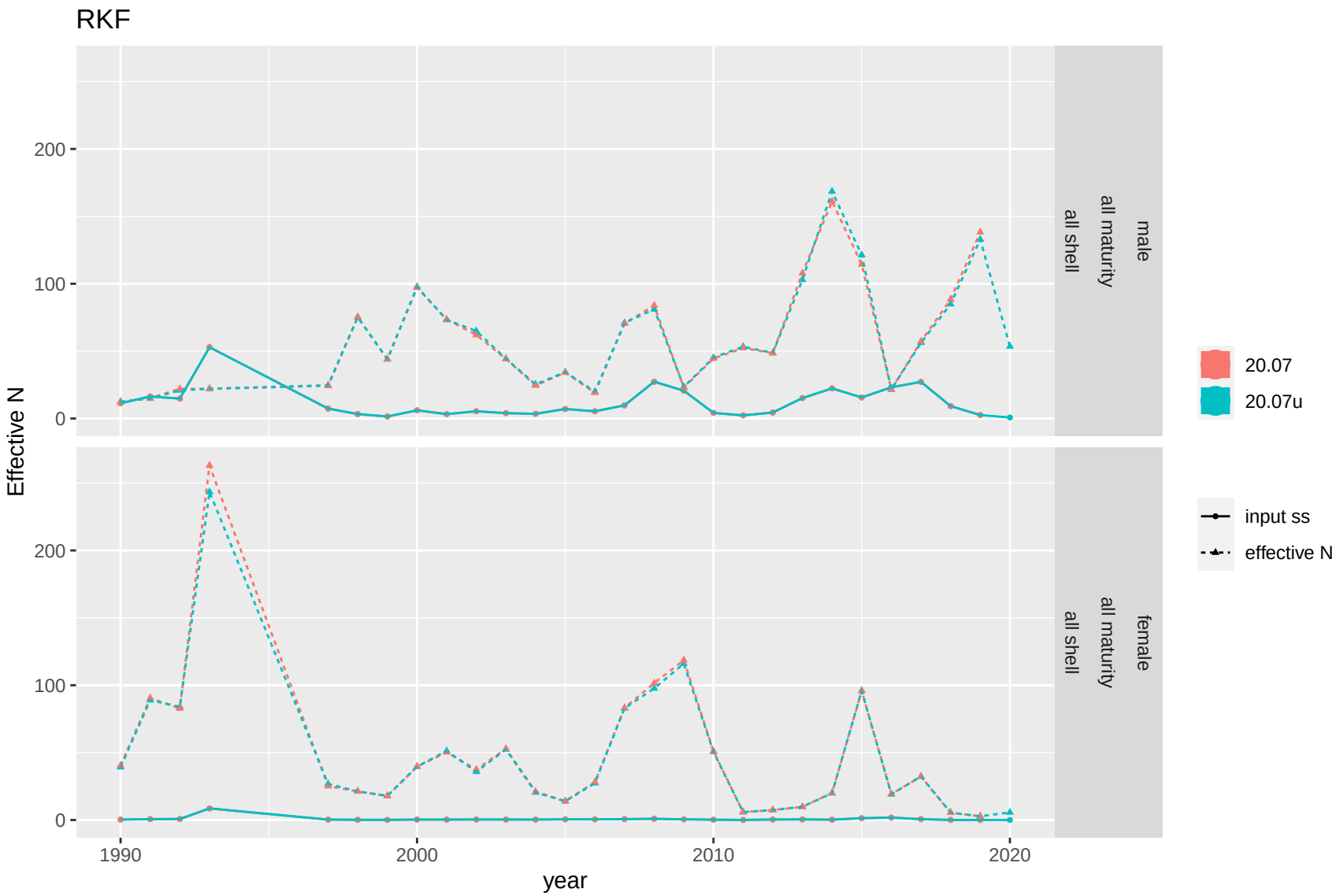

Figure 28: Input and effective sample sizes from total catch size compositions from the RKF fishery.

Appendix E Model Comparisons: Fits to Fisheries Size Composition Data –21.22 vs 21.24 vs 21.22a

William Stockhausen

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Introduction

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Retained catch mean size compositions

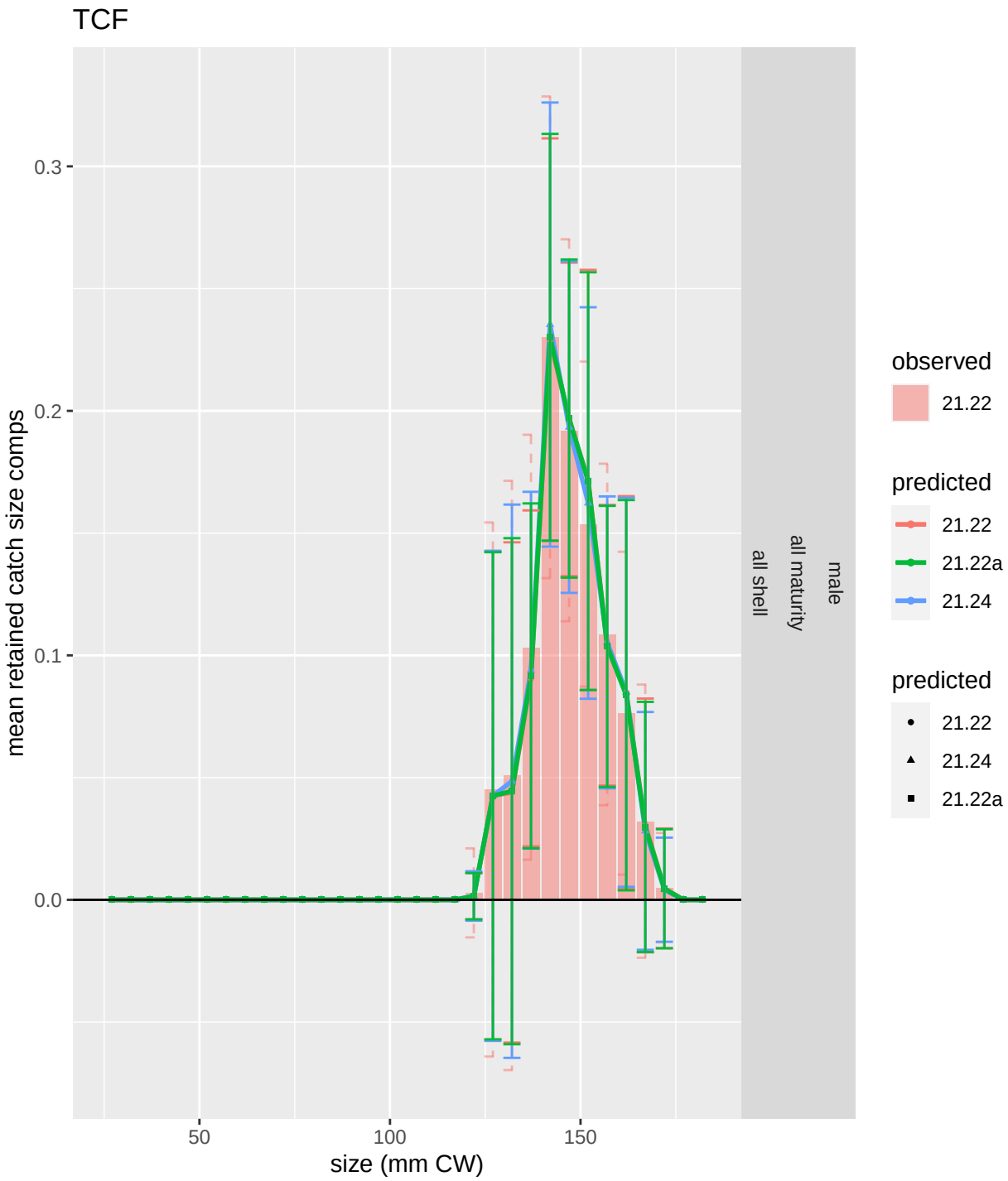

Figure 1: Comparison of observed and predicted mean retained catch size comps for TCF.

Total catch mean size compositions

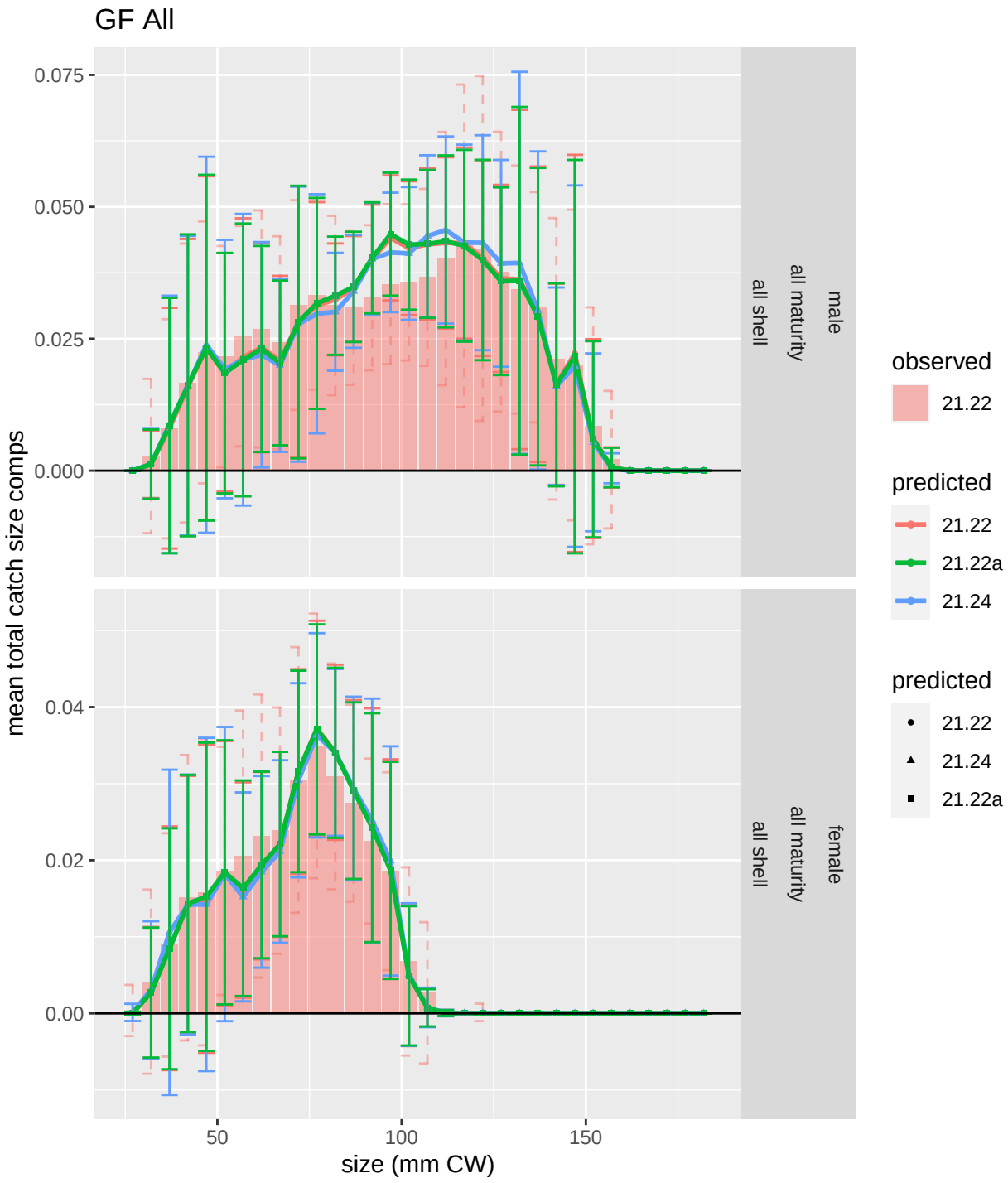

Figure 2: Comparison of observed and predicted mean total catch size comps for GF All.

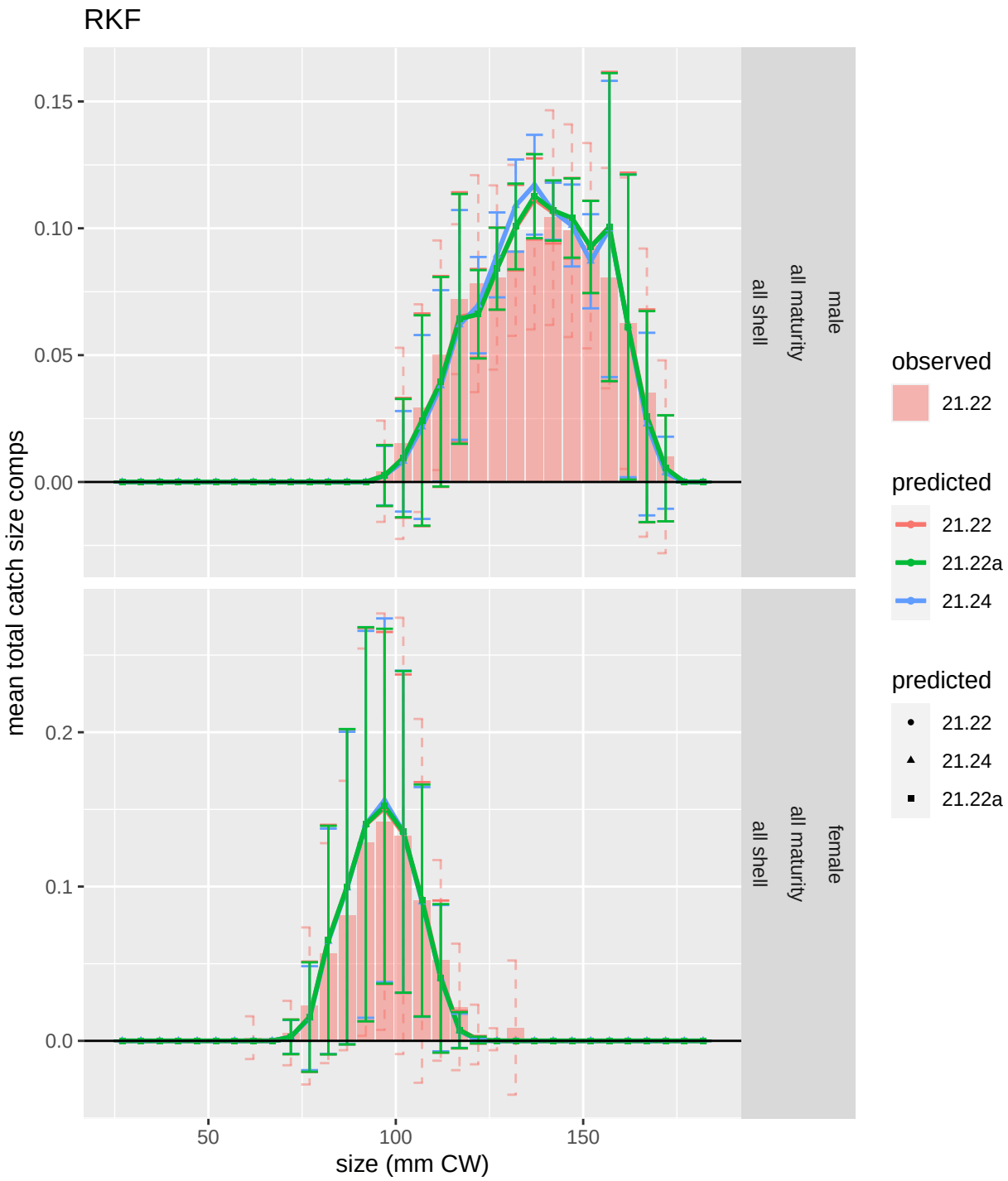

Figure 3: Comparison of observed and predicted mean total catch size comps for RKF.

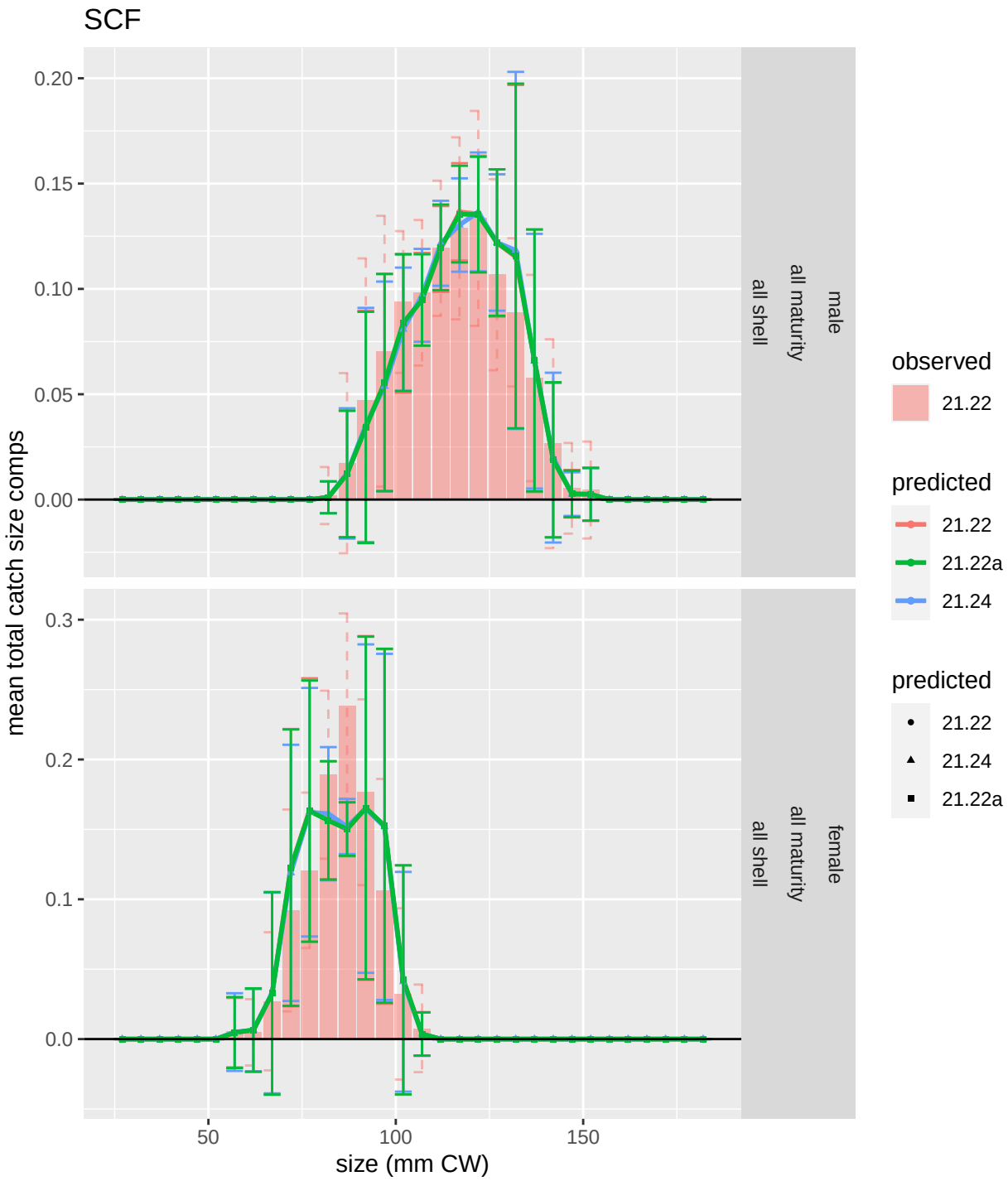

Figure 4: Comparison of observed and predicted mean total catch size comps for SCF.

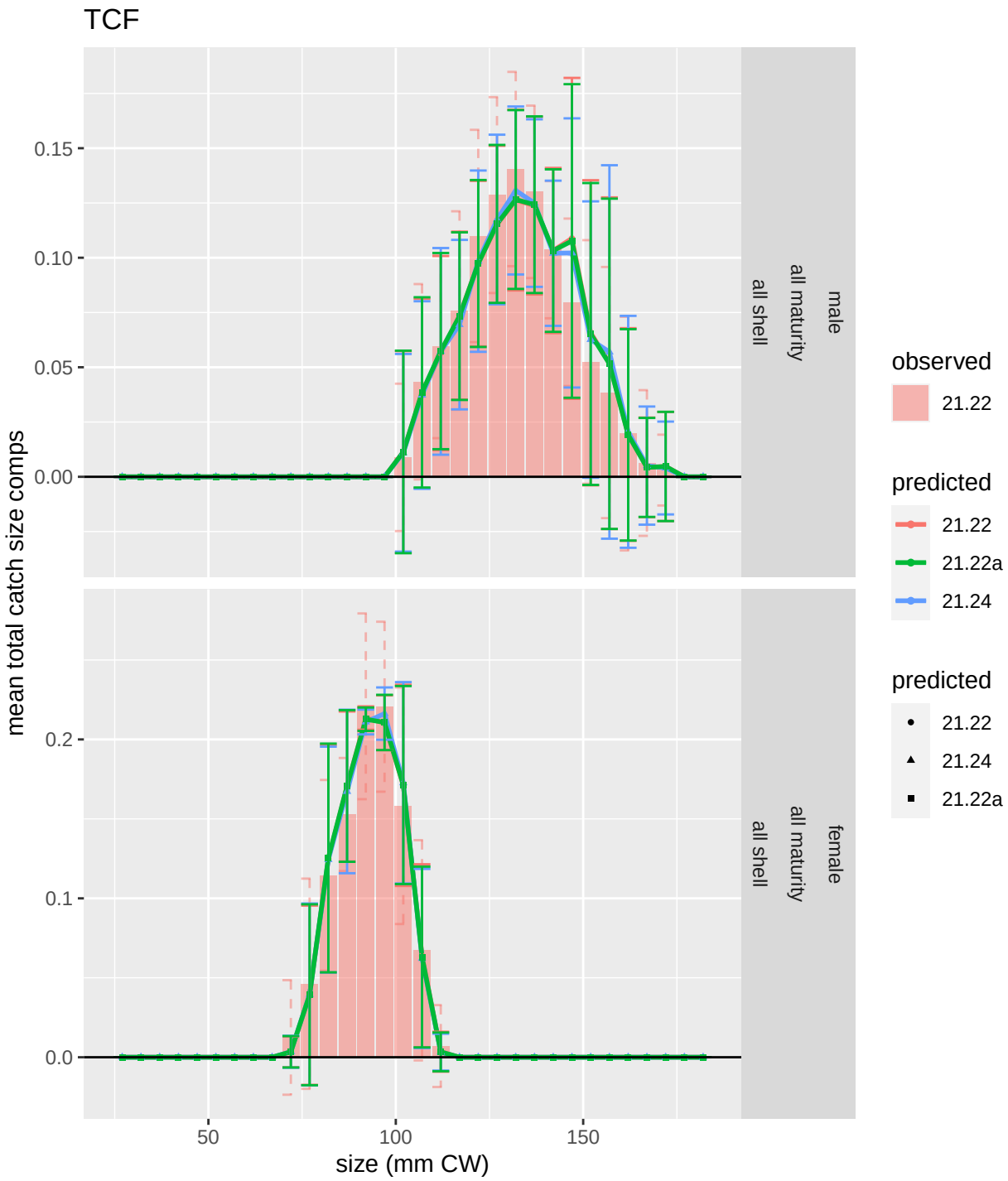

Figure 5: Comparison of observed and predicted mean total catch size comps for TCF.

Fishery retained catch size composition residuals

Pearson's residuals are plotted for fits to size composition data. Symbol areas reflect the size of each residual, Extreme values (residuals larger than 4 in scale) are indicated with a red "X" to facilitate identification.

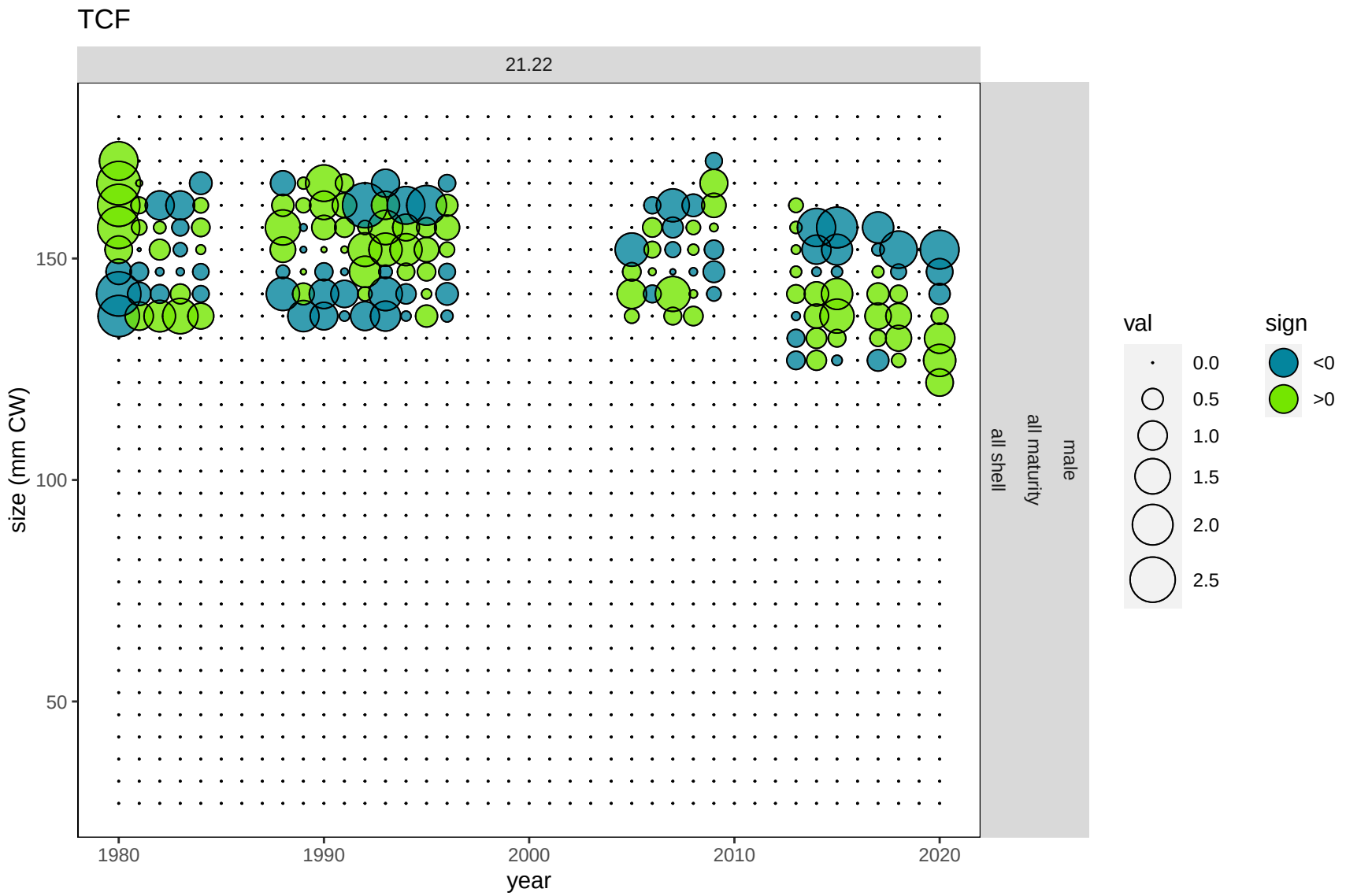

Figure 6: Pearson's residuals for male proportions-at-size from the TCF for scenario 21.22.

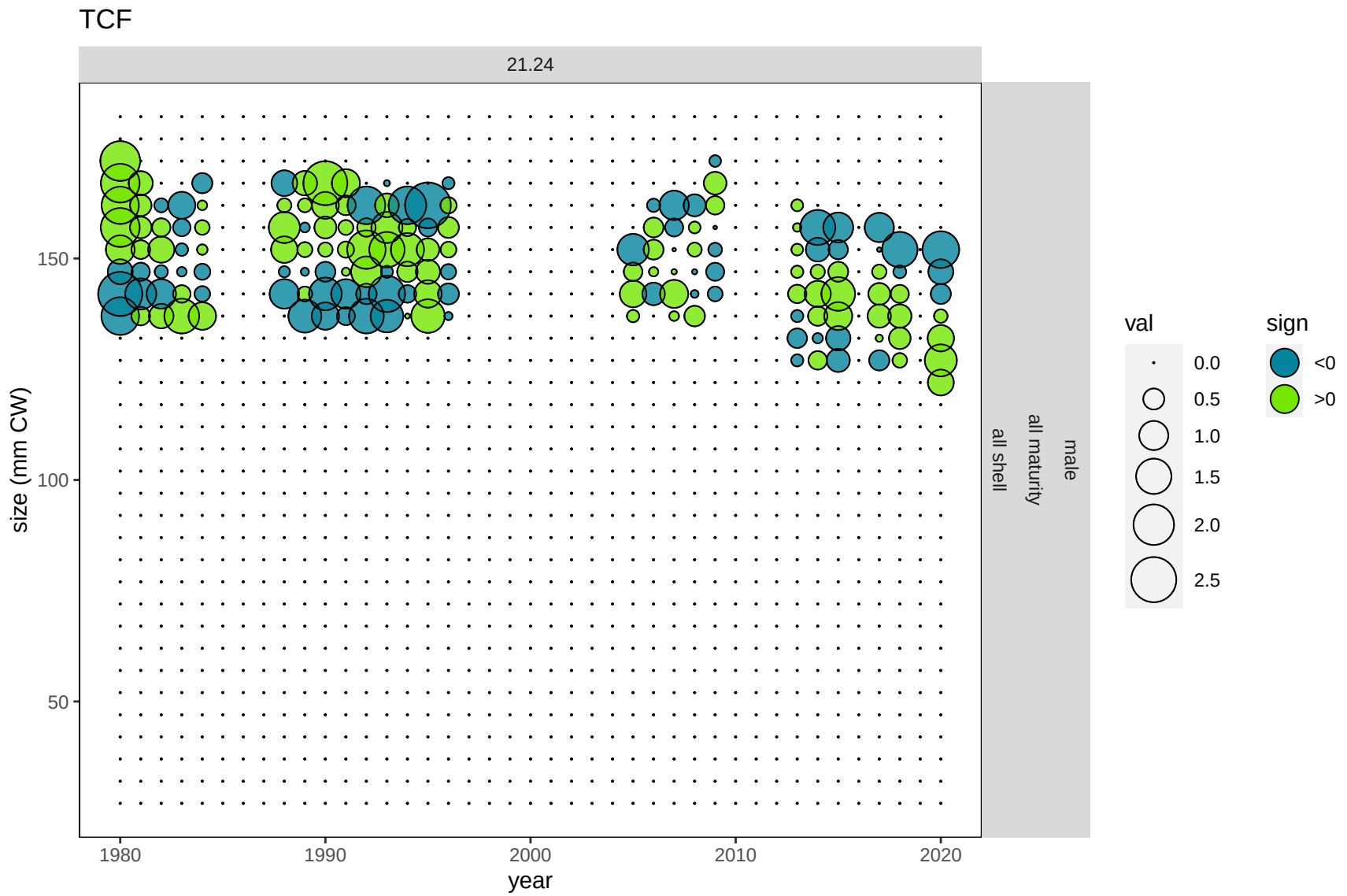

Figure 7: Pearson's residuals for male proportions-at-size from the TCF for scenario 21.24.

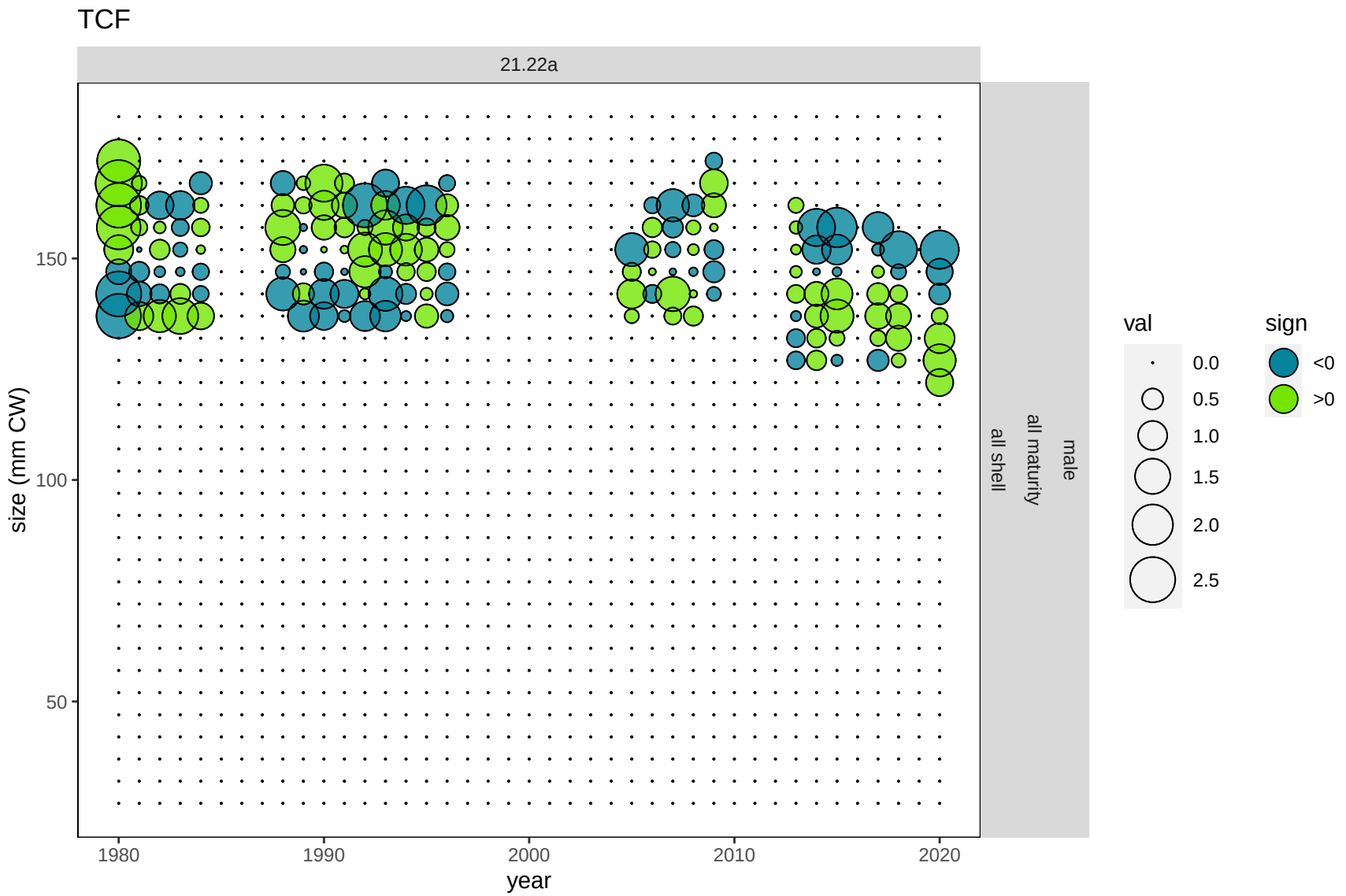

Figure 8: Pearson's residuals for male proportions-at-size from the TCF for scenario 21.22a.

Effective Ns for retained catch size compositions

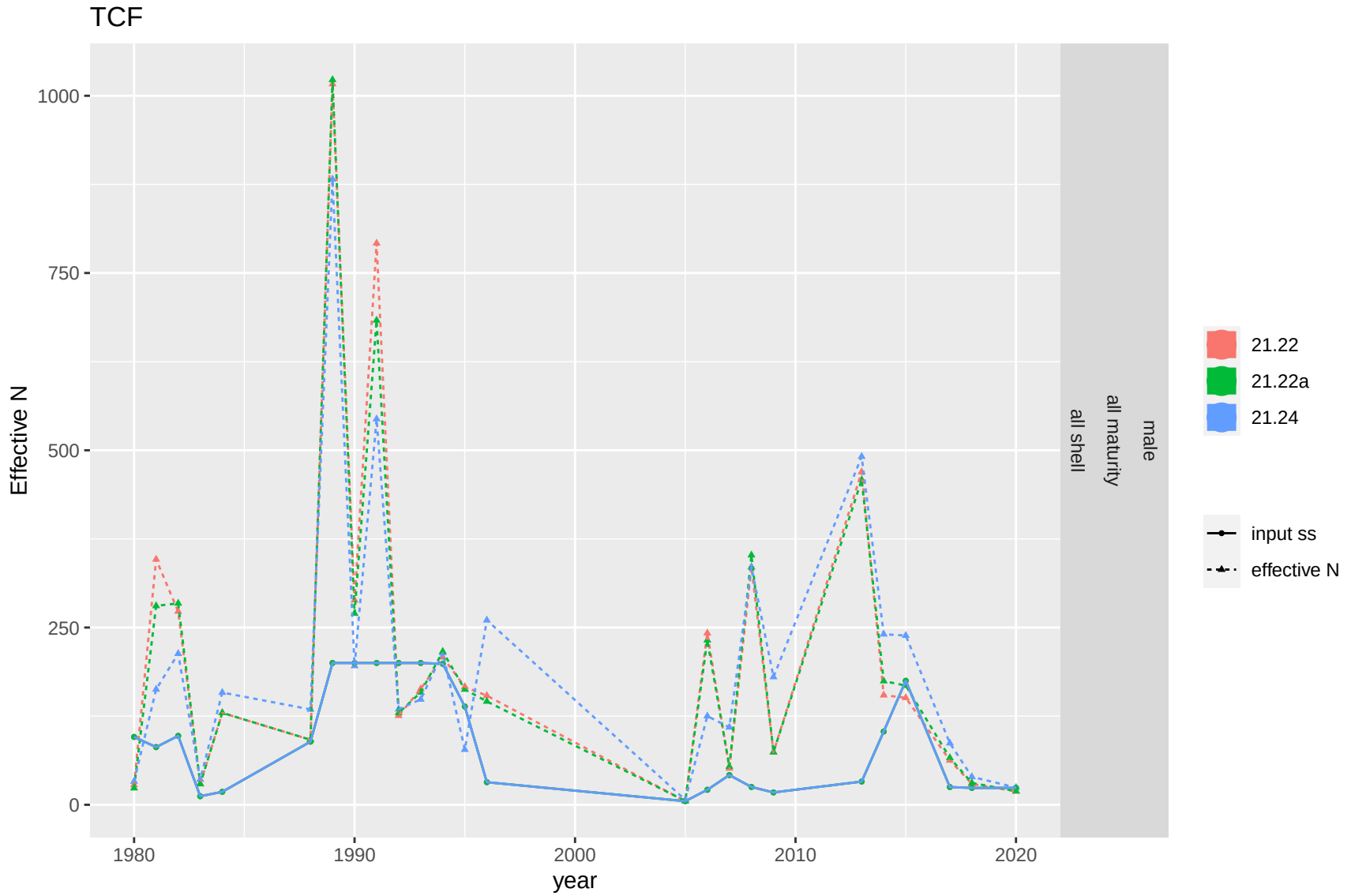

Figure 9: Input and effective sample sizes from retained catch size compositions from the TCF fishery.

Total catch size composition residuals

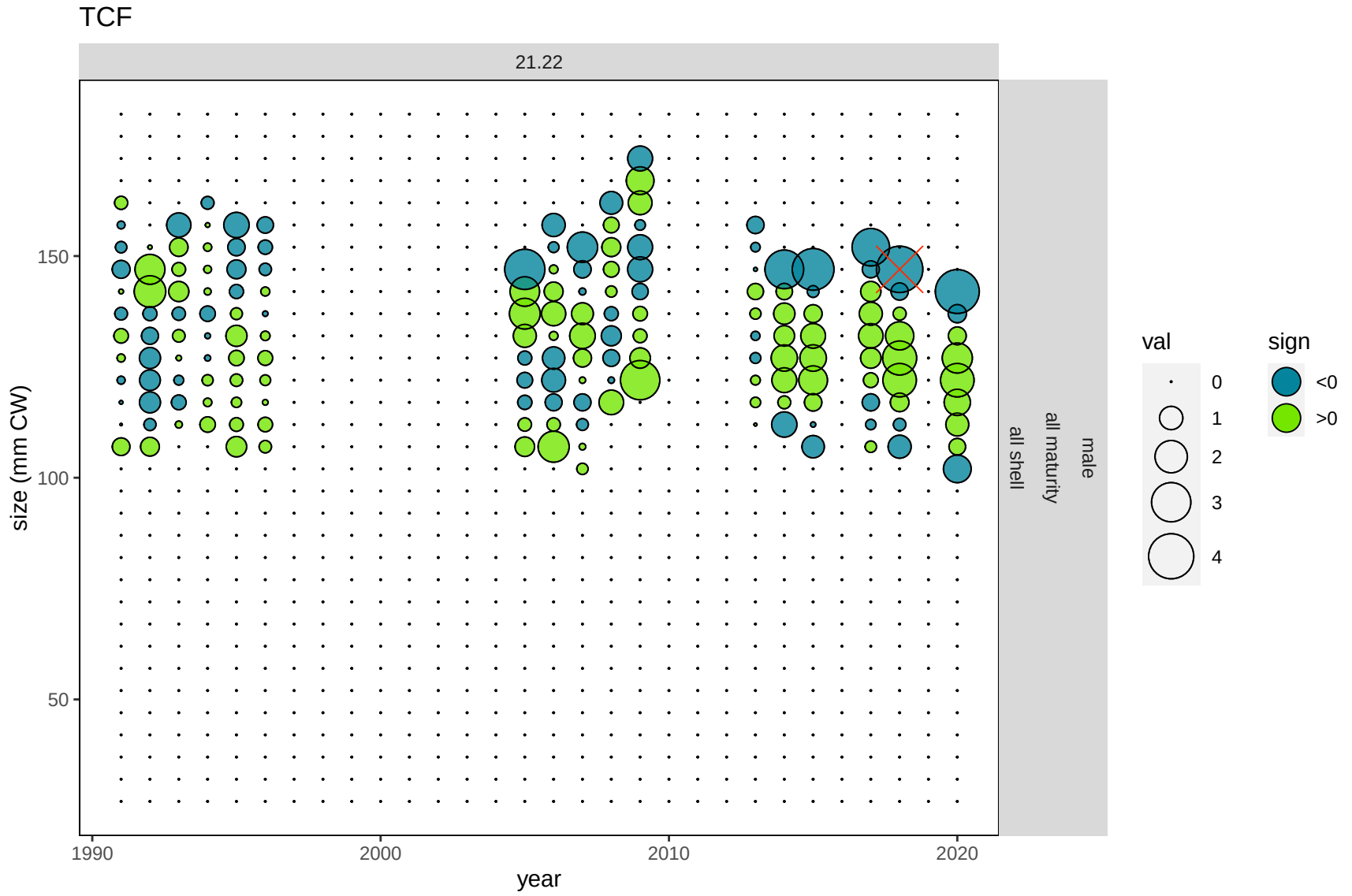

Figure 10: Pearson's residuals for male proportions-at-size from the TCF for scenario 21.22.

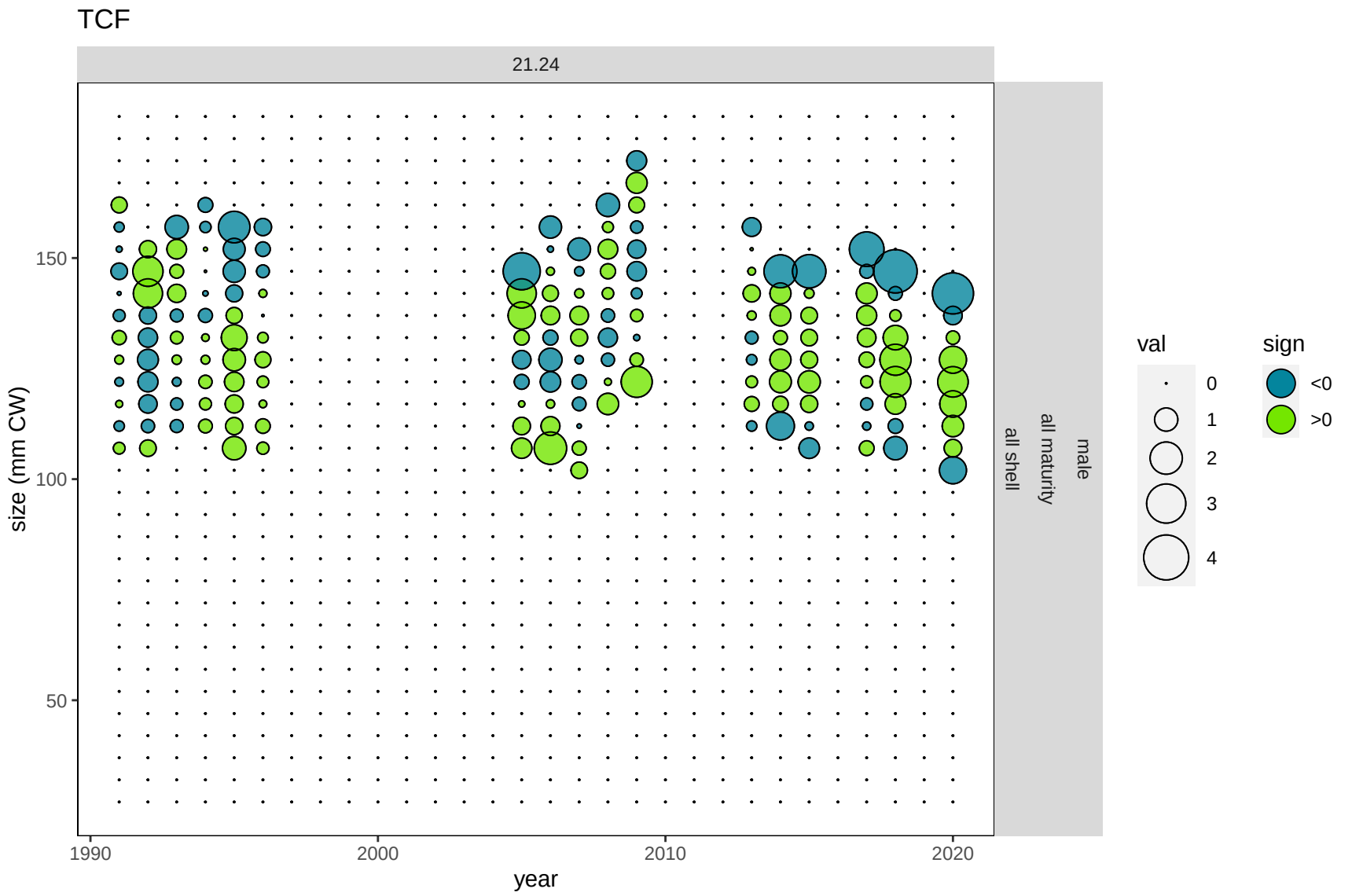

Figure 11: Pearson's residuals for male proportions-at-size from the TCF for scenario 21.24.

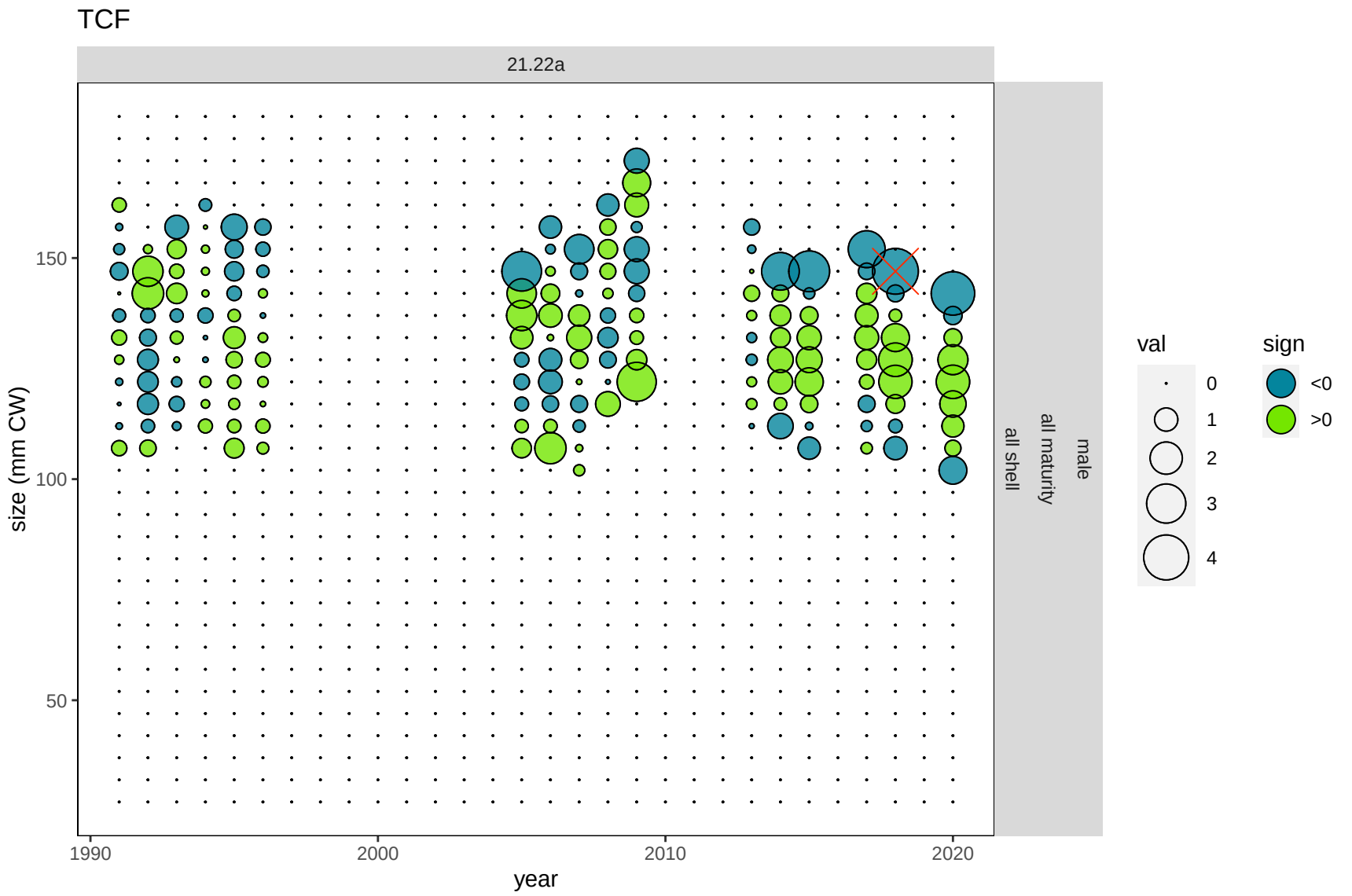

Figure 12: Pearson's residuals for male proportions-at-size from the TCF for scenario 21.22a.

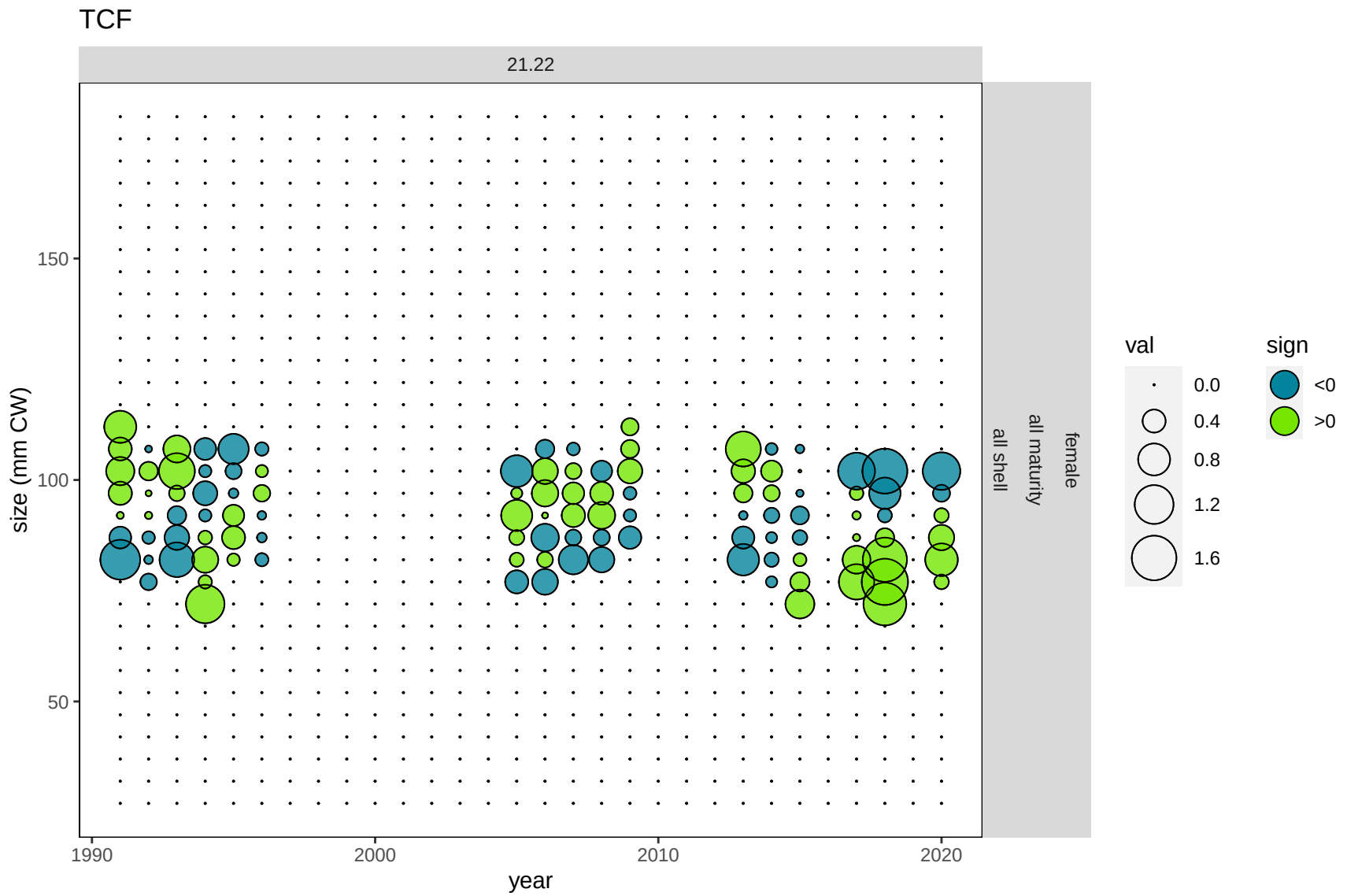

Figure 13: Pearson's residuals for female proportions-at-size from the TCF for scenario 21.22.

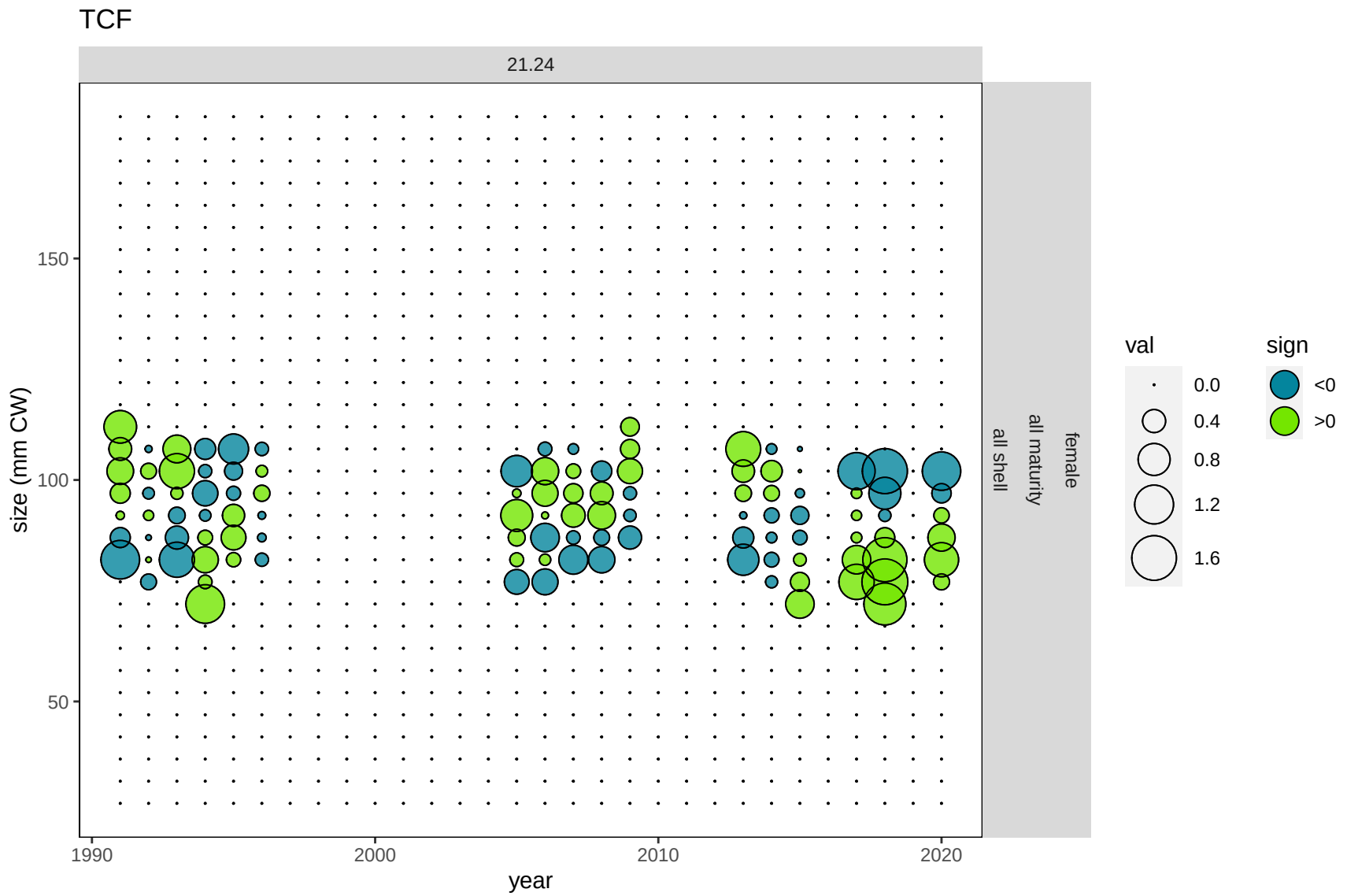

Figure 14: Pearson's residuals for female proportions-at-size from the TCF for scenario 21.24.

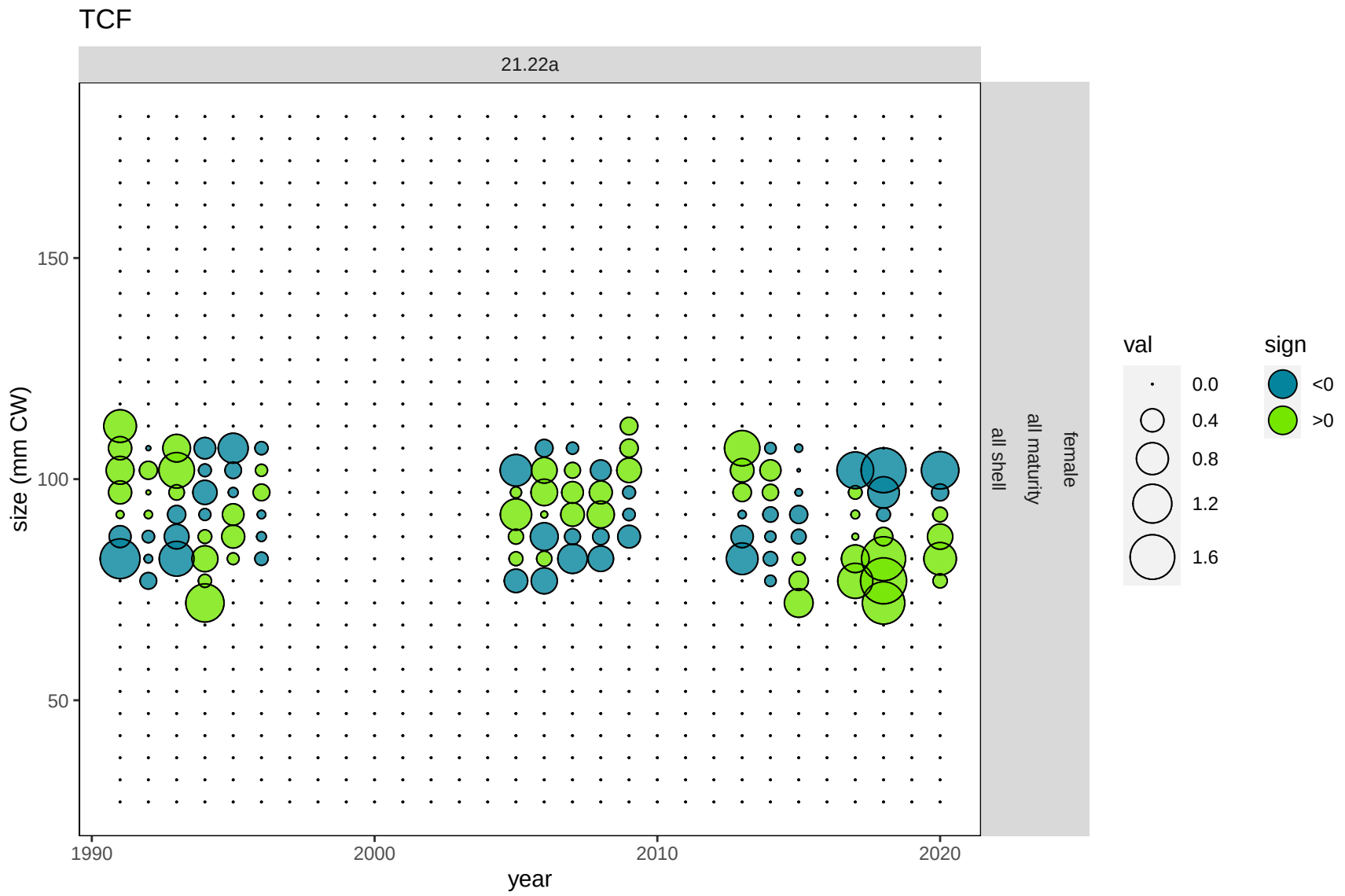

Figure 15: Pearson's residuals for female proportions-at-size from the TCF for scenario 21.22a.

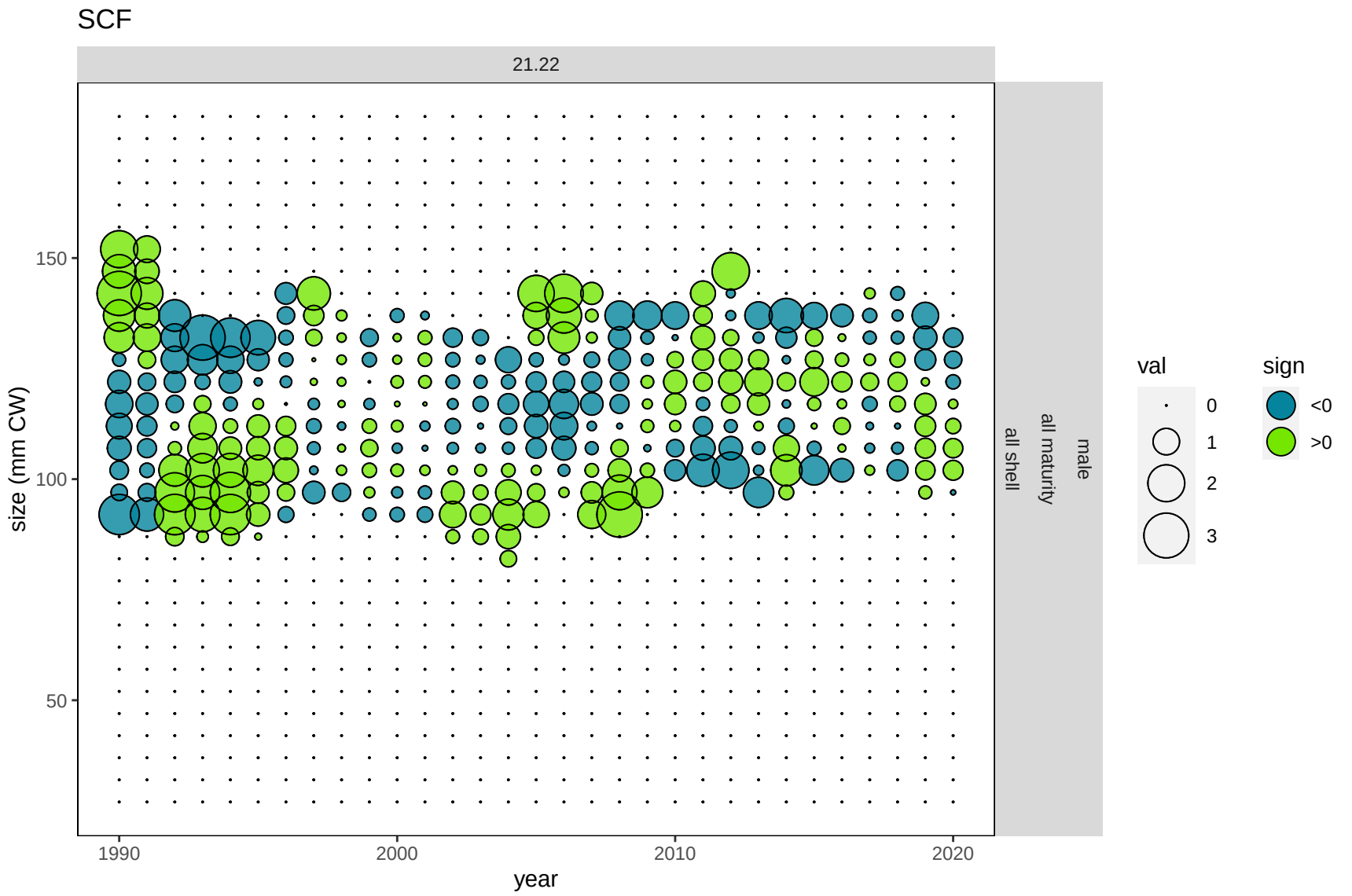

Figure 16: Pearson's residuals for male proportions-at-size from the SCF for scenario 21.22.

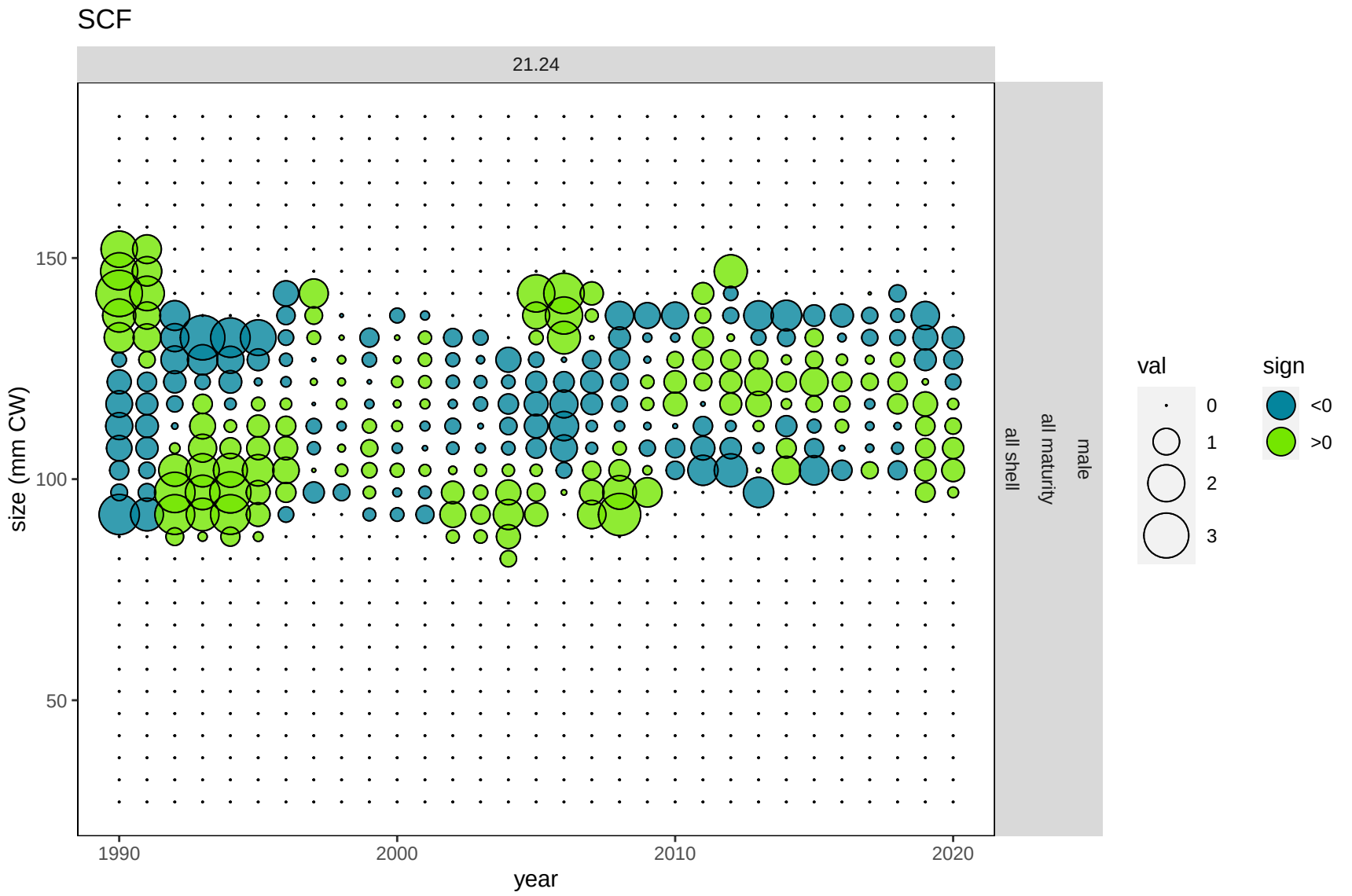

Figure 17: Pearson's residuals for male proportions-at-size from the SCF for scenario 21.24.

Figure 18: Pearson's residuals for male proportions-at-size from the SCF for scenario 21.22a.

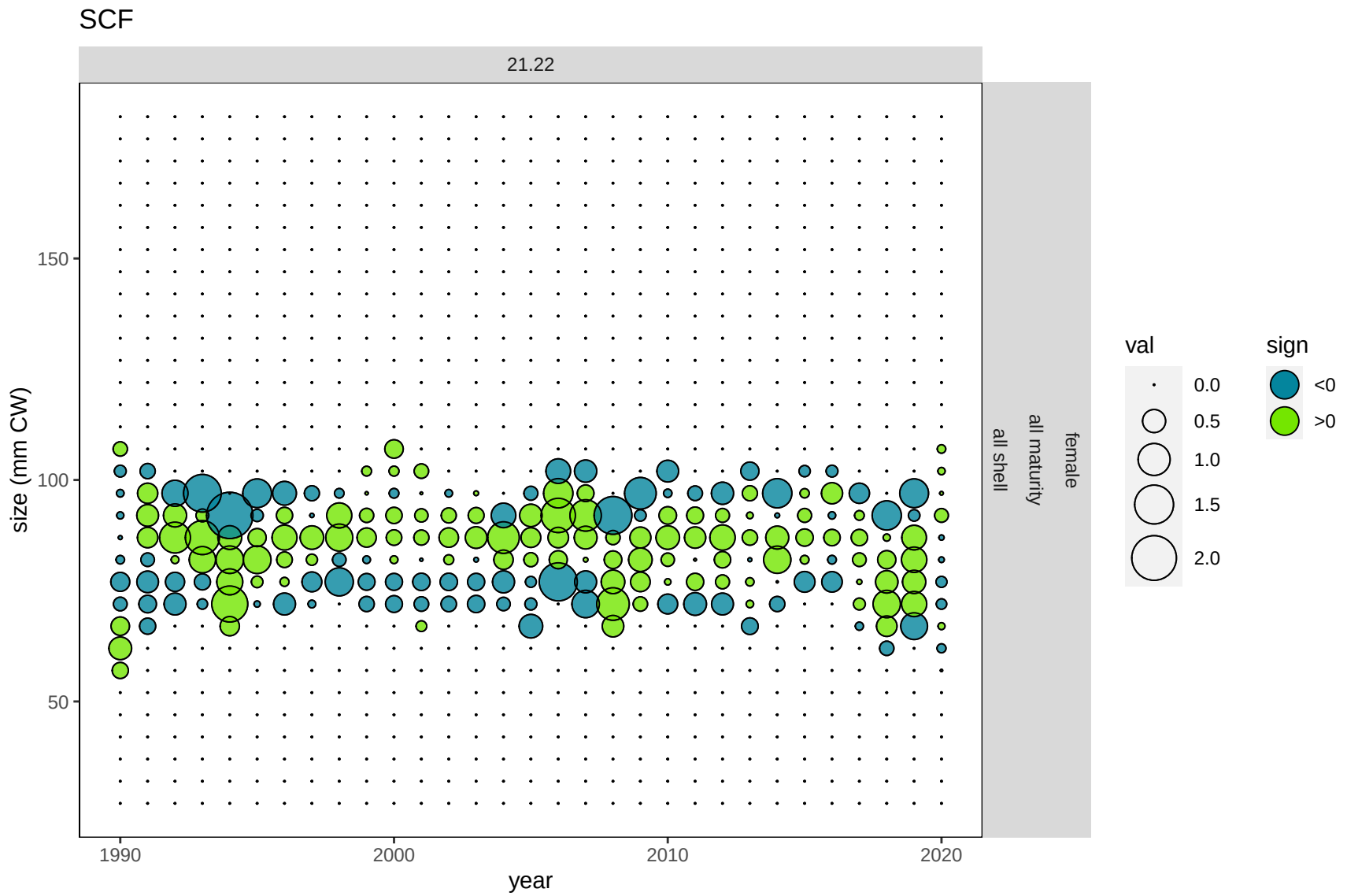

Figure 19: Pearson's residuals for female proportions-at-size from the SCF for scenario 21.22.

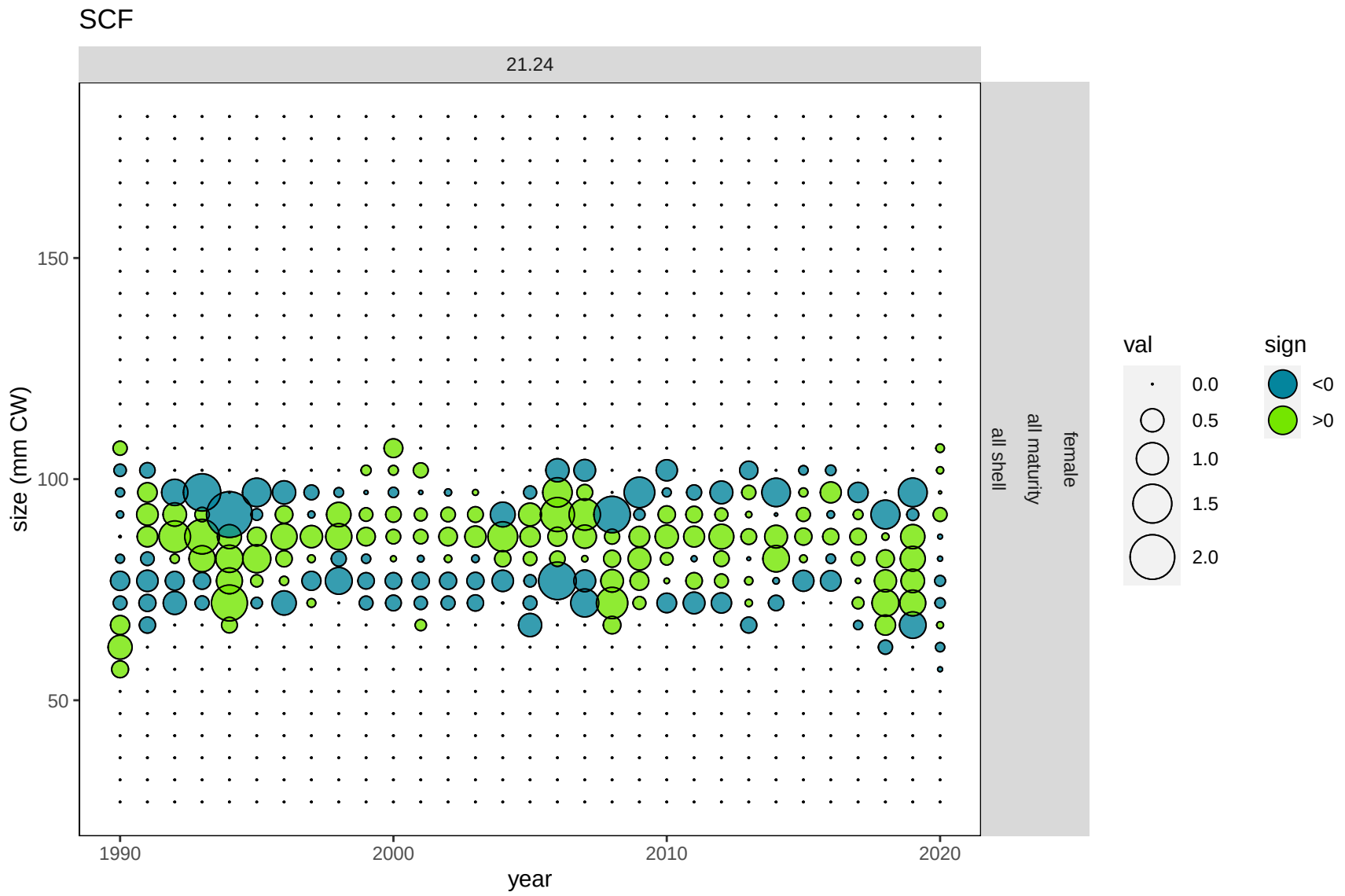

Figure 20: Pearson's residuals for female proportions-at-size from the SCF for scenario 21.24.

Figure 21: Pearson's residuals for female proportions-at-size from the SCF for scenario 21.22a.

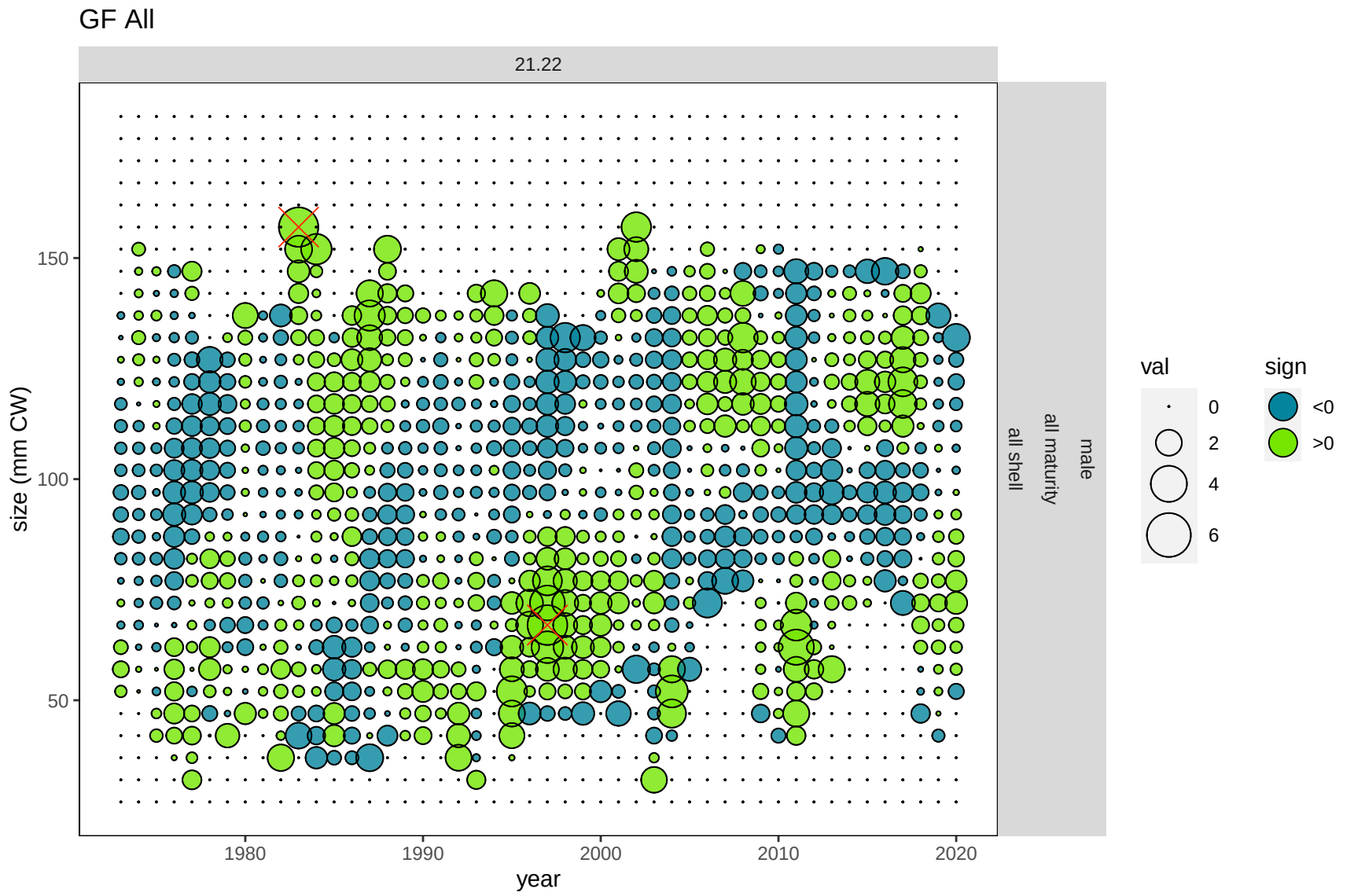

Figure 22: Pearson's residuals for male proportions-at-size from the GF All for scenario 21.22.

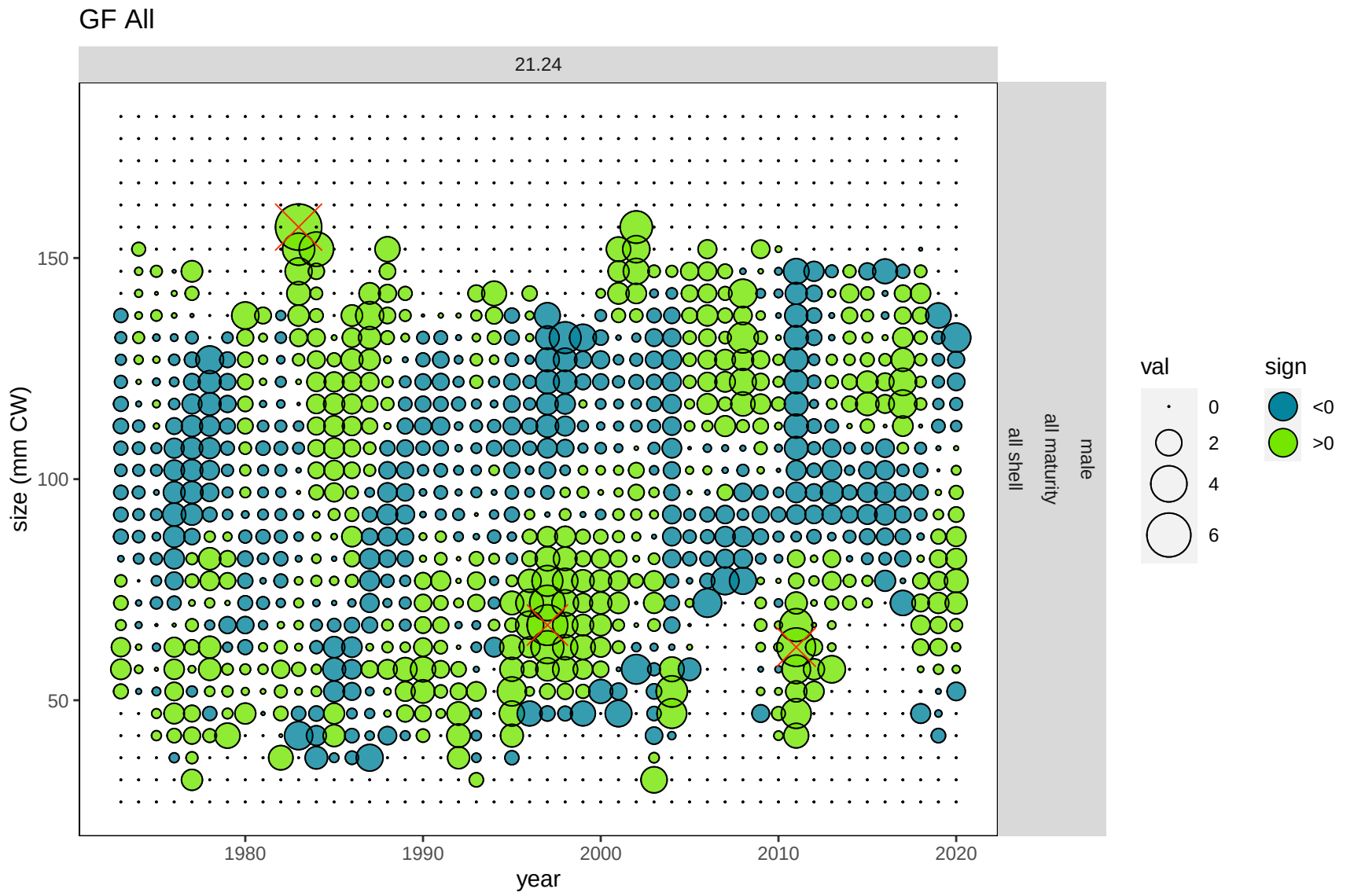

Figure 23: Pearson's residuals for male proportions-at-size from the GF All for scenario 21.24.

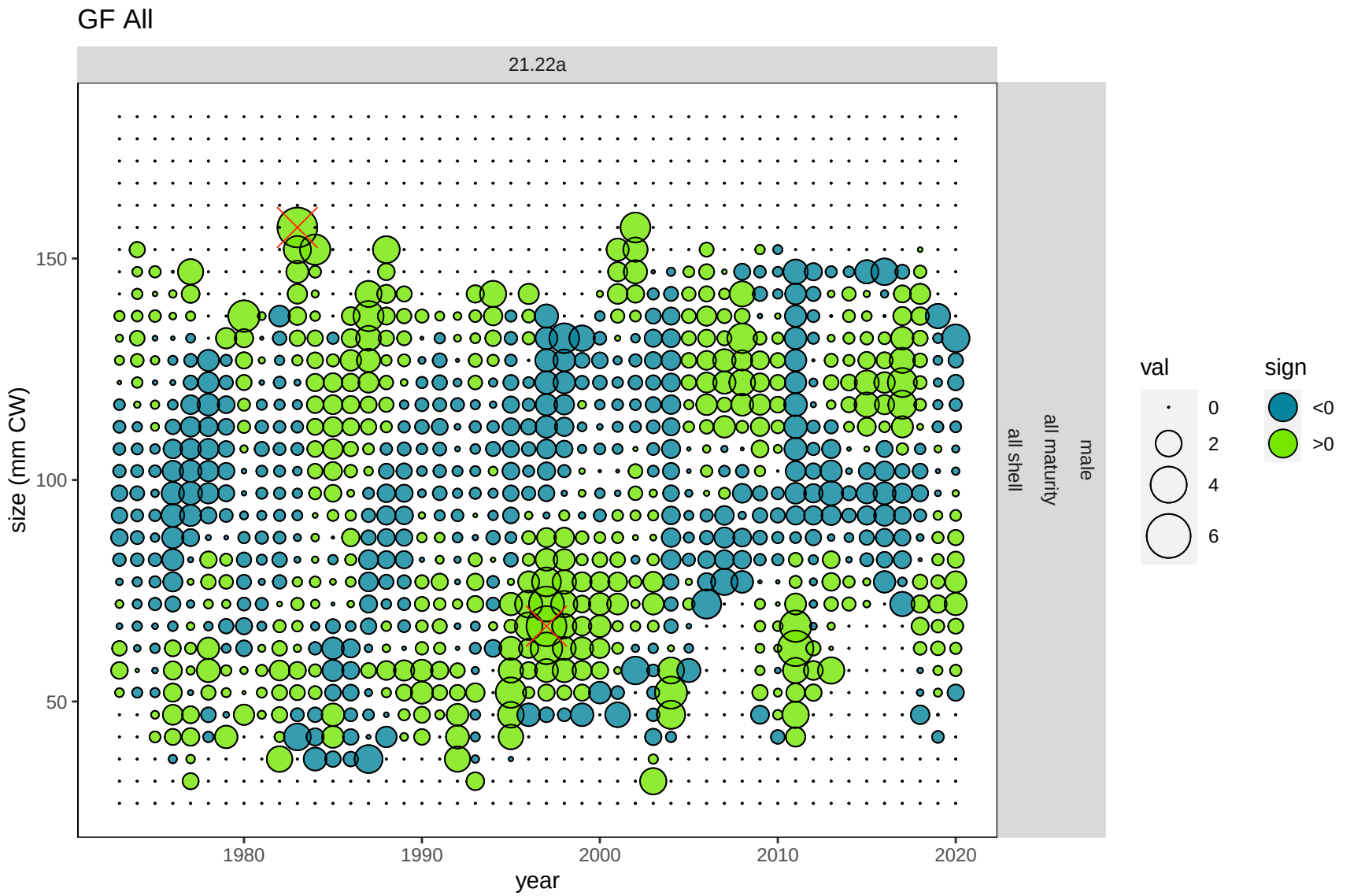

Figure 24: Pearson's residuals for male proportions-at-size from the GF All for scenario 21.22a.

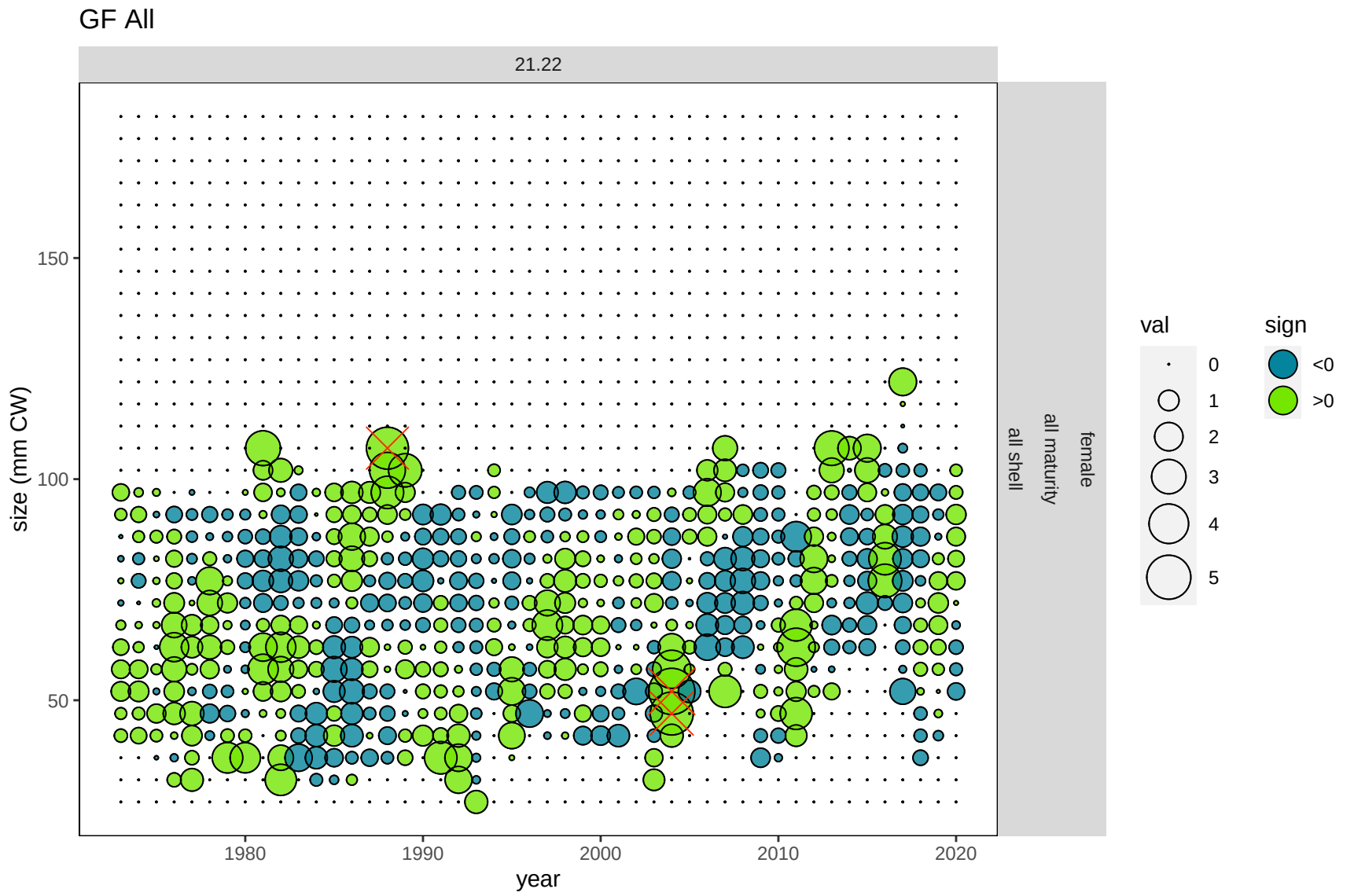

Figure 25: Pearson's residuals for female proportions-at-size from the GF All for scenario 21.22.

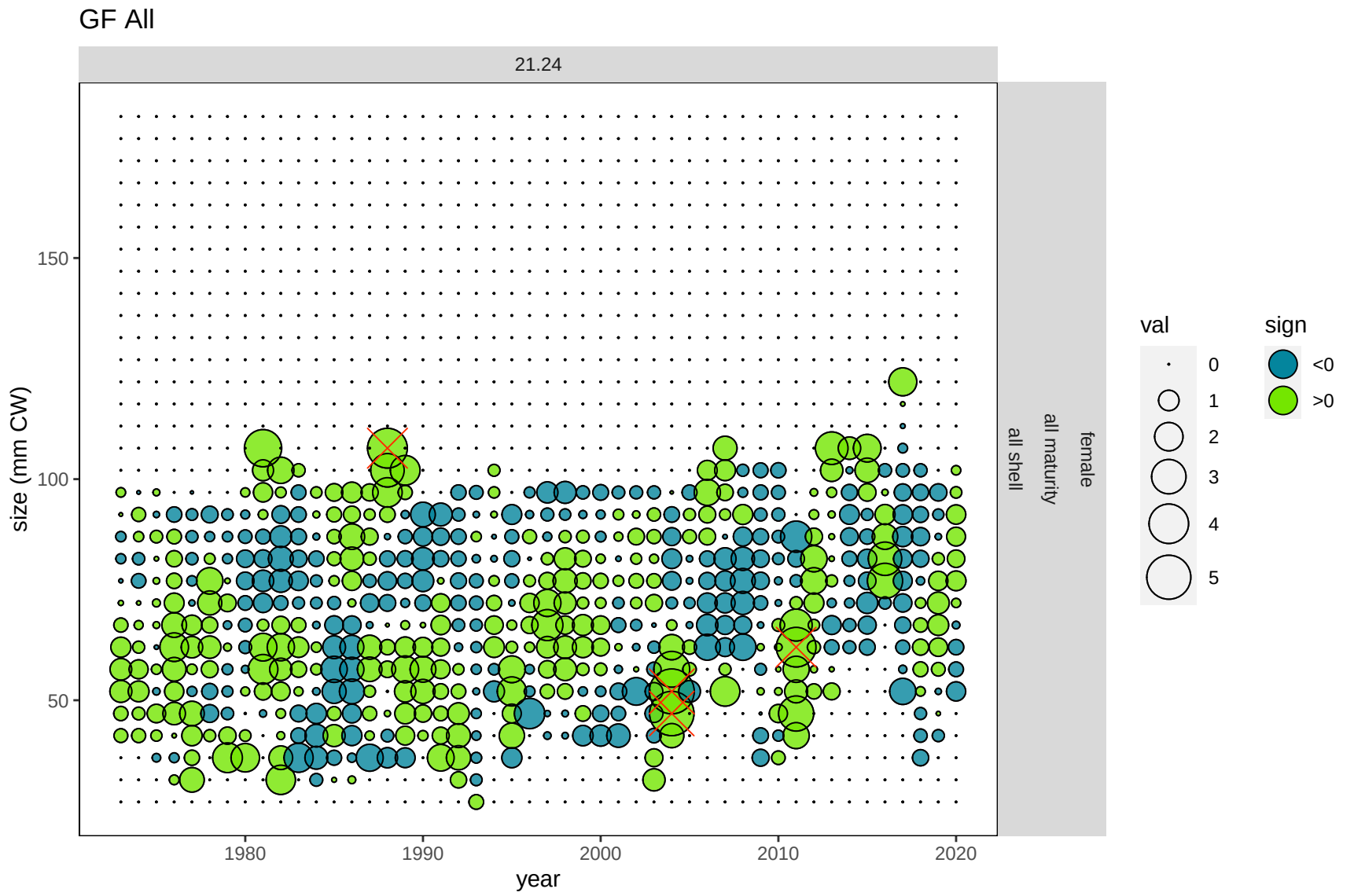

Figure 26: Pearson's residuals for female proportions-at-size from the GF All for scenario 21.24.

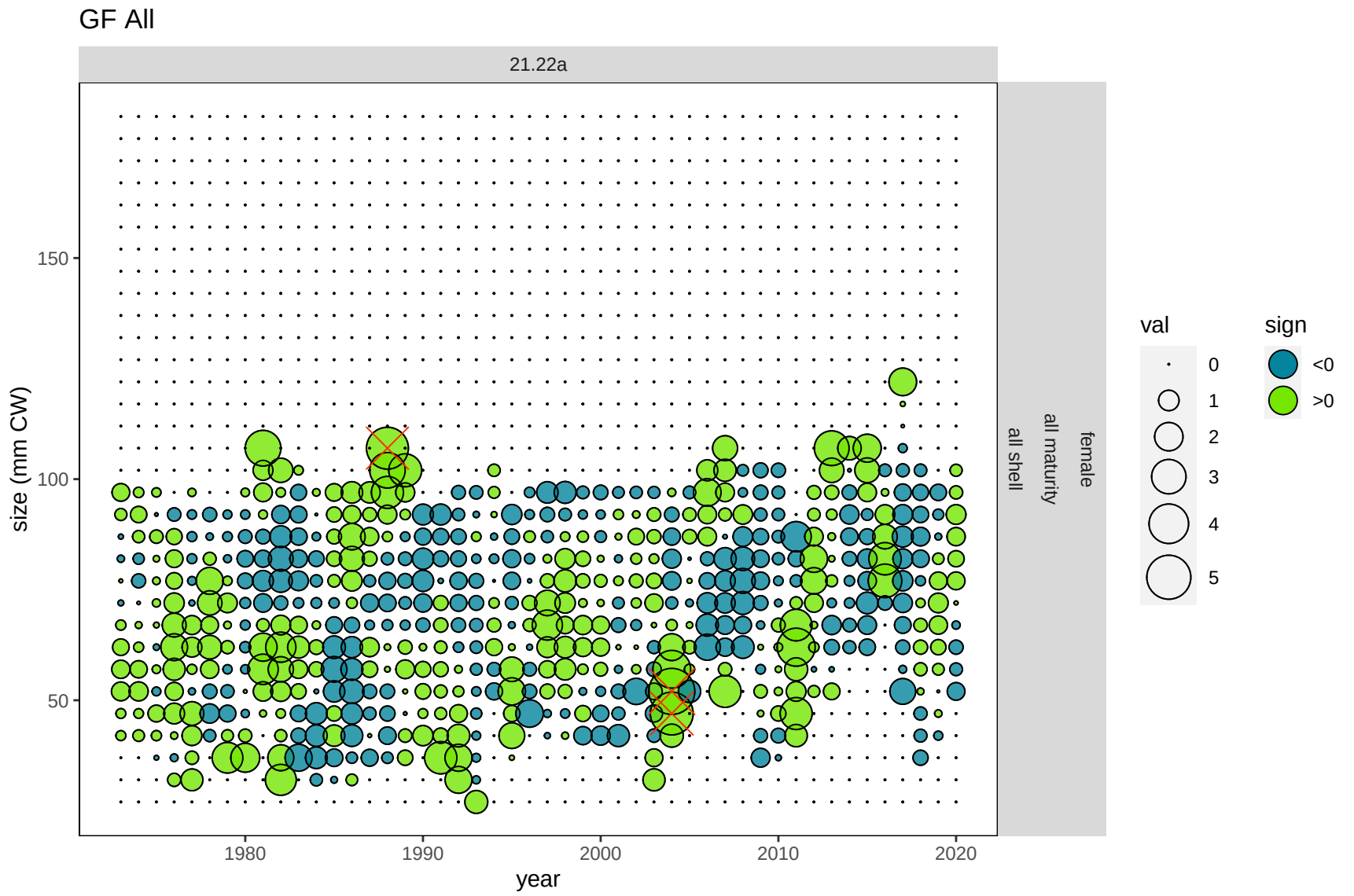

Figure 27: Pearson's residuals for female proportions-at-size from the GF All for scenario 21.22a.

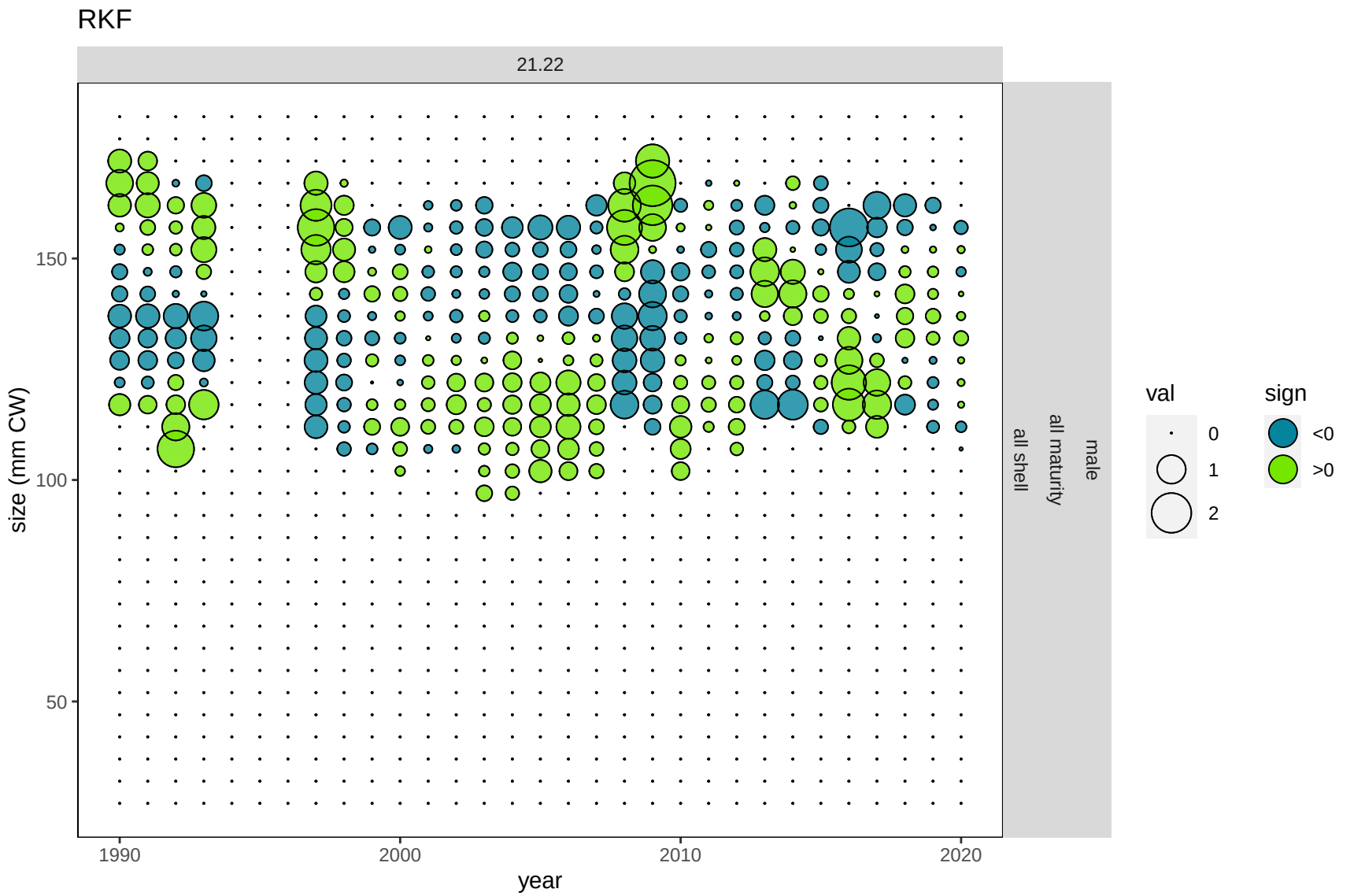

Figure 28: Pearson's residuals for male proportions-at-size from the RKF for scenario 21.22.

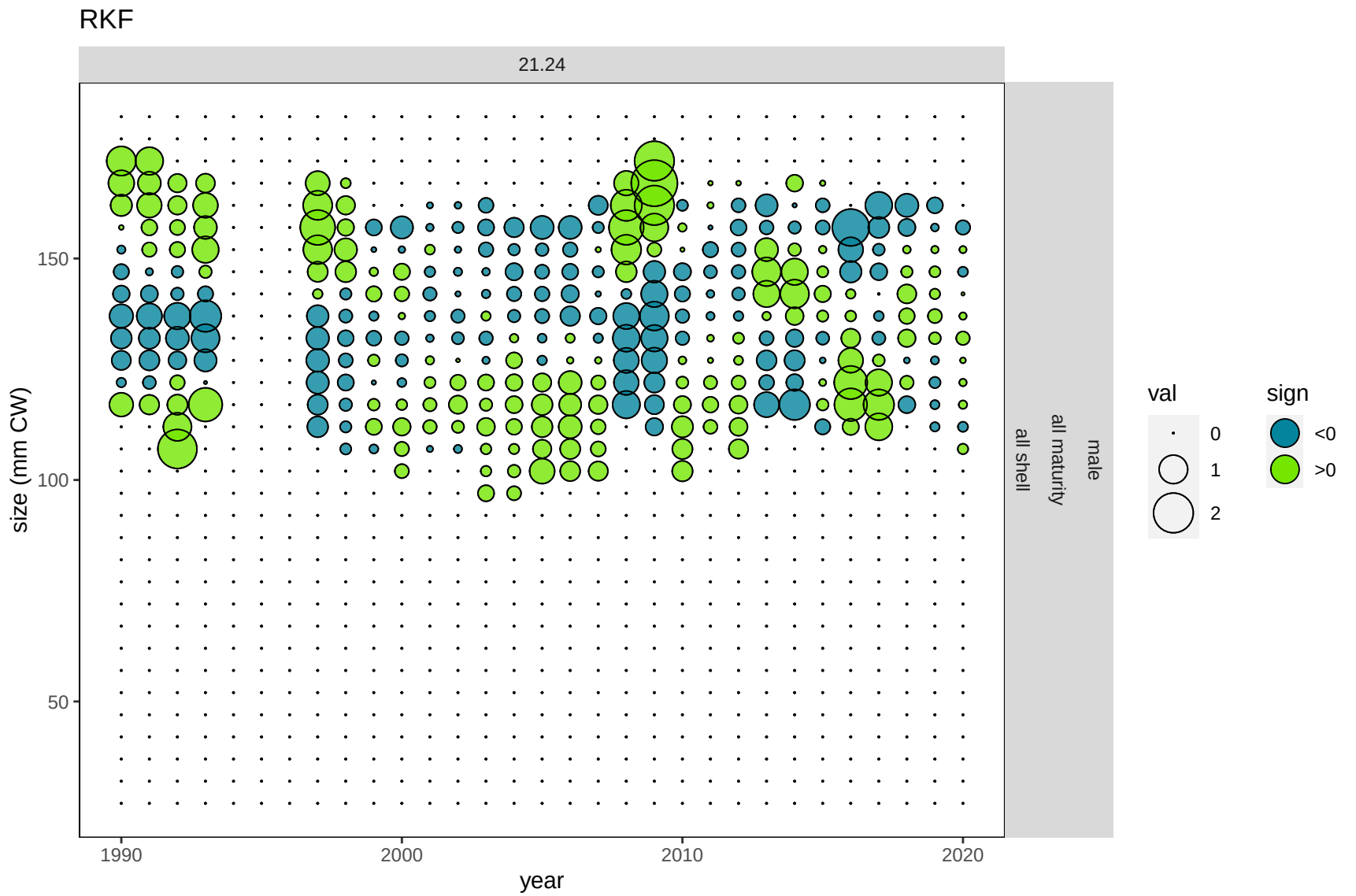

Figure 29: Pearson's residuals for male proportions-at-size from the RKF for scenario 21.24.

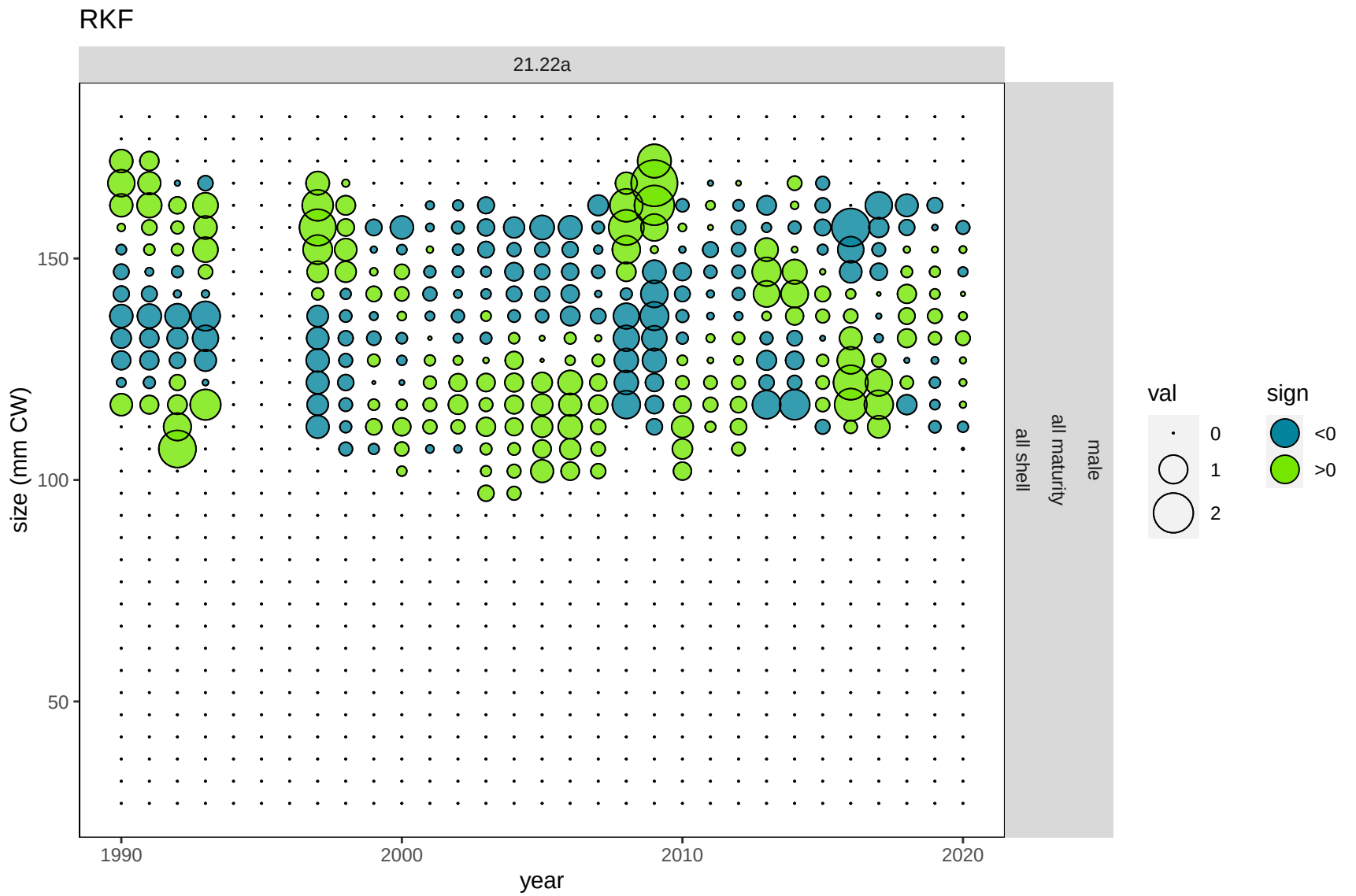

Figure 30: Pearson's residuals for male proportions-at-size from the RKF for scenario 21.22a.

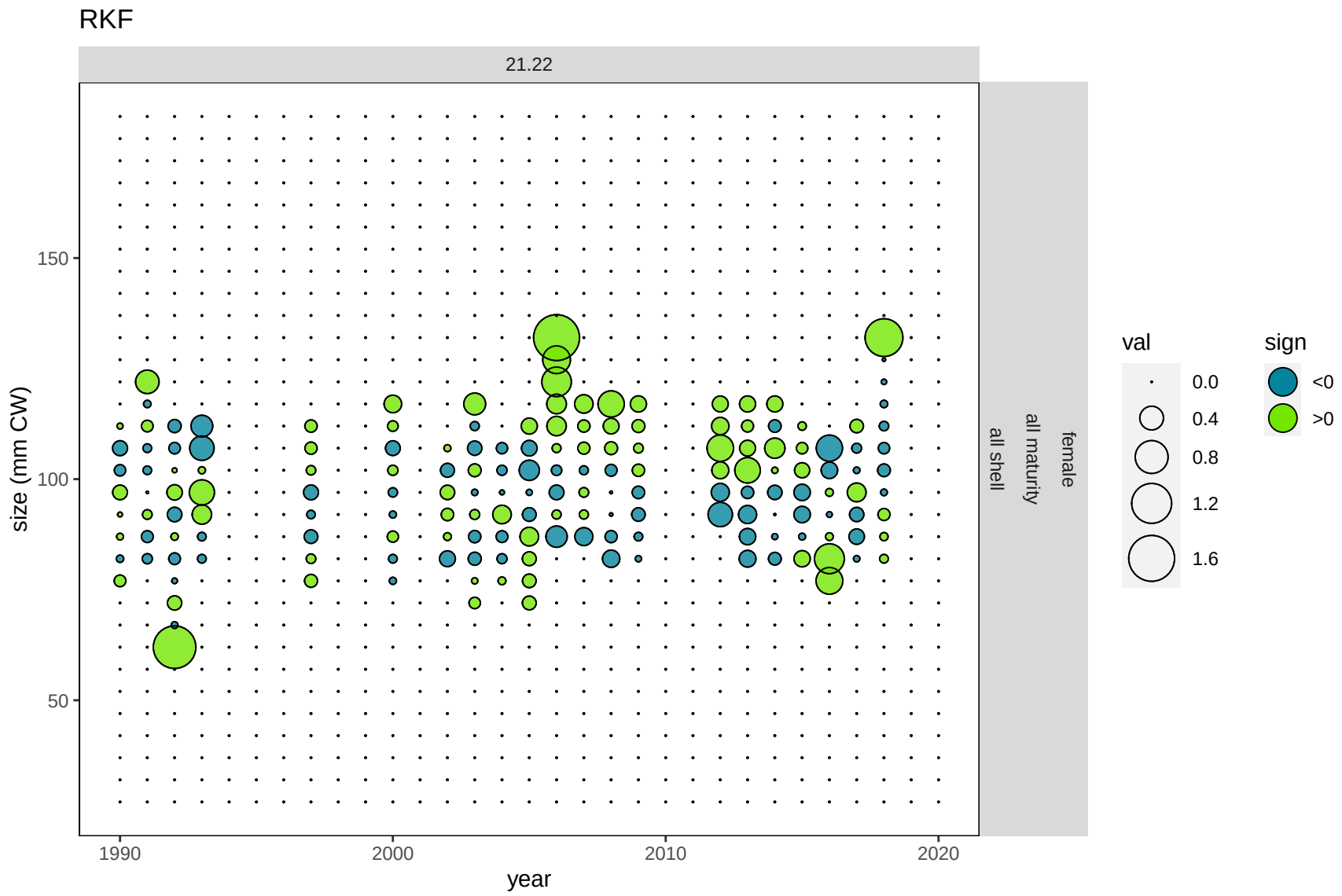

Figure 31: Pearson's residuals for female proportions-at-size from the RKF for scenario 21.22.

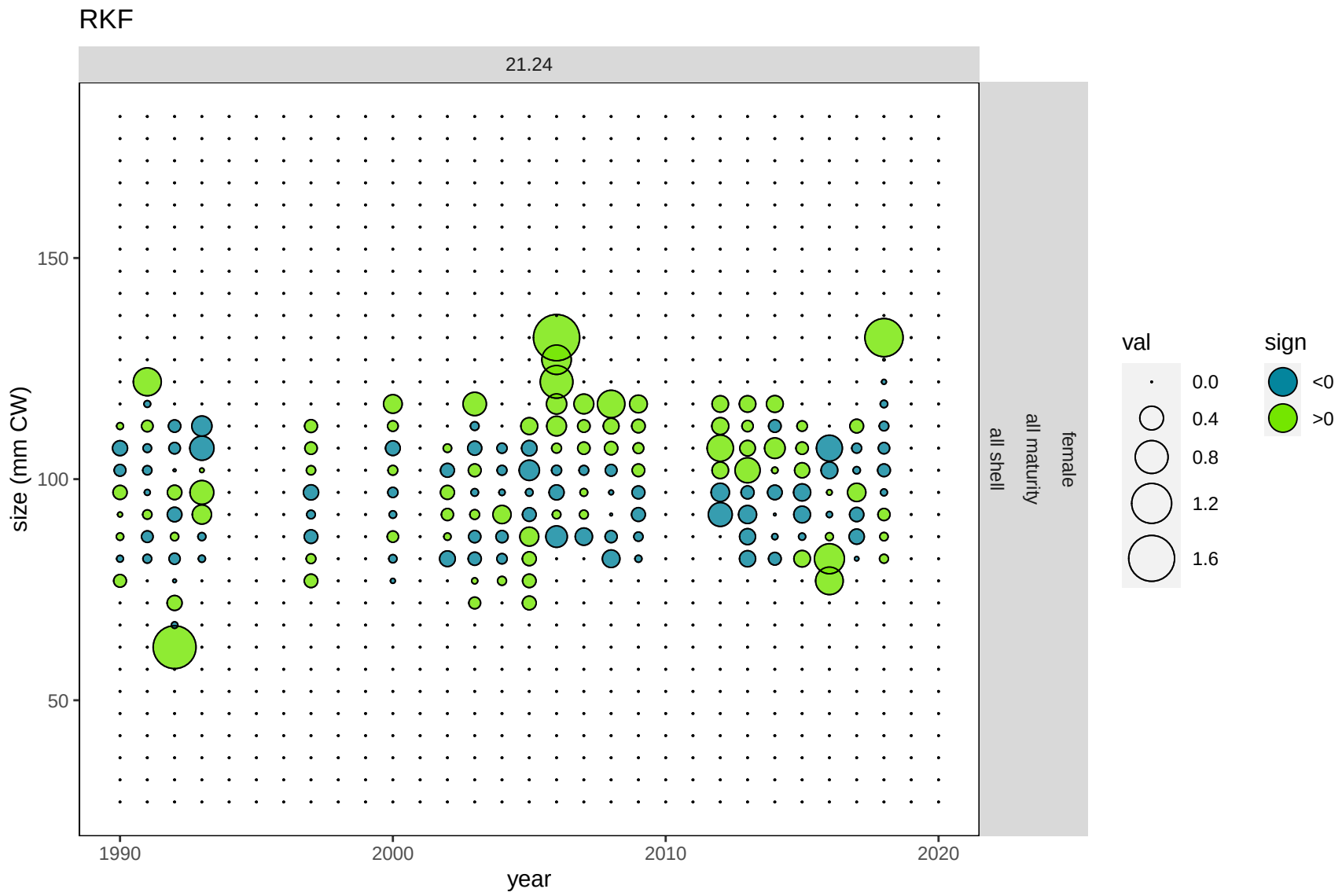

Figure 32: Pearson's residuals for female proportions-at-size from the RKF for scenario 21.24.

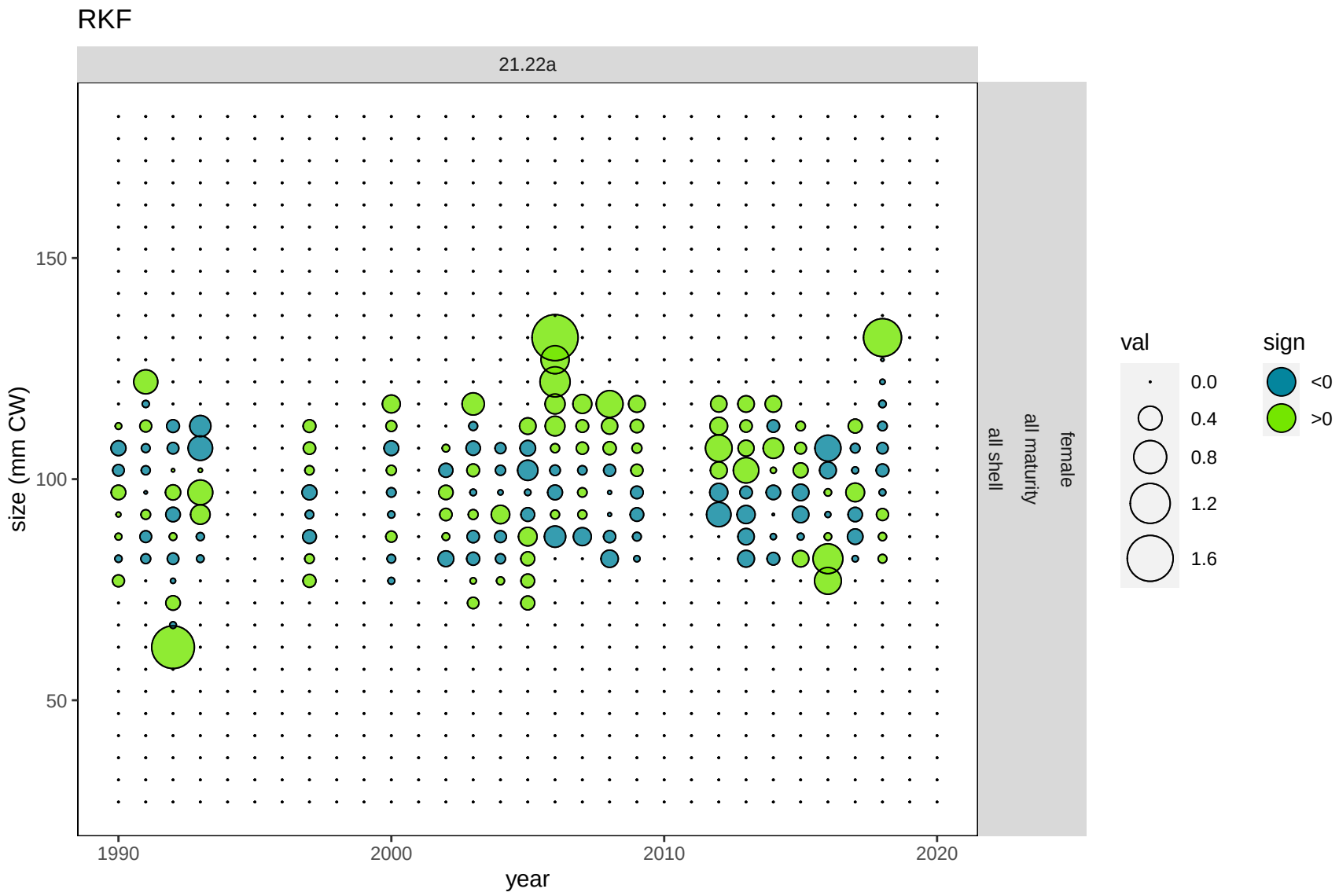

Figure 33: Pearson's residuals for female proportions-at-size from the RKF for scenario 21.22a.

Effective Ns for total catch size compositions

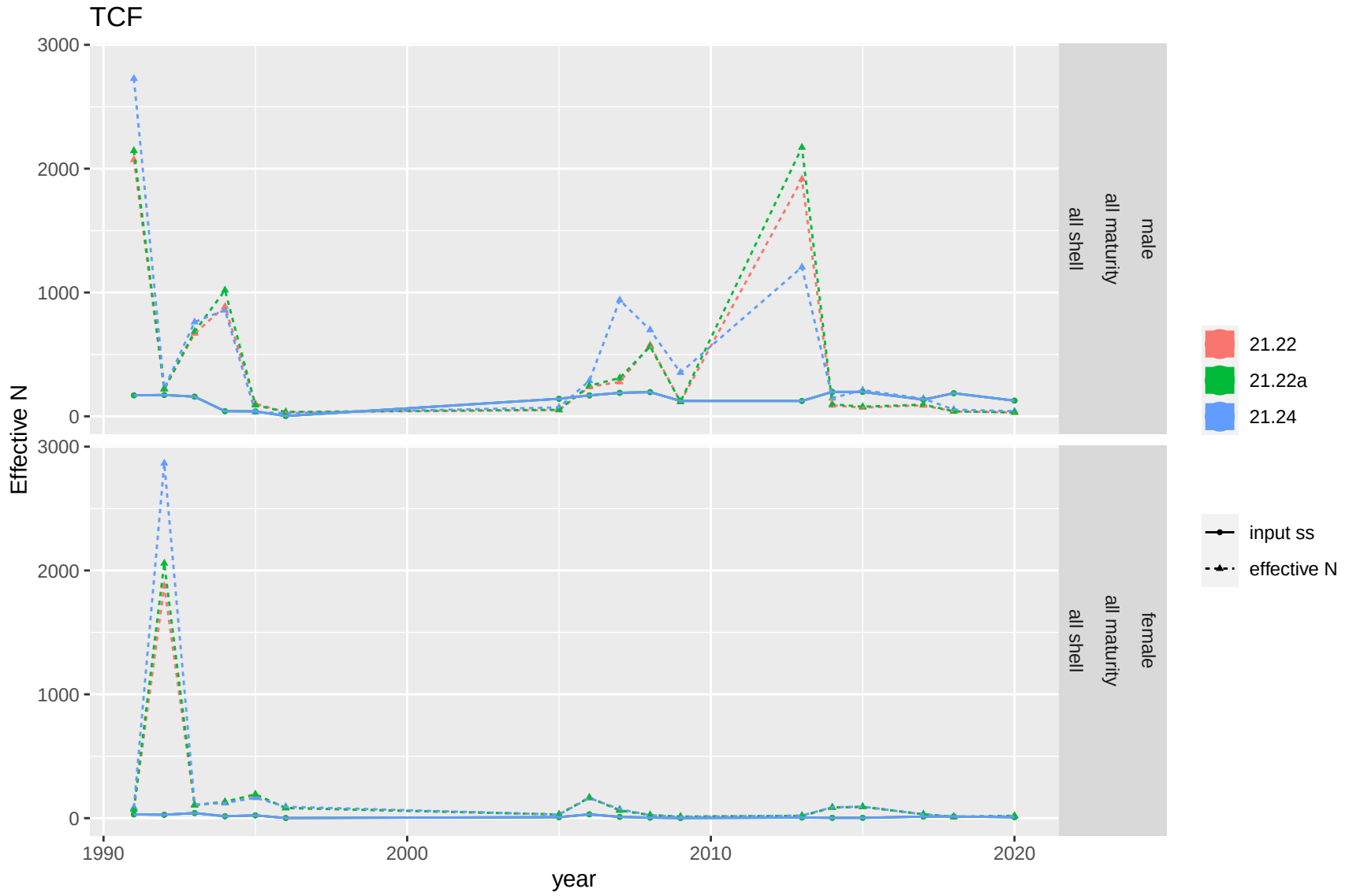

Figure 34: Input and effective sample sizes from total catch size compositions from the TCF fishery.

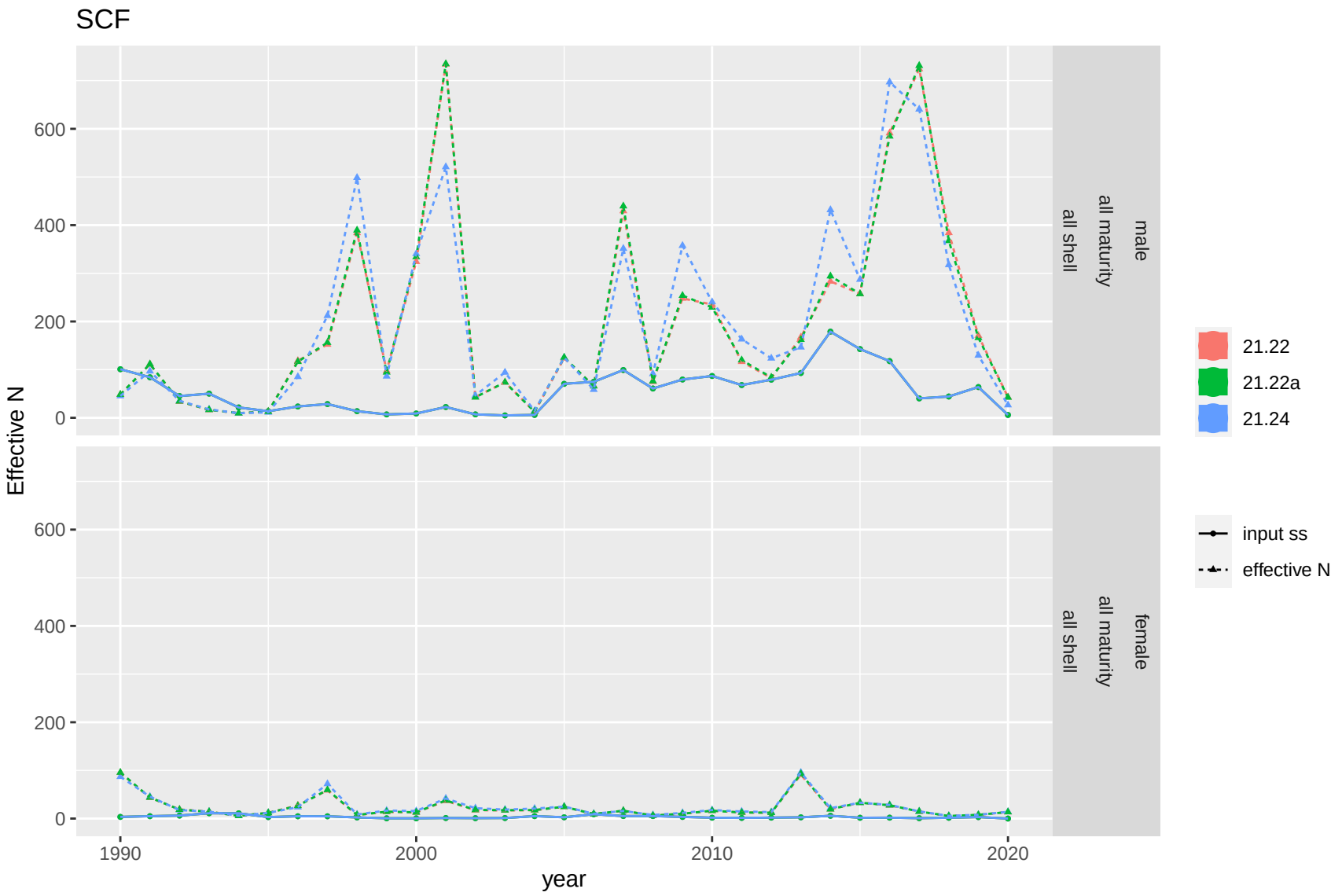

Figure 35: Input and effective sample sizes from total catch size compositions from the SCF fishery.

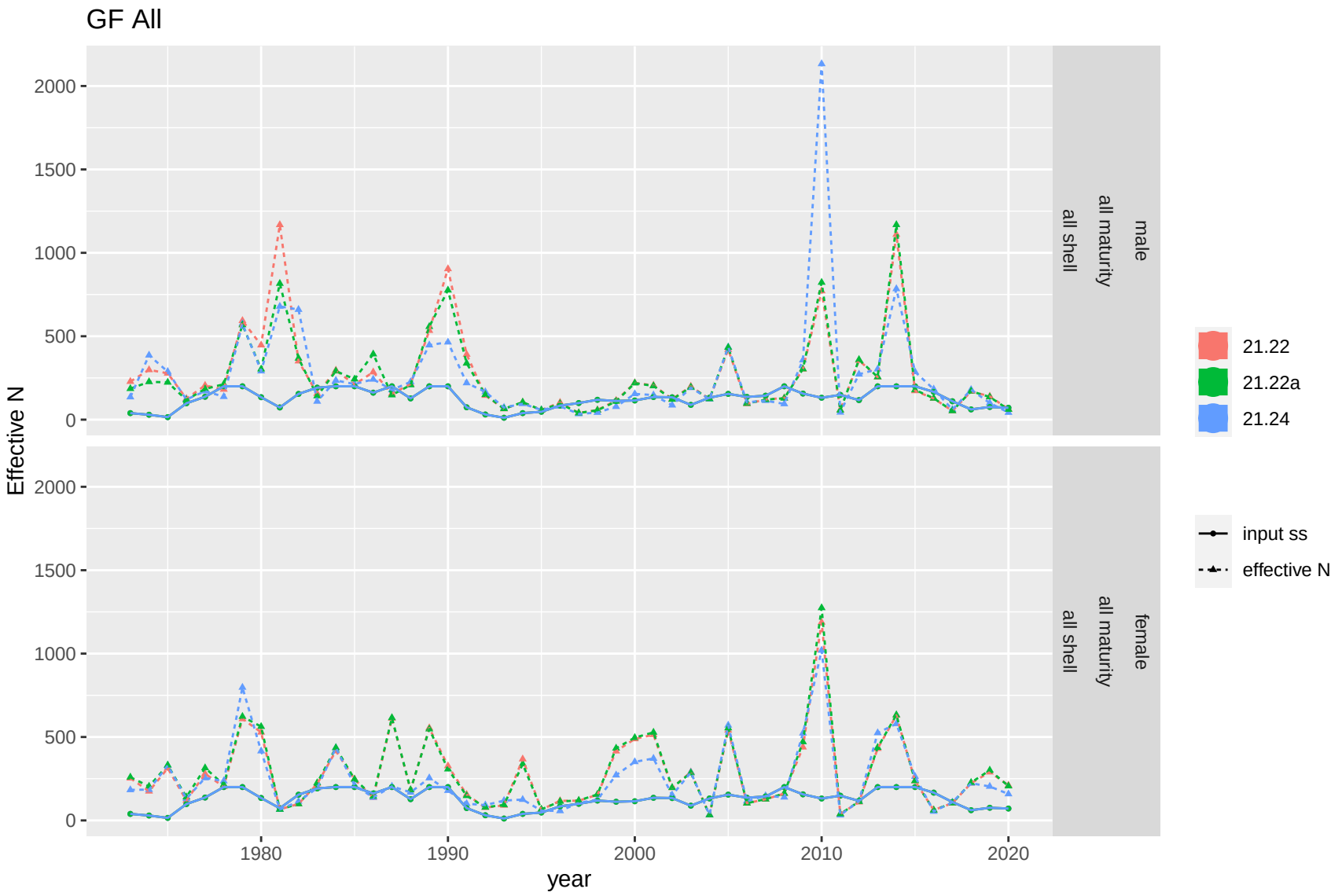

Figure 36: Input and effective sample sizes from total catch size compositions from the GF All fishery.

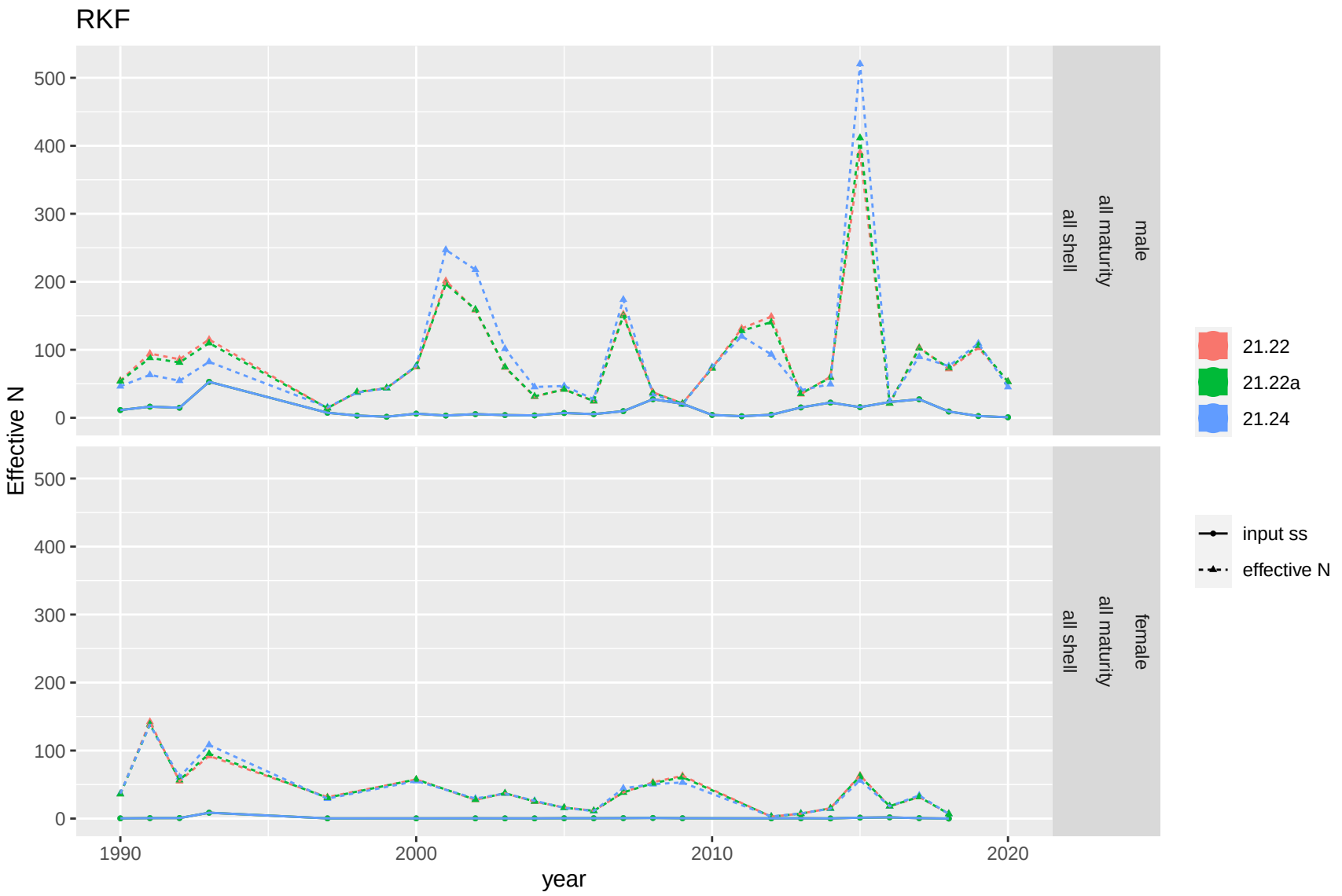

Figure 37: Input and effective sample sizes from total catch size compositions from the RKF fishery.

Appendix F Model Comparisons: Fits to Surveys Size Composition Data –20.07u vs 20.07

William Stockhausen

03 September, 2021

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Residuals to survey size composition data **6**

Effective sample sizes for survey size compositions **15**

Introduction

Fits to survey size composition data available to the model(s) are presented in this section. Included are plots of mean fits to size compositions, Pearson's residuals as bubble plots, and effective sample sizes. Not all of the fits presented are necessarily included in the parameter optimization for each model; some fits to datasets for a particular model may be included for comparison purposes with other models which include those data in their optimization. The reader should consult the main assessment document to determine which fits are included in the optimization for any particular model.

Mean survey size compositions

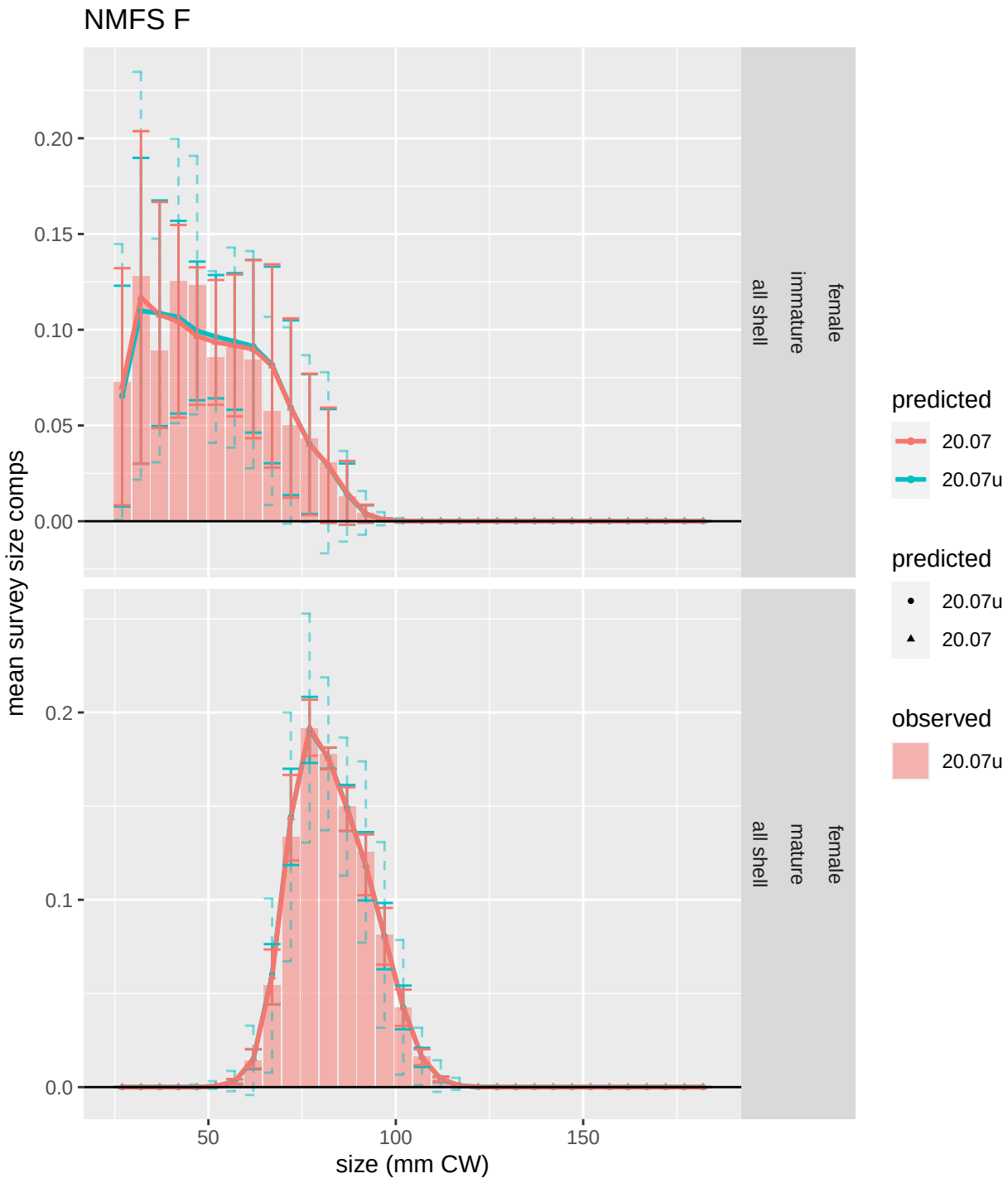

Figure 1: Comparison of observed and predicted mean survey size comps for NMFS F.

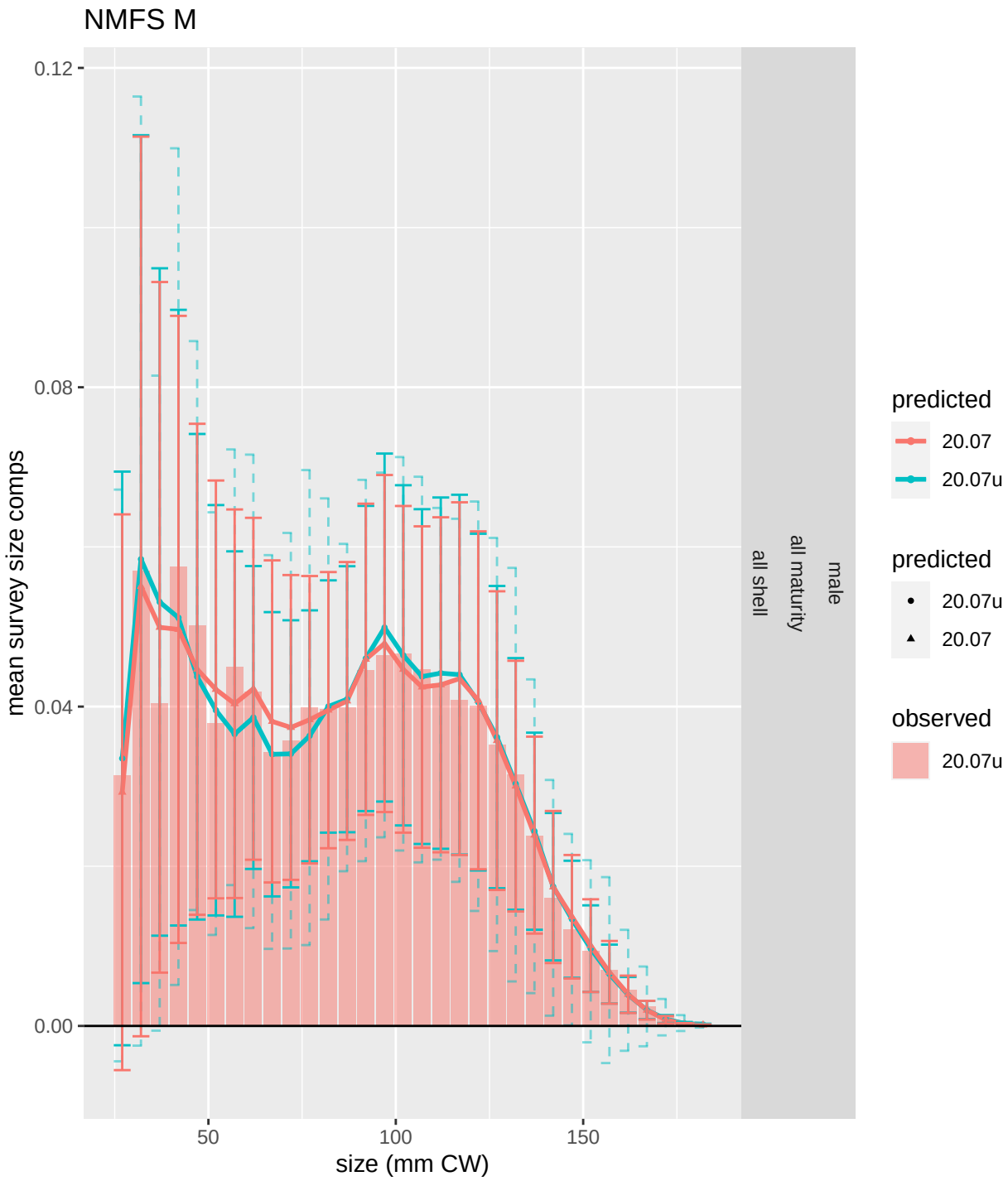

Figure 2: Comparison of observed and predicted mean survey size comps for NMFS M.

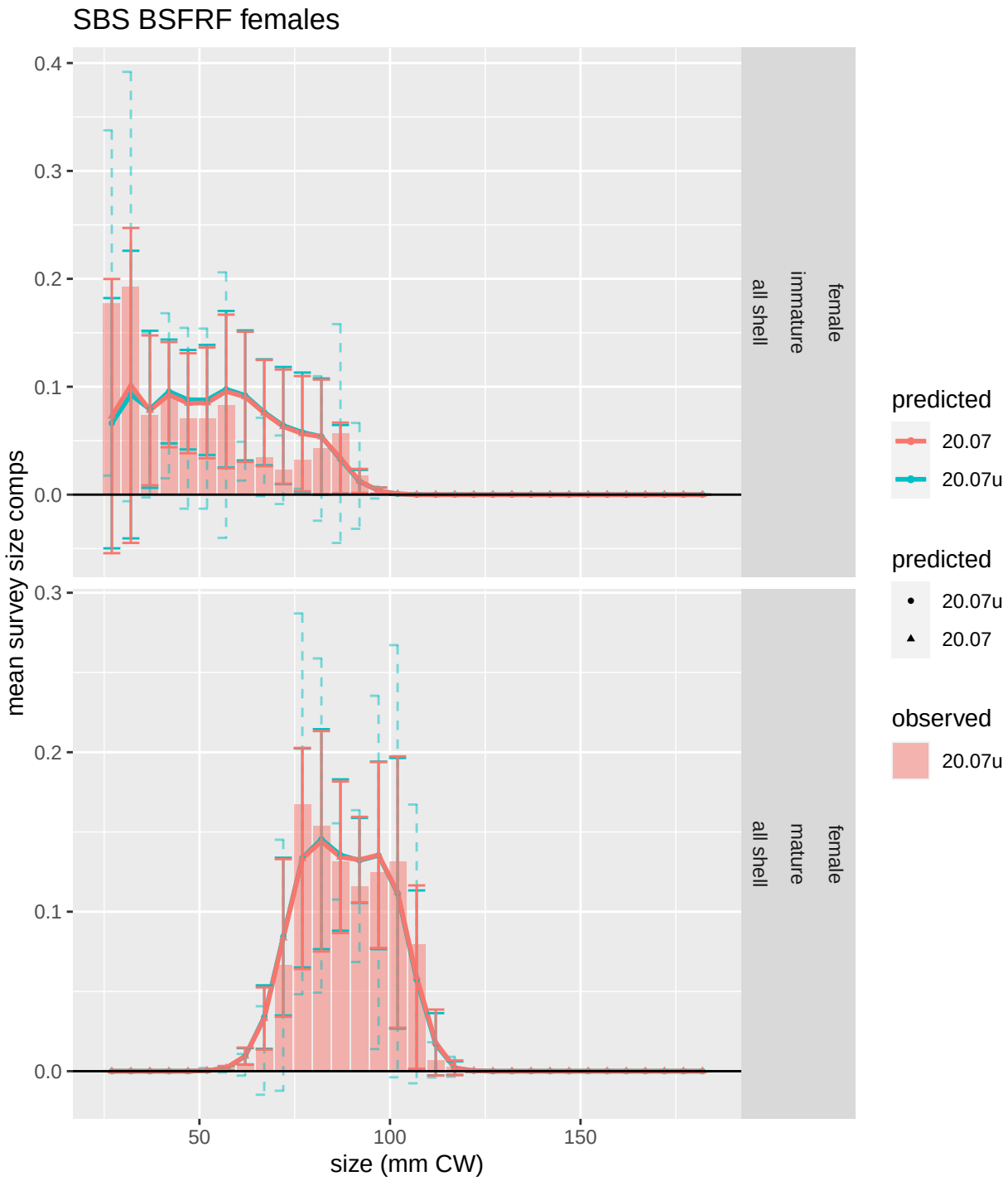

Figure 3: Comparison of observed and predicted mean survey size comps for SBS BSFRF females.

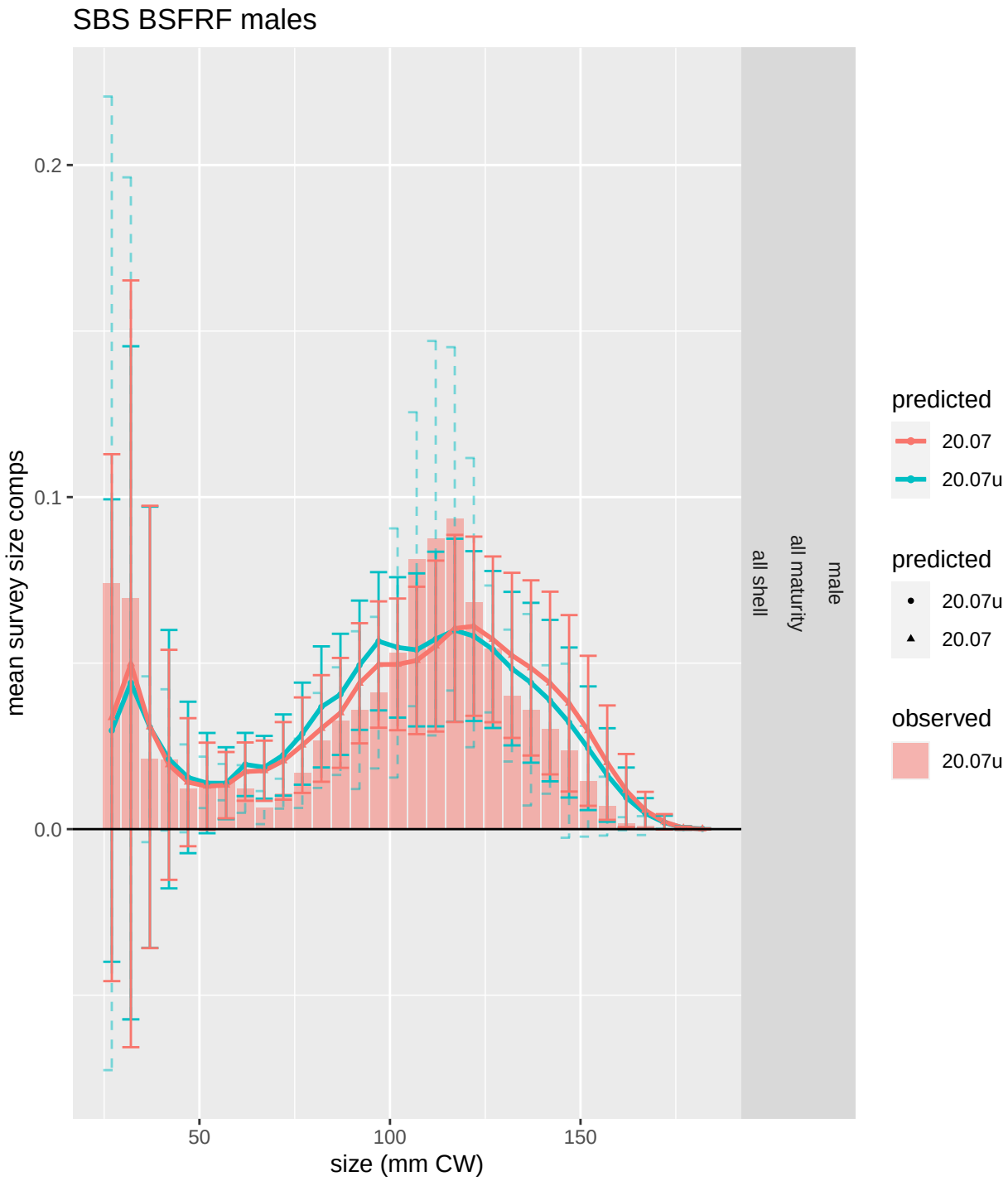

Figure 4: Comparison of observed and predicted mean survey size comps for SBS BSFRF males.

Residuals to survey size composition data

Pearson's residuals are plotted for fits to size composition data. Symbol areas reflect the size of each residual, Extreme values (residuals larger than 4 in scale) are indicated with a red "X" to facilitate identification.

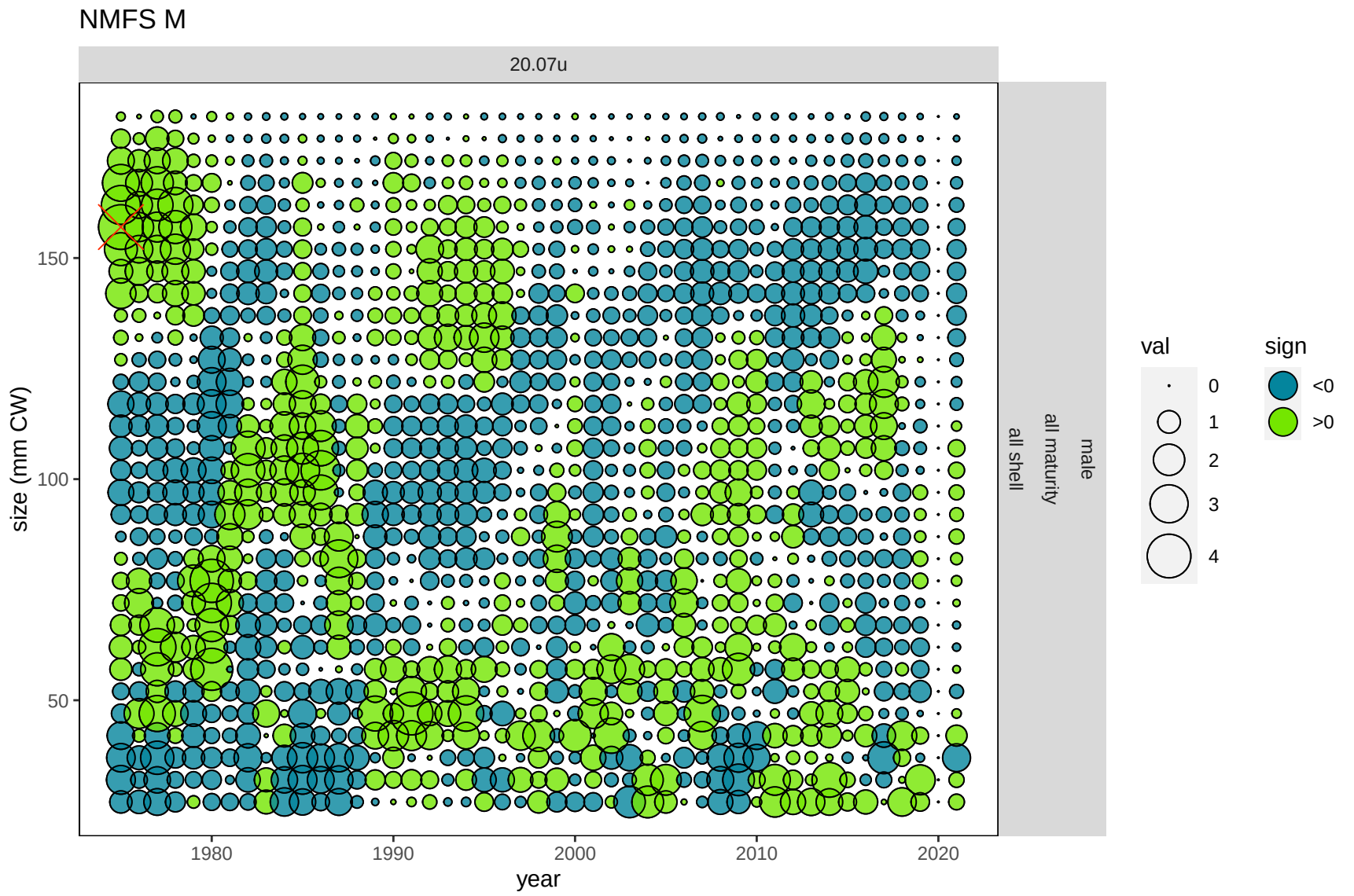

Figure 5: Pearson's residuals for male proportions-at-size from the NMFS M for scenario 20.07u.

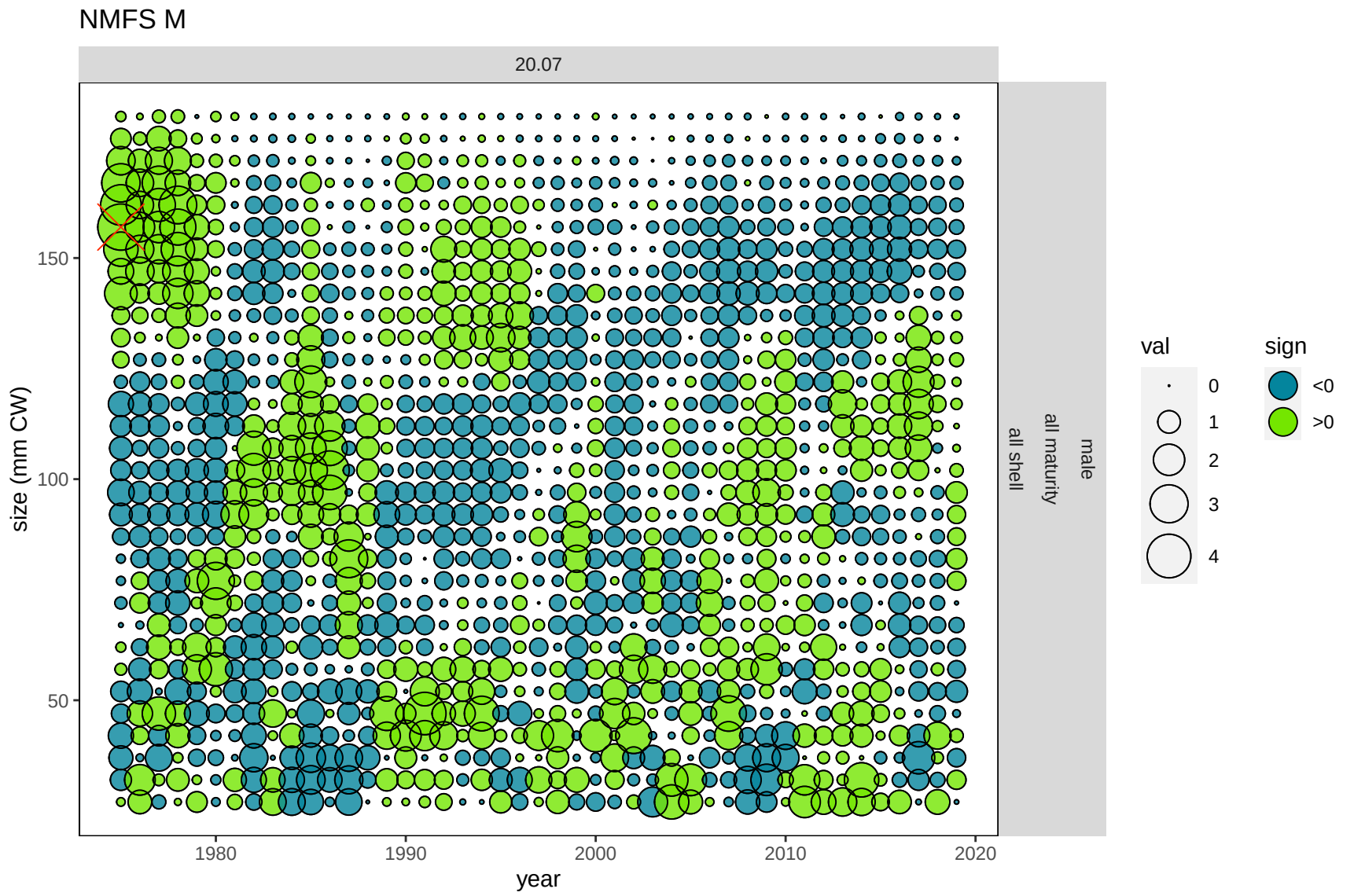

Figure 6: Pearson's residuals for male proportions-at-size from the NMFS M for scenario 20.07.

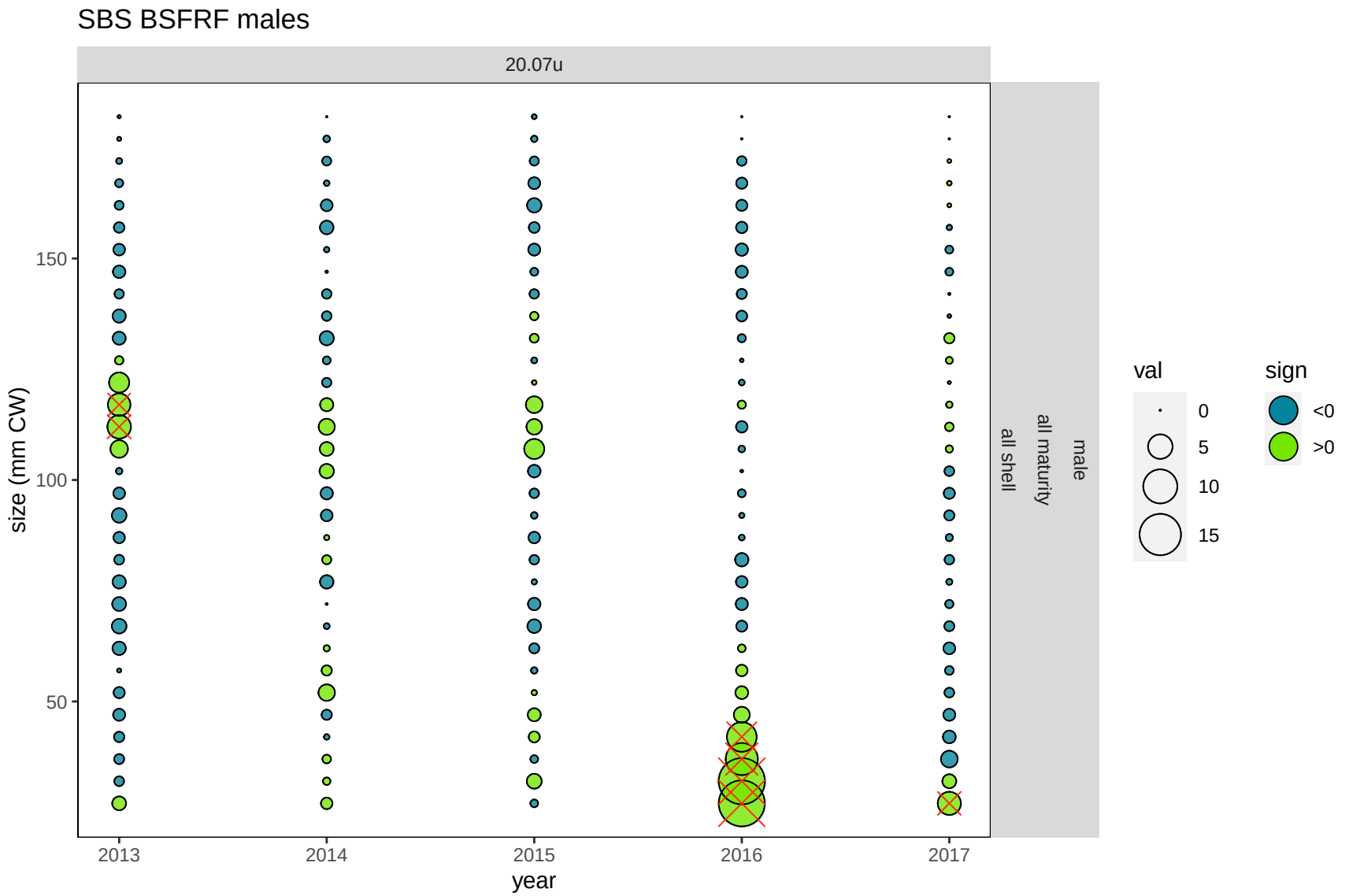

Figure 7: Pearson's residuals for male proportions-at-size from the SBS BSFRF males for scenario 20.07u.

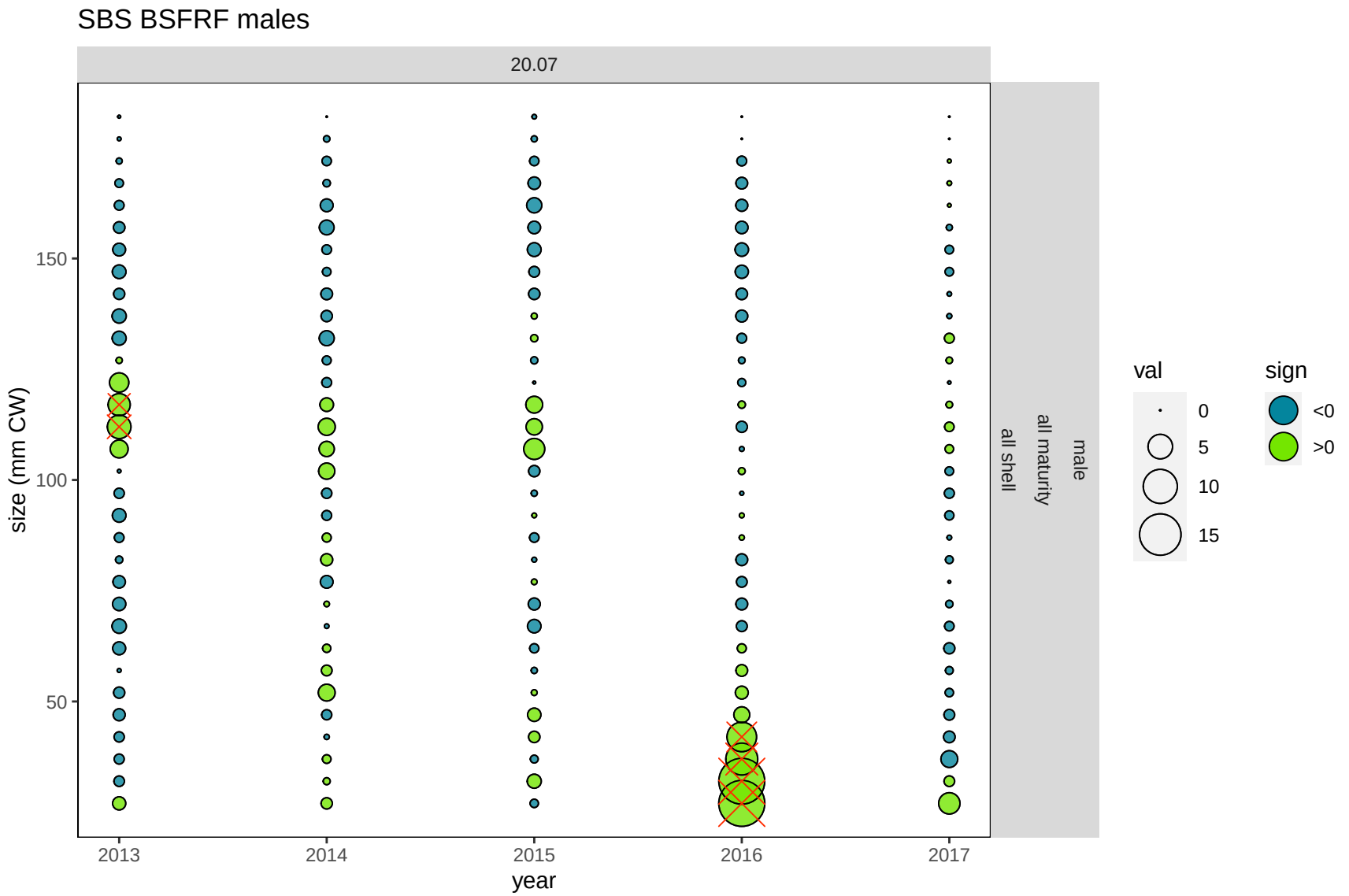

Figure 8: Pearson's residuals for male proportions-at-size from the SBS BSFRF males for scenario 20.07.

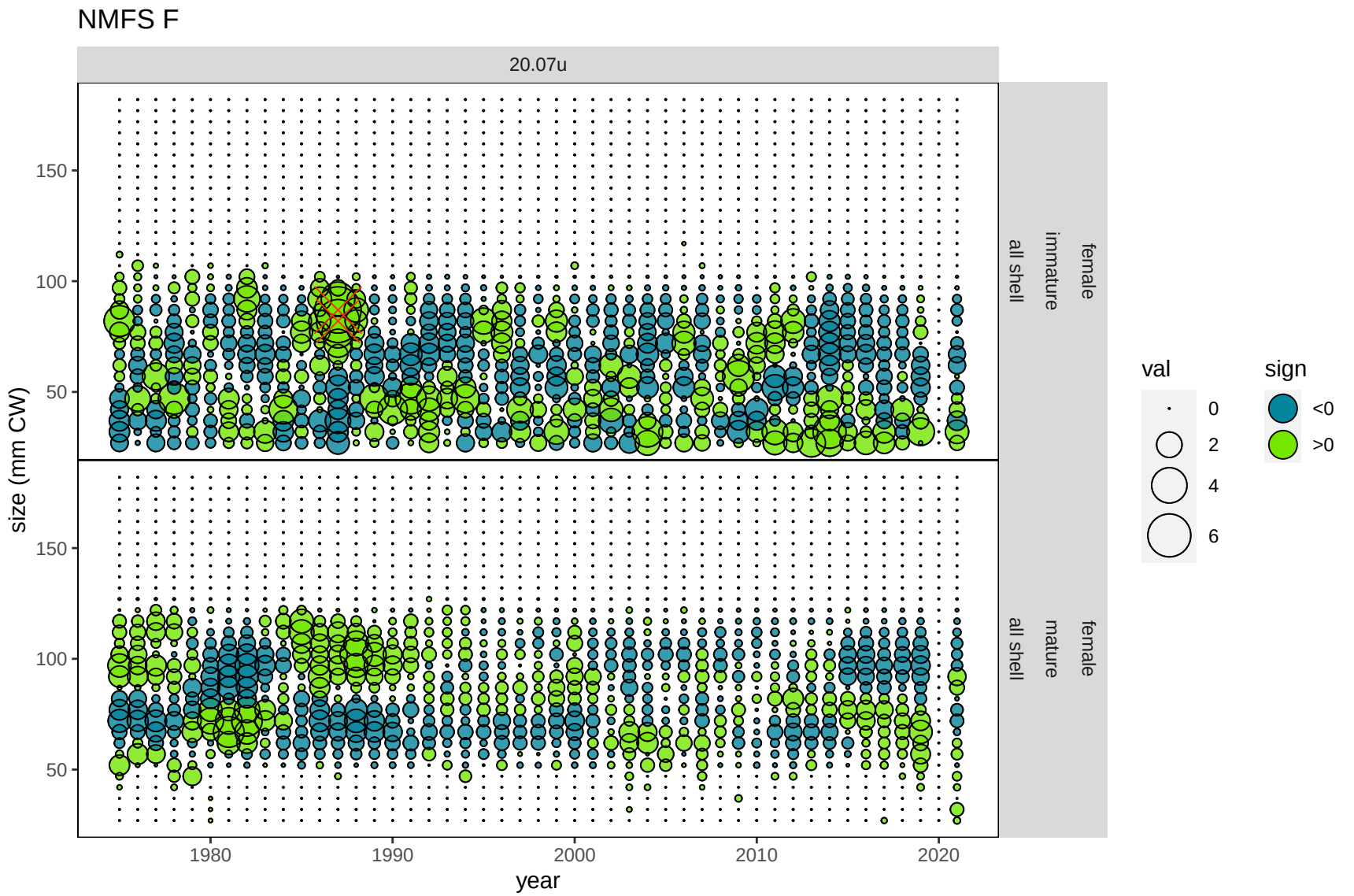

Figure 9: Pearson's residuals for female proportions-at-size from the NMFS F for scenario 20.07u.

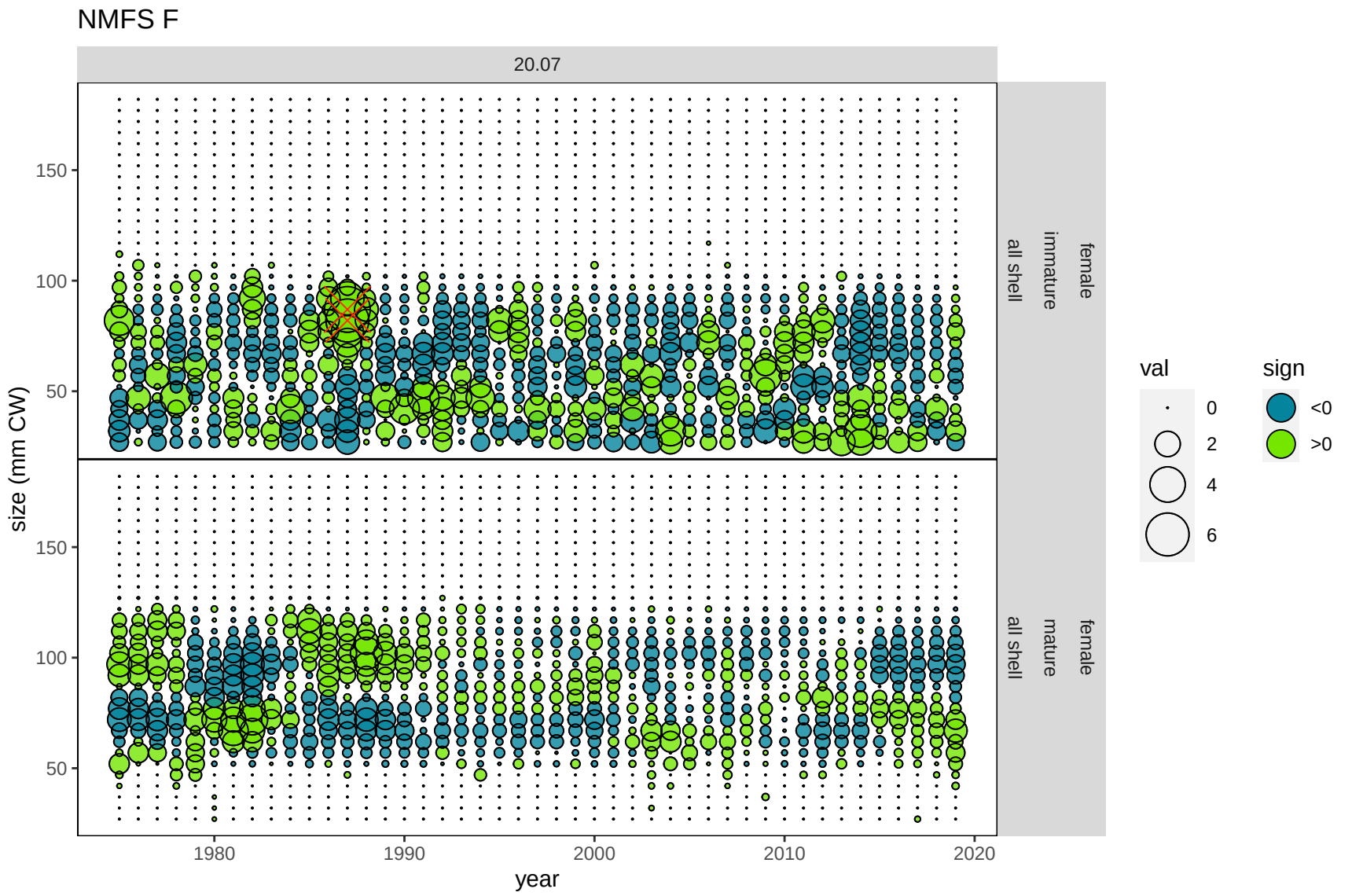

Figure 10: Pearson's residuals for female proportions-at-size from the NMFS F for scenario 20.07.

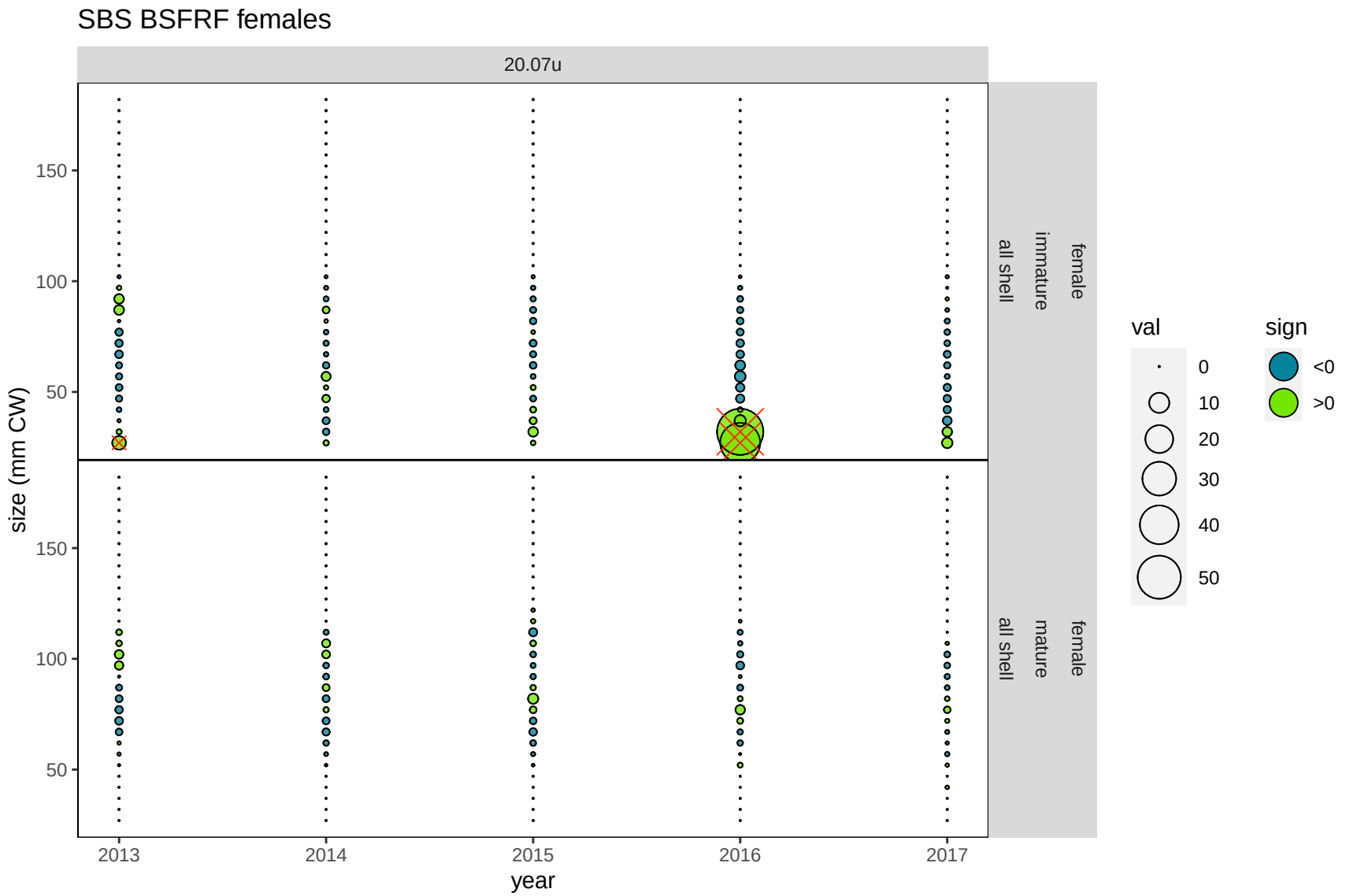

Figure 11: Pearson's residuals for female proportions-at-size from the SBS BSFRF females for scenario 20.07u.

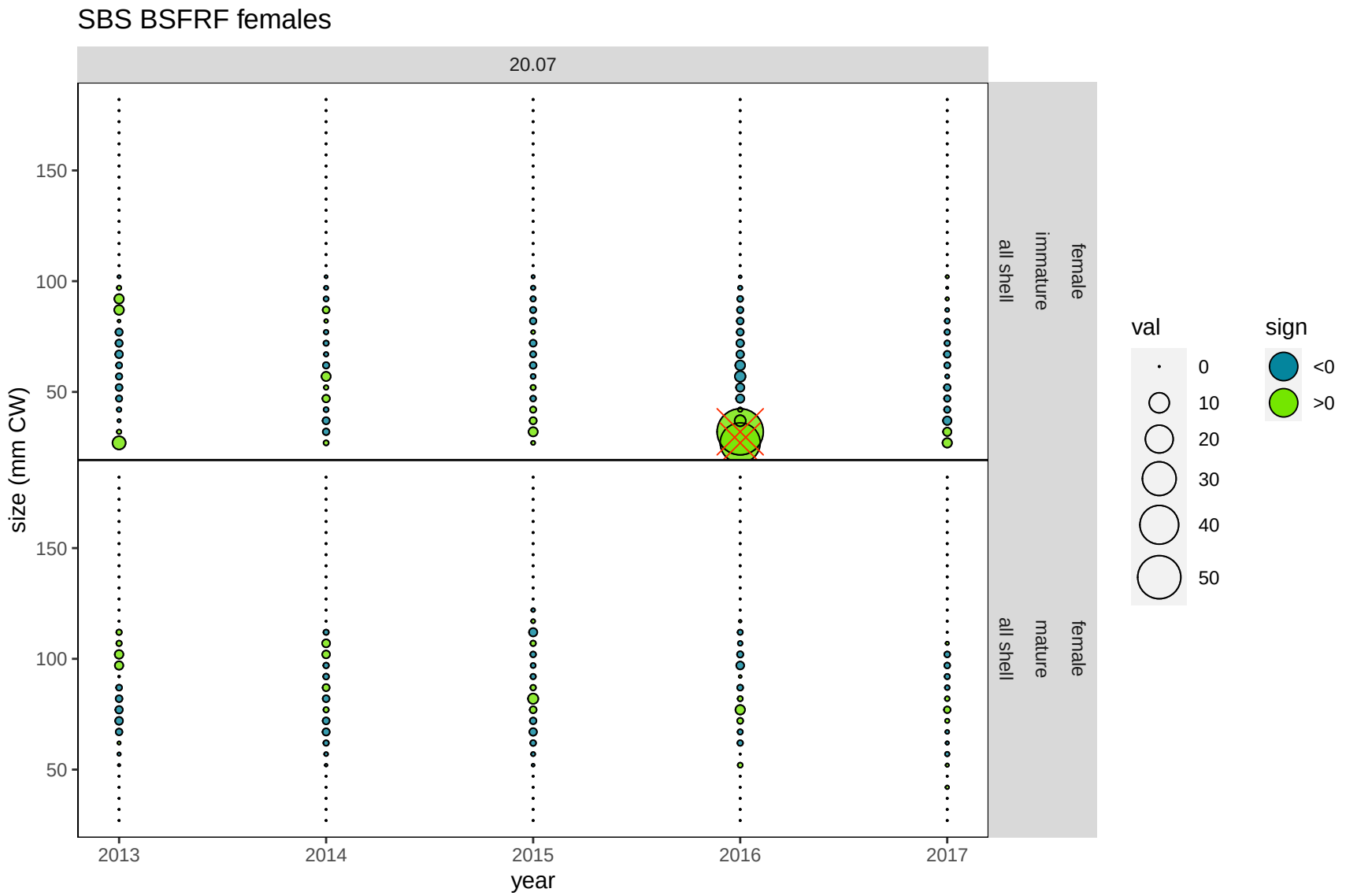

Figure 12: Pearson's residuals for female proportions-at-size from the SBS BSFRF females for scenario 20.07.

Effective sample sizes for survey size compositions

rCompTCMs::extractMDFR.Fits.EffectiveNs: Extracting fleets rCompTCMs::extractMDFR.Fits.EffectiveNs: Extracting fleets

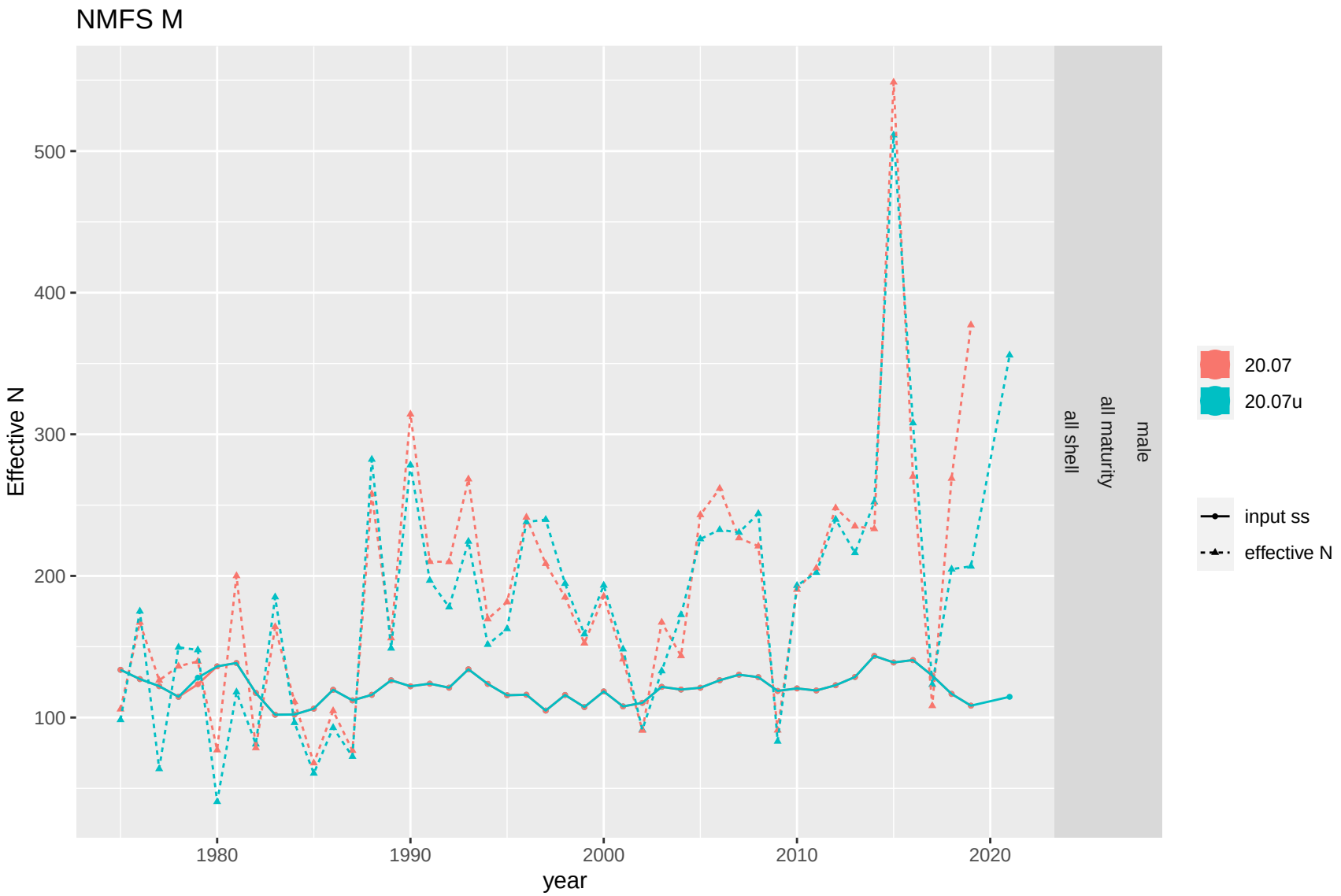

Figure 13: Input and effective sample sizes from retained catch size compositions from the NMFS M.

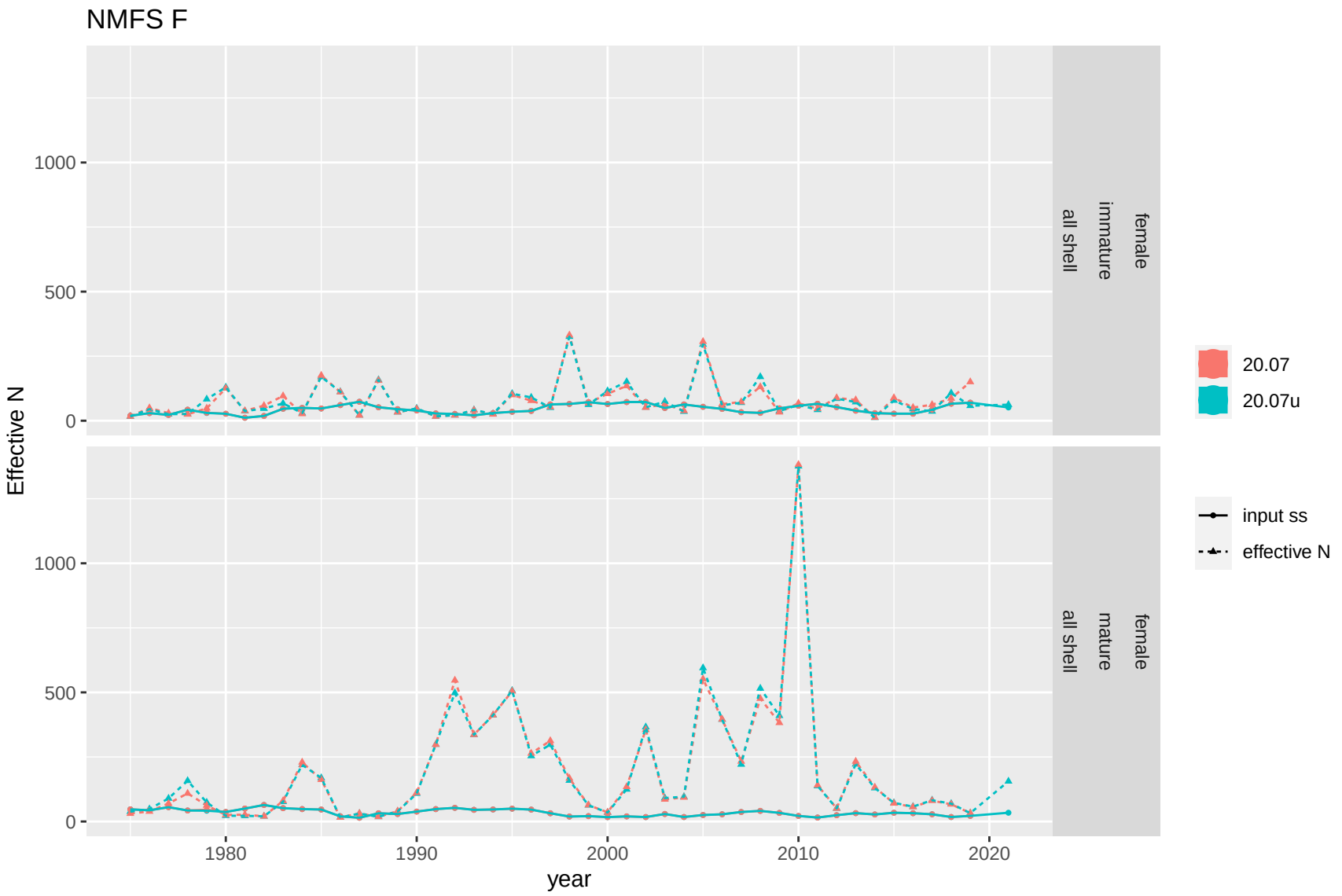

Figure 14: Input and effective sample sizes from retained catch size compositions from the NMFS F.

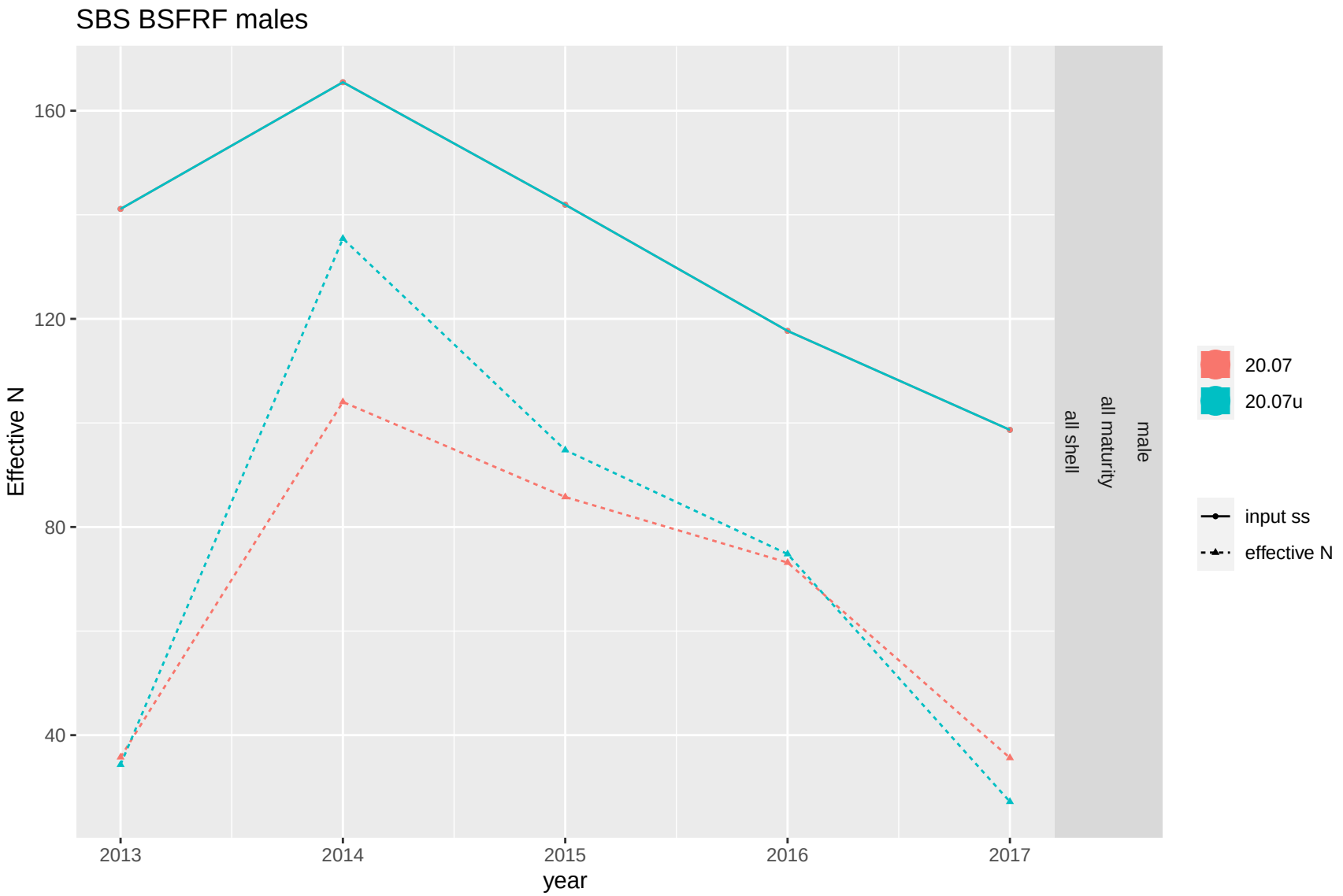

Figure 15: Input and effective sample sizes from retained catch size compositions from the SBS BSFRF males.

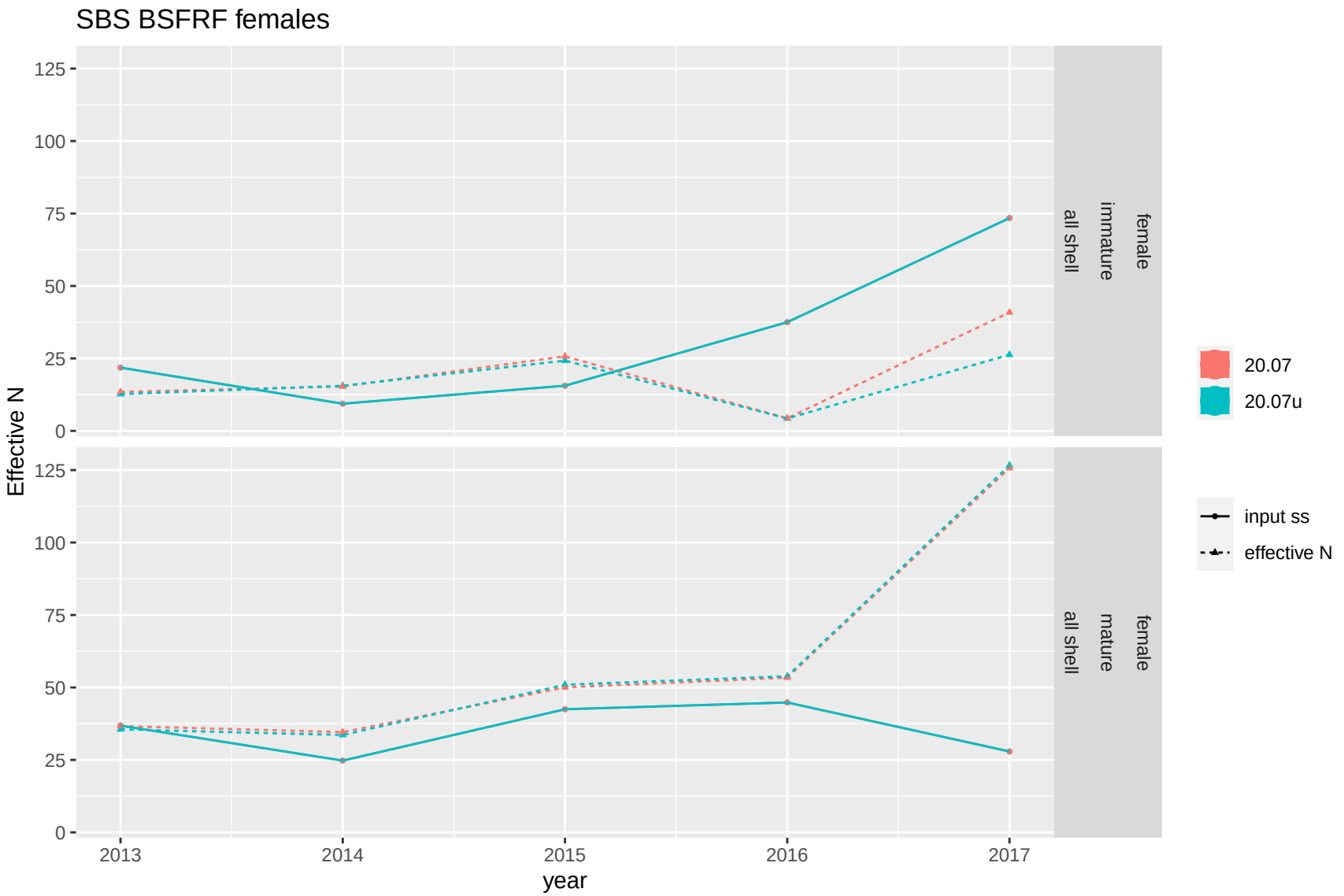

Figure 16: Input and effective sample sizes from retained catch size compositions from the SBS BSFRF females.

Appendix G Model Comparisons: Fits to Surveys Size Composition Data –21.22 vs 21.24 vs 21.22a

William Stockhausen

03 September, 2021

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Introduction

Fits to survey size composition data available to the model(s) are presented in this section. Included are plots of mean fits to size compositions, Pearson's residuals as bubble plots, and effective sample sizes. Not all of the fits presented are necessarily included in the parameter optimization for each model; some fits to datasets for a particular model may be included for comparison purposes with other models which include those data in their optimization. The reader should consult the main assessment document to determine which fits are included in the optimization for any particular model.

Mean survey size compositions

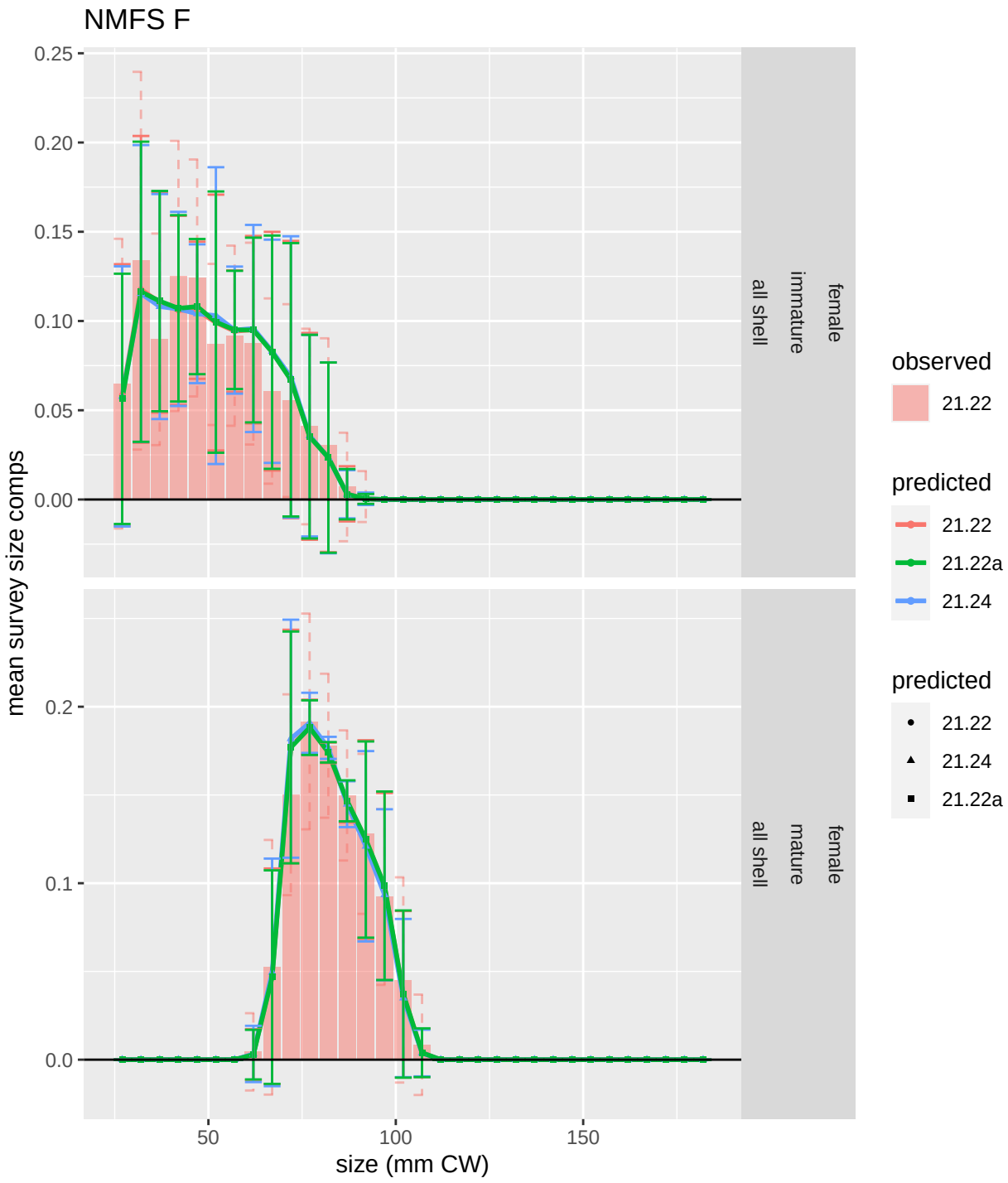

Figure 1: Comparison of observed and predicted mean survey size comps for NMFS F.

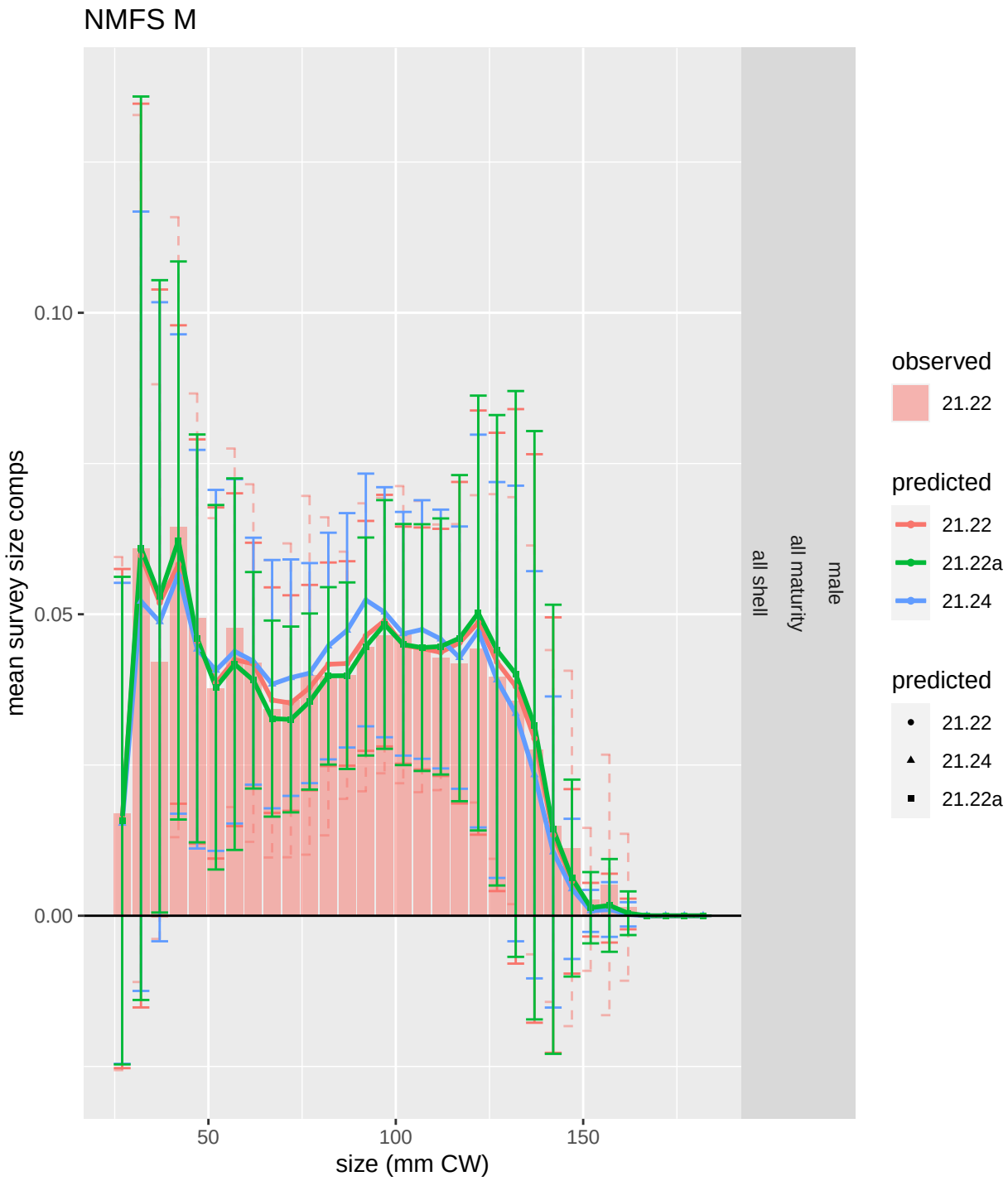

Figure 2: Comparison of observed and predicted mean survey size comps for NMFS M.

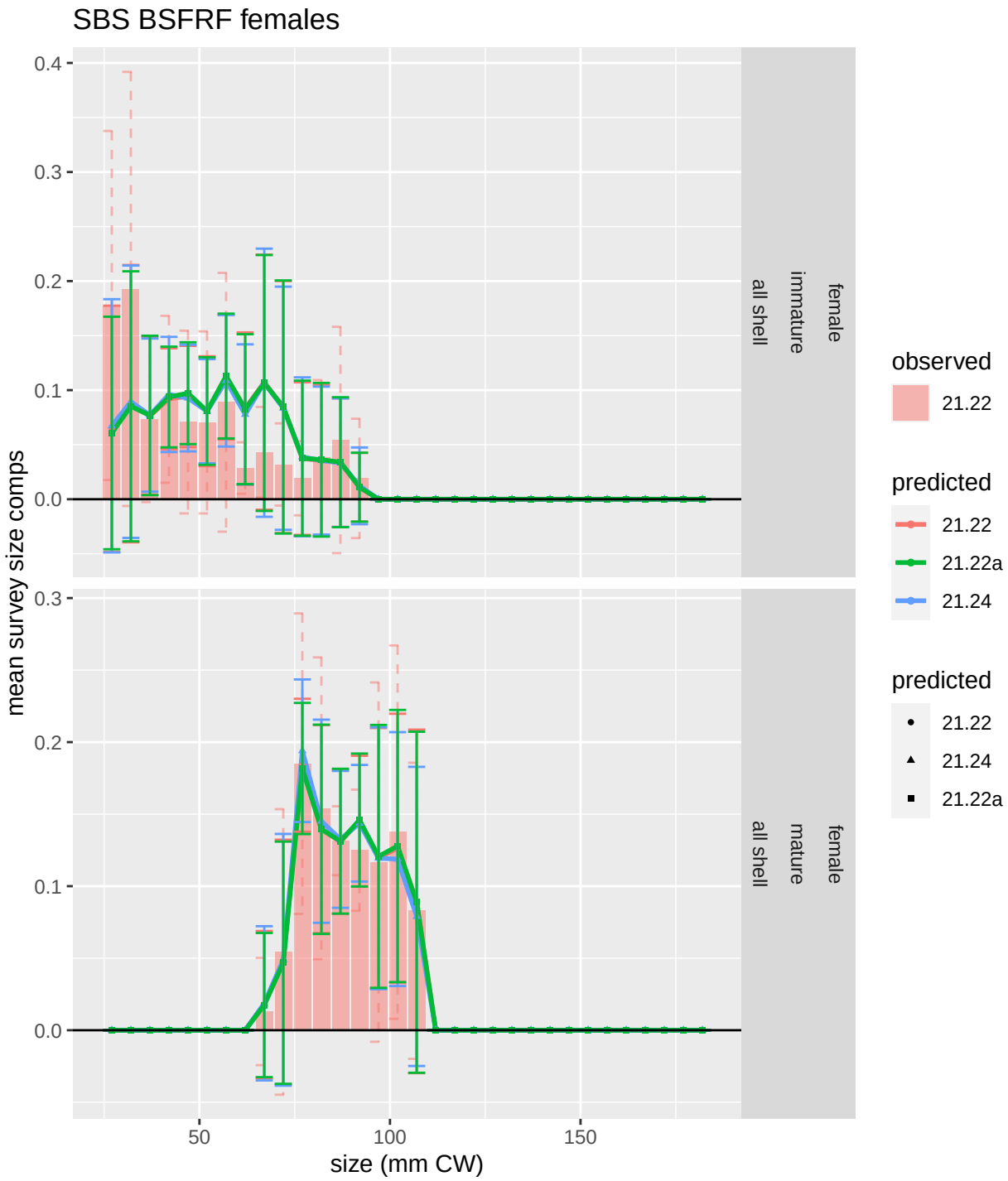

Figure 3: Comparison of observed and predicted mean survey size comps for SBS BSFRF females.

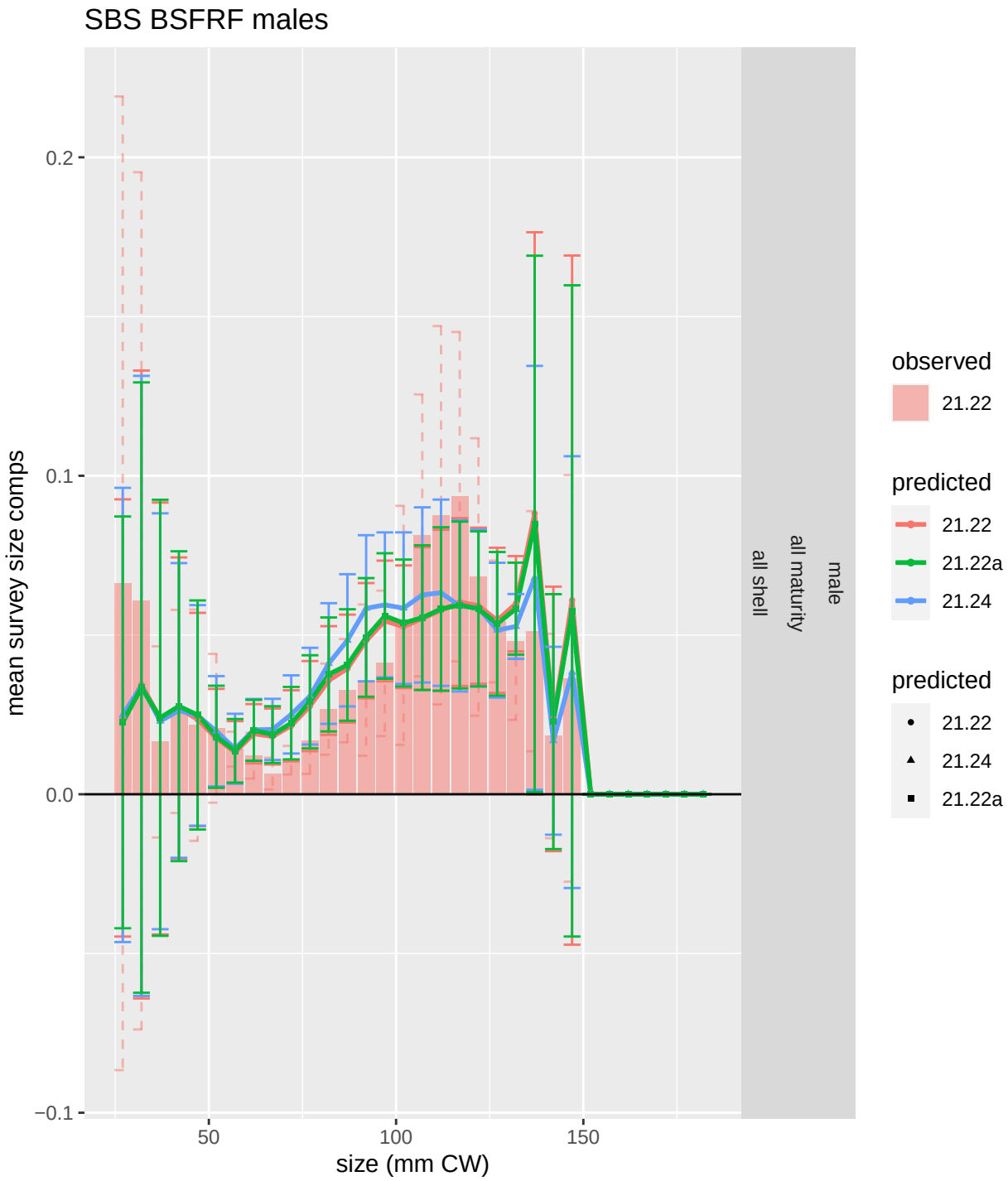

Figure 4: Comparison of observed and predicted mean survey size comps for SBS BSFRF males.

Residuals to survey size composition data

Pearson's residuals are plotted for fits to size composition data. Symbol areas reflect the size of each residual, Extreme values (residuals larger than 4 in scale) are indicated with a red "X" to facilitate identification.

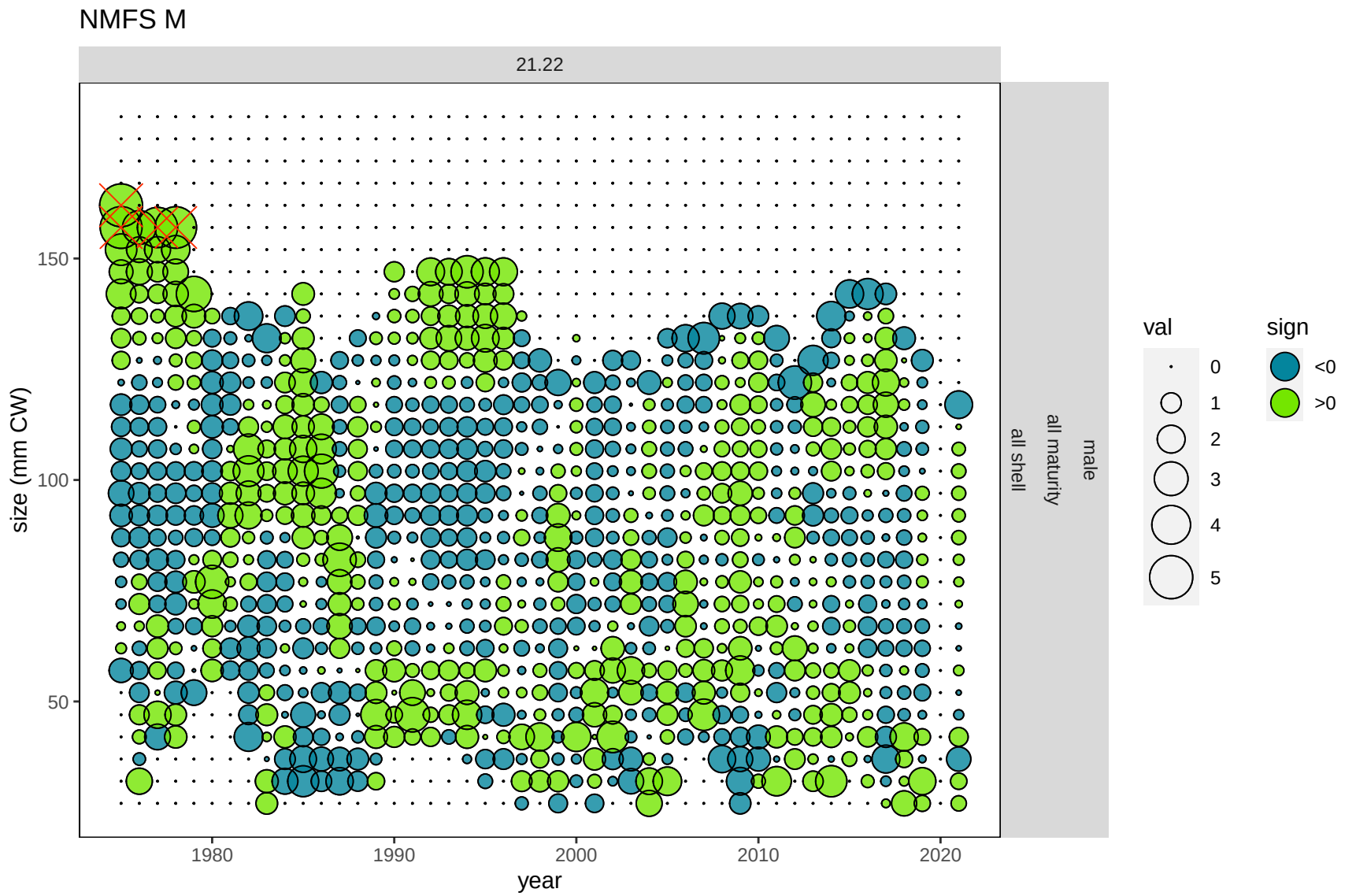

Figure 5: Pearson's residuals for male proportions-at-size from the NMFS M for scenario 21.22.

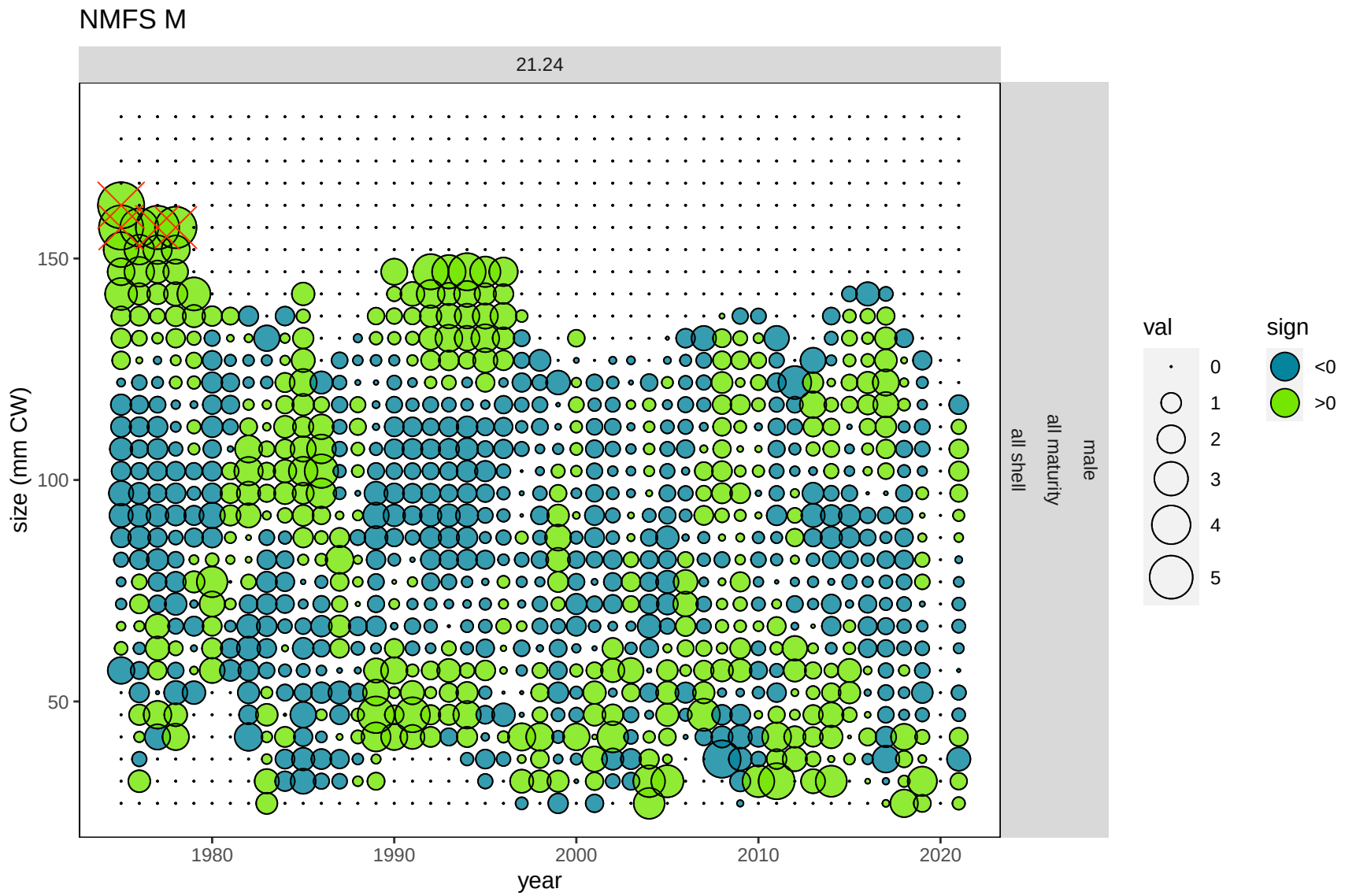

Figure 6: Pearson's residuals for male proportions-at-size from the NMFS M for scenario 21.24.

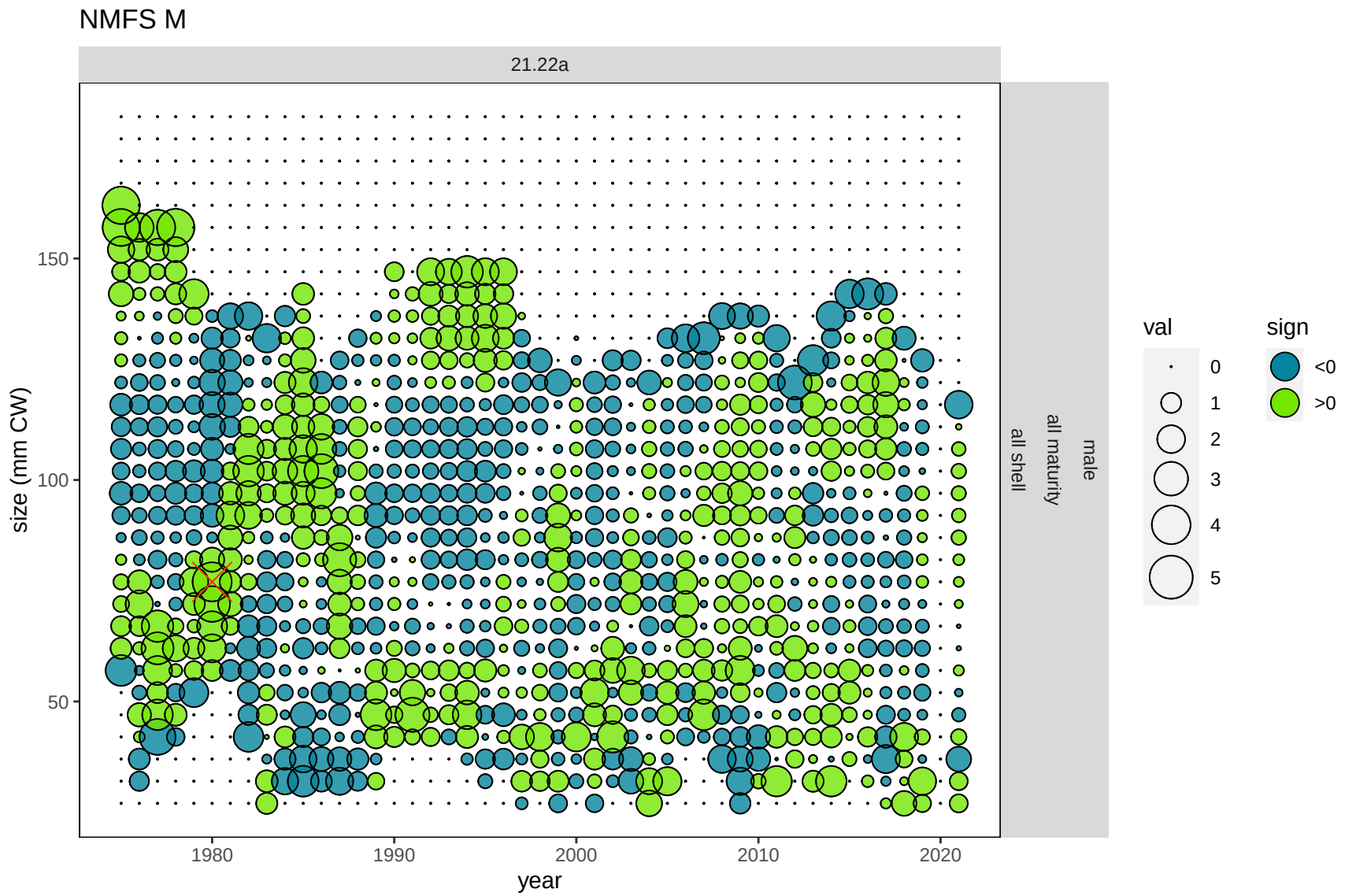

Figure 7: Pearson's residuals for male proportions-at-size from the NMFS M for scenario 21.22a.

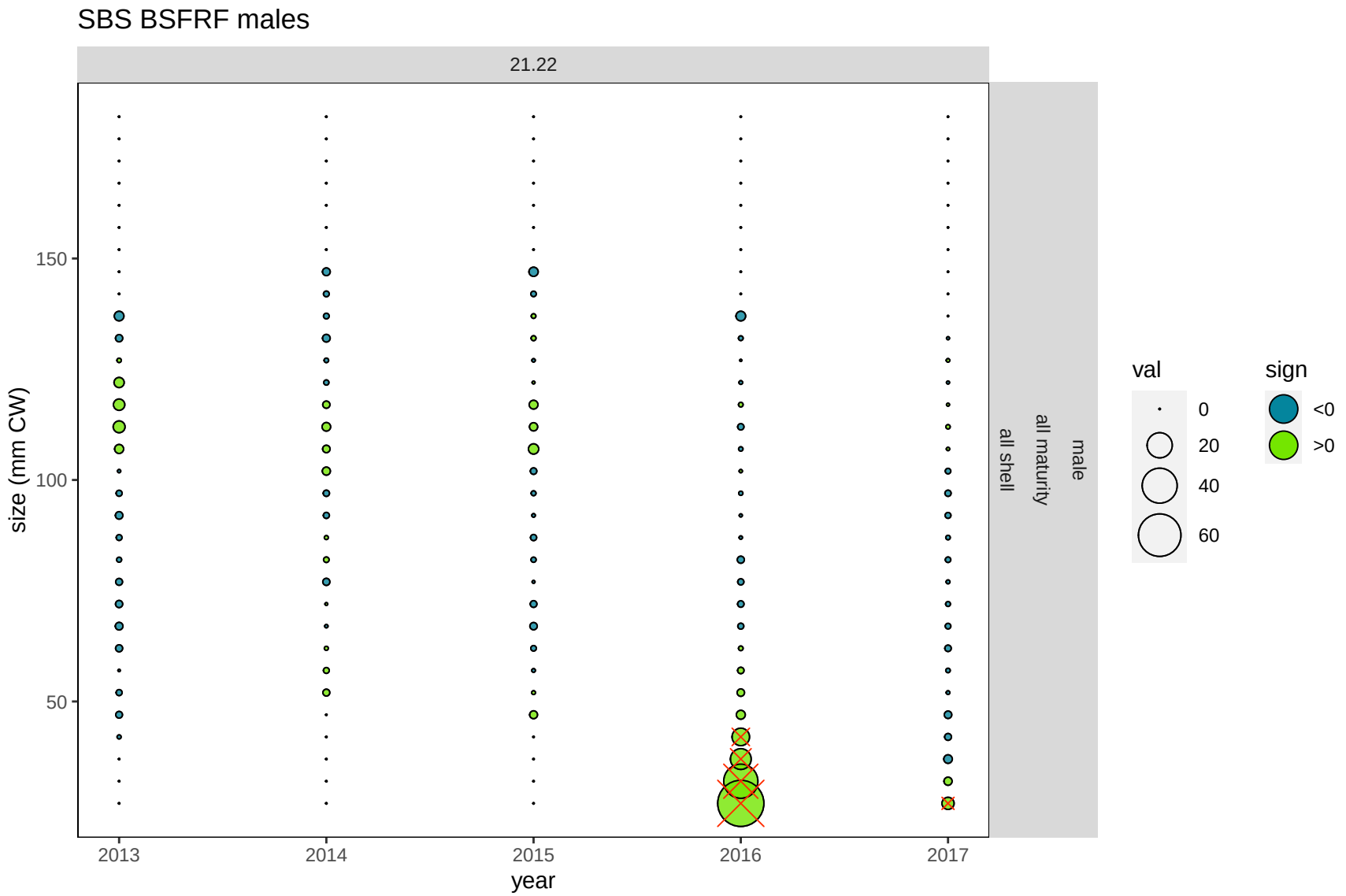

Figure 8: Pearson's residuals for male proportions-at-size from the SBS BSFRF males for scenario 21.22.

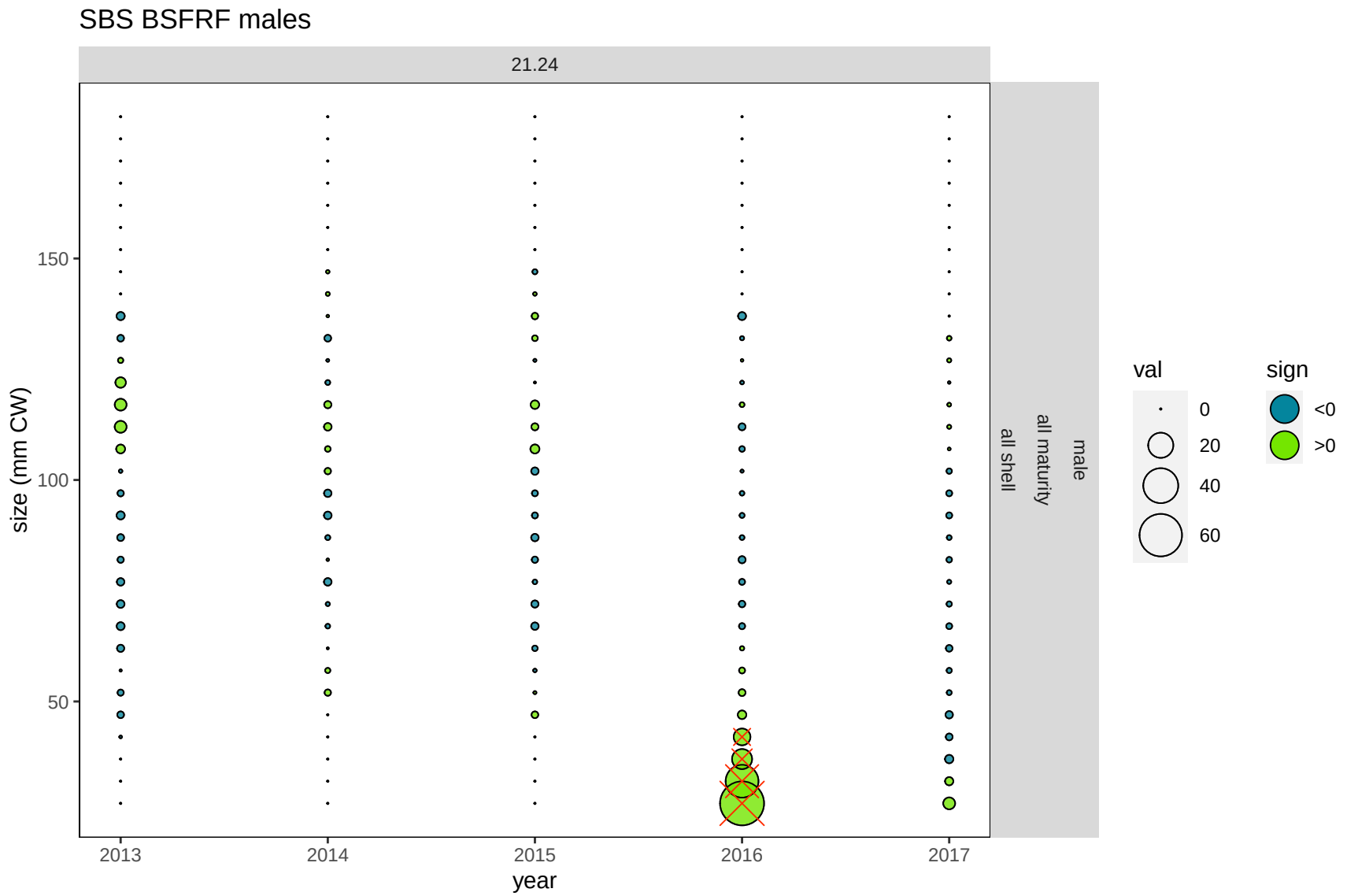

Figure 9: Pearson's residuals for male proportions-at-size from the SBS BSFRF males for scenario 21.24.

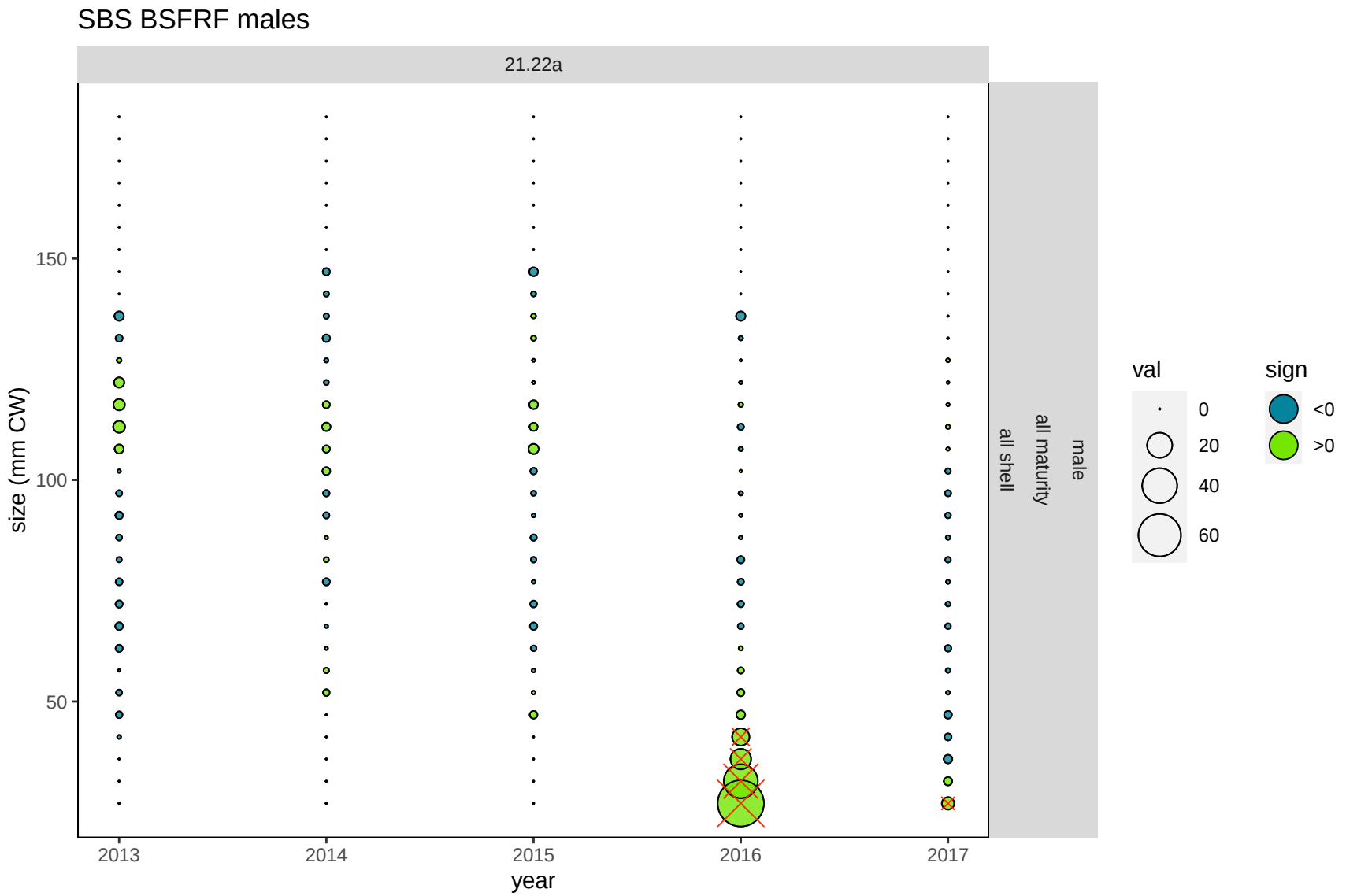

Figure 10: Pearson's residuals for male proportions-at-size from the SBS BSFRF males for scenario 21.22a.

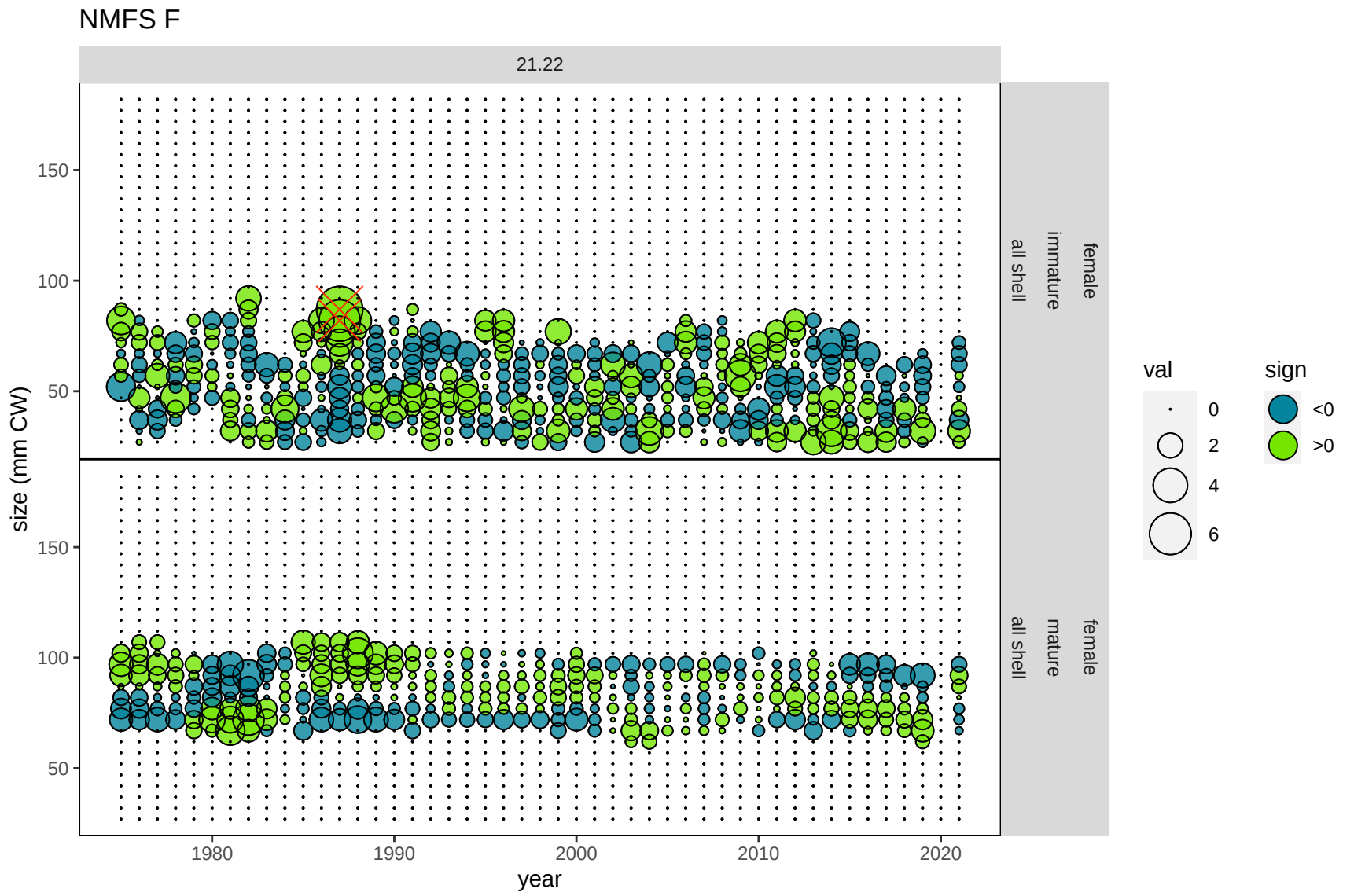

Figure 11: Pearson's residuals for female proportions-at-size from the NMFS F for scenario 21.22.

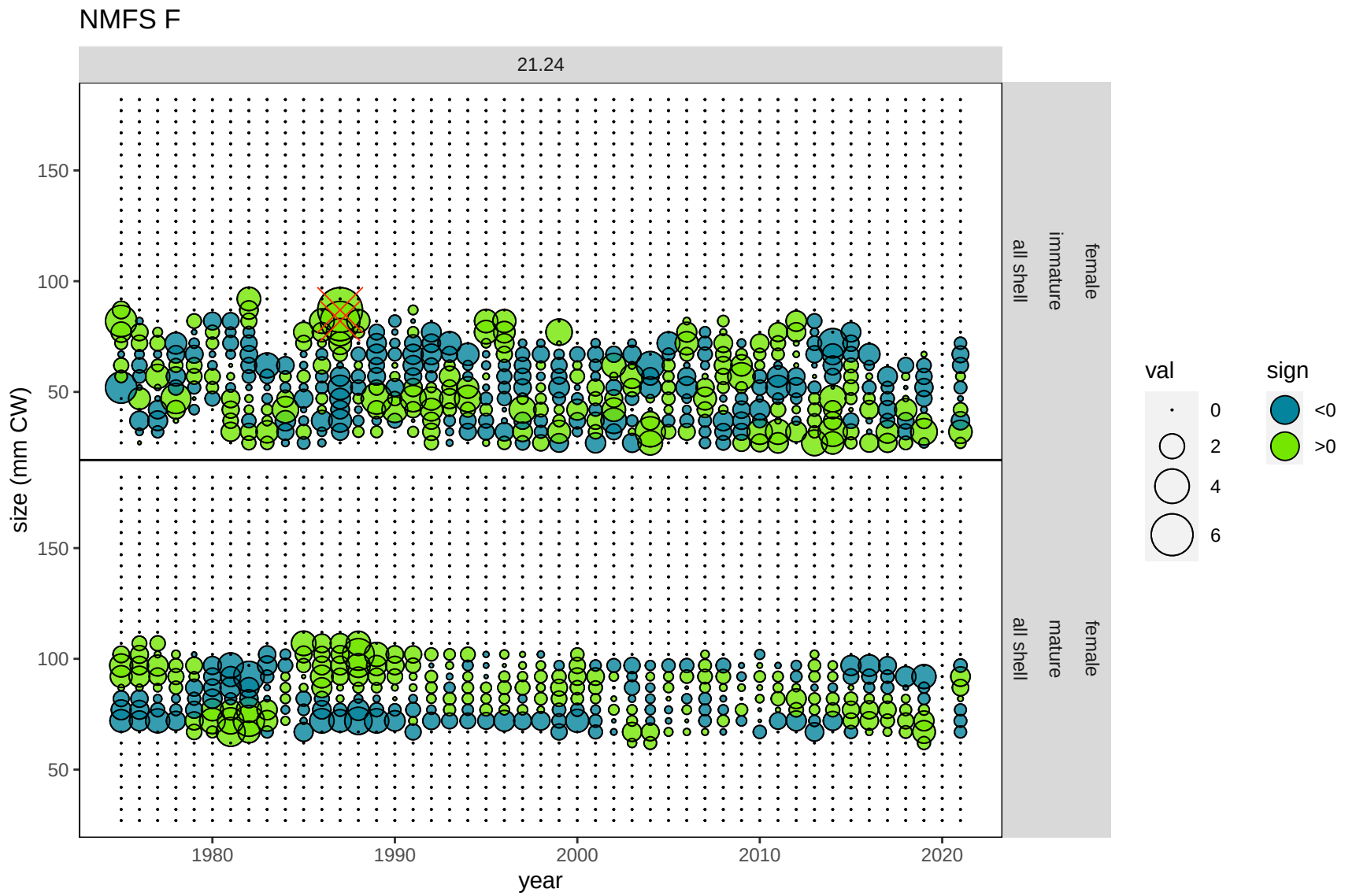

Figure 12: Pearson's residuals for female proportions-at-size from the NMFS F for scenario 21.24.

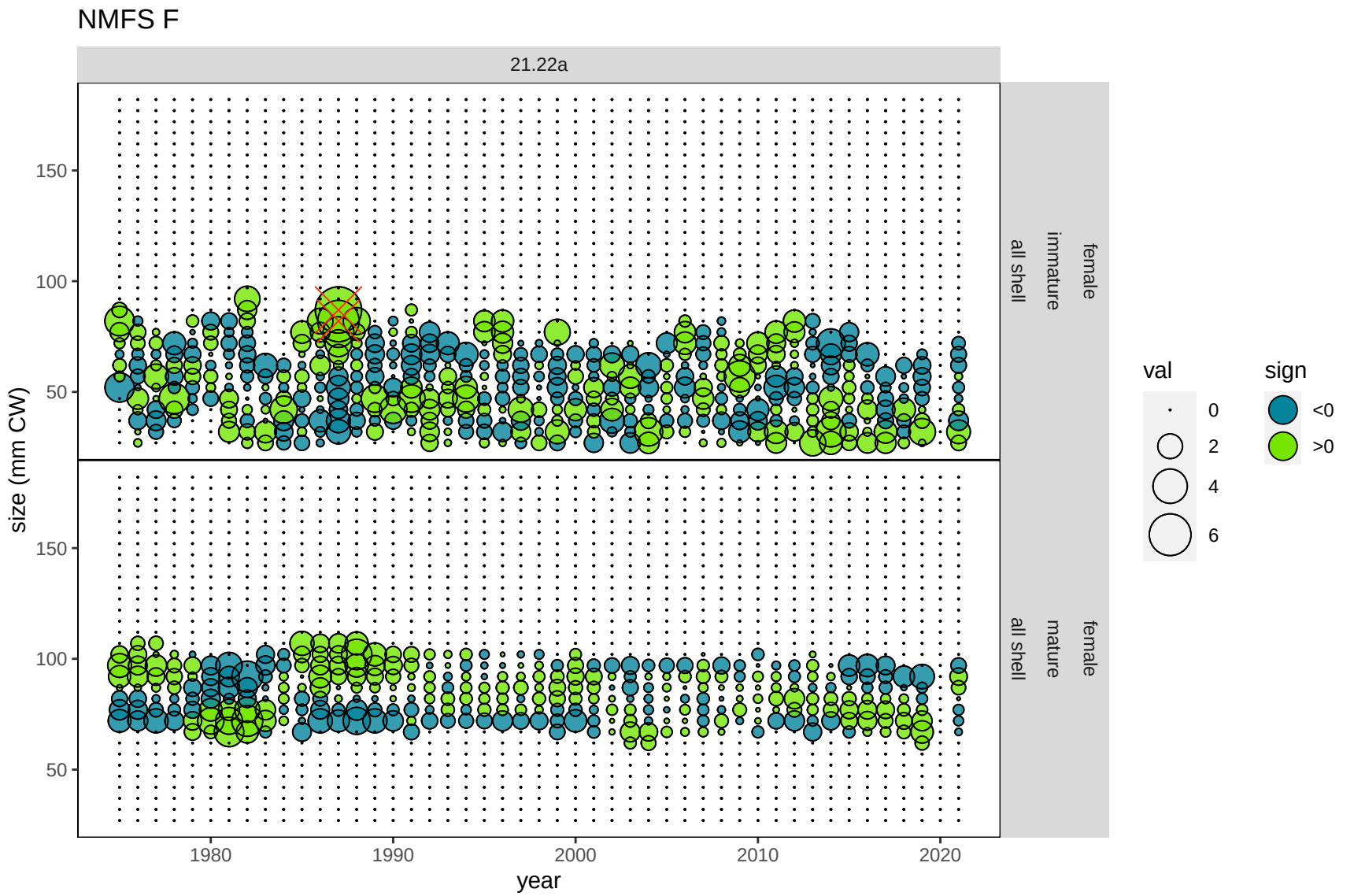

Figure 13: Pearson's residuals for female proportions-at-size from the NMFS F for scenario 21.22a.

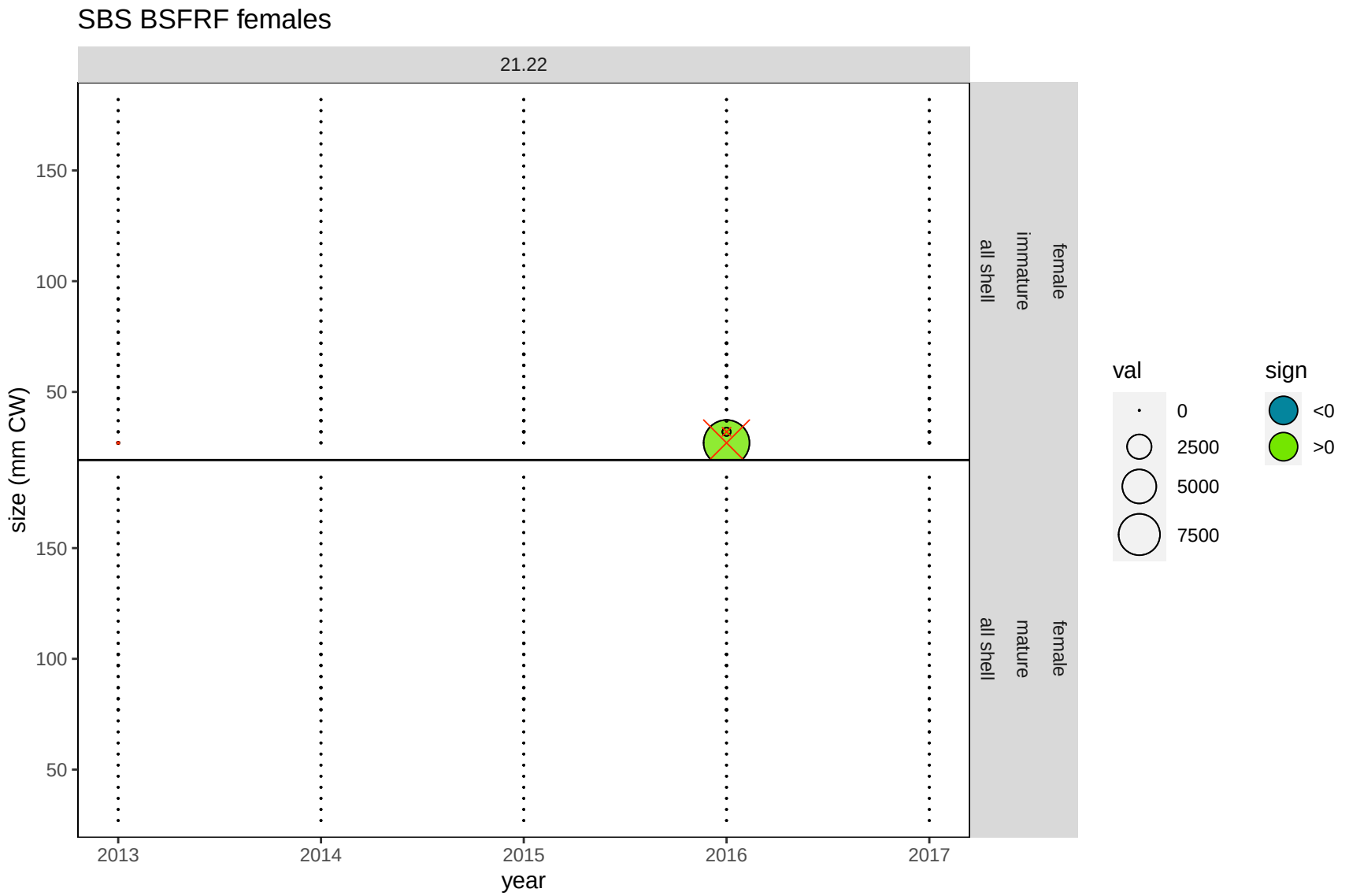

Figure 14: Pearson's residuals for female proportions-at-size from the SBS BSFRF females for scenario 21.22.

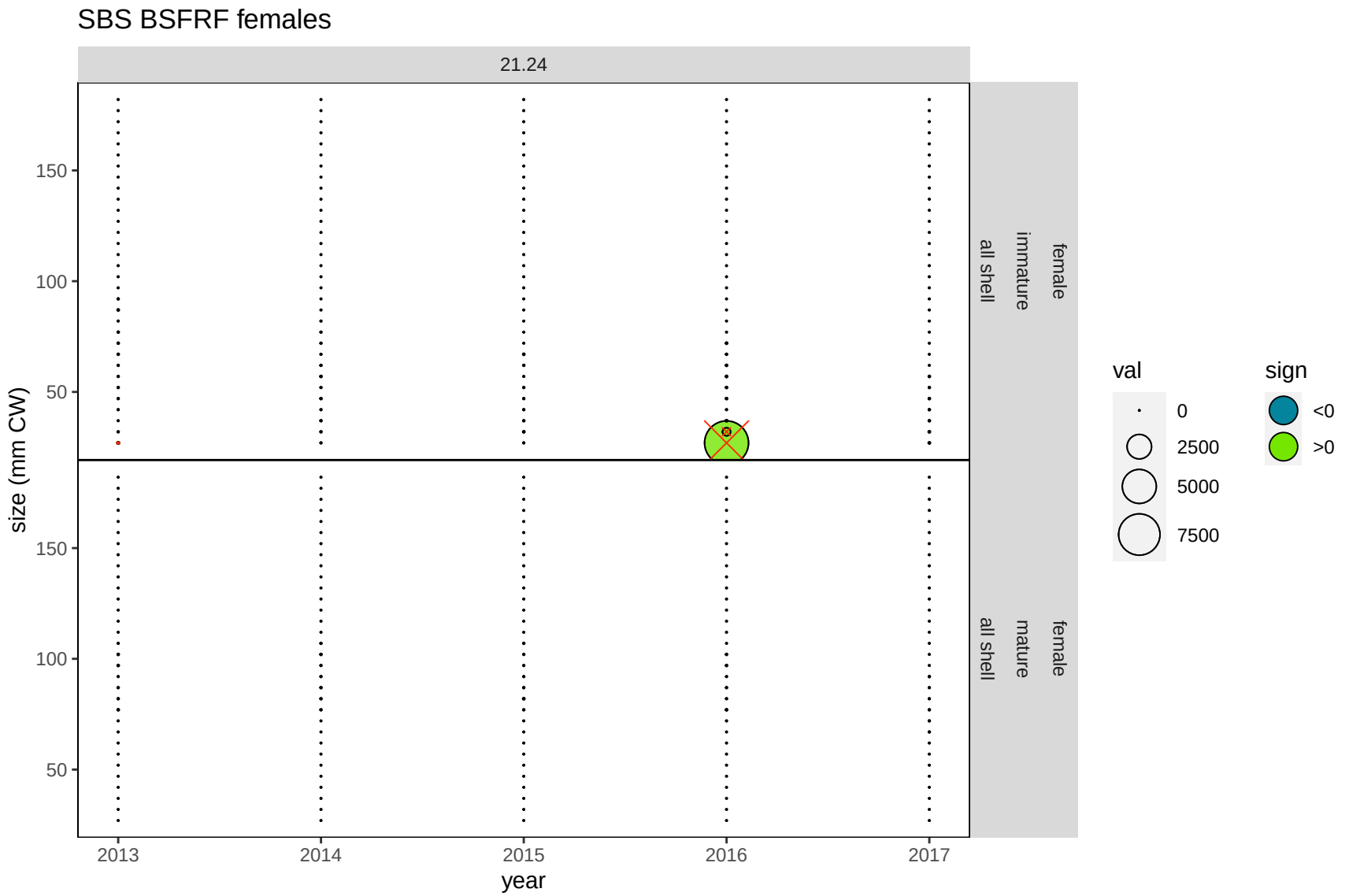

Figure 15: Pearson's residuals for female proportions-at-size from the SBS BSFRF females for scenario 21.24.

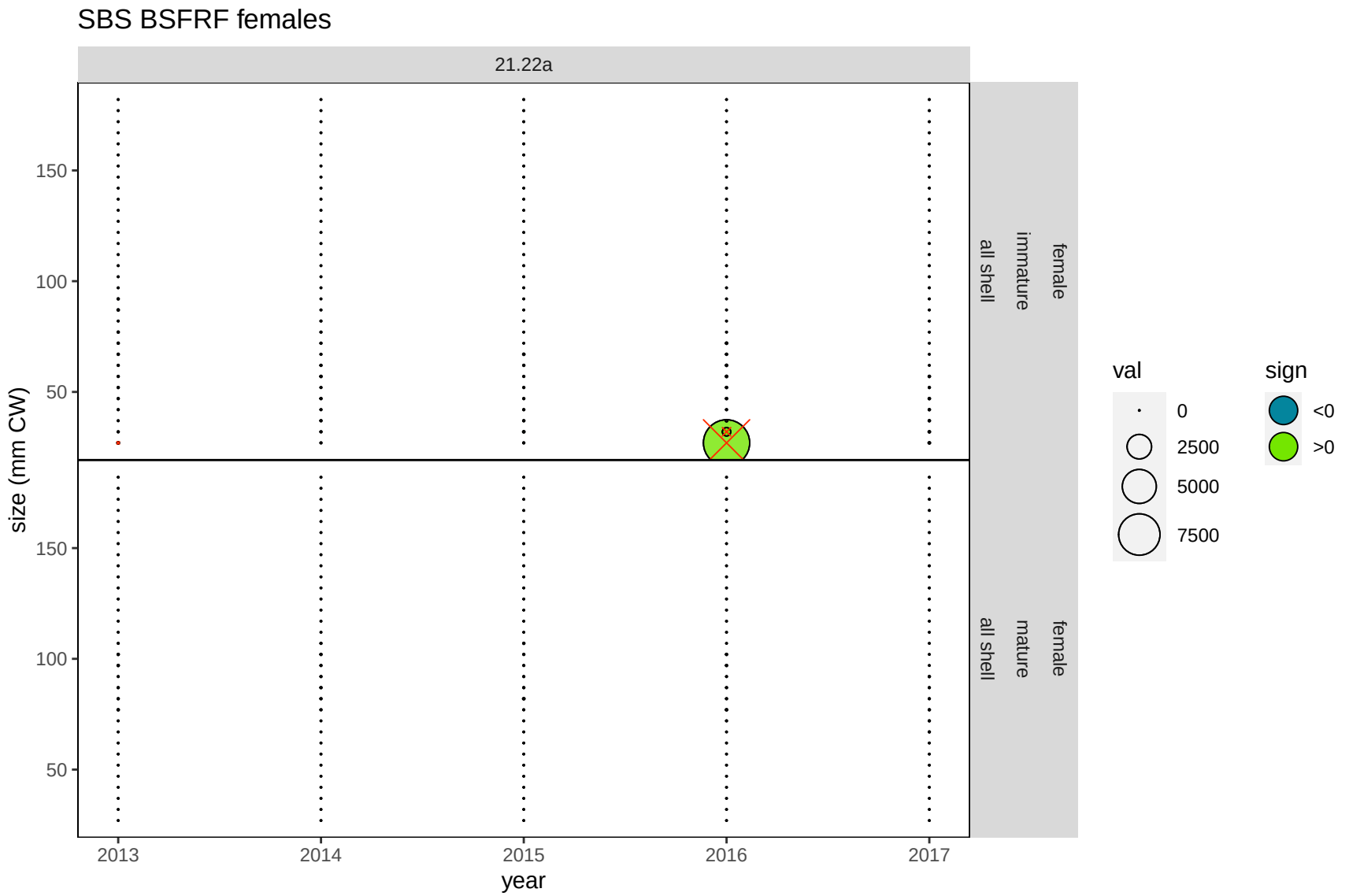

Figure 16: Pearson's residuals for female proportions-at-size from the SBS BSFRF females for scenario 21.22a.

Effective sample sizes for survey size compositions

rCompTCMs::extractMDFR.Fits.EffectiveNs: Extracting fleets rCompTCMs::extractMDFR.Fits.EffectiveNs: Extracting fleets rCompTCMs::extractMDFR.Fits.EffectiveNs: Extracting fleets

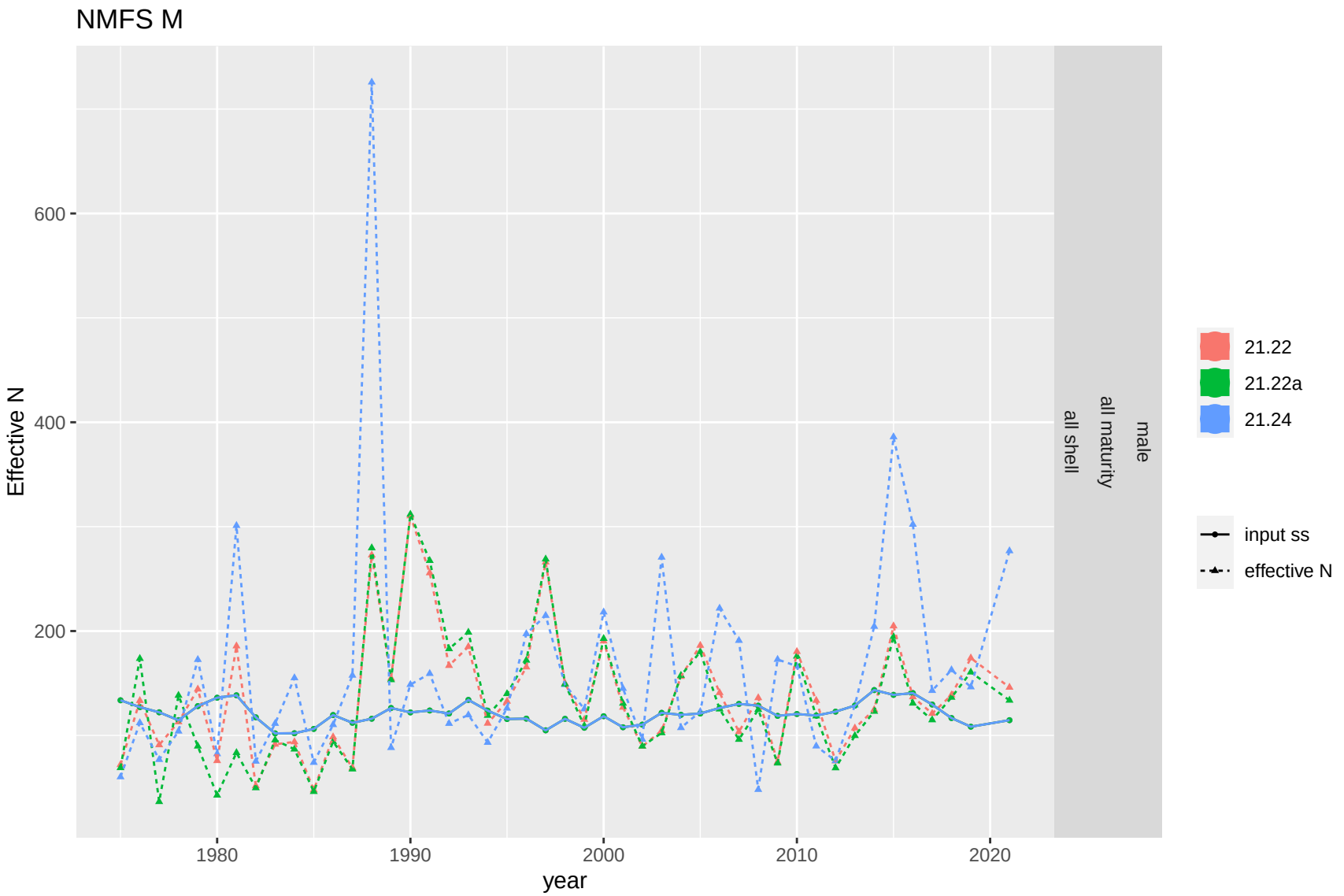

Figure 17: Input and effective sample sizes from retained catch size compositions from the NMFS M.

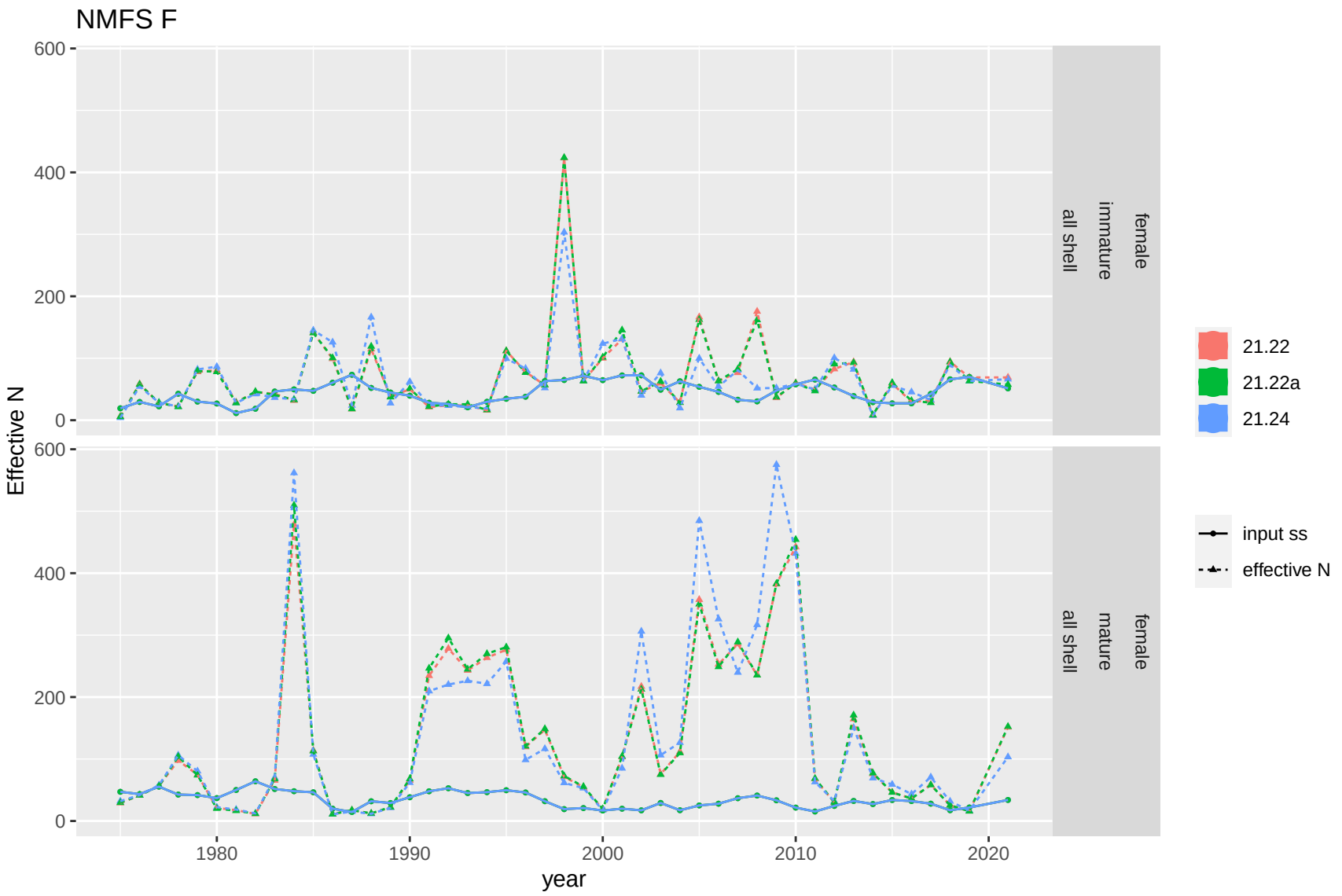

Figure 18: Input and effective sample sizes from retained catch size compositions from the NMFS F.

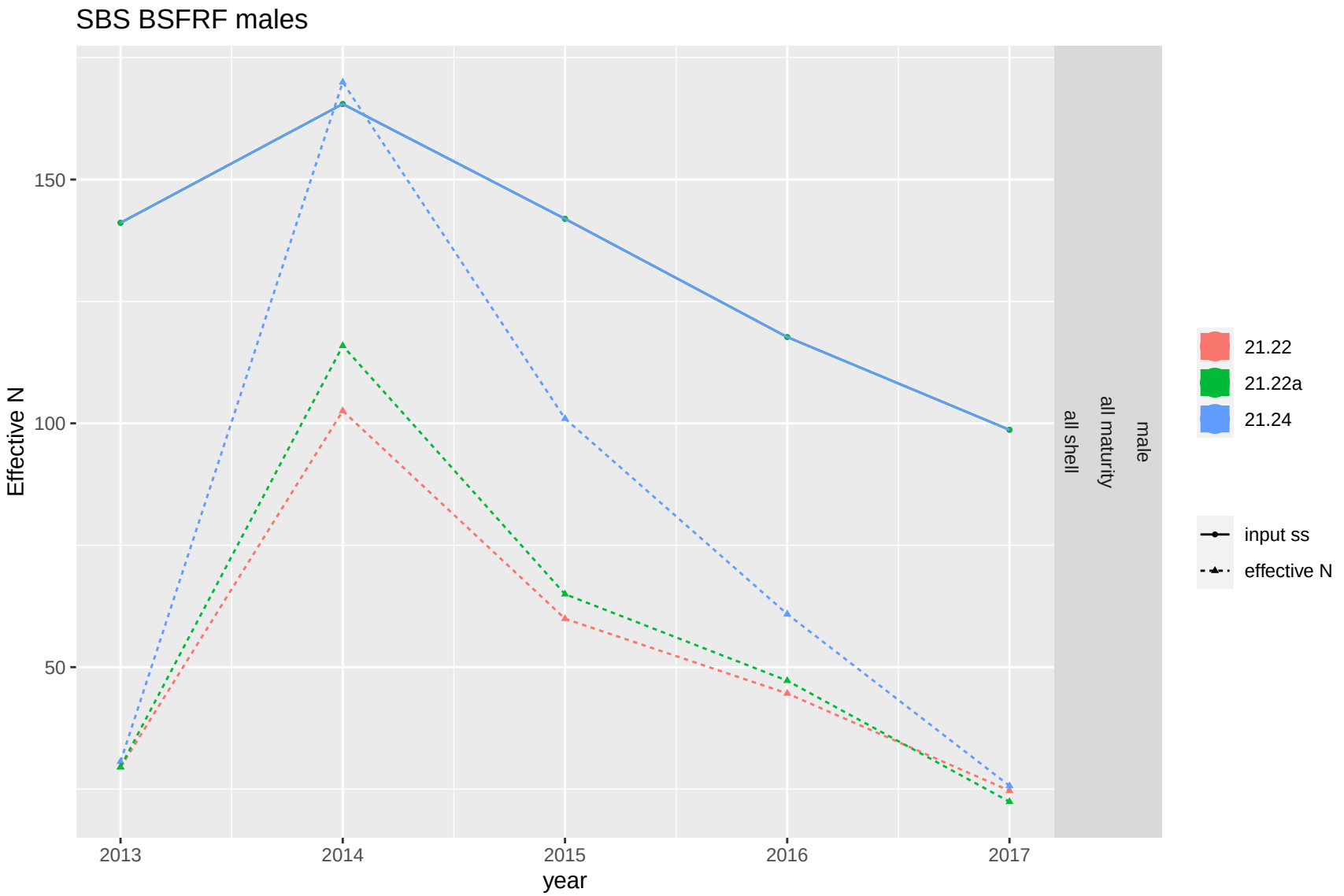

Figure 19: Input and effective sample sizes from retained catch size compositions from the SBS BSFRF males.

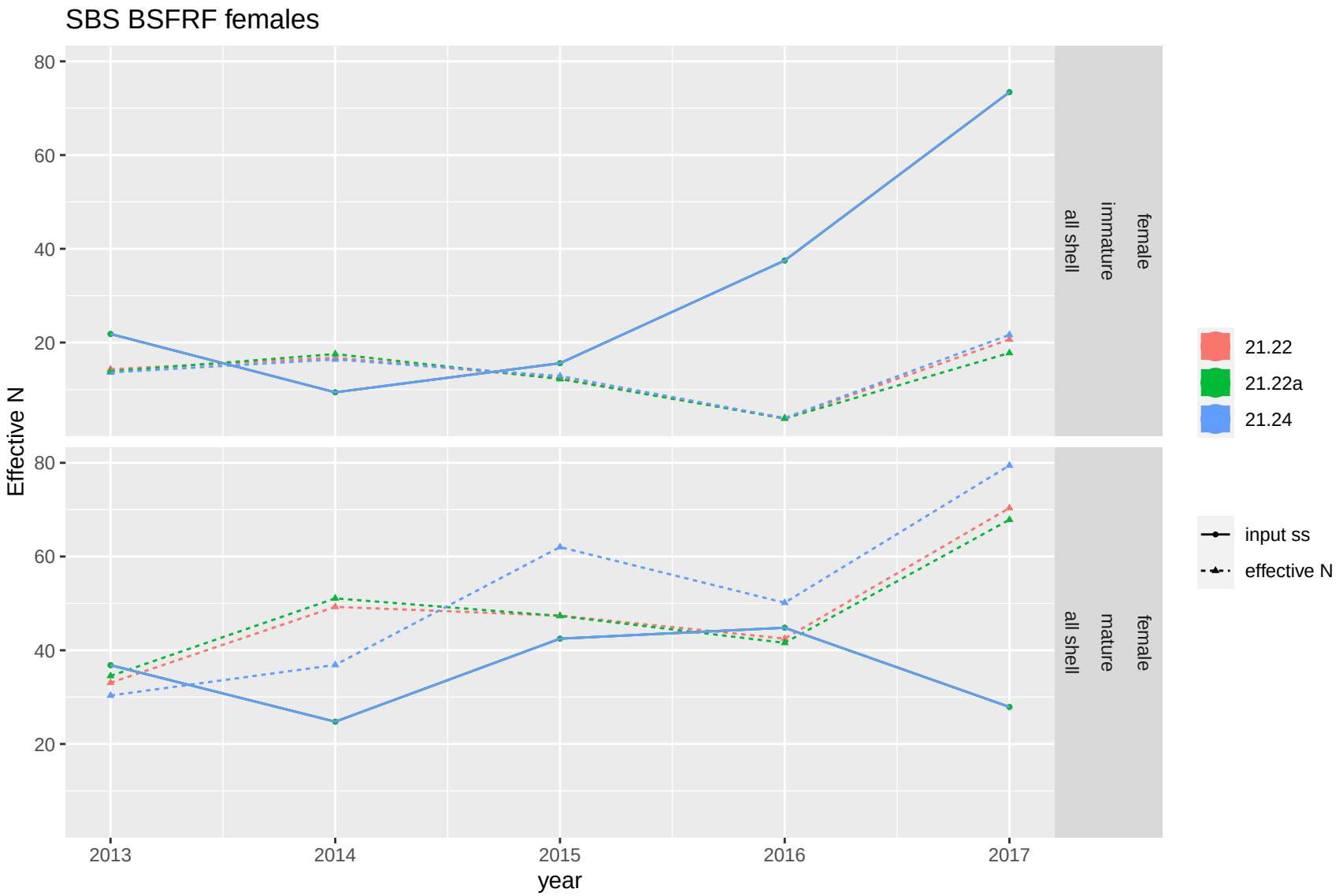

Figure 20: Input and effective sample sizes from retained catch size compositions from the SBS BSFRF females.

Appendix H Model Comparisons: Fits to Size Composition Data – 20.07u vs 20.07

William Stockhausen

03 September, 2021

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Model fits to size compositions, by year **1**

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Model fits to size compositions, by year

Fits to the size composition data available to the model(s) are presented in this section as line plots by year. Not all of the fits presented are necessarily included in the parameter optimization for each model; some fits to datasets for a particular model may be included for comparison purposes with other models which include those data in their optimization. The reader should consult the main assessment document to determine which fits are included in the optimization for any particular model.

Survey size compositions

Figure 1: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 1 of 5.

Figure 2: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 2 of 5.

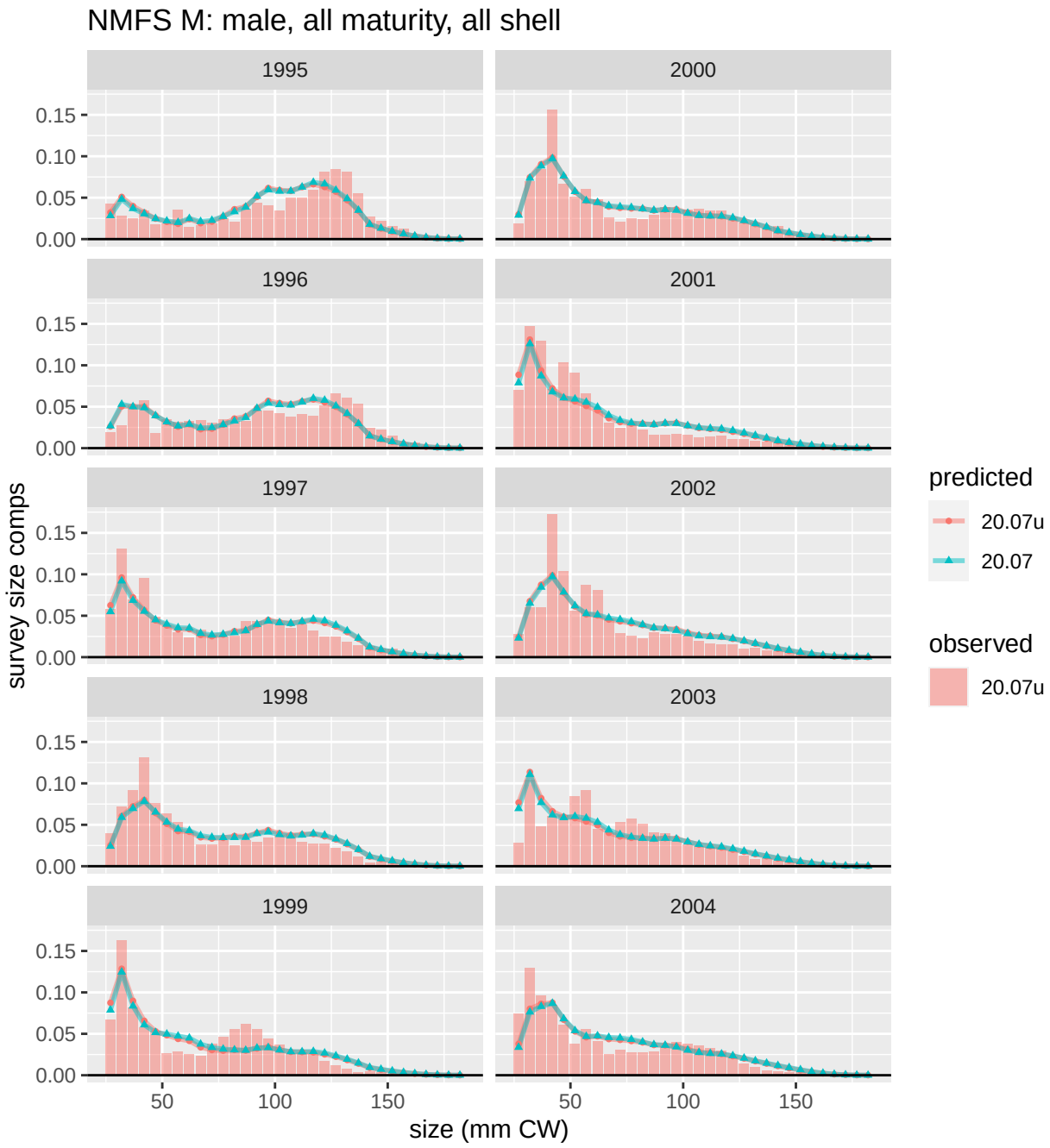

Figure 3: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 3 of 5.

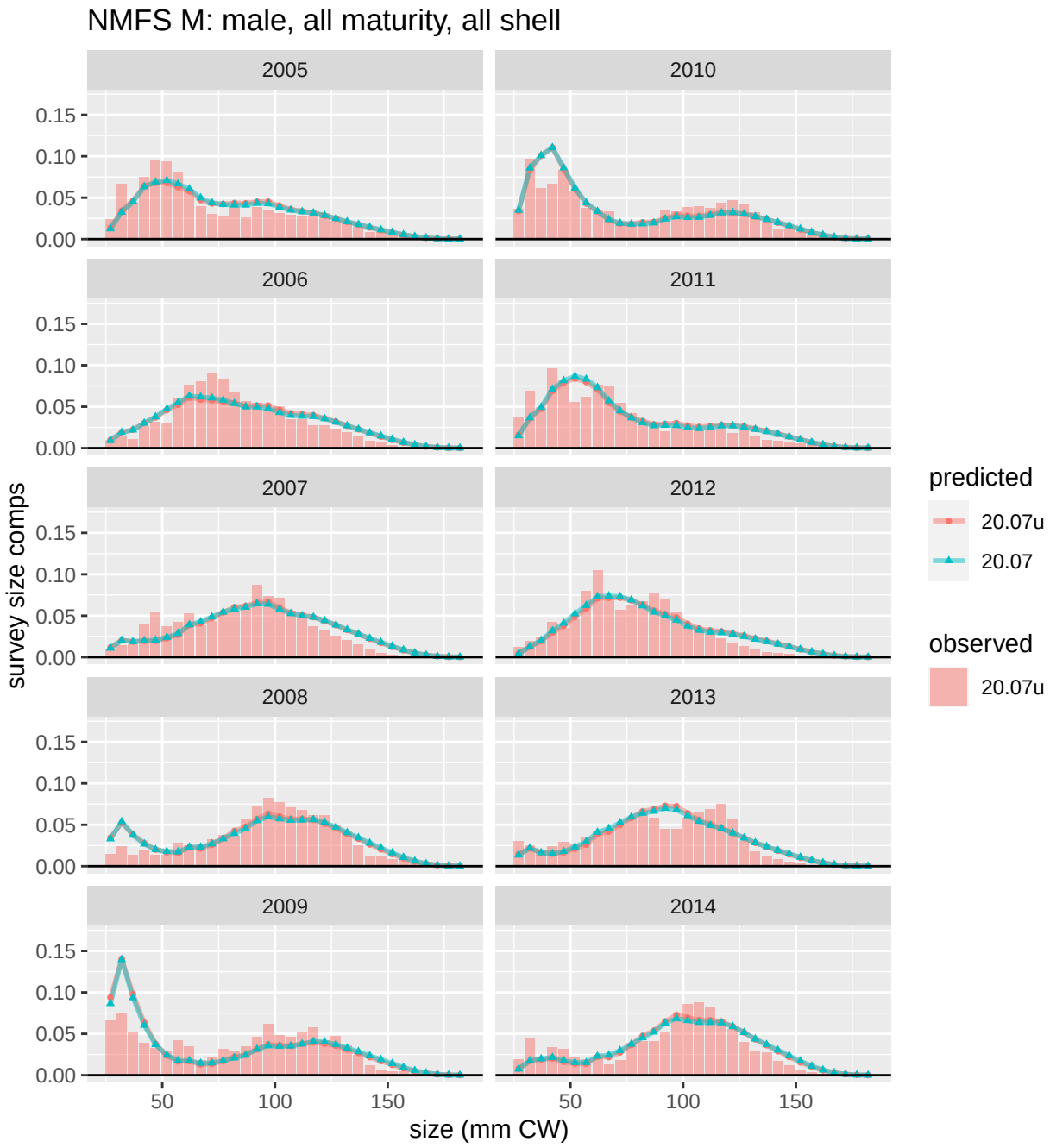

Figure 4: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 4 of 5.

Figure 5: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 5 of 5.

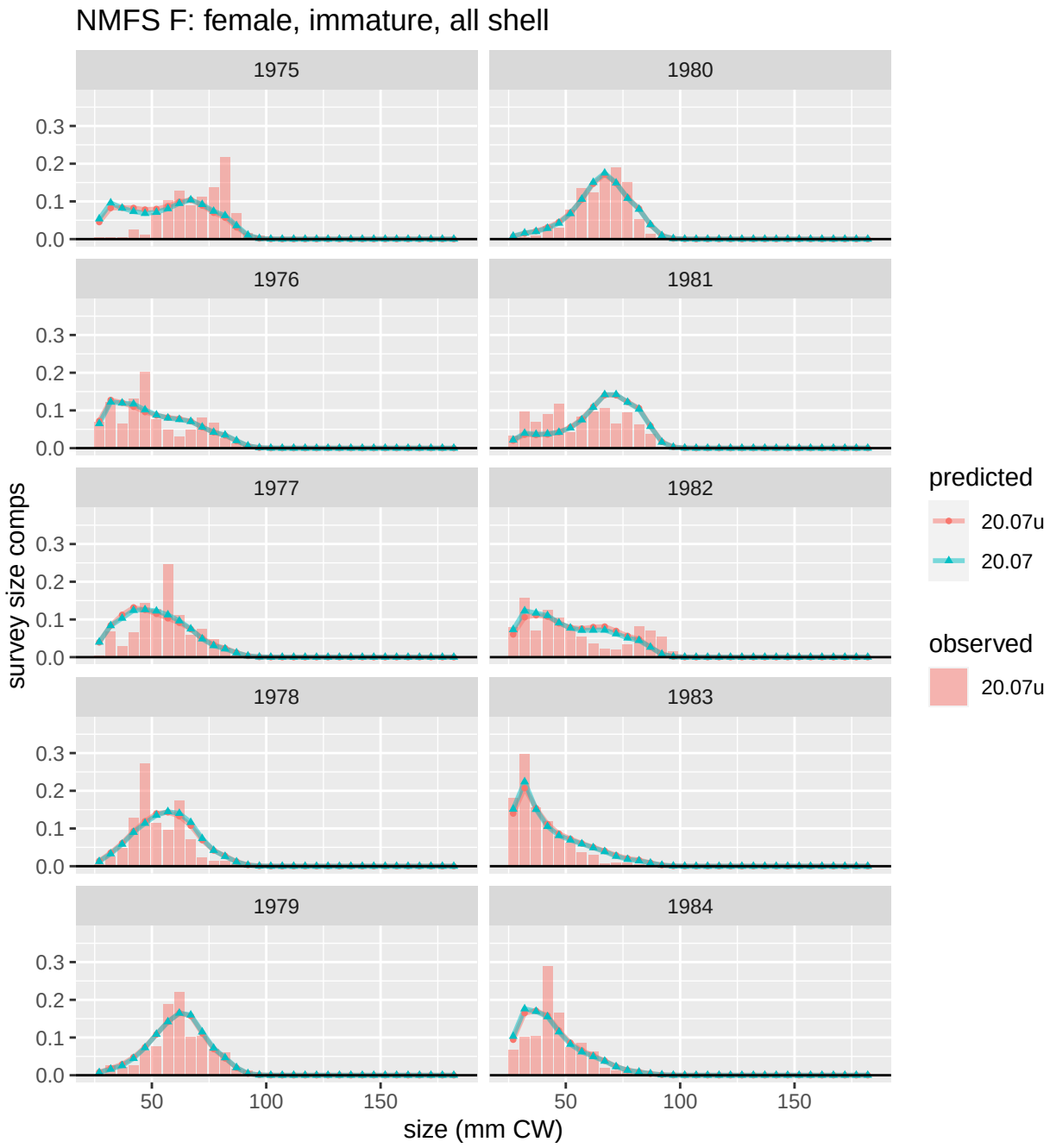

Figure 6: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 1 of 5.

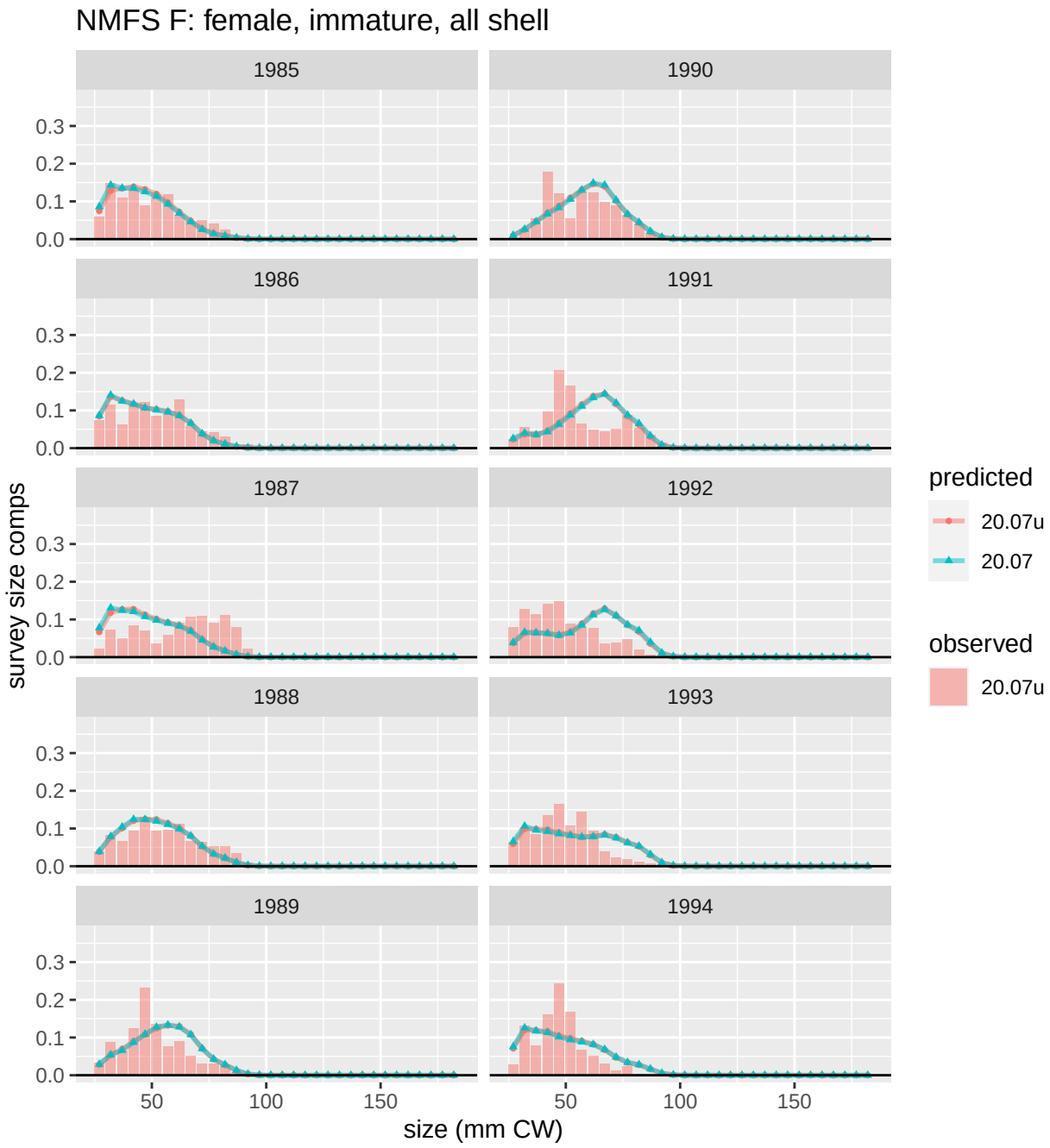

Figure 7: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 2 of 5.

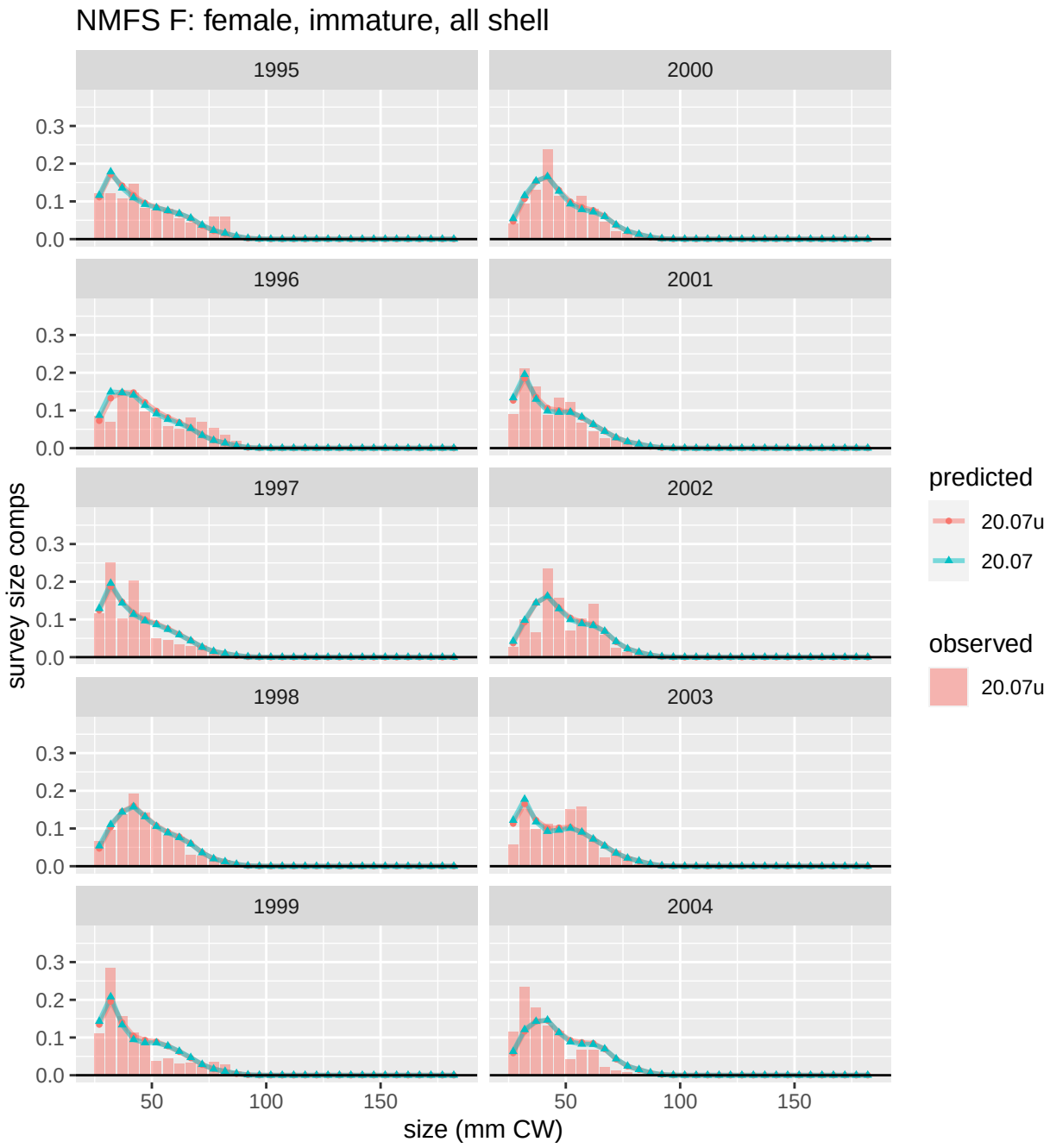

Figure 8: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 3 of 5.

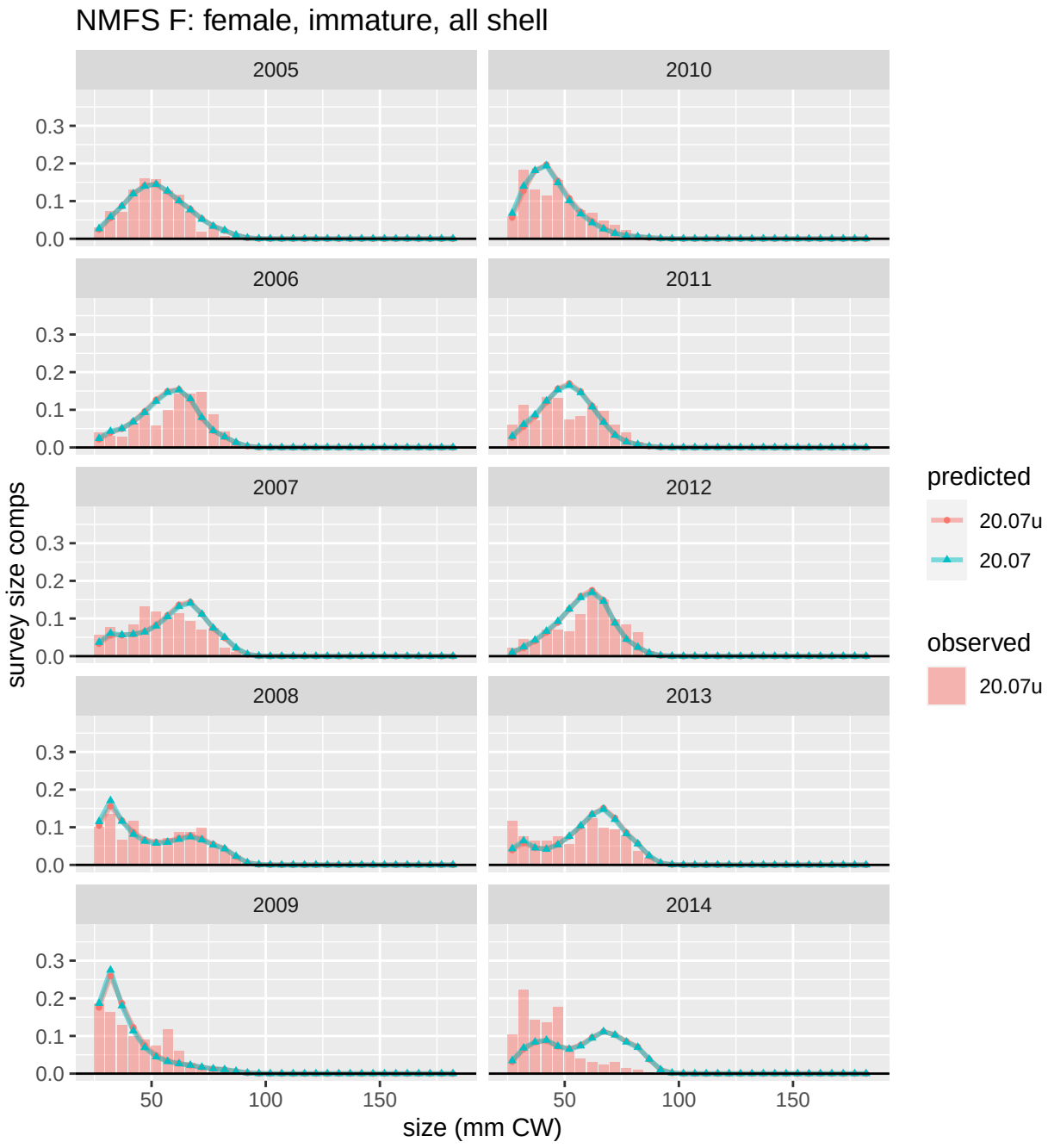

Figure 9: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 4 of 5.

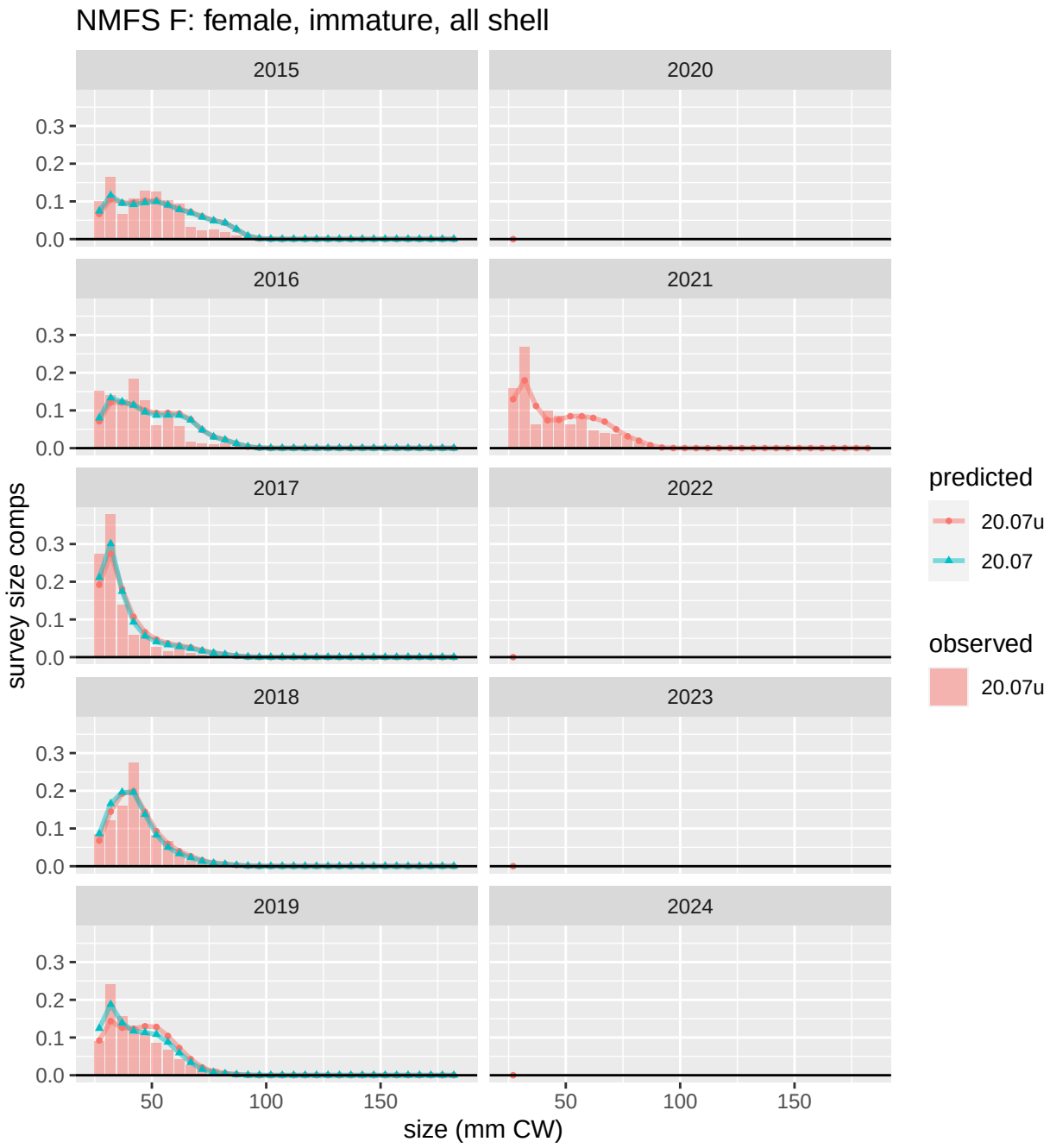

Figure 10: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 5 of 5.

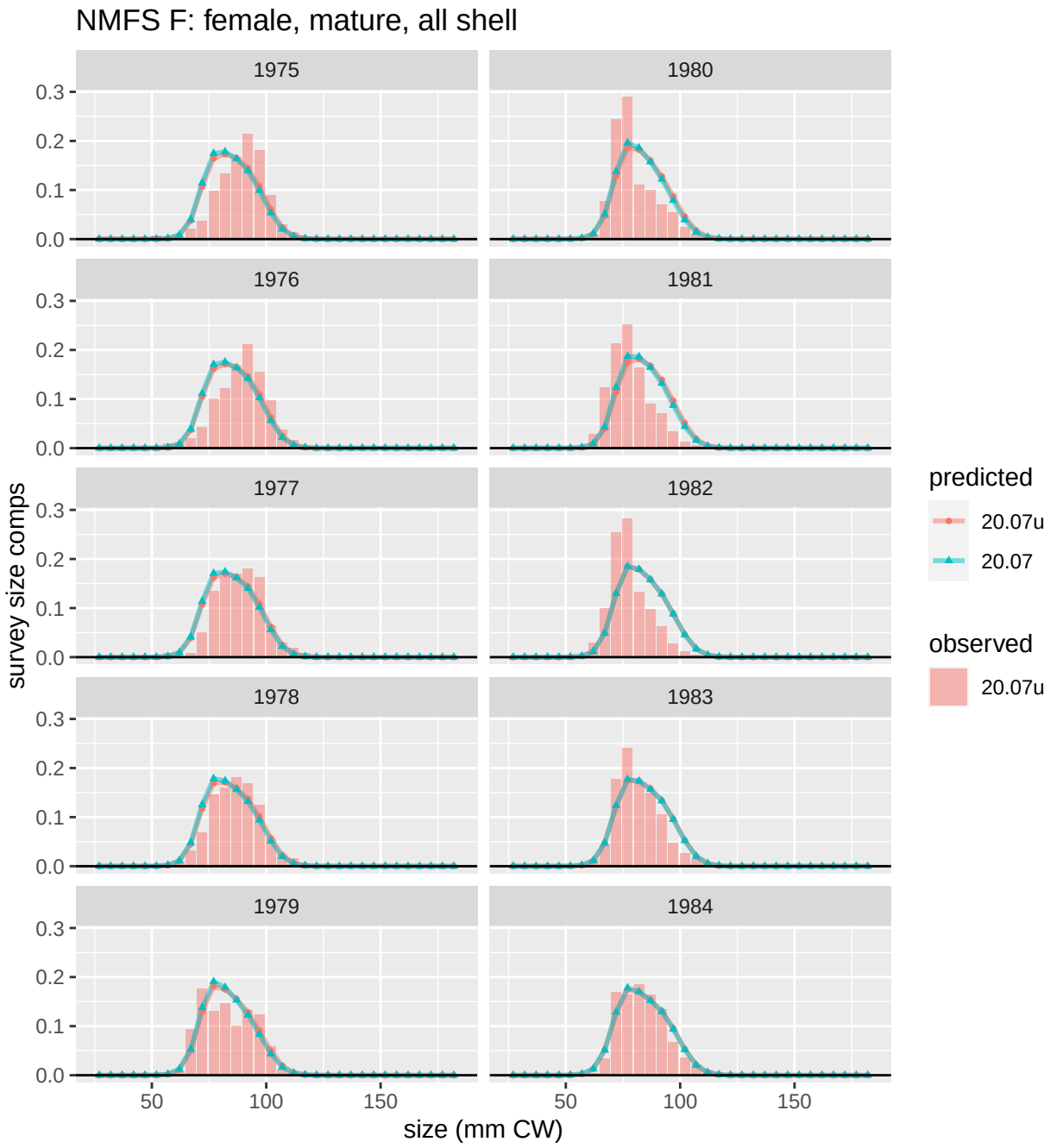

Figure 11: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 1 of 5.

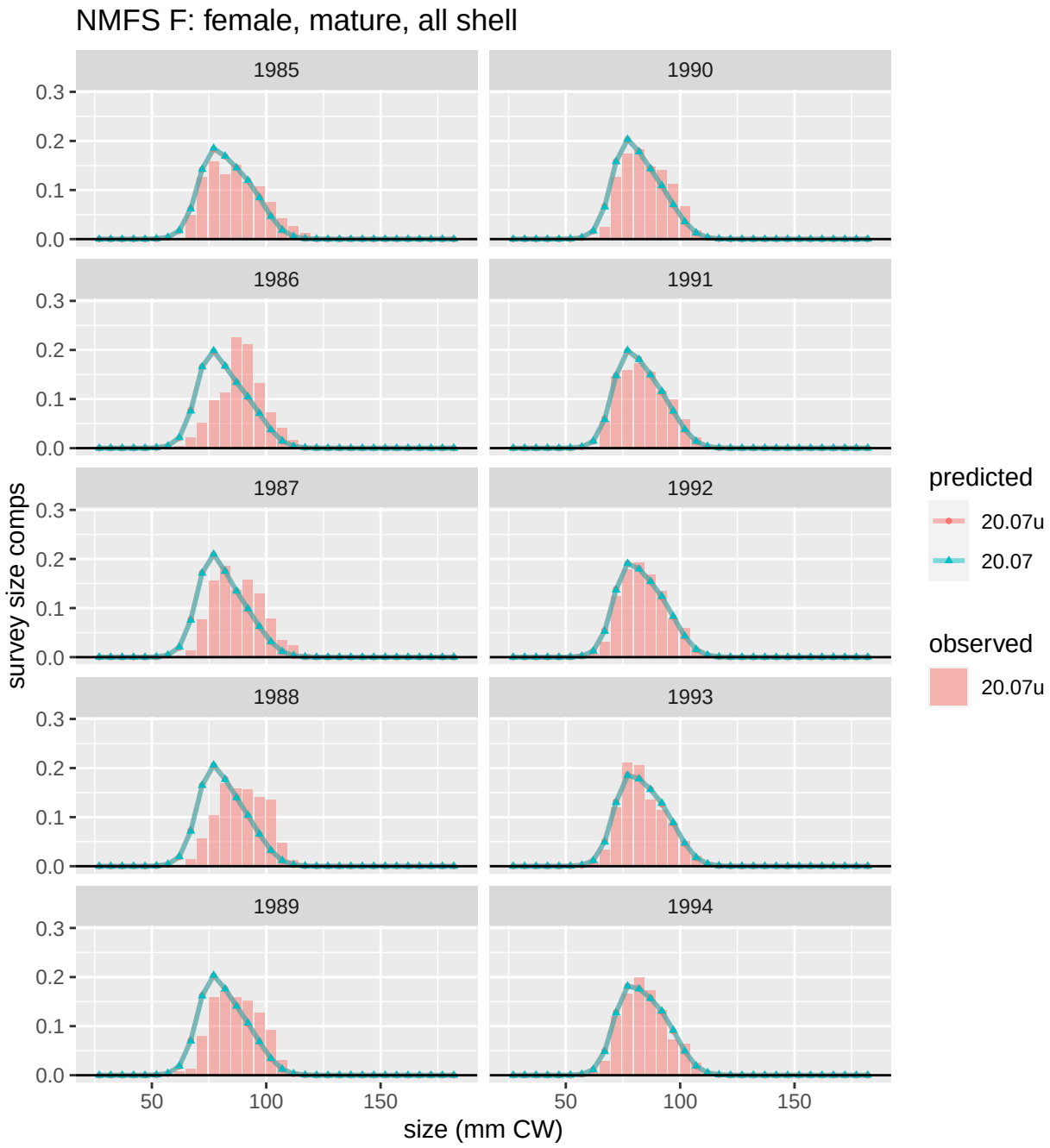

Figure 12: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 2 of 5.

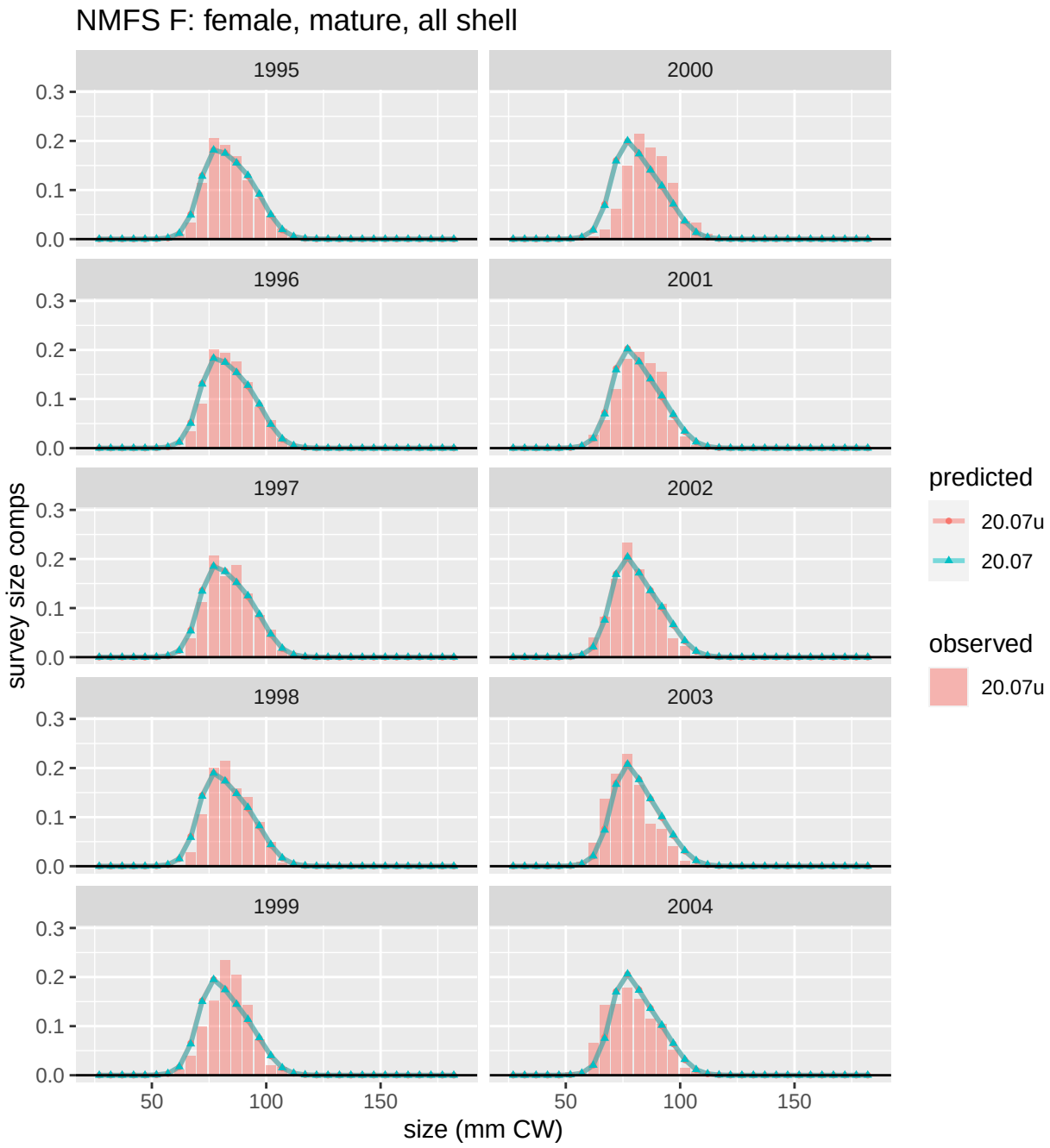

Figure 13: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 3 of 5.

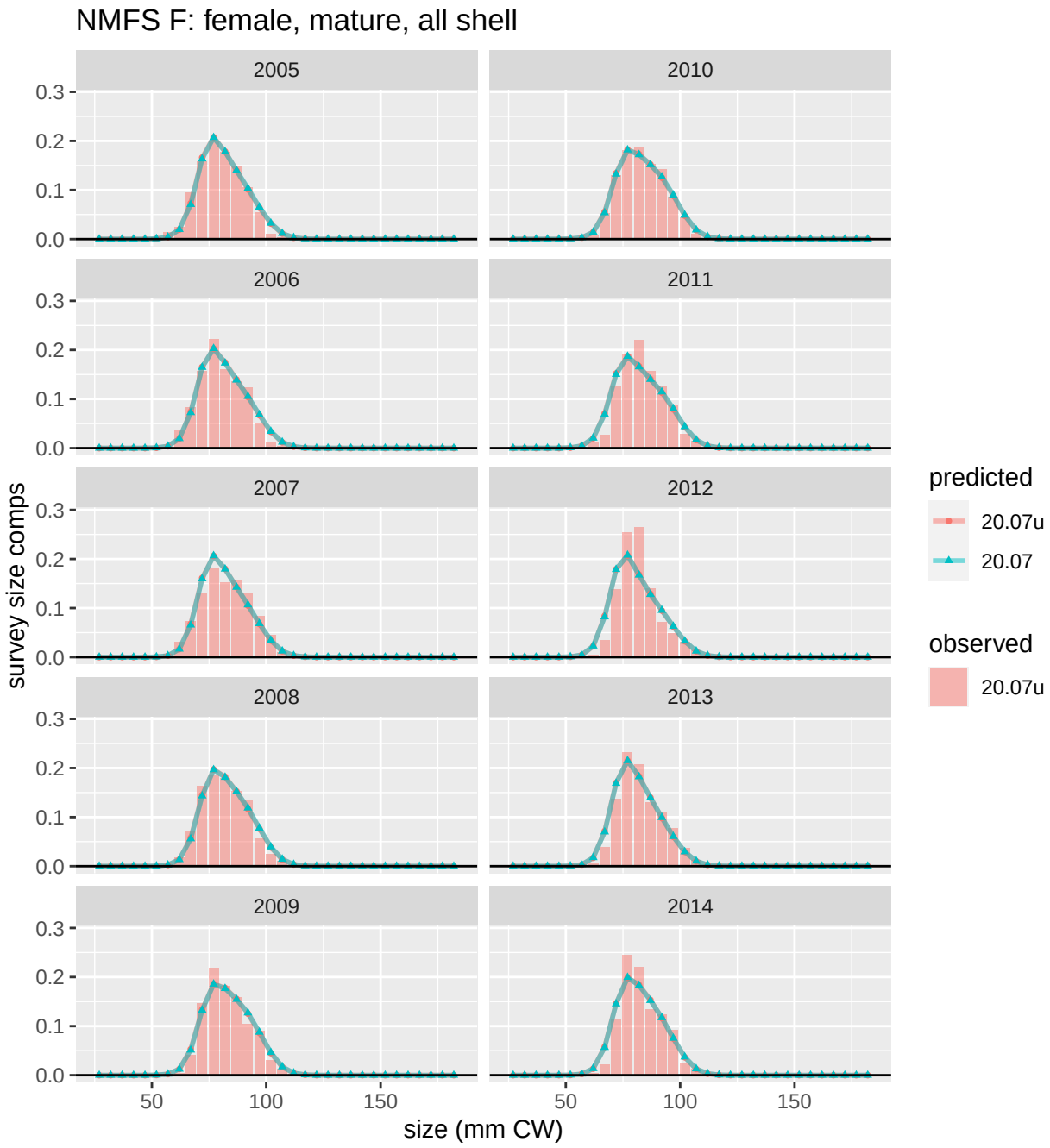

Figure 14: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 4 of 5.

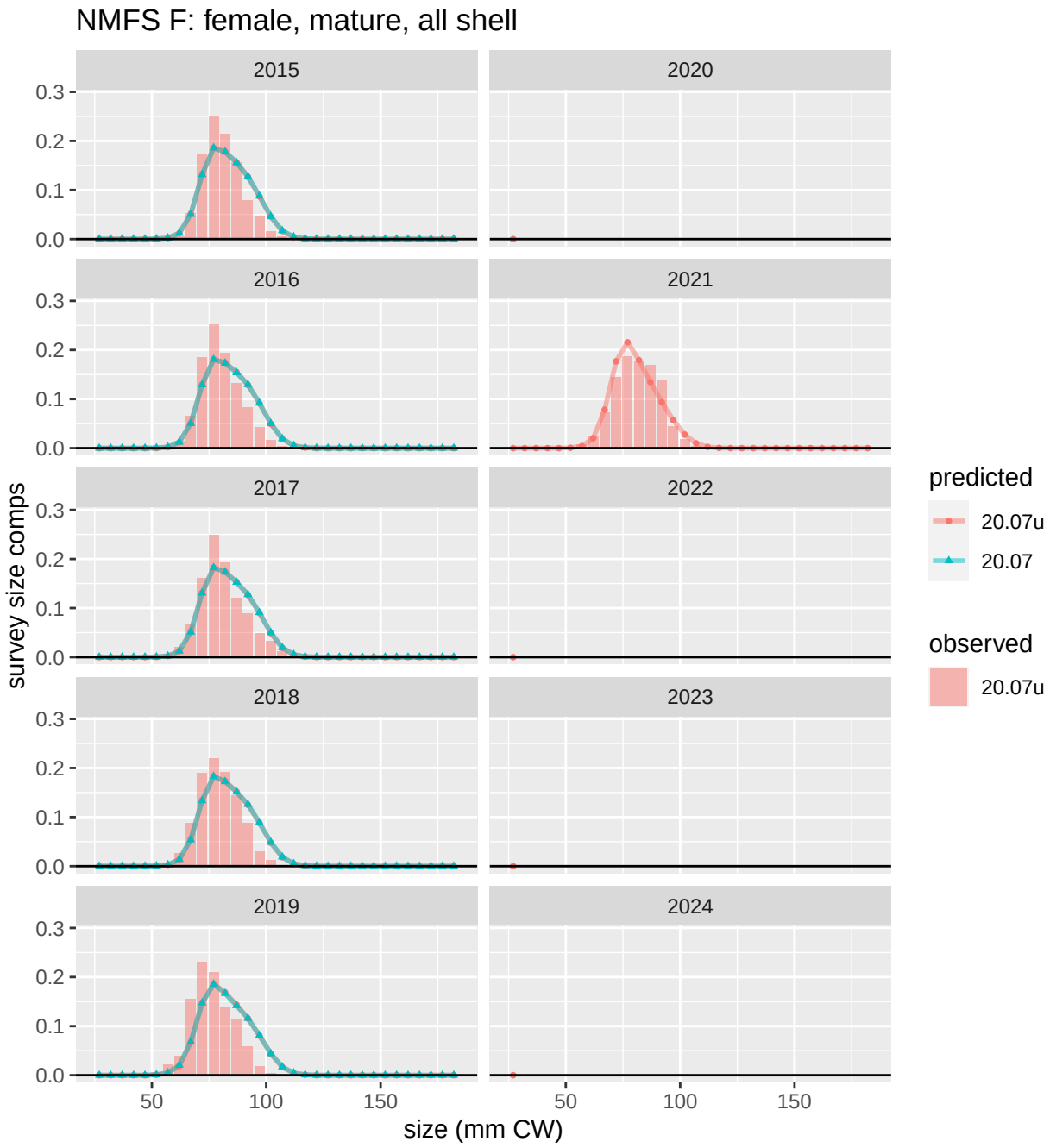

Figure 15: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 5 of 5.

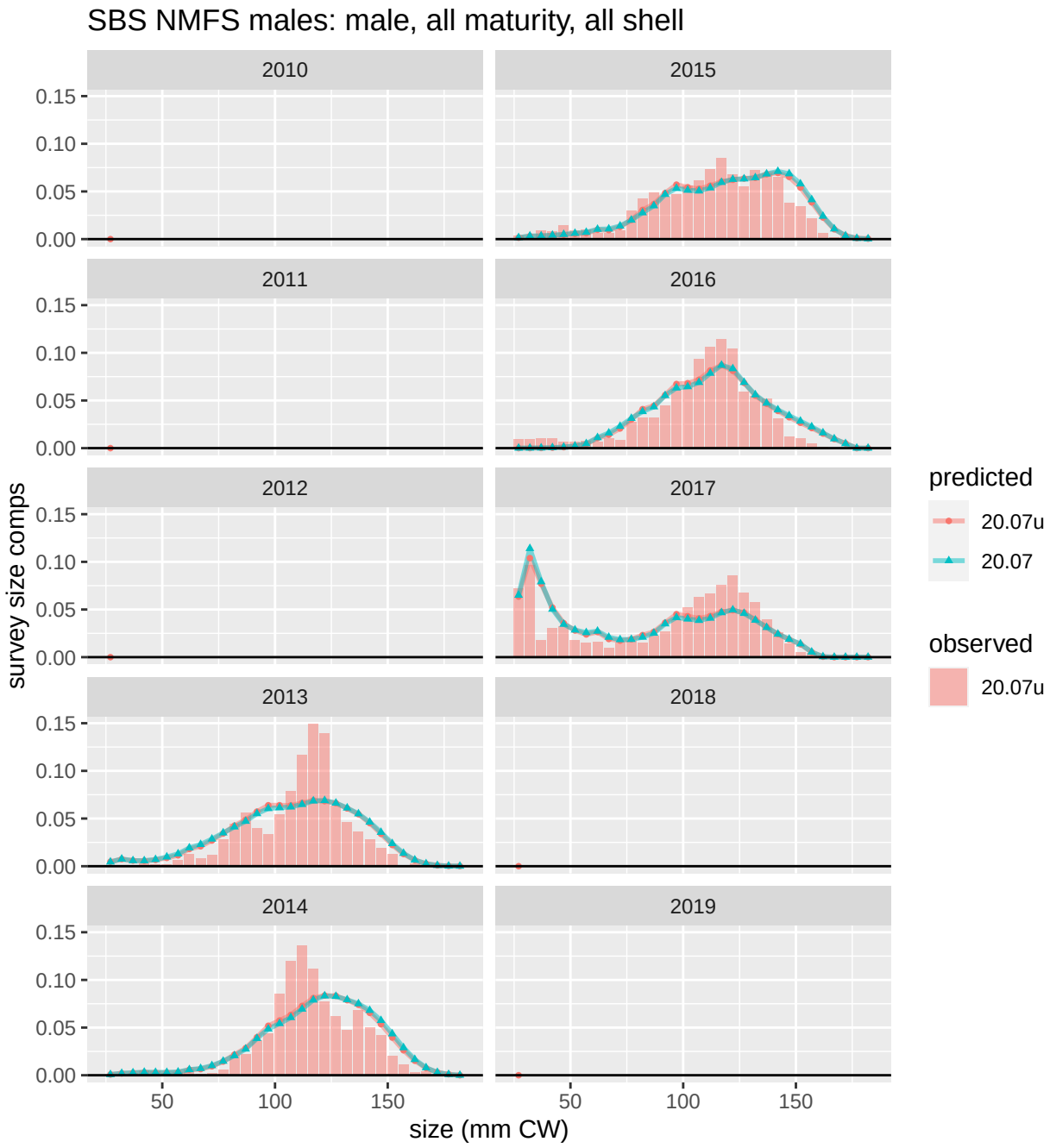

Figure 16: Comparison of observed and predicted male, all maturity, all shell survey size comps for SBS NMFS males. Page 1 of 1.

Figure 17: Comparison of observed and predicted female, immature, all shell survey size comps for SBS NMFS females. Page 1 of 1.

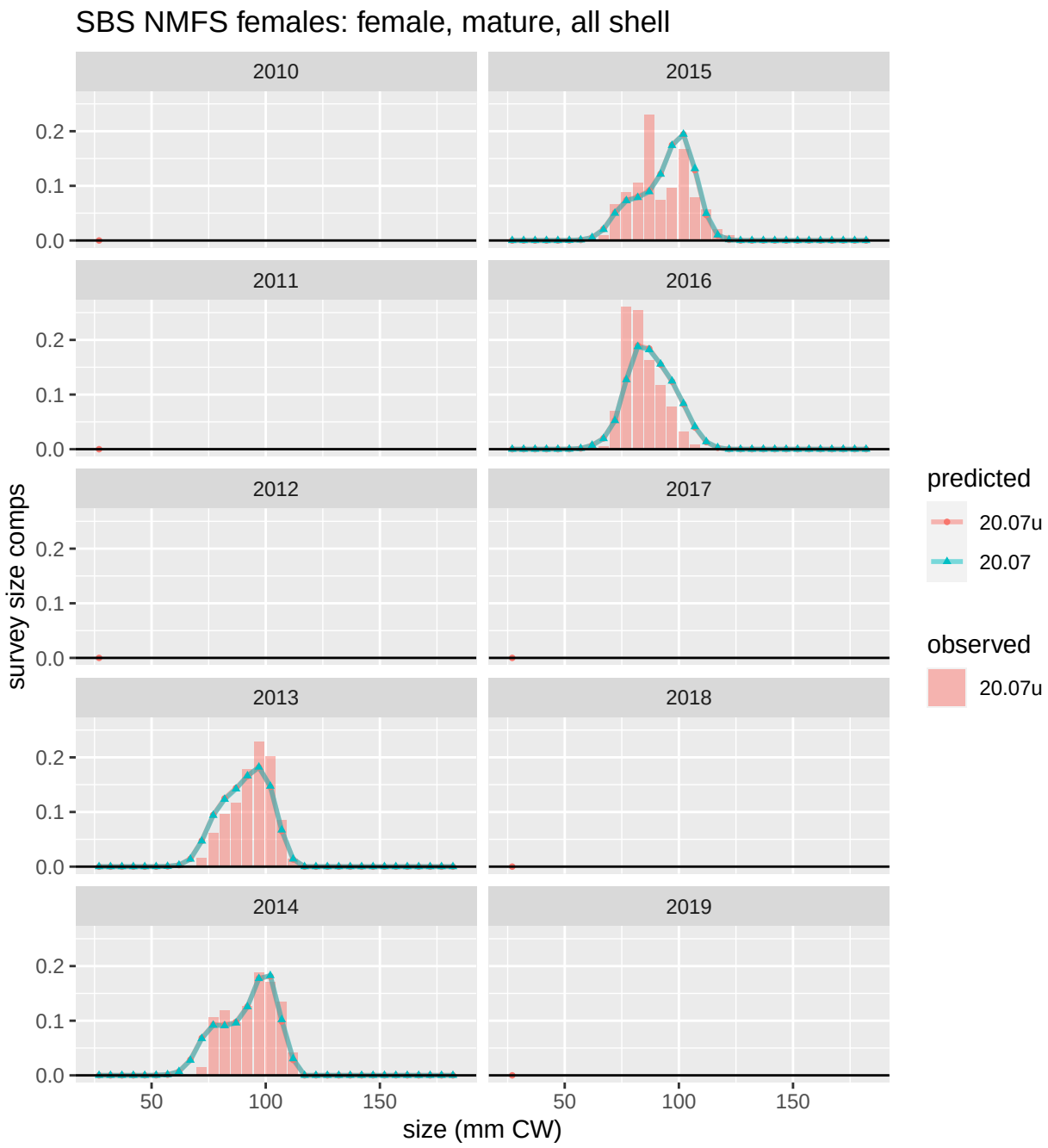

Figure 18: Comparison of observed and predicted female, mature, all shell survey size comps for SBS NMFS females. Page 1 of 1.

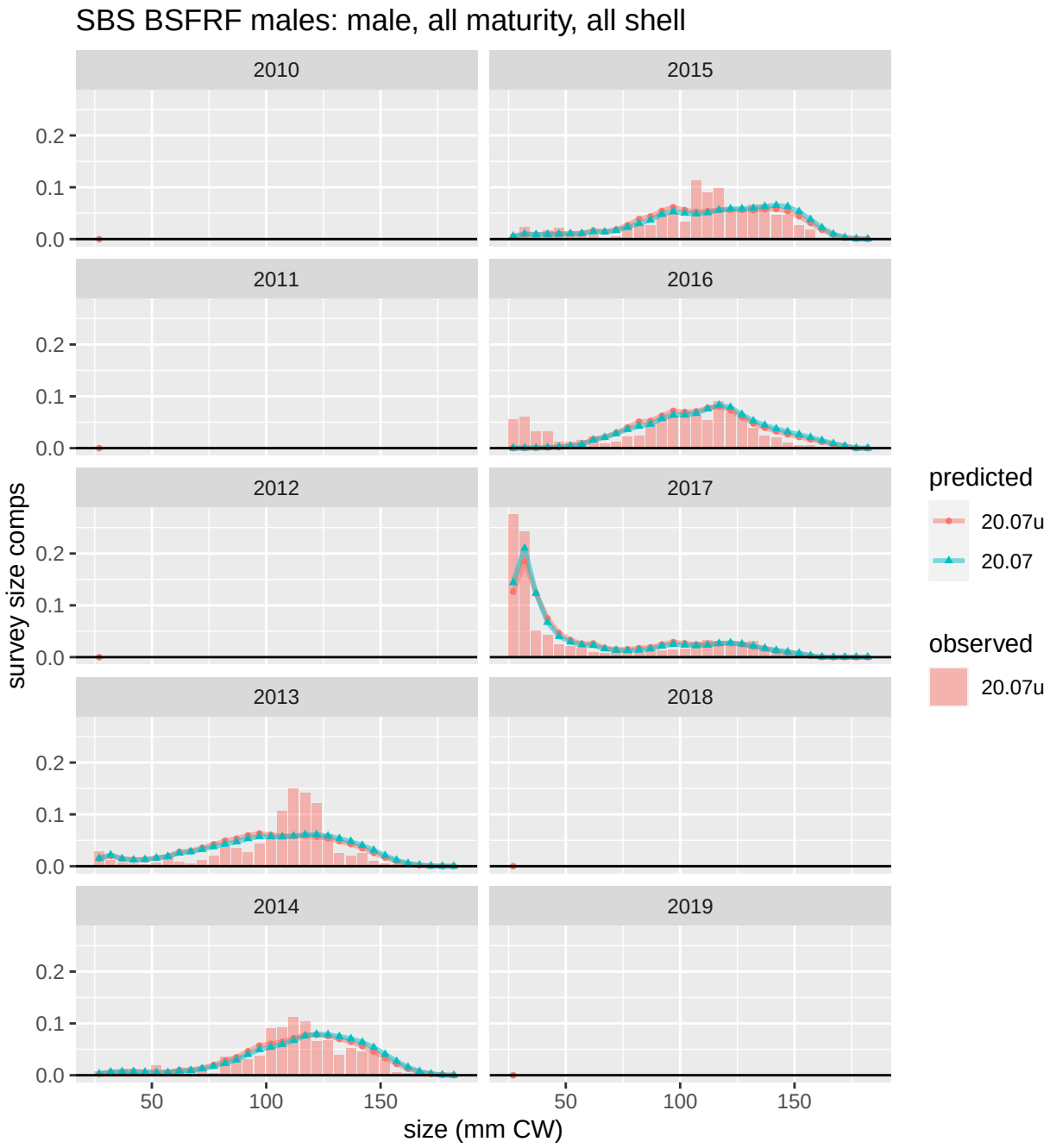

Figure 19: Comparison of observed and predicted male, all maturity, all shell survey size comps for SBS BSFRF males. Page 1 of 1.

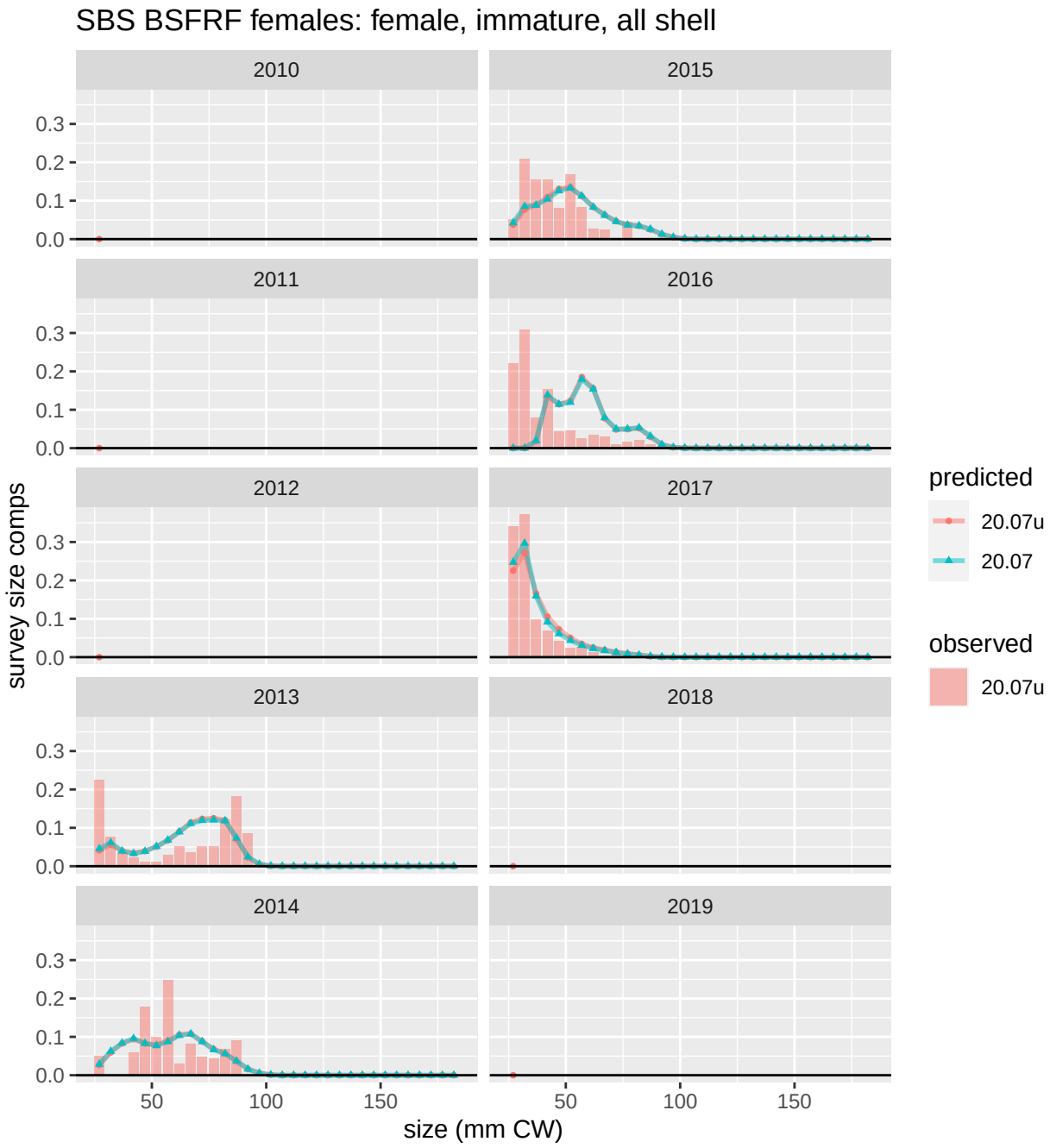

Figure 20: Comparison of observed and predicted female, immature, all shell survey size comps for SBS BSFRF females. Page 1 of 1.

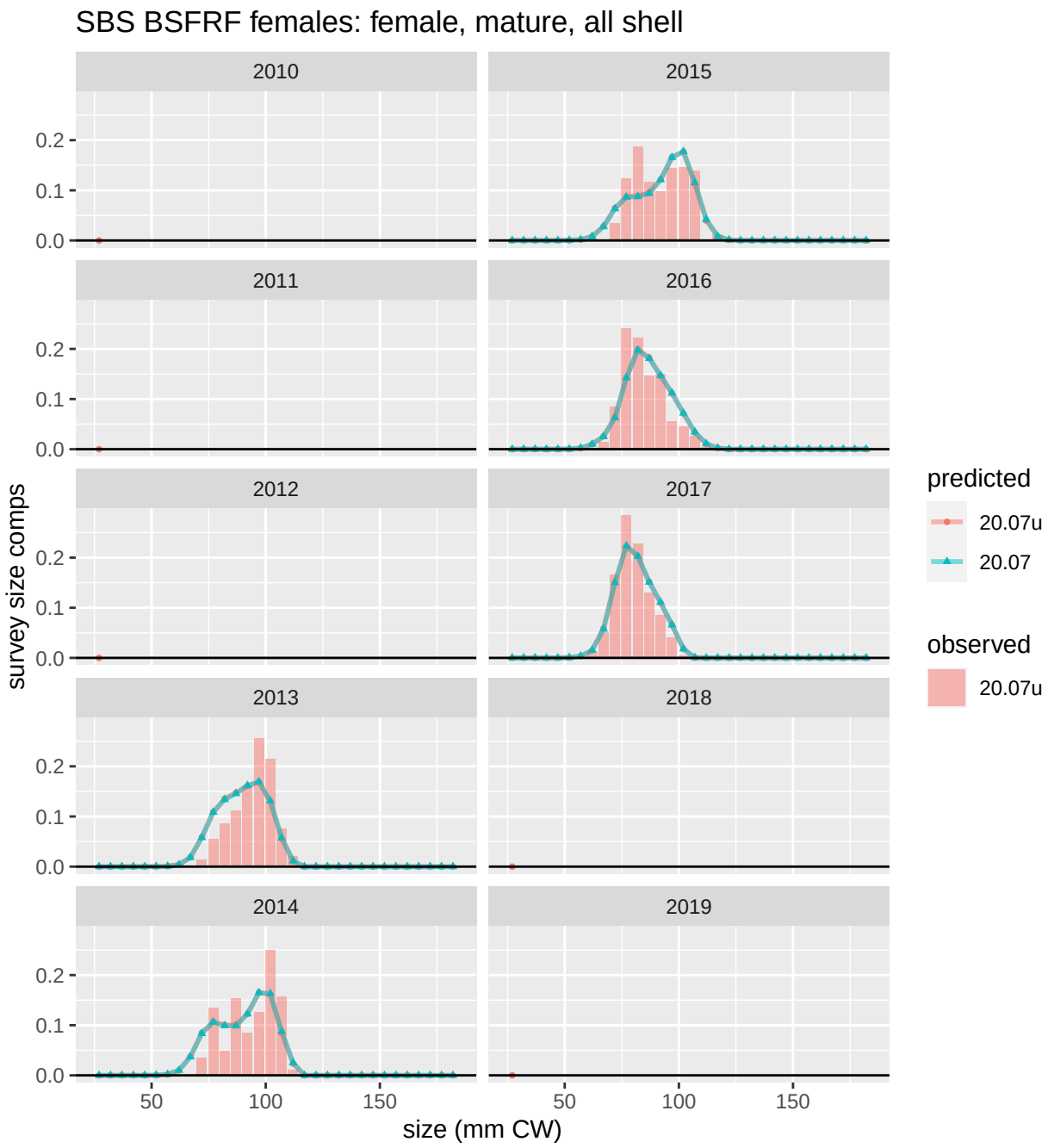

Figure 21: Comparison of observed and predicted female, mature, all shell survey size comps for SBS BSFRF females. Page 1 of 1.

Fishery retained catch size compositions

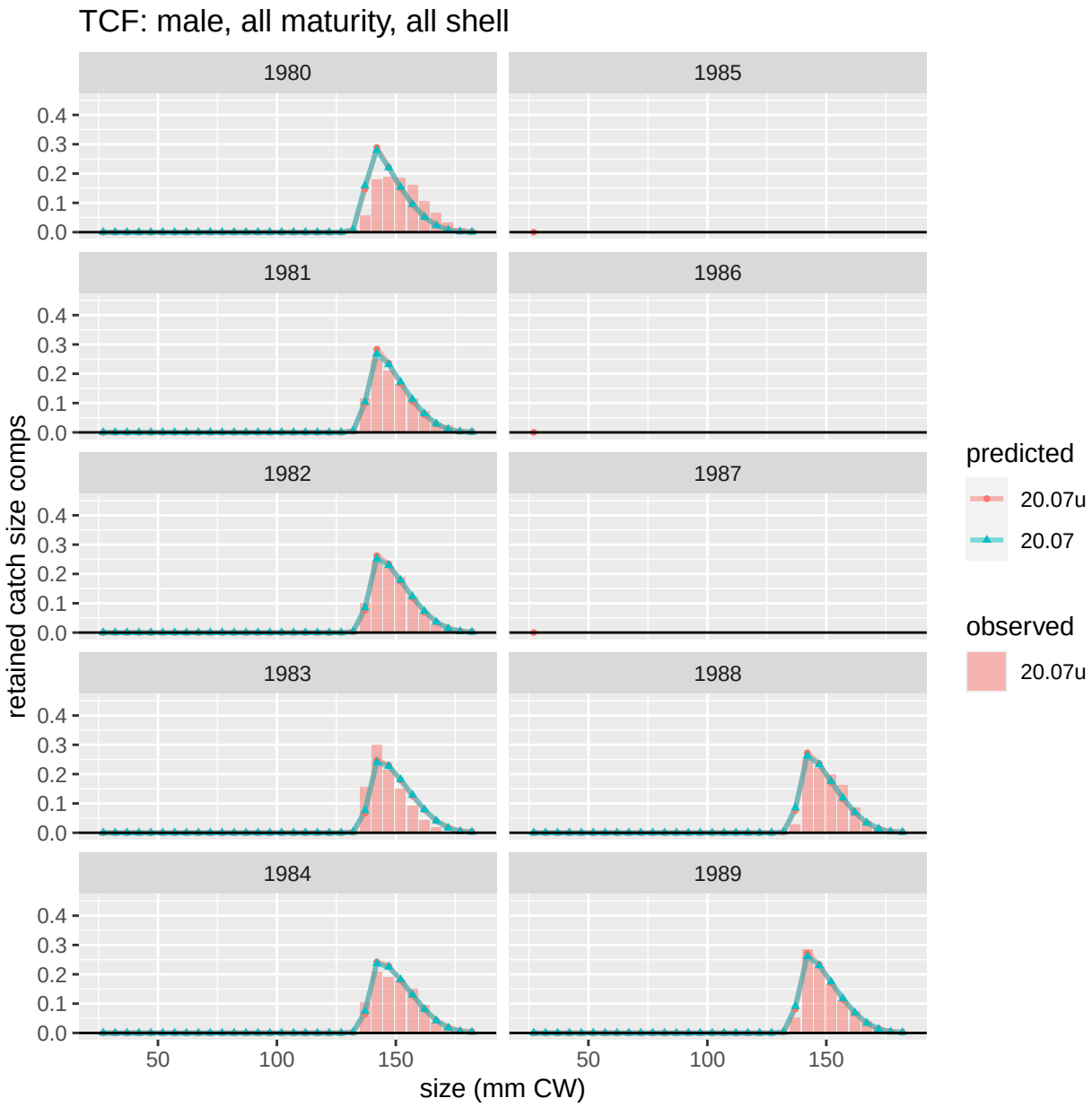

Figure 22: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 1 of 5.

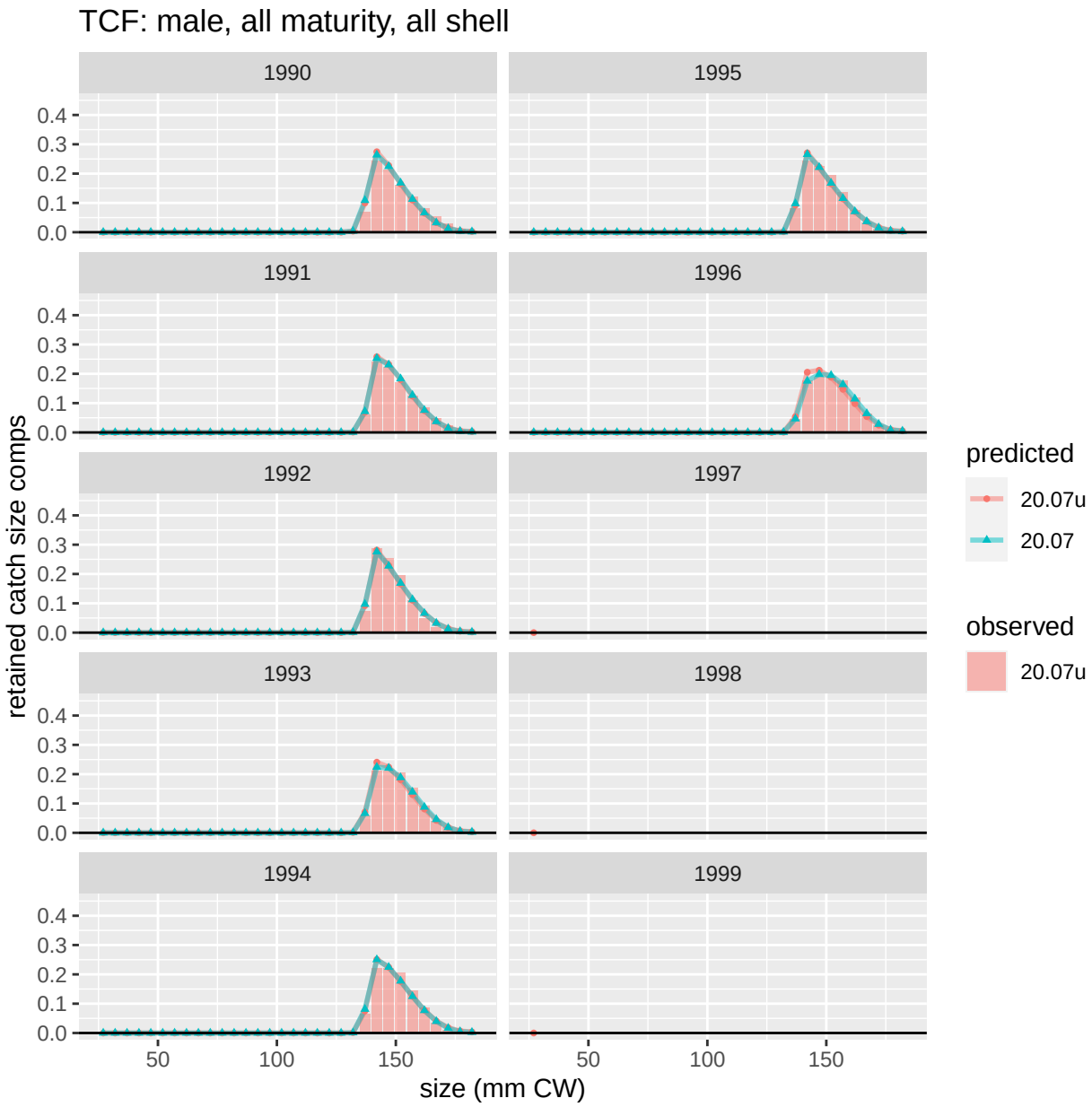

Figure 23: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 2 of 5.

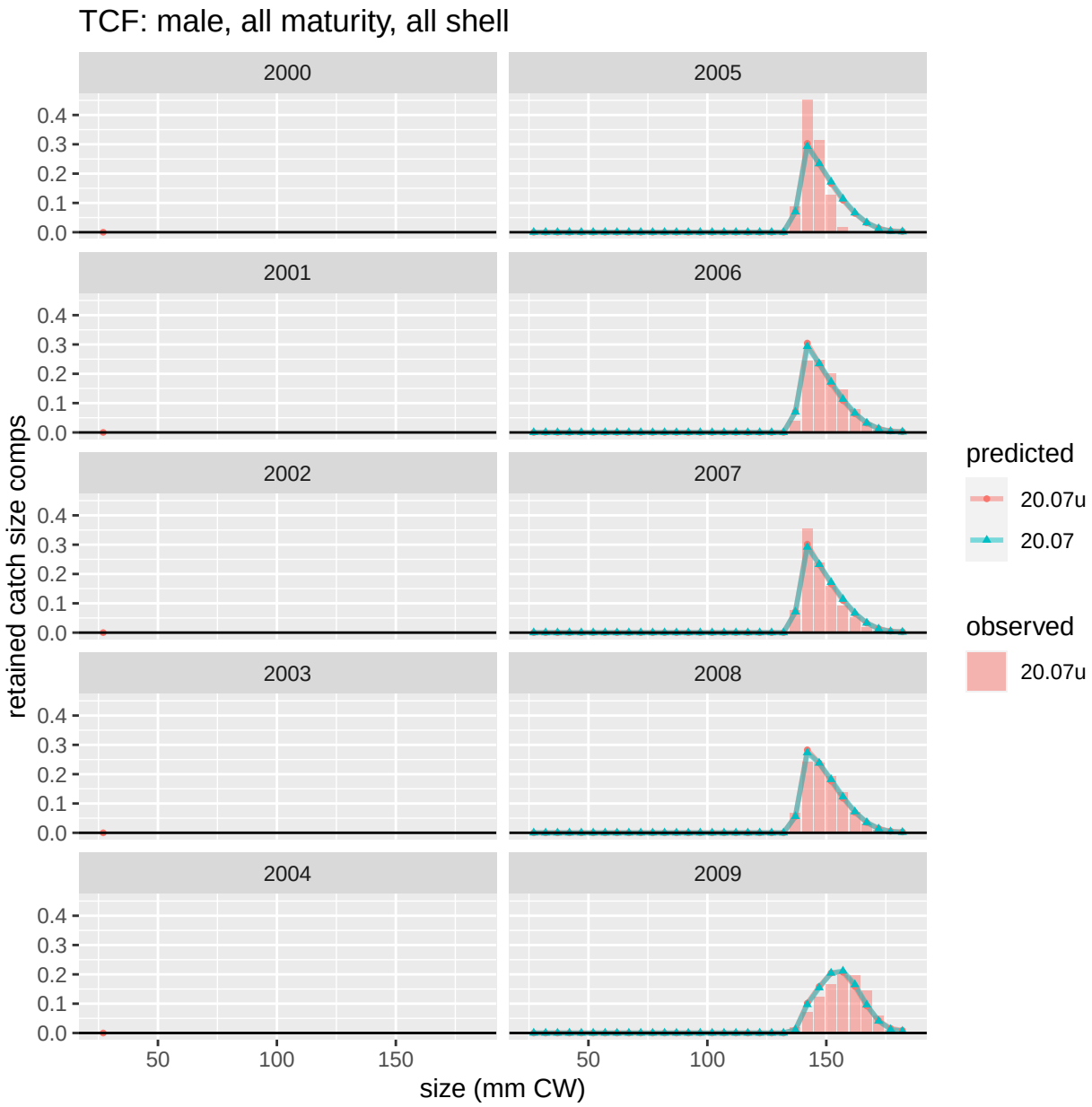

Figure 24: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 3 of 5.

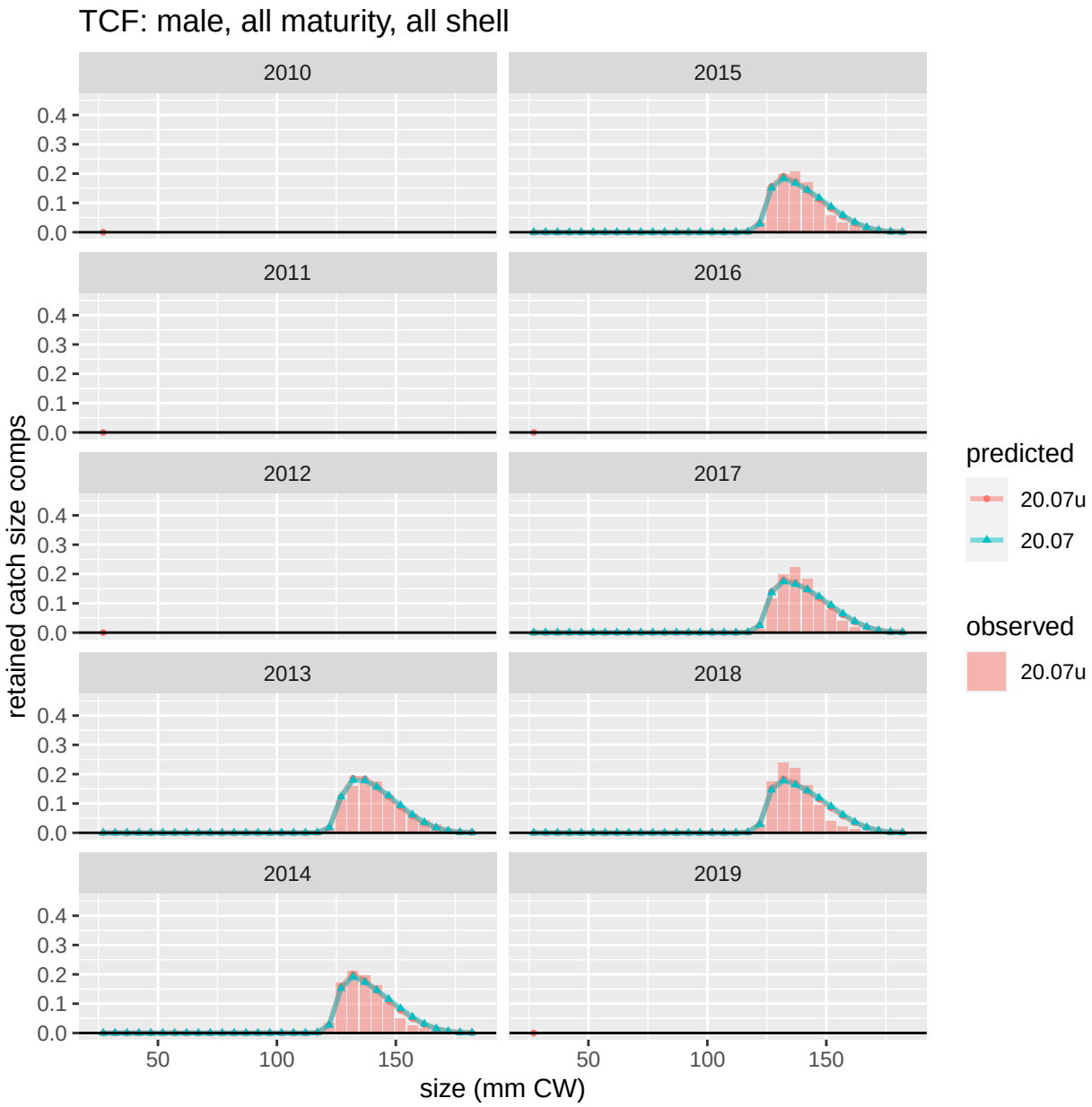

Figure 25: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 4 of 5.

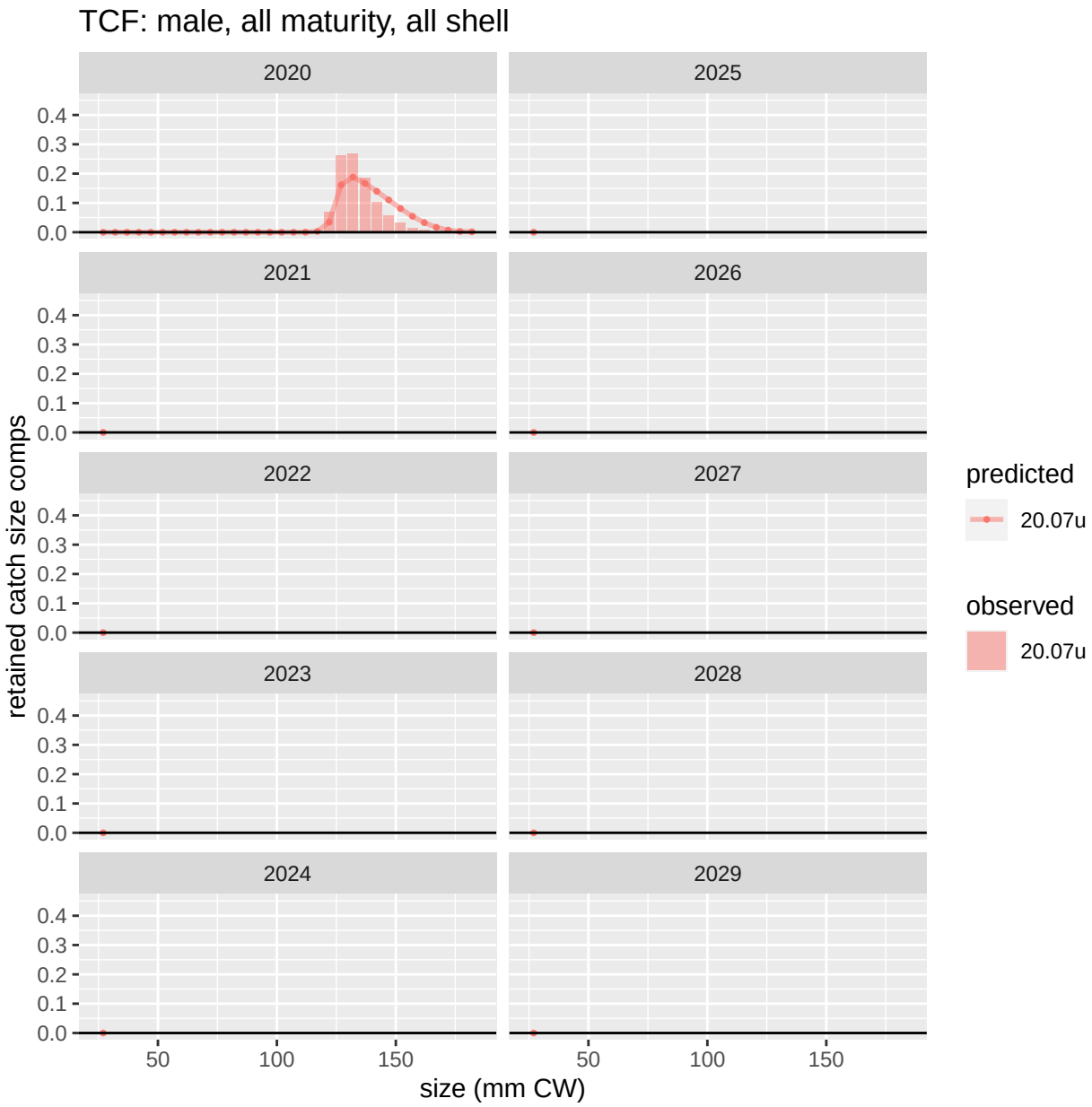

Figure 26: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 5 of 5.

Fishery total catch size compositions

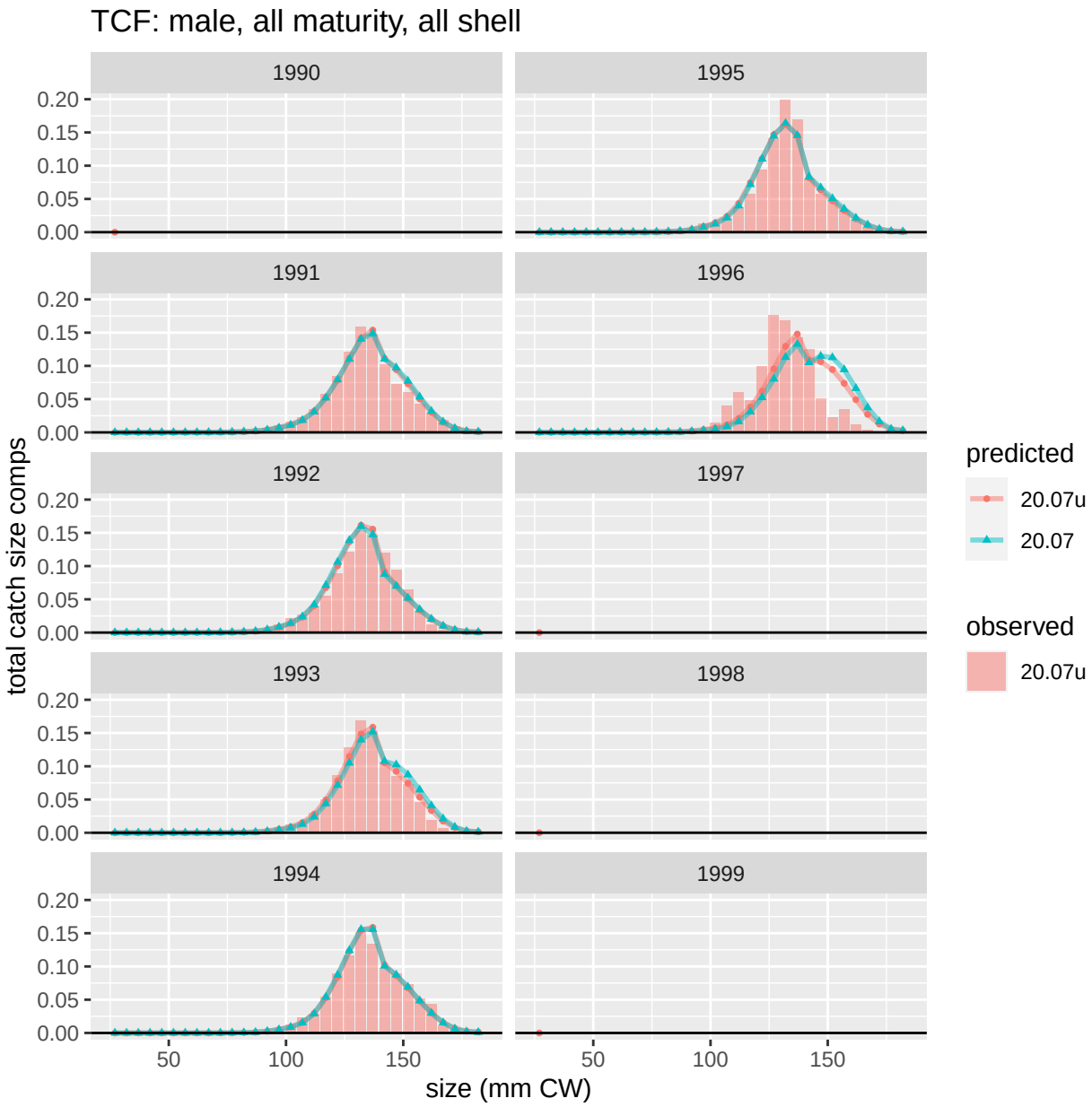

Figure 27: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 1 of 4.

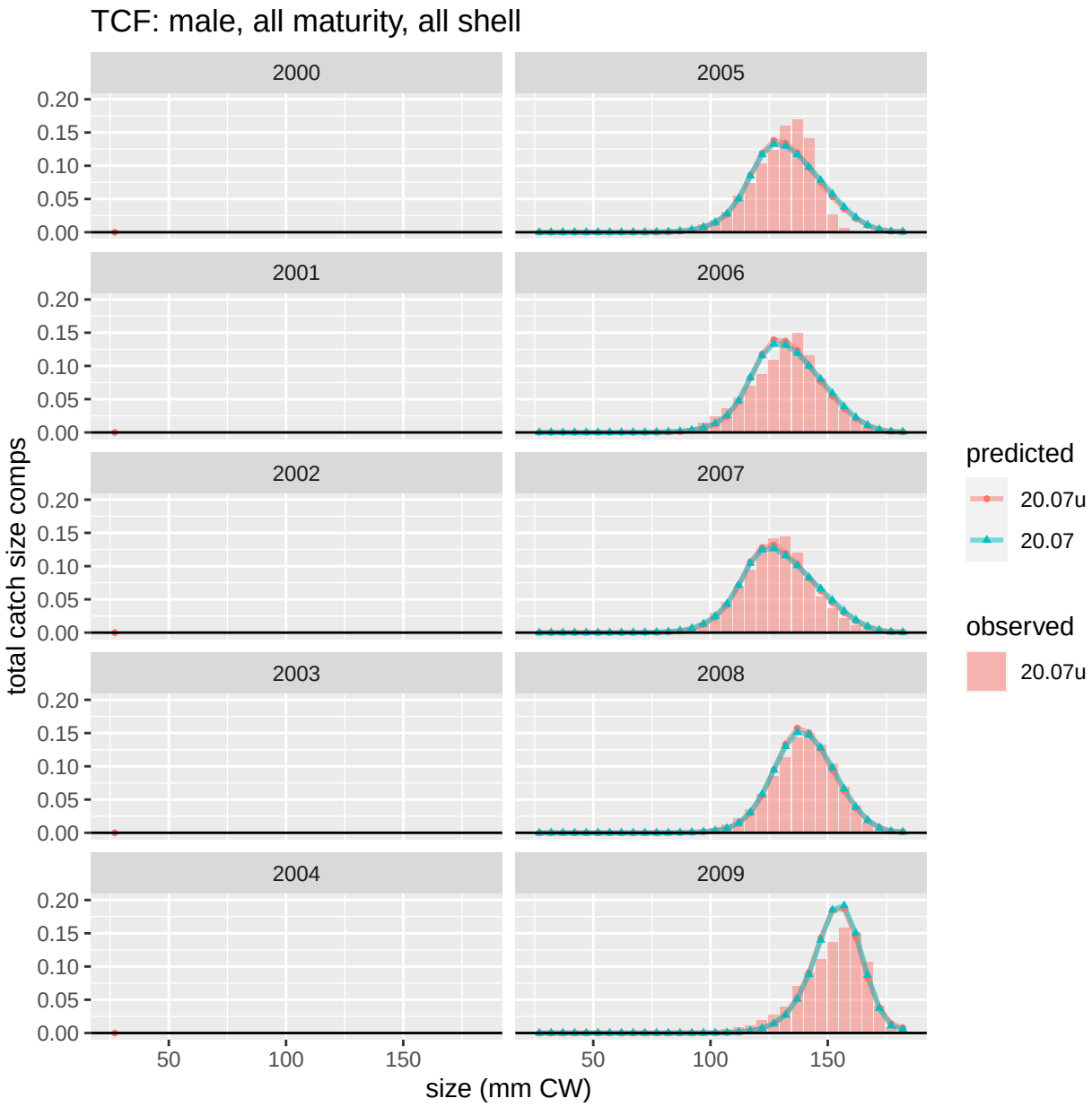

Figure 28: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 2 of 4.

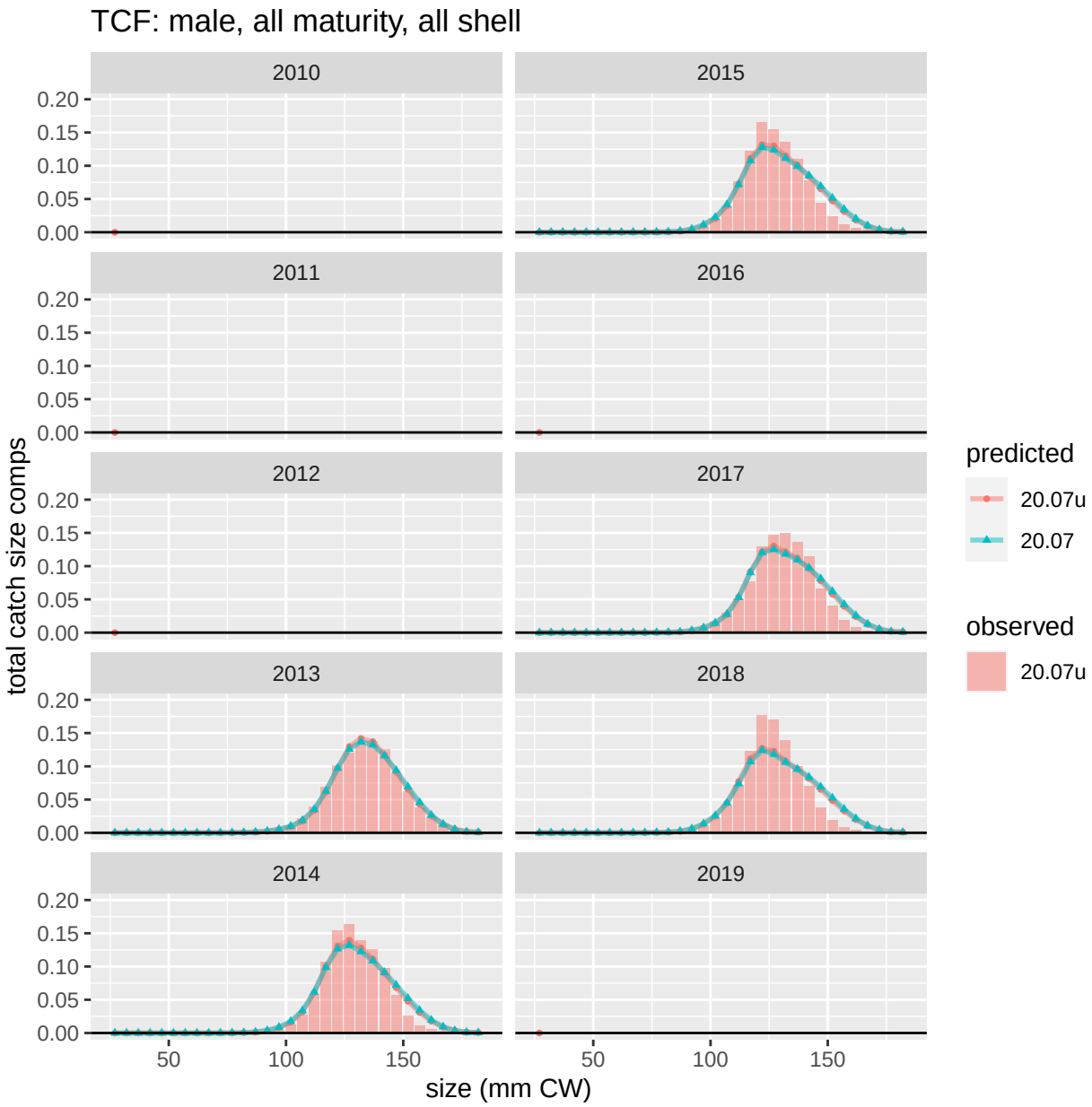

Figure 29: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 3 of 4.

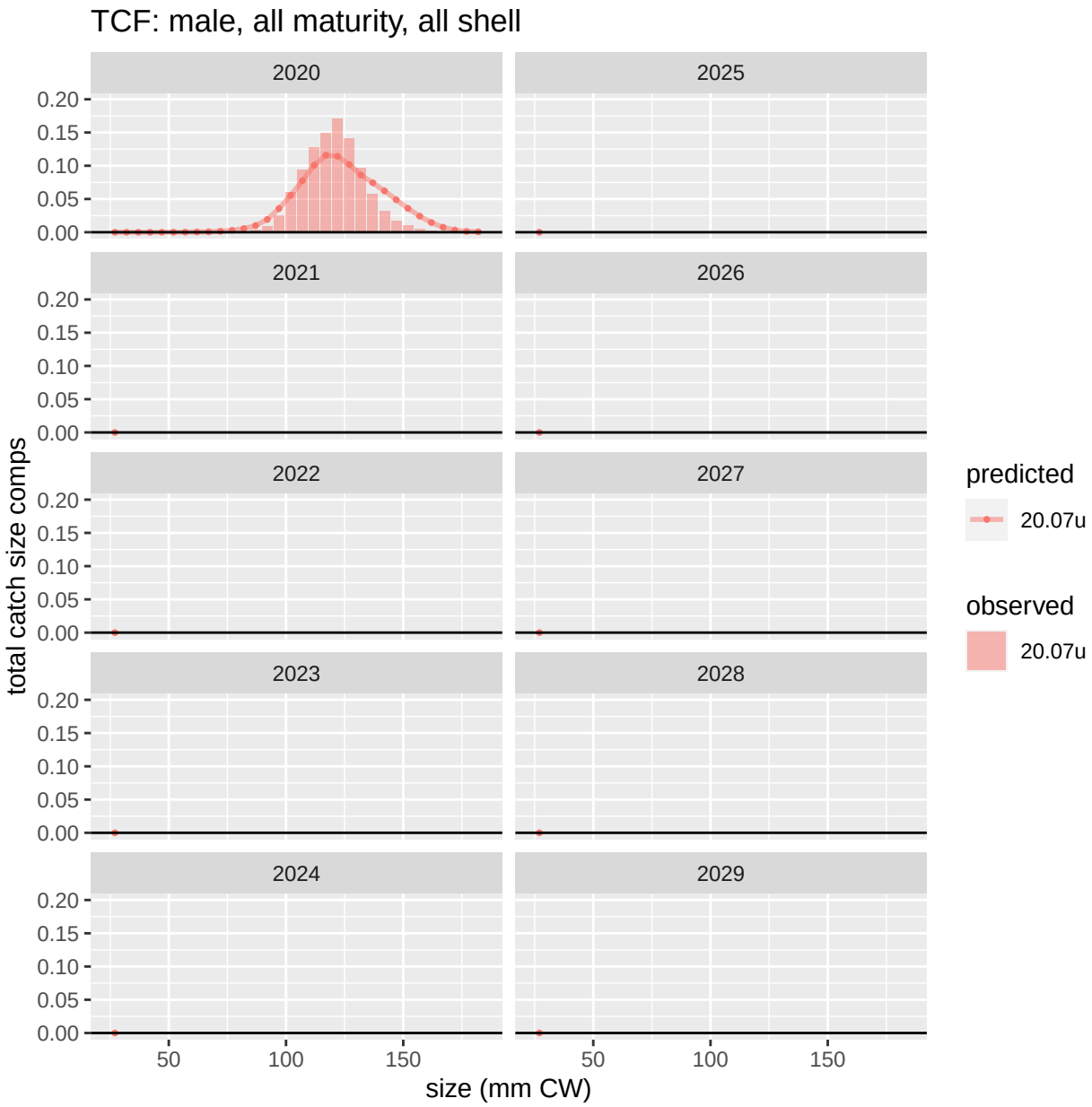

Figure 30: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 4 of 4.

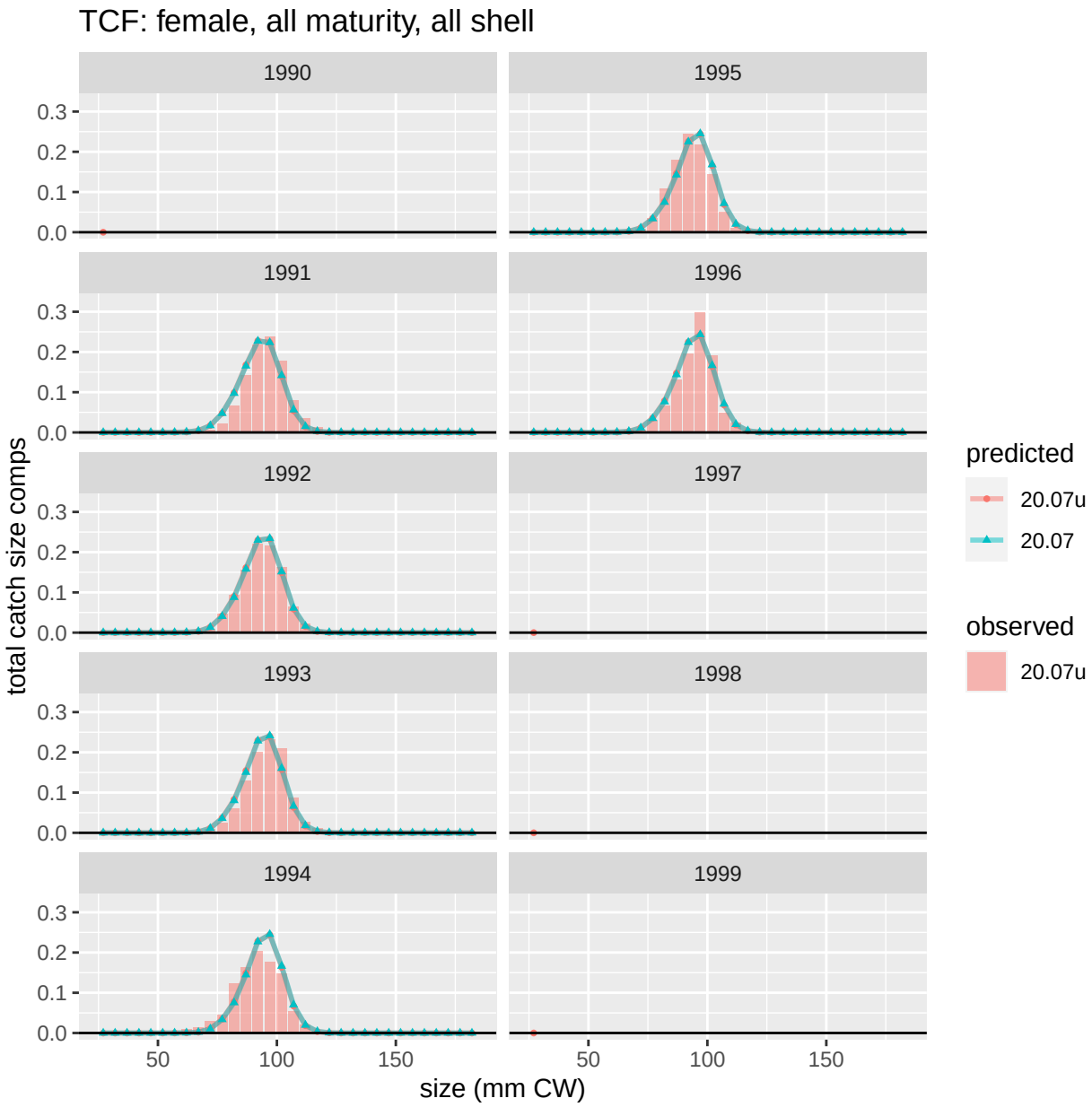

Figure 31: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 1 of 4.

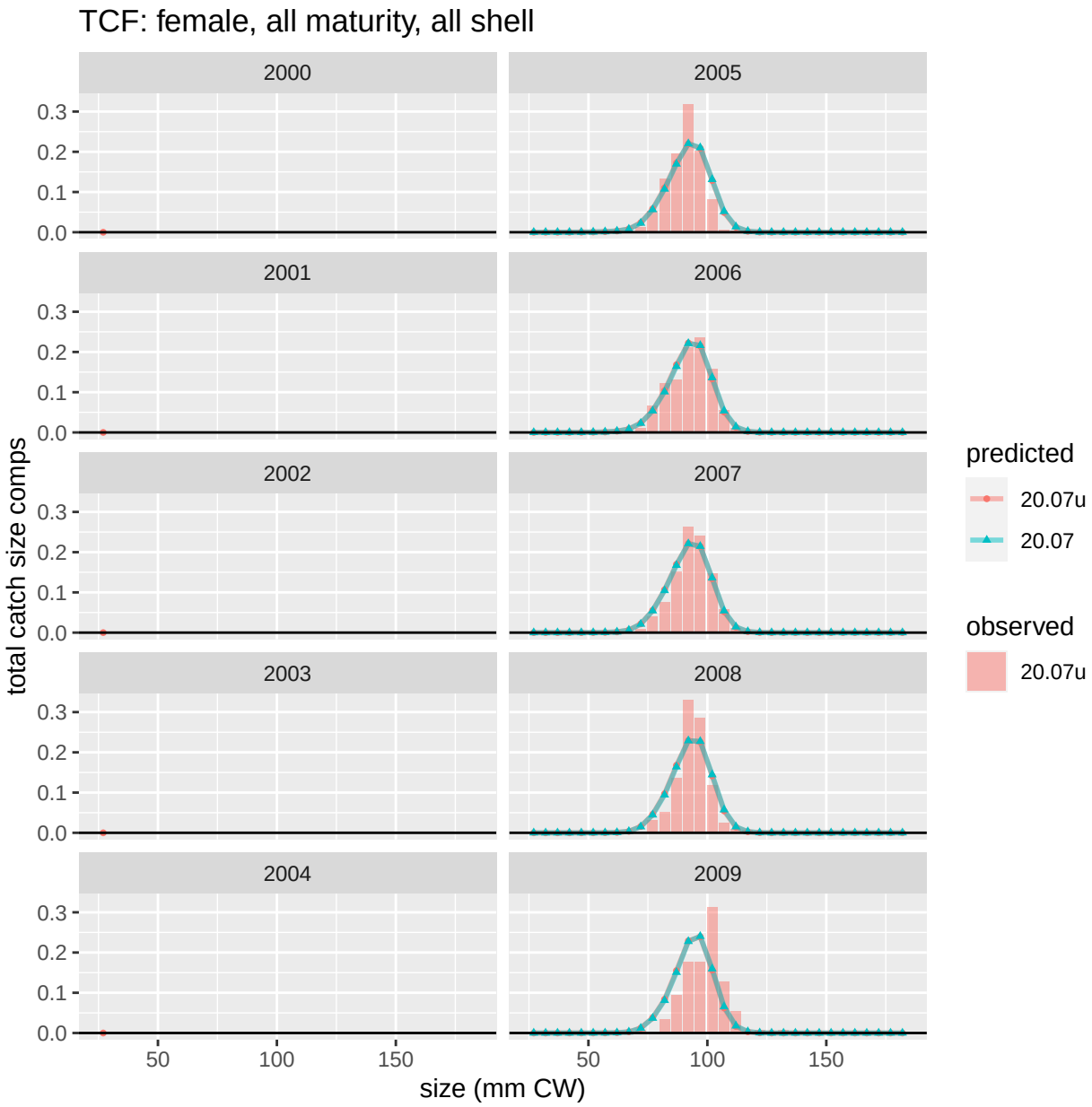

Figure 32: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 2 of 4.

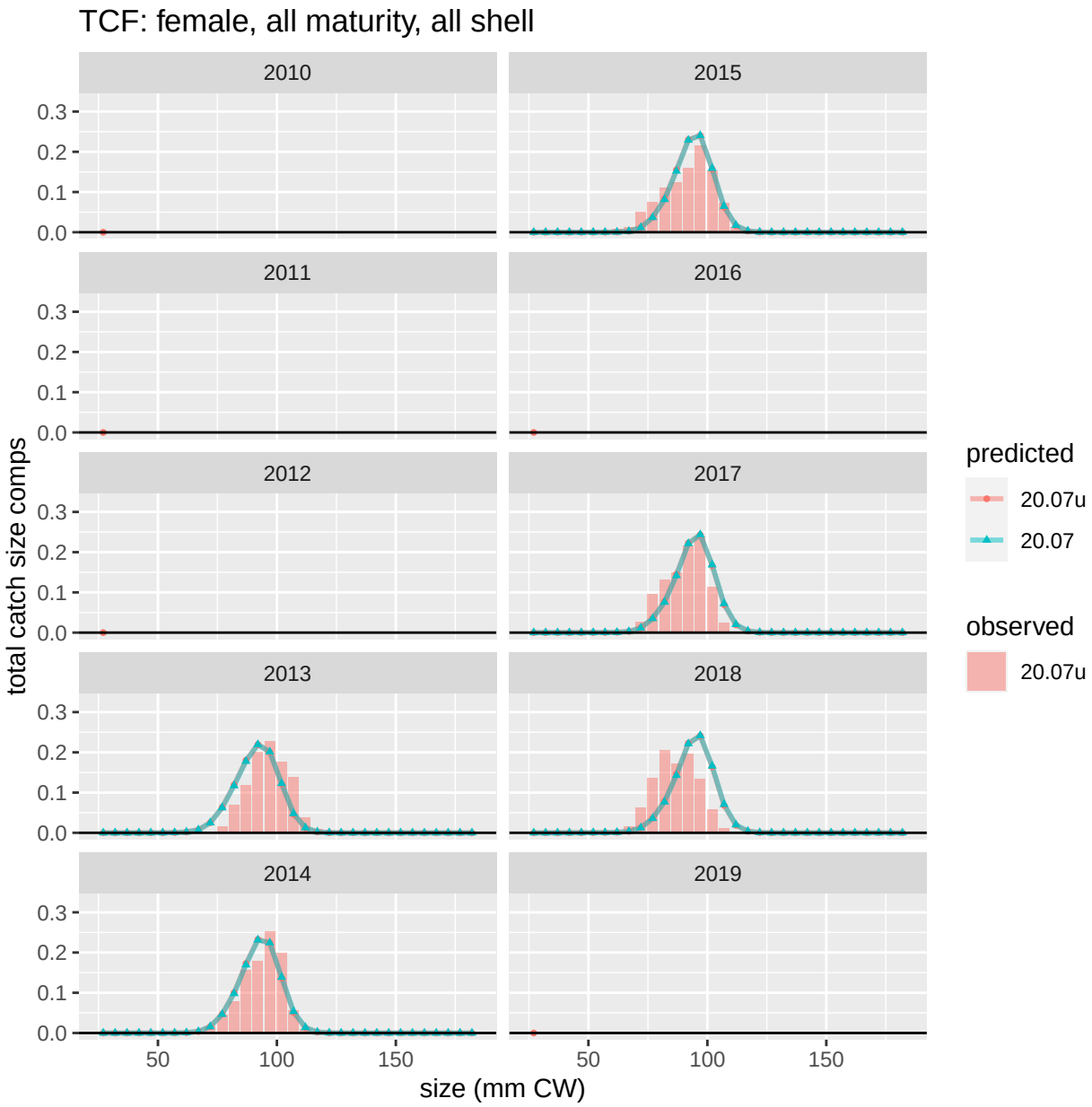

Figure 33: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 3 of 4.

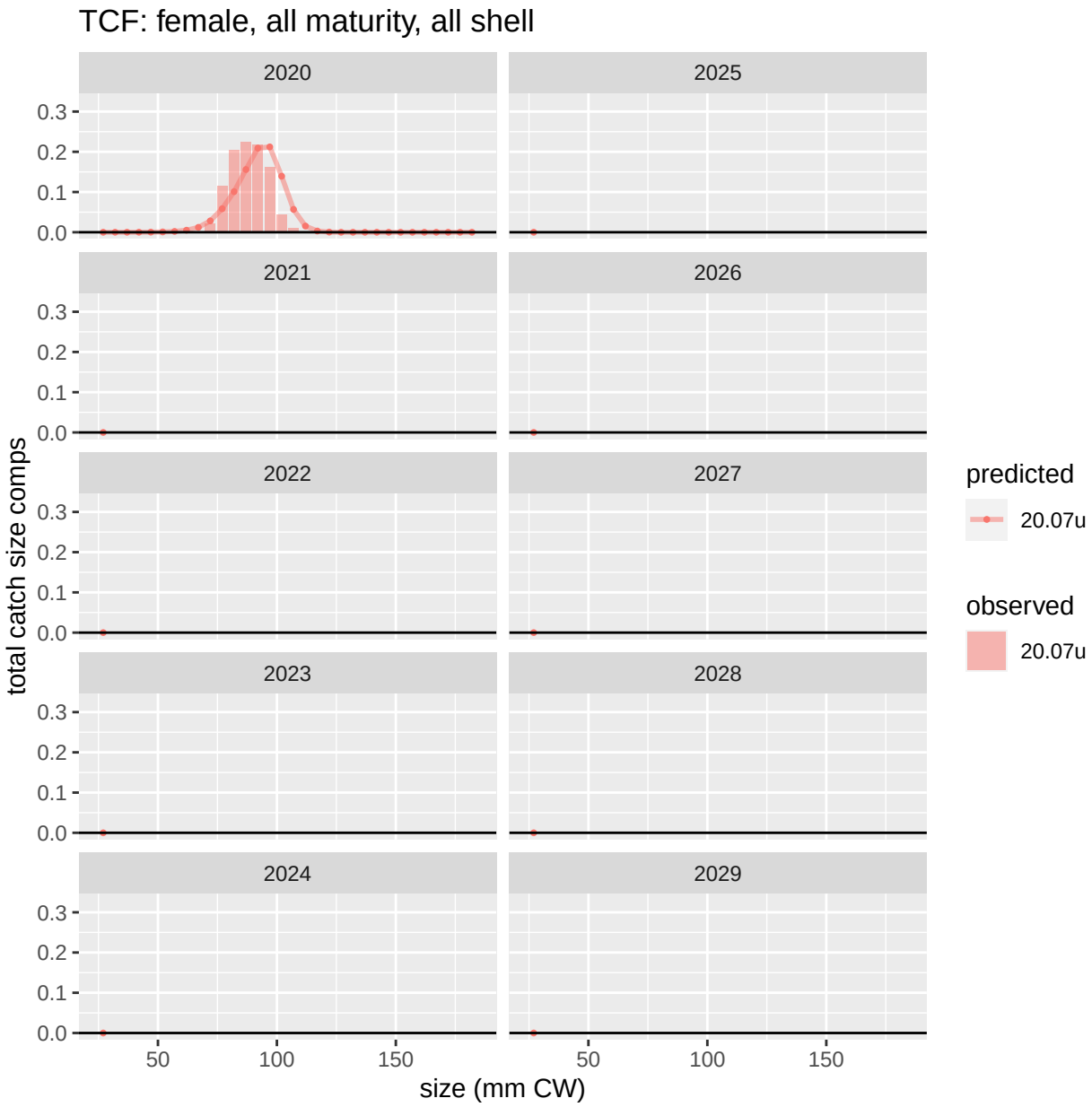

Figure 34: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 4 of 4.

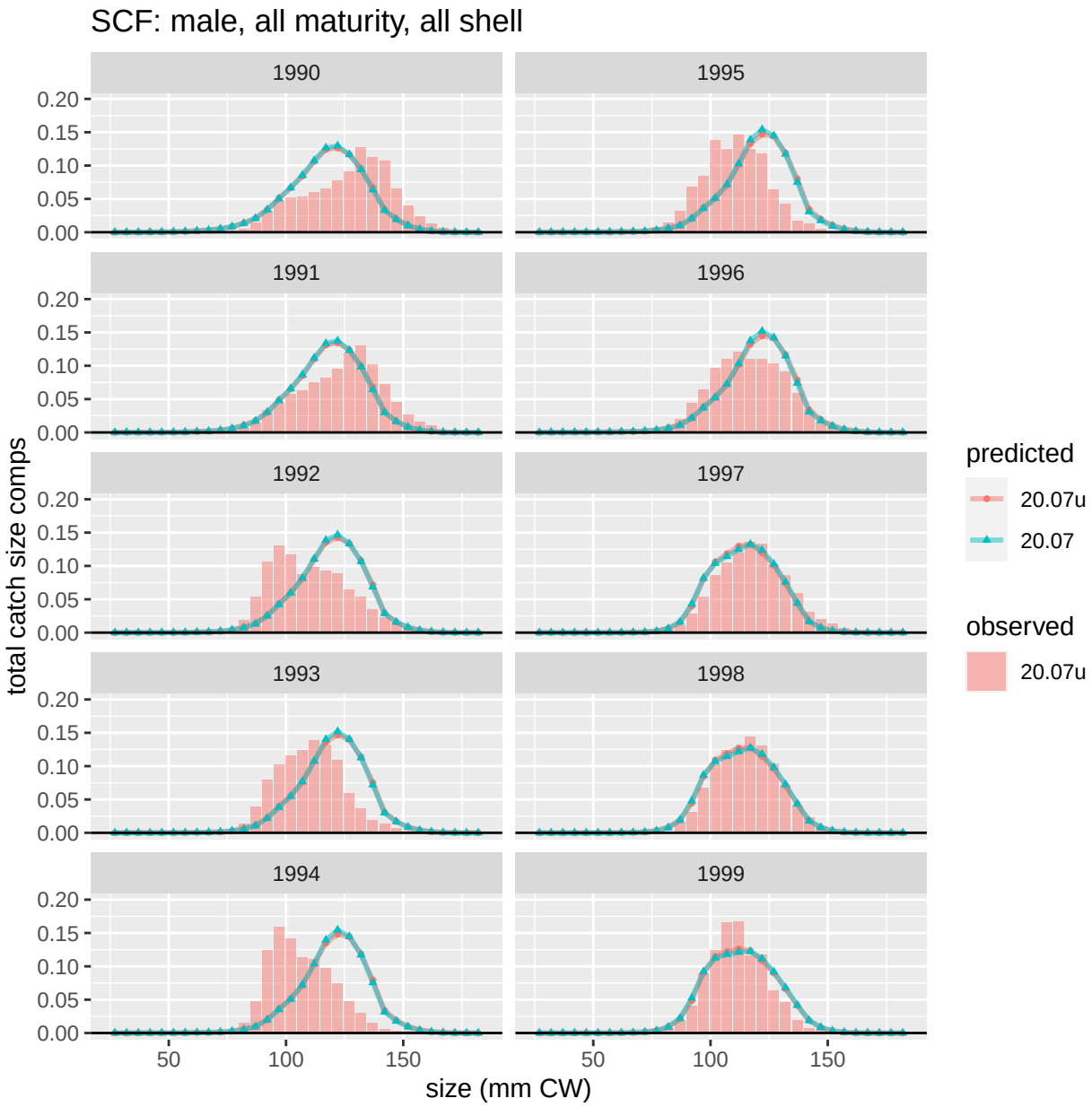

Figure 35: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 1 of 4.

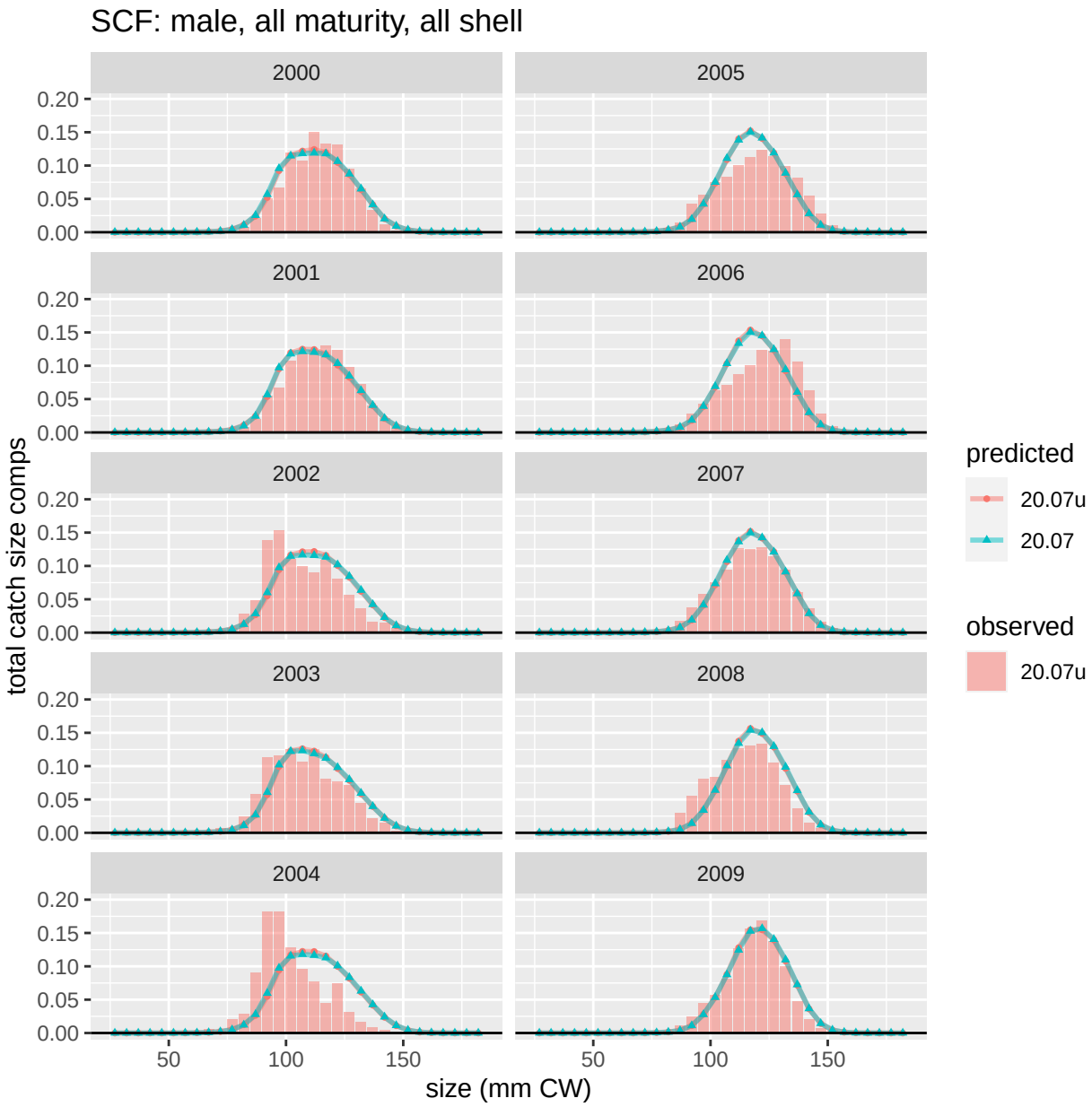

Figure 36: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 2 of 4.

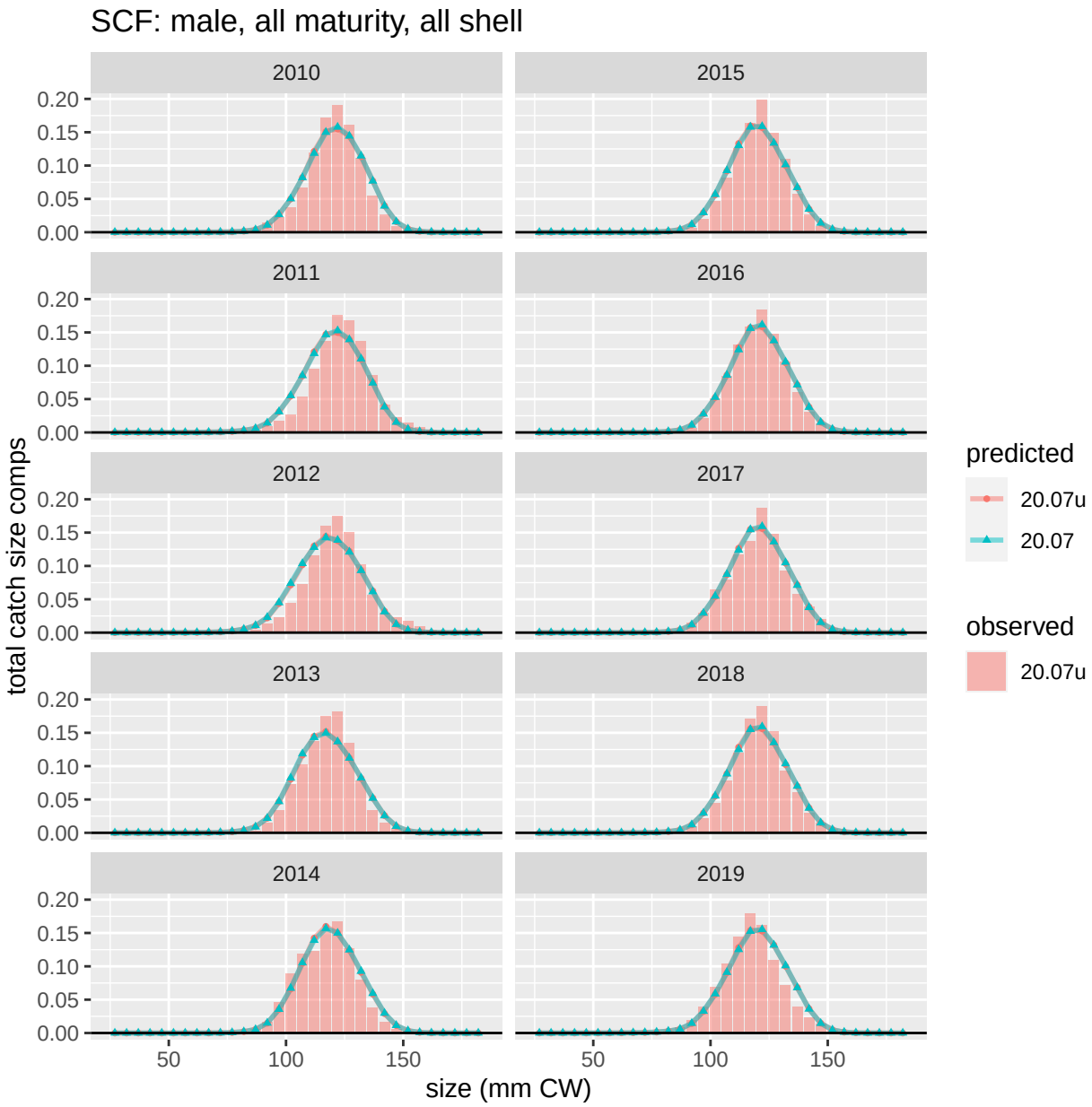

Figure 37: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 3 of 4.

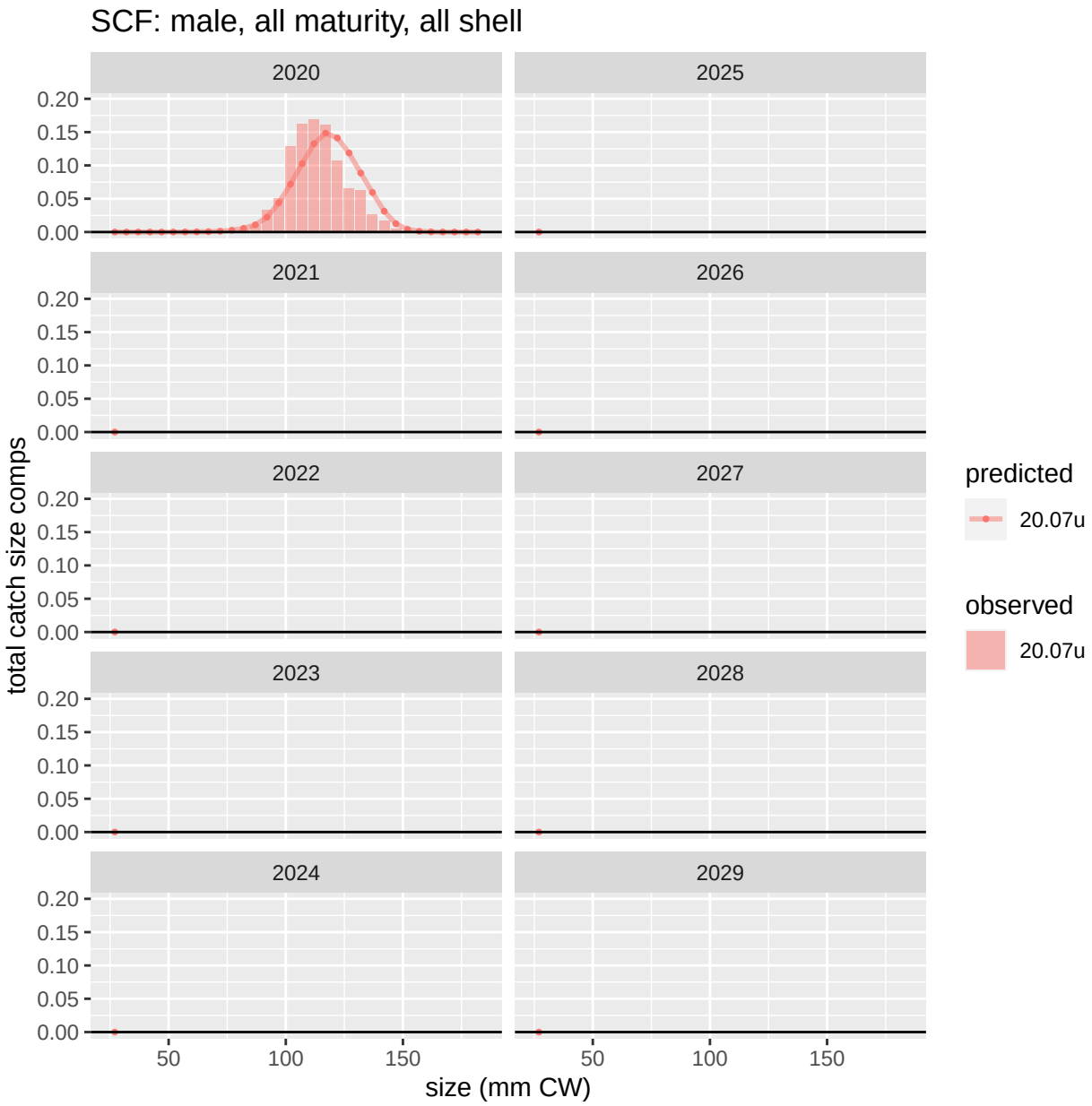

Figure 38: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 4 of 4.

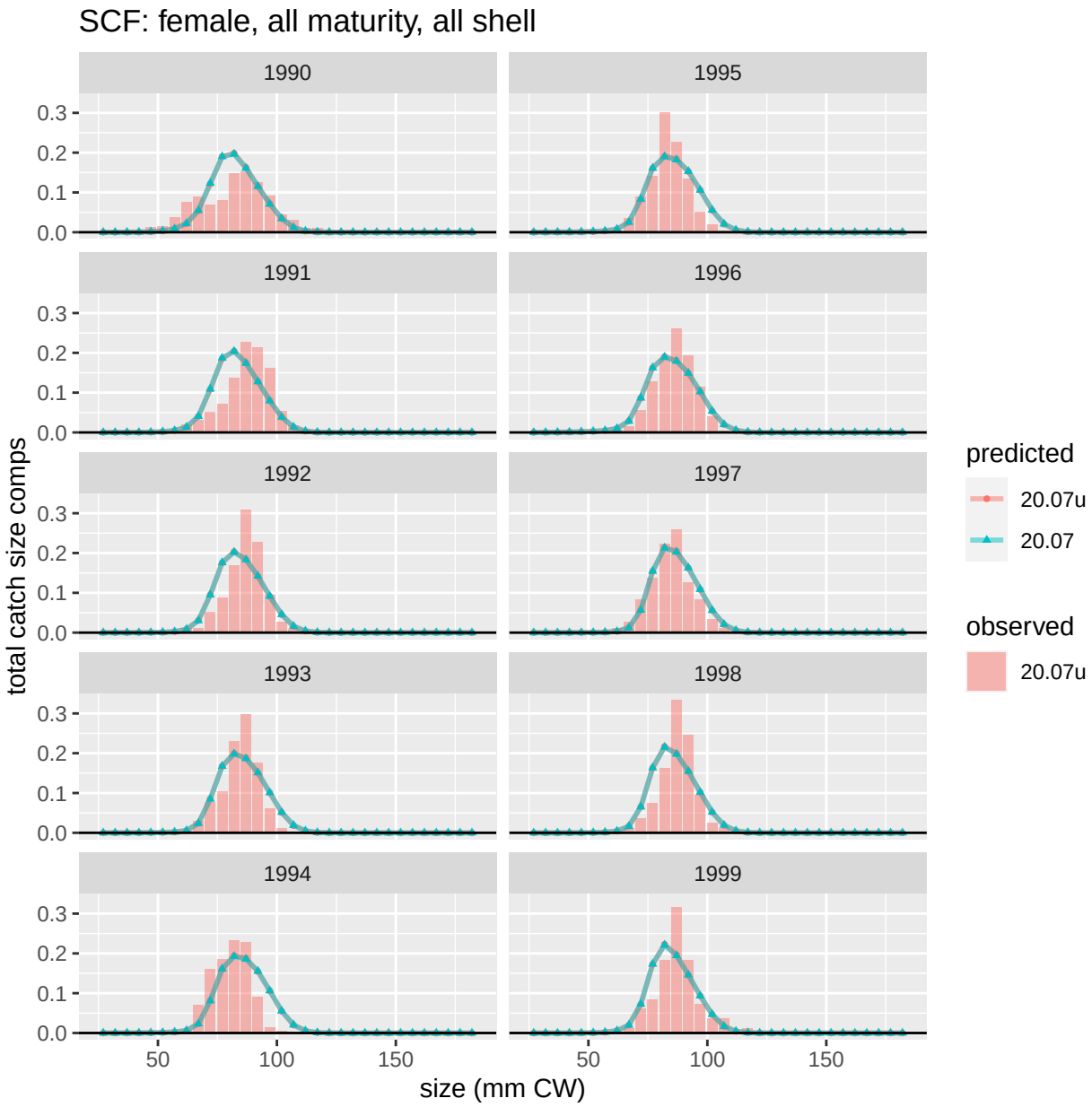

Figure 39: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 1 of 4.

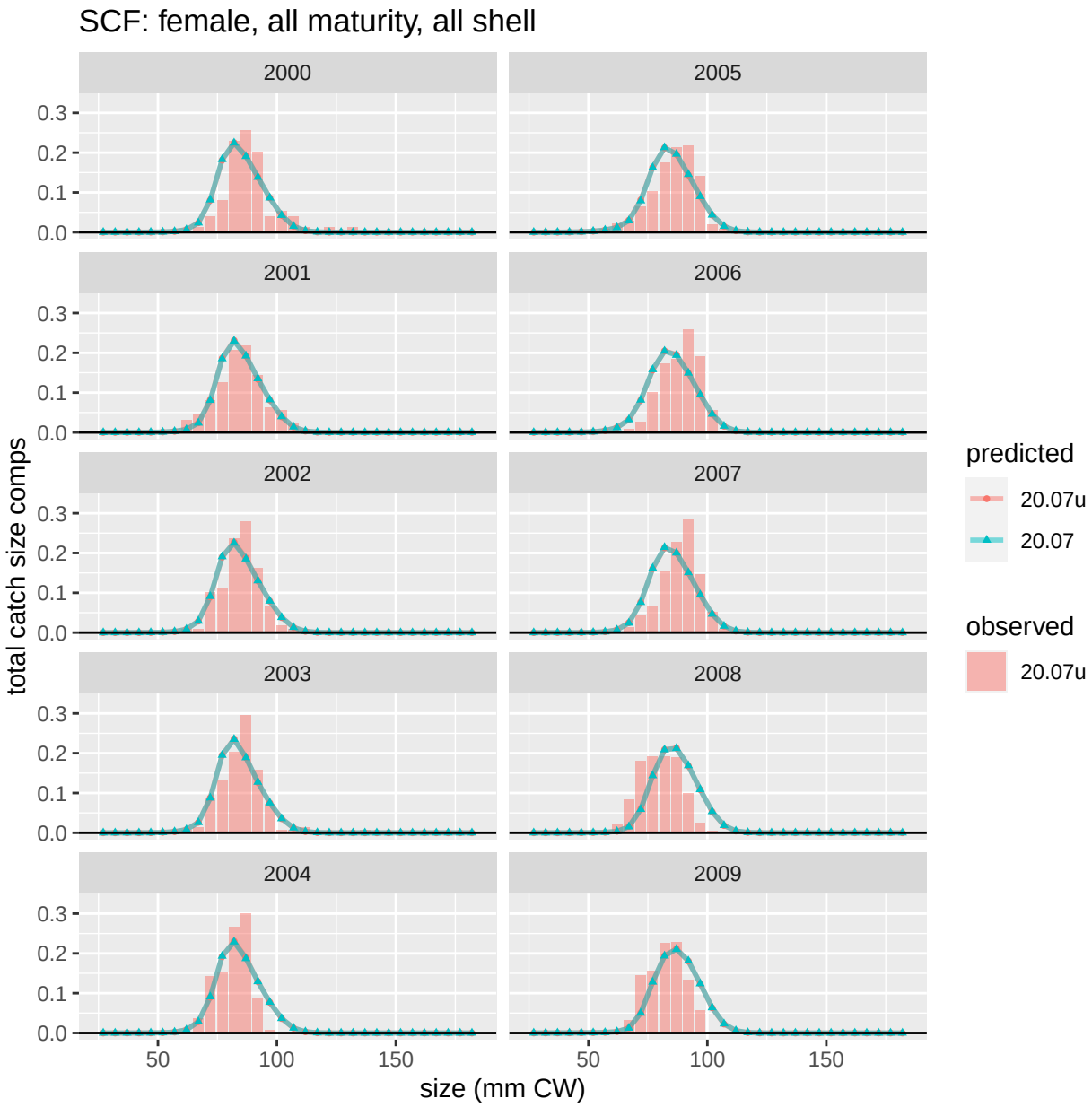

Figure 40: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 2 of 4.

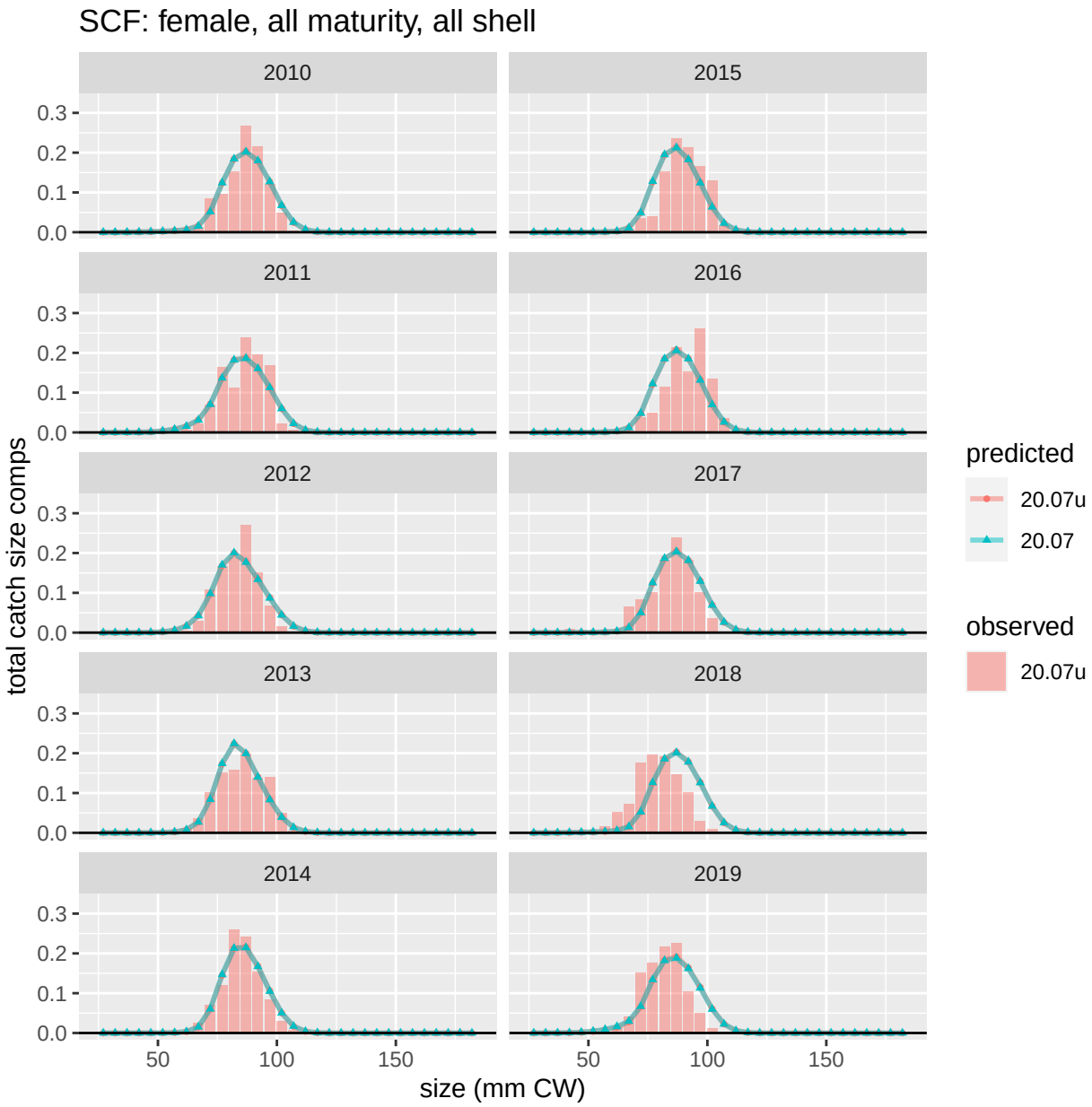

Figure 41: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 3 of 4.

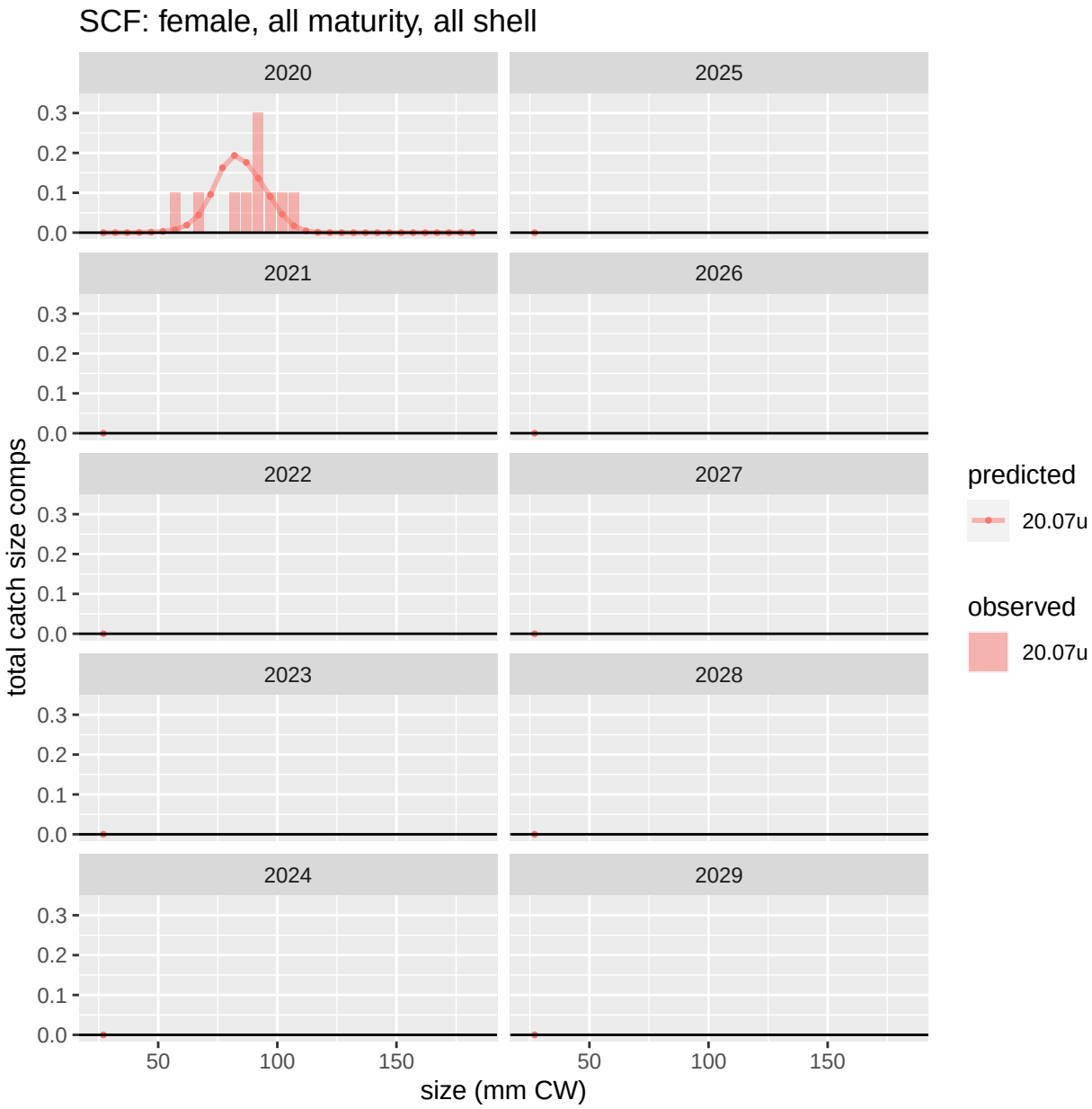

Figure 42: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 4 of 4.

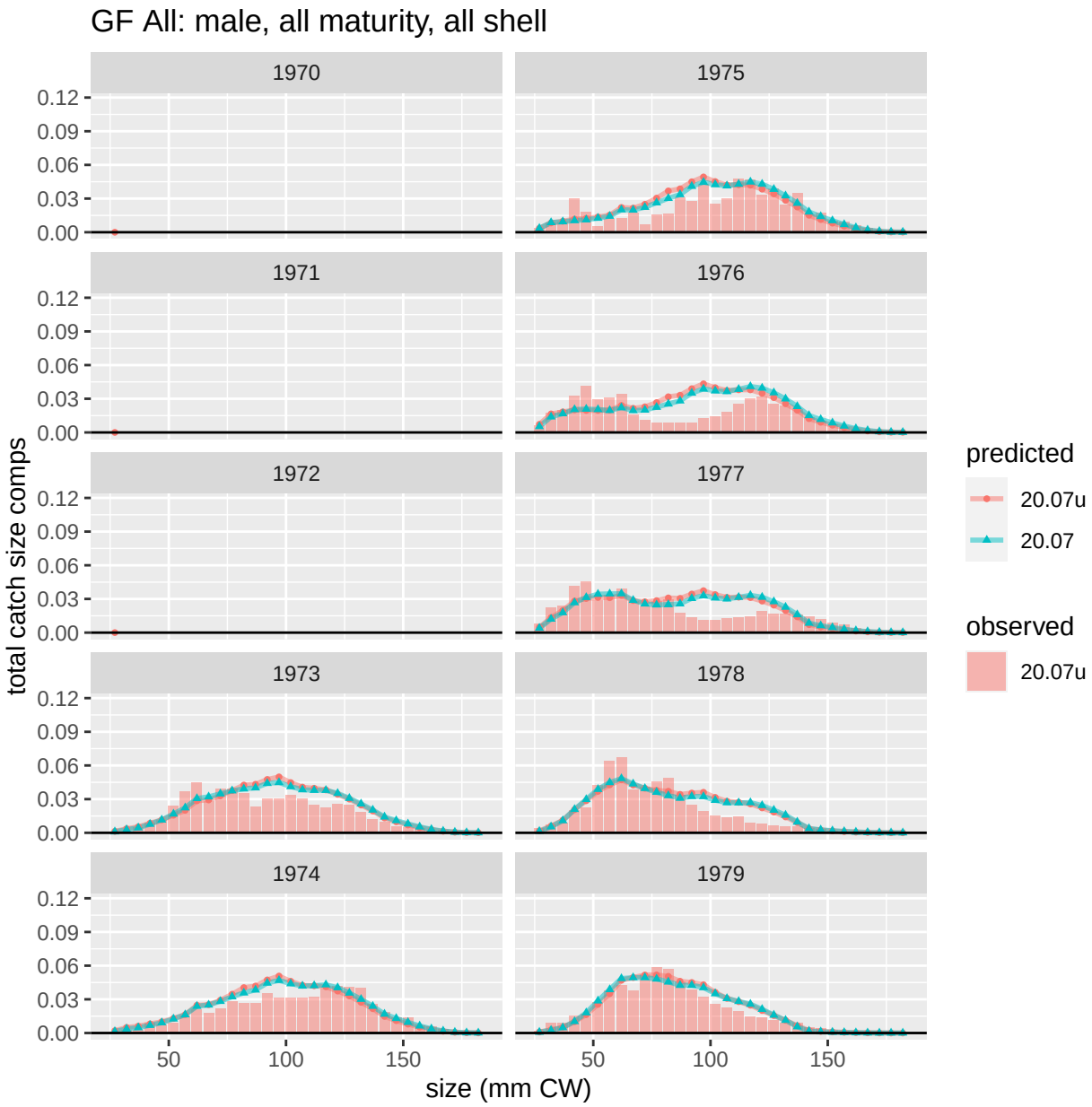

Figure 43: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 1 of 6.

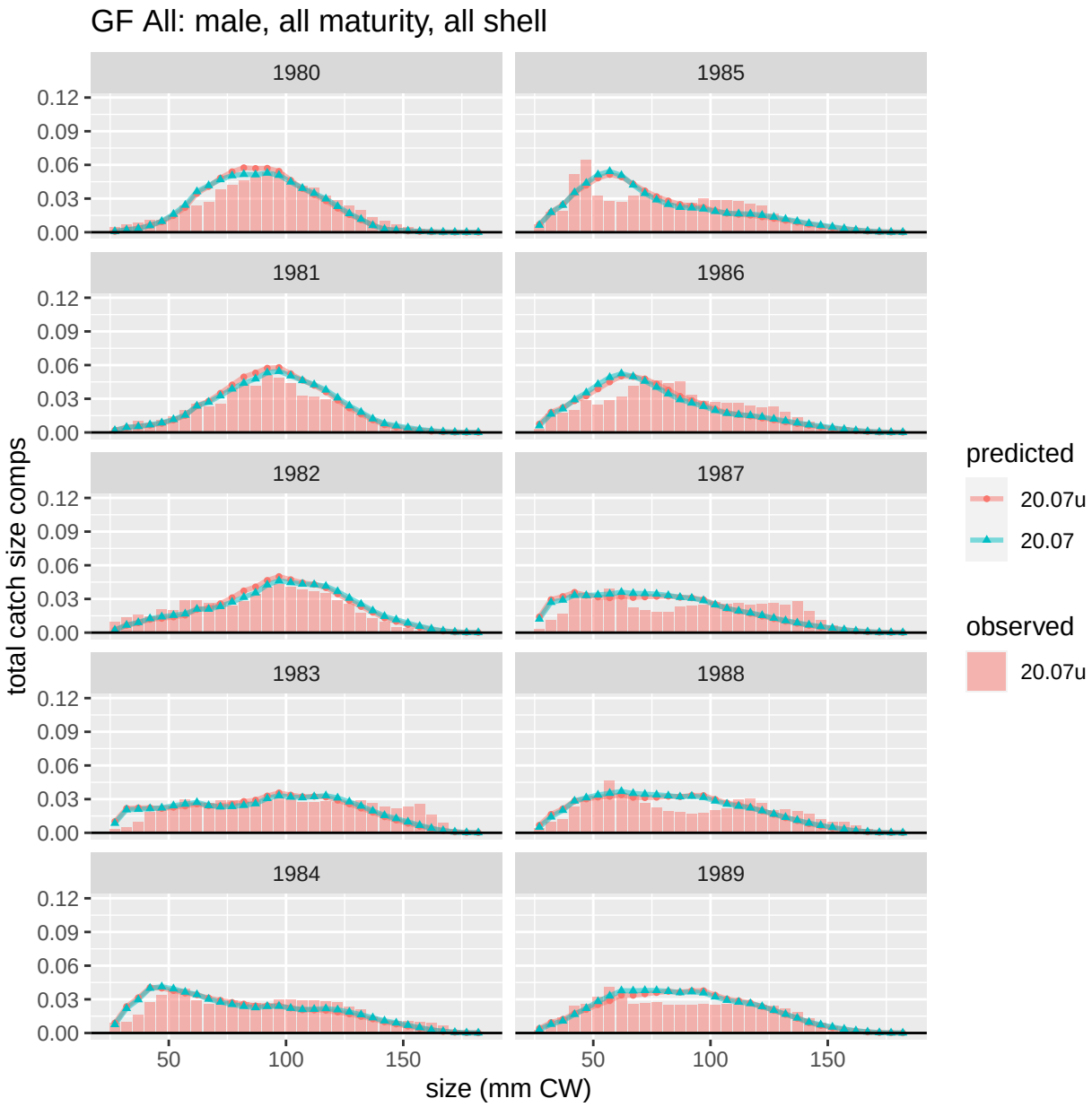

Figure 44: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 2 of 6.

Figure 45: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 3 of 6.

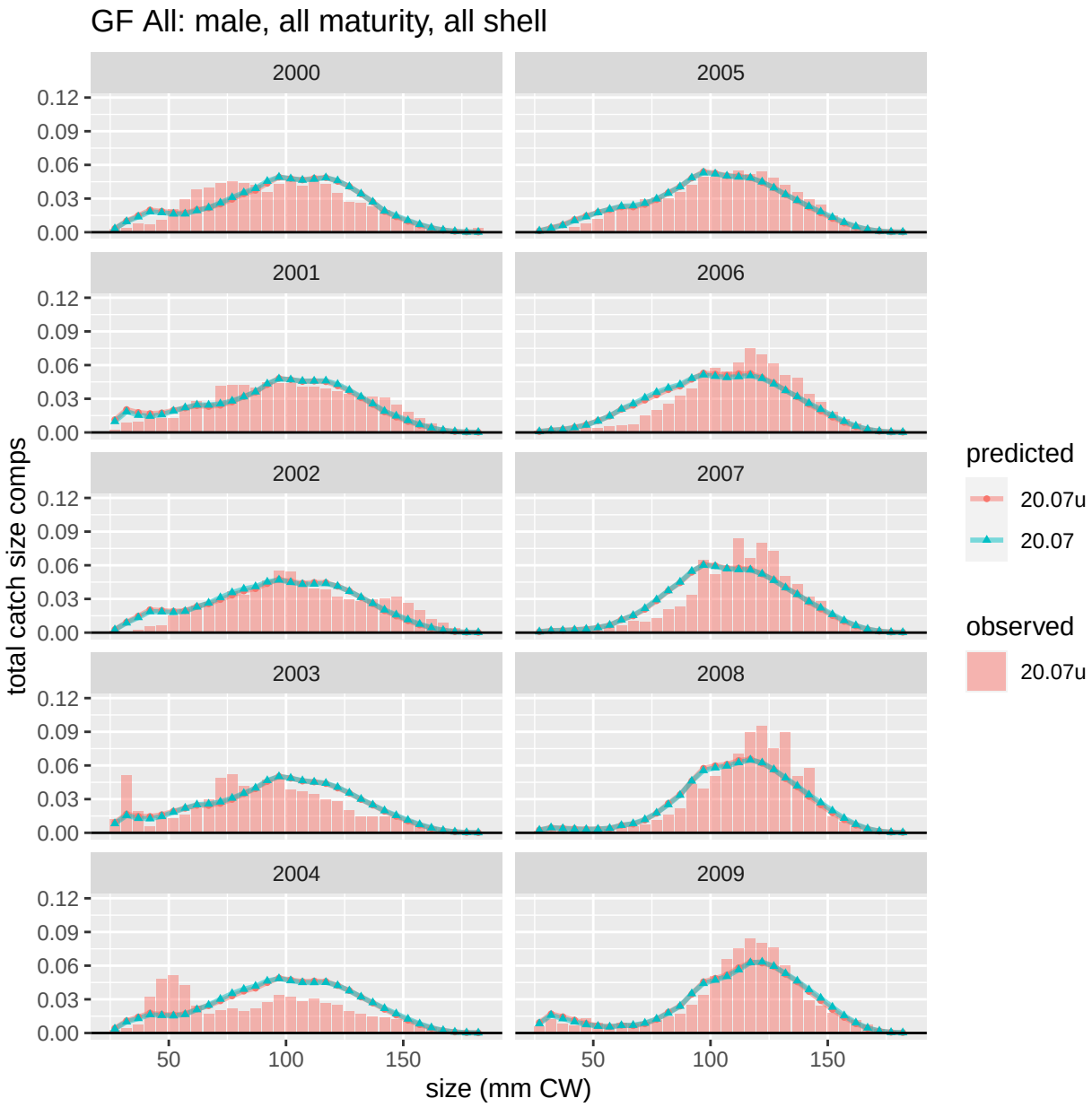

Figure 46: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 4 of 6.

Figure 47: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 5 of 6.

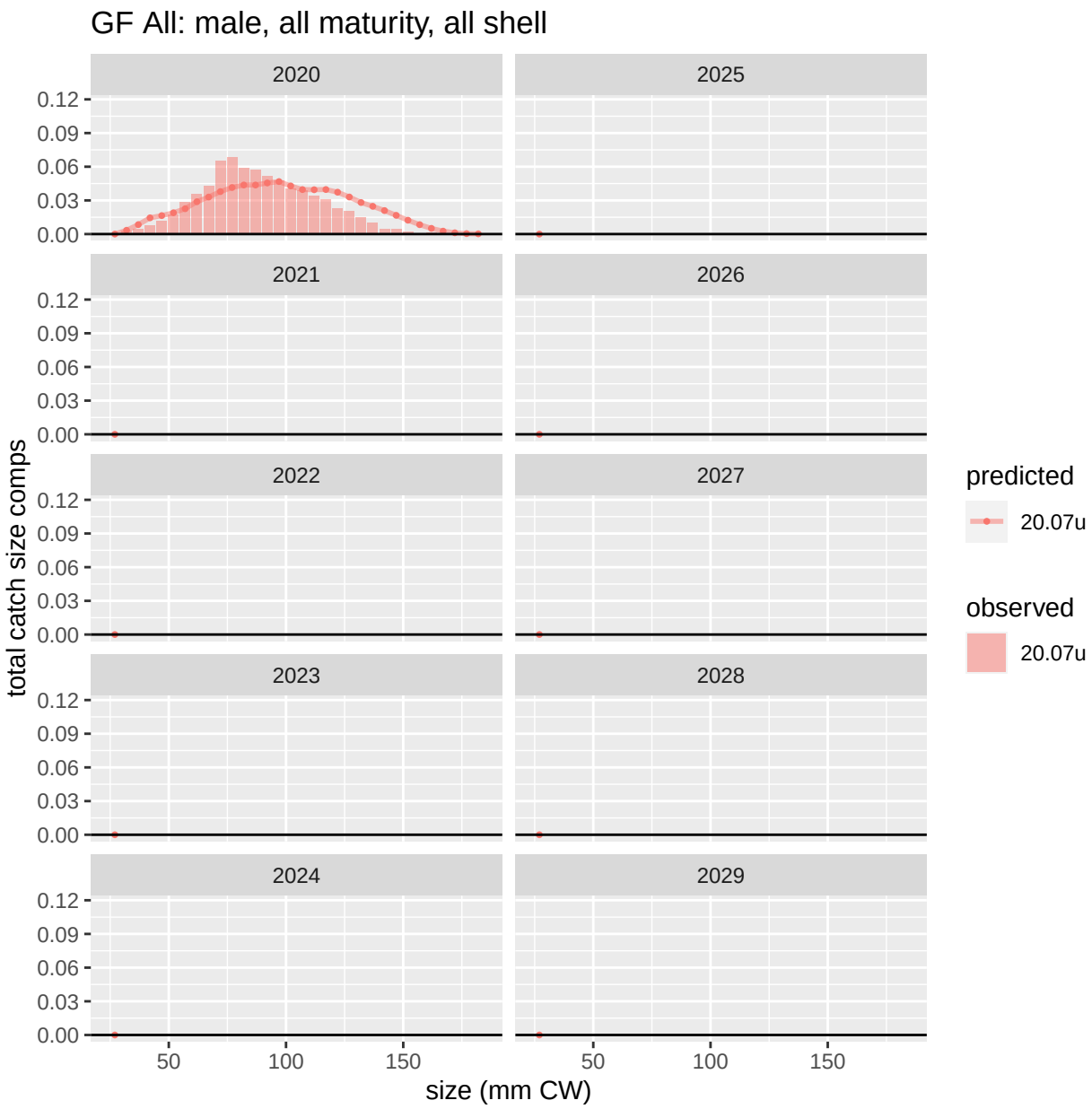

Figure 48: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 6 of 6.

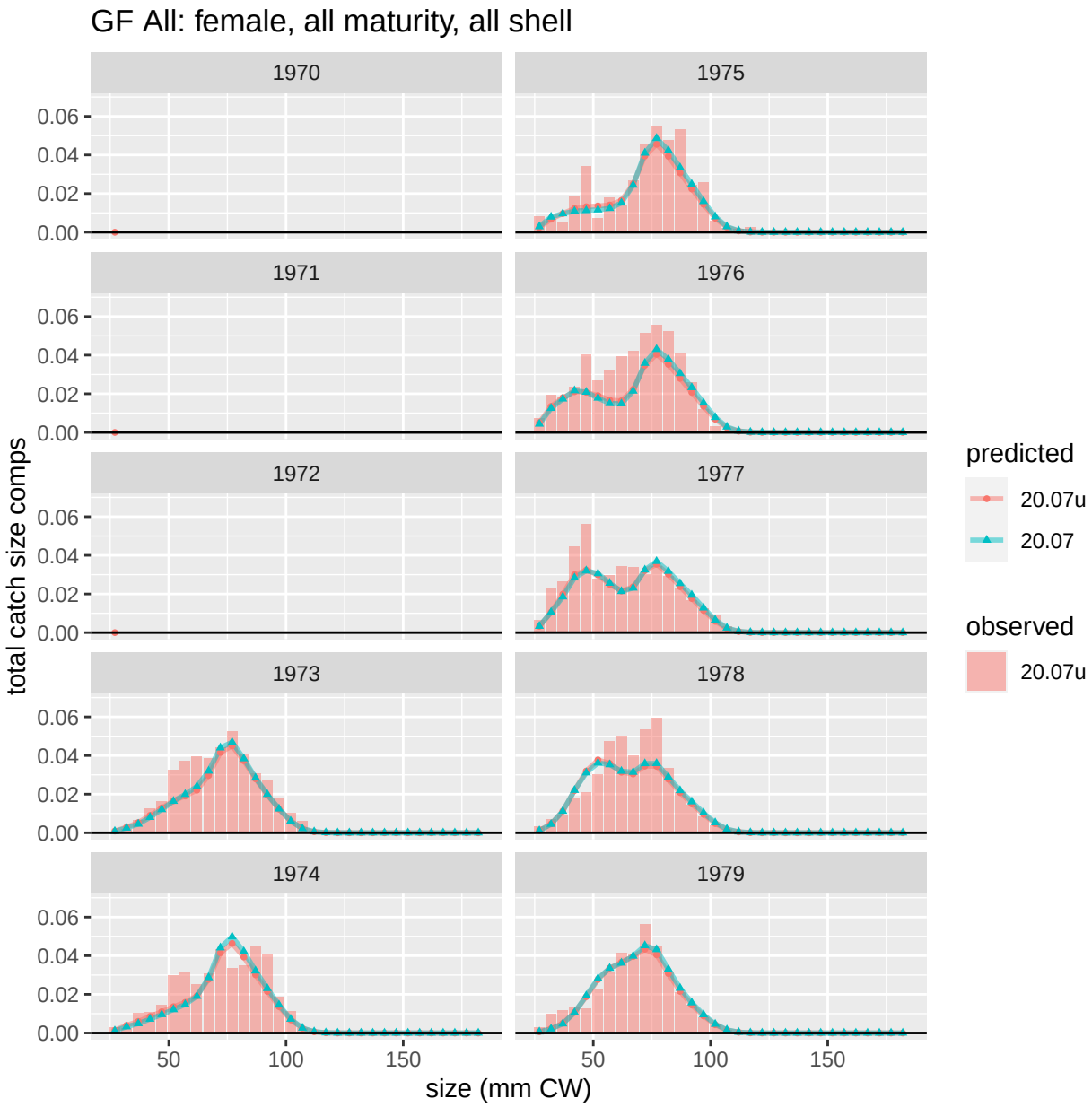

Figure 49: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 1 of 6.

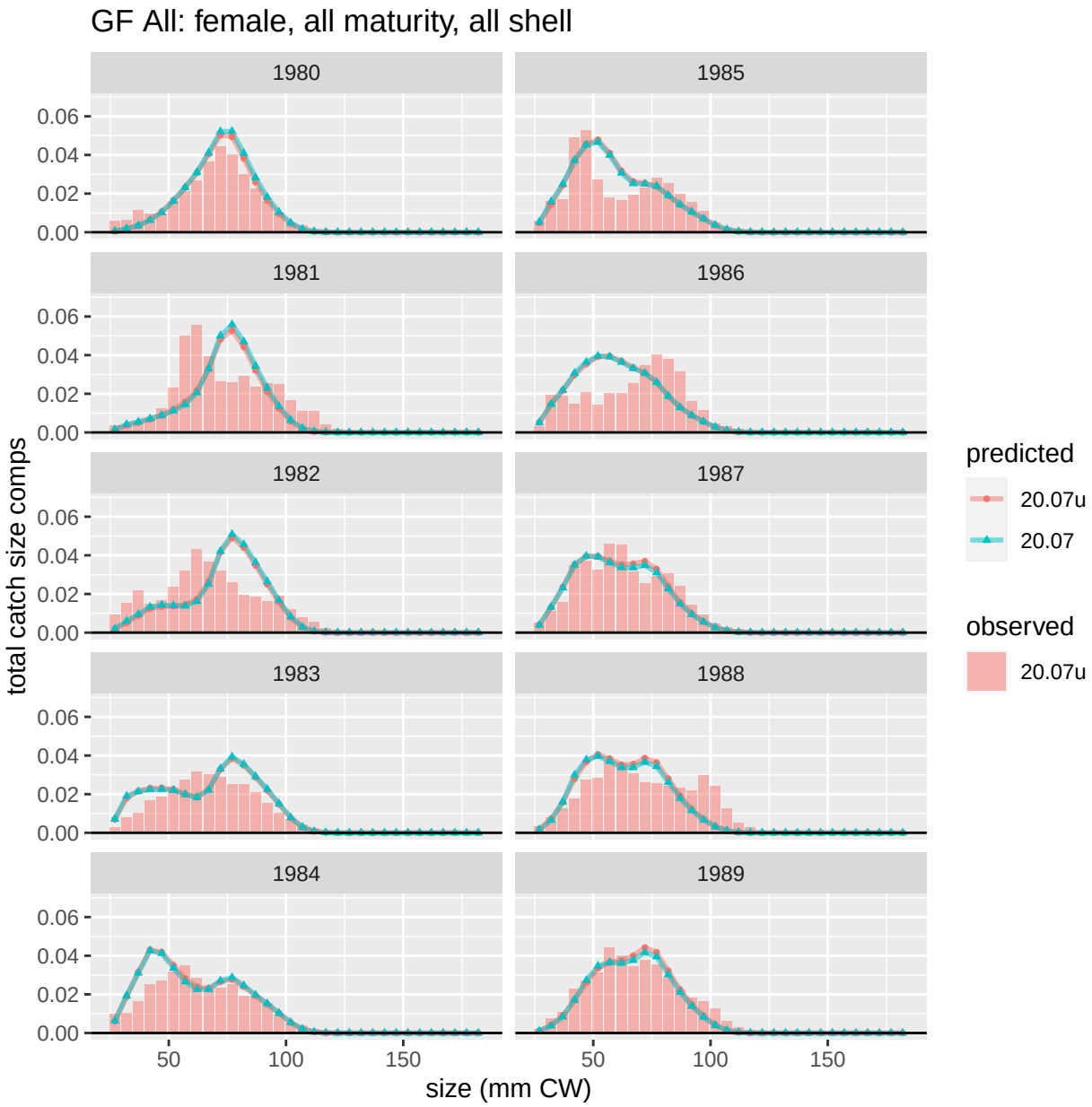

Figure 50: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 2 of 6.

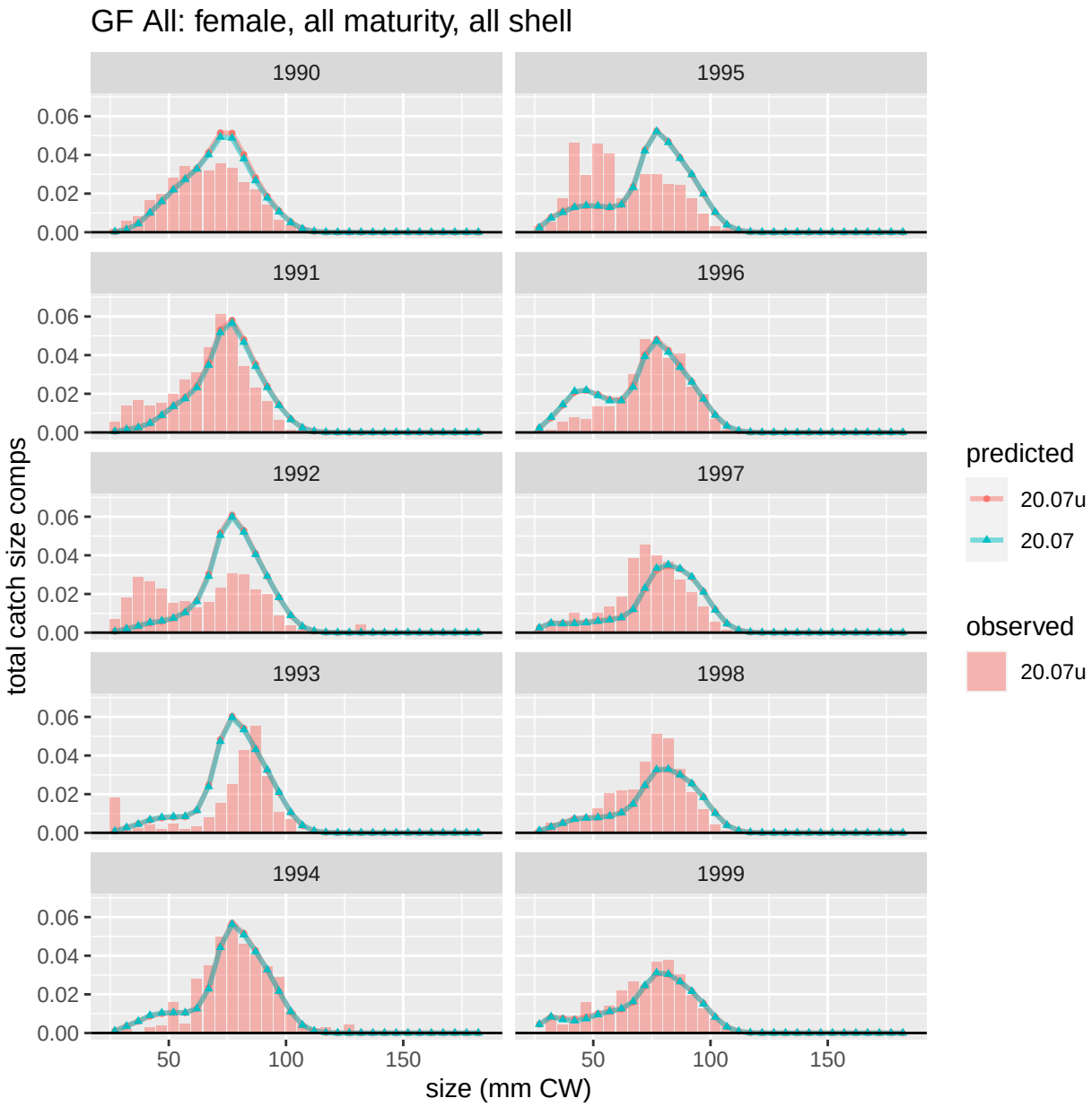

Figure 51: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 3 of 6.

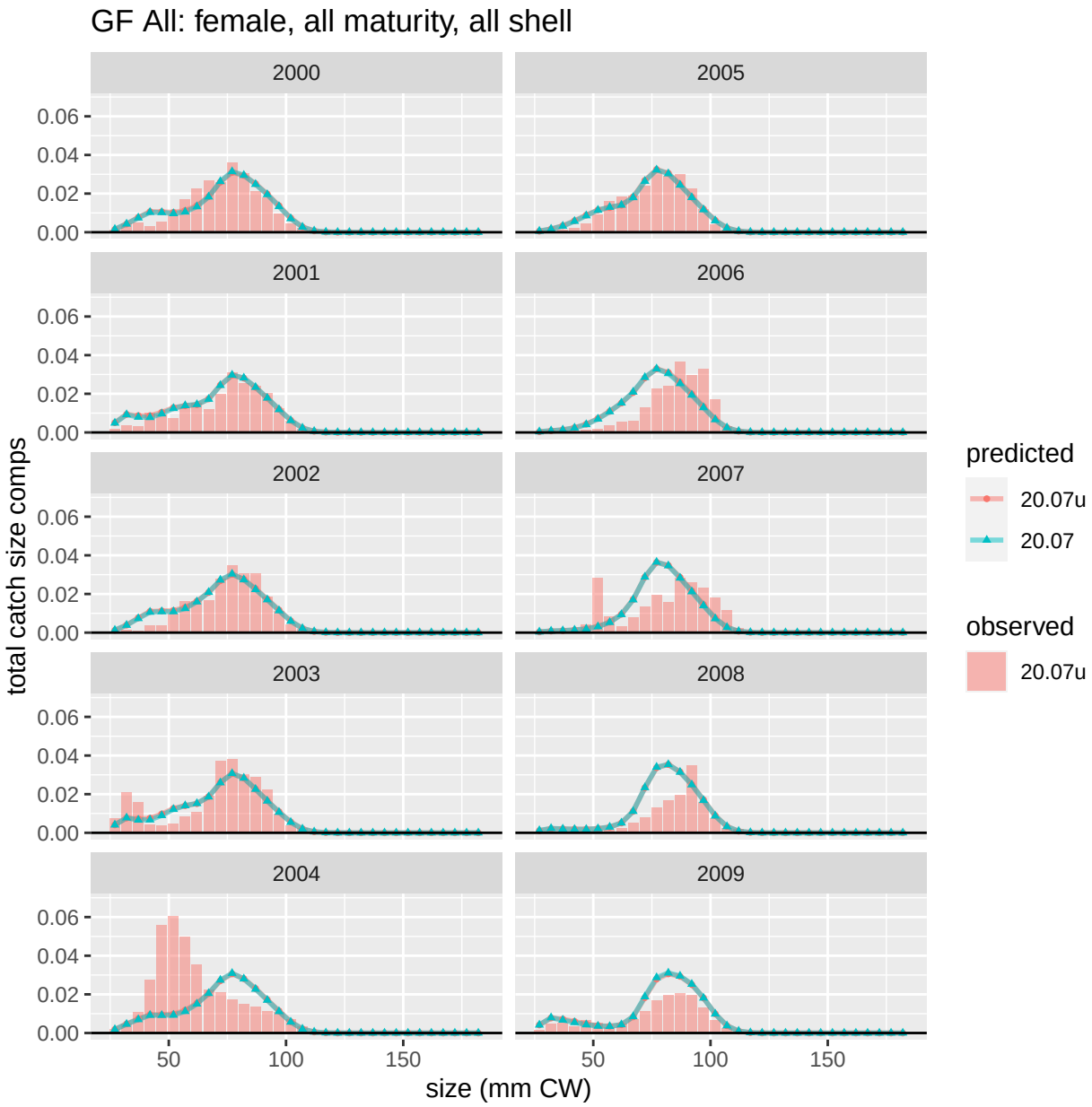

Figure 52: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 4 of 6.

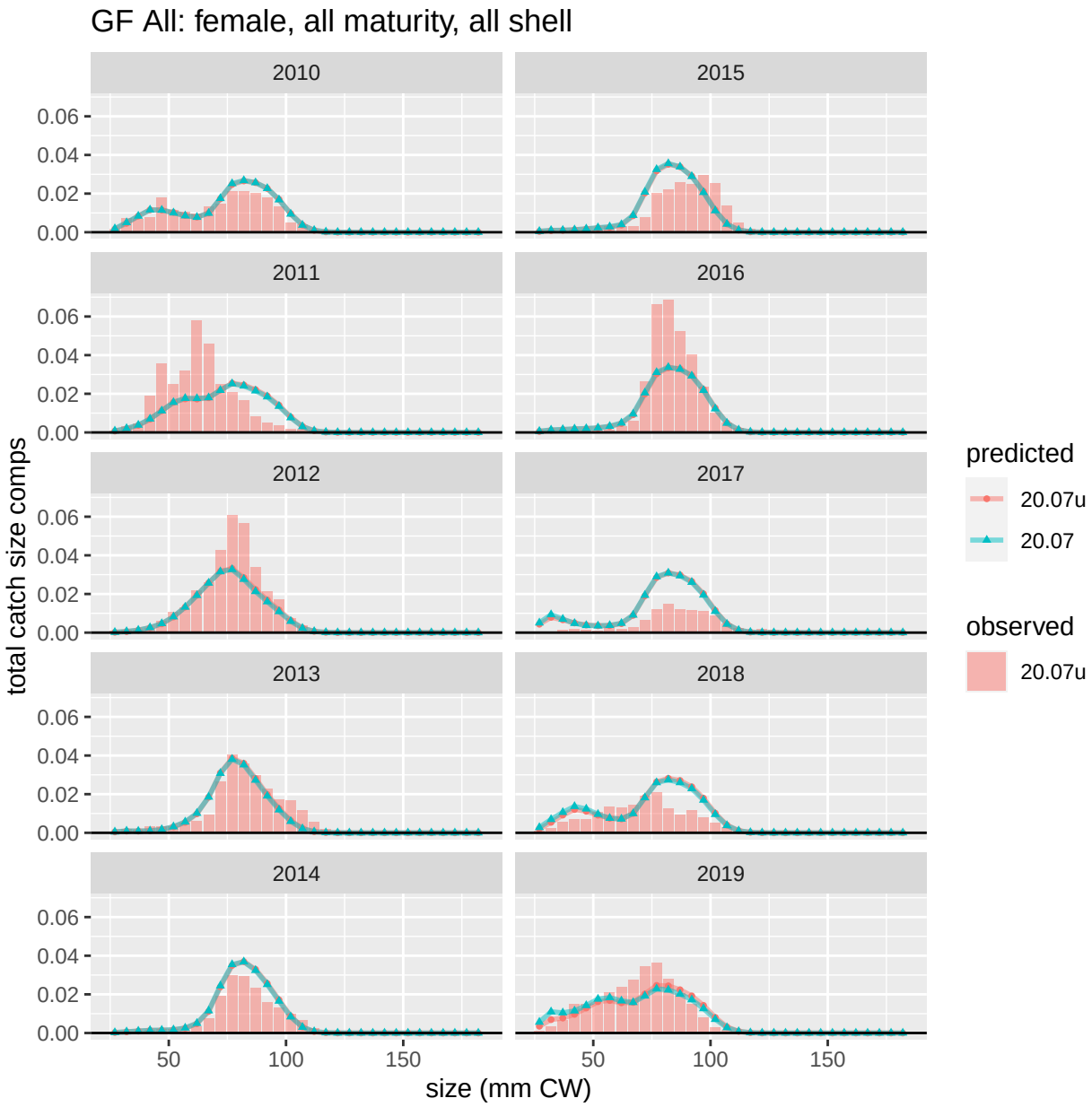

Figure 53: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 5 of 6.

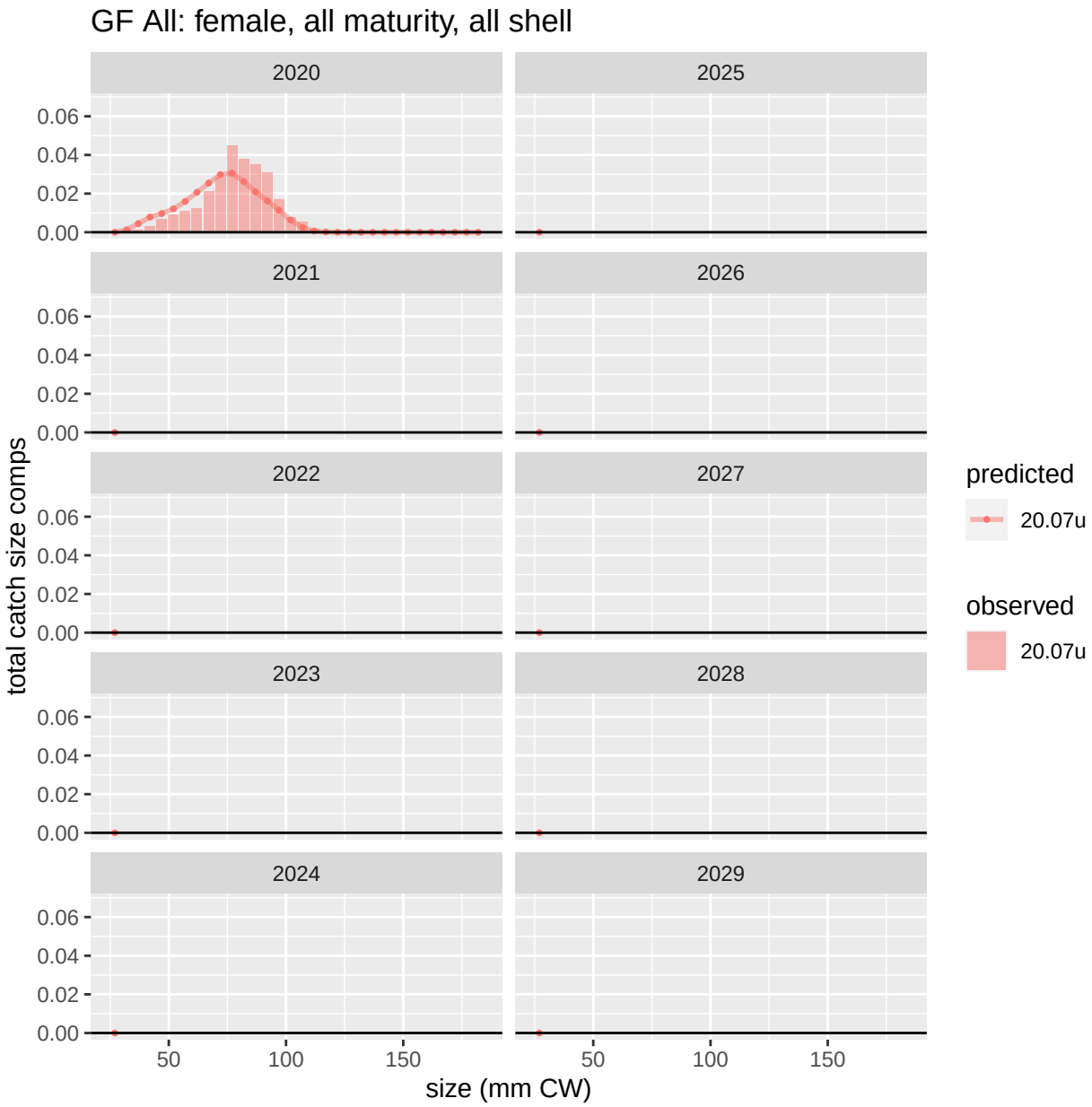

Figure 54: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 6 of 6.

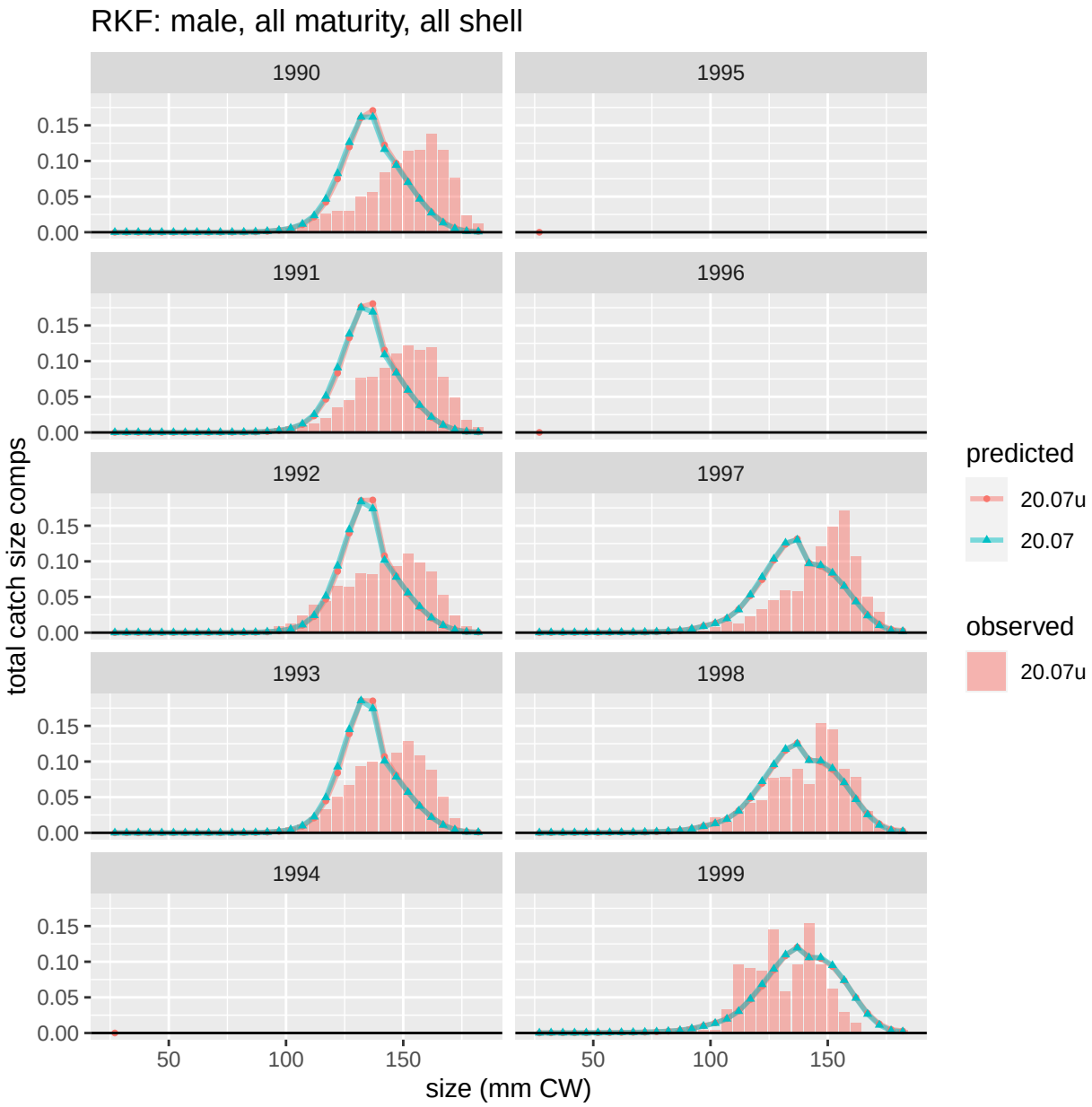

Figure 55: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 1 of 4.

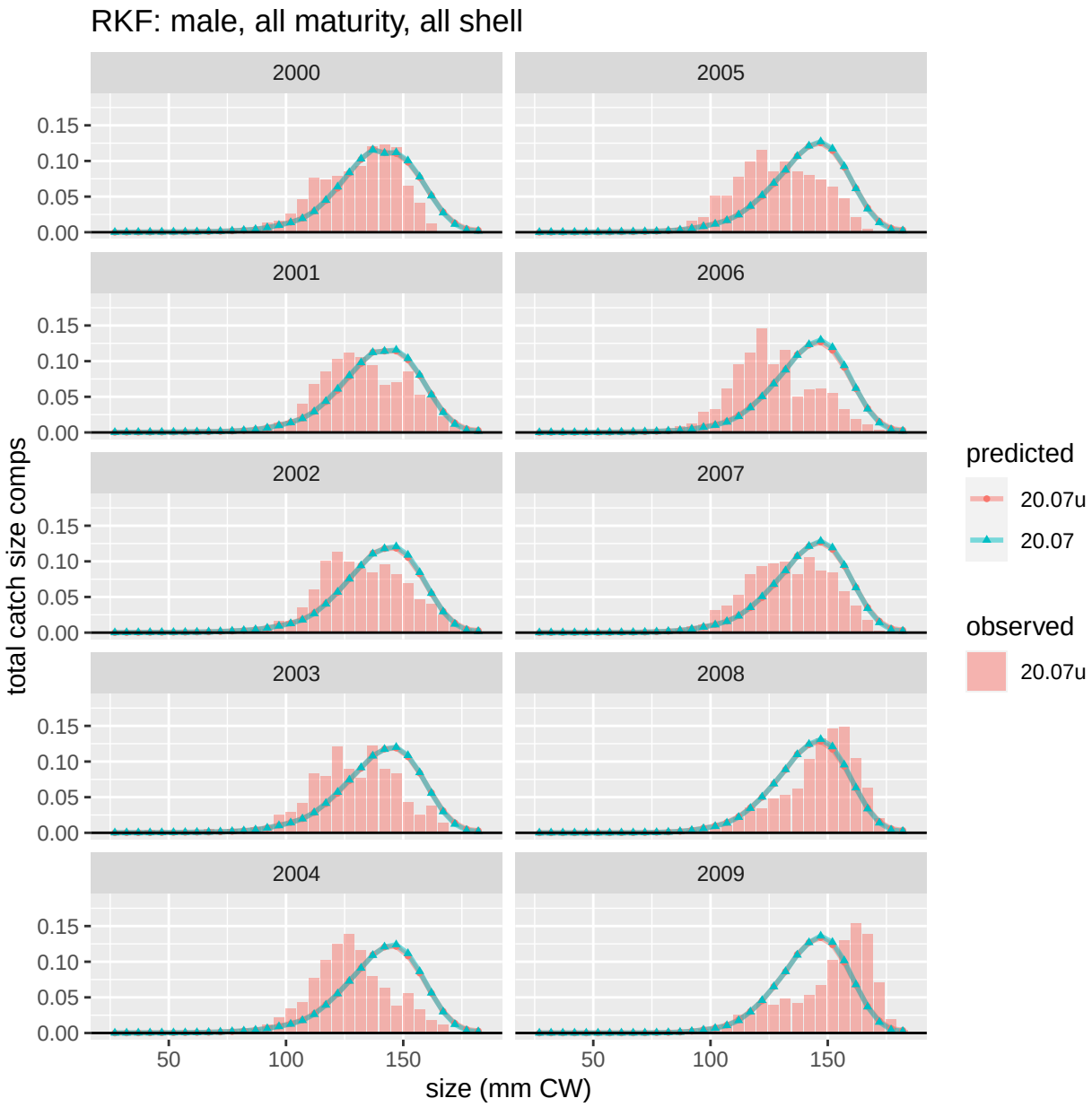

Figure 56: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 2 of 4.

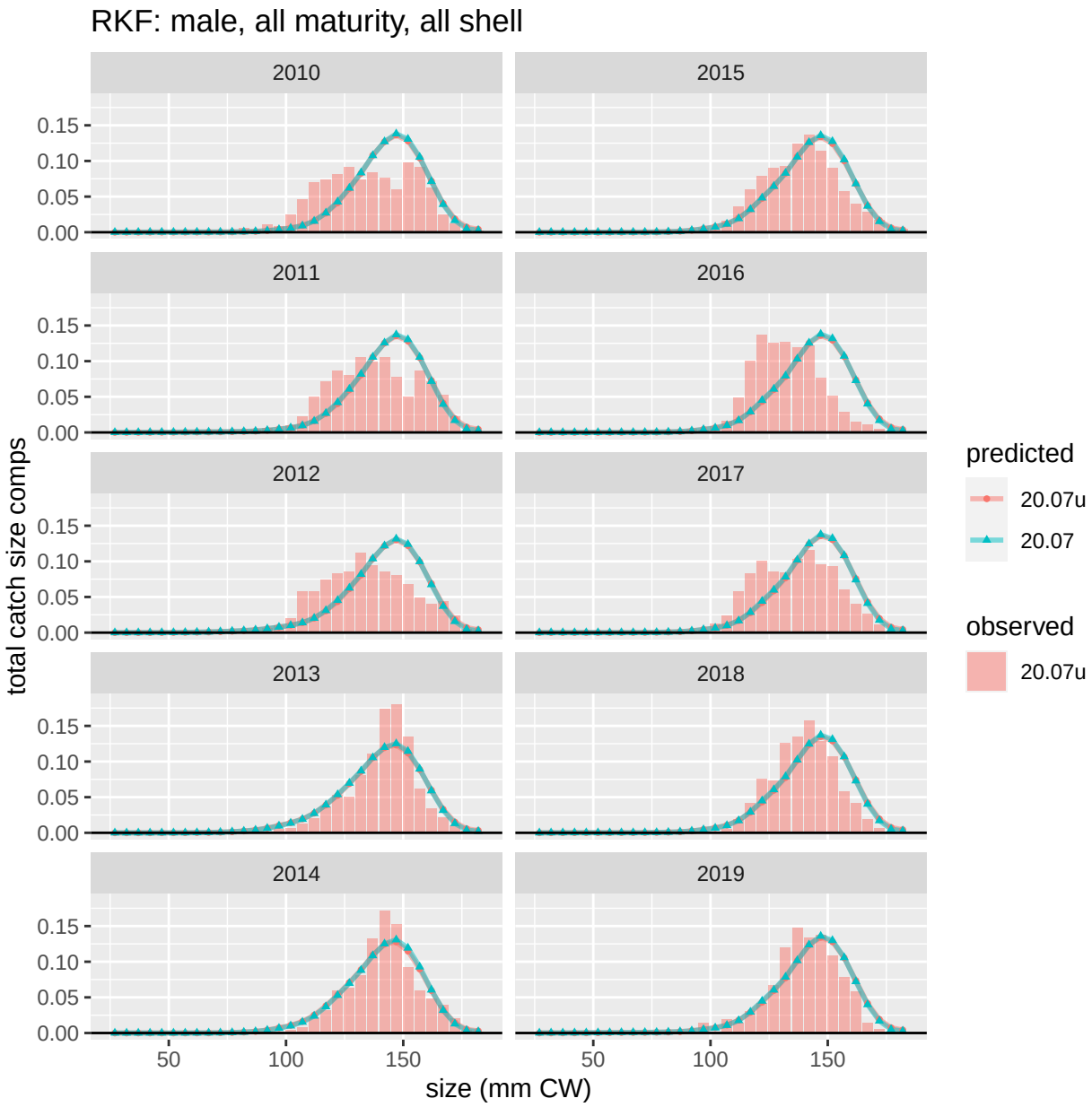

Figure 57: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 3 of 4.

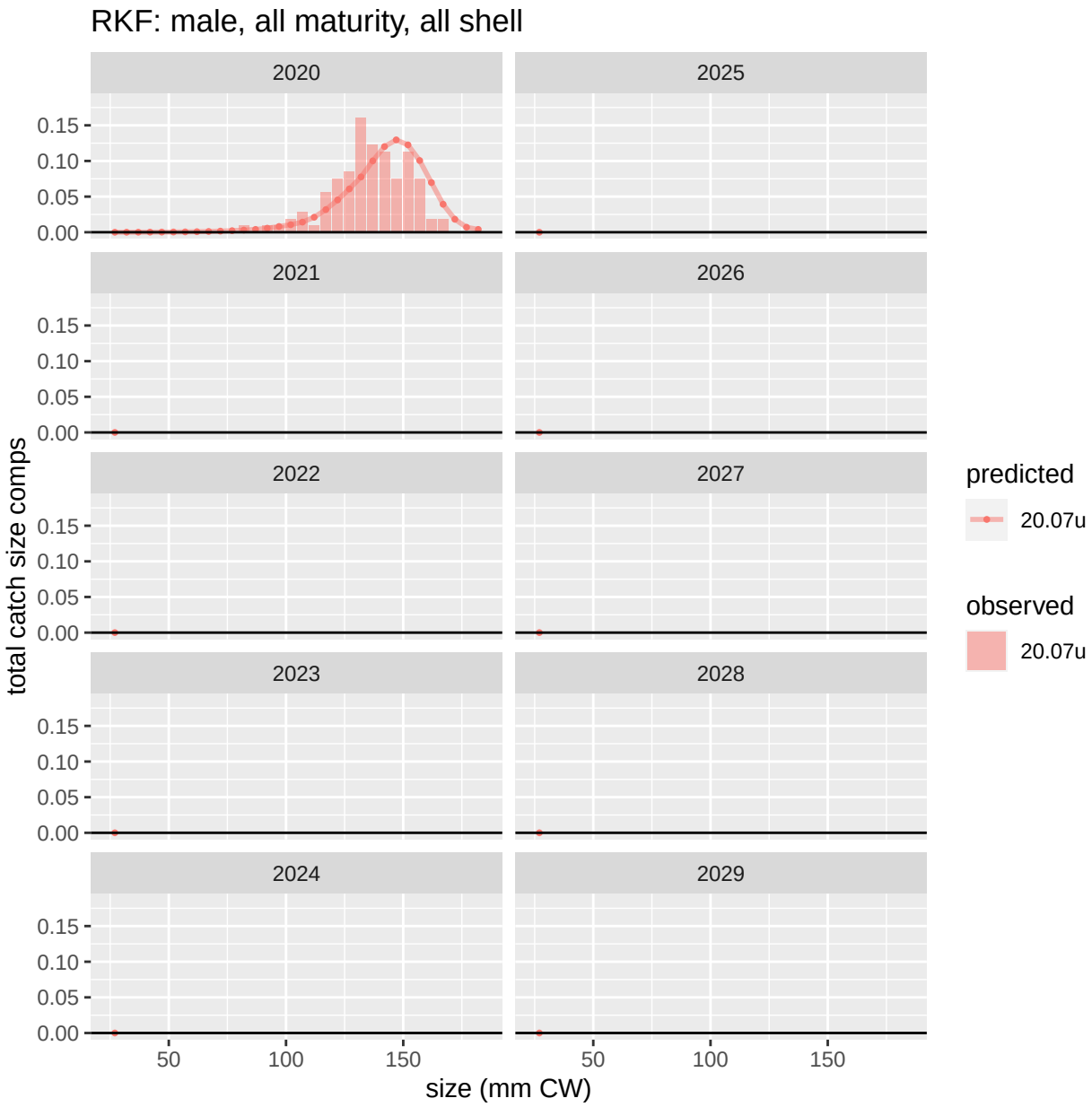

Figure 58: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 4 of 4.

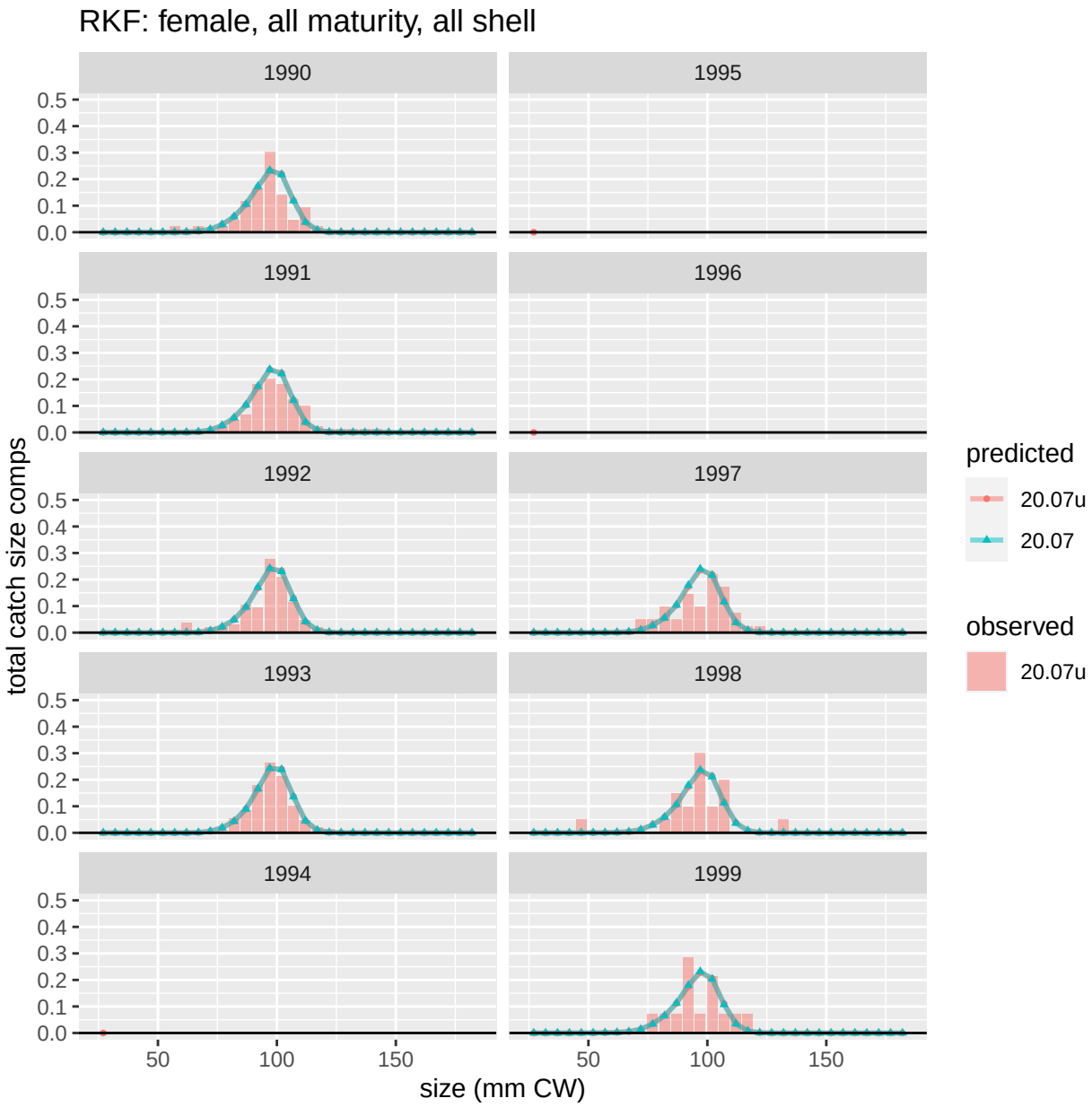

Figure 59: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 1 of 4.

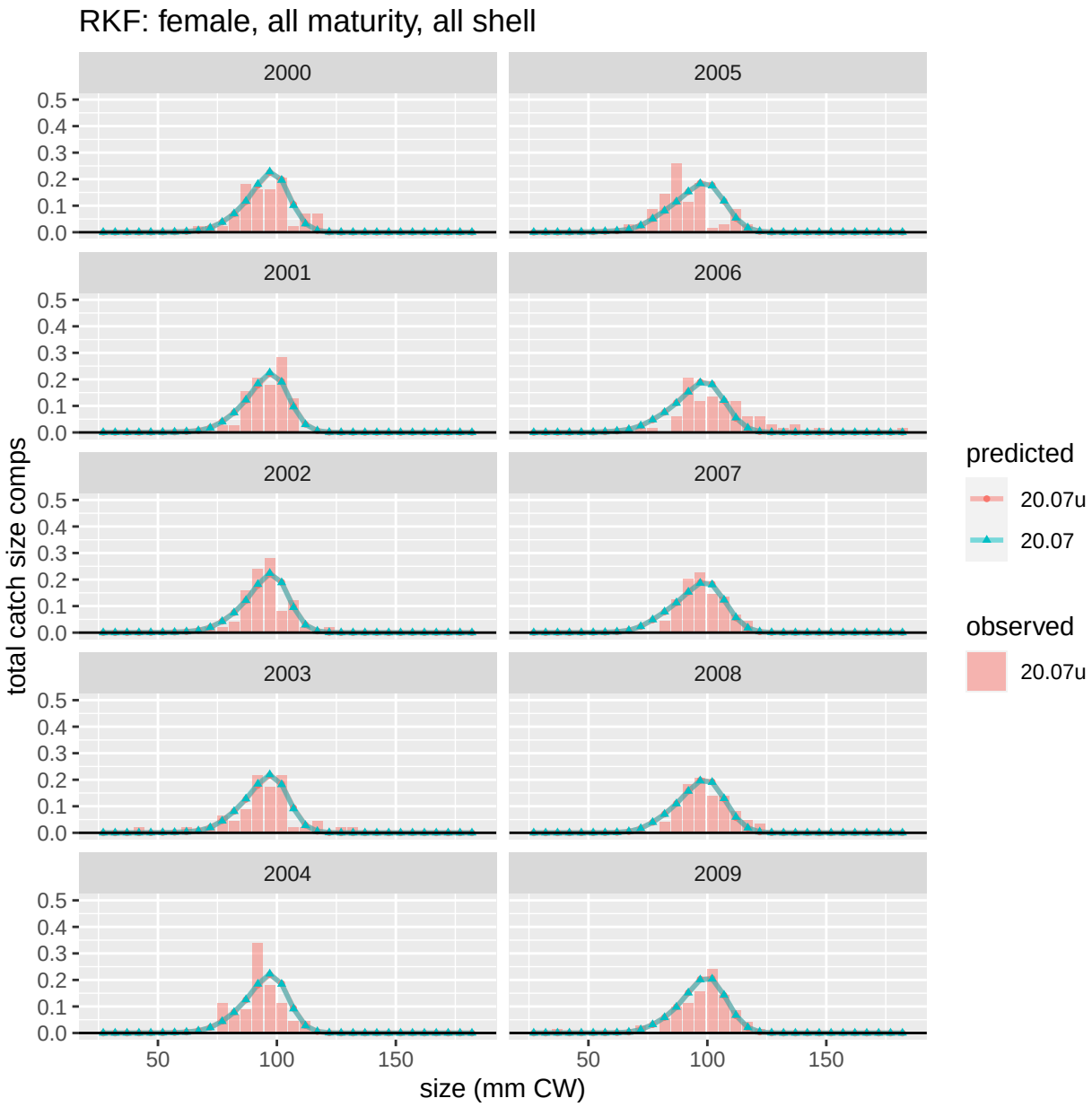

Figure 60: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 2 of 4.

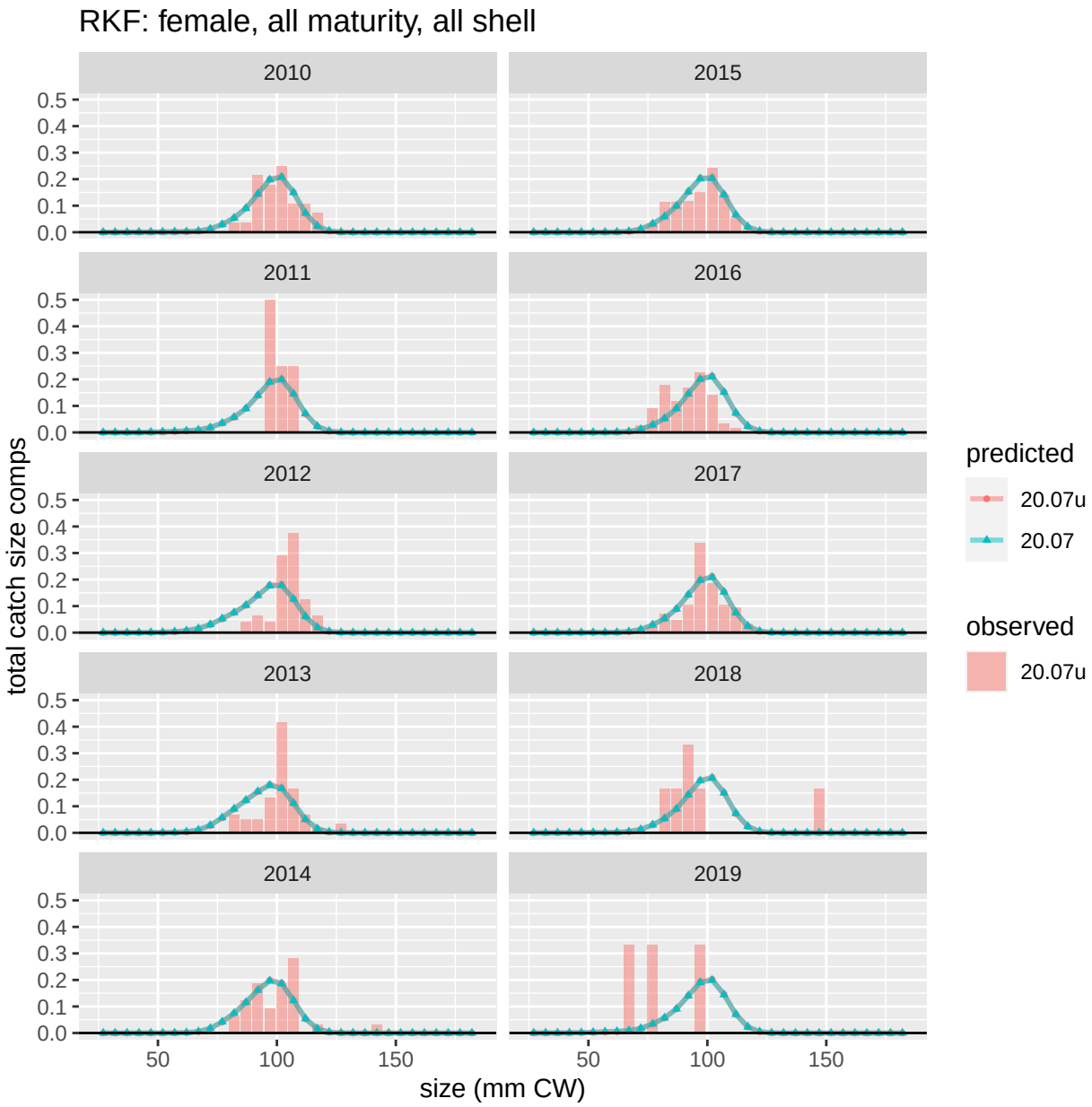

Figure 61: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 3 of 4.

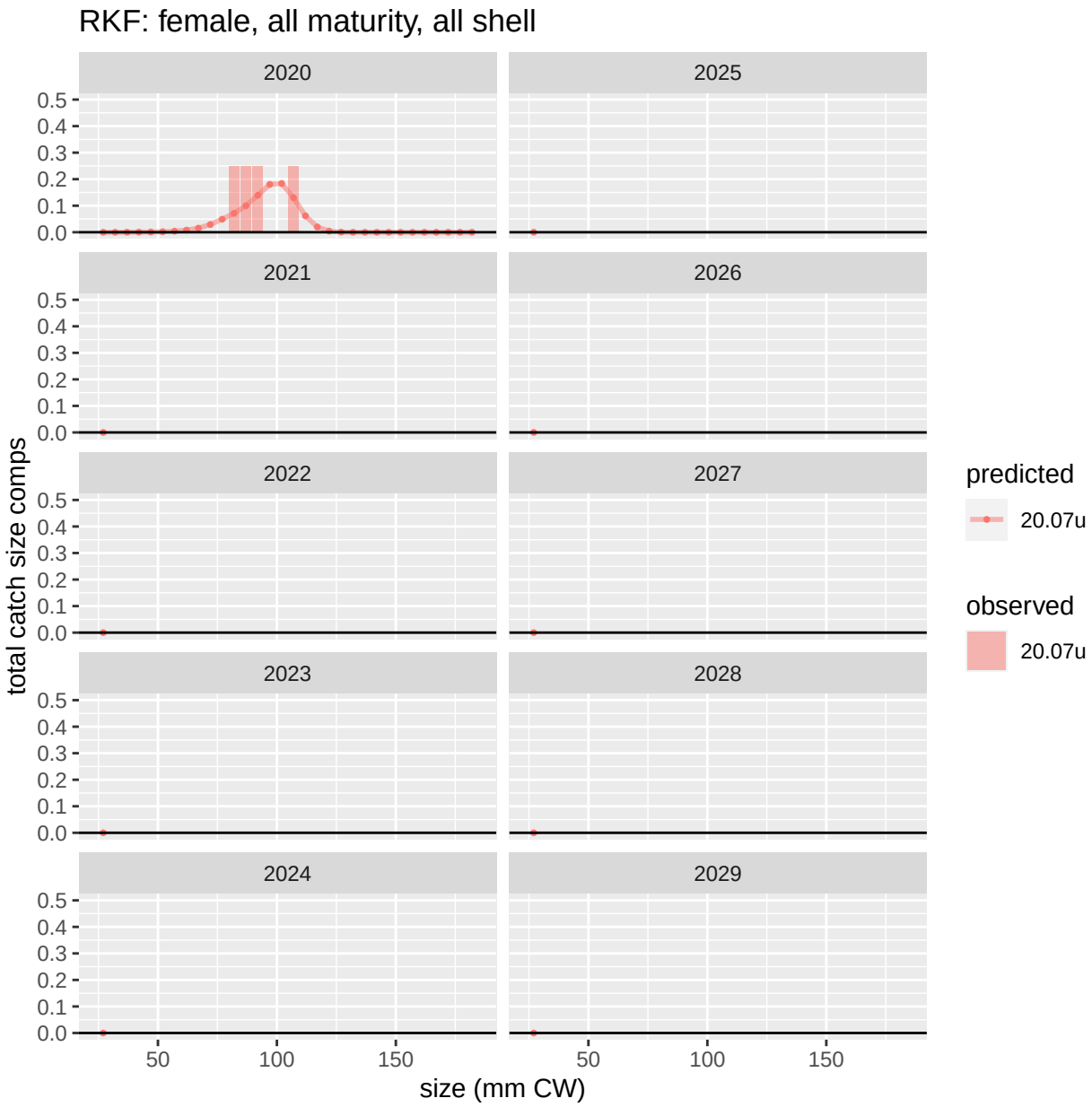

Figure 62: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 4 of 4.

Appendix I Model Comparisons: Fits to Size Composition Data – 21.22 vs 21.24 vs 21.22a

William Stockhausen

03 September, 2021

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Model fits to size compositions, by year **1**

Survey size compositions **2**

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Model fits to size compositions, by year

Fits to the size composition data available to the model(s) are presented in this section as line plots by year. Not all of the fits presented are necessarily included in the parameter optimization for each model; some fits to datasets for a particular model may be included for comparison purposes with other models which include those data in their optimization. The reader should consult the main assessment document to determine which fits are included in the optimization for any particular model.

Survey size compositions

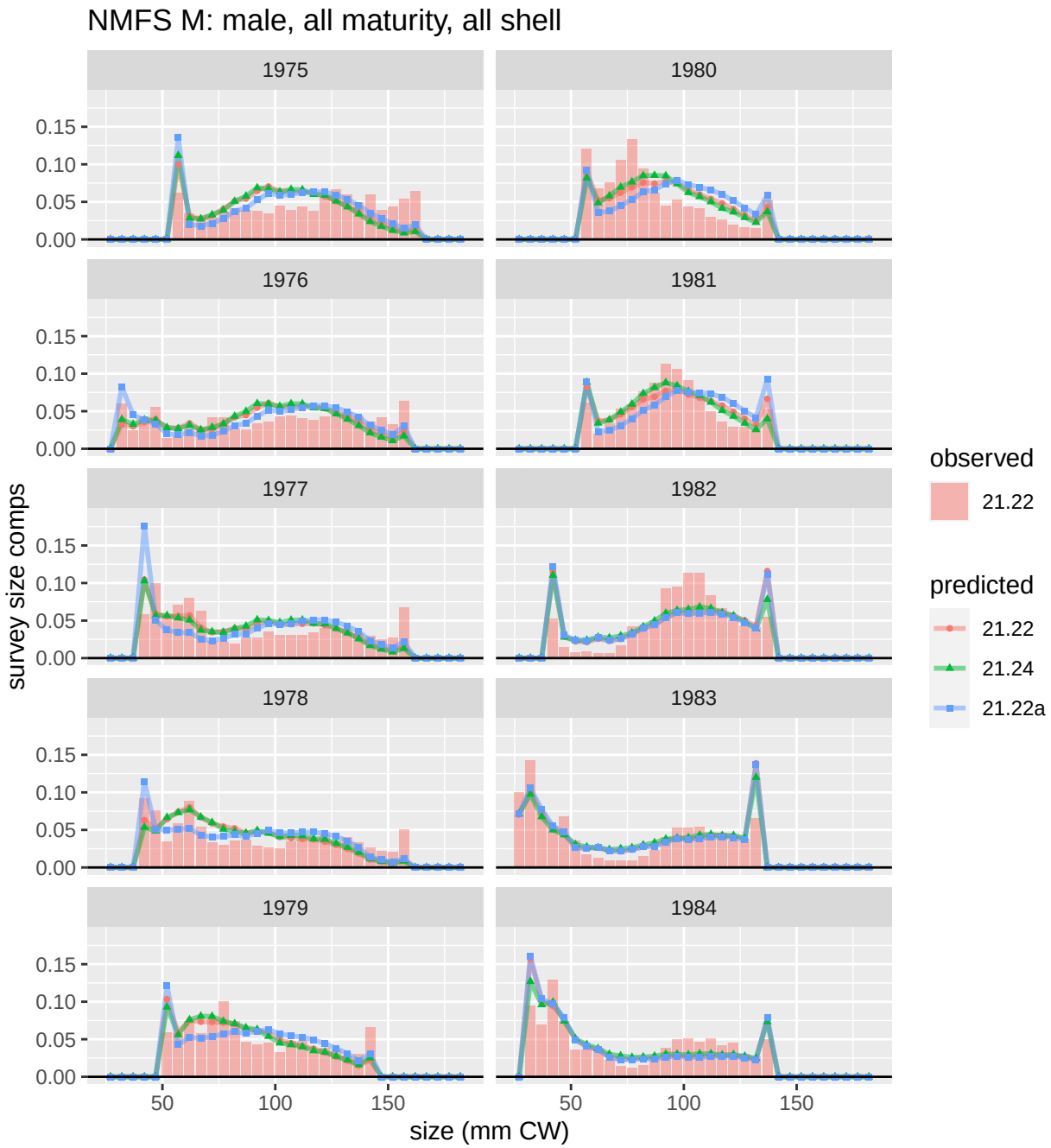

Figure 1: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 1 of 5.

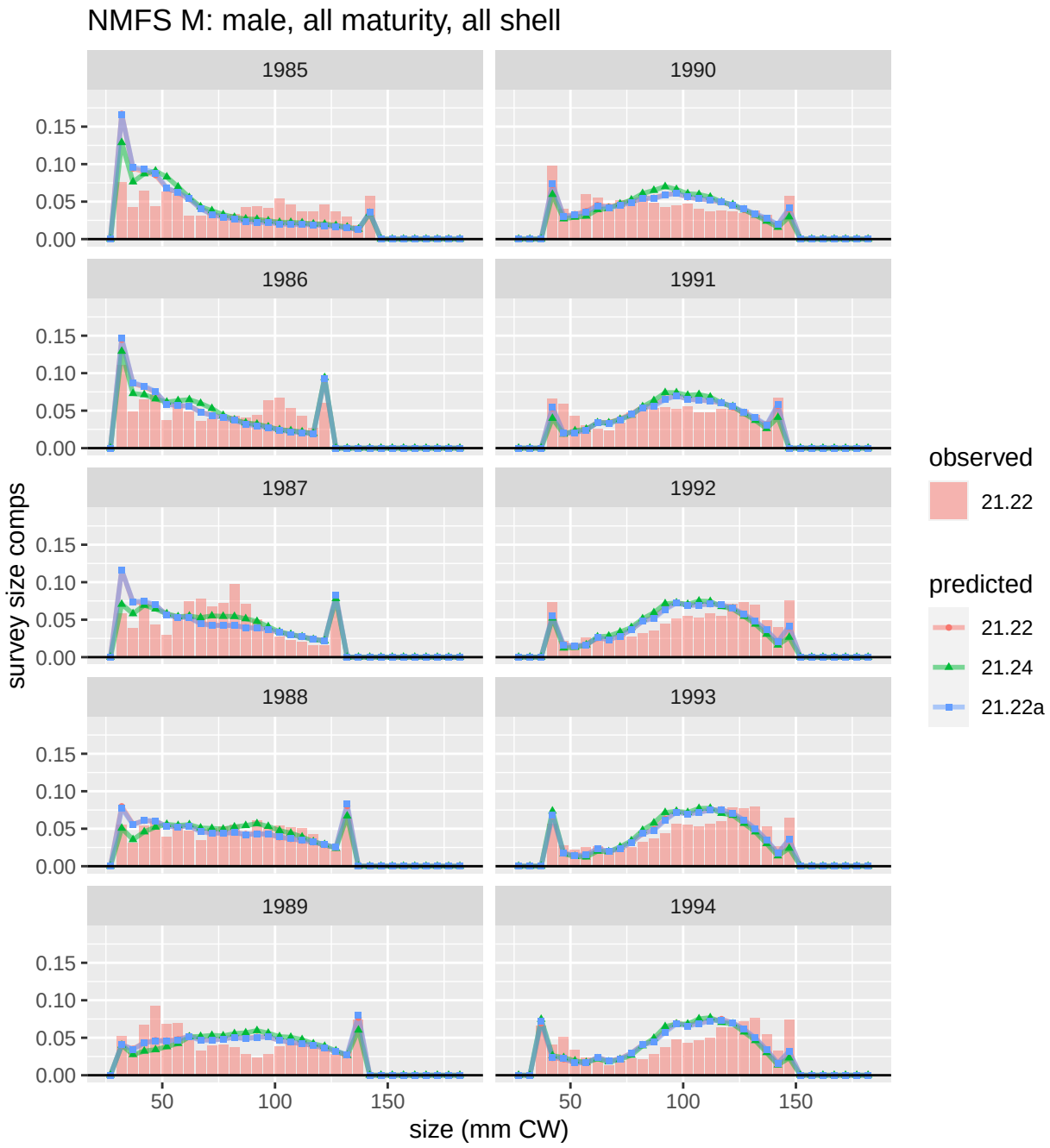

Figure 2: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 2 of 5.

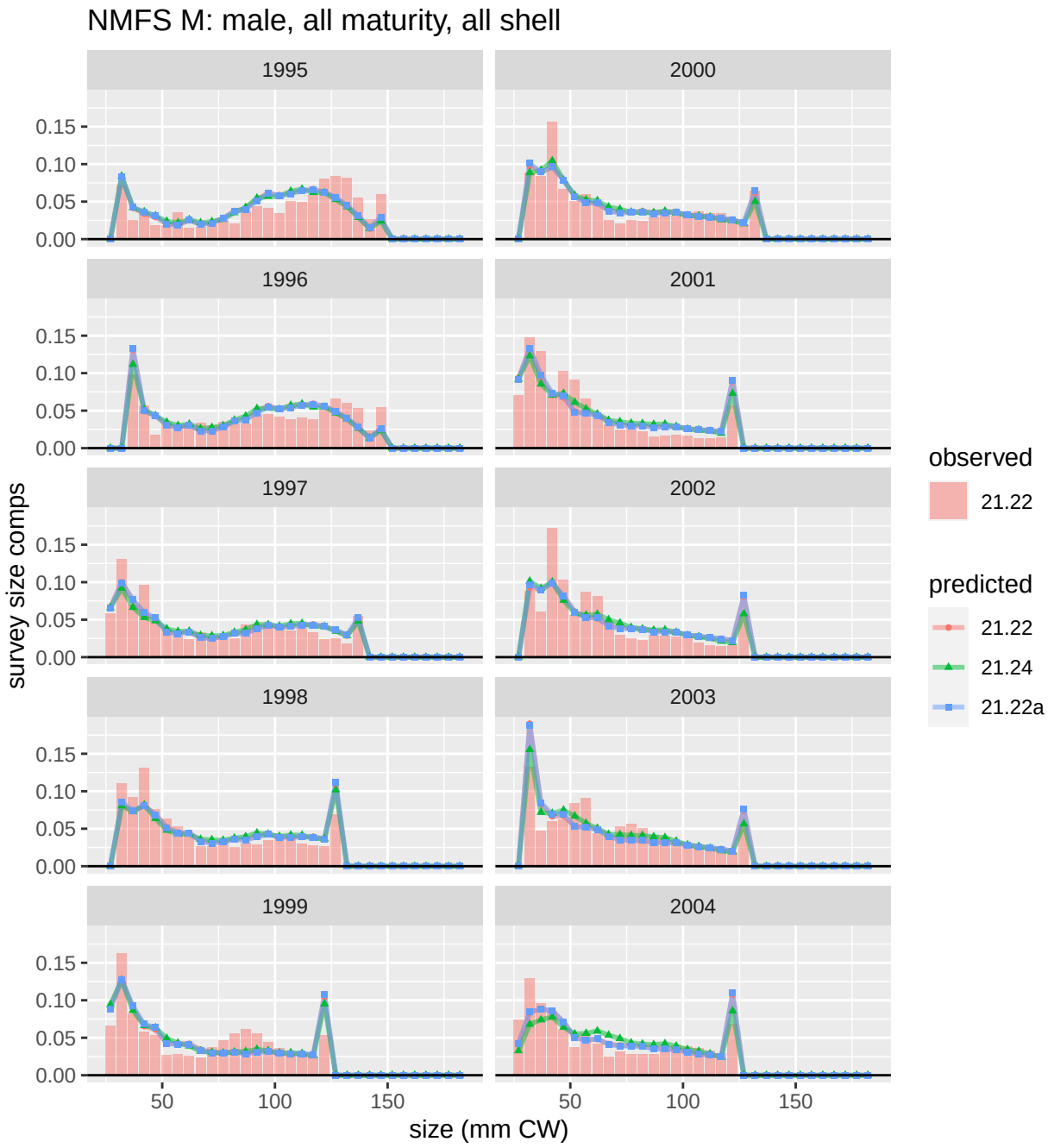

Figure 3: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 3 of 5.

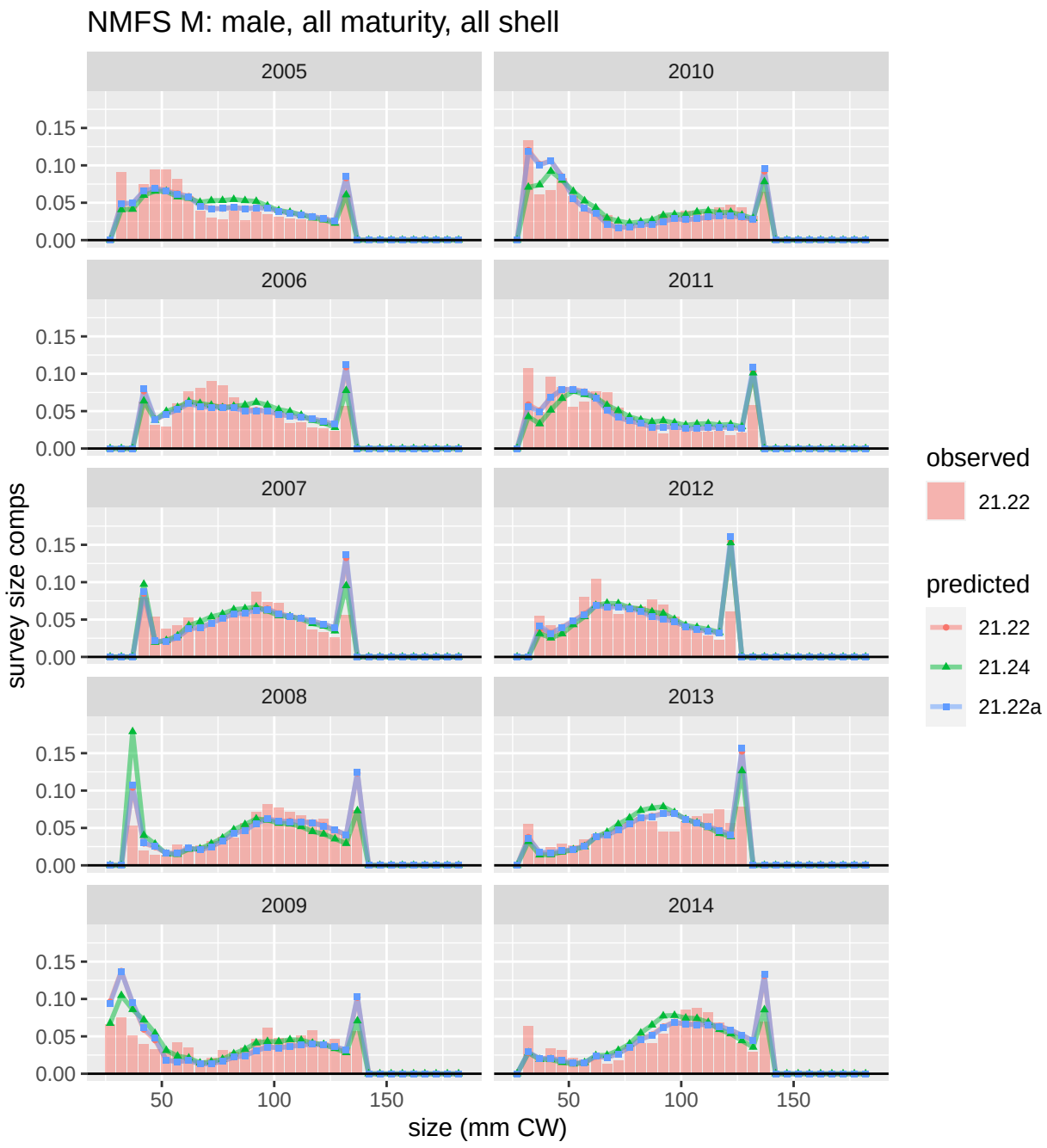

Figure 4: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 4 of 5.

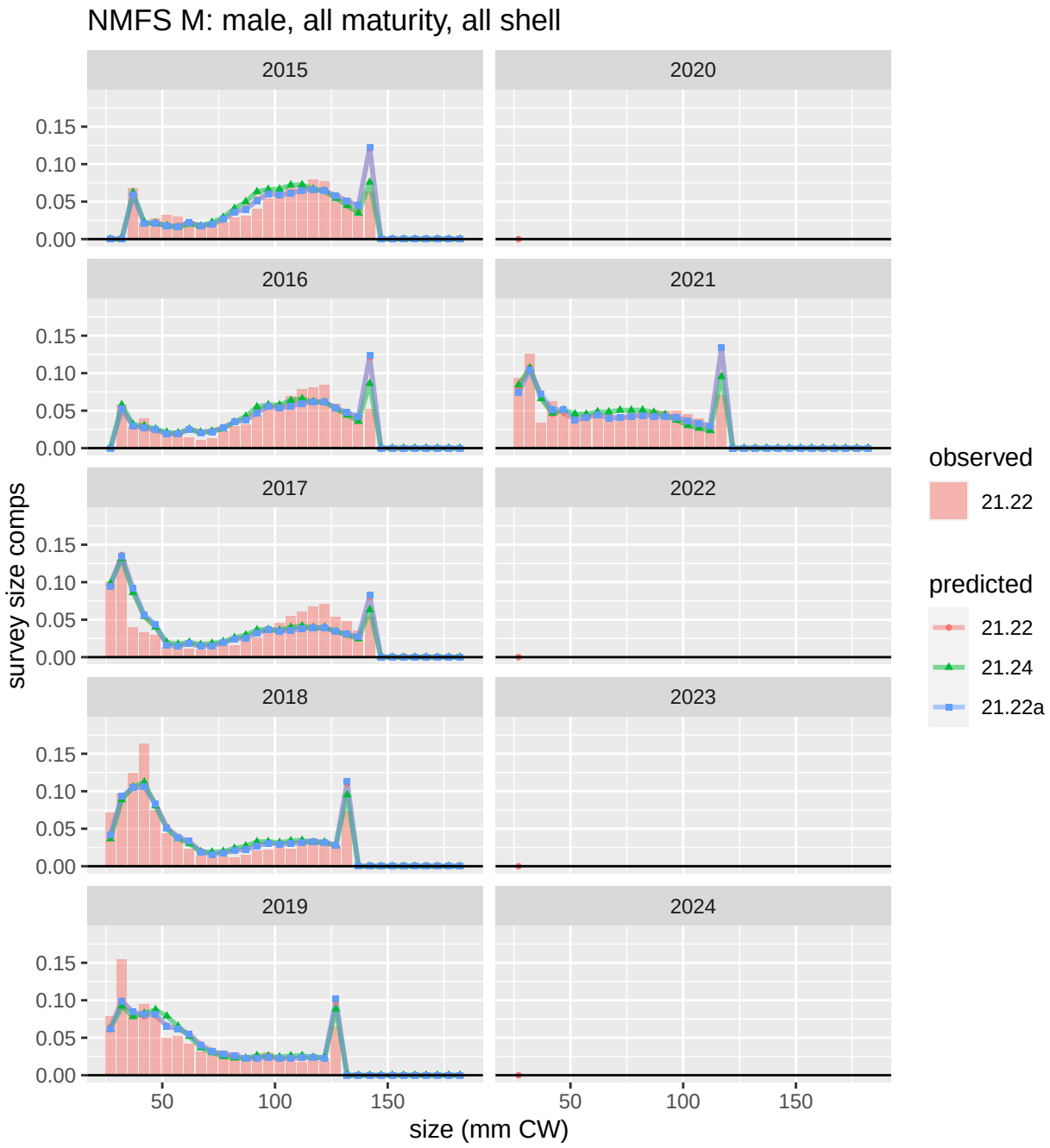

Figure 5: Comparison of observed and predicted male, all maturity, all shell survey size comps for NMFS M. Page 5 of 5.

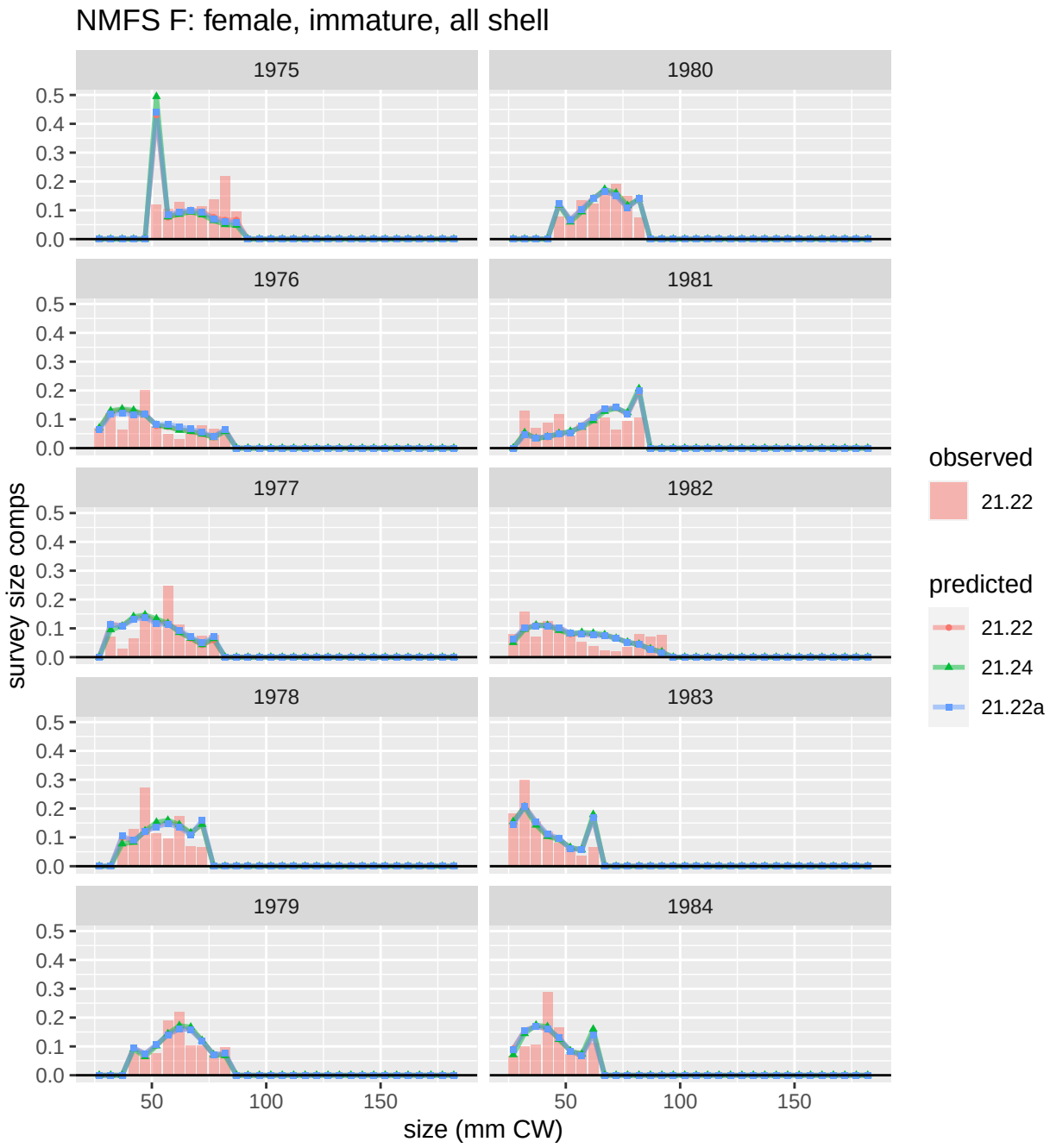

Figure 6: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 1 of 5.

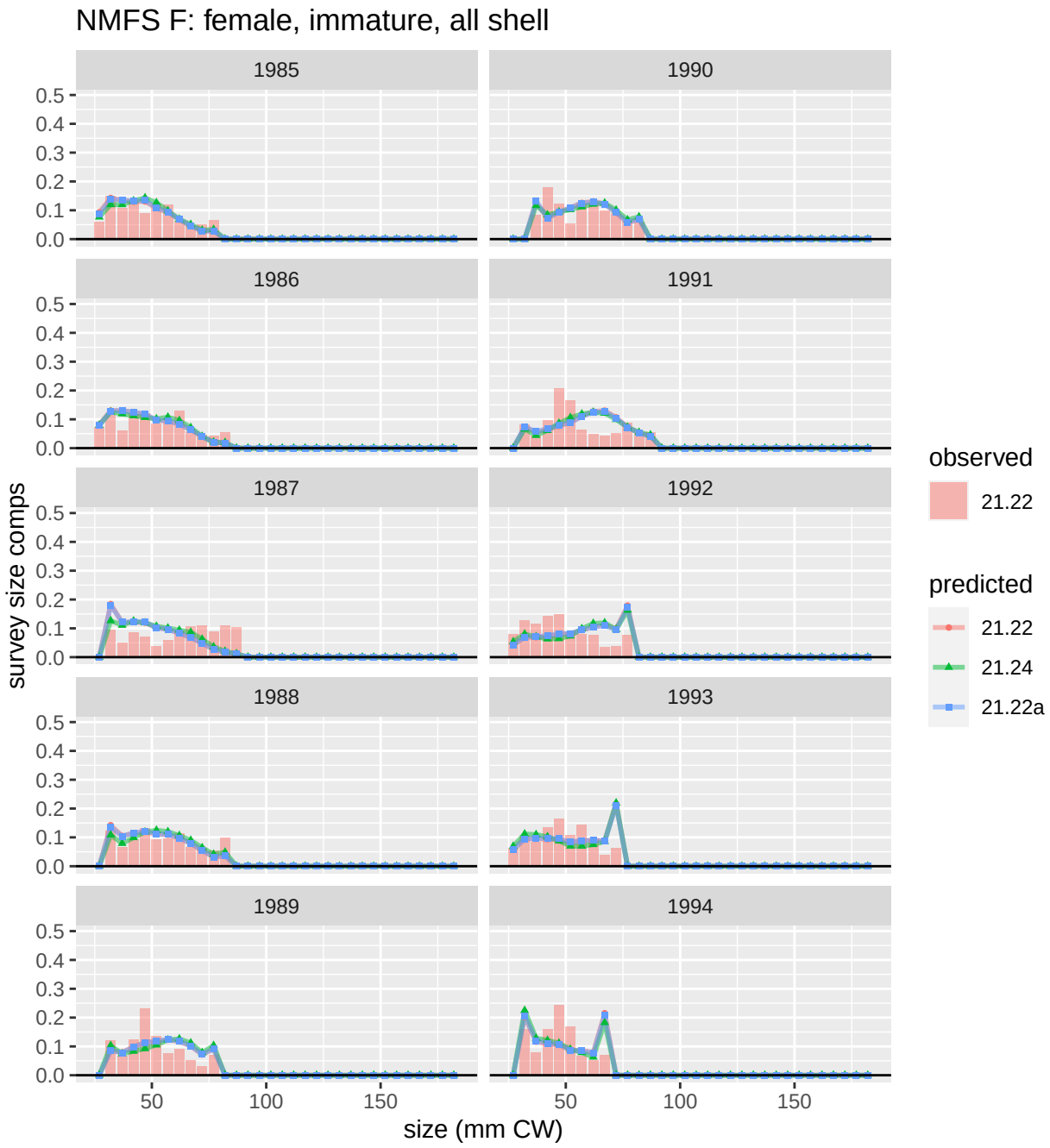

Figure 7: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 2 of 5.

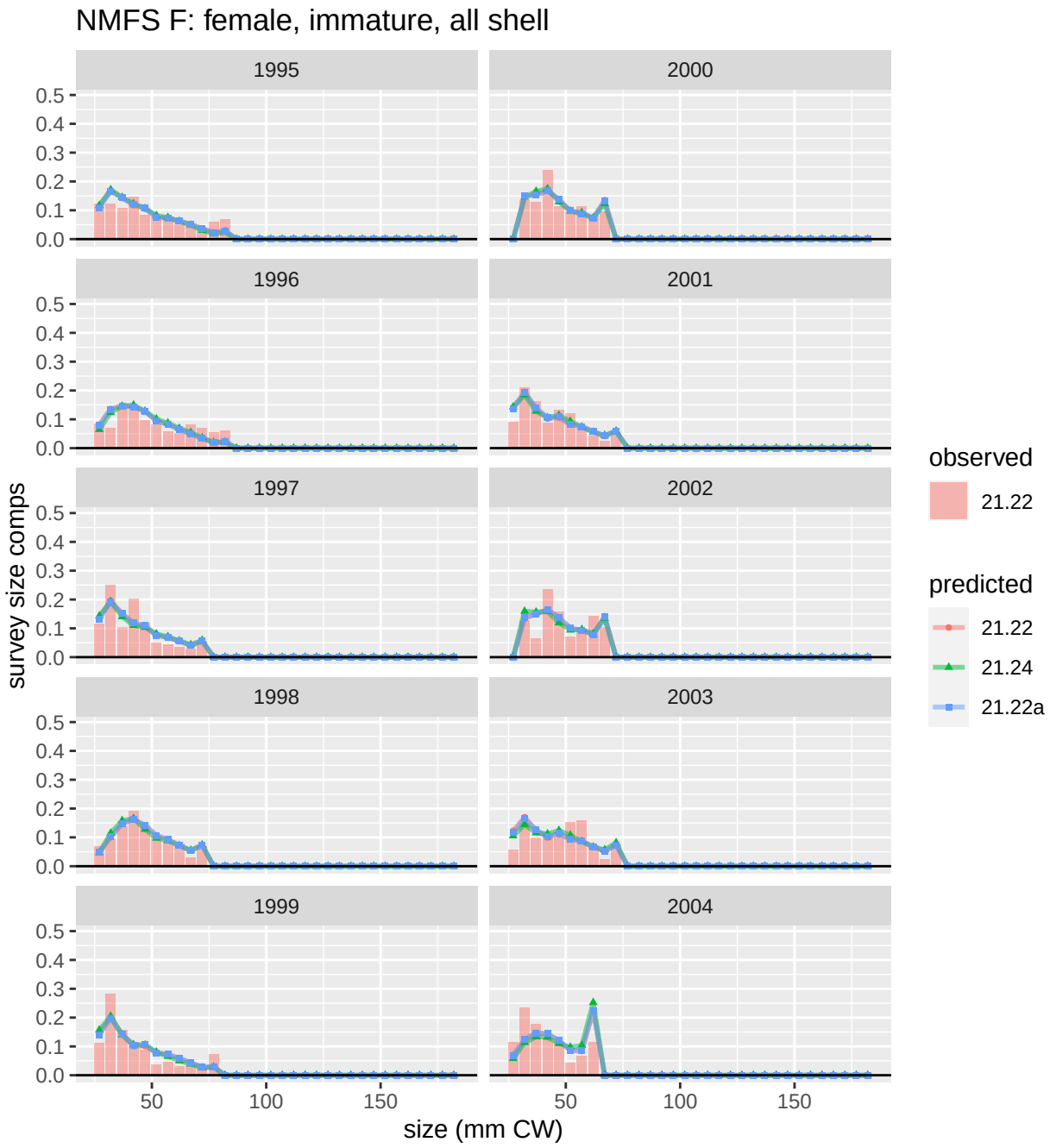

Figure 8: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 3 of 5.

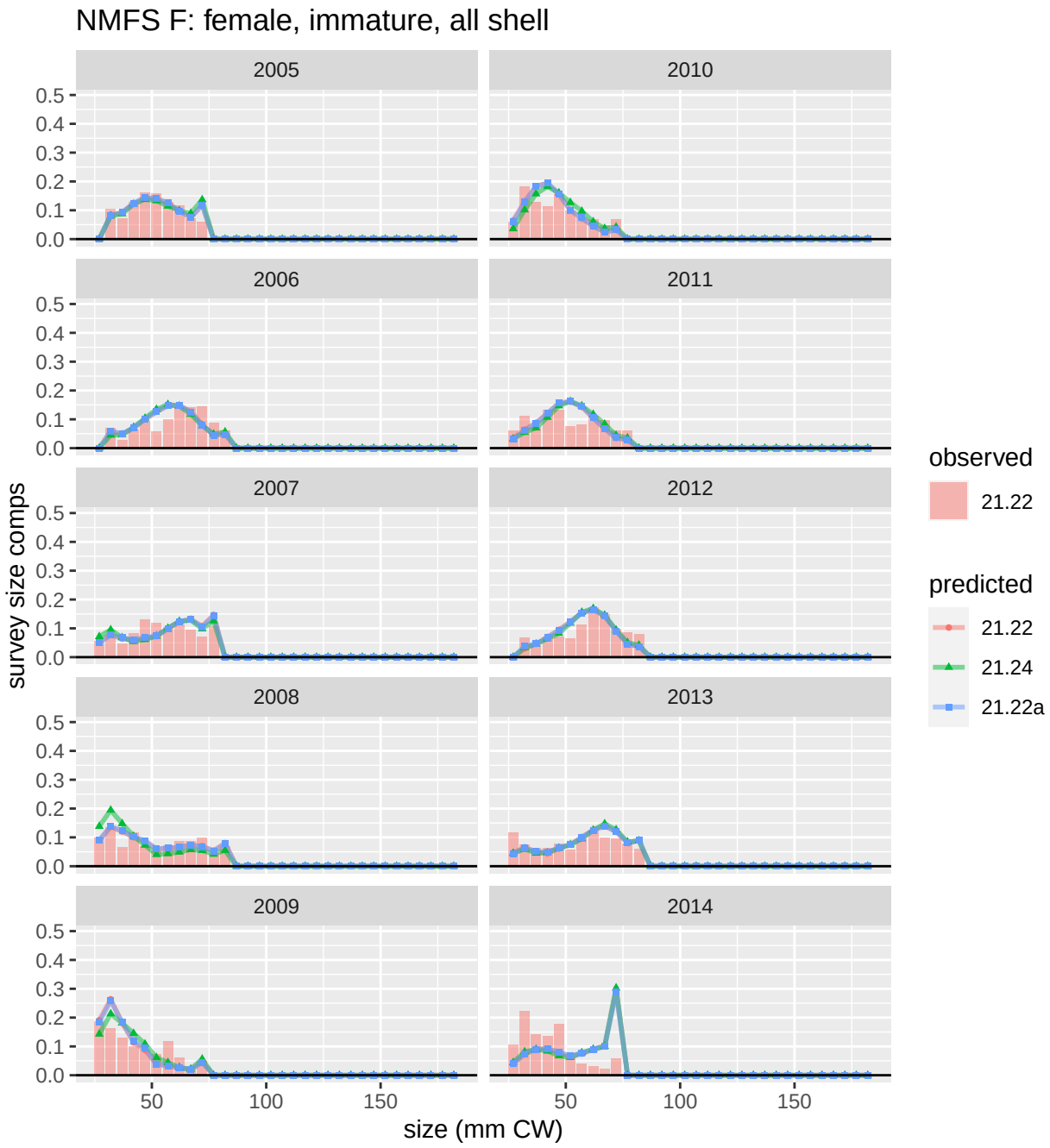

Figure 9: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 4 of 5.

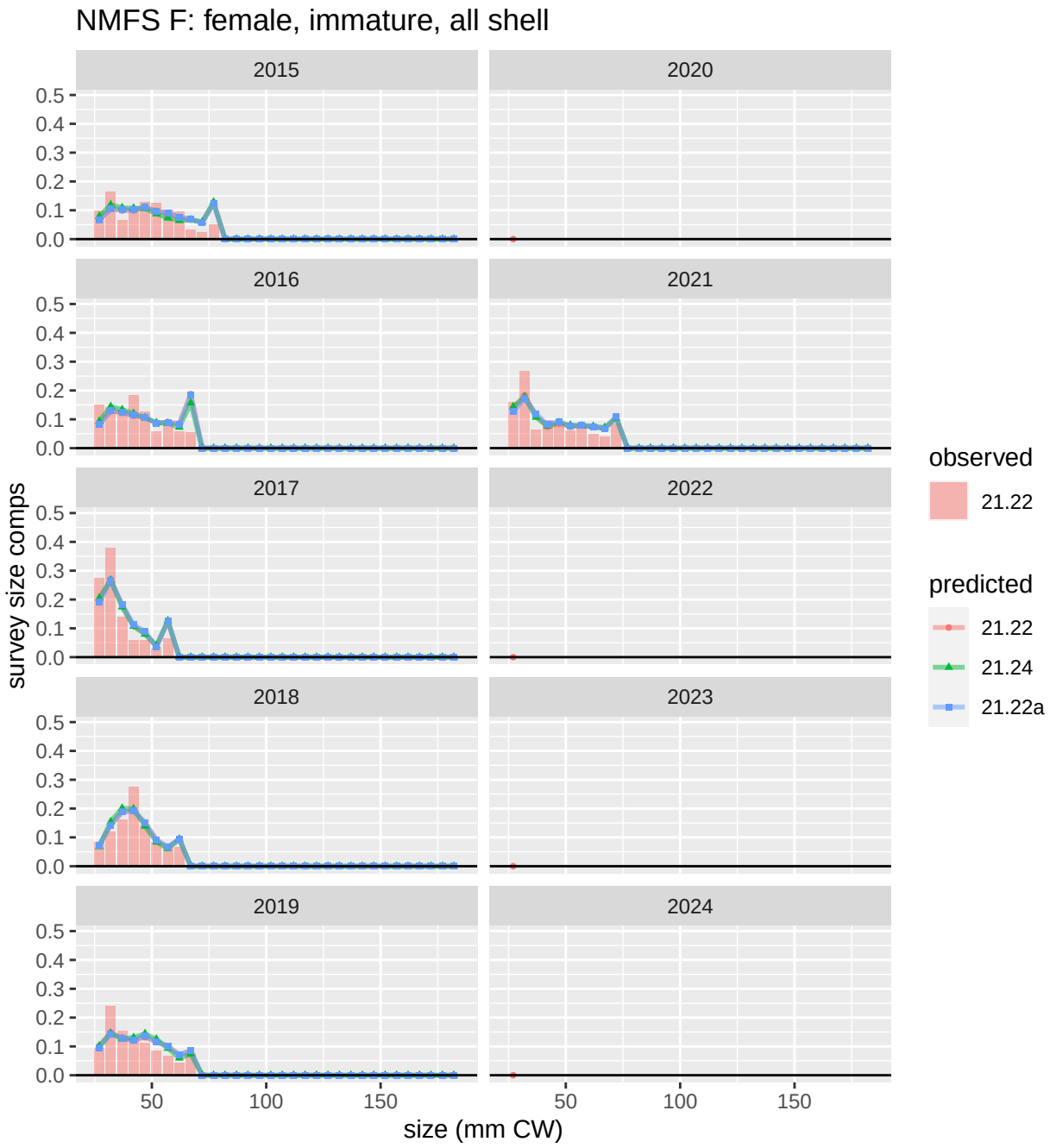

Figure 10: Comparison of observed and predicted female, immature, all shell survey size comps for NMFS F. Page 5 of 5.

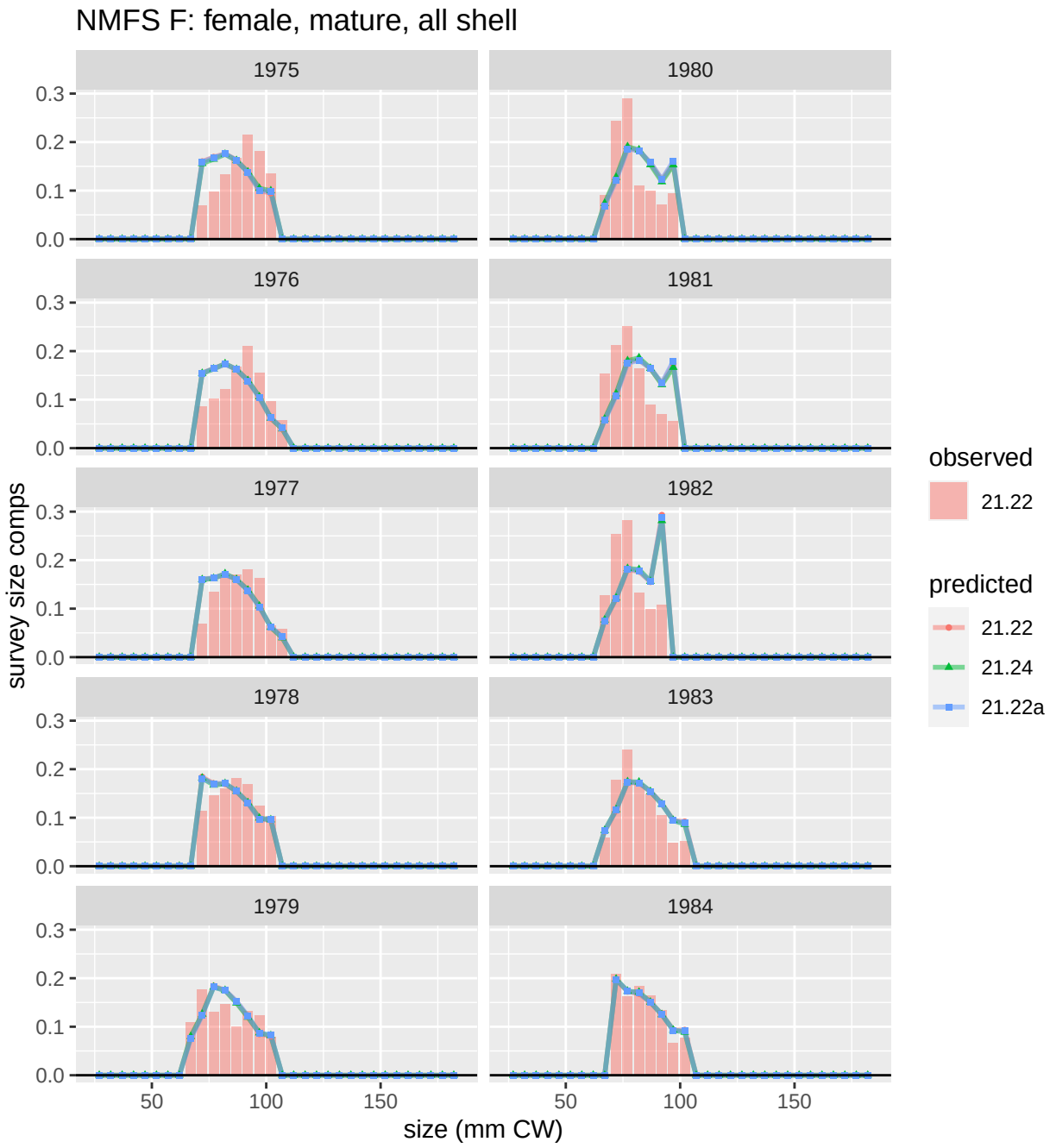

Figure 11: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 1 of 5.

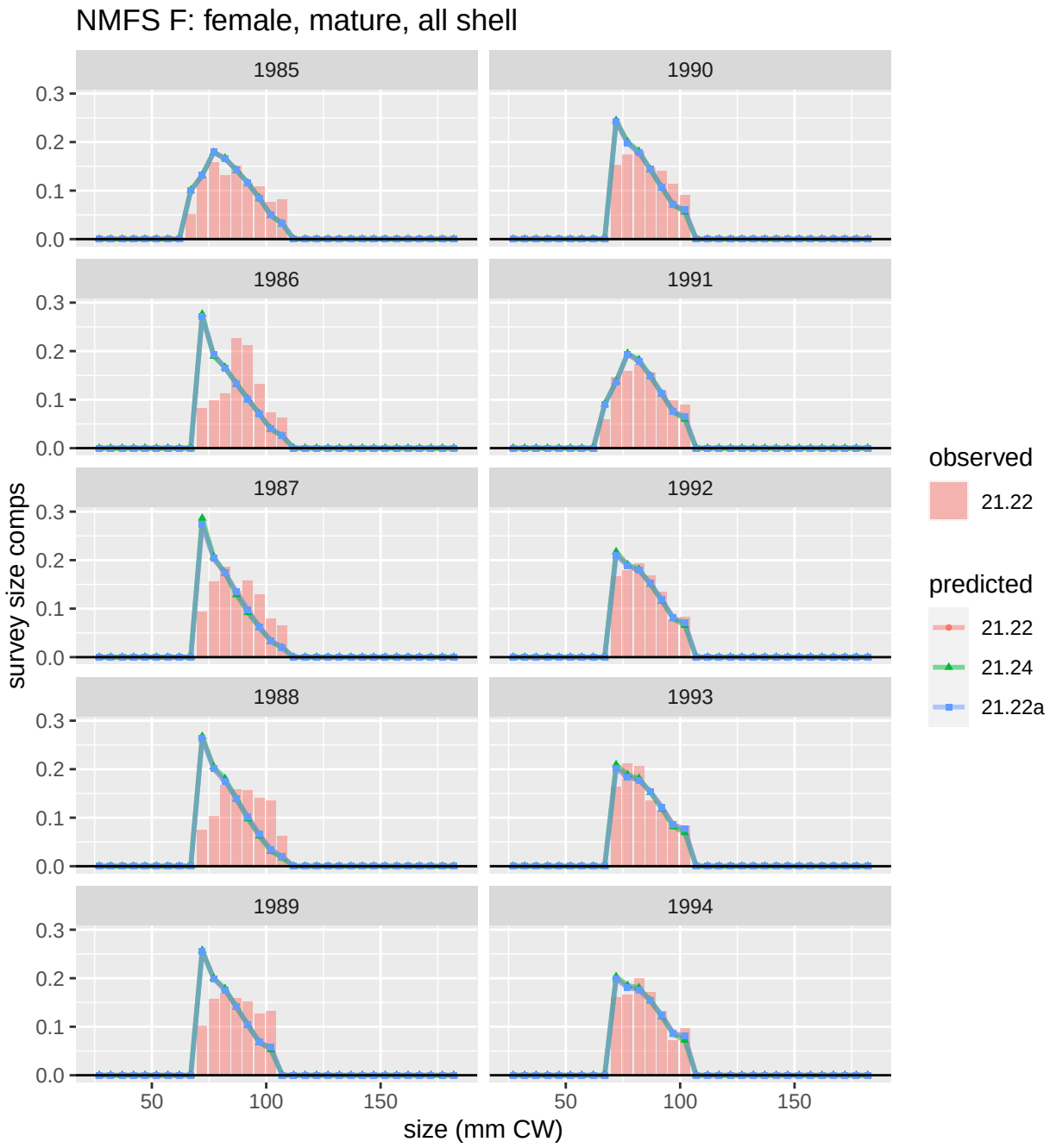

Figure 12: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 2 of 5.

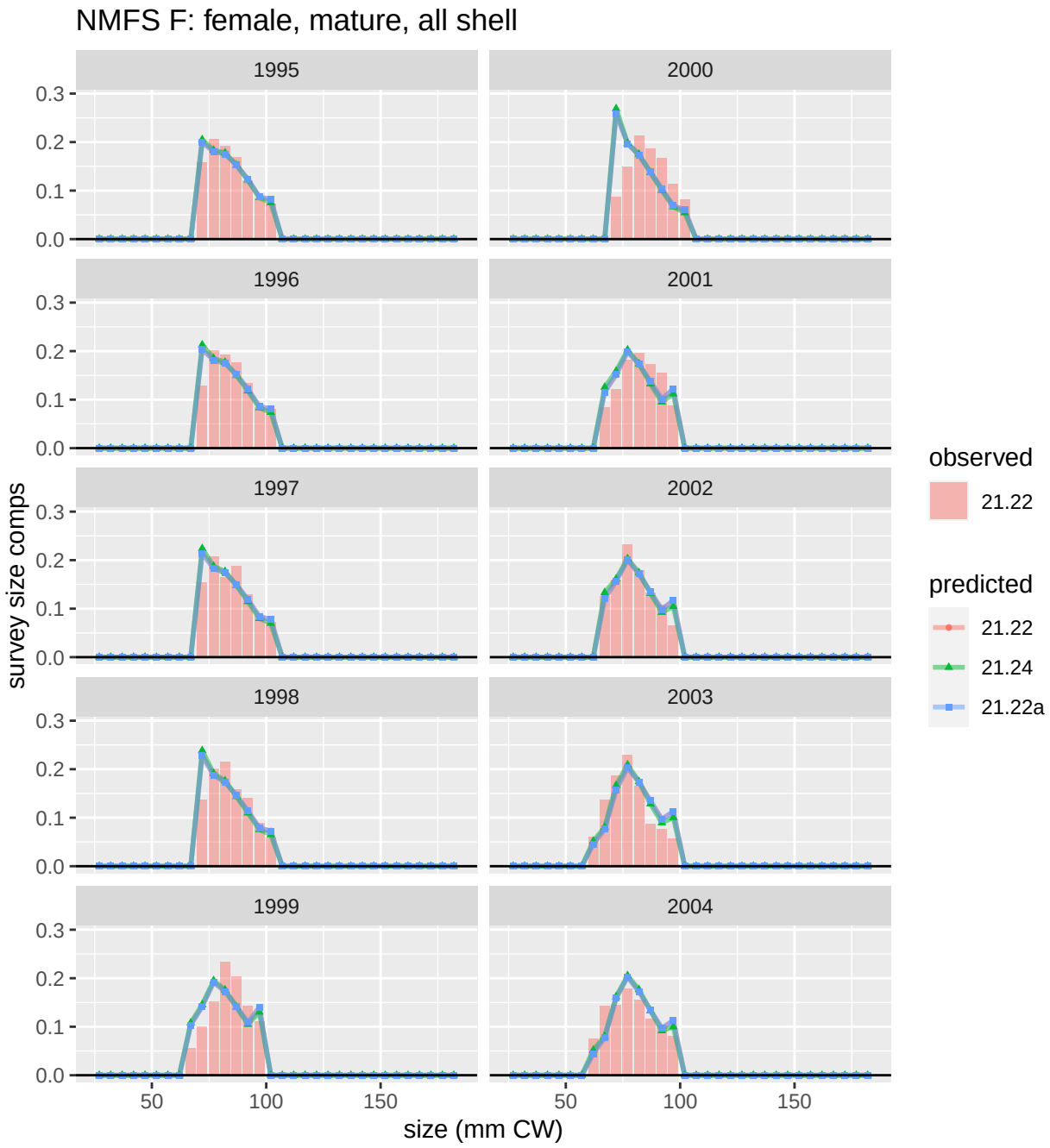

Figure 13: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 3 of 5.

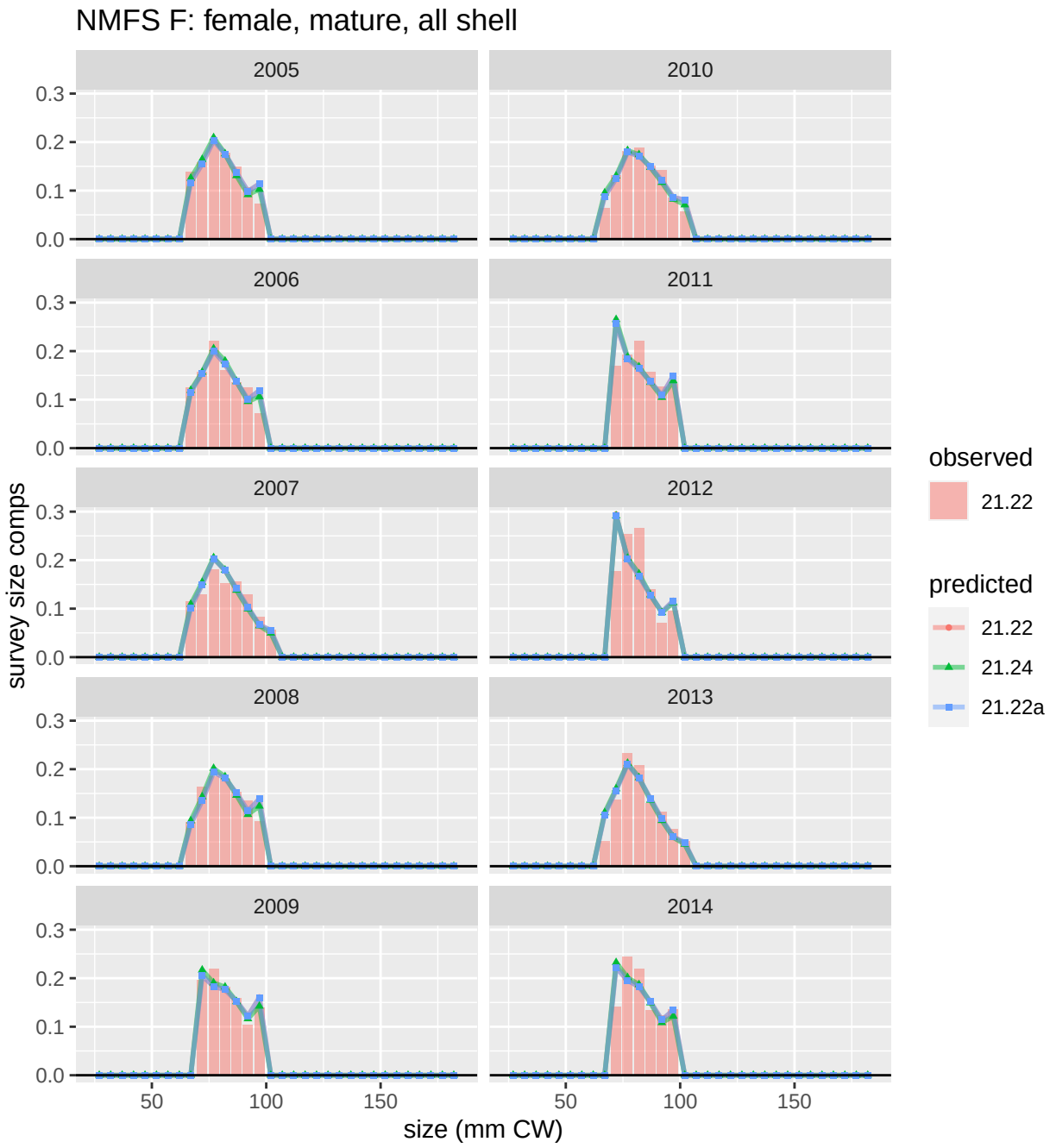

Figure 14: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 4 of 5.

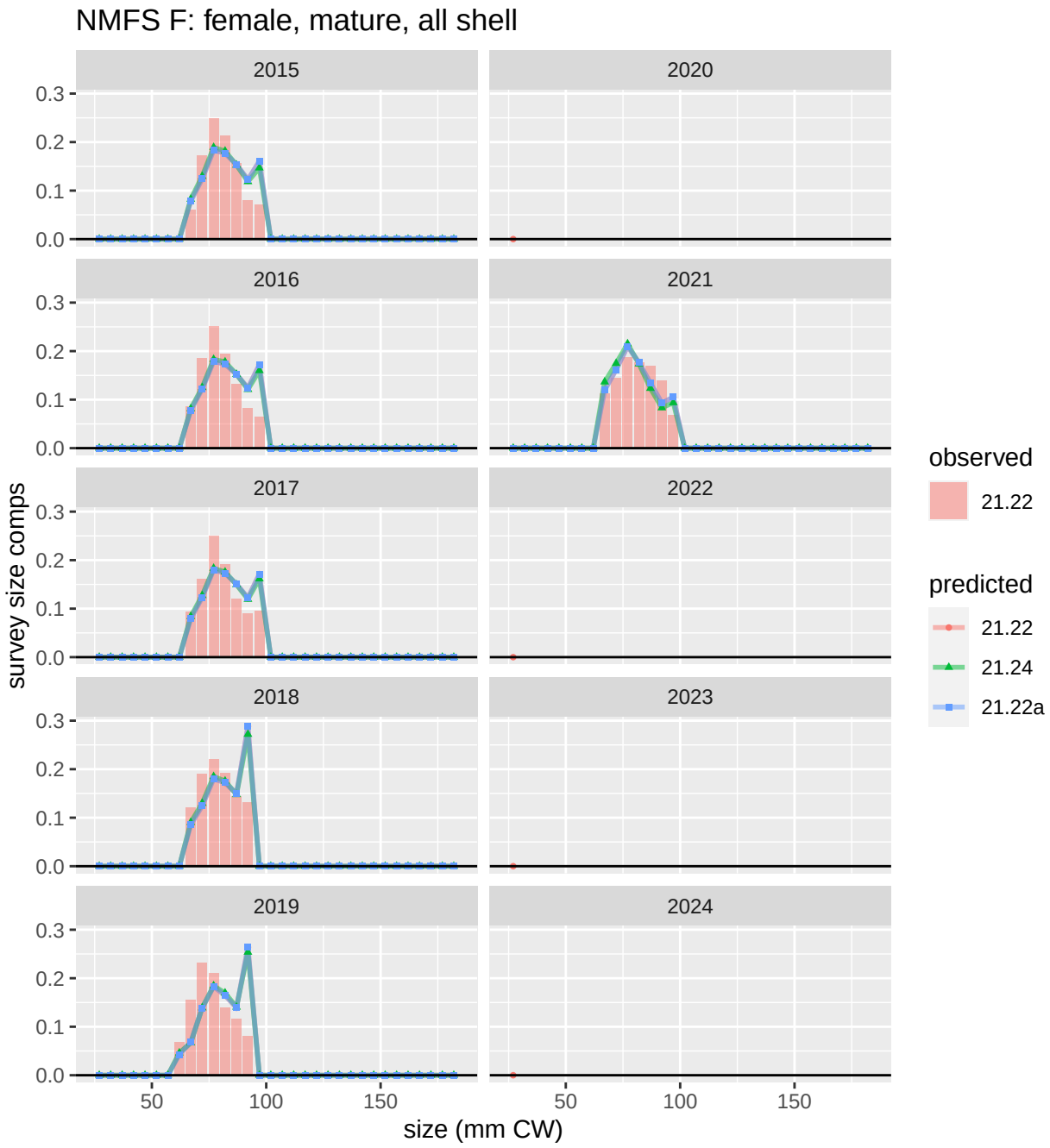

Figure 15: Comparison of observed and predicted female, mature, all shell survey size comps for NMFS F. Page 5 of 5.

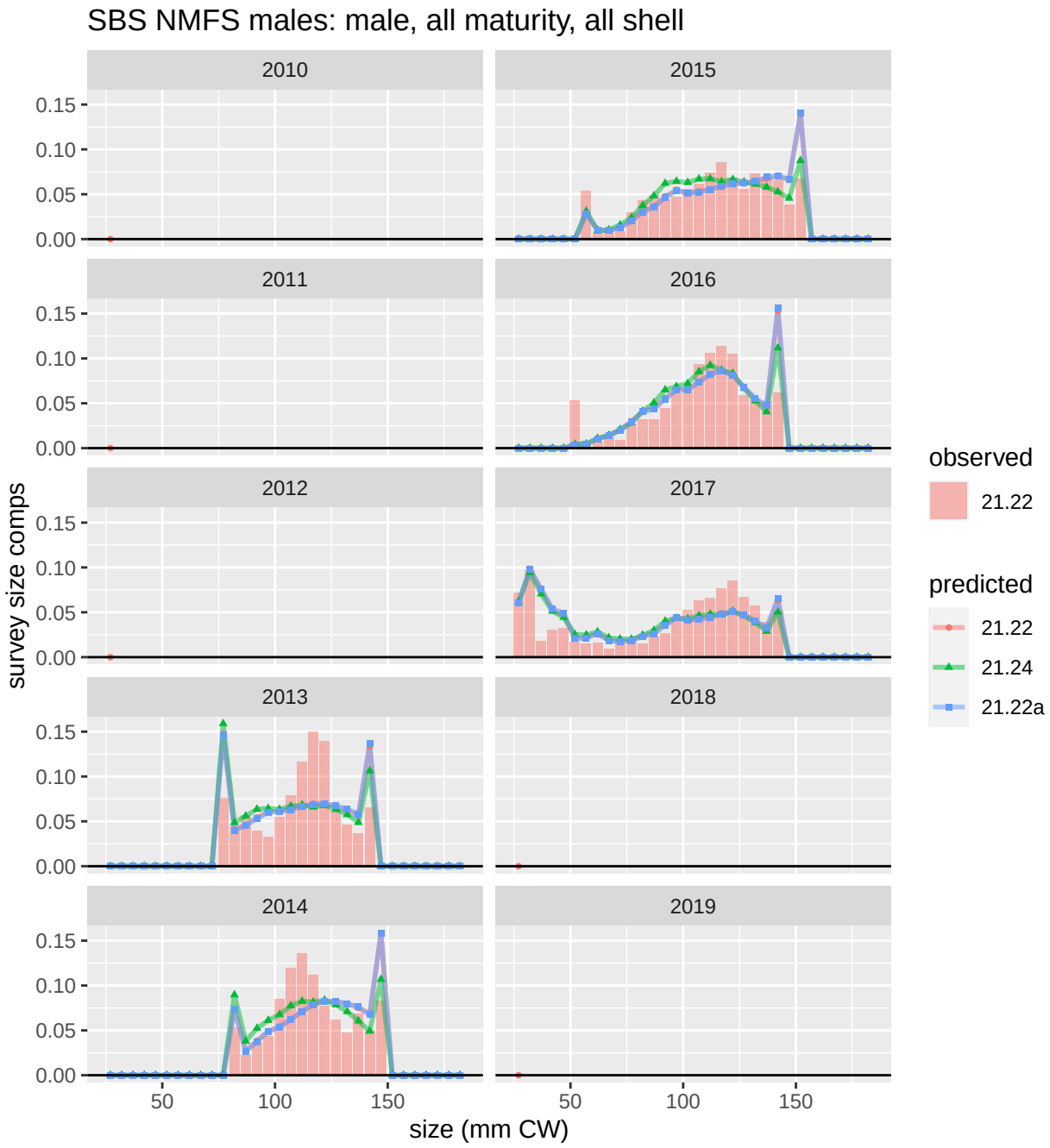

Figure 16: Comparison of observed and predicted male, all maturity, all shell survey size comps for SBS NMFS males. Page 1 of 1.

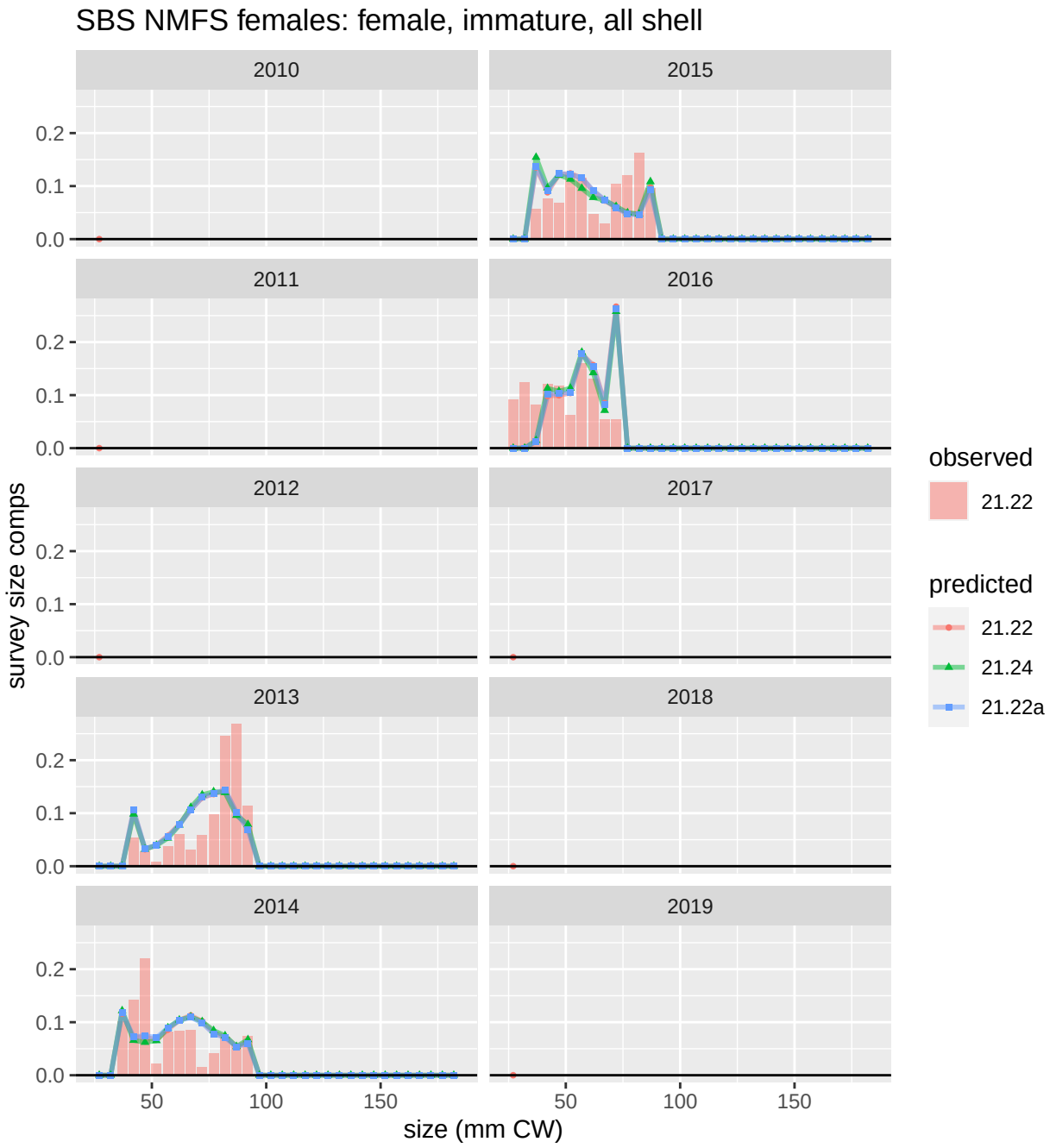

Figure 17: Comparison of observed and predicted female, immature, all shell survey size comps for SBS NMFS females. Page 1 of 1.

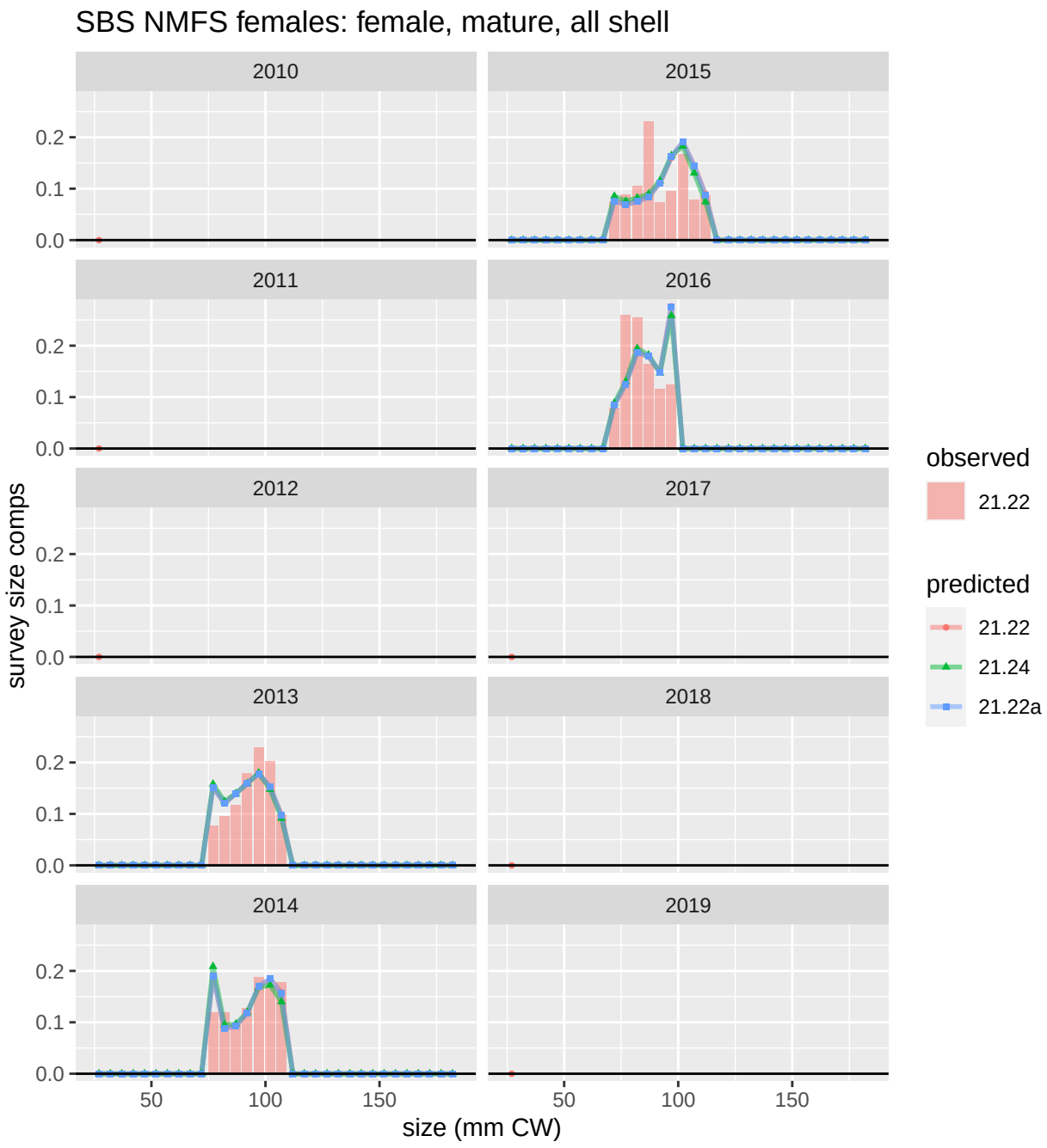

Figure 18: Comparison of observed and predicted female, mature, all shell survey size comps for SBS NMFS females. Page 1 of 1.

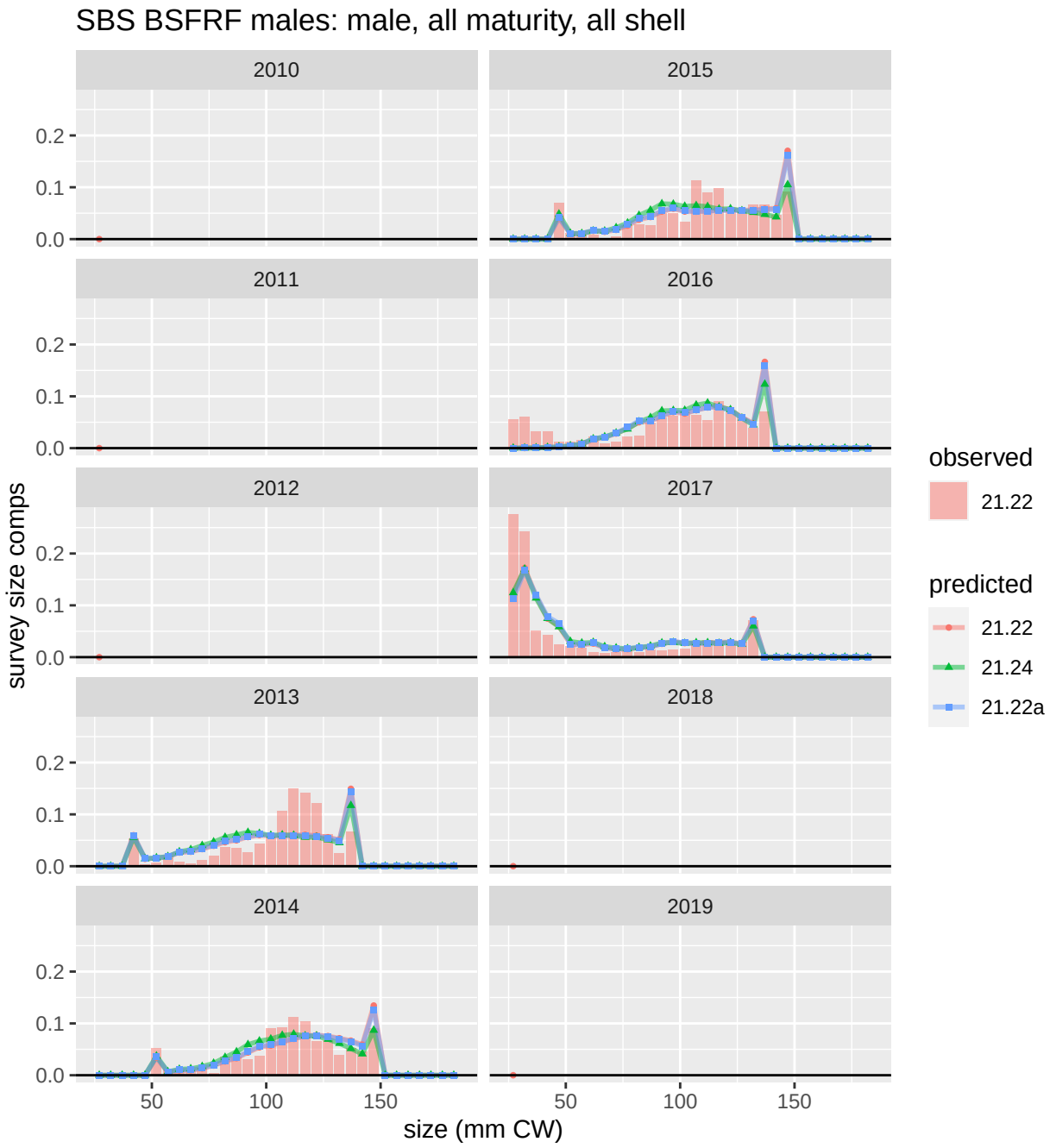

Figure 19: Comparison of observed and predicted male, all maturity, all shell survey size comps for SBS BSFRF males. Page 1 of 1.

Figure 20: Comparison of observed and predicted female, immature, all shell survey size comps for SBS BSFRF females. Page 1 of 1.

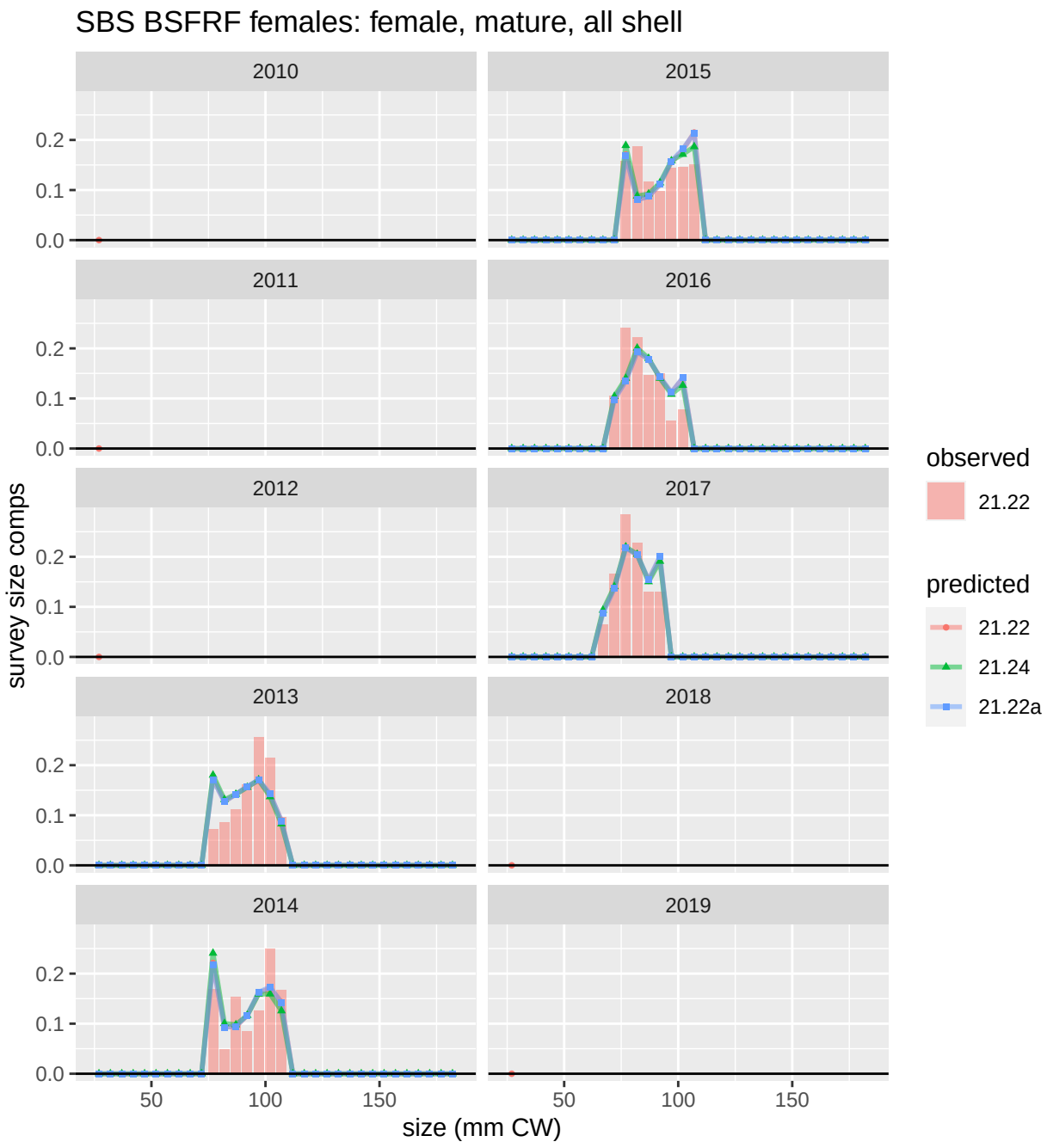

Figure 21: Comparison of observed and predicted female, mature, all shell survey size comps for SBS BSFRF females. Page 1 of 1.

Fishery retained catch size compositions

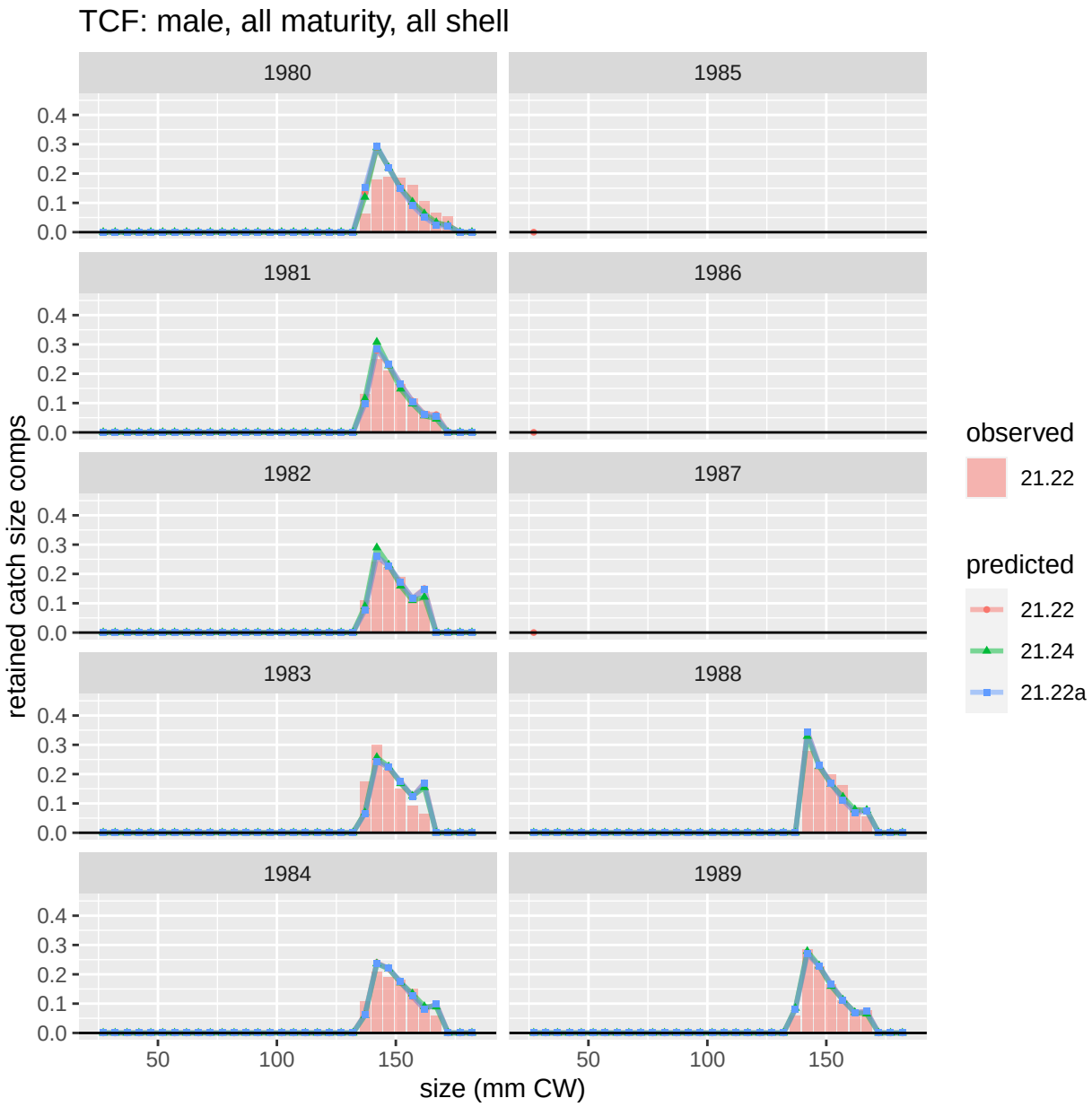

Figure 22: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 1 of 5.

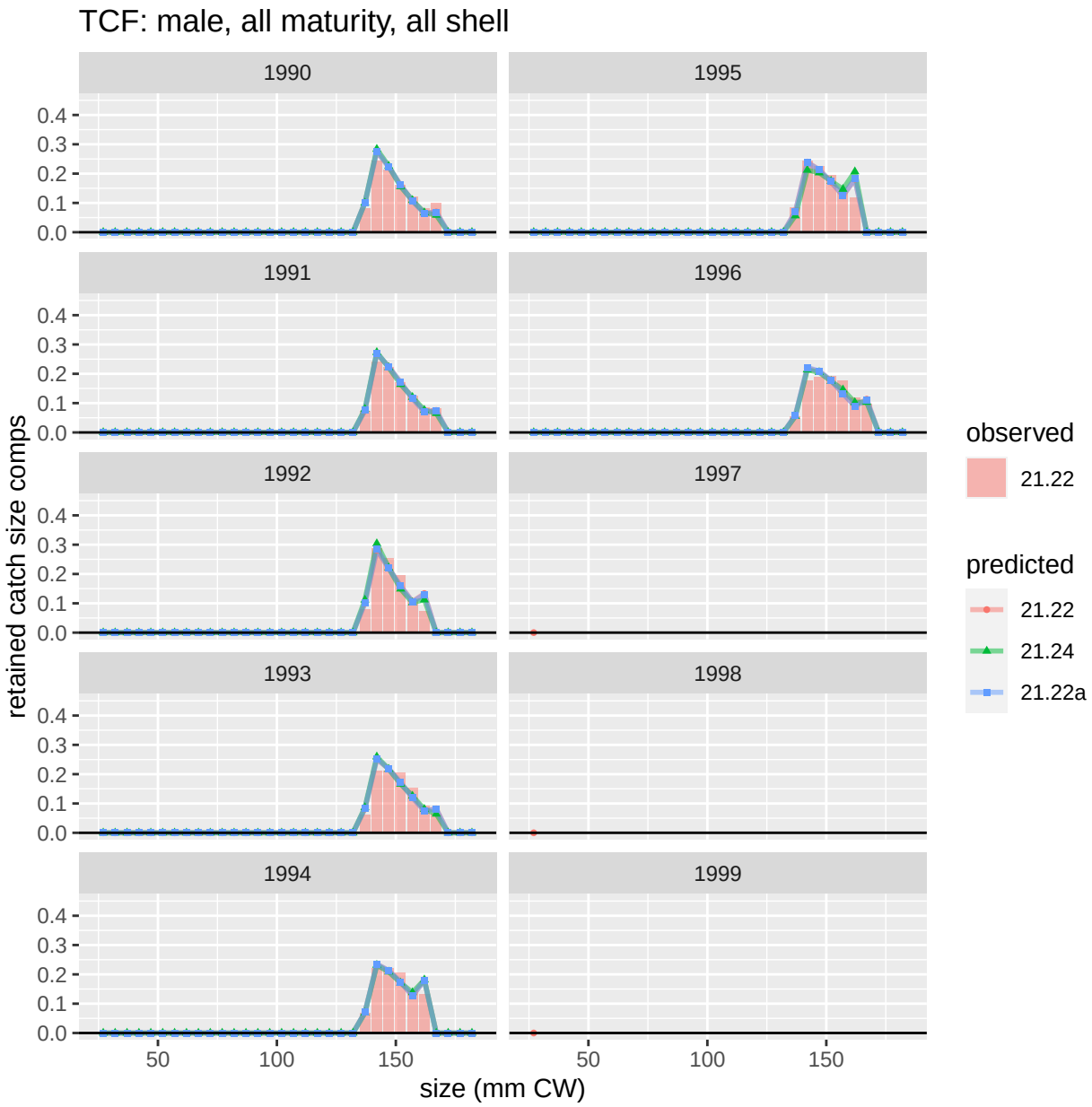

Figure 23: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 2 of 5.

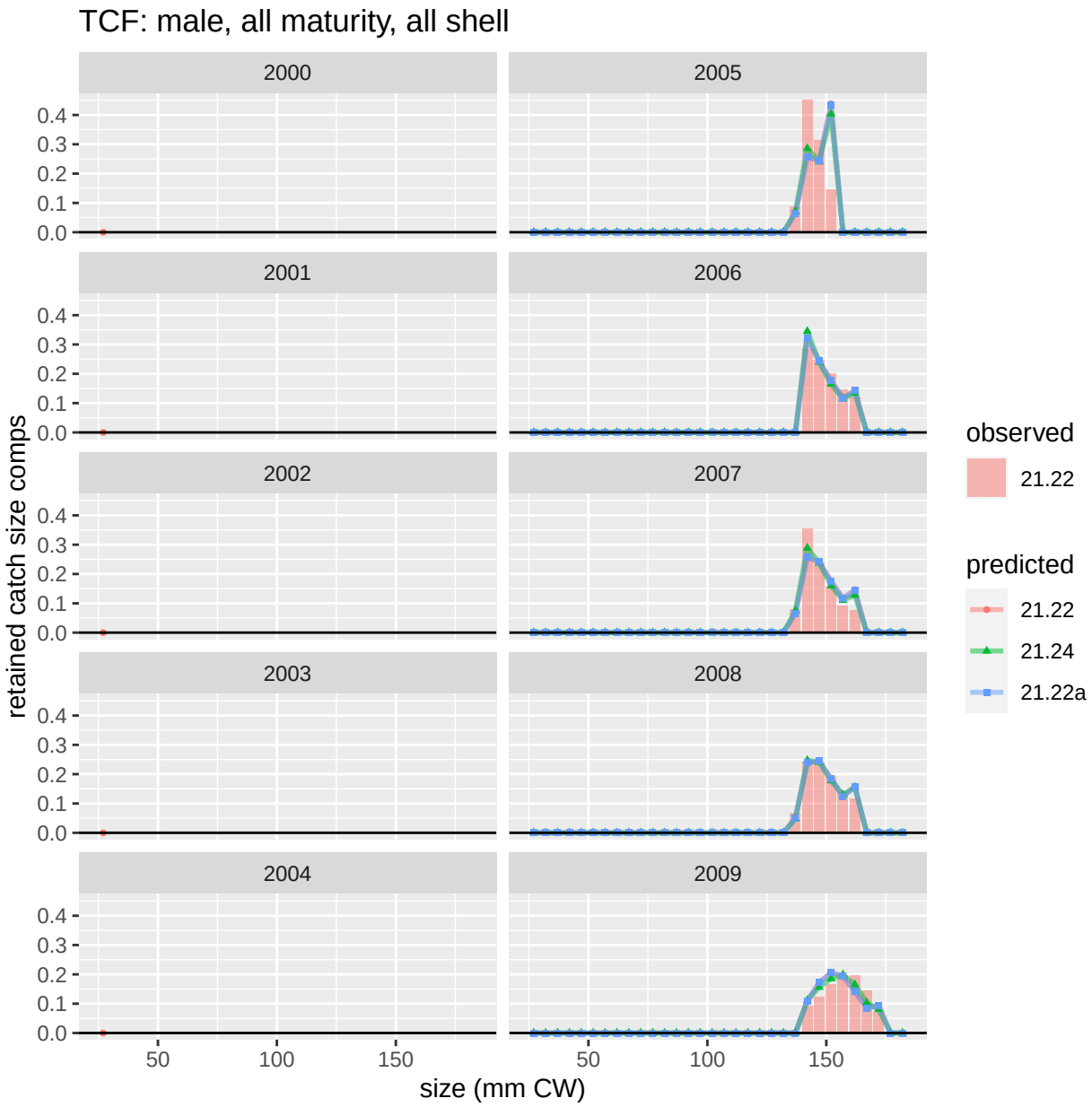

Figure 24: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 3 of 5.

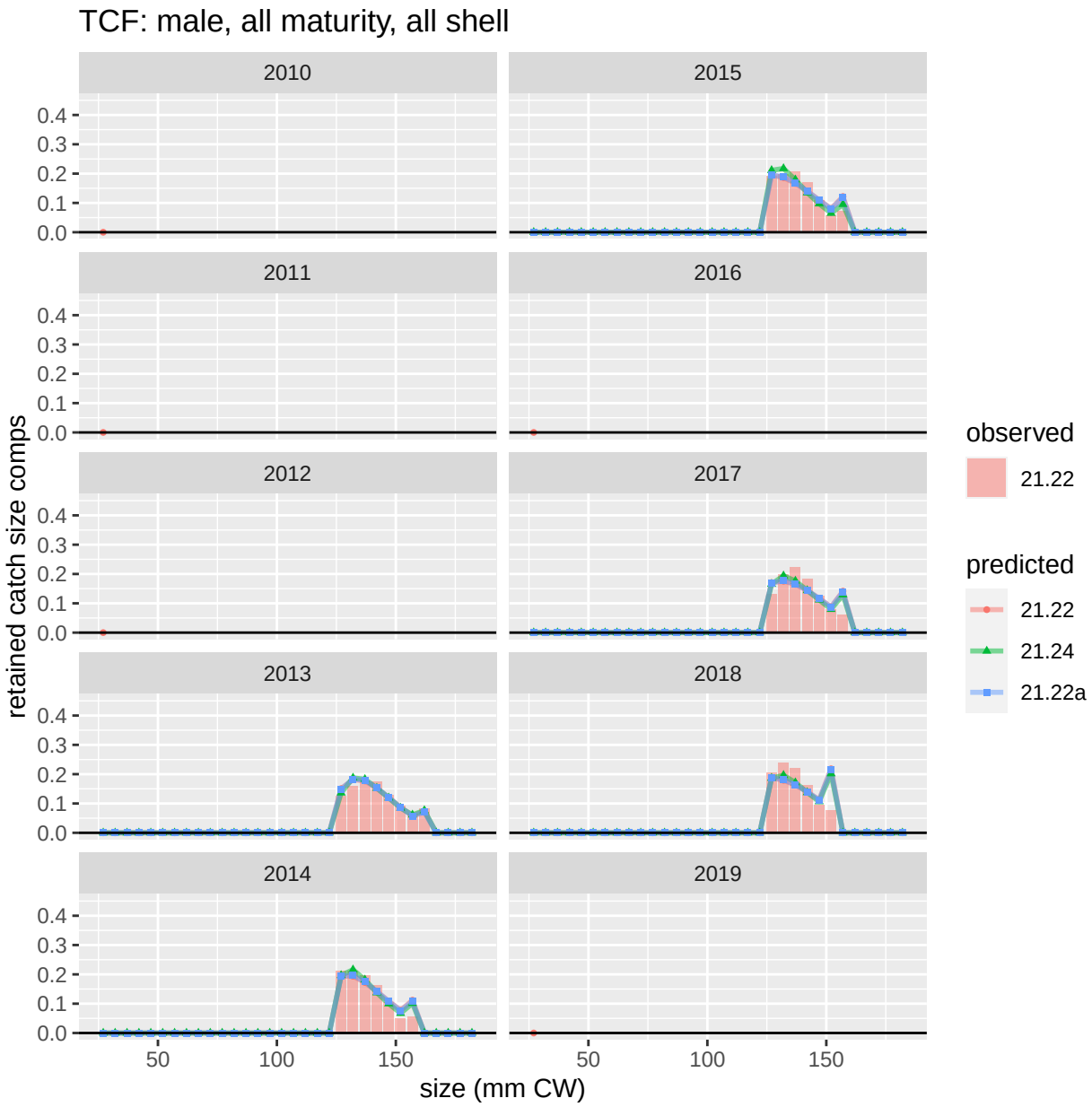

Figure 25: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 4 of 5.

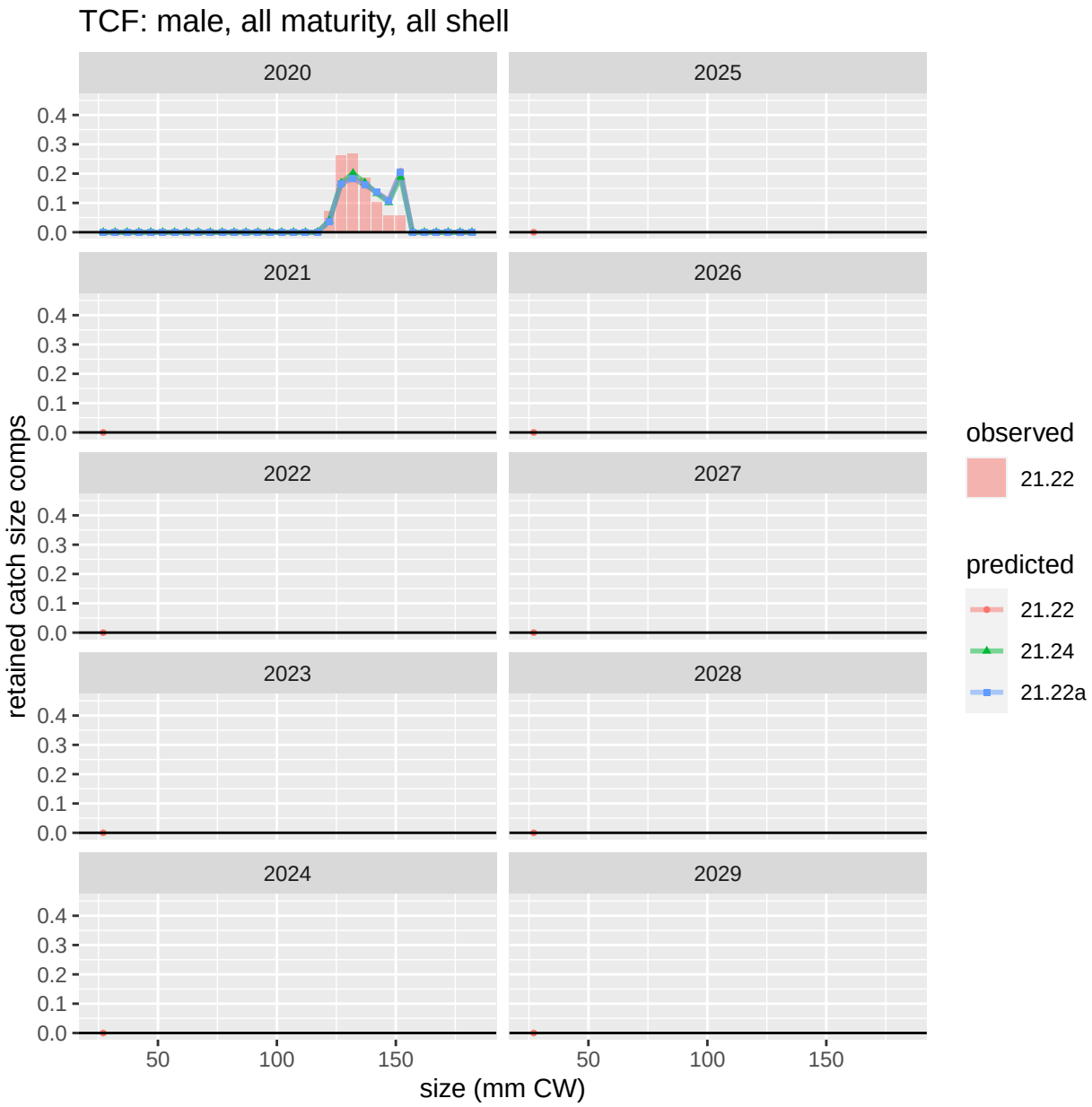

Figure 26: Comparison of observed and predicted male, all maturity, all shell retained catch size comps for TCF. Page 5 of 5.

Fishery total catch size compositions

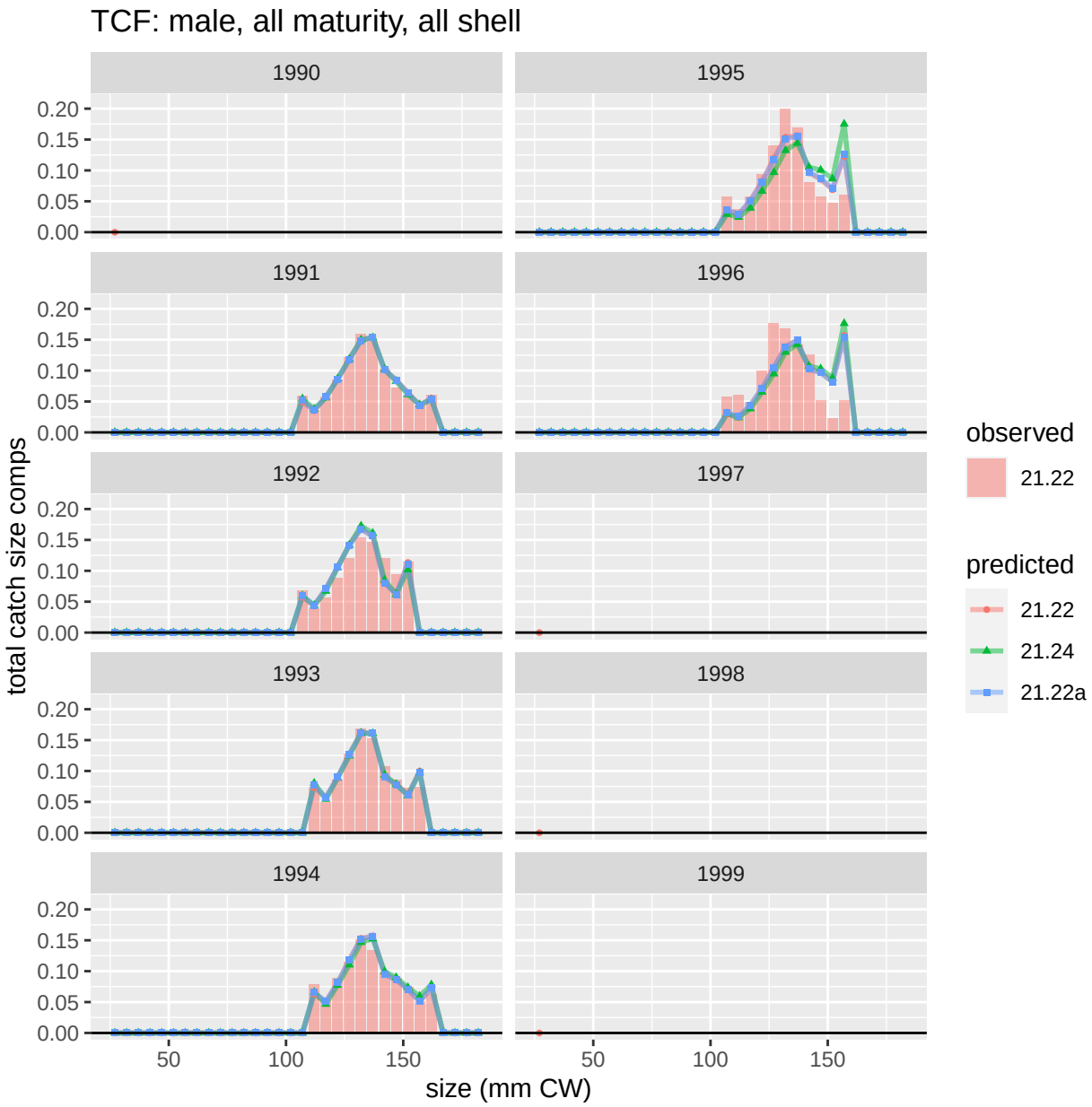

Figure 27: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 1 of 4.

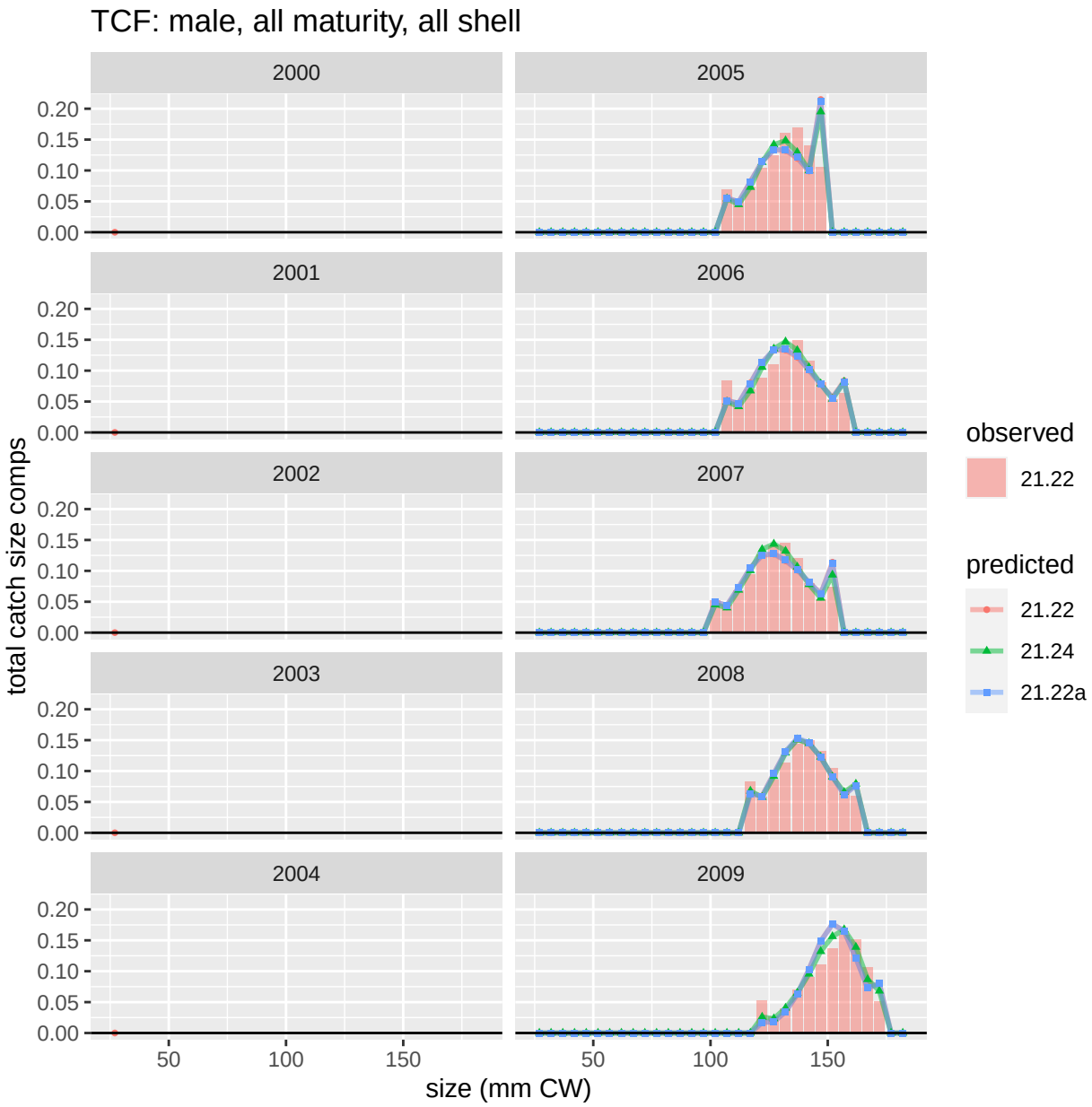

Figure 28: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 2 of 4.

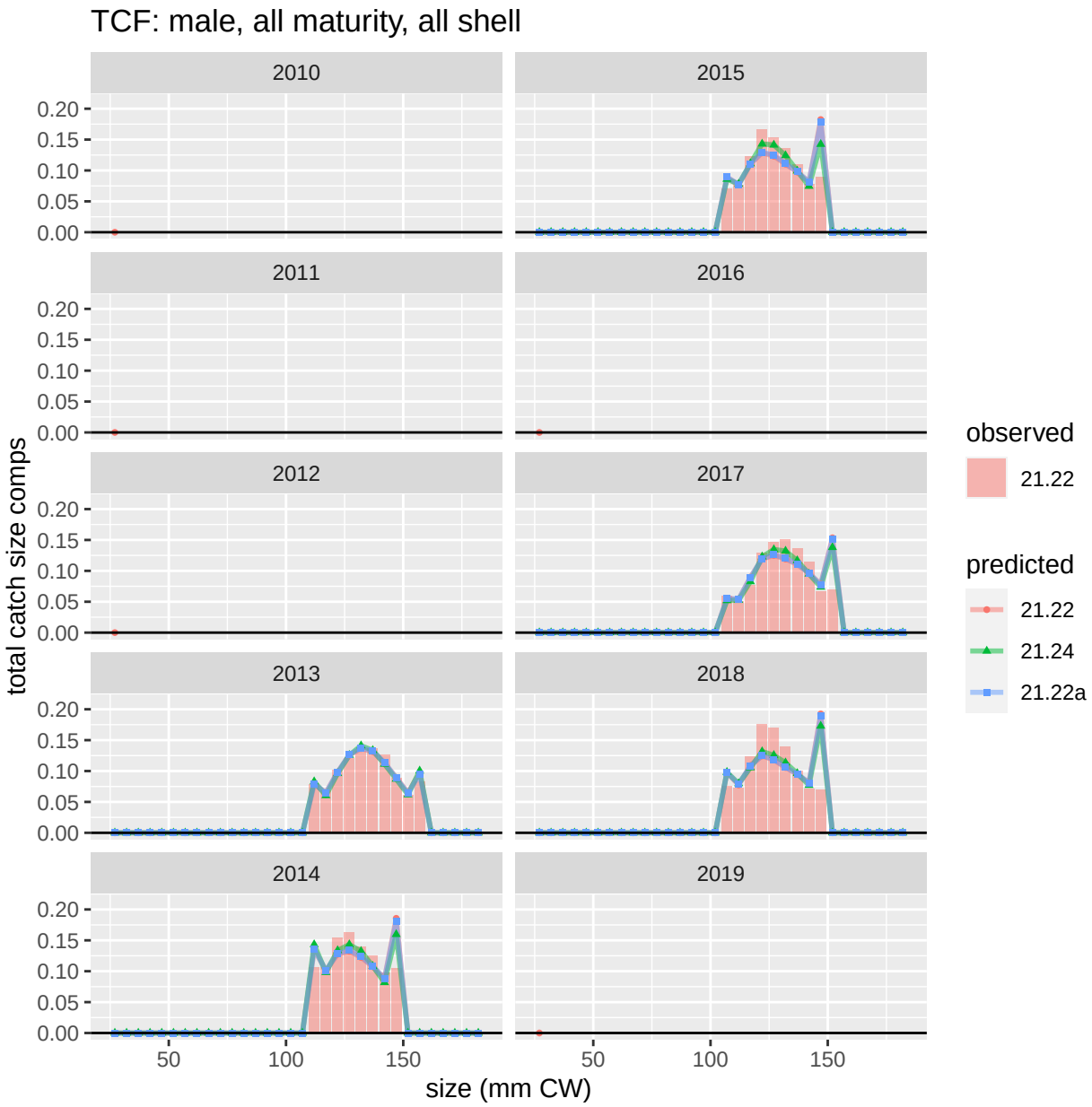

Figure 29: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 3 of 4.

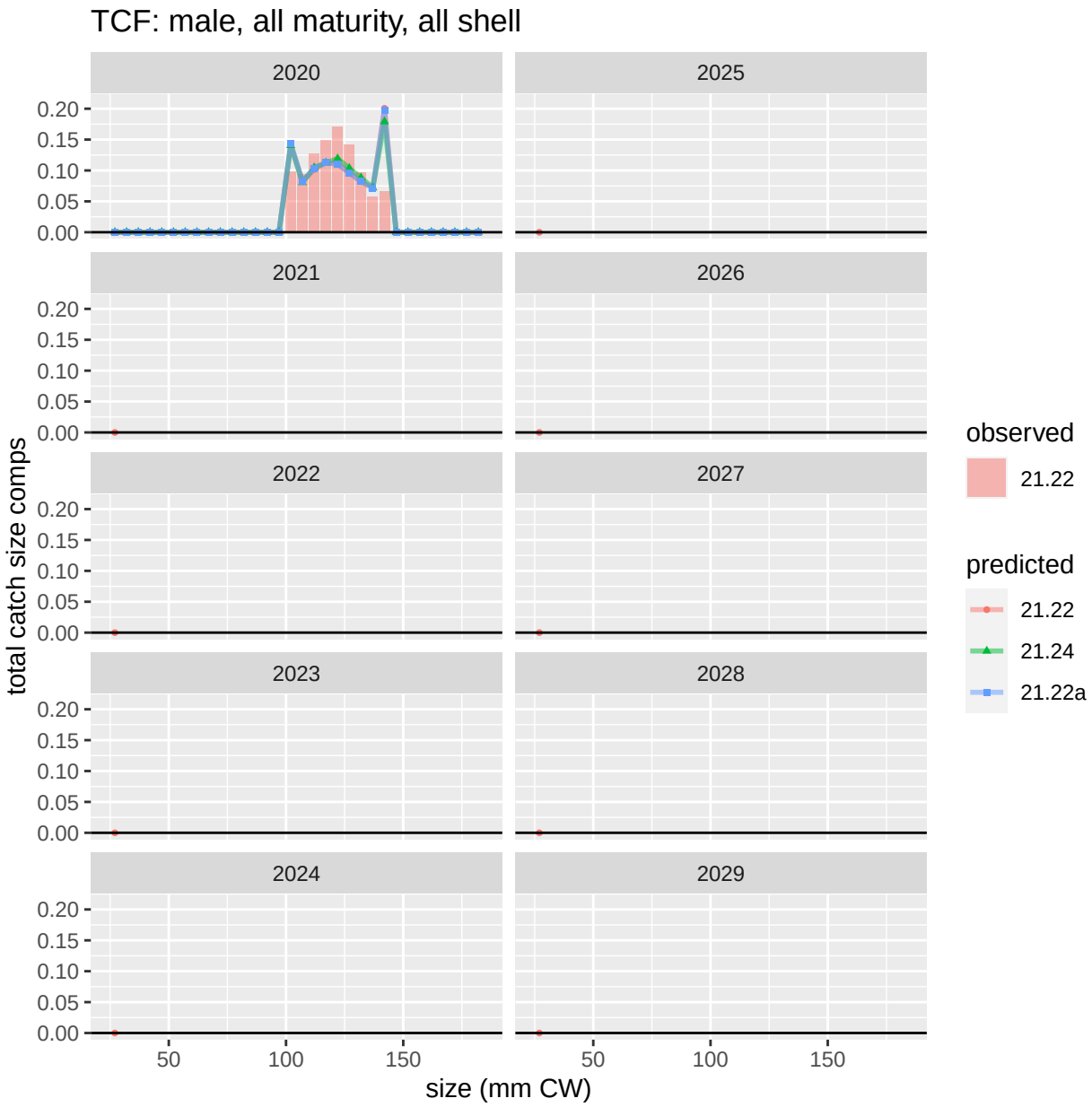

Figure 30: Comparison of observed and predicted male, all maturity, all shell total catch size comps for TCF. Page 4 of 4.

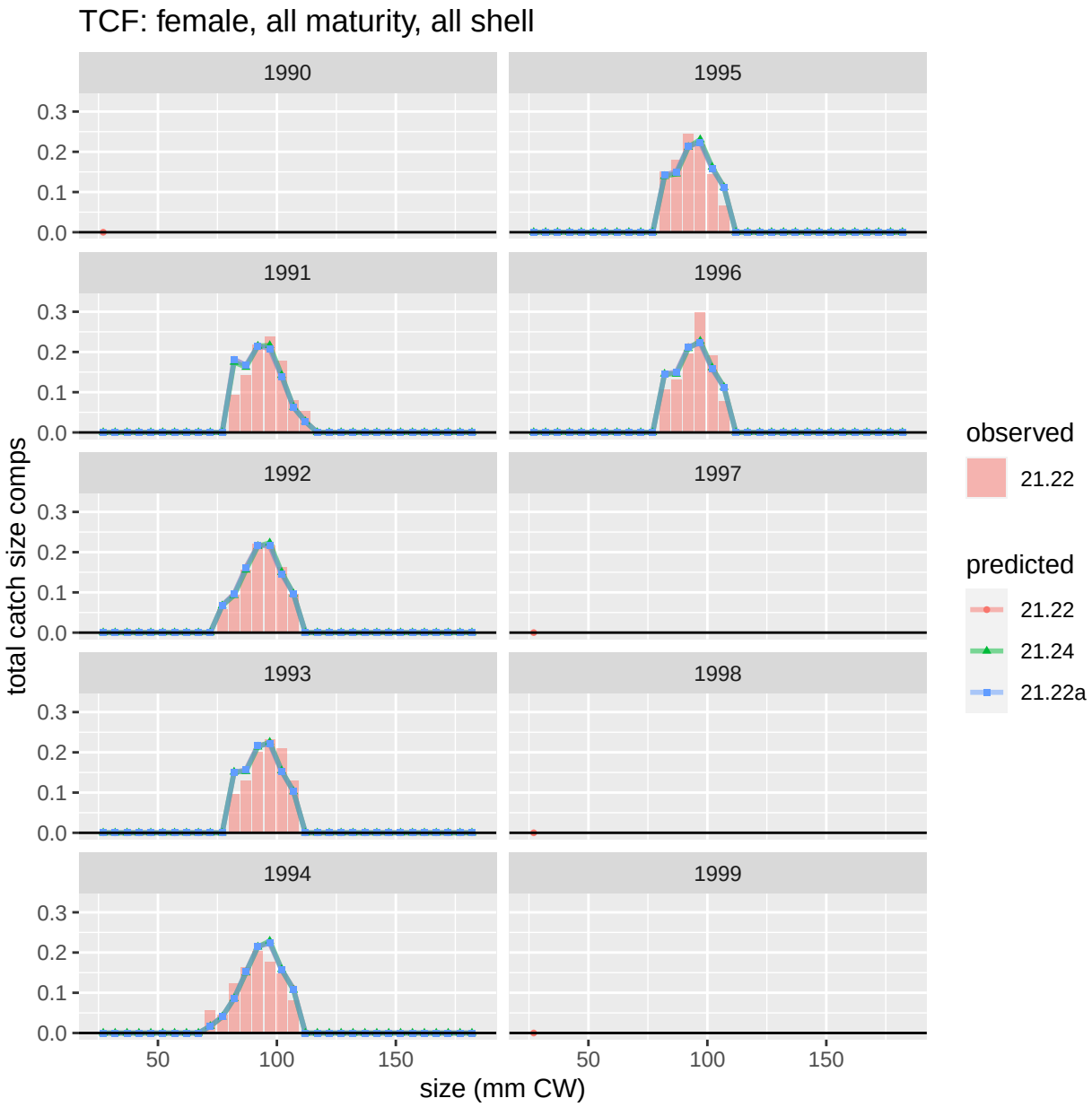

Figure 31: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 1 of 4.

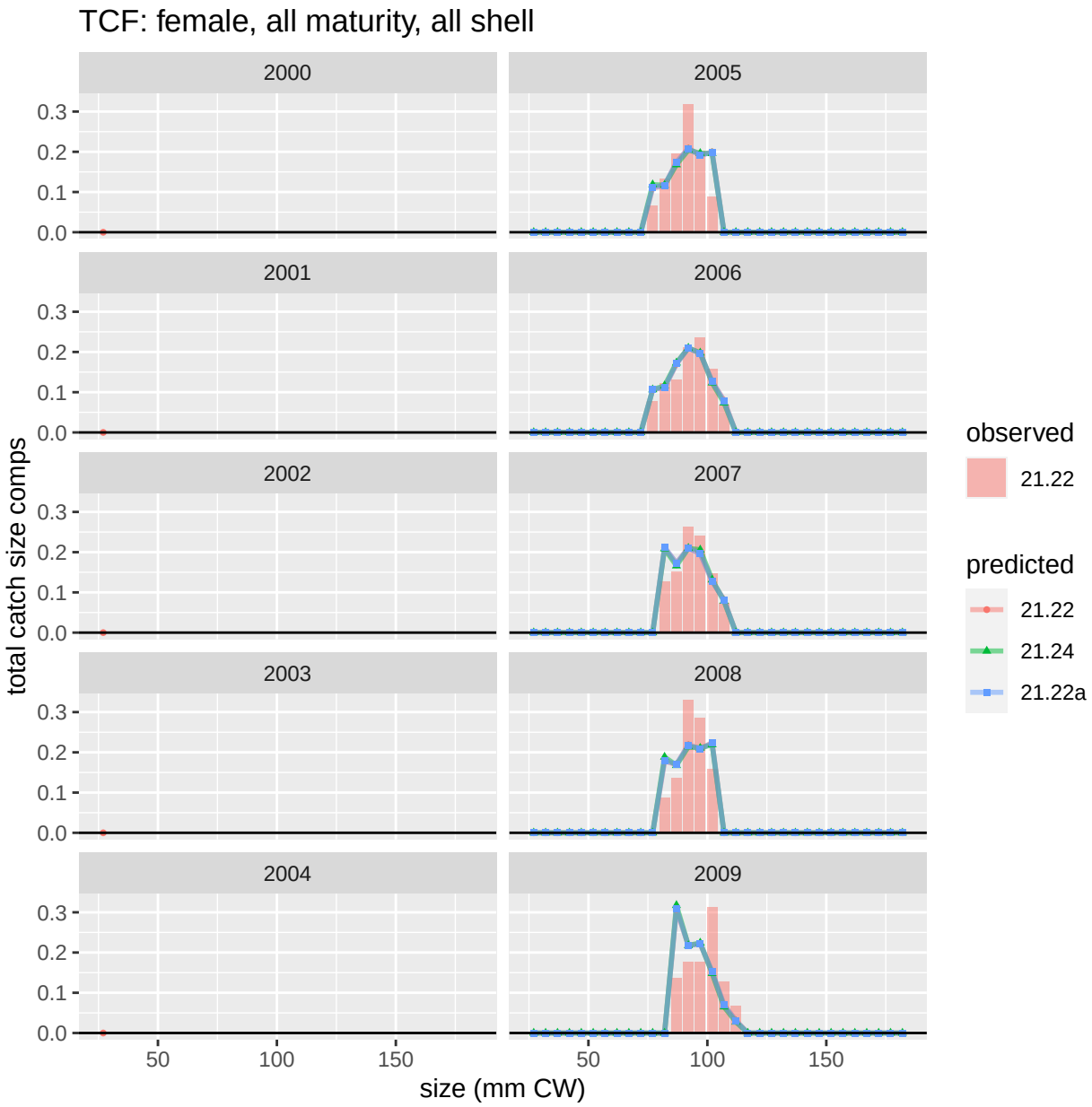

Figure 32: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 2 of 4.

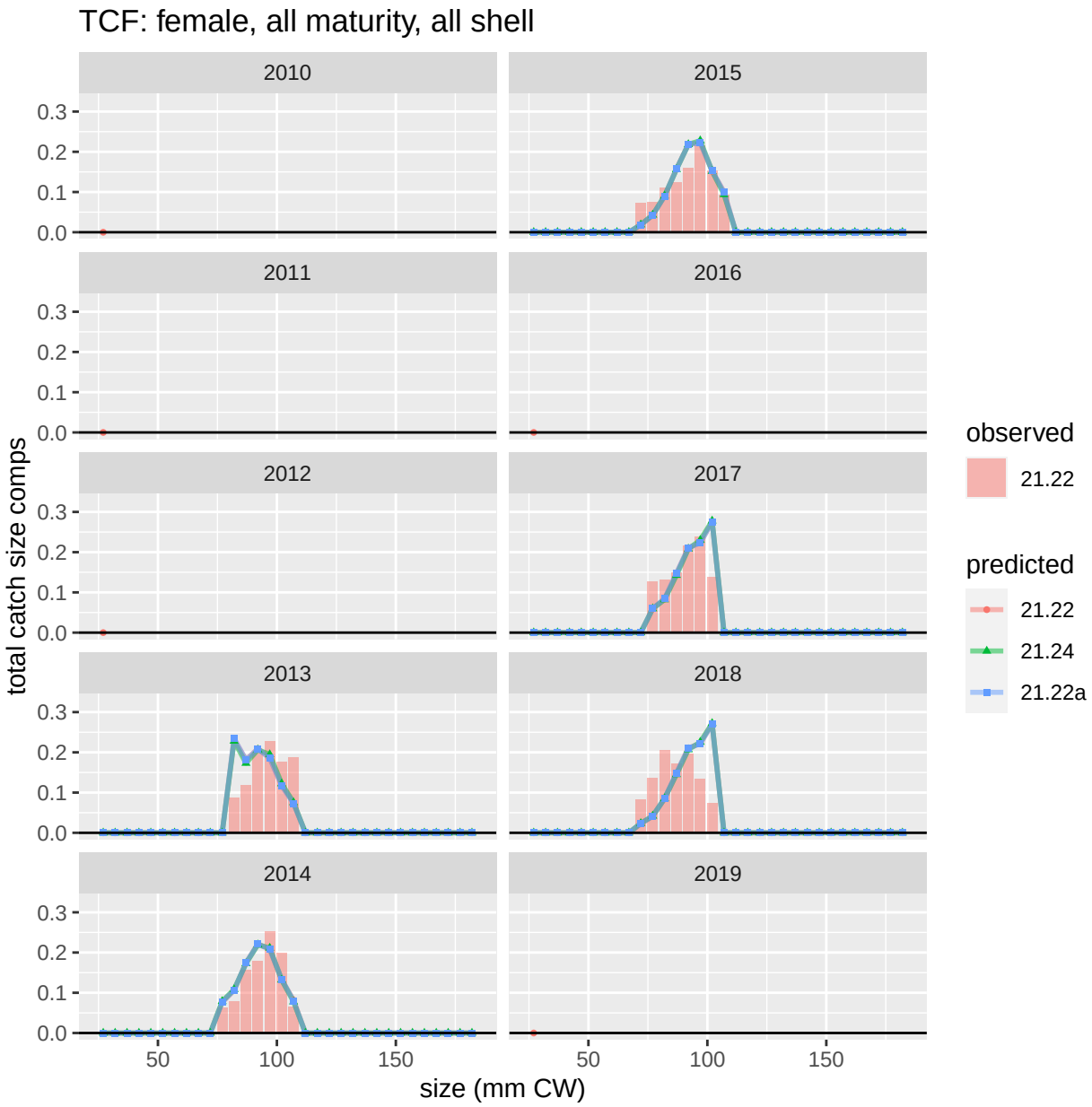

Figure 33: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 3 of 4.

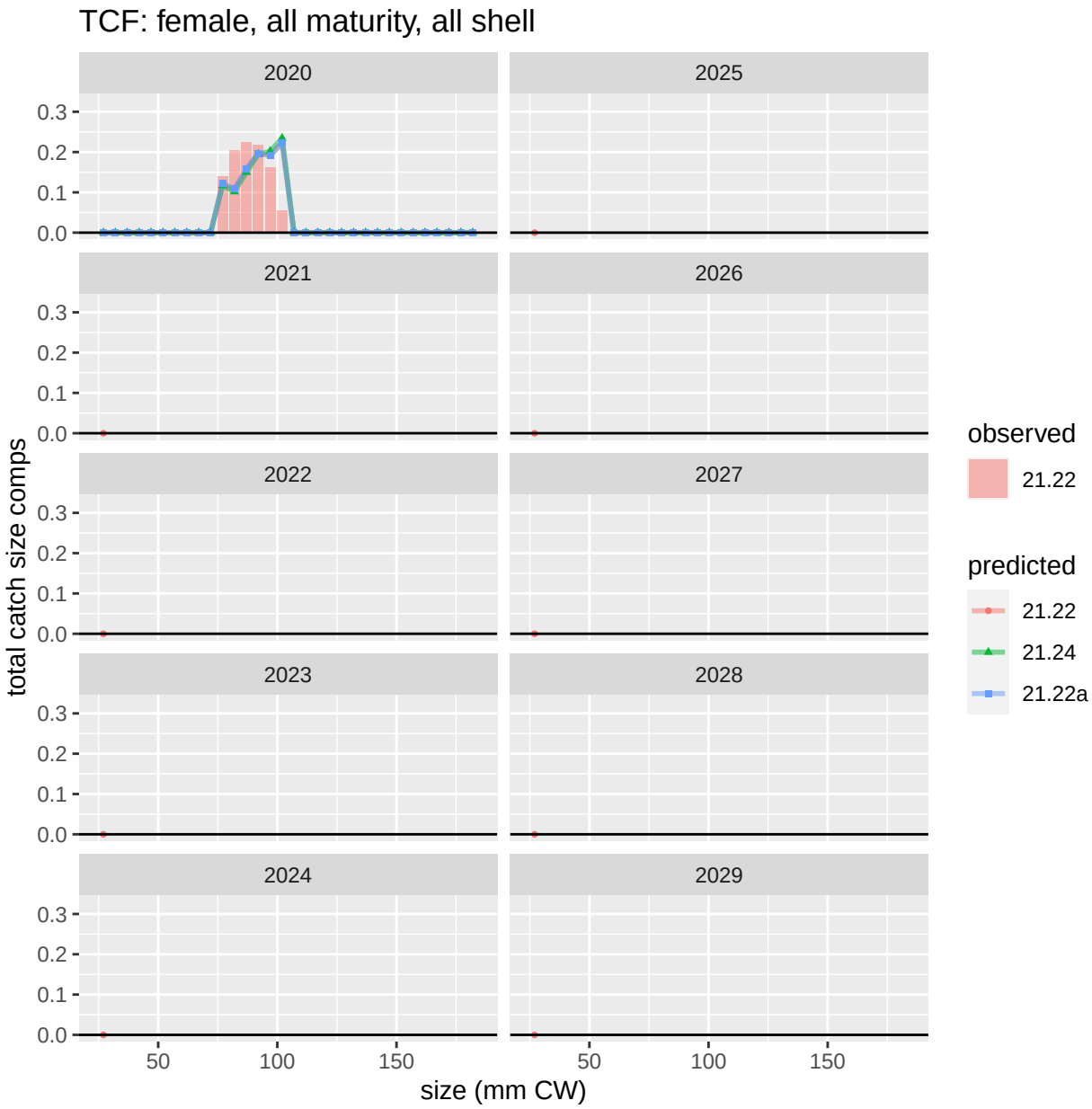

Figure 34: Comparison of observed and predicted female, all maturity, all shell total catch size comps for TCF. Page 4 of 4.

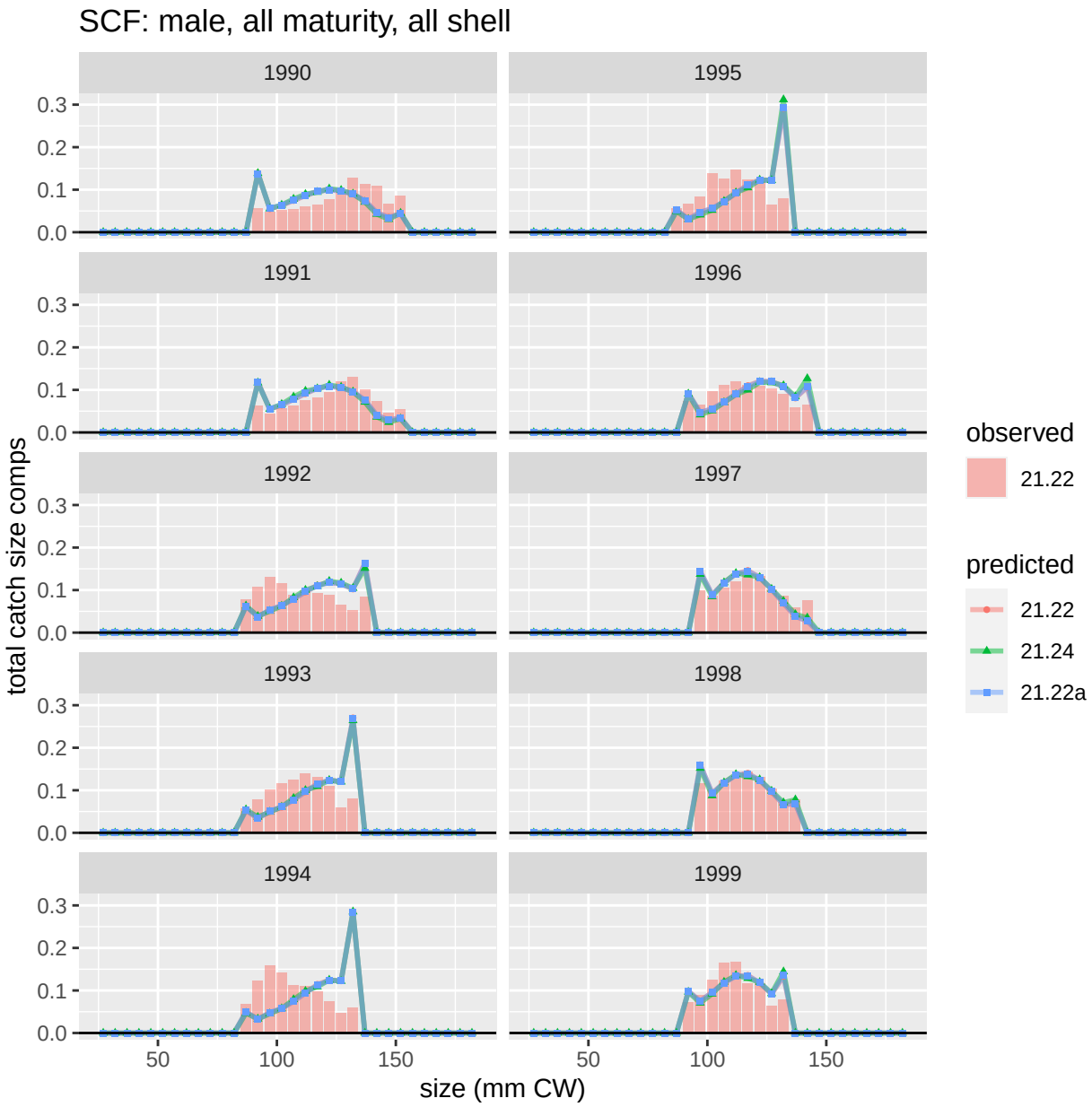

Figure 35: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 1 of 4.

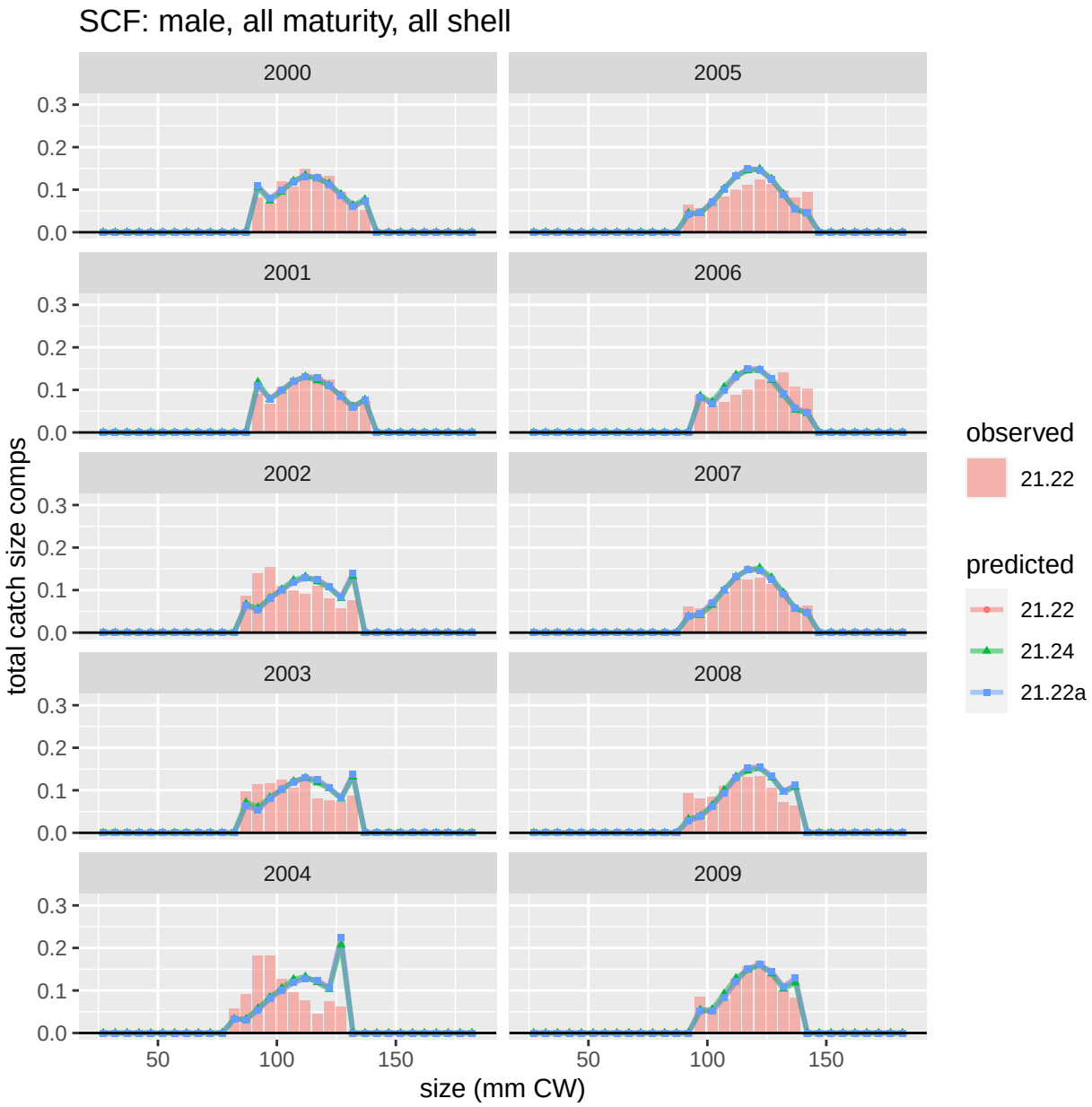

Figure 36: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 2 of 4.

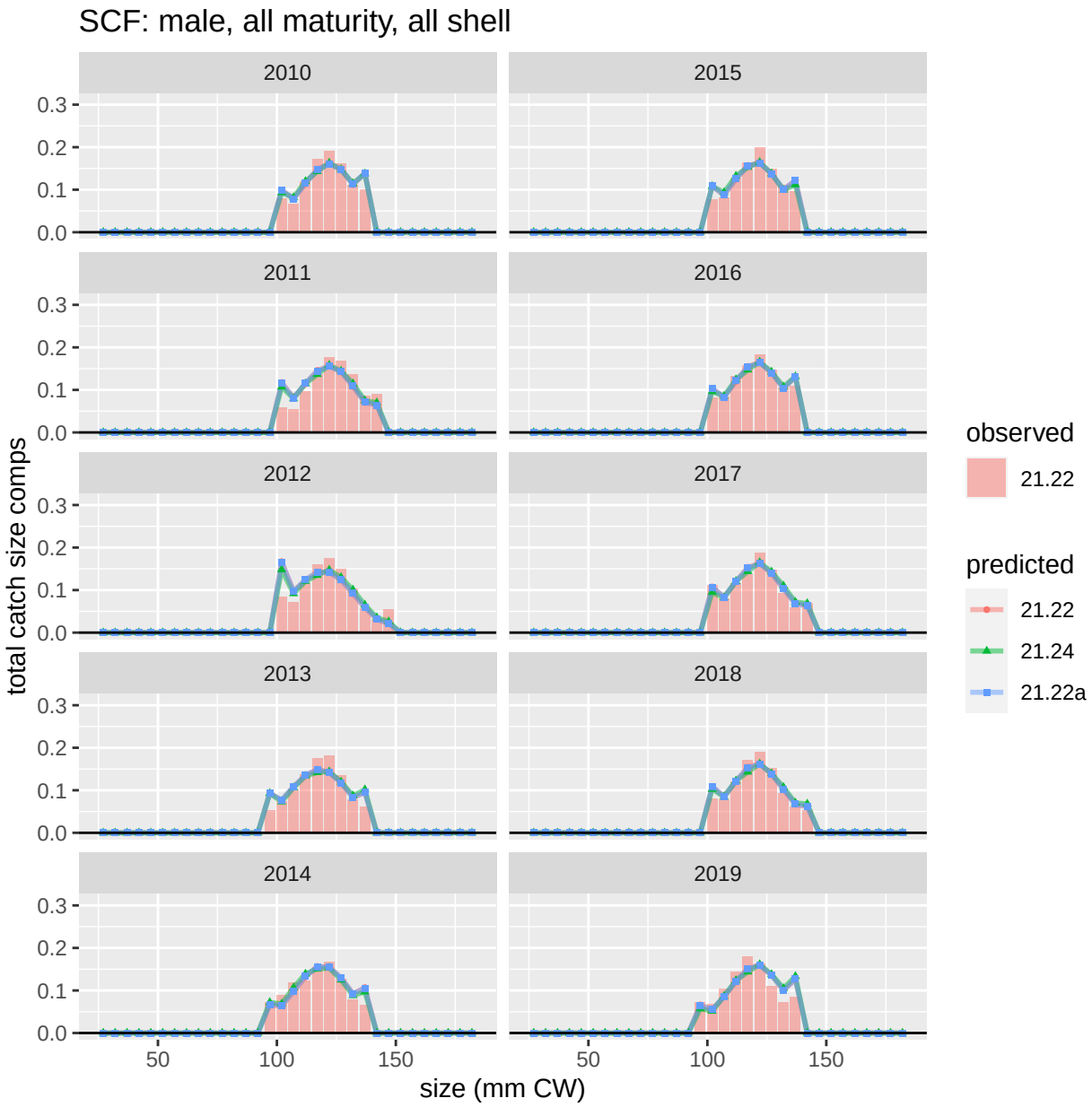

Figure 37: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 3 of 4.

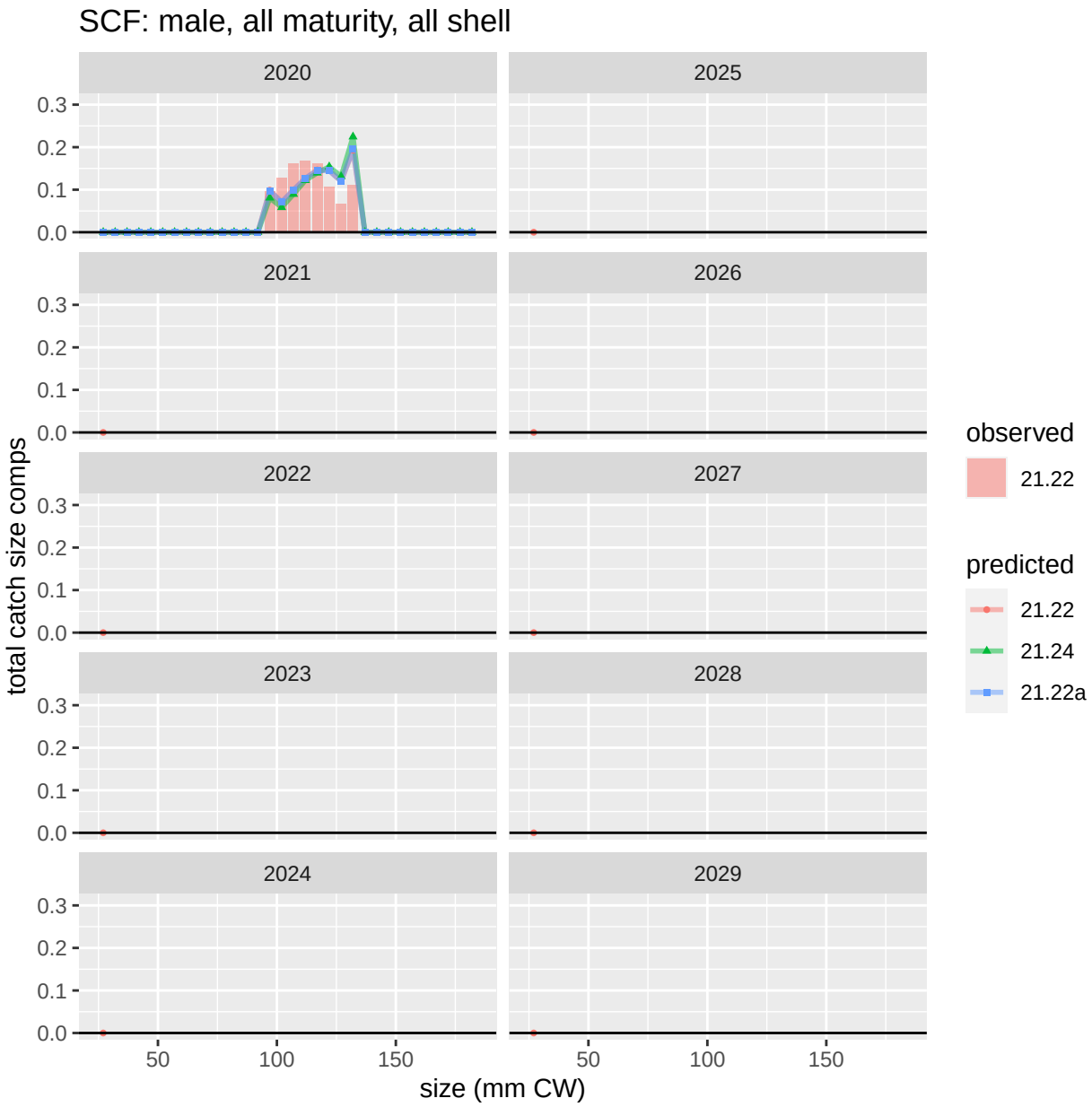

Figure 38: Comparison of observed and predicted male, all maturity, all shell total catch size comps for SCF. Page 4 of 4.

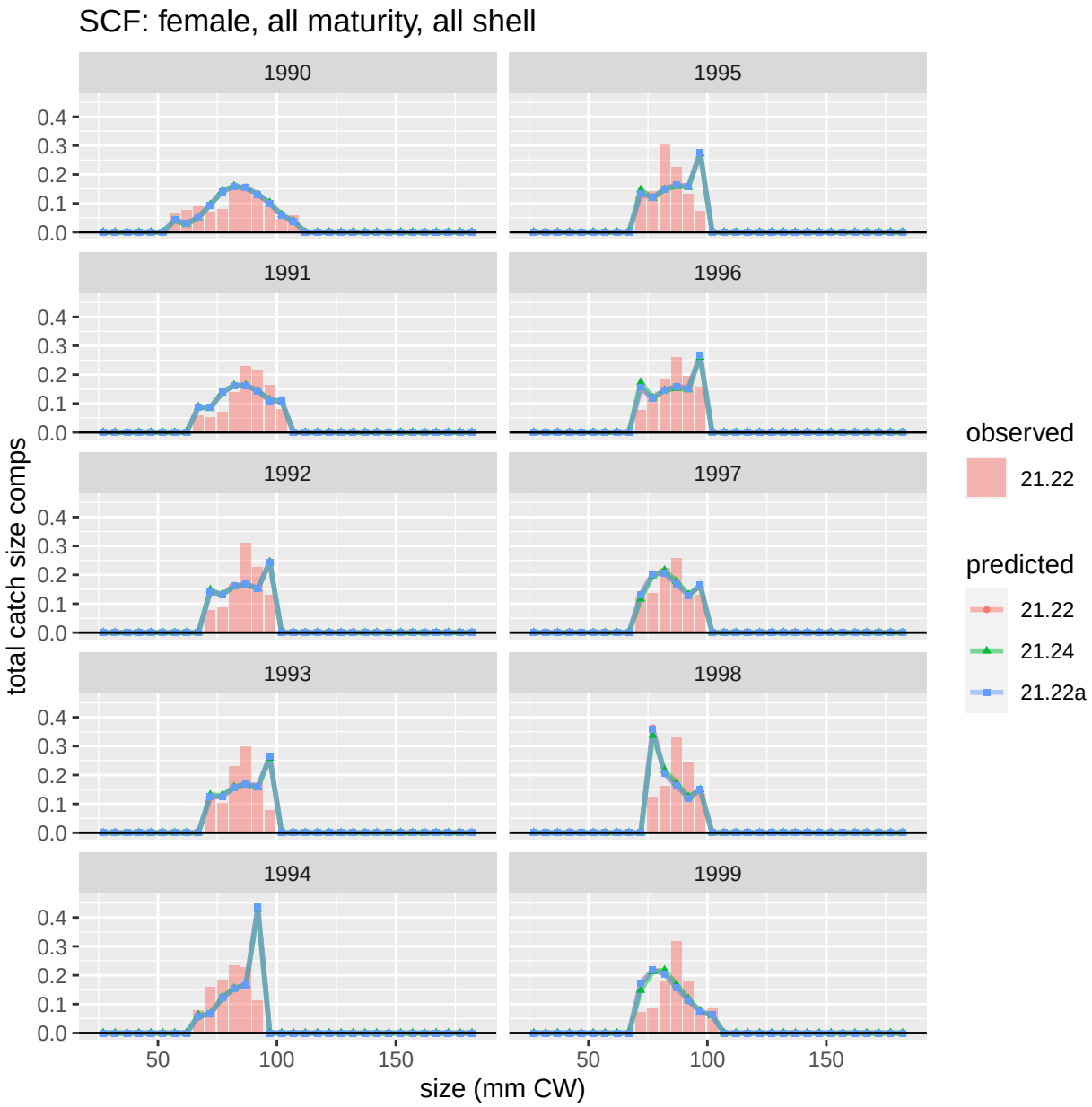

Figure 39: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 1 of 4.

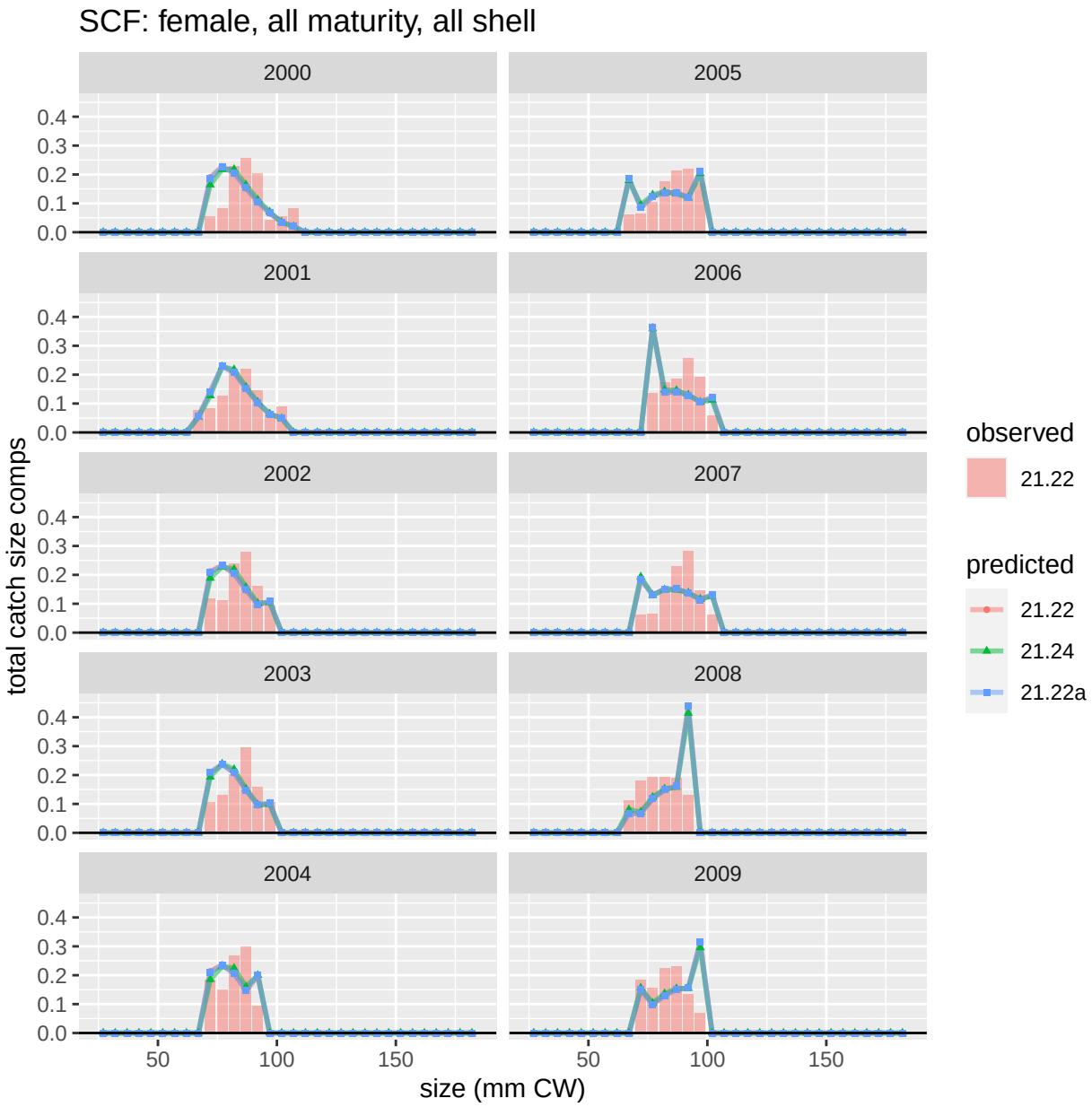

Figure 40: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 2 of 4.

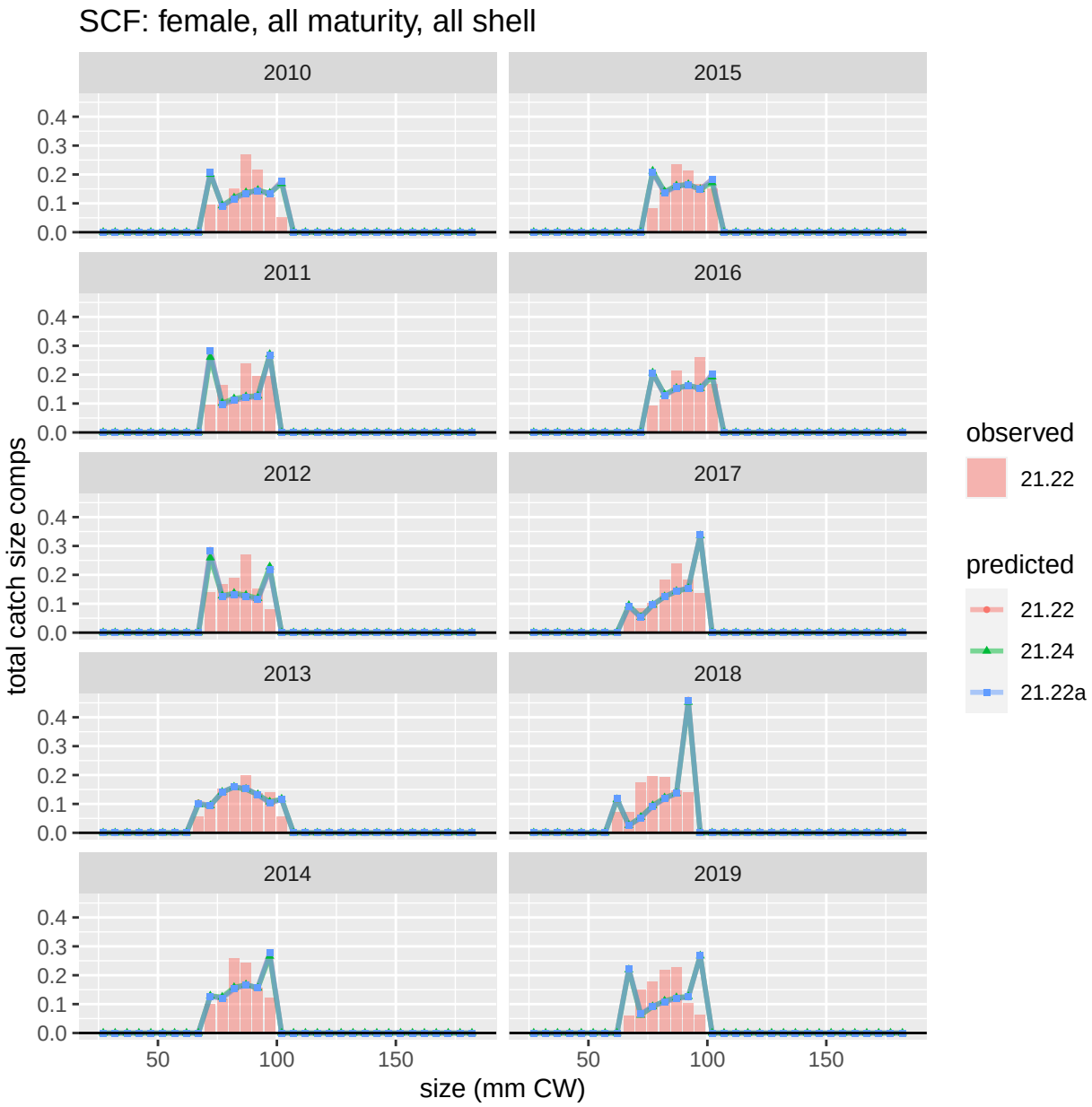

Figure 41: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 3 of 4.

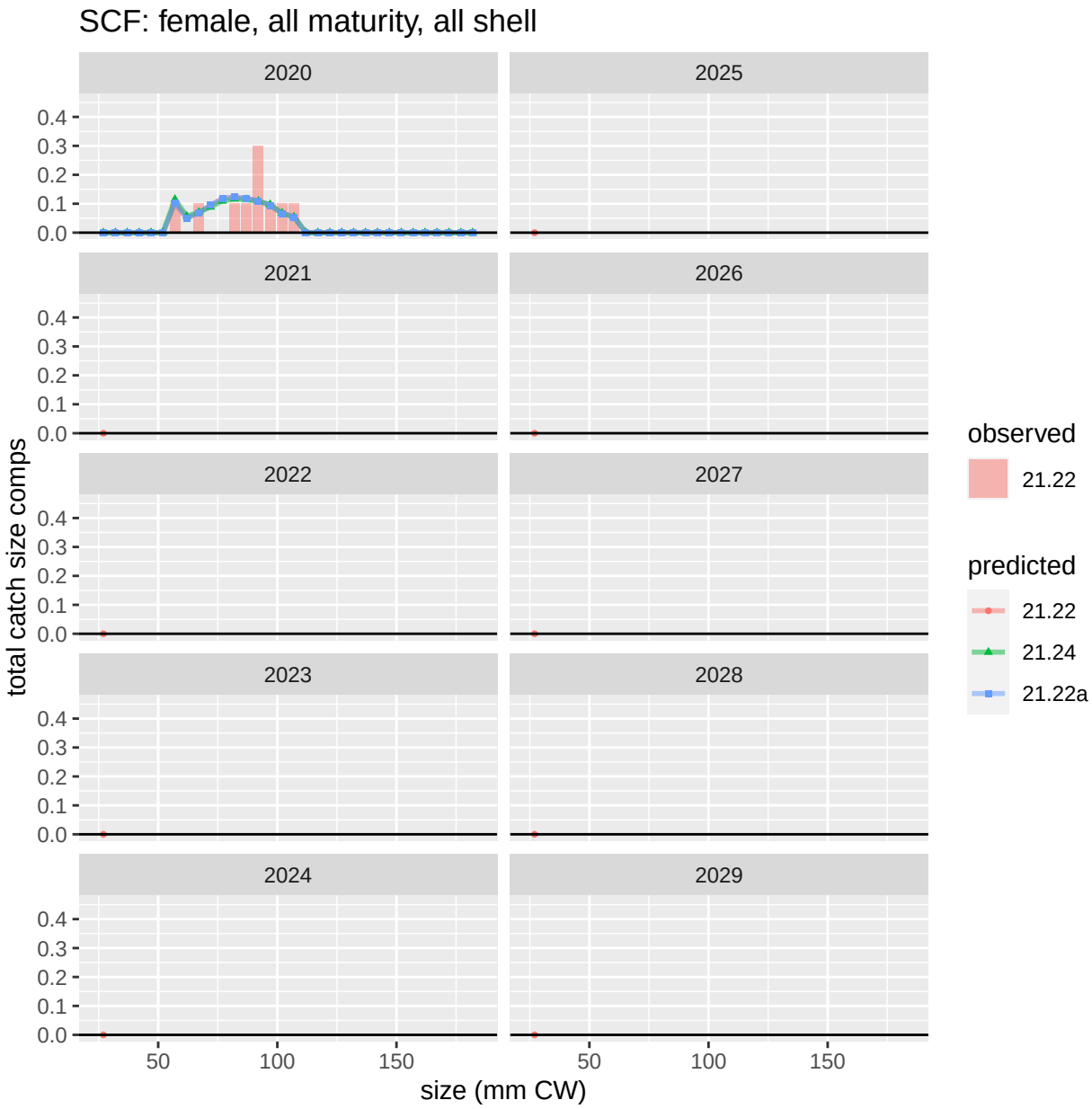

Figure 42: Comparison of observed and predicted female, all maturity, all shell total catch size comps for SCF. Page 4 of 4.

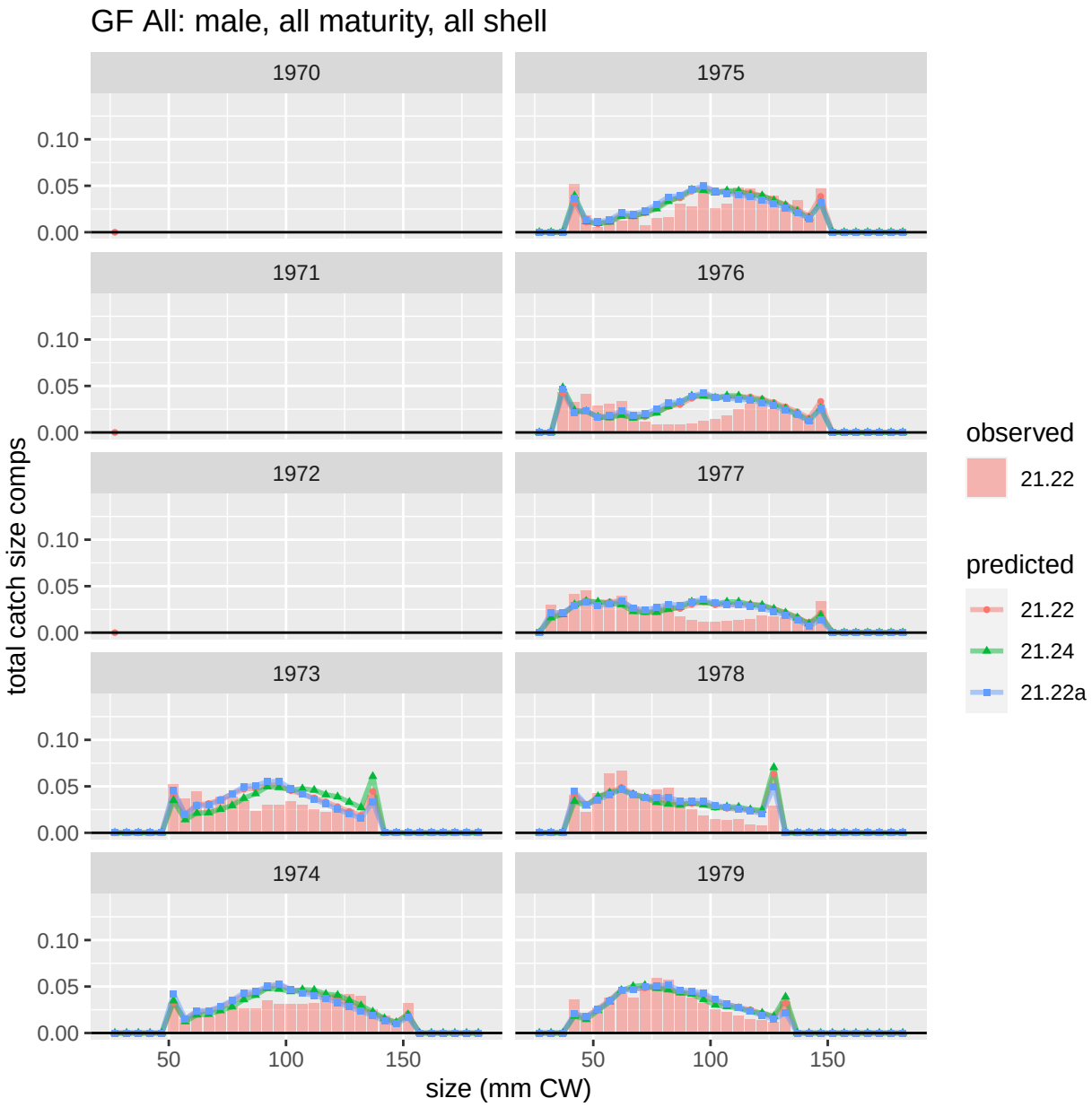

Figure 43: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 1 of 6.

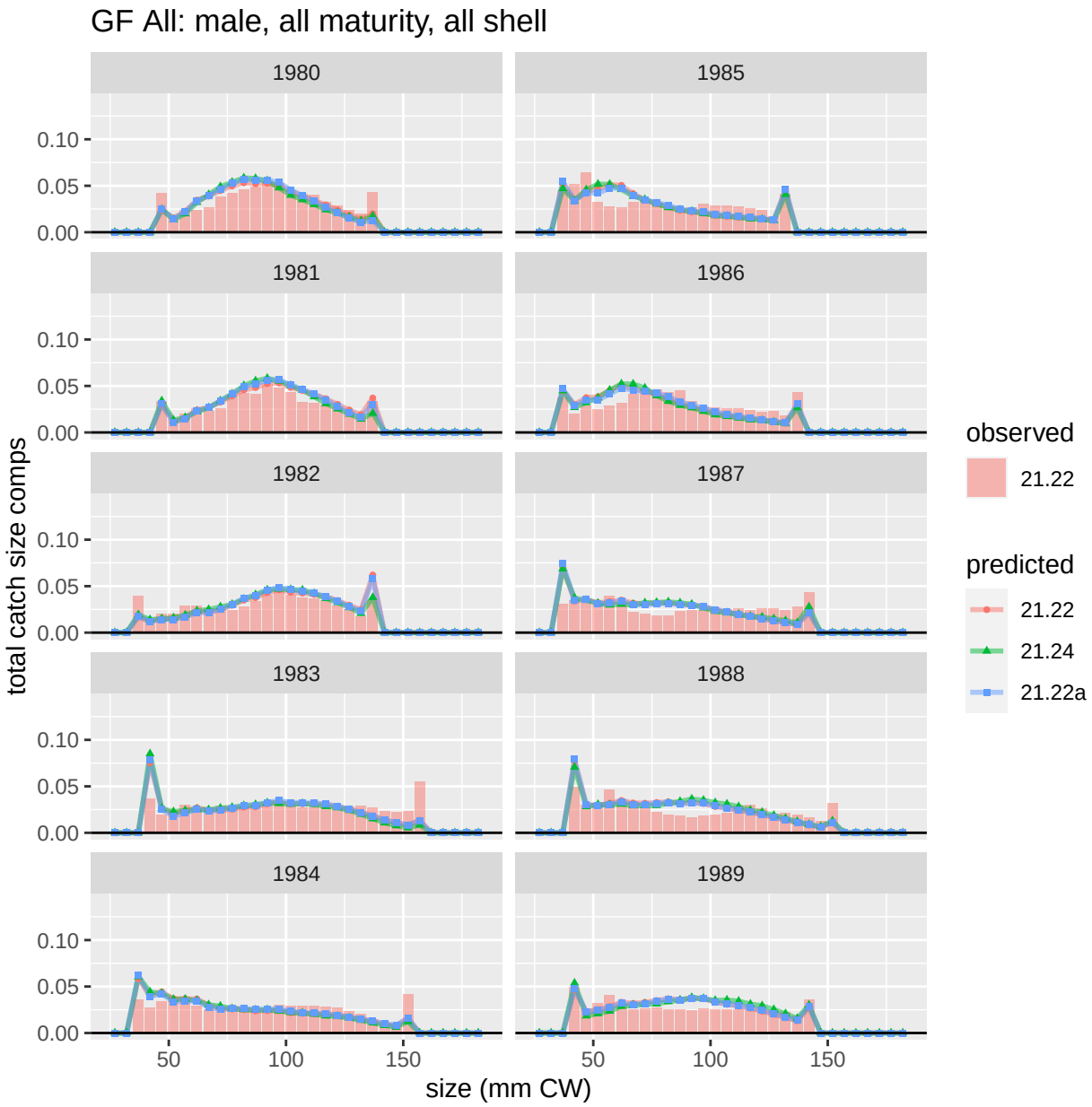

Figure 44: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 2 of 6.

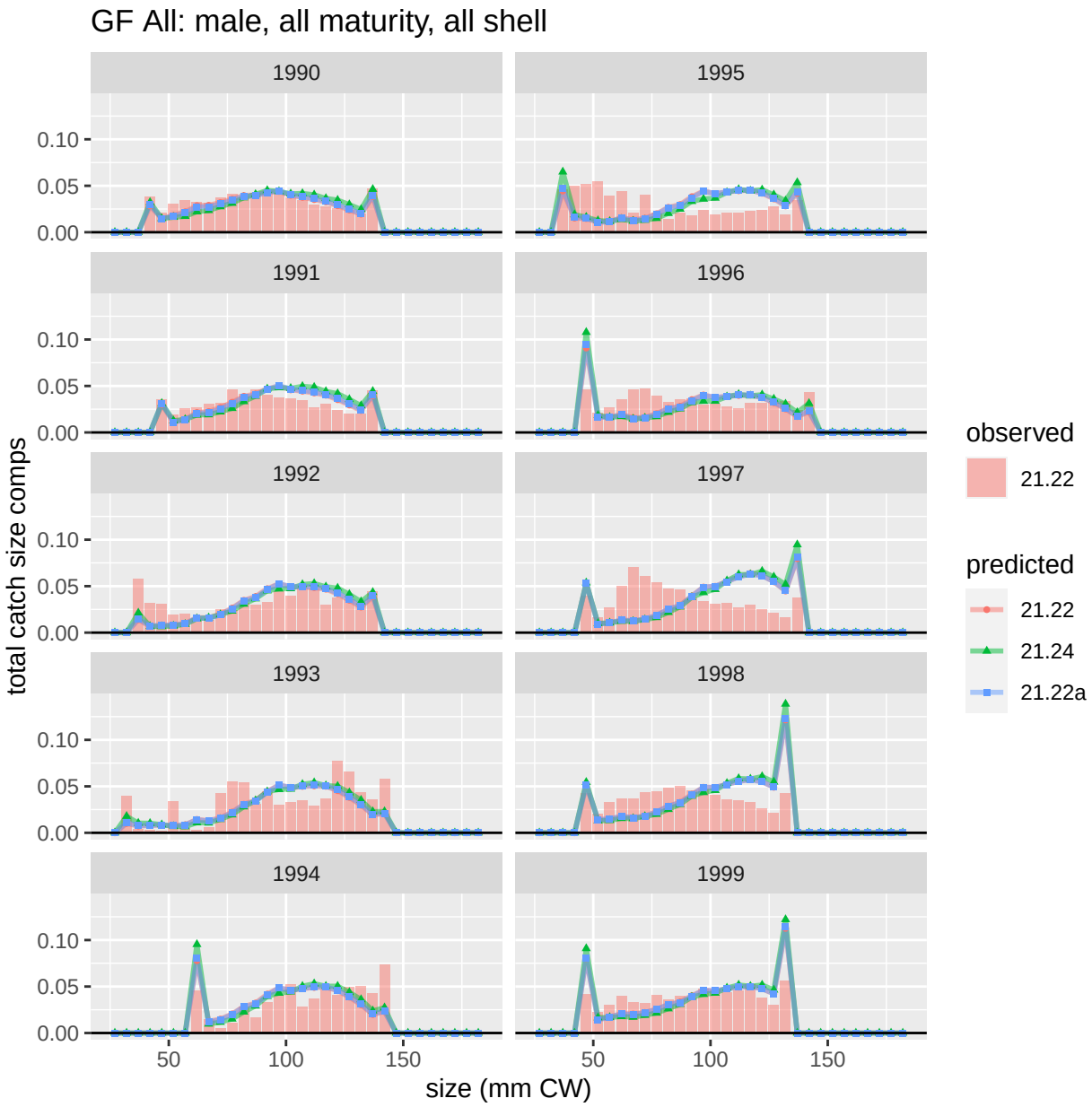

Figure 45: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 3 of 6.

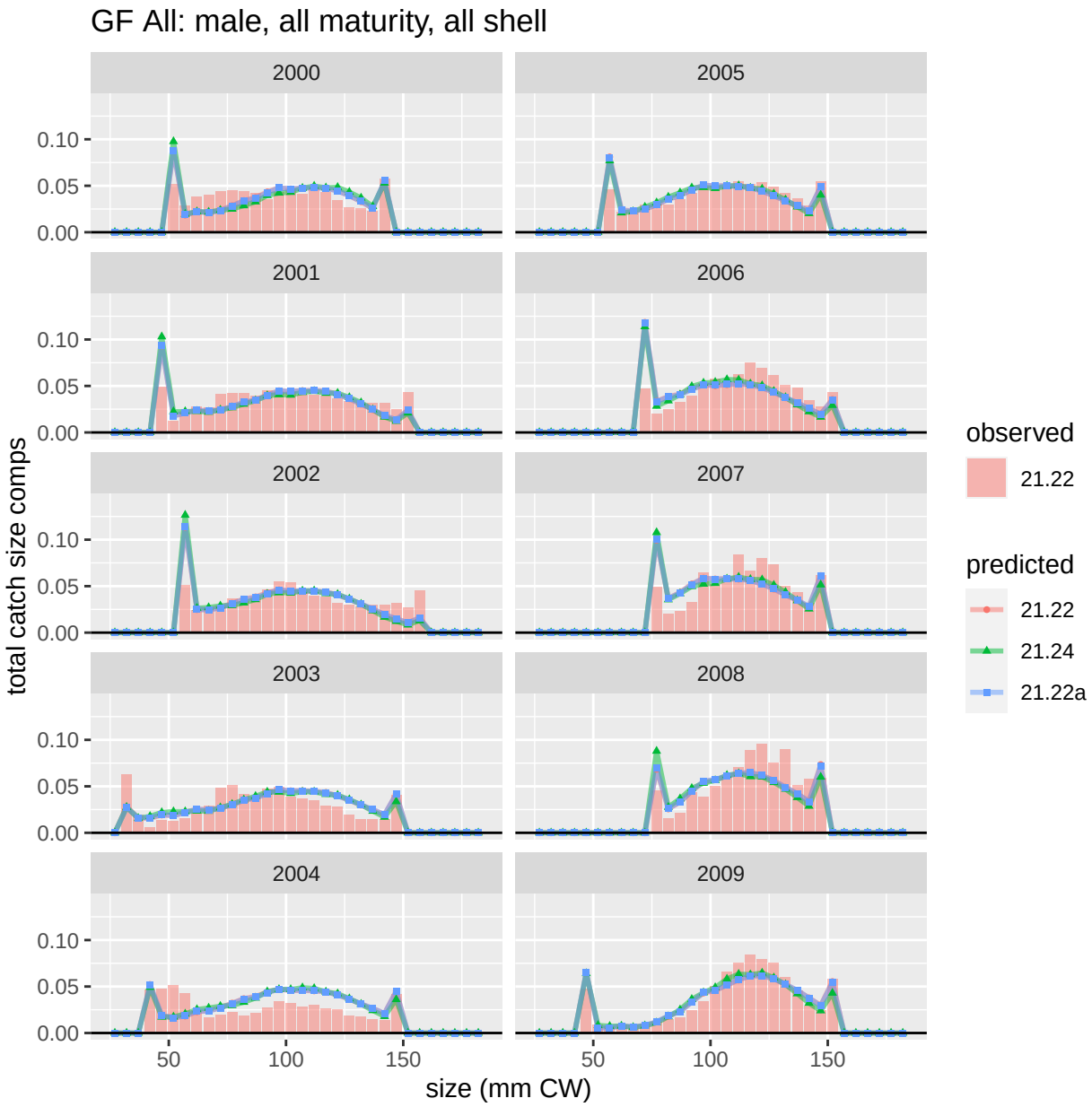

Figure 46: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 4 of 6.

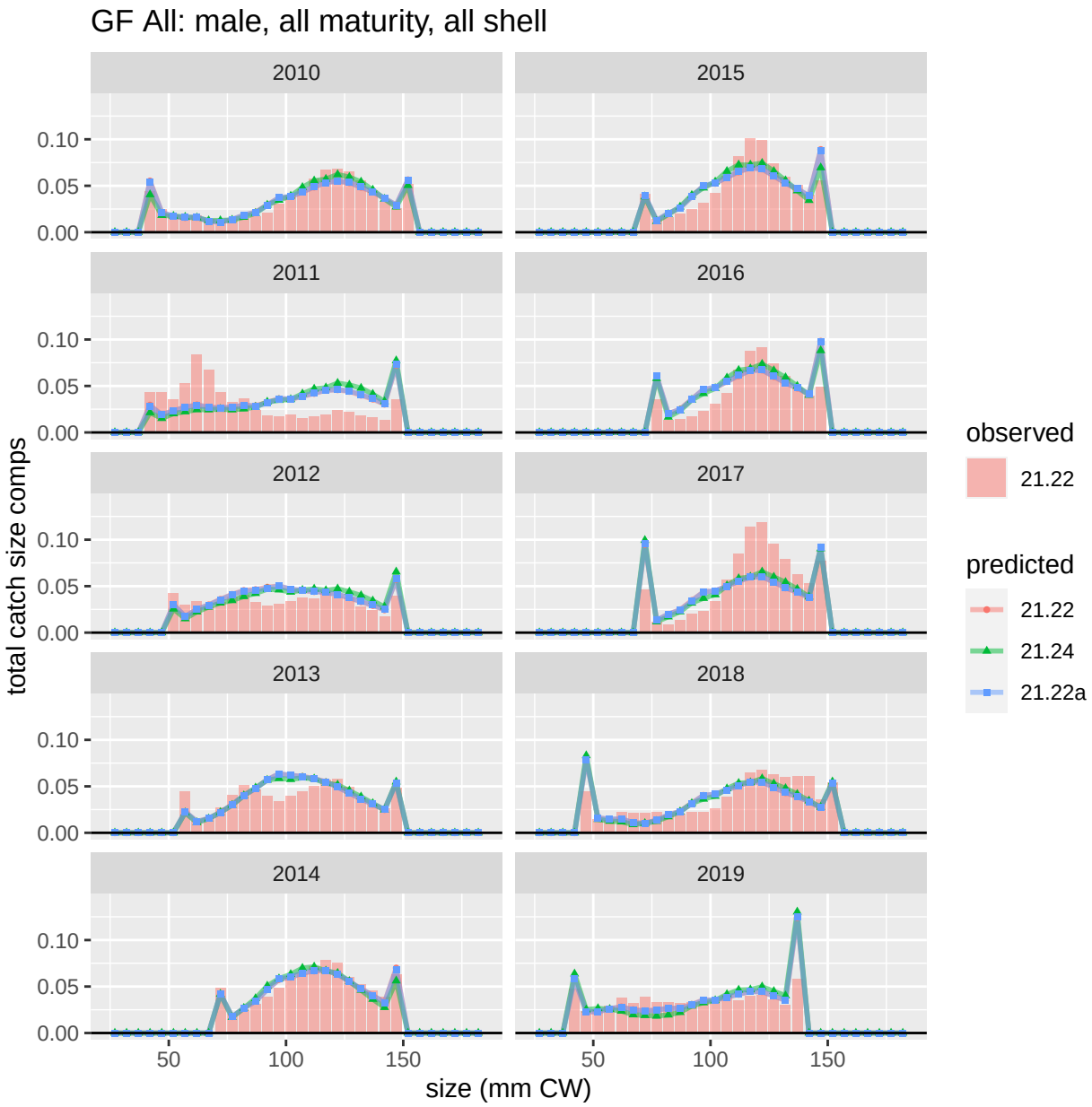

Figure 47: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 5 of 6.

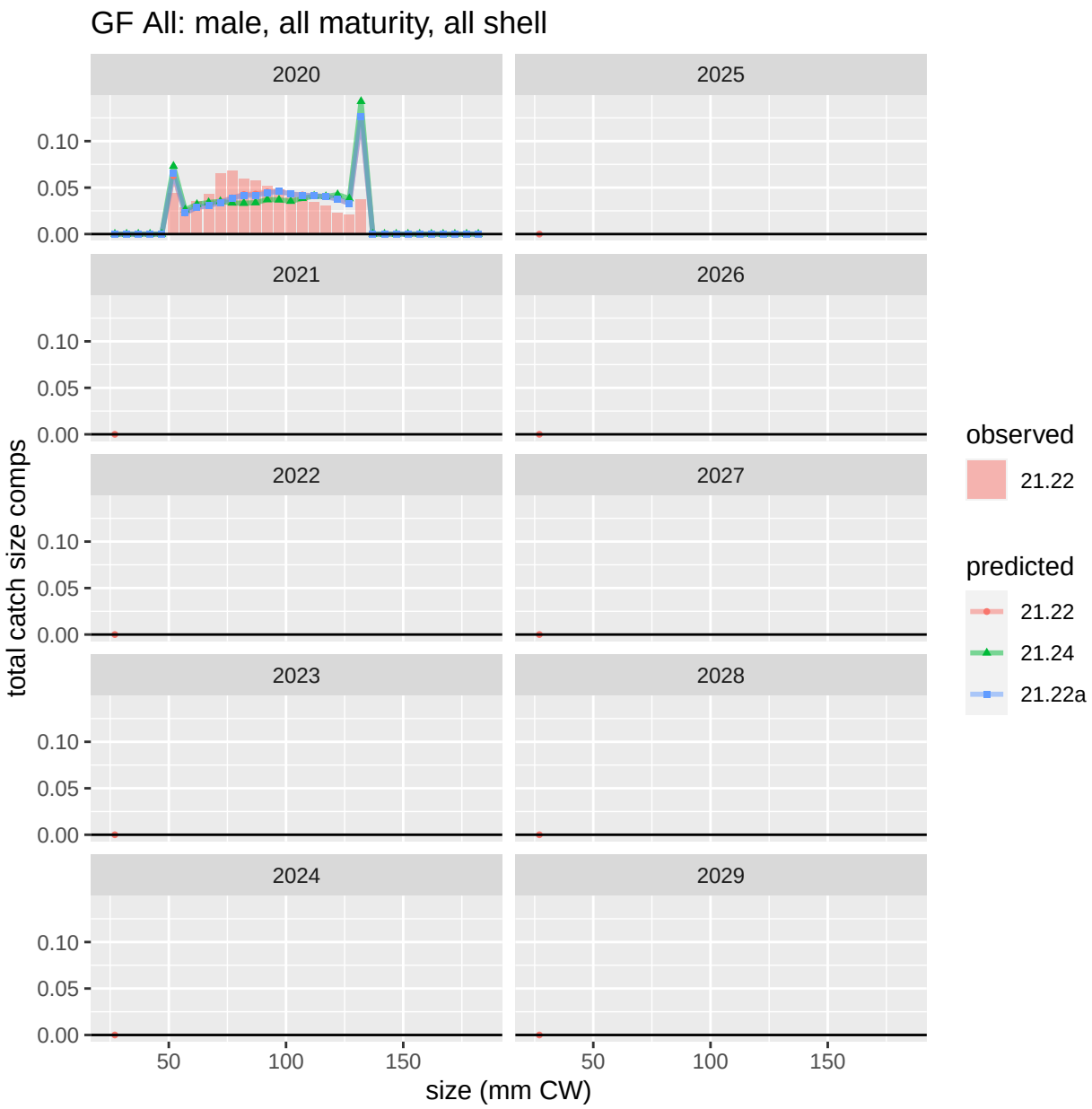

Figure 48: Comparison of observed and predicted male, all maturity, all shell total catch size comps for GF All. Page 6 of 6.

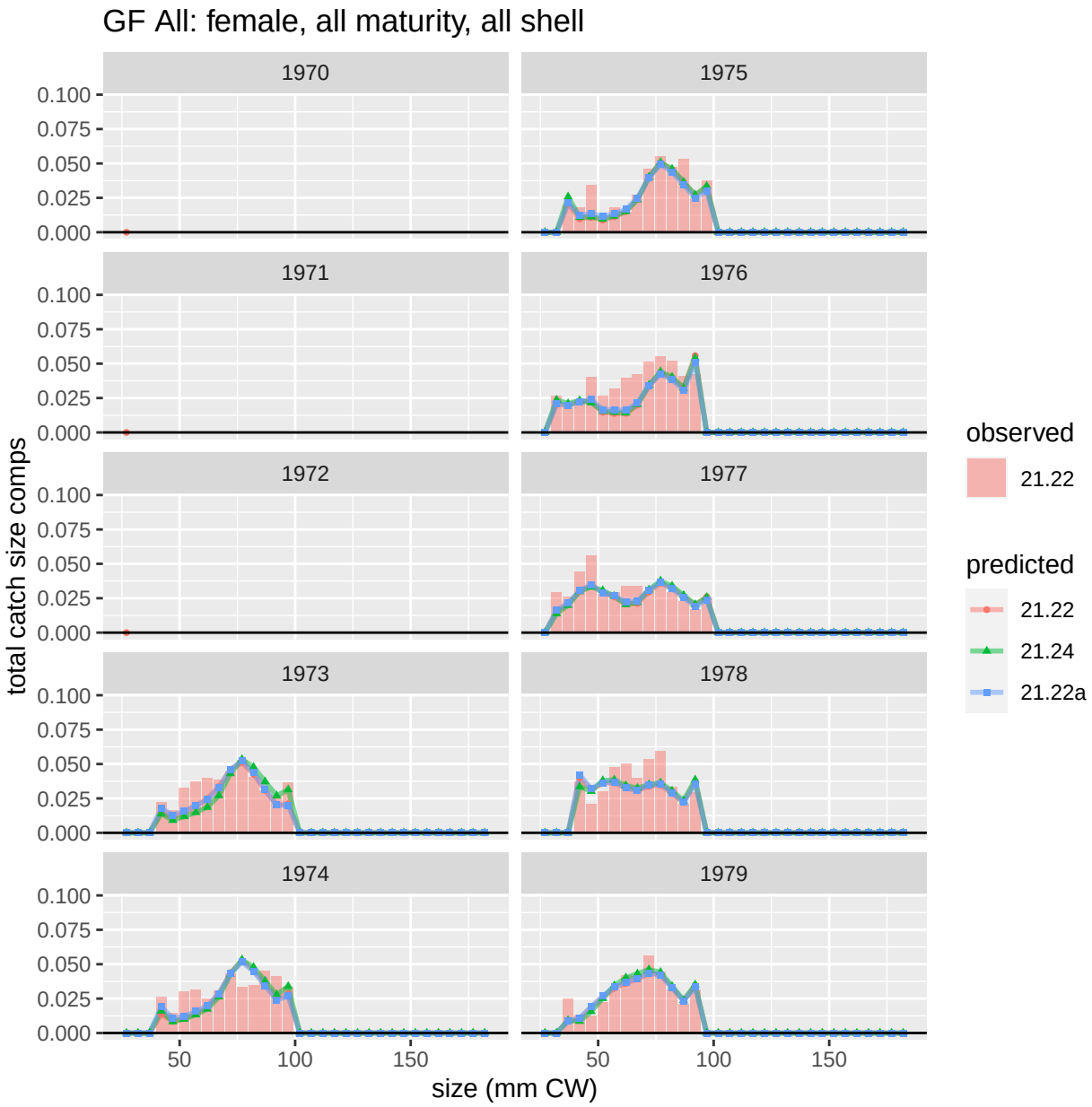

Figure 49: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 1 of 6.

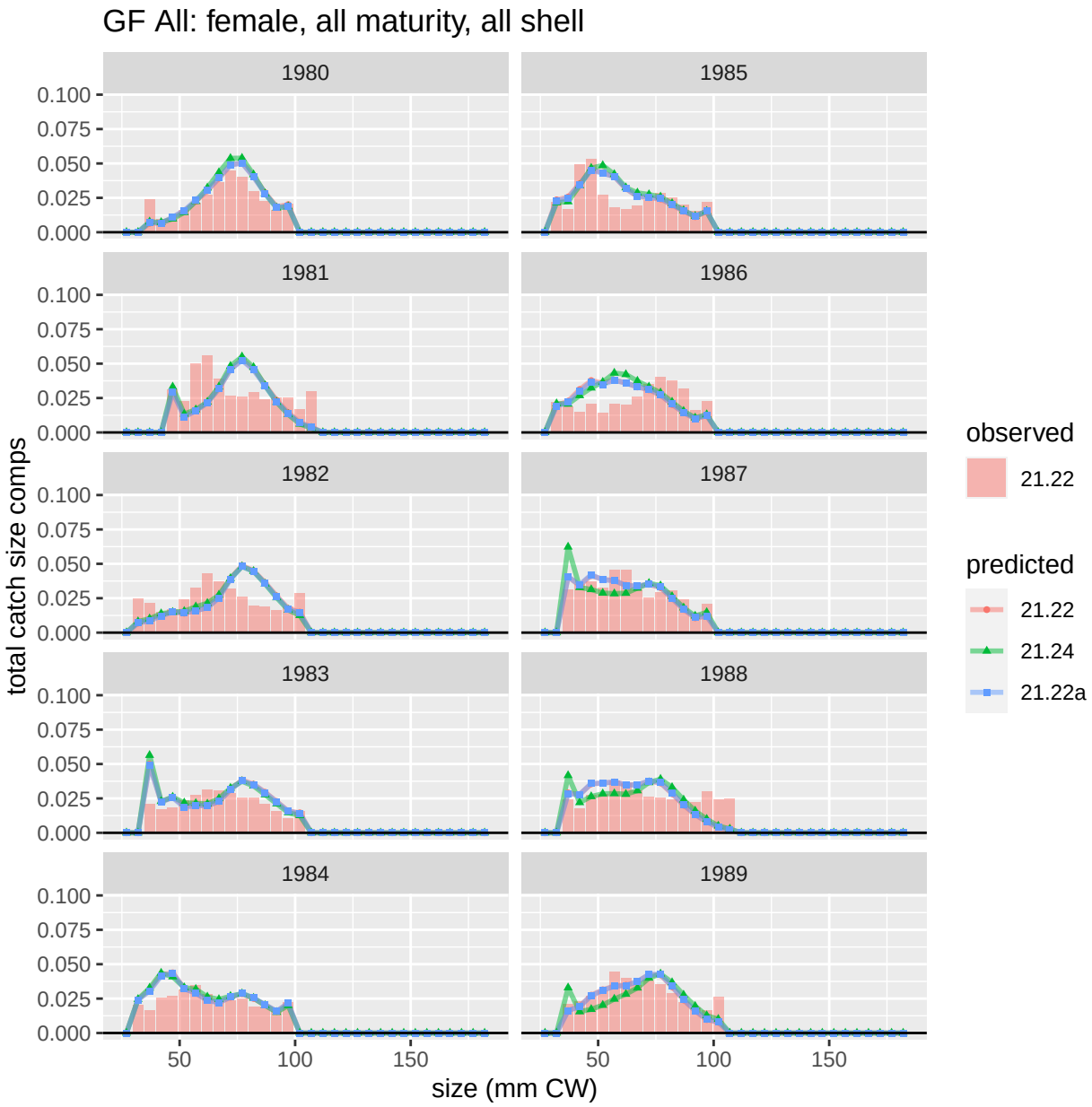

Figure 50: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 2 of 6.

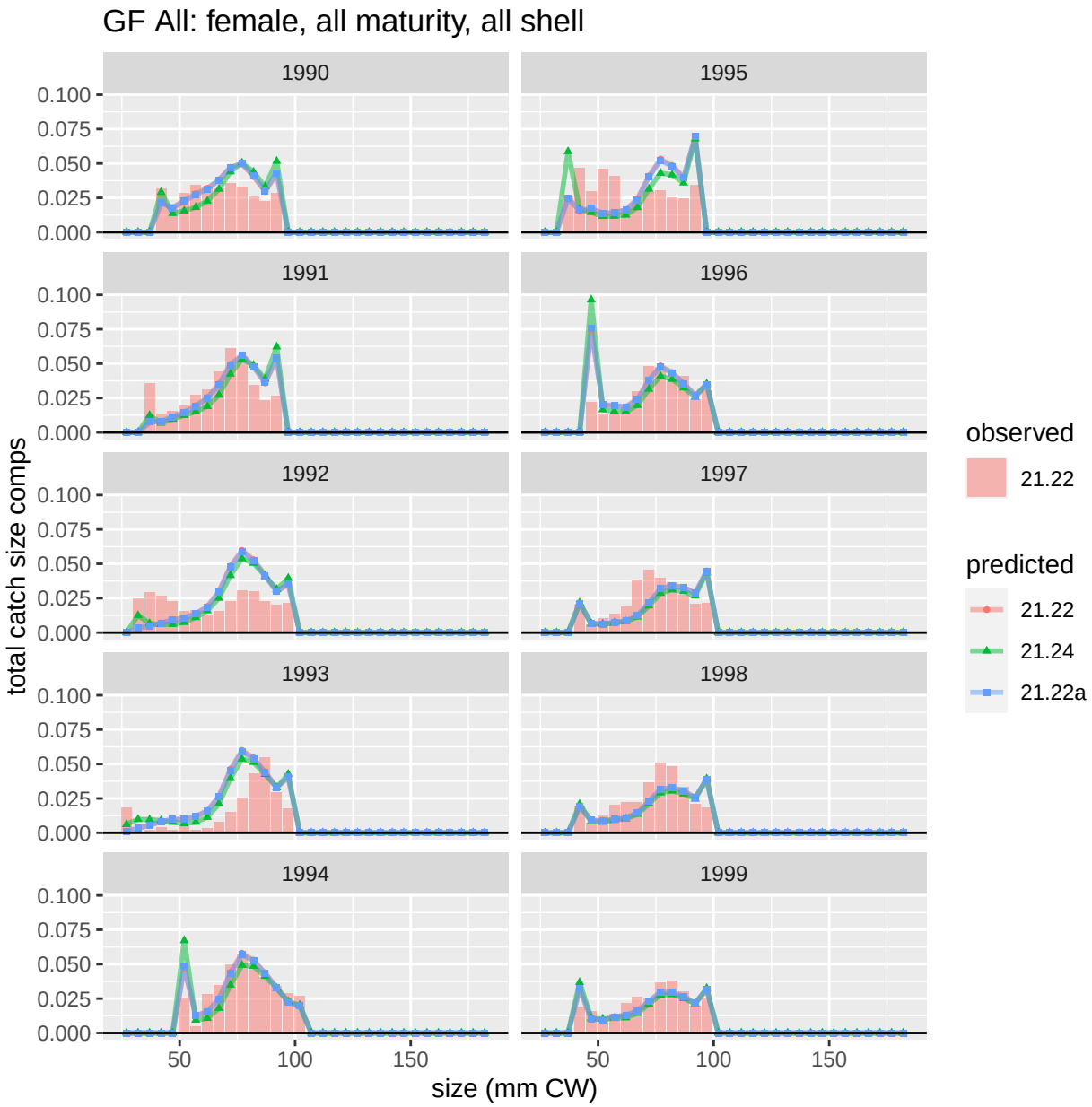

Figure 51: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 3 of 6.

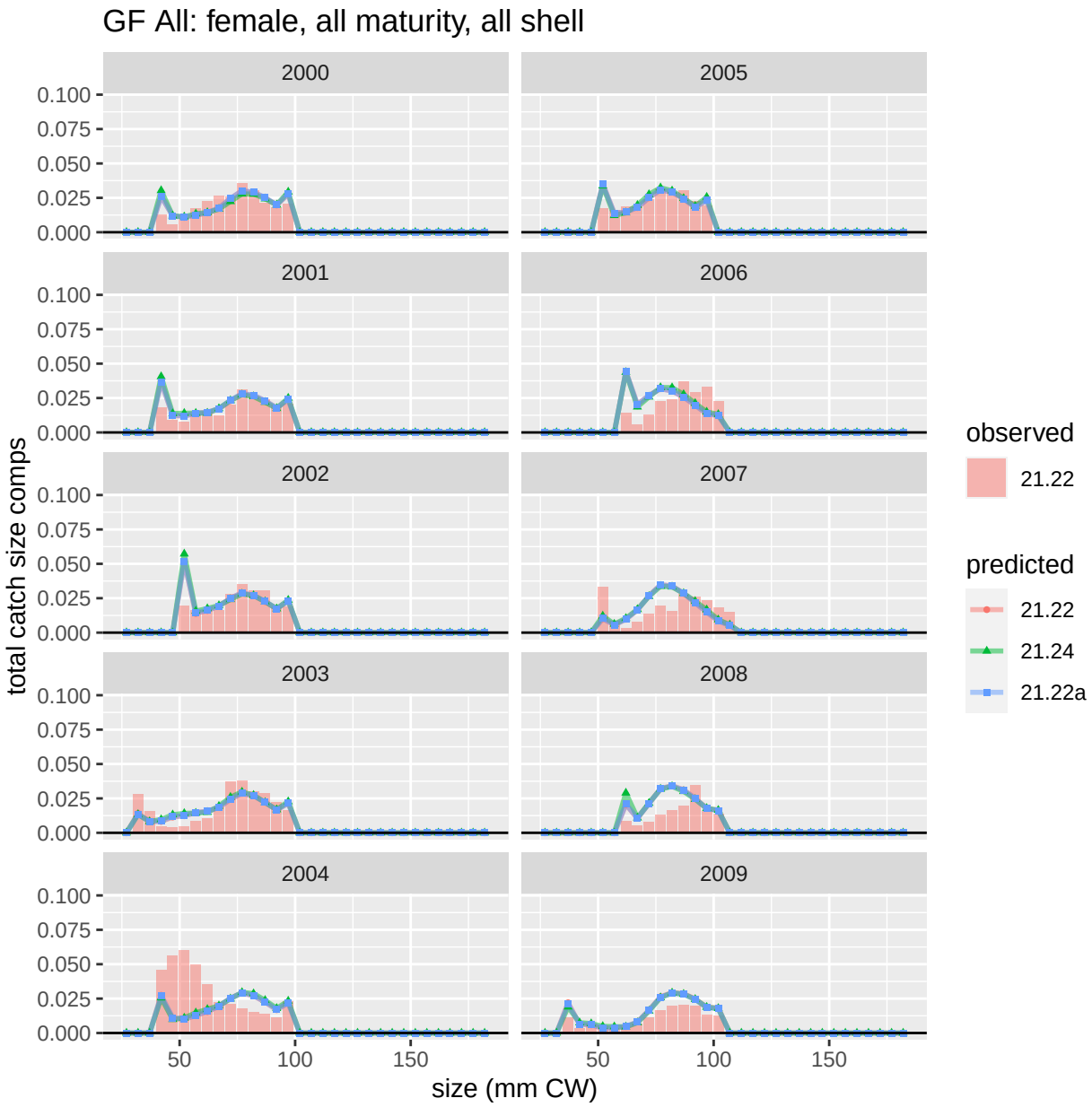

Figure 52: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 4 of 6.

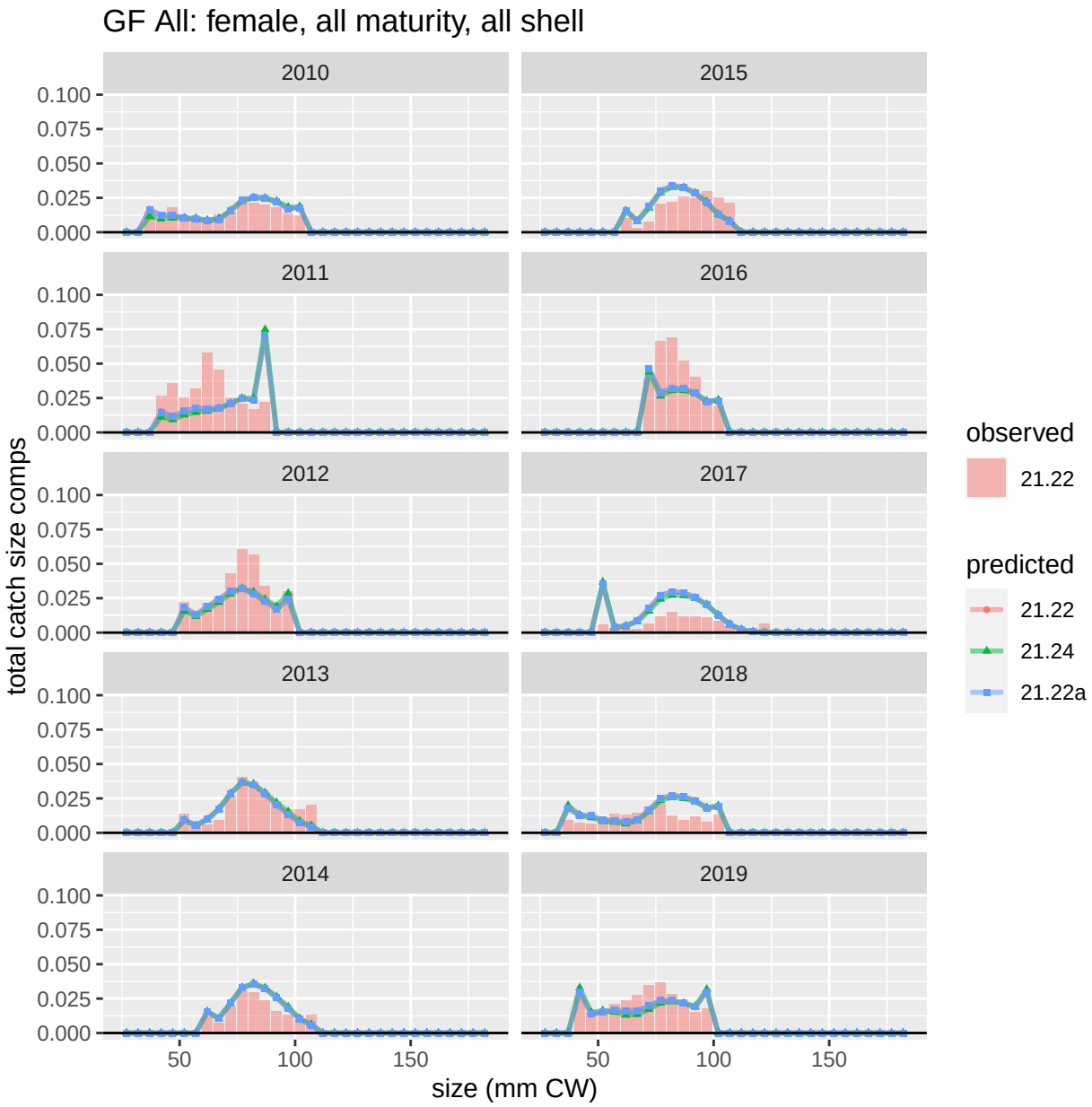

Figure 53: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 5 of 6.

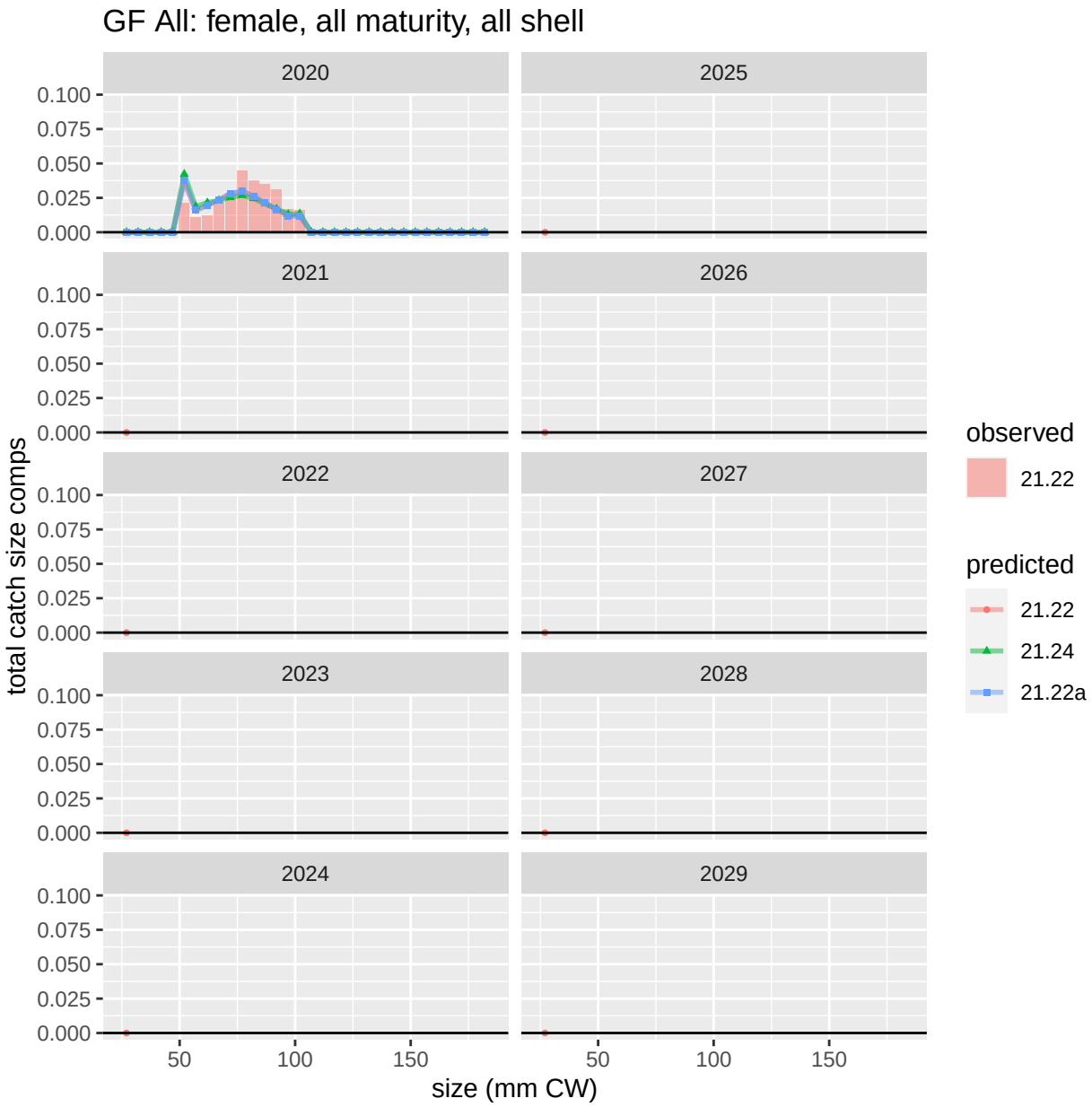

Figure 54: Comparison of observed and predicted female, all maturity, all shell total catch size comps for GF All. Page 6 of 6.

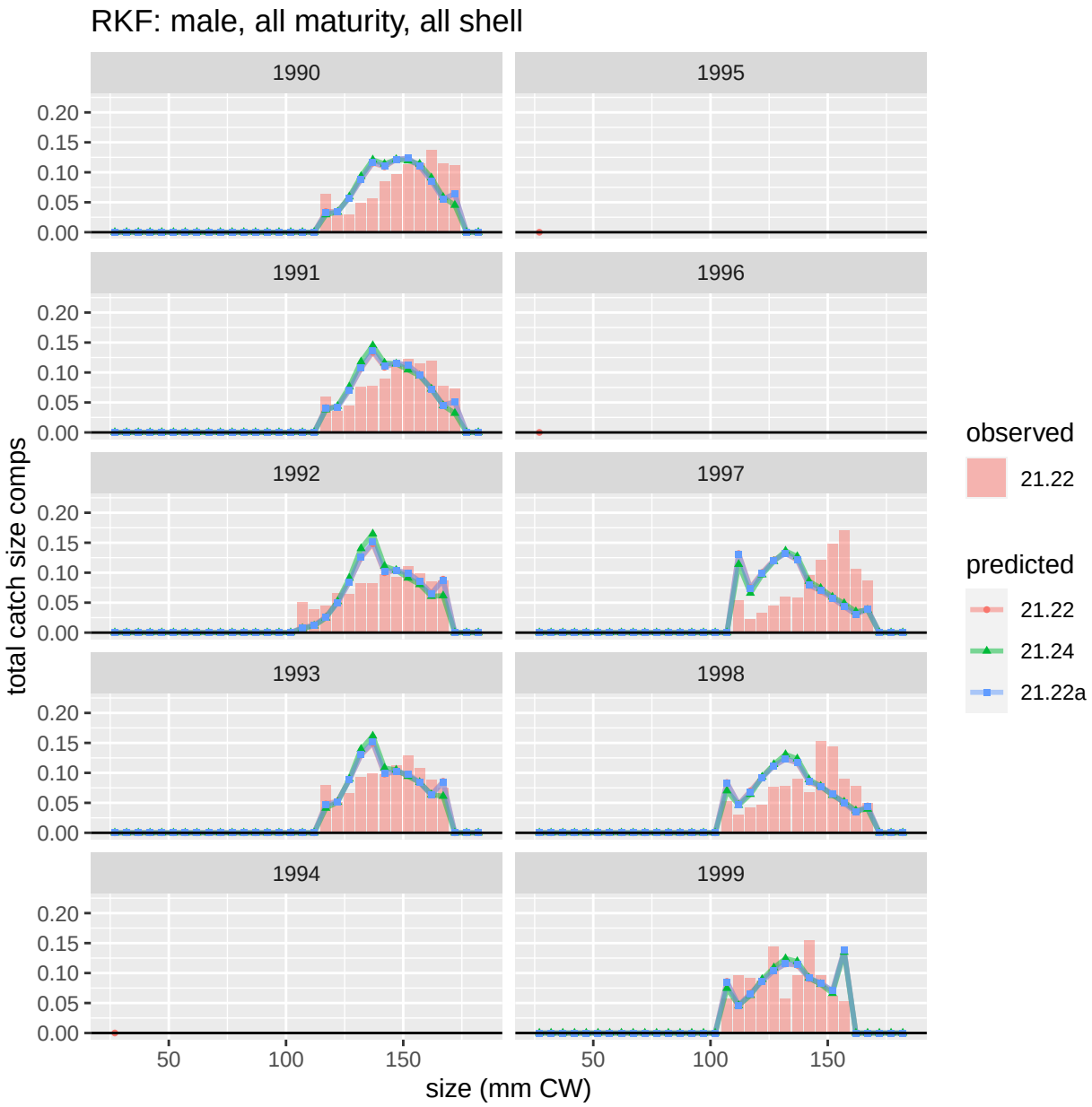

Figure 55: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 1 of 4.

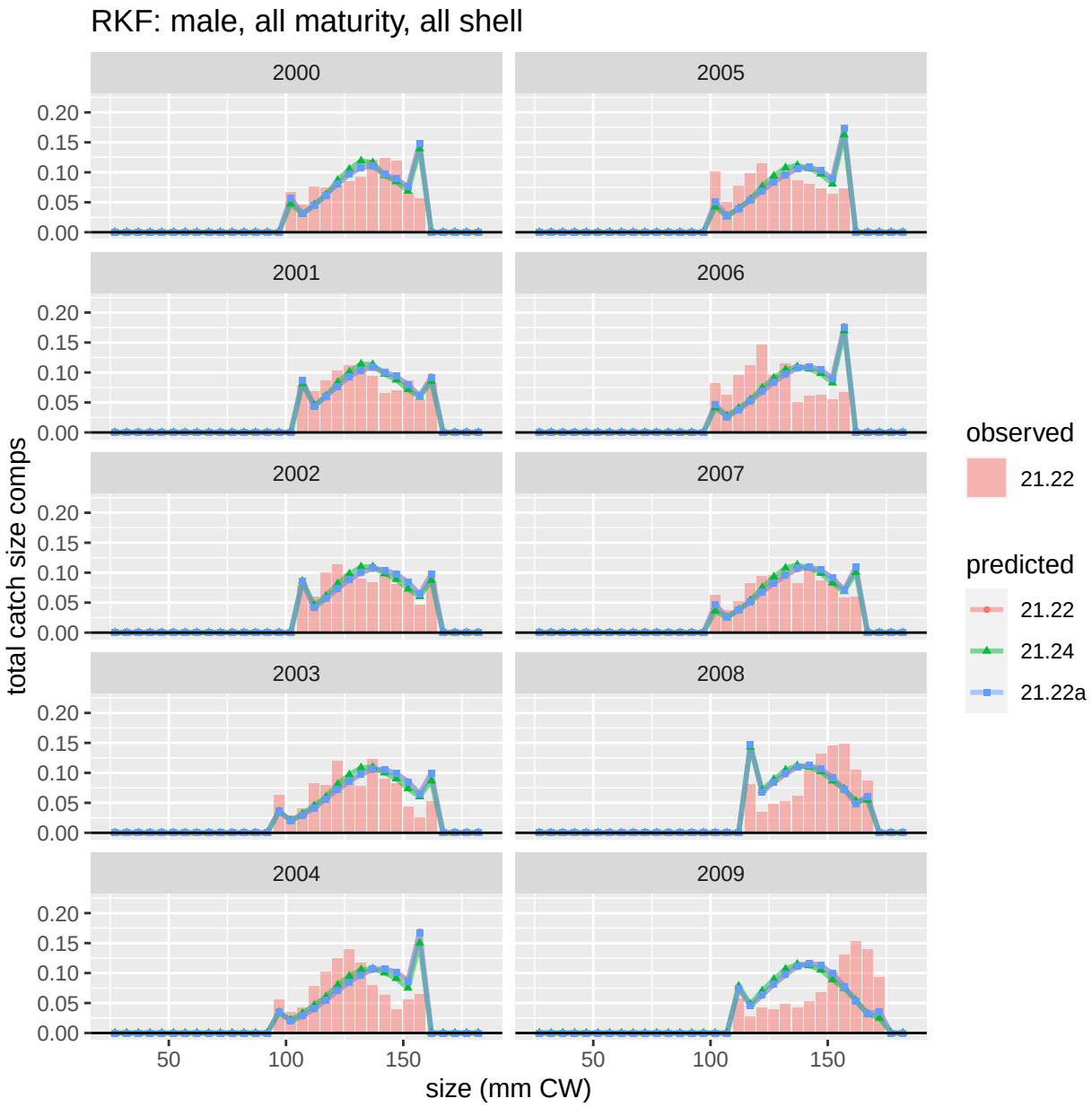

Figure 56: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 2 of 4.

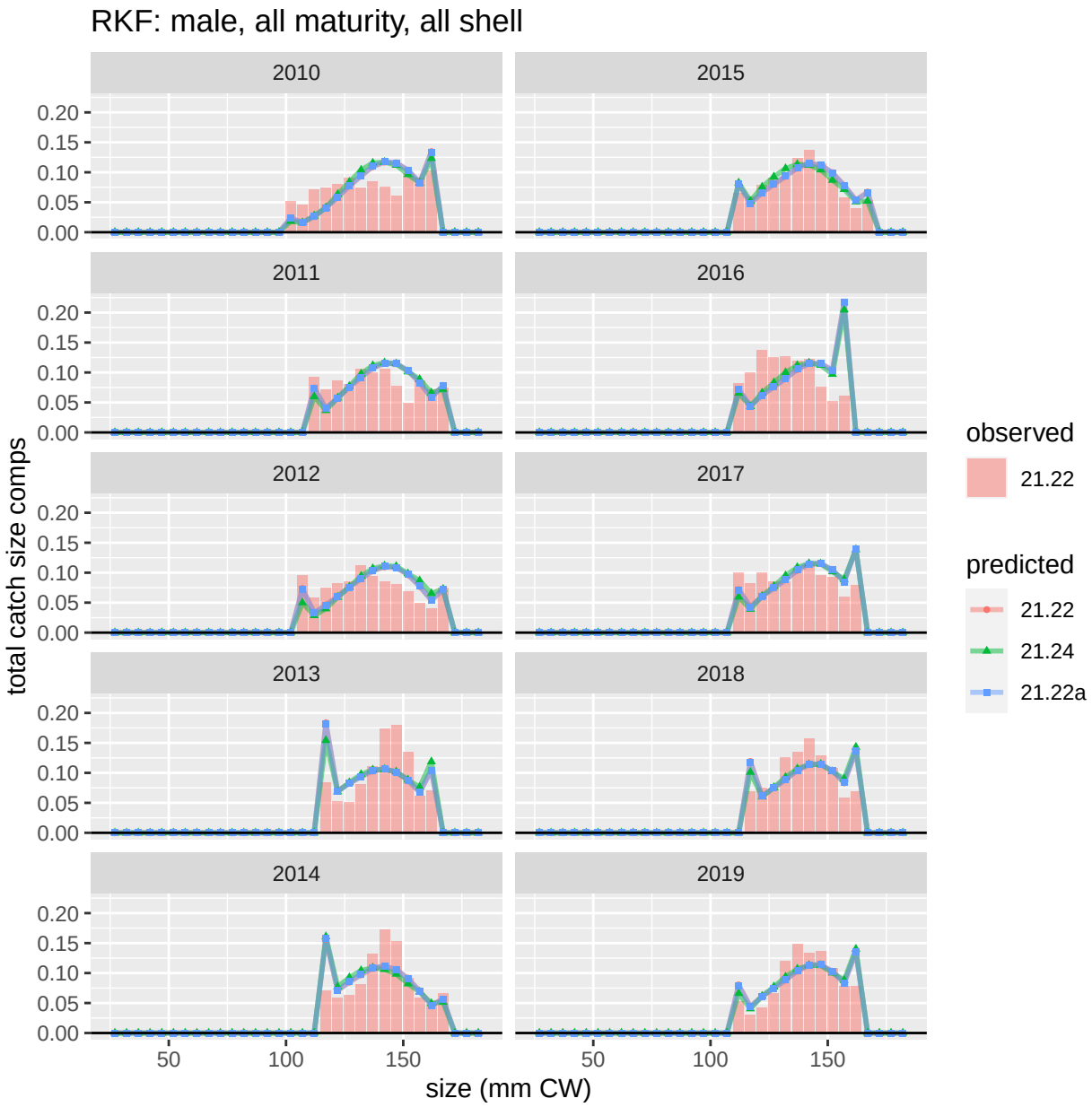

Figure 57: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 3 of 4.

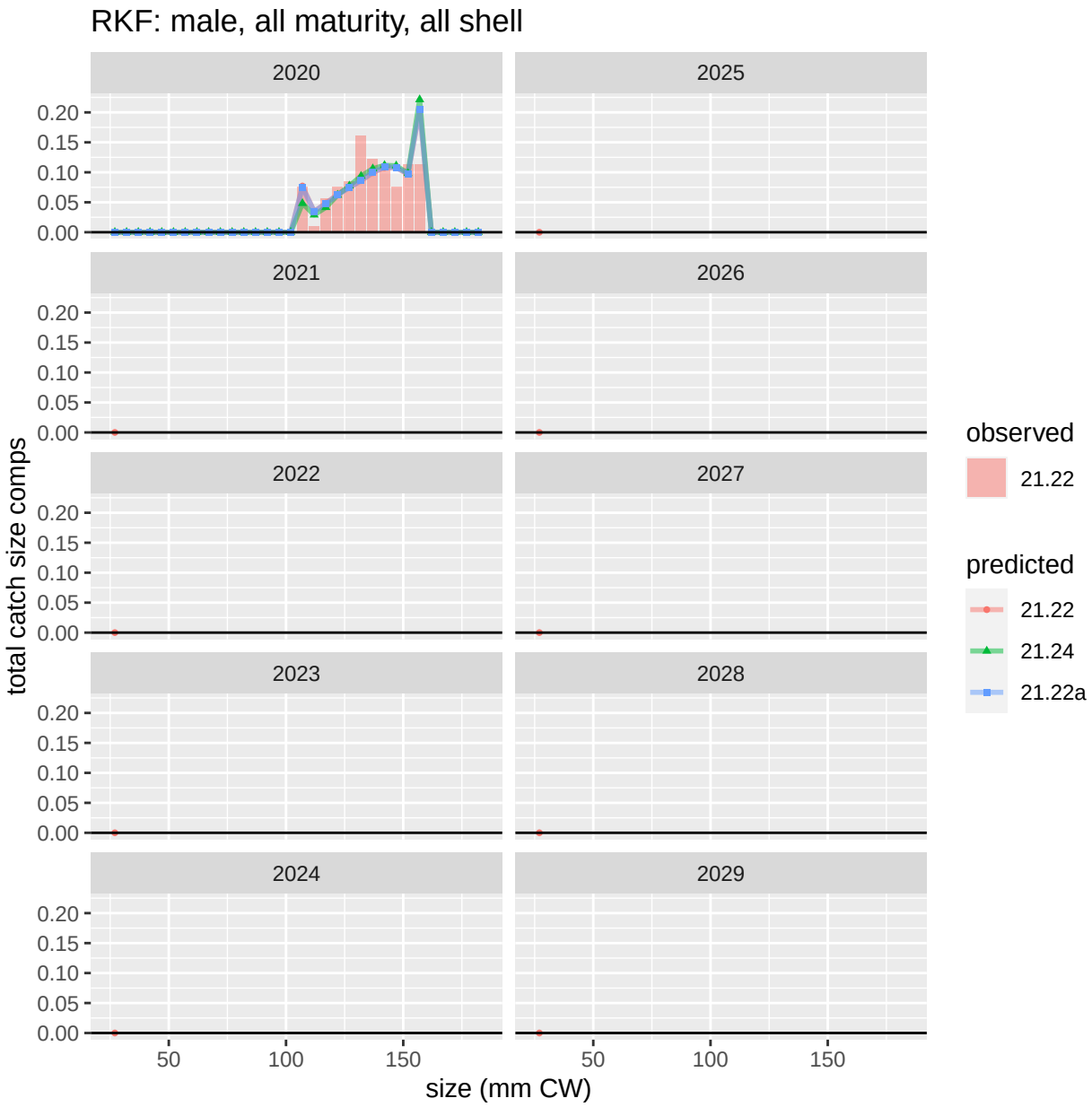

Figure 58: Comparison of observed and predicted male, all maturity, all shell total catch size comps for RKF. Page 4 of 4.

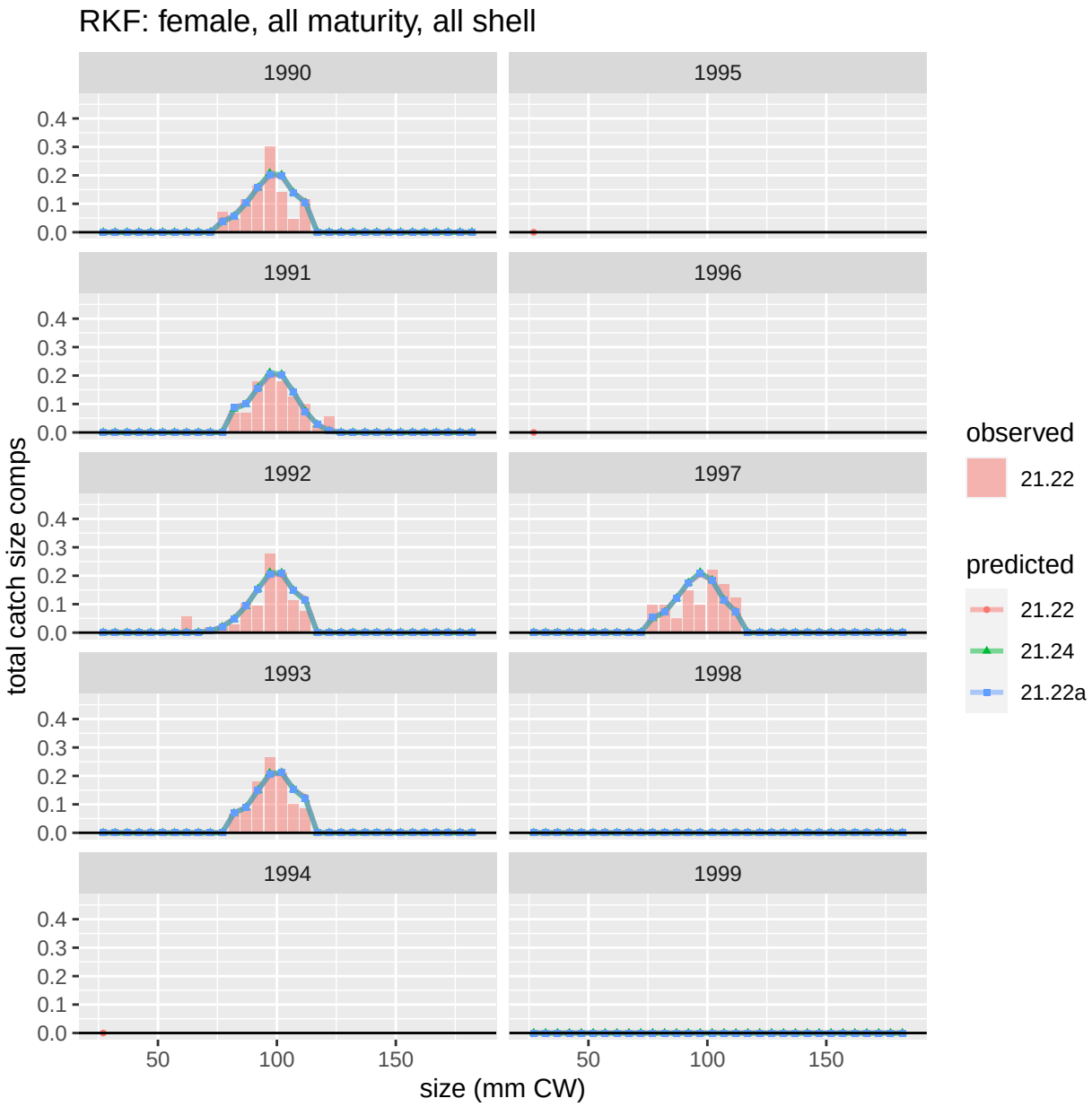

Figure 59: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 1 of 4.

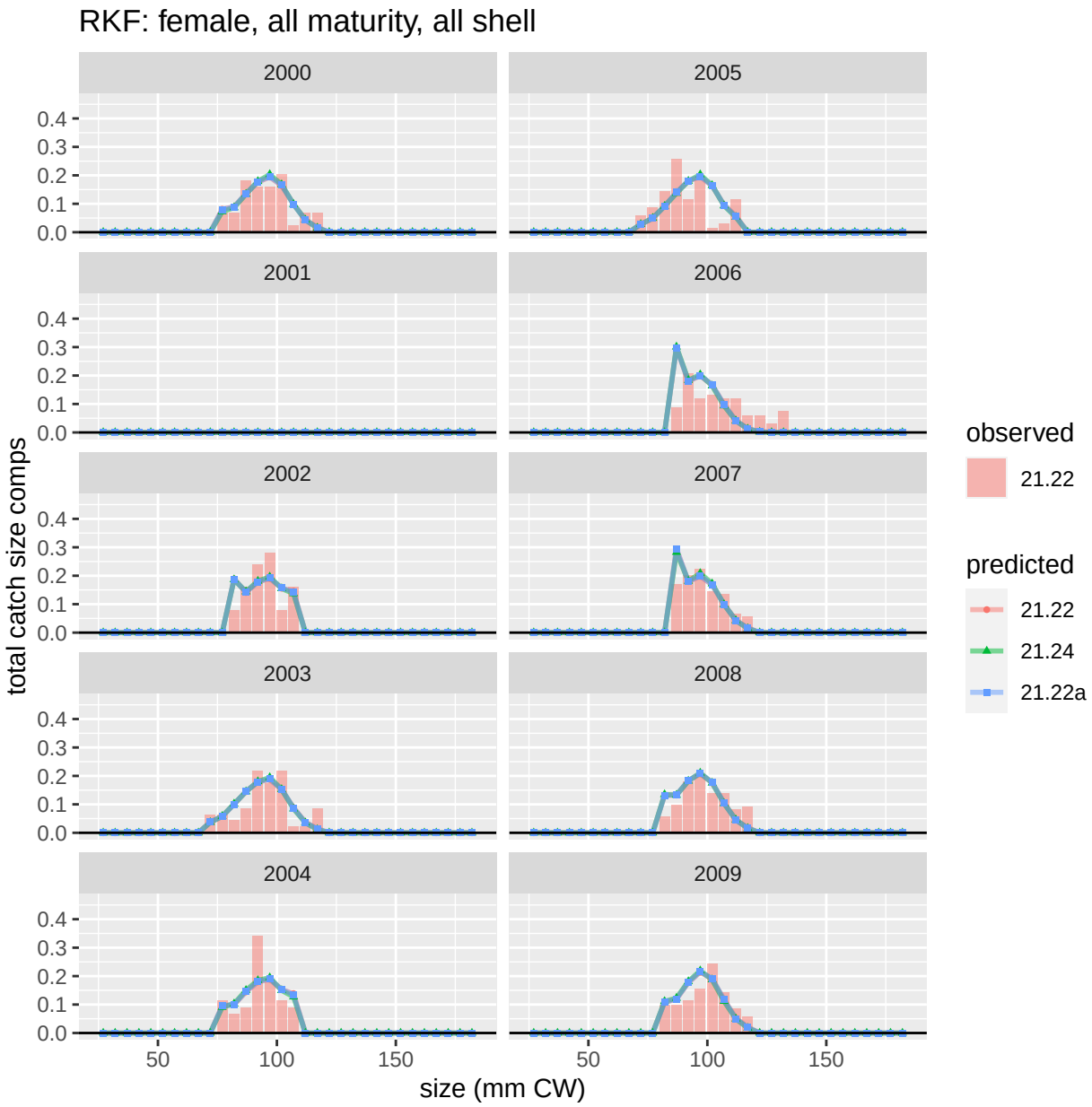

Figure 60: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 2 of 4.

Figure 61: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 3 of 4.

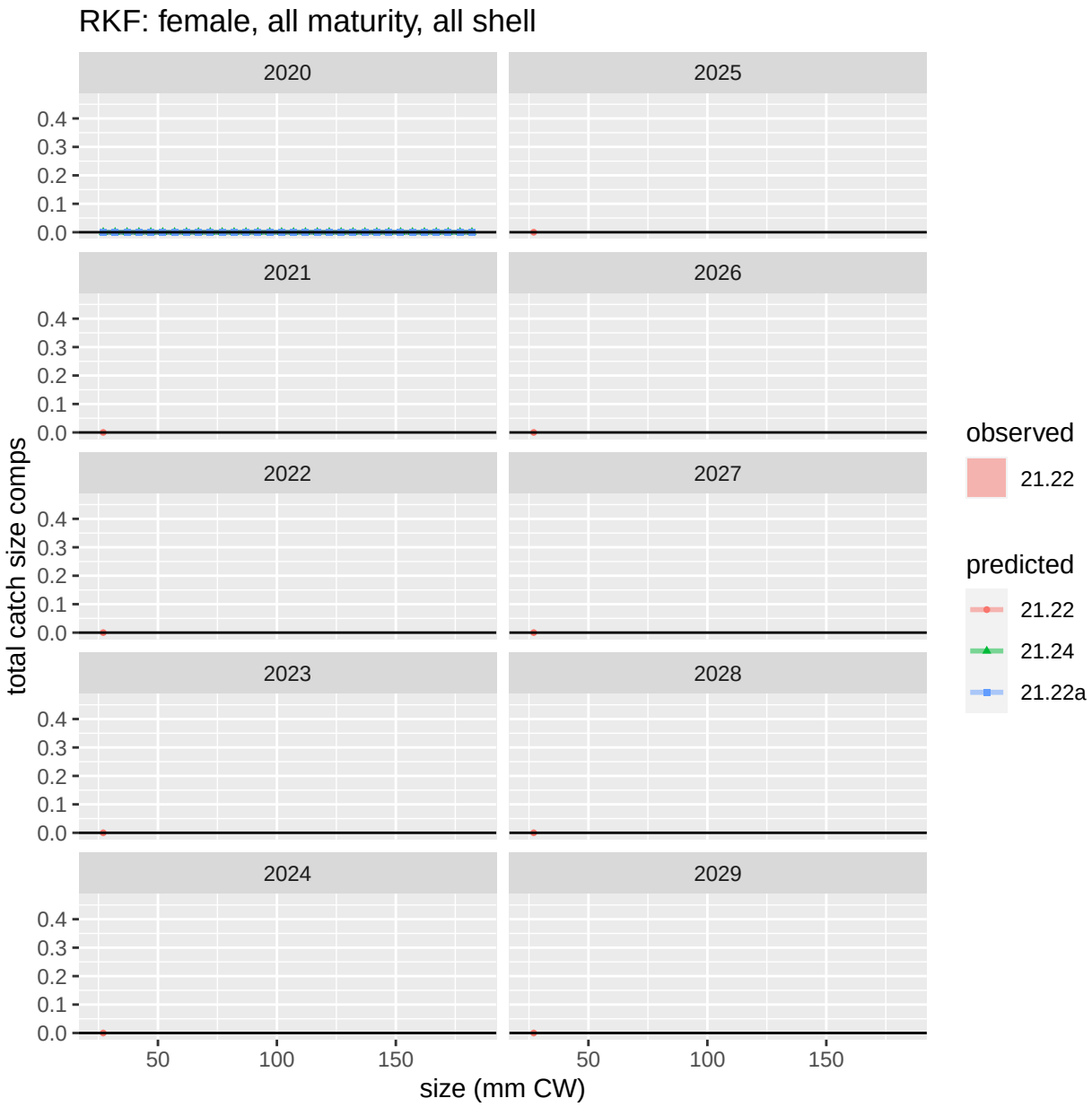

Figure 62: Comparison of observed and predicted female, all maturity, all shell total catch size comps for RKF. Page 4 of 4.

Appendix J:
Further Effects of Missing Surveys

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September 2021

Introduction

In the model scenarios initially considered for the 2021 stock assessment (20.07u, 21.22, 21.24), the ln-scale deviation from median recruitment to the Tanner crab stock in 2020 was estimated at its lower bound of -5 (implying a multiplicative reduction from the median by a factor 150). This was rather unexpected because it was the only recruitment parameter hitting the lower bound, it was unprecedented in terms of previous assessments, and because results from the 2021 NMFS EBS shelf survey (area-swept estimates of stock biomass and size compositions) were included in the model fits and should have been somewhat informative regarding recruitment the previous year. Model code and input files were thoroughly checked to make sure this was not related to a coding or data entry mistake; no problems were identified with the code or the input files. This appendix briefly reports results from a short simulation study that addresses the response of the stock assessment model to the sequential addition of subsequent survey data following a missing survey, as occurred when the 2020 NMFS EBS shelf survey was canceled.

Methods

Model scenario 21.22 was used to consider the "downstream" effects of a missing survey on the assessment as additional surveys are added in subsequent years. First, data for the missing 2020 survey was filled in by simply duplicating the 2021 survey data so that the same data values were being fit for the 2020 and 2021 surveys. Then, the model was run in a retrospective fashion where each "peel" (0 to 5) involved dropping the survey data in the year 2021-"peel" to simulate the addition of a new year of data to the time series. Estimates of recruitment and mature biomass were examined for effects.

Results

The results of the simulation study are presented in Figure 1. When the survey is missing in the year of the assessment (peel = 0), the estimated recruitment deviation is 0 (if that is where the parameter was initialized) and estimated recruitment goes to the median. When the survey is missing in the year prior to the assessment (as it is this year, peel = 1), the estimated recruitment deviation for the year corresponding to the missing survey goes to the bound. As more data is added after the missing survey, the effect becomes smaller, but the estimated deviation is always biased low compared with the 'true" value obtained when no surveys are missing (the "all" case).

Discussion

The results of this study suggest the effects of the missing 2020 survey may be evident in Tanner crab assessment results for several years, although with diminishing effects. It is unknown how much these results depend on the current survey size composition (Figure 2), which suggests that recruitment in 2020 was probably small but not miniscule, given the 2021 proportions in the 40-50 mm CW range.

In retrospect, a better approach may have been to postulate a missing survey in 2010, say, and evaluate the effects of adding subsequent surveys in a “prospective” manner rather than the retrospective approach used here.

Figures

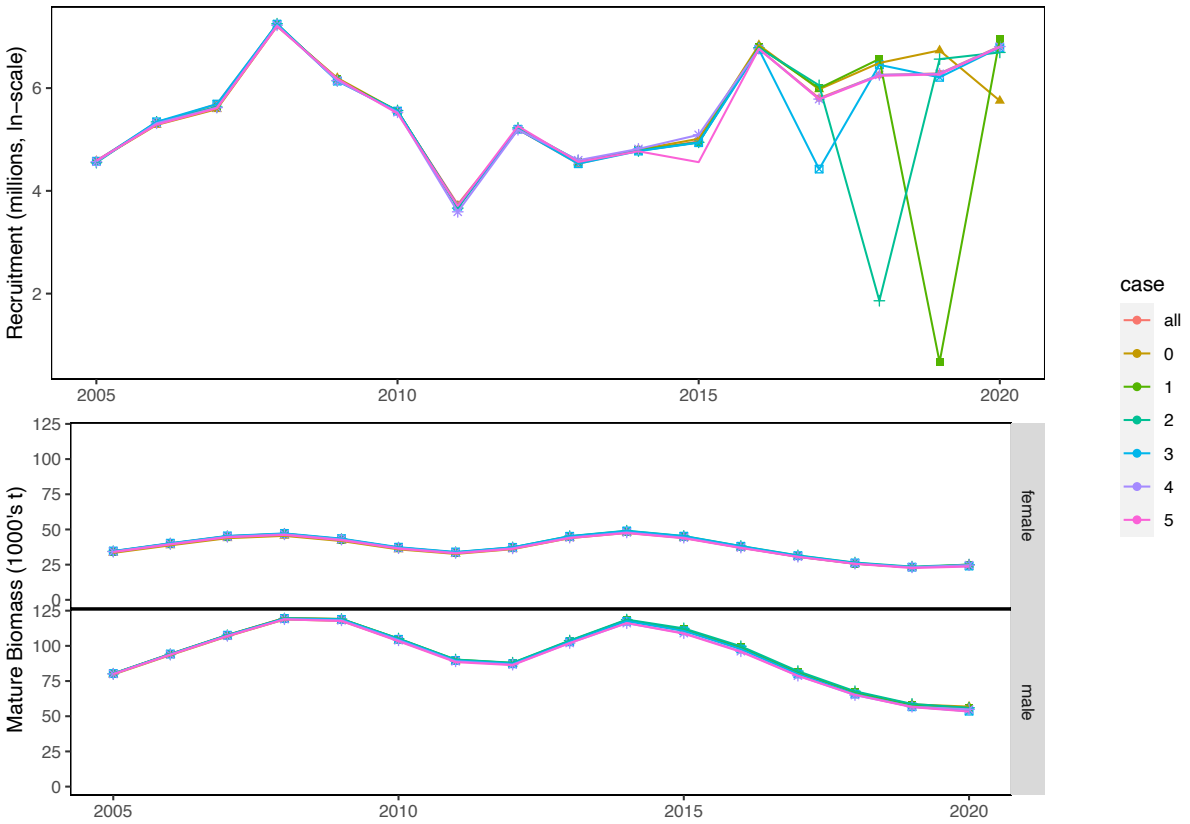

Figure 1. Results of the simulation study. “all” denotes the model run with all data. Numbers denote “peels”, with the survey data missing for survey year 2021-peel.

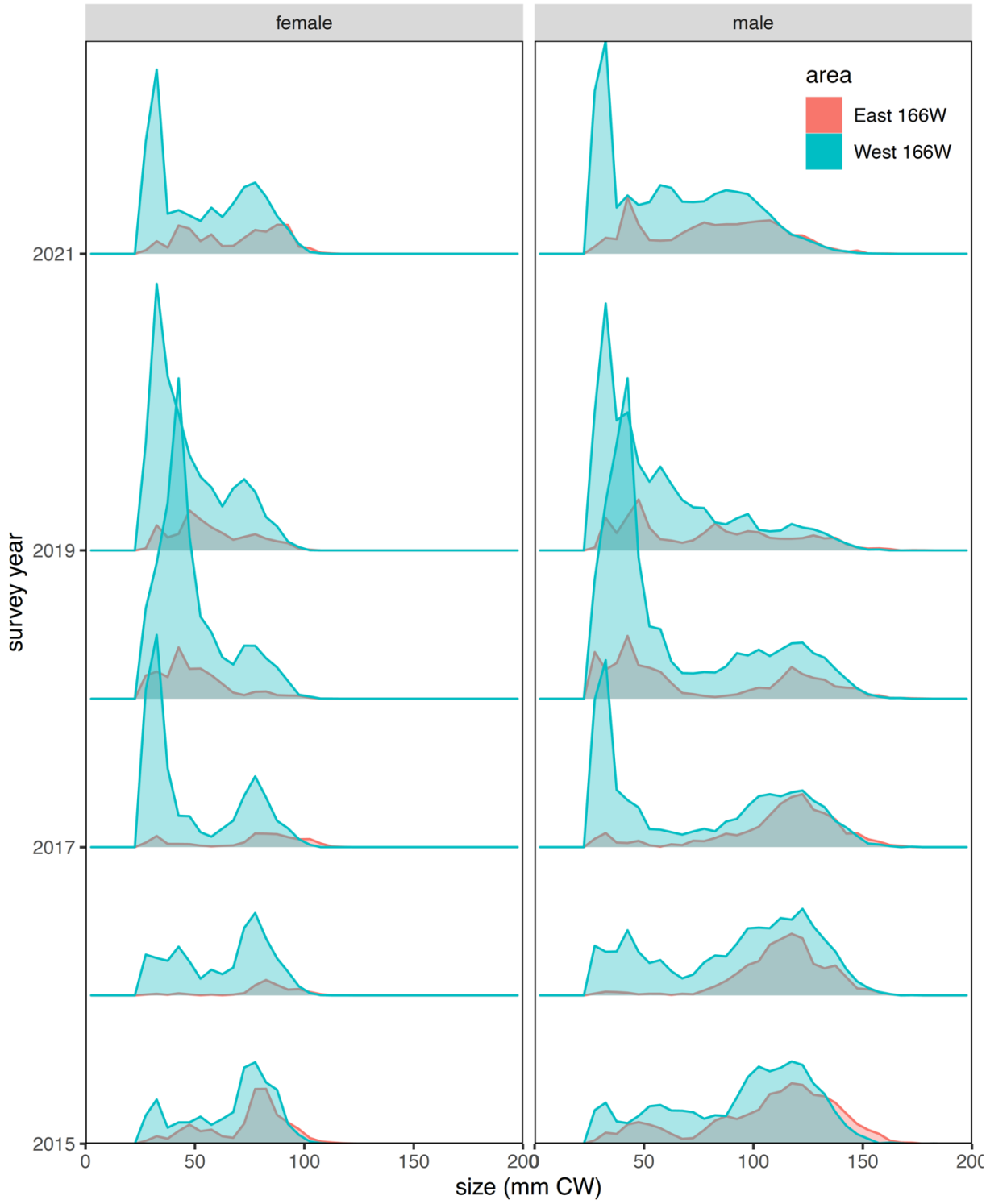

Figure 2. Recent Tanner crab size compositions from the NMFS EBS Shelf Survey. The vertical scales in the two panels are different. Note: the 2020 survey was not conducted.