Figures

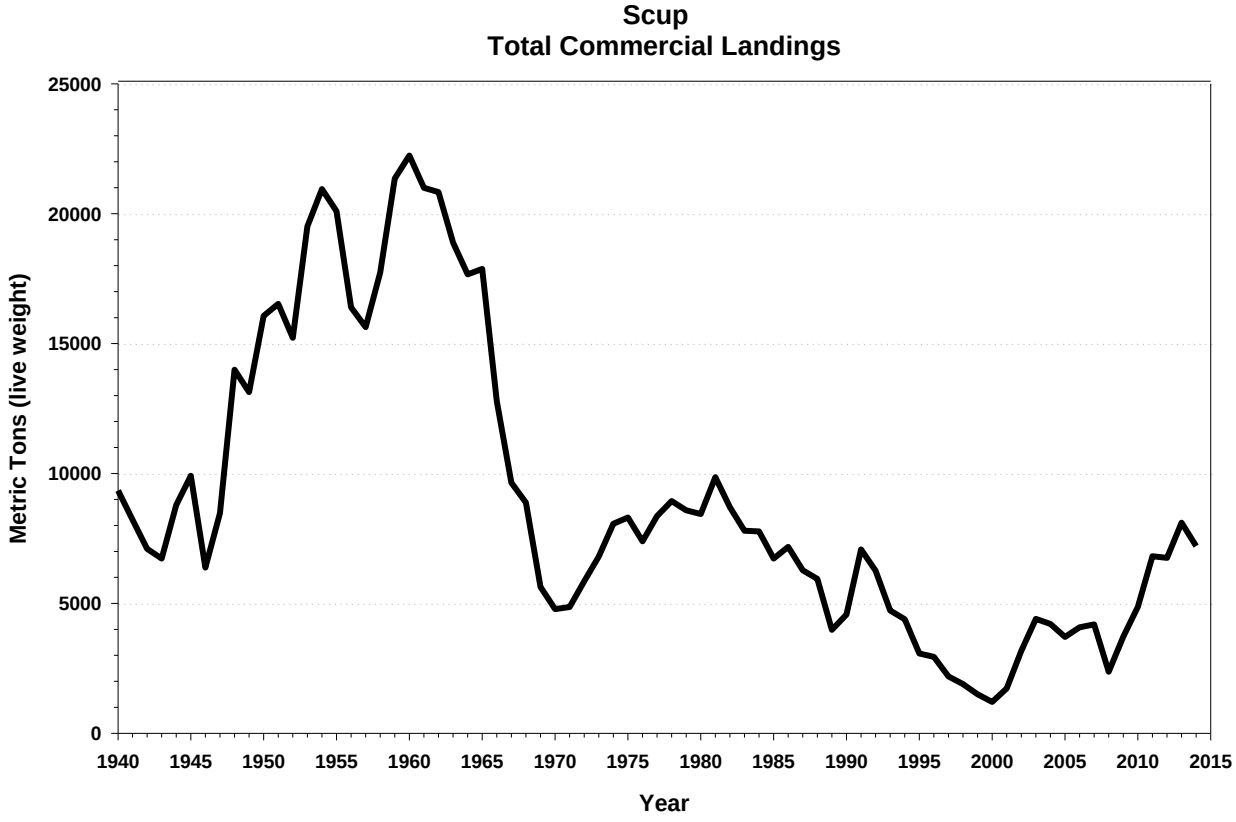

Figure A1. Total commercial fishery landings for scup.

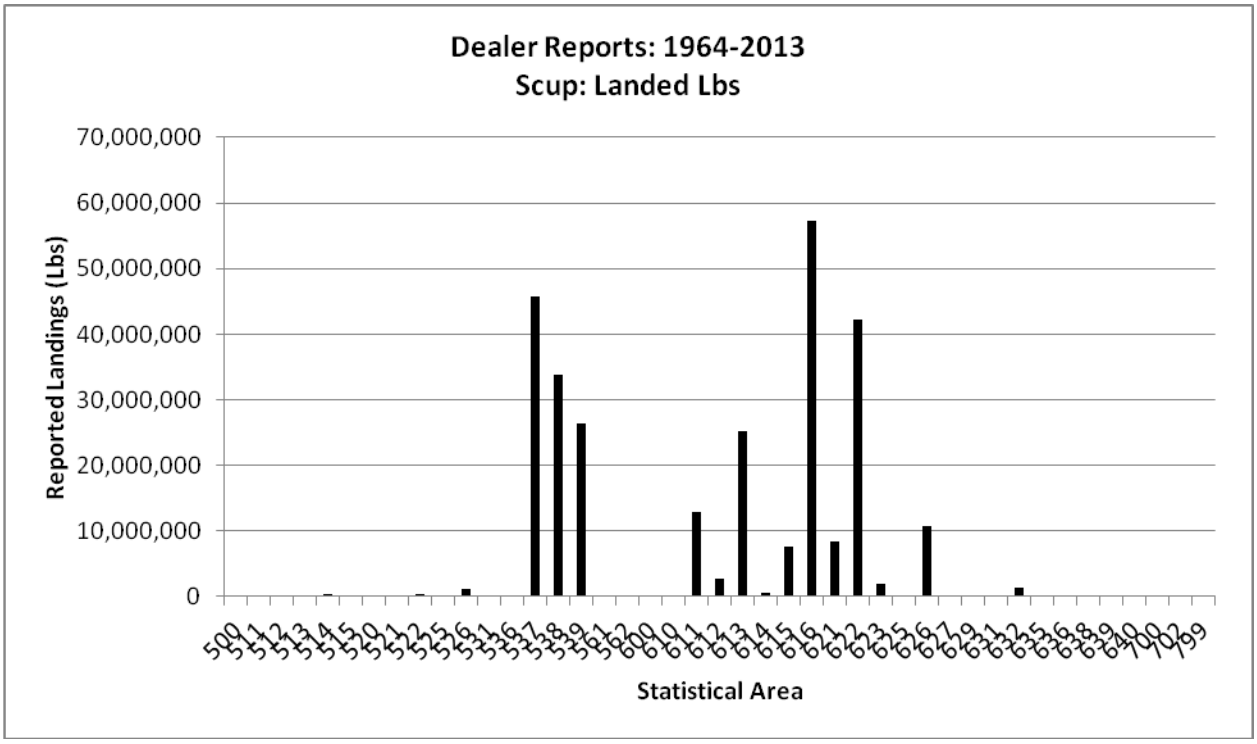

Figure A2. Commercial fishery dealer (port agent interviews before 1994; Vessel Trip Reports thereafter) reported distribution of scup landings by 3-digit statistical area.

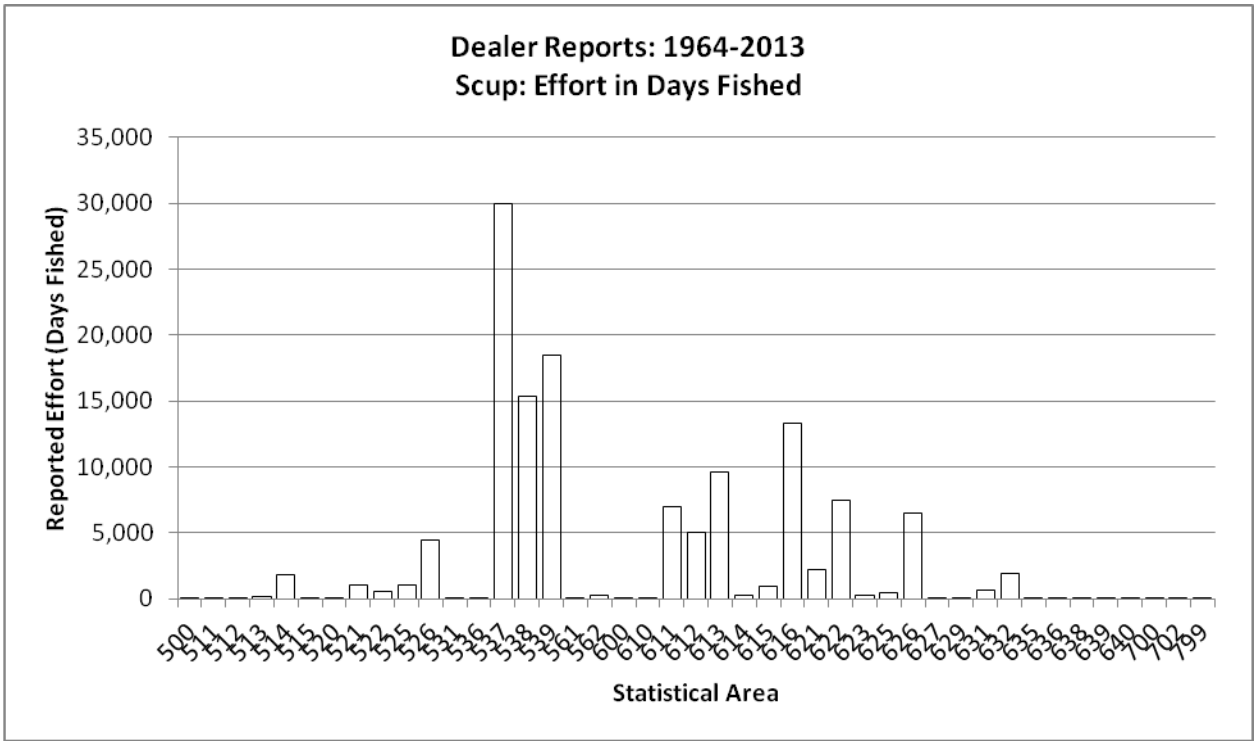

Figure A3. Commercial fishery dealer (port agent interviews before 1994; Vessel Trip Reports thereafter) reported distribution of scup fishing effort (days fished) by 3-digit statistical area.

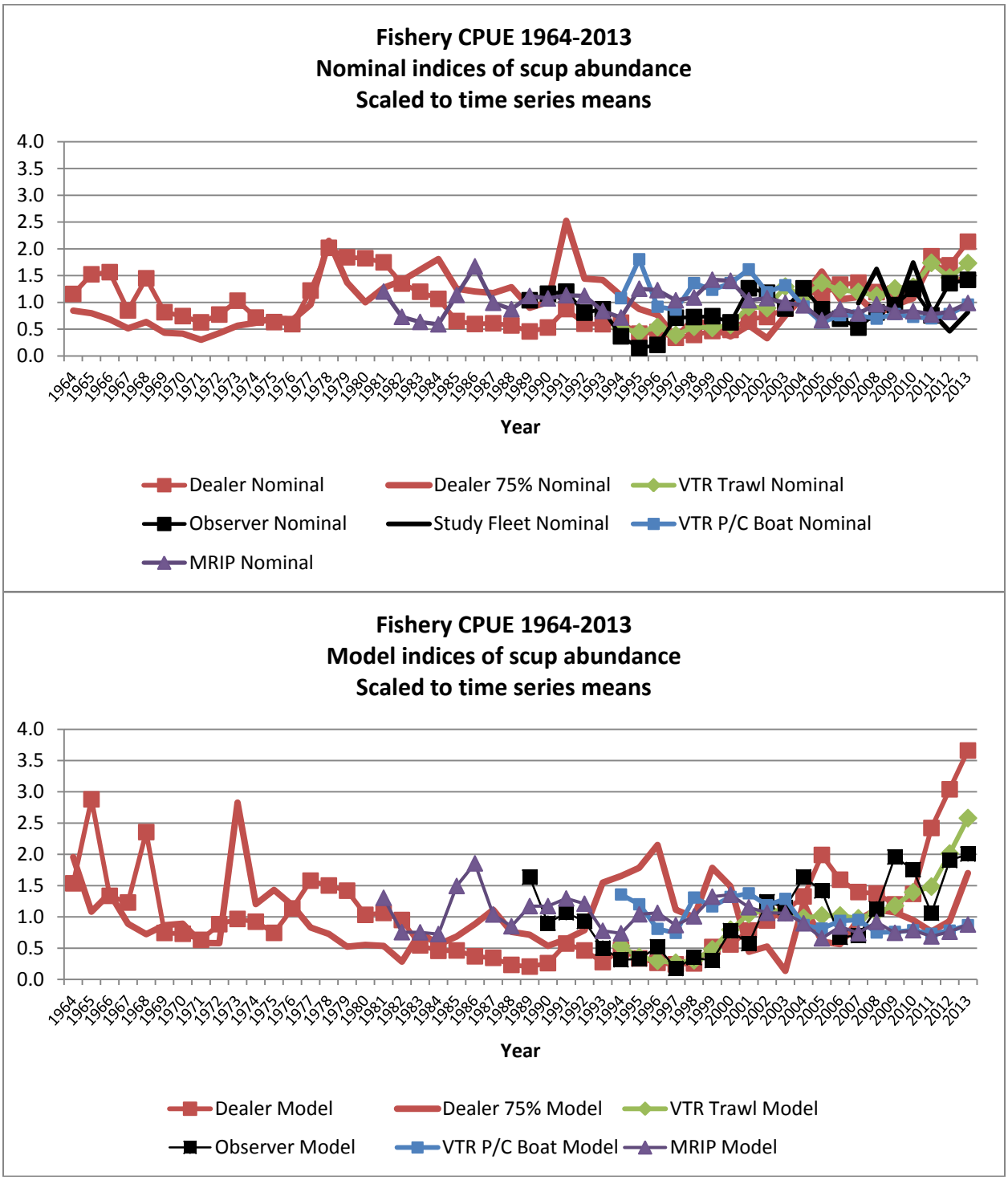

Figure A4. Fishery dependent indices of abundance for scup. Top panel are nominal (un-standardized) CPUE (total catch or landings) indices. Bottom panel are GLM standardized indices.

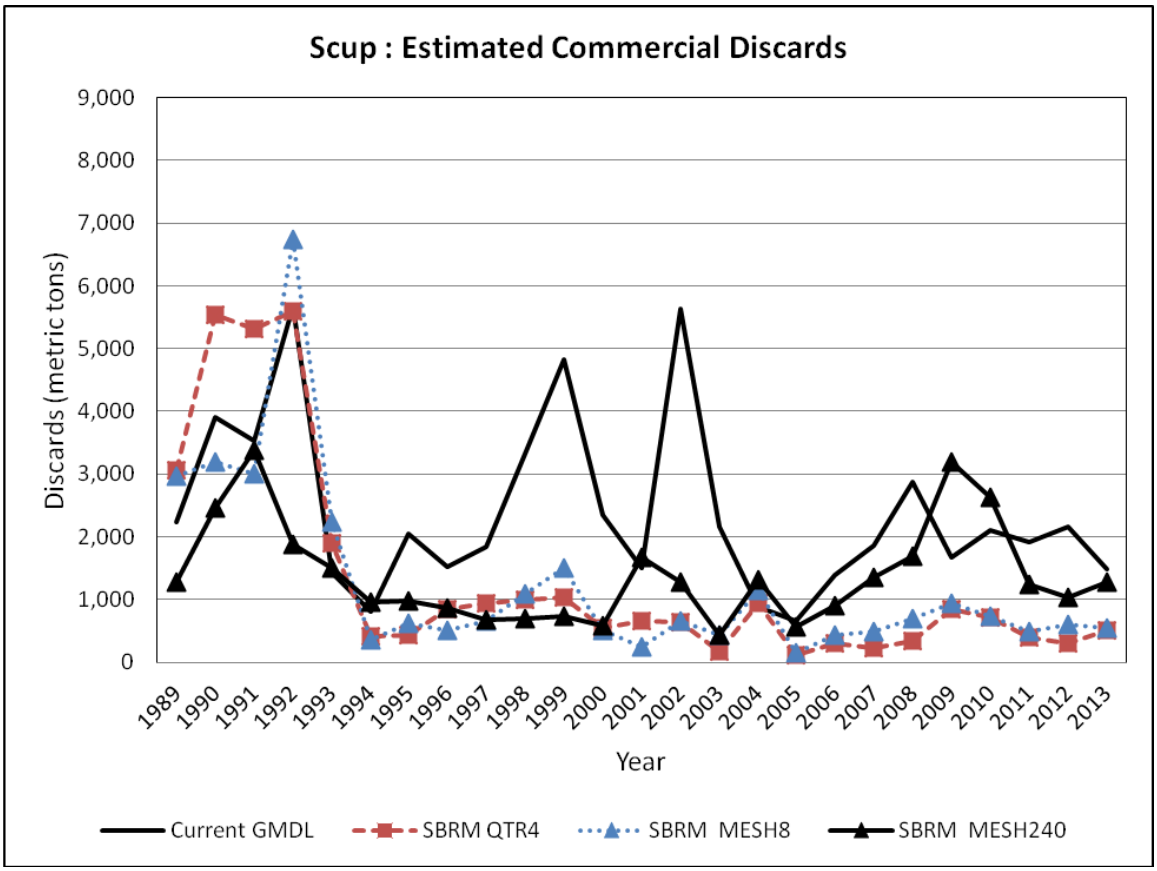

Figure A5. The three SBRM alternative estimates of discards compared with the current GMDL estimates of discards for 1989-2013.

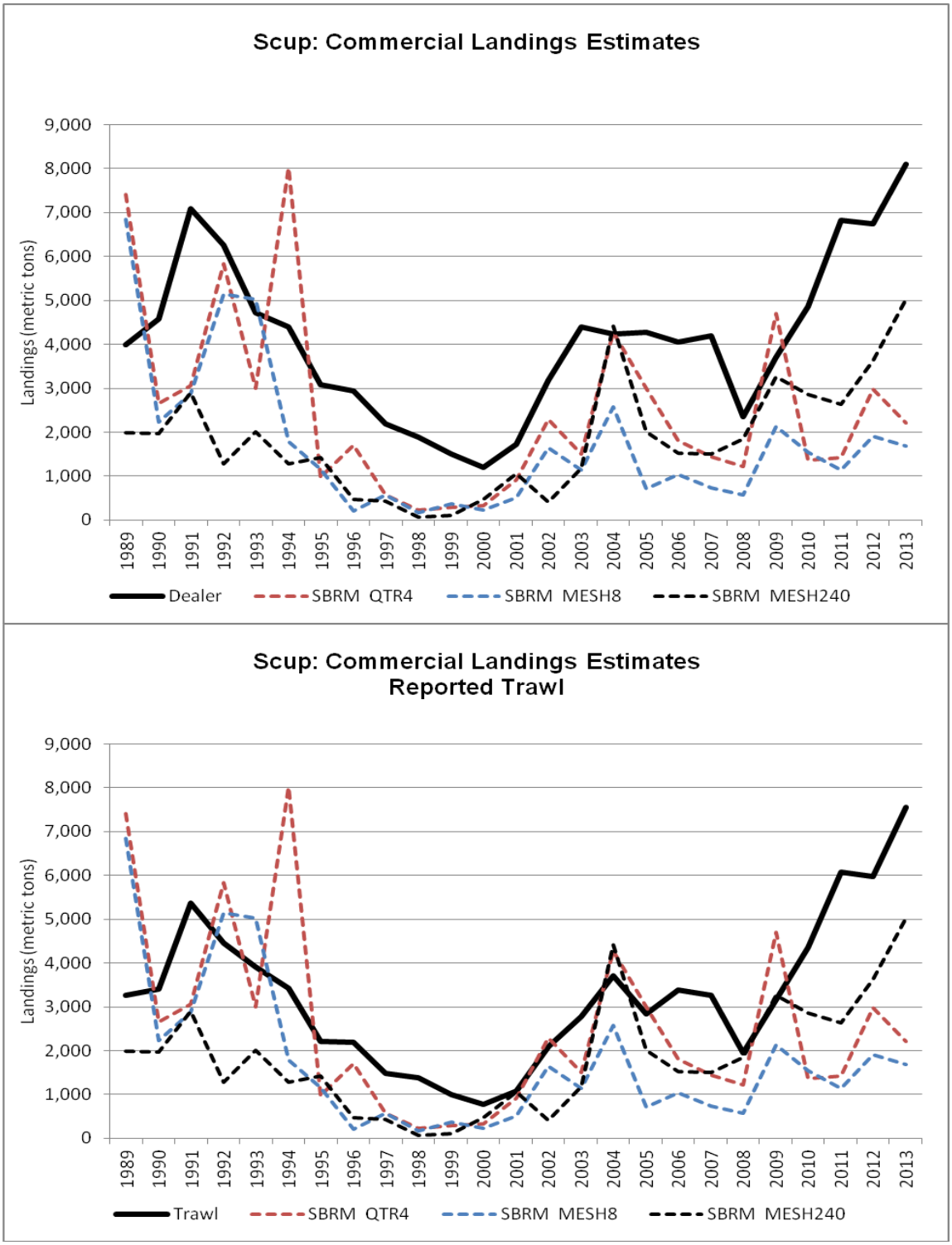

Figure A6. Top panel - the three SBRM alternative estimates of landings compared with the Dealer reported landings for 1989-2013; bottom panel - compared with the Dealer reported Trawl gear landings for 1989-2013

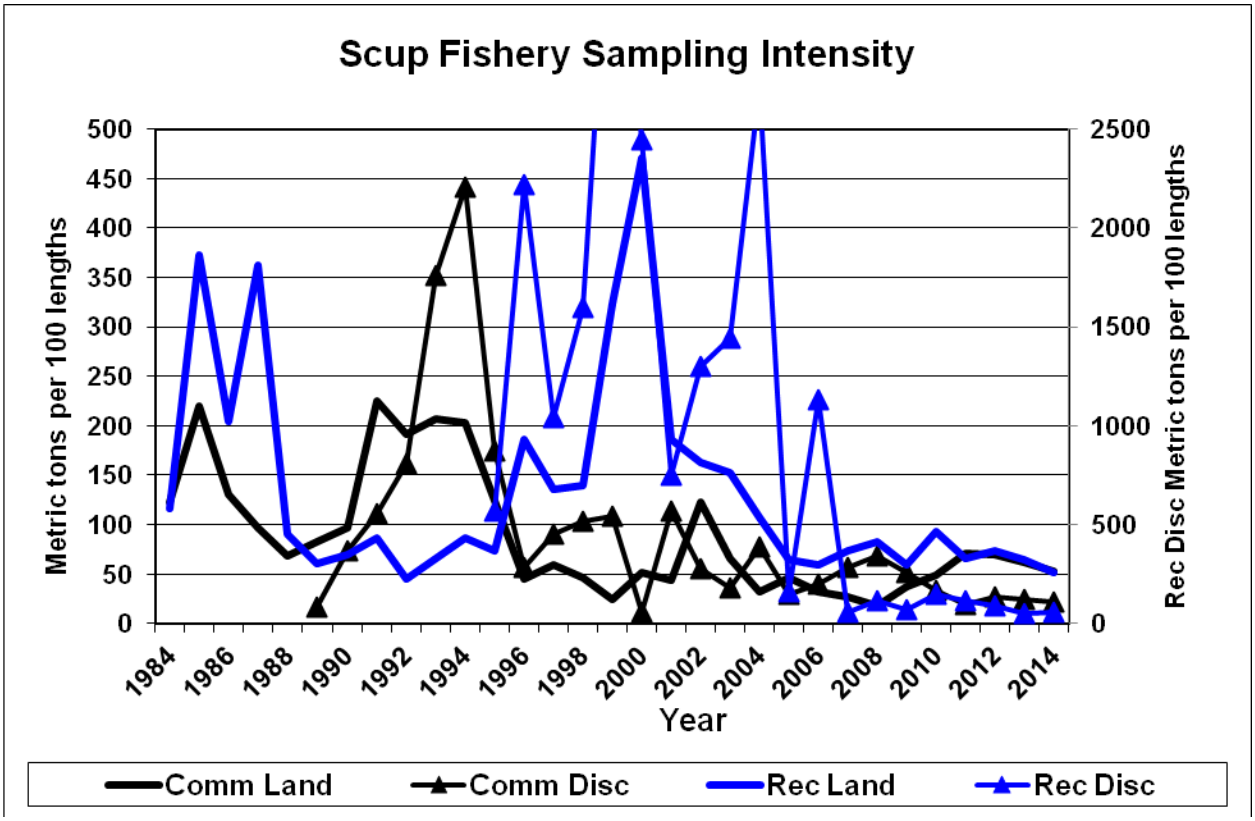

Figure A7. Summary fishery length sampling intensity expressed as metric tons of catch per 100 lengths sampled for consistency across fisheries.

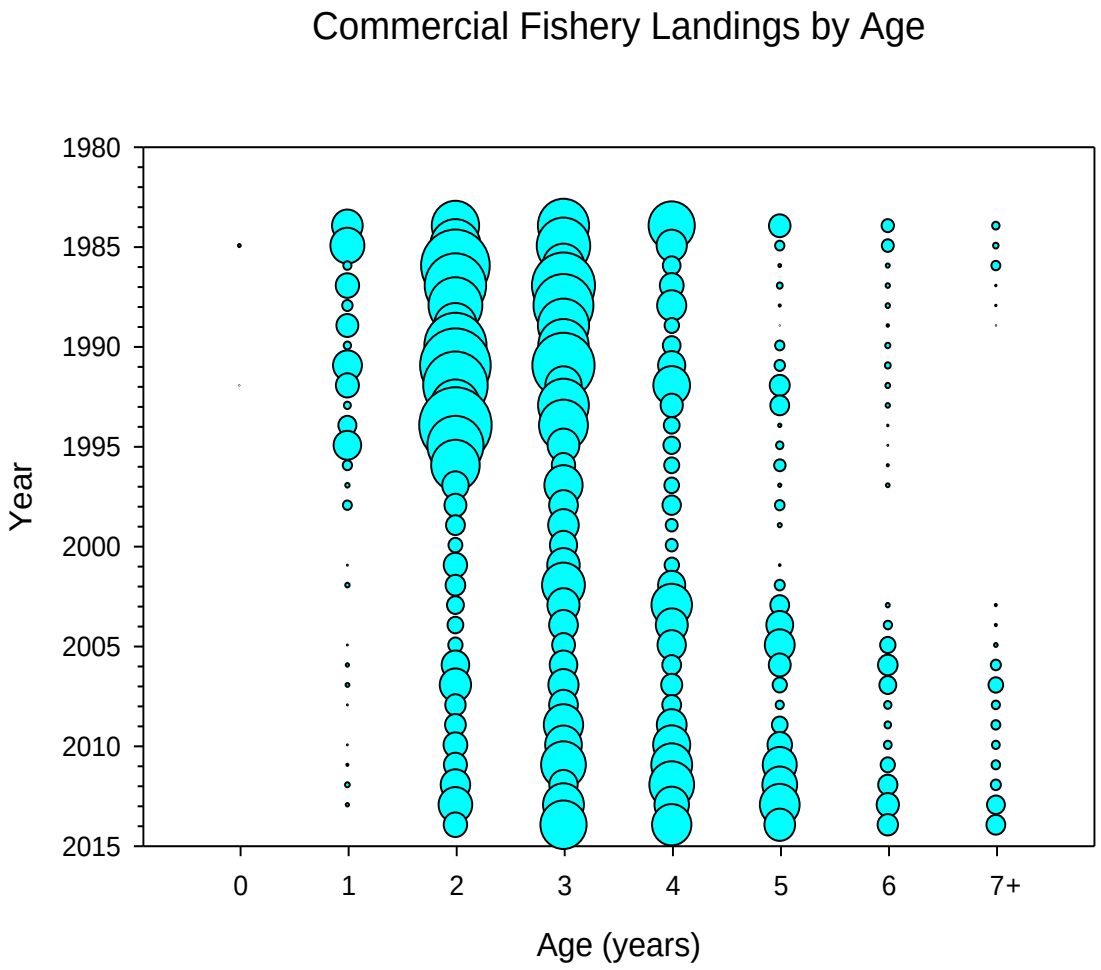

Figure A8. Commercial fishery landings by age for scup.

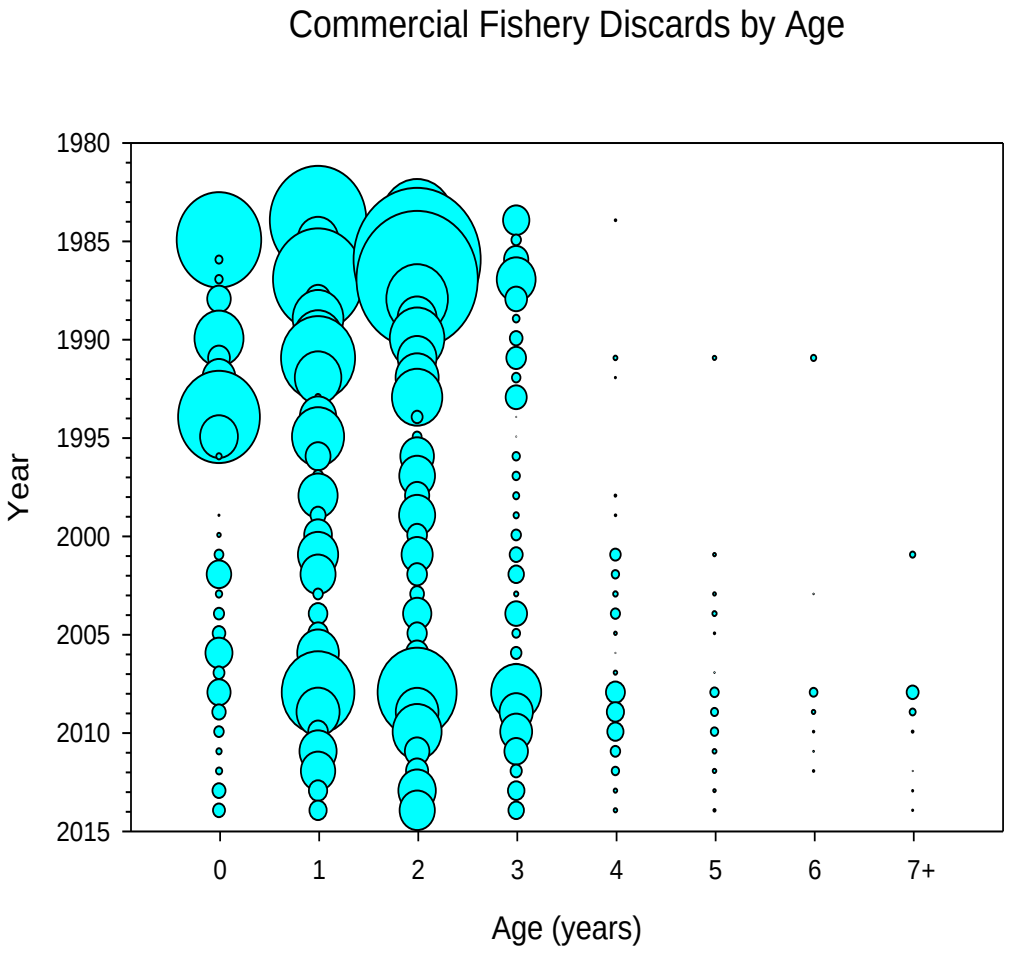

Figure A9. Commercial fishery discards by age for scup.

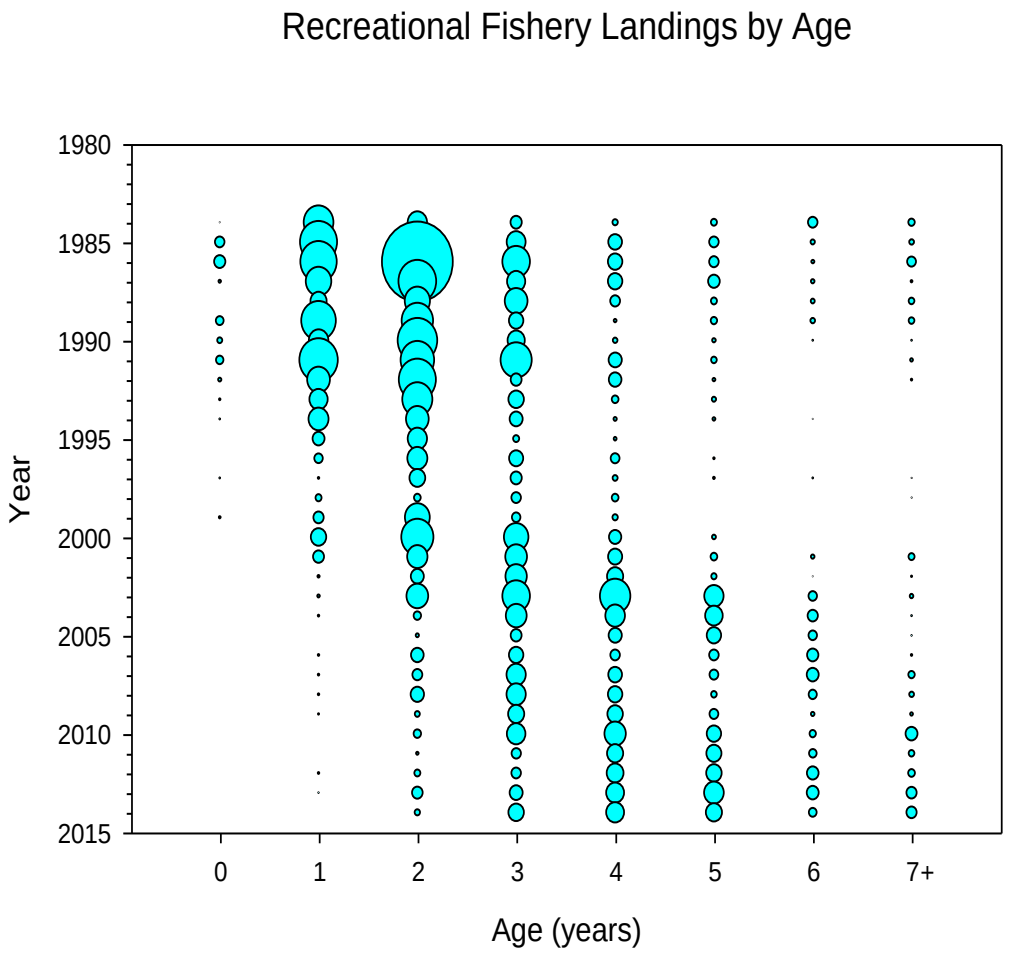

Figure A10. Recreational fishery landings by age for scup.

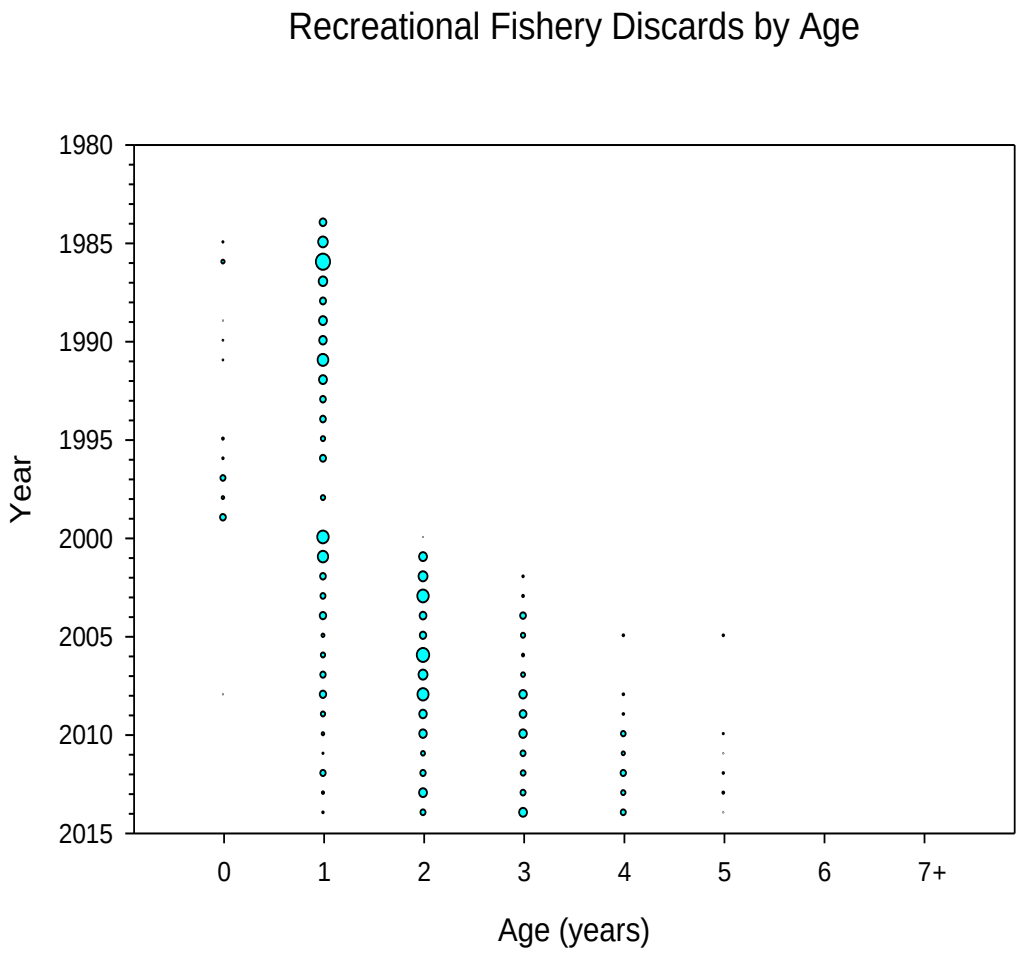

Figure A11. Recreational fishery discards by age for scup.

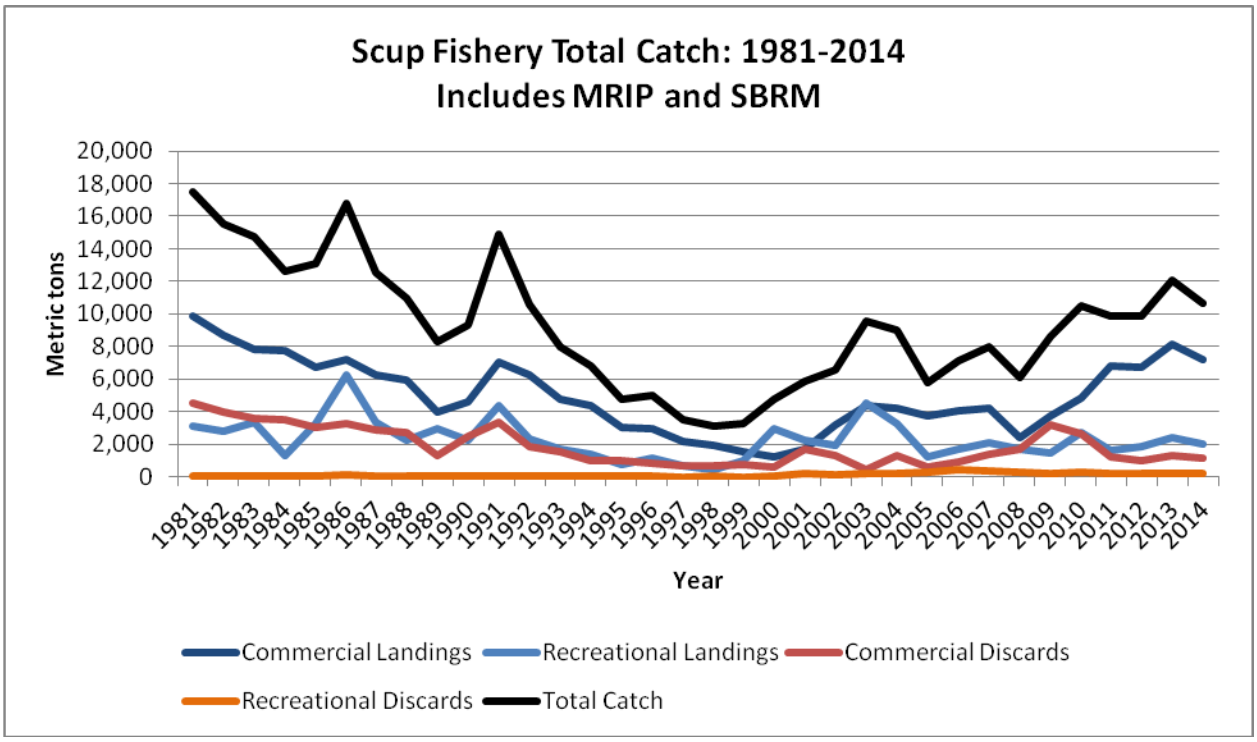

Figure A12. Scup fishery total catch. MRIP = Marine Recreational Information Program estimates of recreational catch; SBRM = Standardized Bycatch Reporting Method estimates of commercial fishery discards. Commercial landings are from Dealer reports.

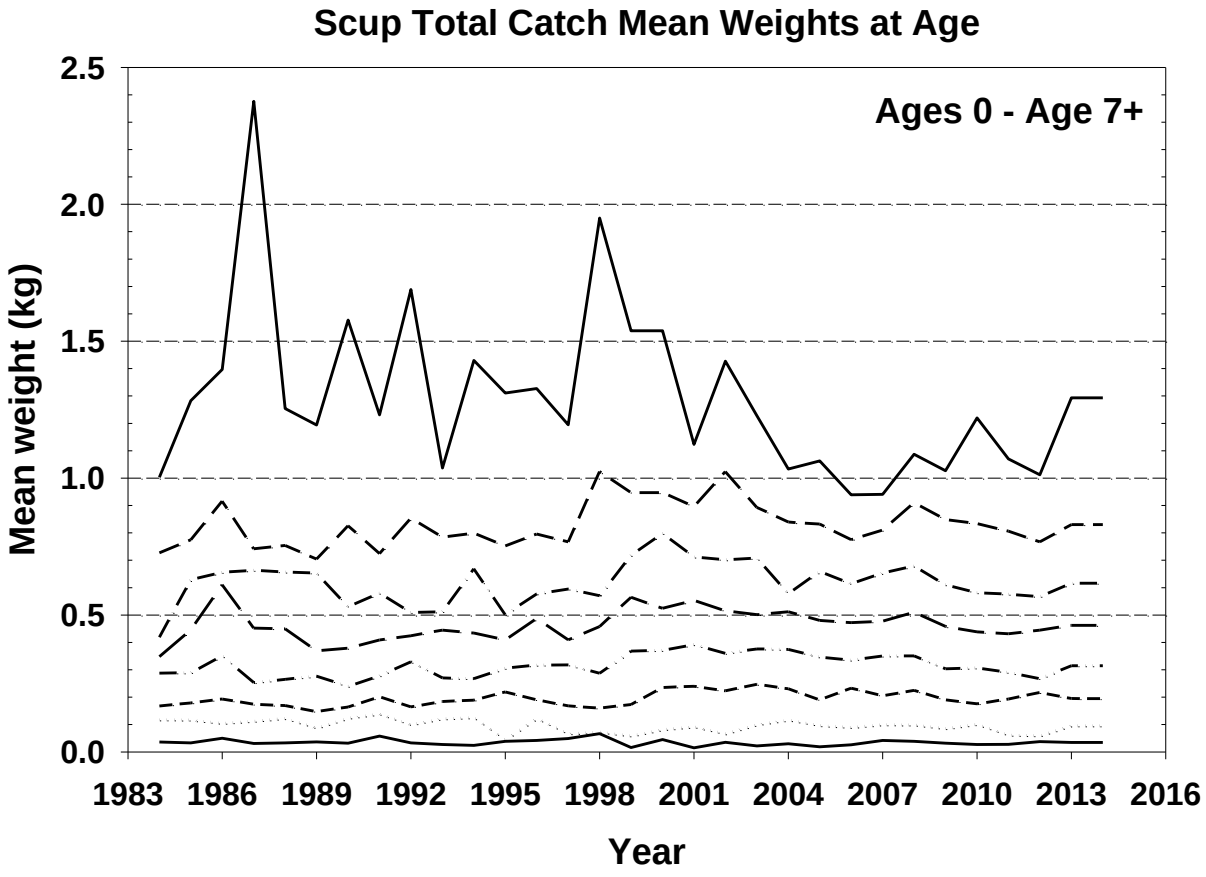

Figure A13. Scup fishery total catch mean weights at age.

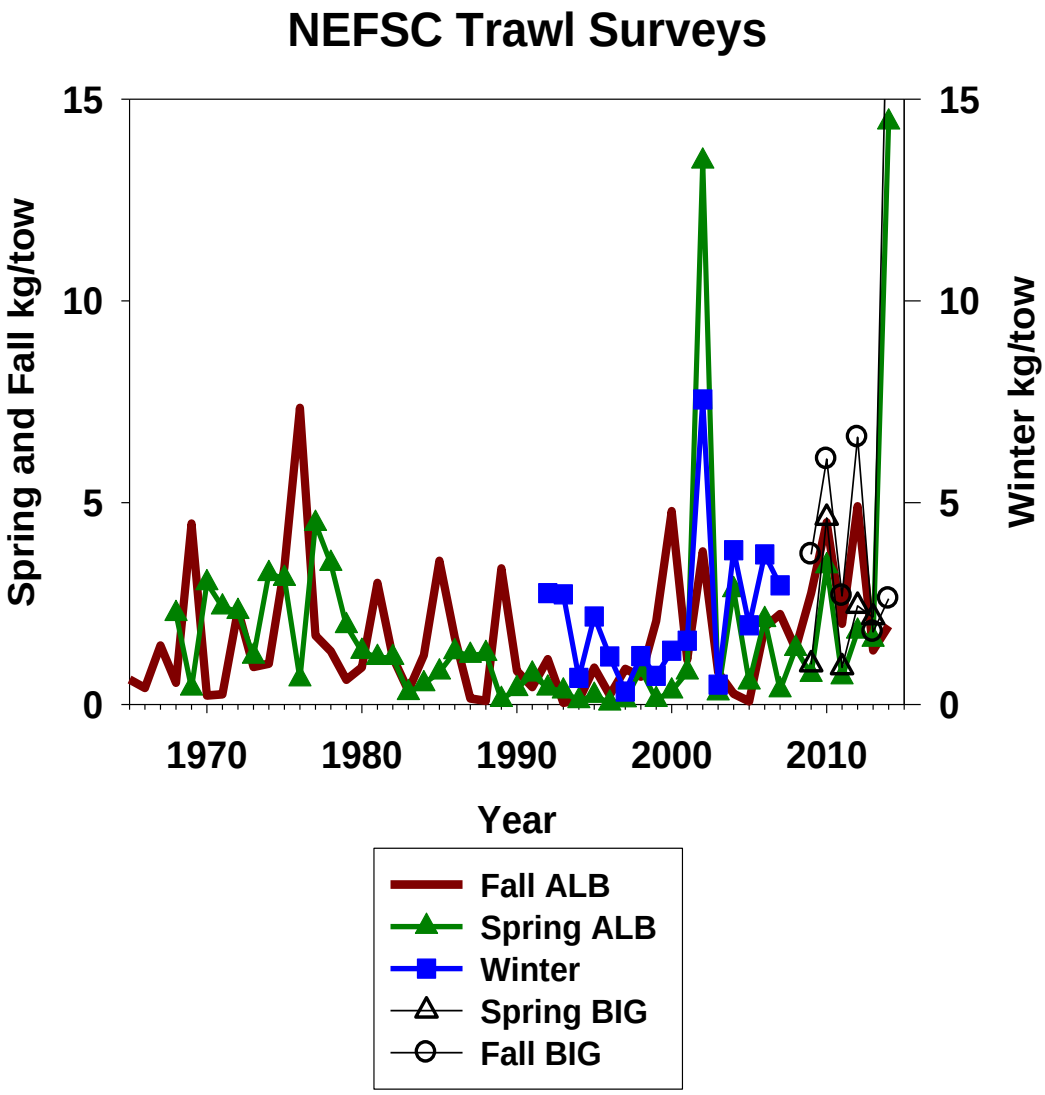

Figure A14. NEFSC winter, spring and fall biomass indices for scup, including FSV *Henry B. Bigelow* (BIG) indices and FSV *Albatross IV* (ALB) equivalents. Note spring 2014 BIG index is above the left hand y-axis scale.

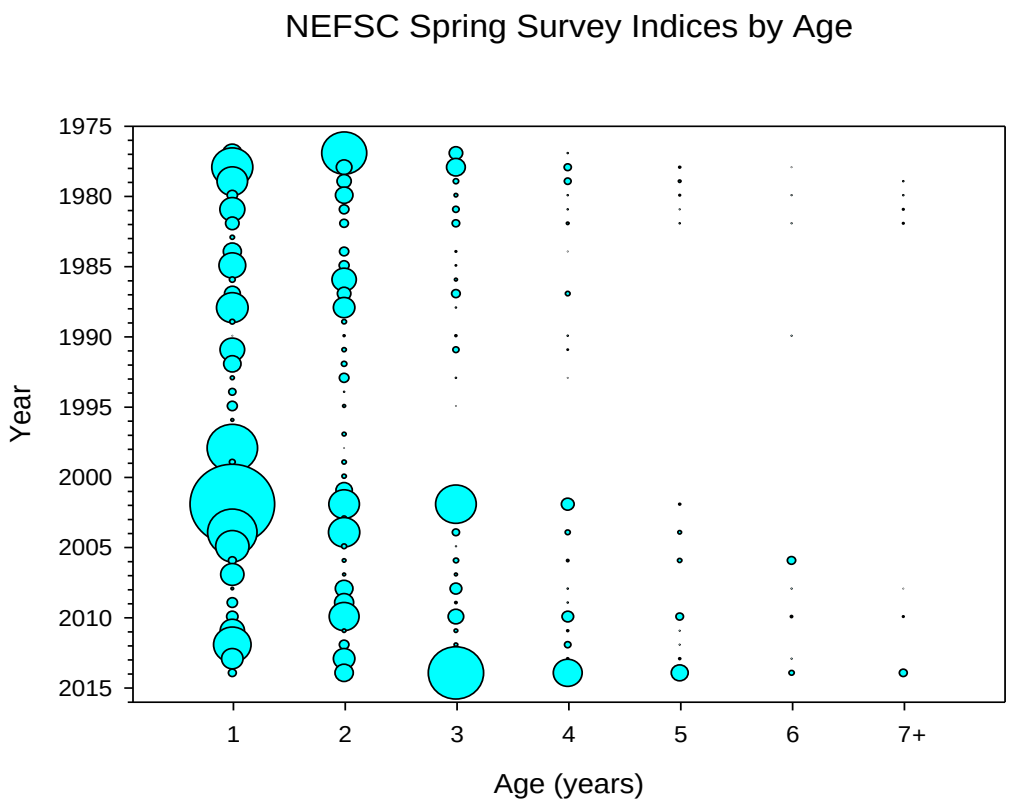

Figure A15. NEFSC spring survey indices by age for scup.

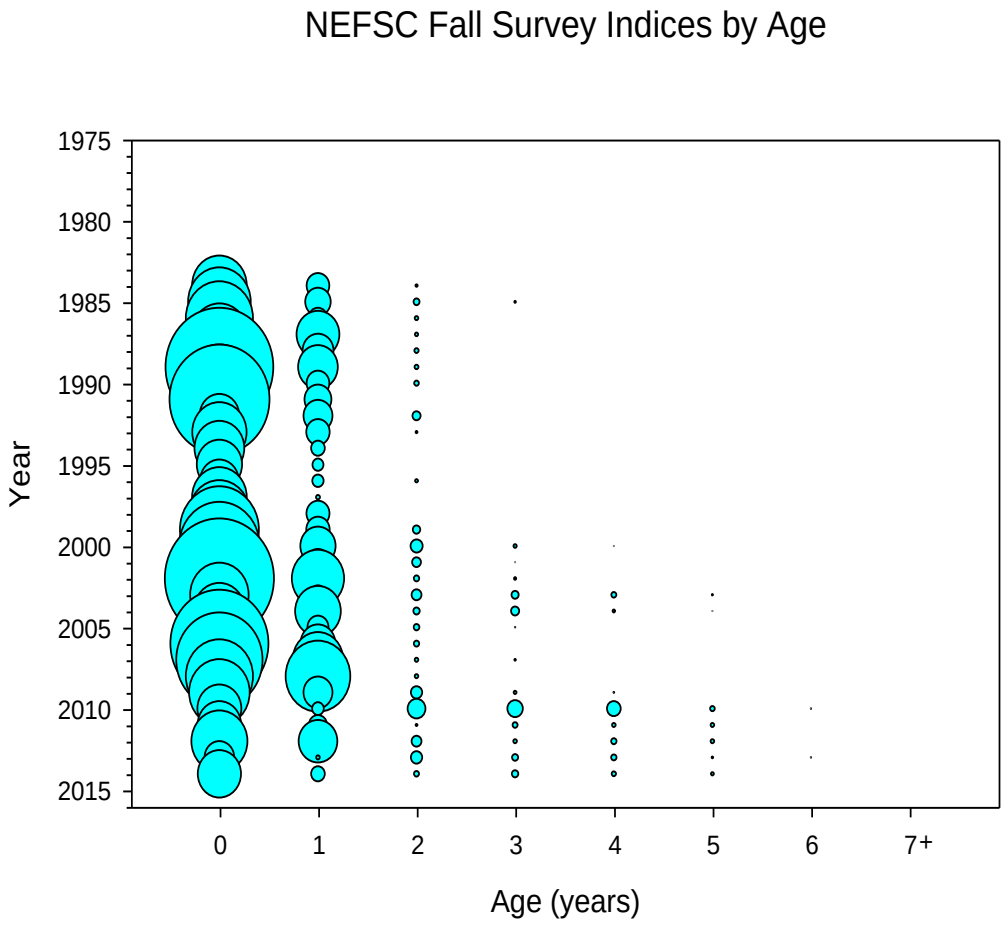

Figure A16. NEFSC fall survey indices by age for scup.

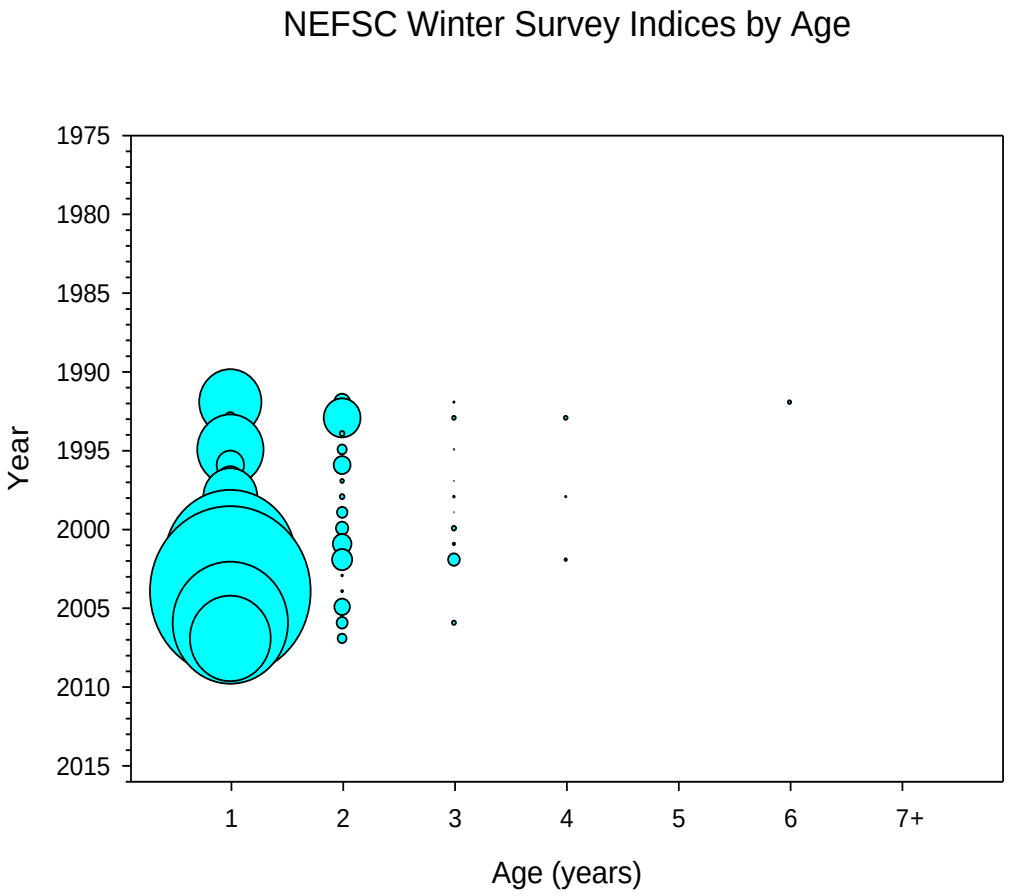

Figure A17. NEFSC winter survey indices by age for scup.

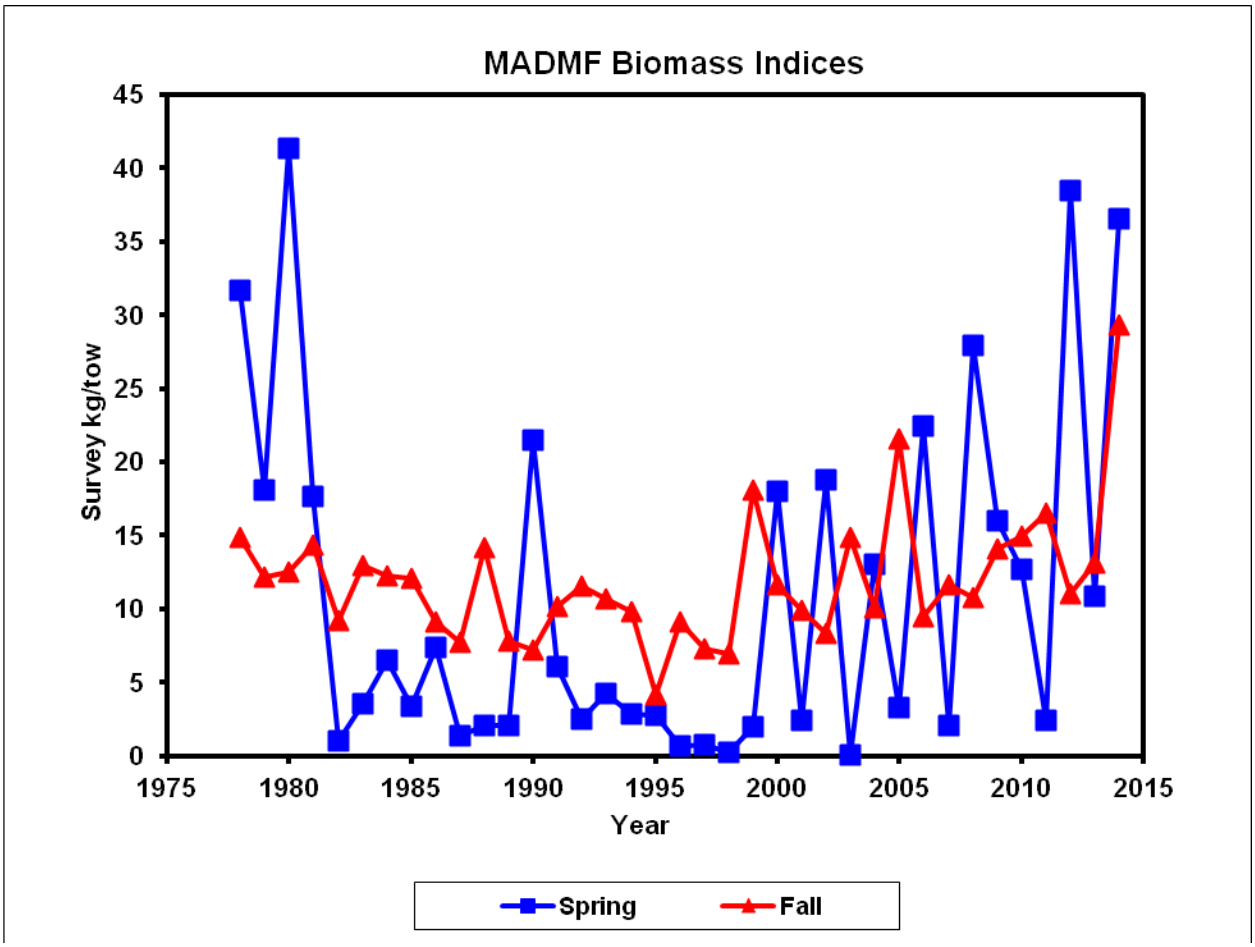

Figure A18. MADMF spring and fall survey aggregate biomass indices.

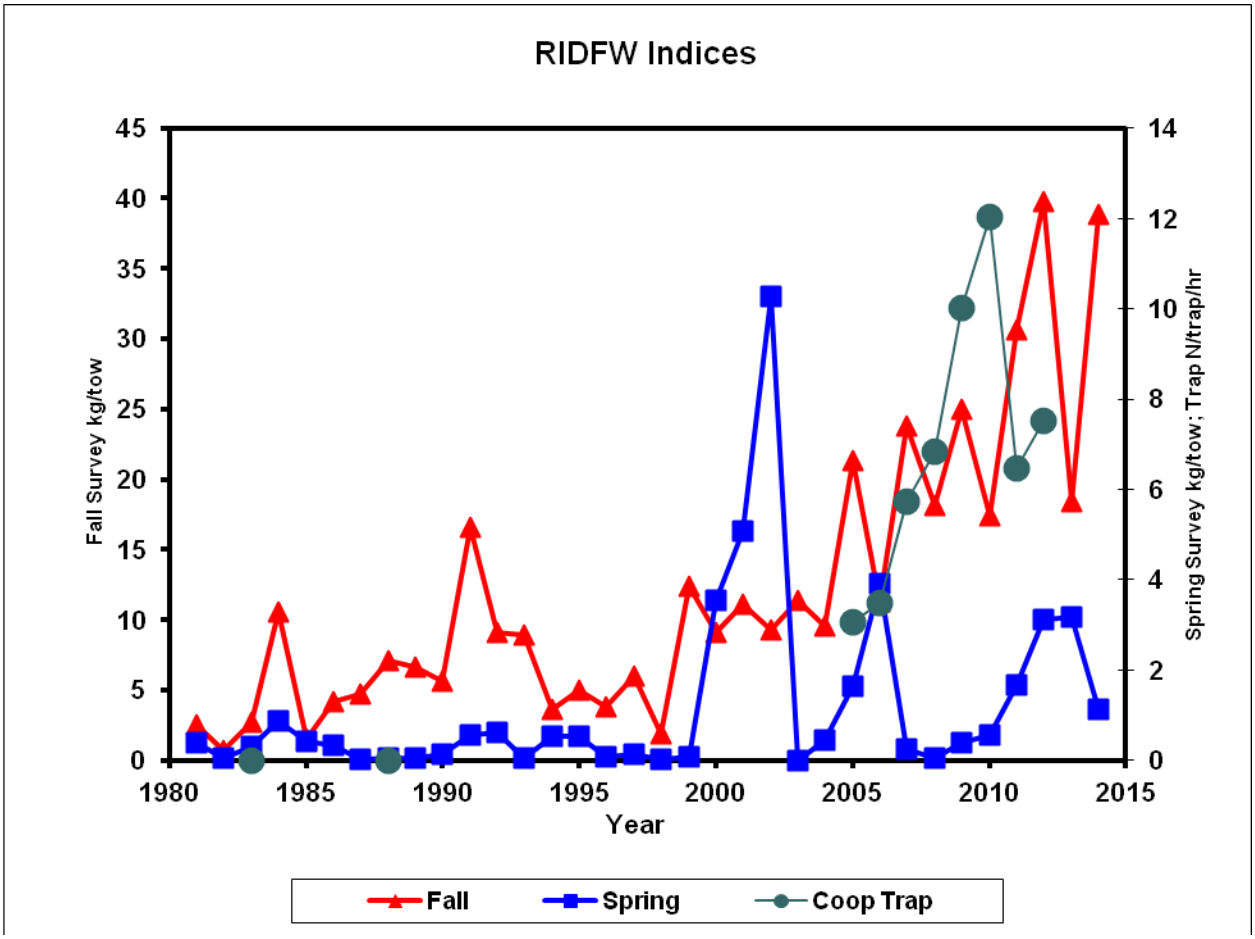

Figure A19. RIDFW spring and fall survey aggregate biomass indices.

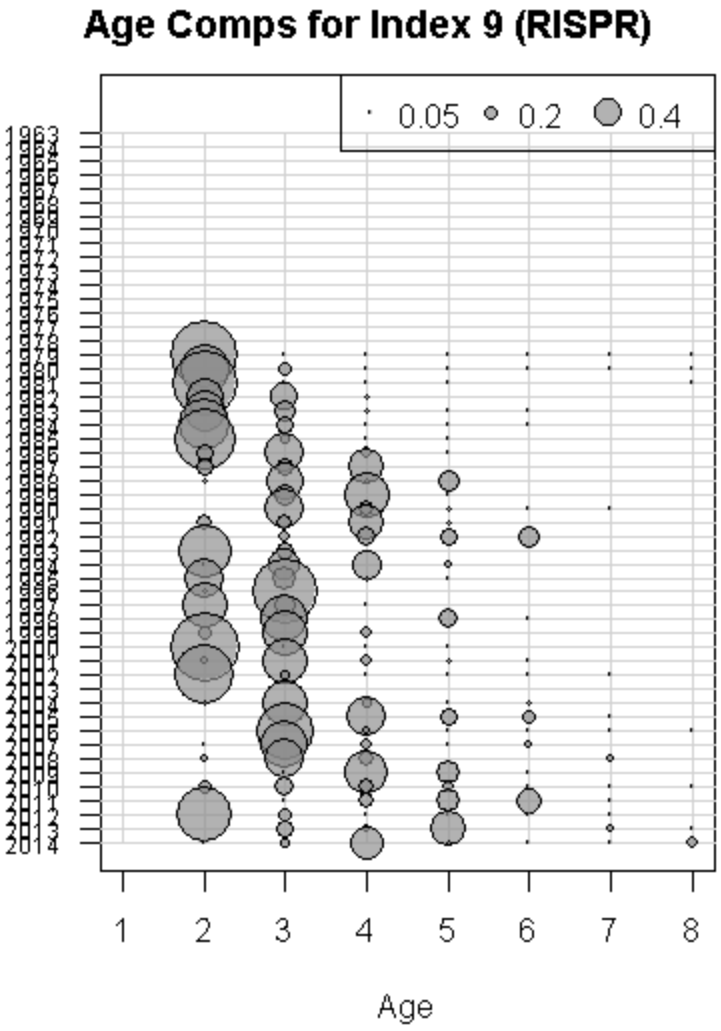

Figure A20. RIDFW spring survey indices by age for scup (plotted age 2 is true age 1, etc.).

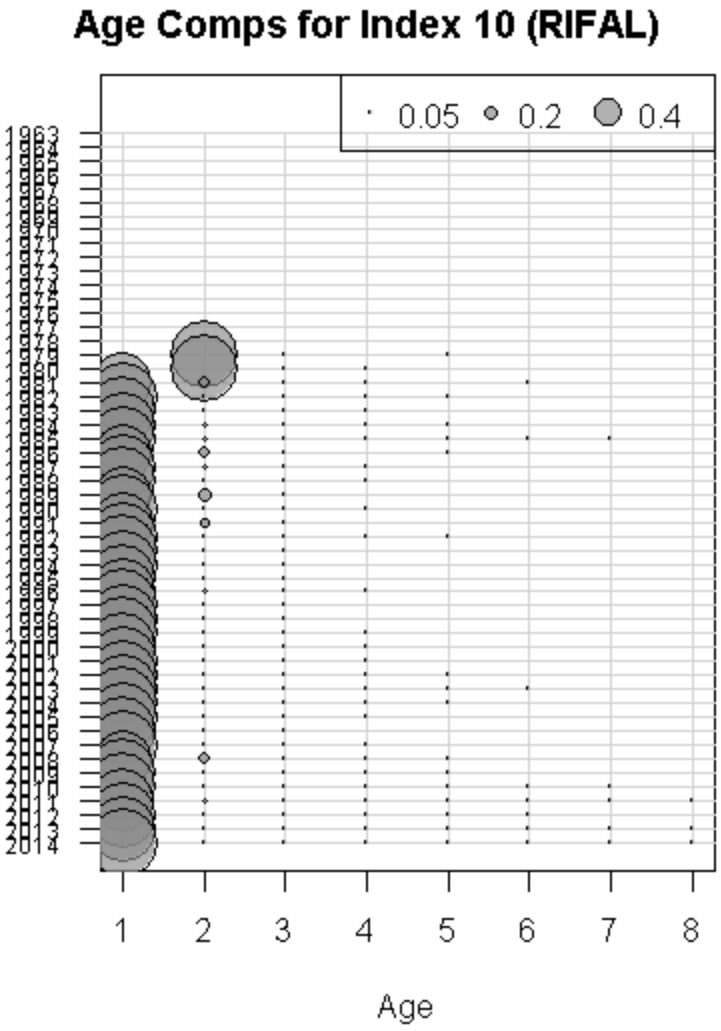

Figure A21. RIDFW fall survey indices by age for scup (plotted age 1 is true age 0, etc).

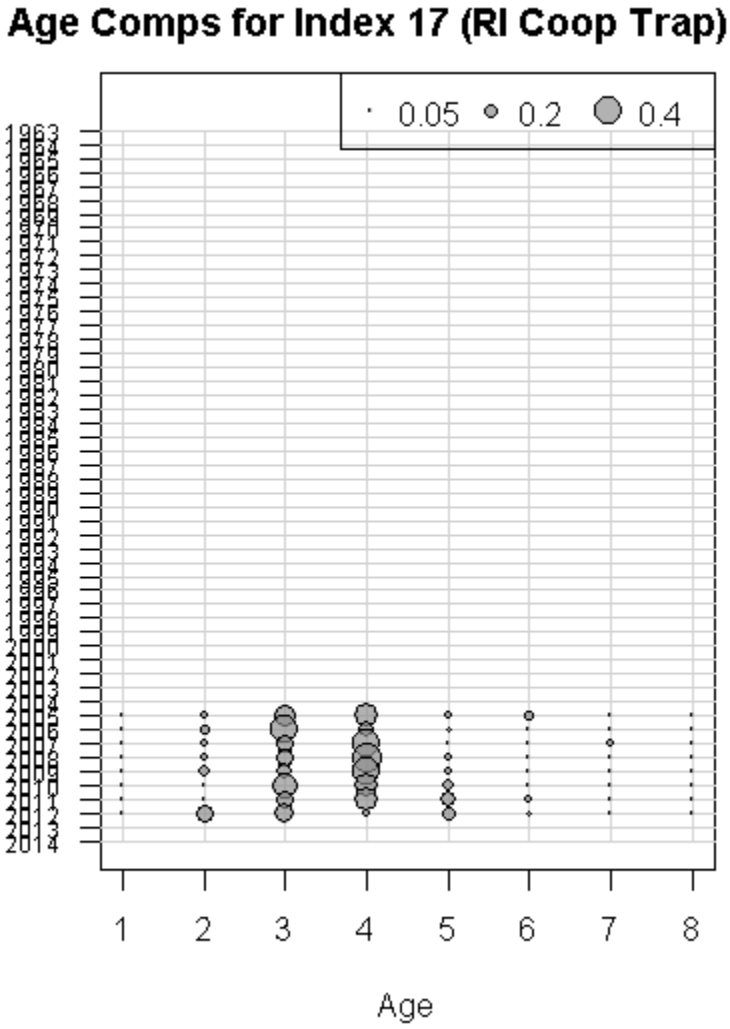

Figure A22. RIDFW cooperative trap survey indices by age for scup (plotted age 1 is true age 0, etc).

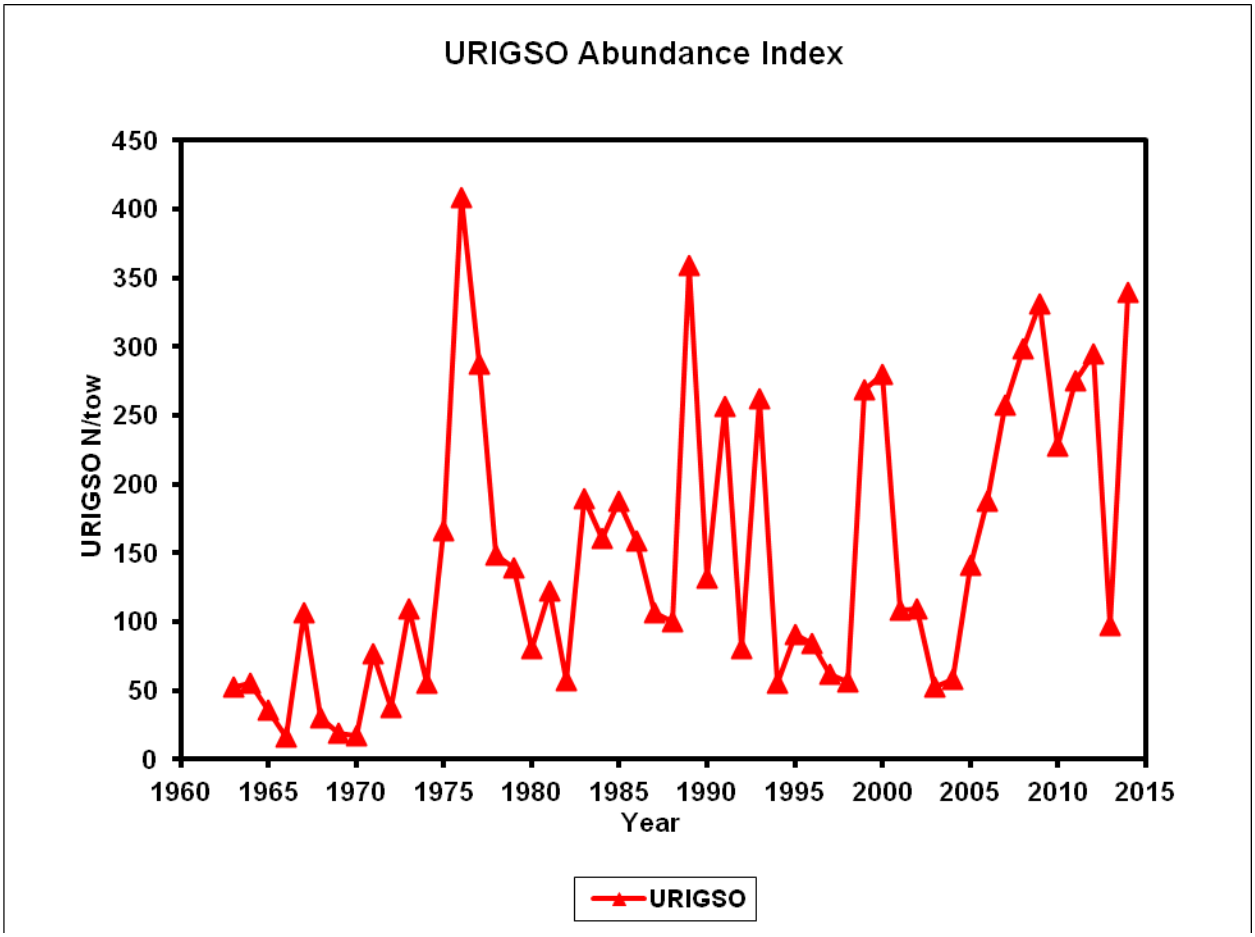

Figure A23. URIGSO survey aggregate abundance index.

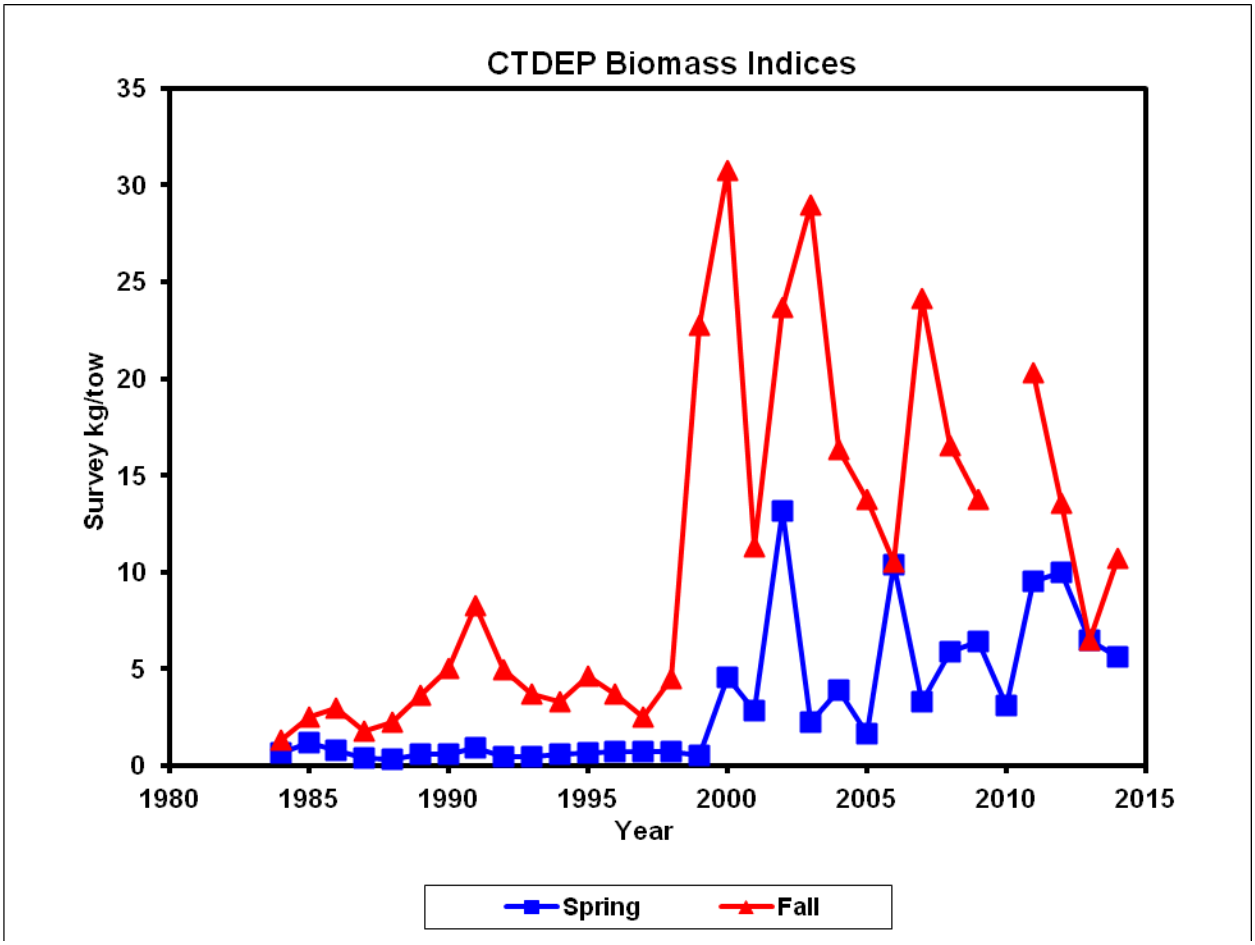

Figure A24. CTDEP spring and fall survey aggregate biomass indices.

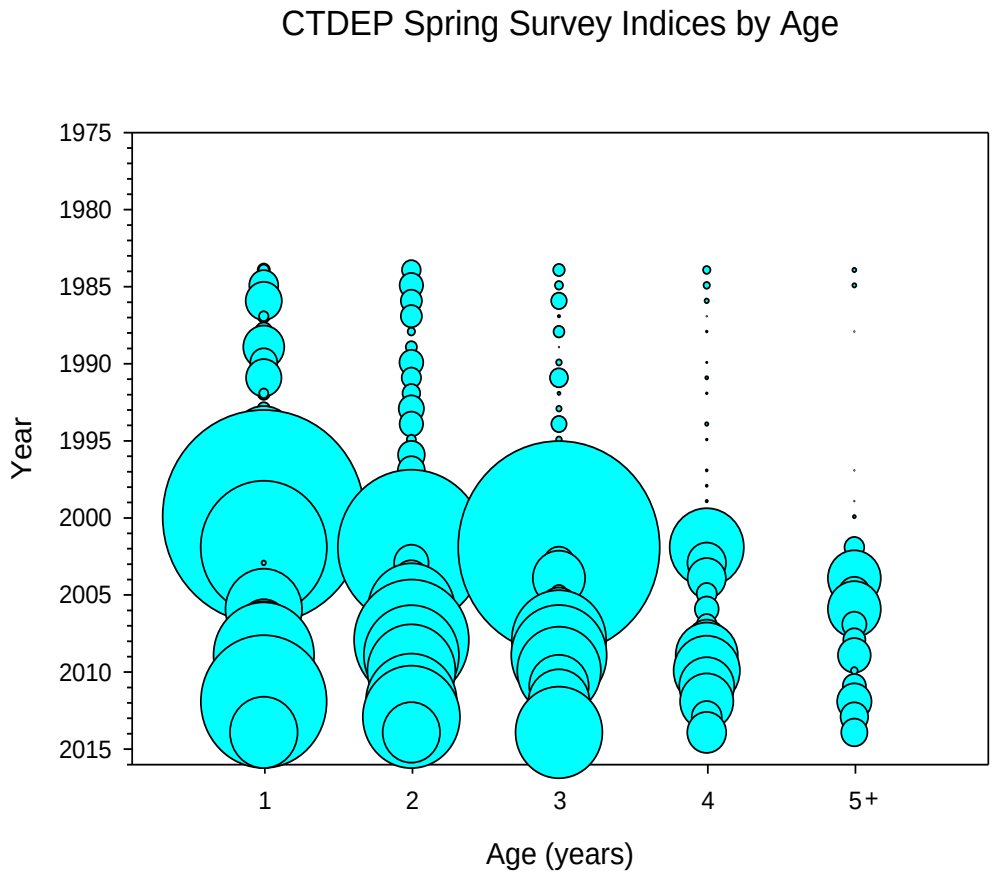

Figure A25. CTDEP spring survey indices by age for scup.

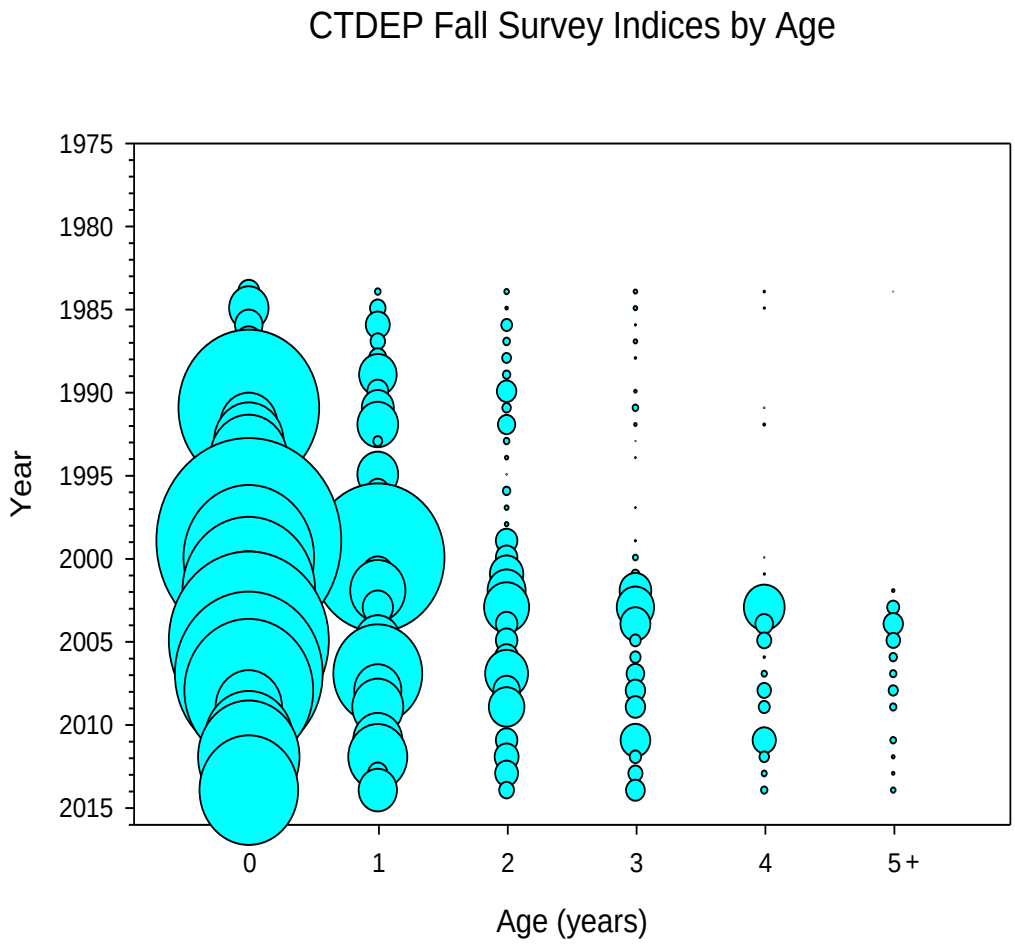

Figure A26. CTDEP fall survey indices by age for scup.

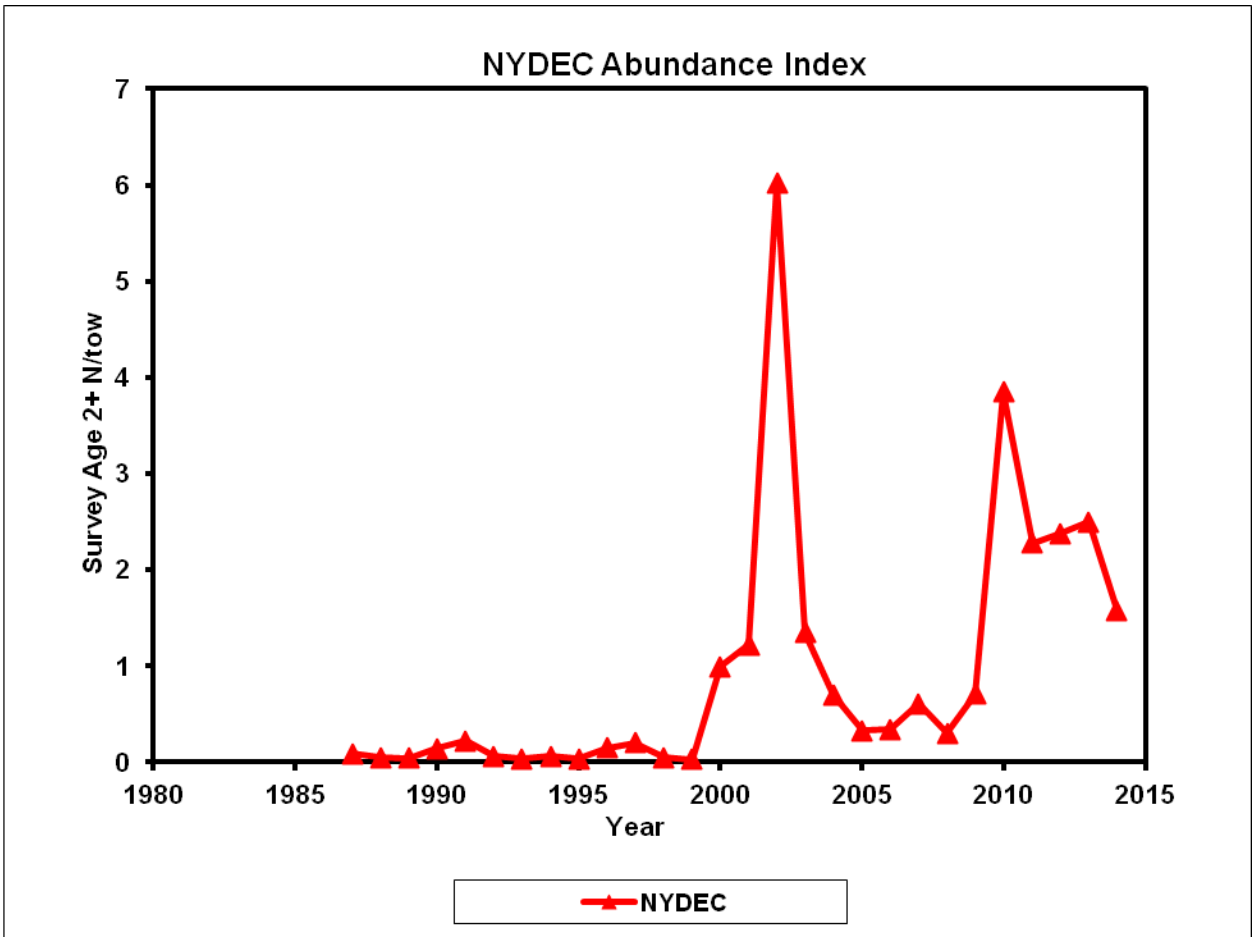

Figure A27. NYDEC survey aggregate numeric index, ages 2+.

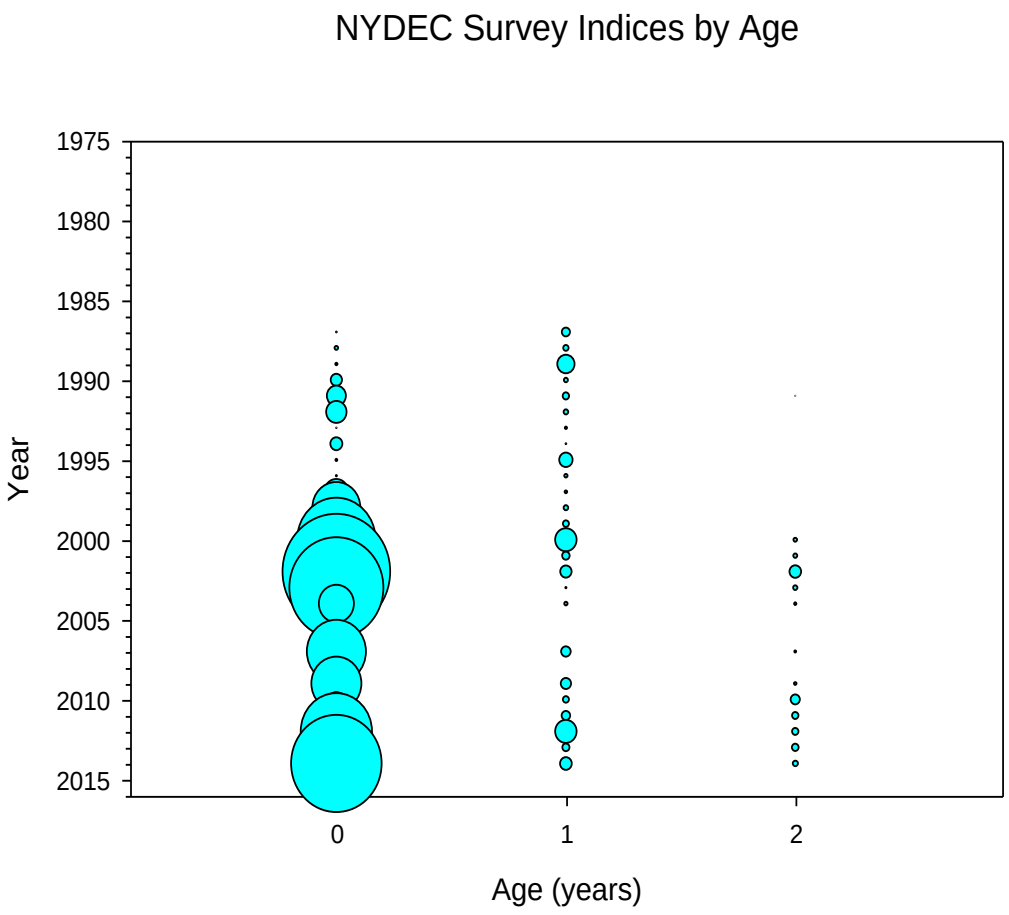

Figure A28. NYDEC survey indices by age for scup.

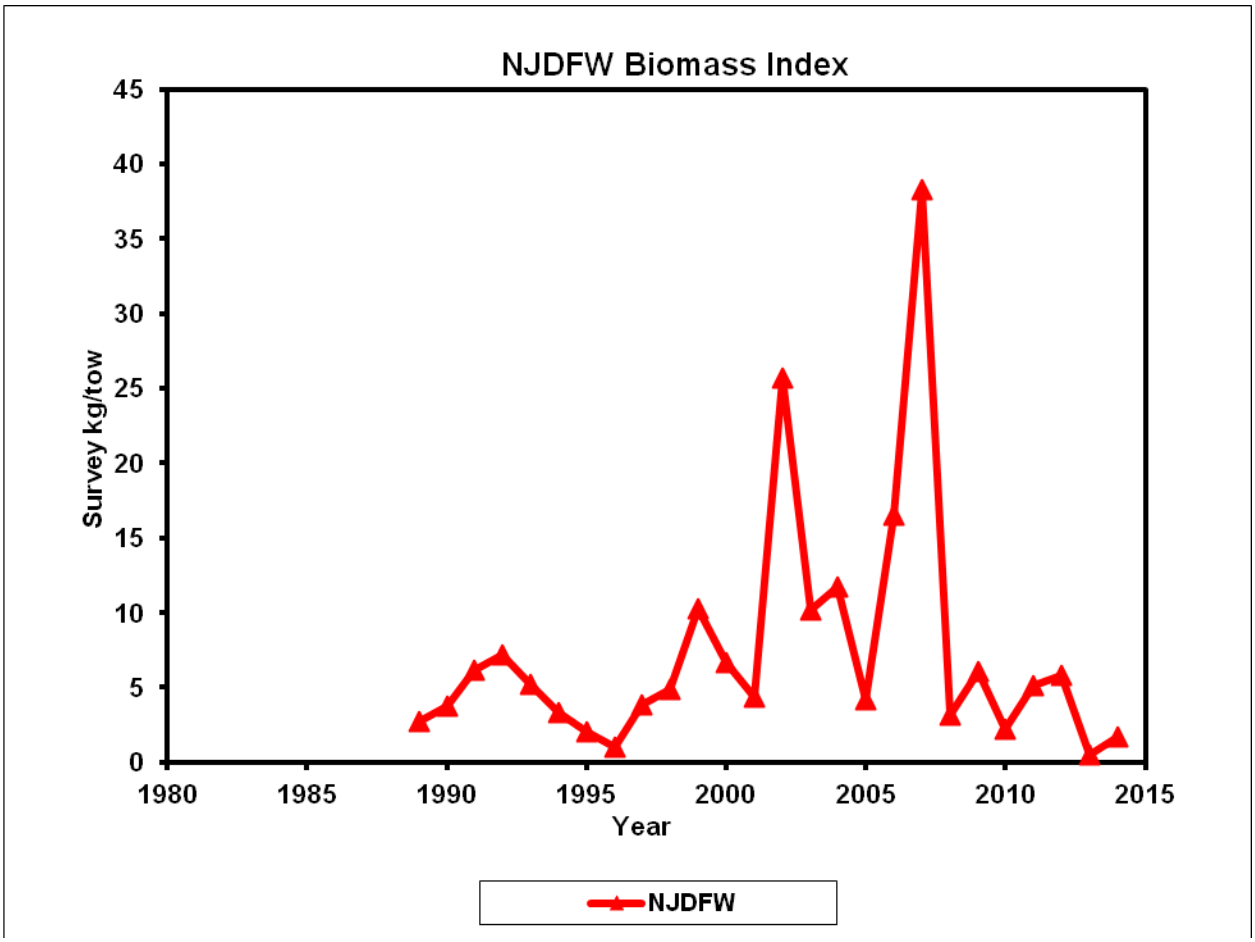

Figure A29. NJBMF survey biomass index.

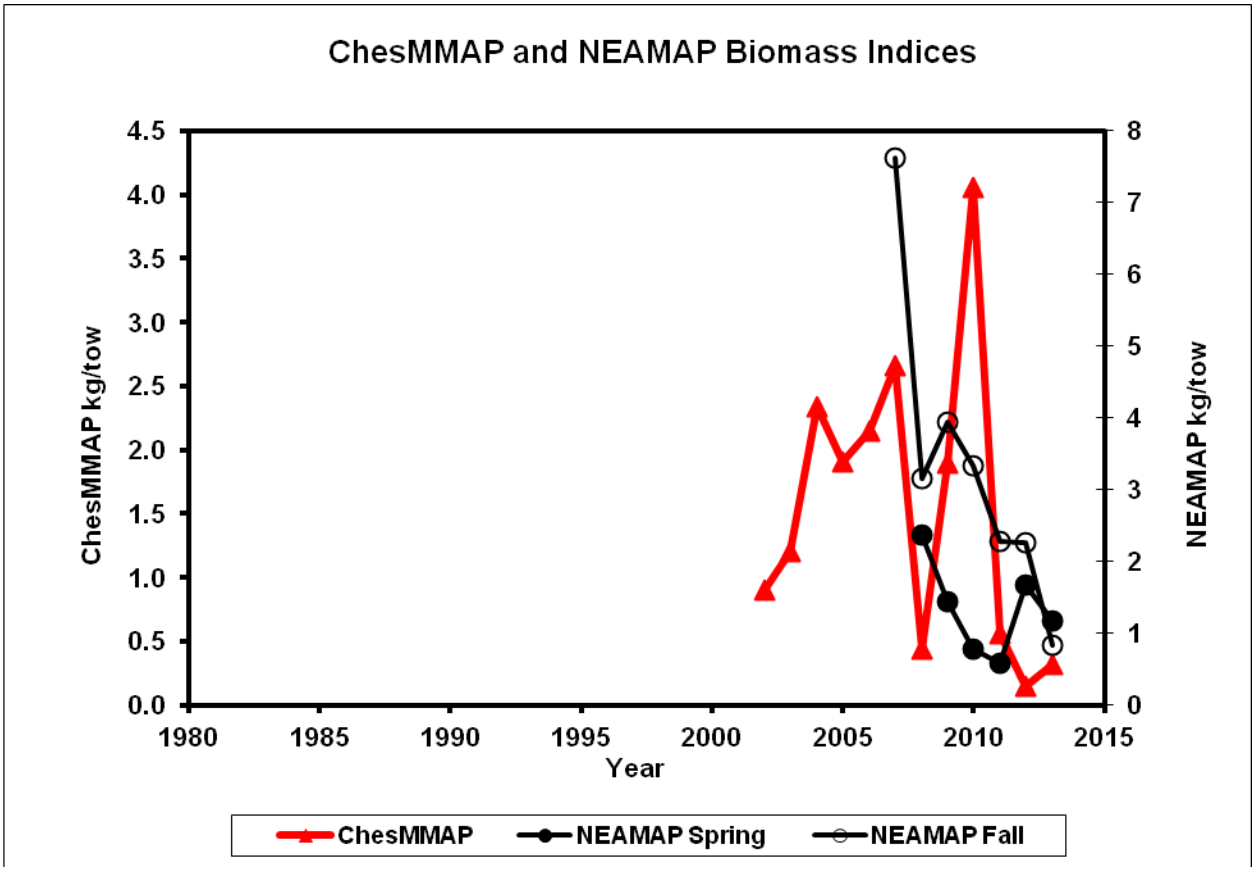

Figure A30. VIMS ChesMMap and NEAMAP spring and fall survey biomass indices.

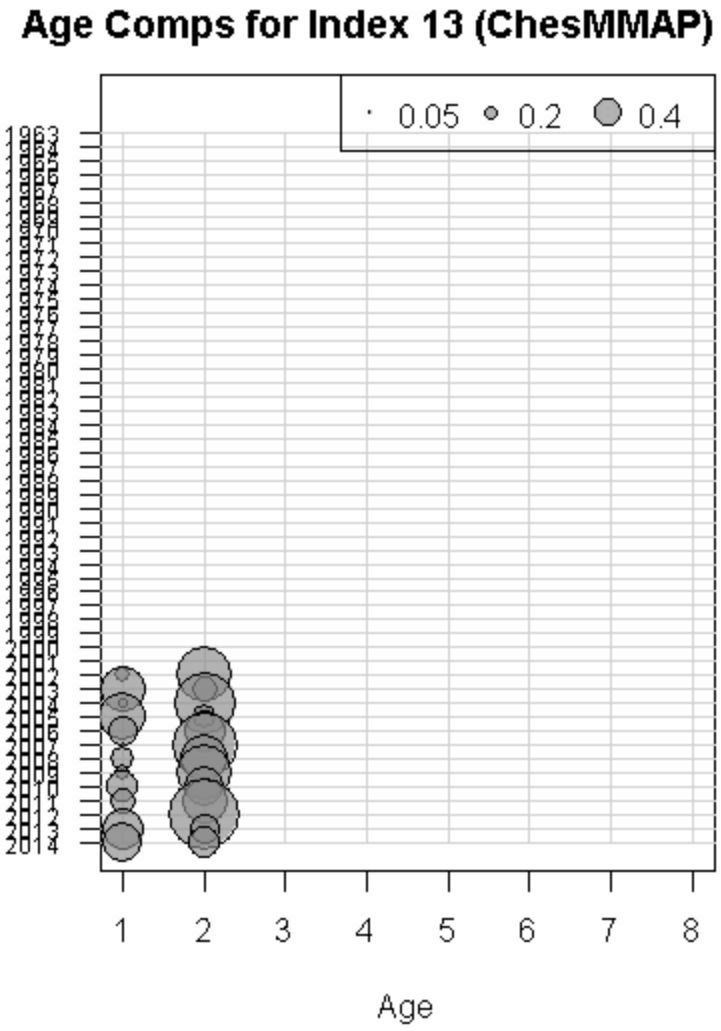

Figure A31. VIMS ChesMMAP survey indices at age (plotted age 1 is true age 0, etc.).

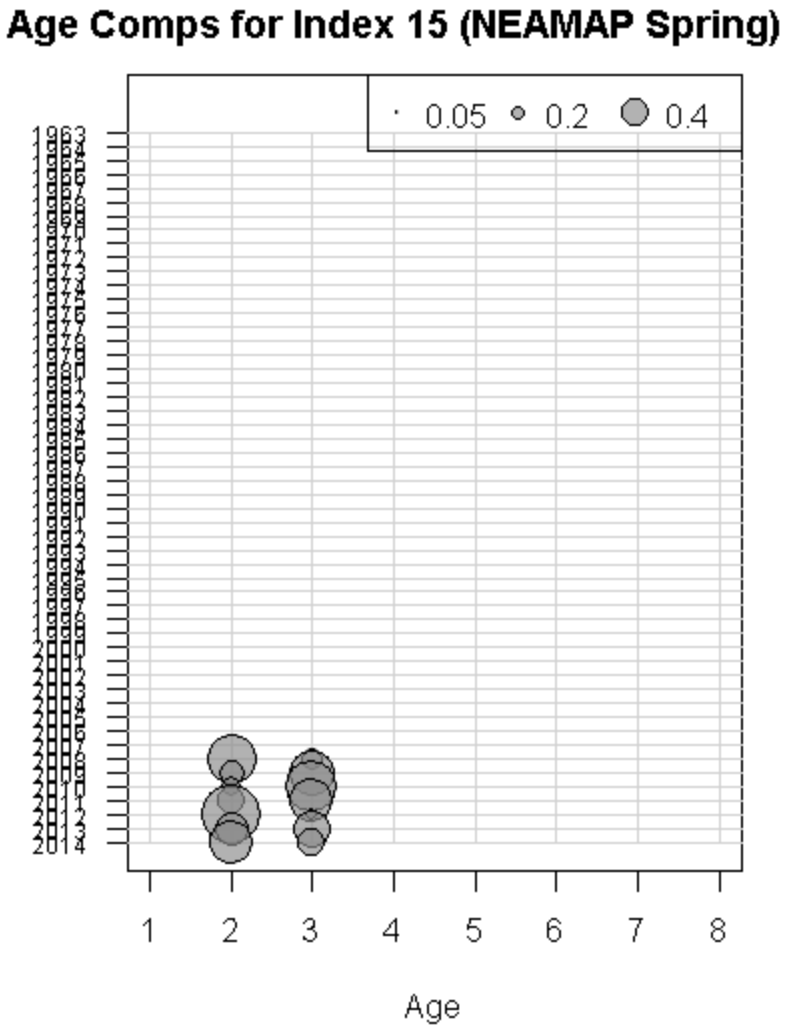

Figure A32. VIMS NEAMAP spring survey indices at age (plotted age 1 is true age 0, etc.).

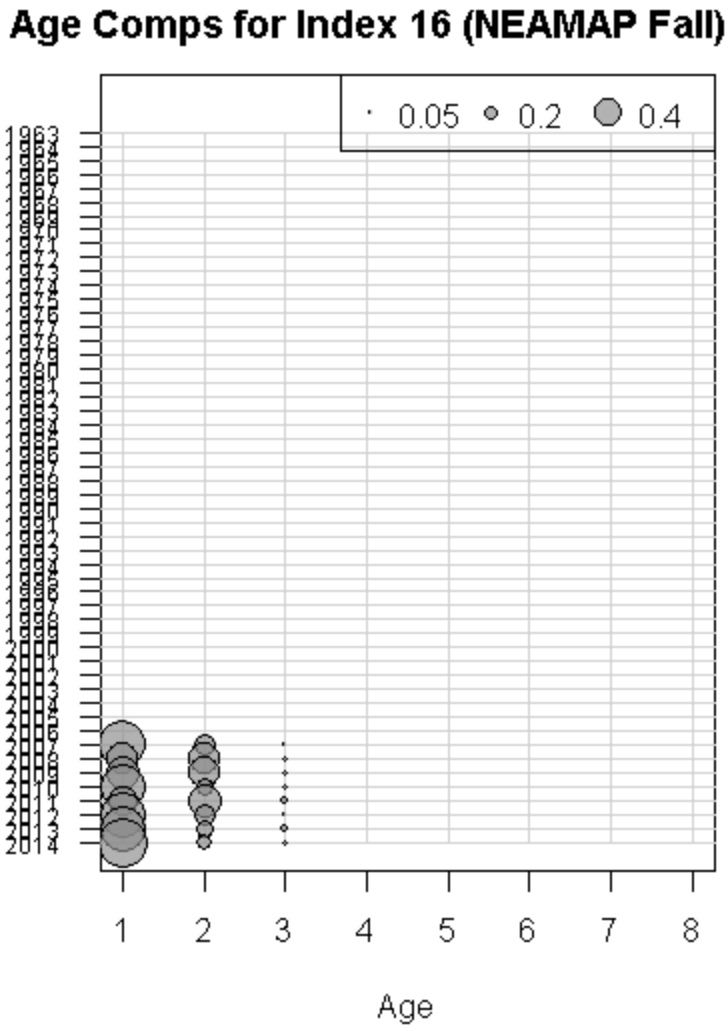

Figure A33. VIMS NEAMAP fall survey indices at age (plotted age 1 is true age 0, etc.).

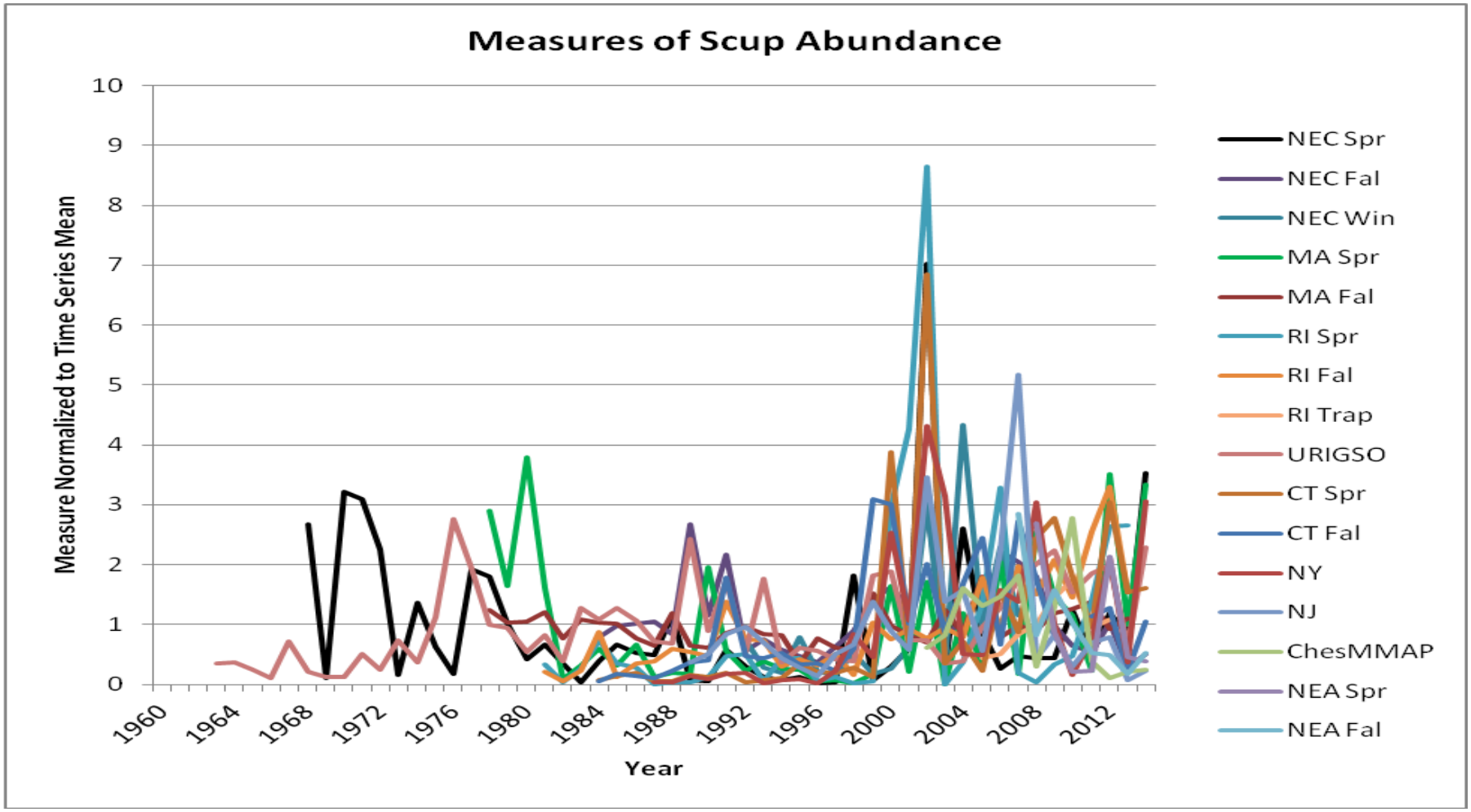

Figure A34. Trends in survey aggregate indices of scup abundance.

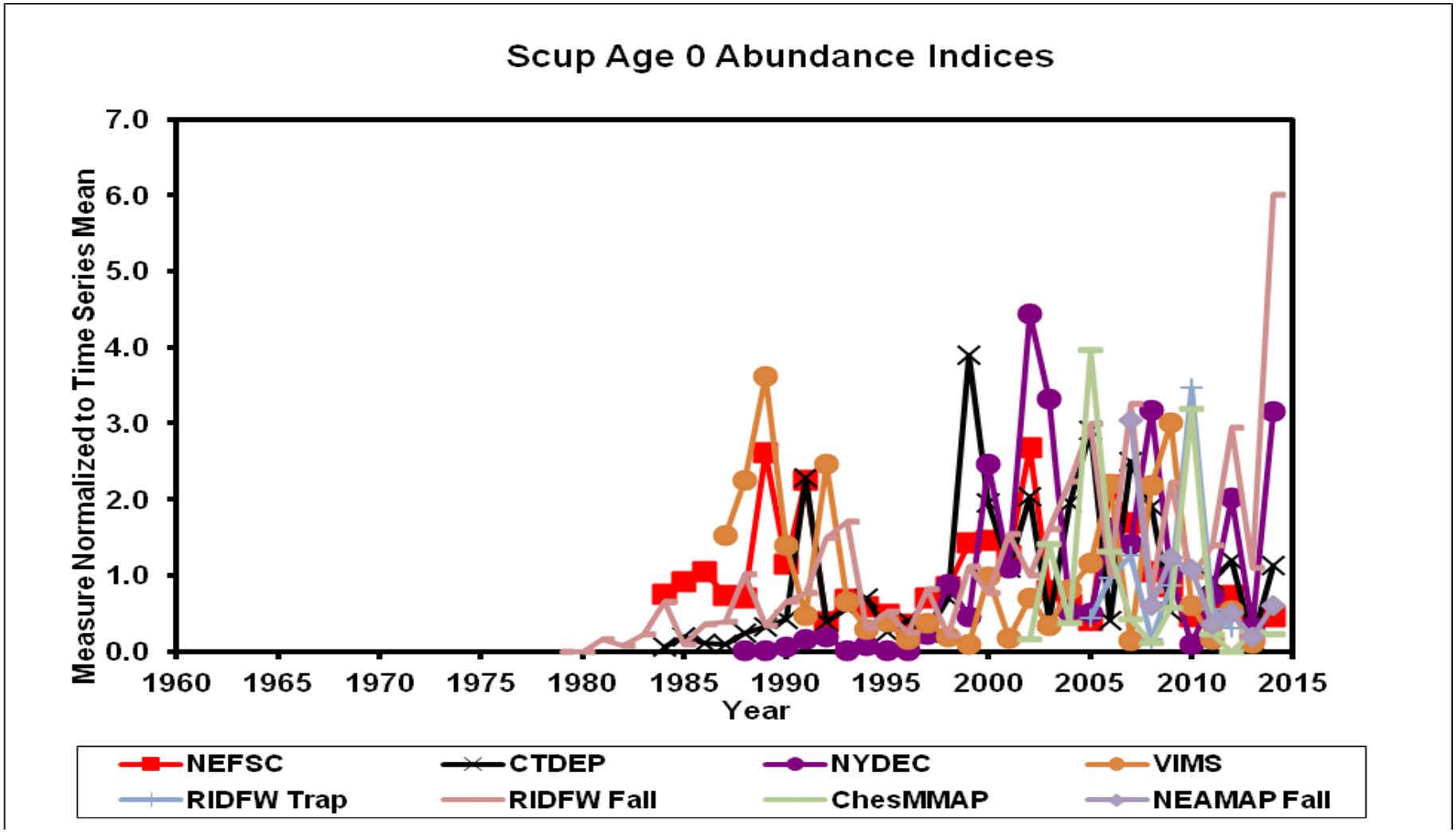

Figure A35. Trends in survey indices of scup recruitment at age 0.

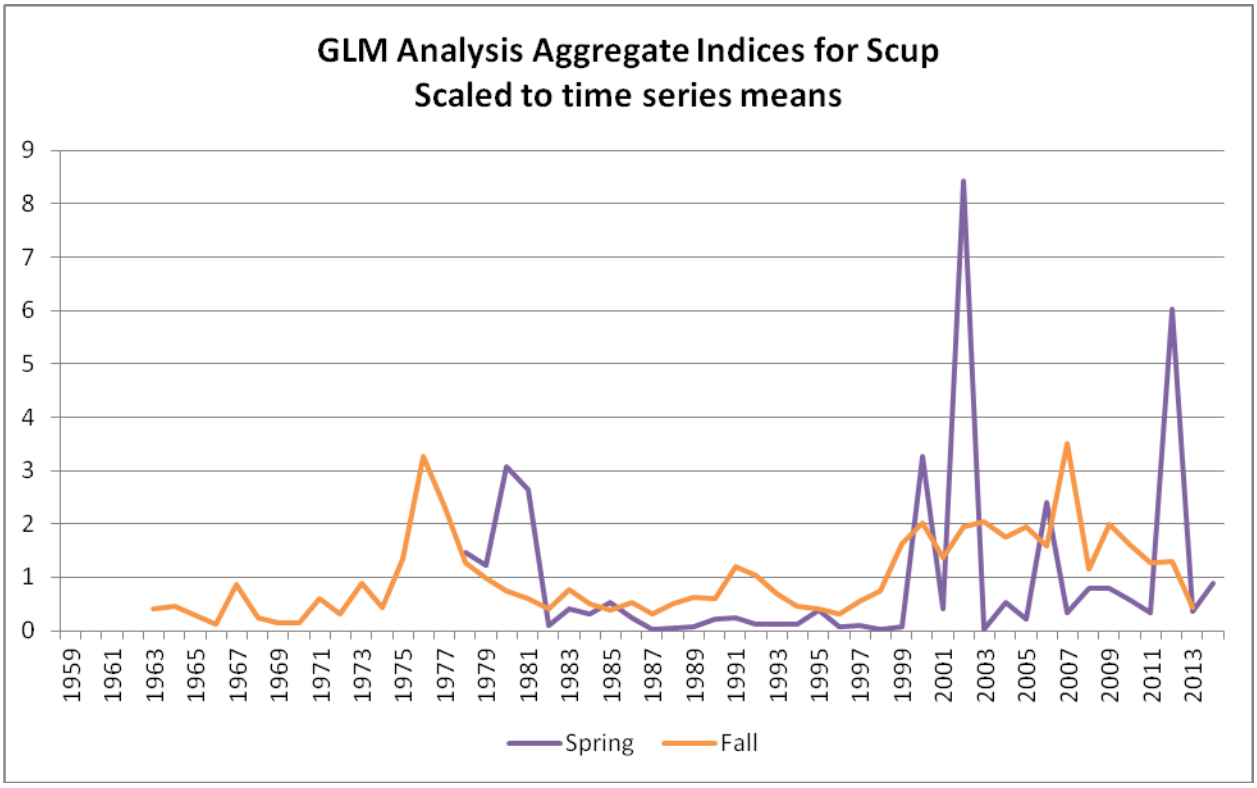

Figure A36. 'GLM Integrated' model aggregate indices of scup abundance based on state agency and academic instituion spring and fall research surveys.

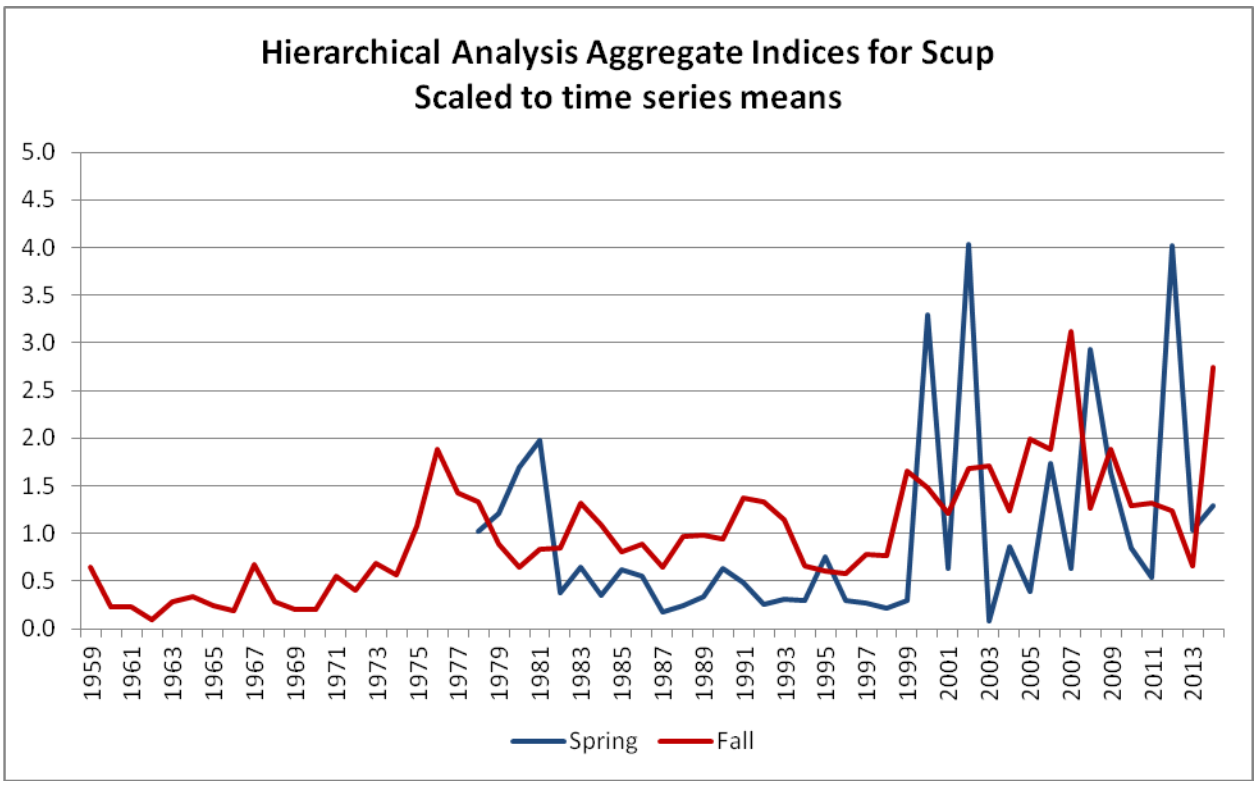

Figure A37. 'Hierarchical' model aggregate indices of scup abundance based on state agency and academic instituion spring and fall research surveys.

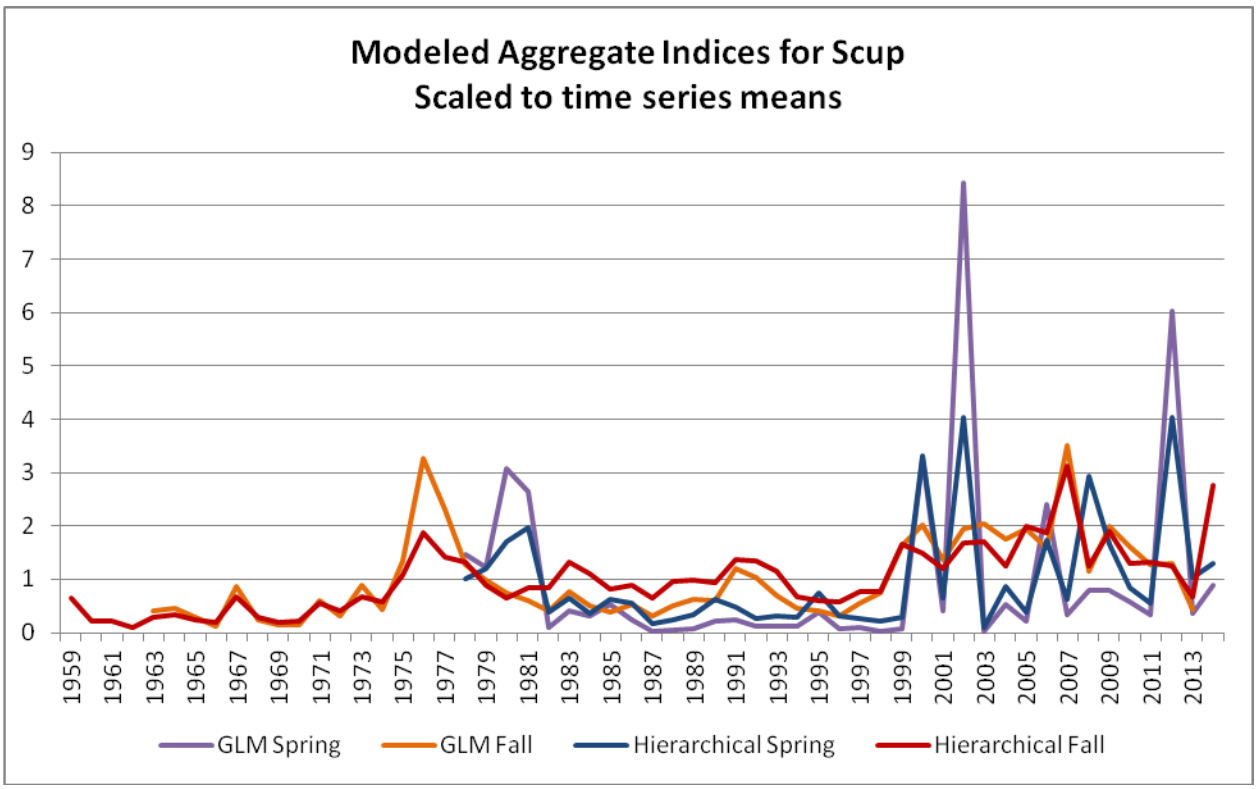

Figure A38. 'GLM Integrated' and 'Hierarchical' model seasonal indices of aggregate abundance based on state agency and academic instituion spring and fall research surveys.

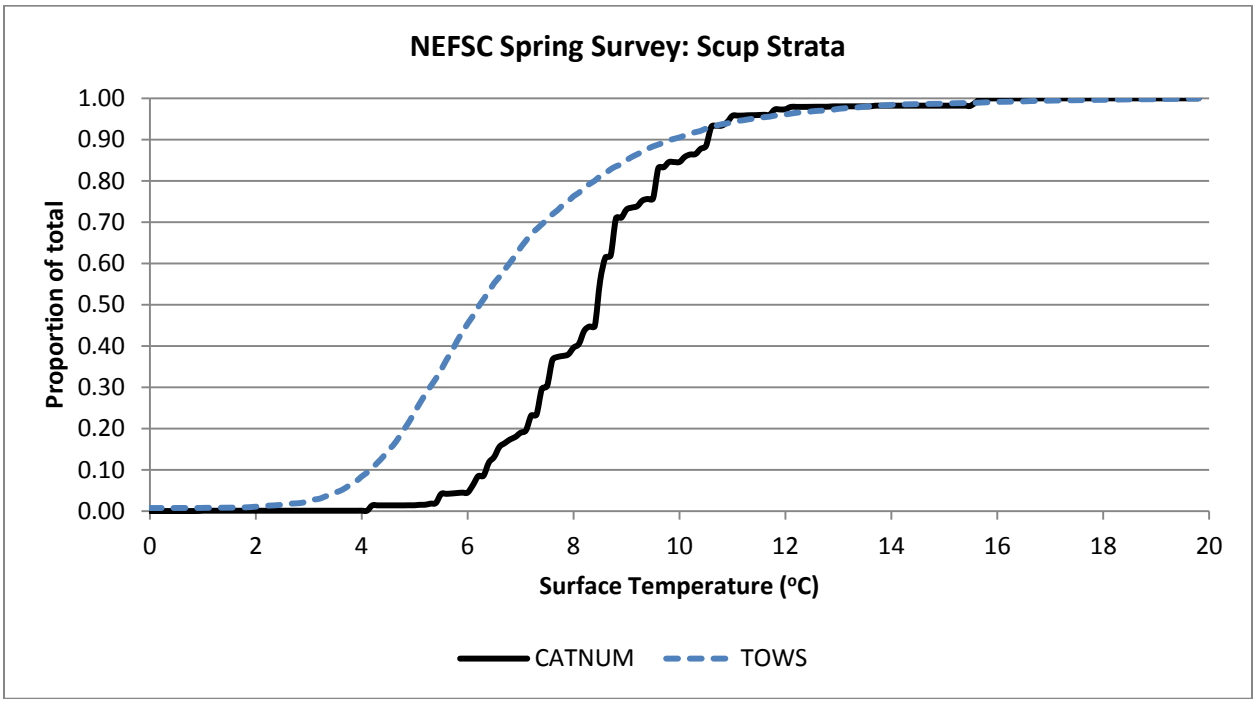

Figure A39. Cumulative proportion of total (expanded catch number per tow or number of tows) by surface temperature for survey stations in the NEFSC spring survey strata set (1968-2014).

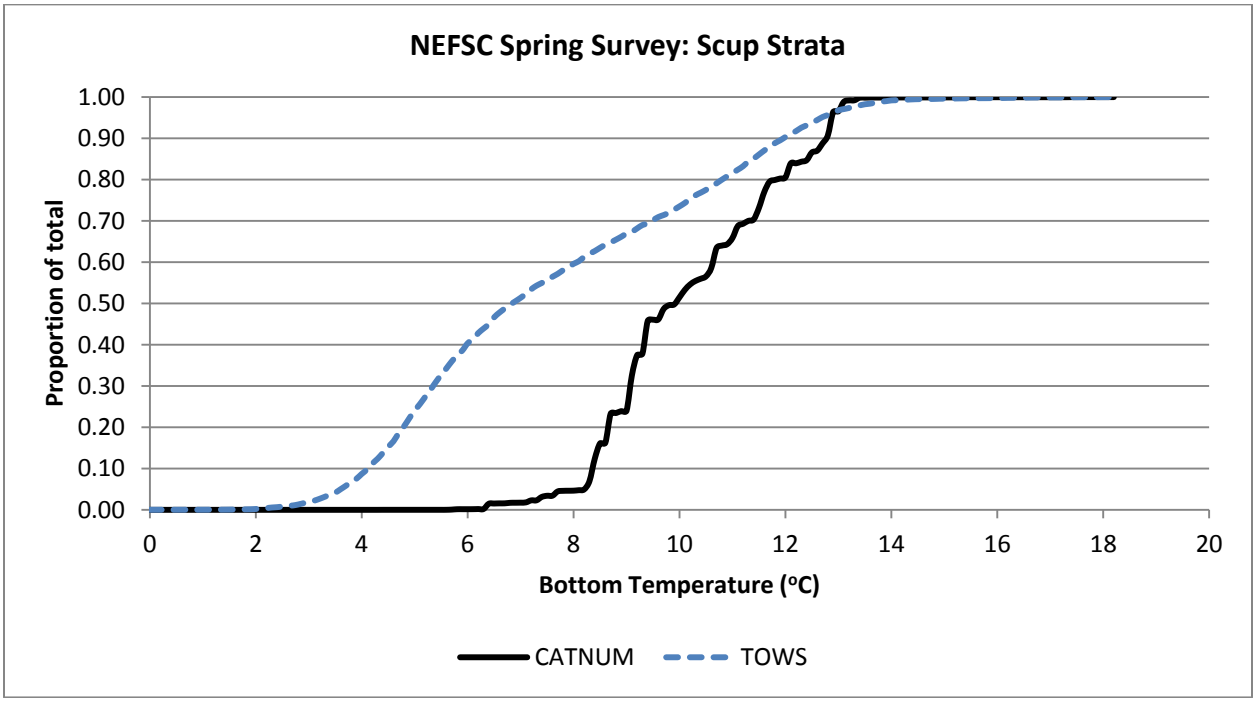

Figure A40. Cumulative proportion of total (expanded catch number per tow or number of tows) by bottom temperature for survey stations in the NEFSC spring survey strata set (1968-2014).

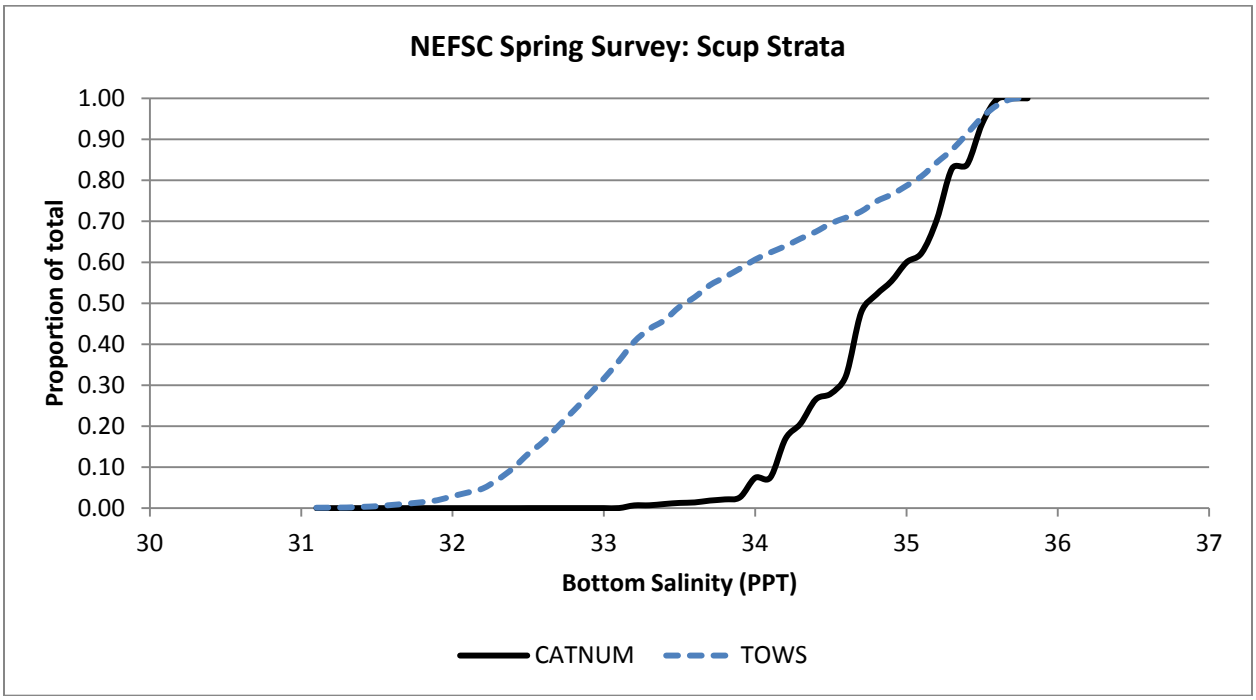

Figure A41. Cumulative proportion of total (expanded catch number per tow or number of tows) by bottom salinity for survey stations in the NEFSC spring survey strata set (1997-2014).

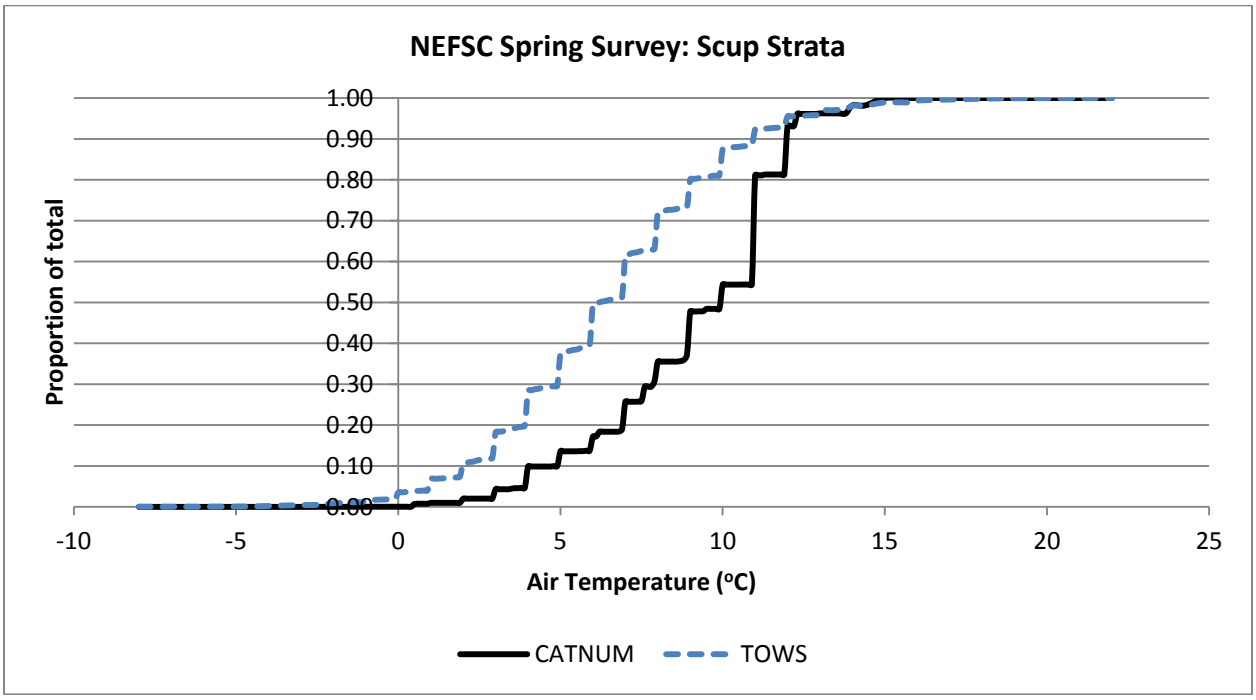

Figure A42. Cumulative proportion of total (expanded catch number per tow or number of tows) by air temperature for survey stations in the NEFSC spring survey strata set (1968-2014).

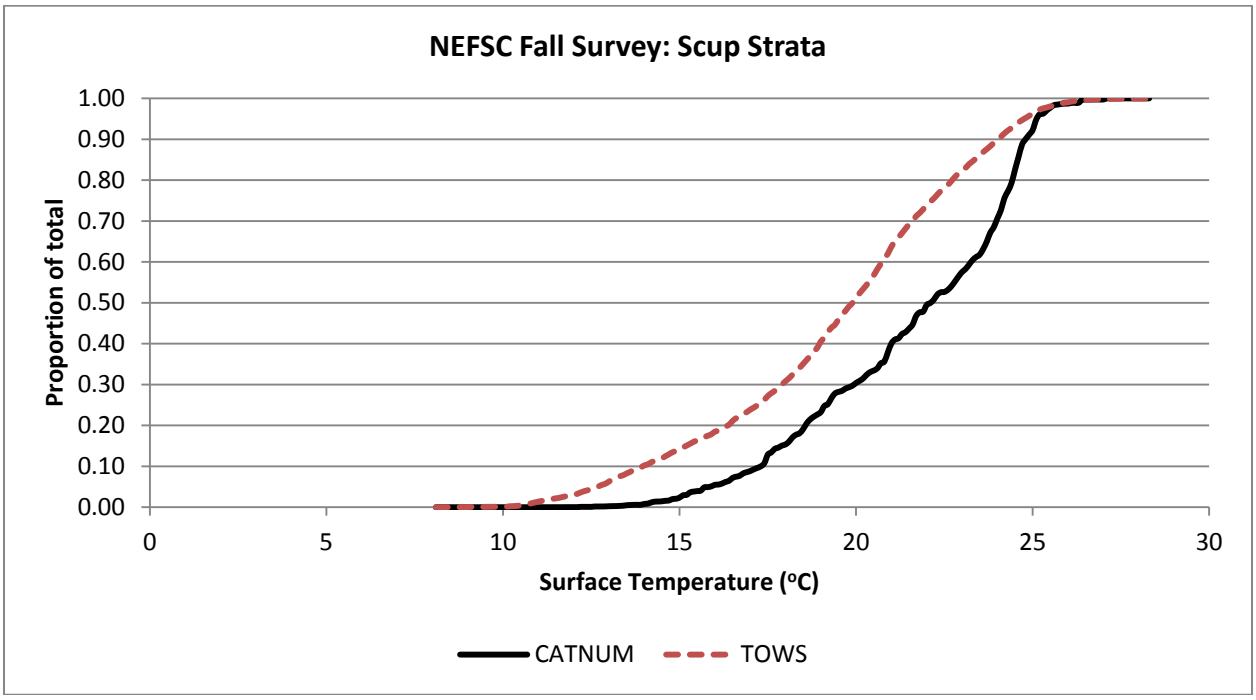

Figure A43. Cumulative proportion of total (expanded catch number per tow or number of tows) by surface temperature for survey stations in the NEFSC fall survey strata set (1968-2013).

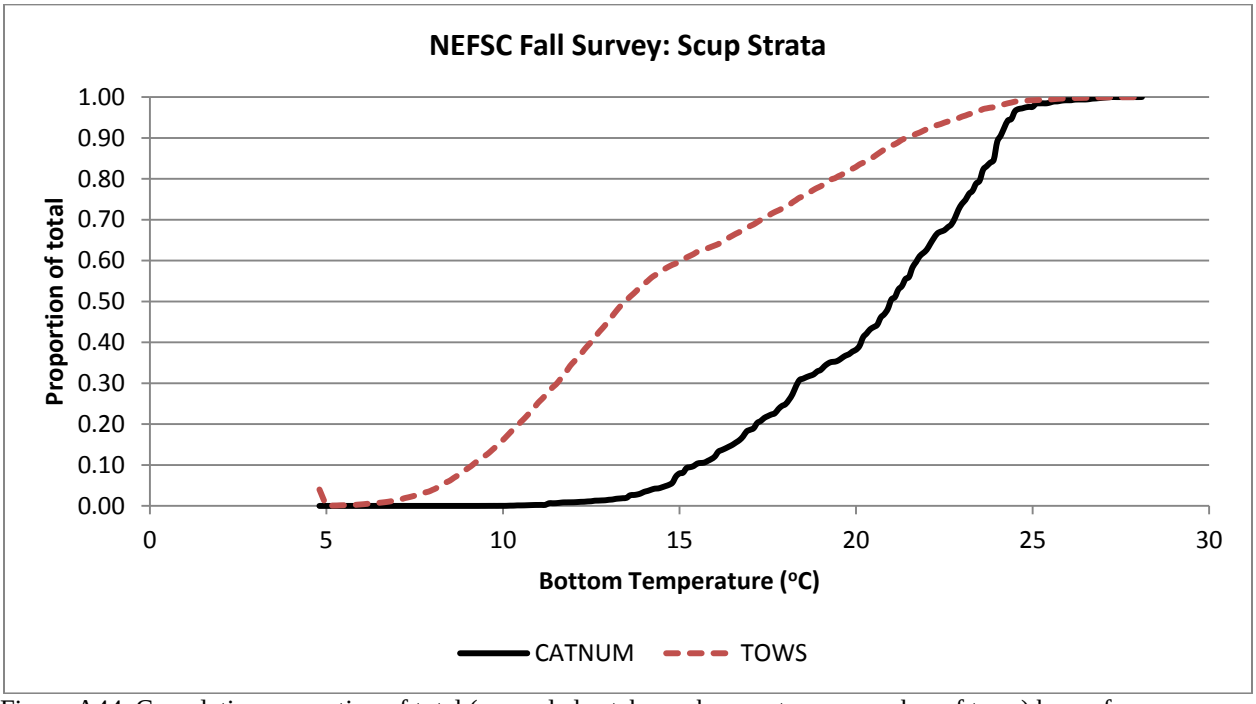

Figure A44. Cumulative proportion of total (expanded catch number per tow or number of tows) by surface temperature for survey stations in the NEFSC fall survey strata set (1968-2013).

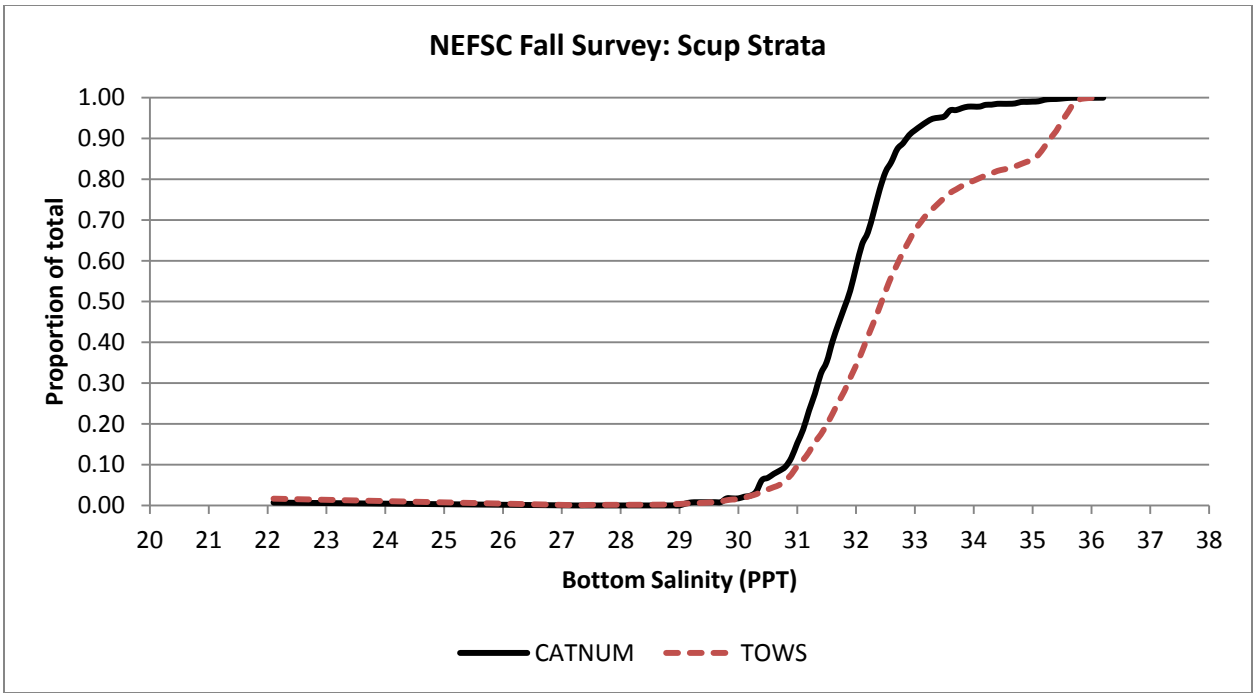

Figure A45. Cumulative proportion of total (expanded catch number per tow or number of tows) by bottom salinity for survey stations in the NEFSC fall survey strata set (1997-2013).

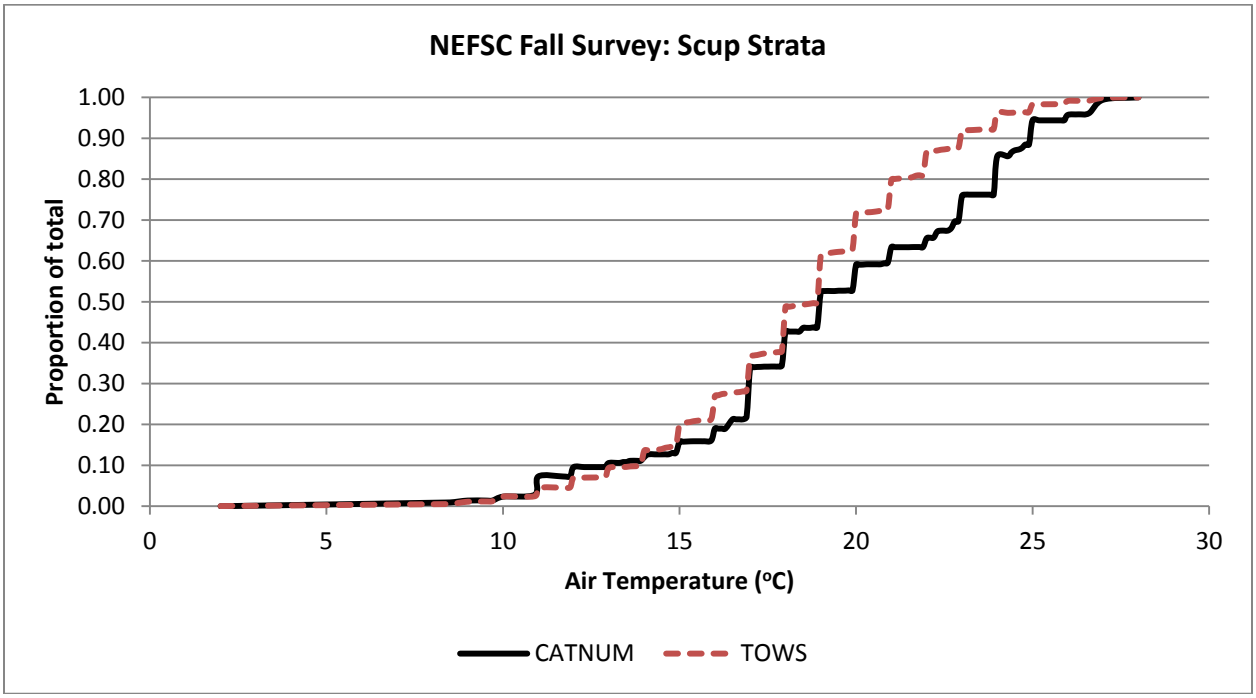

Figure A46. Cumulative proportion of total (expanded catch number per tow or number of tows) by air temperature for survey stations in the NEFSC fall survey strata set (1968-2013).

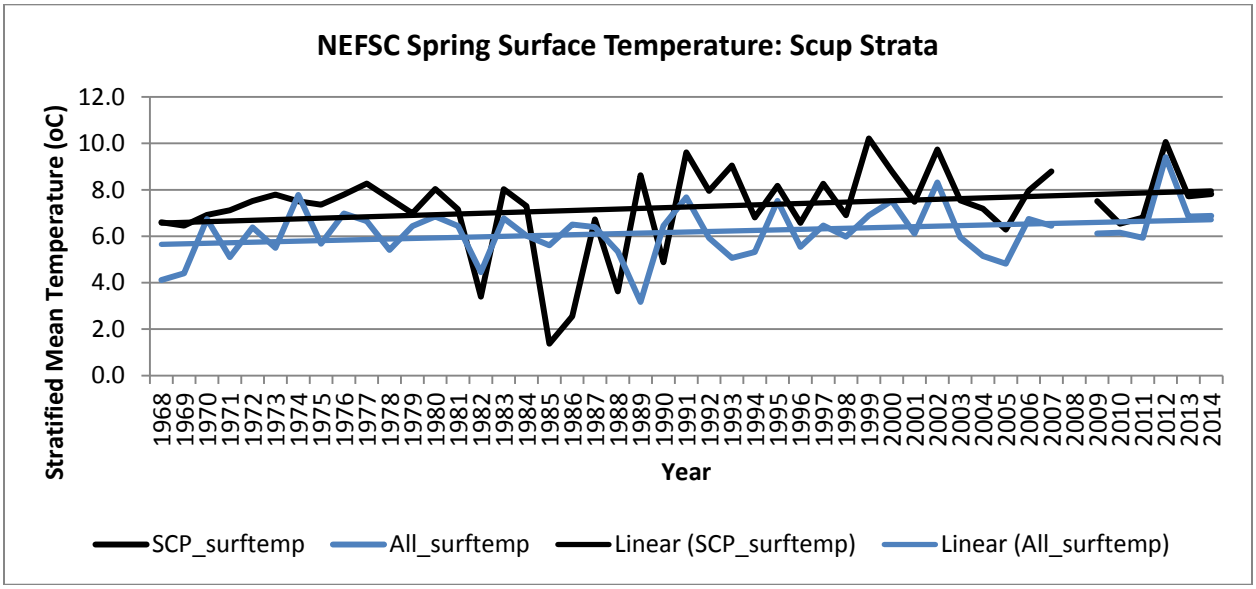

Figure A47. Annual stratified mean values of the surface temperature for spring positive scup catch tows (expcatchnum > 0; SCP_bottemp) was compared with the annual stratified mean values for all tows (All_bottemp).

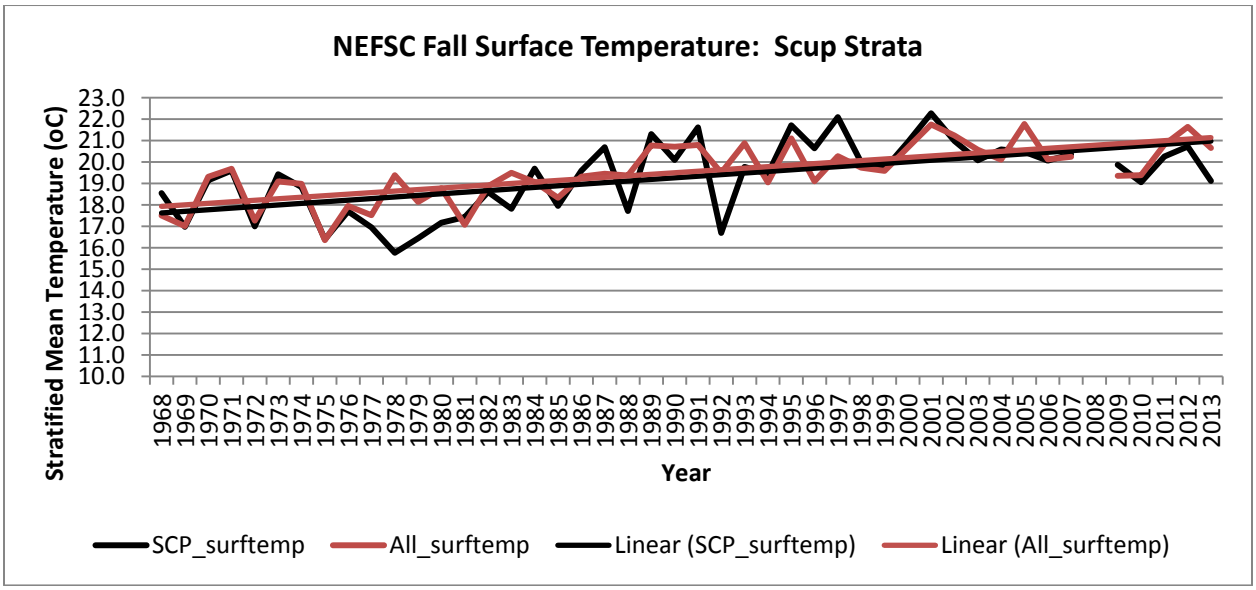

Figure A48. Annual stratified mean values of the surface temperature for fall positive scup catch tows (expcatchnum > 0; SCP_bottemp) was compared with the annual stratified mean values for all tows (All_bottemp).

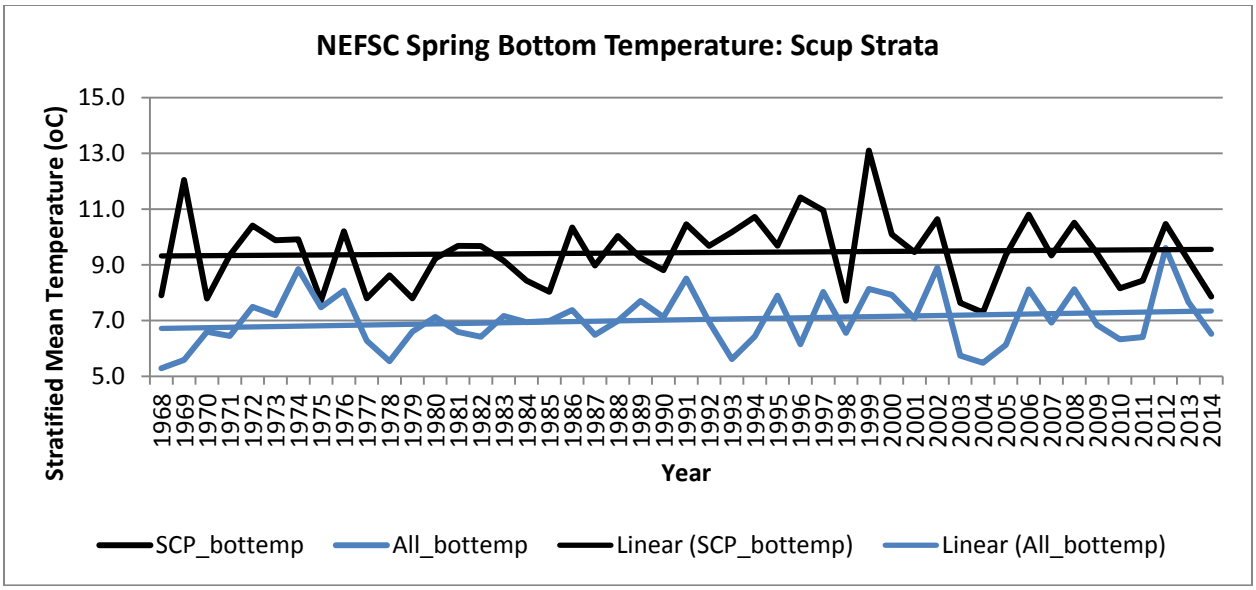

Figure A49. Annual stratified mean values of the bottom temperature for spring positive scup catch tows (expcatchnum > 0; SCP_bottemp) was compared with the annual stratified mean values for all tows (All_bottemp).

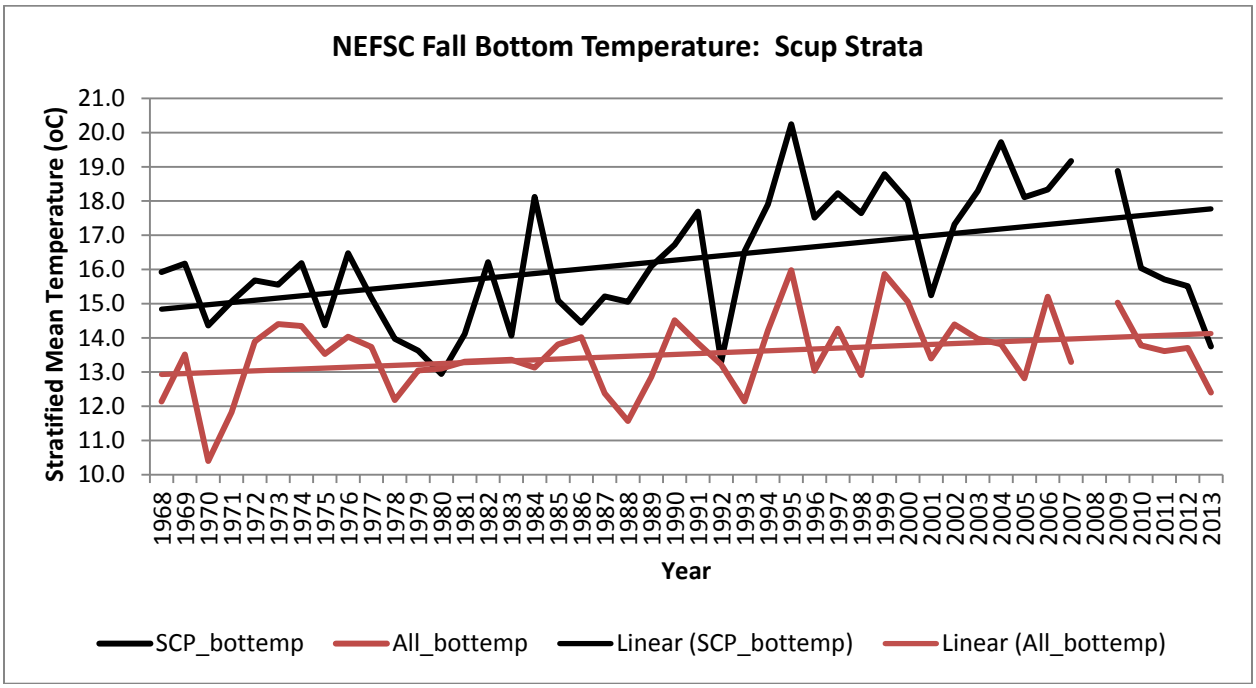

Figure A50. Annual stratified mean values of the bottom temperature for fall positive scup catch tows (expcatchnum > 0; SCP_bottemp) was compared with the annual stratified mean values for all tows (All_bottemp).

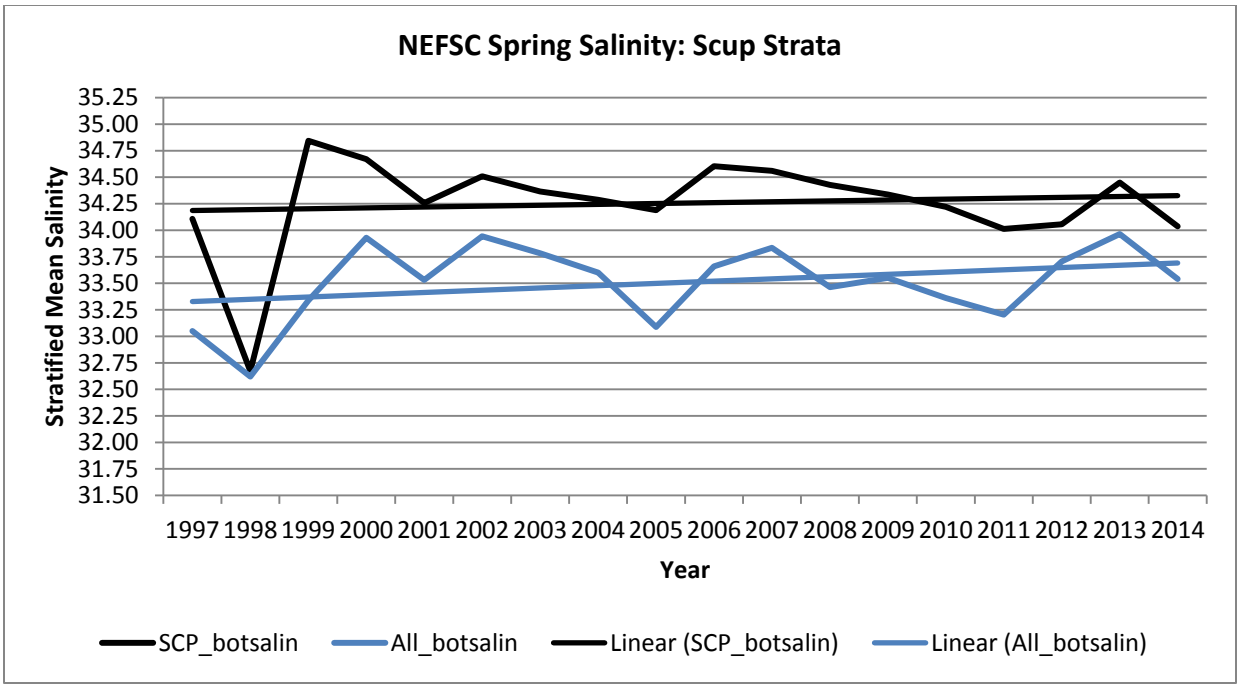

Figure A51. Annual stratified mean values of the bottom salinity for spring positive scup catch tows (expcatchnum > 0; SCP_botsalin) was compared with the annual stratified mean values for all tows (All_botsalin).

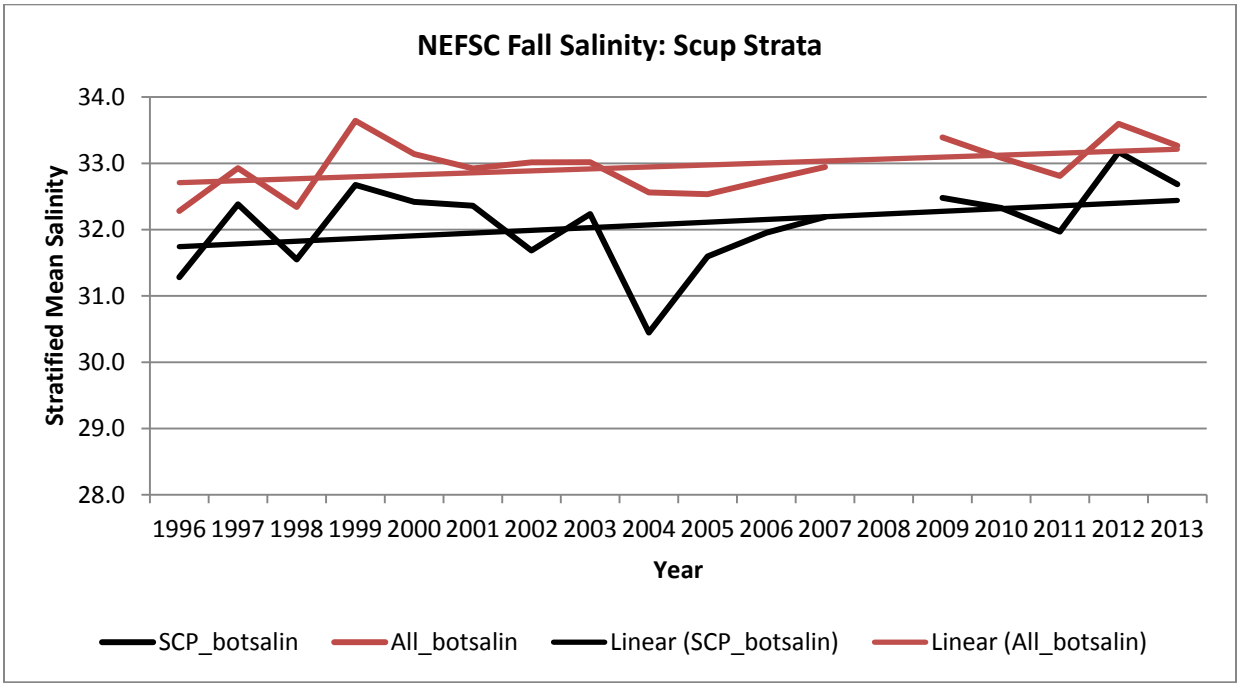

Figure A52. Annual stratified mean values of the bottom salinity for fall positive scup catch tows (expcatchnum > 0; SCP_botsalin) was compared with the annual stratified mean values for all tows (All_botsalin).

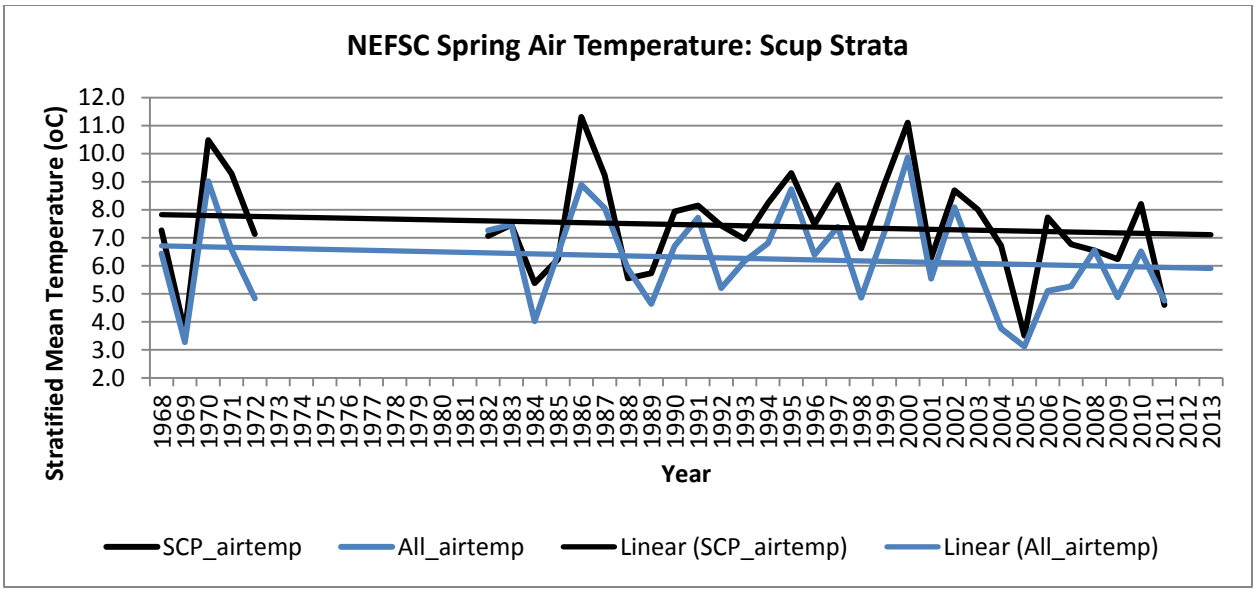

Figure A53. Annual stratified mean values of the air temperature for spring positive scup catch tows (expcatchnum > 0; SCP_airtemp) was compared with the annual stratified mean values for all tows (All_airtemp).

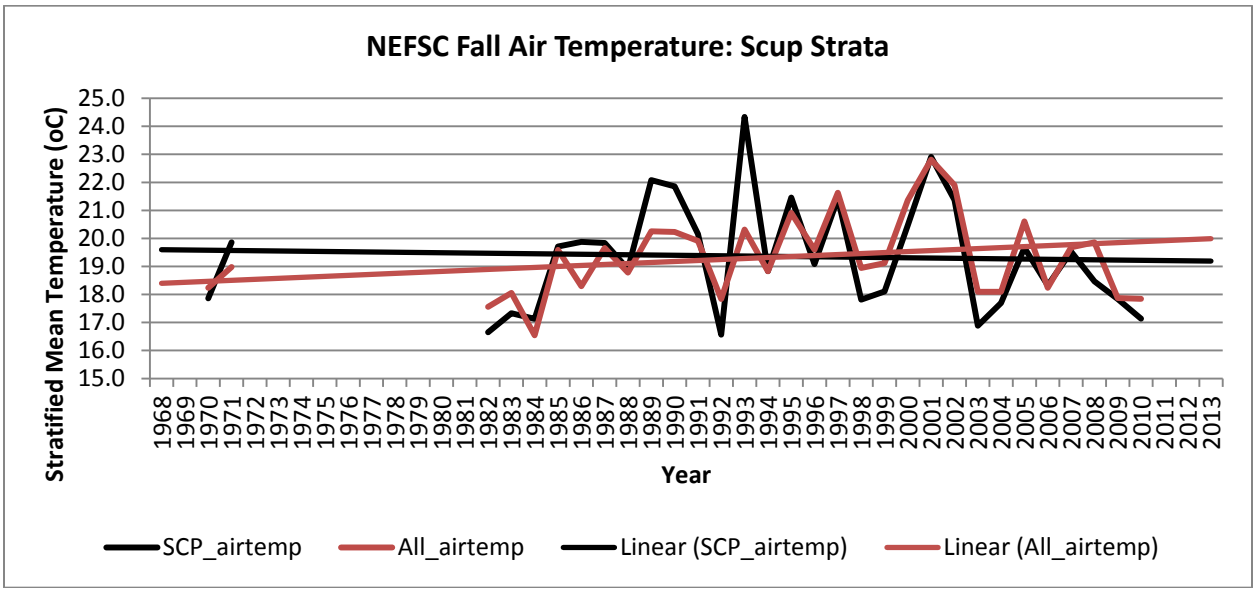

Figure A54. Annual stratified mean values of the air temperature for fall positive scup catch tows (expcatchnum > 0; SCP_airtemp) was compared with the annual stratified mean values for all tows (All_airtemp).

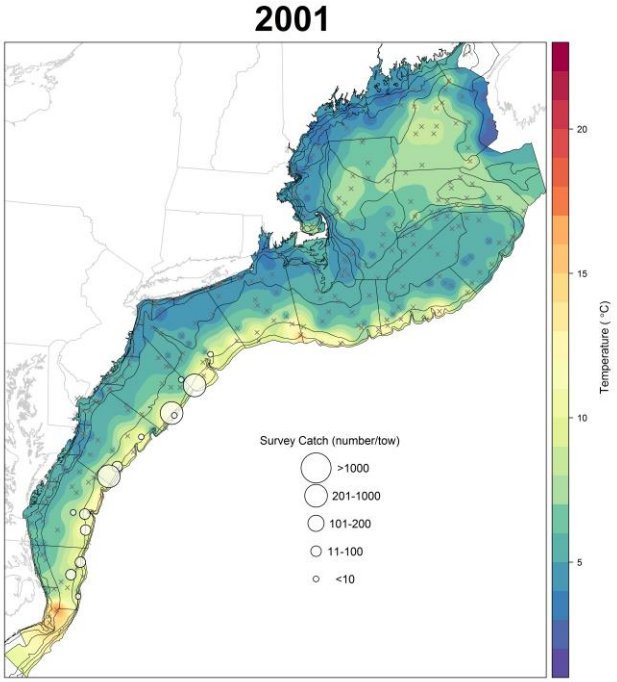

Figure A55. NEFSC spring trawl survey 2001: distribution of scup catch and bottom temperature.

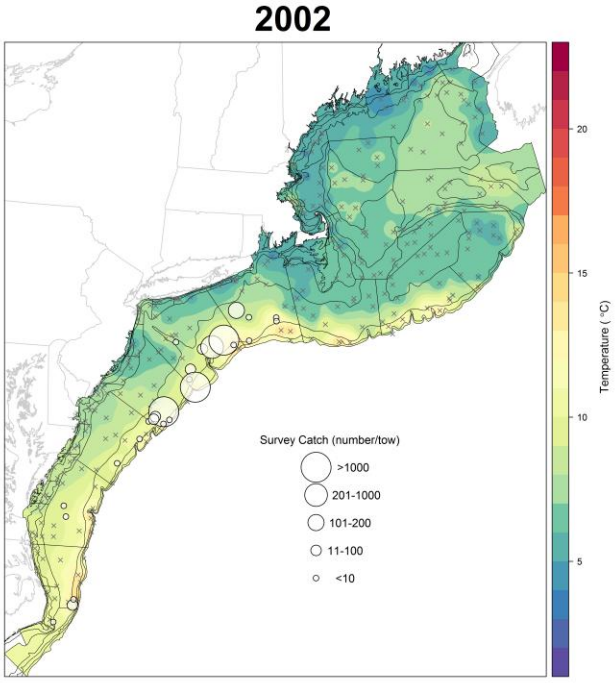

Figure A56. NEFSC spring trawl survey 2002: distribution of scup catch and bottom temperature.

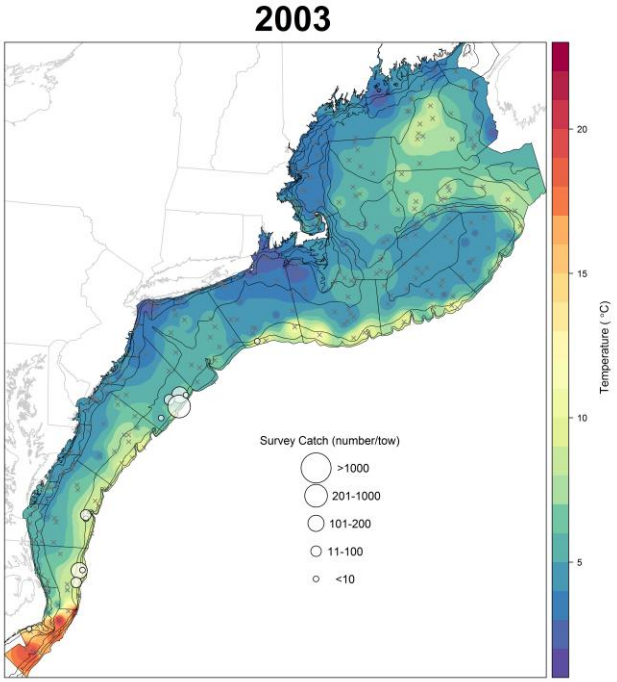

Figure A57. NEFSC spring trawl survey 2003: distribution of scup catch and bottom temperature.

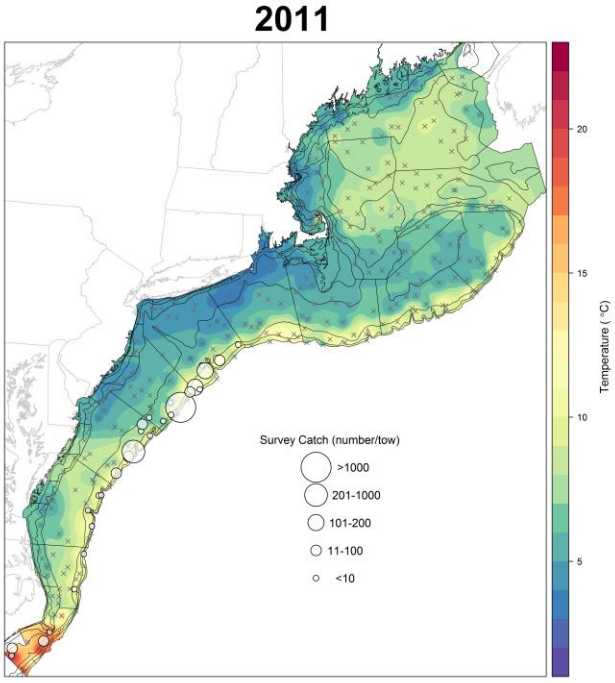

Figure A58. NEFSC spring trawl survey 2011: distribution of scup catch and bottom temperature.

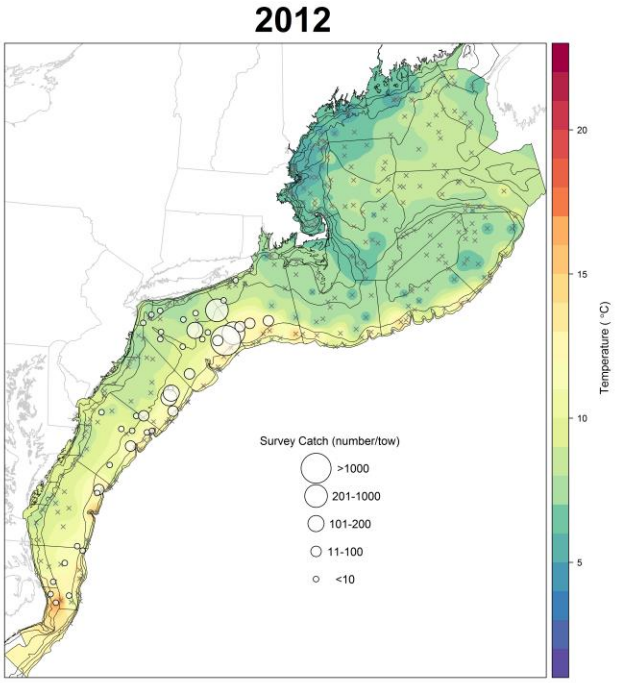

Figure A59. NEFSC spring trawl survey 2012: distribution of scup catch and bottom temperature.

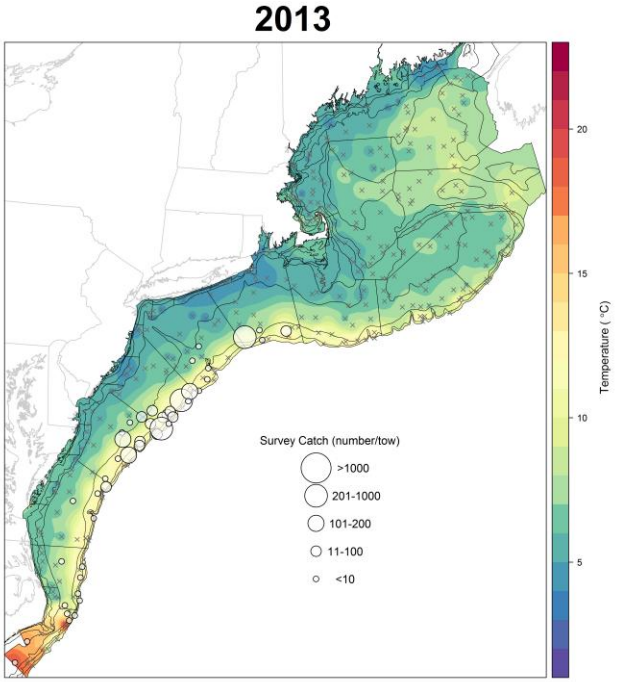

Figure A60. NEFSC spring trawl survey 2013: distribution of scup catch and bottom temperature.

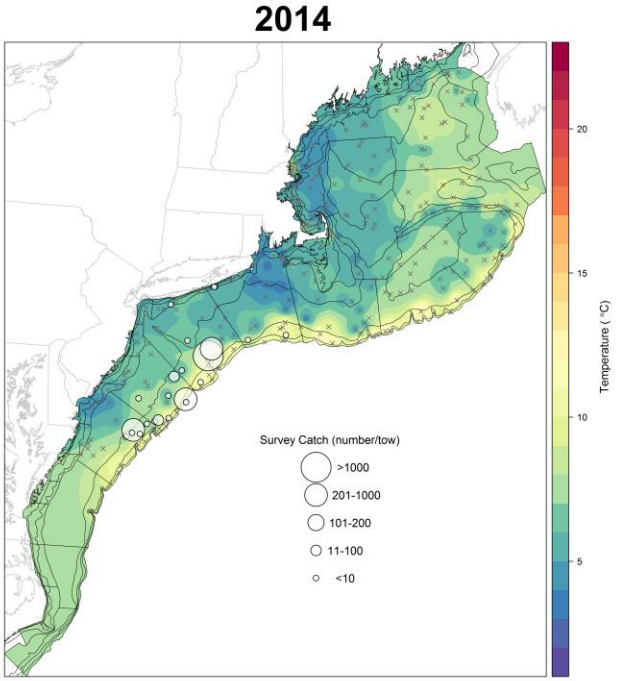

Figure A61. NEFSC spring trawl survey 2014: distribution of scup catch and bottom temperature.

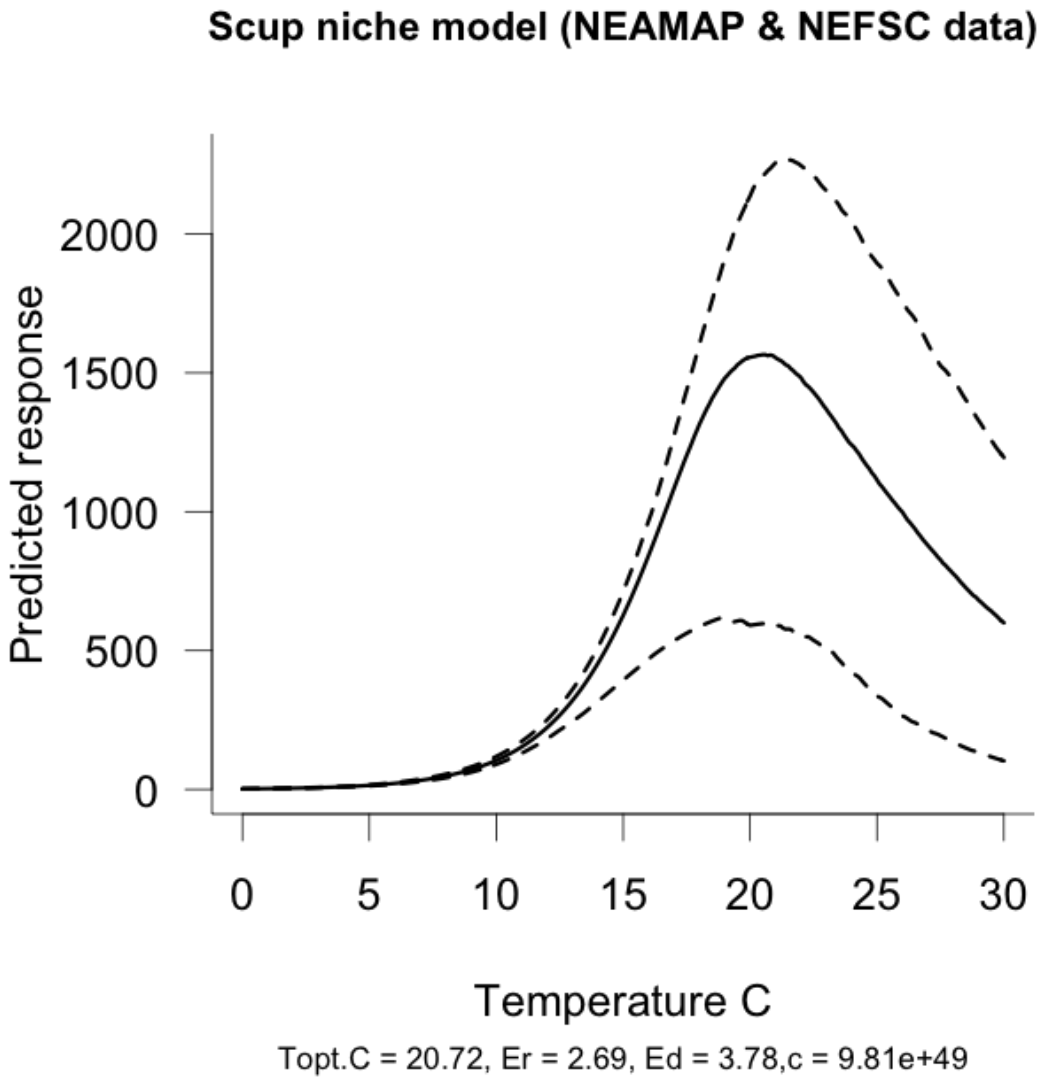

Figure A62. Plot of the thermal response curve for scup constructed by estimating parameters of the Johnson and Lewin equation (solid black line) minimizing negative binomial likelihood using catch as the response and bottom water temperature as the independent variable. Calibration data was from spring and fall bottom trawl surveys of the Northwest Atlantic conducted by the Northeast Fisheries Science Center and NEAMAP from 2008-2014. Dashed lines are 2.5% and 97.5% population prediction intervals developed using parameter estimates and the variance covariance matrix in the method described in Lande et al. (2003) and Bolker (2008). Mean maximum likelihood estimates of parameter values are indicated under the X axis label.

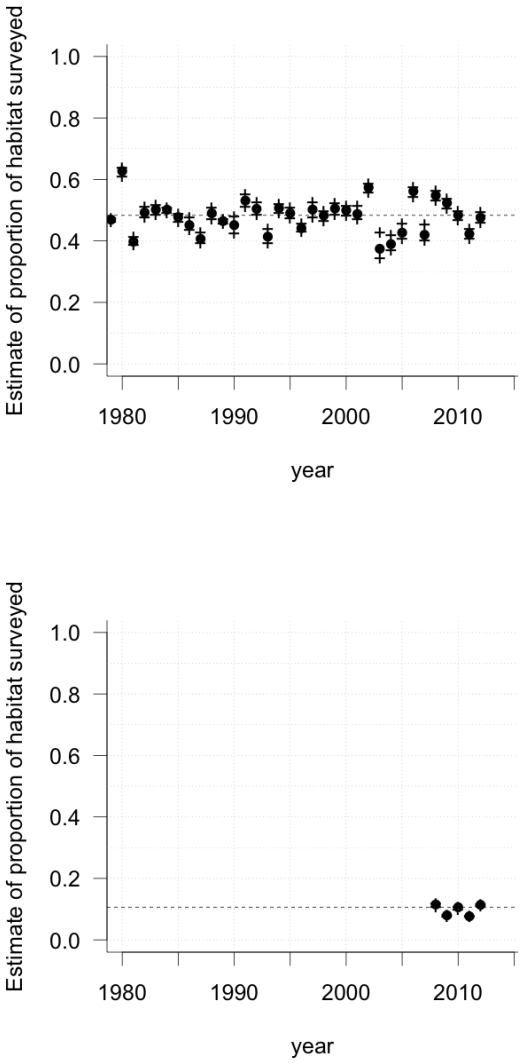

Figure A63. Estimates of the proportion of thermal habitat suitability for scup surveyed in the spring estimated in NEFSC offshore strata (*top panel*) and NEAMAP strata (*bottom panel*) using the niche model coupled to the debiased bottom temperature hindcast. Means (filled circle) and 2.5% and 97.5% population prediction intervals (+) are shown.

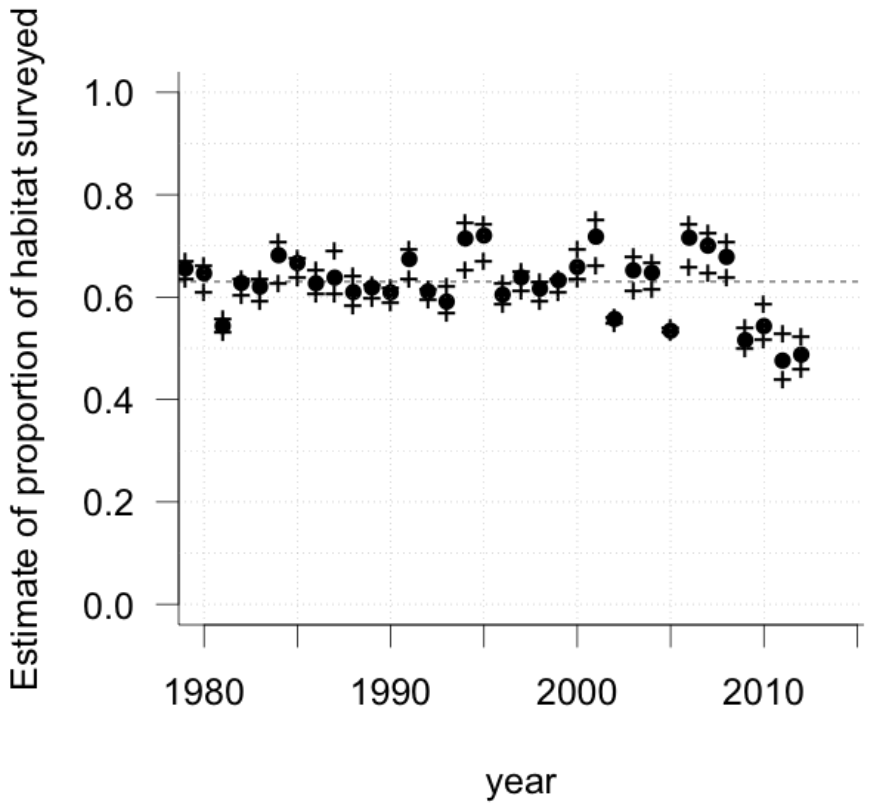

Figure A64. Estimates of the proportion of thermal habitat suitability surveyed for scup estimated using the niche model coupled to the debiased bottom temperature hindcast for NEFSC fall inshore + offshore strata. Means (filled circle) and 2.5% and 97.5% population prediction intervals (+) are shown.

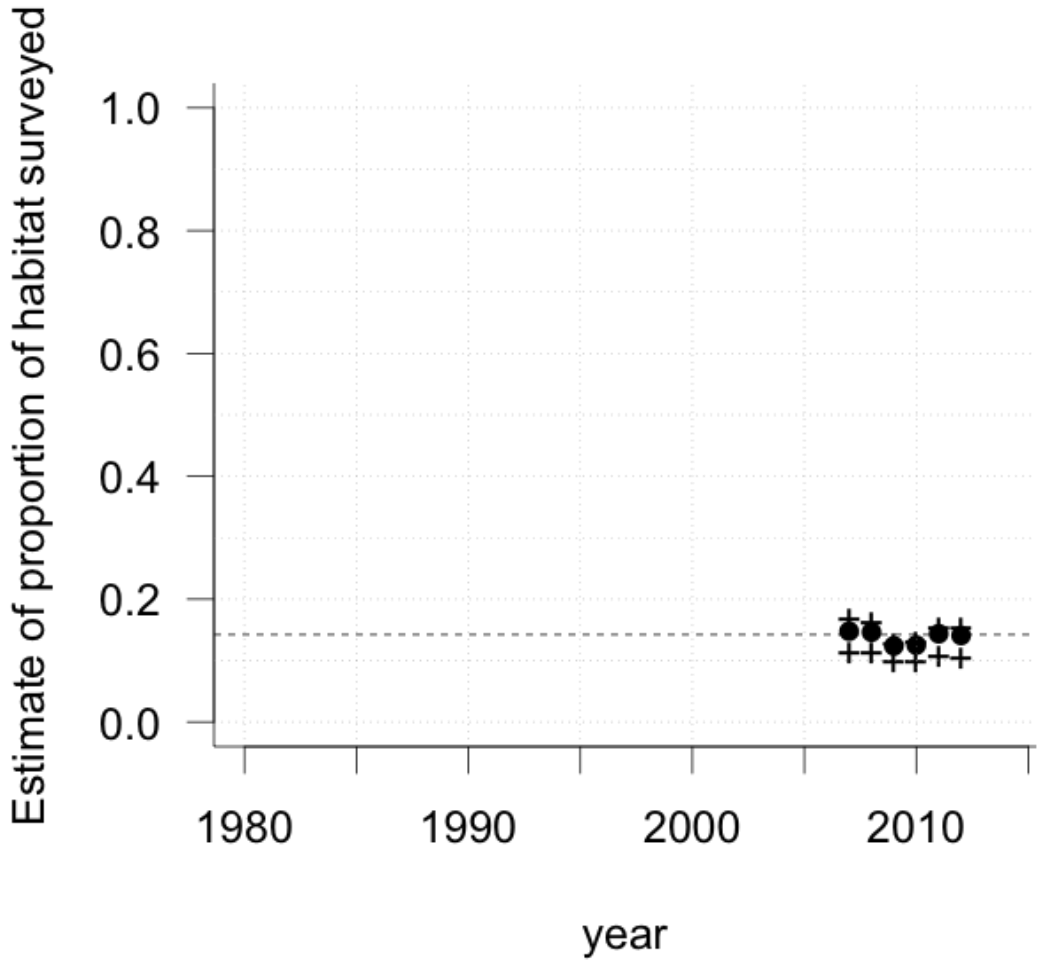

Figure A65. Estimates of the proportion of thermal habitat suitability for scup surveyed in the fall for the NEAMAP survey developed using the niche model coupled to the debiased bottom temperature hindcast. Means (filled circle) and 2.5% and 97.5% population prediction intervals (+) are shown.

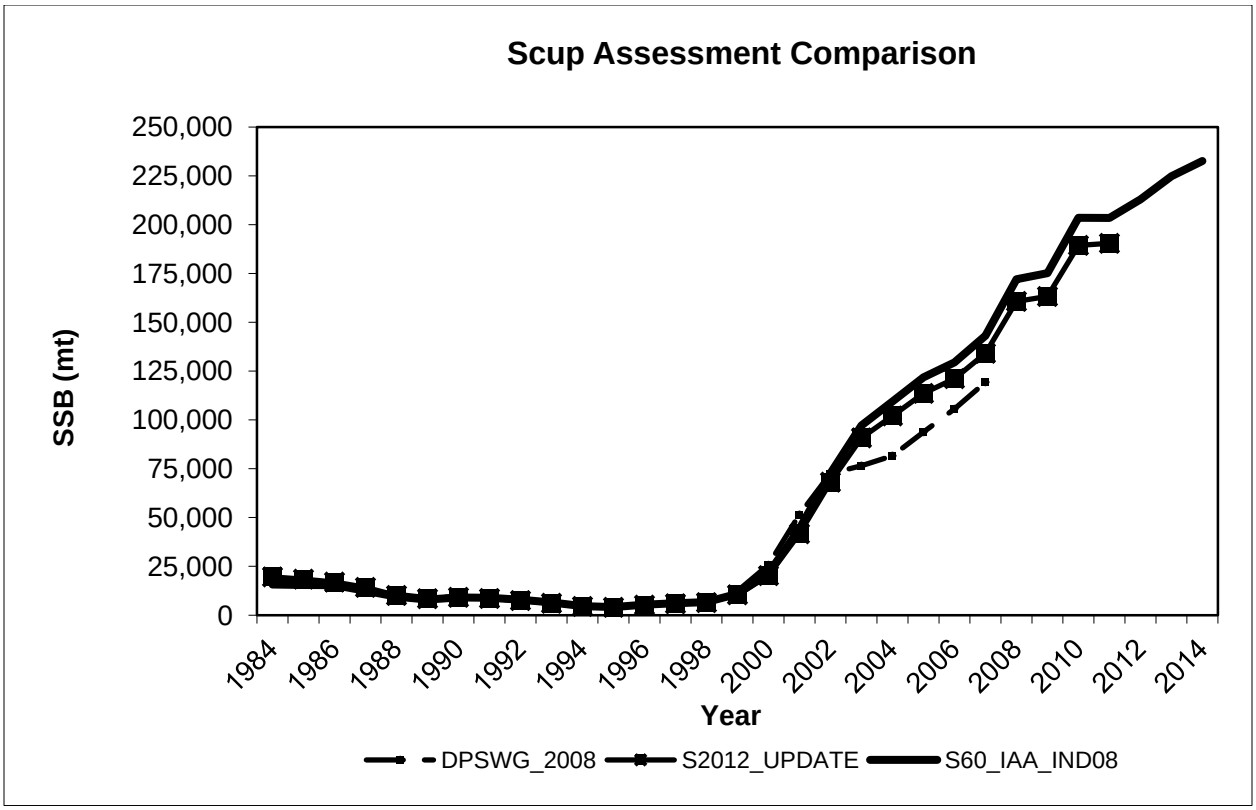

Figure A66. Comparison of 2008 DPSWG, 2012 Model Update, and 2015 SAW 60 IAA_IND08 (2008 model updated with data through 2014) estimates of SSB.

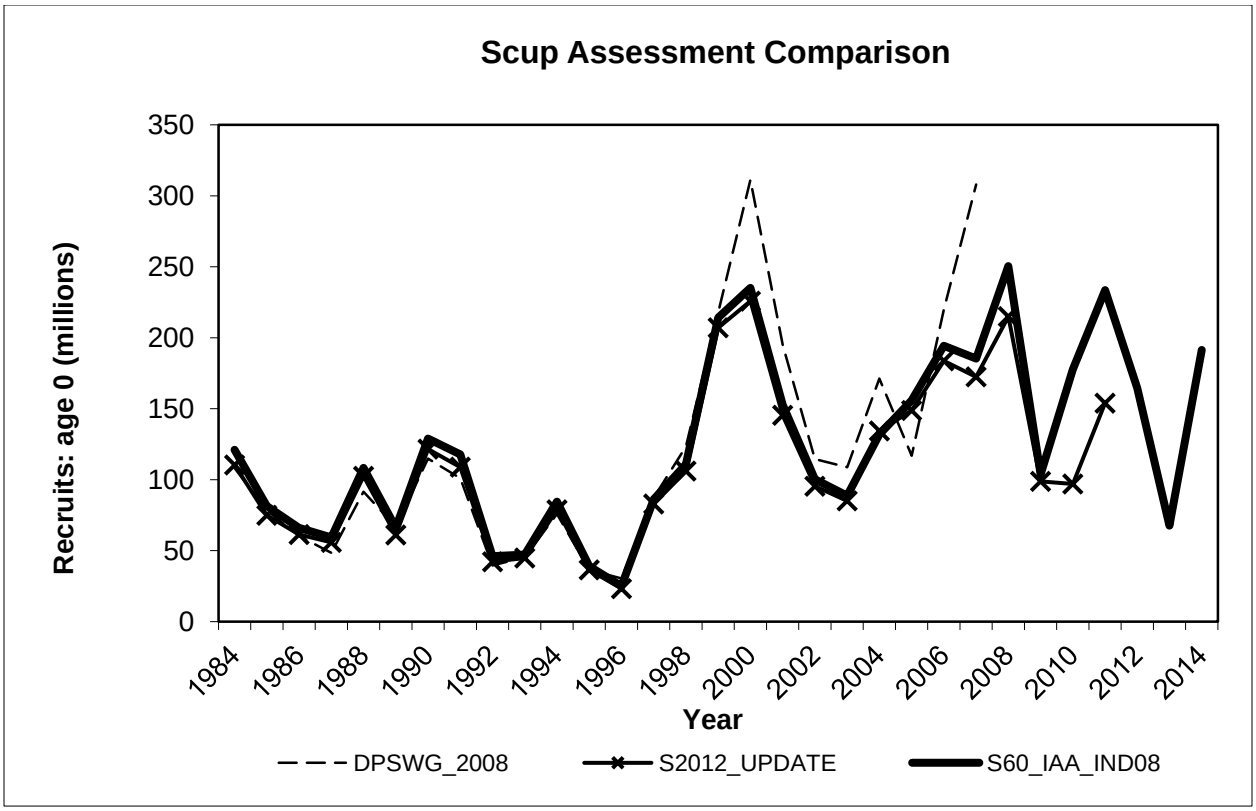

Figure A67. Comparison of 2008 DPSWG, 2012 Model Update, and 2015 SAW 60 IAA_IND08 (2008 model updated with data through 2014) estimates of R.

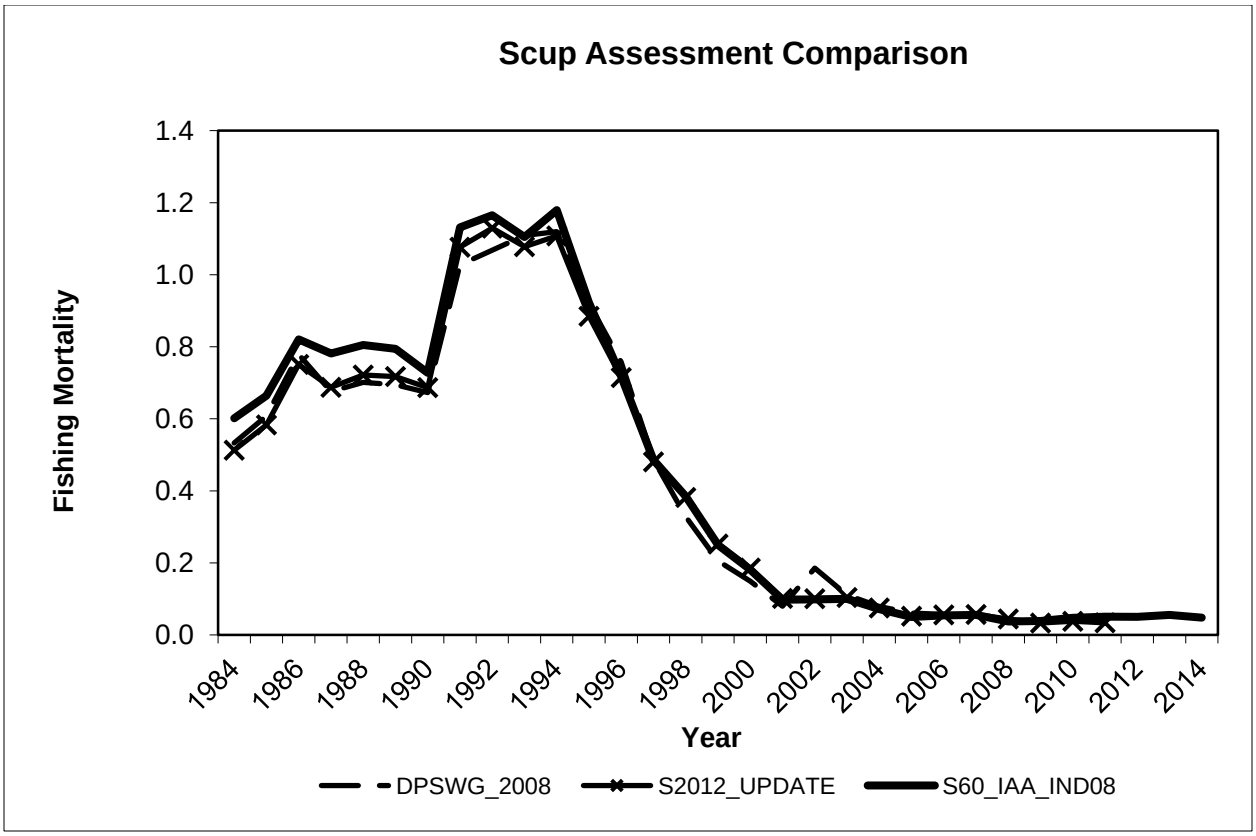

Figure A68. Comparison of 2008 DPSWG, 2012 Model Update, and 2015 SAW 60 IAA_IND08 (2008 model updated with data through 2014) estimates of F.

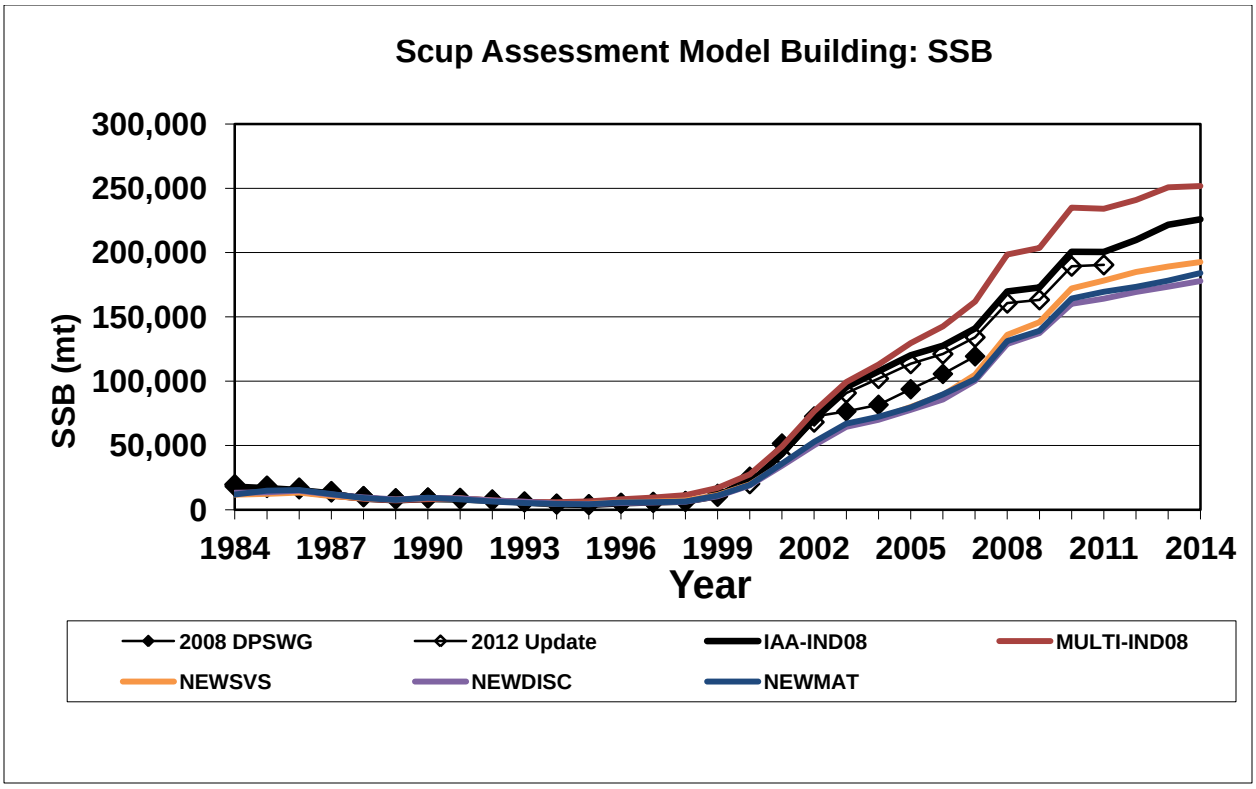

Figure A69. Comparison of 2008 DPSWG, 2012 Model Update, and 2015 SAW 60 IAA_IND08 through NEWMAT model estimates of SSB.

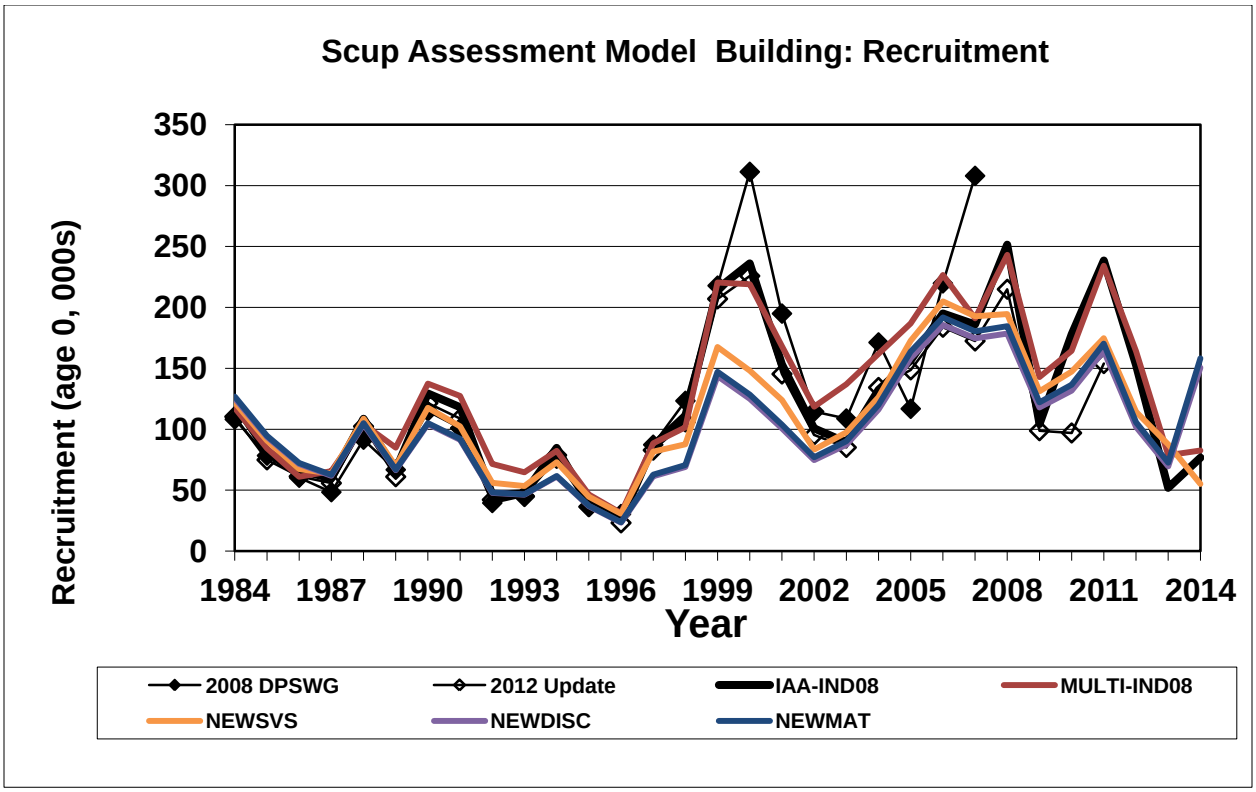

Figure A70. Comparison of 2008 DPSWG, 2012 Model Update, and 2015 SAW 60 IAA_IND08 through NEWMAT model estimates of R.

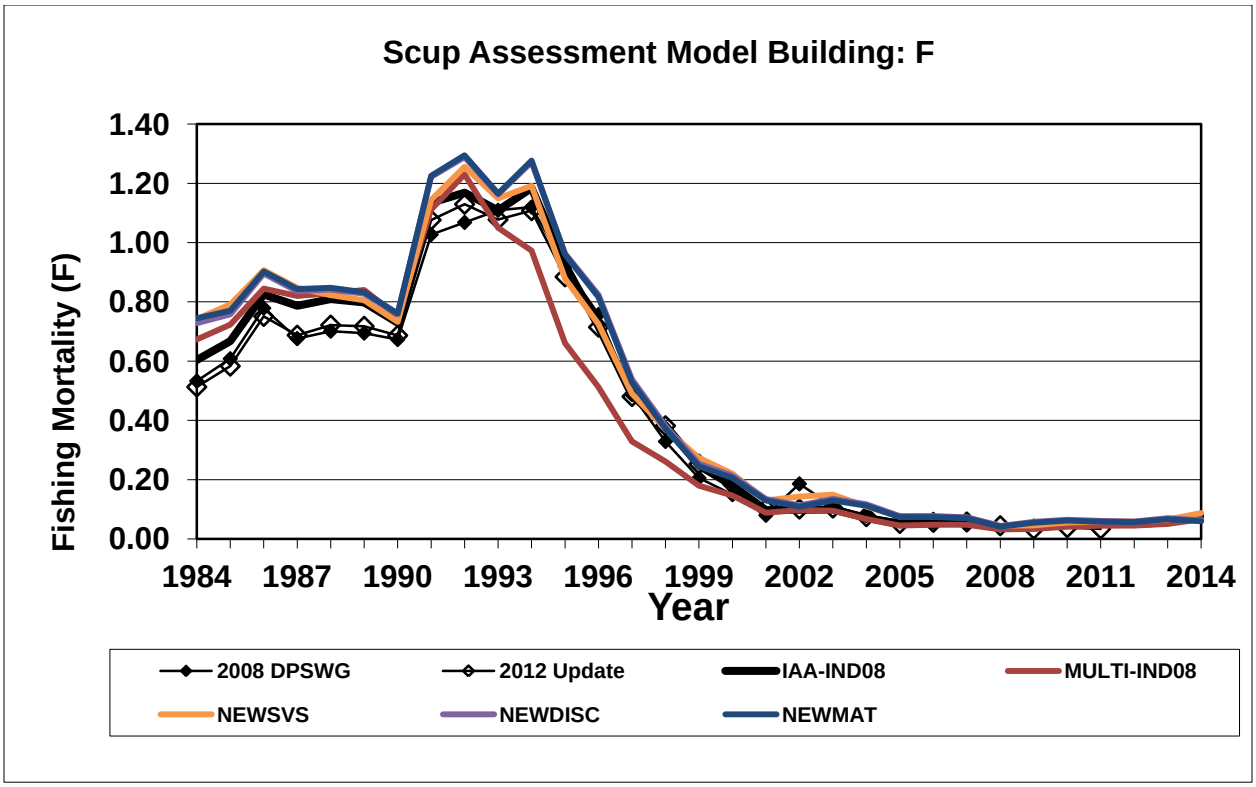

Figure A71. Comparison of 2008 DPSWG, 2012 Model Update, and 2015 SAW S60_IAA_IND08 through NEWMAT model estimates of F.

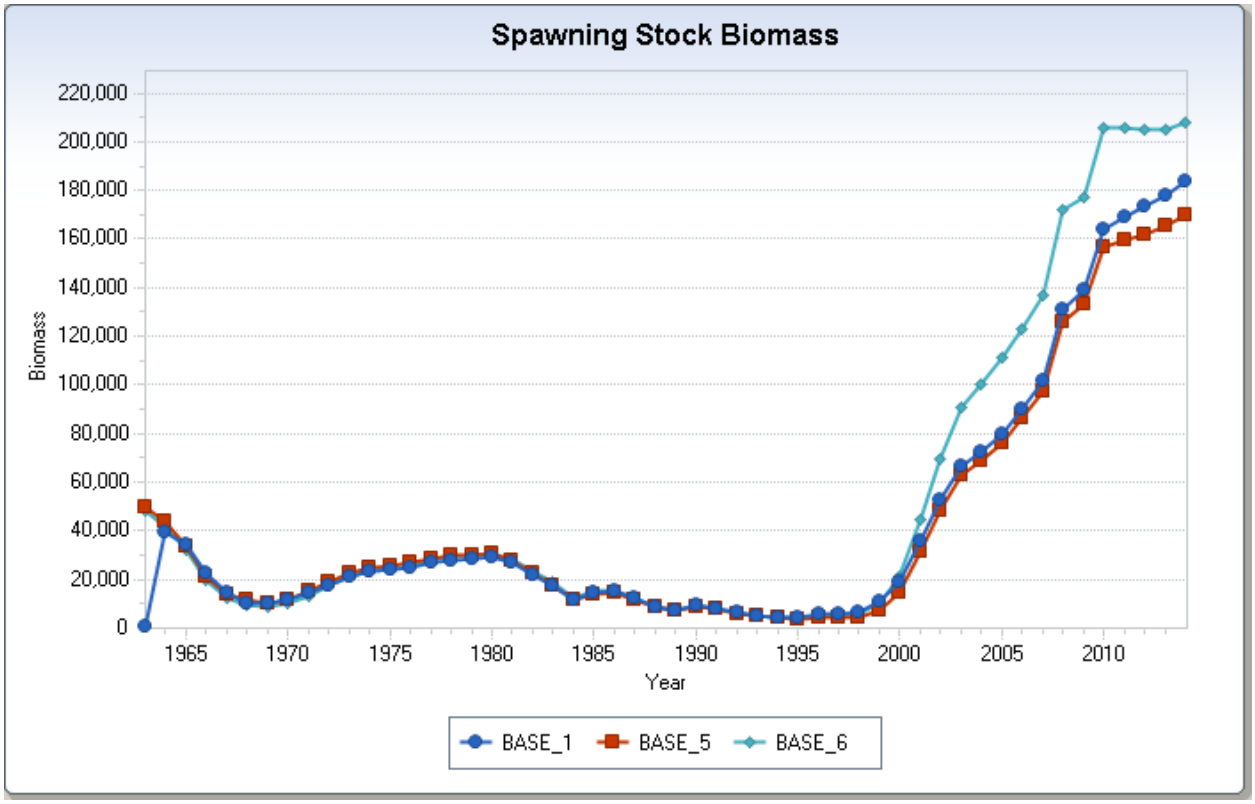

Figure A72. Comparison of 2015 SAW 60 models BASE_1, BASE_5, and BASE_6 estimates of SSB.

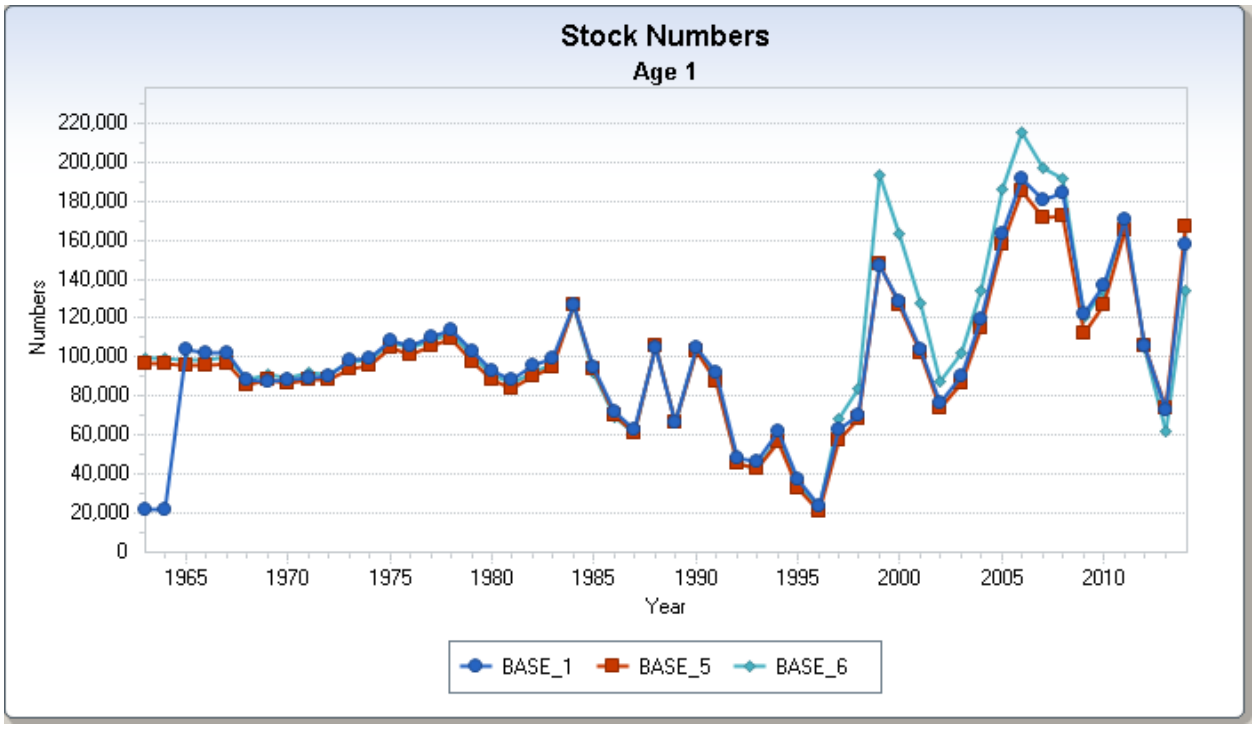

Figure A73. Comparison of 2015 SAW 60 models BASE_1, BASE_5, and BASE_6 estimates of R (recruitment at true age 0, model age 1).

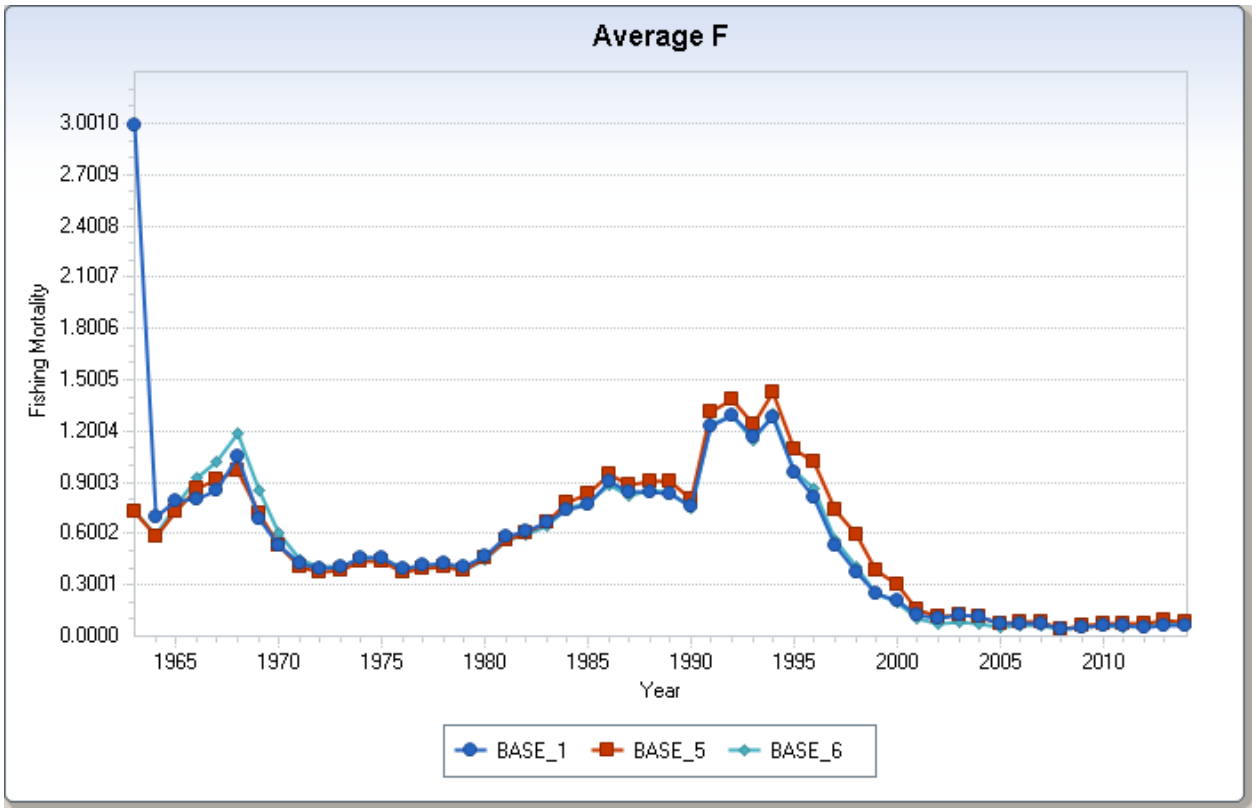

Figure A74. Comparison of 2015 SAW 60 models BASE_1, BASE_5, and BASE_6 estimates of F.

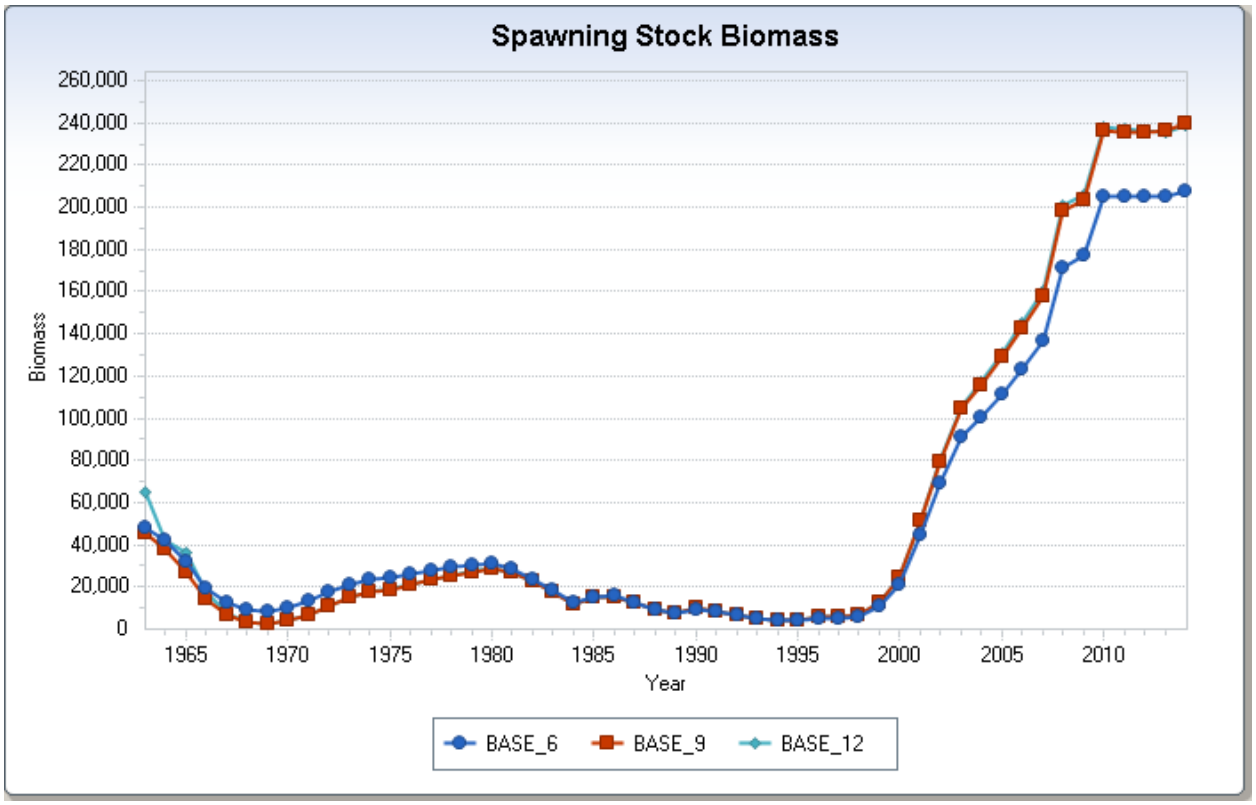

Figure A75. Comparison of 2015 SAW 60 models BASE_6, BASE_9, and BASE_12 estimates of SSB.

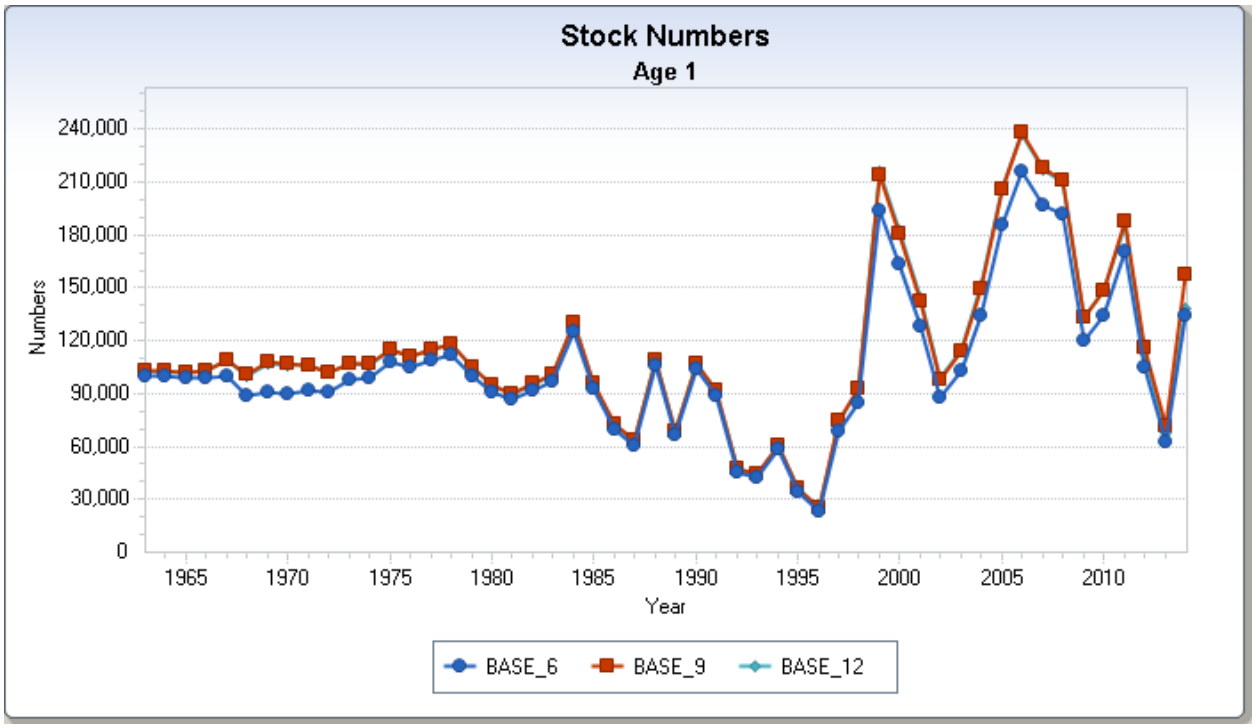

Figure A76. Comparison of 2015 SAW 60 models BASE_6, BASE_9, and BASE_12 estimates of R (recruitment at true age 0, model age 1).

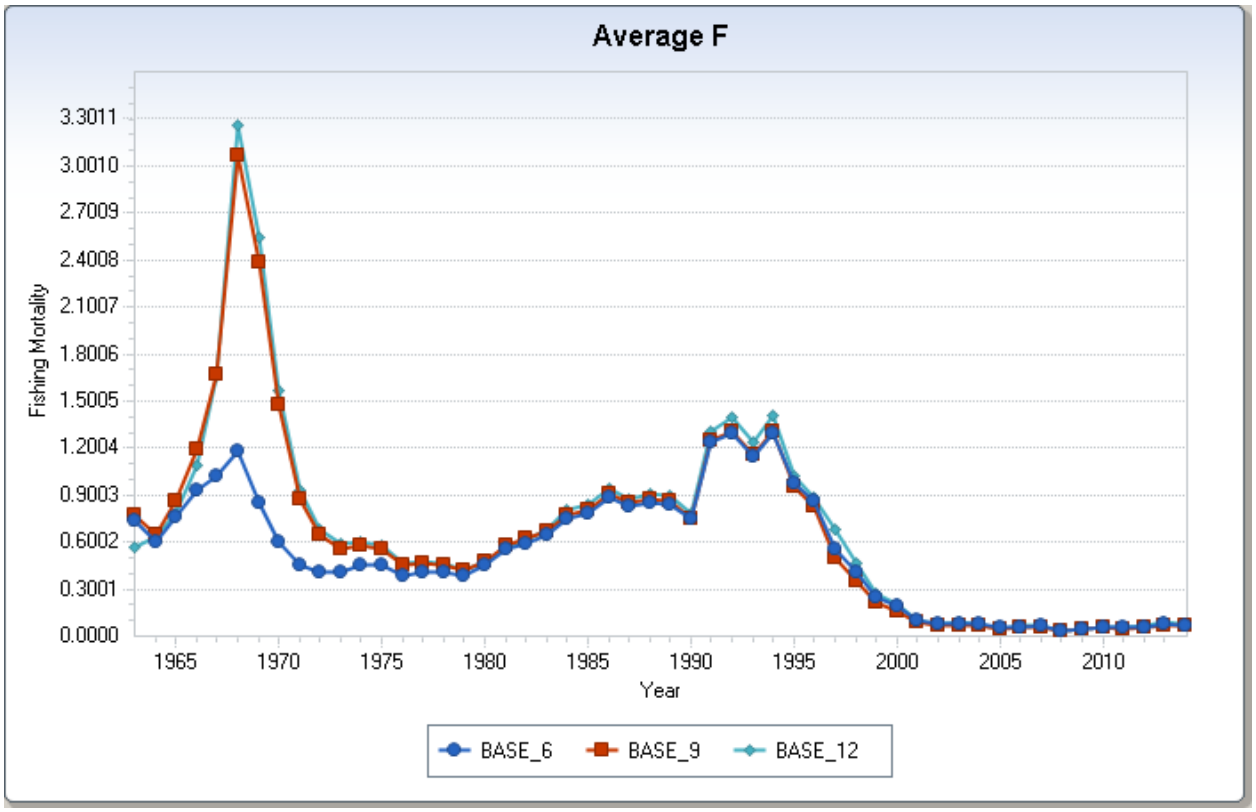

Figure A77. Comparison of 2015 SAW 60 models BASE_6, BASE_9, and BASE_12 estimates of F.

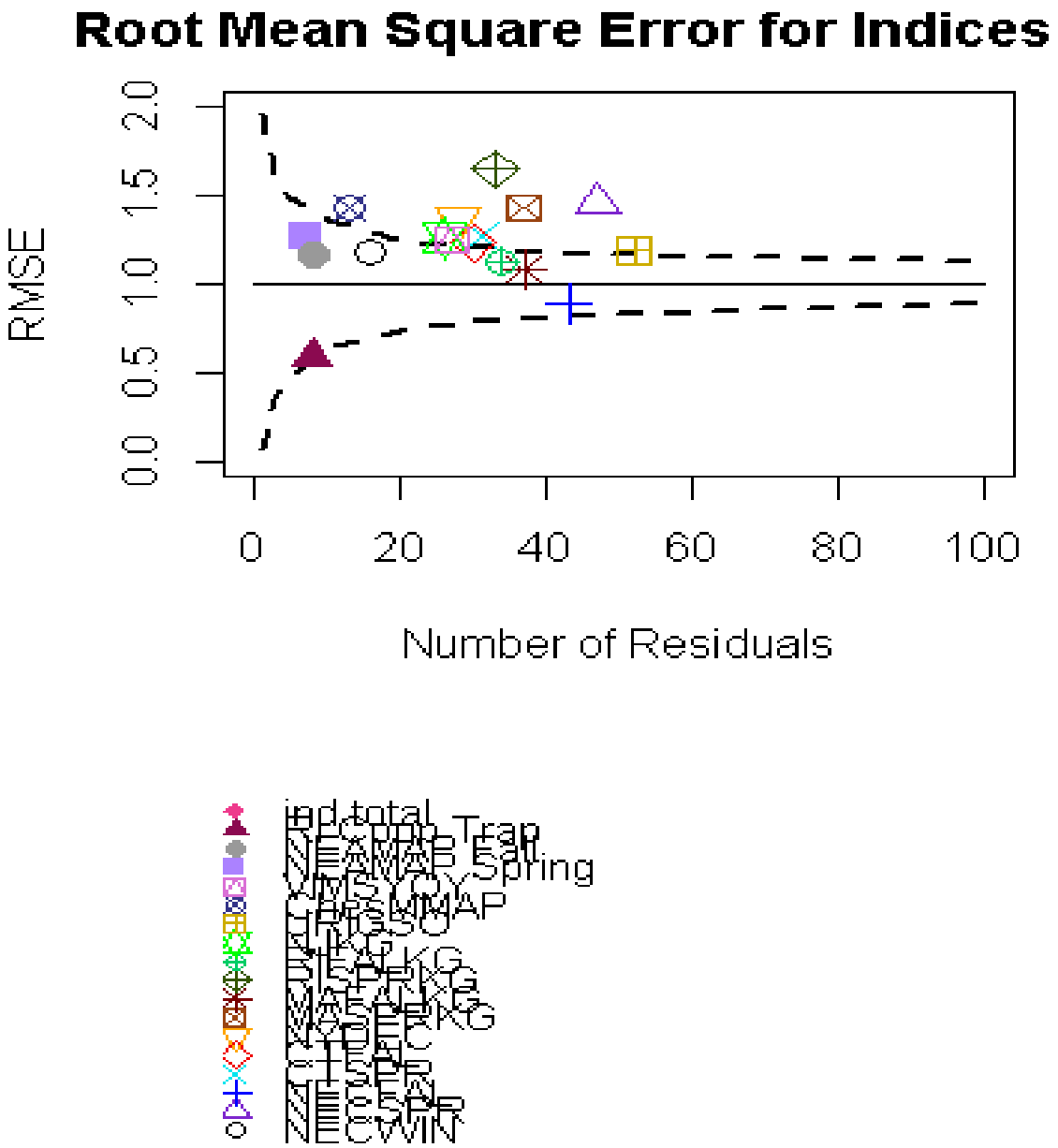

Figure A78. RMSE plot for run S60_BASE_13.

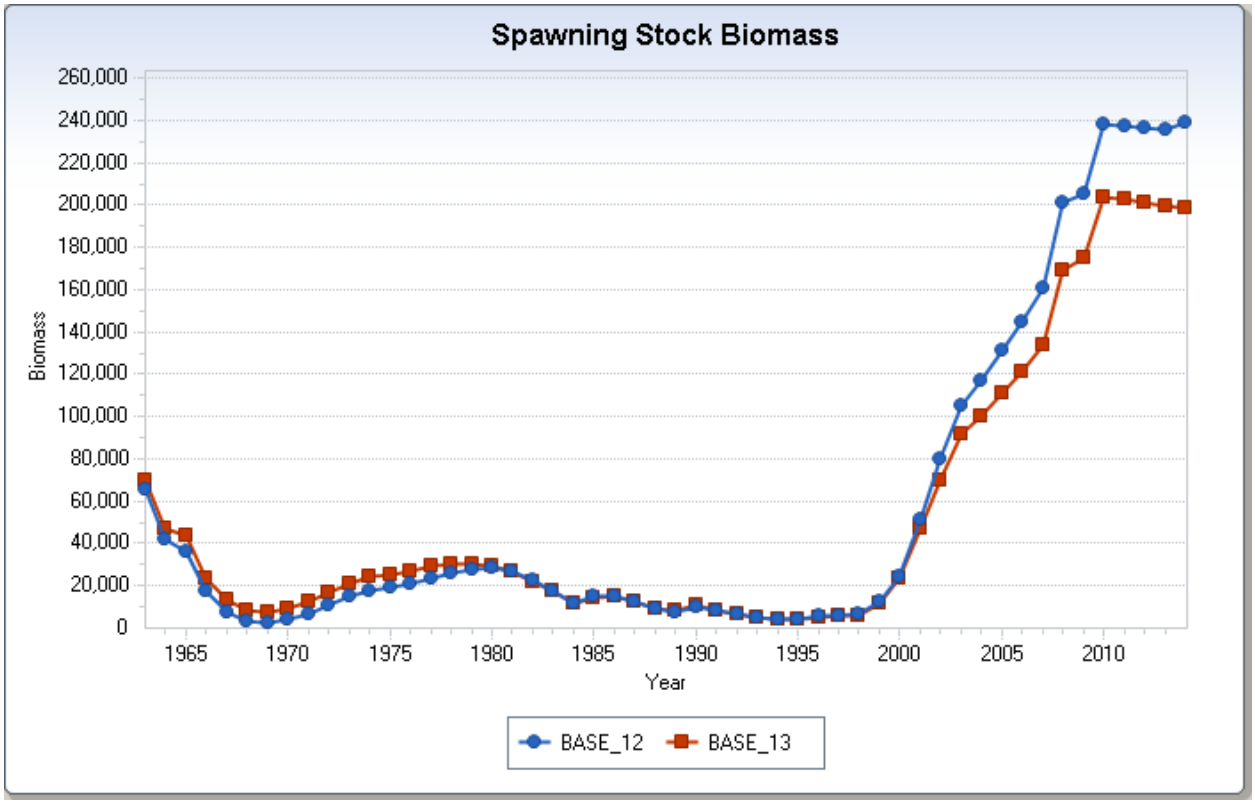

Figure A79. Comparison of 2015 SAW 60 models BASE_12 and BASE_13 estimates of SSB.

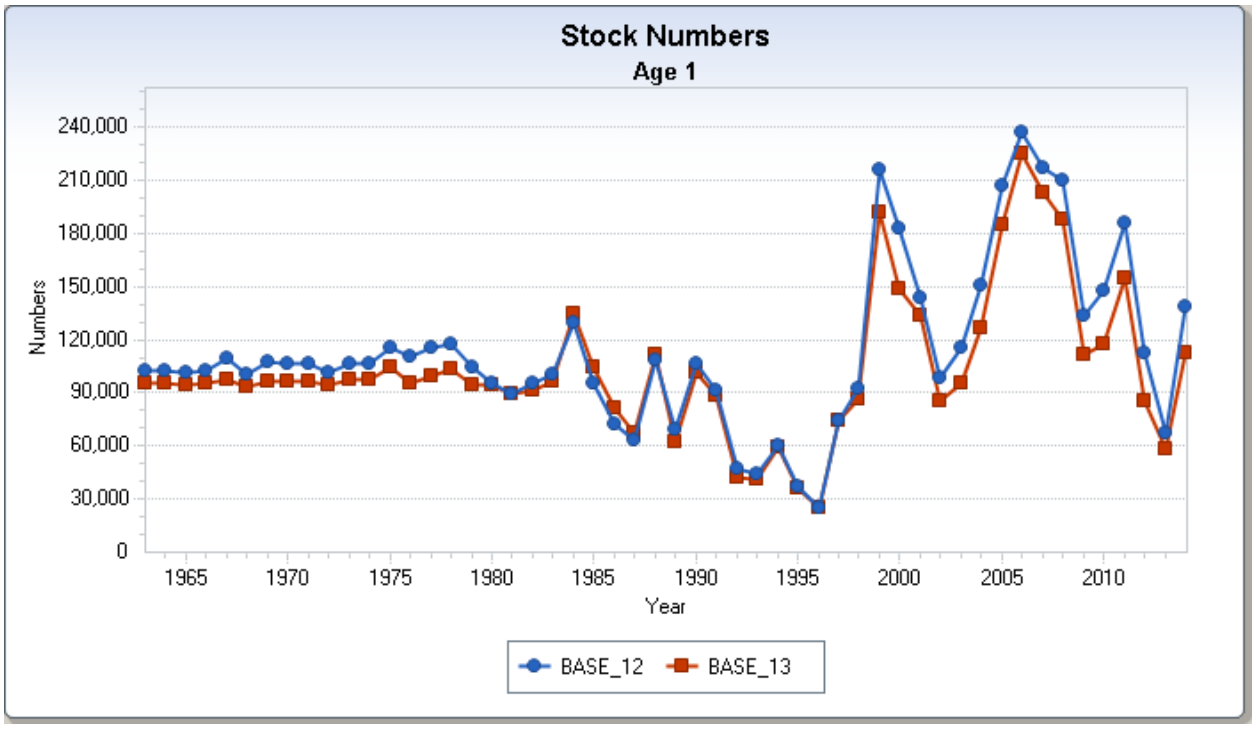

Figure A80. Comparison of 2015 SAW 60 models BASE_12 and BASE_13 estimates of R (recruitment at true age 0, model age 1).

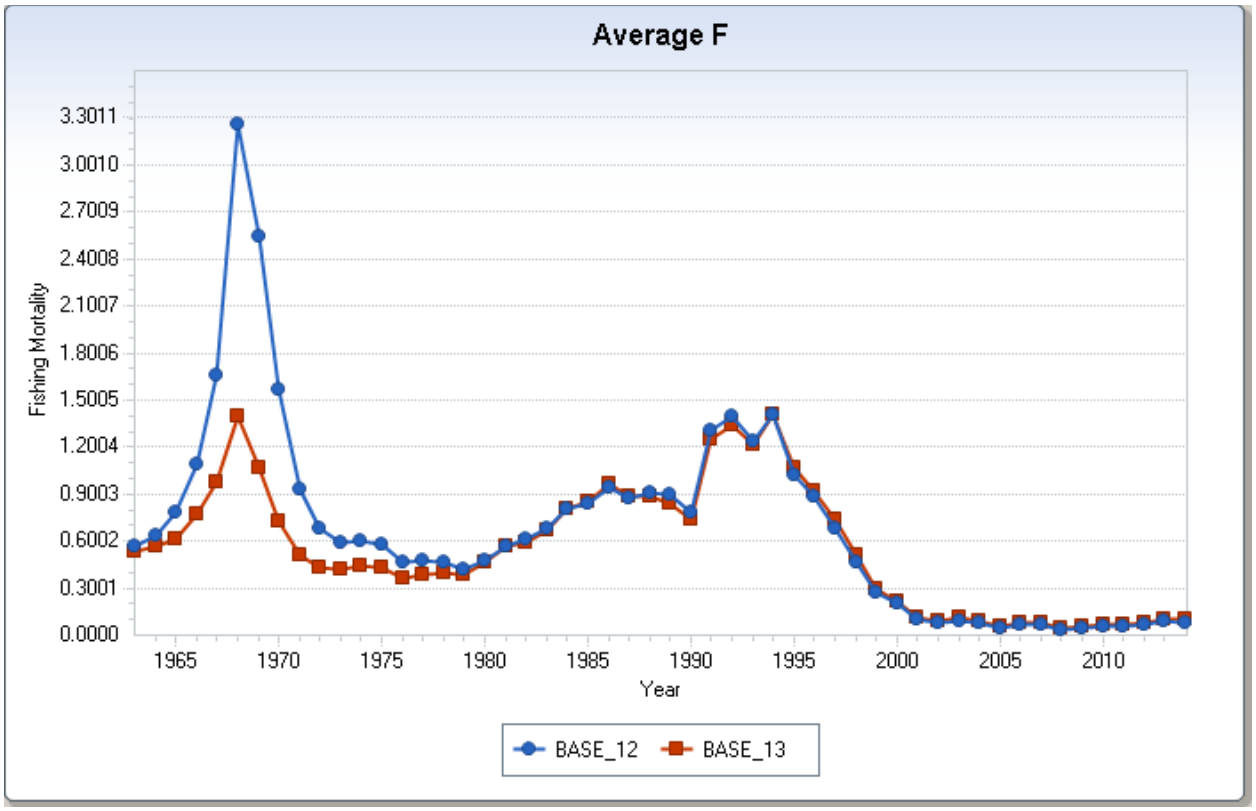

Figure A81. Comparison of 2015 SAW 60 models BASE_12 and BASE_13 estimates of F.

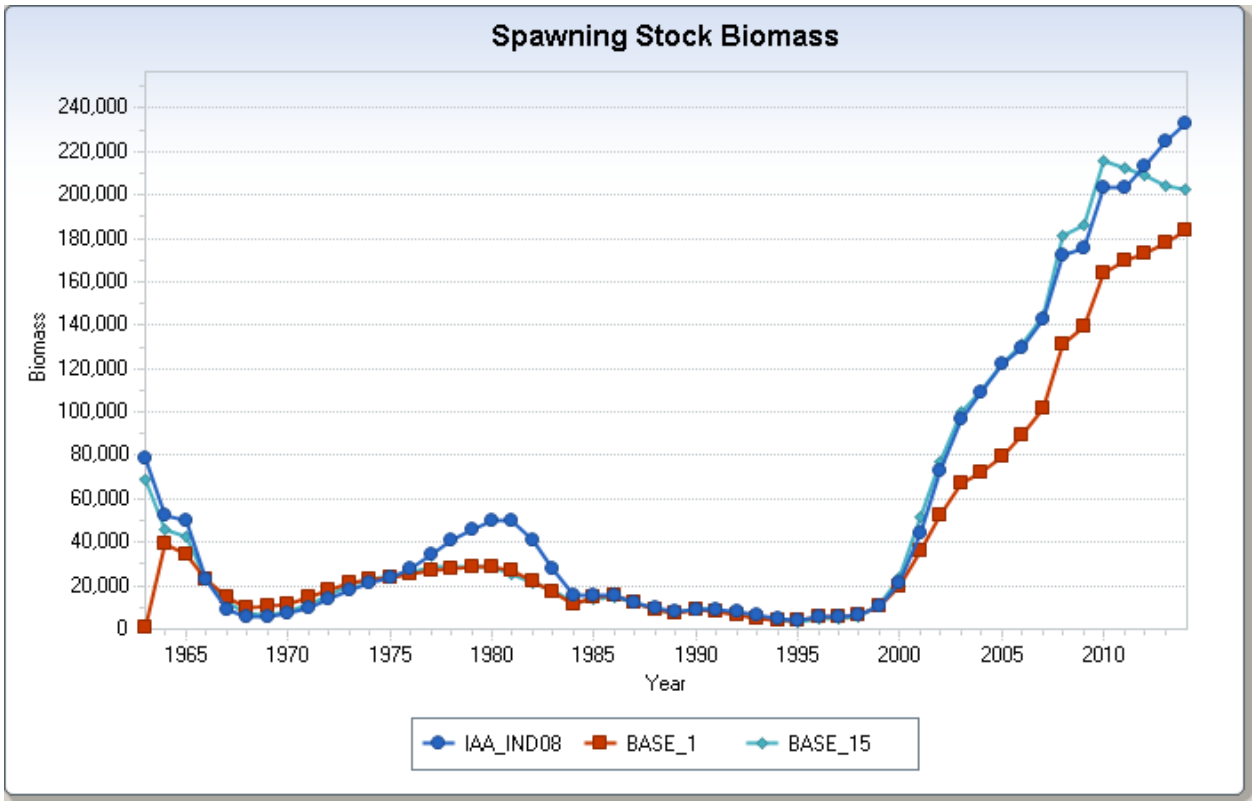

Figure A82. Comparison of 2015 SAW 60 models IAA_IND08, BASE_1 and BASE_15 estimates of SSB.

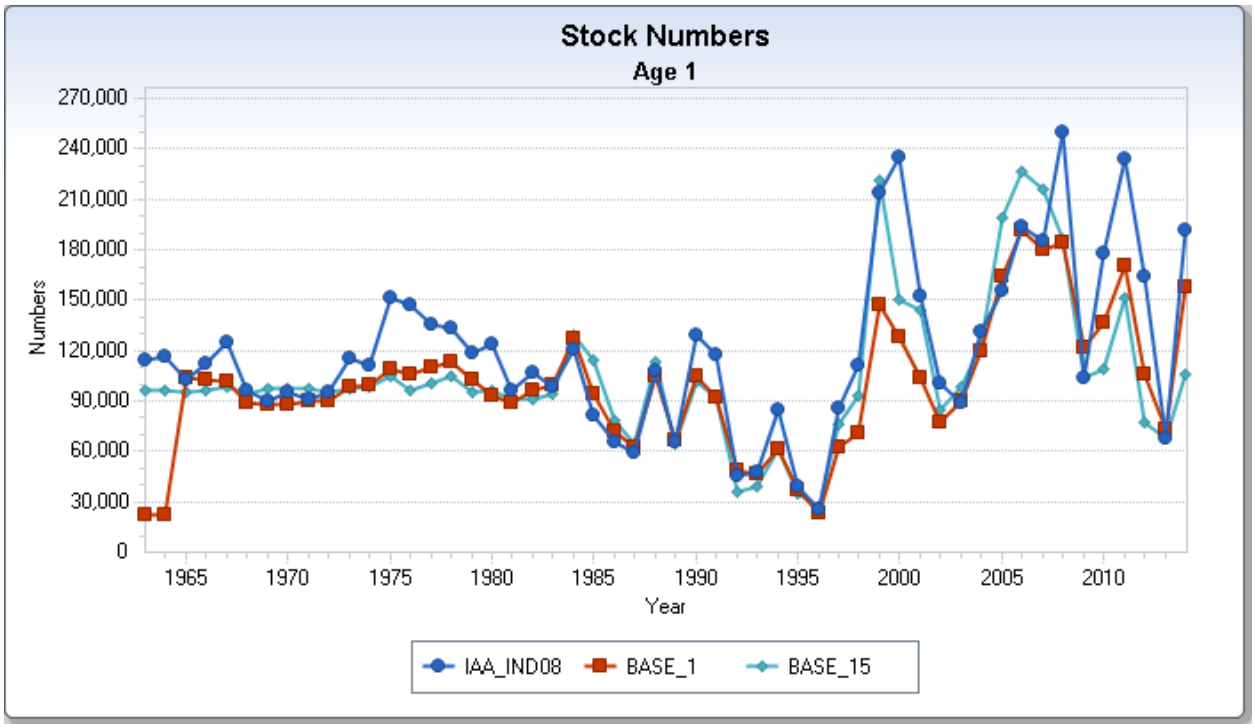

Figure A83. Comparison of 2015 SAW 60 models IAA_IND08, BASE_1 and BASE_15 estimates of R (recruitment at true age 0, model age 1).

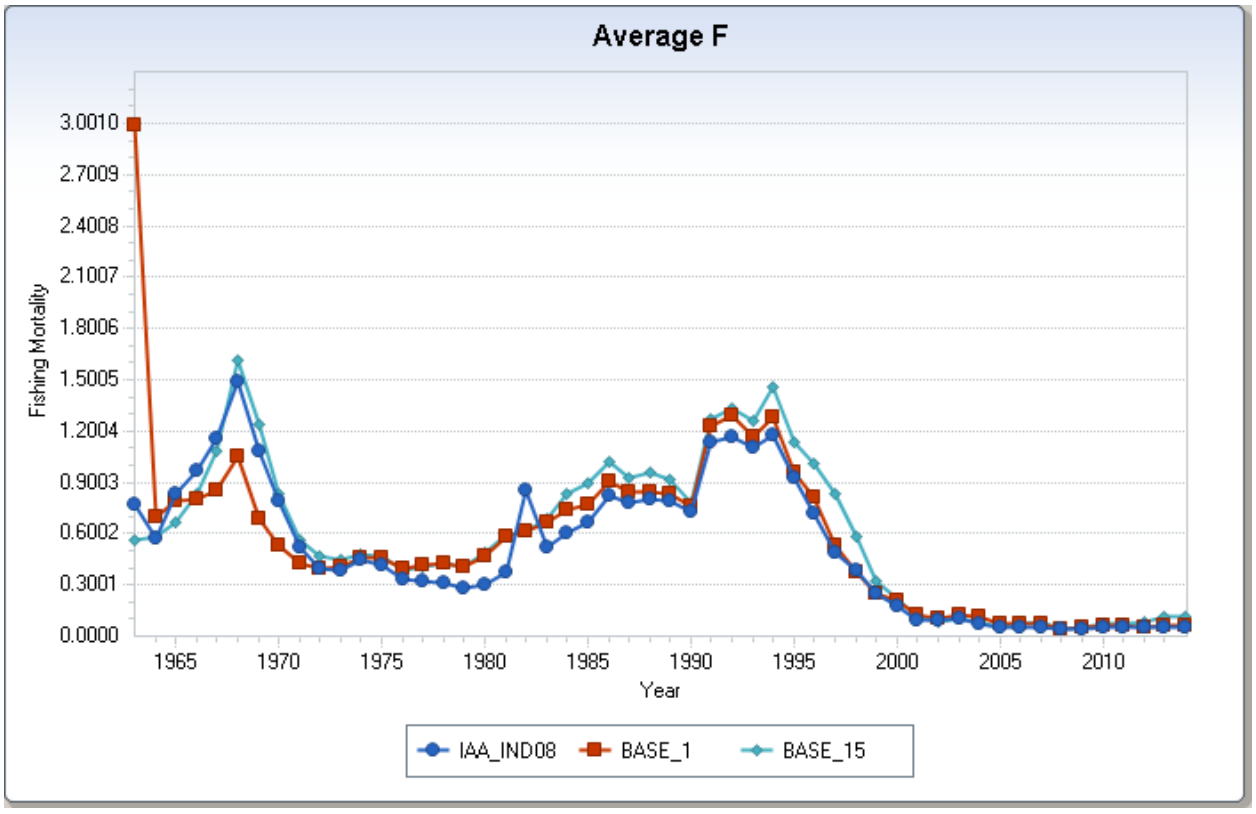

Figure A84. Comparison of 2015 SAW 60 models IAA_IND08, BASE_1 and BASE_15 estimates of F.

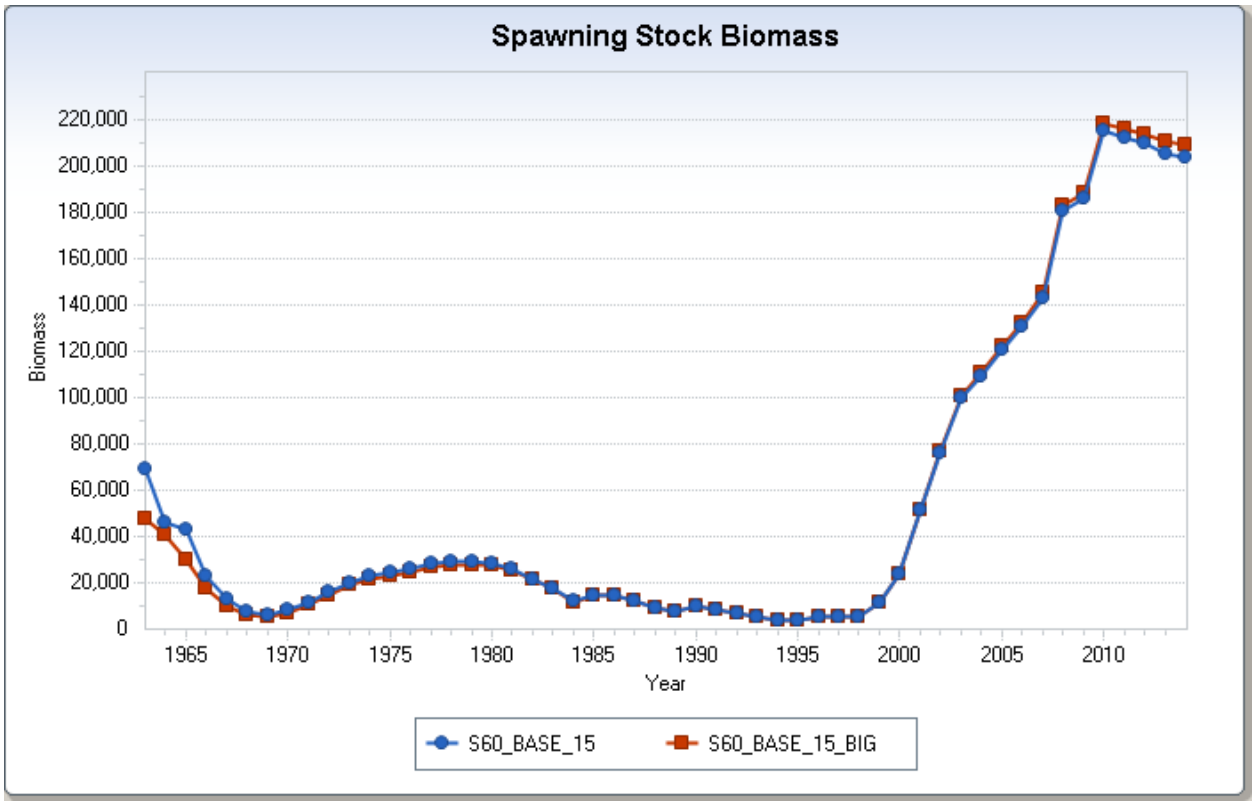

Figure A85. Comparison of run S60_BASE_15 (all calibrated ALB indices) with S60_BASE_15_BIG (ALB indices for 1968/1972 -2008; BIG indices for 2009-2014): SSB.

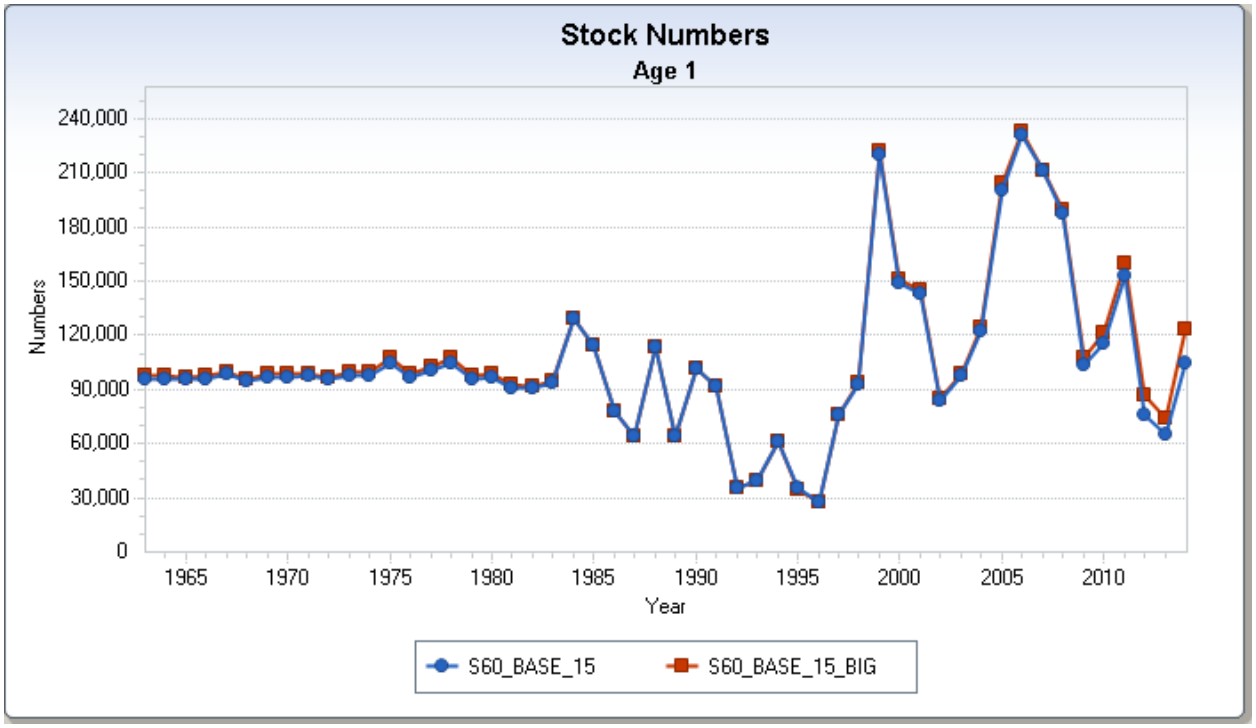

Figure A86. Comparison of run S60_BASE_15 (all calibrated ALB indices) with S60_BASE_15_BIG (ALB indices for 1968/1972 -2008; BIG indices for 2009-2014): R (recruitment at true age 0, model age 1).

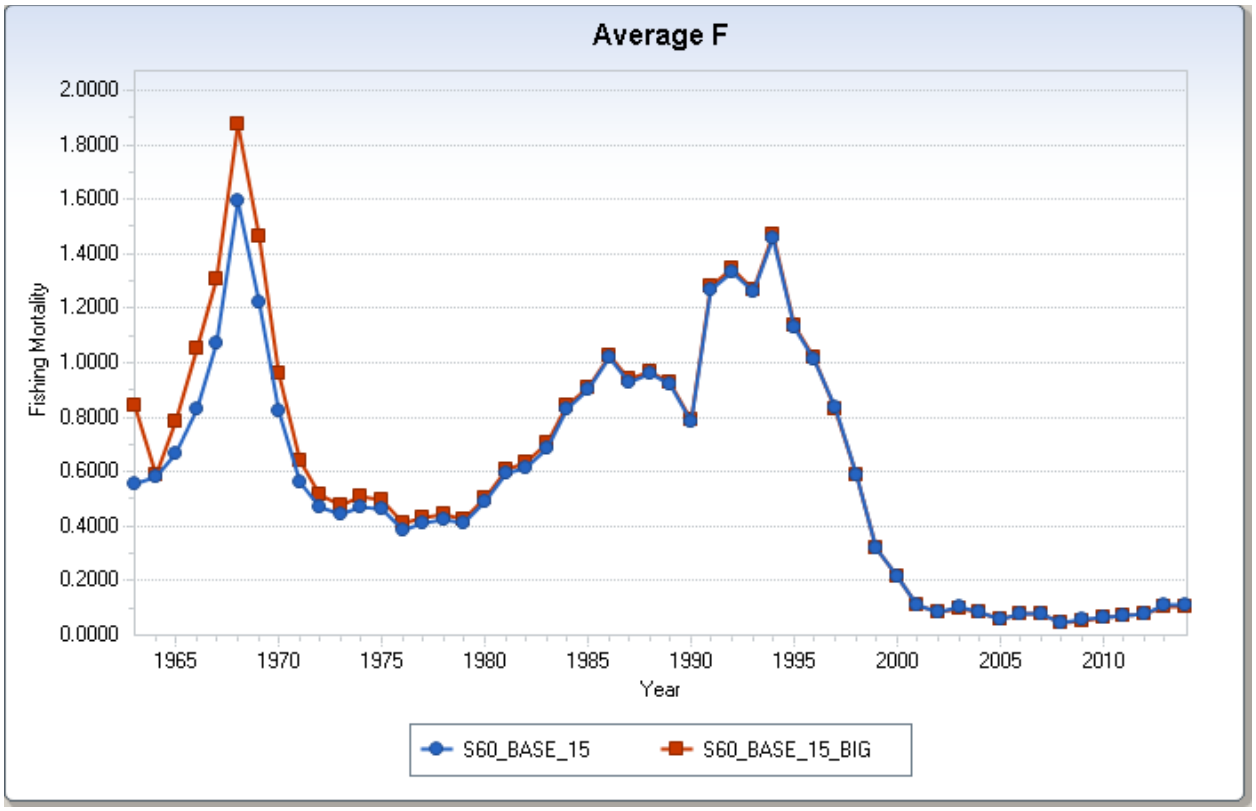

Figure A87. Comparison of run S60_BASE_15 (all calibrated ALB indices) with S60_BASE_15_BIG (ALB indices for 1968/1972 -2008; BIG indices for 2009-2014): F.

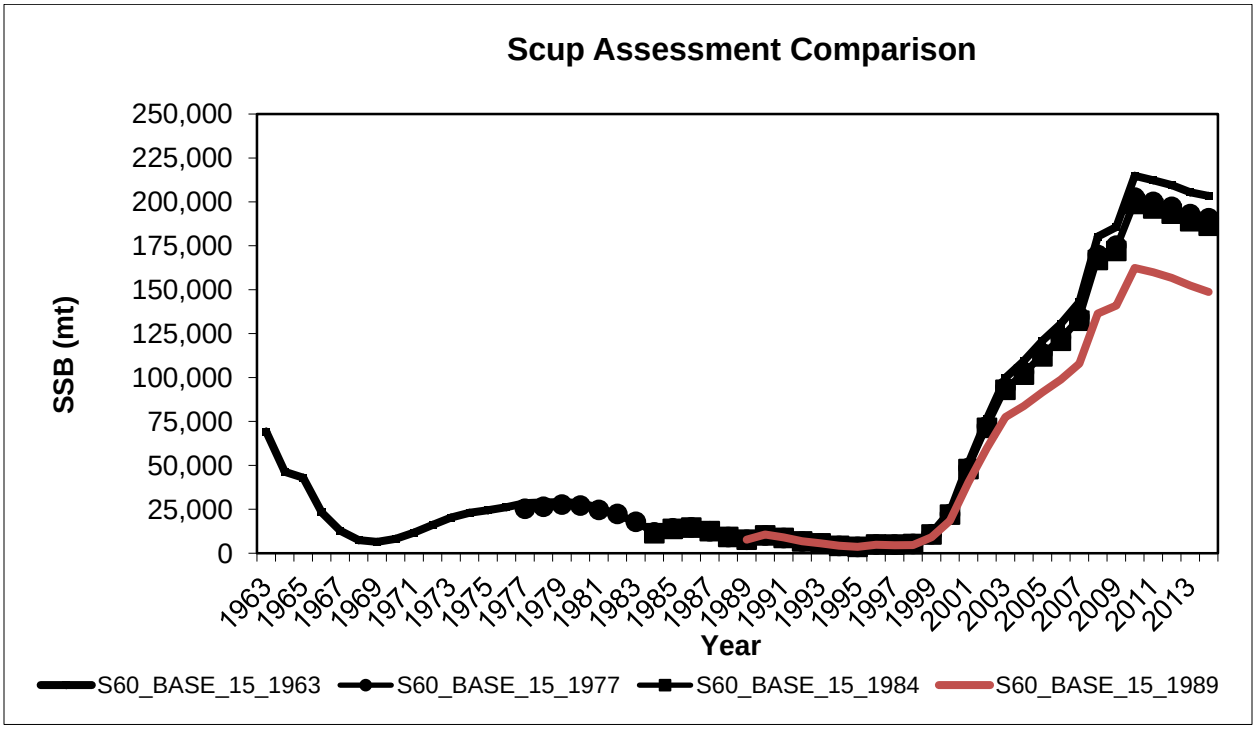

Figure A88. Comparison of the S60_BASE_15 run starting in 1963, with 3 alternatives starting in 1977, 1984, and 1989: SSB.

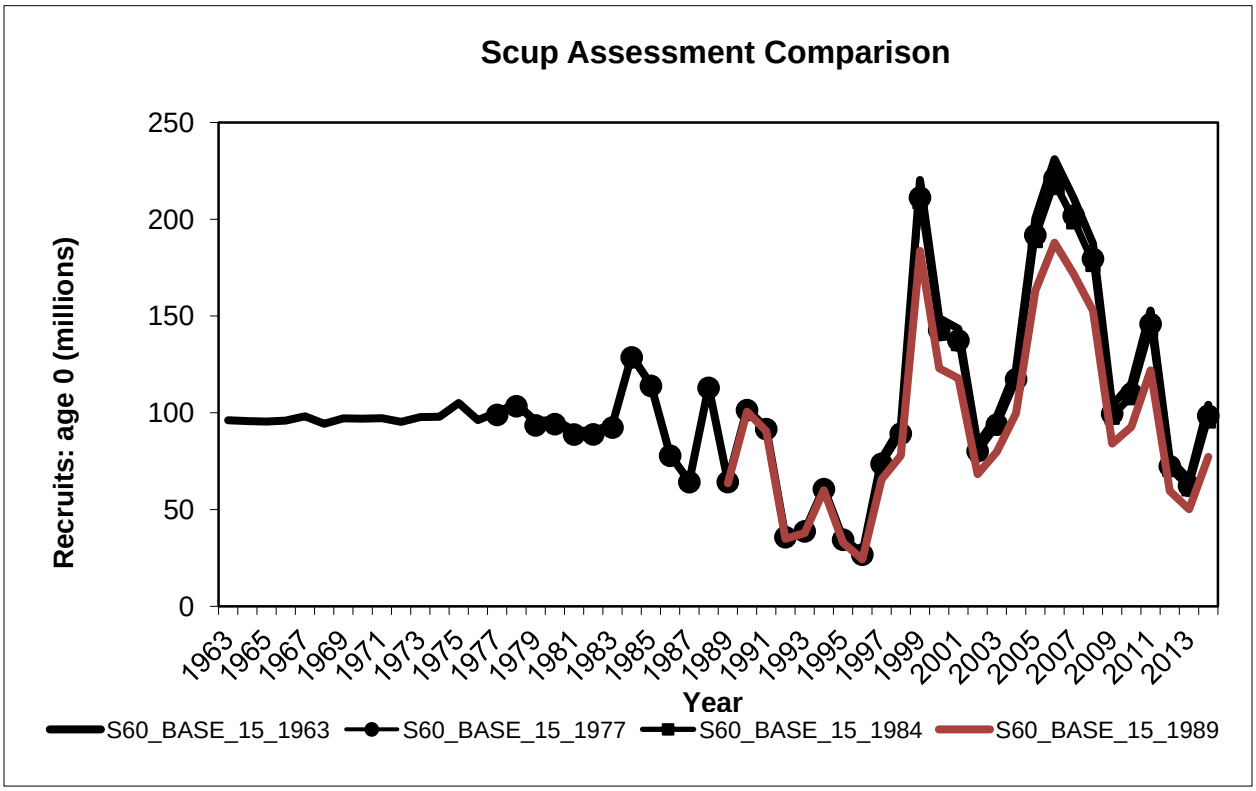

Figure A89. Comparison of the S60_BASE_15 run starting in 1963, with 3 alternatives starting in 1977, 1984, and 1989: R (recruitment at age 0, model age 1).

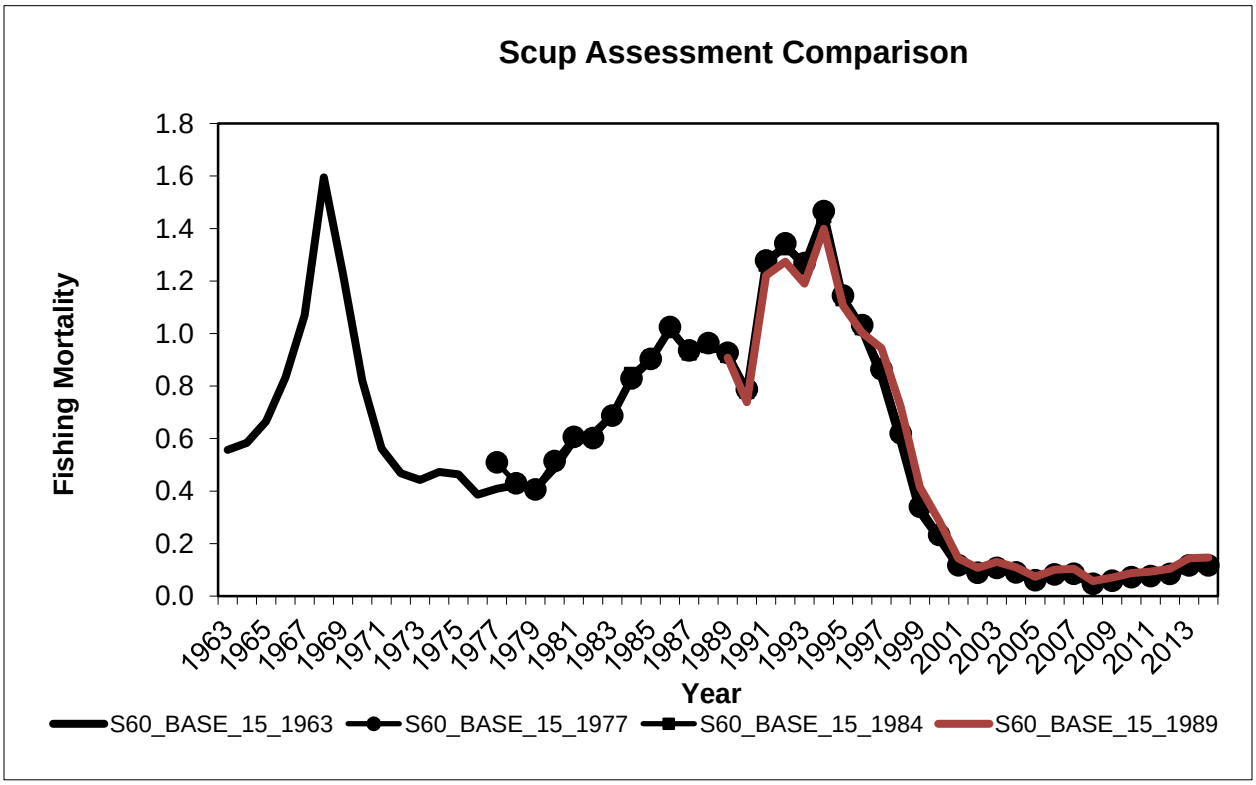

Figure A90. Comparison of the S60_BASE_15 run starting in 1963, with 3 alternatives starting in 1977, 1984, and 1989: F.

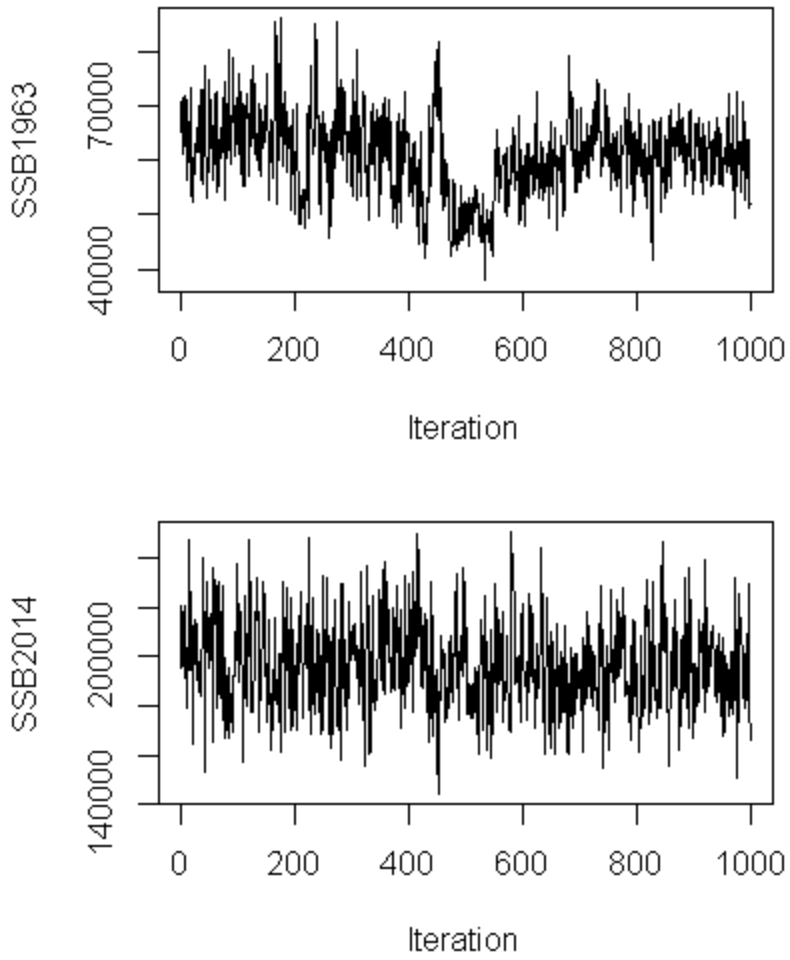

Figure A91. Run S60_BASE_15_1963 MCMC chains for SSB.

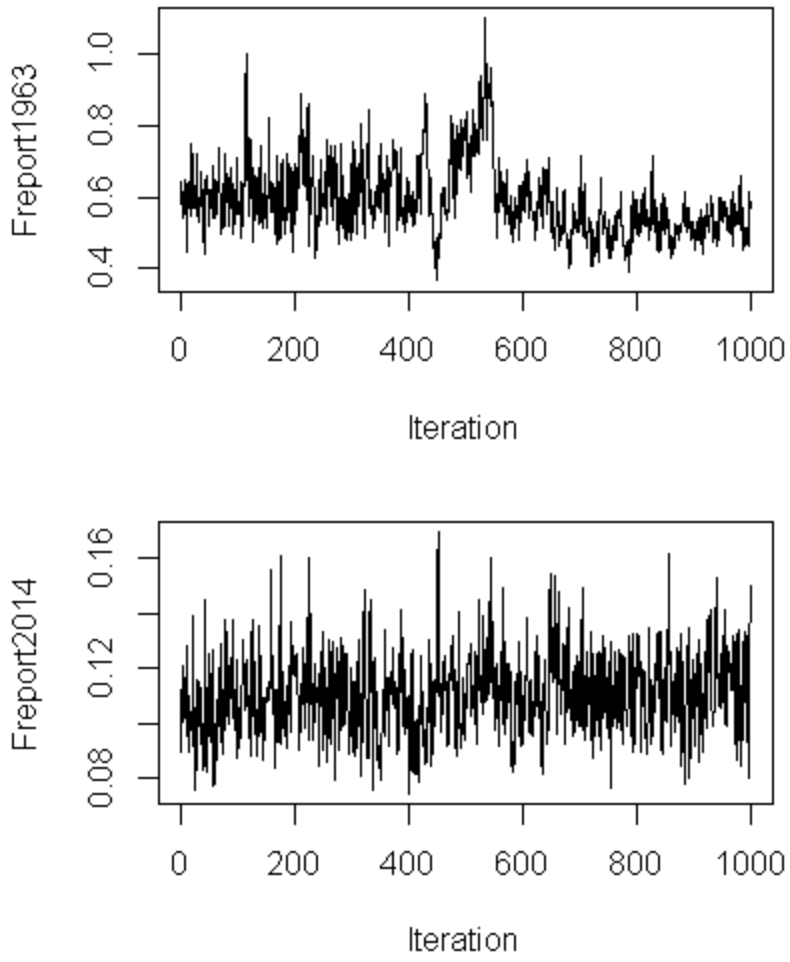

Figure A92. Run S60_BASE_15_1963 MCMC chains for F.

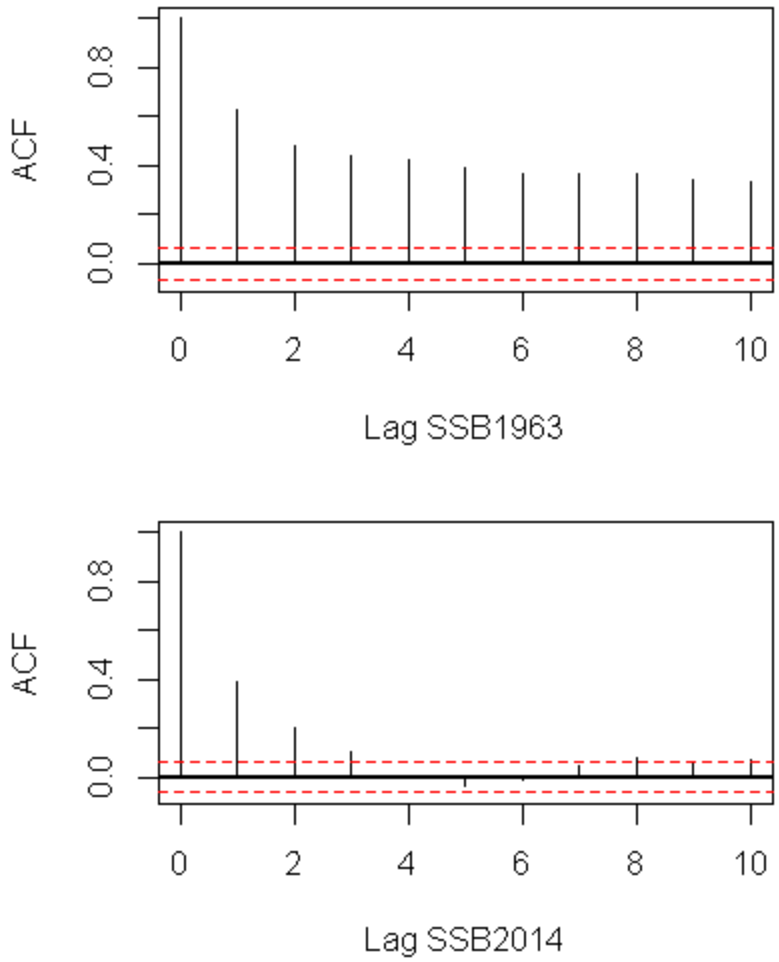

Figure A93. Autocorrelation plot for run S60_BASE_15_1963 MCMC estimates: SSB.

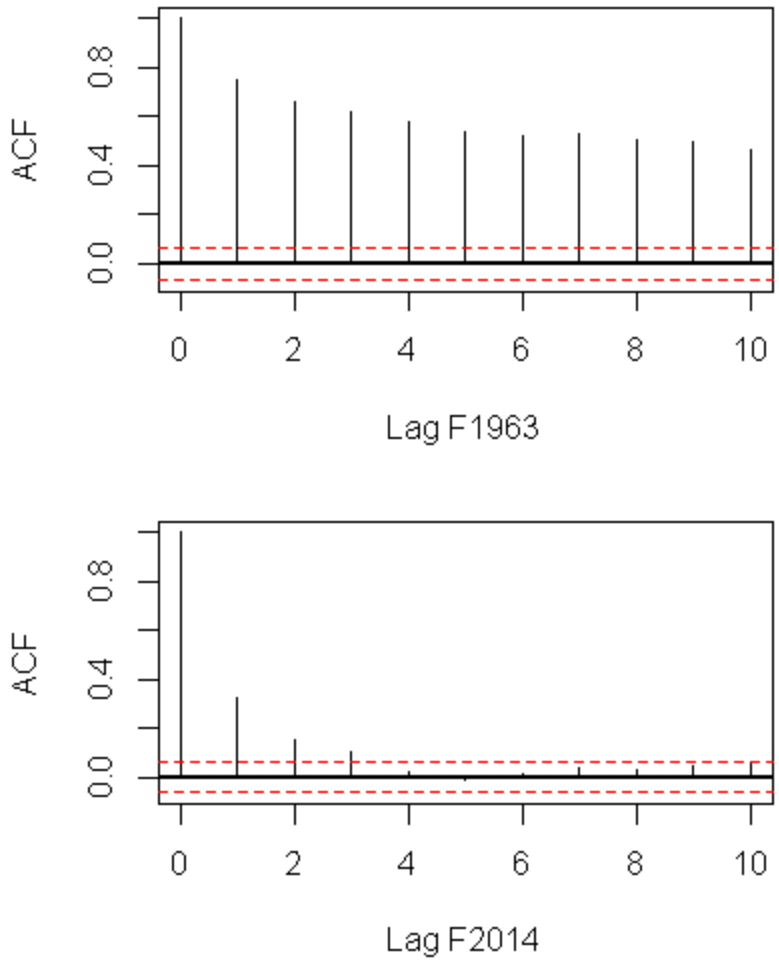

Figure A94. Autocorrelation plot for run S60_BASE_15_1963 estimates: F.

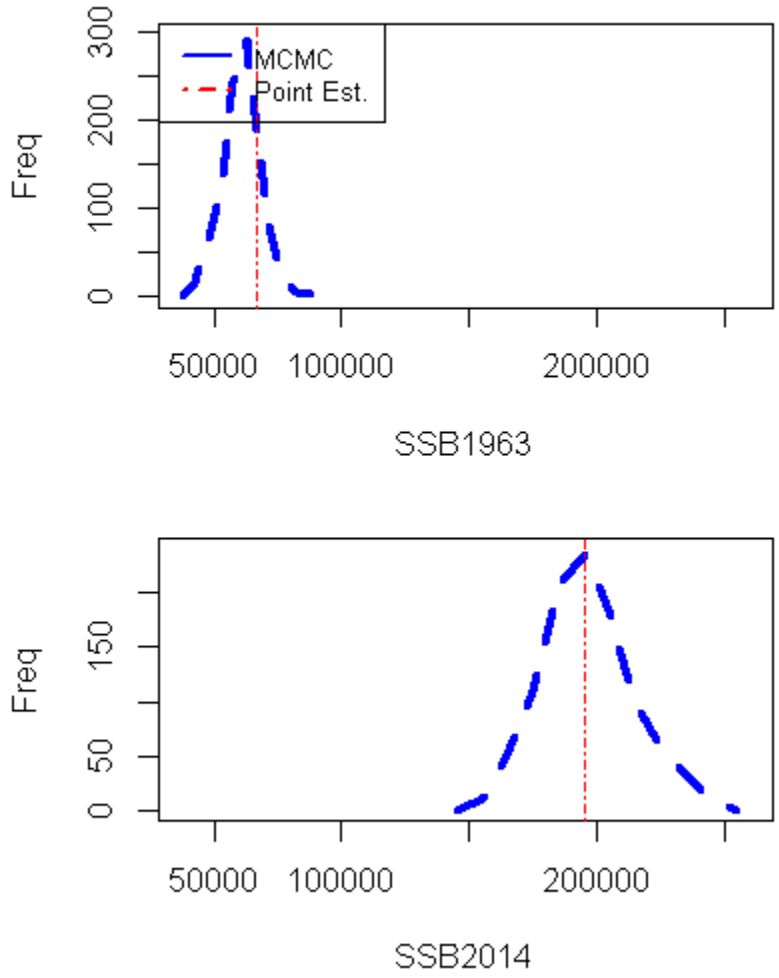

Figure A95. Run S60_BASE_15_1963 point estimates and MCMC distributions: SSB.

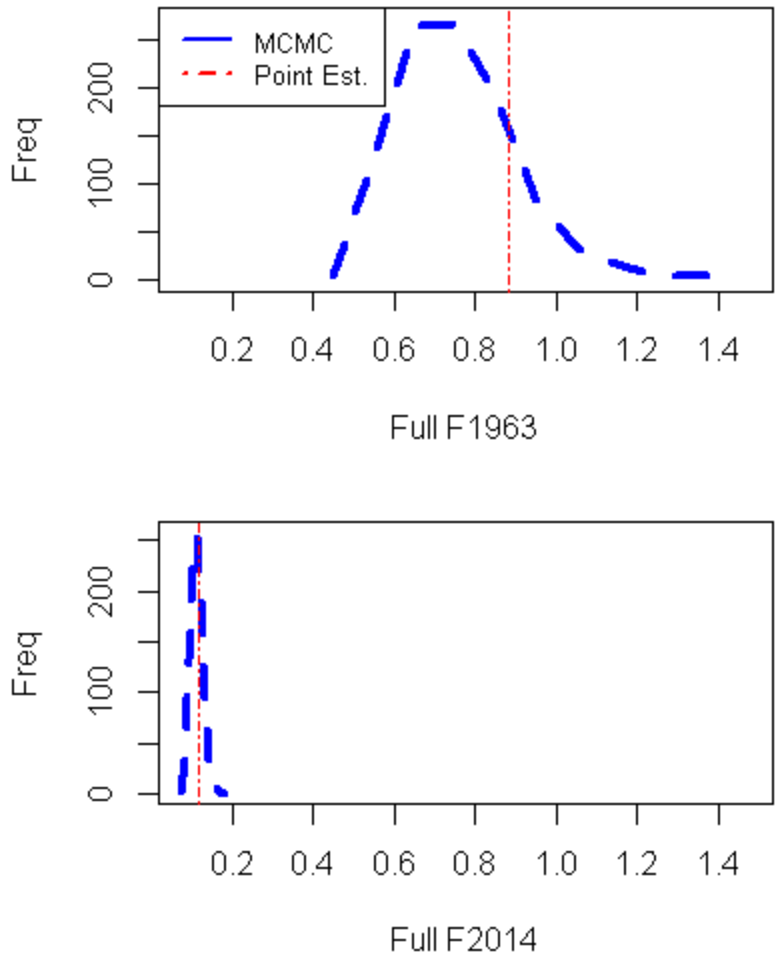

Figure A96. Run S60_BASE_15_1963 point estimates and MCMC distributions: F.

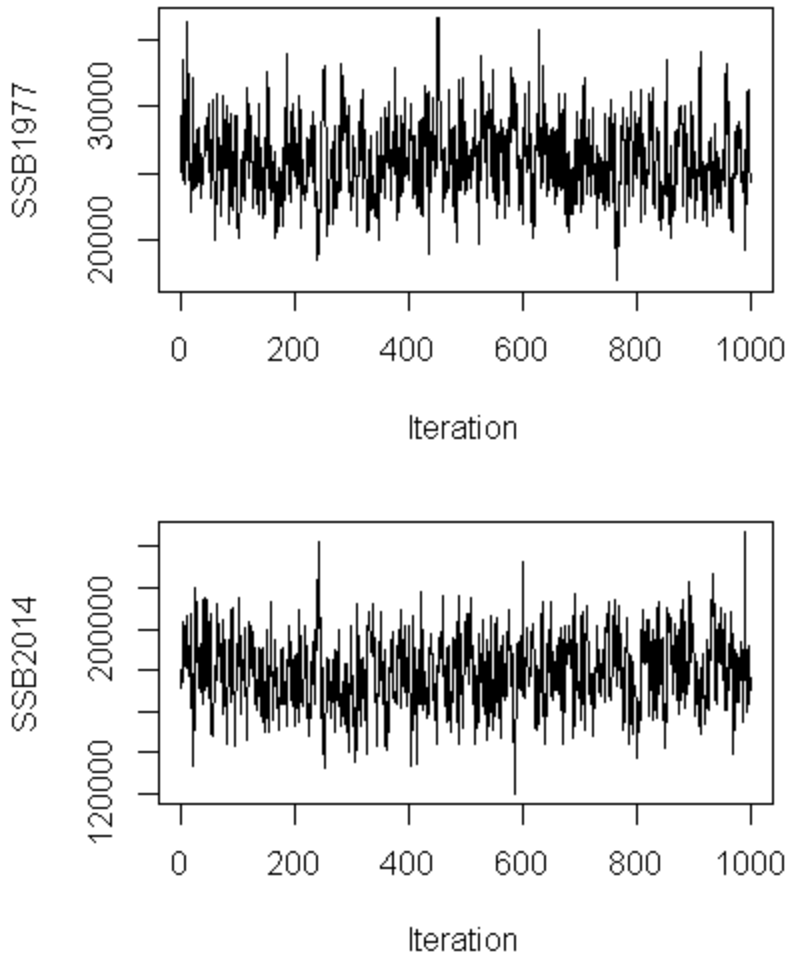

Figure A97. Run S60_BASE_15_1977 MCMC chains for SSB.

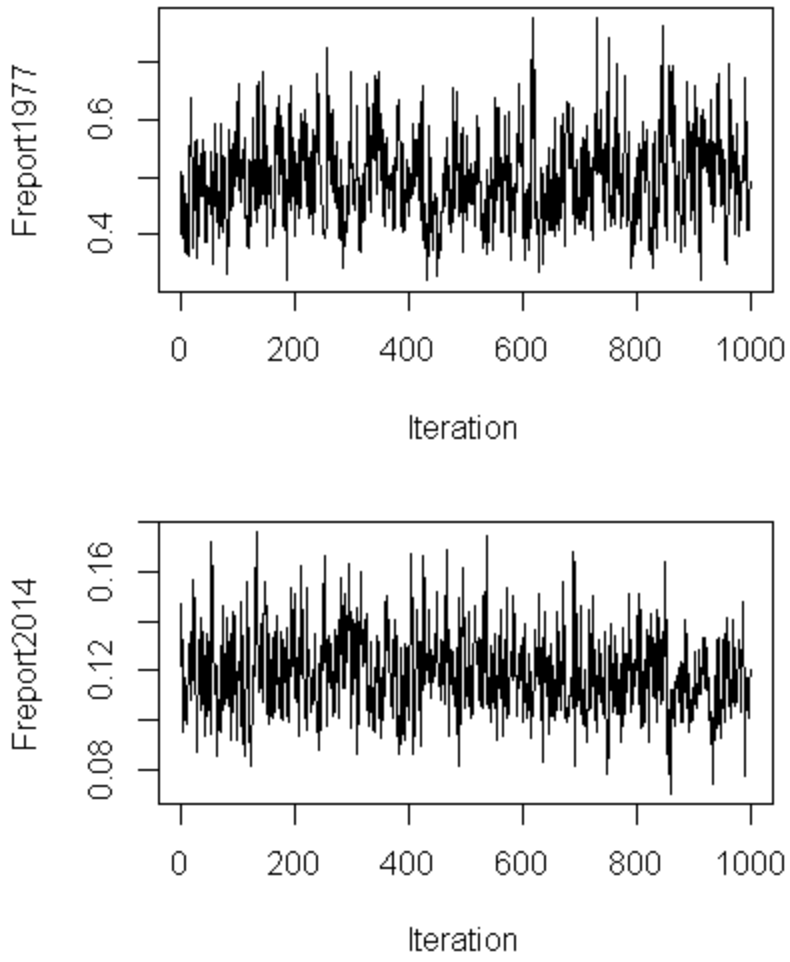

Figure A98. Run S60_BASE_15_1977 MCMC chains for F.

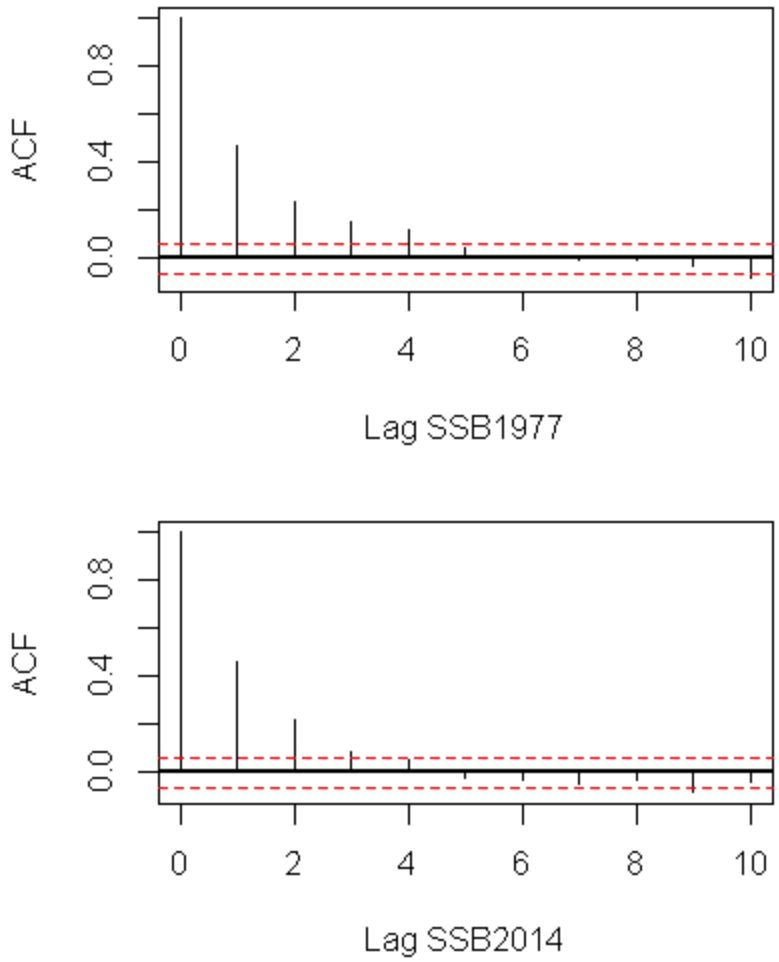

Figure A99. Autocorrelation plot for run S60_BASE_15_1977 MCMC estimates: SSB.

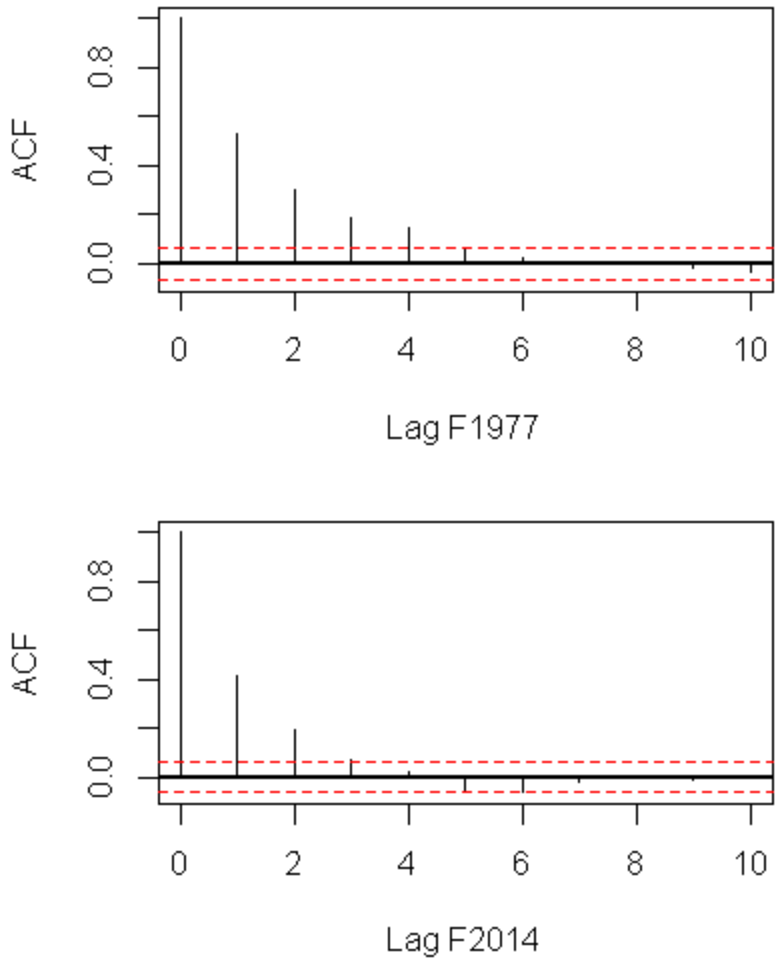

Figure A100. Autocorrelation plot for run S60_BASE_15_1977 MCMC estimates: F.

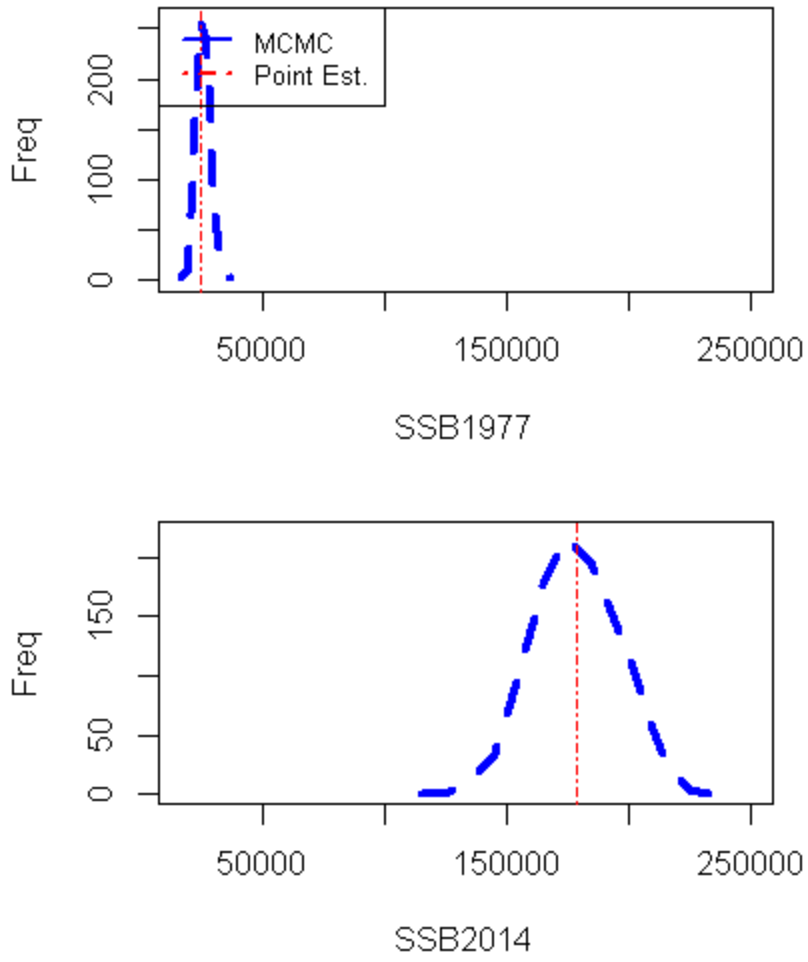

Figure A101. Run S60_BASE_15_1977 point estimates and MCMC distributions: SSB.

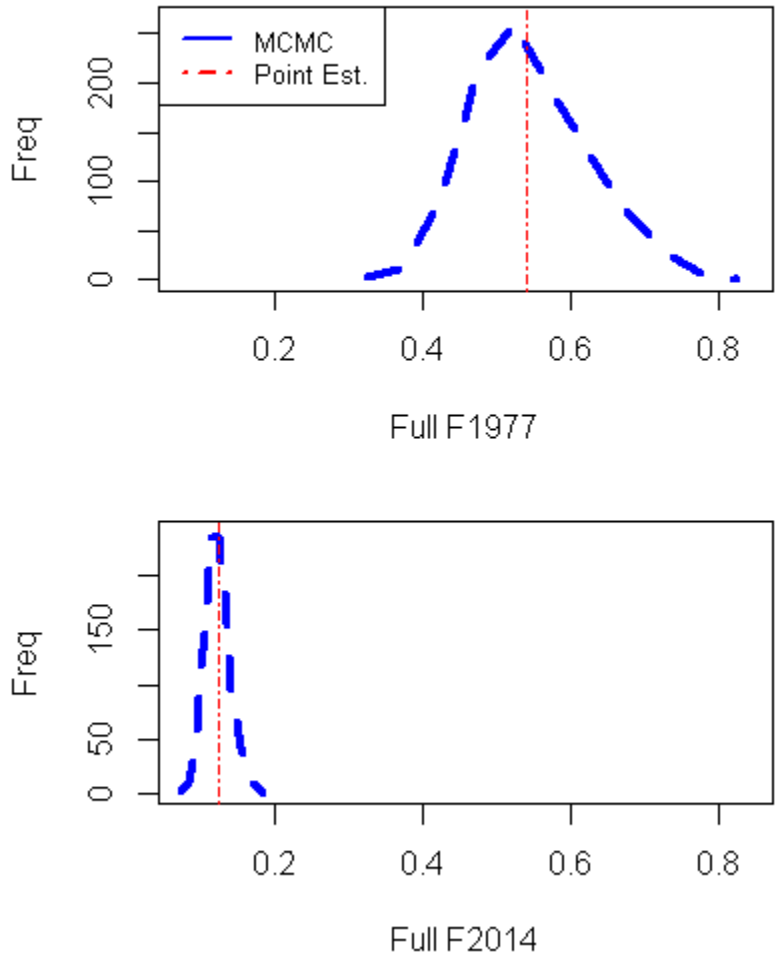

Figure A102. Run S60_BASE_15_1977 point estimates and MCMC distributions: F.

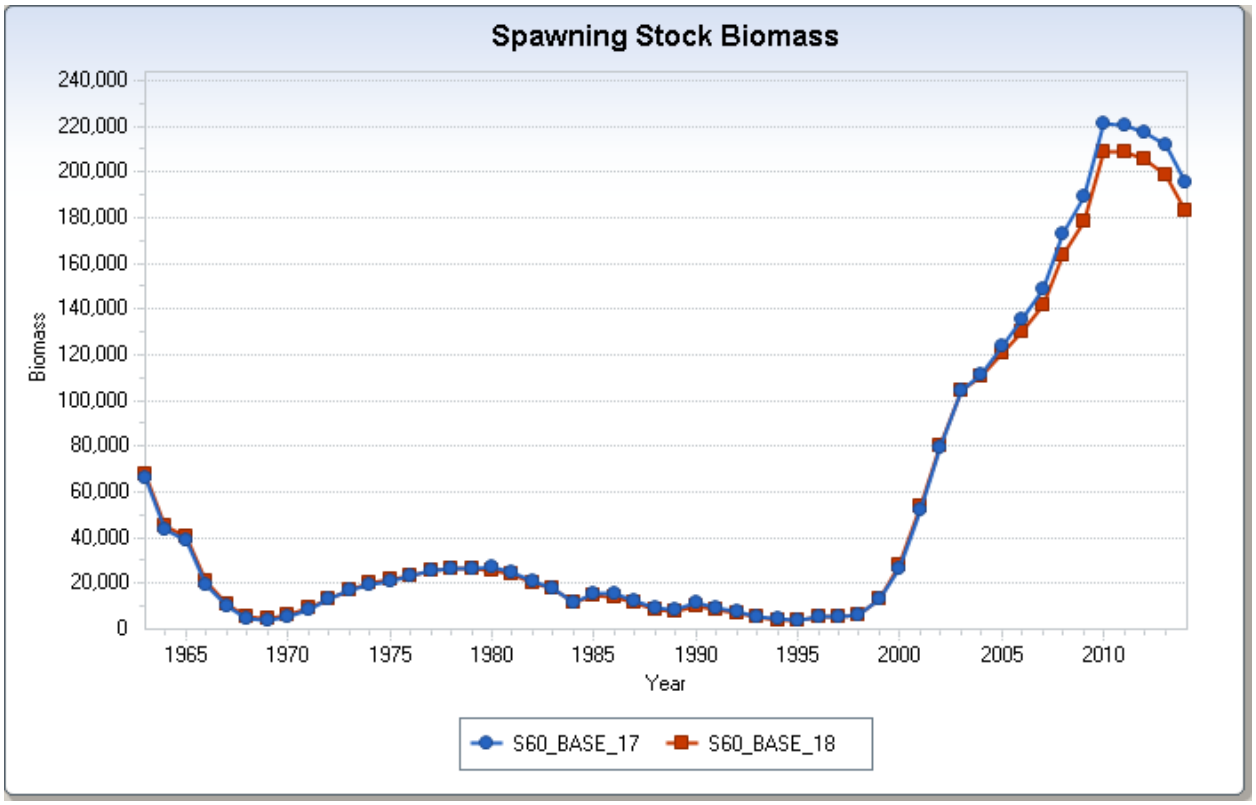

Figure A103. Comparison of run S60_BASE_17 (all indices) with S60_BASE_18 (high RMSE indices omitted): SSB.

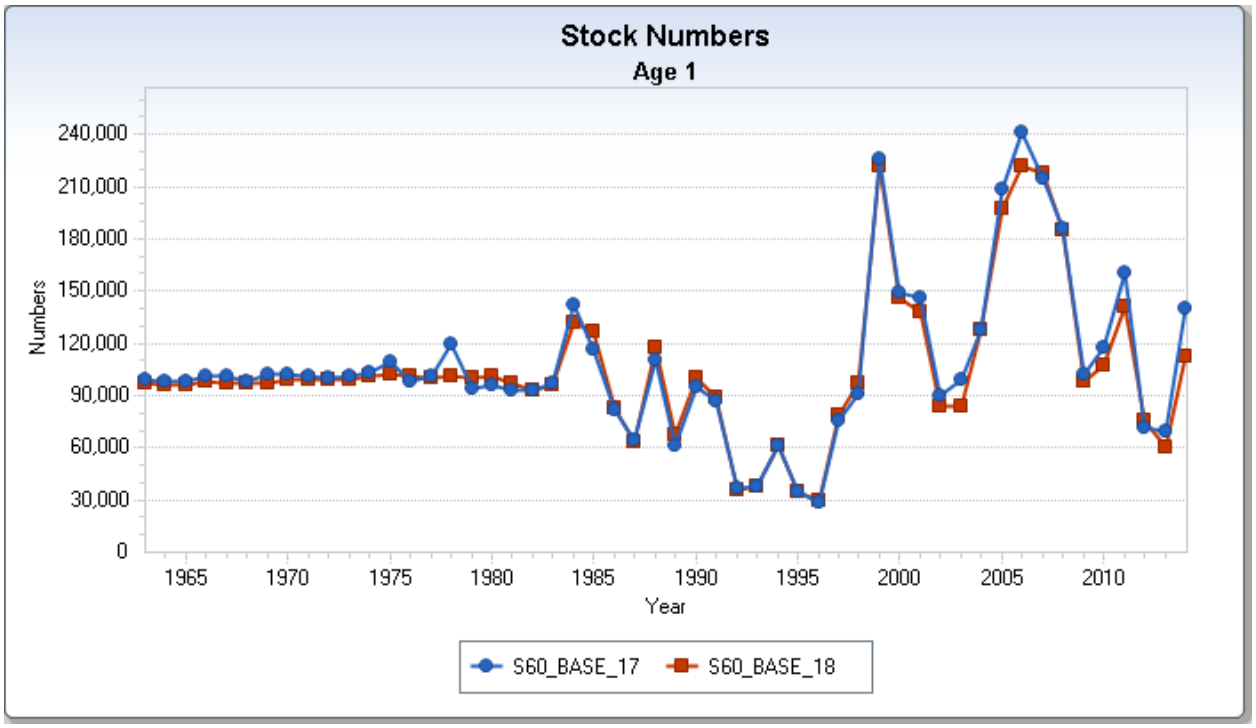

Figure A104. Comparison of run S60_BASE_17 (all indices) with S60_BASE_18 (high RMSE indices omitted): R (recruitment at true age 0, model age 1).

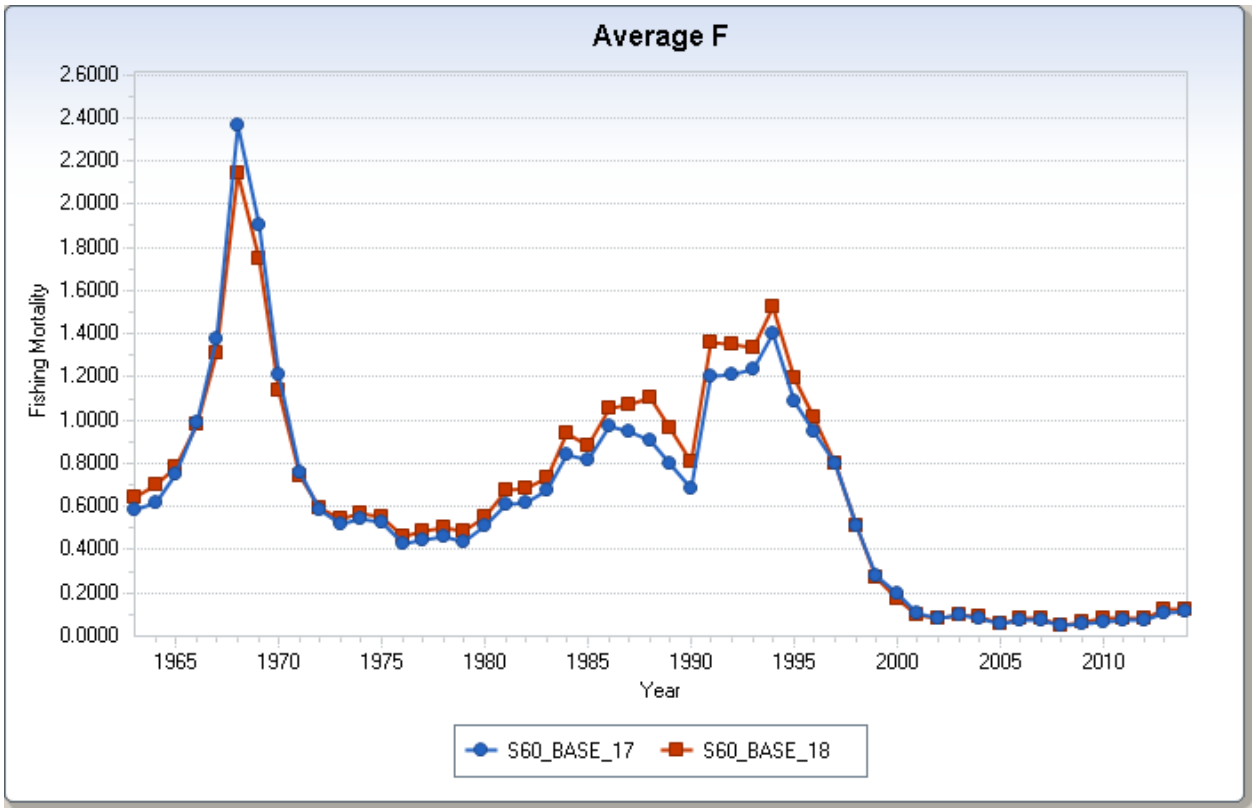

Figure A105. Comparison of run S60_BASE_17 (all indices) with S60_BASE_18 (high RMSE indices omitted): F.

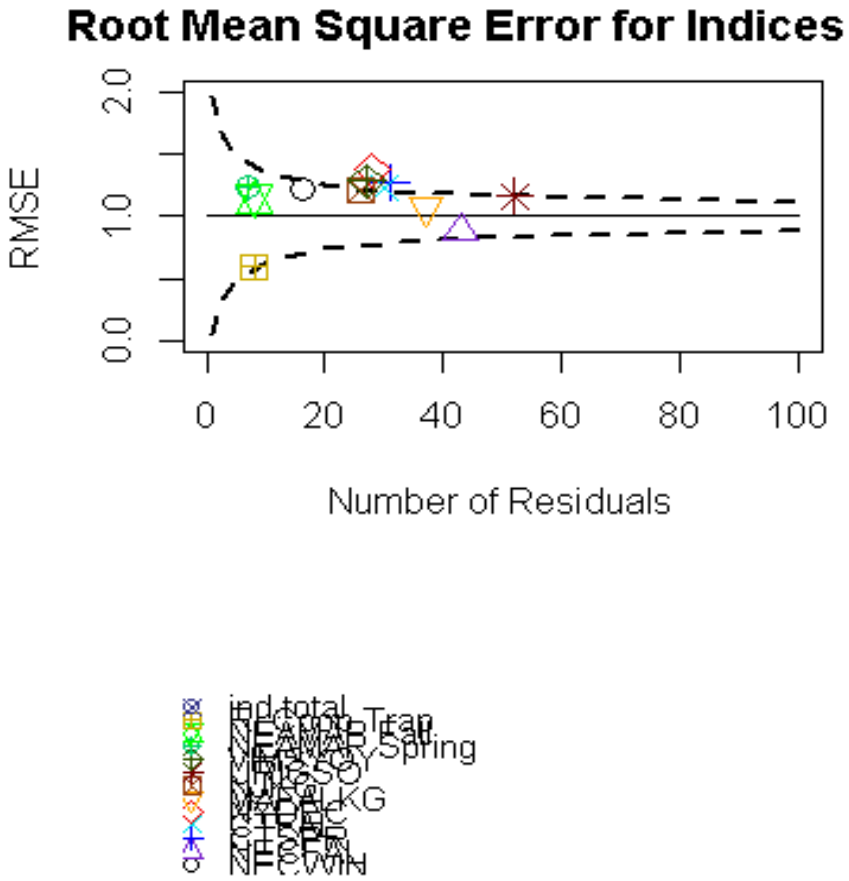

Figure A106. RMSE plot for run S60_BASE_18 indices.

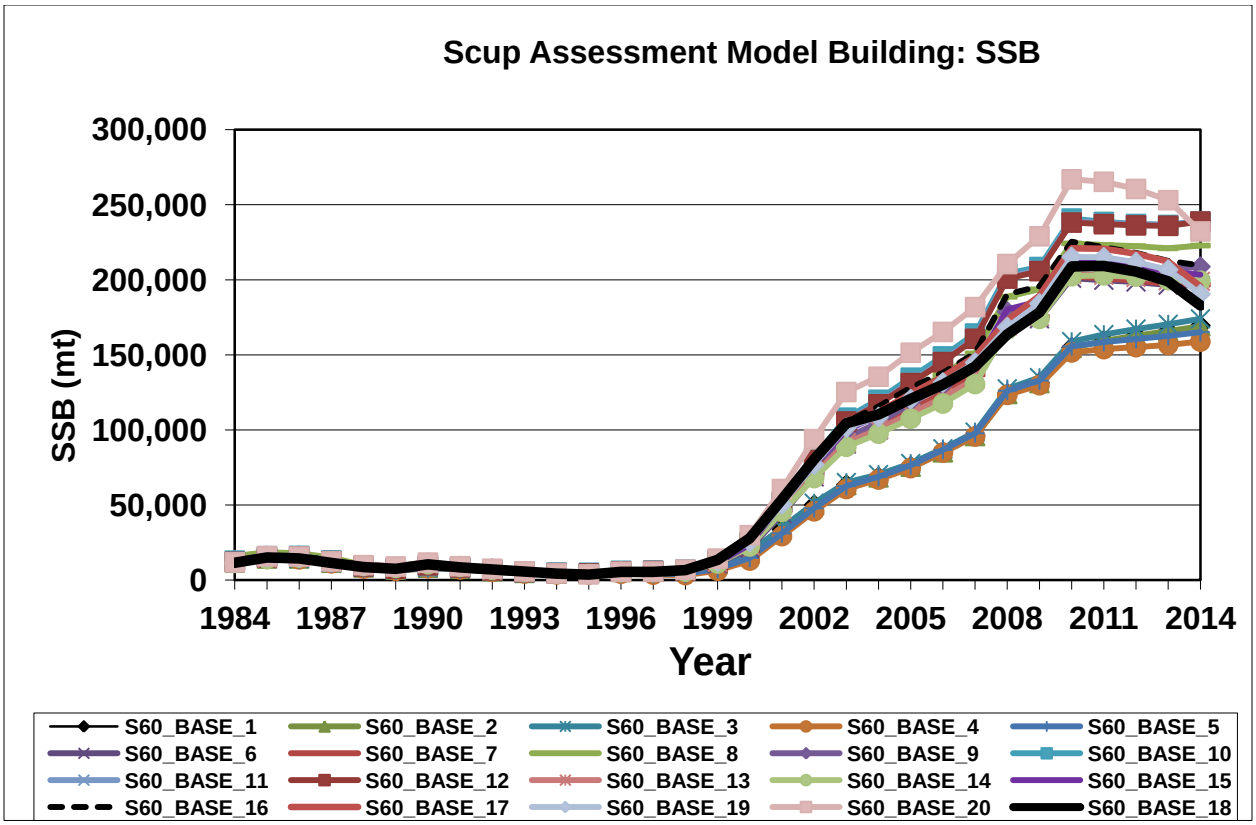

Figure A107. Comparison of results from the 2015 SAW 60 model building. Run S60_BASE_18 that was selected for final status evaluation is plotted in the heavy black line: SSB.

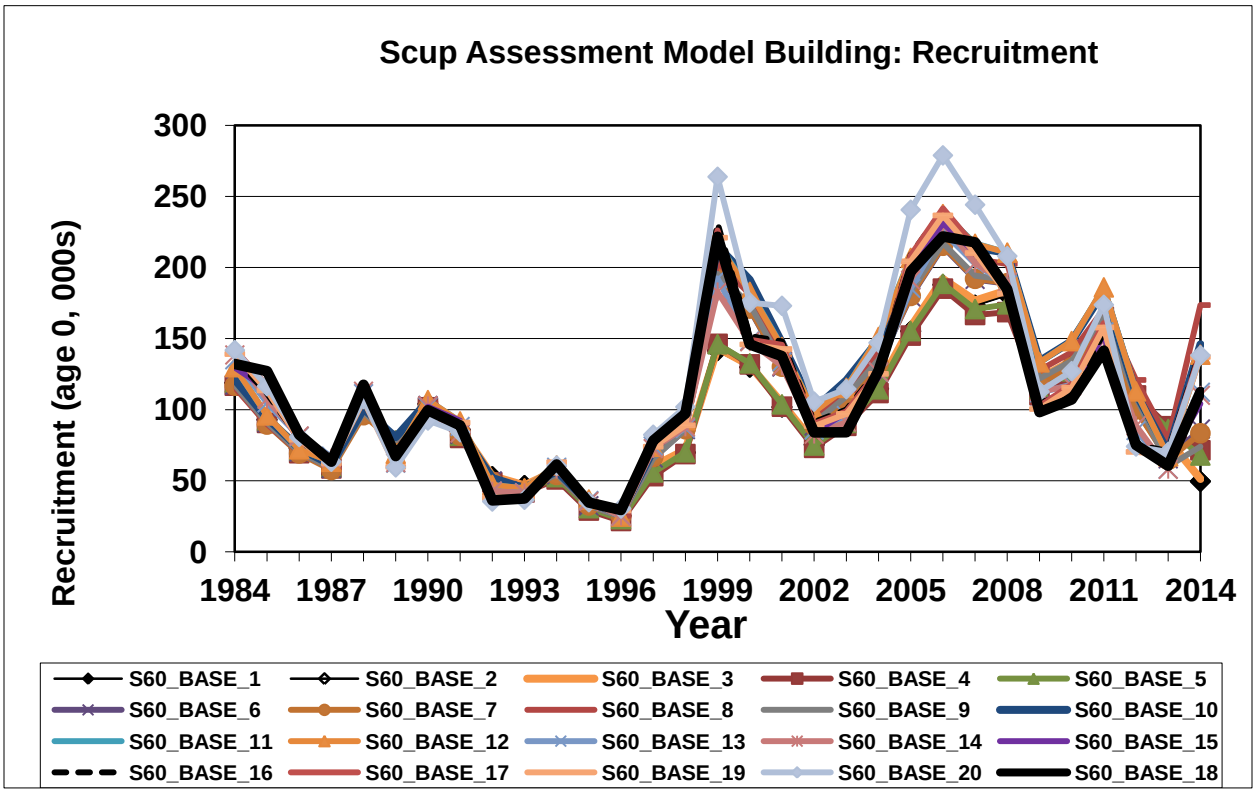

Figure A108. Comparison of results from the 2015 SAW 60 model building. Run S60_BASE_18 that was selected for final status evaluation is plotted in the heavy black line: R (recruitment at true age 0, model age 1).

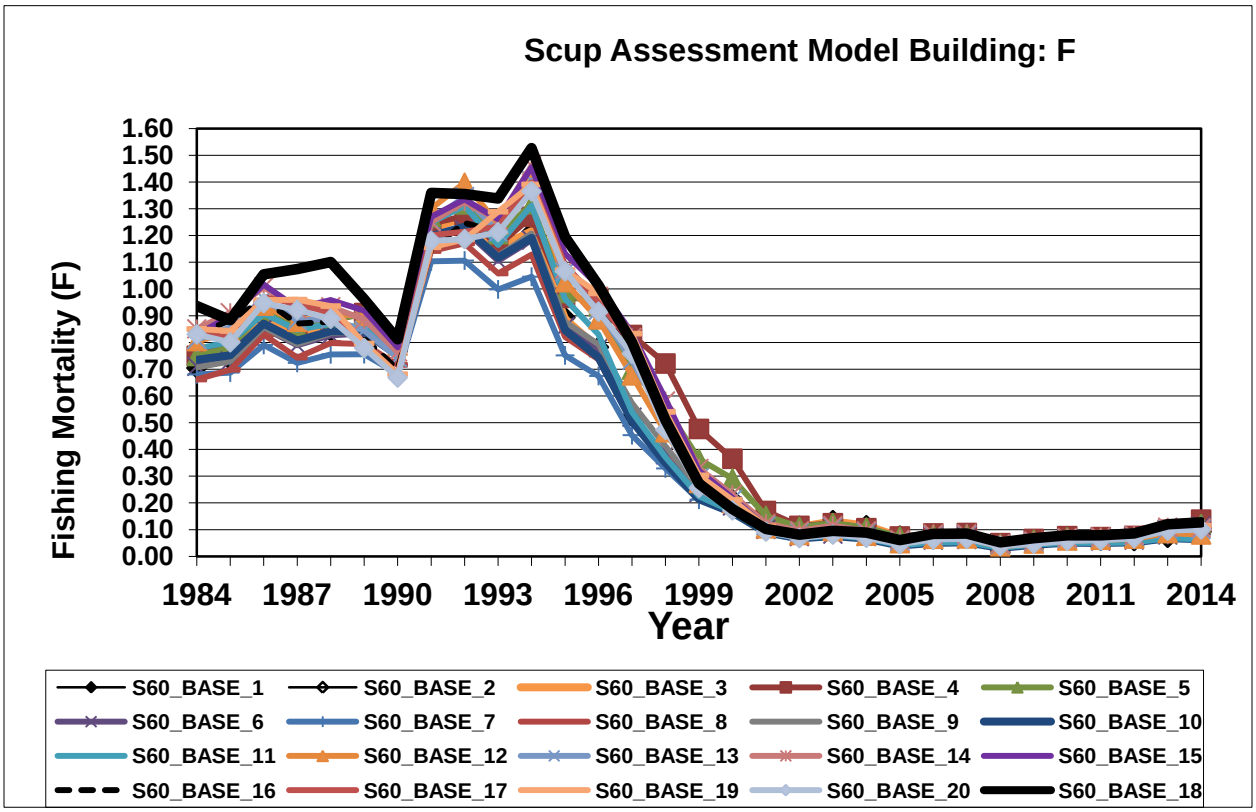

Figure A109. Comparison of results from the 2015 SAW 60 model building. Run S60_BASE_18 that was selected for final status evaluation is plotted in the heavy black line: F.

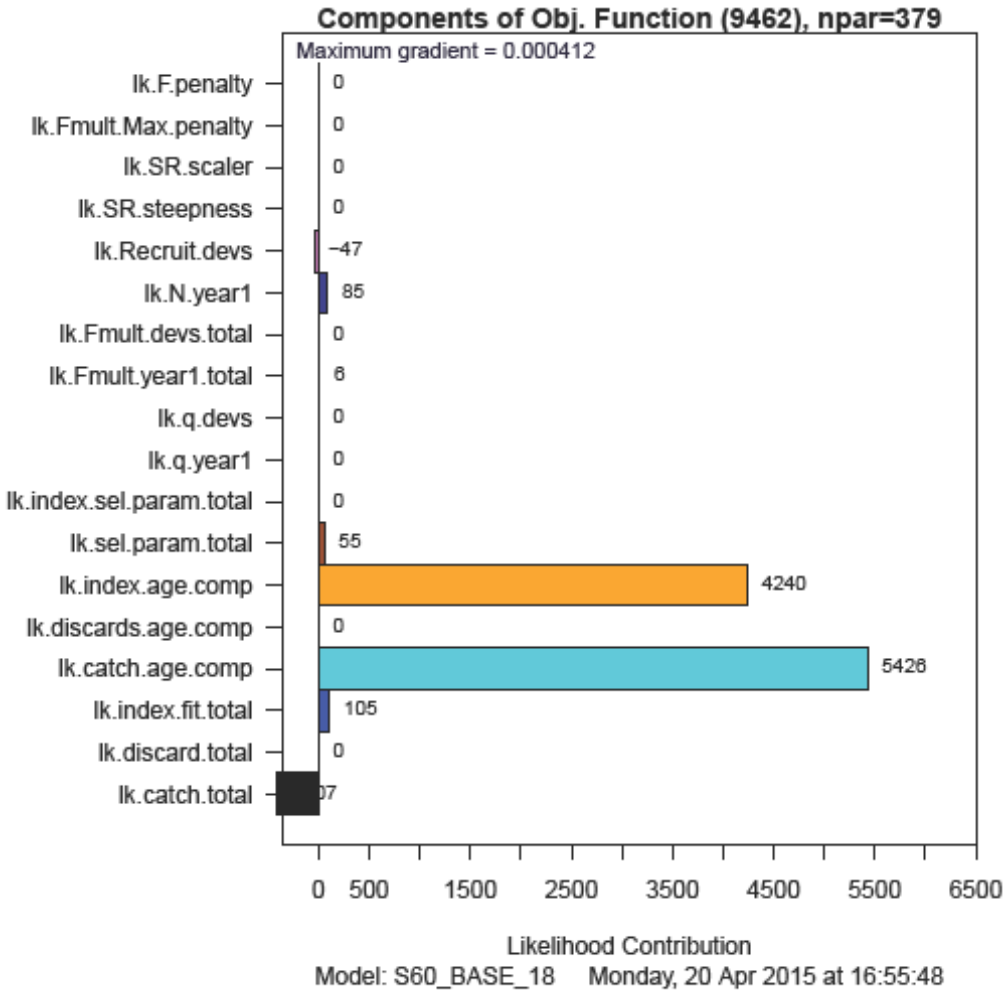

Figure A110. Objective function components contribution to the total likelihood for final run S60_BASE_18.

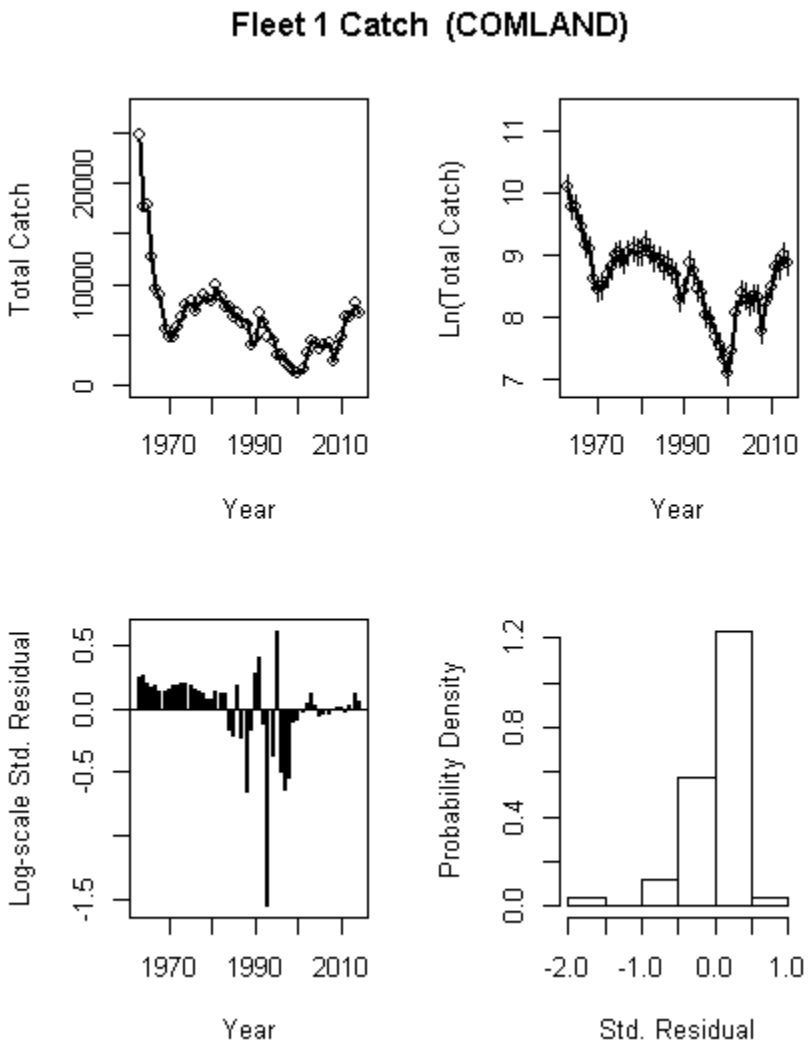

Figure A111. Residuals from the final run S60_BASE_18: commercial landings.

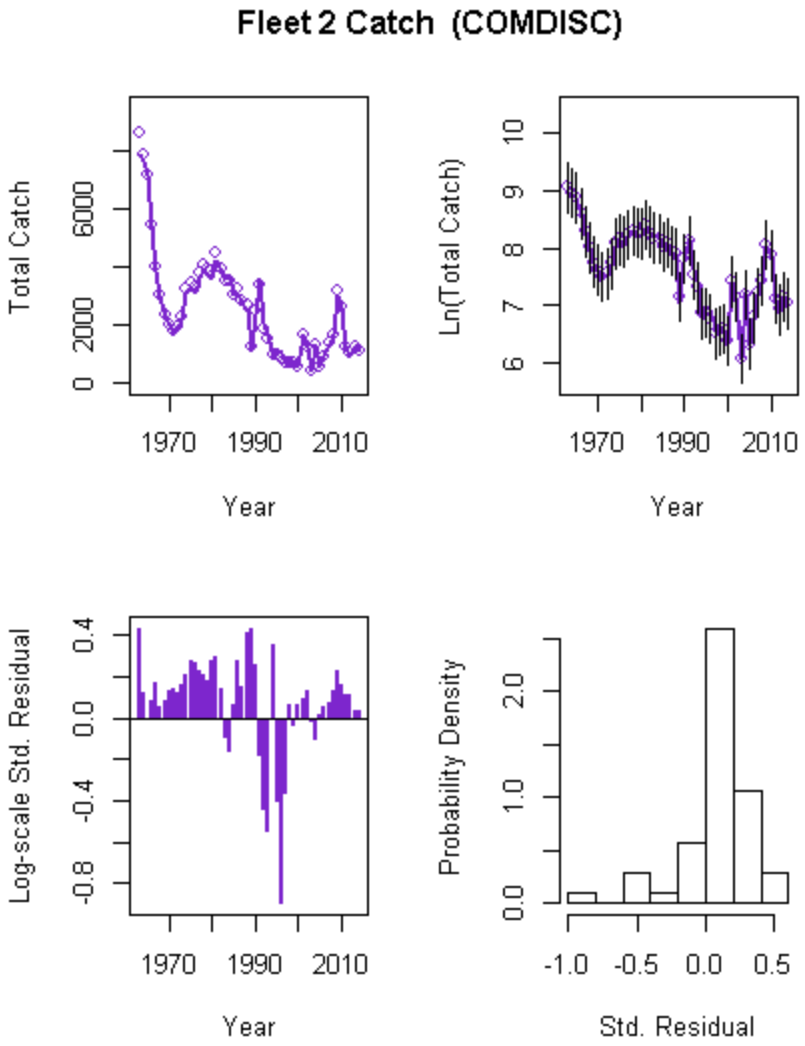

Figure A112. Residuals from the final run S60_BASE_18: commercial discards.

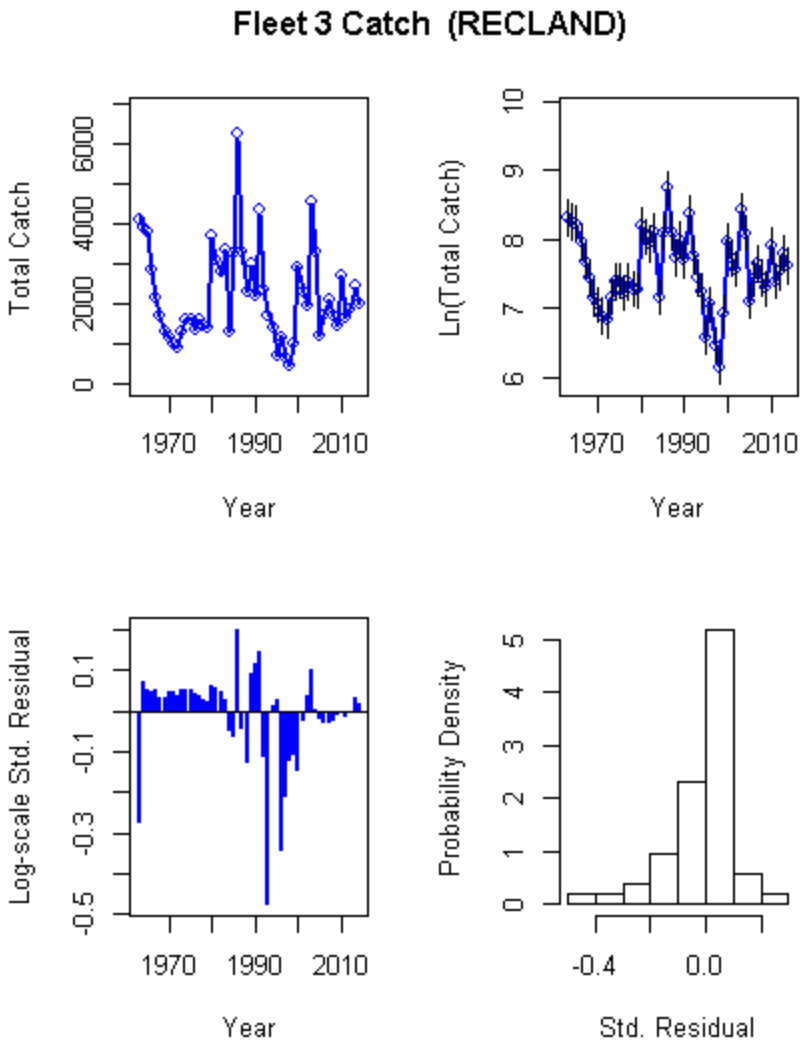

Figure A113. Residuals from the final run S60_BASE_18: recreational landings.

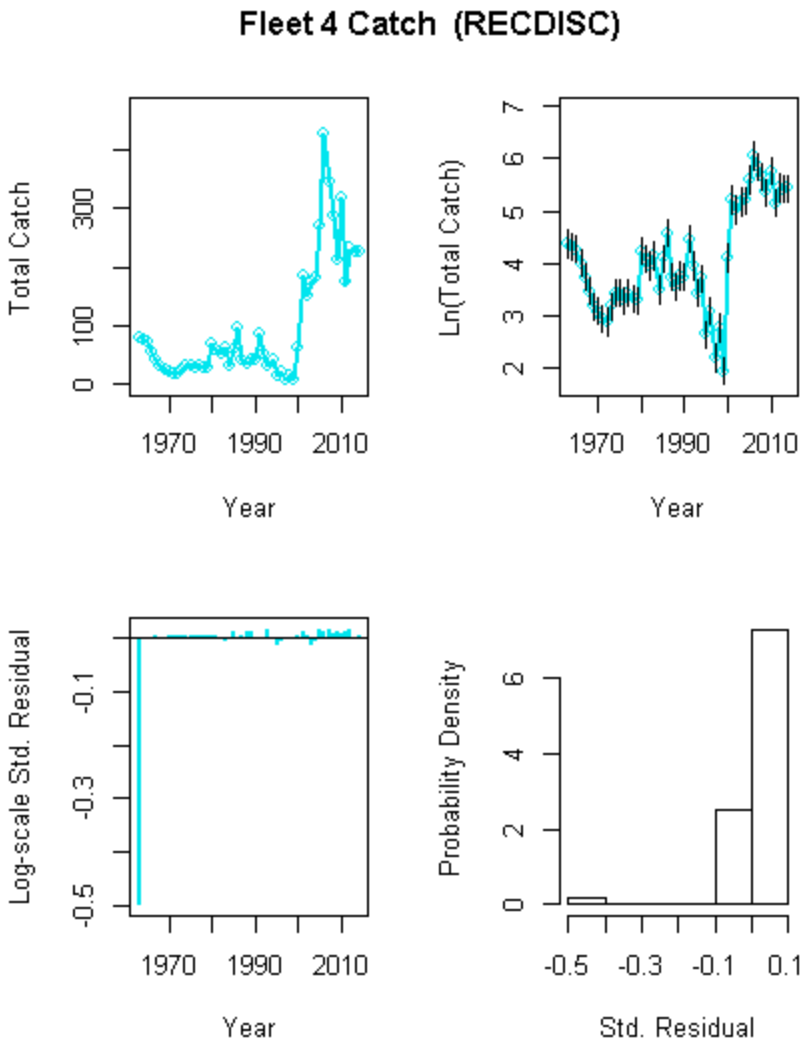

Figure A114. Residuals from the final run S60_BASE_18: recreational discards.

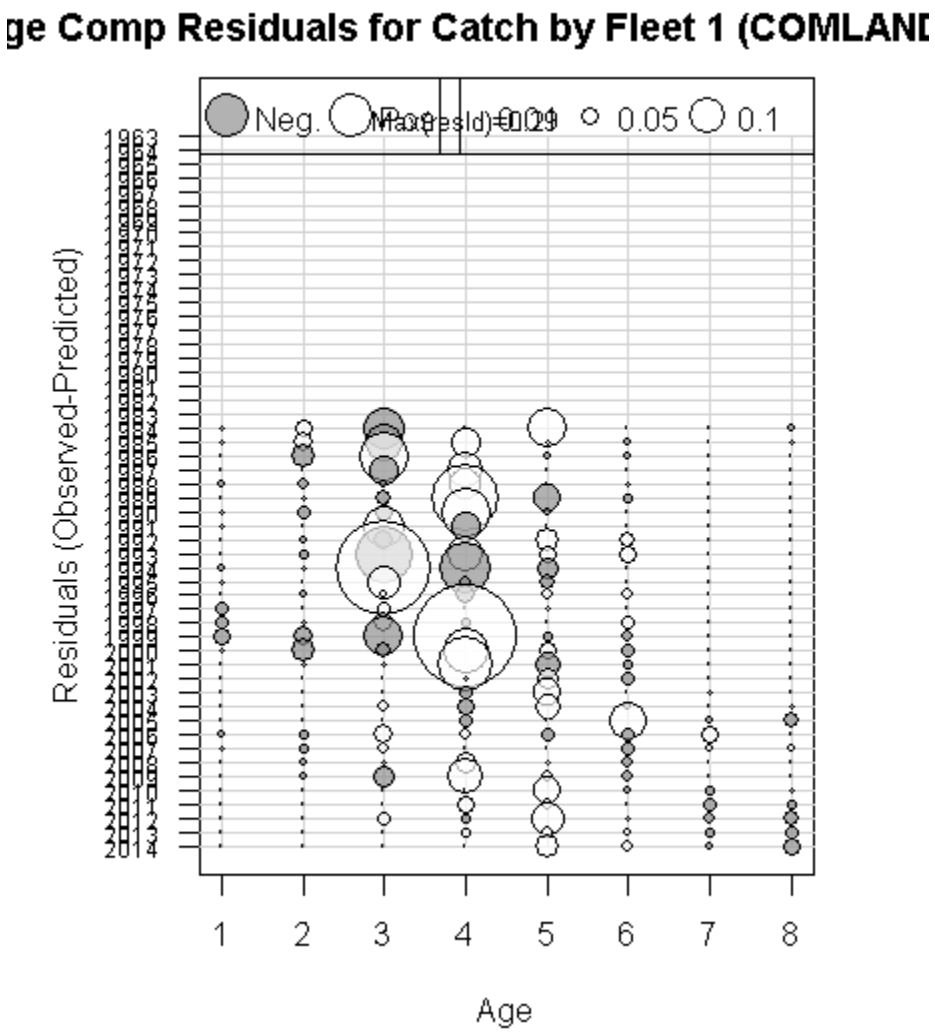

Figure A115. Age composition residuals for final run S60_BASE_18: commercial landings.

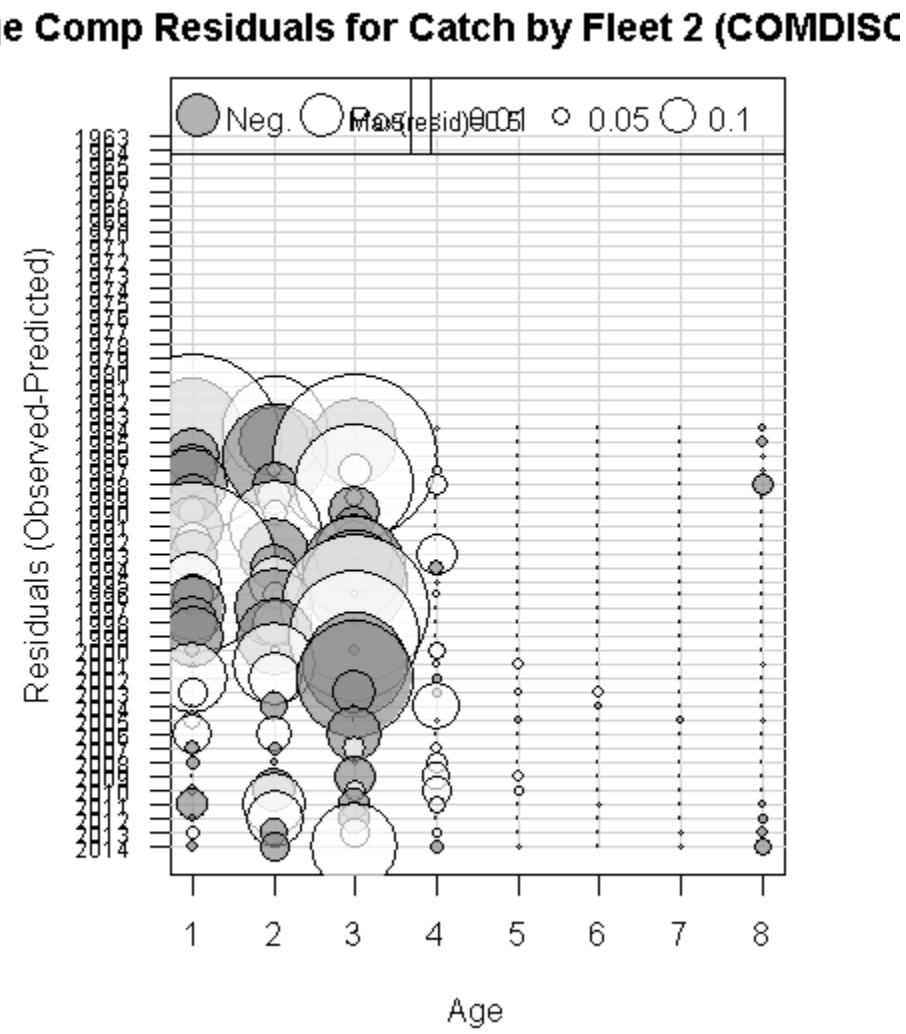

Figure A116. Age composition residuals for final run S60_BASE_18: commercial discards.

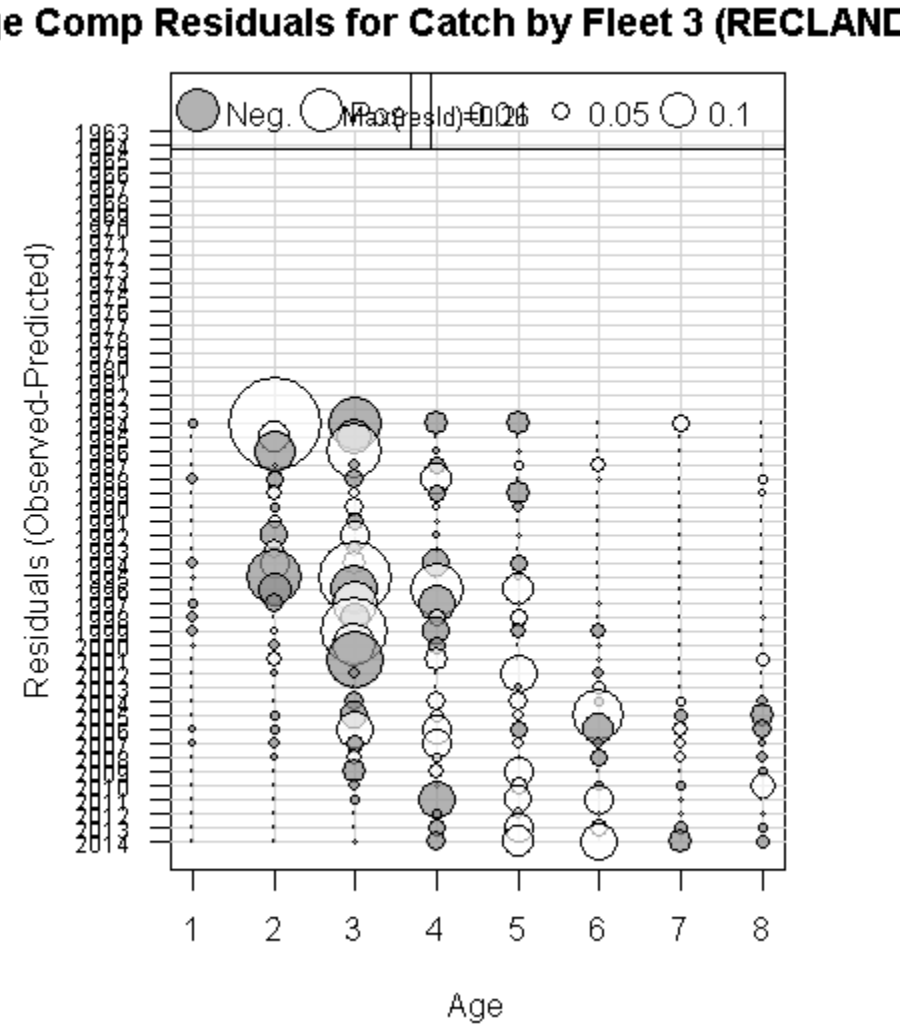

Figure A117. Age composition residuals for final run S60_BASE_18: recreational landings.

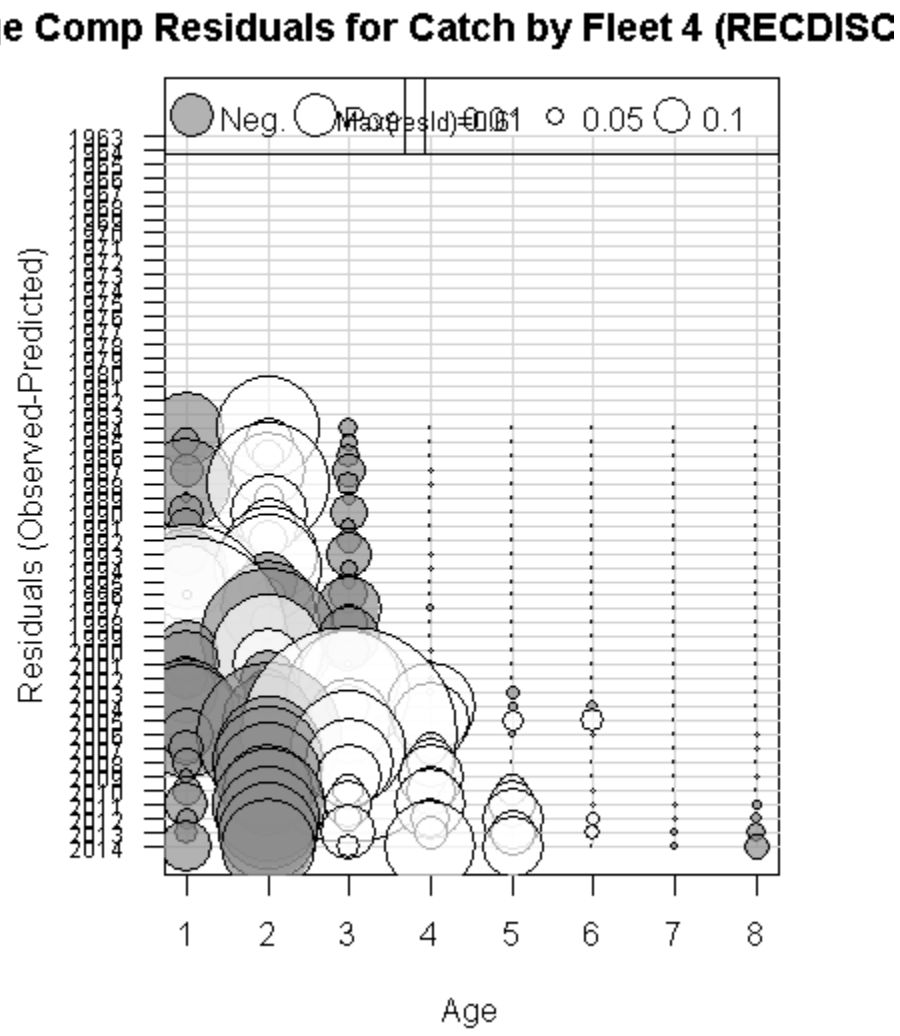

Figure A118. Age composition residuals for final run S60_BASE_18: recreational discards.

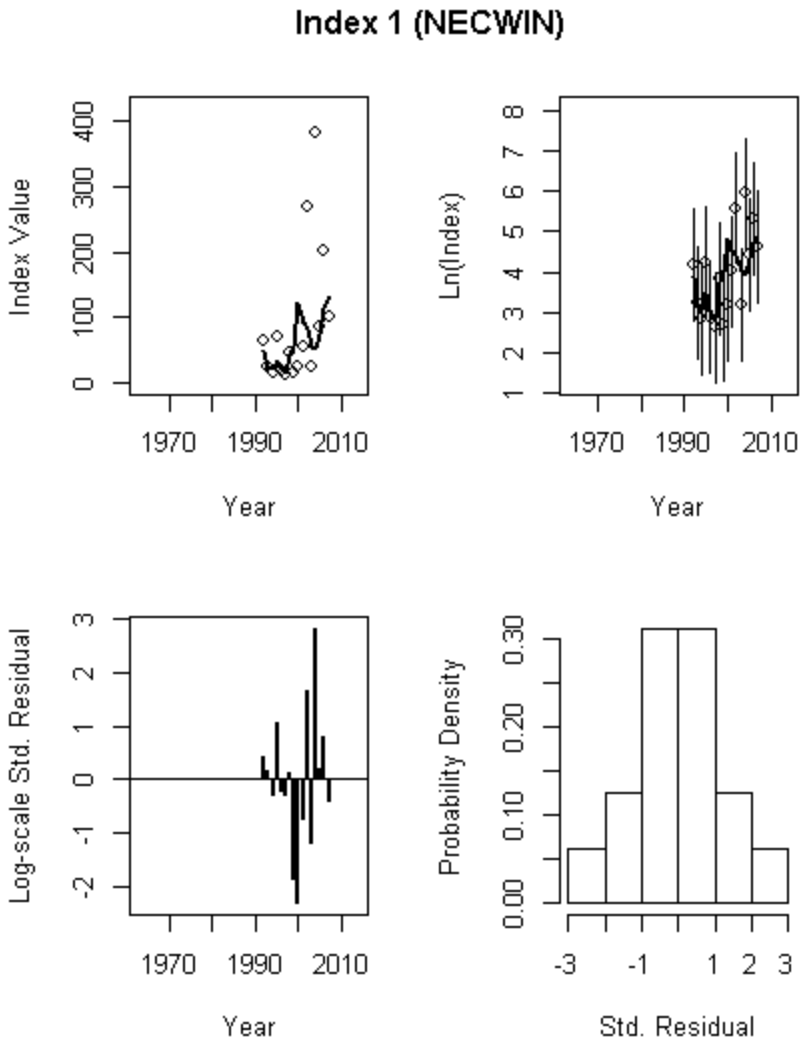

Figure A119. Residuals for final run S60_BASE_18: NEFSC winter survey.

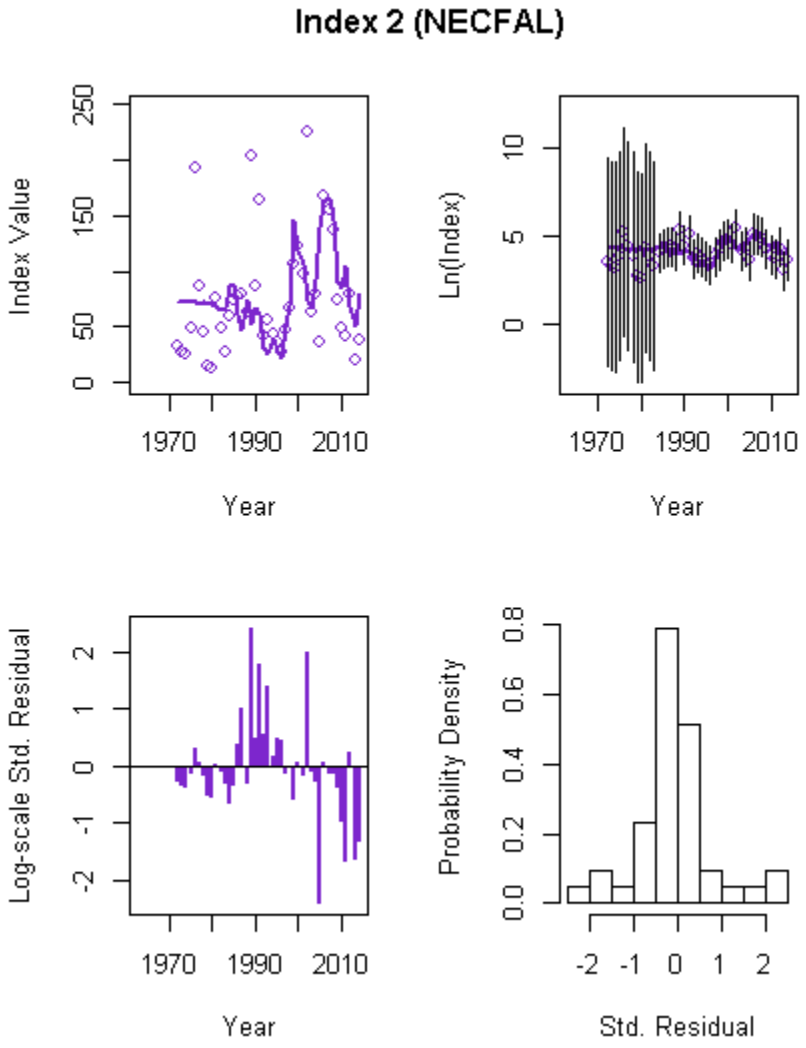

Figure A120. Residuals for final run S60_BASE_18: NEFSC fall survey.

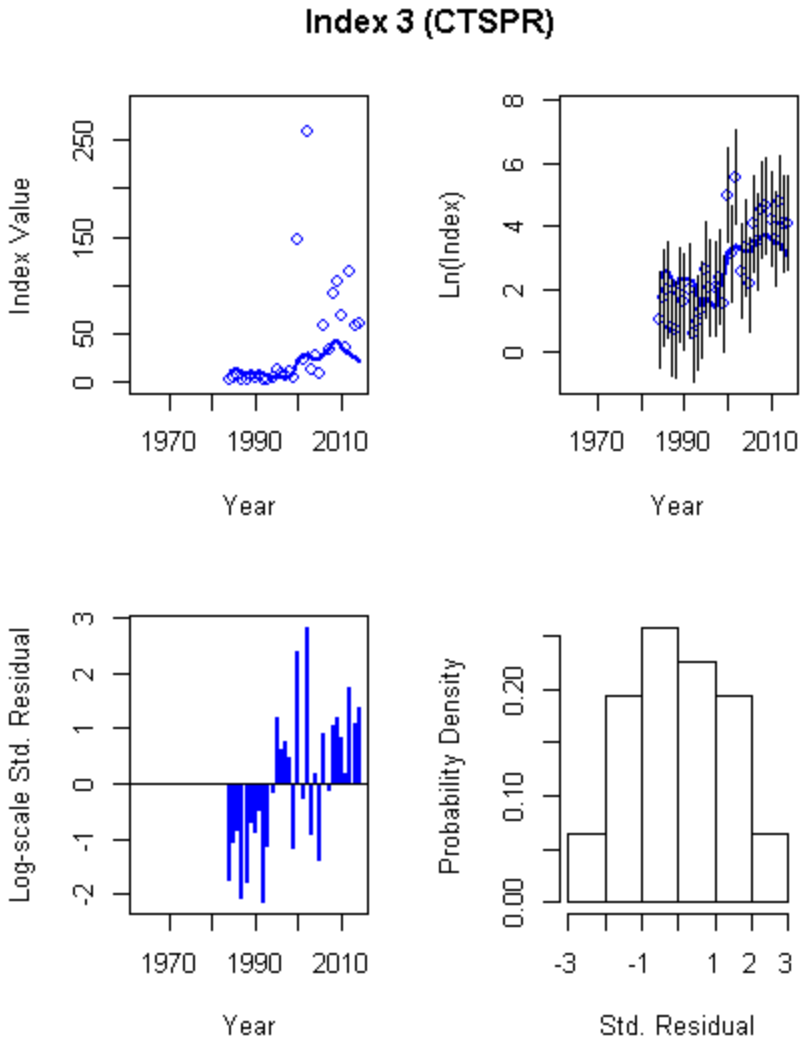

Figure A121. Residuals for final run S60_BASE_18: CTDEEP spring survey.

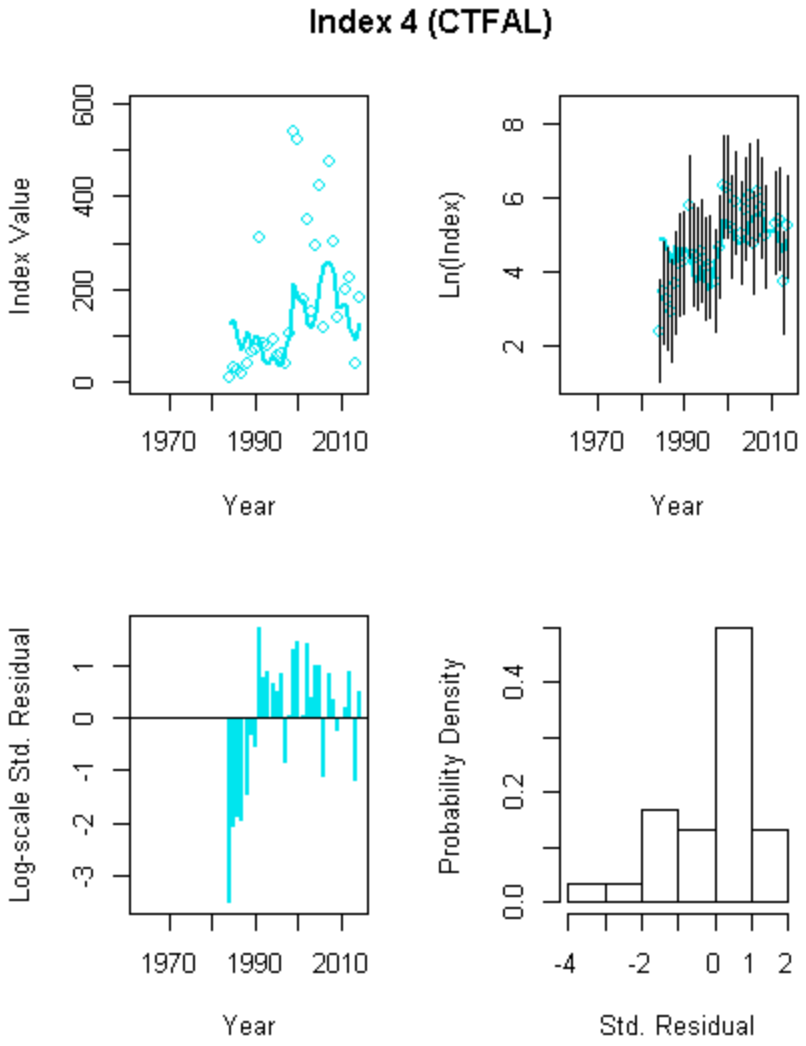

Figure A122. Residuals for final run S60_BASE_18: CTDEEP fall survey.

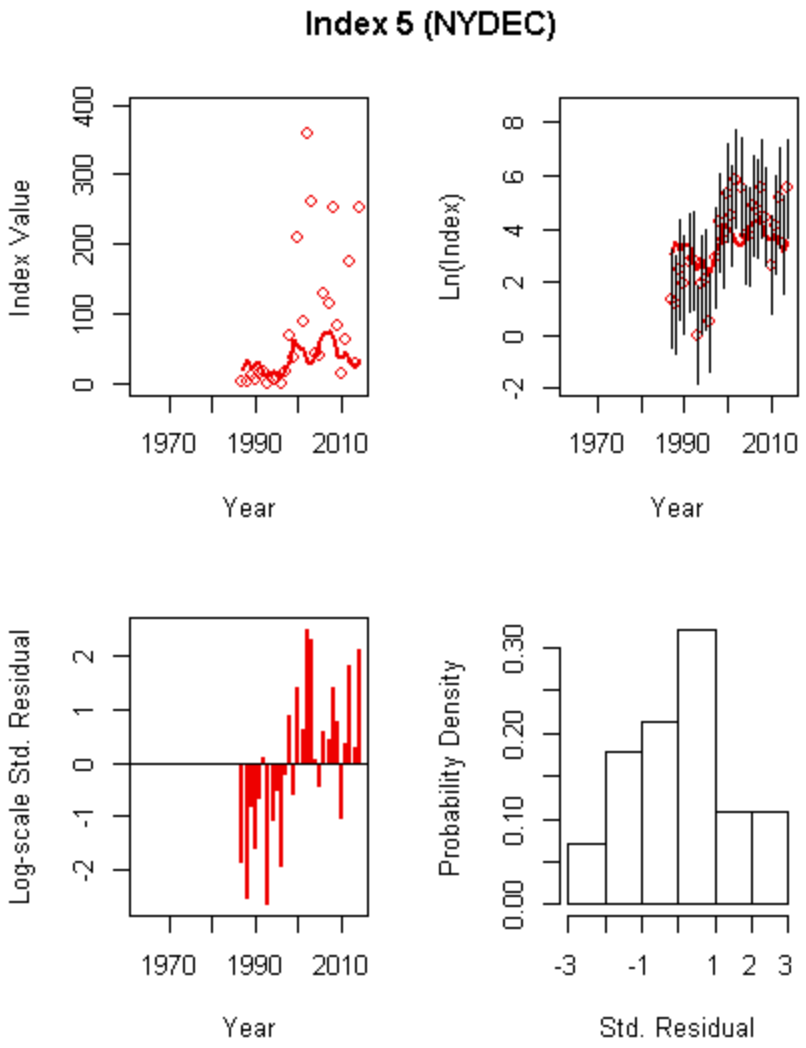

Figure A123. Residuals for final run S60_BASE_18: NYDEC survey.

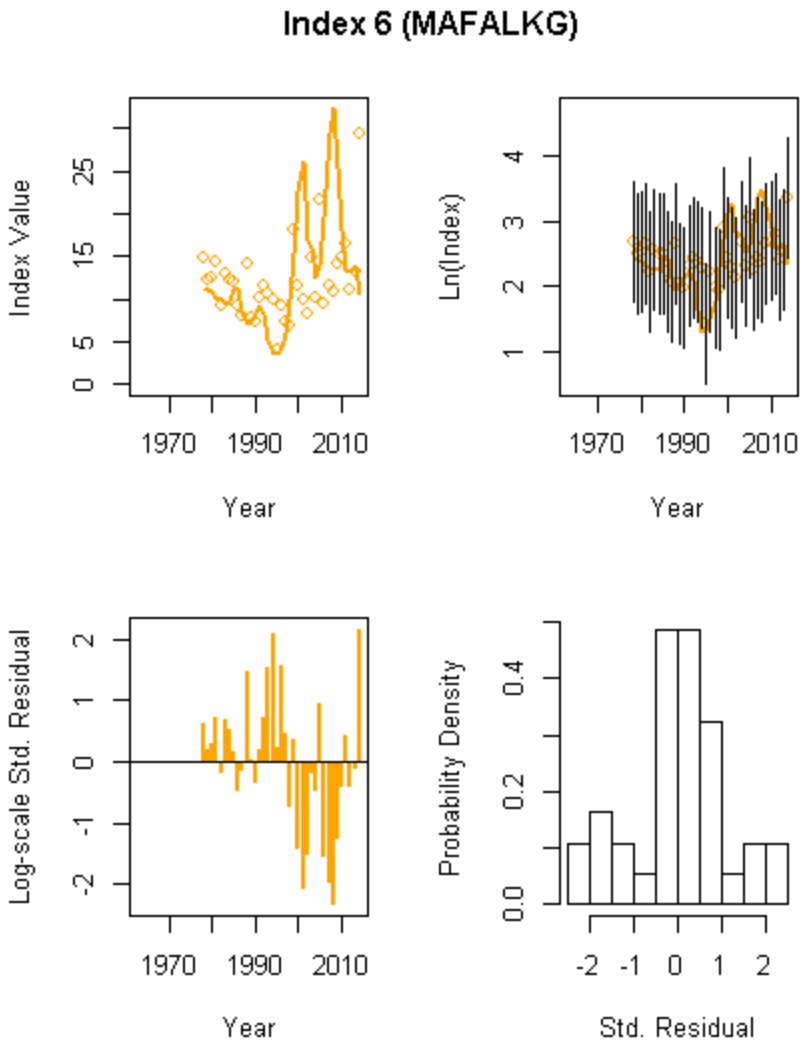

Figure A124. Residuals for final run S60_BASE_18: MADMF fall survey.

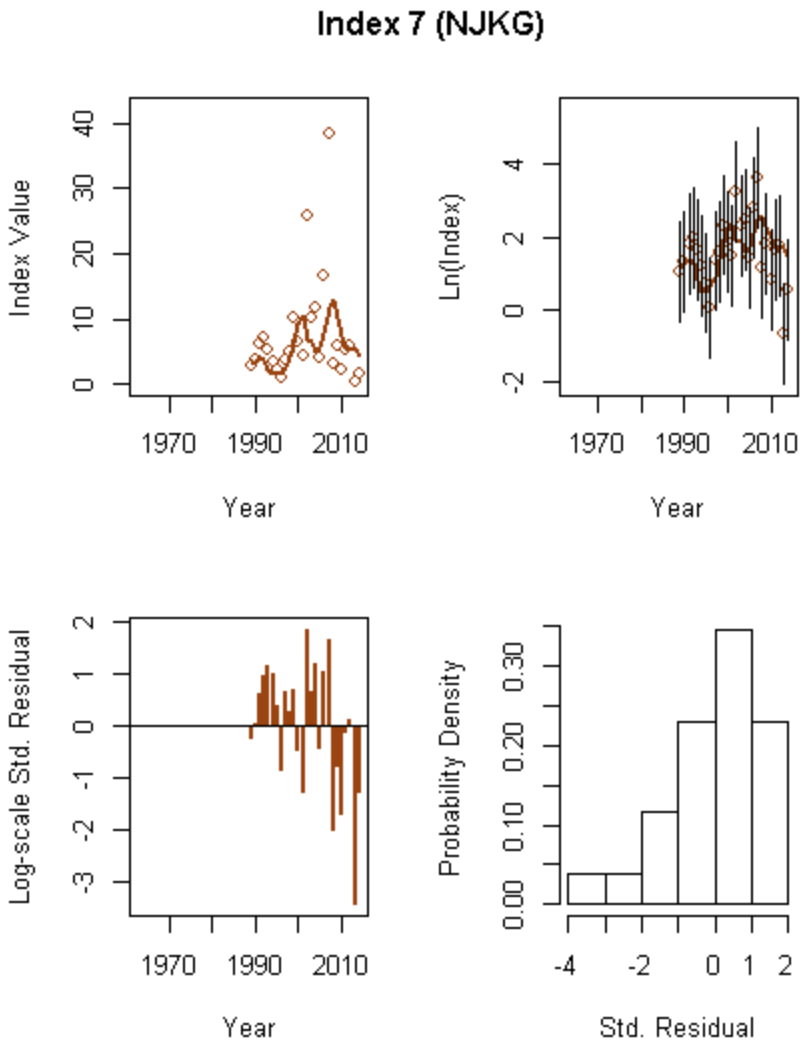

Figure A125. Residuals for final run S60_BASE_18: NJDFW survey.

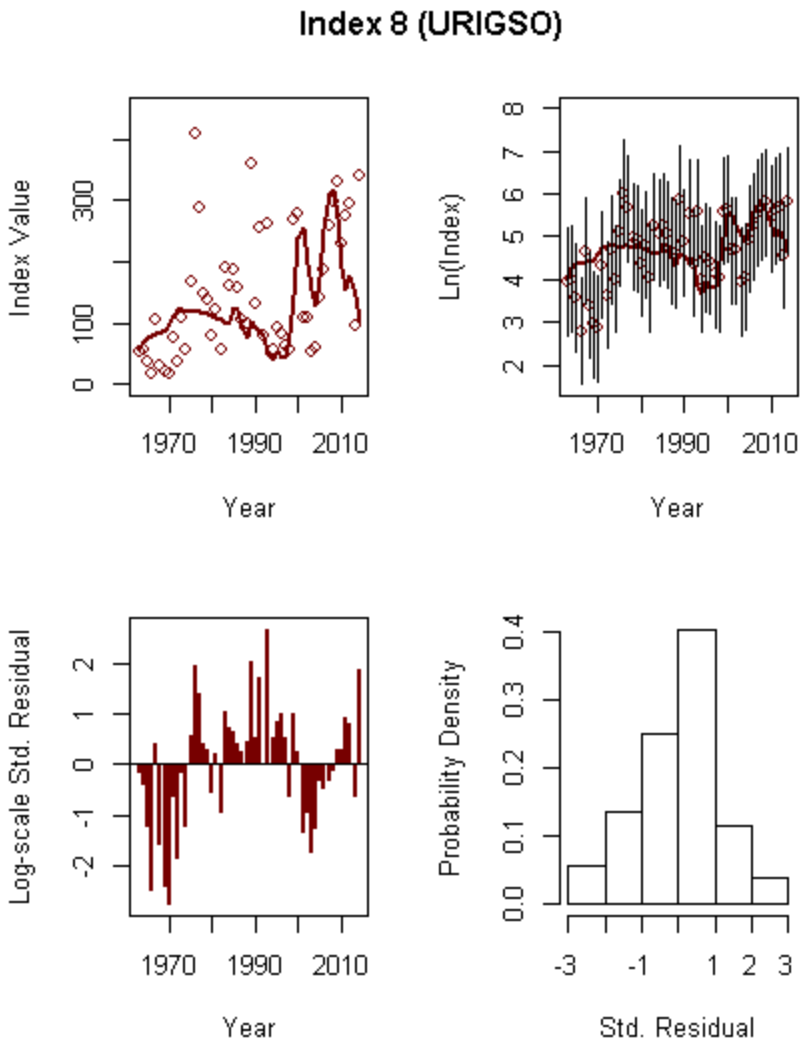

Figure A126. Residuals for final run S60_BASE_18: URIGSO survey.

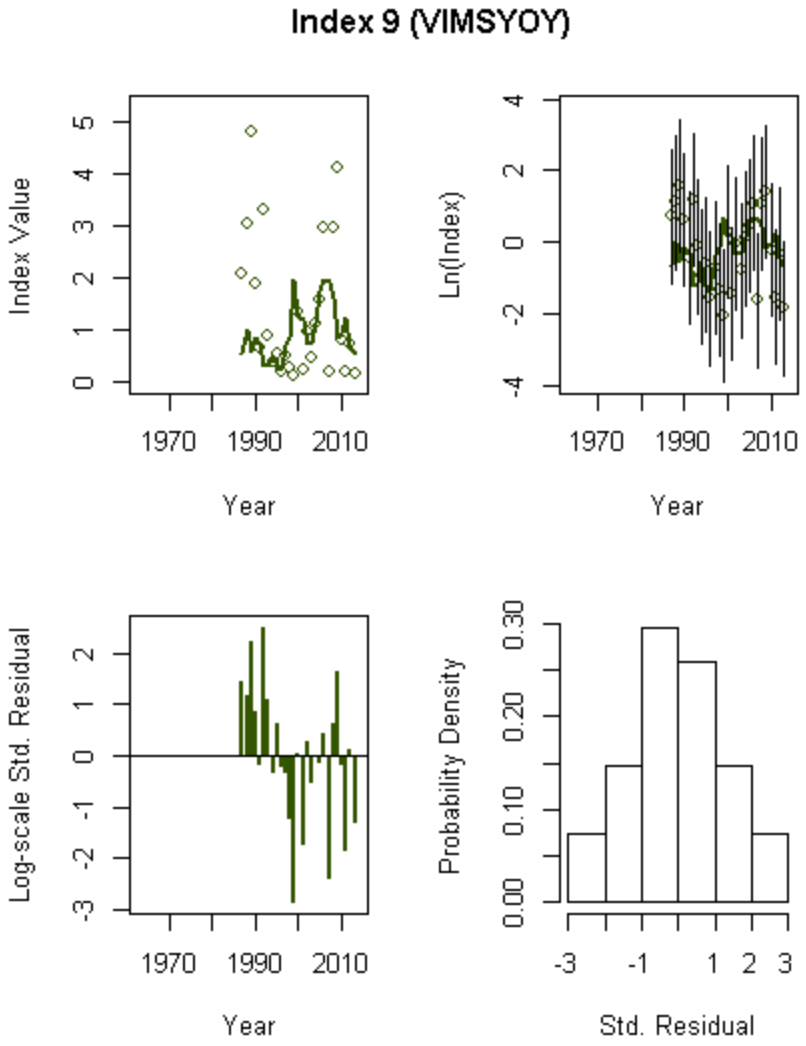

Figure A127. Residuals for final run S60_BASE_18: VIMS juvenile fish (YOY = Young-Of-the-Year) survey.

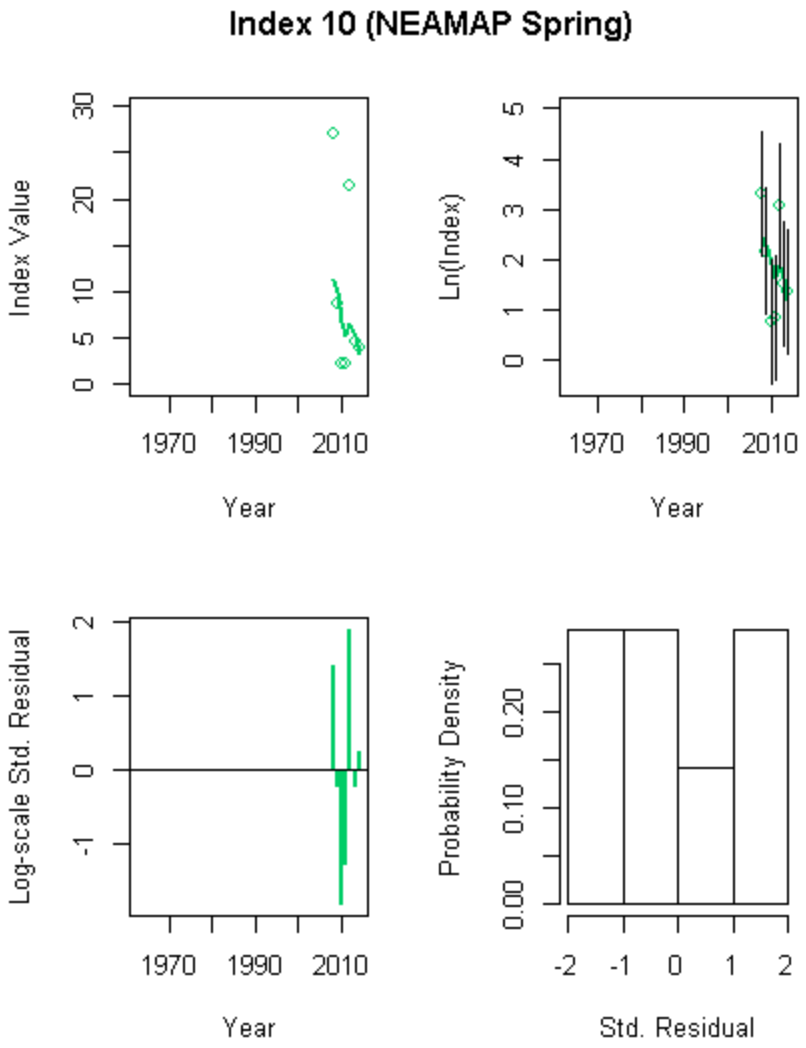

Figure A128. Residuals for final run S60_BASE_18: VIMS NEAMAP spring survey.

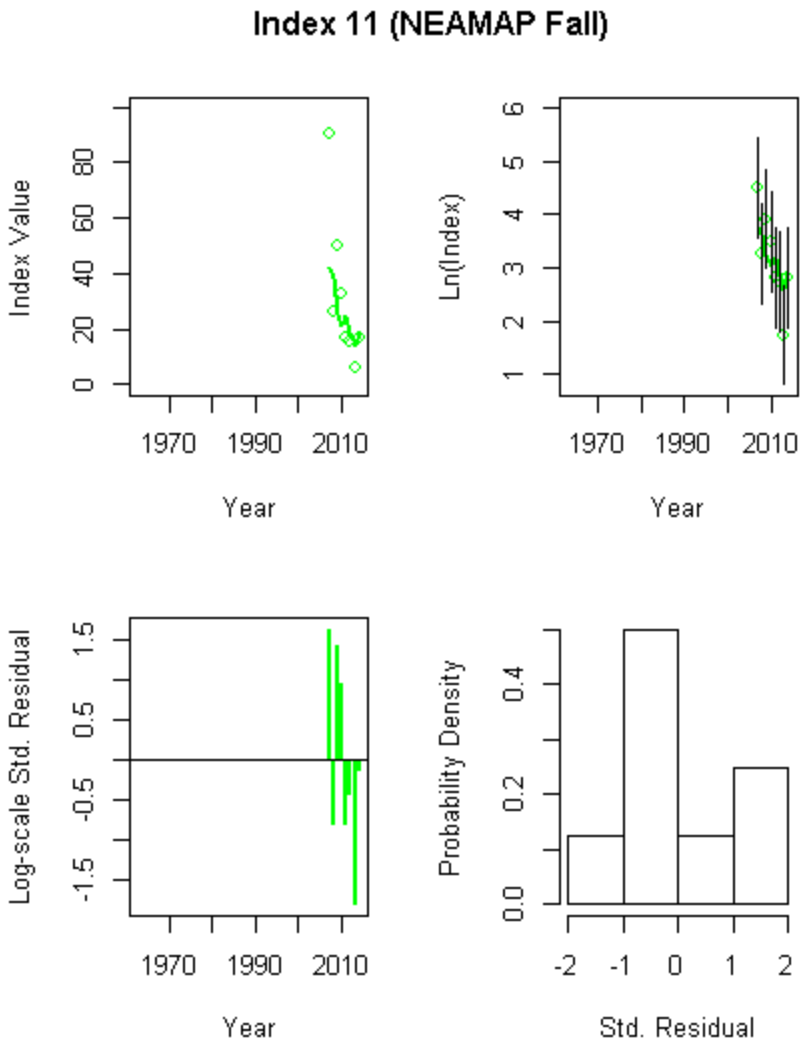

Figure A129. Residuals for final run S60_BASE_18: VIMS NEAMAP fall survey.

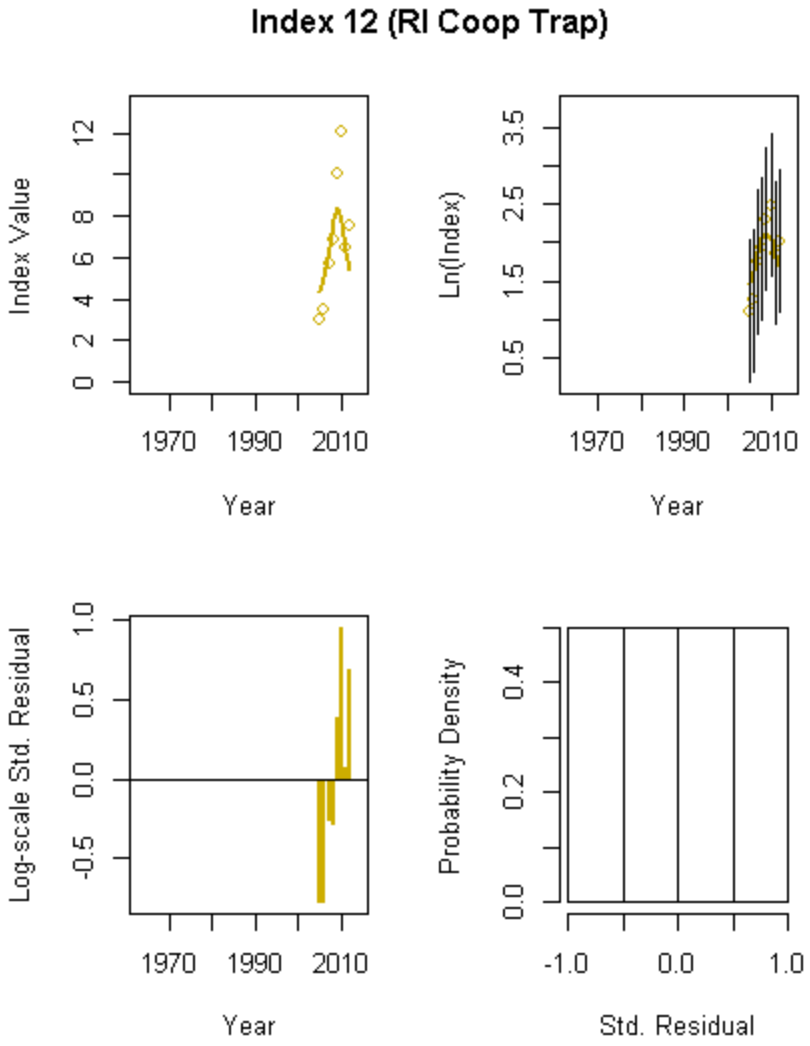

Figure A130. Residuals for final run S60_BASE_18: RIDFW cooperative trap survey.

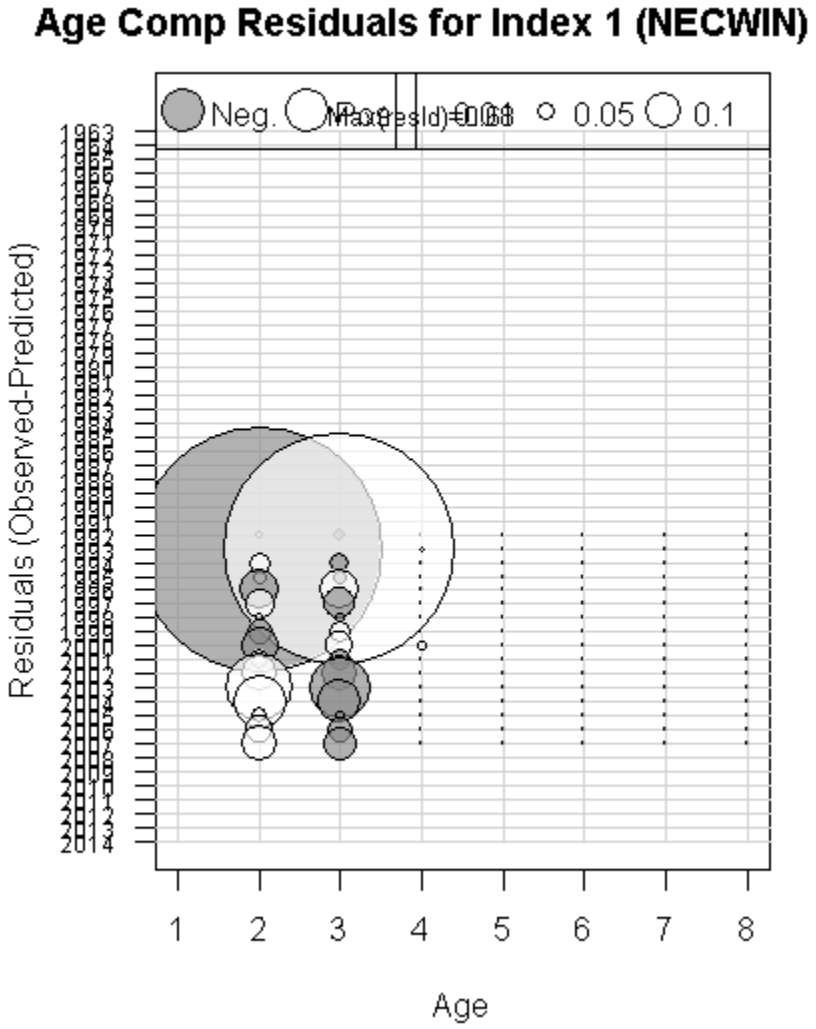

Figure A131. Age composition residuals for final run S60_BASE_19: NEFSC winter survey.

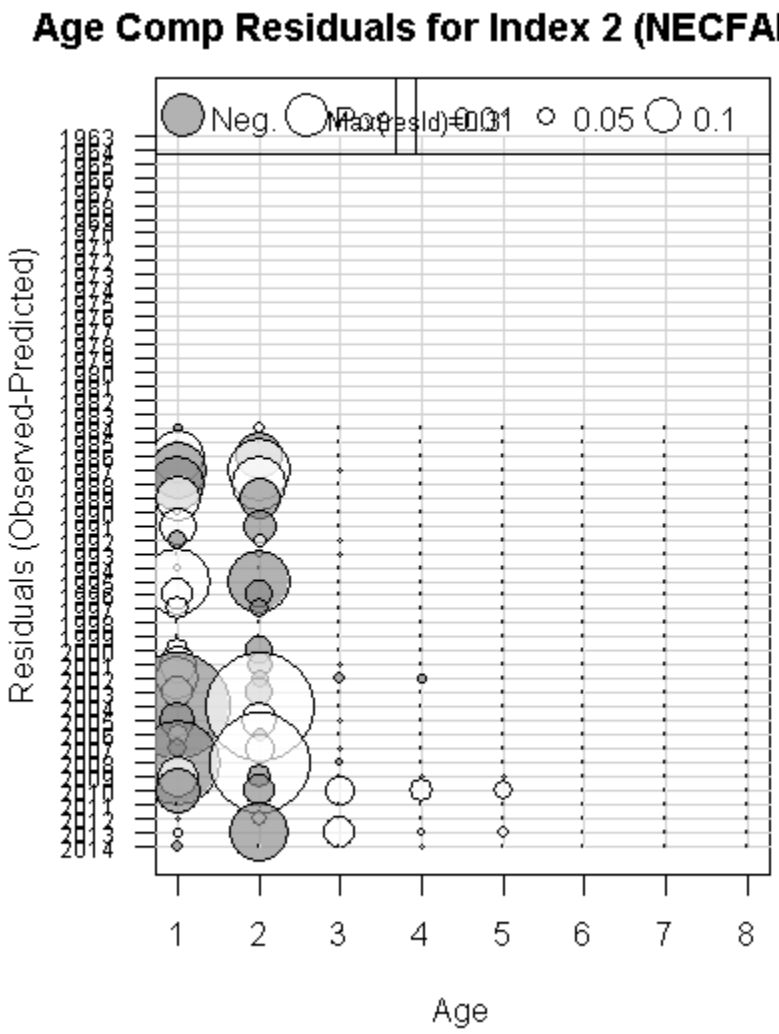

Figure A132. Age composition residuals for final run S60_BASE_19: NEFSC fall survey.

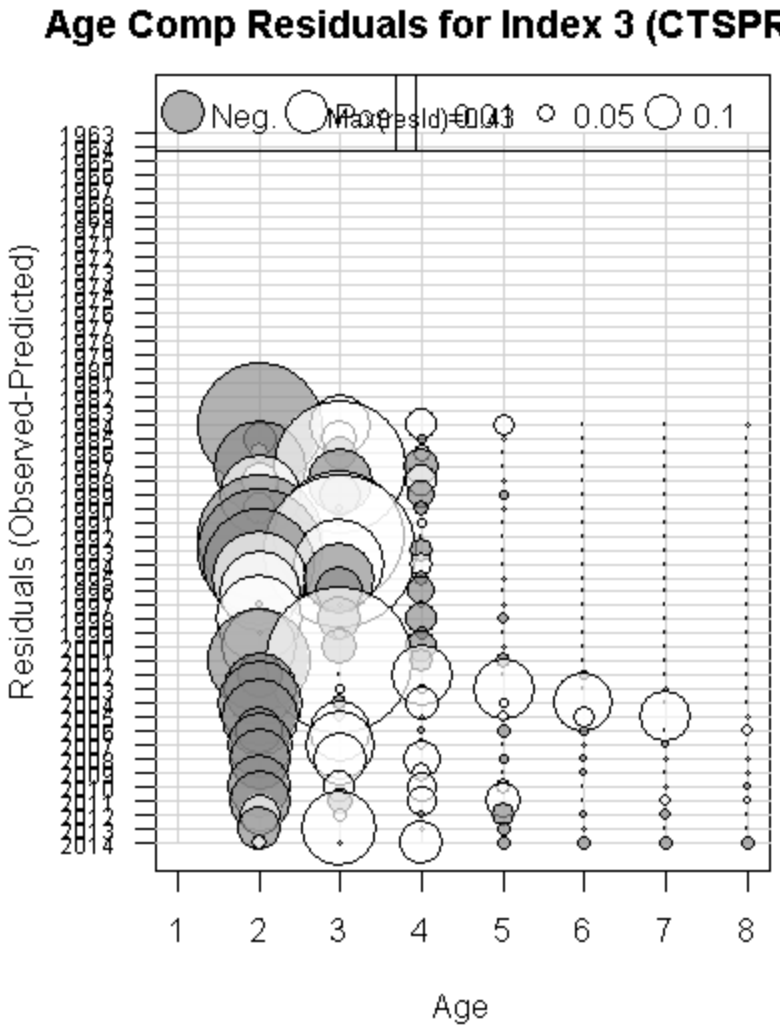

Figure A133. Age composition residuals for final run S60_BASE_19: CTDEEP spring survey.

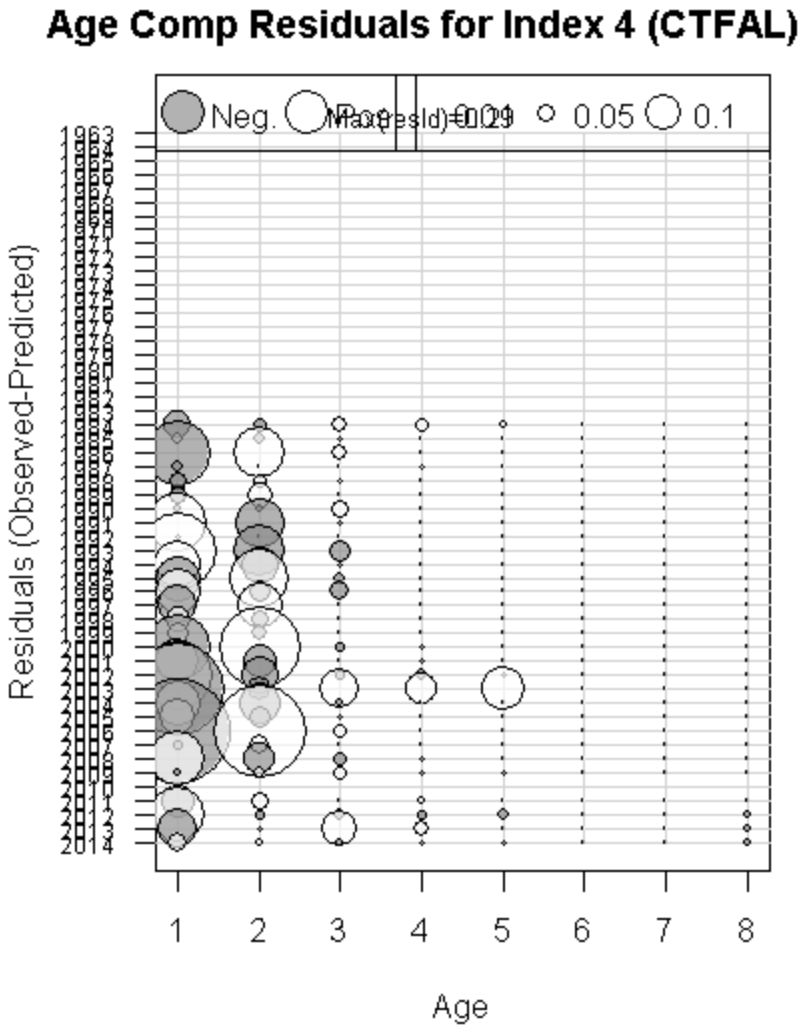

Figure A134. Age composition residuals for final run S60_BASE_19: CTDEEP fall survey.

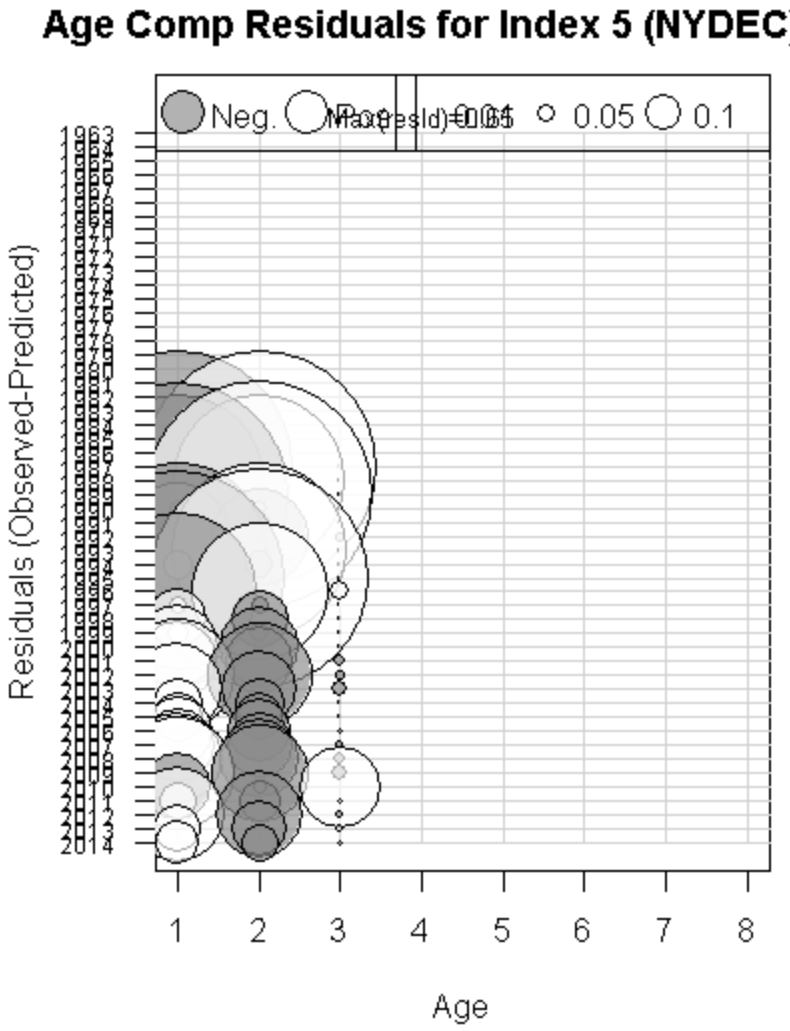

Figure A135. Age composition residuals for final run S60_BASE_19: NYDEC survey.

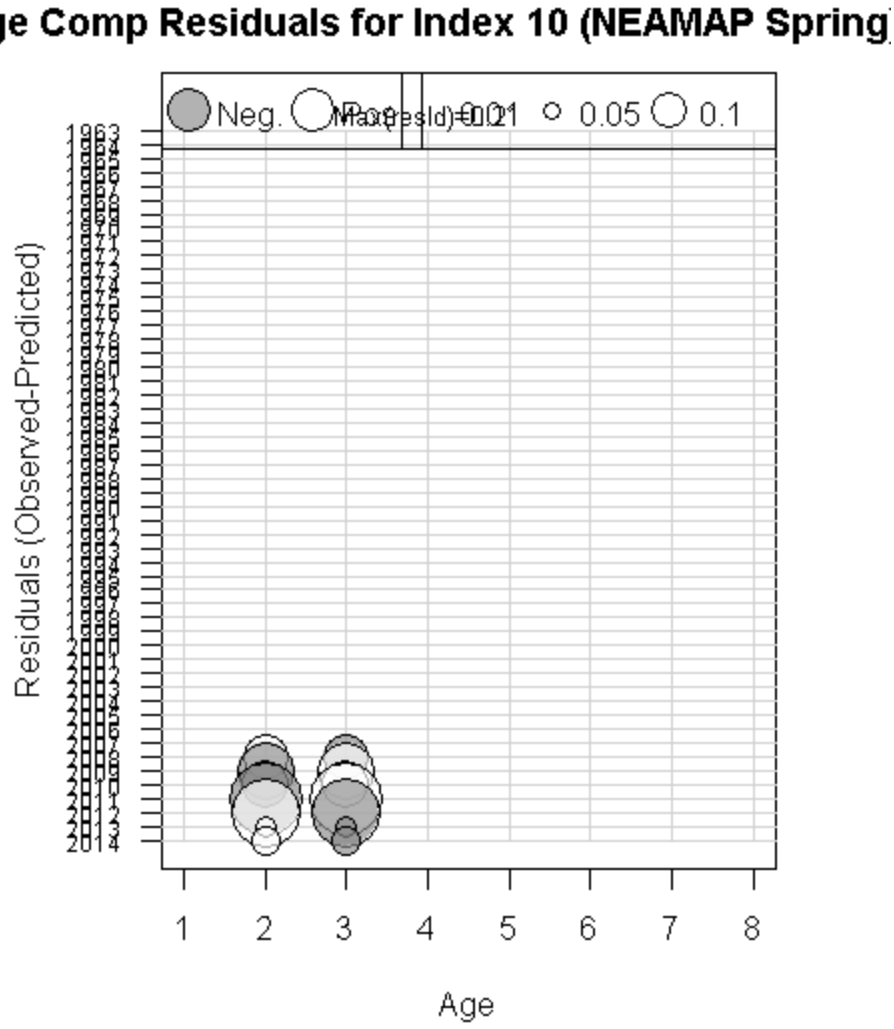

Figure A136. Age composition residuals for final run S60_BASE_19: VIMS NEAMAP spring survey.

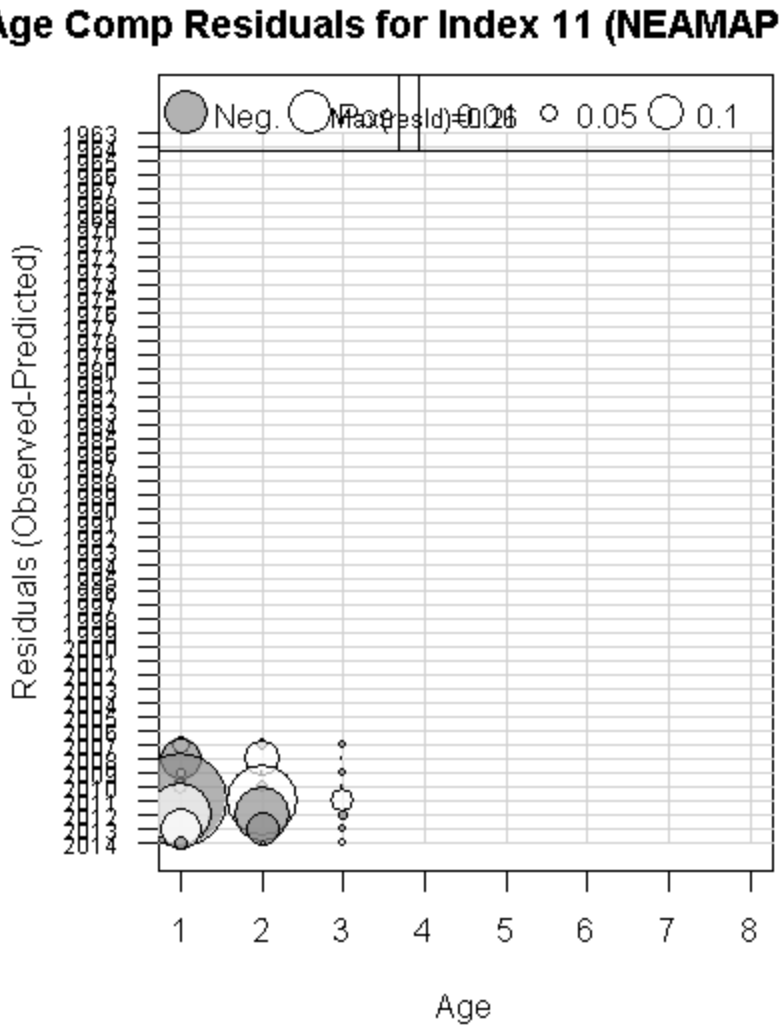

Figure A137. Age composition residuals for final run S60_BASE_19: VIMS NEAMAP fall survey.

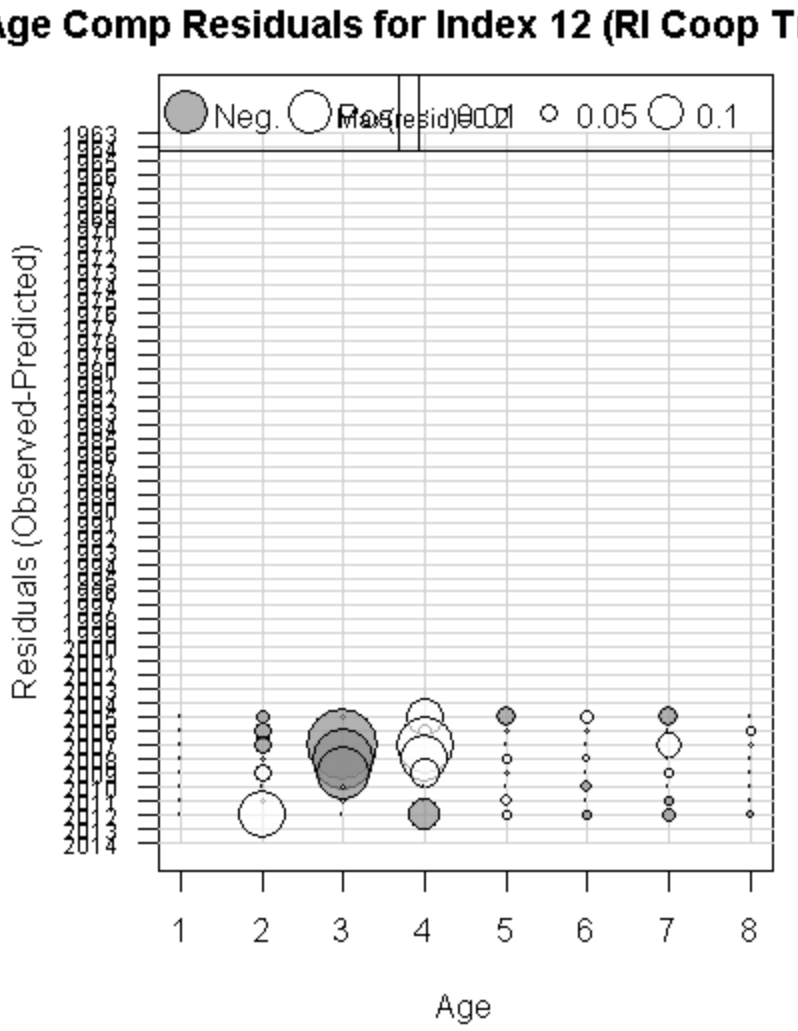

Figure A138. Age composition residuals for final run S60_BASE_19: RIDFW cooperative trap survey.

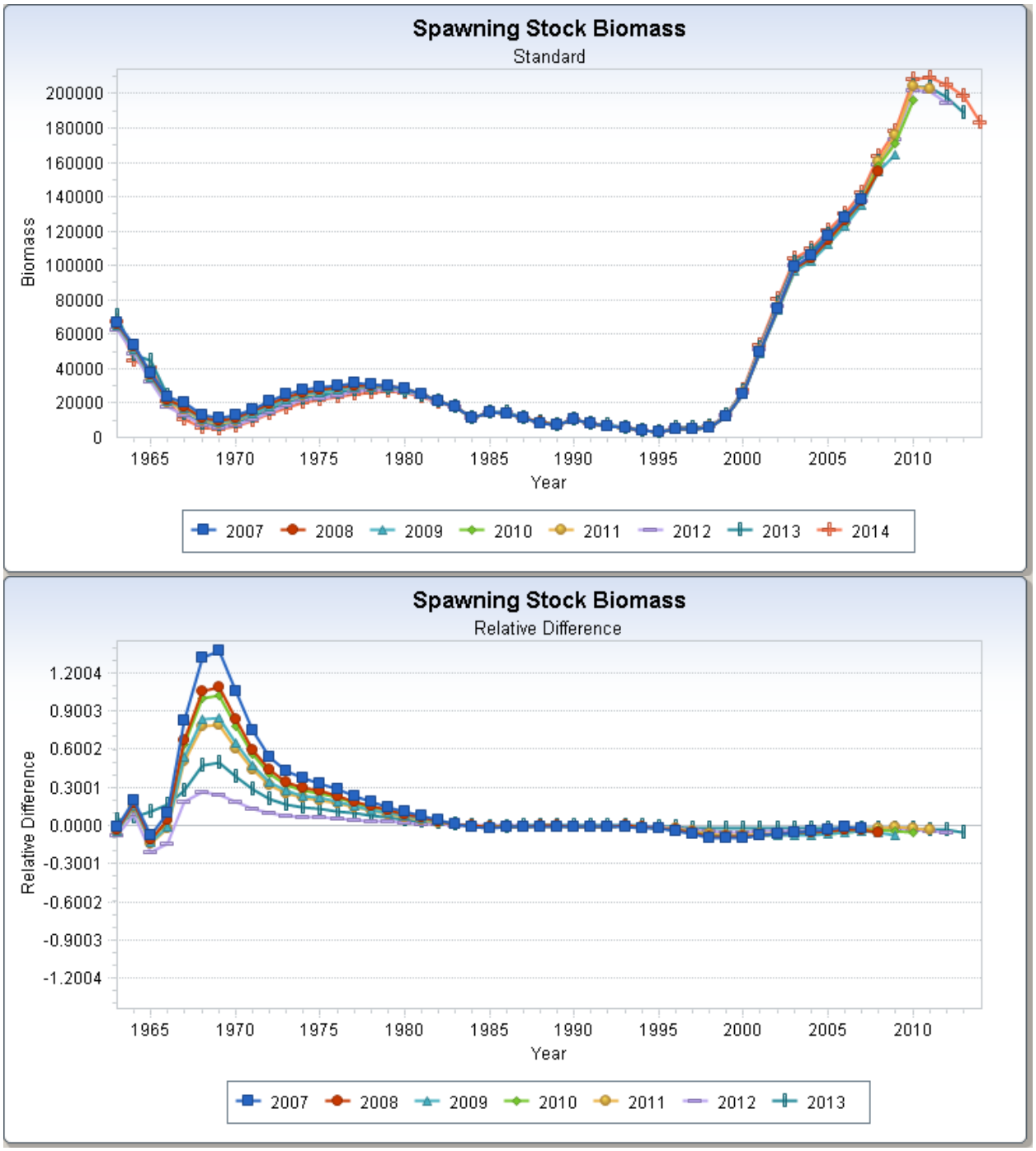

Figure A139. Retrospective analysis for run S60_BASE_18: top panel is absolute difference, bottom panel is relative difference - SSB.

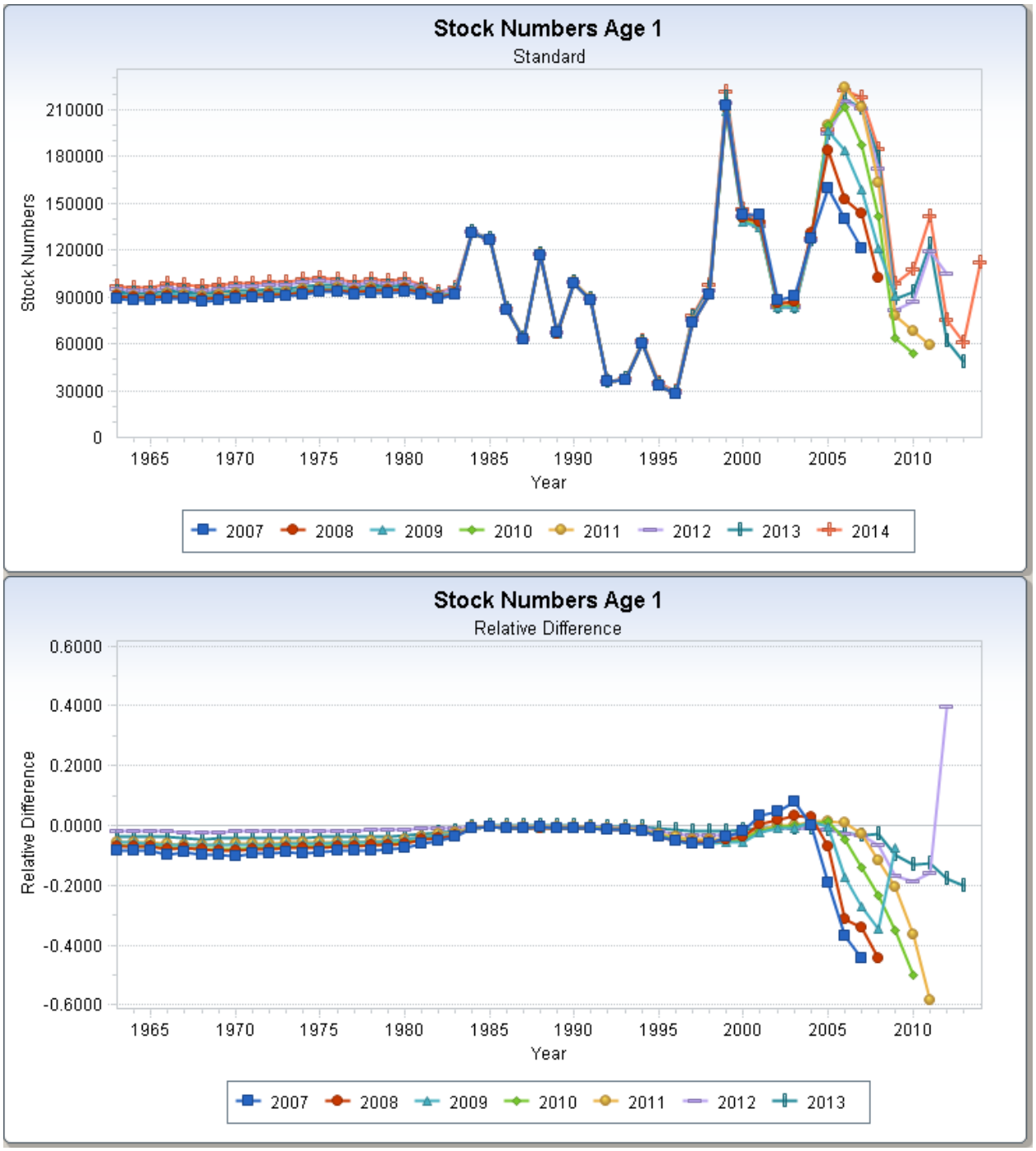

Figure A140. Retrospective analysis for run S60_BASE_18: top panel is absolute difference, bottom panel is relative difference - R (recruitment at true age 0, model age 1).

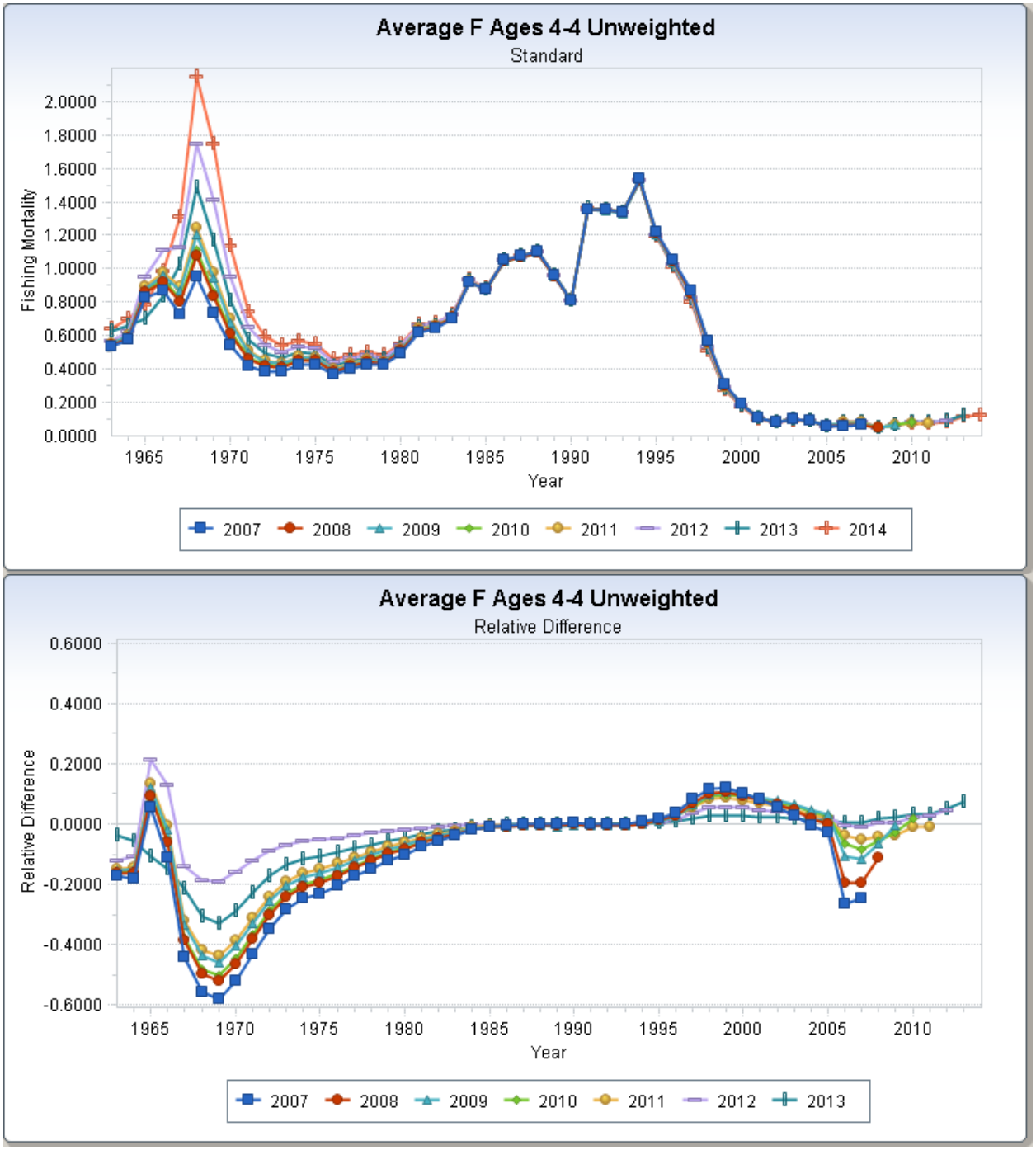

Figure A141. Retrospective analysis for run S60_BASE_18: top panel is absolute difference, bottom panel is relative difference – F (peak F at true age 3, model age 4).

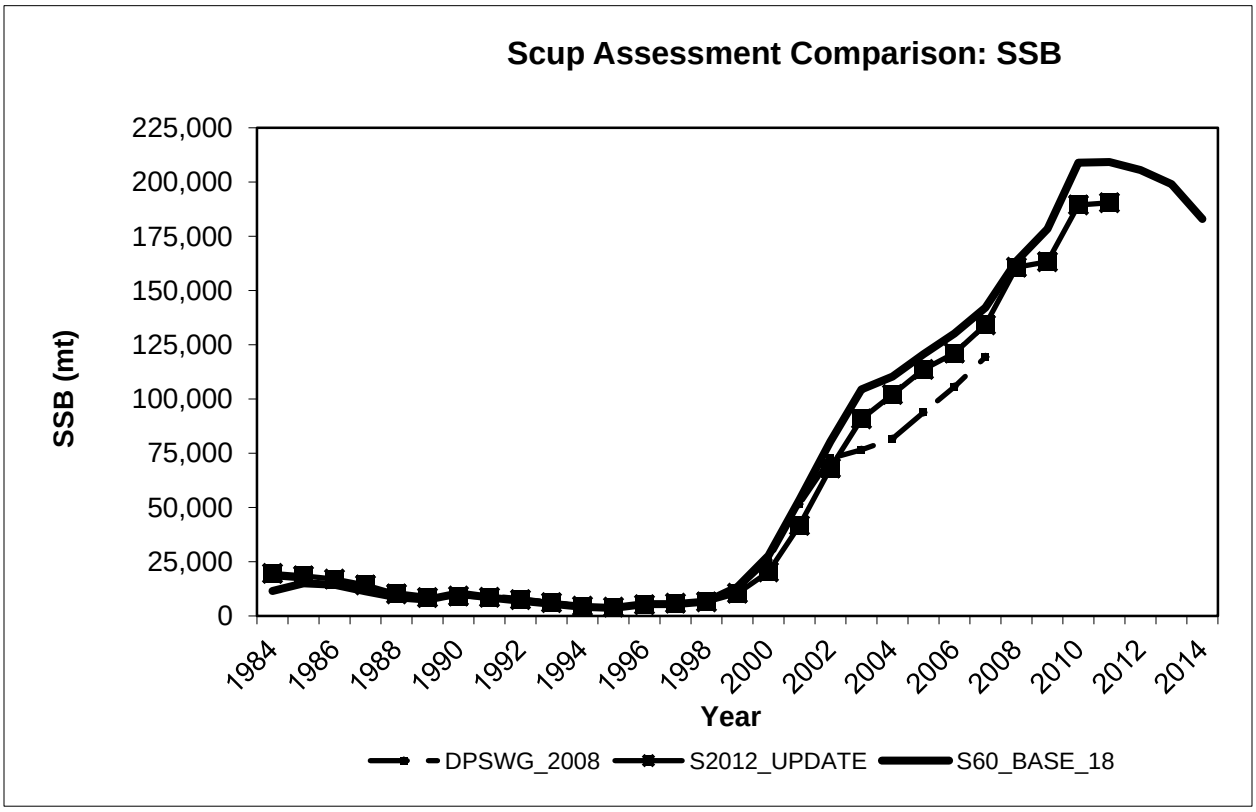

Figure A142. 'Historical' retrospective comparison of the 2008 DPSWG, 2012 update, and 2015 SAW 60 assessments: estimates of SSB.

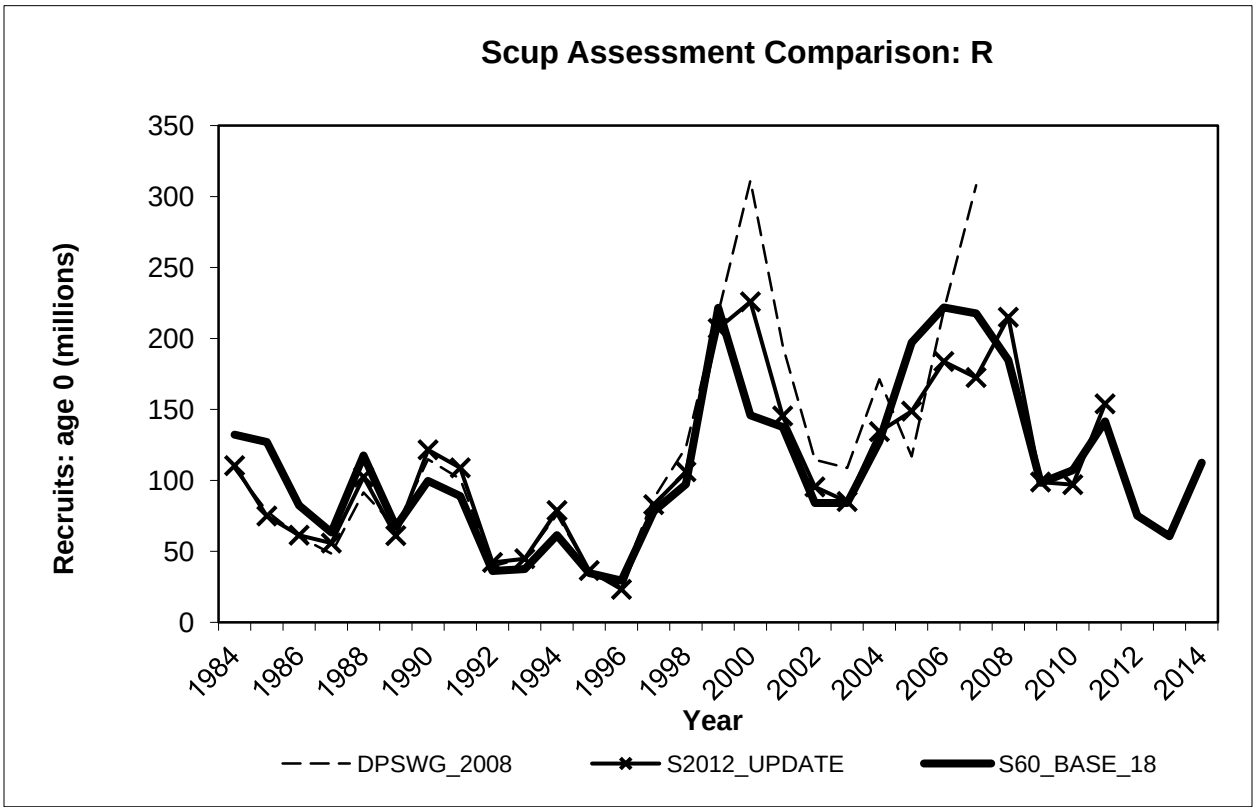

Figure A143. 'Historical' retrospective comparison of the 2008 DPSWG, 2012 update, and 2015 SAW 60 assessments: estimates of R (recruitment at age 0).

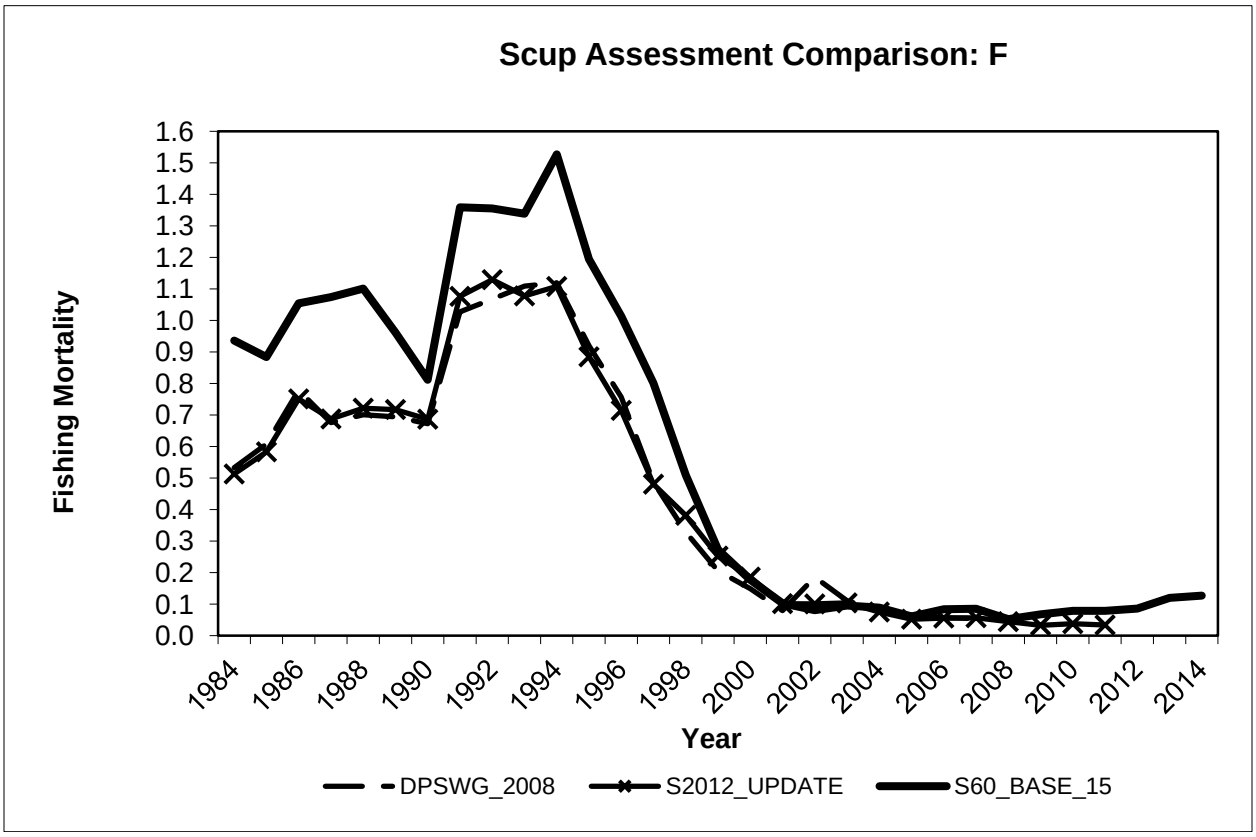

Figure A144. 'Historical' retrospective comparison of the 2008 DPSWG, 2012 update, and 2015 SAW 60 assessments: estimates of F.

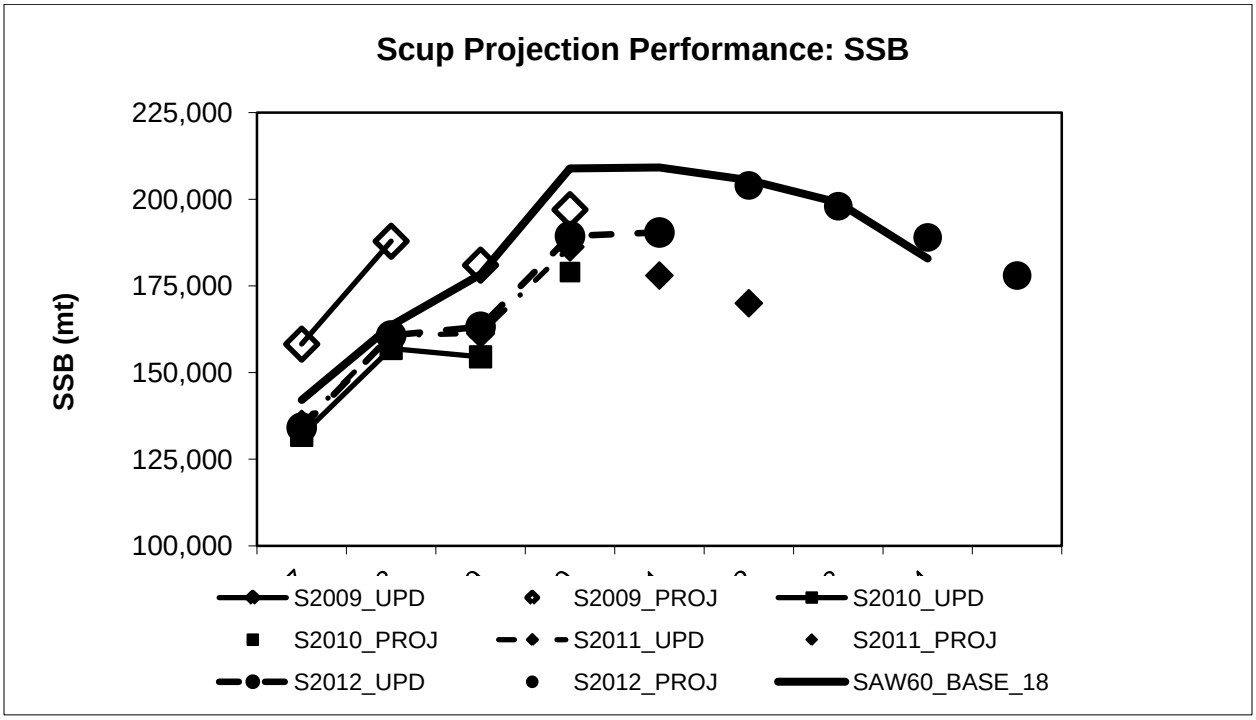

Figure A145. Performance of the 2009-2012 assessment estimates and projections when compared to 2015 SAW 60 final run S60-BASE_18 results: SSB.

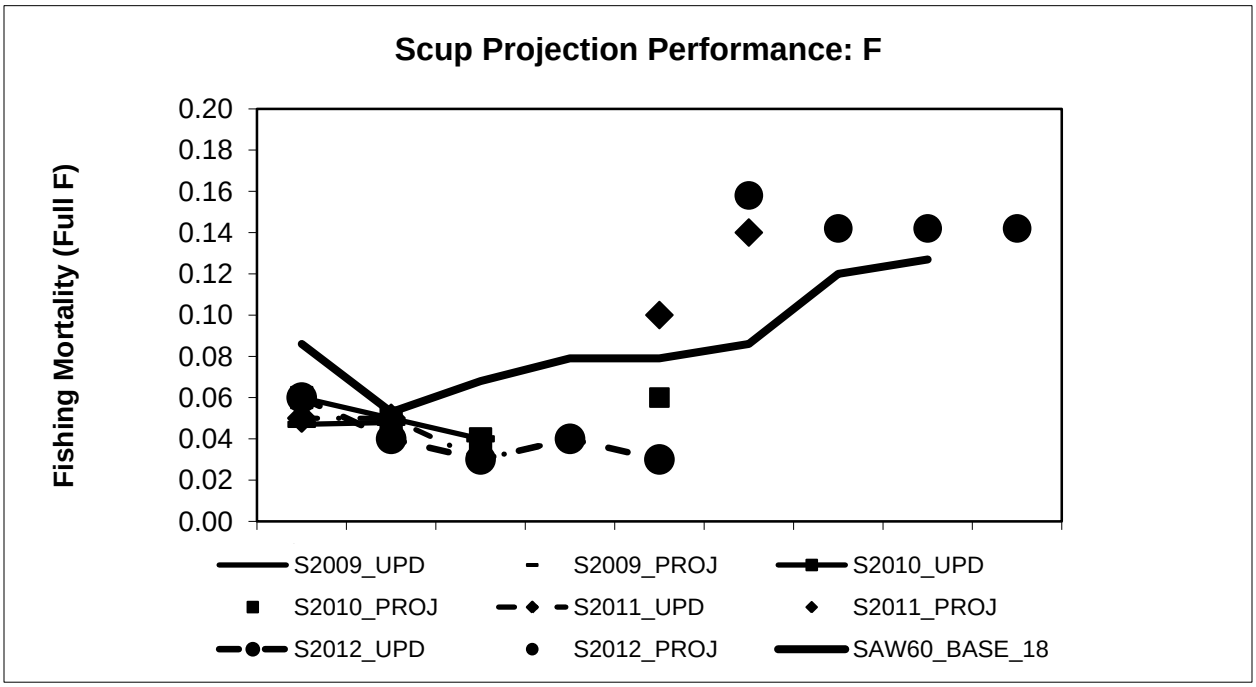

Figure A146. Performance of the 2009-2012 assessment estimates and projections when compared to 2015 SAW 60 final run S60-BASE_18 results: F.

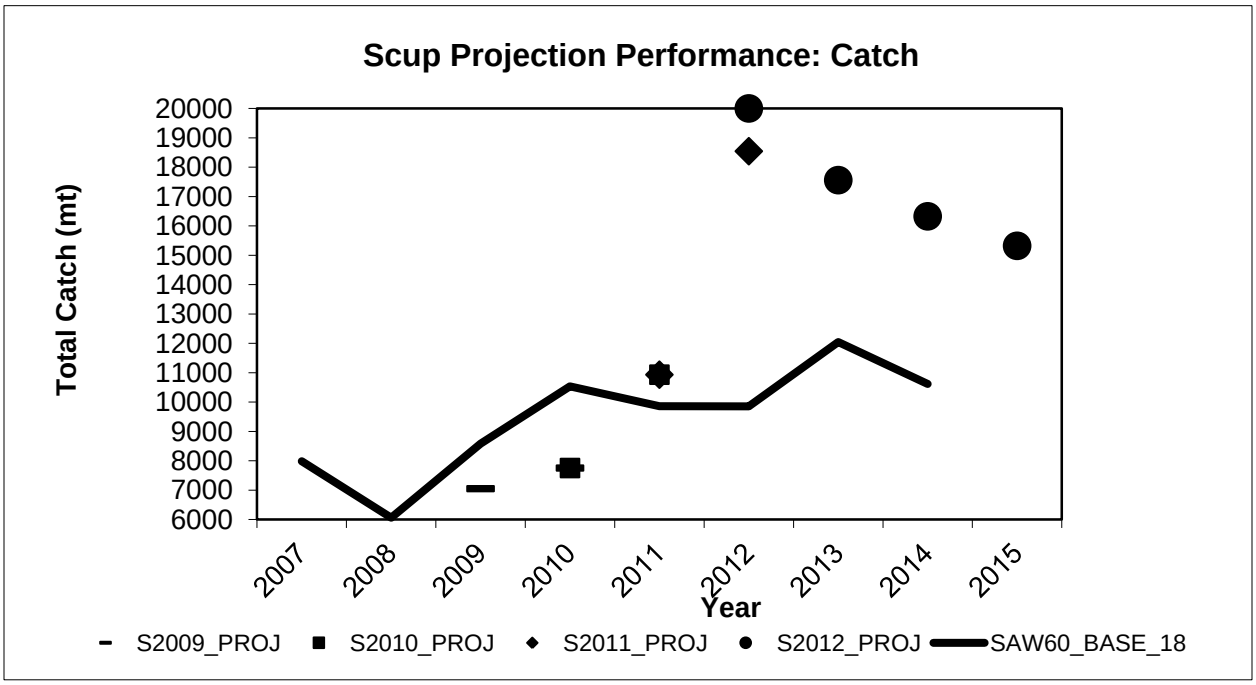

Figure A147. Performance of the 2009-2012 assessment estimates and projections when compared to 2015 SAW 60 final run S60-BASE_18 results: total fishery catch.

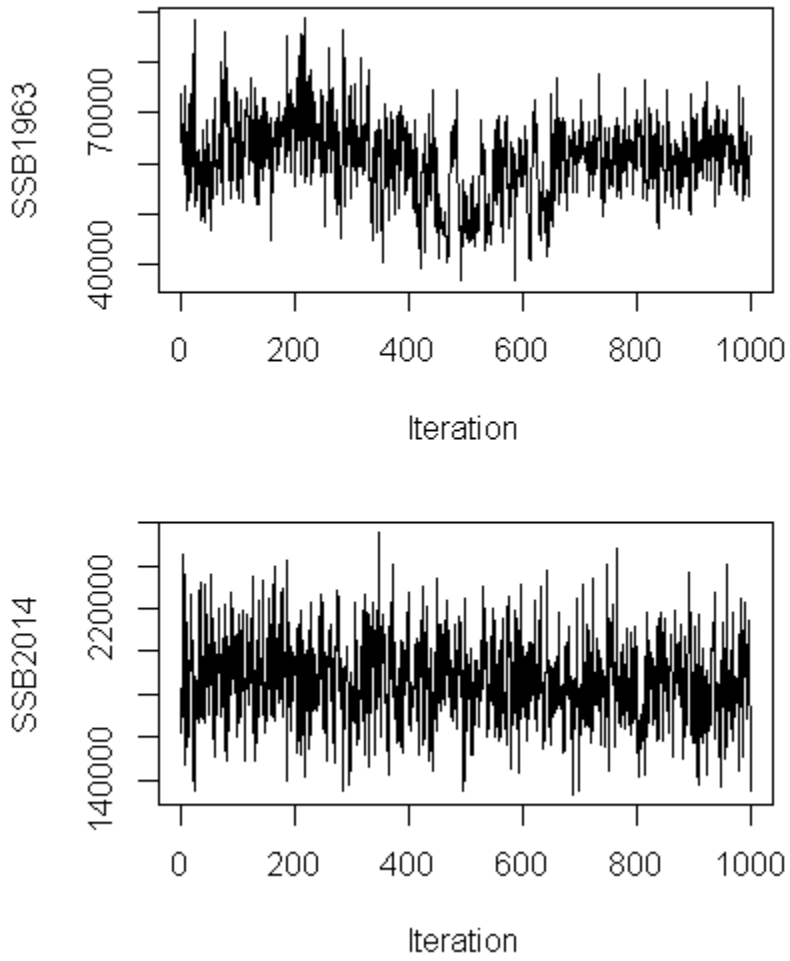

Figure A148. Run S60_BASE_18 MCMC chains for SSB.

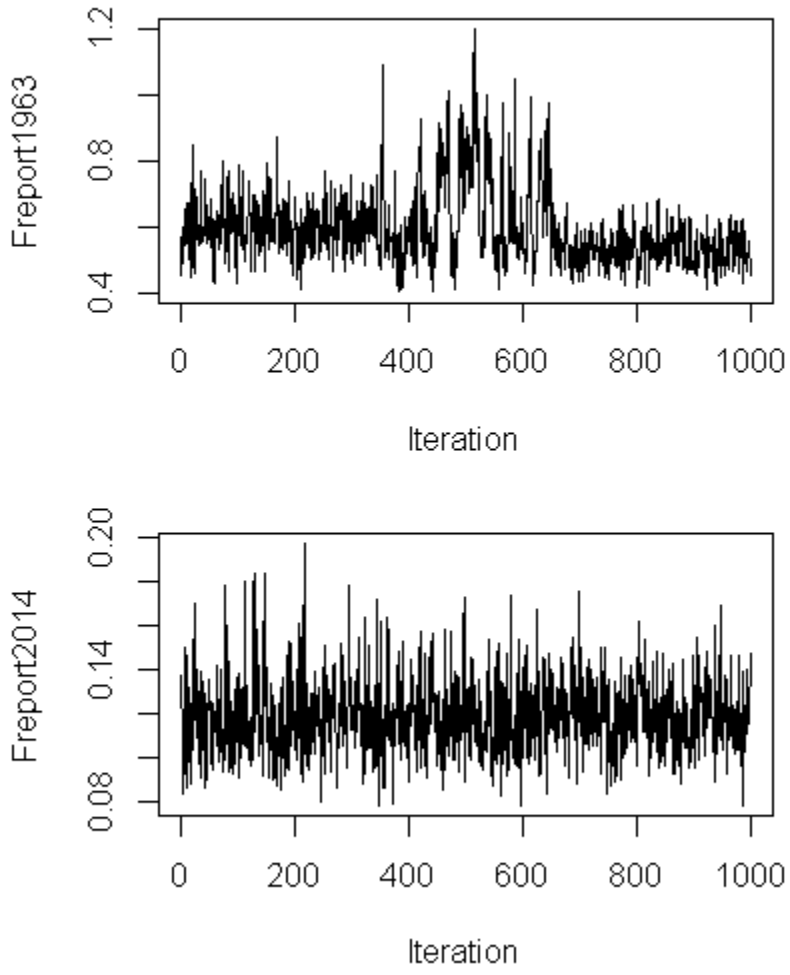

Figure A149. Run S60_BASE_18 MCMC chains for F.

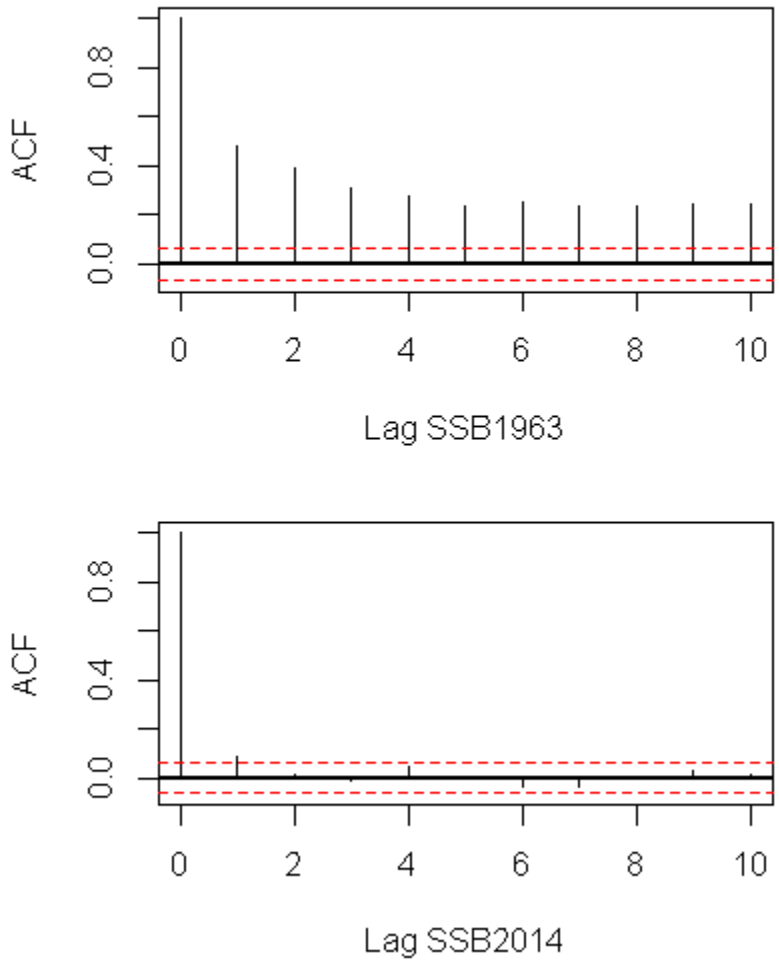

Figure A150. Autocorrelation plot for run S60_BASE_18 MCMC estimates: SSB.

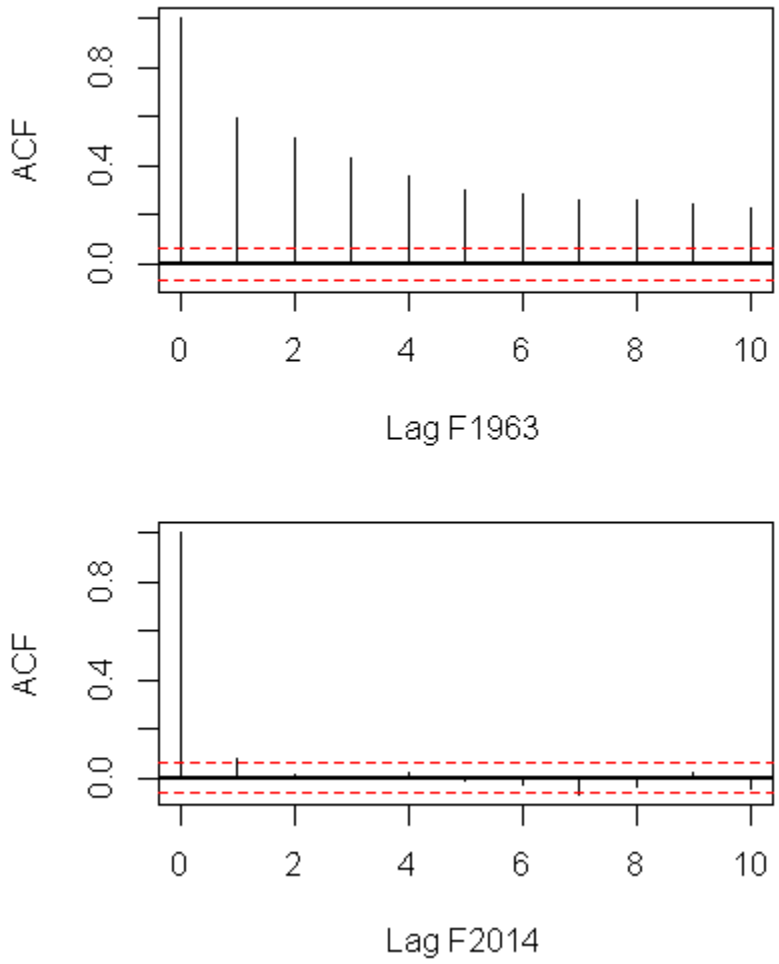

Figure A151. Autocorrelation plot for run S60_BASE_18 MCMC estimates: F.

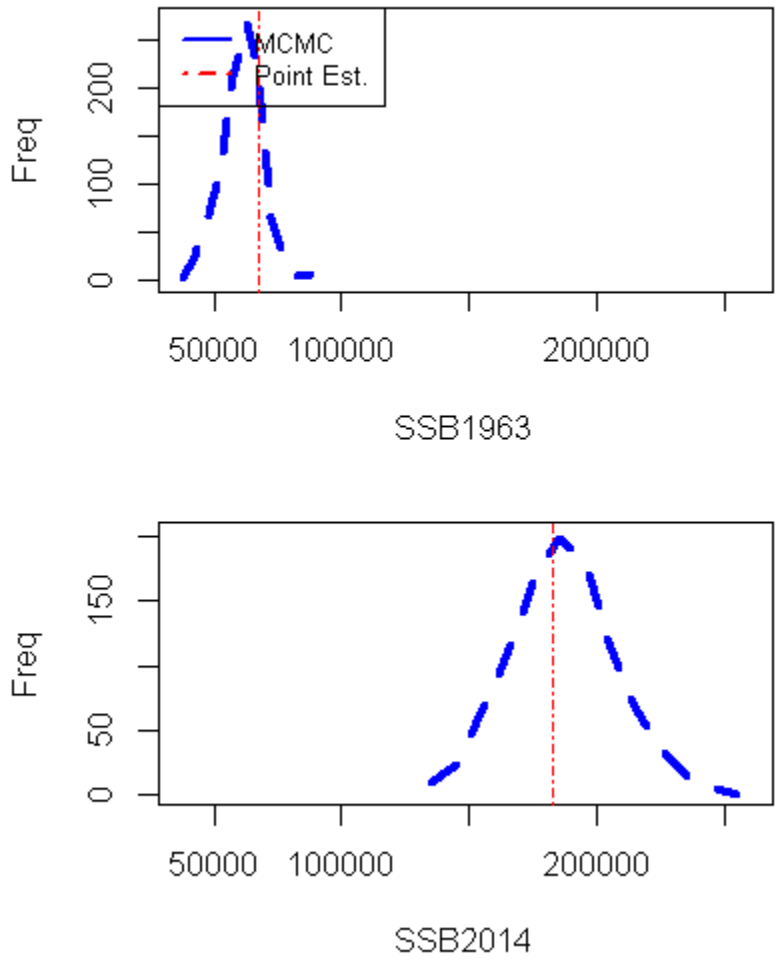

Figure A152. Run S60_BASE_18 point estimates and MCMC distributions: SSB.

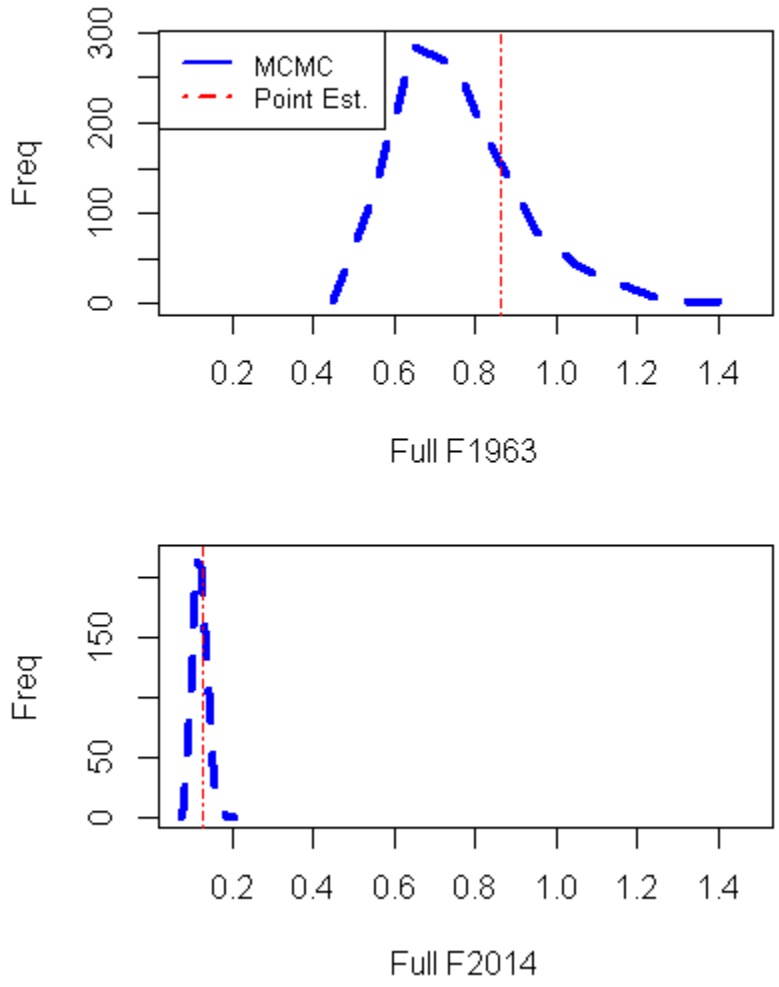

Figure A153. Run S60_BASE_18 point estimates and MCMC distributions: F.

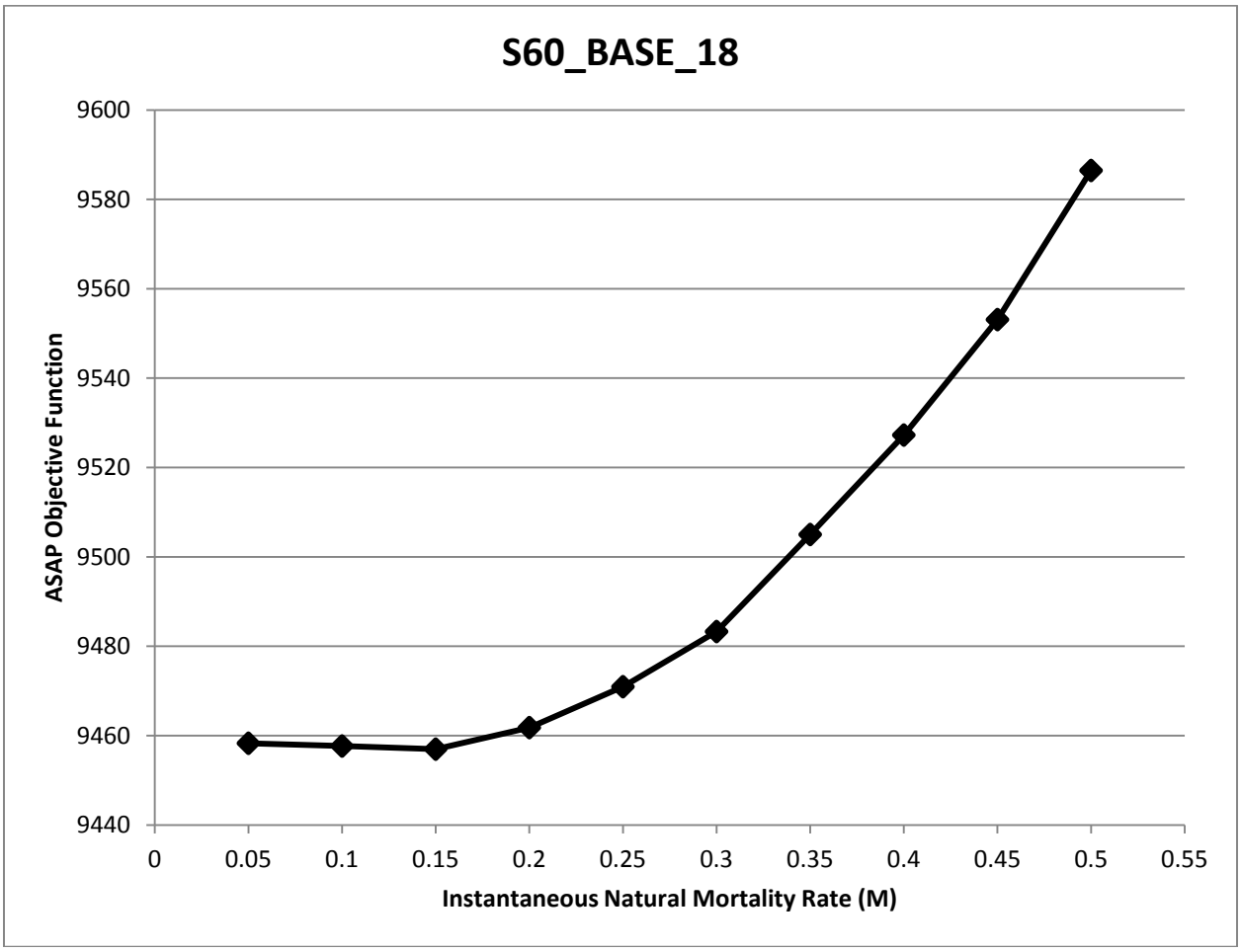

Figure A154. Likelihood profile of run S60_BASE_18 for fixed values of M.

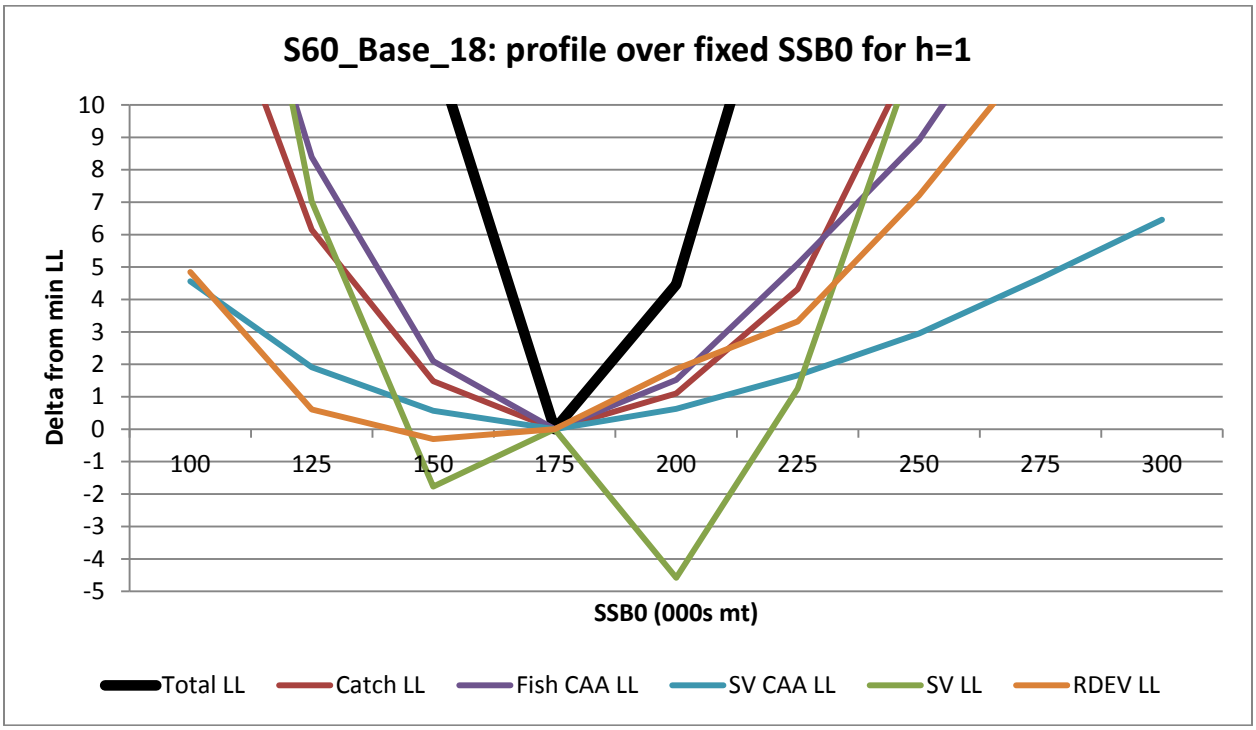

Figure A155. Likelihood profile of run S60_BASE_18 for fixed values of SSB0 given fixed steepness (h =1). The plot shows the difference (delta) from the Total LL at 175 mt for all components to show both the minimum LL for each and to help judge whether differences are likely to be significant.

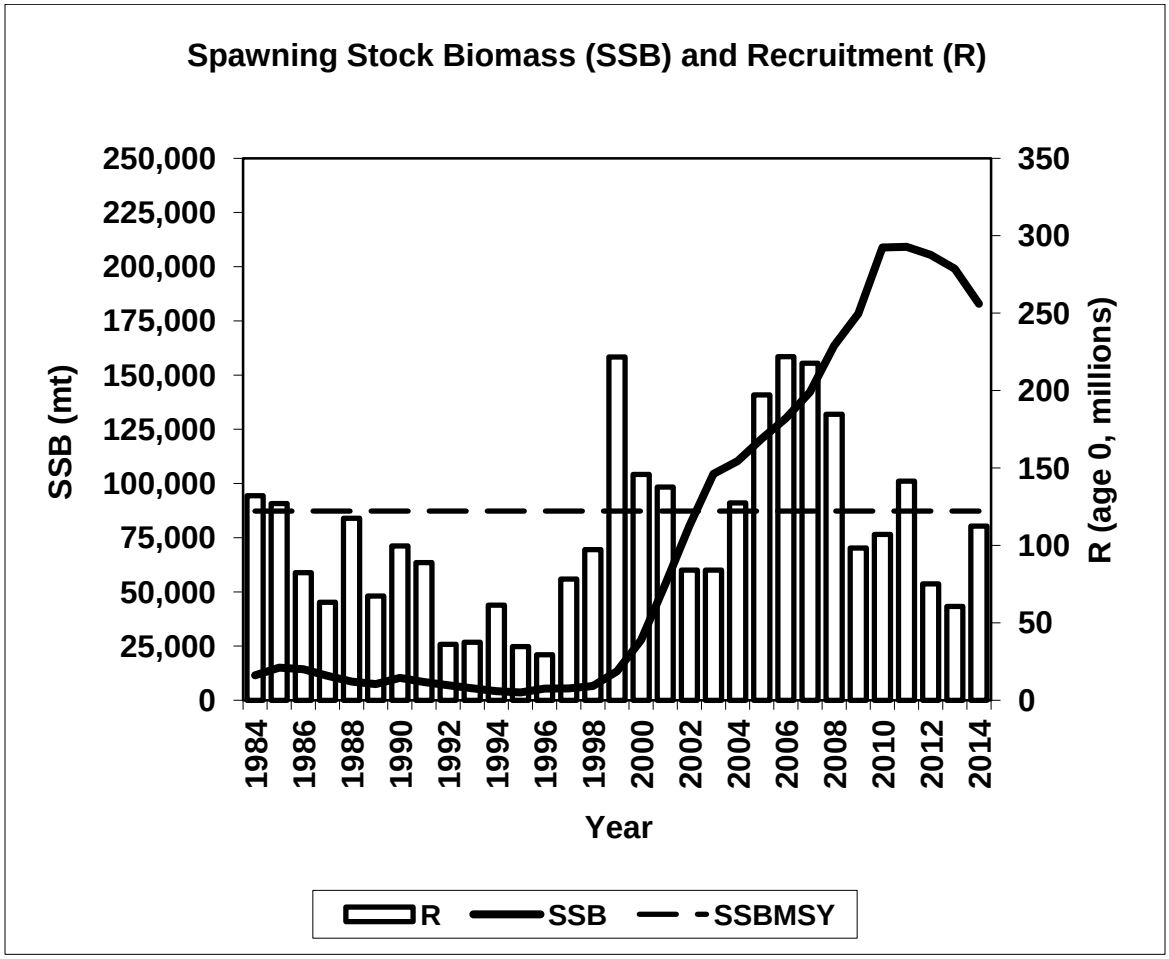

Figure A156. Spawning Stock Biomass (SSB; solid line) and R (Recruitment at age 0; vertical bars). The horizontal dashed line is the SSBMSY proxy = SSB40% = 87,302 mt. Note these plots show only years where fishery age data are available in the model.

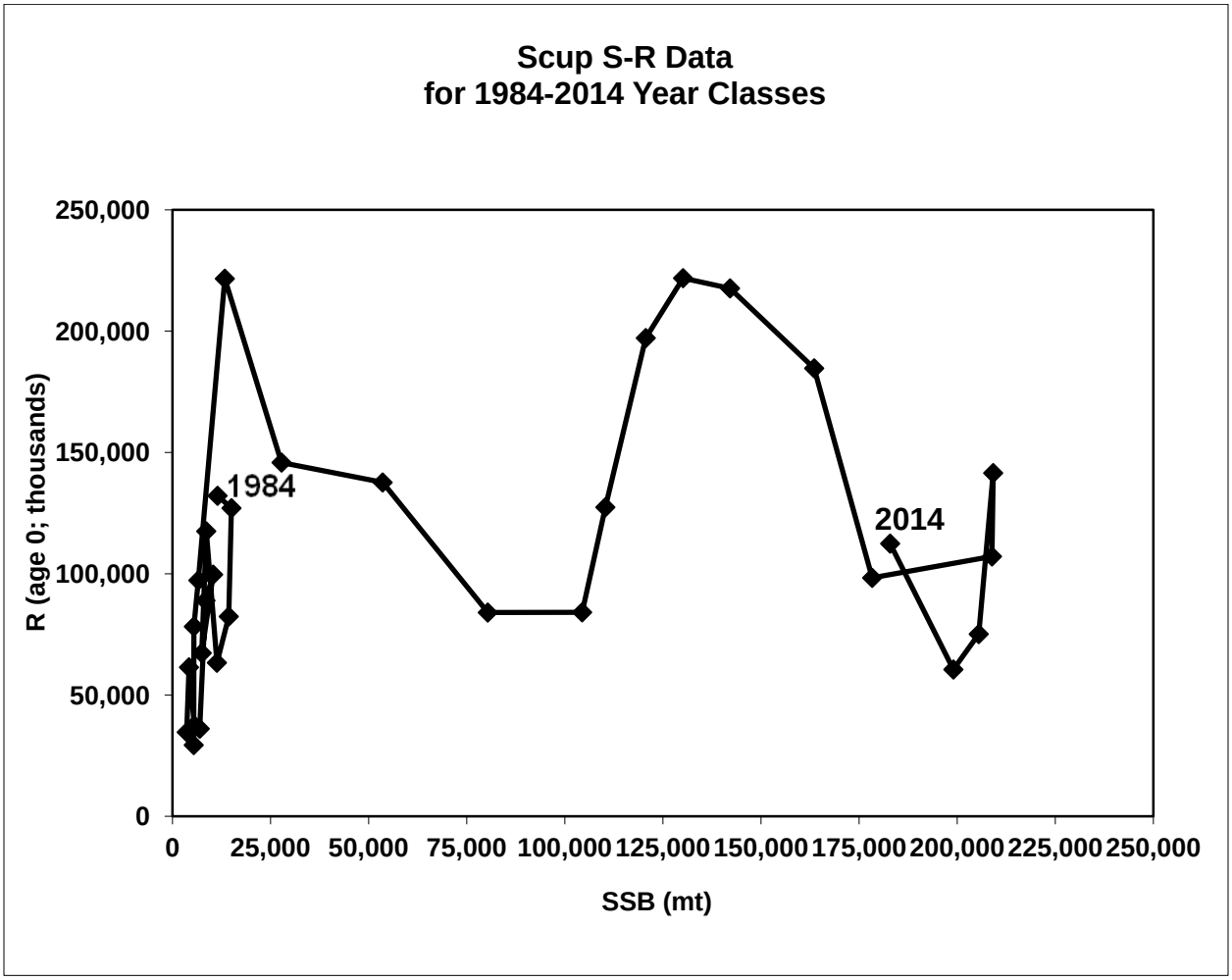

Figure A157. Spawning Stock Biomass (SSB) and Recruitment (R) scatter plot for scup. Note this plot shows only years where fishery age data are available in the model.

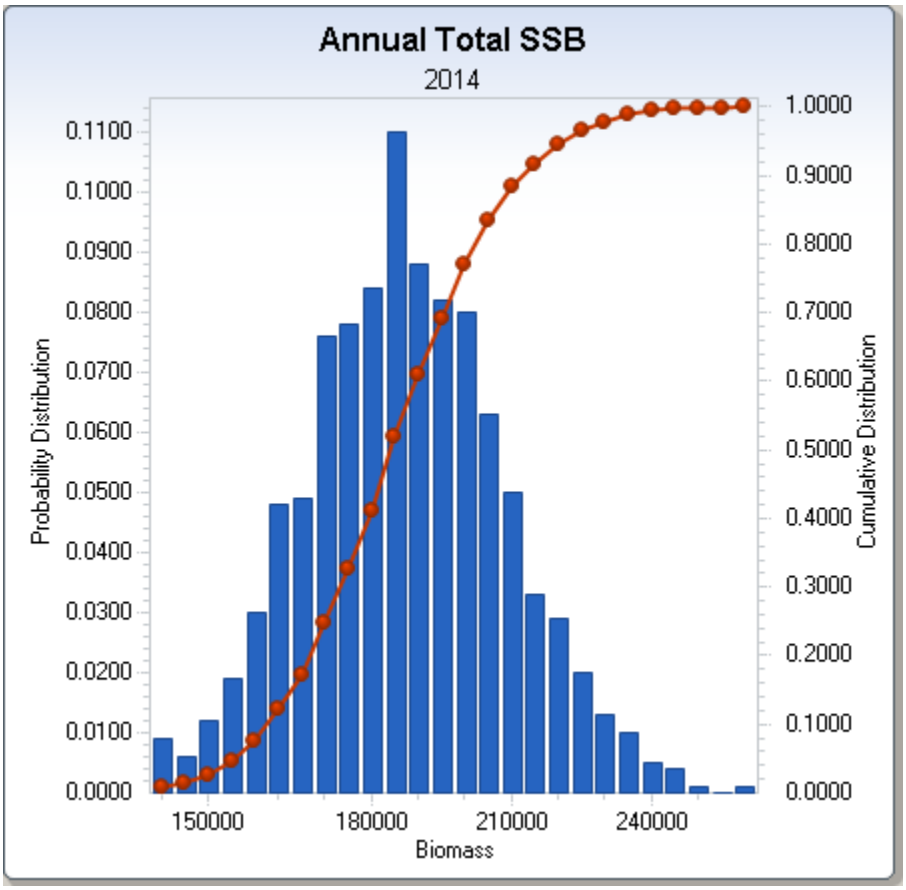

Figure A158. MCMC distribution plot for the 2014 estimate of SSB.

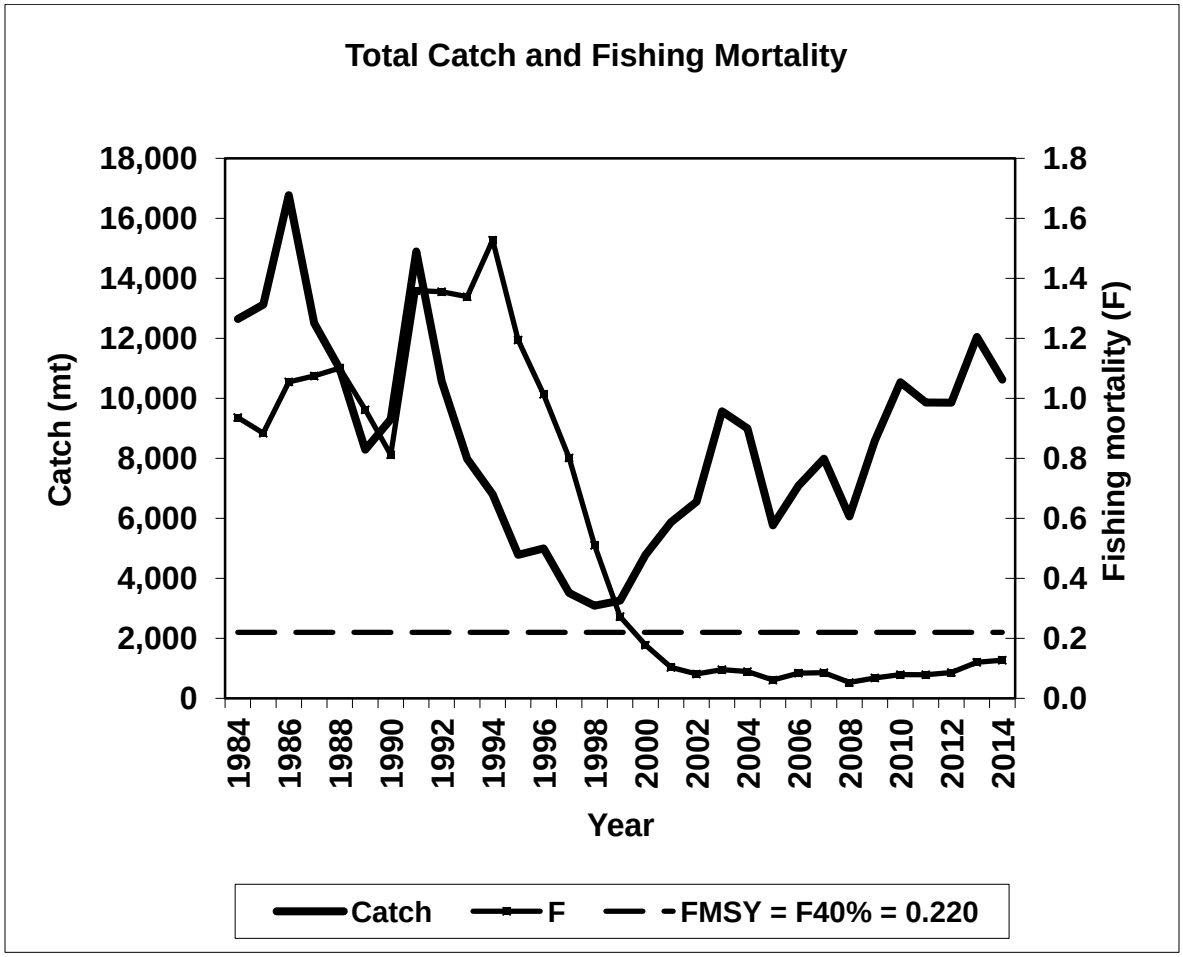

Figure A159. Total fishery catch and fishing mortality (F, peak at age 3). The horizontal dashed line is the FMSY proxy = F40% = 0.220. Note these plots show only years where fishery age data are available in the model.

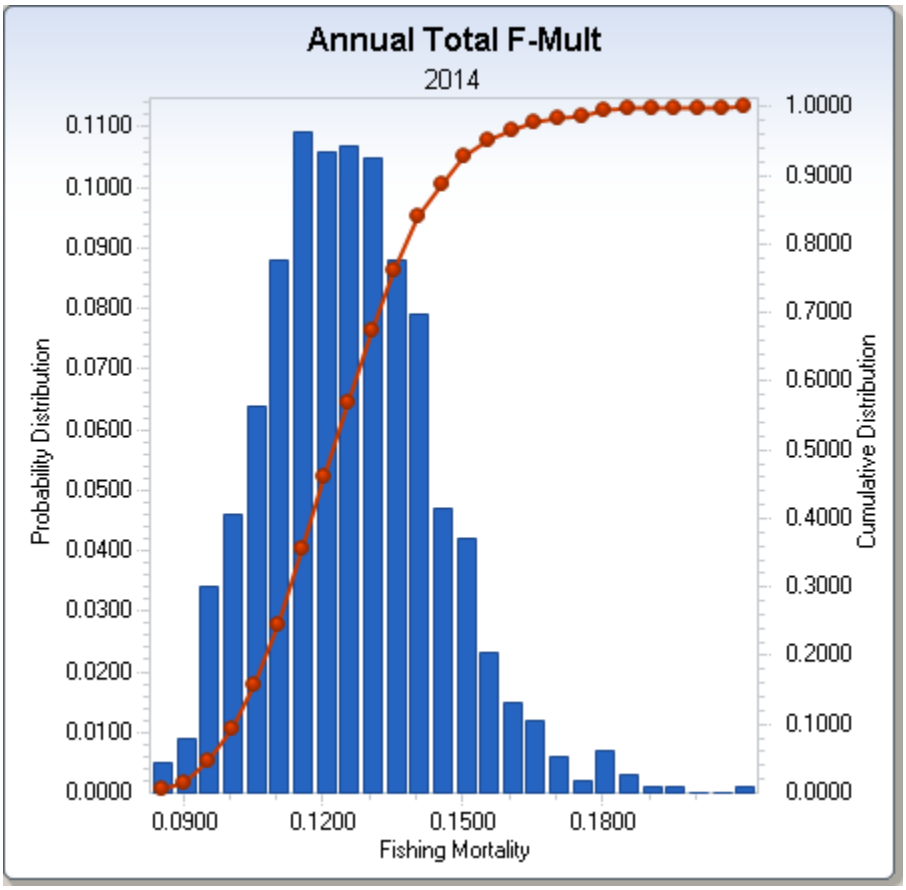

Figure A160. MCMC distribution plot for the 2014 estimate of fishing mortality (F).

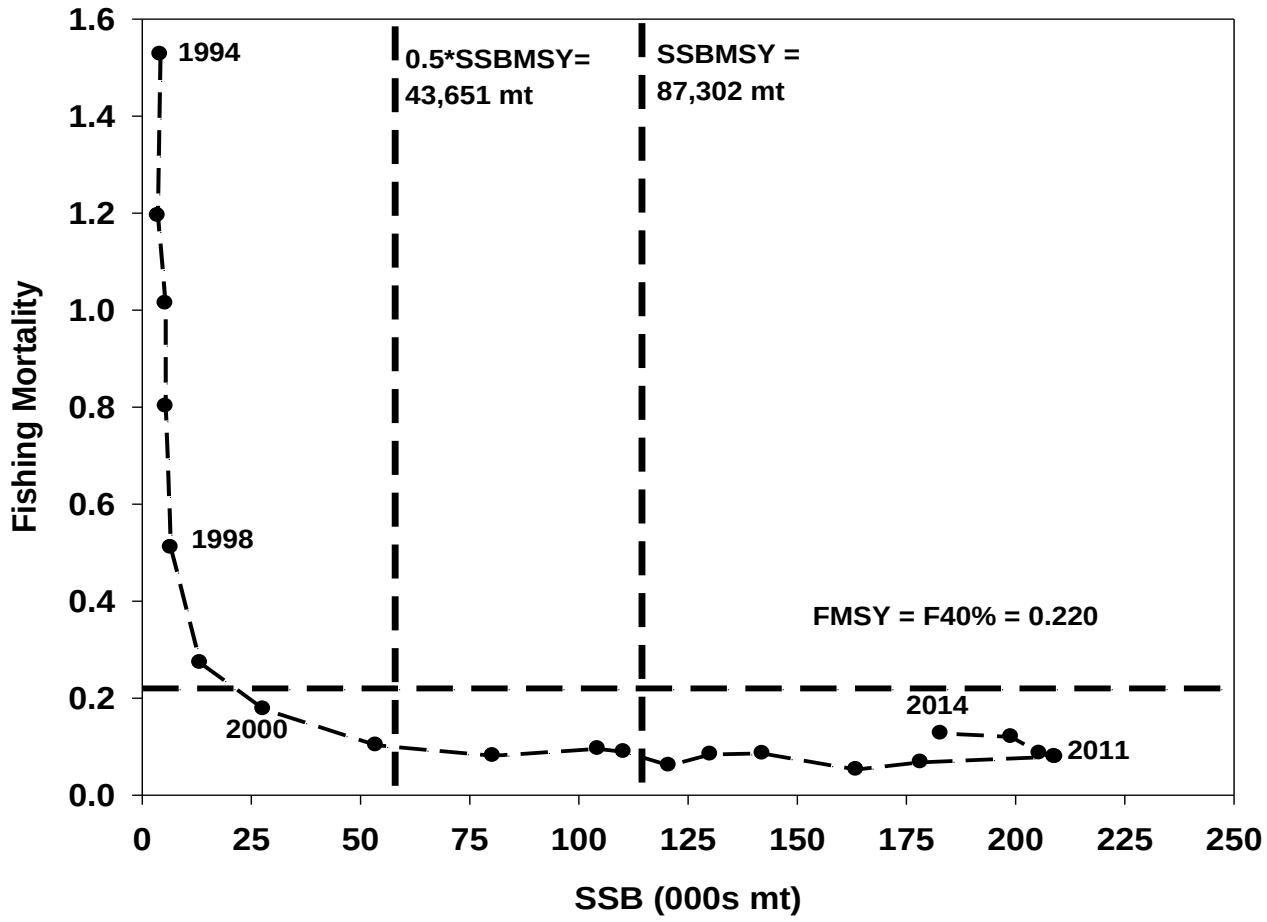

Figure A161. Status determination plot for scup: spawning stock biomass (SSB) and fully-recruited fishing mortality (F) relative to the 2015 SAW 60 biological reference points.