Figures

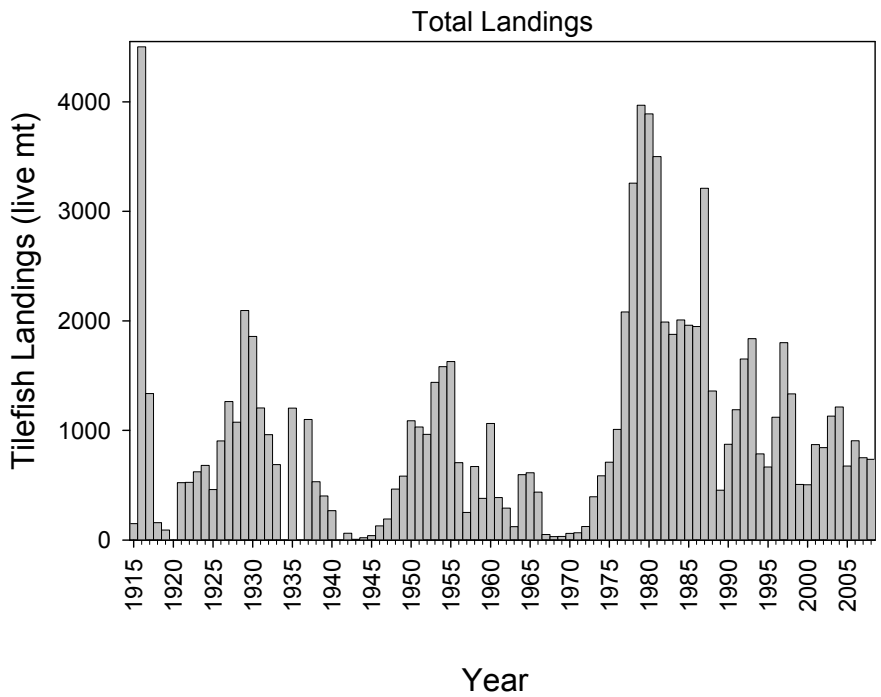


Figure A1. Landings of tilefish in metric tons from 1915-2004. Landings in 1915-1972 are from Freeman and Turner (1977), 1973-1989 are from the general canvas data, 1990-1993 are from the weighout system, 1994-2003 are from the dealer reported data, and 2004-2008 is from dealer electronic reporting.

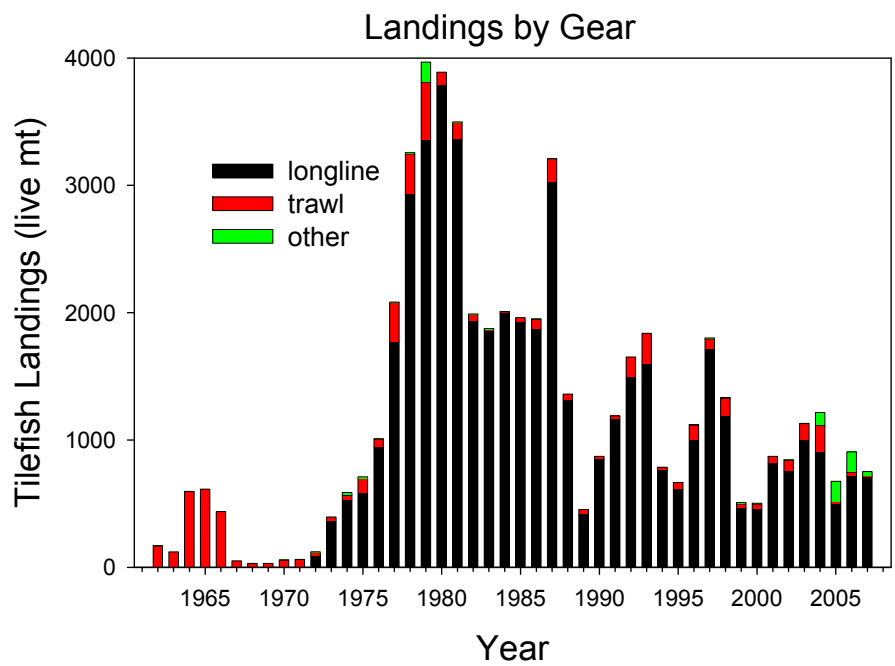


Figure A2. Landings of tilefish (mt, live) by gear. Landing before 1990 are from the general canvas data.

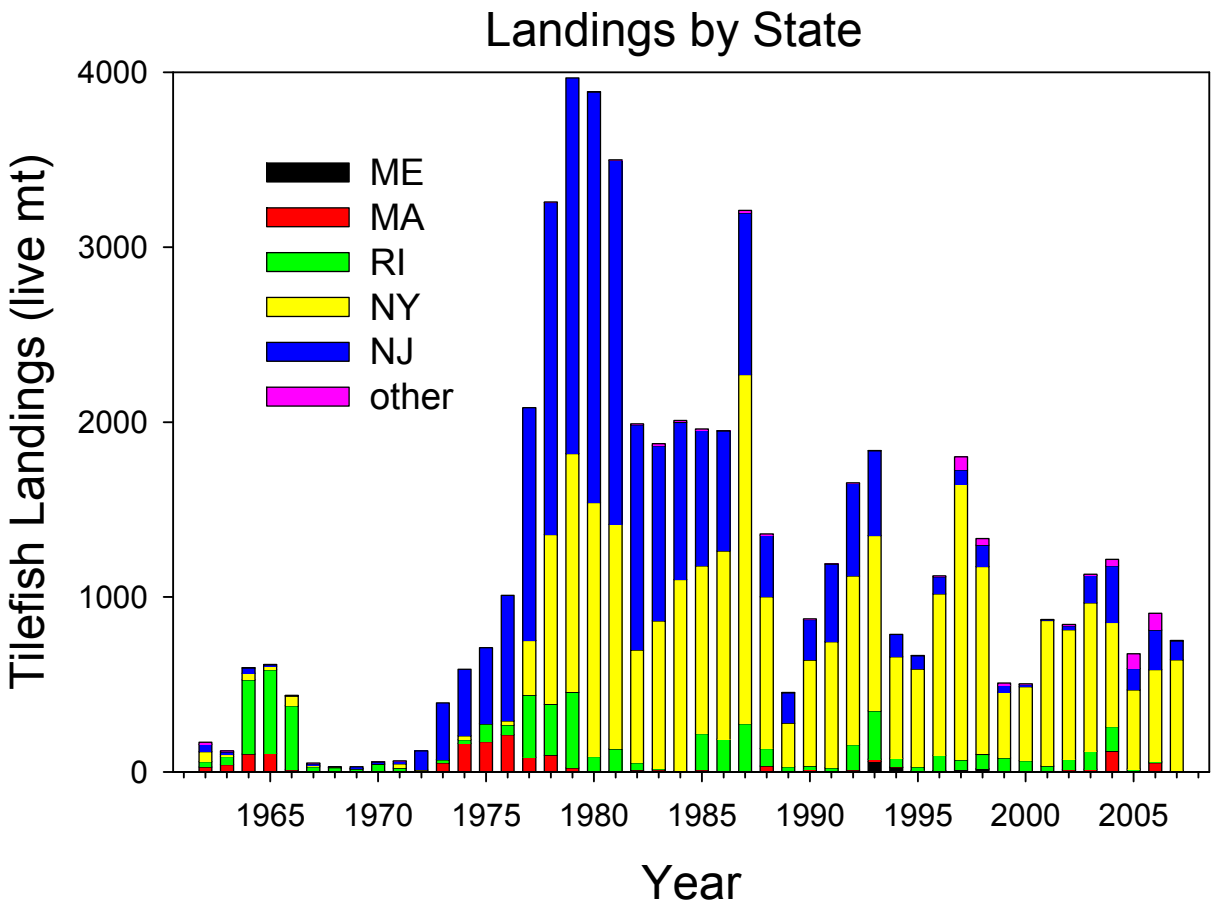


Figure A3. Landings of tilefish (mt, live) by State. Landings before 1990 are from the general canvas data.

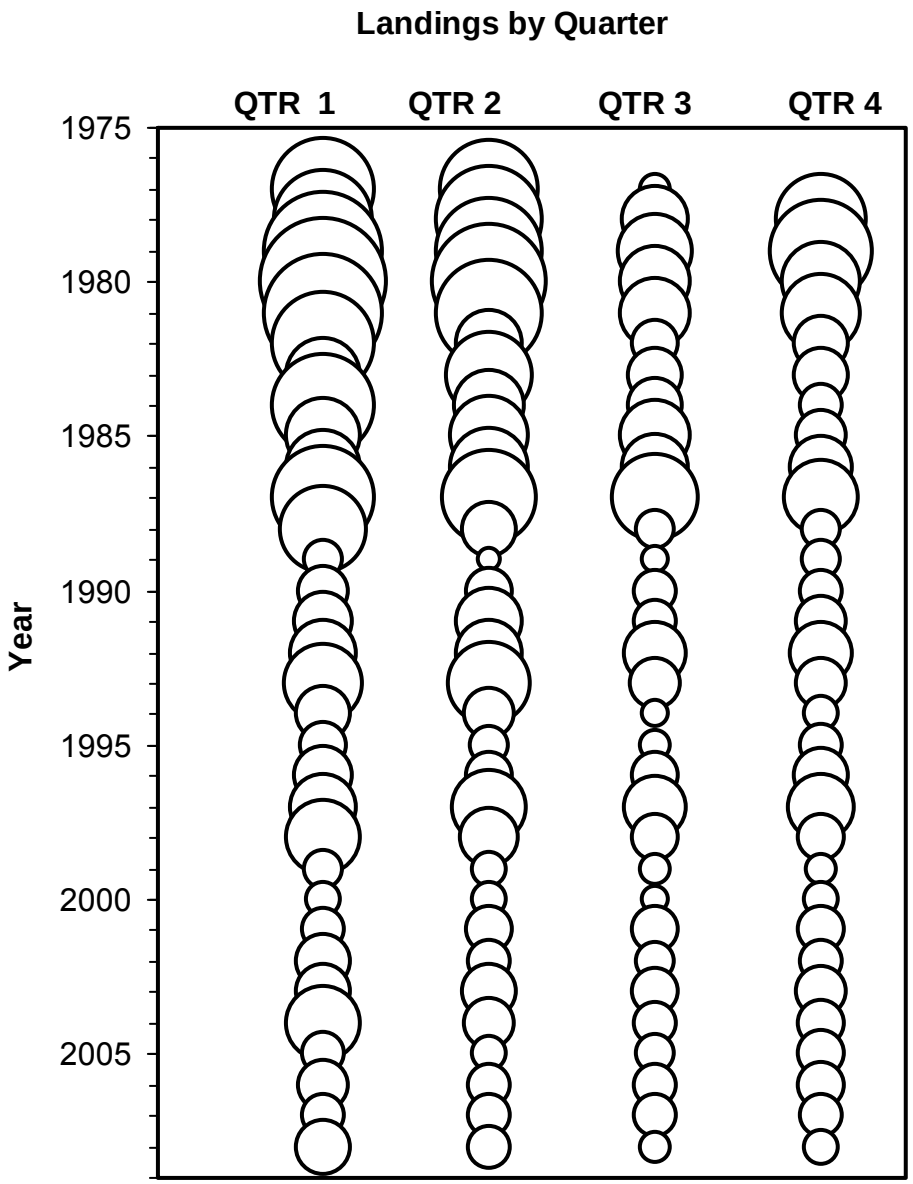


Figure A4. Bubble plot of Golden tilefish landings by quarter.

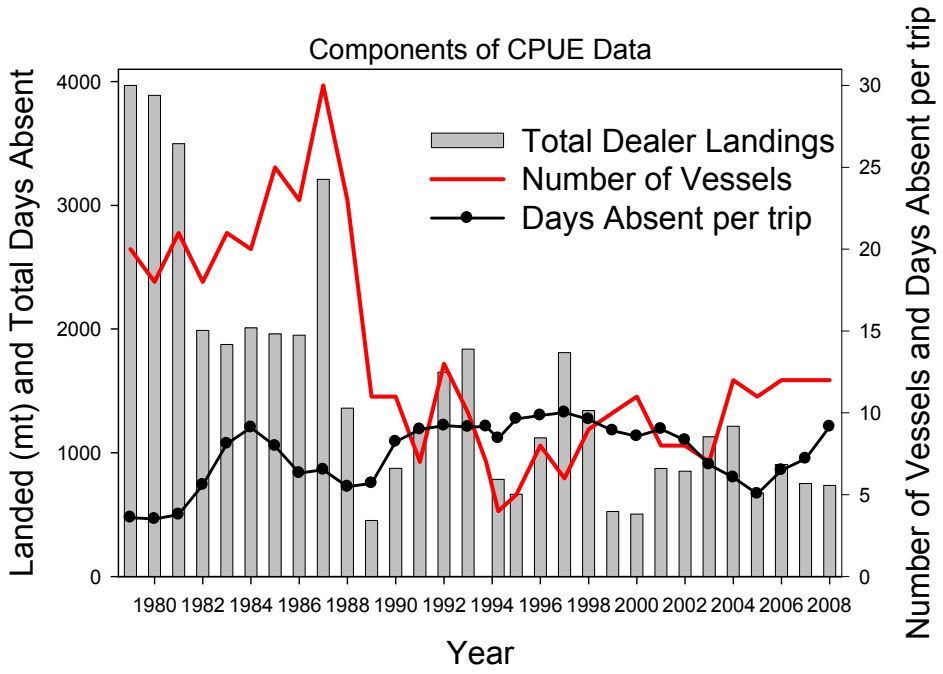


Figure A5. Number of vessels and length of trip (days absent per trip) for trips targeting tilefish (= or >75% tilefish) from 1979-2008. Total Dealer landings are also shown.

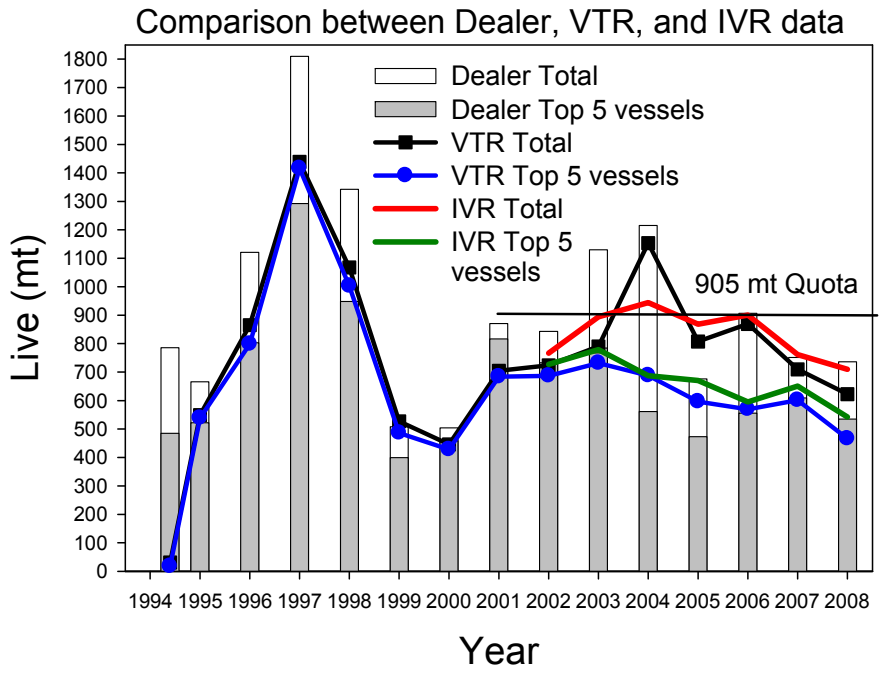


Figure A6. Comparison of dealer, VTR, and IVR total landings in live metric tons. Total landings limited to the top five dominant tilefish vessels are also shown.

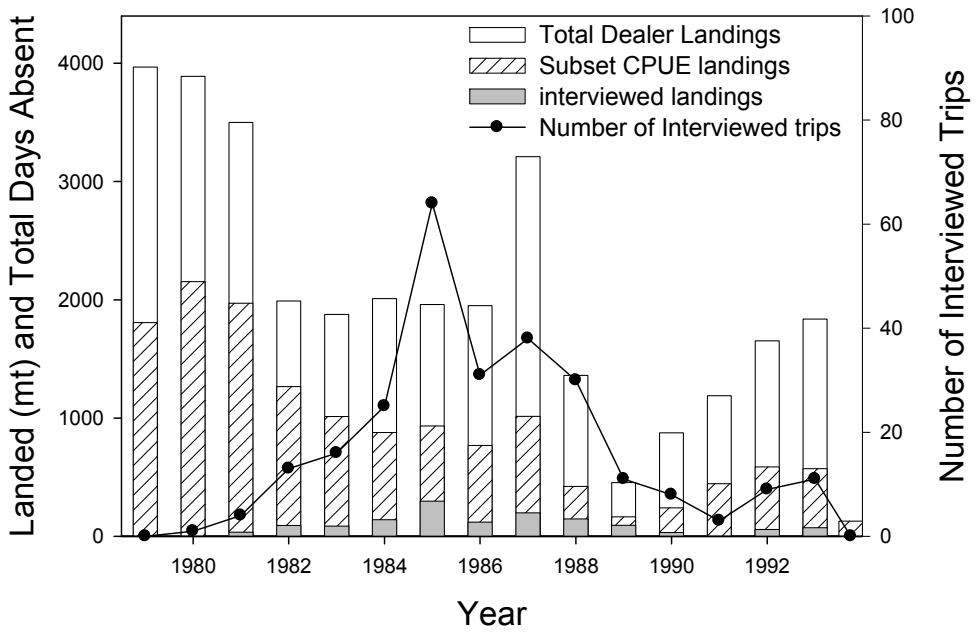


Figure A7. Number of interviewed trips and interviewed landings for trips targeting tilefish (= or >75% tilefish) for the Weighout data from 1979-1994. Total Weighout landings and the subset landings used in CPUE estimate are also shown.

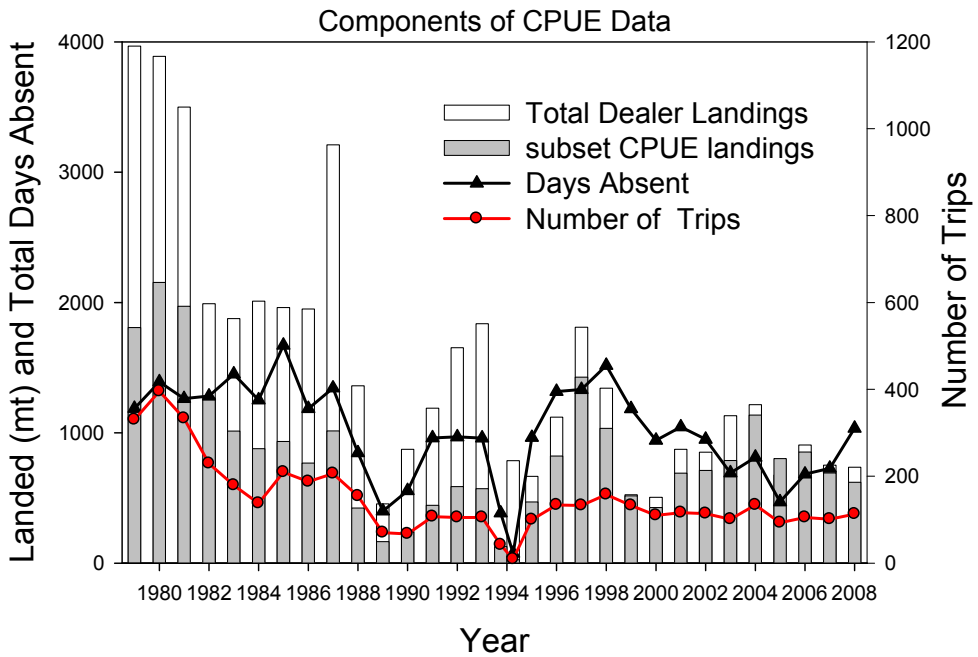


Figure A8. Total number of trips and days absent for trips targeting tilefish (= or >75% tilefish) from 1979-2008. Total Dealer and CPUE subset landings are also shown

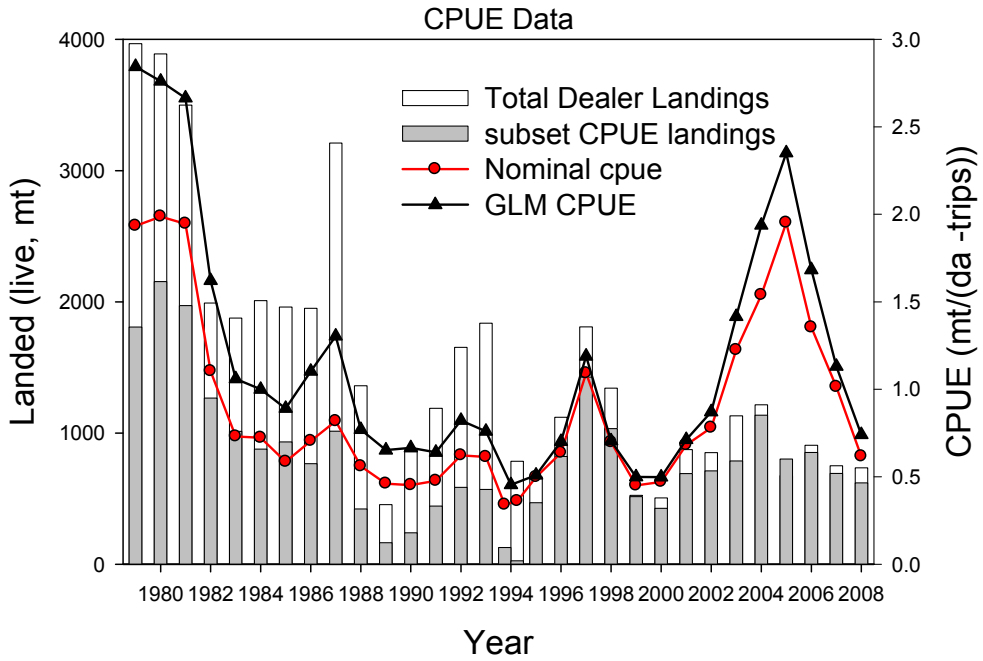


Figure A9. Nominal CPUE (1994 split by Weighout and VTR series) and vessel standard CPUE (GLM) for trips targeting tilefish (= or >75% tilefish) from 1979-2008. Total Dealer and CPUE subset landings are also shown.

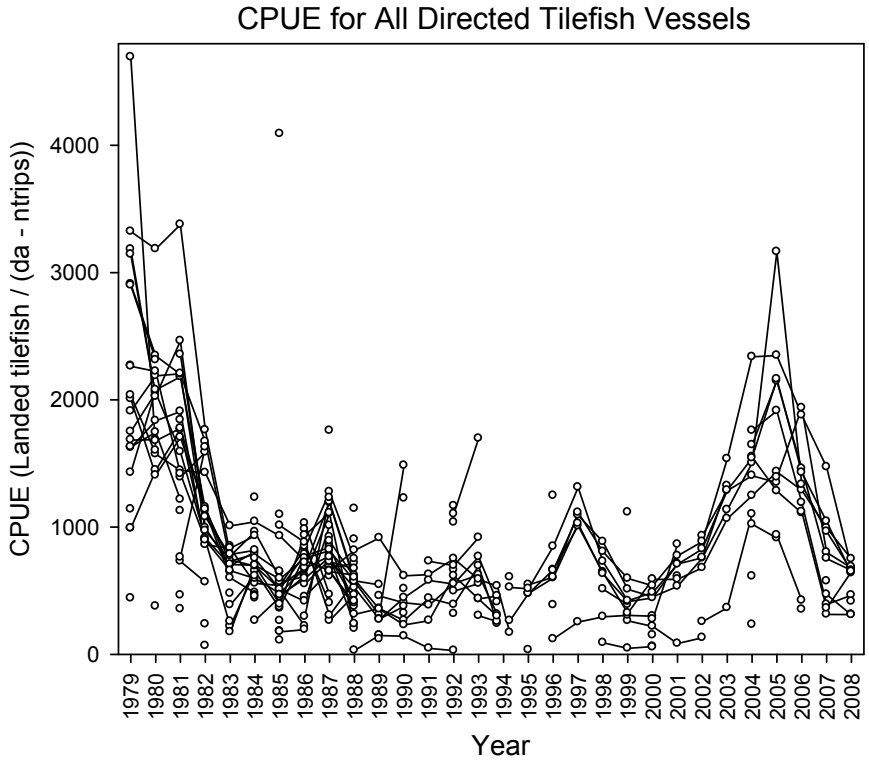


Figure A10. All individual tilefish vessel CPUE data for trips targeting tilefish (= or >75% tilefish) from 1979-200

Figure A11. Depiction of individual vessels (rows) targeting tilefish over the weighout and VTR series. Year 1994 is split by the two series. Below the horizontal line are vessels which are predominantly found in the VTR series.

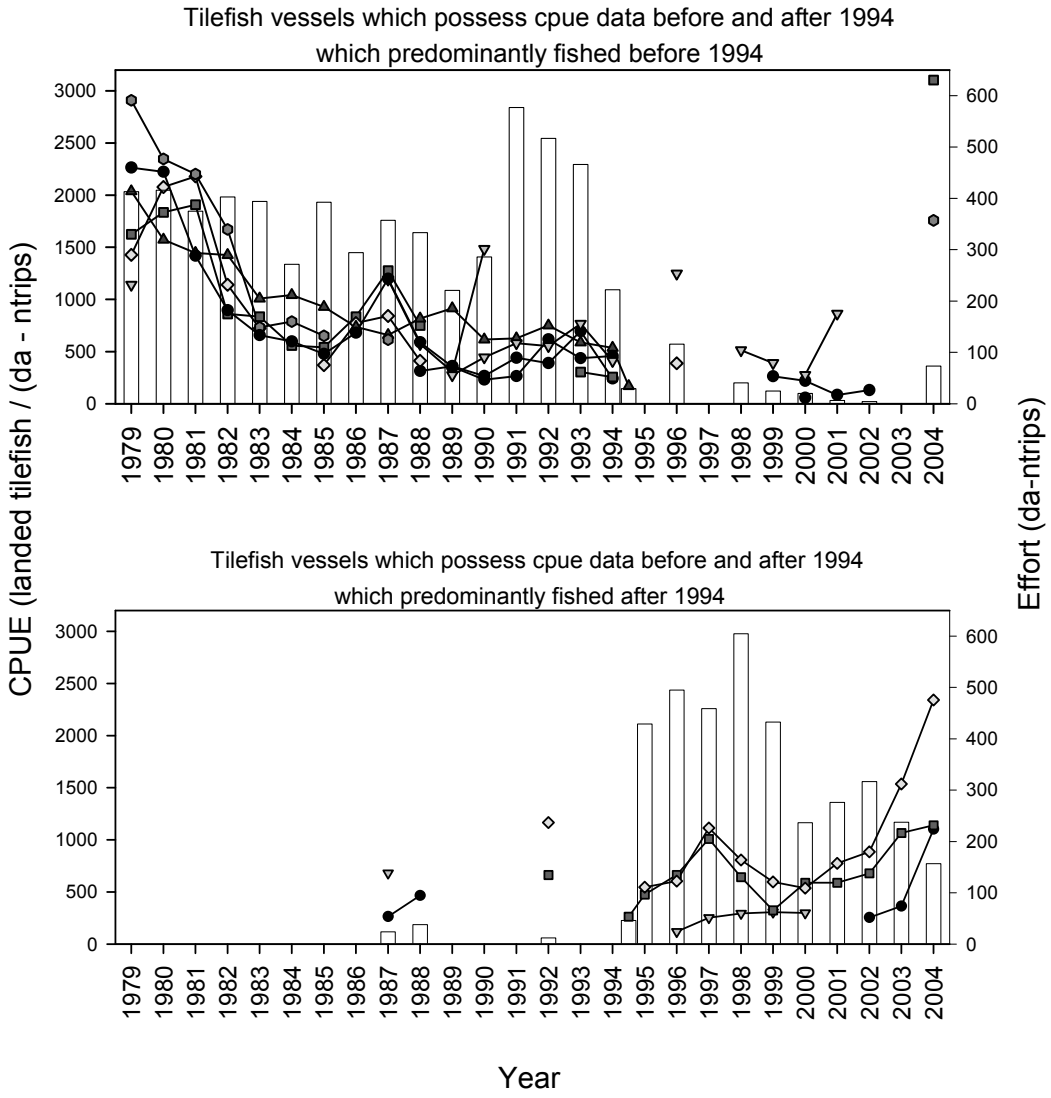


Figure A12. Individual tilefish vessel CPUE and effort data (Bars) for trips targeting tilefish (= or >75% tilefish) from 1979-2004 which are found in both the weighout and VTR series. Top graph are vessels found predominantly in the weighout series. Bottom graph are vessels found predominantly in the VTR series.

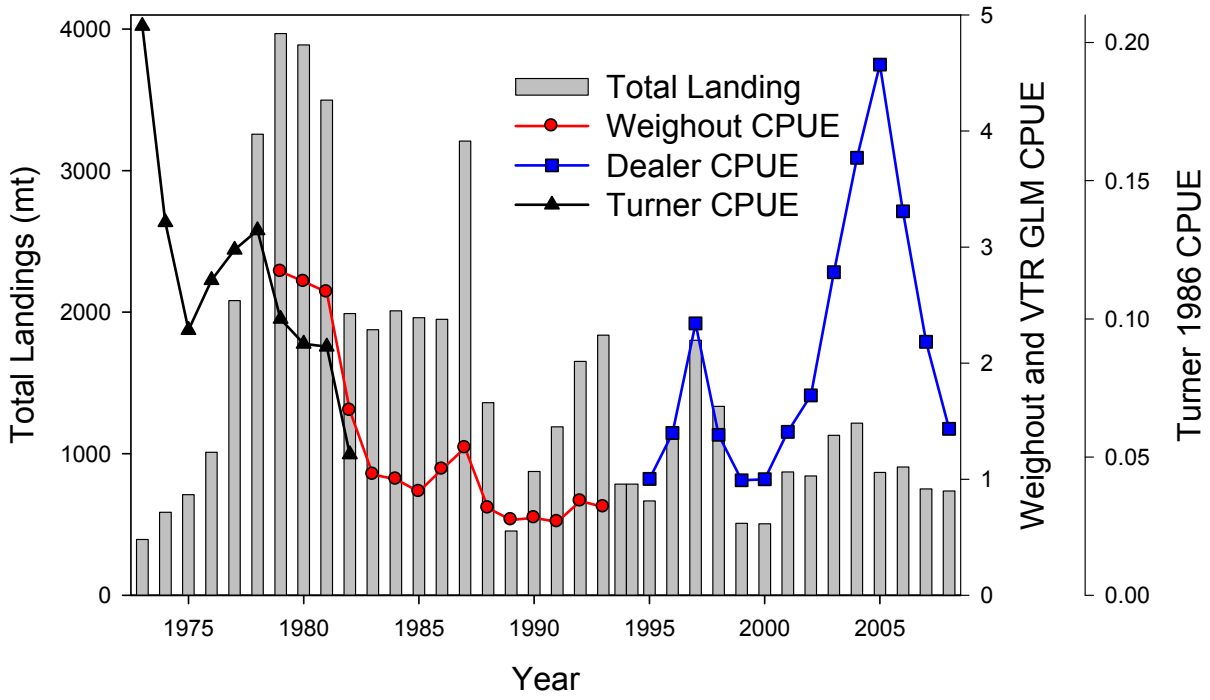


Figure A13. GLM CPUE for the Weighout and VTR data split into two series. Four years of overlap betweenTurner's and the Weighout CPUE series can be seen. Assumed total landings are also shown. Landing in 2005 was taken form the IVR system.

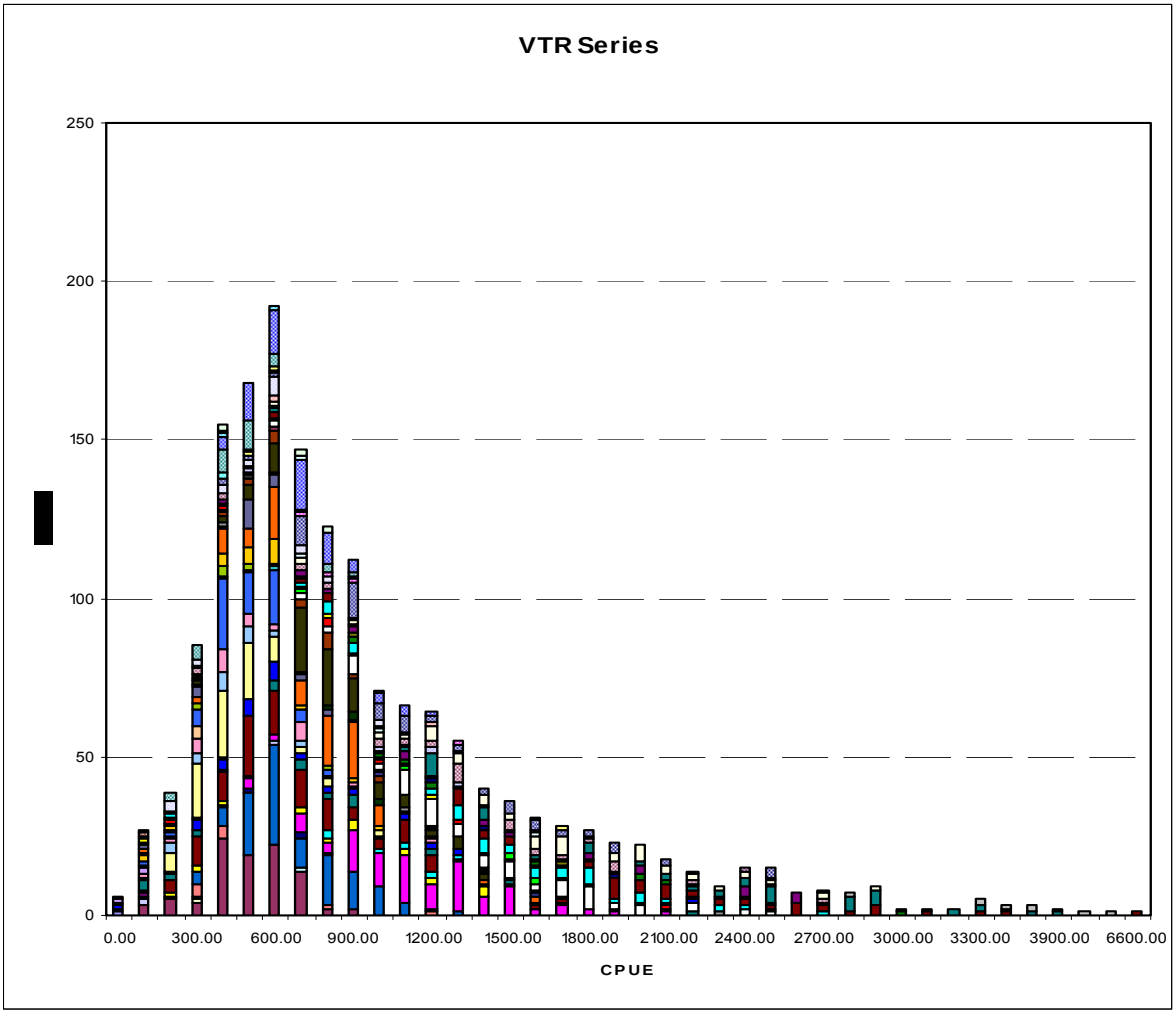


Figure A14. Frequency distribution of the nominal VTR CPUE.

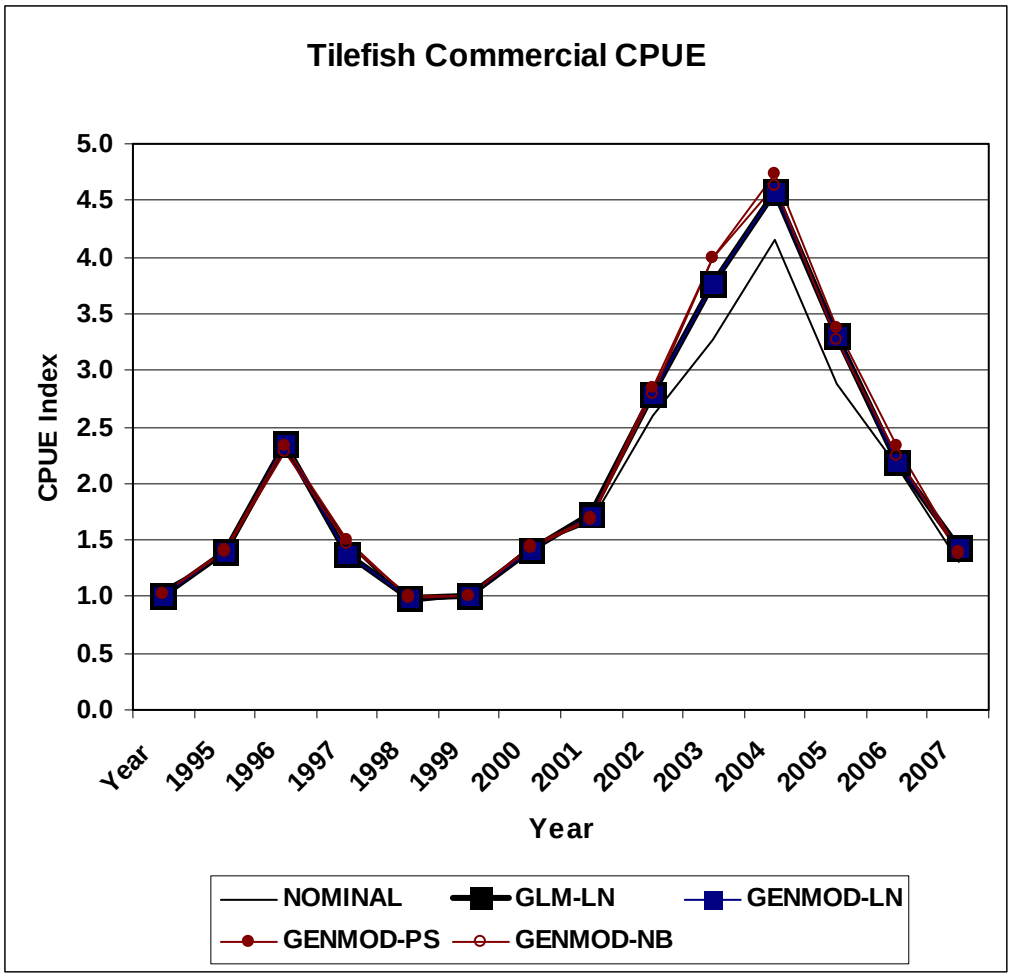


Figure A15. Effect of the assumed error distribution on the vessel standardized GLM CPUE indices.

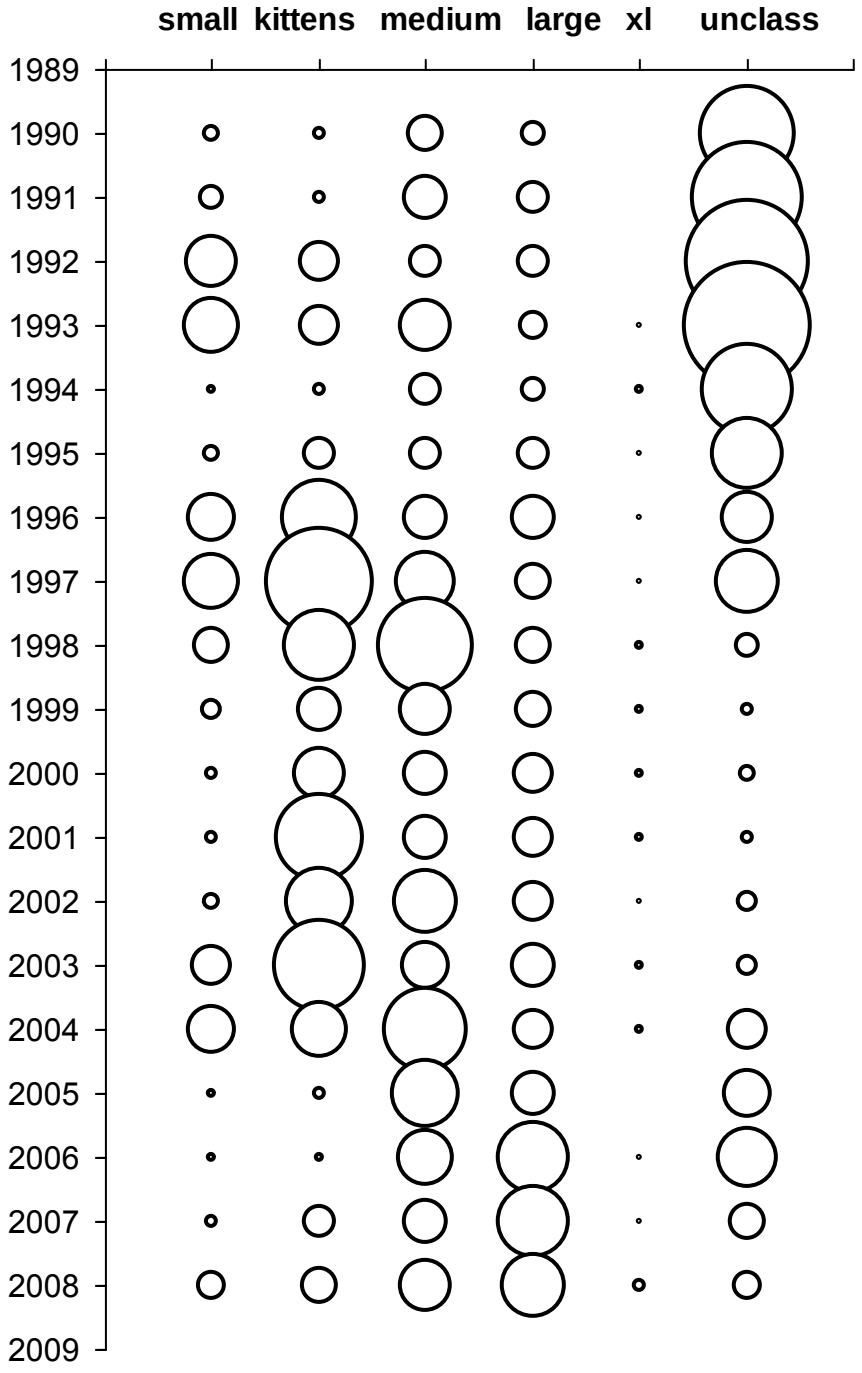


Figure A16. Bubble plot of Golden tilefish landings by market category.

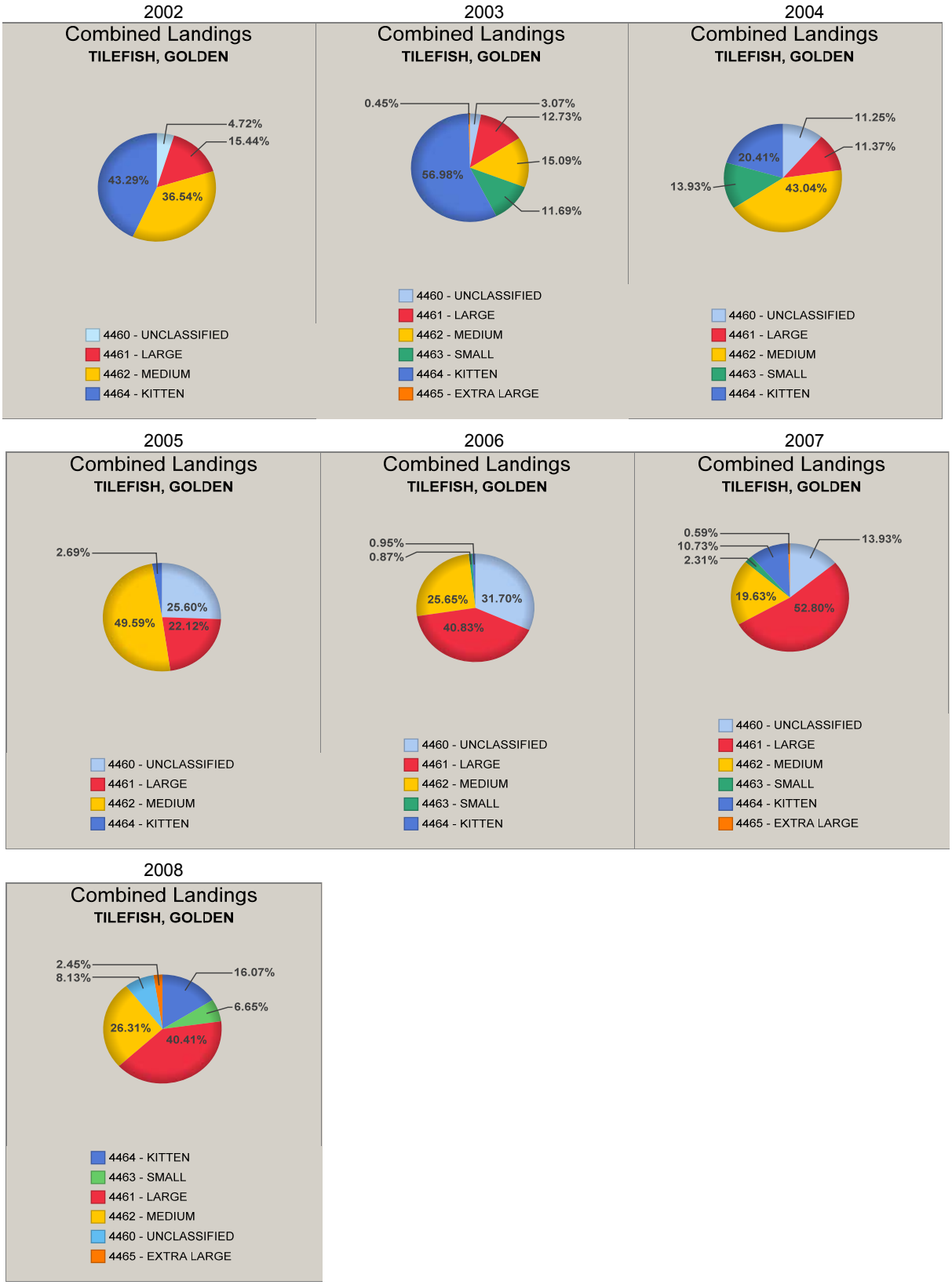


Figure A17. Proportion of landings by market category from 2002-2008.

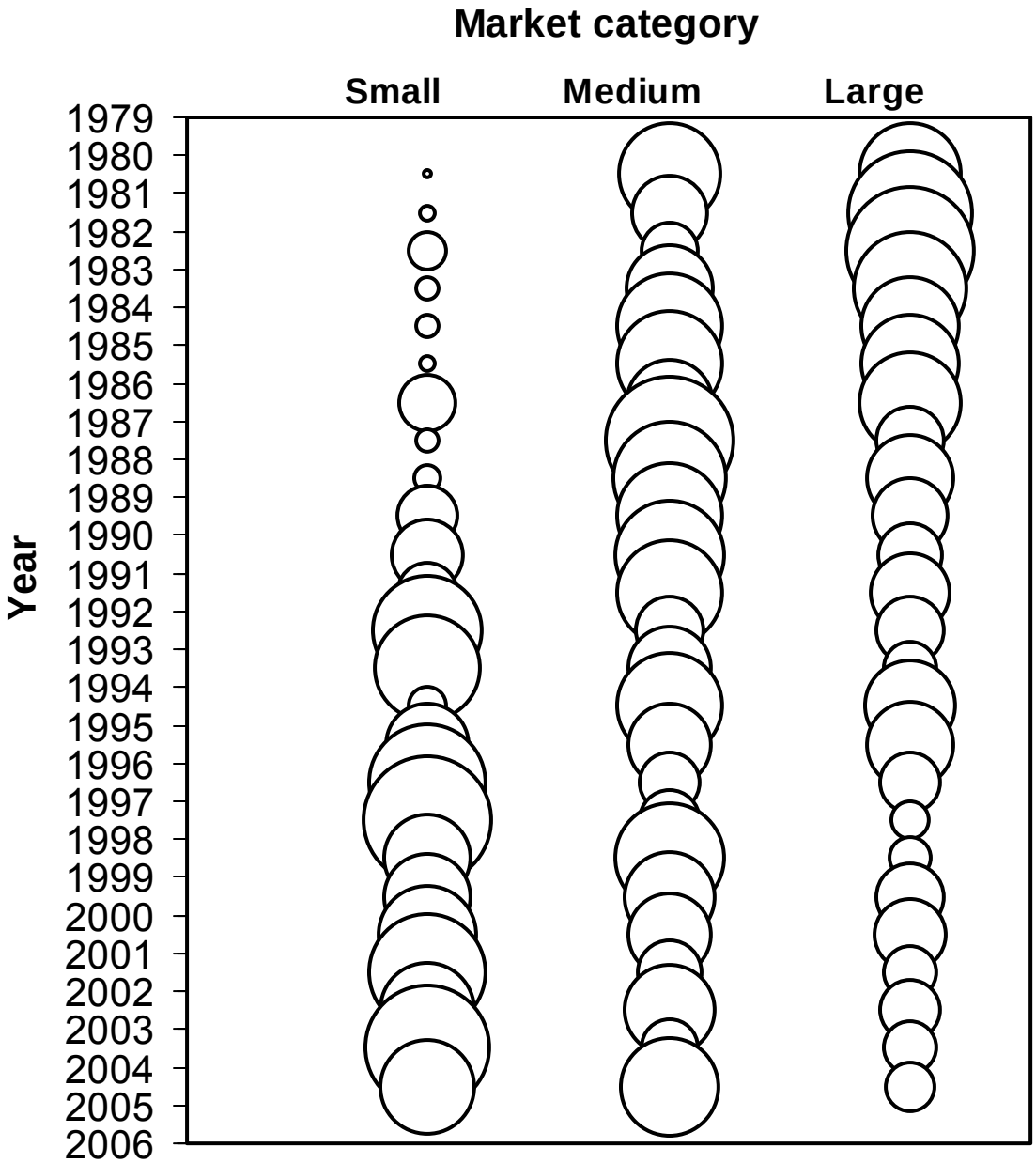


Figure A18. Bubble plot of percent Golden tilefish longline landings by market category. Data from 1980 to 1990 comes from New York tilefish fishermen. Data form 1991-2003 was taken from the dealer data. Data form 2004 are from dealer electronic reporting. Unclassified landings were redistributed according to the other market categories.

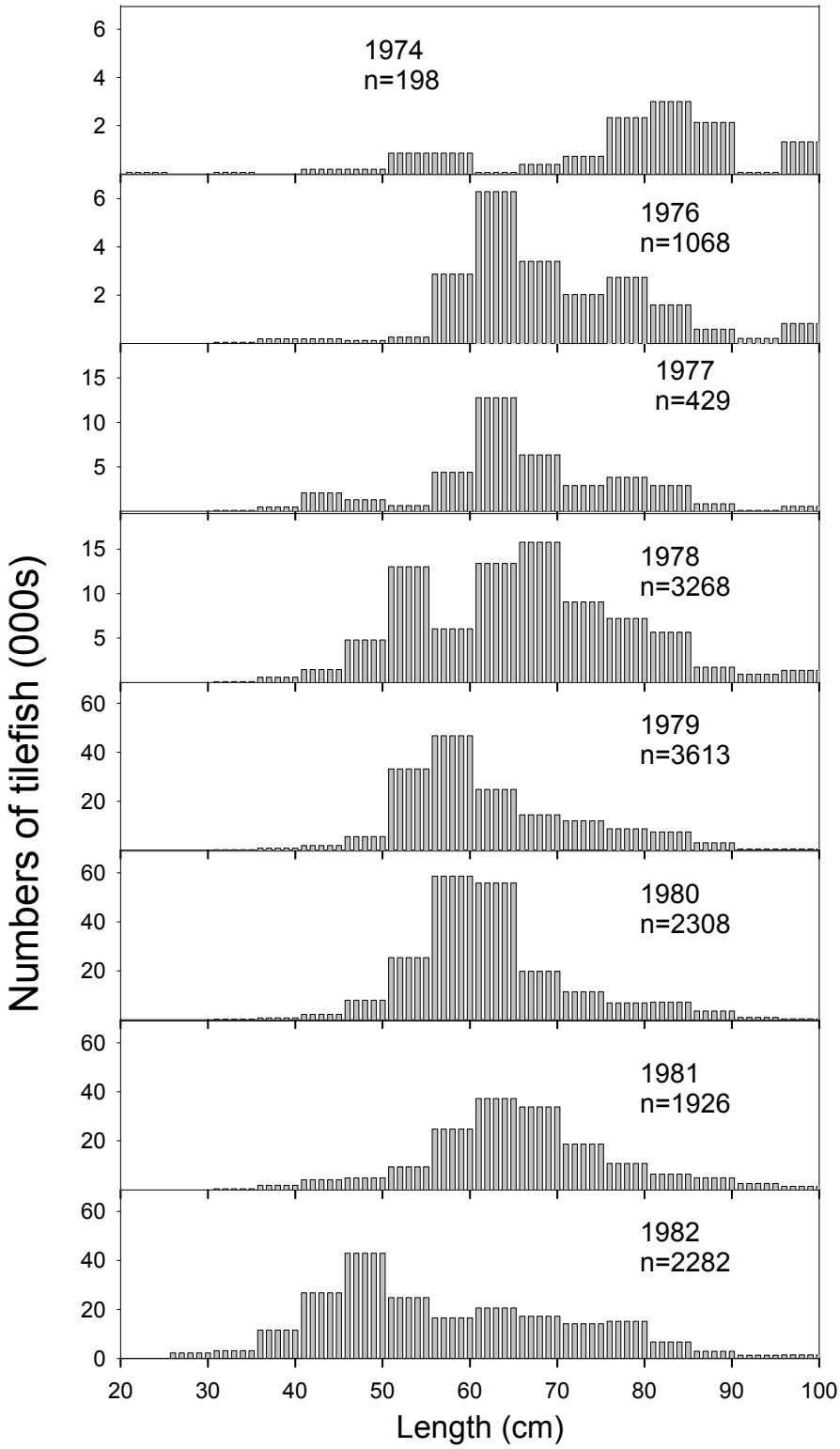


Figure A19. Expanded length frequency distributions using Turner (1986) length samples by 5 cm intervals. Hudson Canyon and Southern New England samples were combined.

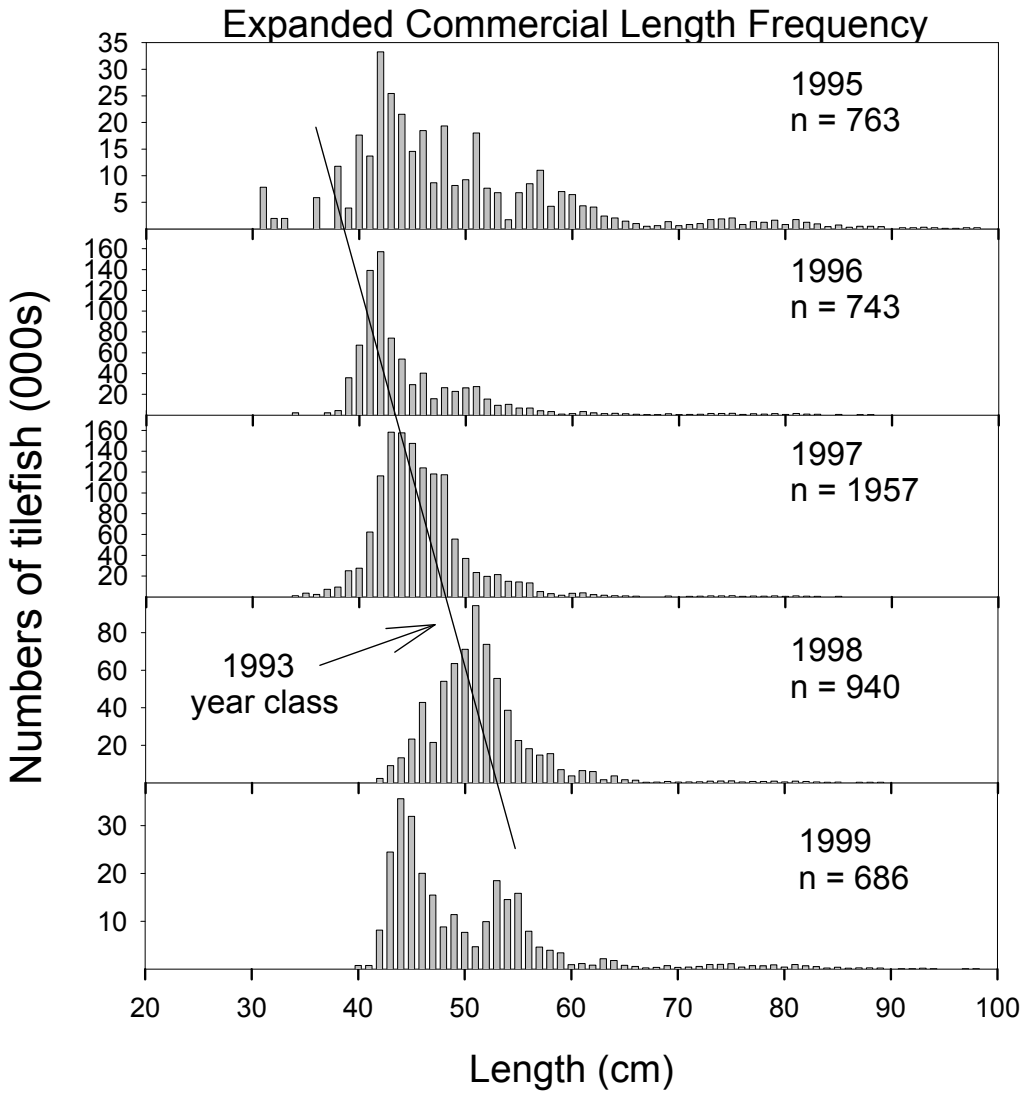


Figure A20. Expanded length frequency distributions by year. Large market category length used from 1995 to 1999 were taken from years 1996, 1998, and 1998. Smalls and kittens were combined and large and extra large were also combined.

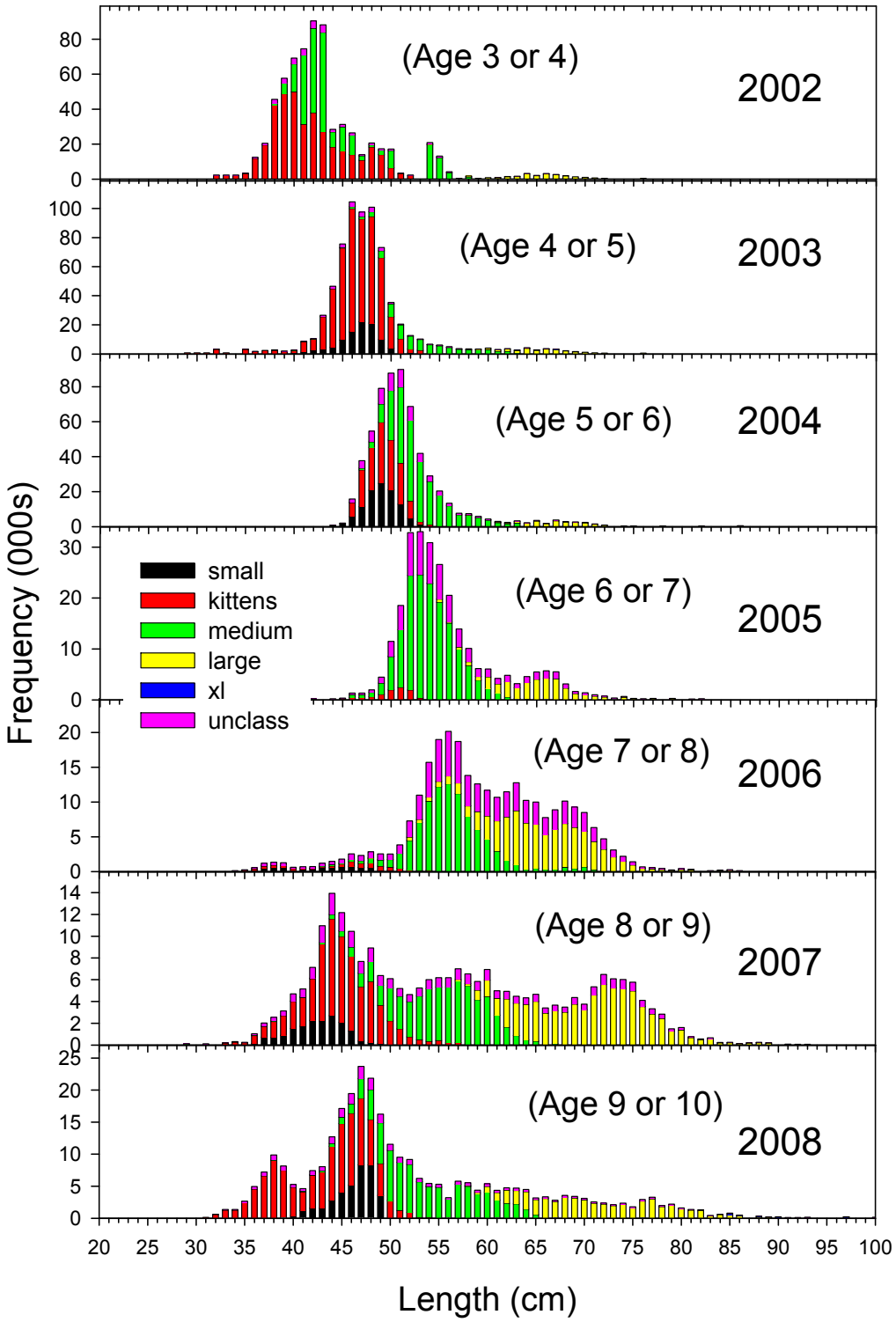


Figure A21. Expanded length frequency distributions by year. Y-axis is allowed to rescale.

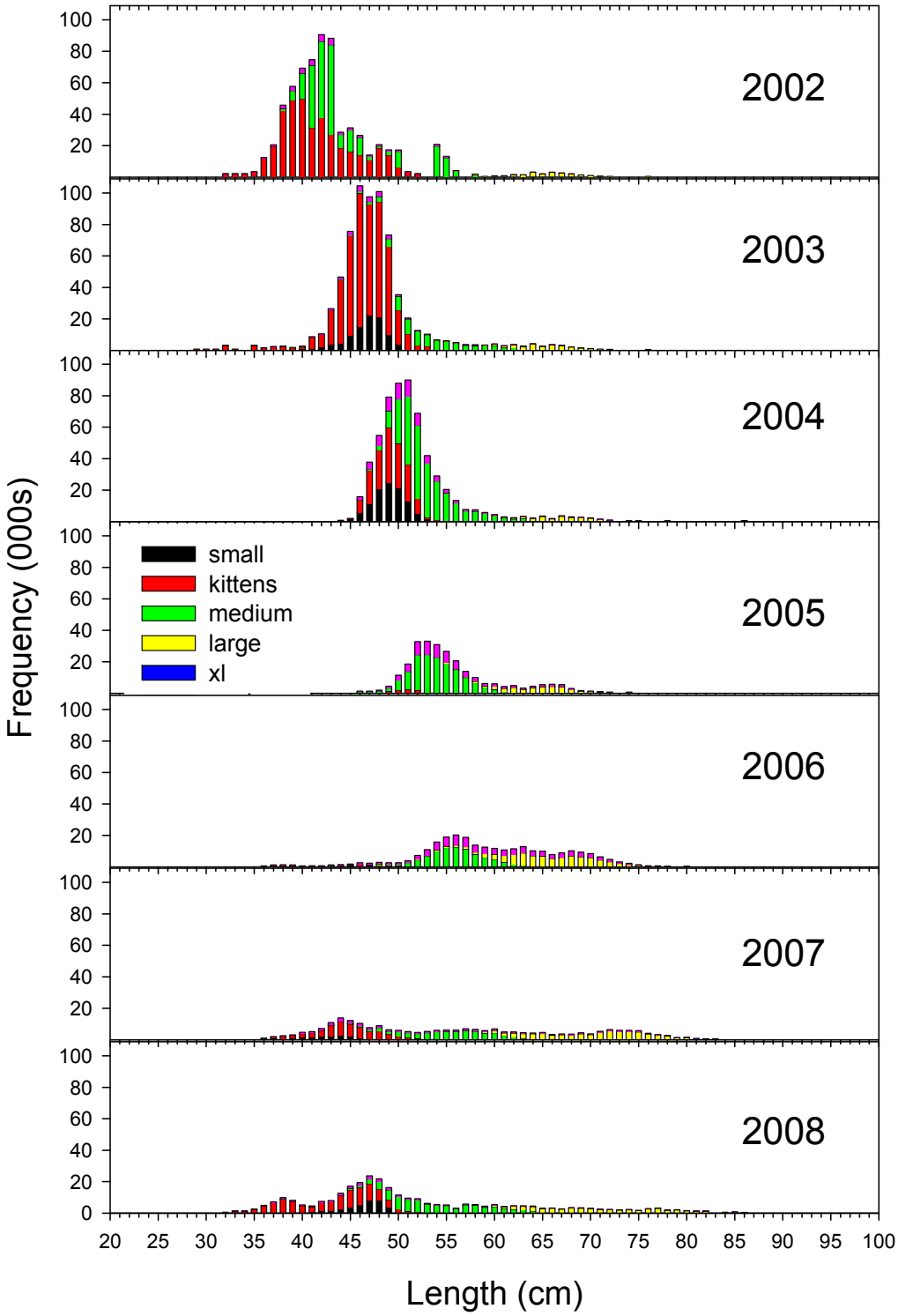


Figure A22. Expanded length frequency distributions by year. Y-axis scale is fixed.

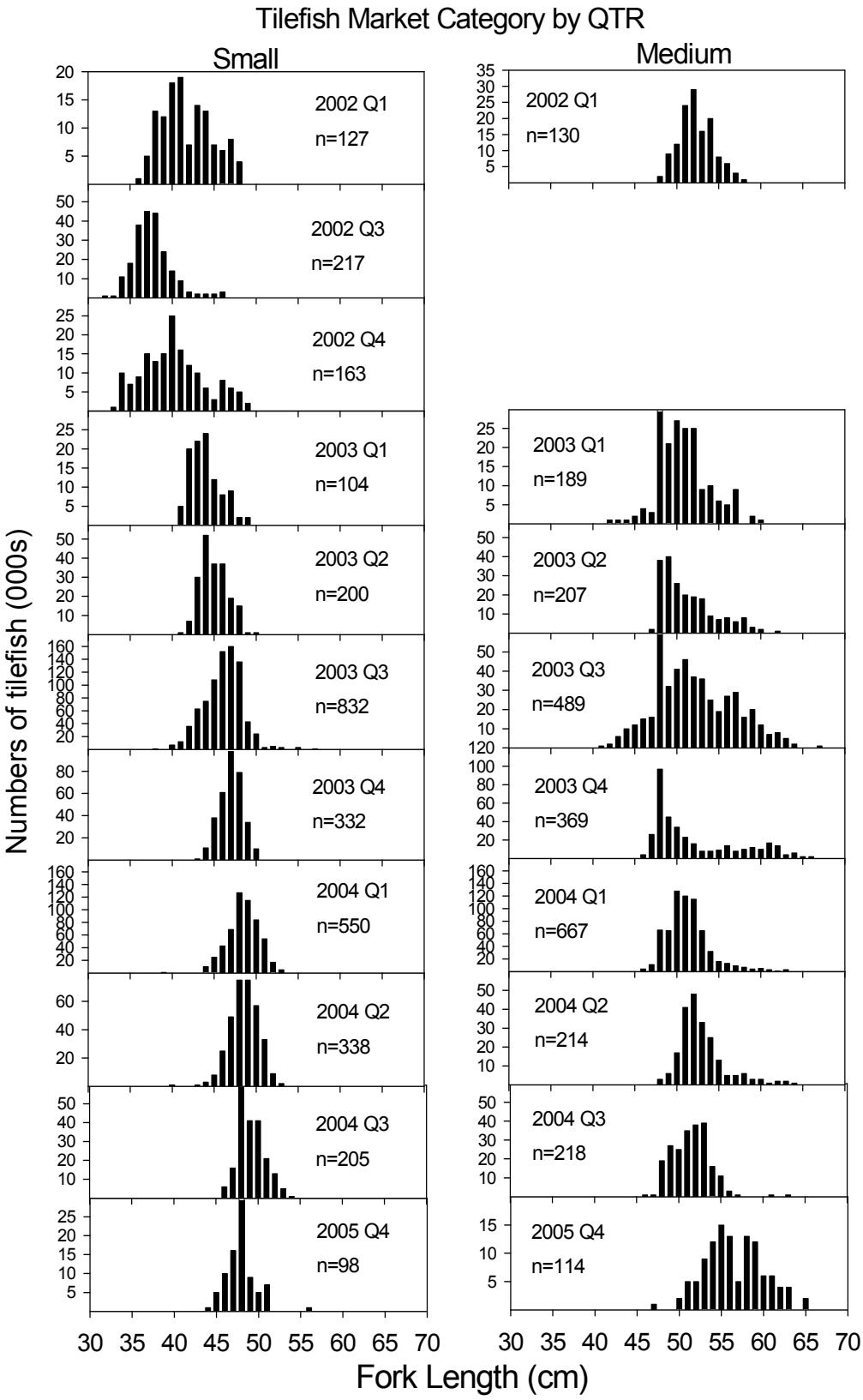


Figure A23. Small and medium tilefish market category length frequency distributions by quarter. Lengths from New York from 2000 to 2004 were converted to fork length.

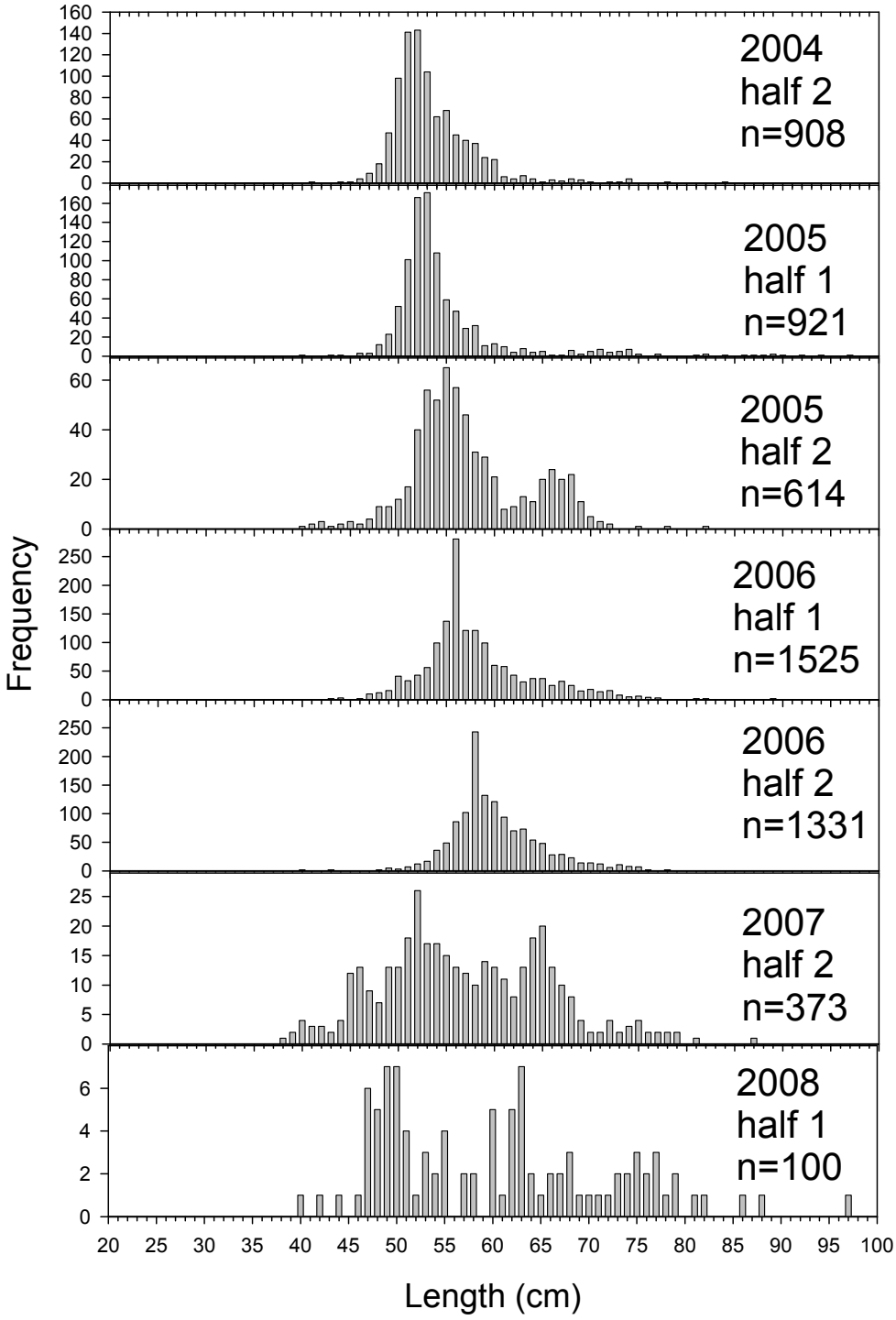


Figure A24. Observer kept length frequency distributions.

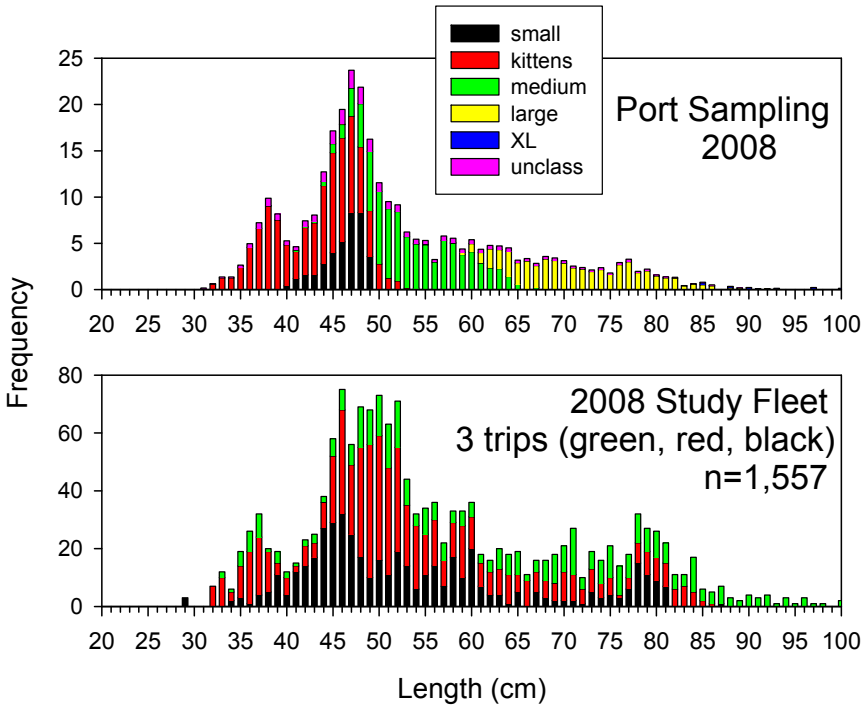


Figure A25. Comparison of study fleet length frequency with expanded landings distribution for 2008.

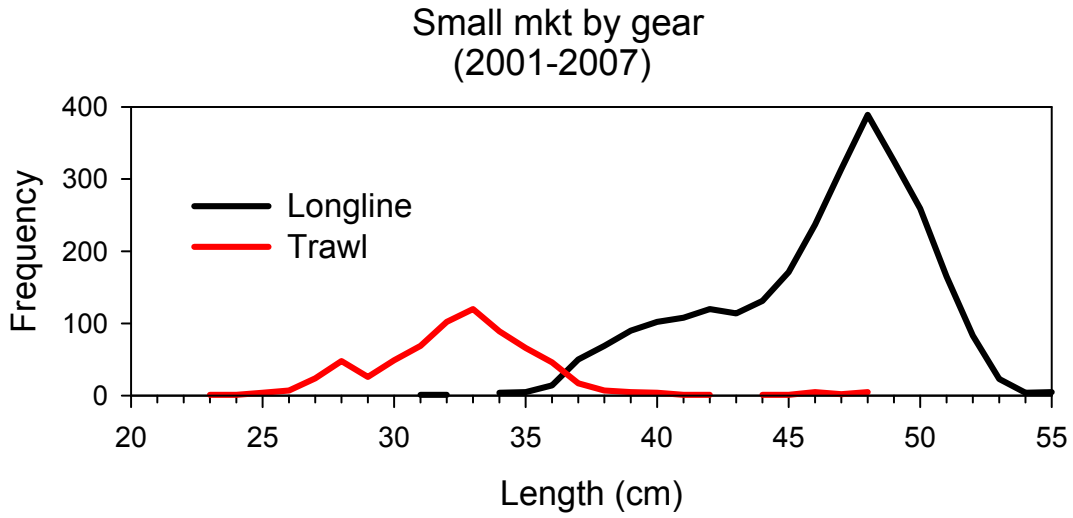


Figure A26. Length frequency distribution of trawl and longline landed fish from the small market category from 2001 to 2007.

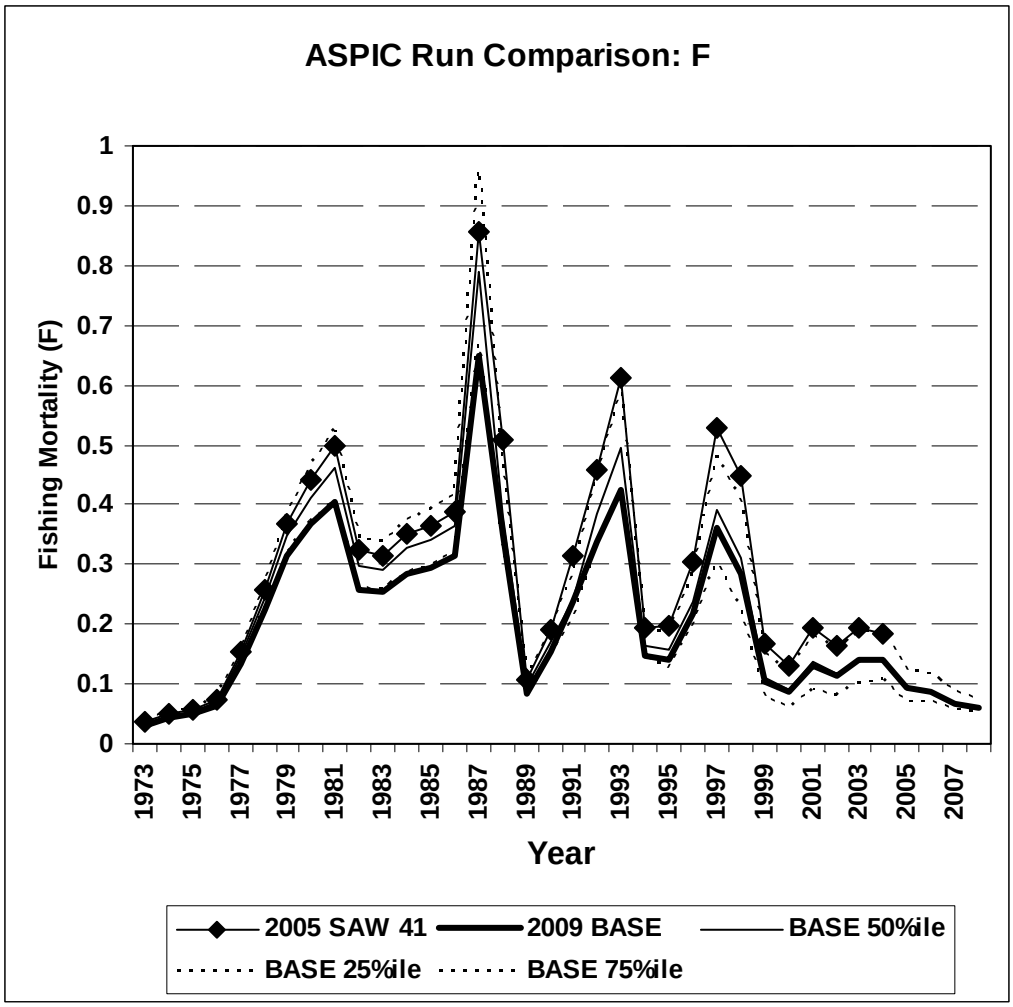


Figure A27. Comparison of the 2005 SAW 41 estimates of fishing mortality (F) with 2009 BASE run estimates.

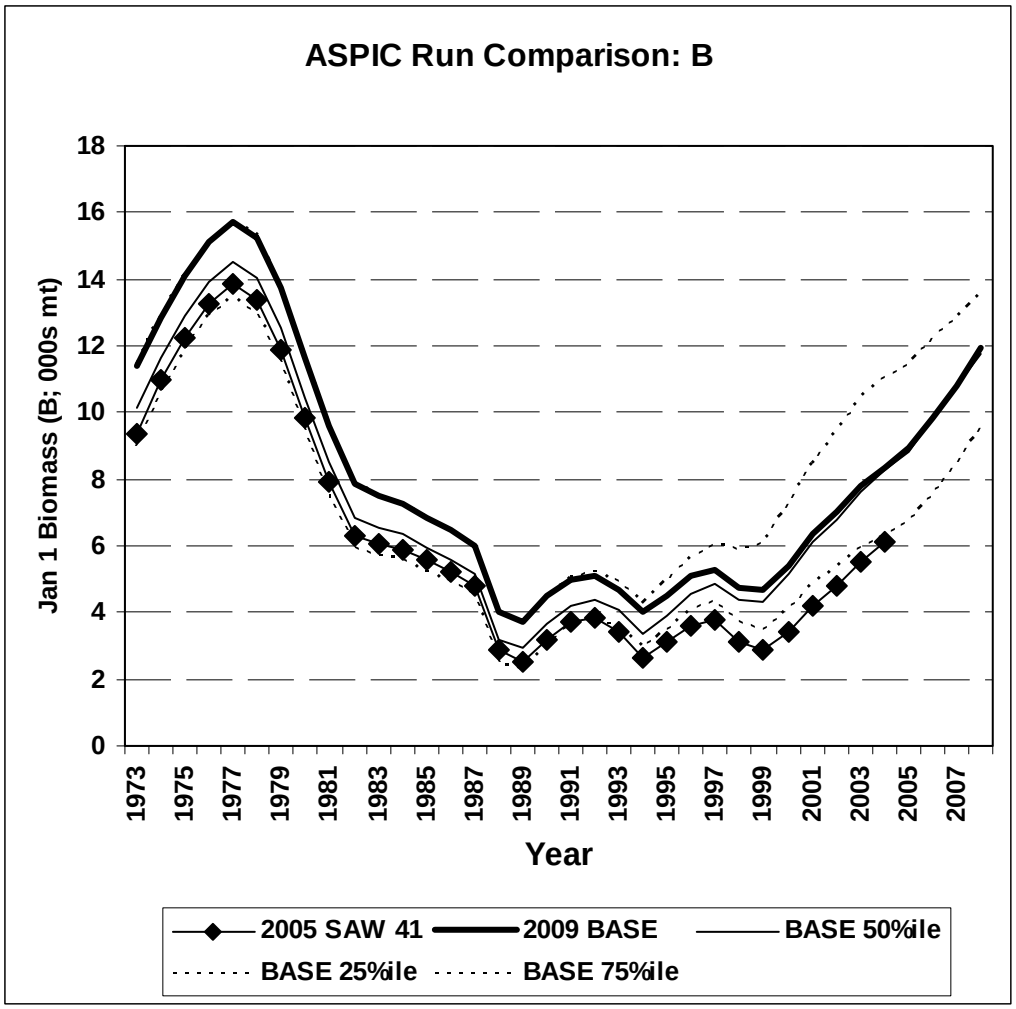


Figure A28. Comparison of the 2005 SAW 41 estimates of stock biomass (B) with 2009 BASE run estimates.

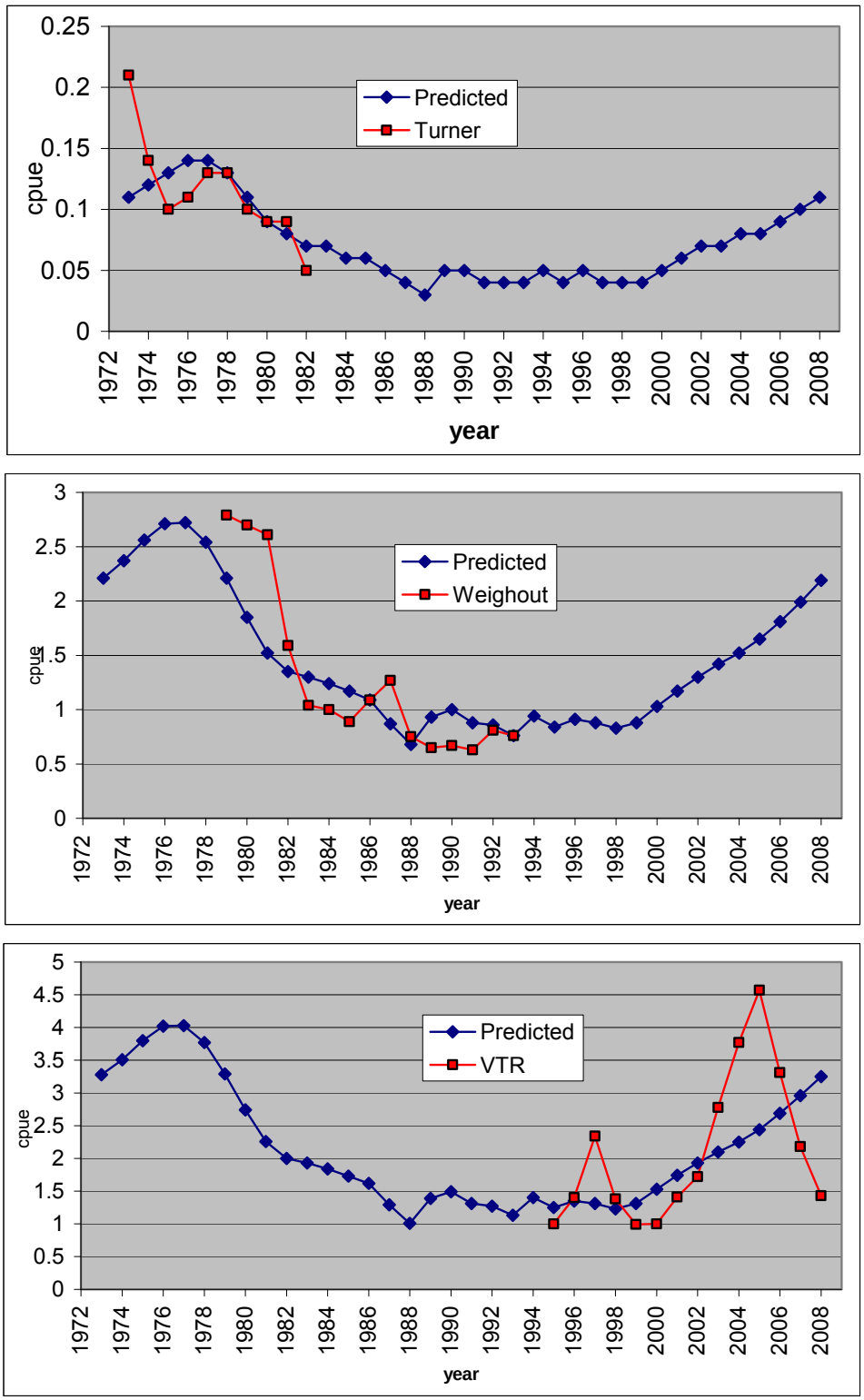


Figure A29. Fit of the ASPIC base run 1 with the three (Turner's, Weighout, and VTR) cpue series.

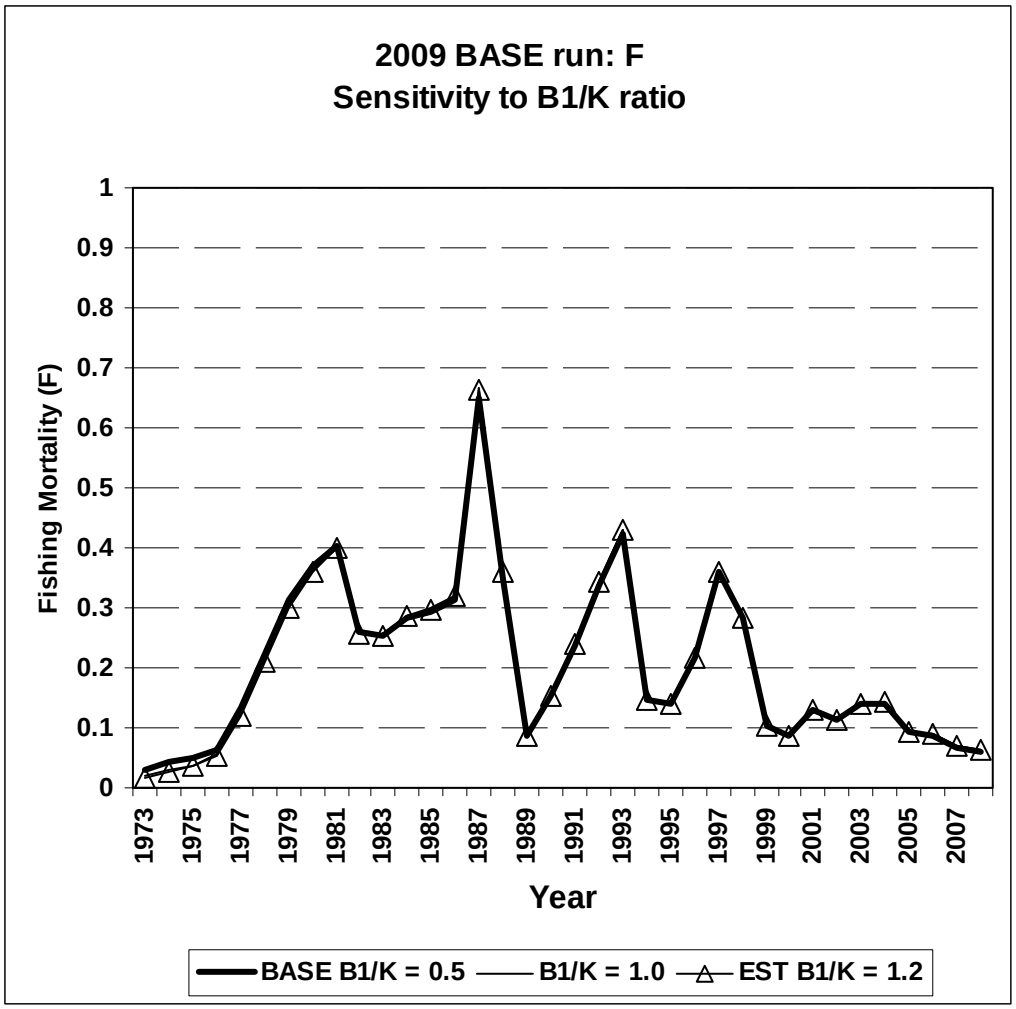


Figure A30. Sensitivity of 2009 BASE run estimated fishing mortality (F) using different values of the time series starting biomass (B1) to carrying capacity (K) ratio. The B1/K = 0.1 run is not shown since this run produced infeasible results by hitting a model bound.

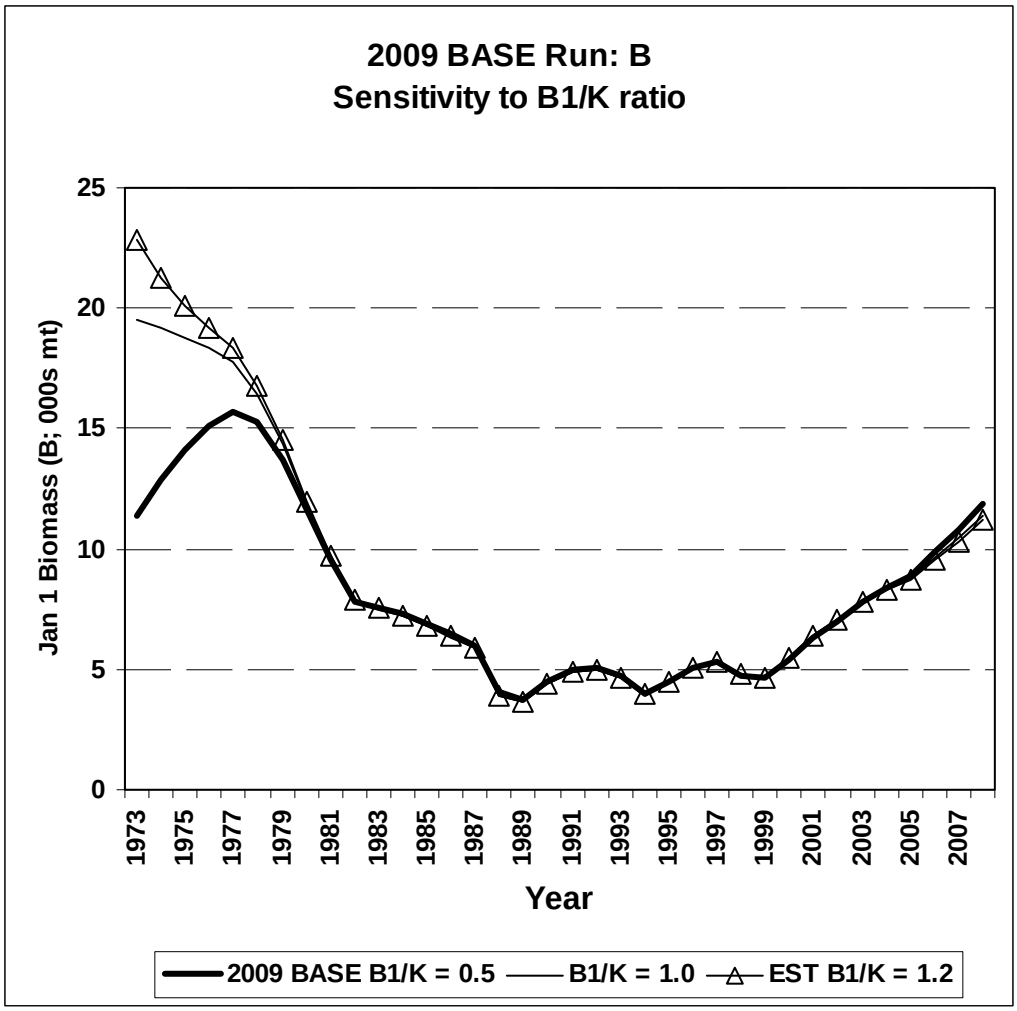


Figure A31. Sensitivity of 2009 BASE run estimated stock biomass (B) for different values of the time series starting biomass (B1) to carrying capacity (K) ratio. The B1/K = 0.1 run is not shown since this run produced infeasible results by hitting a model bound.

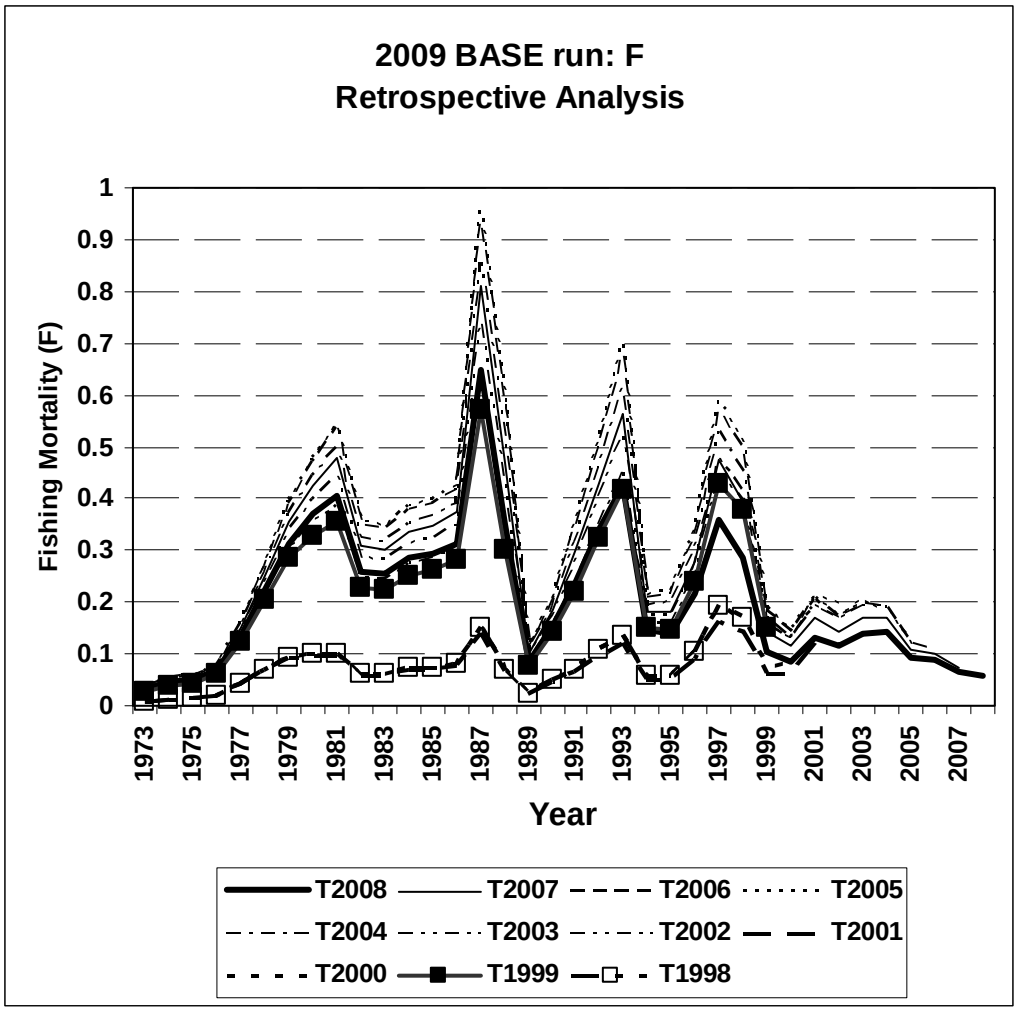


Figure A32. Retrospective analysis results for the 2009 BASE run: fishing mortality (F).

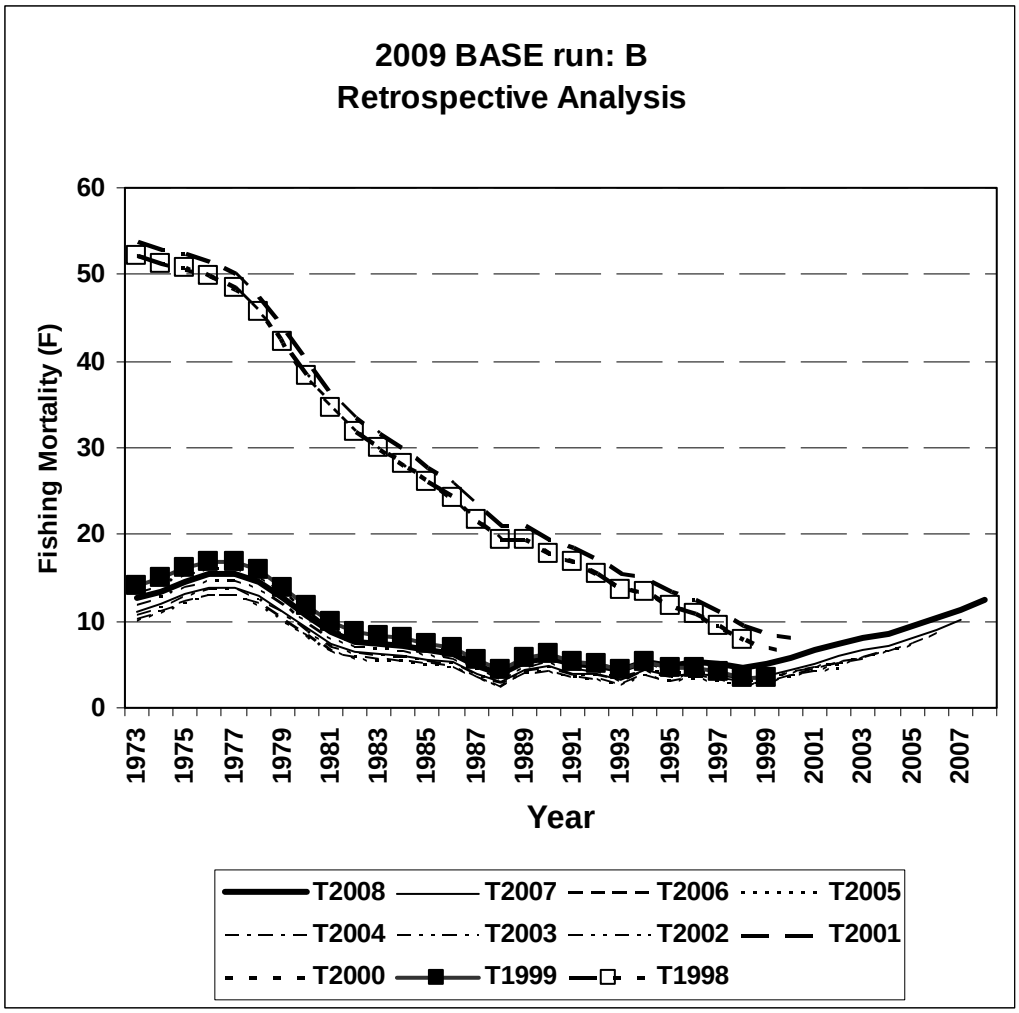


Figure A33. Retrospective analysis results for the 2009 BASE run: stock biomass (B).

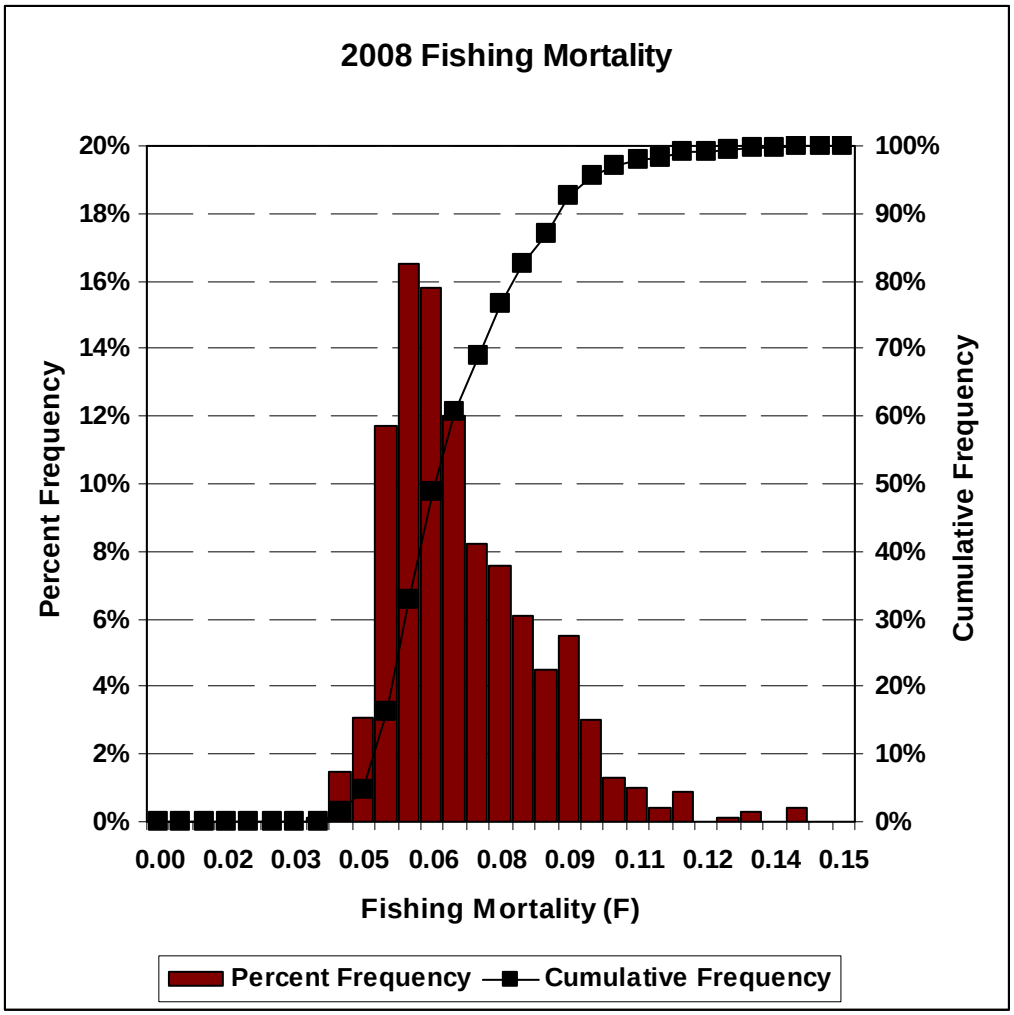


Figure A34. Bootstrap estimates (1000 iterations) of the precision of 2008 fishing mortality from the 2009 BASE run. Vertical bars display the range of the bootstrap estimates; the percent confidence intervals can be taken from the cumulative frequency. The 2008 point estimate of fishing mortality = 0.059.

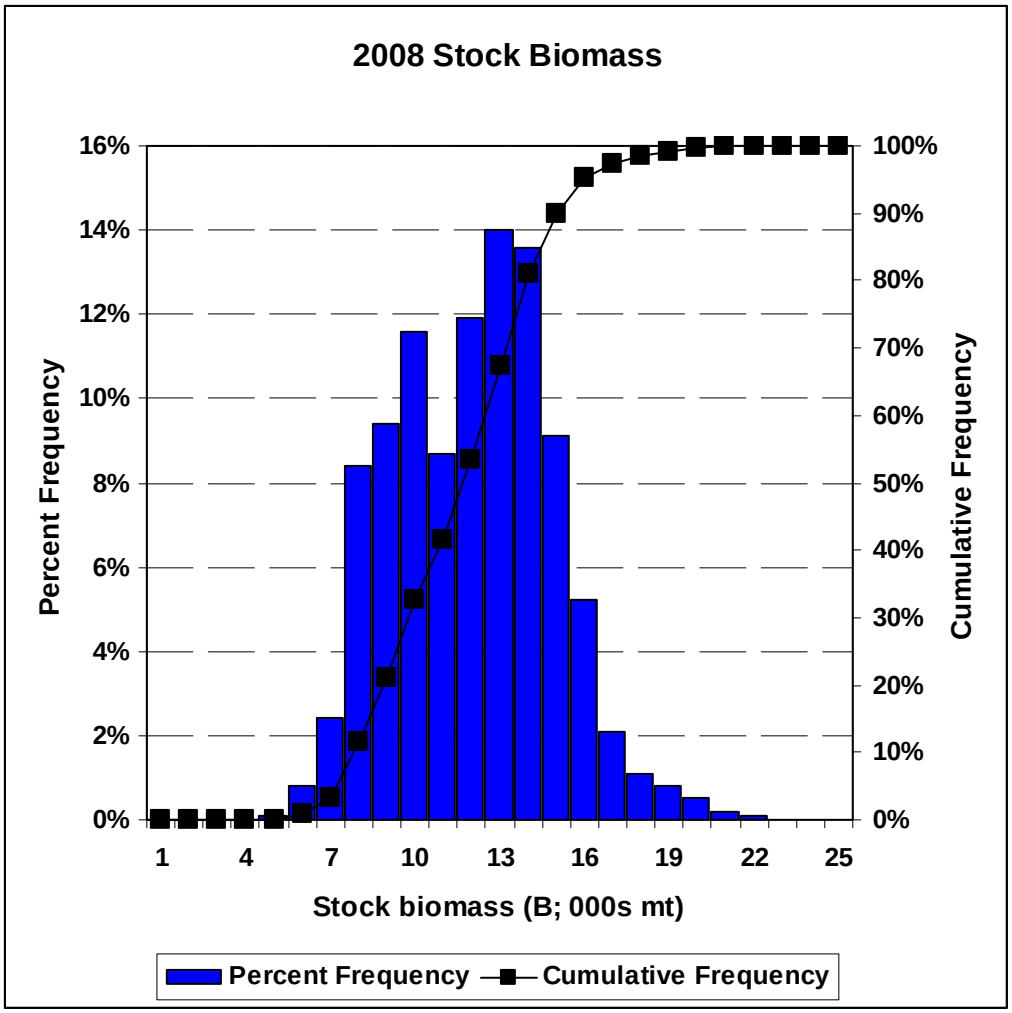


Figure A35. Bootstrap estimates (1000 iterations) of the precision of 2008 stock biomass from the 2009 BASE run. Vertical bars display the range of the bootstrap estimates; the percent confidence intervals can be taken from the cumulative frequency. The 2008 point estimate of stock biomass = 11.910 thousand mt.

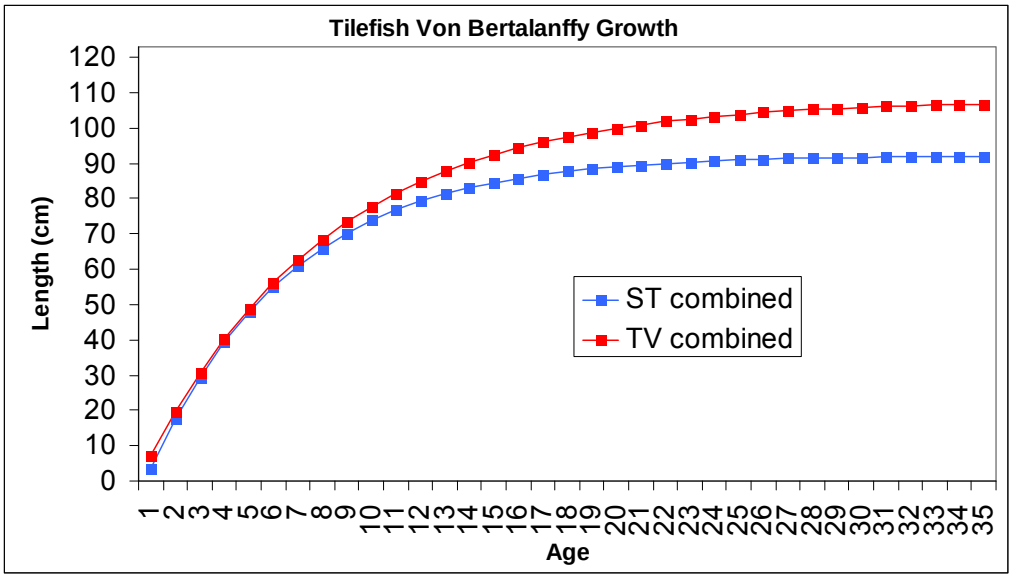


Figure A36. Comparison of Vidal's (2008) and Turner's (1986) von Bertalanffy growth curve with the sexes combined.

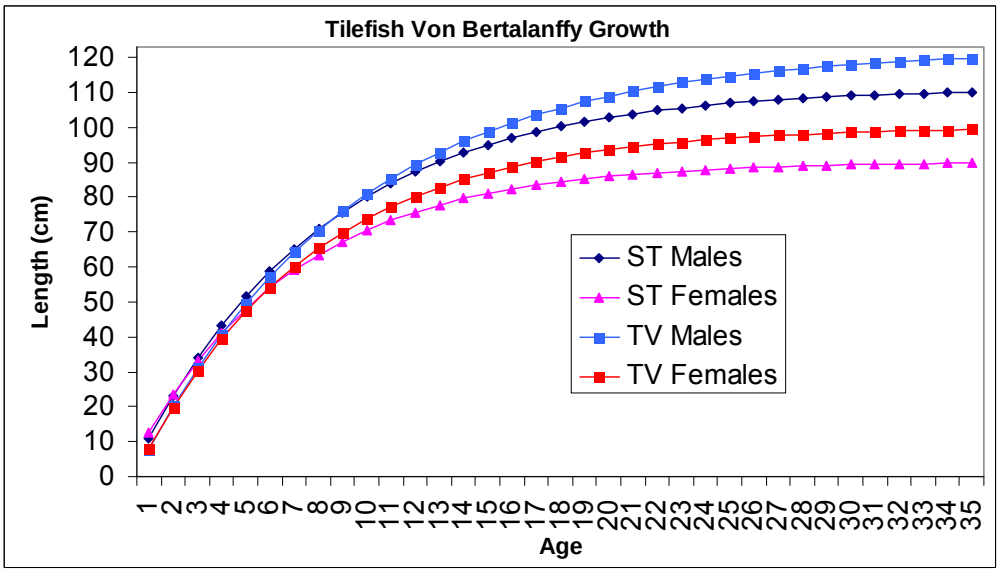


Figure A37. Comparison of Vidal's (2008) and Turner's (1986) von Bertalanffy growth curve with the sexes separated.

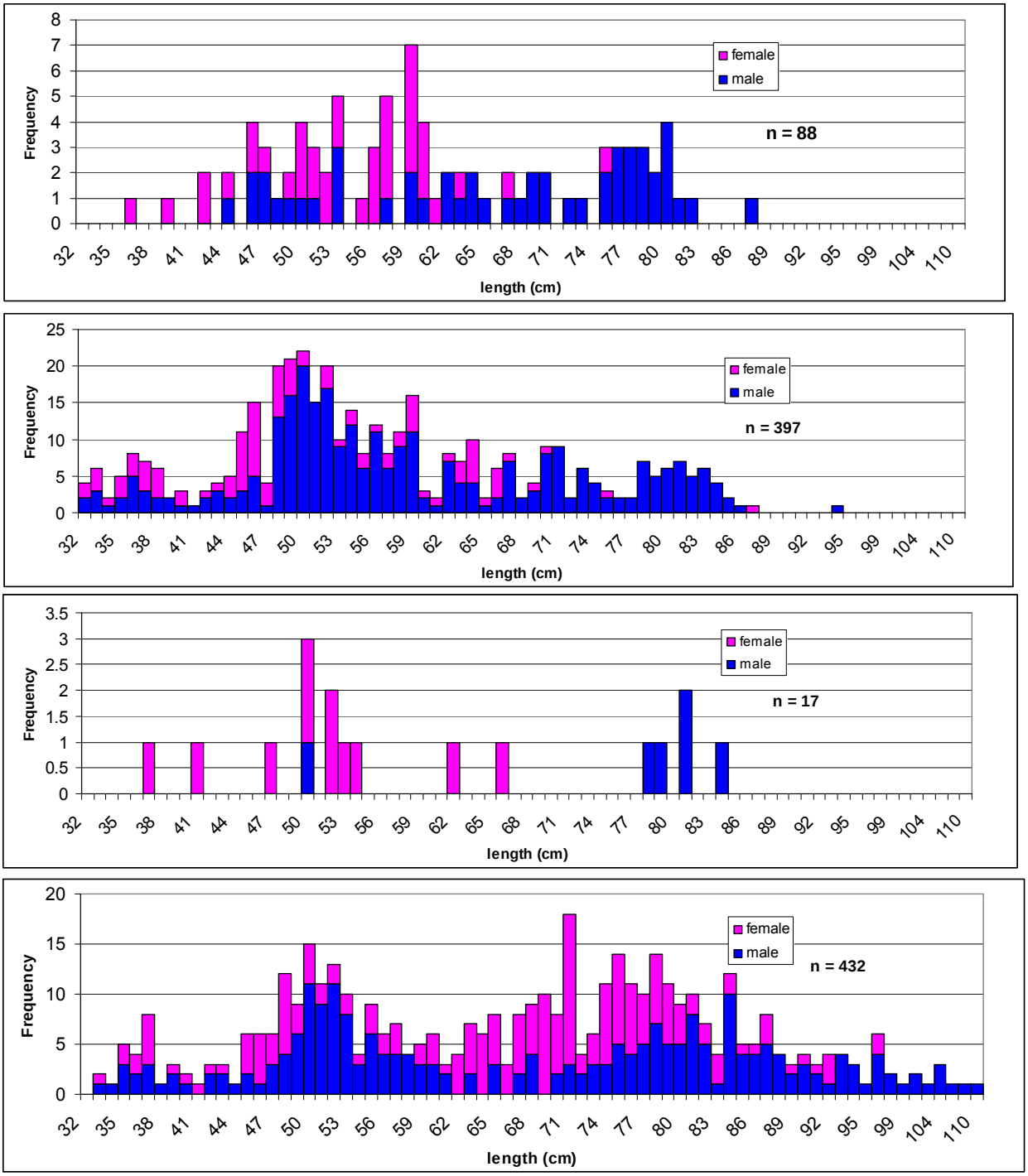


Figure A38. Study fleet length distributions by sex and trip.

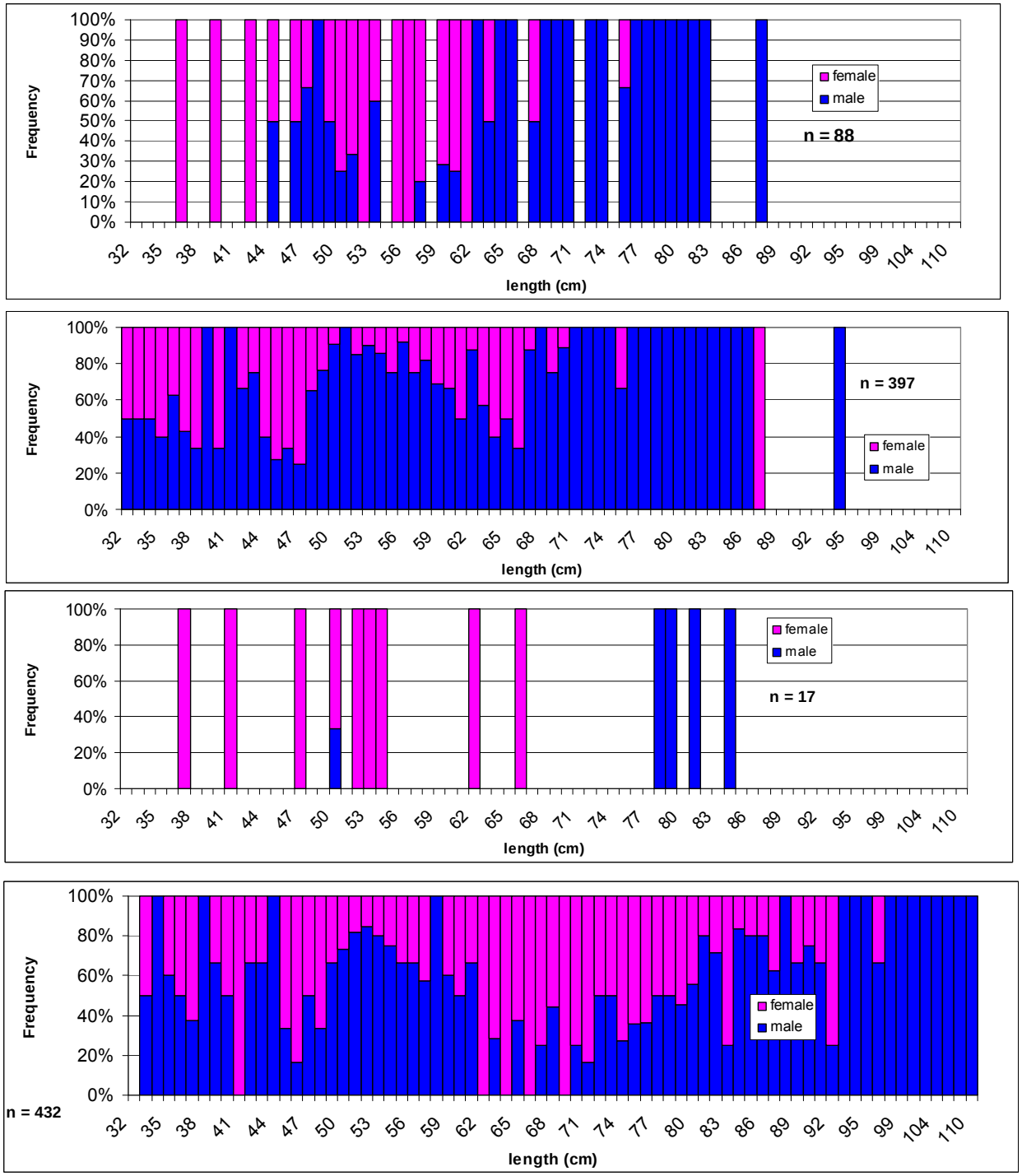
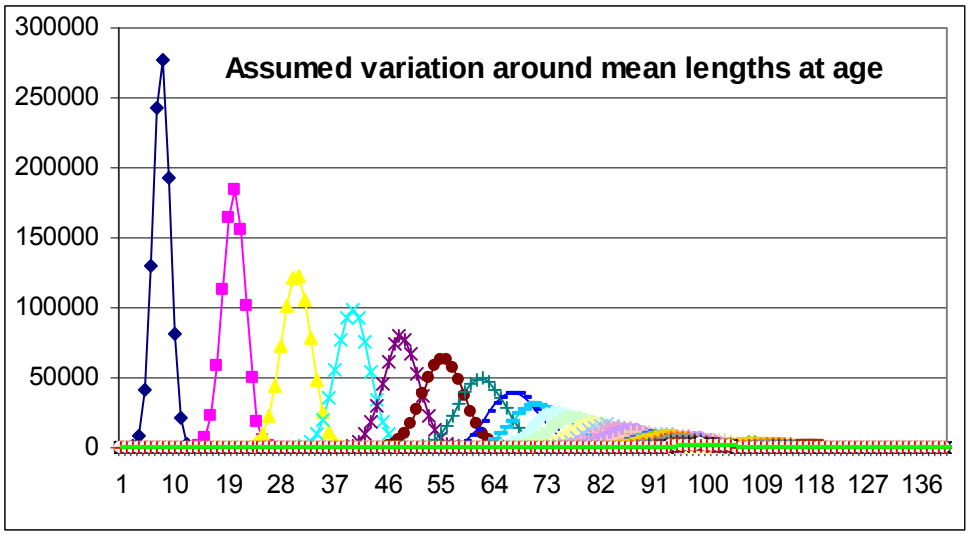


Figure A39. Study fleet sex ratio at length by trip.



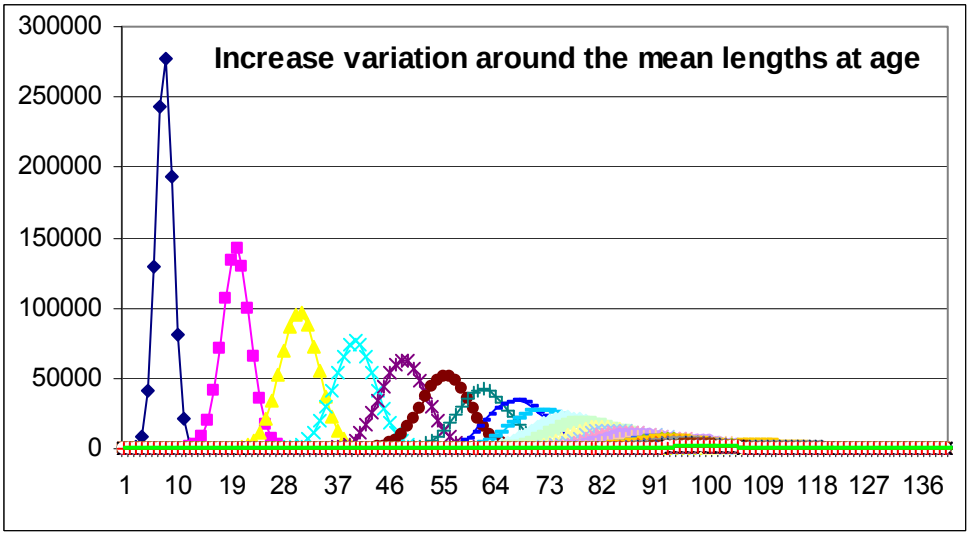


Figure A40. SCALE base run 1 assumed variation around the mean lengths at age (top) and run 5 which increased the assumed variation around the mean lengths at age (bottom).

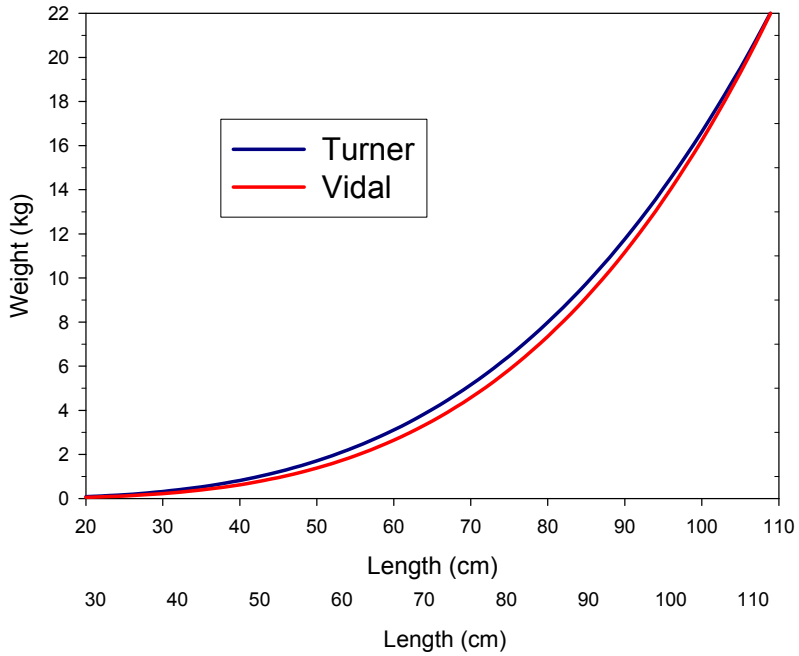


Figure A41. Top graph shows the length weight relationship calculated from the study fleet data (T Vidal 2008). Bottom graph shows the comparison between Turner's (1986) and Vidal length weight relationships.

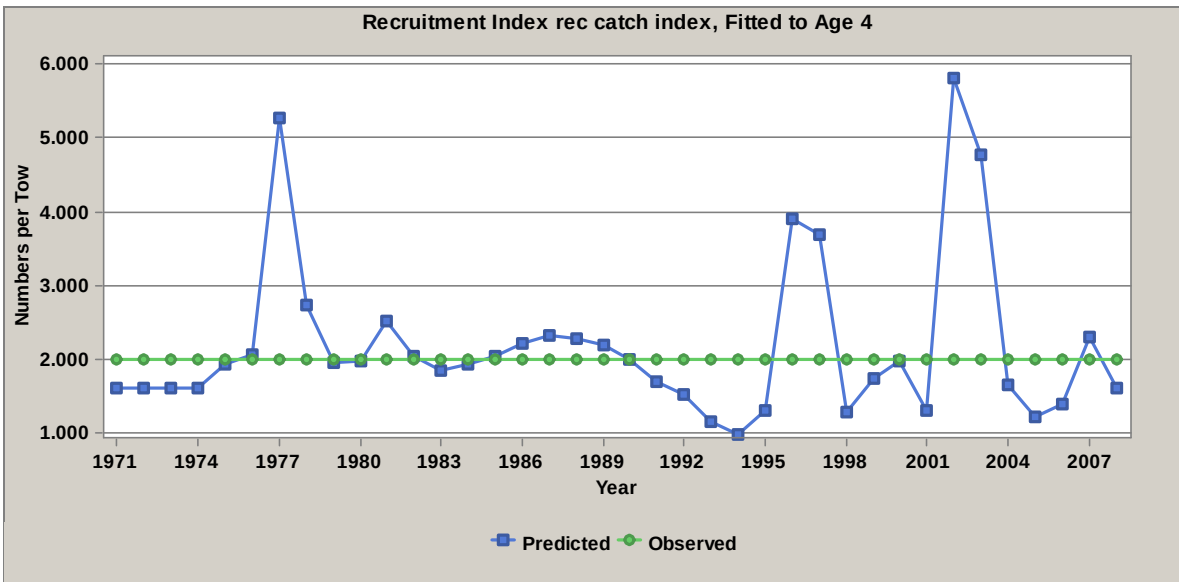


Figure A42. SCALE base run 1 Straight line recruitment index.

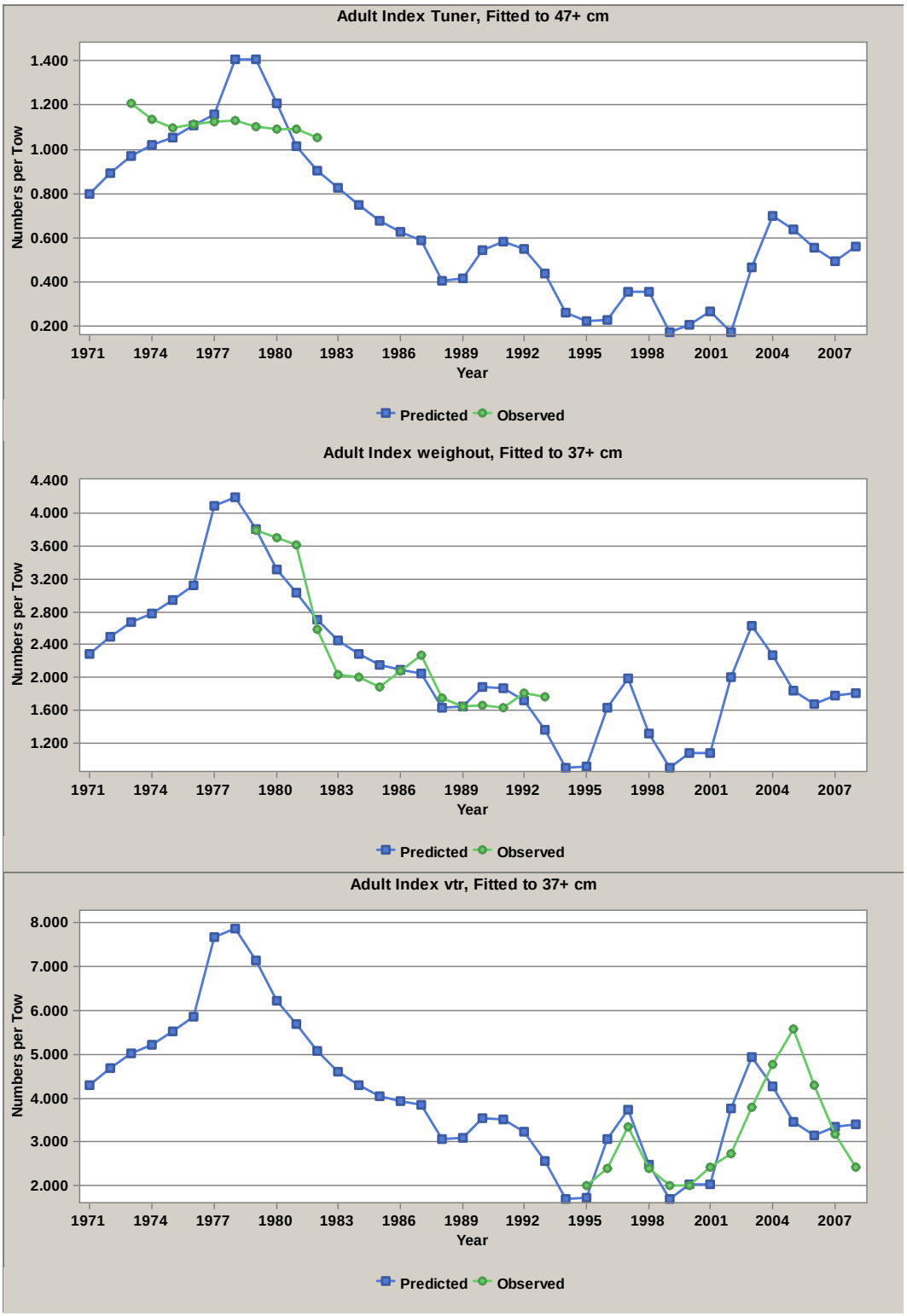


Figure A43. SCALE base run 1 fit to the three cpue indices.

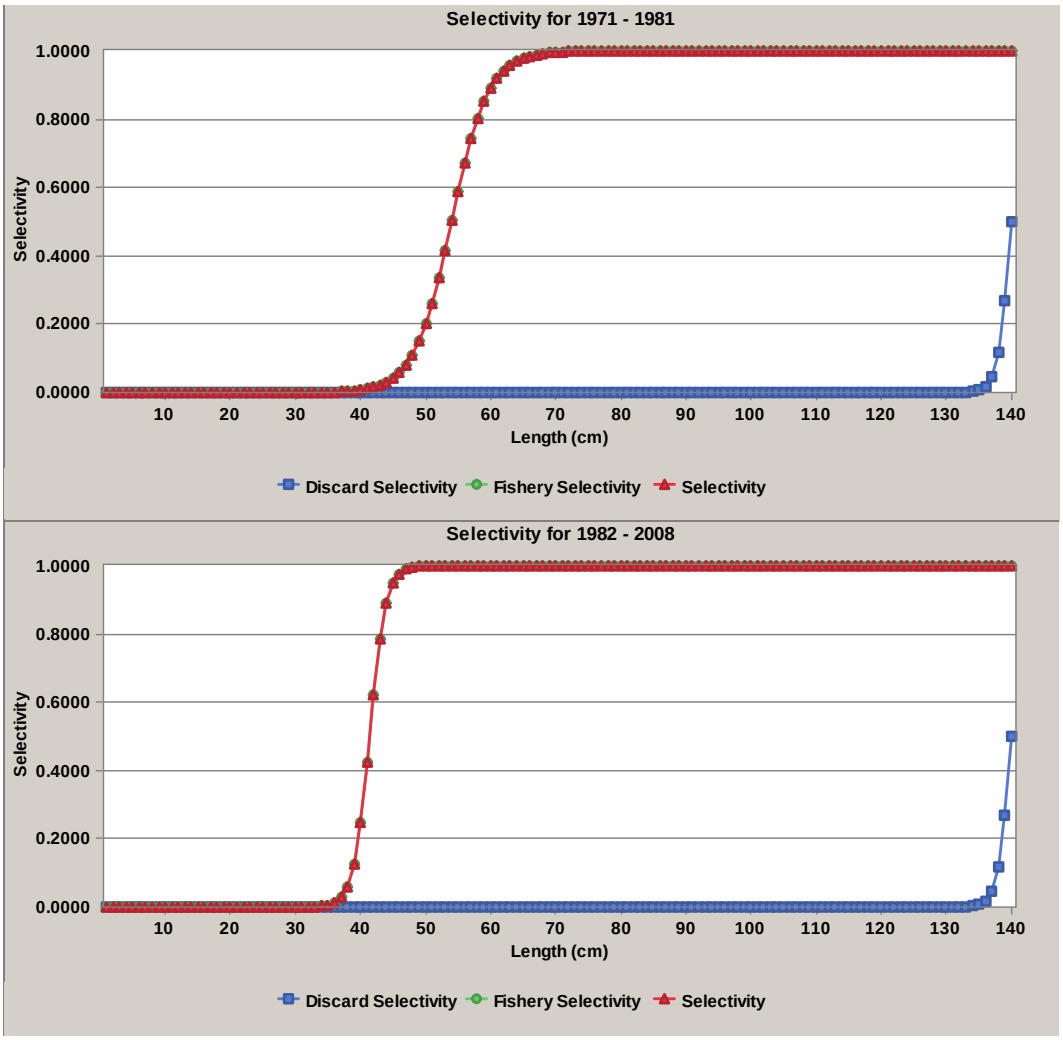


Figure A44. SCALE base run 1 estimated selectivity (block 1 is from1971-1981, block 2 is from 1984-2008).

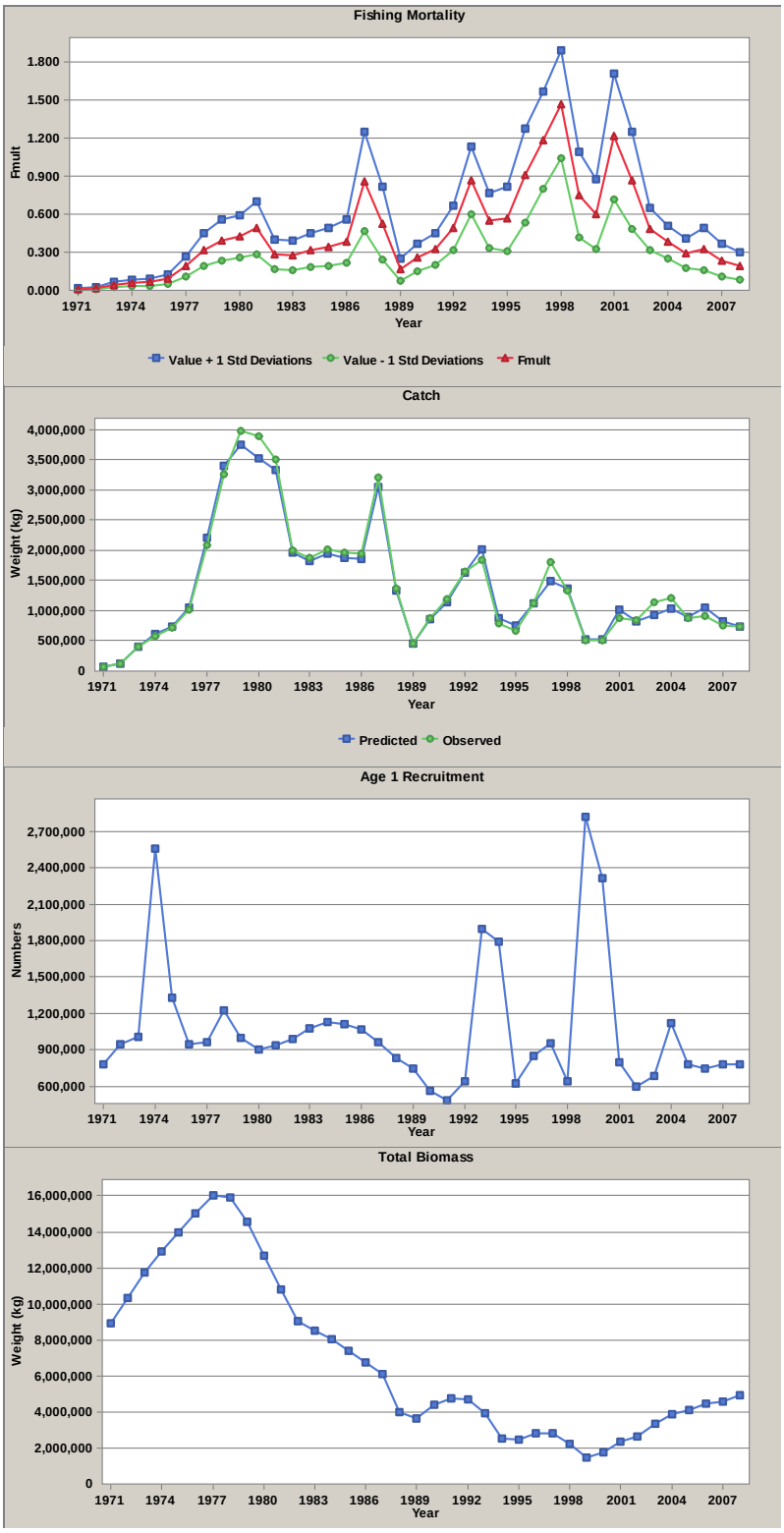
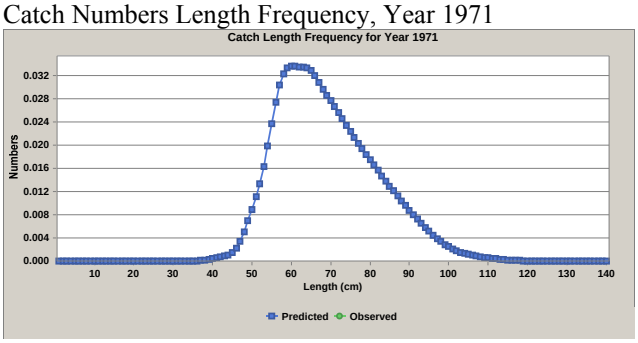
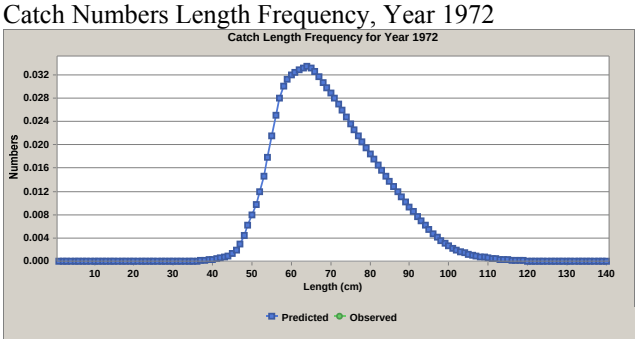


Figure A45. SCALE base run 1 estimated F, fit to the catch, estimated recruitment, and total biomass.

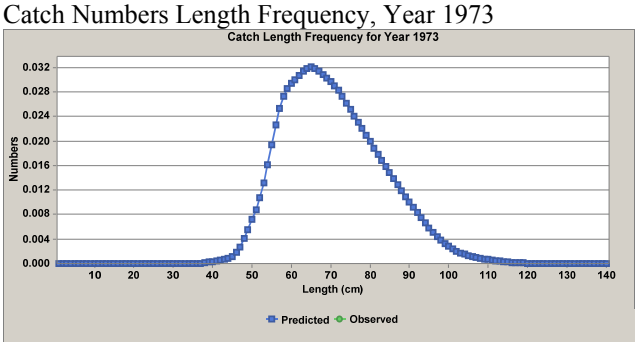
Catch Numbers Length Frequency, Year 1971



Catch Numbers Length Frequency, Year 1972



Catch Numbers Length Frequency, Year 1973



Catch Numbers Length Frequency, Year 1974

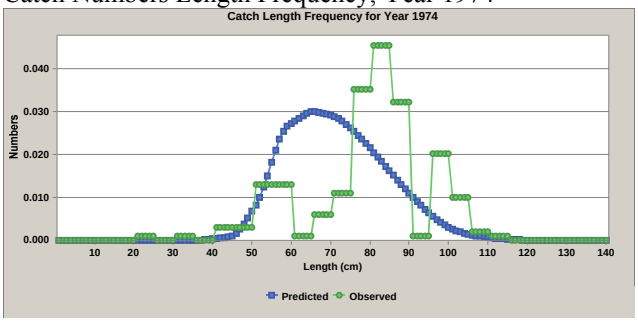
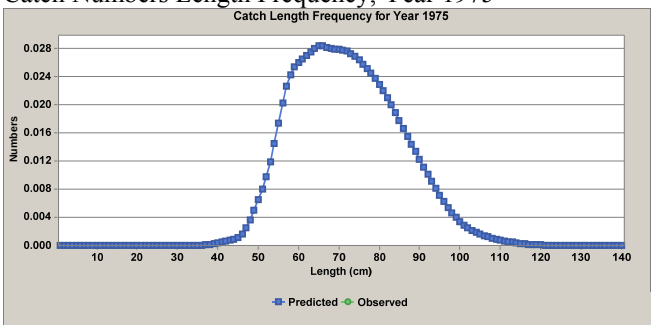
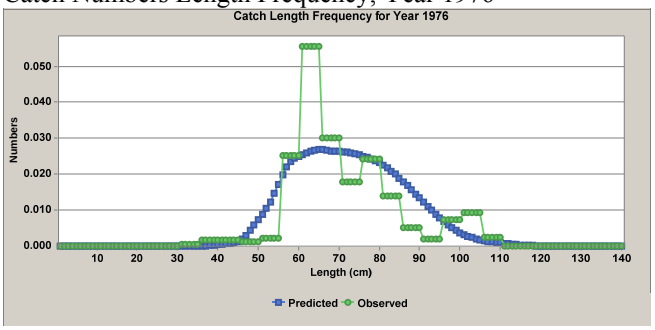


Figure A46. SCALE base run 1 predicted (blue) and observed (green) catch distributions by year. Years which do not have data are also shown.

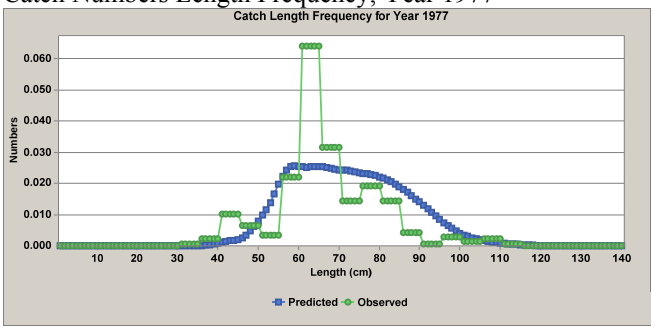
Catch Numbers Length Frequency, Year 1975



Catch Numbers Length Frequency, Year 1976



Catch Numbers Length Frequency, Year 1977



Catch Numbers Length Frequency, Year 1978

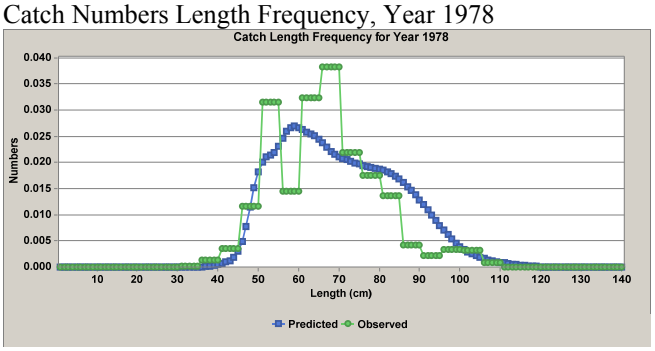
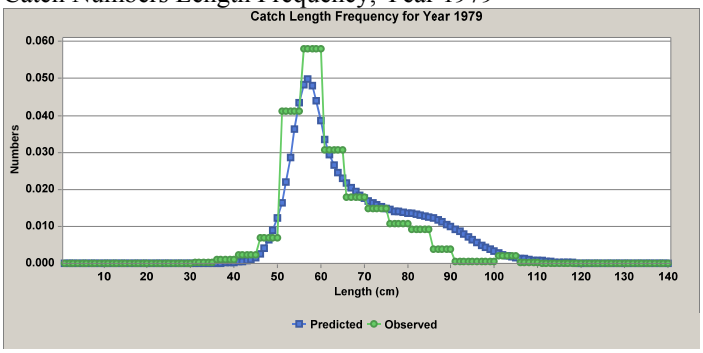
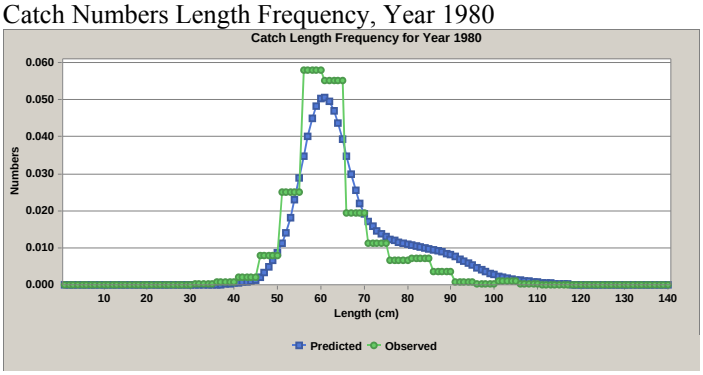


Figure A46. cont.

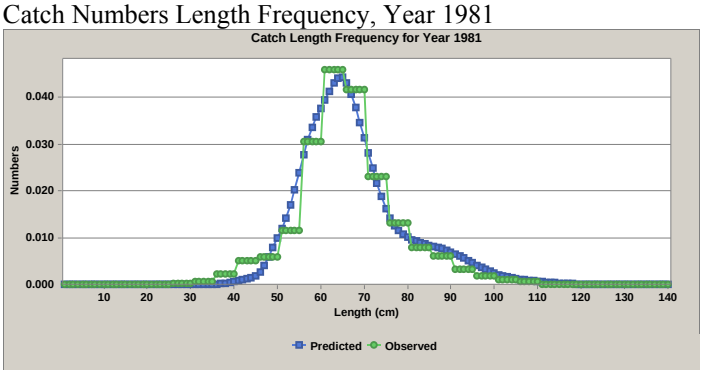
Catch Numbers Length Frequency, Year 1979



Catch Numbers Length Frequency, Year 1980



Catch Numbers Length Frequency, Year 1981



Catch Numbers Length Frequency, Year 1982

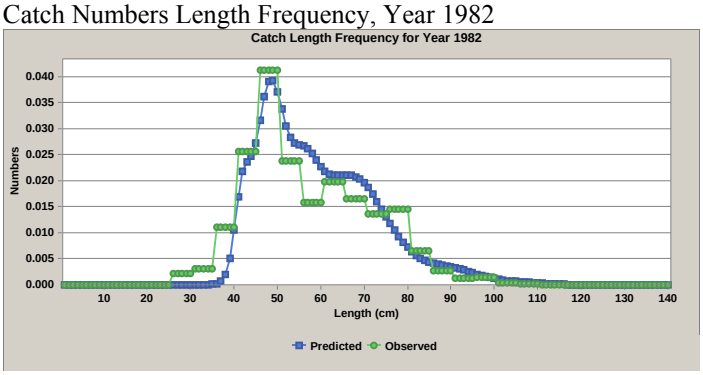
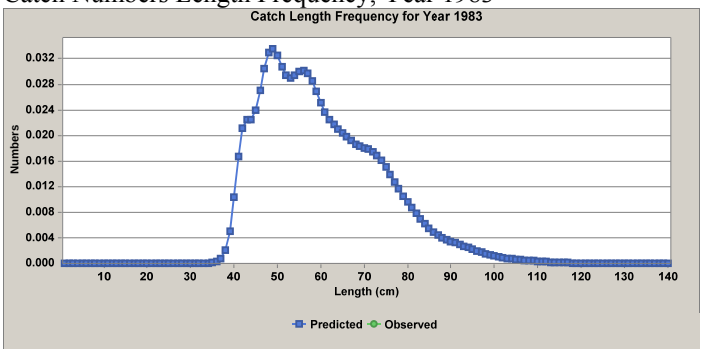
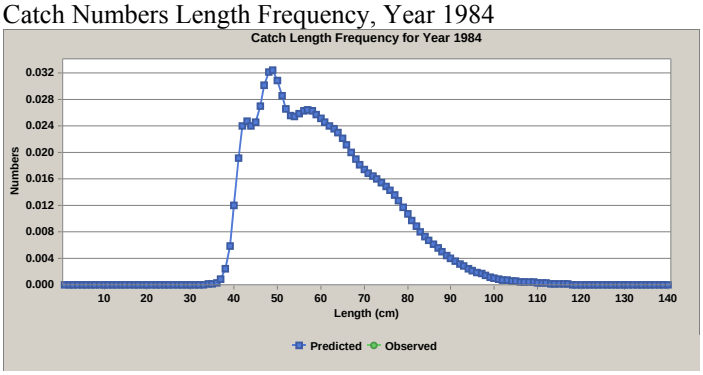


Figure A46. cont.

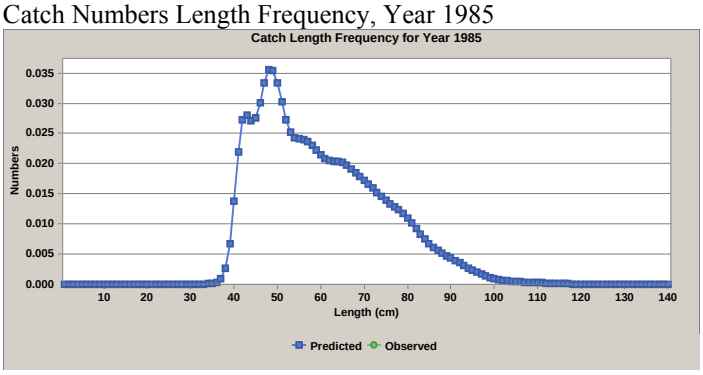
Catch Numbers Length Frequency, Year 1983



Catch Numbers Length Frequency, Year 1984



Catch Numbers Length Frequency, Year 1985



Catch Numbers Length Frequency, Year 1986

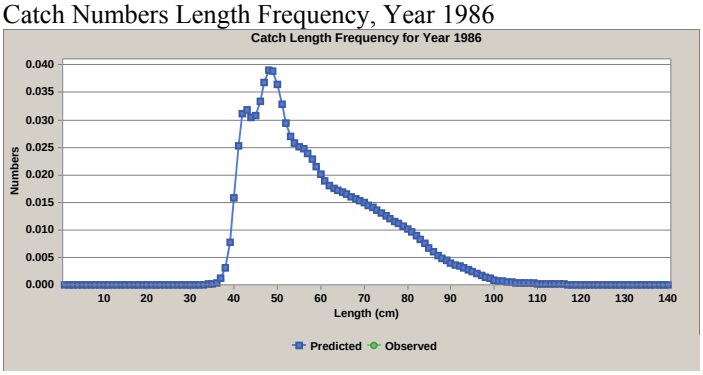
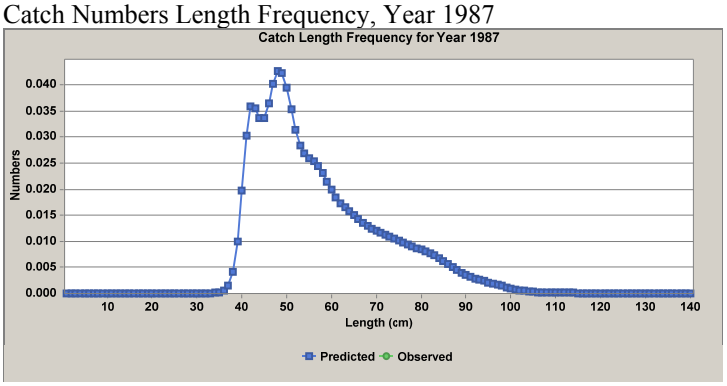
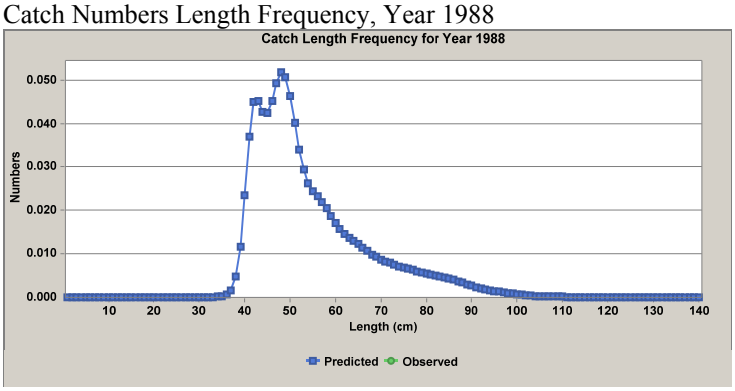


Figure A46. cont.

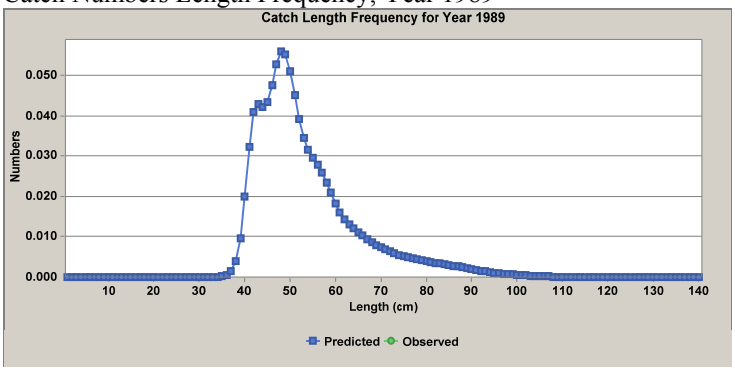
Catch Numbers Length Frequency, Year 1987



Catch Numbers Length Frequency, Year 1988



Catch Numbers Length Frequency, Year 1989



Catch Numbers Length Frequency, Year 1990

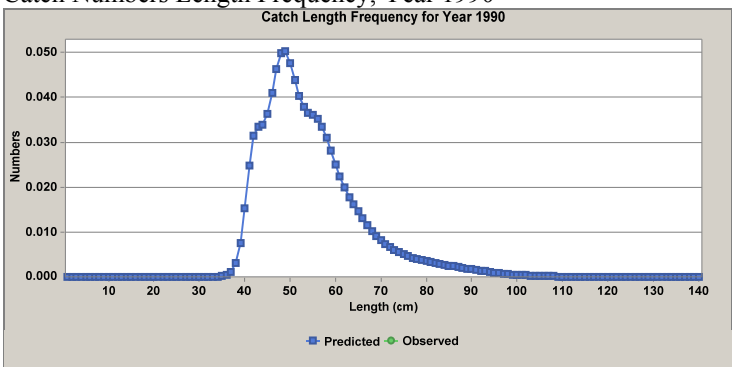
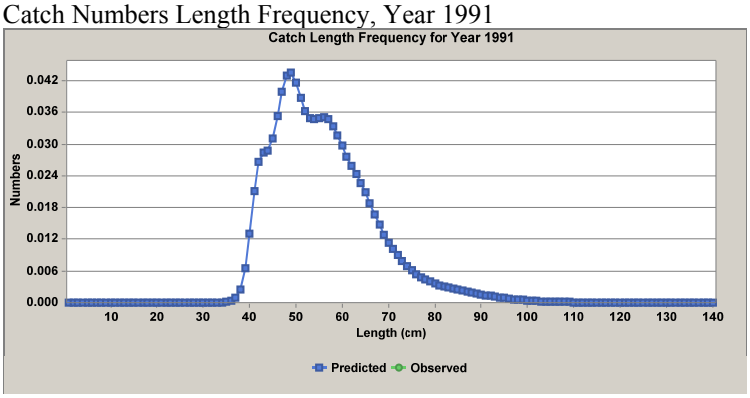
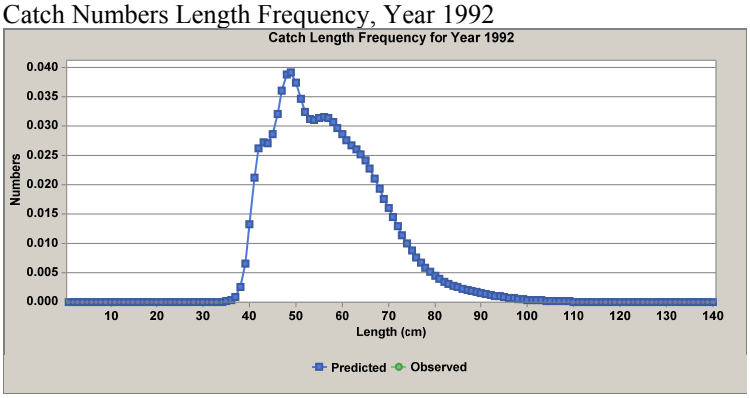


Figure A46. cont.

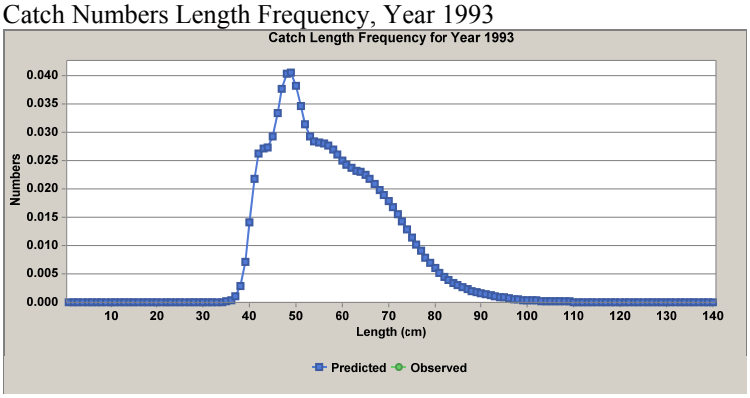
Catch Numbers Length Frequency, Year 1991



Catch Numbers Length Frequency, Year 1992



Catch Numbers Length Frequency, Year 1993



Catch Numbers Length Frequency, Year 1994

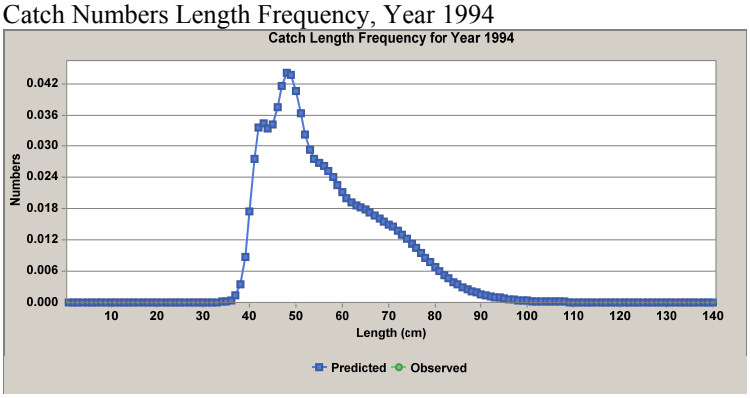
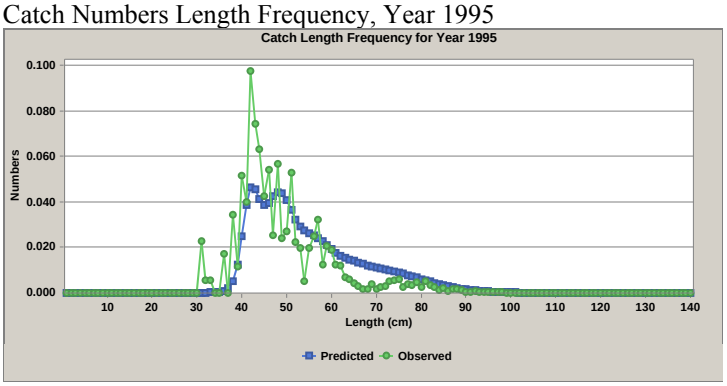
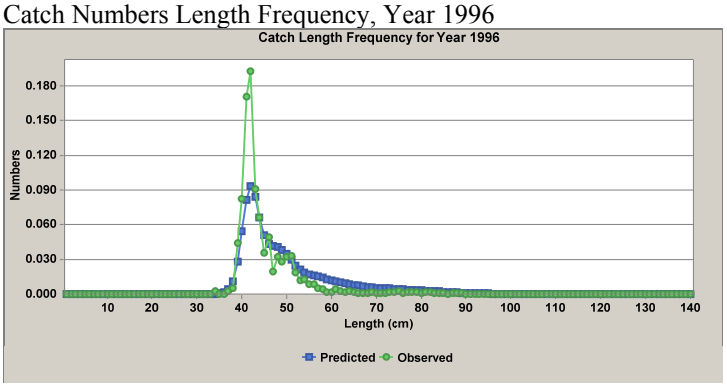


Figure A46. cont.

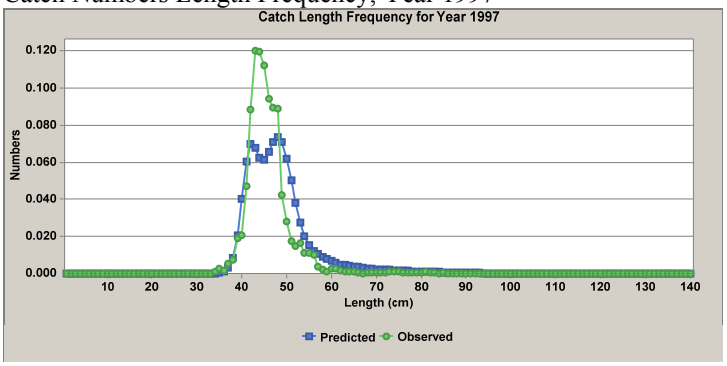
Catch Numbers Length Frequency, Year 1995



Catch Numbers Length Frequency, Year 1996



Catch Numbers Length Frequency, Year 1997



Catch Numbers Length Frequency, Year 1998

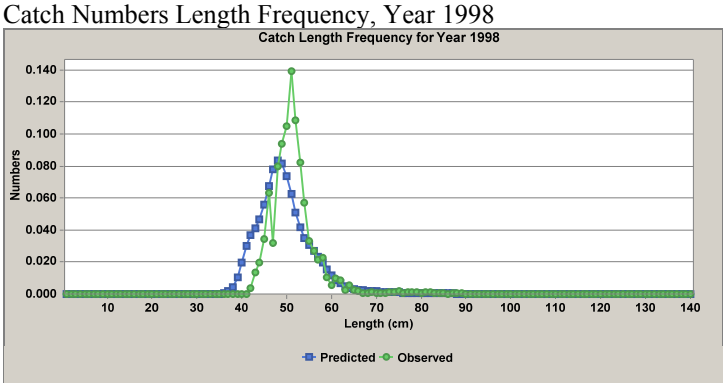
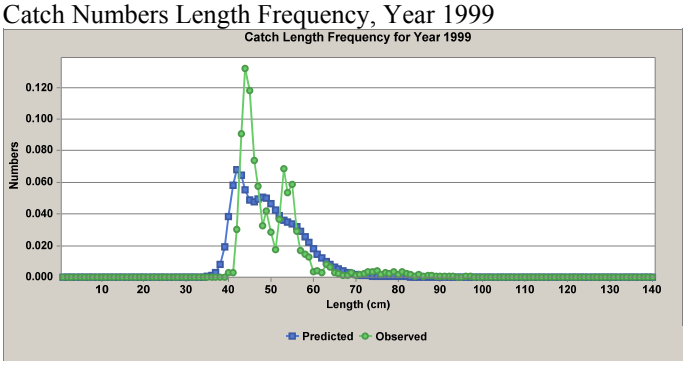
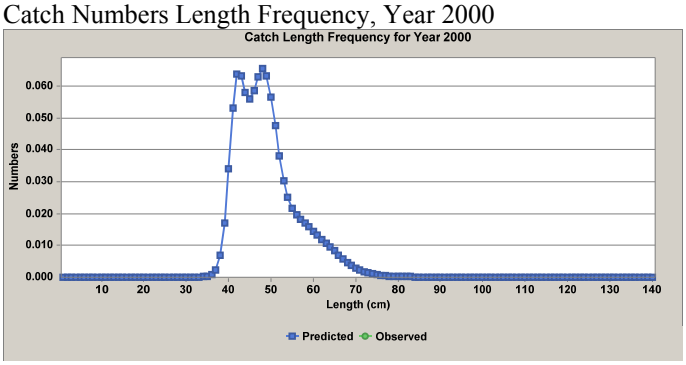


Figure A46. cont.

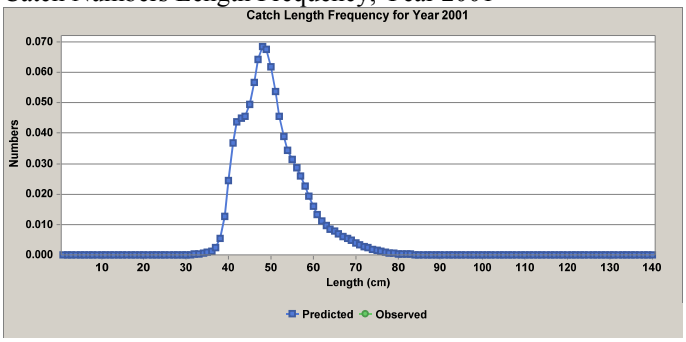
Catch Numbers Length Frequency, Year 1999



Catch Numbers Length Frequency, Year 2000



Catch Numbers Length Frequency, Year 2001



Catch Numbers Length Frequency, Year 2002

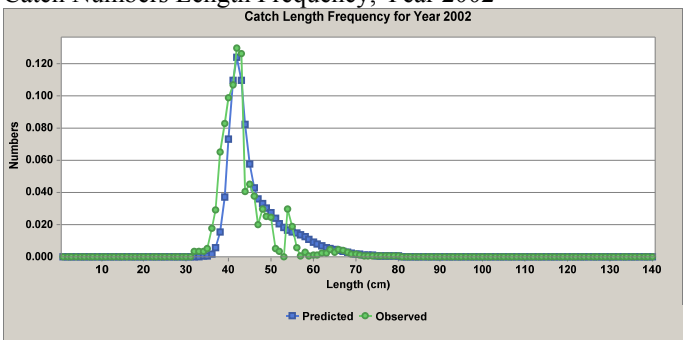
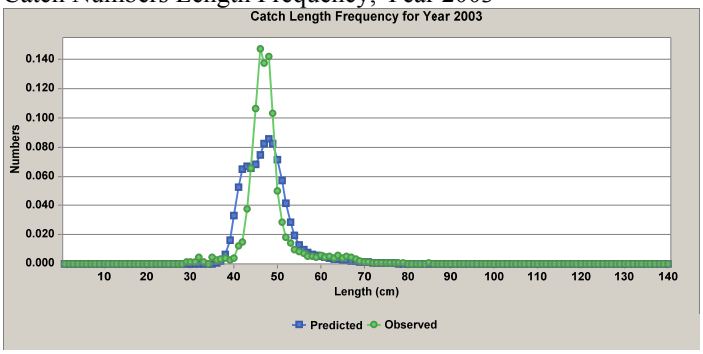
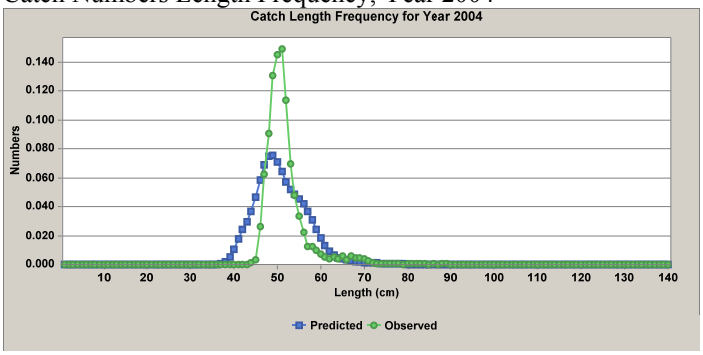


Figure A46. cont.

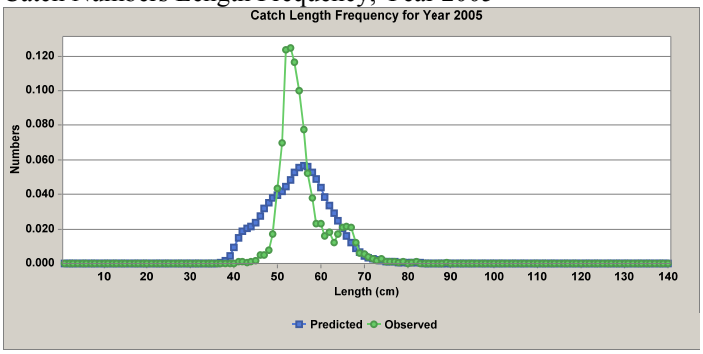
Catch Numbers Length Frequency, Year 2003



Catch Numbers Length Frequency, Year 2004



Catch Numbers Length Frequency, Year 2005



Catch Numbers Length Frequency, Year 2006

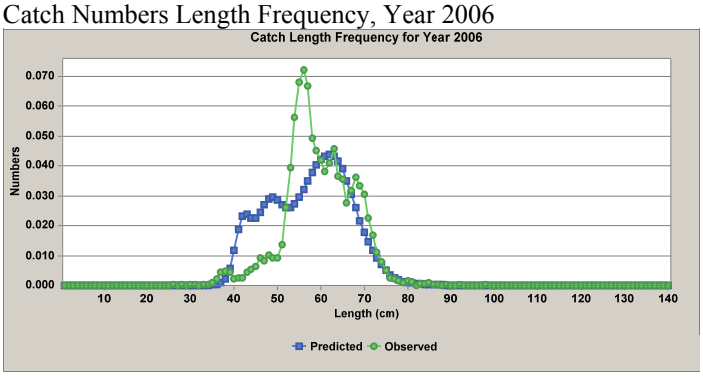
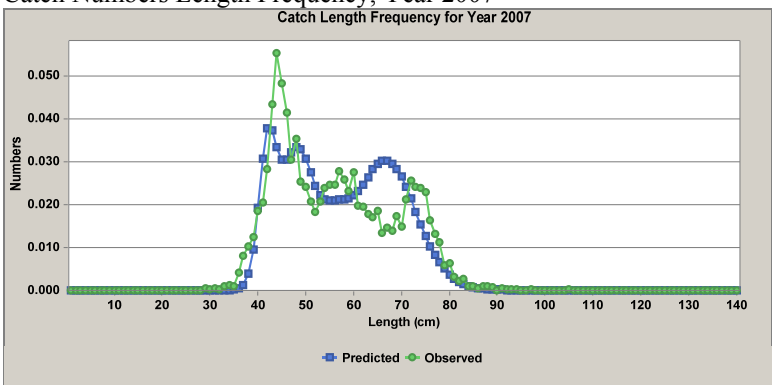


Figure A46. cont.

Catch Numbers Length Frequency, Year 2007



Catch Numbers Length Frequency, Year 2008

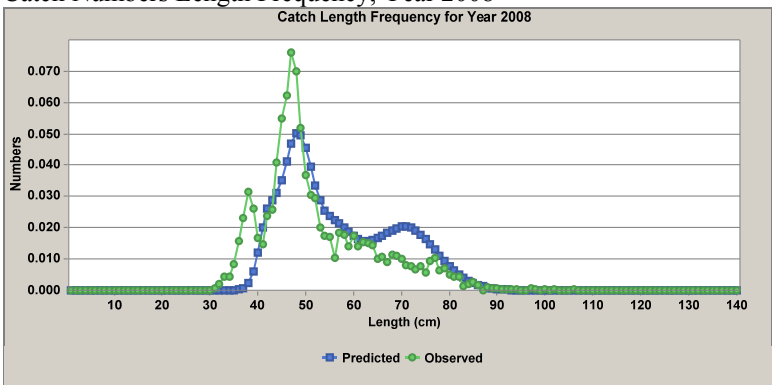


Figure A46. cont.

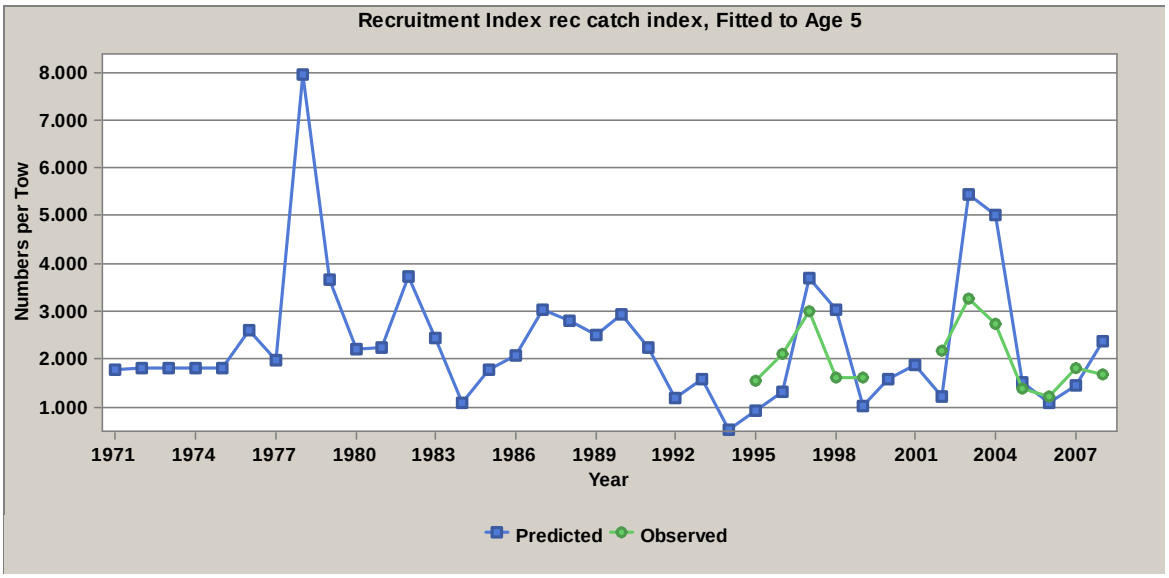


Figure A47. SCALE run 6 was fit to the recruitment index at age 5. The VTR cpue index was applied to the landings proportion at length and 40-50 cm fish were sliced from the index as age 5.

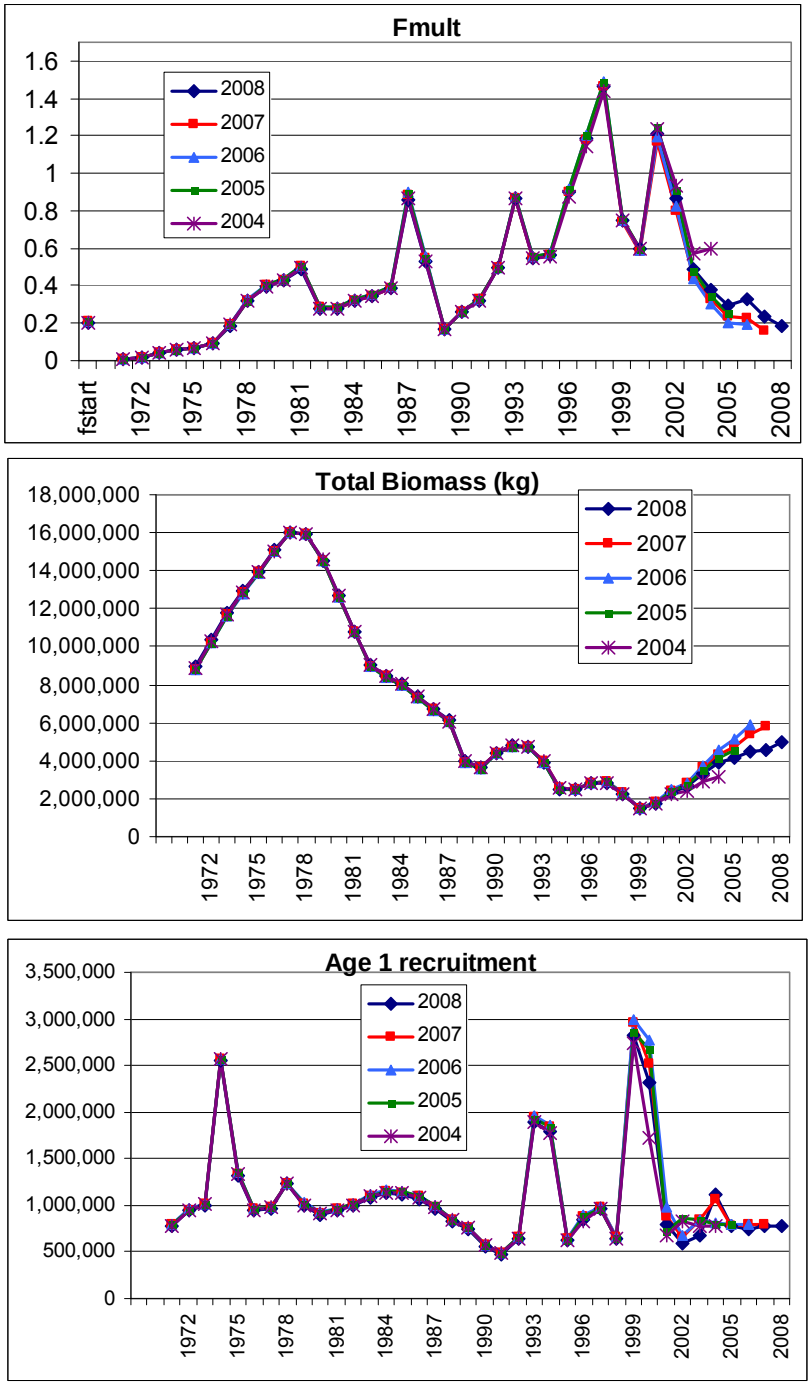


Figure A48. SCALE base run 1 retrospective pattern.

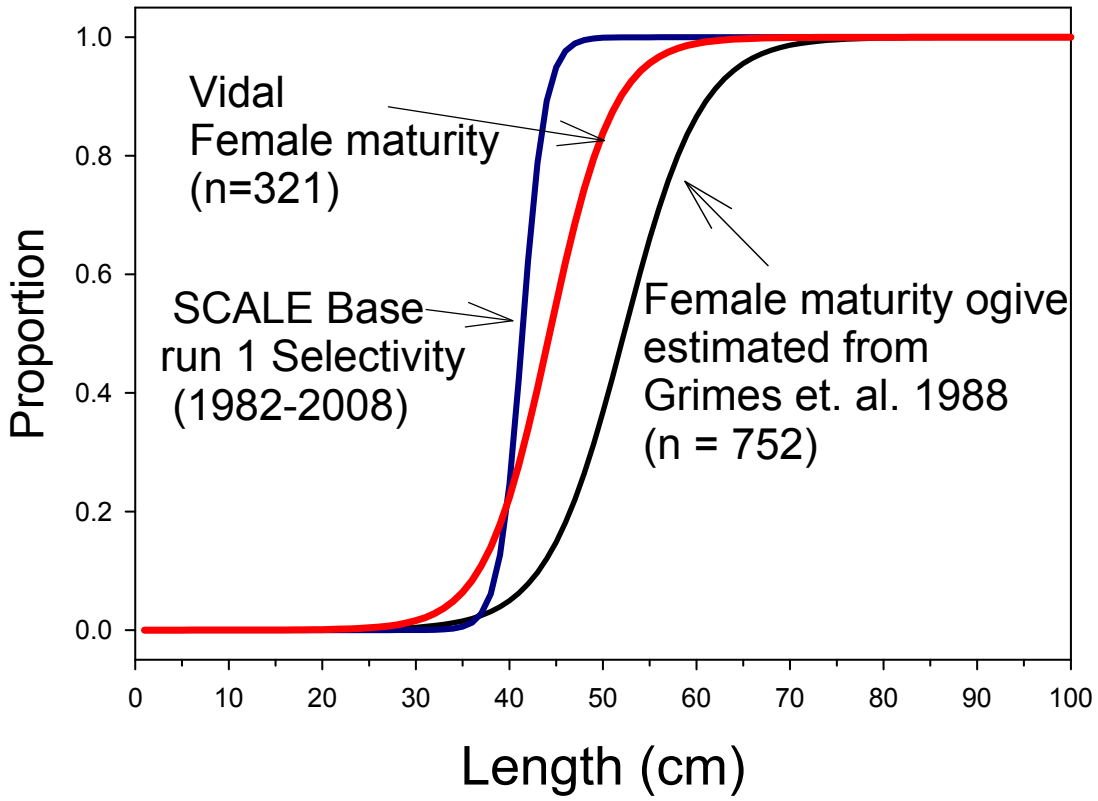


Figure A49. Comparison of SCALE base run 1 selectivity from block 2 (1984-2008), Vidal updated female maturity at length, and Grimes et al (1988) female maturity at length curves.

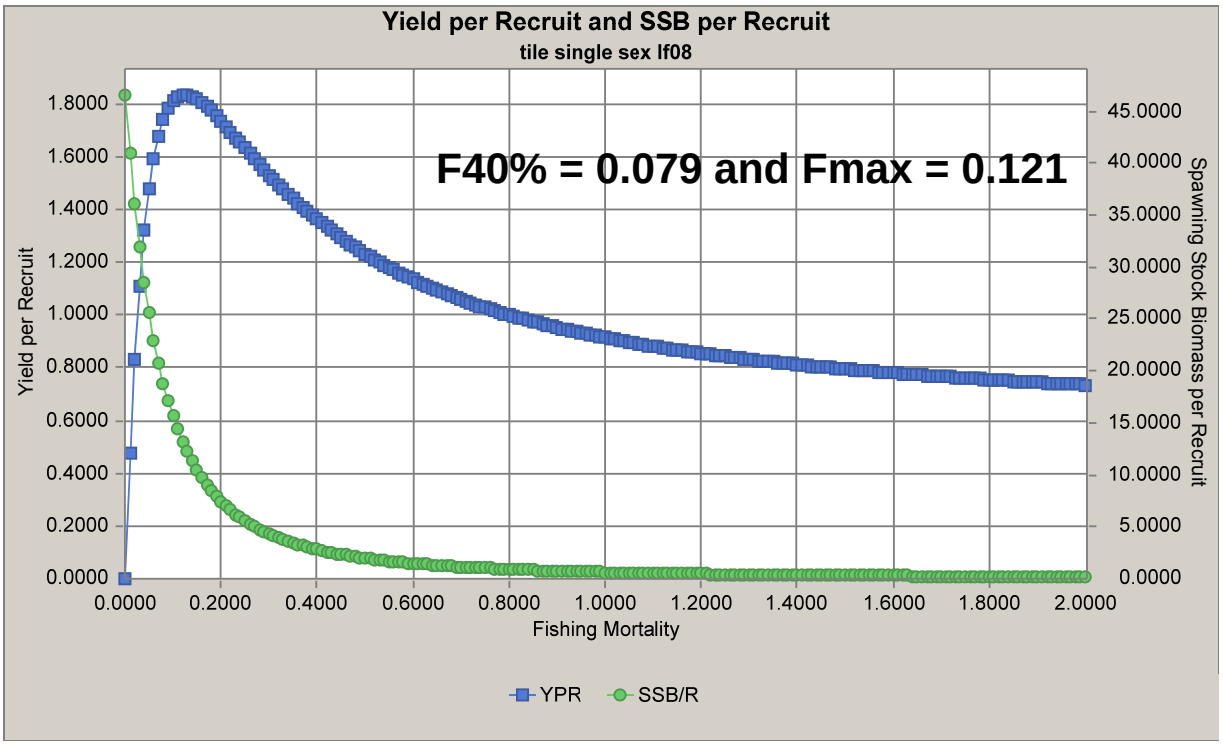


Figure A50. SCALE base run 2 age based YPR and spawners per recruit curves.

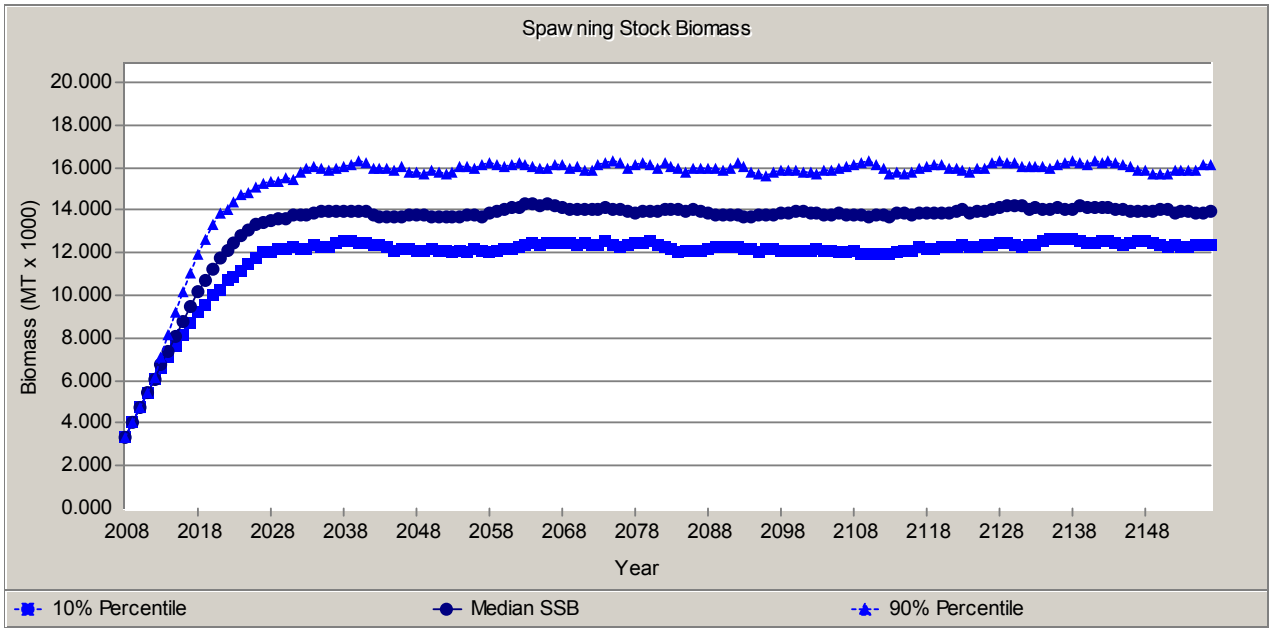


Figure A51. Long term AGEPRO projection at Fmax = 0.121 for run 2 using CDF of recruitment from 1971-2008.

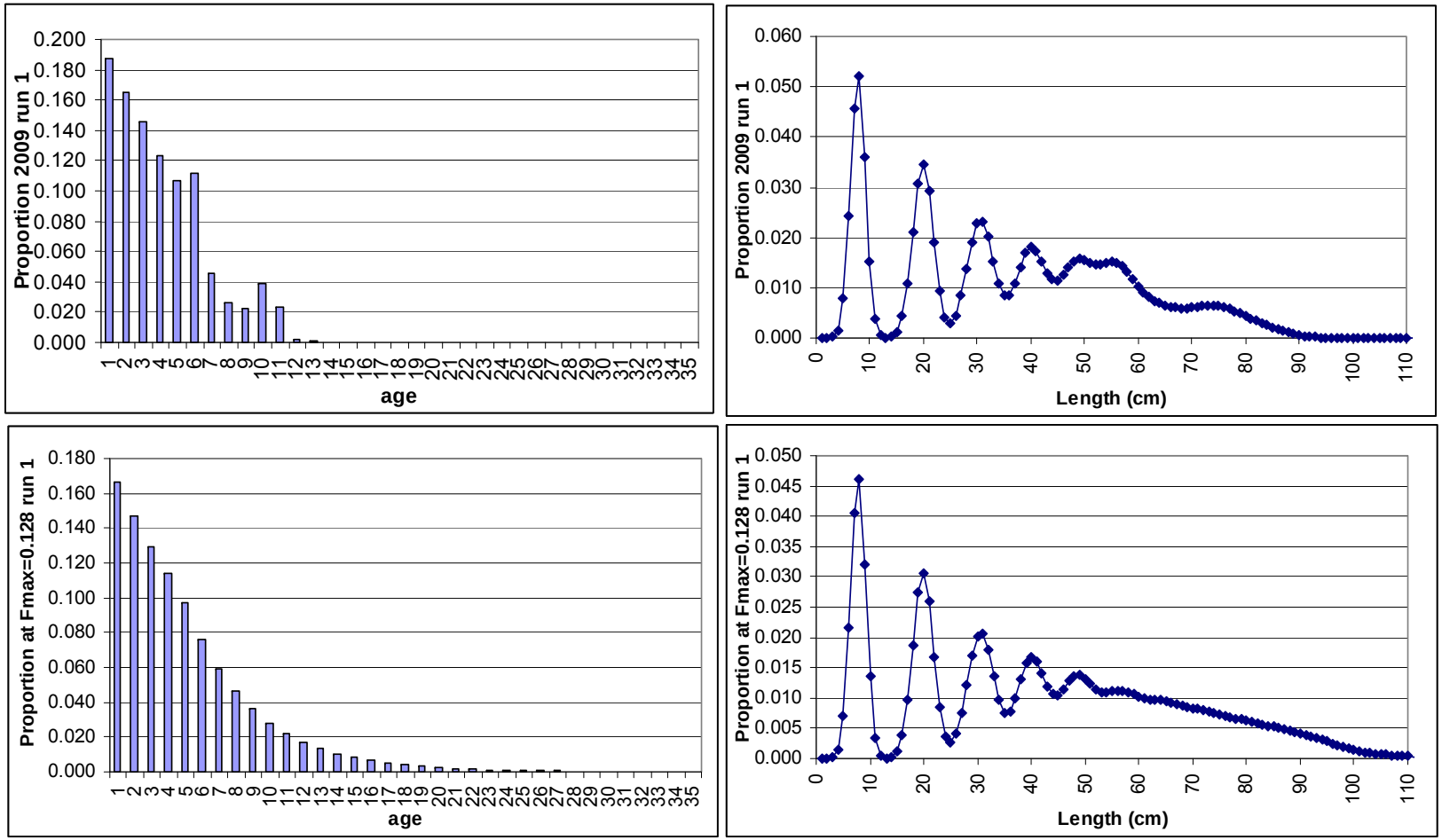


Figure A52. SCALE base run 1 comparison of proportion at length and age in 2009 to Fmax predicted length and age distributions.

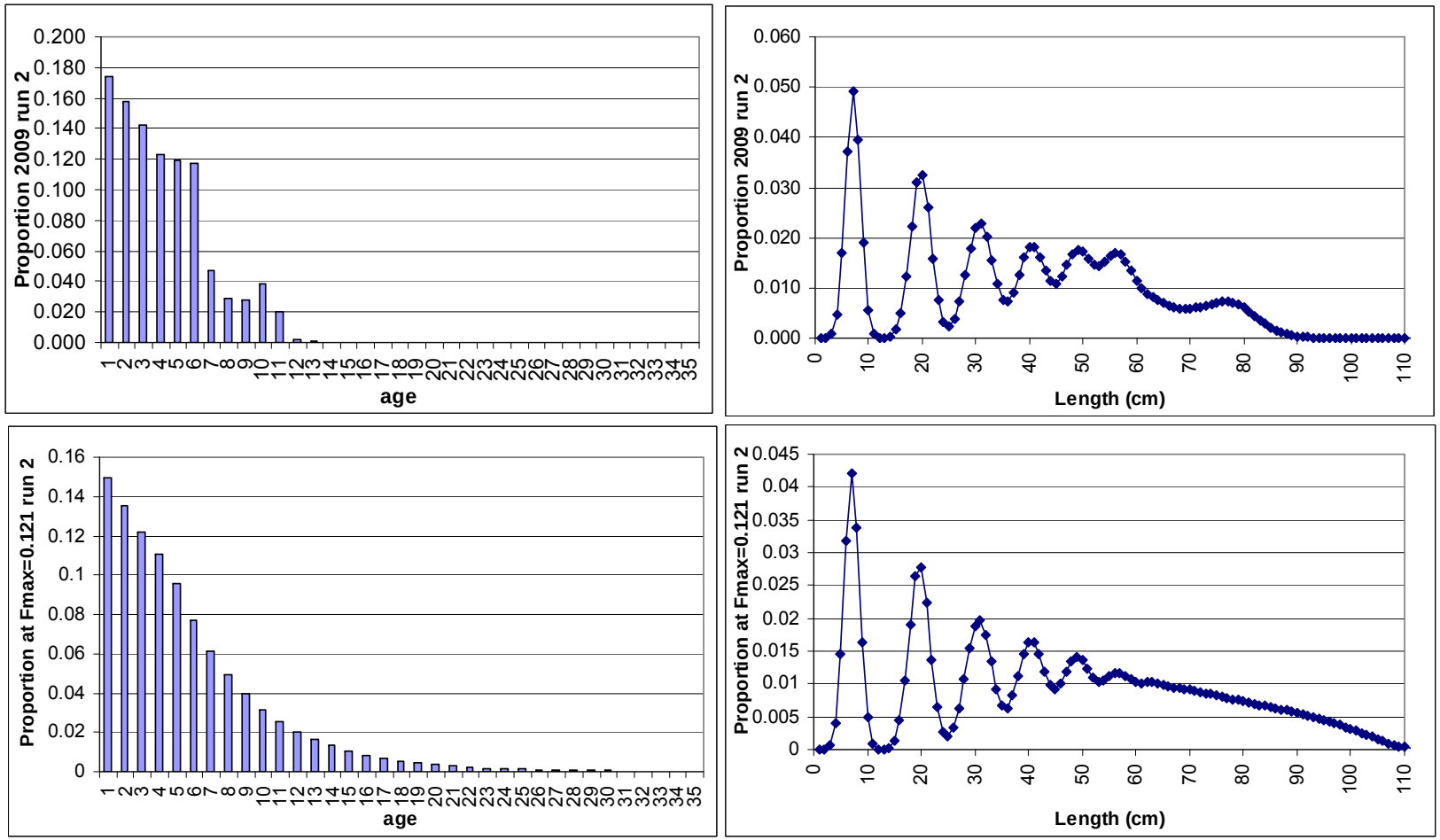


Figure A53. SCALE base run 2 comparison of proportion at length and age in 2009 to Fmax predicted length and age distributions.

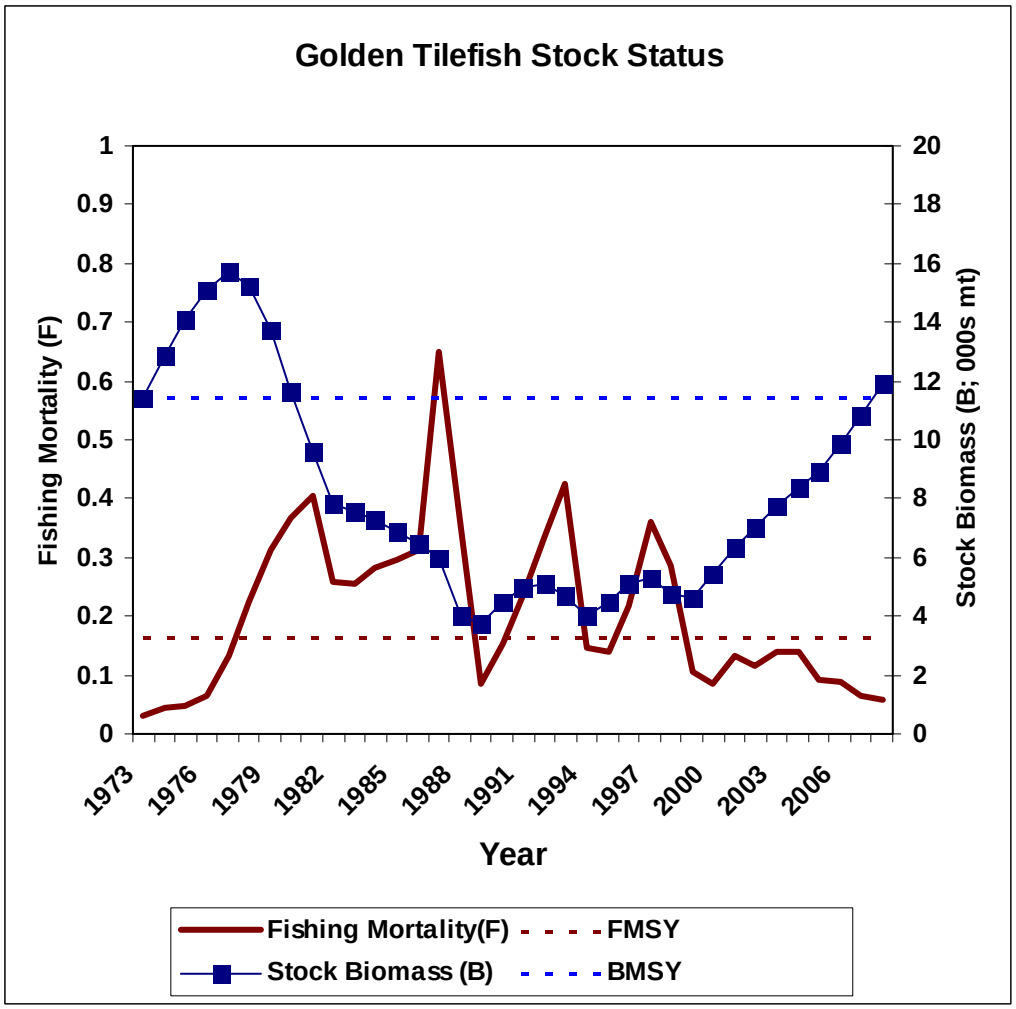


Figure A54. Stock status evaluation for Golden tilefish: 2009 BASE model run.

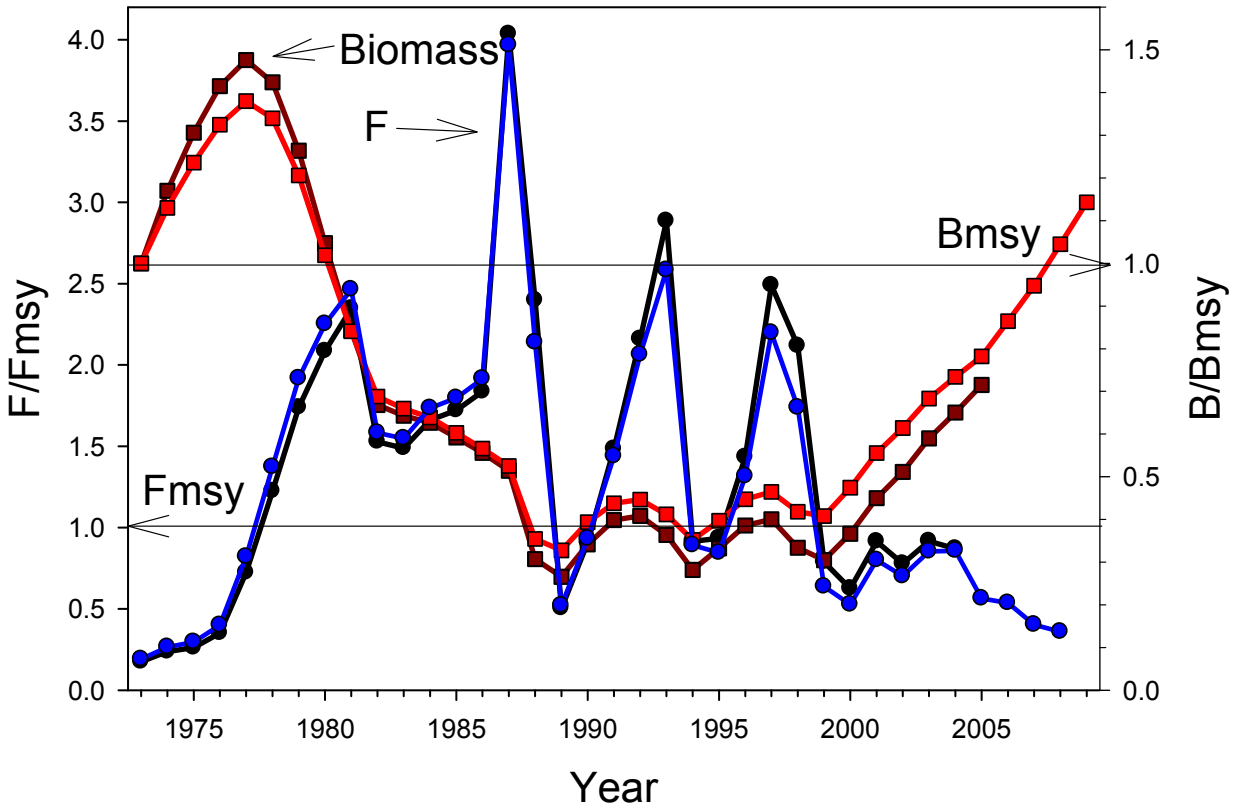


Figure A55. SARC 41 and SARC 48 trends in F/Fmsy and B/ Bmsy ratios for the base ASPIC run which fixed the B1/Bmsy ratio at 1 and used three CPUE series (Turner, Weighout, and VTR).

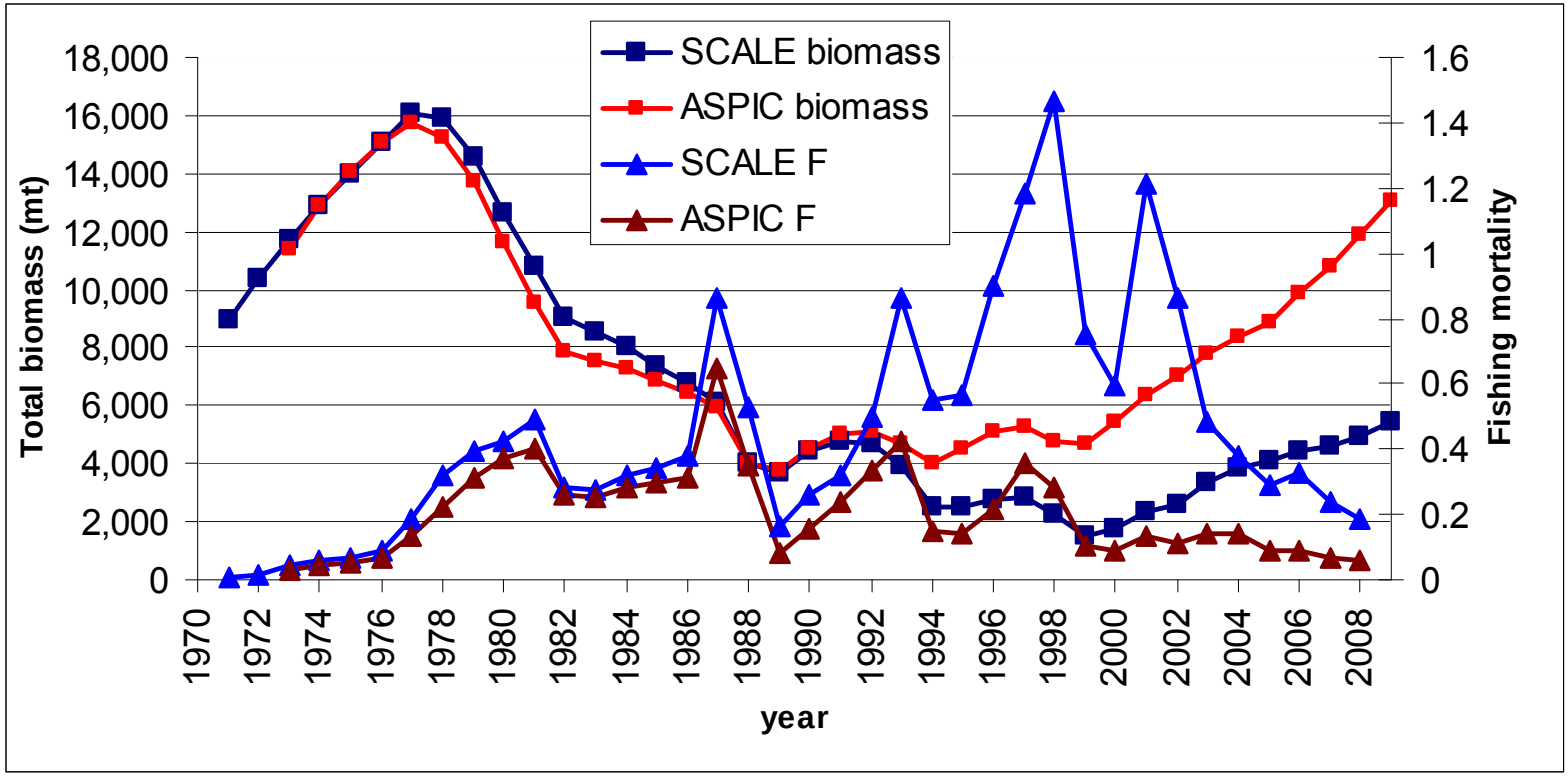


Figure A56. Comparison of F (triangles) and total biomass (squares) between the ASPIC base run 1 with the SCALE base run 1. Note ASPIC base run fixed the biomass in 1973 at Bmsy and SCALE base run estimated Fstart at 0.20.

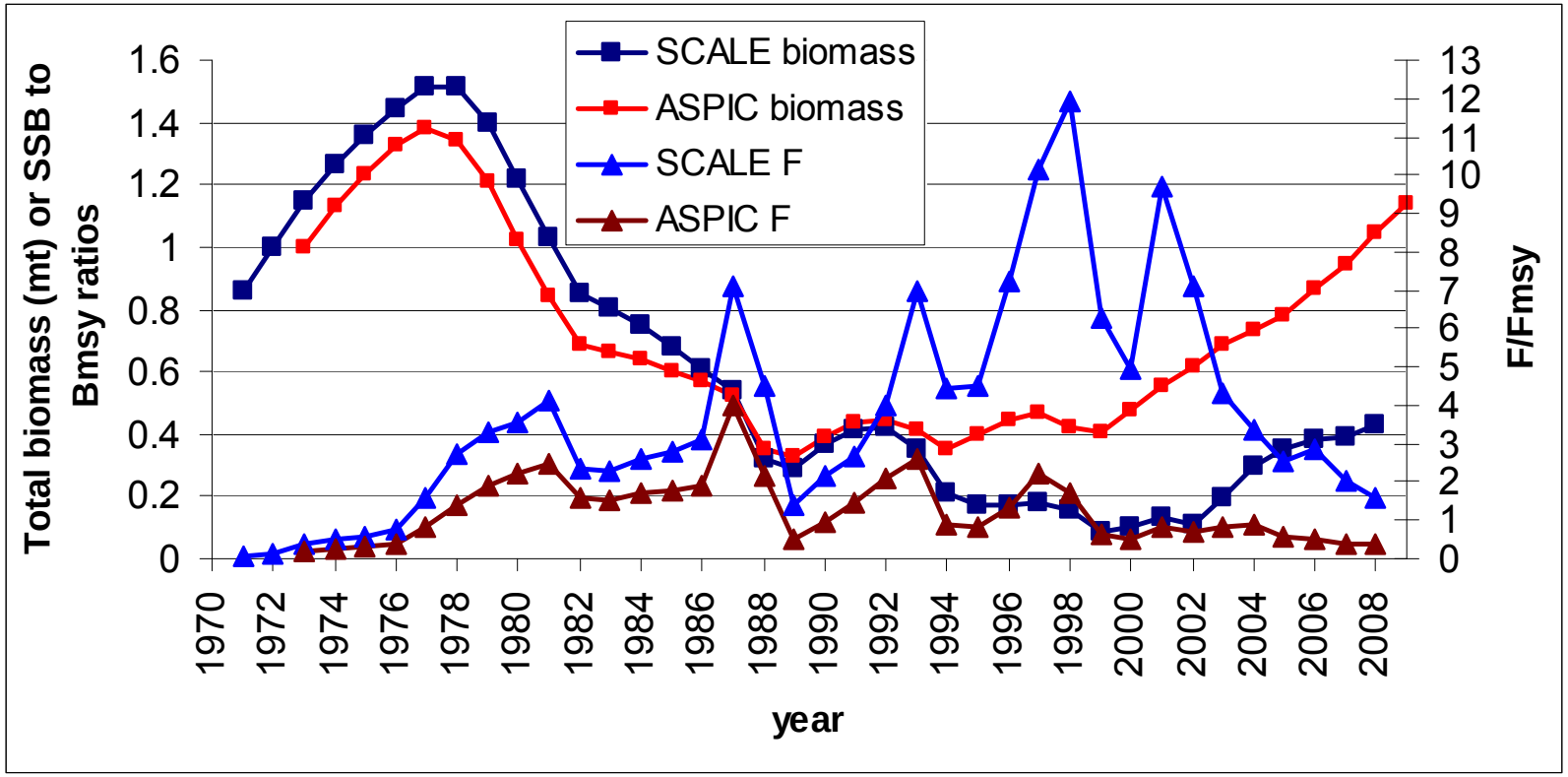


Figure A57. Comparison of F to Fmsy ratio (triangles) and total biomass or SSB to Bmsy ratios (squares) between the ASPIC base run 1 with the SCALE base run 1. Note ASPIC base run fixed the biomass in 1973 at Bmsy and SCALE base run estimated Fstart at 0.20. Fmax (0.128) is used as a proxy for Fmsy and SSBmsy (5,335 mt) is for females only in the SCALE base run 1.

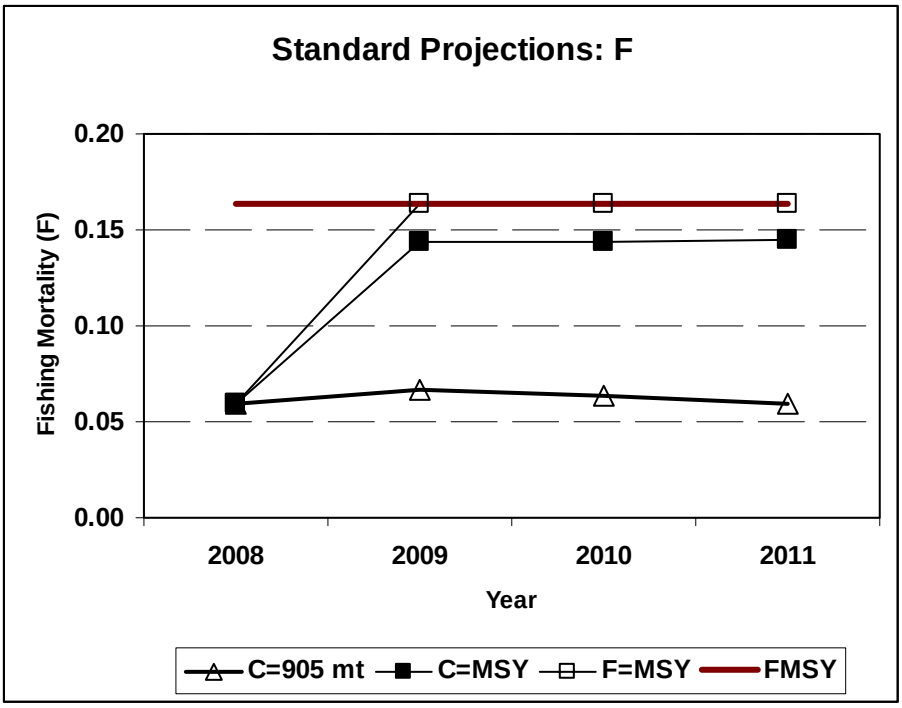


Figure A58. Standard ASPIC projections of fishing mortality (F) for 2009-2011 under alternative assumption for catch (C) or F.

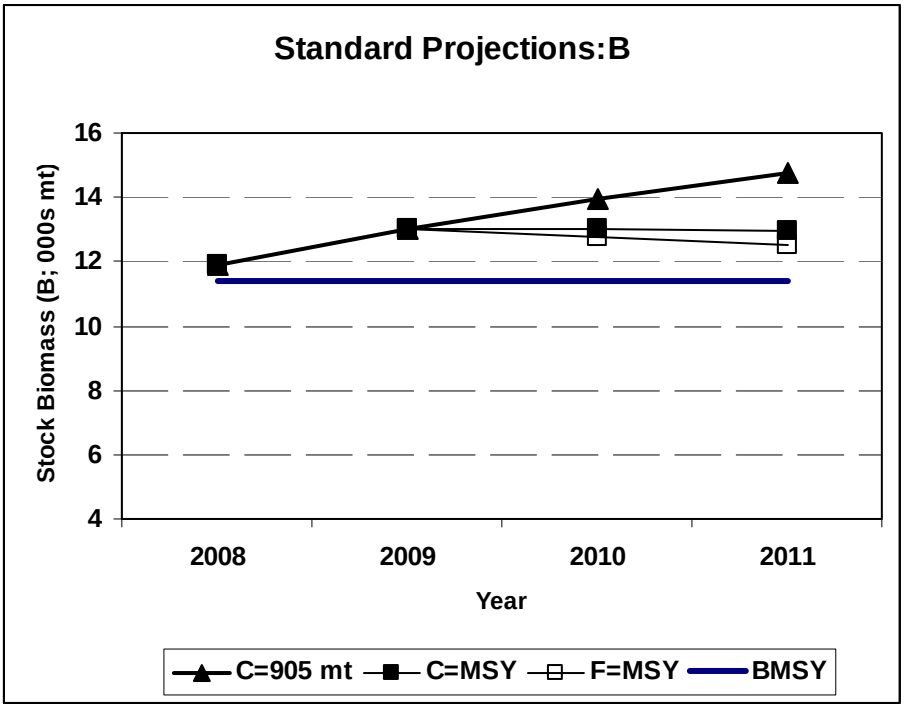


Figure A59. Standard ASPIC projections of stock biomass (B) for 2009-2011 under alternative assumption for catch or F.

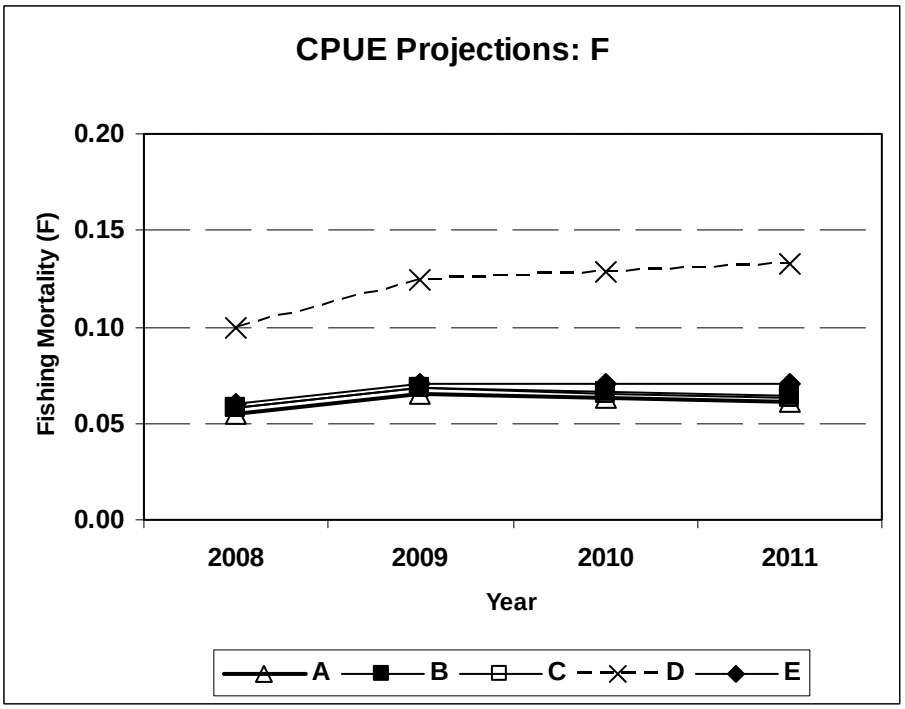


Figure A60. CPUE projections of fishing mortality (F) for 2009-2011 under alternative assumptions for the future trend in fishery VTR CPUE indices (see text).

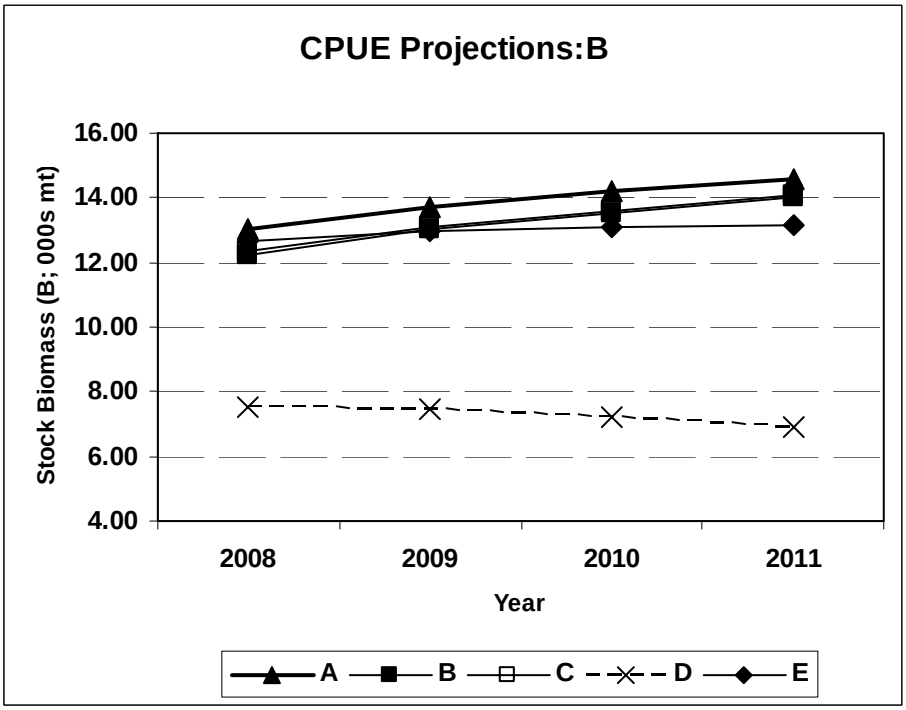


Figure A61. CPUE projections of stock biomass (B) for 2009-2011 under alternative assumptions for the future trend in fishery VTR CPUE indices (see text).

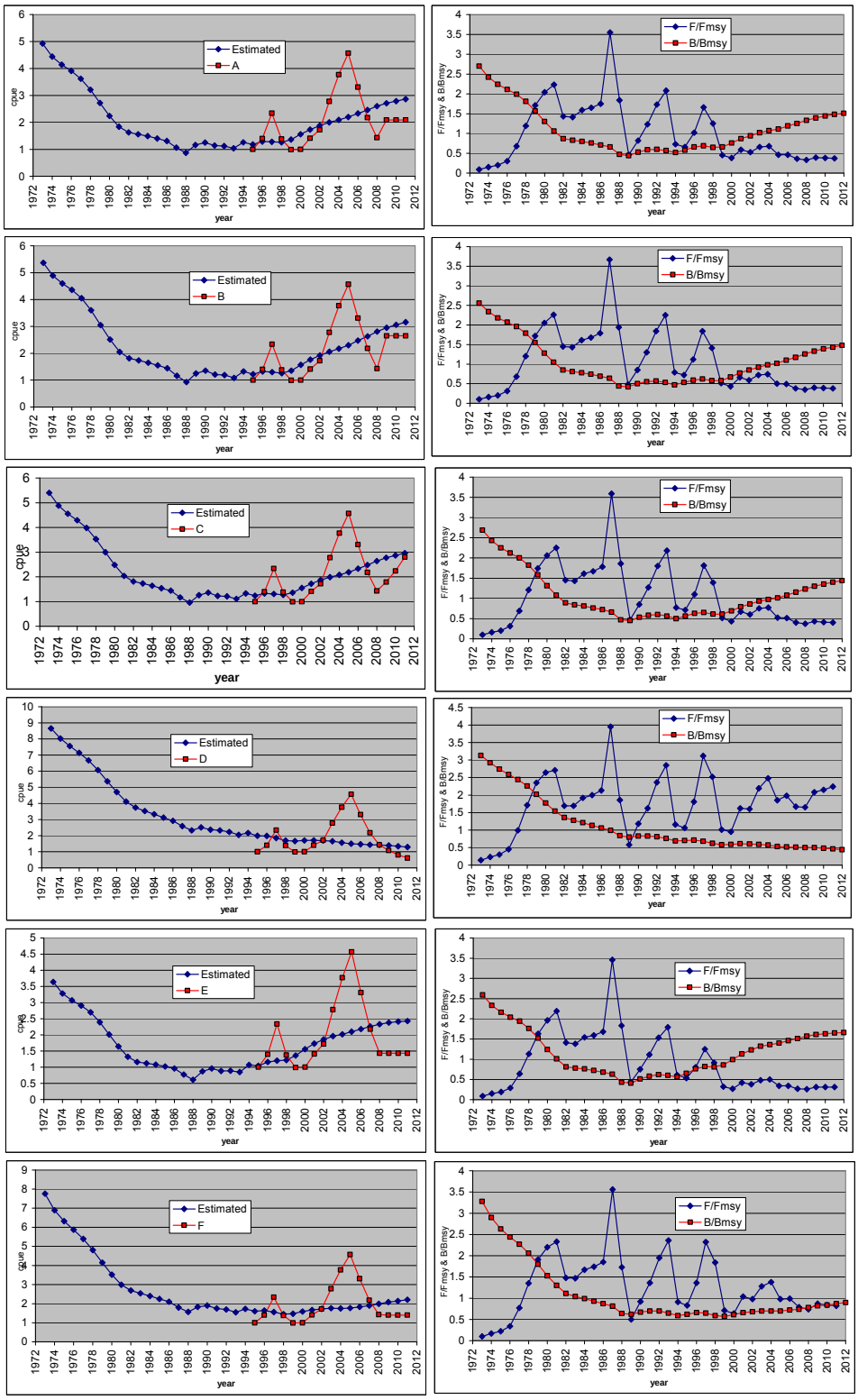


Figure A62. Sensitivity scenarios assuming a constant quota (905 mt) and different cpue estimates from 2009-2011.

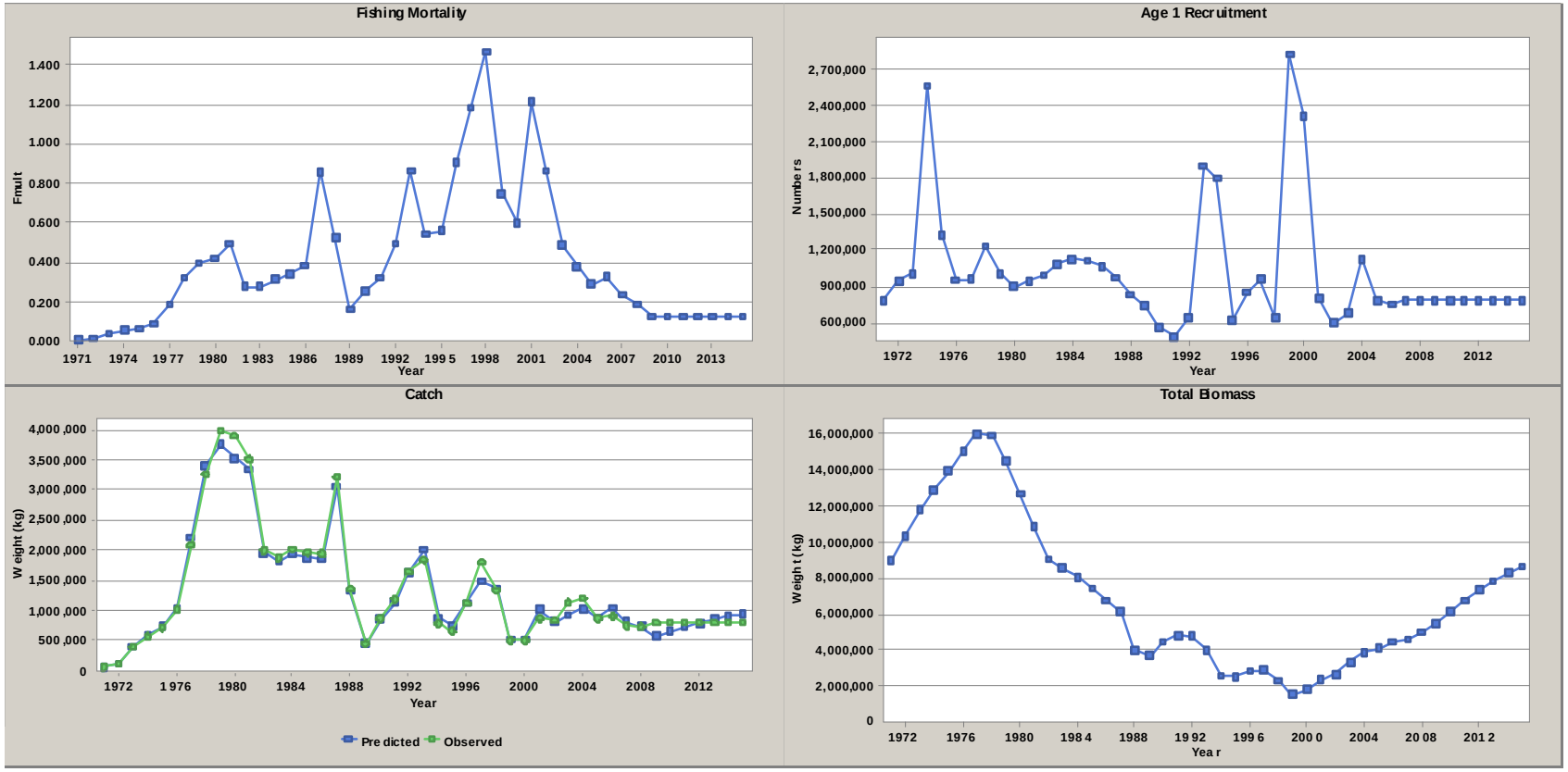


Figure A63. Example of a deterministic SCALE Projection Base run 1 assuming Fmsy=fmax=0.13 from 2009-2015.

Grouped Fmult, Age 1 Recruitment, Observed vs. Predicted Catch Weight, and Total Biomass

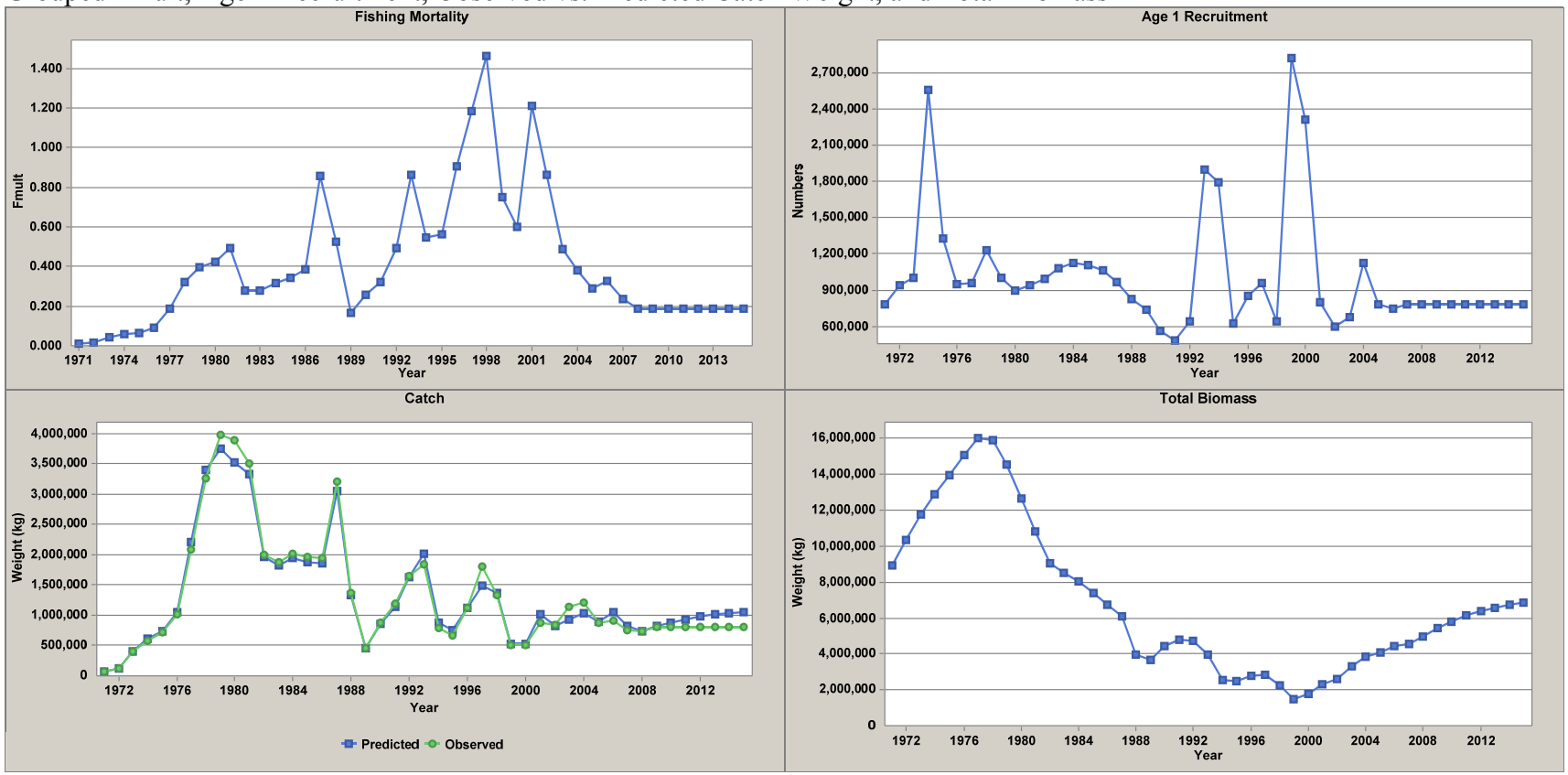


Figure A64. Example of a deterministic SCALE Projection Base run 1 assuming F2008 = 0.19 from 2009-2015.

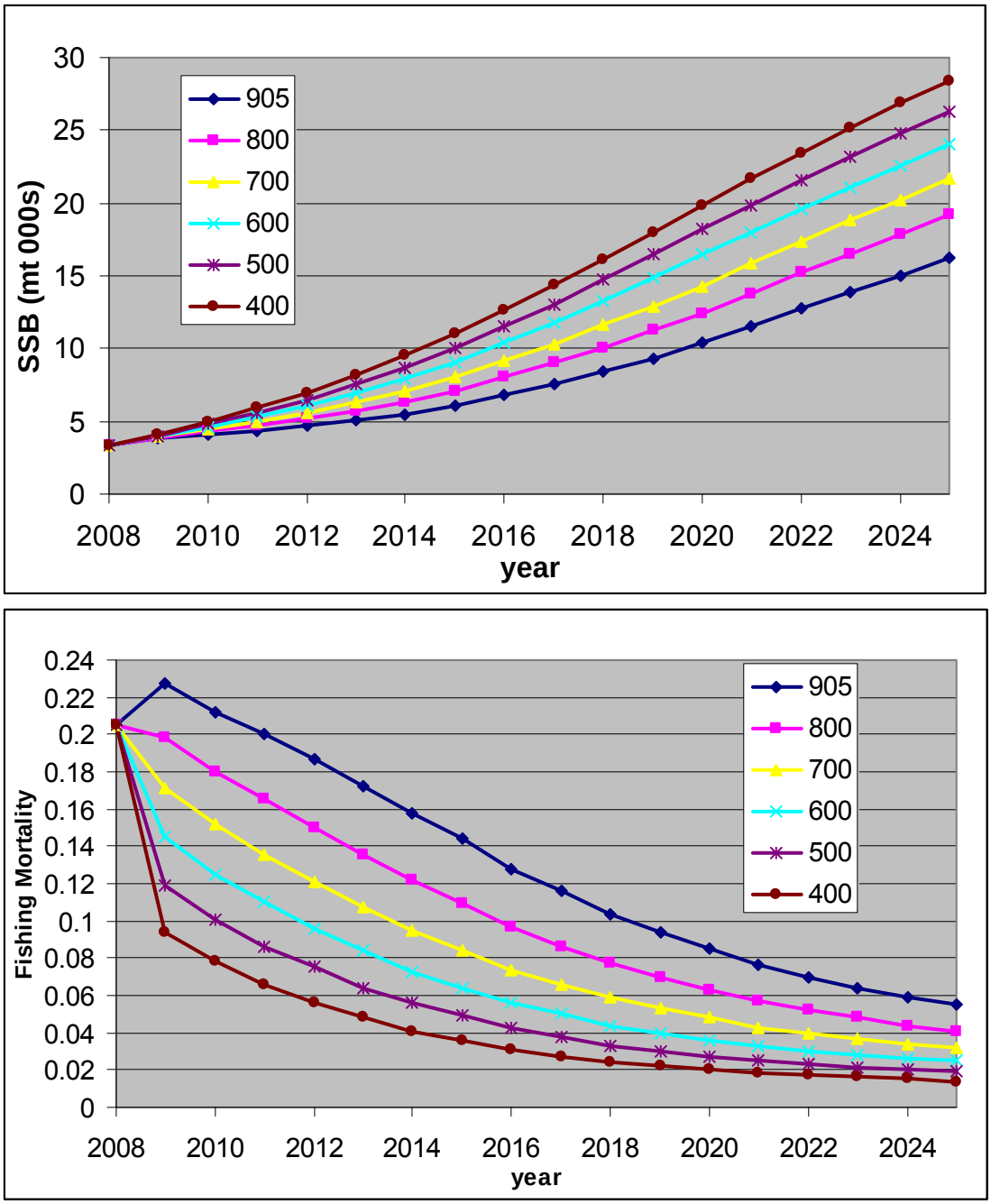


Figure A65. Comparison of SSB and F from Agepro projections for run 2 assuming different constant quotas using the CDF of recruitment from 1971-2008. Note a constant quota no higher than 500 mt is needed to reduce F to Fmax (0.12) in 2009.