

## Scup; Figures

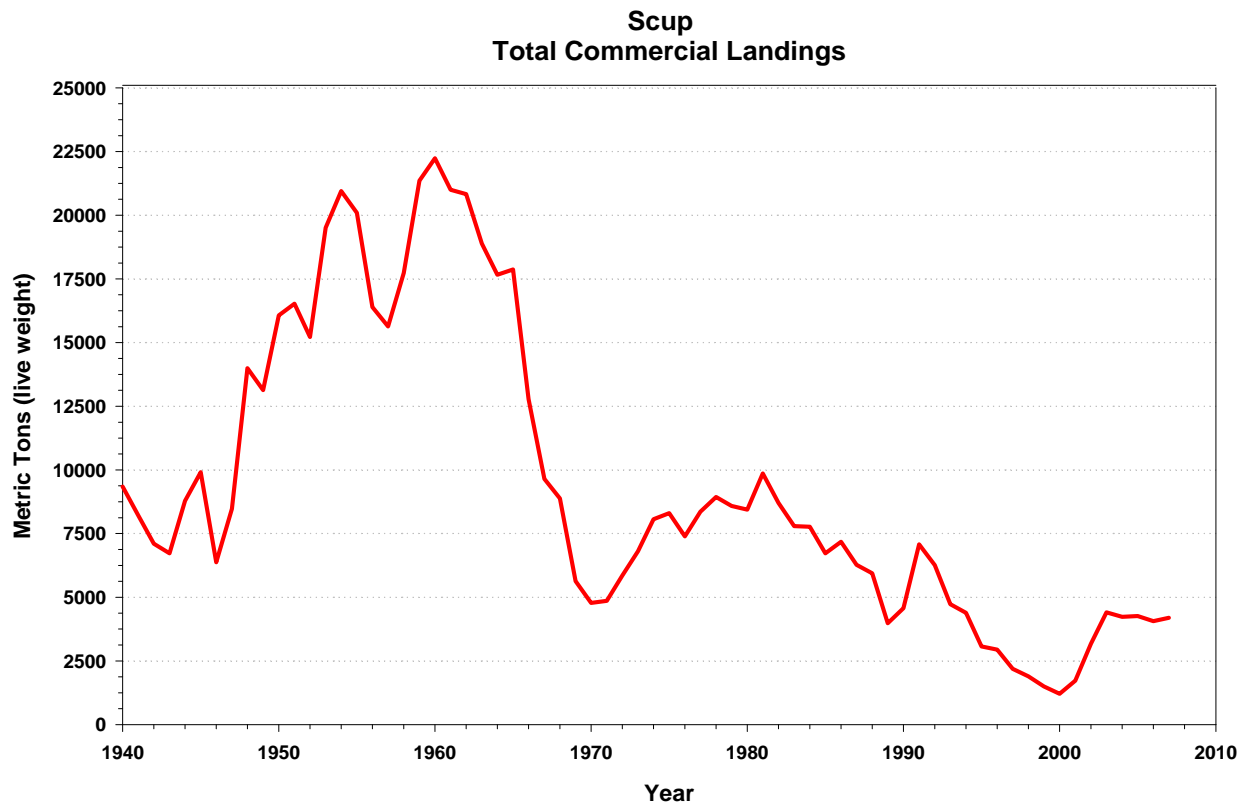


Figure 1. Total commercial fishery landings for scup.

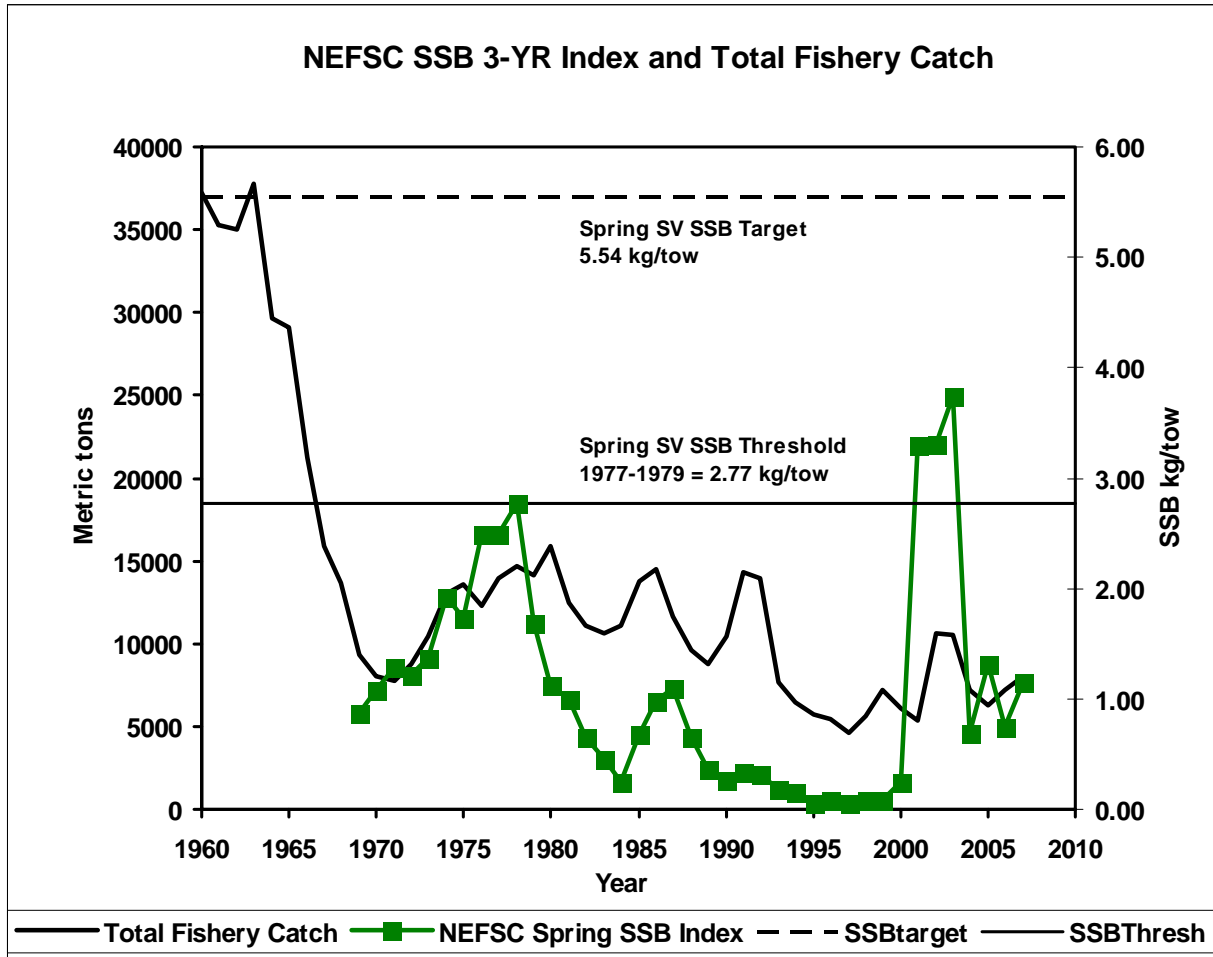


Figure 2. NEFSC Spring survey indices of scup spawning stock biomass per tow (SSB kg/tow) used as proxy target and threshold biomass Biological Reference Points.

# Commercial Fishery Landings by Age

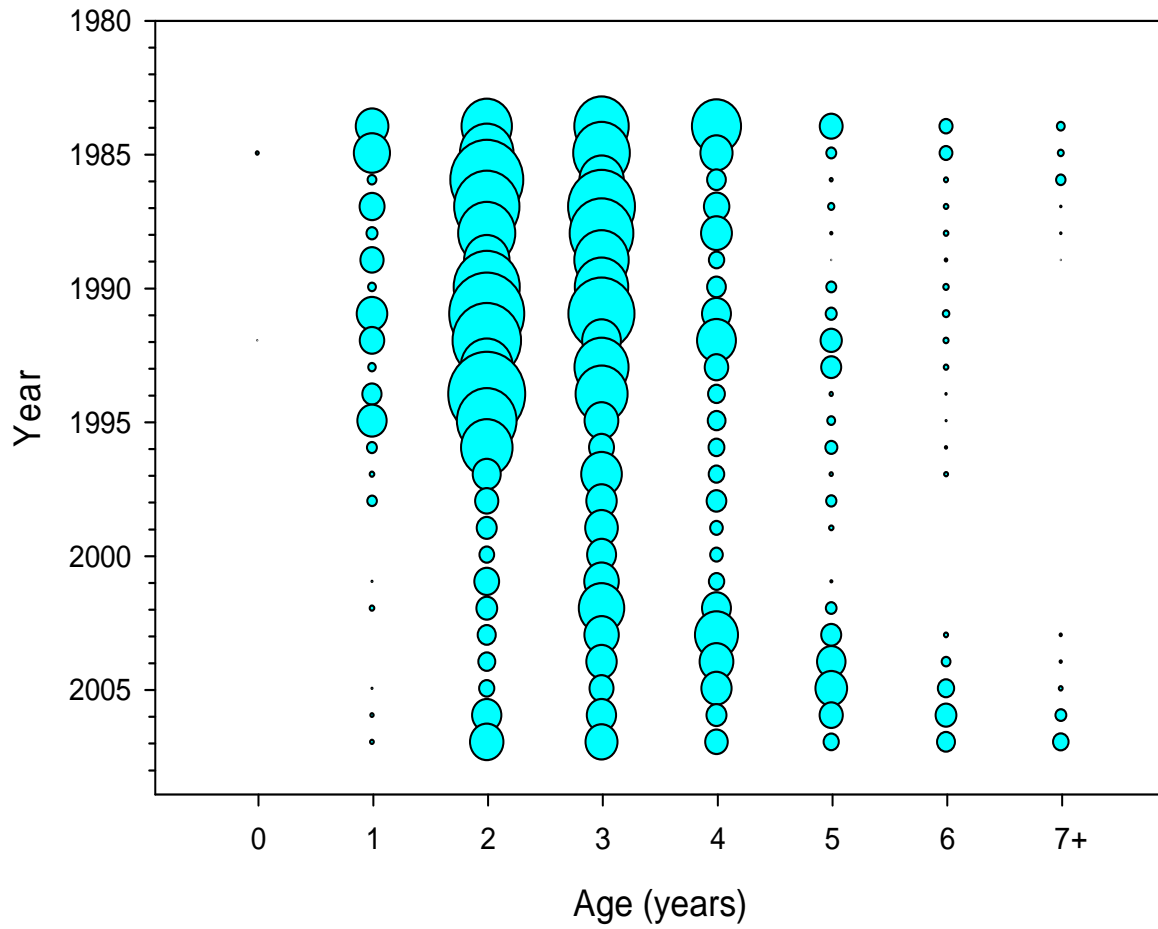


Figure 3. Commercial fishery landings by age for scup.

# Commercial Fishery Discards by Age

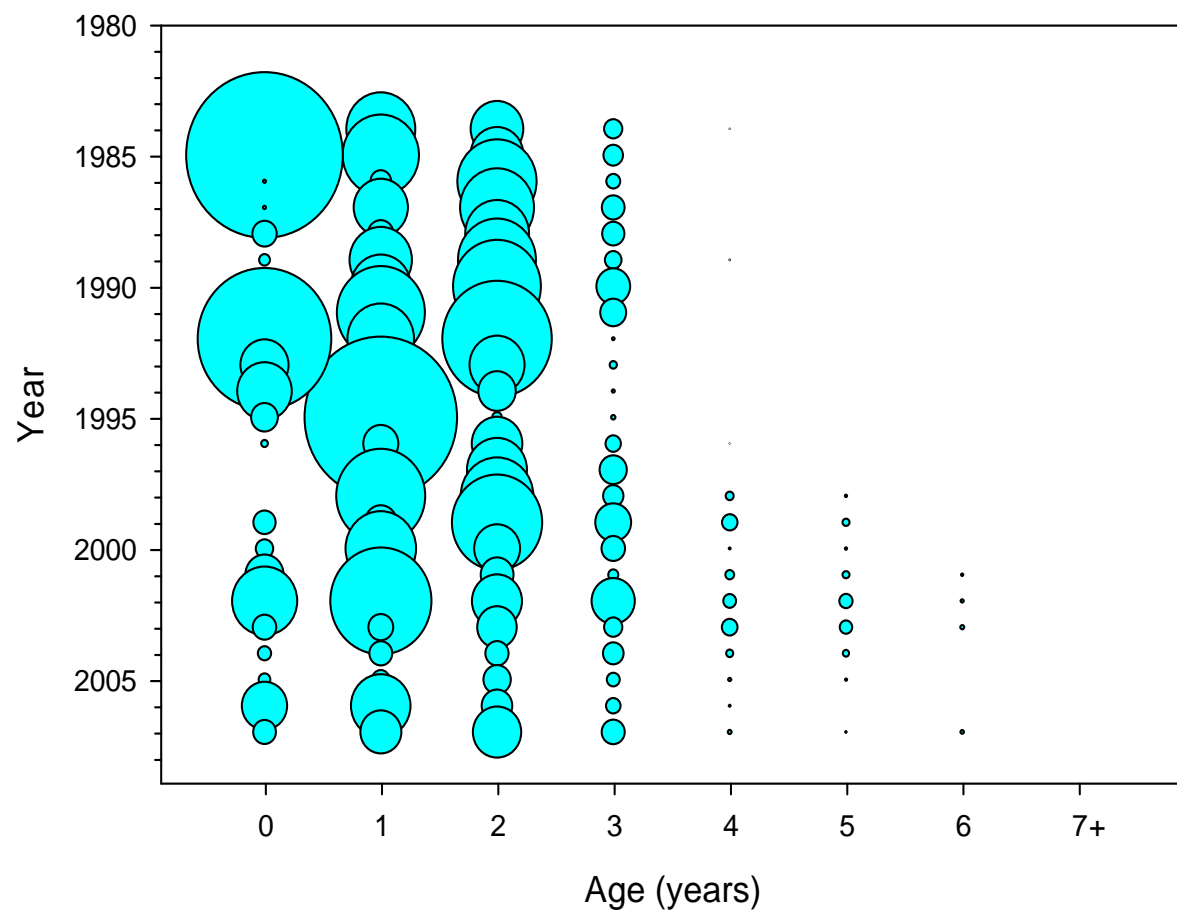


Figure 4. Commercial fishery discards by age for scup.

## Recreational Fishery Landings by Age

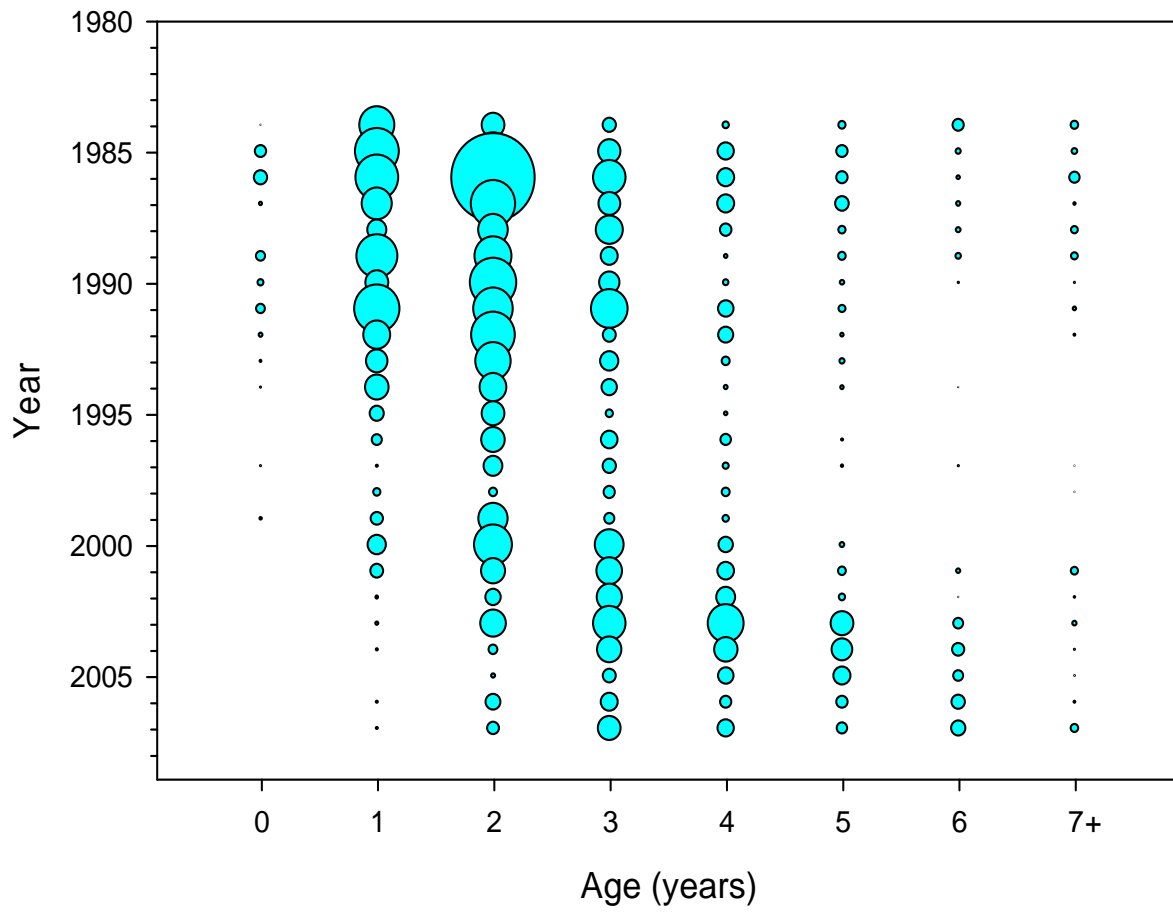


Figure 5. Recreational fishery landings by age for scup.

## Recreational Fishery Discards by Age

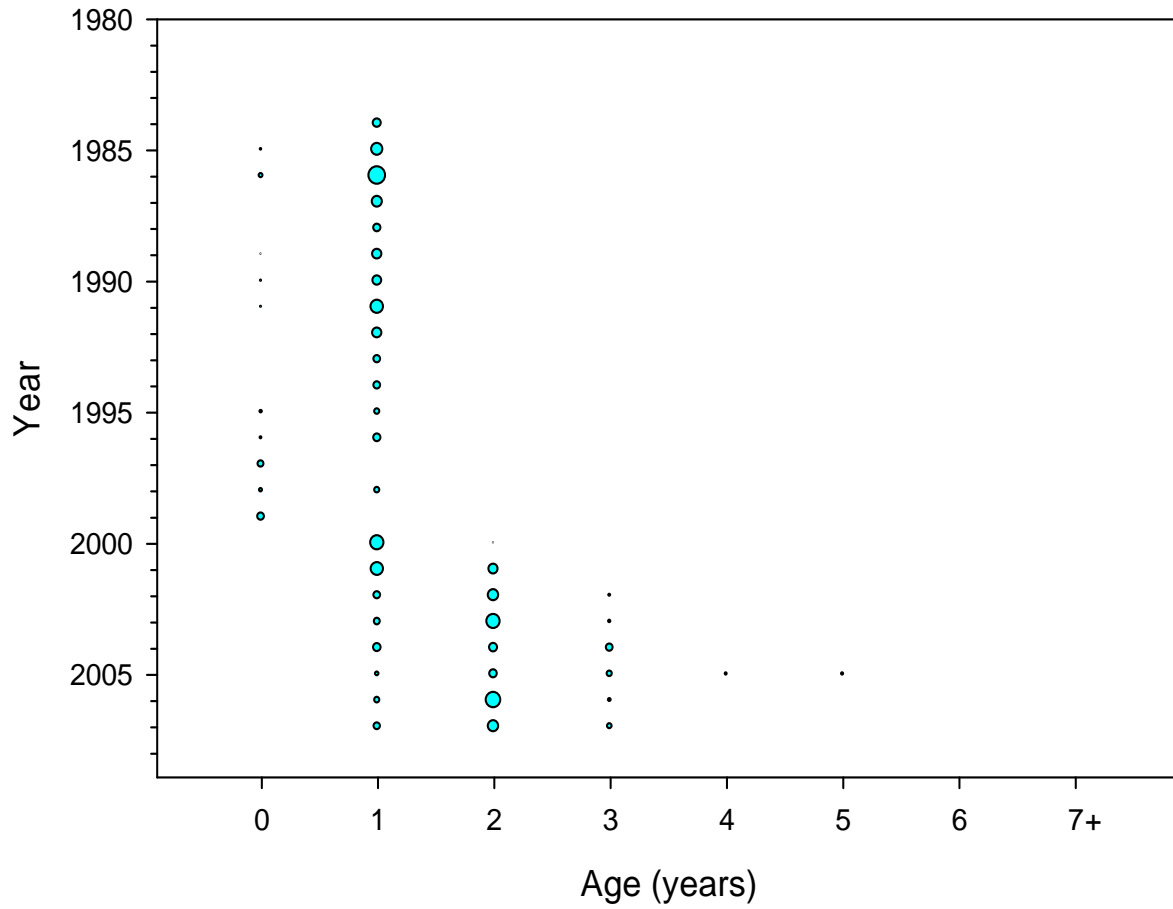


Figure 6. Recreational fishery discards by age for scup.

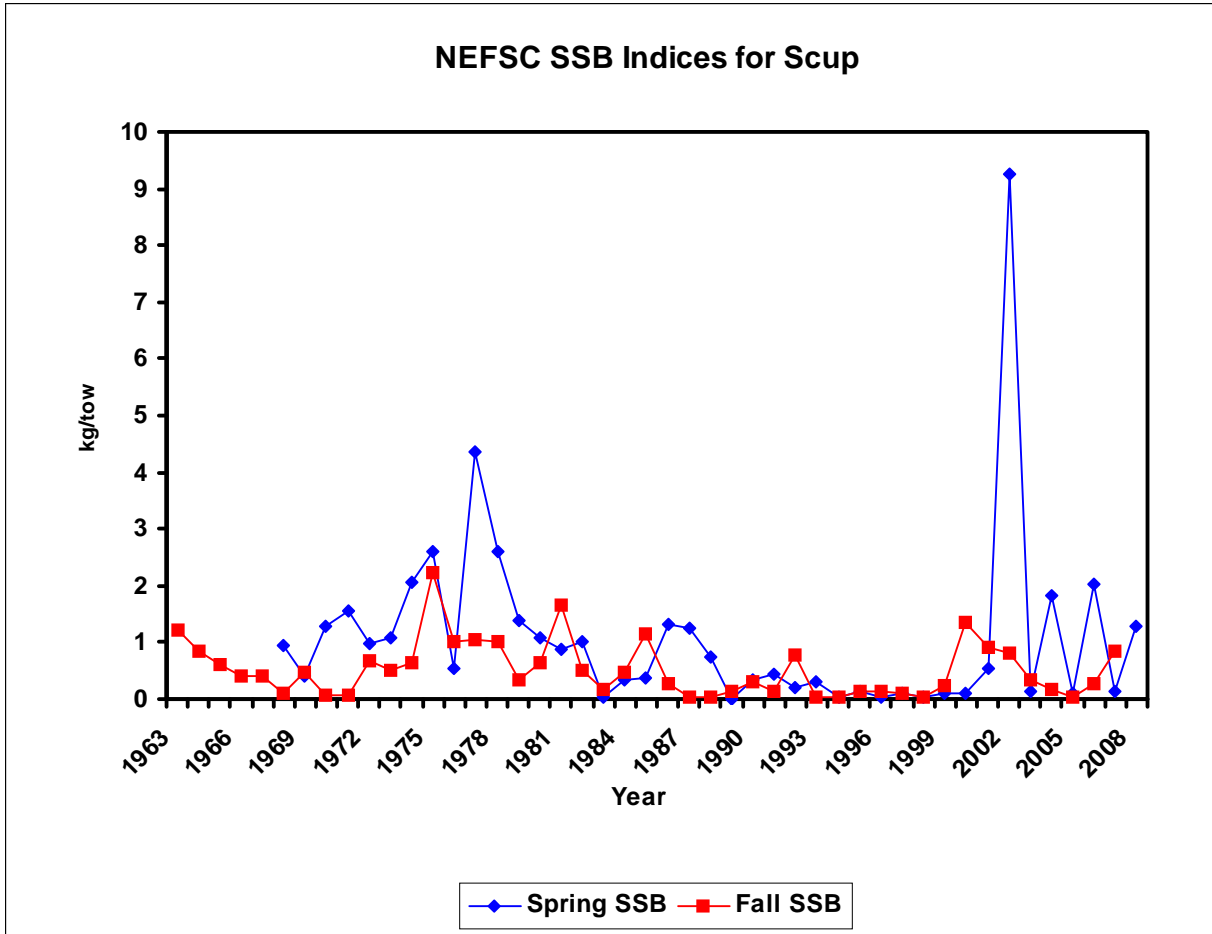


Figure 7. NEFSC spring and fall annual SSB indices for scup.

# NEFSC Spring Survey Indices by Age

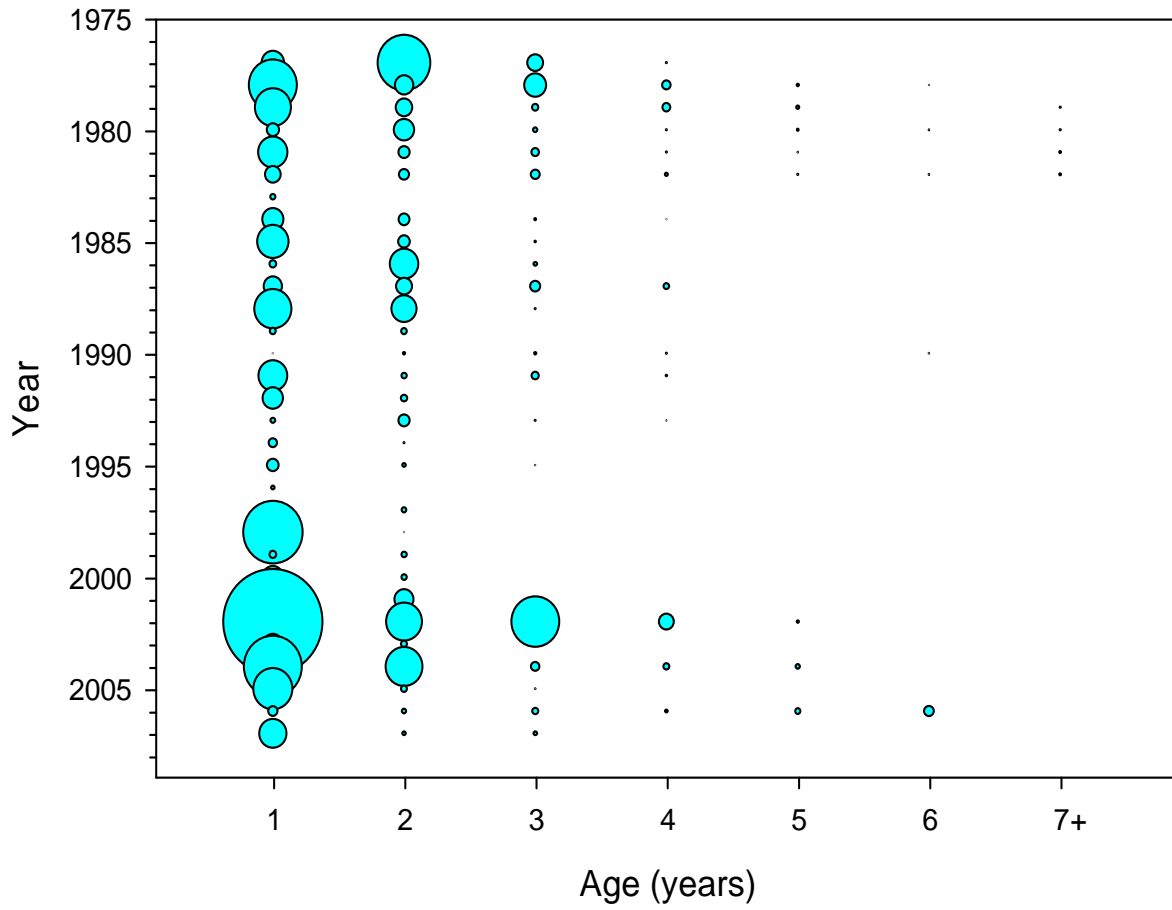


Figure 8. NEFSC Spring survey indices by age for scup.



# NEFSC Fall Survey Indices by Age

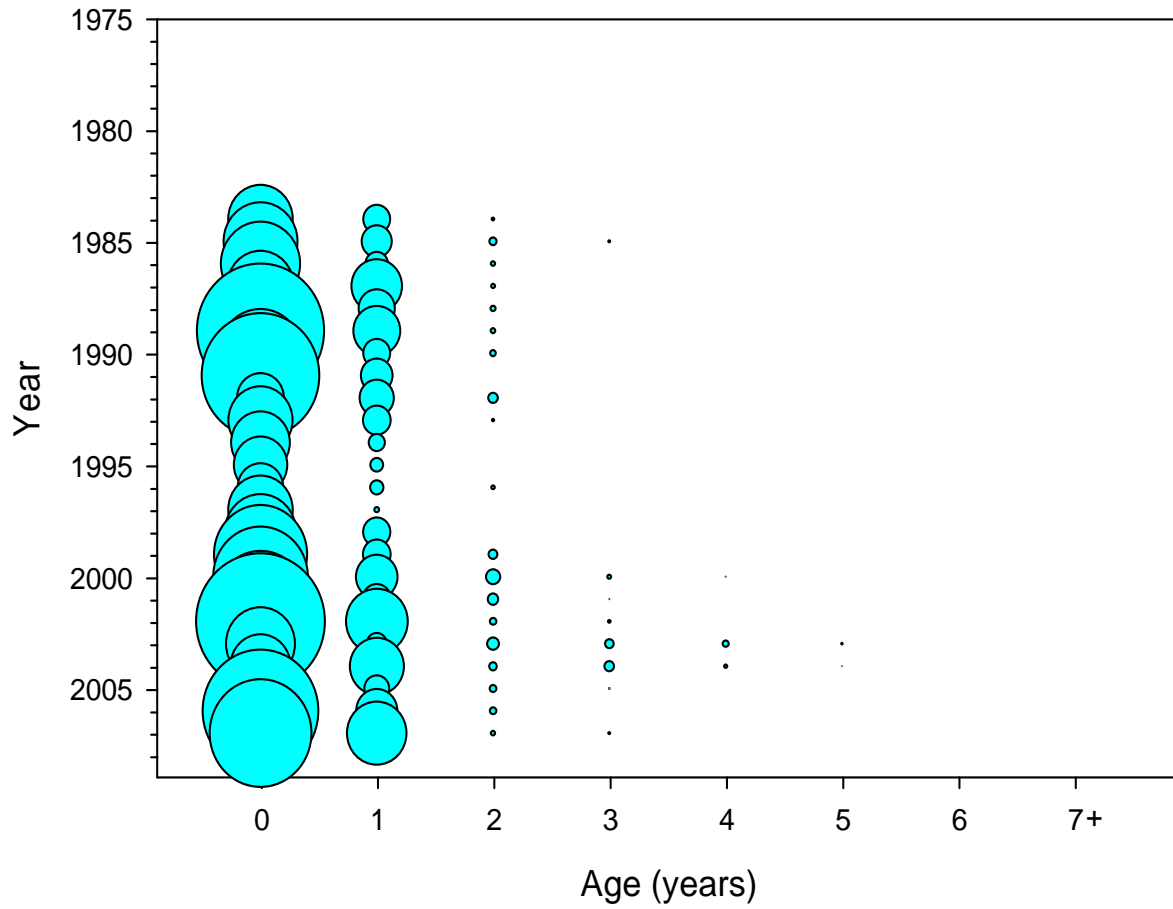


Figure 9. NEFSC Fall survey indices by age for scup.

# NEFSC Winter Survey Indices by Age

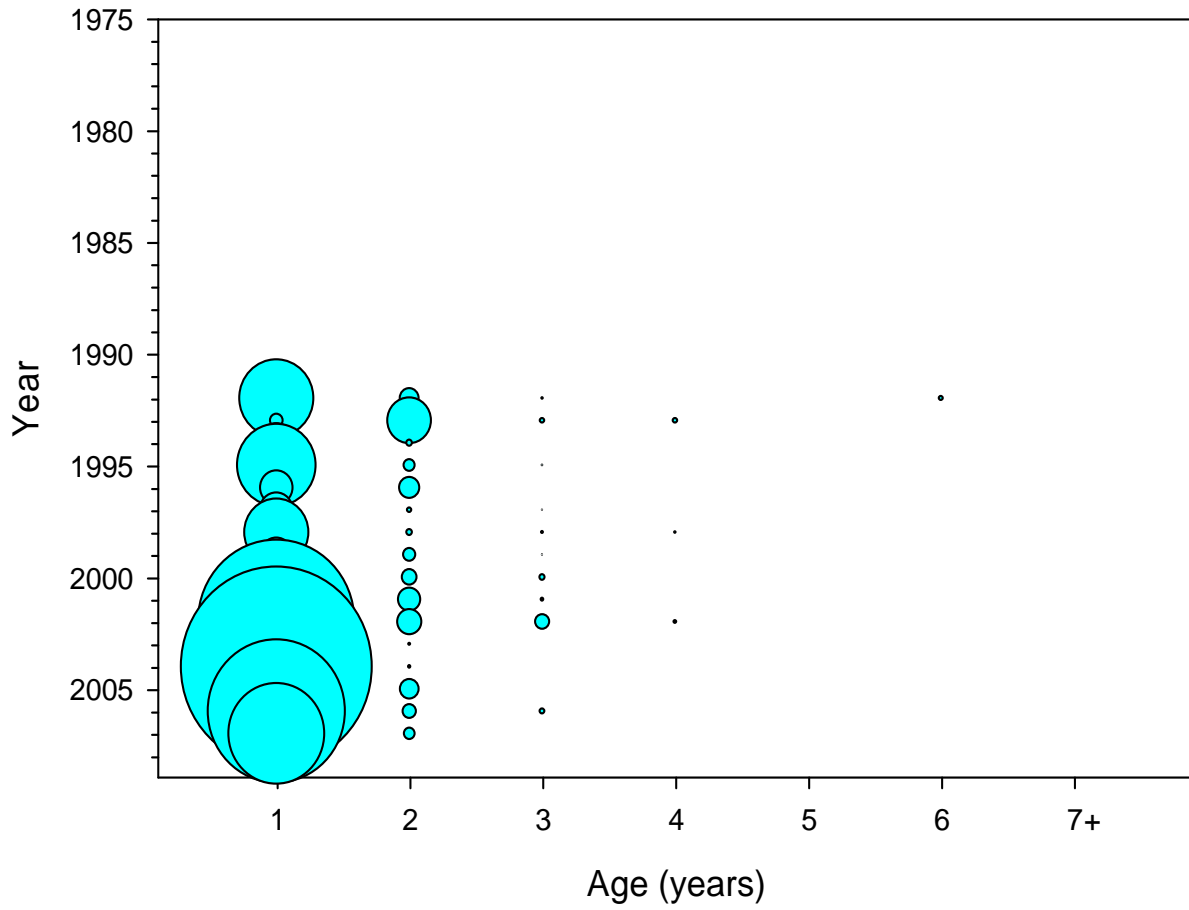


Figure 10. NEFSC Winter survey indices by age for scup.

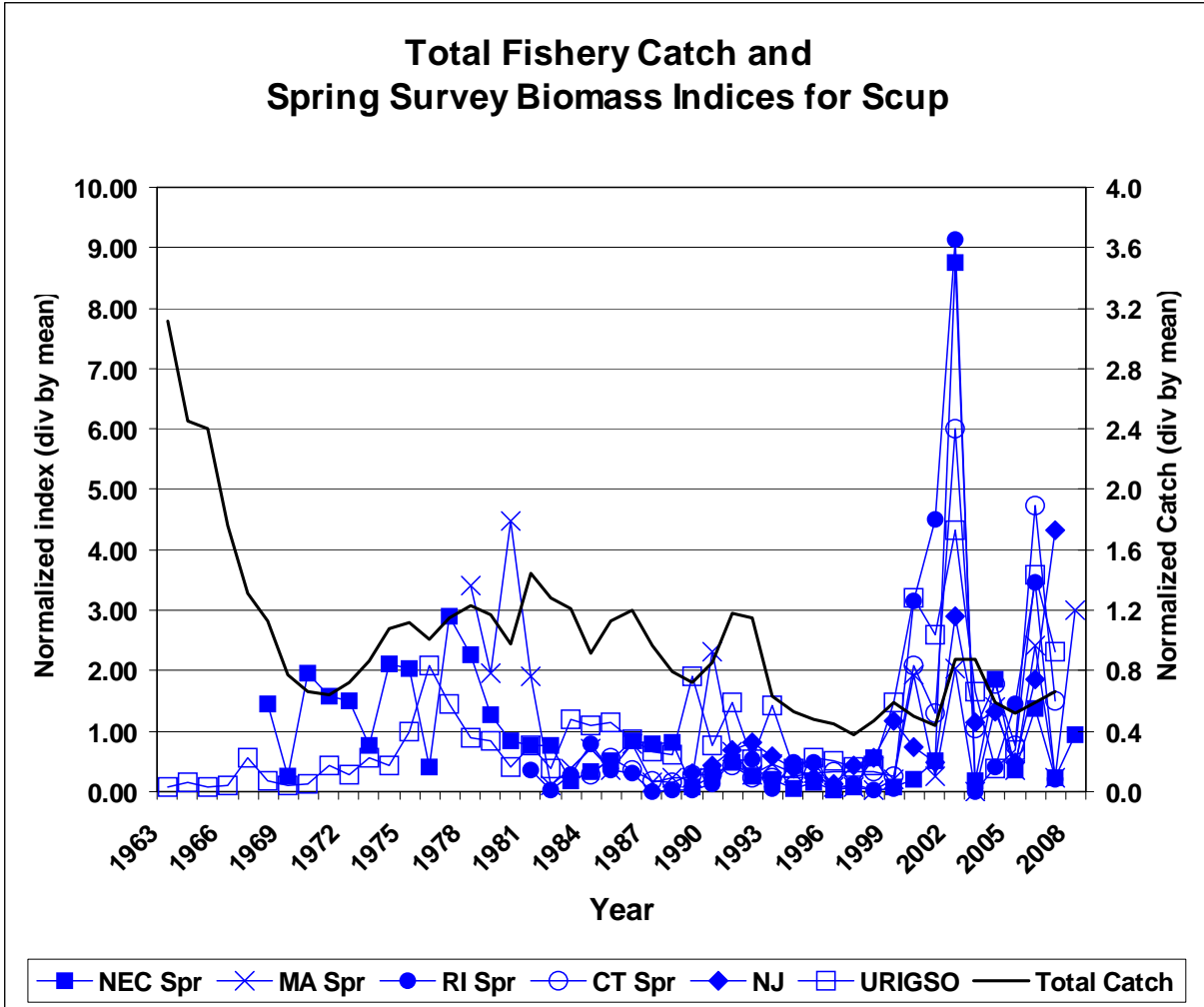


Figure 11. Research survey indices for scup: Spring

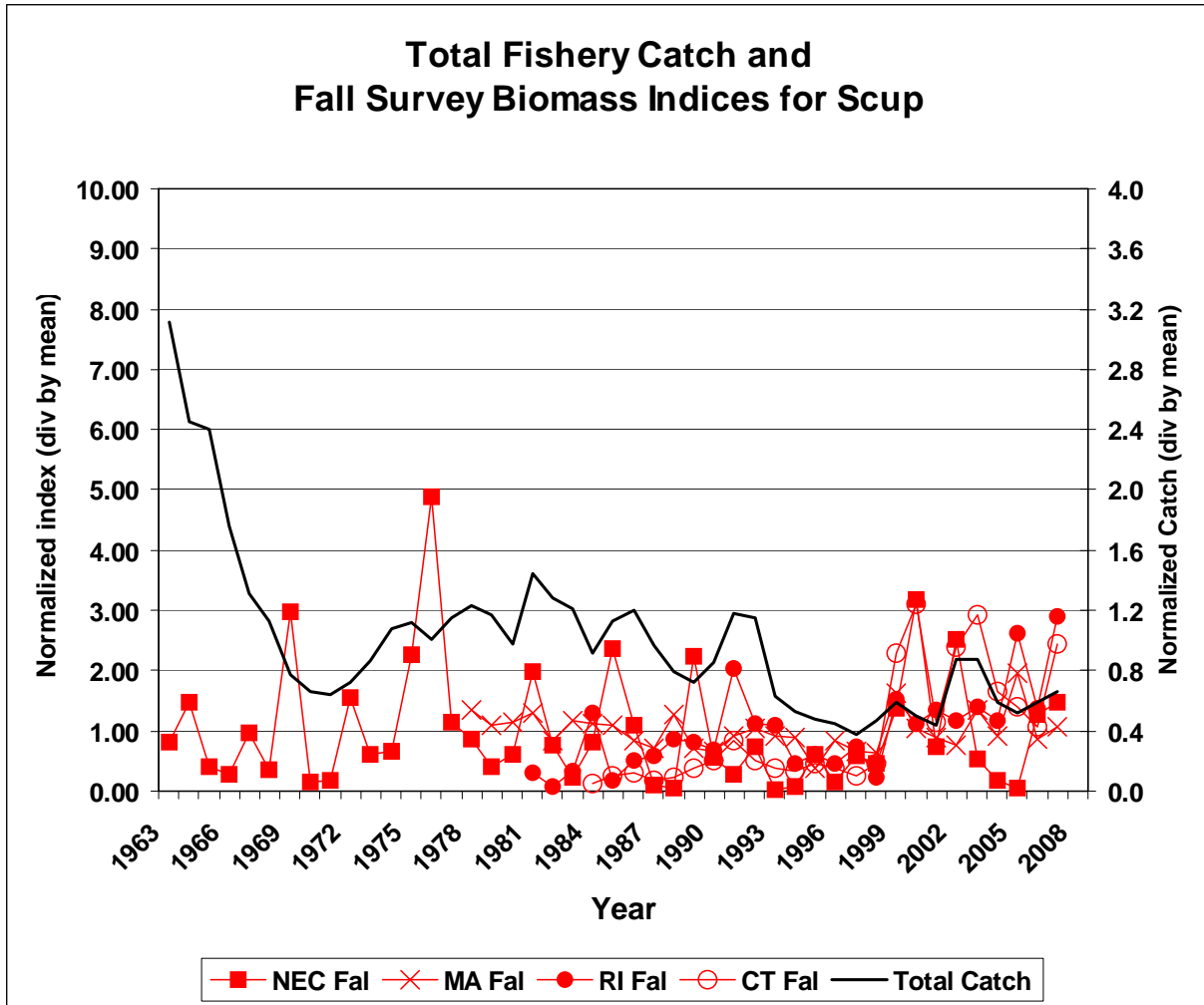


Figure 12. Research survey indices for scup: Fall

### CTDEP Spring Survey Indices by Age

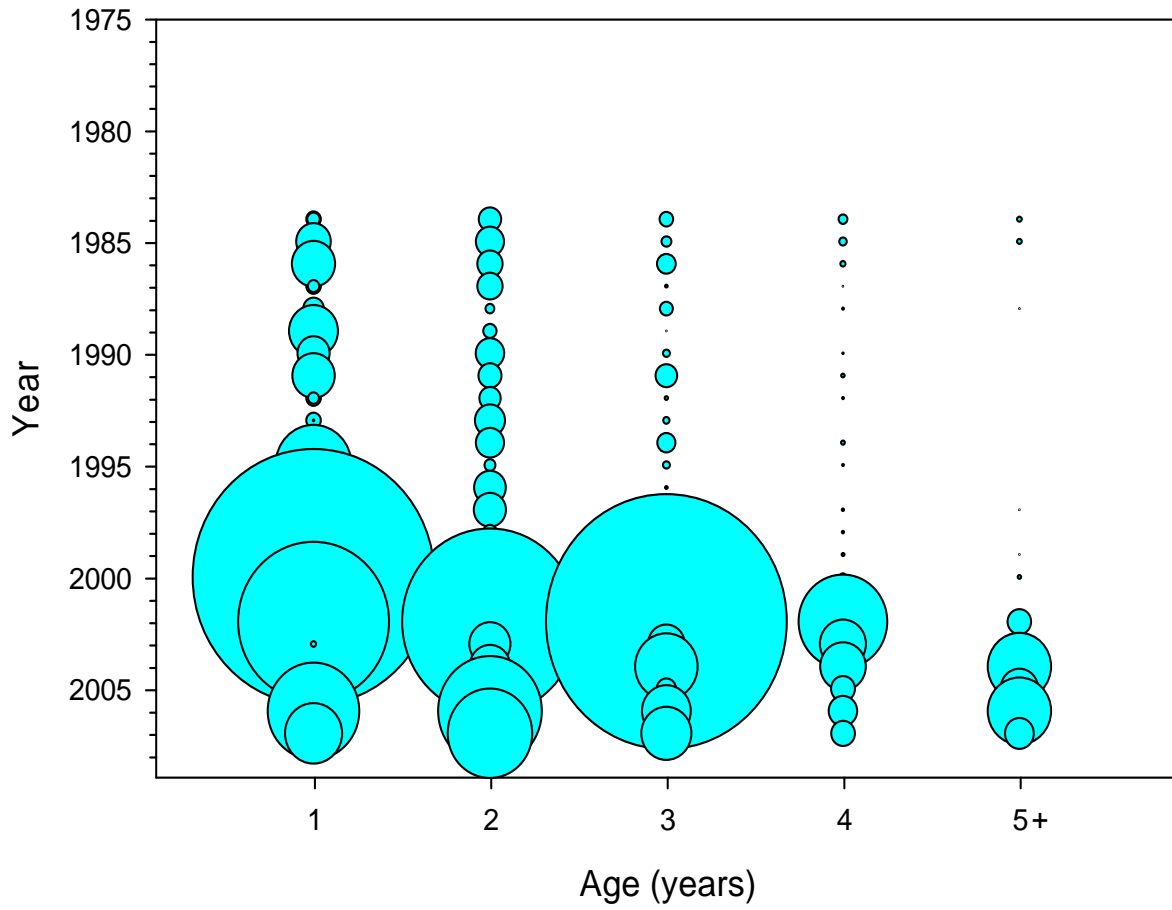


Figure 13. CTDEP Spring survey indices by age for scup.

# CTDEP Fall Survey Indices by Age

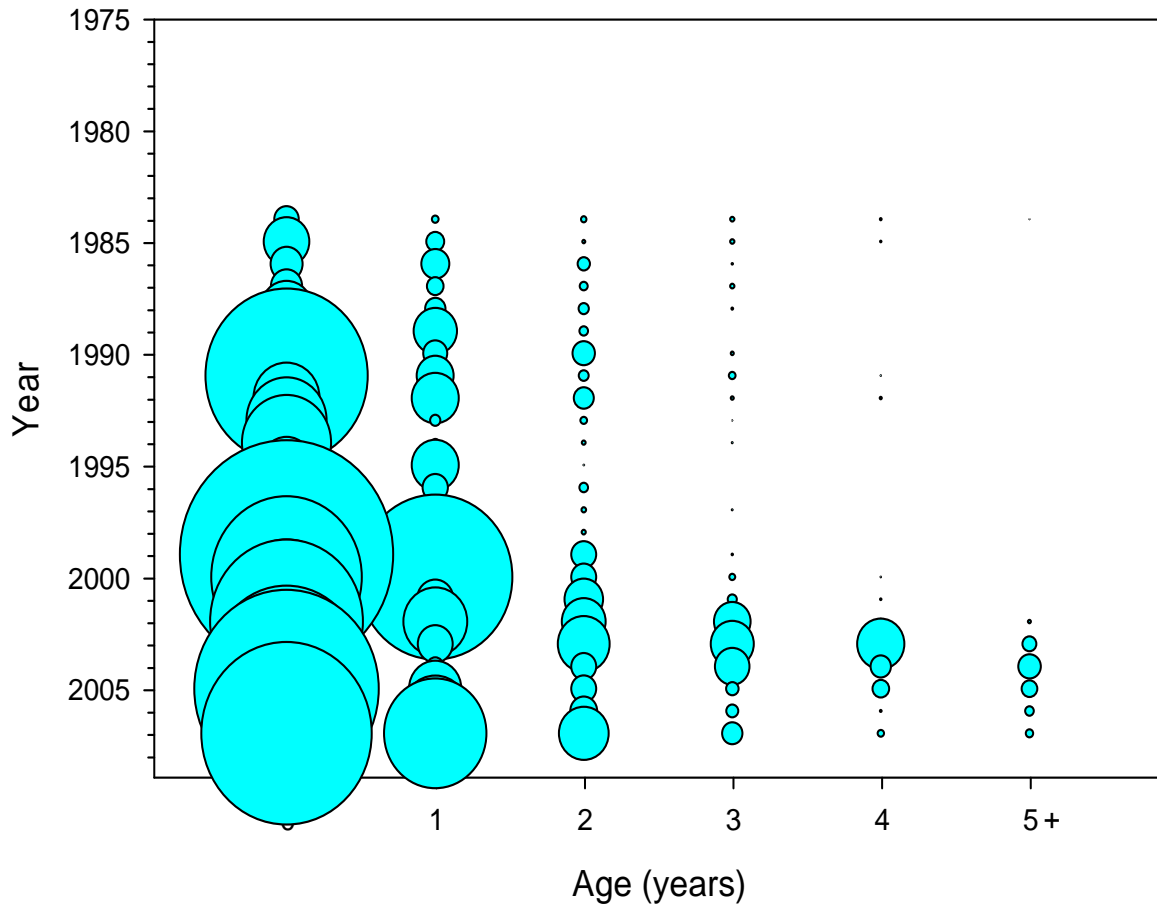


Figure 14. CTDEP Fall survey indices by age for scup.

# NYDEC Survey Indices by Age

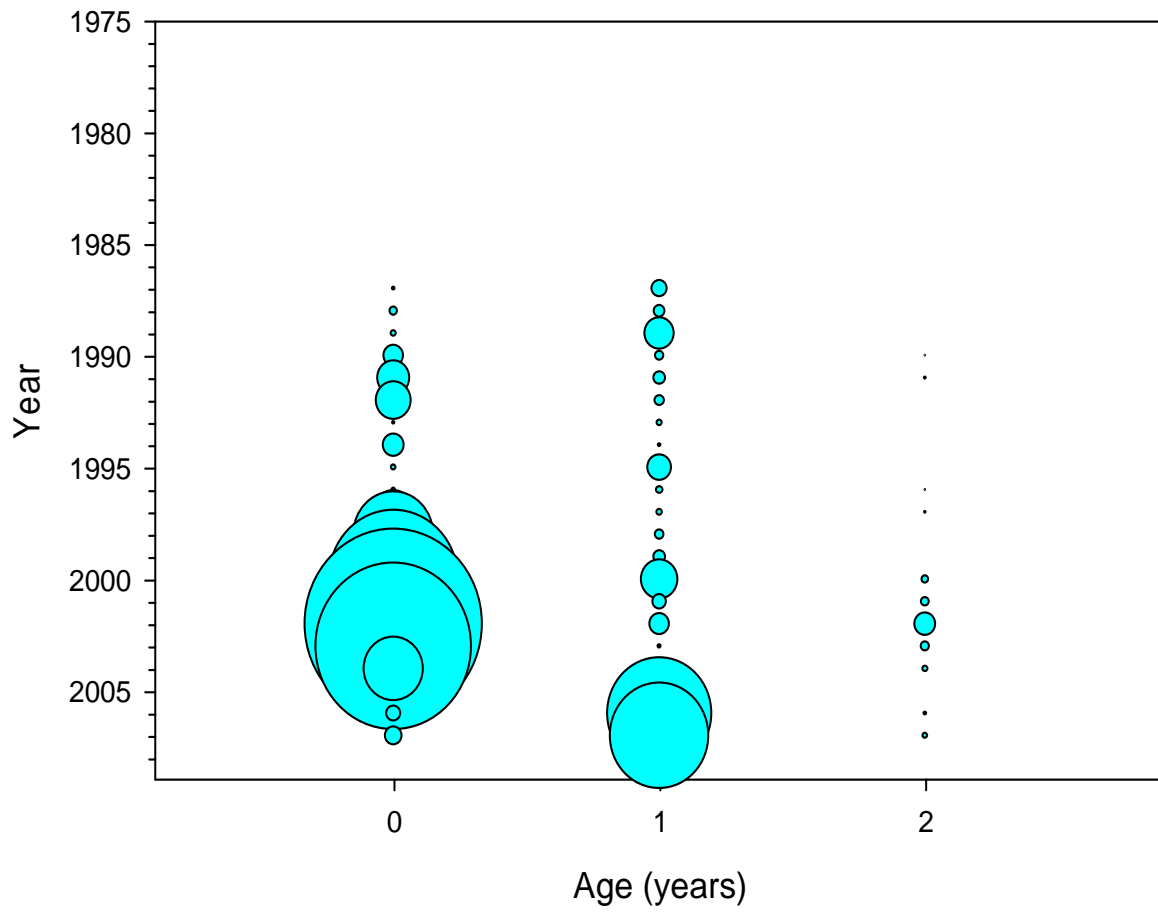


Figure 15. NYDEC survey indices by age for scup.

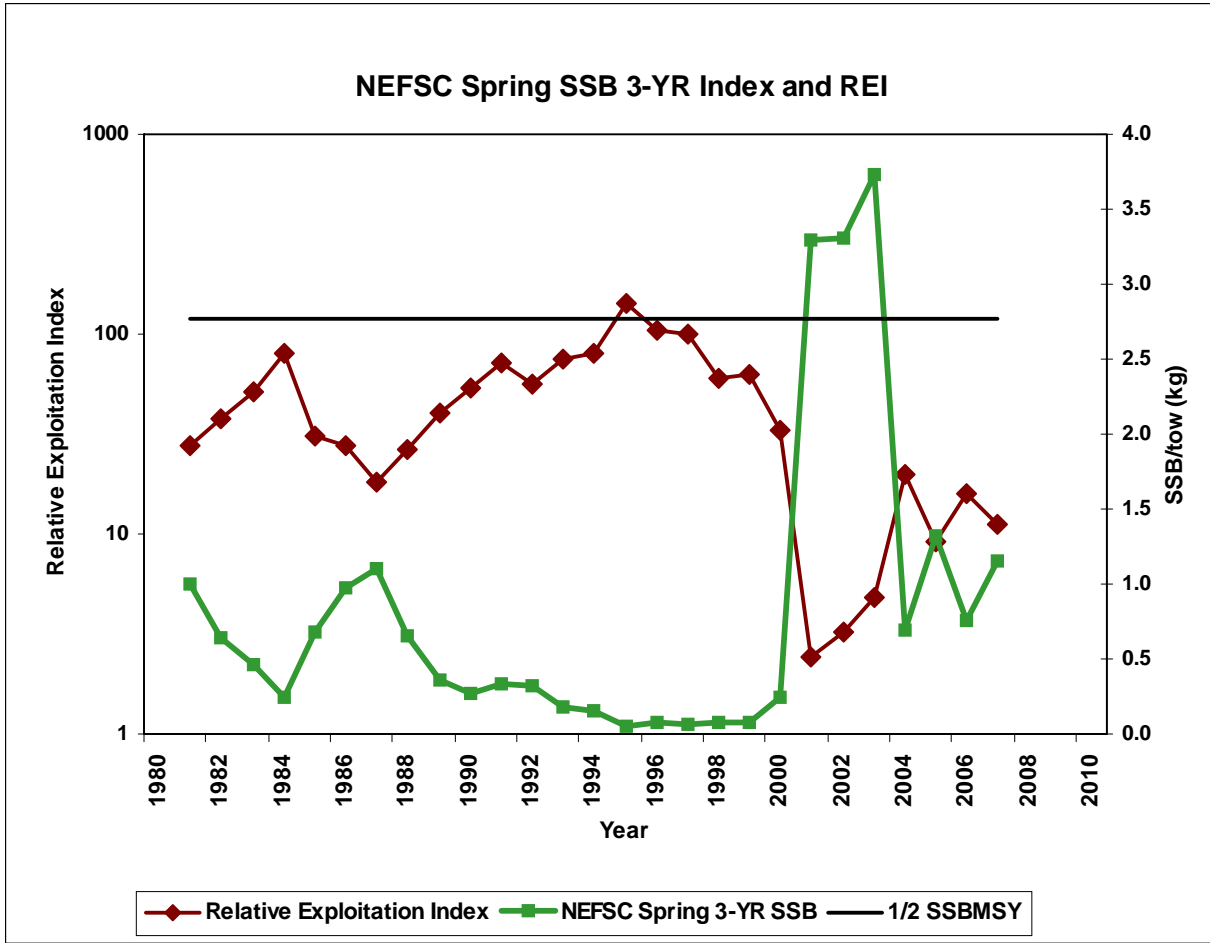


Figure 16. NEFSC Spring survey 3-year average SSB index (biomass metric) and Relative Exploitation Index (REI; fishing mortality rate metric).



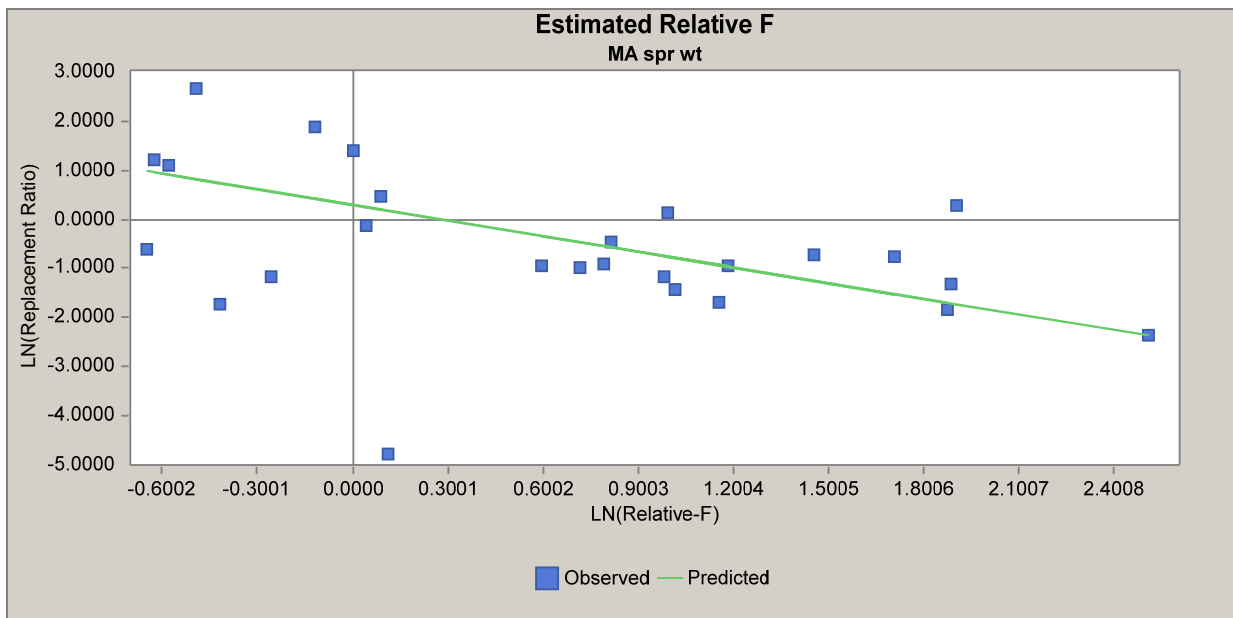
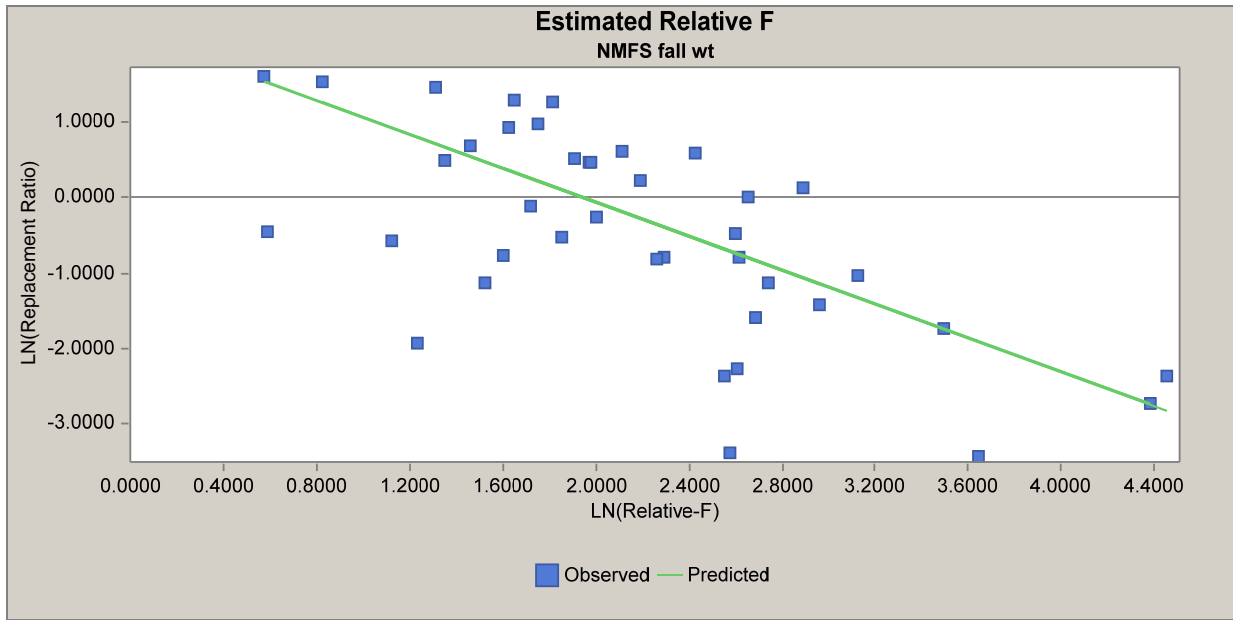


Figure 17. AIM relative F results for the NEFSC Fall and MADMF Spring survey indices.

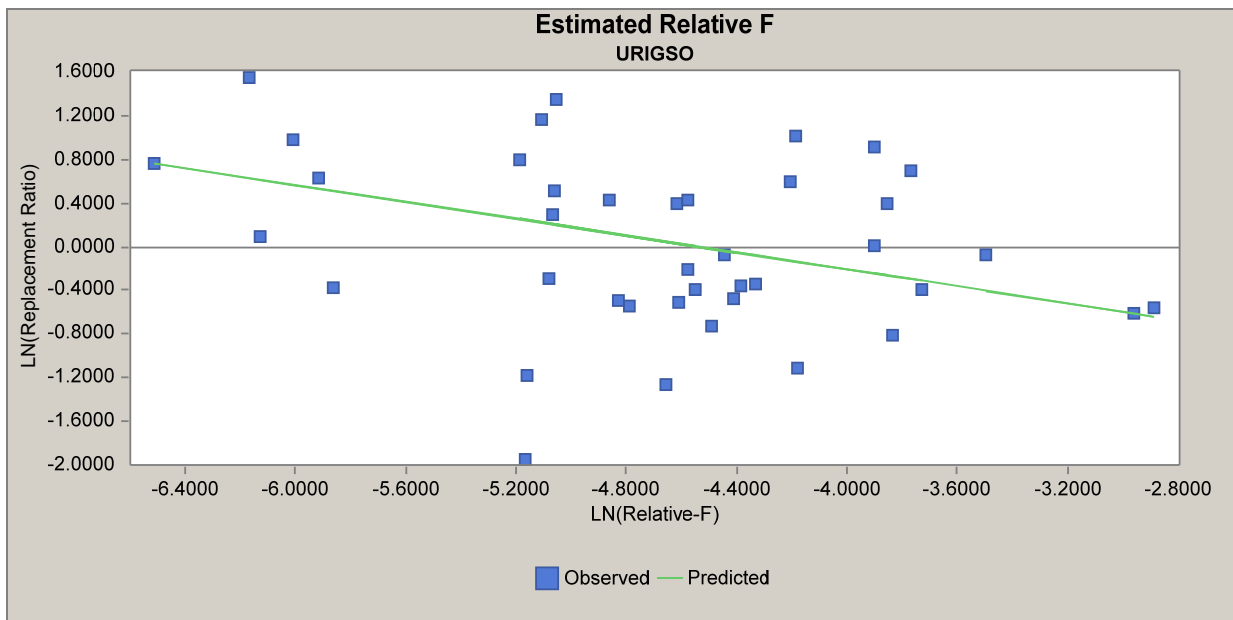
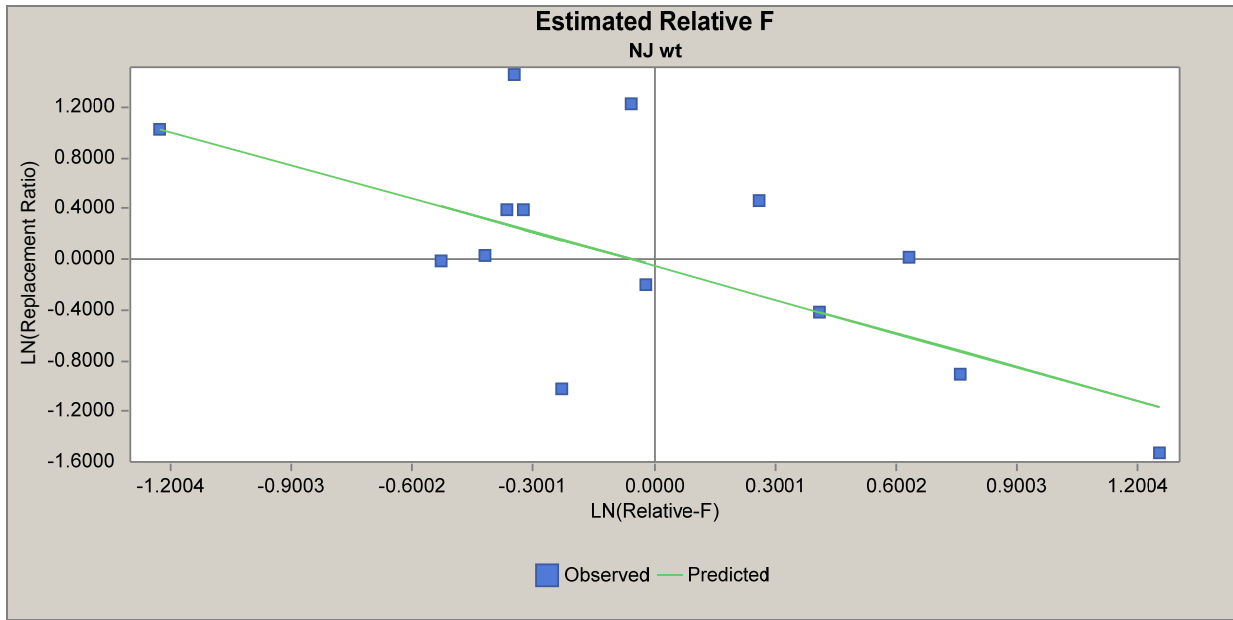


Figure 18. AIM relative F results for the NJBMF Annual and URIGSO indices.

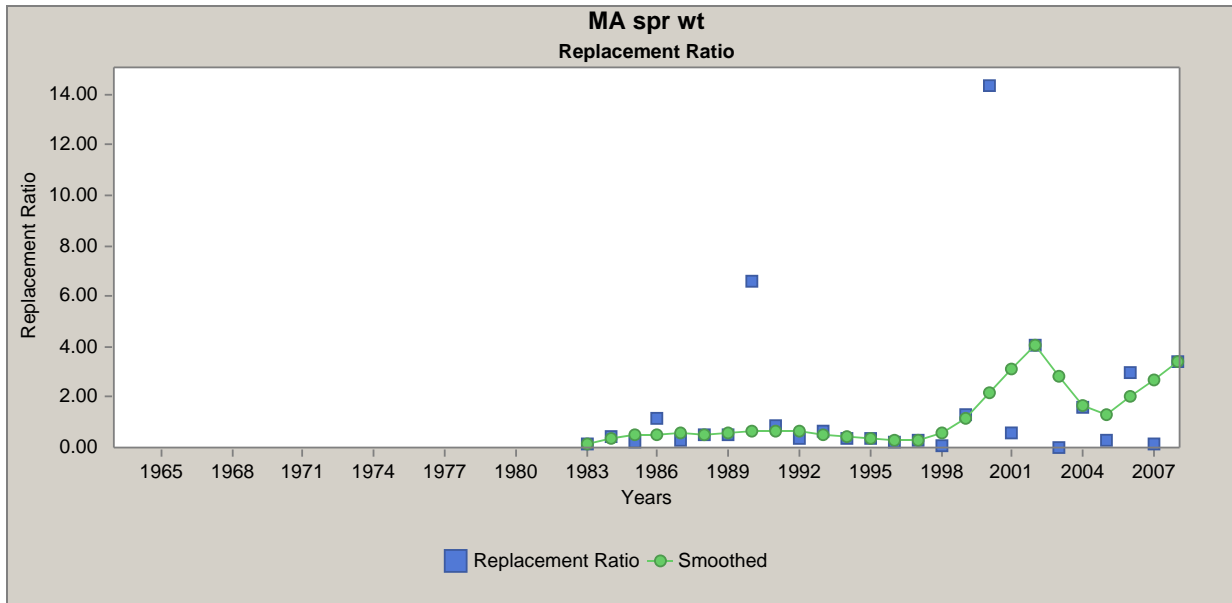
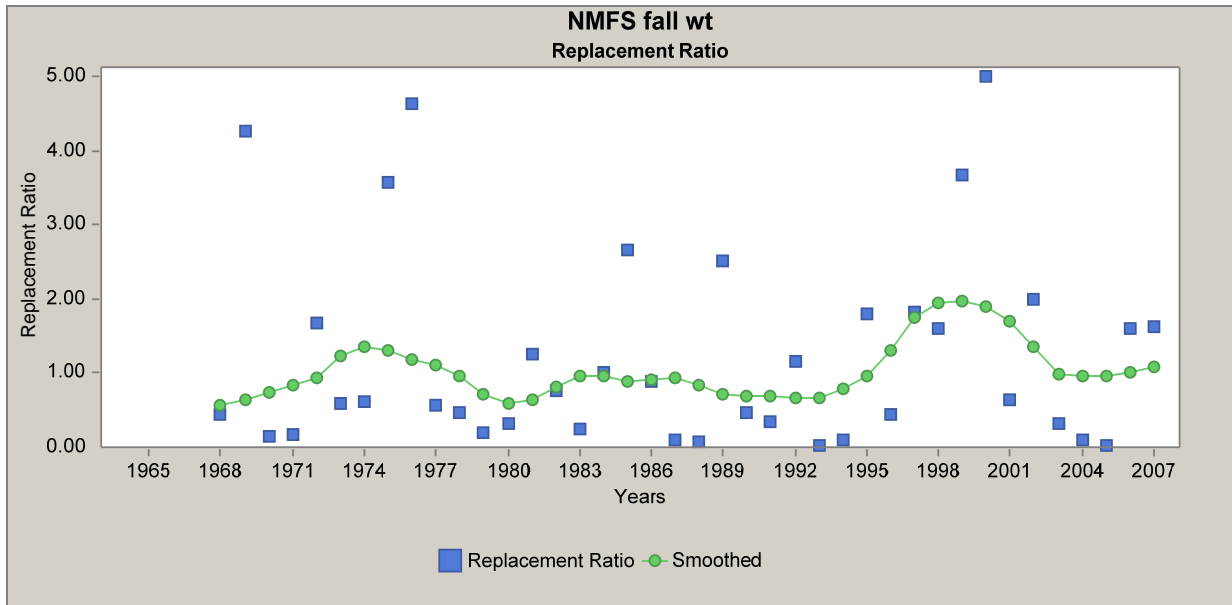


Figure 19. AIM replacement ratio results for NEFSC Fall and MADMF Spring indices.

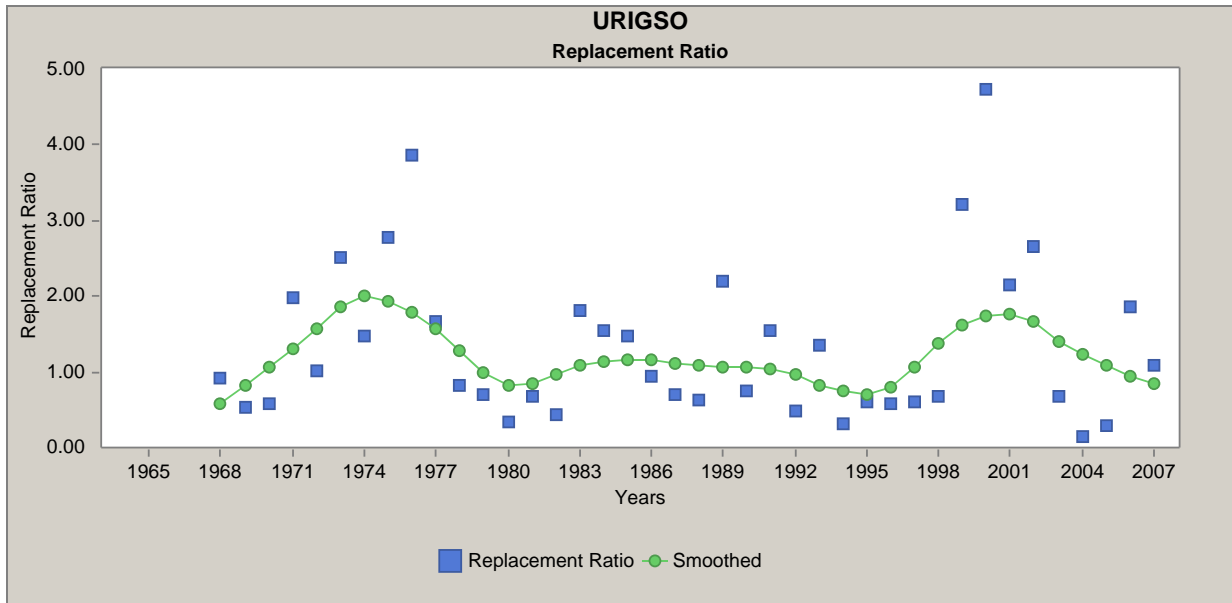
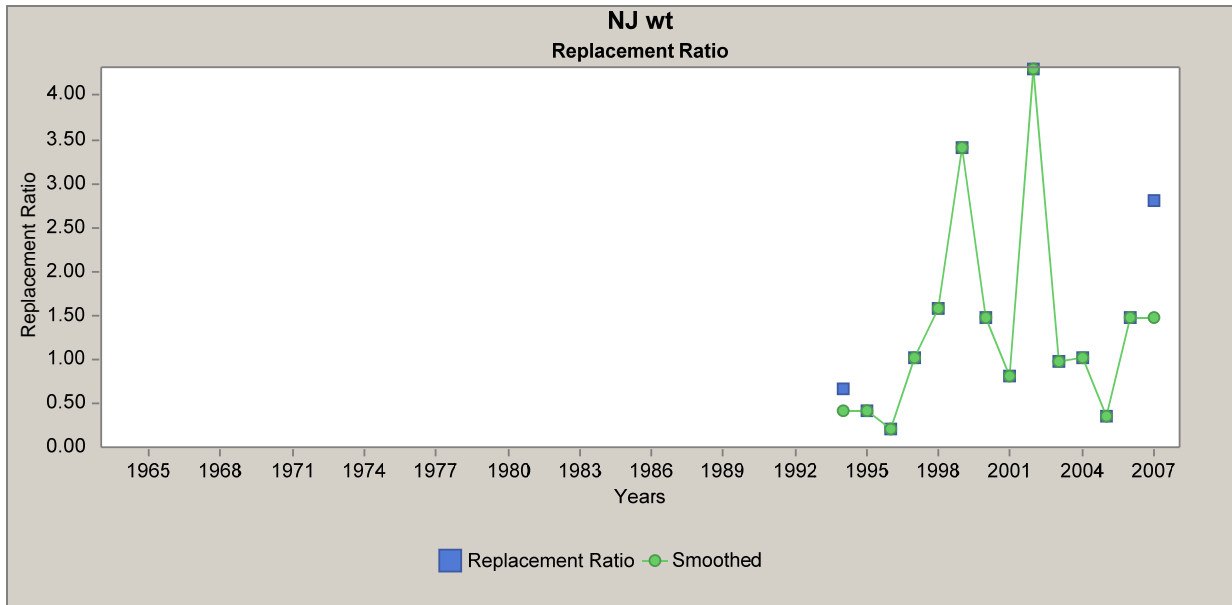


Figure 20. AIM replacement ratio results for NJBMF Annual and URIGSO indices.

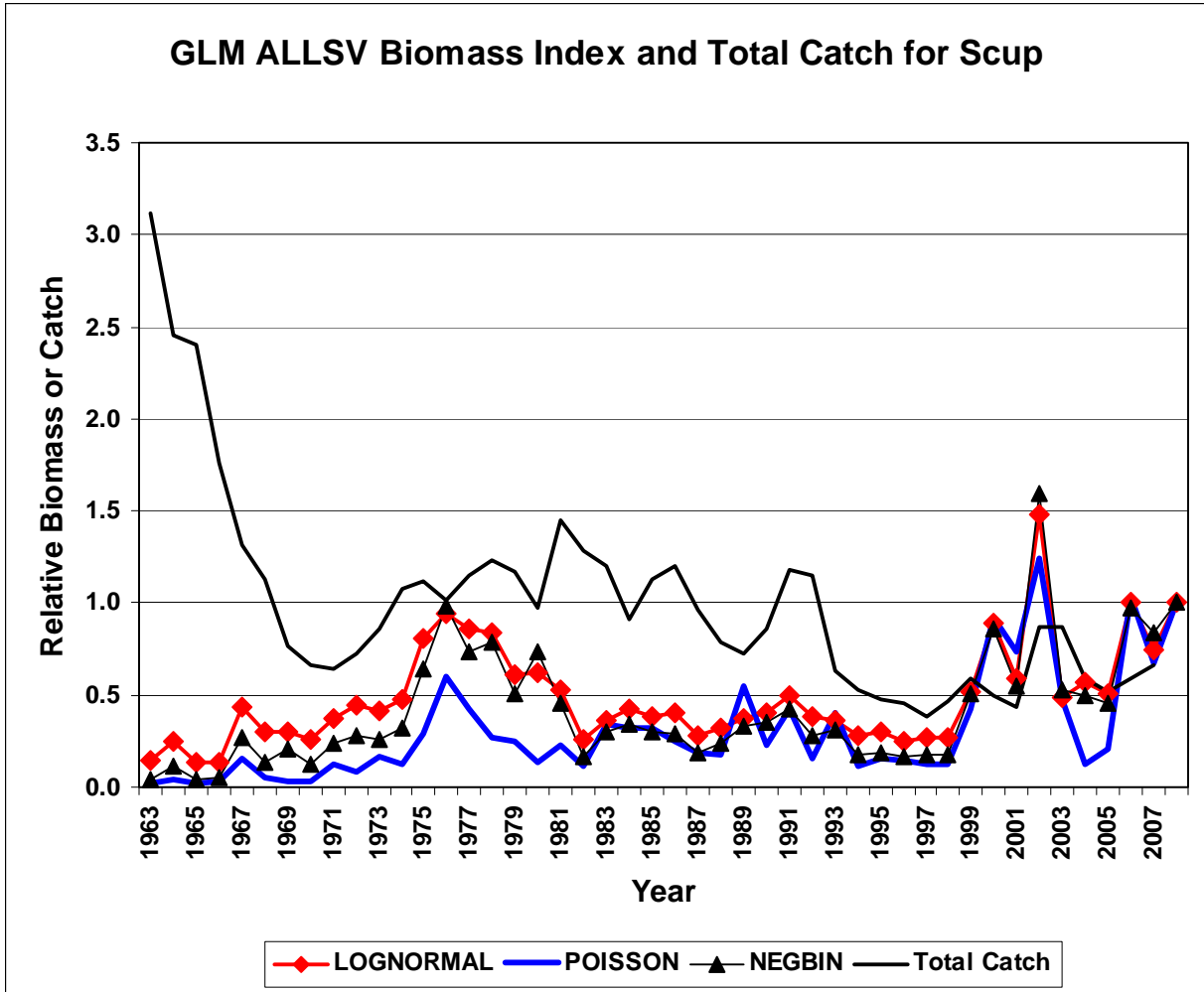


Figure 21. GLM-based biomass index for scup. The Poisson-assumption index was adopted as AIM input.

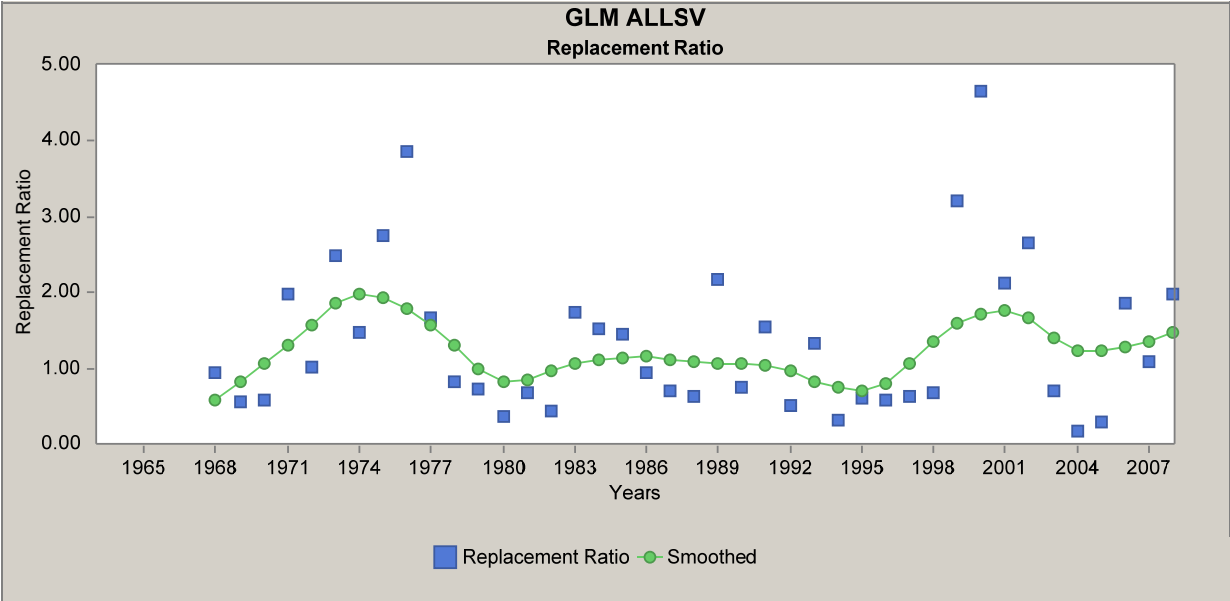
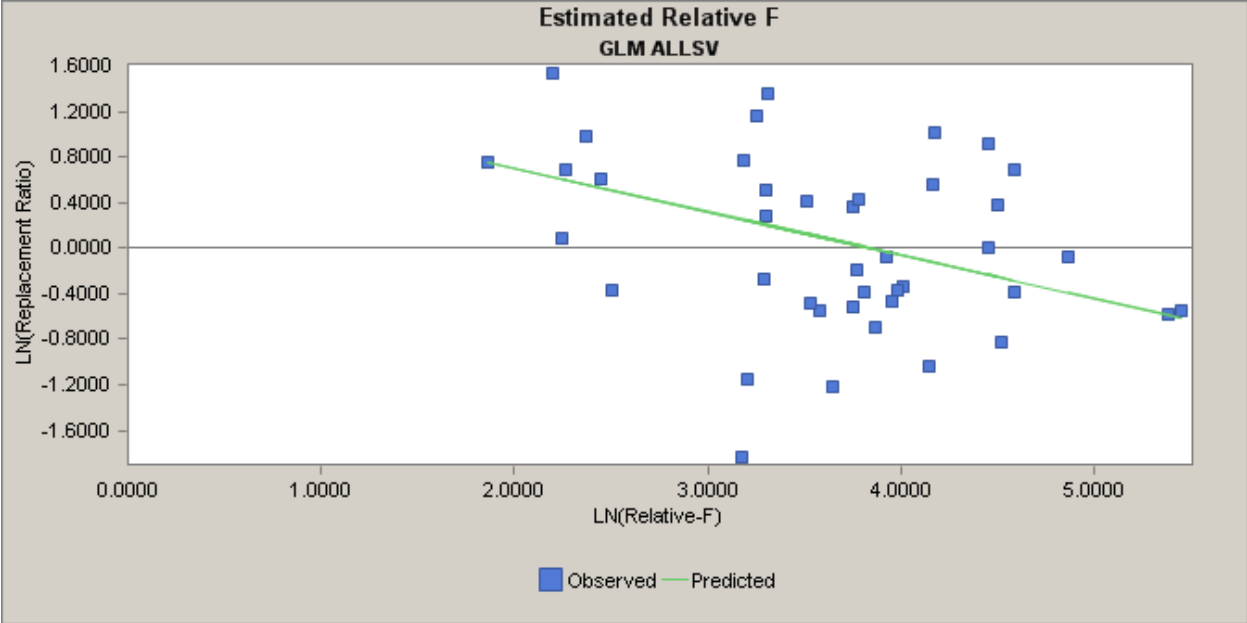


Figure 22. AIM results for the GLM based biomass index for scup.

## Scup (thru May 2008; n=42)

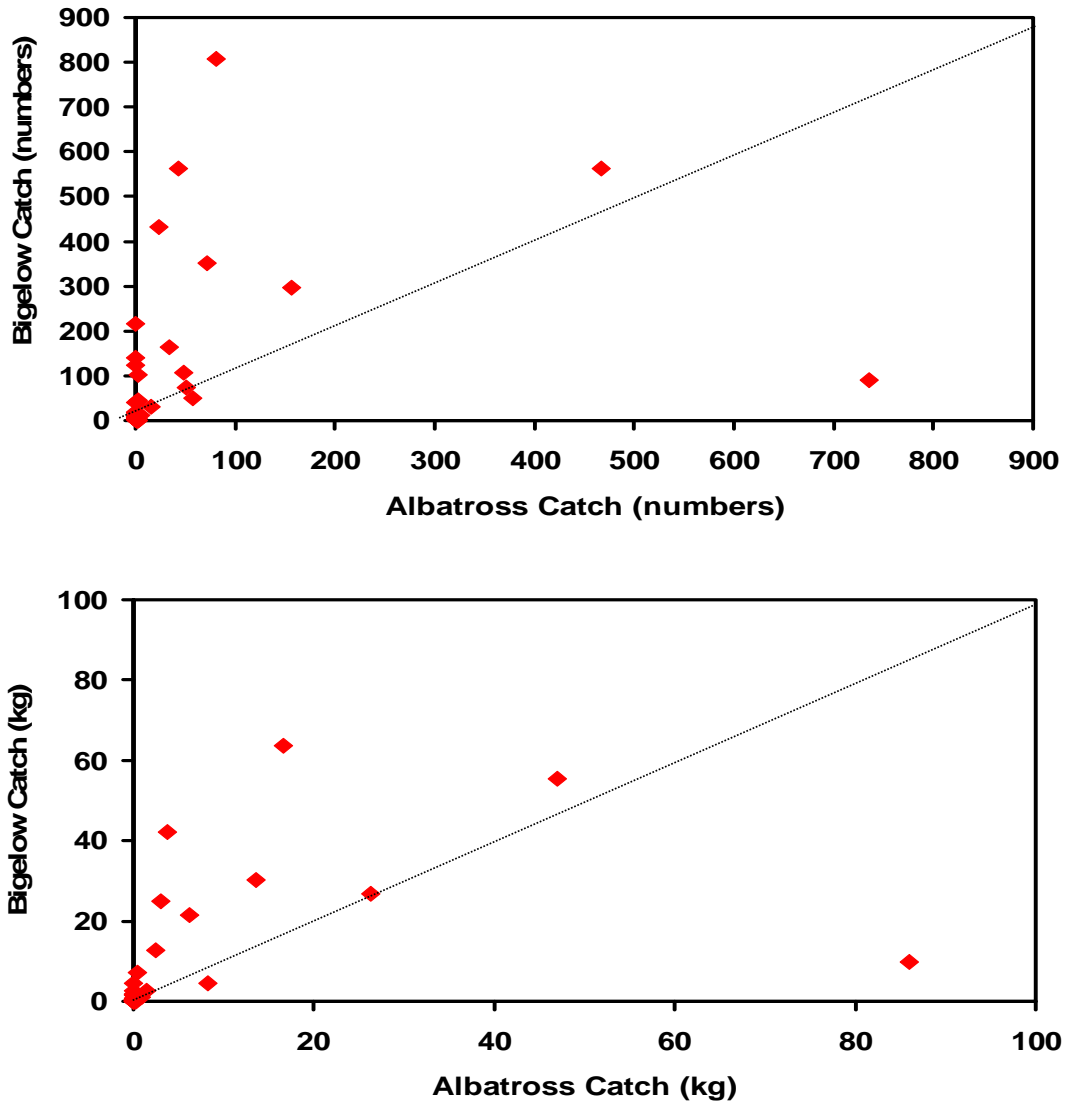


Figure 23. Preliminary NEFSC Survey calibration results for scup.

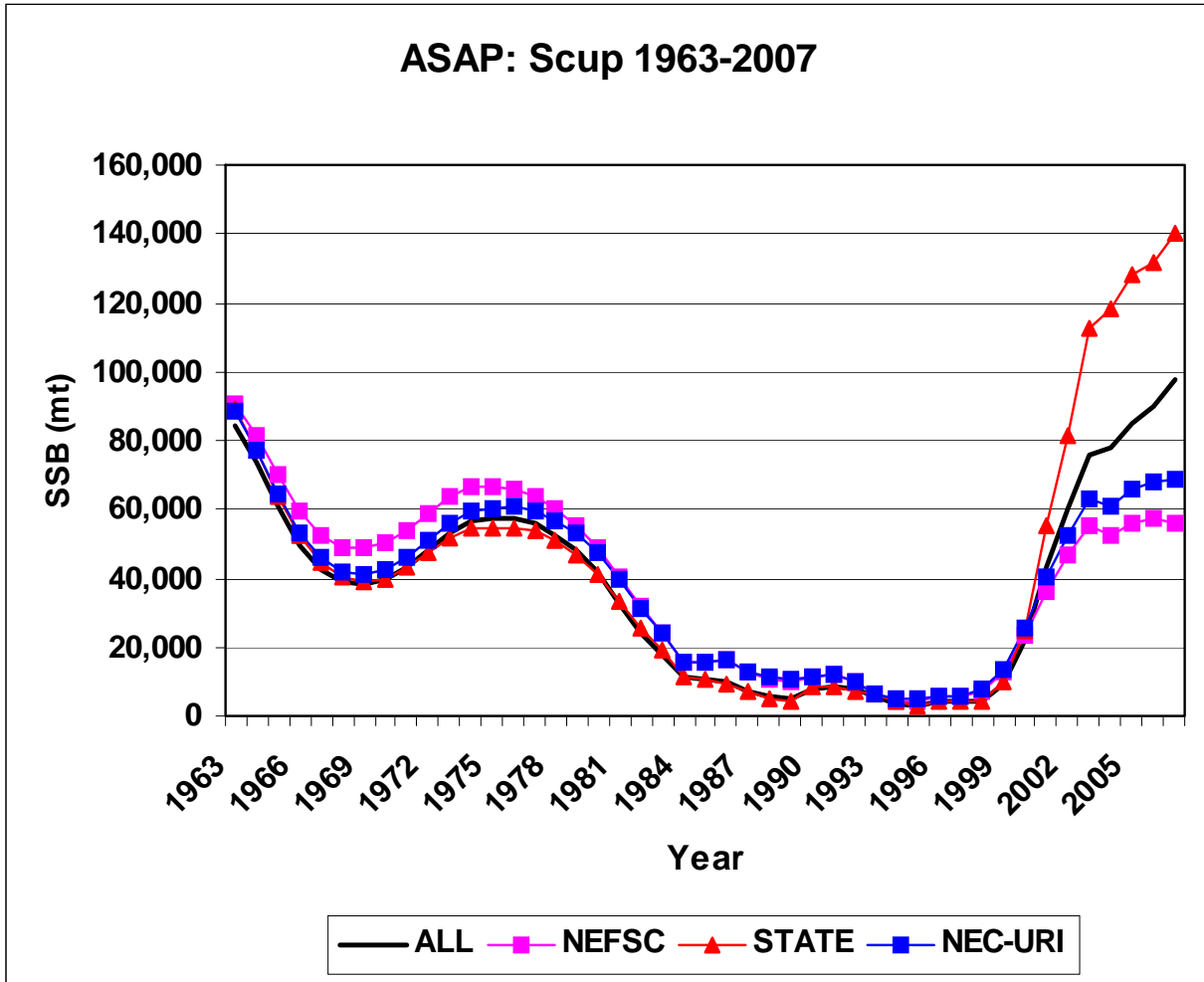


Figure 24. ASAP SSB estimates for the initial four alternative model configurations.



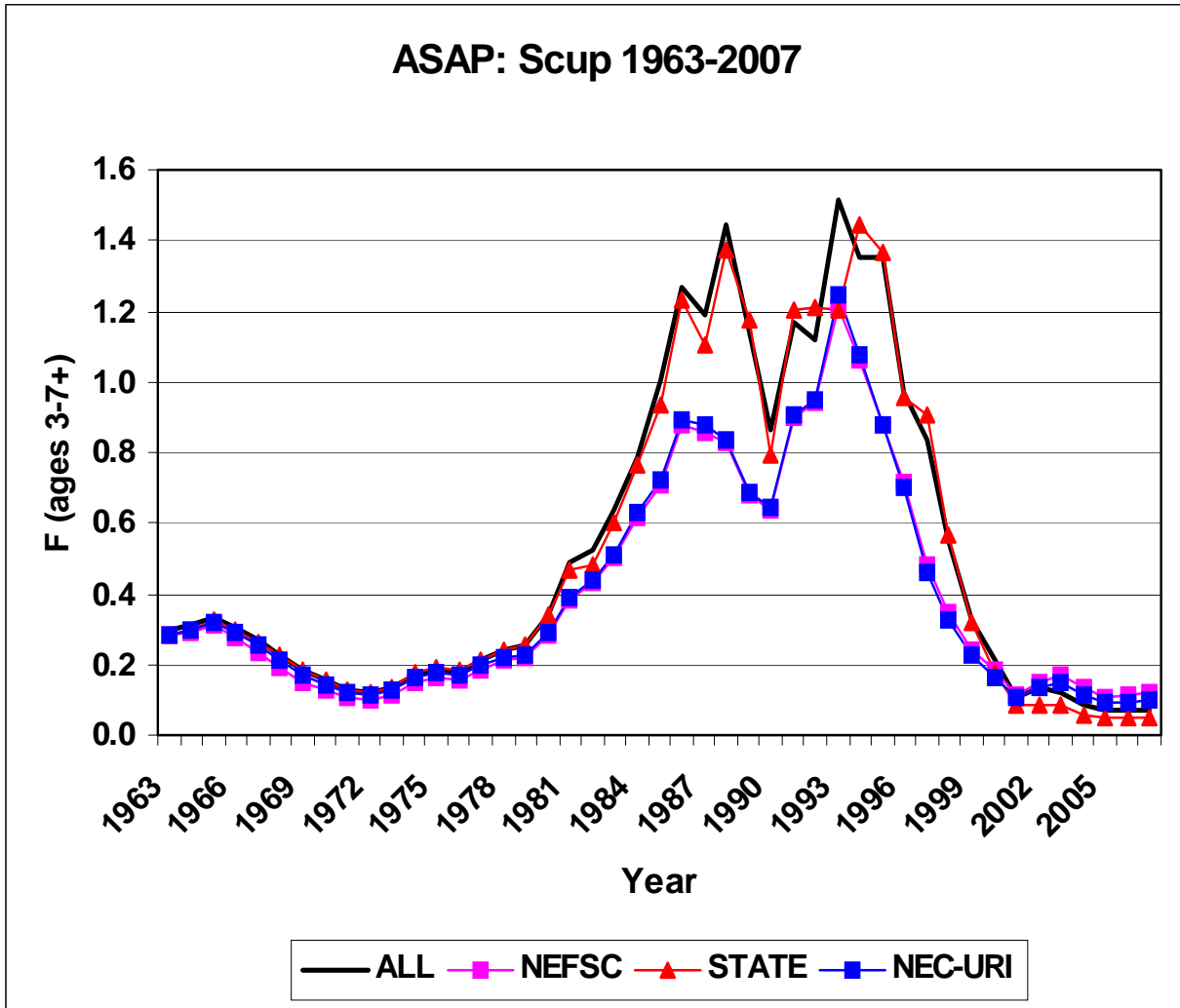


Figure 25. ASAP F estimates for the initial four alternative model configurations.

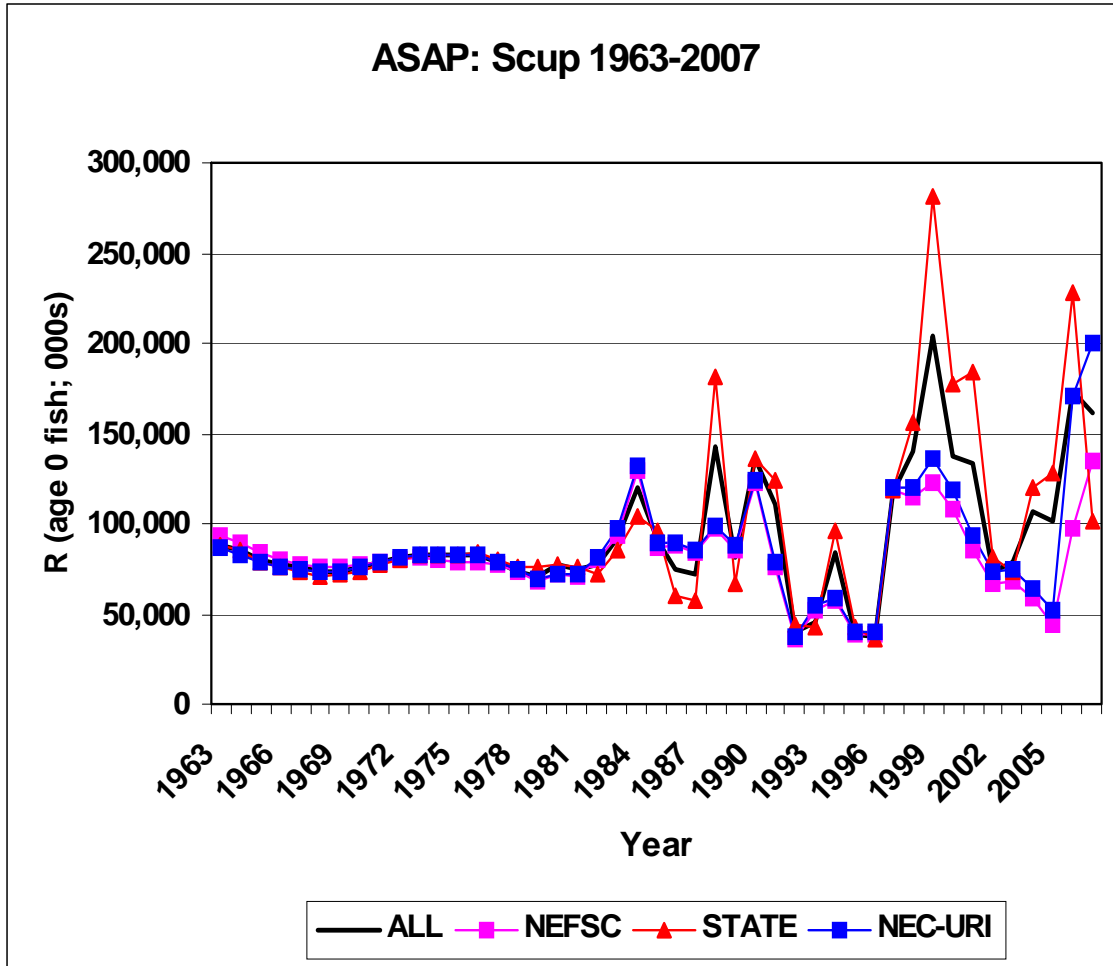


Figure 26. ASAP R (recruitment at age 0) estimates for the initial four alternative model configurations.

RUN ID	SSB63	SSB07	Fhighest	F07	Rhighest	R07	SSBMSY	MSY	FMSY	CATCH07
ALL	84,300	97,700	1.5	0.07	205	161	35600	12300	0.27	8026
NEFSC	90,500	56,300	1.21	0.12	135	135	33000	11000	0.25	8026
STATE	89,000	140,300	1.44	0.05	281	101	35900	12500	0.27	8026
NEC-URI	88,400	68,600	1.25	0.10	200	200	33300	11600	0.27	8026

	SSB07/SSBMSY	F07/FMSY	CAT07/MSY
ALL	2.74	0.26	0.65
NEFSC	1.71	0.48	0.73
STATE	3.91	0.19	0.64
NEC-URI	2.06	0.37	0.69

Figure 27. Initial ASAP results for four alternative run configurations.

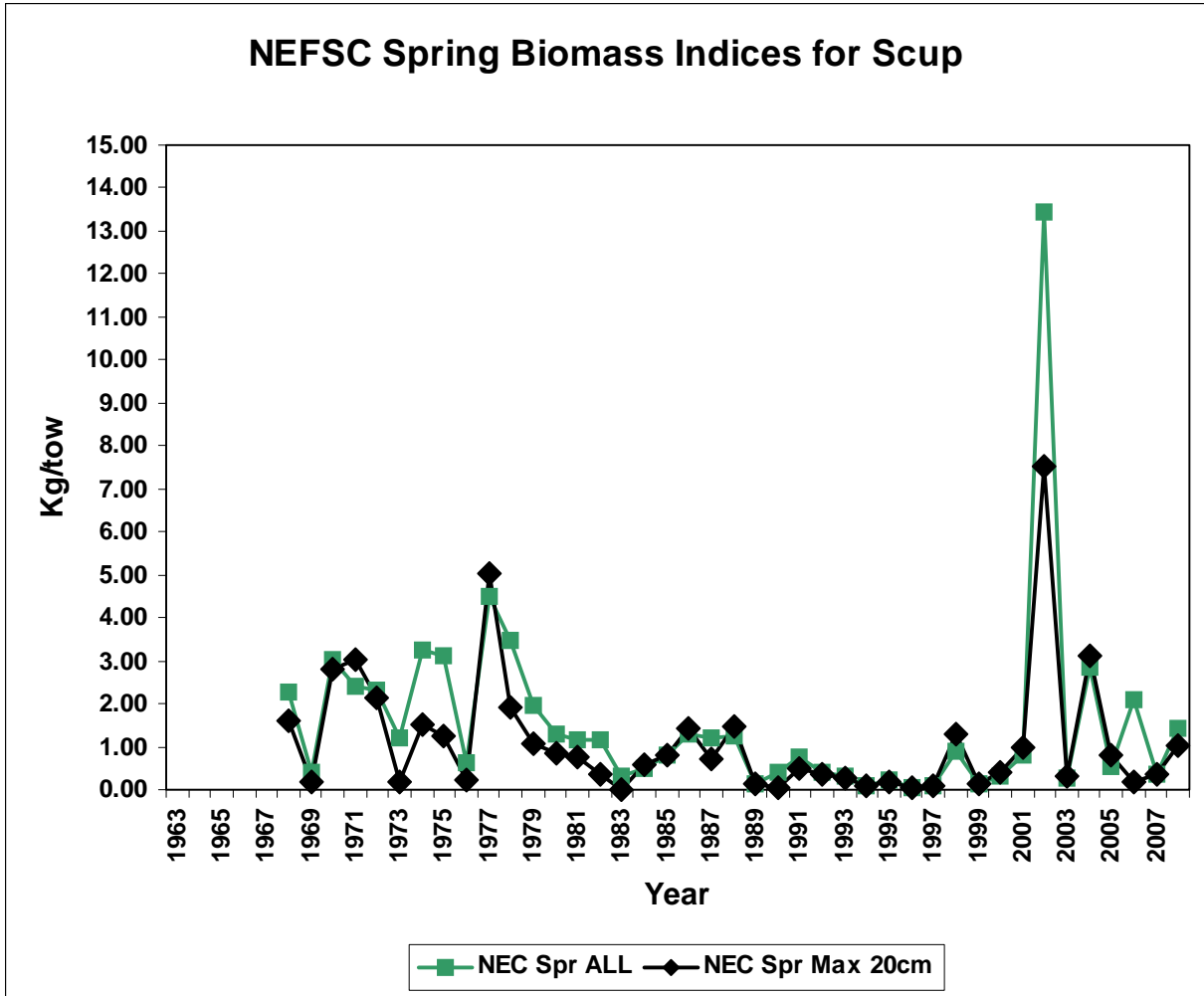


Figure 28. NEFSC Spring trawl survey biomass indices for scup: all sizes, and with a maximum length of 20 cm.

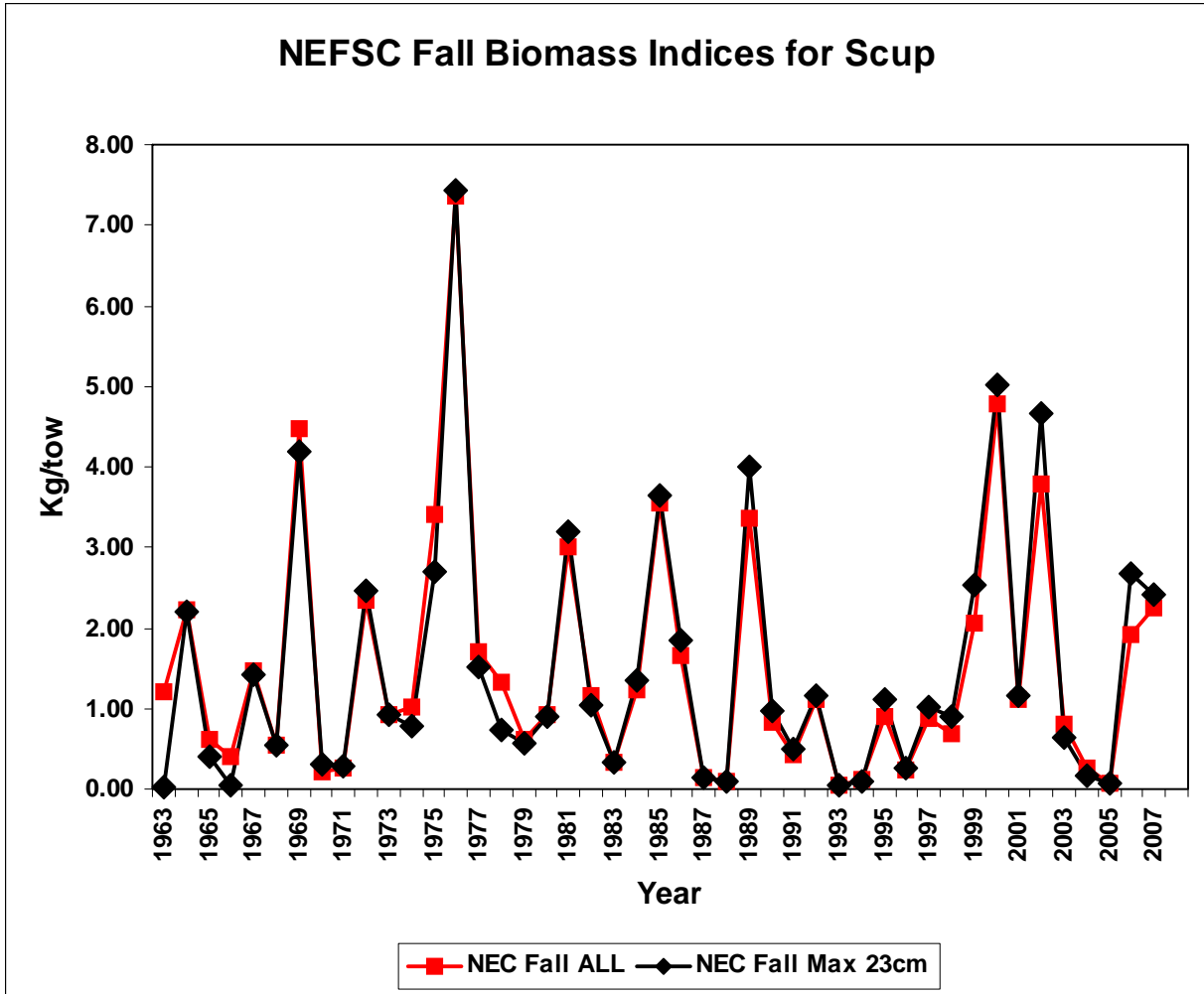


Figure 29. NEFSC Fall trawl survey biomass indices for scup: all sizes, and with a maximum length of 23 cm.

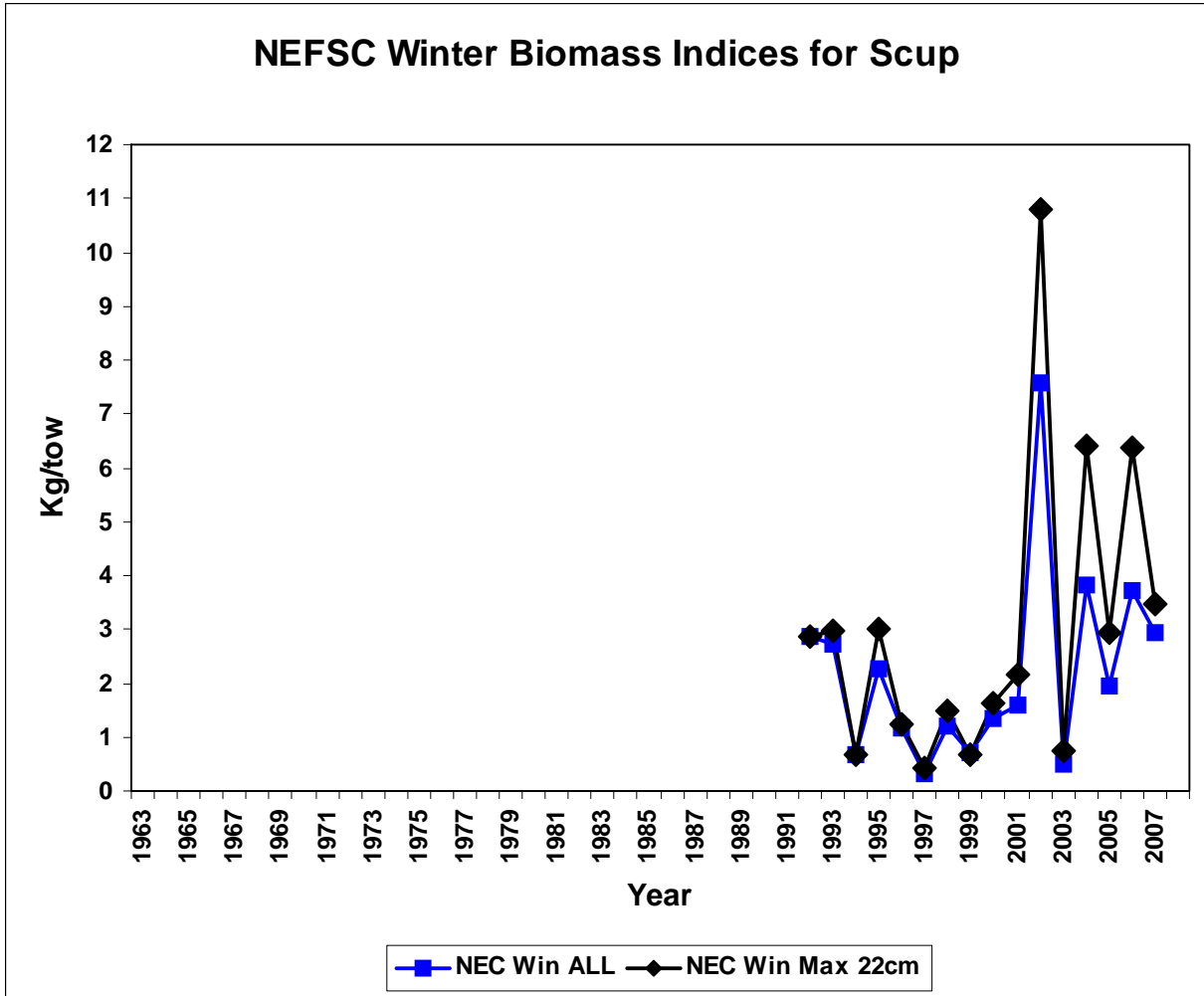


Figure 30. NEFSC Winter trawl survey biomass indices for scup: all sizes, and with a maximum length of 22 cm.

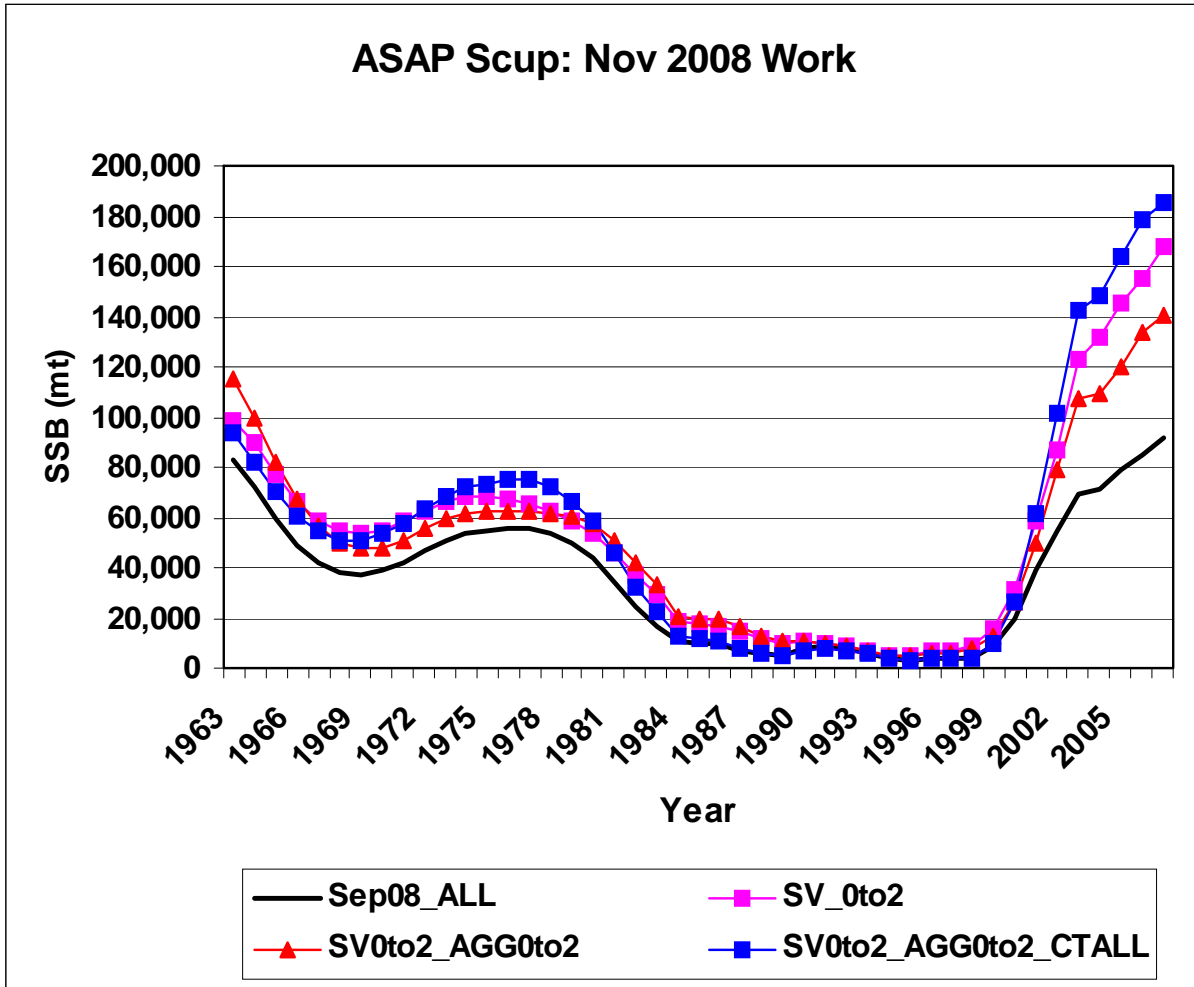


Figure 31. ASAP SSB estimates for the modified survey input model configurations.

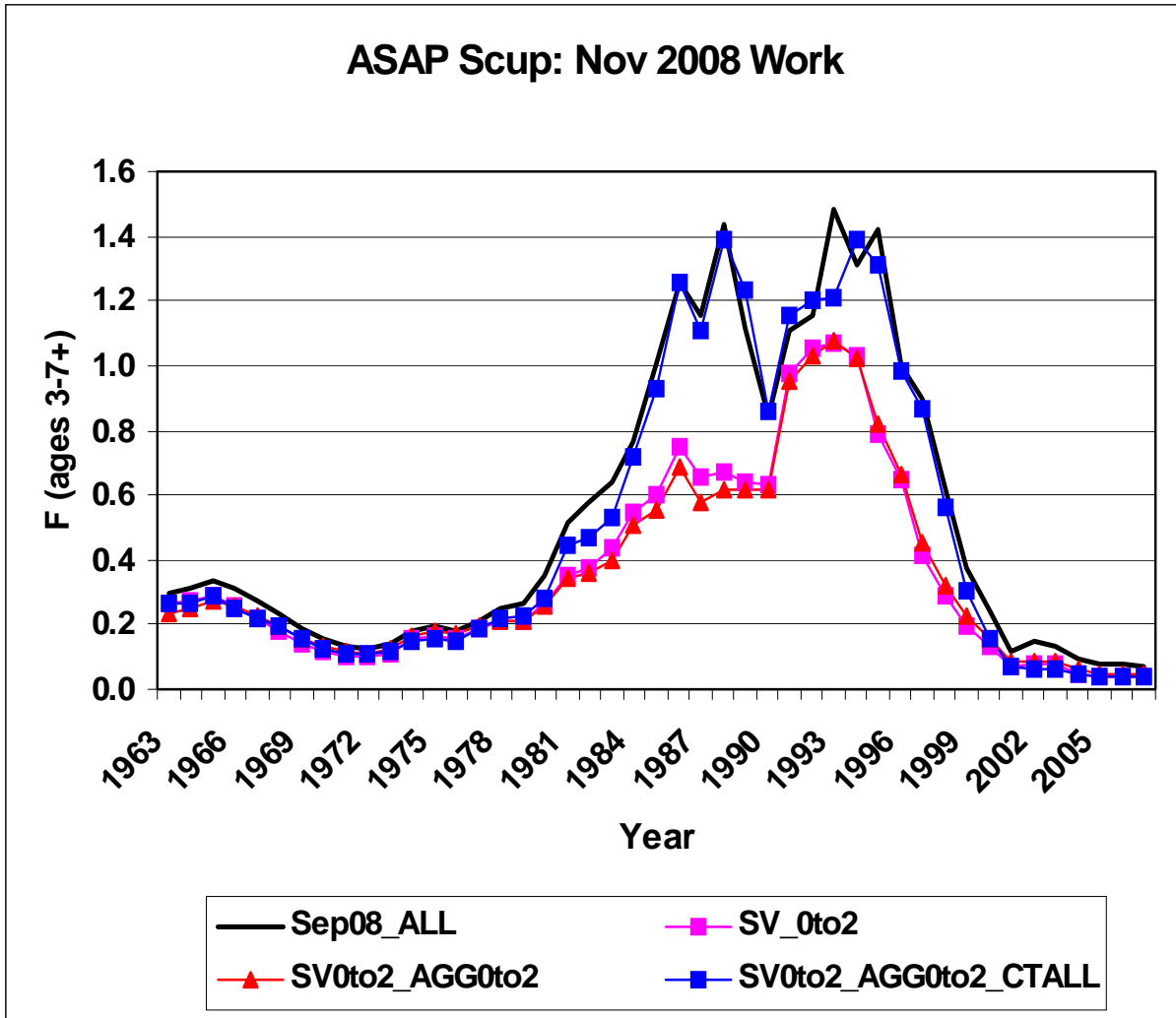


Figure 32. ASAP F estimates for the modified survey input model configurations.

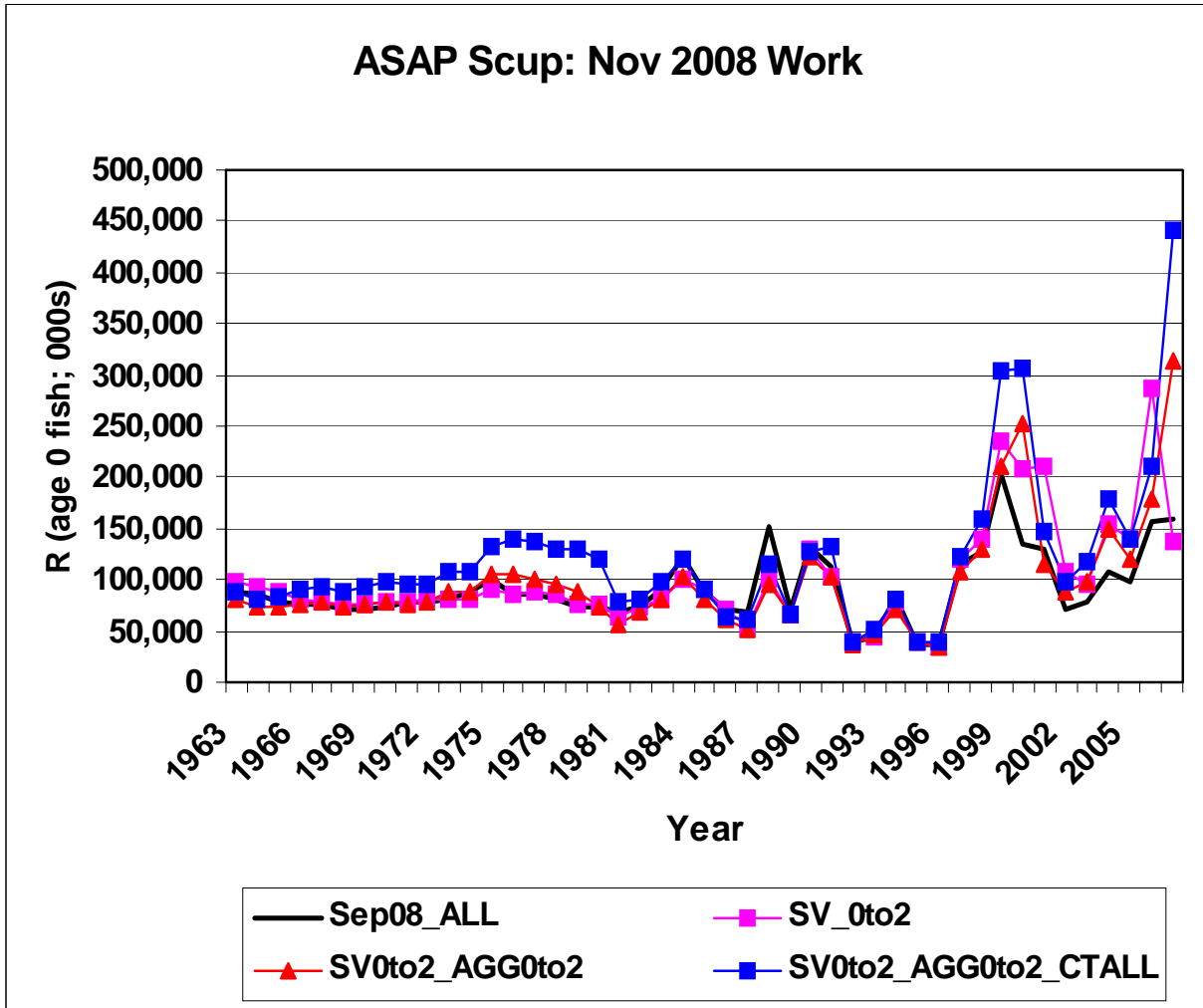


Figure 33. ASAP R (recruitment at age 0) estimates for the modified survey input model configurations.



<b>Objective Function Summary</b>					
<b>Absolute RUN ID</b>	<b>Fishery Total Catch</b>	<b>Fishery Age Comp</b>	<b>Survey Indices</b>	<b>Rec Devs</b>	<b>Total</b>
Sep08_ALL	1052	1997	6354	518	9921
SV0to2	1013	1929	2473	528	5943
SV0to2_AGG0to2	1025	1967	5403	537	8932
SV0to2_AGG0to2_CTALL	1159	1996	5597	553	9305
<b>Percent RUN ID</b>	<b>Fishery Total Catch</b>	<b>Fishery Age Comp</b>	<b>Survey Indices</b>	<b>Rec Devs</b>	<b>Total</b>
Sep08_ALL	11%	20%	64%	5%	100%
SV0to2	17%	32%	42%	9%	100%
SV0to2_AGG0to2	11%	22%	60%	6%	100%
SV0to2_AGG0to2_CTALL	12%	21%	60%	6%	100%

Figure 34. Objective function summary for the ASAP modified survey input runs.

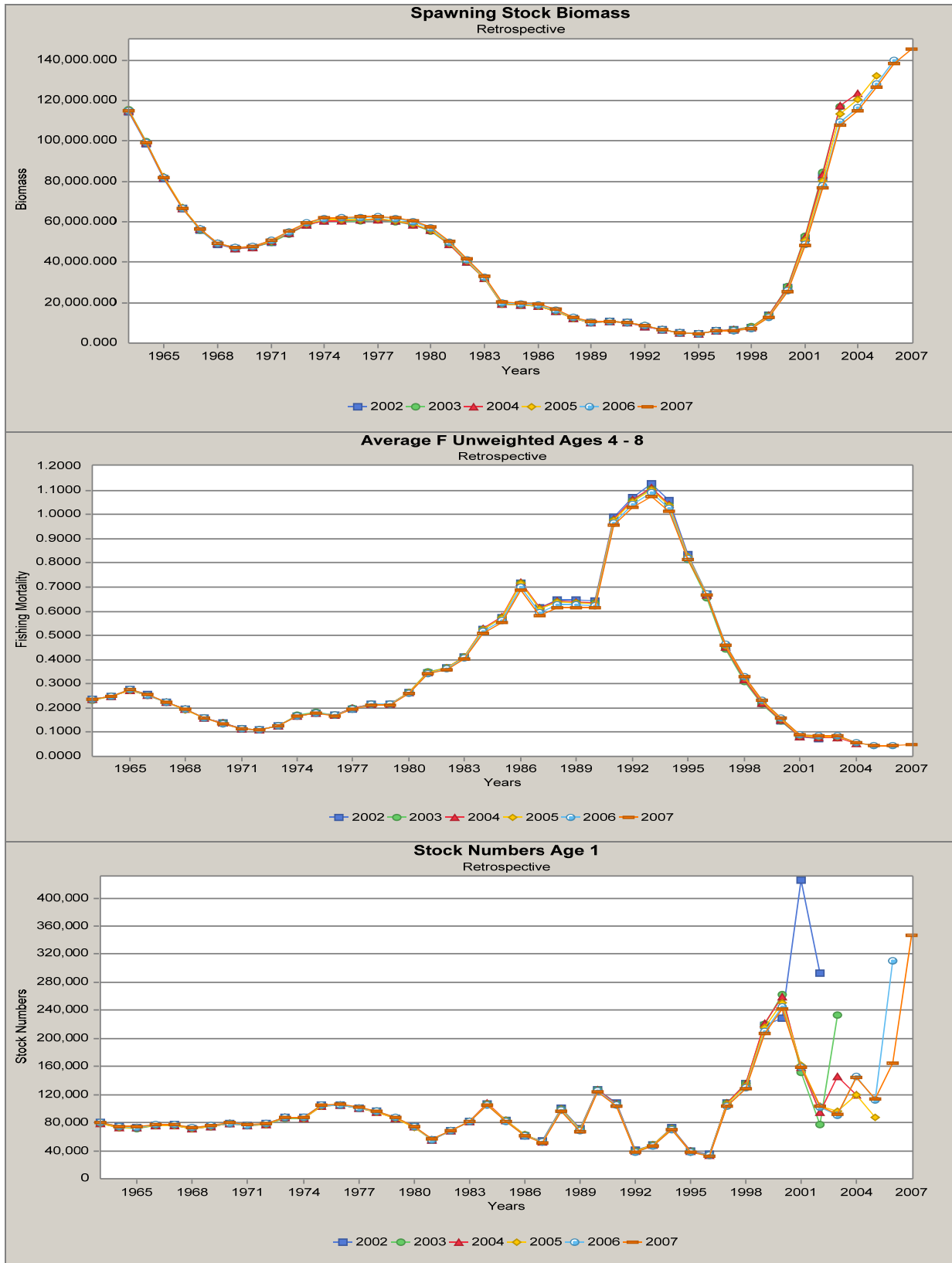


Figure 35. Retrospective results for run SV0to2\_AGG0to2.

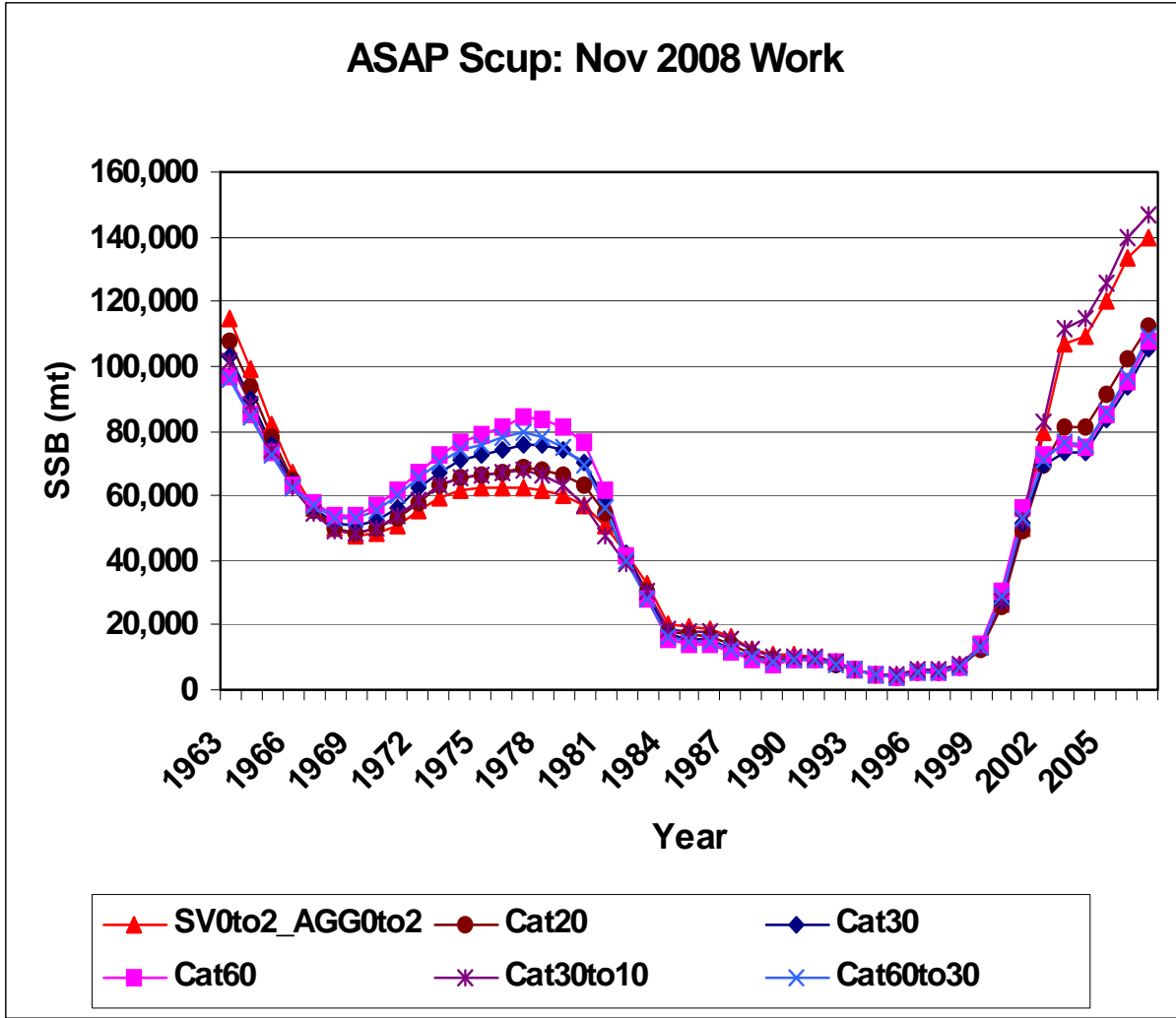


Figure 36. Sensitivity of the SV0to2\_AGG0to2 ASAP results to different assumptions about the uncertainty of fishery catch estimates: estimates of SSB.

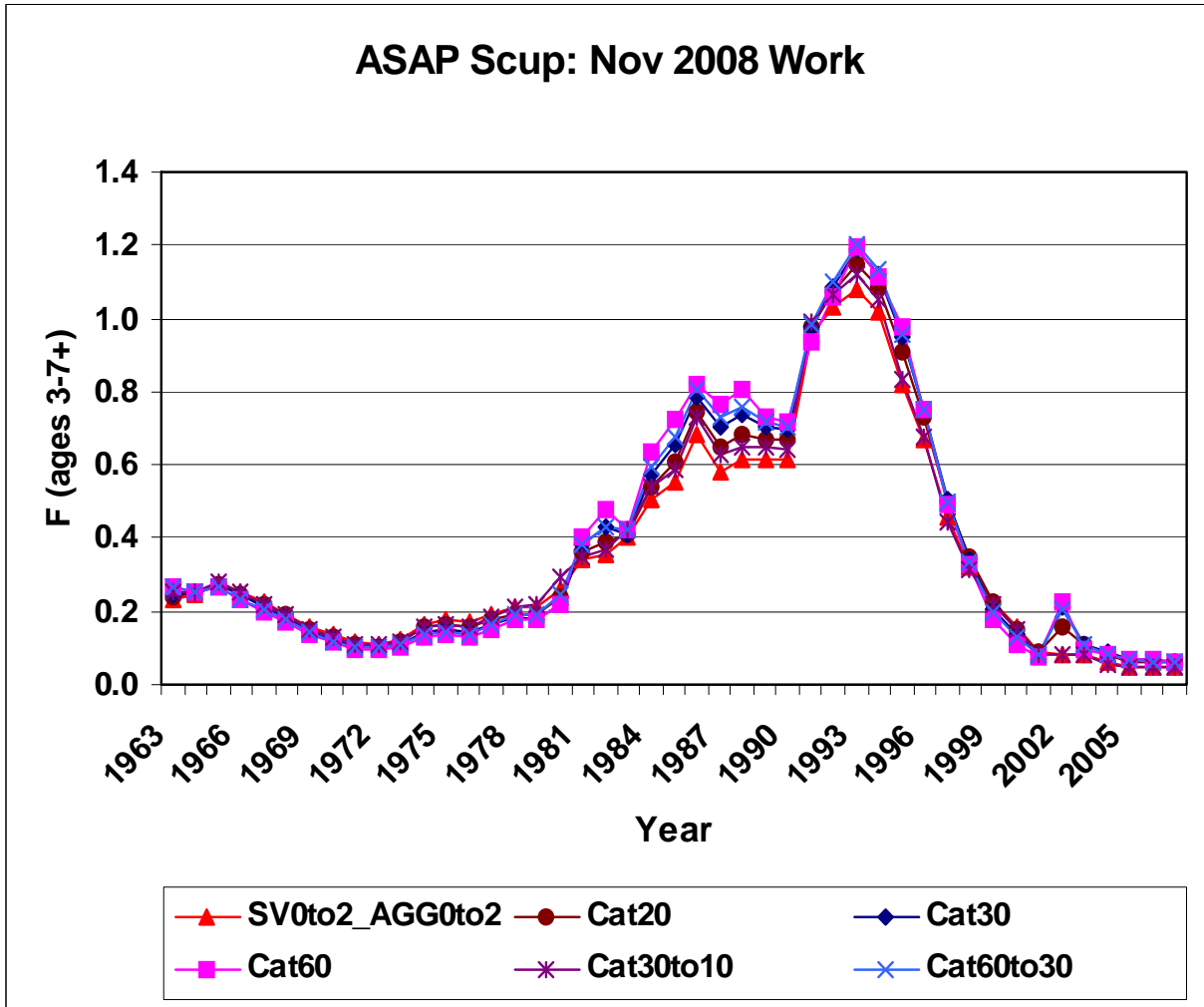


Figure 37. Sensitivity of the SV0to2\_AGG0to2 ASAP results to different assumptions about the uncertainty of fishery catch estimates: estimates of F.

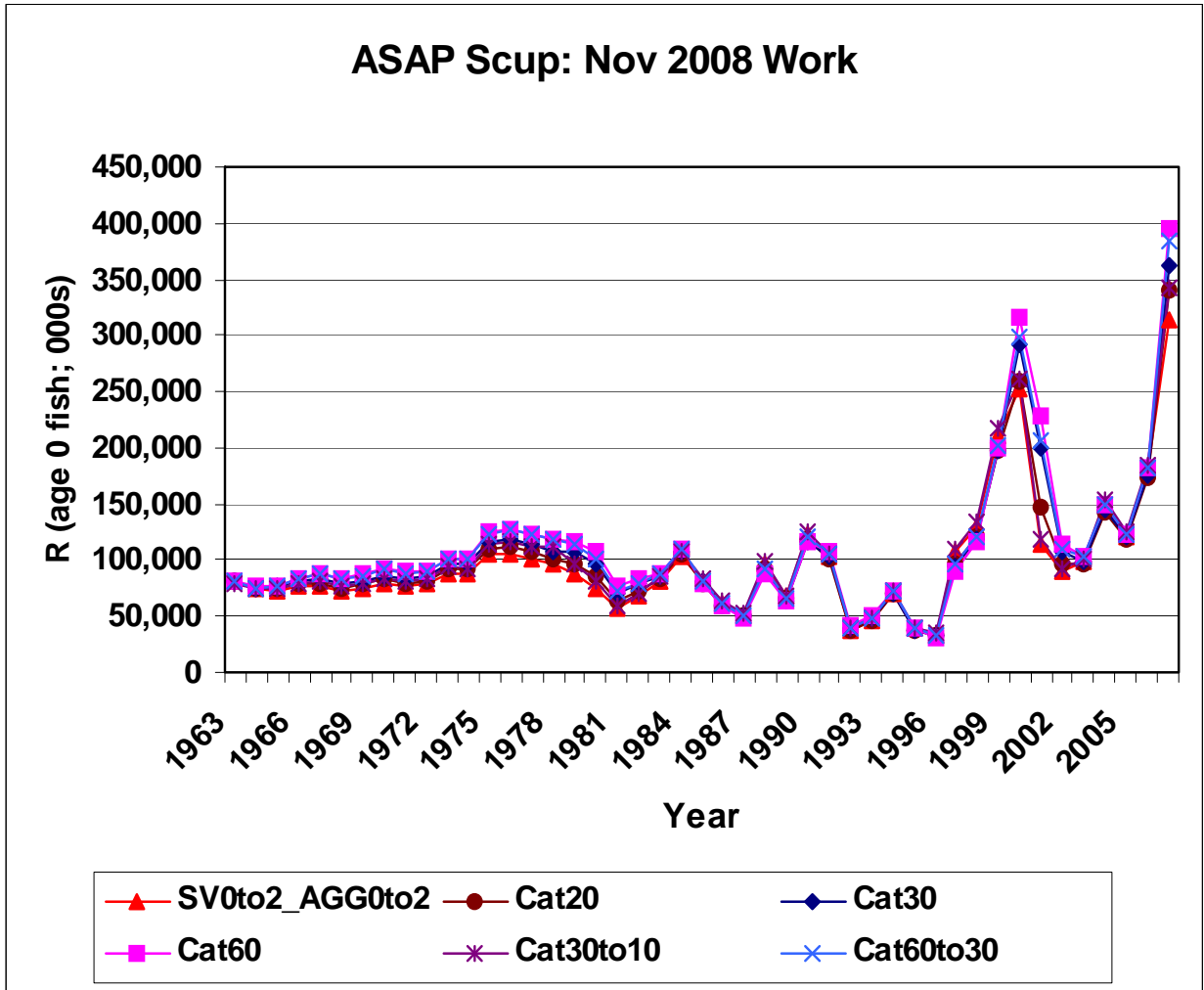


Figure 38. Sensitivity of the SV0to2\_AGG0to2 ASAP results to different assumptions about the uncertainty of fishery catch estimates: estimates of F.

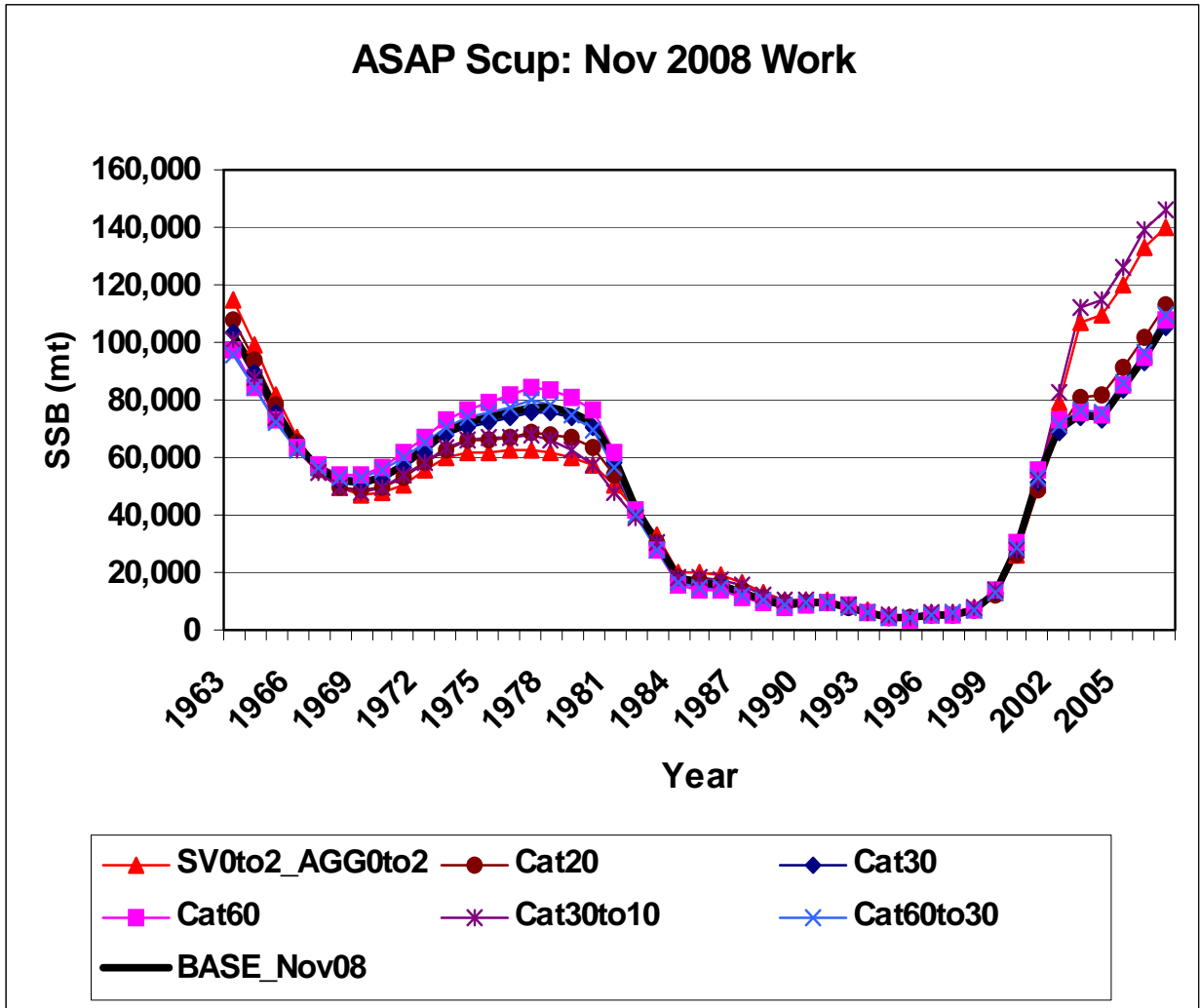


Figure 39. Comparative ASAP results for different assumptions about the uncertainty of fishery catch estimates: estimates of SSB from the BASE\_Nov08 run.

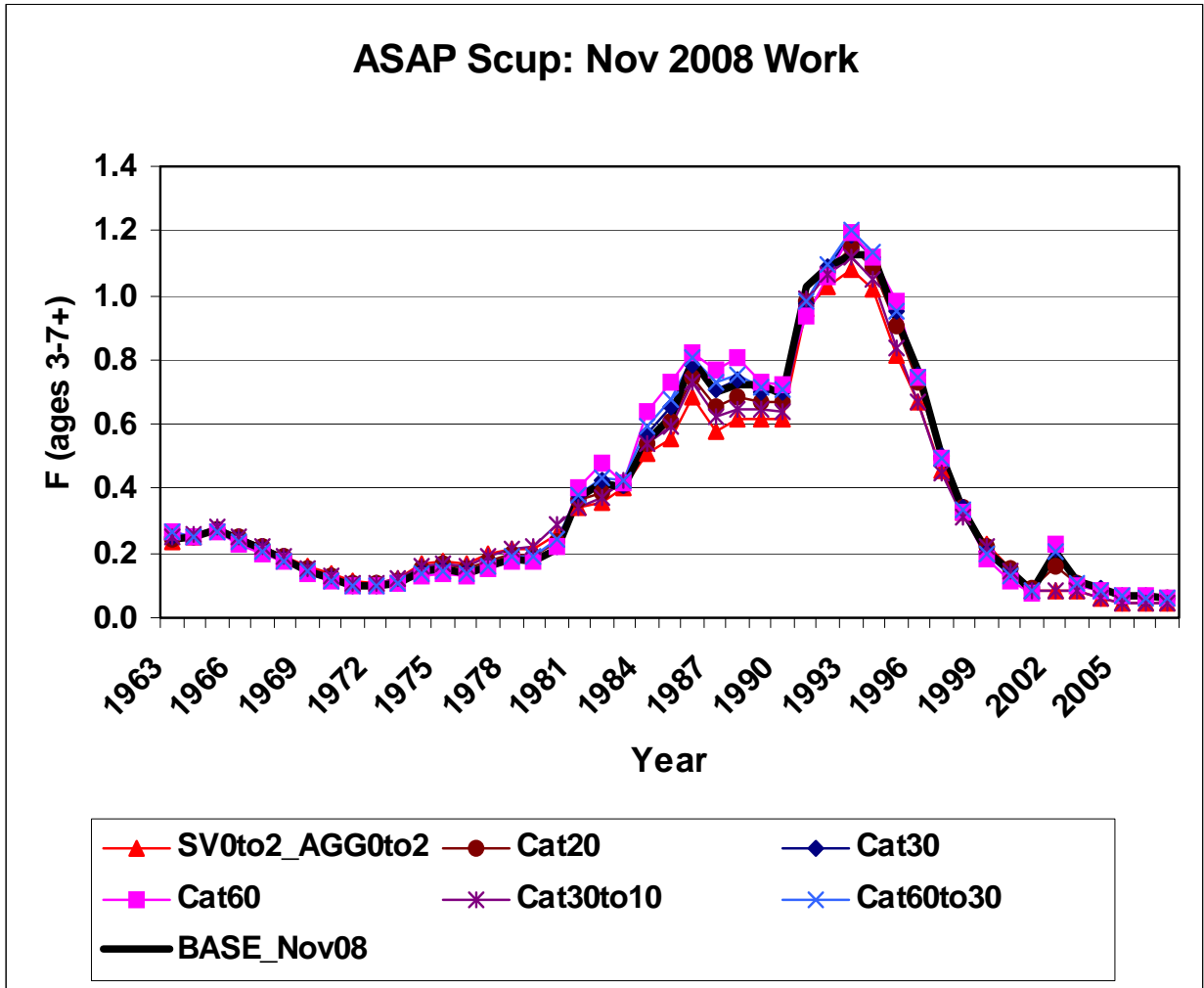


Figure 40. Comparative ASAP results for different assumptions about the uncertainty of fishery catch estimates: estimates of F from the BASE\_Nov08 run.

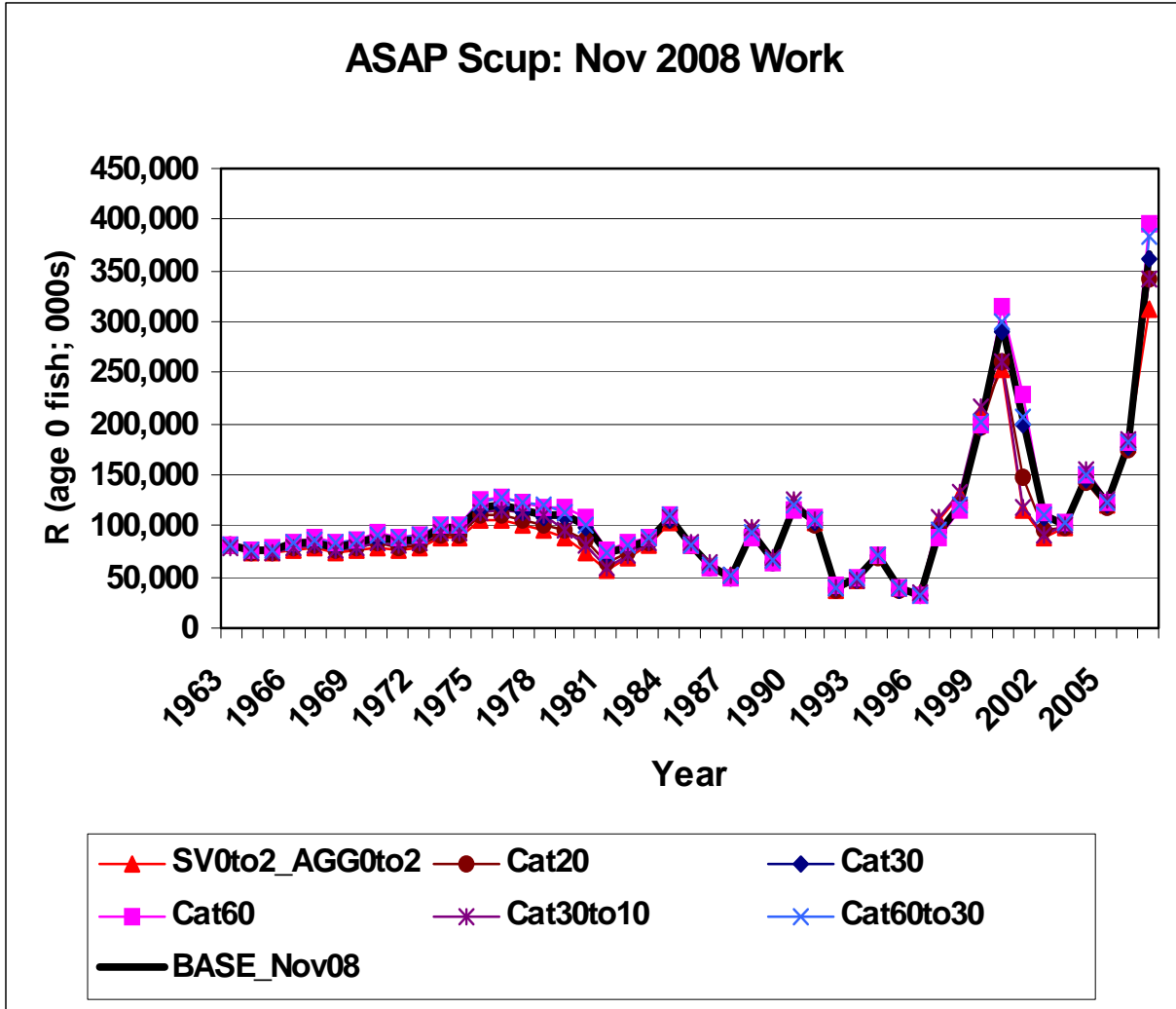


Figure 41. Comparative ASAP results for different assumptions about the uncertainty of fishery catch estimates: estimates of R from the BASE\_Nov08 run.



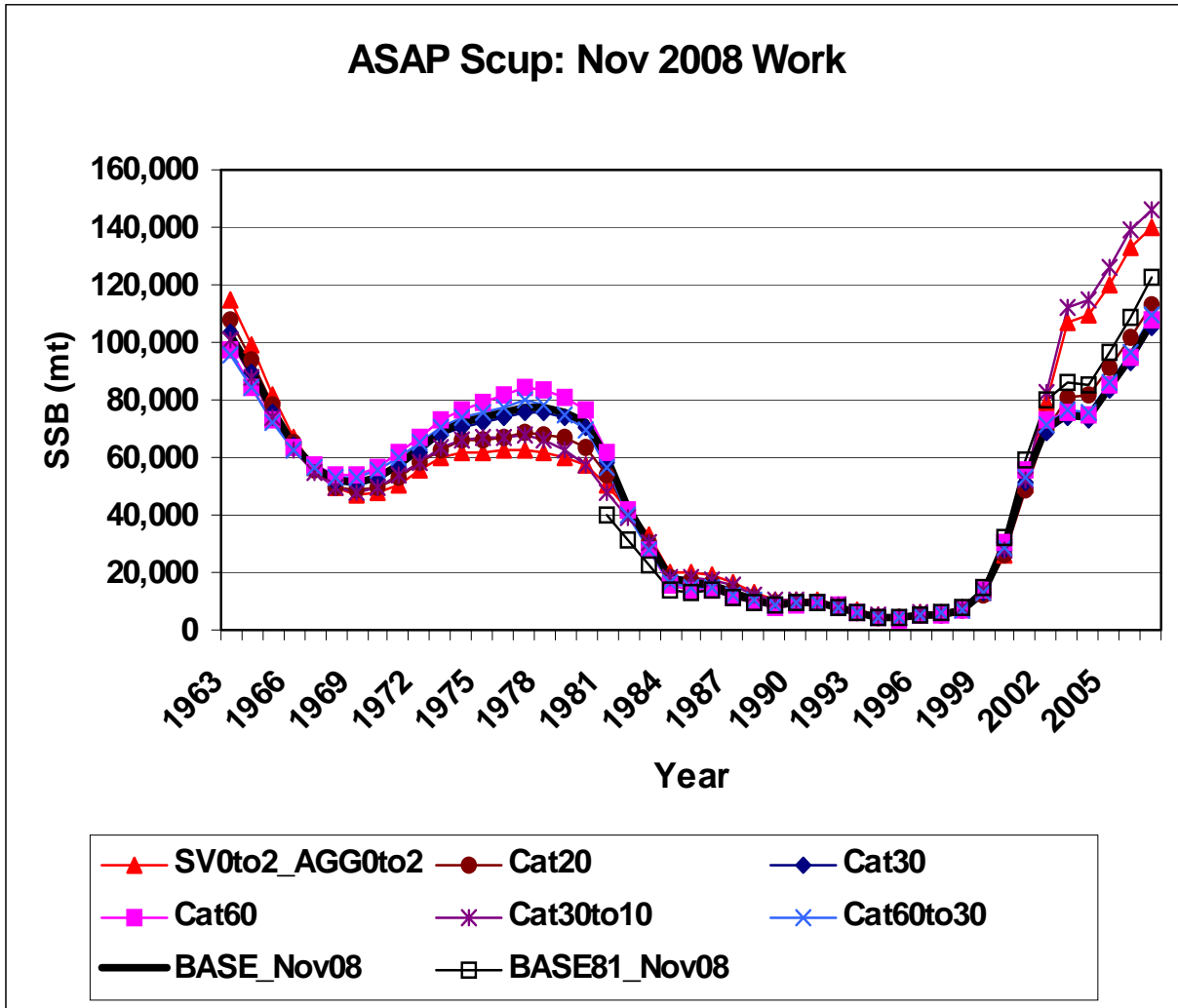


Figure 42. Comparative ASAP results for effect of 1981-2007 time series in run BASE81\_Nov08: estimates of SSB.

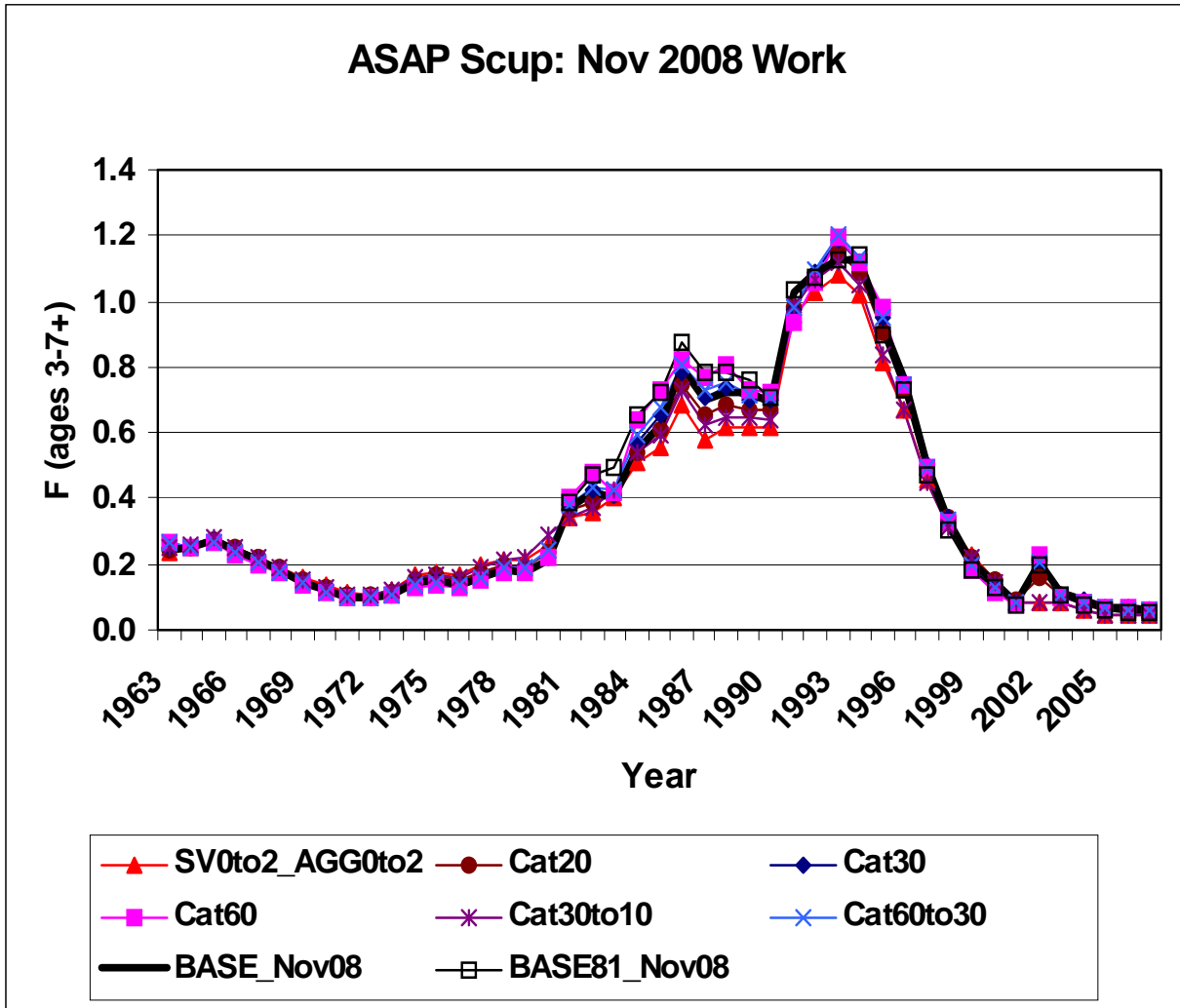


Figure 43. Comparative ASAP results for effect of 1981-2007 time series in run BASE81\_Nov08: estimates of F.

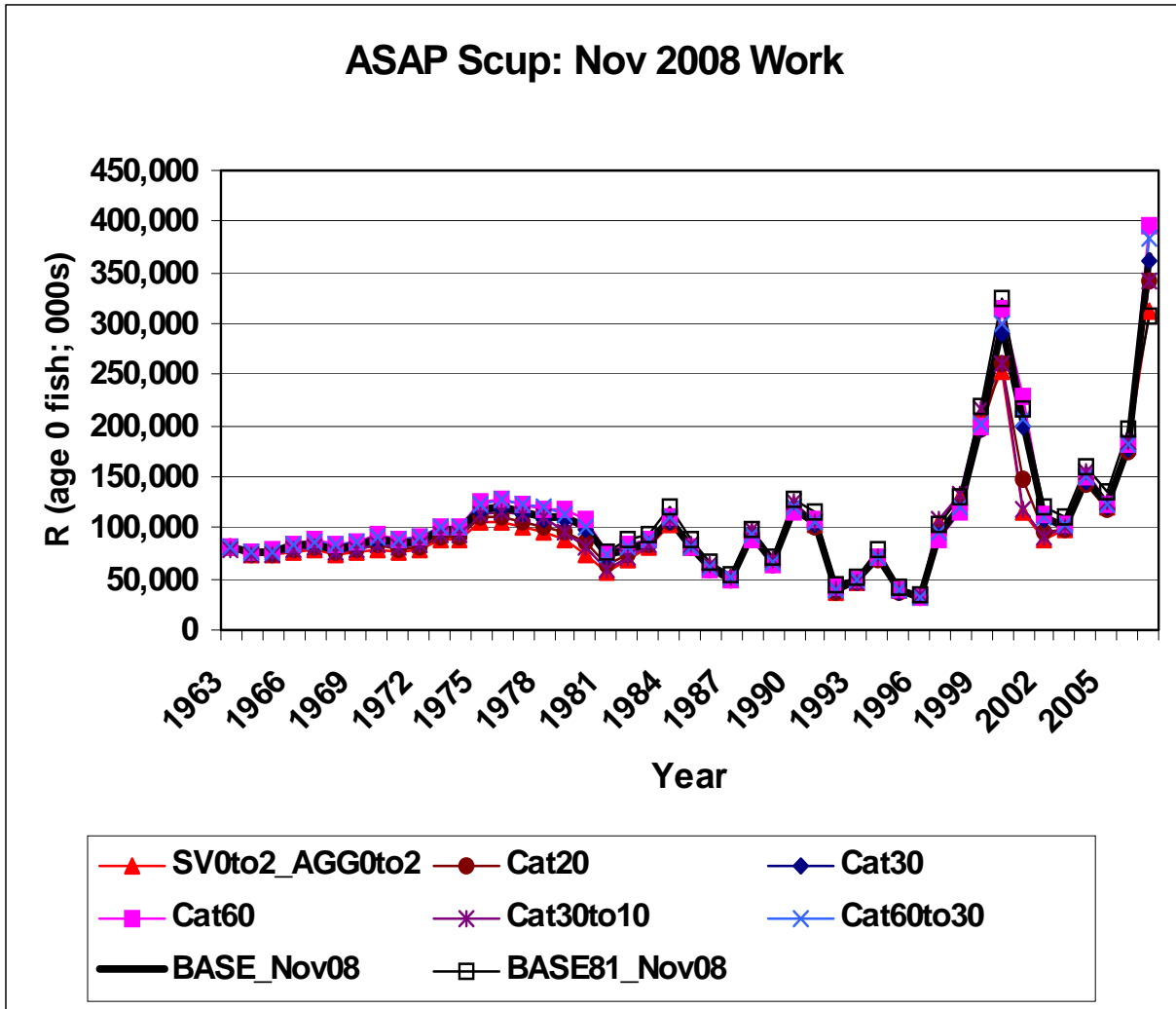


Figure 44. Comparative ASAP results for effect of 1981-2007 time series in run BASE81\_Nov08: estimates of R.

SCUP: ASAP "BASE_Nov08" model				Mean R = 119.2 million age 0 fish			
BRP		Y/R	SSB/R	SSB	Catch	Land	Disc
Fmax	0.272	0.155	0.552	62,630	17,601	13,330	4,271
F35%	0.202	0.151	0.745	85,425	17,349	13,823	3,526

SCUP: ASAP "BASE81_Nov08" model				Mean R = 125.4 million age 0 fish			
BRP		Y/R	SSB/R	SSB	Catch	Land	Disc
Fmax	0.292	0.163	0.547	66,142	19,743	15,202	4,541
F35%	0.213	0.158	0.746	91,119	19,440	15,735	3,705

SCUP: ASAP "BASE_Nov08" model				Catch	Catch07	%MSY
BRP	SSB	SSB07	%SSBMSY			
Fmax	62,630	107,129	171%	17,601	8,026	46%
F35%	85,425	107,129	125%	17,349	8,026	46%

SCUP: ASAP "BASE81_Nov08" model				Catch	Catch07	%MSY
BRP	SSB	SSB07	%SSBMSY			
Fmax	66,142	122,671	185%	19,743	8,026	41%
F35%	91,119	122,671	135%	19,440	8,026	41%

Figure 45. Biological reference points and stock status from ASAP model results, for the full 1963-2007 time series (BASE\_Nov08 run) and shorter 1981-2007 time series (BASE81\_Nov08 run). Fishing mortality rates (F) for both models were about 0.06, about one-quarter of the Fmax proxy for FMSY.

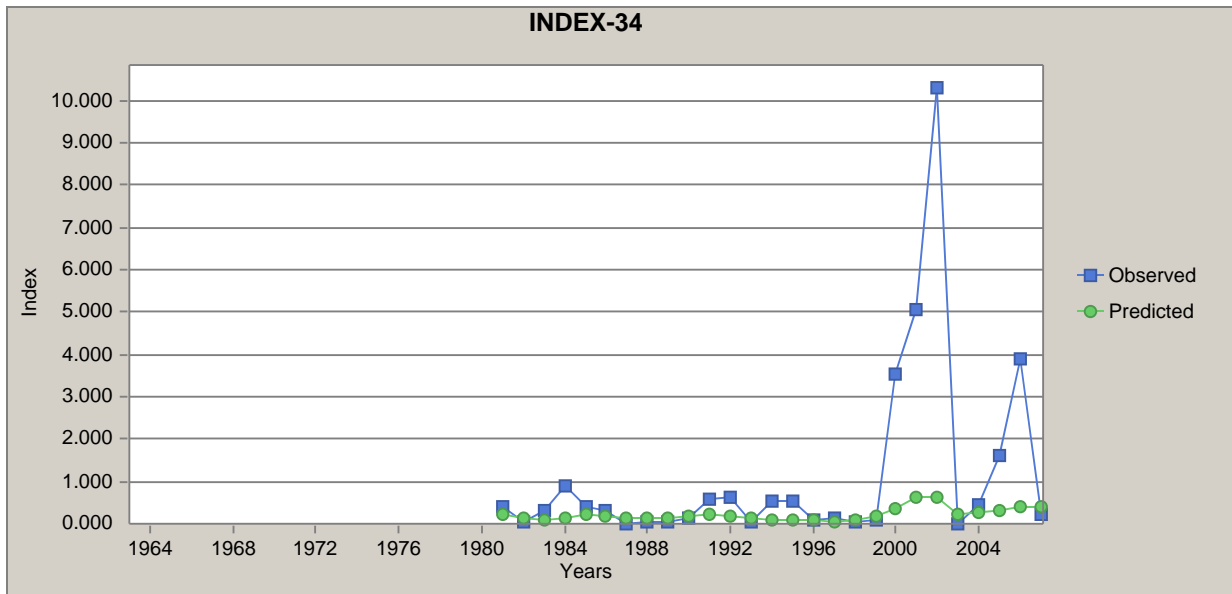
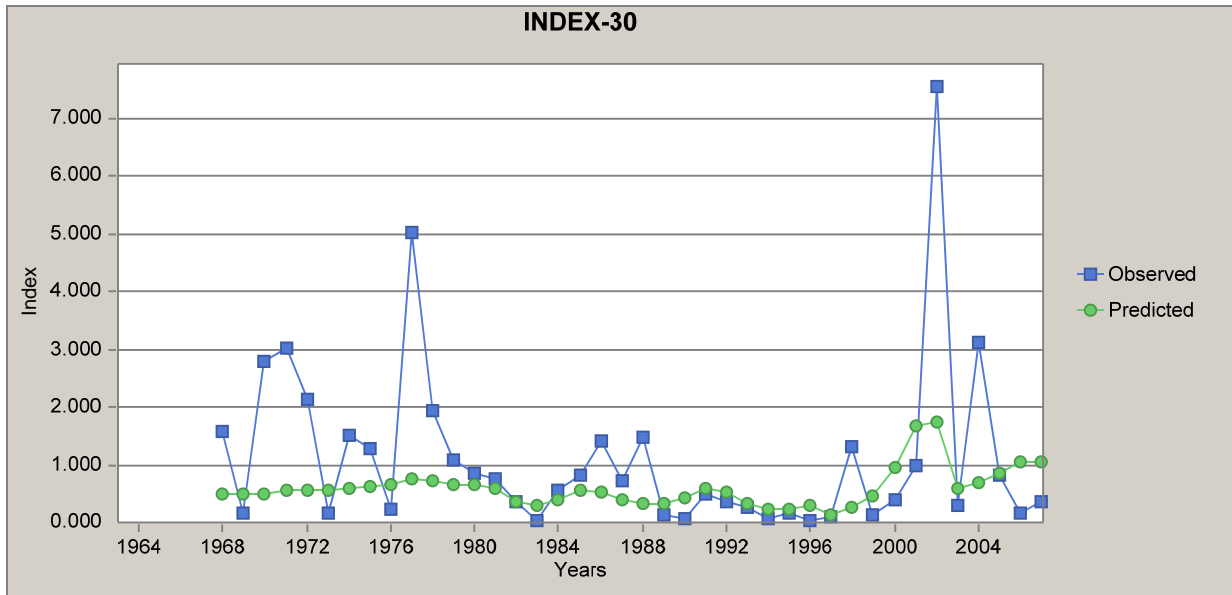


Figure 46. ASAP model BASE\_C2006 run fits for the NEFSC Spring survey aggregate biomass index for ages 1-2 (top - Index 30) and RIDFW Spring survey biomass index for ages 1-2 (bottom - Index 34) showing the large residuals for the 2002 indices.

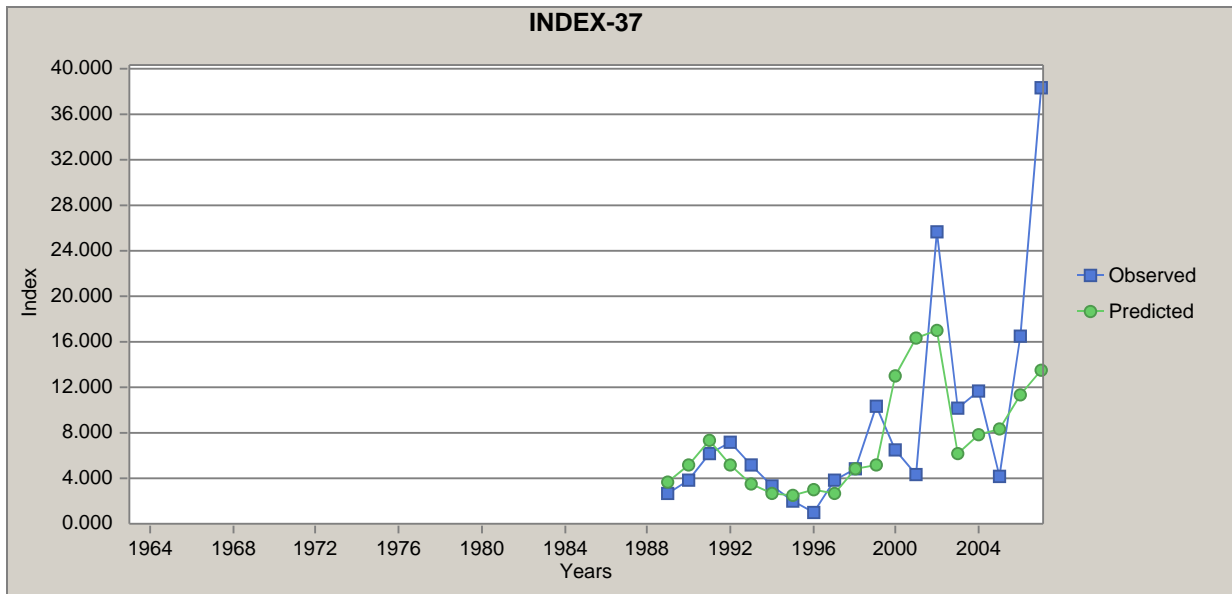
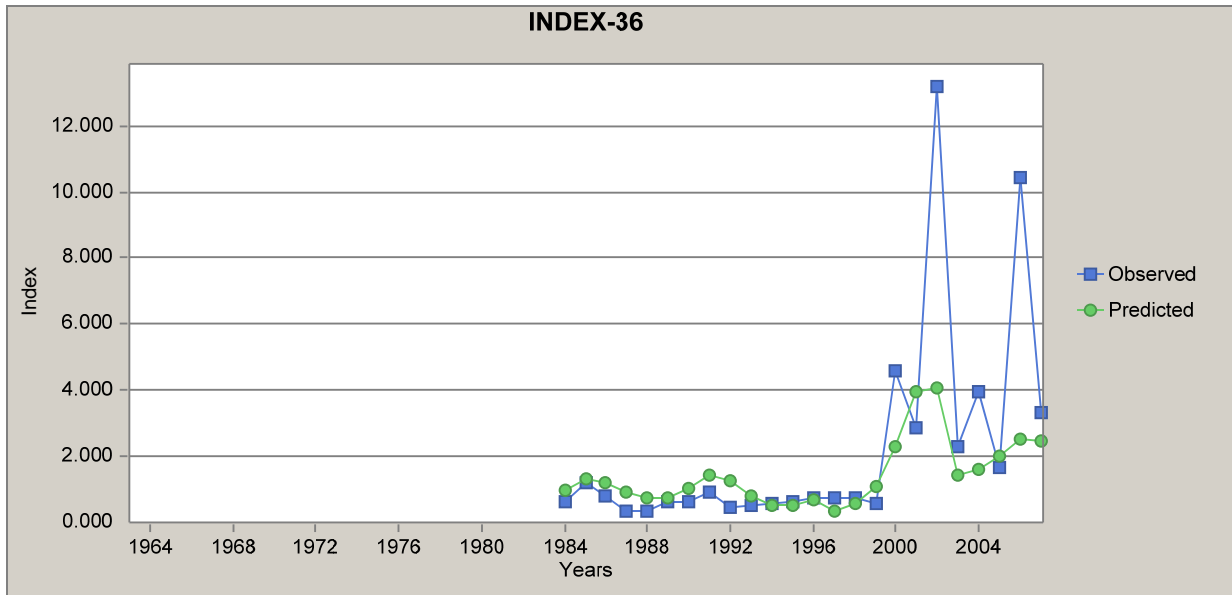


Figure 47. ASAP model BASE\_C2006 run fits for the CTDEP Spring survey aggregate biomass index for ages 1-2 (top - Index 36) and NJBMF Annual survey biomass index for ages 1-2 (bottom - Index 37) showing the large residuals for the 2002 indices.

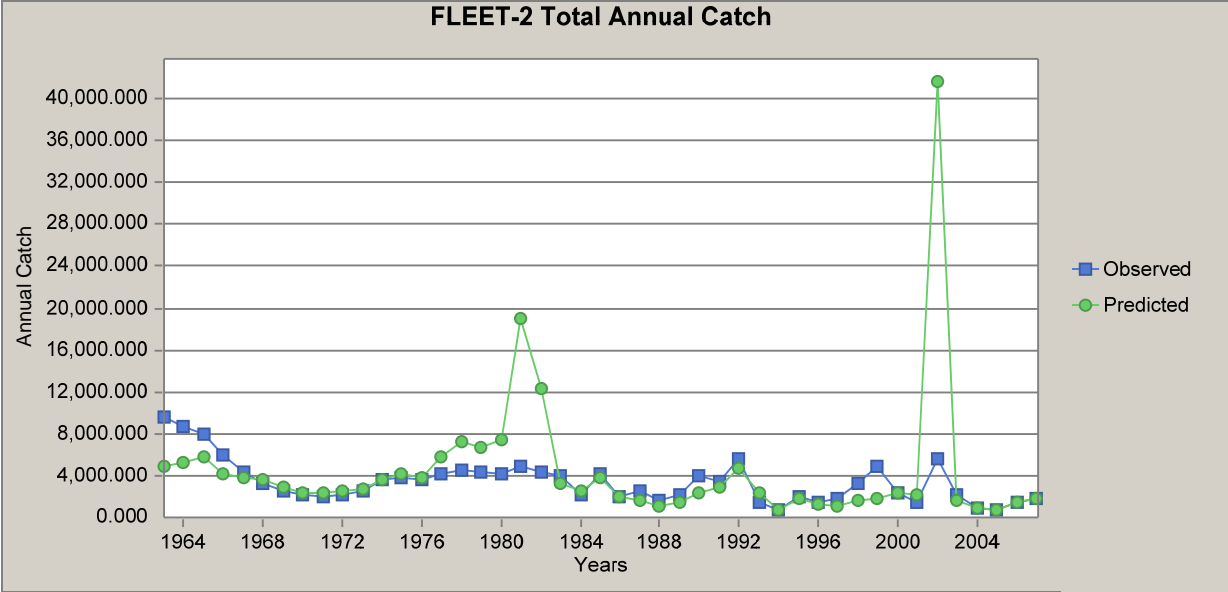


Figure 48. ASAP model BASE\_C2006 run fit for Commercial Fishery Aggregate Discards showing the large residual for the 2002 estimate

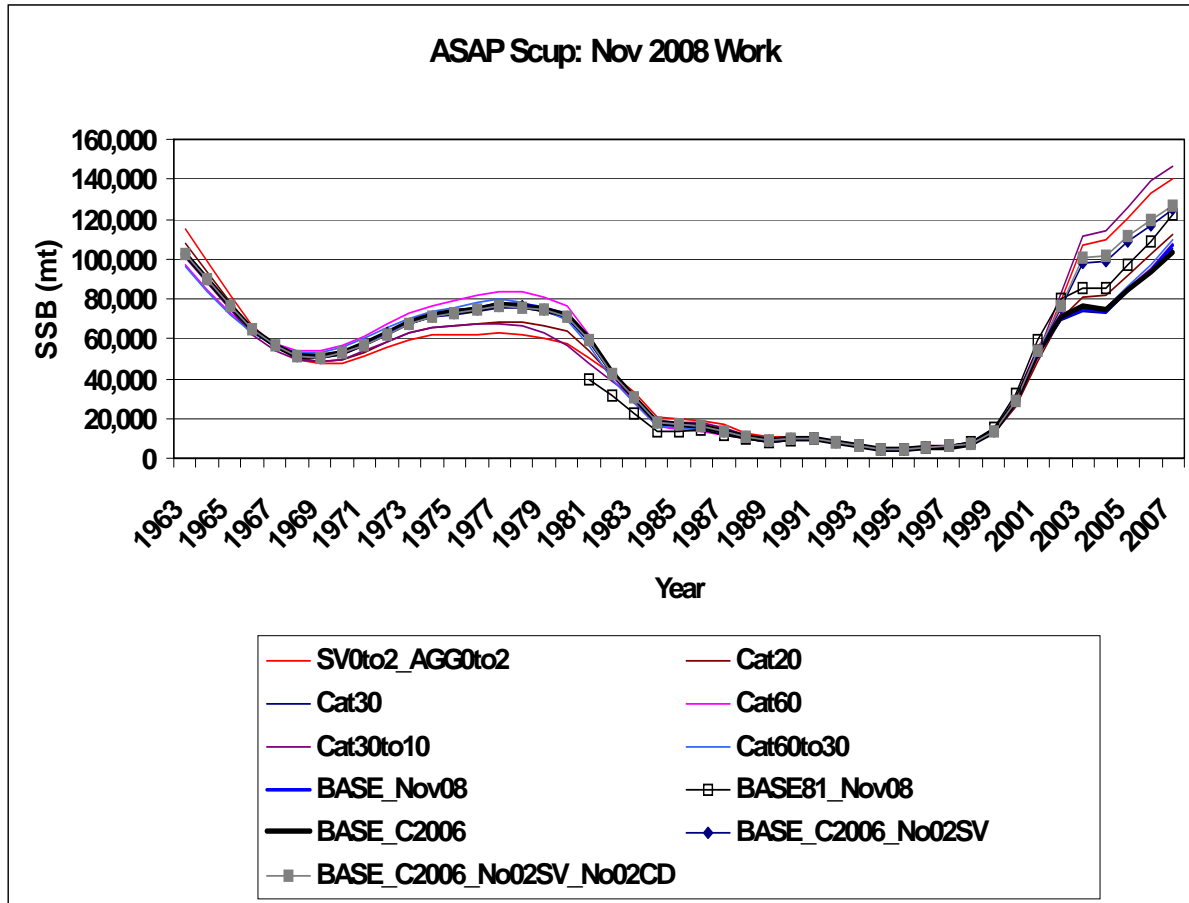


Figure 49. Comparative results for estimated SSB in ASAP runs for scup: effect of 2002 survey and commercial discard input data.



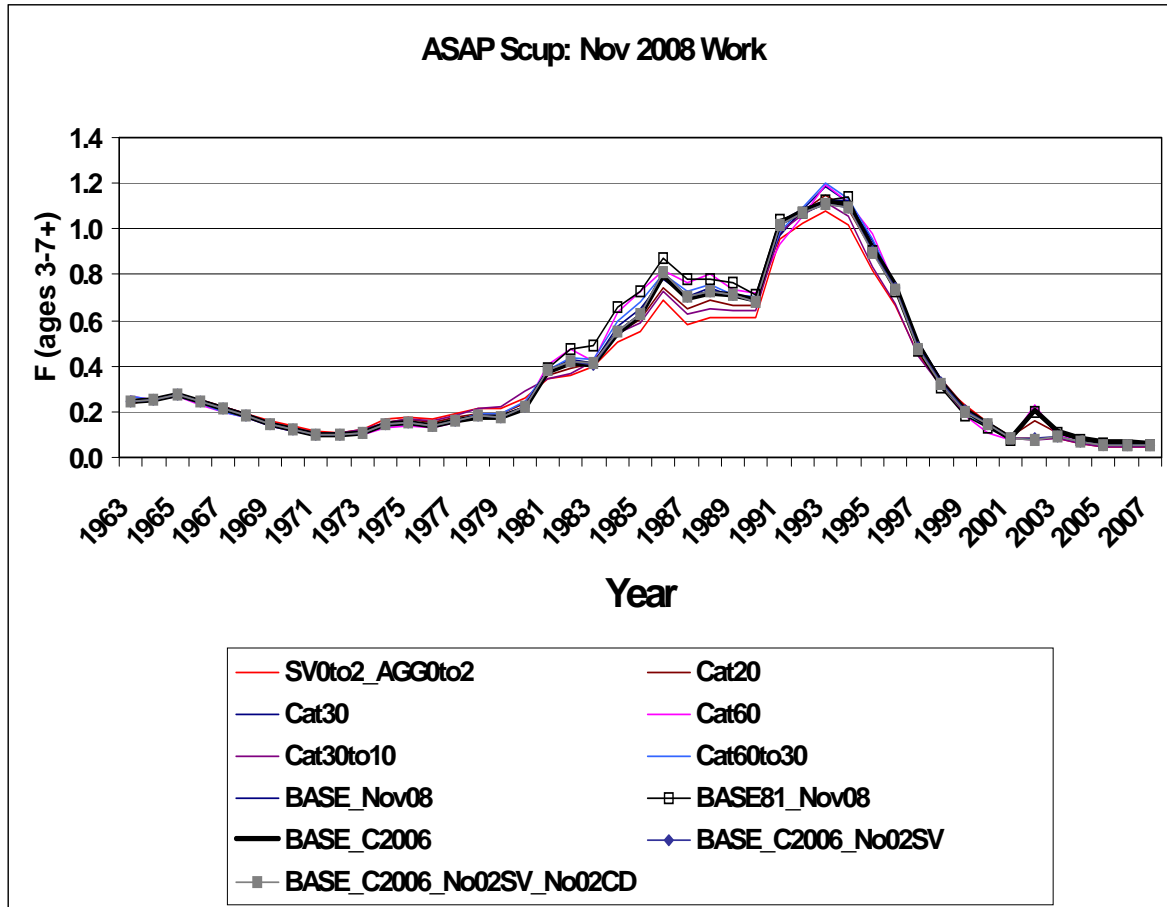


Figure 50. Comparative results for estimated F in ASAP runs for scup: effect of 2002 survey and commercial discard input data.

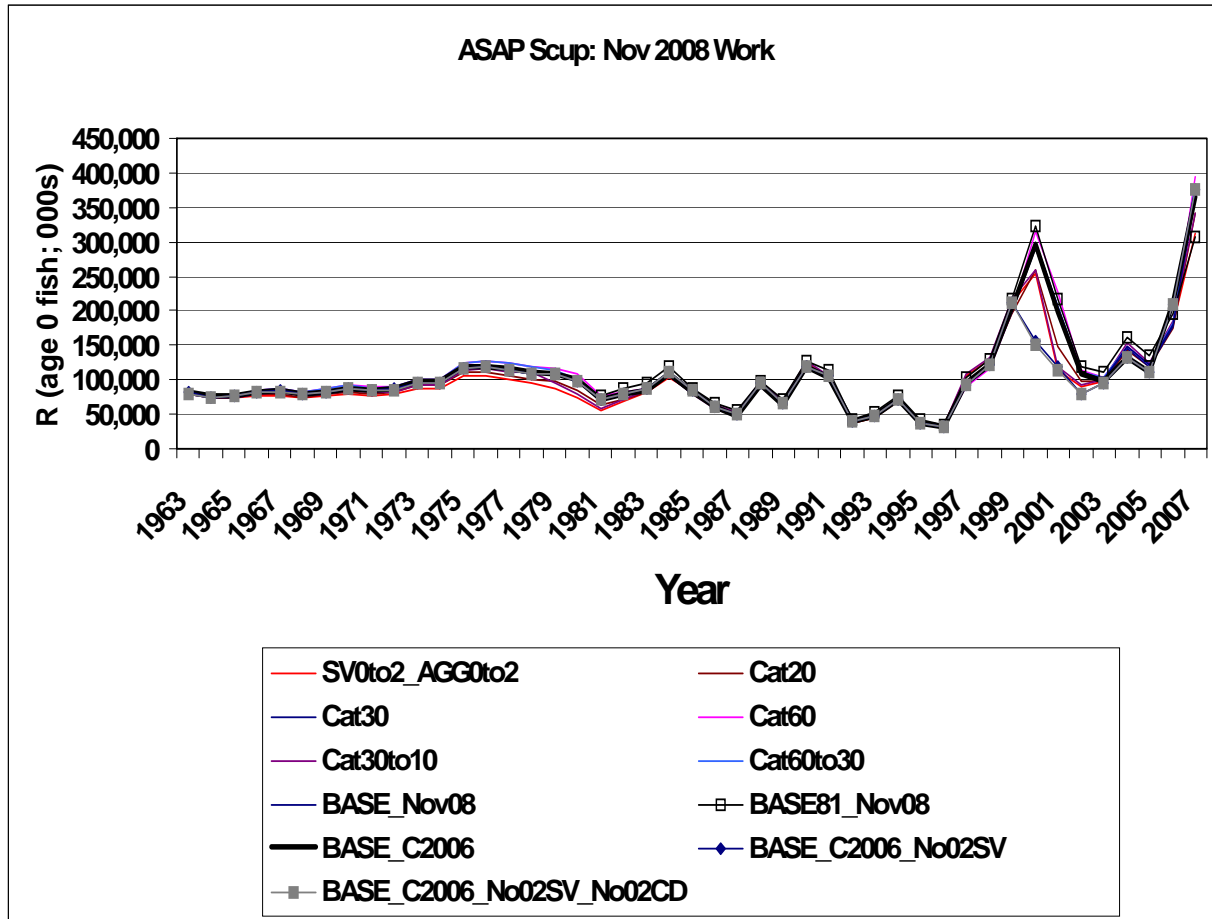


Figure 51. Comparative results for estimated recruitment in ASAP runs for scup: effect of 2002 survey and commercial discard input data.

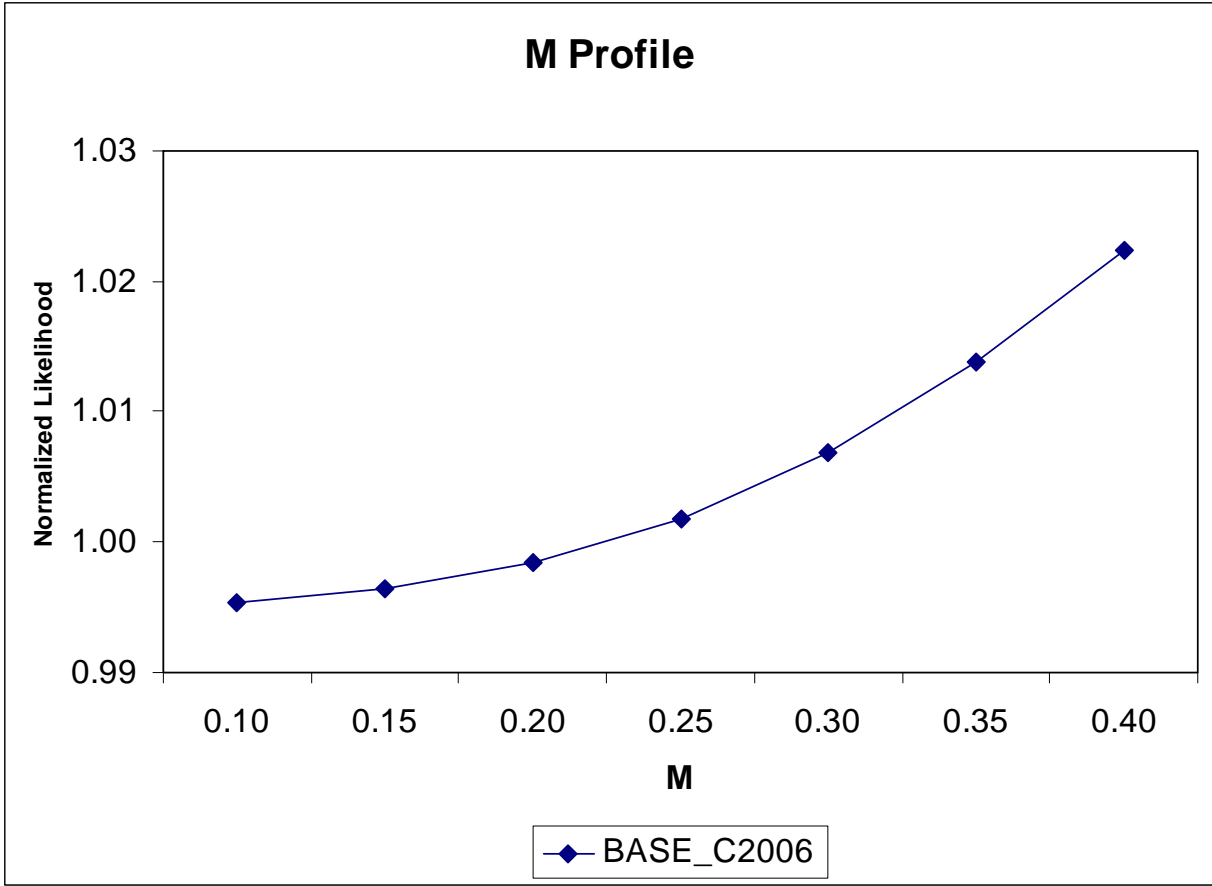


Figure 52. Sensitivity profile of the assumption for natural mortality (M) for the ASAP BASE\_C2006 model configuration.

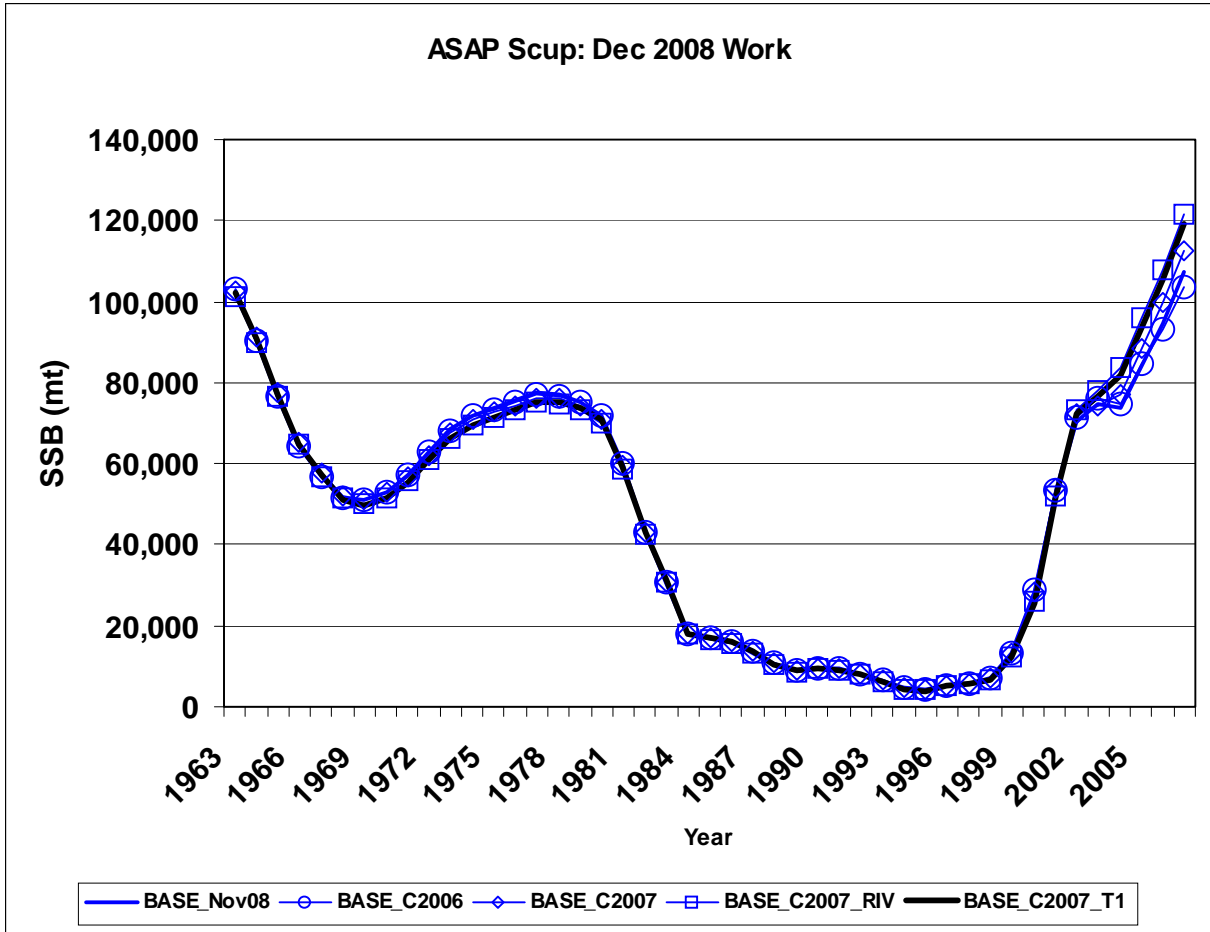


Figure 53. Comparative results for estimated SSB in ASAP runs for scup: run BASE\_C2007\_T1 (solid black line) is the accepted basis for biological reference points and status evaluation.

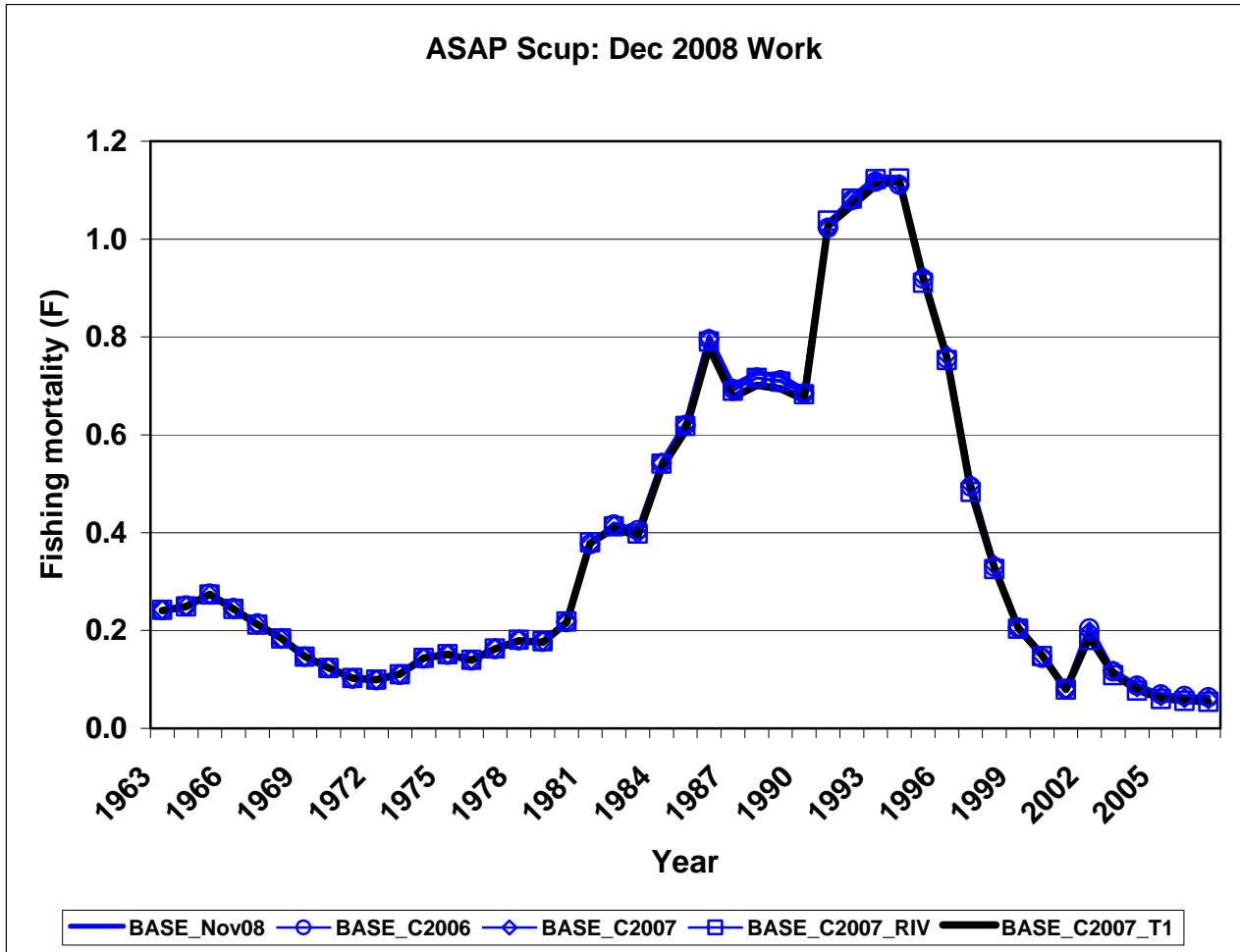


Figure 54. Comparative results for estimated F in ASAP runs for scup: run BASE\_C2007\_T1 (solid black line) is the accepted basis for biological reference points and status evaluation.

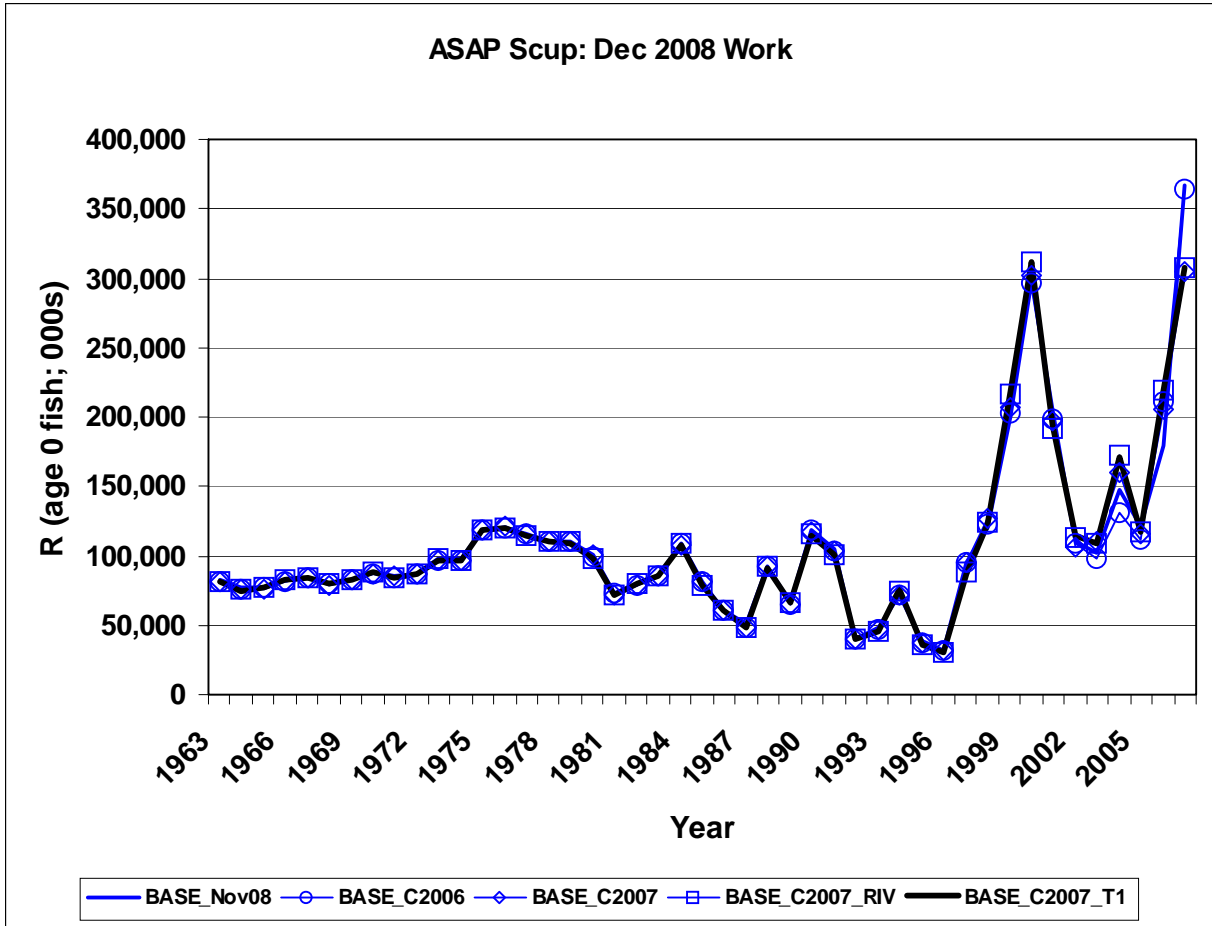


Figure 55. Comparative results for estimated recruitment in ASAP runs for scup: run BASE\_C2007\_T1 (solid black line) is the accepted basis for biological reference points and status evaluation.

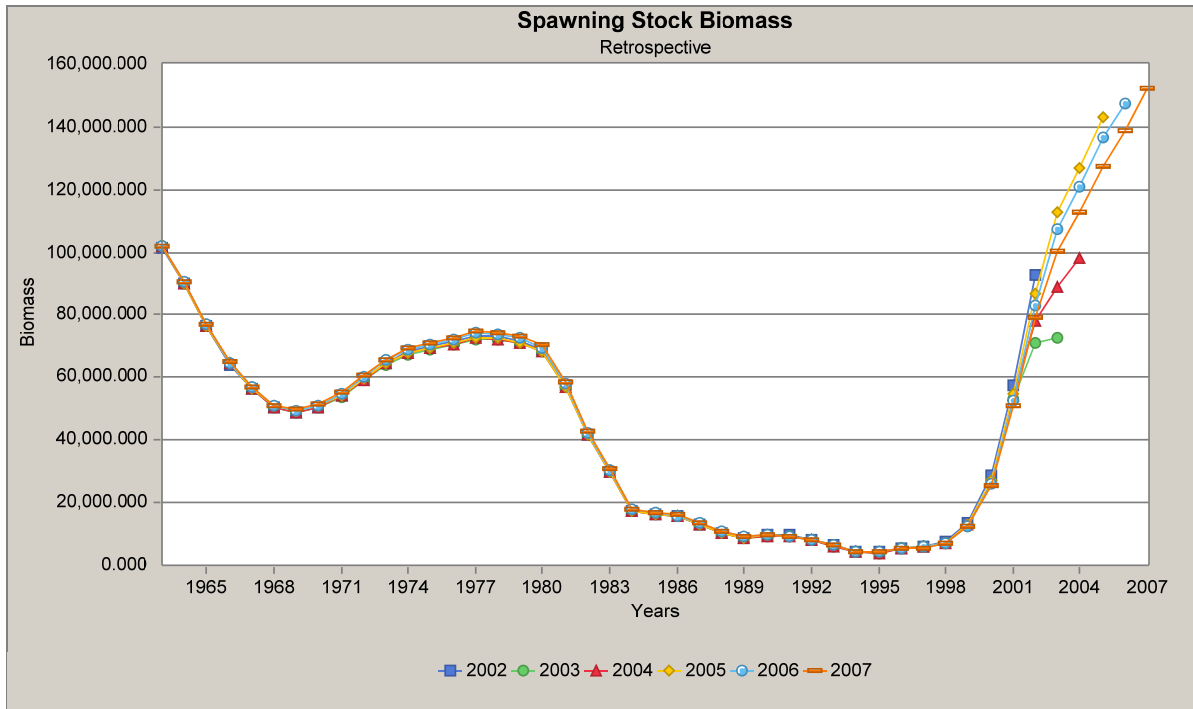


Figure 56. Retrospective analysis for SSB from Scup ASAP accepted model BASE\_C2007\_T1.

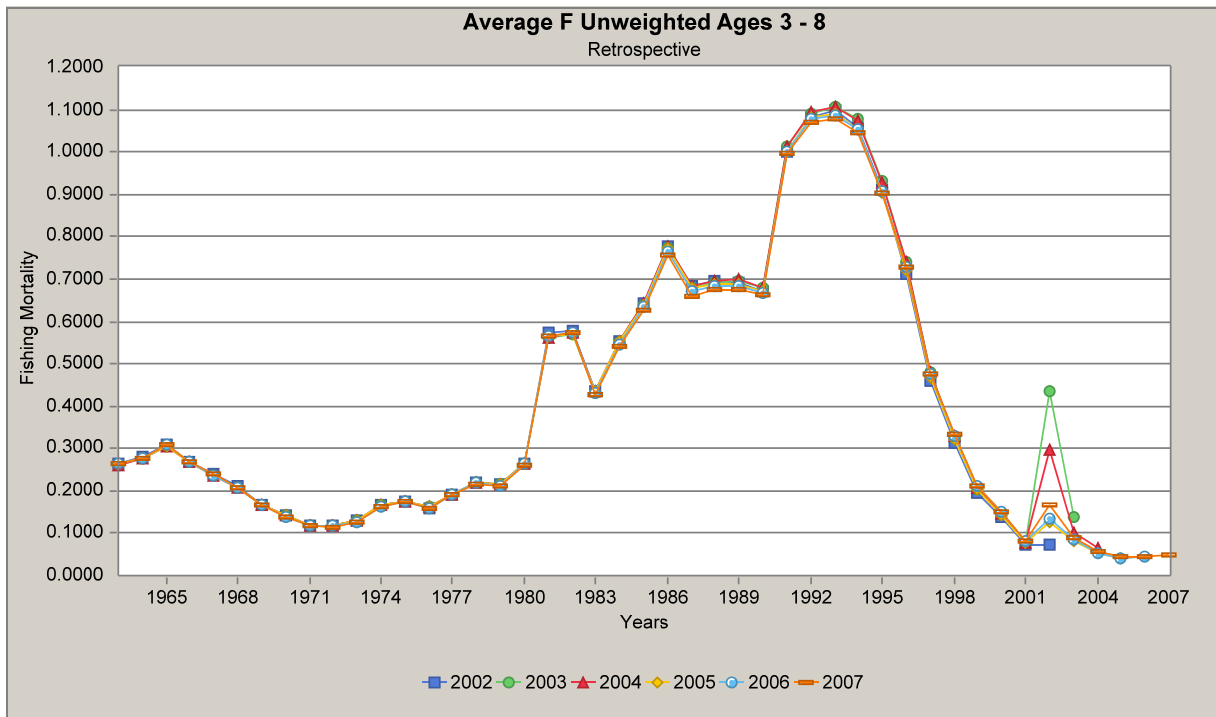


Figure 57. Retrospective analysis for fishing mortality (F) from Scup ASAP accepted model BASE\_C2007\_T1. Note that model coded ages 3-8 are true ages 2-7+.

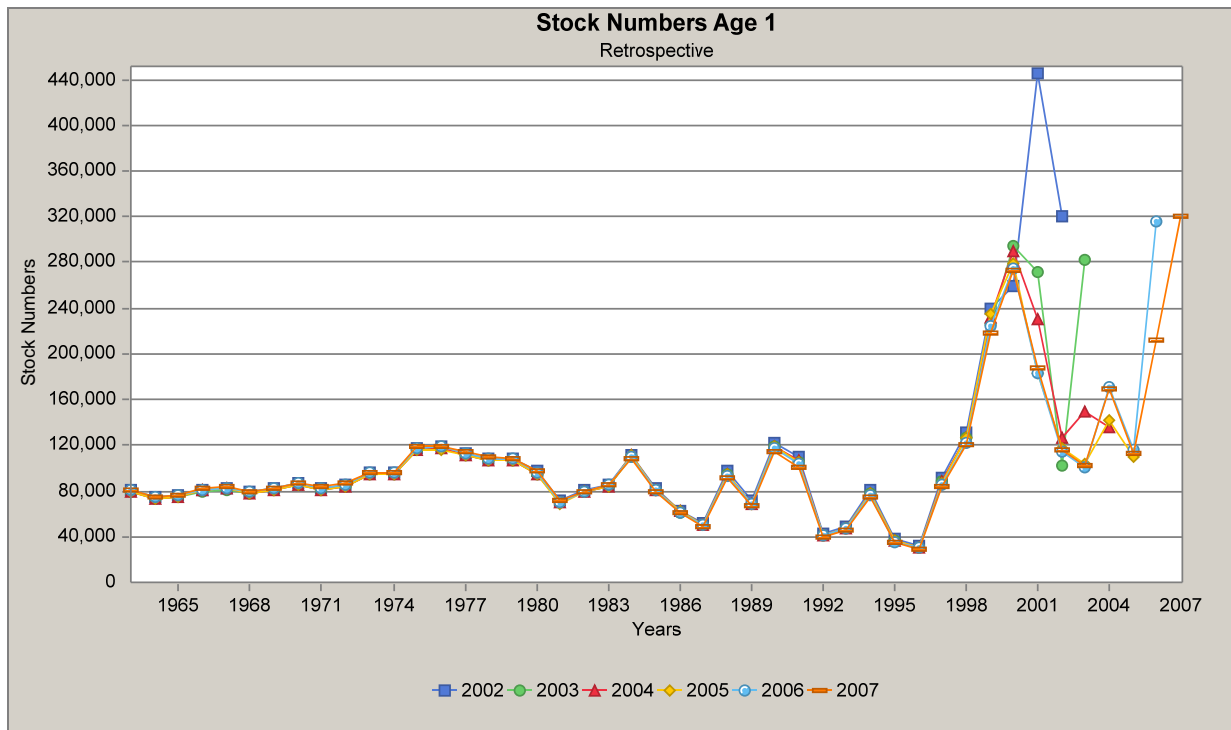


Figure 58. Retrospective analysis for recruitment at age 0 from Scup ASAP accepted model BASE\_C2007\_T1. Note that model coded age 1 is true age 0.



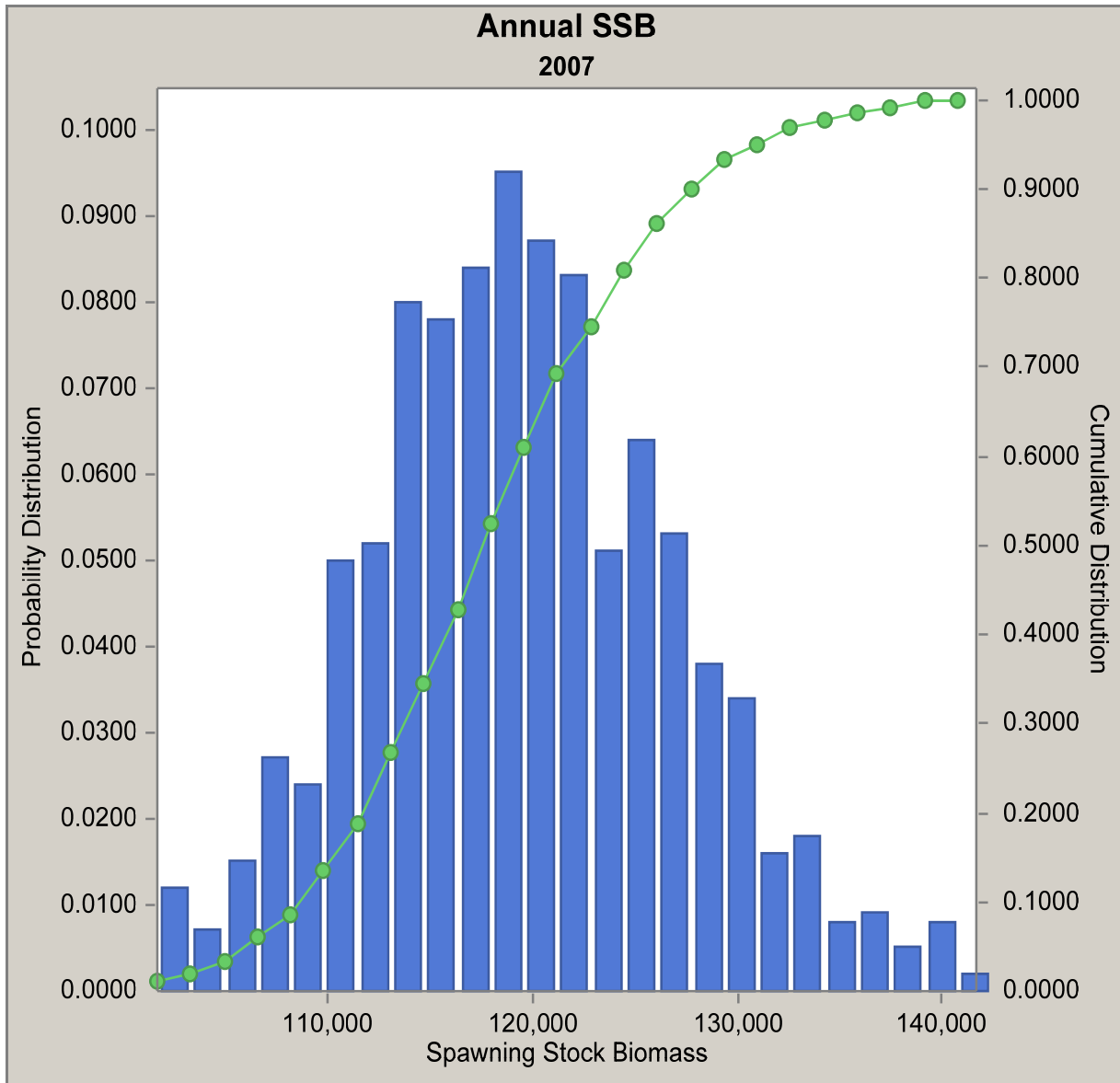


Figure 59. MCMC distribution of SSB in 2007 from the 2008 assessment accepted model BASE\_C2007\_T1.

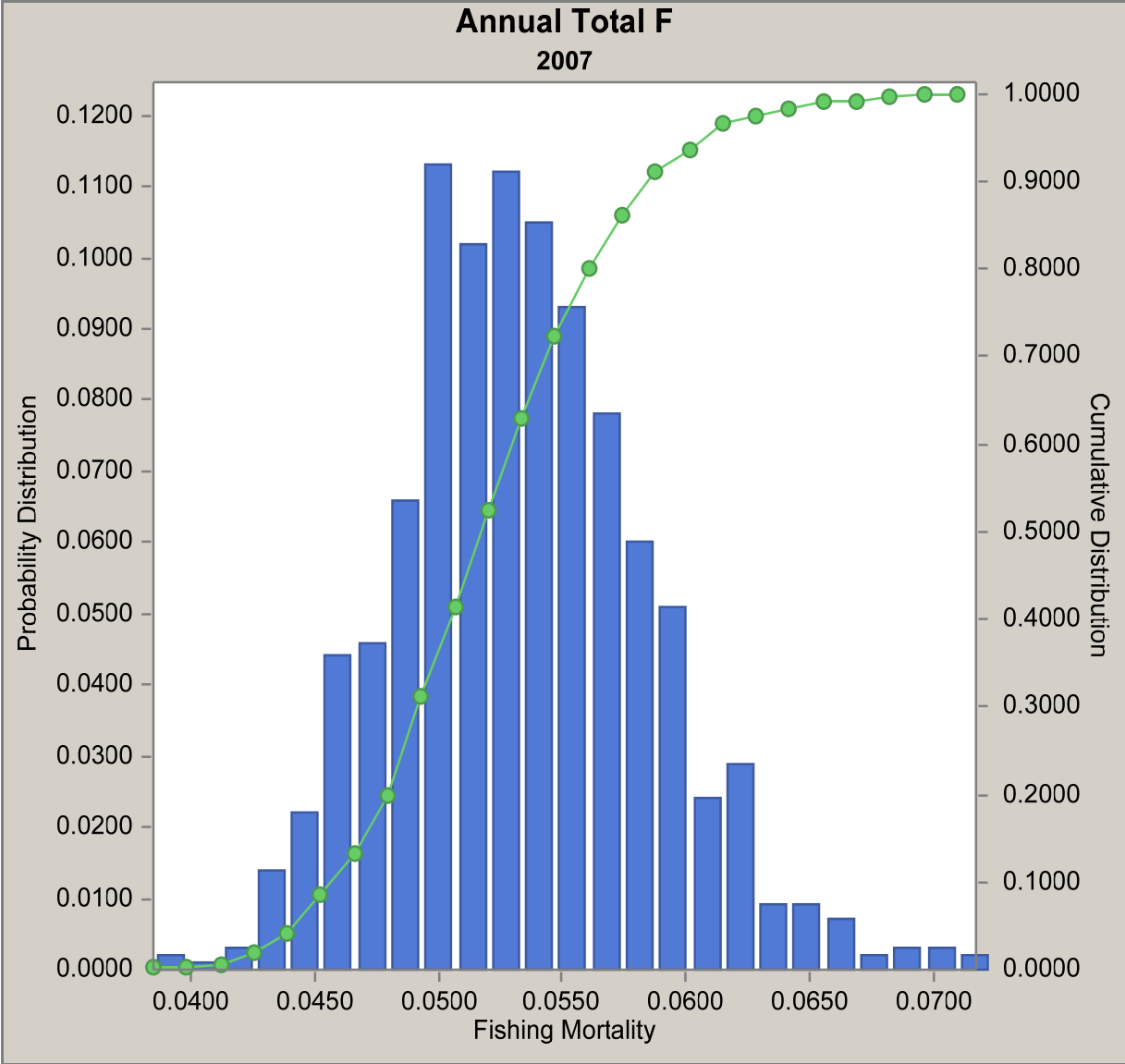


Figure 60. MCMC distribution of F in 2007 from the 2008 assessment accepted model BASE\_C2007\_T1.

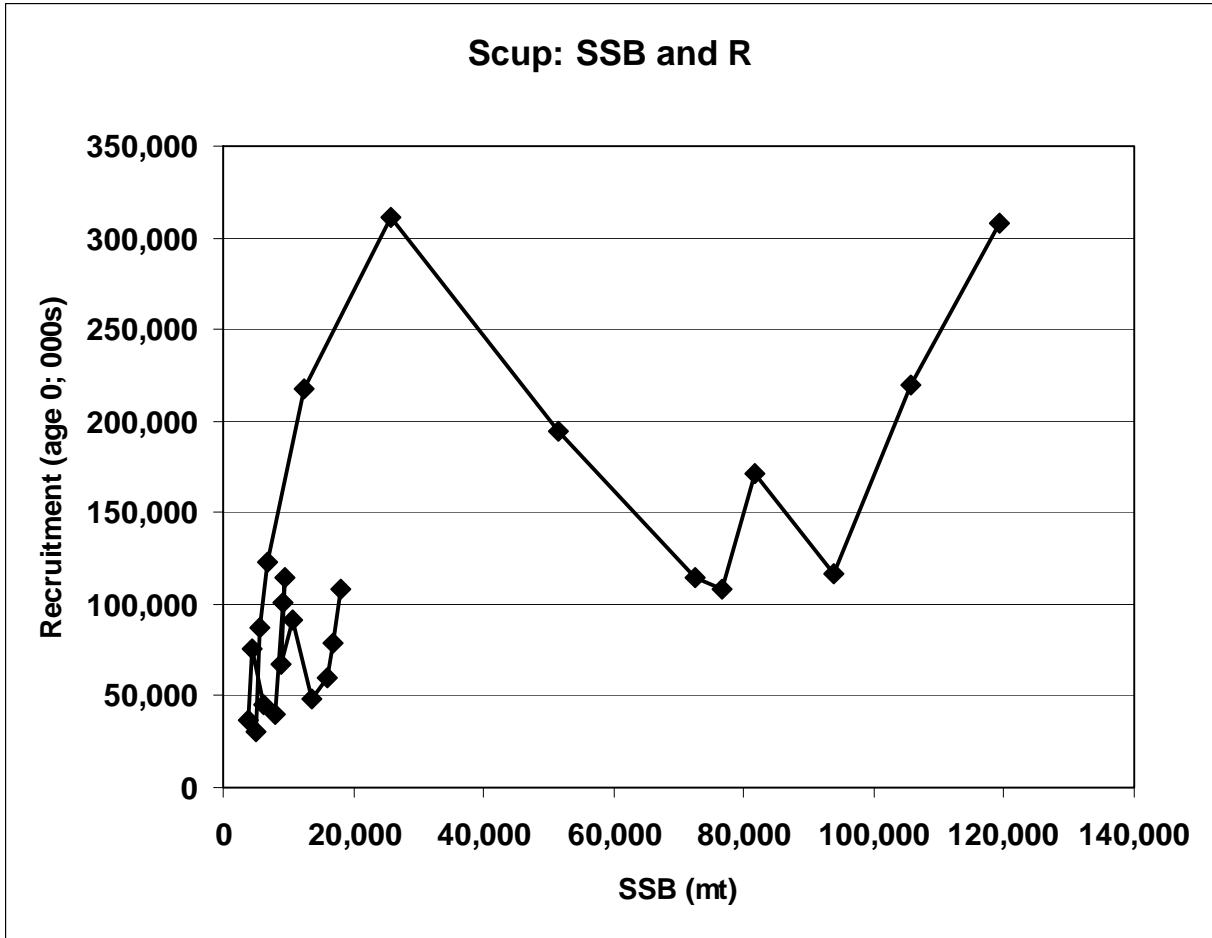


Figure 61. Spawning stock biomass (SSB; metric tons) and recruitment (age 0; 000s) estimates for scup from the 2008 assessment accepted model BASE\_C2007\_T1.

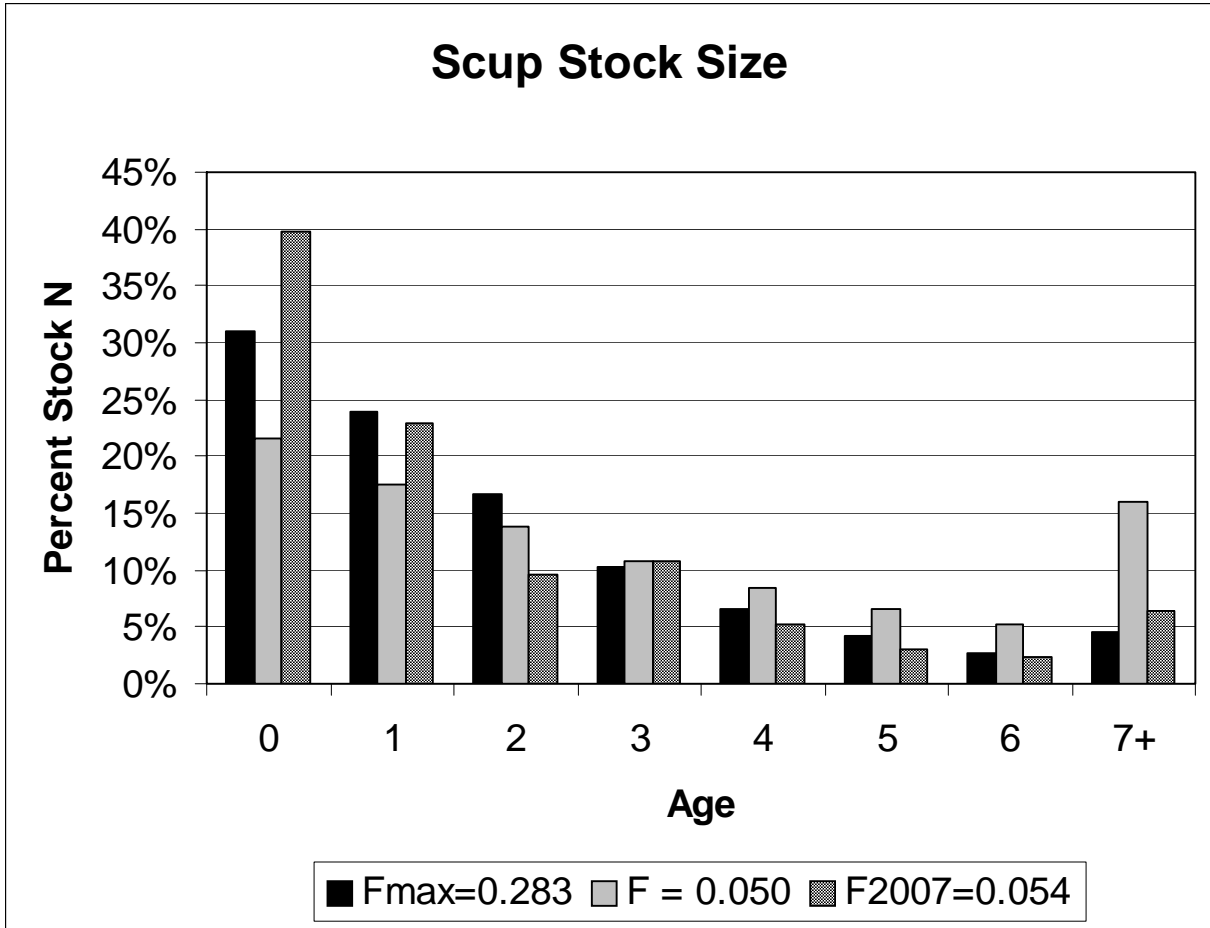


Figure 62. Percentage of scup stock size in numbers expected if the stock were fished at  $F_{max} = 0.283$  or  $F = 0.050$  over the long-term, compared with stock size percentages estimated for 2007 at  $F = 0.054$ .

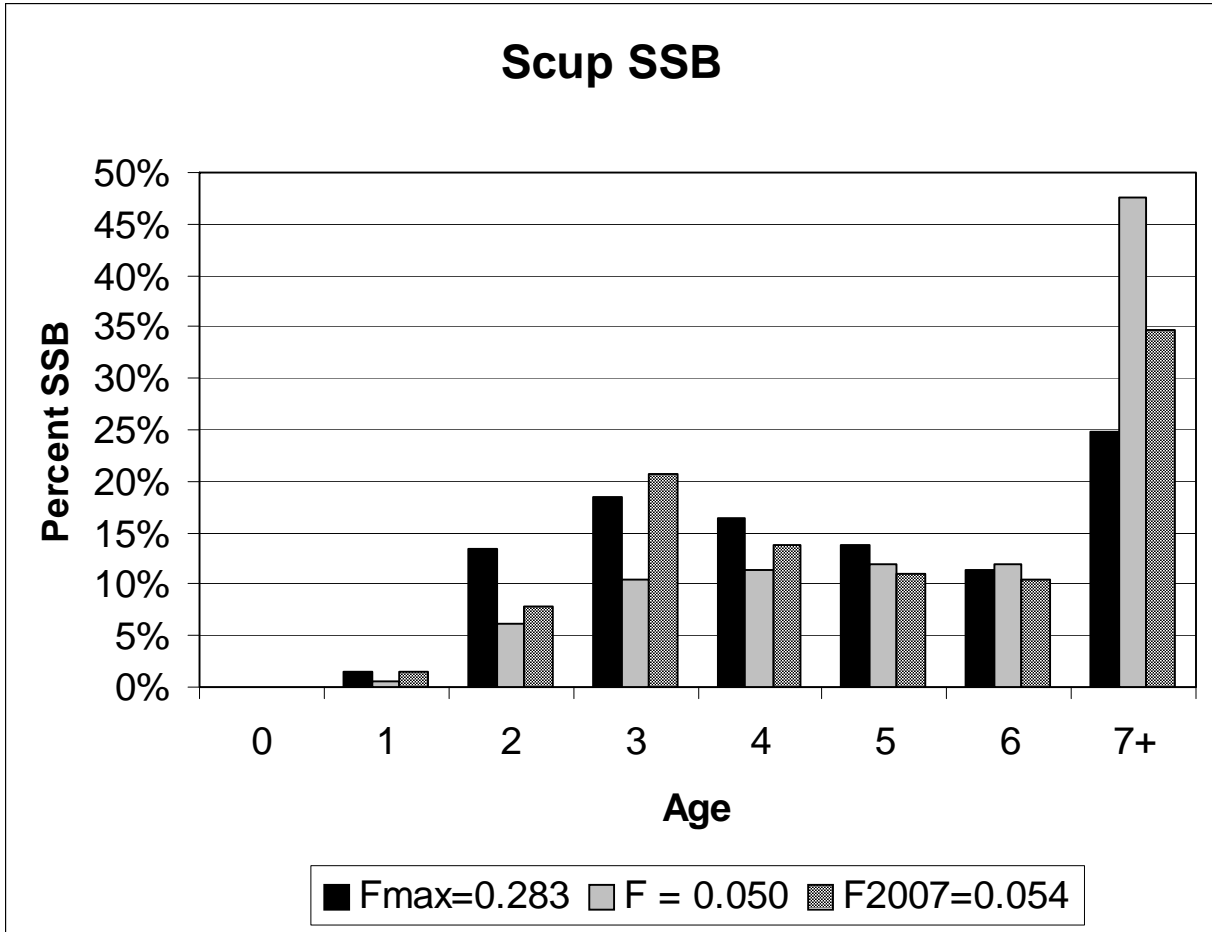


Figure 63. Percentage of SSB in weight expected if the stock were fished at  $F_{max} = 0.283$  or  $F = 0.050$  over the long-term, compared with SSB percentages estimated for 2007 at  $F = 0.054$ . Fish at ages 3 and older are fully (>99%) mature.

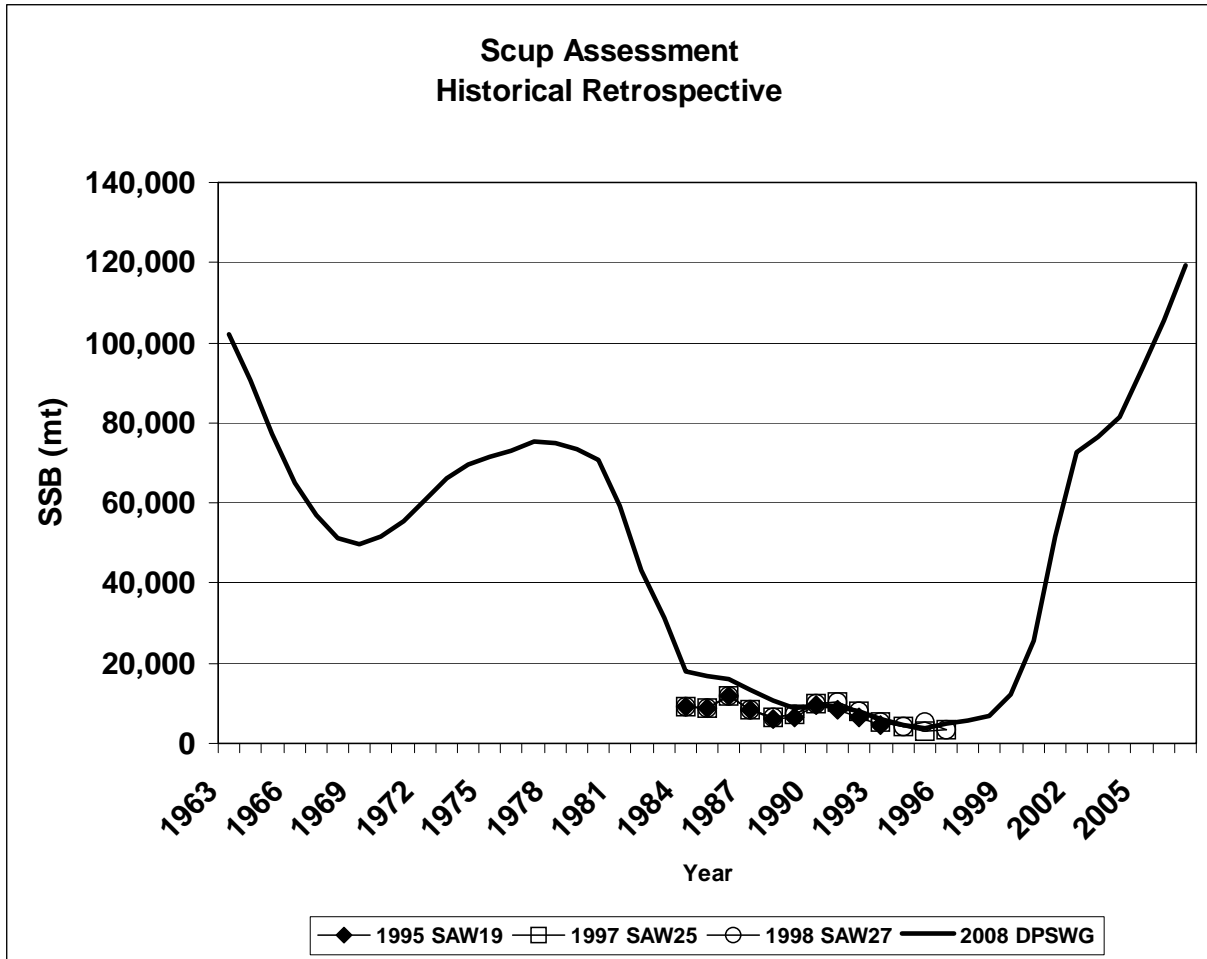


Figure 64. Historical retrospective of previous analytical assessments for scup: SSB. The 1995 SAW19 assessment was the last accepted peer-reviewed assessment. For the 1997 SAW25 and 1998 SAW27 assessments, the analytical components were not accepted as valid bases for assessing stock status. The SAW19, SAW25, and SAW27 analyses used the ADAPT VPA model for data beginning in 1984, while the 2008 DPSWG assessment uses the ASAP accepted model for data beginning in 1963.

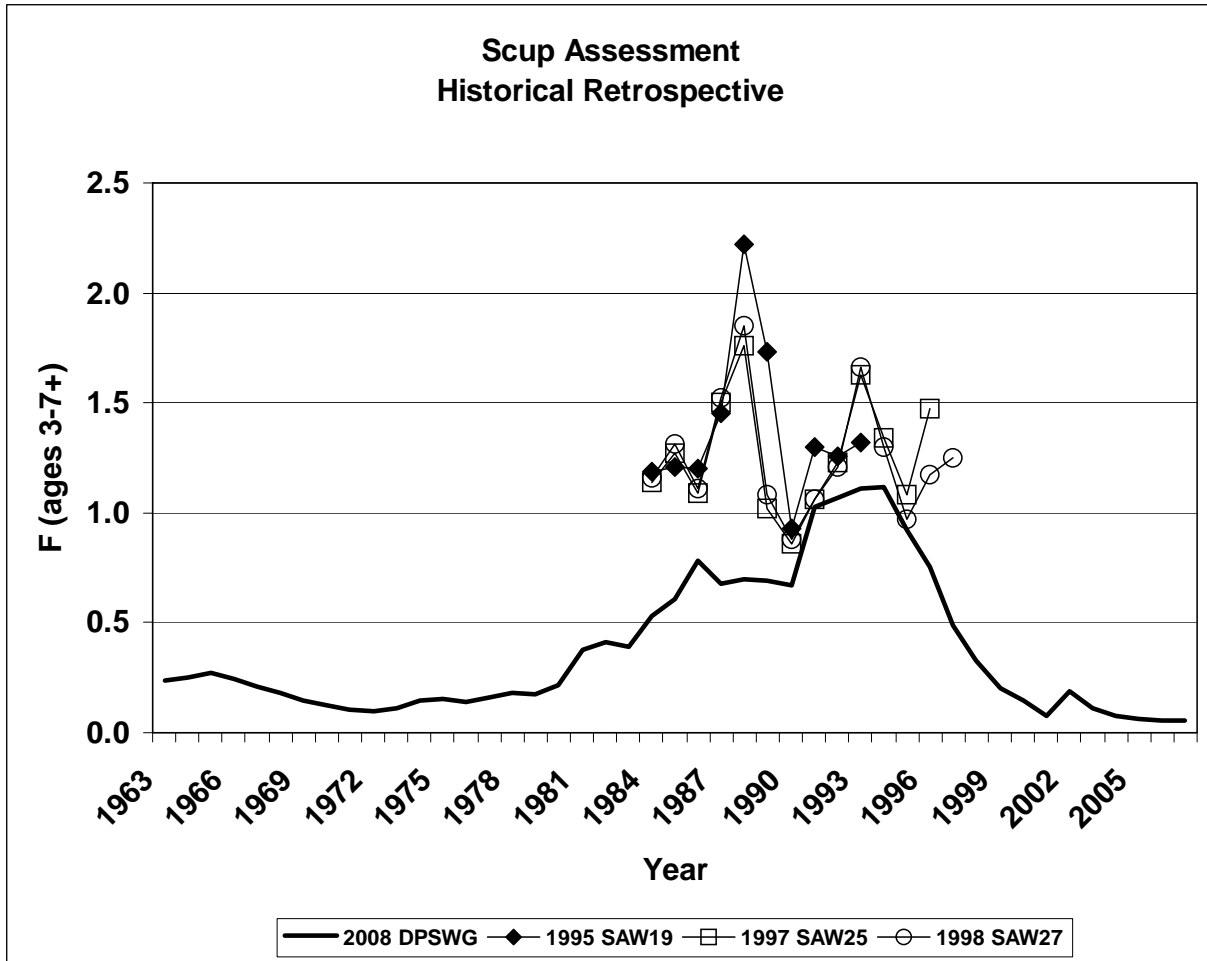


Figure 65. Historical retrospective of previous analytical assessments for scup: Fishing mortality (F). The 1995 SAW19 assessment was the last accepted peer-reviewed assessment. For the 1997 SAW25 and 1998 SAW27 assessments, the analytical components were not accepted as valid bases for assessing stock status. The SAW19, SAW25, and SAW27 analyses used the ADAPT VPA model for data beginning in 1984, while the 2008 DPSWG assessment uses the ASAP accepted model for data beginning in 1963.

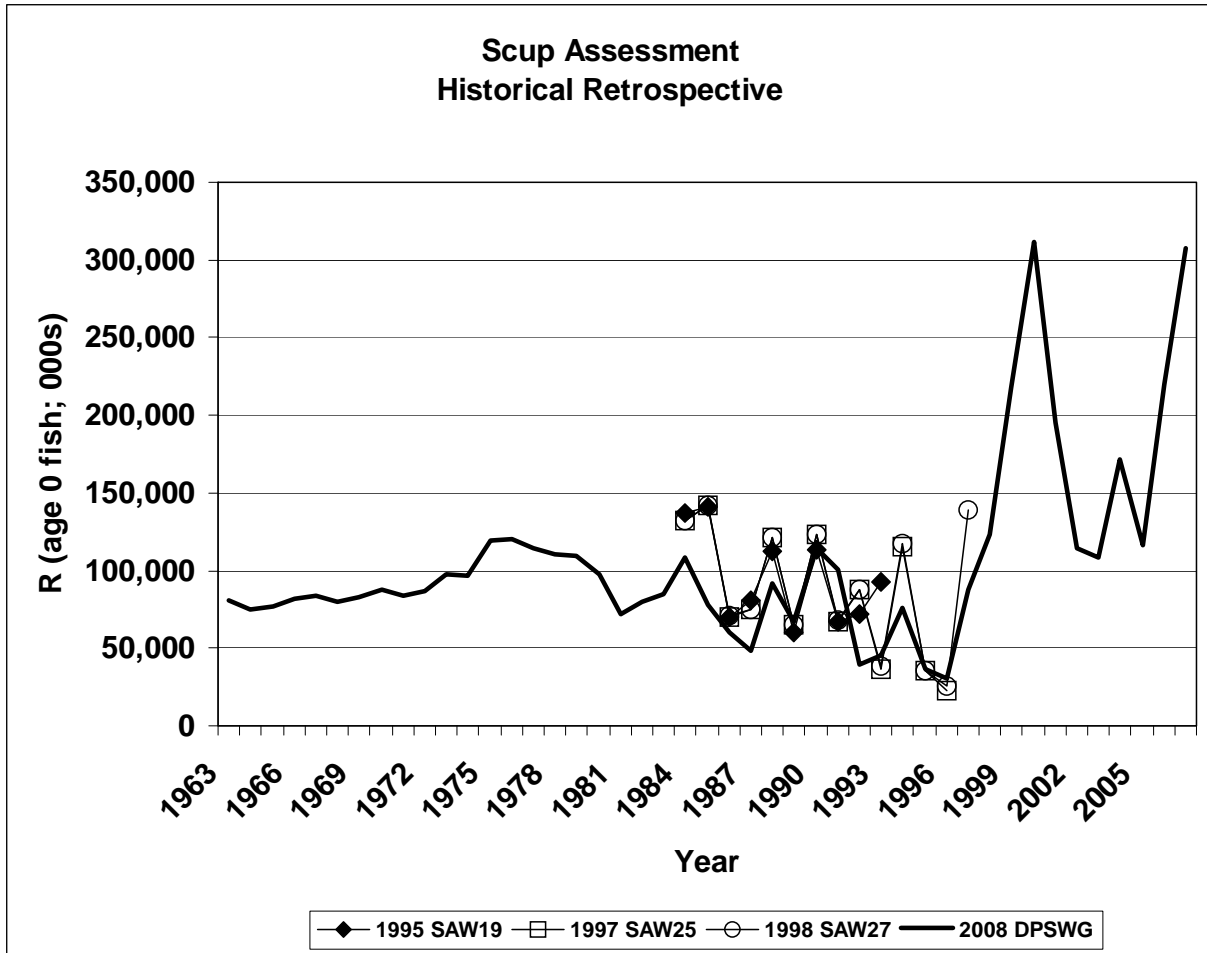


Figure 66. Historical retrospective of previous analytical assessments for scup: Recruitment at age 0 (R). The 1995 SAW19 assessment was the last accepted peer-reviewed assessment. For the 1997 SAW25 and 1998 SAW27 assessments, the analytical components were not accepted as valid bases for assessing stock status. The SAW19, SAW25, and SAW27 analyses used the ADAPT VPA model for data beginning in 1984, while the 2008 DPSWG assessment uses the ASAP accepted model for data beginning in 1963.