NEFSC Weighout CPUE GLM model

```
The                                        SAS                                        System
14:00 Thursday, March 31, 2005   1
The GLM Procedure
                                                        Class Level Information
Class       Levels  Values

lndyear         15  1979 1980 1981 1982 1983 1985 1986 1987 1988 1989 1990 1991 1992 1993 9999

permit          92        (delete permit numbers)
Number of observations    1897
The                                        SAS                                        System
14:00 Thursday, March 31, 2005   2

The GLM Procedure
 Dependent Variable: LNCPUE

                                          Sum of
Source                      DF         Squares     Mean Square    F Value    Pr > F
Model                      105      743.569869        7.081618      23.67    <.0001
Error                     1791      535.787323        0.299155

Corrected Total           1896     1279.357192

R-Square     Coeff Var      Root MSE    LNCPUE Mean
0.581206      8.116663      0.546951       6.738619

Source                      DF       Type I SS     Mean Square    F Value    Pr > F
lndyear                     14     566.9637531      40.4974109     135.37    <.0001
permit                      91     176.6061156       1.9407265       6.49    <.0001

Source                      DF     Type III SS     Mean Square    F Value    Pr > F
lndyear                     14     281.1521083      20.0822934      67.13    <.0001
permit                      91     176.6061156       1.9407265       6.49    <.0001

                                                Standard
Parameter              Estimate                  Error    t Value    Pr > |t|

Intercept           6.232567267 B      0.11429828      54.53      <.0001
lndyear   1979      1.022878443 B      0.07430951      13.77      <.0001
lndyear   1980      0.991305758 B      0.07181247      13.80      <.0001
lndyear   1981      0.957632235 B      0.07168379      13.36      <.0001
lndyear   1982      0.461931590 B      0.07359297       6.28      <.0001
lndyear   1983      0.036989477 B      0.07511938       0.49      0.6225
lndyear   1985     -0.116577906 B      0.07301030      -1.60      0.1105
lndyear   1986      0.078237855 B      0.07992860       0.98      0.3278
lndyear   1987      0.235247667 B      0.07689409       3.06      0.0023
lndyear   1988     -0.290869711 B      0.08580020      -3.39      0.0007
lndyear   1989     -0.437414680 B      0.11355219      -3.85      0.0001
lndyear   1990     -0.412418009 B      0.10524248      -3.92      <.0001
lndyear   1991     -0.462210977 B      0.09637704      -4.80      <.0001
lndyear   1992     -0.213720208 B      0.09349023      -2.29      0.0224
lndyear   1993     -0.277906028 B      0.09113548      -3.05      0.0023
lndyear   9999      0.000000000 B       .                .          .
permit    -         0.053877941 B      0.39953947       0.13      0.8927
permit    -         0.290799259 B      0.40217631       0.72      0.4697
permit    -         2.200653904 B      0.55660933       3.95      <.0001
permit    -        -0.720065816 B      0.33062733      -2.18      0.0295
permit    -         1.204048080 B      0.23673422       5.09      <.0001
permit    -        -0.918838210 B      0.55660933      -1.65      0.0990
permit    -         0.884977111 B      0.55660933       1.59      0.1120
permit    -         0.089186369 B      0.13030426       0.68      0.4938
permit    -         0.351073875 B      0.55660933       0.63      0.5283
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permit	-	-0.474685588	B	0.40127024	-1.18	0.2370
permit	-	-1.051239079	B	0.55796370	-1.88	0.0597
permit	-	0.883791874	B	0.55876605	1.58	0.1139
permit	-	0.042036558	B	0.15197217	0.28	0.7821
permit	-	-2.501448583	B	0.55827964	-4.48	<.0001
permit	-	0.450272193	B	0.12822212	3.51	0.0005
permit	-	0.471191134	B	0.55809344	0.84	0.3986
permit	-	-0.050060896	B	0.14723604	-0.34	0.7339
permit	-	-0.138317903	B	0.24734699	-0.56	0.5761
permit	-	0.288864363	B	0.40301160	0.72	0.4736
permit	-	-0.719753788	B	0.55856606	-1.29	0.1977
permit	-	0.539895149	B	0.20257954	2.67	0.0078
permit	-	0.200325406	B	0.14810284	1.35	0.1764
permit	-	0.166798650	B	0.13012707	1.28	0.2001
permit	-	0.171959971	B	0.11302093	1.52	0.1283
permit	-	0.231976547	B	0.12244851	1.89	0.0583
permit	-	0.024125664	B	0.13432034	0.18	0.8575
permit	-	0.094051267	B	0.16446785	0.57	0.5675
permit	-	0.371090946	B	0.17507191	2.12	0.0342
permit	-	0.068525060	B	0.15621988	0.44	0.6610
permit	-	0.291237884	B	0.55606608	0.52	0.6005
permit	-	0.250774748	B	0.19444954	1.29	0.1973
permit	-	-1.365464039	B	0.19254217	-7.09	<.0001
permit	-	0.202892095	B	0.11692497	1.74	0.0829
permit	-	-0.150565146	B	0.55660933	-0.27	0.7868
permit	-	-1.227887492	B	0.55827964	-2.20	0.0280
permit	-	-1.316984788	B	0.55796370	-2.36	0.0184
permit	-	0.055682092	B	0.55606608	0.10	0.9202
permit	-	0.476788308	B	0.56089822	0.85	0.3954
permit	-	-1.513147475	B	0.22407363	-6.75	<.0001
permit	-	0.925030445	B	0.56089822	1.65	0.0993
permit	-	-0.260880622	B	0.40623775	-0.64	0.5208
permit	-	0.277147040	B	0.11033921	2.51	0.0121
permit	-	-0.894403775	B	0.26894018	-3.33	0.0009
permit	-	-0.087797738	B	0.21953680	-0.40	0.6893
permit	-	0.002668324	B	0.19877790	0.01	0.9893
permit	-	0.496364007	B	0.10872728	4.57	<.0001
permit	-	-0.163600190	B	0.55796370	-0.29	0.7694
permit	-	0.467983305	B	0.12033347	3.89	0.0001
permit	-	0.024708856	B	0.13276574	0.19	0.8524
permit	-	-1.665756882	B	0.40275435	-4.14	<.0001
permit	-	-0.008289609	B	0.21203679	-0.04	0.9688
permit	-	0.422212817	B	0.56253472	0.75	0.4530
permit	-	-0.994541917	B	0.41068120	-2.42	0.0155
permit	-	0.640814312	B	0.17122800	3.74	0.0002
permit	-	0.289229697	B	0.11245469	2.57	0.0102
permit	-	0.232020794	B	0.11406216	2.03	0.0421
permit	-	0.435287696	B	0.23285239	1.87	0.0617
permit	-	-0.093362255	B	0.55876605	-0.17	0.8673
permit	-	0.565119319	B	0.29382393	1.92	0.0546
permit	-	0.185883996	B	0.10864670	1.71	0.0873
permit	-	0.383628924	B	0.26777330	1.43	0.1521
permit	-	-0.429338431	B	0.15476255	-2.77	0.0056
permit	-	0.941153790	B	0.26751142	3.52	0.0004
permit	-	-0.144900138	B	0.55876605	-0.26	0.7954
permit	-	-0.018365360	B	0.39831869	-0.05	0.9632
permit	-	0.233109656	B	0.24325318	0.96	0.3380
permit	-	0.579583698	B	0.55656992	1.04	0.2979
permit	-	0.280357477	B	0.14815327	1.89	0.0586
permit	-	-0.220190021	B	0.33549831	-0.66	0.5117
permit	-	0.477244382	B	0.17126647	2.79	0.0054
permit	-	0.586558492	B	0.29544304	1.99	0.0473
permit	-	1.003951166	B	0.55606608	1.81	0.0712
permit	-	0.882877530	B	0.33498687	2.64	0.0085
permit	-	0.191509700	B	0.24286878	0.79	0.4305
permit	-	0.297364159	B	0.29099874	1.02	0.3070
permit	-	0.283495433	B	0.12957609	2.19	0.0288
permit	-	1.042813481	B	0.56089822	1.86	0.0632
permit	-	-0.065468315	B	0.19188028	-0.34	0.7330
permit	-	-0.153684912	B	0.40328873	-0.38	0.7032
permit	-	0.036432483	B	0.15621610	0.23	0.8156

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permit    -         0.099929826 B      0.29223882       0.34      0.7324
permit    -         0.224377910 B      0.11753056       1.91      0.0564
permit    -         0.334472400 B      0.29263852       1.14      0.2532
permit    -         0.346528767 B      0.39933585       0.87      0.3856
permit    -         0.131354900 B      0.17613902       0.75      0.4559
permit    -         0.056859718 B      0.15272950       0.37      0.7097
permit    -        -1.420176111 B      0.55660933      -2.55      0.0108
permit    -        -1.054505031 B      0.33062733      -3.19      0.0015
permit    -         1.290671749 B      0.56253472       2.29      0.0219
permit    -        -0.545675103 B      0.55660933      -0.98      0.3270
permit    -         0.722755358 B      0.12789264       5.65      <.0001
permit    -         0.000000000 B       .                .         .
```

NEFSC VTR CPUE GLM model

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The GLM Procedure

Class Level Information
Class       Levels  Values

lndyear         19  1995 1996 1997 1998 1999 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
                    2011 2012 2013 9999

permit          36  (delete permit numbers)



Number of Observations Read        2146
Number of Observations Used        2146
                                                                                          14:00  Friday,
November 8, 2013   2
The GLM Procedure

Dependent Variable: LNCPUE

                                          Sum of
Source                      DF          Squares     Mean Square    F Value    Pr > F

Model                       53       648.075178       12.227834      58.58    <.0001
Error                     2092       436.644890        0.208721
Corrected Total           2145      1084.720068

R-Square     Coeff Var      Root MSE    LNCPUE Mean
0.597458      6.805228      0.456860       6.713372

Source                      DF        Type I SS     Mean Square    F Value    Pr > F
lndyear                     18      452.2524125      25.1251340     120.38    <.0001
permit                      35      195.8227654       5.5949362      26.81    <.0001

Source                      DF      Type III SS     Mean Square    F Value    Pr > F
lndyear                     18      400.8695114      22.2705284     106.70    <.0001
permit                      35      195.8227654       5.5949362      26.81    <.0001

                                                  Standard
Parameter                Estimate                    Error    t Value    Pr > |t|

Intercept             5.073759644 B       0.27110831      18.71      <.0001
lndyear   1995       -0.010840525 B       0.06456189      -0.17      0.8667
lndyear   1996        0.325454976 B       0.06062010       5.37      <.0001
lndyear   1997        0.848643292 B       0.05958290      14.24      <.0001
lndyear   1998        0.318906222 B       0.05795507       5.50      <.0001
lndyear   1999       -0.016218797 B       0.05978930      -0.27      0.7862
lndyear   2001        0.343345263 B       0.06155312       5.58      <.0001
lndyear   2002        0.543557316 B       0.06193521       8.78      <.0001
lndyear   2003        1.026699630 B       0.06420643      15.99      <.0001
lndyear   2004        1.357155069 B       0.06265746      21.66      <.0001
lndyear   2005        1.540431534 B       0.06664663      23.11      <.0001
lndyear   2006        1.217942412 B       0.06591796      18.48      <.0001
lndyear   2007        0.789623034 B       0.06544416      12.07      <.0001
```

lndyear	2008	0.378445974	B	0.06286125	6.02	<.0001
lndyear	2009	0.523148894	B	0.06381061	8.20	<.0001
lndyear	2010	1.170092352	B	0.06483635	18.05	<.0001
lndyear	2011	1.386115179	B	0.06781105	20.44	<.0001
lndyear	2012	1.161758259	B	0.06787520	17.12	<.0001
lndyear	2013	1.023305566	B	0.07686102	13.31	<.0001

November 8, 2013
The GLM Procedure

Dependent Variable: LNCPUE

Parameter		Estimate		Standard Error	t Value	Pr > |t|
lndyear	9999	0.000000000	B	.	.	.
permit	-	1.000240081	B	0.53108744	1.88	0.0598
permit	-	-1.021792024	B	0.33616119	-3.04	0.0024
permit	-	-0.179783079	B	0.42173492	-0.43	0.6699
permit	-	0.518893867	B	0.28755105	1.80	0.0713
permit	-	0.648328200	B	0.28668452	2.26	0.0238
permit	-	1.078960128	B	0.53066901	2.03	0.0422
permit	-	0.004834108	B	0.29663146	0.02	0.9870
permit	-	0.207649348	B	0.29312039	0.71	0.4788
permit	-	-0.253254364	B	0.35683079	-0.71	0.4779
permit	-	0.807880459	B	0.28104760	2.87	0.0041
permit	-	0.830907462	B	0.32758196	2.54	0.0113
permit	-	0.331394774	B	0.35509381	0.93	0.3508
permit	-	0.478936831	B	0.27731798	1.73	0.0843
permit	-	0.088150844	B	0.27771544	0.32	0.7510
permit	-	0.955828220	B	0.26860601	3.56	0.0004
permit	-	-0.019828893	B	0.28588920	-0.07	0.9447
permit	-	0.722948931	B	0.27614561	2.62	0.0089
permit	-	0.530397700	B	0.31049062	1.71	0.0877
permit	-	0.305959594	B	0.32044878	0.95	0.3398
permit	-	0.363977510	B	0.31161281	1.17	0.2429
permit	-	0.758052492	B	0.27401682	2.77	0.0057
permit	-	1.960291509	B	0.53091498	3.69	0.0002
permit	-	0.948976026	B	0.26858505	3.53	0.0004
permit	-	-2.225412900	B	0.53163198	-4.19	<.0001
permit	-	-0.538962670	B	0.53096245	-1.02	0.3102
permit	-	0.386452271	B	0.29935630	1.29	0.1969
permit	-	-1.059762130	B	0.53124475	-1.99	0.0462
permit	-	0.221800322	B	0.28682561	0.77	0.4394
permit	-	0.988179949	B	0.26926685	3.67	0.0002
permit	-	0.884573839	B	0.27816892	3.18	0.0015
permit	-	1.197314834	B	0.26788469	4.47	<.0001
permit	-	0.583851859	B	0.29268642	1.99	0.0462
permit	-	-1.541423130	B	0.53145158	-2.90	0.0038
permit	-	0.843729584	B	0.27471313	3.07	0.0022
permit	-	1.108586125	B	0.26793094	4.14	<.0001
permit	-	0.000000000	B	.	.	.

SAW/SARC 58 Golden Tilefish
APPENDIX B2: Final recruitment adjusted projections

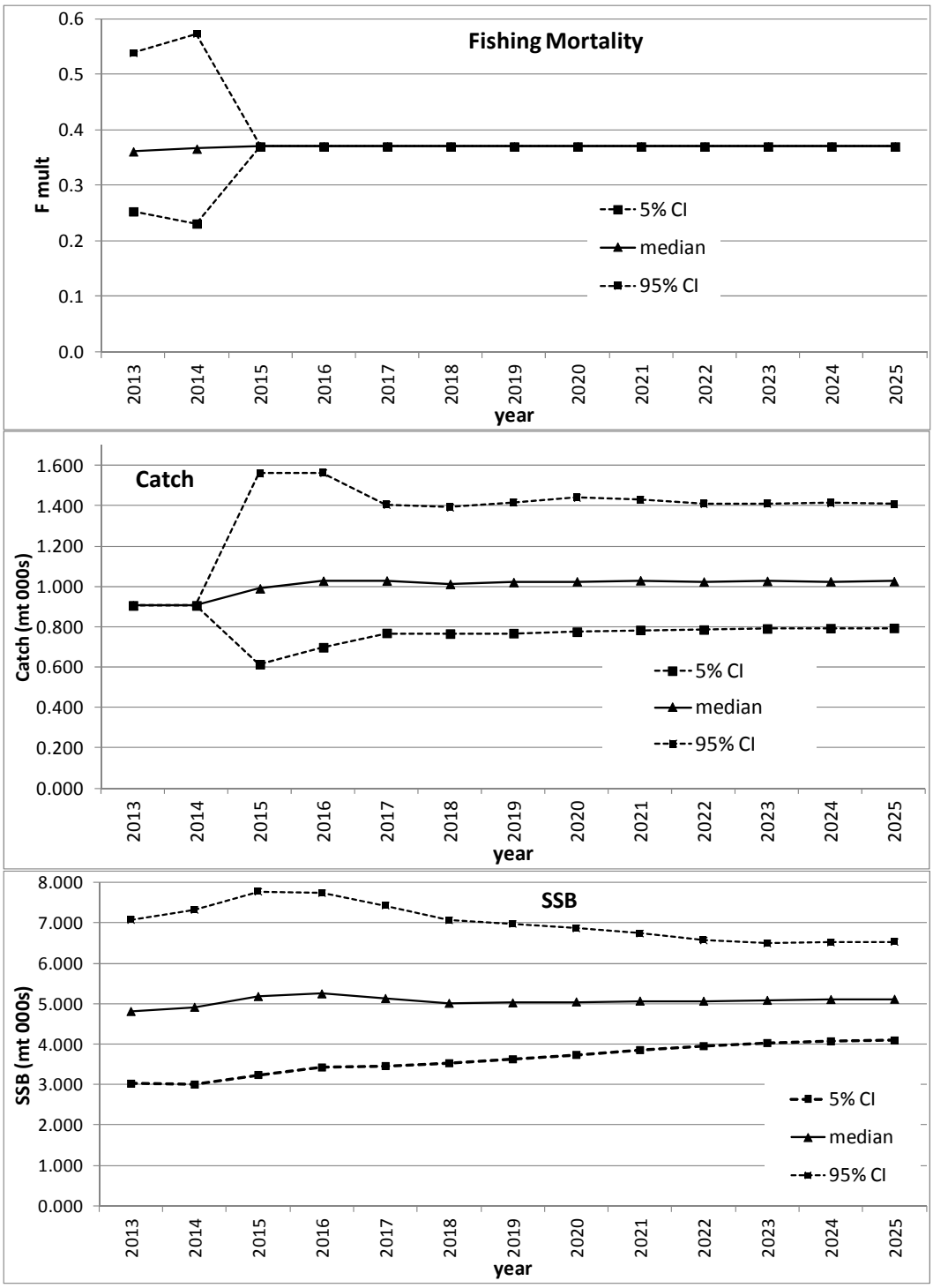
The SARC 58 review panel concluded that there was no information to inform estimates of age-1 recruitment in the last three years of the final ASAP model (2010-2012) because fishery independent measure of abundance are lacking, and bacause age-1 and 2 are not selected and selection of age-3 fish is low, 0.05, in the commercial fishery. Selection at age-4 was estimated at 0.479 which should provide some information on recruitment in 2009. Based on these considerations, recruitment estimates for the last three years of the time series, which are low, are likely underestimated. In the absence of information to inform recruitment at the end of the time series the SARC concluded that the model estimated geometric mean would be a better approximation of the recruitment from 2010 to 2012. To make this adjustment without affecting the underlying model results the SARC choose to make the adjustment in the AGRPRO projections using the Mohn's rho adjustment at age. The age-1 recruitment adjustment to the geometric mean (1.1 million fish) was calculated as 1.67 in 2010, 1.54 in 2011, and 1.47 in 2012. This corresponds to an age-4 (2010 recruitment) to an age-2 (2012 recruitment) adjustment for the t+1 numbers at age in the projections. Year t+1 age-1 recruitment was already configured to use the geometric mean from the time series of recruitment in the final ASAP model. As expected making this recruitment adjustment prevents the estimated decline in biomass at the beginning of the projection relative to unadjusted projections. Differences between the original unadjusted projections with the final adjusted projections can be seen when comparing Figures B97 and B98 to Appendix Figures B2.1 and B2.2. A similar result can be obtained within the model and projections by lowering the CVs on the recruitment deviations in the last three years of the ASAP model in which case a Mohn's rho adjustment is not needed. However this option was not used because it would result in a small change in model parameter estimates in the final model and would likely artificially lower the estimated uncertainty for age-1 at the end of the time series. All projections assume the 905 mt ACL will be taken in the 2013 and 2014 bridge years. Final ASAP run 27b adjusted AGEPRO $F_{MSY} = F_{25\%} = 0.37$ projections with 90% CIs and projections that assume a constant 905 mt catch can be seen in Appendix Tables B2.1 and B2.2 and Appendix Figures B2.1 and B2.2. The CV on the 2015 OFL was estimated as 30% in the recruitment adjusted projections.

Appendix Table B2.1. Landings (mt), fishing mortality (F) and spawning stock biomass (SSB) for the final ASAP run 27b AGEPRO $F_{MSY} = F_{25} = 0.37$ projections using an age-1 recruitment adjustment to the geometric mean for 2010-2012. Removals of 905 mt was assumed in 2013 and 2014 bridge years. Probability of overfishing or being overfished is also given.

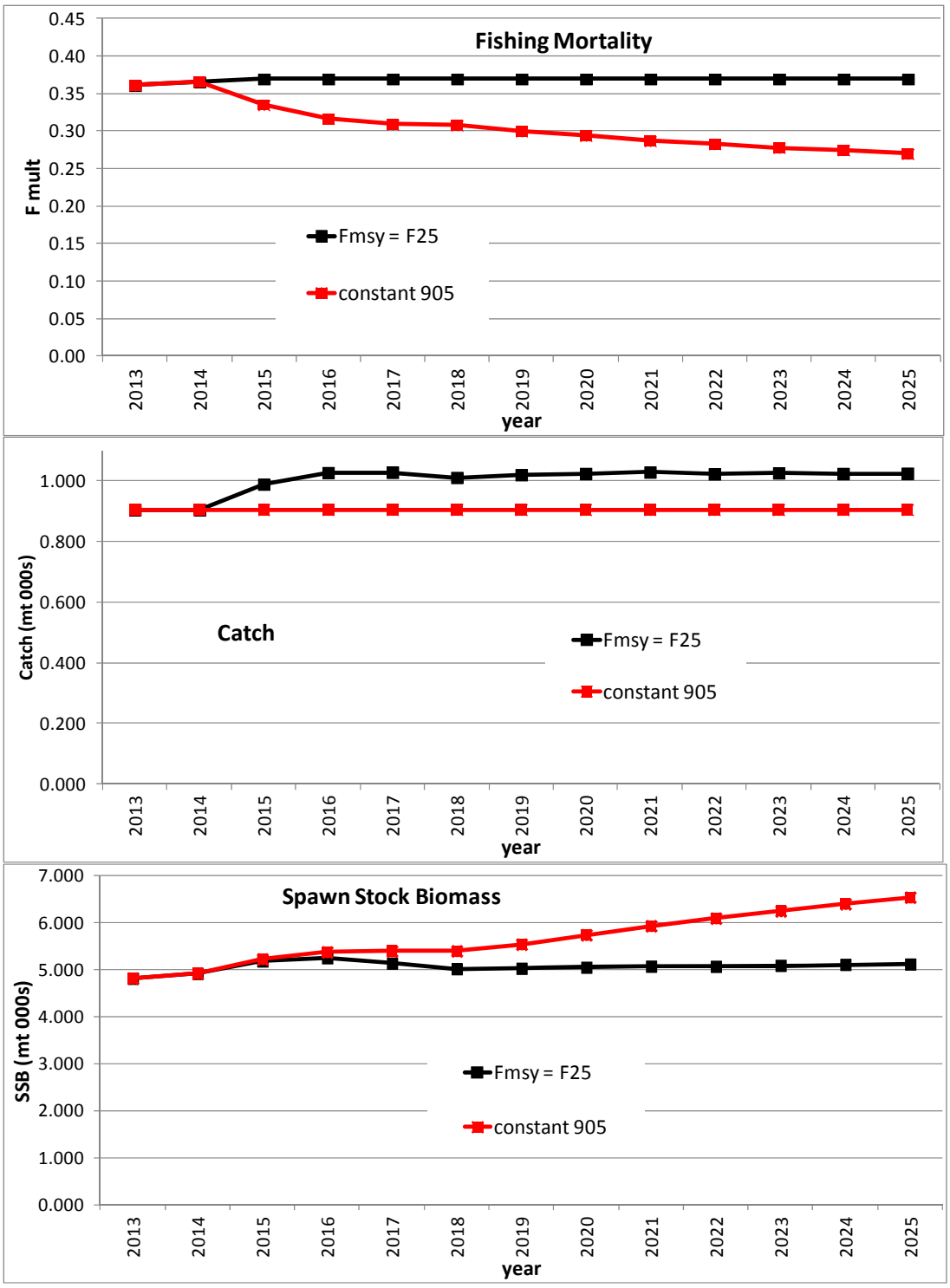
Year	Landings	F	SSB	P(F>Fmsy)	P(SSB<SSBmsy/2)
2013	905	0.361	4,811	0.463	0.010
2014	905	0.366	4,914	0.489	0.013
2015	989	0.370	5,180	-	0.012
2016	1,027	0.370	5,246	-	0.010
2017	1,028	0.370	5,132	-	0.005

Appendix Table B2.2. Landings (mt), fishing mortality (F) and spawning stock biomass (SSB) for the final ASAP run 27b AGEPRO projections assuming a constant catch of 905 mt using an age-1 recruitment adjustment to the geometric mean for 2010-2012. Removals of 905 mt was assumed in 2013 and 2014 bridge years. Probability of overfishing or being overfished is also given.

Year	Landings	F	SSB	P(F>Fmsy)	P(SSB<SSBmsy/2)
2013	905	0.361	4,811	0.463	0.010
2014	905	0.366	4,914	0.489	0.013
2015	905	0.335	5,219	0.371	0.017
2016	905	0.317	5,370	0.323	0.020
2017	905	0.309	5,392	0.273	0.025



Appendix Figure B2.1. Final ASAP run 27b AGEPRO $F_{MSY} = F_{25} = 0.37$ projections with 90% CIs using an age-1 recruitment adjustment to the geometric mean for 2010-2012. Removals of 905 mt was assumed in 2013 and 2014 bridge years.



Appendix Figure B2.2. Comparison of final ASAP run 27b AGEPRO projections using an age-1 recruitment adjustment to the geometric mean for 2010-2012 at $F_{MSY} = F_{25\%} = 0.37$ and a constant catch of 905 mt. A Catch of 905 mt was assumed in 2013 and 2014 bridge years.