SEDAR 64:
Southeastern U.S. Yellowtail Snapper
Joint SSC Meeting
October 30, 2020

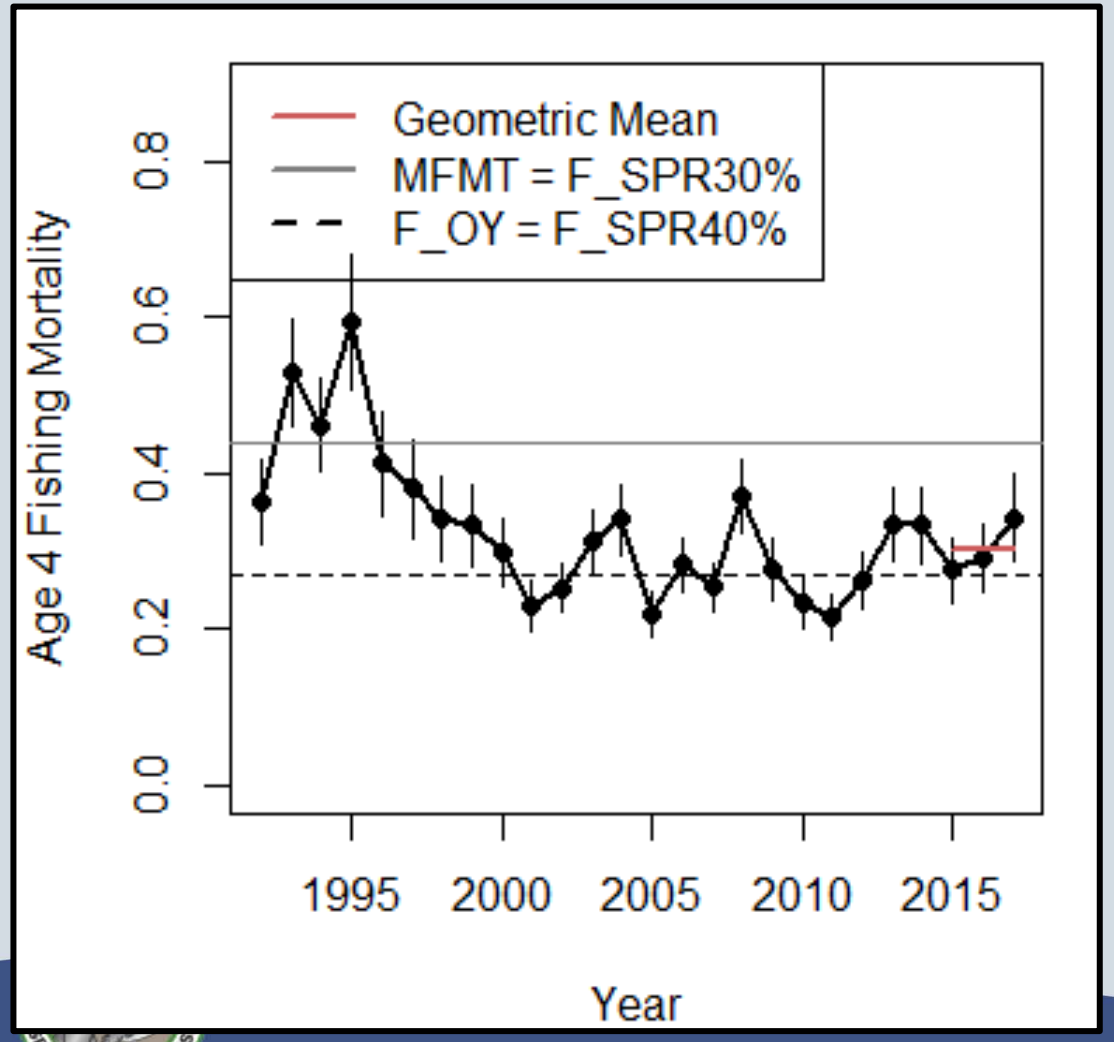
Shanae D. Allen and Christopher E. Swanson

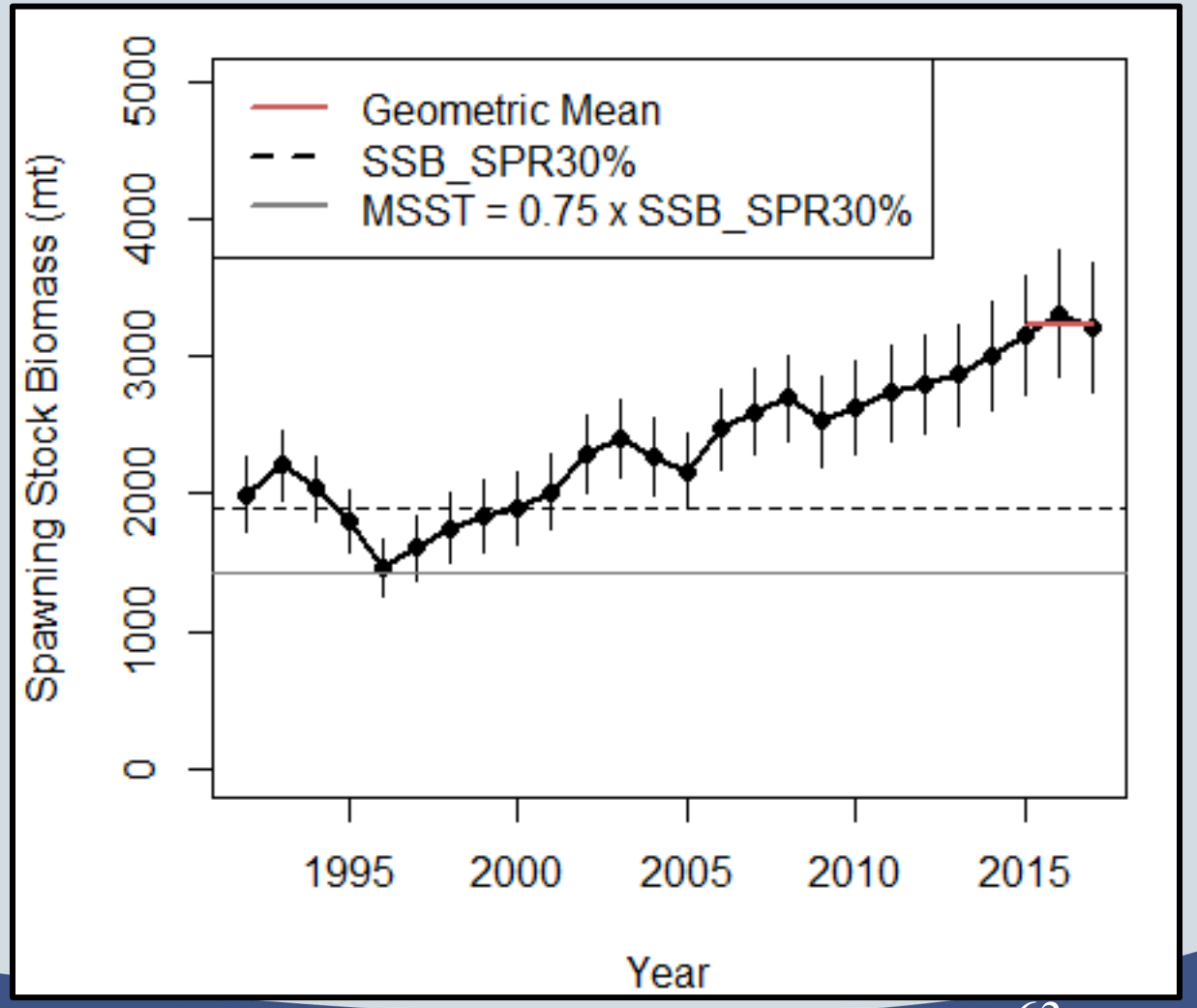
FWRI Stock Assessment Group, St. Petersburg, FL

Outline

- Stock Status Overview
- Projection Methods and Results
- Additional Slides
  - Comparison of SEDAR 27A management benchmarks and quota history
  - Comparison of an alternative SEDAR 27A base model and SEDAR 64

Stock Status Overview

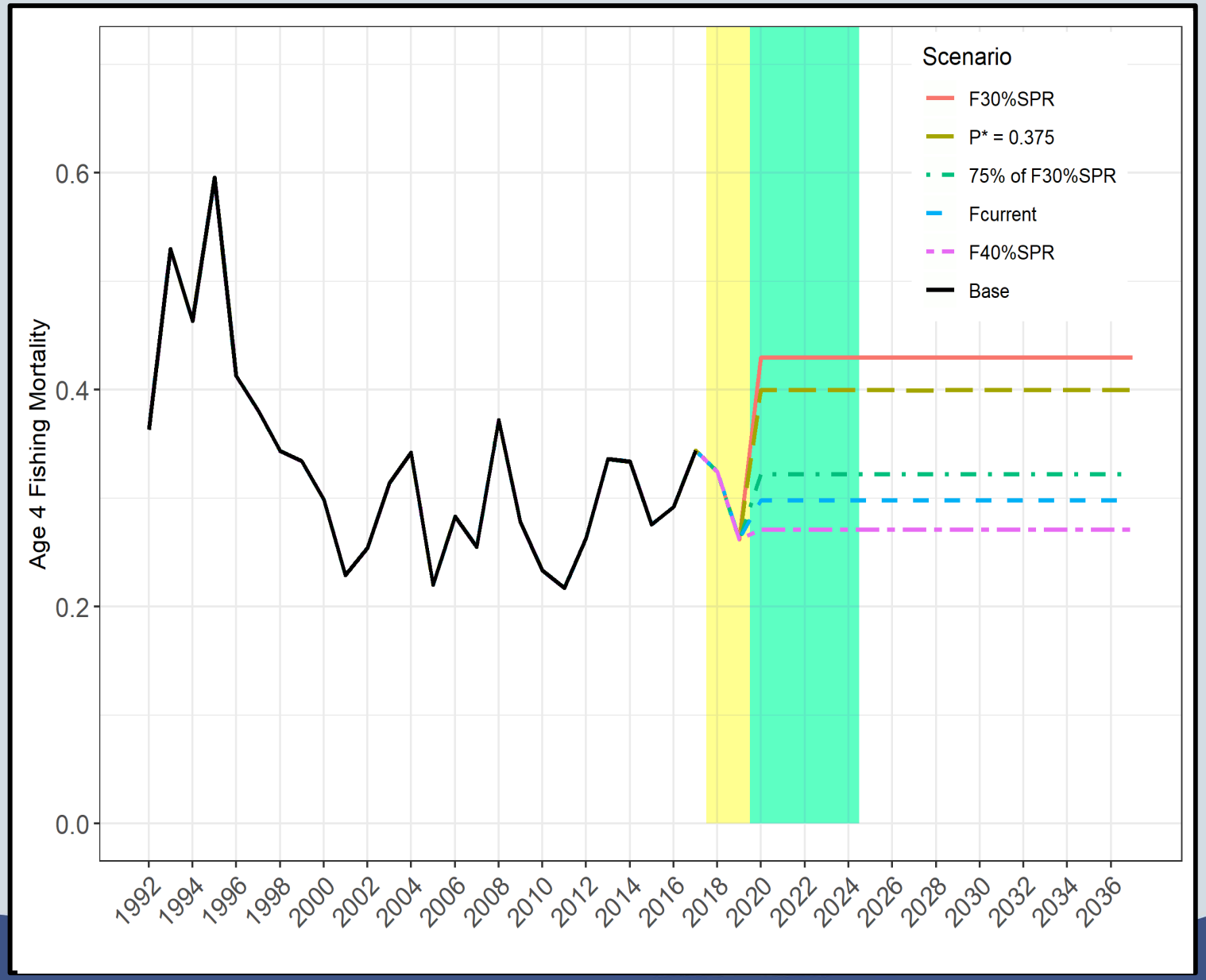




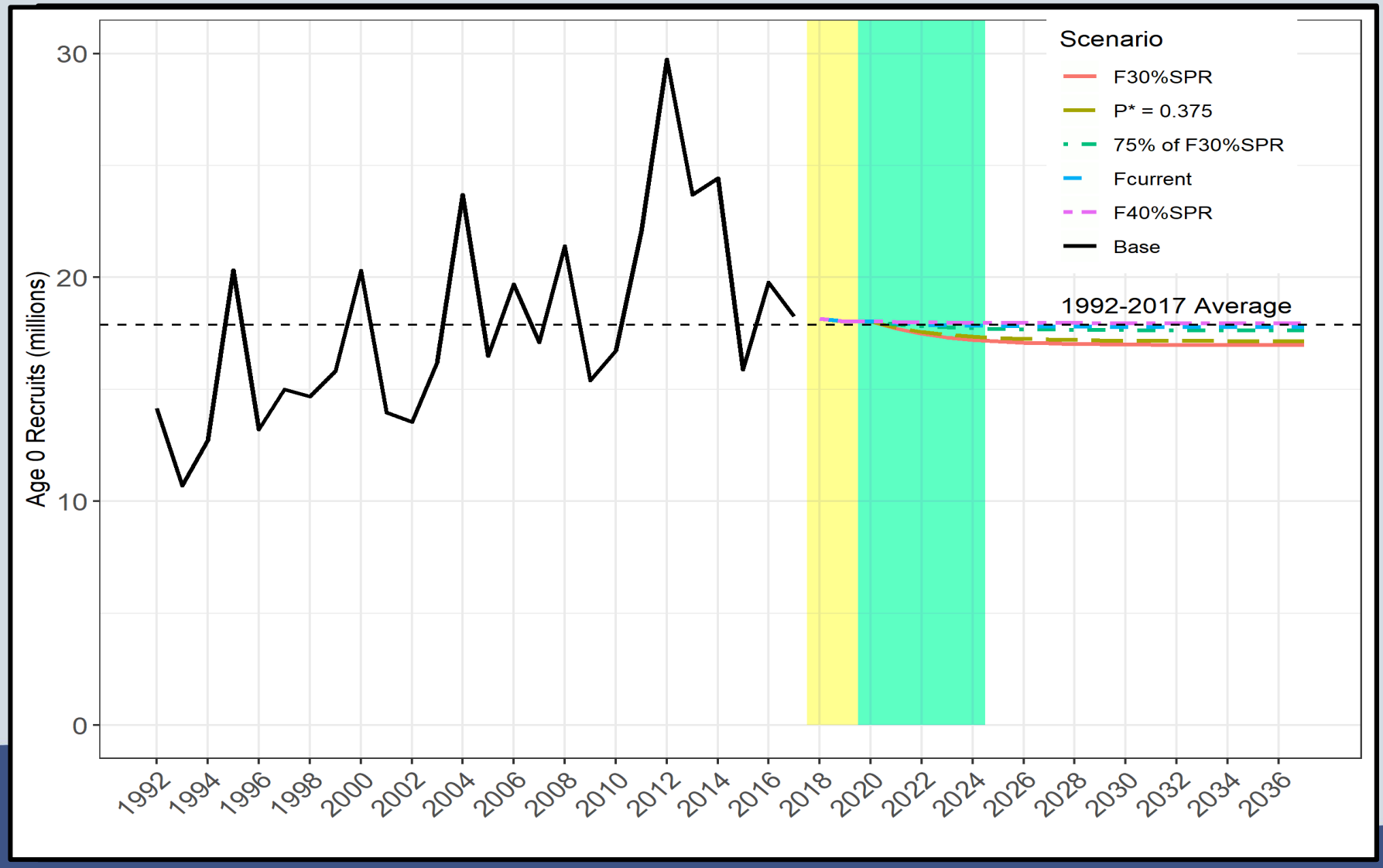
SEDAR 64: Yellowtail Snapper

Projections

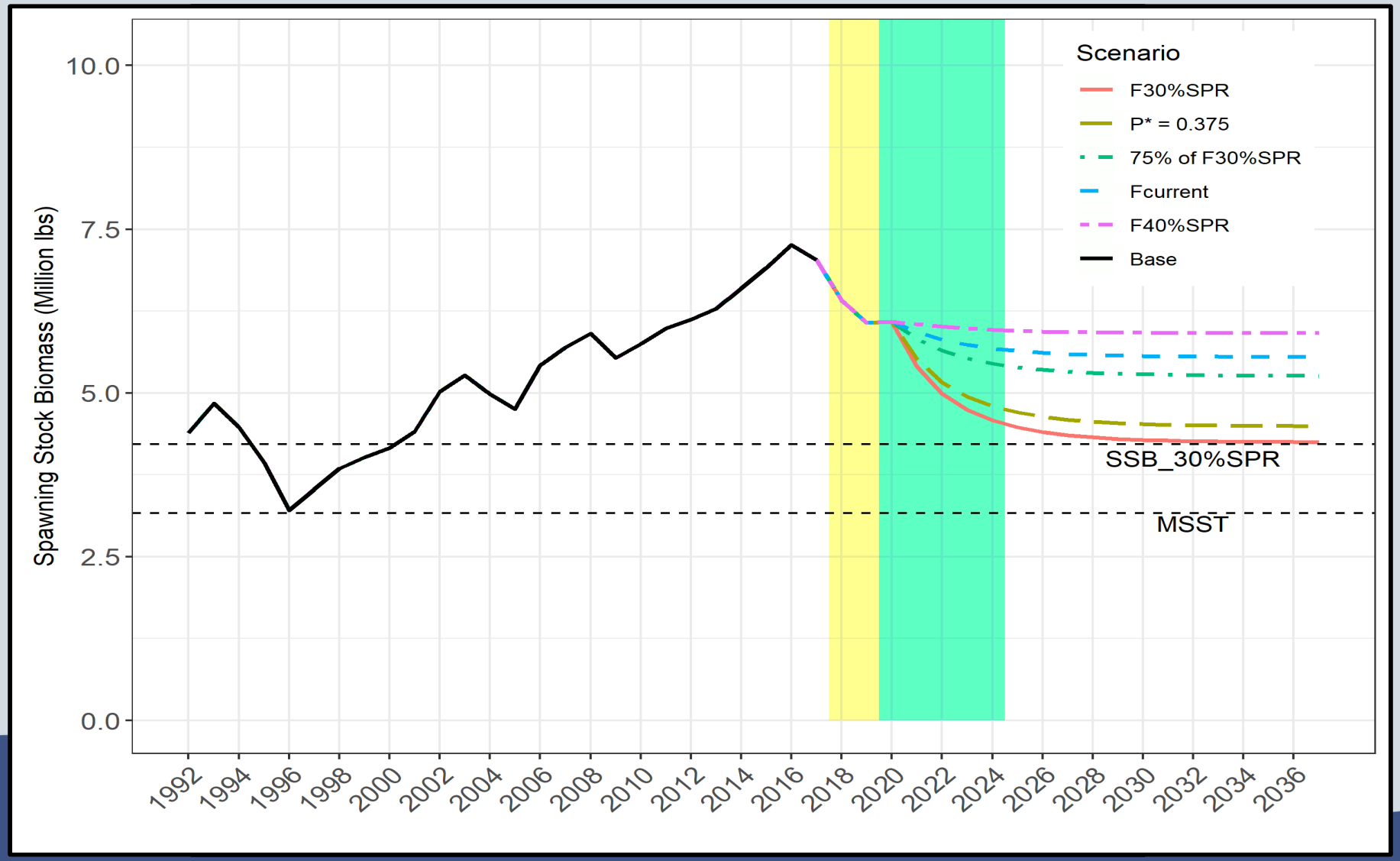
- Deterministic projections were run to estimate landings for years 2020-2037.
- Structure and parameters of the projection model same as assessment model.
- Recruitment for first year of projection equal to 2015 – 2017 average (~18 million).
- For interim years 2018 and 2019, retained landings in numbers (rec fleets) and metric tons (com fleet) were incorporated.
- An iterative method (provided by the SEFSC) specifies fishing mortality rates for each fleet per year (2020 – 2037) so that fleet allocations are kept constant each year.
- Transferring the model from SS version 3.30.14 to 3.30.13 was necessary because of SS 3.30.14 bug. Differences in Base Model output were negligible.


Scenario
F30%SPR
P* = 0.375
75% of F30%SPR
Fcurrent
F40%SPR
Base
Age 4 Fishing Mortality
0.0
0.2
0.4
0.6
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036

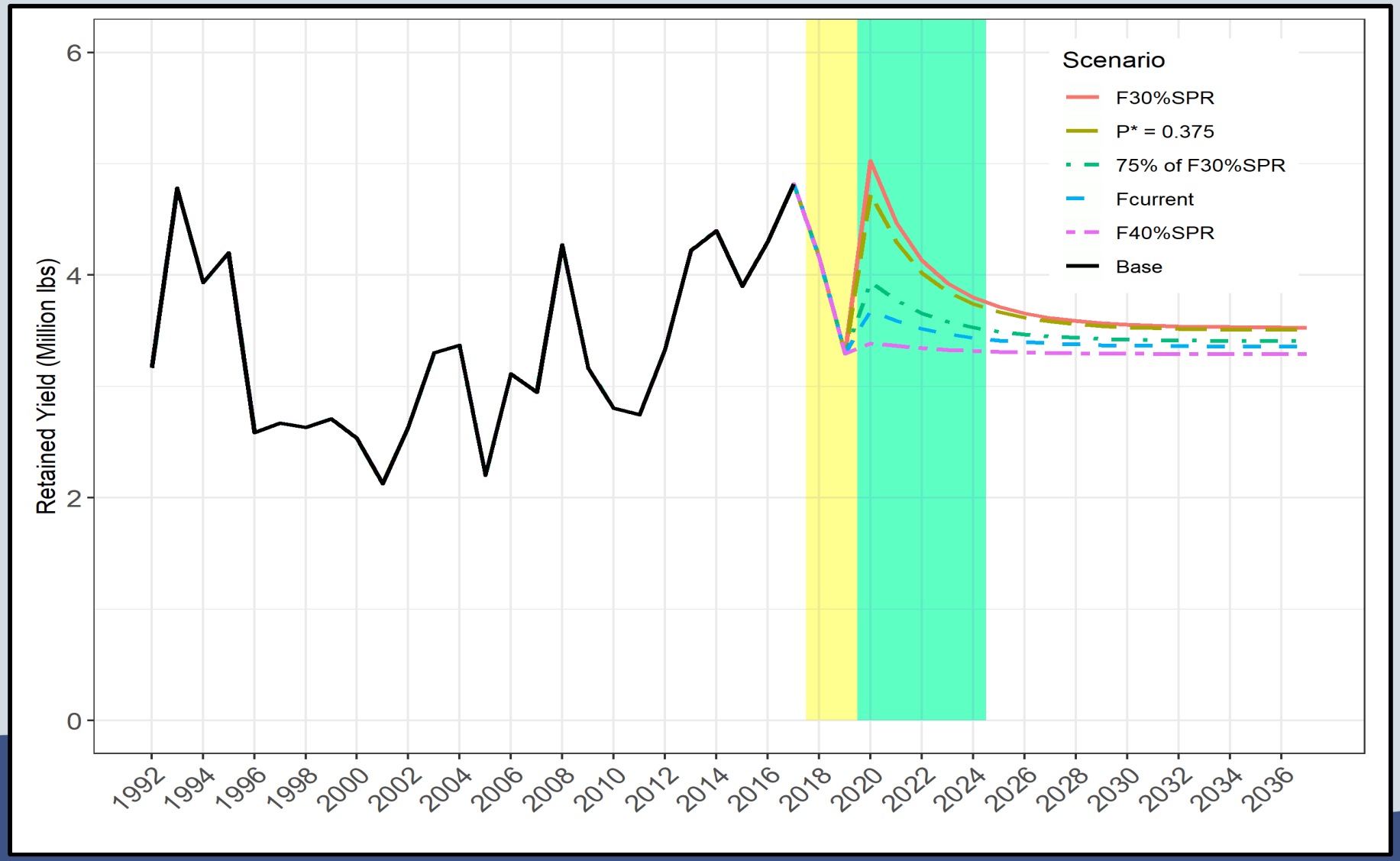
20 Year Projections: Recruitment



20 Year Projections: Spawning Stock Biomass



20 Year Projections: Retained Yield



Retained yield (million lbs)			
Year	Projection Scenario		
	F30%SPR	P* = 0.375	75% of F30%SPR
2018	4.161	4.161	4.161
2019	3.296	3.296	3.296
2020	5.026	4.731	3.939
2021	4.470	4.296	3.773
2022	4.130	4.020	3.658
2023	3.927	3.850	3.581
2024	3.799	3.741	3.528
2025	3.714	3.668	3.492
2026	3.656	3.618	3.466
2027	3.616	3.584	3.448
2028	3.588	3.560	3.436
2029	3.569	3.543	3.428
2030	3.556	3.532	3.420
2031	3.547	3.524	3.416
2032	3.540	3.517	3.413
2033	3.536	3.514	3.411
2034	3.533	3.511	3.409
2035	3.530	3.509	3.408
2036	3.529	3.508	3.407
2037	3.528	3.507	3.406
Terminal 5-yr avg	3.531	3.509	3.408

SSB (million lbs)			
Year	Projection Scenario		
	F30%SPR	P* = 0.375	75% of F30%SPR
2018	6.416	6.416	6.416
2019	6.071	6.071	6.071
2020	6.088	6.088	6.088
2021	5.406	5.520	5.831
2022	4.988	5.161	5.651
2023	4.739	4.941	5.531
2024	4.581	4.799	5.449
2025	4.477	4.704	5.392
2026	4.405	4.638	5.353
2027	4.357	4.594	5.325
2028	4.323	4.563	5.305
2029	4.300	4.541	5.291
2030	4.283	4.526	5.281
2031	4.272	4.515	5.274
2032	4.264	4.507	5.269
2033	4.259	4.502	5.266
2034	4.255	4.499	5.264
2035	4.252	4.496	5.262
2036	4.250	4.494	5.261
2037	4.249	4.493	5.260
Terminal 5-yr avg	4.253	4.497	5.262


Questions?

SEDAR 64 Yellowtail Snapper

Management Quantities for S27A and Quota history

Yellowtail Snapper Management Quantities

Quantity	Definitions		S27A_Final (MRFSS)
Current Conditions	$SSB_{current}$	The geometric mean of SSB for last 3 years	22.05 mp
	$F_{current}$	The geometric mean of age-4 F for last 3 years	0.05 yr-1
F_{MSY}	The fishing mortality rate associated with MSY		0.24 yr^{-1}
$F_{30\%SPR}$	The fishing mortality rate associated with 30% SPR		0.29 yr^{-1}
$F_{40\%SPR}$	The fishing mortality rate associated with 40% SPR		0.19 yr^{-1}
$SSB_{30\%SPR}$	Spawning Stock Biomass associated with 30% SPR		6.77 mp
$SSB_{40\%SPR}$	Spawning Stock Biomass associated with 40% SPR		10.31 mp
MSY (Max Sustainable Yield)	Total Yield @ F_{MSY}	Equilibrium Value	3.75 mp
OY (Optimum Yield)	Total Yield @ F40%SPR	Equilibrium Value	3.69 mp
MSST (Min Stock Size Threshold)	0.75*$SSB_{F30\%SPR}$	Equilibrium Value	
	(1-M)*$SSB_{F30\%SPR}$	Equilibrium Value	5.46 mp
MFMT (Max Fishing Mortality)	F_{MSY}	Empirical Distribution	0.24 yr^{-1}
OFL (Overfishing Limit)	98% of the Total Yield @ F_{MSY}	Stochastic Projections (P*=0.5)	4.51 mp
ABC (Acceptable Biological Catch)	Based on OFL distribution when P* = 0.40		4.05 mp
ACL (Annual Catch Limit)	Gulf (25%)	11% below the Gulf apportionment of ABC	901,125 lbs
	Atlantic (75%)	Equal to the Atlantic apportionment of ABC	3,037,500 lbs

Quota History

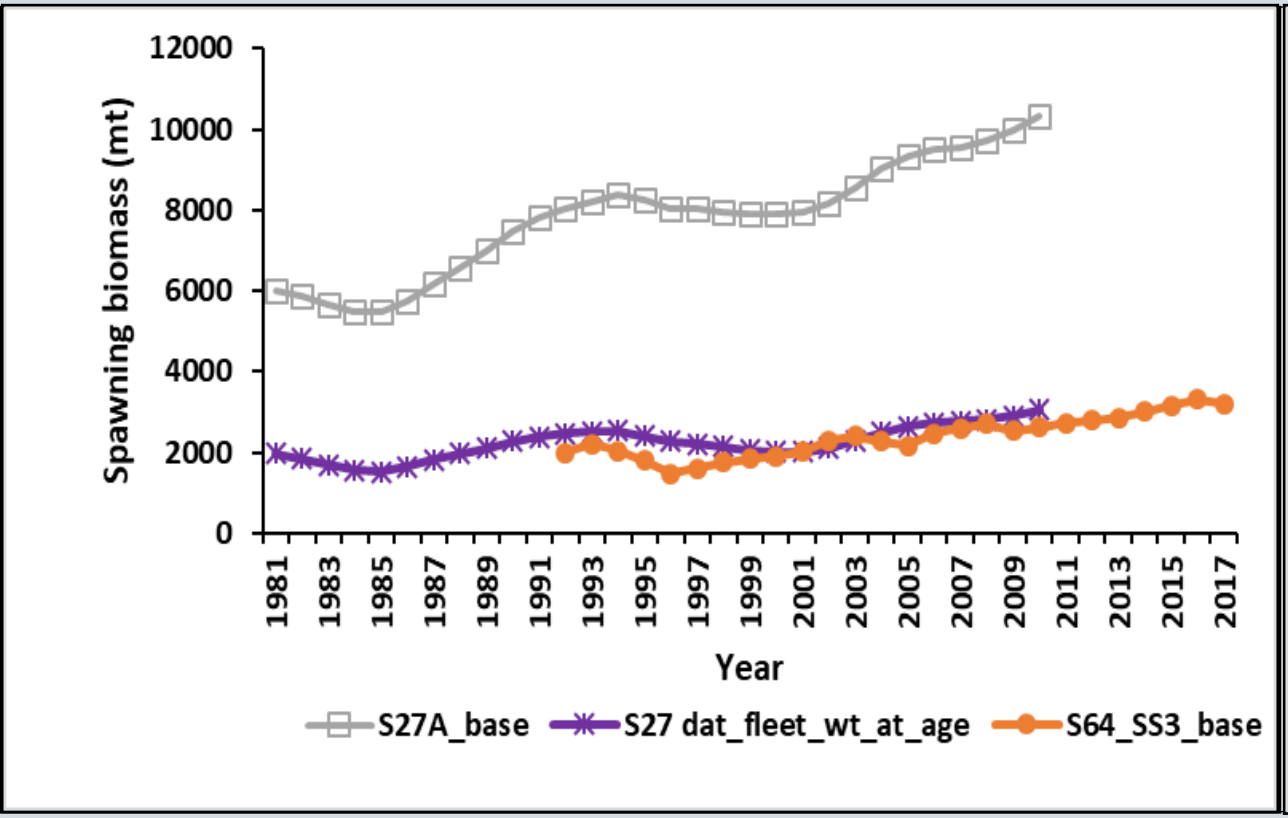
Gulf of Mexico	Date	ACL
Commercial and Recreational	Jan 2012 – Sept 2013	725,000 lbs
	Sept 2013 – Current	**901,125 lbs**
South Atlantic	Date	ACL
Commercial	Apr 2012 – Nov 2012	1,142,589 lbs
	Nov 2012 – Current	**1,596,510 lbs**
Closures	10/31/2015 – 12/31/2015	6/5/2018 – 7/31/2018
	6/3/2017 – 7/31/2017	6/7/2019 – 7/31/2019
Recreational	Apr 2012 – Sept 2013	1,031,286 lbs
	Sept 2013 – Current	**1,440,990 lbs**

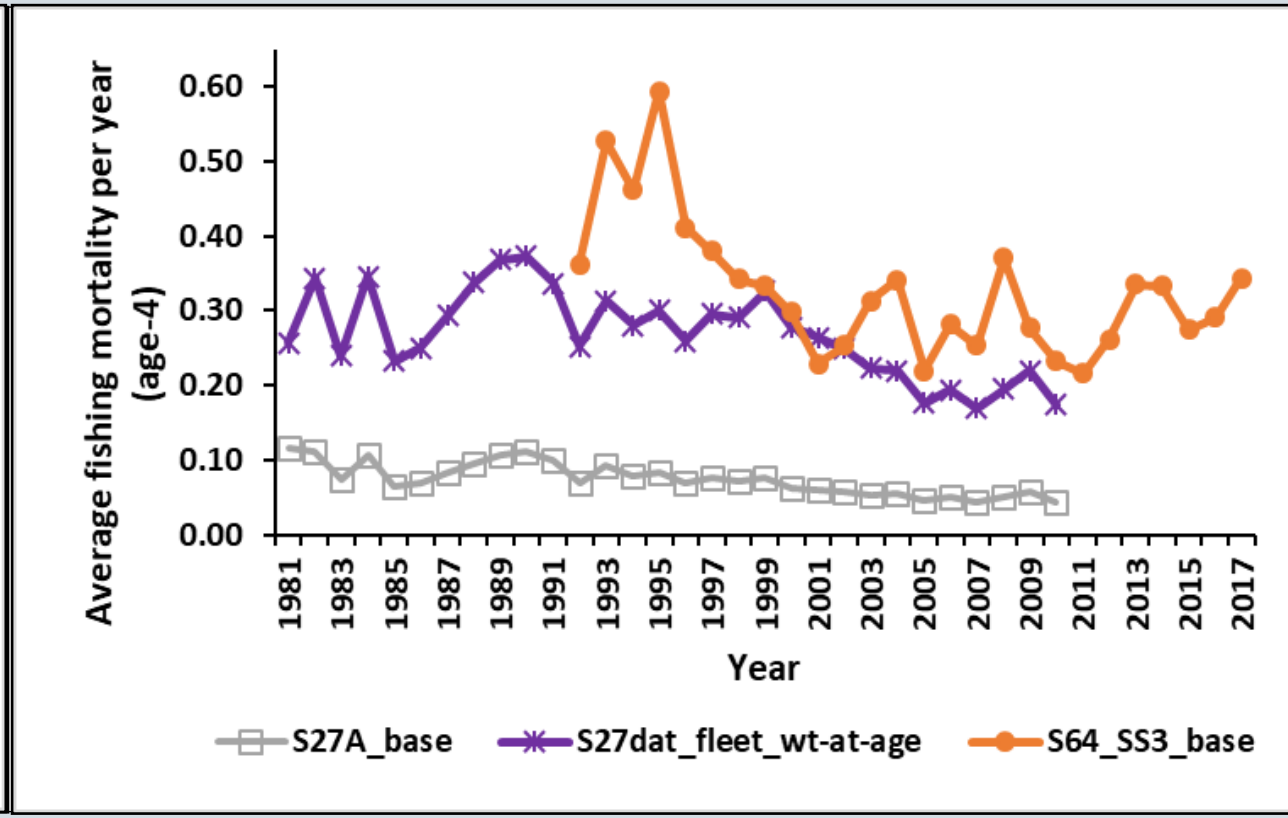
Total ACL (1/30/2012 – 11/2012)	**2,898,875 lbs (1,315 mt)**
Total ACL (9/3/2013 – present)	**3,938,625 lbs (1,787 mt)**

SEDAR 64: Yellowtail Snapper
S27A Alternative Model

S27A data with additional WAA matrices in ASAP v3

Model Bridging with ASAP v.3





Expanding the number of weight-at-age matrices from 3 to 10

- In particular, including separate weight at age matrices for discards and retained landings for each fleet.
- A limitation imposed by the ASAP version 2 platform

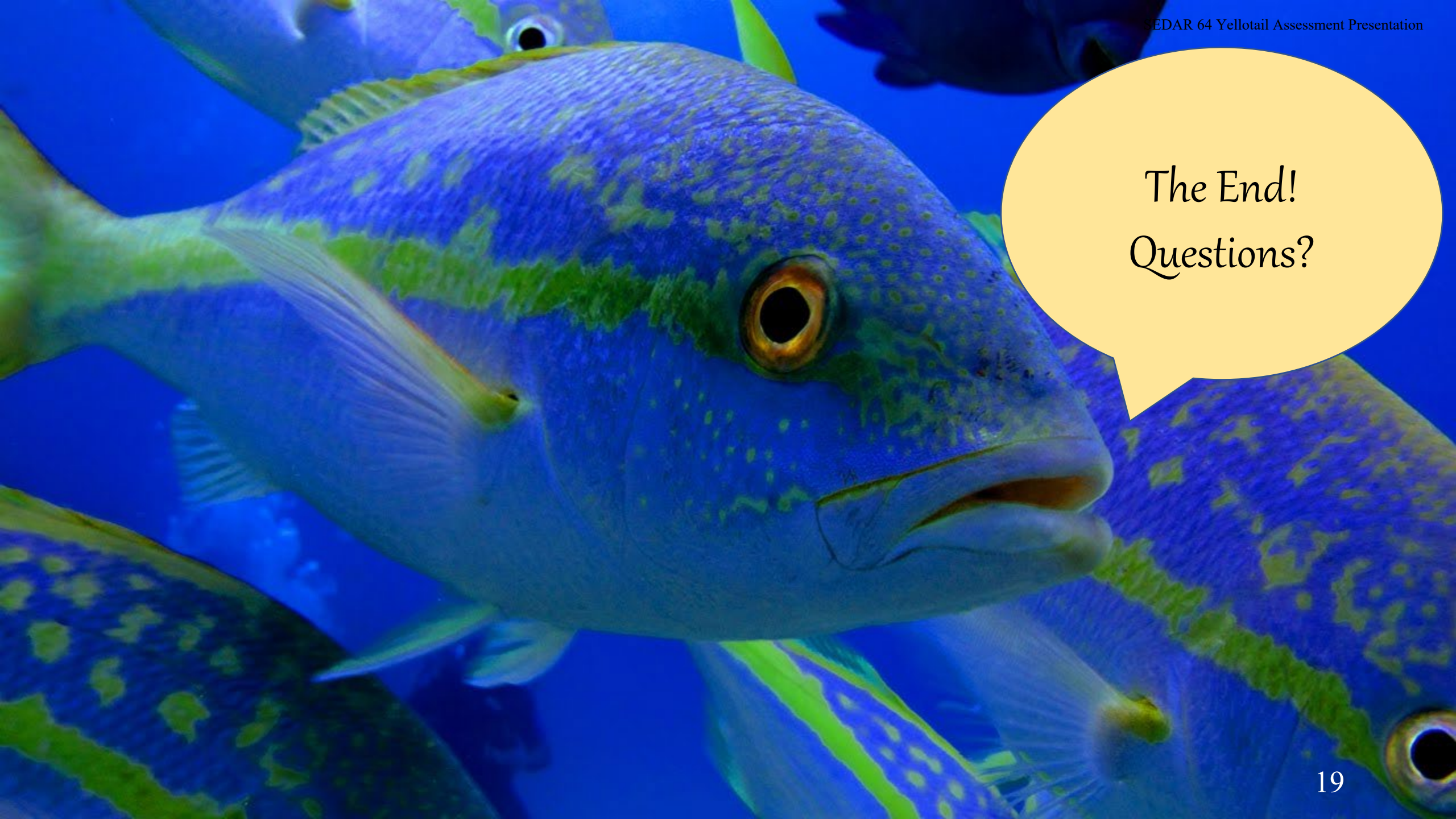
Yellowtail Snapper Management Quantities

Quantity	Definitions		S27A_Final	S27A_Alt	S64_Final (MRIP)
Current Conditions	$SSB_{current}$	The geometric mean of SSB for last 3 years	22.05 mp	6.45 mp	7.11 mp
	$F_{current}$	The geometric mean of age-4 F for last 3 years	0.05 yr-1	0.20 yr^{-1}	0.30 yr-1
F_{MSY}	The fishing mortality rate associated with MSY		0.24 yr^{-1}	0.29 yr^{-1}	Not Estimable
$F_{30\%SPR}$	The fishing mortality rate associated with 30% SPR		0.29 yr^{-1}	0.30 yr^{-1}	0.44 yr^{-1}
$F_{40\%SPR}$	The fishing mortality rate associated with 40% SPR		0.19 yr^{-1}	0.19 yr^{-1}	0.27 yr-1
$SSB_{30\%SPR}$	Spawning Stock Biomass associated with 30% SPR		6.77 mp	4.76 mp	4.20 mp
$SSB_{40\%SPR}$	Spawning Stock Biomass associated with 40% SPR		10.31 mp	6.99 mp	5.94 mp
MSY (Max Sustainable Yield)	Total Yield @ $F_{30\%SPR}$	Equilibrium Value	3.69 mp	2.79 mp	3.67 mp
	Total Yield @ F_{MSY}	Equilibrium Value	3.75 mp	2.67 mp	
MSST (Min Stock Size Threshold)	0.75*$SSB_{F30\%SPR}$	Equilibrium Value			3.15 mp
	(1-M)*$SSB_{F30\%SPR}$	Equilibrium Value	5.46 mp		
MFMT (Max Fishing Mortality)	$F_{30\%SPR}$	Equilibrium Value			0.44 yr^{-1}
	F_{MSY}	Empirical Distribution	0.24 yr^{-1}		
OFL (Overfishing Limit)	Retained Yield @ $F_{30\%SPR}$	Equilibrium Value			3.54 mp
	98% of the Total Yield @ F_{MSY}	Stochastic Projections (P*=0.5)	4.51 mp		
ABC (Acceptable Biological Catch)	Definition of ABC for SEDAR 64				
	Based on OFL distribution when P* = 0.40		4.05 mp		
ACL (Annual Catch Limit)	Gulf (25%)	11% below the Gulf apportionment of ABC	901,125 lbs		
	Atlantic (75%)	Equal to the Atlantic apportionment of ABC	3,037,500 lbs		

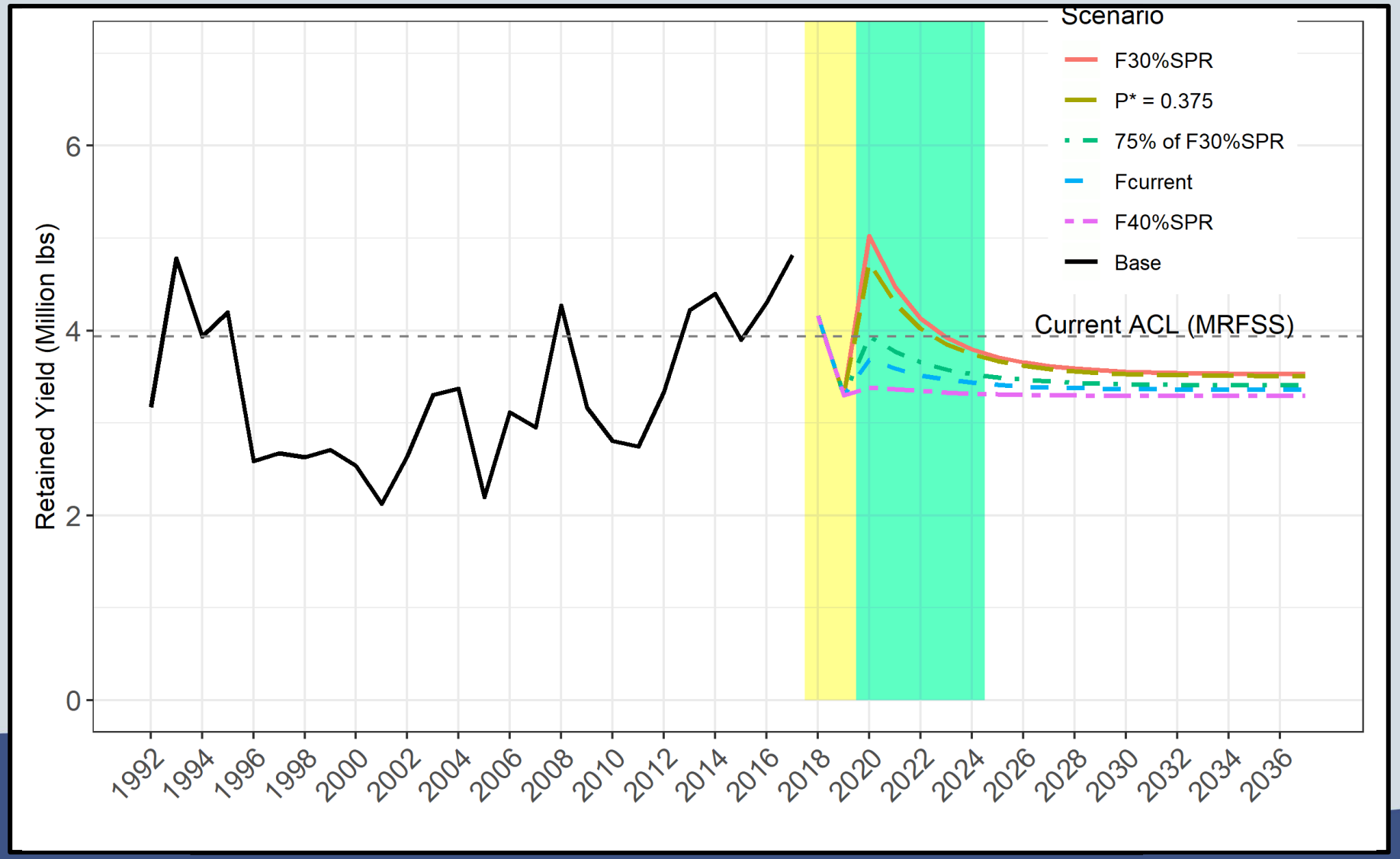
Summary

While it is expected that the ACL would increase after incorporating higher recreational landings for a stock that is deemed to be in good condition, the ACL for SEDAR 64 may be lower than the current ACL for the following reasons:

1. The OFL for SEDAR 27A was above equilibrium MSY by nearly 1 million pounds.
2. SSB was estimated to be much higher in the previous assessment primarily due to a limitation of ASAP version 2.
3. Assumptions of future recruitment levels may change projections of spawning stock biomass and yields.


The End!
Questions?

S64 20 Year Projections: Retained Yield



Comparison of SA Rec (MRFSS) and Com Landings to the ACL

Attachment 14
TAB08_A14_Reg32OptionsPaper_06_2018

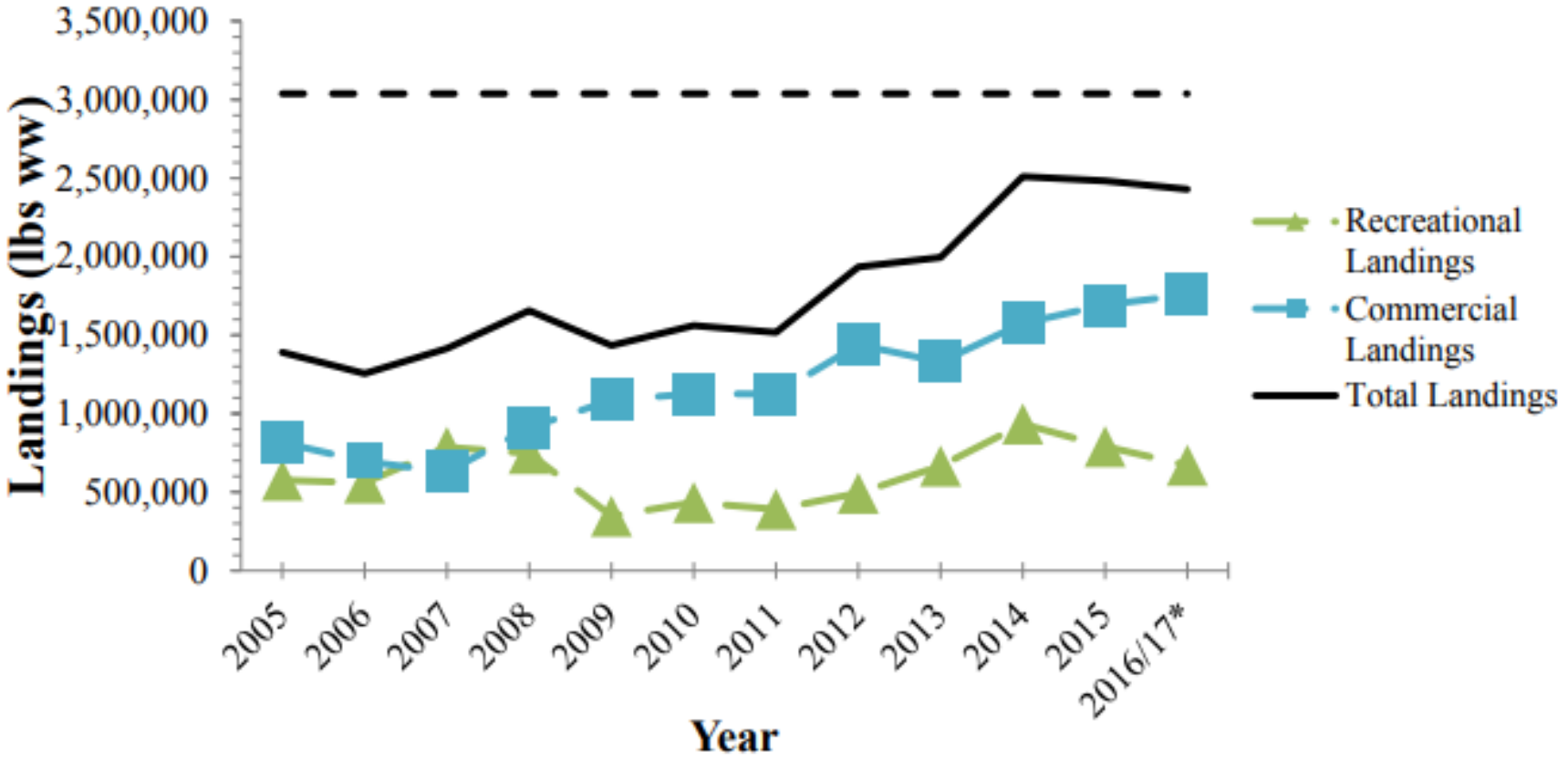
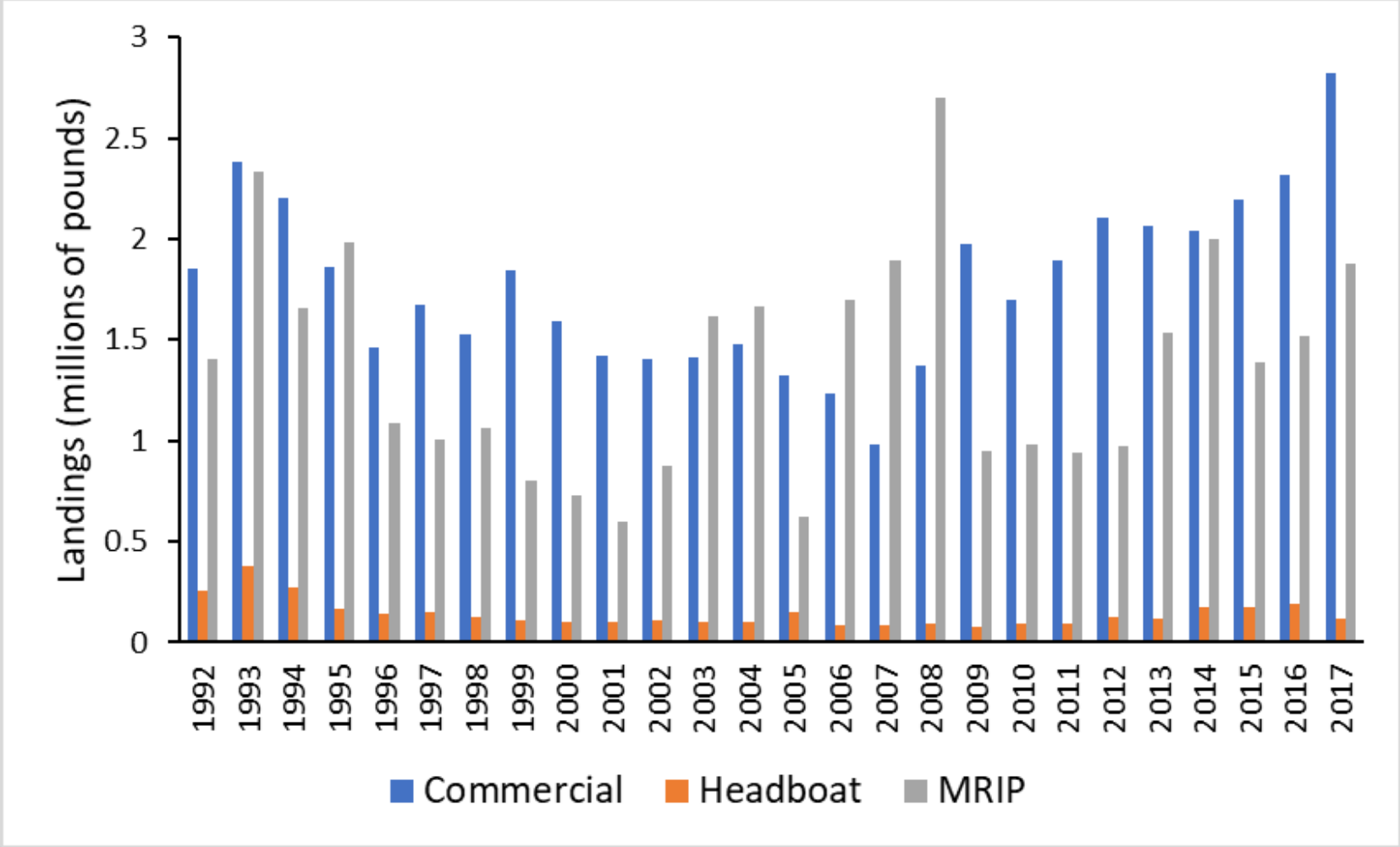


Figure 1. Commercial and recreational landings (lbs ww) of yellowtail snapper in the South Atlantic, 2005-2017.

Total Yellowtail Snapper landings (mt) from SEDAR 64



Stock Status Determination Criterion

Criteria	Definition	S27A_Final	S27A_WAA	S3_Final Male +Fem SSB	S64_Final	Current ACL
MSST (Minimum Stock Size Threshold)	$0.75*SSB_{F30\%SPR}$	2,304 mt	1,621 mt	2,763 mt	1,428 mt	
$SSB_{F30\%SPR}$	The estimated spawning stock biomass associated with F at 30% SPR	3,072 mt	2,161 mt	3,684 mt	1,904 mt	
$SSB_{current}$ (recent average of SSB)	The geometric mean of SSB for last 3 years	10,003 mt	2,925 mt	5,251	3,223 mt	
$F_{30\%SPR}$ (MFMT)	The fishing mortality rate associated with 30% SPR	0.29 yr^{-1}	0.30 yr^{-1}	0.33	0.44 yr^{-1}	
$F_{40\%SPR}$ (F_{OY})	The fishing mortality rate associated with 40% SPR	0.19 yr^{-1}	0.19 yr^{-1}	0.21	0.27 yr^{-1}	
$F_{current}$	The geometric mean of F on age-4 fish for last 3 years	0.05 yr^{-1}	0.20 yr^{-1}	0.19	0.30 yr^{-1}	
Optimum Yield (OY)	Retained Yield at F_{OY}	1,674 mt	1,210 mt		1,497 mt	1,787 mt
MSY Proxy	Retained Yield at $F_{30\%SPR}$	1,674 mt	1,265 mt	946 mt	1,608 mt	

SEDAR 64: Yellowtail Snapper

S27A and S64 Model Bridging

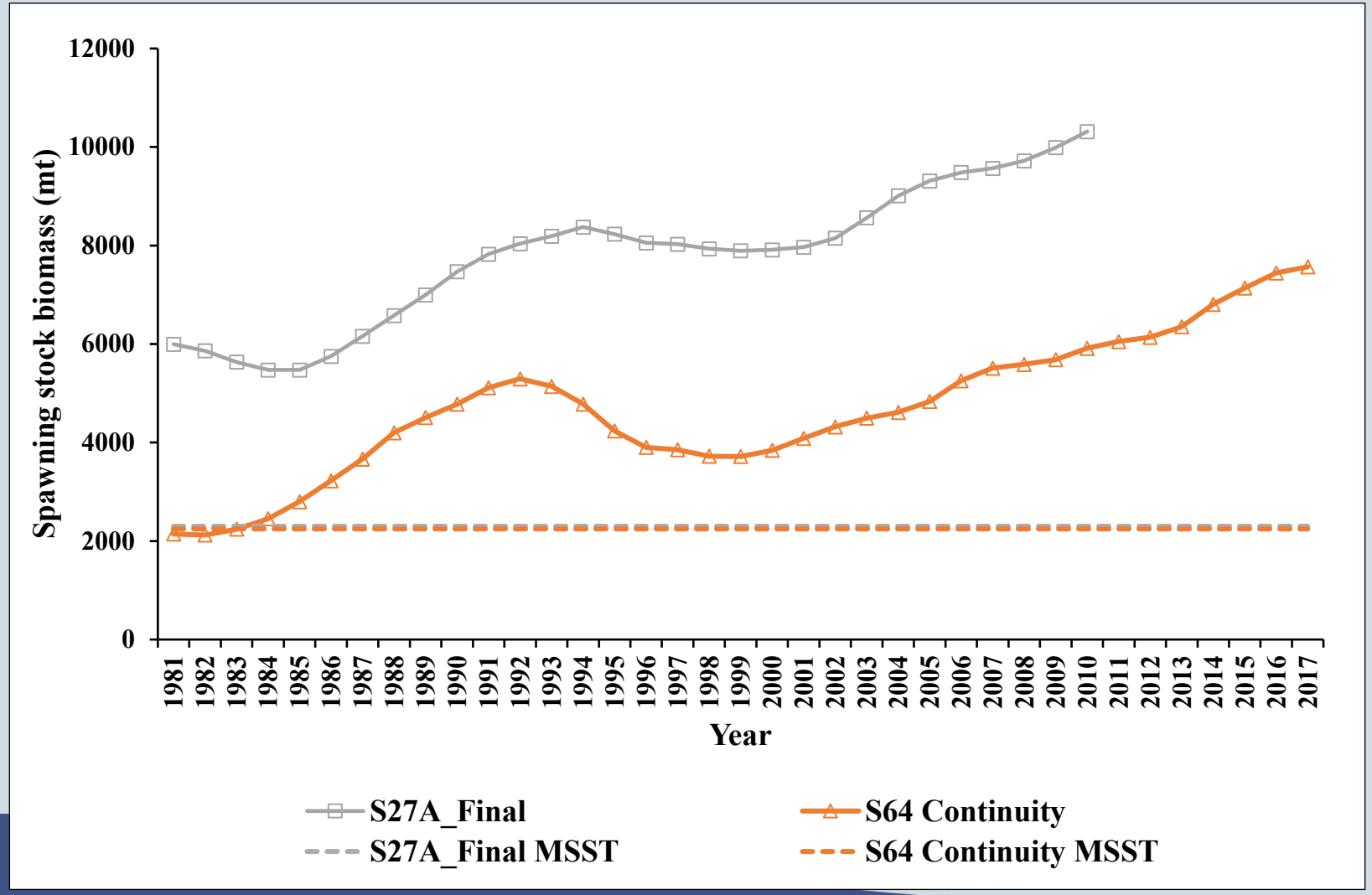
S27A data with S64 configuration using ASAP v3

Continuity Model

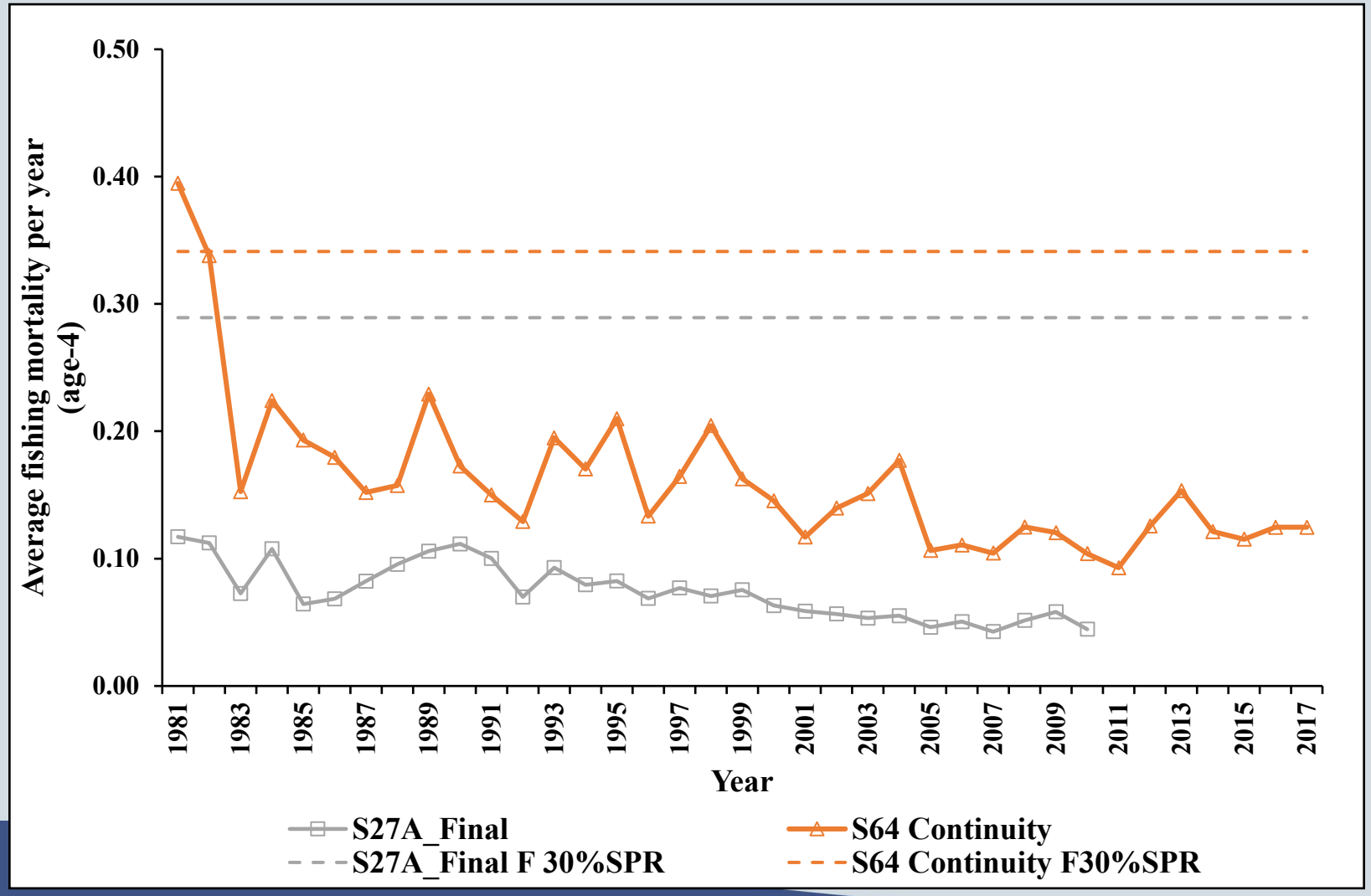
Configure the SEDAR 64 data as close to the methods used for SEDAR 27A as possible (see Table 3.8.1 in the AW Report). For Example,

- 3 weight-at-age matrices
- 9 selectivity blocks
- Flat-topped selectivity types for all fleets
- Only one RVC index (age 1+) and no Headboat index
- Constant catchability for Commercial CPUE index
- Weighting factors (lambdas)
- Age-Length-Key methods

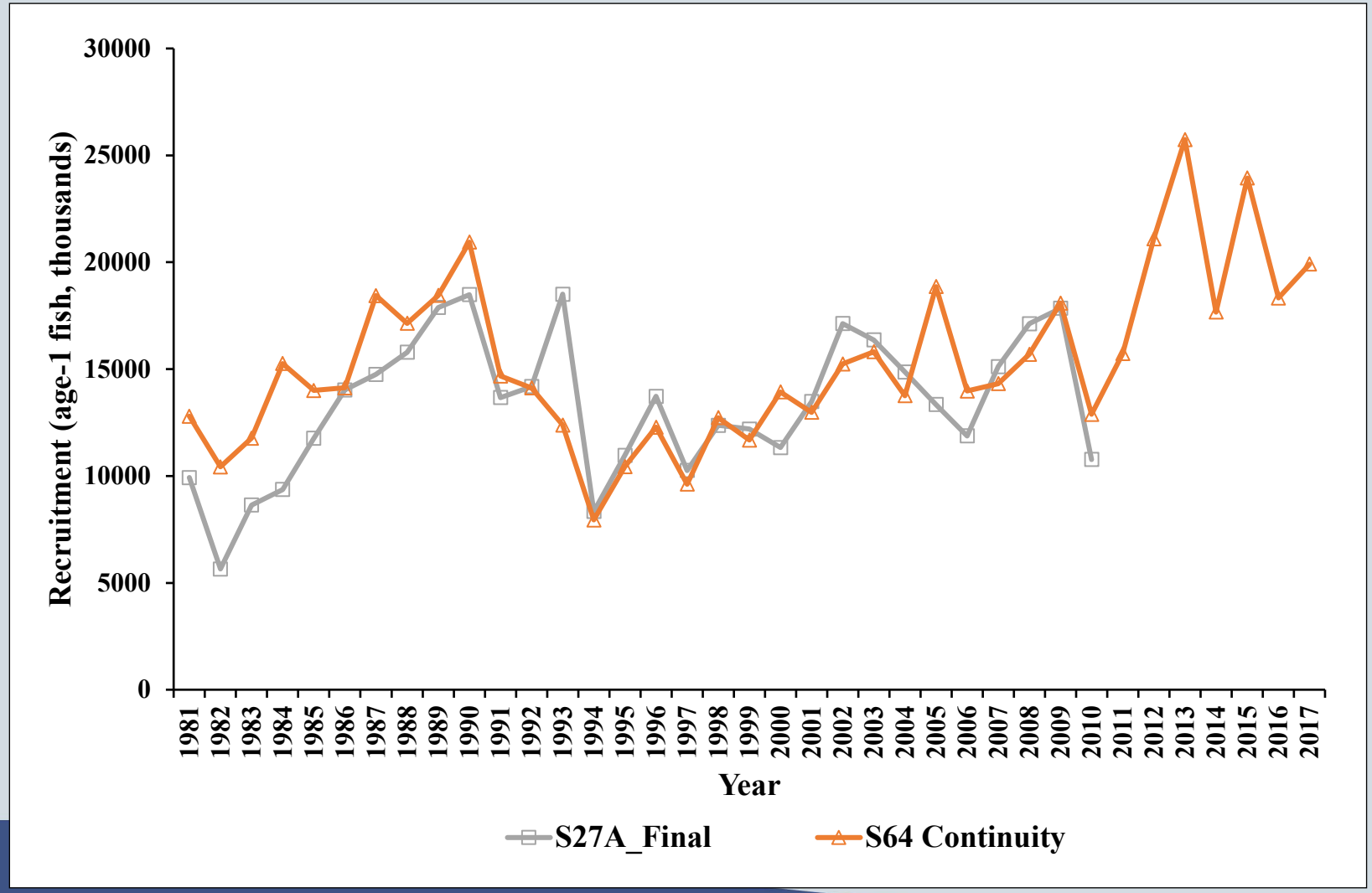
Continuity Model



Continuity Model



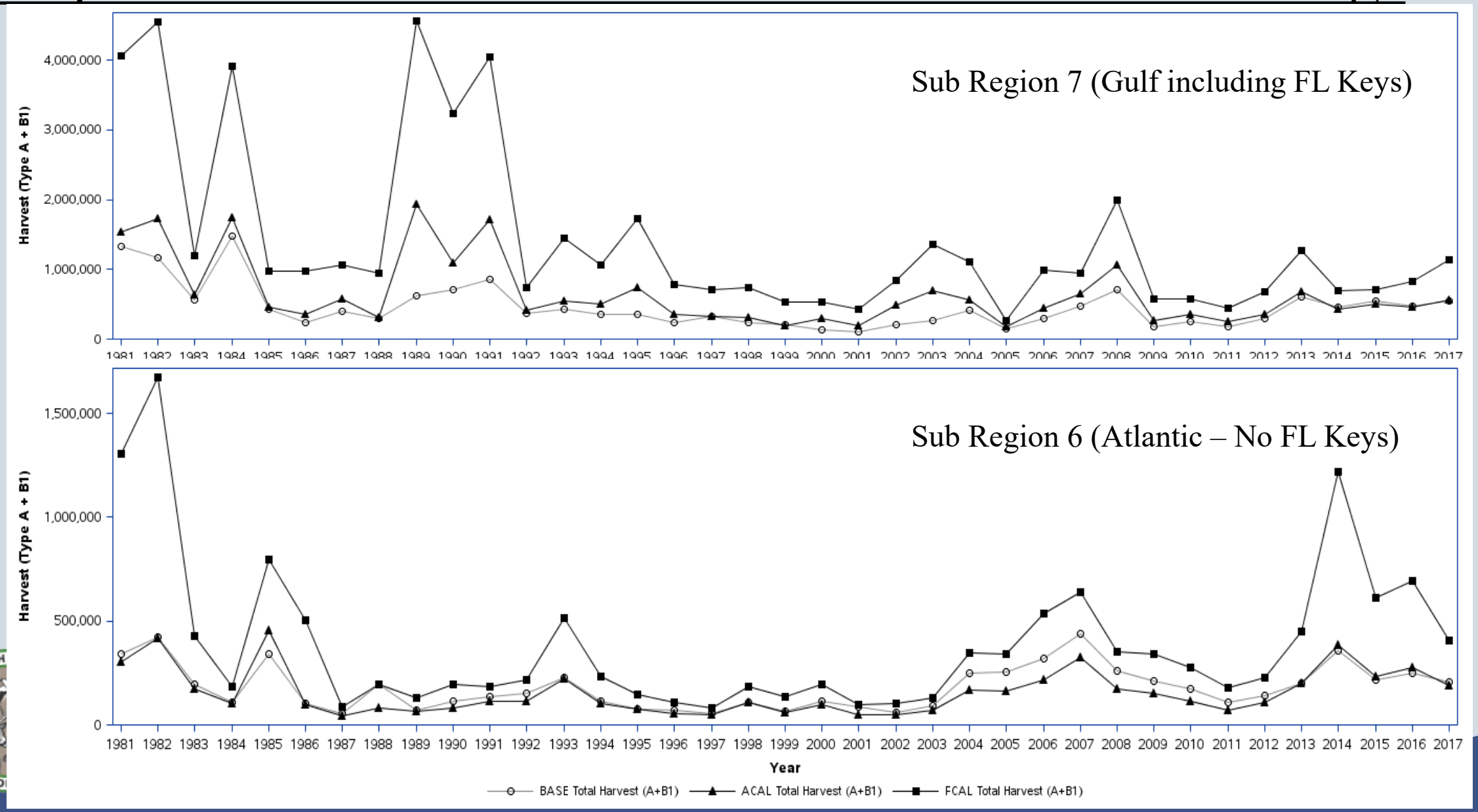
Continuity Model



Stock Status Determination Criterion

Criteria	Definition	S27A_Final	S64_Continuity	S64_Final
MSST (Minimum Stock Size Threshold)	$0.75*SSB_{F30\%SPR}$	2,304 mt	2,250 mt	1,428 mt
$SSB_{F30\%SPR}$	The estimated spawning stock biomass associated with F at 30% SPR	3,072 mt	3,000 mt	1,904 mt
$SSB_{current}$ (recent average of SSB)	The geometric mean of SSB for last 3 years	10,003 mt	7,380 mt	3,223 mt
$F_{30\%SPR}$ (Maximum Fishing Mortality Threshold)	The fishing mortality rate associated with 30% SPR	0.289 yr^{-1}	0.341 yr^{-1}	0.438 yr^{-1}
$F_{40\%SPR}$ (F_{OY})	The fishing mortality rate associated with 40% SPR	0.19 yr^{-1}	0.223 yr^{-1}	0.271 yr^{-1}
$F_{current}$	The geometric mean of F on age-4 fish for last 3 years	0.051 yr^{-1}	0.121 yr^{-1}	0.295 yr^{-1}
Optimum Yield (OY)	Retained Yield at F_{OY}	1,674 mt	2,157 mt	1,497 mt

Comparison of non-calibrated vs calibrated Rec Landings



Comparison of non-calibrated vs calibrated Rec Discards