

SEDAR 94: Florida Hogfish

Review Workshop

Florida Keys/East Florida



*Christopher E. Swanson,
Heather Christiansen, and Dustin Addis*
USF | FWC-FWRI Marine Fisheries Research
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SEDAR 94: Florida Hogfish Projections



Projection Methods

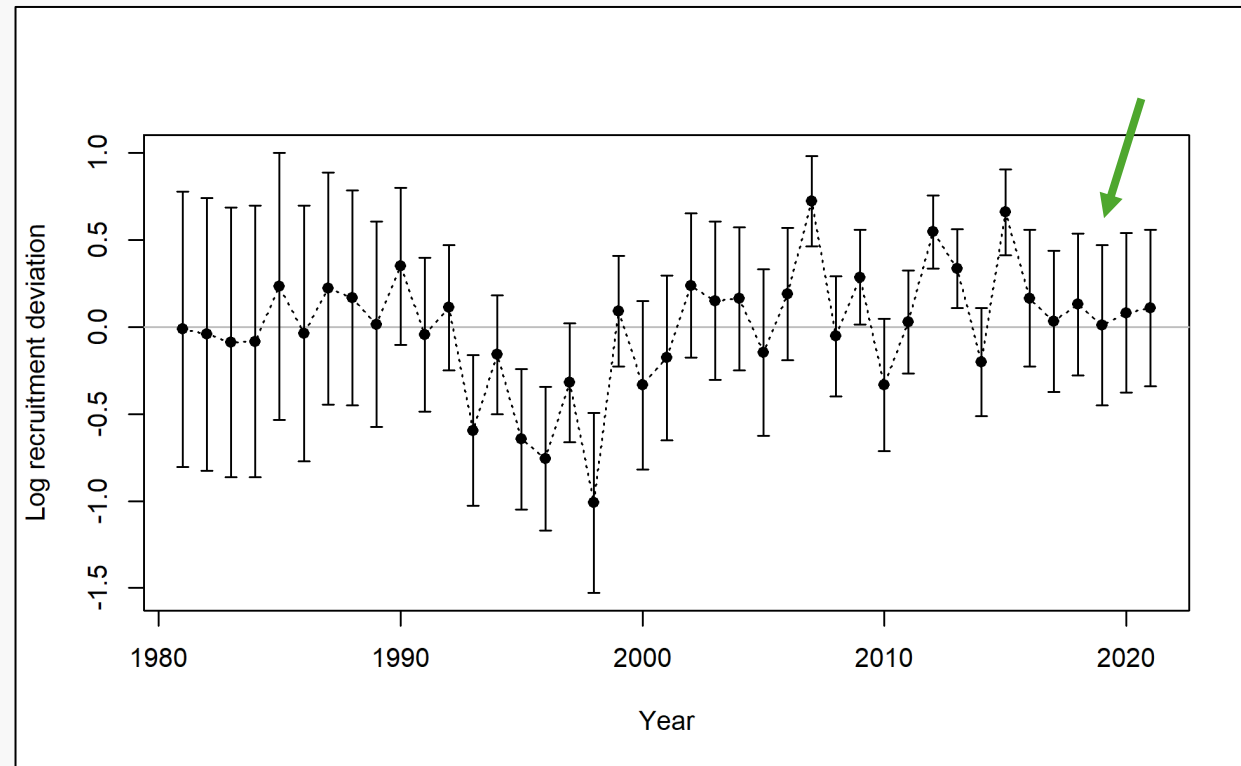
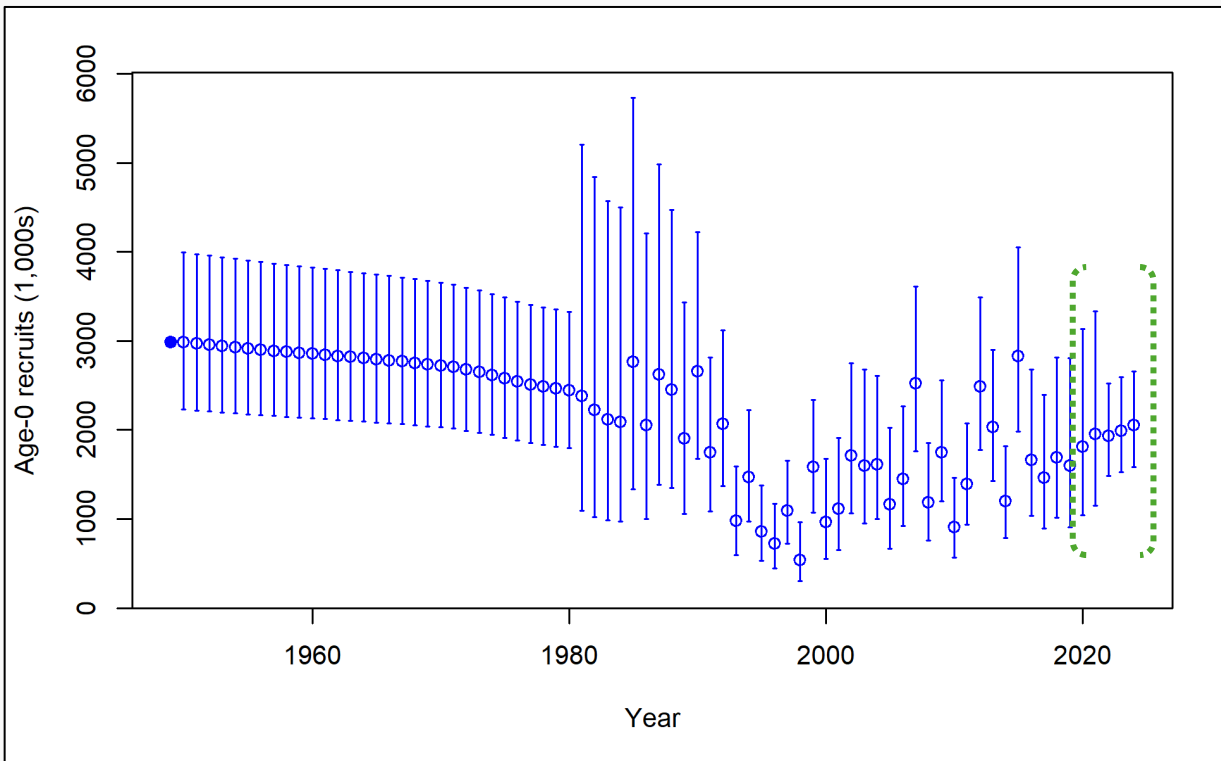
- Developed by SEFSC staff (Nathan Vaughan)
 - An iterative process to set fleet-specific F_s each year to ensure that a given constant fishing mortality rate (or constant catch) scenario is achieved
 - Fleet allocations, selectivity, and retention
 - Set as the average of the last 3-year estimates from the KEYS base model
- Recruitment (age-0) in Jan 2025
 - SAFMC SSC Catch Level Projections Workgroup Final Report, April 2022
 - The KEYS base model ends main_rec_devs in 2021
 - Causes forecast recruitment to begin in 2022, not 2025.
 - For equilibrium (long-term) projections:
 - Average recruitment across the whole timeseries (Type A)
 - KEYS: 1950 – 2024.
 - Recruitment based on SR curve (Type B1)
 - For short-term projections:
 - Average of 2020 – 2024 (5 years).

Projection Scenarios (TOR #10.4)

- Stock projections (including yields) shall be developed in accordance with the following (F_{Current} is the geometric mean of the most recent three years of data):
 - A) If stock is overfished:
 $F=0$, F_{Current} , $F=F_{\text{MSY}}$, F at 75% of F_{MSY} , F_{OY}
 $F=F_{\text{Rebuild}}$ (per Magnuson-Stevens Act)
 - B) If overfishing is occurring:
 $F=F_{\text{Current}}$, $F=F_{\text{MSY}}$, F at 75% of F_{MSY} , F_{OY}
 - **C) If stock is neither overfished nor undergoing overfishing:**
 $F=F_{\text{Current}}$, $F=F_{\text{MSY}}$, F at 75% of F_{MSY} , F_{OY}
 - D) If data limitations preclude classic projections (i.e. A, B, C above), explore alternative models to provide management advice.
 - E) If an alternative proxy for F_{MSY} is recommended, provide outputs for both the current and recommended proxies.
 - SAFMC regulations currently based on $F_{30\% \text{SPR}}$
 - $F_{40\% \text{SPR}}$ also provided

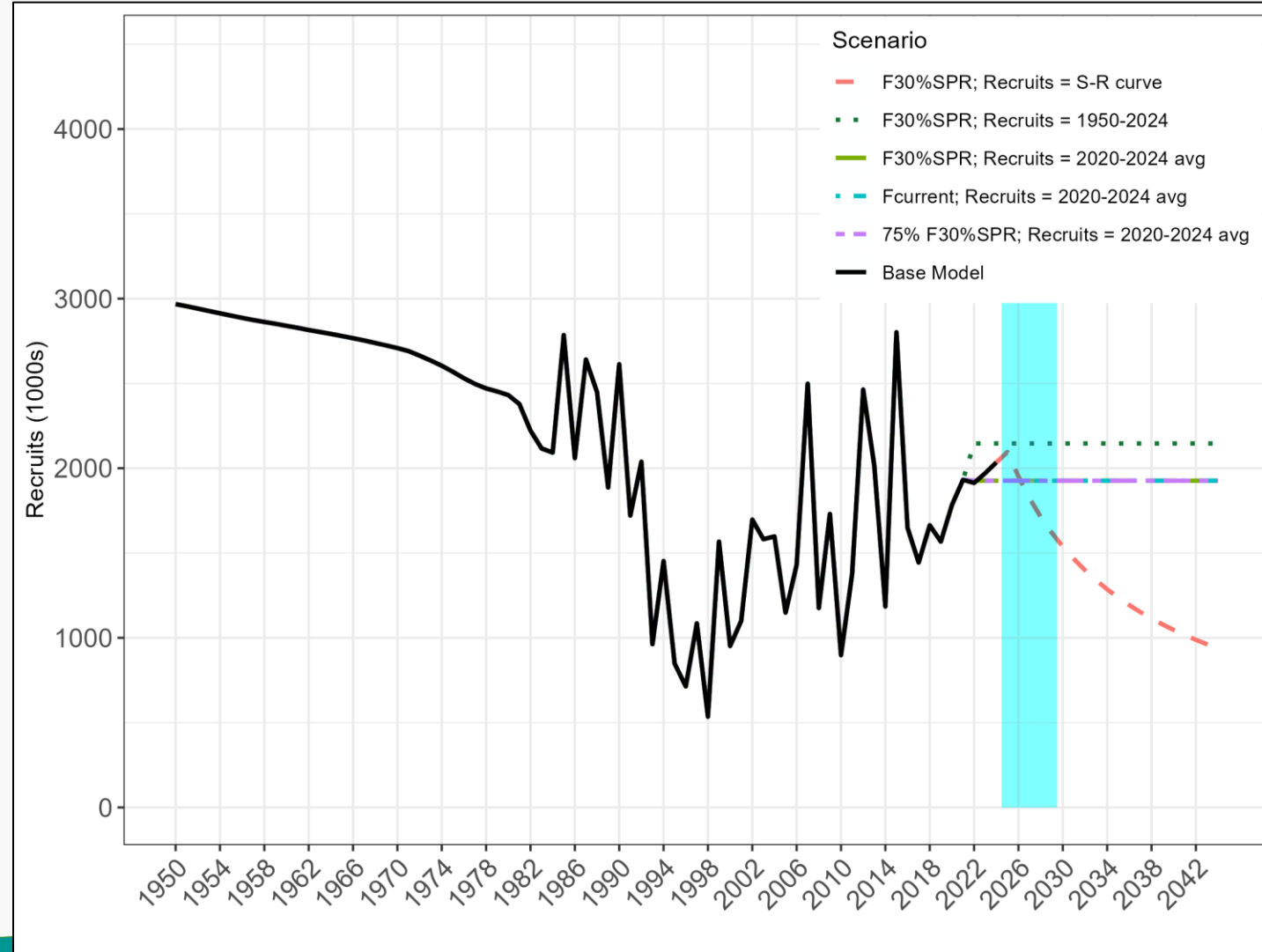


Estimated Age-0 Recruitment



Whole avg. 2,145,969 fish
5-year avg. 1,926,502 fish

Constant F Projection: Recruitment



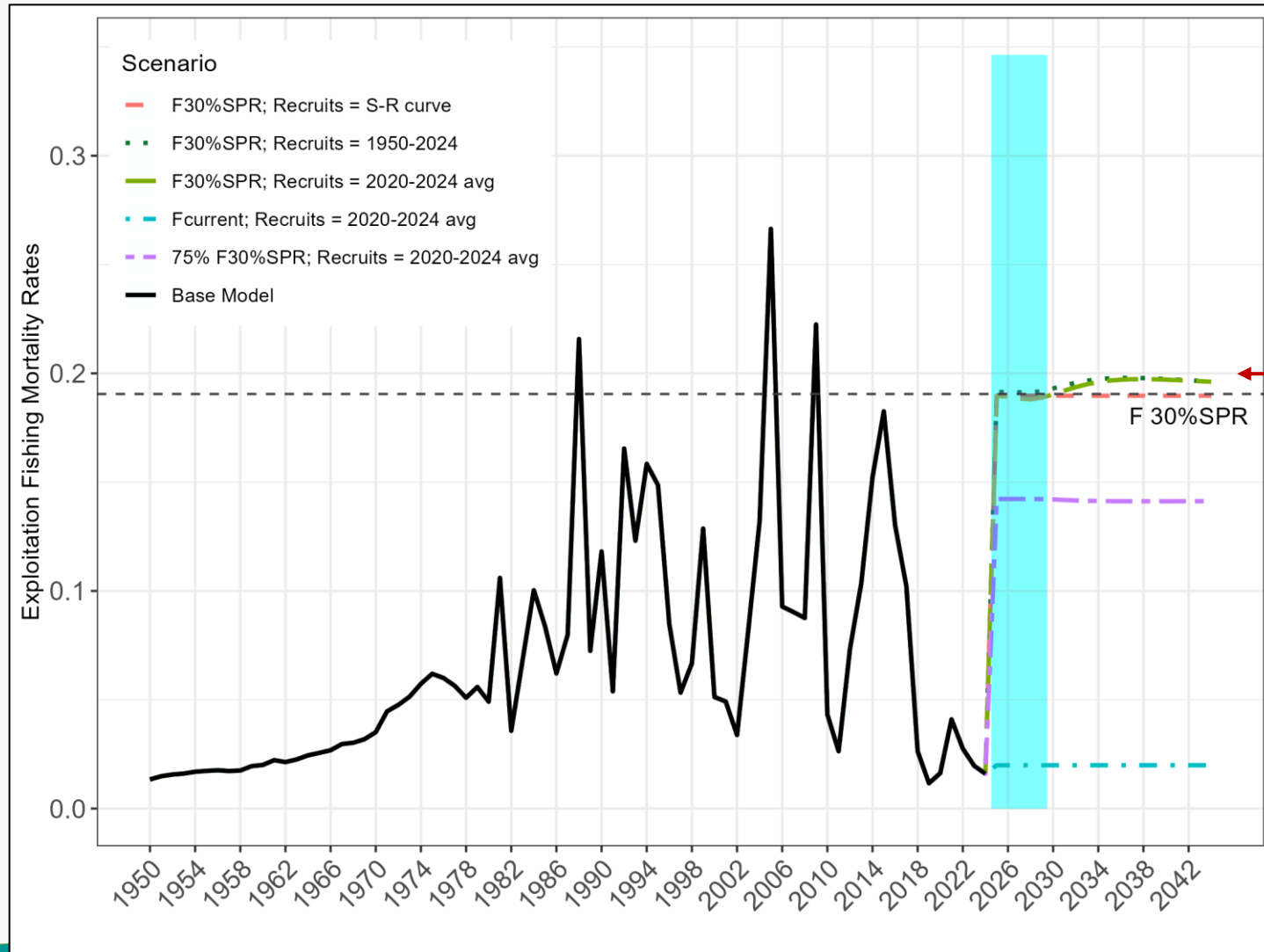
Avg recr 1950-2024: 2,145.97

Avg recr 2020-2024: 1,926.5

Projections based on SR curve nearly crash population by end of 100 years.

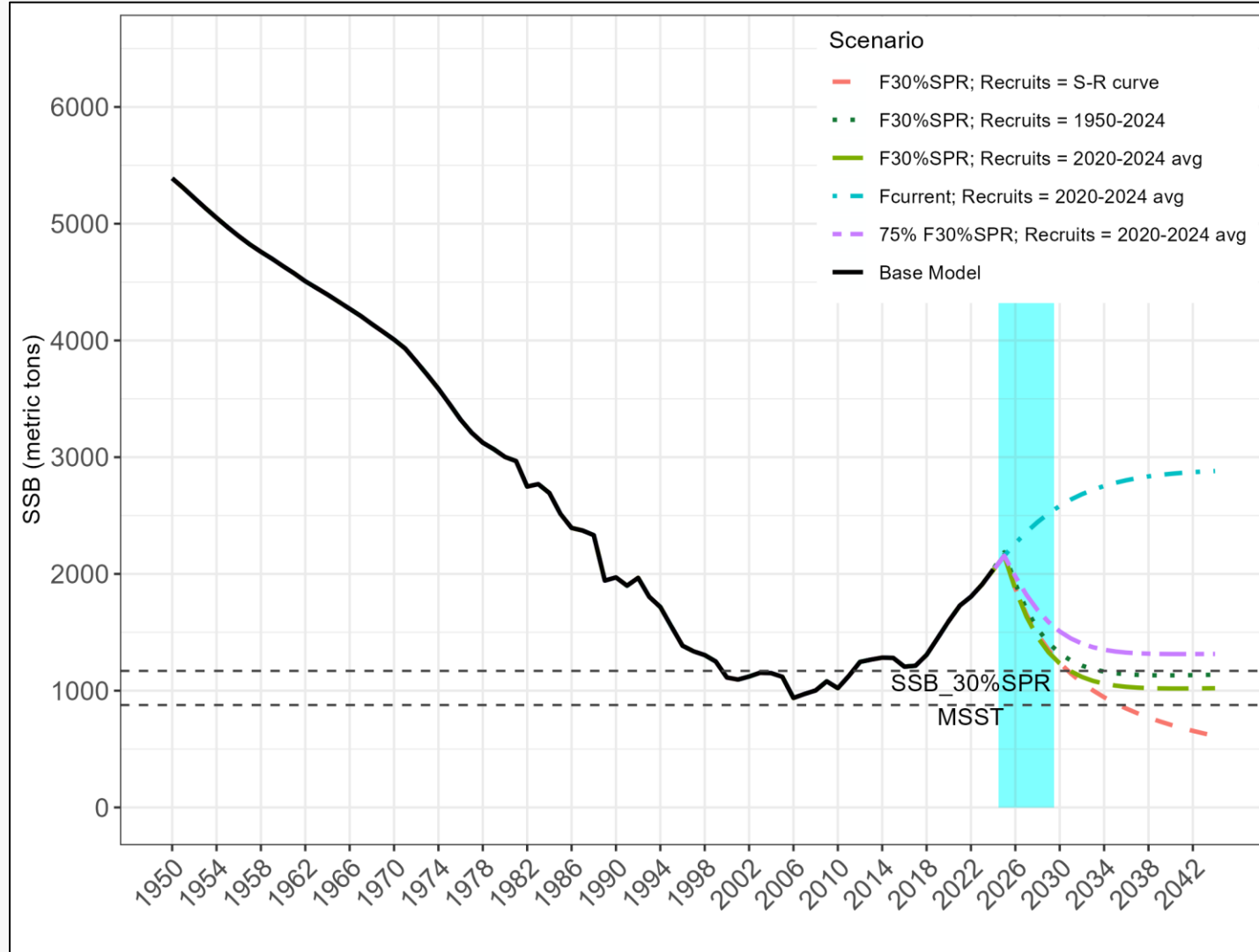
*** Forecast recruitment starts in 2022 ***

Constant F Projection Scenarios



Scenario	Value
$F_{30\%SPR}$	0.190 yr^{-1}
F_{current}	0.020 yr^{-1}
$F_{75\%_F30\%SPR}$	0.142 yr^{-1}

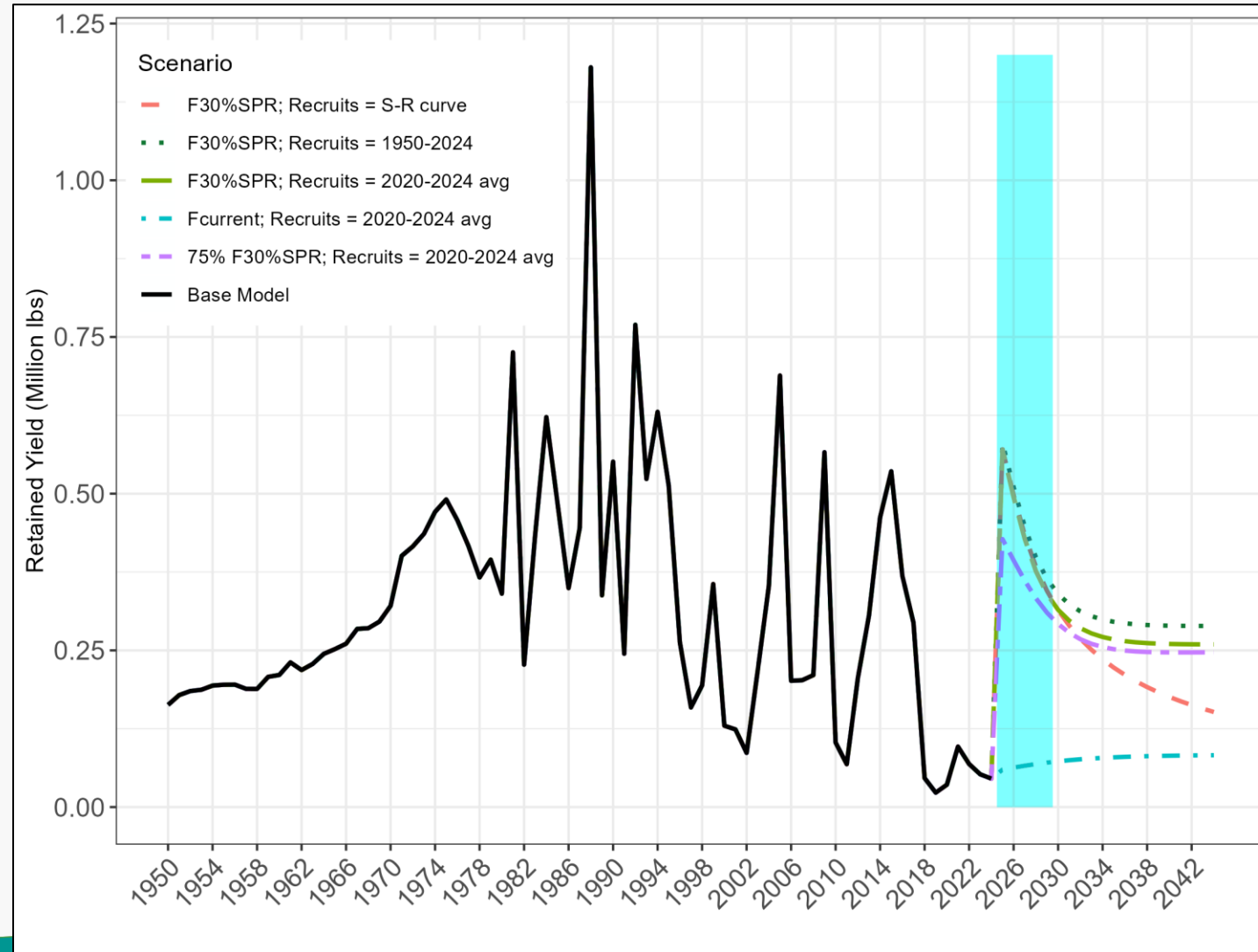
Constant F Projection: SSB



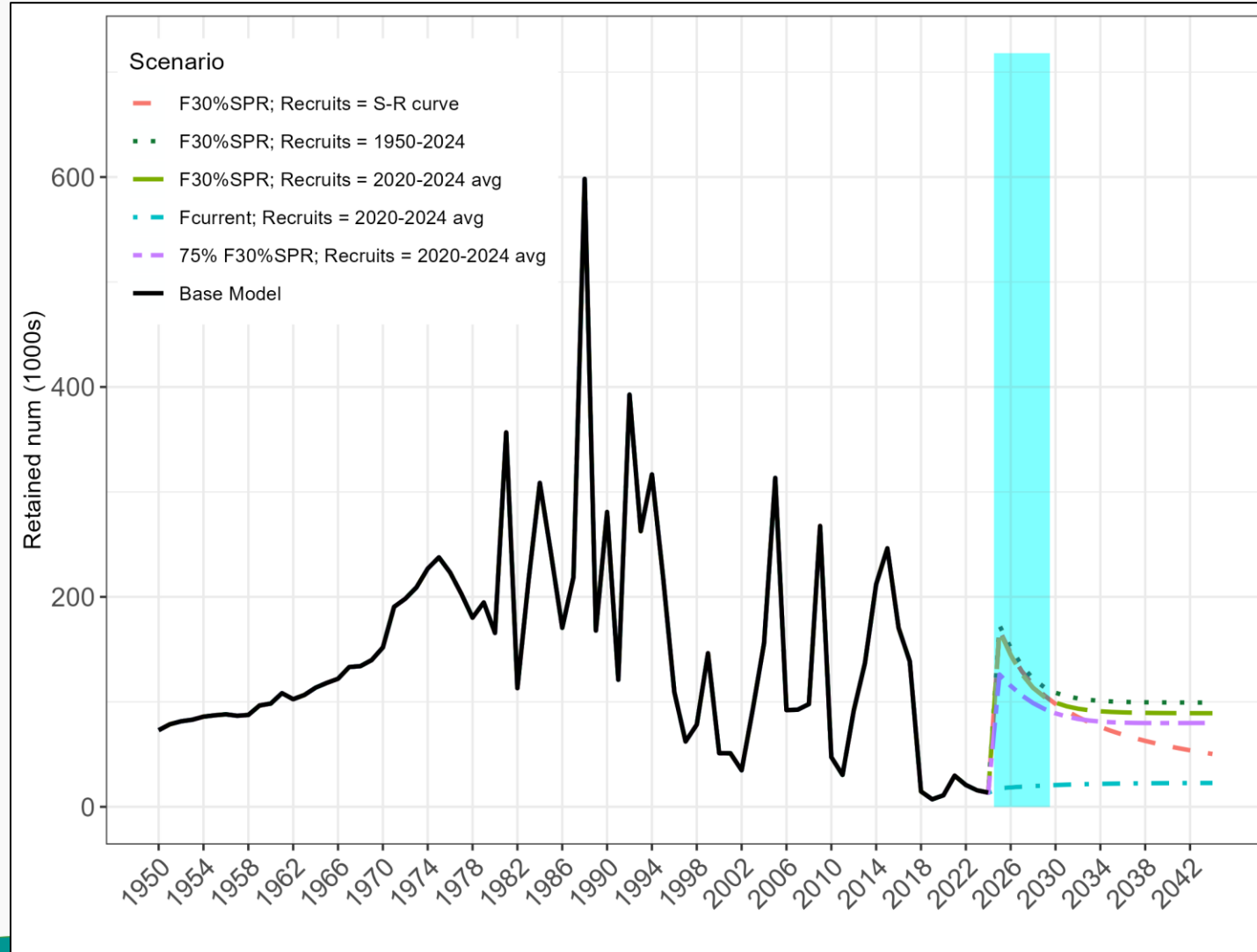
- Avg. SSB of last 10 years of projection period
 - Forecast Model (1950-2024)
SSB_F30%SPR = 1,169.432 mt
 - Base Model (SR)
SSB_F30%SPR = 237.270 mt

Projections based on SR curve nearly crash population by end of 100 years.

Constant F Projection: Retained Yield (lbs.)



Constant F Projection: Retained Yield (000s)



Constant F Projection: Retained Yield (lbs.)

Table 3.19

Table 3.20

F _{30%SPR} Long-Term Projections						F _{30%SPR} Short-Term Projections				
Year	Age-0 Recruits	F	SSB	Retained Yield	Retained Num	Age-0 Recruits	F	SSB	Retained Yield	Retained Num
2025	2,145.97	0.191	2,185.380	580,881	172,753	1,926.50	0.190	2,155.770	570,132	167,826
2026	2,145.97	0.192	1,916.610	510,476	151,453	1,926.50	0.189	1,869.460	494,613	144,732
2027	2,145.97	0.191	1,696.180	447,544	134,281	1,926.50	0.188	1,635.390	427,970	126,381
2028	2,145.97	0.191	1,529.400	398,698	121,997	1,926.50	0.188	1,457.900	376,586	113,371
2029	2,145.97	0.192	1,407.670	363,882	113,866	1,926.50	0.189	1,327.660	339,998	104,783
2030	2,145.97	0.193	1,320.370	339,911	108,658	1,926.50	0.190	1,233.560	314,744	99,271
2031	2,145.97	0.194	1,258.520	323,561	105,358	1,926.50	0.192	1,166.210	297,431	95,761
2032	2,145.97	0.196	1,214.620	312,262	103,220	1,926.50	0.194	1,117.870	285,407	93,477
2033	2,145.97	0.197	1,184.140	304,507	101,837	1,926.50	0.195	1,083.770	277,093	91,990
2034	2,145.97	0.197	1,163.390	299,210	100,945	1,926.50	0.196	1,060.060	271,359	91,021

Units:

Recruits in thousands

SSB in metric tons

Retained Yield in pounds

Retained Num in numbers



Constant F Projection: Retained Yield (lbs.)

Table 3.23

Table 3.20

F_{current} Short-Term Projections						75% $F_{30\% \text{SPR}}$ Short-Term Projections				
Year	Age 0 Recruits	F	SSB	Retained Yield	Retained Num	Age 0 Recruits	F	SSB	Retained Yield	Retained Num
2025	1,926.50	0.020	2,155.770	59,795	17,692	1,926.50	0.142	2,155.770	427,532	126,030
2026	1,926.50	0.020	2,262.330	63,001	18,473	1,926.50	0.142	1,978.620	393,651	115,229
2027	1,926.50	0.020	2,358.610	65,961	19,166	1,926.50	0.142	1,821.100	361,314	106,084
2028	1,926.50	0.020	2,444.060	68,629	19,771	1,926.50	0.142	1,690.870	333,212	98,817
2029	1,926.50	0.020	2,518.370	70,974	20,290	1,926.50	0.142	1,587.270	310,172	93,232
2030	1,926.50	0.020	2,582.350	73,011	20,729	1,926.50	0.142	1,507.440	292,090	89,053
2031	1,926.50	0.020	2,637.280	74,771	21,104	1,926.50	0.142	1,447.680	278,162	85,948
2032	1,926.50	0.020	2,682.810	76,236	21,410	1,926.50	0.142	1,403.570	267,813	83,724
2033	1,926.50	0.020	2,721.140	77,476	21,666	1,926.50	0.141	1,372.190	260,447	82,200
2034	1,926.50	0.020	2,753.400	78,524	21,879	1,926.50	0.141	1,350.480	255,349	81,193

Units:

Recruits in thousands

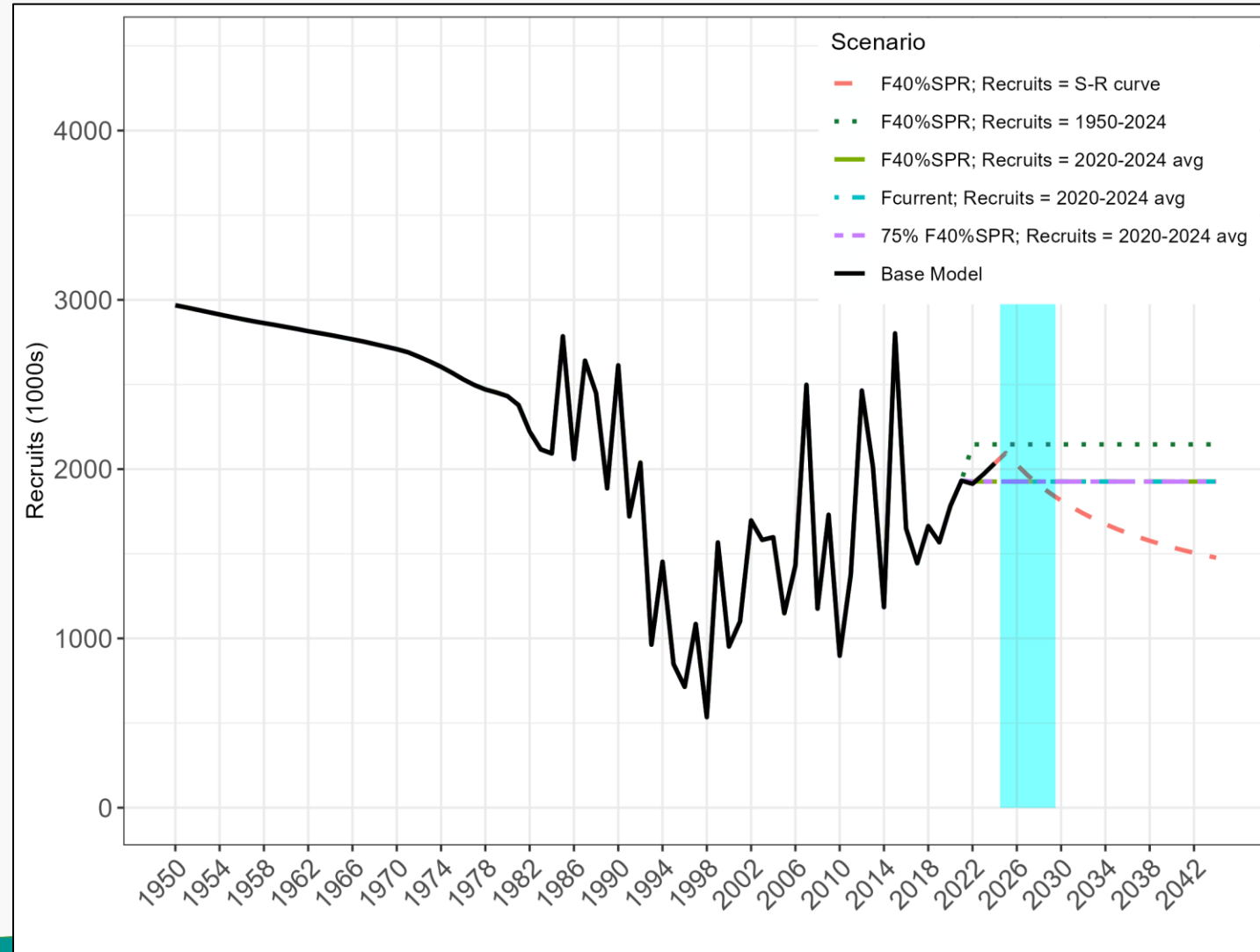
SSB in metric tons

Retained Yield in pounds

Retained Num in numbers



Constant F Projection: Recruitment



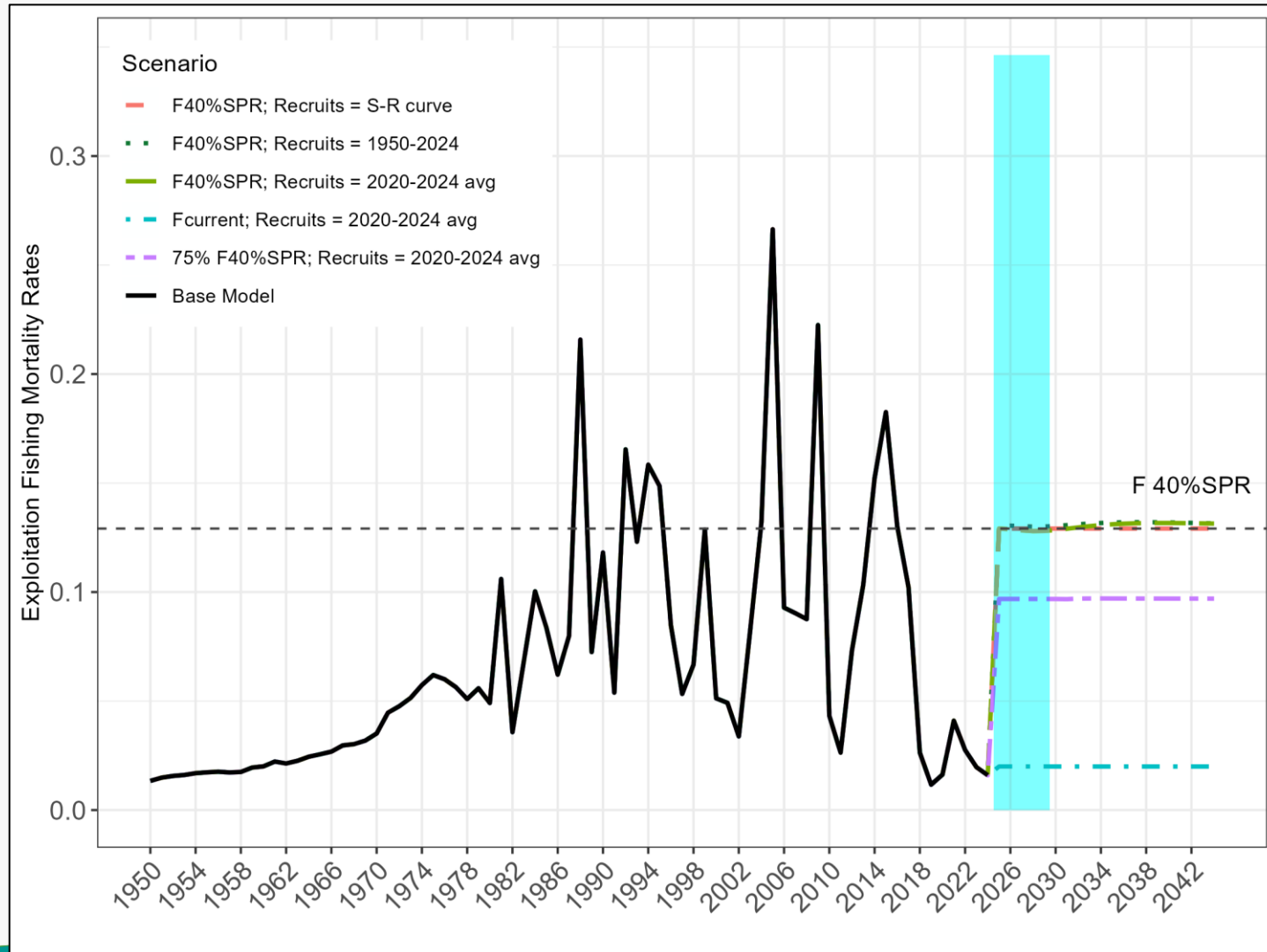
Avg recr 1950-2024: 2,145.97

Avg recr 2020-2024: 1,926.5

Figure 3.74

*** Forecast recruitment starts in 2022 ***

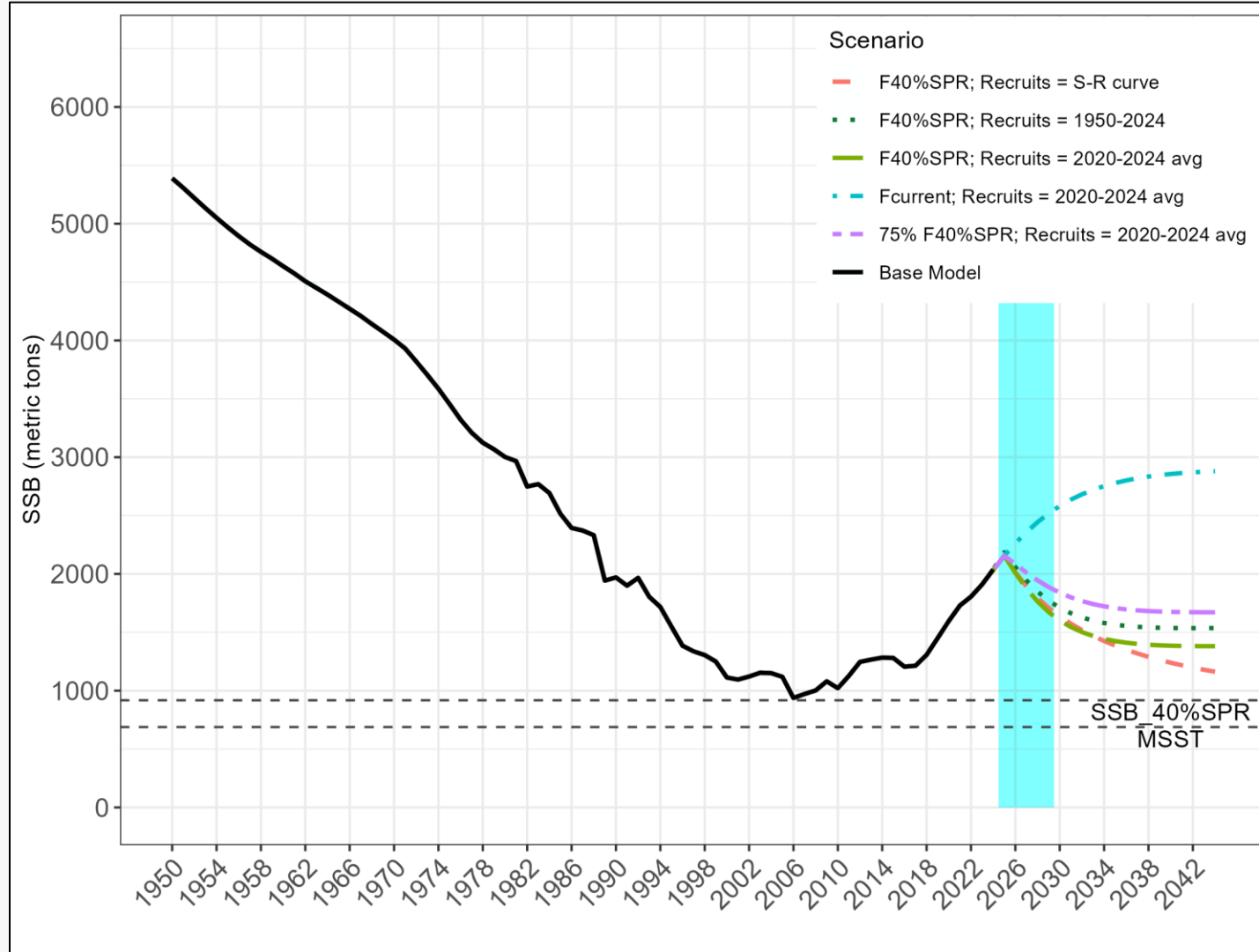
Constant F Projection Scenarios



Scenario	Value
$F_{40\%SPR}$	0.129 yr^{-1}
F_{current}	0.020 yr^{-1}
$F_{75\%_F40\%SPR}$	0.097 yr^{-1}

Figure 3.71

Constant F Projection: SSB



- Influence of long-term avg recruitment (1950 – 2024)
 - Base Model (SR)
SSB_{F40%SPR} = 912 mt
 - Forecast Model (1950-2024)
SSB_{F40%SPR} = 1,558 mt
 - Avg. SSB of last 10 years of projection period

Figure 3.73

Constant F Projection: Retained Yield (lbs.)

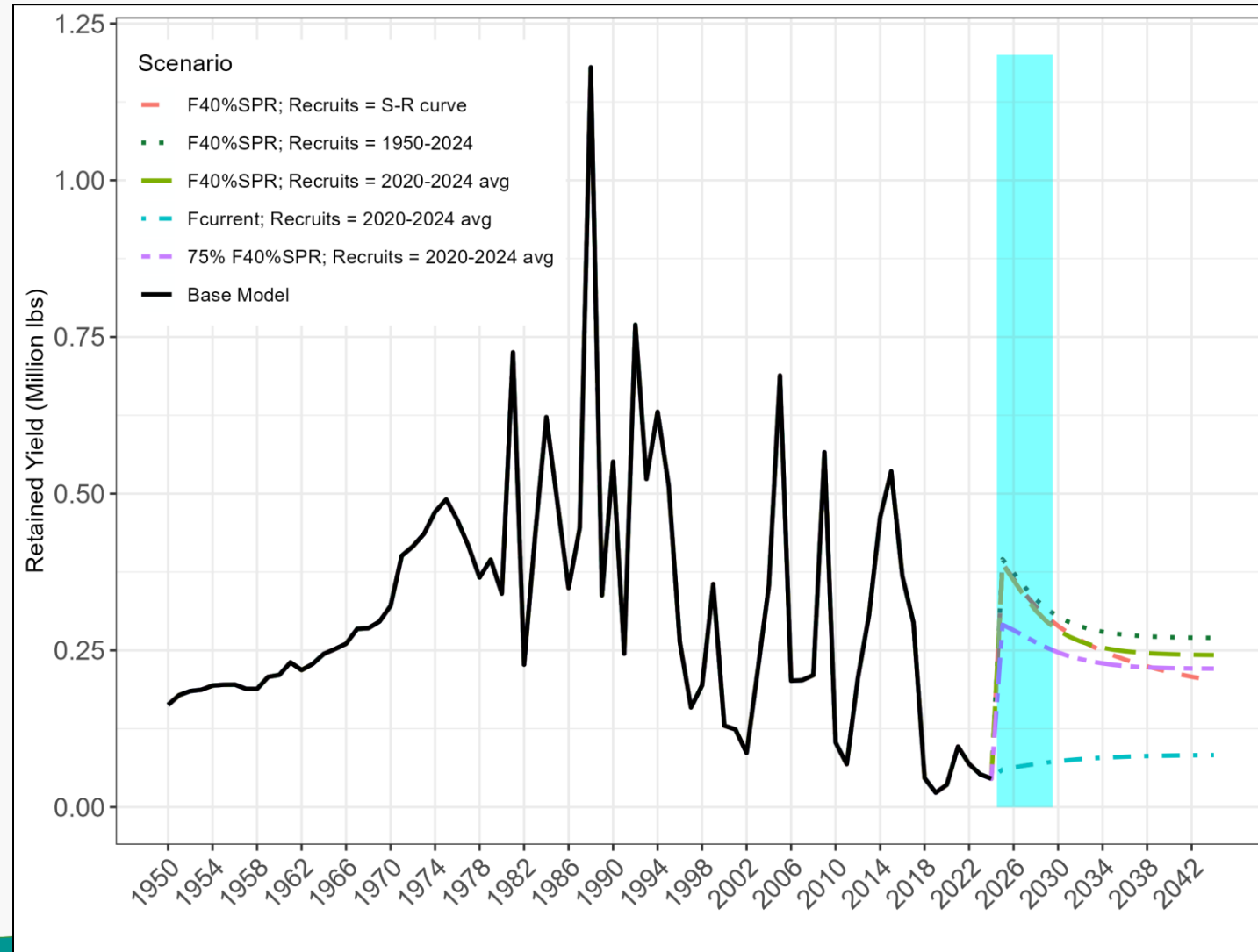
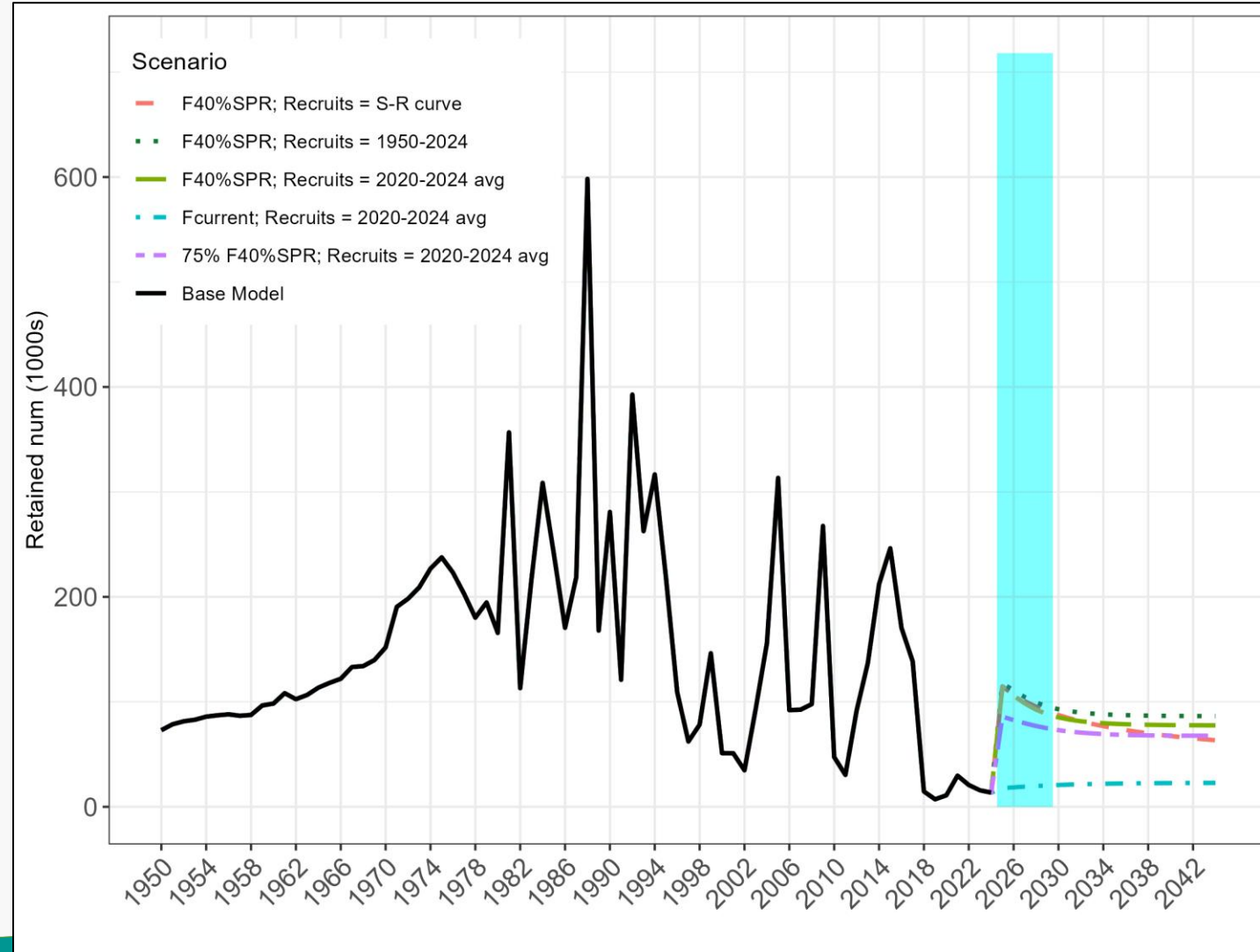


Figure 3.72

Constant F Projection: Retained Yield (000s)



Constant F Projection: Retained Yield (lbs.)

Table 3.21

Table 3.22

F _{40%SPR} Long-Term Projections						F _{40%SPR} Short-Term Projections				
Year	Age-0 Recruits	F	SSB	Retained Yield	Retained Num	Age-0 Recruits	F	SSB	Retained Yield	Retained Num
2025	2,145.97	0.130	2,185.380	395,330	117,777	1,926.50	0.129	2,155.770	387,977	114,417
2026	2,145.97	0.130	2,059.460	373,607	110,836	1,926.50	0.129	2,008.970	361,975	105,975
2027	2,145.97	0.130	1,944.460	351,083	104,475	1,926.50	0.128	1,875.570	335,863	98,479
2028	2,145.97	0.130	1,848.360	331,348	99,374	1,926.50	0.128	1,763.710	313,326	92,573
2029	2,145.97	0.130	1,771.090	315,678	95,612	1,926.50	0.128	1,673.190	295,513	88,248
2030	2,145.97	0.130	1,710.440	303,796	92,943	1,926.50	0.128	1,601.540	281,984	85,181
2031	2,145.97	0.131	1,663.730	294,951	91,083	1,926.50	0.129	1,545.760	271,867	83,037
2032	2,145.97	0.131	1,627.520	288,264	89,752	1,926.50	0.130	1,502.120	264,205	81,501
2033	2,145.97	0.131	1,600.220	283,304	88,809	1,926.50	0.130	1,468.760	258,484	80,410
2034	2,145.97	0.132	1,579.990	279,639	88,140	1,926.50	0.131	1,443.600	254,228	79,632

Units:

Recruits in thousands

SSB in metric tons

Retained Yield in pounds

Retained Num in numbers



Constant F Projection: Retained Yield (lbs.)

Table 3.23

Table 3.22

F_{current} Short-Term Projections						75% $F_{40\%SPR}$ Short-Term Projections				
Year	Age 0 Recruits	F	SSB	Retained Yield	Retained Num	Age 0 Recruits	F	SSB	Retained Yield	Retained Num
2025	1,926.50	0.020	2,155.770	59,990	17,750	1,926.50	0.097	2,155.770	290,920	85,881
2026	1,926.50	0.020	2,262.180	63,201	18,531	1,926.50	0.097	2,083.630	282,153	82,639
2027	1,926.50	0.020	2,358.300	66,169	19,226	1,926.50	0.097	2,011.210	272,361	79,612
2028	1,926.50	0.020	2,443.600	68,845	19,834	1,926.50	0.097	1,945.210	262,819	76,996
2029	1,926.50	0.020	2,517.760	71,199	20,355	1,926.50	0.097	1,887.620	254,188	74,818
2030	1,926.50	0.020	2,581.600	73,242	20,796	1,926.50	0.097	1,839.180	246,758	73,048
2031	1,926.50	0.020	2,636.390	75,004	21,170	1,926.50	0.097	1,799.770	240,519	71,627
2032	1,926.50	0.020	2,681.800	76,471	21,477	1,926.50	0.097	1,767.690	236,111	70,717
2033	1,926.50	0.020	2,720.020	77,714	21,734	1,926.50	0.097	1,742.110	232,258	69,913
2034	1,926.50	0.020	2,752.180	78,762	21,948	1,926.50	0.097	1,722.370	229,227	69,295

Units:

Recruits in thousands

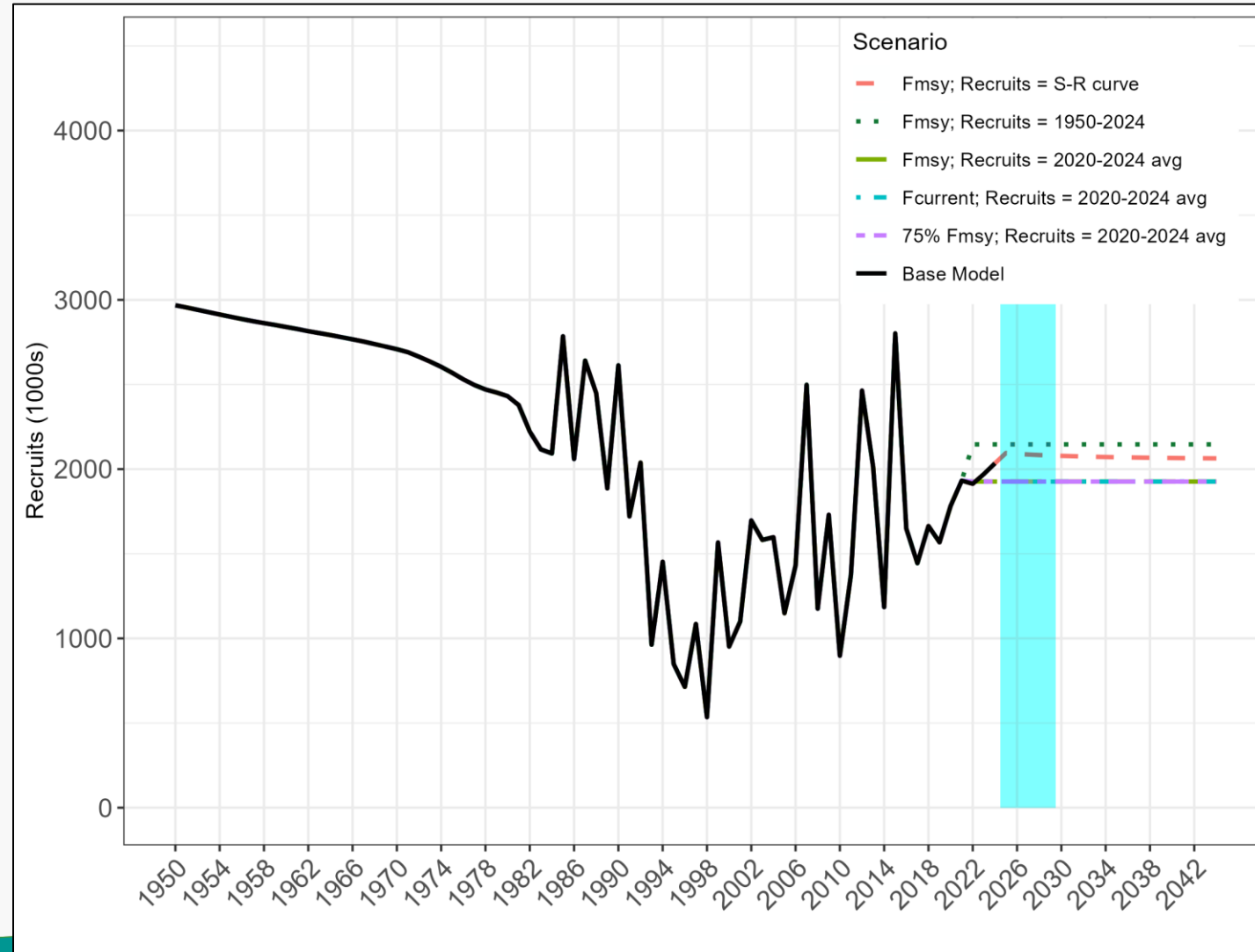
SSB in metric tons

Retained Yield in pounds

Retained Num in numbers



Constant F Projection: Recruitment



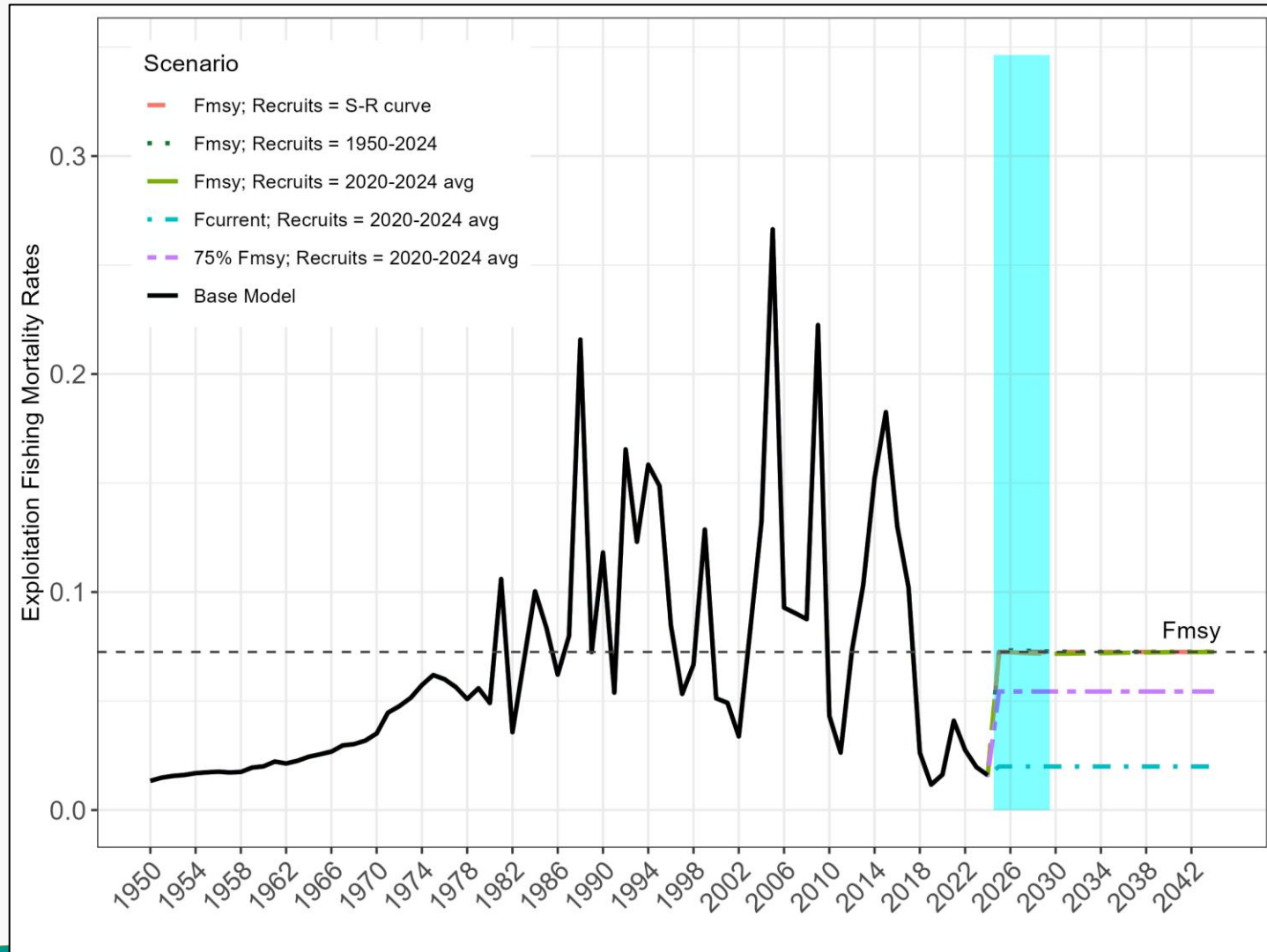
Avg recr 1950-2024: 2,145.97

Avg recr 2020-2024: 1,926.5

Figure 3.78

*** Forecast recruitment starts in 2022 ***

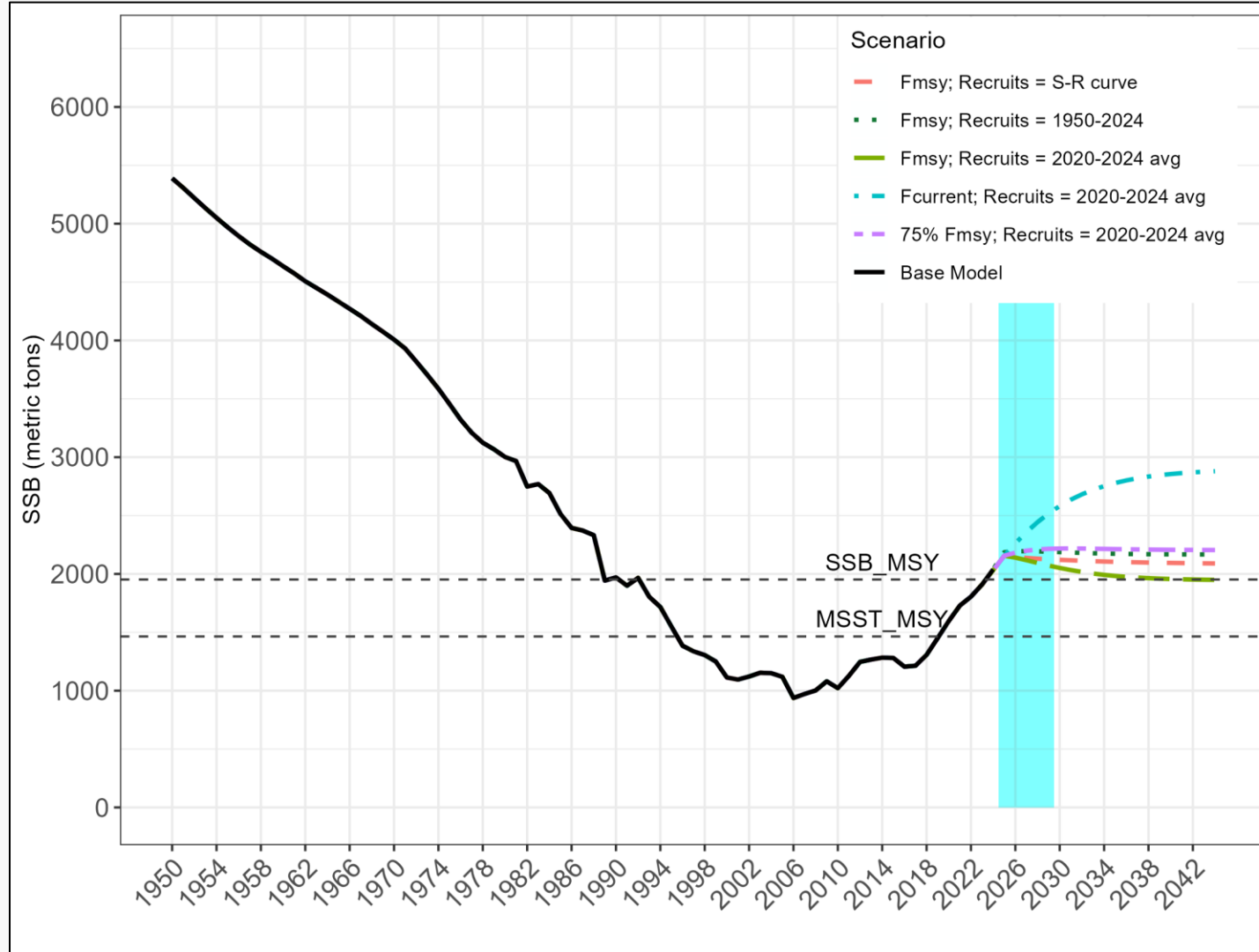
Constant F Projection Scenarios



Scenario	Value
F_{MSY}	0.073 yr ⁻¹
$F_{current}$	0.020 yr ⁻¹
$F_{75\%_FMSY}$	0.054 yr ⁻¹

Figure 3.75

Constant F Projection: SSB



- Influence of long-term avg recruitment (1950 – 2024)
 - Base Model (SR)
 - SSB_FMSY = 1,952.4 mt
 - Forecast Model (1950-2024)
 - SSB_FMSY = 2,167.4 mt
 - Avg. SSB of last 10 years of projection period
 - Forecast Model (2020-2024)
 - SSB_FMSY = 1945.7 mt

Figure 3.77

Constant F Projection: Retained Yield (lbs.)

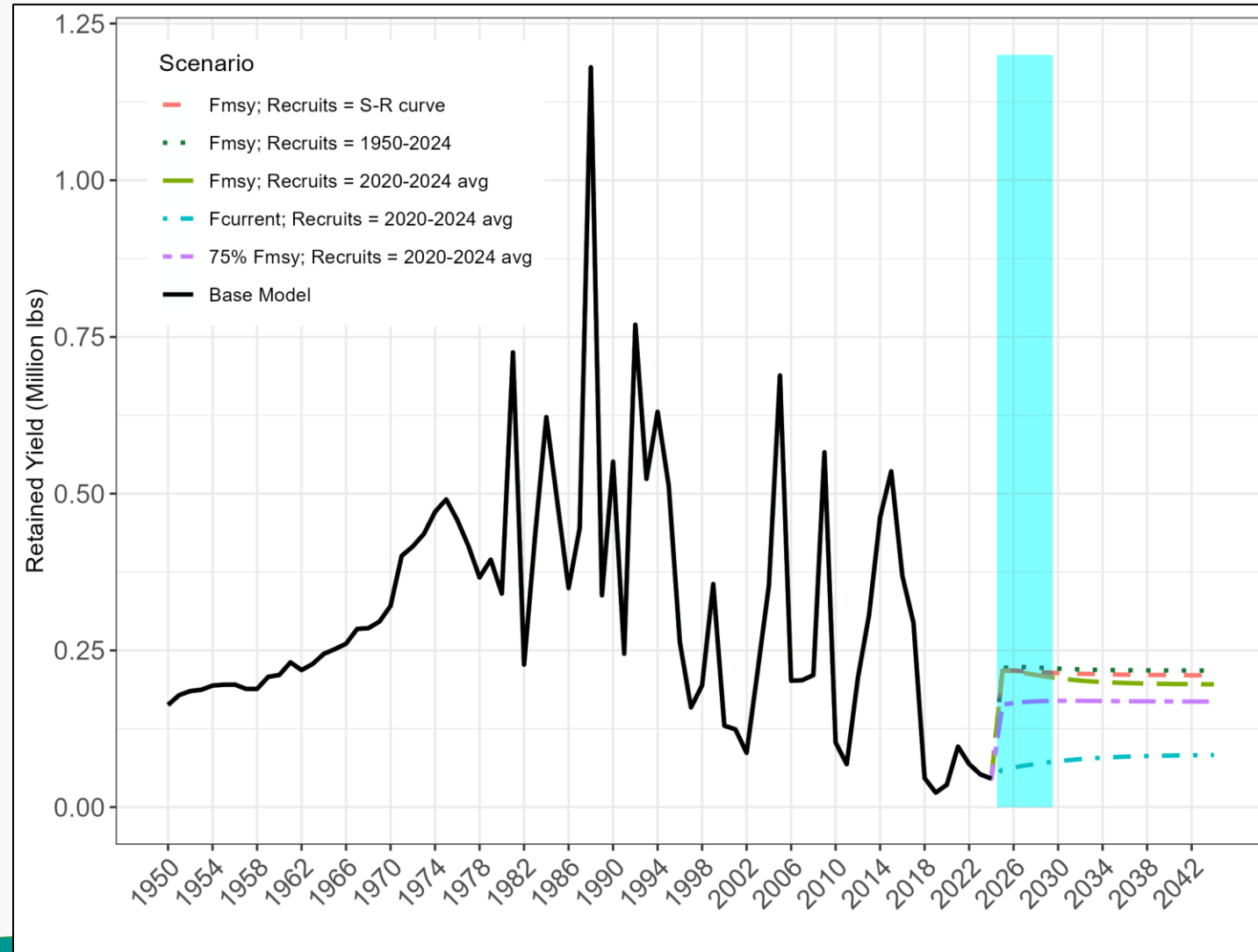
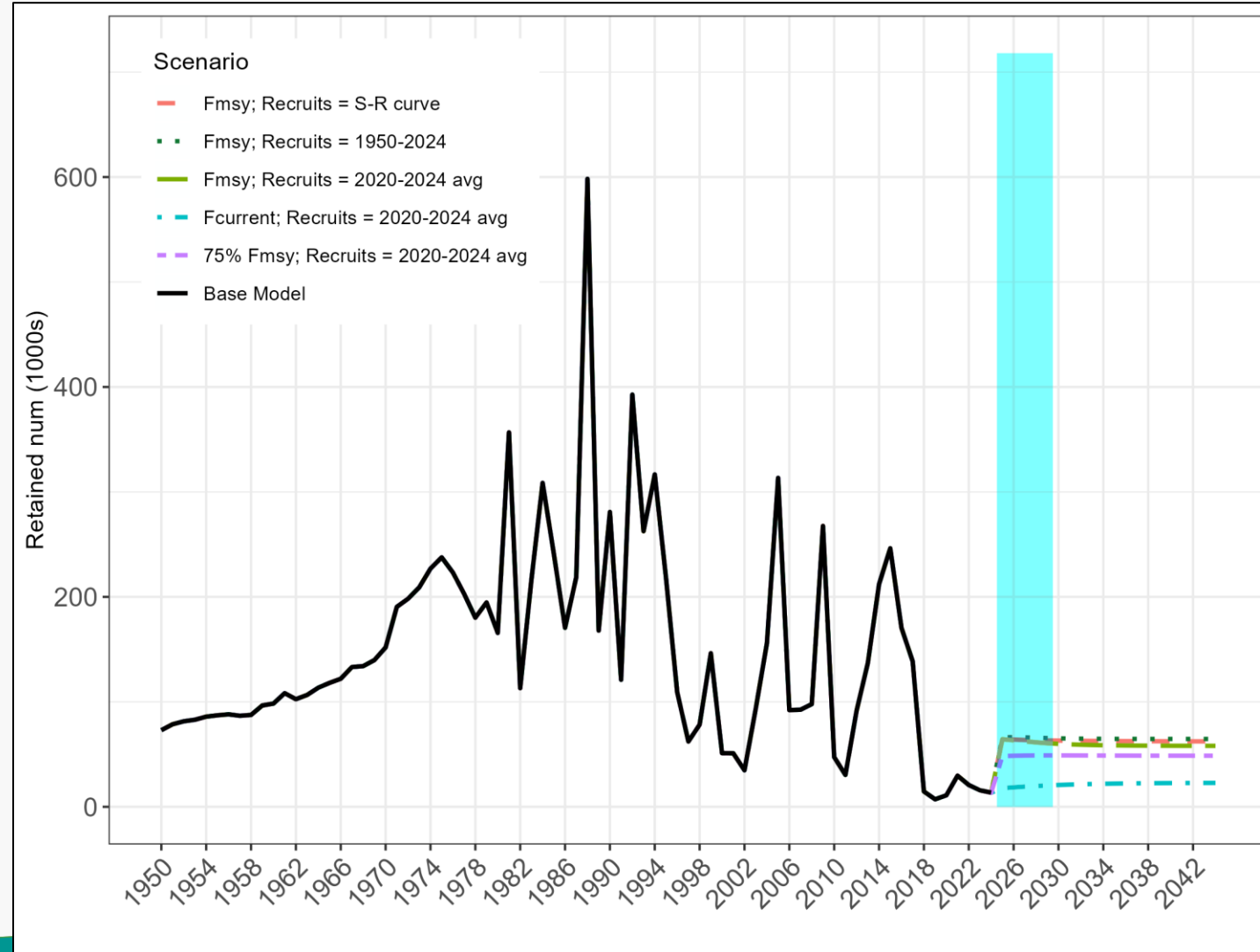


Figure 3.76

Constant F Projection: Retained Yield (000s)



Constant F Projection: Retained Yield (lbs.)

Table 3.24

Table 3.24

F_{MSY} Equilibrium Long-Term Projections (S-R)						F_{MSY} Equilibrium Long-Term Projections				
Year	Age-0 Recruits	F	SSB	Retained Yield	Retained Num	Age-0 Recruits	F	SSB	Retained Yield	Retained Num
2025	2,095.40	0.073	2,155.98	218,112	64,521	2,145.97	0.073	2,185.38	222,050	66,262
2026	2,090.78	0.073	2,146.29	217,779	64,067	2,145.97	0.073	2,193.60	223,641	66,363
2027	2,086.26	0.073	2,136.87	216,692	63,675	2,145.97	0.073	2,194.87	223,564	66,123
2028	2,083.28	0.073	2,130.67	215,583	63,402	2,145.97	0.073	2,193.32	222,748	65,783
2029	2,080.71	0.073	2,125.35	214,639	63,209	2,145.97	0.073	2,190.30	221,783	65,472
2030	2,078.45	0.073	2,120.68	213,883	63,066	2,145.97	0.073	2,186.84	220,926	65,230
2031	2,076.60	0.073	2,116.85	213,294	62,964	2,145.97	0.073	2,183.70	220,251	65,065
2032	2,074.61	0.073	2,112.75	212,729	62,863	2,145.97	0.073	2,180.06	219,635	64,931
2033	2,072.90	0.073	2,109.24	212,265	62,778	2,145.97	0.073	2,176.98	219,162	64,837
2034	2,071.48	0.073	2,106.32	211,893	62,707	2,145.97	0.073	2,174.55	218,815	64,775

Units:

Recruits in thousands

SSB in metric tons

Retained Yield in pounds

Retained Num in numbers



Constant F Projection: Retained Yield (lbs.)

Table 3.25

Table 3.25

F_{MSY} Short-Term Projections						$0.75 * F_{MSY}$ Short-Term Projections				
Year	Age-0 Recruits	F	SSB	Retained Yield	Retained Num	Age-0 Recruits	F	SSB	Retained Yield	Retained Num
2025	1,926.50	0.073	2,155.77	217,900	64,372	1,926.50	0.054	2,155.77	163,401	48,298
2026	1,926.50	0.073	2,139.95	216,661	63,479	1,926.50	0.054	2,182.07	166,019	48,654
2027	1,926.50	0.073	2,117.77	213,933	62,404	1,926.50	0.054	2,198.84	167,707	48,850
2028	1,926.50	0.073	2,094.41	210,819	61,406	1,926.50	0.054	2,209.31	168,732	48,950
2029	1,926.50	0.073	2,071.79	207,928	60,588	1,926.50	0.054	2,215.04	169,282	48,986
2030	1,926.50	0.073	2,051.14	205,480	59,958	1,926.50	0.054	2,217.67	169,532	48,983
2031	1,926.50	0.073	2,033.16	203,499	59,495	1,926.50	0.054	2,218.60	169,613	48,968
2032	1,926.50	0.073	2,016.90	201,820	59,133	1,926.50	0.054	2,217.49	169,510	48,927
2033	1,926.50	0.073	2,003.19	200,482	58,862	1,926.50	0.054	2,215.90	169,363	48,884
2034	1,926.50	0.073	1,991.89	199,432	58,663	1,926.50	0.054	2,214.27	169,212	48,846

Units:

Recruits in thousands

SSB in metric tons

Retained Yield in pounds

Retained Num in numbers



Thank You!

