# STOCK ASSESSMENT FOR SOUTH ATLANTIC ALBACORE USING A NON-EQUILIBRIUM PRODUCTION MODEL

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## **SUMMARY**

A Stock-Production Model Incorporating Covariates (ASPIC), a non-equilibrium surplus-production model, was attempted for the stock assessment for the southern Atlantic Ocean albacore, using the software package ASPIC ver. 5.34. Various cases exist with different index and/or period of Japanese longline CPUE. For each case, four models by different weighting and shape parameter, which were selected for final models at 2013 and 2016 assessment, were examined. Several models predicted that at some stage in the recent past, the southern Albacore stock had been overfishing and overfished. The fishing pressure appears to have eased in recent years, with a subsequent recovery in biomass. The scenarios with Japanese longline core area CPUE were more optimistic, but CPUE fit was worse. Based on the results of future projection, stock status will be in green zone with >60% probability if future catch is up to 28,000 to 30,000t (depends on the cases and scenarios).

## RÉSUMÉ

Un modèle stock-production incorporant des covariances (ASPIC), un modèle de production excédentaire en conditions de non-équilibre, a été tenté pour l'évaluation du stock de germon de l'océan Atlantique Sud, en utilisant le logiciel ASPIC ver 5.34. 5.34. Il existe divers cas avec différents indices et/ou périodes de CPUE de la palangre japonaise. Pour chaque cas, on a examiné quatre modèles selon plusieurs paramètres de pondération et de forme, qui ont été retenus comme modèles définitifs lors de l'évaluation de 2013 et 2016. Plusieurs modèles ont prédit qu'à un moment donné dans le passé récent, le stock de germon du Sud avait été victime de surpêche et avait été surexploité. La pression de la pêche semble s'être atténuée au cours de ces dernières années, la biomasse s'étant rétablie par la suite. Les scénarios utilisant la CPUE de la zone centrale de la palangre japonaise étaient plus optimistes, mais l'ajustement du CPUE était pire. Selon les résultats des futures projections, l'état du stock se situera dans la zone verte avec une probabilité de >60 % si les prises futures atteignent 28.000 à 30.000 tonnes (selon les cas et les scénarios).

## RESUMEN

Se probó un modelo de producción de stock que incorporaba covariables (ASPIC), un modelo de producción excedente en no equilibrio, para la evaluación de stock de atún blanco el océano Atlántico sur, utilizando un paquete ASPIC versión 5.34. Existen varios casos con diferente índice y/o período de CPUE del palangre japonés. En cada caso se examinaron cuatro modelos con diferente ponderación y parámetro de forma, que fueron seleccionados para los modelos finales en la evaluación de 2013 y 2016. Varios modelos predijeron que, en alguna fase del pasado reciente, el stock de atún blanco del sur había sido objeto de sobrepesca y había estado sobrepescado. La presión pesquera parece haberse atenuado en años recientes, con la consiguiente recuperación de la biomasa. Los escenarios con CPUE del área núcleo del palangre japonés eran más optimistas, pero el ajuste de la CPUE era peor. Sobre la base de los resultados de las proyecciones futuras, el estado del stock se situará en la zona verde con una probabilidad superior al 60 % si la captura futura es de hasta 28.000 a 30.000 toneladas (según los casos y escenarios).

## **KEYWORDS**

Stock assessment, mathematical model, yield predictions, albacore, catch/effort

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#### 1. Introduction

At 2013 ICCAT albacore stock assessment meeting, stock assessment of south Atlantic albacore was held based on a Stock-Production Model Incorporating Covariates (ASPIC) (Matsumoto *et al.*, 2014) and Bayesian Surplus Production (BSP) (Babcock, 2014) model because there are not enough size data for the south Atlantic and so age structured model was not used. At that time the results for both models, which were comparatively similar, were adopted for management advice. Also at the previous (2016) ICCAT albacore stock assessment meeting, the same two models, which used similar specifications as those in the 2013 stock assessment, were used and adopted for management advice. At 2019 ICCAT SCRS meeting, it was decided that stock assessment of south Atlantic albacore in 2020 will be conducted based on surplus production models (ICCAT, 2019).

This paper provides preliminary stock assessment results based on ASPIC model version 5.34 (Prager, 1992) applied to the albacore tuna stock in the southern Atlantic Ocean.

## 2. Model description and data input

## 2.1 Data

The model was fit to eight time series of catch (1956-2018) and three time series of CPUE (1968-2018 for longest series) data covering 8 distinct fishing fleets. Fleet description (**Table 1**) is similar to that used for ASPIC model at 2011 (ICCAT, 2012), 2013 (ICCAT, 2014b) or 2016 (ICCAT, 2017) assessment, and several fisheries, which were not included in the ICCAT Task I data for previous assessment, were added. In 2011, eight CPUE series were used. However, at 2013 ICCAT Atlantic albacore data preparatory meeting, the working group decided not to use indices for Japanese longline transition period (1970-1975), Brazilian longline and South African baitboat (ICCAT, 2014a). At 2016 ICCAT Atlantic albacore stock assessment meeting, the working group decided not to use indices for Japanese longline target period (1956 –1969), and recent years for Japanese longline bycatch period (2012 –2014) due to concern for target shift (ICCAT, 2017).

This year, as for CPUE by Japanese longline, in addition to that based on the same method as before (Matsumoto and Matsubara, 2020), CPUE in the south Atlantic core area is also available (Matsumoto, 2020). Therefore, in this study, CPUE for the same fleet as those in 2016 assessment (Chinese Taipei longline, Japanese longline bycatch period and Uruguay longline) were used, with some variations for Japanese longline CPUE. Some other indices were used for sensitivity analyses. **Table 2** and **Figure 1** show catch by fleet and **Table 3** and **Figure 2** show available CPUE indices including those used in the models. **Table 4** shows the list of "cases" (group of scenarios) with different CPUE series for Japanese longline.

## 2.2 Structural assumptions of the model

Basically, the same models as those for 2011, 2013 or 2016 assessment were examined. Both logistic (Schaefer) and FOX shape were used to fit the data. Weighting of fleet is either by equal weighting or weighting by catch amount (average catch).  $B_1/K$  was fixed to 0.9 based on decision at 2011 stock assessment meeting (ICCAT, 2012), which was also applied at 2013 and 2016 assessment. These four scenarios (**Table 5**) were applied for all the cases in **Table 4**, thus total of 20 scenarios were examined.

## 2.3 Future projection

Software package ASPICP ver 3.16 was used for future projections. Based on bootstrapping (500 times) of above scenarios, future projections were conducted. Projection period is 15 years (2019-2033). Constant future catch with 12,000 t to 34,000 t (at 2,000 t interval) or constant future F with  $0.75*F_{2018}/F_{MSY}$  to  $1.00*F_{2018}/F_{MSY}$  (at  $0.05*F_{2018}/F_{MSY}$  interval) was assumed. Catch for 2019 and 2020 was assumed to be the average of 2016-2018, which was applied also for constant F scenarios.

## 2.4 Sensitivity analysis

Several sensitivity and retrospective analyses were conducted for one scenario (Case 2, Run08) of ASPIC model (**Table 6**). These are same as those in the previous stock assessment. Sensitivity analyses include scenarios with different B1/K, scenarios with one CPUE, and with additional CPUE. For the scenario in which start year is 1975, B1/K was set to the ratio of estimated biomass in 1975 to that in 1956 from the base model.

## 3. Result and discussion

**Table 7** shows summary results of ASPIC runs with those for past assessment. Regarding scenarios with updated Japanese longline CPUE, estimation of MSY ranged 26.1 to 28.5 thousand tons, which was much higher than 2018 catch (17.1 thousand tons). Estimation of MSY for the scenarios with core area Japanese longline CPUE was higher (28.5 to 30.6 thousand tons). Estimation of r (intrinsic growth rate) differed depending on scenarios.

**Figure 3** shows model fits to the indices of abundance for each scenario. CPUE fit was similar among scenarios in the same Case. CPUE fit was basically good, but that for Japanese longline core area index was comparatively poor. **Figure 4** shows trends of B-ratio ( $B/B_{MSY}$ ) and F-ratio ( $F/F_{MSY}$ ) for each scenario, and **Figure 5** shows Kobe I plot. It appears that the stock experienced overfishing and overfished around 2000 for several scenarios, but is recovering after that and the stock is currently in a green zone.

**Figure 6** and **Figure 7** show the trends of F-ratio and B-ratio, respectively, for the future projection with constant catch. It was estimated that for several scenarios F exceeds and biomass drops under MSY level within 15 years if future catch is 30,000 t or hither. **Figure 8** shows the trends of B-ratio for the future projection with constant F. B-ratio approaches to MSY level with F equal to F<sub>MSY</sub> level.

**Table 8** shows Kobe II matrixes (risk assessment) based on future projections of each scenario, and **Table 9** shows Kobe II matrixes for the four scenarios of each case combined. To avoid to be too long, only green zone probability is shown. Seeing combined matrixes, future catch up to 28,000 to 30,000 t enables the probability of being in the green zone with >60% within 15 years.

**Figure** 9 shows the trends predicted yield for the future projection with constant F. Future catch sharply increases after 2019 even by 0.75\*F<sub>MSY</sub> level, and then decreases and approaches to MSY level.

It seems that, in recent years, due to lower catch level (Figure 1), south Atlantic albacore stock is recovering, and will continue to recover if current catch level is continued.

**Figure 10** shows the results of sensitivity analysis. B-ratio of initial period changed for different  $B_1/K$ . The results were a bit more pessimistic with only Chinese Taipei longline CPUE. The model with South African baitboat CPUE did not converge. The results were very close to that in the base case as for the other scenarios. **Figure 11** shows the results of retrospective analysis. The results were close to that for the base case, but the difference was larger for the scenarios with Japanese longline core area CPUE.

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**Table 1**. Fleet descriptions used in the ASPIC models for south Atlantic in this study. Bold means addition from the previous stock assessment.

the previou	us stock asse	essment.			
Fleet	Fleet 1	Fleet 2 (1956 –1969) Fleet 3 (1970 –1975) Fleet 4 (1976 –2018)	Fleet 5	Fleet 6 (1956 –1998) Fleet 7 (1999 –2018)	Fleet 8
CPUE	Chinese Taipei (LL)	Japan (LL) None (1956-1975)	None	None	Uruguay (LL)
Catch	Chinese Taipei (LL) Korea (LL)	China LL E. C. Spain (LL) E. C. Portugal (LL) Japan (LL) Philippines (LL) St Vincent and Grenadier (LL) USA (LL) Vanuatu (LL) Honduras (LL) Nei (LL) Côte D'Ivoire (LL) EU.United Kingdom (LL) Seychelles (LL) UK.Sta Helena (LL) Angola (LL) Senegal (LL) Trinidad and Tobago (LL)	Brazil (LL, SU) Panama (LL) South Africa (LL, UN) Argentina (LL, TW, UN) Belize (LL) Cambodia (LL) Cuba (LL, UN) Namibia (LL)	Brazil (BB, GN, HL, PS, TW, UN) E. C. Spain (PS) E. C. France (BB, PS) E. C. Portugal (BB, PS) Japan (BB, PS) Namibia (BB) Korea (BB) Maroc (PS) Panama (PS) South Africa (BB, HL, PS, RR, SP) USA (PS) USSR (SU, UN) UK St Helena (BB, RR) Chinese Taipei (GN) Nei (BB, PS) Argentina (PS) Belize (PS) Cape Verde (PS) Curaçao (PS) Guatemala (PS) Guatemala (PS) Ghana (BB, PS) Guinea Ecuatorial (UN, HL) Guinée Rep. (PS) St. Vincent and Grenadines (PS) Guinea Ecuatorial (HL)	Uruguay (LL)

**Table 2.** Catches (t) of south Atlantic albacore for each fleet listed in **Table 1.** 

Table 2.	Catches (t)	of south Atla	antic albac	ore for eac	ch fleet liste	ed in Table	1.		
Year	Fleet 1	Fleet 2	Fleet 3	Fleet 4	Fleet 5	Fleet 6	Fleet 7	Fleet 8	Total
1956		21							21
1957		725							725
1958		1,047							1,047
1959		3,015			1,700				4,715
1960		8,673			1,802				10,475
1961		8,893			1,872				10,765
1962		16,422			2,549				18,971
1963		15,104			2,281				17,385
1964	115	23,738			2,124	22			25,999
1965	346	28,309			1,190	0			29,845
1966	5,275	21,023			998	0			27,296
1967	7,412	7,719			752	0			15,883
1968 1969	12,489 21,732	11,857 6,331			1,304 430	38 0			25,688 28,493
1909	17,255	0,331	5,898		500	0			23,653
1971	21,323		3,218		344	0			24,885
1972	30,640		2,087		352	110			33,189
1973	25,888		277		1,969	100			28,234
1974	19,079		109		365	163			19,716
1975	16,614		306		536	151			17,607
1976	17,976			73	1,129	197			19,375
1977	19,858			105	1,019	473			21,455
1978	21,837			135	828	295			23,095
1979	21,218			105 333	532	785 2.275			22,640
1980 1981	19,400 18,869			558	938 976	2,275 3,614		23	22,946 24,040
1982	23,363			569	1,095	4,410		235	29,672
1983	10,101			162	1,360	2,922		373	14,918
1984	8,237			224	1,056	4,556		526	14,599
1985	20,154			623	517	8,272		1,531	31,097
1986	27,913			739	1,257	7,117		262	37,288
1987	29,173			357	1,725	9,197		178	40,630
1988	20,926			405	807	7,935		100	30,173
1989	18,440			450	788	7,450		83	27,212
1990 1991	20,461			587 804	638 1,333	6,973 3,930		55 34	28,714
1991	19,914 23,068			1,001	3,374	9,089		31	26,016 36,562
1993	19,420			748	3,753	8,863		28	32,813
1994	22,576			923	1,292	10,492		16	35,300
1995	18,354			695	941	7,513		49	27,552
1996	18,974			785	1,165	7,426		75	28,426
1997	18,169			673	769	8,354		56	28,022
1998	16,113			487	3,098	10,787		110	30,595
1999	17,391			1,560	1,651		6,965	90	27,656
2000	17,239 15,834			3,041 5,235	4,027		6,989	90 125	31,387
2001 2002	15,834			5,233 1,142	6,834 3,097		10,757 10,074	135 111	38,796 31,746
2002	17,321			534	2,641		7,367	108	28,005
2003	13,325			703	605		7,792	120	22,545
2005	10,772			1,446	726		5,940	32	18,916
2006	12,359			2,247	3,041		6,713	93	24,453
2007	13,202			1,313	538		5,195	34	20,283
2008	10,054			2,633	478		5,650	53	18,867
2009	9,052			2,470	493		10,152	97	22,265
2010	11,105			1,693	649		5,754	24	19,225
2011 2012	13,103 12,902			1,888 3,708	1,417 1,226		7,684 7,434	37 12	24,129 25,282
2012	8,552			4,136	991		5,569	209	23,282 19,457
2013	6,677			1,647	564		4,814	20)	13,702
2015	7,161			2,327	617		5,095		15,199
2016	8,955			1,502	786		3,093		14,336
2017	9,176			1,743	755		2,150		13,825
2018	9,394			3,518	856		3,331		17,098

**Table 3.** Standardized CPUE series included in the ASPIC models for south Atlantic albacore.

Table 3. Stand									
Fleet	Fleet 1	Fleet 2	Fleet 3	Fleet 4	Fleet 4	Fleet 5	Fleet 6	Fleet 7	Fleet 8
CPUE	Chinese	Japan	Japan	Japan	Japan	Brazil	SA BB	SA BB	Uruguay
series flag	Taipei LL	LL1**	LL2**	LL3 (update)	LL3 (core)	LL*	1	2*	LL
1959		1.888		(update)	(core)		(NA)		
1960		1.780					(IM)		
1961		1.430							
1962		1.025							
1963		0.992							
1964		0.996							
1965		0.671							
1966		0.610							
1967 1968	1.879	0.648 0.598							
1969	1.739	0.362	2.199						
1970	1.467	0.302	1.057						
1971	1.749		1.673						
1972	1.177		0.897						
1973	0.982		0.603						
1974	0.986		0.357						
1975	1.210		0.213	1 140	1.321				
1976 1977	1.176 1.262			1.140 0.722	0.545				
1977	1.202			1.346	0.343				
1979	1.191			0.544	1.059				
1980	1.144			0.811	0.472				
1981	1.024			1.726	1.509				
1982	1.008			1.338	1.819				
1983	1.007			1.088	0.869				1.689
1984	1.120			1.089	0.598				1.459
1985 1986	1.088 1.020			1.892 2.331	1.834 1.224				1.526 1.509
1987	0.866			0.914	0.345				1.411
1988	0.686			0.641	0.291				1.467
1989	0.632			0.800	0.467				1.754
1990	0.613			1.094	0.265				1.148
1991	0.634			1.250	0.285				1.333
1992	0.738			0.677	0.253				0.884
1993	0.792 0.851			0.578	0.361 0.241				1.546
1994 1995	1.022			0.788 0.522	0.241				0.690 1.103
1996	0.863			0.582	0.328				1.511
1997	1.156			0.737	0.409				1.110
1998	0.928			0.679	0.467	2.166			1.532
1999	0.825			0.780	0.575	1.611			1.217
2000	0.692			1.145	1.042	1.297			0.970
2001 2002	0.823 0.570			1.276 0.793	0.976	1.547			0.564 0.455
2002	0.370			0.793	0.413 0.188	1.007 0.961		1.008	0.455
2003	0.483			0.833	0.168	0.855		0.817	0.229
2005	0.804			0.677	0.817	0.890		0.942	0.145
2006	0.655			0.382	0.761	0.978		1.125	0.561
2007	0.860			0.327	1.064	0.650		1.342	0.706
2008	0.969			0.577	2.038	1.200		1.105	0.531
2009	1.018			0.760	0.735	0.973		1.463	0.671
2010 2011	1.080 0.936			0.988 0.770	0.696 1.833	0.768 0.751		1.157 0.890	0.589 0.371
2011	1.003			1.992	2.584	0.751		0.890	0.5/1
2012	1.003			3.116	3.012	0.027		1.036	
2013	0.800			0.705	2.319	0.765		1.304	
2015	0.974			0.574	2.174	0.808		1.083	
2016	1.150			0.733	1.441	0.641		0.637	
2017	1.027			0.703	1.233	0.709		0.637	
2018	1.294			1.655	2.555	0.805		0.766	

<sup>\*</sup> Only for sensitivity analysis, \*\* not used for analysis.

**Table 4.** List of model "cases". Each case includes four scenarios shown in **Table 5.** 

Case	Name	JPN LL CPUE used	Comments
Case 1	JPLL_Update7611	Update 1976-2011	Same as 2016 assessment
Case 2	JPLL_Update7618	Update 1976-2018	
Case 3	JPLL_Update7618_no1213	Update 1976-2011, 2014-2018	
Case 4	JPLL_Core7611	Core 1976-2011	
Case 5	JPLL_Core7618	Core 1976-2018	

**Table 5**. List of model runs presented in this paper.

Run	Scenario name	Weight	<i>B1/K</i>	Model	
			(fixed)		
2	Run02_Eq_Sh	Equal for all fleets	0.9	Logistic	_
6	Run06_Eq_Fox	Equal for all fleets	0.9	Fox	
7	Run07_CW_Sh	Weighted by catch	0.9	Logistic	
8	Run08_CW_Fox	Weighted by catch	0.9	Fox	

**Table 6.** Scenarios of sensitivity analyses for the ASPIC model runs for south Atlantic albacore.

Scenario	Abbreviation in the graph
B1/K fix at 0.8	B1/K 0.8
B1/K fix at 1.0	B1/K 1.0
Only with Chinese Taipei LL index	only TWLL
Only with index of Japan LL3 (1976-2018)	only JPLL3
Without Uruguay LL index	no URG LL
Additional South Africa BB index (late)	Add BB_L
Additional Brazil LL index	Add BZLL
Start year 1975	Start1975

**Table 7.** Results of the ASPIC model runs with those of 2013 and 2016 assessment.

	Model	MSY	E	$B_{MSY}$	$B_{2019}$	$F_{2018}$	V(4)	
	run	(t)	$F_{MSY}$	(t)	$B_{MSY}$	$F_{MSY}$	K(t)	r
Case 1	Run2	27,680	0.262	105,850	1.474	0.425	211,700	0.52
JPLL_Update7611	Run6	26,470	0.231	114,343	1.536	0.428	310,800	0.23
	Run7	28,500	0.177	160,800	1.563	0.386	321,600	0.35
	Run8	28,070	0.220	127,329	1.788	0.344	346,100	0.22
Case 2	Run2	27,650	0.255	108,450	1.493	0.419	216,900	0.51
JPLL_Update7618	Run6	26,670	0.237	112,466	1.591	0.410	305,700	0.24
	Run7	28,500	0.177	160,800	1.563	0.386	321,600	0.35
	Run8	28,120	0.222	126,520	1.795	0.342	343,900	0.22
Case 3	Run2	27,000	0.213	126,600	1.335	0.484	253,200	0.43
JPLL_Update7618_no1213	Run6	26,060	0.206	126,299	1.448	0.462	343,300	0.21
	Run7	28,500	0.177	160,800	1.563	0.386	321,600	0.35
	Run8	28,000	0.213	131,340	1.773	0.348	357,000	0.21
Case 4	Run2	30,320	0.723	41,950	1.686	0.331	83,900	1.45
JPLL_Core7611	Run6	28,710	0.433	66,369	2.009	0.297	180,400	0.43
	Run7	28,500	0.177	160,800	1.563	0.386	321,600	0.35
	Run8	28,560	0.256	111,694	1.870	0.323	303,600	0.26
Case 5	Run2	30,630	0.844	36,290	1.687	0.327	72,580	1.69
JPLL_Core7618	Run6	29,520	0.673	43,890	2.098	0.274	119,300	0.67
	Run7	28,650	0.186	154,300	1.577	0.380	308,600	0.37
	Run8	28,900	0.307	94,219	1.944	0.306	256,100	0.31
2016 results*	Run2	26,920	0.212	127,100	0.937	0.573	254,300	0.42
	Run6	25,200	0.172	146,200	1.001	0.564	397,300	0.17
	Run7	26,210	0.145	180,300	1.097	0.491	360,600	0.29
	Run8	25,080	0.138	182,000	1.147	0.489	494,800	0.14
2013 results*	Run2	28,060	0.301	93,330	0.813	1.076	186,700	0.60
	Run6	25,660	0.199	128,800	0.861	1.098	350,000	0.20
	Run7	22,620	0.070	323,000	0.816	1.301	646,000	0.14
	Run8	24,250	0.127	191,300	0.950	1.047	520,000	0.13

<sup>\*</sup>B-ratio and F-ratio for terminal year

**Table 8**. Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore.

Case 1 JPLL\_Update7611

Run02 Prob	ahility d	of heins	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
14,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
16,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
18,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
20,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
22,000	99%	99%	99%	99%	99%	98%	97%	97%	97%	97%	97%	97%	96%	96%	96%
24,000	99%	99%	99%	99%	98%	96%	96%	95%	95%	95%	95%	95%	94%	94%	94%
26,000	99%	99%	99%	99%	96%	95%	94%	94%	93%	92%	92%	91%	91%	91%	90%
28,000	99%	99%	99%	96%	94%	93%	91%	88%	86%	84%	83%	81%	80%	79%	77%
30,000	99%	99%	95%	92%	86%	82%	77%	73%	68%	64%	59%	54%	47%	44%	38%
32,000	99%	99%	92%	83%	74%	67%	58%	47%	40%	32%	26%	20%	16%	12%	8%
34,000	99%	99%	85%	73%	60%	45%	33%	24%	18%	12%	7%	4%	2%	1%	1%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	99%	99%	97%	97%	95%	94%	93%	93%	92%	92%	92%	92%	92%	92%	91%
0.80*FMSY	99%	99%	92%	92%	92%	92%	91%	89%	88%	87%	87%	87%	87%	87%	87%
0.85*FMSY	99%	99%	86%	86%	86%	86%	86%	86%	84%	83%	83%	83%	82%	82%	81%
0.90*FMSY	99%	99%	74%	74%	74%	74%	74%	74%	74%	74%	74%	73%	73%	73%	73%
0.95*FMSY	99%	99%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	61%	61%
1.00*FMSY	99%	99%	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%	43%
Run06 Prob															
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Catch (t) 12,000	2019 100%	2020 100%	2021 100%	2022 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Catch (t) 12,000 14,000	2019 100% 100%	2020 100% 100%	2021 100% 100%	2022 100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%
Catch (t) 12,000 14,000 16,000	2019 100% 100% 100%	2020 100% 100% 100%	2021 100% 100% 100%	2022 100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000	2019 100% 100% 100% 100%	100% 100% 100% 100% 100%	2021 100% 100% 100% 100%	2022 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000	2019 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99%	100% 100% 100% 100% 100% 100% 100% 99%	100% 100% 100% 100% 100% 100% 100% 99%	100% 100% 100% 100% 100% 100% 100% 98%	100% 100% 100% 100% 100% 100% 100% 98%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 98% 84%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 98% 91%	100% 100% 100% 100% 100% 100% 100% 97% 86%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 94% 73%	100% 100% 100% 100% 100% 100% 100% 99% 92% 68%	100% 100% 100% 100% 100% 100% 100% 99%	100% 100% 100% 100% 100% 100% 100% 99% 88% 52%	100% 100% 100% 100% 100% 100% 100% 98% 86% 45%	100% 100% 100% 100% 100% 100% 100% 98% 84% 40%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 94% 81%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 86% 60%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 92% 68% 29%	100% 100% 100% 100% 100% 100% 100% 99% 91% 60% 21%	100% 100% 100% 100% 100% 100% 100% 99% 88% 52%	100% 100% 100% 100% 100% 100% 98% 86% 45% 10%	100% 100% 100% 100% 100% 100% 100% 98% 84% 40%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 94%	100% 100% 100% 100% 100% 100% 100% 98% 91%	100% 100% 100% 100% 100% 100% 100% 97% 86%	100% 100% 100% 100% 100% 100% 100% 96% 80%	100% 100% 100% 100% 100% 100% 100% 94% 73%	100% 100% 100% 100% 100% 100% 100% 99% 92% 68%	100% 100% 100% 100% 100% 100% 100% 99% 91% 60%	100% 100% 100% 100% 100% 100% 100% 99% 88% 52%	100% 100% 100% 100% 100% 100% 100% 98% 86% 45%	100% 100% 100% 100% 100% 100% 100% 98% 84% 40%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 94% 81% 58%	100% 100% 100% 100% 100% 100% 100% 98% 91% 71% 43%	100% 100% 100% 100% 100% 100% 100% 97% 86% 60% 29%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40%	100% 100% 100% 100% 100% 100% 100% 99% 92% 68% 29%	100% 100% 100% 100% 100% 100% 100% 99% 91% 60% 21%	100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3%	100% 100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 94% 81% 58%	100% 100% 100% 100% 100% 100% 100% 98% 91% 71% 43%	100% 100% 100% 100% 100% 100% 100% 97% 86% 60% 29%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40% 14%	100% 100% 100% 100% 100% 100% 100% 99% 92% 68% 29% 9%	100% 100% 100% 100% 100% 100% 100% 99% 91% 60% 21% 5%	100% 100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3%	100% 100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8% 1%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 89% 73%	100% 100% 100% 100% 100% 100% 100% 99% 81% 58%	100% 100% 100% 100% 100% 100% 100% 91% 71% 43%	100% 100% 100% 100% 100% 100% 100% 97% 86% 60% 29%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40% 14%	100% 100% 100% 100% 100% 100% 99% 92% 68% 29% 9%	100% 100% 100% 100% 100% 100% 100% 99% 91% 60% 21% 5%	100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3%	100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8% 1%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 89% 73% 2023 100% 98%	100% 100% 100% 100% 100% 100% 100% 99% 81% 58% 2024 100% 98%	100% 100% 100% 100% 100% 100% 100% 91% 71% 43% 2025 100% 98%	100% 100% 100% 100% 100% 100% 100% 97% 86% 60% 29%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21% 2027 100% 98%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40% 14% 2028 100% 98%	100% 100% 100% 100% 100% 100% 99% 92% 68% 29% 9% 2029 99% 98%	100% 100% 100% 100% 100% 100% 99% 91% 60% 21% 5% 2030 99% 97%	100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3%	100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2% 2032 99% 97%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8% 1%
Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 89% 73% 2023 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 99% 81% 58% 2024 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 91% 71% 43% 2025 100% 93%	100% 100% 100% 100% 100% 100% 100% 97% 60% 29% 2026 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21% 2027 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40% 14% 2028 100% 98% 93%	100% 100% 100% 100% 100% 100% 99% 92% 68% 29% 9% 2029 99% 98% 93%	100% 100% 100% 100% 100% 100% 99% 91% 60% 21% 5% 2030 99% 97% 93%	100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3% 2031 99% 97%	100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2% 2032 99% 97% 92%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8% 1% 2033 99% 92%
Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 89% 73% 2023 100% 98% 93% 80%	100% 100% 100% 100% 100% 100% 100% 99% 81% 58% 2024 100% 98% 93% 80%	100% 100% 100% 100% 100% 100% 98% 91% 71% 43% 2025 100% 98% 93% 80%	100% 100% 100% 100% 100% 100% 100% 97% 86% 60% 29% 2026 100% 98% 93% 80%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21% 2027 100% 98% 93% 80%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40% 14% 2028 100% 98% 93% 80%	100% 100% 100% 100% 100% 100% 99% 92% 68% 29% 9% 2029 99% 98% 93% 80%	100% 100% 100% 100% 100% 100% 99% 91% 60% 21% 5% 2030 99% 97% 93% 80%	100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3% 2031 99% 97% 92% 80%	100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2% 2032 99% 97% 92% 80%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8% 1% 2033 99% 96% 92% 80%
Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 89% 73% 2023 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 99% 81% 58% 2024 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 91% 71% 43% 2025 100% 93%	100% 100% 100% 100% 100% 100% 100% 97% 60% 29% 2026 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 96% 80% 48% 21% 2027 100% 98% 93%	100% 100% 100% 100% 100% 100% 100% 94% 73% 40% 14% 2028 100% 98% 93%	100% 100% 100% 100% 100% 100% 99% 92% 68% 29% 9% 2029 99% 98% 93%	100% 100% 100% 100% 100% 100% 99% 91% 60% 21% 5% 2030 99% 97% 93%	100% 100% 100% 100% 100% 100% 99% 88% 52% 16% 3% 2031 99% 97%	100% 100% 100% 100% 100% 100% 98% 86% 45% 10% 2% 2032 99% 97% 92%	100% 100% 100% 100% 100% 100% 98% 84% 40% 8% 1% 2033 99% 96% 92%

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 1 JPLL\_Update7611

Run07 Prob	ahility c	of heins	green											ĺ	
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12.000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16.000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%
22,000	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
24,000	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
26,000	100%	100%	100%	100%	99%	99%	99%	99%	99%	98%	98%	98%	98%	98%	98%
28,000	100%	100%	100%	99%	99%	99%	99%	98%	98%	97%	97%	96%	95%	94%	94%
30.000	100%	100%	99%	99%	98%	97%	95%	94%	91%	88%	86%	84%	80%	77%	74%
32,000	100%	100%	99%	97%	94%	89%	85%	78%	72%	67%	63%	59%	51%	46%	40%
34.000	100%	100%	97%	92%	84%	75%	66%	59%	49%	39%	34%	26%	23%	20%	17%
0.,000			0.7.70	0 _ //	0 170	7 0 70	0070	0070	1070	0070	1,70				
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	98%	98%	98%	98%	98%	98%	97%	96%	96%	95%	95%	95%	95%
0.80*FMSY	100%	100%	95%	95%	95%	95%	95%	95%	95%	94%	94%	94%	93%	92%	92%
0.85*FMSY	100%	100%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	87%	87%	86%
0.90*FMSY	100%	100%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
0.95*FMSY	100%	100%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
1.00*FMSY	100%	100%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Run08 Prob															
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
28,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
30,000	100%	100%	100%	100%	100%	100%	100%	100%	99%	98%	97%	96%	94%	92%	89%
32,000	100%	100%	100%	100%	100%	99%	97%	96%	92%	88%	84%	79%	72%	65%	57%
34,000	100%	100%	100%	100%	98%	96%	89%	84%	74%	64%	54%	44%	33%	25%	20%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%
0.80*FMSY	100%	100%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%
0.85*FMSY	100%	100%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%
0.90*FMSY	100%	100%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
0.95*FMSY	100%	100%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
1.00*FMSY	100%	100%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 2 JPLL\_Update7618

Run02 Prob	ability o	of being	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	99%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
20,000	99%	100%	100%	99%	99%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
22,000	99%	100%	100%	99%	98%	97%	97%	97%	96%	96%	96%	96%	96%	96%	96%
24,000	99%	100%	100%	99%	97%	96%	95%	95%	95%	95%	95%	94%	94%	94%	94%
26,000	99%	100%	100%	98%	96%	95%	94%	93%	93%	92%	92%	91%	91%	91%	91%
28,000	99%	100%	98%	95%	94%	92%	91%	89%	87%	84%	82%	81%	80%	78%	77%
30,000	99%	100%	95%	92%	87%	81%	77%	73%	69%	65%	60%	57%	51%	45%	42%
32,000	99%	100%	92%	83%	74%	68%	60%	51%	44%	38%	33%	27%	20%	15%	11%
34,000	99%	100%	86%	74%	62%	48%	39%	31%	23%	15%	10%	6%	5%	3%	1%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	99%	100%	95%	95%	95%	94%	93%	92%	92%	91%	91%	91%	91%	91%	91%
0.80*FMSY	99%	100%	92%	92%	92%	92%	91%	90%	89%	88%	88%	88%	87%	87%	87%
0.85*FMSY	99%	100%	85%	85%	85%	85%	85%	85%	84%	82%	82%	81%	81%	81%	81%
0.90*FMSY	99%	100%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	73%	73%
0.95*FMSY	99%	100%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%
1.00*FMSY	99%	100%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%
Run06 Prob															
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Catch (t) 12,000	2019 100%	2020 100%	2021 100%	2022 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Catch (t) 12,000 14,000	2019 100% 100%	2020 100% 100%	2021 100% 100%	2022 100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%
Catch (t) 12,000 14,000 16,000	2019 100% 100% 100%	2020 100% 100% 100%	2021 100% 100% 100%	2022 100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000	2019 100% 100% 100% 100%	2020 100% 100% 100% 100%	2021 100% 100% 100% 100%	2022 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000	2019 100% 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97%	100% 100% 100% 100% 100% 100% 100% 97%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 92%	100% 100% 100% 100% 100% 100% 100% 99%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91%	100% 100% 100% 100% 100% 100% 100% 98% 87%	100% 100% 100% 100% 100% 100% 100% 97% 80%	100% 100% 100% 100% 100% 100% 100% 97% 74%	100% 100% 100% 100% 100% 100% 100% 95% 67%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 92% 55%	100% 100% 100% 100% 100% 100% 99% 90% 51%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 92% 55% 16%	100% 100% 100% 100% 100% 100% 100% 99% 90% 51%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91%	100% 100% 100% 100% 100% 100% 100% 98% 87%	100% 100% 100% 100% 100% 100% 100% 97% 80%	100% 100% 100% 100% 100% 100% 100% 97% 74%	100% 100% 100% 100% 100% 100% 100% 95% 67%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 92% 55%	100% 100% 100% 100% 100% 100% 99% 90% 51%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68% 42%	100% 100% 100% 100% 100% 100% 100% 98% 87% 59%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 97% 74% 40% 13%	100% 100% 100% 100% 100% 100% 100% 95% 67% 31%	100% 100% 100% 100% 100% 100% 100% 94% 63% 23%	100% 100% 100% 100% 100% 100% 100% 55% 16% 6%	100% 100% 100% 100% 100% 100% 99% 90% 51% 12% 3%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 92% 55% 16%	100% 100% 100% 100% 100% 100% 99% 90% 51% 12% 3%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68% 42%	100% 100% 100% 100% 100% 100% 100% 98% 87% 59% 29%	100% 100% 100% 100% 100% 100% 100% 97% 80% 50% 2028	100% 100% 100% 100% 100% 100% 100% 97% 74% 40% 13%	100% 100% 100% 100% 100% 100% 100% 95% 67% 31% 10%	100% 100% 100% 100% 100% 100% 100% 94% 63% 23% 7%	100% 100% 100% 100% 100% 100% 100% 55% 16% 6%	100% 100% 100% 100% 100% 100% 99% 90% 51% 12% 3%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 28,000 30,000 32,000 34,000 F 0.75*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 98% 67% 2024	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68% 42%	100% 100% 100% 100% 100% 100% 100% 98% 87% 59% 29%	100% 100% 100% 100% 100% 100% 100% 97% 80% 50% 20%	100% 100% 100% 100% 100% 100% 100% 97% 74% 40% 13%	100% 100% 100% 100% 100% 100% 100% 95% 67% 31% 10%	100% 100% 100% 100% 100% 100% 100% 94% 63% 7% 2031	100% 100% 100% 100% 100% 100% 100% 55% 16% 6%	100% 100% 100% 100% 100% 100% 99% 90% 51% 12% 3%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 82% 2023 100% 98%	100% 100% 100% 100% 100% 100% 100% 98% 67% 2024 100% 98%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68% 42% 2026 100% 98%	100% 100% 100% 100% 100% 100% 100% 98% 87% 59% 29% 2027 100% 98% 94%	100% 100% 100% 100% 100% 100% 100% 97% 80% 50% 20%	100% 100% 100% 100% 100% 100% 100% 97% 40% 13% 2029 100% 97%	100% 100% 100% 100% 100% 100% 100% 95% 67% 31% 10% 2030 100% 97% 94%	100% 100% 100% 100% 100% 100% 100% 94% 63% 7% 2031 99% 97% 94%	100% 100% 100% 100% 100% 100% 100% 92% 55% 16% 6% 2032 99% 97% 94%	100% 100% 100% 100% 100% 100% 99% 90% 51% 3% 2033 99% 97% 94%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 82% 2023 100% 98% 94%	100% 100% 100% 100% 100% 100% 100% 98% 67% 2024 100% 98% 94%	100% 100% 100% 100% 100% 100% 100% 96% 78% 54% 2025 100% 98% 94%	100% 100% 100% 100% 100% 100% 100% 99% 91% 68% 42% 2026 100% 98% 94%	100% 100% 100% 100% 100% 100% 100% 98% 87% 59% 29% 2027 100% 98%	100% 100% 100% 100% 100% 100% 100% 97% 80% 50% 20% 2028 100% 98% 94%	100% 100% 100% 100% 100% 100% 100% 97% 40% 13% 2029 100% 97% 94%	100% 100% 100% 100% 100% 100% 100% 95% 67% 31% 10% 2030 100% 97%	100% 100% 100% 100% 100% 100% 100% 94% 63% 23% 7%	100% 100% 100% 100% 100% 100% 100% 92% 55% 16% 6%	100% 100% 100% 100% 100% 100% 99% 90% 51% 3% 2033 99% 97%

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 2 JPLL\_Update7618

Run07 Prob	ability o	of being	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%
24,000	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
26,000	100%	100%	100%	100%	99%	99%	99%	99%	98%	98%	98%	97%	97%	97%	96%
28,000	100%	100%	100%	100%	99%	99%	98%	98%	97%	96%	95%	94%	93%	93%	93%
30,000	100%	100%	99%	99%	97%	96%	93%	92%	90%	90%	88%	84%	82%	80%	78%
32,000	100%	100%	98%	96%	92%	90%	86%	81%	76%	71%	67%	61%	56%	49%	44%
34,000	100%	100%	96%	90%	85%	78%	70%	62%	54%	44%	36%	30%	25%	20%	18%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	98%	98%	98%	98%	97%	96%	96%	95%	94%	94%	94%	94%	93%
0.80*FMSY	100%	100%	94%	94%	94%	94%	94%	94%	94%	93%	93%	92%	91%	91%	91%
0.85*FMSY	100%	100%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
0.90*FMSY	100%	100%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%
0.95*FMSY	100%	100%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
1.00*FMSY	100%	100%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
					1										
Run08 Prob					0000	0004	0005	2000	0007	0000	2000	2000	0001	0000	0000
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Catch (t) 12,000	2019 100%	2020 100%	2021 100%	2022 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Catch (t) 12,000 14,000	2019 100% 100%	2020 100% 100%	2021 100% 100%	2022 100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%
Catch (t) 12,000 14,000 16,000	2019 100% 100% 100%	2020 100% 100% 100%	2021 100% 100% 100%	2022 100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000	2019 100% 100% 100% 100%	2020 100% 100% 100% 100%	2021 100% 100% 100% 100%	2022 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000	2019 100% 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 95%	100% 100% 100% 100% 100% 100% 100% 99% 94%	100% 100% 100% 100% 100% 100% 100% 99% 92%	100% 100% 100% 100% 100% 100% 100% 99% 89%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 95% 75%	100% 100% 100% 100% 100% 100% 100% 99% 94%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60%	100% 100% 100% 100% 100% 100% 100% 99% 89%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 95%	100% 100% 100% 100% 100% 100% 100% 99% 94%	100% 100% 100% 100% 100% 100% 100% 99% 92%	100% 100% 100% 100% 100% 100% 100% 99% 89%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 95% 75% 40%	100% 100% 100% 100% 100% 100% 100% 99% 94% 69% 32%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60% 25%	100% 100% 100% 100% 100% 100% 100% 99% 89% 54% 21%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 95% 75%	100% 100% 100% 100% 100% 100% 100% 99% 94%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60%	100% 100% 100% 100% 100% 100% 100% 99% 89% 54% 21%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 95% 75% 40%	100% 100% 100% 100% 100% 100% 100% 99% 94% 69% 32%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60% 25%	100% 100% 100% 100% 100% 100% 100% 99% 89% 54% 21%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 28,000 30,000 32,000 34,000 F 0.75*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 98% 90%	100% 100% 100% 100% 100% 100% 100% 99% 95% 80%	100% 100% 100% 100% 100% 100% 100% 99% 92% 72% 2027 99% 97%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 75% 40% 2030 99% 97%	100% 100% 100% 100% 100% 100% 100% 99% 94% 69% 32% 2031 99% 97%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60% 25% 2032 99% 96%	100% 100% 100% 100% 100% 100% 100% 99% 54% 21% 2033 98% 96%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 90% 2025 97% 91%	100% 100% 100% 100% 100% 100% 100% 99% 95% 80% 2026 97% 91%	100% 100% 100% 100% 100% 100% 100% 99% 92% 72% 2027 99% 91%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 75% 40% 2030 99% 97% 91%	100% 100% 100% 100% 100% 100% 100% 99% 94% 69% 32% 2031 99% 97% 91%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60% 25% 2032 99% 96% 91%	100% 100% 100% 100% 100% 100% 100% 99% 54% 21% 2033 98% 96% 91%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 98% 90%	100% 100% 100% 100% 100% 100% 100% 99% 95% 80%	100% 100% 100% 100% 100% 100% 100% 99% 92% 72% 2027 99% 97%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 75% 40% 2030 99% 97%	100% 100% 100% 100% 100% 100% 100% 99% 94% 69% 32% 2031 99% 97%	100% 100% 100% 100% 100% 100% 100% 99% 92% 60% 25% 2032 99% 96%	100% 100% 100% 100% 100% 100% 100% 99% 54% 21% 2033 98% 96%

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 3 JPLL\_Update7618\_no1213

Run02 Prob	ability o	of being	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
14,000	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
16,000	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
18,000	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
20,000	98%	99%	99%	99%	99%	99%	99%	98%	98%	98%	98%	98%	98%	98%	98%
22,000	98%	99%	99%	99%	98%	98%	98%	98%	97%	97%	97%	97%	97%	97%	97%
24,000	98%	99%	99%	99%	98%	97%	97%	97%	97%	97%	97%	97%	97%	96%	96%
26,000	98%	99%	99%	98%	97%	97%	97%	96%	96%	95%	95%	95%	94%	94%	94%
28,000	98%	99%	98%	97%	96%	95%	92%	90%	88%	85%	82%	78%	76%	72%	70%
30,000	98%	99%	96%	93%	87%	79%	71%	65%	61%	56%	50%	43%	37%	34%	29%
32,000	98%	99%	91%	79%	67%	58%	47%	38%	32%	25%	19%	12%	8%	5%	3%
34,000	98%	99%	77%	61%	45%	34%	25%	17%	9%	6%	4%	2%	1%	1%	1%
											ĺ	ĺ			
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	98%	99%	98%	97%	97%	97%	96%	96%	96%	96%	96%	95%	95%	95%	95%
0.80*FMSY	98%	99%	96%	96%	96%	95%	95%	95%	94%	94%	94%	94%	94%	93%	93%
0.85*FMSY	98%	99%	90%	90%	90%	90%	90%	90%	90%	89%	88%	88%	88%	87%	87%
0.90*FMSY	98%	99%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	79%
0.95*FMSY	98%	99%	65%	65%	65%	65%	65%	65%	65%	65%	64%	64%	64%	64%	64%
1.00*FMSY	98%	99%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%
Run06 Prob	ability o	of being	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26,000	100%	100%	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	98%	98%	98%
28,000	100%	100%	100%	100%	99%	98%	97%	96%	94%	93%	92%	88%	84%	81%	76%
30,000	100%	100%	99%	97%	95%	93%	87%	79%	71%	65%	53%	43%	35%	29%	23%
32,000	100%	100%	97%	93%	83%	71%	57%	42%	32%	24%	18%	15%	9%	6%	5%
34,000	100%	100%	92%	76%	59%	38%	27%	18%	13%	8%	5%	4%	3%	3%	2%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	98%	98%	98%
0.80*FMSY	100%	100%	97%	97%	97%	97%	97%	97%	97%	96%	96%	96%	96%	96%	96%
0.85*FMSY	100%	100%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
0.90*FMSY	100%	100%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
		1000													
0.95*FMSY 1.00*FMSY	100% 100%	100%	64% 43%												

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 3 JPLL\_Update7618\_no1213

Run07 Prob	ahility c	of heins	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14.000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18.000	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%
20,000	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
22,000	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
24,000	100%	100%	100%	99%	99%	99%	99%	99%	99%	98%	98%	98%	98%	98%	98%
26,000	100%	100%	100%	99%	99%	99%	98%	98%	98%	98%	98%	97%	97%	97%	97%
28,000	100%	100%	100%	99%	99%	98%	98%	98%	97%	97%	95%	94%	94%	93%	93%
30.000	100%	100%	99%	98%	97%	96%	94%	92%	91%	90%	88%	85%	82%	80%	78%
32,000	100%	100%	98%	96%	93%	91%	87%	81%	76%	70%	64%	60%	55%	49%	44%
34.000	100%	100%	96%	92%	86%	78%	69%	60%	54%	43%	36%	31%	27%	22%	18%
0.,000	100%	100%	0070	0 _ //	5575	7 0 70	0070	0070	0 170	1070	0070				
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	98%	98%	98%	98%	97%	97%	96%	95%	95%	94%	94%	94%	94%
0.80*FMSY	100%	100%	94%	94%	94%	94%	94%	94%	94%	93%	93%	92%	92%	92%	91%
0.85*FMSY	100%	100%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	89%	88%
0.90*FMSY	100%	100%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%	79%
0.95*FMSY	100%	100%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%
1.00*FMSY	100%	100%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
Run08 Prob		of being	green												
Catch (t)	ability o	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Catch (t) 12,000		2020 100%	2021 100%	2022 100%	100%	100%	100%	100%	2027	100%	100%	2030	2031	2032	100%
Catch (t) 12,000 14,000	2019 100% 100%	2020 100% 100%	2021 100% 100%	2022 100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%
Catch (t) 12,000 14,000 16,000	2019 100% 100% 100%	2020 100% 100% 100%	2021 100% 100% 100%	2022 100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000	2019 100% 100% 100% 100%	2020 100% 100% 100% 100%	2021 100% 100% 100% 100%	2022 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93%	100% 100% 100% 100% 100% 100% 100% 99%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62%	100% 100% 100% 100% 100% 100% 100% 99% 90%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93%	100% 100% 100% 100% 100% 100% 100% 99%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62%	100% 100% 100% 100% 100% 100% 100% 99% 99% 55% 18%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62% 25%	100% 100% 100% 100% 100% 100% 100% 99% 955% 18%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62% 25%	100% 100% 100% 100% 100% 100% 100% 99% 955% 18%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 96% 80%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62% 25% 2032 99% 97%	100% 100% 100% 100% 100% 100% 100% 99% 55% 18% 2033
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 96% 80% 2026 100% 93%	100% 100% 100% 100% 100% 100% 100% 99% 93% 72% 2027 100% 93%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62% 25% 2032 99% 97% 93%	100% 100% 100% 100% 100% 100% 100% 99% 55% 18% 2033 99% 96% 93%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 96% 80% 2026 100% 93% 79%	100% 100% 100% 100% 100% 100% 100% 99% 93% 72% 2027 100% 93% 79%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 2030 99% 97% 93% 79%	100% 100% 100% 100% 100% 100% 100% 95% 70% 34% 2031 99% 97% 93% 79%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62% 25% 2032 99% 97% 93% 79%	100% 100% 100% 100% 100% 100% 100% 99% 55% 18% 2033 99% 96% 93% 79%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 96% 80% 2026 100% 93%	100% 100% 100% 100% 100% 100% 100% 99% 93% 72% 2027 100% 93%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 62% 25% 2032 99% 97% 93%	100% 100% 100% 100% 100% 100% 100% 99% 955% 18% 2033 99% 96% 93%

**Table** 8. Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 4 JPLL\_Core7611

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 4 JPLL\_Core7611

Run07 Proba	ability o	of being	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
14,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
16,000	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
18,000	99%	99%	99%	99%	99%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
20,000	99%	99%	99%	99%	98%	98%	97%	97%	97%	97%	97%	97%	97%	97%	97%
22,000	99%	99%	99%	98%	97%	97%	97%	97%	97%	96%	96%	96%	96%	96%	96%
24,000	99%	99%	99%	98%	97%	97%	96%	95%	95%	95%	95%	94%	94%	94%	94%
26,000	99%	99%	99%	97%	97%	96%	95%	94%	94%	93%	92%	92%	92%	92%	92%
28,000	99%	99%	99%	97%	96%	95%	94%	93%	92%	91%	90%	89%	88%	88%	86%
30,000	99%	99%	97%	94%	92%	90%	88%	85%	84%	81%	79%	77%	75%	73%	71%
32,000	99%	99%	94%	90%	86%	82%	78%	74%	70%	65%	60%	55%	51%	46%	43%
34,000	99%	99%	90%	84%	78%	71%	64%	55%	49%	43%	39%	32%	29%	25%	22%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	99%	99%	92%	92%	92%	92%	92%	92%	91%	90%	89%	88%	88%	88%	88%
0.80*FMSY	99%	99%	88%	88%	88%	88%	88%	88%	88%	87%	86%	85%	85%	84%	84%
0.85*FMSY	99%	99%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	79%
0.90*FMSY	99%	99%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%
0.95*FMSY	99%	99%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
1.00*FMSY	99%	99%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Run08 Proba															
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24,000		1000/	1000/	1000/	1000/	4000/	4.000/	1000/	1000/	1000/	1000/	4.0.00/	1000/		
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100% 100%	100% 100%
26,000 28,000	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 99%	100% 99%	100% 99%	100% 98%	100% 100% 98%	100% 100% 98%
26,000 28,000 30,000	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 99%	100% 100% 98%	100% 100% 98%	100% 99% 98%	100% 99% 96%	100% 99% 95%	100% 98% 93%	100% 100% 98% 92%	100% 100% 98% 89%
26,000 28,000 30,000 32,000	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 99%	100% 100% 100% 98%	100% 100% 99% 97%	100% 100% 98% 94%	100% 100% 98% 92%	100% 99% 98% 87%	100% 99% 96% 82%	100% 99% 95% 78%	100% 98% 93% 73%	100% 100% 98% 92% 67%	100% 100% 98% 89% 61%
26,000 28,000 30,000	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 99%	100% 100% 98%	100% 100% 98%	100% 99% 98%	100% 99% 96%	100% 99% 95%	100% 98% 93%	100% 100% 98% 92%	100% 100% 98% 89% 61%
26,000 28,000 30,000 32,000 34,000	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 99%	100% 100% 100% 99% 98%	100% 100% 100% 98% 94%	100% 100% 99% 97% 89%	100% 100% 98% 94% 82%	100% 100% 98% 92% 75%	100% 99% 98% 87% 68%	100% 99% 96% 82% 58%	100% 99% 95% 78% 47%	100% 98% 93% 73% 38%	100% 100% 98% 92% 67% 30%	100% 100% 98% 89% 61% 25%
26,000 28,000 30,000 32,000 34,000	100% 100% 100% 100% 100% 2019	100% 100% 100% 100% 100% 2020	100% 100% 100% 100% 100%	100% 100% 100% 100% 99%	100% 100% 100% 99% 98%	100% 100% 100% 98% 94% 2024	100% 100% 99% 97% 89%	100% 100% 98% 94% 82% 2026	100% 100% 98% 92% 75%	100% 99% 98% 87% 68%	100% 99% 96% 82% 58%	100% 99% 95% 78% 47%	100% 98% 93% 73% 38%	100% 100% 98% 92% 67% 30%	100% 100% 98% 89% 61% 25%
26,000 28,000 30,000 32,000 34,000 F 0.75*FMSY	100% 100% 100% 100% 100% 2019	100% 100% 100% 100% 100% 2020	100% 100% 100% 100% 100% 2021 98%	100% 100% 100% 100% 99% 2022 98%	100% 100% 100% 99% 98% 2023	100% 100% 100% 98% 94% 2024 98%	100% 100% 99% 97% 89% 2025 98%	100% 100% 98% 94% 82% 2026 98%	100% 100% 98% 92% 75% 2027 98%	100% 99% 98% 87% 68% 2028	100% 99% 96% 82% 58% 2029 98%	100% 99% 95% 78% 47% 2030 98%	100% 98% 93% 73% 38% 2031	100% 100% 98% 92% 67% 30% 2032 98%	100% 100% 98% 89% 61% 25% 2033
26,000 28,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	100% 100% 100% 100% 100% 2019 100% 100%	100% 100% 100% 100% 100% 2020 100% 100%	100% 100% 100% 100% 100% 2021 98% 96%	100% 100% 100% 100% 99% 2022 98% 96%	100% 100% 100% 99% 98% 2023 98% 96%	100% 100% 100% 98% 94% 2024 98% 96%	100% 100% 99% 97% 89% 2025 98% 96%	100% 100% 98% 94% 82% 2026 98% 96%	100% 100% 98% 92% 75% 2027 98% 96%	100% 99% 98% 87% 68% 2028 98% 96%	100% 99% 96% 82% 58% 2029 98% 96%	100% 99% 95% 78% 47% 2030 98% 95%	100% 98% 93% 73% 38% 2031 98% 95%	100% 100% 98% 92% 67% 30% 2032 98% 95%	100% 100% 98% 89% 61% 25% 2033 98% 95%
26,000 28,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY	100% 100% 100% 100% 100% 2019 100% 100%	100% 100% 100% 100% 100% 2020 100% 100%	100% 100% 100% 100% 100% 2021 98% 96% 89%	100% 100% 100% 100% 99% 2022 98% 96% 89%	100% 100% 100% 99% 98% 2023 98% 96% 89%	100% 100% 100% 98% 94% 2024 98% 96% 89%	100% 100% 99% 97% 89% 2025 98% 96% 89%	100% 100% 98% 94% 82% 2026 98% 96% 89%	100% 100% 98% 92% 75% 2027 98% 96% 89%	100% 99% 98% 87% 68% 2028 98% 96% 89%	100% 99% 96% 82% 58% 2029 98% 96% 89%	100% 99% 95% 78% 47% 2030 98% 95% 89%	100% 98% 93% 73% 38% 2031 98% 95% 89%	100% 100% 98% 92% 67% 30% 2032 98% 95% 89%	100% 100% 98% 89% 61% 25% 2033 98% 95% 88%
26,000 28,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	100% 100% 100% 100% 100% 2019 100% 100%	100% 100% 100% 100% 100% 2020 100% 100%	100% 100% 100% 100% 100% 2021 98% 96%	100% 100% 100% 100% 99% 2022 98% 96%	100% 100% 100% 99% 98% 2023 98% 96%	100% 100% 100% 98% 94% 2024 98% 96%	100% 100% 99% 97% 89% 2025 98% 96%	100% 100% 98% 94% 82% 2026 98% 96%	100% 100% 98% 92% 75% 2027 98% 96%	100% 99% 98% 87% 68% 2028 98% 96%	100% 99% 96% 82% 58% 2029 98% 96%	100% 99% 95% 78% 47% 2030 98% 95%	100% 98% 93% 73% 38% 2031 98% 95%	100% 100% 98% 92% 67% 30% 2032 98% 95%	100% 100% 98% 89% 61% 25% 2033 98% 95% 88% 78% 65%

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 5 JPLL\_Core7618

Run02 Prob	ability o	of beins	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
28,000	100%	100%	100%	100%	99%	97%	96%	95%	95%	95%	95%	95%	95%	95%	95%
30,000	100%	100%	100%	99%	94%	90%	85%	81%	79%	77%	76%	75%	74%	73%	73%
32,000	100%	100%	100%	87%	70%	61%	54%	50%	44%	37%	31%	27%	23%	16%	12%
34,000	100%	100%	95%	67%	52%	40%	29%	23%	15%	10%	7%	4%	3%	2%	2%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	95%	95%	90%	89%	88%	88%	88%	88%	88%	88%	88%	88%	88%
0.80*FMSY	100%	100%	86%	86%	84%	80%	79%	79%	79%	79%	79%	79%	79%	79%	79%
0.85*FMSY	100%	100%	71%	71%	71%	71%	70%	69%	69%	69%	69%	69%	69%	69%	69%
0.90*FMSY	100%	100%	62%	62%	62%	62%	62%	62%	61%	61%	61%	61%	61%	61%	61%
0.95*FMSY	100%	100%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%	53%
1.00*FMSY	100%	100%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
D 00 D 1															
Run06 Prob				2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Catch (t) 12,000	2019	2020 100%	2021	100%	100%	100%	100%								100%
	100%		100%				100%	100%	100%	100%	100%	100%	100%	100%	
14,000 16,000	100%	100%	100%	100% 100%	100%	100%	100%	100%	100%	100% 100%	100%	100% 100%	100%	100% 100%	100% 100%
18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26,000	100%	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	98%	98%	98%
28,000	100%	100%	100%	100%	100%	98%	97%	96%	96%	96%	95%	94%	94%	94%	94%
30,000	100%	100%	100%	100%	97%	94%	92%	89%	86%	83%	80%	78%	77%	74%	72%
32,000	100%	100%	100%	96%	91%	83%	76%	68%	59%	48%	41%	34%	25%	18%	14%
34.000	100%	100%	99%	92%	80%	65%	51%	38%	26%	15%	11%	7%	5%	2%	1%
01,000	10070	100%	0070	02/0	3070	0070	0170	0070	2070	1070	1.170	, , ,	0 70	270	170
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1.									89%	88%	88%	88%	88%		88%
0.75*FMSY	100%	100%	91%	91%	91%	91%	90%	89%	09/0	00/0	00/0	00/0	00/0	88%	00/0
	100% 100%	100% 100%	91% 84%	91% 84%	91% 84%	91% 84%	90% 84%	83%	83%	83%	82%	82%	82%	88% 82%	
0.75*FMSY															
0.75*FMSY 0.80*FMSY	100%	100%	84%	84%	84%	84%	84%	83%	83%	83%	82%	82%	82%	82%	82%
0.75*FMSY 0.80*FMSY 0.85*FMSY	100% 100%	100% 100%	84% 77%	84% 77%	84% 77%	84% 77%	84% 77%	83% 77%	83% 77%	83% 77%	82% 77%	82% 77%	82% 76%	82% 76%	82% 76%

**Table 8.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (each scenario) for south Atlantic albacore (continued).

Case 5 JPLL\_Core7618

Run07 Prob	ability o	of being	green												
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	98%	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
14.000	98%	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
16,000	98%	98%	99%	99%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
18,000	98%	98%	99%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
20,000	98%	98%	99%	98%	98%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%
22,000	98%	98%	99%	98%	97%	97%	97%	97%	96%	96%	96%	96%	96%	96%	96%
24,000	98%	98%	99%	97%	97%	96%	96%	96%	96%	95%	95%	95%	95%	95%	95%
26,000	98%	98%	99%	97%	97%	96%	95%	95%	94%	94%	93%	93%	93%	93%	92%
28,000	98%	98%	98%	97%	96%	95%	94%	93%	93%	92%	90%	90%	89%	87%	86%
30,000	98%	98%	97%	95%	93%	91%	89%	86%	83%	81%	80%	75%	73%	72%	69%
32,000	98%	98%	95%	92%	86%	82%	77%	73%	68%	64%	62%	57%	54%	49%	45%
34,000	98%	98%	92%	85%	76%	70%	64%	58%	52%	44%	40%	36%	31%	26%	24%
, i															
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	98%	98%	93%	93%	93%	93%	93%	92%	91%	90%	90%	89%	89%	88%	88%
0.80*FMSY	98%	98%	88%	88%	88%	88%	88%	88%	88%	86%	85%	85%	84%	83%	83%
0.85*FMSY	98%	98%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	79%
0.90*FMSY	98%	98%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%
0.95*FMSY	98%	98%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
1.00*FMSY	98%	98%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Dunus Drah															
Run08 Prob															
Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Catch (t) 12,000	2019 100%	2020 100%	2021 100%	2022 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Catch (t) 12,000 14,000	2019 100% 100%	2020 100% 100%	2021 100% 100%	2022 100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%	100% 100%
Catch (t) 12,000 14,000 16,000	2019 100% 100% 100%	2020 100% 100% 100%	2021 100% 100% 100%	2022 100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%	100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000	2019 100% 100% 100% 100%	2020 100% 100% 100% 100%	2021 100% 100% 100% 100%	2022 100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000	2019 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%	100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000	2019 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000	2019 100% 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000	100% 100% 100% 100% 100% 100% 100% 100%	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99%	100% 100% 100% 100% 100% 100% 100% 100%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93%	100% 100% 100% 100% 100% 100% 100% 99% 92%	100% 100% 100% 100% 100% 100% 100% 99% 90%	100% 100% 100% 100% 100% 100% 100% 99% 89%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 89% 52%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93%	100% 100% 100% 100% 100% 100% 100% 99% 92%	100% 100% 100% 100% 100% 100% 100% 99% 90%	100% 100% 100% 100% 100% 100% 100% 99% 89% 52%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37%	100% 100% 100% 100% 100% 100% 100% 99% 92% 64% 30%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23%	100% 100% 100% 100% 100% 100% 100% 99% 89% 52% 17%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 34,000	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37%	100% 100% 100% 100% 100% 100% 100% 99% 92% 64% 30%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23%	100% 100% 100% 100% 100% 100% 100% 99% 89% 52% 17%
Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37%	100% 100% 100% 100% 100% 100% 100% 99% 92% 64% 30%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23%	100% 100% 100% 100% 100% 100% 100% 99% 52% 17% 2033
Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 79% 2026 99% 94%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 95% 79% 48% 2029 98% 93%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37% 2030 98% 93%	100% 100% 100% 100% 100% 100% 100% 99% 92% 64% 30% 2031 98% 93%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23% 2032 97% 93%	100% 100% 100% 100% 100% 100% 100% 99% 52% 17% 2033 97% 93%
Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 79% 2026 94% 88%	100% 100% 100% 100% 100% 100% 100% 99% 66% 2027 99% 94% 88%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 95% 79% 48% 2029 98% 93% 88%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37% 2030 98% 93% 88%	100% 100% 100% 100% 100% 100% 100% 99% 64% 30% 2031 98% 93% 87%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23% 2032 97% 93% 86%	100% 100% 100% 100% 100% 100% 100% 99% 52% 17% 2033 97% 93% 86%
Catch (t) 12,000 14,000 16,000 18,000 20,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY 0.90*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 79% 2026 94% 88% 76%	100% 100% 100% 100% 100% 100% 100% 99% 66% 2027 99% 94% 88% 76%	100% 100% 100% 100% 100% 100% 100% 58% 2028 98% 94% 88% 76%	100% 100% 100% 100% 100% 100% 100% 95% 79% 48% 2029 98% 93% 88% 76%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37% 2030 98% 93% 88% 76%	100% 100% 100% 100% 100% 100% 100% 99% 64% 30% 2031 98% 93% 87% 76%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23% 2032 97% 93% 86% 75%	100% 100% 100% 100% 100% 100% 100% 99% 52% 17% 2033 97% 93% 86% 75%
Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 30,000 32,000 34,000 F 0.75*FMSY 0.85*FMSY	2019 100% 100% 100% 100% 100% 100% 100% 1	2020 100% 100% 100% 100% 100% 100% 100%	2021 100% 100% 100% 100% 100% 100% 100%	2022 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 99% 93% 79% 2026 94% 88%	100% 100% 100% 100% 100% 100% 100% 99% 66% 2027 99% 94% 88%	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 95% 79% 48% 2029 98% 93% 88%	100% 100% 100% 100% 100% 100% 100% 99% 93% 71% 37% 2030 98% 93% 88%	100% 100% 100% 100% 100% 100% 100% 99% 64% 30% 2031 98% 93% 87%	100% 100% 100% 100% 100% 100% 100% 99% 90% 59% 23% 2032 97% 93% 86%	2033 100% 100% 100% 100% 100% 100% 100% 99% 89% 52% 17% 2033 97% 93% 86% 75% 60% 43%

**Table 9.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (four scenarios of each case combined) for south Atlantic albacore.

Catch (c)   2019   2020   2021   2022   2023   2024   2025   2026   2027   2028   2029   2030   2031   2032   2032   2033   12001   12000   12000   10000   220000   10000   10000   10000   10000   10000   10000   10000   10000   220000   10000   10000   10000   10000   10000   10000   10000   220000   10000   10000   10000   10000   10000   10000   220000   10000   10000   10000   10000   10000   10000   220000   10000   10000   10000   10000   10000   10000   220000   10000   10000   10000   10000   10000   10000   220000   1	Case 1 JP	H. H	ndate'	7611												
14,000   100%					2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
14.000   1005																
18,000   1005																
18.000   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   12																
22,000   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   1008   22,000   1008   1008   1008   1008   1008   24,000   1008   1008   1008   1008   1008   26,000   1008   1008   1008   1008   1008   26,000   1008   1008   1008   1008   1008   26,000   1008   1008   1008   1008   1008   1008   26,000   1008   1008   1008   1008   1008   1008   26,000   1008   1008   1008   1008   1008   1008   1008   26,000   1008   1008   1008   1008   1008   26,000   1008   1008   26,000   1008   1008   26,000																
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32000 100% 100% 190% 99% 98% 98% 93% 90% 88% 84% 88% 79% 68% 58% 94% 88% 88% 84% 78% 70% 63% 57% 50% 46% 53% 33% 28% 34,000 100% 100% 100% 94% 88% 79% 68% 58% 49% 41% 32% 26% 20% 15% 12% 10% 100% 100% 100% 99% 98% 98% 98% 98% 98% 98% 98% 98% 98																
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F. 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2030 205+PMSY 100% 100% 99% 99% 98% 98% 98% 98% 97% 97% 97% 97% 96% 96% 96% 96% 96% 96% 96% 96% 96% 96																
0.75=FMSY   100%   100%   99	04,000	10070	100%	0 470	0070	7 0 70	0070	0070	7070	7170	02/0	2070	2070	1070	12/0	10/0
0.88=FMSY 100% 100% 86% 96% 96% 96% 95% 95% 95% 95% 94% 94% 94% 94% 94% 93% 93% 0.85=FMSY 100% 100% 100% 89% 89% 89% 89% 89% 89% 89% 89% 89% 89	F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.85=FMSY 100% 100% 89% 89% 89% 89% 89% 89% 89% 89% 89% 89	0.75*FMSY	100%	100%	99%	99%	98%	98%	98%	97%	97%	97%	97%	96%	96%	96%	96%
0.995+FMSY	0.80*FMSY	100%	100%	96%	96%	96%	96%	95%	95%	95%	94%	94%	94%	94%	93%	93%
0.99=FMSY	0.85*FMSY	100%	100%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	88%	88%	87%
100   100   100   46   46   46   46   46   46   46	0.90*FMSY	100%	100%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%
Case 2 JPLL_Update7618  Catch (U) 2019   2020   2021   2022   2023   2024   2025   2026   2027   2028   2029   2030   2031   2032   2033   12.000   100%   1	0.95*FMSY	100%	100%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
Catch (t)   2019   2020   2021   2022   2023   2024   2025   2026   2027   2028   2029   2030   2031   2032   2033   12,000   100%	1.00*FMSY	100%	100%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%
12,000 100% 100% 100% 100% 100% 100% 100%	Case 2 JP		pdate'													
14,000 100% 100% 100% 100% 100% 100% 100% 1																2033
16,000																100%
18,000										100%					100%	100%
20,000 100% 100% 100% 100% 100% 100% 100%	16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22,000 100% 100% 100% 100% 99% 99% 99% 99% 99% 99% 99% 99% 99%	18,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24,000 100% 100% 100% 100% 99% 99% 99% 99% 99% 98% 98% 98% 98% 98	20,000	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%
26,000 100% 100% 100% 99% 99% 99% 99% 98% 98% 98% 97% 97% 97% 97% 97% 97% 99% 99% 99% 30,000 100% 100% 99% 99% 99% 98% 98% 98% 98% 95% 94% 93% 92% 92% 92% 90% 90% 30,000 100% 100% 99% 99% 96% 96% 81% 74% 68% 62% 55% 48% 42% 35% 30% 34,000 100% 100% 95% 89% 82% 72% 63% 54% 45% 35% 27% 22% 17% 14% 11% F  2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 100% 100% 98% 99% 99% 99% 99% 97% 97% 97% 97% 96% 96% 96% 96% 96% 96% 96% 96% 96% 96	22,000	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
28,000 100% 100% 99% 99% 98% 98% 98% 97% 96% 95% 94% 93% 92% 92% 90% 90% 30,000 100% 100% 97% 94% 96% 96% 94% 91% 88% 86% 83% 80% 70% 73% 66% 66% 65% 32,000 100% 100% 97% 94% 90% 86% 81% 74% 668% 662% 55% 48% 42% 35% 30% 34,000 100% 100% 95% 89% 82% 72% 63% 54% 45% 35% 27% 22% 17% 14% 11% FE 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 100% 100% 98% 98% 98% 98% 97% 97% 97% 96% 96% 96% 96% 96% 96% 96% 96% 96% 96	24,000	100%	100%	100%	100%	99%	99%	99%	99%	98%	98%	98%	98%	98%	98%	98%
30,000 100% 100% 99% 98% 96% 94% 91% 89% 86% 83% 80% 76% 73% 68% 65% 32,000 100% 100% 97% 94% 90% 86% 81% 74% 66% 62% 55% 44% 42% 35% 35% 30% 34,000 100% 100% 95% 89% 82% 72% 63% 54% 45% 35% 27% 22% 17% 14% 11% 11% F 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 100% 100% 98% 98% 98% 98% 98% 97% 97% 97% 96% 96% 96% 96% 96% 96% 96% 96% 96% 96	26,000	100%	100%	100%	99%	99%	99%	98%	98%	98%	97%	97%	97%	97%	97%	97%
32,000 100% 100% 97% 94% 90% 86% 81% 74% 68% 62% 55% 48% 42% 35% 30% 34,000 100% 100% 95% 89% 82% 72% 63% 54% 45% 35% 27% 22% 17% 14% 11% 11% F 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 100% 100% 98% 98% 98% 97% 97% 97% 96% 96% 96% 96% 96% 96% 96% 96% 88*FMSY 100% 100% 95% 95% 95% 95% 95% 95% 95% 95% 94% 94% 94% 93% 93% 93% 93% 0.90*FMSY 100% 100% 90% 90% 90% 90% 90% 90% 89% 89% 89% 89% 89% 89% 89% 98% 98% 97% 97% 97% 97% 97% 97% 97% 97% 97% 97	28,000	100%	100%	99%	99%	98%	98%	97%	96%	95%	94%	93%	92%	92%	90%	90%
34,000 100% 100% 95% 89% 82% 72% 63% 54% 45% 35% 27% 22% 17% 14% 11%   F																
F	30,000	100%	100%	99%	98%	96%	94%	91%	89%	86%	83%	80%	76%	73%	68%	65%
0.75*FMSY   100%   100%   98%   98%   98%   97%   97%   97%   96																
0.75*FMSY   100%   100%   98%   98%   98%   97%   97%   97%   96	32,000	100%	100%	97%	94%	90%	86%	81%	74%	68%	62%	55%	48%	42%	35%	65% 30% 11%
0.80*FMSY	32,000 34,000	100% 100%	100% 100%	97% 95%	94% 89%	90% 82%	86% 72%	81% 63%	74% 54%	68% 45%	62% 35%	55% 27%	48% 22%	42% 17%	35% 14%	30% 11%
0.85*FMSY	32,000 34,000 F	100% 100% 2019	100% 100% 2020	97% 95% 2021	94% 89% 2022	90% 82% 2023	86% 72% 2024	81% 63% 2025	74% 54% 2026	68% 45% 2027	62% 35% 2028	55% 27% 2029	48% 22% 2030	42% 17% 2031	35% 14% 2032	30% 11% 2033
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	32,000 34,000 F 0.75*FMSY	100% 100% 2019 100%	100% 100% 2020 100%	97% 95% 2021 98%	94% 89% 2022 98%	90% 82% 2023 98%	86% 72% 2024 98%	81% 63% 2025 97%	74% 54% 2026 97%	68% 45% 2027 97%	62% 35% 2028 96%	55% 27% 2029 96%	48% 22% 2030 96%	42% 17% 2031 96%	35% 14% 2032 96%	30% 11% 2033 96%
0.95*FMSY   100%   100%   63%   6	32,000 34,000 F 0.75*FMSY 0.80*FMSY	100% 100% 2019 100% 100%	100% 100% 2020 100% 100%	97% 95% 2021 98% 95%	94% 89% 2022 98% 95%	90% 82% 2023 98% 95%	86% 72% 2024 98% 95%	81% 63% 2025 97% 95%	74% 54% 2026 97% 95%	68% 45% 2027 97% 95%	62% 35% 2028 96% 94%	55% 27% 2029 96% 94%	2030 96% 94%	42% 17% 2031 96% 93%	35% 14% 2032 96% 93%	30% 11% 2033 96% 93%
1.00*FMSY   100%   100%   47	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY	100% 100% 2019 100% 100% 100%	100% 100% 2020 100% 100% 100%	97% 95% 2021 98% 95% 90%	94% 89% 2022 98% 95% 90%	90% 82% 2023 98% 95% 90%	86% 72% 2024 98% 95% 90%	81% 63% 2025 97% 95% 90%	74% 54% 2026 97% 95% 90%	68% 45% 2027 97% 95% 90%	62% 35% 2028 96% 94% 89%	55% 27% 2029 96% 94% 89%	2030 96% 94% 89%	42% 17% 2031 96% 93% 89%	35% 14% 2032 96% 93% 89%	30% 11% 2033 96% 93% 89%
Case 3 JPLL_Update 7618_no1213    Catch (t)   2019   2020   2021   2022   2023   2024   2025   2026   2027   2028   2029   2030   2031   2032   2033   12,000   99%   100%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY	100% 100% 2019 100% 100% 100% 100%	100% 100% 2020 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78%	94% 89% 2022 98% 95% 90% 78%	90% 82% 2023 98% 95% 90% 78%	86% 72% 2024 98% 95% 90% 78%	81% 63% 2025 97% 95% 90% 78%	74% 54% 2026 97% 95% 90% 78%	68% 45% 2027 97% 95% 90% 78%	62% 35% 2028 96% 94% 89% 78%	55% 27% 2029 96% 94% 89% 78%	48% 22% 2030 96% 94% 89% 78%	42% 17% 2031 96% 93% 89% 78%	35% 14% 2032 96% 93% 89% 78%	30% 11% 2033 96% 93% 89% 78%
Catch (t)         2019         2020         2021         2022         2023         2024         2025         2026         2027         2028         2029         2030         2031         2032         2033           12,000         99%         100%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 0.95*FMSY	100% 100% 2019 100% 100% 100% 100%	100% 100% 2020 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63%	94% 89% 2022 98% 95% 90% 78% 63%	90% 82% 2023 98% 95% 90% 78% 63%	86% 72% 2024 98% 95% 90% 78% 63%	81% 63% 2025 97% 95% 90% 78% 63%	74% 54% 2026 97% 95% 90% 78% 63%	68% 45% 2027 97% 95% 90% 78% 63%	62% 35% 2028 96% 94% 89% 78% 63%	55% 27% 2029 96% 94% 89% 78% 63%	48% 22% 2030 96% 94% 89% 78% 63%	42% 17% 2031 96% 93% 89% 78% 63%	35% 14% 2032 96% 93% 89% 78% 63%	30% 11% 2033 96% 93% 89% 78% 63%
12,000 99% 100% 100% 100% 100% 100% 100% 10	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY	100% 100% 2019 100% 100% 100% 100% 100%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47%	94% 89% 2022 98% 95% 90% 78% 63% 47%	90% 82% 2023 98% 95% 90% 78% 63% 47%	86% 72% 2024 98% 95% 90% 78% 63%	81% 63% 2025 97% 95% 90% 78% 63%	74% 54% 2026 97% 95% 90% 78% 63%	68% 45% 2027 97% 95% 90% 78% 63%	62% 35% 2028 96% 94% 89% 78% 63%	55% 27% 2029 96% 94% 89% 78% 63%	48% 22% 2030 96% 94% 89% 78% 63%	42% 17% 2031 96% 93% 89% 78% 63%	35% 14% 2032 96% 93% 89% 78% 63%	30% 11% 2033 96% 93% 89%
14,000 99% 100% 100% 100% 100% 100% 100% 10	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP	100% 100% 2019 100% 100% 100% 100% 100% LL_U	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618_	94% 89% 2022 98% 95% 90% 78% 63% 47% no121	90% 82% 2023 98% 95% 90% 78% 63% 47%	86% 72% 2024 98% 95% 90% 78% 63% 47%	81% 63% 2025 97% 95% 90% 78% 63% 47%	74% 54% 2026 97% 95% 90% 78% 63% 47%	68% 45% 2027 97% 95% 90% 78% 63% 47%	62% 35% 2028 96% 94% 89% 78% 63% 47%	55% 27% 2029 96% 94% 89% 78% 63% 47%	2030 96% 94% 89% 78% 63% 47%	42% 17% 2031 96% 93% 89% 78% 63% 47%	35% 14% 2032 96% 93% 89% 78% 63% 47%	30% 11% 2033 96% 93% 89% 78% 63% 47%
16,000 99% 100% 100% 100% 100% 100% 100% 10	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP Catch (t)	100% 100% 2019 100% 100% 100% 100% 100% LL_U 2019	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 47% 7618_ 2021	94% 89% 2022 98% 95% 90% 78% 63% 47% no121 2022	90% 82% 2023 98% 95% 90% 78% 63% 47% 13	86% 72% 2024 98% 95% 90% 78% 63% 47%	81% 63% 2025 97% 95% 90% 78% 63% 47%	74% 54% 2026 97% 95% 90% 78% 63% 47%	68% 45% 2027 97% 95% 90% 78% 63% 47%	62% 35% 2028 96% 94% 89% 78% 63% 47%	55% 27% 2029 96% 94% 89% 78% 63% 47%	2030 96% 94% 89% 78% 63% 47%	42% 17% 2031 96% 93% 89% 78% 63% 47%	35% 14% 2032 96% 93% 89% 78% 63% 47%	30% 11% 2033 96% 93% 89% 78% 63% 47%
18,000 99% 100% 100% 100% 100% 100% 100% 10	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000	100% 100% 2019 100% 100% 100% 100% 100% 100% LL_U 2019 99%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618_ 2021 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no121 2022 100%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100%	86% 72% 2024 98% 95% 90% 78% 63% 47%	81% 63% 2025 97% 95% 90% 78% 47% 2025 100%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026	97% 95% 90% 78% 63% 47%	62% 35% 2028 96% 94% 89% 78% 63% 47%	55% 27% 2029 96% 94% 89% 78% 63% 47%	2030 96% 94% 89% 78% 63% 47%	42% 17% 2031 96% 93% 89% 78% 63% 47%	35% 14% 2032 96% 93% 89% 78% 63% 47%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033
20,000 99% 100% 100% 100% 100% 100% 99% 99% 99% 99% 99% 99% 99% 99% 99%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000	100% 100% 2019 100% 100% 100% 100% 100% LL_U 2019 99% 99%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 47% 7618 2021 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no121 2022 100% 100%	90% 82% 2023 98% 95% 90% 78% 47% 13 2023 100% 100%	86% 72% 2024 98% 95% 90% 63% 47% 2024 100%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100%	2030 96% 94% 89% 78% 63% 47%	42% 17% 2031 96% 93% 89% 78% 63% 47%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100%
22,000 99% 100% 100% 100% 99% 99% 99% 99% 99% 99% 99% 99% 99%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000	100% 100% 2019 100% 100% 100% 100% 100% 100% LL_U 2019 99% 99%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no121 2022 100% 100%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100%	86% 72% 2024 98% 95% 90% 78% 63% 47% 2024 100% 100%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100%
24,000 99% 100% 100% 100% 99% 99% 99% 99% 99% 99% 99% 99% 99%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 18,000	100% 100% 2019 100% 100% 100% 100% 100% 100% 2019 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618_ 2021 100% 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no122 2022 100% 100% 100%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100%	86% 72% 2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100%
26,000 99% 100% 100% 99% 99% 99% 99% 99% 98% 98% 98% 98% 97% 97% 97% 97% 28,000 99% 100% 99% 99% 98% 98% 98% 95% 94% 92% 90% 88% 87% 85% 30,000 99% 100% 99% 97% 95% 92% 88% 84% 80% 77% 72% 67% 62% 59% 55% 32,000 99% 100% 97% 92% 86% 80% 72% 64% 58% 51% 46% 41% 35% 31% 27% 34,000 99% 100% 91% 82% 72% 61% 53% 44% 37% 30% 24% 20% 16% 13% 10% FE 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 99% 100% 99% 99% 98% 98% 98% 98% 98% 97% 97% 97% 97% 97% 97% 0.80*FMSY 99% 100% 96% 96% 96% 96% 96% 96% 96% 96% 95% 95% 95% 95% 95% 94% 94% 0.85*FMSY 99% 100% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 18,000 20,000	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618_ 2021 100% 100% 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no122 2022 100% 100% 100%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100%	86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 100%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99%
28,000 99% 100% 99% 99% 98% 98% 97% 96% 95% 94% 92% 90% 88% 87% 85% 30,000 99% 100% 99% 97% 95% 92% 88% 84% 80% 77% 72% 67% 62% 59% 55% 32,000 99% 100% 97% 92% 86% 80% 72% 64% 58% 51% 46% 41% 35% 31% 27% 34,000 99% 100% 91% 82% 72% 61% 53% 44% 37% 30% 24% 20% 16% 13% 10% FF 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 99% 100% 99% 99% 98% 98% 98% 98% 98% 97% 97% 97% 97% 97% 97% 98% 98% 98% 98% 98% 98% 98% 98% 98% 98	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618_ 2021 100% 100% 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 100% 99%	86% 72% 2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100% 100% 99%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99%
30,000 99% 100% 99% 97% 95% 92% 88% 84% 80% 77% 72% 67% 62% 59% 55% 32,000 99% 100% 97% 92% 86% 80% 72% 64% 58% 51% 46% 41% 35% 31% 27% 34,000 99% 100% 91% 82% 72% 61% 53% 44% 37% 30% 24% 20% 16% 13% 10% F 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 99% 100% 99% 99% 98% 98% 98% 98% 98% 97% 97% 97% 97% 97% 97% 98% 98% 98% 98% 98% 98% 98% 98% 98% 98	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 18,000 20,000 22,000 24,000	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 100% 100% 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no121 2022 100% 100% 100% 100%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 100% 99% 99%	86% 72% 2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100% 100% 99% 99%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 100% 99% 99%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 99%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 99%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99%
32,000 99% 100% 97% 92% 86% 80% 72% 64% 58% 51% 46% 41% 35% 31% 27% 34,000 99% 100% 91% 82% 72% 61% 53% 44% 37% 30% 24% 20% 16% 13% 10% F 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 0.75*FMSY 99% 100% 99% 99% 98% 98% 98% 98% 98% 97% 97% 97% 97% 97% 97% 98% 98% FMSY 99% 100% 96% 96% 96% 96% 96% 96% 96% 95% 95% 95% 95% 95% 94% 94% 0.85*FMSY 99% 100% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 1.00*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 100% 100% 100% 100% 100% 100%	94% 89% 2022 98% 95% 90% 78% 63% 47% no121 2022 100% 100% 100% 100% 100% 100%	90% 82% 2023 98% 95% 90% 78% 47% 13 2023 100% 100% 100% 100% 99% 99%	86% 72% 2024 98% 95% 90% 63% 47% 2024 100% 100% 100% 100% 99% 99%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 100% 99% 99%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 100% 99% 99%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 99%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 99%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 99% 98%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 99%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 100% 99% 99% 99%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99%
34,000 99% 100% 91% 82% 72% 61% 53% 44% 37% 30% 24% 20% 16% 13% 10%  F	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 1.00*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 28,000	100% 100% 2019 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 100% 100% 100% 100% 100% 100% 100%	94% 89% 2022 98% 95% 90% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 100% 99% 99%	90% 82% 2023 98% 95% 90% 63% 47% 13 2023 100% 100% 100% 100% 99% 99% 99%	86% 72% 2024 98% 95% 90% 63% 47% 2024 100% 100% 100% 100% 99% 99% 98%	81% 63% 2025 97% 95% 90% 63% 47% 2025 100% 100% 100% 100% 99% 99% 99%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 100% 99% 99% 99%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 100% 99% 99% 98% 95%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 100% 99% 99% 99% 98% 94%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 100% 99% 99% 99%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 100% 99% 99% 99%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 100% 99% 99% 99%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 100% 99% 99% 97% 87%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 99%
F 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 20.75*FMSY 99% 100% 99% 99% 98% 98% 98% 98% 98% 97% 97% 97% 97% 97% 97% 97% 98% 98% 98% 98% 98% 98% 98% 98% 98% 98	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 28,000 30,000	100% 100% 2019 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 95% 98% 95% 90% 78% 63% 47% 7618 2021 100% 100	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 99% 99% 97%	90% 82% 2023 98% 95% 90% 63% 47% 13 2023 100% 100% 100% 100% 99% 99% 99% 98%	86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 100% 99% 99% 98% 92%	81% 63% 2025 97% 95% 90% 63% 47% 2025 100% 100% 100% 100% 99% 99% 99%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 100% 99% 99% 99% 99%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 100% 99% 99% 98% 95% 80%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 100% 99% 99% 98% 94% 77%	55% 27% 2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 100% 99% 99% 99% 98% 92% 72%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 100% 99% 99% 99% 99%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 100% 99% 99% 97% 88% 62%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 100% 99% 99% 97% 87% 59%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 97% 85%
0.75*FMSY         99%         100%         99%         99%         98%         98%         98%         98%         97%         90%         90%         90%         90%         90%         90%         90%         90%         90%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY 1.00*I 12,000 16,000 18,000 20,000 24,000 24,000 28,000 30,000 32,000	100% 100% 2019 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 95% 98% 95% 90% 78% 63% 47% 7618 2021 100% 100	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 99% 99% 97% 92%	90% 82%  2023 98% 95% 90% 78% 63% 47% 13  2023 100% 100% 100% 100% 99% 99% 98% 95% 86%	86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 99% 99% 98% 92% 80%	81% 63% 2025 97% 95% 90% 63% 47% 2025 100% 100% 100% 100% 99% 99% 99% 97% 88% 72%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 100% 99% 99% 99% 96% 84% 64%	2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 100% 99% 98% 95% 80% 58%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 100% 99% 99% 98% 94% 77% 51%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 98% 92% 72% 46%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99% 98% 90% 67% 41%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 97% 88% 62% 35%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 100% 99% 99% 97% 87% 59% 31%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 99% 95% 55% 27%
0.75*FMSY         99%         100%         99%         99%         98%         98%         98%         98%         97%         90%         90%         90%         90%         90%         90%         90%         90%         90%	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY 1.00*I 12,000 16,000 18,000 20,000 24,000 24,000 28,000 30,000 32,000	100% 100% 2019 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 95% 98% 95% 90% 78% 63% 47% 7618 2021 100% 100	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 99% 99% 97% 92%	90% 82%  2023 98% 95% 90% 78% 63% 47% 13  2023 100% 100% 100% 100% 99% 99% 98% 95% 86%	86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 99% 99% 98% 92% 80%	81% 63% 2025 97% 95% 90% 63% 47% 2025 100% 100% 100% 100% 99% 99% 99% 97% 88% 72%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 100% 99% 99% 99% 96% 84% 64%	2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 100% 99% 98% 95% 80% 58%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 100% 99% 99% 98% 94% 77% 51%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 98% 92% 72% 46%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99% 98% 90% 67% 41%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 97% 88% 62% 35%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 100% 99% 99% 97% 87% 59% 31%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 99% 95% 55% 27%
0.80*FMSY       99%       100%       96%       96%       96%       96%       96%       96%       96%       95%       95%       95%       95%       95%       94%       94%         0.85*FMSY       99%       100%       91% <td>32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 32,000 32,000 34,000</td> <td>100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99%</td> <td>100% 100% 2020 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%</td> <td>97% 95% 2021 98% 95% 90% 78% 47% 7618 2021 100% 100% 100% 100% 100% 100% 100% 99% 99% 97% 91%</td> <td>94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 10</td> <td>90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 99% 99% 99% 98% 95% 86% 72%</td> <td>86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 99% 99% 98% 92% 80% 61%</td> <td>81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 99% 97% 88% 72% 53%</td> <td>74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 96% 84% 64% 44%</td> <td>68% 45% 2027 97% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 99% 98% 80% 58% 37%</td> <td>62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 99% 98% 94% 77% 51% 30%</td> <td>2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 98% 92% 72% 46% 24%</td> <td>2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99% 67% 41% 20%</td> <td>42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 99% 97% 88% 62% 35% 16%</td> <td>35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 97% 87% 59% 31% 13%</td> <td>30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 95% 55% 27% 10%</td>	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Case 3 JP Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 28,000 30,000 32,000 32,000 32,000 34,000	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99%	100% 100% 2020 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 47% 7618 2021 100% 100% 100% 100% 100% 100% 100% 99% 99% 97% 91%	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 10	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 99% 99% 99% 98% 95% 86% 72%	86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 99% 99% 98% 92% 80% 61%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 99% 97% 88% 72% 53%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 96% 84% 64% 44%	68% 45% 2027 97% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 99% 98% 80% 58% 37%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 99% 98% 94% 77% 51% 30%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 98% 92% 72% 46% 24%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99% 67% 41% 20%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 99% 97% 88% 62% 35% 16%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 97% 87% 59% 31% 13%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 95% 55% 27% 10%
0.85*FMSY     99%     100%     91% <td< td=""><td>32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 28,000 32,000 32,000 34,000</td><td>100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99% 99%</td><td>100% 100% 100% 100% 100% 100% 100% 100%</td><td>97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 10</td><td>94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 99% 99% 92% 82% 2022</td><td>90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 99% 99% 99% 98% 95% 86% 72%</td><td>86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 99% 99% 99% 98% 92% 80% 61%</td><td>81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 99% 97% 88% 72% 53%</td><td>74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 44% 44%</td><td>68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 98% 98% 80% 58% 37%</td><td>62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 98% 94% 77% 51% 30%</td><td>2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 98% 98% 92% 46% 24%</td><td>2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 98% 90% 67% 41% 20%</td><td>2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 99% 99% 97% 88% 62% 35% 16%</td><td>2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 97% 87% 59% 31% 13%</td><td>30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 997% 85% 55% 27% 10%</td></td<>	32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY Catch (t) 12,000 14,000 16,000 20,000 22,000 24,000 26,000 28,000 32,000 32,000 34,000	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99% 99%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 10	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 99% 99% 92% 82% 2022	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 99% 99% 99% 98% 95% 86% 72%	86% 72% 2024 98% 95% 90% 78% 63% 47%  2024 100% 100% 100% 99% 99% 99% 98% 92% 80% 61%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 99% 97% 88% 72% 53%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 44% 44%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 98% 98% 80% 58% 37%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 98% 94% 77% 51% 30%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 98% 98% 92% 46% 24%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 98% 90% 67% 41% 20%	2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 99% 99% 97% 88% 62% 35% 16%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 97% 87% 59% 31% 13%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 997% 85% 55% 27% 10%
0.90*FMSY         99%         100%         80%         80%         80%         80%         80%         80%         80%         80%         80%         80%         80%         80%         79%         79%           0.95*FMSY         99%         100%         64%	32,000 34,000  F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY 1.00*FMSY 1.00*FMSY 2.000 14,000 16,000 18,000 20,000 24,000 26,000 28,000 30,000 32,000 32,000 34,000 F 0.75*FMSY	100% 100% 2019 100% 100% 100% 100% 100% 2019 99% 99% 99% 99% 99% 99% 99% 99% 99% 9	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 47% 7618 2021 100% 1	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 10	90% 82% 2023 98% 95% 90% 78% 47% 13 2023 100% 100% 100% 100% 99% 99% 98% 95% 86% 72%	2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100% 99% 99% 98% 92% 80% 61%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 97% 88% 72% 53% 2025 98%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 96% 84% 64% 44% 2026	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 98% 95% 80% 58% 37%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 99% 94% 77% 51% 30%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 98% 92% 72% 46% 24%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 98% 90% 67% 41% 20% 2030	2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 97% 88% 62% 35% 16%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 99% 99% 97% 87% 59% 31% 13%	2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 97% 85% 55% 27% 10%
0.95*FMSY 99% 100% 64% 64% 64% 64% 64% 64% 64% 64% 64% 64	32,000 34,000  F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY 1.00*FMSY 1.00*FMSY 2.000 14,000 16,000 18,000 20,000 22,000 24,000 26,000 28,000 30,000 30,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 90% 78% 63% 47% 7618 2021 100% 1	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 99% 97% 92% 82% 2022 99% 96%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 100% 99% 99% 99% 95% 86% 72%	2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100% 99% 99% 98% 92% 80% 61%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 97% 88% 72% 53% 2025 98%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 94% 64% 44% 44% 2026 98% 96%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 100% 99% 99% 99% 98% 95% 80% 58% 37% 2027 98% 96%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 99% 94% 77% 51% 30% 2028 97%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 98% 92% 72% 46% 24% 2029	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 98% 90% 67% 41% 20% 2030	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 97% 88% 62% 35% 16% 2031 97% 95%	35% 14% 2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 97% 87% 59% 31% 13% 2032 97% 94%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 997% 85% 55% 27% 10%
	32,000 34,000  F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.95*FMSY 1.00*FMSY 1.00*FMSY 1.00*FMSY 2.000 14,000 16,000 20,000 24,000 24,000 26,000 28,000 30,000 32,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.85*FMSY	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 10	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 100% 100% 100% 2022 99% 92% 82% 2022 99% 91%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 100% 99% 99% 99% 95% 86% 72% 2023 96% 91%	2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100% 100% 99% 99% 98% 92% 80% 61%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 99% 99% 97% 88% 72% 53% 2025 98% 96% 91%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 94% 64% 44% 44% 2026 98% 96% 91%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 100% 99% 99% 98% 95% 80% 58% 37% 2027 98% 96% 91%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 100% 99% 99% 99% 94% 77% 51% 30% 2028 97% 95% 91%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 92% 72% 46% 24% 2029 97% 95% 91%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99% 98% 90% 67% 41% 20% 2030 97% 95% 91%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 97% 88% 62% 35% 16% 2031 97% 95% 91%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 99% 97% 87% 59% 31% 13% 2032 97% 94%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 955% 27% 10% 2033 97% 94% 90%
10.0	32,000 34,000  F 0.75*FMSY 0.80*FMSY 0.90*FMSY 0.90*FMSY 1.00*FMSY 1.00*FMSY 1.00*FMSY 2.000 14,000 16,000 20,000 24,000 24,000 26,000 28,000 30,000 32,000 32,000 34,000 F 0.75*FMSY 0.80*FMSY 0.90*FMSY	100% 100% 100% 100% 100% 100% 100% 100%	100% 100% 100% 100% 100% 100% 100% 100%	97% 95% 2021 98% 95% 90% 78% 63% 47% 7618 2021 100% 10	94% 89% 2022 98% 95% 90% 78% 63% 47% no12 2022 100% 100% 100% 100% 100% 99% 97% 92% 82% 2022 99% 91% 80%	90% 82% 2023 98% 95% 90% 78% 63% 47% 13 2023 100% 100% 100% 100% 99% 99% 99% 95% 86% 72% 2023 96% 91% 80%	2024 98% 95% 90% 78% 63% 47% 2024 100% 100% 100% 99% 99% 98% 92% 80% 61% 2024 96% 91% 80%	81% 63% 2025 97% 95% 90% 78% 63% 47% 2025 100% 100% 100% 100% 99% 99% 97% 88% 72% 53% 2025 98% 96% 91% 80%	74% 54% 2026 97% 95% 90% 78% 63% 47% 2026 100% 100% 100% 99% 99% 99% 99% 944% 64% 44% 2026 98% 96% 91% 80%	68% 45% 2027 97% 95% 90% 78% 63% 47% 2027 100% 100% 100% 99% 99% 98% 95% 80% 58% 37% 2027 96% 91% 80%	62% 35% 2028 96% 94% 89% 78% 63% 47% 2028 100% 100% 100% 99% 99% 99% 94% 77% 51% 30% 2028 97% 95% 91% 80%	2029 96% 94% 89% 78% 63% 47% 2029 100% 100% 100% 99% 99% 92% 72% 46% 24% 2029 97% 95% 91% 80%	2030 96% 94% 89% 78% 63% 47% 2030 100% 100% 100% 99% 99% 99% 98% 90% 67% 41% 20% 2030 97% 95% 91% 80%	42% 17% 2031 96% 93% 89% 78% 63% 47% 2031 100% 100% 100% 99% 99% 97% 88% 62% 35% 16% 2031 95% 91% 80%	2032 96% 93% 89% 78% 63% 47% 2032 100% 100% 100% 99% 97% 87% 59% 31% 13% 2032 97% 94% 90% 79%	30% 11% 2033 96% 93% 89% 78% 63% 47% 2033 100% 100% 100% 99% 99% 99% 95% 55% 27% 10% 2033

**Table 9.** Kobe II risk matrix (for the probability of being green) based on ASPIC results (four scenarios of each case combined) for south Atlantic albacore (continued)

## Case 4 JPLL\_Core7611

Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%
20,000	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
22,000	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
24,000	100%	100%	100%	99%	99%	98%	98%	98%	98%	98%	98%	97%	97%	97%	97%
26,000	100%	100%	100%	99%	98%	97%	97%	96%	96%	96%	96%	96%	96%	96%	96%
28,000	100%	100%	100%	98%	97%	96%	95%	94%	93%	93%	92%	92%	91%	91%	91%
30,000	100%	100%	99%	96%	94%	92%	90%	87%	86%	84%	82%	80%	78%	76%	74%
32,000	100%	100%	97%	92%	88%	82%	78%	73%	68%	62%	57%	52%	46%	41%	37%
34,000	100%	100%	94%	86%	79%	71%	62%	54%	46%	39%	33%	26%	21%	17%	14%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	93%	93%	92%	92%	91%	91%	90%	90%	90%	89%	89%	89%	89%
0.80*FMSY	100%	100%	88%	88%	88%	87%	86%	86%	86%	86%	86%	85%	85%	85%	85%
0.85*FMSY	100%	100%	80%	80%	80%	80%	80%	80%	80%	80%	80%	79%	79%	79%	79%
0.90*FMSY	100%	100%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
0.95*FMSY	100%	100%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%	59%
1.00*FMSY	100%	100%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%

# Case 5 JPLL\_Core7618

Catch (t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
12,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
14,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
16,000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18,000	100%	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
20,000	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
22,000	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
24,000	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
26,000	100%	100%	100%	99%	99%	99%	99%	99%	98%	98%	98%	98%	98%	98%	98%
28,000	100%	100%	100%	99%	99%	98%	97%	96%	96%	96%	95%	95%	94%	94%	93%
30,000	100%	100%	99%	98%	96%	94%	91%	89%	87%	85%	83%	80%	79%	77%	76%
32,000	100%	100%	99%	94%	87%	81%	76%	71%	65%	59%	53%	47%	42%	36%	31%
34,000	100%	100%	96%	86%	76%	67%	58%	50%	40%	32%	26%	21%	17%	13%	11%
F	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0.75*FMSY	100%	100%	95%	95%	93%	93%	92%	92%	92%	91%	91%	91%	91%	91%	90%
0.80*FMSY	100%	100%	88%	88%	87%	87%	86%	86%	86%	85%	85%	85%	84%	84%	84%
0.85*FMSY	100%	100%	79%	79%	79%	79%	79%	78%	78%	78%	78%	78%	78%	78%	77%
0.90*FMSY	100%	100%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	68%	68%
0.95*FMSY	100%	100%	58%	58%	58%	58%	58%	58%	58%	58%	58%	58%	58%	58%	58%
1.00*FMSY	100%	100%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%

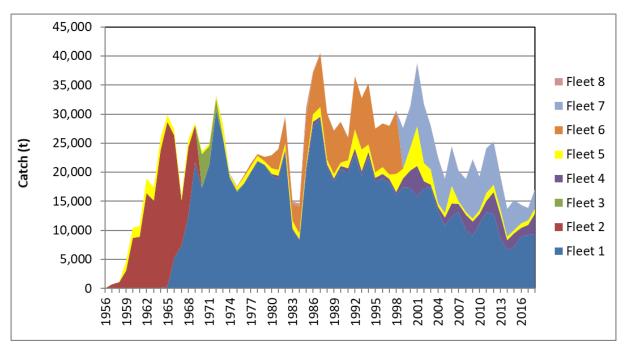
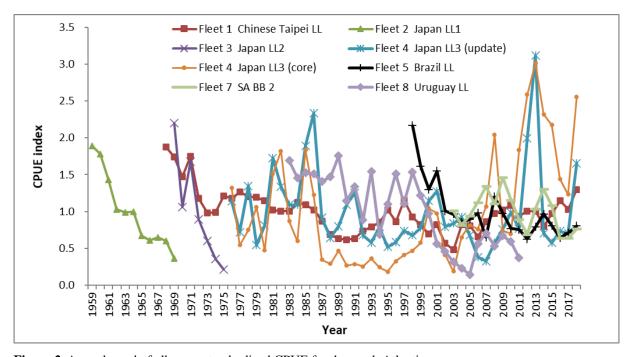
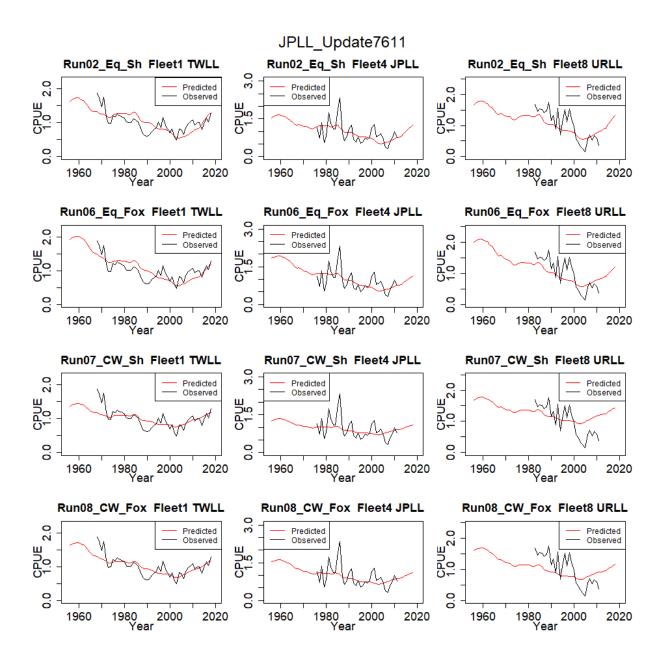


Figure 1. Annual trend of catch amount by fleet for ASPIC models for the south Atlantic.



 $\textbf{Figure 2.} \ Annual \ trend \ of \ albacore \ standardized \ CPUE \ for \ the \ south \ Atlantic.$ 



**Figure 3.** CPUE fit for each ASPIC runs.

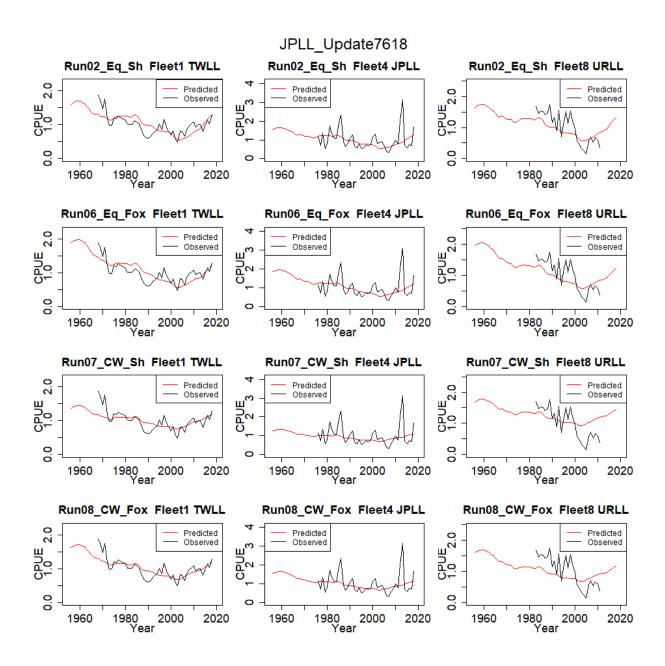


Figure 3. CPUE fit for each ASPIC runs. (continued)

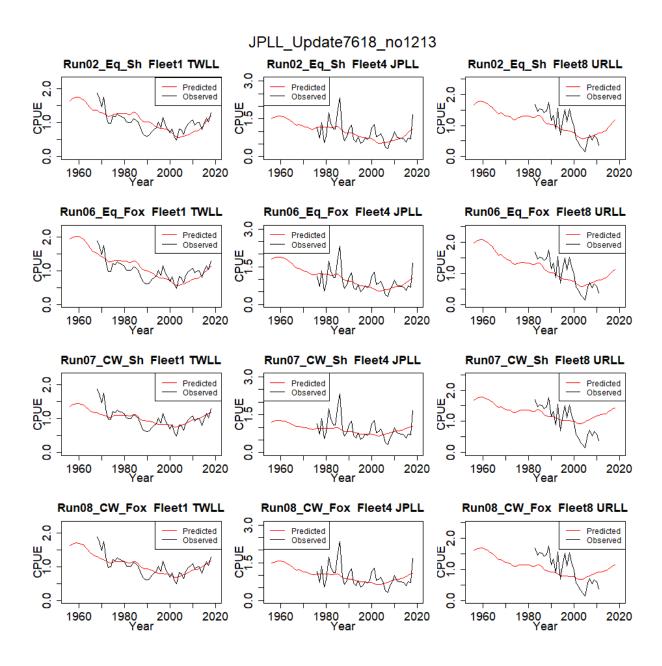


Figure 3. CPUE fit for each ASPIC runs. (continued)

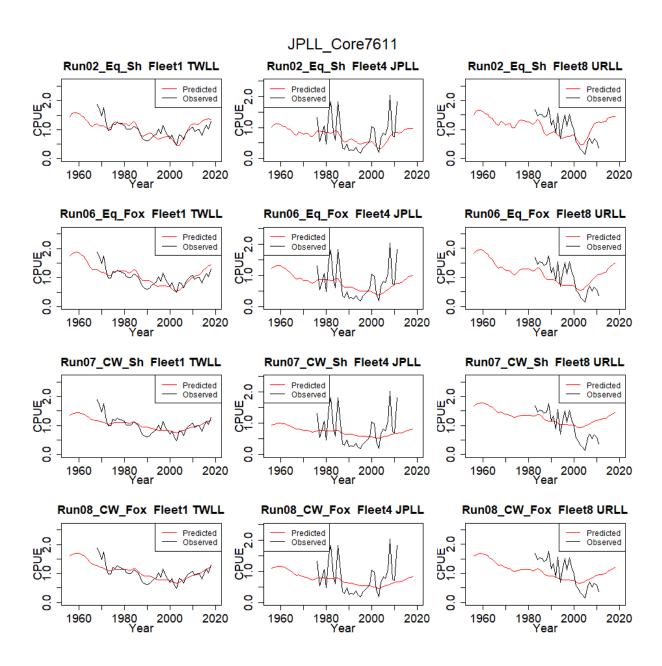


Figure 3. CPUE fit for each ASPIC runs. (continued)

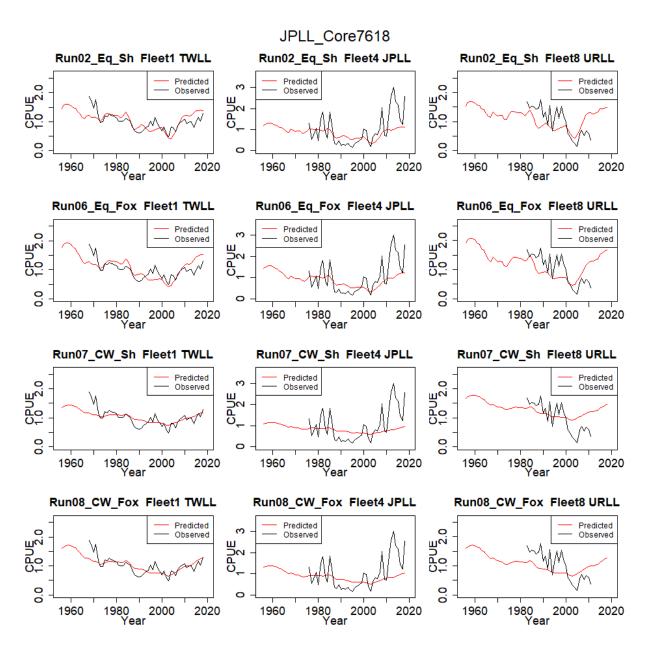


Figure 3. CPUE fit for each ASPIC runs. (continued)

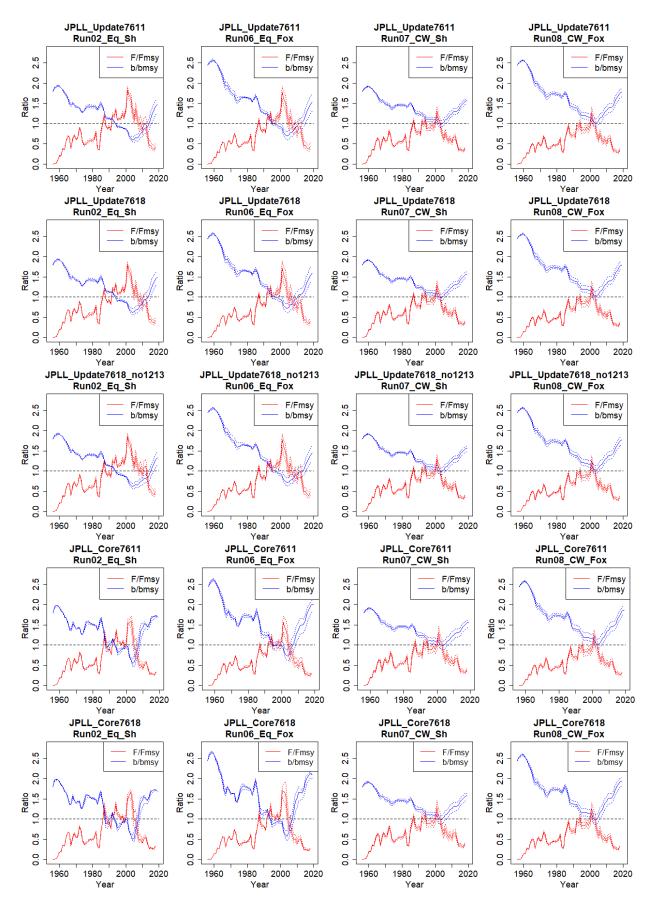
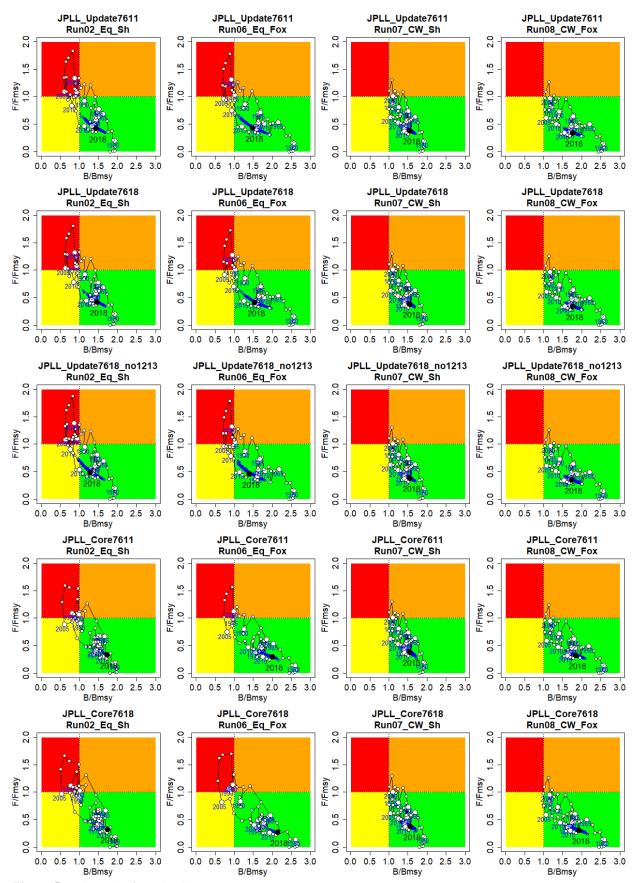


Figure 4. Trajectories of B/B<sub>MSY</sub> and F/F<sub>MSY</sub> with 80% confidence limits (dashed lines) for ASPIC runs.



**Figure 5.** Kobe I plot for ASPIC runs.

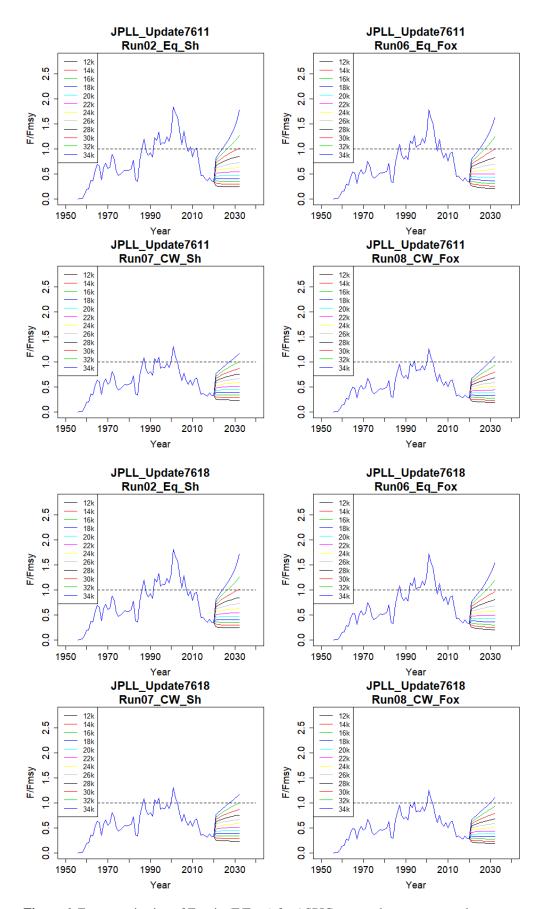


Figure 6. Future projection of F-ratio ( $F/F_{MSY}$ ) for ASPIC runs under constant catch.

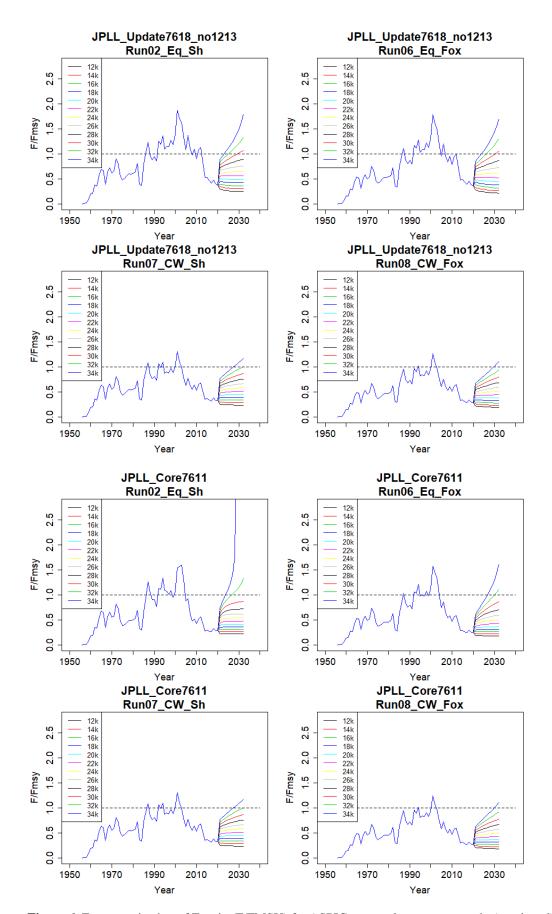


Figure 6. Future projection of F-ratio (F/FMSY) for ASPIC runs under constant catch. (continued)

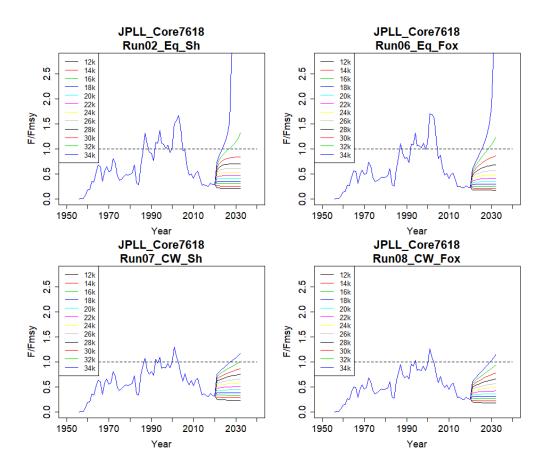


Figure 6. Future projection of F-ratio (F/FMSY) for ASPIC runs under constant catch. (continued)

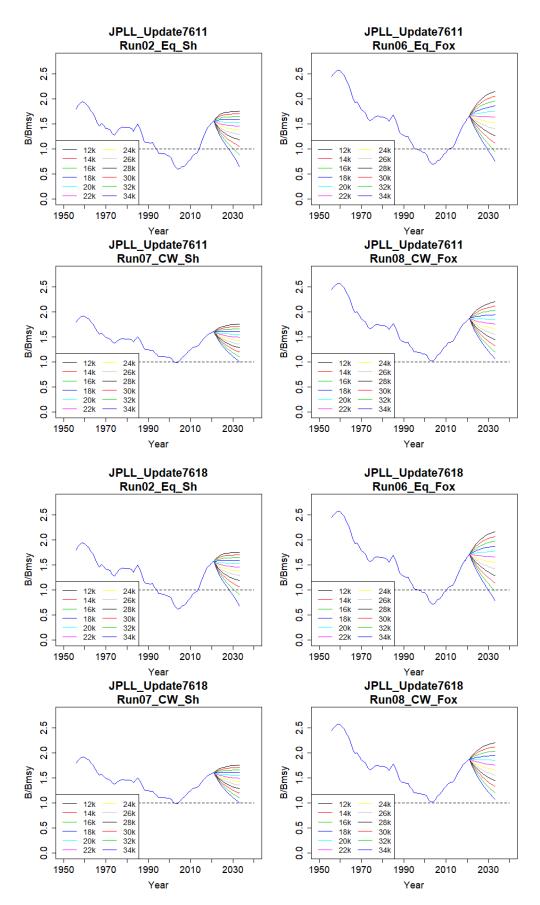


Figure 7. Future projection of B-ratio (B/B<sub>MSY</sub>) for ASPIC runs under constant catch.

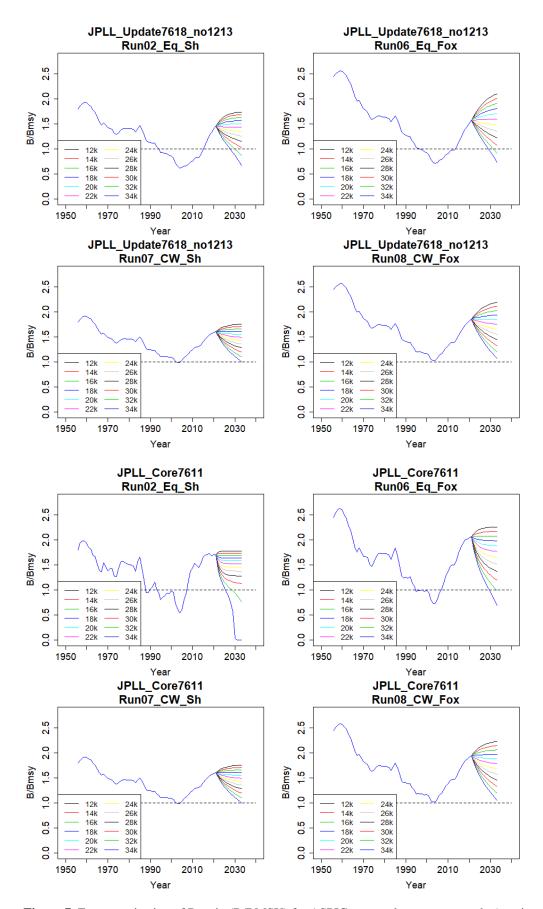


Figure 7. Future projection of B-ratio (B/BMSY) for ASPIC runs under constant catch. (continued)

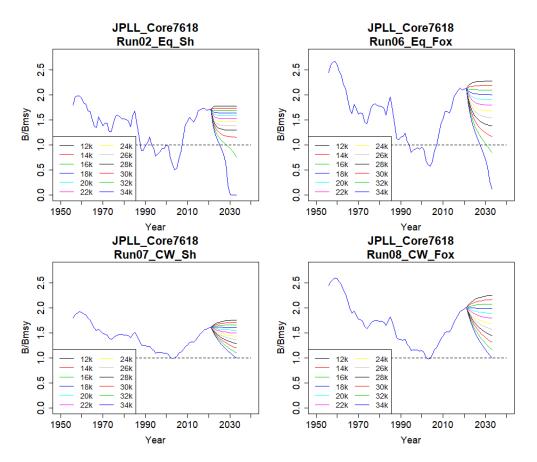
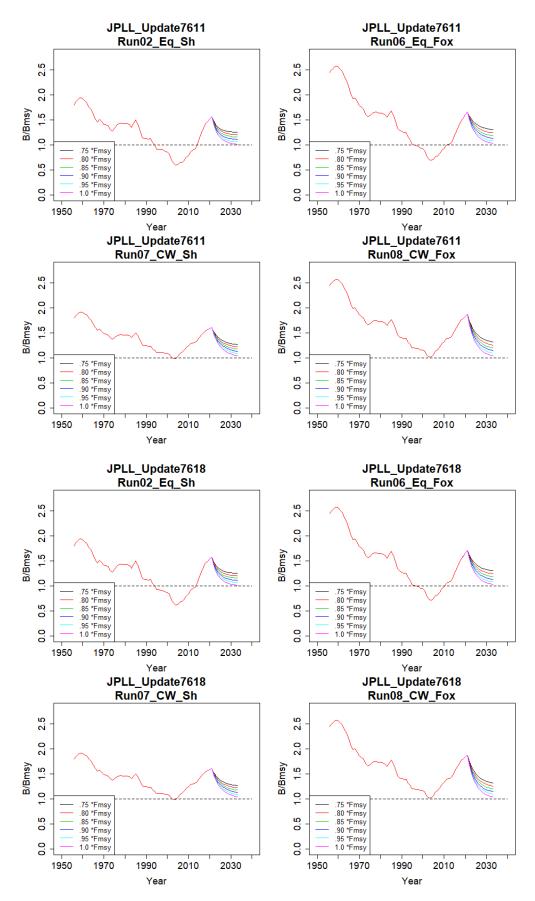


Figure 7. Future projection of B-ratio (B/BMSY) for ASPIC runs under constant catch. (continued)



**Figure 8.** Future projection of B-ratio (B/B<sub>MSY</sub>) for ASPIC runs under constant F.

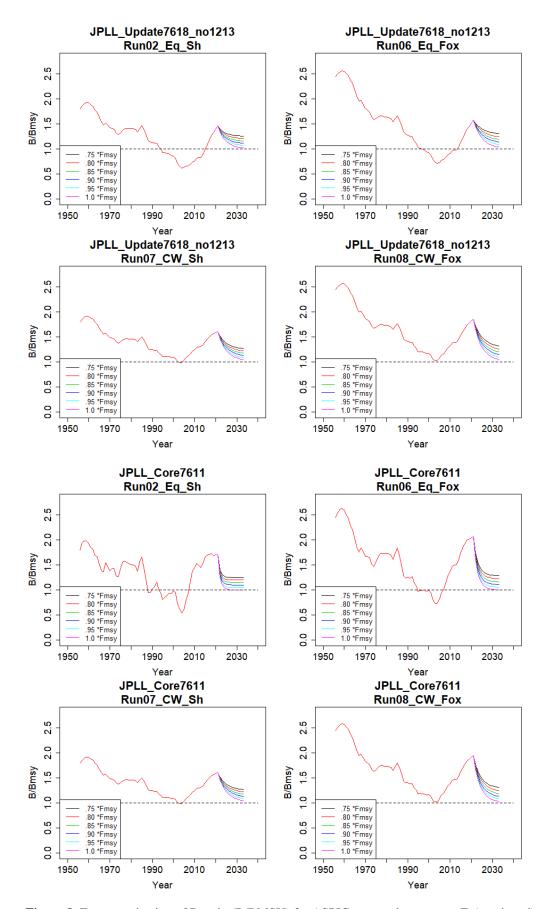


Figure 8. Future projection of B-ratio (B/BMSY) for ASPIC runs under constant F. (continued)

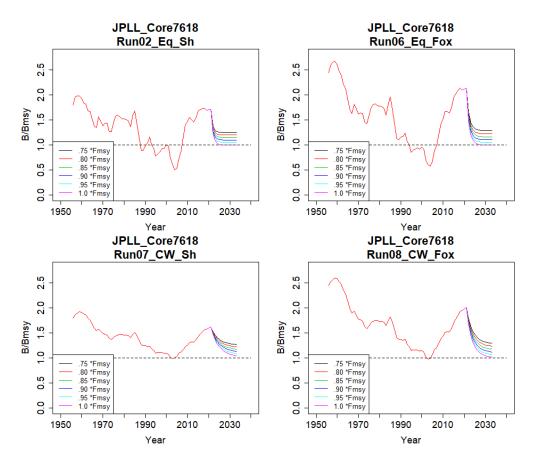
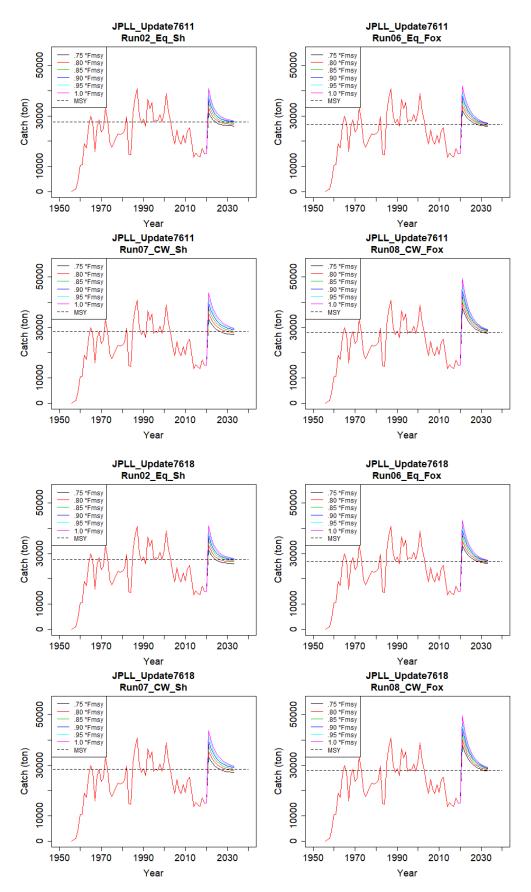
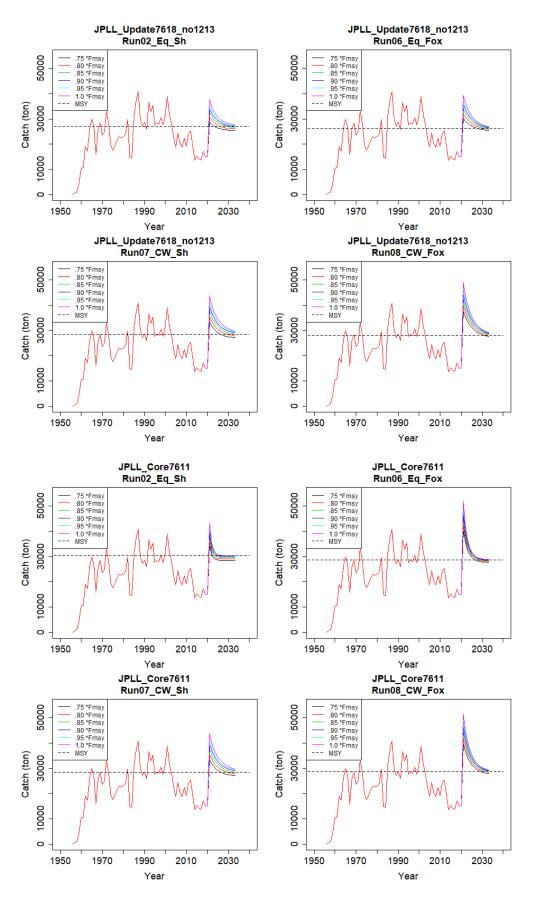


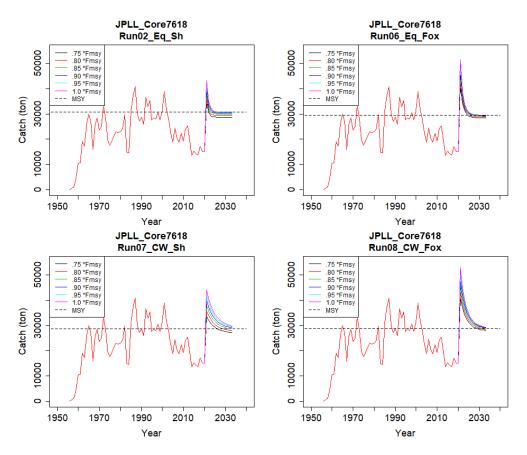
Figure 8. Future projection of B-ratio (B/BMSY) for ASPIC runs under constant F. (continued)



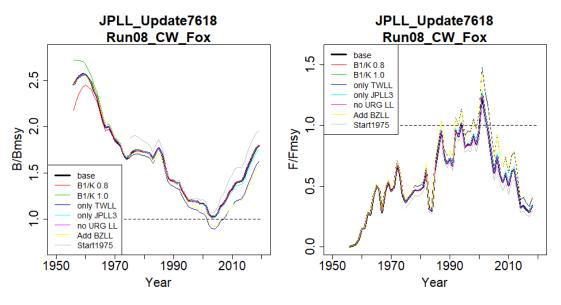
**Figure 9.** Predicted yield for future projection (15 years) for ASPIC runs for South Atlantic albacore under constant F.



**Figure 9.** Predicted yield for future projection (15 years) for ASPIC runs for South Atlantic albacore under constant F. (continued)



**Figure 9.** Predicted yield for future projection (15 years) for ASPIC runs for South Atlantic albacore under constant F. (continued)



**Figure 10.** Results of sensitivity analyses for ASPIC Case 2 (JPLL\_Update7618) Run08 for south Atlantic albacore. Note: the scenario with baitboat CPUE (ADD BB\_L) didn't converge.

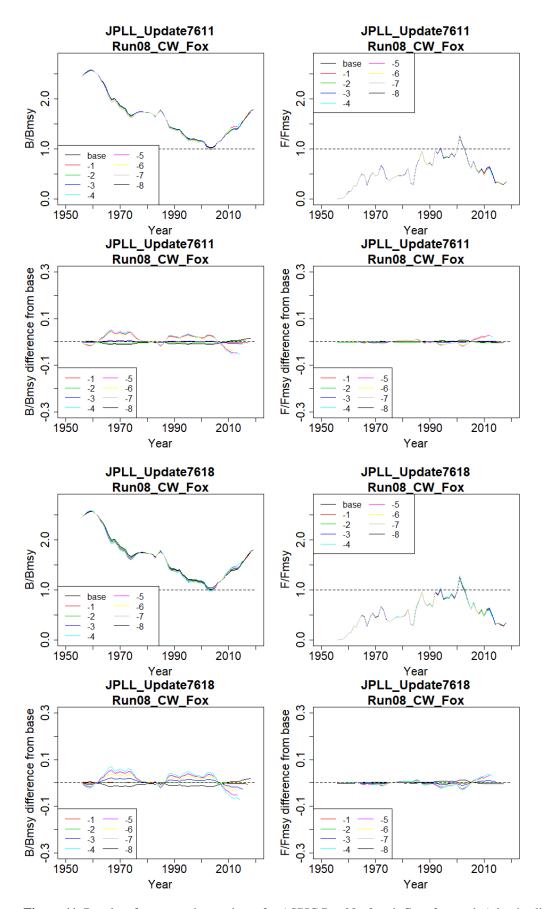
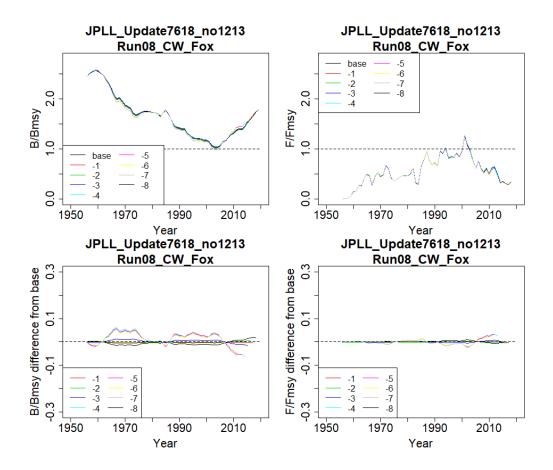
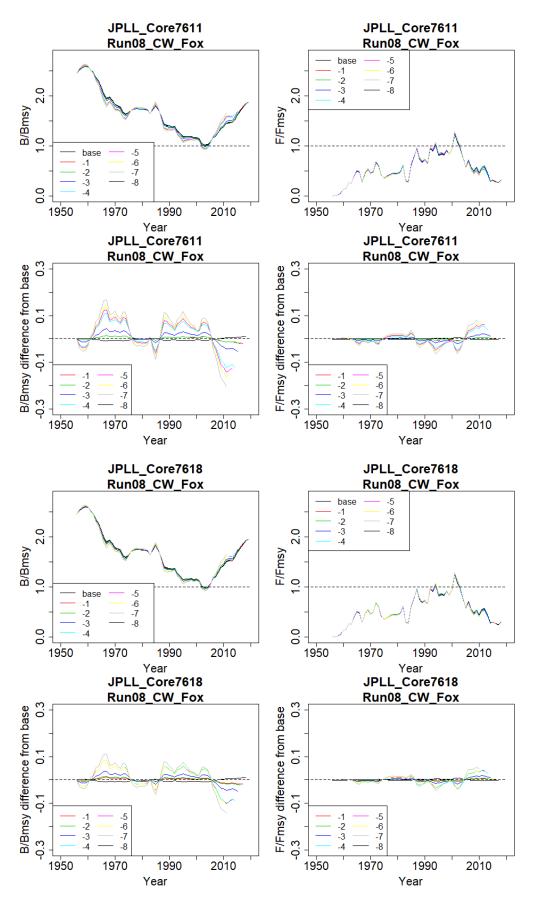


Figure 11. Results of retrospective analyses for ASPIC Run08 of each Case for south Atlantic albacore.



**Figure 11.** Results of retrospective analyses for ASPIC Run08 of each Case for south Atlantic albacore. (continued).



**Figure 11.** Results of retrospective analyses for ASPIC Run08 of each Case for south Atlantic albacore. (continued).