Report on the Simulations of Catch Allocation Based on Criteria from the EU proposal and the Coastal States Proposal

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Executive Summary

This report calculates proportions of an overall TAC by species and flag and uses the estimates of CPCs historical catch data for the IOTC species that were first published in Circular 2018-28. The actual criteria for catch allocation were based on IOTC-2018-S22-INF01E (EU proposal) and IOTC-2019-TCAC05-PropA[E] (Coastal States Proposal). The catch allocation proposals outline frameworks to assign a proportion of the Total Allowable Catch (TAC) by flag state and species. Allocated proportions are translated to a flag and species specific TAC by using the 2018 stock status advice for MSY as a proxy for the TAC to provide tangible values of actual allocated catch should the 2018 MSY values be adopted. These estimates are illustrative only it should be noted that MSY is subject to change and may not be a viable value for species TAC. Information on the proportion of the TAC is also presented. Values in this report are summarized to the median TAC by historical catch allocation method. Each proposal considered different metrics of the calculating the baseline historical catch. The Coastal States Proposal calculated one historical catch and summarized it in three ways while the EU Proposal uses three different historical catch allocations summarized in the same manner. For purposed of comparison and reference, the reported average catches from 2012-2016 are compared to calculated TAC values, by species and flag, for both proposals in Annex 5.

1. Introduction

RECALLING the IOTC objective as stated in the IOTC Agreement, Article V, para 1: "*The Commission shall promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilization of stocks covered by this Agreement and encouraging sustainable development of fisheries based on such stocks*."

CONSIDERING that the IOTC has further clarified its objectives via IOTC Conservation and Management Measures, including the aim of maintaining stocks in perpetuity and with high probability, at levels not less than those capable of producing their maximum sustainable yield, as qualified by relevant environmental, social and economic factors including the special requirements of developing States in the IOTC Area of Competence. The IOTC agreed to a program of work on the allocation of fishing opportunities that covers 2018 and 2019 (IOTC–2018–S22–R[E]). This report details the specifications of the analysis preformed as part of this project.

2. Material and Methods

This report uses the for catch allocation based on IOTC-2018-S22-INF01E (EU proposal) and IOTC-2019-TCAC05-PropA[E] (Coastal States Proposal). The criteria for the proposals are based on estimates of CPCs historical catch of the IOTC species (Table 1). These catch values were first published in Circular 2018-28 but have subsequently undergone several revisions/corrections (http://www.iotc.org/allocation-estimations). The proposals are similar in that they both allocate proportion of the overall Total Allowable Catch (TAC) by species to CPCs. Because no TAC has been adopted for the species listed in Table 1, the 2018 MSY (or $Yeild_{40\%SSB}$ for skipjack, Anon. 2018) values have been used as Example TAC (ETAC) values. The example allocations presented in the next section are based on the specific flag/species proportion resulting from the proposal, multiplied by the ETAC value for that species.

2.1 Baseline Historical Catch Summary

Each proposal considered different metrics of the calculating the baseline historical catch (Table 2). For details of the historical catch allocation the reader is referenced to the proposal documents, key differences in the calculation of the baseline allocation are:

Coastal States Proposal

- The Coastal States Proposal considered the average contribution to the total of the average catches for three timeframes 1) 2012-2016, 2)2002-2016, and the top 5 years of catch.
- The Coastal States Proposal considered all catch within an EEZ to be allocated to the coastal state
- The coastal states proposal allocates catches that overlap EEZ(s) and/or the high proportionately by area (see IOTC-2019-TCAC05-PropA[E]
- The Coastal States Proposal attributed all the historical fishing activity of vessels from Taiwan, China in the high seas and EEZs to China.
- The Coastal States Proposal did not consider that the sovereignty of the EU over Reunion and Mayotte to render the EU coastal state.

EU Proposal

- The EU Proposal considered a proportional allocation based on the timeframe of 2000-2016.
- The EU Proposal considered three partitions of catch caught in an EEZ between the respective Coastal State and the Flag State of the fishing vessel of 80%, 90% and 100% allocated to the flag state of the fishing vessel.

- The EU Proposal attributed all the historical fishing activity of vessels from Taiwan, China to Taiwan, China and separately allocated historical catch to China for historical catch, in the high seas and EEZs, from China.
- The EU Proposal did consider that the sovereignty of the EU over Reunion and Mayotte rendered the EU a coastal state.

Data files are accessible via the IOTC website at (http://www.iotc.org/allocation-estimations). The "ASSIGNED_CPC" field was used for both proposals. Historical catch data was filtered for only those flags that are currently CPCs (including CNPCs, Annex 2, reproduced from the Coastal States Proposal). These baseline historical catch calculations are shown for the Coastal States Proposal (Figure 1) and for the EU Proposal (Figure 2). In summary the Coastal States Proposal calculated one historical catch and summarized it in three ways while the EU Proposal uses three different historical catches summarized in the same manner.

2.2 Weighting Schemes

Both proposals considered different weighting schemes for the consideration of other factors such as the needs of least developed countries, small island developing states or new entrants to the fisheries. Detailed descriptions of the weighting schemes are outlined in the aforementioned Proposal, as well as in Appendix 3 (EU Proposal) and Appendix 4 (Coastal States Proposal). The broad descriptions of the proposals are;

- The EU proposal breaks the catch allocation into four main components;
    - The historical allocation,
    - The complementary allocation,
    - The correction factors (TBD added to Historical and complementary allocation)
    - The new entrants allocation.
- The Coastal States Proposal partitions the catch allocation into four sections;
    - The baseline coastal state allocation
    - The baseline historical catch allocation
    - The supplementary high seas allocation
    - The new entrants allocation.

The Coastal States Proposal further breaks the coastal state allocation into three components; Coastal State, Developing Coastal state (DCS), and EEZ proportion. The DCS component is further subdivided into the HDI, GNI and SIDS component. A summary of the range of values for the components in the proposal is shown in table 4, with details in the Appendix 4.

The range of values for the Coastal States main components (historical allocation, coastal state allocation and supplementary high seas allocation) were crossed, meaning that each combination of historical catch, baseline coastal states, and supplementary high seas allocation was combined with each other, as well as each combination of the coastal state and DCS components. This set of proportions was then filtered for those combinations that totaled 100%. This resulted in 5148 simulations for each of the 3 types of historical catch allocation. The individual weights for each of the components from the proposal, (main, coastal states, and DCS), of which are shown in Appendix 4, Tables 4.1-4.3.

The EU proposal included a plus/minus 10% variation in the values used for the simulations, this resulted in 51 simulations for each of the three historical catch allocation methods. The range of values used for each component of the simulation is shown in Table 3, though direct comparison between the values used in each proposal is cautioned, because of the underlying differences in the calculation of the historical catch, and other allocation principals contained in the proposals. Details of the catch allocation specification for the EU and Coastal States proposals are shown in Appendix 3 and 4, respectively.

3. Summary of Results

Summary statistics using the median proportional allocation of the results by historical allocation method are shown in Tables 4-8. These tables show the medians of all the simulations for a given historical catch allocation, by flag for each species. Note that because the simulations are summarized by the median allocation proportion, the allocations are broadly comparable between proposals, however the summaries are not directly comparable, because the medians do not necessarily sum to one. For details of the proposal and detailed results of the catch allocation proportion and the catch allocation (in 1000 MT) the reader is referred to Appendix 3 and 4 of this report where the EU and Coastal States proposals are shown, respectively along with the spreadsheets referenced therein.

The allocated flag and species-specific TAC (median of all the proportions multiplied by the ETAC) is shown in Tables 9-13. These tables report the specific flag/species proportion resulting from the proposal, summarized by the median and multiplied by the ETAC value for that species. Values are reported the units of 1000 MT, and retain the caveat that the medians do not necessarily sum to one. Further it is re-iterated that that the ETAC values used in this report (based on the 2018 stock status advice) are subject to change as the best available science is updated. This same information is shown graphically in Figures 3-7.

REFERENCES

Anon. APPENDIX 6. CONSOLIDATED PROGRAM OF WORK FOR ALLOCATION OF FISHING OPPORTUNITIES (2018-19)IOTC–2018–S22–R[E]

IOTC-2018-S22-INF01E_-_On_Allocation_TCAC04-PropA_Rev2_-_European_Union

Circular 2018-28 - Estimates of CPC historical catches [E]

IOTC-2019-TCAC05-PropA[E] - Allocation of fishing opportunities

Anon. Summary of Stock Status. 2018. Status summary for species of tuna and tuna-like species under the IOTC mandate, as well as other species impacted by IOTC fisheries http://www.iotc.org/science/status-summary-species-tuna-and-tuna-species-under-iotc-mandate-well-other-species-impacted-iotc.

FIGURES

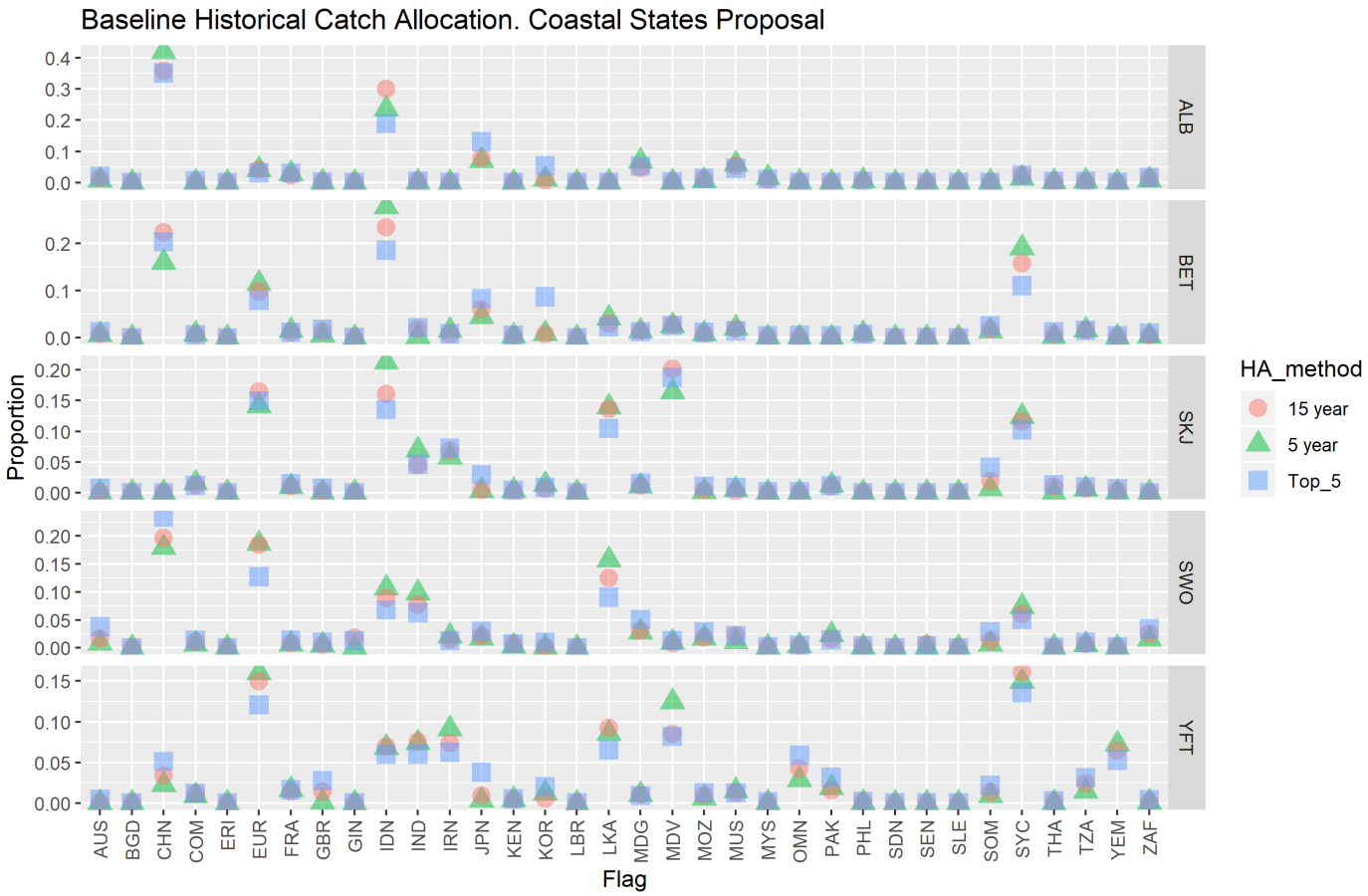

Figure 1. Baseline historical catch proportions from the Coastal States Proposal. Each panel represents one of the species of interest. The Historical Allocation method (HA_method) is calculated for three timeframes 1) 2012-2016 (green triangles), 2)2002-2016 (pink circles), and the top 5 years of catch blue squares. Due to the range of values and over-plotting semi-transparent colors are used. Values represent the proportion of catch by flag for each species.

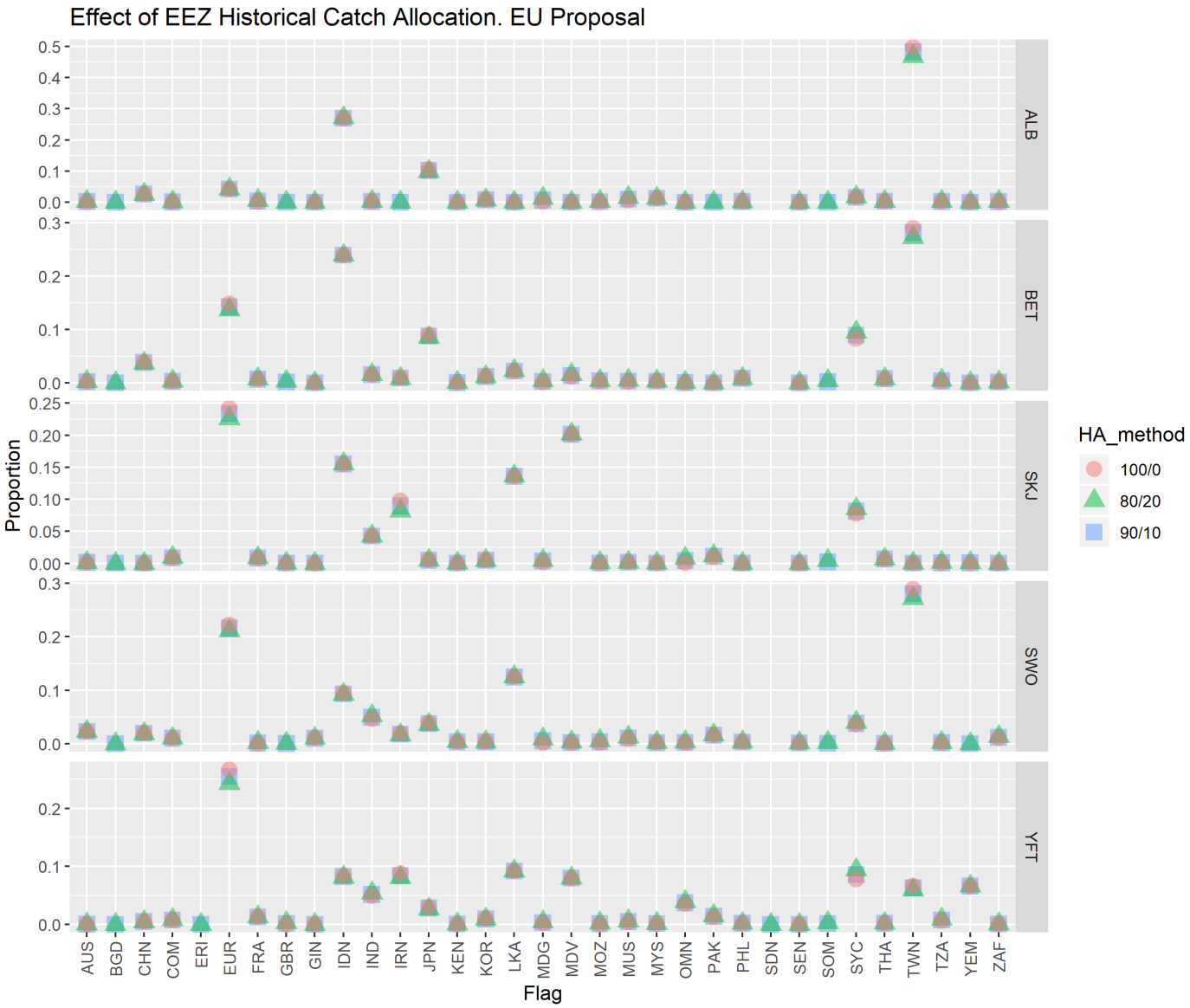

Figure 2. Baseline historical catches from the EU Proposal. Each panel represents one of the species of interest. The Historical Allocation method (HA_method) is calculated for three allocation methods for catch in an EEZ; 1) 100% to the Flag State (pink circles), 2) 90% to the flag state (blue squares), and 3) 80% to the flag state (green triangles). Due to the range of values and over-plotting semi-transparent colors are used. Values represent the proportion of catch by flag for each species.

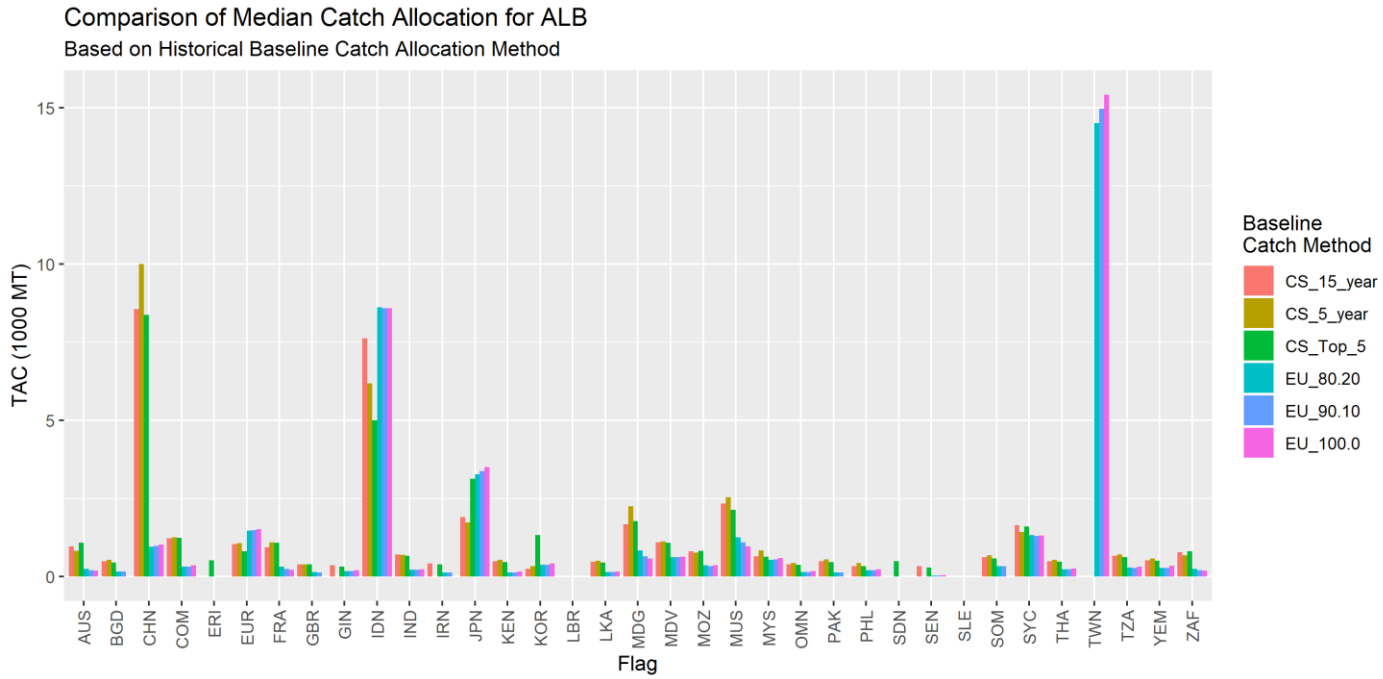

Figure 3. Comparison of the catch allocation (TAC in 1000 MT), for albacore (ALB) based on the median of the simulations by historical catch allocation. The Coastal States baseline catch calculation methods CS_15_year, CS_5_Year and CS_Top_5 indicate the average catches for three timeframes 1) 2012-2016, 2)2002-2016, and the top 5 years of catch. The EU Proposal baseline catch calculations, EU_80.20, EU_90.10, EU_100.0 indicate an 80%, 90% and 100% allocation of catch to the flag state for catch in an EEZ.

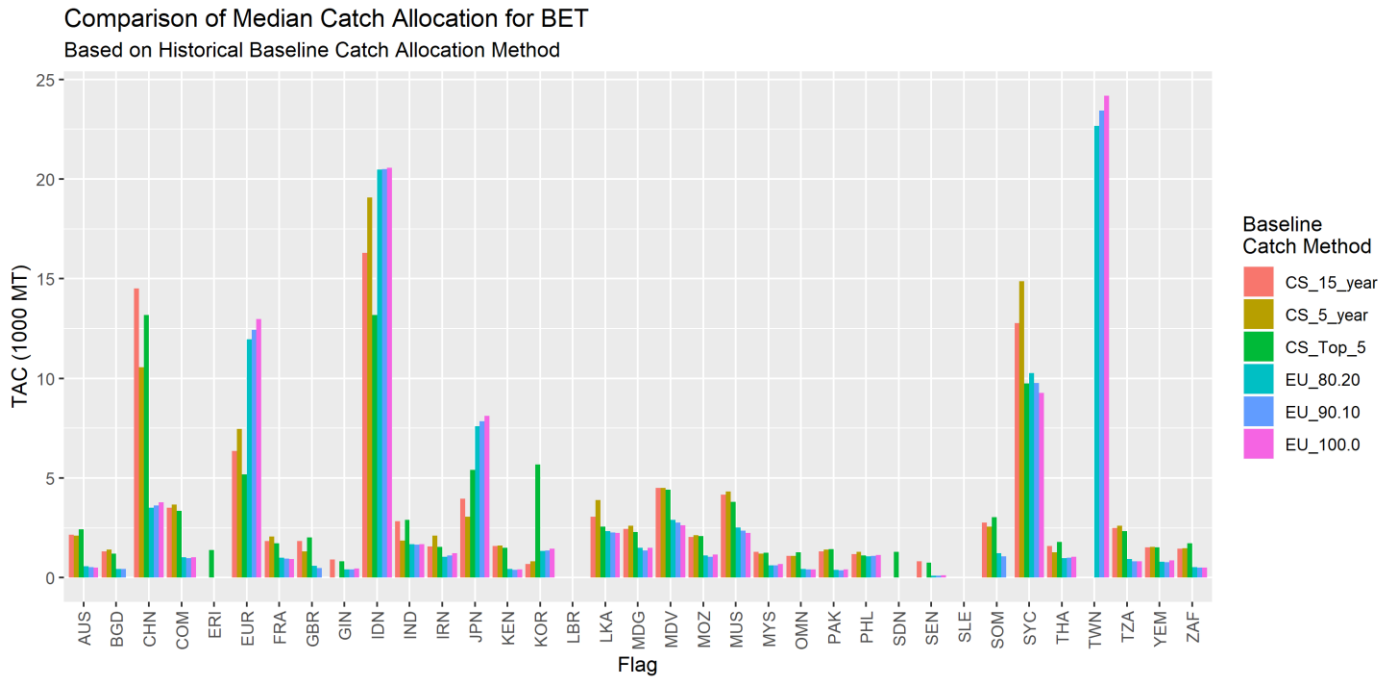

Figure 4. Comparison of the catch allocation (TAC in 1000 MT), for bigeye (BET) based on the median of the simulations by historical catch allocation. The Coastal States baseline catch calculation methods CS_15_year, CS_5_Year and CS_Top_5 indicate the average catches for three timeframes 1) 2012-2016, 2)2002-2016, and the top 5 years of catch. The EU Proposal baseline catch calculations, EU_80.20, EU_90.10, EU_100.0 indicate an 80%, 90% and 100% allocation of catch to the flag state for catch in an EEZ.

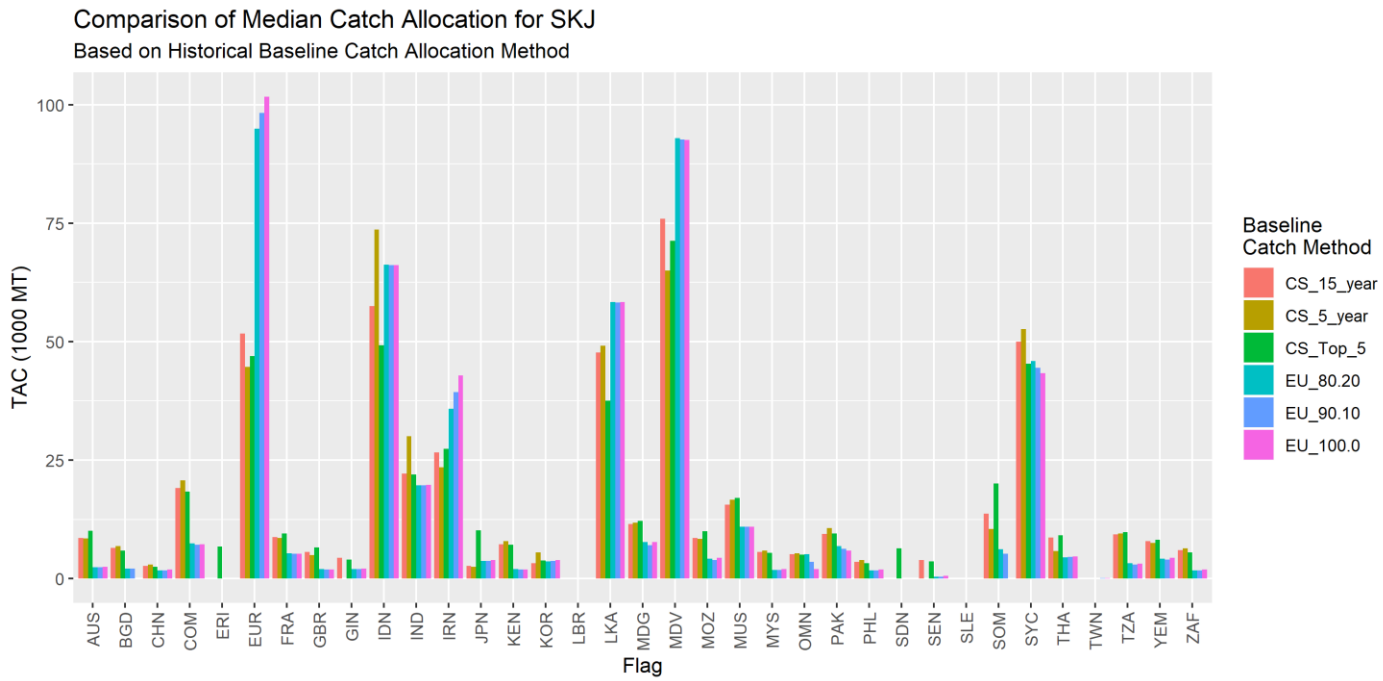

Figure 5. Comparison of the catch allocation (TAC in 1000 MT), for skipjack tuna (SKJ) based on the median of the simulations by historical catch allocation. The Coastal States baseline catch calculation methods CS_15_year, CS_5_Year and CS_Top_5 indicate the average catches for three timeframes 1) 2012-2016, 2)2002-2016, and the top 5 years of catch. The EU Proposal baseline catch calculations, EU_80.20, EU_90.10, EU_100.0 indicate an 80%, 90% and 100% allocation of catch to the flag state for catch in an EEZ.

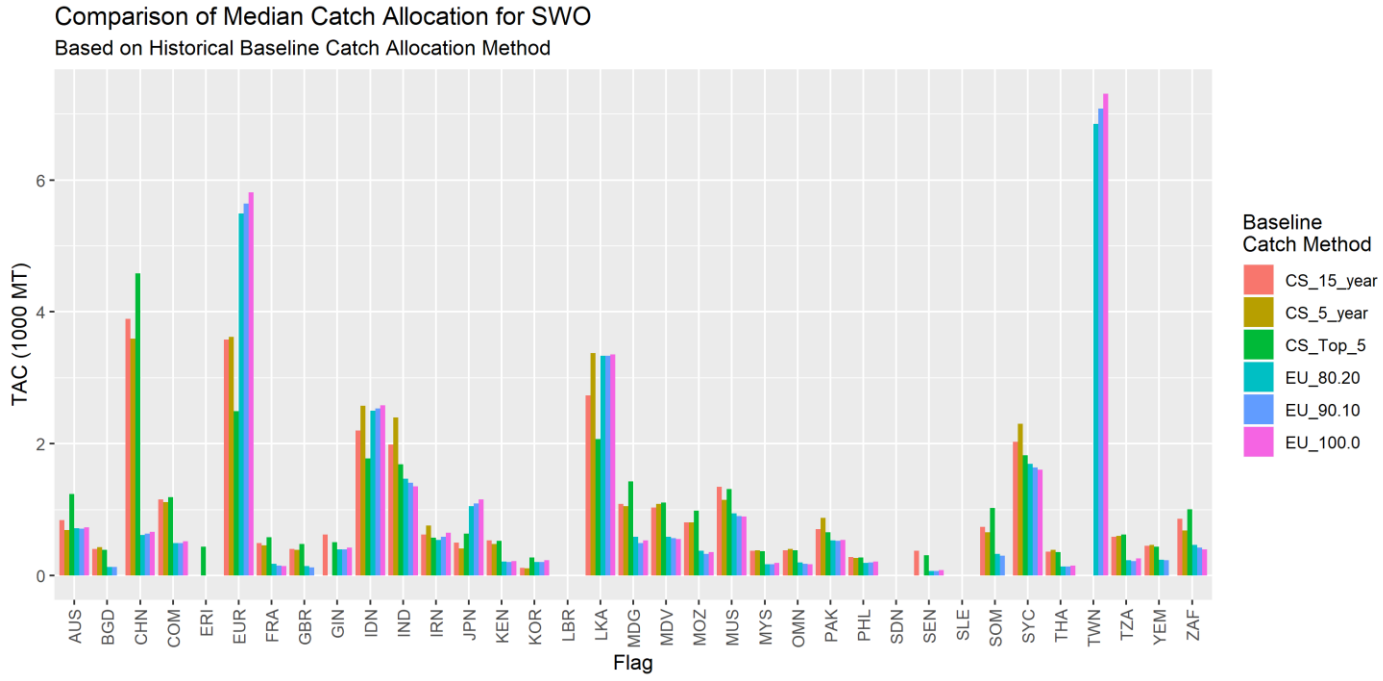

Figure 6. Comparison of the catch allocation (TAC in 1000 MT), for swordfish (SWO) based on the median of the simulations by historical catch allocation. The Coastal States baseline catch calculation methods CS_15_year, CS_5_Year and CS_Top_5 indicate the average catches for three timeframes 1) 2012-2016, 2)2002-2016, and the top 5 years of catch. The EU Proposal baseline catch calculations, EU_80.20, EU_90.10, EU_100.0 indicate an 80%, 90% and 100% allocation of catch to the flag state for catch in an EEZ.

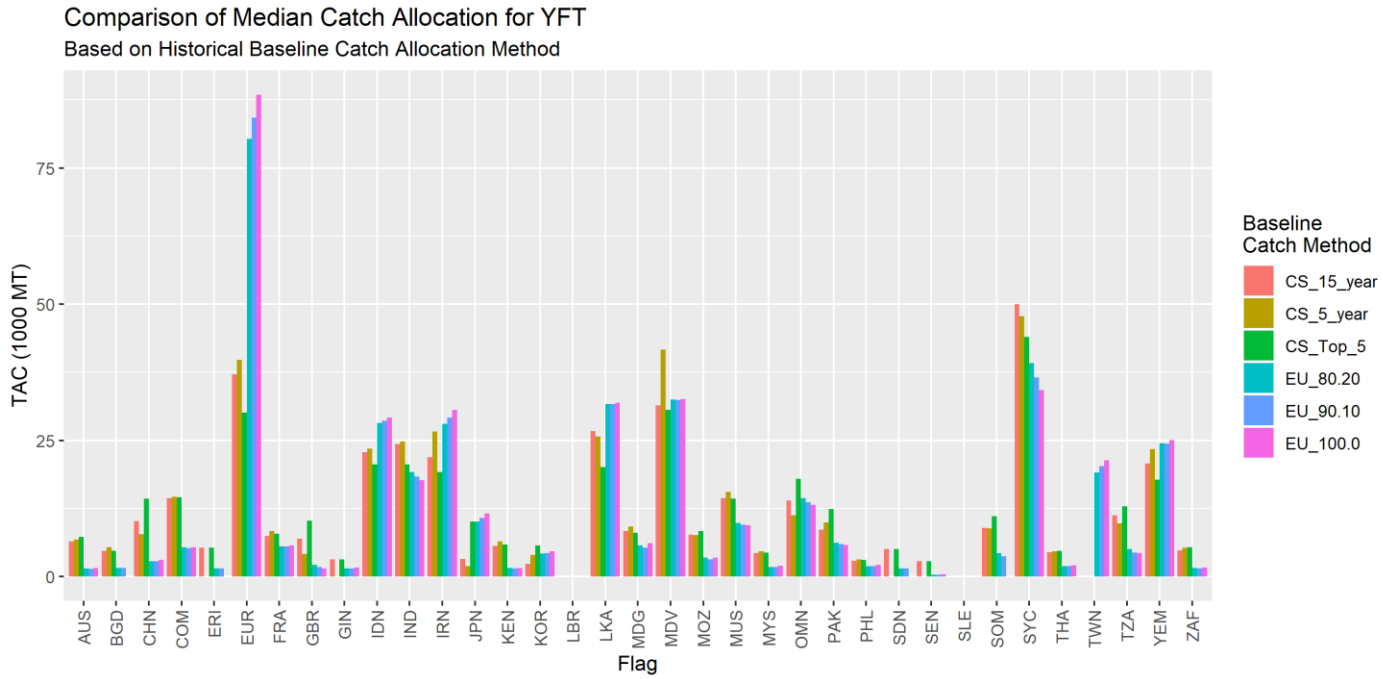

Figure 7. Comparison of the catch allocation (TAC in 1000 MT), for yellowfin tuna (YFT) based on the median of the simulations by historical catch allocation. The Coastal States baseline catch calculation methods CS_15_year, CS_5_Year and CS_Top_5 indicate the average catches for three timeframes 1) 2012-2016, 2)2002-2016, and the top 5 years of catch. The EU Proposal baseline catch calculations, EU_80.20, EU_90.10, EU_100.0 indicate an 80%, 90% and 100% allocation of catch to the flag state for catch in an EEZ.

TABLES

Table 1. IOTC species considered in this report, example total allowable catch (TAC), and TAC reference.

Common name	Scientific name	Species Code	Example TAC (1000 MT)	TAC Reference
Tropical tunas				
Bigeye tuna	*Thunnus obesus*	BET	104	2018 MSY
Skipjack tuna	*Katsuwonus pelamis*	SKJ	510.1	Yield@ 40%SSB
Yellowfin tuna	*Thunnus albacares*	YFT	403	2018 MSY
Temperate tuna				
Albacore	*Thunnus alalunga*	ALB	38.8	2018 MSY
Billfish				
Swordfish	*Xiphias gladius*	SWO	31.59	2018 MSY

Table 2. Description of the historical catch calculation for the Coastal States Proposal and European Union Proposal.

Coastal States Proposal Historical Allocation

Description	Time Frame	EEZ/Flag State Allocation for Catches in an EEZ
Percent contribution of 5 year average catch by species/flag	2012-2016	100% EEZ / 0% Flag State
Percent contribution of 15 year average catch by species/flag	2002-2016	100% EEZ / 0% Flag State
Percent contribution of the best 5 years catch by species and flag	1950-2016	100% EEZ / 0% Flag State

European Union Proposal Historical Allocation

Description	Time Frame	EEZ/Flag State Allocation for Catches in an EEZ
Percent contribution over time by species and flag	2000-2016	0% EEZ & 100% Flag
Percent contribution over time by species and flag	2000-2016	10% EEZ & 90% Flag
Percent contribution over time by species and flag	2000-2016	20 % EEZ & 80% Flag

Table 3. Summary of the range of weighting values used in the simulations for the EU Proposal and Coastal States Proposal. Note that the categories are not directly comparable. Each combination of values used was applied to each of three methods of calculating the historical catch.

Coastal States		
Variable	Minimum	Maximum
Historical	0.5	0.7
SUPHS	0.03	0.07
Coast	0.25	0.45
EEZ_cmp	0.1	0.2
CS_CPC_cmp	0.2	0.4
DCS_CPC_cmp	0.4	0.7
DCS_SIDS_cmp	0.3	0.4
DCS_GNI_cmp	0.3	0.4
DCS_HDI_cmp	0.3	0.4

EU		
Variable	Minimum	Maximum
Historical	0.75	0.9
New Entrants	0.01	0.01
Correction	0.01	0.18
Complementary	0.04	0.12
LDCs	0.25	0.5
SIDS	0.25	0.5
CDS	0.25	0.5

Table 4. Comparison of the median proportion by historical allocation method for albacore (ALB) tuna. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
ALB	AUS	0.025	0.021	0.028	0.006	0.005	0.005
ALB	BGD	0.013	0.014	0.012	0.004	0.004	0.000
ALB	CHN	0.220	0.258	0.216	0.025	0.025	0.027
ALB	COM	0.031	0.032	0.032	0.008	0.008	0.009
ALB	ERI	0.000	0.000	0.013	0.000	0.000	0.000
ALB	EUR	0.027	0.028	0.021	0.038	0.038	0.039
ALB	FRA	0.024	0.028	0.028	0.008	0.007	0.006
ALB	GBR	0.010	0.010	0.010	0.004	0.004	0.000
ALB	GIN	0.009	0.000	0.008	0.004	0.004	0.005
ALB	IDN	0.196	0.159	0.129	0.222	0.221	0.221
ALB	IND	0.018	0.018	0.017	0.006	0.006	0.006
ALB	IRN	0.011	0.000	0.010	0.003	0.003	0.000
ALB	JPN	0.049	0.045	0.081	0.084	0.087	0.090
ALB	KEN	0.013	0.014	0.012	0.004	0.003	0.004
ALB	KOR	0.007	0.009	0.034	0.010	0.010	0.011
ALB	LBR	0.000	0.000	0.000	0.000	0.000	0.000
ALB	LKA	0.012	0.013	0.011	0.004	0.004	0.004
ALB	MDG	0.043	0.058	0.046	0.021	0.017	0.015
ALB	MDV	0.028	0.029	0.028	0.016	0.016	0.016
ALB	MOZ	0.021	0.020	0.021	0.009	0.009	0.009
ALB	MUS	0.060	0.065	0.055	0.032	0.028	0.025
ALB	MYS	0.017	0.021	0.017	0.014	0.014	0.015
ALB	OMN	0.010	0.011	0.010	0.004	0.004	0.005
ALB	PAK	0.013	0.014	0.012	0.003	0.003	0.000
ALB	PHL	0.009	0.011	0.009	0.005	0.005	0.006
ALB	SDN	0.000	0.000	0.013	0.000	0.000	0.000
ALB	SEN	0.009	0.000	0.007	0.001	0.001	0.001
ALB	SLE	0.000	0.000	0.000	0.000	0.000	0.000
ALB	SOM	0.016	0.017	0.015	0.009	0.009	0.000
ALB	SYC	0.042	0.037	0.041	0.034	0.033	0.034
ALB	THA	0.013	0.014	0.012	0.006	0.006	0.007
ALB	TWN	NA	NA	NA	0.374	0.386	0.398
ALB	TZA	0.017	0.018	0.016	0.007	0.007	0.008
ALB	YEM	0.014	0.015	0.013	0.007	0.007	0.009
ALB	ZAF	0.020	0.018	0.021	0.007	0.005	0.005

Table 5. Comparison of the median proportion by historical allocation method for bigeye (BET) tuna. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
BET	AUS	0.021	0.020	0.023	0.005	0.005	0.005
BET	BGD	0.013	0.013	0.012	0.004	0.004	0.000
BET	CHN	0.139	0.102	0.127	0.034	0.035	0.036
BET	COM	0.034	0.035	0.032	0.010	0.009	0.010
BET	ERI	0.000	0.000	0.013	0.000	0.000	0.000
BET	EUR	0.061	0.072	0.050	0.115	0.119	0.125
BET	FRA	0.018	0.020	0.017	0.009	0.009	0.009
BET	GBR	0.018	0.013	0.019	0.006	0.005	0.000
BET	GIN	0.009	0.000	0.008	0.004	0.004	0.004
BET	IDN	0.157	0.183	0.127	0.197	0.197	0.198
BET	IND	0.027	0.018	0.028	0.016	0.016	0.016
BET	IRN	0.015	0.020	0.015	0.010	0.011	0.012
BET	JPN	0.038	0.029	0.052	0.073	0.075	0.078
BET	KEN	0.015	0.015	0.014	0.004	0.004	0.004
BET	KOR	0.007	0.008	0.054	0.013	0.013	0.014
BET	LBR	0.000	0.000	0.000	0.000	0.000	0.000
BET	LKA	0.029	0.037	0.025	0.022	0.022	0.022
BET	MDG	0.024	0.025	0.022	0.014	0.013	0.014
BET	MDV	0.043	0.043	0.042	0.028	0.026	0.025
BET	MOZ	0.020	0.020	0.020	0.011	0.010	0.011
BET	MUS	0.040	0.042	0.037	0.024	0.023	0.022
BET	MYS	0.012	0.012	0.012	0.006	0.006	0.006
BET	OMN	0.010	0.011	0.012	0.004	0.004	0.004
BET	PAK	0.013	0.013	0.014	0.004	0.004	0.004
BET	PHL	0.011	0.012	0.011	0.010	0.010	0.011
BET	SDN	0.000	0.000	0.012	0.000	0.000	0.000
BET	SEN	0.008	0.000	0.007	0.001	0.001	0.001
BET	SLE	0.000	0.000	0.000	0.000	0.000	0.000
BET	SOM	0.027	0.025	0.029	0.012	0.010	0.000
BET	SYC	0.123	0.143	0.094	0.099	0.094	0.089
BET	THA	0.015	0.012	0.017	0.009	0.010	0.010
BET	TWN	NA	NA	NA	0.218	0.225	0.233
BET	TZA	0.024	0.025	0.022	0.009	0.008	0.008
BET	YEM	0.014	0.015	0.015	0.008	0.007	0.008
BET	ZAF	0.014	0.014	0.017	0.005	0.005	0.005

Table 6. Comparison of the median proportion by historical allocation method for skipjack (SKJ) tuna. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
SKJ	AUS	0.017	0.017	0.020	0.005	0.005	0.005
SKJ	BGD	0.013	0.013	0.012	0.004	0.004	0.000
SKJ	CHN	0.005	0.006	0.005	0.003	0.003	0.004
SKJ	COM	0.037	0.041	0.036	0.015	0.014	0.014
SKJ	ERI	0.000	0.000	0.013	0.000	0.000	0.000
SKJ	EUR	0.101	0.088	0.092	0.186	0.193	0.199
SKJ	FRA	0.017	0.017	0.019	0.010	0.010	0.010
SKJ	GBR	0.011	0.010	0.013	0.004	0.004	0.004
SKJ	GIN	0.009	0.000	0.008	0.004	0.004	0.004
SKJ	IDN	0.113	0.144	0.096	0.130	0.130	0.130
SKJ	IND	0.043	0.059	0.043	0.039	0.039	0.039
SKJ	IRN	0.052	0.046	0.054	0.070	0.077	0.084
SKJ	JPN	0.005	0.005	0.020	0.007	0.007	0.008
SKJ	KEN	0.014	0.016	0.014	0.004	0.004	0.004
SKJ	KOR	0.006	0.011	0.008	0.007	0.007	0.008
SKJ	LBR	0.000	0.000	0.000	0.000	0.000	0.000
SKJ	LKA	0.094	0.096	0.074	0.114	0.114	0.114
SKJ	MDG	0.023	0.023	0.024	0.015	0.014	0.015
SKJ	MDV	0.149	0.127	0.140	0.182	0.182	0.182
SKJ	MOZ	0.017	0.016	0.020	0.008	0.008	0.009
SKJ	MUS	0.031	0.033	0.033	0.021	0.021	0.022
SKJ	MYS	0.011	0.011	0.011	0.004	0.004	0.004
SKJ	OMN	0.010	0.011	0.010	0.010	0.007	0.004
SKJ	PAK	0.018	0.021	0.019	0.013	0.012	0.012
SKJ	PHL	0.007	0.008	0.006	0.003	0.003	0.004
SKJ	SDN	0.000	0.000	0.012	0.000	0.000	0.000
SKJ	SEN	0.008	0.000	0.007	0.001	0.001	0.001
SKJ	SLE	0.000	0.000	0.000	0.000	0.000	0.000
SKJ	SOM	0.027	0.021	0.039	0.012	0.010	0.000
SKJ	SYC	0.098	0.103	0.089	0.090	0.087	0.085
SKJ	THA	0.017	0.011	0.018	0.009	0.009	0.009
SKJ	TWN	NA	NA	NA	0.000	0.000	0.000
SKJ	TZA	0.018	0.019	0.019	0.006	0.006	0.006
SKJ	YEM	0.016	0.015	0.016	0.008	0.008	0.009
SKJ	ZAF	0.012	0.012	0.011	0.003	0.003	0.004

Table 7. Comparison of the median proportion by historical allocation method for swordfish (SWO). Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
SWO	AUS	0.027	0.022	0.039	0.023	0.023	0.023
SWO	BGD	0.013	0.014	0.012	0.004	0.004	0.000
SWO	CHN	0.123	0.114	0.145	0.020	0.020	0.021
SWO	COM	0.037	0.035	0.038	0.016	0.016	0.017
SWO	ERI	0.000	0.000	0.014	0.000	0.000	0.000
SWO	EUR	0.113	0.115	0.079	0.174	0.179	0.184
SWO	FRA	0.016	0.015	0.018	0.006	0.005	0.004
SWO	GBR	0.013	0.012	0.015	0.005	0.004	0.000
SWO	GIN	0.020	0.000	0.016	0.013	0.013	0.013
SWO	IDN	0.070	0.081	0.056	0.079	0.080	0.082
SWO	IND	0.063	0.076	0.054	0.047	0.044	0.043
SWO	IRN	0.020	0.024	0.018	0.017	0.019	0.021
SWO	JPN	0.016	0.013	0.020	0.033	0.035	0.037
SWO	KEN	0.017	0.015	0.017	0.007	0.007	0.007
SWO	KOR	0.004	0.003	0.009	0.006	0.007	0.007
SWO	LBR	0.000	0.000	0.000	0.000	0.000	0.000
SWO	LKA	0.087	0.107	0.066	0.105	0.105	0.106
SWO	MDG	0.034	0.033	0.045	0.019	0.016	0.017
SWO	MDV	0.033	0.034	0.035	0.019	0.018	0.018
SWO	MOZ	0.026	0.026	0.031	0.012	0.010	0.011
SWO	MUS	0.043	0.036	0.042	0.030	0.029	0.028
SWO	MYS	0.012	0.012	0.012	0.005	0.005	0.006
SWO	OMN	0.012	0.013	0.012	0.006	0.006	0.005
SWO	PAK	0.022	0.028	0.021	0.017	0.017	0.017
SWO	PHL	0.009	0.008	0.009	0.006	0.006	0.007
SWO	SDN	0.000	0.000	0.000	0.000	0.000	0.000
SWO	SEN	0.012	0.000	0.010	0.002	0.002	0.003
SWO	SLE	0.000	0.000	0.000	0.000	0.000	0.000
SWO	SOM	0.023	0.021	0.032	0.010	0.009	0.000
SWO	SYC	0.064	0.073	0.058	0.054	0.052	0.051
SWO	THA	0.012	0.012	0.011	0.004	0.004	0.005
SWO	TWN	NA	NA	NA	0.217	0.224	0.231
SWO	TZA	0.019	0.019	0.020	0.007	0.007	0.008
SWO	YEM	0.014	0.015	0.014	0.007	0.007	0.000
SWO	ZAF	0.027	0.022	0.032	0.015	0.013	0.013

Table 8. Comparison of the median allocation proportion by historical allocation method for yellowfin (YFT) tuna. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
YFT	AUS	0.016	0.017	0.018	0.004	0.004	0.004
YFT	BGD	0.012	0.013	0.012	0.004	0.004	0.000
YFT	CHN	0.025	0.019	0.035	0.007	0.007	0.008
YFT	COM	0.036	0.036	0.036	0.013	0.013	0.013
YFT	ERI	0.013	0.000	0.013	0.004	0.004	0.000
YFT	EUR	0.092	0.099	0.075	0.199	0.209	0.220
YFT	FRA	0.018	0.021	0.020	0.014	0.014	0.014
YFT	GBR	0.017	0.010	0.026	0.005	0.004	0.004
YFT	GIN	0.008	0.000	0.008	0.004	0.004	0.004
YFT	IDN	0.057	0.058	0.051	0.070	0.071	0.072
YFT	IND	0.060	0.062	0.051	0.048	0.045	0.044
YFT	IRN	0.054	0.066	0.048	0.069	0.072	0.076
YFT	JPN	0.008	0.005	0.025	0.025	0.027	0.029
YFT	KEN	0.014	0.016	0.015	0.004	0.004	0.004
YFT	KOR	0.006	0.010	0.014	0.010	0.011	0.012
YFT	LBR	0.000	0.000	0.000	0.000	0.000	0.000
YFT	LKA	0.066	0.064	0.050	0.079	0.079	0.079
YFT	MDG	0.021	0.023	0.020	0.014	0.013	0.015
YFT	MDV	0.078	0.103	0.076	0.081	0.080	0.081
YFT	MOZ	0.019	0.019	0.021	0.009	0.008	0.009
YFT	MUS	0.036	0.039	0.036	0.024	0.024	0.023
YFT	MYS	0.011	0.012	0.011	0.004	0.004	0.005
YFT	OMN	0.035	0.028	0.045	0.036	0.034	0.033
YFT	PAK	0.021	0.025	0.031	0.015	0.015	0.014
YFT	PHL	0.007	0.008	0.008	0.005	0.005	0.005
YFT	SDN	0.012	0.000	0.012	0.004	0.004	0.000
YFT	SEN	0.007	0.000	0.007	0.001	0.001	0.001
YFT	SLE	0.000	0.000	0.000	0.000	0.000	0.000
YFT	SOM	0.022	0.022	0.027	0.011	0.009	0.000
YFT	SYC	0.124	0.119	0.109	0.097	0.091	0.085
YFT	THA	0.011	0.012	0.012	0.005	0.005	0.005
YFT	TWN	NA	NA	NA	0.047	0.050	0.053
YFT	TZA	0.028	0.024	0.032	0.012	0.011	0.011
YFT	YEM	0.051	0.058	0.044	0.061	0.061	0.062
YFT	ZAF	0.012	0.013	0.013	0.004	0.004	0.004

Table 9. Comparison of the ETAC allocation by historical allocation method for albacore (ALB) tuna. Values are in 1000 MT, assuming a global total allowable catch of 38.8 thousand MT. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
ALB	AUS	0.974	0.822	1.086	0.242	0.204	0.195
ALB	BGD	0.491	0.539	0.452	0.160	0.159	0.000
ALB	CHN	8.552	10.001	8.377	0.954	0.976	1.028
ALB	COM	1.221	1.256	1.240	0.320	0.313	0.358
ALB	ERI	0.000	0.000	0.521	0.000	0.000	0.000
ALB	EUR	1.042	1.073	0.804	1.475	1.482	1.519
ALB	FRA	0.941	1.093	1.090	0.319	0.254	0.217
ALB	GBR	0.395	0.394	0.392	0.144	0.139	0.000
ALB	GIN	0.359	0.000	0.322	0.170	0.170	0.203
ALB	IDN	7.619	6.186	5.004	8.623	8.584	8.590
ALB	IND	0.715	0.698	0.666	0.216	0.214	0.239
ALB	IRN	0.422	0.000	0.390	0.134	0.134	0.000
ALB	JPN	1.910	1.733	3.135	3.272	3.368	3.501
ALB	KEN	0.498	0.541	0.467	0.136	0.135	0.163
ALB	KOR	0.254	0.339	1.333	0.374	0.381	0.415
ALB	LBR	0.000	0.000	0.000	0.000	0.000	0.000
ALB	LKA	0.478	0.511	0.443	0.144	0.142	0.167
ALB	MDG	1.670	2.252	1.778	0.833	0.651	0.585
ALB	MDV	1.091	1.128	1.077	0.620	0.618	0.631
ALB	MOZ	0.806	0.764	0.826	0.369	0.333	0.363
ALB	MUS	2.330	2.536	2.139	1.253	1.099	0.974
ALB	MYS	0.647	0.833	0.643	0.535	0.552	0.595
ALB	OMN	0.393	0.437	0.371	0.145	0.146	0.175
ALB	PAK	0.493	0.543	0.458	0.135	0.134	0.000
ALB	PHL	0.339	0.439	0.332	0.205	0.205	0.234
ALB	SDN	0.000	0.000	0.489	0.000	0.000	0.000
ALB	SEN	0.335	0.000	0.290	0.034	0.034	0.044
ALB	SLE	0.000	0.000	0.000	0.000	0.000	0.000
ALB	SOM	0.616	0.674	0.577	0.334	0.332	0.000
ALB	SYC	1.648	1.435	1.606	1.324	1.297	1.311
ALB	THA	0.499	0.534	0.474	0.229	0.231	0.260
ALB	TWN	NA	NA	NA	14.505	14.963	15.423
ALB	TZA	0.663	0.704	0.615	0.284	0.277	0.318
ALB	YEM	0.526	0.580	0.504	0.283	0.283	0.347
ALB	ZAF	0.786	0.683	0.807	0.254	0.210	0.194

Table 10. Comparison of the ETAC allocation by historical allocation method for bigeye (BET) tuna. Values are in 1000 MT, assuming a global total allowable catch of 104 thousand MT. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
BET	AUS	2.152	2.098	2.425	0.571	0.518	0.506
BET	BGD	1.316	1.395	1.211	0.427	0.427	0.000
BET	CHN	14.504	10.566	13.166	3.506	3.615	3.774
BET	COM	3.507	3.670	3.352	1.024	0.982	1.028
BET	ERI	0.000	0.000	1.377	0.000	0.000	0.000
BET	EUR	6.352	7.468	5.167	11.946	12.425	12.972
BET	FRA	1.833	2.059	1.721	0.988	0.942	0.941
BET	GBR	1.826	1.317	2.025	0.597	0.479	0.000
BET	GIN	0.907	0.000	0.828	0.413	0.413	0.464
BET	IDN	16.305	19.077	13.167	20.469	20.487	20.572
BET	IND	2.820	1.859	2.895	1.676	1.658	1.682
BET	IRN	1.563	2.095	1.542	1.039	1.111	1.221
BET	JPN	3.954	3.051	5.411	7.600	7.838	8.115
BET	KEN	1.583	1.607	1.503	0.430	0.398	0.407
BET	KOR	0.692	0.817	5.664	1.331	1.371	1.448
BET	LBR	0.000	0.000	0.000	0.000	0.000	0.000
BET	LKA	3.063	3.896	2.557	2.329	2.270	2.246
BET	MDG	2.452	2.605	2.289	1.491	1.348	1.503
BET	MDV	4.511	4.498	4.416	2.906	2.756	2.631
BET	MOZ	2.035	2.117	2.082	1.108	1.053	1.153
BET	MUS	4.172	4.322	3.810	2.512	2.357	2.238
BET	MYS	1.283	1.211	1.249	0.612	0.621	0.672
BET	OMN	1.080	1.093	1.259	0.441	0.406	0.411
BET	PAK	1.325	1.399	1.432	0.383	0.372	0.403
BET	PHL	1.168	1.295	1.103	1.061	1.083	1.143
BET	SDN	0.000	0.000	1.295	0.000	0.000	0.000
BET	SEN	0.817	0.000	0.739	0.086	0.086	0.112
BET	SLE	0.000	0.000	0.000	0.000	0.000	0.000
BET	SOM	2.763	2.568	3.040	1.233	1.056	0.000
BET	SYC	12.771	14.881	9.731	10.271	9.757	9.259
BET	THA	1.594	1.278	1.783	0.987	0.994	1.040
BET	TWN	NA	NA	NA	22.675	23.431	24.190
BET	TZA	2.484	2.592	2.325	0.940	0.828	0.813
BET	YEM	1.507	1.549	1.512	0.785	0.771	0.873
BET	ZAF	1.460	1.467	1.722	0.522	0.493	0.505

Table 11. Comparison of the ETAC allocation by historical allocation method for skipjack (SKJ) tuna. Values are in 1000 MT, assuming a global total allowable catch of 510.1 thousand MT. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals.

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
SKJ	AUS	8.545	8.473	10.096	2.348	2.346	2.477
SKJ	BGD	6.451	6.840	5.936	2.095	2.095	0.000
SKJ	CHN	2.661	2.929	2.479	1.763	1.763	1.895
SKJ	COM	19.084	20.691	18.332	7.429	7.156	7.204
SKJ	ERI	0.000	0.000	6.757	0.000	0.000	0.000
SKJ	EUR	51.668	44.700	46.942	94.941	98.229	101.712
SKJ	FRA	8.750	8.586	9.535	5.321	5.244	5.286
SKJ	GBR	5.660	4.945	6.584	2.011	1.889	1.897
SKJ	GIN	4.374	0.000	3.994	1.966	1.966	2.140
SKJ	IDN	57.460	73.687	49.196	66.238	66.099	66.170
SKJ	IND	22.173	30.029	21.937	19.705	19.668	19.787
SKJ	IRN	26.600	23.526	27.373	35.833	39.307	42.853
SKJ	JPN	2.723	2.493	10.181	3.760	3.766	3.906
SKJ	KEN	7.264	7.935	7.155	2.002	1.906	1.938
SKJ	KOR	3.240	5.554	3.838	3.670	3.713	3.888
SKJ	LBR	0.000	0.000	0.000	0.000	0.000	0.000
SKJ	LKA	47.705	49.147	37.576	58.339	58.215	58.301
SKJ	MDG	11.534	11.781	12.155	7.677	7.064	7.736
SKJ	MDV	75.937	64.998	71.242	92.892	92.681	92.590
SKJ	MOZ	8.599	8.384	10.005	4.158	3.959	4.360
SKJ	MUS	15.637	16.674	17.041	10.966	10.920	10.974
SKJ	MYS	5.594	5.861	5.464	1.832	1.833	1.965
SKJ	OMN	5.178	5.358	5.042	5.124	3.487	2.018
SKJ	PAK	9.431	10.672	9.493	6.859	6.325	5.911
SKJ	PHL	3.505	3.872	3.200	1.763	1.763	1.895
SKJ	SDN	0.000	0.000	6.352	0.000	0.000	0.000
SKJ	SEN	3.943	0.000	3.581	0.416	0.416	0.544
SKJ	SLE	0.000	0.000	0.000	0.000	0.000	0.000
SKJ	SOM	13.712	10.513	20.041	6.228	5.264	0.000
SKJ	SYC	49.942	52.690	45.313	45.866	44.433	43.291
SKJ	THA	8.625	5.819	9.113	4.519	4.542	4.697
SKJ	TWN	NA	NA	NA	0.062	0.065	0.068
SKJ	TZA	9.366	9.554	9.757	3.205	2.951	3.145
SKJ	YEM	7.919	7.503	8.233	4.159	4.023	4.361
SKJ	ZAF	6.018	6.343	5.535	1.764	1.764	1.896

Table 12. Comparison of the ETAC allocation by historical allocation method for swordfish (SWO). Values are in 1000 MT, assuming a global total allowable catch of 31.59 thousand MT. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
SWO	AUS	0.842	0.690	1.235	0.718	0.713	0.729
SWO	BGD	0.406	0.428	0.389	0.132	0.131	0.000
SWO	CHN	3.896	3.594	4.585	0.617	0.635	0.663
SWO	COM	1.154	1.111	1.187	0.495	0.490	0.524
SWO	ERI	0.000	0.000	0.435	0.000	0.000	0.000
SWO	EUR	3.578	3.623	2.494	5.495	5.641	5.814
SWO	FRA	0.495	0.462	0.579	0.180	0.152	0.141
SWO	GBR	0.401	0.388	0.478	0.143	0.126	0.000
SWO	GIN	0.622	0.000	0.505	0.396	0.398	0.423
SWO	IDN	2.201	2.574	1.776	2.501	2.532	2.583
SWO	IND	1.986	2.398	1.691	1.470	1.405	1.355
SWO	IRN	0.620	0.761	0.575	0.539	0.587	0.648
SWO	JPN	0.497	0.410	0.635	1.053	1.095	1.159
SWO	KEN	0.531	0.479	0.525	0.214	0.209	0.221
SWO	KOR	0.120	0.109	0.274	0.204	0.209	0.232
SWO	LBR	0.000	0.000	0.000	0.000	0.000	0.000
SWO	LKA	2.735	3.377	2.070	3.332	3.332	3.356
SWO	MDG	1.086	1.051	1.430	0.590	0.492	0.536
SWO	MDV	1.036	1.085	1.109	0.587	0.565	0.556
SWO	MOZ	0.807	0.809	0.982	0.379	0.328	0.354
SWO	MUS	1.346	1.150	1.315	0.943	0.904	0.892
SWO	MYS	0.380	0.381	0.373	0.171	0.174	0.194
SWO	OMN	0.383	0.406	0.385	0.201	0.176	0.169
SWO	PAK	0.702	0.879	0.655	0.534	0.526	0.538
SWO	PHL	0.279	0.266	0.274	0.194	0.196	0.216
SWO	SDN	0.000	0.000	0.000	0.000	0.000	0.000
SWO	SEN	0.378	0.000	0.309	0.066	0.067	0.081
SWO	SLE	0.000	0.000	0.000	0.000	0.000	0.000
SWO	SOM	0.741	0.658	1.023	0.331	0.300	0.000
SWO	SYC	2.031	2.300	1.827	1.693	1.641	1.604
SWO	THA	0.364	0.388	0.353	0.137	0.137	0.155
SWO	TWN	NA	NA	NA	6.853	7.082	7.312
SWO	TZA	0.586	0.601	0.622	0.232	0.217	0.259
SWO	YEM	0.453	0.468	0.440	0.237	0.234	0.000
SWO	ZAF	0.862	0.681	1.007	0.469	0.425	0.398

Table 14. Comparison of the ETAC allocation by historical allocation method for yellowfin (YFT) tuna. Values are in 1000 MT, assuming a global total allowable catch of 403 thousand MT. Note that because the simulations are summarized by the median allocation proportion, the allocations are only broadly comparable between proposals

		Coastal States Proposal			EU Proposal		
SPECIES_CODE	Flag	15 year	5 year	Top 5	80%/20%	90%/10%	100%/ 0%
YFT	AUS	6.450	6.787	7.313	1.463	1.439	1.611
YFT	BGD	4.740	5.416	4.762	1.575	1.568	0.000
YFT	CHN	10.141	7.815	14.279	2.800	2.858	3.112
YFT	COM	14.394	14.665	14.536	5.418	5.204	5.395
YFT	ERI	5.336	0.000	5.336	1.512	1.512	0.000
YFT	EUR	37.141	39.776	30.132	80.307	84.239	88.485
YFT	FRA	7.437	8.400	7.907	5.567	5.551	5.710
YFT	GBR	6.963	4.129	10.286	2.193	1.754	1.506
YFT	GIN	3.165	0.000	3.163	1.463	1.463	1.698
YFT	IDN	22.859	23.451	20.582	28.233	28.648	29.194
YFT	IND	24.345	24.821	20.627	19.223	18.327	17.675
YFT	IRN	21.937	26.616	19.177	27.994	29.208	30.574
YFT	JPN	3.219	1.917	10.115	10.075	10.741	11.556
YFT	KEN	5.653	6.438	5.882	1.616	1.506	1.591
YFT	KOR	2.302	3.985	5.742	4.193	4.341	4.665
YFT	LBR	0.000	0.000	0.000	0.000	0.000	0.000
YFT	LKA	26.698	25.754	20.110	31.686	31.686	31.909
YFT	MDG	8.340	9.159	8.018	5.692	5.318	6.129
YFT	MDV	31.457	41.667	30.617	32.524	32.437	32.576
YFT	MOZ	7.727	7.614	8.337	3.477	3.141	3.452
YFT	MUS	14.377	15.588	14.312	9.842	9.532	9.425
YFT	MYS	4.322	4.644	4.417	1.768	1.783	1.993
YFT	OMN	13.945	11.255	17.950	14.372	13.688	13.186
YFT	PAK	8.584	9.948	12.389	6.221	5.930	5.815
YFT	PHL	2.934	3.120	3.056	1.907	1.927	2.142
YFT	SDN	5.017	0.000	5.017	1.469	1.469	0.000
YFT	SEN	2.832	0.000	2.831	0.318	0.318	0.430
YFT	SLE	0.000	0.000	0.000	0.000	0.000	0.000
YFT	SOM	8.970	8.879	11.049	4.288	3.771	0.000
YFT	SYC	49.998	47.823	43.969	39.168	36.531	34.194
YFT	THA	4.479	4.646	4.699	1.904	1.907	2.105
YFT	TWN	NA	NA	NA	19.110	20.227	21.345
YFT	TZA	11.235	9.788	12.925	5.022	4.431	4.302
YFT	YEM	20.718	23.389	17.762	24.445	24.410	25.079
YFT	ZAF	4.819	5.275	5.385	1.578	1.522	1.661

APPENDIX 1**

I. Definitions

1. ***Allocation period***: Period of time for which an allocation shall apply, and which may vary by species. The allocation period shall be aligned with the species stock assessment schedule and the resultant Global Total Allowable Catch (GTAC) set by the Commission. The default allocation period shall be one (1) calendar year, unless otherwise agreed by the Commission.

2. ***Coastal fisheries:*** means coastal fisheries as defined by the IOTC in Resolution 15/02, or any superseding Resolution.

3. ***Contracting Party (CP)***: Contracting Party to the IOTC Agreement.

4. ***Cooperating Non-Contracting Party (CNCP)***: Cooperating Non-Contracting Party to the IOTC Agreement, as defined in Rule IX of the IPHC Rules of Procedure (2014).

5. ***CPC***: Collective of Contracting Parties, and Cooperating Non-Contracting Parties to the IOTC Agreement.

6. ***Distant Water Fishing Nation (DWFN) CPC***: means a State, or regional economic integration organization, which is acting in the capacity of a flag State within the IOTC Area of Competence, as listed in Appendix I.

7. ***Coastal State CPC***: means a State, which partly or wholly, occurs within the IOTC Area of Competence, as listed in Appendix I.

8. ***Developing Coastal State (DCS) CPC***: means a Indian Ocean Coastal State whose development status is considered to be in the low, medium or high human development index (HDI) categories by the United Nations Development Programme (UNDP). Therefore, the term 'Developing Coastal State' excludes those Coastal States whose development status is considered to be in the very high HDI category (http://hdr.undp.org/en/composite/HDI).

9. ***Small Island Developing States (SIDS) CPC***: means Indian Ocean Coastal States defined as SIDS by the United Nations Department of Economic and Social Affairs and the OECD (https://sustainabledevelopment.un.org/topics/sids/list) (listed in Appendix I).

10. ***Global Total Allowable Catch (GTAC)***: means for an IOTC species, a catch limit set as an output control on fishing, in accordance with any relevant management procedure or other agreed management framework.

11. ***Conservation and Management Measure (CMM)***: means a Conservation and Management Measure adopted by the IOTC pursuant to Article IX(1) of the IOTC Agreement.

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APPENDIX 2**

IOTC membership by category and other categories for catch allocation calculations

CPC	CP	CNCP	Coastal State CPC	DWFN CPC	DCS	SIDS[1]	HDI[2]	GNI[3]	EEZ[4]
Australia	Y		Y				very high	high	8
Bangladesh	Y		Y		Y		medium	low-middle	1
China (incl. Taiwan, Province of China)	Y			Y			high	upper-middle	N/A
Comoros	Y		Y		Y	Y	low	low	1
Eritrea	Y		Y		Y		low	low	1
European Union (FR, SP, IT)[5]	Y			Y			very high	high	N/A
France (OT)	Y		Y				very high	high	3
Guinea	Y			Y			low	low	N/A
India	Y		Y		Y		medium	low-middle	4
Indonesia	Y		Y		Y		medium	low-middle	4
Iran, Islamic Republic of	Y		Y		Y		high	upper-middle	1
Japan	Y			Y			very high	high	N/A
Kenya	Y		Y		Y		medium	low-middle	1
Korea, Republic of	Y			Y			very high	high	N/A
Madagascar	Y		Y		Y		low	low	2
Malaysia	Y		Y		Y		high	upper-middle	1
Maldives	Y		Y		Y	Y	high	upper-middle	2
Mauritius	Y		Y		Y	Y	high	upper-middle	3
Mozambique	Y		Y		Y		low	low	1
Oman	Y		Y		Y		high	high	1
Pakistan	Y		Y		Y		medium	low-middle	1
Philippines	Y			Y			medium	low-middle	N/A
Seychelles	Y		Y		Y	Y	high	high	3
Sierra Leone	Y			Y			low	low	N/A
Somalia	Y		Y		Y		low*	low	2
South Africa	Y		Y		Y		medium	upper-middle	1

Sri Lanka	Y		Y		Y		high	low-middle	1
Sudan	Y		Y		Y		low	low-middle	1
Tanzania	Y		Y		Y		low	low	1
Thailand	Y		Y		Y		high	upper-middle	1
United Kingdom (OT)	Y		Y				very high	high	2
Yemen	Y		Y		Y		low	low-middle	1
Liberia		Y		Y			low	low	N/A
Senegal		Y		Y			low	low	0
TOTAL (34)	**32**	**2**	**25**	**9**	**22**	**4**	**-**	**-**	**-**

[1] **Small Island Developing State (SIDS)** status: https://sustainabledevelopment.un.org/topics/sids/list. United Nations Department of Economic and Social Affairs and the OECD.

[2] **Human Development Index (HDI)** status: http://hdr.undp.org/en/composite/HDI. *Somalia currently does not have an official Human Development Index (HDI) from the UNDP, which is based on 4 quantified factors. However, as 2 of the 4 factors have been quantified, and they measure within the 'low' HDI status, we have assigned Somalia to this category for the purposes of allocation of fishing opportunities.

[3] **Gross national income (GNI)** status: https://data.worldbank.org/indicator/NY.GNP.PCAP.CD. Atlas method (current US$).

[4] **Exclusive Economic Zone (EEZ)** status: http://www.marineregions.org/.

[5] The EUR is considered a coastal state under the EU Proposal, but not under the coastal states proposal.

****This Annex was reproduced from the Coastal States Proposal, for the purposes of the EU Proposal Taiwan P.O.C. was included.**

APPENDIX 3 Detailed Results Based on the EU Proposal.

A3.1 Summary of results based on the EU Proposal.

The EU proposal is based on the historical baseline catch calculation, as outlined in IOTC-2018-TCAC04-PropA Rev2. This historical allocation is calculated in three ways, with 80%, 90%, and 100 % of the catch in an EEZ by a flag state fishing vessel being attributed to the flag state of that fishing vessel. The future catch allocation proportion of the overall TAC is calculated based on weighting four main components; the historical allocation, the complementary allocation, the correction factors, and the new entrants allocation. The weighting for the correction factors has yet to be set forth and adopted, therefore this component was added to the sum of the historical allocation and the complementary allocation. Table A3.1 shows the values used in the simulation, the bold text indicates that of the primary simulation values as set forth in the EU proposal (i.e. allocation based on historical catch [85]% of the allocation, complementary allocation [8%], new entrants allocation [1%] and adjusted by correction factors [6%]).

The complementary allocation is partitioned into three sub-components, the least developed countries [50%], the small island developing states [25%], and the coastal developing states [25%]. The historical allocation is based on paragraph 8 of the EU proposal which states "The initial baseline allocation of the TAC amongst CPCs shall be based on historical catches covering the period [2000-2016]." Therefore, the initial baseline allocation (herein after referred to as a historical catch allocation proportion), is the proportion of catch by flag for a given species. If a CPC had no catch in the 2000-2016 period this resulted zero allocation. New entrants allocation was kept at 1% for all simulations, given that there are no new entrants this was distributed proportionally amongst IOTC Members on the basis of their final allocation.

Detailed results of the set of simulations preformed based on the EU proposal, and is provided as an excel work book (EU_simulation_results_15February.xlsx) associated with this report. The results spreadsheet contains the components of the simulations in columns A:H, these variables are sortable and will return the simulation results associated with the user's specification of the simulation components. Note that there is a flag and species code associated with each column from K:FF. There are six tabs showing the results of the simulation, the first three show TAC in 1000 MT (green tabs), the second three (blue tabs) show the results in proportion of overall TAC. The baseline catch calculations are also shown Additionally, graphical representation of the spread of TAC values for each of the flags for each species is shown in Figures A3.1-A3.3, for each historical catch allocation method.

The effect of the primary components (Historical and Complementary Correction) weights on the allocation TACS (in 1000 MT) are shown in Figures A3.4- A3.6 (Historical), in Figures A3.7- A3.9(Complementary) and Figures A3.10-A3.12 (Correction Factors).

A3.2 Tables associated with the EU Proposal

TABLE A3.1. Simulation Specifications for each of the historical catch allocation methods, based on the EU proposal. The components of the complementary allocation are least developed countries (LDCs), small island developing states (SIDS), and coastal developing states (CDS).

Simulation Number	Historical Allocation Proportion	Complementary Allocation	New Entrants Proportion	Correction Allocation	Components of the Complementary Allocation		
					LDCs	SIDS	CDS
1	0.75	0.06	0.01	0.18	0.5	0.25	0.25
2	0.75	0.06	0.01	0.18	0.25	0.5	0.25
3	0.75	0.06	0.01	0.18	0.25	0.25	0.5
4	0.75	0.08	0.01	0.16	0.5	0.25	0.25
5	0.75	0.08	0.01	0.16	0.25	0.5	0.25
6	0.75	0.08	0.01	0.16	0.25	0.25	0.5
7	0.75	0.1	0.01	0.14	0.5	0.25	0.25
8	0.75	0.1	0.01	0.14	0.25	0.5	0.25
9	0.75	0.1	0.01	0.14	0.25	0.25	0.5
10	0.75	0.12	0.01	0.12	0.5	0.25	0.25
11	0.75	0.12	0.01	0.12	0.25	0.5	0.25
12	0.75	0.12	0.01	0.12	0.25	0.25	0.5
13	0.8	0.04	0.01	0.15	0.5	0.25	0.25
14	0.8	0.04	0.01	0.15	0.25	0.5	0.25
15	0.8	0.04	0.01	0.15	0.25	0.25	0.5
16	0.8	0.06	0.01	0.13	0.5	0.25	0.25
17	0.8	0.06	0.01	0.13	0.25	0.5	0.25
18	0.8	0.06	0.01	0.13	0.25	0.25	0.5
19	0.8	0.08	0.01	0.11	0.5	0.25	0.25
20	0.8	0.08	0.01	0.11	0.25	0.5	0.25
21	0.8	0.08	0.01	0.11	0.25	0.25	0.5
22	0.8	0.1	0.01	0.09	0.5	0.25	0.25
23	0.8	0.1	0.01	0.09	0.25	0.5	0.25
24	0.8	0.1	0.01	0.09	0.25	0.25	0.5
25	0.8	0.12	0.01	0.07	0.5	0.25	0.25
26	0.8	0.12	0.01	0.07	0.25	0.5	0.25
27	0.8	0.12	0.01	0.07	0.25	0.25	0.5
28	0.85	0.04	0.01	0.1	0.5	0.25	0.25
29	0.85	0.04	0.01	0.1	0.25	0.5	0.25
30	0.85	0.04	0.01	0.1	0.25	0.25	0.5
31	0.85	0.06	0.01	0.08	0.5	0.25	0.25
32	0.85	0.06	0.01	0.08	0.25	0.5	0.25
33	0.85	0.06	0.01	0.08	0.25	0.25	0.5
34	**0.85**	**0.08**	**0.01**	**0.06**	**0.5**	**0.25**	**0.25**
35	0.85	0.08	0.01	0.06	0.25	0.5	0.25
36	0.85	0.08	0.01	0.06	0.25	0.25	0.5
37	0.85	0.1	0.01	0.04	0.5	0.25	0.25
38	0.85	0.1	0.01	0.04	0.25	0.5	0.25

Table 1.
Continued.

Simulation Number	Historical Allocation Proportion	Complementary Allocation	New Entrants Proportion	Correction Allocation	Components of the Complementary Allocation		
					LDCs	SIDS	CDS
39	0.85	0.1	0.01	0.04	0.25	0.25	0.5
40	0.85	0.12	0.01	0.02	0.5	0.25	0.25
41	0.85	0.12	0.01	0.02	0.25	0.5	0.25
42	0.85	0.12	0.01	0.02	0.25	0.25	0.5
43	0.9	0.04	0.01	0.05	0.5	0.25	0.25
44	0.9	0.04	0.01	0.05	0.25	0.5	0.25
45	0.9	0.04	0.01	0.05	0.25	0.25	0.5
46	0.9	0.06	0.01	0.03	0.5	0.25	0.25
47	0.9	0.06	0.01	0.03	0.25	0.5	0.25
48	0.9	0.06	0.01	0.03	0.25	0.25	0.5
49	0.9	0.08	0.01	0.01	0.5	0.25	0.25
50	0.9	0.08	0.01	0.01	0.25	0.5	0.25
51	0.9	0.08	0.01	0.01	0.25	0.25	0.5

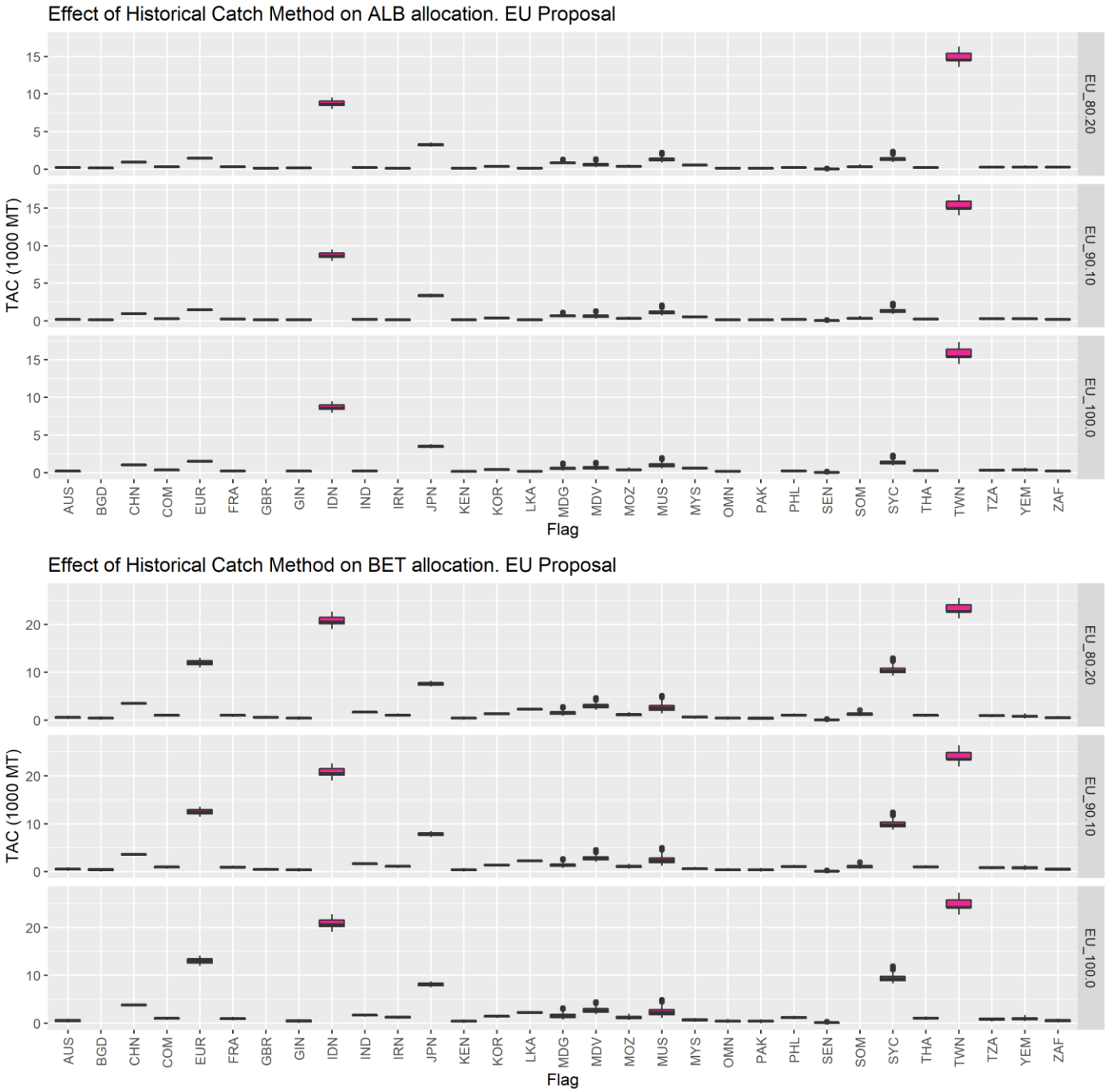

Figure A3.1. Simulation results for all for albacore tuna (ALB, top plot), and bigeye tuna (BET bottom plot) based on the EU Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels, top, middle and bottom, show the effect for each of the historical catch allocation methods.

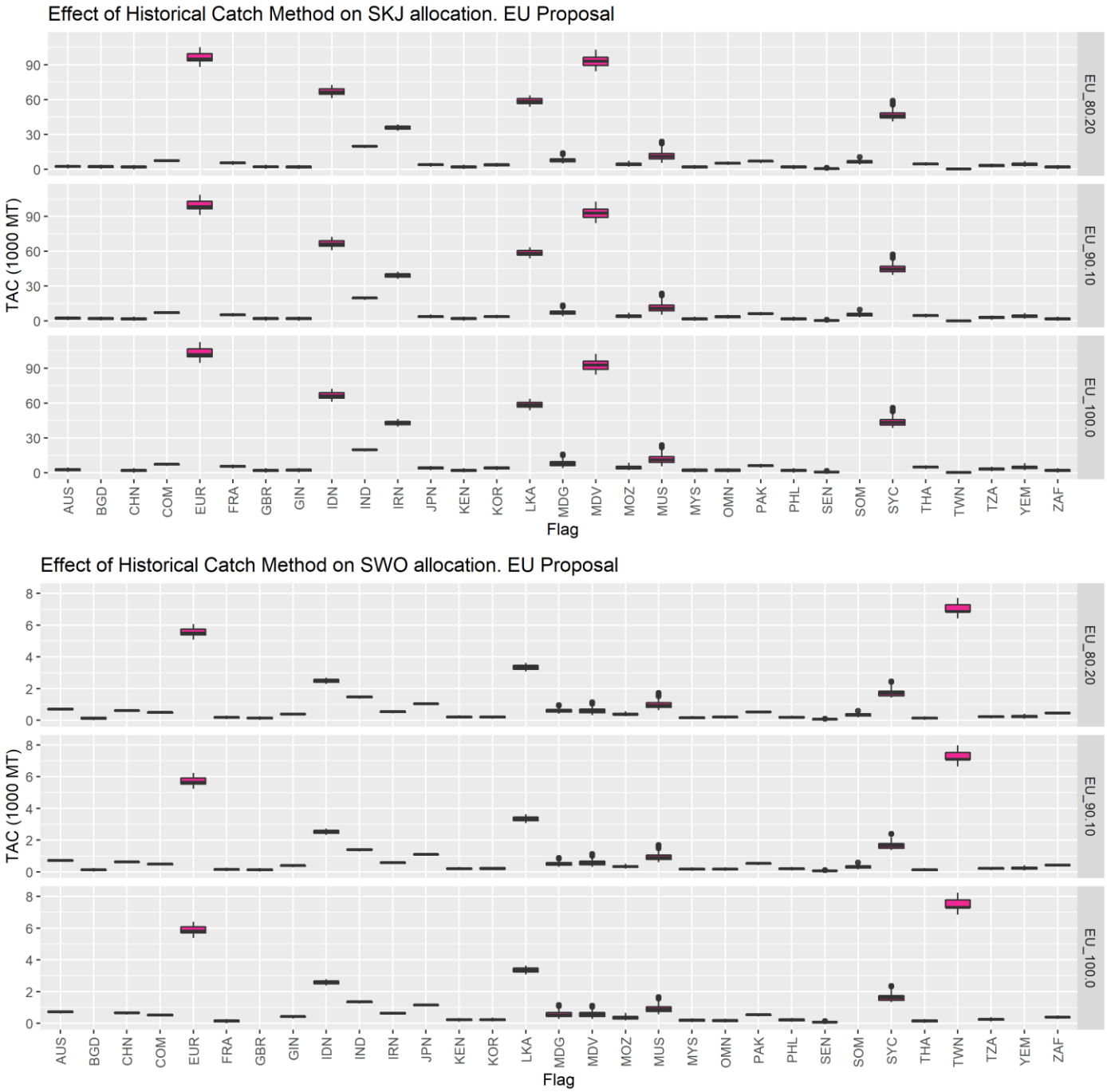

Figure A3.2. Simulation results for all for skipjack tuna (SKJ, top plot), and swordfish (SWO bottom plot) based on the EU Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels, top, middle and bottom, show the effect for each of the historical catch allocation methods.

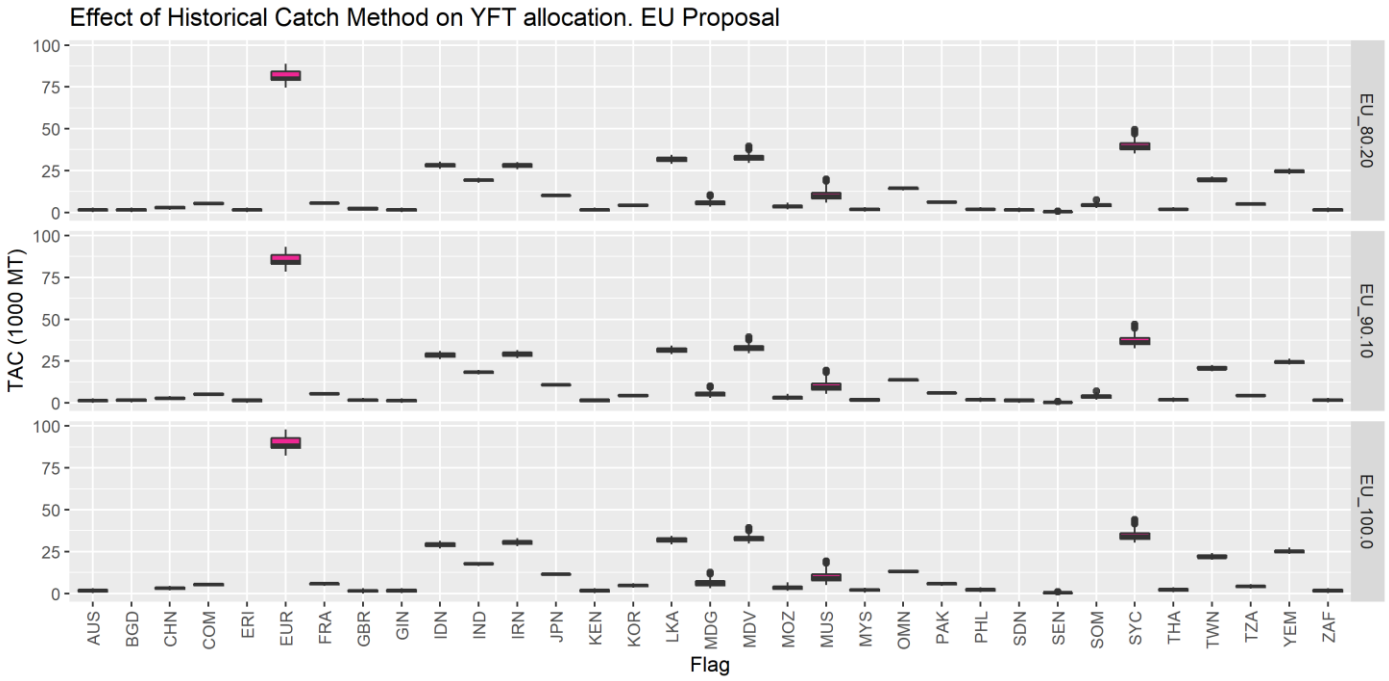

Figure A3.3. Simulation results for all for yellowfin tuna (YFT), based on the EU Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels, top, middle and bottom, show the effect for each of the historical catch allocation methods.

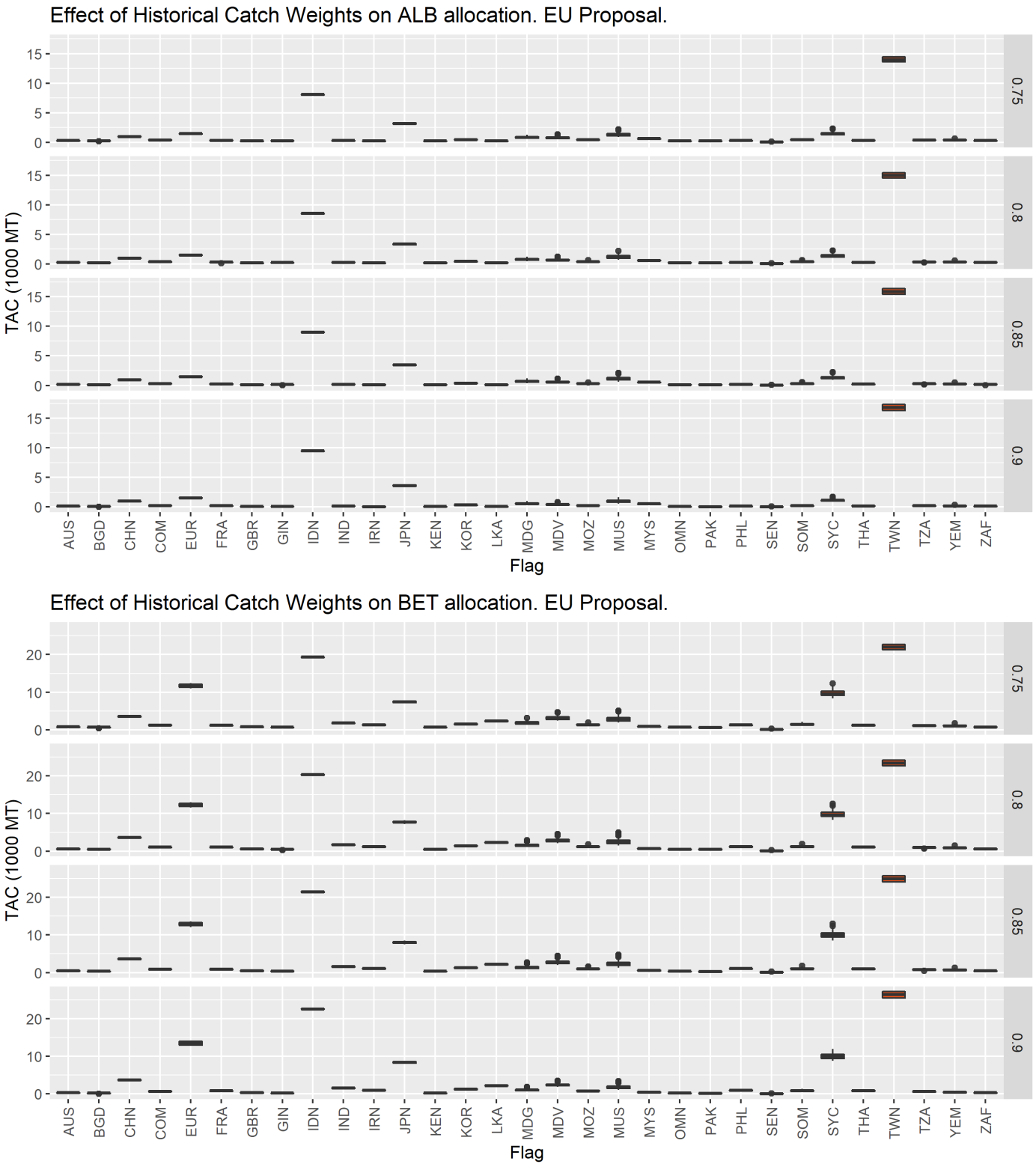

Figure A3.4 Simulation results for albacore tuna (ALB, top panel), and bigeye tuna (BET bottom panel) based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The panels show the effect of the range weights on the historical catch component of the allocation.

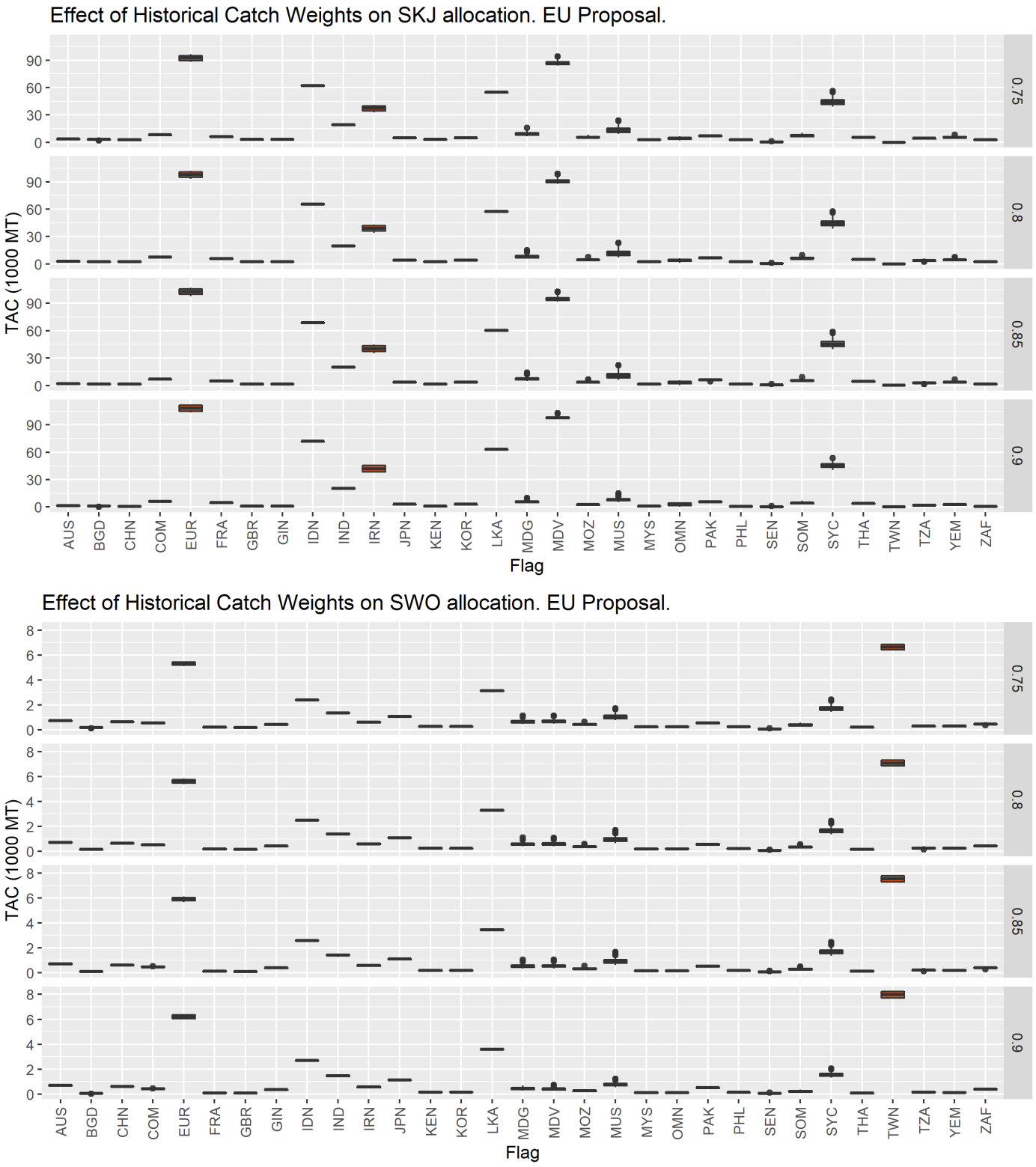

Figure A3.5. Simulation results for skipjack tuna (SKJ, top panel), and swordfish (SWO bottom panel) based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The panels show the effect of the range weights on the historical catch component of the allocation.

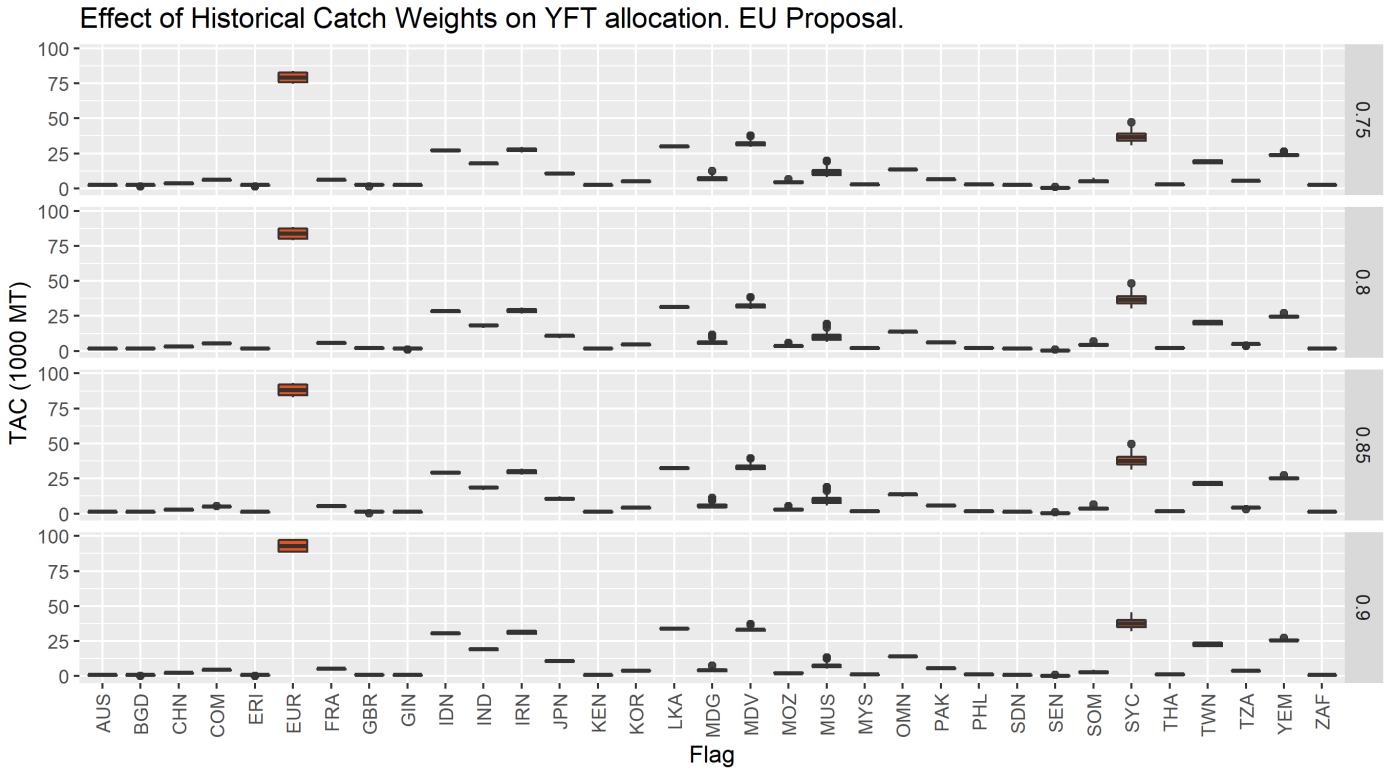

Figure A3.6. Simulation results for yellowfin tuna (YFT), based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The panels show the effect of the range weights on the historical catch component of the allocation.

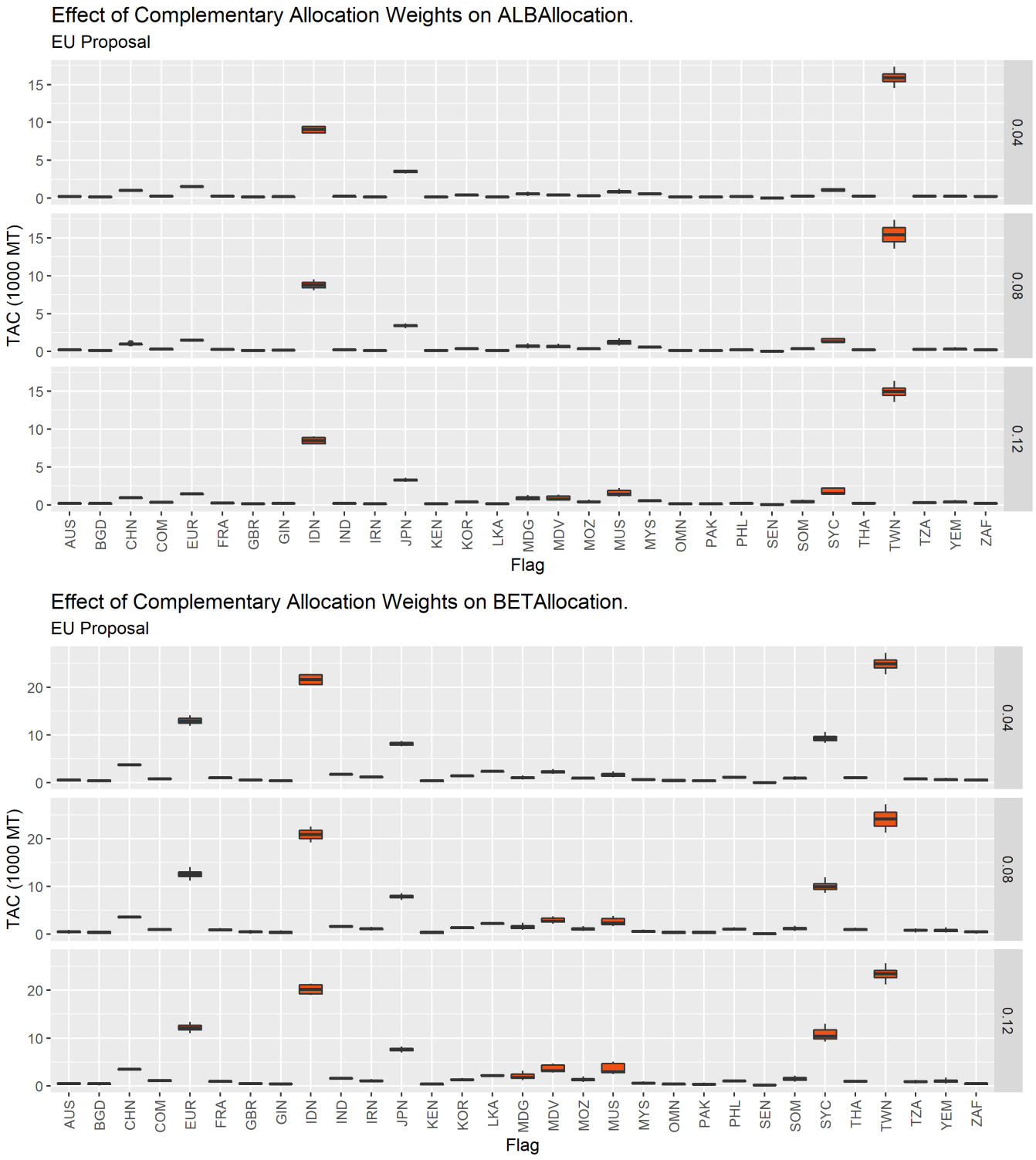

Figure A3.7. Simulation results for albacore tuna (ALB, top panel), and bigeye tuna (BET bottom panel) based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The three panels in each plot show the effect of the range of the Complementary catch component of the allocation.

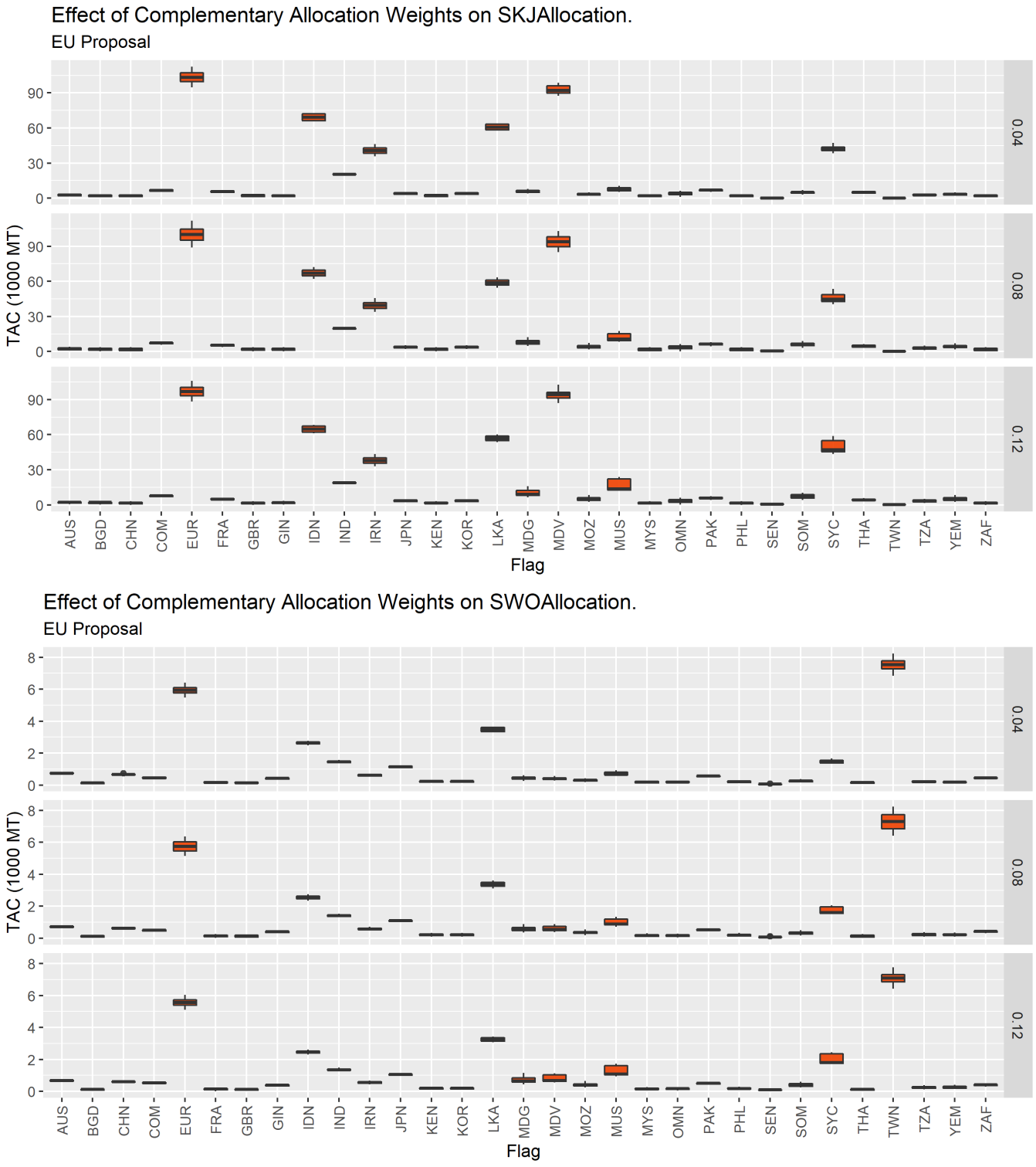

Figure A3.8 Simulation results for skipjack tuna (SKJ, top panel), and swordfish (SWO bottom panel) based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The three panels in each plot show the effect of the range of the complementary allocation component.

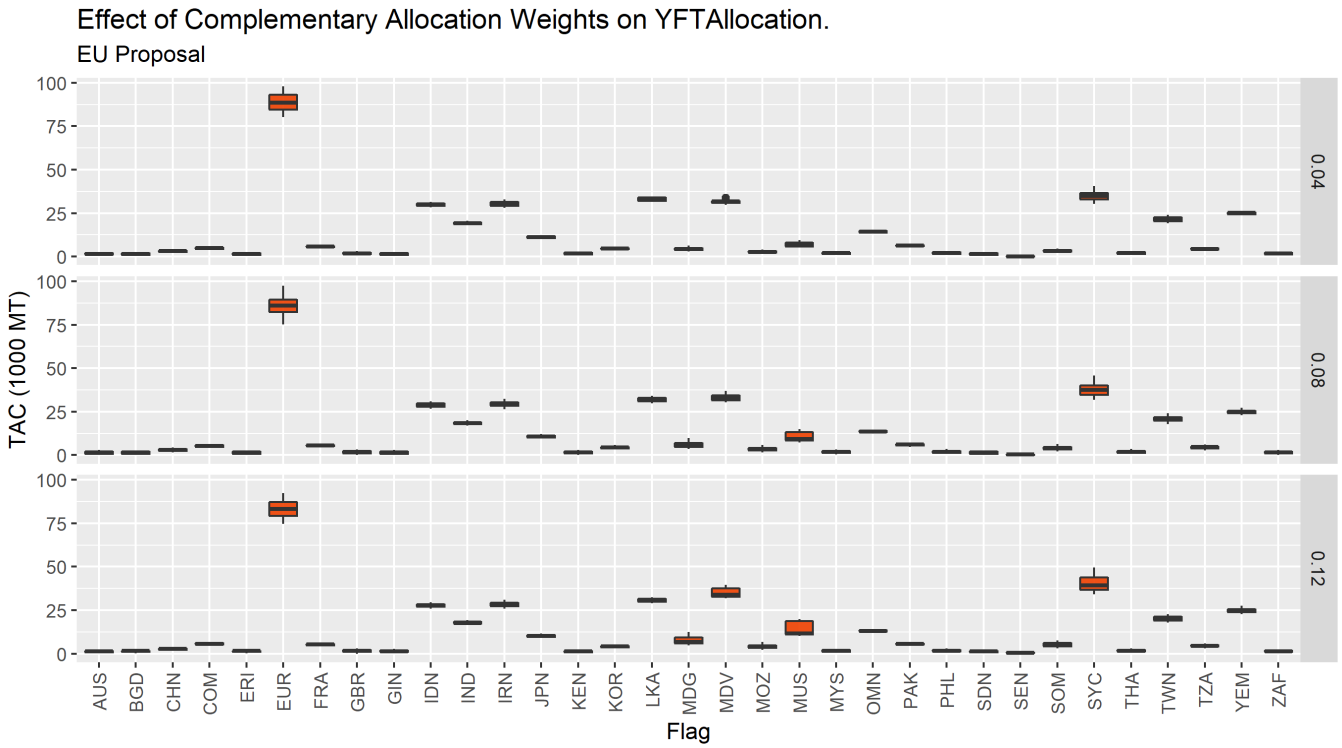

Figure A3.9. Simulation results for yellowfin tuna (YFT), based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The three panels in the plot show the effect of the range of the complementary allocation component.

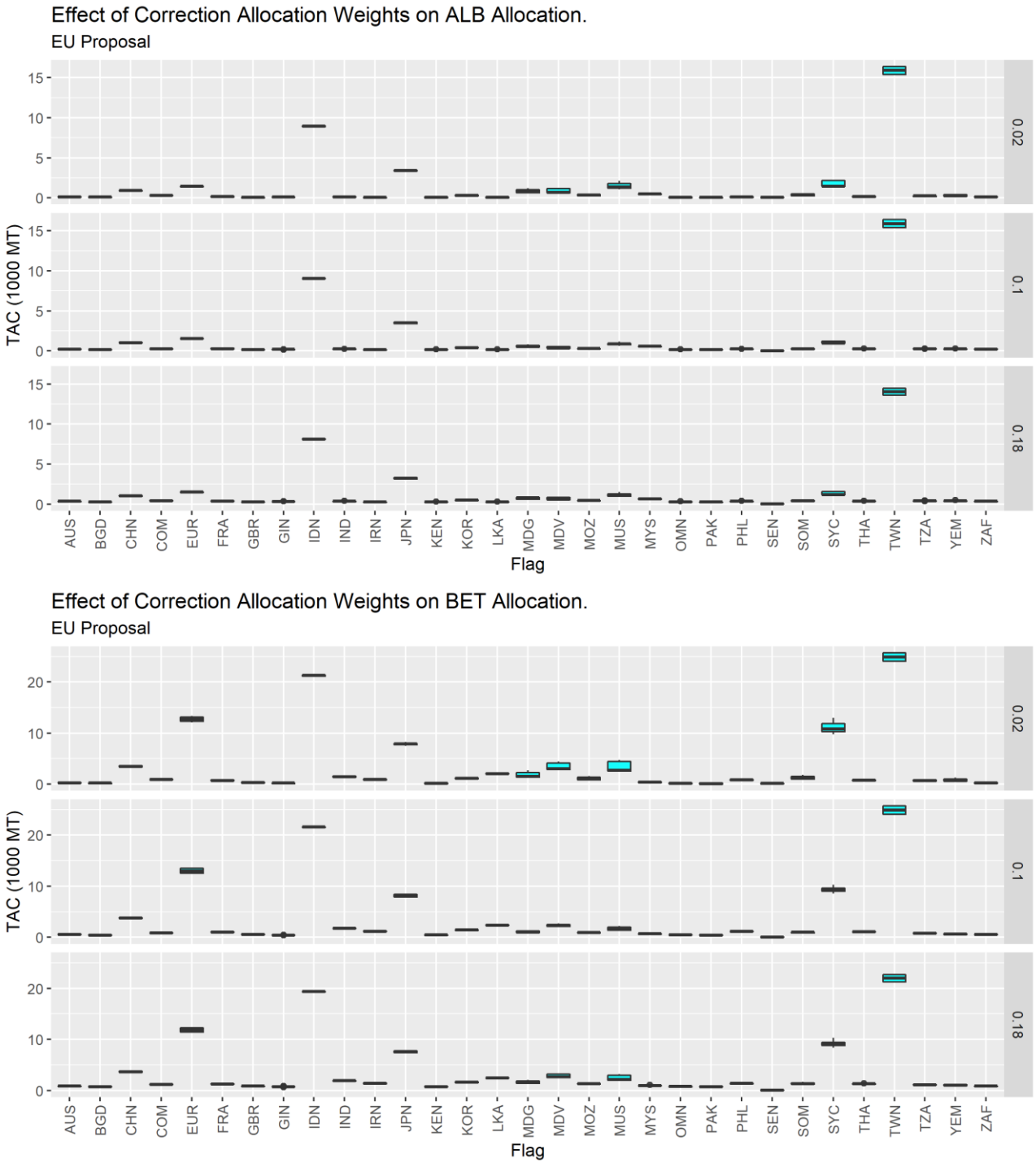

Figure A3.10. Simulation results for albacore tuna (ALB, top panel), and bigeye tuna (BET bottom panel) based on the EU Proposal. The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The three panels in the plot show the effect of the range of the correction component of the allocation.

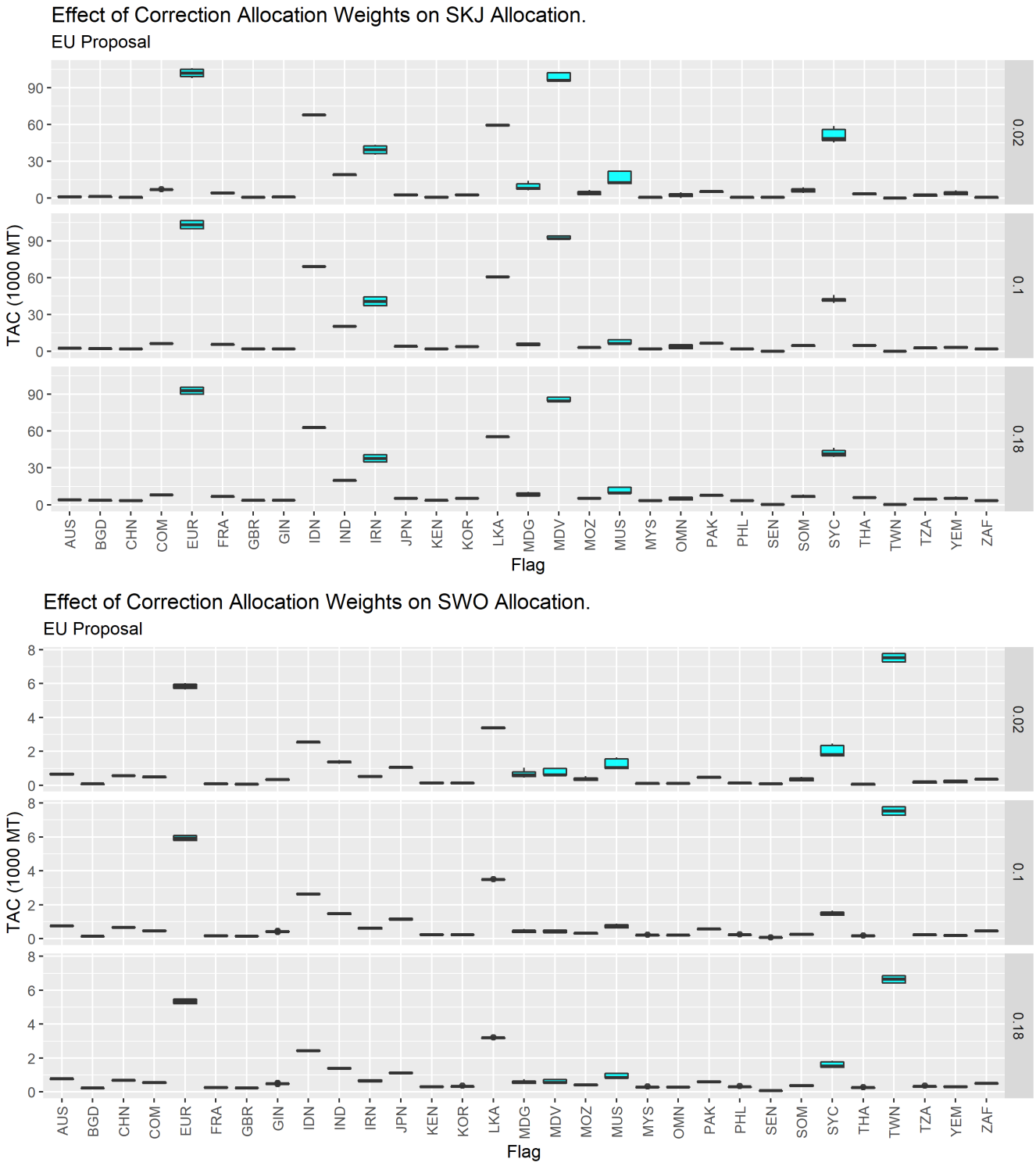

Figure A3.11 Simulation results for skipjack tuna (SKJ, top panel), and swordfish (SWO bottom panel) based on the EU Proposal The boxplots represent the range of TAC (1000 MT Y-axis) allocated to each flag (shown on the X axis) assuming the ETAC described in the main text. The three panels in the plot show the effect of the range of the correction component of the allocation.

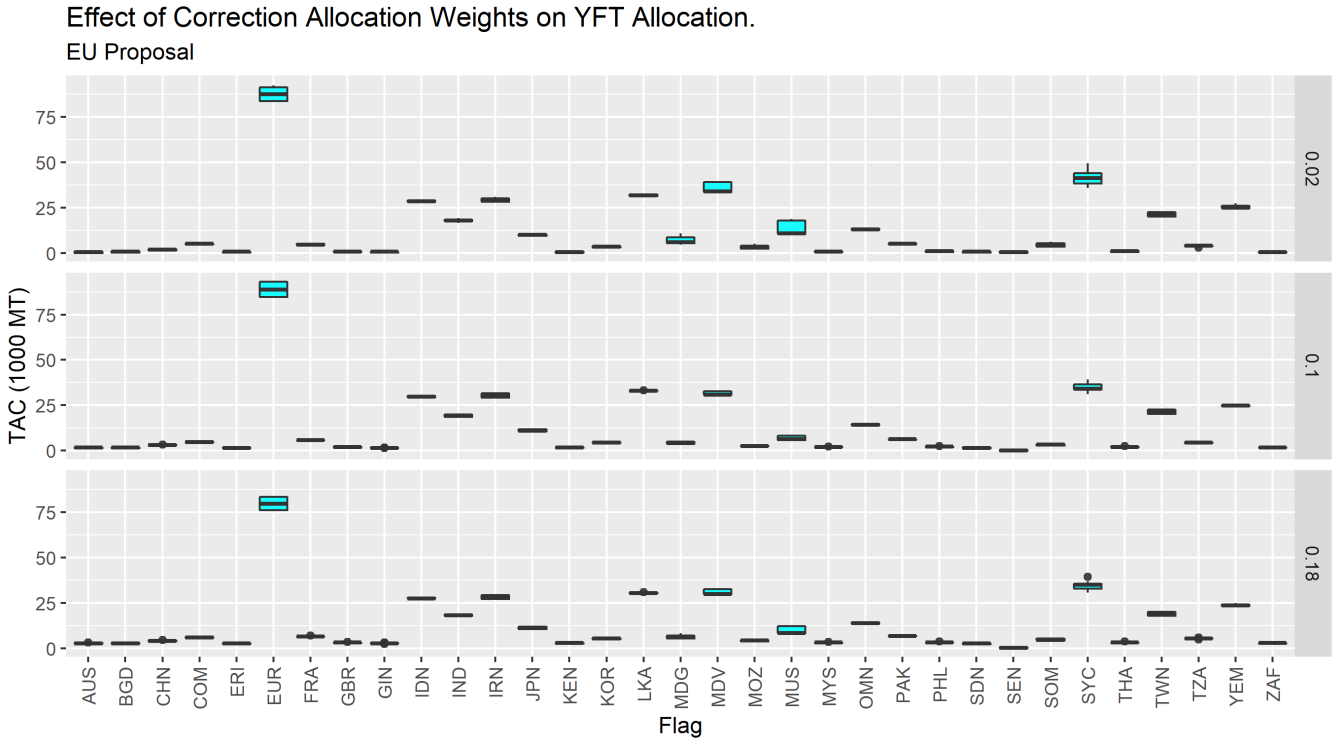

Figure A3.12 Simulation results for yellowfin tuna (YFT), based on the EU Proposal. The boxplots represent the range of proportions (Y-axis) allocated to each flag (shown on the X axis) The three panels show the effect of the range of the correction allocation component.

APPENDIX 4. Detailed Results Based on the Coastal States Proposal.

A4.1. Summary of results from the Coastal Sates Proposal

The Coastal States proposal is based on the baseline historical catch allocation which was summarized in 3 forms, a 5 year average (2012-16), a 15 year average (2002-16), and the best 5 years averaged from within the period 1950-2016. The catch allocation framework included these baseline historical catches as a weighted component of the total allocation along with a baseline coastal state allocation, a supplementary high seas allocation, and a new entrants allocation. Each component of the catch allocation was weighted by an individual weighting factor. The coastal state allocation has three components; coastal state, developing coastal state (DCS), and EEZ proportion. The DCS component is further subdivided into the HDI, GNI and SIDS sub-components. Note that as written in the proposal the SIDS component could be up to 70% of the DCS component of the baseline coastal state allocation, however this would decrease the HDI and GNI components to 50% of the proposed lower bound, this was remedied by capping the SIDS component at 40%, similar to the HDI and GNI components.

The options for the weighting the main components (historical allocation, coastal state allocation and supplementary high seas allocation) were crossed. This means that each combination of historical catch, baseline coastal states, and supplementary high seas allocation was combined with each other, as well as each combination of the coastal state and DCS components. This set of proportions was then filtered for those combinations that totaled 100%. This resulted in 5148 simulations for each of the 3 types of historical catch allocation. The individual components, (main, coastal states, and DCS) are shown in Tables 4.1-4.3.

The Coastal States Proposal is limited to IOTC CPCs and consisted of a range of values for the allocation based on historical catch, coastal states allocation and supplementary high seas allocation. While no descriptive scenario was specified a considerable range of simulations was completed, yet this results in difficulty in the graphical representation (i.e. YFT) in Figure A4.1, therefore the data is being presented as an excel work book(CoastalStates_SimulationResults_15Feb.xlsx) associated with this report.

The results spreadsheet contains results in 1000 MT (in the tab named CS_Sim_Results_TAC_MT) as well as a proportion of the overall TAC (in the tab named CS_simResults_Proportion). The components of the simulations are in columns A:I, theses are able to be sorted and will return the simulation results associated with the specification of the simulation components. Note that there is a historical allocation method (HA_method), flag and species code associated with each column from. Additionally, graphical representation of the spread of values for each of the flags and species from the baseline historical calculation is shown in Figures A4.2-A4.4. The effect of the primary weighting components (Coastal, Historical and Supplementary High Seas) on the allocation values is shown in Figures A4.5- A4.7 (effect of Supplementary High Seas weights), in Figures A4.8- A4.10(effect of Coastal Weights) and Figures A4.11-A4.13 (effect of Historical Weights).

Appendix 4. Tables.

Table 4.1. Proportions for the main components from the Coastal States proposal for the simulations.

Allocation Proportions			Allocation Proportions			Allocation Proportions		
Coastal States	Historical Catch	High Seas	Coastal States	Historical Catch	High Seas	Coastal States	Historical Catch	High Seas
0.25	0.68	0.07	0.32	0.62	0.06	0.38	0.59	0.03
0.25	0.69	0.06	0.32	0.63	0.05	0.39	0.54	0.07
0.25	0.7	0.05	0.32	0.64	0.04	0.39	0.55	0.06
0.26	0.67	0.07	0.32	0.65	0.03	0.39	0.56	0.05
0.26	0.68	0.06	0.33	0.6	0.07	0.39	0.57	0.04
0.26	0.69	0.05	0.33	0.61	0.06	0.39	0.58	0.03
0.26	0.7	0.04	0.33	0.62	0.05	0.4	0.53	0.07
0.27	0.66	0.07	0.33	0.63	0.04	0.4	0.54	0.06
0.27	0.67	0.06	0.33	0.64	0.03	0.4	0.55	0.05
0.27	0.68	0.05	0.34	0.59	0.07	0.4	0.56	0.04
0.27	0.69	0.04	0.34	0.6	0.06	0.4	0.57	0.03
0.27	0.7	0.03	0.34	0.61	0.05	0.41	0.52	0.07
0.28	0.65	0.07	0.34	0.62	0.04	0.41	0.53	0.06
0.28	0.66	0.06	0.34	0.63	0.03	0.41	0.54	0.05
0.28	0.67	0.05	0.35	0.58	0.07	0.41	0.55	0.04
0.28	0.68	0.04	0.35	0.59	0.06	0.41	0.56	0.03
0.28	0.69	0.03	0.35	0.6	0.05	0.42	0.51	0.07
0.29	0.64	0.07	0.35	0.61	0.04	0.42	0.52	0.06
0.29	0.65	0.06	0.35	0.62	0.03	0.42	0.53	0.05
0.29	0.66	0.05	0.36	0.57	0.07	0.42	0.54	0.04
0.29	0.67	0.04	0.36	0.58	0.06	0.42	0.55	0.03
0.29	0.68	0.03	0.36	0.59	0.05	0.43	0.5	0.07
0.3	0.63	0.07	0.36	0.6	0.04	0.43	0.51	0.06
0.3	0.64	0.06	0.36	0.61	0.03	0.43	0.52	0.05
0.3	0.65	0.05	0.37	0.56	0.07	0.43	0.53	0.04
0.3	0.66	0.04	0.37	0.57	0.06	0.43	0.54	0.03
0.3	0.67	0.03	0.37	0.58	0.05	0.44	0.5	0.06
0.31	0.62	0.07	0.37	0.59	0.04	0.44	0.51	0.05
0.31	0.63	0.06	0.37	0.6	0.03	0.44	0.52	0.04
0.31	0.64	0.05	0.38	0.55	0.07	0.44	0.53	0.03
0.31	0.65	0.04	0.38	0.56	0.06	0.45	0.5	0.05
0.31	0.66	0.03	0.38	0.57	0.05	0.45	0.51	0.04
0.32	0.61	0.07	0.38	0.58	0.04	0.45	0.52	0.03

Table 4.2. Components of the coastal states allocation from the Coastal States Proposal used in conducting simulations.

Components of the Coastal State Allocation		
Coastal State	Developing Coastal State	EEZ
0.4	0.4	0.2
0.35	0.45	0.2
0.4	0.45	0.15
0.3	0.5	0.2
0.35	0.5	0.15
0.4	0.5	0.1
0.25	0.55	0.2
0.3	0.55	0.15
0.2	0.6	0.2
0.25	0.6	0.15
0.2	0.65	0.15
0.25	0.65	0.1
0.2	0.7	0.1

Table 4.3. Components of the developing coastal state component of the coastal state allocation from the Coastal States proposal The components of the developing coastal state allocation are small island developing states (SIDS), and Gross National Income (GNI) and Human Development Index (HDI).

Components of the Developing Coastal State		
SIDS	GNI	HDI
0.3	0.3	0.4
0.3	0.4	0.3
0.4	0.3	0.3
0.333	0.333	0.333

Appendix 4 FIGURES

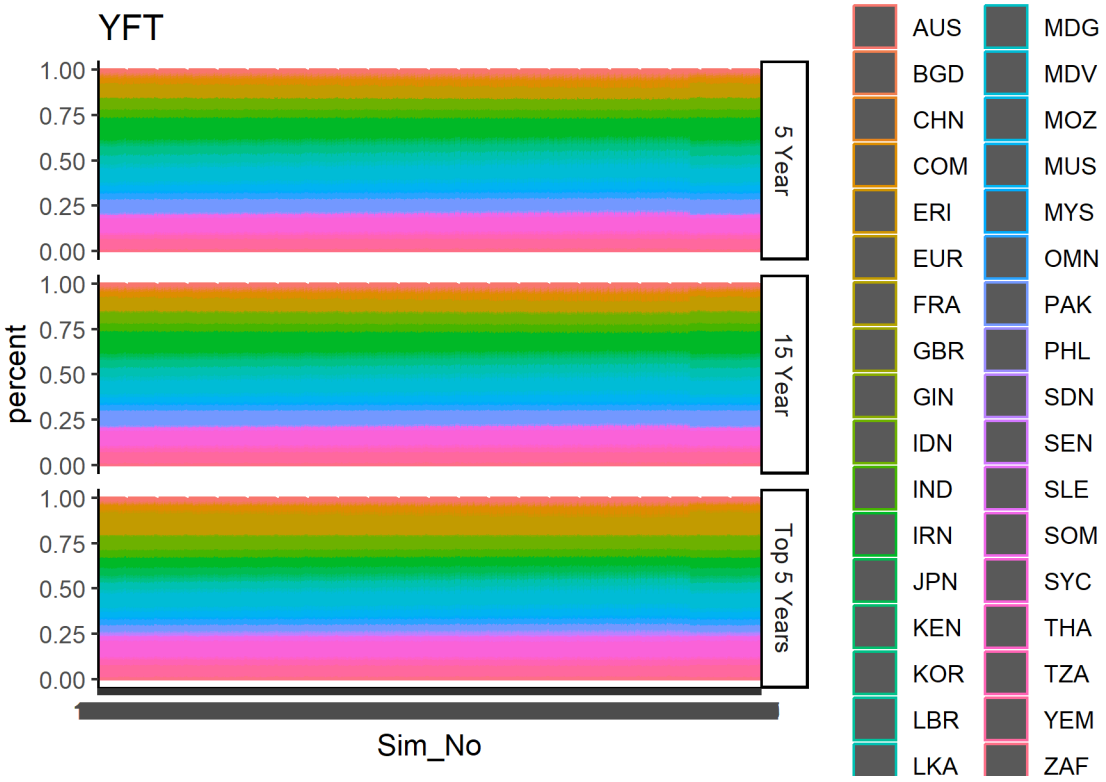

Figure A4.1. Simulation results for yellowfin based on the Coastal States Proposal. The colors are associated with each of the flag states (right side) and the three panels show the effect of the 5, 15, and top 5 year strategies for the historical catch allocation.

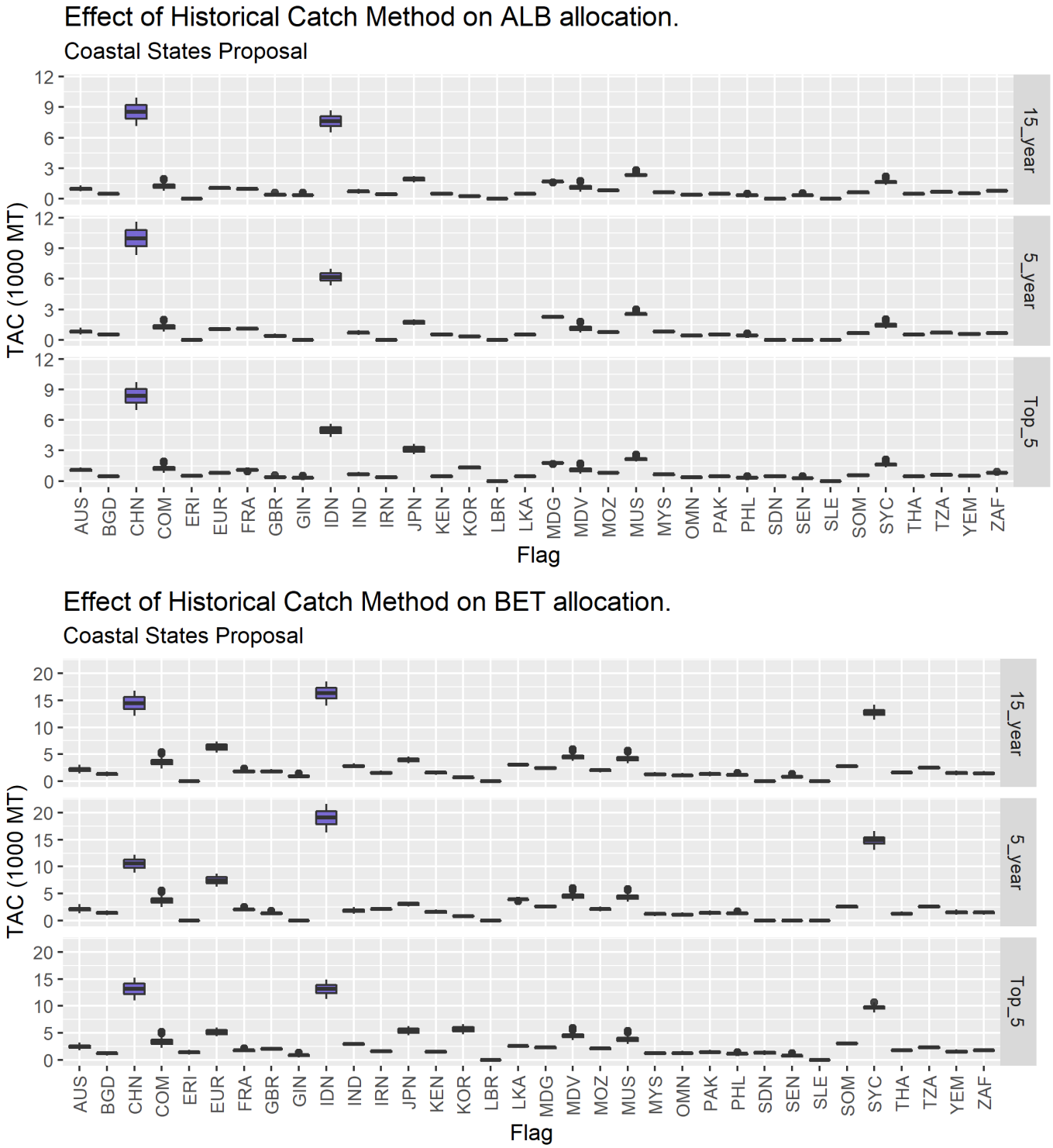

Figure A4.2. Simulation results for all for albacore tuna (ALB, top plot), and bigeye tuna (BET bottom plot) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels, top, middle and bottom, show the effect the 5, 15, and top 5 year strategies for the historical catch allocation method.

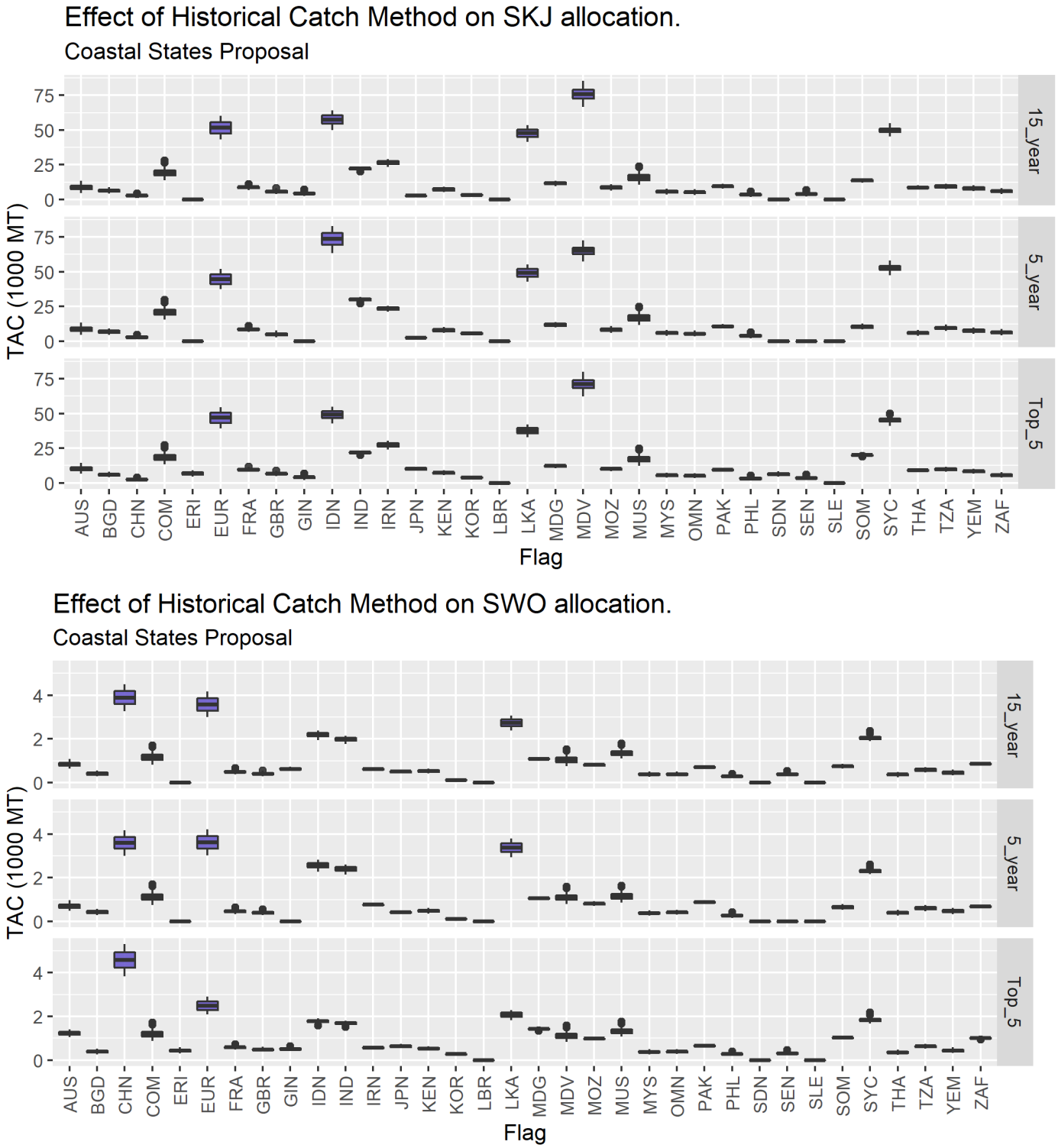

Figure A4.3 Simulation results for skipjack (SKJ top plot, and swordfish (SWO bottom plot) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels, top, middle and bottom, show the effect the 5, 15, and top 5 year strategies for the historical catch allocation methods.

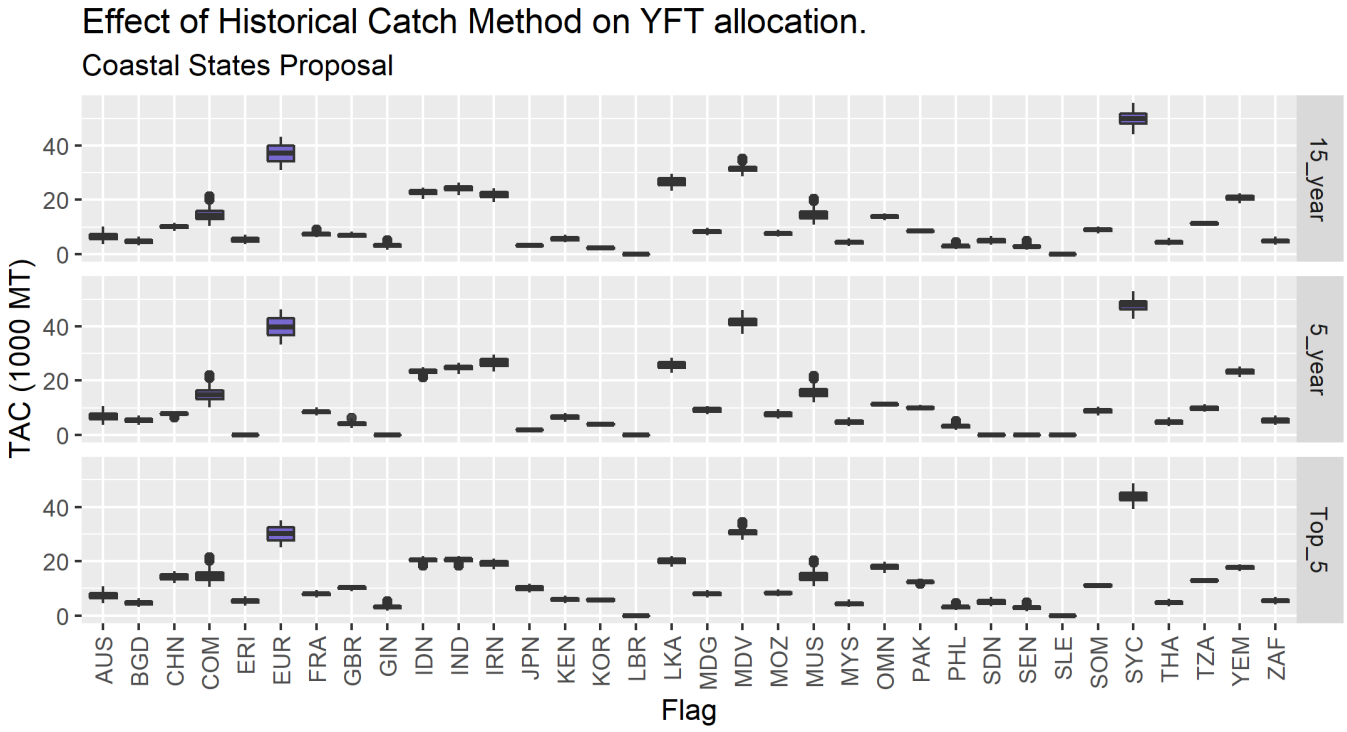

Figure A4.4. Simulation results for yellowfin tuna (YFT) based on the Coastal States Proposal. T The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels, top, middle and bottom, show the effect the 5, 15, and top 5 year strategies for the historical catch allocation methods.

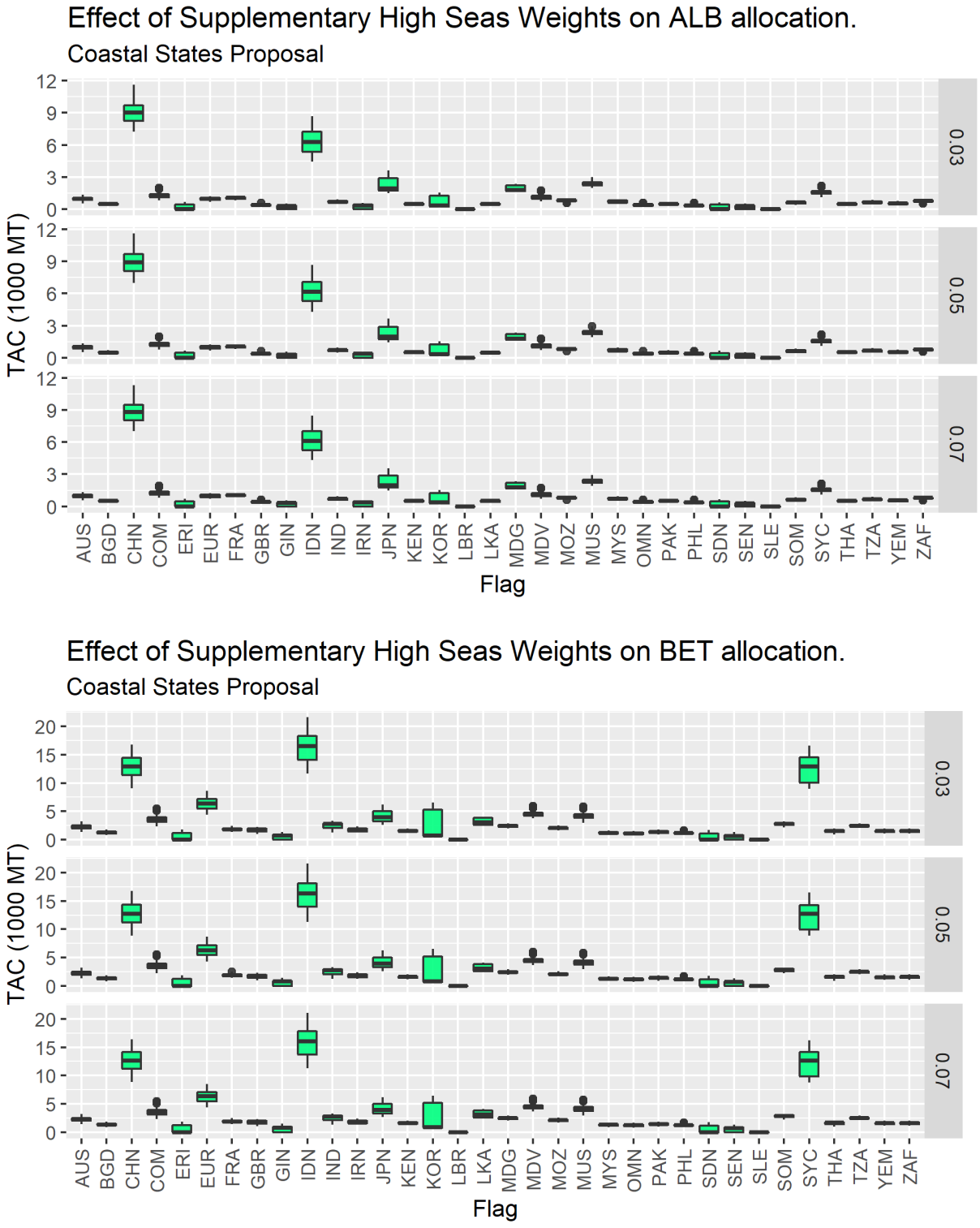

Figure A4.5 Simulation results for albacore tuna (ALB, top plot), and bigeye tuna (BET bottom plot) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The three panels show the effect of the range of supplementary high seas component of the allocation.

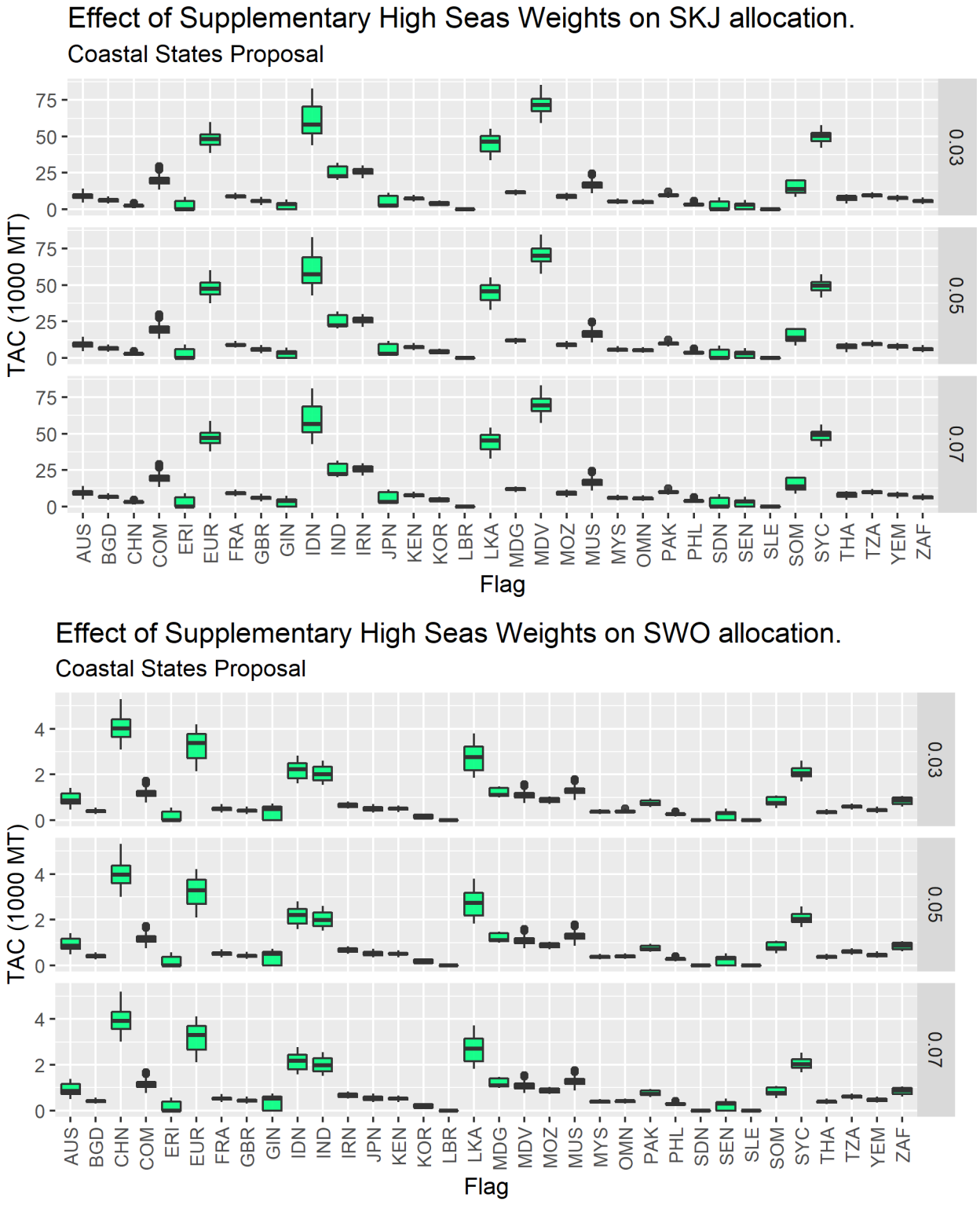

Figure A4.6. Simulation results for skipjack tuna (SKJ and swordfish (SWO, bottom plot) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The three panels show the effect of the range of supplementary high seas component of the allocation.

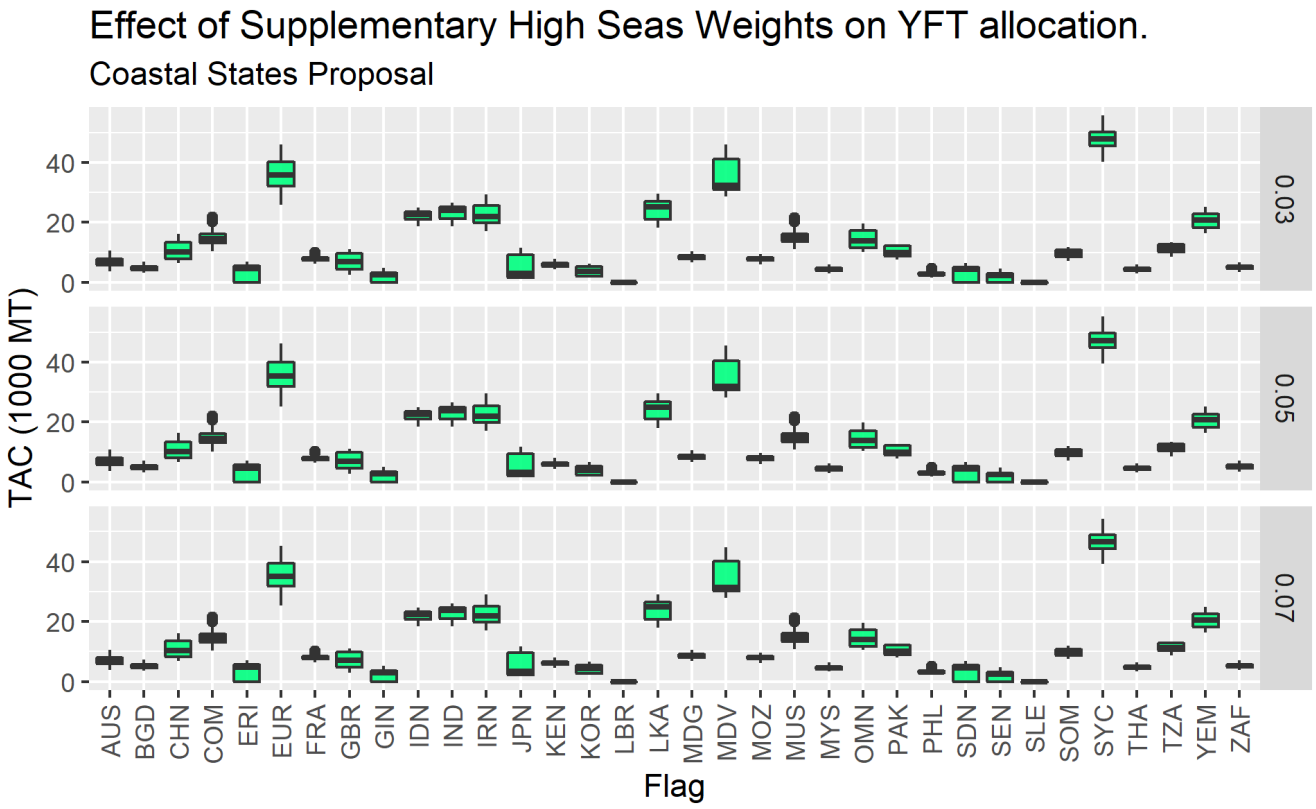

Figure A4.7 Simulation results for yellowfin tuna (YFT) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The three panels show the effect of the range of supplementary high seas component of the allocation.

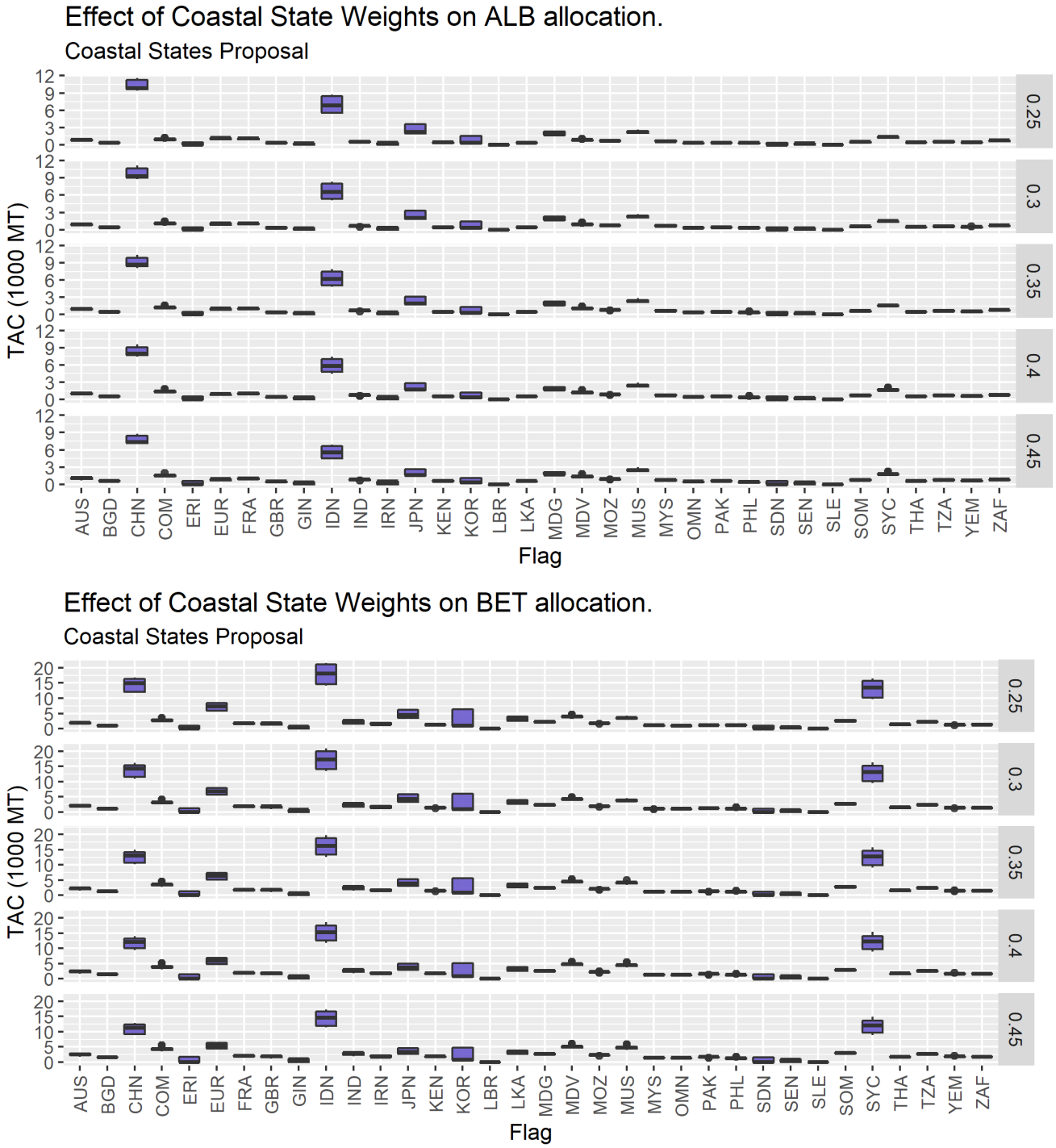

Figure A4.8 Simulation results for albacore tuna (ALB, top panel), and bigeye tuna (BET bottom panel) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels show the effect of the range of the Coastal States component of the allocation.

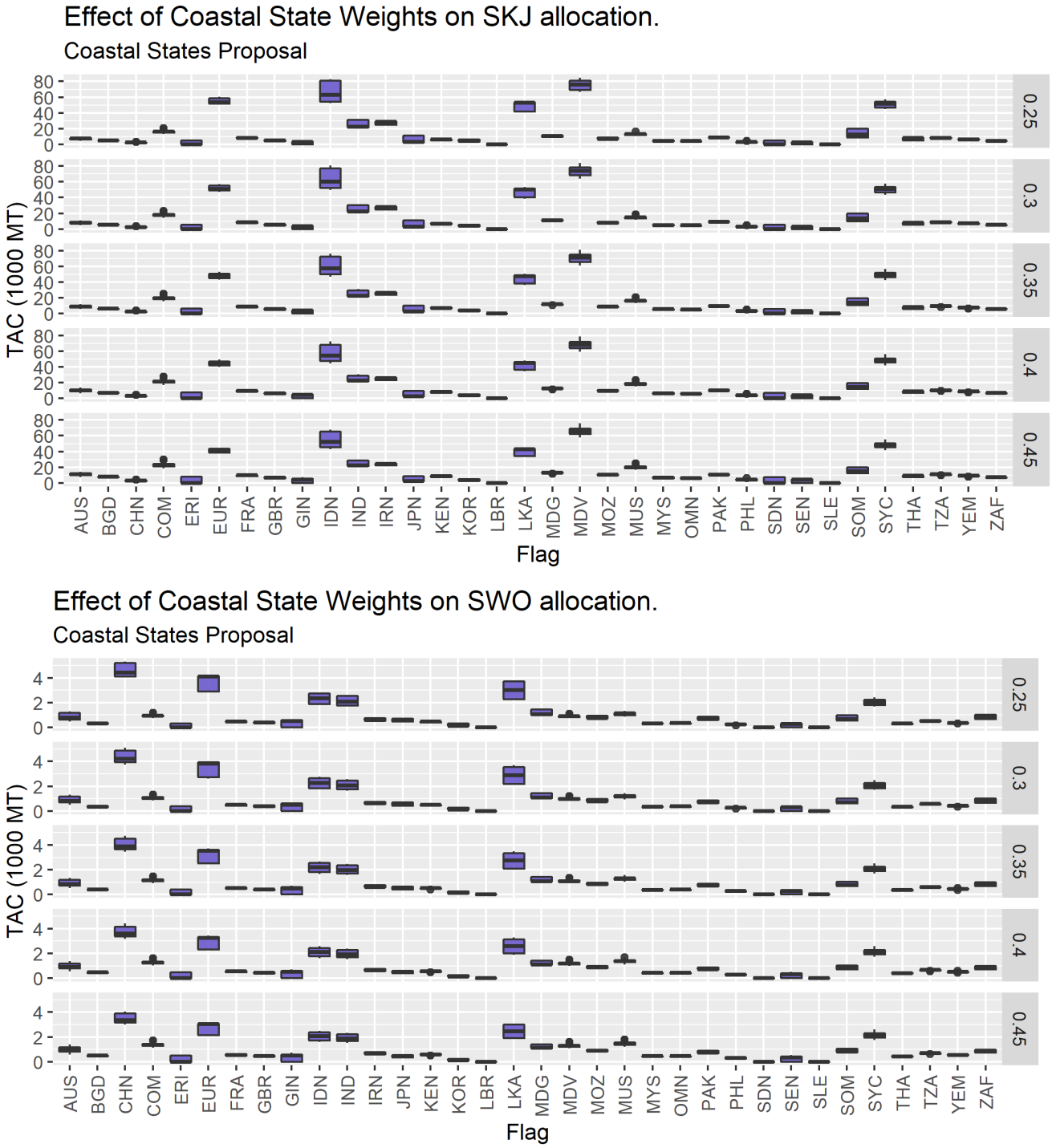

Figure A4.9 Simulation results for skipjack tuna (SKJ, top panel), and swordfish (SWO bottom panel) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels show the effect of the range of the Coastal States component of the allocation.

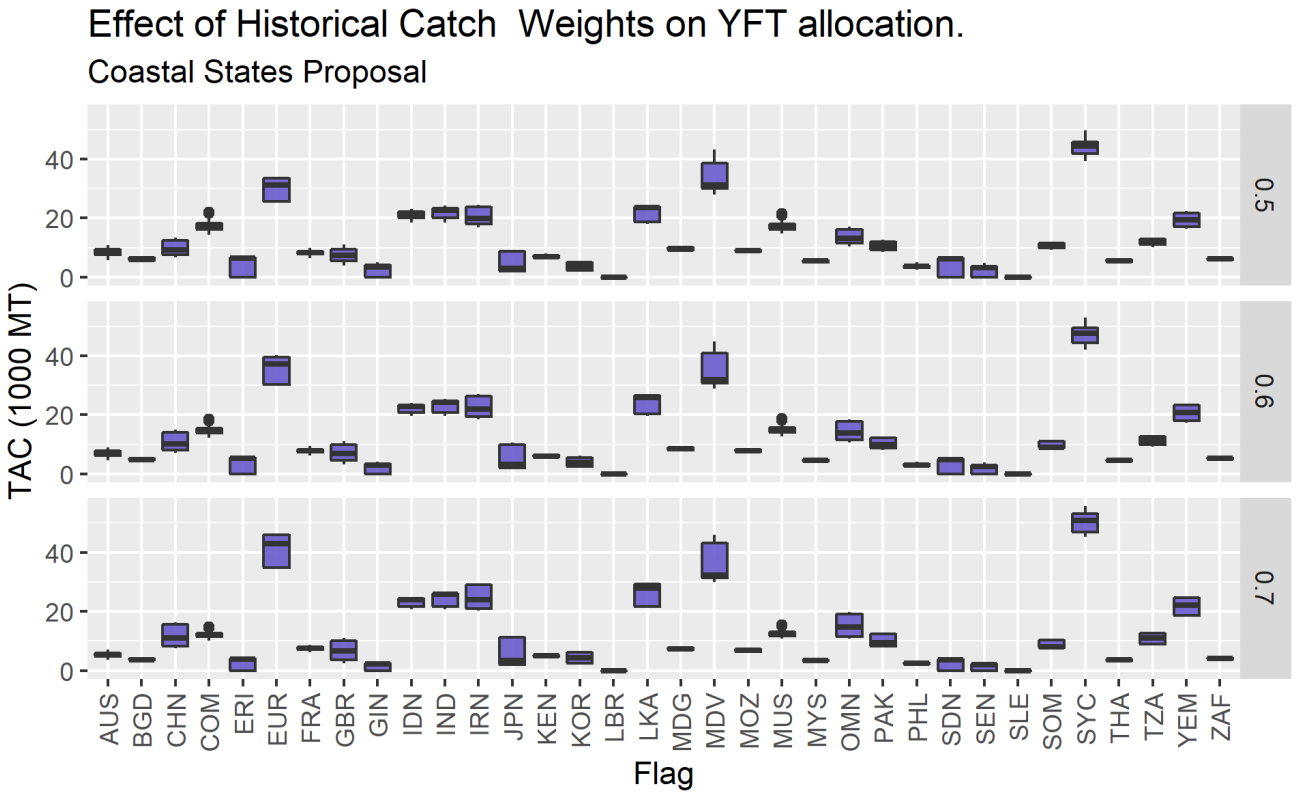

Figure A4.10. Simulation results for yellowfin tuna (YFT) based on the Coastal States Proposal The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The panels show the effect of the range of the Coastal States component of the allocation.

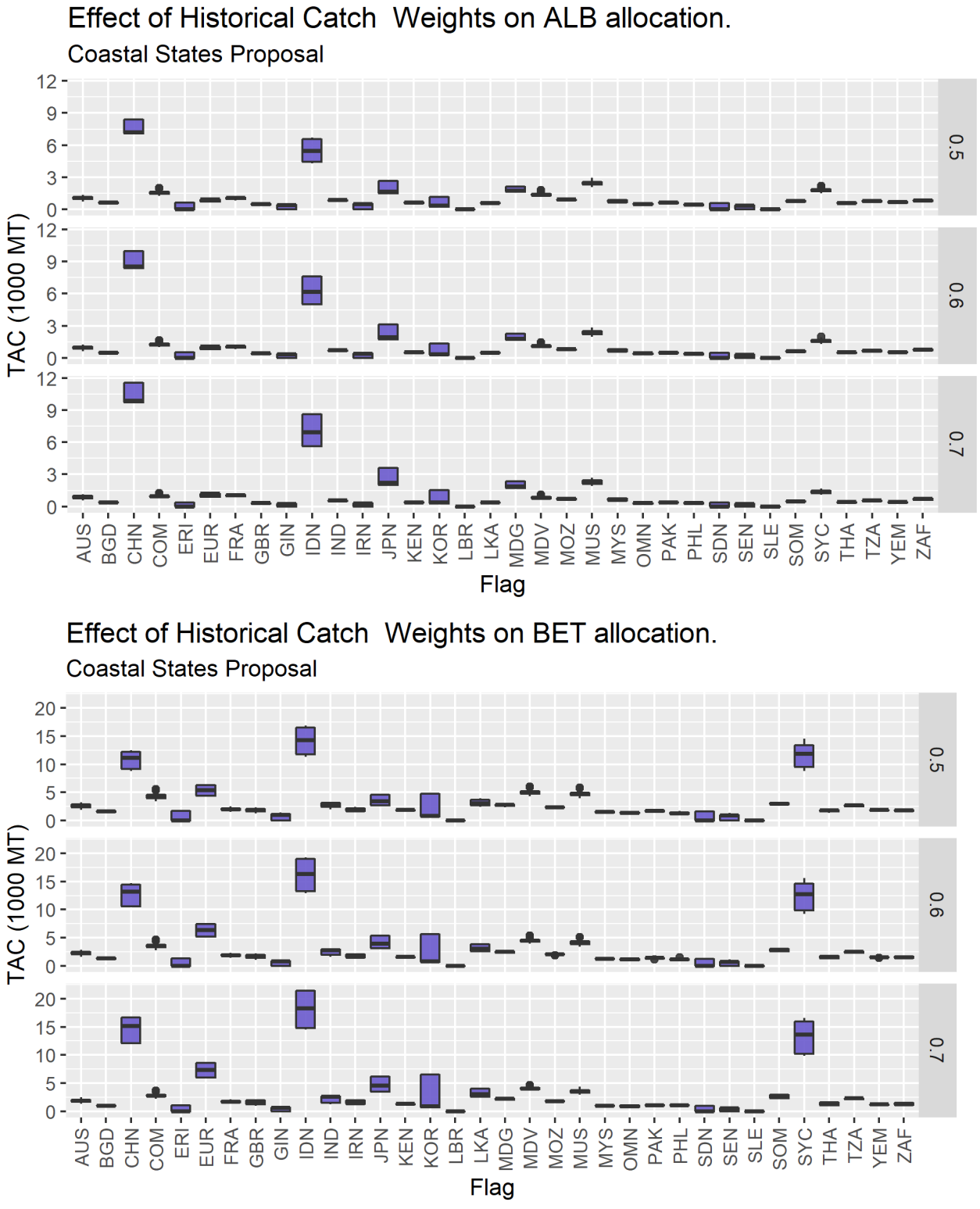

Figure A4.11. Simulation results for albacore tuna (ALB, top panel), and bigeye tuna (BET, bottom panel) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The three panels show the effect of the range of the historical allocation component of the allocation.

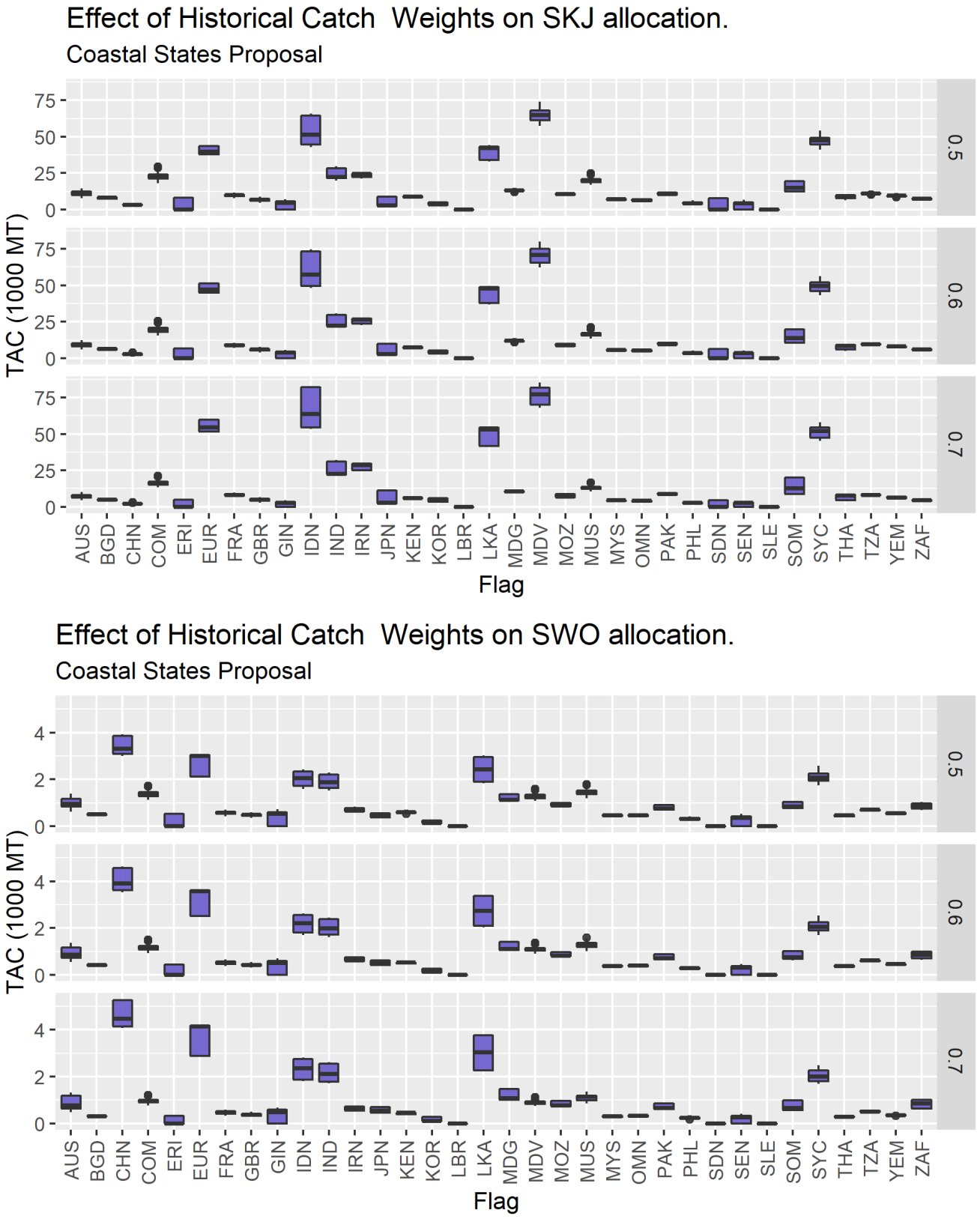

Figure A4.12. Simulation results for skipjack tuna (SKJ, top panel), and swordfish (SWO bottom panel based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The three panels show the effect of the range of the historical allocation component of the allocation.

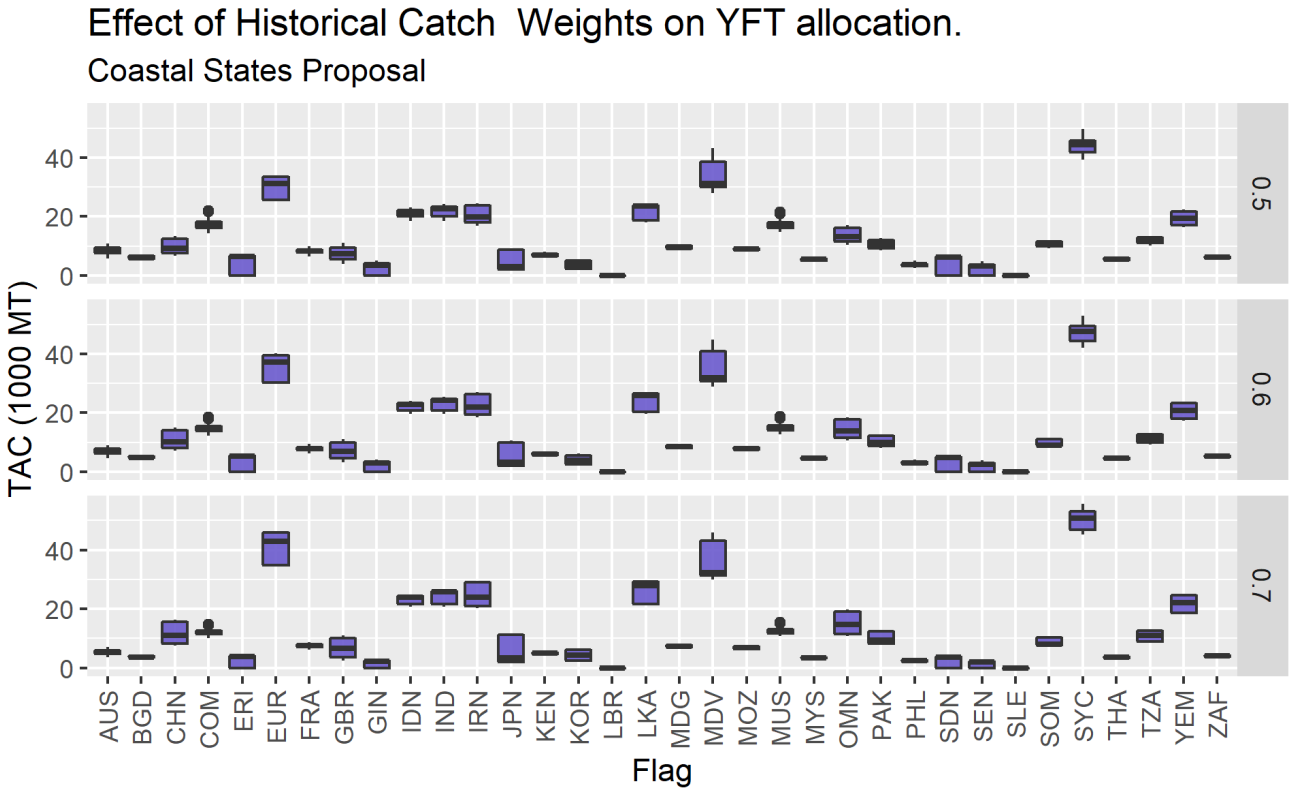

Figure A4.13. Simulation results for yellowfin tuna (YFT) based on the Coastal States Proposal. The boxplots represent the range of TAC values (1000 MT, Y axis) allocated to each flag (shown on the X axis), with the assumed ETAC (Table 1 main report). The three panels show the effect of the range of the historical allocation component of the allocation.

ANNEX 5. Comparison of Estimated TAC to average of 2012-2016 Catches.

The TCAC requested that the catch allocation (assuming the 2018 ETAC recommendations) be compared to the mean of the 2012-2016 catch by species and flag. Table A5.1 shows the mean 2012-2016 catches (in 1000 MT) for the species of interest as well as the ETAC values assumed in this report. The species-specific results from each of the proposals, for the three historical allocation results are shown in Tables A5.2-A5.6 (Coastal States) and Tables A5.7-A5.11 for the EU proposal. Figures A5.1-A5.5 show the changes for the CS proposal and figures A5.6-A5.10 show the results for the EU proposal.

Table A5.1. Comparison of the mean of the 2012-2016 catch, and the ETAC used in this report.

	1000 MT	
SPECIES_CODE	**Mean 2012-2016**	**ETAC**
ALB	**34.3**	**38.8**
BET	**100.8**	**104.0**
SKJ	**409.8**	**510.1**
SWO	**28.9**	**31.6**
YFT	**396.7**	**403.0**

Table A5.2 Difference from average 2012-2016 catch (in 1000MT) based on the Coastal States Proposal for albacore.

		Historical Allocation Method		
SPECIES_CODE	**Flag**	**15_year**	**5_year**	**Top_5**
ALB	AUS	0.746	0.594	0.858
ALB	BGD	0.491	0.539	0.452
ALB	CHN	-5.843	-4.394	-6.018
ALB	COM	1.176	1.211	1.195
ALB	ERI	0.000	0.000	0.521
ALB	EUR	-0.375	-0.344	-0.613
ALB	FRA	-0.020	0.133	0.130
ALB	GBR	0.378	0.377	0.375
ALB	GIN	0.359	0.000	0.322
ALB	IDN	-0.490	-1.923	-3.106
ALB	IND	0.689	0.672	0.639
ALB	IRN	0.422	0.000	0.390
ALB	JPN	-0.480	-0.657	0.744
ALB	KEN	0.496	0.538	0.465
ALB	KOR	-0.082	0.003	0.997
ALB	LBR	0.000	0.000	0.000
ALB	LKA	0.459	0.492	0.424
ALB	MDG	-0.665	-0.082	-0.556
ALB	MDV	1.076	1.113	1.062
ALB	MOZ	0.592	0.550	0.612
ALB	MUS	0.299	0.505	0.108
ALB	MYS	0.094	0.280	0.090
ALB	OMN	0.366	0.411	0.344
ALB	PAK	0.487	0.537	0.451
ALB	PHL	0.141	0.241	0.134
ALB	SDN	0.000	0.000	0.489
ALB	SEN	0.335	0.000	0.290
ALB	SLE	0.000	0.000	0.000
ALB	SOM	0.604	0.662	0.565
ALB	SYC	1.193	0.981	1.152
ALB	THA	0.388	0.423	0.363
ALB	TWN	NA	NA	NA
ALB	TZA	0.538	0.579	0.490
ALB	YEM	0.526	0.579	0.504
ALB	ZAF	0.516	0.413	0.537

Table A5.3 Difference from average 2012-2016 catch (in 1000MT) based on the Coastal States Proposal for bigeye.

		Historical Allocation Method		
SPECIES_CODE	**Flag**	**15_year**	**5_year**	**Top_5**
BET	AUS	1.567	1.513	1.840
BET	BGD	1.316	1.395	1.211
BET	CHN	-1.596	-5.534	-2.934
BET	COM	2.786	2.950	2.632
BET	ERI	0.000	0.000	1.377
BET	EUR	-5.245	-4.129	-6.430
BET	FRA	0.332	0.558	0.220
BET	GBR	1.302	0.793	1.501
BET	GIN	0.907	0.000	0.828
BET	IDN	-11.632	-8.860	-14.770
BET	IND	2.666	1.706	2.741
BET	IRN	0.090	0.622	0.069
BET	JPN	-0.511	-1.414	0.946
BET	KEN	1.240	1.263	1.159
BET	KOR	-0.164	-0.040	4.808
BET	LBR	0.000	0.000	0.000
BET	LKA	-1.131	-0.298	-1.637
BET	MDG	1.028	1.181	0.865
BET	MDV	1.992	1.979	1.897
BET	MOZ	1.200	1.282	1.247
BET	MUS	2.149	2.299	1.787
BET	MYS	1.242	1.171	1.208
BET	OMN	1.062	1.075	1.241
BET	PAK	1.318	1.392	1.425
BET	PHL	0.355	0.482	0.290
BET	SDN	0.000	0.000	1.295
BET	SEN	0.817	0.000	0.739
BET	SLE	0.000	0.000	0.000
BET	SOM	1.398	1.204	1.676
BET	SYC	-6.395	-4.285	-9.434
BET	THA	1.445	1.128	1.633
BET	TWN	NA	NA	NA
BET	TZA	0.877	0.985	0.718
BET	YEM	1.428	1.470	1.433
BET	ZAF	1.179	1.185	1.441

Table A5.4 Difference from average 2012-2016 catch (in 1000MT) based on the Coastal States Proposal for skipjack.

		Historical Allocation Method		
SPECIES_CODE	**Flag**	**15_year**	**5_year**	**Top_5**
SKJ	AUS	8.543	8.471	10.094
SKJ	BGD	6.451	6.840	5.936
SKJ	CHN	2.612	2.880	2.430
SKJ	COM	12.529	14.136	11.776
SKJ	ERI	0.000	0.000	6.757
SKJ	EUR	-6.300	-13.268	-11.026
SKJ	FRA	4.627	4.463	5.412
SKJ	GBR	5.537	4.823	6.461
SKJ	GIN	4.374	0.000	3.994
SKJ	IDN	-29.580	-13.353	-37.843
SKJ	IND	-6.344	1.513	-6.579
SKJ	IRN	2.945	-0.130	3.718
SKJ	JPN	1.267	1.037	8.725
SKJ	KEN	5.793	6.463	5.683
SKJ	KOR	-2.312	0.003	-1.713
SKJ	LBR	0.000	0.000	0.000
SKJ	LKA	-9.636	-8.194	-19.766
SKJ	MDG	7.075	7.322	7.695
SKJ	MDV	8.573	-2.365	3.878
SKJ	MOZ	7.901	7.686	9.307
SKJ	MUS	13.497	14.534	14.902
SKJ	MYS	5.537	5.804	5.407
SKJ	OMN	5.110	5.290	4.974
SKJ	PAK	4.283	5.524	4.345
SKJ	PHL	3.504	3.871	3.200
SKJ	SDN	0.000	0.000	6.352
SKJ	SEN	3.943	0.000	3.581
SKJ	SLE	0.000	0.000	0.000
SKJ	SOM	10.959	7.760	17.288
SKJ	SYC	-0.857	1.892	-5.485
SKJ	THA	8.625	5.819	9.113
SKJ	TWN	NA	NA	NA
SKJ	TZA	7.099	7.286	7.489
SKJ	YEM	7.724	7.307	8.037
SKJ	ZAF	6.017	6.342	5.533

Table A5.5 Difference from average 2012-2016 catch (in 1000mt) based on the Coastal States Proposal for swordfish.

		Historical Allocation Method		
SPECIES_CODE	**Flag**	**15_year**	**5_year**	**Top_5**
SWO	AUS	0.596	0.444	0.989
SWO	BGD	0.399	0.421	0.382
SWO	CHN	-1.301	-1.603	-0.612
SWO	COM	0.953	0.911	0.986
SWO	ERI	0.000	0.000	0.435
SWO	EUR	-1.806	-1.761	-2.890
SWO	FRA	0.309	0.276	0.393
SWO	GBR	0.270	0.256	0.347
SWO	GIN	0.622	0.000	0.505
SWO	IDN	-0.898	-0.525	-1.323
SWO	IND	-0.844	-0.433	-1.140
SWO	IRN	0.009	0.150	-0.036
SWO	JPN	0.005	-0.082	0.144
SWO	KEN	0.447	0.395	0.441
SWO	KOR	0.086	0.075	0.240
SWO	LBR	0.000	0.000	0.000
SWO	LKA	-1.812	-1.169	-2.476
SWO	MDG	0.281	0.247	0.626
SWO	MDV	0.746	0.795	0.819
SWO	MOZ	0.315	0.316	0.490
SWO	MUS	1.016	0.820	0.986
SWO	MYS	0.349	0.350	0.342
SWO	OMN	0.265	0.288	0.268
SWO	PAK	0.007	0.185	-0.039
SWO	PHL	0.238	0.226	0.233
SWO	SDN	0.000	0.000	0.000
SWO	SEN	0.378	0.000	0.309
SWO	SLE	0.000	0.000	0.000
SWO	SOM	0.537	0.454	0.819
SWO	SYC	-0.100	0.168	-0.305
SWO	THA	0.321	0.345	0.310
SWO	TWN	NA	NA	NA
SWO	TZA	0.411	0.427	0.448
SWO	YEM	0.434	0.449	0.421
SWO	ZAF	0.421	0.240	0.566

Table A5.5 Difference from average 2012-2016 catch (in 1000mt) based on the Coastal States Proposal for yellowfin.

		Historical Allocation Method		
SPECIES_CODE	**Flag**	**15_year**	**5_year**	**Top_5**
YFT	AUS	6.302	6.638	7.164
YFT	BGD	4.721	5.397	4.744
YFT	CHN	1.166	-1.160	5.303
YFT	COM	10.831	11.101	10.973
YFT	ERI	5.336	0.000	5.336
YFT	EUR	-26.288	-23.653	-33.297
YFT	FRA	0.847	1.809	1.316
YFT	GBR	6.478	3.644	9.801
YFT	GIN	3.165	0.000	3.163
YFT	IDN	-4.290	-3.699	-6.568
YFT	IND	-5.064	-4.588	-8.781
YFT	IRN	-14.154	-9.475	-16.914
YFT	JPN	1.894	0.592	8.790
YFT	KEN	3.953	4.738	4.181
YFT	KOR	-2.410	-0.727	1.031
YFT	LBR	0.000	0.000	0.000
YFT	LKA	-7.332	-8.276	-13.920
YFT	MDG	4.266	5.085	3.945
YFT	MDV	-17.897	-7.688	-18.738
YFT	MOZ	5.419	5.305	6.029
YFT	MUS	8.330	9.541	8.265
YFT	MYS	4.244	4.566	4.339
YFT	OMN	2.427	-0.262	6.432
YFT	PAK	1.104	2.469	4.910
YFT	PHL	2.837	3.022	2.959
YFT	SDN	5.017	0.000	5.017
YFT	SEN	2.832	0.000	2.831
YFT	SLE	0.000	0.000	0.000
YFT	SOM	5.358	5.268	7.438
YFT	SYC	-9.257	-11.432	-15.286
YFT	THA	4.397	4.565	4.618
YFT	TWN	NA	NA	NA
YFT	TZA	5.334	3.887	7.024
YFT	YEM	-8.084	-5.413	-11.040
YFT	ZAF	4.383	4.840	4.949

Table A5.7 Difference from average 2012-2016 catch (in 1000MT) based on the European Union Proposal for albacore.

		Historical Allocation Method		
SPECIES_CODE	Flag	80%Flag	90% Flag	100% Flag
ALB	AUS	0.181	0.164	0.176
ALB	BGD	0.160	0.159	0.000
ALB	CHN	-0.596	-0.603	-0.580
ALB	COM	0.299	0.296	0.344
ALB	ERI	0.000	0.000	0.000
ALB	EUR	0.341	0.379	0.447
ALB	FRA	0.062	0.081	-0.006
ALB	GBR	0.140	0.137	0.000
ALB	GIN	0.170	0.170	0.203
ALB	IDN	0.516	0.478	0.485
ALB	IND	0.211	0.211	0.239
ALB	IRN	0.134	0.134	0.000
ALB	JPN	0.523	0.575	0.664
ALB	KEN	0.136	0.135	0.163
ALB	KOR	-0.031	-0.032	-0.007
ALB	LBR	0.000	0.000	0.000
ALB	LKA	0.126	0.124	0.123
ALB	MDG	0.308	0.356	0.519
ALB	MDV	0.612	0.611	0.623
ALB	MOZ	0.305	0.289	0.331
ALB	MUS	0.672	0.702	0.763
ALB	MYS	-0.307	-0.326	-0.320
ALB	OMN	0.082	0.077	0.100
ALB	PAK	0.132	0.133	0.000
ALB	PHL	-0.010	-0.012	0.015
ALB	SDN	0.000	0.000	0.000
ALB	SEN	0.034	0.034	0.044
ALB	SLE	0.000	0.000	0.000
ALB	SOM	0.331	0.331	0.000
ALB	SYC	1.049	1.044	1.080
ALB	THA	0.102	0.102	0.129
ALB	TWN	-2.411	-2.432	-2.451
ALB	TZA	0.143	0.134	0.173
ALB	YEM	0.283	0.283	0.347
ALB	ZAF	0.184	0.165	0.174

Table A5.8 Difference from average 2012-2016 catch (in 1000MT) based on the European Union Proposal for bigeye.

		Historical Allocation Method		
SPECIES_CODE	Flag	80%Flag	90% Flag	100% Flag
BET	AUS	0.374	0.370	0.407
BET	BGD	0.427	0.427	0.000
BET	CHN	-0.096	-0.126	-0.105
BET	COM	0.621	0.627	0.721
BET	ERI	0.000	0.000	0.000
BET	EUR	-3.110	-3.088	-2.998
BET	FRA	-0.156	-0.157	-1.697
BET	GBR	0.491	0.426	0.000
BET	GIN	0.413	0.413	0.464
BET	IDN	-7.775	-7.797	-7.753
BET	IND	1.624	1.622	1.658
BET	IRN	-0.799	-0.916	-0.994
BET	JPN	2.428	2.577	2.766
BET	KEN	0.361	0.364	0.407
BET	KOR	0.261	0.274	0.324
BET	LBR	0.000	0.000	0.000
BET	LKA	-1.543	-1.566	-1.555
BET	MDG	1.077	1.092	1.404
BET	MDV	0.716	0.609	0.527
BET	MOZ	0.575	0.560	0.585
BET	MUS	1.671	1.676	1.717
BET	MYS	0.553	0.560	0.609
BET	OMN	0.227	0.275	0.333
BET	PAK	0.327	0.344	0.403
BET	PHL	-0.060	-0.076	-0.055
BET	SDN	0.000	0.000	0.000
BET	SEN	0.086	0.086	0.112
BET	SLE	0.000	0.000	0.000
BET	SOM	0.941	0.910	0.000
BET	SYC	-3.125	-2.982	-2.824
BET	THA	0.817	0.822	0.822
BET	TWN	2.961	2.954	2.950
BET	TZA	0.346	0.374	0.499
BET	YEM	0.769	0.763	0.871
BET	ZAF	0.354	0.339	0.365

Table A5.9 Difference from average 2012-2016 catch (in 1000MT) based on the European Union Proposal for skipjack.

		Historical Allocation Method		
SPECIES_CODE	Flag	80% Flag	90% Flag	100% Flag
SKJ	AUS	2.347	2.345	2.476
SKJ	BGD	2.095	2.095	0.000
SKJ	CHN	1.763	1.763	1.895
SKJ	COM	2.391	2.359	2.648
SKJ	ERI	0.000	0.000	0.000
SKJ	EUR	16.860	17.420	18.177
SKJ	FRA	2.089	2.068	-2.512
SKJ	GBR	1.987	1.877	1.896
SKJ	GIN	1.966	1.966	2.140
SKJ	IDN	-20.799	-20.937	-20.866
SKJ	IND	-8.808	-8.845	-8.724
SKJ	IRN	6.373	6.783	7.266
SKJ	JPN	2.288	2.292	2.430
SKJ	KEN	1.672	1.719	1.894
SKJ	KOR	-3.221	-3.346	-3.338
SKJ	LBR	0.000	0.000	0.000
SKJ	LKA	0.997	0.872	0.957
SKJ	MDG	5.925	5.771	6.902
SKJ	MDV	25.629	25.432	25.355
SKJ	MOZ	3.992	3.869	4.342
SKJ	MUS	8.878	8.847	8.916
SKJ	MYS	1.776	1.776	1.908
SKJ	OMN	2.203	1.993	1.934
SKJ	PAK	0.828	0.735	0.763
SKJ	PHL	1.763	1.763	1.895
SKJ	SDN	0.000	0.000	0.000
SKJ	SEN	0.416	0.416	0.544
SKJ	SLE	0.000	0.000	0.000
SKJ	SOM	5.677	4.988	0.000
SKJ	SYC	6.919	6.941	7.254
SKJ	THA	4.519	4.542	4.697
SKJ	TWN	-0.046	-0.050	-0.054
SKJ	TZA	2.477	2.418	2.807
SKJ	YEM	4.058	3.934	4.285
SKJ	ZAF	1.764	1.764	1.896

Table A5.10 Difference from average 2012-2016 catch (in 1000MT) based on the European Union Proposal for swordfish.

		Historical Allocation Method		
SPECIES_CODE	Flag	80% Flag	90% Flag	100% Flag
SWO	AUS	0.515	0.515	0.537
SWO	BGD	0.130	0.130	0.000
SWO	CHN	-0.127	-0.132	-0.127
SWO	COM	0.322	0.321	0.358
SWO	ERI	0.000	0.000	0.000
SWO	EUR	-0.840	-0.819	-0.771
SWO	FRA	0.128	0.120	0.113
SWO	GBR	0.116	0.113	0.000
SWO	GIN	0.396	0.398	0.423
SWO	IDN	-0.839	-0.838	-0.818
SWO	IND	-0.840	-0.834	-0.813
SWO	IRN	-0.217	-0.249	-0.269
SWO	JPN	0.398	0.420	0.463
SWO	KEN	0.148	0.144	0.118
SWO	KOR	0.131	0.131	0.149
SWO	LBR	0.000	0.000	0.000
SWO	LKA	-1.286	-1.301	-1.292
SWO	MDG	0.382	0.364	0.488
SWO	MDV	0.388	0.379	0.339
SWO	MOZ	0.228	0.217	0.264
SWO	MUS	0.837	0.829	0.848
SWO	MYS	0.120	0.120	0.137
SWO	OMN	0.000	0.012	0.041
SWO	PAK	-0.182	-0.177	-0.153
SWO	PHL	0.143	0.144	0.162
SWO	SDN	0.000	0.000	0.000
SWO	SEN	0.066	0.067	0.081
SWO	SLE	0.000	0.000	0.000
SWO	SOM	0.289	0.279	0.000
SWO	SYC	0.150	0.165	0.194
SWO	THA	0.092	0.091	0.098
SWO	TWN	0.832	0.888	0.944
SWO	TZA	0.148	0.145	0.200
SWO	YEM	0.233	0.232	0.000
SWO	ZAF	0.228	0.210	0.208

Table A5.11 Difference from average 2012-2016 catch (in 1000MT) based on the European Union Proposal for yellowfin.

		Historical Allocation Method		
SPECIES_CODE	Flag	80% Flag	90% Flag	100% Flag
YFT	AUS	1.397	1.384	1.566
YFT	BGD	1.571	1.566	0.000
YFT	CHN	1.660	1.674	1.884
YFT	COM	2.856	2.796	3.142
YFT	ERI	1.512	1.512	0.000
YFT	EUR	-8.064	-7.381	-6.386
YFT	FRA	-1.181	-1.290	-11.623
YFT	GBR	2.094	1.703	1.504
YFT	GIN	1.463	1.463	1.698
YFT	IDN	0.732	1.102	1.602
YFT	IND	-8.569	-9.233	-9.652
YFT	IRN	-10.060	-9.950	-9.688
YFT	JPN	6.801	7.223	7.795
YFT	KEN	1.203	1.254	1.500
YFT	KOR	-2.571	-2.680	-2.614
YFT	LBR	0.000	0.000	0.000
YFT	LKA	-2.883	-2.993	-2.878
YFT	MDG	4.153	4.183	5.398
YFT	MDV	-16.617	-16.664	-16.486
YFT	MOZ	2.964	2.858	3.388
YFT	MUS	5.610	5.572	5.736
YFT	MYS	1.658	1.669	1.875
YFT	OMN	1.575	1.309	1.226
YFT	PAK	-1.628	-1.686	-1.569
YFT	PHL	1.764	1.778	1.987
YFT	SDN	1.469	1.469	0.000
YFT	SEN	0.318	0.318	0.430
YFT	SLE	0.000	0.000	0.000
YFT	SOM	3.563	3.408	0.000
YFT	SYC	0.966	0.926	1.186
YFT	THA	1.818	1.820	1.996
YFT	TWN	6.444	7.001	7.559
YFT	TZA	0.872	0.504	0.600
YFT	YEM	-4.187	-4.200	-3.511
YFT	ZAF	1.358	1.329	1.495

ANNEX 5 FIGURES

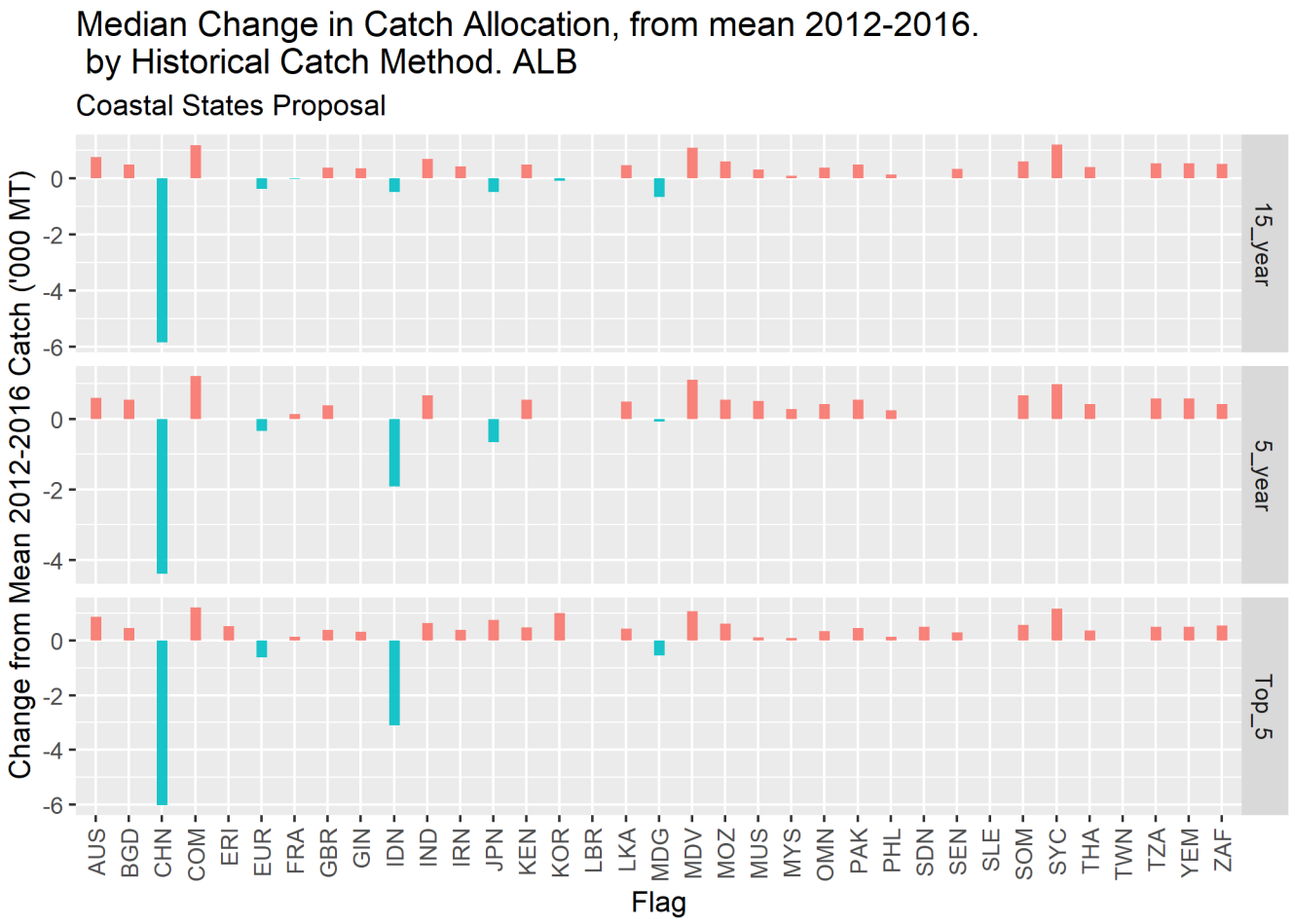

Figure A5.1. Median change in catch allocation from average 2012-2016 catch, based on the Coastal States proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for albacore.

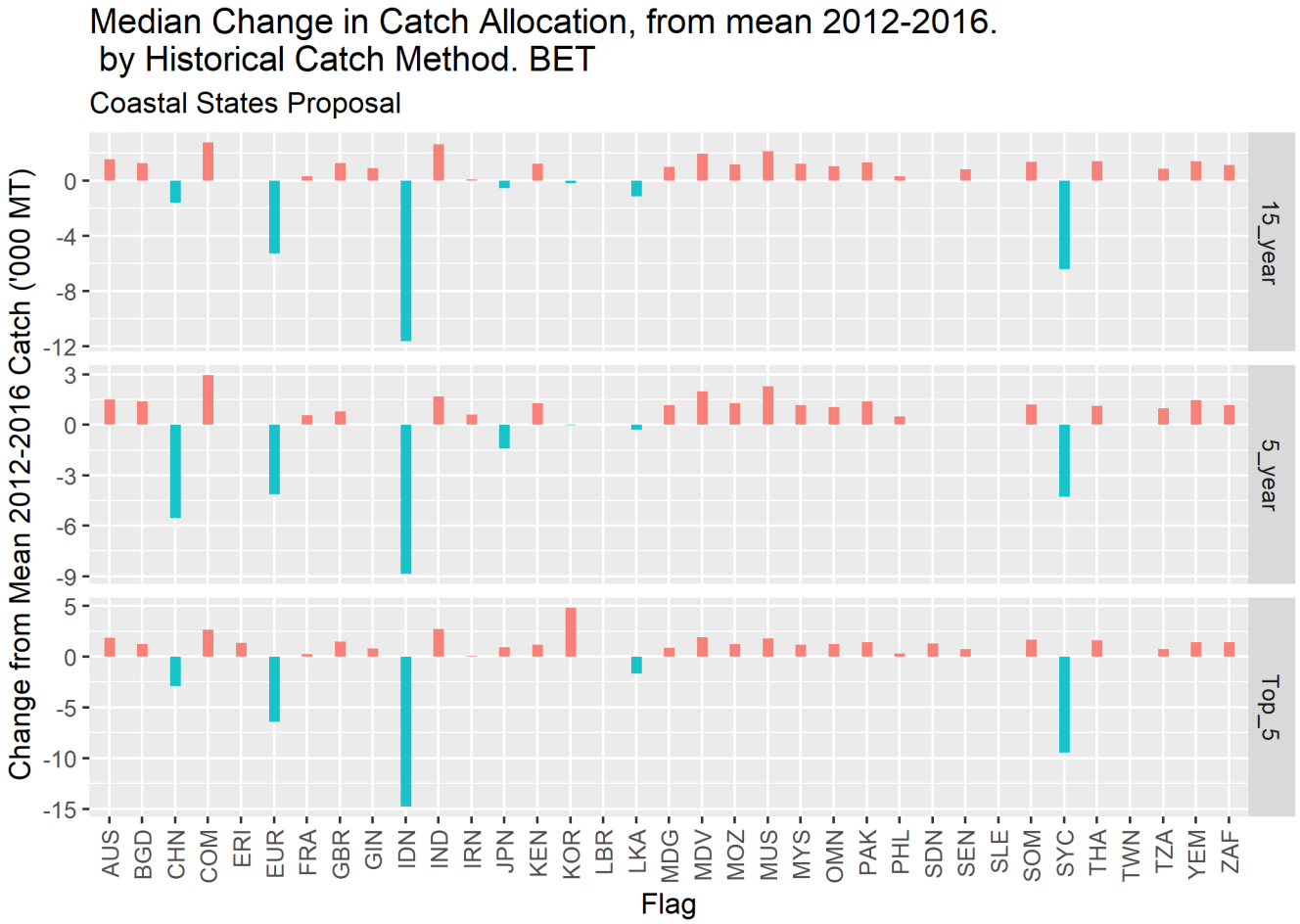

Figure A5.2. Median change in catch allocation from average 2012-2016 catch, based on the Coastal States proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for bigeye.

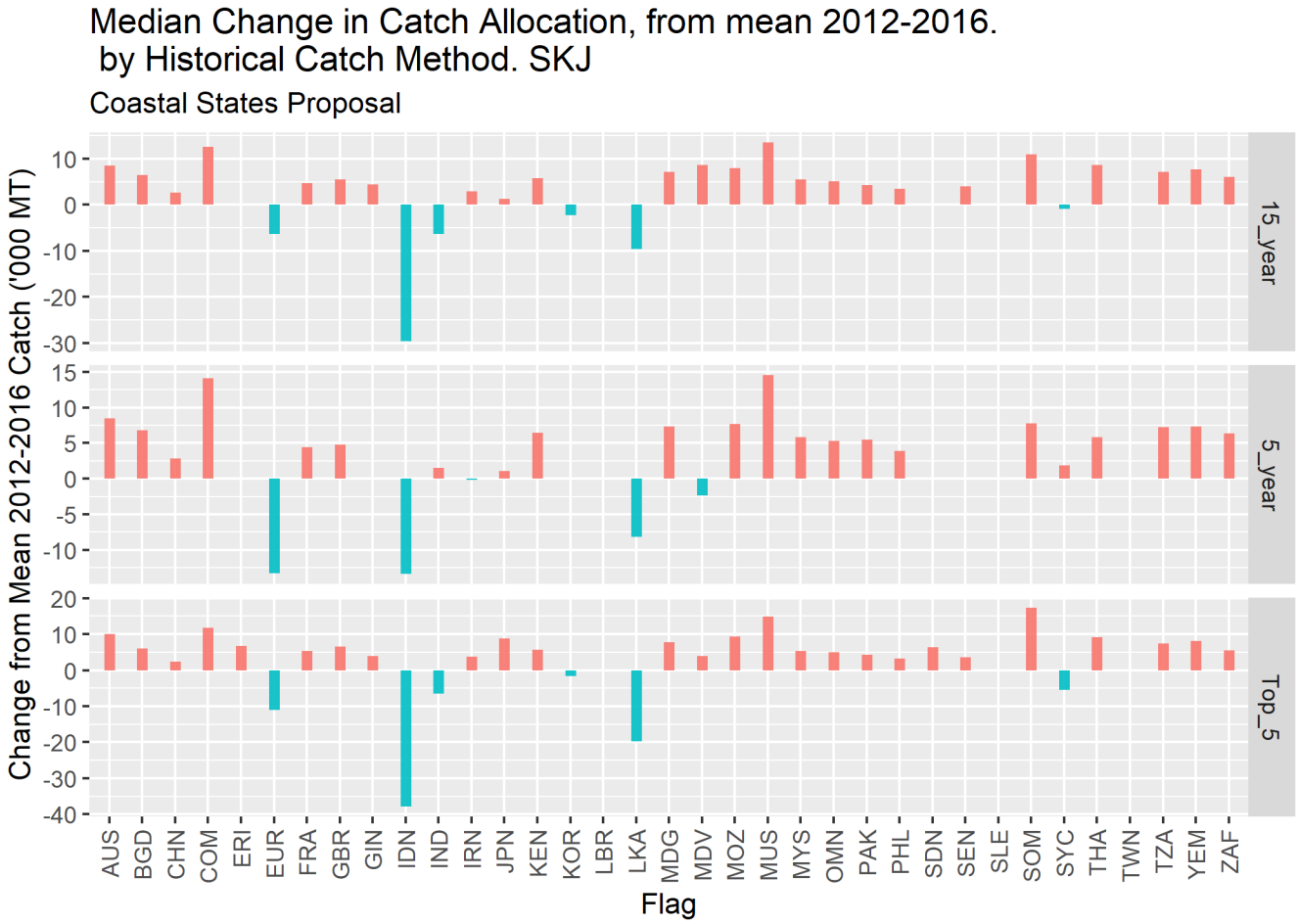

Figure A5.3. Median change in catch allocation from average 2012-2016 catch, based on the Coastal States proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for skipjack.

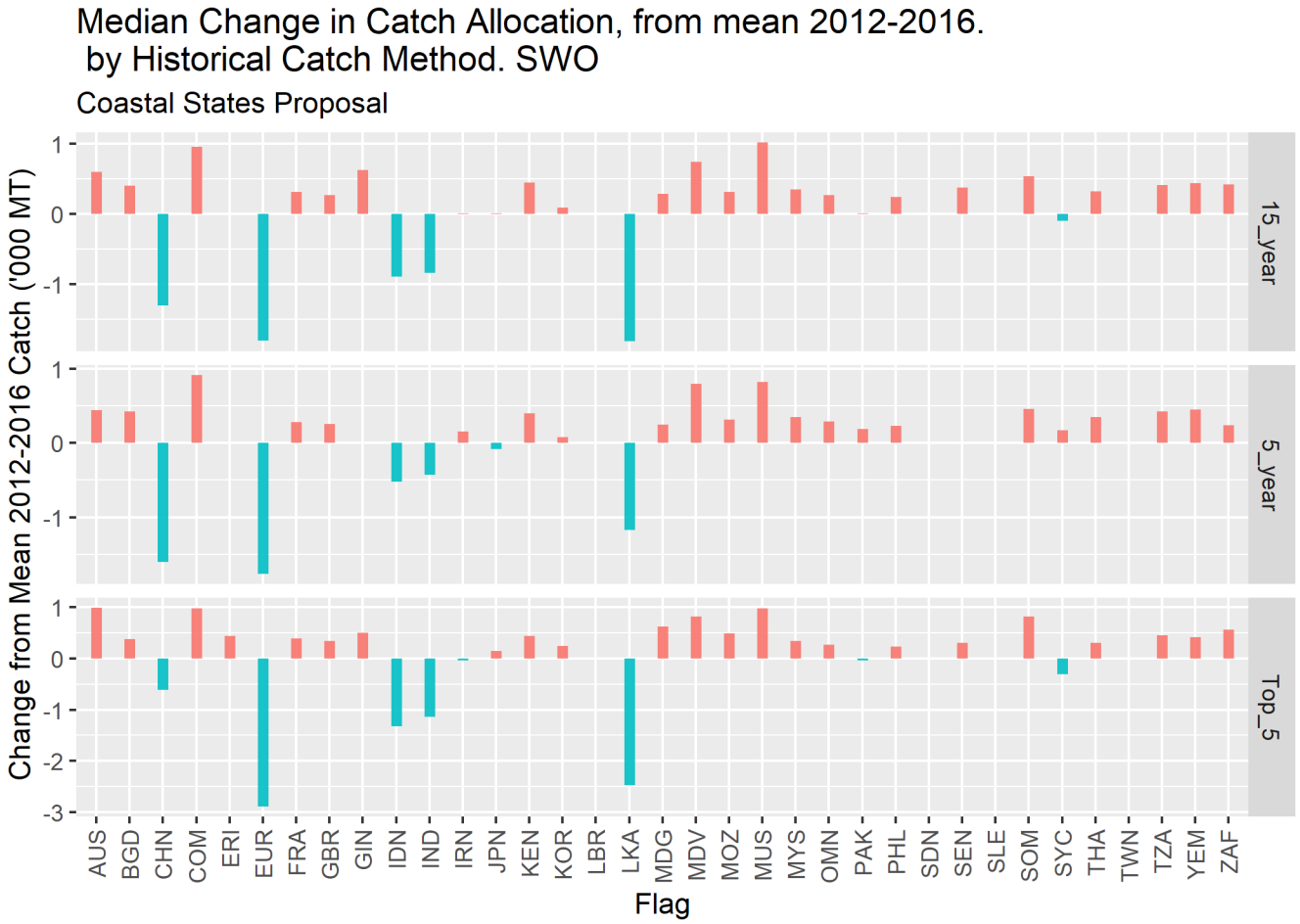

Figure A5.4. Median change in catch allocation from average 2012-2016 catch, based on the Coastal States proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for swordfish.

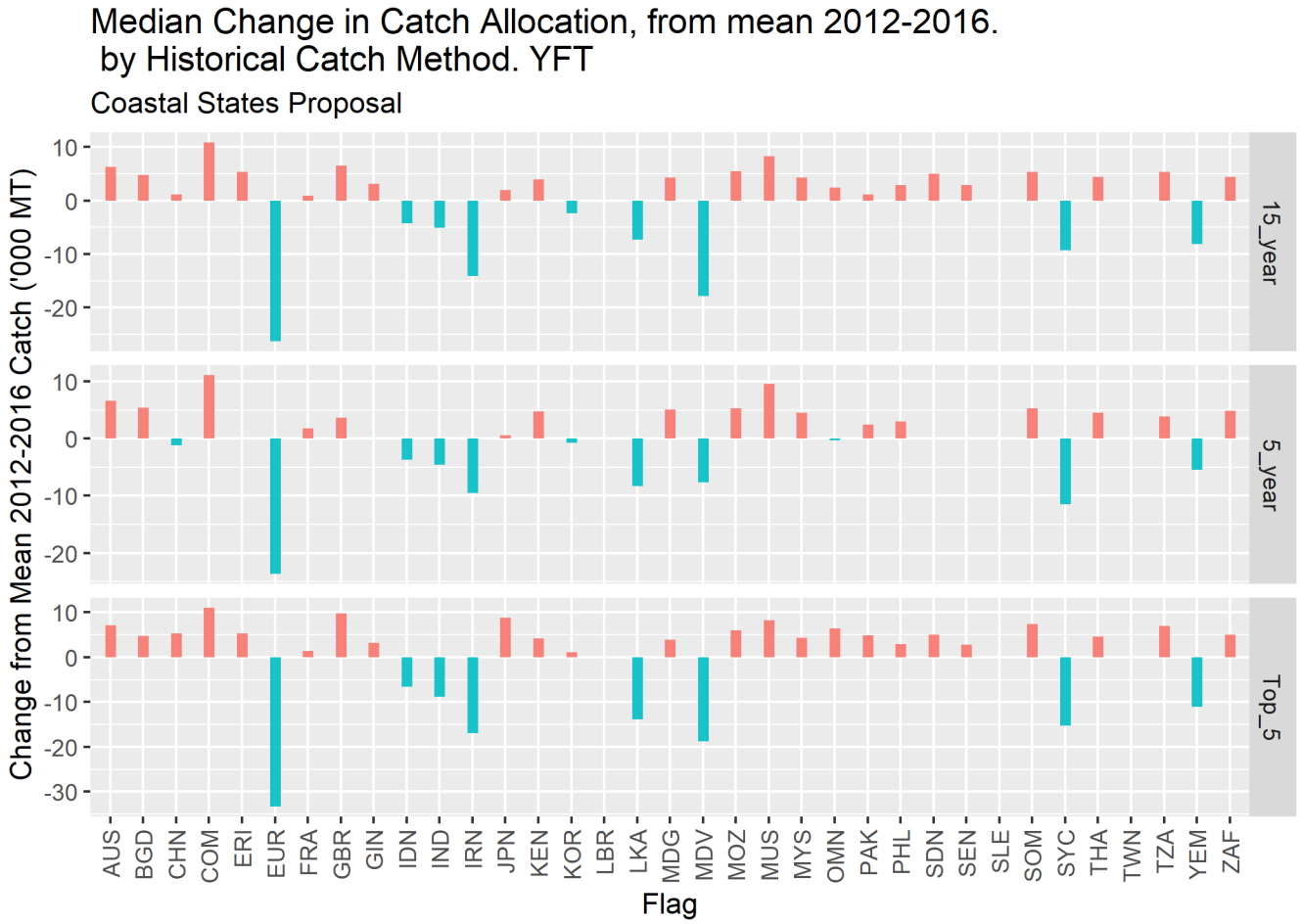

Figure A5.5. Median change in catch allocation from average 2012-2016 catch, based on the Coastal States proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for yellowfin.

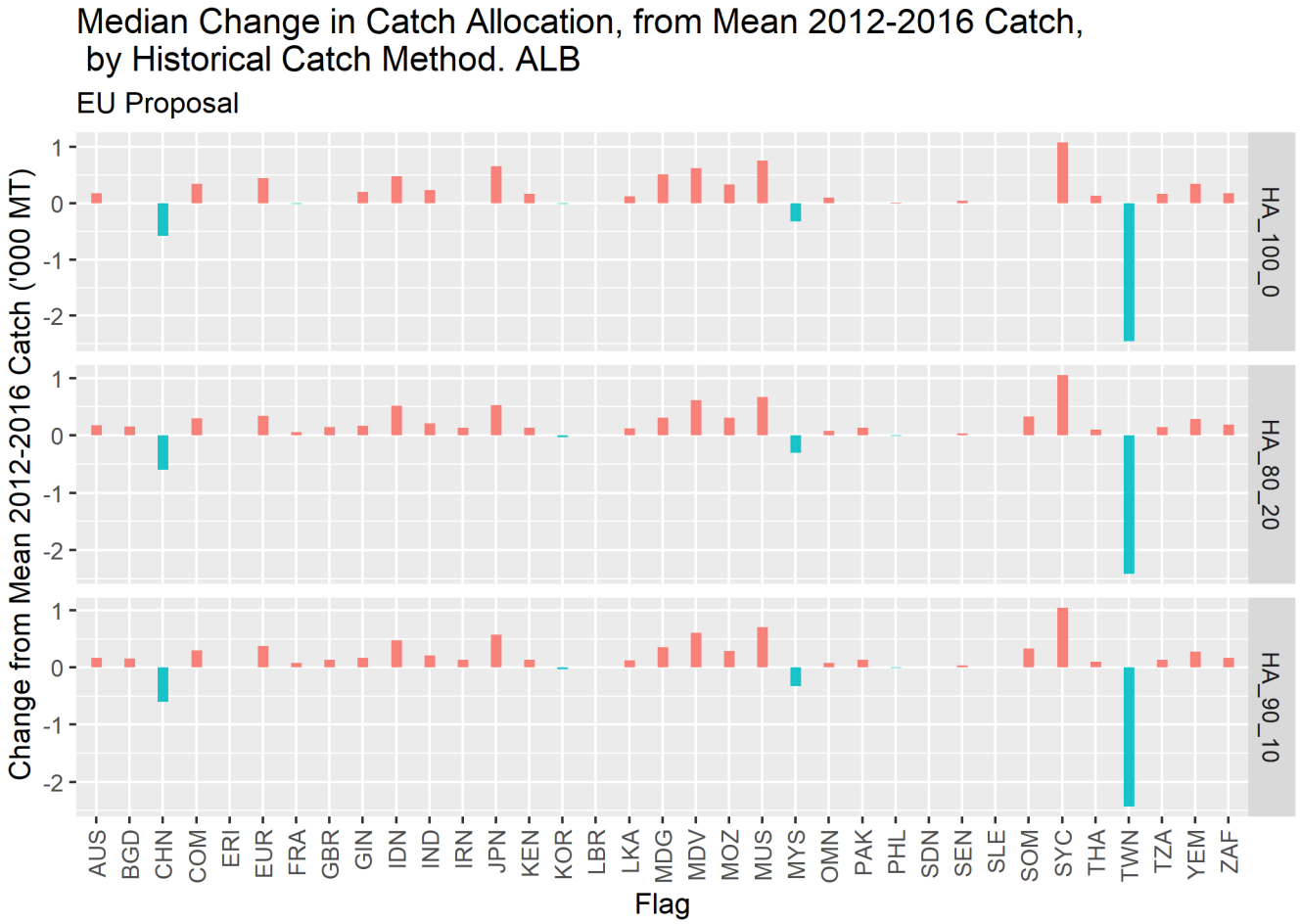

Figure A5.6. Median change in catch allocation from average 2012-2026 catch, based on the EU proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for albacore.

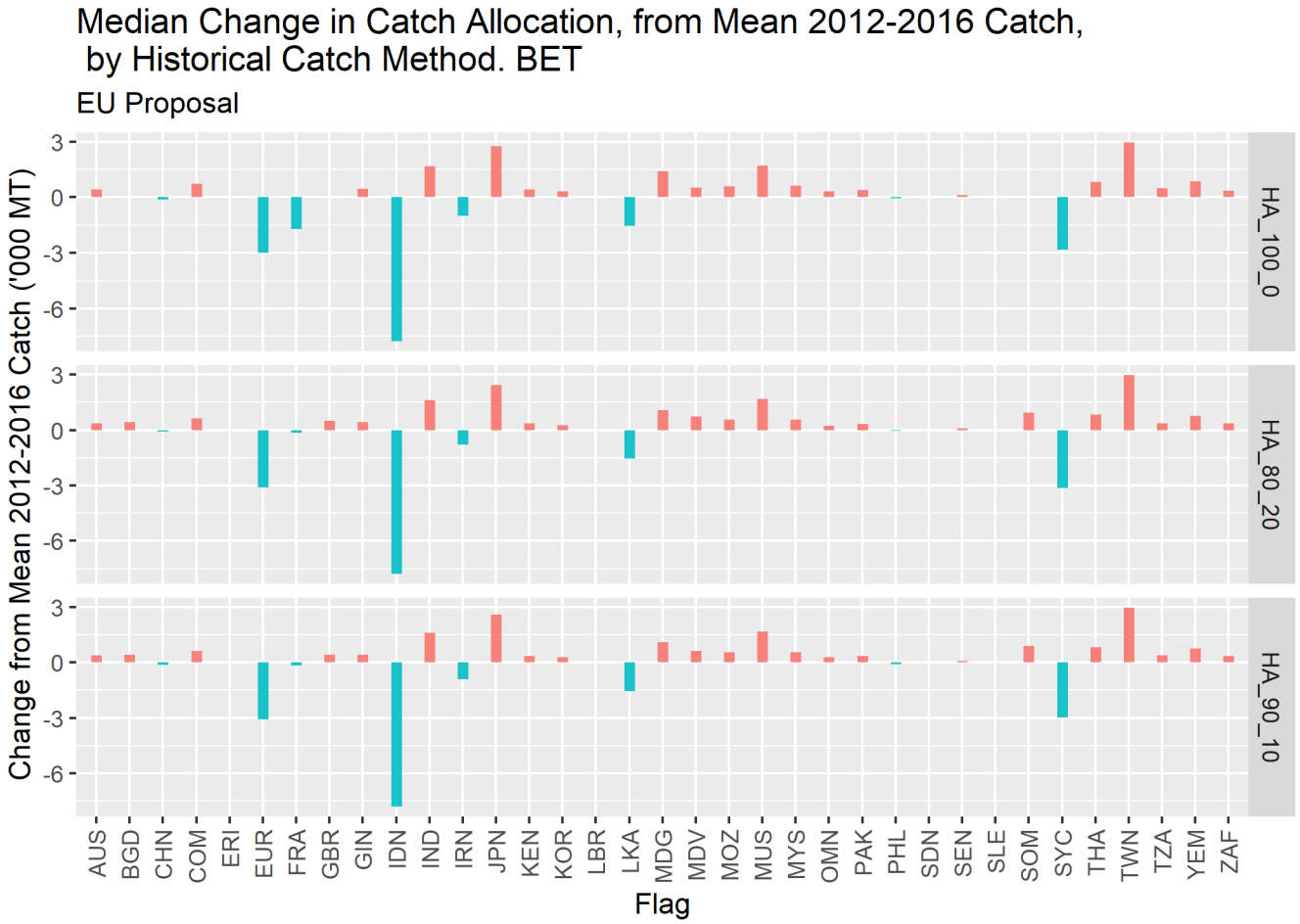

Figure A5.7. Median change in catch allocation from average 2012-2016 catch, based on the EU proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for bigeye.

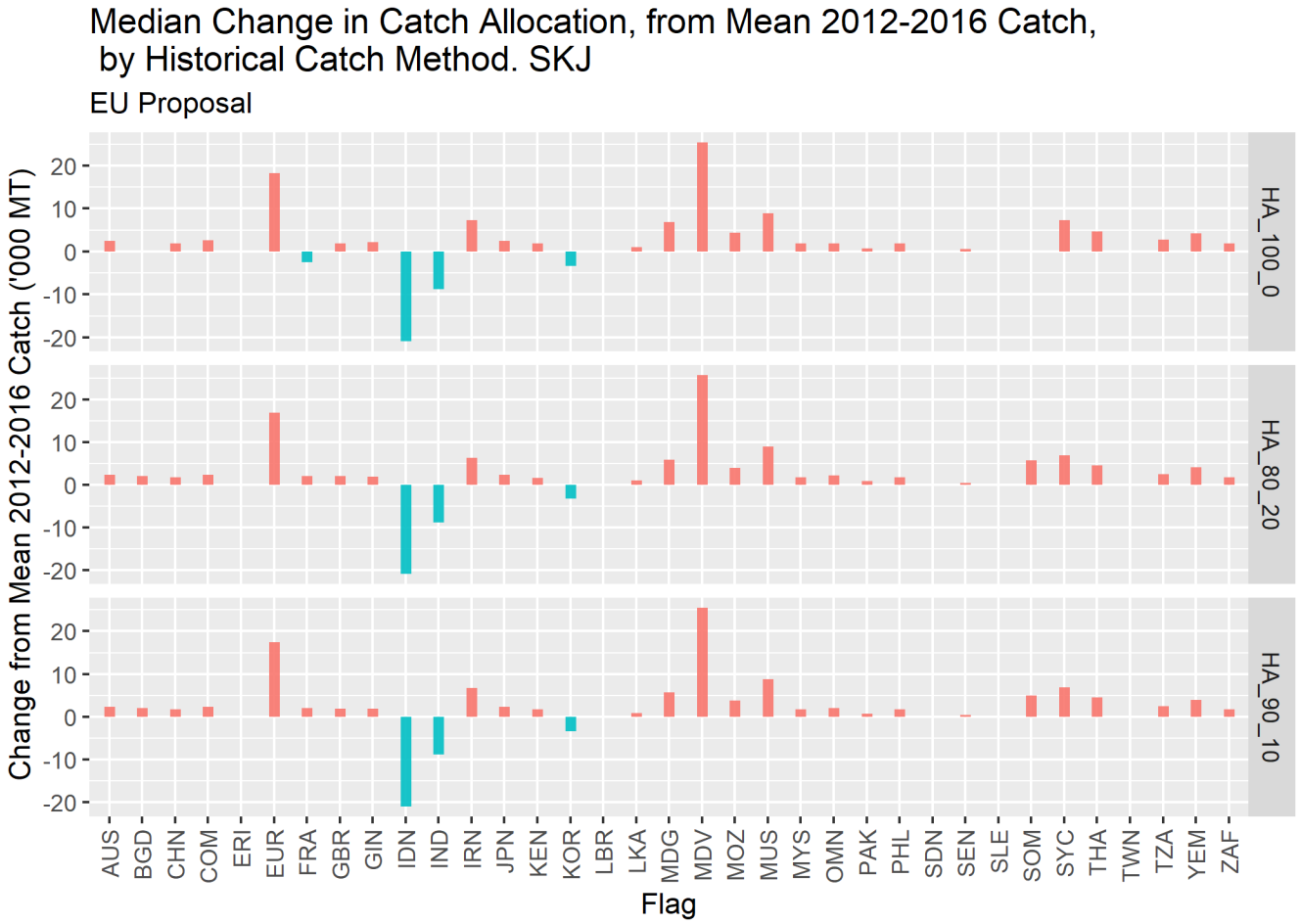

Figure A5.8. Median change in catch allocation from average 2012-2016 catch, based on the EU proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for skipjack.

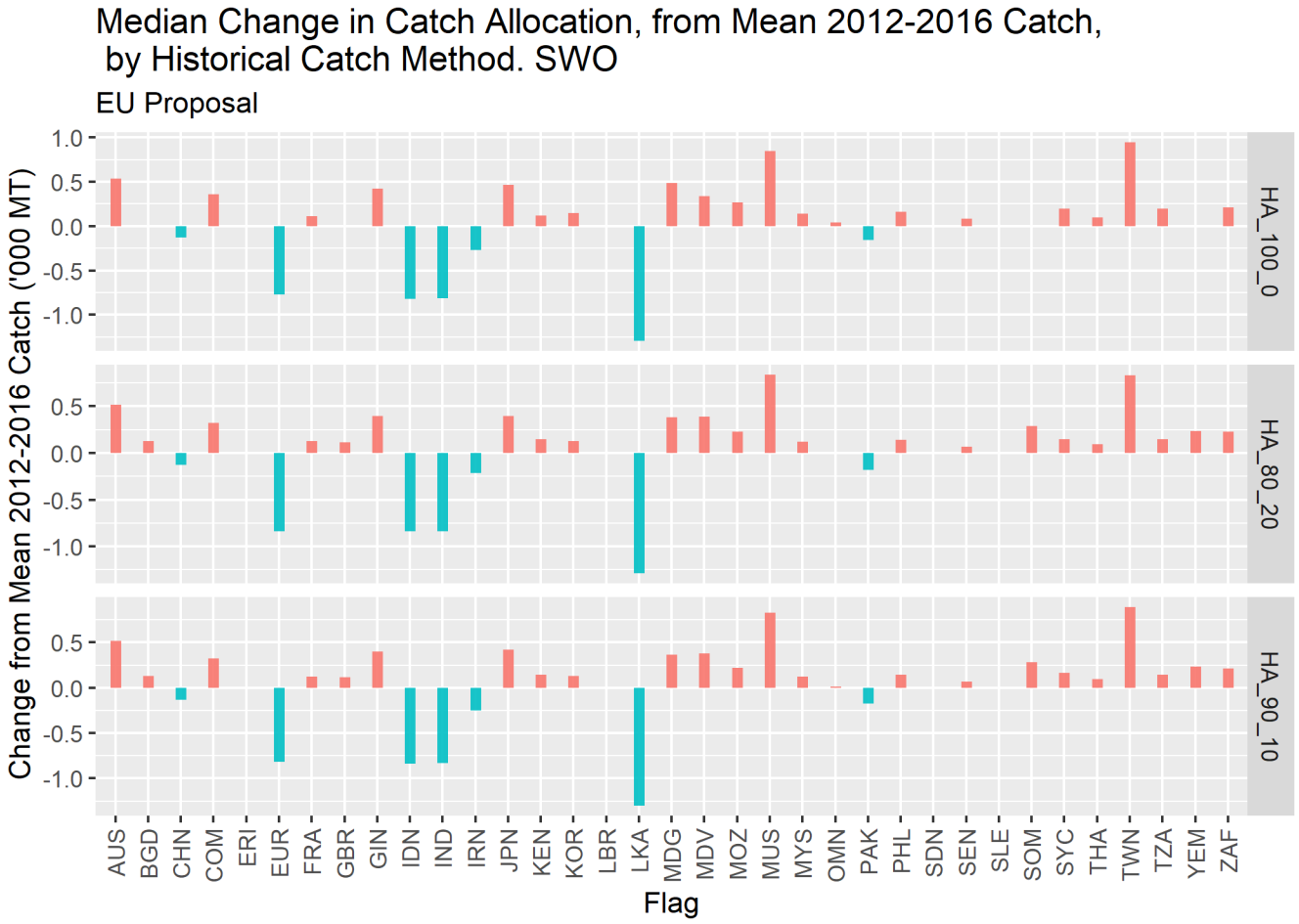

Figure A5.9. Median change in catch allocation from average 2012-2016 catch, based on the EU proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for swordfish.

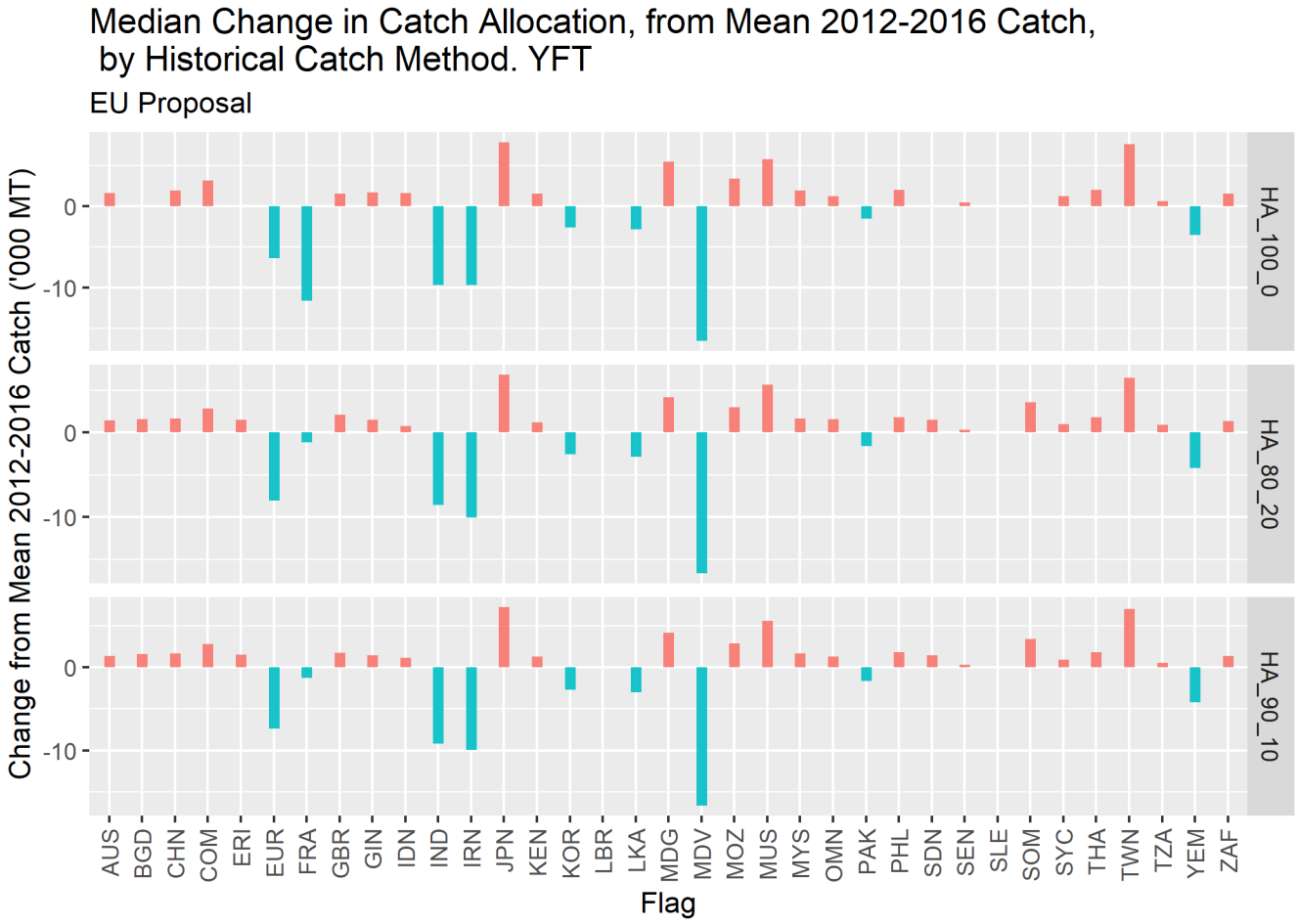

Figure A5.10. Median change in catch allocation from average 2012-2016 catch, based on the EU proposal. Catches (in 1000 MT) based on the historical catch allocation method (in panels), for yellowfin.

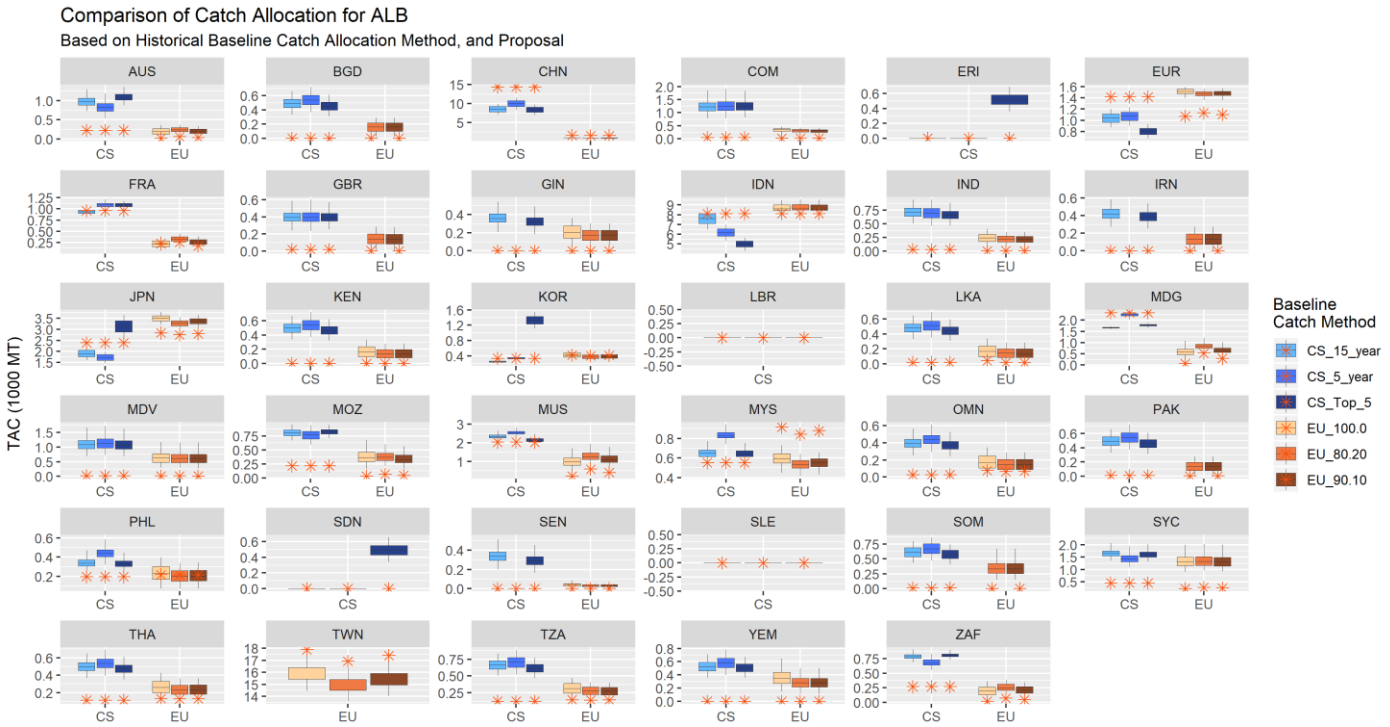

Figure A5.11. Comparison of catch allocations based on the Coastal States Proposal (blue box plots) and the EU proposal (brown shaded box plots) by flag, for albacore. The red stars indicate the average catch for the period 2012-2016 for each proposal.

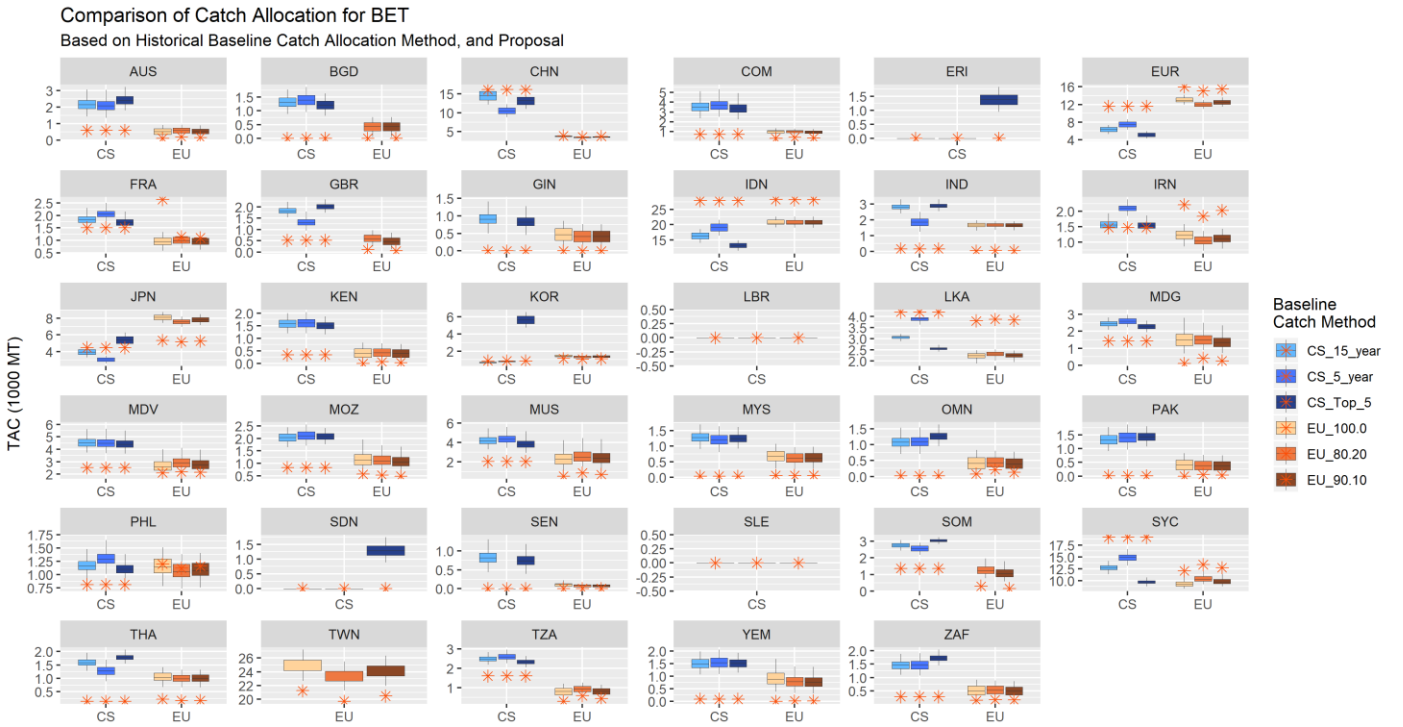

Figure A5.12. Comparison of catch allocations based on the Coastal States Proposal (blue shaded box plots) and the EU proposal (brown shaded box plots) by flag, for bigeye. The red stars indicate the average catch for the period 2012-2016 for each proposal.

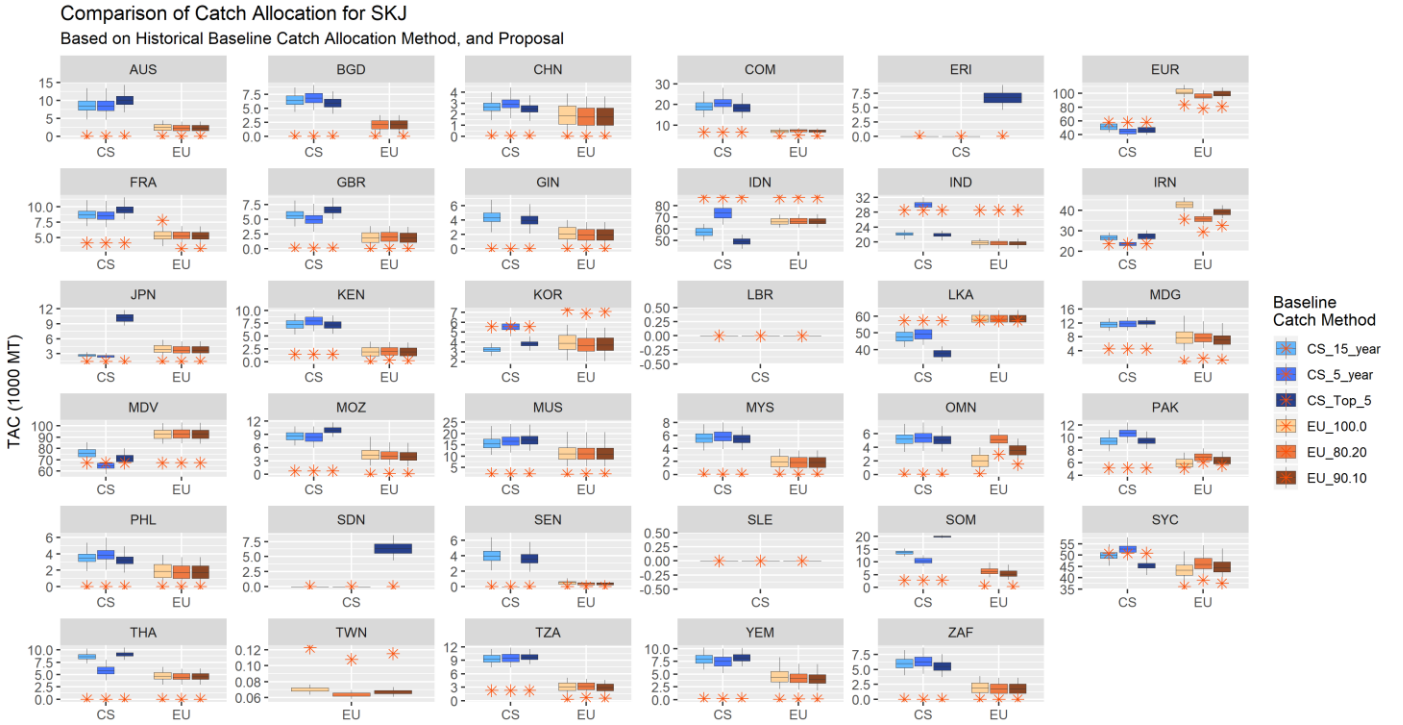

Figure A5.13. Comparison of catch allocations based on the Coastal States Proposal (blue shaded box plots) and the EU proposal (brown shaded box plots) by flag, for skipjack. The red stars indicate the average catch for the period 2012-2016 for each proposal.

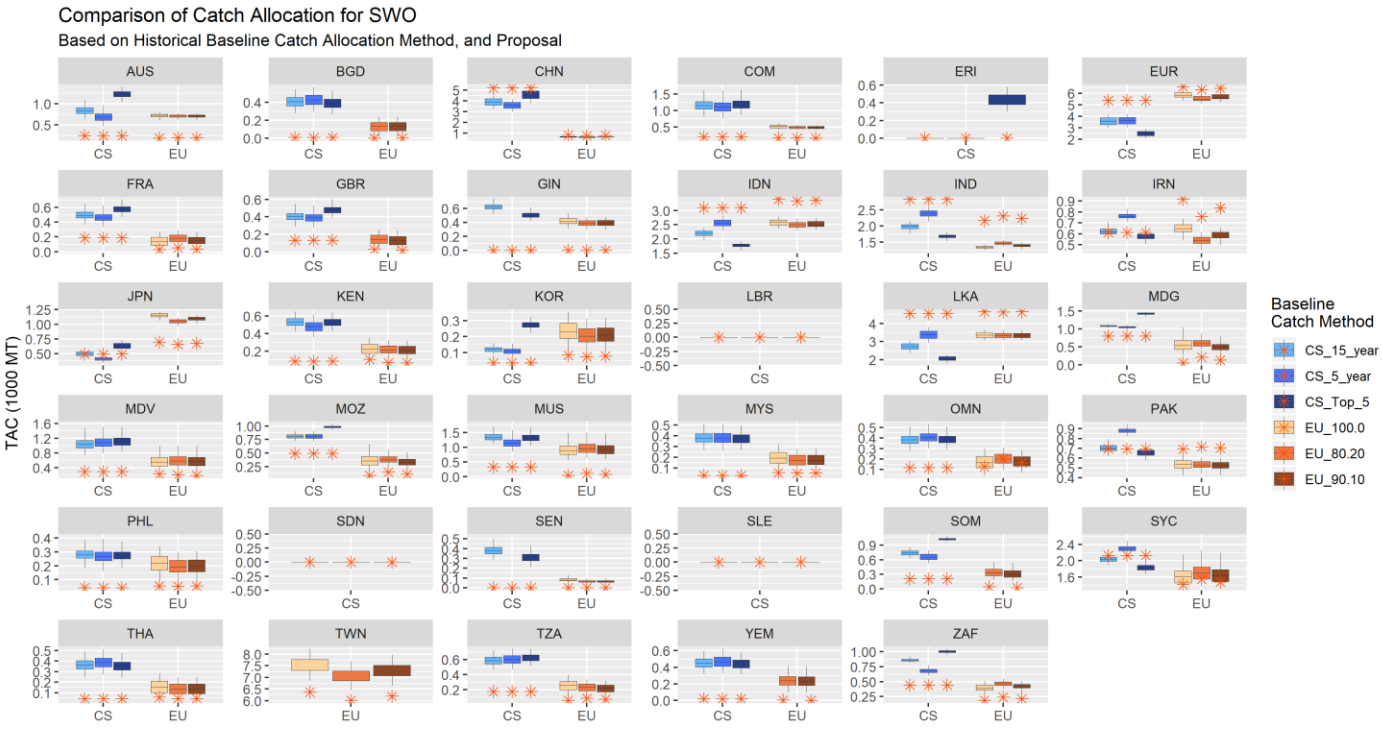

Figure A5.14. Comparison of catch allocations based on the Coastal States Proposal (blue shaded box plots) and the EU proposal (brown shaded box plots) by flag, for swordfish. The red stars indicate the average catch for the period 2012-2016 for each proposal.

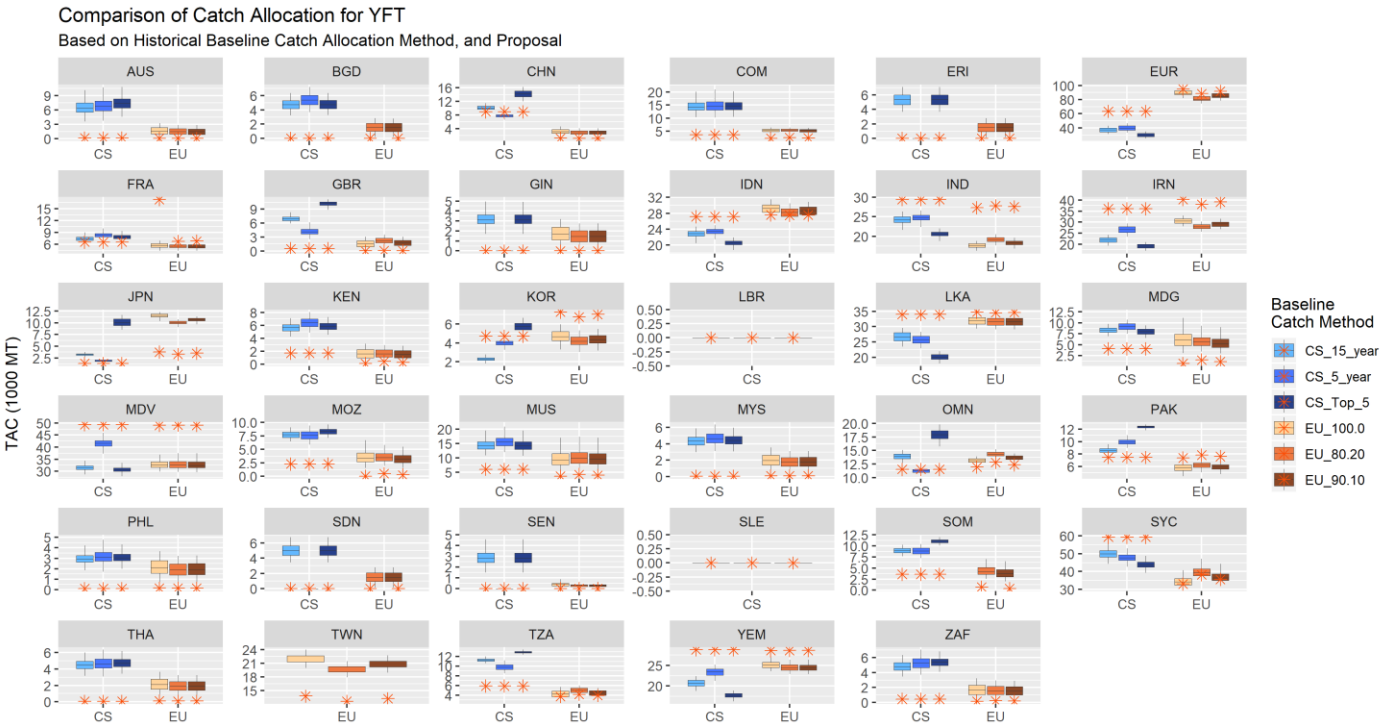

Figure A5.15. Comparison of catch allocations based on the Coastal States Proposal (blue shaded box plots) and the EU proposal (brown shaded box plots) by flag, for yellowfin. The red stars indicate the average catch for the period 2012-2016 for each proposal.