THIRD INTERSESSIONAL MEETING OF PANEL 2 ON BLUEFIN TUNA MSE
(Online, 14 July 2022)

1. Opening of the Meeting and meeting arrangements

The meeting was opened by the Chair of Panel 2, Mr. Shingo Ota (Japan).

2. Nomination of Rapporteur

Mr. Mathieu Pellerin (Canada) was appointed as rapporteur.

3. Adoption of Agenda

The agenda (**Appendix 1**) was adopted without changes. The List of Participants is included in **Appendix 2.**

4. Update on BFT MSE framework and Candidate Management Procedure (CMPs) by SCRS
5. Candidate management procedure performance, refinement and selection

These Agenda items were discussed together.

Dr John Walter (the SCRS) presented an update on the BFT-MSE framework, including CMP development, performance, refinement, and selection (**Appendix 3**). With the withdrawal by the developers of two CMPs that did not meet the lowest depletion $(LD^*)_{15}$ requirement, there are currently 6 CMPs remaining that are under development. Also, two indices were deemed unsuitable by the SCRS in their present condition to be used for CMP inputs. After this, the choice of indices used in each CMP was at the discretion of developers with emphasis placed on whether the CMPs performed well when using these indices.

Additional requested statistics

The SCRS presented three additional or revised performance statistics, including the probability of overfishing (**PrpOF**), which is represented by the proportion of simulation years in which the annual harvest rate (U= catch/B) is above U_{MSY} (fixed harvest rate corresponding to SSB_{MSY} at year 50) for projection years 1-30; **AvUrel**, which consists of the average of U/U_{MSY} for projection years 1-30; and a revised **AvgBr**, which is now the average of B/B_{MSY} for years 11-30 (compared to years 1-30 before).

SCRS responses to feedback provided at the previous Intersessional Meeting of PA2

The SCRS tested a 3-year management cycle on two CMPs (BR and TC) and presented the results for one of those including variants (BR) (**Appendix 4**). The SCRS indicated that performance was slightly inferior than with the 2-year cycle, which means that practical considerations, such as maintaining a constant TAC for a longer period to support industry stability and reducing administrative burden, may support a 3-year management cycle if so decided by Panel 2.

As requested by Panel 2 at the May meeting, the SCRS also tested all CMPs with a phase-in period with maximum TAC variations of +20%/-10%. The phase-in made little difference to long-term biomass or yield outcomes, and thus confirmed that it is a viable approach.

The SCRS also evaluated a symmetrical stability provision for a TAC variation of +20%/-20% compared to the default option of +20%/-30%. The +20%/-20% option was slower to implement necessary TAC decreases and thus had lower yield and biomass performance (i.e., greater risk). The SCRS has not yet evaluated the +20%/-20% option with a 3-year management cycle scenario but expects performance to be worse since not even the +20%/-30% option had satisfactory performance as regards B_{LIM} requirements with that scenario.

CMP performance, refinement and selection

The SCRS presented recent results from the 6 remaining CMPs in revised quilt plots to show overall rankings and key performance trade-offs for management objectives. Most CMPs perform best when TAC variations are limited to +20%/-30% between management cycles. Most developers have completed development tuning of the CMPs, but there are still opportunities to improve before getting into performance tuning. Below is the primary quilt plot for the West and East for tuning level 2 (i.e., Br30=1.25 for West and Br30=1.5 for East) and using the default weighting scheme.

CMP	West					East					Tot	# indices
	PGK (Mean)	AvC10 (50%)	AvC30 (50%)	VarC (50%)	LD (15%)	PGK (Mean)	AvC10 (50%)	AvC30 (50%)	VarC (50%)	LD (15%)		
BR2a	0.63	3.02	2.72	12.61	0.49	0.78	40.9	32.65	16.56	0.66	0.26	10
AI2a	0.58	3.03	2.77	16.43	0.53	0.71	41.16	37.62	16.17	0.65	0.27	10
TC2a	0.61	2.83	2.64	6.71	0.4	0.73	33.43	29.21	8.18	0.54	0.48	7
FO2a	0.62	2.84	2.77	14.29	0.48	0.64	37.37	30.46	13.93	0.47	0.53	6
LW2a	0.59	2.68	2.56	15.63	0.5	0.72	34.63	30.27	17.21	0.6	0.58	4
PW2a	0.67	2.37	2.29	17.11	0.45	0.74	35.36	29.93	13.27	0.6	0.71	4

6. **Key decisions for 14 July**
7. **Feedback and guidance on additional changes to CMPs by PA2 to the SCRS**

These Agenda items were discussed together.

Decision point #1: 2-year vs. 3-year management cycle.

Testing carried out by the SCRS showed that a 3-year cycle was slower to react to signals to decrease the TAC and had a biomass status (Br30) slightly below the 50th percentile and slightly reduced AvC30, except for the stability clause +20/-30% with practically constant average catch, and coupled with slightly higher variability in average annual TAC changes, although these changes remained below 20%. To compensate, the SCRS explored greater allowable TAC reductions (+20%/-35% stability) that improved Br30 status slightly for both eastern and western stocks. As previously stated, performance was only slightly inferior and practical considerations may support a 3-year management cycle.

The SCRS suggested that the decision to adopt a 2- or 3- year management cycle should be made at this meeting, if at all possible, to facilitate further CMP development and testing in the time remaining this year. Two CPCs supported a 3-year management cycle while several CPCs supported a 2-year management cycle. Some of the CPCs favoring the 2-year option argued that it would be better for transitioning and adapting to the MSE. Further, many stressed that the CMPs performed better under the 2-year management period. The linkage to the stability clause was also highlighted, including the need for larger TAC reductions under a 3-year management cycle. A CPC favouring the 3-year option noted that the differences are often related to the second decimal place, and highlighted that a 3-year management cycle in combination with greater TAC reductions (+20%/-35%) performs better than 2-year management cycle with +20%/-30% TAC stability. The SCRS noted that such maximum TAC reduction seldom occurs only when abrupt deterioration of resources happens. It was also noted that the information available to the Panel on the impact of a 3-year management period was very limited, with some initial testing provided relative to only one CMP and no information provided on the performance relative to the status objective. Some of these CPCs also noted the possibility to change to a 3-year or longer management cycle when the MSE might be reviewed in 6 years. Finally, a CPC highlighted that MSE was a tool that would make decisions about the TAC level much easier since the CMP would simply identify the required TAC each time it was applied. Given that, the administrative burden associated with TAC setting in ICCAT should not be substantial. In light of the impasse, the SCRS suggested several possible ways forward to try and meet the needs expressed while ensuring that the CMP developers could complete their work in the available time, including conducting sensitivity analyses looking at the 3-year management period or waiting until finalist CMPs have been identified and then testing both 2- and 3-year management periods in this smaller number of CMPs. These options were not acceptable to one CPC.

The SCRS noted that leaving the management cycle question undecided will increase the workload of the SCRS as they will need to test more combinations, and that developers will not be able to test all CMPs with 2-year and 3-year cycles, especially in view of the fact that the 3-year cycle has so far not been tested (or at best tested only to a limited extent) by developers. As there was no consensus on this matter during the meeting, Panel 2 agreed to convey the discussion to the developers and ask them to conduct, if possible, testing of a 3-year management cycle in addition to the 2-year default management cycle, noting that it is up to the developers to determine what can be tested. The EU noted that it would have problems moving forward with the process down the road and may not be able to make a decision if not enough testing was done on the 3-year management cycle option. Moreover, the EU highlighted that all CMP testing should adequately cover both options on the duration of the management cycle that will be considered by Panel 2, i.e., 2-year and 3-year long management cycle, on an equal footing. The EU made a statement to this effect, which is included as **Appendix 5.**

Decision point #2: Incorporation of 'phase-in' as default.

Following testing of the phase-in approach across CMPs, the SCRS found that it made little difference to long-term biomass (risk) or yield outcomes and is thus confirmed as a viable approach. A CPC noted, however, that testing seemed to indicate that LD performance was worse using the phase-in and that, therefore, it should be possible to achieve more yield without using the phase-in while increasing safety. The phase-in would limit any upward/downward TAC changes to +20%/-10% for the first two management cycles if a 2-year cycle is adopted by Panel 2. It is important to note that, should Panel 2 opt for a 3-year management cycle, the phase-in approach would only be applied to the first management cycle. Panel 2 agreed to move forward with the phase-in approach, whether it is used once or twice will depend on the pending decision regarding management cycle length.

Panel 2 also discussed the question of the general stability clause (i.e., TAC stability between management periods), which would apply after the phase-in period. It agreed to keep using the +20%/-30% option as the default limits on TAC variation with the 2-year management cycle scenario but acknowledged that a greater decrease (i.e., -35%) might be necessary to achieve the same stock safety with a 3-year cycle scenario.

Decision point #3: Culling of CMPs that fail thresholds defined in the 2nd Intersessional Meeting of Panel 2 on BFT MSE (9-10 May 2022).

Decision point #4: Culling of lowest performers.

These decision points were discussed together.

Since the previous meeting, two CMPs that did not meet the LD_{15} requirement were withdrawn by the developers, which means that there are currently 6 CMPs remaining under development. The SCRS noted that this makes the culling of additional CMPs less important in the short term as there are already fewer CMPs to work with. The remaining 6 CMPs are satisfying the B_{LIM} of 0.4 dynamic SSB_{MSY} at LD_{15} over projection years 11-30, and they all are satisfying (or nearly) the requirement to be at or above 60% probability of being in the green quadrant of a Kobe plot (PGK) for the default tuning level (median Br30 of 1.25 for the western stock and 1.50 for the eastern).

Panel 2 discussed whether any other CMPs apart from the two that have been withdrawn by the developers should be culled right now. One CPC suggested culling 2 CMPs (LW and PW) that incorporate fewer indices than the others. However, most CPCs were not ready to exclude any CMPs from the process. As there was no consensus from Panel 2 as regards CMP culling, it was decided to keep all six remaining CMPs as the SCRS did not need a decision on culling at this point. It was further noted that CMP developers may yet withdraw more CMPs if they are not performing.

Feedback and guidance on additional changes to CMPs by PA2 to the SCRS

a)   Preferences on yield 'path'

The SCRS mentioned that recent high abundance is expected to result in increased catches (both in the East and the West stocks) in the short term, followed by a decline. The SCRS sought Panel 2 views on whether the possibility of tuning CMPs to reduce the size of that variation in order to spread it over a longer period should be investigated. Panel 2 requested that the developers take its preference for more stability into account and, to the extent possible, investigate approaches aimed at smoothing out "peaks".

b)   Further preferences on desirable CMP features

The SCRS noted that some CMPs use all of the approved indices to set TACs, while others use as few as two per management area. While the SCRS acknowledges that there is some robustness associated with having more indices within a CMP, most CMPs that use two indices calculate an average over multiple years. This means that these CMPs are robust enough in case one year of data is missing, but vulnerable if one of the indices was entirely dropped.

Some CPCs demonstrated a clear preference for CMPs that have more indices. One CPC was also concerned about CMPs that only use indices related to western spawning stock abundance and do not account for western area abundance in TAC-setting. Another CPC noted that it is important to recognize that not all indices are equal or interchangeable, with some being more helpful in correctly assessing stock status, and suggested that it might be better to focus on performance rather than the number of indices at this point. As there was no consensus, Panel 2 agreed for CMP development to continue with the indices they currently use and to not drop any CMPs based on the number of indices.

c)   Performance tuning options

The SCRS mentioned that it will soon discuss the process of performance tuning to achieve a higher yield while meeting minimum safety and status objectives. The SCRS noted that all CMPs might not be able to meet both targets of PGK60% and LD_{15}. A CPC clarified that LD_{15} should be treated as a limit and not a target. The same is true for PGK. It was stressed that the idea of performance tuning is to achieve greater yield while not falling below those limits. The SCRS agreed, noting that it is likely that achieving 60% PGK as a minimum will be more precautionary than the LD_{15} limit.

The SCRS expressed concerns about the workload related to testing all remaining combinations with 6 CMPs (i.e., LD_5, LD_{10}, LD_{15}, 2-year vs 3-year management cycles, etc.). The SCRS noted that they can keep both 2-year and 3-year management cycle options on the table, but that one will be primary and the other secondary with limited set of variance. In terms of the LD performance statistic, Panel 2 agreed to keep only LD_{15} and LD_{10} for performance tuning and to drop LD_5. Regarding the PGK performance statistic, 60% was agreed as the lower limit and the SCRS will also show higher options in the results.

Overall, testing will continue on the remaining 6 CMPs using the following parameters:

–   2-year management cycle and 3-year management cycle (up to the developers to see what can be tested), with default TAC variation limit of +20%/-30% for 2-year cycle and +20%/-30% and +20%/-35% for 3-year cycles;

–   Default phase-in approach to limit any upward/downward TAC changes to +20%/-10%. This is applicable for the first two CMP applications with the 2-year management cycle option but only for the first CMP application with the 3-year management cycle option;

– LD_{15} and LD_{10} values for B_{LIM} and minimum PGK of 60%.;

–   Performance tuning to maximize yield for both the East and West stocks, while respecting established values for B_{LIM} and PGK.

The Panel also discussed what to expect from SCRS prior to and at the 14 October intersessional meeting. The SCRS noted its intention to continue performance tuning to identify top performers, of which two were already proving to be better performers than the rest. The SCRS will provide feedback on all remaining CMPs at the 14 October meeting and may recommend some CMPs be culled if they do not perform well. The SCRS will provide the rationale for removal to aid decision-making, including presenting performance results in quilt plots. The SCRS will also present the top performers so all 6 CMPs can be compared. However, developers may withdraw their CMPs before then if they cannot reach satisfactory performance or they are no longer able to continue working on them. The Panel was generally supportive of this approach, noting, in particular, that there should be no artificial limitation on the number of CMPs or CMP variants that can be presented in October for consideration. The SCRS noted that multiple viable options would likely be presented in October unless there is one CMP that is clearly far superior to the rest and that performance tuning is needed to determine if there are clear differentiations between CMPs.

8. Process for obtaining feedback from CPCs of their stakeholder preferences relative to CMP decisions

A key aspect of the refinement of CMPs will involve making adjustments to provide anticipated future TAC trajectories in line with stakeholders' preferences, both for short-term stability and longer-term trends and variability. This will require dialogue to provide feedback from CPCs to the SCRS to inform as regards finalization of CMP development and, related to that, CPCs should have processes to get input from their stakeholders. The SCRS noted that it will hold an Ambassador meeting in early October before the Panel 2 meeting on 14 October. The purpose of this meeting would be to inform stakeholders about the bluefin tuna MSE and, while the open discussion at this meeting could result in good ideas being brought out that CMP developers might find useful, it was stressed that Ambassador meetings are not a forum for the SCRS to seek or receive official positions or instruction from CPCs or stakeholders that would result in changes to the MSE process. There was no agreement on how to directly provide the views of stakeholders to the SCRS that are otherwise usually channeled to the SCRS through the CPCs. The Ambassador meetings could, however, facilitate stakeholder understanding of the issue. This could improve the ability of stakeholders to provide substantive input on the MSE process to their respective CPCs, which could then be conveyed, as appropriate, to the SCRS through Panel 2 meetings.

9. Other matters

No other matters were discussed.

10. Adoption of report and closure

The Chair thanked all participants for their work and adjourned the meeting. The meeting report was adopted by correspondence.

Appendix 1

Agenda

1. Opening of the meeting and meeting arrangements
2. Nomination of Rapporteur
3. Adoption of agenda
4. Update on BFT-MSE framework and CMPs by SCRS

    a) Additional requested statistics

        i. PrpOF (proportion of simulation - years above U_{MSY} for projection years 1-30, aka probability of overfishing)
        ii. AvUrel (average U/U_{MSY} for projection years 1-30)
        iii. Revised AvgBr: now average B/B_{MSY} for years 11-30 (was 1-30)

    b) SCRS responses to feedback provided at the Intersessional Meeting of PA2 (1-3 March 2022)

        i. Evaluation of 3-year TAC setting for selected CMPs
        ii. "Phase-in" of +20/-10 for first two CMP applications
        iii. Revised quilt plots and summary table of CMPs

5. Candidate management procedure performance, refinement and selection

    a) Finalized development tuning
    b) Complete set of CMPs
    c) Complete illustration of performance tuning options

6. Key Decisions for 14 July

    a) 2-year vs 3-year management cycle
    b) Incorporation of 'phase-in' as default
    c) Culling of CMPs that fail thresholds defined in the 2nd Intersessional Meeting of Panel 2 on BFT MSE (9-10 May 2022)

        i. LD threshold (>15% probability of falling below 40%SSB_{MSY})
        ii. 60% Pgreen in year 30 of projections

    d) Culling of lowest performers

7. Feedback and guidance on additional changes to CMPs by PA2 to the SCRS

    a) Preferences on yield 'path'

        i. Recent high abundance is expected to result in increased catches (both in the East and the West) in the short term, followed by a decline. Should the possibility of reducing the size of the peak of this pulse in TACs to spread it over a longer period be investigated?
        ii. Are stable trajectories preferred over more variable?

    b) Further preferences on desirable CMP features

        i. More vs fewer indices
        ii. Specific indices
        iii. Type of CMP: Simple, intermediate complexity, artificial intelligence

    c) Performance tuning options

8. Process for obtaining feedback from CPCs of their stakeholder preferences relative to CMP decisions
9. Other matters
10. Adoption of report and closure

Appendix 2

List of participants* 1

CONTRACTING PARTIES

ALGERIA
Belacel, Amar *
Directeur du Développement de la Pêche, Ministère de la pêche et des productions halieutiques, Route des quatre canons, 16000
Tel: +213 214 33197; +213 796 832 690, E-Mail: amar.belacel67@gmail.com; amar.belacel@mpeche.gov.dz

Bouaouina, Chahrazed
Rue des quatre canons, 16000
Tel: +213 553 734 193, Fax: +213 214 133 37, E-Mail: chahrapeche1@gmail.com

Ferhani, Khadra
Centre National de Recherche et de Développement de la Pêche et de l'Aquaculture (CNRDPA), 11 Boulevard Colonel Amirouche, BP 67, 42415 Tipaza Bou Ismail
Tel: +213 550 735 537, Fax: +213 24 32 64 10, E-Mail: ferhani_khadra@yahoo.fr; ferhanikhadra@gmail.com

Kouadri-Krim, Assia
Sous-Directrice infrastructures, industries et services liés à la pêche, Ministère de la Pêche et des Productions Halieutiques, Direction du développement de la pêche, Route des Quatre Canons, 1600
Tel: +213 558 642 692, Fax: +213 214 33197, E-Mail: assiakrim63@gmail.com; assia.kouadri@mpeche.gov.dz

Mennad, Moussa
Ministère de la Pêches et des Ressources Halieutiques, CNRDPA, 11 Bd Colonel Amirouche, 42415 Tipaza
Tel: +213 560 285 239, Fax: +213 243 26410, E-Mail: mennad.moussa@gmail.com

Ouchelli, Amar
Rue des quatre canons, 16000
Tel: +213 550 306 938, Fax: +213 433 337, E-Mail: amarouchelli.dz@gmail.com

CANADA
Waddell, Mark *
Director General, Fisheries and Oceans Canada, 200 Kent Street, Ottawa ON K1A0E6
Tel: +1 613 897 0162, E-Mail: mark.waddell@dfo-mpo.gc.ca

Atkinson, Troy
Nova Scotia Swordfisherman's Association, 155 Chain Lake Drive, Suite #9, Halifax, NS B3S 1B3
Tel: +1 902 499 7390, E-Mail: hiliner@ns.sympatico.ca

Couture, John
Oceans North, 74 Bristol Drive, Sydney NS B1P 6P3
Tel: +1 902 578 0903, E-Mail: jcouture@oceansnorth.ca

Duprey, Nicholas
Senior Science Advisor, Fisheries and Oceans Canada, 200-401 Burrard Street, Vancouver, BC V6C 3R2
Tel: +1 604 499 0469, E-Mail: nicholas.duprey@dfo-mpo.gc.ca

Elsworth, Samuel G.
South West Nova Tuna Association, 228 Empire Street, Bridgewater, NS B4V 2M5
Tel: +1 902 543 6457, E-Mail: sam.fish@ns.sympatico.ca

Kay, Lise
Policy Advisor, Fisheries and Oceans Canada, 200 Kent Street, Ottawa, ON K1A 0E6
Tel: +1 343 542 1301, E-Mail: Lise.Kay@dfo-mpo.gc.ca

---

* Head Delegate
1 Some delegate contact details have not been included following their request for data protection.

MacDonald, Carl
Senior Advisor, Fisheries and Oceans Canada, 1 Challenger Drive, PO Box 1006, Bedford Institute of Oceanography, Dartmouth, NS B2Y 4A2
Tel: +1 902 293 8257, E-Mail: carl.macdonald@dfo-mpo.gc.ca

MacMillan, Robert
Government of Prince Edward Island, Department of Fisheries and Communities, 548 Main Street, Montague, P.E.I C0A 1RD
Tel: +1 902 838 0699, E-Mail: rjmacmillan@gov.pe.ca

Pellerin, Mathieu
Resource Manager, Fisheries and Oceans Canada, 104 Rue Dalhousie, QC G1K 7Y7
Tel: +1 418 572 9957, E-Mail: mathieu.pellerin@dfo-mpo.gc.ca

Schleit, Kathryn
Oceans North, 1533 Barrington Street, Suite 200, Halifax, NS B3J 1Z6
Tel: +1 902 488 4078, E-Mail: kschleit@oceansnorth.ca

CHINA, (P. R.)
Feng, Ji
Shanghai Ocean University, 999 Hucheng Huan Rd, 201306 Shanghai
Tel: +86 159 215 36810, E-Mail: fengji_shou@163.com; 276828719@qq.com; f52e@qq.com

Zhang, Fan
Shanghai Ocean University, 999 Hucheng Huan Rd, 201306 Shanghai
Tel: +86 131 220 70231, E-Mail: f-zhang@shou.edu.cn

EGYPT
Atteya, Mai
Production Research Specialist, 210, area B - CITY, 5TH DISTRICT ROAD 90, 11311 New Cairo
Tel: +201 003 878 312, Fax: +202 281 117 007, E-Mail: janahesham08@gmail.com

Badr, Fatma Elzahraa
Fish Production Specialist, Agreements Administration, Lakes and Fish Resources Protection and Development Agency, 210, area B - CITY, 5TH DISTRICT ROAD 90, 11311 New Cairo
Tel: +201 092 348 338, Fax: +202 281 117 007, E-Mail: fatima.elzahraa.medo@gmail.com

Shawky, Doaa Hafez
International Agreements Specialist, Foreign Affairs Specialist, 210, area B - CITY, 5TH DISTRICT ROAD 90, 11311 New Cairo
Tel: +201 017 774 198, Fax: +202 281 117 007, E-Mail: doaahafezshawky@yahoo.com; gafrd_eg@hotmail.com

EUROPEAN UNION
Jessen, Anders * [1]
Deputy Director, Head of Unit - European Commission, DG Mare B 2, B-1049 Brussels, Belgium

Biagi, Franco
Senior Expert Marine & Fishery Sciences, Directorate General for Maritime Affairs and Fisheries (DG-Mare) - European Commission, Unit C3: Scientific Advice and data collection, Rue Joseph II, 99, 1049 Brussels, Belgium
Tel: +322 299 4104, E-Mail: franco.biagi@ec.europa.eu

Costica, Florina
DG MARE, Rue Joseph II, 99, 1040 Brussels, Belgium
Tel: +32 493 540 902, E-Mail: florina.costica@ec.europa.eu

Malczewska, Agata
European Commission DG MARE, JII-99 4/073, 1000 Belgium, Belgium
Tel: +32 229 6761; +32 485 853 835, E-Mail: agata.malczewska@ec.europa.eu

Andonegi Odriozola, Eider
AZTI, Txatxarramendi ugartea z/g, 48395 Sukarrieta, Bizkaia, Spain
Tel: +34 661 630 221, E-Mail: eandonegi@azti.es

Cosnard, Nolwenn
OP SATHOAN - FRANCE Mediterranée, 34200 Séte Hérault, France
Tel: +33 646 592 386, E-Mail: nolwenn@sathoan.fr; nolwenn.sathoan@gmail.com

Crespin, Rosalie
Comité National des Pêches Maritimes et des Elevages Marins, 134 avenue Malakoff, 75116 Paris, France
Tel: +33 172 711 814, E-Mail: rcrespin@comite-peches.fr

Houlihan, Julie Marie
Department of Agriculture, Food and the Marine, National Seafood Centre, Clogheen, Clonakilty, P85 TX47 Cork, Ireland
Tel: +353 870 604 148, E-Mail: juliemarie.houlihan@agriculture.gov.ie

Kafouris, Savvas
Fisheries and Marine Research Officer, Department of Fisheries and Marine Research (DFMR); Ministry of Agriculture, Natural Resources and Environment, 101, Vithleem Street, Strovolos, 1416 Nicosia, Cyprus
Tel: +357 228 07825, Fax: +357 2231 5709, E-Mail: skafouris@dfmr.moa.gov.cy; skafouris80@gmail.com

Larzabal, Serge
Président, Commission Thon Rouge, CNPMEM Syndicat Marins CGT, 12 quai Pascal Elissalt, 64500 Ciboure, France
Tel: +33 680 211 995, Fax: +33 1 727 11 850, E-Mail: sergelarzabal@gmail.com; serge.larzabal@yahoo.fr; president@cidpmem6440.eu

Lintanf, Philippe
Chef du BAEI, Ministère de la mer - Direction Générale des Affaires Maritimes, de la Pêche et de l'Aquaculture (DGAMPA), Tour Séquoia - 1 place Carpeaux, 92055 Paris-La Défense, France
Tel: +33 1 40 81 68 05; +33 763 631 931, E-Mail: philippe.lintanf@agriculture.gouv.fr

Oikonomou, Maria
Ministry of Rural Development & Food, Directorate General for Fisheries, 150, Syngrou A. 176 71 Kallithea, 176 71 Athens, Greece
Tel: +302 109 287 186, E-Mail: moikonom@minagric.gr

Rodríguez-Marín, Enrique
Centro Oceanográfico de Santander (COST-IEO). Instituto Español de Oceanografía (IEO). Consejo Superior de Investigaciones Científicas (CSIC), C.O. de Santander, C/ Severiano Ballesteros 16, 39004 Santander, Cantabria, Spain
Tel: +34 942 291 716, Fax: +34 942 27 50 72, E-Mail: enrique.rmarin@ieo.csic.es

Rouyer, Tristan
Ifremer - Dept Recherche Halieutique, B.P. 171 - Bd. Jean Monnet, 34200 Sète, Languedoc Rousillon, France
Tel: +33 782 995 237, E-Mail: tristan.rouyer@ifremer.fr

Rueda Ramírez, Lucía
Ministerio de Ciencia, Innovación y Universidades, Instituto Español de Oceanografía Málaga, Puerto pesquero s/n, 29640 Fuengirola Malaga, Spain
Tel: +34 952 197 124, E-Mail: lucia.rueda@ieo.csic.es

Sarricolea Balufo, Lucía
Secretaría General de Pesca, Ministerio de Agricultura, Pesca y Alimentación, Calle Velázquez, número 144, 28006 Madrid, Spain
Tel: +34 913 476 170; +34 618 330 518, E-Mail: lsarricolea@mapa.es

Scarcella, Giuseppe
L.go Fiera della pesca SNC, 60125 Ancona, Italy
Tel: +39 338 704 3071, E-Mail: giuseppe.scarcella@cnr.it

Suárez Sánchez, Manuel
Cofradía de Pescadores de Tarifa, C/ Guzmán el Bueno, 8, 11380 Algeciras, Cadiz, Spain
Tel: +34 678 879 270, E-Mail: gerenteopp78@hotmail.com

Teixeira, Isabel
Chefe de Divisão de Recursos Externos da Direção-Geral de Recursos Naturais, Segurança e Serviços Marítimos, DGRM, Avenida Brasilia, 1449-030 Lisbon, Portugal
Tel: +351 919 499 229, E-Mail: iteixeira@dgrm.mm.gov.pt

Trigo, Patricia
DGRM, Avenida Brasilia ES8, 1449-030 Lisbon, Portugal
Tel: +351 969 455 882; +351 213 035 732, E-Mail: pandrada@dgrm.mm.gov.pt

JAPAN
Ota, Shingo *
Japan's Commissioner to ICCAT, Advisor to the Minister of Agriculture, Forestry and Fisheries, 1-2-1 Kasumigaseki, Chiyoda-Ku, Tokyo 100-8907
Tel: +81 3 3502 8460, Fax: +81 3 3504 2649, E-Mail: shingo_ota810@maff.go.jp

Daito, Jun
Manager, Japan Tuna Fisheries Co-operative Association, 31-1, Eitai 2-Chome, Koto-ku, Tokyo 135-0034
Tel: +81 356 462 382, Fax: +81 356 462 652, E-Mail: daito@japantuna.or.jp

Fukuda, Hiromu
Head of Group, Highly Migratory Resources Division, Fisheries Stock Assessment Center, Fisheries Resources Institute, Japan Fisheries Research and Education Agency, 2-12-4 Fukuura, Kanazawa, Yokohama, 234-8648
Tel: +81 45 788 7936, E-Mail: fukudahiromu@affrc.go.jp

Fukui, Shingo
Director, International Fisheries Coordination, International Affairs Division, Fisheries Agency, 1-2-1 Kasumigaseki, Chiyoda-Ku, Tokyo 100-8907
Tel: +81 3 3502 8460, Fax: +81 3 3504 2649, E-Mail: shingo_fukui970@maff.go.jp

Ito, Kohei
Assistant Director, International Affairs Division, Fisheries Agency of Japan, 1-2-1 Kasumigaseki, Chiyoda-Ku, Tokyo 100-8907
Tel: +81 3 3502 8460, Fax: +81 3 3504 2649, E-Mail: kohei_ito060@maff.go.jp

Kitakado, Toshihide
Professor, Faculty of Marine Science, Tokyo University of Marine Science and Technology, Department of Marine Biosciences, 4-5-7 Konan, Minato, Tokyo 108-8477
Tel: +81 5 5463 0568, Fax: +81 3 5463 0568, E-Mail: kitakado@kaiyodai.ac.jp; toshihide.kitakado@gmail.com

Kumamoto, Jumpei
Technical Official, International Affairs Division, Fisheries Agency of Japan, 1-2-1 Kasumigaseki, Chiyoda-Ku, Tokyo 100-8907
Tel: +81 3 3502 8460, Fax: +81 3 3504 2649, E-Mail: jumpei_kumamoto270@maff.go.jp

Miura, Nozomu
Assistant Director, International Division, Japan Tuna Fisheries Co-operative Association, 2-31-1 Eitai Koto-ku, Tokyo 135-0034
Tel: +81 3 5646 2382, Fax: +81 3 5646 2652, E-Mail: miura@japantuna.or.jp; gyojyo@japantuna.or.jp

Morita, Hiroyuki
Assistant Director, International Affairs Division, Fisheries Agency of Japan, 1-2-1 Kasumigaseki, Chiyoda-Ku, Tokyo 100-8907
Tel: +81 3 3502 8460, Fax: +81 3 3504 2649, E-Mail: hiroyuki_morita970@maff.go.jp

Nakatsuka, Shuya
Deputy Director, Highly Migratory Resources Division, Fisheries Resources Institute, Japan Fisheries Research and Education Agency, 2-12-4, Fukuura, Kanazawa Kanagawa, 236-8648
Tel: +81 45 788 7950, E-Mail: nakatsuka_shuya49@fra.go.jp; snakatsuka@affrc.go.jp

Tsukahara, Yohei
Scientist, Highly Migratory Resources Division, Fisheries Stock Assessment Center, Fisheries Resources Institute, Japan Fisheries Research and Education Agency, 2-12-4, Fukuura, Kanagawa, Yokohama, Shizuoka Shimizu-ku 236-8648
Tel: +81 45 788 7937, Fax: +81 54 335 9642, E-Mail: tsukahara_yohei35@fra.go.jp; tsukahara_y@affrc.go.jp

Uozumi, Yuji
Advisor, Japan Tuna Fisheries Co-operation Association, Japan Fisheries Research and Education Agency, Tokyo Koutou ku Eitai 135-0034

KOREA (REP.)
Yang, Jae-geol
Policy Analyst, Korea Overseas Fisheries Cooperation Center, 6th FL, S Building, 253, Hannuri-daero, 30127 Sejong
Tel: +82 44 868 7364, Fax: +82 44 868 7840, E-Mail: jg718@kofci.org

MOROCCO
Abid, Noureddine
Chercheur et ingénieur halieute au Centre Régional de recherche Halieutique de Tanger, Responsable du programme de suivi et d'étude des ressources des grands pélagiques, Centre régional de l'INRH à Tanger/M'dig, B.P. 5268, 90000 Drabed, Tangier
Tel: +212 53932 5134; +212 663 708 819, Fax: +212 53932 5139, E-Mail: nabid@inrh.ma; noureddine.abid65@gmail.com

Bensbai, Jilali
Chercheur, Institut National de Recherche Halieutique à Casablanca - INRH/Laboratoires Centraux, Ain Diab près du Club équestre OULAD JMEL, Rue Sidi Abderrhman / Ain Diab, 20100 Casablanca
Tel: +212 661 59 8386, Fax: +212 522 397 388, E-Mail: bensbaijilali@gmail.com

Haoujar, Bouchra
Cadre à la Division de Durabilité et d'Aménagement des Ressources Halieutiques, Département de la Pêche Maritime, Nouveau Quartier Administratif, BP 476, 10150 Haut Agdal, Rabat
Tel: +212 253 768 8121, Fax: +212 537 688 089, E-Mail: haoujar@mpm.gov.ma
Hassouni, Fatima Zohra
Chef de la Division de Durabilité et d'Aménagement des Ressources Halieutiques, Département de la Pêche maritime, Nouveau Quartier Administratif, Haut Agdal, B.P.: 476 Rabat
Tel: +212 537 688 122/21, Fax: +212 537 688 089, E-Mail: hassouni@mpm.gov.ma

NORWAY
Sørdahl, Elisabeth *
Ministry of Trade, Industry and Fisheries, Department for Fisheries and Aquaculture, Kongensgate 8, Postboks 8090 Dep., 0032 Oslo
Tel: +47 22 44 65 45, E-Mail: elisabeth.sordahl@nfd.dep.no

Selbekk, Kari
Kongens gate 8, 0153 Oslo
Tel: +47 911 95712, E-Mail: Kari.selbekk@nfd.dep.no

PANAMA
Vergara, Yarkelia
Jefa de Cooperación Internacional, Autoridad de los Recursos Acuáticos de Panamá - ARAP, Calle 45, Bella Vista, Edificio Riviera, 0819-02398
Tel: +507 511 6008, E-Mail: yvergara@arap.gob.pa

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
De Oliveira, José
The Centre for Environment, Fisheries and Aquaculture Science, CEFAS, Pakefield Road, Lowestoft - Suffolk, IP19 8JX
Tel: +44 150 252 7727, E-Mail: jose.deoliveira@cefas.co.uk

King, Thomas
International Fisheries Policy Officer, Department for Environment, Food and Rural Affairs (Defra), Marine & Fisheries Directorate, First Floor, Seacole Wing, 2 Marsham Street, London SW1P 4DF
Tel: +44 777 661 5108, E-Mail: Thomas.King@defra.gov.uk

Sampson, Harry
Senior International Fisheries Policy Officer, Department for Environment, Food and Rural Affairs (Defra), Marine & Fisheries Directorate, Nobel House 17 Smith Square, London SW1P 3JR
Tel: +44 208 026 4403; +44 755 742 8543, E-Mail: harry.sampson@defra.gov.uk; trfmo@defra.gov.uk

UNITED STATES
Kryc, Kelly *
U.S. Federal Government Commissioner to ICCAT and Deputy Assistant Secretary for International Fisheries, National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, 1401 Constitution Ave, Washington, DC 20230
Tel: +1 202 961 8932; +1 202 993 3494, E-Mail: kelly.kryc@noaa.gov

Baker, Colleen
Sea Grant Knauss Fellow, Office of Marine Conservation (OES/OMC) Department of State, Washington DC 20520-7878
Tel: +1 609 206 9830, E-Mail: bakerca2@fan.gov; colleen.a.baker@gmail.com

Blankenbeker, Kimberly
Foreign Affairs Specialist, Office of International Affairs, Trade, and Commerce (F/IATC), NOAA, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring Maryland 20910
Tel: +1 301 427 8357, Fax: +1 301 713 1081, E-Mail: kimberly.blankenbeker@noaa.gov

Blankinship, David Randle
Chief, Atlantic Highly Migratory Species Management Division, NOAA - National Marine Fisheries Service, 263 13th Ave South, Saint Petersburg, Florida 33701
Tel: +1 727 824 5313, Fax: +1 727 824 5398, E-Mail: randy.blankinship@noaa.gov

Bogan, Raymond D.
Alternate U.S. Recreational Commissioner, Sinn, Fitzsimmons, Cantoli, Bogan, West and Steuerman, 501 Trenton Avenue, P.O. Box 1347, Point Pleasant Beach, Sea Girt New Jersey 08742
Tel: +1 732 892 1000; +1 732 233 6442, Fax: +1 732 892 1075, E-Mail: rbogan@lawyernjshore.com

Brown, Craig A.
Chief, Highly Migratory Species Branch, Sustainable Fisheries Division, Southeast Fisheries Science Center, NOAA, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, Florida 33149
Tel: +1 305 586 6589, E-Mail: craig.brown@noaa.gov

Delaney, Glenn Roger
Alternate U.S. Commercial Commissioner, 601 Pennsylvania Avenue NW Suite 900 South Building, Washington, D.C. 20004
Tel: +1 202 434 8220, Fax: +1 202 639 8817, E-Mail: grdelaney@aol.com

Golet, Walter
School of Marine Sciences, The University of Maine/Gulf of Maine Research Institute, 350 Commercial Street, Portland, Maine 04101-4618
Tel: +1 207 228 1671, E-Mail: walter.golet@maine.edu

Keller, Bryan
Foreign Affairs Specialist, Office of International Affairs, Trade and Commerce (F/IATC), NOAA, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, Maryland 20910
Tel: +1 202 897 9208; +1 301 427 7725, E-Mail: bryan.keller@noaa.gov

Lauretta, Matthew
Fisheries Biologist, NOAA Fisheries Southeast Fisheries Center, 75 Virginia Beach Drive, Miami, Florida 33149
Tel: +1 305 361 4481, E-Mail: matthew.lauretta@noaa.gov

Leape, Gerald
Principal Officer, Pew Charitable Trusts, 901 E Street NW, Washington DC 20004
Tel: +1 202 431 3938, Fax: +1 202 540 2000, E-Mail: gleape@pewtrusts.org

Loughran, Tyler
Sea Grant Knauss Fellow, NOAA, Herbert C. Hoover Building 1401 Constitution Avenue NW, Washington 20230
Tel: +1 206 920 4847, E-Mail: tyler.loughran@noaa.gov

McLaughlin, Sarah
Management and Program Analyst, NOAA - National Marine Fisheries Service, Highly Migratory Species Management Division, 55 Great Republic Drive, Gloucester, Massachusetts 01930
Tel: +978 281 9260, Fax: +978 281 9340, E-Mail: sarah.mclaughlin@noaa.gov

Peterson, Cassidy
Fisheries Biologist, NOAA Fisheries, Southeast Fisheries Science Centre, 101 Pivers Island Rd, Miami, FL 28516
Tel: +1 910 708 2686, E-Mail: cassidy.peterson@noaa.gov

Schalit, David
President, American Bluefin Tuna Association, P.O. Box 854, Norwell, Massachusetts 02061
Tel: +1 917 573 7922, E-Mail: dschalit@gmail.com

Sissenwine, Michael P.
Marine Policy Center, Woods Hole Oceanographic Institution, 39 Mill Pond Way, East Falmouth Massachusetts 02536
Tel: +1 508 566 3144, E-Mail: m.sissenwine@gmail.com

Walline, Megan J.
Attorney- Advisor, NOAA Office of the General Counsel, Fisheries & Protected Resources Division, U.S. Department of Commerce, 1315 East-West Highway SSMC-III, Silver Spring Maryland 20910
Tel: +301 713 9695, Fax: +1 301 713 0658, E-Mail: megan.walline@noaa.gov

Walter, John
Research Fishery Biologist, NOAA Fisheries, Southeast Fisheries Science Center, Sustainable Fisheries Division, 75 Virginia Beach Drive, Miami, Florida 33149
Tel: +305 365 4114; +1 804 815 0881, Fax: +1 305 361 4562, E-Mail: john.f.walter@noaa.gov

OBSERVERS FROM NON-GOVERNMENTAL ORGANIZATIONS

PEW CHARITABLE TRUSTS - PEW
Galland, Grantly
Officer, Pew Charitable Trusts, 901 E Street, NW, Washington, DC 20004, United States
Tel: +1 202 540 6953; +1 202 494 7741, Fax: +1 202 552 2299, E-Mail: ggalland@pewtrusts.org

Samari, Mona
Pew Charitable Trusts, 248A Marylebone Rd, Marylebone, London NW1 6JZ, United Kingdom
Tel: +44 751 582 8939, E-Mail: monasamari@outlook.com

Tak, Paulus
Senior Officer, Government Relations, Pew Charitable Trusts, Avenue des Arts 40, 1040 Brussels, Belgium
Tel: +32 478 24 13 32, E-Mail: ptak@pewtrusts.org

THE INTERNATIONAL POLE & LINE FOUNDATION - IPNLF
Dyer, Emilia
IPNLF, 1 London Street, Reading, Berkshire RG1 4QW, United Kingdom
Tel: +44 745 512 0898, E-Mail: emilia.dyer@ipnlf.org

THE OCEAN FOUNDATION
Levontin, Polina
Consultant, Renewable resources Assessment Group Imperial College of Science, Technology & Medicine, Center of Environmental Science and Technology, 13 Chalcot Gardens, London NW3 4YB, United Kingdom
Tel: +44 794 707 8739, E-Mail: levontin@hotmail.com

Miller, Shana
The Ocean Foundation, 1320 19th St., NW, 5th Floor, Washington, DC 20036, United States
Tel: +1 631 671 1530, E-Mail: smiller@oceanfdn.org

Pipernos, Sara
The Ocean Foundation, 1320 19th St. NW, Washington DC 20036, United States
Tel: +1 860 992 6194, E-Mail: spipernos@oceanfdn.org; sarapipernos@gmail.com

OTHER PARTICIPANTS

SCRS CHAIRMAN
Melvin, Gary
SCRS Chairman, St. Andrews Biological Station - Fisheries and Oceans Canada, Department of Fisheries and Oceans, 285 Water Street, St. Andrews, New Brunswick E5B 1B8, Canada
Tel: +1 506 652 95783; +1 506 651 6020, E-Mail: gary.d.melvin@gmail.com; gary.melvin@dfo-mpo.gc.ca

SCRS VICE-CHAIRMAN
Arrizabalaga, Haritz
Principal Investigator, SCRS Vice-Chairman, AZTI Marine Research Basque Research and Technology Alliance (BRTA), Herrera Kaia Portualde z/g, 20110 Pasaia, Gipuzkoa, Spain
Tel: +34 94 657 40 00; +34 667 174 477, Fax: +34 94 300 48 01, E-Mail: harri@azti.es

INVITED EXPERT
Butterworth, Douglas S.
Emeritus Professor, Department of Mathematics and Applied Mathematics, University of Cape Town, Rondebosch, 7701 Cape Town, South Africa
Tel: +27 21 650 2343, E-Mail: doug.butterworth@uct.ac.za

*****

ICCAT Secretariat
C/ Corazón de María 8 – 6th floor, 28002 Madrid – Spain
Tel: +34 91 416 56 00; Fax: +34 91 415 26 12; E-mail: info@iccat.int

Manel, Camille Jean Pierre
Neves dos Santos, Miguel
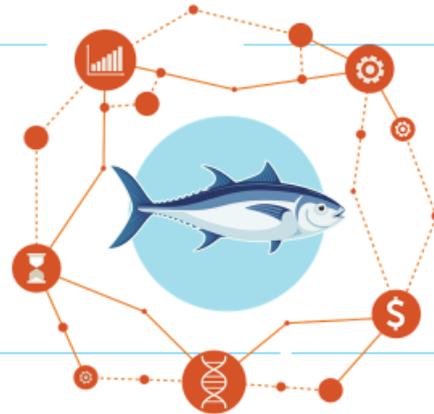**Ortiz**, Mauricio
Kimoto, Ai
Taylor, Nathan

ICCAT INTERPRETERS
Baena Jiménez, Eva J.
Fleming, Jack
Gelb Cohen, Beth
Liberas, Christine
Linaae, Cristina
Pinzon, Aurélie

*****

**An update on the BFT-MSE framework,
including CMP development, performance, refinement, and selection**
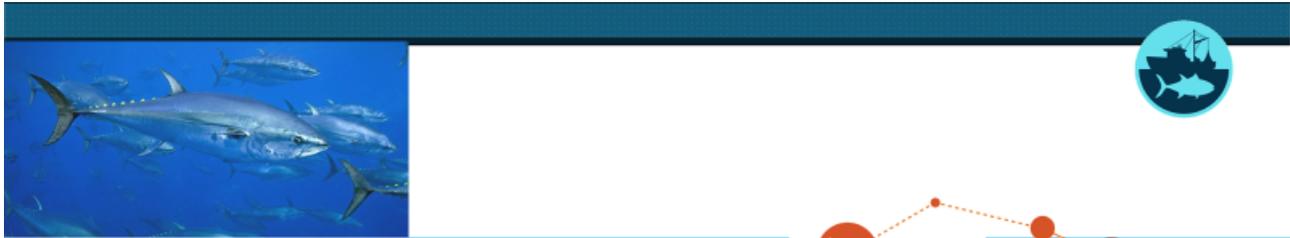
BFT Management Strategy
Evaluation (MSE)

Part 1: 14 July 2022

References
1. BFT MSE summary: Background & Structure
2. BFT MSE summary: Results, Decisions & Next Steps
3. Splash Page: https://iccat.github.io/abft-mse/

ICCAT BFT MSE

1

Outline (numbered according to PA2 agenda)

4. Update on BFT-MSE framework and CMPs by SCRS
    a. Additional requested statistics
        i.   PrpOF - proportion of simulation years above U_{MSY} for projection years 1-30
        ii. AvUrel - average U/U_{MSY} for projection years 1-30
        iii. Revised AvgBr - now average SSB/SSB_{MSY} for years 11-30 (was 1-30)
    b. SCRS Responses to feedback provided at the Intersessional Meeting of PA2 (1-3 Mar 2022)
        i.   Evaluation of 3-year TAC setting for selected CMPs
        ii. "Phase-in" of +20/-10% allowable TAC change for the first 2 CMP applications
        iii. Revised quilt plots and summary table of CMPs

5. Candidate management procedure performance, refinement, and selection
    a. Finalized development tuning
    b. Complete set of CMPs
    c. Illustration of performance tuning options

ICCAT BFT MSE

2

Outline (numbered according to PA2 agenda)

6. Key Decisions

a) Decision point 1 (PA2 Agenda Item 6.a): 2-year vs. 3-year management cycle and symmetric stability

b) Decision point 2 (PA2 Agenda Item 6.b): Incorporation of 'phase-in' as default

c) Decision point 3 (PA2 Agenda Item 6.c): Culling of CMPs that fail thresholds defined at May PA2 meeting

d) Decision point 4: Culling of lowest performing CMPs

3

Outline (numbered according to PA2 agenda)

7. Feedback and guidance on additional changes to CMPs by PA2 to the SCRS

- Preferences on yield path
  - Recent high abundance is expected to result in increased catches (both in the East and the West) in the short term, followed by a decline. Should the possibility of reducing the size of the peak of this pulse in TACs to spread it over a longer period be investigated?

- Index selection for CMPs
  - Number of indices: Some CMPs use all 10 of the approved indices to set TACs, while others use as few as 2 per management area (**Figure 1**).

- Performance tuning
  - SCRS will discuss the process of performance tuning to achieve higher yield performance while meeting minimum safety and status objectives.

4

Outline (numbered according to PA2 agenda)

8. Process for obtaining feedback from CPCs of their stakeholder preferences relative to CMP decisions (see also Next steps below)
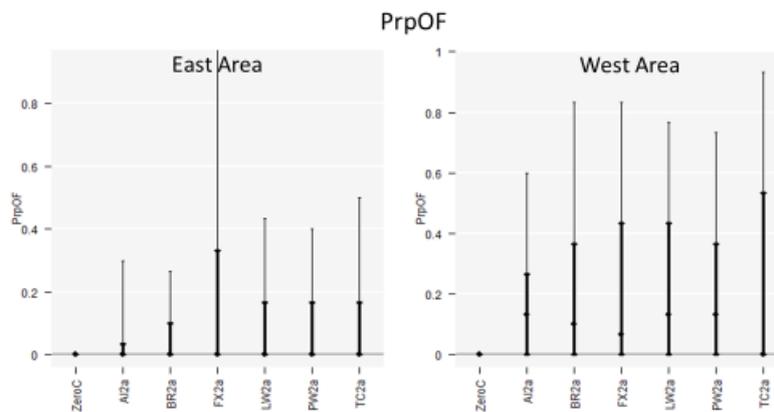
  - How may the SCRS assist in CPC-planned stakeholder outreach?

5

Additional requested performance statistics

- **PrpOF** - proportion of simulation years above U_{MSY} for projection years 1-30
- **AvUrel** - average U/U_{MSY} for projection years 1-30
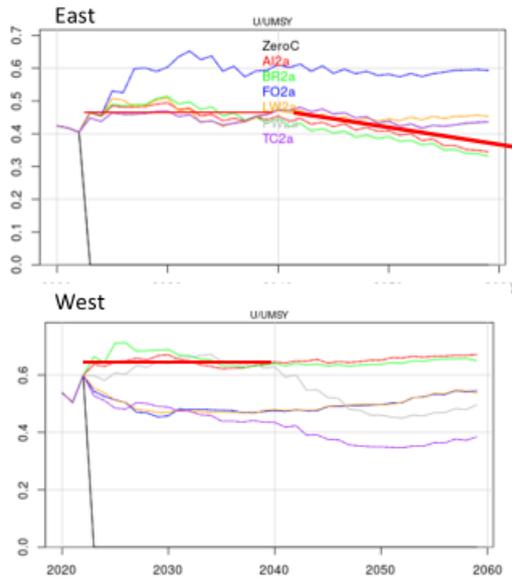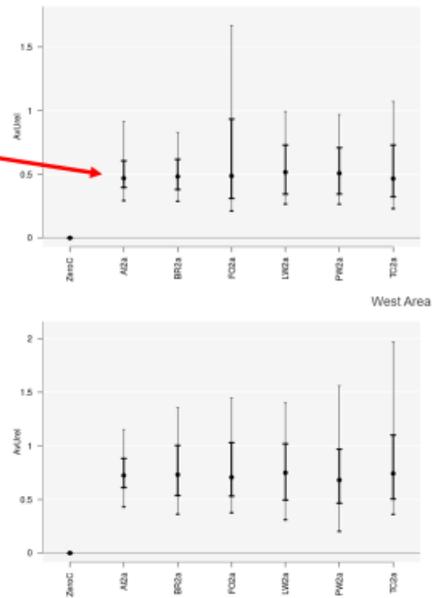- **Revised AvgBr** - now average B/B_{MSY} for years 11-30 (was 1-30)

PrpOF

ICCAT BFT MSE

6

U/U$_{MSY}$ for projection years 1-30 (across all OMs)

AvUrel - average U/U$_{MSY}$ for projection years 1-30

East

East Area

U/UMSY

ZeroC
AI2a
BR2a
FO2a
LW2a
PW2a
TC2a

West

West Area

U/UMSY

ICCAT BFT MSE

7

Table 2. Table of Operational Management Objectives and Performance Statistics.

Management Objectives (Res. 18-03) + May 2022 PA2 guidance	Primary Performance Statistics (Tuning Objective & Quilt 1)	Secondary Performance Statistics (Quilt 2)
Status The stock should have a greater than [60]% probability of occurring in the green quadrant of the Kobe matrix. (To be evaluated at intermediate points between zero and 30 years, and at the end of the 30-year period.)	Br30 – Br [i.e., biomass ratio, or spawning stock biomass (SSB) relative to dynamic SSBMSY[3]] after 30 years. PGK: probability of being in the Kobe green quadrant (i.e., SSB>dSSBMSY and U<UMSY[4]) in year 30.	AvgBr – Average Br over projection years 11-30. Br20 – Br after 20 years. POF – Probability of overfishing (U>UMSY) after 30 projected years. PNRK - Probability of not being in the red Kobe quadrant (SSB > SSBMSY or U < UMSY) after 30 projected years. OFT – Overfished Trend, SSB trend if Br30<1. PrpOF – Proportion U > U$_{MSY}$ (i.e., probability of overfishing in projection years 1-30). (See presentation. Not currently in quilt plot.) AvUrel – mean U/U$_{MSY}$ in projection years 1-30. (See presentation. Not currently in quilt plot.) U/UMSY – exploitation rate (U) in biomass divided by exploitation rate at MSY. (Shown as a trajectory in the presentation rather than in a quilt plot)
Safety There should be no more than a [15]% probability of the stock falling below BLIM at any point during the years 11-30 of the projection period.	LD* – Lowest depletion (i.e., SSB relative to dynamic SSB$_{MSY}$) over years 11-30 in the projection period. LD* value is evaluated relative to SCRS-proposed B$_{LIM}$ (40% of dynamic SSB$_{MSY}$).[5] LD5%, LD10% and LD15% will all be evaluated, with the latter in Quilt 1 and the former 2 in Quilt 2.	
Yield Maximize overall catch levels.	AvC10 – Median TAC (t) over years 1-10. AvC30 – Median TAC (t) over years 1-30.	C1 – TAC in first 2 years of MP (i.e., 2023-24). AvC20 – Median TAC (t) over years 1-20.
Stability Any change in TAC between management periods should be no more than a 20% increase or a [20][30]% decrease, except during the application of the MP in the first two management periods, where any TAC change shall not exceed a 20% increase or a 10% decrease.	VarC – Variation in TAC (%) between 2-year management cycles.	

Decision point 1: Evaluation of 3-year TAC setting for BR CMPs 'performance tuned' to LD*15%

| CMP | Mgmt Cycle | Stability | East | | | | | | West | | | | | |
			Br30 50% tile	Br30 5% tile	LD*15	LD*10	Difference in AvC30 (kt)	VarC	Br30 50% tile	Br30 5% tile	LD*15	LD*10	Difference in AvC30 (kt)	VarC
BR5a	2-year	+20/-30	1.03	0.24	0.4	0.31	-	19.7	1.07	0.41	0.4	0.32	-	13.56
BR5c	3-year	+20/-30	1.1	0.20	0.4	0.28	-1.81	20.1	1.15	0.37	0.4	0.29	-0.11	15.12
BR5d	3-year	+20/-35	1.13	0.31	0.4	0.34	-2.37	20.9	1.17	0.42	0.4	0.31	-0.08	15.33

Subscript a indicates 2-year management cycle

Subscript c indicates 3-year management cycle

TAKE HOME: Performance was only slightly inferior and practical considerations (stability, reduced administrative burden) may support a 3-year management cycle

ICCAT BFT MSE

9

Decision point 2: "Phase-in" of +20/-10% allowable TAC change for the first 2 CMP applications across 5 CMPs tested

East CMP	C1 (50%)	AvC10 (50%)	AvC30 (50%)	VarC (50%)	LD (5%)	LD (15%)	PGK (Mean)
AI2a	32.27	41.16	37.62	16.17	0.42	0.65	0.71
AI2b	32.4	44.04	37.71	16.49	0.36	0.55	0.7
BR2a	43.2	40.9	32.65	16.56	0.49	0.66	0.78
BR2b	43.2	40.81	32.47	16.51	0.42	0.61	0.78
LW2a	43.2	34.63	30.27	17.21	0.44	0.6	0.72
LW2b	43.2	34.46	30.19	17.2	0.39	0.56	0.72
PW2a	41.14	35.36	29.93	13.27	0.43	0.6	0.74
PW2b	40.76	34.82	29.59	13.24	0.4	0.57	0.75
TC2a	37.26	33.43	29.21	8.18	0.37	0.54	0.73
TC2b	38.39	35.58	30.97	8.38	0.32	0.49	0.68

West CMP	C1 (50%)	AvC10 (50%)	AvC30 (50%)	VarC (50%)	LD (5%)	LD (15%)	PGK (Mean)
AI2a	2.82	3.03	2.77	16.43	0.32	0.53	0.58
AI2b	2.82	3.05	2.75	16.36	0.25	0.48	0.58
BR2a	2.71	3.02	2.72	12.61	0.28	0.49	0.63
BR2b	2.71	3	2.69	12.57	0.22	0.47	0.63
LW2a	2.53	2.68	2.56	15.63	0.28	0.5	0.59
LW2b	2.51	2.7	2.54	15.82	0.22	0.48	0.6
PW2a	2.42	2.37	2.29	17.11	0.28	0.45	0.67
PW2b	2.45	2.48	2.3	17.42	0.21	0.41	0.67
TC2a	2.68	2.83	2.64	6.71	0.18	0.4	0.61
TC2b	2.73	2.95	2.74	6.85	0.16	0.38	0.58

Subscript a indicates no phase-in

Subscript b indicates +20/-10% allowable TAC change phase-in for the first 2 management cycles

ICCAT BFT MSE

Take Home: The phase-in made little difference to long-term biomass (risk) or yield outcomes, and thus is confirmed as a viable approach

10

19

Symmetric TAC change +20/-20

- Stability alternative
  - symmetrical stability provision: +20/-20% allowable TAC change from one cycle to the next (in contrast to the default structure, which allows 20% TAC increases and 30% TAC decreases).
    - slower to implement necessary TAC decreases
    - lower yield
    - lower biomass performance

Variant	Mgmt Cycle	Stability	East					West				
			Br30	LD*15	LD*10	AvC30	VarC	Br30	LD*15	LD*10	AvC30	VarC
BR2a	2-year	+20/-30	1.5	0.66	0.58	32.65	16.56	1.25	0.49	0.38	2.72	12.61
BR2g	2-year	+20/-20	1.49	0.55	0.46	32.38	14.53	1.24	0.46	0.32	2.71	12.15

Comparative performance for variations of the BR CMP. Performance of BR2g (+20/-20 stability) has slightly lower yields (AvC30) compared to BR2a (+20/-30 stability), as well as poorer conservation (Br30) performance.

Take Home: Performance of BR2g (+20/-20 stability) has slightly lower yields (AvC30) compared to BR2a (+20/-30 stability), as well as poorer conservation (LD*) performance.

ICCAT BFT MSE

11

## c) Decision point 3 Culling of CMPs that fail thresholds as defined at May PA2 meeting

- For +20/-30 stability, ordered according to statistic weighting from May.
- Lowest depletion, LD* (>15% probability of falling below B_{LIM}, i.e., 40% of dynamic SSB_{MSY})
  Two CMPs (i.e., EA and TN) were withdrawn by their developers due to difficulties in meeting this.
- 60% pGreen (i.e., probability of being in the green quadrant of the Kobe matrix in year 30).
  All 6 CMPs meet or nearly meet this for the default tuning level (median Br30 of 1.25 for the western stock and 1.50 for the eastern).

CMP	West					East					Tot	# indices
	PGK (Mean)	AvC10 (50%)	AvC30 (50%)	VarC (50%)	LD (15%)	PGK (Mean)	AvC10 (50%)	AvC30 (50%)	VarC (50%)	LD (15%)		
BR2a	0.63	3.02	2.72	12.61	0.49	0.78	40.9	32.65	16.56	0.66	0.26	10
AI2a	0.58	3.03	2.77	16.43	0.53	0.71	41.16	37.62	16.17	0.65	0.27	10
TC2a	0.61	2.83	2.64	6.71	0.4	0.73	33.43	29.21	8.18	0.54	0.48	7
FO2a	0.62	2.84	2.77	14.29	0.48	0.64	37.37	30.46	13.93	0.47	0.53	6
LW2a	0.59	2.68	2.56	15.63	0.5	0.72	34.63	30.27	17.21	0.6	0.58	4
PW2a	0.67	2.37	2.29	17.11	0.45	0.74	35.36	29.93	13.27	0.6	0.71	4

Spider/Radar plots

East — West
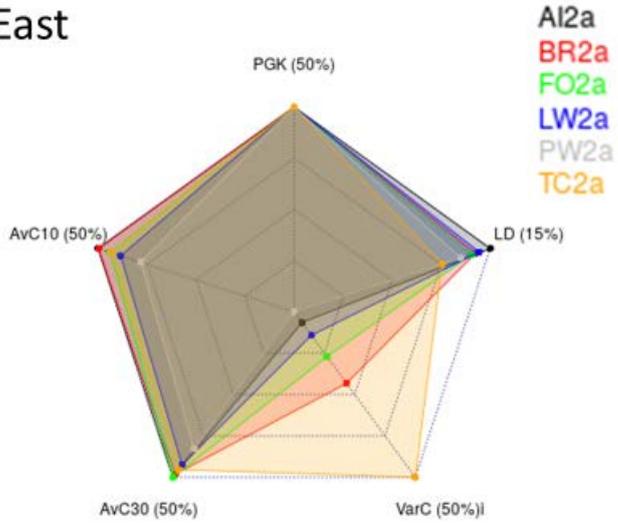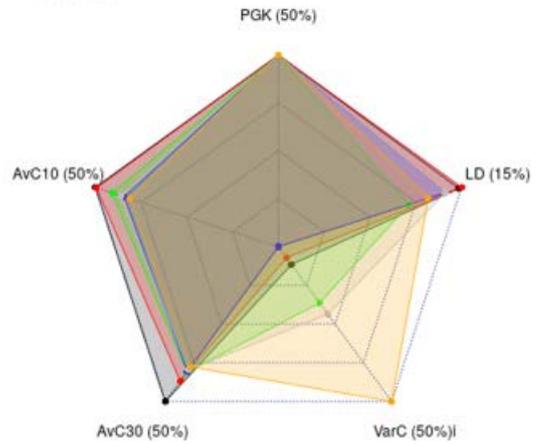
AI2a
BR2a
FO2a
LW2a
PW2a
TC2a

Secondary quilt plots West (+20/-30 stability)

West

CMP	C1 (50%)	AvC20 (50%)	AvgBr (50%)	Br20 (50%)	Br30 (5%)	LD (5%)	LD (10%)	POF (Mean)	PNRK (Mean)	OFT (P>0)
BR2a	2.71	2.73	1.34	1.31	0.54	0.28	0.38	0.22	0.83	0.86
AI2a	2.82	2.83	1.35	1.31	0.63	0.32	0.42	0.26	0.87	0.87
TC2a	2.68	2.59	1.42	1.41	0.35	0.18	0.27	0.28	0.78	0.86
FO2a	2.41	2.78	1.38	1.35	0.48	0.3	0.38	0.26	0.81	0.85
LW2a	2.53	2.56	1.34	1.3	0.49	0.28	0.38	0.26	0.81	0.84
PW2a	2.42	2.27	1.23	1.18	0.49	0.28	0.38	0.09	0.95	0.94

Secondary quilt plots East (+20/-30 stability)

East

CMP	C1 (50%)	AvC20 (50%)	AvgBr (50%)	Br20 (50%)	Br30 (5%)	LD (5%)	LD (10%)	POF (Mean)	PNRK (Mean)	OFT (P>0)
BR2a	43.2	34.05	1.49	1.45	0.73	0.49	0.58	0.03	0.99	0.96
AI2a	32.27	40.51	1.53	1.51	0.47	0.42	0.55	0.11	0.9	0.86
TC2a	37.26	28.84	1.59	1.58	0.52	0.37	0.47	0.07	0.94	0.9
FO2a	43.2	29.83	1.52	1.5	0.3	0.25	0.37	0.21	0.81	0.84
LW2a	43.2	30.14	1.52	1.5	0.55	0.44	0.53	0.08	0.95	0.92
PW2a	41.14	30.2	1.53	1.5	0.57	0.43	0.52	0.06	0.97	0.93

Table 1. Table of Candidate Management Procedures (CMPs).

CMP	Indices used EAST	WEST	Detailed description	Strengths/Weaknesses	References
FO	FR AER SUV2 JPN LL NEAtl2 W-MED LAR SUV	US RR 66-144, CAN SWNS RR US-MEX GOM PLL	Uses an estimated F0.1 applied to an estimate of biomass to provide TAC advice. The F0.1 estimate is based on the relative abundance of young, medium and old fish for each area (which is informed from the areas indices noted on the left). Estimated biomass for each area is derived from an index from that area and a period of reference years.	Strengths: - performs well across several indicators. - uses indices that represent various age class to calculate TAC.	SCRS/2020/144 SCRS/2021/122
AI	All	All	An artificial neural network is trained on simulated projected data for all indices (from both sides of the ocean) and a management value V, that is the true simulated vulnerable biomass in each area multiplied by a harvest control rule. Once trained, the neural network can predict V using new index data (simulated or real). Area-specific TAC is then calculated as a constant fraction of V.	Strengths: - performs well across several indicators. - uses all indices. Weaknesses: - lacks a clear relationship between index values and TAC, due to machine learning component. - struggles to achieve LD and PGK.	SCRS/2021/028
BR	All	All	TACs are set based on relative harvest rates (with some slight initial time dependence) for a reference year (2018) applied to the 2-year moving average of a combined master abundance index for each of the West and East areas. These master indices are weighted averages across the indices available for the area based on their variances and to achieve smoother TAC trends over time.	Strengths: - strong performance, across most indicators. - uses all indices.	SCRS/2021/121 SCRS/2021/152 SCRS/2022/082 SCRS/2022/126
LW	W-MED LAR SUV JPN LL NEAtl2	GOM LAR SUV MEXUS_LL	LW uses a 3-yr average of catch divided by relative SSB to estimate a constant harvest rate metric. All 4 indices on the left are used for the West area to account for stock mixing; Med larval and JPN East LL are used for the East area.	Strengths: - performs well across several indicators. Weaknesses: - has struggled to achieve some of PA2 identified thresholds for PGK.	SCRS/2021/127
PW	W-MED LAR SUV JPN LL NEAtl2	GOM LAR SUV MEXUS_LL	Similar to LW, PW uses indices in the East and the West (as specified on the left) to achieve a constant exploitation rate. It adjusts Western TAC according to Eastern indices under the assumption that Western TACs are supported by Eastern mixing.	Strengths: - performs well across several indicators. Weaknesses: - poor stability and yield.	SCRS/2021/155 SCRS/2022/078
TC	MOR POR TRAP JPN LL NEAtl2 W-MED LAR SUV GBYP AER SUV BAR	US RR 66-144 JPN_LL_West2 GOM_LAR_SUV	Two fishery indices for each area (West: JPN_LL_West2, US_RR_66_144, East: JPN_LL_NEAtl2, MOR_POR_TRAP) and three stock-specific fishery independent indices (West: GOM_LAR_SUV, East: MED_LAR_SUV, GBYP_AER_SUV_BAR) are used to predict area biomass assuming a fixed rate of stock mixing (e.g., a fixed fraction of the Eastern stock enters the West area). The TAC is calculated for each area by multiplying the predicted area biomass by a constant harvest rate.	Strengths: - highest stability Weaknesses: - increased stability causes somewhat lower biomass and yield performance.	SCRS/2020/150 SCRS/2020/165

22

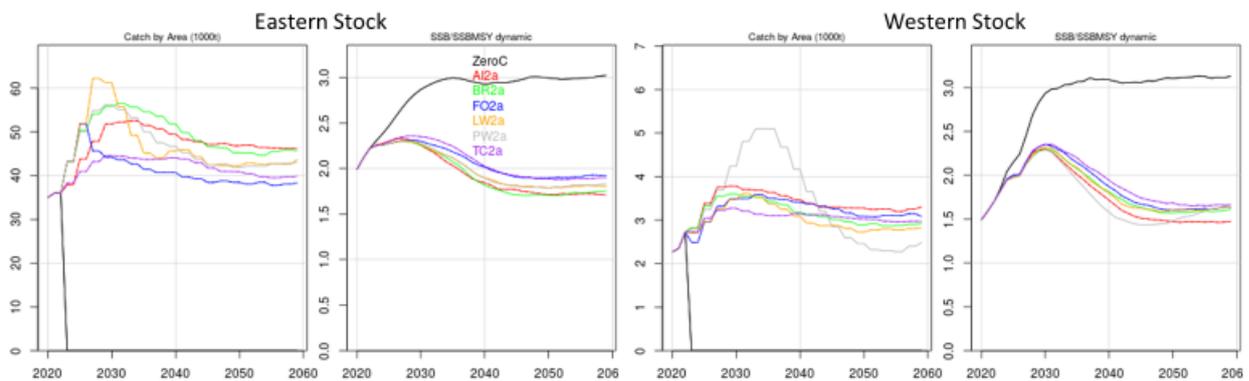7. Feedback and guidance on additional changes to CMPs by PA2 to the SCRS

- ## Preferences on yield path
  - Recent high abundance is expected to result in increased catches (both in the East and the West) in the short term, followed by a decline. Should the possibility of reducing the size of the peak of this pulse in TACs to spread it over a longer period be investigated?
- ## Index selection for CMPs
  - Number of indices: Some CMPs use all 10 of the approved indices to set TACs, while others use as few as 2 per management area (**Figure 1**).
- ## Performance tuning
  - The SCRS will discuss the process of performance tuning to achieve higher yield performance while meeting minimum safety and status objectives.

17

Yield path preferences

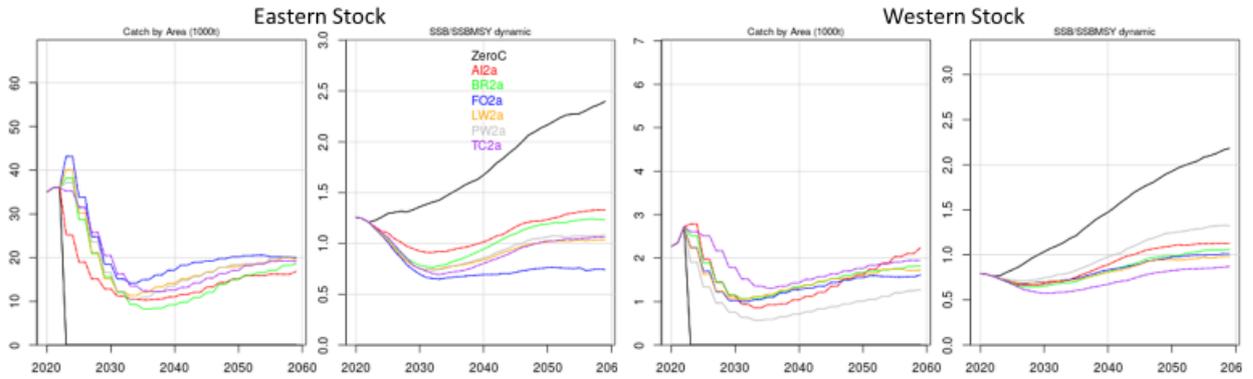## Recruitment Scenario 1 (high recruitment East/High status in West)

ICCAT BFT MSE

18

23

Yield path preferences

Recruitment Scenario 2 (low recruitment in East and West)
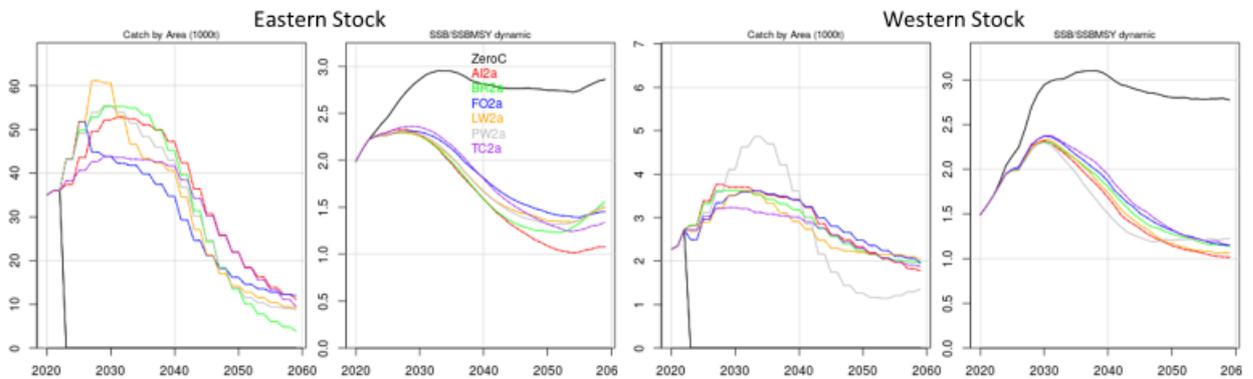

ICCAT BFT MSE

19

Yield path preferences

Recruitment Scenario 3 (future regime shift)
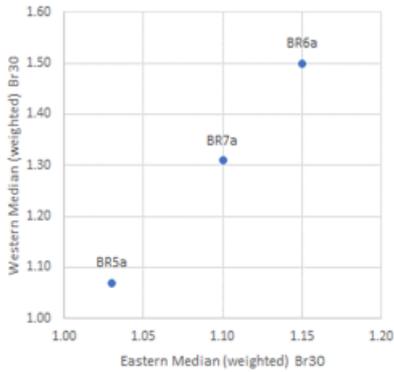

ICCAT BFT MSE

20

7. Feedback and guidance on additional changes to CMPs by PA2 to the SCRS

- Performance tuning
  - The SCRS will discuss the process of performance tuning to achieve higher yield performance while meeting minimum safety and status objectives.

Performance tuning means dialing up the fishing intensity to achieve higher yield, while satisfying safety and status thresholds.

Akin to tuning a race car for speed, while keeping it on the track.

BR CMP has been initially 'performance' tuned to LD*15%, 10% and 5%. Results are still preliminary but also do not currently meet PGK at 60% across the tunings.

21

8. Process for obtaining feedback from CPCs of their stakeholder preferences relative to CMP decisions (see also Next steps below)
  - How may the SCRS assist in CPC-planned stakeholder outreach?
  - Ambassador meetings
    - Late July?
    - Late September or early October

ICCAT BFT MSE

22

Next steps

After the 14 July Panel 2 meeting, there is one remaining meeting of Panel 2 to take place before the Commission Plenary, scheduled for 14 October 2022. This will follow the September meetings of the SCRS Bluefin MSE Technical Subgroup, Bluefin Species Group, and SCRS Plenary meeting. The Bluefin Species Group also hopes to convene additional Ambassador meetings (tentatively, in late July and early October) in English, French and Spanish, and some summary materials are available in Arabic.

ICCAT BFT MSE
23

Next Steps (yellow are Panel 2/Commission meetings)

Date	Meeting (hybrid)	Objectives
2022 September 5-8	SCRS BFT MSE Technical Group meeting (Madrid)	• CMP developers to present updated results. • BFTSG to provide feedback. • CMP developers to present revised results, incorporating feedback. • BFTSG to cull the CMPs to a maximum of three.
September 20-21	SCRS BFT Species Group (Madrid)	• BFTSG to review and endorse final CMP results. • BFTSG to select one final CMP, with multiple tuning levels, for presentation to the SCRS.
September 26-30	SCRS Plenary (Madrid)	• SCRS to review and endorse final CMP results. • SCRS to select one final CMP, with multiple tuning levels, for presentation to Panel 2.
October 14 (or 2 days?)	4th Panel 2 meeting BFT MSE (Madrid)	• SCRS to present final CMPs, with all final specifications, for review. • Panel 2 to select a CMP to recommend for Commission adoption.
November 14-21	Annual Commission meeting (Portugal)	• Commission to adopt a fully specified MP, including final operational management objectives.

24

26

Decisions:

1. Decision point 1: **2-year vs. 3-year management cycle and symmetric stability (+20/-20 or asymmetric (+20/-30; +20/-35)**
2. Decision point 2: **Incorporation of 'phase-in' as default (+20/-10 for first two TACs)**
3. Decision point 3 (PA2 Agenda Item 6.c): Culling of CMPs that fail thresholds defined at May PA2 meeting **(no decision needed)**
4. Decision point 4: Culling of lowest performing CMPs **(no decision needed)**

ICCAT BFT MSE

25

Preferences/Feedback:

1. Preferences on yield path
   Recent high abundance is expected to result in increased catches (both in the East and the West) in the short term, followed by a decline. Should the possibility of reducing the size of the peak of this pulse in TACs to spread it over a longer period be investigated?

2. Index selection for CMPs
   Number of indices: Some CMPs use all 10 of the approved indices to set TACs, while others use as few as 2 per management area.

3. Performance tuning
   SCRS will discuss the process of performance tuning to achieve higher yield performance while meeting minimum safety and status objectives.

ICCAT BFT MSE

26

Relative weighting of key performance statistics (from May 9-10 meeting)

Examples of weighting schemes	Status PGK (mean)	Yield AvC10 (50%)	Yield AvC30 (50%)	Stability VarC (50%)	Safety LD* (%TBD)
Default: Equal across yield, stability, and safety	0	0.5	0.5	1	1
Sensitivity 1: Double weighting of safety	0	0.25	0.25	0.5	1
Sensitivity 2: Double weighting of yield	0	1	1	1	1

PGK: Probability of Green Kobe ($SSB > SSB_{MSY}$ & $U < U_{MSY}$) after 30 projected years
AvC10: Mean catches over first 10 projected years
AvC20: Mean catches over first 20 projected years
VarC: Average annual variation in catches

ICCAT BFT MSE

27

28

Appendix 4

New results for BR
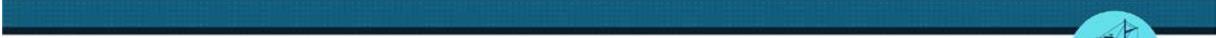
New results

Variant	Mgmt Cycle	Stability	phase in	East					West				
				Br30 50% tile	LD*15	LD*10	AvC30	VarC	Br30 50% tile	LD*15	LD*10	AvC30	VarC
BR2a	2-year	+20/-30	no	1.5	0.66	0.58	32.65	16.56	1.25	0.49	0.38	2.72	12.61
BR2g	2-year	+20/-20	no	1.49	0.55	0.46	32.38	14.53	1.24	0.46	0.32	2.71	12.15
BR2c	3-year	+20/-30	no	1.47	0.52	0.44	32.88	18.29	1.23	0.45	0.31	2.72	14.57
BR2d	3-year	+20/-35	no	1.5	0.58	0.5	32.35	19.14	1.25	0.46	0.33	2.71	14.64
BR2i	3-year	+20/-20	no	1.47	0.39	0.27	31.57	15.21	1.27	0.38	0.25	2.65	13.44
BR2j	3-year	+20/-35	+20/-10; 2 TACs	1.48	0.47	0.38	32.4	18.77	1.24	0.4	0.25	2.7	14.54
BR2k	3-year	+20/-35	+20/-10; 1 TAC	1.5	0.58	0.5	32.35	19.14	1.25	0.46	0.32	2.71	14.64

ICCAT BFT MSE   1

Appendix 5

Statement by the European Union on Bluefin tuna Management Strategy Evaluation

The ongoing process for the formulation of Bluefin tuna Management Procedure through Management Strategy Evaluation ('BFT-MSE') is one of the main priorities for the ICCAT in 2022. The European Union (the 'EU') has been actively supporting this process and contributed to the discussions and dialogue with the SCRS and will continue to do so in the coming weeks and months.

In order to deliver expected results, i.e., guaranteeing sustainable fishing with a very low risk for the management objectives for both East and West Atlantic Bluefin tuna stocks, the Candidate Management Procedures (CMPs) that are to be considered by the Commission must firstly be thoroughly tested against adequately fine-tuned modalities that take into account the needs for proper and effective implementation of the management framework under development. To this end and as long as the decision on the duration of management cycle has not yet been collectively taken by the members of Panel 2, all CMPs testing should adequately cover both options on the duration of the management cycle, i.e., 2-year and 3-year long management cycle, so they can be considered by Panel 2 on an equal footing. This is consistent with the discussions in the Panel so far and has been regularly requested during the different phases including lately, at the Second Intersessional Meeting of Panel 2 on Bluefin Tuna Management Strategy Evaluation (BFT MSE) held in May, with a dedicated matrix embedding both the duration of the management cycle and the constraints on the TAC change between adjacent management periods.

It is against this background that the EU notes with regret and concern that so far CMPs developers have focused mainly on testing under a 2-years management cycle' scenario, with the risk that the 3-year management cycle' in practice may not become available as an option for managers not because its performance is lower than a 2-year cycle, but rather due to managers not being in a position to take an informed decision on this option due to the absence of proper testing. The only CMP that has tested both durations of management cycle clearly shows that there are no meaningful differences in terms of performance. On the other hand, there is an example of already implemented and properly functioning 3-years long management cycle in the of the MP for Northern Albacore. The duration of the management cycle - once it is preliminary shown as not affecting the overall performance of the different status, safety and yield axis - is a relevant element of the fisheries management stability. Those very regrettable shortcomings need to be addressed in the coming months by the developers' and SCRS work, so that the Commission is able to make an informed decision on the choice between the two options.

Against this backdrop, unless adequate testing is carried out equally for both options and there are sufficient data to draw conclusions on 3-years management cycle' option, the EU reserves its position and notes that it may be difficult for it to take an informed decision on the future Bluefin tuna Management Procedure at this year's annual meeting.