ANNEX 10

19th Meeting of the
International Scientific Committee for Tuna
and Tuna-Like Species in the North Pacific Ocean
Taipei, Taiwan
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REPORT OF THE SECOND PACIFIC BLUEFIN TUNA MANAGEMENT STRATEGY EVALUATION WORKSHOP

July 2019

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Annex 10

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International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean

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San Diego, CA U.S.A.

1. INTRODUCTION

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) hosted the Second Pacific Bluefin Tuna Management Strategy Evaluation (PBF MSE) Workshop in San Diego, CA, USA during 20-21 May 2019. The objectives of the workshop were to enhance stakeholders' understanding of MSE and promote their involvement, and to further develop the discussion of PBF MSE based on the results of the first Workshop and ISC's work thereafter.

Approximately 70 stakeholders from six countries participated in the event, including resource managers, scientists, industry, representatives from Pacific Ocean tuna regional fishery management organizations, environmental organizations, and other stakeholders interested in PBF (Annex 1).

Due to the large number of new participants to the process and discussion, much of the time was spent reviewing the concepts of harvest strategies and reference points, defining MSE, and how to interpret results. Discussions were aimed at clarifying the purpose of the MSE, defining how stakeholders provide input and participate in the MSE process, possible management objectives, potential performance metrics and the process for decision making. Dr. Mark Maunder, Head of the Stock Assessment Program of the Inter-American Tropical Tuna Commission and Dr. Shuya Nakatsuka, Head of Pacific Bluefin Tuna Resources of the National Research Institute of Far Seas Fisheries co-chaired the event.

The proposed agenda for the meeting was considered and adopted with no changes (Annex 2). The workshop presentations can be found at http://isc.fra.go.jp/reports/pbf_mse_workshop_2019.html.

The Science and Research Director of the NOAA Fisheries Southwest Fisheries Science Center, Kristen Koch, provided opening remarks and defined the scope of the workshop. It was noted that the current rebuilding targets of SSBMED and 20%SSBF=0 must be achieved by 2024 and 2034, respectively, and discussions at the workshop were intended to educate stakeholders on the requirements to develop and implement a strategy for managing PBF when those targets are reached.

2. BACKGROUND

S. Nakatsuka introduced the background of the ISC MSE workshop and presented a summary of the first workshop. He explained that the Western and Central Pacific Fisheries Commission (WCPFC) Harvest Strategy 2017-02, which was originally developed by the IATTC – WCPFC Northern Committee (NC) Joint Working Group (Joint Working Group), requested ISC to hold workshops on MSE. ISC held a first workshop in 2018 and this workshop was the second. The first workshop held in May 2018 in Yokohama, Japan, featured presentations that included basics of MSE and explanations of the roles of different stakeholders in the MSE process. The participants also discussed various aspects of advancing an MSE. In the second workshop, he explained that there would be some overlap in presentation as this was the first workshop to involve stakeholders in the eastern Pacific Ocean, and further discussion on management strategies for MSE were also expected based on ISC's responses to the outcome of the first workshop.

3. MSE PRESENTATIONS

3.1. Harvest Strategies and Reference Points

J. Valero introduced a harvest strategy framework including management objectives, performance metrics, reference points and harvest control rules. There could be many types of objectives such as social (e.g., jobs, food access), economical (e.g., profitability), biological (e.g., low risk of collapse), ecosystem (e.g., bycatch, diversity) and political (e.g., allocation). Clear and specific objectives are fundamental for developing and evaluating strategies. There are tradeoffs between objectives and performance metrics. Treatment of uncertainty and risk is very important when considering alternative strategies. Target, threshold, limit and rebuilding reference points were presented along with methods of derivation such as model-based and empirical (or data-based). Pros and cons of input and output controls were discussed as well as their role in the development of harvest control rules. Constant, empirical and model-based harvest control rules were described, along with alternative shapes and their inclusion or not of reference points. Harvest control rules should be developed in the management planning stage with the involvement of all stakeholders, which helps in the definition of the problem, assumptions, and it facilitates trust and policy "buy in". Some example reference points and harvest control rules were presented, including for EPO tropical (bigeye, yellowfin and skipjack) tunas as well as examples for pacific bluefin tuna. The roles of different participants were described. Managers and stakeholders typically identify management objectives, candidate target reference points, candidate harvest control rules, and the criteria against which their performance should be evaluated. Scientists typically identify appropriate biological limits to exploitation and evaluate the performance of identified candidate harvest control rules. The emphasis of harvest strategy elements varies by fishery, their historical context (e.g. developing, stable or rebuilding) and the level of monitoring, available analyses and management systems. A harvest control rule cannot be properly evaluated without specific management objectives, data collection, analyses, treatment of uncertainty and other components of a harvest strategy. Development and success of harvest control rules and reference points benefit from the involvement of all stakeholders in the management planning stage and through the harvest strategy evaluation.

3.2. An Overview of Management Strategy Evaluation

S. Teo provided an introduction to MSE. In many ways, an MSE is to fishery management what a flight simulator is to flying a plane. However, in an MSE there are often multiple pilots with multiple conflicting objectives, and substantially more uncertainty in the operating and estimation models. An MSE is at the interface of science and decision making, with different roles for scientists, and decision-makers / stakeholders / advocates. In this presentation, the focus was on the roles and responsibilities of the decision-makers, stakeholders, and advocates. The main roles and responsibilities of the decision-makers, stakeholders, and advocates are to: 1) develop qualitative management objectives; 2) develop candidate harvest strategies and harvest control rules; and 3) provide feedback to the scientists and make decisions. Examples from the north Pacific albacore MSE process were provided.

3.3. Interpreting MSE Results and MSE Application Case Studies

D. Tommasi presented three case studies of management strategy evaluation (MSE), namely North Pacific Albacore tuna (NPALB), Pacific sardine, and Bluefin tuna, to showcase examples of operational management objectives and performance metrics. All case studies included conservation and economic management objectives. Results of the recent first round of NPALB MSE were used to illustrate examples of MSE output, including graphics. It was noted that MSE is useful to highlight trade-offs among management objectives, and that the spider plot can be employed to portray multiple performance metrics at once. For the NPALB MSE trade-offs between relative catch and catch variability, and relative catch and relative biomass were evident. The presentation ended with an overview of lessons learned from the NPALB MSE: 1) it is important to be aware of the iterative nature of the MSE process, 2) having a set of pre-agreed management objectives at the start is essential to getting the MSE process underway, 3) the ideal set of harvest control rules (HCRs) and uncertainty scenarios may have to be refocused given reality of available resources, so it is best to start small (in terms of HCRs, reference points, scenarios to test), 4) engagement of managers, stakeholders, and scientists important to produce relevant and useful results, 5) as MSE output can be overwhelming scientists need to take time to explain things many times in different ways, 6) feedback from managers and stakeholders important to improve communication strategy, and 7) when interpreting results be aware of limitations and assumptions of the MSE modeling framework.

3.4. MSE Application to Pacific Bluefin Tuna: Requirements for Implementation and Development Strategy and Future Workplan

S. Nakatsuka clarified general roles of managers and stakeholders in MSE. Managers and stakeholders have a major responsibility in MSE, including developing management objectives and operational management objectives as well as deciding respective performance indicators. He then introduced the document titled Basic Structure of PBF MSE (Annex 3), which was originally developed by the first workshop then commented on by the ISC PBFWG (PBFWG comments in red). He emphasized that the intention of the document is not to indicate any agreement, but rather to capture the current state of the discussion of MSE in order to facilitate a structured discussion. Noting that general management objectives or PBF were already agreed to in the harvest strategy (WCPFC HS2017-02), he introduced the content of the document (Annex 3) item by item, with a particular focus on operational management objectives and respective performance indicators which are necessary for ISC to develop an MSE.

Discussion
In order to understand the general perspectives among participants, open discussion was held with regard to what stakeholders want to achieve through the management of PBF. Many views were presented including:

Some participants felt that PBF MSE should also include evaluation of the rebuilding plan until the second rebuilding target is met. Others felt that it should evaluate management strategies after the second rebuilding target (20%SSB0) was achieved. It was noted that the IATTC – WCPFC NC Joint Working Group meeting in 2017 identified the purpose of PBF MSE as the latter, and that the Joint Working Group meeting in 2017 also recommended a rebuilding strategy that was subsequently adopted by the WCPFC and IATTC. From the analysts' perspective, questions such as "are we going to change the rebuilding strategy as a result of MSE?" or "are we going to test full rebuilding strategy in the MSE?" need to be answered in order to determine the starting point of MSE. No consensus on purpose was achieved.

3.5. Latest Pacific Bluefin Tuna Information

H. Fukuda from the ISC PBF Working Group (PBWG) presented the latest information about the PBF stock based on the outcomes of the latest PBFWG meeting. The last assessment was conducted in March 2018 with the data up until 2017 calendar year and suggested that the spawning stock biomass of PBF in the terminal year was lower than the rebuilding targets although it showed a slow increase since 2011. Because no formal assessment was scheduled in 2019, the PBFWG updated indicators to monitor the latest trend of the stock and the fishery. He also presented some results of the future projections which were requested from the IATTC – WCPFC Northern Committee Working Group (Joint Working Group).

Catch-per-unit-effort (CPUE) based abundance indices from Japanese and Taiwanese longline fleets, which represented the relative trend of the large PBF (e.g., age 7+) biomass, indicated continuation of the slow increase in the PBF spawning stock during the 2018 calendar year.
A CPUE-based abundance index from Japanese troll fleet, which represented the relative trend of the PBF recruitment, and the Japanese recruitment monitoring survey suggested that the values in 2017 and 2018 were similar or even higher than the historical average.

PBF catch during the 2018 calendar year was lower than the historical average and that for 2015-2017 when the conservation and management measures (CMMs) were in place under the auspices of the IATTC and WCPFC.

All of the future harvesting scenarios, which were prepared and requested by the Joint Working Group, were tested through the future projection analysis. The results showed that the scenario mimicking the current CMMs as well as some scenarios in which the catch upper limit was increased had a higher probability of achieving both of the rebuilding targets than the reference probabilities prescribed in the WCPFC HS2017-02. Increasing the catch limit of small PBF (<30 kg) has a large impact on the probability of achieving the rebuilding targets.

3.6. Pacific Bluefin Tuna Joint Working Group Perspectives

D. Lowman, co-chair of the Joint IATTC – WCPFC Northern Committee Working Group (Joint Working Group), discussed the Joint Working Group's support for an MSE process to support long-term management decision making for Pacific bluefin tuna throughout their range. The Joint Working Group is an informal group that has met once a year since 2016 to develop recommendations relative to Pacific bluefin tuna conservation and management for consideration by the WCPFC Northern Committee and the IATTC.

In 2017, the Joint Working Group requested the ISC to begin work to develop an MSE in 2019 with the goal of completing by 2024. She noted that the current workshop is one of two initial workshops organized by the ISC to engage stakeholders in understanding the MSE process and to begin identifying specific management objectives. On 3-5 September 2019, the Joint Working Group will be meeting in Portland, Oregon. During this meeting, the Joint Working Group will review the report of this workshop, and work on identifying, as an initial guideline for the MSE, at least one candidate Target Reference Point (TRP), two candidate Limit Reference Points (LRPs), and candidate Harvest Control Rule (HCR). The Joint Working Group will also consider how to assist the development of the MSE including identifying experts and financial resources. Co-chair Lowman encouraged workshop participants to continue to be actively engaged as the MSE work progresses.

4. OPEN DISCUSSION ON FUTURE WORKPLAN

M. Maunder and S. Nakatsuka moderated a discussion on the future workplan and noted that management objectives and performance metrics were important aspects to discuss at this meeting. It was noted that economics were not presented and that the expertise was not available at this meeting.

A variety of general management objectives and performance metrics (and sometimes the approach for achieving) were discussed, including: increasing total yield, probabilities of rebuilding in certain time periods, increasing spawning output/avoiding recruitment collapse, recreational catch of few larger or more smaller fish, spawning stock biomass above a LRP, total biomass above a certain level, maintaining equitable catches between the eastern and western Pacific, a "healthy" stock, minimizing stock collapse, fishery impacts, increased revenue and economic stability.

It was noted that tradeoffs will occur between maximum catches and high catch rates, or maximum catches and larger fish, and that industry feedback would be useful. Fishery impact on SSB can be allocated by country and each country could distribute that impact. It was noted that future discussions of performance metrics should focus on the metrics and leave methods for evaluation to more science-based meetings.

The approach for incorporating stakeholder input in to the MSE and decisions on performance metrics, for example, were also discussed. The process needs to be transparent with stakeholder involvement and well organized. While ISC-hosted workshops function as the principal means for providing stakeholder input into the NPALB MSE, such an approach will be more challenging for PBF MSE due to more diverse fisheries and an unclear input mechanism (e.g.,

authority of the Joint Working Group?). As ISC has completed two workshops which were requested by the Joint Working Group, the Joint Working Group should clarify the process for stakeholder input and decision making regarding MSE inputs hereafter. A forum for formal decision-making for MSE needs to be identified and empowered, and a framework to secure stakeholder participation also needs to be considered. The Joint Working Group would be the natural candidate to lead the MSE discussion but it was also noted that it is not a formal organization and has limited meeting time available. One way to support decision making and stakeholder input would be for the Joint Working Group to appoint an individual responsible for coordinating stakeholder meetings and liaising between the ISC and the Joint Working Group. The complex management structure will also influence the PBF MSE, and support for the scientific resources to conduct the MSE by ISC are other considerations that the Joint Working Group could consider.

4.1. Documentation of Workshop

It was noted that this workshop will be reported to ISC Plenary in July as a "Chairs' Summary", summarizing major discussions, and will become publicly available after that time. It will be shared with the IATTC – WCPFC NC Joint Working Group in September, if so requested.

5. NEXT STEPS

Participants were reminded that no final decisions were expected at this meeting and that these discussions will inform decisions at the next Joint IATTC-WCPFC NC meeting scheduled for September 2019. The Chairs thanked the decision-makers, scientists, and stakeholders for their participation and candor at the meeting.

ANNEX 1
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ANNEX 2

Second Pacific Bluefin Tuna
Management Strategy Evaluation Workshop Agenda

May 20-21, 2019
Tom Ham's Lighthouse
2150 Harbor Island Drive, San Diego, CA U.S.A.

Goals/Expectations:

- **to enhance the understanding of stakeholders on MSE and promote their involvement, and**
- **further develop the discussion of PBF MSE based on the results of the 1st Workshop and ISC's work thereafter.**

May 20, 2018

Registration (9:00-9:30)

9:30	Welcome and Opening Remarks - K. Koch (10 minutes)
9:40	ISC Goals and Expectations – K. Koch for J. Holmes (10 minutes)
9:50	Review and Adoption of Agenda – M. Maunder (10 minutes)
10:00	Review of 1st workshop – S. Nakatsuka (15 minutes)
10:15	MSE Presentations a. Harvest Strategies and Reference Points – IATTC – J. Valero (60 minutes)

Break 11:15—11:30

11:30-12:30	b. Management Strategy Evaluation –Overview/Intro/101– S. Teo (60 minutes)

Lunch 12:30-1:45

1:45-2:15	c. Interpreting MSE Results and MSE Application Case Studies – D. Tommasi (30 minutes)
2:15-3:15	MSE Application to Pacific Bluefin Tuna: Requirements for Implementation and Development Strategy and Future workplan – Moderator: S. Nakatsuka (60 minutes)

3:15-3:45	Latest information about Pacific Bluefin Tuna -- Fukuda (30 minutes)
3:45-4:00	Pacific Bluefin Tuna Joint Working Group Perspectives (15 minutes)

Closing remarks and adjourn

May 21, 2019

9:00-9:30	Recap of Day 1 -- S. Nakatsuka (30 minutes)
9:30-11:00	Open Discussion on Future Workplan – Moderators: M. Maunder and S. Nakatsuka (2 hours)
11:00	Closing remarks – M. Maunder

Adjourn