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ISC18 – ANNEX 8
Summary Report of the Pacific Bluefin Tuna Management Strategic Evaluation Workshop

WCPFC-NC14-2018/IP-07

ISC[1]

[1] International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean

FINAL

ISC/18/ANNEX/08

ANNEX 8

18th Meeting of the
International Scientific Committee for Tuna
and Tuna-Like Species in the North Pacific Ocean
Yeosu, Republic of Korea
July 11-16, 2018

Summary Report of the Pacific Bluefin Tuna Management Strategy Evaluation Workshop

July 2018

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SUMMARY REPORT OF THE PACIFIC BLUEFIN TUNA MANAGEMENT STRATEGY EVALUATION WORKSHOP

Gerard DiNardo and Shuya Nakatsuka

International Scientific Committee for Tuna and Tuna-Like Species In the North Pacific Ocean (ISC)

May 30-31, 2018
Yokohama, Japan

1.0 Introduction

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) hosted the First Pacific Bluefin Tuna Management Strategy Evaluation Workshop at the Queens Forum (in Queen's Square) in Yokohama, Japan from 30-31 May 2018. The objective of the workshop was to review the objectives, benefits, and requirements to implement an MSE, as well as recent progress made by tuna Regional Fishery Management Organizations (t-RFMO) and Regional Fishery Organizations towards adopting and implementing the Management Strategy Evaluation (MSE) process. Discussions were aimed at defining the roles of decision-makers (resource managers), scientists, and stakeholders (industry and environmental organizations) in the MSE process, particularly as they relate to facilitating the completion of an MSE for Pacific bluefin tuna (PBF), scheduled to commence in 2019. Dr. Gerard DiNardo, Fisheries Resources Division Director at NOAA Fisheries, Southwest Fisheries Science Center and Dr. Shuya Nakatsuka, Head of Pacific Bluefin Tuna Resources, National Research Institute of Far Seas Fisheries chaired the event. The Fisheries Research Agency, Japan co-sponsored the event.

Approximately 70 stakeholders participated in the event, including resource managers, scientists, industry, representatives from Pacific Ocean t-RFMOs, environmental organizations, and other stakeholders interested in PBF (Annex 1). 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/isc_mse_workshop_2018.html.

Fisheries Agency of Japan Resources Management Department Councilor, Shingo Ota, provided the welcome remarks, defining the workshop goals and sharing the outcome of recent management meetings on PBF with participants. It was noted that the current rebuilding targets of SSB_{MED} and $20\%SSB_{F=0}$ will need to be achieved by 2024 and 2034, respectively, and discussions at the workshop are intended educate stakeholders on the requirements to development and implement an MSE for PBF.

As this was a public meeting, decision-makers, scientists, and stakeholders were urged to ask questions and candidly express their perceptions regarding the need for a PBF MSE. While no final decisions were expected at this workshop, the discussions will help structure discussions at the 3rd Joint IATTC-WCPFC NC Meeting scheduled for September 2018 and future PBF MSE workshops in 2019.

2.0 Background

2.1 Management Requests – The Need for an MSE

S. Nakatsuka introduced the events requiring the need for a PBF MSE, as well as goals and objectives of the current workshop. He explained that WCPFC Harvest Strategy 2017-02 (hereafter referred to as HS) outlines the ocean-wide management strategy of PBF and Item 6 outlines future plans on the development and implementation of a PBF MSE. In particular, the HS requests ISC to initiate development of the MSE in 2019 and to complete the task by 2024. The HS also requests ISC to convene MSE workshops in 2018 and 2019, with the goal of educating stakeholders on the utility and requirements of an MSE. Since the current HS is the only guidance ISC received to plan and conduct the MSE, aspects of the request require additional clarification from managers to advance MSE development.

While the HS requests the ISC to conduct the PBF MSE, it was pointed out that their (ISC) involvement is conditional on receiving requisite information and funding in 2019. In particular, a candidate limit reference point (LRP), two candidate target reference points (TRP), harvest control rules (HCRs) for further evaluation, and funding to support the hiring of two MSE staff members. This was a stipulation for ISC's engagement in the MSE research, and agreed to by all parties during the 2nd Joint IATTC-WCPFC NC meeting in 2017.

3.0 MSE Presentations

3.1 Management Strategy Evaluation – Realizing its Full Potential

G. DiNardo discussed the goals, objectives, and rationale for Management Strategy Evaluation (MSE) development and implementation. MSE is a modeling based approach to assess the robustness of candidate management strategies or options to meet the management objectives of the fishery. The MSE process involves using an operating model that incorporates sufficient uncertainty to represent the 'true' underlying dynamics of the fishery resource to generate simulated future data, and an estimation model that uses the simulated data to assess the state of the stock and performance in achieving the management objectives relative to agreed target and limit reference points and decision rules (harvest control rules) to determine management actions. MSEs also provide a platform to assess the potential utility of new data streams (value of information) associated with proposed data collection programs. The roles and responsibilities of decision-makers, scientists, and stakeholders in the MSE development and implementation process was discussed. It was stressed that successful development and implementation requires engagement and input from all decision-makers, scientists, and

stakeholders throughout the development process.

It was noted that several t-RFMOs are engaged in MSE development and implementation. However, despite similarities in MSE architecture, there is no consistent nomenclature. This leads to confusion and a standardizing nomenclature was recommended as a step forward.

3.2 MSE Application Case Studies

J. Holmes discussed five applications of MSE as case studies in order to describe some principles and commonalities among successful MSE applications. The five case studies were Canadian Sablefish (*Anoplopoma fimbria*), Pacific Halibut (*Hippoglossus stenolepsis*), Pacific Hake (*Merluccius productus*), Pacific Herring (*Clupea pallasii*) in Canada, and north Pacific Albacore (*Thunnus alalonga*). MSE is a structured process that provides decision-makers and stakeholders with the information on which to base rational management decisions, given their own objectives, preferences, and attitudes to risk. Measurable objectives for management are critical to the success of MSE since the performance of alternative management strategies is measured against these objectives. The benefit of an MSE process is that it communicates results clearly, highlighting trade-offs among multiple and sometimes conflicting objectives, to decision-makers and stakeholders. Robustness of management strategies to key uncertainties in the management system (monitoring, assessment, decision-making, and implementation of management actions) is a key principle of MSE. It does not provide certainty but it does guide decisions in an uncertain world. MSE is an iterative and ongoing process and requires collaboration among scientists, stakeholders and decision-makers.

3.3 MSE Application to Pacific Bluefin Tuna: Requirements for Implementation

S. Nakatsuka discussed how the MSE for PBF can advance, based on requirements outlined in the HS. It was reemphasized that managers have a major role in MSE development, including the identification of management objectives, corresponding performance indicators, and candidate management strategies. It was noted that the HS provides some insights for the required information; in particular, management objectives and performance indicators. However, in order to move into actual MSE development, clarification is needed. For example, what is the purpose of MSE? Management objectives need to be “operationalized” so that they can be quantitatively evaluated. Current management objectives are general and aspirational. Also, performance indicators need to be re-considered to evaluate of the achievement of operational management objectives. While the HS states that managers will provide ISC with 2 candidate TRPs, a candidate LRP and HCRs for further evaluation, desired features of the MSE needs to be specified for development to proceed. It was emphasized that the Workshop is the first opportunity to start discussions regarding various aspects of MSE development for PBF, and that the process (MSE development) is iterative; as analyses proceed, elements of the MSE can be re-discussed and further refined. It was pointed out, that several structural aspects of the MSE are known based on recent research which could expedite development, including; (i) management measures to achieve the agreed rebuilding targets, (ii) the PBF stock is slowly recovering and recruitment is not collapsing, (iii) recruitment is monitored annually to detect

the “unexpected”, (iv) stock assessments are conducted (at least) once in two years, and (v) MSE development by ISC will require additional personnel.

It was pointed out that CCSBT has already developed a southern bluefin tuna (SBT) MSE to guide effective resource management decision-making. There was agreement by participants that developers of the PBF MSE should review the events and activities leading to the successful completion of the SBT MSE as soon as practical. We want to make sure we embrace the positive steps, while staying clear of the pitfalls.

4.0 Towards Development of a Pacific Bluefin Tuna MSE – Open Discussion

Development and implementation of the PBF MSE requires consistent engagement and input from all decision-makers, scientists, and stakeholders. While there was participation from resource managers, scientists, environmental organizations and advocacy groups at the workshop, industry participation was scant. Given their importance in developing the MSE, alternative procedures to ensure industries future participation may need to be explored. This is particularly important given the nature of PBF fisheries, multi-national and North Pacific Ocean-wide.

4.1 Purpose of the MSE

It was clarified that the purpose of this MSE is to evaluate long-term management strategies of PBF robust to perceived uncertainties, including environmental, while also evaluating the current rebuilding strategy aimed at rebuilding the stock to 20%$SSB_{F=0}$ by 2034. It was also noted that the MSE can be used to determine candidate target and limit reference points, as well as harvest control rules.

4.2 Management objectives and performance indicators

At the 14th Meeting of the WCPFC, the HS was discussed and adopted. Within the HS a suite of management objectives and performance indicators are outlined, and their applicability for use in the MSE was reviewed by participants. There was general agreement among participants that many of the management objectives outlined in the HS are aspirational and lack necessary specificity to be evaluated quantitatively through MSE. For example, the objective “Support Thriving PBF Fisheries” would be difficult to evaluate within an MSE framework. Future effort should be directed at specifying operational management objectives that at a minimum address sustainability, socio-economic, yield, and conservation, and include specific reference to targets, risk levels, and time horizons that can be used to assess performance of a specific objective. Given the goal of this workshop (introduction to MSE) and scant participation by industry, the identification of operational management objectives and performance indicators will be discussed in detail at the next workshop.

4.3 Organizational structure for advancing the PBF MSE

The process for advancing development of the MSE was discussed by participants. While the ISC is responsible for educational and technical aspects of MSE development, ensuring engagement by all decision-makers, scientists, and stakeholders is challenging, as well as a mechanism to obtain feed-back from both the WCPFC and IATTC. Understanding that the technical portion of MSE development is time consuming, and recognizing that NGOs are presently hosting industry meeting to introduce the goals, objectives, and benefits of fishery management, there was a proposal to utilize NGOs to assist with the educational component of MSE development. While there was no decision on this proposal it will be discussed at ISC18. Further discussion on organizational structure will occur at the 3rd Joint IATTC-WCPFC NC Meeting scheduled for September 2018.

4.3 Further Considerations

- Developing MSEs is an iterative process and time-consuming.
- Economic performance metrics are important and should be incorporated into the PBF MSE.
- Need to develop a clear/transparent process that allows stakeholders to come forward with comments for management objectives/performance metrics.
- Need to achieve an equitable balance between management in the EPO and WCPO.
- The educational component of MSE development is critical.
- Continued involvement from decision-makers, scientists, and stakeholders is paramount to the development and implementation of a successful MSE.

4.4 Documentation of the discussion of the Workshop

There was considerable discussion concerning management objectives and performance indicators and the salient points are summarized in Annex 3, which should be viewed as a living document. Annex 3, Basic Structure of PBF MSE, forms the basis for future discussions and will change based on further discussions with decision-makers, scientists, and stakeholders.

5.0 Next Steps

Participants were reminded that no final decisions were expected at this meeting and that these discussions will inform decisions at the 3rd Joint IATTC-WCPFC NC meeting scheduled for September 2018 and next PBF MSE Workshop tentatively scheduled for May 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.

Pacific Bluefin Tuna
Management Strategy Evaluation Workshop

Queens Forum, Queens Tower B 7th Floor (in Queen's Square)
Yokohama, Japan

May 30-31, 2018

May 30, 2018（10:00 am – 5:00 pm）

Registration (10:00-10:30) – Coffee Service

1. Welcome-Japan (10 minutes) – 10:30–10:45

2. Opening Remarks and Introductions – J. Holmes (10 minutes) - 10:45-10:55

3. Review and Adoption of Agenda – G. DiNardo (5 minutes) – 10:55-11:00

4. Management Requests-The Need for an MSE – S. Nakatsuka (15 min) – 11:00-11:15

5. MSE Presentations
   a. Management Strategy Evaluation – Realizing its Full Potential – G. DiNardo (60 minutes) – 11:15 -12:15

Lunch 12:15-1:30

b. MSE Application Case Studies – J. Holmes & G. DiNardo (60 minutes) – 1:30-2:30
c. MSE Application to Pacific Bluefin Tuna: Requirements for Implementation S. Nakatsuka (60 minutes) – 2:30-3:30

Break 3:30-3:45 coffee service

6. Towards Development of a Pacific Bluefin Tuna MSE - Open Discussion Moderator: S Nakatsuka – (60 minutes) - 3:45-4:45

Recap Summary 4:45-5:00

May 31, 2018（9:30 am – 2:00 pm）

Coffee Service – 9:30-10:00

6. Towards Development of a Pacific Bluefin Tuna MSE - Open Discussion Moderator: S Nakatsuka (60 minutes) – 10:00-11:00

7. Future Work Plan and Expectations- Moderator: G. DiNardo (30 minutes) 11:00-11:30

8. Open Discussion – S. Nakatsuka and G. DiNardo (30 minutes) - 11:30-12:00

Lunch 12:00-1:30

9. Other matters: latest information about Pacific Bluefin Tuna (30 minutes) 1:30-2:00

10. Closing remarks – J. Holmes

Adjourn

Annex 3

Basic structure of PBF MSE (as of May 2018)
This document will continuously be updated as MSE develops.

1. **The Purpose of MSE of PBF**: "To develop long-term management strategies of PBF robust to perceived uncertainties including environmental impacts while also evaluating the current rebuilding strategy to rebuild the stock to 20%$SSB_{F=0}$ by 2034"

2. Management objectives, operational management objectives and corresponding performance indicators:

(1) Suggested possible additions to the current (aspirational) management objectives in the WCPFC Harvest Strategy (for further discussion at WCPFC NC-IATTC joint WG)

- Minimize negative impacts of increased PBF on other fisheries not targeting PBF
- Minimize negative impacts of management measures on sustainability of small-scale fisheries

(2) Possible operational management objectives (should be able to be evaluated quantitatively through MSE)

Sustainability:

- Rebuilding: achieve 2nd rebuilding target (20%$SSB_{F=0}$) by 2034 with probability of at least 60%.
- Target: maintain the stock above TRP (B-base and/or F-base) (TBD) with relatively high probability (TBD)
- Risk: maintain the stock above LRP (B-base and/or F-base) (TBD) with (very) high probability (TBD). If the stock falls below LRP, rebuild the stock above LRP (TBD) within TIME (TBD) under the long-term management strategy (after 2034). (add recruitment related objective?)

Harvest:

- Yield: maximize yield (possibly including changing size of fish caught)
- Stability: ensure management changes are relatively small (TBD)
- Responsiveness: Respond more timely to biomass trend including recruitment variability

Socio-economics:

- Maximize revenue to fisheries (trade-offs among fisheries? Increase Yield/Recruit?)
- Maximize social benefit from PBF fisheries (economic size of related industry?)

(3) Performance indicators (to be further refined as operational management objectives will be further developed). Discussion was postponed until ISC responds taking into account operational management objectives.

Management Objectives	**Performance Indicators**	**Comments from scientists (<u>this column to be deleted</u>)**
(i) Support thriving PBF fisheries	1. Probability of achieving each of the rebuilding targets within each of the rebuilding periods	Can be combined?
	2. Time expected to achieve each of the rebuilding targets	
	3. Expected annual yield, by fishery.	Possible.
	4. Expected annual fishing effort, by PBF-directed fishery.	Possible, but indispensable?
	5. Inter-annual variability in yield and fishing effort, by fishery.	Usually trade off with yield.
	6. Probabilities of SSB falling below the B-limit and the historical lowest level.	Possible.
	7. Probability of fishing mortality exceeding F_{MSY} or an appropriate proxy, and other relevant benchmarks.	Possible.
(ii) Maintain Equitable balance among CCMs	8. Expected proportional fishery impact on SSB, by fishery and by WCPO fisheries and EPO fisheries.	Cumulative impact can be calculated
(iii) Find equitable balance W/EPO		??

3. F<u>eatures of candidate management strategies to be advised by managers: options could to be evaluated through MSE. Some of them could be automatically filled as operational management objectives will be specified more.</u>

Features	**Status**	**Additional instruction**
Rebuilding targets	Specified (SSBmed and 20%$SSB_{F=0}$, including timeframe)	
Risks (probability)	Specified only for rebuilding strategy	Risk to go below LRP, no more than 20% usually in WCPFC
Type of Management Strategy	Not specified. Empirical or Model based?	
Reference points	Not specified. Not indispensable, but low limit is desirable to evaluate MSs	
Duration of TAC	e.g. 2 or 3 years	
Change of TAC	e.g. 10%, 20% or absolute value (e.g. maximum or minimum)	
General guidance of TAC change	Proportional, different among CCMs, among fisheries?	
Any other features	e.g. Area-wise, size-wise, country-wise TAC? Any other?	

4. **<u>Organizational structure for advancing PBF MSE</u>**: Organizations responsible for various aspects to advance MSE, including decision-making, steering MSE related work, scientific work and outreach, need to be clearly specified. Advice further discussion in this regard at NC-IATTC joint WG meeting.