COMMISSION
NINETEENTH REGULAR SESSION

Da Nang, Viet Nam
27 November - 3 December 2022

Reference Document for North Pacific Blue Shark (Agenda 8.1.1.3)

WCPFC19-2022-23
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Secretariat

A. INTRODUCTION

1. The purpose of this paper is to provide a quick reference guide to the latest recommendations of the Scientific Committee (SC18) for North Pacific blue shark (*Prionace glauca*) to be discussed under Agenda 8.1.1.3. This paper includes latest stock status and management advice from SC18 for the north Pacific blue shark stock.

B. SCIENTIFIC COMMITTEE RECOMMENDATIONS

B.1 Provision of Scientific Information (*Paragraphs 45 – 48, SC18 Outcomes Document*)

a. Stock status and trends

2. SC18 thanked ISC for the updated stock assessment for North Pacific blue shark and noted the following conclusions on the stock status provided by ISC.

> Target and limit reference points have not yet been established for pelagic sharks in the Pacific Ocean by either the WCPFC or the IATTC. Stock status was reported in relation to MSY-based reference points. The following information on the status of North Pacific blue shark was provided.
>
> The median of the annual spawning stock biomass (SSB) from the model ensemble had a steadily decreasing trend until 1992 and slightly increased until recent years. The median of the annual F from the model ensemble gradually increased in the late 1970s and 1980s and suddenly dropped around 1990, which slightly preceded the high-seas drift gillnet fishing ban, after which it has been slightly decreasing. The median of the annual age-0 recruitment estimates from the model ensemble appeared relatively stable with a slightly decreasing trend over the assessment period except for 1988, which shows a large pulse. The historical trajectories of stock status from the model ensemble revealed that North Pacific blue shark had experienced some level of depletion and overfishing in previous years, showing that the trajectories moved through the overfishing zone, overfished and overfishing zone, and overfished zone in the Kobe plots relative to MSY reference points. However, in the last two decades, median estimates of the stock condition returned into the not overfished and not overfishing zone.

Based on these findings, the following information on the status of the North Pacific blue shark is provided:

1) Median female SSB in 2020 was estimated to be 1.170 of SSB_{MSY} (80^{th} percentile, 0.570 - 1.776) and is likely (63.5% probability) not in an overfished condition relative to MSY-based reference points.
2) Recent annual F ($F_{2017\text{-}2019}$) is estimated to be below F_{MSY} and overfishing of the stock is very likely (91.9% probability) not occurring relative to MSY-based reference points.
3) The base case model results show that there is a 61.9% joint probability that NPO blue shark stock is not in an overfished condition and that overfishing is not occurring relative to MSY based reference points.

3. SC18 noted that the current assessment is an improvement over the previous assessment and supports the model ensemble approach taken in the 2022 stock assessment as a more comprehensive way of characterizing structural uncertainty in stock status. However, SC18 noted that the model ensemble did not consider some key uncertainties, in particular natural mortality or stock-recruitment steepness and SC18 recommended a more thorough use of the model ensemble approach is recommended to better represent uncertainty for future assessments.

b. Management advice and implications

4. SC18 noted the following conservation information from ISC.

Stock projections of biomass and catch of NPO blue shark from 2020 to 2030 were performed assuming four different harvest policies: $F_{current}$ (2017-2019), F_{MSY}, $F_{current}$+20%, and $F_{current}$-20% and evaluated relative to MSY-based reference points. Based on these findings, the following conservation information is provided:

1) Future projections in three of the four harvest scenarios ($F_{current}$ (2017-2019), $F_{current}$+20%, and $F_{current}$-20%) showed that median SSB in the North Pacific Ocean will likely (>50 probability) increase; the F_{MSY} harvest scenario led to a decrease in median SSB.
2) Median estimated SSB of blue shark in the North Pacific Ocean will likely (>50 probability) remain above SSB_{MSY} in the next ten years for all scenarios except F_{MSY}; harvesting at F_{MSY} decreases SSB below SSB_{MSY} (Figure 5E, SC18-SA-WP-06).
3) There remain some uncertainties in the time series based on the quality (observer vs. logbook) and timespans of catch and relative abundance indices, limited size composition data for several fisheries, the potential for additional catch not accounted for in the assessment, and uncertainty regarding life history parameters. Continued improvements in the monitoring of blue shark catches, including recording the size and sex of sharks retained and discarded for all fisheries, as well as continued research into the biology, ecology, and spatial structure of blue shark in the North Pacific Ocean are recommended.

5. SC18 noted that recent estimated recruitment was below the average level from the Beverton-Holt stock recruit relationship, and that if these low recruitments persist into the future, then the projection results could be overly optimistic.