

# ISC WCNPO Striped Marlin Assessment Peer Review

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Institute of Oceanography  
National Taiwan University (IONTU)  
Chinese Taipei

## Chair

Robert Ahrens

## Reviewers

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[https://isc.fra.go.jp/pdf/ISC24/ISC24\\_ANNEX11-Western and Central North Pacific Ocean Striped Marlin Assessment Concensus Review-FINAL.pdf](https://isc.fra.go.jp/pdf/ISC24/ISC24_ANNEX11-Western%20and%20Central%20North%20Pacific%20Ocean%20Striped%20Marlin%20Assessment%20Concensus%20Review-FINAL.pdf)



The panel and the review chair greatly appreciated the hard work and exceptional support the members of the ISC BILLWG provided (Dr. Michelle Sculley, Dr. Yi-Jay Chang, Dr. Chi-Lu Sun, Dr. Wei-Chuan Chiang, Dr. Mikihiko Kai, Dr. Marko Jusup, and Dr. Jon Brodziak).

The panel and the review chair were also grateful to the Institute of Oceanography National Taiwan University for their hospitality during the review meeting.

# Terms of Reference

01

## Structure

Review the information available on Pacific MLS stock structure and conceptual model and provide any recommendations for changing WCNPO MLS stock boundaries or to the fleet structure.

02

## Model inputs

Commenting on the adequacy and appropriateness of data sources and data inputs to the stock assessment: growth, catch, size compositions, cpue, data inputs.

03

## Model configuration, assumptions and settings

Comment on the approaches taken for: selectivity, initial conditions, uncertainty, start year, alternative models.

04

## Model diagnostics

Comment on the model diagnostics use and suggest potential changes.

# Terms of Reference

05

## Reference points

Comment on the proposed reference points and management parameters (e.g., MSY, FMSY, SSBMSY,  $20\%SSBF = 0$ ); if possible and feasible, estimate values for alternative reference points or alternative methods of determining the appropriate reference years for the dynamic  $B_0$  calculations.

06

## Research

Suggest research priorities to improve our understanding of essential population and fishery dynamics, necessary to formulate best management practice, with the identification of priorities to improve future assessments.

07

## Presentation

Comment on whether the stock assessment methods, results, and assessment decision process are clearly and accurately presented in the detailed report of the stock assessment.

- (S) Re-evaluative and simplify the Japanese fleet structure by focusing on operational level information.
- (S) For each fleets improve information on their spatiotemporal structure to more fully understand CPUE, size composition, targeting, changes in fleet composition and vessel turnover.
- (L) Continue to pursue genetic research towards improving understanding of stock structure.
- (L) Explore the use of and index fishery approach with the potential of developing a cross fleet unified CPUE

- (S) Growth and selectivity have a strong impact on the modeling results and continued effort to more fully understand these is necessary (International Biological Billfish Sampling Project (IBBS), fitting growth in the assessment, resolving spine age bias, spatial structure)
- (S) Standardize size compositions
- (S) Try not to split CPUE time series. In particular the Japanese longline CPUE if early period driftnet removals are included.
- (S) Unresolvable conflicting CPUE time series should be used in alternative model scenarios.
- (L) Explore developing multinational CPUE time series to address decreasing spatial coverage due to fleet range contraction

- (S) Continue to improve the full historical time series of catch, discards, and reporting even if the full series is not used in the assessment.
- (L) Consider age sampling for a fleet to improve population scale estimates.
- (S) Revisit all life history characteristics (mortality, steepness, etc.) given new information and the evolution of best practices.

- (S) The panel recommends the adoption of an ensemble model approach. The ensemble should consider: growth, assessment start year, steepness, catch uncertainty, and conflicting time series.
- (S) Given the structure of the area-implicit assessment model, The panel recommends fleet 18, the TWN DWLL, as the only fleet with have asymptotic selectivity.
- (S) Aim to remove time blocks from the selectivity parameterization of the Japanese and US fleets.
- (S) Review selectivity assumptions and diagnostics (parameter variances, bounds) to improve convergence.
- (L) Engage in simulation work to understand how best to account for spatial differences in life history characteristics.
- (S) The panels preference is that the model begin as early as possible (i.e, 1977) and alternative start dates be included in the ensemble approach.



- (S) Models that have not converged should not be in base reporting of results.
- In general the model diagnostic and sensitivity analysis used were appropriate.
- (S) Revisit data weighting when residual scales are notable difference (e.g., size composition).
- (S) Tension between flat CPUE through the high catch period and independent scaling of this period and the later period where length frequency data is fit appears to have forced the model into a domain where it needs to be highly responsive to recruitment deviations as well as fishery removals to fit the data. The adoption of the review panel's recommendations related to selectivity and continuity of time series should change this pattern. The response of the model to these changes as demonstrated by the additional runs requested suggest these are productive areas of exploration

- (S) Recommend calculating and reporting both the 20-year moving average as well as the annual dynamic  $B_0$  so that the trends can be compared.
- (S) Recommend averaging relative  $F_s$  over the last 3-5 years but not including the terminal year for the calculation of  $FSSB_{20\%}$  rather than using the terminal year.
- (S) The panel suggests continued reporting of additional status metrics such as %SPR or 1-SPR.
- (S) The panel recommends reviewing the standards outlined by the WCPFC and considering the adoption of the same approach.

- (S) The development of an age validated growth curve is essential to improve the reliability of the assessment model.
- (S) Consider exploring requirements for CKMR .
- (L) Continue to develop a more comprehensive understanding of the genetic structure of the entire Pacific as well as the genetic composition of the removals.
- (L) Implement CKMR approaches should they prove to be tractable for the population.
- (L) Simulation work to understand the best assessment approaches to deal with a complex fishery and life history spatial structure.

- (S) The review panel found the reporting of the process to be well documented, appreciated the extensive supporting material, and was highly appreciative of the effort.
- (S) Some of the supporting documentation in the working group papers would benefit from greater detail in the decisions made and well as the diagnostics used. It would be helpful to have this information within these documents. This is important for the development of both CPUE time series and size data. Encourage analysts to follow standard guidelines for documenting these analyses, and development of
- (L) Recommend working with the institutions involved with the assessment and reporting process to ensure that personnel are afforded the time to fully explore data analyses and report comprehensively on the findings.

