

Stock assessment for Kawakawa (*Euthynnus affinis*) in the Andaman Sea Thailand

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Abstract

The study of the stock assessment of Kawakawa (*Euthynnus affinis*) in the Andaman Sea, Thailand, was conducted using the Bayesian surplus production model JABBA (Just Another Bayesian Biomass Assessment), which used data from commercial fishing vessel catch and CPUE data from purse seines collected by the Fisheries Department from 2001 to 2024. The assessment results showed that the maximum sustainable yield (MSY) of Kawakawa tuna estimate was 10,161 tons, while the catch in 2024 was 5,714 tons, and the biomass at MSY (BMSY) estimate was 25,197 tons. The JABBA study indicated that the stock of Kawakawa tuna in the Andaman Sea is underfished.

Key words: maximum sustainable yield, Kawakawa (*Euthynnus affinis*), Andaman Sea, JABBA (Just Another Bayesian Biomass Assessment)

1. Introduction

Kawakawa tuna (*Euthynnus affinis*) is a small, deep-sea tuna belonging to the family Scombridae. Kawakawa tuna is one of the most popular tunas consumed in Thailand. Both artisanal and commercial fisheries are fished, particularly in the Andaman Sea, where this species is a major breeding ground. Due to its relatively short life cycle, rapid growth rate, and seasonal abundance, Kawakawa tuna are targeted by various fishing gears, including purse seines, gill net, and hook and line fishing.

In recent years, increased fishing effort, coupled with environmental variability, have raised concerns about the sustainability of the kawakawa tuna status in Andaman Sea. However, despite its commercial and ecological importance, official stock status assessments of this species in the Andaman Sea are limited. Understanding the current status of the kawakawa stock status is essential for implementing effective fisheries management measures and ensuring long-term sustainability.

This study presents a population assessment of kawakawa in the Andaman Sea using a state-space Bayesian biomass assessment (JABBA). The assessment aims to assess the current population status against biological reference points, including maximum sustainable yield (MSY) and biomass at maximum sustainable fisheries (B_{MSY}). The results of this study provide scientific guidance to fisheries managers and stakeholders to develop strategies for the responsible use and conservation of this valuable resource.

2. Material and Methods

2.1 Data sources

The data used for the estimation are the total catch volume (tonnes) of Kawakawa tuna and fishing effort data from 2001 to 2024 from both artisanal and commercial fishing gears, which use purse seines as the standard fishing gear, recorded and compiled by the Department of Fisheries of Thailand.

2.2 JABBA model

The MSY analysis for this study used the stock assessment model JABBA (Winker et al. 2018), available online at: <https://github.com/jabbamodel/JABBA>, The Fox, Schaefer and Pella-Tomlinson production functions was used function with preliminary data for key parameters (K , r and initial state) for Kawakawa tuna.

3. Result and discussion

The catch of Kawakawa tuna (*Euthynnus affinis*) from purse seines in the Andaman Sea was used to estimate the MSY. The data were analysed using the Fox surplus production model. The results showed that the biomass of Kawakawa tuna from 2001 to the present is at the optimum fishing level (Figure 1).

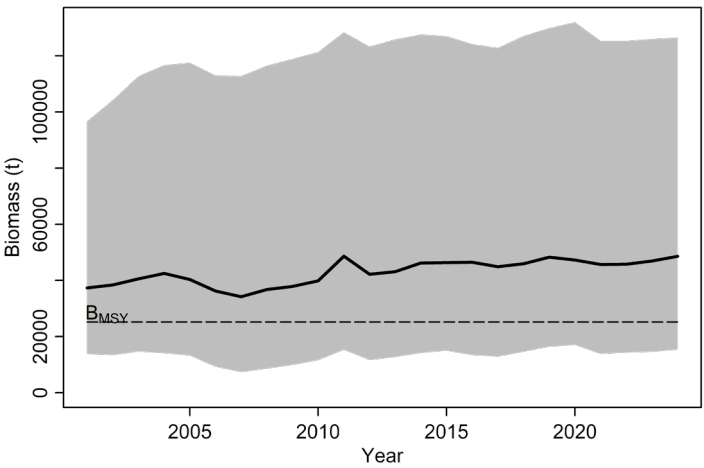


Figure 1. The biomass of Kawakawa tuna in Andaman Sea from 2001 to 2024

The maximum sustainable yield (MSY) of Kawakawa tuna estimate was 10,161 tons, while the catch in 2024 was 5,714 tons, and the biomass at MSY (B_{MSY}) estimate was 25,197 tons. Kawakawa tuna resources are currently being fished at fishing effort levels consistent with F_{msy} (Figure 2)

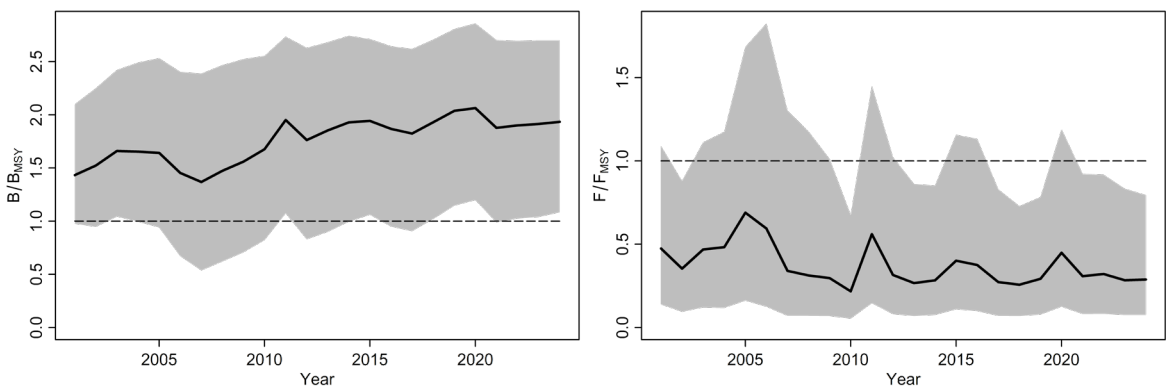


Figure 2. F/F_{MSY} and B/B_{MSY} of Kawakawa tuna in Andaman Sea, Thailand

The Kobe graph shows that the status of Kawakawa tuna from 2001 to the present in 2024 is in the green zone, indicating that the stock status of the Kawakawa tuna in the Andaman Sea is healthy, with no overfishing. (Figure 3)

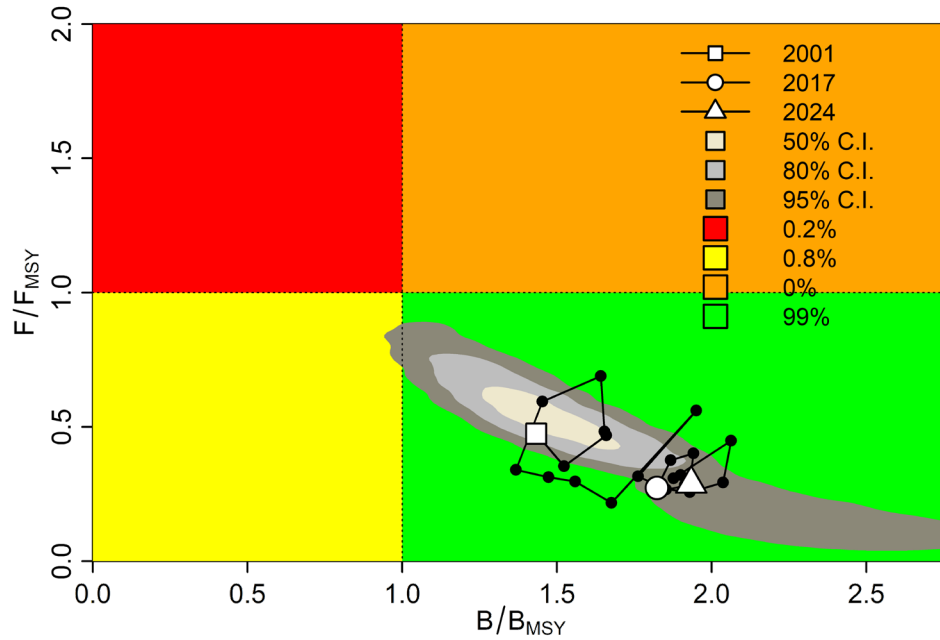


Figure 3. Kobe plot of the assessment of stock status for Kawakawa tuna in Andaman Sea, Thailand

4. Conclusion

A Bayesian excess production model (JABBA) was used to assess the stock status of kawakawa tuna in the Andaman Sea. Fox production model function was chosen to align with the stock status assessment used by Thailand to determine the MSY of the group species as a reference point for determining the Total Allowable Catch (TAC). The results showed that the stock of kawakawa tuna in the Andaman Sea is below the MSY level. Although no management measures are currently in place for any single species, assessing the status of any single species is an important part of monitoring the status of each fish in the group species to determine the most appropriate and effective measures.

5. References

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