

We reviewed operational logbook data collected from Taiwanese longline vessels operating in coastal and offshore waters between 2011 and 2023. Given that the relative abundance index is one of the most critical inputs for stock assessment, we re-conducted CPUE standardization using spatial-temporal modeling approaches, including the Vector Autoregressive Spatio-Temporal model (VAST) and sdmTMB. These models replaced the general linear model (GLM) that had been applied in previous years. Standardized indices of relative abundance were estimated using an area-weighted method that incorporated information from both fished and unfished regions, allowing for more comprehensive spatial coverage and reduced estimation bias.

Both spatial-temporal models identified consistent seasonal patterns in abundance, with a clear peak during the second quarter followed by a decline in the third quarter. These results align with known migratory behavior and oceanographic conditions affecting the target species. While the two models generally agreed on overall trends, sdmTMB produced stronger spatial contrast and slightly higher abundance estimates in the earlier years of the time series. Compared to these approaches, the GLM underestimated the contribution of high-density fishing areas and dampened both seasonal variation and inter-annual differences, leading to a flatter and potentially less accurate index.

The relative abundance indices derived from the spatial-temporal models and the GLM exhibit broadly similar trends but show noticeable differences in specific years, particularly in the early part of the time series. These discrepancies could lead to revised stock assessment outcomes compared to previous years. As a result, the upcoming stock assessment will be updated using the newly standardized indices to ensure that population dynamics are modeled more accurately. Following this, the management strategy evaluation (MSE) will also be revised to reflect the updated stock status and dynamics. The goal of these updates is to support more informed and adaptive management recommendations that are grounded in the best available science and account for both spatial and temporal variability in stock distribution.