

# INTER-AMERICAN TROPICAL TUNA COMMISSION

## 98<sup>TH</sup> MEETING

(by videoconference)

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### DOCUMENT IATTC-98 INF-D

## CORRECTING BIAS IN THE BEST SCIENTIFIC ESTIMATES (BSE) OF THE TROPICAL TUNA CATCH IN THE COVID-19 PANDEMIC YEARS OF 2020 AND 2021

### SUMMARY

The best scientific estimates (BSE) of the tropical tuna catch in 2020 and 2021 are potentially biased due to the effects of the COVID-19 pandemic on port sampling operations. As a result, these estimates should not be used for stock assessment and management purposes until the biases are investigated and corrected, if necessary.

### OVERVIEW

The COVID-19 pandemic impacted IATTC staff's port sampling operations, which has potentially biased the best scientific estimates (BSE) of catch ( $C_{BSE}$ ) for the tropical tuna.  $C_{BSE}$  is a primary source of data required in stock assessments and is being considered for use in the proposals for an Individual Vessel Limit (IVL) scheme for bigeye catch (C-1 VEN/C-3 ECU). Correcting for the effect of COVID-19 on tropical tuna data sources falls within the methods proposed in the staff's work plan to improve the current BSE approach (see below).

The current  $C_{BSE}$  methodology estimates the species composition on the total tropical tuna catch (the sum of yellowfin, skipjack and bigeye tuna from cannery, observer, and logbook data sources), by strata, using the port-sampling data. A detailed description of the  $C_{BSE}$  methodology can be found in IATTC Stock Assessment Reports [2](#) and [4](#) and in [Document WSBET-02-06](#) prepared for the 2019 BET External Review. The catch strata used to estimate the  $C_{BSE}$  are defined by several factors, including the sampling area, month and set type. The estimated catch of each of the three species for each stratum are summed up across strata to obtain estimates of the total annual catch by species. The species composition of the cannery, observer and logbook data are not used for the  $C_{BSE}$  because of concerns about the reliability of those estimates. For observer and logbook data, concerns have been expressed that observers and vessel crew may have difficulty distinguishing between small bigeye tuna and small yellowfin tuna. In addition, on their own (*i.e.*, without discussing catch composition with the vessel crew), observers must make catch estimates by species primarily from their view of the brailing process, which requires them to estimate catch composition based on visual inspection of brailer-loads of fish. As regards cannery data, concerns have been expressed that cannery species identifications may be influenced by the going market price for the various species.

The port-sampling data are collected using a specific protocol, which can be found in the Appendix of [IATTC Special Report 18](#). In brief, sampling of the catches from a vessel's well is only done when the catch is from the same sampling area, month, and set type. Typically, one to two wells are sampled for a trip, and in a normal year, about 60% of trips of Class-6 vessels are sampled (see slide 12 of the [2020 Tuna Fishery presentation](#)). Since not all wells or trips are sampled, the species composition of tropical tuna catch in strata without sample data must be estimated from the sample data of other strata. As the number of wells sampled decreases, a greater proportion of the species catch has to be estimated from sample data of strata that do not directly correspond to the strata of the catch. The greater the number of catch strata without sample data, the greater the potential for bias in the estimates of total catch by species.

## **STAFF'S CONCERNS**

### **Potential biases in the 2020 and 2021 BSE catch estimates**

In 2020 and 2021 the port sampling was reduced due to access issues caused by COVID. If the limitation on access was random, this would have only reduced the precision of the estimates. However, the access was more limited in some ports than others (e.g., no sampling was conducted for an extended period in the largest port where bigeye tuna is unloaded). This non-random access potentially biases the estimates of catch by species for the reason noted above.

### **Proposed work plan**

The IATTC staff plans to improve the analyses used to estimate the catch by species and these methods may reduce the bias caused by COVID. The approach has not yet been developed but is likely to use sophisticated statistical methods such as spatial-temporal models. Additional work will be needed to identify the factors that differ among ports and make sure these are taken into consideration in the analysis. The methods will be tested based on historical data that do not have the same issues with limited data from some ports. The methods will be applied to the historical data with the data from some ports deleted and comparing those to estimates using the full data set. A thorough analysis is likely to be time consuming at a time when the IATTC statistical staff members are currently in transition and also potentially having to develop methods for the [IVL scheme](#) if it is implemented. Therefore, it is unlikely that a thorough analysis can be conducted so that revised estimates of the 2020-2021 catch can be available before the 2022 SAC. The staff proposes to have corrections for  $C_{BSE}$  available in time for any stock assessments to be presented at the 2023 SAC.