



**PBF size composition 2022-2023 from the Mexican purse seine fishery. Data collected during pen transfer operations.**

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## Summary

An analysis of the PBF catch size-composition data for 2022 and 2023 fishing years is presented based on length measurements taken from stereoscopic underwater camera videos during pen transfer operations of live PBF tuna. PBF average size for 2022 was 118 cm furcal length in both years. The highest modes in both years is 120 cm.

## Introduction

Information related to size composition has been presented to PBFWGs in the past, Aires-da-Silva and Dreyfus, 2012, Dreyfus and Aires-da-Silva, 2014, Dreyfus and Aires-da-Silva, 2015 where a statistical method was used for the first time to raise sample sizes from stereoscopic underwater cameras during PBF transfers from transportation pens to feeding pens, in Dreyfus, 2018, Dreyfus 2020 and Dreyfus, 2021 the same methodology was applied as well as now for data obtained from the 2022 and 2023 fishing operations.

During recent years, collaborative efforts between INAPESCA-Mexico, FIDEMAR that manages a national observer program and the PBF fishing industry generated access to PBF size-composition data collected during pen transfer operations. Stereoscopic cameras have been introduced in the bluefin ranch sector and are utilized to obtain counts of fish and estimates of individual fish lengths, as well as weight composition data, under at-sea transfer conditions. This state-of-the-art technology provides a large volume of high-quality length-frequency data (Phillips et al, 2009).

## Materials and Methods

A size data sample was obtained from stereoscopic cameras video measurements for each set-transfer and the PBF size-composition data was raised to total catch using the equation below, used in previous analysis:

$$N_{ik} = (n_{ijk} * C_{jk} / S_{jk}) * R_k$$

where

$N_i$  is the estimate of the number of fish in size bin  $i$  for year  $k$ .

$i$  = size bin (2cm bins from smallest size to largest size)

$j$  = sampled set

$k$  = year

$n$  = # fish measured in a set

$C$  = catch per set sampled (tons)

$S$  = amount in tons of fish measured in a set

$R$  = total PBF catch in year  $k / \sum C_{jk}$  (where the sum is over  $j$ )

## Results and Discussion

In figure 1 is presented the size composition of the catch for 2022 and 2023, in both years, 3 year old PBF where the main target of the fishery and the range of ages goes from 1+ to 5+ years of age fish.

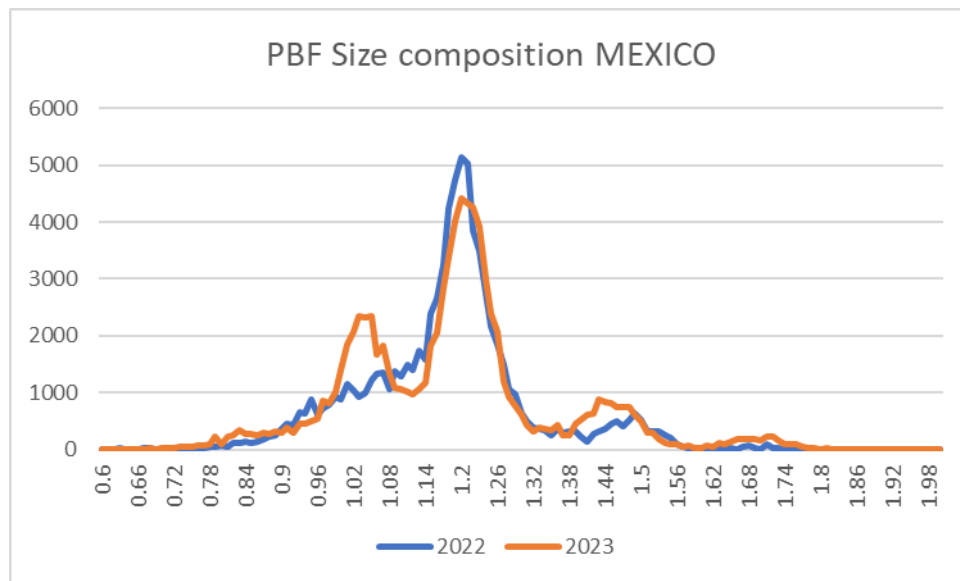


Figure 1. PBF catch size composition in the Mexican purse seine fishery, 2022-2023

In the next table (1), some statistics are presented, minimum and maximum size present in the catch, average size, and the size bin where the highest mode is located. In both cases the average size lies close to the value of the highest mode.

Table 1. Size statistics of the PBF Mexican purse seine catch.

	2022	2023
Minimum size	61 cm	66 cm
Maximum size	198 cm	182 cm
Average size	118 cm	118 cm
Highest Mode	120 cm	120 cm

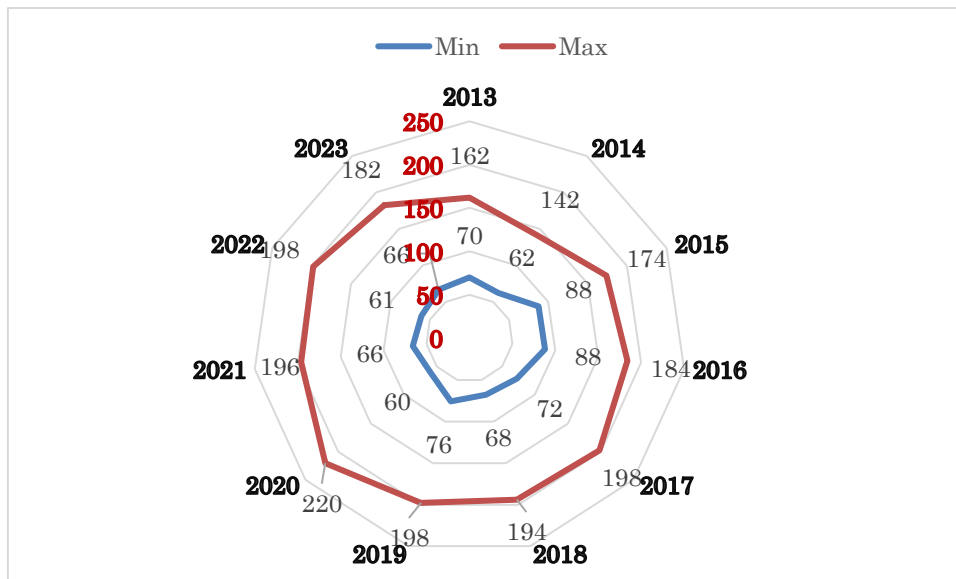


Figure 2. Minimum and maximum length sizes from 2013 to 2023

Some similarities are detected from 2017 to 2023 in relation to maximum and the minimum values. In 2015 and 2016 the minimum values are higher, compared to the following years. The highest value overall was observed in 2020 and lowest value was observed also in that year.

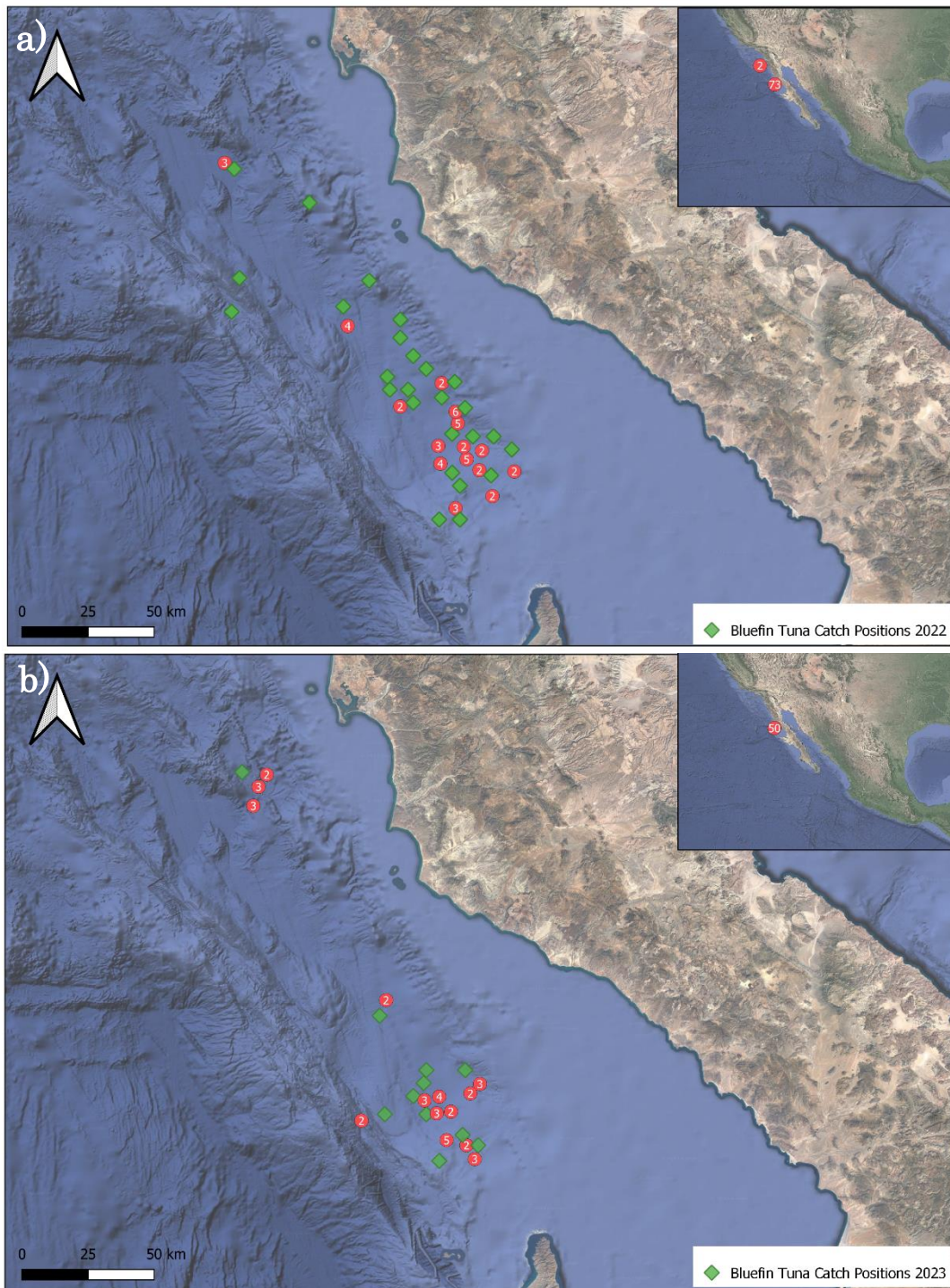


Figure 3. Bluefin tuna catch positions in a) 2022 and b) 2023. Red circles with numbers represent the amount of sets in the same position.

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