



**PBF catch size-composition of the Mexican purse seine fishery from data collected at pen rearing operations during 2015-2017**

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## Summary

An analysis of the PBF catch size-composition data for 2015 to 2017 fishing seasons is presented based on length measurements taken from stereoscopic underwater cameras during pen transfer operations of live PBF tuna. PBF average size for the 2015, 2016 and 2017 fishing seasons were 115 cm, 114 cm and 137 cm respectively. The highest mode for 2015 was located in 110 cm, in 116 cm for 2016 and 134 cm for 2017.

## **Introduction**

Information related to size composition has been presented to PBFWG's in the past, Aires-da-Silva and Dreyfus, 2012, Dreyfus and Aires-da-Silva, 2014 and finally Dreyfus and Aires-da-Silva, 2015 where a statistical method is used to raise sample sizes from stereoscopic underwater cameras during PBF transfers from transportation pens to feeding pens is presented, In this new document the same methodology is used to obtain size composition of the Mexican catch from 2015 to 2017.

During recent years, collaborative efforts between INAPESCA-Mexico 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).

### **PBF size composition estimates for 2015-2017**

PBF size composition statistics obtained through the use of underwater stereoscopic cameras were previously presented starting with data from 2011 and 2012 fishing years. A first attempt at producing size-composition estimates representative of the PBF total catch for 2013-2014 was already presented and used in previous assessment. This time 3 more fishing years and size composition of the total PBF Mexican catch are presented below.

A summary of the PBF data available for this study are presented in Table I. Sampling effort is shown with respect to the number

of sets from where size data was collected. More sampling effort was conducted in the 2016 fishing season, as compared to the 2015 fishing season, considering percent of total sets sampled (table I).

Table I. Sample size for the 2015-2017 fishing season

	% of sets sampled	Total number of sampled sets
2015	25%	15
2016	89.2%	25
2017	66.6%*	30

\*preliminary

### Raising to total catch

Available PBF size-composition data were raised to total catch using the equation below:

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

where

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

$i$  = size bin (2cm bins from 60cm to 160 cm)

$j$  = 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

In figure 1 the location of all the effort for 2015-2017 fishing years is presented. A small area located in the northern part of Baja California peninsula is where in recent years all the fishing activities are situated for logistical reasons.



Figure 1. Fishing area for PBF in Baja California, Mexico (2013-2017)

The raised PBF size compositions of the Mexican purse-seine fishing operations for 2015 to 2017 are presented in Figure 2. The size range (minimum and maximum size measured) is shown in table II, some slight differences are detected. By contrast size composition and age classes present in the catch can have important differences year by year.

In 2015 season, two modes are present in the catch, dominated by 110 cm PBFs and a smaller fraction of some relatively larger PBF (> 140 cm) were captured but fish > 140 cm did not appear in large numbers in the catch of year 2016 when fish predominantly of 116 cm were captured and in contrast in 2017 considerable larger animals were captured of 134 cm and 160 cm modes.

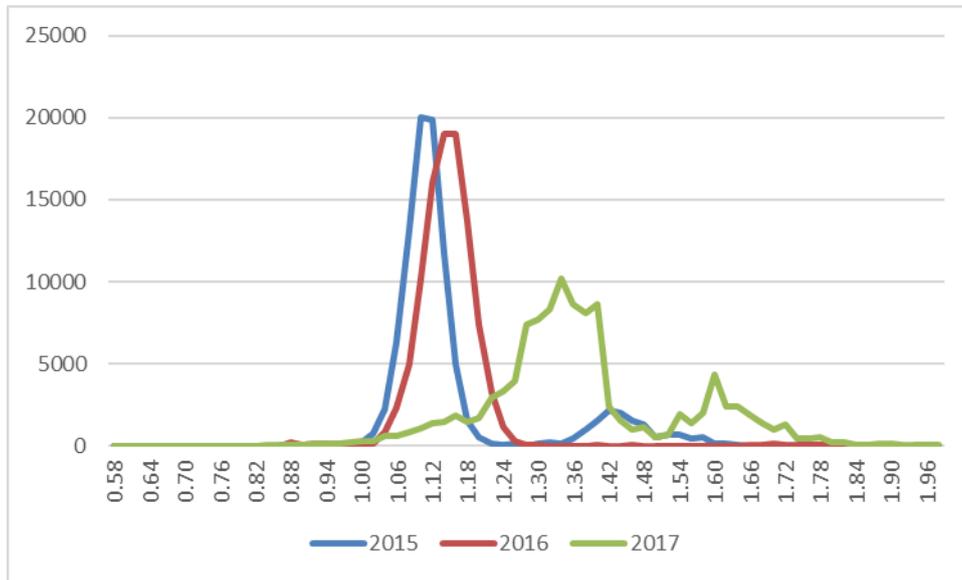


Figure 2. PBF size composition from the mexican purse seine fishery in the EPO, 2015-2017

The range of sizes as well as average size of PBF in Mexican catch is shown in table II.

Table II statistics from PBF measured

	2015	2016	2017
Minimum size	88 cm	88 cm	72 cm
Maximum size	174 cm	184 cm	198 cm
Average size	115 cm	114 cm	137 cm

PBF average size for the 2013 and 2014 fishing seasons were 103 cm and 104 cm, there is a slight increase in average size in 2015 and 2016 and substantial increase in 2017. An estimated total of 96070 fishes were captured in 2015, 100345 in 2016 and 111702 fishes in 2017 based on this analysis.

## References

Aires-da-Silva A. and M. Dreyfus. 2012. A critical review on the PBF length-composition data for the EPO purse seine fishery with new data collected at Mexican PBF pen rearing operations. ISC12/PBFWG-3/02

Dreyfus, M. and A. Aires-da-Silva. 2014. An Update on PBF catch size composition for the Mexican fishery directed to farming operations in the EPO (2012 -2013). ISC14/PBFWG-1/04

Dreyfus-Leon M. and A. Aires-daSilva. 2015. PBF catch size-composition of the Mexican purse seine fishery from data collected at pen rearing operations: an update for 2013-2014. ISC/15/PBFWG-2/05

Phillips, K, V, Boero-Rodriguez, E. Harvey, D. Ellis, J. Seager, G. Begg, J. Hender. 2009. Assessing the operational feasibility of stereo-video and evaluating monitoring options for the Southern Bluefin Tuna fishery ranch sector. Fisheries Research and Development Corporation and Bureau of Rural Sciences. ISBN 978-1-921192-32-6.

