

UPDATE, HOMOGENEITY AND IMPROVEMENT IN THE FISHING INDICATORS OF THE PURSE SEINER AND BAIT BOAT TUNA FLEETS OF THE ATLANTIC OCEAN

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SUMMARY

This document presents an analysis and review of fishing indicators related to tropical tuna fishing by the purse seine and baitfish fleet. From a historical perspective, and as a result of the current legislative and exploitation changes in these fisheries, the suitability of the current fishing indicators presented by some countries is analyzed. Currently, new exploitation strategies are underway and greater coordination between countries is necessary for the acceptance, homogenization and standardization of the fishing indicators of their fleets. Forty-eight different fishing indicators are presented for review, acceptance and proposals for improvement.

RÉSUMÉ

Ce document présente une analyse et un examen des indicateurs des pêches de thonidés tropicaux des flottilles de senneurs et canneurs. D'un point de vue historique, et faisant suite aux changements actuels apportés à la législation et à l'exploitation dans ces pêcheries, la pertinence des indicateurs des pêches actuels présentés par certains pays est analysée. Actuellement, de nouvelles stratégies d'exploitation sont en cours et une plus grande coordination est nécessaire entre les pays en vue d'accepter, d'homogénéiser et de standardiser les indicateurs des pêches de leurs flottilles. Quarante-huit indicateurs des pêches différents sont présentés pour examen, acceptation et propositions d'amélioration.

RESUMEN

Este documento presenta un análisis y una revisión de los indicadores de pesca relacionados con la pesca de atún tropical por parte de las flotas de cerco y de cebo vivo. Desde una perspectiva histórica, y como consecuencia de los actuales cambios legislativos y de explotación de estas pesquerías, se analiza la idoneidad de los actuales indicadores de pesca presentados por algunos países. Actualmente, están en marcha nuevas estrategias de explotación y es necesaria una mayor coordinación entre los países para la aceptación, homogeneización y estandarización de los indicadores de pesca de sus flotas. Se presentan 48 indicadores de pesca diferentes para su revisión, aceptación y propuestas de mejora.

KEYWORDS

Fishing indicators, effort, purse seiner, bait boat, floating objects, FAD, free schools, homogenization and standardization

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1. Introduction

The statistics on tropical tuna catches with purse seine gear are based on the information contained in the logbooks that skippers fill in in a detailed and systematic manner. Since 1984, after the meeting of the Working Group on Juvenile Tropical Tunas, the specific composition of the catches is corrected based on data from multispecies port sampling (Bard, F.X. and Vendeville, 1986), according to the procedure elaborated by the group (Anon, 1984). The correction of the specific composition led to a significant increase in the estimated catches of juvenile bigeye and, to a lesser extent, yellowfin tuna, clearly underestimated in the records of the skippers. Since 1991, the changes initiated in the fishery with the introduction of fishing on fish aggregating devices made it advisable to review the procedures for correcting the specific composition and for obtaining size distributions, due to the important differences in the characteristics of the catches obtained on a floating object (FOB) or a free school (FS). During 1996 and 1997, a coordinated program (France-Spain-EU) was developed (Pallarés and Nordstrom, 1997) for the analysis of the sampling strategy and treatment of tropical tuna data. This program allowed to analyze in depth the problems linked to obtaining data from a multispecies fishery and to develop a new sampling scheme (Pallarés and Petit, 1998), with a sounder statistical background, for the correction of the species composition and size distribution of the catch.

The monitoring of the fishing effort, technological improvements, changes in strategies and catches by fishing fleets are of paramount importance for understanding the fishery, to study its evolution over time and to make recommendations and proposals that help an adequate and sustainable management of fish stocks.

After many years of analysis and monitoring of different fishing indicators of the tropical tuna fishery, this paper seeks a new format of the main indices presented until now, to improve, standardize and homogenize the presentation of this diverse information related to the fishing activity of purse seiners (PS) and bait boat (BB). Currently, some fishing indicators have little “value” for the scientific community and low representativeness of the fishing activity too.

In the data preparatory meeting celebrated in Madrid from 22nd to 26th of April 2019, the group noted: “that showing the number of sets per day by fishing mode (floating object versus free school sets) for the EU and associated fleets would be useful for understanding trends. The group also considered that it would be useful to see the trends in number of vessels, active fishing days and carrying capacity for the total tropical tuna PS and BB fisheries” and recommended changes to some protocols for the submission of information: the group recommends that the annual submission of number of vessels, active fishing days, and specific vessel characteristics (ST01FC) be mandatory for all CPCs with fisheries on PS and BB tropical tunas in the Atlantic”.

In the Regional Coordination Group on Large Pelagics Data Management (RCG LP DM) technical meeting celebrated in Sète from 3rd to 5th of June 2021 and in the related Restitution Meeting in Tenerife in 2022, the group discussed and worked on this topic to find the best format and the best indices, more representative and with a good sensitivity to fishery changes. The group highlighted that to improve the format and standardize the presentation of the main indices, it is necessary to enhance or upgrade the monitoring and analysis of these indicators. The group recommended a joint work among all interested countries for the construction of a homogeneous and standard “template”, necessary to present these fishing indicators in a clear and useful way in future meetings of the RFMOs.

“The RCG LP DM group noted that the section presenting national fleets in the statistical working documents submitted to t-RFMOs needs common fishery indicators through an agreed template to allow comparison of patterns. Furthermore, the group recommends initiating a collaborative work between Spain, Seychelles, Senegal and France on this subject. The aim will be the production of a template (for the fleets involved) with several indicators and present/discuss it during the next ICCAT SCRS WGTT in September and during the next IOTC working party on tropical tunas”.

“In recent years, both in the Atlantic and Indian RFMOs, new control standards and catch limitations for tropical tuna fishing have been implemented. This new regulation has caused the fleet to change its fishing strategies, modifying its traditional fishing behavior carried out until recent years. The current system of statistics started in 1980, and uses the same methodology for Spain, France, some coastal countries and Spanish or French NEI-vessel. A file or work template was presented with the submission of 40 fishing indicators as a proposal to start discussing the details of calculation, homologation and acceptance for its annual presentation with the statistical documents of these fishing fleets”

The tropical tuna fishery carried out by industrial PS is in continuous technological evolution. Throughout its history, fishing strategies have changed numerous times in order to maximize the profitability of the activity. Technological changes have occurred in many fronts, like the shape of the ships, ship size, cargo capacity, Net size, Fish Aggregating Device (FAD) design, etc. Additionally, the purse seine fleet has changed its fishing strategy in the last decades, progressively moving from sets on free schools to sets on FADs. In relation to this, fishing selectivity has changed a lot throughout the history of this fishery. There have also been changes in the fishing zones every year depending on the existence of fishing agreements or responding to environmental changes. Finally, the entry into force of new management measures in the different RFMOs have resulted in various changes in the fishing strategy of the fleet. Notably, spatiotemporal closures (total or FAD closures) have modified some fishing patterns in the tropical tuna purse seine fishery.

In addition, there have been numerous regulatory changes (limitations in the number of FADs by vessel, a longer moratorium season and Total Allowable Catch (TAC) limit for bigeye tuna (BET) that have led to new exploitation rules in tropical tuna fishing. Currently, fishing activity is much more restricted and the demand for information is very abundant. Furthermore, the request for annual data from fishing countries through new data calls is increasingly rigorous and detailed.

An annual and updated presentation of all these fishing indicators constitutes the main and most important fishing information of the fleet. With rigorous and adequate information on these issues, it will be possible to test annually how the fishing activity of said fleets is or how it has been in the current year or throughout a particular period. Likewise, this information could be a useful tool to help and support the evaluations of the species captured by the fleet.

This paper constitutes a first preliminary proposal for the presentation of fishing indicators with the objective of homogenization and standardization, improving monitoring and highlighting robust indicators, which clearly reflect the most current situation of the fishery.

2. Methods and Results

Fishing indicators are analyzed for the whole time-series available in ICCAT area. The fishing indicators of Spain, France and the NEI fleet are analyzed in a historical context. The different fishing indicators present in the statistical documents have been assessed in relation to their format, their homogeneity between CPCs and their usefulness, their homogeneity between countries and their usefulness.

New approaches and new suggestions are presented for their consideration. The “fishi package” (FISHeries Indicators) is presented as a new standardized methodology proposed in the generation of fishing indicators. It aims to regroup standardized indicators to facilitate fisheries and marine sciences research, by providing a suite of tools and functions for data analysis, visualization, and modelling. It encompasses a range of capabilities tailored to fisheries-related tasks, including the processing and manipulation of fisheries data, statistical analysis, and the creation of informative visualizations. The package attempts to simplify common processes encountered in fisheries research, enhancing the efficiency and effectiveness of analyzing and interpreting data in this domain. This package is in development and available on GitHub (<https://github.com/OB7-IRD/fishi>, <https://ob7-ird.github.io/fishi/index.html>). Furthermore, a full documentation is associated. Inputs can be materialized by csv/excel datasets or SQL queries link to databases. Inputs to the different functions in R, are provided as data frames and indicators are provided in the form of graphical or table outputs (**Figure 1**).

The statistical monitoring of the fishing activity on tropical tunas in ICCAT shows significant differences in the type of format of data presented. One of the first attempts to summarize trends in ICCAT fisheries and tropical tuna stocks was carried out by Diouf and Fonteneau in 1990. These authors presented 10 data tables with catches, effort and size frequency grouped into different categories according to the size of the vessels. The figures in these early documents showed catch data, nominal abundance indices, and effort distributions in the fishing area (SCRS/1989/063 Rev).

Subsequently, changes occurred because of the new sampling and monitoring strategies that were defined at the end of the 90s in a program coordinated by France, Spain and EU. New stratifications associated with fishing rose and processes like the conversion of the first dorsal length to fork length sizes were especially implemented to match the reality of fishery at that time. With the new treatment system for tropical tuna statistics (T3) agreed, there is a significant improvement in correcting the specific composition of the catches and in obtaining their size distributions (SCRS/1999/064).

In the 2000s, statistical documents were presented, with a standardized effort in 12-hour days, with more detailed data tables and, above all, with the size composition of the catches according to fishing mode: free-school and floating object. The figures of the size distributions and the catches by species and type of fishing were presented with great precision (SCRS/00/85). At this time, there began to be better coordination between France and Spain and formats and fishing indicators were standardized in the SCRS statistical monitoring documents.

From 2010 to 2018, the cooperation and coordination between the European countries and the NEI fleet was very efficient and detailed information from other flags was incorporated into the required statistical documents. Despite the coordination between France, Spain, NEI fleet and associated countries, indicators were presented using different formats and criteria. (SCRS/2018/056; SCRS/2020/137).

After the implementation of TACs for BET in 2017 (65,000 t, ICCAT. Rec. 15-01) and especially in 2018 (62,500 t, ICCAT. Rec. 19-02), CPCs began to have difficulties with the reported catches of this species. The adoption of CPC-specific catch limits for bigeye implied the development of tools to monitor quotas in near real-time by member states, and introduced changes to the statistical methodology followed historically for this fishery. After the global pandemic of COVID-19 in 2020, joint statistical documents for ICCAT and IOTC were not presented, and numerous changes that occurred in the fishery were detected but not included in the statistical documents that followed. This document reflects the usefulness of some of them.

With the intention of establishing the best quality standards and contributing to a more detailed and current knowledge of the fleet's activity, a revision of the fishing indicators of the fleet that fishes for tropical tunas is suggested and new proposals are made (**Table 1**).

3. Discussion

3.1 Effort

20 effort indicators are analyzed in this document (**Table 1**).

No.Vessels, that have operated or fished under a flag, regardless of the number of days of fishing that have been carried out in the year. Mandatory value. Presentation of figures and tables are recommended, and updating them each year.

TRB or *GRT*, Gross record tonnage (Tx) of each vessel. It refers to the total volume onboard. Optional value. Presentation of figures and tables are recommended, and updating them each five years.

CC and *CC_Year*, carrying capacity in wells of boat and by year, with weighted capacity carried out throughout year. $CC * \text{factor of conversion} = CC_Year$. The factor of conversion computed: $\text{Max (tonnes of tuna) catches in wells} / \text{M3 Shipyard} = \text{around } 0.7$; The slope of this calculation is 0.727, with a 95% CI of 0.69-0.76. And there is another similar index: *CC_Year* by active fishing month by year. Only taking into account the months in which actual fishing was carried out each year. The calculus is $CC_Year = CC * \text{fishing months} / 12$. Optional value, no graphs or data presentation required.

FD and *FT*, total days spent by the fleet during all year, and the computation is: $FT / 12$ hours in the Atlantic Ocean and $FT / 13$ hours in Indian Ocean. In the Indian Ocean, the value is 13 hours because the vessel could start the fishing operation before the sunrise for a set on FOBs

Dist., total distance for all fishing trips of the year. Optional value, no graphs or data table presentation required.

SeD., searching days, it is the time spent in searching activity only. Optional value. Presentation of figures and tables are recommended, and updating them each year.

SetDur. Set duration. Time required to carry out a fishing operation. It is computed with the release of skiff and ends with the closure of the net purse.

NumSet. Number of sets. Total number of sets by vessels or year. Mandatory value. Presentation of figures and tables are recommended, and updating them each year.

Pos_Set. Number Positive Set. Total number of sets with catches. Mandatory value. Presentation of figures and tables are recommended, and updating them each year.

Neg_Set. Number Null Set. Total number of sets without catches. Mandatory value. Presentation of figures and tables are recommended, and updating them each year.

No.Set/on objects. Number of sets over FAD. Total number of sets over objects/FAD by vessels or year. Optional value. Presentation of figures and tables are recommended, and updating them each year.

No.Set/on free schools. Number of set over free schools. Total number of set over free school by vessels or year. Optional value. Presentation of figures and tables are recommended, and updating them each year.

No.Set/FD. Total number of sets/FD. Ratio of sets by fishing days. Optional value. Presentation of figures and tables are recommended, and updating them each year.

No.CWP. Number of squares 1° x 1° visited. The presence of the ship in each 1° x 1° square is computed. Optional value. Only the data table presentation is recommended. An update is also recommended every year.

No.CWP with set. Number of squares visited with set. The development of a fishing operation each square of 1° x 1° is computed. Only the data table presentation is recommended. An update is recommended every year.

No.CWP with catches. Number of squares visited with catches. The development of a positive fishing operation for each 1° x 1° square is computed.

No.CWP Esf. >12hrs. Number of squares visited with more than 12 hours spent. Those 1° x 1° squares are computed, where there has been more than 12 hours of fishing activity on their bed. Only the data table presentation is recommended. An update is recommended every year.

No.CWP Esf. >60hrs. Number of squares visited with more than 60 hours spent. Those 1° x 1° squares are computed, where there has been more than 60 hours of fishing activity on their bed. Only the data table presentation is recommended. An update is recommended every year.

3.2 Production

Catch. Total Catches. Total production declared by vessels or country. Mandatory value. Presentation of figures and tables are recommended, and updating them each year.

Co_Catch. Total corrected catches by vessels or country. Total annual production is corrected using a new specific composition of species obtained through port sampling methodology. Optional value. Presentation of figures and tables are recommended, along with updating them each year.

Catch Obj. Total Catches on Objects or FADs. The total production obtained from FOB fishing sets is computed. Mandatory value. Presentation of figures and tables are recommended, and also updating them each year.

Catch FS. Total Catches on Free Schools. The total production obtained from FS fishing sets is computed. Mandatory value. Presentation of figures and tables are recommended, as well as updating them each year.

Land./gear. Landing gear. Total landing by gear. Optional value. Presentation of figures and tables are recommended, and also updating them each year.

Land./port. Landing port. Total landing by port. Optional value. Presentation of figures and tables are recommended, along with updating them each year.

Land./samples. Landing samples. Total number of fishing trips or landings sampled. Optional value. Presentation of figures and tables are recommended, along with updating them each year.

% Cover. % Coverage. Percentage of coverage of the samplings on landings of vessels or country. Optional value. Presentation of figures and tables are recommended, as well as updating them each year.

FP. Faux Poisson. Total landings of Faux-poisson for Local Market by vessels or country. Optional value. Only the data table presentation is recommended. An update is recommended every year.

%FP. % of Faux Poisson. Relative % between FP and Total Catch target species by vessels or country. Optional value. Only the data table presentation is recommended. An update is also recommended every year.

3.4 CPUE

NCPUE. Nominal CPUE. Total production / fishing days. This fishing index could be calculated in fishing hours, which would greatly improve its usefulness.

NCPUE/SET by Fmode. NCPUE/SET by fishing mode. Nominal CPUE by total set and fishing mode.

NCPUE/SET+ _F.mode. Nominal CPUE by total positive sets. Total production throughout the year /No. positive sets and fishing mode.

3.5 Samples

No.Size_samp. Number of size samples. Total number of size samples by species taken during landing at port. This onshore sampling of landings by species and size category should be carried out by a sampling team with experience.

Land./samples. Landing samples. The ratio of total landings with samples is recommended to know coverage's rate.

%Cover. Percentage of coverage. % Coverage of samples / landing.

No.Count Samp./tonne. Number of count sample by species.

AW_Obj. Average weight by species on floating object is recommended.

AW_FS. Average weight by species on Free School is recommended.

RFlen_mode. Range Fork length by species and fishing mode. Range Fork length by species and fishing mode is recommended.

AFlen_mode. Average Fork length by species and fishing mode. Average size length by species and fishing mode is recommended.

MFlen_mode. Modal Fork length by species and fishing mode. Modal size length by species and fishing mode. Modal is the value that appears most frequently.

3.6 Activity indicators of FAD

No.deployments. Number of deployments by vessels and years. Resolution 19-02 requires that: CPCs with purse seine and/or bait boat vessels fishing for bigeye, yellowfin and skipjack tunas in association with FADs, shall submit to the Executive Secretary Management Plans for the use of aggregating devices by vessels flying their flag by 31 January each year. This information is requested through ST08-FadsDep.

No.visits. Number of visits to FADs by vessels and years.

No.active buoys. Number of active buoys by vessels and years.

Buoy densities. Buoy densities by vessels and years.

3.7 Discards and By-Catch Information

Dis_Catch. Discards of catches. Discards (in t) of major and minor tuna species by vessels or country.

By-Catch. By-catch of catches. Bycatch (in t) of bycatch species caught.

FP. Faux-Poisson. Total landing of “Faux-poisson” for Local Market.

%FP. % landing Faux-Poisson. Relative % between FP and total catch of target species.

3.8 Other Fishery Information

MS. Moratory season. The date, duration, and area of the moratorium has changed throughout fishing history.

FA. Fishing agreements. Name of fishing agreements that affect the total production. For example: Gabon’s agreement affects the total production of tropical tuna in the Atlantic Ocean.

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Table 1. Fishing Indicators and others index of Pure Seiner tuna fishery (Analysis and Proposal).

<i>Code</i>	<i>Name</i>	<i>Explanation</i>	<i>Computation for European vessels</i>	<i>Graphics Y/N</i>	<i>Data Tables Y/N</i>	<i>ICCAT Legislation</i>	<i>This study Mandatory</i>	<i>Notes</i>
<i>EFFORT</i>								
<i>No.Vessel</i>	Number of vessels	Total number of vessels operating during year by size category.	From dataset	Y	Y	M:TRO01, M:TRO02, Rec. 21-01/22-01, CP01-Vesslsts (v2022a)	Yes	Update every year, Size category refers to different fishing powers
<i>TRB or GRT</i>	Gross registered tonnage (GRT)	Total volume onboard of boat. Is the total internal volume of a vessel expressed in "Registered Tonnage" of 100 cubic feet.	From official declaration of characteristics Vessel	Y	Y	M:TRO01, M:TRO02, Rec. 21-01/22-01, CP01-Vesslsts (v2022a)	No	Update every 5 years
<i>CC</i>	Carrying Capacity (M3) or TEUs	Total Carrying Capacity in wells of boat or to measure the capacity of a ship or the amount of freight a vessel can carry.	From official declaration of characteristic Vessel. Dataset Turbobat reference.	N	N	M:TRO01, M:TRO02, Rec. 21-01/22-01, CP01-Vesslsts (v2022a)	No	Update every year
<i>CC_Year</i>	Carrying Capacity (M3) weighted capacity by fishing activity during the year	Total Carrying Capacity in wells of boat with weighted carrying capacity by year	CC_Year=CC of the vessel * factor of conversion = Max(Tons of tuna) by year/ M3 SHIPYARD = around 0.7. The slop is 0.727, with a 95% CI of 0.69-0.76.	Y	Y		Yes	Update every year, there is another CC_Year pondered by activity, if we conect the vessel's CC with the mounth annual activity.
<i>FD.</i>	Fishing days	Total days spent by the fleet	FD = FT / 12 hours Atlantic ; FT / 13 hours Indian	Y	Y	ST03-T2CE	Yes	Update every year
<i>FT.</i>	Fishing time	Represents the time spent by the fleet (in hours)	12 hours Atlantic and 13 hours Indian Ocean	Y	Y	ST03-T2CE	Yes	Update every year
<i>Dist.</i>	Dist.	Total distance for all fishing trips	From dataset	N	N		No	Update every year
<i>SeD.</i>	Searching days	Time of vessel searching activity	SeD=fishing time - set duration - other time spent	Y	Y		No	Update every year
<i>SetDur.</i>	Set duration	Time required to make a catch (It starts when fish are encircled)	Queryor script	Y	Y		No	Update every year
<i>NumSet.</i>	Number of Sets	Total number of sets in the whole fleet	From dataset	Y	Y	ST03-T2CE	Yes	Update every year
<i>Pos_Set.</i>	Number of Positive Sets	Total number of sets with catches	From dataset	Y	Y	ST03-T2CE	Yes	Update every year
<i>Neg_Set.</i>	Number of Null Sets	Total number of sets without catches	From dataset	Y	Y	ST03-T2CE	Yes	Update every year

<i>No.Set/on objects</i>	Number of sets over objects	Total number of sets over objets by vessels or year	From dataset	Y	Y	ST03-T2CE	No	Update every year
<i>No.Set/on free schools</i>	Number of sets over free schools	Total number of sets over free schools by vessels or year	From dataset	Y	Y	ST03-T2CE	No	Update every year
<i>No.Set/FD</i>	Ratio of sets over fishing days	Ratio of sets by fishing days. Total number of sets/FD	From dataset	Y	Y		No	Update every year
<i>No.CWP</i>	Number of square 1° x 1° visited	The presence of the ship in each 1° x 1° square is computed.	From dataset	N	Y		No	Update every year
<i>No.CWP with set</i>	Number of square visited with set	The development of a fishing operation each square of 1° x 1° is computed.	From dataset	N	Y		No	Update every year
<i>No.CWP with catches</i>	Number of square visited with catches	The development of a positive fishing operation for each 1° x 1° square is computed.	From dataset	N	Y		No	Update every year
<i>No.CWP Esf. >12hrs</i>	Number of square visited with more than 12 hours spent	Those 1° x 1° squares where there has been more than 12 hours of fishing activity on their bed are computed.	From dataset	N	Y		No	Update every year
<i>No.CWP Esf. >60hrs</i>	Number of square visited with more than 60 hours spent	Those 1° x 1° squares, where there has been more than 60 hours of fishing activity on their bed are computed.	From dataset	N	Y		No	Update every year
<i>PRODUCTION</i>								
<i>Catch</i>	Total Catches	Total production declared by vessels or country	From dataset	Y	Y	ST02-T1NC	Yes	Update every year
<i>Co_Catch</i>	Total corrected catches	Total production corrected by sampling methodology of vessels/country	From dataset	Y	Y		No	Update every year, with T3 or T3+
<i>Catch Obj</i>	Total Catches on Objects	Total production of vessels or country by type of set	From dataset	Y	Y	ST03-T2CE	Yes	Update every year
<i>Catch FS</i>	Total Catches on Free Schools	Total production of vessels or countrny by type of set	From dataset	Y	Y	ST03-T2CE	Yes	Update every year
<i>Land./gear</i>	Landing gear	Total landing by gear	From dataset	Y	Y		Yes	Update every year
<i>Land./port</i>	Landing port	Total landing by port	From dataset	Y	Y		Yes	Update every year
<i>CPUE</i>								
<i>NCPUE</i>	Nominal CPUE	Total production/ fishing days	From dataset	Y	Y		No	Update every year
<i>NCPUE/SET_F.mode</i>	Nominal CPUE by Total Set	Total production/No. Set	From dataset	Y	Y		No	Update every year
<i>NCPUE/SET+_F.mode</i>	Nominal CPUE by Total + Set	Total production/No. + Set	From dataset	Y	Y		No	Update every year

SAMPLES		SAMPLING						
<i>No.Size_samp.</i>	Number of size sample	Total number of size sample by species	From dataset	N	Y	ST04-T2CS y ST05-T2CS	Yes	Update every year
<i>Land./samples</i>	Landing samples	Total landing with samples	From dataset	Y	Y		Yes	Update every year
<i>%Cover.</i>	Percentage of coverage	% Coverage of samples / landings	From dataset	Y	Y		No	Update every year
<i>No.Count Samp./tonne</i>	Number of fish count by tonne	Number of samples by species counted by tonne.	From dataset	N	Y		No	Update every year
<i>AW_Obj</i>	Average weight	Average weight by species on free schools	From dataset	N	Y		Yes	Update every year
<i>AW_FS</i>	Average weight	Average weight by species on objects	From dataset	N	Y		Yes	Update every year
<i>RFlen._mode</i>	Range Fork length by specie/fishing mode	Range Fork length by species	From dataset	N	Y		No	Update every year
<i>AFlen._mode</i>	Average Fork length by specie/fishing mode	Average Size length by species and fishing mode	From dataset	N	Y		No	Update every year
<i>MFlen._mode</i>	Modal Fork length by specie/fishing mode	Modal Size length by species and fishing mode. Modal is the value that appears most frequently.	From dataset	N	Y		No	Update every year
<i>FADs indicators</i>						S:TRO02 y Rec. 22-01		
<i>No.deployments</i>	Number of deployments	Number of deployments by vessels and year	FAD dataset in FAD's book.	N	Y	S:TRO02, Rec. 22-02, ST08-fADSdEP	Yes	Update every year
<i>No.visits</i>	Number of visits	Nuber of visits to FADs by vessels and year	FAD dataset in FAD's book.	N	Y	S:TRO02, Rec. 22-02, ST08-fADSdEP	No	Update every year
<i>No.active buoys</i>	Number of active buoys	Number of active buoys by vessels and year.	FAD dataset in FAD's book.	N	Y	S:TRO02, Rec. 22-02, ST08-fADSdEP	Yes	Update every year
<i>Buoy densities</i>	Buoy densities	Buoy densities by vessels and year	FAD dataset in FAD's book.	N	Y	S:TRO02, Rec. 22-02, ST08-fADSdEP	No	Update every year
<i>DISCARDS and By-CATCH</i>						S:TRO05, Rec. 22-01		
<i>Dis_Catch</i>	Discards of catches	Discards (in t) of major and minor tuna species	From Observer programs	N	Y	S:TRO05, Rec. 22-01, ST09-DomObPrg	No	Update every year, new proposal
<i>By-Catch</i>	By-catch of catches	Bycatch (in t) of bycatch species caught	From Observer programs	N	Y	S:TRO05, Rec. 22-01, ST09-DomObPrg	No	Update every year, new proposal
<i>FP</i>	Faux-Poisson	Total Landings of Faux-poisson for Local Market	From dataset	N	Y		Yes	Update every year, new proposal
<i>%FP</i>	% landing Faux-Poisson	Relative % between FP and Total Catch target species	From dataset	N	Y		No	Update every year, new proposal

<i>Other Fishery Information</i>								
<i>MS</i>	Moratory season	The date, duration, and area of the moratorium have changed throughout fishing history.		N	Y	Rec. 98-01, Rec. 99-01, Rec. 14-01, Rec. 16-01, Rec. 19-02, Rec. 21-01 y Rec. 22-01	No	Update every year, new proposal
<i>FA</i>	Fishing agreements	Name of fishing agreements that affect the total production		N	Y		NO	Update every year, new proposal

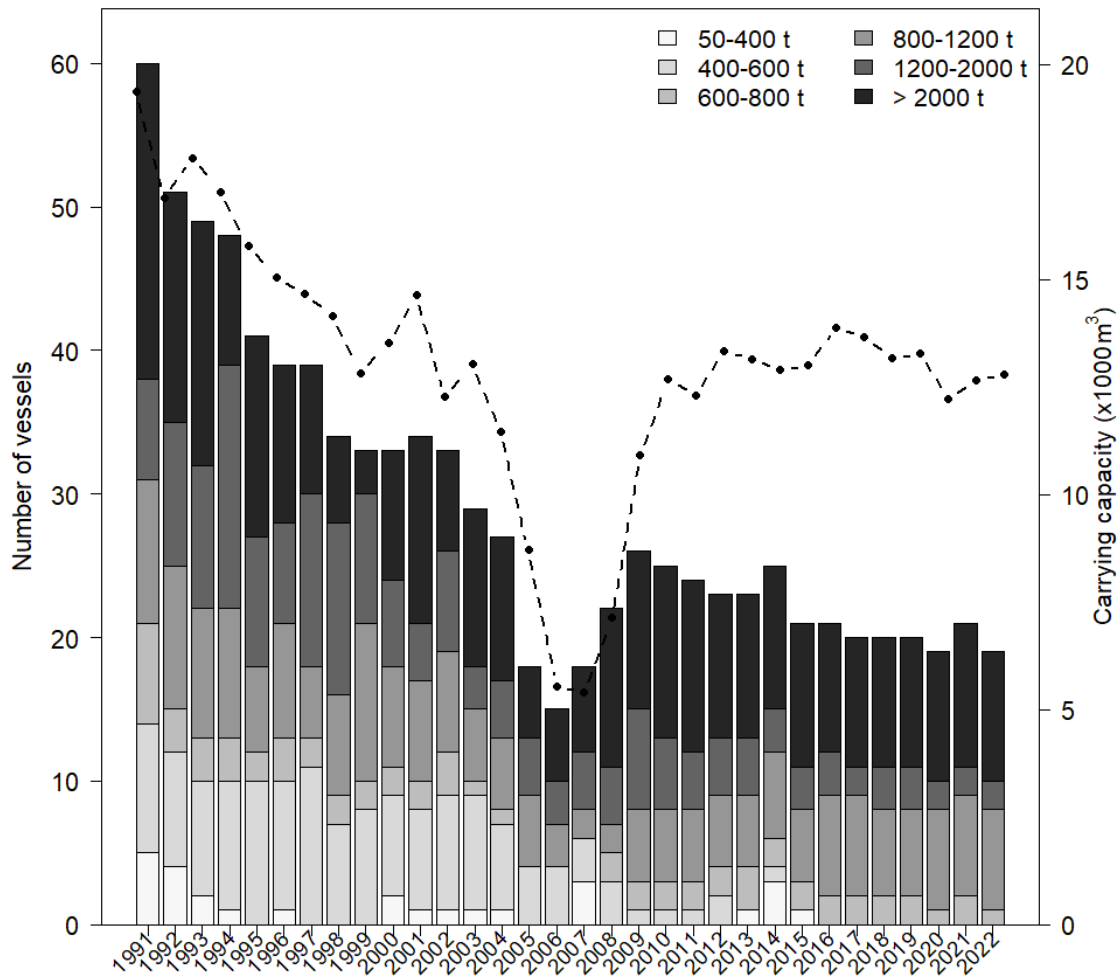


Figure 1. Fishing capacity of the European vessels purse seine fishing fleet in the Atlantic Ocean. Annual changes in the number of purse seiners by tonnage categories (barplots) and total carrying capacity (dashed line with circles) during 1991-2022.