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THE TUNA FISHERY IN THE EASTERN PACIFIC OCEAN IN 2025

A. The fishery for tunas and billfishes in the eastern Pacific Ocean 1
B. Yellowfin tuna 49
C. Skipjack tuna 68
D. Bigeye tuna 74
E. Pacific bluefin tuna 83
F. Albacore tuna 88
G. Swordfish 96
H. Blue marlin 102
I. Striped marlin 107
J. Sailfish 109
K. Sharks 112
L. Ecosystem considerations 117

This report provides a summary of the catches and effort in 2025 of the fishery for tunas in the eastern Pacific Ocean (EPO), for whose management the Inter-American Tropical Tuna Commission (IATTC) is responsible. It is based on data available to the IATTC staff in March 2026; therefore, some of the data for 2024 and 2025 are incomplete, and all data for 2021 - 2025 should be considered preliminary. Any changes in the fishery statistics provided in this report for the years prior to 2020 are due to data updates reported by CPCs.

All weights of catches and discards are in metric tons (t). In the tables, 0 means no effort, or a catch of less than 0.5 t; - means no data collected; * means data missing or not available. The following acronyms are used:

Species:	
ALB	Albacore tuna (*Thunnus alalunga*)
BET	Bigeye tuna (*Thunnus obesus*)
BIL	Unidentified istiophorid billfishes
BKJ	Black skipjack (*Euthynnus lineatus*)
BLM	Black marlin (*Makaira indica*)
BUM	Blue marlin (*Makaira nigricans*)
BZX	Bonito (*Sarda* spp.)
MLS	Striped marlin (*Kajikia audax*)
PBF	Pacific bluefin tuna (*Thunnus orientalis*)
SFA	Indo-Pacific sailfish (*Istiophorus platypterus)*
SKJ	Skipjack tuna (*Katsuwonus pelamis*)
SSP	Shortbill spearfish (*Tetrapturus angustirostris*)
SWO	Swordfish (*Xiphias gladius*)
TUN	Unidentified tunas
YFT	Yellowfin tuna (*Thunnus albacares*)

Fishing gears:	
FPN	Trap
GN	Gillnet
HAR	Harpoon
LHP	Handline
LL	Longline
LP	Pole and line
LTL	Troll
LX	Hook and line
MO	Multi-purpose

OTR	Other[1]
UNK	Unknown
PS	Purse seine
RG	Recreational
TX	Trawl

Ocean areas:	
EPO	Eastern Pacific Ocean
WCPO	Western and Central Pacific Ocean

Set types:	
DEL	Dolphin
NOA	Unassociated school
OBJ	Floating object
	LOG: Flotsam
	FAD: Fish-aggregating device

Flags:	
IATTC Members & Cooperating Non-Members	
BLZ	Belize
BOL	Bolivia
CAN	Canada
CHL	Chile
CHN	China
COL	Colombia
CRI	Costa Rica
ECU	Ecuador
EUR	European Union
EU (CYP)	Cyprus
EU (ESP)	Spain
EU (PRT)	Portugal
FRA	France
FRA (PYF)	French Polynesia
GTM	Guatemala
HND	Honduras
IDN	Indonesia
JPN	Japan
KIR	Kiribati
KOR	Republic of Korea
LBR	Liberia
MEX	Mexico
NIC	Nicaragua
PAN	Panama
PER	Peru
SLV	El Salvador
TWN	Chinese Taipei
USA	United States of America
VEN	Venezuela
VUT	Vanuatu
Other flag codes	
COK	Cook Islands
MHL	Marshall Islands
PHL	Philippines
SLB	Solomon Islands
THA	Thailand
UNK	Unknown

Stock assessment:	
B	Biomass
C	Catch
CPUE	Catch per unit of effort
F	Rate of fishing mortality
MSY	Maximum sustainable yield
S	Index of spawning biomass
SBR	Spawning biomass ratio
SSB	Spawning stock biomass

[1] Used to group known gear types.

INTRODUCTION

This document summarizes the catches and effort of the fisheries for species covered by the IATTC's Antigua Convention ("*tunas and tuna-like species and other species of fish taken by vessels fishing for tunas and tuna-like species*") in the eastern Pacific Ocean (EPO) in 2025. The most important of these species are the scombrids (family Scombridae), which include tunas, bonitos, seerfishes, and some mackerels. The principal species of tunas caught are the three tropical tuna species (yellowfin, skipjack, and bigeye), followed by the temperate tunas (albacore, and lesser catches of Pacific bluefin); other scombrids, such as bonitos and wahoo, are also caught. In addition to the tunas, this document covers the billfishes (swordfish, marlins, shortbill spearfish, and sailfish).

Complementary to this document, EB-04-01 (*Ecosystem Considerations*), provides information on other, non-target species (e.g., elasmobranchs (sharks, rays, and skates), sea turtles, and teleosts (e.g., dorado, wahoo, carangids), that belong to the same ecosystem and are affected by fishing for, or dependent on or associated with, the fish stocks covered by the Antigua Convention.

Access to the fisheries is regulated by Resolution C-02-03, which allows only vessels on the IATTC Regional Vessel Register to fish for tunas in the EPO. Vessels are authorized to fish by their respective flag governments, and only duly authorized vessels are included in the Register. The Register lists, in addition to a vessel's name and flag, its fishing gear, dimensions, carrying capacity, date of construction, ownership, home port, and other characteristics. However, this requirement has not been applied to the thousands of small artisanal vessels, called *pangas*, that are known to catch tunas, among other species, in coastal waters of the EPO, but data on their numbers, effort, and catches are incomplete or unavailable. A pilot program, focused on sharks, to collect data on these fisheries in Central America has been completed (SAC-11-13). The results of the pilot study offer guidance in the development of a long-term sampling program in the region (SAC-07-06b(ii), SAC-07-06b(iii), SAC-11-13, SAC-14 INF-L, SAC-14 INF-P). With support from a second phase of the IATTC Common Oceans project to improve data collection for shark fisheries in the EPO (SAC-14 INF-M), the sampling research conducted in Central America has expanded to other EPO coastal states (SAC-15-10), specifically Ecuador, Mexico and Peru. Significant progress has been achieved during 2023 to 2026, including the completion of the metadata phase (SAC-16 INF-V), the identification, mapping, and classification of priority landing sites (SAC-16 INF-W), a feasibility study for biological and morphometric sampling—including a CKMR sampling design (SAC-17 INF-O)—and preliminary sampling designs for collecting fisheries-dependent data to support stock assessments of priority shark species (SAC-17 INF-P).

The IATTC staff has collected and compiled data on the longline fisheries since 1952, on catches of yellowfin and skipjack since 1954, bluefin since 1973, and bigeye since 1975. The data in this report, which are as accurate and complete as possible, are derived from various sources, including vessel logbooks, on-board observer data, unloading records provided by canners and other processors, export and import records, reports from governments and other entities, and the IATTC species and size composition port sampling program.

1. CATCHES AND LANDINGS OF TUNAS, BILLFISHES, AND ASSOCIATED SPECIES

Almost all the catches in the EPO are made by the purse-seine and longline fleets; pole-and-line vessels, and various artisanal and recreational fisheries, account for a small percentage of the total catches. The IATTC staff compiles catch data for all fishing gears, including trolls, harpoons, and gillnets.

Detailed catch data are available for the purse-seine fishery, which takes over 90% of the total reported catches; the data for the other fisheries are incomplete, as data submission for recent years is still ongoing. Purse-seine data for 2024 and 2025, and 2021-2024 data for longlines and other gears, are preliminary.

Since 1993 all Class-6[2] purse-seine vessels carry observers, who collect detailed data on catches, including

[2] Class 6: carrying capacity greater than 363 metric tons (t).

those discarded at sea. Estimates of the "retained" catch (the portion of the total catch that is landed) are based principally on data collected during vessel unloadings.

Longline vessels, particularly the larger ones, fish primarily for bigeye, yellowfin, albacore, and swordfish. Data on the retained catches of most of the larger longline vessels are obtained from the vessels' flag governments; data for smaller longliners, artisanal vessels, and other vessels that fish for species covered by the Antigua Convention are incomplete or unavailable, but some are obtained from vessel logbooks, or from governments or governmental reports.

Data for the western and central Pacific Ocean (WCPO) are taken from the Tuna Fishery Yearbook for 2025, published by the Western and Central Pacific Fisheries Commission (WCPFC).

This report summarizes data from all the above sources. The estimated total catches of tropical tunas (yellowfin, skipjack, and bigeye) in the entire Pacific Ocean are shown in Table A-1 and are discussed further in the sections below.

Estimates of the annual retained and discarded catches of tunas and other species taken by tuna-fishing vessels in the EPO during 1996-2025 are shown in Tables A-2a-b.

The catches of tropical tunas during 1996-2025, by flag, are shown in Tables A-3a-e, and the purse-seine catches and landings of tunas during 2024-2025 are summarized by flag in Tables A-4a-b.

2. CATCHES BY SPECIES

2.1. Yellowfin tuna

The total annual catches of yellowfin in the Pacific Ocean during 1996-2025 are shown in Table A-1. The 2025 EPO catch of 446 thousand t is 69% higher than the average of 264 thousand t for the previous 10-year period (2015-2024). In the WCPO, the catches of yellowfin reached a record high of 756 thousand t in 2021.

The annual retained catches of yellowfin in the EPO, by gear, during 1996-2025 are shown in Table A-2a. Over the most recent 10-year period (2015-2024), the annual retained purse-seine catches have fluctuated around an average of 252 thousand t (range: 211 to 298 thousand t). The preliminary estimate of the retained catch in 2025, 444 thousand t, is 51% higher than that of 2024, and 76% higher than the 2015-2024 average. Less than 1% of the total purse-seine catch of yellowfin was discarded at sea during the most recent 10-year period (average at 0.2% during the most recent 10-year period, 2015-2024) (Table A-2a).

During 1996-2006, annual longline catches in the EPO averaged about 19 thousand t (range: 10 to 30 thousand t), or about 6% of the total retained catches of yellowfin on average. They then declined sharply, to an annual average of 10 thousand t (range: 7 to 13 thousand t), or about 4% of the total retained catches, during 2007-2024. Catches by other fisheries (pole and line, recreational, gillnet, troll, artisanal, *etc.*), whether incidental or targeted, are shown in Table A-2a, under "Other gears" (OTR); during 1996-2023 they averaged about 1.5 thousand t.

2.2. Skipjack tuna

The total annual catches of skipjack in the Pacific Ocean during 1996-2025 are shown in Table A-1. Most of the catch is taken in the WCPO. WCPO total annual catches of skipjack averaged 1.8 million t over the most recent 10-year period (2015-2024), reaching an all-time catch high of 2 million t in 2019 and 2024. In the EPO, total catches of skipjack reached 472 thousand t in 2024, higher than the previous 10-year (2014-2023) average of 361 thousand t by approximately 31%.

The annual retained catches of skipjack in the EPO, by gear, during 1996-2025 are shown in Table A-2a. During 2015-2024 the annual retained purse-seine catch averaged 358 thousand t (range: 289 to 641 thousand t). The preliminary estimate of the retained catch in 2025, 470 thousand t, is 31% greater than the 10-year average (358 thousand t) for 2015-2024.

Discards of skipjack at sea were less than 1.2% of the total purse-seine catches of the species (average at

0.7% during the most recent 10-year period, 2015-2024) (Table A-2a).

Catches of skipjack in the EPO by longlines and other gears are negligible (Table A-2a).

2.3. Bigeye tuna

The total annual catches of bigeye in the Pacific Ocean during 1996-2025 are shown in Table A-1. In the WCPO starting in 1996 the bigeye fluctuated between 107 thousand t and a historic peak of 183 thousand t in 2004. In the EPO, the average catch during 1996-2025 was 100 thousand t, with a low of 55 thousand t in 2024 and a high of 149 thousand t in 2000.

The annual retained catches of bigeye in the EPO by purse-seine vessels during 1996-2025 are shown in Table A-2a. The introduction of fish-aggregating devices (FADs) in 1993, deployed by fishers to attract tunas, led to a sudden and dramatic increase in the purse-seine catches. From 1996 to 1999, the average annual retained purse-seine catch of bigeye in the EPO was 55 thousand t, and then in 2000 was over 95 thousand t. From 2001-2024, it has fluctuated between 34 and 84 thousand t; the preliminary estimates for 2025 is 45 thousand t.

During 2000-2025 the percentage of the purse-seine catch of bigeye discarded at sea has steadily decreased, from 5% in 2000 to less than 1% in 2022, averaging about 1.4%.

Before the expansion of the FAD fishery, longliners caught almost all the bigeye in the EPO. Since 1996, coinciding with the expansion of the FAD fishery, the longline fishery has accounted for about 37% of the total bigeye catch, averaging 38 thousand t during 1996-2024. The preliminary estimate for 2024 is approximately 18 thousand t (Table A-2a).

Small amounts of bigeye are caught in the EPO by other gears (Table A-2a).

2.4. Pacific bluefin tuna

The catches of Pacific bluefin in the entire Pacific Ocean, by flag and gear, as reported by the vessels' flag governments to the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC), are shown in Table A-5a.

The catches of Pacific bluefin in the EPO during 1996-2025, by gear, are shown in Table A-2a. EPO total annual catches of bluefin averaged 4.3 thousand t over the most recent 10-year period (2015-2024). During this same period, the purse-seine vessels accounted for 75% of the annual catch, on average. The 2015-2024 average EPO retained catch by purse seine vessels is 3.2 thousand t (range: 2.5 t to 4.1 thousand t); the preliminary estimate for 2025 is 6.2 thousand t (Table A-2a).

Catches of Pacific bluefin by recreational gear in the EPO during 1996-2025 are reported in numbers of individual fish caught (Table A-5b).

2.5. Albacore tuna

Data provided by the relevant CPCs on catches of albacore in the EPO, by gear, are shown in Table A-2a. The same information, by area (north and south of the equator), is also shown in Table A-6. On average over the most recent 10-year period (2015-2024), troll vessels (LTL, included under "Other gears" (OTR) in Table A-2a) have accounted for 81% of the annual retained catches of albacore north of the equator. The total annual retained catches of albacore north of the equator averaged 12 thousand tons over the most recent 10-year period (2015-2024), with a range of 6 to 19 thousand tons. In contrast, retained catches of albacore south of the equator are predominantly taken by longline (LL) gear (averaging 100% over the same period). Total annual retained catches of albacore south of the equator during 2015-2024 averaged 26 thousand t (range: 17 to 35 thousand t).

2.6. Other tunas and tuna-like species

While yellowfin, skipjack, and bigeye tunas comprise the great majority of the retained purse-seine catches in the EPO, other tunas and tuna-like species, such as albacore, black skipjack, Pacific bluefin, bonito,

frigate and bullet tunas, contribute to the overall harvest. The estimated annual retained and discarded catches of these species during 1996-2025 are shown in Table A-2a. The catches reported in the "unidentified tunas" (TUN) category in Table A-2a contain some catches reported by species (frigate and bullet tunas) along with the unidentified tunas. The total retained catch of these other species by the purse-seine fishery in 2025 was 12 thousand t, a little less then the 10-year average (2015-2024) average of 13 thousand t (range: 8 to 16 thousand t).

Black skipjack are also caught by other gears in the EPO, mostly by coastal artisanal fisheries. Bonitos are also caught by artisanal fisheries, and have been reported as catch by longline vessels in some years. Except for 2022 and 2024, annual catch reports for bonitos have increased greatly from 2019 to 2023 (45-66 thousand t), largely due to new reports submitted by one CPC from its artisanal fisheries.

2.7. Billfishes

Catch data for billfishes (swordfish, blue marlin, black marlin, striped marlin, shortbill spearfish, and sailfish) are shown in Table A-2b.

Swordfish are caught in the EPO with large-scale and artisanal longlines, gillnets, harpoons, and occasionally with recreational gear. During 1996-2014 the longline catch averaged 14 thousand t, but during 2015-2018 this increased by about 69%, to over 24 thousand t, possibly due to increased abundance of swordfish, increased effort directed toward the species along with improved fishing efficiency, increased reporting, or a combination of all of these.

Other billfishes are caught with large-scale and artisanal longlines and recreational gear. The average annual longline catches of blue marlin and striped marlin during the recent 10-year period (2015-2024) were about 2.7 thousand and 1.5 thousand t, respectively. Smaller amounts of other billfishes are taken by longline.

Little information is available on the recreational catches of billfishes, but, the retained catches are believed to be substantially less than the commercial catches for all species, due to catch-and-release practices.

Billfishes are caught incidentally in the purse-seine fisheries, which during 2015-2024 accounted for about 1% of the total catch of billfishes in the EPO. Table A-2b

3. CATCHES AND FISHING EFFORT

3.1. Purse seine

Estimates of the numbers of purse-seine sets of each type (associated with dolphins (DEL), associated with floating objects (OBJ), and unassociated (NOA)) in the EPO during 2010-2025, and the retained catches from those sets, are shown in Table A-7 and Figure 1. The estimates for Class 1-5[3] vessels were calculated from logbook data in the IATTC statistical data base and some observer data from the voluntary TUNACONS program, and those for Class-6 vessels from the observer data bases of the IATTC, Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, the United States, and Venezuela.

Since the introduction of artificial fish-aggregating devices (FADs) in the mid-1990s, they have become predominant in the floating-object fishery, and now account for an estimated 97% of all floating-object sets by Class-6 vessels (Table A-8).

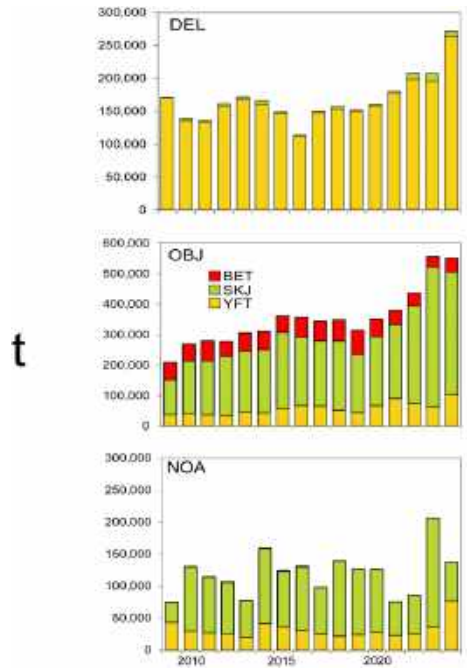


FIGURE 1. Purse-seine catches of tunas, by species and set type, 2010-2025

3.2. Longline

The reported nominal fishing effort (in thousands of hooks) by longline vessels in the EPO, and their catches of the predominant tuna species, are shown in Table A-9.

4. DISTRIBUTIONS OF THE CATCHES OF TROPICAL TUNAS

4.1. Purse-seine catches

The average annual distributions of purse-seine catches, by set type, of tropical tunas (yellowfin, skipjack, and bigeye) in the EPO during 2015-2024 are shown in Figures A-1a, A-2a, and A-3a, respectively, and preliminary estimates for 2025 are shown in Figures A-1b, A-2b, and A-3b.

Yellowfin: The majority of catches in 2025 were taken in sets associated with dolphins in two principal areas: north of 5°N to 20°N from 100°W to 135°W, and inshore north of 5°S from 100°W to the coast. Lesser amounts of yellowfin were taken in Unassociated school and floating-objects sets in the offshore area when compared to the previous 10 years (Figure A-1b).

Skipjack: In 2025, catches are predominantly on floating object sets along the equatorial band between 5°N and 10°S and from 80°W to 130°W which has increased over the previous 10 years for the same area. Also, the amount of skipjack caught on floating-object sets on the western edge of the EPO in 2025 is less than the previous 10 years. While the proportion of skipjack catch from Unassociated school sets in the area between 8°N and 20°S and from 70°W to 100°W has decreased over the previous 10 years. Note that skipjack catches on Dolphin sets are rare and show up in small amounts north of 10°N.(Figure A-2b).

Bigeye are not often caught north of 10°N in the EPO except in very small amounts. Almost all of the 2025 catches were taken in sets on floating object sets between the 10°N and 10°S and west of 110°W but still less than the previous 10 years. Lesser amounts of bigeye were taken in floating object sets between 10°N and 30°S and east of 110°W than in the previous 10 years. Not much bigeye catch is made

[3] ≤363 t carrying capacity.

on dolphin and unassociated school sets (Figure A-3b).

4.2. Longline catches

Since 2009, the IATTC has received tuna catch and effort data from Belize, China, France (French Polynesia), Japan, the Republic of Korea, Panama, Chinese Taipei, the United States, and Vanuatu. Albacore, bigeye and yellowfin tunas make up the majority of the catches by most of these vessels. The distributions of the catches of bigeye and yellowfin in the Pacific Ocean by Chinese, Japanese, Korean, and Chinese Taipei longline vessels during 2020-2024 are shown in Figure A-4.

5. SIZE COMPOSITIONS OF THE CATCHES OF TUNAS

5.1. Purse-seine

Length-frequency samples are the basic source of data used for estimating the size and age compositions of the various species of fish in the landings. This information is necessary to obtain age-structured estimates of the populations for various purposes, primarily the integrated modeling that the staff uses to assess the status of the stocks (see Stock Assessment Reports). Length-frequency samples are obtained from the catches of purse-seine vessels in the EPO by IATTC personnel at ports of landing in Ecuador and Mexico. The methods for sampling the catches of tunas are described in the IATTC Annual Report for 2000 and in IATTC Stock Assessment Reports 2 and 4.

Historical long-term time series of size-composition data for yellowfin and bigeye are available in the Stock Assessment Reports, and average length stock status indicators (SSIs) are available for yellowfin, bigeye and skipjack (SAC-16-02). In this report, data on the size composition of the catches during 2020-2025 are presented (Figures A-6 to A-8), with two sets of length-frequency histograms for each species: the first shows the data for 2025 by stratum (gear type, set type, and area), and the second the combined data for each year of the 2020-2025 period.

Yellowfin: nine purse-seine fisheries (four associated with floating objects (OBJ), three associated with dolphins (DEL), and two unassociated (NOA)) and one pole-and-line (LP) fishery, which includes all 13 sampling areas) are defined (Figure A-5). Of the 959 wells with fish caught during 2025, 872 contained yellowfin. The estimated size compositions of the fish caught are shown in Figure A-6a. The size–frequency distributions indicate a clear separation in the size composition of yellowfin tuna among fisheries. The DEL fisheries (North, Inshore, and South) are dominated by larger individuals, with distributions peaking broadly between approximately 100 and 140 cm and average weights ranging from 25.6 to 27.6 kg. In contrast, the OBJ fisheries across all regions (North, Equatorial, Inshore, and South) are characterized by small-sized fish, primarily below 80 cm, with substantially lower average weights (2.3–4.4 kg). The NOA fisheries show an intermediate pattern, with NOA-N exhibiting a wider and somewhat multimodal distribution and a higher average weight (13.2 kg) than NOA-S (9.7 kg), suggesting a mixture of size classes. Overall, these patterns highlight a strong spatial and fishery-specific structuring of yellowfin size composition, with OBJ fisheries predominantly exploiting juvenile fish, DEL fisheries targeting larger individuals, and NOA fisheries representing a transitional or mixed size assemblage.

The estimated size compositions of the yellowfin caught by all fisheries combined during 2020-2025 are shown in Figure A-6b. The average weight of yellowfin in 2025, 9.6 kg, was higher than 2021 (7.9 kg) and 2022 (6.5 kg) but lower than 2020 (10.5 kg), 2023 (9.7 kg) and 2024(9.8 kg). The size distribution shifted toward the middle of the range between 100 cm to 140 cm when compared to previous years, indicating fewer smaller and larger sized yellowfin in 2025.

Skipjack: seven purse-seine fisheries (four OBJ, two NOA, one DEL) and one LP fishery are defined (Figure A-5); the last two include all 13 sampling areas. Of the 959 wells with fish caught, 487 contained skipjack. The estimated size compositions of the fish caught during 2025 are shown in Figure A-7a. The size–frequency distributions show that skipjack tuna catches in this figure are dominated by small individuals across most fisheries. The OBJ fisheries (North, Equatorial, Inshore, and South) display broadly

similar patterns, with a clear distribution concentrated between approximately 45 and 75 cm and low average weights (3.1–3.4 kg), indicating consistent catches of juvenile fish across all regions. The NOA fisheries also reflect relatively small size distribution, with NOA-N exhibiting the lowest average weight (2.6 kg) and a narrower distribution skewed toward smaller individuals, while NOA-S shows a slightly broader distribution and a marginally higher average weight (3.5 kg).

The estimated size compositions of skipjack caught by all fisheries combined during 2020-2025 are shown in Figure A-7b. The average weight of the skipjack in 2025 was 3.3 kg which is higher than the previous 5 years (1.9 kg to 2.5 kg). The size distribution shifted toward 60 cm to 70 cm compared to previous with the exception of 2024 which also had similar size distribution in the same range.

Bigeye: six purse-seine fisheries (four OBJ, one NOA, one DEL) and one LP fishery are defined (Figure A-5); all except the OBJ fisheries include all 13 sampling areas. Of the 959 wells with fish caught, 97 contained bigeye. The estimated size compositions of the fish caught during 2025 are shown in Figure A-8a. Most of the smaller bigeye catch (<80 cm) was taken in the OBJ-N and OBJ-S fishery in the first, second and fourth quarters. The larger bigeye (>80 cm) was taken in the OBJ-N and OBJ-S fisheries in all 4 quarters.

The estimated size compositions of bigeye caught by all fisheries combined during 2020-2025 are shown in Figure A-8b. The average weight of bigeye in 2025 (12.1 kg) was considerably higher than the previous 5 years (4.0 – 5.5 kg). The majority of bigeye was caught in 2025 in the 80-120 cm range, with less of the larger bigeye >80 cm than 2020-2024.

Pacific bluefin are caught by purse-seine and recreational gears off California and Baja California, historically from about 23°N to 35°N, but only between 28°N and 32°N in recent years. The 2025 purse-seine fishing season continued the trend starting in January with the first caught in middle of January, and the fishery was closed in late April, when the annual catch limit was reached. Most of the catch is transported live to grow-out pens near the coast of Mexico. Mexico's National Observer Program (PNAAPD) submitted the length-composition data for purse-seine catches during 2020-2025 (Figure A-9). This data is provided every other year, so the figure will next be updated in 2028.

5.2. Longline fishery

The size compositions of yellowfin and bigeye caught by the Japanese longline fleet (commercial and training vessels) in the EPO during 2020-2024 are shown in Figures A-10 and A-11. The average annual weight during that period ranged from 47.0 to 55.2 kg for yellowfin, and from 65.2 to 77.3 kg for bigeye. Size composition data for 2021 and 2022 was not available due to difficulties resulting from the COVID-19 pandemic, which impacted the collection and analysis of 2021 and 2022 YFT and BET size data.

5.3. Catches of tunas, by flag and gear

The annual retained catches of tunas in the EPO during 1996-2025, by flag and gear, are shown in Tables A-3a-e. The purse-seine catches of tunas in 2024 and 2025 by flag and species, are summarized in Table A-4a. Of the 972 thousand t of tunas caught in 2025, 40% were caught by Ecuadorian vessels, and 22% by Mexican vessels. Other countries with significant catches included Panama (14%), United States (6%), Venezuela (6%) and Colombia (4%). The purse-seine landings of tunas in 2024 and 2025, by species and country of landing, are summarized in Table A-4b. Of the 973 thousand t of tunas landed in the EPO in 2025, 62% were landed in Ecuadorian ports, and 22% in Mexican ports. Other countries with landings of tunas in the EPO included Colombia (4%), Peru (3%) and the United States (1%).

6. THE FLEETS

6.1. Purse seine

The IATTC Regional Vessel Register contains detailed records of all purse-seine vessels that are authorized to fish for tunas in the EPO. However, only vessels that fished for yellowfin, skipjack, bigeye, and/or Pacific bluefin tuna in the EPO in 2025 are included in the following description of the purse-seine fleet.

The IATTC uses well volume, in cubic meters (m^3), to measure the carrying capacity of purse-seine vessels (Table A-10; Figure 2).

The 2024 and preliminary 2025 data for numbers and total well volumes of purse-seine vessels that fished for tunas in the EPO are shown in Tables A-11a and A-11b. During 2025, the fleet was dominated by Ecuadorian and Mexican vessels, with about 32% and 24%, respectively, of the total well volume; they were followed by the Panama (12%), United States (10%), Venezuela (8%), Colombia (5%), European Union (Spain) (3%), El Salvador (3%), Nicaragua (2%) and Guatemala (1%).[4]

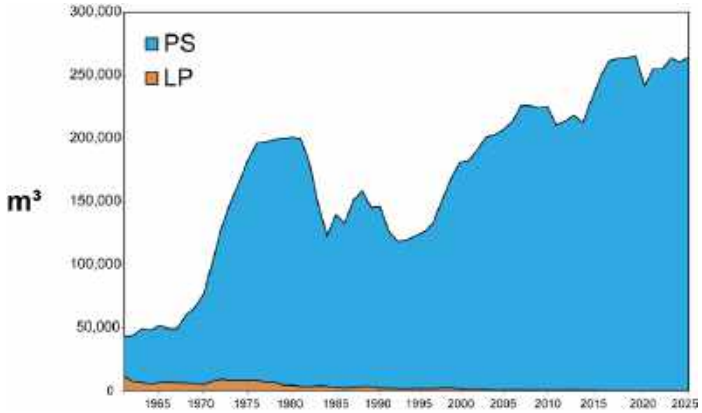


FIGURE 2. Carrying capacity, in cubic meters of well volume, of the purse-seine and pole-and-line fleets in the EPO, 1961-2025

The cumulative capacity at sea during 2025 is compared to those of the previous five years in Figure 3.

The monthly average, minimum, and maximum total well volumes at sea (VAS), in thousands of cubic meters, of purse-seine and pole-and-line vessels that fished for tunas in the EPO during 2015-2024, and the 2025 values, are shown in Table A-12. The monthly values are averages of the VAS estimated at weekly intervals by the IATTC staff. The average VAS value for 2015-2024 was higher, at about 146 thousand m^3 (57% of total capacity), compared to 133 thousand m^3 (50% of total capacity) in 2025.

6.2. Other fleets of the EPO

Information on other types of vessels that are authorized to fish in the EPO is available in the IATTC's Regional Vessel Register. In some cases, particularly for large longline vessels, the Register contains information for vessels authorized to fish not only in the EPO, but also in other oceans, and which may not have fished in the EPO during 2025, or ever.

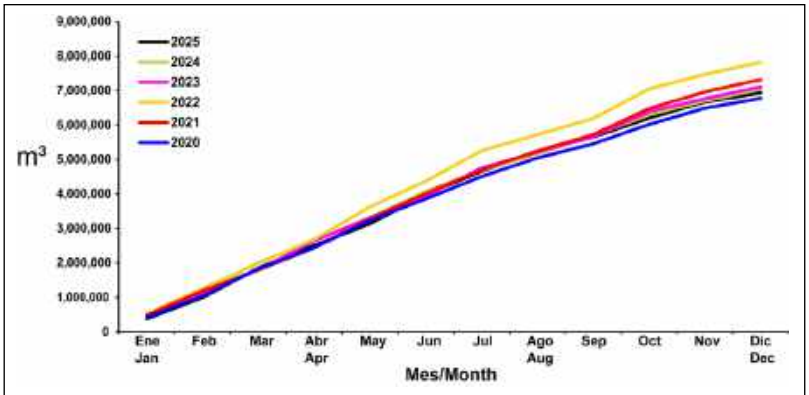


FIGURE 3. Cumulative capacity of the purse-seine fleet at sea, by month, 2020-2025

[4] The sum of the percentages may not add up to 100% due to rounding.

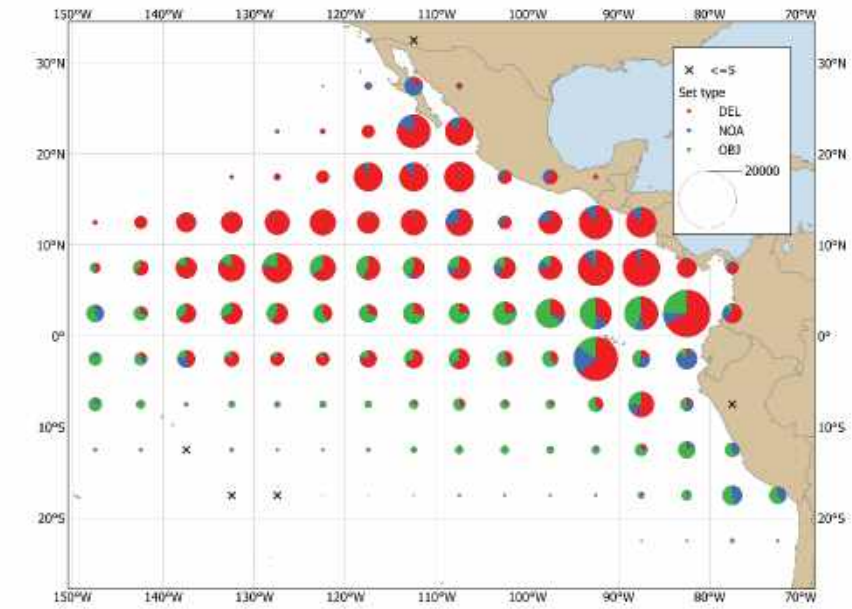


FIGURE A-1a. Average annual distributions of the purse-seine catches of yellowfin, by set type, 2015-2024. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas.
FIGURA A-1a. Distribución media anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 2015-2024. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente.

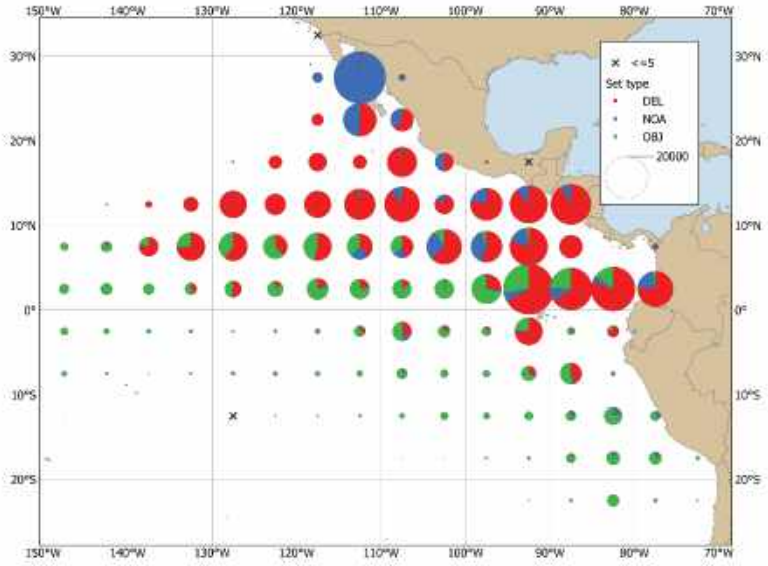


FIGURE A-1b. Annual distributions of the purse-seine catches of yellowfin, by set type, 2025. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas.
FIGURA A-1b. Distribución anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 2025. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente.

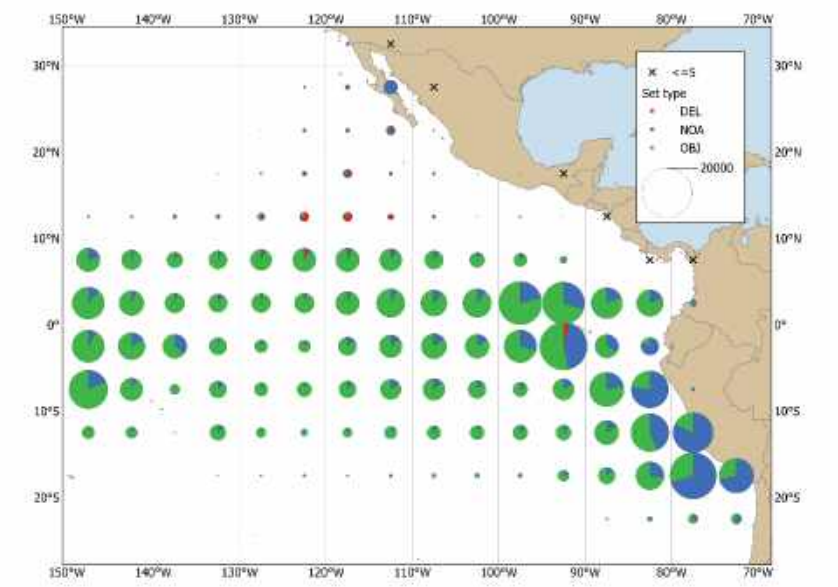


FIGURE A-2a. Average annual distributions of the purse-seine catches of skipjack, by set type, 2015-2024. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas.
FIGURA A-2a. Distribución media anual de las capturas cerqueras de barrilete, por tipo de lance, 2015-2024. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente.

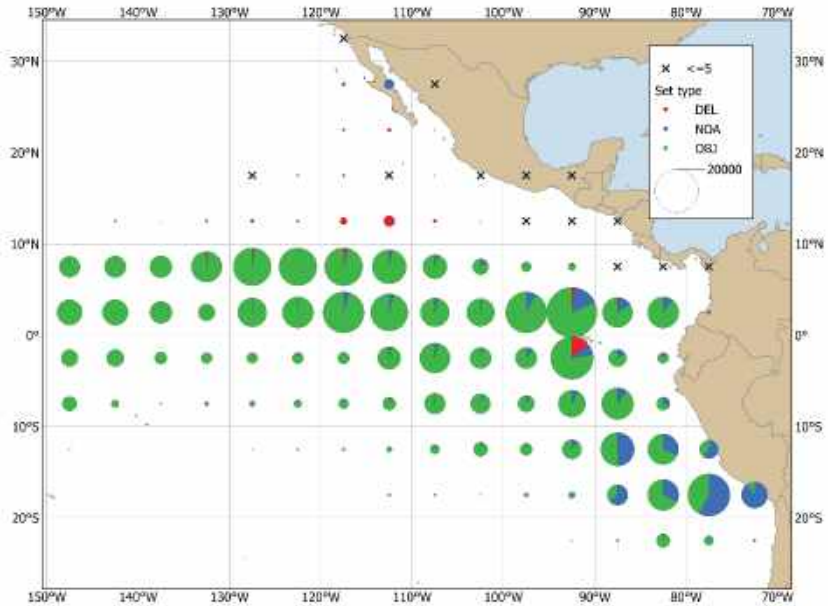


FIGURE A-2b. Annual distributions of the purse-seine catches of skipjack, by set type, 2025. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas.
FIGURA A-2b. Distribución anual de las capturas cerqueras de barrilete, por tipo de lance, 2025. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente.

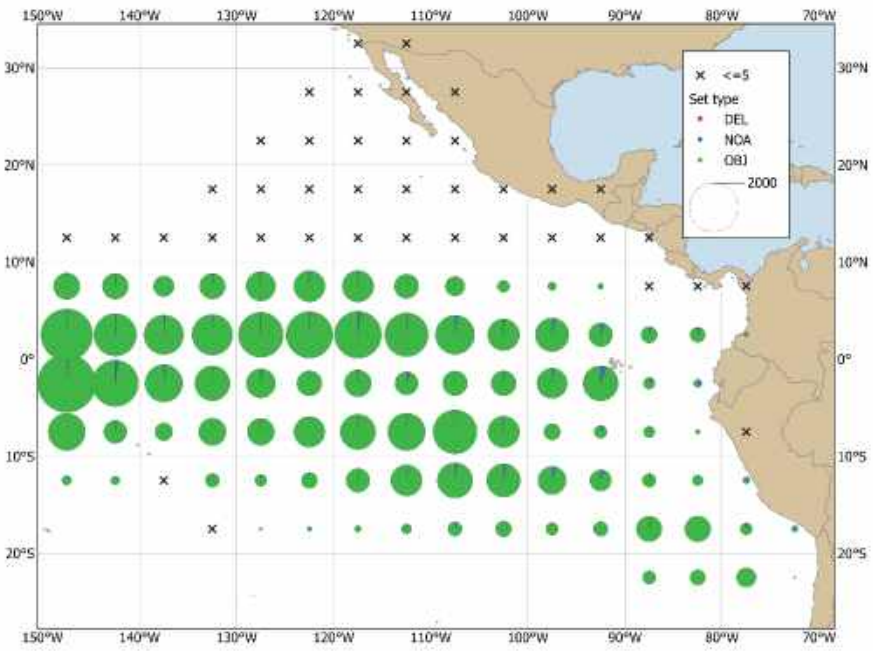


FIGURE A-3a. Average annual distributions of the purse-seine catches of bigeye, by set type, 2015-2024. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas.
FIGURA A-3a. Distribución media anual de las capturas cerqueras de patudo, por tipo de lance, 2015-2024. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5° correspondiente.

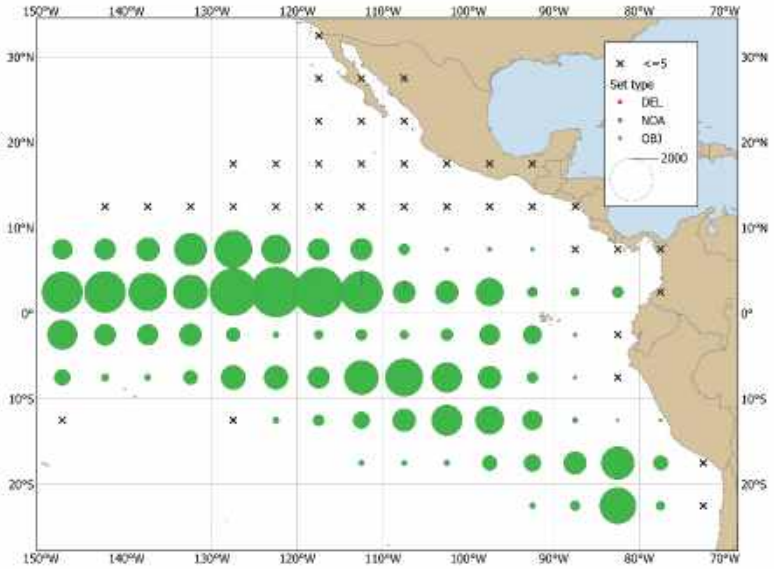


FIGURE A-3b. Annual distributions of the purse-seine catches of bigeye, by set type, 2025. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas.
FIGURA A-3b. Distribución anual de las capturas cerqueras de patudo, por tipo de lance, 2025. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5° correspondiente.

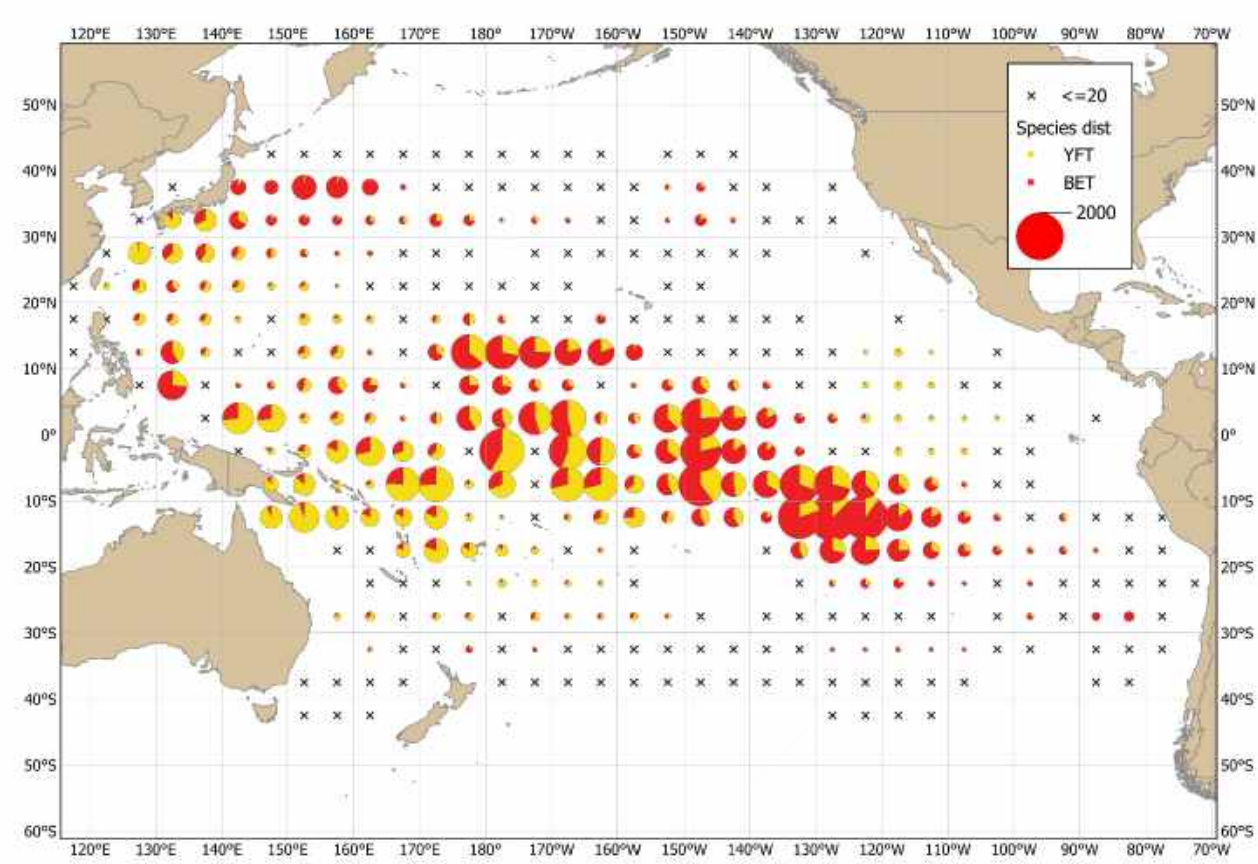


FIGURE A-4. Distributions of the average annual catches of bigeye and yellowfin tunas in the Pacific Ocean, in metric tons, by Chinese, Japanese, Korean, and Chinese Taipei longline vessels, 2020-2024. The sizes of the circles are proportional to the amounts of bigeye and yellowfin caught in those 5° by 5° areas.
FIGURA A-4. Distribución de las capturas anuales medias de atunes patudo y aleta amarilla en el Océano Pacifico, en toneladas métricas, por buques palangreros de China, Corea, Japón, y Taipei Chino, 2020-2024. El tamaño de cada círculo es proporcional a la cantidad de patudo y aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente.

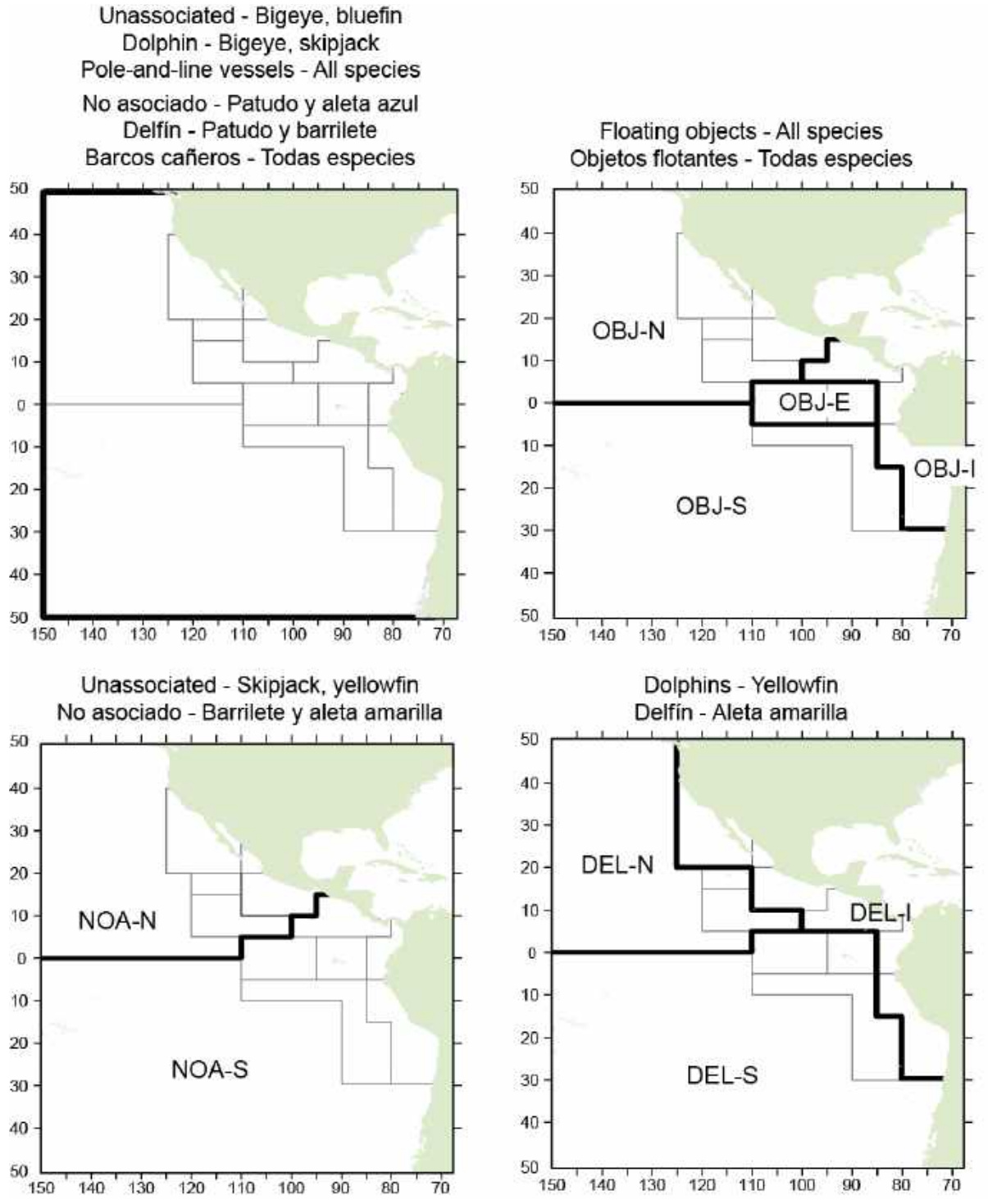


FIGURE A-5. The purse-seine fisheries defined by the IATTC staff for analyses of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries.

FIGURA A-5. Las pesquerías cerqueras definidas por el personal de la CIAT para los análisis de los atunes aleta amarilla, barrilete, y patudo en el OPO. Las líneas delgadas indican los límites de las 13 zonas de muestreo de frecuencia de tallas, y las líneas gruesas los límites de las pesquerías.

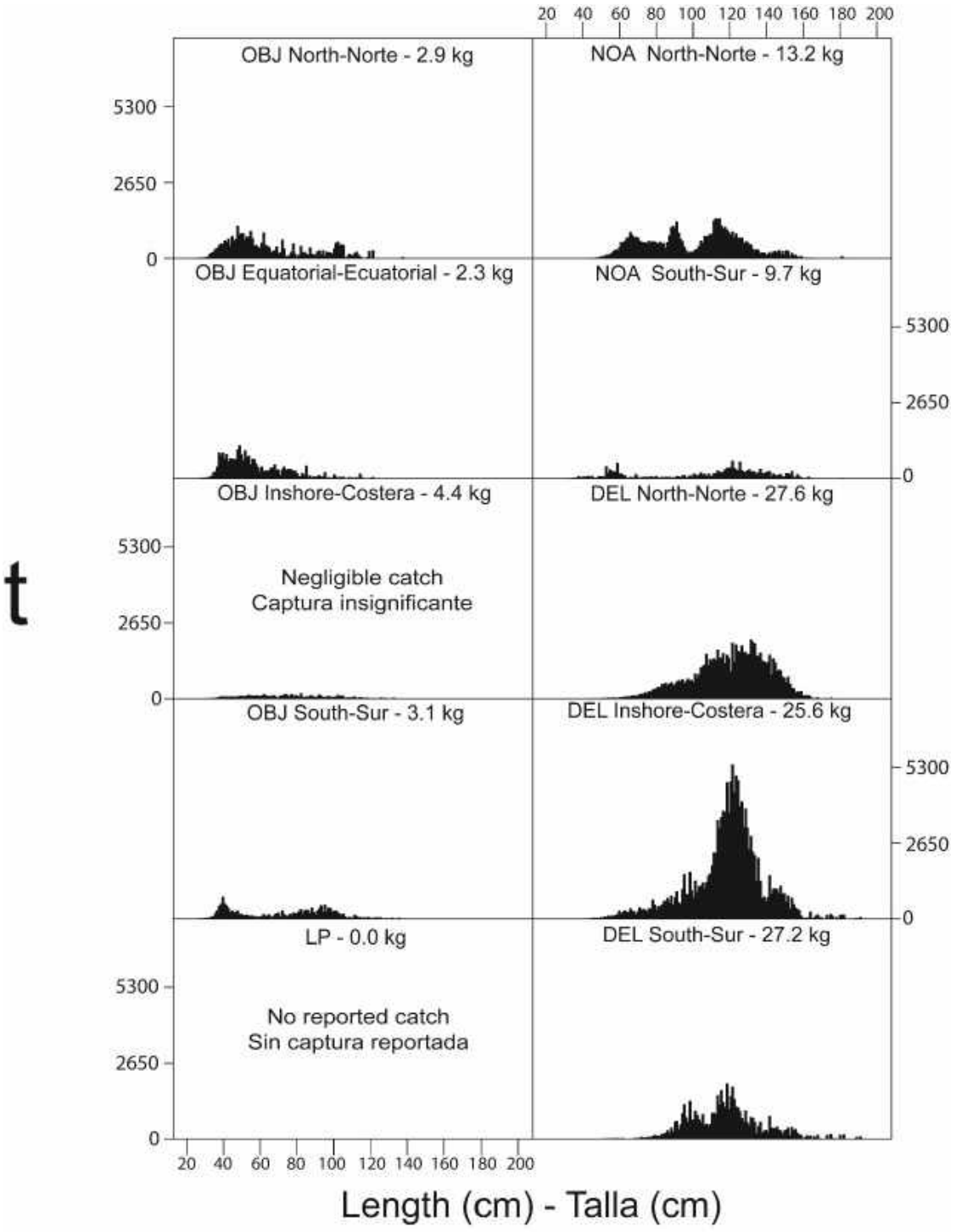


FIGURE A-6a. Estimated size compositions of the yellowfin caught in the EPO during 2025 for each fishery designated in Figure A-5. The value at the top of each panel is the average weight of the fish in the samples.

FIGURA A-6a. Composición por tallas estimada del aleta amarilla capturado en el OPO durante 2025 en cada pesquería ilustrada en la Figura A-5. El valor en cada recuadro representa el peso promedio del pescado en las muestras.

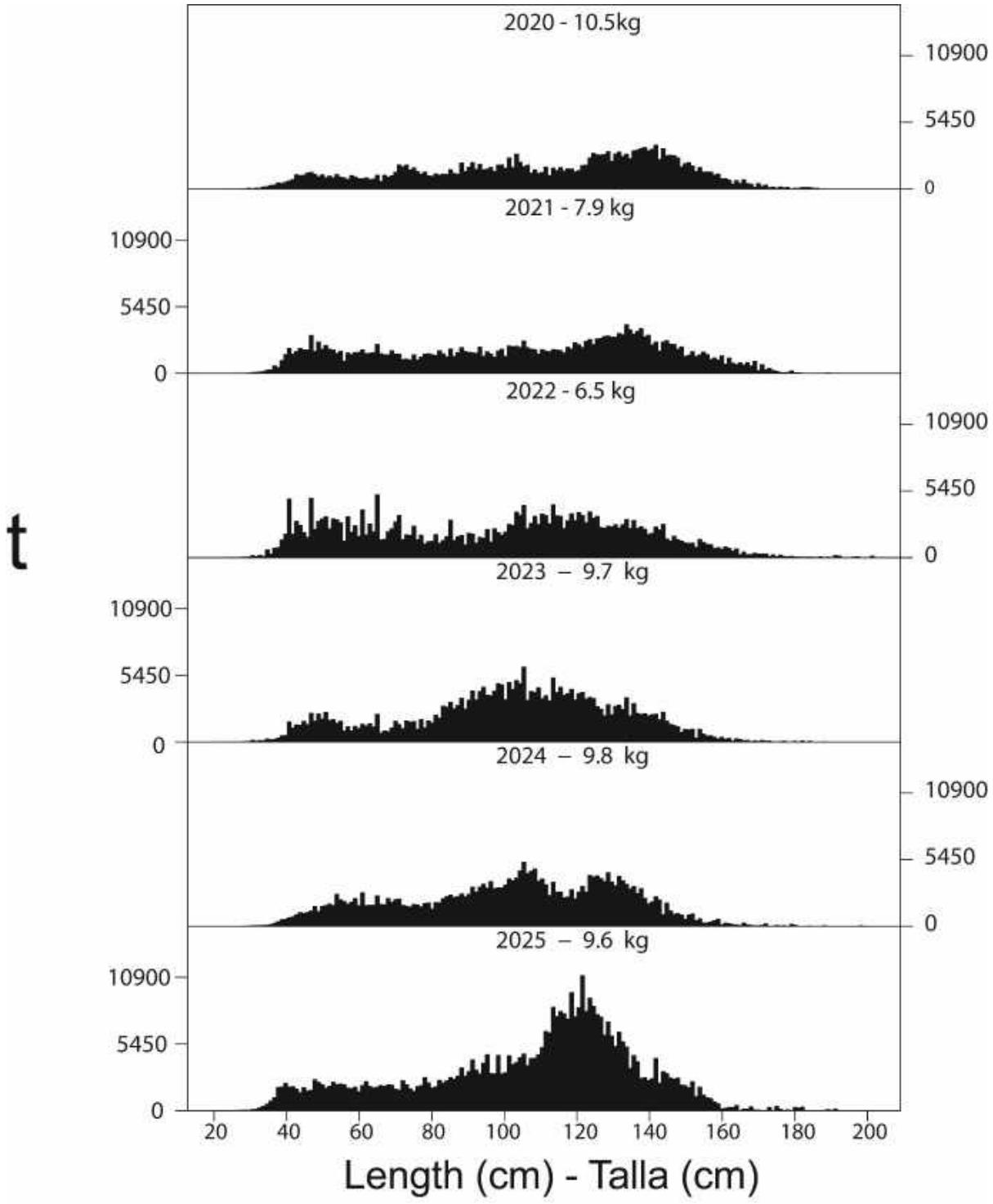


FIGURE A-6b. Estimated size compositions of the yellowfin caught by purse-seine and pole-and-line vessels in the EPO during 2020-2025. The value at the top of each panel is the average weight of the fish in the samples.

FIGURA A-6b. Composición por tallas estimada del aleta amarilla capturado por buques cerqueros y cañeros en el OPO durante 2020-2025. El valor en cada recuadro representa el peso promedio del pescado en las muestras.

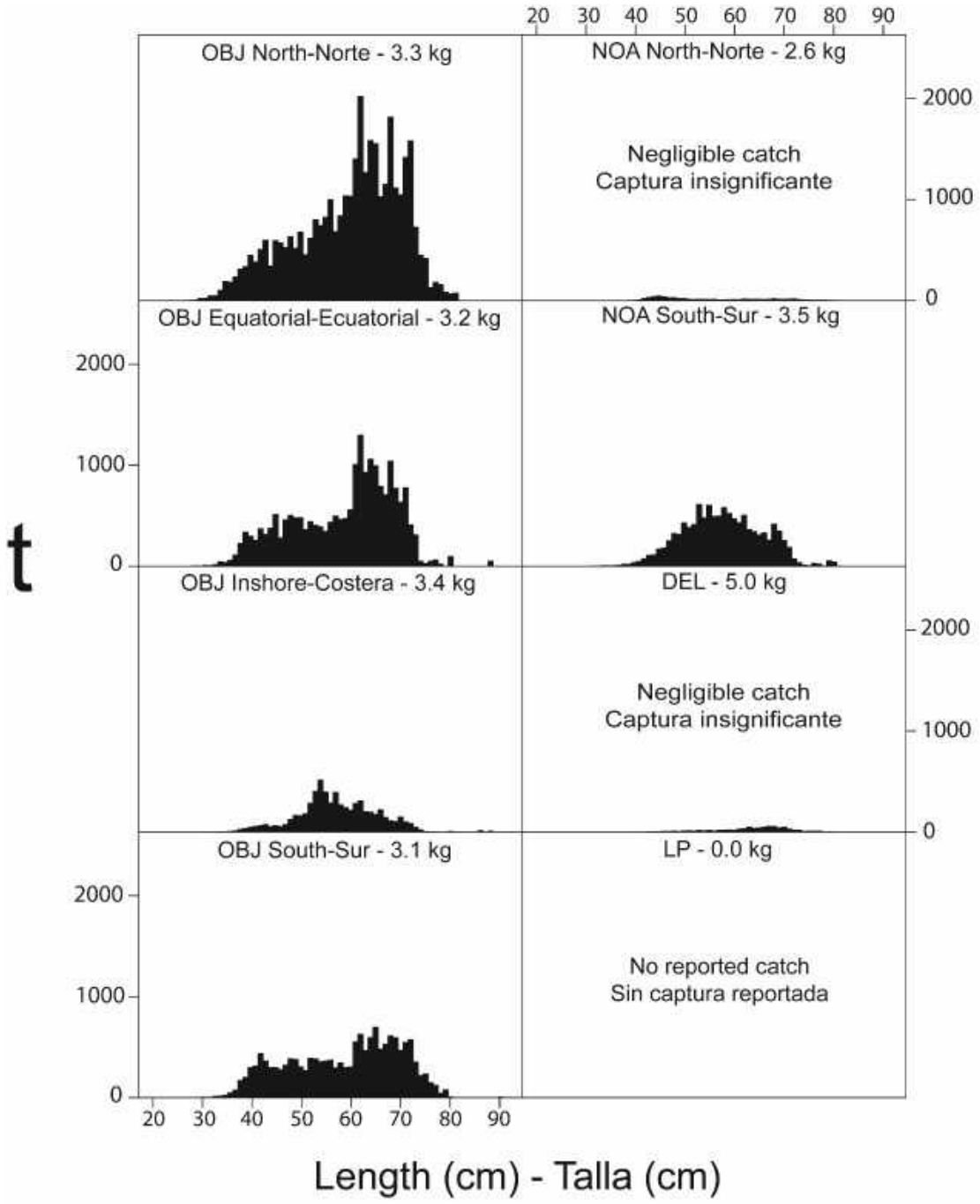


FIGURE A-7a. Estimated size compositions of the skipjack caught in the EPO during 2025 for each fishery designated in Figure A-5. The value at the top of each panel is the average weight of the fish in the samples.
FIGURA A-7a. Composición por tallas estimada del barrilete capturado en el OPO durante 2025 en cada pesquería ilustrada en la Figura A-5. El valor en cada recuadro representa el peso promedio del pescado en las muestras.

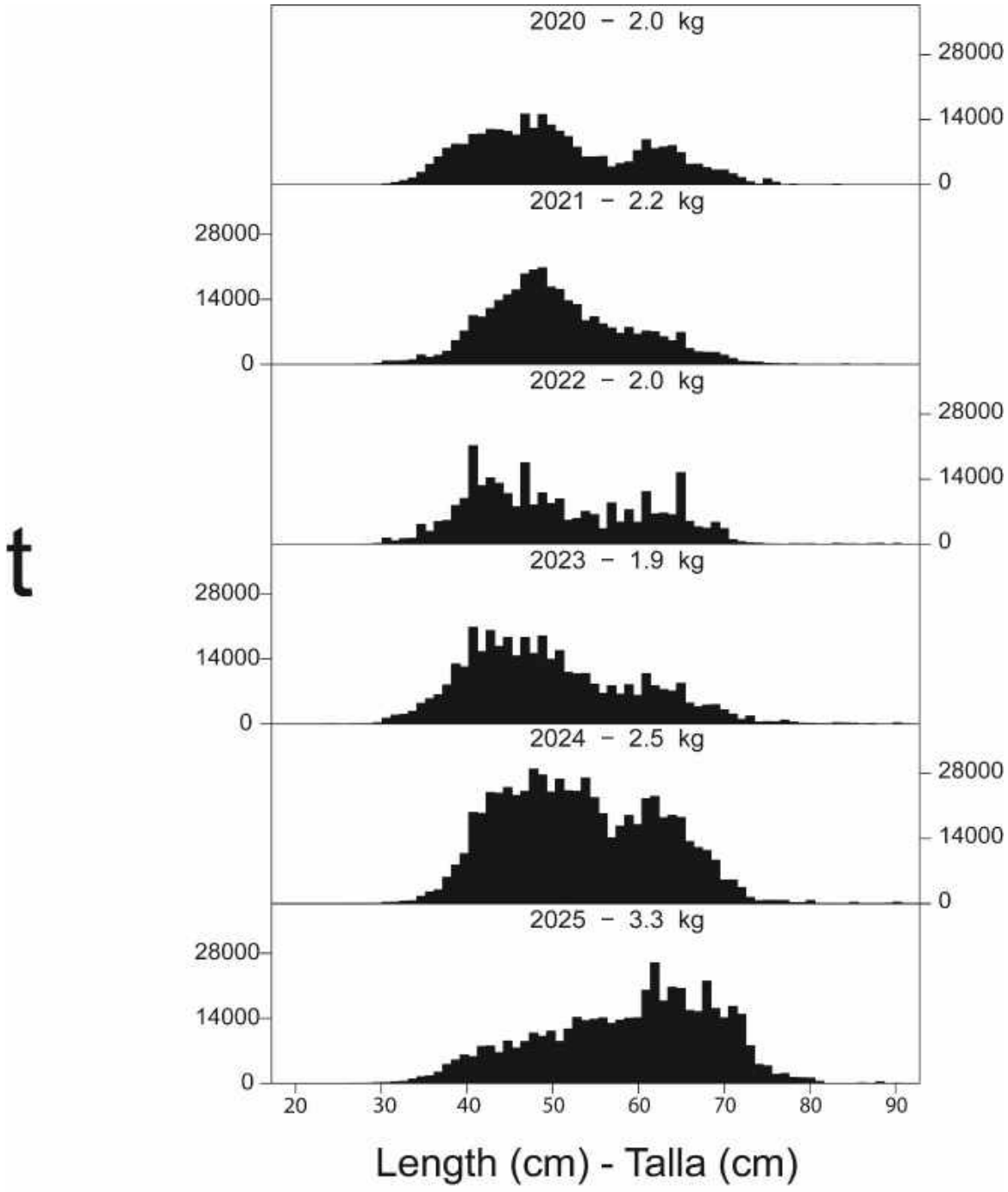


FIGURE A-7b. Estimated size compositions of the skipjack caught by purse-seine and pole-and-line vessels in the EPO during 2020-2025. The value at the top of each panel is the average weight of the fish in the samples.

FIGURA A-7b. Composición por tallas estimada del barrilete capturado por buques cerqueros y cañeros en el OPO durante 2020-2025. El valor en cada recuadro representa el peso promedio del pescado en las muestras.

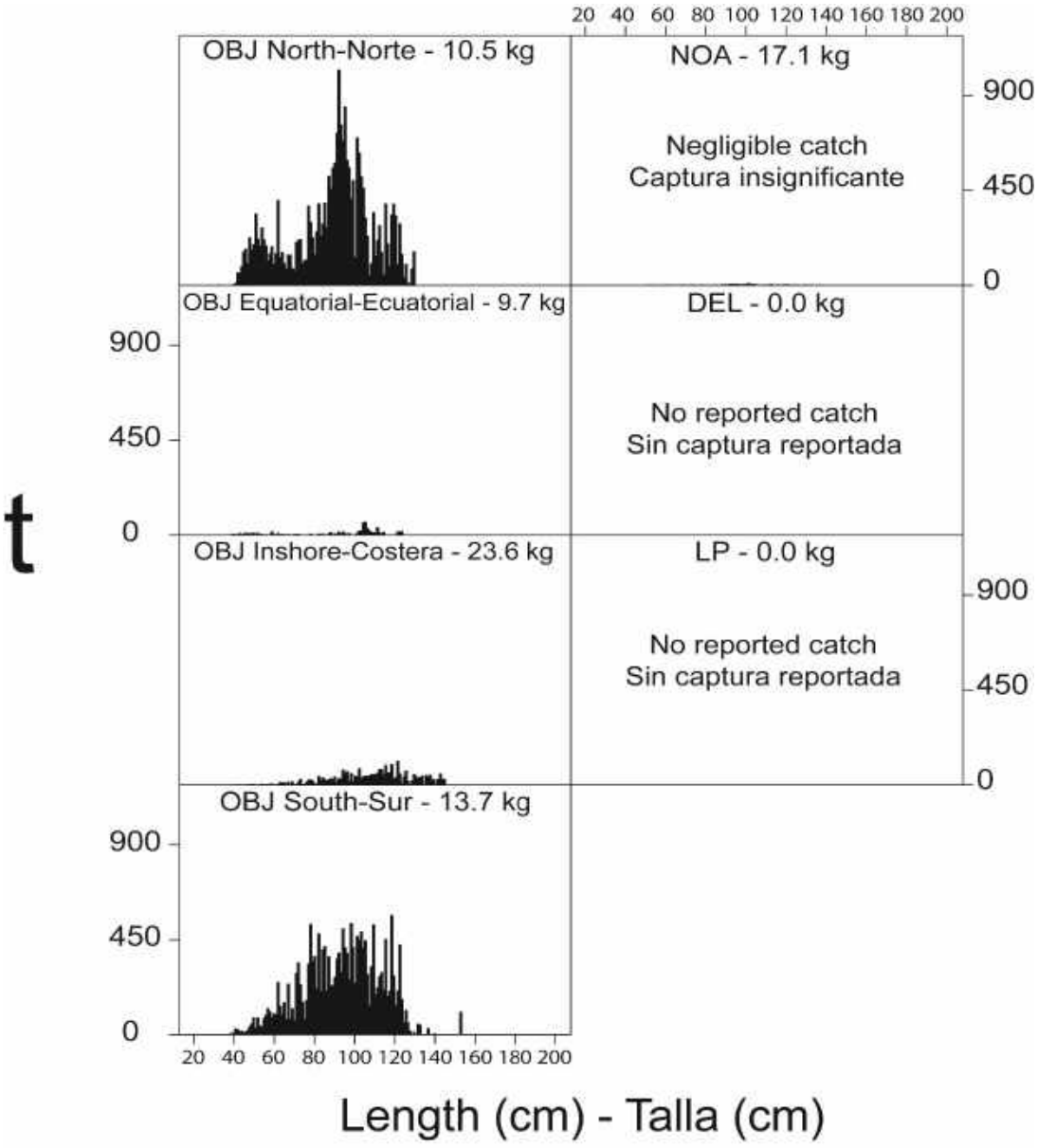


FIGURE A-8a. Estimated size compositions of the bigeye caught in the EPO during 2025 for each fishery designated in Figure A-5. The value at the top of each panel is the average weight.
FIGURA A-8a. Composición por tallas estimada del patudo capturado en el OPO durante 2025 en cada pesquería ilustrada en la Figura A-5. El valor en cada recuadro representa el peso promedio del pescado en las muestras.

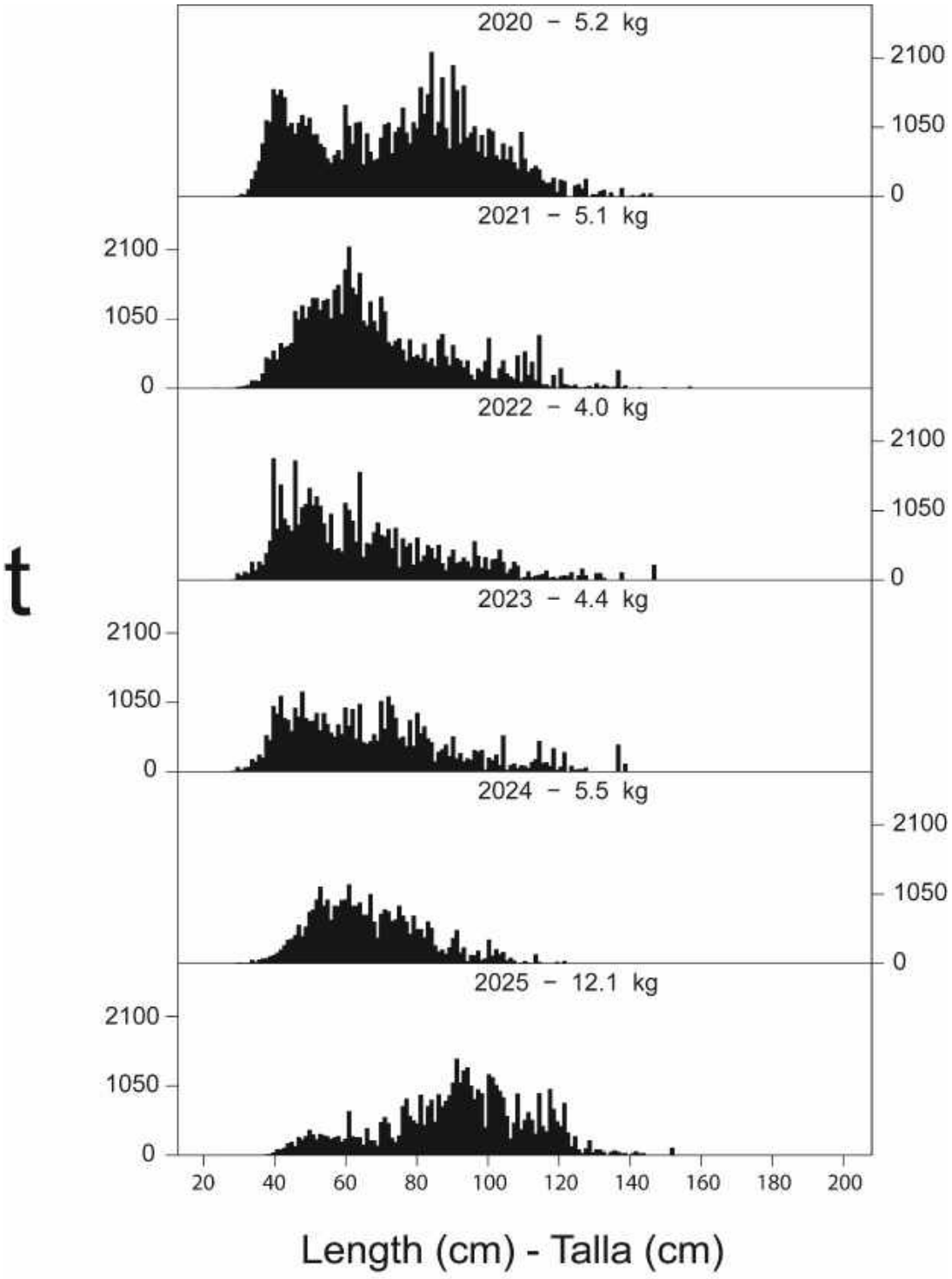


FIGURE A-8b. Estimated size compositions of the bigeye caught by purse-seine vessels in the EPO during 2020-2025. The value at the top of each panel is the average weight.
FIGURA A-8b. Composición por tallas estimada del patudo capturado por buques cerqueros en el OPO durante 2020-2025. El valor en cada recuadro representa el peso promedio del pescado en las muestras.

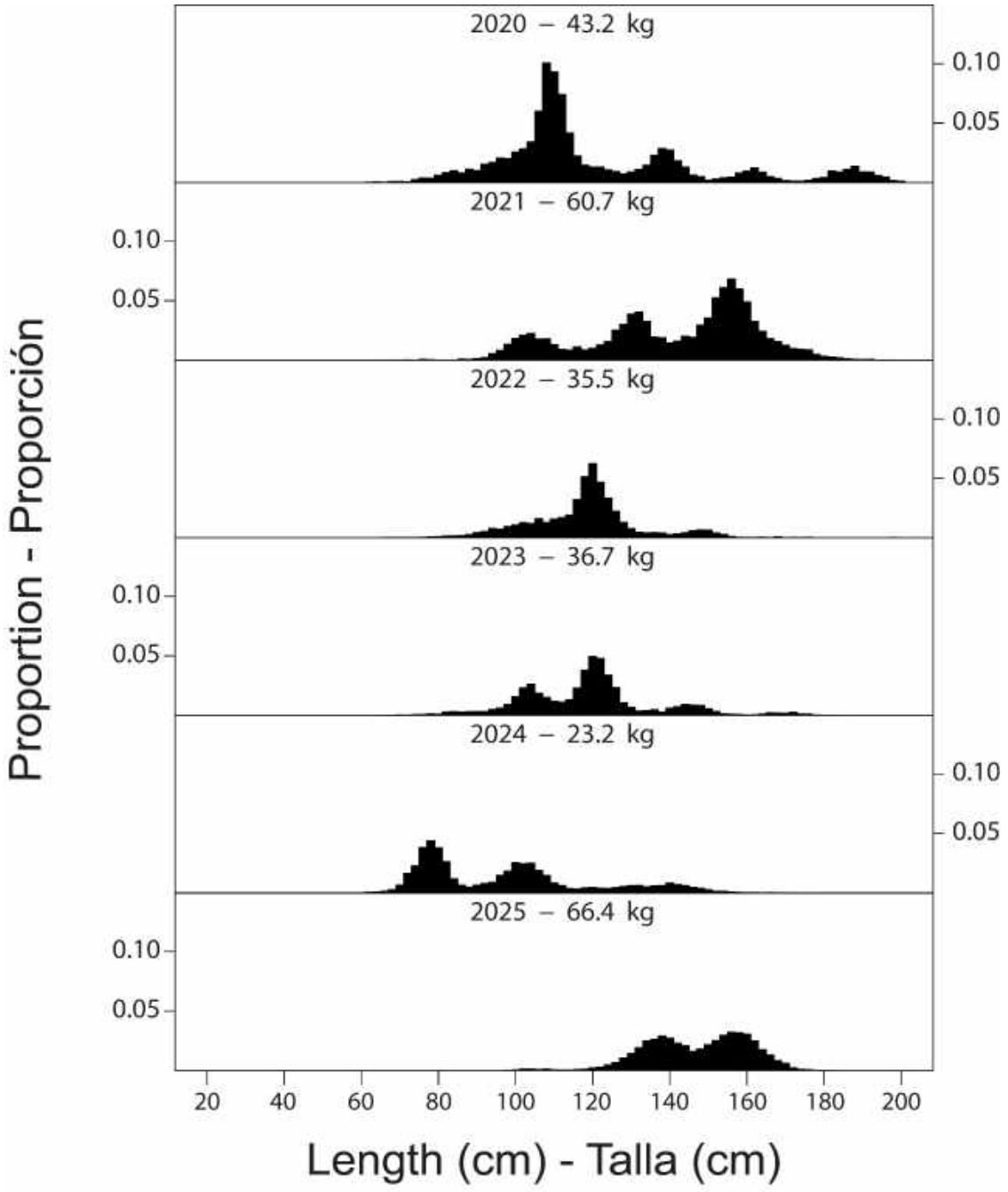


FIGURE A-9. Estimated length compositions of purse-seine catches of Pacific bluefin tuna, 2020-2025. The length distribution has been standardized as a proportion of the total number of measured tuna in each length interval. The value at the top of each panel is the average weight.
Source: Mexico's National Observer Program (PNAAPD).
FIGURA A-9. Composición por talla estimada de las capturas cerqueras de atún aleta azul del Pacífico, 2020-2025. La distribución de las tallas ha sido estandarizada como proporción del número total de atunes medidos en cada intervalo de talla. El valor en cada recuadro representa el peso promedio.
Fuente: Programa Nacional de Observadores de México (PNAAPD).

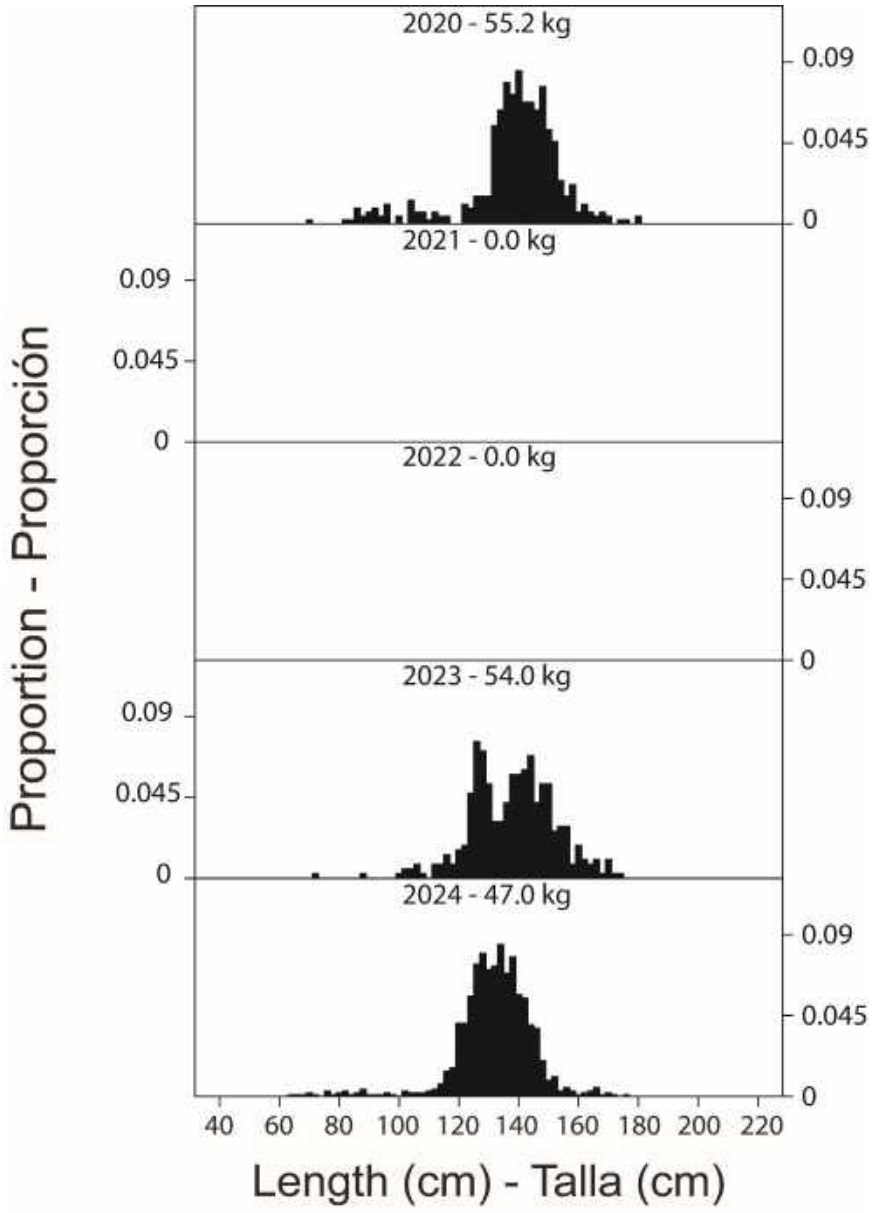


FIGURE A-10. Estimated size compositions of the catches of yellowfin by the Japanese longline fleet in the EPO, 2020-2024. The size distribution has been standardized as a proportion of the total number of measured tunas in each size range. The value at the top of each panel is the average weight. Source: Fisheries Agency of Japan. [Size composition data for 2021 and 2022 was not available due to difficulties resulting from the COVID-19 pandemic, which impacted the collection and analysis of 2021 and 2022 YFT size data.]

FIGURA A-10. Composición por tallas estimada de las capturas de aleta amarilla por la flota palangrera japonesa en el OPO, 2020-2024. La distribución de las tallas ha sido estandarizada como proporción del número total de atunes medidos en cada gama de tallas. El valor en cada recuadro representa el peso promedio. Fuente: Agencia Pesquera de Japón. [Los datos de composición por talla de 2021 y 2022 no estaban disponibles debido a las dificultades derivadas de la pandemia de COVID-19, que afectaron la recolección y el análisis de los datos de talla de YFT de 2021 y 2022.]

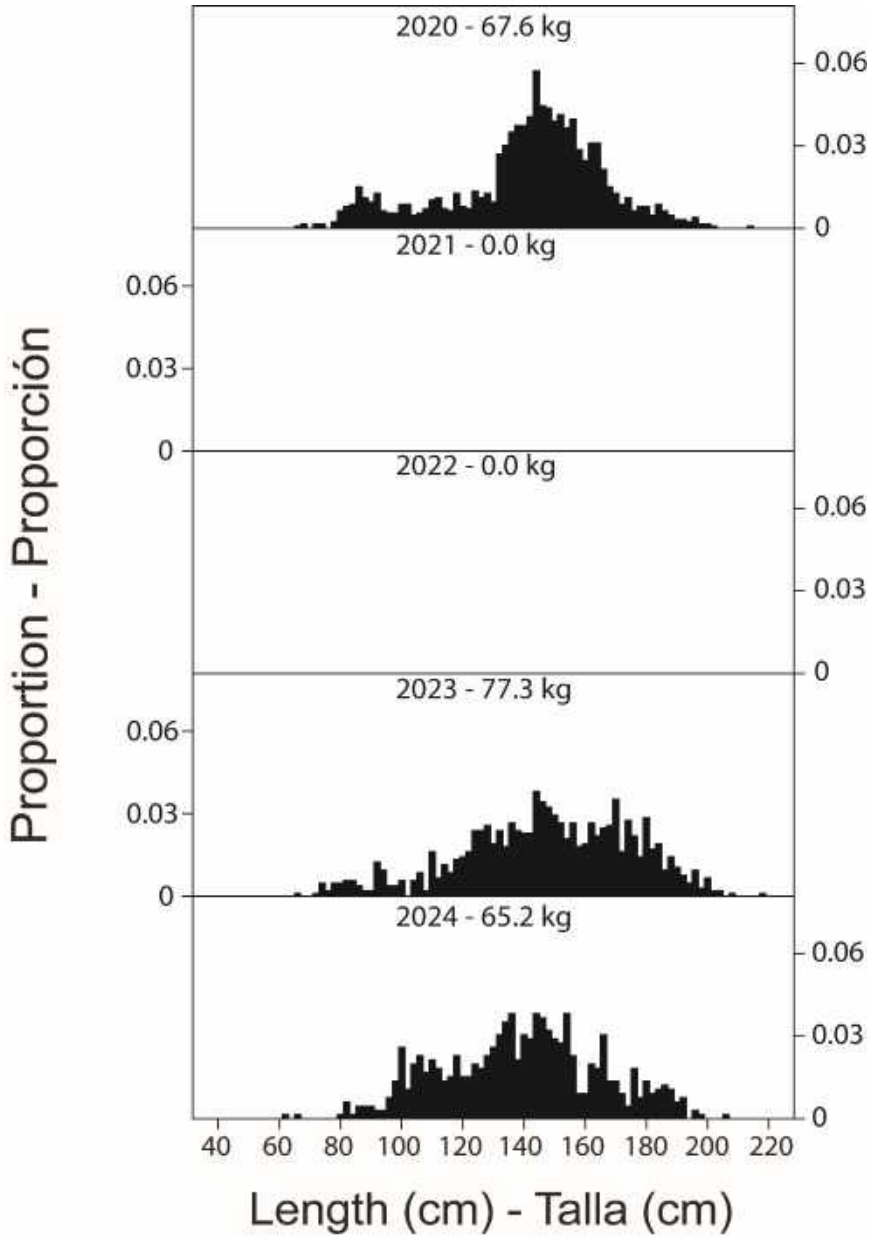


FIGURE A-11. Estimated size compositions of the catches of bigeye by the Japanese longline fleet in the EPO, 2020-2024. The size distribution has been standardized as a proportion of the total number of measured tunas in each size range. The value at the top of each panel is the average weight. Source: Fisheries Agency of Japan. [Size composition data for 2021 and 2022 was not available due to difficulties resulting from the COVID-19 pandemic, which impacted the collection and analysis of 2021 and 2022 BET size data.]

FIGURA A-11. Composición por tallas estimada de las capturas de patudo por la flota palangrera japonesa en el OPO, 2020-2024. La distribución de las tallas ha sido estandarizada como proporción del número total de atunes medidos en cada gama de tallas. El valor en cada recuadro representa el peso promedio. Fuente: Agencia Pesquera de Japón. [Los datos de composición por talla de 2021 y 2022 no estaban disponibles debido a las dificultades derivadas de la pandemia de COVID-19, que afectaron la recolección y el análisis de los datos de talla de BET de 2021 y 2022.]

TABLE A-1. Total annual catches (t) of yellowfin, skipjack, and bigeye tunas, by all types of gear combined, in the Pacific Ocean. The EPO totals for 1996-2025 include discards from purse-seine vessels with carrying capacities greater than 363 t.

TABLA A-1. Capturas totales anuales (t) de atunes aleta amarilla, barrilete, y patudo, por todas las artes combinadas, en el Océano Pacífico. Los totales del OPO de 1996-2025 incluyen los descartes de buques cerqueros de más de 363 t de capacidad de acarreo.

	YFT			SKJ			BET			Total		
	EPO	**WCPO**	**Total**	**EPO**	**WCPO**	**Total**	**EPO**	**WCPO**	**Total**	**EPO**	**WCPO**	**Total**
1996	266,928	425,669	692,597	132,335	999,701	1,132,036	114,706	107,168	221,874	513,969	1,532,538	2,046,507
1997	277,575	481,019	758,594	188,285	939,497	1,127,782	122,274	133,495	255,769	588,134	1,554,011	2,142,145
1998	280,606	536,845	817,451	165,489	1,244,132	1,409,621	93,954	152,415	246,369	540,049	1,933,392	2,473,441
1999	304,638	474,648	779,286	291,249	1,070,280	1,361,529	93,078	162,524	255,602	688,965	1,707,452	2,396,417
2000	286,863	506,028	792,891	230,479	1,194,139	1,424,618	148,557	148,094	296,651	665,899	1,848,261	2,514,160
2001	425,008	504,501	929,509	157,676	1,100,714	1,258,390	130,546	134,459	265,005	713,230	1,739,674	2,452,904
2002	443,458	489,995	933,453	167,048	1,253,634	1,420,682	132,806	157,958	290,764	743,312	1,901,587	2,644,899
2003	415,933	563,926	979,859	300,470	1,245,155	1,545,625	115,175	143,471	258,646	831,578	1,952,552	2,784,130
2004	296,847	595,888	892,735	217,249	1,354,765	1,572,014	110,722	182,599	293,321	624,818	2,133,252	2,758,070
2005	286,492	551,822	838,314	283,453	1,418,105	1,701,558	110,514	154,748	265,262	680,459	2,124,675	2,805,134
2006	180,519	537,076	717,595	309,090	1,479,366	1,788,456	117,328	165,386	282,714	606,937	2,181,828	2,788,765
2007	182,141	565,930	748,071	216,324	1,663,353	1,879,677	94,260	165,365	259,625	492,725	2,394,648	2,887,373
2008	197,328	644,365	841,693	307,699	1,649,067	1,956,766	103,350	171,317	274,667	608,377	2,464,749	3,073,126
2009	250,413	558,914	809,327	239,408	1,761,272	2,000,680	109,255	169,294	278,549	599,076	2,489,480	3,088,556
2010	261,871	564,607	826,478	153,092	1,680,215	1,833,307	95,408	139,796	235,204	510,371	2,384,618	2,894,989
2011	216,720	530,946	747,666	283,509	1,536,806	1,820,315	89,460	168,119	257,579	589,689	2,235,871	2,825,560
2012	213,310	625,697	839,007	273,519	1,731,944	2,005,463	102,687	167,245	269,932	589,516	2,524,886	3,114,402
2013	231,170	578,467	809,637	284,043	1,831,413	2,115,456	86,029	154,783	240,812	601,242	2,564,663	3,165,905
2014	246,784	618,262	865,046	265,490	1,985,110	2,250,600	96,054	169,046	265,100	608,328	2,772,418	3,380,746
2015	260,265	589,128	849,393	334,049	1,788,545	2,122,594	104,820	145,709	250,529	699,134	2,523,382	3,222,516
2016	255,465	658,112	913,577	345,163	1,791,373	2,136,536	92,952	156,495	249,447	693,580	2,605,980	3,299,560
2017	224,800	704,628	929,428	327,629	1,615,560	1,943,189	102,860	130,533	233,393	655,289	2,450,721	3,106,010
2018	253,305	695,759	949,064	291,352	1,843,397	2,134,749	94,479	153,017	247,496	639,136	2,692,173	3,331,309
2019	242,248	682,704	924,952	350,992	2,044,247	2,395,239	97,145	131,124	228,269	690,385	2,858,075	3,548,460
2020	231,693	736,547	968,240	298,583	1,714,513	2,013,096	105,183	139,923	245,106	635,459	2,590,983	3,226,442
2021	263,842	755,978	1,019,820	328,616	1,714,670	2,043,286	80,177	140,586	220,763	672,635	2,611,234	3,283,869
2022	298,862	660,975	959,837	298,136	1,750,324	2,048,460	68,265	146,065	214,330	665,263	2,557,364	3,222,627
2023	306,108	746,359	1,052,467	390,554	1,668,328	2,058,882	67,240	143,704	210,944	763,902	2,558,391	3,322,293
2024	308,200	716,282	1,024,482	646,643	2,051,550	2,698,193	55,415	141,338	196,753	1,010,258	2,909,170	3,919,428
2025	445,756	*	445,756	471,708	*	471,708	63,753	*	63,753	981,217	*	981,217

TABLE A-2a. Estimated catches, in metric tons, of tunas and bonitos in the EPO, by fishing gear, 1996-2025. For purse-seine (PS) vessels, retained (Ret.) catches include all vessels; discard (Dis.) data are for Class-6 vessels only. 'C' indicates that the catch has been combined with the total in the 'OTR' column. The purse-seine and pole-and-line (LP) data for yellowfin, skipjack, and bigeye tunas have been adjusted to the species composition estimate, and are preliminary. The data for 2021-2025 are preliminary.

TABLA A-2a. Capturas estimadas, en toneladas métricas, de atunes y bonitos en el OPO, por arte de pesca, 1996-2025. En el caso de los buques de cerco (PS), las capturas retenidas (Ret) incluyen todos los buques; los datos de descartes (Dis.) son de buques de Clase 6 únicamente. 'C' indica que la captura se ha combinado con el total en la columna 'OTR'. Los datos de los atunes aleta amarilla, barrilete, y patudo de las pesquerías de cerco y de caña (LP) fueron ajustados a la estimación de composición por especies, y son preliminares. Los datos de 2021-2025 son preliminares.

	Yellowfin—Aleta amarilla						Skipjack—Barrilete						Bigeye—Patudo					
	PS		LP	LL	OTR + UNK	Total	PS		LP	LL	OTR + UNK	Total	PS		LP	LL	OTR + UNK	Total
	Ret.	Dis.[§]					Ret.	Dis.[§]					Ret.	Dis.[§]				
1996	238,607	6,312	3,762	16,608	1,639	266,928	103,973	24,494	2,555	52	1,261	132,335	61,311	5,689	-	46,958	748	114,706
1997	244,878	5,516	4,418	22,163	600	277,575	153,456	31,338	3,260	135	96	188,285	64,272	5,402	-	52,580	20	122,274
1998	253,959	4,697	5,085	15,336	1,529	280,606	140,631	22,643	1,684	294	237	165,489	44,129	2,822	-	46,375	628	93,954
1999	281,920	6,547	1,783	11,682	2,706	304,638	261,565	26,046	2,044	201	1,393	291,249	51,158	4,932	-	36,450	538	93,078
2000	253,263	6,205	2,431	23,855	1,109	286,863	205,647	24,467	231	68	66	230,479	95,282	5,417	-	47,605	253	148,557
2001	383,936	7,028	3,916	29,608	520	425,008	143,165	12,815	448	1,214	34	157,676	60,518	1,254	-	68,755	19	130,546
2002	412,286	4,140	950	25,531	551	443,458	153,546	12,506	616	261	119	167,048	57,421	949	-	74,424	12	132,806
2003	383,279	5,865	470	25,174	1,145	415,933	273,968	22,453	638	634	2,777	300,470	53,052	2,326	-	59,776	21	115,175
2004	272,557	3,000	1,884	18,779	627	296,847	197,824	17,078	528	713	1,106	217,249	65,471	1,574	-	43,483	194	110,722
2005	268,101	2,771	1,822	11,946	1,852	286,492	263,229	16,915	1,299	231	1,779	283,453	67,895	1,900	-	40,694	25	110,514
2006	166,631	1,534	686	10,210	1,458	180,519	296,268	11,177	435	224	986	309,090	83,838	1,680	-	31,770	40	117,328
2007	170,016	1,725	894	8,067	1,439	182,141	208,295	6,450	276	238	1,065	216,324	63,450	890	-	29,876	44	94,260
2008	185,057	696	814	9,820	941	197,328	296,603	8,249	499	1,185	1,163	307,699	75,028	2,086	-	26,208	28	103,350
2009	236,757	1,262	709	10,444	1,241	250,413	230,523	6,064	151	1,584	1,086	239,408	76,799	1,019	-	31,422	15	109,255
2010	251,009	1,031	460	8,339	1,032	261,871	147,192	2,769	47	1,815	1,269	153,092	57,752	564	-	37,090	2	95,408
2011	206,851	415	276	8,048	1,130	216,720	276,035	5,215	24	1,384	851	283,509	56,512	631	-	32,317	-	89,460
2012	198,017	451	400	12,954	1,488	213,310	266,215	3,511	303	2,381	1,109	273,519	66,020	473	-	36,167	27	102,687
2013	218,187	207	759	10,783	1,234	231,170	278,560	2,254	164	2,024	1,041	284,043	49,487	273	-	36,170	99	86,029
2014	234,066	517	C	8,649	3,552	246,784	261,469	2,596	C	194	1,231	265,490	60,445	83	-	35,356	170	96,054
2015	245,727	334	C	10,622	3,582	260,265	328,907	3,699	C	187	1,256	334,049	62,913	177	-	41,709	21	104,820
2016	242,118	404	C	9,801	3,142	255,465	337,561	4,086	-	214	3,302	345,163	56,731	541	-	35,656	24	92,952
2017	210,980	412	C	10,647	2,761	224,800	324,759	1,765	C	185	920	327,629	66,973	201	-	35,650	36	102,860
2018	238,981	231	C	12,576	1,517	253,305	288,821	865	C	1,221	445	291,352	64,523	145	C	29,787	24	94,479
2019	228,313	578	C	11,921	1,436	242,248	347,405	2,851	C	263	473	350,992	69,223	117	-	27,787	18	97,145
2020	218,747	148	C	11,674	1,124	231,693	295,961	1,787	C	269	566	298,583	78,784	106	-	26,249	44	105,183
2021	253,415	246	C	9,477	704	263,842	326,524	1,824	C	225	43	328,616	58,170	69	C	21,929	9	80,177
2022	291,661	332	C	6,715	154	298,862	296,791	1,058	C	201	86	298,136	46,974	50	C	21,117	124	68,265
2023	297,980	379	C	7,166	583	306,108	388,884	1,323	C	217	130	390,554	42,366	92	C	24,608	174	67,240
2024	294,584	732	C	12,733	151	308,200	641,220	4,590	C	382	451	646,643	34,083	238	-	21,085	9	55,415
2025	444,360	1,396	*	*	*	445,756	470,065	1,643	*	*	*	471,708	45,297	125	-	18,331	*	63,753

[§] Class-6 (carrying capacity >363 t) purse-seine vessels only-Buques cerqueros de Clase 6 (capacidad de acarreo >363 t) solamente

TABLE A-2a. (continued)
TABLA A-2a. (continuación)

	Pacific bluefin—Aleta azul del Pacífico						Albacore—Albacora						Black skipjack—Barrilete negro					
	PS		LP	LL	OTR + UNK	Total	PS		LP	LL	OTR + UNK	Total	PS		LP	LL	OTR + UNK	Total
	Ret.	Dis. [§]					Ret.	Dis. [§]					Ret.	Dis. [§]				
1996	8,333	-	-	19	83	8,435	11	-	72	7,631	8,398	16,112	704	2,304	-	12	-	3,020
1997	2,608	3	2	14	235	2,862	1	-	59	9,678	7,540	17,278	100	2,512	-	11	-	2,623
1998	1,772	-	-	95	516	2,383	42	-	81	12,635	13,158	25,916	489	1,876	39	-	-	2,404
1999	2,553	54	5	151	514	3,277	47	-	227	11,633	14,510	26,417	171	3,404	-	-	-	3,575
2000	3,712	-	61	46	349	4,168	71	-	86	9,663	13,453	23,273	294	1,995	-	-	-	2,289
2001	1,155	3	1	148	378	1,685	3	-	157	19,410	13,727	33,297	2,258	1,019	-	-	-	3,277
2002	1,758	1	3	71	620	2,453	31	-	381	15,289	14,433	30,134	1,459	2,283	8	-	-	3,750
2003	3,233	-	3	87	369	3,692	34	-	59	24,901	20,397	45,391	433	1,535	6	13	117	2,104
2004	8,880	19	-	15	59	8,973	105	-	126	18,444	22,011	40,686	884	387	-	27	862	2,160
2005	4,743	15	-	-	80	4,838	2	-	66	9,350	15,668	25,086	1,472	2,124	-	-	22	3,618
2006	9,928	-	-	-	93	10,021	109	-	1	13,831	18,980	32,921	1,999	1,972	-	-	-	3,971
2007	4,189	-	-	-	14	4,203	187	-	21	11,107	19,261	30,576	2,307	1,625	-	2	54	3,988
2008	4,392	14	15	-	63	4,484	49	-	1,050	9,218	16,505	26,822	3,624	2,251	-	-	8	5,883
2009	3,428	24	-	-	161	3,613	50	2	-	12,072	19,090	31,214	4,256	1,020	-	2	-	5,278
2010	7,746	-	-	3	89	7,838	25	-	-	14,256	19,363	33,644	3,425	1,079	-	8	184	4,696
2011	2,829	4	-	1	244	3,078	10	-	-	16,191	16,074	32,275	2,317	719	-	6	-	3,042
2012	6,705	-	-	1	405	7,111	-	-	-	24,198	18,100	42,298	4,504	440	-	5	7	4,956
2013	3,154	-	-	1	819	3,974	-	-	-	25,396	18,513	43,909	3,580	805	-	10	24	4,419
2014	5,263	66	C	1	427	5,757	-	-	-	29,231	19,463	48,694	4,153	486	-	11	81	4,731
2015	3,168	-	C	7	412	3,587	-	-	-	28,939	17,142	46,081	3,763	356	-	1	111	4,231
2016	3,025	-	C	0	728	3,753	2	-	-	26,777	14,567	41,346	6,606	792	-	-	178	7,576
2017	4,109	-	C	3	482	4,594	-	-	-	26,592	9,442	36,034	5,079	306	C	-	54	5,439
2018	2,852	-	C	0	588	3,440	8	-	-	25,759	11,138	36,905	3,002	732	C	-	120	3,854
2019	2,475	-	C	0	530	3,005	-	-	-	20,814	11,876	32,690	5,199	499	C	-	132	5,830
2020	3,383	19	C	1	857	4,260	-	-	-	19,983	10,358	30,341	4,573	684	C	-	363	5,620
2021	3,069	0	C	0	1,467	4,536	-	-	-	31,439	7,415	38,854	4,699	472	C	109	129	5,409
2022	3,392	7	C	2	1,782	5,183	76	-	-	31,802	13,334	45,212	6,453	591	C	-	9	7,053
2023	3,402	1	C	2	2,201	5,606	0	-	-	29,794	5,397	35,191	5,455	345	C	1	25	5,826
2024	3,516	18	C	1	1,520	5,055	1	-	-	35,514	8,482	43,997	7,292	810	C	-	3	8,105
2025	6,162	*	*	*	*	6,162	0	-	-	*	*	0	4,450	679	*	-	*	5,129

[§] Class-6 (carrying capacity >363 t) purse-seine vessels only-Buques cerqueros de Clase 6 (capacidad de acarreo >363 t) solamente

TABLE A-2a. (continued)
TABLA A-2a. (continuación)

	Bonitos						Unidentified tunas—Atunes no identificados						Total					
	PS		LP	LL	OTR + UNK	Total	PS		LP	LL	OTR + UNK	Total	PS		LP	LL	OTR + UNK	Total
	Ret.	Dis.§					Ret.	Dis.§					Ret.	Dis.§				
1996	647	1	7	-	16	671	37	1,028	-	-	1,038	2,103	413,623	39,827	6,395	71,283	13,183	544,311
1997	1,097	4	8	-	34	1,143	71	3,383	-	7	1,437	4,898	466,483	48,157	7,747	84,588	9,962	616,936
1998	1,330	4	7	-	588	1,929	13	1,233	-	24	18,158	19,428	442,365	33,276	6,897	74,758	34,815	592,111
1999	1,719	-	-	24	369	2,112	27	3,092	-	2,113	4,279	9,511	599,160	44,076	4,059	62,254	24,310	733,859
2000	636	-	-	75	56	767	190	1,410	-	1,992	1,468	5,060	559,095	39,494	2,809	83,305	16,756	701,459
2001	17	-	-	34	19	70	191	679	-	2,448	55	3,373	591,243	22,799	4,523	121,616	14,755	754,935
2002	-	-	-	-	1	1	576	1,863	-	482	1,422	4,343	627,077	21,741	1,958	116,057	17,158	783,992
2003	-	-	1	-	25	26	80	1,238	-	215	750	2,283	714,079	33,416	1,177	110,799	25,600	885,071
2004	15	35	1	8	3	62	256	973	-	349	258	1,836	545,992	23,066	2,539	81,818	25,120	678,536
2005	313	18	-	-	11	342	190	1,922	-	363	427	2,902	605,945	25,664	3,187	62,585	19,865	717,246
2006	3,507	80	12	-	3	3,602	50	1,910	-	29	193	2,182	562,330	18,353	1,134	56,066	21,754	659,636
2007	15,906	628	107	2	-	16,643	598	1,221	-	2,197	301	4,317	464,948	12,540	1,298	51,488	22,179	552,452
2008	7,874	37	9	6	26	7,952	136	1,380	1	727	883	3,127	572,763	14,712	2,388	47,164	19,617	656,644
2009	9,720	15	-	8	77	9,820	162	469	-	1,933	74	2,638	561,695	9,875	860	57,466	21,743	651,640
2010	2,820	19	4	2	70	2,915	136	709	-	1,770	36	2,651	470,105	6,170	511	63,279	22,045	562,111
2011	7,969	45	18	10	11	8,053	108	784	-	3,178	-	4,070	552,631	7,813	318	61,136	18,311	640,208
2012	8,191	156	-	1	64	8,412	41	354	-	196	221	812	549,693	5,385	704	75,900	21,419	653,101
2013	2,067	9	-	13	27	2,116	53	461	-	-	529	1,043	555,088	4,009	923	74,397	22,286	656,703
2014	2,821	38	-	-	154	3,013	113	328	-	269	392	1,102	568,330	4,114	C	73,711	25,470	671,625
2015	789	28	-	1	-	818	90	242	-	-	1,232	1,564	645,357	4,836	C	81,466	23,756	755,415
2016	3,806	15	-	-	1	3,822	129	212	-	-	294	635	649,978	6,050	C	72,448	22,236	750,712
2017	3,438	54	-	-	130	3,622	234	303	C	1	366	904	615,572	3,041	C	73,078	14,191	705,882
2018	2,409	58	-	-	44	2,511	75	448	-	3	213	739	600,671	2,479	C	69,346	14,089	686,585
2019	7,255	27	-	-	37,775	45,057	83	276	-	4	66	429	659,953	4,348	C	60,789	52,306	777,396
2020	3,169	6	-	-	41,446	44,621	211	480	-	4	44	739	604,828	3,230	C	58,180	54,802	721,040
2021	6,899	75	-	-	46,153	53,127	1,253	441	-	1	172	1,867	654,029	3,127	C	63,180	56,092	776,428
2022	3,242	9	-	-	*	3,251	2,379	705	-	0	0	3,084	650,968	2,752	C	59,837	15,489	729,046
2023	855	0	C	-	64,831	65,686	1,968	589	-	-	424	2,981	740,910	2,729	C	61,788	73,765	879,192
2024	5	18	-	-	*	23	3,149	600	-	-	-	3,749	983,850	7,006	C	69,715	10,616	1,071,187
2025	74	*	-	-	*	74	1,735	534	-	-	-	2,269	972,143	4,377	*	18,331	*	994,851

§ Class-6 (carrying capacity >363 t) purse-seine vessels only-Buques cerqueros de Clase 6 (capacidad de acarreo >363 t) solamente

TABLE A-2b. Estimated catches, in metric tons, of billfishes in the EPO, by fishing gear, 1996-2025. Purse-seine (PS) vessel data are for Class-6 vessels only. The data for 2021-2025 are preliminary.
TABLA A-2b. Capturas estimadas, en toneladas métricas, de peces picudos en el OPO, por arte de pesca, 1996-2025. En el caso de los buques de cerco (PS), los datos son de buques de Clase 6 únicamente. Los datos de 2021-2025 son preliminares.

	Swordfish—Pez espada					Blue marlin—Marlín azul					Black marlin—Marlín negro					Striped marlin-Marlín rayado				
	PS [§]		LL	OTR	Total	PS [§]		LL	OTR	Total	PS [§]		LL	OTR	Total	PS [§]		LL	OTR	Total
	Ret.	Dis.				Ret.	Dis.				Ret.	Dis.				Ret.	Dis.			
1996	1	-	7,071	2,486	9,558	62	15	3,596	-	3,673	46	24	100	-	170	20	9	3,218	430	3,677
1997	2	1	10,580	1,781	12,364	126	15	5,915	-	6,056	71	22	154	-	247	28	3	4,473	329	4,833
1998	3	-	9,800	3,246	13,049	130	20	4,856	-	5,006	72	28	168	-	268	20	3	3,558	509	4,090
1999	2	-	7,569	1,965	9,536	181	38	3,691	-	3,910	83	42	94	-	219	26	11	2,621	376	3,034
2000	3	-	8,930	2,383	11,316	120	23	3,634	-	3,777	67	21	105	-	193	17	3	1,889	404	2,313
2001	3	1	16,007	1,964	17,975	119	40	4,196	-	4,355	67	48	123	-	238	13	8	1,961	342	2,324
2002	1	-	17,598	2,119	19,718	188	33	3,480	-	3,701	86	30	78	-	194	69	5	2,158	412	2,644
2003	3	1	18,161	354	18,519	185	21	4,015	-	4,221	121	26	73	-	220	31	4	1,904	417	2,356
2004	2	-	15,372	309	15,683	140	21	3,783	-	3,944	62	5	41	-	108	23	1	1,547	390	1,961
2005	2	-	8,935	4,304	13,241	209	14	3,350	-	3,573	95	9	39	-	143	37	4	1,531	553	2,125
2006	7	-	9,890	3,800	13,697	164	21	2,934	105	3,224	124	21	77	-	222	54	3	1,735	490	2,282
2007	4	-	9,639	4,390	14,033	124	13	2,393	106	2,636	74	8	47	-	129	32	4	1,656	1,024	2,716
2008	6	-	12,248	3,071	15,325	125	8	1,705	114	1,952	76	9	100	-	185	33	2	1,291	1,045	2,371
2009	4	-	15,539	3,905	19,448	159	15	2,102	131	2,407	76	8	94	-	178	23	2	1,333	7	1,365
2010	4	-	18,396	4,480	22,880	176	12	2,920	126	3,234	62	9	160	-	231	21	2	2,129	9	2,161
2011	3	-	20,400	5,101	25,504	150	6	2,025	144	2,325	59	7	187	-	253	28	1	2,640	16	2,685
2012	5	-	23,587	7,148	30,740	178	15	3,723	177	4,093	71	4	444	-	519	28	-	2,703	20	2,751
2013	2	-	22,342	5,560	27,904	172	15	4,202	168	4,557	99	4	138	-	241	21	1	2,439	19	2,480
2014	4	-	21,331	6,332	27,667	209	12	4,069	186	4,476	70	4	151	-	225	22	1	1,929	3	1,955
2015	5	1	26,021	6,159	32,186	306	11	4,170	182	4,669	117	14	239	-	370	26	-	1,267	474	1,767
2016	4	-	24,370	7,513	31,887	247	6	3,776	175	4,204	62	3	80	-	145	19	-	1,562	4	1,585
2017	1	2	22,449	8,073	30,525	151	4	3,903	191	4,249	39	1	211	-	251	10	-	1,752	7	1,769
2018	2	-	24,571	7,040	31,613	167	1	4,094	174	4,436	23	-	298	-	321	10	1	1,819	5	1,835
2019	3	-	21,874	9,248	31,125	201	4	2,499	186	2,890	45	-	162	-	207	16	-	1,733	11	1,760
2020	2	-	22,542	5,768	28,312	131	1	2,799	194	3,125	45	0	611	-	656	10	-	1,864	9	1,883
2021	2	0	18,902	5,046	23,950	117	1	1,628	-	1,746	38	-	372	-	410	12	-	1,354	2	1,368
2022	3	-	20,639	5,039	25,681	168	3	1,248	-	1,419	39	1	212	-	252	16	1	1,067	2	1,086
2023	3	-	21,879	7,354	29,236	185	2	1,393	-	1,580	52	2	259	-	313	16	-	1,394	2	1,412
2024	3	0	21,812	10,485	32,300	205	6	1,671	-	1,882	50	1	432	-	483	22	0	1,307	3	1,332
2025	4	*	*	*	4	240	8	*	-	248	63	3	*	-	66	17	*	*	*	17

[§] Class-6 (carrying capacity >363 t) purse-seine vessels only-Buques cerqueros de Clase 6 (capacidad de acarreo >363 t) solamente

TABLE A-2b. (continued)
TABLA A-2b. (continuación)

	Shortbill spearfish—Marlín trompa corta					Sailfish—Pez vela					Unidentified istiophorid billfishes—Picudos istiofóridos no identificados					Total billfishes—Total de peces picudos				
	PS §		LL	OTR	Total	PS §		LL	OTR	Total	PS §		LL	OTR	Total	PS §		LL	OTR	Total
	Ret.	Dis.				Ret.	Dis.				Ret.	Dis.				Ret.	Dis.			
1996	1	-	126	-	127	10	12	738	-	760	6	13	308	-	327	146	73	15,157	2,916	18,292
1997	1	-	141	-	142	12	11	1,891	-	1,914	3	5	1,324	-	1,332	243	57	24,478	2,110	26,888
1998	-	-	200	-	200	28	31	1,382	-	1,441	5	7	575	55	642	258	89	20,539	3,810	24,696
1999	1	-	278	-	279	33	8	1,216	-	1,257	6	12	1,136	-	1,154	332	111	16,605	2,341	19,389
2000	1	-	285	-	286	33	17	1,380	-	1,430	3	6	880	136	1,025	244	70	17,103	2,923	20,340
2001	-	-	304	-	304	18	45	1,539	325	1,927	2	5	1,741	204	1,952	222	147	25,871	2,835	29,075
2002	1	-	273	-	274	19	15	1,792	17	1,843	4	5	1,862	14	1,885	368	88	27,241	2,562	30,259
2003	1	4	290	-	295	38	49	1,174	-	1,261	6	5	1,389	-	1,400	385	110	27,006	771	28,272
2004	1	-	207	-	208	19	13	1,400	17	1,449	4	4	1,385	-	1,393	251	44	23,735	716	24,746
2005	1	-	229	-	230	32	11	805	15	863	5	3	901	-	909	381	41	15,790	4,872	21,084
2006	1	-	231	-	232	30	13	1,007	35	1,085	23	4	490	1	518	403	62	16,364	4,431	21,260
2007	1	-	239	-	240	41	8	1,032	64	1,145	13	4	1,171	15	1,203	289	37	16,177	5,599	22,102
2008	1	-	266	-	267	28	7	524	72	631	16	5	1,587	8	1,616	285	31	17,721	4,310	22,347
2009	1	-	446	-	447	17	6	327	8	358	11	1	1,799	12	1,823	291	32	21,640	4,063	26,026
2010	1	-	519	-	520	27	20	655	3	705	8	2	2,604	-	2,614	299	45	27,383	4,618	32,345
2011	-	-	462	-	462	18	5	658	28	709	15	1	2,377	3	2,396	273	20	28,749	5,292	34,334
2012	1	-	551	-	552	14	2	685	15	716	10	1	2,178	-	2,189	307	22	33,871	7,360	41,560
2013	1	-	913	-	914	16	2	614	9	641	15	3	2,743	1	2,762	326	25	33,391	5,757	39,499
2014	-	-	721	-	721	16	1	481	8	506	8	2	220	3	233	329	20	28,902	6,532	35,783
2015	1	-	498	-	499	18	8	1,403	22	1,451	19	1	654	4	678	492	35	34,252	6,841	41,620
2016	1	-	416	-	417	49	9	458	19	535	112	9	633	1	755	494	27	31,295	7,712	39,528
2017	-	-	245	-	245	22	2	526	15	565	164	12	259	16	451	387	21	29,345	8,302	38,055
2018	-	-	234	-	234	13	2	466	17	498	123	6	204	12	345	338	10	31,686	7,248	39,282
2019	-	-	751	-	751	17	1	857	5	880	121	5	416	51	593	403	11	28,292	9,501	38,207
2020	1	-	647	-	648	18	1	493	3	515	77	3	564	32	676	284	5	29,520	6,006	35,815
2021	0	0	138	-	138	10	1	603	-	614	70	6	78	23	177	249	8	23,075	5,071	28,403
2022	1	0	211	-	212	8	2	546	-	556	61	4	103	2	170	296	11	24,026	5,043	29,376
2023	1	0	128	-	129	9	1	458	-	468	63	3	55	16	137	329	8	25,566	7,372	33,275
2024	0	0	89	-	89	18	1	465	-	484	62	3	25	10	100	360	11	25,801	10,498	36,670
2025	0	0	*	-	0	19	4	*	-	23	59	3	*	*	62	402	18	*	*	420

§ Class-6 (carrying capacity >363 t) purse-seine vessels only-Buques cerqueros de Clase 6 (capacidad de acarreo >363 t) solamente

TABLE A-3a. Retained catches (t) of yellowfin tuna by purse-seine vessels in the EPO, by vessel flag. 'C' indicates that the catch has been combined with the total in the 'OTR' column. The data have been adjusted to the species composition estimate and are preliminary.
TABLA A-3a. Capturas retenidas (t) de atún aleta amarilla por buques de cerco en el OPO, por bandera del buque. 'C' indica que la captura se ha combinado con el total en la columna 'OTR'. Los datos están ajustados a la estimación de composición por especie, y son preliminares.

	COL	CRI	ECU	EU (ESP)	MEX	NIC	PAN	PER	SLV	USA	VEN	VUT	C + OTR[1]	Total
1996	9,855	C	17,125	C	119,878	-	3,084	-	-	6,948	62,846	10,549	8,322	238,607
1997	9,402	-	18,697	C	120,761	-	4,807	-	-	5,826	57,881	20,701	6,803	244,878
1998	15,592	-	36,201	5,449	106,840	-	3,330	-	C	2,776	61,425	17,342	5,004	253,959
1999	13,267	-	53,683	8,322	114,545	C	5,782	-	C	3,400	55,443	16,476	11,002	281,920
2000	6,138	-	35,492	10,318	101,662	C	5,796	-	-	4,374	67,672	8,247	13,563	253,262
2001	12,950	-	55,347	18,448	130,087	C	9,552	-	C	5,670	108,974	10,729	32,180	383,937
2002	17,574	-	32,512	16,990	152,864	C	15,719	C	7,412	7,382	123,264	7,502	31,068	412,287
2003	9,770	-	34,271	12,281	172,807	-	16,591	C	C	3,601	96,914	9,334	27,710	383,279
2004	C	-	40,886	13,622	91,442	C	33,563	-	C	C	39,094	7,371	46,577	272,555
2005	C	-	40,596	11,947	110,898	4,838	33,393	-	6,470	C	28,684	C	31,276	268,102
2006	C	-	26,049	8,409	69,449	4,236	22,521	-	C	C	13,286	C	22,679	166,629
2007	C	-	19,749	2,631	65,091	3,917	26,024	-	C	C	20,097	C	32,507	170,016
2008	C	-	18,463	3,023	84,462	4,374	26,993	C	C	C	17,692	C	30,050	185,057
2009	C	-	18,167	7,864	99,785	6,686	35,228	C	C	C	25,298	C	43,729	236,757
2010	20,493	-	34,764	2,820	104,969	9,422	34,538	C	C	-	21,244	C	22,758	251,008
2011	18,643	-	32,946	1,072	99,812	7,781	18,607	-	C	C	18,712	C	9,278	206,851
2012	20,924	-	29,485	1,065	93,323	7,541	15,932	-	C	C	23,408	C	6,339	198,017
2013	16,476	-	27,655	511	114,706	8,261	18,301	C	C	-	24,896	C	7,381	218,187
2014	17,185	-	37,546	760	120,980	8,100	19,349	C	C	1,105	23,025	-	6,016	234,066
2015	17,270	-	50,153	C	106,171	6,876	26,558	783	C	3,212	30,428	-	4,276	245,727
2016	19,280	-	59,280	C	93,928	11,047	23,249	1,647	C	4,578	23,812	-	5,298	242,118
2017	15,106	-	55,705	C	80,870	9,347	19,921	3,349	C	6,500	16,809	-	3,373	210,980
2018	21,855	-	57,164	C	101,651	7,552	22,625	1,458	C	3,808	19,527	-	3,341	238,981
2019	17,177	-	46,102	C	105,426	7,114	17,826	1,782	C	6,515	22,558	-	3,814	228,313
2020	16,641	-	39,897	C	102,137	5,423	22,585	561	C	3,728	24,475	-	3,300	218,747
2021	14,613	-	50,420	C	107,945	7,429	30,095	C	C	4,595	33,293	-	5,025	253,415
2022	15,710	-	59,897	C	119,381	8,918	39,151	*	C	4,399	37,995	-	6,210	291,661
2023	21,147	-	53,588	C	143,062	10,083	35,118	C	C	4,811	24,089	-	6,082	297,980
2024	7,964	-	45,898	C	157,482	6,684	35,858	C	C	3,718	33,504	-	3,476	294,584
2025	16,120	-	93,388	C	197,690	C	57,241	*	C	6,720	57,159	-	16,042	444,360

[1] Includes—Incluye: BLZ, BOL, CHN, EU(CYP), GTM, HND, LBR, UNK

TABLE A-3b. Total annual catches (t) of yellowfin tuna by longline vessels, and totals for all gears, in the EPO, by vessel flag. 'C' indicates that the catch has been combined with the total in the 'OTR' column. The data for 2021-2025 are preliminary.
TABLA A-3b. Capturas totales anuales (t) de atún aleta amarilla por buques de palangre en el OPO, y totales de todas las artes, por bandera del buque. 'C' indica que la captura se ha combinado con el total en la columna 'OTR'. Los datos de 2021-2025 son preliminares.

	CHN	CRI	FRA (PYF)	JPN	KOR	MEX	PAN	TWN	USA	VUT	C + OTR[1]	Total LL	Total PS+LL	OTR[2]
1996	-	183	253	12,631	3,491	0	-	37	13	-	*	16,608	255,215	5,401
1997	-	715	307	16,218	4,753	-	-	131	11	-	28	22,163	267,041	5,018
1998	-	1,124	388	10,048	3,624	16	-	113	15	-	8	15,336	269,295	6,614
1999	-	1,031	206	7,186	3,030	10	-	186	7	-	26	11,682	293,602	4,489
2000	-	1,084	1,052	15,265	5,134	153	359	742	10	5	51	23,855	277,118	3,540
2001	942	1,133	846	14,808	5,230	29	732	3,928	29	13	1,918	29,608	413,544	4,436
2002	1,457	1,563	278	8,513	3,626	4	907	7,360	5	290	1,528	25,531	437,817	1,501
2003	2,739	1,418	462	9,125	4,911	365	C	3,477	5	699	1,973	25,174	408,453	1,615
2004	798	1,701	767	7,338	2,997	32	2,802	1,824	6	171	343	18,779	291,336	2,511
2005	682	1,791	530	3,966	532	0	1,782	2,422	7	51	183	11,946	280,047	3,674
2006	246	1,402	537	2,968	928	0	2,164	1,671	21	164	109	10,210	176,841	2,144
2007	224	1,204	408	4,582	353	8	-	745	11	154	378	8,067	178,083	2,333
2008	469	1,248	335	5,383	83	5	-	247	33	175	1,842	9,820	194,877	1,755
2009	629	1,003	590	4,268	780	10	-	636	84	244	2,200	10,444	247,201	1,950
2010	459	3	301	3,639	737	6	-	872	54	269	1,999	8,339	259,348	1,492
2011	1,807	-	349	2,373	754	6	-	647	55	150	1,907	8,048	214,899	1,406
2012	2,591	1,482	538	3,600	631	7	519	749	39	155	2,643	12,954	210,971	1,888
2013	1,874	1,424	410	3,117	928	8	325	572	43	101	1,981	10,783	228,970	1,993
2014	2,120	1,072	567	2,633	704	4	249	896	61	323	20	8,649	242,715	3,552
2015	2,642	1,415	929	2,177	957	20	419	1,287	107	530	139	10,622	256,349	3,582
2016	2,398	1,010	825	1,839	1,124	29	688	1,222	247	166	253	9,801	251,919	3,142
2017	2,907	837	1,252	1,463	1,176	10	612	1,263	532	406	190	10,647	221,627	2,761
2018	5,386	1,190	1,101	1,412	1,189	*	231	1,212	423	293	139	12,576	251,557	1,517
2019	3,372	1,490	1,015	1,652	1,725	*	314	1,556	253	344	199	11,921	240,234	1,436
2020	3,392	1,719	853	1,463	2,110	*	94	1,185	338	242	278	11,674	230,421	1,124
2021	2,299	*	1,933	1,118	1,641	*	1,037	895	200	215	139	9,477	262,892	704
2022	1,388	*	1,096	874	1,597	*	44	1,188	273	80	175	6,715	298,376	154
2023	1,474	*	C	617	2,348	*	81	1,156	257	143	1,090	7,166	305,146	583
2024	2,494	*	C	1,075	4,854	*	348	1,861	261	456	1,384	12,733	307,317	151
2025	*	*	*	*	*	*	*	*	*	*	*	*	444,360	*

[1] Includes—Incluye: BLZ, CHL, ECU, EU(ESP), EU(PRT), GTM, HND, NIC, SLV
[2] Includes gillnets, handline, harpoon, pole-and-line, recreational, trawler, troll and unknown gears—Incluye red agallera, línea de mano, arpon, caña, artes deportivas, red de arrastre, curricán y desconocidas

TABLE A-3c. Total annual catches (t) of skipjack tuna by purse-seine and longline vessels in the EPO, by vessel flag, adjusted to the species composition estimate. 'C' indicates that the catch has been combined with the total in the 'OTR' column. The 2021-2025 data are preliminary.

TABLA A-3c. Capturas totales anuales (t) de atún barrilete por buques de cerco y de palangre en el OPO, por bandera del buque, ajustadas a la estimación de composición por especie. 'C' indica que la captura se ha combinado con el total en la columna 'OTR'. Los datos de 2021-2025 son preliminares.

	PS														LL+ OTR[2]
	COL	CRI	ECU	EU(ESP)	MEX	NIC	PAN	PER	SLV	USA	VEN	VUT	C+OTR[1]	Total	
1996	13,230	C	32,433	C	14,501	-	3,619	-	-	12,012	4,104	10,873	13,201	103,973	3,868
1997	12,332	-	51,826	C	23,416	-	4,277	-	-	13,687	8,617	14,246	25,055	153,456	3,491
1998	4,698	-	67,074	20,012	15,969	-	1,136	-	C	6,898	6,795	11,284	6,765	140,631	2,215
1999	11,210	-	124,393	34,923	16,767	C	5,286	-	C	13,491	16,344	21,287	17,864	261,565	3,638
2000	10,138	-	104,849	17,041	14,080	C	9,573	-	-	7,224	6,720	13,620	22,399	205,644	365
2001	9,445	-	66,144	13,454	8,169	C	6,967	-	C	4,135	3,215	7,824	23,813	143,166	1,696
2002	10,908	-	80,378	10,546	6,612	C	9,757	C	4,601	4,582	2,222	4,657	19,283	153,546	996
2003	14,771	-	139,804	18,567	8,147	-	25,084	C	C	5,445	6,143	14,112	41,895	273,968	4,049
2004	C	-	89,621	8,138	24,429	C	20,051	-	C	C	23,356	4,404	27,825	197,824	2,347
2005	C	-	140,927	9,224	32,271	3,735	25,782	-	4,995	C	22,146	C	24,149	263,229	3,309
2006	C	-	138,490	16,668	16,790	8,396	44,639	-	C	C	26,334	C	44,952	296,269	1,645
2007	C	-	93,553	2,879	21,542	4,286	28,475	-	C	C	21,990	C	35,571	208,296	1,579
2008	C	-	143,431	4,841	21,638	7,005	43,230	C	C	C	28,333	C	48,125	296,603	2,847
2009	C	-	132,712	6,021	6,847	5,119	26,973	C	C	C	19,370	C	33,481	230,523	2,821
2010	11,400	-	82,280	1,569	3,010	5,242	19,213	C	C	-	11,818	C	12,660	147,192	3,132
2011	23,269	-	149,637	5,238	11,899	3,889	29,837	-	C	C	27,026	C	25,240	276,035	2,259
2012	15,760	-	151,280	15,773	18,058	3,931	25,786	-	C	C	20,829	C	14,798	266,215	3,793
2013	22,168	-	172,002	2,900	17,350	4,345	31,022	C	C	-	17,522	C	11,251	278,560	3,229
2014	22,732	-	172,239	5,581	8,783	6,300	21,776	C	C	521	13,767	-	9,770	261,469	1,425
2015	16,431	-	208,765	C	23,515	1,261	31,427	5,225	C	16,826	4,792	-	20,665	328,907	1,443
2016	20,665	-	190,577	C	13,286	1,971	32,844	6,449	C	40,036	9,067	-	22,666	337,561	3,516
2017	19,284	-	190,139	C	21,238	6,959	37,419	6,257	C	24,989	7,288	-	11,186	324,759	1,105
2018	15,365	-	177,456	C	17,014	7,759	36,504	4,119	C	11,869	6,679	-	12,056	288,821	1,667
2019	23,395	-	211,827	C	19,656	8,089	33,662	8,944	C	19,706	5,719	-	16,407	347,405	735
2020	15,569	-	189,750	C	7,322	9,049	39,058	2,618	C	14,119	4,578	-	13,898	295,961	834
2021	26,107	-	193,168	C	7,944	7,574	44,375	C	C	24,116	7,306	-	15,934	326,524	268
2022	20,493	-	170,116	C	11,601	7,760	47,962	*	C	17,593	6,412	-	14,854	296,791	287
2023	21,830	-	231,535	C	12,034	8,934	53,570	C	C	29,843	2,767	-	28,371	388,884	347
2024	32,810	-	354,008	C	23,294	14,867	105,722	C	C	51,404	4,117	-	54,998	641,220	833
2025	19,081	-	272,197	C	6,705	10,481	72,627	*	C	41,529	5,369	-	42,076	470,065	*

[1] Includes—Incluye: BLZ, BOL, CHN, EU(CYP), GTM, HND, LBR, UNK

[2] Includes gillnets, handline, harpoon, pole-and-line, recreational, trawler, troll and unknown gears—Incluye red agallera, línea de mano, arpon, caña, artes deportivas, red de arrastre, curricán y desconocidas

TABLE A-3d. Retained catches (t) of bigeye tuna by purse-seine vessels in the EPO, by vessel flag. 'C' indicates that the catch has been combined with the total in the 'OTR' column. The data have been adjusted to the species composition estimate and are preliminary for 2024 and 2025.
TABLA A-3d. Capturas retenidas (t) de atún patudo por buques de cerco en el OPO, por bandera del buque. 'C' indica que la captura se ha combinado con el total en la columna 'OTR'. Los datos están ajustados a la estimación de composición por especie, y los de 2024 y 2025 son preliminares.

	COL	CRI	ECU	EU(ESP)	MEX	NIC	PAN	PER	SLV	USA	VEN	VUT	C + OTR[1]	Total
1996	7,692	C	20,279	C	82	-	1,445	*	-	8,380	619	12,374	10,440	61,311
1997	3,506	-	30,092	C	38	-	1,811	*	-	8,312	348	6,818	13,347	64,272
1998	596	-	25,113	5,747	12	-	12	*	C	5,309	348	4,746	2,246	44,129
1999	1,511	-	24,355	11,703	33	C	1,220	*	C	2,997	10	5,318	4,011	51,158
2000	7,443	-	36,094	12,511	0	C	7,028	*	-	5,304	457	10,000	16,446	95,283
2001	5,230	-	24,424	7,450	0	C	3,858	*	C	2,290	0	4,333	12,933	60,518
2002	5,283	-	26,262	5,108	0	C	4,726	C	2,228	2,219	0	2,256	9,340	57,422
2003	3,664	-	22,896	4,605	0	-	6,222	C	C	1,350	424	3,500	10,390	53,051
2004	C	-	30,817	3,366	0	C	8,294	*	C	C	9,661	1,822	11,511	65,471
2005	C	-	30,507	3,831	0	1,551	10,707	*	2,074	C	9,197	C	10,028	67,895
2006	C	-	39,302	5,264	6	2,652	14,099	*	C	C	8,317	C	14,197	83,837
2007	C	-	40,445	711	0	1,058	7,029	*	C	C	5,428	C	8,780	63,451
2008	C	-	41,177	1,234	327	1,785	11,018	C	C	C	7,221	C	12,266	75,028
2009	C	-	35,646	2,636	1,334	2,241	11,807	C	C	C	8,479	C	14,657	76,800
2010	4,206	-	34,902	579	11	1,934	7,089	C	C	-	4,360	C	4,672	57,753
2011	3,210	-	31,282	4,111	133	2,256	7,953	*	C	C	301	C	7,266	56,512
2012	1,873	-	45,633	3,866	225	1,250	7,238	*	C	C	848	C	5,087	66,020
2013	1,405	-	32,444	1,672	124	2,749	6,118	-	C	-	963	C	4,012	49,487
2014	2,479	-	39,094	2,812	40	3,068	8,168	-	C	129	1,183	-	3,472	60,445
2015	2,470	-	44,063	C	156	774	10,113	-	C	2,384	100	-	2,853	62,913
2016	2,743	-	33,139	C	255	667	8,440	312	C	2,801	345	-	8,029	56,731
2017	3,656	-	38,299	C	358	1,610	10,544	0	C	6,210	1,256	-	5,040	66,973
2018	1,449	-	40,427	C	766	1,519	11,753	104	C	3,354	1,157	-	3,994	64,523
2019	4,171	-	38,757	C	962	2,630	10,868	-	C	3,304	996	-	7,536	69,223
2020	4,548	-	47,957	C	726	1,885	10,519	65	C	4,066	688	-	8,330	78,784
2021	3,742	-	31,084	C	1,107	1,700	6,473	-	C	5,078	275	-	8,711	58,170
2022	2,137	-	24,252	C	580	2,056	7,374	-	C	3,866	838	-	5,871	46,974
2023	1,712	-	23,209	C	331	1,666	5,592	C	C	2,923	20	-	6,913	42,366
2024	1,758	-	18,750	C	806	725	3,007	C	C	3,222	123	-	5,692	34,083
2025	560	-	23,847	C	*	C	7,333	*	C	5,239	126	-	8,192	45,297

[1] Includes—Incluye: BLZ, BOL, CHN, EU(CYP), GTM, HND, LBR, UNK

TABLE A-3e. Total annual catches (t) of bigeye tuna by longline vessels, and totals for all gears, in the EPO, by vessel flag. 'C' indicates that the catch has been combined with the total in the 'OTR' column. The data for 2021-2025 are preliminary.
TABLA A-3e. Capturas totales anuales (t) de atún patudo por buques de palangre en el OPO, y totales de todas las artes, por bandera del buque. 'C' indica que la captura se ha combinado con el total en la columna 'OTR'. Los datos de 2021-2025 son preliminares.

	CHN	CRI	FRA (PYF)	JPN	KOR	MEX	PAN	TWN	USA	VUT	C + OTR[1]	Total LL	Total PS + LL	OTR[2]
1996	-	1	113	36,685	9,983	-	-	95	81	-	*	46,958	108,269	748
1997	-	9	250	40,571	11,376	-	-	256	118	-	*	52,580	116,852	20
1998	-	28	359	35,752	9,731	-	-	314	191	-	*	46,375	90,504	628
1999	-	25	3,652	22,224	9,431	-	-	890	228	-	*	36,450	87,608	538
2000	-	27	653	28,746	13,280	42	14	1,916	162	2,754	11	47,605	142,887	253
2001	2,639	28	684	38,048	12,576	1	80	9,285	147	3,277	1,990	68,755	129,273	19
2002	7,614	19	388	34,193	10,358	-	6	17,253	132	2,995	1,466	74,424	131,845	12
2003	10,066	18	346	24,888	10,272	-	C	12,016	232	1,258	680	59,776	112,828	21
2004	2,645	21	405	21,236	10,729	-	48	7,384	149	407	459	43,483	108,954	194
2005	2,104	23	398	19,113	11,580	-	30	6,441	536	318	151	40,694	108,589	25
2006	709	18	388	16,235	6,732	-	37	6,412	85	960	195	31,771	115,608	40
2007	2,324	15	361	13,977	5,611	-	-	6,057	417	1,013	101	29,876	93,326	44
2008	2,379	16	367	14,908	4,150	-	-	1,852	1,277	790	468	26,207	101,236	28
2009	2,481	13	484	15,490	6,758	-	-	3,396	730	1,032	1,038	31,422	108,221	15
2010	2,490	4	314	15,847	9,244	-	-	5,276	1,356	1,496	1,063	37,090	94,842	2
2011	5,450	-	445	13,399	6,617	-	-	3,957	1,050	694	706	32,318	88,829	-
2012	4,386	3	464	16,323	7,450	-	-	4,999	875	1,063	604	36,167	102,187	27
2013	5,199	-	527	14,258	8,822	-	-	4,162	2,054	604	544	36,170	85,657	99
2014	5,253	9	526	13,634	8,203	-	114	4,511	2,073	913	120	35,356	95,801	170
2015	8,401	8	692	13,079	8,635	-	364	5,181	2,948	2,073	328	41,709	104,622	21
2016	7,052	3	477	10,467	7,692	-	313	6,006	2,090	877	679	35,656	92,387	24
2017	7,093	16	700	8,055	8,749	-	357	6,186	2,700	1,463	331	35,650	102,623	36
2018	6,060	14	897	6,125	6,675	-	415	5,125	2,408	1,841	227	29,787	94,310	24
2019	5,372	23	800	5,656	6,137	-	325	5,868	1,720	1,571	315	27,787	97,010	18
2020	4,048	35	745	5,429	7,633	-	164	5,414	1,405	1,077	299	26,249	105,033	44
2021	3,481	-	906	4,447	7,029	-	41	3,526	1,389	947	163	21,929	80,099	9
2022	2,923	-	1,127	3,654	6,629	-	91	5,140	1,049	256	248	21,117	68,091	124
2023	2,382	-	C	2,663	11,428	-	57	5,049	1,273	700	1,056	24,608	66,974	174
2024	2,632	-	C	2,086	9,547	-	258	3,528	468	1,289	1,277	21,085	55,168	9
2025	2,780	-	*	3,037	7,628	-	*	4,160	*	726	*	18,331	63,628	*

[1] Includes—Incluye: BLZ, CHL, ECU, EU(ESP), EU(PRT), HND, SLV
[2] Includes gillnets, handline, harpoon, pole-and-line, recreational, trawler, troll and unknown gears—Incluye red agallera, línea de mano, arpon, caña, artes deportivas, red de arrastre, curricán y desconocidas

TABLE A-4a. Preliminary estimates of the retained catches, in metric tons, of tunas and bonitos caught by purse-seine vessels in the EPO in 2024 and 2025, by species and vessel flag. The data for yellowfin, skipjack, and bigeye tunas have been adjusted to the species composition estimates and are preliminary.
TABLA A-4a. Estimaciones preliminares de las capturas retenidas, en toneladas métricas, de atunes y bonitos por buques cerqueros en el OPO en 2024 y 2025, por especie y bandera del buque. Los datos de los atunes aleta amarilla, barrilete, y patudo fueron ajustados a las estimaciones de composición por especie, y son preliminares.

	YFT	SKJ	BET	PBF	ALB	BKJ	BZX	TUN	Total	%
2024	**Retained catches–Capturas retenidas**									
COL	7,964	32,810	1,758	-	-	69	-	15	42,616	4.3
ECU	45,898	354,008	18,750	-	-	2,919	5	2,425	424,005	43.1
MEX	157,482	23,294	806	3,516	-	3,679	-	22	188,799	19.2
NIC	6,684	14,867	725	-	-	99	-	74	22,449	2.3
PAN	35,859	105,722	3,007	-	-	442	-	462	145,492	14.8
USA	3,718	51,404	3,222	-	1	55	-	22	58,422	5.9
VEN	33,504	4,116	123	-	-	18	-	2	37,763	3.8
OTR[1]	3,475	54,999	5,692	-	-	11	-	127	64,304	6.6
Total	294,584	641,220	34,083	3,516	1	7,292	5	3,149	983,850	
2025	**Retained catches–Capturas retenidas**									
COL	16,120	19,082	560	-	-	28	-	61	35,851	3.7
ECU	93,388	272,197	23,847	-	-	1,823	9	1,531	392,795	40.4
MEX	197,690	6,705		6,162	-	2,470	65	-	213,092	21.9
PAN	57,242	72,627	7,333	-	-	71	-	106	137,379	14.1
USA	6,720	41,529	5,239	-	-	14	-	26	53,528	5.5
VEN	57,159	5,369	126	-	-	7	-	2	62,663	6.5
OTR[2]	16,041	52,556	8,192	-	-	37	-	9	76,835	7.9
Total	444,360	470,065	45,297	6,162	-	4,450	74	1,735	972,143	

[1] Includes El Salvador, European Union (Spain) and Peru - This category is used to avoid revealing the operations of individual vessels or companies.
[1] Incluye El Salvador, Perú y Unión Europea (España) - Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.
[2] Includes El Salvador, European Union (Spain), Guatemala, and Nicaragua - This category is used to avoid revealing the operations of individual vessels or companies.
[2] Incluye El Salvador, Guatemala, Nicaragua y Unión Europea (España) - Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

TABLE A-4b. Preliminary estimates of the landings, in metric tons, of tunas and bonitos caught by purse-seine vessels in the EPO in 2024 and 2025, by year, species and country of landing. The data for yellowfin, skipjack, and bigeye tunas have not been adjusted to the species composition estimates and are preliminary. Landings in a given year may include retained catches from the previous year.

TABLA A-4b. Estimaciones preliminares de las descargas, en toneladas métricas, de atunes y bonitos por buques cerqueros en el OPO en 2024 y 2025, por año, especie y país de descarga. Los datos de los atunes aleta amarilla, barrilete, y patudo no fueron ajustados a las estimaciones de composición por especie, y son preliminares. Las descargas de un año determinado pueden incluir capturas retenidas del año anterior.

	YFT	SKJ	BET	PBF	ALB	BKJ	BZX	TUN	Total	%
2024	**Landings-Descargas**									
COL	12,416	32,603	1,741	-	-	16	-	5	46,781	4.8
ECU	103,326	489,809	21,064	-	-	3,418	7	3,060	620,684	63.0
MEX	156,822	21,848	700	3,516	-	3,678	-	18	186,582	18.9
PER	2,031	23,531	797	-	-	19	-	20	26,398	2.7
USA	1,063	27,039	1,358	-	1	-	-	-	29,461	3.0
OTR[1]	33,476	38,136	2,775	-	-	57	-	87	74,531	7.6
Total	309,134	632,966	28,435	3,516	1	7,188	7	3,190	984,437	
2025	**Landings-Descargas**									
COL	17,009	20,229	1,456	-	-	-	-	-	38,694	4.0
ECU	210,811	358,528	32,385	-	-	2,031	10	1,705	605,470	62.2
MEX	194,658	6,891	352	6,162	-	2,470	65	2	210,600	21.6
PER	6,076	23,560	2,401	-	-	20	-	10	32,067	3.3
USA	1,457	9,539	1,370	-	-	-	-	-	12,366	1.3
OTR[2]	35,530	34,449	3,768	-	-	32	-	30	73,809	7.6
Total	465,541	453,196	41,732	6,162	-	4,553	75	1,747	973,006	

[1] Includes China, Costa Rica, El Salvador, Guatemala, High Seas and Kiribati - This category is used to avoid revealing the operations of individual vessels or companies.

[1] Incluye China, Costa Rica, El Salvador, Guatemala, High Seas y Kiribati - Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

[2] Includes Costa Rica, El Salvador, European Union (Spain), France (French Polynesia), Guatemala and Kiribati - This category is used to avoid revealing the operations of individual vessels or companies.

[2] Incluye Costa Rica, El Salvador, Francia (Polinesias Francesas), Guatemala, Kiribati y Unión Europea (España) - Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

TABLE A-5a. Annual retained catches of Pacific bluefin tuna, by gear type and flag, in metric tons, 1996-2024. The data for 2021 - 2024 are preliminary; 2025 data are not available.
TABLA A-5a. Capturas retenidas anuales de atún aleta azul del Pacífico, por arte de pesca y bandera, en toneladas, 1996-2024. Los datos de 2021 - 2024 son preliminares; no se dispone de datos de 2025.

PBF	Western Pacific flags—Banderas del Pacífico occidental[1]										EPO flags—Banderas del OPO					Total
	JPN				KOR		TWN			Sub-	MEX		USA		Sub-	
	PS	LP	LL	OTR	PS	OTR	PS	LL	OTR	total	PS	OTR	PS	OTR	total	
1996	7,644	94	901	5,359	102	-	-	956	-	15,056	3,700	-	4,639	110	8,449	23,505
1997	13,152	34	1,300	4,354	1,054	-	-	1,814	-	21,708	367	-	2,240	264	2,871	24,579
1998	5,391	85	1,255	4,450	188	-	-	1,910	-	13,279	1	0	1,771	703	2,475	15,754
1999	16,173	35	1,157	5,246	256	-	-	3,089	-	25,956	2,369	35	184	592	3,180	29,136
2000	16,486	102	953	7,031	2,401	-	-	2,780	2	29,755	3,019	99	693	380	4,191	33,946
2001	7,620	180	791	5,614	1,176	10	-	1,839	4	17,234	863	-	292	392	1,547	18,781
2002	8,903	99	841	4,338	932	1	-	1,523	4	16,641	1,708	2	50	625	2,385	19,026
2003	5,768	44	1,237	3,345	2,601	-	-	1,863	21	14,879	3,211	43	22	373	3,649	18,528
2004	8,257	132	1,847	3,855	773	-	-	1,714	3	16,581	8,880	14	-	61	8,955	25,536
2005	12,817	549	1,925	6,363	1,318	9	-	1,368	2	24,351	4,542	-	201	80	4,823	29,174
2006	8,880	108	1,121	4,058	1,012	3	-	1,149	1	16,332	9,806	-	-	96	9,902	26,234
2007	6,840	236	1,762	4,983	1,281	4	-	1,401	10	16,517	4,147	-	42	14	4,203	20,720
2008	10,221	64	1,390	5,505	1,866	10	-	979	2	20,037	4,407	15	-	64	4,486	24,523
2009	8,077	50	1,080	4,814	936	4	-	877	11	15,849	3,019	-	410	162	3,591	19,440
2010	3,742	83	890	3,681	1,196	16	-	373	36	10,017	7,746	-	-	89	7,835	17,852
2011	8,340	63	837	3,754	670	14	-	292	24	13,994	2,731	1	-	343	3,075	17,069
2012	2,462	113	673	2,846	1,421	2	-	210	4	7,731	6,668	1	-	442	7,111	14,842
2013	2,771	8	784	2,848	604	1	-	331	3	7,350	3,154	-	-	820	3,974	11,324
2014	5,456	5	683	3,429	1,305	6	-	483	42	11,409	4,862	-	401	427	5,690	17,099
2015	3,645	8	648	2,086	676	1	-	552	26	7,642	3,082	-	86	411	3,579	11,221
2016	5,095	54	691	2,514	1,024	5	-	454	0	9,837	2,709	-	316	413	3,438	13,275
2017	4,540	49	913	3,491	734	9	-	415	0	10,151	3,643	-	466	483	4,592	14,743
2018	4,049	9	700	1,447	523	12	-	381	3	7,124	2,840	-	12	589	3,441	10,565
2019	4,464	0	1,002	2,043	542	39	-	486	6	8,582	2,249	-	226	533	3,008	11,590
2020	3,960	1	1,416	2,632	567	38	-	1,149	1	9,764	3,285	-	116	860	4,261	14,025
2021	4,199	0	1,512	2,916	422	87	-	1,478	-	10,614	3,027	-	43	1,469	4,539	15,153
2022	4,702	13	1,599	3,768	654	227	-	1,490	1	12,454	3,194	22	198	1,784	5,198	17,652
2023	4,570	24	1,557	3,662	448	220	-	2,116	5	12,602	3,399	19	3	2,202	5,623	18,225
2024	4,614	6	1,550	3,556	440	329	-	2,259	5	12,759	3,531	31	-	1,523	5,085	17,844

[1] Source: International Scientific Committee, 25th Plenary Meeting, PBFWG workshop report on Pacific Bluefin Tuna, June 2025—Fuente: Comité Científico Internacional, 25ª Reunión Plenaria, Taller PBFWG sobre Atún Aleta Azul del Pacífico, junio de 2025

TABLE A-5b. Reported catches of Pacific bluefin tuna in the EPO by recreational gear, in number of fish, 1996-2025.
TABLA A-5b. Capturas reportadas de atún aleta azul del Pacifico en el OPO por artes deportivas, en número de peces, 1996-2025.

1996	2,739	**2011**	31,494
1997	8,338	**2012**	40,012
1998	20,466	**2013**	63,158
1999	36,797	**2014**	27,889
2000	20,669	**2015**	28,661
2001	21,913	**2016**	12,312
2002	33,399	**2017**	16,493
2003	22,291	**2018**	14,072
2004	3,391	**2019**	18,702
2005	5,757	**2020**	37,494
2006	7,473	**2021**	58,881
2007	1,028	**2022**	60,904
2008	10,187	**2023**	86,225
2009	12,138	**2024**	54,252
2010	8,453	**2025**	55,267

TABLE A-6. Annual retained catches of albacore in the EPO, by gear and area (north and south of the equator), in metric tons, 1996-2024. The data for 2021 - 2024 are preliminary; 2025 data are not available.
TABLA A-6. Capturas retenidas anuales de atún albacora en el OPO, por arte y zona (al norte y al sur de la línea ecuatorial), en toneladas, 1996-2024. Los datos de 2021 - 2024 son preliminares; no se dispone de datos de 2025.

ALB	North—Norte				South—Sur				Total
	LL	LTL[1]	OTR	Subtotal	LL	LTL	OTR	Subtotal	
1996	1,675	8,267	99	10,041	5,956	94	21	6,071	16,112
1997	1,365	6,115	1,019	8,499	8,313	466	0	8,779	17,278
1998	1,730	12,019	1,250	14,999	10,905	12	0	10,917	25,916
1999	2,701	11,028	3,668	17,397	8,932	81	7	9,020	26,417
2000	1,880	10,960	1,869	14,709	7,783	778	3	8,564	23,273
2001	1,822	11,727	1,638	15,187	17,588	516	6	18,110	33,297
2002	1,227	12,286	2,388	15,901	14,062	131	40	14,233	30,134
2003	1,129	17,808	2,260	21,197	23,772	419	3	24,194	45,391
2004	854	20,288	1,623	22,765	17,590	331	0	17,921	40,686
2005	405	13,807	1,741	15,953	8,945	181	7	9,133	25,086
2006	3,671	18,515	408	22,594	10,161	48	119	10,328	32,922
2007	2,708	17,948	1,415	22,071	8,399	19	87	8,505	30,576
2008	1,160	17,137	308	18,605	8,058	0	159	8,217	26,822
2009	91	17,933	996	19,020	11,981	0	213	12,194	31,214
2010	1,134	18,246	892	20,272	13,122	3	247	13,372	33,644
2011	1,833	15,437	426	17,696	14,357	0	222	14,579	32,275
2012	4,583	16,633	1,222	22,438	19,613	35	210	19,858	42,296
2013	6,193	17,398	844	24,435	19,204	0	271	19,475	43,910
2014	3,546	18,178	1,042	22,766	25,685	0	243	25,928	48,694
2015	2,067	15,986	935	18,988	26,872	0	221	27,093	46,081
2016	1,627	13,600	679	15,906	25,150	0	290	25,440	41,346
2017	2,580	8,851	402	11,833	24,012	3	186	24,201	36,034
2018	1,106	10,433	539	12,078	24,653	0	174	24,827	36,905
2019	1,425	10,146	1,517	13,088	19,389	1	212	19,602	32,690
2020	2,655	9,905	326	12,886	17,328	0	127	17,455	30,341
2021	1,230	7,082	312	8,624	30,209	2	19	30,230	38,854
2022	1,517	12,718	590	14,825	30,285	14	88	30,387	45,212
2023	1,075	4,802	577	6,454	28,719	3	15	28,737	35,191
2024	1,034	7,585	869	9,488	34,480	12	17	34,509	43,997

[1] Includes pole-and-line—Incluye caña

TABLE A-7. Estimated numbers of sets, by set type and vessel capacity category, and estimated retained catches, in metric tons, of yellowfin, skipjack, and bigeye tuna by purse-seine vessels in the EPO. The data for 2024 and 2025 are preliminary. The data for yellowfin, skipjack, and bigeye tunas have been adjusted to the species composition estimate and are preliminary.

TABLA A-7. Números estimados de lances, por tipo de lance y categoría de capacidad de buque, y capturas retenidas estimadas, en toneladas métricas, de atunes aleta amarilla, barrilete, y patudo por buques cerqueros en el OPO. Los datos de 2024 y 2025 son preliminares. Los datos de los atunes aleta amarilla, barrilete, y patudo fueron ajustados a la estimación de composición por especie, y son preliminares.

	Number of sets—Número de lances			Retained catch—Captura retenida		
	Vessel capacity—Capacidad del buque		Total	YFT	SKJ	BET
	≤363 t	>363 t				
DEL	**Sets associated with dolphins Lances asociados a delfines**					
2010	0	11,646	11,646	170,028	1,365	0
2011	0	9,604	9,604	134,926	4,387	2
2012	0	9,220	9,220	133,825	2,122	0
2013	0	10,736	10,736	157,432	4,272	0
2014	0	11,382	11,382	167,780	4,413	3
2015	0	11,020	11,020	160,595	5,608	2
2016	0	11,219	11,219	146,526	3,179	4
2017	0	8,863	8,863	112,533	1,656	1
2018	0	9,774	9,774	147,859	2,456	1
2019	0	9,680	9,680	153,649	3,696	28
2020	0	9,773	9,773	150,263	1,705	63
2021	0	9,887	9,887	158,256	2,585	0
2022	0	10,614	10,614	177,458	2,874	0
2023	0	10,328	10,328	198,411	9,584	0
2024	0	10,554	10,554	195,668	12,052	0
2025	0	11,175	11,175	264,011	7,308	0
OBJ	**Sets associated with floating objects Lances asociados a objetos flotantes**					
2010	2,432	6,399	8,831	37,850	114,659	57,059
2011	2,538	6,921	9,459	42,176	171,193	55,587
2012	3,067	7,610	10,677	37,487	177,055	65,035
2013	3,081	8,038	11,119	35,112	194,372	48,337
2014	3,860	8,777	12,637	46,049	199,696	59,797
2015	3,457	9,385	12,842	43,603	206,515	60,975
2016	4,214	10,377	14,591	58,673	248,190	55,269
2017	4,544	11,148	15,692	67,167	224,422	65,443
2018	4,954	11,871	16,825	66,122	213,626	63,815
2019	4,885	10,591	15,476	52,862	226,375	68,553
2020	3,363	8,788	12,151	44,461	191,399	78,208
2021	4,002	11,167	15,169	66,542	227,028	57,391
2022	4,520	13,394	17,914	90,837	241,855	46,737
2023	4,634	12,630	17,264	74,129	319,153	42,167
2024	3,478	11,697	15,175	62,544	459,338	33,833
2025	3,982	12,425	16,407	104,019	401,929	45,240

TABLE A-7. (continued)
TABLA A-7. (continuación)

	Number of sets—Número de lances			Retained catch—Captura retenida		
	Vessel capacity—Capacidad del buque		Total	YFT	SKJ	BET
	≤363 t	>363 t				
NOA	**Sets on unassociated schools Lances sobre cardúmenes no asociados**					
2010	2,744	3,885	6,629	43,131	31,168	693
2011	2,840	5,182	8,022	29,749	100,455	923
2012	2,996	5,369	8,365	26,705	87,038	985
2013	3,064	4,156	7,220	25,643	79,916	1,150
2014	2,428	3,369	5,797	20,237	57,360	645
2015	3,116	6,201	9,317	41,529	116,784	1,936
2016	2,300	5,101	7,401	36,919	86,192	1,458
2017	2,016	4,960	6,976	31,280	98,681	1,529
2018	1,925	4,163	6,088	25,000	72,739	707
2019	2,064	5,948	8,012	21,802	117,334	642
2020	1,883	4,575	6,458	24,023	102,857	513
2021	1,678	4,803	6,481	28,617	96,911	779
2022	1,301	3,459	4,760	23,366	52,062	237
2023	850	3,435	4,285	25,440	60,147	199
2024	1,057	6,538	7,595	36,372	169,830	250
2025	738	3,735	4,473	76,330	60,828	57
ALL	**Sets on all types of schools Lances sobre todos tipos de cardumen**					
2010	5,176	21,930	27,106	251,009	147,192	57,752
2011	5,378	21,707	27,085	206,851	276,035	56,512
2012	6,063	22,199	28,262	198,017	266,215	66,020
2013	6,145	22,930	29,075	218,187	278,560	49,487
2014	6,288	23,528	29,816	234,066	261,469	60,445
2015	6,573	26,606	33,179	245,727	328,907	62,913
2016	6,514	26,697	33,211	242,118	337,561	56,731
2017	6,560	24,971	31,531	210,980	324,759	66,973
2018	6,879	25,808	32,687	238,981	288,821	64,523
2019	6,949	26,219	33,168	228,313	347,405	69,223
2020	5,246	23,136	28,382	218,747	295,961	78,784
2021	5,680	25,857	31,537	253,415	326,524	58,170
2022	5,821	27,467	33,288	291,661	296,791	46,974
2023	5,484	26,393	31,877	297,980	388,884	42,366
2024	4,535	28,789	33,324	294,584	641,220	34,083
2025	4,720	27,335	32,055	444,360	470,065	45,297

TABLE A-8. Types of floating objects involved in sets by vessels of >363 t carrying capacity, 2010-2025. The 2024 and 2025 data are preliminary.
TABLA A-8. Tipos de objetos flotantes sobre los que realizaron lances buques de >363 t de capacidad de acarreo, 2010-2025. Los datos de 2024 and 2025 son preliminares.

OBJ	Flotsam Naturales		FADs Plantados		Unknown Desconocido		Total
	No.	%	No.	%	No.	%	
2010	337	5.3	6,038	94.3	24	0.4	6,399
2011	563	8.1	6,342	91.6	16	0.2	6,921
2012	286	3.8	7,321	96.2	3	< 0.1	7,610
2013	274	3.4	7,759	96.5	5	0.1	8,038
2014	283	3.2	8,490	96.7	4	< 0.1	8,777
2015	273	2.9	9,093	96.9	19	0.2	9,385
2016	278	2.7	10,070	97.0	29	0.3	10,377
2017	271	2.4	10,877	97.6	0	0	11,148
2018	322	2.7	11,549	97.3	0	0	11,871
2019	216	2.0	10,373	97.9	2	< 0.1	10,591
2020	166	1.9	8,622	98.1	0	0	8,788
2021	260	2.3	10,907	97.7	0	0	11,167
2022	413	3.1	12,980	96.9	1	< 0.1	13,394
2023	375	3.0	12,253	97.0	2	< 0.1	12,630
2024	297	2.5	11,399	97.5	1	< 0.1	11,697
2025	341	2.7	12,083	97.3	1	<0.1	12,425

TABLE A-9. Reported nominal longline fishing effort (E; 1000 hooks) and catch (C; metric tons) of yellowfin, skipjack, bigeye, Pacific bluefin, and albacore tunas only, by flag, in the EPO. 2025 data are not available.

TABLA A-9. Esfuerzo de pesca palangrero nominal reportado (E; 1000 anzuelos), y captura (C; toneladas métricas) de atunes aleta amarilla, barrilete, patudo, aleta azul del Pacífico, y albacora solamente, por bandera, en el OPO. No se dispone de datos de 2025.

LL	CHN		JPN		KOR		FRA(PYF)		TWN		USA		OTR[1]
	E	C	E	C	E	C	E	C	E	C	E	C	C
1996	-	-	103,654	52,298	40,290	14,121	2,087	931	5,830	3,553	510	182	185
1997	-	-	96,383	59,325	30,493	16,663	3,464	1,941	8,720	5,673	464	215	752
1998	-	-	106,568	50,167	51,817	15,089	4,724	2,858	10,586	5,039	1,008	406	1,176
1999	-	-	80,958	32,886	54,269	13,294	5,512	4,446	23,247	7,865	1,756	469	1,157
2000	-	-	79,311	45,216	33,585	18,759	8,090	4,382	18,152	7,809	737	204	4,868
2001	13,056	5,162	102,219	54,775	72,261	18,201	7,445	5,086	41,920	20,060	1,438	238	15,612
2002	34,889	10,398	103,920	45,401	96,273	14,370	943	3,238	78,018	31,773	613	138	10,258
2003	43,289	14,548	101,227	36,187	71,006	15,551	11,098	4,101	74,460	28,328	1,314	262	11,595
2004	15,889	4,033	76,824	30,936	55,861	14,540	13,757	3,030	49,979	19,535	1,049	166	9,193
2005	16,896	3,681	65,081	25,712	15,798	12,284	13,356	2,515	38,536	12,229	2,397	557	5,244
2006	588	969	56,525	21,432	27,472	7,892	11,786	3,220	38,134	12,375	234	121	10,027
2007	12,226	2,624	45,972	20,514	10,548	6,037	9,672	3,753	22,244	9,498	2,689	436	6,424
2008	11,518	2,984	44,547	21,375	3,442	4,256	10,255	3,017	12,544	4,198	6,322	1,369	9,231
2009	10,536	3,435	41,517	21,492	18,364	7,615	10,686	4,032	13,904	6,366	5,141	852	11,731
2010	11,905	3,590	47,807	21,017	25,816	10,477	8,976	3,139	24,976	10,396	8,879	1,480	11,400
2011	37,384	9,983	52,194	18,682	25,323	7,814	9,514	3,192	21,065	9,422	7,359	1,233	7,616
2012	55,508	14,462	55,587	22,214	20,338	8,286	8,806	3,589	20,587	11,924	5,822	986	14,237
2013	70,411	18,128	48,825	19,097	31,702	10,248	9,847	3,303	19,198	11,722	10,765	2,127	9,754
2014	78,851	24,282	40,735	17,235	22,695	9,132	10,572	3,291	17,047	10,435	11,276	2,168	6,874
2015	99,131	25,559	35,290	16,046	22,394	9,879	13,661	4,509	15,334	11,274	13,868	3,089	10,924
2016	66,405	25,756	30,910	13,242	23,235	9,457	13,677	3,954	20,941	11,432	11,313	2,372	6,236
2017	82,461	27,341	27,961	10,617	27,540	10,525	11,641	3,425	24,164	11,811	15,266	3,266	6,093
2018	83,023	27,024	24,608	8,686	19,443	8,474	13,258	4,300	31,735	9,985	13,607	2,876	7,998
2019	65,298	18,652	18,472	8,342	17,655	8,556	12,620	4,209	34,930	12,170	11,117	2,012	6,843
2020	56,607	15,620	17,987	7,766	23,284	10,427	14,253	3,906	43,643	11,778	9,384	1,863	6,816
2021	84,812	27,299	15,266	6,491	19,704	9,699	15,748	5,092	28,693	8,032	8,123	1,688	4,770
2022	75,160	26,649	12,338	5,666	18,304	9,208	16,449	5,541	31,431	9,878	7,214	1,402	1,493
2023	30,837	24,528	7,548	3,592	5,131	14,416	14,638	5,431	28,786	10,609	8,425	1,777	1,434
2024	72,913	32,625	4,975	3,397	21,672	16,054	14,716	6,132	16,261	7,500	4,489	761	3,246

[1] Includes the catches of—Incluye las capturas de: BLZ, CHL, COK, CRI, ECU, EU(ESP), GTM, HND, MEX, NIC, PAN, EU(PRT), SLV, VUT

TABLE A-10. Numbers and well volumes, in cubic meters, of purse-seine and pole-and line vessels of the EPO tuna fleet. The data for 2024 and 2025 are preliminary. (* The data provided for pole and line vessels for these years are reported combined under total catch (OTR; Table A-2a) because there is no information available by individual vessel; therefore, the total number of PL vessels and well volume is not available.)
TABLA A-10. Número y volumen de bodega, en metros cúbicos, de buques cerqueros y cañeros de la flota atunera del OPO. Los datos de 2024 y 2025 son preliminares. (* Los datos de buques cañeros de estos años se presentan combinados bajo captura total (OTR; Tabla A-2a) porque no se dispone de información por buque individual; por lo tanto, no se dispone del número total de buques cañeros ni del volumen de bodega).

	PS		LP		Total	
	No.	**Vol. (m^3)**	**No.**	**Vol. (m^3)**	**No.**	**Vol. (m^3)**
1996	180	130,774	17	1,646	197	132,420
1997	194	147,926	23	2,127	217	150,053
1998	202	164,956	22	2,216	224	167,172
1999	208	178,724	14	1,642	222	180,366
2000	205	180,679	12	1,220	217	181,899
2001	204	189,088	10	1,259	214	190,347
2002	218	199,870	6	921	224	200,791
2003	214	202,381	3	338	217	202,719
2004	218	206,473	3	338	221	206,811
2005	220	212,419	4	498	224	212,917
2006	225	225,166	4	498	229	225,664
2007	227	225,359	4	380	231	225,739
2008	219	223,804	4	380	223	224,184
2009	221	224,632	4	380	225	225,012
2010	202	210,025	3	255	205	210,280
2011	208	213,237	3	339	211	213,576
2012	209	217,687	4	464	213	218,151
2013	203	212,087	3	268	206	212,355
2014	226	230,379	2	226	228	230,605
2015	244	248,428	1	125	245	248,553
2016	250	261,474	*	*	250	261,474
2017	254	263,018	*	*	254	263,018
2018	261	263,666	*	*	261	263,666
2019	261	265,085	*	*	261	265,085
2020	243	241,631	*	*	243	241,631
2021	241	254,972	*	*	241	254,972
2022	244	254,720	*	*	244	254,720
2023	252	263,295	*	*	252	263,295
2024	238	260,573	*	*	238	260,573
2025	230	263,955	*	*	230	263,955

TABLE A-11a. Estimates of the numbers and well volume (cubic meters) of purse-seine (PS) and pole-and-line (LP) vessels that fished in the EPO in 2024, by flag and gear. Each vessel is included in the total for each flag under which it fished during the year but is included only once in the "Grand total"; therefore, the grand total may not equal the sums of the individual flags.

TABLA A-11a. Estimaciones del número y volumen de bodega (metros cúbicos) de buques cerqueros (PS) y cañeros (LP) que pescaron en el OPO en 2024 por bandera y arte de pesca. Se incluye cada buque en los totales de cada bandera bajo la cual pescó durante el año, pero solamente una vez en el "Total general"; por consiguiente, los totales generales no equivalen necesariamente a las sumas de las banderas individuales.

Flag Bandera	Gear Arte	Well volume —Volumen de bodega (m^3)					Total	
		<401	401-800	801-1300	1301-1800	>1800	No.	Vol. (m^3)
		Number—Número						
COL	PS	2	2	7	3	-	14	14,860
ECU	PS	33	36	27	9	8	113	91,171
EU(ESP)	PS	-	-	-	-	4	4	9,330
MEX	PS	3	4	20	23	-	50	61,043
NIC	PS	-	-	2	1	1	4	6,099
PAN	PS	-	-	6	8	6	20	31,002
PER	PS	-	5	-	-	-	5	2,686
SLV	PS	-	-	-	1	2	3	6,202
USA	PS	1	-	1	8	5	15	23,233
VEN	PS	-	-	3	6	1	10	14,947
Grand total— Total general	PS	39	47	66	59	27	238	
Well volume—Volumen de bodega (m^3)								
Grand total— Total general	PS	11,215	27,280	75,006	89,931	57,141		260,573

- : none—ninguno

TABLE A-11b. Estimates of the numbers and well volumes (cubic meters) of purse-seine (PS) vessels that fished in the EPO in 2025, by flag and gear. Each vessel is included in the total for each flag under which it fished during the year but is included only once in the "Grand total"; therefore, the grand total may not equal the sums of the individual flags.

TABLA A-11b. Estimaciones del número y volumen de bodega (metros cúbicos) de buques cerqueros (PS) que pescaron en el OPO en 2025, por bandera y arte de pesca. Se incluye cada buque en los totales de cada bandera bajo la cual pescó durante el año, pero solamente una vez en el "Total general"; por consiguiente, los totales generales no equivalen necesariamente a las sumas de las banderas individuales.

Flag Bandera	Gear Arte	Well volume —Volumen de bodega (m^3)					Total	
		<401	401-800	801-1300	1301-1800	>1800	No.	Vol. (m^3)
		Number—Número						
COL	PS	1	2	7	3	-	13	14,590
ECU	PS	32	32	23	10	8	105	85,258
EU(ESP)	PS	-	-	-	-	4	4	9,330
GTM	PS	-	-	-	-	1	1	1,940
MEX	PS	3	2	21	24	-	50	62,155
NIC	PS	-	-	1	1	1	3	4,901
PAN	PS	-	-	8	7	6	21	31,578
SLV	PS	-	-	-	2	2	4	7,761
USA	PS	-	-	2	7	6	15	25,693
VEN	PS	-	-	5	7	2	14	20,749
Grand total— Total general	PS	36	36	67	61	30	230	
		Well volume—Volumen de bodega (m^3)						
Grand total— Total general	PS	10,520	20,965	75,719	93,857	62,894		263,955

- : none—ninguno

TABLE A-12. Minimum, maximum, and average capacity, in thousands of cubic meters, of purse-seine and pole-and-line vessels at sea in the EPO during 2015-2024 and in 2025 by month.
TABLA A-12. Capacidad mínima, máxima, y media, en miles de metros cúbicos, de los buques cerqueros y cañeros en el mar en el OPO durante 2015-2024 y en 2025, por mes.

Month Mes	2015-2024			2025
	Min	Max	Ave.-Prom.	
1	92.4	130.4	112.3	95.0
2	154.2	192.3	180.8	154.5
3	151.9	189.7	173.3	169.9
4	151.2	200.8	173.3	164.9
5	159.3	196.9	175.6	157.9
6	152.1	198.6	176.3	168.2
7	155.8	200.4	173.1	170.9
8	107.6	148.7	120.9	114.3
9	102.2	142.2	117.9	104.7
10	141.7	188.9	167.9	138.8
11	93.5	135.9	113.0	92.5
12	56.3	90.4	67.7	66.9
Ave.-Prom.	126.5	167.9	146.0	133.2

B. YELLOWFIN TUNA

For the full version of the analyses herein, see documents SAC-16-03, SAC-16 INF-T, SAC-16 INF-U and SAC-17-02.

Yellowfin are distributed across the Pacific Ocean, but the bulk of the catch is made in the eastern and western regions. Purse-seine catches in the vicinity of the western boundary of the eastern Pacific Ocean (EPO) at 150°W are relatively low, but have been increasing, mainly in sets on floating objects (Figure A-1a and A-1b, Tables A-1, A-2). Most of the catch in the eastern Pacific Ocean (EPO) is taken in purse-seine sets associated with dolphins and floating objects (Figure B-1). Tagging studies of yellowfin throughout the Pacific indicate that they tend to stay within 1,800 km of their release positions. This regional fidelity, along with the geographic variation in phenotypic and genotypic characteristics of yellowfin shown in some studies, suggests that there might be multiple stocks of yellowfin in the EPO and throughout the Pacific Ocean.Despite the challenged posed by this spatial heterogeneity, the latest yellowfin tuna assessment in the EPO successfully addressed hypotheses of spatial structure (SAC-16-03).

The purse-seine catches of yellowfin tuna were at the all time highest value of 446,000 t in 2025, which is about 70% higher than the average for the previous 10 years (Figure B-1), and about 50% higher than the 2024 catches. Catches from other gears (mainly longline) are about 5% of the total catches. The catch of yellowfin on purse-seine sets on floating-object peaked again in 2025 at 104,000 t, 15% higher than the 2022 peak at 91,000 t, and about 66% higher than the 10-year average of 63,000 t (2015-2024). The peak catches on 2022 were a concern due to the simultaneous peak in the number of floating objects sets, which decreased since then (Figure B-2), but in the 2025 benchmark it was estimated to be related to a strong recruitment (Figure B-5a). The increase in 2025 catches on purse-seine sets on floating-object maybe both related to the slight increase in effort, but also maybe an indication of another strong recruitment taking place, as catches also increased in the purse-seine on unassociated sets. The catches of purse-seine on unassociated sets also showed a considerable increases to about 76,000 t, which is double the 2024 catches and three times the average for the previous ten years. This fishery catches both small and young fish and large and old fish (SAC-16-03), the recent increase in catches may be due to both the result of the the growth of the fish from the 2022 cohort recruitment, which provided large fish, and a likely high 2025 recruitment, which provided small fish. The 2022 large recruitment, in combination with the slight increase in the number of sets (Figure B-2a), is likely responsible for the increasing trend in catches in the in purse-seine sets associated with dolphins since 2023, which peaked in 2025, as this fishery catches larger and older yellowfin tuna than the floating object fishery. In 2025, the yellowfin tuna catches in purse-seine sets associated with dolphins amounted to 265,000 t, which is 35% higher than the 2024 catches and 65% higher than the average catches for the previous 10 years (2015-2024). The indicators for yellowfin tuna also showed increase. The catch per set increased in 2025 for all three types of purse-seine sets (Figure B-2b). The indices of abundance based on purse-seine associated with dolphins (Figure B-2c) and longline (Figure B-2d) also show substantial increases in 2024 and 2025 indicating a likelily increase in abundance in the population consistent with the strong cohort seen in the floating object fishery in 2022. These interpretations would be confirmed in the next yellowfin tuna assessment.

The increase in yellowfin catches in the floating-object fishery in 2022 may also be a consequence of the strong La Niña events in 2021 and 2022. The analysis of changes in yellowfin tuna catch of small fish in the purse-seine floating-object fishery relative to El Niño Southern Oscillation (ENSO) events suggested that there is positive impact of La Niña events on yellowfin recruitment into the fishery (SAC-16-INF-T, Figure B-3). The effect of ENSO may also vary by region, with the NE region being favored by La Niña conditions and the SW region by the El Niño conditions (SAC-14-06, Figure B-5b).

At least two stocks/regional areas may be exploited by the EPO fisheries, roughly associated with epi- and meso-pelagic biogeochemical provinces (SAC-14-06), and that the boundaries between the stocks may vary dynamically. Tagging studies indicates that movement of yellowfin is limited (Schaefer and Fuller, 2022) and that isolation by distance may be occurring. Given the uncertainty in stock structure, two hypotheses were

used to develop models for the 2025 benchmark assessment (SAC-16-03):

- **Regional dynamics**: one stock with spatial dynamics among regions. The differences among regions may be due to spatial structure, movement, catchability/selectivity/availability and/or different exploitation rates. This hypothesis was implemented in the benchmark assessment with an EPO-wide areas-as-fleets model, where catches taken from the three regions and areas within were treated as separate fisheries and the differences in size composition were modeled with different selectivity curves. Note that a three-region spatial model was also implemented, but movement rates were estimated to be low so it was equivalent to independent stocks.
- **Independent stocks**: it is unlikely that the fish of different regions would be completely independent but given the estimation in the spatial model of movement rates to be very low, independent models for different regions are justified. In addition, modelling the regions independently will allow for understanding of the dynamics in different regions without influence from data outside the region. Two separate assessments were done. One for a northeast region (NE) where most of the yellowfin catches are taken and another that encompasses the south and west of the EPO (SW), where the purse-seine catches on floating objects are more important (Figure B-4).

Four configurations representing the spatial-structure hypotheses in the 2025 benchmark assessment: 1) EPO, 2) SW, 3) NE, and 4) NE-short. The NE-short models were the same as the NE models, but started in 2006 instead of 1984, to address patterns in the data. One risk analysis was done for each spatial configuration, with eighteen models each, with a total of 72 models. A "base" scenario was built with new assumptions of growth, natural mortality and reproductive biology based on results of recent research. The uncertainty in biological parameters (growth, low and high, and natural mortality, low and high) and effort creep (increase in the catchability of the indices of abundance of 1% a year) was represented by alternative scenarios. Three values of steepness of the Beverton-Holt stock recruitment curve (1.0, 0.9, 0.8) are considered for the third level hypothesis. In the risk analyses, equal weight was used for level 2 hypotheses and expert judgement was used for level 3 (steepness). Indices of abundance and standardized length composition were obtained using spatiotemporal models fit to data from the purse-seine fishery associated with dolphins (to fit EPO, NE, NE-short) or longline fishery (SW). The models incorporated new information on growth, reproductive biology, and natural mortality, some derived from the IATTC Regional Tuna Tagging Program (RTTP). The indices were key to provide the relative trends in abundance but the information on absolute scale came from the length composition data.

Recruitment had two peaks in all models for all four spatial structure assumptions (Figure B-5a), but the timing differed. For the SW model the first peak occurred in 1998, while in the others it occured in 1999. The second peak was in 2021. The EPO and NE models estimate a regime shift in recruitment to a lower level after the first peak, while the SW model does not. The SW models also estimated high recruitment in 2015-2017. Recruitment appears to be related to environmental conditions connected to the El Niño - La Niña system, but the relationship is more complex than what it can be represented by a simple index such as ONI (Figure B-6).

Spawning biomass generally follows the recruitment trends, with a 2-3 year delay, and since 2010 are diametric for the NE and SW regions (Figure B-6). The strong cohorts of 1998 and 1999 in the NE and SW regions apper as large spawning biomasses in 2001 and 2002 in the two regions, respectively. The NE (and NE_short) spawning biomass is estimated to be about twice the level of that estimated for the SW. EPO-wide models have difficulty fitting data with incompatible trends and estimate larger and more uncertain biomass levels than the NE and SW combined.

Fishing mortality is higher for older fish (Figure B-7) and has been generally higher after 2000, but without any obvious trends except for a consistent increase in small fish in the SW region reflecting the increasing effort in the floating object fishery. The fishing mortality is lower for the EPO models, which is a consequence of its biomass being estimated to be higher than the sum of the biomasses for the NE and SW

regions. The fishing mortality on the intermediate aged yellowfin (9-12 quarters of age) is low in the SW since the unassociated catches are lower and the purse-seine fishery associated with dolphins generally catches larger yellowfin. The fishing mortality on the youngest yellowfin (1-4 quarters of age) has steadily increased following the expansion of the floating object fishery in the mid 1990's. After 2015 the fishing mortality of this age group surpasses the 5-8 age class. The trends in fishing mortality are similar between the NE and the NE_short models, indicating that starting the model later does not change the perception of the effects of fishing in recent years. For those two hypotheses, there is a general increase in fishing mortality in all age classes after the year 2006, declining after 2015, with the lowest at the start of the covid19 pandemic, in 2020. After that, the fishing mortality increases, particularly for older yellowfin. The increase in fishing mortality noticed in the last five years in the NE area is not shared by the EPO model. This may be due to the influence of the SW area, which has stable fishing mortality followed by a sharp decline in 2023. This indicates that using an EPO-wide model may underestimate and mask regional trends in fishing mortality.

Impacts of the different types of fisheries in the EPO, NE and NE_short models are similar (Figure B-8). The longline fisheries have the smallest impact, while the purse-seine fisheries associated with dolphins have the greatest impact during most of the modelled period. The unassociated fisheries had the second largest impact in the early years, but in the 1990s the impact of the floating-object fisheries started to increase and surpassed that of the unassociated fisheries around 2008. For the SW models, the impact of the different purse seine set type has changed considerably over time. The longline fishery and the purse-seine associated with dolphins had the largest impact until mid-1990's, when there was an expansion of the floating object fishery, which steadily increased its impact and became the fishery with the largest impact in this region, larger than all other fisheries combined. The longline fishery has decreased both its effort and its impact on yellowfin in that area. The fishery associated with dolphins has slowly increased its absolute impact in this region, but in proportion it has stayed stable since the year 2000.

The spawning biomass ratio for all four spatial-structure hypotheses has been above the limit reference point (Figure B-9) for all the assessment periods. The spawning biomass is estimated to be above the staff's proposed MSY proxy target reference point of $30\%S_{_d}$ (SAC-15-05) (and the biomass corresponding to MSY) for most of the assessment period, with the exceptions of some years for NE and NE_short (Figure B-10). The stock(s) is estimated to be currently well above the spawning biomass that corresponds to MSY (S_{MSY}) and the proxy $30\%S_{_}$ with low probability of being below these (Table B-1, Figure B-11). The fishing mortality is estimated to be well below the level corresponding to MSY and the MSY proxy $F_{30\%}$ with low probability of being above these (Table B-1, Figure B-12). The assessment estimates zero probability that the spawning biomass or fishing mortality limit reference points have been breached (Table B-1, Figure B-13). The EPO models are the most optimistic. The most pessimistic models are those with low natural mortality (Figures B-11 and B-12). Some of these models estimate that the spawning biomass is below the $S_{30\%}$ level and the fishing mortality is above the $F_{30\%}$ level. The high natural mortality levels are generally the most optimistic. The estimates of the SBR (the ratio of the spawning biomass to the virgin spawning biomass) corresponding to MSY are low (generally below 20%) even though the highest fishing mortality is on older yellowfin. The value is higher with lower steepness of the stock-recruitment relationship and lower natural mortality.

Future work to improve the assessment should focus on the key uncertainties: spatial structure, growth, natural mortality, and information about absolute abundance. This assessment showed that different areas in the EPO may have different depletion levels. The values used for natural mortality and the reliance on size composition data to inform absolute abundance remain key sources of uncertainty. Growth, especially at older ages, relied on a few high-quality tag returns. All four of these sources of uncertainty could be reduced by a comprehensive tagging program (SAC-17-INF-F), which could allow for the application of newly developped spatiotemporal model approach to derive estimates of absolute abundance from tagging data, as done for skipjack tuna (SAC-15-04).

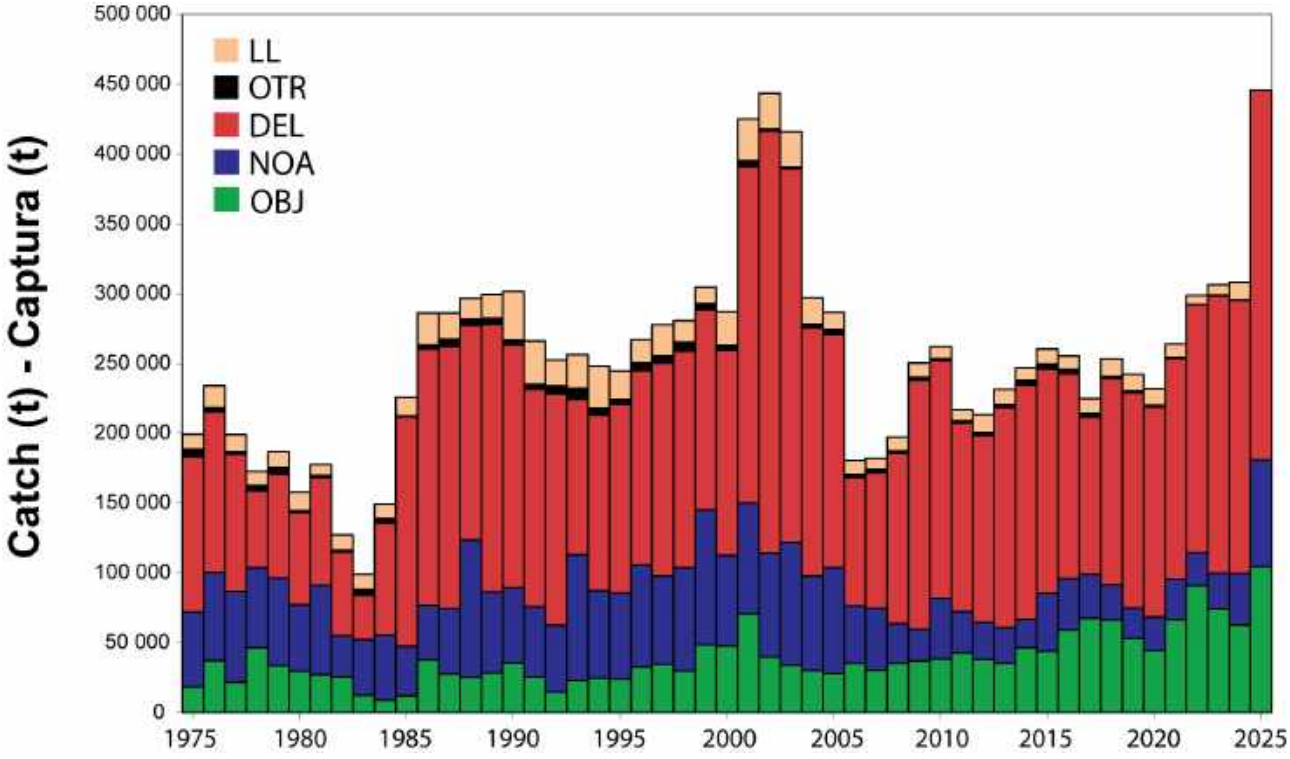


FIGURE B-1. Total catches (retained catches plus discards) for the purse-seine fisheries, by set type (DEL, NOA, OBJ), and retained catches for the longline (LL) and other (OTR) fisheries, of yellowfin tuna in the eastern Pacific Ocean, 1975-2025. The purse-seine catches are adjusted to the species composition estimate obtained from sampling the catches. The data for 2024 and 2025 are preliminary.

FIGURA B-1. Capturas totales (capturas retenidas más descartes) en las pesquerías de cerco, por tipo de lance (DEL, NOA, OBJ), y capturas retenidas de las pesquerías de palangre (LL) y otras (OTR), de atún aleta amarilla en el Océano Pacífico oriental, 1975-2025. Se ajustan las capturas de cerco a la estimación de la composición por especie obtenida del muestreo de las capturas. Los datos de 2024 y 2025 son preliminares.

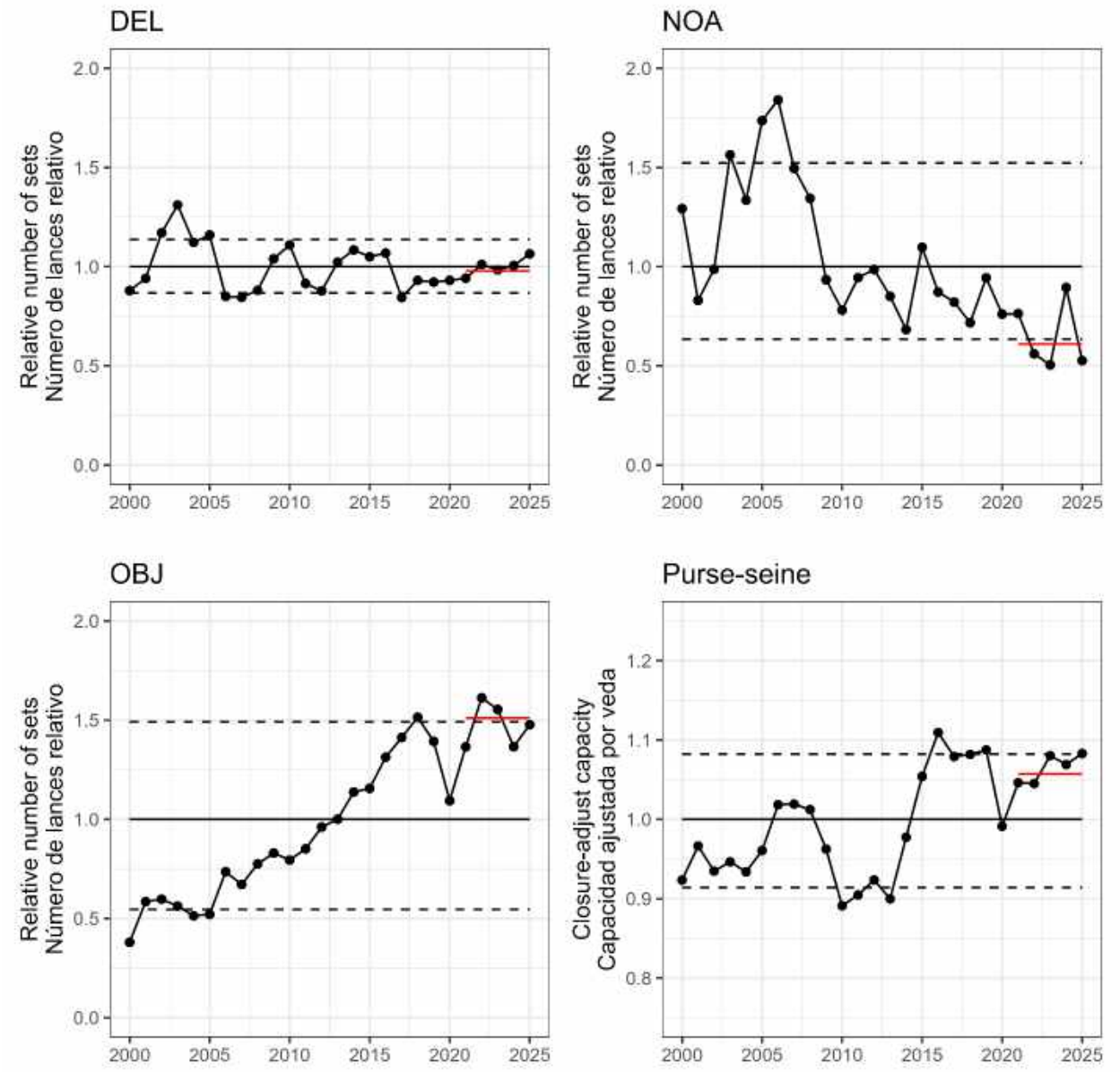


FIGURE B-2a. Indicators of total effort in the EPO for 2000-2025, based on annual total number of sets, by type and purse-seine closure-adjusted capacity. The dashed horizontal lines are the 10th and 90th percentiles, the solid horizontal line is the mean. The red dashed lines mark the *status quo* levels (average conditions in 2021-2023).

FIGURA B-2a. Indicadores del esfuerzo total en el OPO para 2000-2025, basados en número total anual de lances, por tipo, y capacidad ajustada por veda de cerco. Las líneas horizontales de trazos representan los percentiles de 10 y 90%, y la línea horizontal sólida el promedio. Las líneas discontinuas rojas marcan los niveles de *statu quo* (condiciones promedio en 2021-2023).

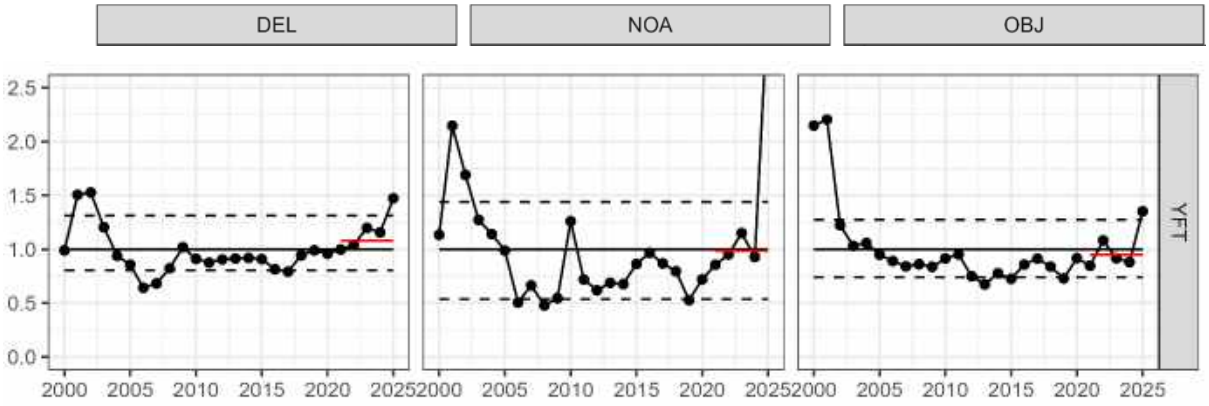


FIGURE 2b. Indicators based on purse-seine catch-per-set, 2000-2025. The OBJ catch per set during 2020 and 2021 (COVID-19 years) are biased-adjusted according to SAC-14-INF-D. The red horizontal lines mark the benchmark reference levels (average conditions in 2021-2023).
FIGURA 2b. Indicadores basados en captura por lance cerquero, 2000-2025. La captura por lance OBJ durante 2020 y 2021 (años de COVID-19) es ajustada por sesgo acorde a SAC-14-INF-D. Las líneas horizontales rojas marcan los niveles de referencia (condiciones promedio en 2021-2023).

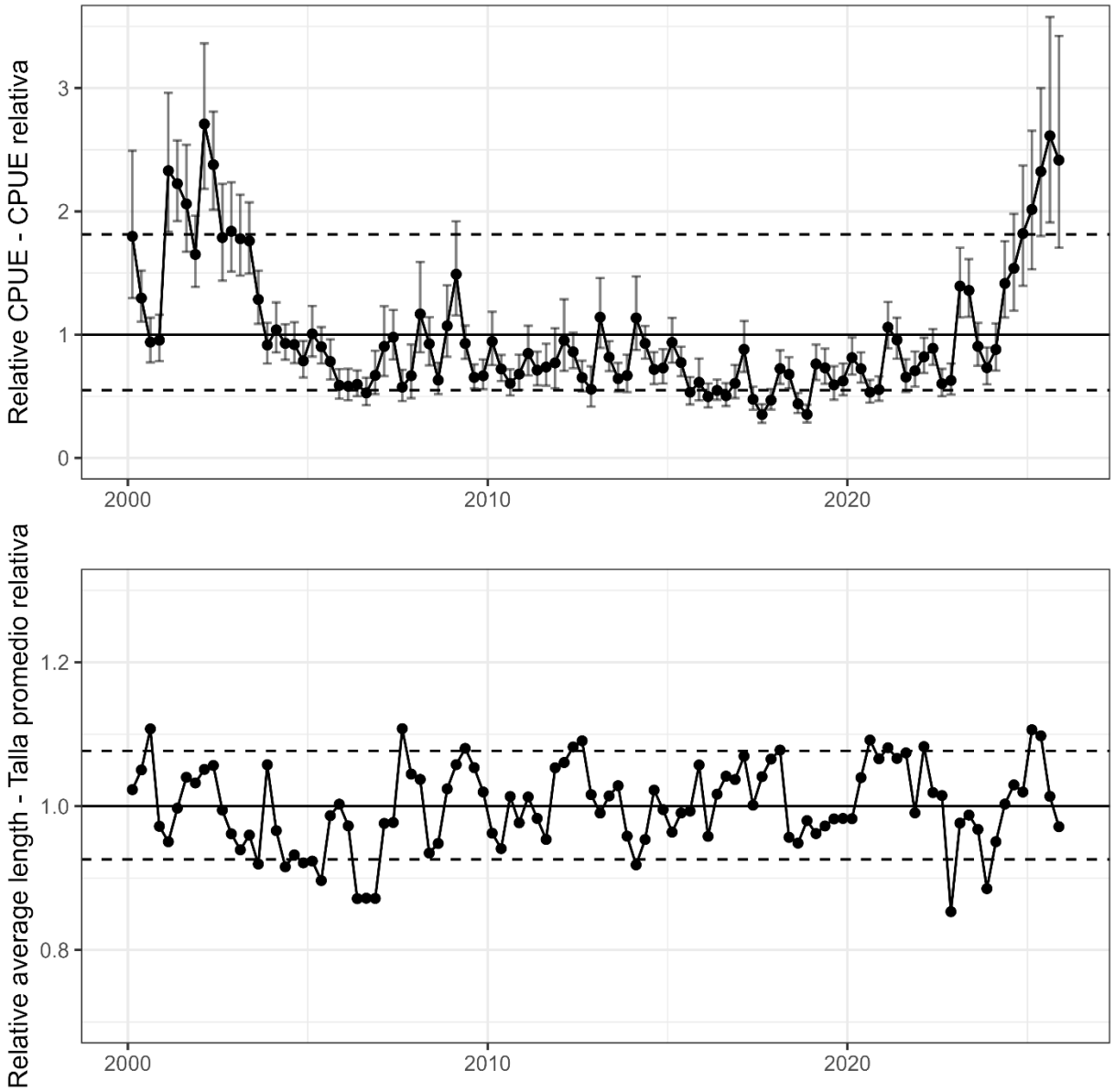


FIGURE 2c. Quarterly indicators based on spatio-temporal modeling of catch-per-day-fished and length compositions for the purse-seine fishery on yellowfin associated with dolphins, 2000-2025. The error bars represent the 95% confidence intervals.
FIGURA 2c. Indicadores trimestrales basados en el modelado espaciotemporal de la captura por día de pesca y composiciones por talla para la pesquería cerquera de aleta amarilla asociada a delfines, 2000-2025. Las barras de error representan los intervalos de confianza del 95%.

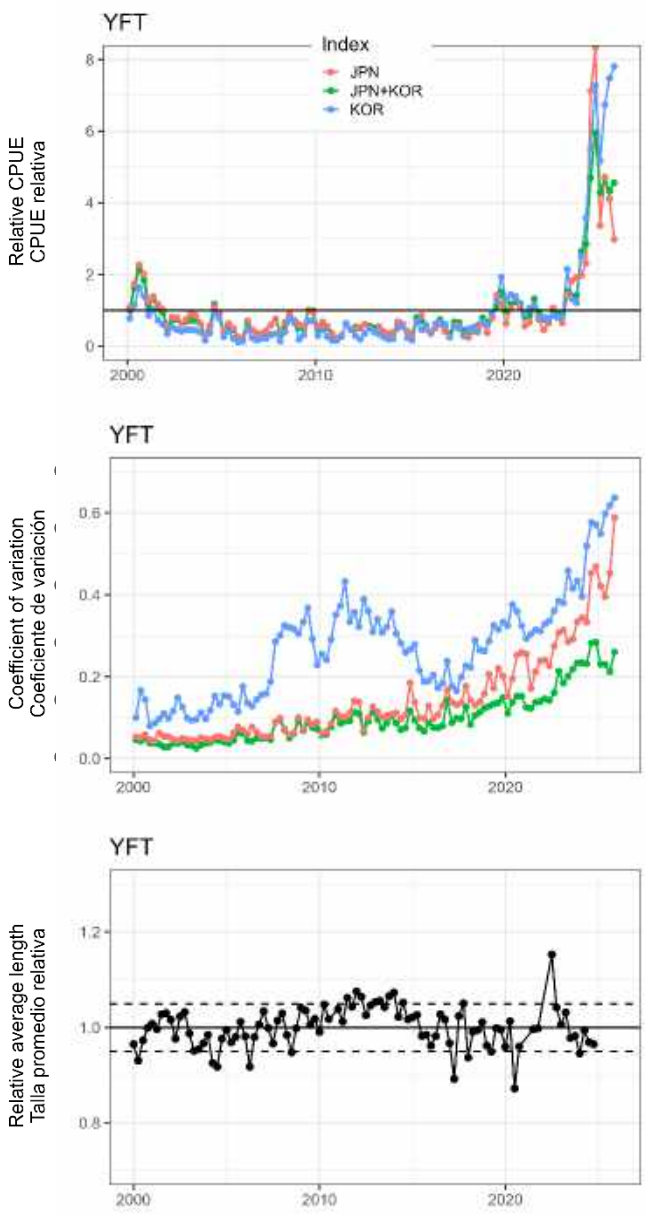


FIGURA 2d. Quarterly indicators based on spatio-temporal modeling of Japanese, Korean, or Japanese + Korean longline CPUE data (top row), the associated coefficient of variation (middle row), and Japanese + Korean longline length composition data (bottom row), 2000-2025. The y-axis limits for average length differ from the figures for the other indicators to accentuate the changes because average length is less sensitive to fishing mortality.

FIGURA 2d. Indicadores trimestrales basados en el modelado espaciotemporal de datos de CPUE de palangre de Japón, Corea o Japón + Corea (fila superior), el coeficiente de variación asociado (fila central) y los datos de composición por talla de palangre de Japón + Corea (fila inferior), 2000-2025. Los límites del eje "y" para la talla promedio difieren de las figuras de los otros indicadores para acentuar los cambios ya que la talla promedio es menos sensible a la mortalidad por pesca.

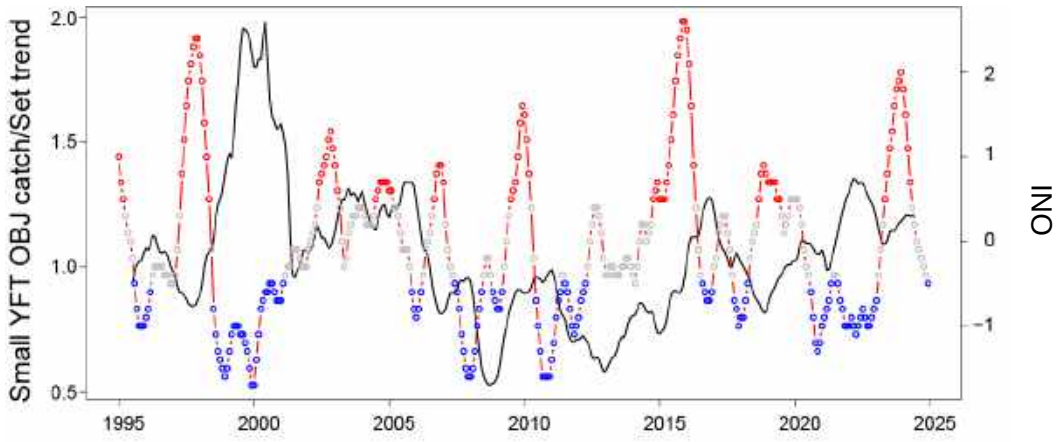


FIGURE B-3. Small yellowfin tuna monthly CPUE trend data overlaid with the Oceanic Niño Index (ONI). The colors of the points of ONI correspond to the El Niño (red), La Niña (blue), or Neutral (grey) phase (SAC-16 INF-T).
FIGURA B-3. Datos de tendencia de la CPUE mensual del atún aleta amarilla pequeño superpuestos con el índice Niño Oceánico (ONI). Los colores de los puntos del ONI corresponden a las fases de El Niño (rojo), La Niña (azul) o neutras (gris) (SAC-16 INF-T).

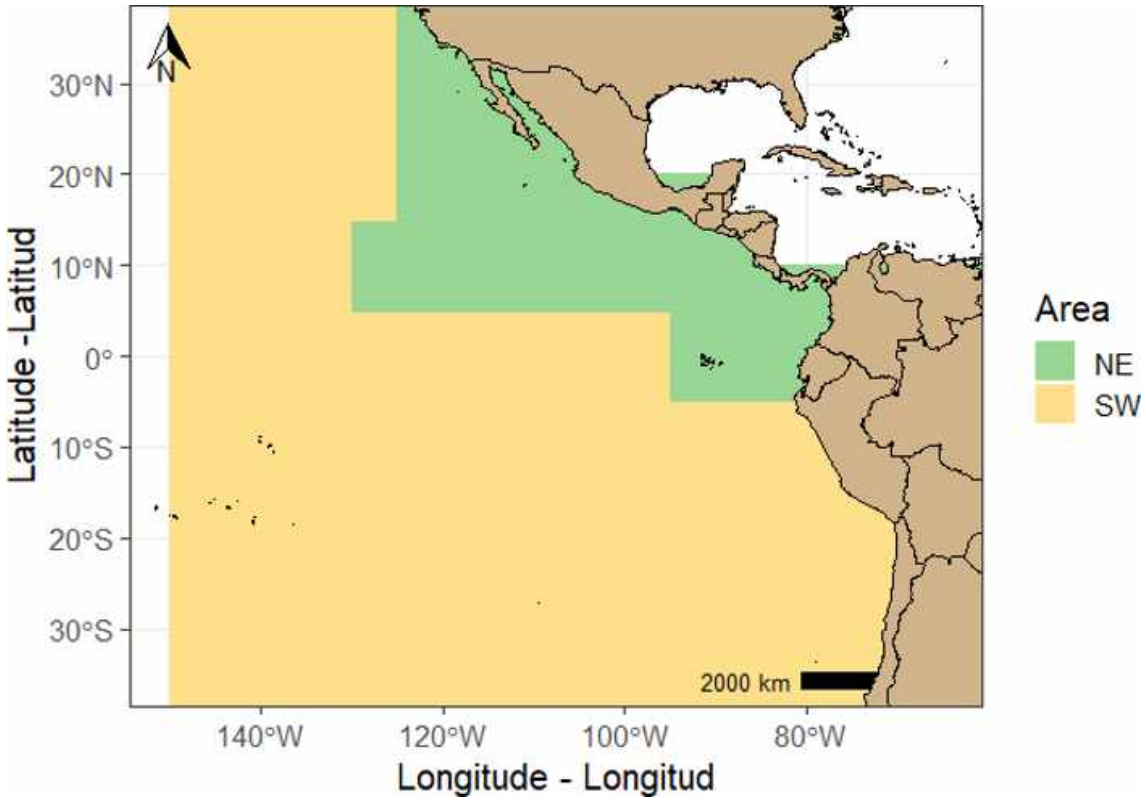


FIGURE B-4. The 2025 yellowfin tuna benchmark assessment included models that considered the whole EPO, and the NE and SW regions separatedly.
FIGURA B-4. La evaluación de referencia del atún aleta amarilla incluyó modelos que consideraron todo el OPO y las regiones NE y SW por separado.

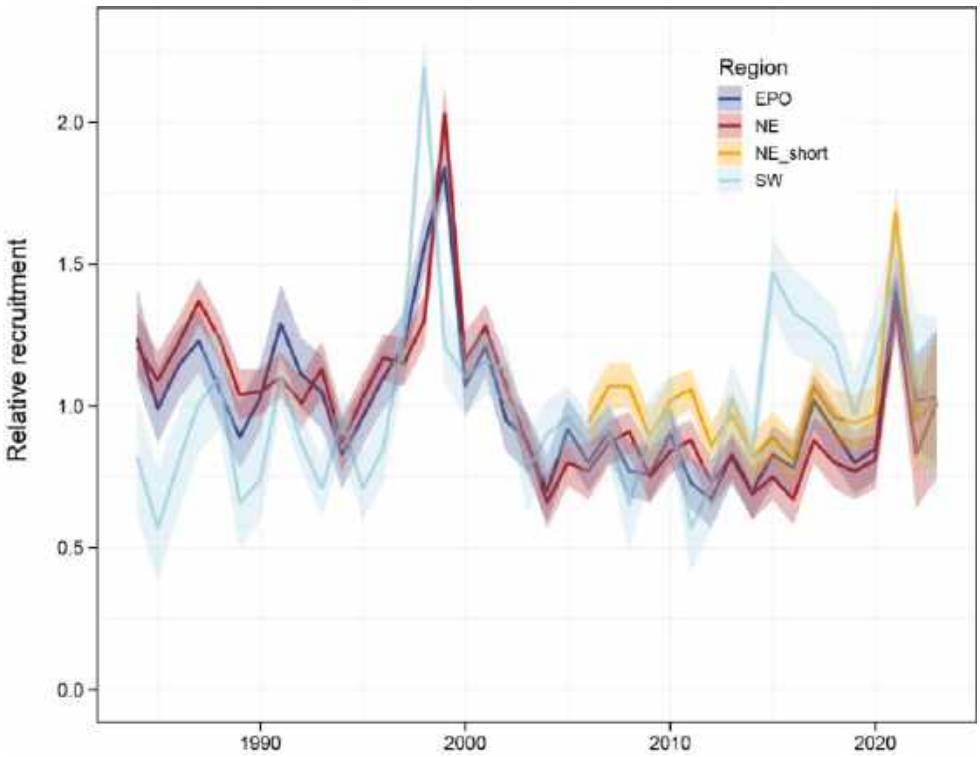


FIGURE B-5a. Relative recruitment. Comparison of multi-model estimates of median relative annual recruitment and 80% confidence interval of yellowfin tuna for each hypothesis of spatial structure. The multi-model estimates include all level 2 and level 3 uncertainty scenarios.

FIGURA B-5a. Reclutamiento relativo. Comparación de las estimaciones de múltiples modelos de la mediana del reclutamiento anual relativo y del intervalo de confianza del 80% del atún aleta amarilla para cada hipótesis de estructura espacial. Las estimaciones de múltiples modelos incluyen todos los escenarios de incertidumbre de nivel 2 y 3.

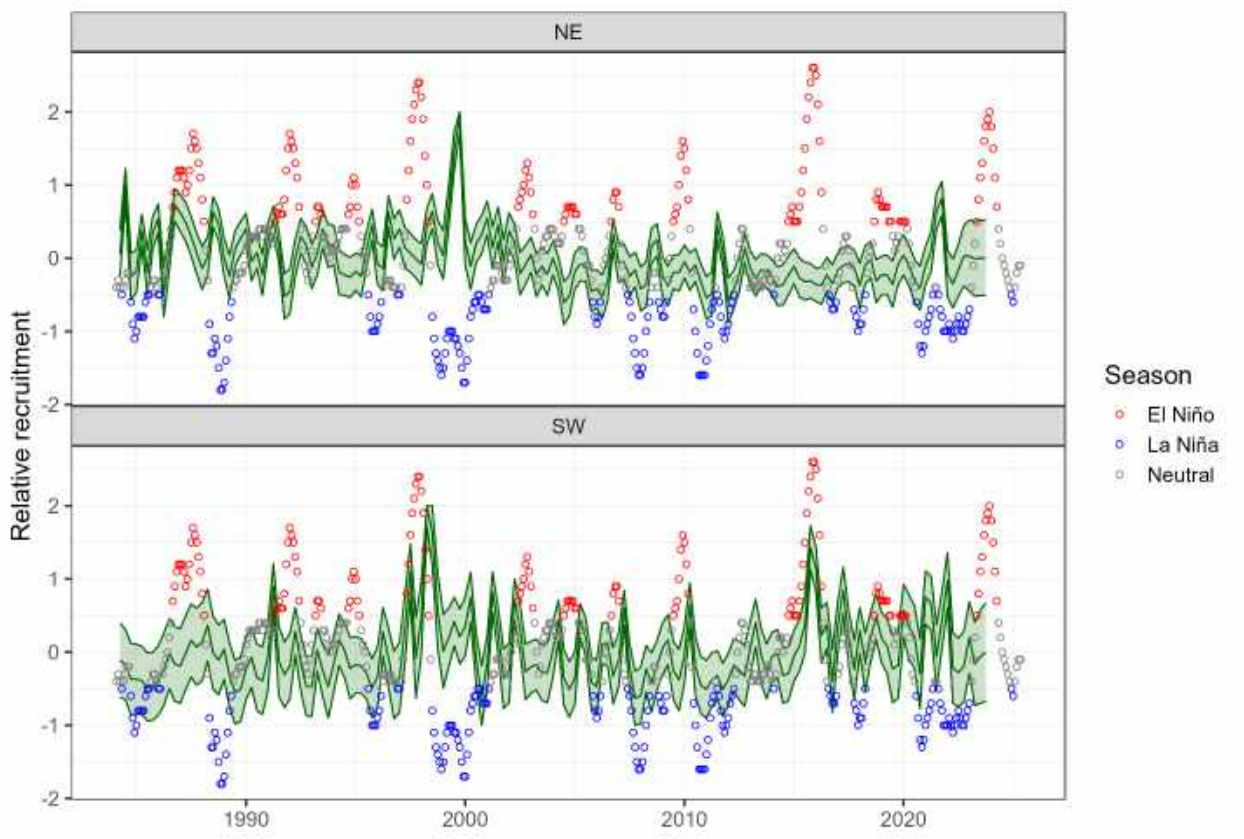


FIGURE B-5b. Relative recruitment. Quarterly estimates centered at 0 overlaid with the Oceanic Niño Index (ONI) for the NE (upper) and SW (lower) models. The colors of the points of ONI correspond to the El Niño (red), La Niña (blue), or Neutral (grey) phase.
FIGURA B-5b. Reclutamiento relativo. Reclutamientos trimestrales centrados en cero superpuestos con el índice Niño Oceánico (ONI). Los colores de los puntos del ONI corresponden a las fases de El Niño (rojo), La Niña (azul) o neutras (gris).

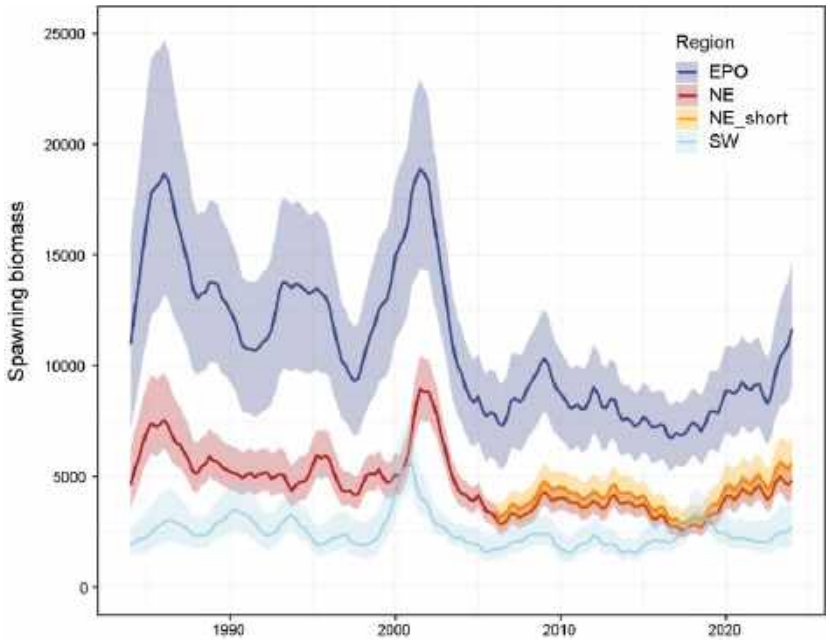


FIGURE B-6. Comparison of multi-model estimated spawning biomass of yellowfin tuna for each hypothesis of spatial structure with 80% confidence intervals.
FIGURA B-6. Comparación de la biomasa reproductora del atún aleta amarilla estimada en múltiples modelos para cada hipótesis de estructura espacial con intervalos de confianza del 80%.

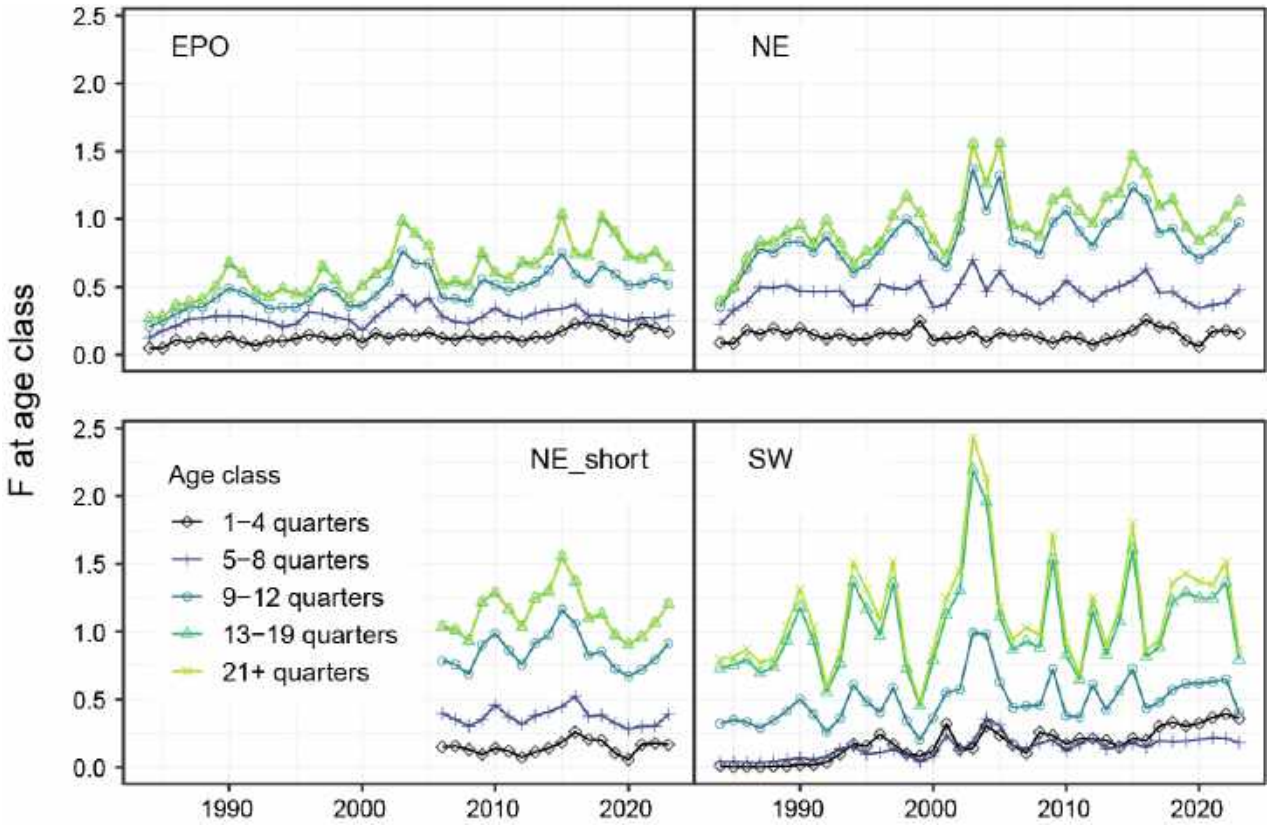


FIGURE B-7. Annual fishing mortality at age (sum of the four quarterly estimates within a year) of yellowfin by age group for each hypothesis of spatial structure (level 1). The values for each age group are weighted across level 2 and level 3 hypotheses.

FIGURA B-7. Mortalidad por pesca anual por edad (suma de las cuatro estimaciones trimestrales dentro de un año) de aleta amarilla por grupo de edad para cada hipótesis de estructura espacial (nivel 1). Los valores para cada grupo de edad están ponderados entre las hipótesis de nivel 2 y nivel 3

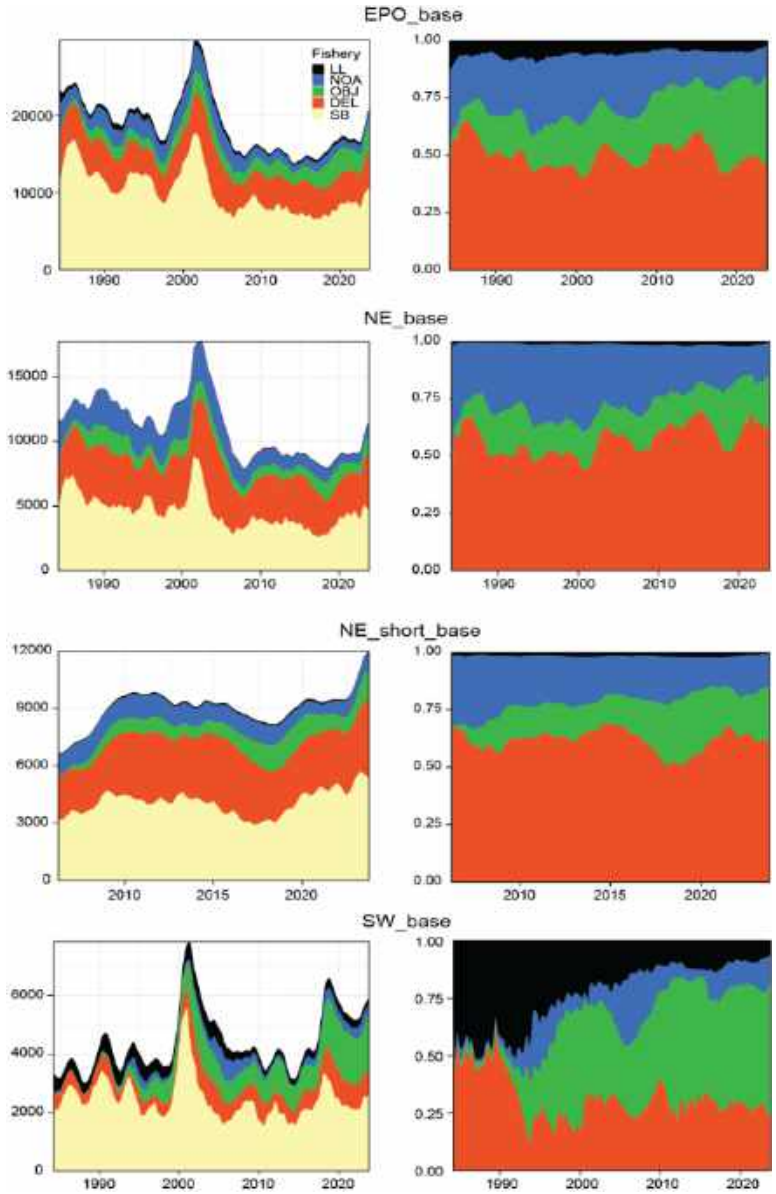


FIGURE B-8. Impact of the different fishing methods on the spawning biomass. Left panels: comparison of spawning biomass trajectory of a simulated population of yellowfin tuna that was never exploited (colored area) and that predicted by the stock assessment model (SB, yellow shaded area), and the impact of each fishing method (purse-seine on floating objects OBJ, also includes sorting discards and pole and line, purse-seine associated with dolphins DEL, purse-seine unassociated NOA and longline LL fisheries) for each stock structure hypothesis calculated from the base reference models with steepness of 1. Right panels: Proportional impacts.

FIGURA B-8. Impacto de los diferentes métodos de pesca en la biomasa reproductora. Paneles de la izquierda: comparación de la trayectoria de la biomasa reproductora de una población simulada de aleta amarilla que nunca fue explotada (área coloreada) y la predicha por el modelo de evaluación (SB, área sombreada en amarillo), y el impacto de cada método de pesca (cerco sobre objetos flotantes OBJ, también incluye descartes y caña, cerco asociado a delfines DEL, cerco no asociado NOA y pesquerías de palangre LL) para cada hipótesis de estructura de la población calculada a partir de los modelos de referencia base con inclinación de 1. Paneles de la derecha: impactos proporcionales.

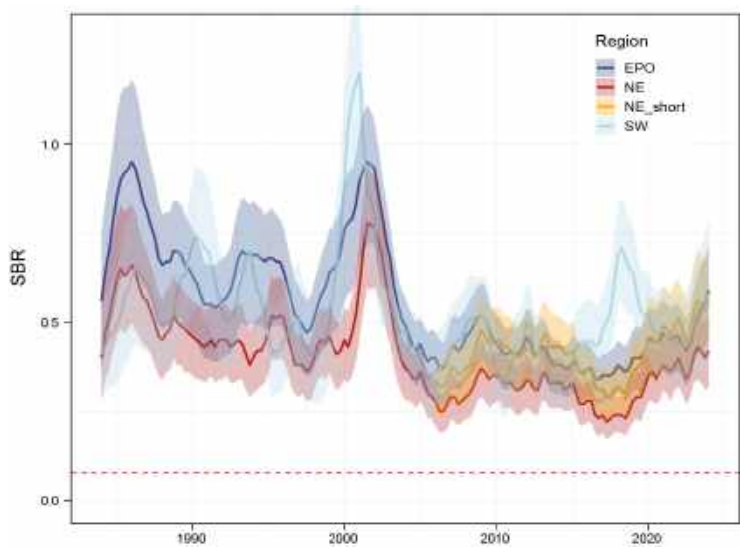


FIGURE B-9. Comparison of multi-model estimated spawning biomass ratio (spawning biomass over equilibrium virgin spawning biomass) of yellowfin tuna for each hypothesis of spatial structure with 80% confidence intervals. The red dashed line (at 0.077) indicates the SBR at the limit reference point S_{LIMIT}.

FIGURA B-9. Comparación del cociente de biomasa reproductora del atún aleta amarilla (biomasa reproductora sobre biomasa reproductora virgen de equilibrio) estimado en múltiples modelos para cada hipótesis de estructura espacial con intervalos de confianza del 80%. La línea roja discontinua (en 0.077) indica el SBR en el punto de referencia límite $S_{\text{LÍMITE}}$.

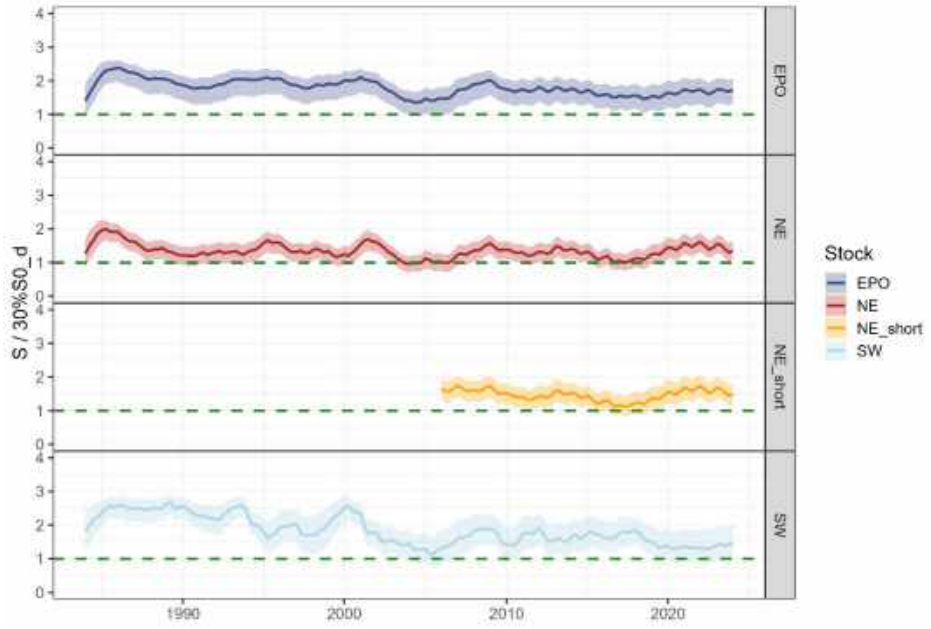


FIGURE B-10. Comparison of multi-model estimates of the ratio of S to $30\%S_{_d}$ of yellowfin tuna for each hypothesis of stock structure.

FIGURA B-10. Comparación de estimaciones de múltiples modelos de la relación entre S y $30\%S_{_d}$ del atún aleta amarilla para cada hipótesis de estructura de la población.

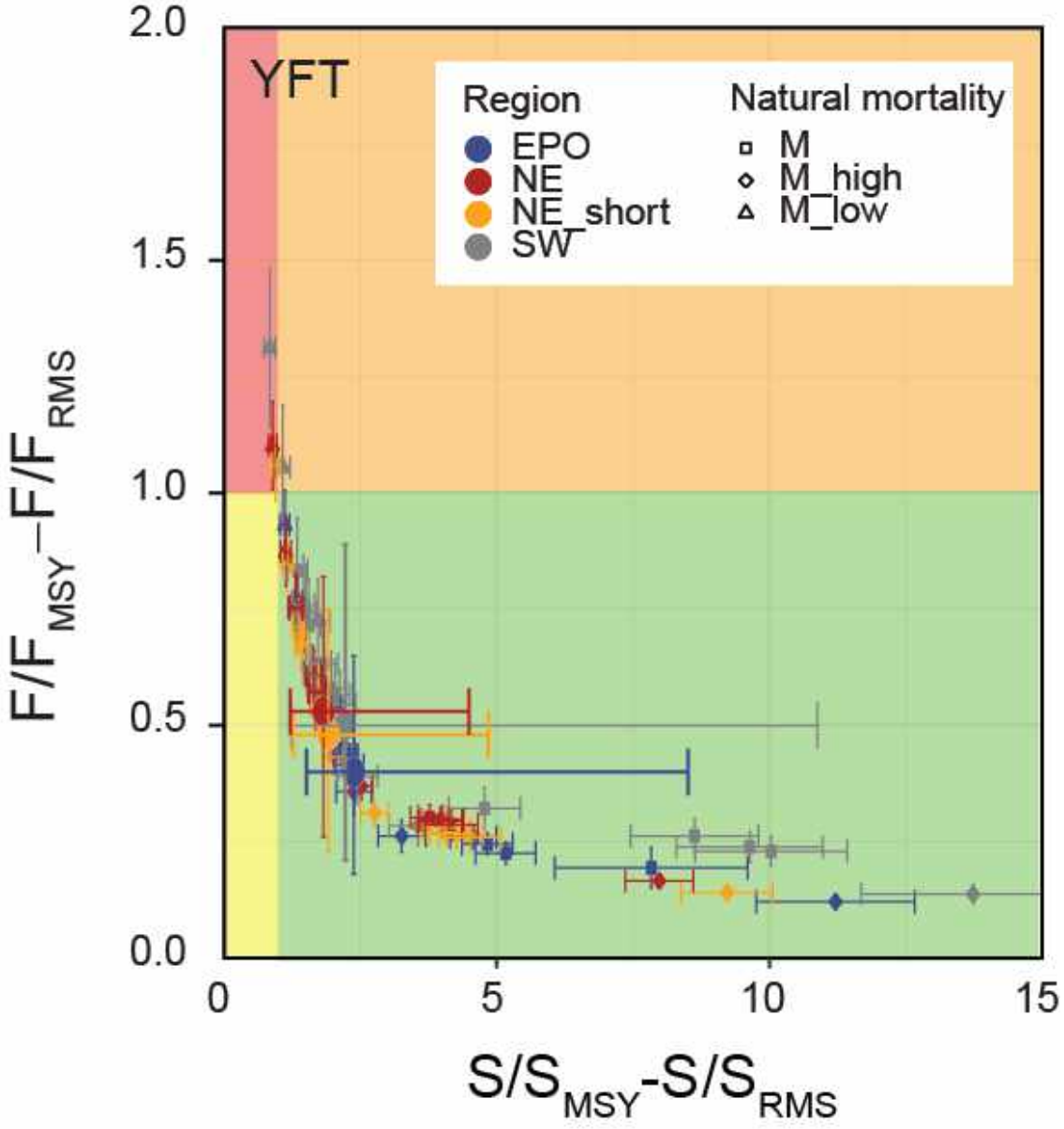


FIGURE B-11. Kobe plot of the most recent estimates of spawning biomass (*S*) and fishing mortality (*F*) relative to their target reference points (S_{MSY_d} and F_{MSY}) for each hypothesis of spatial structure. Each dot is based on the average *F* over the most recent three years, 2021-2023, and the *S* for the first quarter of 2024 and the error bars represent the 80% confidence interval of model estimates. The larger dots represent the combined result for each spatial structure hypothesis.

FIGURA B-11. Gráfica de Kobe de las estimaciones más recientes de biomasa reproductora (*S*) y mortalidad por pesca (*F*) en relación con sus puntos de referencia objetivo (S_{RMS_d} y F_{RMS}) para cada hipótesis de estructura espacial. Cada punto se basa en la *F* promedio de los tres años más recientes, 2021-2023, y la *S* del primer trimestre de 2024, y las barras de error representan el intervalo de confianza del 80% de las estimaciones del modelo. Los puntos más grandes representan el resultado combinado para cada hipótesis de estructura espacial

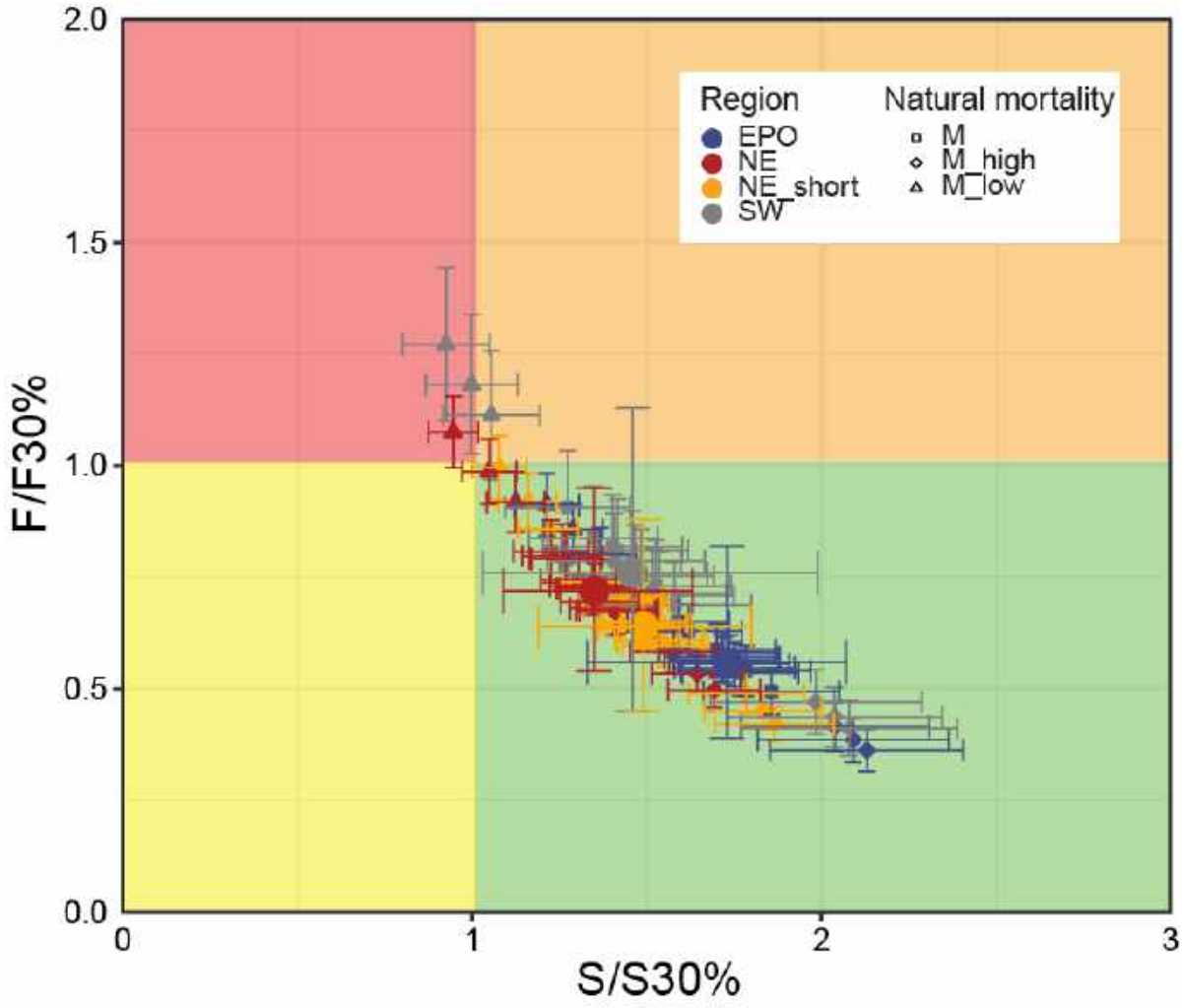


FIGURE B-12. Kobe plot of the most recent estimates of spawning biomass (*S*) and fishing mortality (*F*) relative to their proxy target reference points ($30\%S_{_d}$ and $F_{30\%S_{_d}}$) for each hypothesis of spatial structure. Each dot is based on the average *F* over the most recent three years, 2021-2023, and the *S* for the first quarter of 2024 and the error bars represent the 80% confidence interval of model estimates. The larger dots represent the combined result for each spatial structure hypothesis.

FIGURA B-12. Gráfica de Kobe de las estimaciones más recientes de biomasa reproductora (*S*) y mortalidad por pesca (*F*) relativas a sus puntos de referencia objetivo sustitutos ($30\%S_{_d}$ y $F_{30\%S_{_d}}$) para cada hipótesis de estructura espacial. Cada punto se basa en la *F* promedio de los tres años más recientes, 2021-2023, y la *S* del primer trimestre de 2024, y las barras de error representan el intervalo de confianza del 80% de las estimaciones del modelo. Los puntos más grandes representan el resultado combinado para cada hipótesis de estructura espacial.

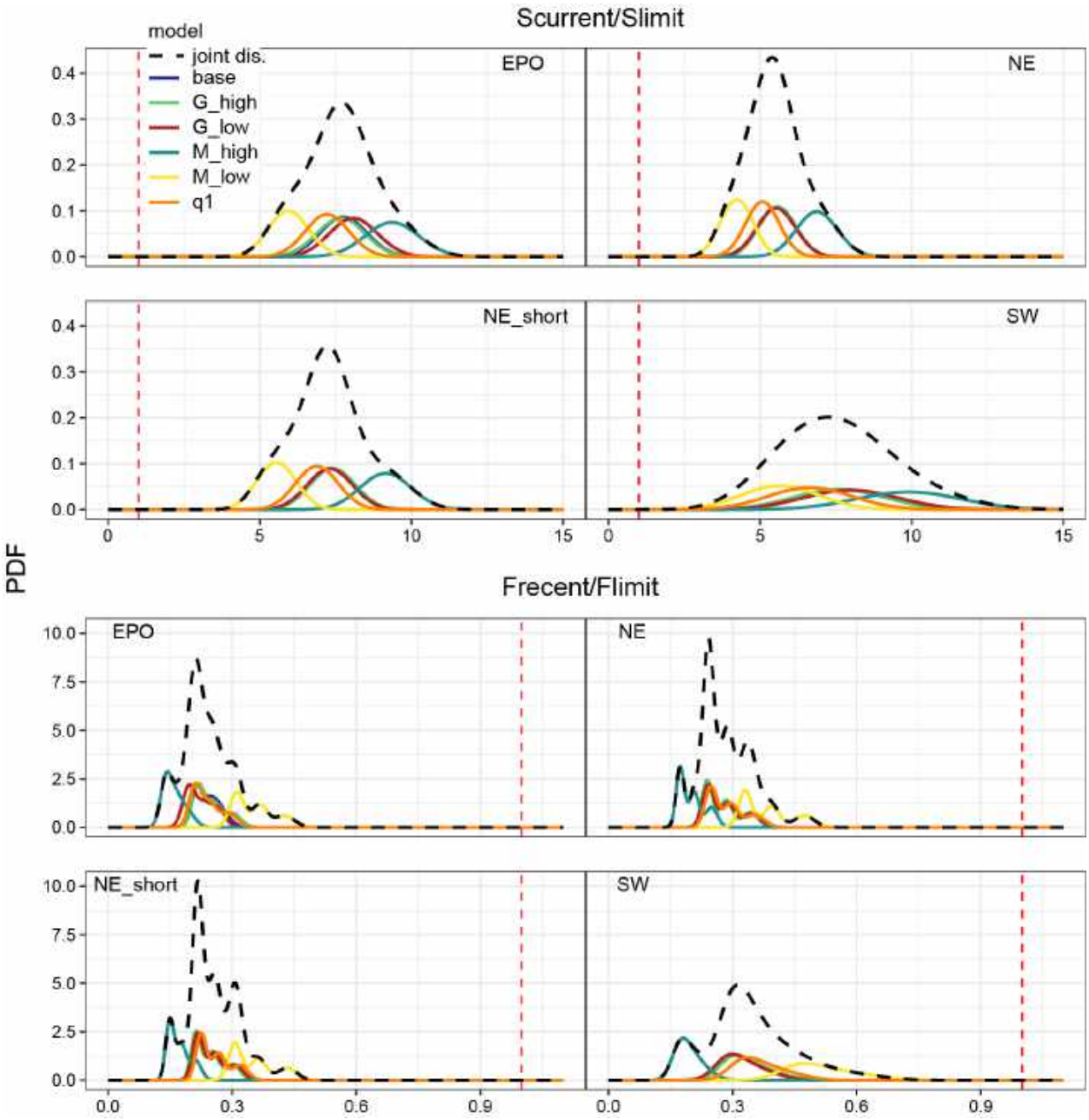


FIGURE B-13. The joint probability distributions for spawning biomass (S) in the first quarter of 2024 and average fishing mortality (F) in 2021-2023 relative to their limit reference points (S_{Limit} and F_{Limit}). The distributions are provided for each of the four spatial structure hypotheses separated into different components (level 2 hypotheses). The level 3 hypotheses (steepness values) were integrated out.

FIGURA B-13. Las distribuciones de probabilidad conjunta para la biomasa reproductora (S) en el primer trimestre de 2024 y la mortalidad por pesca (F) promedio en 2021-2023 en relación con sus puntos de referencia límite ($S_{Límite}$ y$F_{Límite}$). Las distribuciones se proporcionan para cada una de las cuatro hipótesis de estructura espacial separadas en distintos componentes (hipótesis de nivel 2). Las hipótesis de nivel 3 (valores de inclinación) se integraron fuera.

TABLE B-1. Management quantities for yellowfin tuna in the EPO for each spatial structure hypothesis. The medians (or expected values *) and probabilities were obtained from the join probability distributions across models.

TABLA B-1. Cantidades de ordenación para el atún aleta amarilla en el OPO para cada hipótesis de estructura espacial. Las medianas (o valores esperados *) y probabilidades fueron obtenidas de las distribuciones de probabilidad conjunta en todos los modelos.

	EPO	**NE**	**NE_short**	**SW**
*SRMS/S0 **	0.180	0.189	0.194	0.162
*SRMS_d/S0_d **	0.190	0.192	0.201	0.170
$F_{actual}/ F_{30\%S0_d}$	0.559	0.718	0.643	0.757
$p(F_{actual} > F_{30\%S0_d})$	0.002	0.059	0.020	0.161
F_{actual}/ F_{RMS}	0.397	0.532	0.484	0.502
$p(F_{actual} > F_{RMS})$	0.004	0.034	0.031	0.075
$F_{actual}/ F_{LÍMITE}$	0.232	0.272	0.243	0.330
$p(F_{actual} > F_{LÍMITE})$	0.000	0.000	0.000	0.000
$S_{actual}/ 30\%S0_d$	1.73	1.35	1.49	1.46
$p(S_{actual} < 30\%S0_d)$	0.0000588	0.044	0.004	0.081
$S_{(actual)\ (/)\ S(RMS_d)}$	2.38	1.82	1.91	2.22
$p(S_{actual} < S_{RMS_d})$	0.000	0.000	0.000	0.000
$S_{actual}/ S_{LÍMITE}$	7.67	5.43	7.23	7.48
$p(S_{actual} < S_{LÍMITE})$	0.000	0.000	0.000	0.000

C. SKIPJACK TUNA

Skipjack tuna are distributed in tropical waters across the Pacific Ocean. In the eastern Pacific Ocean (EPO), the majority of catch is taken by the purse seine fishery. Since 1990 the purse-seine fishery associated with floating objects has become the dominant fishery type (Figure C-1).

A benchmark stock assessment for skipjack tuna in the EPO was conducted using an integrated statistical age-structured catch-at-length model in Stock Synthesis. This assessment represents a significant improvement from the initial interim assessment conducted in 2022. It reflects major advancements in the assessment methodologies and incorporates new data sets, including tagging data collected through the Regional Tuna Tagging Program in the EPO.

Several data sources are available to fit the model, including data from sixteen defined fisheries and five "surveys". The fisheries are classified by gear type (purse-seine, longline) and purse-seine set type, which includes dolphin-associated (DEL), floating-object associated (OBJ), and unassociated (NOA) sets, as well as by geographical area of operation. The "surveys" data include: a) catch-per-set indices for purse-seine sets, by set type (OBJ, NOA), where the relationship between catch-per-set and abundance remains uncertain; b) an index based on recently developed echosounder buoy data; c) absolute biomass from a spatiotemporal Petersen-type model applied to tag-recapture data; and d) an index of relative biomass from a tagging biomass model that uses a flexible effort assumption. A reference model is developed based on the most plausible assumptions and sensitivity analyses are conducted by changing the assumptions of the reference model. There is substantial uncertainty about several model assumptions and sensitivity analyses are conducted to determine if the management advice is robust to the uncertainty, especially concerning model assumptions about growth and selectivity. There is also uncertainty about the reliability of different data sources, and there is conflict in the information they provide about absolute abundance. Sensitivity analyses are conducted to determine if the management advice is robust to the use of the different data sources. The diagnostics indicate that a data conflict exists. However, the management results were robust to the model assumptions about growth and selectivity, as well as to the inclusion or exclusion of the index of abundance and length-composition data sets.

MSY-based quantities cannot be estimated because the tradeoff between growth and natural mortality, in combination with the assumption that recruitment is independent of stock size, implies fish should be caught at the youngest ages to maximize yield, implying that the optimal fishing mortality should be infinite. Therefore, a conservative proxy for the target biomass of SBR = 0.3 based on values for bigeye and yellowfin, and the fishing mortality corresponding to that biomass, are proposed as the target reference points (SAC-14-09; SAC-14 INF-O). The reference model estimated that the 2023 exploitation rate was below *status quo* (average level of 2017-2019; Figure C-2). Only one of the sensitivity analyses, which removed the ECHO index, estimated exploitation rates that exceeded the *status quo* in 2023 slightly (Table C-1). The reference model and most of the sensitivity analyses estimate that the current biomass is above the target reference point and the fishing mortality is below the target fishing mortality (Figure C-3, Table C-1). Only the pessimistic model that excluded the echosounder buoy index estimates that the stock is below the proxy target and only when based on the static definition (Table C-1). None of these scenarios estimate that the stock is below the limit reference point (Table C-1).

A risk assessment conducted herein incorporates both the reference and seventeen sensitivity models to provide management advice, treating all models with equal weight. The risk analysis reveals unimodal probability distributions for key management metrics, indicating: a) a 4% probability that the spawning biomass at the start of 2024 was below 30% of the unexploited level, according to the dynamic SBR ($dSBR_{MSY\ proxy}$), b) zero probability that average fishing mortality during 2021-2023 exceeded the level associated with the target biomass ($F_{MSY\ proxy}$), and c) less than 1% probability that the spawning biomass at the start of 2024 was below the limit reference point (S_{limit}) (Figure C-4).

The improvement of the stock assessment for skipjack and future management advice will continue to strongly rely on the implementation of a comprehensive tagging program.

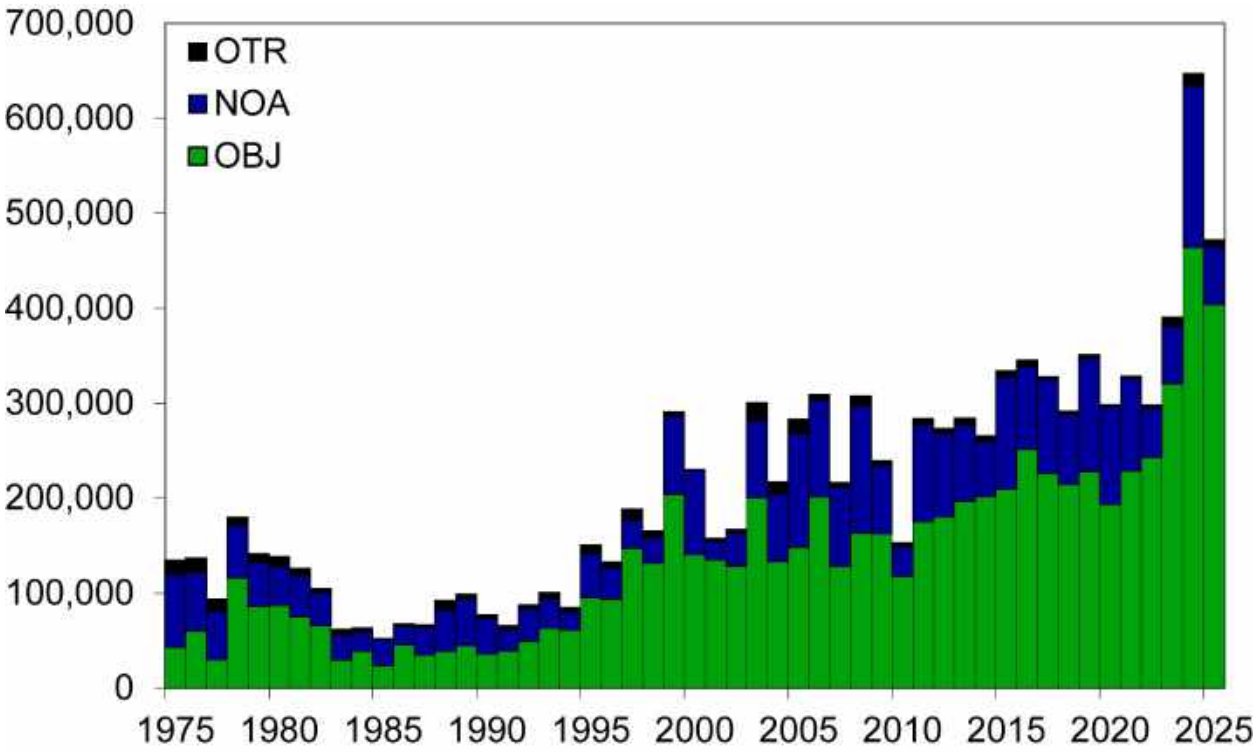


FIGURE C-1. Total catches (retained catches plus discards) for the purse-seine fisheries, by set type (NOA, OBJ) and retained catches for the other (OTR) fisheries, of skipjack tuna in the eastern Pacific Ocean, 1975-2025. The purse-seine catches are adjusted to the species composition estimate obtained from sampling the catches. The 2024 and 2025 catch data are preliminary.

FIGURA C-1. Capturas totales (capturas retenidas más descartes) en las pesquerías de cerco, por tipo de lance (NOA, OBJ), y capturas retenidas de las otras pesquerías (OTR), de atún barrilete en el Océano Pacífico oriental, 1975-2025. Se ajustan las capturas de cerco a la estimación de la composición por especie obtenida del muestreo de las capturas. Los datos de captura de 2024 y 2025 son preliminares.

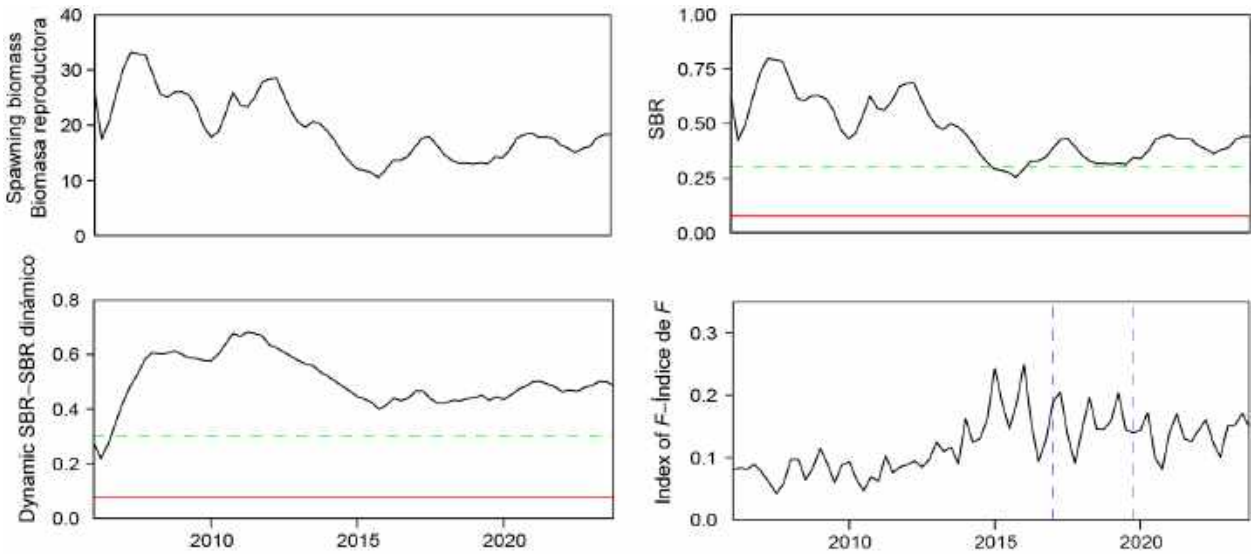


FIGURE C-2. Spawning biomass, spawning biomass ratio, dynamic spawning biomass ratio, and an index of quarterly exploitation rate for the reference model. The green dashed horizontal line is the target biomass reference point (SBR = 0.3) and the red horizontal dashed line is the limit biomass reference point (SBR = 0.077). The two vertical lines represent the *status quo* period (2017-2019).

FIGURA C-2. Biomasa reproductora, cociente de biomasa reproductora, cociente de biomasa reproductora dinámica y un índice de la tasa de explotación trimestral para el análisis de sensibilidad que supone que la edad de un pez de 37 cm es 3 trimestres. La línea horizontal verde discontinua es el punto de referencia objetivo de la biomasa (SBR = 0.3) y la línea horizontal roja discontinua es el punto de referencia límite de la biomasa (SBR = 0.077). Las dos líneas verticales representan el periodo de *statu quo* (2017-2019).

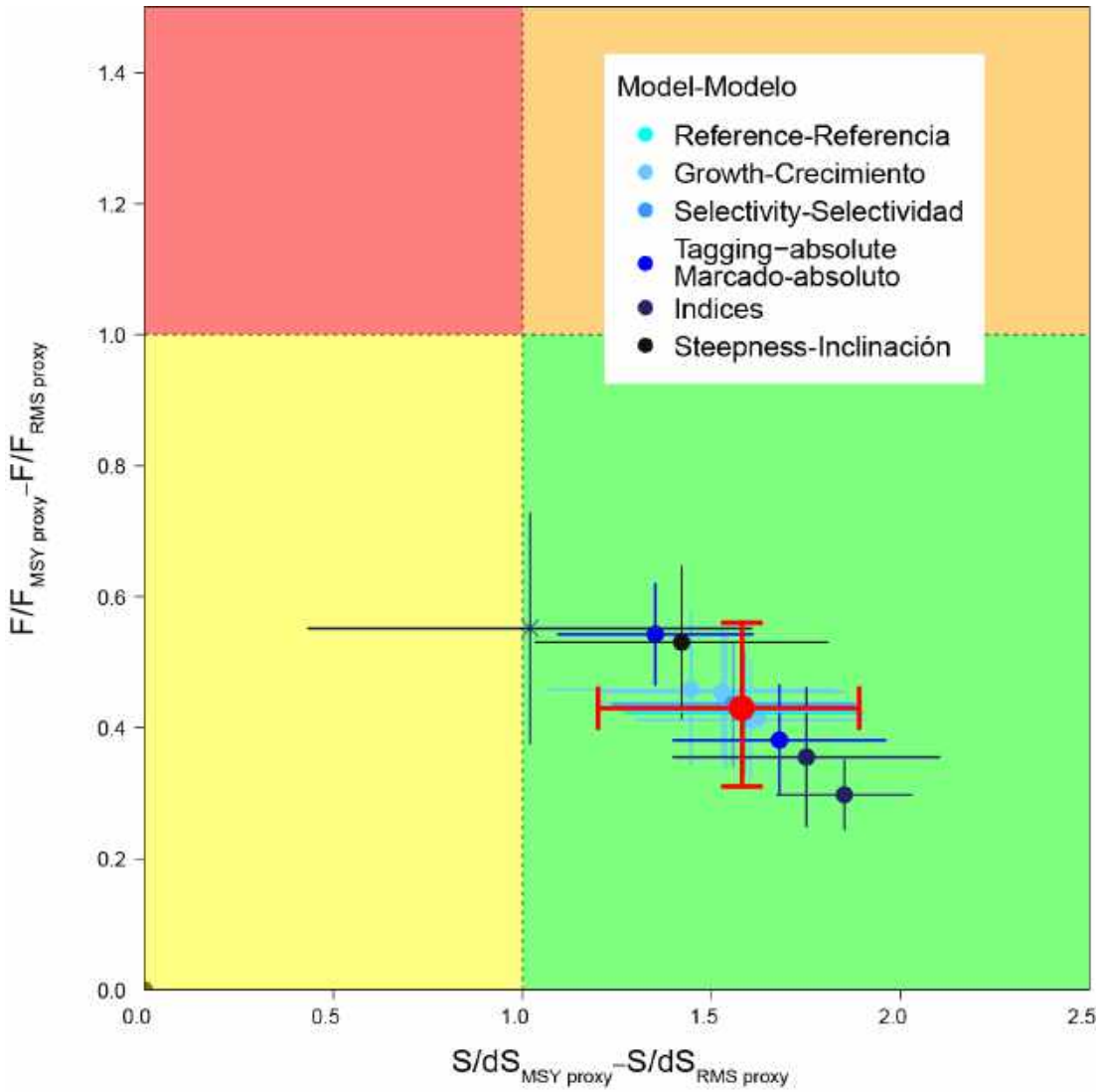


FIGURE C-3. Kobe plot showing the stock status estimates from all the models. The red dot and error bars represent weighted values across all eighteen models. The deep indigo cross and error bars represent the estimates from the model in which the ECHO index was removed.

FIGURA C-3. Gráfica de Kobe que muestra las estimaciones de la condición de la población de todos los modelos. El punto rojo y las barras de error representan los valores ponderados de los 18 modelos. La cruz azul oscuro y las barras de error representan las estimaciones del modelo en el que se eliminó el índice ECO.

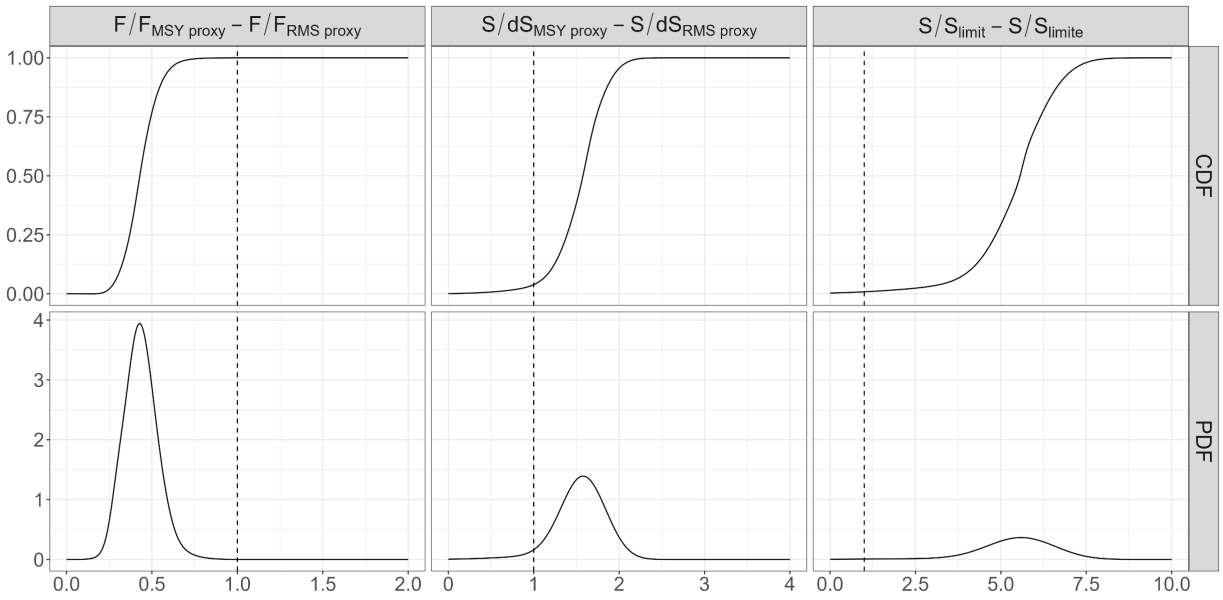


FIGURE C-4. The joint probability and cumulative distributions for spawning biomass (*S*) in the first quarter of 2024 and fishing mortality (*F*) in 2021-2023 relative to their reference points ($F_{\text{MSY proxy}}$, $dS_{\text{MSY proxy}}$, S_{limit}).

FIGURA C-4. Las distribuciones acumuladas y de probabilidad conjunta para la biomasa reproductora (*S*) en el primer trimestre de 2024 y la mortalidad por pesca (*F*) en 2021-2023 con respecto a sus puntos de referencia ($F_{\text{RMS sust.}}$, $dS_{\text{RMS sust.}}$, $S_{\text{límite}}$).

TABLE C-1. Estimates of spawning biomass (SB), spawning biomass ratio (SBR) and dynamic spawning biomass ratio (dSBR) at the beginning of 2024, average recruitment over the model time period (except the 4th quarter of 2023) as a ratio of the estimated virgin recruitment for all of the models, average exploitation rate in 2022 as a ratio of the *status quo*, average exploitation rate in 2023 as a ratio of the *status quo*, and current fishing mortality (the average F over the most recent three years, 2021-2023) as a ratio of the fishing mortality corresponding to $B_{\text{MSY proxy}} = 0.3B_0$. R_{ave}/R_0 is a check to make sure the SBR based on B_0 is not biased due to the bias correction for recruitment residuals (this will affect the plots of SBR that are plotted with confidence intervals). The dSBR is adjusted by the ratio R_{ave}/R_0. The red highlighting and text indicate where SBR or dSBR are below the proxy target reference point (0.3) and when the *status quo* fishing mortality (average of 2017-2019) has been exceeded.

TABLA C-1. Estimaciones de biomasa reproductora (SB), cociente de biomasa reproductora (SBR), cociente de biomasa reproductora dinámica (dSBR), reclutamiento promedio a lo largo del periodo del modelo (excepto el cuarto trimestre de 2023) como razón del reclutamiento virgen estimado para todos los modelos, tasa promedio de explotación en 2022 como razón del *statu quo*, tasa promedio de explotación en 2023 como razón del *statu quo*, y mortalidad por pesca actual como razón de la mortalidad por pesca correspondiente a $B_{\text{objetivo}} = 0.3B_0$. R_{prom}/R_0 es una comprobación para asegurarse de que el SBR basado en B_0 no esté sesgado debido a la corrección del sesgo por los residuales de reclutamiento (esto afectará a las gráficas de SBR que se trazan con intervalos de confianza). El dSBR se ajusta por la razón R_{prom}/R_0. Las celdas y el texto en rojo indican los casos en que el SBR o dSBR están por debajo del punto de referencia objetivo sustituto (0.3) y cuando se ha rebasado la mortalidad por pesca del *statu quo* (promedio de 2017-2019).

Group	ID	Model	S_{cur}	SBR_{cur}	$dSBR_{cur}$	R_{av}/R_0	F_{2022}/F_{sq}	F_{2023}/F_{sq}	$F_{cur}/FB_{MSY\ proxy}$
Reference	1	Reference model	17809	0.43	0.47	0.95	0.85	0.85	0.42
Growth	2	Estimating L_{inf}	17873	0.43	0.48	0.95	0.85	0.85	0.42
	3	L_{inf} = 78 cm	16769	0.42	0.46	0.95	0.85	0.85	0.45
	4	L_{inf} = 88 cm	18181	0.43	0.48	0.96	0.85	0.84	0.41
	5	Estimating L_{cv}	14055	0.41	0.43	1.01	0.82	0.82	0.46
	6	L_{cv} = 0.03	18926	0.43	0.49	0.94	0.86	0.85	0.41
	7	L_{cv} = 0.09	16612	0.42	0.46	0.97	0.84	0.84	0.44
	8	Estimating growth shape parameter	17814	0.43	0.48	0.95	0.85	0.85	0.42
Selectivity	9	Constant longline selectivity after 78 cm	17873	0.43	0.48	0.95	0.85	0.85	0.42
	10	Constant longline selectivity after 83 cm	17818	0.43	0.48	0.95	0.85	0.85	0.42
	11	Constant longline selectivity after 88 cm	17826	0.43	0.48	0.95	0.85	0.85	0.42
	12	F9 asymptotic selectivity, fixed longline selectivity and no fit for longline size composition	17263	0.42	0.47	0.96	0.85	0.85	0.44
Tagging-absolute	13	Using the most precise tagging-based absolute index and upweight by ten times	13357	0.37	0.41	0.95	0.90	0.87	0.54
	14	Using four tagging-based absolute indices with low CVs and weight by one	20018	0.46	0.50	0.96	0.83	0.83	0.38
Indices	15	No tagging-based absolute index	21849	0.47	0.53	0.96	0.83	0.83	0.36
	16	No echosounder buoy index	8543	0.22	0.31	0.96	1.00	1.07	0.55
	17	Including longline survey index and size composition	24444	0.50	0.56	0.95	0.80	0.85	0.30
Steepness	18	Steepness = 0.75	18420	0.39	0.43	0.92	0.85	0.84	0.53

D. BIGEYE TUNA

For the full version of this analysis, see document SAC-17-03.

Bigeye tuna are distributed in tropical and temperate waters across the Pacific Ocean. In the eastern Pacific Ocean (EPO), the majority of catch before 1993 was taken by longline fisheries that target large bigeye (Figure D-1). Due to the expansion of purse-seine fisheries associated with floating objects, purse-seine fisheries that catch small bigeye have replaced longline fisheries as the dominant fishery type for EPO bigeye since 1996. A workplan to improve the stock assessments for tropical tunas was executed and an external review for data used in stock assessments and an external review of modelling aspects for stock assessments were completed.

In the last benchmark assessment (SAC-15-02), the overarching hypothesis for bigeye tuna aimed to explain the apparent regime shift in recruitment estimates that coincided with the expansion of the floating-object fishery in the EPO. However, the degree of the regime shift in recruitment estimates from the new assessment models is reduced greatly, from 140% to 20% for the base reference model. As such, this overarching hypothesis is not included in this benchmark assessment. This significant decrease of the regime shift in recruitment results from the combination of changes made to the assessment model. Among these changes the most influential in reducing the regime shift are adding one more time block to the selectivity of longline fishery fleets in 2011, improving the CPUE standardization model, and using the Lorenzen natural mortality curve for juvenile bigeye. The reference models in this benchmark assessment address three major uncertainties within a hierarchical framework: (1) the misfit to the length-composition data for the longline fishery that is assumed to have asymptotic selectivity; (2) the degree of effort creep in the longline fishery; and (3) the steepness of the stock-recruitment relationship.

Level 1 hypothesis: Four models are included to address the misfit to the composition data for the longline fishery that is assumed to have asymptotic selectivity: (1) ignore the issue (Fix); (2) estimate the growth curve with a prior on L_{inf} (Gro); (3) estimate a dome-shape selectivity curve for the longline fishery that is assumed to have asymptotic selectivity (Sel); and (4) estimate the scaler of the natural mortality vector (Mrt). Additionally, a model where growth rather than natural mortality is sex-specific is explored to address the misfit, but it is not included for this hypothesis due to its worse misfit compared to the model where the issue is ignored (Fix). The four reference models are equally weighted. The decision to equally weight the four models is made based on the outcome of the two risk analysis workshops organized by the IATTC (WSRSK-01-RPT and WSRSK-02-RPT).

Level 2 hypothesis: Three levels of annual increasing rate of the longline catchability for bigeye are included to address the uncertainty in effort creep. Considering that bigeye is the main target species of the Japanese longline fishery in the EPO, its catchability in this fishery is expected to increase owing to advancements in fishing skill and technology. The review panel suggests considering a 1% annual increase in the catchability of bigeye in the longline fishery (RVMTT-01-RPT). Based on this recommendation, three annual increases in longline catchability (0%, 1%, and 2%) are considered to address this uncertainty, each equally weighted.

Level 3 hypothesis: Three steepness values (1.0, 0.9, and 0.8) are included to address the uncertainty in the shape of the stock-recruitment relationship. The three steepness values are weighted based on expert judgement from the risk analysis for the last benchmark assessment (SAC-11 INF-F).

The stock assessment of bigeye tuna in the EPO was updated in 2026 using data up to the last quarter of 2025 (SAC-17-03). Data updated for this assessment include new longline indices of relative abundance, longline and purse-seine catches, and purse-seine length compositions for 2024 and 2025, new longline length compositions for 2023 and 2024, and updated data for previous years were available, all of which were incorporated to estimate the current stock status. All model assumptions and parameters in this update assessment are set identically to those employed in the 2024 benchmark assessment.

Results from the thirty-six converged reference models show that (1) there is no apparent regime shift in

recruitment and a strong recruitment is estimated for 2023 (Figure D-2); (2) there is an overall decreasing trend in spawning biomass until 2025 when the trend started to turn positive (Figure D-3); (3) the fishing mortality on juvenile bigeye has decreased significantly since 2022 (Figure D-4).

The estimates from the thirty-six converged reference models are combined in a risk analysis framework to provide management advice (Figure D-5). The overall results of the risk analysis show unimodal probability distributions for management quantities. The risk analysis indicates the following regarding management quantities,:

- **19.5%** probability that the spawning biomass at the beginning of 2026 falls below the target reference point associated with the MSY (median $S_{current}/S_{MSY_d} = 1.43$; Figure D-6)
- **0.3%** probability that the fishing mortality in 2023-2025 exceeds the target reference point associated with the MSY (median $F_{current}/F_{MSY} = 0.52$; Figure D-6)
- **53.4%** probability that the spawning biomass at the beginning of 2026 falls below the target reference point associated with 30% dynamic SBR (median $S_{current}/S_{30\%} = 0.98$; Figure D-6)
- **3.0%** probability that the fishing mortality in 2023-2025 exceeds the target reference point associated with 30% dynamic SBR (median $F_{current}/F_{30\%} = 0.70$; Figure D-6)
- **0.0%** probability that the spawning biomass at the beginning of 2026 falls below the limit reference point associated with 7.7% SBR (median $S_{current}/S_{limit} = 3.45$; Figure D-7)
- **0.0%** probability that the fishing mortality in 2023-2025 exceeds the limit reference point associated with 7.7% SBR (median $F_{current}/F_{limit} = 0.33$; Figure D-7)

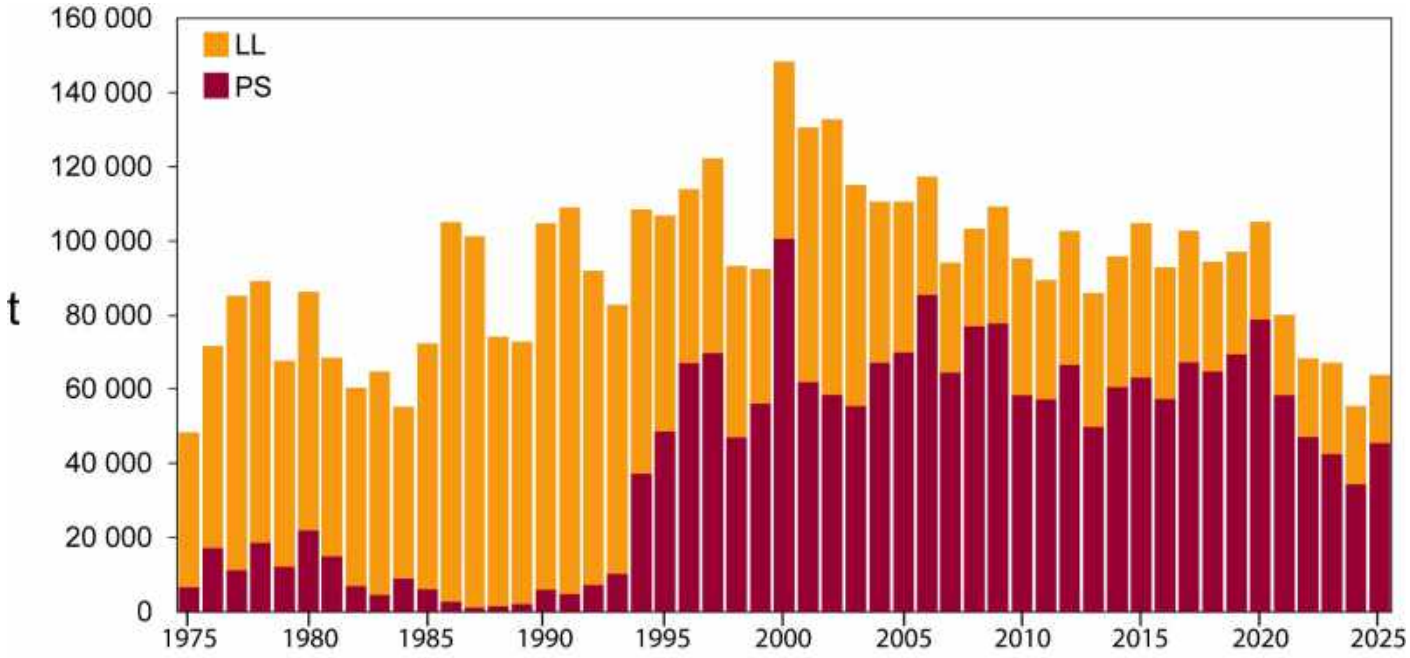


FIGURE D-1. Total catches (retained catches plus discards) by the purse-seine (PS) fisheries, and retained catches by the longline (LL) fisheries, of bigeye tuna in the eastern Pacific Ocean, 1975-2025. The purse-seine catches are adjusted to the species composition estimate obtained from sampling the catches. 2024 and 2025 data are preliminary.

FIGURA D-1. Capturas totales (capturas retenidas más descartes) de las pesquerías de cerco (PS), y capturas retenidas de las pesquerías de palangre (LL), de atún patudo en el Océano Pacífico oriental, 1975-2025. Se ajustan las capturas de cerco a la estimación de la composición por especie obtenida del muestreo de las capturas. Los datos de 2024 y 2025 son preliminares.

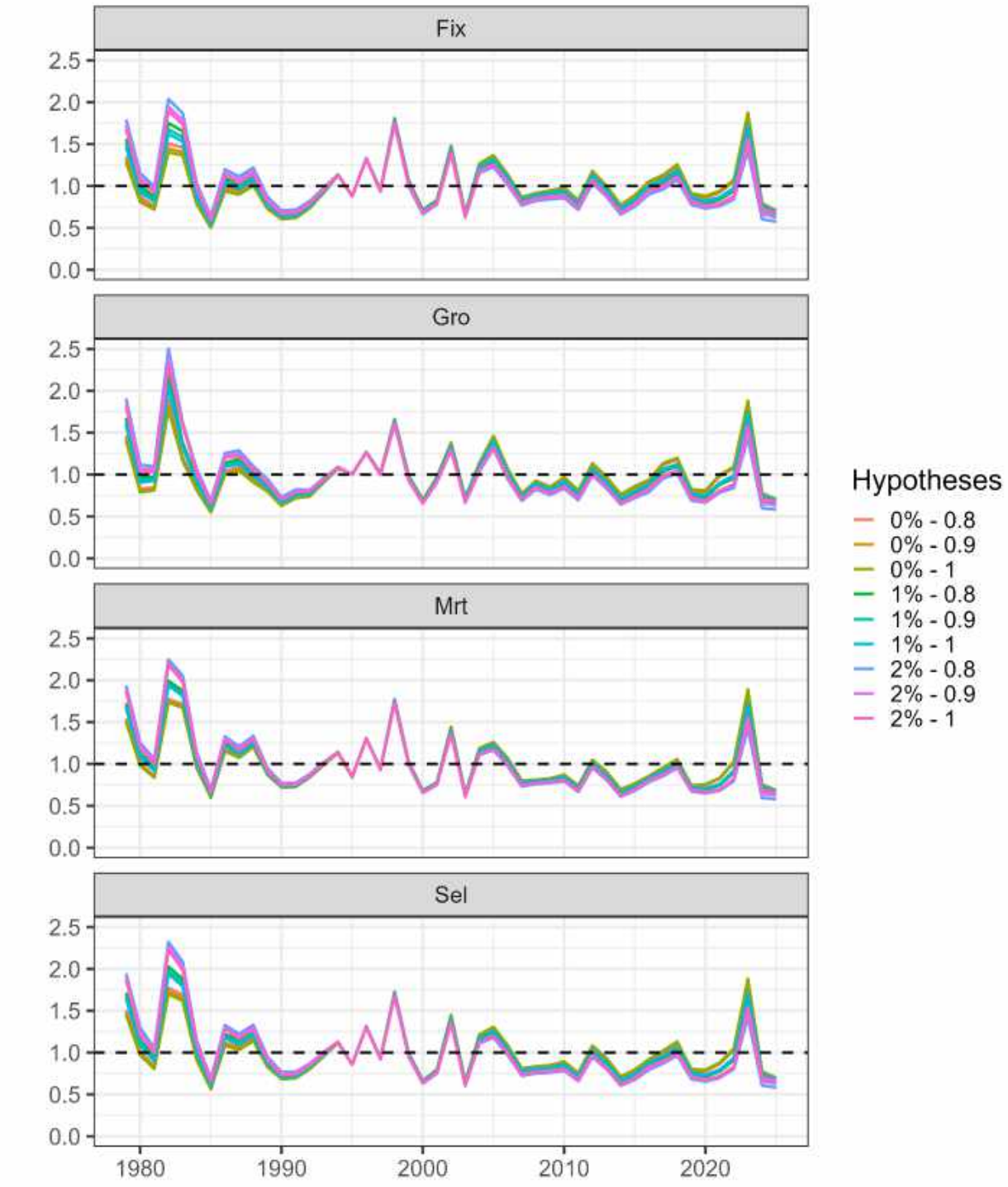


FIGURE D-2. Comparison of estimated relative annual recruitment of bigeye tuna between 1979 and 2025.
FIGURA D-2. Comparación del reclutamiento anual relativo estimado del atún patudo entre 1979 y 2025.

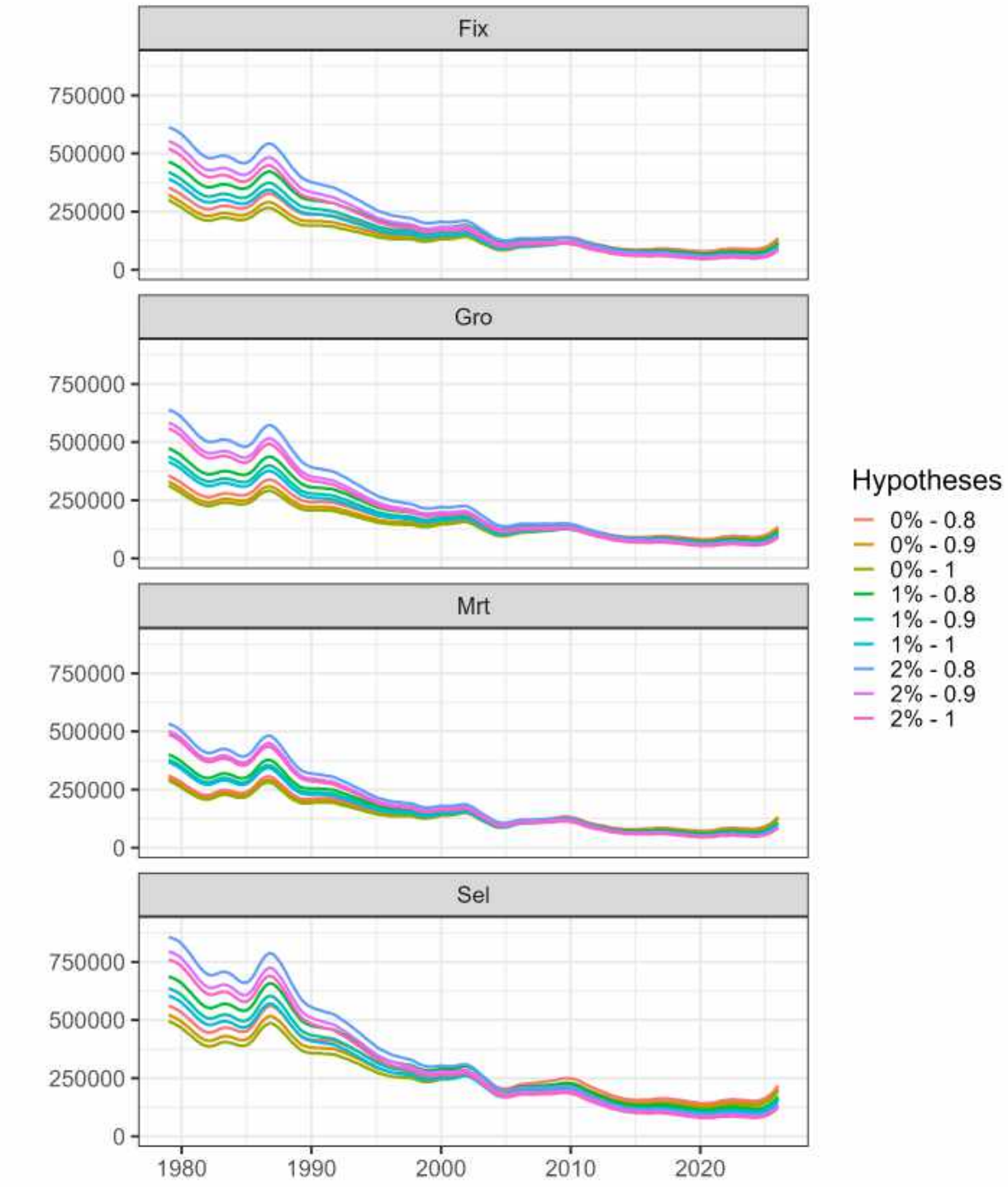


FIGURE D-3. Comparison of estimated spawning biomass of bigeye tuna between 1979 and 2025.
FIGURA D-3. Comparación de la biomasa reproductora estimada del atún patudo entre 1979 y 2025.

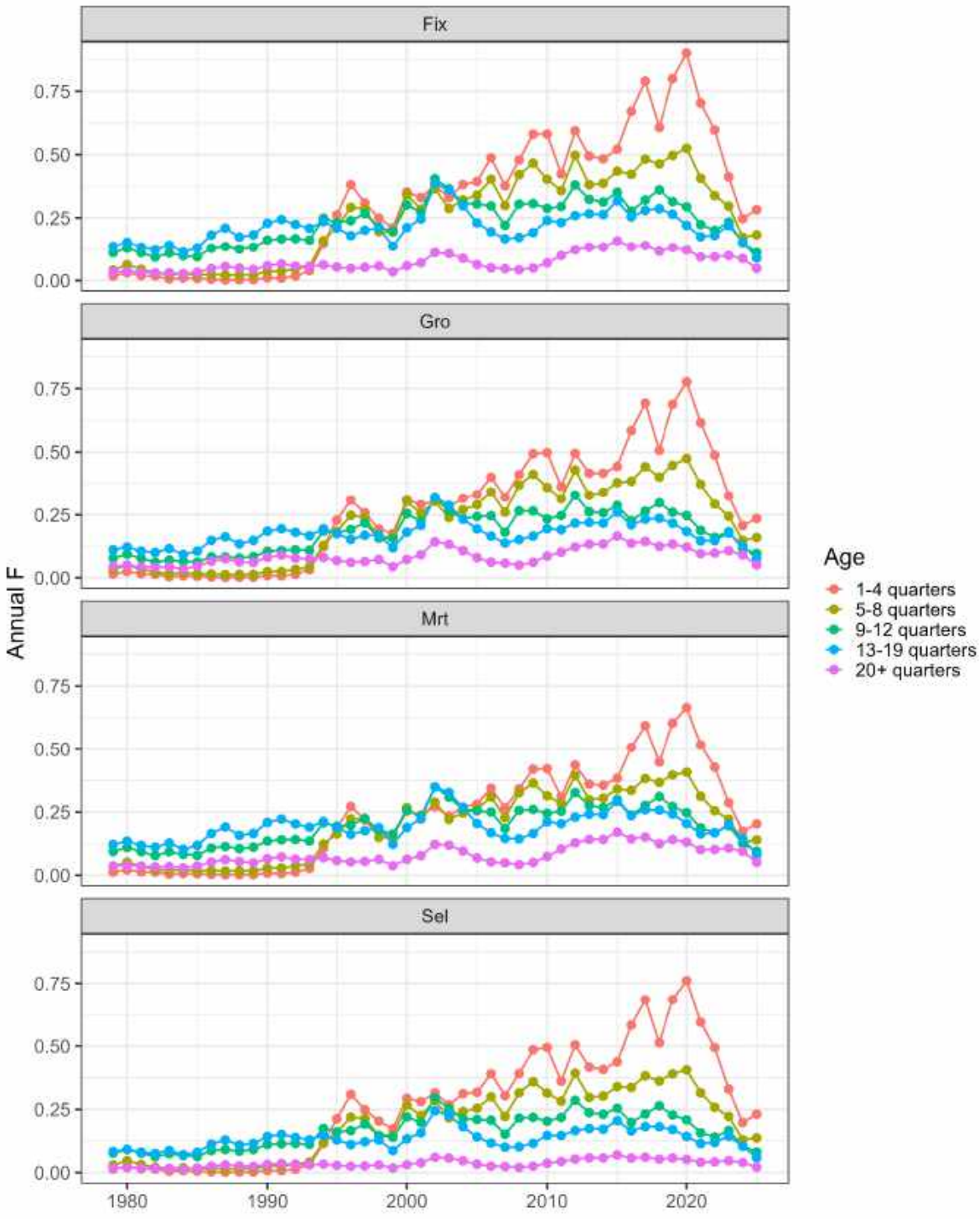


FIGURE D-4. Comparison of average annual fishing mortality, by age groups, of bigeye tuna between 1979 and 2025. The values for each model and age group are weighted across the second- and third-level hypotheses.

FIGURA D-4. Comparación de la mortalidad por pesca anual promedio, por grupos de edad, del atún patudo entre 1979 y 2025. Los valores para cada modelo y grupo de edad se ponderan en las hipótesis de segundo y tercer nivel.

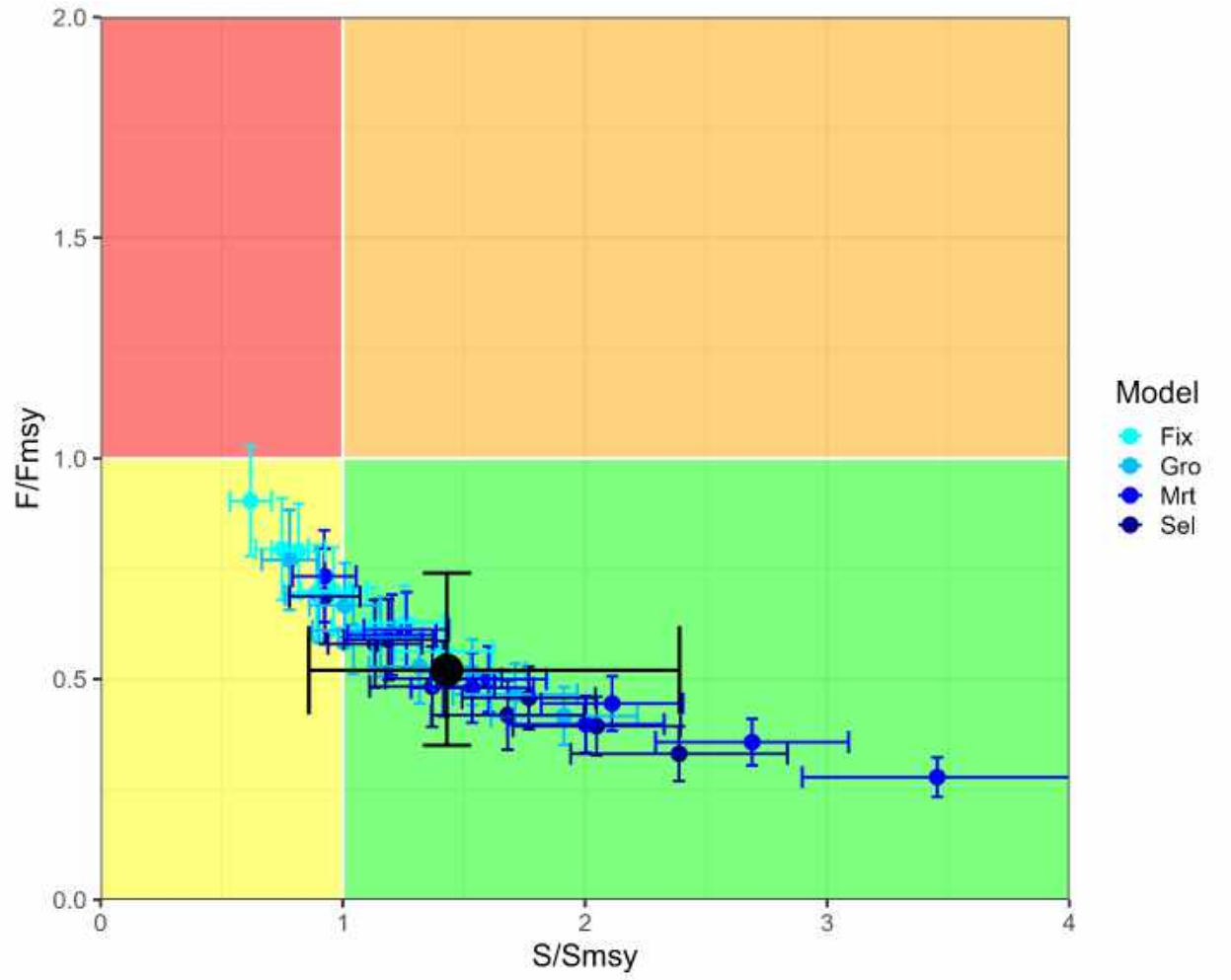


FIGURE D-5. Kobe plot of the most recent estimates of spawning biomass (*S*) and fishing mortality (*F*) relative to their MSY reference points (S_{MSY_d} and F_{MSY}) from the 36 reference models. Each dot is based on the average *F* over the most recent three years, 2023-2025, and the error bars represent the 95% confidence interval of model estimates. The black dot and error bars represent the medium and 95% confidence interval of combined values, respectively.

FIGURA D-5. Gráfica de Kobe de las estimaciones más recientes de biomasa reproductora (*S*) y mortalidad por pesca (*F*) con respecto a sus puntos de referencia de RMS (*SRMS_d* y *FRMS*) de los 36 modelos de referencia. Cada punto se basa en la *F* promedio de los últimos tres años, 2023-2025, y las barras de error representan el intervalo de confianza del 95% de las estimaciones de los modelos. El punto negro y las barras de error representan el intervalo de confianza medio y del 95% de los valores combinados, respectivamente.

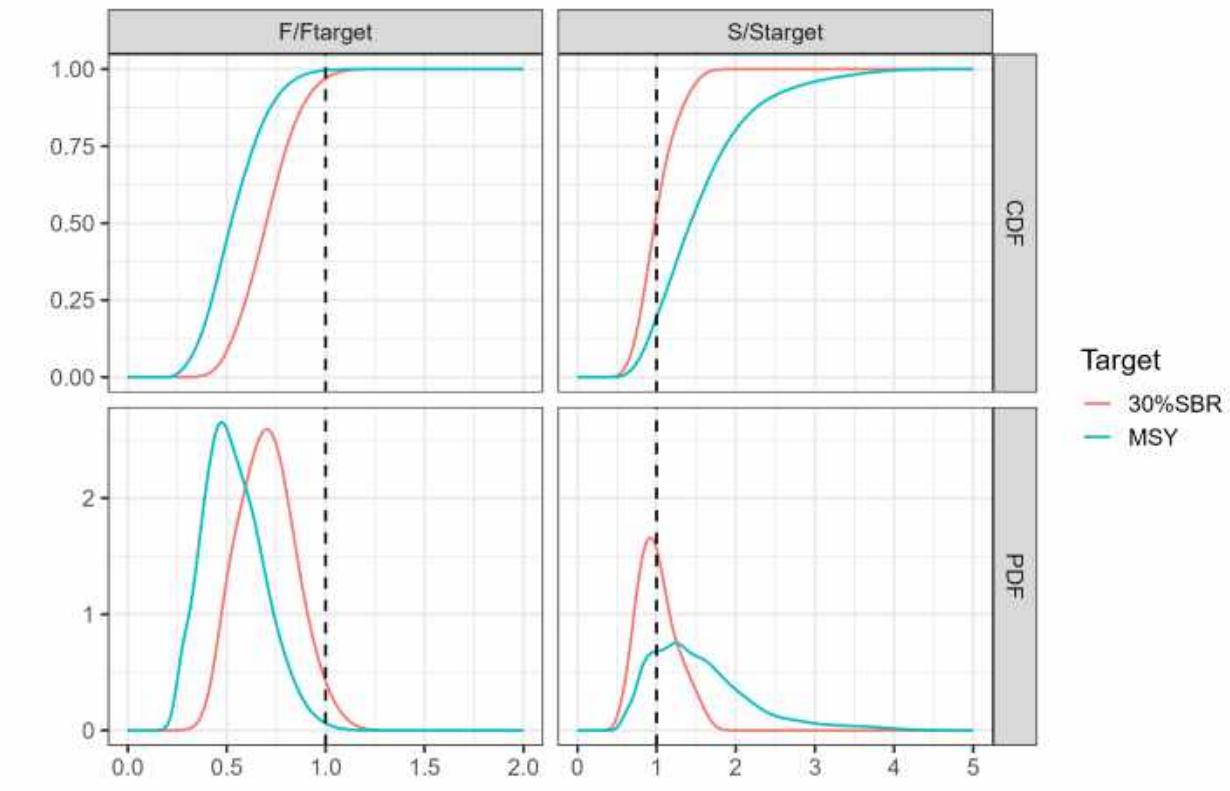


FIGURE D-6. The joint probability and cumulative distribution functions for spawning biomass (S) in the first quarter of 2026 and fishing mortality (F) in 2023-2025 relative to their MSY (S_{MSY_d} and F_{MSY}) and 30% SBR ($S_{30\%}$ and $F_{30\%}$) reference points.

FIGURA D-6. Funciones de distribución acumulada y de probabilidad conjunta para la biomasa reproductora (*S*) en el primer trimestre de 2026 y la mortalidad por pesca (*F*) en 2023-2025 en relación con sus puntos de referencia de RMS (*SRMS_d y FRMS*).

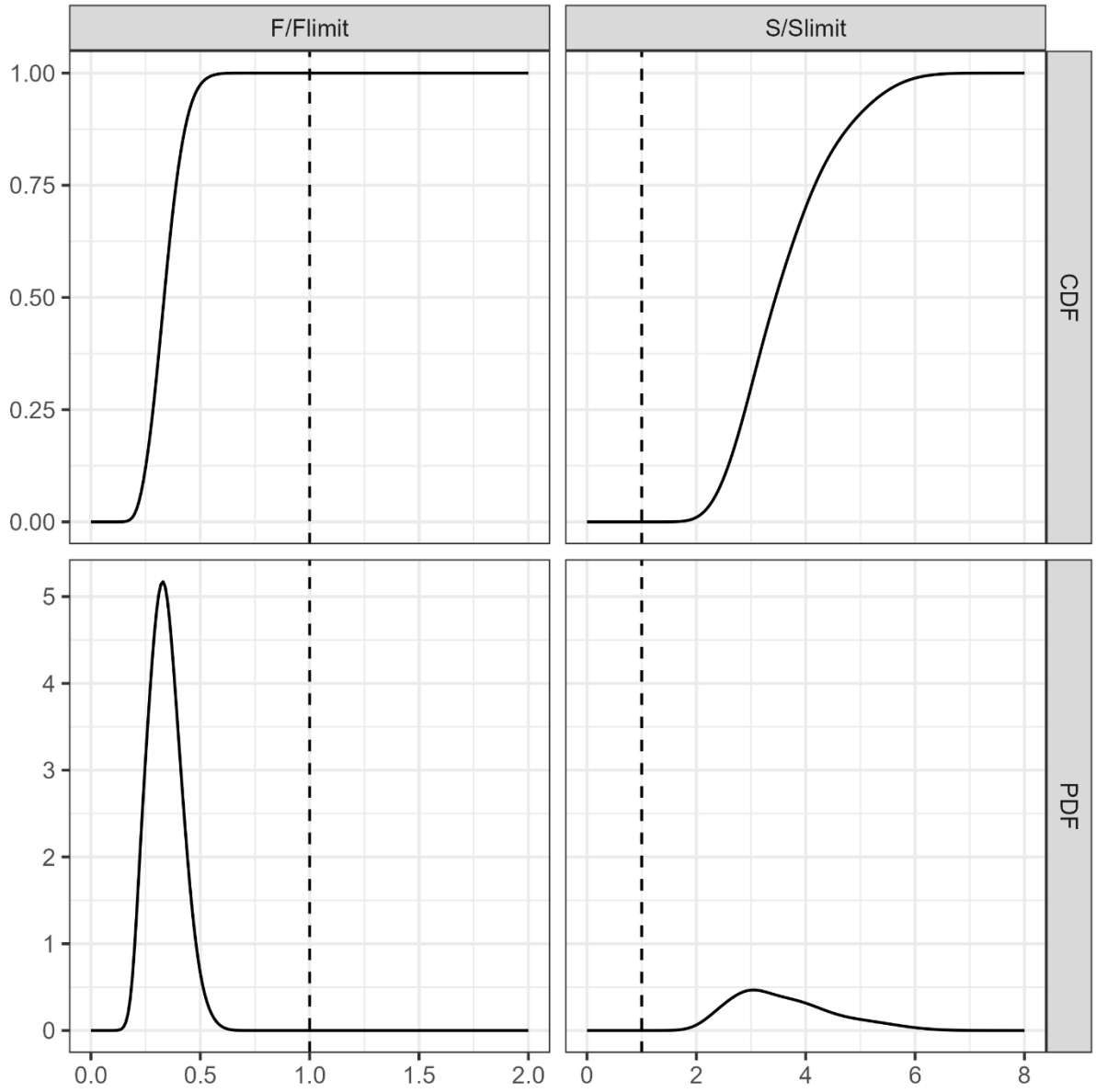


FIGURE D-7. The joint probability and cumulative distribution functions for spawning biomass (S) in the first quarter of 2026 and fishing mortality (F) in 2023-2025 relative to their limit reference points (S_{Limit} and F_{Limit}).

FIGURA D-7. Funciones de distribución acumulada y de probabilidad conjunta para la biomasa reproductora (*S*) en el primer trimestre de 2026 y la mortalidad por pesca (*F*) en 2023-2025 en relación con sus puntos de referencia límite ($S_{Límite}$ y $F_{Límite}$).

E. PACIFIC BLUEFIN TUNA

Tagging studies have shown that there is exchange of Pacific bluefin between the eastern and western Pacific Ocean. Larval, post larval, and early juvenile bluefin have been caught in the western Pacific Ocean (WPO), but not in the eastern Pacific Ocean (EPO), so it is likely that there is a single stock of bluefin in the Pacific Ocean (or possibly two stocks in the Pacific Ocean, one spawning in the vicinity of Taiwan and the Philippines and the other spawning in the Sea of Japan).

Most of the commercial catches of bluefin in the EPO are taken by purse seiners. Nearly all of the purse-seine catches have been made west of Baja California and California, within about 100 nautical miles of the coast, between about 23°N and 35°N. Ninety percent of the catch is estimated to have been between about 60 and 100 cm in length, representing mostly fish 1 to 3 years of age. Aquaculture facilities for bluefin were established in Mexico in 1999, and some Mexican purse seiners began to direct their effort toward bluefin during that year. During recent years, most of the catches have been transported to holding pens, where the fish are held for fattening and later sale to sashimi markets. Lesser amounts of bluefin are caught by recreational, gillnet, and longline gear. Bluefin have been caught in the EPO during every month of the year, but most of the fish are taken from May through October.

Bluefin are exploited by various gears in the WPO from Taiwan to Hokkaido, Japan. Age-0 fish, about 15 to 30 cm in length, are caught by the Japanese troll fishery during July-October south of Shikoku Island and south of Shizuoka Prefecture. During November-April, age-0 fish about 35 to 60 cm in length are taken in troll fisheries south and west of Kyushu Island. Age-1 and older fish are caught by purse seining, mostly during May-September, between about 30°-42°N and 140°-152°E. Bluefin of various sizes are also caught by traps, gillnets, and other gear, especially in the Sea of Japan. Additionally, small amounts of bluefin are caught near the southeastern coast of Japan by longlining. The Chinese Taipei small-scale longline fishery, which has expanded since 1996, takes bluefin tuna more than 180 cm in length from late April to June, when they are aggregated for spawning in the waters east of the northern Philippines and Taiwan.

The high-seas longline fisheries are directed mainly at tropical tunas, albacore, and billfishes, but small amounts of Pacific bluefin are caught by these fisheries. Small amounts of bluefin are also caught by Japanese pole-and-line vessels on the high seas.

Tagging studies, conducted with conventional and archival tags, have revealed a great deal of information about the life history of bluefin. Some fish apparently remain their entire lives in the WPO, while others migrate to the EPO. These migrations begin mostly during the first and second years of life. The first- and second-year migrants are exposed to various fisheries before beginning their journey to the EPO. Then, after crossing the ocean, they are exposed to commercial and recreational fisheries off California and Baja California. Eventually, the survivors return to the WPO.

Bluefin more than about 50 cm in length are most often found in waters where the sea-surface temperatures (SSTs) are between 17° and 23°C. Fish 15 to 31 cm in length are found in the WPO in waters where the SSTs are between 24° and 29°C. The survival of larval and early juvenile bluefin is undoubtedly strongly influenced by the environment. Conditions in the WPO probably influence recruitment, and thus the portions of the juvenile fish there that migrate to the EPO, as well as the timing of these migrations. Likewise, conditions in the EPO probably influence the timing of the return of the juvenile fish to the WPO.

The total catches of bluefin have fluctuated considerably during the last 50 years (Figure E-1). The consecutive years of above-average catches (mid-1950s to mid-1960s) and below-average catches (early 1980s to early 1990s) could be partially due to consecutive years of above-average and below-average recruitments. The estimated impact of the fisheries on the bluefin population for the entire time period modeled (1952-2012) is substantial (Figure E-2). The WPO fisheries have had a greater impact than the EPO fisheries, and their impact increased starting in 1980s only leveling off in 2000s.

A benchmark stock assessment was carried out by the Pacific Bluefin Working Group of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) in 2024. The assessment was conducted with Stock Synthesis, an integrated statistical age-structured

stock assessment model. A peer review of the assessment was conducted in 2026, and the next benchmark assessment is scheduled for 2027.

The base-case model results show that: (1) spawning stock biomass (SSB) fluctuated throughout the assessment period (fishing years 1983-2022); (2) the SSB steadily declined from 1996 to 2010; (3) the SSB has rapidly increased since 2011; (4) fishing mortality decreased from a level producing about 1% of spawner-per-recruit (SPR) in 2004-2009 to a level producing 23.6% of SPR in 2020-2022; and (5) SSB in 2022 increased to 23.2% of SSB0, achieving the second rebuilding target by WCPFC and IATTC in 2021, and (6) the probability that it is above 20%SSB0 is 75.9%, which is greater than the 60% defined in resolution C-18-02. Based on the model diagnostics, the estimated biomass trend throughout the assessment period is considered robust. The SSB in 2022 was estimated to be 144,483 t, more than 10 times of its historical low in 2010. An increase in immature fish (0-3 years old) is observed in 2016-2019, likely resulting from reduced fishing mortality on this age group. This led to a substantial increase in SSB after 2019. No biomass-based or fishing mortality limit or target reference points have been adopted to evaluate whether Pacific bluefin is overfished.

Historical recruitment estimates have fluctuated since 1983 without an apparent trend. Currently, stock projections assume that future recruitment will fluctuate around the historical (1983-2020 FY) average recruitment level. Previously, no significant autocorrelation was found in recruitment estimates, supporting the use in the projections of recruitment sampled at random from the historical time series. In addition, now that SSB has recovered to 23.2%SSB0, the PBFWG considers the assumption that the future recruitment will fluctuate within the historical range to be reasonable. The PBFWG also confirmed that the distributions of historical recruitment from the updated long-term model (1952-2022) and the present base-case model (1983-2022) are comparable.

Resolution C-18-02 states that the Commission recognizes that the management objective of the IATTC is to maintain or restore fish stocks at levels capable of producing MSY, and shall implement a provisional rebuilding plan by adopting an 1) initial (first) rebuilding target of $SSB_{med,\ 1952\text{-}2014}$ (the median point estimate for 1952-2014) to be achieved by 2024 with at least 60% probability and 2) a second rebuilding target of 20%SSB0 to be achieved within 10 years of reaching the initial rebuilding target or by 2034, whichever is earlier, with at least 60% probability. The IATTC has adopted resolutions to restrict the catch of bluefin tuna in the EPO (e.g. C-16-08, C-18-01, C-20-02, C-21-05). Resolution C-18-02 also requires that no later than the IATTC meeting in 2020, taking into account the outcomes of the Joint IATTC-WCPFC NC Working Group, the Commission shall consider and develop candidate reference points and harvest control rules. These candidate reference points and harvest control rules will be forwarded to the Joint IATTC-WCPFC NC Working Group and ISC for consideration and potential inclusion in a management strategy evaluation to be completed by the ISC. This task has still not been accomplished.

SSB of PBF reached its initial rebuilding target (SSBMED = 6.3%SSB0) in 2017, 7 years earlier than originally anticipated by the RFMOs, and its second rebuilding target (20%SSB0) in 2021. Resolution C-23-01 provided a harvest control rule to be applied based on the results of stock assessments and SSB projections from the year in which the stock has achieved the second rebuilding target to the year a long-term harvest strategy based on an MSE process is implemented.

a. If the SSB projection indicates that SSB will be below 20%SSB0 with a probability of 60%, management measures shall be modified to increase the SSB to at least 20%SSB0 with 60% probability. For this purpose, the IATTC scientific staff is requested to collaborate with the ISC to provide information on possible management measures to achieve 60% that the stock is above 20%SSB0 after 10 years of the latest stock assessment.

b. If the SSB projection indicates that SSB will be greater than 20%SSB0 with a probability of 60%, management measures should be adjusted so long as any changes maintain SSB greater than 20%SSB0 with a probability of 60%. For this purpose, the IATTC scientific staff is requested to collaborate with the ISC to provide information on possible management under which the stock is maintained above 20%SSB0 with a probability of 60%.

c. Any adjustments to management measures shall be considered in cooperation between the IATTC and WCPFC taking into account historical and future projected proportional fishery impacts on SSB between fisheries in the EPO and fisheries in the WCPO. For this purpose, the IATTC scientific staff is requested to collaborate with the ISC to provide relevant information, including projected proportional fishery impact of potential management measures changes.

d. This harvest control rule will be reviewed and modified, as necessary, if depletion estimates across the time-series have been adjusted due to changes in assumptions and/or settings of the stock assessment model.

IATTC Resolution C-24-02 establishes management of Pacific bluefin tuna in the EPO for the period 2025 2026, defining total commercial catches and biennial catch limits for each CPC. This resolution expires at the end of 2026.

Management Strategy Evaluation (MSE) was completed for Pacific bluefin in 2025 (SAC-17 INF-H.a). The sixteen Harvest Control Rules (HCRs) tested in the MSE were put forward by the Pacific bluefin Joint Working Group (JWG). Each HCR used the same simplified version of the stock assessment model as the estimation model, but varied in the HCR's target fishing mortality and the location of the control points. The HCRs were tested using twenty different operating models based on the stock assessment model and were evaluated based on several performance metrics.The JWG has not agreed on their preferred HCR.

The Joint IATTC and WCPFC-NC Working Group on the Management of Pacific Bluefin Tuna (PBFJWG) is expected to recommend a long-term harvest strategy for implementation in 2027, which would be reflected in new management measures by both Commissions.

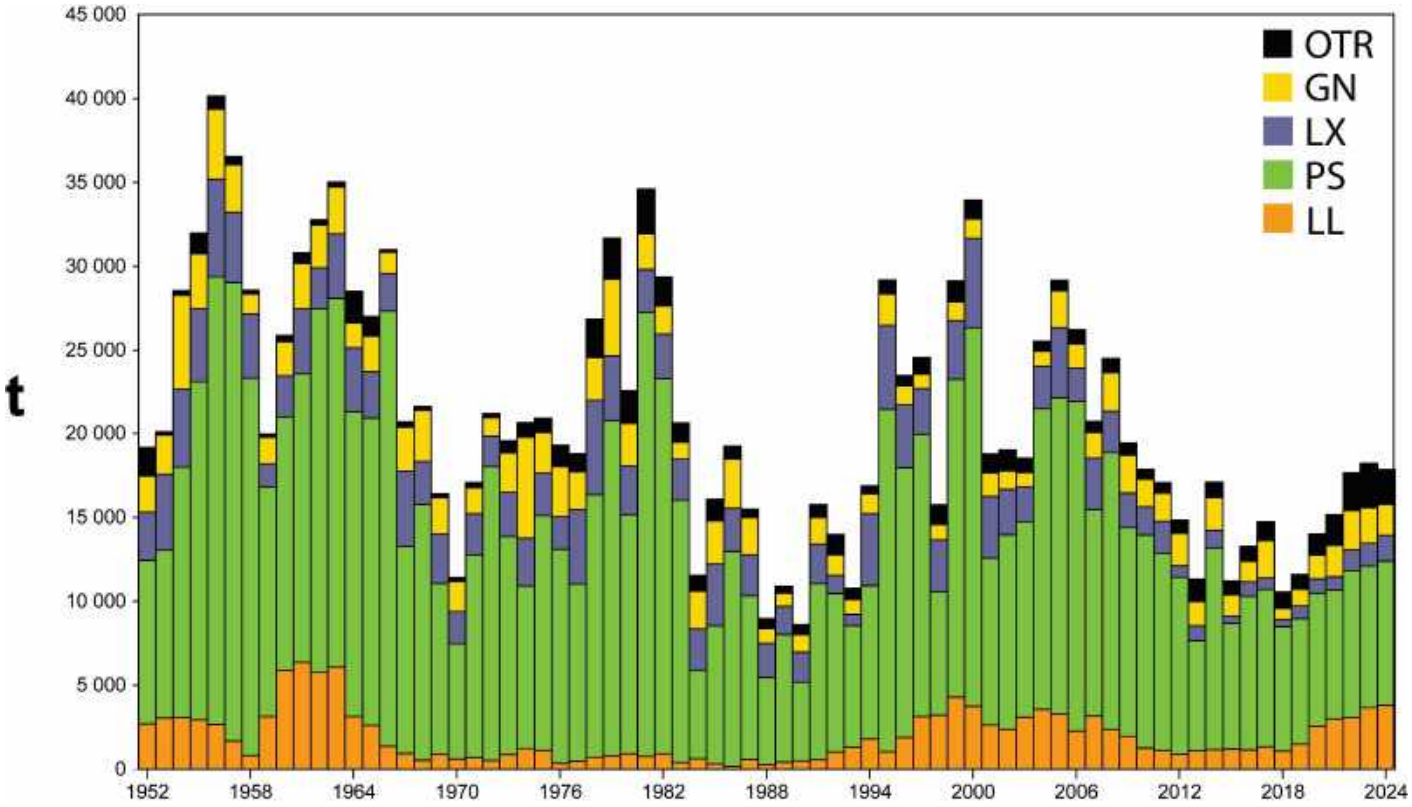


FIGURE E-1. Retained catches of Pacific bluefin tuna, by gear, 1952-2024. GN: gillnet; LL: longline; LX: hook and line; OTR: other; PS: purse seine.
FIGURA E-1. Capturas retenidas de atún aleta azul del Pacífico, por arte, 1952-2024. GN: red agallera; LL: palangre; LX: sedal y anzuelo; OTR: otras; PS: red de cerco.

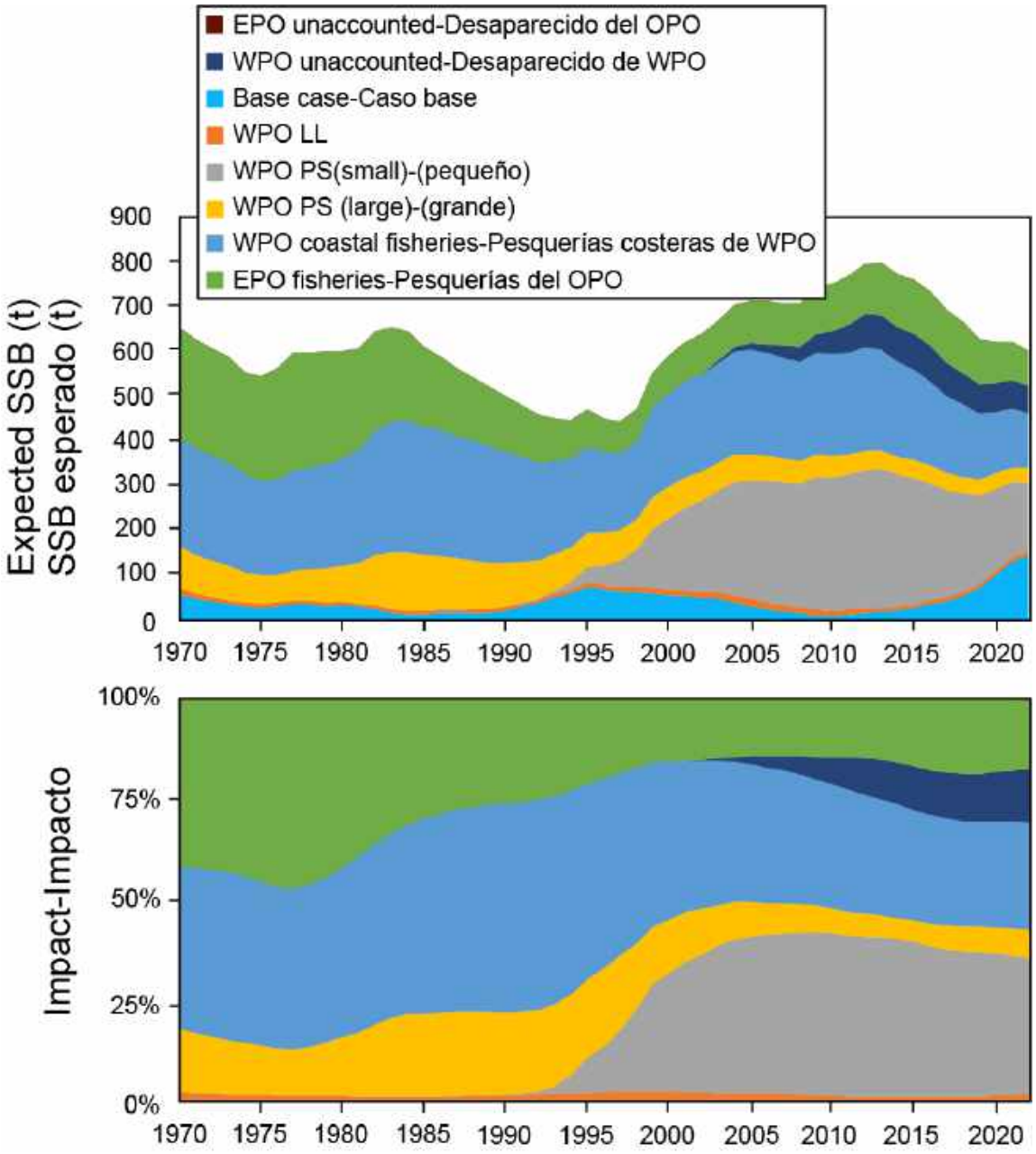


FIGURE E-2. Estimates of the impact on the Pacific bluefin tuna population of fisheries in the EPO and in the WPO (upper panel). The dashed line represents the estimated hypothetical unfished spawning biomass, and the solid line the estimated actual spawning biomass. The shaded areas indicate the impact attributed to each fishery. The lower panel presents the proportion of impact attributed to the EPO and WPO. (Figure from the draft Executive Summary of ISC 2022 stock assessment; subject to change and approval by the ISC Plenary.)

FIGURA E-2. Estimaciones del impacto sobre la población de atún aleta azul del Pacífico de las pesquerías en el OPO y en el WPO (panel superior). La línea de trazos representa la biomasa reproductora no pescada hipotética estimada, y la línea sólida la biomasa reproductora real estimada. Las áreas sombreadas indican el impacto atribuido a cada pesquería. El panel inferior ilustra la proporción del impacto atribuida al OPO y al WPO. (Figura del borrador de resumen ejecutivo de la evaluación de 2022 del ISC; sujeta a cambio y aprobación por la plenaria del ISC.)

F. ALBACORE TUNA

There are two stocks of albacore in the Pacific Ocean, one in the northern hemisphere and the other in the southern hemisphere. Albacore are caught by longline gear in most of the North and South Pacific, but not often between about 10°N and 5°S, by trolling gear in the eastern and central North and South Pacific, and by pole-and-line gear in the western North Pacific. In the North Pacific, about 40% of the catch is taken by pole-and-line and troll fisheries that catch smaller, younger albacore, and about 50% was taken by longline. In the South Pacific, almost all the albacore is taken by longline. The total annual catches of South Pacific albacore ranged from about 25,000 t to 50,000 t during the 1980s and 1990s but increased after that and peaked at about 94,500 t in 2017. During 2022-2024, the annual albacore catches in the south Pacific averaged about 78,000 t (Figure F-1a), of which about 40.0% was taken in the eastern Pacific Ocean (EPO). It is worth noting that even though the total annual catch has decreased slightly since 2018, the annual catch in the EPO has increased slightly since 2018, leading to an increase contribution of the EPO in terms of annual albacore catch in the south Pacific Ocean. The total annual catches of North Pacific albacore increased from about 55,000 t in 1993 to about 126,000 t in 1999 (Figure F-1b). They then declined in the early 2000s then recovered in the early 2010s. Since 2012 catches have declined from about 92,000 t to about 44,000 t in 2024. The catches averaged about 46,000 t in 2022-2024, of which 22.3 % was taken in the EPO. Those declines in catches coincide with decline in effort in the north EPO (Figure F-2).

Juvenile and adult albacore are caught mostly in the Kuroshio Current, the North Pacific Transition Zone, and the California Current in the North Pacific and in the Subtropical Convergence Zone in the South Pacific, but spawning occurs in tropical and subtropical waters, centering around 20°N and 20°S latitudes. North Pacific albacore are believed to spawn between March and July in the western and central Pacific.

The movements of North Pacific albacore are strongly influenced by oceanic conditions, and migrating albacore tend to concentrate along oceanic fronts in the North Pacific Transition Zone. Most of the catches are made in water temperatures between about 15° and 19.5°C. Details of the migration remain unclear, but juvenile fish (2- to 5-year-olds) are believed to move into the eastern Pacific Ocean (EPO) in the spring and early summer, and return to the western and central Pacific, perhaps annually, in the late fall and winter, where they tend to remain as they mature. This pattern may be complicated by sex-related movements of large adult fish (fork length (FL) >125 cm), which are predominately male, to areas south of 20°N. The significance of such movements for the demographic dynamics of this stock are uncertain at present.

Less is known about the movements of albacore in the South Pacific Ocean. The juveniles move southward from the tropics when they are about 35 cm long, and then eastward along the Subtropical Convergence Zone to about 130°W. When the fish approach maturity they return to tropical waters, where they spawn. Recoveries of tagged fish released in areas east of 155°W were usually made at locations to the east and north of the release site, whereas those of fish released west of 155°W were usually made at locations to the west and north of the release site.

The most recent published stock assessments for the South and North Pacific stocks of albacore are from 2024 and 2026, respectively. The assessments indicate that it is not likely that either stock is overfished or that overfishing is taking place.

South Pacific albacore

In collaboration with the IATTC, the Pacific Community (SPC) conducted a benchmark stock assessment for South Pacific albacore tuna in 2024. This assessment is based on a spatially-explicit stock assessment model in which the South EPO is included as a single area with multiple fishery fleets using an areas-as-fleets approach. Structural uncertainty in natural mortality and steepness were explored in this benchmark assessment using a Monte Carlo ensemble model approach with 100 models.

Based on the ensemble of models, the estimated reference points for albacore tuna in the South Pacific are:

1. The median depletion for the recent period ($SB_{2019\text{-}2022}/SB_{F=0}$) is 0.48 with a 10th to 90th percentile interval of 0.36 to 0.62.

2. All models in the uncertainty ensemble had $SB_{2019-2022}/SB_{F=0} > 0.2$, the limit reference point for WCPFC key tuna stocks.

3. The median recent spawning biomass is well above the MSY level (median $SB_{2019-2022}/SB_{MSY}$ is 3.02 with a 10^{th} to 90^{th} percentile interval 2.04 to 5.21).

4. The median recent fishing mortality as a ratio of that corresponding the MSY ($F_{2019-20122}/F_{MSY}$) is 0.18 with a 10^{th} to 90^{th} percentile interval of 0.06 to 0.44.

In summary, the benchmark assessment suggests that the South Pacific albacore stock is healthy and the recent fishing mortality is much lower than the fishing mortality at MSY. For albacore in the south EPO, the spawning biomass ratio in 2022 (spawning biomass divided by dynamic spawning biomass in an unfished condition) is estimated to be slightly below 0.5. The staff will continue collaborating with the Pacific Community to monitor the stock status of South Pacific albacore tuna by using stock status indicators and conducting another benchmark assessment with the SPC in 3-4 years.

North Pacific albacore

A new stock assessment for north Pacific albacore was completed in 2026 by the Albacore Working Group (ALBWG) of the International Scientific Committee for Tuna and Tuna-like Species in the north Pacific Ocean (ISC) (SAC-17 INF-I). The north Pacific albacore tuna stock has been exploited for a long time, the catches were the highest in 1976 (about 127,000 t) and the lowest in 1991 (about 37,000 t). During the assessment period (1994-2024), the highest and lowest catches were in 1999 (about 120,000 t) and 2022 (about 35,000 t), respectively. About 2/3 of the catches come from surface fisheries (troll and pole-and-line) that harvest mainly juveniles, and the rest from longline fisheries that harvest mainly adults.

The assessment was done using the "best model" approach while many sensitivity analyses were conducted to evaluate the robustness of the "best model". The working group concluded that the stock is likely not experiencing overfishing and is likely not overfished (Figure F-2, Table F-1). The SSB_{2024} was estimated to be approximately 60% (95% CI: 38 – 83%) of $SSB_{current, F=0}$ and 2.01 (95% CI: 1.26 – 2.76) times greater than the estimated threshold reference point (Table ES1). The estimated current fishing intensity ($F_{2021-2023}$) was estimated to be $F_{66\%SPR}$ (95% CI: $F_{74\%SPR}$ – $F_{57\%SPR}$) and was lower than both the $F_{45\%SPR}$ target reference point and the average fishing intensity during 2002 – 2004 (Table F1).

Based on the results of the new stock assessment for north Pacific albacore, the working group concludes that:

1. The stock is likely not overfished relative to the threshold ($30\%SSB_{current, F=0}$) and limit ($14\%SSB_{current, F=0}$) reference points adopted by the WCPFC and IATTC, and
2. The stock is likely not experiencing overfishing relative to the target reference point ($F45_{\%SPR}$).

The current IATTC conservation and management measures for north Pacific albacore (Resolutions C-05-02, C-13-03 and C-18-03) are based on maintaining the fishing effort below the 2002-2004 levels. The effort levels in eastern Pacific Ocean for 2019-2021 were 48% and 49% of those in 2002-2004, for vessel-days and number of vessels respectively, and are showing a declining trend in the last 10 years (Figure F-2).

In 2022, the Commission adopted the objectives, the target, threshold, and limit reference points, the acceptable level of risk of breaching the limit reference point and the monitoring method for the stock (IATTC Resolution C-22-04) following the completion of the Management Strategy Evaluation (MSE) for the stock by the ALBWG (ISC/21/ANNEX/11). Also, under that resolution, the Commission adopted a harvest control rule with those elements in 2023. The overarching objective is to ensure the sustainability of the North Pacific albacore tuna stock and current fisheries supported by the stock in the EPO. To reach the overarching objective, the following management objectives were established (C-22-04):

1. Maintain Spawning Stock Biomass (SSB) above the Limit Reference Point, with a probability of at least 80% over the next 10 years.
2. Maintain depletion of total biomass around historical (2006-2015) average depletion over the next 10 years.

3. Maintain fishing intensity (F) at or below the target reference point with a probability of at least 50% over the next 10 years.
4. To the extent practicable, management changes (e.g., catch and/or effort) should be relatively gradual between years.

The reference points adopted are:

1. Target reference point (TRP) of F45%SPR, which is the fishing intensity level that results in the stock producing 45% SPR.
2. Threshold reference point (ThRP, $SSB_{threshold}$) of $30\%SSB_{current,F=0}$, which is 30% of the dynamic unfished spawning stock biomass.
3. Limit reference point (LRP) of $14\%SSB_{current,\ F=0}$, which is 14% of the dynamic unfished spawning stock biomass.

The acceptable level of risk of breaching the LRP based on the most current estimate of SSB shall be no greater than 20%. The resolution further stated that if the LRP is breached, a rebuilding plan should be adopted.

In 2023, the Commission adopted the harvest control rules that apply to all fisheries harvesting albacore in the Convention Area north of the equator (IATTC resolution C-23-02). The harvest control rule parameters produce a relationship between stock status and fishing intensity with the minimum allowed fishing intensity equal to $F_{87\%}$ (Figure F-4), which is the fishing intensity level that results in the stock producing 87% of spawning potential ratio. The harvest control rules also state that if $SSB_{current}/SSB_{current,\ F=0}$ is above the LRP and below $SSB_{threshold}$, the maximum increase or decrease in catch or effort between the three-year management periods shall be 20%. In the year following the relevant ISC stock assessment, the IATTC will recommend adjustment to the existing Resolution for North Pacific Albacore to ensure fishing intensity is at or below the level set forth by this HCR using the latest ISC stock assessment. Changes to fishing intensity in accordance with the harvest control parameters shall apply between assessments starting the year after the stock assessment was completed, until the year following the next stock assessment that provides an estimate of unfished SSB.

In 2024, the ALBWG produced two documents for North Pacific Albacore. The first one develops the criteria to identify exceptional circumstances that would result in suspending or modifying the application of the adopted harvest strategy, and potentially may require updated MSE simulation work (SAC-15 INF-S). In 2025, one minor change was made from the previous version of the exceptional circumstances per ISC25 plenary's request. The second one provides scientific advice on interpreting the fishing intensity metric from the harvest strategies in terms of catch and effort management measures (SAC-15 INF-T). The ALBWG recommends that changes in fishing intensity required by the NPALB harvest strategy can potentially be translated into changes in catch for the management of all fleet groups, and changes in effort for the management of surface fleet groups and two Japanese longline fleets that likely target north Pacific albacore. Effort management is less precise than catch management in terms of changing the fishing intensity for surface fleet groups. In 2026, the ALBWG provided necessary information (SAC-17 INF-U) to support potential fleet-specific allocation of reductions in fishing intensity, and to inform harvest strategy implementation discussions, if the NPALB stock declines below the threshold reference level in the future.

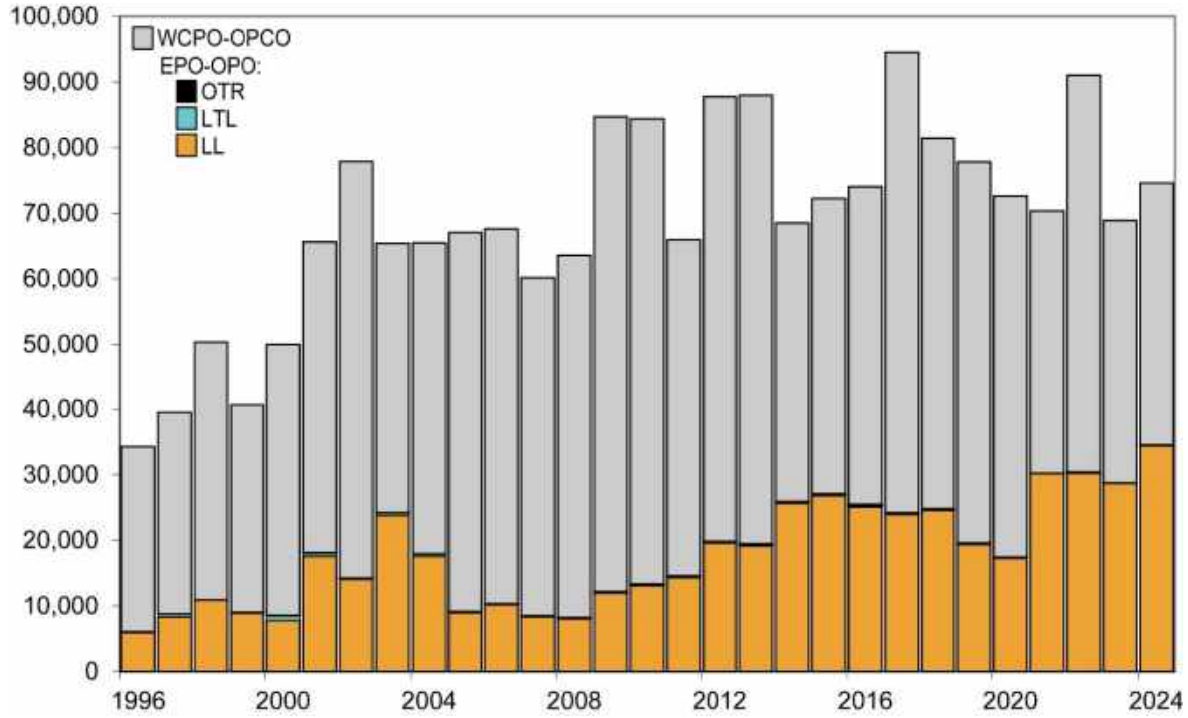


FIGURE F-1a. Retained catches of south Pacific albacore, by region. EPO catches broken down by gear: LL: longline; LTL: troll; OTR: other

FIGURA F-1a. Capturas retenidas de albacora del Pacífico sur, por región. Capturas del OPO desglosadas por arte: LL: palangre; LTL: curricán; OTR: otro.

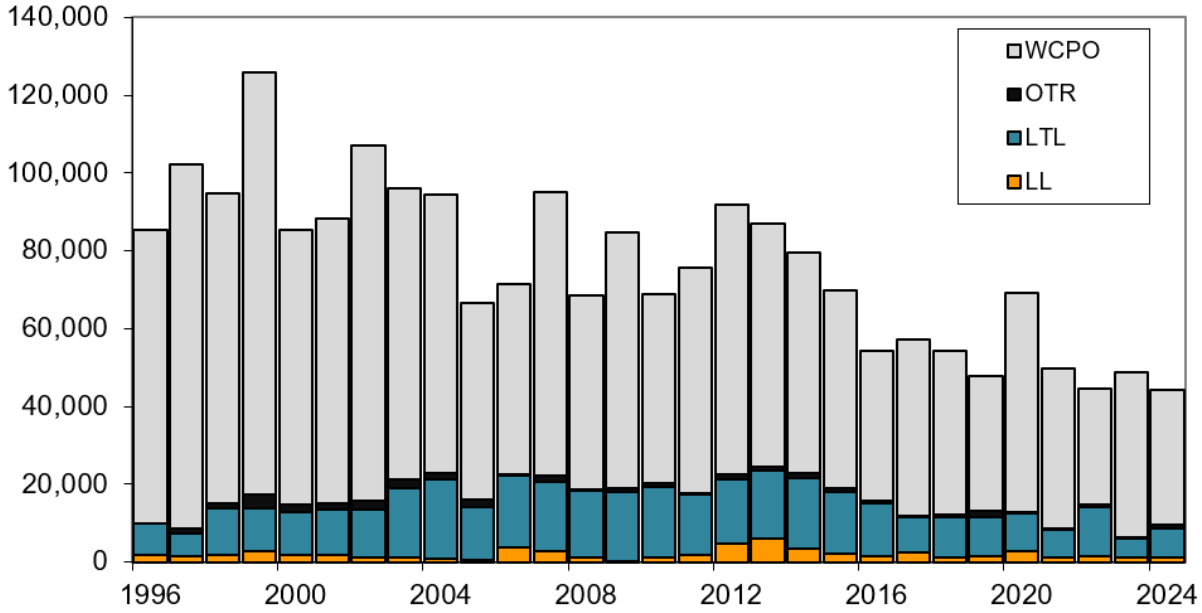


FIGURE F-1b. Retained catches of north Pacific albacore, by region. EPO catches broken down by gear: LL: longline; LTL: troll; OTR: other.

FIGURA F-1b. Capturas retenidas de albacora del Pacífico norte, por región. Capturas del OPO desglosadas por arte: LL: palangre; LTL: curricán; OTR: otro.

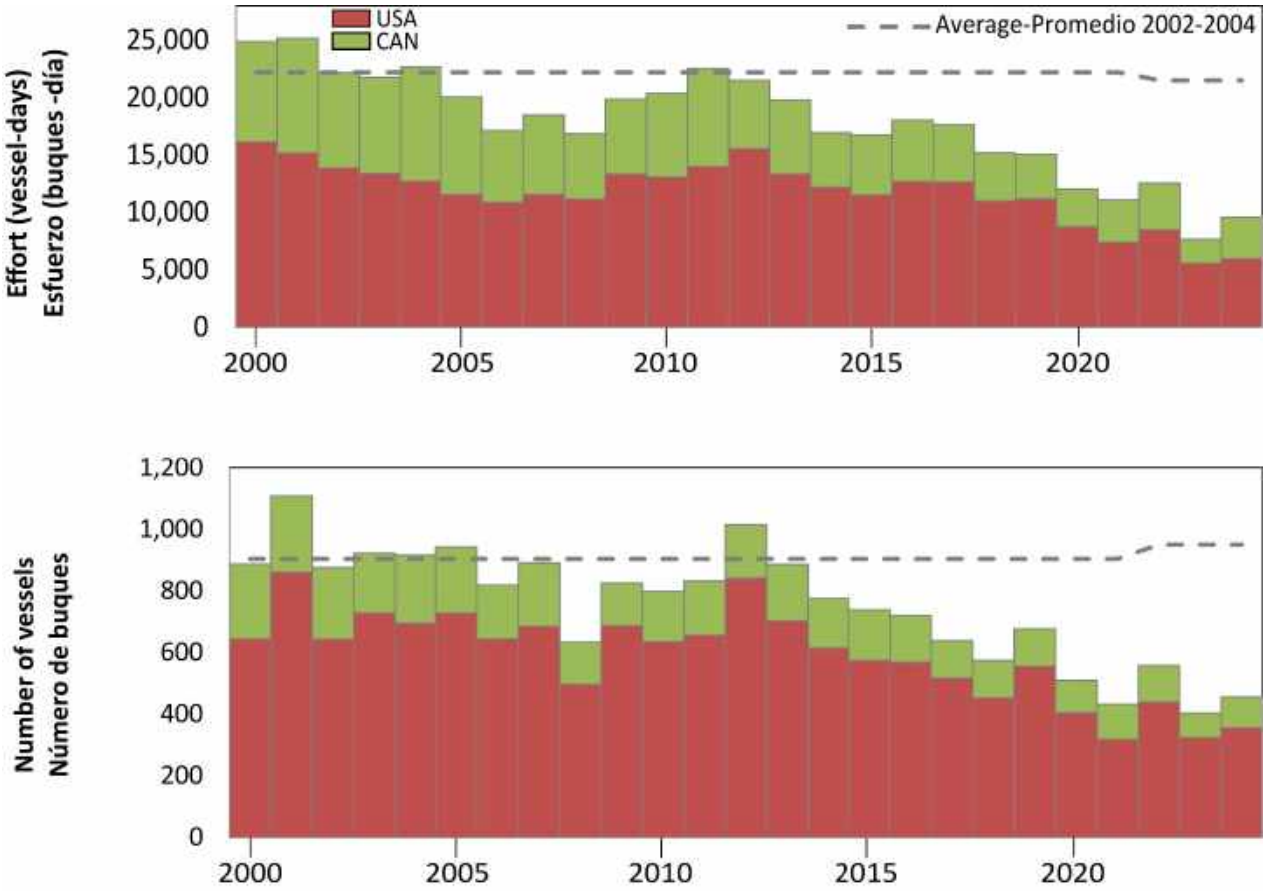


FIGURE F-2. Effort in vessel-days and number of vessels for the north Pacific albacore tuna in the eastern Pacific Ocean.
FIGURA F-2. Esfuerzo en días de buque y número de buques para el atún albacora del Pacífico norte en el Océano Pacífico oriental.

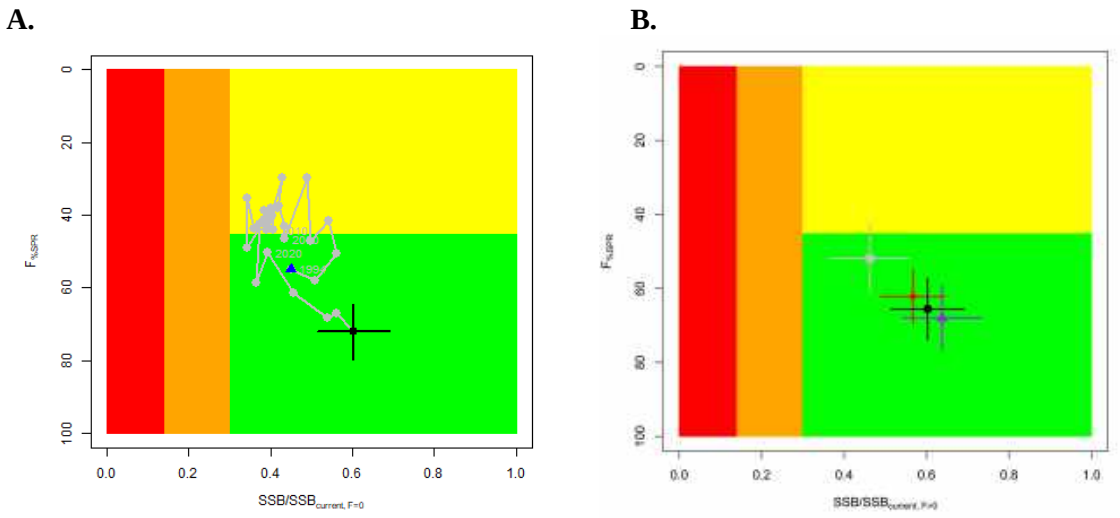


Figure F-3. (**A**) Stock status phase plot showing the status of the north Pacific albacore (*Thunnus alalunga*) stock relative to the biomass-based threshold ($30\%SSB_{current,\ F=0}$) and limit ($14\%SSB_{current,\ F=0}$) reference points, and fishing intensity-based target reference point ($F45_{\%SPR}$) over the modeling period (1994 – 2024). Blue triangle indicates the start year (1994) and black circle with 95% confidence intervals indicates the terminal year (2024). (**B**) Stock status plot showing current stock status and 95% confidence intervals of the base case model (black circle), a sensitivity run an important sensitivity run of CV = 0.06 for L_{inf} in the growth model (gray), an important sensitivity run with two initial fishing mortality parameters (red), and a model representing an update of the 2023 base case model to 2026 data (purple). Red zones in both panels indicate female SSBs falling below the limit reference point while the orange zones indicate female SSBs between the threshold and limit reference points. Green zones indicate female SSBs above the threshold reference point and fishing intensity levels below the target reference point. Yellow areas indicate female SSBs above the threshold reference point and fishing intensity levels above the target reference point. The Fs in this figure are indicators of fishing intensity based on spawning potential ratio (SPR) and calculated as %SPR. SPR is the ratio of the equilibrium SSB per recruit that would result from the estimated F-at-age relative to that of an unfished population. A higher %SPR indicates lower fishing intensity. Current fishing intensity values and $SSB/SSB_{current,F=0}$ ratios in (B) were calculated as the average during 2021-2023 ($F_{\%SPR,\ 2021\text{-}2023}$) and 2024 ($SSB_{2024}/SSB_{current,\ F=0}$), respectively. The model representing an update of the 2023 base case model is similar to but not identical to the 2023 base case model due to changes in data preparation and model structure.

FIGURA F-3. **(A)** Gráfico de fase del estado de la población que muestra el estado de la población de albacora del Pacífico Norte (Thunnus alalunga) en relación con el umbral basado en biomasa (30 % $SSB_{actual,\ F=0}$) y los puntos de referencia límite (14 % $SSB_{actual,\ F=0}$), así como el punto de referencia objetivo basado en la intensidad de la pesca ($F45\%SPR$) durante el periodo de modelado (1994 – 2024). El triángulo azul indica el año de inicio (1994) y el círculo negro con intervalos de confianza del 95 % indica el año terminal (2024). **(B)** Gráfico de estado de la población que muestra el estado actual de la población y los intervalos de confianza del 95 % del modelo base (círculo negro), una prueba de sensibilidad importante de CV = 0,06 para L_{inf} en el modelo de crecimiento (gris), una secuencia importante de sensibilidad con dos parámetros iniciales de mortalidad por pesca (rojo), y un modelo que representa una actualización del modelo base de 2023 a datos de 2026 (morado). Las zonas rojas en ambos paneles indican que el número de hembras de la SSB cae por debajo del punto de referencia límite, mientras que las zonas anaranjadas indican las hembras de la SSB entre los puntos de referencia umbral y límite. Las zonas verdes indican hembras de SSB por encima del punto de referencia umbral y los niveles de intensidad de pesca por debajo del punto de referencia objetivo. Las zonas amarillas indican hembras de SSB por encima del punto de referencia umbral y niveles de intensidad de pesca por encima del punto de referencia objetivo. Las F en

esta figura son indicadores de intensidad de pesca basados en la razón de potencial de reproducción (SPR) y calculados como % SPR. SPR es la razón entre el SSB de equilibrio por recluta que resultaría de la estimación de F-a a la edad relativa a la de una población no pescada. Un % de SPR más alto indica menor intensidad de pesca. Los valores actuales de intensidad de pesca y las relaciones $SSB/SSB_{actual, F=0}$ en (B) se calcularon como promedio durante 2021-2023 (F%SPR, 2021-2023) y 2024 ($SSB2024/ SSB_{actual}$, F=0), respectivamente. El modelo que representa una actualización del modelo de caso base de 2023 es similar, pero no idéntico, al modelo de caso base de 2023 debido a cambios en la preparación de datos y la estructura del modelo.

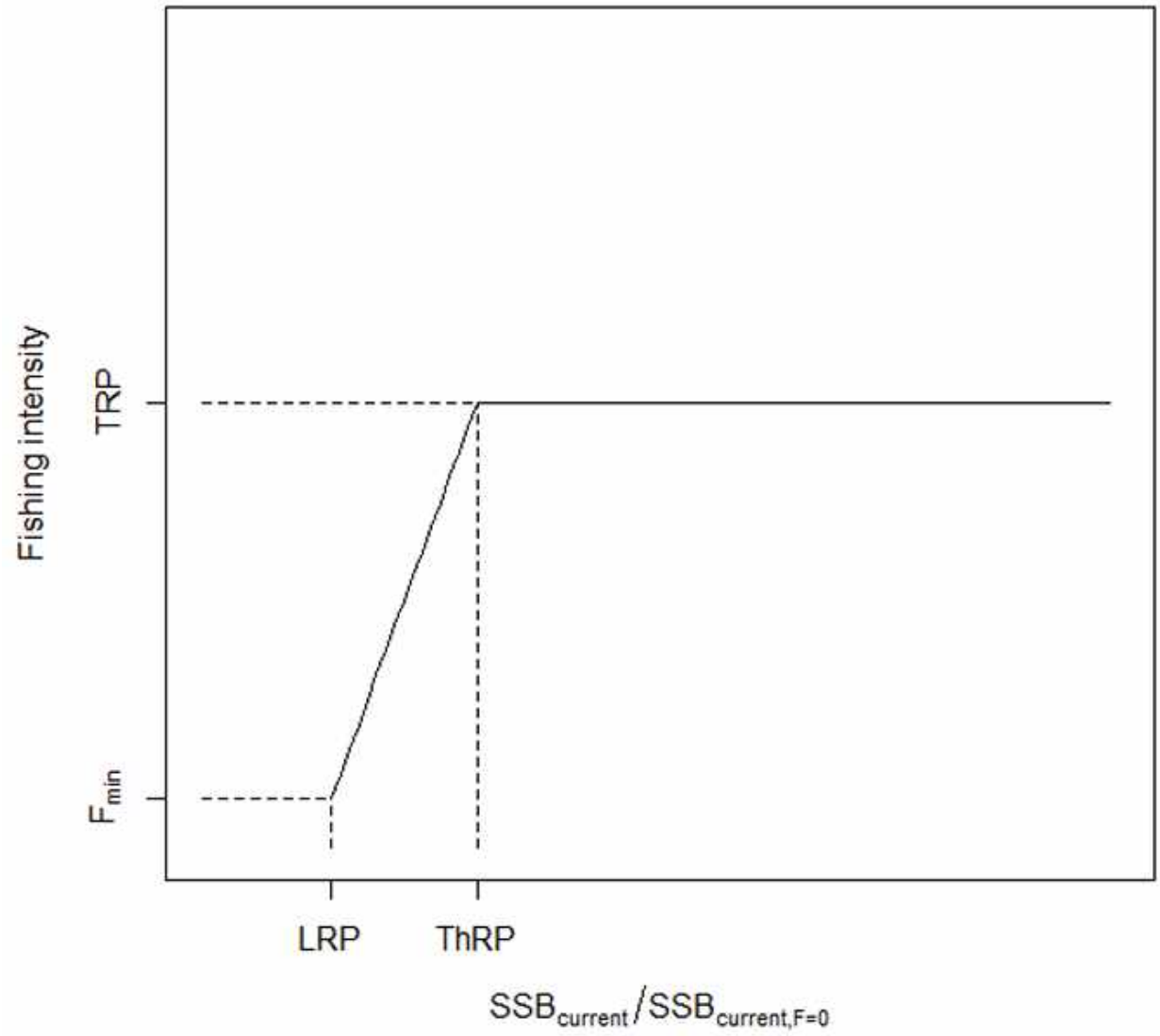


FIGURE F-4. Illustration of the harvest control rules with target reference point (TRP), threshold reference point (ThRP), limit reference point (LRP), and the minimum allowed fishing intensity (F_{min}). The harvest control rules include the triggering of a rebuilding measure if the $SSB_{current}/SSB_{current,F=0}$ falls below the LRP.
FIGURA F-4. Ilustración de las reglas de control de extracción con el punto de referencia objetivo (PRO), el punto de referencia umbral (PRU), el punto de referencia límite (PRL) y la intensidad de pesca mínima permitida (Fmin). Las reglas de control de extracción incluyen la activación de una medida de recuperación si $SSB_{actual}/SSB_{actualF=0}$ cae por debajo del PRL.

TABLE F1. Estimates of maximum sustainable yield (MSY), female spawning stock biomass (SSB), fishing intensity (F), and reference point ratios for north Pacific albacore tuna for: 1) the base case model; 2) one important sensitivity model due to uncertainty in growth parameters; 3) a model representing an update of the 2023 base case model to 2026 data; and 4) a model representing uncertainty in the specification of initial fishing mortality. SSB_0, $SSB_{current,\ F=0}$ and SSB_{MSY} are the expected female SSB of a population in the equilibrium, unfished state; in the current, dynamic, unfished state; and at MSY, respectively. The Fs in this table are indicators of fishing intensity based on spawning potential ratio (SPR) and calculated as %SPR. SPR is the ratio of the equilibrium SSB per recruit that would result from the estimated F-at-age relative to that of an unfished population. Depletion is calculated as the proportion of the age-1+ biomass during the specified period relative to an unfished age-1+ equilibrium biomass. The model representing an update of the 2023 base case model is similar to but not identical to the 2026 base case model due to changes in data preparation and model structure. †A value of >1 for the depletion ratio indicates higher age-1+ biomass in 2024 relative to the 2006 – 2015 period. §Higher %SPR values indicate lower fishing intensity levels. ¶Values of >1 for ratios of $F_{\%SPR}$ to $F_{\%SPR}$-based reference points indicate fishing intensity levels lower than the reference points.

Quantity	Base Case	Growth CVold = 0.06	Update of 2023 base case model to 2026 data	Initial Conditions initF F20 F24
MSY (t)	106,578	86,675	113,793	100,322
SSB_{MSY} (t)	19,360	15,878	20,524	18,316
SSB_0 (t)	139,466	113,685	147,874	131,221
SSB_{2024} (t)	84,209	49,547	96,362	73,236
$SSB_{current,\ F=0}$ (2024 estimate)	139,777	107,072	151,193	129,224
$SSB_{2024}/SSB_{current,\ F=0}$	0.60	0.46	0.64	0.57
$SSB_{2024}/30\%SSB_{current,\ F=0}$	2.01	1.54	2.12	1.89
$SSB_{2024}/14\%SSB_{current,\ F=0}$	4.30	3.31	4.55	4.05
† $Depletion_{2024}/Depletion_{2006\text{-}2015}$	1.45	1.40	1.61	1.45
§ $F_{\%SPR,\ 2021\text{-}2023}$ (%SPR)	65.6	51.9	68.0	62.2
§ $F_{\%SPR,\ 2013\text{-}2023}$ (%SPR)	50.3	36.7	53.6	46.6
¶ $F_{\%SPR,\ 2021\text{-}2023}/F_{\%SPR,\ MSY}$	4.03	3.17	4.18	3.80
¶ $F_{\%SPR,\ 2013\text{-}2023}/F45_{\%SPR}$	1.12	0.82	1.19	1.04
¶ $F_{\%SPR,\ 2021\text{-}2023}/F45_{\%SPR}$	1.46	1.15	1.51	1.38
¶ $F_{\%SPR,\ 2021\text{-}2023}/F_{\%SPR,\ 2002\text{-}2004}$	1.87	2.13	1.78	1.95

G. SWORDFISH

Swordfish (*Xiphias gladius*) occur throughout the Pacific Ocean (PO) between about 50°N and 50°S. In the eastern Pacific Ocean (EPO), they are caught mostly by the longline fishery—about 80% of the catch in weight on average in recent years —by distant water fleets of Far East and Western Hemisphere nations. Lesser amounts are taken by drifting gillnets (~20%), mainly in South America, and minimal amounts by other gillnets and harpoon. They are seldom caught in the recreational fishery in the EPO.

Swordfish grow in length very rapidly, with both males and the faster-growing females reaching lower-jaw-fork lengths of more than a meter during their first year. Swordfish begin reaching maturity at about two years of age, when they are about 150 to 170 cm in length, and by age four all are mature. They probably spawn more than once per season. For fish greater than 170 cm in length, the proportion of females increases with increasing length.

Swordfish tend to inhabit waters further below the surface during the day than at night, and they tend to inhabit current frontal zones. Several of these fronts occur in the eastern Pacific Ocean (EPO), including areas off California and Baja California, off Ecuador, Peru, and Chile, and in the equatorial Pacific. Swordfish tolerate temperatures of about 5° to 27°C, but their preferred range is about 18° to 22°C, while larvae have been found only at temperatures exceeding 24°C.

There is strong evidence that swordfish in the Pacific comprise multiple stocks. Several specific spawning regions are known, and analyses of fisheries, tagging and genetic data suggest that there is only limited exchange of swordfish between geographical areas, including between the eastern and western, and the northern and southern, Pacific Ocean. As many as six stocks may exist in the Pacific Ocean, but the exact boundaries of these stocks, as well as their exchange rates—for the purposes of stock assessment—is currently uncertain. In the early 2000's, the IATTC produced indicators for swordfish in five areas of the EPO: two areas north of 10°N, separated at 125°W, a central area between 10°N and 5°S, and two areas south of 5°S, separated at 90°W.

Currently, two stocks are assumed to inhabit the EPO. One in the south and one in the north. The stock boundaries are uncertain, but it was assumed in the most recent assessments that the southern EPO stock could be distributed up to 10°N and that the north Pacific Ocean stock includes the EPO north of 10°N. The area north of 5°S and south of 10°N was added in the south EPO assessment in one of the stock structure hypotheses considered, as there was evidence of connectivity between that area and the area south of 5°S (SAC-13 INF-N), which defined the stock boundary in the previous assessment (SAC-02-09). The definition used in the previous assessment was also included as an alternative stock structure hypothesis. Tagging studies (presented during SWO-01) showed movement of swordfish across the previously assumed stock boundary between the north and central Pacific Ocean swordfish stock and the north EPO —a diagonal line from the tropics in the central Pacific to the northern coast of Mexico. This information motivated the revision of the stock boundary assumed for the north Pacific swordfish stock (ISC/21/BILLWG-01) to include the EPO north of 10°N. This new stock boundary assumption allowed for the inclusion of areas off Mexico and Central America in the 2023 north Pacific swordfish assessment (ISC/23/ANNEX/11), which were not included in the 2018 assessment (ISC/18/ANNEX/16).

In the northern EPO (north of 10°N), the annual longline fishing effort for the main longline fleets[5] operating decreased from about 21 million hooks in 2017 to about 10 million hooks in 2023, and 6,000 million hooks in 2024 (Figure G-1). The last three-year average (2022-2024) of about 9 million hooks remains within the historical range of 5 million to 23 million hooks (Figure G-1).

The reported catches in the EPO north of 10°N average about 2,000 t in the last 40 years (ranged from 230 t to 3,800 t) , decreased to an average of about 675 t in the most recent 10 years and are currently in the lowest levels of about 310 t in the last three years (Figure G-2), when effort is also low (Figure G-1).

In the southern EPO (south of 10°N), the total annual longline fishing effort for the main longline fleets[1] in EPO was 238 million hooks in 2002 and declined steadily to about 78 million hooks in 2008, increasing again

[5] Japan, Korea, Chinese Taipei, China, United States and French Polynesia

to 2012. Since 2012 the total effort was the effort remained relatively stable, except for the sharp decrease in 2023, and returned to the about 129,000 million hooks in (Figure G-3

The reported catches in the EPO south of 10°N average about 17,000 t in the last 40 years (ranged from 2000 tons to 32,000 t) , increased to an average of about 29,000 t in the most recent 10 years and are currently at the same level in (Figure G-4). The last assessment of the north Pacific Ocean swordfish stock, which included the EPO north of 10°N, was conducted in 2023 by the Billfish Working Group (BILLWG) of the International Scientific Committee for Tuna and Tuna-like Species in the north Pacific Ocean. Results indicated that stock biomass (age 1 and older) for the stock fluctuated around an average of 83,000 t during 1975-2021 and was estimated to be 88,755 t in 2021. The recent 3-year (2019-2021) average spawning biomass was 34,900 t, 2.5 times greater than SSB_{MSY}. The fishing mortality (F) has been declining steadily since 2001 and was 49% of F_{MSY} during 2019-2021 (average F for ages 1 – 10). Reference points for the stock are yet to be adopted. Using MSY-based reference points as illustration, the base case model indicated that under current conditions the stock was very likely not overfished (>99% probability) and was very likely not subject to overfishing (>99% probability).

The most recent benchmark assessment of southern EPO swordfish (south of 10°N) was done in 2023, with data up to 2019 (SAC-14-15). A compilation of catch data was conducted which resulted in higher values than those in Figure G-4 due to some catches, mainly of artisanal fleets, still underreported to the IATTC. The catch data compiled for the EPO south of 10°N showed a dramatic increase since the mid-2000s (Figure 3 in SAC-14-15). The average catch per year from 2000 to 2009 was about 15,000 t, while the average catch per year for 2010 to 2019 almost doubled to about 29,000 tons. In the last three years of the compilation available for the assessment (2017 - 2019), the average catch was about 34,000 t a year (of those about 30,000 t were reported to the IATTC, Figure G-4). The fleets took the most catch in the latest 3-years of the assessment were the Spanish longline fleet, with about 30% of the total catches in weight, followed by the Chilean gillnet fleet with 22%, and the Ecuadorian longline fleet with 20%.

The main uncertainties accounted in the benchmark assessment were stock structure and the relationship of the indices of abundance with the stock biomass. Associated with the increase in catches, there was a clear increase in the indices of abundance, which was a continuation of the trends already apparent in the previous assessment (2011). Four hypotheses were proposed to explain the simultaneous increase of catches and indices of abundance, which included both the possibilities that the increase is either real or not (increase in availability or catchability). Reference points, which are used only for illustrative purposes since reference points have yet to be adopted for swordfish by the Commission, indicated that the stock is approaching one of the hypothetical dynamic biomass TRP (of 40% unfished biomass) for one of the hypotheses and is larger for the other hypotheses ($SSB_{current}/SSBF = 0 > 0.4$). However, the stock is not approaching the hypothetical dynamic limit reference point of 20% unfished biomass (Figure G-5). All models estimate a strong increase in fishing mortality since the start of the fishery in the 1950's. The fishing intensity is slightly above the fishing intensity target reference point for one of the hypotheses and below for the other hypotheses (Figure G-6). There is not enough information in the current data to determine the relative plausibility of the different hypotheses that may explain the simultaneous increases in catch and indices of abundance. Annecdotical evidence is surfacing that the gear may have changed causing increases in catchability.

In June 2025, a regional workshop was held in Chile with the participation of Chile, Ecuador, Costa Rica, the European Union and the IATTC stock assessment staff and aimed at starting a plan to improve the research and information for the future south EPO swordfish stock assessment (SAC-17-INF-V).

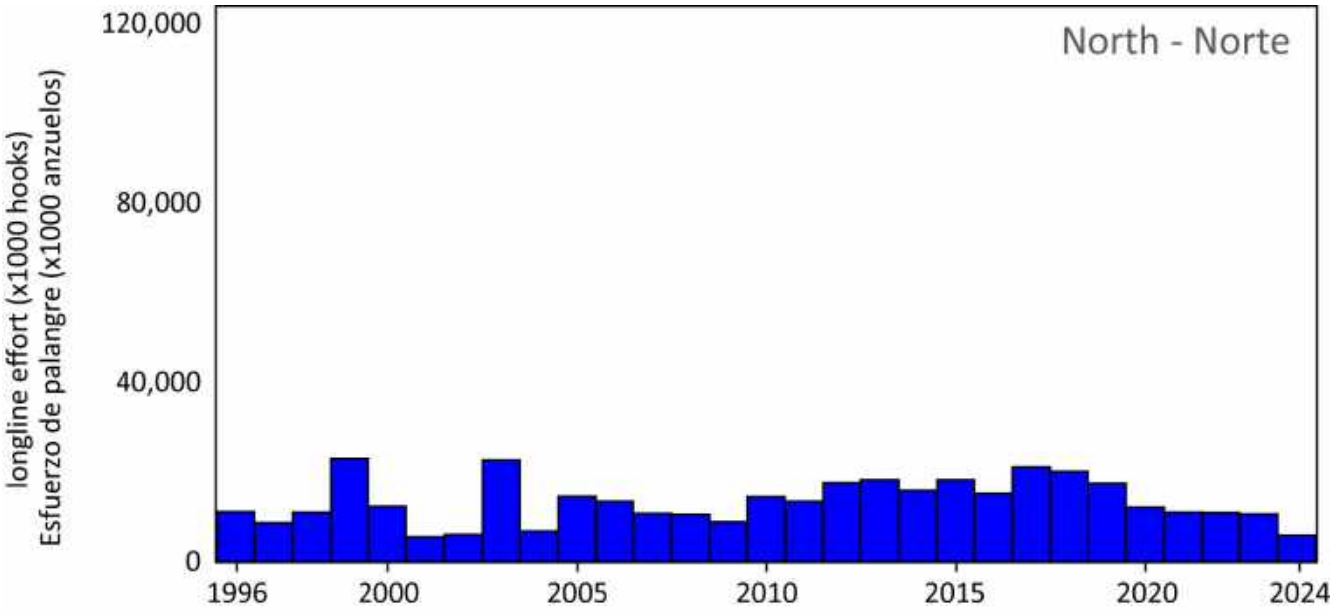


FIGURE G-1. Longline fishing effort (in millions of hooks) in the north EPO for the main longline fleets for 1996–2024 (north of 10°N)
FIGURA G-1. Esfuerzo de pesca de palangre (en millones de anzuelos) en el OPO Norte para las principales flotas palangreras para 1996–2024 (al norte 10°N).

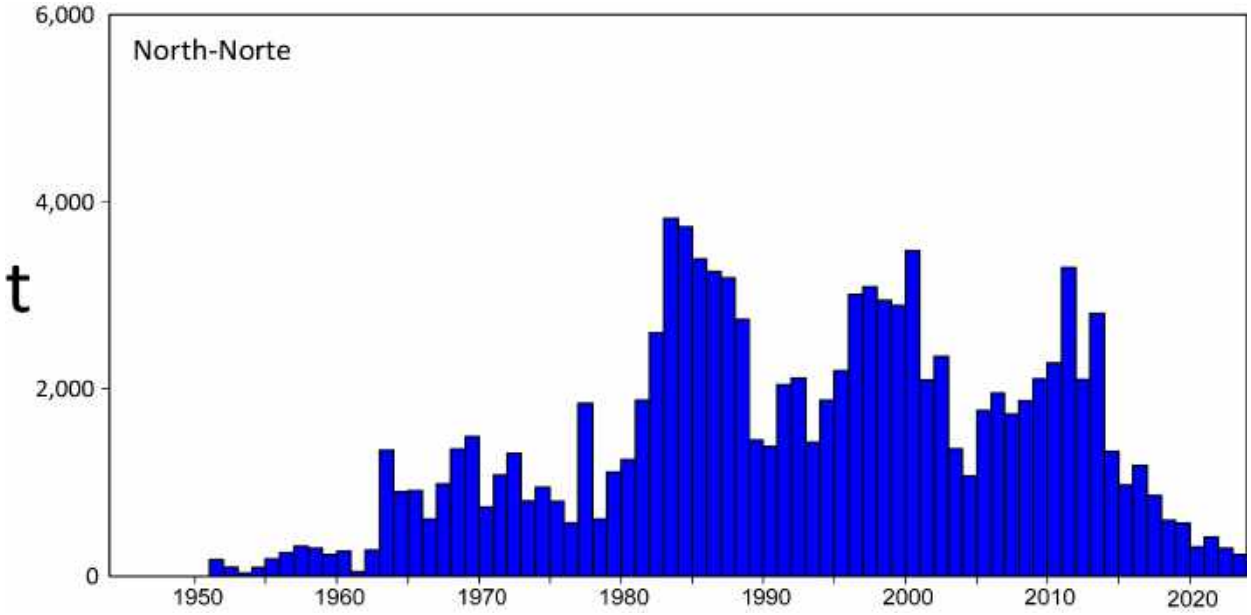


FIGURE G-2. Retained catches of swordfish in the north EPO stock for 1945–2024(north of 10°N)
FIGURA G-2. Capturas retenidas de pez espada en la población del OPO Norte para 1945–2024 (al norte de 10°N).

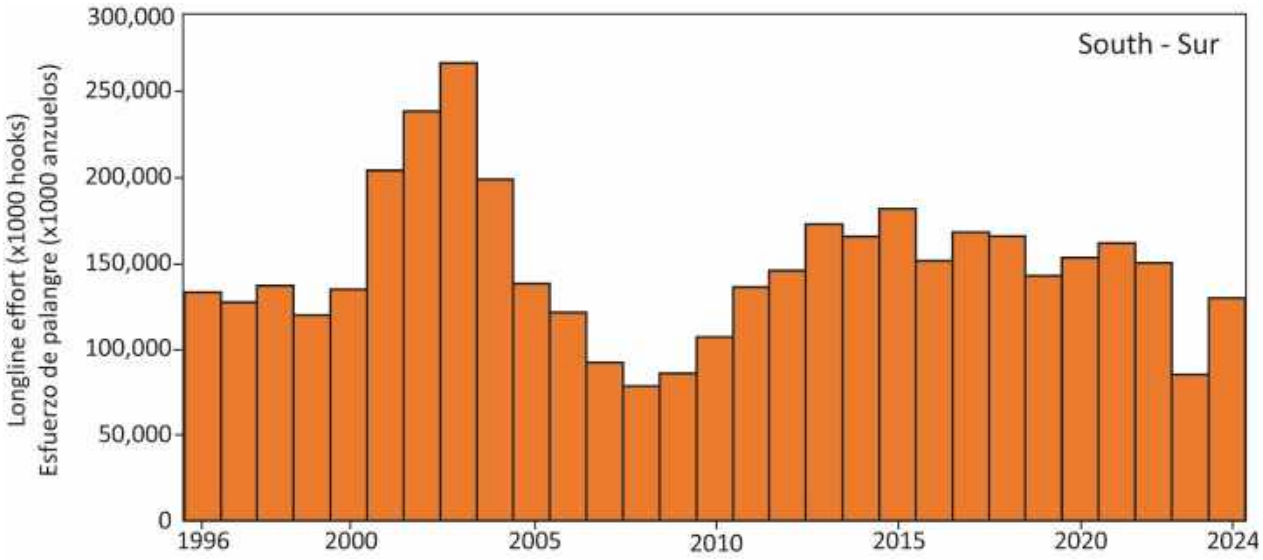


FIGURE G-3. Longline fishing effort (in millions of hooks) in the south EPO for the main longline fleets for 1996–2024. (south of 10°N)
FIGURA G-3. Esfuerzo de pesca de palangre (en millones de anzuelos) en el OPO Sur para las principales flotas palangreras para 1996–2024 (al sur de 10°N) (Tabla A-9)

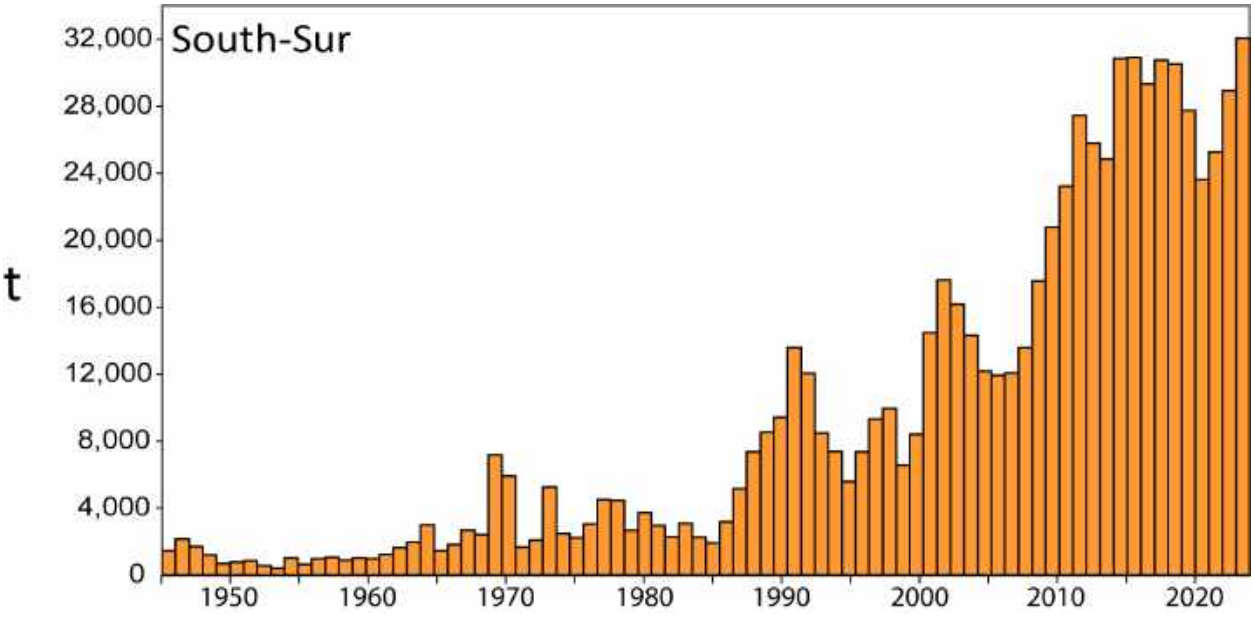


FIGURE G-4. Retained catches of swordfish in the south EPO stock for 1945–2024 (south of 10°N) reported to the IATTC.
FIGURA G-4. Capturas retenidas de pez espada en la población del OPO Sur para 1945–2024 (al sur de 10°N).

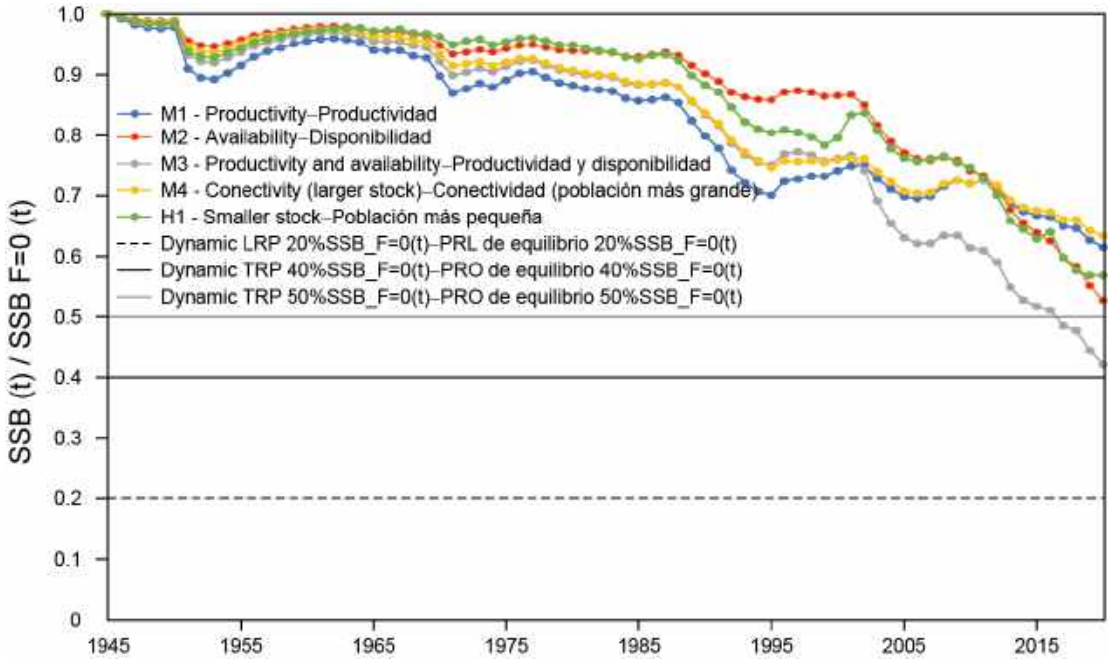


FIGURE G-5. Ratio of the estimated spawning stock biomass and spawning stock biomass with no fishing (dynamic) for the models corresponding to the four hypotheses that explain the simultaneous increase in indices of abundance and catches and the model corresponding to the stock structure hypothesis H1 (north boundary at 5°S). Note that M4 corresponds to the stock structure hypothesis H3 (western boundary at 170°W).

FIGURE G-5. Razón entre la biomasa de la población reproductora estimada y la biomasa de la población reproductora sin pesca (dinámica) para los modelos correspondientes a las cuatro hipótesis que explican el aumento simultáneo de los índices de abundancia y las capturas y el modelo correspondiente a la hipótesis de estructura de la población H1 (límite norte en 5°S). Nótese que el modelo M4 corresponde a la hipótesis de estructura de la población H3 (límite occidental en 170°O).

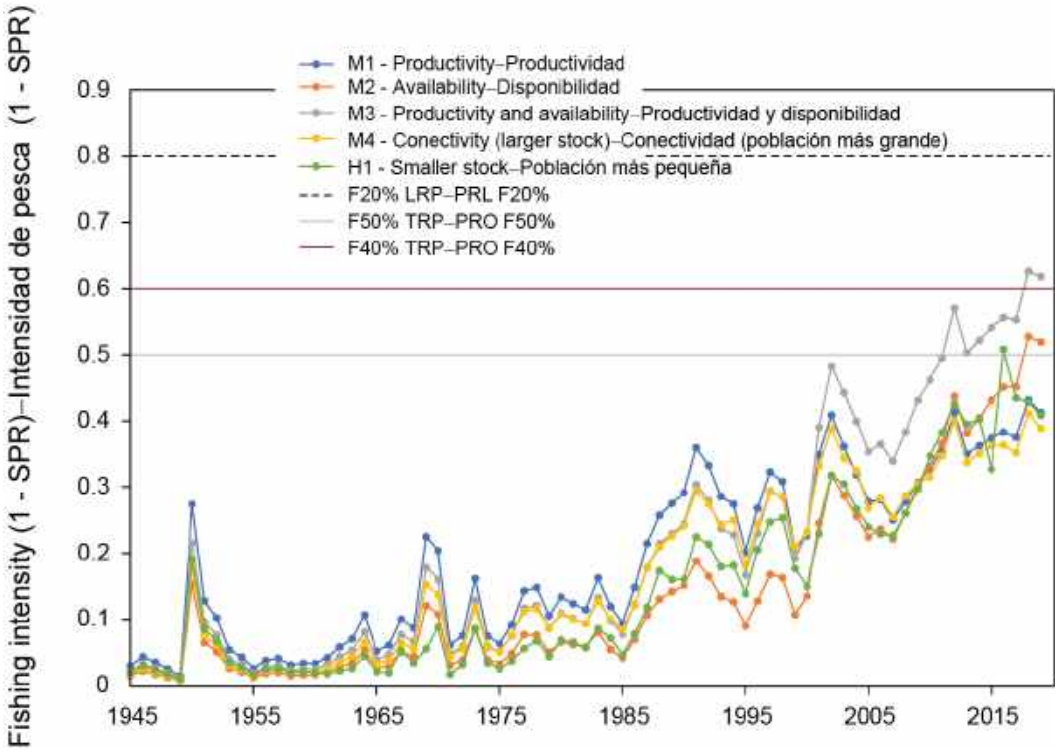


FIGURE G-6. Fishing intensity (1-SPR) for the models corresponding to the four hypotheses that explain the simultaneous increase in indices of abundance and catches and the model corresponding to the stock structure hypothesis H1 (north boundary at 5°S). Note that M4 corresponds to the stock structure hypothesis H3 (western boundary at 170°W). Fishing intensity is a proxy for fishing mortality, based on SPR (proportion of the spawning biomass produced by each recruit with fishing relative to biomass per recruit in the unfished condition, Goodyear 1993). Large SPR are indicative of low fishing mortality, thus a proxy for fishing mortality is 1-SPR.

FIGURE G-6. Intensidad de pesca (1-SPR) para los modelos modelos correspondientes a las cuatro hipótesis que explican el aumento simultáneo de los índices de abundancia y las capturas y el modelo correspondiente a la hipótesis de estructura de la población H1 (límite norte en 5°S). Nótese que el modelo M4 corresponde a la hipótesis de estructura de la población H3 (límite occidental en 170°O). La intensidad de pesca es un sustituto de la mortalidad por pesca, con base en SPR (proporción de la biomasa reproductora producida por cada recluta con pesca en relación con la biomasa por recluta en ausencia de pesca, Goodyear 1993). Una SPR alta indica una mortalidad por pesca baja, por lo que 1-SPR es sustituto de la mortalidad por pesca.

H. BLUE MARLIN

The best information currently available indicates that blue marlin constitutes a single world-wide species (*Makaira nigricans*) and a single stock in the Pacific Ocean. For this reason, statistics on catches (Figure H-1) are compiled, and analyses of stock status are made, for the entire Pacific Ocean.

Blue marlin are taken mostly in longline fisheries for tunas and billfishes between about 30°N and 30°S. Lesser amounts are taken by recreational fisheries and by various other commercial fisheries, such as purse-seine.

Small numbers of blue marlin have been tagged with conventional dart tags, by researchers. In contrast, over 50,000 blue marlin have been tagged by recreational fishers among the world's five largest volunteer gamefish tagging programs, with over 600 fish being recaptured. While a small number of tagged fish have been recaptured long distances from their release locations (4,000–15,000 km), most tagged fish have been recaptured less than 1000 km from their release location, despite some being at liberty for over 3 years. Blue marlins have been tagged in studies of post-release survival and movement, mostly in the Gulf of Mexico and the Atlantic Ocean, using electronic pop-up satellite tags (PSATs) that collected data over periods of about 30–180 days. The largest coordinated electronic tagging effort for billfishes is the International Game Fish Association (IGFA) Great Marlin Race, a collaboration between IGFA and Stanford University initiated in 2011. The program was originally developed for Pacific blue marlin in Hawaii and has subsequently expanded throughout the Pacific and other ocean basins. As of 2025, the program had deployed 378 blue marlin worldwide. Several Pacific blue marlin tracked by the program have travelled thousands of nautical miles across the central and eastern Pacific, confirming extensive connectivity among regional populations while also revealing substantial individual variability in movement behaviour.

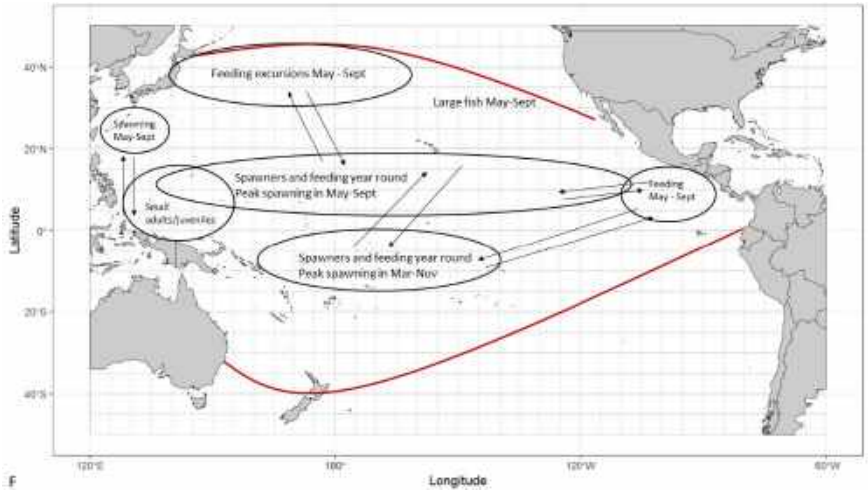
Blue marlin usually inhabit regions where the sea-surface temperatures (SSTs) are greater than 24°C, and spend about 90% of their time at depths with temperatures within 1° to 2° of the SSTs. They inhabit the equatorial area (10°N to 10°S) but their latitudinal range may expand seasonally during the summer in each hemisphere to 35°N or 25°S in the EPO. They are epipelagic and spend most of their time within 10 m of depth but do occasional dives below 500 m. Size and sex- composition data generally indicate larger individuals and more females are encountered by fisheries in the eastern and more poleward areas of the Pacific Ocean, whereas smaller individuals, which include mature males and juveniles, are more encountered by fishing fleets in the western and equatorial areas (Figure H-1) (SC22-2026-WP10).

The catches of blue marlin in the Pacific Ocean have been declining since the peak in 2016 of about 23,000 to about 11,500 t in 2023, but increased in 2024 to about 14,500 t. Most of the catches are taken in the WCPO. The EPO contribution is on average 20% and had ranged from 10 to 30% on the last 20 years (Figure H-1). The annual catches in the EPO average about 4,400 t from 2012 to 2018, declined to about 3,000 t in 2019-2020 and stayed lower from 2021 to 2024, when the catches were about 1,900 t (Figure H-2).

In 2026 a full assessment for blue marlin was finalized by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) Billfish Working Group (SC22-2026-WP10). The 2026 stock assessment model was implemented in Stock Synthesis (SS3) with the updated best-available life history parameters and catch estimates, abundance indices, and size composition data for 1971–2024. The results indicated population biomass (age 1 and older) of Pacific blue marlin declined from an initially fished level of 217,857 t in 1971 to 183,150 t in 1993, then 123,318 t in 1999. Population biomass exhibited a steady further decline to average 102,490 t in 2021–2023, with a terminal year increase to an estimated 127,300 t in 2024. The spawning stock biomass (SSB) was 24% of the $SSB_{F=0}$.The estimated fishing mortality rate (F, expressed as exploitation rate of biomass) increased through the 1970s–1990s peaking at 0.23, then fluctuated around 0.20 before declining to 0.12 in 2023 and 0.14 in 2024. No target or limit reference points have been adopted for blue marlin in the Pacific Ocean. As an illustration the maximum sustainable yield (MSY) based reference points were used to evaluate stock status. Fishing mortality rates

have been below the rate that produces the maximum sustainable yield (F_{MSY} = 0.26) for the entire assessment period. The recent (average for 2021–2023) female spawning stock biomass (SSB) of 42,038 t was greater than SSB_{MSY} (SSB_{MSY} =31,651 t) and the recent F of 0.13 (average for 2021–2023) was 50% below F_{MSY}. The base model indicated under current conditions, the Pacific blue marlin stock was not overfished (>99% probability) and was not subject to overfishing (>99% probability) relative to MSY-based reference points (Figure H-3). The lack of sex-specific size data for all but one fishing fleet, and the simplified treatment of the spatial structure of Pacific blue marlin fishing fleets and population dynamics remain as two important sources of uncertainty for improving future assessments.

Females



Males

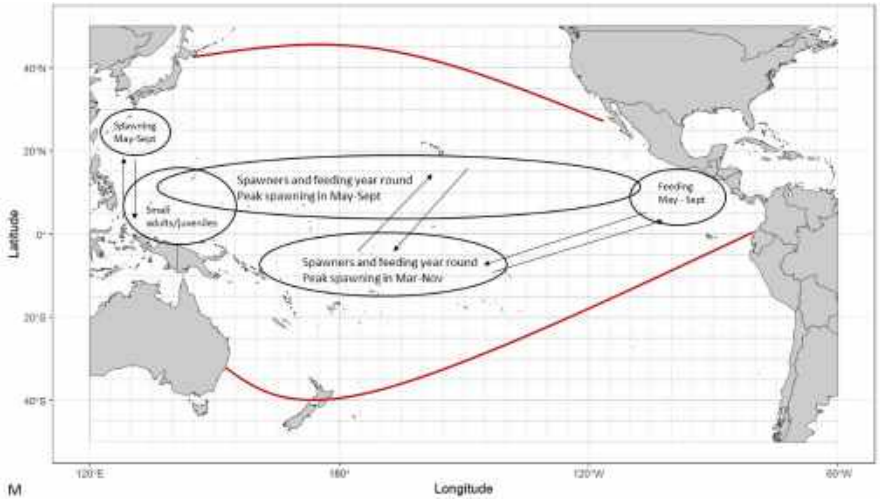


FIGURE H-1. Diagram of the conceptual model for Pacific blue marlin. Arrows show general exchange of fish not directed movement. The red boundary represents approximate habitat range of Pacific blue marlin.(SC22-2026-WP10).

FIGURA H-1. Diagrama del modelo conceptual para el marlín azul del Pacífico. Las flechas muestran un intercambio general de peces, no un movimiento dirigido. El límite rojo representa el rango aproximado de hábitat del marlín azul del Pacífico. (SC22-2026-WP10).

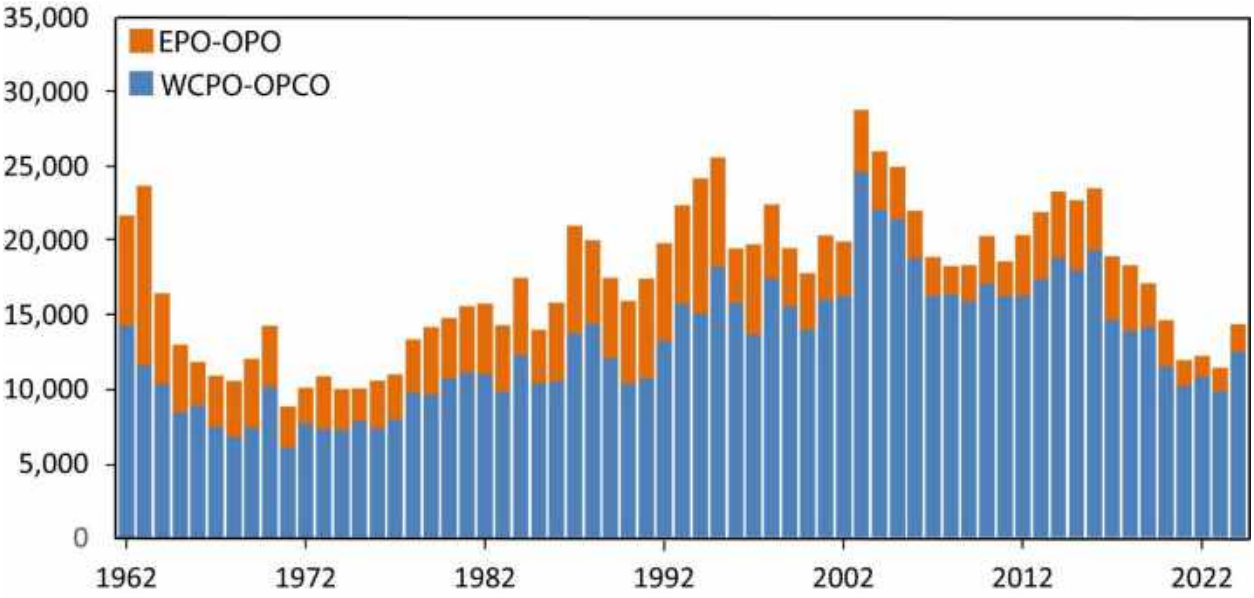


FIGURE H-2. Retained catches of blue marlin in the Pacific Ocean, by region (1962-2024).
FIGURA H-2. Capturas retenidas de marlín azul en el Océano Pacífico, por región (1962-2024).

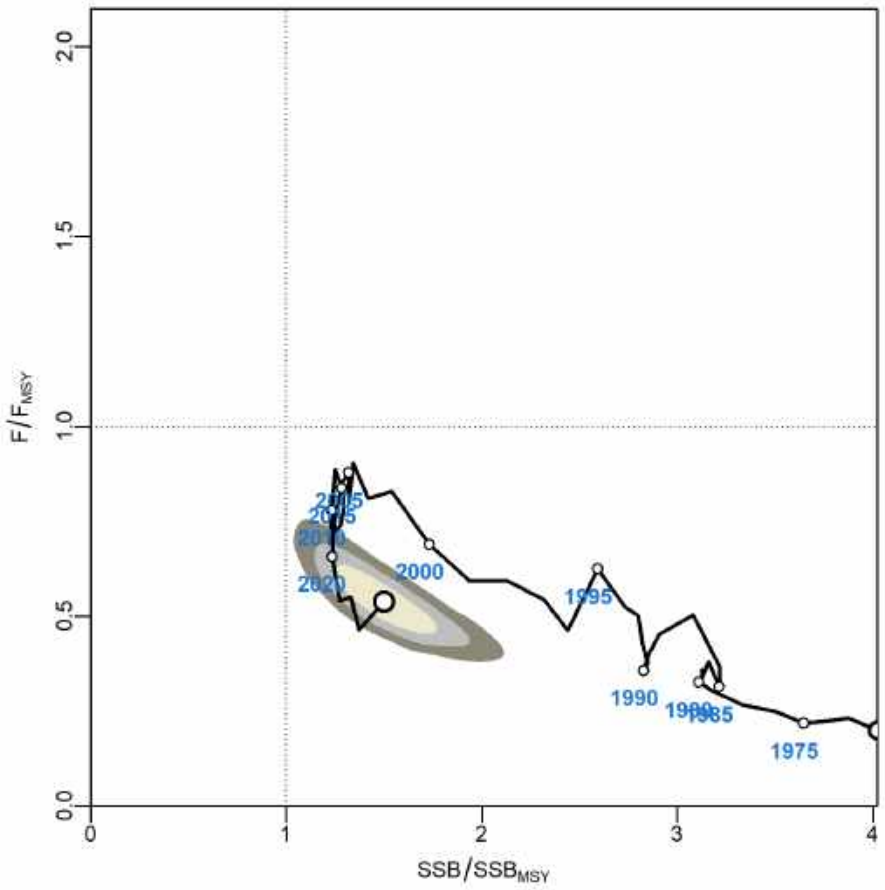


FIGURE H-3. Kobe plot of the timeseries of estimates of mature female spawning stock biomass (SSB) and fishing mortality rate (as exploitation of biomass) relative to MSY values (SSB_{MSY} and F_{MSY}, respectively) of Pacific blue marlin (*Makaira nigricans*) during 1971–2024. The earliest white symbol indicates 1971, subsequent years are labeled in 5-year increments. Shading indicates 50% (innermost), 80%, and 95% confidence intervals of terminal year (2024) stock status.

FIGURA H-3. Gráfico de Kobe de la serie temporal de estimaciones de la biomasa reproductora de hembras maduras (SSB) y la tasa de mortalidad por pesca (como explotación de la biomasa) en relación con los valores RMS (SSB_{RMS} y F_{RMS}, respectivamente) del marlín azul del Pacífico (*Makaira nigricans*) durante 1971–2024. El símbolo blanco más antiguo indica 1971; los años siguientes se etiquetan en incrementos de 5 años. El sombreado indica intervalos de confianza del 50 % (el de más adentro), 80 % y 95 % del estado de las poblaciones del año terminal (2024).

I. STRIPED MARLIN

Striped marlin (*Kajikia audax*) occurs throughout the Pacific Ocean between about 45°N and 45°S. Significant effort has been devoted to understanding the stock structure of striped marlin in the Pacific Ocean, which is moderately well known. There most likely are a number of stripped marlin stocks in the Pacific Ocean, but the boundaries are uncertain. Information on movement from research studies deploying conventional dart tags is limited, although over 40,000 striped marlin have been tagged by various volunteer recreational fisher tagging programs. Although reported recapture rates are below 1%, recapture data show that striped marlin are capable of moving long distances (5,000–6,000 km), however, most recaptures have occurred reasonably close to the release location. In the EPO specifically, fish tagged off the tip of Baja California were generally recaptured near where they were tagged, but some were recaptured around the Revillagigedo Islands, a few around Hawaii, and one near Norfolk Island, off Australia. Tagging studies in the Pacific, using pop-off satellite tags, indicated that there is essentially no mixing among tagging areas, and that striped marlin maintain site fidelity. Analyses of fisheries and genetic data indicate that the northern EPO supports a single stock, though there may be a seasonal low-level presence of juveniles from a more westerly Hawaii/Japan stock.

Historically, most of the catch in the EPO was taken by longline fisheries, which began expanding into the EPO in the mid-1950s and extended throughout the region by the late 1960s. Except for a few years in the late 1960s to early 1970s in the northern EPO, these fisheries did not target billfish. The fishing effort by large longline vessels in the northern EPO (north of 10°N) has decreased since 2017 and is currently about 6,000 million hooks, 70% less than the 2017 peak (Figure G-1). In the southern EPO (south of 10°N), effort remained stable, except for the sharp decrease in 2023, and returned to the about 129,000 million hooks in 2024 (Figure G-3), but the catch of striped marlin has remained largely unchanged since then, and it is currently about 1,300 t (annual average for 2022-2024). The current catches are about 20% lower than the average for the previous 10 years (2014-2023), which was about 1,600 t. Since the early 1990's, the catches by recreational fisheries have become important, although most fish caught are released (Figure I-1). However, the survival rate of released fish is little understood.

The recreational fishery has increased its contribution to the total annual reported catches of striped marlin in the EPO, particularly in the North EPO, from around 10% in 1990 to 64% and 84% in 2007 and 2008, respectively. However, a paucity of reported data since 2009 probably means that the catches of striped marlin in the EPO have been significantly underestimated since this time. The recent reported catches are only about 20 t Also, it appears that catches of billfishes, including striped marlin, by the artisanal longline fisheries from coastal CPCs may be incomplete. Therefore, the total catch of striped marlin in the EPO, and thus the total impact of fishing on the stock since about 2009, is not known.

Fishing by artisanal longline vessels targeting tuna and other species off Central America, for which data availability is limited, appears to have increased, over the past decade at least. The shifting patterns of areas fished and targeting practices increase the difficulties encountered when using fisheries data in analyses of stock status and trends. These difficulties are exacerbated when analyzing species which are not principal targets of the fishery, and further complicated when the total catch of the species by all fisheries is not known.

The last full assessment of striped marlin in the EPO was conducted in 2008, using Stock Synthesis, and later updated with data through October 2010 (SAC-01-10). The spatial domain of the assessment was north of 10°S, east of about 145°W north of the equator, and east of about 165°W south of the equator. Key results were that (1) the stock was not overfished; (2) overfishing was not occurring; and (3) the spawning stock biomass was above the level that would support MSY. More recently, average annual catches in the last ten years (2014–2023, 1,638 t) were at about half the estimated MSY level in 2010. If fishing effort and catches continue at or below the 2010 level (2,129 t), it is expected that the biomass of the stock will continue to increase over the near term.

In 2022-2023, the Billfish Working Group (BILLWG) of the International Scientific Committee for Tuna and Tuna-like Species in the north Pacific Ocean completed a full assessment of the western and central north Pacific Ocean (WCNPO) stock of striped marlin (ISC/23/ANNEX/14). A Stock Synthesis model was

produced with the best-available life history parameters and catch, abundance index, and length composition data for the period 1977–2020. The results indicated that the fishing mortality (average for ages 3 – 12 during 2018-2020) was about three times the F_{MSY} and 9% above $F20\%SSB_{(F=0)}$. The spawning biomass (average for 2018-2020) was of 1,360 t, which is 63% below $20\%SSB_{F=0}$. Relative to dynamic 20-year 20%SSBF=0-based reference point, the WCNPO striped marlin stock was very likely overfished and was likely subject to overfishing.

Efforts continue to obtain reliable catch data from all fisheries. Until the data are available and updated, and a review of the status of striped marlin in the EPO is completed, it is recommended that, as a precautionary measure, fishing effort by fisheries that take most of the striped marlin catch in the EPO not be increased.

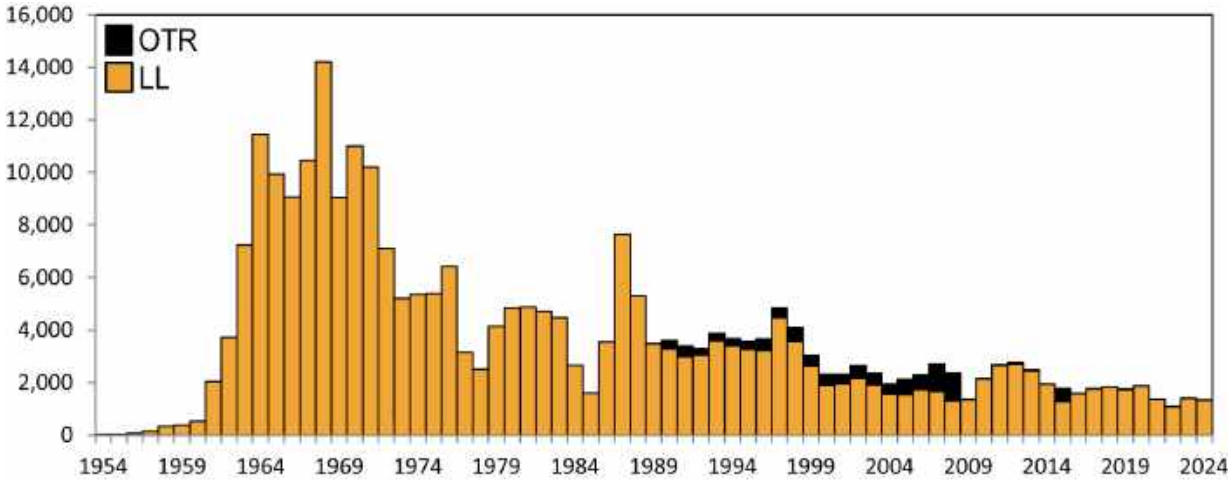


FIGURE I-1. Total reported retained catches of striped marlin in the North EPO by longline (LL) and other (OTR) fisheries (primarily recreational, 1954–2024. Due to unreported catches by recreational fisheries, estimates for 2009–2024 are minimums.

FIGURA I-1. Capturas retenidas totales reportadas de marlín rayado en el OPO Norte por las pesquerías palangreras (LL) y otras (OTR, principalmente recreativas), 1954–2024. Debido a capturas no reportadas por pesquerías recreativas, las estimaciones de 2009–2024 son mínimas.

J. SAILFISH

The stock structure of sailfish (*Istiophorus platypterus*) in the Pacific Ocean is well known. The species is most abundant in waters relatively near the continents and the Indo-Pacific land masses bordering the Pacific, and less frequently encountered in the high seas separating them. The populations in the EPO and in the western Pacific are genetically distinct.

The centers of sailfish distribution along the coast of the Americas shift in response to seasonal changes in surface and mixed-layer water temperature. Sailfish are found most often in waters warmer than about 28°C, and are present in tropical waters nearer the equator in all months of the year. Sailfish have among the largest number of conventional tag deployment of all billfishes, mainly attributed to their high importance to recreational fisheries worldwide. At least 126,000 sailfish have been tagged among the world's five largest volunteer gamefish tagging programs, although less than 2,000 fish (1.5%) have been recaptured. The data complement genetic information in that there appears to be high population substructure with fish often moving less than 500 km from their release locations. However, there are several instances where sailfish have moved reasonably long distances (2,000–3,500 km) over periods of less than a year, however, these distances can be considered small in comparison to movements of other billfish species in the EPO.

Spawning takes place off the coast of Mexico during the summer and fall, and off Costa Rica during winter, and perhaps year-round in areas with suitable conditions. The sex ratio is highly skewed towards males during spawning. The known shifts in sex ratios among spawning areas, and the spatial-temporal distributions of gonad indices and size-frequency distributions, which show smaller fish offshore, suggest that there may be maturity-dependent patterns in the distribution of the species in the EPO. Sailfish can reach an age of about 11 years in the EPO.

The principal fisheries that capture sailfish in the EPO include the large-scale tuna longline fishery primarily consisting of China, Chinese Taipei, Japan, and Korea; the smaller-vessel longline fisheries targeting tuna and other species, particularly those operating off Central America; and the artisanal and recreational fisheries of Central and South America. Sailfish are also taken occasionally in the purse-seine fisheries targeting tropical tunas, particularly in more coastal regions.

The first assessment of sailfish in the EPO was conducted in 2013 (SAC-04-07c). Initial analyses indicated that either this stock had uncharacteristically low productivity and high standing biomass, or—more likely—that a large amount of catch was missing in the data compiled for the assessment. A satisfactorily estimate of the missing catch was unavaible, thus the estimates of stock status and trends using Stock Synthesis—the preferred model for assessments—were unreliable. As a result, the assessment was conducted using a surplus production model, which provided results consistent with those obtained with Stock Synthesis and simplified the illustration of the issues in the assessment.

Key results:

1. It is not possible to determine the status of the sailfish stock in the EPO with respect to specific management parameters, such as maximum sustained yield (MSY), because the parameter estimates used in making these determinations in this case cannot be derived from the model results.
2. Average annual reported catches during 2022–2024 were 501 t (Figure J-1), significantly less than the 1993–2007 average of 2,057 t.
3. Sailfish abundance trended downward during 1994–2009, since then it has been relatively constant or slightly increasing until 2011, the last year in the assessment model (Figure J-2).
4. Assessment model results suggest that there are significant levels of unreported catch, and the actual catch in earlier years was probably higher than those reported for 1993–2007. Assuming that this level of harvest has existed for many years, it is expected that the stock condition will not deteriorate if catch is not increased above current levels.

5. A precautionary approach that does not increase fishing effort directed at sailfish, and that closely monitors catch until sufficient data are available to conduct another assessment, is recommended.

6. A reliable assessment of the sailfish resources in the EPO cannot be obtained without reliable estimates of catch. It is therefore recommended that:
   a. historical data on catches of sailfish be obtained wherever possible
   b. fisheries currently reporting sailfish catches commingled with other species be required to report catches by species.
   c. existing data from small-scale fisheries, such as local longline fleets, artisanal and recreational fisheries, be compiled and that, where necessary, catch monitoring programs to identify catches by species be implemented.

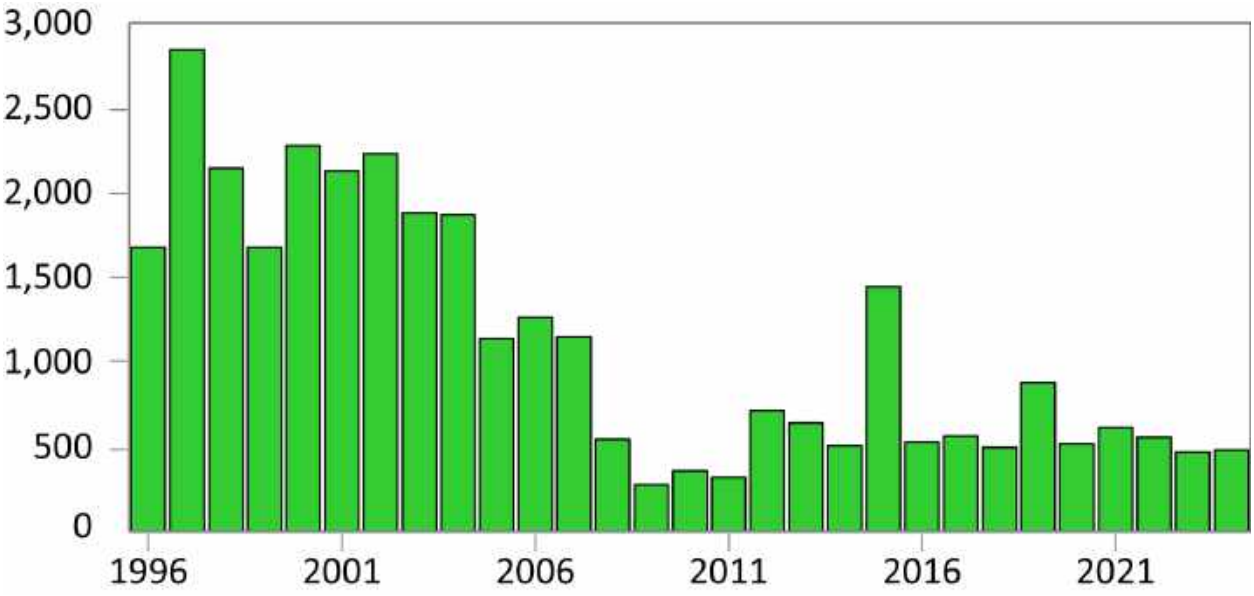


FIGURE J-1. Total reported catches of sailfish in the EPO, 1996–2024. (The actual catches were probably greater).
FIGURA J-1. Capturas totales reportadas de pez vela en el OPO, 1996–2024. (Las capturas reales fueron probablemente mayores).

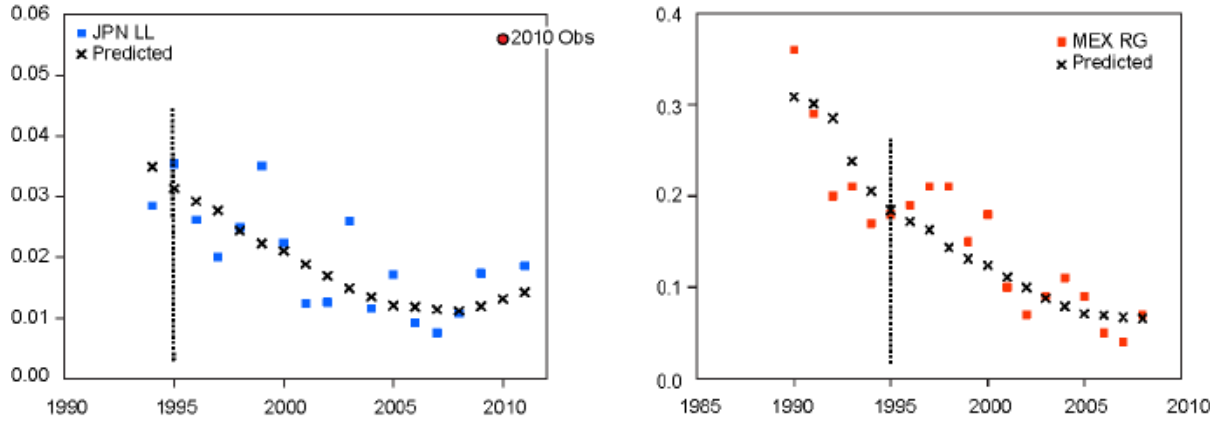


FIGURE J-2. Observed and predicted indices of relative abundance of sailfish in the EPO from Japanese longline (JPN LL) and Mexican recreational (MEX RG) fisheries. The 2010 observation in the JPN LL series was not included in the analyses.
FIGURA J-2. Índices observados y predichos de abundancia relativa del pez vela en el OPO, basados en las pesquerías palangrera japonesa (JPN LL) y recreacional mexicana (MEX RG). No se incluyó en los análisis la observación de 2010 en la serie JPN LL.

K. SHARKS

Over 300 species of sharks inhabit the Pacific Ocean, of which at least 49 species have been documented to be caught, either as a target or incidental bycatch, in the industrial and small-scale coastal (*i.e.*, 'artisanal') pelagic fisheries of the eastern Pacific Ocean (EPO). In general, sharks are long-lived (20+ years), slow growing, mature late in life and produce a small number of offspring (<10 pups), often every few years, resulting in conservation concerns for many species impacted by fishing. In recognition of the potential negative impacts of fishing on sharks, the IATTC has implemented a range of conservation and management measures (CMMs) since at least 2005 to limit their capture, or prohibit retention, or to promote best handling and releasing practices to maximize their post-release survival. For example, retention prohibition measures have been in place for oceanic whitetip shark in all EPO industrial tuna fisheries since 2011 (Resolution C-11-10) and for silky shark in all purse-seine fisheries since 2016 (Resolution C-16-06). In 2025, the IATTC adopted Resolution C-25-08 "*Conservation measures for the protection and sustainable management of sharks*" which consolidates existing measures that pertain to sharks in IATTC resolutions and strengthens shark conservation and management measures in the EPO. Furthermore, the resolution includes a list of 18 shark species with special interest in research and management and to be under the purview of the Commission. A list of 49 species documented to interact with pelagic fisheries in the EPO was used in combination with other available species lists, ecological characteristics and conservation classifications by international instruments to provide recommendations from the staff , along with the EBWG and SAC on the 18 shark species to be included in the Resolution (SAC-15-09 Recs). As mentioned, these species were subsequently adopted by the Commission, with a particular emphasis on *Carcharhinus longimanus*, C. *falciformis*, *Sphyrna lewini*, *S. zygaena*, and *S. mokarran*, *Alopias pelagicus* and *A. supercilicious*, and *Prionace glauca*, with a goal to collaborate with the Western and Central Pacific Fisheries Commission (WCPFC) for Pacific-wide stocks.

Sharks are often incidentally caught as bycatch in EPO fisheries targeting tunas and billfish. Insufficient or unreliable catch and biological data available for most shark species have hindered the development of stock assessments, except for a small number of economically important species such as blue and shortfin mako sharks that are assessed by the ISC as contiguous north Pacific stocks every 5 years. The most recent assessments for these species were completed in 2022 and 2024 respectively, with updates scheduled for 2027 and 2029. For the south EPO, a collaboration with the Comisión Permanente del Pacífico Sur (CPPS -regional) is in progress for the assessment of blue shark in the south EPO (and MOU was signed between IATTC and CPPS); a workshop to establish a conceptual model for the stock shall take place in 2026. Given data deficiencies, but at the same time acknowledging the need to demonstrate ecological sustainability mandates under the Antigua Convention, the IATTC has used ecological risk assessment to identify vulnerable species for monitoring, research and management, and where possible, undertake detailed assessments of stock indicators or stock status. In parallel, the IATTC has been conducting a pilot study of the use close-kin mark-recapture (CKMR) as a stock assessment tool for silky sharks in the EPO, with plans to expand to hammerhead sharks in the future.

Vulnerability assessment of sharks caught in eastern Pacific Ocean pelagic fisheries

In 2018, the IATTC staff developed of a flexible spatially-explicit quantitative ecological risk assessment approach—Ecological Assessment of Sustainable Impacts of Fisheries (EASI-Fish)—specifically designed to quantify the cumulative impacts of multiple fisheries for data-limited bycatch species to identify vulnerable species and prioritize them for data collection, research and management. In 2022, the IATTC undertook the first comprehensive vulnerability assessment for sharks in the EPO using EASI-Fish (SAC-13-11), which characterized their vulnerability status for 2019, the most recent complete fishing year to be representative of contemporary fishing effort regimes in the EPO before fishing effort, data collection and provision were significantly impacted by the COVID-19 pandemic.

Of the 49 shark species recorded to interact with industrial (purse-seine and longline) and artisanal (longline and gillnet) pelagic fisheries in the EPO, 32 species were formally assessed using EASI-Fish. In 2019, estimates of a proxy for fishing mortality ($\tilde{F}_{2019}$) and the spawning stock biomass per recruit (SBR_{2019})

exceeded proxies for biological reference points ($F_{40\%}$ and $SBR_{40\%}$) for 20 species, classifying them as "most vulnerable" (Figure K-1; SAC-13-11). These included hammerhead sharks (5 species; *Sphyrna corona, S. media, S. mokarran, S. lewini,* and *S. zygaena*), requiem sharks (10 species; *Carcharhinus altimus, C. brachyurus, C. falciformis, C. leucas, C. limbatus, C. longimanus, C. plumbeus, C. porosus, Nasolamia velox,* and *Rhizoprionodon longurio*), threshers (2 species; *Alopias superciliosus* and *A. pelagicus*), mesopelagic sharks (3 species; *Dalatias licha, Pseudocarcharias kamoharai,* and *Zameus squamulosus*) and the commercially important blue shark (*Prionace glauca*) and shortfin mako (*Isurus oxyrinchus*). The remaining 12 species were classified as "least vulnerable" (9 species) or "increasingly vulnerable" (3 species). Key knowledge gaps identified were the location of fishing effort and the shark catch in small-scale coastal (i.e, 'artisanal') fisheries and basic biological information for several species. Overall, the most vulnerable species were *S. zygaena, C. falciformis* and *S. lewini,* which coincidentally, were identified by the IATTC as a priority for stock assessments (Resolution C-16-05), while stock indicators for silky shark have been produced annually since 2014 (Figure K-2). However, given the lack of species-specific catch data for these species, particularly in small-scale coastal (i.e., 'artisanal') fisheries where catches are believed to be high (SAC-14-INF-L), EASI-Fish is planned to be used as an exploratory tool in the interim period until catch and post-release survival data are improved to simulate changes to existing, or additional, management measures, either in isolation or in concert, to determine their efficacy for reducing species-specific vulnerability to overfishing. This exploratory approach was implemented in 2023, where the effects of 43 different conservation and management measures were simulated for silky shark (*Carcharhinus falciformis*) and three hammerhead species; scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*Sphyrna mokarran*), and smooth hammerhead (*Sphyrna zygaena*) using EASI-Fish (SAC-14-12). This assessment showed that no single management measure was able to reduce the vulnerability status of any species from a "vulnerable" to a "least vulnerable" status. Although scenarios such as temporal EPO closures, banning wire traces, imposing a 100 cm total length minimum retention length for all sharks, and even prohibiting landing of all sharks predicted a significant reduction in at-vessel mortality, this positive effect on vulnerability was mostly negated by high post-release mortality of these species. These results highlighted the utility of adopting "best handling and release practice" guidelines (SAC-15-11; SAC-16-10; SAC-17-08) and that the most effective mitigation measure for these sharks is to avoid interaction with EPO fisheries. The assessment identified several major data gaps that need to be addressed through a collaborative participatory research approach between the IATTC and its CPCs, including basic biology and improved species-specific catch and size composition data in artisanal fisheries and the industrial longline fishery. Addressing these data needs will not only help to improve short-term rapid assessments such as EASI-Fish but also develop longer-term time series data required to undertake new and conventional methods such as close-kin mark recapture or traditional stock assessments from which population status of these vulnerable species can be determined.

In response to paragraphs 15 and 16 of Resolution C-25-08, the IATTC staff developed a proposed Shark Data Collection and Research Plan for 2026–2030 (SAC-17-09), to be carried out by the scientific staff in collaboration with the EBWG and the SAC. Following the shark workplan of the IATTC Strategic Science Plan 2026–2030 (IATTC-103-03a), the plan organizes research on the priority species under four interdependent pillars: (i) data collection, which underpins all subsequent activities and, in response to paragraph 15, sets out a standardized data collection program that includes the monitoring of small-scale, coastal fisheries (SAC-15-10); (ii) stock assessment, through close-kin mark-recapture (CKMR) and conventional models, to estimate population status; (iii) assessment of impacts, via ecological risk assessments (e.g., EASI-Fish), spatial-management analyses and ecosystem-advice products; and (iv) mitigation of impacts, with tools applied before (e.g., bycatch avoidance), during (e.g., gear technology) and after (e.g., best handling and release practices) the fishing interaction, all underpinned by supporting life-history and telemetry research. Recognizing that reliable assessments are a key priority, the staff combined the two principal tools—the small-scale fisheries data collection program (paragraph 15) and the silky shark CKMR assessment (paragraph 16)—into a single integrated shark assessment and sampling program, and recommended that the Commission implement and execute the plan together with its associated budget, favoring a targeted

large- and small-scale sampling option with a cost estimate of approximately USD 2.4 million over three years (SAC-17 INF-E). Both the EBWG and the SAC endorsed the plan.

Updated stock status indicators for silky sharks in the eastern Pacific Ocean (1994-2025)

The indices for large silky sharks (>150 cm total length (TL)), based on data from the purse-seine fishery on floating objects, have been updated through 2025 for the north and south EPO (Figure 5; SAC-17-10). Previous analyses (SAC-08-08a(i), Lennert-Cody et al., 2019) identified a correlation between north EPO indices, particularly those for small (<90 cm TL) and medium silky sharks (90–150 cm TL), and interannual variability in oceanographic conditions, and thus the indices for those size categories, and for all silky sharks, were not updated because of concerns about bias. Because of recent increases in the live release of silky sharks, two sets of indices for large silky sharks were computed, one including live release data and the other not. Taken together, the two sets of indices likely bracket the trend that would have resulted in both the north and south EPO if "finning"[6], shark handling, and data recording practices had continued unchanged since 1994. The real trend is considered to be closer to the index based on dead + live releases because sharks recorded as released alive in recent years would probably have been recorded as dead previously, and thus the dead + live release is likely a more consistent indicator. The terminal point of these indices suggest a relatively stable abundance level for almost two decades, with the 2025 values slightly higher in north and slightly lower in south relative to the 2024 value, and thus no changes to management measures are recommended. However, the stock status is uncertain, and an assessment has not been possible due to the paucity of data, especially for the longline fleets of coastal nations, which are believed to have the greatest impact on the stock (SAC-05-11a, SAC-14 INF-L). Thus, the IATTC staff reiterates its previous recommendations (SAC-07-06b(i), SAC-07-06b(iii), SAC-08-11) that improving shark fishery data collection in the EPO is critical. This will facilitate the development of other reliable stock status indicators and/or stock assessments to better inform the management of the silky shark, and likely other, co-occurring shark species.

[6] Cutting the fins off sharks and discarding the carcass.

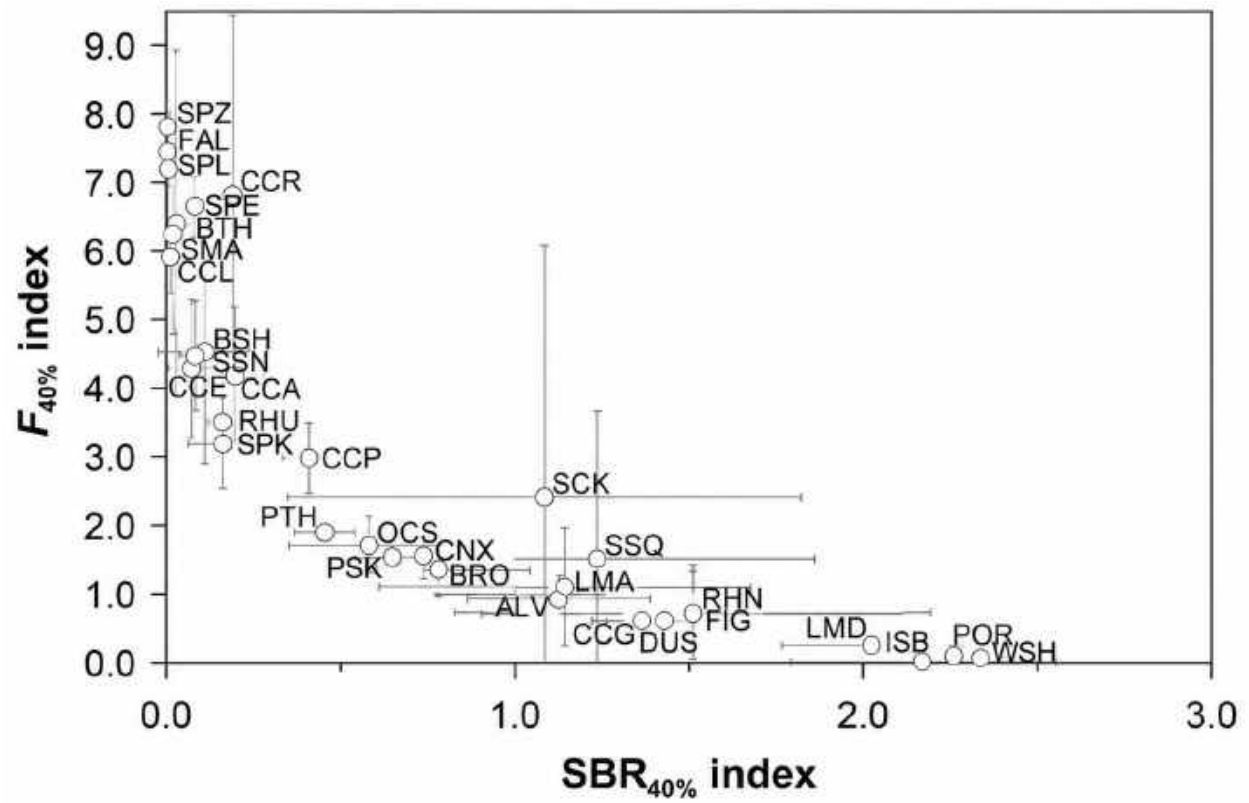


FIGURE K-1. Vulnerability phase plot showing the vulnerability status of 32 shark species caught in eastern Pacific Ocean pelagic fisheries assessed by EASI-Fish represented by mean (± standard deviation) estimates the biological reference points $\tilde{F}_{2019}/F_{40\%}$ and $SBR_{2019}/SBR_{40\%}$. Labels adjacent to symbols denote species codes shown Table 6. Vulnerability status values for each species are provided in Table 6.

FIGURA K-1. Gráfica de fase de vulnerabilidad que muestra el estado de vulnerabilidad de 32 especies de tiburones capturadas en las pesquerías pelágicas del Océano Pacífico oriental evaluadas por EASI-Fish, representadas por estimaciones promedio (± desviación estándar) de los puntos de referencia biológicos $\tilde{F}_{2019}/F_{40\%}$ y $SBR_{2019}/SBR_{40\%}$. Las etiquetas adyacentes a los símbolos indican los códigos de especie mostrados en la Tabla 6. Los valores del estado de vulnerabilidad de cada especie se presentan en la Tabla 6.

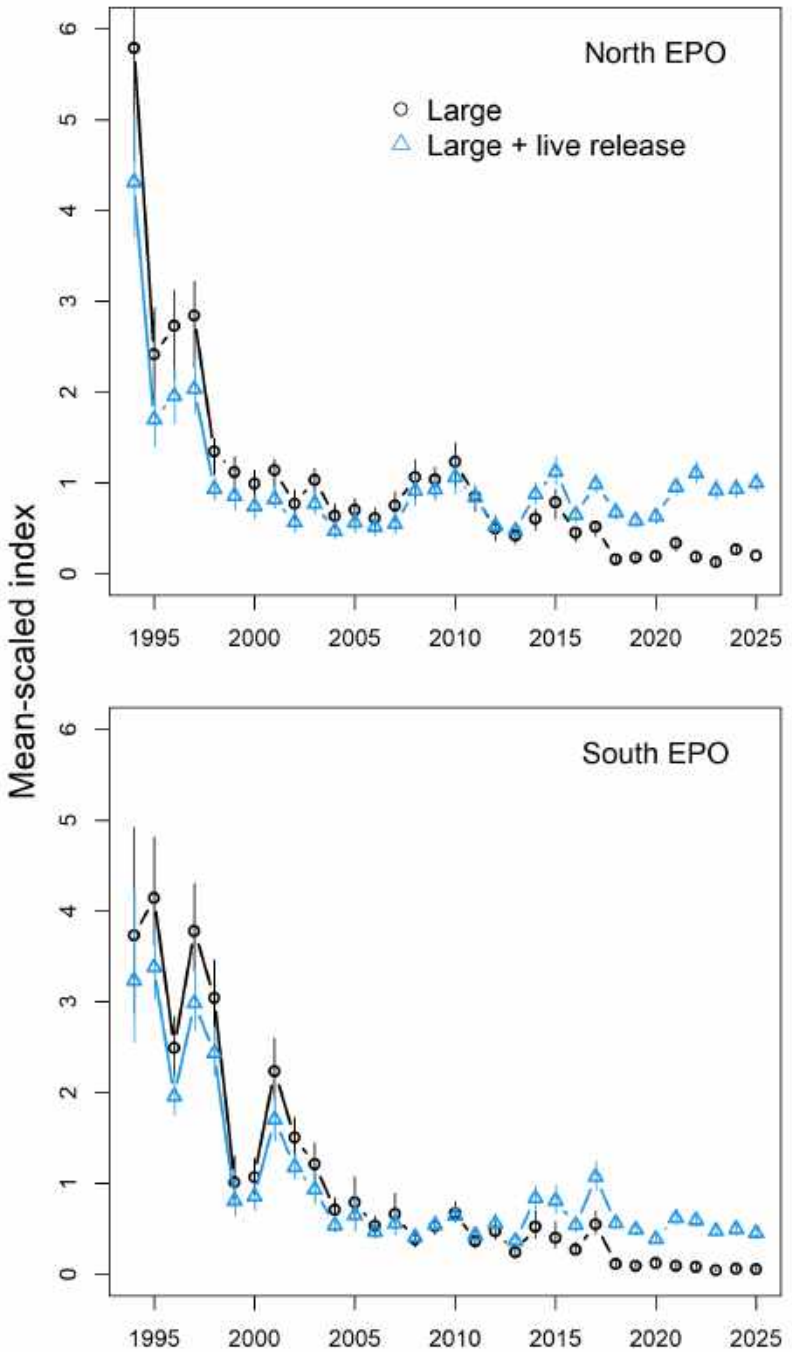


FIGURE K-2. Mean-scaled standardized bycatch-per-set (in numbers of sharks per set) of large silky sharks in sets on floating objects, with and without live release, in the north (top) and south (bottom) EPO.
FIGURA K-2. Captura incidental por lance (en número de tiburones por lance) estandarizada de tiburones sedosos grandes en lances sobre objetos flotantes, con y sin liberación en vivo, en el OPO norte (arriba) y sur (abajo).

L. ECOSYSTEM CONSIDERATIONS

CONTENTS

Summary……117
1. Introduction 118
2. Data sources 119
2.1. Purse-seine 120
2.2. Longline 121
3. Fishery interactions with species groups 122
3.1. Tunas and billfishes 122
3.2. Marine mammals 122
3.3. Sea turtles 123
3.4. Seabirds 125
3.5. Sharks 126
3.6. Rays 129
3.7. Other large fishes 131
3.8. Forage species 132
4. Physical environment 133
4.2. Spatio-temporal exploration of environmental conditions 134
4.3. Environmental conditions and distribution of catches 134
5. Identification of species at risk: ERAs 135
6. Ecosystem dynamics 135
6.1. Ecological indicators 136
7. Future developments 137
Acknowledgments 138
Literature cited 138

SUMMARY

Over the past two decades, fisheries management worldwide has expanded beyond target stocks to more explicitly consider the impacts of fishing on non-target species and the ecosystem as a whole. This broader ecosystem approach to fisheries management (EAFM) aims to maintain ecosystem integrity while supporting the sustainable use of commercially-important fisheries and ecosystem services that provide social, cultural and economic benefits to society. In response to growing interest in EAFM within the IATTC—particularly following the adoption of the Antigua Convention—the staff has presented an *Ecosystem Considerations* report since 2003. This report provides information on non-target species and on the effect of tuna fisheries on the ecosystem and provides initial insights on how ecosystem research can inform management advice and decision-making. It also summarizes recent advances related to the ecological impacts of fishing and environmental variability in the eastern Pacific Ocean (EPO). Specifically, the report includes information on: (1) fisheries interactions, such as incidental catches of non-target species ("bycatch") across major taxonomic groups (marine mammals, sea turtles, seabirds, elasmobranchs and teleosts); (2) the physical environment, including short and medium-term (e.g., El Niño Southern Oscillation) and long-term (e.g., Pacific Decadal Oscillation) environmental indicators; (3) tools for identifying potentially vulnerable species[7] such as the Ecological Assessment of Sustainable Impacts of Fisheries (EASI-Fish); (4) ecosystem dynamics evaluated using an eastern tropical Pacific Ocean (ETP)

[7] Unless specified otherwise, including but not limited to citations to vulnerability assessments and any qualitative/quantitative scores (e.g. BYC-10 INF-B; SAC-13-11; SAC-14-12), the staff's definition of "vulnerable species" refers to the species that, in the sensu latu, and due to their low-productive life-history traits (i.e. K species in r/K selection theory), are more vulnerable to the impacts of fisheries and other anthropogenic activities on these species or their habitat and ecosystem. This includes the marine mammals, seabirds, sea turtles and the elasmobranchs.

ecosystem model and associated ecological indicators; and (5) future directions for ecological research in the EPO to support science-based advice to the IATTC.

Data limitations remain a significant challenge for many bycatch species taken in fisheries other than the large vessel purse-seine fishery (class 6, >363 t), which benefits from 100% observer coverage. For example, the industrial longline fishery is subject to a minimum observer coverage of 5% and biological data for many species are limited. This data gap has long been recognized by the staff (e.g., see SAC-07-INF C(d), SAC-08-07b, SAC-10 INF-B), and several recommendations have been made to improve data collection. These efforts include data improvement workshops for "industrial longline" fisheries (WSDAT-01, WSDAT-01-RPT) and "small purse-seine vessels" (≤363 t; WSDAT-02, WSDAT-02-RPT), with consolidated recommendations provided in 2025 (SAC-16 INF-O). A future workshop will address data improvement matters for the "small-scale" fisheries in the IATTC area.

Additionally, SAC-17-07 aims to develop a clear and standardized classification system for longline vessels operating in the EPO to improve consistency in terminology, data reporting, and compliance with IATTC measures. By doing so, it supports more effective management, research prioritization, and implementation and interpretation of obligations across CPCs.

Finally, updates to the proposed workplan to restructure the *Ecosystem Considerations* report into two ecosystem-advice products—an indicator-based ecosystem report card ("*EcoCard*") and a complementary *Ecosystem Status Assessment*—were presented in 2025 (EB-03-04). These updates focused on Phase 1 (*Planning*) to improve IATTC's communication of ecosystem status. A progress report on Phase 2 of this workplan, focused on "*Establishing criteria*" is provided in EB-04-03.

1. INTRODUCTION

The ecosystem approach to fisheries management (EAFM) was formalized in the 1995 FAO *Code of Conduct for Responsible Fisheries*, which stipulates that "*States and users of living aquatic resources should conserve aquatic ecosystems*" and that "*management measures should not only ensure the conservation of target species, but also of species belonging to the same ecosystem or associated with or dependent upon the target species*". These principles were reinforced in 2001, through the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem committed to incorporating an ecosystem approach into fisheries management.

The IATTC's Antigua Convention, which entered into force in 2010, reflects these principles. Article VII (f) establishes that one of the functions of the IATTC is to "*adopt, as necessary, conservation and management measures and recommendations for species belonging to the same ecosystem and that are affected by fishing for, or dependent on or associated with, the fish stocks covered by this Convention, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened*". Earlier, the 1999 Agreement on the International Dolphin Conservation Program (AIDCP) had already introduced ecosystem considerations into the management of the tuna fisheries in the EPO. Consequently, the IATTC has, for over two decades, recognized ecosystem-related issues in tuna fisheries, and has progressively incorporated EAFM elements into its decision-making (e.g., SAC-10 INF-B; Juan-Jorda et al. 2018). This work has been further advanced under IATTC's 5-year Strategic Science Plan (SSP), first implemented in 2019 (IATTC-93-06a), through which staff conduct ecological research and generate the data and tools needed to implement EAFM. Current and planned ecosystem-related activities by the staff is summarized in the 2026–2030 SSP (IATTC-103-03A, SAC-16-07).

Assessing the ecological sustainability of EPO tuna fisheries remains challenging due to the wide range of species with differing life histories with which tuna fisheries interact. While relatively good information is available for catches of tuna and tuna-like species throughout the Convention Area, data on most non-target ("bycatch") species are limited, especially those that are less frequently encountered, discarded at sea or have low economic value (see section 2 and IATTC Special Report 25). In addition, environmental variability operating across multiple temporal and spatial scales—such as the El Niño-Southern Oscillation, Pacific Decadal Oscillation, ocean warming, anoxia and acidification—affect species distributions and their

interactions with tuna fisheries (e.g., SAC-15 INF-L, SAC-16 INF-T). Recognizing these challenges, the IATTC adopted its first Resolution on climate change (C-23-10) in 2023, later amended in 2024 (C-24-10), and has initiated a workplan towards climate resilient fisheries (SAC-15-12; SAC-16 INF-P), including dedicated workshops (WSCC-01; WSCC-02) in February 2025 and April 2026, respectively. Additional workshops will be organized in the future under the mentioned workplan.

Traditional single-species management of target species relies on biological reference points, based on estimates of fishing mortality, spawning stock biomass, recruitment, and other biological parameters. However, the catch and/or biological data required for estimating those metrics are often unavailable or unreliable for most bycatch species. More broadly, the complexity of marine ecosystems precludes the use of any single indicator that can holistically represent the structure, function and responses to fishing and environmental change.

As the scope of ecological, environmental and fishery considerations relevant to EAFM in the EPO has expanded, the *Ecosystem Considerations* report has grown in length and complexity, limiting its effectiveness as a communication tool for IATTC's Cooperating Members and Non-members (CPCs), stakeholders and the public. To address this, the staff plan to re-envision the report—drawing on parallel efforts by the other tuna-Regional Fisheries Management Organizations (t-RFMOs)—into two complementary ecosystem-advice products: (1) an indicator-based Ecosystem Report Card or "*EcoCard*" that highlights a selected set of key bycatch, ecosystem, and climate indicators, among others, identified by the staff and through stakeholder consultation to best represent ecosystem status and (2) a complementary, descriptive "*Ecosystem Status Assessment*" that documents the full suite of indicators used to communicate the overall status of marine ecosystems and trends over time.

This approach builds on similar initiatives undertaken by other t-FRMOs to advance EAFM. A phased workplan (EB-02-02) has been developed to guide implementation of EAFM, beginning with Phase 1 (*Planning*), which focused on defining the purpose, objectives and designing a conceptual framework (EB-03-04), followed by Phase 2 (*Establishing* criteria), including proposed screening criteria for defining ecoregions and developing candidate indicators (EB-04-03). Until this transition is completed, the *Ecosystem Considerations* report will continue to be updated.

2. DATA SOURCES

In this report, estimated total annual catches of bycatch species were obtained from observer data for the large-vessel purse-seine fishery[8], nominal catches reported by the limited observer coverage onboard the small-vessel purse-seine fishery[9], and gross annual removals by the longline fishery were obtained from annual summary reports (TASK I data, see SAC-12-09, WSDAT-01-01, specifications for data provision) submitted to the IATTC by CPCs.

Minimum catches in 2024 reported by observers on longline vessels are also included as an interim measure until observer coverage increases from the mandated 5% to at least 20%—as recommended to the Commission by the scientific staff—that may allow total annual catches for some bycatch species to be reliably estimated. Observer coverage for CPCs has not been considered by staff to be representative of the activities of their longline fleets (see section 2.2. below and BYC-10 INF-D), although for some CPCs observer coverage has been above the 5% minimum coverage requirement (see e.g., SAC-16 INF-B, SAC-17 INF-B). Longline data were available through 2024 as the deadline for data reporting for the previous year occurs after the annual SAC meeting (see Resolutions C-03-05; C-19-08). However, these data are incomplete as operational data have not yet been received by all CPCs at the time of this report.

Purse-seine data were available through 2025, with data from the last 2 years considered preliminary as of March 2026.

Each data source and their associated data gaps are described in detail below. Additional information on

[8] Size class 6 purse-seine vessels with a carrying capacity > 363 t
[9] Size class <6 purse-seine vessels with a carrying capacity ≤363 t

bycatch data is available by fishery (see e.g., SAC-07-INF-C(d), SAC-12-09, DAT-01-01, DAT-02-01, IATTC Special Report 25).

2.1. Purse-seine

Data from the purse-seine fishery is compiled from 3 data sources: 1) IATTC and National Program observer programs, 2) vessel logbooks that are obtained by staff at the Commission's field offices in Latin American tuna ports, and 3) canneries. The observer data from the large-vessel (Class 6) fishery are the most comprehensive in terms of bycatch species, since the 1992 Agreement on the Conservation of Dolphins (the La Jolla Agreement) has required an observer be onboard for all trips for Class- 6 vessels since 1993. An historical perspective of bycatch data collection from the observer programs is described in IATTC Special Report 25. Observers working in the IATTC and the various National Programs provide detailed bycatch data by species, catch, disposition and effort for the exact fishing position (i.e., the latitude and longitude of the purse-seine set).

Both the fisher-completed logbook and cannery datasets contain very limited data on bycatch species as reporting is primarily focused on commercially important tuna species. The logbook data, like the observer data, includes exact fishing positions. The cannery (or "unloading") data do not have an exact fishing position but rather a broad geographic region where fish were caught (e.g., the eastern Pacific or western Pacific Ocean). These data contain bycatch species only if they were retained in a purse-seine well during the fishing operation and unloaded.

Smaller (Class 1–5) purse-seine vessels are not required to carry observers, except under specific circumstances (e.g., certification purposes, fishing during closure periods). The primary sources of unobserved data are logbook records and cannery unloading records. Some trips made by small purse-seine vessels are sampled for species composition and length frequencies (i.e., port sampling data). All of these data sources focus on tuna species. The FAD form, a logbook designed in late 2018 to be used by skippers of small vessels without observers when fishing on FADs, is also a source of unobserved data for tunas and sensitive species groups, but bycatch data from this form is currently of little use for the purposes of the *Ecosystem Considerations* report as data are aggregated into broad taxonomic groups and data quality is uncertain. As such, there is limited information recorded on interactions with bycatch species by smaller purse-seine vessels. For additional information on data sources for the small purse-seine fishery see WSDAT-02-01.

In recent years there has been an increase in the number of smaller vessels that have carried observers. This is due to AIDCP requirements for these vessels to fish during closure periods for Class 6 purse-seine vessels, a desire for dolphin-safe fishery certification, an IATTC pilot project trialing the efficacy of electronic monitoring methodologies (SAC-11-11), and a voluntary observer program for smaller vessels established by the Tuna Conservation Group (TUNACONS)—a consortium of Ecuadorian tuna fishing companies that began in 2018.

The minimum observer-derived catch reported by observers for bycatch species by small vessel trips are included in this report to provide rudimentary information currently available for this fishery, with a view to expanding reporting on this fishery as data provision is hoped to improve in future (but see WSDAT-02-02). The second Workshop on Data Improvement focused on the small purse-seine fishery (WSDAT-02, February 2025) to discuss possible means for improving data collection and provision with the overarching goal of producing recommendations for updating the data provision Resolution C-03-05 (see WSDAT-02-RPT) and updated recommendations based on participant feedback (SAC-16 INF-O). In 2025, more than half of the trips (54%) made by smaller vessels were observed: 46% were observed by the voluntary TUNACONS observer program, 5% from the Ecuadorian National observer program, and 3% from the IATTC observer program.

Therefore, in this report we primarily focus on the comprehensive observer dataset from large purse-seine vessels to provide catch estimates for bycatch species. The bycatch data provided by the observers are used to estimate total catches, by set type (i.e., floating objects (OBJ), unassociated tunas (NOA), and dolphins (DEL)). The numbers of sets for each type made in the EPO during 2010–2025 are shown in Table A-7 of Document SAC-17-01.

Despite the observer requirement for all Class-6 trips, some sets are known to have taken place, based on

logbooks and other sources, but were not observed. For example, at the start of bycatch data collection in 1993, about 46% of sets were observed, increasing to 70% in 1994. From 1994 to 2008, the average percent of sets observed was around 80%. From 2009 onwards, nearly 100% of sets were observed. Catch-per-day data for both target and non-target, bycatch species are extrapolated[10] to account for such instances.

2.2. Longline

Substantial variability in reporting formats, data quality, completeness, and observer coverage for longline fisheries has limited the staff's ability to estimate EPO-wide catches for bycatch species (SAC-08-07b, SAC-08-07d, SAC-08-07e, BYC-10 INF-D). The longline bycatch data presented herein are based on gross annual removals estimated by each CPC and reported to the IATTC in summarized ("TASK I") form. Given uncertainty regarding the completeness of submissions and marked variability among taxa and CPCs, these data are considered incomplete, or 'sample data', and are therefore treated as minimum annual reported catch estimates for the period 1995–2024.
To address these limitations, a staff–CPC collaborative process is underway to develop recommendations for updating Resolution C-03-05 on data provision, with the objective of improving data collection, reporting, and analysis in line with the Antigua Convention and the SSP (IATTC-103-03-A). An initial focus of this work has been the organization of collaborative workshops to assess the feasibility of collecting priority data types and to develop standardized data collection templates by gear type, explicitly including interactions with bycatch species listed as priority species for research and management advice (e.g., see SAC-15-09, Resolution C-24-05).
The first workshop (2023), focused on the industrial longline fishery, involved nearly 100 participants. A background document outlining key data deficiencies, illustrative case examples, and staff recommendations was prepared in advance (WSDAT-01-01) and discussed during the workshop, along with invited expert presentations. Staff recommendations for updating Resolution C-03-05 were subsequently revised based on workshop discussions and bilateral consultations with CPCs (SAC-14-14). The workshop report (WSDAT-01-RPT) and further refinements to the recommendations are documented in SAC-14 INF-Q and SAC-16 INF-O.
In 2023, the SAC broadly endorsed the staff's recommendations related to tunas (SAC-14-16, para.1(d)) and recommended that the Commission review and update Resolution C-03-05, taking into account SAC-14 INF-Q (SAC-14-16, para. 7.1). Similar recommendations were reiterated in 2024, emphasizing the need for operational longline data to support stock assessments of tuna and associated species, and urging CPCs to provide historical operational data to enable the development of abundance indices and other assessment inputs. These recommendations were reiterated in 2025 (SAC-16-11, SAC-16-16) and 2026 (SAC-17-10), which encourages updating Resolution C-03-05 to better reflect the Antigua Convention's mandate to address non-target, dependent and associated species, and the effects of the fishery on the ecosystem.
Observer data reporting for longline vessels >20 m has improved following the adoption of Resolution C-19-08 in 2019, which replaced the earlier measure (C-11-08). While detailed set-by-set operational level observer data has been received from several CPCs, observer deployment was significantly disrupted during the COVID-19 pandemic. Observer programs resumed in 2023, and the limited data available for 2024 are included in this report (see section 2 Data Sources; SAC-17 INF-B).

The IATTC staff, the Ecosystems and Bycatch Working Group (EBWG) and the SAC have consistently recommended increasing longline observer coverage to at least 20%, noting that the current 5% minimum

[4] The observed data is aggregated by species, year, flag and set type. The number of known unobserved sets is taken from logbooks and other sources. Additionally, there are known EPO trips for which the staff do not know the number and type of sets made. Therefore, known bycatch-per-day from observer data is calculated by species, year, flag and set type, and applied to the number of days-at-sea for each trip to estimate the bycatch. In some instances, there may be unobserved sets or days-at-sea data by a flag that have no equivalent observer data for that year to facilitate a reliable estimation of catch. For these trips, yearly data from a proxy flag is used. The proxy flag is determined by subsequent 5 trips made by the vessel where an observer was onboard, and adopting the predominant flag used for those trips as the proxy flag. Then the bycatch-per-set or day of the known proxy flag for the year in question is applied to the data for the unrepresented flag.

is insufficient for scientific purposes (BYC-10 INF-D). Analyses indicate that even for relatively data-rich species such as yellowfin and bigeye tunas, 5% coverage is inadequate to reliably estimate total catches, implying that estimates for bycatch species are likely to be considerably less reliable. Consequently, the data presented in this report are provided for transparency and represent minimum documented interactions and mortalities. While IATTC staff aims to develop fleet-wide longline catch estimates based on observer data in the future, these efforts will require further improvements in data reporting before robust extrapolation can be undertaken (SAC-12-09, WSDAT-01-01, SAC-14 INF-Q).

3. FISHERY INTERACTIONS WITH SPECIES GROUPS

3.1. Tunas and billfishes

Data on catches of the principal species of tunas and bonitos (genera *Thunnus*, *Katsuwonis*, *Euthynnus*, and *Sarda*), as well as billfishes in the families Istiophoridae and Xiphiidae, are reported in SAC-17-01. The staff has conducted stock assessments, including benchmark assessments for bigeye tuna (SAC-17-03; updated assessment), yellowfin tuna (SAC-16-03) and skipjack tuna (SAC-15-04), as well as stock status indicators (SSIs) for tropical tunas (SAC-17-02). In addition, work on the bigeye tuna harvest strategy (SAC-17-06) and results of the management strategy evaluation (MSE) for bigeye tuna (SAC-17-05) was presented at the 17th meeting of the SAC in 2026. Plans for the IATTC Tropical Tuna Tagging Program are also provided in SAC-17 INF-F.

The staff has further contributed to a range of collaborative assessments with other regional scientific bodies. These include assessments of Pacific bluefin (2024; SAC-16 INF-Q) and north Pacific albacore (2023 with an updated benchmark assessment scheduled for 2026. These efforts are led by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). Additional collaborations include the assessment of south Pacific albacore tuna (2024) led by the Western and Central Pacific Fisheries Commission (WCPFC), and ISC-led assessments for north Pacific swordfish (2023), western and central North Pacific striped marlin (2023), and blue marlin (2021). A new blue marlin stock assessment is expected to be finalized in 2026 by the ISC billfish working group. Finally, a benchmark assessment for swordfish in the southern EPO is presented in SAC-14-15.

3.2. Marine mammals

Marine mammals, especially spotted dolphins (*Stenella attenuata*), spinner dolphins (*S. longirostris*), and common dolphins (*Delphinus delphis*), frequently co-occur with yellowfin tuna in the EPO. Purse-seine fishers commonly set their nets around herds of dolphins and the associated yellowfin tuna and then release the dolphins while retaining the tunas. The incidental mortality of dolphins using this method was high during the early years of the fishery, but declined dramatically in the early 1990s, and has remained at low levels thereafter (AIDCP-43-02; Figure L-1).

3.2.1. Research projects

The IATTC staff is collaborating on two research projects on dolphins focused on improving current understanding of the potential impacts of tuna fisheries on dolphin populations (SAC-14 INF-K), including a cow-calf separation study and a close kin mark recapture (CKMR) assessment pilot. As part of Phase I: Sampling Feasibility of the CKMR assessment, collaborators assessed DNA recovered from dolphin skin swabs and found high quantities of species-specific uncontaminated DNA that may allow for kinship parent-offspring identification. DNA quality was variable and further testing will be conducted during Phase II (SAC-17 INF-S). In early 2026, the staff organized two cetacean expert meetings to discuss the most recent and accurate life history parameters of spotted and spinner dolphins. This information will guide the conceptual model, which will underpin future simulation modeling and population assessments.

3.2.2. Purse-seine data: large vessels

Estimates of incidental mortality of dolphins in the purse-seine fishery of large vessels during 1995–2025 are shown in Table L-1a. In 2025, the stock of dolphins with the highest incidental mortality was the eastern spinner (n=378), followed by the northeastern spotted dolphins (n=198), the western-southern spotted

(n=183), and the whitebelly spinner (n=104). Common dolphins were least impacted by the fishery, with mortalities of 37 northern, 25 southern, and 13 central common dolphins.

3.2.3. Longline observer data

In recent years, substantial improvements have been made to the minimum data standards for longline observer data submitted to the IATTC, which now require submission of operational level data under Resolution C-19-08. However, as discussed in section 2.2, the low level of observer coverage (at least 5%) currently mandated for these vessels remains insufficient to adequately represent the diversity of fleet components and limits the ability to extrapolate observed data to estimate total interactions (see BYC-10 INF-D).

Given these limitations, only the minimum number of observed interactions and mortalities involving marine mammals is reported here for 2024 (Table L-1b). Interactions and mortalities are classified based on observer-reported fate (e.g., injured, discarded, released, or unknown) and release condition (alive, alive and healthy, alive and injured, dead, or unknown). In cases where disposition was either not reported or recorded as discarded, events were precautionarily treated as mortalities.

Under these assumptions, three of the nine marine mammal interactions recorded by observers in the EPO in 2024 were classified as mortalities. The observed interactions included five spinner dolphins (*Stenella longirostris*), two false killer whales (*Pseudorca crassidens*), one striped dolphin (*Stenella coeruleoalba*), and one bottlenose dolphin (*Tursiops truncatus*).

The staff reiterates that increasing observer coverage to at least the recommended 20% is essential to improve the reliability of estimates and enable expansion of observed interactions and mortalities to total fleet activities, for marine mammals and other vulnerable bycatch species.

3.3. Sea turtles

Sea turtles are occasionally caught in the purse-seine fishery in the EPO, usually when associated with floating objects that are encircled, although they are sometimes also caught by happenstance in sets on unassociated tunas or tunas associated with dolphins. They can also rarely become entangled in the webbing of fish-aggregating devices (FADs) or other floating objects (FAD-07-04) and drown or be injured or killed by fishing gear, although the impact of this is expected to be minimal due to improved FAD construction and design requirements (C-23-04 and C-23-05).

3.3.1. Best Handling and Release Practices (BHRPs)

Various IATTC resolutions, most recently C-19-04, have aimed to mitigate fishing impacts on sea turtles and establish safe handling and release procedures for sea turtles caught by purse-seine and longline gears. In support of these efforts, a "circle hook" workshop was convened prior to the 13th SAC meeting in 2022 to discuss a) the effects of different sizes of circle hooks on mitigating bycatch of sea turtles and other vulnerable species in the longline fishery and b) the minimum hook size to satisfy the requirements outlined in Resolution C-19-04.

During the workshop, participants discussed the use of various circle hook configurations, noting that the minimum width should be defined on a fishery-specific basis and depend on the target species. However, no definitive conclusions or recommendations were reached (WSHKS-01). Discussions continued at subsequent meetings, including the 11th Bycatch Working Group meeting in May 2022, and the EBWG-1 and EBWG-2 meetings (May 2023 and June 2024, respectively). A second circle hook workshop was later held in April 2025 (WSHKS-02).

At that workshop, several topics were addressed, based on the EBWG recommendations, including: (1) defining the size characteristics that qualify as a 'large' circle hook under Resolution C-19-04 (paragraph 3(d)(i)); (2) reviewing the impacts of fishing operations on the form, durability and structural integrity of circle hooks across sizes and manufacturers; (3) developing a third mitigation measure, as described in paragraph 3(d)(iii) of Resolution C-19-04, for small coastal, multi-species vessel fleets; and 4) updating best handling and release practice guidelines for shallow-set longline fisheries. A background document

(WSHKS-02-01), which includes several reviews and discussions (WSHKS-02) of these topics, is available on the workshop website. BHRP guidelines for all fishing gears (document EB-03-05) were generated based on feedback from the workshop (for hook and line) and following a comment and review period by CPCs and subject matter experts and were presented to the EBWG-3 in 2025. These guidelines were further refined following the 1st IATTC Workshop for Advancing BHRP Guidelines for Sharks, Sea Turtles and Seabirds and a comment review period, and were discussed at the EBWG-4 meeting in 2026 (EB-04-04).

3.3.2. Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish)

A preliminary vulnerability assessment was conducted in collaboration with the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC) for the eastern Pacific stock of leatherback turtles for 2018, using the Ecological Assessment of Sustainable Impacts of Fisheries (EASI-Fish) approach (BYC-10 INF-B). The vulnerability status of the stock was determined to be "most vulnerable" in 2018. The staff continued to collaborate with IAC in 2020–2023 to improve the species distribution model (BYC-11-01, Lopez et al. 2024) and vulnerability assessment using updated fisheries data from coastal CPCs (BYC-11-02, Griffiths et al. 2024). The final assessment showed that the vulnerability status of the stock remained as "most vulnerable" in 2019. Modelling of 70 conservation and management scenarios showed that the implementation of improved handling and release practices by industrial and artisanal fleets, or use of circle hooks, or use of fish bait by longline fleets could reduce at-vessel and/or post-release mortality to an extent where the vulnerability status of the population could improve to "least vulnerable", assuming the fishing effort dynamics of all EPO fisheries do not change. The use of these three measures in concert was predicted to reduce vulnerability even further. Detailed results from this work were presented in 2022, at the Bycatch Working Group meeting (BYC-11-01, BYC-11-02) and at the Ecosystem and Bycatch Working Group of ICCAT in May 2023, as an example of a successful collaboration between two international organizations. Yet, Resolution C-19-04 has not been updated to reflect the potential benefits of such conservation and management measures on the leatherback turtle. Therefore, the IATTC staff reiterates the recommendation to consider updating Resolution C-19-04 based on the scientific work conducted under BYC-11-02 and Griffiths et al. 2024 (SAC-17-10).

3.3.3. Purse-seine data: large vessels

The estimated number of sea turtle mortalities and interactions recorded by observers on large purse-seine vessels from 1995–2025 are presented in Figure L-2a and Figure L-2b, respectively, disaggregated by set type. Interactions are defined based on observer-recorded fate on the dedicated turtle form and include the following: entangled, released unharmed, light injuries, escaped from net, observed but not involved in the set and other/unknown. Mortalities include individuals recorded as: grave injuries, killed, or consumed.

The Olive Ridley turtle (*Lepidochelys olivacea*) is by far the most frequently encountered species, with 20,944 recorded interactions and 794 mortalities (~4%) over the 1995–2025 period. In 2025 alone, 181 interactions were recorded, with no associated mortalities (Table L-2a).

In 2025, observer data also documented 30 interactions with eastern Pacific green turtles, 13 with loggerhead turtles, and 3 each of hawksbill and leatherback turtles. An additional 121 interactions involved unidentified turtle species. No mortalities were reported for any species during 2025.

3.3.4. Longline and gillnet fisheries

In longline fisheries, sea turtles are caught when they swallow a baited hook, are foul hooked, or drown after becoming entangled in the mainline, floatlines or branchlines and cannot reach the surface to breathe. Similar risks occur in coastal pelagic and bottom-set gillnet fisheries, where turtles may become enmeshed in the net or entangled in the floatlines or headrope.

Data on incidental mortality in longline and gillnet fisheries remain limited. However, mortality rates in the EPO industrial longline fishery are likely to be lowest in "deep" sets (around 200–300 m), which primarily target bigeye tuna and albacore, and highest in "shallow" sets (<150 m) targeting swordfish. In addition, a substantial number of artisanal longline and gillnet fleets operating in coastal waters are known to interact

with sea turtles, although data availability for these fleets is sparse (see BYC-11-02).

3.3.4.1. Longline observer data

Historically, data on sea turtle interactions and mortalities in longline fisheries have been limited (SAC-08-07b). However, reporting has improved since 2019 following the submission of operational-level observer data in accordance with Resolution C-19-08.

Observer coverage in longline fisheries remains low—5% or less (see BYC-10 INF-D)—compared to 100% observer coverage in the large-vessel purse-seine fishery. As a result, reported interactions and mortalities provided by CPCs for 2024 should be considered minimum estimates (Table L-2b; see also section 2.2).

In this dataset, interactions and mortalities are defined using observer-reported fate (e.g., discarded, injured, grave injuries, released, released with hook, or not reported) and/or release condition (e.g., alive and healthy, alive and injured, dead, unknown, or not reported). For 2024, observers reported 10 sea turtle interactions in the EPO, including 4 leatherback, 3 Olive Ridley, and 3 loggerhead turtles. Of these 10 interactions, five resulted in mortalities, including 2 leatherback (50% mortality rate), and all 3 loggerhead turtles (100%). Looking ahead, the staff aim to use the new operational observer data submissions required under C-19-08 to report the first total longline fleet catch estimate for sea turtle species. However, as noted in BYC-10 INF-D, current observer coverage levels are insufficient to generate robust total catch estimates.

3.4. Seabirds

There are approximately 100 species of seabirds in the tropical EPO. Some of them associate with epipelagic predators, such as fishes (especially tunas) and marine mammals, near the ocean surface; for some, feeding opportunities are dependent on the presence of tuna schools feeding near the surface. Some seabirds, especially albatrosses and petrels, are attracted to the lights and baits of pelagic longline vessels and are caught on baited hooks—often in the process of their deployment—used by this fishery. Sightings-only data are available for the purse-seine fishery (IATTC Special Report 25).

3.4.1. Progress on seabird mitigation, data collections and BHRP guidelines

The IATTC has adopted a single resolution addressing seabird bycatch (C-11-02). In parallel, draft BHRP guidelines for seabirds were presented to the EBWG-01 and EBWG-02 meetings in 2023 (EB-01-01, Annex 1) and 2024 (EB-02-03, Annex 1), respectively. These guidelines were further refined in 2025 (EB-03-06) in response to the IATTC's Seabird Action Plan and updated again following the IATTC inter-sessional workshop for advancing BHRPs in 2026 (EB-04-05), to improve survival outcomes following seabird interactions across all fisheries under IATTC purview.

The potential role of circle hooks in reducing seabird bycatch was also considered during the 2022 circle hook workshop (WSHKS-01). However, participants concluded that available data remains inconclusive, largely due to a lack of empirical studies evaluating the effects of hook shape and size on seabird mortality. A second circle hook workshop was conducted in April 2025 (WSHKS-02-01) but was solely focused on objectives to fulfill the requirements of the sea turtle Resolution C-19-08 (see section 3.3.1).

Recognizing key knowledge gaps necessary to update the seabird Resolution (C-11-02), the EBWG adopted a seabird action plan in 2024 (see SAC-15-15, Annex 1), which tasked IATTC scientific staff with: (1) comparing seabird mitigation measures under C-11-02 with those implemented by other tuna RFMOs; (2) updating previous analyses of seabird spatial distributions in relation to longline fishing effort (SAR-7-05b); (3) compiling an overview of mitigation measures currently used by CPCs, including in areas where such measures are not required; and (4) summarizing observed and estimated seabird bycatch rates in the IATTC Convention Area to inform potential revisions to Resolution C-11-02.

Progress toward these objectives was reported at the EBWG-03 in 2025. Document EB-03-02 examined the overlap between seabird distributions and longline fishing effort, as well as associated seabird bycatch rates, while document EB-03-03 reviewed available mitigation options, measures and their implementation and compared these to those in the IATTC Resolution. In 2026, this work was further expanded through an

updated analysis of seabird distribution overlap with longline fishing effort (EB-04-02). In addition, a standardized seabird mitigation reporting template (EB-04 INF-A) was developed to address the lack of a uniform template for CPCs to report seabird interactions to the IATTC, as recommended by EBWG-3.

3.4.2. Longline observer data

As with sea turtles, data on seabird interactions and mortalities in the longline fishery have been unavailable (SAC-08-07b), but with the submission of operational-level observer data for longline vessels >20 m beginning in 2019, some minimum values for 2024 are available (Table L-3) (but see section 2.2 for uncertainties and data gaps in reported data).

The longline observer data for the EPO submitted by CPCs for 2024 contained 13 total interactions, all of which were considered to result in mortalities. Dispositions for 12 of the interactions were not recorded and without additional information, these were precautionarily presumed to result in mortalities. One interaction with a Frigate bird (*Fregata* spp.) was recorded as "dead". The data included 6 taxa: black-footed albatross (*Phoebastria nigripes*: 4 interactions), laysan albatross (*Phoebastria immutabilis*: 2 interactions), frigate bird (*Fregata* spp.: 3 interactions), boobies and gannets, nei (Sulidae: 2 interactions), Wilson's storm petrel (*Oceanites oceanicus:* 1 interaction) and unidentified shearwater (*Puffinus* spp.: 1 interaction).

The staff hopes to report the first total longline fleet catch estimate for seabird species in the future using the operational observer data as improvements in data collection continue—but see BYC-10 INF-D for a discussion on the current inadequacy of longline observer data for expanding data to the activities of the longline fleet to provide estimates of total catch.

3.5. Sharks

3.5.1. Best Handling and Release Practices (BHRPs)

Sharks are caught as bycatch in EPO tuna purse-seine fisheries and as both bycatch and target species in longline and multi-species and multi-gear fisheries of some CPCs. To improve post release survival rates following interactions where sharks are not retained and reduce the impacts of these interactions on shark populations, the scientific staff has developed guidelines for BHRPs. The use of BHRPs is an effective, low-cost conservation strategy with measurable improvements to survival rates post-release across fishing gears. Resolution C-23-07 (paragraph 12) requested the scientific staff, in collaboration with the SAC and EBWG, to develop a set of BHRP guidelines for inclusion in an updated measure. Document SAC-15-11 compiled the BHRPs based on an extensive data review for all IATTC fishing gears and provided a list of research recommendations for filling data gaps relevant to the development of BHRPs.

An updated shark conservation measure (Resolution C-24-05) was adopted in 2024, incorporating BHRP recommendations loosely based on the data driven BHRP recommendations compiled in SAC-15-11. Recognizing the need to improve the adopted BHRP recommendations in the Annex of the Resolution, the Resolution (paragraph 12) requested the staff to continue to collaborate with the SAC and EBWG to further refine these guidelines in 2025. Document SAC-16-10 was prepared in response to this request and provided updated recommendations following a comment and review period by CPC nominated subject-matter experts and industry representatives. An updated Resolution was adopted in 2025 (C-25-08) without an update to the BHRPs and requesting the staff to continue working on a set of updated BHRP guidelines.

In response, the staff held the 1st IATTC Workshop for Advancing Shark, Sea Turtle, and Seabird BHRP Guidelines virtually in December 2025, which continued in January 2026. Following the workshop, a third update to the shark BHRP guidelines was developed incorporating CPC, industry and subject-matter expert advice provided during the workshop and a subsequent comment period. The resulting document (SAC-17-08), contains guidance for purse-seine fisheries, which includes, among others, not rolling sharks through the power block, and to the extent possible, removing sharks from the net prior to sacking, promptly releasing entangled individuals, avoiding chute transfer to the wells, and minimizing handling time and stress onboard. For longline fisheries, recommended practices include leaving sharks in the water, removing trailing gear, and minimizing handling stress.

3.5.2. Stock assessments

Stock assessments or stock status indicators (SSIs) are available for only 4 shark species in the EPO: silky shark (*Carcharhinus falciformis*) (Lennert-Cody et al. 2018; BYC-10 INF-A, BYC-11 INF-A, EBWG-01 INF-A, SAC-17-10), blue shark (*Prionace glauca*) (ISC Shark Working Group), shortfin mako (*Isurus oxyrinchus*) (ISC Shark Working Group), and common thresher shark (*Alopias vulpinus*) (NMFS). Additional Pacific-wide assessments have been conducted under the FAO Common Oceans Tuna Project, including porbeagle shark (*Lamna nasus*) in the southern hemisphere (Clarke 2017), bigeye thresher shark (*Alopias superciliosus*) (Fu et al. 2018), and silky shark (Clarke 2018a), along with a risk assessment for the Indo-Pacific whale shark population (Clarke 2018b).

The staff are also currently conducting a close-kin mark recapture (CKMR) pilot for silky sharks and working to improve data collection and understanding of shark catches in small-scale coastal fisheries in Central America, Mexico, Peru, and Ecuador, with particular emphasis on silky and hammerhead (Sphyrnidae) sharks (e.g., SAC-14 INF-L, SAC-14 INF-M, SAC-16 INF-V, SAC-16 INF-W, SAC-17 INF-O, SAC-17 INF-P).

3.5.3. Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish)

The first quantitative vulnerability assessment of sharks interacting with EPO large-scale industrial and small-scale artisanal fisheries—using the EASI-Fish methodology—was completed in 2022 (SAC-13-11). Of the 49 shark species recorded in these EPO tuna fisheries, 32 were formally assessed for 2019. Overall, 20 species were classified as "most vulnerable", including hammerhead sharks (4 species), requiem sharks (10 species), threshers (*Alopias superciliosus* and *A. pelagicus*), mesopelagic sharks (3 species) as well as blue shark (*Prionace glauca*) and shortfin mako shark (*Isurus oxyrinchus*). The remaining 12 species were classified as either "least vulnerable" (9 species) or "increasingly vulnerable" (3 species).

The staff recommended further analysis to evaluate potential hypothetical conservation and management measures (CMMs), applied individually or in combination, to reduce fishery impacts on highly vulnerable species identified such as silky, thresher and hammerhead sharks. This approach was subsequently applied to silky shark and hammerhead sharks during 2022–2023 to assess the relative benefits of alternative management scenarios on species' vulnerability (SAC-14-12).

3.5.4. List of species of special research and management interest for the IATTC

At its 101st meeting in 2023, the IATTC adopted Resolution C-23-07, requesting staff to develop, in collaboration with the EBWG and SAC, an interim list of shark species for the consideration by Members to be under the purview of the Commission. Using a list of 49 species documented to interact with pelagic fisheries in the EPO, combined with other available species lists, ecological characteristics and conservation classifications by international instruments, the staff developed recommendations presented in SAC-15-09. A final list of 18 species was adopted in 2024 under Resolution C-24-05 (Annex 4) and its replacement resolution in 2025 (C-25-08; Annex 4) as species of special research and management interest for the Commission. From those, a smaller list of 8 shark species was identified by the Resolution as key species that would need to be included in the IATTC's Shark Research Plan (SAC-17-09; IATTC-103-03-A).

3.5.5. Purse-seine data: large vessels

Catches (t) of sharks in the large-vessel purse-seine fishery (1995–2025) are presented in Table L-4a, with trends for the most frequently caught species shown in Figure L-3a. Most shark catch in this fishery occurs in floating object sets, although this varies by species.

Silky shark is the most commonly caught shark species, with annual catches averaging 551 t and reaching 737 t in 2025, primarily from floating-object sets. Oceanic whitetip shark (*Carcharhinus longimanus*) catches averaged 50 t annually and were 30 t in 2025, also mainly in floating-object sets. In contrast, blue shark catches in the purse-seine fishery are negligible, averaging 2 t annually.

Other notable species include smooth hammerhead (*Sphyrna zygaena*), pelagic thresher (*Alopias*

pelagicus), and mako sharks (*Isurus* spp.) (Table L-4a, Figure L-3a). Smooth hammerhead catches averaged 26 t annually and were 11 t in 2025, largely from floating-object sets. Pelagic thresher sharks were primarily caught in unassociated tuna school sets, with catches averaging 5 t and reaching 14 t in 2025. Mako shark catches were comparatively low, averaging 3 t and totaling 1 t in 2025.

To better understand temporal trends and anomalies, catch by set type was standardized (mean = 1 over 1995–2025) for silky shark, oceanic whitetip shark and smooth hammerhead shark (Figure L-3b). This relative catch in weight (t) helps to better understand trends and anomalies in species catch. Silky shark relative catches were higher and more variable in dolphin and unassociated sets in the earlier years, while oceanic whitetip shark showed a consistent decline across all set types. Smooth hammerhead catches exhibited high interannual variability, particularly in dolphin and unassociated sets.

Spatial distributions (5°x5° grid cells) of these species (Figure L-3c) indicate that silky shark catches are widespread, primarily between 10°N to 10°S and mostly in floating-object sets. In 2025, catches were slightly reduced west of 130°W and south of the equator compared to the 2020–2024 average, with some new catches observed in the Sea of Cortez from unassociated sets. Catches of oceanic whitetip and smooth hammerhead were generally low in both recent and historical periods, with minimal catches of oceanic whitetip shark in the western region (west of 110°W) from the equator to 10°N during 2025.

3.5.6. Purse-seine data: small vessels

The limited observer data from small purse-seine vessels showed 34 t of silky shark and 2 t of scalloped hammerhead were caught in floating-object sets in 2025, while catches of other shark species or species groups (7 taxa) were minimal (≤ 1 t) (Table L-5).

3.5.7. Longline totals (TASK I data)

Minimum reported catches[11] of sharks by longline fisheries (1995–2024) are also provided in Table L-4a. Reporting of many shark species began in 2006 and remains variable due to data gaps and inconsistencies in reporting.

Silky shark catches in longline fisheries averaged 9,007 t annually (2006–2024), but only 104 t were reported in 2024. Oceanic whitetip shark catches averaged 165 t (2006–2018), with no reported catches from 2019 to 2024.

Blue shark is the most frequently reported species in longline fisheries, with annual catches averaging 7,057 t and reaching 10,853 t in 2024. Other important species include smooth hammerhead (average 759 t; 3 t in 2024), pelagic thresher (average 1,703 t; none reported in 2024), and mako sharks (average 1,505 t; 1,319 t in 2024).

The staff reiterate the importance of updating Resolution C-03-05 and its corresponding specifications to align with the mandates of the Antigua Convention and encourage CPCs to develop a revised resolution based on recent technical input (see SAC-12-09, WSDAT-01-01, SAC-14 INF-Q, SAC-16 INF-O). These efforts are expected to improve the completeness and reliability of shark catch data.

3.5.8. Longline observer data

Minimum catches derived from the reported observer longline data for 2024 are presented in Table L-4b (see section 2.2 and BYC-10 INF-D for uncertainties and data gaps). This dataset includes operational information and provides insights into interaction outcomes. Dispositions categorized as survival include "Alive and healthy," "Alive with light injuries," and "Alive," while mortality includes "Dead," "Alive mortal," "Alive injured," "Discarded," "Unknown," or cases where disposition was not reported.

Blue shark was the most frequently observed species with 6,907 interactions (91% mortality) in 2024,

[11] Sharks caught by longline vessels are recorded using different weight metrics (e.g., round, trunk or whole weight) and thus, total annual reported catch estimates may contain a mix of these weight metrics. The staff is working on harmonizing shark data collection to improve the reliability of total catch estimates (e.g., SAC-11-13).

followed by various unidentified sharks (Euselachii) with 1,172 interactions (87% mortality), the crocodile shark (*Pseudocarcharias kamoharai*) with 1,071 interactions (72% mortality), shortfin mako shark with 490 interactions (66% mortality), bigeye thresher shark with 212 interactions (50% mortality), velvet dogfish (*Zameus squamulosus*) with 121 interactions (84% mortality), and oceanic whitetip shark with 117 interactions (82% mortality). All other shark taxa had fewer than 100 interactions.

3.5.9. Small scale fisheries

The small scale longline fisheries in coastal CPCs seasonally target sharks, tunas, billfishes and dorado (*Coryphaena hippurus*), with some vessels operating in areas beyond national jurisdictions (Martínez-Ortiz et al. 2015, SAC-16-09, SAC-17-07). However, key shark data from these longline fisheries remain limited, constraining the ability to conduct conventional stock assessments or develop stock status indicators (see data challenges outlined in SAC-07-06b(iii)).

Recent work has focused on defining fleet characteristics to improve classification and data reporting. Proposed classifications have evolved from three categories (SAC-16-09) to five: large-scale, advanced medium-scale, medium-scale, small-scale commercial, and small-scale coastal longline fisheries (SAC-17-07), in response to EBWG and SAC recommendations (see SAC-15-15 "Fleet Characteristics" and SAC-16-Rpt; "7. Fleet Characterization"). These revised classifications aim to provide clearer guidance to CPCs, data handlers, scientists, policymakers, and other stakeholders, particularly regarding data reporting requirements with respect to small-scale longline fisheries and associated relevant Resolutions.

Long-term collaborative efforts between IATTC staff and regional partners (i.e., CPCs belonging to the Organización del Sector Pesquero y Acuícola del Istmo Centroamericano: OSPESCA), have improved sampling methodologies and data collection for shark fisheries in the EPO coastal States. This work, carried out over approximately 7 years (2015–2021), was supported by the Food and Agriculture Organization of the United Nations (FAO) and the Global Environmental Facility (GEF) under the framework of the ABNJ Common Oceans program, as well as the IATTC capacity building fund and the European Union, and was completed in December 2021.

The final results were presented in 2023 at SAC-14 (e.g., SAC-14 INF-L). However, the program was discontinued and maintaining continuity in data collection remains essential to generate key fisheries information needed to assess and manage shark species in the EPO. In parallel, a second phase of the FAO-GEF ABNJ project is underway, through which the IATTC has expanded this work to additional EPO coastal States of Mexico, Ecuador and Peru (SAC-14 INF-M). Progress updates on this second phase were presented in 2025 at SAC-16 (see SAC-16 INF-V and SAC-16 INF-W). In 2026, two additional documents were prepared addressing the feasibility of biological sampling for sharks in EPO coastal fisheries (SAC-17 INF-O) and a sampling design for shark landings (SAC-17 INF-P). Data obtained from these projects may be included in future iterations of this report to provide improved catch estimates, albeit minimum estimates, for sharks by the various longline, gillnet and mixed gear fleets.

3.6. Rays

3.6.1. Best Handling and Release Practices (BHRPs)

The development of BHRP guidelines for rays is now planned for 2027 (EB-02-03) pending the outcome of the BHRP discussions during the 2026 EBWG-4 and SAC-17 for sharks, sea turtles and seabirds, as well some preliminary results for three different survival studies currently being conducted in both longline and purse-seine fisheries across the EPO.

3.6.2. Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish)

The vulnerability status and efficacy of potential CMMs for the spinetail manta (*Mobula mobular*) impacted by industrial purse-seine and longline fisheries in the EPO was determined using the EASI-Fish methodology (Griffiths and Lezama-Ochoa 2021). In the assessment year of 2018, the estimated fishing mortality exceeded the $F/F_{40\%}$ and $SBR/SBR_{40\%}$ biological reference points, leading to a vulnerability classification of "most vulnerable". A retrospective analysis of vulnerability from 1979–2018 showed the species to be classified as

"least vulnerable" between 1979 and 1993, but became "most vulnerable" from 1994, which coincided with the rapid spatial expansion of the industrial purse-seine fishery. Vulnerability increased significantly from 2011 following the rapid increase in the number of purse-seine sets made on floating objects to 2018.

Simulating the CMMs in place in 2018 for EPO tuna fisheries (i.e., an EPO-wide closure) and for mobulids specifically (i.e., use of BHRPs under C-15-04) resulted in 31 of the 45 scenarios changing the classification of the species from "most vulnerable" to "least vulnerable", which primarily involved a reduction of post-capture mortality by as little as 20%. Implementing appropriate BHRPs can be a reasonably simple, rapid and cost-effective conservation measure, but a recommendation from the work was to extend the EASI-Fish analysis to all species of mobulids impacted by EPO tuna fisheries, improve estimates of post-release mortality for these species through dedicated tagging studies (which are currently being conducted: Project M.2.c; Stewart et al. 2024), and improve species-specific catch reporting and identification, especially in small scale coastal fisheries, to improve the reliability of outputs from EASI-Fish.

3.6.3. Ray species list

The IATTC has recognized the conservation importance of mobulids since 2015 when it adopted Resolution C-15-04. However, as was the case with shark species prior to 2024, there has been no prescriptive list of ray species that come under the purview of the IATTC. In 2024, the SAC made a recommendation to the Commission that "*…the IATTC staff develop a draft list of ray and mobulid species under the purview of the IATTC for consideration by the EBWG and the SAC*". In 2025, the staff analyzed catch data from IATTC data holdings for large-scale industrial and small scale coastal pelagic fisheries in the EPO and identified interactions with 17 ray species. Of these, 7 species—6 mobulids and the pelagic stingray (*Pteroplatytrygon violacea*)—had oceanic distributions and occupied epipelagic habitats where IATTC pelagic fisheries regularly operate and were recommended to come under the purview of the IATTC (SAC-16-08). This recommendation was ultimately endorsed by the EBWG and SAC (see SAC-16 Rpt). The IATTC staff is reiterating this recommendation in 2026 (SAC-17-10).

3.6.4. Purse-seine data: large vessels

To better represent estimated annual catches of manta rays (Mobulidae) and stingrays (Dasyatidae), these taxa are reported in numbers of individuals by the large-vessel purse-seine fishery (1995–2025) in Table L-6a, while catches of key species are shown in Figure L-4a. The largest average catches in the purse-seine fishery were observed for unidentified mobulid rays (Mobulidae spp., average 1995–2025: 961 individuals; number of individuals in 2025: 251), followed by the pelagic stingray (average: 790; 2025: 755), the smoothtail manta (average 1998–2025: 338; 2025: 46), the spinetail manta (average 2001–2025: 244; 2025: 125), unidentified stingrays (Dasyatidae spp., average 1998–2025: 170; 2025: 37) and the giant manta ray (average 1995–2025: 109; 2025: 35 individuals). Although catches of these rays can vary by set type, they have been highest in unassociated sets, followed by dolphin sets, and lowest in floating-object sets (Figure L-4a).

Similar to sharks, relative catches of rays in numbers of individuals (i.e., scaled catch with the average equal to 1) by set type for large purse-seine vessels are provided in Figure L-4b. As with the reported observed catch (Figure L-4a), ray relative catches were highly variable with no apparent trends, and peaks of relatively high catches were not consistent between species and set type.

The spatial distribution of catches (5°x5° grid cells) was highest for pelagic stingray, with notable variation by set type. For the 5-year average (2020–2024), most catches occurred in floating-object sets south of 10°N and east of 130°W, in dolphin sets north of the equator, and in unassociated tuna school sets along the South American coast. In 2025, the highest catches shifted to unassociated sets along the coast of Baja California, Mexico and near 5°N, 105°W, with lower catches off South America compared to the 5-year average (Figure L-4c). Catches of giant manta were minimal (<5 individuals) and confined to the region between 5°N and 5°S in both 2025 and the 2020–2024 average. In contrast, spinetail manta (primarily <30 individuals) and smoothtail manta (primarily <50 individuals) were more frequently observed in coastal areas. Spinetail manta catches in 2025 occurred mainly in dolphin sets off Central America, with some catches in the Sea of Cortez. During the

2020–2024 period, catches were primarily associated with unassociated sets, with higher concentrations off the South American coast—patterns not observed in 2025. Smoothtail manta catches were observed in unassociated sets off South America in the 5-year average dataset, while in both time periods they also occurred in dolphin sets off central America.

3.6.5. Purse-seine data: small vessels

For the small purse-seine vessel fishery, the limited observer data available for 2025 showed floating-object sets contained the largest numbers of individual ray species, including the spinetail manta (n=37), followed by the pelagic stingray (n=7), Chilean devil ray (n=6) and unidentified mobulid rays (n=6) while the number of other manta rays were ≤2 (Table L-5).

3.6.6. Longline observer data

Rays have rarely been reported in the annual summary reports for the longline fishery, although data have been available in the more recently obtained observer data (see Table L-6b). The limited data available from the reported longline observer dataset for 2024 (see section 2.2. for data gaps and BYC-10 INF-D) indicate that most interactions occurred with pelagic stingrays (5,901 individuals), of which 5,595 (95%) resulted in mortality. This was followed by manta rays with 9 interactions (1 mortality; 11%), unidentified rays and skates with 7 interactions (all resulting in mortality), spinetail manta rays with 7 interactions (6 mortalities; 86%), and giant manta rays with 2 interactions (both resulting in mortality) (Table L-6b).

3.7. Other large fishes

3.7.1. Dorado research and management in the EPO

Dorado (Coryphaenidae) is one of the most important large pelagic fishes in the EPO, supporting large-scale, small-scale and recreational fisheries throughout the region (SAC-07-06a(i)).

Research on dorado at the IATTC began in 2012, including a series of regional workshops (DOR-01, DOR-02, DOR- 03) organized at the request of several coastal Member States. An exploratory stock assessment using integrated models was conducted for the southern EPO, where most catches occur (SAC-07-06a(i)). Recommendations for potential reference points and harvest control rules were presented in 2019 at SAC-10 (SAC-10-11).

More recently, Resolution C-23-09 on research for the management of dolphinfish was adopted at IATTC's 101st Commission meeting in 2023. In 2025, Resolution C-25-05 established the Working Group on Dorado, which become operational in 2026. In March 2026 the 4th Technical Meeting on Dorado (DOR-04) reviewed new information and initiated planning for an updated stock assessment.

3.7.2. Purse-seine data: large vessels

Species composition in the large-vessel purse-seine (primarily in floating-object sets; 1995–2025) is provided in Table L-7a, with time series of key species presented in Figure L-5.

Dorado is the most commonly caught large pelagic fish in this fishery, with an estimated average annual catch was 1,353 t (1995–2025) and 887 t recorded in 2025.

Other important species include wahoo (Scombridae) and rainbow runner (Carangidae). Wahoo catches averaged 353 t annually over the period 1995–2025, declining from a peak of 1,025 t in 2001 to 227 t in 2025 (Figure L-5).

Rainbow runner catches were comparatively low, with an estimated average of 52 t annually (1995–2025). Catches peaked at 158 t in 2007 and were 118 t in 2025 (Figure L-5).

3.7.3. Purse-seine data: small vessels

Observer coverage for the small purse-seine fishery remains limited. Available data for 2025 included catches of 169 t of dorado, 50 t of wahoo and 11 t of rainbow runner in floating-object sets. All other large-fish taxa (four groups) had reported catches of ≤6 t (Table L-5).

3.7.4. Longline data (TASK I)

Species composition in the longline fishery differs from that of the purse-seine fishery. Minimum reported annual catches for key species (Table L-7a, Figure L-5) include dorado, opah (Lampridae), snake mackerels (Gempylidae), pomfrets (Bramidae), and wahoo.

Like the purse-seine fishery, dorado is the most commonly reported pelagic fish in this dataset, with minimum reported annual catches averaging 5,660 t (1995–2024), although a much lower value (123 t) was reported in 2024.

For other taxa, minimum reported annual catches averaged 384 t for opah (1995–2024), 358 t for snake mackerels (2006–2024), 189 t for wahoo (1995–2024), and 57 t for pomfrets (1995–2024). In 2024, reported catches were 289 t of opah, 384 t of snake mackerels, 300 t of wahoo, and 54 t of pomfrets (Table L-7a).

Catches of these taxa have generally increased since the mid-2000s (Figure L-5). Although interpretation should consider the uncertainty and data gaps associated with this dataset (see section 2.2).

3.7.5. Longline observer data

Limited data from longline observers for 2024 (see section 2.2. and BYC-10 INF-D) are provided in Table L-7b. The most frequently recorded species was the long snouted lancetfish (*Alepisaurus ferox*) with 9,769 interactions (9,761 mortalities). This was followed by escolar (*Lepidocybium flavobrunneum*) with 5,926 interactions, (5,834 mortalities), wahoo with 5,109 interactions (5,104 mortalities), and opah with 4,422 interactions (4,382 mortalities).

Additional species included snake mackerel (*Gempylus serpens*), with 1,227 interactions (1,213 mortalities), sickle pomfret (*Taractichthys steindachneri*), with 820 interactions (684 mortalities; 84%) and butterfly kingfish (*Gasterochisma melampus*) with 509 interactions (all mortalities). The remaining 13 taxa each had fewer than 500 interactions.

Overall, interactions with large fishes in this dataset resulted in high mortality rates, averaging approximately 99%.

3.8. Forage species

A large number of taxa occupying the middle trophic levels in the EPO ecosystem—generically referred to as “forage” species—play a key role in linking primary producers at the base of the food web to upper-trophic-level predators, such as tunas and billfishes.

Some of these small forage fishes are incidentally caught by purse-seine vessels operating on the high seas, mostly in sets on floating objects, as well as by coastal small-scale fisheries. However, they are generally discarded at sea. Catches of these species are presented in Table L-8, with key taxa for the large-vessel purse-seine fishery highlighted in Figure L-6.

3.8.1. Purse-seine data: large vessels

Bullet and frigate tunas (Scombridae) are by far the most commonly reported forage species, with estimated annual catches averaging 964 t over the period 1995–2025. However, catches have declined substantially from a peak of 1,921 in 2005 to 534 t in 2025 (Figure L-6).

Triggerfishes (Balistidae) and filefishes (Monacanthidae) are the second most commonly reported forage group, with estimated annual catches averaging 302 t (1995–2025) and totaling 855 t in 2025. Combined catches of these groups peaked at 922 t in 2004 but have otherwise fluctuated over time.

Sea chubs (Kyphosidae) are caught in much smaller quantities, with average annual catches of 16 t (1995–2025) and only 4 t reported in 2025.

Finally, species grouped as ‘epipelagic forage fishes’ have consistently low catches, averaging 7 t annually (1995–2025), with 15 t reported in 2025.

3.8.2. Purse-seine data: small vessels

Observer coverage for small purse-seine vessels remains limited. In 2025, observer data reported 250 t of triggerfishes and filefishes and 159 t of bullet and frigate tunas caught in floating-object sets.

Catches of all other small-fish taxa (four groups) were minimal, totaling ≤2 t (Table L-5).

4. PHYSICAL ENVIRONMENT

Environmental conditions affect marine ecosystems and therefore impact species distributions and abundance, the dynamics and catchability of target and bycatch species, and the activities of fishers[12] (e.g., SAC-10 INF-D, SAC-16 INF-T). At IATTC's 101st meeting in 2023, a Resolution on climate change was adopted (C-23-10; amended in 2024 as C-24-10), and correspondingly, a proposed workplan towards climate resilient fisheries was presented in 2024 at EBWG-02 and SAC-15 (SAC-15-12), and the staff has made recommendations on this matter in 2025 (SAC-16-INF P) and 2026 (SAC-17 INF-M)).

The following summary of the biophysical environment covers: 1) short-medium and long-term environmental indicators, and 2) environmental conditions and their potential effect on the fishery during the previous year, in this case, 2025.

4.1. Environmental indicators

The ocean environment changes on a variety of time scales, from seasonal to inter-annual, decadal, and longer "regimes". Longer-term climate-induced changes are typically decadal at intervals of around 10–30 years and are characterized by relatively stable average conditions and patterns in physical and biological variables. The dominant source of variability in the upper layers of the EPO is the El Niño-Southern Oscillation (ENSO), an irregular fluctuation involving the entire tropical Pacific Ocean and the world's atmosphere (Fiedler 2002). El Niño events occur at two- to seven-year intervals, and are characterized by weaker trade winds, deeper thermoclines, and higher sea-surface temperatures (SSTs) in the equatorial EPO. El Niño's alternate phase is commonly called La Niña and is characterized by stronger trade winds, shallower thermoclines, and lower SSTs. The changes in the biogeochemical environment caused by ENSO have an impact on the biological productivity, feeding, and reproduction of fishes, seabirds, and marine mammals (Fiedler 2002).

ENSO is thought to cause considerable variability in the availability of commercially important tunas and billfishes to capture by tuna fleets in the EPO (Bayliff 1989). For example, the shallow thermocline during a La Niña event can increase purse-seine catch rates for tunas by compressing the preferred thermal habitat of small tunas near the sea surface, while the deeper thermocline during an El Niño event likely could make tunas less susceptible to capture, and thus reduce catch rates. Furthermore, warmer- or cooler-than-average SSTs can also cause the fish to move to more favorable habitats, which may also affect catch rates as fishers expend more effort on locating the fish.

Recruitment of tropical tunas in the EPO may also be affected by ENSO events. For example, strong La Niña events in 2007–2008 may have been partly responsible for the subsequent lower recruitment of bigeye tuna, while the largest recruitments corresponded to the extreme El Niño events in 1982–1983 and 1998 (SAC-09-05). Yellowfin recruitment was also low in 2007, but high during 2015–2016, after the extreme El Niño event in 2014–2016 (SAC-09-06). Analyses on the potential effects of environment on tuna catches were presented at SAC-15 in 2024 (SAC-15 INF-L) and updated for SAC-16 in 2025 (SAC-16 INF-T).

The Climate Diagnostics Bulletin of the US National Weather Service reported that, in 2025, anomalies—defined as departures from monthly mean conditions—in oceanic and atmospheric variables (e.g., surface and sub-surface temperatures, thermocline depth, wind, and convection) were consistent with El Niño conditions in January. These conditions weakened in February and transitioned to ENSO-neutral conditions by April, which persisted through August, followed by the development of La Niña conditions from

[12] See SAC-04-08, *Physical Environment*, and SAC-06 INF-C for a comprehensive description of the effects of physical and biological oceanography on tunas, prey communities, and fisheries in the EPO.

September through December.

Indices of variability in such conditions are commonly used to monitor the direction and magnitude of ENSO events in the Pacific Ocean. The Oceanic Niño Index (ONI) is used by the US National Oceanic and Atmospheric Administration (NOAA) as the primary indicator of warm El Niño and cool La Niña conditions within the Niño 3.4 region in the east-central tropical Pacific Ocean (Dahlman 2016) (Figure L-7a). Therefore, the ONI is used in this report to characterize inter-annual variability in SST anomalies. The ONI is a measure of El Niño defined by NOAA as "a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of SST anomalies in the Niño 3.4 region that is above (below) the threshold of +0.5°C (-0.5°C)." The ONI can be categorized into ENSO events from "extreme" to "weak" (Figure L-7b). For example, the "extreme" El Niño event in 1997–1998 was followed by a "very strong" La Niña event in 1998–2000. "Strong" La Niña events were also observed in 2007–2008 and 2010–2011. The highest ONI values (>2.5) were recorded during the 2015–2016 "extreme" El Niño event. Neutral to weak La Niña conditions persisted in 2025, with values ranging from 0 to -0.6 during this time period (Figure L-7b).

The Pacific Decadal Oscillation (PDO; Figure L-8) index is used to describe longer-term environmental fluctuations in the Pacific Ocean. In the EPO, it has been used to explain the influence of environmental drivers on the vulnerability of some species, such as the silky shark, to capture by tuna fleets (Lennert-Cody et al. 2018). The PDO—a long-lived El Niño-like pattern of Pacific climate variability, with events persisting 20–30 years—tracks large-scale interdecadal patterns of environmental and biotic changes, primarily in the North Pacific Ocean (Mantua 1997), with secondary patterns observed in the tropical Pacific, the opposite of ENSO (Hare and Mantua 2000). As with ENSO, PDO phases are classified as "warm" or "cool". PDO values peaked at 2.79 in August 1997 and at 2.62 in April 2016, both of which coincided with the extreme El Niño events indicated by the ONI. The PDO has been in a "cool" phase since early 2020. During 2025, cool conditions persisted with the lowest value in July (-3.59) and the highest value in March (-0.89) (see ERSST V5 PDO Time series data).

4.2. Spatio-temporal exploration of environmental conditions

A time series of SST and chlorophyll-a concentration (CHL-a; an indicator of primary productivity biomass) (Figure L-9) in the eastern tropical Pacific (ETP) from 5°N to 5°S—the same latitudinal band used in the ONI—was developed to explore the variability in these variables across space and time using time-longitude Hovmöller diagrams. The SST time series show mean monthly values from 1993–2025, while monthly CHL-a concentrations cover data for 2003–2025 due to limitations with data availability. The SST plot (Figure L-9, top panel) clearly shows the extension of warmer waters during the extreme El Niño events of 1997–1998, 2015–2016, and for the latter half of 2023 into 2024 while cooler waters are observed during the strong La Niña events in 1999–2000, 2007–2008 and 2010–2011 across the ETP. The CHL-a plot (Figure L-9, bottom panel), although the pattern is less clear than the SST plot, shows an increase in CHL-a concentrations following the strong La Niña events particularly in 2010–2011, likely due to increases in nutrient availability associated to colder waters.

4.3. Environmental conditions and distribution of catches

The availability of fish, and thus catches, are strongly related to environmental conditions and processes, particularly in pelagic waters (Fiedler and Lavín 2017; Chassot et al. 2011). ENSO conditions are influenced by many oceanic and atmospheric factors, but both SST and CHL-a levels are known to strongly influence the habitat and distributions of oceanic animals (Hobday and Hartog 2014).

Figures L-10 and L-11 show quarterly mean SSTs and CHL-a concentrations, respectively, to: 1) provide a general indication of seasonal environmental variability for 2025, and 2) overlay the distribution of tropical tuna catches, as a first step, to illustrate the potential influence of environmental conditions on catches across the EPO during 2025. In the future, the staff plans to incorporate catch distributions for key bycatch species and develop species distribution models (SDMs) to better describe potential relationships between environment and species. Recent SDMs have been developed for the leatherback sea turtle (BYC-11-01; 2022), oceanic whitetip (2025), and silky sharks (2025), while in 2026 SDMs will be generated for

dorado. The final goal is to develop an IATTC SDM library that could help develop scientific tools and advice to inform conservation and management in the region.

SST across the EPO exhibited clear seasonal structure, with relatively cooler conditions in the subtropical (i.e., the northern and southern extremities of the Convention Area) and equatorial regions in early 2025 (January–March; Figure L-10). As the year progressed into April–June, warmer waters expanded westward and intensified along the equator and coastal regions of Central and South America. Peak warming occurred during July–September, when warm waters (>28–30°C) became most extensive, especially in the eastern equatorial and coastal zones, while cool waters persisted at higher latitudes. By October–December, SSTs began to moderate slightly, though warm conditions remained prominent in the eastern equatorial Pacific and along the Central American coastline, maintaining a zonal gradient from warm east to cooler west. A secondary, warm pool was observed in the southwestern EPO (below the equator–20°S, 130°–150°W) during January–June, which contracted in July–September.

Figure L-11 shows CHL-a concentrations were highest along the coast of the Americas year-round and along the equatorial regions, particularly during the second half of 2025. The oligotrophic[13] South Pacific Gyre—located between 20°–40°S and extending from 150°–90°W—was largest in January–March, substantially retracted by July–September, and returned in October–December.

Skipjack was the most broadly distributed species and dominated the tropical tuna catches across the tropical Pacific in 2025 (Fig. L-10), where CHL-a concentration was high (Fig. L-11). Proportions of skipjack catches were greatest in the southeast during January–June. Yellowfin was the predominant tuna species in the catch primarily north of the equator year-round; the greatest yellowfin catches occurred off the Mexican coast during July–September in the warmer waters (~29°C). Bigeye tuna catches were concentrated south of 10°N with greater proportions in the equatorial region primarily west of ~110°W, particularly in April–June. No tuna catches were recorded in the oligotrophic gyre.

5. IDENTIFICATION OF SPECIES AT RISK: ERAS

The primary objective of EAFM is to ensure the long-term sustainability of the ecosystem and all species impacted—directly or indirectly—by fishing activities. Achieving this objective is particularly challenging in fisheries that interact with numerous non-target species with diverse life histories, for which reliable catch and biological data required for conventional single-species assessments are lacking.

In such data-limited contexts, Ecological Risk Assessments (ERAs) provide a practical alternative. Reflected in Goal ECO 1, of the updated SSP (2026–2030; SAC-16-07; IATTC 103-03a), ERAs are designed to identify and prioritize species that may be vulnerable to fishing impacts, thereby guiding data collection, research and management efforts.

This goal includes two key targets: (1) conducting ERAs for prioritized shark species, as requested in Resolution C-24-05, now replaced with C-25-08 (paragraph 16) and (2) undertaking similar assessments, as needed, for other potentially vulnerable taxa such as rays, seabirds, sea turtles and marine mammals. In this context, ‘vulnerability’ is defined as the potential for the productivity of a stock to be diminished by the direct and indirect impacts of fishing activities.

The IATTC developed the Ecological Assessment of the Sustainable Impacts of Fisheries (EASI-Fish) in 2018 (Griffiths et al. 2018, Griffiths et al. 2019), a sophisticated ERA that is spatially explicit and can accommodate the cumulative effects of fishing on the species of interest, while also serving as a simulation tool to evaluate the hypothetical impacts of CMMs on these species. As with other tools used by IATTC staff to develop scientific advice for management, future plans exist to externally review this tool.

6. ECOSYSTEM DYNAMICS

Although vulnerability assessments (e.g., EASI-Fish) are useful for assessing the ecological impacts

[13] An area of low productivity, nutrients, and surface chlorophyll, often referred to as an “oceanic desert”.

of fishing by assessing the populations of individual species, ecosystem models are required to detect changes in the structure, integrity and internal dynamics of an ecosystem. These models are generally data- and labor-intensive to construct, and consequently, few fisheries worldwide have access to a reliable ecosystem model to guide conservation and management. These models require a good understanding of ecosystem components and the direction and magnitude of the trophic flows between them, which require detailed ecological studies involving stomach contents and/or stable isotope studies. Purposefully, IATTC staff have had a long history of undertaking such trophic studies, including the experimental determination of consumption estimates of yellowfin tuna at the NMFS Kewalo Basin facility on Oahu, HI in the 1980s, to more recent analyses of stomach content and stable isotope analysis of a range of top-level predators.

In 2003, the IATTC staff compiled the trophic data to complete the development of a model of the pelagic ecosystem in the tropical EPO (IATTC Bulletin, Vol. 22, No. 3)—named "ETP7"—to explore how fishing and climate variation might affect target species (e.g., tunas), byproduct species (e.g., wahoo, dorado), elasmobranchs (e.g., sharks), forage groups (e.g., flyingfishes, squids) and species of conservation importance (e.g., sea turtles, cetaceans). A simplified food-web diagram, with approximate trophic levels (TLs), from the model is shown in Figure L-12.

The model was calibrated to time series of biomass and catch data for yellowfin and bigeye tunas for 1961–1998. There have been significant improvements in data collection programs in the EPO since 1998, that has allowed the model to be updated with these new data up to 2018 ("ETP-8"). The model required a further update in 2021 ("ETP-21") due to a significant change in how the IATTC staff have reclassified the catch data submitted by the CPCs for "other gears" into longline and other gear types following an internal review of the data. This resulted in a dramatic increase in reported longline catches of high trophic level predators (sharks), which can have a strong influence on ecosystem dynamics. Therefore, annual catch estimates by species for 1993–2018 were assigned to the relevant functional groups in the ETP-21 model, which was then rebalanced and recalibrated to time series data to provide an updated ecosystem status for 2021 and to undertake simulations to assess potential impacts of the FAD fishery on the structure of the ecosystem (SAC-12-13).

The model has not been updated since 2024 due to data limitations and constrained internal resources. However, the staff has plans to update the model with new data during 2026–2027, with support from global experts and collaborators. This effort will enable existing staff to resume model development and more effectively support EAFM objectives, in line with the EcoCard workplan in EB-02-02, including the generation of indicators describing ecosystem structure and function. Planned work also includes the exploration of integrated ecosystem indicators (e.g., the Ecosystem Traits Index: ETI; Fulton and Sainsbury 2025).

6.1. Ecological indicators

Since 2017, the most recent Ecopath model has been used in the *Ecosystem Considerations* report to provide annual values for seven ecological indicators that, together, can identify changes in the structure and internal dynamics of the ETP ecosystem. These indicators are: mean trophic level of the catch (TL_c), the Marine Trophic Index (MTI), the Fishing in Balance (FIB) index, Shannon's index, and the mean trophic level of the modelled community for trophic levels 2.0–3.25 ($TL_{2.0}$), ≥3.25–4.0 ($TL_{3.5}$), and >4.0 ($TL_{4.0}$). A full description of these indicators is provided in SAC-10-14.

ETP-21 was updated in 2024 (named ETP-24) using annual catch estimates by species for 1993–2022 assigned to the relevant functional groups, which was then rebalanced to provide an updated ecosystem status for 2022.

Ecological indicators showed that values for TL_c and MTI decreased from their peak of 4.77 and 4.83 in 1991 to 4.66 and 4.69 in 2022, respectively, as the purse-seine fishing effort on floating objects significantly increased (Figure L-13), where there was increasing catches of high trophic level bycatch species that tend to aggregate around floating objects (e.g., sharks, billfish, wahoo and dorado). Since its peak in 1991, TL_c

declined by 0.170 of a trophic level in the subsequent 30 years, or 0.057 trophic levels per decade. The increasing number of OBJ sets is also seen in the FIB index that exceeds zero after 1990, as well as the continual change in the evenness of biomass of the community indicated by Shannon's index.

The above indicators generally describe the change in the exploited components of the ecosystem, whereas community biomass indicators describe changes in the structure of the ecosystem once biomass has been removed due to fishing. The biomass of the $TL_{MC4.0}$ community was at one of its highest values (4.493) in 1986 but has continued to decline to 4.467 in 2022 (Figure L-13). As a result of changes in predation pressure on lower trophic levels, between 1993 and 2022 the biomass of the $TL_{MC3.25}$ community increased from 3.801 to 3.829, while interestingly, the biomass of the $TL_{MC2.0}$ community also increased from 3.092 to 3.107.

Together, these indicators show that the ecosystem structure has likely changed over the 43-year analysis period. The consistent patterns of change in each ecological indicator, particularly in the mean trophic level of the communities since 1993, certainly warrant the continuation, and ideally an expansion, of monitoring programs for fisheries in the EPO. The COVID-19 pandemic in 2020 allowed staff to examine the direct effects of reduced fishing effort on the ecosystem through use of ecological indicators. The most notable change was a 23% decrease in the number of purse-seine floating-object sets from 14,987 sets in 2019 to 11,543 sets in 2020. This decrease in effort resulted in abrupt changes in most ecological indicators for 2020 and increasing beyond pre-pandemic levels in 2022 when the number of floating-object sets increased significantly to 17,699 (Figure L-13). These results suggest that the increase in floating-object sets may be primarily responsible for the continued change in ecosystem structure over the past two decades.

The model was not updated in 2025, but plans are in place to resume ecosystem indicator development in the near future.

7. FUTURE DEVELOPMENTS

In the near term, stock assessments are unlikely to be available for most of the bycatch species interacting with IATTC tuna fisheries. As a result, continued ecological research on the impacts of the fishery and alternative assessment approaches remain essential to provide managers with reliable, science-based information to guide ecosystem-oriented conservation and management measures. This work is critical for ensuring that the IATTC continues to fulfil its responsibilities under the Antigua Convention, transition towards EAFM, as well as the objectives set out in both the original and updated SSPs (IATTC-93-06a: 2019-2023; IATTC-103-03a: 2026-2030).
In addition to updating the 2024 ecosystem model ETP-24, priority ecosystem-and bycatch-related research areas identified by the scientific staff—reflected in Theme 4 (Ecological Impacts of Fisheries: Assessment and Mitigation (ECO) of the current SSP—are outlined below:

- GOAL ECO 7: Advance and ultimately implement the EcoCard workplan (EB-02-02) to improve the communication of ecosystem advice and the status of ecosystems in the EPO.
- GOAL ECO 1: Conduct an external review of the EASI-Fish methodology and, following any recommended improvements, apply it to prioritized shark species (identified in Resolution C-25-08) and other vulnerable taxa (e.g., rays, seabirds, sea turtles, and marine mammals).
- GOAL ECO 2: Develop tools to reduce interactions between Commission-managed fisheries and prioritized bycatch species.
- GOAL ECO 4: Complete the development of science-based, standardized best handling and release practices (BHRPs) for all vulnerable taxa and Commission-managed fisheries, including associated crew training programs.
- GOAL ECO 6: Develop a toolbox to support the Commission's use of spatial management measures, including options aligned with the Biodiversity Beyond National Jurisdiction (BBNJ) agreement.

In addition, under Theme 5 (Interactions among the Environment, the Ecosystem, and Fisheries, ENV):

- GOAL ENV 1: Establish the foundation for climate-resilient fisheries through implementation of the ongoing workplan (see SAC-15-12).

Similarly, two priority goals for sharks are listed under theme 1 (Data collection for scientific support of management, DAT) and 3 (Sustainable fisheries, FISH):

- GOAL DAT 3: Complete the design and support the implementation of a standardized data collection program for shark species associated with fisheries managed by the Commission.
- GOAL FISH 5: Conduct a close-kin mark-recapture (CKMR) stock assessment for silky shark.

A key cross-cutting challenge related to bycatch and ecological analyses is the limitation of available data. The quality of ecological analyses and the annual reporting of EPO-wide bycatch estimates are currently constrained by the IATTC resolution on data provision (C-03-05), which no longer aligns with the Commission's evolving responsibilities under the Antigua Convention (see SAC-12-09). These responsibilities include assessing and monitoring the impacts of EPO tuna fisheries on associated and dependent species—one of the primary motivations for the development and annual update of the *Ecosystem Considerations* report.

At present, reliable bycatch data are largely limited to observer records from large (Class-6) purse-seine vessels, with substantial data gaps for other pelagic fisheries in the EPO. Addressing these gaps is therefore a priority. Proposed capacity building opportunities, along with a series of workshops involving IATTC staff and CPCs, aim to establish clearer data reporting standards and improve data submission, catch estimation and reporting practices.

Initial discussions have already taken place through workshops on industrial longline fisheries (WSDAT-01, WSDAT-01 RPT) and the small purse-seine fishery (≤363 t carrying capacity) (WSDAT-02, WSDAT-02-01, WSDAT-02-02, WSDAT-02 RPT). Similar efforts are expected in the near future for the small scale fisheries operating in the region. These efforts have informed a set of updated staff recommendations, developed in consultation with CPCs and compiled in 2025 (SAC-16 INF-O). Collectively, these initiatives are expected to strengthen the data foundation for ecological analyses and support the IATTC in meeting its obligations under the Antigua Convention.

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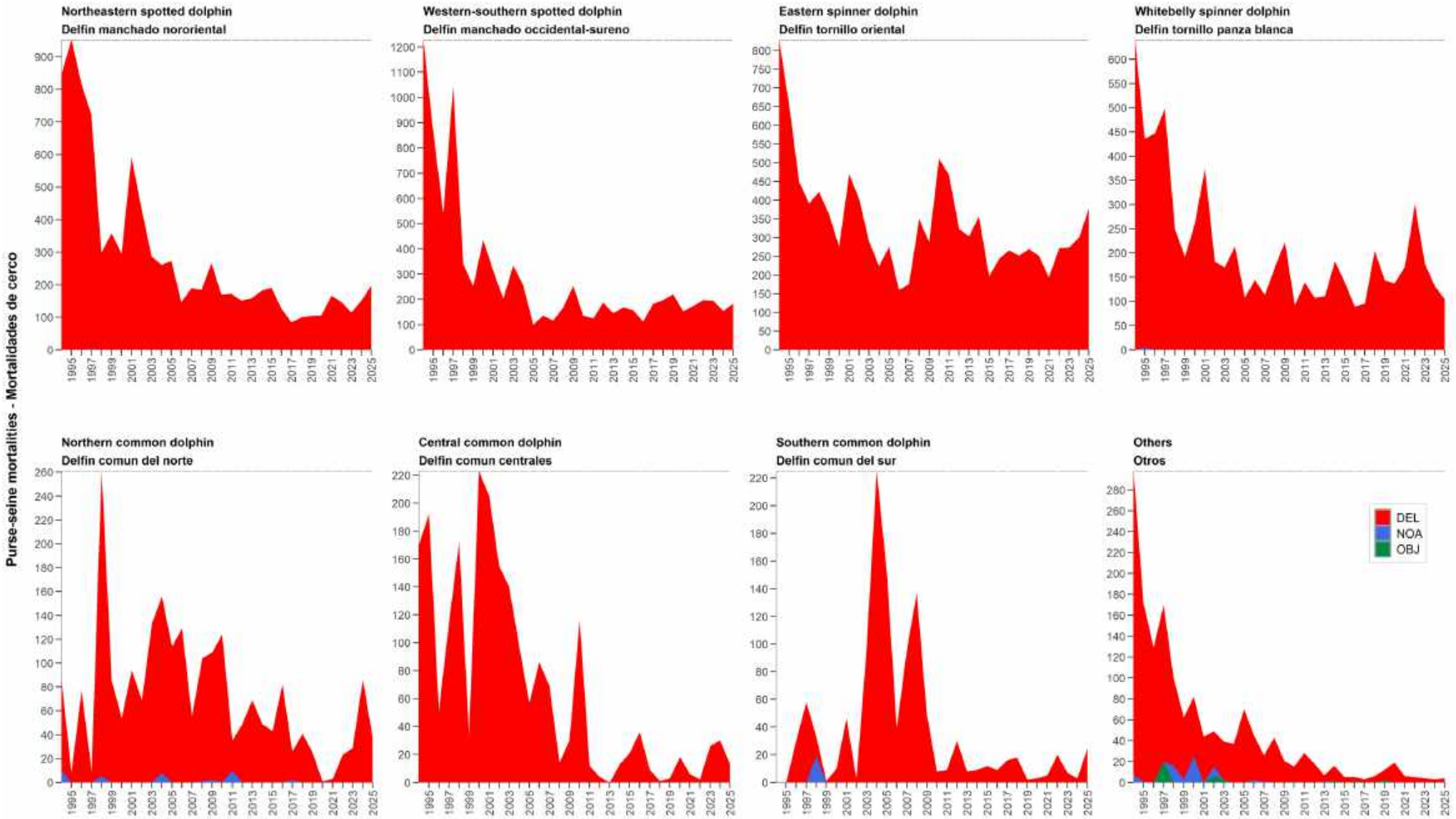
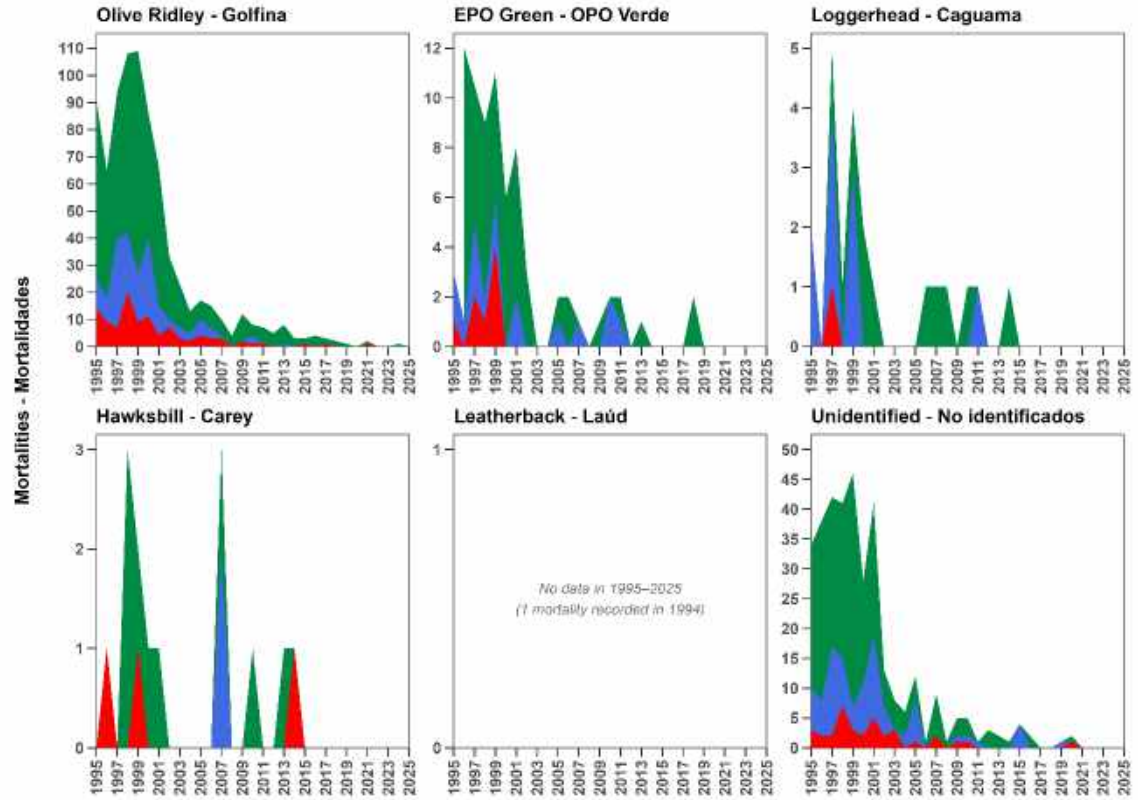


FIGURE L-1. Estimated number of incidental dolphin mortalities by observers onboard purse-seine vessels, 1995–2025.
FIGURA L-1. Número estimado de mortalidades incidentales de delfines por observadores a bordo de buques cerqueros grandes, 1995–2025.

a.



b.

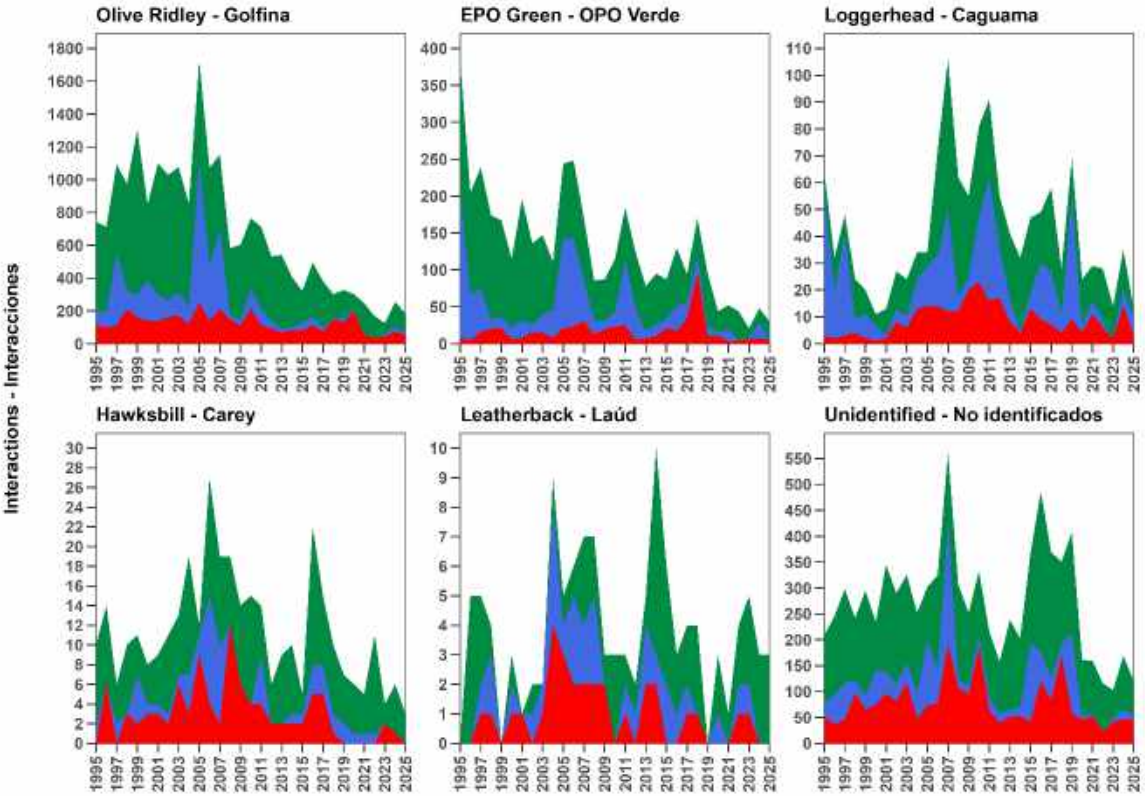


FIGURE L-2. Estimated number of sea turtle a) mortalities and b) interactions by observers onboard large purse-seine (Class 6, carrying capacity > 363 t) vessels, 1995–2025, by set type (dolphin (DEL), unassociated (NOA), floating object (OBJ)).

FIGURA L-2. Número estimado de a) mortalidades y b) interacciones de tortugas marinas por observadores a bordo de buques cerqueros grandes (clase 6, capacidad de acarreo > 363 t), 1995-2025, por tipo de lance (delfín (DEL), no asociado (NOA), objeto flotante (OBJ)).

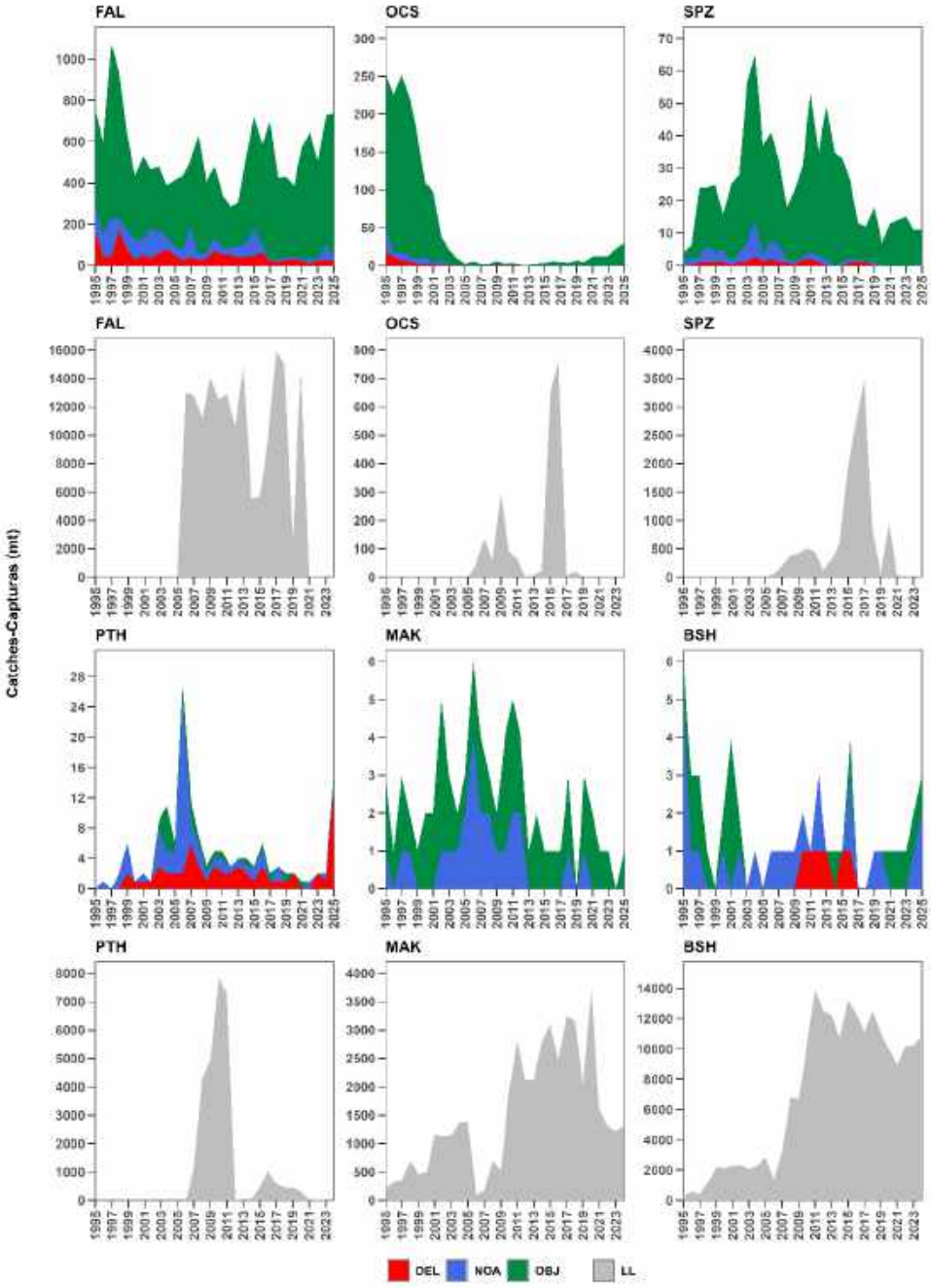


FIGURE L-3a. Estimated catches in metric tons (t) of key shark species in the eastern Pacific Ocean recorded by observers onboard large purse-seine (Class 6, carrying capacity > 363 t) vessels and minimum longline (LL) estimates of gross annual removals reported by CPCs (see section 2.2. for uncertainty and data gaps in reporting of bycatch species caught by longline). Purse-seine catches are provided for size-class 6 vessels with a carrying capacity >363 t (1995–2025) by set type: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Longline catches (1995–2024) are minimum reported gross-annual removals that may have been estimated using a mixture of different weight metrics (see footnote in section 3.5). FAL: Silky shark, OCS: Oceanic whitetip shark, SPZ: Smooth hammerhead shark, PTH: Pelagic thresher shark, MAK: Mako shark, BSH: Blue shark.

FIGURA L-3a. Capturas estimadas en toneladas (t) de especies clave de tiburones en el Océano Pacífico oriental registradas por observadores a bordo de buques cerqueros grandes (clase 6, capacidad de acarreo > 363 t) y estimaciones mínimas de palangre (LL) de extracciones anuales brutas reportadas por los CPC (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos en la notificación de especies capturadas incidentalmente con palangre). Se presentan las capturas cerqueras para buques de clase 6 con una capacidad de acarreo >363 t (1995-2025) por tipo de lance: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Las capturas palangreras (1995–2024) son extracciones anuales brutas mínimas reportadas que pueden haber sido estimadas usando una mezcla de diferentes métricas de peso (ver nota al pie de página en la sección 3.5). FAL: Tiburón sedoso, OCS: Tiburón oceánico punta blanca, SPZ: Tiburón martillo, PTH: Zorro pelágico, MAK: Marrajo, BSH: Tiburón azul.

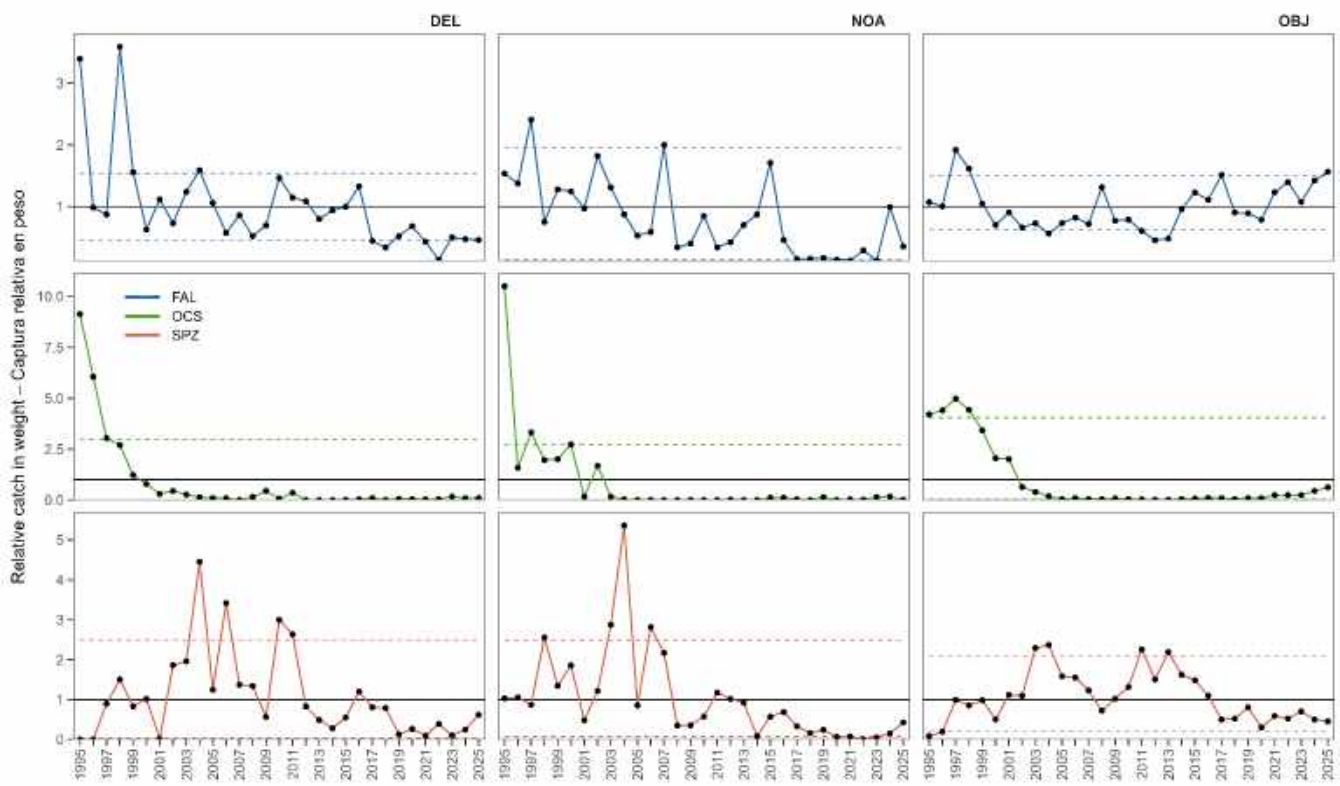


FIGURE L-3b. Indicators of relative catch of key shark species reported by observers onboard large purse-seine vessels (Class 6, carrying capacity > 363 t) by set type: dolphins (DEL), unassociated tuna schools (NOA) and floating object (OBJ). The solid line is the average total annual catch for the period 1995–2025 and scaled to 1 and the dashed lines represent the 10th and 90th percentiles. FAL: silky shark (*Carcharhinus falciformis*), OCS: oceanic whitetip shark (*Carcharhinus longimanus*), SPZ: smooth hammerhead shark (*Sphyrna zygaena*).

FIGURA L-3b. Indicadores de captura relativa de especies clave de tiburones notificada por observadores a bordo de buques cerqueros grandes (clase 6, capacidad de acarreo > 363 t) por tipo de lance: sobre delfines (DEL), no asociados (NOA) y sobre objetos flotantes (OBJ). La línea continua es el promedio de captura anual total para el periodo 1995-2025 y está escalada a 1 y las líneas punteadas representan los percentiles de 10 y 90%. FAL: tiburón sedoso (*Carcharhinus falciformis*), OCS: tiburón oceánico punta blanca (*Carcharhinus longimanus*), SPZ: cornuda cruz (*Sphyrna zygaena*).

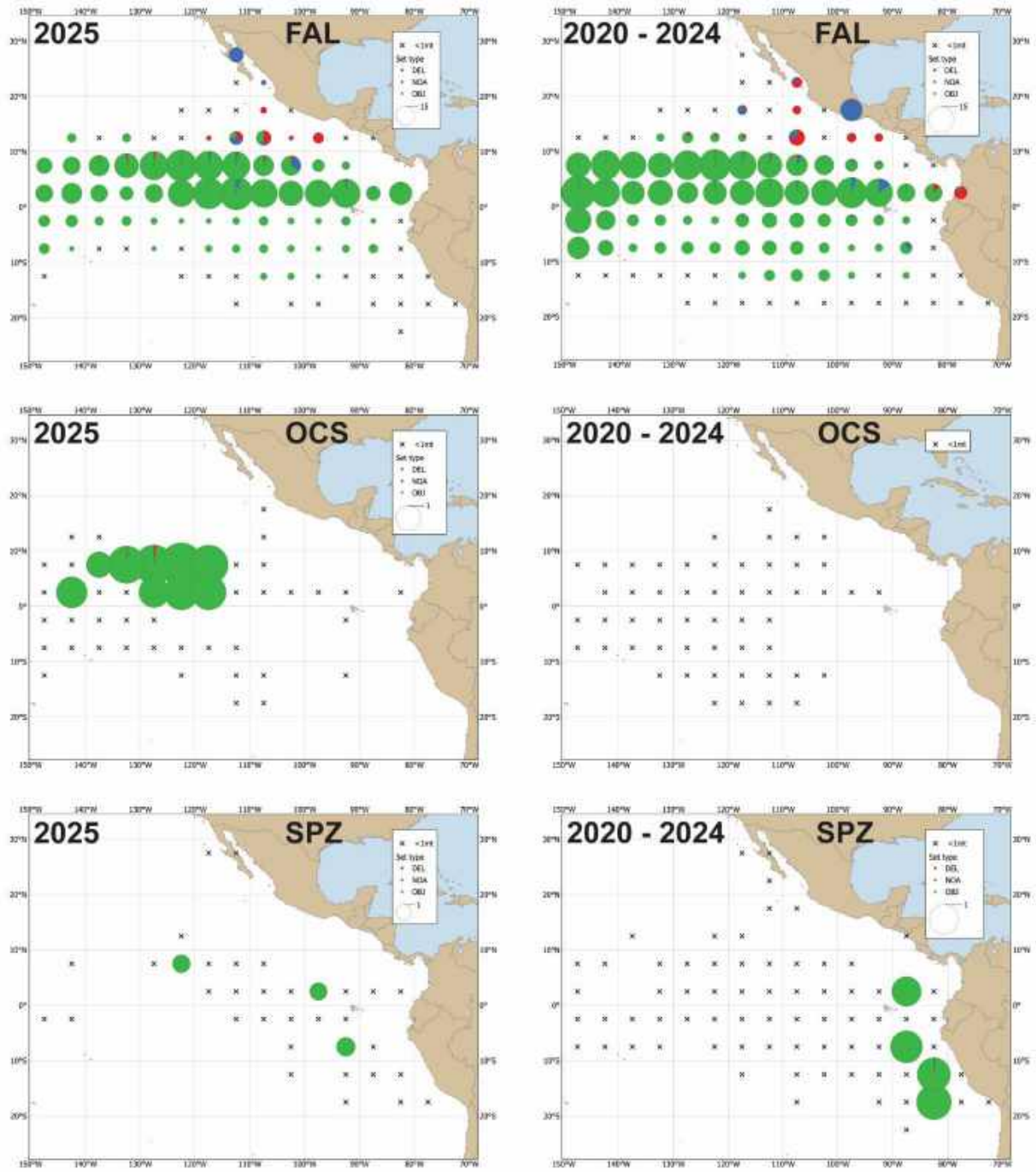


FIGURE L-3c. Purse-seine catches (Class 6, carrying capacity > 363 t) (at 5°x5° resolution) of key species of sharks by set type: floating object (OBJ) unassociated tuna schools (NOA) and dolphins (DEL), for 2025 (left panel) and the 2020–2024 averages (right panel). FAL: silky shark (*Carcharhinus falciformis*), OCS: oceanic whitetip shark (*Carcharhinus longimanus*), SPZ: smooth hammerhead shark (*Sphyrna zygaena*).
FIGURA L-3c. Capturas cerqueras (clase 6, capacidad de acarreo > 363 t) (resolución de 5°x5°) de especies clave de tiburones por tipo de lance: sobre objetos flotantes (OBJ), no asociados (NOA) y sobre delfines (DEL), para 2025 (panel izquierdo) y los promedios de 2020–2024 (panel derecho). FAL: tiburón sedoso (*Carcharhinus falciformis*), OCS: tiburón oceánico punta blanca (*Carcharhinus longimanus*), SPZ: cornuda cruz (*Sphyrna zygaena*).

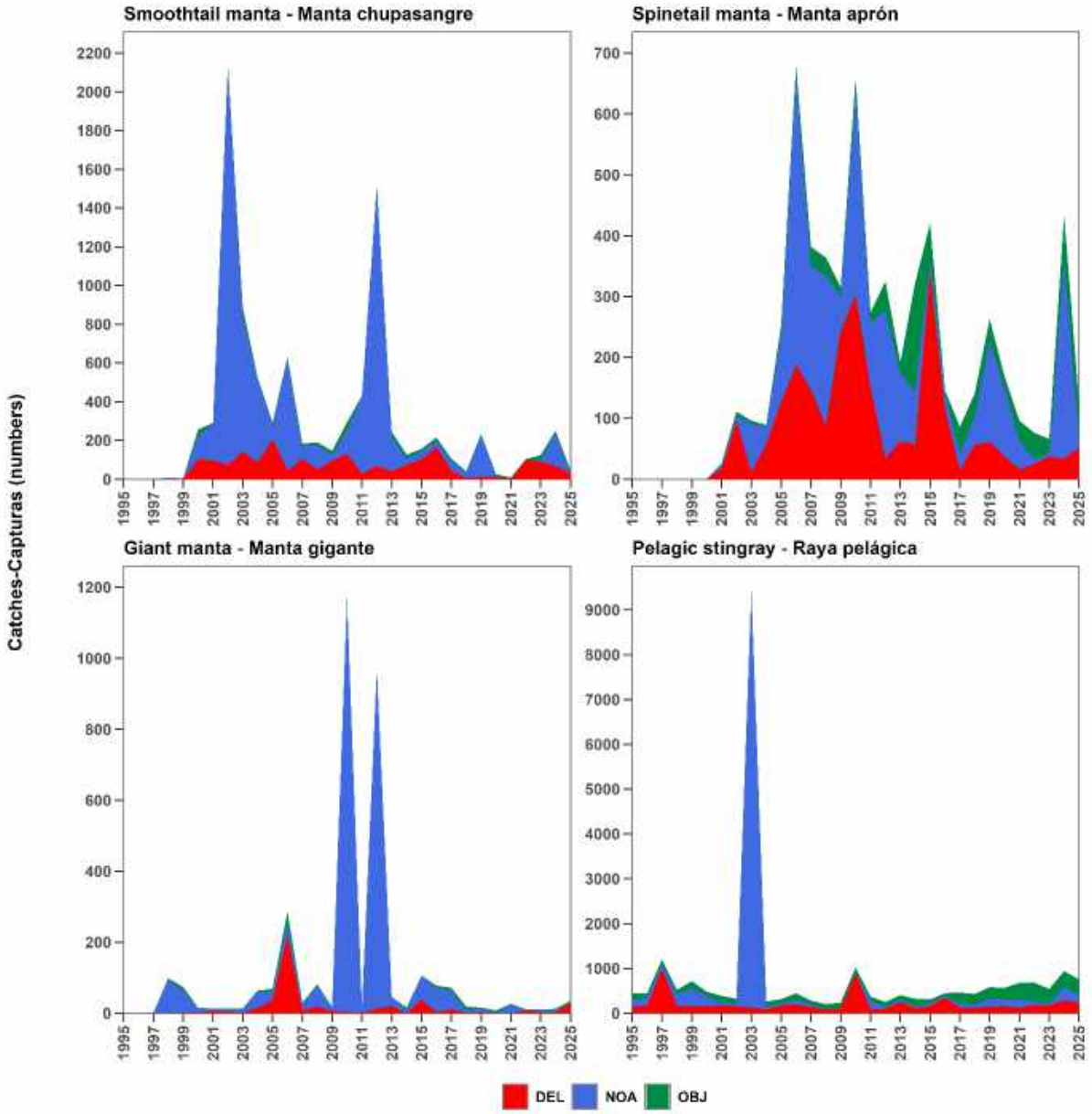


FIGURE L-4a. Estimated purse-seine catches in numbers of individuals of key species of rays in the eastern Pacific Ocean. Purse seine catches are provided for size-class 6 vessels with a carrying capacity >363 t (1995–2025) by set type: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL).

FIGURA L-4a. Capturas cerqueras estimadas en número de individuos de especies clave de rayas en el Océano Pacífico oriental. Se presentan las capturas cerqueras para buques de clase 6 con una capacidad de acarreo >363 t (1995-2025) por tipo de lance: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL).

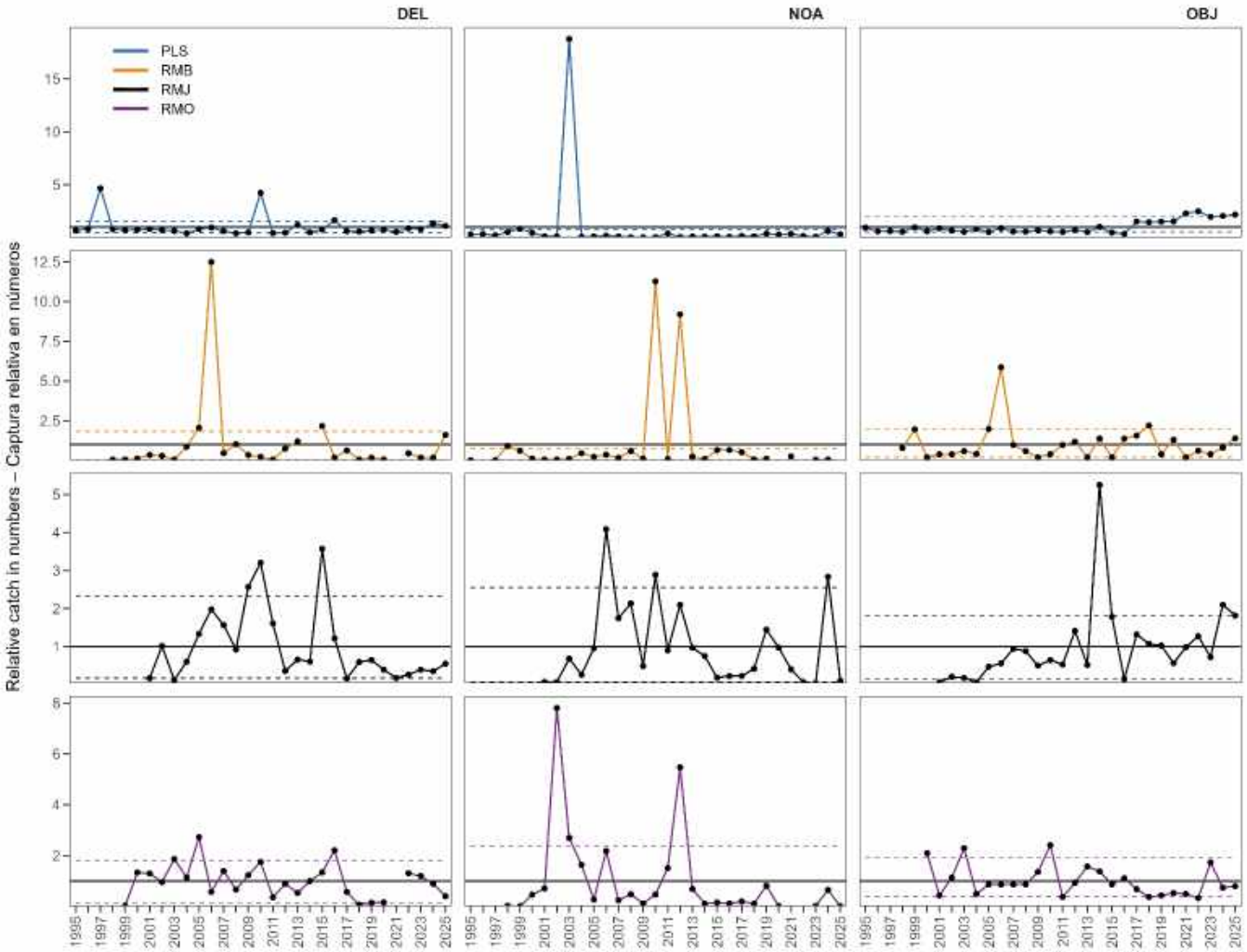


FIGURE L-4b. Indicators of relative number of individuals of rays reported by observers onboard large purse-seine vessels (Class 6, carrying capacity > 363 t) by set type: dolphins (DEL), unassociated tuna schools (NOA) and floating object (OBJ). The solid line is the average total annual catch for the period 1995–2025 and scaled to 1 and the dashed lines represent the 10th and 90th percentiles. PLS: pelagic stingray (*Pteroplatytrygon violacea*), RMB: giant manta (*Mobula birostris*), RMJ: spinetail manta (*Mobula mobular*), RMO: smoothtail manta (*Mobula thurstoni*).
FIGURA L-4b. Indicadores del número relativo de individuos de rayas notificado por observadores a bordo de buques cerqueros grandes (clase 6, capacidad de acarreo > 363 t) por tipo de lance: sobre delfines (DEL), no asociados (NOA) y sobre objetos flotantes (OBJ). La línea continua es el promedio de captura anual total para el periodo 1995-2025 y está escalada a 1 y las líneas punteadas representan los percentiles de 10 y 90%. PLS: raya pelágica (*Pteroplatytrygon violacea*), RMB: manta gigante (*Mobula birostris*), RMJ: manta mobula (*Mobula mobular*), RMO: manta diablo (*Mobula thurstoni*).

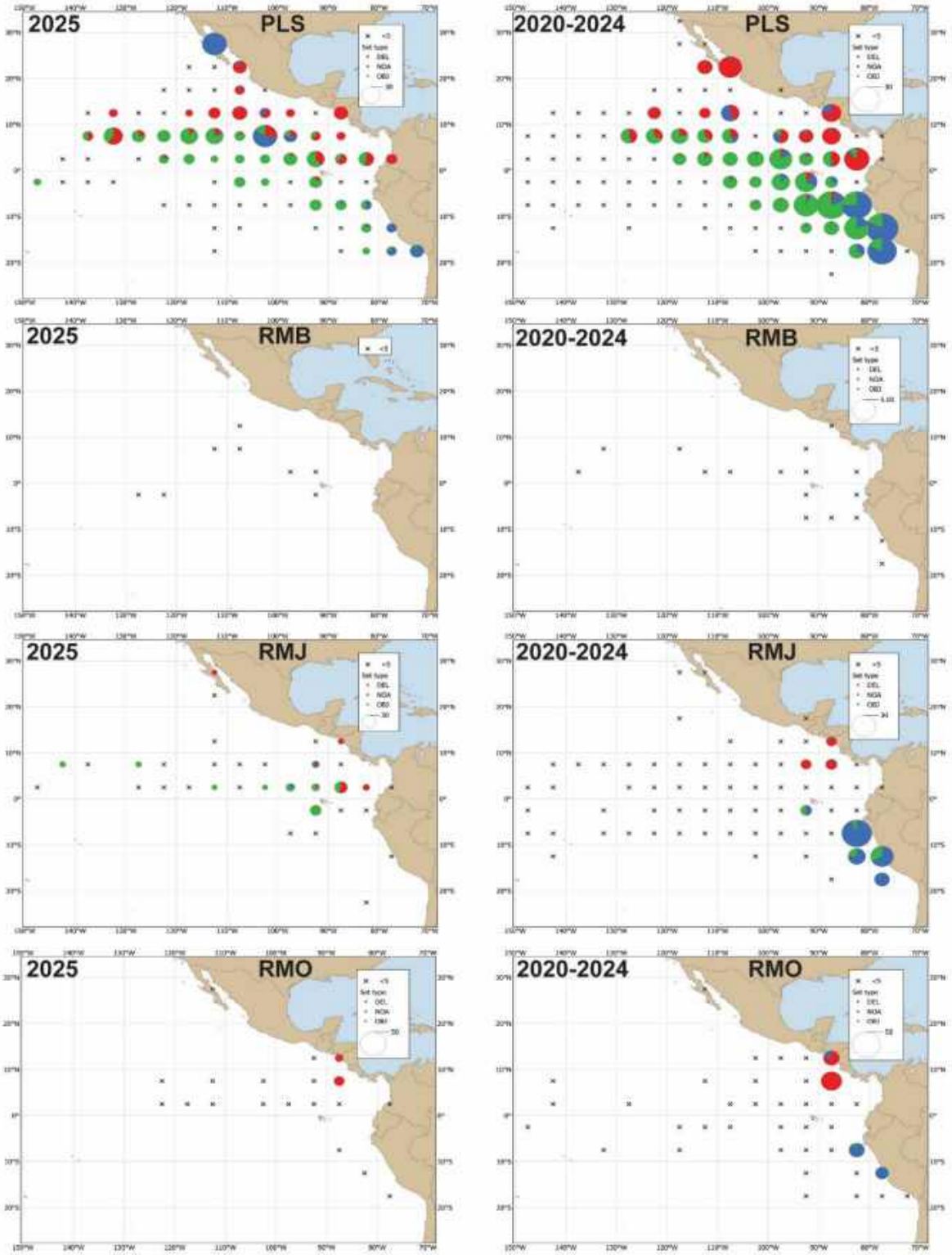


FIGURE L-4c. Purse-seine catches (Class 6, carrying capacity > 363 t) (at 5°x5° resolution) of key species of rays by set type: floating object (OBJ) unassociated tuna schools (NOA) and dolphins (DEL), for 2025 (left panel) and the 2020–2024 averages (right panel). PLS: pelagic stingray (*Pteroplatytrygon violacea*), RMB: giant manta (*Mobula birostris*), RMJ: spinetail manta (*Mobula mobular*), RMO: smoothtail manta (*Mobula thurstoni*).
FIGURA L-4c. Capturas cerqueras (clase 6, capacidad de acarreo > 363 t) (resolución de 5°x5°) de especies clave de rayas por tipo de lance: sobre objetos flotantes (OBJ), no asociados (NOA) y sobre delfines (DEL), para 2025 (panel izquierdo) y los promedios de 2020–2024 (panel derecho). PLS: raya pelágica (*Pteroplatytrygon violacea*), RMB: manta gigante (*Mobula birostris*), RMJ: manta mobula (*Mobula mobular*), RMO: manta diablo (*Mobula thurstoni*).

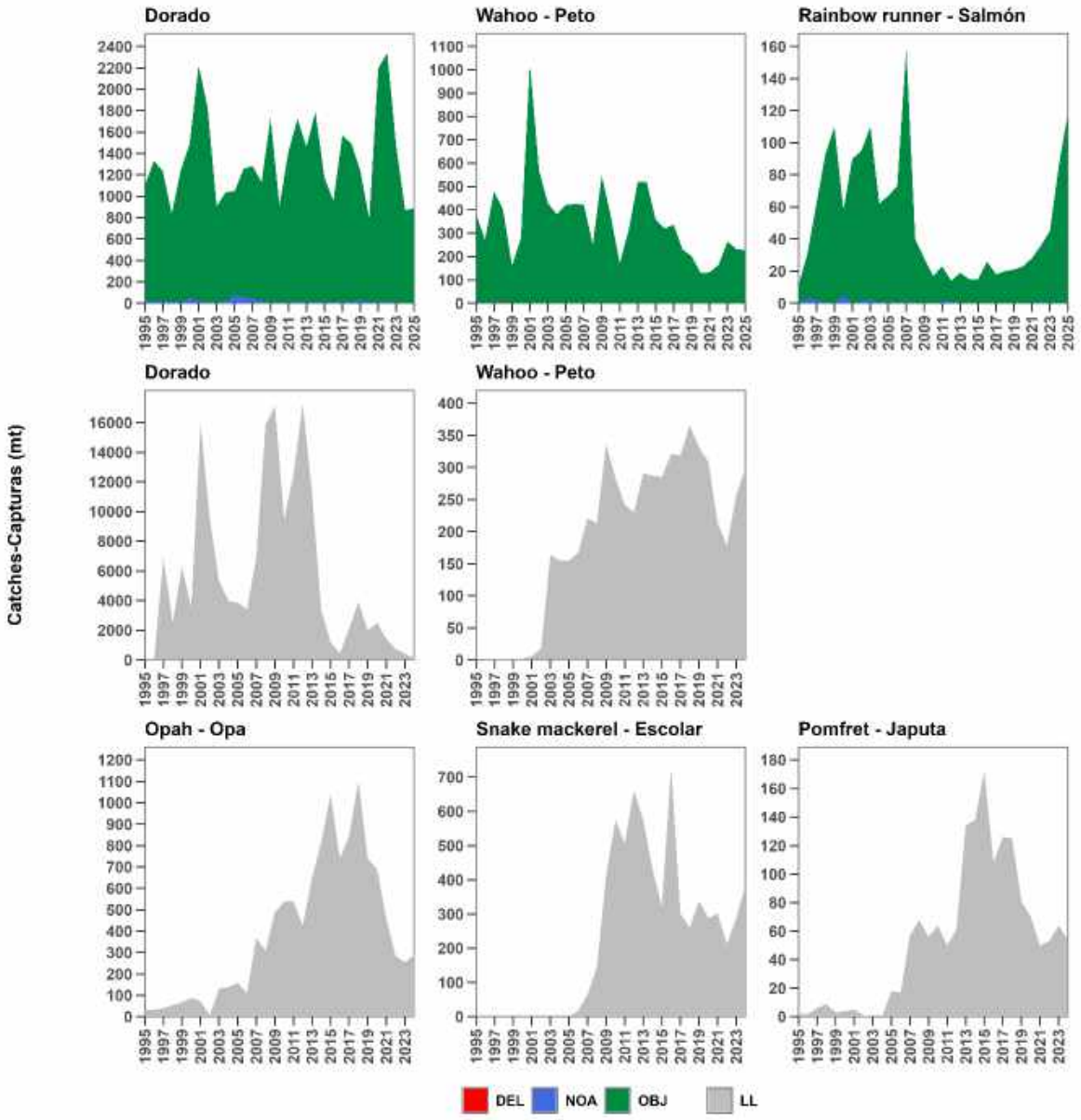


FIGURE L-5. Estimated purse-seine and longline catches in metric tons (t) of key species of large fishes in the eastern Pacific Ocean. Purse-seine catches are provided for size-class 6 vessels with a carrying capacity >363 t (1995–2025) by set type: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Longline (LL) catches (1995–2024) are minimum reported gross-annual removals (see section 2.2. for uncertainty and data gaps in reporting of bycatch species caught by longline).

FIGURA L-5. Capturas cerqueras y palangreras estimadas en toneladas (t) de especies clave de peces grandes en el Océano Pacífico oriental. Se presentan las capturas cerqueras para buques de clase 6 con una capacidad de acarreo >363 t (1995-2025) por tipo de lance: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Las capturas palangreras (LL) (1995–2024) son extracciones anuales brutas mínimas reportadas (ver la Sección 2.2 para consultar información sobre la incertidumbre y las deficiencias de los datos en la notificación de especies capturadas incidentalmente con palangre).

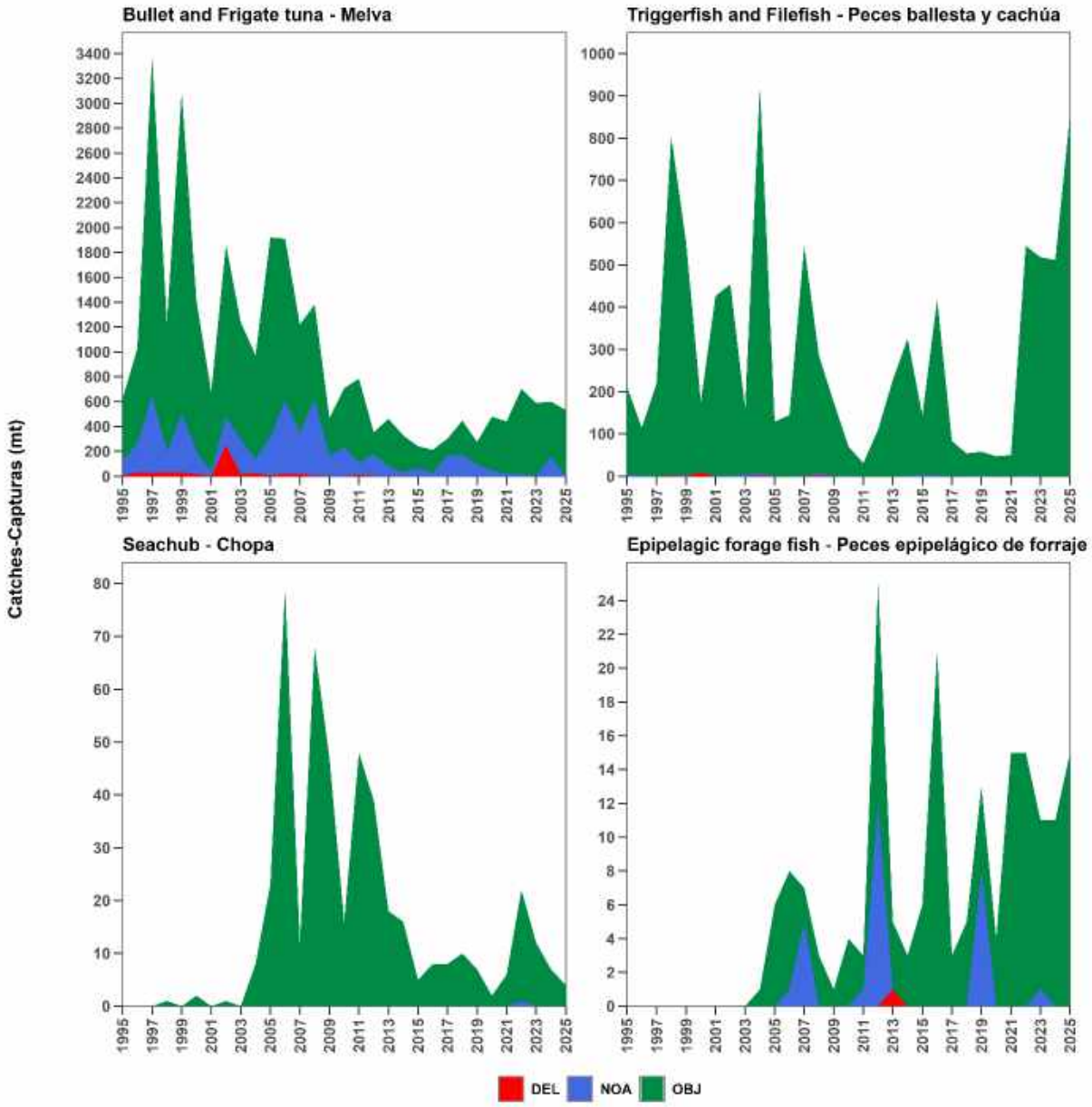


FIGURE L-6. Estimated purse-seine catches in metric tons (t) of key species of small fishes in the eastern Pacific Ocean. Purse seine catches are provided for size-class 6 vessels with a carrying capacity >363 t (1995–2025) by set type: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL).
FIGURA L-6. Capturas cerqueras estimadas en toneladas (t) de especies clave de peces pequeños en el Océano Pacífico oriental. Se presentan las capturas cerqueras para buques de clase 6 con una capacidad de acarreo >363 t (1995-2025) por tipo de lance: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL).

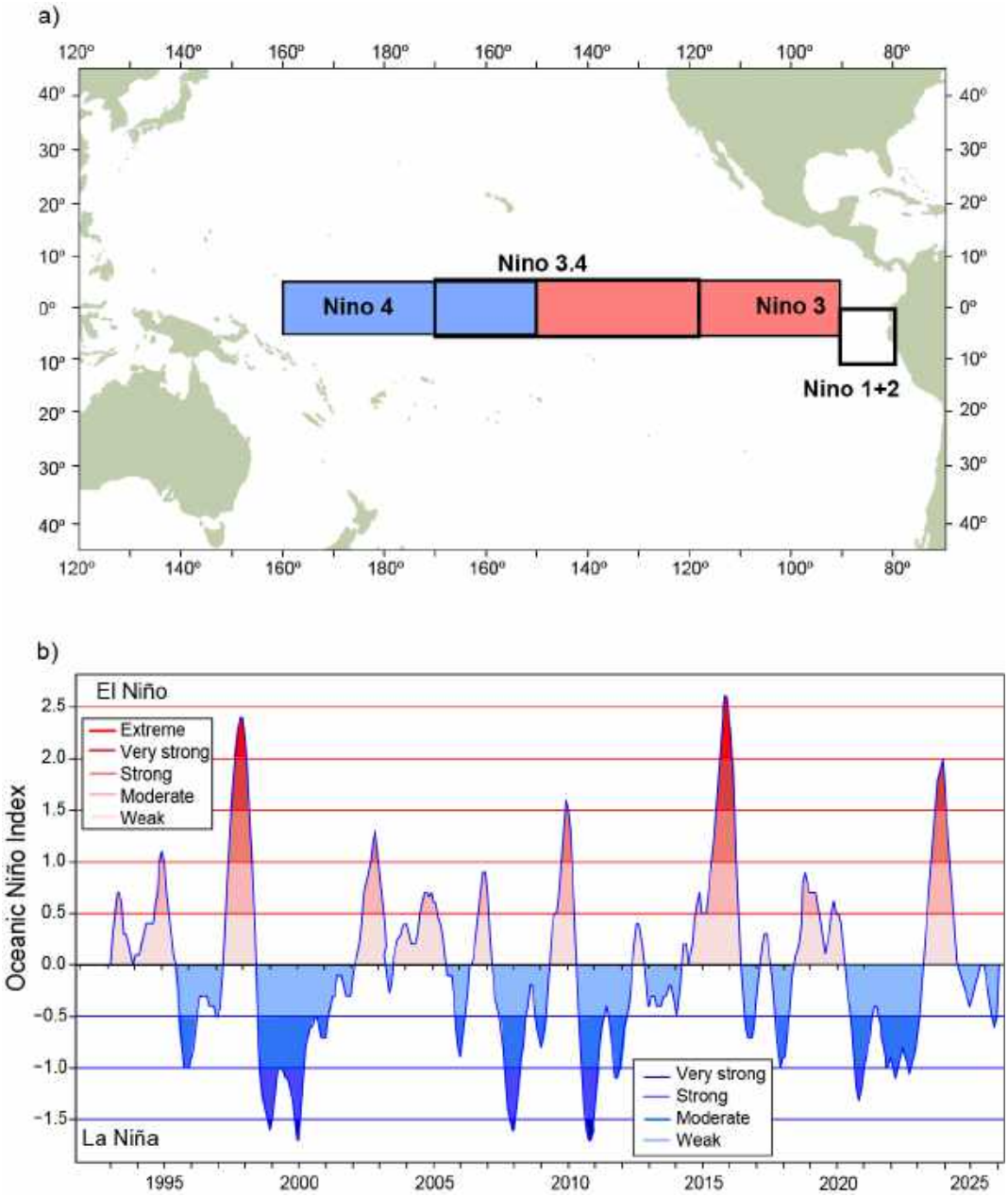


FIGURE L-7. El Niño regions used as indicators of El Niño Southern Oscillation (ENSO) events in the Pacific Ocean (top panel), and the Oceanic Niño Index (ONI) used to monitor ENSO conditions in Niño region 3.4 from 5°N to 5°S and 120°W to 170°W (bottom panel). Time series shows the running 3-month mean ONI values from the start of the IATTC observer program (1993) through December 2025. ONI data obtained from: http://origin.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php

FIGURA L-7. Regiones de El Niño utilizadas como indicadores de los eventos de El Niño-Oscilación del Sur (ENOS) en el Océano Pacífico (panel superior), e Índice de El Niño Oceánico (ONI) usado para dar seguimiento a las condiciones de ENOS en la región Niño 3.4 de 5°N a 5°S y de 120°O a 170°O (panel inferior). Las series de tiempo muestran los valores del promedio móvil de 3 meses del ONI desde el inicio del programa de observadores de la CIAT (1993) hasta finales de diciembre de 2025. Datos del ONI obtenidos de: http://origin.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php

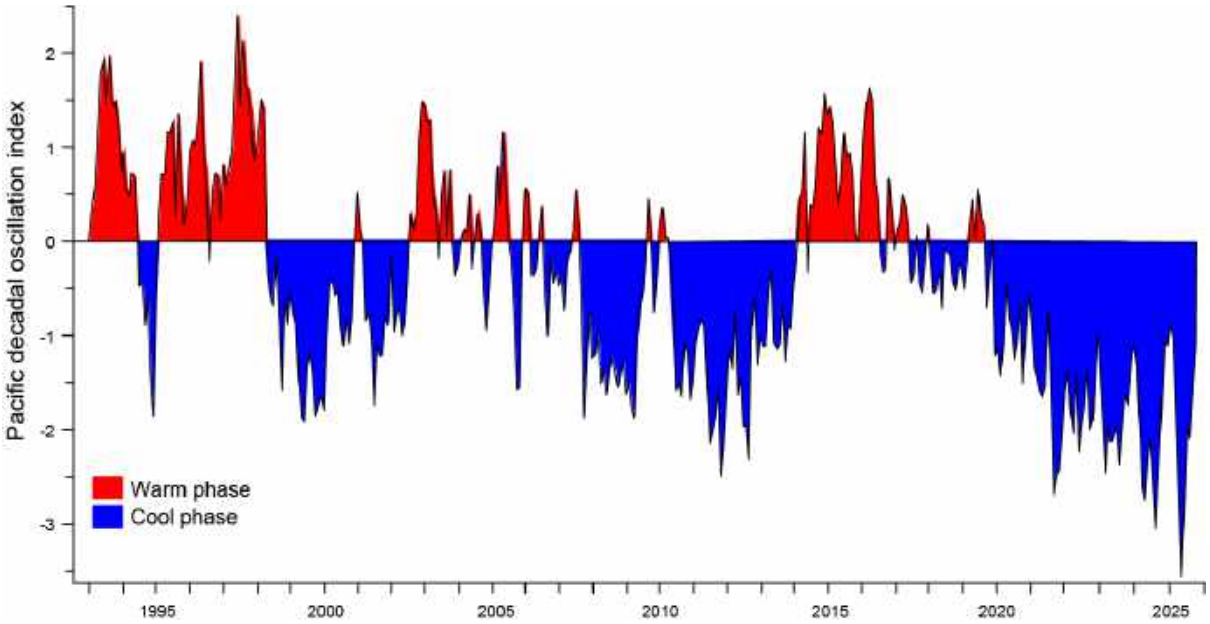


FIGURE L-8. Monthly values of the Pacific Decadal Oscillation (PDO) Index, January 1993–December 2025. ERSST V5 PDO Time Series data obtained from: https://psl.noaa.gov/pdo/
FIGURA L-8. Valores mensuales del índice de Oscilación Decadal del Pacífico (PDO), enero de 1993–diciembre de 2025. Datos de la serie de tiempo ERSST V5 PDO obtenidos de: https://psl.noaa.gov/pdo/

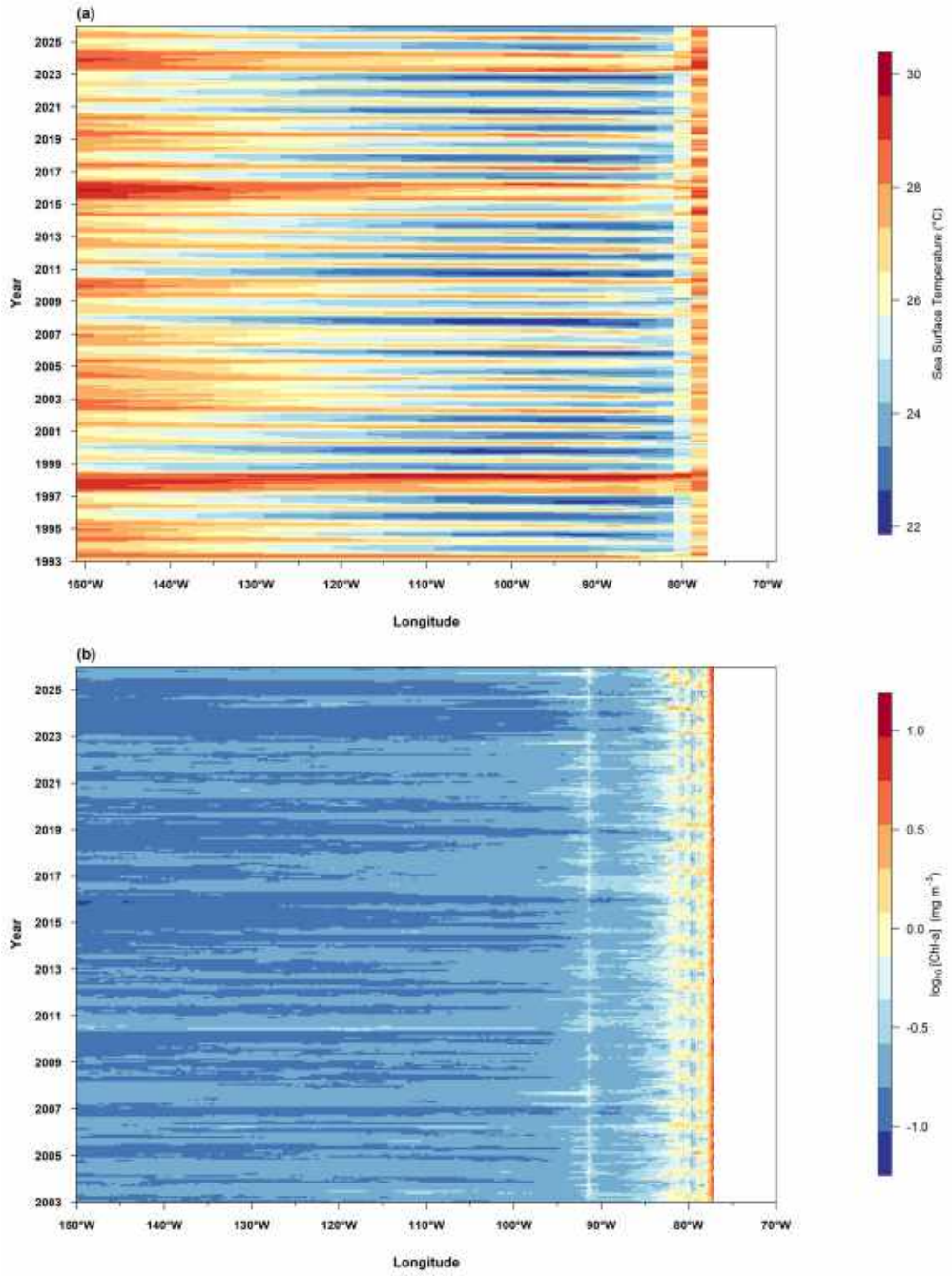


FIGURE L-9. Time-longitude Hovmöller diagram with data averaged across the tropical eastern Pacific Ocean from 5°N to 5°S for mean monthly SST for January 1993–December 2025 (top panel) (https://coastwatch.pfeg.noaa.gov/erddap/griddap/nceiErsstv5_LonPM180.html) and mean monthly chlorophyll-a concentration for January 2003–December 2025 (bottom panel); 2003–2024: https://coastwatch.pfeg.noaa.gov/erddap/info/erdMH1chlamday_R2022SQ/index.html; January 2024–December 2025: https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdMH1chlamday_R2022NRT.html.

FIGURA L-9. Diagrama de Hovmöller tiempo-longitud con datos promediados en el Océano Pacífico tropical oriental de 5°N a 5°S para la TSM promedio mensual de enero de 1993 a diciembre de 2025 (panel superior) (https://coastwatch.pfeg.noaa.gov/erddap/griddap/nceiErsstv5_LonPM180.html) y concentración promedio mensual de clorofila-a de enero de 2003 a diciembre de 2025 (panel inferior); 2003–2024: https://coastwatch.pfeg.noaa.gov/erddap/info/erdMH1chlamday_R2022SQ/index.html; enero de 2024–diciembre de 2025: https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdMH1chlamday_R2022NRT.html.

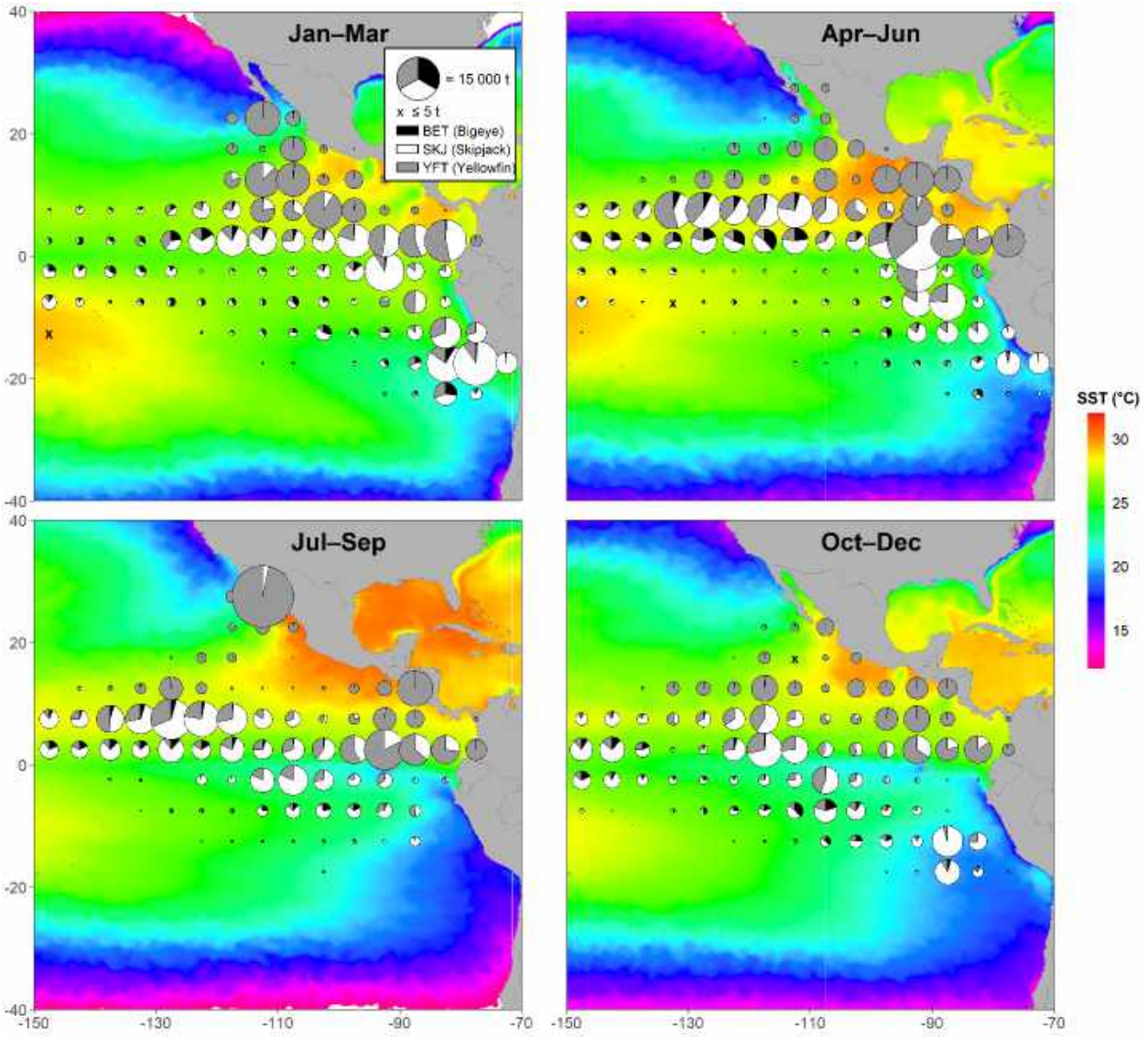


FIGURE L-10. Mean sea surface temperature (SST) for each quarter during 2025 with catches of tropical tunas overlaid. SST data obtained from NOAA NMFS SWFSC ERD on April 16, 2026, "Multi-scale Ultra-high Resolution (MUR) SST Analysis fv04.1, Global, 0.01°, 2002–present, Monthly", https://coastwatch.pfeg.noaa.gov/erddap/info/jplMURSST41mday/index.html.

FIGURA L-10 Temperatura superficial del mar (TSM) promedio para cada trimestre de 2025 con las capturas de atunes tropicales superpuestas. Datos de TSM obtenidos de NOAA NMFS SWFSC ERD el 16 de abril de 2026, "Multi-scale Ultra-high Resolution (MUR) SST Analysis fv04.1, Global, 0.01°, 2002–present, Monthly", https://coastwatch.pfeg.noaa.gov/erddap/info/jplMURSST41mday/index.html.

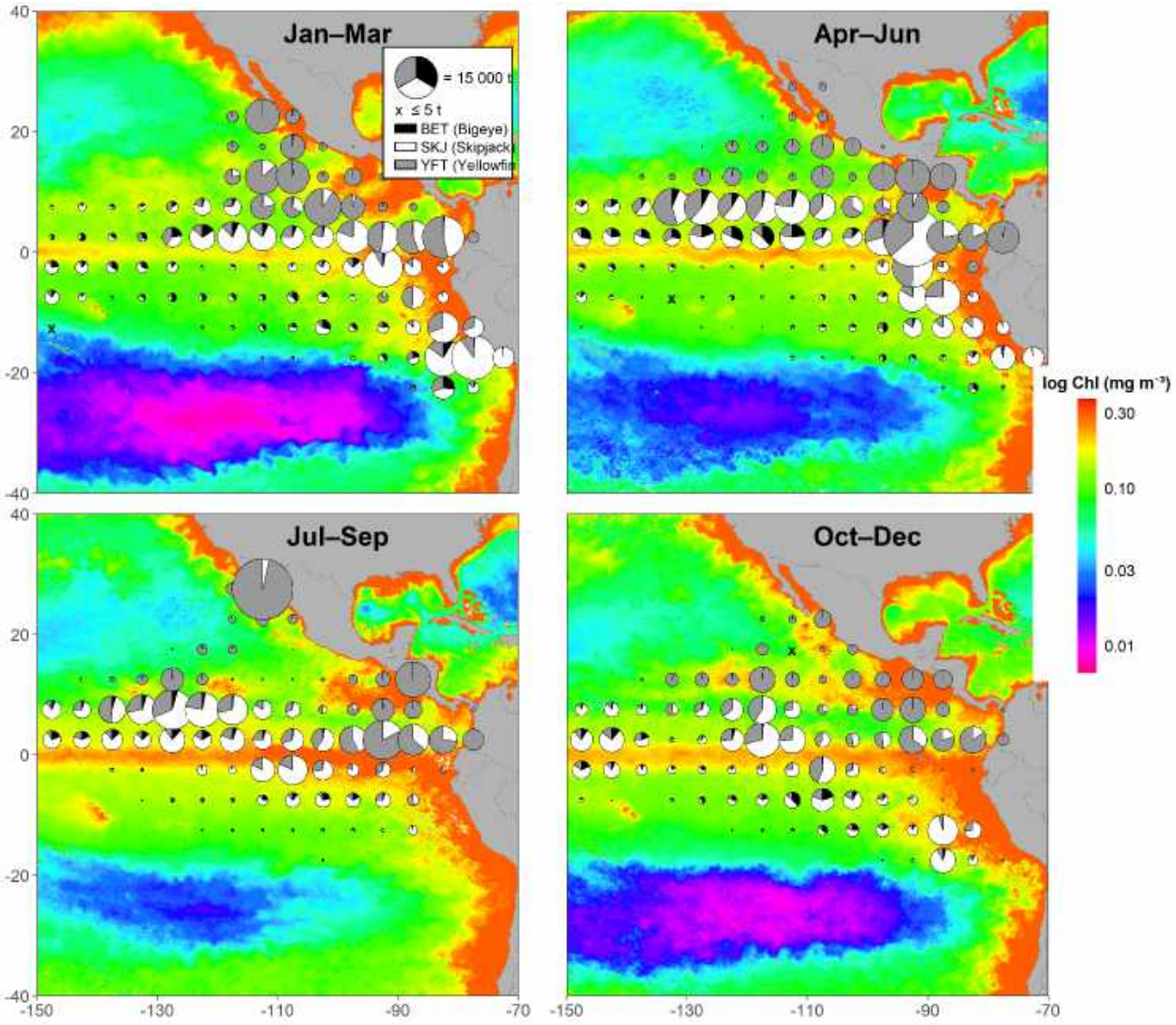


FIGURE L-11. Mean log chlorophyll-a concentration (in mg m^3) for each quarter during 2025 with catches of tropical tunas overlaid. Chlorophyll data obtained from NOAA CoastWatch on April 17, 2026, quarters 1–3: "Chlorophyll-a, Aqua MODIS, NPP, L3SMI, Global, 4km, R2022 SQ, 2003-present (Monthly Composite)", https://coastwatch.pfeg.noaa.gov/erddap/info/erdMH1chlamday_R2022SQ/index.html and quarter 4: "Chlorophyll-a, Aqua MODIS, NPP, L3SMI, Global, 4km, R2022 NRT, 2003-present (Monthly Composite)" https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdMH1chlamday_R2022NRT.html.

FIGURA L-11. Concentración promedio de clorofila-a (en mg m^3) para cada trimestre de 2025 con las capturas de atunes tropicales superpuestas. Datos de clorofila obtenidos de NOAA CoastWatch el 17 de abril de 2026, trimestres 1-3 "Chlorophyll-a, Aqua MODIS, NPP, L3SMI, Global, 4km, R2022 SQ, 2003-present (Monthly Composite)", https://coastwatch.pfeg.noaa.gov/erddap/info/erdMH1chlamday_R2022SQ/index.html y trimestre 4: "Chlorophyll-a, Aqua MODIS, NPP, L3SMI, Global, 4km, R2022 NRT, 2003-present (Monthly Composite)" https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdMH1chlamday_R2022NRT.html.

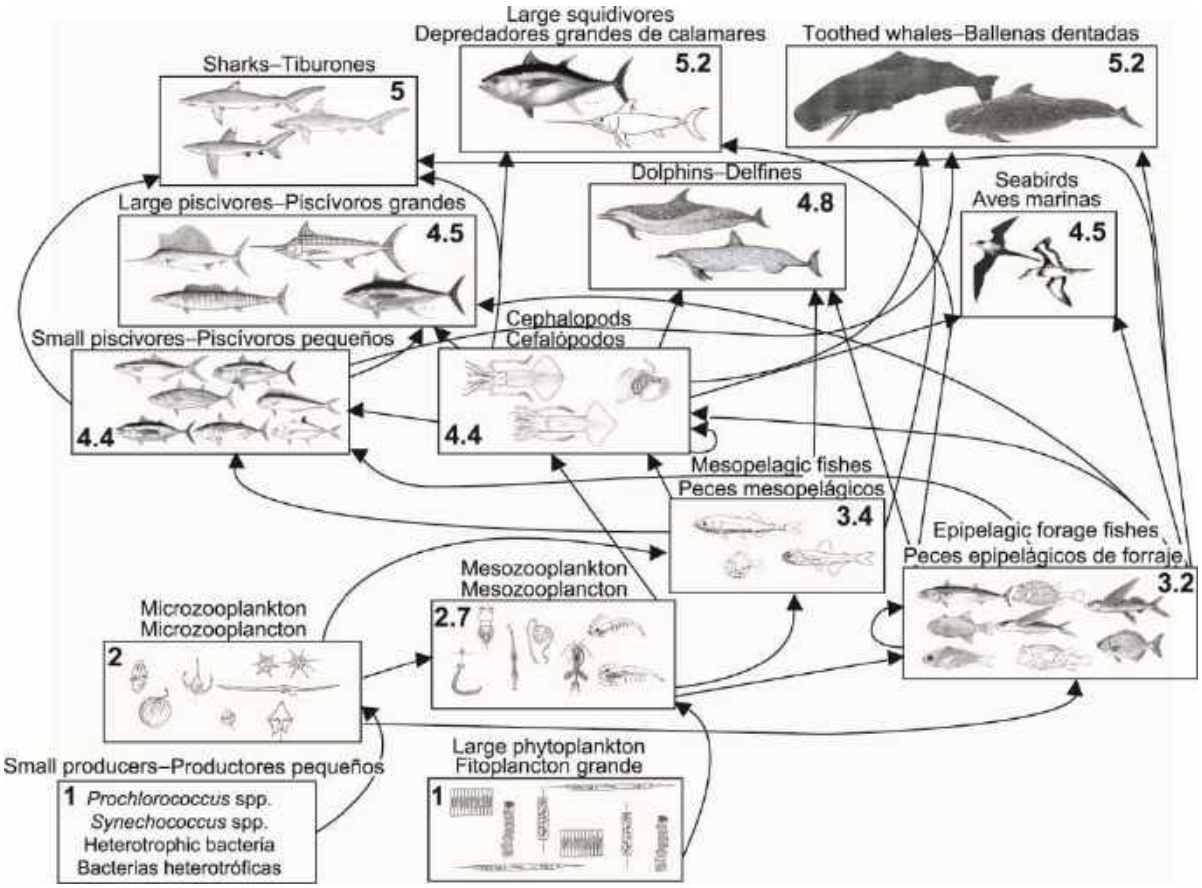


FIGURE L-12. Simplified food-web diagram of the pelagic ecosystem in the tropical EPO. The numbers inside the boxes indicate the approximate trophic level of each group.
FIGURA L-12. Diagrama simplificado de la red trófica del ecosistema pelágico en el OPO tropical. Los números en los recuadros indican el nivel trófico aproximado de cada grupo.

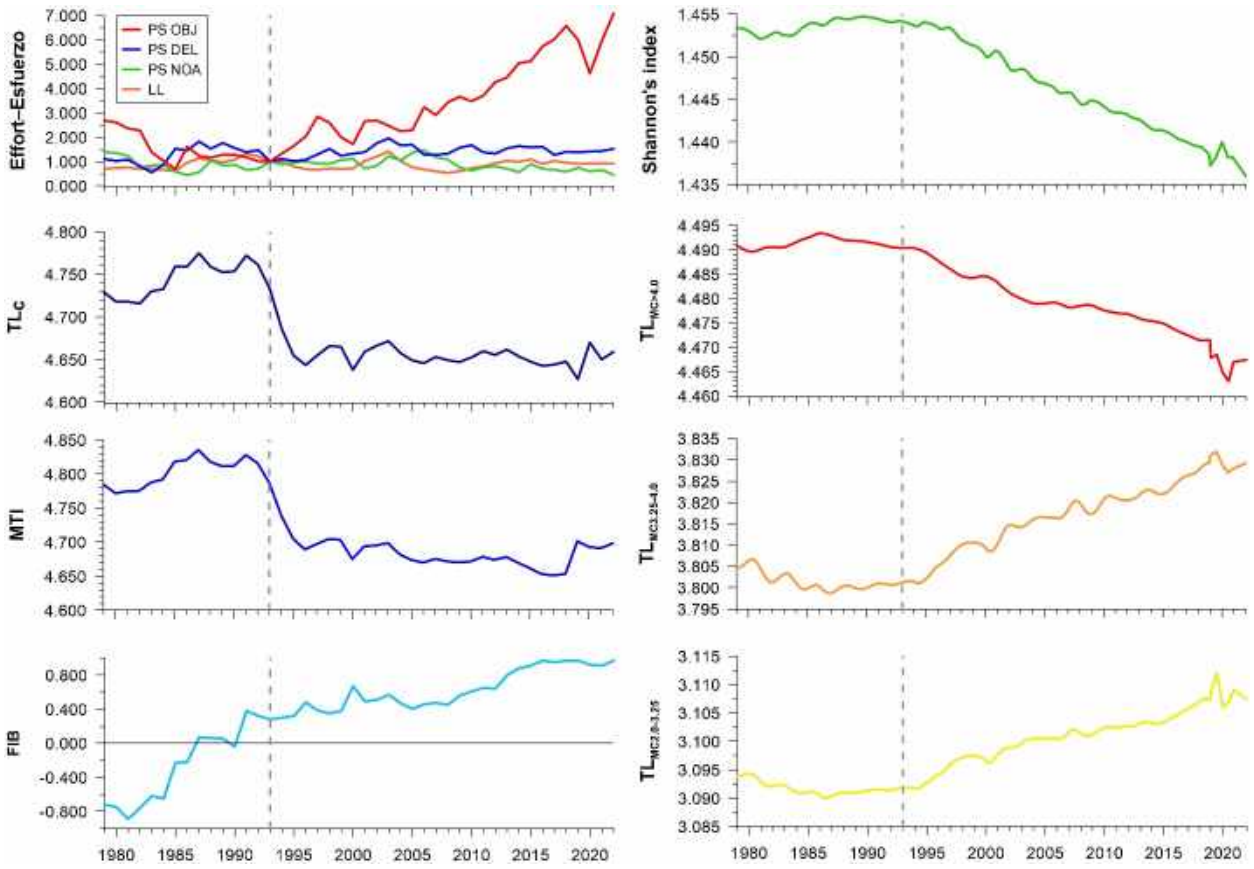


FIGURE L-13. Annual values for seven ecological indicators of changes in different components of the tropical EPO ecosystem, 1979–2022 (see Section 6 of text for details), and an index of longline (LL) and purse-seine (PS) fishing effort, by set type (dolphin (DEL), unassociated (NOA), floating object (OBJ)), relative to the model start year of 1993 (vertical dashed line), when the expansion of the purse-seine fishery on FADs began.

FIGURA L-13 Valores anuales de siete indicadores ecológicos de cambios en diferentes componentes del ecosistema del OPO tropical, 1979–2022 (ver detalles en la sección 6 del texto), y un índice de esfuerzo palangrero (LL) y cerquero (PS), por tipo de lance (delfín (DEL), no asociado (NOA), objeto flotante (OBJ)) relativo al año de inicio del modelo de 1993 (línea de trazos vertical), cuando comenzó la expansión de la pesquería cerquera sobre plantados.

Table L-1a. Estimated number of individuals of incidental dolphin mortalities by set type and stock in the eastern Pacific Ocean by the purse-seine fishery from 1995-2025. Purse-seine set types: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Data for 2024–2025 are considered preliminary.

Tabla L-1a. Número estimado de individuos de mortalidades incidentales de delfines por la pesquería de cerco durante 1995–2025, por tipo de lance y población en el Océano Pacífico oriental. Tipos de lances de cerco: sobre objetos flotantes (OBJ), no asociados (NOA) y sobre delfines (DEL). Los datos de 2024–2025 se consideran preliminares.

	Northeastern spotted Purse seine			Western-southern spotted Purse seine			Eastern spinner Purse seine			Whitebelly spinner Purse seine		
Year	DEL	NOA	OBJ	DEL	NOA	OBJ	DEL	NOA	OBJ	DEL	NOA	OBJ
1995	952	-	-	859	-	-	654	-	-	431	5	-
1996	818	-	-	545	-	-	450	-	-	447	-	-
1997	718	3	-	1,044	-	-	391	-	-	498	-	-
1998	298	-	-	341	-	-	422	-	-	249	-	-
1999	358	-	-	253	-	-	363	-	-	192	-	-
2000	295	-	-	435	-	-	275	-	-	262	-	-
2001	592	-	-	315	-	-	470	-	-	374	-	-
2002	435	-	-	203	-	-	403	-	-	182	-	-
2003	288	-	-	335	-	-	290	-	-	170	-	-
2004	261	-	-	256	-	-	223	-	-	214	-	-
2005	273	-	-	100	-	-	275	-	-	108	-	-
2006	147	-	-	135	-	-	160	-	-	144	-	-
2007	189	-	-	116	-	-	175	-	-	113	-	-
2008	184	-	-	167	-	-	349	-	-	171	-	-
2009	266	-	-	254	-	-	288	-	-	222	-	-
2010	170	-	-	135	-	-	510	-	-	92	-	-
2011	172	-	-	124	-	-	467	-	-	139	-	-
2012	151	-	-	187	-	-	324	-	-	107	-	-
2013	158	-	-	145	-	-	303	-	-	111	-	-
2014	181	-	-	168	-	-	356	-	-	183	-	-
2015	191	-	-	158	-	-	196	-	-	139	-	-
2016	127	-	-	111	-	-	243	-	-	89	-	-
2017	85	-	-	183	-	-	266	-	-	95	-	-
2018	99	-	-	197	-	-	252	-	-	205	-	-
2019	104	-	-	220	-	-	269	-	-	143	-	-
2020	106	-	-	153	-	-	251	-	-	138	-	-
2021	166	-	-	173	-	-	194	-	-	172	-	-
2022	147	-	-	197	-	-	271	-	-	300	-	-
2023	115	-	-	195	-	-	274	-	-	178	-	-
2024	151	-	-	154	-	-	300	-	-	132	-	-
2025	198	-	-	183	-	-	378			104	-	-
Total	8,395	3	-	8,041	-	-	10,042	-	-	6,104	5	-

Table L-1a continued

	Northern common Purse seine			Central common Purse seine			Southern common Purse seine			Other dolphins Purse seine		
Year	DEL	NOA	OBJ	DEL	NOA	OBJ	DEL	NOA	OBJ	DEL	NOA	OBJ
1995	9	-	-	192	-	-	-	-	-	171	1	-
1996	77	-	-	51	-	-	30	-	-	129	-	-
1997	9	-	-	114	-	-	58	-	-	150	-	20
1998	256	5	-	172	-	-	14	19	-	84	16	-
1999	85	-	-	34	-	-	1	-	-	59	3	-
2000	54	-	-	223	-	-	10	-	-	57	24	1
2001	94	-	-	205	-	-	46	-	-	44	-	-
2002	69	-	-	155	-	-	3	-	-	34	9	6
2003	133	-	-	140	-	-	97	-	-	37	-	2
2004	148	8	-	97	-	-	225	-	-	37	-	-
2005	114	-	-	57	-	-	154	-	-	70	-	-
2006	129	-	-	86	-	-	40	-	-	43	2	-
2007	55	-	-	69	-	-	95	-	-	25	1	-
2008	103	1	-	14	-	-	137	-	-	43	-	-
2009	107	2	-	30	-	-	49	-	-	21	-	-
2010	124	-	-	116	-	-	8	-	-	14	-	1
2011	25	10	-	12	-	-	9	-	-	28	-	-
2012	49	-	-	4	-	-	30	-	-	18	-	-
2013	69	-	-	-	-	-	8	-	-	6	1	-
2014	49	-	-	13	-	-	9	-	-	15	-	1
2015	43	-	-	21	-	-	12	-	-	5	-	-
2016	82	-	-	36	-	-	9	-	-	4	-	1
2017	24	2	-	9	-	-	16	-	-	3	-	-
2018	41	-	-	1	-	-	18	-	-	6	-	-
2019	25	-	-	3	-	-	2	-	-	10	-	2
2020	1	-	-	18	-	-	3	-	-	19	-	-
2021	3	-	-	6	-	-	5	-	-	6	-	-
2022	23	-	-	2	-	-	20	-	-	5	-	-
2023	29	-	-	26	-	-	7	-	-	4	-	-
2024	86	-	-	30	-	-	3	-	-	3	-	-
2025	37	-	-	13	-	-	25	-	-	4	-	-
Total	2,152	28	-	1,949	-	-	1,143	19	-	1,154	57	34

Table L-1b. Minimum number of marine mammal interactions and mortalities in the eastern Pacific Ocean (EPO) in 2024 reported by observers onboard longline vessels under the current mandate of at least 5% coverage (C-19-08) of each CPC fleet operating in the EPO. Reported marine mammal interactions were precautionarily presumed to be mortalities (i.e., disposition was either not reported or a detailed disposition was not provided e.g., “discarded”, “injured”) unless release condition was reported as “alive”, “alive and healthy”, or “released”. These data are considered incomplete as data are insufficient for expanding to fleet totals (BYC-10 INF-D) (see section 2.2 for uncertainty and data gaps associated with longline data reporting).
Tabla L-1b. Número mínimo de interacciones con mamíferos marinos y mortalidades en el Océano Pacífico oriental (OPO) en 2024 reportadas por observadores a bordo de buques palangreros bajo el mandato actual de al menos 5% de cobertura (C-19-08) de cada flota de los CPC que opera en el OPO. Se supuso precautoriamente que las interacciones con mamíferos marinos reportadas resultaron en mortalidades (es decir, no se reportó la disposición o no se proporcionó una disposición detallada, por ejemplo, "descartado", "herido", a menos que la condición de liberación fuera reportada como "vivo", "vivo y sano" o "liberado"). Estos datos se consideran incompletos ya que son insuficientes para expandirlos a totales de la flota (BYC-10 INF-D) (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos asociadas a la notificación de datos de palangre)

Common name	Scientific name	Interactions	Mortalities
Spinner dolphin	*Stenella longirostris*	5	-
False killer whale	*Pseudorca crassidens*	2	1
Striped dolphin	*Stenella coeruleoalba*	1	1
Bottlenose dolphin	*Tursiops truncatus*	1	1
Total numbers		9	3

Table L-2a. Estimated number of turtle interactions and mortalities by observers onboard purse-seine size-class 6 vessels with a carrying capacity >363 t (1995–2025). Purse-seine set types: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Data for 2024–2025 are considered preliminary.

Tabla L-2a. Número estimado de mortalidades e interacciones de tortugas por observadores a bordo de buques cerqueros de clase 6 con una capacidad de acarreo >363 t (1995–2025). Tipos de lances cerqueros: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Los datos de 2024–2025 se consideran preliminares.

	Lepidochelys olivacea, Olive ridley (LKV)						*Chelonia agassizii*, *Chelonia mydas*, eastern Pacific green (TUG)						*Caretta caretta*, loggerhead (TTL)					
	Purse seine						Purse seine						Purse seine					
	interactions			mortality			interactions			mortality			interactions			mortality		
Year	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**
1995	537	89	117	66	11	14	181	196	8	10	2	1	9	52	3	-	2	-
1996	520	97	96	47	9	9	138	63	4	11	1	-	12	18	2	-	-	-
1997	544	439	112	54	33	7	164	59	16	8	3	2	7	38	3	1	3	1
1998	649	116	209	66	22	20	141	13	20	7	1	1	15	5	4	1	-	-
1999	1,005	140	160	82	18	9	130	16	21	5	2	4	9	9	2	1	3	-
2000	463	248	139	46	29	11	93	17	5	6	-	-	4	6	1	2	-	-
2001	802	162	136	51	11	4	164	24	8	6	2	-	10	1	2	1	-	-
2002	767	97	165	23	3	7	110	11	15	3	-	-	14	5	8	-	-	-
2003	762	147	168	16	4	3	107	25	15	-	-	-	14	4	6	-	-	-
2004	624	110	120	8	3	2	65	38	8	-	-	-	10	11	13	-	-	-
2005	606	872	249	7	6	4	101	122	21	1	1	-	5	15	14	-	-	-
2006	595	337	140	8	4	3	106	119	23	2	-	-	39	19	14	1	-	-
2007	450	494	210	6	1	3	83	56	31	-	1	-	56	38	12	1	-	-
2008	408	27	147	4	-	-	54	20	12	-	-	-	45	5	12	1	-	-
2009	464	30	110	10	-	2	56	12	19	1	-	-	30	5	20	-	-	-
2010	424	128	212	4	3	1	71	20	23	-	2	-	34	24	23	1	-	-
2011	502	96	115	6	-	1	70	89	25	1	1	-	29	46	16	-	1	-
2012	388	53	91	5	-	-	77	42	5	-	-	-	19	19	17	-	-	-
2013	454	20	66	7	1	-	61	10	7	1	-	-	24	9	8	-	-	-
2014	304	19	83	3	-	-	69	16	10	-	-	-	27	1	4	1	-	-
2015	195	49	78	2	-	1	54	12	21	-	-	-	28	6	13	-	-	-
2016	333	49	113	4	-	-	78	35	17	-	-	-	19	21	9	-	-	-
2017	285	24	72	2	-	1	39	21	34	-	-	-	31	20	7	-	-	-
2018	150	5	147	2	-	-	50	24	96	2	-	-	17	7	4	-	-	-
2019	170	28	129	1	-	-	72	13	10	-	-	-	14	46	9	-	-	-
2020	91	14	197	-	-	-	29	4	11	-	-	-	17	3	4	-	-	-
2021	191	2	54	1	-	1	32	17	3	-	-	-	13	5	11	-	-	-
2022	133	2	33	-	-	-	40	-	4	-	-	-	19	3	6	-	-	-
2023	65	14	47	-	-	-	13	2	6	-	-	-	12	-	2	-	-	-
2024	154	29	73	1	-	-	19	22	7	-	-	-	14	7	14	-	-	-
2025	112	16	53	-	-	-	24	1	5	-	-	-	3	7	3	-	-	-
Total	13,149	3,953	3,842	533	158	104	2,490	1,119	510	64	16	8	599	455	266	11	9	1

Table L-2a continued

	Eretmochelys imbricata, hawksbill (TTH)						*Dermochelys coriacea*, leatherback (DKK)						Unidentified turtles					
	Purse seine						Purse seine						Purse seine					
	interactions			mortality			interactions			mortality			interactions			mortality		
Year	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**	**OBJ**	**NOA**	**DEL**
1995	8	2	-	-	-	-	-	-	-	-	-	-	130	27	52	24	7	3
1996	8	-	6	-	-	1	5	-	-	-	-	-	151	58	37	30	6	2
1997	4	2	-	-	-	-	3	1	1	-	-	-	180	72	46	25	15	2
1998	7	-	3	3	-	-	1	2	1	-	-	-	121	24	97	26	8	7
1999	4	5	2	1	-	1	-	-	-	-	-	-	202	28	65	39	4	3
2000	4	1	3	1	-	-	1	1	1	-	-	-	92	68	74	17	9	2
2001	5	1	3	1	-	-	-	-	1	-	-	-	206	43	96	22	14	5
2002	8	1	2	-	-	-	1	1	-	-	-	-	175	33	82	6	5	2
2003	6	1	6	-	-	-	-	1	1	-	-	-	169	40	117	5	-	3
2004	12	4	3	-	-	-	1	4	4	-	-	-	151	53	48	4	2	-
2005	1	2	9	-	-	-	1	1	3	-	-	-	103	126	73	4	7	1
2006	12	11	4	-	-	-	1	3	2	-	-	-	184	64	77	1	-	-
2007	9	8	2	1	2	-	3	2	2	-	-	-	130	240	191	7	-	2
2008	7	-	12	-	-	-	2	3	2	-	-	-	182	18	107	1	-	-
2009	8	-	6	-	-	-	1	-	2	-	-	-	141	16	95	3	1	1
2010	11	-	4	1	-	-	3	-	-	-	-	-	122	24	187	3	1	1
2011	5	5	4	-	-	-	1	1	1	-	-	-	125	28	63	-	1	-
2012	4	-	2	-	-	-	1	1	-	-	-	-	99	19	40	3	-	-
2013	7	-	2	1	-	-	1	2	2	-	-	-	175	13	51	2	-	-
2014	7	1	2	-	-	1	7	1	2	-	-	-	132	18	53	1	-	-
2015	2	1	2	-	-	-	4	2	-	-	-	-	174	152	42	-	4	-
2016	14	3	5	-	-	-	2	1	-	-	-	-	307	59	120	2	-	-
2017	7	3	5	-	-	-	2	1	1	-	-	-	243	43	83	-	-	-
2018	7	2	1	-	-	-	3	-	1	-	-	-	160	22	169	-	-	-
2019	5	2	-	-	-	-	-	-	-	-	-	-	193	155	59	-	1	-
2020	5	1	-	-	-	-	2	1	-	-	-	-	108	8	45	1	-	1
2021	4	1	-	-	-	-	1	-	-	-	-	-	102	5	53	-	-	-
2022	10	1	-	-	-	-	2	1	1	-	-	-	92	1	23	-	-	-
2023	2	-	2	-	-	-	3	1	1	-	-	-	55	6	42	-	-	-
2024	5	-	1	-	-	-	3	-	-	-	-	-	102	21	46	-	-	-
2025	3	-	-	-	-	-	3	-	-	-	-	-	68	7	46	-	-	-
Total	201	58	91	9	2	3	58	31	29	-	-	-	4,574	1,490	2,379	226	85	35

Table L-2b. Minimum number of sea turtle interactions and mortalities in the eastern Pacific Ocean (EPO) in 2024 reported by observers onboard longline vessels under the current mandate of at least 5% coverage (C-19-08) of each CPC fleet operating in the EPO. Dispositions considered to indicate a survival event are those reported by observers as “Alive and Healthy”, “Light injuries”, “Released” and “Released with a hook”, while those considered to indicate a mortality event are dispositions reported as “Dead”, “Discarded”, “Grave Injuries”, “Injured”, “Alive and injured”, or precautionarily where disposition was not reported. These data are considered incomplete as data are insufficient for expanding to fleet totals (BYC-10 INF-D) (see section 2.2 for uncertainty and data gaps associated with longline data reporting).
Tabla L-2b. Número mínimo de interacciones con tortugas marinas y mortalidades en el Océano Pacífico oriental (OPO) en 2024 reportadas por observadores a bordo de buques palangreros bajo el mandato actual de al menos 5% de cobertura (C-19-08) de cada flota de los CPC que opera en el OPO. Las disposiciones que se considera que indican un evento de supervivencia son las reportadas por los observadores como “Viva y sana”, “Heridas leves”, "Liberada" y "Liberada con un anzuelo", mientras que las que se considera que indican un evento de mortalidad son las disposiciones reportadas como "Muerta", "Descartada", "Heridas graves", "Herida", "Viva y herida" o, de manera precautoria, cuando la disposición no fue reportada. Estos datos se consideran incompletos ya que son insuficientes para expandirlos a totales de la flota (BYC-10 INF-D) (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos asociadas a la notificación de datos de palangre).

Common name	Scientific name	Interactions	Mortalities
Leatherback turtle	*Dermochelys coriacea*	4	2
Olive Ridley turtle	*Lepidochelys olivacea*	3	-
Loggerhead turtle	*Caretta caretta*	3	3
Total numbers		10	5

Table L-3. Minimum number of seabird interactions in the eastern Pacific Ocean (EPO) in 2024 reported by observers onboard longline vessels under the current mandate of at least 5% coverage (C-19-08) of each CPC fleet operating in the EPO. Seabird interactions with reported dispositions as “discarded” or blank were precautionarily presumed to be mortalities. These data are considered incomplete as data are insufficient for expanding to fleet totals (BYC-10 INF-D) (see section 2.2 for uncertainty and data gaps associated with longline data reporting).
Tabla L-3. Número mínimo de interacciones con aves marinas en el Océano Pacífico oriental (OPO) en 2024 reportadas por observadores a bordo de buques palangreros bajo el mandato actual de al menos 5% de cobertura (C-19-08) de cada flota de los CPC que opera en el OPO. Se supone precautoriamente que las interacciones con aves marinas con disposiciones reportadas como "descartada” o en blanco son mortalidades. Estos datos se consideran incompletos ya que son insuficientes para expandirlos a totales de la flota (BYC-10 INF-D) (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos asociadas a la notificación de datos de palangre).

Common name	Scientific name	Interactions	Mortalities
Black-footed albatross	*Phoebastria nigripes*	4	4
Laysan albatross	*Phoebastria immutabilis*	2	2
Frigate / man of war	*Fregata* spp.	3	3
Boobies and gannets nei	Sulidae Fam.	2	2
Wilson's storm petrel	*Oceanites oceanicus*	1	1
Unidentified shearwater	*Puffinus* spp.	1	1
Total numbers		13	13

Table L-4a. Estimated purse-seine catches by set type in metric tons (t) of sharks by observers onboard size-class 6 vessels with a carrying capacity >363 t (1995–2025) and minimum reported longline (LL) catches of sharks (gross-annual removals in t) (1995–2024, *data not available; see section 2.2. for uncertainty and data gaps in reporting of bycatch caught by longline). Purse-seine set types: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Species highlighted bold are discussed in main text. Data for 2020–2024 (longline) and 2024–2025 (purse-seine) are considered preliminary.

Tabla L-4a. Capturas cerqueras estimadas de tiburones, por tipo de lance, en toneladas (t), por observadores a bordo de buques de clase 6 con una capacidad de acarreo >363 t (1995–2025) y capturas palangreras (LL) mínimas reportadas de tiburones (extracciones anuales brutas en t) (1995–2024, *datos no disponibles; ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos en la notificación de especies capturadas incidentalmente con palangre). Tipos de lances cerqueros: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Las especies en negritas se discuten en el texto principal. Los datos de 2020–2024 (palangre) y 2024–2025 (cerco) se consideran preliminares.

	Carcharhinidae															
	***Carcharhinus falciformis*, silky shark**				***Carcharhinus longimanus*, oceanic whitetip**				***Prionace glauca*, blue shark**				Other Carcharhinidae, requiem sharks			
	Purse seine				Purse seine				Purse seine				Purse seine			
Year	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**
1995	471	120	162	-	200	36	18	-	<1	5	<1	280	4	2	11	-
1996	442	107	47	-	209	5	12	-	2	<1	<1	606	12	<1	7	-
1997	843	188	42	-	236	11	6	-	2	<1	<1	425	18	3	5	-
1998	710	59	171	-	211	7	5	-	1	<1	<1	1,164	4	<1	<1	-
1999	460	100	74	-	163	7	2	-	<1	<1	<1	2,185	9	<1	<1	-
2000	308	97	30	-	98	9	2	-	<1	<1	<1	2,112	5	<1	<1	-
2001	399	76	53	-	96	<1	<1	-	4	<1	<1	2,304	9	<1	-	-
2002	291	142	35	-	31	6	<1	<1	1	<1	<1	2,356	4	17	<1	-
2003	320	102	59	-	19	<1	<1	-	<1	<1	<1	2,054	7	6	<1	-
2004	247	68	76	-	9	<1	<1	<1	<1	<1	-	2,325	5	3	<1	-
2005	322	41	51	-	2	-	<1	-	<1	<1	-	2,825	4	2	3	-
2006	361	46	27	13,053	5	<1	<1	46	<1	1	<1	1,341	13	3	8	280
2007	316	156	41	12,771	2	-	<1	136	<1	1	-	3,169	8	24	11	419
2008	577	27	25	11,205	2	-	<1	55	<1	1	<1	6,838	11	<1	1	741
2009	339	31	33	14,042	4	<1	<1	294	<1	<1	<1	6,678	29	4	20	431
2010	347	66	70	12,510	2	-	<1	94	<1	1	1	10,130	17	10	21	4,259
2011	266	26	55	12,866	2	-	<1	63	<1	<1	1	13,863	20	6	4	4,730
2012	200	33	52	10,585	<1	<1	-	1	<1	2	<1	12,565	8	<1	1	4,082
2013	212	55	38	14,762	<1	<1	-	5	<1	<1	1	12,237	12	2	3	753
2014	422	68	45	5,511	2	-	-	25	1	<1	<1	10,728	13	<1	5	1,515
2015	540	133	48	5,690	3	<1	<1	647	<1	<1	<1	13,194	31	7	2	1,901
2016	488	36	63	9,610	5	<1	<1	755	<1	2	1	12,381	35	<1	3	2,755
2017	665	12	21	15,893	4	<1	<1	3	<1	<1	-	11,086	54	<1	2	2,562
2018	397	12	16	15,072	3	-	<1	19	<1	<1	<1	12,499	28	3	1	1,360
2019	392	13	25	2,599	5	<1	<1	-	<1	<1	<1	11,070	26	4	6	10
2020	345	11	33	14,752	4	-	<1	-	<1	<1	-	15,080	87	5	4	2,896
2021	542	10	21	12	12	<1	<1	-	<1	<1	<1	8,920	30	<1	<1	-
2022	614	23	7	36	12	<1	<1	-	1	<1	-	10,191	30	2	2	-
2023	473	10	24	55	12	<1	<1	-	<1	<1	-	10,245	26	<1	2	-
2024	625	78	23	104	21	<1	<1	-	<1	1	-	10,853	25	<1	1	-
2025	687	28	22	*	30	<1	<1	*	<1	2	<1	*	31	5	1	*
Total	13,624	1,974	1,489	171,128	1,405	85	51	2,143	22	25	9	211,707	614	117	127	28,694

Table L-4a Continued

	Sphyrnidae															
	***Sphyrna zygaena*, smooth hammerhead**				*Sphyrna lewini*, scalloped hammerhead				*Sphyrna mokarran*, great hammerhead				*Sphyrna* spp., hammerheads, nei			
	Purse seine				Purse seine				Purse seine				Purse seine			
Year	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**
1995	2	2	-	-	<1	<1	<1	-	<1	-	-	-	71	15	4	-
1996	4	2	-	-	1	<1	-	-	<1	-	-	-	87	39	5	-
1997	21	2	<1	-	10	3	<1	-	1	<1	<1	-	63	10	3	-
1998	18	5	1	-	8	9	<1	-	3	<1	3	-	37	12	5	-
1999	21	3	<1	-	16	3	1	-	1	<1	<1	-	18	5	3	-
2000	11	4	<1	-	7	15	1	-	7	<1	<1	-	7	2	7	-
2001	24	1	<1	-	12	1	<1	-	5	-	<1	-	23	<1	1	-
2002	24	3	1	-	47	<1	1	-	7	-	<1	-	46	4	2	-
2003	49	6	1	-	38	3	3	-	13	<1	<1	-	52	3	2	-
2004	51	11	3	-	25	3	2	-	3	<1	<1	-	60	2	<1	-
2005	34	2	<1	-	25	10	3	-	2	-	<1	-	19	<1	<1	<1
2006	33	6	2	58	19	3	1	-	1	<1	<1	-	3	<1	<1	5
2007	27	5	<1	200	12	3	1	<1	-	<1	<1	-	1	1	<1	43
2008	16	<1	<1	381	16	11	<1	64	<1	-	<1	-	6	<1	1	42
2009	22	<1	<1	423	13	2	1	50	<1	-	-	-	5	1	<1	22
2010	28	1	2	508	13	1	1	143	<1	-	<1	-	3	<1	<1	118
2011	49	2	2	443	13	6	2	191	3	<1	<1	-	12	<1	1	131
2012	32	2	<1	118	9	4	<1	89	<1	<1	<1	-	5	2	1	130
2013	47	2	<1	311	22	2	<1	87	<1	<1	<1	-	9	1	<1	296
2014	35	<1	<1	593	23	2	<1	5	1	<1	<1	-	14	<1	<1	208
2015	32	1	<1	1,961	9	<1	<1	11	<1	<1	-	-	9	<1	<1	392
2016	24	1	<1	4,052	12	1	<1	6	5	<1	-	-	11	1	<1	338
2017	11	<1	<1	3,495	8	3	<1	83	<1	<1	<1	-	6	<1	<1	197
2018	11	<1	<1	851	7	<1	<1	<1	<1	-	-	-	6	<1	<1	173
2019	17	<1	<1	33	11	2	<1	43	1	-	<1	-	5	<1	<1	5
2020	7	<1	<1	941	13	<1	<1	39	<1	-	<1	-	5	<1	<1	1,021
2021	13	<1	<1	37	31	<1	<1	<1	2	-	<1	-	7	-	<1	-
2022	11	-	<1	<1	47	<1	<1	3	<1	-	-	-	9	<1	<1	-
2023	15	<1	<1	18	19	<1	<1	42	<1	<1	-	-	8	<1	<1	-
2024	11	<1	<1	3	15	<1	<1	<1	3	1	<1	-	4	<1	<1	-
2025	10	<1	<1	*	27	<1	1	*	<1	<1	-	*	4	<1	-	*
Total	710	67	22	14,227	530	93	28	859	66	5	5	-	614	106	42	3,122

Table L-4a Continued

	Alopiidae															
	***Alopias pelagicus*, pelagic thresher**				*Alopias superciliosus*, bigeye thresher				*Alopias vulpinus*, thresher shark				*Alopias* spp., thresher shark, nei			
	Purse seine				Purse seine				Purse seine				Purse seine			
Year	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**
1995	<1	<1	<1	-	<1	2	<1	-	<1	1	1	-	1	6	3	200
1996	-	1	-	-	<1	1	<1	-	<1	<1	<1	-	<1	2	4	28
1997	<1	<1	-	-	<1	1	<1	-	<1	<1	<1	-	<1	4	<1	5
1998	<1	2	<1	-	<1	4	1	-	<1	2	<1	-	<1	5	3	5
1999	<1	4	2	-	<1	1	6	-	<1	<1	<1	-	<1	3	2	5
2000	<1	<1	<1	-	<1	8	1	-	<1	<1	<1	-	<1	<1	6	64
2001	<1	<1	<1	-	<1	4	2	-	<1	<1	<1	-	<1	4	1	172
2002	<1	<1	<1	-	2	8	1	-	<1	2	<1	-	<1	6	4	88
2003	1	5	3	-	<1	8	6	-	<1	<1	<1	-	<1	4	3	134
2004	6	3	2	-	<1	16	1	-	<1	2	<1	-	<1	4	2	43
2005	1	3	2	-	<1	6	3	-	<1	1	2	-	<1	<1	<1	12
2006	2	23	2	-	<1	22	3	187	<1	7	<1	60	<1	3	<1	8
2007	3	3	6	1,133	2	3	3	115	<1	<1	<1	35	<1	1	1	15
2008	1	3	3	4,323	<1	3	3	240	<1	2	<1	38	<1	1	2	17
2009	<1	<1	1	4,909	<1	<1	2	343	<1	<1	<1	76	<1	<1	1	4
2010	<1	<1	3	7,828	<1	<1	2	373	1	<1	<1	34	<1	<1	1	389
2011	<1	2	2	7,302	<1	2	2	458	<1	<1	<1	61	<1	1	<1	430
2012	<1	1	2	7	<1	1	2	326	<1	<1	<1	86	<1	1	<1	526
2013	<1	<1	3	46	<1	<1	2	543	<1	<1	<1	49	<1	<1	1	109
2014	<1	1	2	36	<1	3	2	636	<1	<1	<1	2	<1	<1	<1	850
2015	<1	2	1	463	<1	1	<1	859	<1	-	<1	13	<1	<1	<1	283
2016	<1	2	3	1,045	<1	<1	4	944	<1	1	<1	549	<1	<1	1	96
2017	<1	<1	<1	582	<1	<1	<1	1,148	-	<1	<1	1,682	<1	<1	<1	153
2018	<1	2	<1	464	<1	<1	<1	32	<1	<1	<1	1,684	<1	<1	<1	39
2019	1	<1	<1	444	<1	<1	<1	17	-	-	<1	<1	<1	<1	<1	31
2020	<1	<1	2	342	<1	<1	1	1,273	-	-	<1	745	<1	<1	<1	6
2021	<1	<1	<1	1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	1
2022	<1	<1	<1	17	<1	<1	<1	48	<1	<1	<1	-	<1	<1	<1	3
2023	<1	<1	2	10	<1	<1	6	31	-	<1	<1	-	<1	<1	<1	<1
2024	<1	<1	<1	-	<1	<1	<1	11	-	<1	-	-	<1	<1	<1	<1
2025	<1	1	13	*	<1	2	2	*	-	<1	<1	*	<1	<1	<1	*
Total	24	65	60	28,952	18	103	60	7,585	5	27	13	5,114	13	52	44	3,716

Table L-4a Continued

	Lamnidae								Triakidae											
	***Isurus* spp., mako sharks**				Lamnidae spp., mackerel sharks, porbeagles nei				Triakidae spp., houndsharks, nei				Other sharks				All sharks			
	Purse seine				Purse seine				Purse seine				Purse seine				Purse seine			
Year	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**	**OBJ**	**NOA**	**DEL**	**LL**
1995	2	<1	<1	216	-	-	-	-	-	-	-	-	103	29	13	226	856	220	213	922
1996	1	<1	<1	318	-	-	-	-	-	-	-	-	69	41	34	168	830	202	110	1,120
1997	2	1	-	361	-	-	-	-	-	-	-	-	88	4	2	166	1,287	230	62	956
1998	1	<1	<1	693	-	-	-	-	-	-	-	-	90	10	6	237	1,085	116	198	2,099
1999	<1	<1	<1	460	-	-	-	-	-	-	-	-	50	12	4	3,347	739	140	97	5,997
2000	2	<1	-	502	-	-	-	-	-	-	-	-	21	67	178	5,740	466	207	227	8,418
2001	2	<1	<1	1,168	-	-	-	-	-	-	-	-	29	4	2	8,896	605	94	62	12,540
2002	4	<1	<1	1,131	-	-	-	-	-	-	-	1,484	40	11	3	7,339	497	201	51	12,398
2003	2	<1	<1	1,156	-	-	-	-	-	-	-	1,287	12	37	4	9,866	516	177	83	14,498
2004	1	<1	<1	1,374	-	-	-	-	-	-	-	846	36	10	5	6,684	446	125	95	11,273
2005	1	2	<1	1,367	-	-	-	-	-	-	-	838	5	1	1	7,075	417	71	67	12,117
2006	2	4	<1	95	-	-	-	2	-	-	-	674	8	<1	<1	4,770	449	118	46	20,579
2007	2	2	-	181	-	-	-	1	-	-	-	996	5	3	1	5,786	380	203	67	25,000
2008	<1	2	<1	707	-	-	-	1	-	-	-	1,398	12	<1	2	4,091	644	52	40	30,141
2009	1	<1	<1	534	-	-	-	7	-	-	-	695	19	3	1	2,478	434	46	63	30,988
2010	3	<1	<1	1,901	-	-	-	<1	-	-	-	<1	17	4	2	2,246	433	87	104	40,533
2011	3	2	<1	2,802	-	-	-	26	-	-	-	7	30	<1	<1	2,074	401	51	72	45,449
2012	2	2	<1	2,120	-	-	-	12	-	-	-	-	10	<1	<1	1,242	272	50	62	31,889
2013	1	<1	<1	2,121	-	-	-	44	-	-	-	211	45	2	<1	1,517	351	67	49	33,090
2014	2	<1	<1	2,778	-	-	-	51	-	-	-	4,067	24	<1	<1	2,075	540	78	56	29,081
2015	<1	<1	<1	3,118	-	-	-	79	-	-	-	621	18	3	3	10,593	645	151	58	39,825
2016	1	<1	<1	2,476	-	-	-	91	-	-	-	538	19	3	<1	2,245	602	50	78	37,880
2017	<1	<1	-	3,256	-	-	-	112	-	-	-	987	16	1	<1	1,267	766	21	27	42,506
2018	2	<1	<1	3,161	-	-	-	111	-	-	-	730	5	<1	<1	1,161	460	21	20	37,357
2019	<1	<1	<1	2,020	-	-	-	8	-	-	-	<1	6	<1	<1	53	465	23	34	16,335
2020	2	<1	-	3,693	-	-	-	95	-	-	-	1,032	3	2	<1	2,381	467	21	42	44,297
2021	2	<1	-	1,604	-	-	-	7	-	-	-	2	6	<1	<1	162	646	12	24	10,750
2022	1	<1	-	1,303	-	-	-	5	-	-	-	-	2	<1	<1	167	729	27	11	11,773
2023	1	-	<1	1,219	-	-	-	6	-	-	-	-	1	<1	<1	72	557	13	36	11,698
2024	<1	<1	<1	1,319	-	-	-	11	-	-	-	2	2	1	<1	56	708	86	26	12,361
2025	1	<1	-	*	-	-	-	*	-	-	-	*	1	<1	<1	*	794	40	40	*
Total	49	26	3	45,154	-	-	-	670	-	-	-	16,417	792	254	267	94,181	18,485	2,998	2,220	633,870

Table L-4b. Minimum number of shark interactions and mortalities in the eastern Pacific Ocean (EPO) in 2024 reported by observers onboard longline vessels under the current mandate of at least 5% coverage (C-19-08) of each CPC fleet operating in the EPO. Data are considered incomplete and are deemed by the staff to be insufficient for expanding to fleet totals (BYC-10 INF-D) (see section 2.2 for uncertainty and data gaps associated with longline data reporting). Dispositions considered to indicate a survival event are those reported by observers as “Alive and Healthy”, “Alive with light injuries” and “Alive”, while those considered to indicate a mortality event are dispositions reported as “Dead”, “Alive mortal”, “Alive injured”, “Discarded”, “Unknown”, or precautionarily where disposition was not reported.

Tabla L-4b. Número mínimo de interacciones con tiburones y mortalidades en el Océano Pacífico oriental en 2024 reportadas por observadores a bordo de buques palangreros bajo el mandato actual de al menos 5% de cobertura (C-19-08) de cada flota de los CPC que opera en el OPO. Los datos se consideran incompletos y el personal considera que son insuficientes para expandirlos a totales de la flota (BYC-10 INF-D) (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos asociadas a la notificación de datos de palangre). Las disposiciones que se considera que indican un evento de supervivencia son las reportadas por los observadores como "Vivo y sano", "Vivo con heridas leves" y "Vivo", mientras que las que se considera que indican un evento de mortalidad son las disposiciones reportadas como "Muerto", "Vivo, mortalidad probable", “Vivo herido", “Descartado", "Desconocida" o precautoriamente cuando la disposición no fue reportada.

Common Name	Scientific Name	Interactions	Mortalities
Blue shark	*Prionace glauca*	6,907	6,314
Various sharks nei	Euselachii	1,172	1,023
Crocodile shark	*Pseudocarcharias kamoharai*	1,071	769
Short fin mako shark	*Isurus oxyrinchus*	490	325
Bigeye thresher shark	*Alopias superciliosus*	212	107
Velvet dogfish	*Zameus squamulosus*	121	102
Oceanic whitetip shark	*Carcharhinus longimanus*	117	96
Silky shark	*Carcharhinus falciformis*	77	47
Requiem sharks, nei	Carcharhinidae	39	39
Pelagic thresher shark	*Alopias pelagicus*	33	3
Other sharks*		83	56
Total		10,322	8,881

*Other sharks" include those with ≤20 interactions from 13 taxa in 2024

Table L-5. Minimum nominal purse-seine catches of **a)** sharks, large fishes and small fishes in metric tons (t) and **b)** rays in numbers of individuals in 2025 for size-class 1–5 vessels with a carrying capacity <363 t as reported by observers in 54% of all trips that carried an observer. Purse-seine set types: floating object (OBJ) and unassociated tuna schools (NOA).

Tabla L-5. Capturas cerqueras nominales mínimas de **a)** tiburones, peces grandes y peces pequeños, en toneladas (t), y **b)** rayas en número de individuos en 2025 para buques de clases 1-5 con una capacidad de acarreo <363 t según lo reportado por los observadores en el 54% de todos los viajes que llevaban observador a bordo. Tipo de lances cerqueros: objeto flotante (OBJ) y atunes no asociados (NOA).

a.

			Set type	
Broad group	Common name	Scientific name	OBJ	NOA
Sharks	Silky shark	*Carcharhinus falciformis*	34	<1
	Oceanic whitetip shark	*Carcharhinus longimanus*	<1	
	Blue shark	*Prionace glauca*	<1	<1
	Other carcharhinid shark	Carcharhinidae spp.	<1	
	Smooth hammerhead shark	*Sphyrna zygaena*	1	
	Scalloped hammerhead shark	*Sphyrna lewini*	2	
	Pelagic thresher shark	*Alopias pelagicus*	<1	
	Thresher shark	*Alopias vulpinus*	<1	
	Mako shark	*Isurus* spp.	<1	
Large fishes	Dorado	Coryphaenidae spp.	169	
	Wahoo	*Acanthocybium solandri*	50	
	Rainbow runner	*Elagatis bipinnulata*	11	
	Amberjack, nei	*Seriola* spp.	6	
	Jacks, crevalles, nei	*Caranx* spp.	1	
	Tripletail	*Lobotes surinamensis*	<1	
	Mola, nei	Molidae spp.	<1	
Small fishes	Triggerfishes, Filefishes	Balistidae, Monacanthidae spp.	250	
	Bullet and frigate tunas	*Auxis spp.*	159	
	Epipelagic forage fishes		2	
	Sea chubs	Kyphosidae spp.	<1	
	Small carangid, nei	Carangidae spp.	<1	
	Other small fish		<1	

b.

			Set type	
Broad group	Common name	Scientific name	OBJ	NOA
Rays	Spinetail manta	*Mobula mobular*	37	
	Pelagic stingray	*Pteroplatytrygon violacea*	7	
	Chilean devil ray	*Mobula tarapacana*	6	
	Mobulidae ray, nei	Mobulidae spp.	6	<1
	Smoothtail manta	*Mobula thurstoni*	2	
	Manta ray	*Mobula birostris*	1	

Table L-6a. Estimated purse-seine catches by set type in numbers of rays by observers onboard size-class 6 vessels with a carrying capacity >363 t (1995–2025). Purse-seine set types: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Species highlighted bold are discussed in main text. Data for 2024–2025 are considered preliminary.

Tabla L-6a. Capturas cerqueras estimadas de rayas, por tipo de lance, en número de rayas, por observadores a bordo de buques de clase 6 con una capacidad de acarreo >363 t (1995–2025). Tipos de lances cerqueros: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Las especies en negritas se discuten en el texto principal. Los datos de 2024–2025 se consideran preliminares.

	Mobulidae														
	***Mobula thurstoni*, smoothtail manta**			***Mobula mobular*, spinetail manta**			*Mobula munkiana*, munk's devil ray			*Mobula tarapacana*, Chilean devil ray			***Mobula birostris*, giant manta**		
	Purse seine			Purse seine			Purse seine			Purse seine			Purse seine		
Year	OBJ	NOA	DEL	OBJ	NOA	DEL	OBJ	NOA	DEL	OBJ	NOA	DEL	OBJ	NOA	DEL
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
1996	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
1998	-	8	-	-	-	-	-	-	-	-	-	-	4	94	1
1999	-	2	1	-	-	-	-	-	-	-	-	-	10	63	1
2000	34	121	101	-	-	-	-	-	-	-	-	-	1	12	2
2001	7	185	98	2	8	16	-	-	3	4	-	-	2	6	6
2002	18	2,048	72	7	8	96	1	3	10	7	15	7	2	6	5
2003	37	707	141	6	79	11	7	35	26	-	-	8	3	10	1
2004	8	429	86	2	30	57	-	15	17	1	28	4	2	47	15
2005	14	72	205	16	111	126	-	21	14	3	42	79	10	23	36
2006	14	572	43	19	473	187	-	65	31	5	52	45	30	37	219
2007	14	64	105	32	202	148	2	29	24	24	37	55	5	17	8
2008	14	126	50	30	247	87	8	127	36	10	276	30	3	61	18
2009	22	31	93	17	56	243	9	45	6	2	21	190	1	11	6
2010	39	123	132	22	334	303	1	48	33	7	12	148	2	1,163	4
2011	6	397	27	18	104	152	11	58	29	9	28	78	5	9	1
2012	15	1,435	67	48	243	34	3	63	6	7	94	21	6	949	13
2013	25	180	40	18	112	62	6	55	6	7	29	26	1	24	21
2014	22	29	75	179	87	57	6	4	15	5	10	18	7	9	-
2015	14	41	101	61	21	338	6	11	74	12	25	93	1	67	38
2016	18	31	166	5	26	115	2	236	86	13	17	26	7	68	3
2017	11	52	43	45	26	15	8	15	10	10	-	11	8	53	11
2018	6	29	5	37	48	56	22	4	12	8	2	2	11	7	1
2019	7	214	11	35	167	61	9	-	8	24	8	18	2	11	3
2020	9	4	12	19	113	37	1	-	47	5	2	7	7	-	1
2021	8	-	-	34	46	16	10	5	-	11	3	13	1	26	-
2022	5	-	98	43	8	25	12	-	4	23	-	12	3	-	8
2023	28	6	90	25	4	37	5	8	220	73	8	14	2	5	3
2024	12	171	67	72	328	33	2	32	69	39	23	12	4	6	3
2025	13	3	30	62	12	52	2	-	30	21	-	14	7	-	28
Total	421	7,081	1,958	853	2,893	2,365	134	879	817	331	733	933	148	2,788	456

Table L-6a Continued

	Mobulidae			Dasyatidae											
	Mobulidae spp., mobulid rays, nei			***Pteroplatytrygon violacea*, pelagic stingray**			**Dasyatidae spp., stingrays, nei**			Other rays			All rays		
	Purse seine			Purse seine			Purse seine			Purse seine			Purse seine		
Year	OBJ	NOA	DEL	OBJ	NOA	DEL	OBJ	NOA	DEL	OBJ	NOA	DEL	OBJ	NOA	DEL
1995	69	2,248	500	159	151	144	-	-	-	-	-	-	228	2,400	643
1996	124	1,341	385	101	165	176	-	-	-	-	-	-	225	1,506	561
1997	126	707	396	106	106	993	-	-	-	-	-	-	232	816	1,390
1998	73	2,906	337	95	258	170	-	1,136	-	2	1	-	174	4,403	508
1999	140	1,498	474	164	403	151	-	-	-	-	-	-	314	1,966	627
2000	36	1,805	1,276	104	221	159	-	-	-	-	-	-	175	2,159	1,537
2001	50	289	447	150	64	174	-	-	-	-	-	-	215	553	744
2002	40	1,994	723	113	60	153	2	-	-	-	-	-	190	4,133	1,066
2003	130	1,005	904	94	9,188	135	-	-	-	-	-	-	277	11,025	1,226
2004	63	656	351	138	39	86	4	282	5	-	-	-	218	1,526	620
2005	36	259	177	91	52	173	9	13	20	-	1,724	-	179	2,317	831
2006	43	340	295	153	91	202	29	764	30	-	-	160	293	2,394	1,213
2007	40	205	237	98	54	132	9	931	21	-	19	-	225	1,557	730
2008	41	145	91	97	19	87	14	20	28	-	-	-	217	1,022	427
2009	37	107	270	116	17	105	5	4	68	-	-	-	209	292	981
2010	97	629	256	101	21	901	5	-	60	-	1,596	-	274	3,926	1,837
2011	27	227	81	92	193	90	13	114	18	-	24	-	181	1,154	476
2012	18	186	41	121	30	100	13	17	3	1	12	7	232	3,029	292
2013	15	121	323	90	59	255	27	2	6	-	-	403	189	582	1,142
2014	24	72	24	173	43	108	19	22	18	-	-	-	436	277	315
2015	20	54	141	82	65	163	11	5	32	-	-	-	207	289	980
2016	41	248	162	60	37	352	12	-	70	-	-	-	159	663	980
2017	141	290	100	258	76	130	31	68	144	-	-	137	512	580	601
2018	102	117	155	247	61	123	62	17	14	-	-	-	495	286	368
2019	87	484	165	255	185	143	40	38	27	-	8	1	460	1,114	437
2020	62	67	163	260	145	160	17	14	41	-	-	-	380	345	468
2021	85	73	154	388	178	117	46	3	14	-	25	-	584	360	314
2022	128	23	95	422	76	187	34	9	7	-	-	-	671	116	437
2023	112	20	81	333	37	173	40	12	5	1	-	20	618	100	643
2024	144	367	101	348	304	291	42	60	88	-	1	-	663	1,292	664
2025	94	62	95	369	149	236	25	4	8		267		592	497	495
Total	2,244	18,545	9,000	5,379	12,547	6,569	509	3,535	729	4	3,677	729	10,023	52,678	23,554

Table L-6b. Minimum number of ray interactions and mortalities in the eastern Pacific Ocean (EPO) in 2024 reported by observers onboard longline vessels under the current mandate of at least 5% coverage (C-19-08) of each CPC fleet operating in the EPO. Data are considered incomplete as data are insufficient for expanding to fleet totals (BYC-10 INF-D) (see section 2.2 for uncertainty and data gaps associated with longline data reporting). Dispositions considered to indicate a survival event are those reported by observers as “Alive and Healthy”, “Alive with light injuries”, “Alive” and “Escaped”, while those considered to indicate a mortality event are dispositions reported as “Dead”, “Alive mortal”, Alive injured”, Discarded”, “Unknown”, or precautionarily where disposition was not reported.
Tabla L-6b. Número mínimo de interacciones con rayas y mortalidades en el Océano Pacífico oriental en 2024 reportadas por observadores a bordo de buques palangreros bajo el mandato actual de al menos 5% de cobertura (C-19-08) de cada flota de los CPC que opera en el OPO. Los datos se consideran incompletos ya que los datos son insuficientes para expandirlos a totales de la flota (BYC-10 INF-D) (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos asociadas a la notificación de datos de palangre). Las disposiciones que se considera que indican un evento de supervivencia son las reportadas por los observadores como "Viva y sana", "Viva con heridas leves", "Viva" y "Escapada", mientras que las que se considera que indican un evento de mortalidad son las disposiciones reportadas como "Muerta", "Viva, mortalidad probable", “Viva herida", “Descartada", "Desconocida" o precautoriamente cuando la disposición no fue reportada.

Common name	Scientific name	Total interactions	Mortalities
Pelagic stingray	*Pteroplatytrygon violacea*	5,901	5,595
Manta rays	*Mobula spp.*	9	1
Rays, skates, nei	Rajiformes	7	7
Spinetail manta	*Mobula mobular*	7	6
Giant manta	*Mobula birostris*	2	2
Total numbers		5,926	5,611

Table L-7a. Estimated purse-seine catches by set type in metric tons (t) of large fishes by observers onboard size-class 6 vessels with a carrying capacity >363 t (1995–2025) and minimum reported longline (LL) catches of large fishes (gross-annual removals in t) (1995–2024, *data not available , see section 2.2. for uncertainty and data gaps in reporting of bycatch caught by longline). Purse-seine set types: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Species highlighted bold are discussed in main text. Data for 2020–2024 (longline) and 2024–2025 (purse-seine) are considered preliminary.

Tabla L-7a. Capturas cerqueras estimadas de peces grandes, por tipo de lance, en toneladas (t), por observadores a bordo de buques de clase 6 con una capacidad de acarreo >363 t (1995–2025) y capturas palangreras (LL) mínimas reportadas de peces grandes (extracciones anuales brutas en t) (1995–2024, *datos no disponibles; ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos en la notificación de especies capturadas incidentalmente con palangre). Tipos de lances cerqueros: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Las especies en negritas se discuten en el texto principal. Los datos de 2020–2024 (palangre) y 2024–2025 (cerco) se consideran preliminares.

	Coryphaenidae				Scombridae				Carangidae											
	Coryphaenidae spp., dorado				***Acanthocybium solandri, wahoo***				***Elagatis bipinnulata, rainbow runner***				*Seriola spp., amberjacks, nei*				*Caranx* spp., jacks, crevalles, nei			
	Purse seine				Purse seine				Purse seine				Purse seine				Purse seine			
Year	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL
1995	1,071	22	3	39	379	<1	<1	1	11	<1	<1	-	<1	<1	-	-	-	-	-	-
1996	1,312	18	<1	43	271	<1	<1	1	28	3	<1	-	4	-	-	-	-	-	-	-
1997	1,225	12	<1	6,866	475	3	1	<1	60	2	<1	-	1	-	-	-	<1	-	-	-
1998	816	18	<1	2,528	396	<1	4	2	93	<1	<1	-	4	-	-	-	<1	-	-	-
1999	1,238	4	<1	6,283	161	<1	<1	2	110	<1	<1	-	<1	-	-	-	<1	-	-	-
2000	1,437	51	2	3,537	277	2	<1	2	53	5	<1	-	<1	-	-	-	<1	-	-	-
2001	2,202	17	3	15,942	1,023	2	<1	6	90	<1	<1	-	1	-	-	-	<1	-	-	-
2002	1,815	8	<1	9,464	571	<1	<1	18	94	1	<1	-	<1	<1	-	-	<1	-	-	-
2003	894	11	1	5,301	428	<1	<1	164	108	2	-	-	1	<1	-	-	<1	-	-	-
2004	1,018	17	1	3,986	380	<1	<1	155	62	<1	-	-	56	9	<1	1	2	<1	-	-
2005	972	75	1	3,854	420	<1	<1	155	66	<1	<1	-	26	2	<1	-	2	1	-	-
2006	1,197	58	<1	3,408	424	1	<1	167	73	<1	<1	-	53	8	<1	-	10	220	<1	-
2007	1,235	47	1	6,907	421	2	<1	221	157	<1	-	-	18	80	<1	-	1	11	-	-
2008	1,112	17	2	15,845	249	1	<1	213	40	<1	<1	-	27	<1	-	-	17	18	-	-
2009	1,722	7	<1	17,136	547	<1	<1	336	28	<1	<1	-	13	<1	-	-	11	8	-	-
2010	912	3	<1	9,484	373	1	<1	284	17	<1	<1	-	3	23	-	-	1	48	-	-
2011	1,410	7	<1	12,438	169	2	<1	242	22	<1	-	-	7	33	-	<1	4	14	-	1
2012	1,705	18	<1	17,255	313	<1	<1	230	13	1	-	-	10	7	-	-	2	15	<1	-
2013	1,455	7	<1	11,249	518	1	<1	291	19	<1	-	-	6	<1	<1	-	4	2	<1	-
2014	1,779	9	<1	3,342	517	2	<1	287	15	<1	<1	-	6	2	-	-	3	<1	<1	-
2015	1,167	8	<1	1,206	357	1	<1	285	15	<1	-	-	6	<1	-	-	9	8	<1	-
2016	949	7	<1	446	318	2	<1	321	26	<1	<1	-	12	<1	<1	-	4	<1	8	-
2017	1,557	11	<1	2,118	335	<1	<1	319	18	<1	<1	-	12	5	<1	-	4	12	-	-
2018	1,483	5	5	3,932	230	<1	<1	366	20	<1	-	-	62	<1	-	-	9	<1	-	-
2019	1,208	29	<1	1,971	201	<1	<1	331	21	<1	<1	-	12	4	<1	-	5	<1	-	-
2020	783	4	<1	2,507	130	<1	<1	309	23	-	<1	-	9	1	-	<1	3	<1	<1	-
2021	2,183	13	<1	1,431	132	<1	<1	214	28	<1	<1	-	81	3	-	-	3	<1	-	-
2022	2,325	12	2	738	164	<1	<1	178	35	<1	-	-	25	4	-	-	6	<1	-	-
2023	1,457	4	2	421	264	<1	<1	256	45	<1	<1	-	9	<1	-	-	3	-	-	-
2024	864	5	<1	123	232	<1	<1	300	86	<1	<1	-	16	-	-	-	7	<1	<1	-
2025	884	3	<1	*	227	<1	<1	*	118	<1	-	*	33	<1	-	*	15	<1	-	*
Total	41,387	528	36	169,801	10,905	30	9	5,659	1,594	20	<1	-	516	183	<1	2	126	361	9	1

Table L-7a Continued

	Carangidae				Molidae				Lobotidae				Sphyraenidae				Lampridae			
	Seriola, Caranx spp., amberjacks, jacks, crevalles, nei				*Molidae spp., molas, nei*				*Lobotes surinamensis, tripletail*				*Sphyraenidae spp., barracudas*				***Lampris spp., opahs***			
	Purse seine				Purse seine				Purse seine				Purse seine				Purse seine			
Year	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL
1995	17	19	-	-	2	4	<1	-	<1	<1	-	-	<1	3	-	-	-	-	-	33
1996	29	153	-	-	5	6	<1	-	<1	-	-	-	<1	<1	-	-	-	-	-	33
1997	68	16	3	-	5	4	3	-	1	<1	<1	-	<1	<1	-	-	-	-	-	40
1998	72	7	<1	-	2	2	1	-	16	<1	-	-	<1	<1	-	-	-	-	-	54
1999	52	46	-	-	2	5	1	-	8	<1	-	-	-	-	-	-	-	-	-	68
2000	29	19	<1	4	2	4	1	-	4	<1	-	-	<1	-	<1	-	-	-	-	88
2001	70	<1	<1	18	6	2	1	-	<1	-	-	-	<1	<1	-	-	-	-	-	73
2002	26	9	<1	15	6	2	1	-	3	-	-	-	<1	-	-	-	-	-	-	6
2003	43	<1	<1	54	<1	4	<1	-	3	<1	-	-	<1	-	-	-	-	-	-	132
2004	8	7	<1	-	6	<1	1	-	1	<1	-	-	<1	-	-	-	-	-	-	139
2005	1	<1	-	-	2	9	2	-	7	<1	<1	-	<1	-	<1	-	-	-	-	159
2006	29	-	-	-	26	14	2	-	9	<1	<1	-	<1	-	-	-	-	-	-	109
2007	2	2	-	6	9	8	2	-	3	<1	<1	-	<1	1	-	-	-	-	-	370
2008	4	-	-	5	9	6	4	-	2	<1	-	-	<1	-	<1	-	-	-	-	308
2009	3	<1	<1	10	6	5	1	-	7	<1	<1	-	1	<1	-	-	-	-	-	488
2010	<1	4	-	8	9	44	1	-	<1	-	-	-	<1	-	<1	-	-	<1	-	539
2011	<1	4	-	7	4	113	<1	-	3	<1	-	-	<1	2	<1	8	-	-	-	539
2012	7	1	-	1	9	12	<1	-	3	<1	-	-	<1	<1	-	-	-	<1	-	425
2013	2	<1	-	<1	9	28	2	-	2	-	<1	-	<1	-	<1	-	-	<1	-	648
2014	2	2	-	11	3	9	1	-	2	-	<1	-	<1	<1	-	-	-	<1	-	818
2015	2	-	<1	11	6	12	1	87	2	<1	-	-	<1	-	-	-	-	-	-	1,039
2016	7	5	<1	11	10	7	<1	275	2	-	-	-	<1	<1	-	-	-	-	-	741
2017	4	4	-	-	8	4	<1	<1	5	-	<1	-	<1	-	-	-	-	-	-	846
2018	2	-	-	-	5	2	<1	-	3	<1	-	-	<1	<1	-	-	-	-	-	1,102
2019	3	<1	-	-	2	6	<1	-	2	-	<1	-	<1	-	-	-	-	-	<1	740
2020	<1	1	-	-	1	<1	<1	-	2	<1	-	-	<1	-	-		-	-	-	684
2021	2	<1	-	-	<1	2	<1	-	1	<1	-	-	1	<1	-	-	-	-	-	459
2022	4	<1	-	-	2	2	<1	-	4	<1	<1	-	<1	-	-	-	-	-	-	284
2023	1	-	-	-	2	<1	<1	4	2	-	<1	-	2	-	<1	<1	-	-	-	254
2024	9	<1	<1	-	<1	6	<1	-	3	<1	-	-	<1	-	-	-	-	-	-	289
2025	3	-	-	*	4	<1	<1	*	2	-	-	*	<1	<1	-	*	-	-	-	*
Total	504	301	3	162	165	322	34	366	103	<1	<1	-	13	7	<1	8	-	<1	<1	11,509

Table L-7a continued

Year	*Gempylidae* spp., snake mackerels, nei				*Bramidae* spp., pomfrets, nei				Other large fishes				Unidentified fishes				All fishes			
	Purse seine				Purse seine				Purse seine				Purse seine				Purse seine			
	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL
1995	-	-	-	-	-	-	-	2	<1	3	<1	-	3	1	<1	209	1,485	53	4	285
1996	-	-	-	-	-	-	-	2	3	125	<1	-	3	<1	<1	456	1,655	306	1	535
1997	-	-	-	-	-	-	-	6	7	5	<1	-	7	2	-	847	1,850	44	7	7,760
1998	-	-	-	-	-	-	-	9	13	10	<1	-	7	<1	<1	1,338	1,420	38	7	3,931
1999	-	-	-	-	-	-	-	3	4	54	<1	-	22	4	<1	974	1,599	114	2	7,330
2000	-	-	-	-	-	-	-	4	1	1	-	-	1	<1	<1	1,485	1,804	82	4	5,119
2001	-	-	-	-	-	-	-	5	2	9	<1	-	3	<1	<1	1,720	3,398	30	4	17,763
2002	-	-	-	-	-	-	-	<1	2	<1	<1	-	2	6	<1	1,895	2,521	27	2	11,399
2003	-	-	-	-	-	-	-	-	4	<1	-	-	2	2	-	4,386	1,484	19	2	10,037
2004	-	-	-	-	-	-	-	-	4	<1	<1	-	10	<1	<1	377	1,548	35	3	4,658
2005	-	-	-	-	-	-	-	18	<1	<1	<1	-	3	<1	<1	303	1,501	89	3	4,489
2006	-	-	-	18	-	<1	-	17	<1	<1	<1	7	3	<1	<1	285	1,824	302	3	4,011
2007	-	-	-	65	-	-	-	57	1	<1	<1	5	1	5	<1	1,763	1,848	158	4	9,394
2008	-	-	-	144	-	-	-	68	1	<1	<1	-	<1	<1	<1	793	1,462	44	6	17,375
2009	-	-	-	412	-	-	-	56	1	<1	<1	67	2	-	<1	1,077	2,343	21	2	19,581
2010	-	-	-	575	-	-	-	64	<1	-	<1	-	<1	<1	-	879	1,318	122	2	11,833
2011	-	-	-	506	-	<1	-	50	<1	<1	-	15	<1	-	<1	612	1,621	175	<1	14,418
2012	-	-	-	661	-	-	-	61	<1	2	<1	11	1	<1	-	1,305	2,065	57	1	19,949
2013	-	-	-	574	-	-	-	134	<1	<1	<1	36	<1	<1	-	1,112	2,016	40	3	14,045
2014	-	-	-	431	-	-	-	138	<1	<1	-	77	<1	-	-	1,013	2,329	25	2	6,116
2015	-	-	-	321	<1	-	-	172	<1	<1	-	7	2	<1	-	1,367	1,568	30	2	4,495
2016	<1	-	-	730	-	-	-	108	<1	<1	<1	100	<1	1	-	506	1,328	23	9	3,238
2017	-	-	-	301	-	-	-	126	<1	<1	-	62	1	-	-	1,532	1,946	36	1	5,304
2018	-	-	-	260	-	-	-	125	<1	-	-	1	-	-	-	222	1,816	9	6	6,009
2019	-	-	-	338	-	-	-	81	<1	-	-	26	<1	<1	<1	272	1,455	41	1	3,759
2020	-	-	-	288	-	-	-	70	<1	-	-	213	<1	<1	<1	1,915	953	9	<1	5,991
2021	-	-	-	302	-	-	-	50	<1	<1	-	<1	<1	<1	-	1,995	2,432	19	1	4,453
2022	-	-	-	212	<1	-	-	53	<1	<1	-	<1	<1	-	-	3,099	2,564	19	3	4,565
2023	-	-	-	288	<1	<1	-	64	<1	-	-	7	-	-	-	3,251	1,785	5	3	4,546
2024	-	-	-	384	-	-	-	54	<1	<1	<1	<1	<1	-	-	1,359	1,218	13	1	2,510
2025	-	-	-	*	-	-	-	*	<1	<1	-	*	<1	-	-	*	1,286	5	1	*
Total	<1	-	-	6,811	<1	<1	-	1,596	51	211	<1	570	75	24	<1	38,411	55,442	1,988	93	234,912

Table L-7b. Minimum number of interactions and mortalities of large fishes in the eastern Pacific Ocean (EPO) in 2024 reported by observers onboard longline vessels under the current mandate of at least 5% coverage (C-19-08) of each CPC fleet operating in the EPO. Data are incomplete and considered insufficient for expanding to fleet totals (BYC-10 INF-D) (see section 2.2 for uncertainty and data gaps associated with longline data reporting). Dispositions considered to indicate a survival event are those reported by observers as “Alive and Healthy”, “Alive with light injuries” and “Alive”, while those considered to indicate a mortality event are dispositions reported as “Dead”, “Alive mortal”, Alive injured”, Discarded”, “Unknown”, or where disposition was not reported.

Tabla L-7b. Número mínimo de interacciones y mortalidades de peces grandes en el Océano Pacífico oriental en 2024 reportadas por observadores a bordo de buques palangreros bajo el mandato actual de al menos 5% de cobertura (C-19-08) de cada flota de los CPC que opera en el OPO. Los datos se consideran incompletos y se consideran insuficientes para expandirlos a totales de la flota (BYC-10 INF-D) (ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos asociadas a la notificación de datos de palangre). Las disposiciones que se considera que indican un evento de supervivencia son las reportadas por los observadores como "Vivo y sano", "Vivo con heridas leves" y "Vivo", mientras que las que se considera que indican un evento de mortalidad son las disposiciones reportadas como "Muerto", "Vivo, mortalidad probable", “Vivo herido", “Descartado", "Desconocida" o cuando la disposición no fue reportada.

Common Name	Scientific Name	Interactions	Mortalities
Long snouted lancetfish	*Alepisaurus ferox*	9,769	9,761
Escolar	*Lepidocybium flavobrunneum*	5,926	5,834
Wahoo	*Acanthocybium solandri*	5,109	5,104
Opah	*Lampris guttatus*	4,422	4,382
Snake mackerel	*Gempylus serpens*	1,227	1,213
Sickle pomfret	*Taractichthys steindachneri*	820	684
Butterfly kingfish	*Gasterochisma melampus*	509	509
Common dolphinfish	*Coryphaena hippurus*	467	457
Oilfish	*Ruvettus pretiosus*	453	452
Dorado, mahi mahi, dolphin fish, nei	Coryphaenidae	371	371
Lancetfishes nei	*Alepisaurus* spp	343	343
Pomfrets, ocean breams nei	Bramidae	294	289
Slender tuna	*Allothunnus fallai*	127	127
Short snouted lancetfish	*Alepisaurus brevirostris*	60	60
Ocean sunfish, Mola	*Mola mola*	57	51
Slender sunfish	*Ranzania laevis*	45	44
Snake mackerels, escolars nei	Gempylidae	44	44
Atlantic pomfret	*Brama brama*	26	26
Unicornfish	*Lophotus capellei*	20	20
Other fishes*		107	94
Total		30,196	29,865

*"Other large fishes" includes those with ≤15 interactions from 20 taxa in 2024.

Table L-8. Estimated purse-seine catches by set type in metric tons (t) of small forage fishes by observers onboard size-class 6 vessels with a carrying capacity >363 t (1995–2025) and minimum reported longline (LL) catches of small forage fishes (gross-annual removals in t) (1995–2024, *data not available, see section 2.2. for uncertainty and data gaps in reporting of bycatch caught by longline). Purse-seine set types: floating object (OBJ), unassociated tuna schools (NOA) and dolphins (DEL). Species highlighted bold are discussed in main text. Data for 2020–2024 (longline) and 2024–2025 (purse seine) are considered preliminary. "Epipelagic forage fishes" include various mackerels and scad (*Decapterus* spp., *Trachurus* spp., *Selar crumenophthalmus*), Pacific saury (*Cololabis saira*), and tropical two-wing flyingish (*Exocoetus volitans*).

Tabla L-8. Capturas cerqueras estimadas de peces forrajeros pequeños, por tipo de lance, en toneladas (t), por observadores a bordo de buques de clase 6 con una capacidad de acarreo >363 t (1995–2025) y capturas palangreras (LL) mínimas reportadas de peces forrajeros pequeños (extracciones anuales brutas en t) (1995-2024, *datos no disponibles; ver Sección 2.2. para consultar información sobre la incertidumbre y las deficiencias de los datos en la notificación de especies capturadas incidentalmente con palangre). Tipos de lances cerqueros: objeto flotante (OBJ), atunes no asociados (NOA) y delfines (DEL). Las especies en negritas se discuten en el texto principal. Los datos de 2020–2024 (palangre) y 2024–2025 (cerco) se consideran preliminares. "Peces epipelágicos de forraje" incluyen varias caballas y jureles (*Decapterus* spp., *Trachurus* spp., *Selar crumenophthalmus*), paparda del Pacífico (*Cololabis saira*), y volador tropical (*Exocoetus volitans*).

	***Auxis* spp., bullet and frigate tunas**				**Balistidae, Monacanthidae spp., triggerfishes and filefishes**				**Kyphosidae, sea chubs**				**Epipelagic forage fishes**				Small Carangidae spp., carangids, nei				Other small fishes			
	Purse seine				Purse seine				Purse seine				Purse seine				Purse seine				Purse seine			
Year	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL	OBJ	NOA	DEL	LL
1995	501	119	6	-	208	4	<1	-	<1	-	-	-	-	-	-	-	<1	-	-	-	319	4	4	-
1996	761	234	33	-	113	2	<1	-	-	-	-	-	-	-	-	-	-	<1	-	-	55	8	25	-
1997	2,734	623	25	-	219	<1	<1	-	-	-	-	-	-	-	-	-	<1	-	-	-	151	12	2	-
1998	1,033	168	32	-	801	2	1	-	<1	-	-	-	<1	-	-	-	<1	-	-	-	91	15	3	-
1999	2,589	473	29	-	551	3	<1	-	<1	<1	-	-	<1	-	-	-	<1	<1	-	-	85	3	2	-
2000	1,210	181	19	-	168	<1	9	-	2	-	-	-	-	-	-	-	<1	-	-	-	68	8	6	-
2001	641	38	-	-	426	1	-	-	<1	-	-	-	-	-	-	-	<1	-	-	-	27	2	<1	-
2002	1,382	234	248	-	453	<1	-	-	<1	-	-	-	-	-	-	-	<1	-	-	-	25	3	<1	-
2003	944	278	16	-	157	4	<1	-	<1	-	-	-	<1	-	-	-	<1	-	-	-	75	1	1	-
2004	834	115	24	-	914	7	2	-	8	<1	<1	-	<1	<1	-	-	<1	<1	-	-	22	1	<1	-
2005	1,606	309	6	-	129	<1	<1	-	23	<1	<1	-	6	<1	<1	-	2	<1	<1	-	<1	9	<1	-
2006	1,300	591	19	-	145	<1	<1	-	79	<1	<1	-	7	1	-	-	2	<1	<1	-	5	1	<1	-
2007	868	336	18	-	544	1	<1	-	12	<1	<1	-	2	5	-	-	<1	<1	<1	-	4	<1	<1	-
2008	759	619	2	-	276	7	2	-	68	<1	<1	-	3	<1	-	-	10	<1	-	-	2	<1	<1	-
2009	303	165	1	-	174	1	<1	-	47	<1	-	-	<1	<1	-	-	<1	<1	<1	-	1	<1	<1	-
2010	474	234	<1	-	69	<1	<1	-	16	-	<1	-	4	<1	<1	-	1	<1	-	-	<1	-	<1	-
2011	677	97	11	-	31	<1	-	-	48	<1	-	-	2	<1	<1	-	<1	<1	-	-	<1	<1	<1	-
2012	173	179	1	-	110	<1	-	-	39	-	-	-	13	12	-	-	<1	<1	-	-	4	2	-	-
2013	385	77	-	-	228	<1	<1	-	18	-	<1	-	4	-	<1	-	<1	4	<1	-	2	<1	<1	-
2014	297	30	<1	-	325	<1	<1	-	16	-	-	-	3	<1	<1	-	<1	<1	-	-	1	<1	<1	-
2015	177	64	-	-	140	4	<1	-	5	-	<1	-	6	-	-	-	<1	<1	-	-	1	<1	<1	-
2016	189	23	<1	-	416	2	<1	-	8	-	-	-	21	-	<1	<1	<1	<1	-	-	3	<1	<1	77
2017	131	172	-	-	83	<1	-	-	8	-	-	-	3	-	-	-	<1	<1	-	-	<1	<1	-	-
2018	276	172	-	-	54	<1	<1	-	10	-	-	-	5	<1	-	-	<1	-	-	-	<1	<1	<1	-
2019	182	94	<1	-	57	<1	<1	-	7	<1	<1	-	5	8	<1	-	<1	<1	-	-	<1	5	-	-
2020	435	44	<1	-	47	<1	<1	-	2	-	<1	-	4	<1	-	<1	<1	<1	-	<1	<1	<1	<1	<1
2021	423	18	-	-	50	<1	-	-	6	-	<1	-	15	-	-	-	<1	<1	-	-	<1	1	<1	<1
2022	687	17	<1	-	543	2	<1	-	21	1	-	-	15	-	<1	-	<1	<1	-	-	1	3	<1	-
2023	588	<1	<1	-	518	<1	<1	-	12	-	-	-	10	<1	<1	-	3	<1	<1	-	1	12	<1	<1
2024	445	155	-	-	512	<1	-	-	7	-	-	-	11	<1	-	-	2	<1	-	-	<1	<1	<1	-

2025	531	2	-	*	855	<1	<1	*	4	-	-	*	15	-	<1	*	<1	-	-	*	<1	<1	-	*
Total	23,536	5,862	492	-	9,314	48	16	-	468	2	<1	-	154	29	<1	<1	28	6	<1	<1	950	93	45	79