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Suva, Fiji (Hybrid)

Overview of Fisheries and Stock Status of Tuna, Billfish, and Sharks in the Western and Central Pacific Ocean

WCPFC21-2024-27 (Rev.02)[1]
21 November 2024

Submitted by the SPC-OFP

[1] Rev.01 – Correction to stock status summary for ICCAT Bigeye (slide 20, page 23)
Rev.02 – Longline effort slide 11 (page 14) has been truncated at 1970 to omit the decade prior (dating back to 1960) for which the data are known to be incomplete due to the unavailability of vessel numbers from some fleets operating in the area during that time period. Corrections to effort trend summary table notes (slide 13, page 16).

Executive Summary

This set of slides provides a summary of the key fishery data, latest catch and effort levels and recent trends for the tuna fisheries in the Western and Central Pacific Fisheries Commission – Convention Area (WCPFC-CA). In addition, summaries of stock status for the key tuna (skipjack, yellowfin, bigeye, and south Pacific albacore), billfish and sharks assessed by the WCPFC Science Service Provided (SSP), The Pacific Community (SPC), are provided. The content of the slides is based on data available in SPC databases as of October 30, 2024, which includes 'provisional' complete data for 2023. As a supporting resource of fisheries statistics the paper, "Overview of Tuna Fisheries in the Western and Central Pacific Ocean, Including Economic Conditions – 2023" WCPFC-SC20-2024/GN-WP-01 rev1, has been provided as WP27A, that paper was also provided to SC20 and TCC20. The annual Tuna Fisheries Assessment Report (TFAR) will be available in the New Year, it was not possible to provide a draft version for WCPFC21, but many of the figures in this slide set will be in the new 23rd TFAR.

The updates for fisheries catch and effort data for 2023 did not show any major changes compared to 2022. In terms of overall catch of tuna, the 2023 catch of approximately 2.62 million metric tonnes (mt) was slightly lower than for 2022. Catches have been similar for the past 4 years, having declined by around 10% since the historical peak in 2019. The purse seine (PS) fishery remains the dominant gear accounting for 70% of the total tuna catch, followed by the combined 'Other' category (17%) which includes various gear types and the handline fisheries from Vietnam, Philippines and Indonesia. Skipjack remains the dominant species (approx. 1,636 million mt), accounting for 62% of the total catch, followed by yellowfin 28% (approx. 746,000 mt), bigeye 6% (approx. 146,000 mt) and albacore 4% (96,000 mt), with approximately double the amount of albacore caught south of the equator compared to north of the equator in the WCPFC-CA.

Effort in the purse seine fishery in 2023 was 47,623 days, only slightly higher than 2022. The number of sets has decreased by around 20% since 2010. Purse seine catch in weight is dominated by skipjack, followed by yellowfin then bigeye, with a negligible catch of albacore. While total purse catch is stable over the last four years, the 2023 catch of 1.837 million mt was 13% below the historical peak in 2019.

Effort in the longline fishery in 2023 was 602 million hooks, slightly lower than 2022, and has decreased by around 22% since the historic peak in 2012. The decline in hooks per year is consistent with the decline in catch per year of about 18% since 2010. Longline catch in weight is dominated by yellowfin, followed by albacore then bigeye, with a very minor catch of skipjack. Longline catches in the last two years (228,000 mt in 2023) have increased slightly despite a continued decline in total effort. This increase appears entirely due to increased catches of albacore, primarily south of the equator.

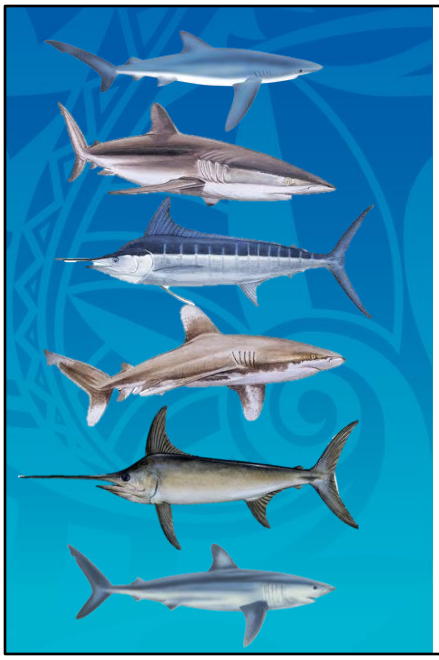
Pole and line effort has continued to decline, although some flattening in the rate of decline is seen in the last decade. Japanese vessels are the largest component of the fleet, followed by domestic Pacific Island vessels.

Stocks of all four tuna based on their most recent assessments (skipjack 2022, bigeye and yellowfin 2023, south Pacific albacore 2024), are estimated to be close to their respective target objectives for biomass depletion and not overfished or undergoing overfishing. The next tuna assessment will be skipjack in 2025.

Southwest Pacific swordfish was assessed in 2021 and was classified and not overfished and not undergoing overfishing. Southwest Pacific striped marlin was assessed in 2024, however, the

assessment was not accepted for management advice at SC20. The assessment will undergo more technical work and be presented to SC21 in 2025. Management advice remains as per 2019 that the stock is likely overfished and close to undergoing overfishing.

For the key sharks the most recent assessment was for silky shark in the WCPO in 2024, which concluded that the stock was unlikely being overfished, but that stock biomass, while displaying a recovering trend, was uncertain. The conclusion that this stock is now unlikely to be undergoing overfishing is an improvement from the previous assessment that concluded that the stock was likely being overfished. For the other sharks assessed by the SSP, southwest Pacific blue shark was assessed in 2022 as unlikely overfished, and unlikely to be undergoing overfishing, and southwest Pacific mako shark has uncertain stock status after the inconclusive first assessment attempt in 2021. The Oceanic whitetip shark in the WCPO will be assessed in 2025, based on the 2019 assessment it remains considered as overfished and subject to overfishing.



Overview of fisheries and stock status of tuna, billfish and sharks in the Western and Central Pacific Ocean

SPC, Oceanic Fisheries Program

WCPFC – 21st Regular Session of the Commission – WP27 (rev 2)

Suva, Fiji, 28th Nov – 3rd Dec 2024.

Background

- Recent information on the fisheries catch and effort
- Status of stocks of 'key' tuna species **assessed by SPC** – skipjack, yellowfin, bigeye and South Pacific albacore
- Summary slides for billfish and key sharks

Sources

The Western and Central Pacific Tuna Fishery: 2023 Overview and Status of Stocks. https://fame.spc.int/resources/documents/tuna-fisheries-assessment-report (**in prep**)

WCPFC Tuna Fishery Yearbook 2023. https://www.wcpfc.int/statistical-bulletins

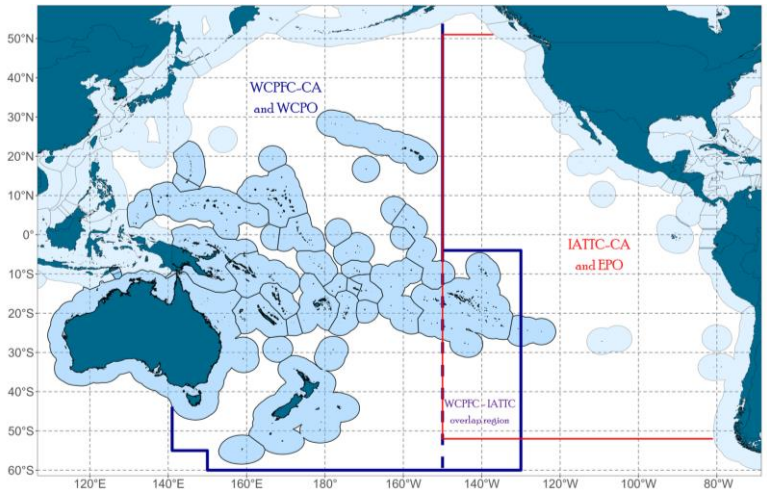
Overview of Tuna Fisheries in the Western and Central Pacific Ocean, Including Economic Conditions – 2023 https://meetings.wcpfc.int/node/23098

This presentation will provide:

1) A summary of the recent updated fisheries catch and effort data for the key target tuna species in the WCPFC-CA. The summaries are for data held by SPC and updated as of October 30, 2024.
2) The status of stocks of the key target tuna based on the most recent assessments accepted by the Science Committee (SC) for management advice.
3) A brief summary of stock status for sharks and billfish assessed by SPC.

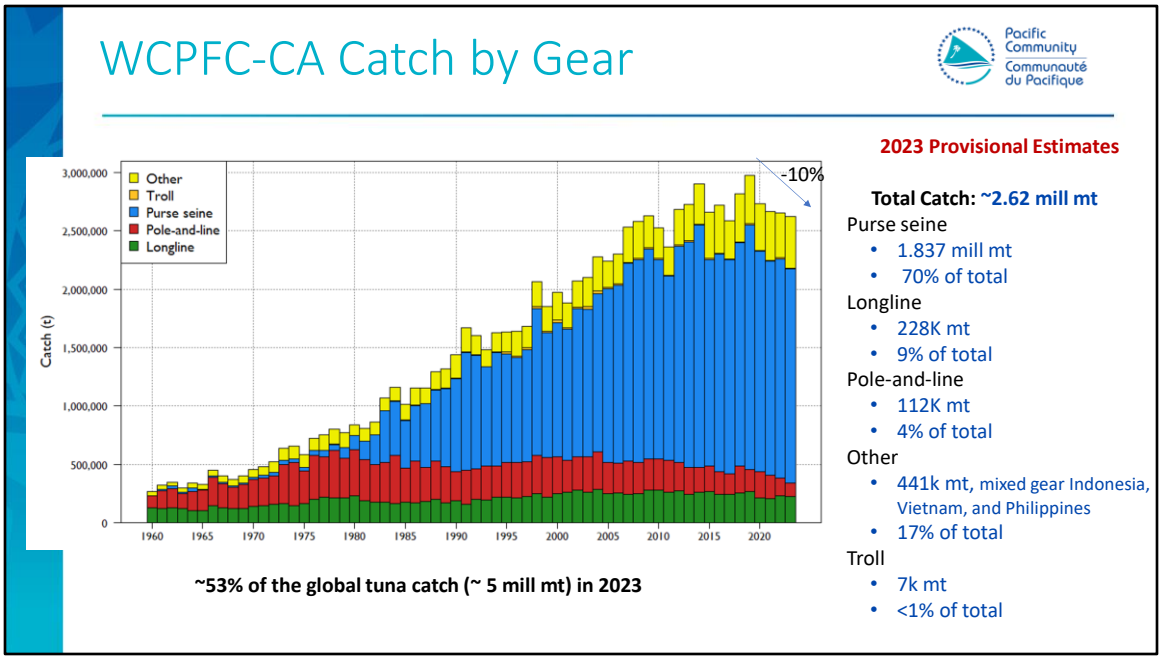
Note this presentation is usually accompanied by a draft version of the Tuna Fisheries Assessment Report (TFAR) which would included much of the content that is in this presentation, plus more. Due to unforeseen issues the draft TFAR is not available for WCPFC21, it will be released early in the new year. To accompany this presentation, the paper "Overview of Tuna Fisheries in the Western and Central Pacific Ocean, Including Economic Conditions – 2023" WCPFC-SC20-2024/GN-WP-01 rev1, has been provided. This paper was also provided to SC20 and TCC20. Any difference between this paper and the figures/tables presented in this presentation will be minor and due to the more recent data updates included in this presentation.

WCPFC - CA



Map of the Pacific Ocean showing the Western and Central Pacific Fisheries Commission – Convention Area (WCPFC-CA) which included the WCPFC-IATTC overlap area.

Catch and effort summaries



This figure provides a summary of the total catches since 1960 across the four target tuna (skipjack, yellowfin, bigeye and albacore (North and South Pacific combined)) by gear type in the WCPFC-CA.

- Provisional catches from 2023 are slightly lower than for 2022, overall catches have been fairly similar for the past 4 years, having declined by around 10% since the historical peak in 2019.

- The purse seine (PS) fishery remains the dominant gear accounting for 70% of the total catch, followed by the combined 'Other' category which includes various gear types and the handline fisheries from Vietnam, Philippines and Indonesia.

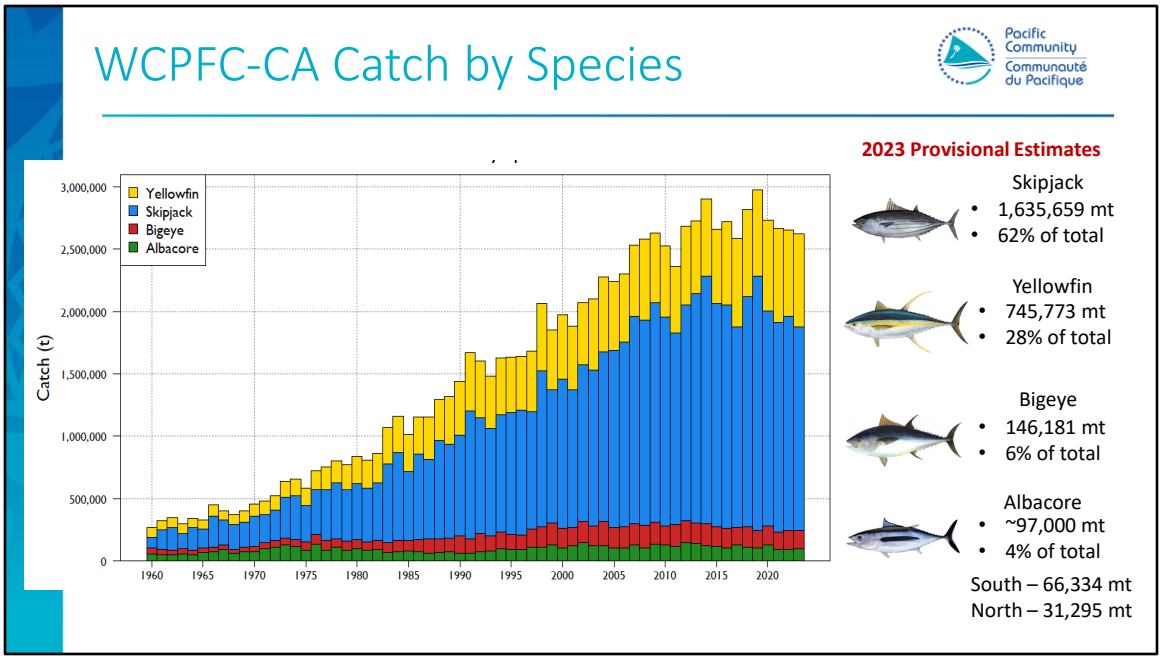
- Pole-and-line fishery continues to contract, while longline catch has been very stable over the last 4 years.

Catch trends by gear type

Gear type	Catch (1000 t)	% of total gear catch	Change from 2022	Notes
Purse seine	1837	70%	-2%	4% below 5 yr avg.
Longline	228	9%	-1%	3% below 5 yr avg.
Pole-Line	112	4%	-28%	lowest since 1960
Troll	7	<1%	-27%	44% below 5 yr avg.
Other	441	17%	+14%	8% above 5 yr avg.
Total	2624	100%	-1%	5% below 5 yr avg.

This table provides the catches by gear in 2023 (left column) along with statistics on the proportions of total tuna catches, the % changes from 2022 and % difference from the previous 5 year average.

The most notable reductions are for pole and line and troll, an the most notable recent increase is for the “Other” category (i.e. Indonesia/Philippines/Vietnam).



This figure provides a summary of the catches since 1960 according to the four target tuna (skipjack, yellowfin, bigeye and albacore) in the WCPFC-CA, with catch for albacore also separated by north and south of the equator as they are considered separate stocks.

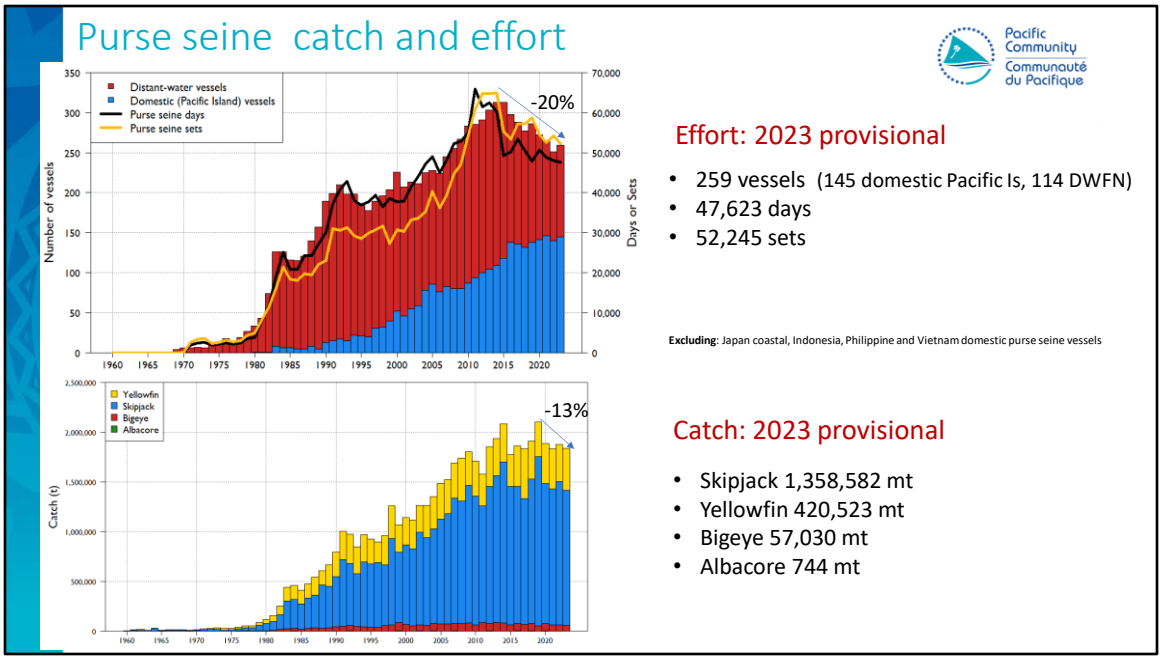
- Skipjack remains the dominant species, accounting for 62% of the total catch, followed by yellowfin 28%, bigeye 6% and albacore 4%, with approximately double the amount of albacore caught south of the equator compared to north of the equator in the WCPFC-CA.

Catch trends by species

Species	Catch (1000 t)	% of total tuna catch	Change from 2022	Notes
Albacore	96	4%	+3%	8% below 5 yr avg
Bigeye	146	6%	-1%	1% below 5 yr avg
Skipjack	1636	62%	-5%	9% below 5 yr avg
Yellowfin	746	28%	+7%	4% above 5 yr avg
Total	2624	100%	-1%	5% below 5 yr avg.

This table provides the catches by species in 2023 (left column) along with statistics on the proportions of total tuna catches, the % changes from 2022 and % difference from the previous 5 year average.

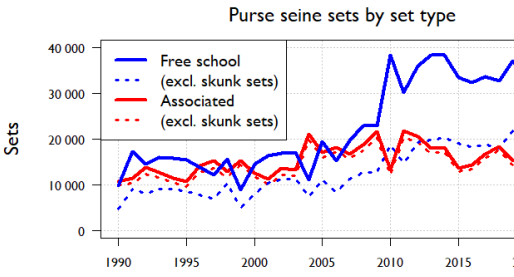
The most notable reductions are for skipjack, and while albacore is below the recent 5 year average, catches in 2023 were higher than 2022. The most notable increases is for yellowfin, both for 2023 compared to 2022 and 2023 compared to the recent 5 year average. Short term trends in bigeye catches are stable.

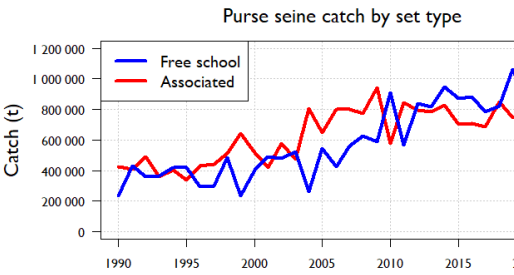


This figure shows the catch (bottom) and effort (top) histories for purse seine, 1960 - 2023.

- The effort is provided in sets (orange line), days (black line) and numbers of vessels according to Distant Water or Domestic/Pacific Island. Domestic/Pacific Island vessels now outnumber Distant Water vessels, and have continued to increase, although the rate of increase has flattened in recent years. In contrast, vessels identified as Distant Water have decreased since around 2014.
- Effort in terms of sets has decreased by around 20% since 2010. Effort in terms of days shows a notable decrease shortly after 2010 but has been reasonably stable since then.
- Purse seine catch in weight is dominated by skipjack, followed by yellowfin then bigeye, with a negligible catch of albacore.
- While total purse catch is stable in the last four years, the 2023 catch was 13% below the historical peak in 2019.

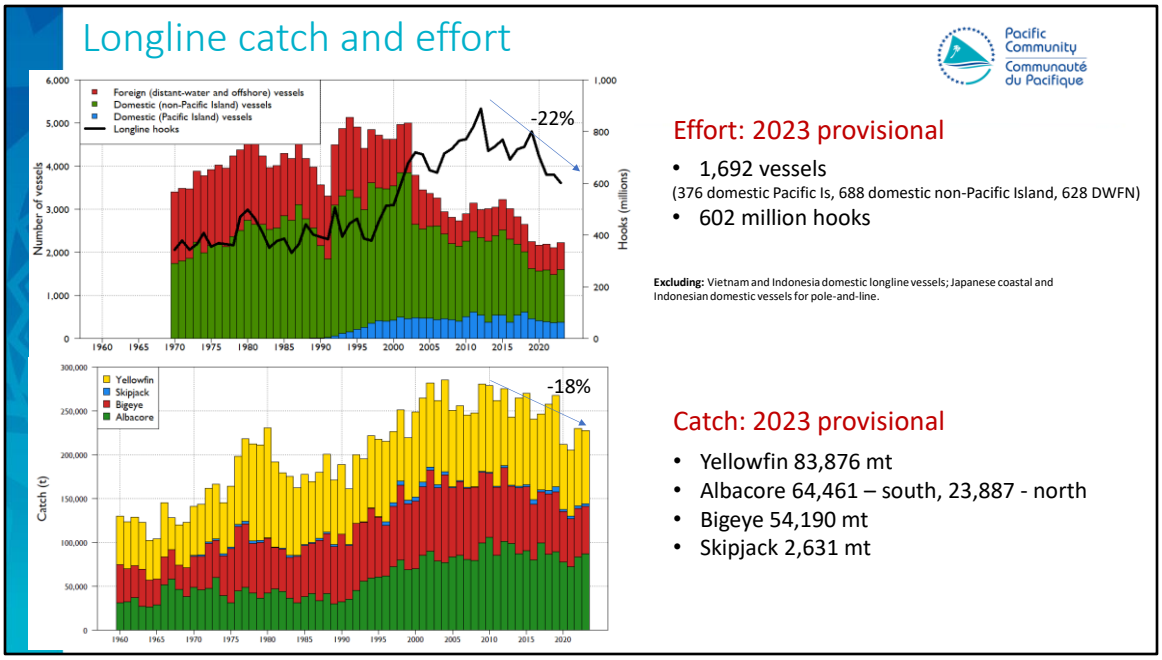
Purse seine by set type





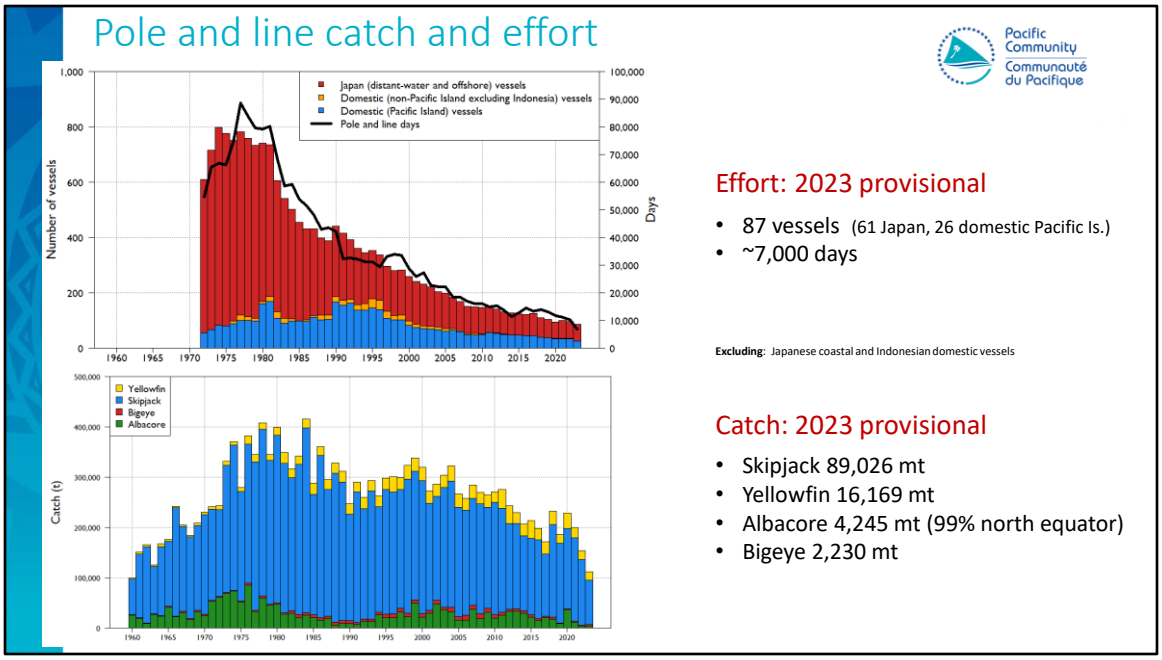
These figures show the time series of numbers of sets by set type (top) and the catch by set type (bottom) for 1990 - 2023.

- The top figure show total sets by set type and the numbers of sets with 'skunk' or failed sets removed (dotted lines). For total sets, there is an increase in free school sets in 2010 and the higher level of free school sets compared to FADs sets is subsequently maintained. However, when the skunk sets are removed the numbers of successful sets are similar between set types. The increased free school sets corresponds with the implementation of the VDS and FAD closure periods.
- The catch history by set type (bottom) shows similar levels of catch taken by each set type – particularly over the last three years.



This figure shows the catch (bottom) and effort (top) histories for longline, 1960 - 2023.

- The effort is provided in numbers of hooks (line), and numbers of vessels per year according to fleet groupings.
- Domestic non-Pacific Island vessels are now the largest component of the fleet, followed by foreign distant water vessel and domestic Pacific Island vessels.
- Effort in terms of number of hooks per year has decreased by around 22% since the historic peak in 2012. Number of hooks per year increased from 1995 to 2012, while vessel numbers decreased, this was due to changes in gear and fishing methods - deploying much longer monofilament main lines and more hooks between floats to target deeper depths.
- The decline in catch per year of about 18% since 2010 is consistent with the decline in hook numbers per year.
- Catch in weight is dominated by yellowfin, followed by albacore then bigeye, with a very minor catch of skipjack.
- Catches in the last two years have increased despite a continued decline in effort. This increase is entirely due to increased catches of albacore, primarily south of the equator.



This figure shows the catch (bottom) and effort (top) histories for pole and line, 1960 - 2023.

- The effort is provided in numbers of days (line), and numbers of vessels per year according to fleet groupings. The effort has continued to decline, although with some flattening in the rate of decline is seen in the last decade.
- Japanese vessels are the largest component of the fleet, followed by domestic Pacific Island vessels.
- Catch in weight is dominated by skipjack, followed by yellowfin then albacore (vast majority north of equator), with a minor catch of bigeye.

Effort trends by gear

Gear	Unit	Number	Change from 2022	Notes
Purse seine	vessels	259	+3%	4% lower than 5 yr avg
Purse seine	days	47,623	-1%	3% lower than 5 yr avg
Purse seine	sets	52,245	-4%	6% lower than 5 yr avg
Longline	vessels	2,227	-6%	2% lower than 5 yr avg
Longline	hooks	602,200,000	-5%	lowest since 2001
Pole-and-line	vessels	87	-10%	lowest on record
Pole-and-line	days	6,918	-32%	lowest on record

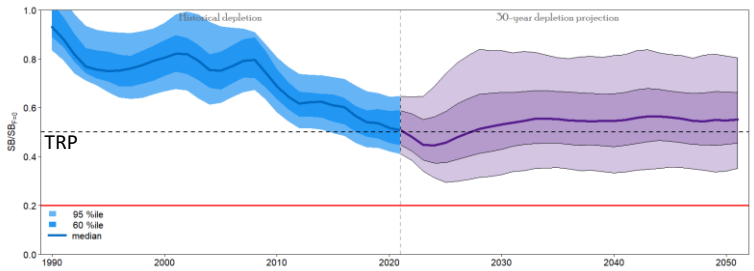
This table provides statistics on recent effort trends by gear types and effort measures.

- The most notable recent changes are the declines in longline and pole and line effort. Purse seine effort in sets has also declined in 2023 relative to 2022 and relative to the recent 5 year average.

Tuna stock status summaries

Skipjack

- Last assessed 2022, next assessment 2025



- Not overfished
- Not undergoing overfishing

Species	$SB_{recent}/SB_{F=0}$ median	10-90 %iles	F_{recent}/F_{MSY} median	10-90 %iles	"Recent" Probability breaching LRP	"Future" Probability breaching LRP *2021 fishing levels*
Skipjack	0.51	0.43-0.64	0.32	0.18-0.45	0%	0%

Skipjack MP TRP calibrated on 2022 assessment = 0.50

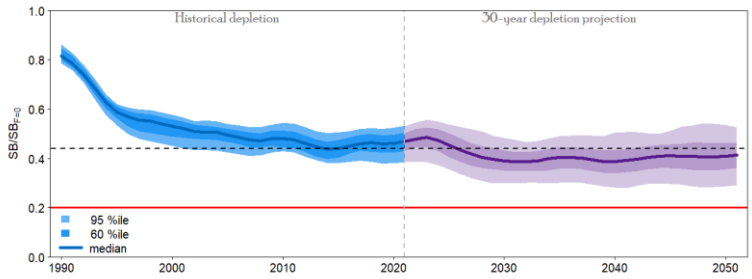
This figure summarises the recent stock status (bottom table) and the historic (blue ribbon, truncated from 1990-2021) and projected (purple ribbon) stock trajectory for skipjack in the WCPO from the 18 models in the uncertainty grid of the 2022 assessment (last year of data 2021). Median value illustrated by the dark line. The projections over thirty years include stochastic recruitment, and fishing levels fixed at 2023 catch/effort levels from 2024 onwards, observed levels applied for 2022, 2023. The depletion stock trajectory (top figure) is calculated as $SB_{recent}/SB_{F=0}$.

- The recent median stock depletion $SB_{recent}/SB_{F=0}$ = 0.51, is close to the TRP (0.50) as defined by the skipjack MP.
- Median F_{recent} is below F_{MSY}
- There is zero probability of breaching the limit reference point (LRP) for the recent stock status and the projected stock status under recent fishing levels.

- **Stock is not overfished or undergoing overfishing.**

Yellowfin

- Last assessed 2023, next assessment 2026



- Not overfished
- Not undergoing overfishing

Species	$SB_{recent}/SB_{F=0}$ median	10-90 %iles	F_{recent}/F_{MSY} median	10-90 %iles	"Recent" Probability breaching LRP	"Future" Probability breaching LRP *2019-2021 fishing*
Yellowfin	0.47	0.42-0.52	0.50	0.41-0.62	0%	0%

Includes estimation uncertainty

CMM 2023-01 objective (2012-2015) calibrated on 2023 assessment = 0.44

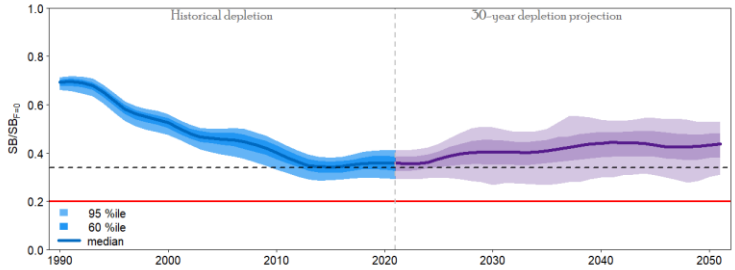
This figure summarises the recent stock status (bottom table) and the historic (blue ribbon, truncated from 1990-2021) and projected (purple ribbon) stock trajectory for yellowfin in the WCPO from the 54 models in the uncertainty grid of the 2023 assessment (last year of data 2021). Median value illustrated by the dark line. The projections over thirty year include stochastic recruitment, and fishing levels fixed at 2023 catch/effort levels from 2024 onwards, observed levels applied for 2022, 2023. The depletion stock trajectory (top figure) is calculated as $SB_{recent}/SB_{F=0}$.

- The recent median stock depletion $SB_{recent}/SB_{F=0}$ = 0.47, is close to the CMM 2023-01 objective of average 2012-2015 depletion levels (0.44).
- Median F_{recent} is below F_{MSY}
- There is zero probability of breaching the limit reference point (LRP) for the recent stock status and the projected stock status under recent fishing levels.

- **Stock is not overfished or undergoing overfishing.**

Bigeye

- Last assessed 2023, next assessment 2026



- Not overfished
- Not undergoing overfishing

Species	$SB_{recent}/SB_{F=0}$ median	10-90 %iles	F_{recent}/F_{MSY} median	10-90 %iles	"Recent" Probability breaching LRP	"Future" Probability breaching LRP *2019-2021 fishing*
Bigeye	0.35	0.30-0.40	0.59	0.46-0.74	0%	0%

Includes estimation uncertainty

CMM 2023-01 objective (2012-2015) calibrated on 2023 assessment = 0.34

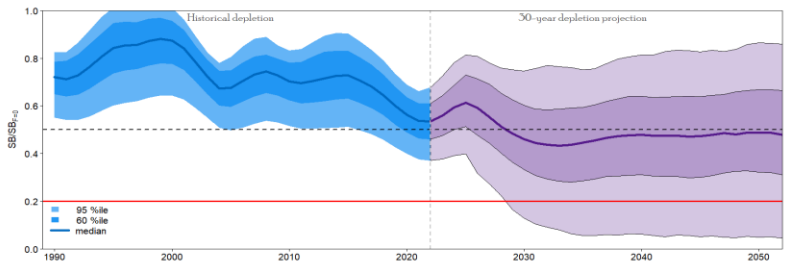
This figure summarises the recent stock status (bottom table) and the historic (blue ribbon, truncated from 1990-2021) and projected (purple ribbon) stock trajectory for bigeye in the WCPO from the 54 models in the uncertainty grid of the 2023 assessment (last year of data 2021). Median value illustrated by the dark line. The projections over thirty year include stochastic recruitment, and fishing levels fixed at 2023 catch/effort levels from 2024 onwards, observed levels applied for 2022, 2023. The depletion stock trajectory (top figure) is calculated as $SB_{recent}/SB_{F=0}$.
(The projections assumes the historic 'lower' long-term recruitment scenario)

- The recent median stock depletion $SB_{recent}/SB_{F=0}$ = 0.35, is close to the CMM 2023-01 objective of average 2012-2015 depletion levels (0.34).
- Median F_{recent} is below F_{MSY}
- There is zero probability of breaching the limit reference point (LRP) for the recent stock status and the projected stock status under recent fishing levels.

- **Stock is not overfished or undergoing overfishing.**

South Pacific albacore

- Last assessed 2024, next assessment 2027



- Not overfished
- Not undergoing overfishing

Species	$SB_{recent}/SB_{F=0}$ median	10-90 %iles	F_{recent}/F_{MSY} median	10-90 %iles	"Recent" Probability breaching LRP	"Future" Probability breaching LRP *2020-2022 fishing*
SP albacore	0.48	0.36-0.62	0.18	0.06-0.44	0%	14%

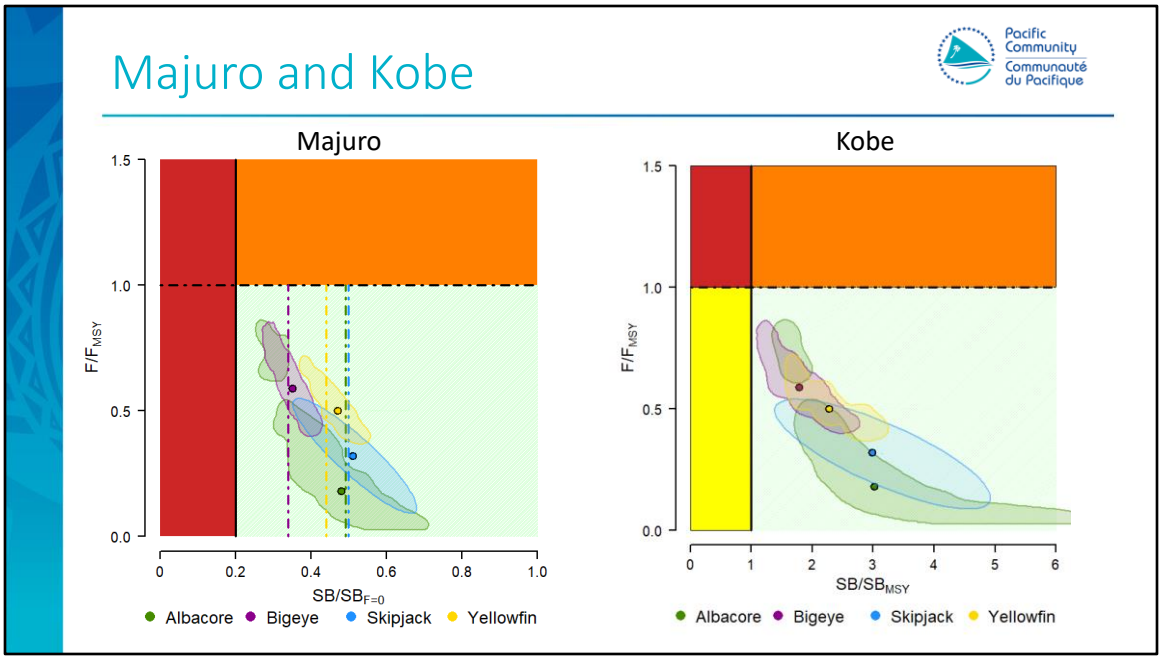
Includes estimation uncertainty

Interim TRP calibrated on 2024 assessment = 0.50

This figure summarises the recent stock status (bottom table) and the historic (blue ribbon, truncated from 1990-2022) and projected (purple ribbon) stock trajectory for south Pacific albacore (entire south Pacific stock including EPO/IATTC region) from the 100 model ensemble from the 2024 assessment (last year of data 2022). Median value illustrated by the dark line. The projections over thirty years include stochastic recruitment, and fishing levels fixed at 2023 catch/effort levels. The depletion stock trajectory (top figure) is calculated as $SB_{recent}/SB_{F=0}$.

- The recent median stock depletion $SB_{recent}/SB_{F=0}$ = 0.48, is close to the interim TRP calibrated to be 0.50 based on the 2024 assessment.
- Median F_{recent} is below F_{MSY}
- There is zero probability of breaching the limit reference point (LRP) for the recent stock status and the projected stock status under recent fishing levels.

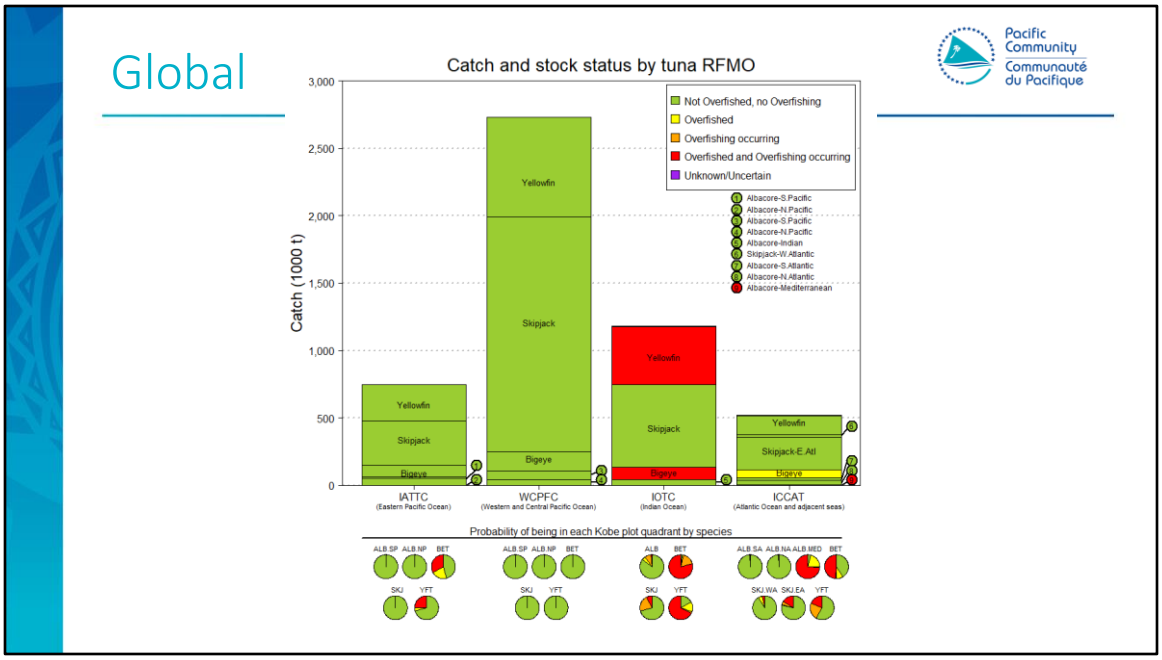
- **Stock is not overfished or undergoing overfishing.**



These figures show the stock status summaries for the four tuna stocks on a Majuro plot (left) and Kobe plot (right). The ellipses or irregular kernels indicate the ranges of uncertainty for each assessment of stock status. The points indicate the median estimates from the uncertainty grids or ensemble of models used for management advice in each assessment.

- The median stock status is close to target objectives for all stocks.
- Bigeye continues to have the most depleted stock status and highest relative fishing mortality.
- While skipjack, yellowfin and south Pacific albacore have similar stock status, relative fishing mortality is higher for yellowfin, followed by skipjack then south Pacific albacore.

Global



This figure compares stock status of tuna across the four key species for all tuna RFMO regions. Pie charts show probability of the stock status being in each quadrant of the Kobe plot.

- **Stocks in the Pacific Ocean (WCPFC and IATTC)** based on the most recent assessments are all classified as: **not overfished and not undergoing overfished.**
- **Bigeye and yellowfin in the Indian Ocean (IOTC)** are classified as: **overfished and undergoing overfishing.**
- **Bigeye in the Atlantic Ocean** is classified as: **overfished but not undergoing overfishing.**

Billfish and sharks

Billfish (MSY default reference points)

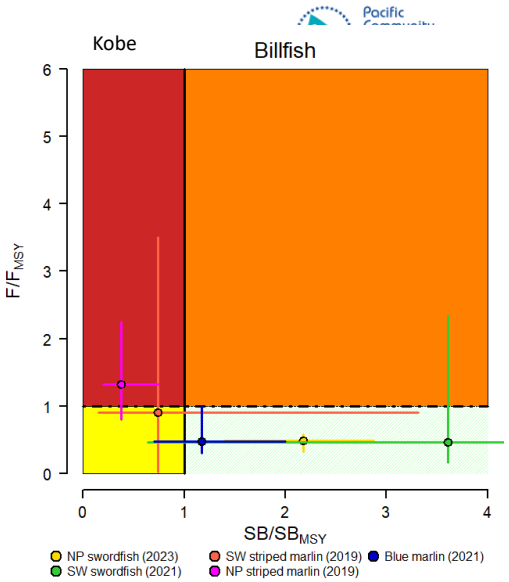
SPC assessments

Southwest Pacific striped marlin

- Assessed 2024 (last data year 2022), assessment not accepted for management advice, more technical work to do and present to SC21 in 2025.
- Management advice per 2019 assessment: *likely overfished close to undergoing overfishing*

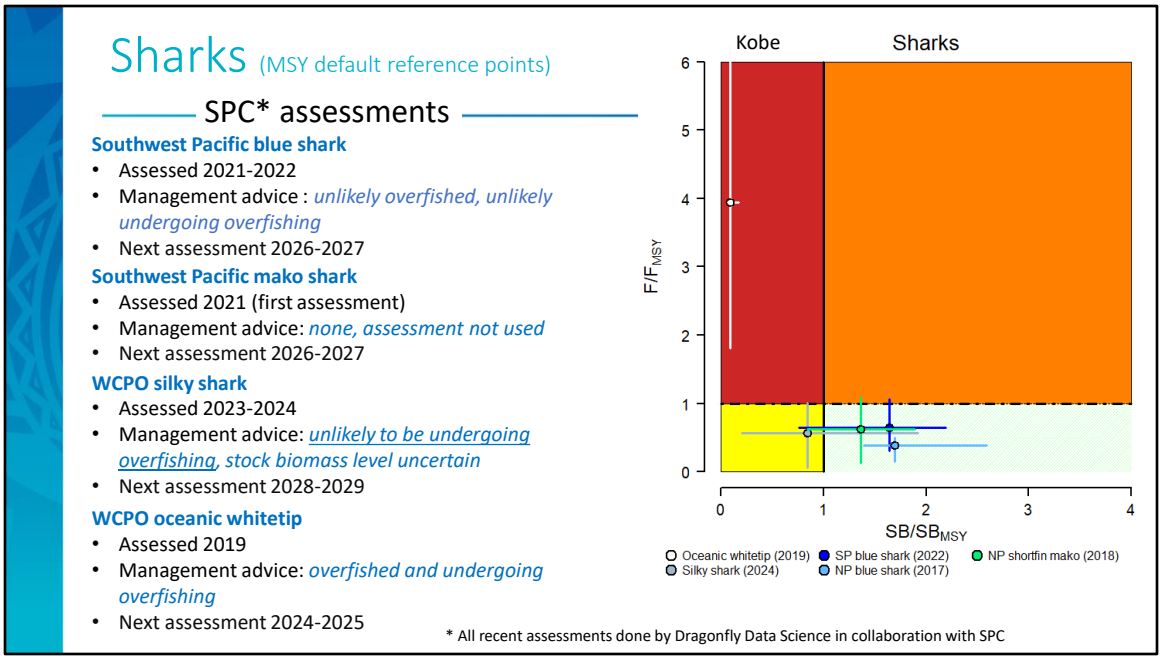
Southwest Pacific swordfish

- Assessed 2021 (last data year 2019)
- Management advice: *not overfished not undergoing overfishing*
- Next assessment 2025



SPC is responsible for the assessment of two billfish stocks: southwest Pacific striped marlin and southwest Pacific swordfish. The billfish are typically assessed every 4 years. The other stocks indicated in the Kobe plot are assessed by the ISC. There is no Majuro plot for billfish as there are no WCPFC agreed limit or target refence points for depletion ($SB/SB_{F=0}$), so stock status is assessed in relation F_{MSY} and SB_{MSY}. The points indicate the median estimates and bars the 95%iles.

- **Southwest Pacific striped marlin** was assessed in 2024, unfortunately issues with that assessment and the data used could not be resolved in the time available, and the assessment was not accepted for management advice. It will undergo more work and be re-presented next year. The stock status remains from the 2019 assessment: **likely overfished and close to undergoing overfishing.**
- **Southwest Pacific swordfish** was assessed in 2021: **not overfished and not undergoing overfishing**
- Across all the billfish, striped marlin have the worst stock status for both the south and north Pacific stocks.



This figure summarise the stock status of key sharks based on most recent assessments. Sharks are typically assessed every 5-6 years. They are now assessed across a 2 year period, the first year is focussed on data inputs and second year on the assessment. SPC has responsibility for the assessment of 4 shark stocks and has recently been contracting shark assessments to Dragonfly Data Science. There is no Majuro plot for sharks as there are no WCPFC agreed limit or target refence points for depletion ($SB/SB_{F=0}$), so stock status is assessed in relation F_{MSY} and SB_{MSY}. The points indicate the median estimates and bars the 95%iles.

- **Southwest Pacific blue shark**: last assessed 2021-2022: **unlikely overfished, unlikely undergoing overfishing.**
- **Southwest Pacific mako shark**: last assessed 2021 (first assessment attempt): assessment unsuccessful, **stock status is uncertain**.
- **WCPO silky shark**: last assessed 2024: **unlikely being overfished, but stock biomass is uncertain.** The conclusion that this stock is now unlikely to be undergoing overfishing is an improvement from the previous assessment that concluded that the stock was likely being overfished. The biomass trend is now increasing, suggesting the stock is recovering.

- **WCPO whitetip shark**: last assessed 2019: **overfished and subject to overfishing**.
- Stock status remains the worst for Oceanic whitetip and then silky shark.

Thanks

TFAR 2023
Coming soon!