

(The great) tuna fisheries of the Western and Central Pacific Ocean

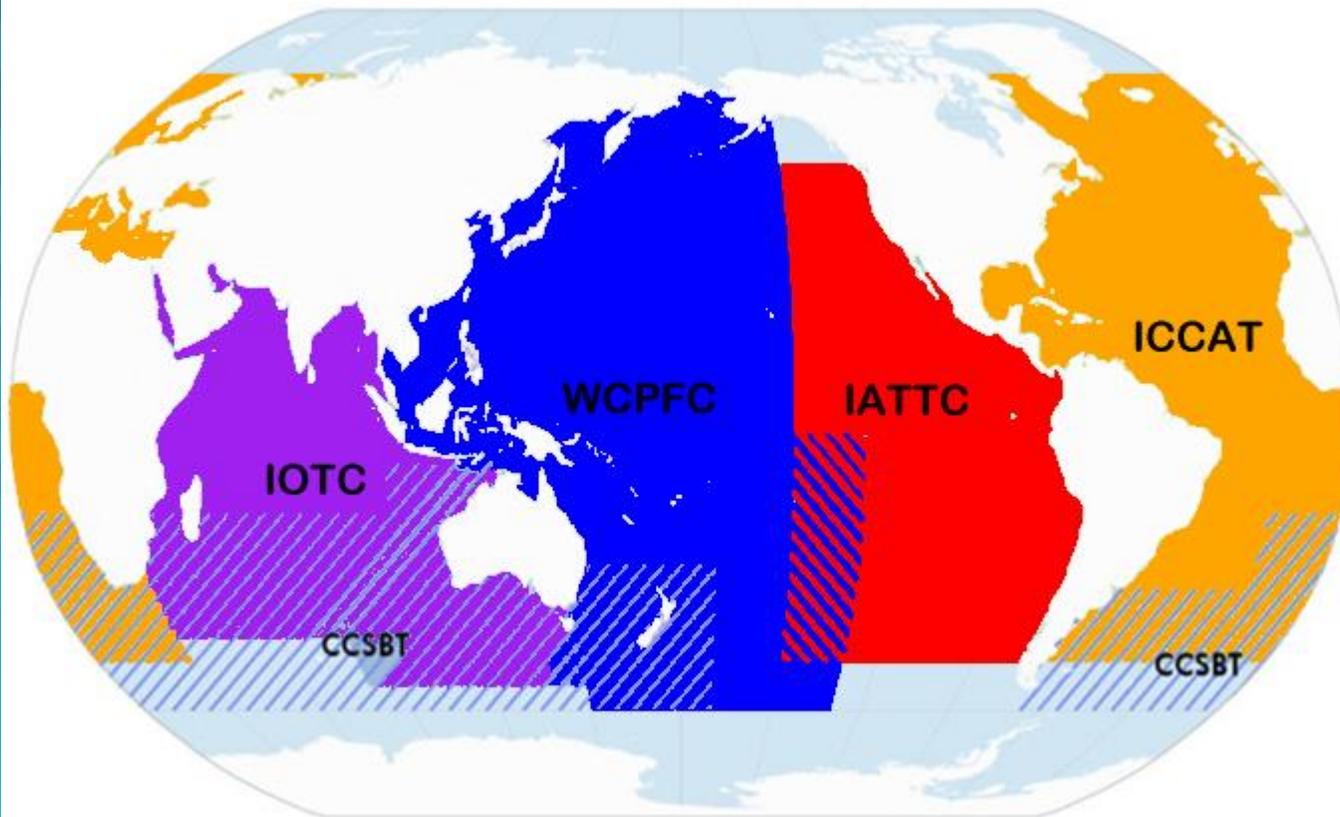
An overview of the stocks, their status and outlook

Talk outline

1. Food and financial dependency of PICTs on the great tuna fisheries
2. Biology and distribution of major tunas
3. The WCPO tuna fisheries, by the numbers
 - a. Size of fleet
 - b. Size of catch
 - c. Who and where are the fish caught
4. Bycatch taken in the fisheries
5. Status of stocks and outlook
6. Management of stocks
7. How to maintain mgmt. in face of climate change

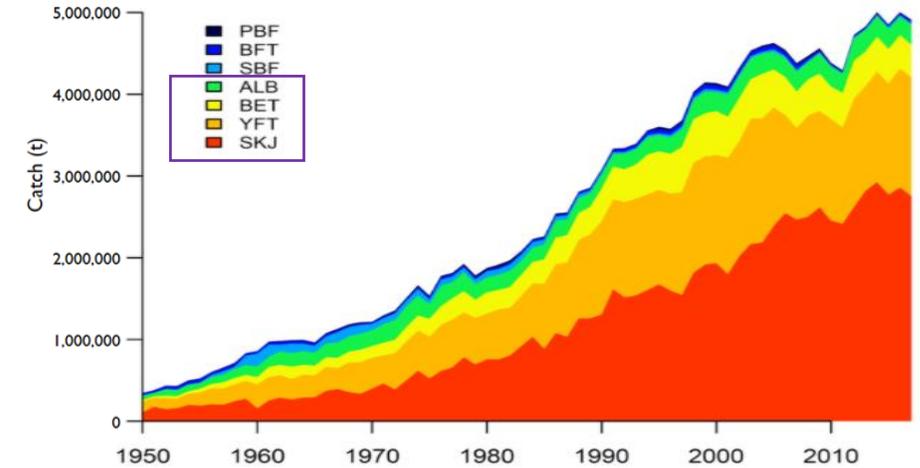
The Tuna Regional Fisheries Management Organizations (RFMOs)

The world's tunas are managed by five RFMOs

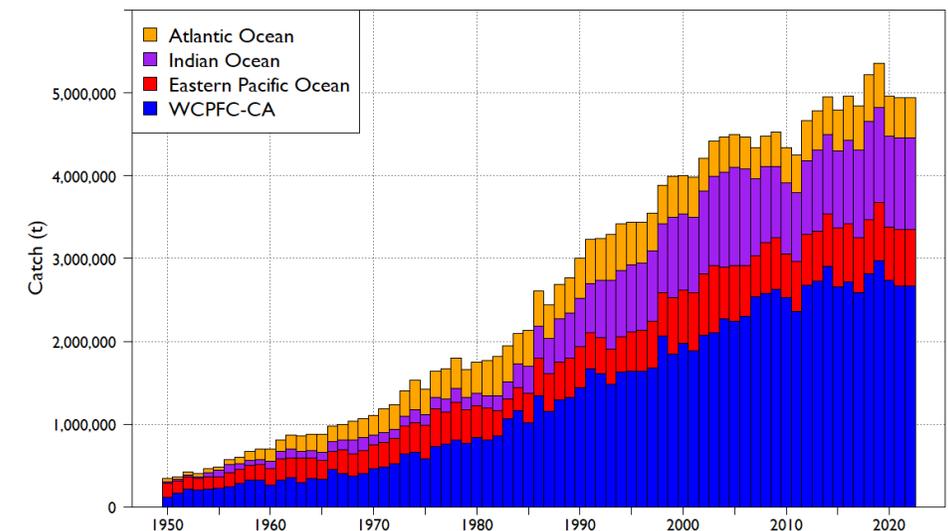


Adapted from PEW info diagram

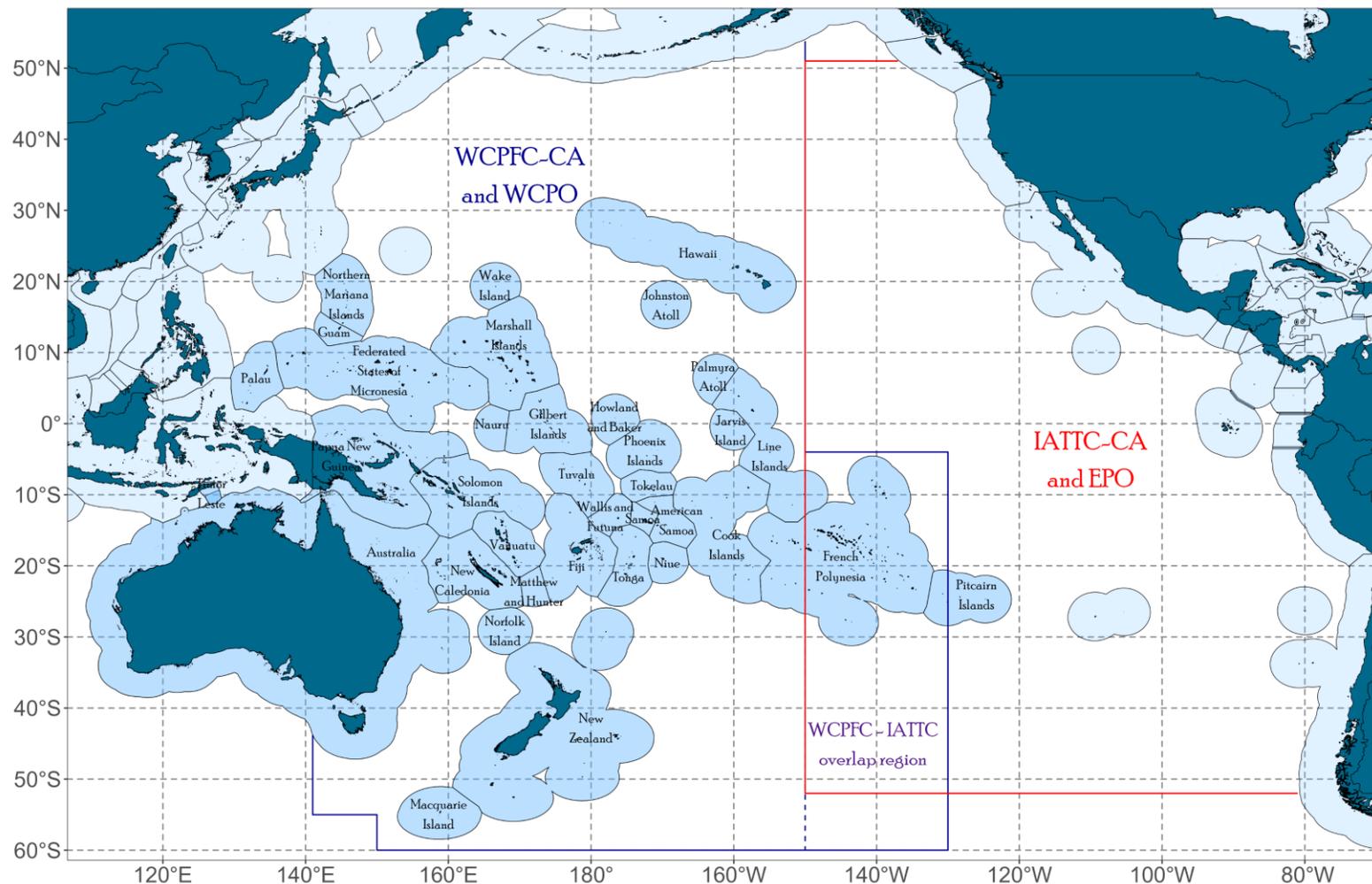
Catch by species



Catch by ocean basin



The Western and Central Pacific Ocean (WCPO), Pacific Island Countries and Territories (PICTs), Exclusive Economic Zones (EEZs)



The WCPO covers roughly 100,000,000 km².

This is about 20% of the world's surface area.

Half of the WCPO is comprised of the “high seas”, i. e., waters outside any EEZs

How important are fish to the people of the WCP?

Food security, protein and health

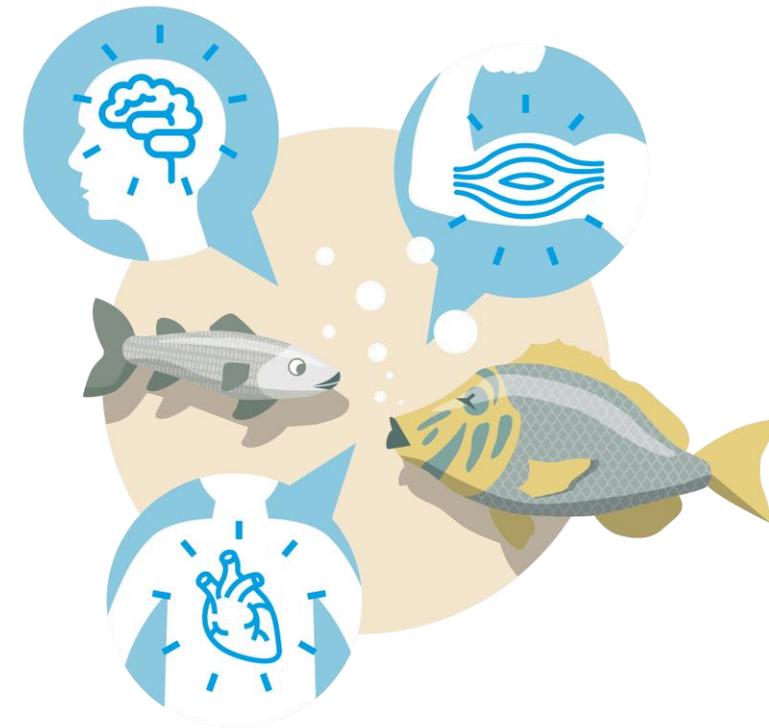
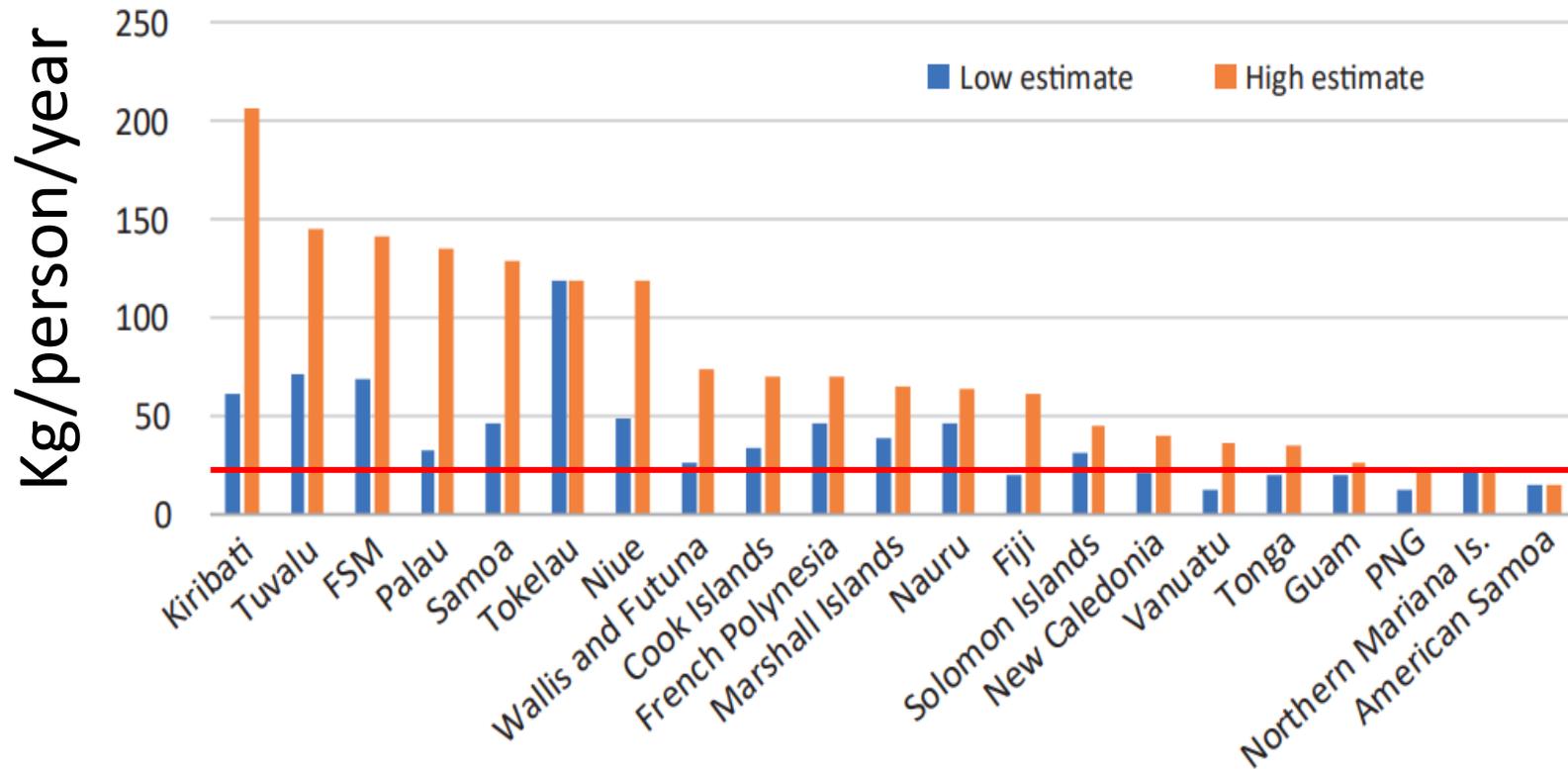
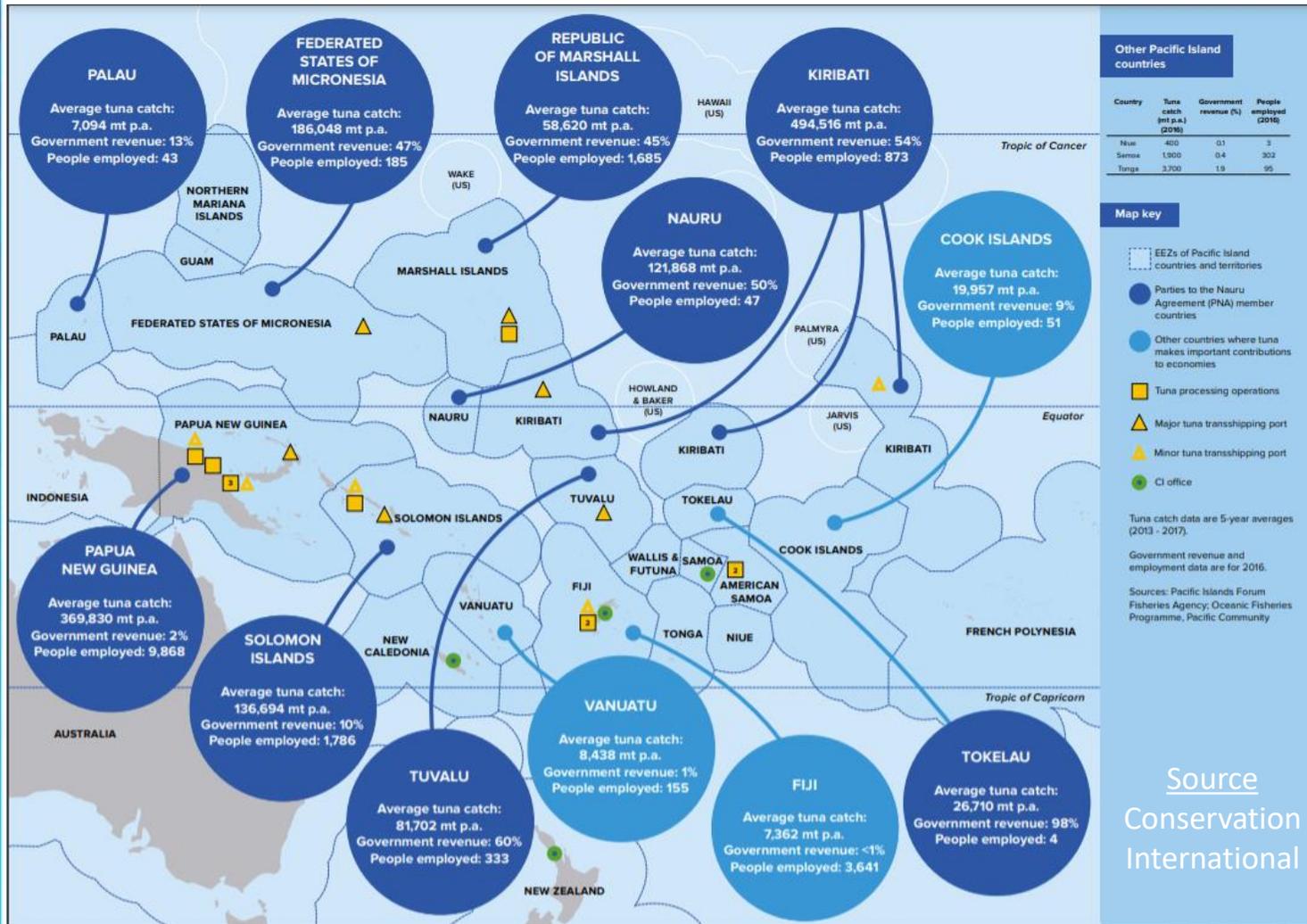


Figure 34-1: Ranges in estimates of annual per capita fish consumption (kg/person/year)

How important are the tuna fisheries of the WCPO?

Govt. revenue and employment



Source
Conservation
International

Meet the target tuna of the WCPO



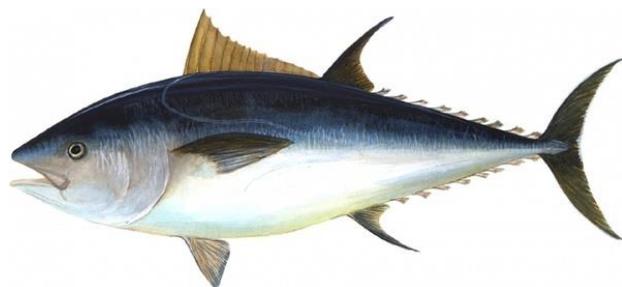
Skipjack tuna *Katsuwonus pelamis*

Max size: 0.8 m and 10 kg
Max age: <10 years



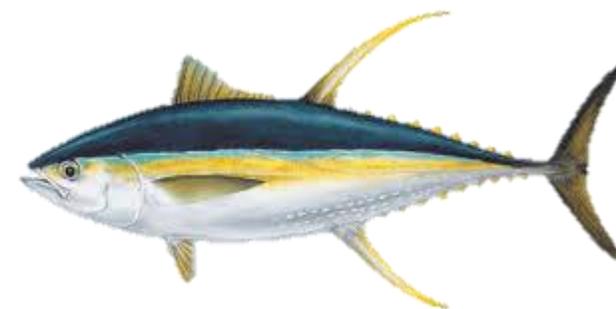
Albacore tuna *Thunnus alalunga*

Max size: 1.2 m and 55 kg
Max age: at least 15 years



Bigeye tuna *Thunnus obesus*

Max size: 2.5 m and 200 kg
Max age: at least 15 years



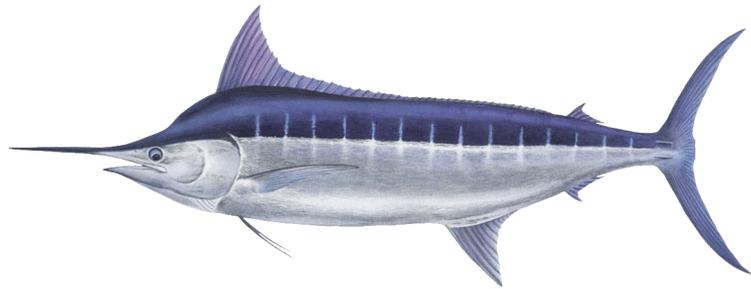
Yellowfin tuna *Thunnus albacares*

Max size: 2.4 m and 200 kg
Max age: at least 15 years

Note: Southern bluefin tuna also a target species, but managed separately; recent catches ~ 17,000 mt

Some important bycatch species

Billfish



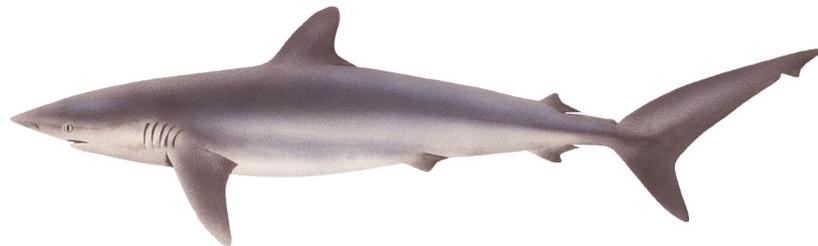
Large pelagics



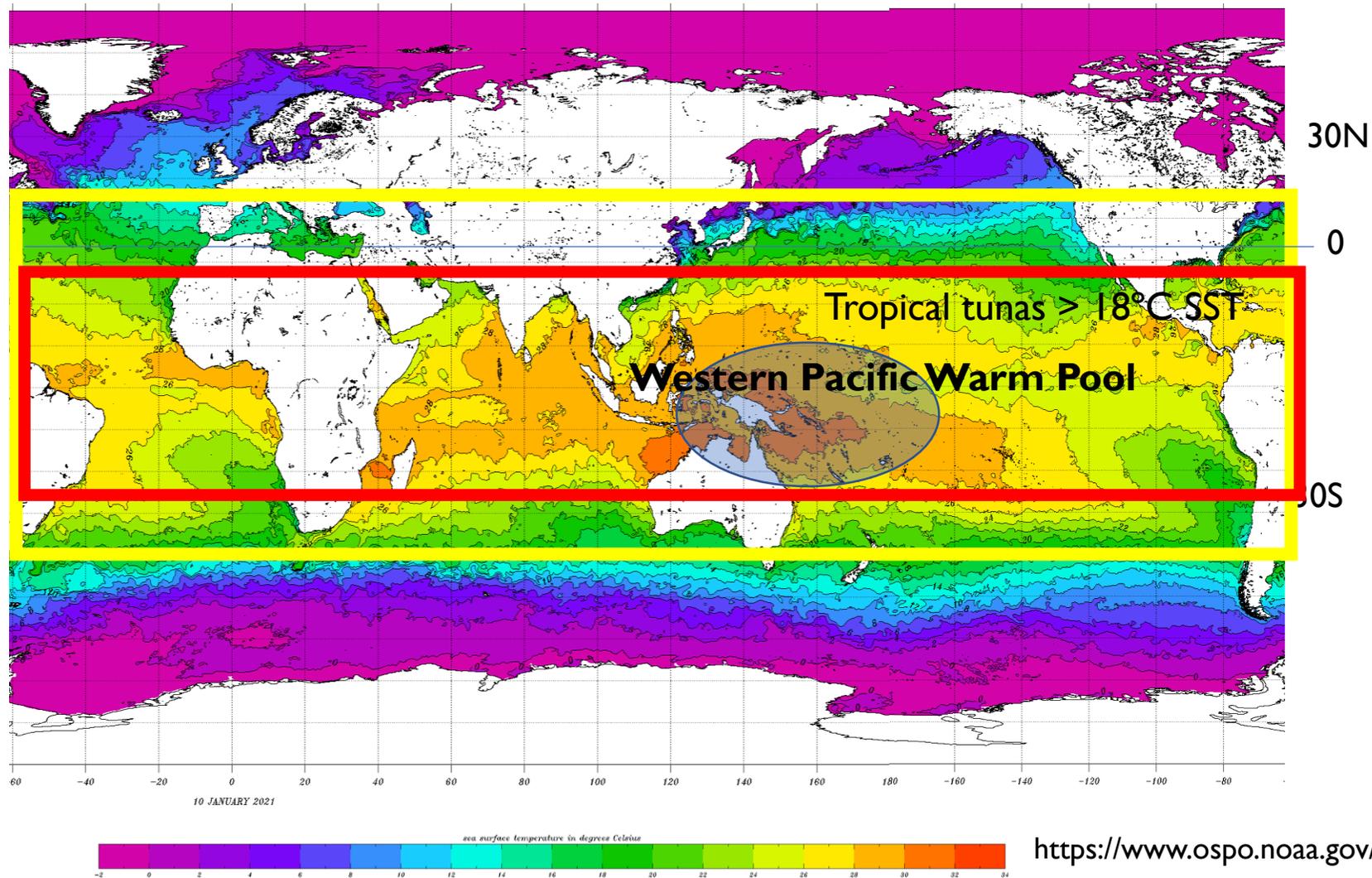
Sharks



Species of special interest (SSIs)

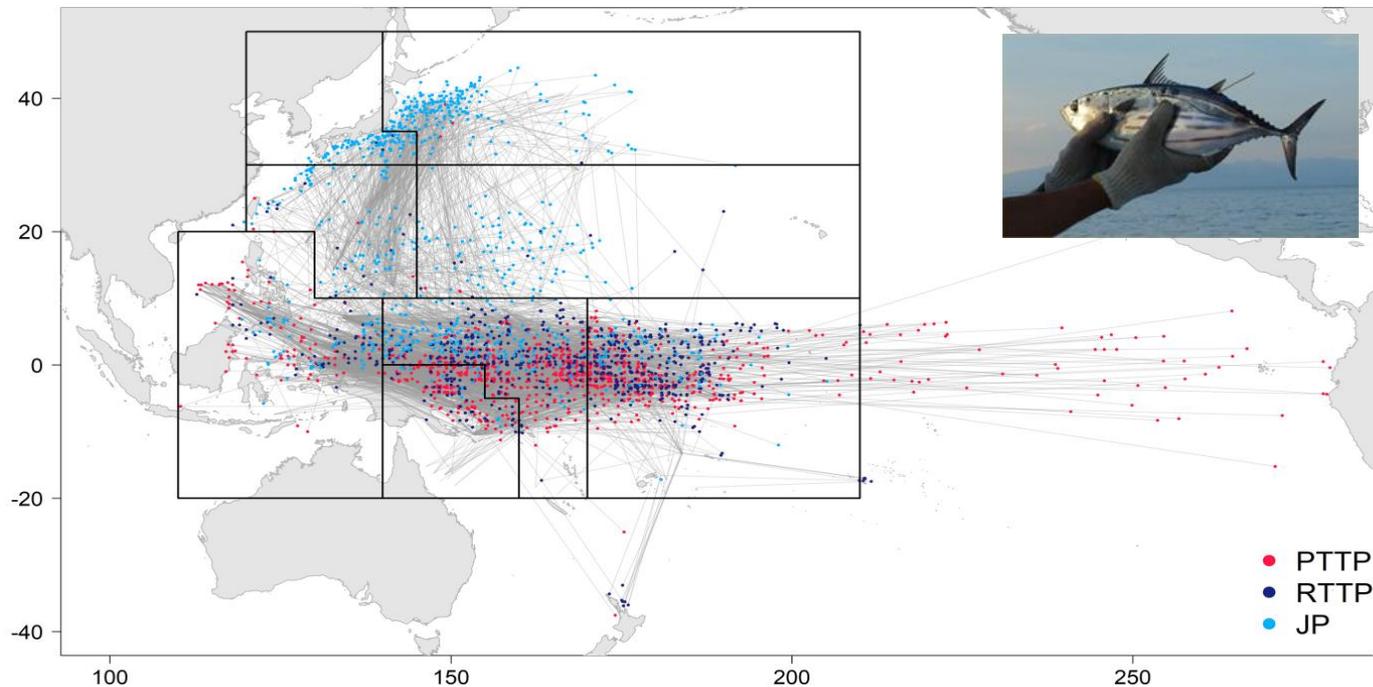


All 4 species are found in all the global oceans



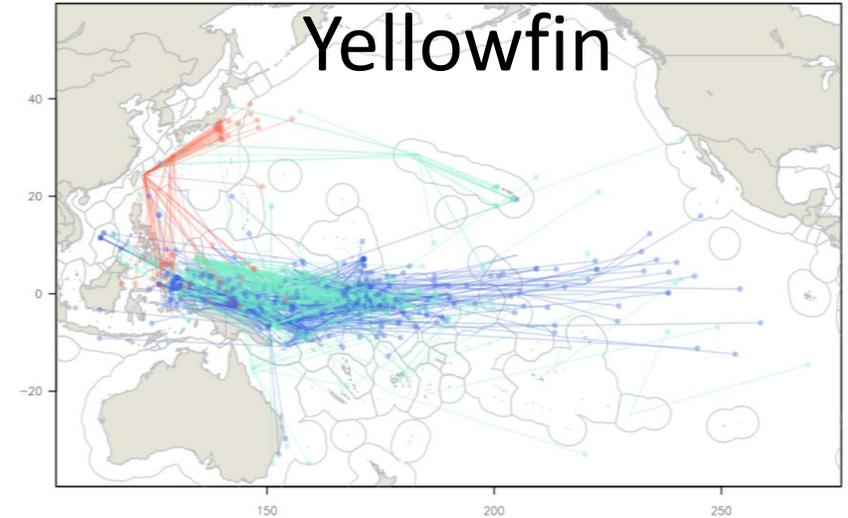
Tuna movement - horizontally

Skipjack

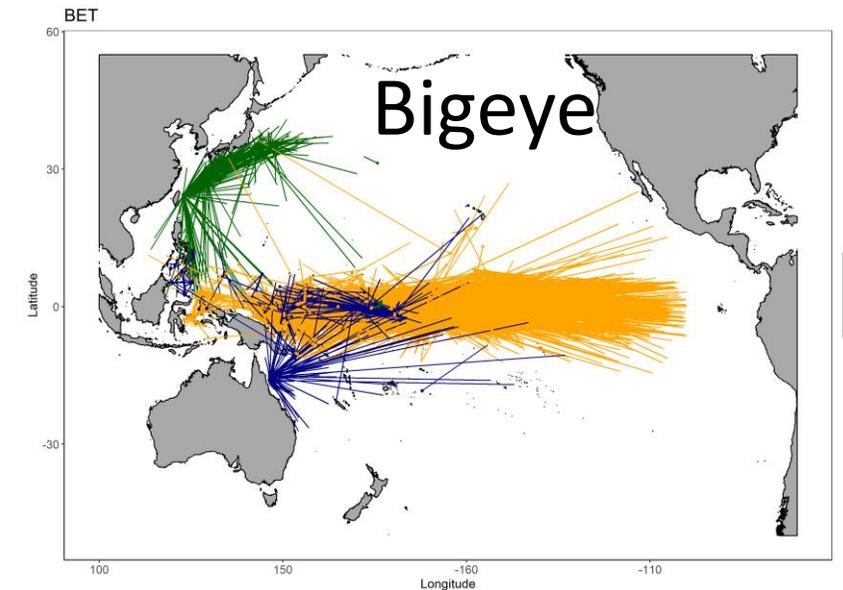


About 500,000 skipjack have been tagged in the WCPO

Yellowfin

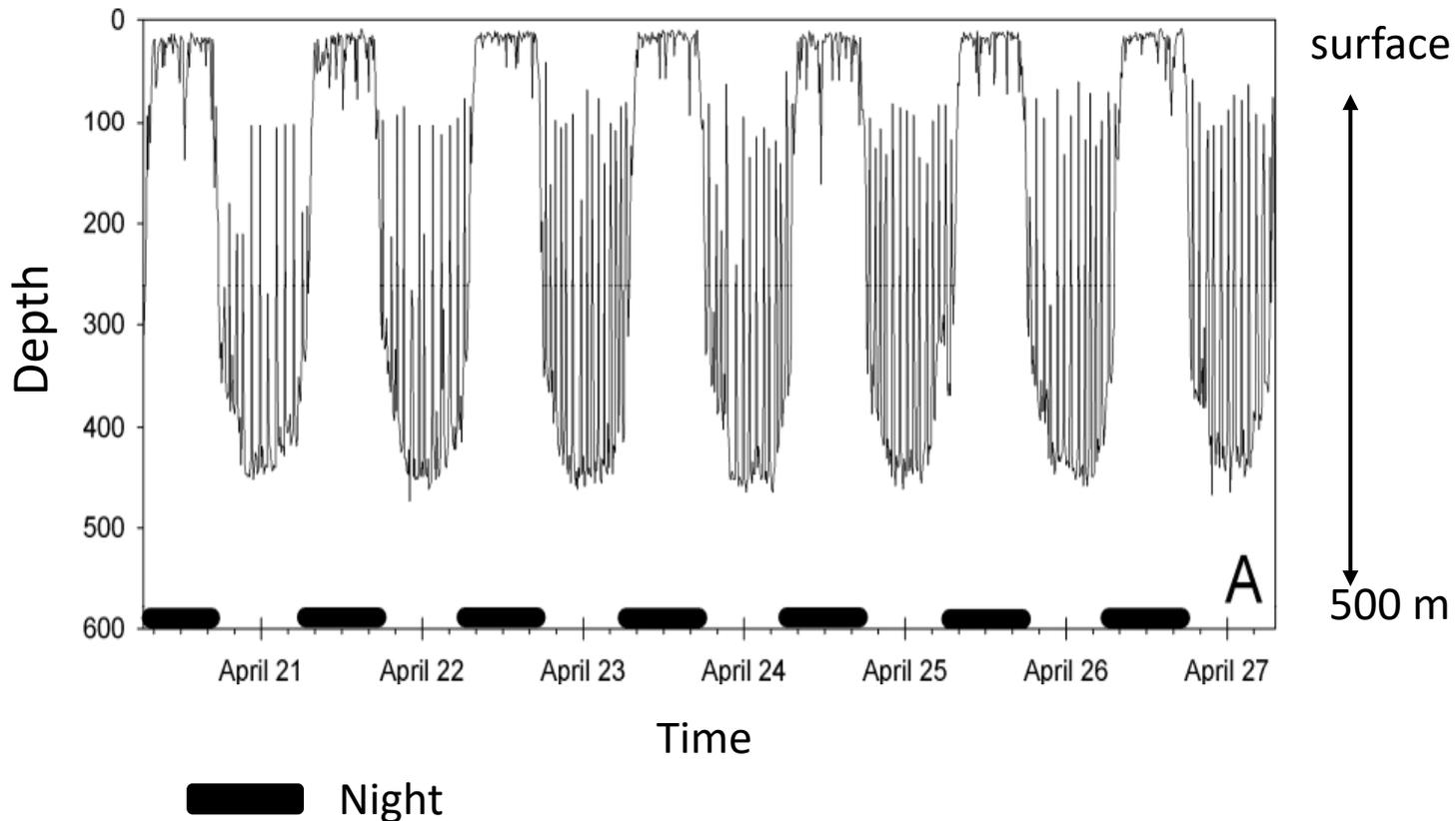


Bigeye



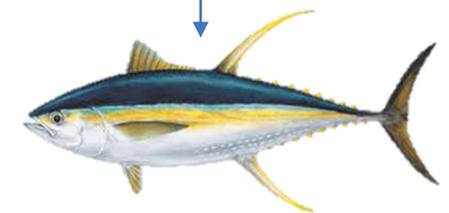
Tuna movement - vertically

Daily depth profiles from electronic tags



Bigeye

Albacore



Yellowfin
Skipjack

Brill et al.

Col. Vol. Sci. Pap. ICCAT, 57(2): 142-161 (2005)

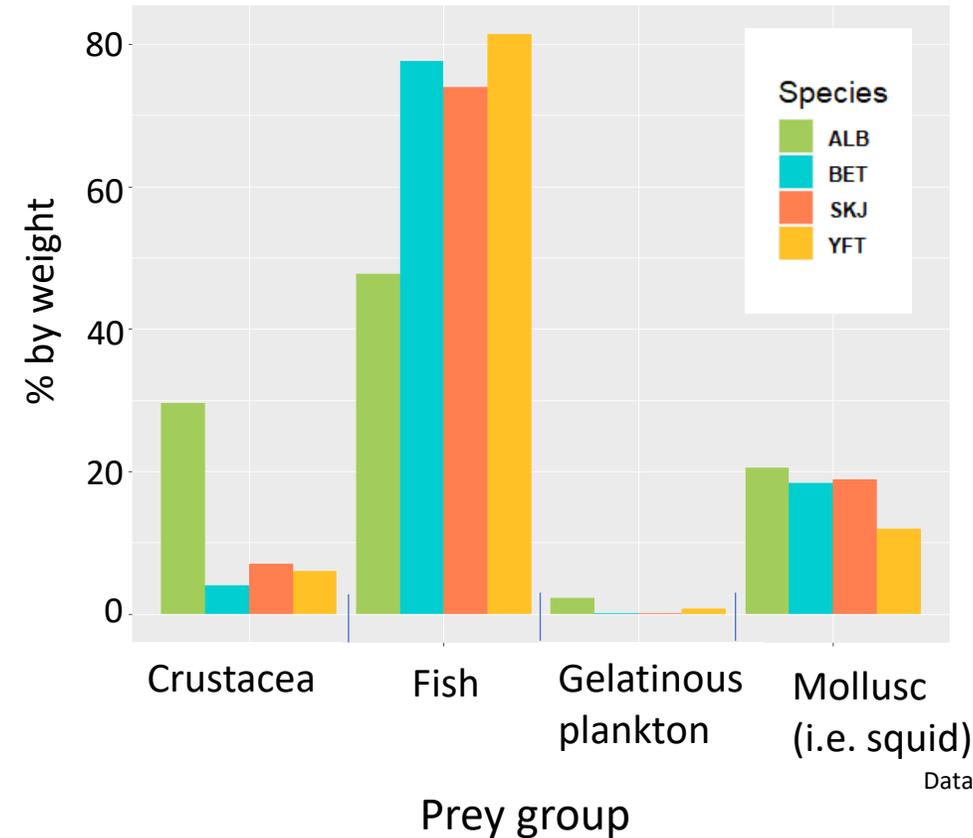
Williams et al. 2015, Deep Sea Research Part II

What do tuna eat?



Skipjack – mostly fish, and bit of squid

Yellowfin, albacore and bigeye – more diverse diets; fish, squids, crustaceans



Data from Valerie Allain, SPC

What eats tuna?

- 10-15 % of billfishes (sailfish and marlins) sampled in the western tropical Pacific had yellowfin tuna in their stomachs
- 30-40% had skipjack in their stomachs.
- Also sharks, e.g. silky sharks
- And other tuna: yellowfin and skipjack prey on smaller skipjack



Humans:
3 million tonnes
from WCPO in 2019

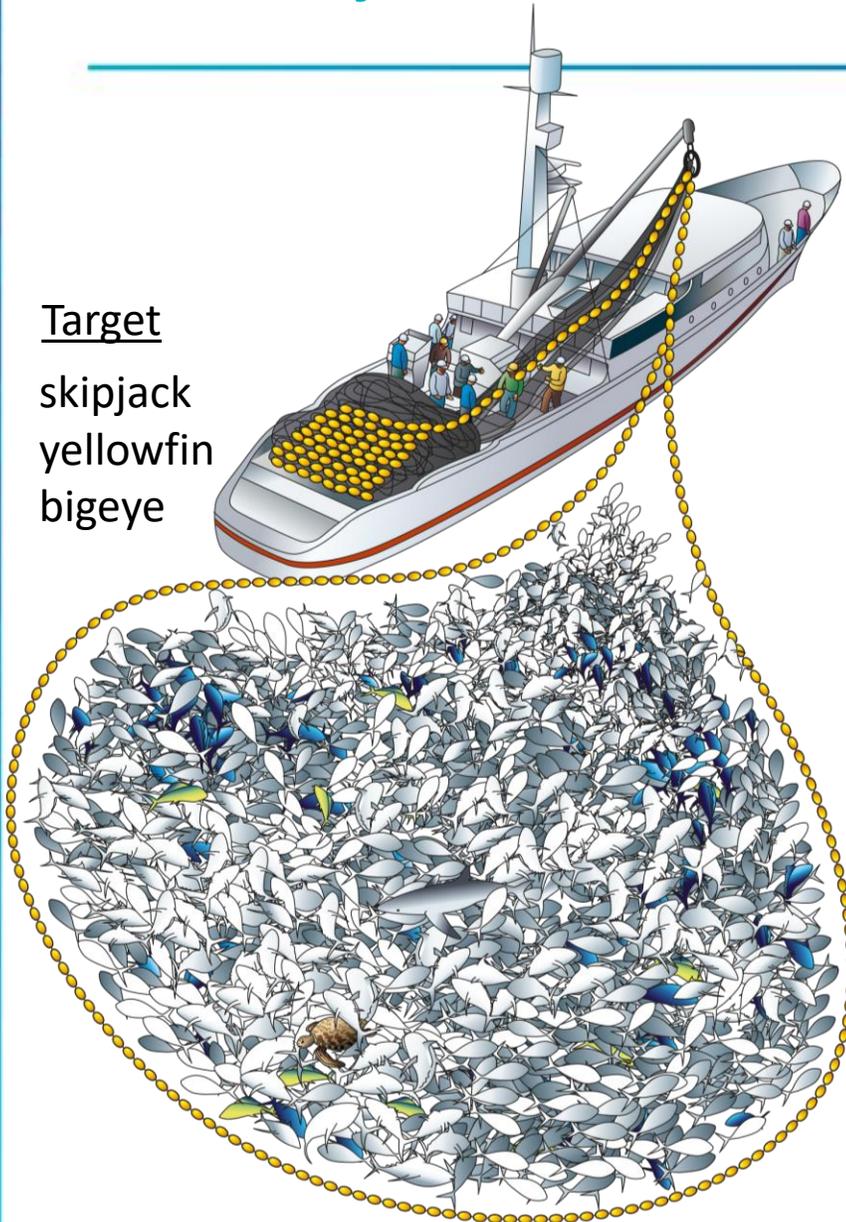
(Hunsicker et al. 2012, MEPS, 445: 263-277)

The major commercial fishing methods in the WCPO

Purse seine (70%)

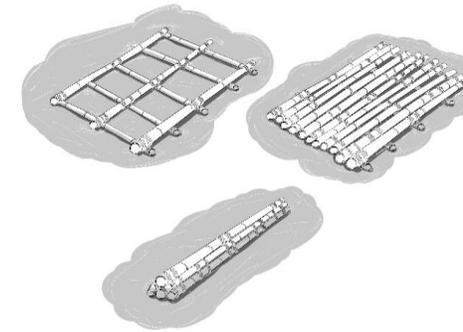
Target

- skipjack
- yellowfin
- bigeye



Drifting Fish Aggregating Device (~ 40% of WCPO*)

A RAFT



Satellite buoys

Most dFADS carry buoys, allows location and presence of fish to be monitored from distance

Submerged APPENDAGES



Increase drag, and attractiveness

Average depth: 50m



© Satlink

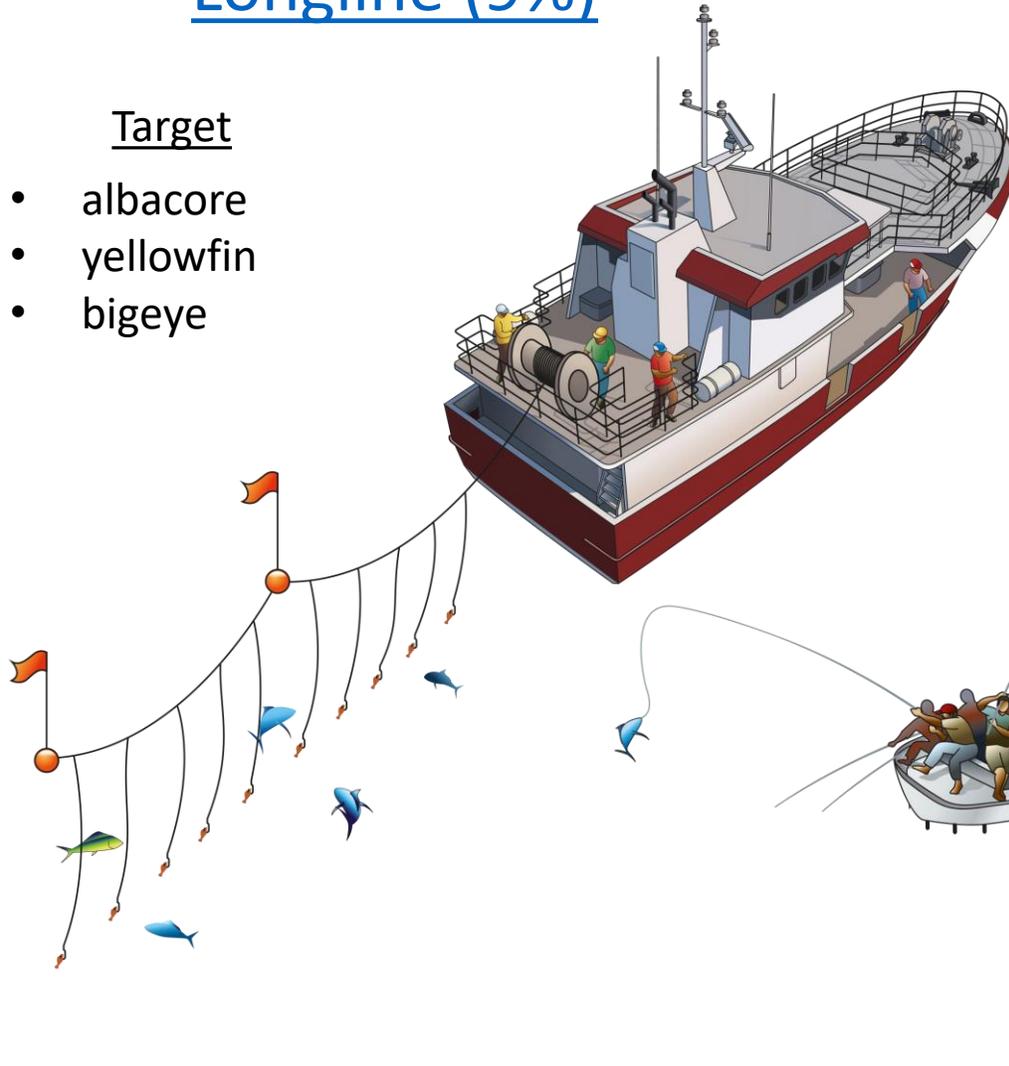
*Compared to 60%, 70% and 80% for E, Pac., Atlantic and Indian Oceans, respectively

The major commercial fishing methods in the WCPO

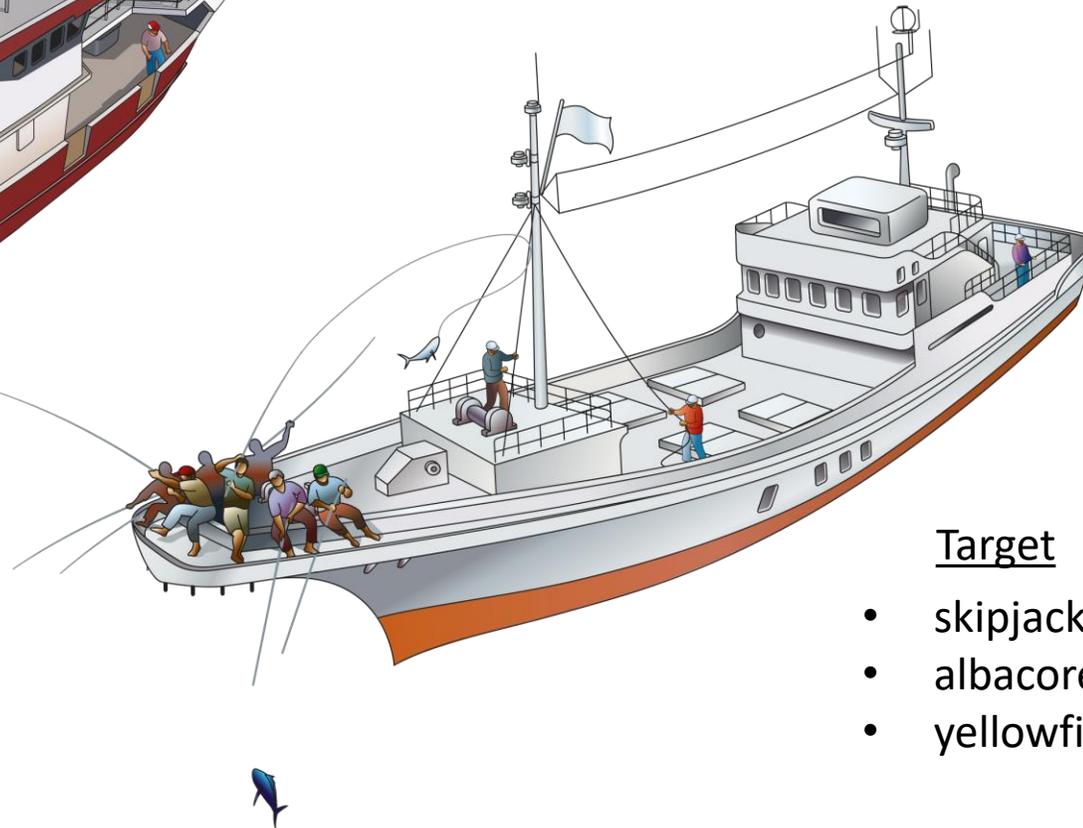
Longline (9%)

Target

- albacore
- yellowfin
- bigeye



Pole and Line (7%)



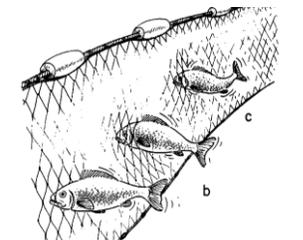
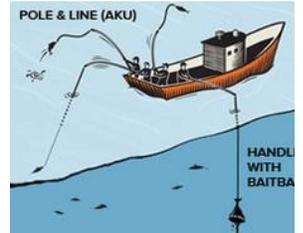
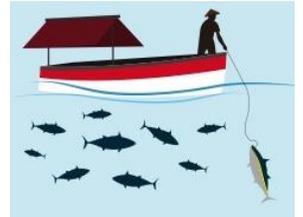
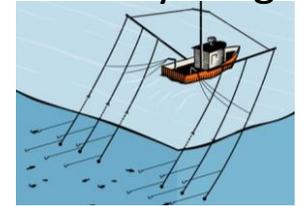
Target

- skipjack
- albacore
- yellowfin

Small-scale (14%)

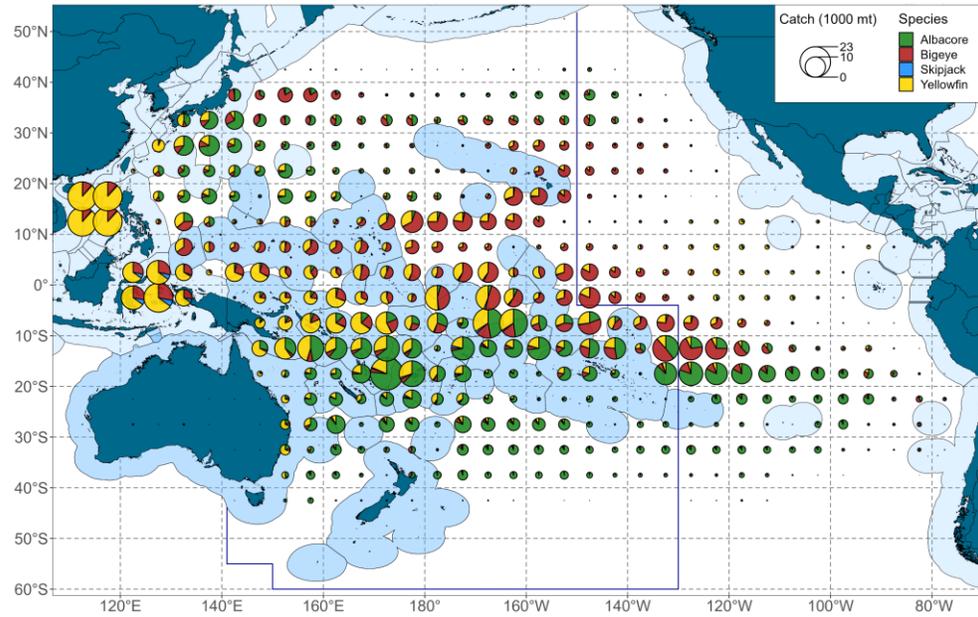
Target

- everything

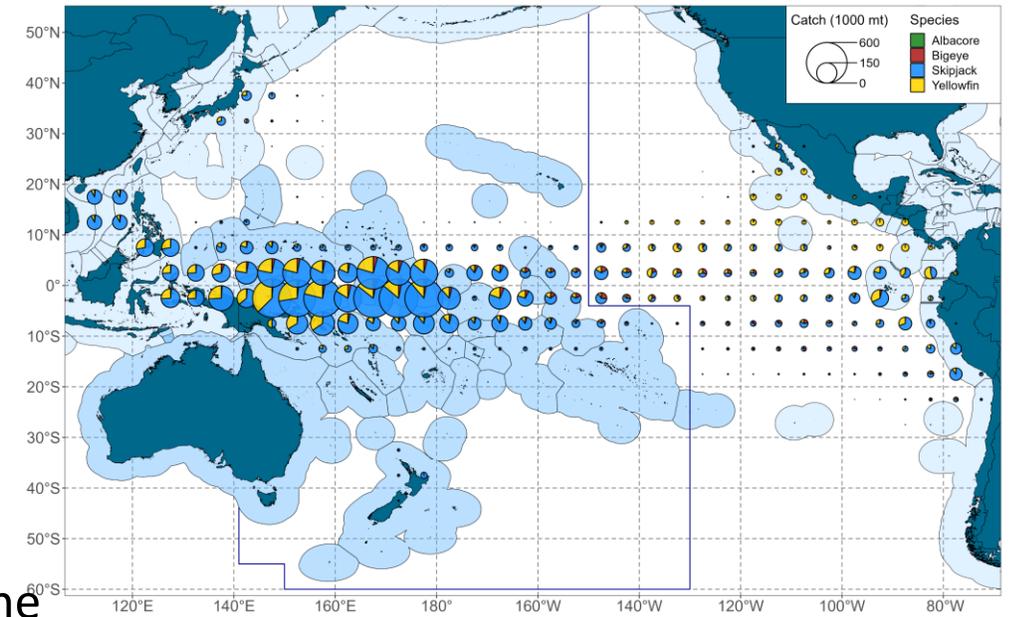


Distribution of catch by gear type

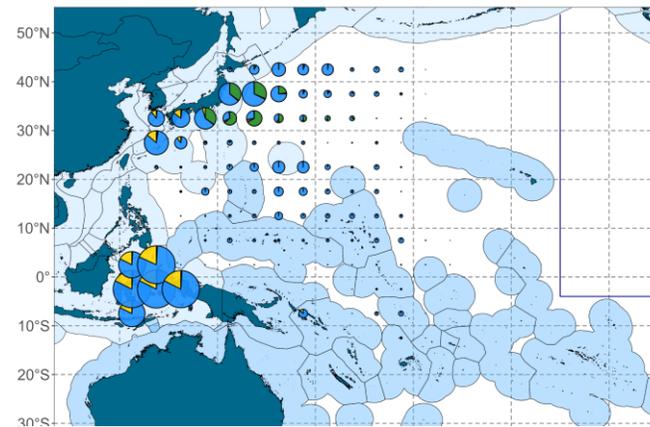
Longline



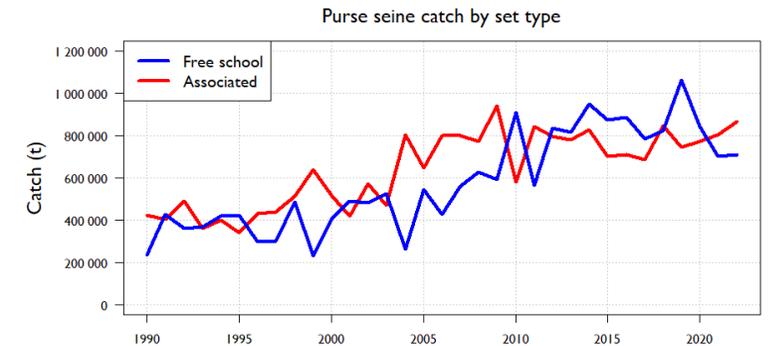
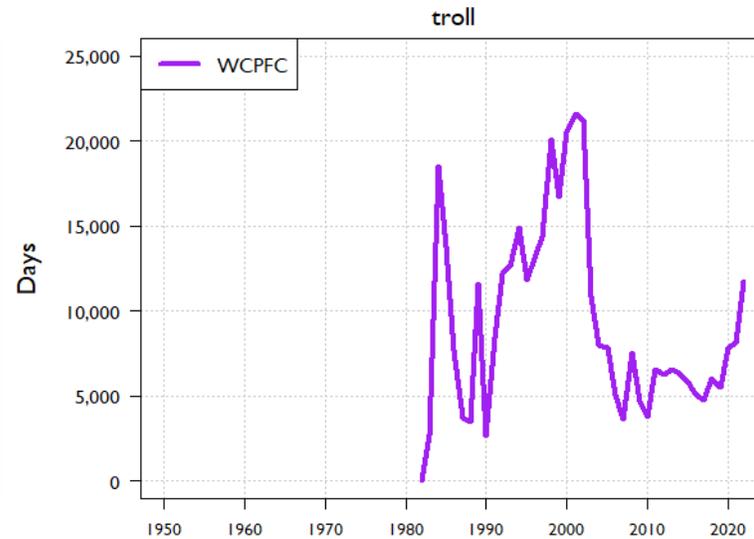
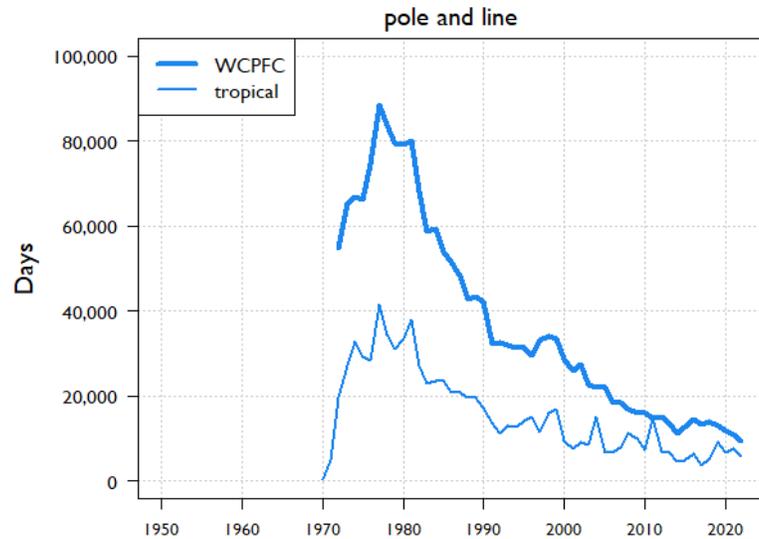
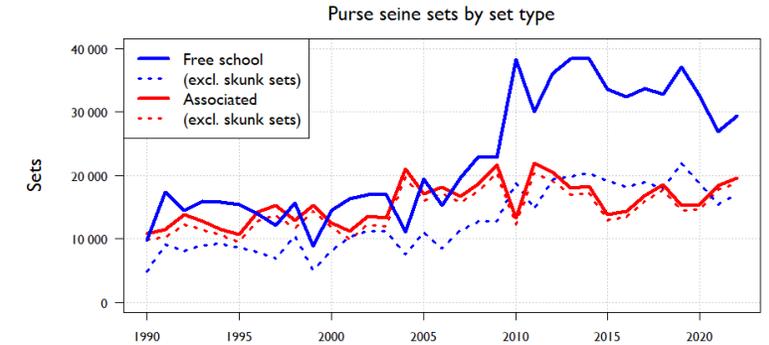
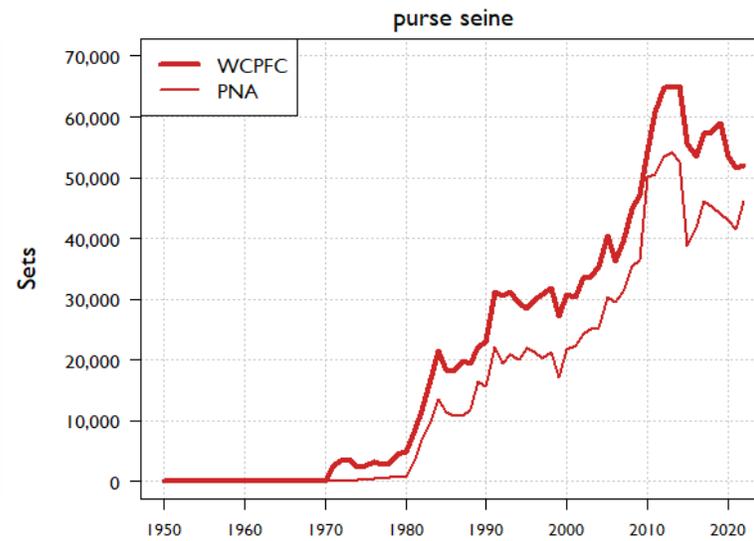
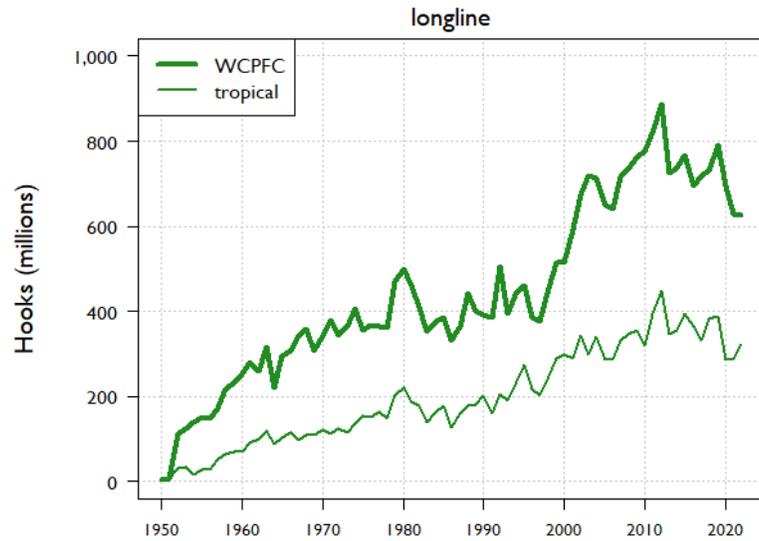
Purse seine



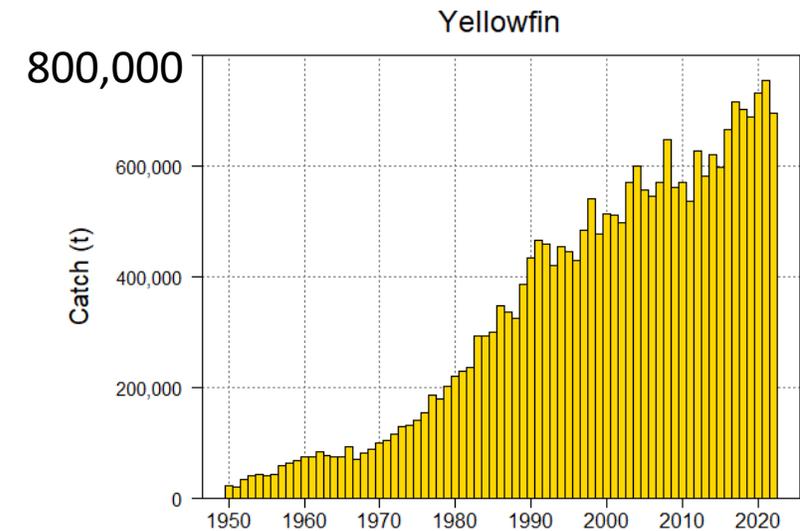
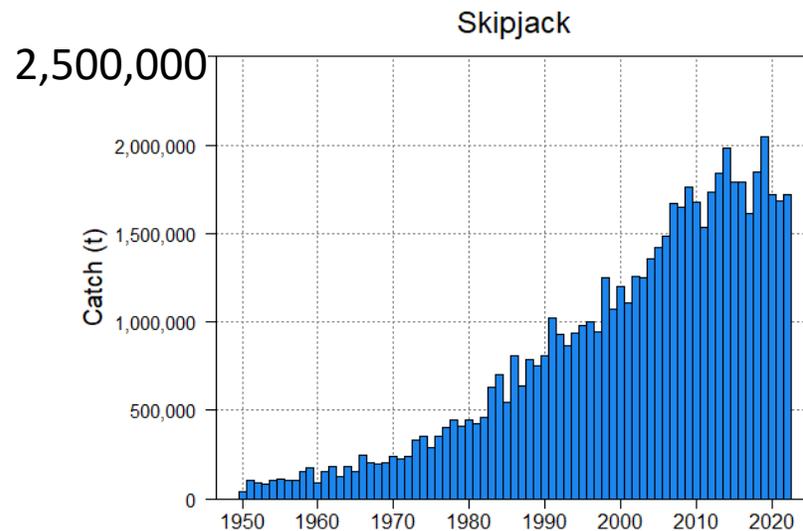
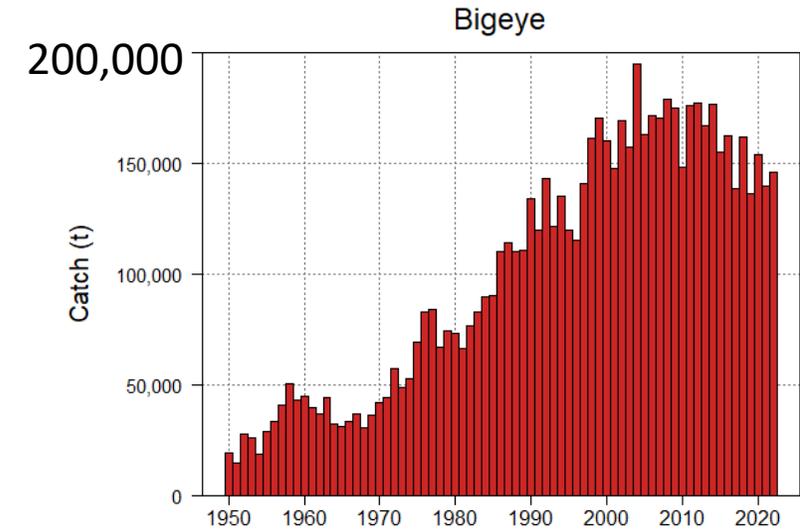
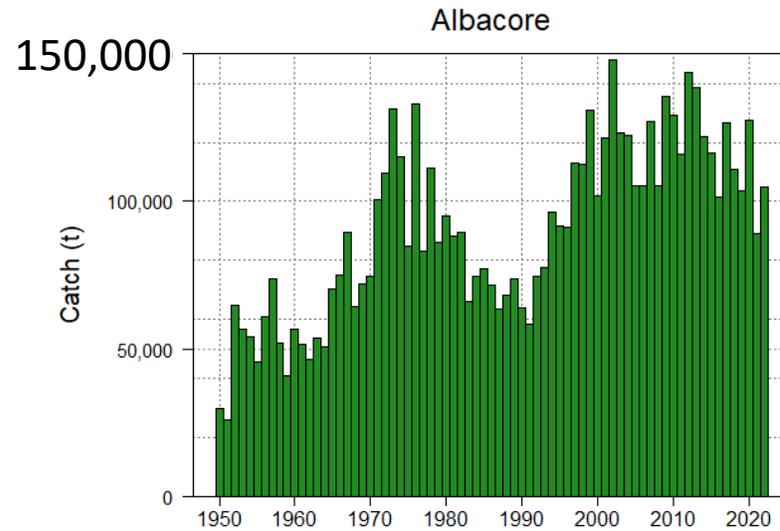
Pole&Line



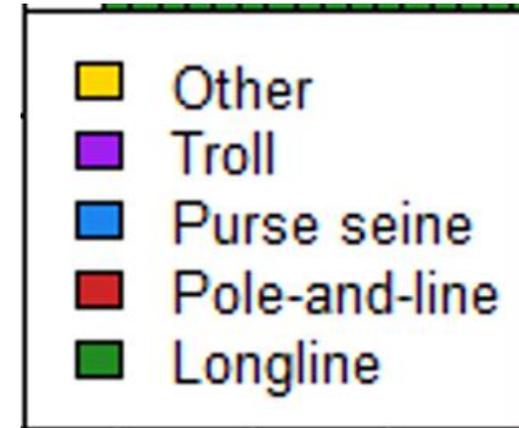
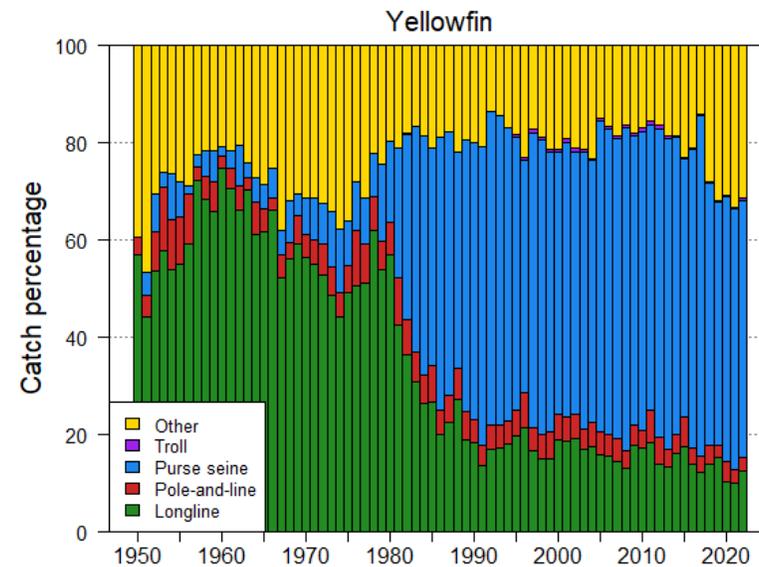
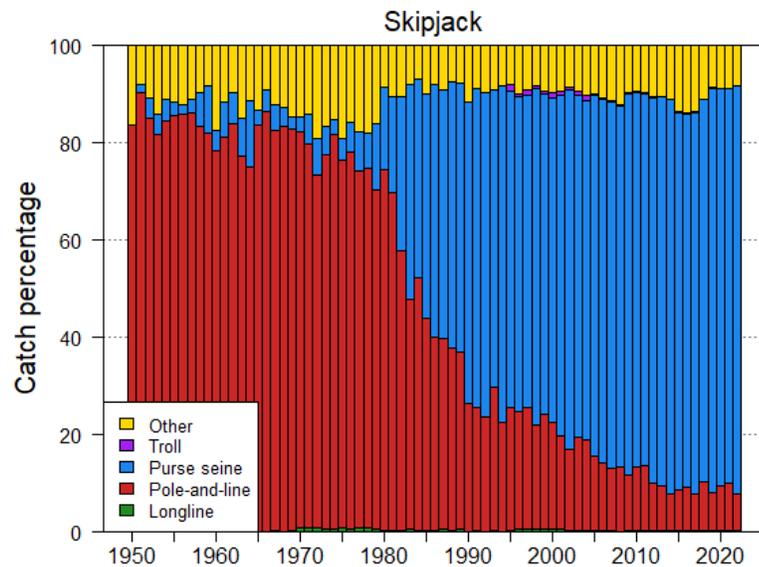
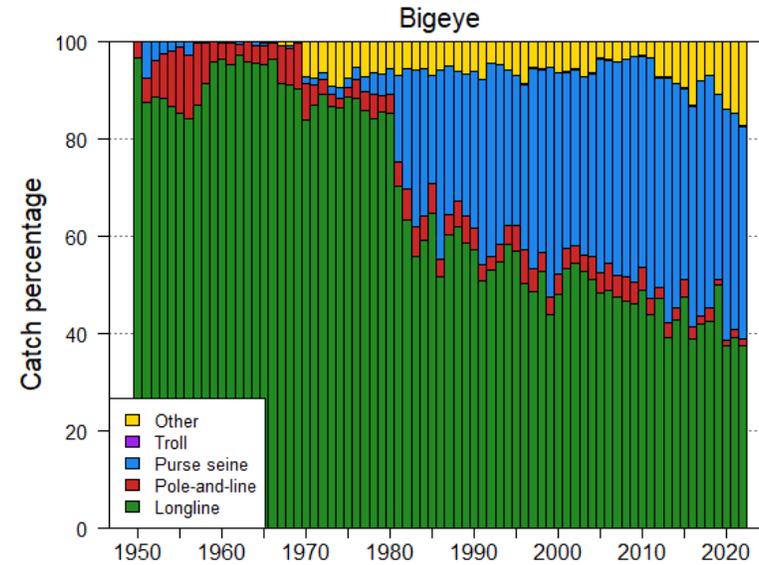
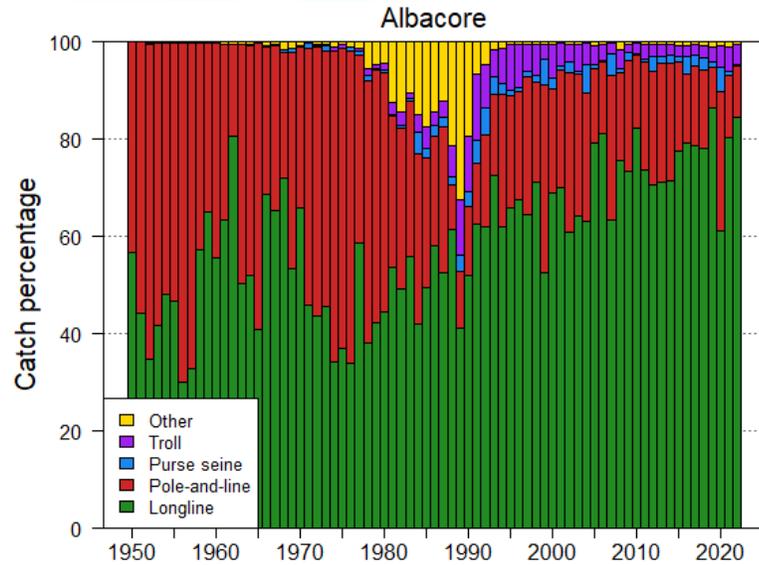
WCPFC fishing effort by gear type



70 years of tuna catch in the WCPFC-CA

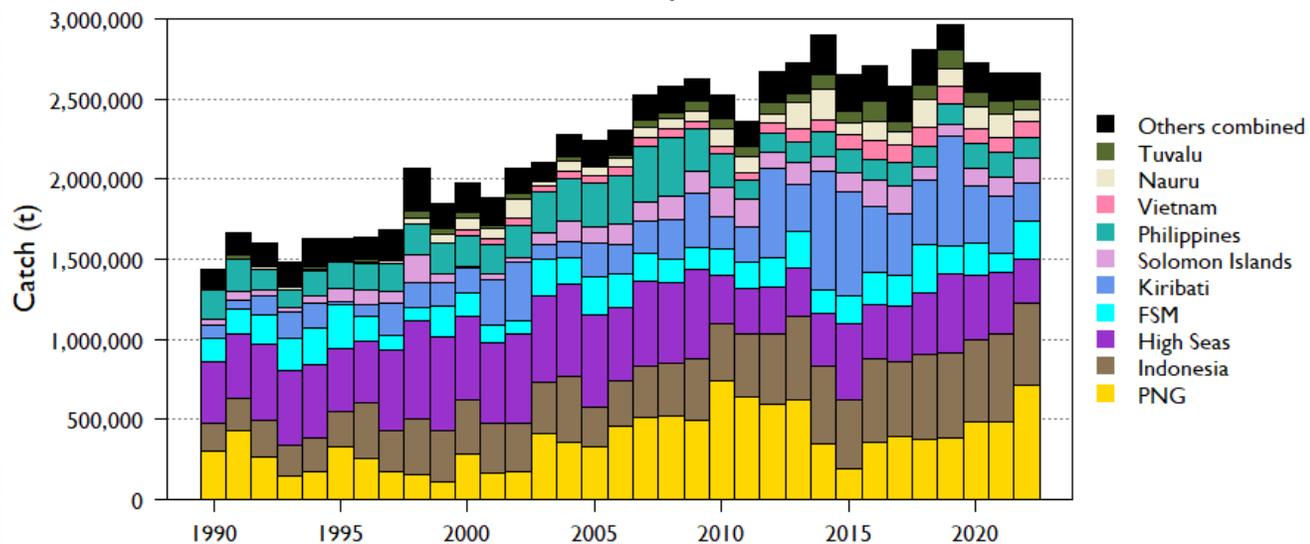


Species catch by gear type

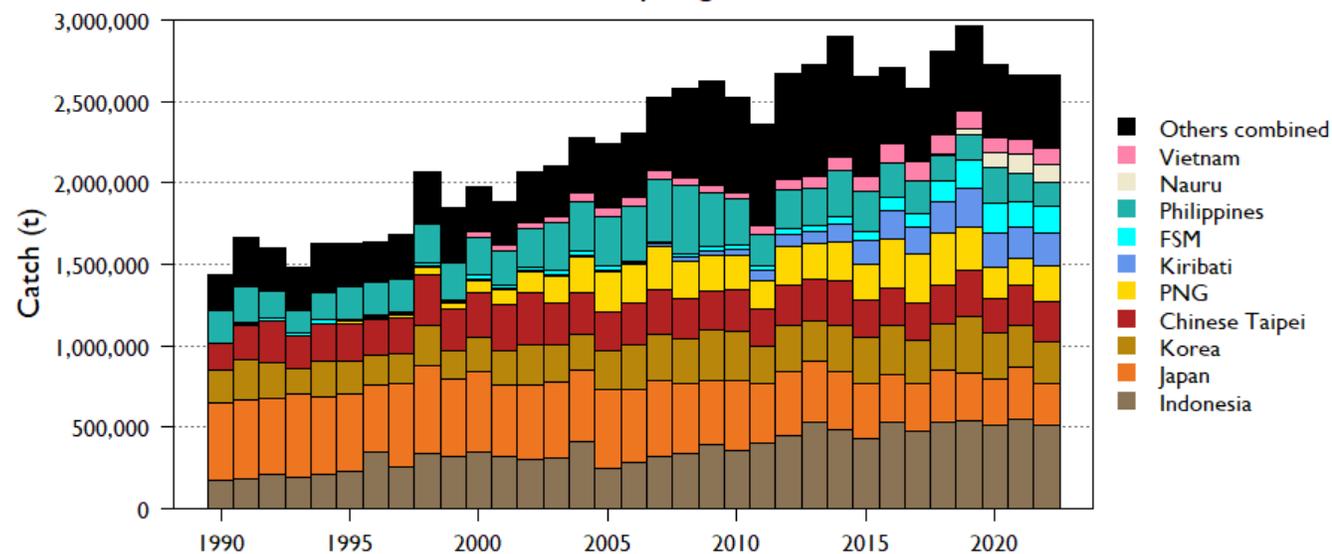


Who catches the tuna where?

Tuna catch by EEZ



Tuna catch by flag nation

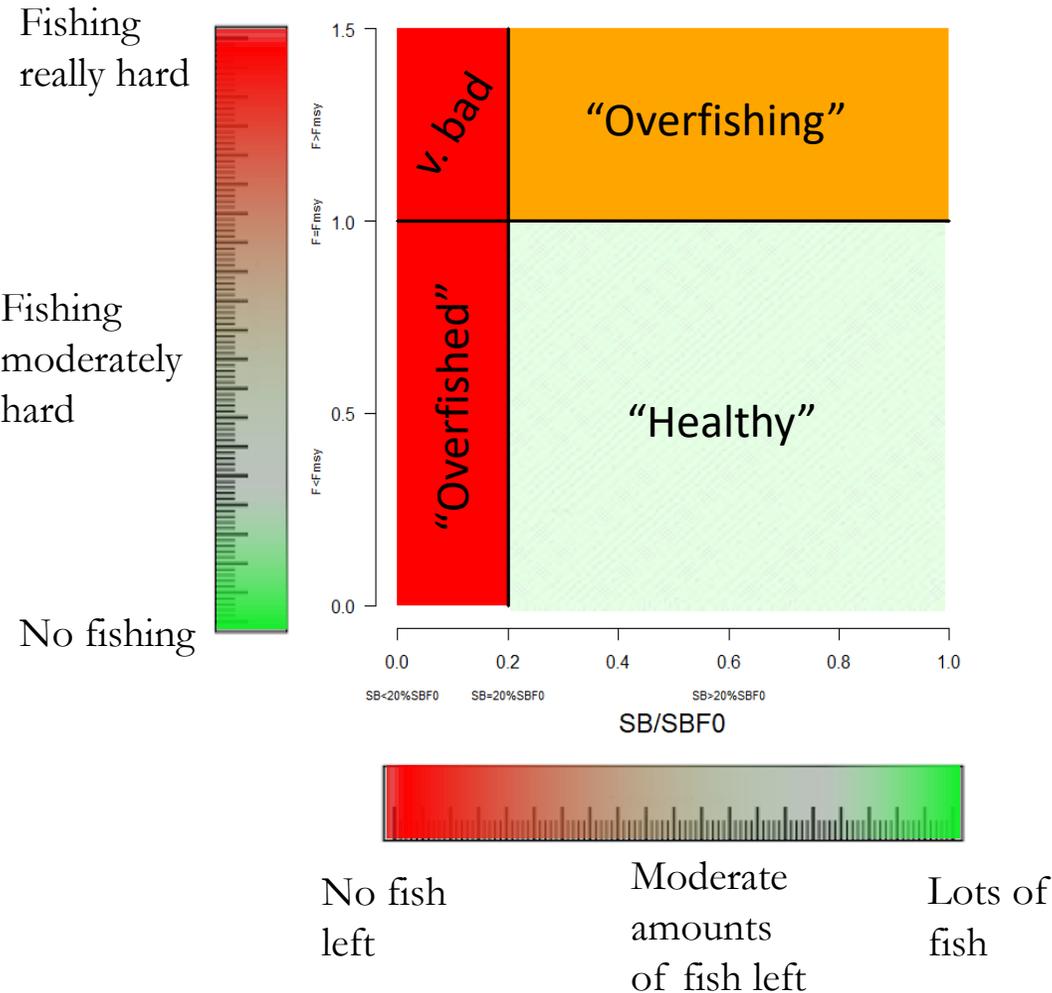


WCPFC Recent and scheduled Stock Assessments

| | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|-----------------------------|--------|------|------|-------------|--------|------|------|------|
| Bigeye tuna | | SA | | | SA | | | SA |
| Yellowfin tuna | | SA | | Peer review | SA | | | SA |
| Skipjack tuna | SA | | | SA | | | SA | |
| South Pacific (SP) albacore | | | SA | | | SA | | |
| North Pacific (NP) albacore | | SA | | | SA | | | SA |
| Pacific bluefin tuna | SA | | | SA | | | SA | |
| SP swordfish | | | SA | | | | SA | |
| NP swordfish | SA | | | | SA | | | |
| SP striped marlin | SA | | | | | | | |
| NP striped marlin | SA | | | | | SA | | |
| Pacific blue marlin | | | SA | | | | | SA |
| Oceanic whitetip shark | (2018) | | | | | SA | | |
| Silky shark | Update | | | | SA | | | |
| NP blue shark | | | SA | | | | | |
| SWP blue shark | (2016) | | | SA | update | | | |
| SP Mako | | | | | | SA | | |

The Majuro (and Kobe) plot

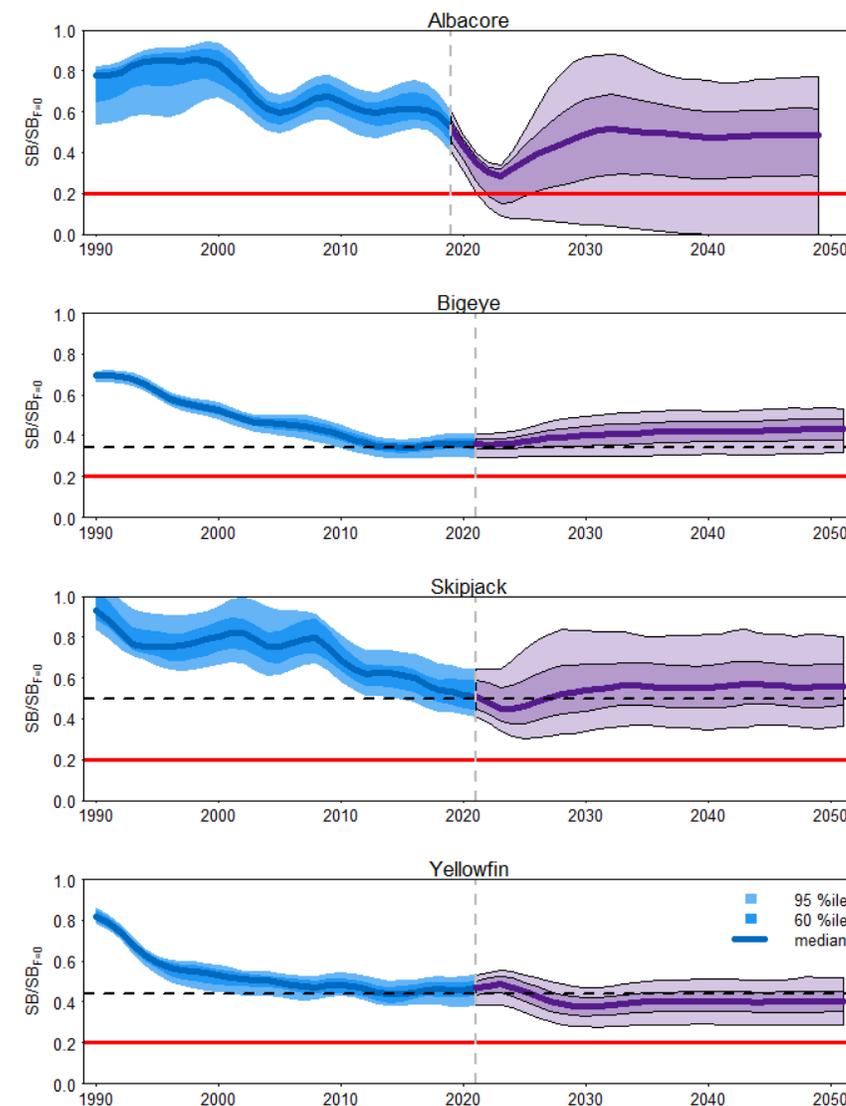
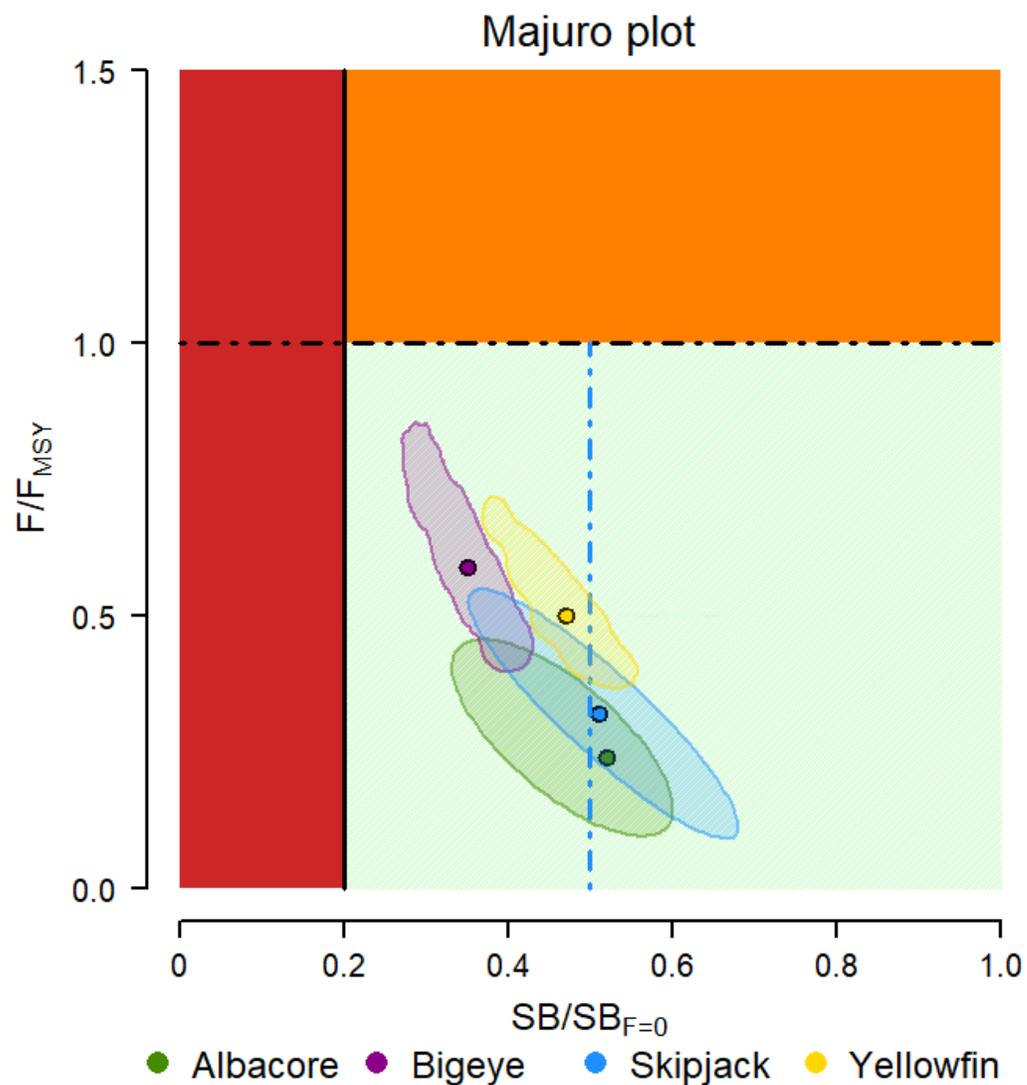
Is the stock experiencing OVERFISHING?



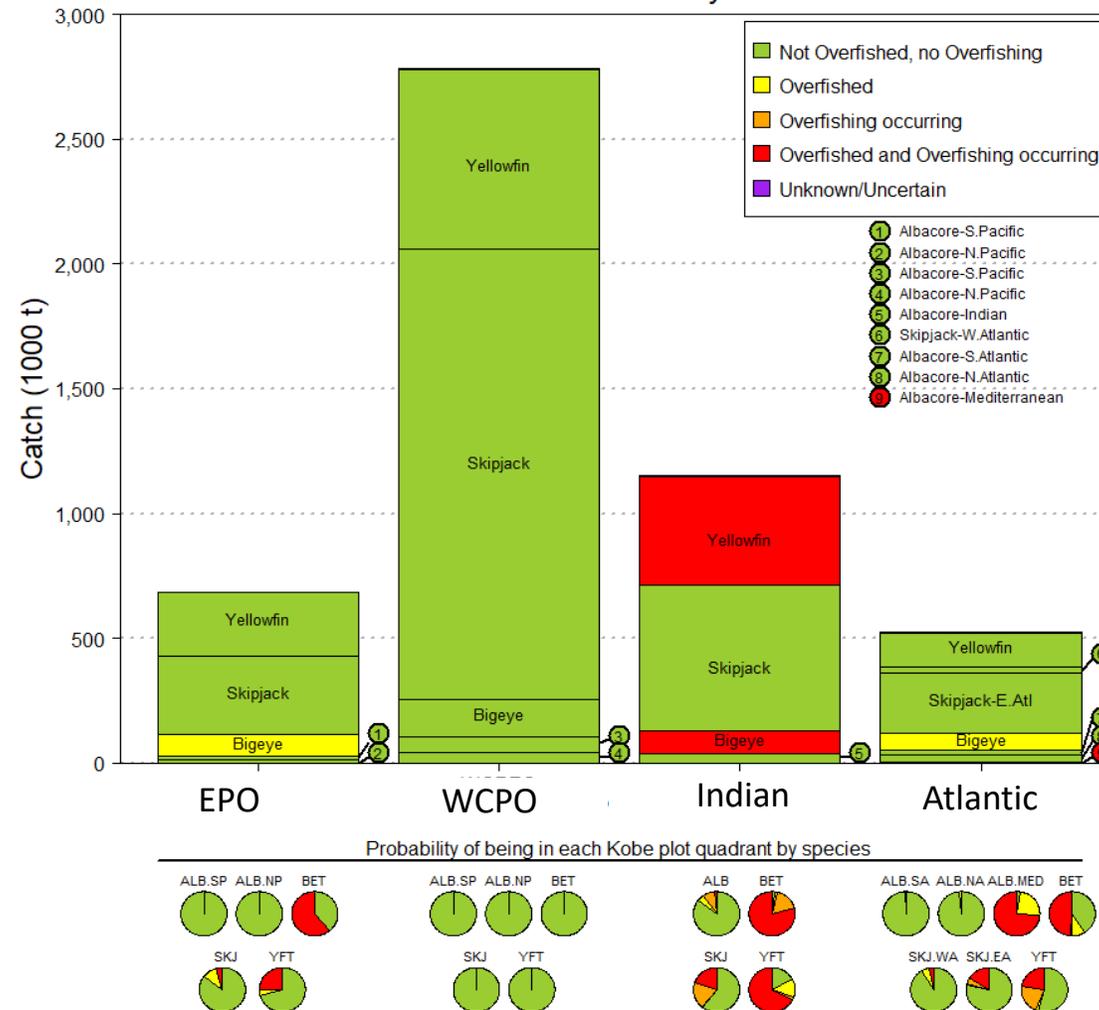
Is the stock OVERFISHED?

- The point of the Majuro (or related Kobe) plot is to convey in ONE FIGURE an instant diagnosis of the past and present health of the stock.
- One or the other of these plots are now used almost universally
- The difference between them is technical but the quadrants have the same meaning

Stock status and outlook for WCPO target tuna stocks



Current status of tuna around the world



Moving towards Harvest Strategies

| Stock: | Skipjack | SP Albacore | Bigeye | Yellowfin |
|------------------------|--------------------------|--------------------------|-------------------|------------|
| Key gear: | Tropical purse seine | Southern longline | Tropical longline | |
| Management objectives | TRP adopted [*] | Interim TRP [^] | Noted | Noted |
| Management procedure | MP adopted [*] | Developing | | |
| Performance indicators | Identified | Identified | Identified | Identified |
| Mixed fishery | Developing | | | |
| Monitoring strategy | Proposed [#] | Developing | | |

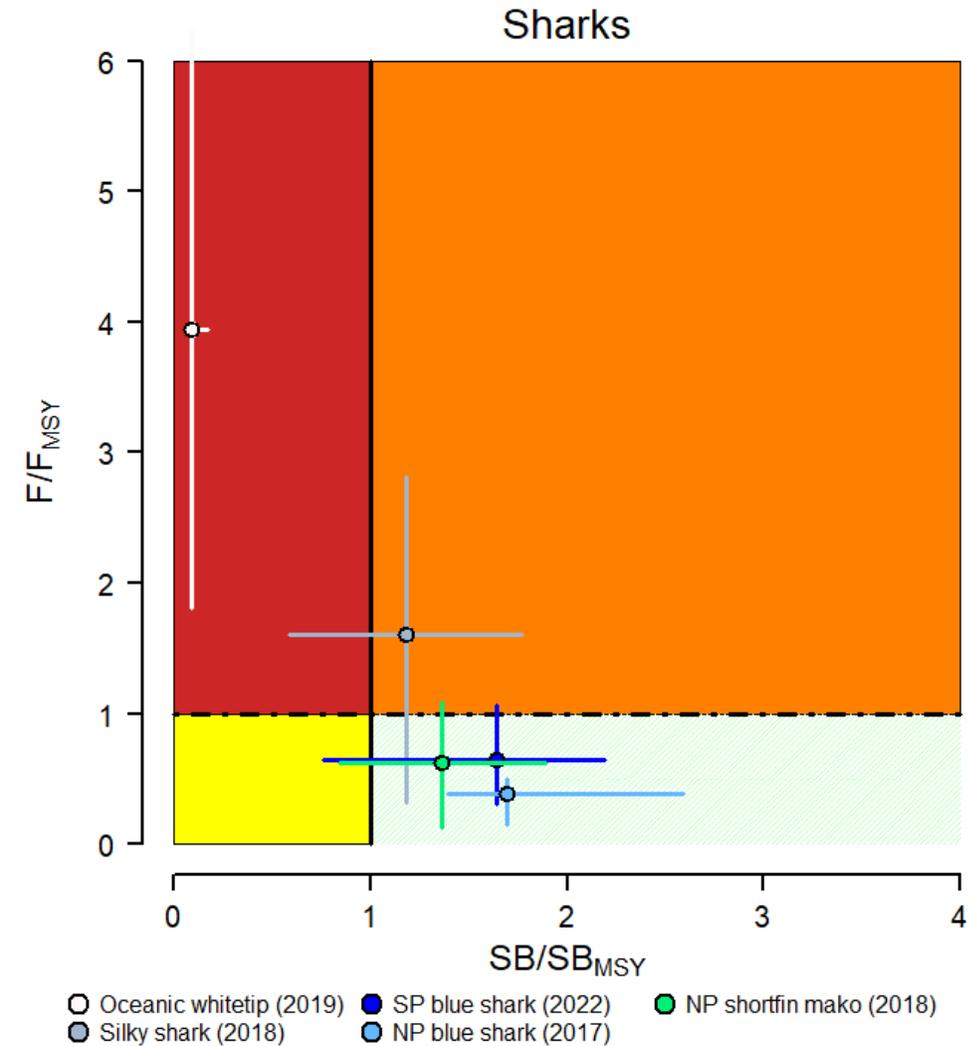
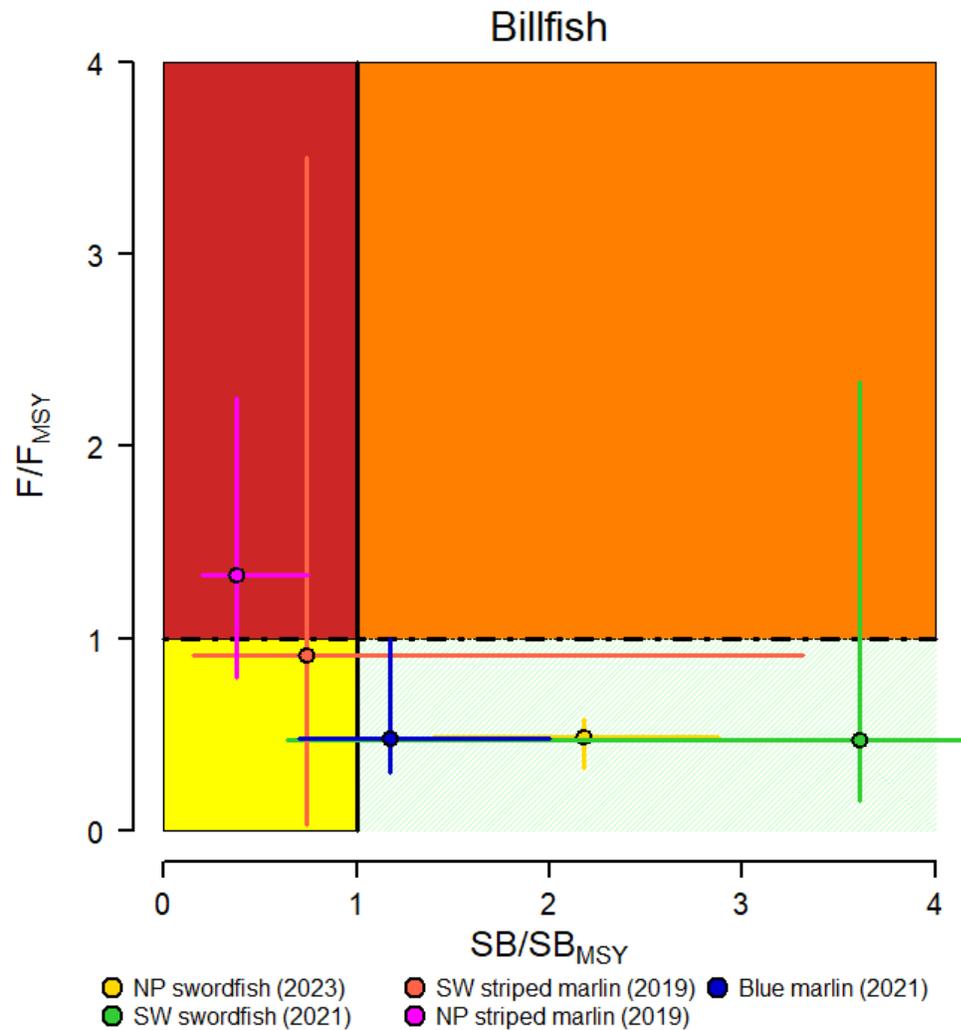
^{*} *WCPFC CMM 2022-01. Conservation and Management Measure on a Management Procedure for WCPO Skipjack Tuna*

[#] *Scott, R et al. 2023. Monitoring the WCPO skipjack management procedure. WCPFC-SC19-MI-WP-02*

[^] *WCPFC20 Outcomes and Attachments (19Dec2023) - Rev.01*

Harvest strategy development work attempting to incorporate climate change impacts, mainly via effects on recruitment. At present these are part of the robustness case scenarios.

Status of important “bycatch” species

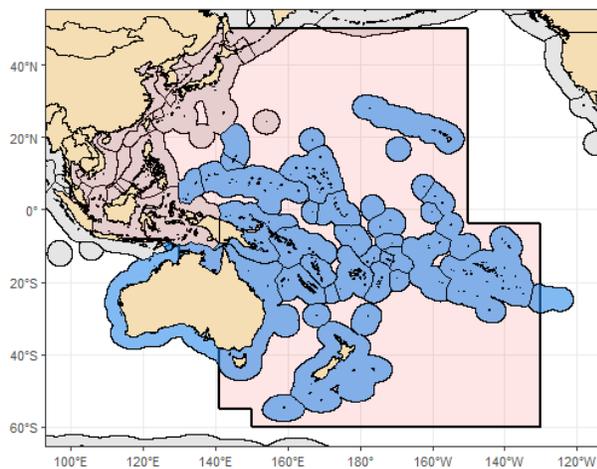


WCPFC Membership

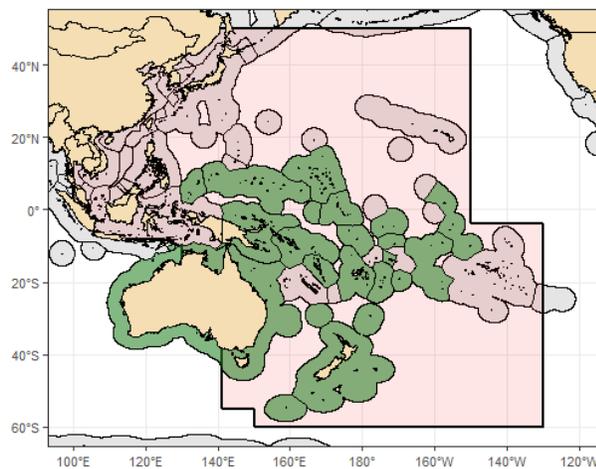
- **26 Members**
 - (FFA) Australia, Cook Islands, FSM, Fiji, Kiribati, RMI, Nauru, NZ, Niue, Palau, PNG, Samoa, Solomon, Tonga, Tuvalu, Vanuatu.
 - (Non-FFA) Canada, China, EU, France, Great Britain, Indonesia, Japan, Korea, Philippines, Chinese Taipei, USA
- **7 Territories**
 - American Samoa, Northern Mariana Islands, French Polynesia, Guam, New Caledonia, Tokelau, Wallis and Futuna
- **8 Cooperating Non-Members**
 - Curacao, Ecuador, El Salvador, Liberia, Mexico, Panama, Thailand and Vietnam.
- **25+ Observers**
 - NGOs such as WWF, EDF, Greenpeace
 - Commercial Interest groups such as International Pole and Line Fishery, Hawaii Longline Association
- The WCPFC meets annually at one of the Member Countries in December.

Associated organizations

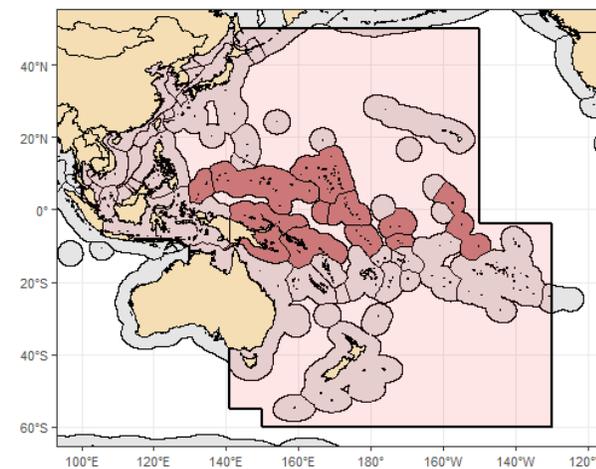
SPC



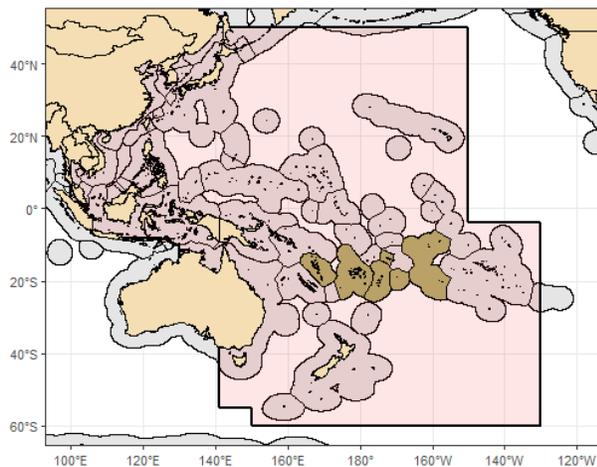
FFA



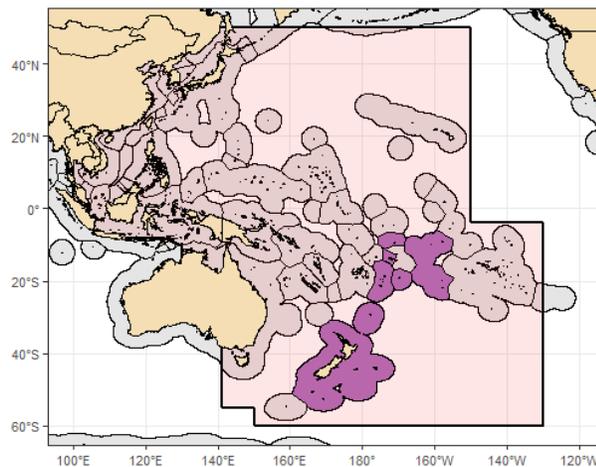
PNA



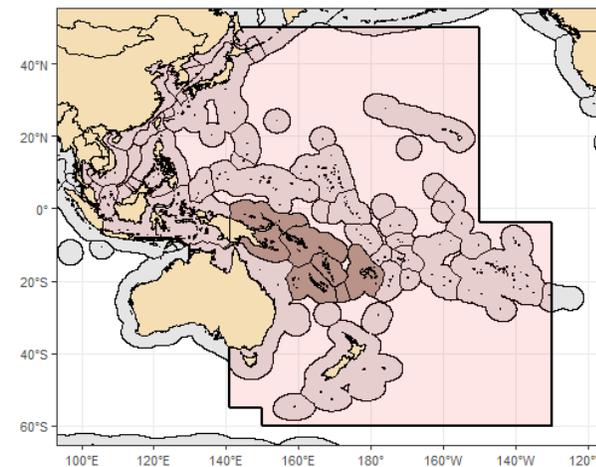
South Pacific Group (SPG)



Te Vaka Moana (TVM)



Melanesian Spearhead Group (MSG)



Key challenges for WCPFC to manage tuna fisheries

- A multi stock and multi gear fishery, often requires difficult choices about tradeoffs
- 1000s of vessels and millions of tons of fish make data collection a challenge
- Coastal states vs flag states
- Often significant compliance issues and enforcement resources are stretched thin
- WCPFC CMMs are developed by consensus, a challenge when 30+ countries and territories are involved

Now add climate change-forced redistribution of the tuna stocks to the mix