

Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission



Ecosystem Considerations (EB-02-01)

Leanne Fuller, Shane Griffiths and Jon Lopez

2a Reunión del Grupo de Trabajo sobre Ecosistema y Captura Incidental - 5-6 de junio de 2024
2nd Meeting of the Permanent Working Group on Ecosystem and Bycatch, 05-06 June 2024

Outline

- Review IATTC ecosystem mandates and the Ecosystem Approach to Fisheries (EAF)
- Provide history of the *Ecosystem Considerations* (EC) report
- Discuss important components of [EB-02-01](#)
 - Reporting of species-specific bycatch by taxonomic group
 - Continued need for improved data reporting on bycatch
 - Reporting of physical environmental indicators
 - Update of ecosystem model indicators
- Future research priorities



IATTC mandates

- Under the Antigua convention, the IATTC is responsible for ensuring the “*long-term conservation and sustainable use of the stocks of tunas and tuna-like species and other associated species of fish taken by vessels fishing for tunas and tuna-like species in the eastern Pacific Ocean (EPO)*”
- Article IV. “*Where the status of target stocks or non-target or associated or dependent species is of concern, the members of the Commission shall subject such stocks and species to enhanced monitoring in order to review their status and the efficacy of conservation and management measures. They shall revise those measures regularly in the light of new scientific information available.*”
- Article VII. “*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*”

Ecosystem Approach to Fisheries (EAF)

- Recognizes broader impacts of fisheries on ecosystem dynamics
- IATTC proactive in pursuing EAF and ecological sustainability
 - Dolphin mortality limits (DMLs)
 - Monitoring catches of incidentally-caught species
 - Resolutions pertaining to potentially vulnerable species (e.g., elasmobranchs, sea turtles)
 - Research on trophic ecology
 - ETP ecosystem model development ([Olson and Watters, 2003](#)) and updates (e.g., [SAC-12-13](#))
 - Development and application of ecological risk assessment methods
 - (e.g., EASI-Fish; [BYC-11-02](#); [SAC-13-11](#); [SAC-14-12](#))

History of the *Ecosystem Considerations* report

- Originally developed by Dr. Robert Olson in [2003](#)
- Created in response to development of the EAFM & prompted by:
 - The FAO Code of Conduct for Responsible Fisheries
 - The Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem
 - Adoption of the Antigua Convention
- Published as a section in IATTC's *Fishery Status Report* annually
 - Assist management decisions
 - Ensure ecosystem considerations are a perpetual part of the Commission's agenda
- Initial focus (previous year only):
 - Summarize direct impacts of fisheries on species and species groups
 - Review species not directly impacted by fisheries (e.g., prey groups: lanternfishes, flyingfishes)
 - Review environmental conditions
 - Include research in the EPO by scientists external to IATTC

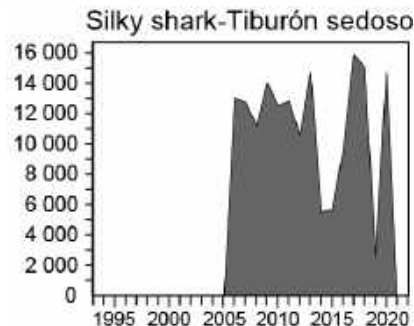
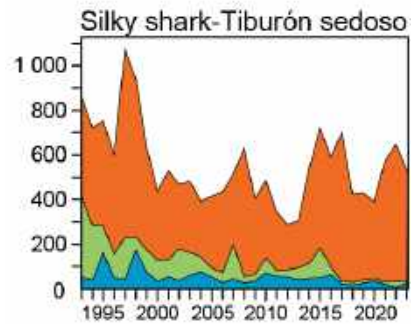
Contemporary changes to the EC report

- Primary focus on IATTC staff's research in the EPO



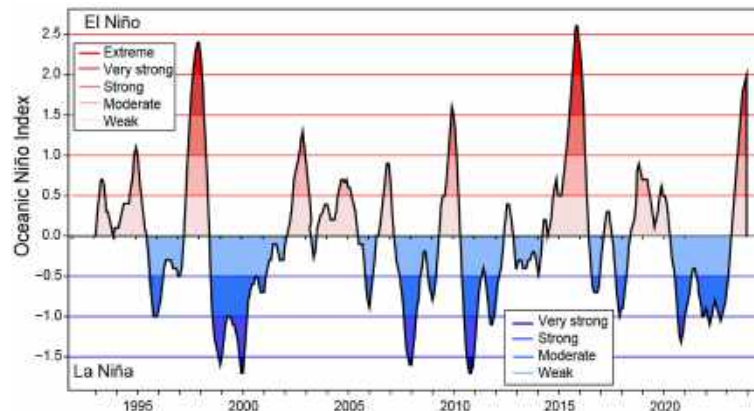
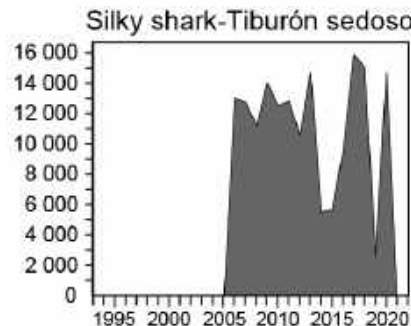
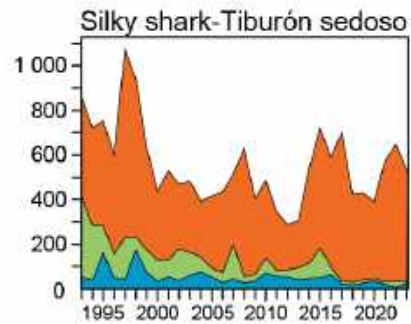
Contemporary changes to the EC report

- Primary focus on IATTC staff's research in the EPO
- Time series of observed and/or reported species-specific bycatch quantities
 - Provides transparency and context to the relative magnitude of change
- Inclusion of minimum reported catches by LL



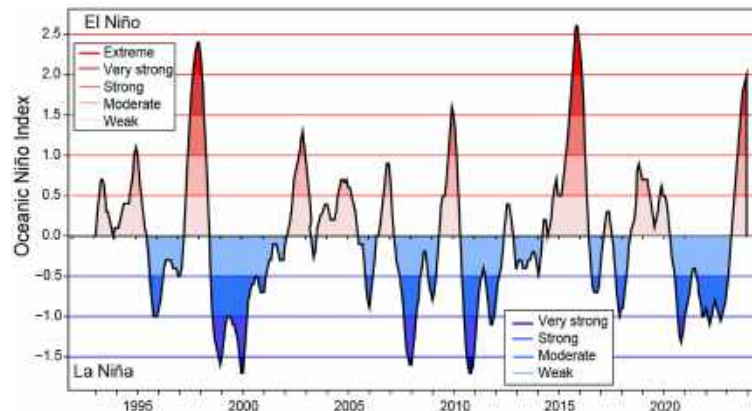
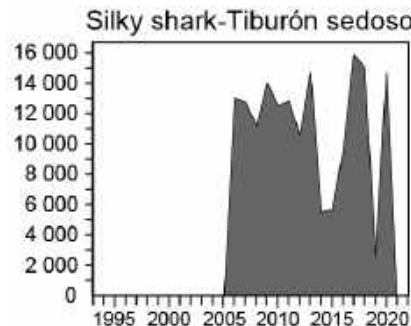
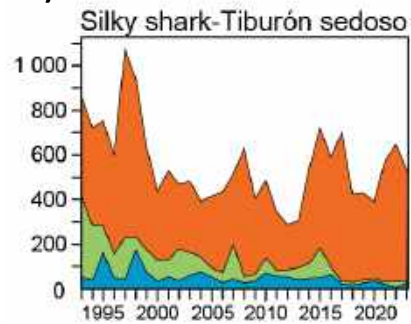
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Contemporary changes to the EC report

- Primary focus on IATTC staff's research in the EPO
- Time series of observed and/or reported species-specific bycatch quantities
 - Provides transparency and context to the relative magnitude of change
- Inclusion of minimum reported catches by LL
- Reporting of ecological and environmental indicators
- Updates of analyses prioritizing vulnerable species & exploring hypothetical CMMs
 - (e.g., EASI-Fish)



Reporting of bycatch species: data variability (longline)

- Inclusion of minimum catches by longline vessels (*Task I data*)

- Obtained using “Task I” summarized data of gross annual removals (time series where available)
- “Required Data” defined under [data provision specifications](#) pursuant to Res. [C-03-05](#)

SPECIFICATIONS FOR DATA PROVISION

- The technical aspects for data that are compiled and maintained by the IATTC on species under its purview have been established by the Director in accordance with Resolutions [C-03-05](#)¹ on data provision and [C-04-05](#) on bycatch.

2. REQUIRED DATA

The specifications are presented below in expanded form, using a format and terminology generally consistent with those used by ICCAT, IOTC, FAO, and other fisheries bodies handling tuna fisheries statistics.

2.1. TASK I CATCH STATISTICS: Gross annual removals² (round weight of all fish caught or killed during fishing operations) and disposition (retained or discarded) of tuna and tuna-like species (Table 1), and other species (Table 2) taken in fisheries which capture tuna and tuna-like species in the Antigua Convention Area. If the data provided are nominal catches³ (round weight of retained catch when there is no information on discards), please note this when providing the data.

These catch data should be reported as round weight, in metric tons or in kilograms, by species, by year, gear and disposition (retained or discarded). If the round weights are estimated by conversion from processed or sampled weights or measurements, or by some other means, the method and the sample data used to obtain the estimates should be provided.

2.2. TASK I EFFORT STATISTICS: Fishing power (fleet) statistics. The number of fishing vessels by gear, operating in the Antigua Convention Area in each calendar year should be reported.

¹ For the full texts of the resolutions cited, see <http://www.iatc.org/ResolutionsActiveENG.htm>

² <https://www.iatc.org/images/WebPics/EPOMan.jpg>

³ <https://www.fao.org/3/bt981t/bt981t.pdf>

TABLE 2. Some of the principal species known to be caught by vessels and gears fishing for species under the purview of the Commission in the Antigua Convention Area. Catches of species not shown on this list should be reported using the common name, and the scientific name if known, as well as the ASFIS 3-alpha code⁶ if available. Note that codes have not been assigned for all species.

Common name	Scientific name	ASFIS code
Blue shark	<i>Prionace glauca</i>	BSH
Salmon shark	<i>Lamna ditropis</i>	LMD
Bigeye thresher shark	<i>Alopias superciliosus</i>	BTH
Pelagic thresher shark	<i>Alopias pelagicus</i>	PTH
Thresher sharks nei ⁷	<i>Alopias</i> spp. nei	THR
Blacktip shark	<i>Carcharhinus limbatus</i>	CCL
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	OCS
Silky shark	<i>Carcharhinus falciformis</i>	FAL
Shortfin mako shark	<i>Isurus oxyrinchus</i>	SMA
Longfin mako shark	<i>Isurus paucus</i>	LMA
Mako sharks nei	<i>Isurus</i> spp. nei	MAK
Scalloped bonnethead shark	<i>Sphyrna corona</i>	SSN
Scalloped hammerhead shark	<i>Sphyrna lewini</i>	SPL
Scoophead shark	<i>Sphyrna media</i>	SPE
Great hammerhead shark	<i>Sphyrna mokarran</i>	SPK
Bonnethead shark	<i>Sphyrna tiburo</i>	SPJ
Smooth hammerhead shark	<i>Sphyrna zygaena</i>	SPZ
Hammerhead sharks nei	Sphyrnidae	SPY
Sharks nei	Elasmobranchii nei	SKX
Unidentified fishes	Osteichthyes nei	MZZ
Pelagic stingray	<i>Pteroplatytrygon violacea</i>	PLS
Stingrays nei	<i>Dasyatis</i> spp.	STI
Giant manta	<i>Mobula birostris</i>	RMB
Devil fish	<i>Mobula mobular</i>	RMM
Munk's devil ray	<i>Mobula munkiana</i>	RMU
Chilean devil ray	<i>Mobula tarapacana</i>	RMT

Reporting of bycatch species: data variability (longline)

- Inclusion of minimum catches by longline vessels (*Task 1 data*)
 - Incomplete, highly variable data
 - e.g., 1 CPC reported FAL for 2021 (12 mt) and 2022 (37 mt);
4 CPCs reported FAL for 2020 (14,752 mt)
 - Sharks considered ‘*under the purview of IATTC*’ not formally defined (see Res. [C-23-07](#); [SAC-15-09](#))

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Reporting of bycatch species: data variability (longline)

- Improvements in longline observer data
 - Minimum longline observer-reported interactions and mortalities (2022)
 - Observer data currently insufficient for reliably estimating annual bycatches ([BYC-10 INF-D](#))

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- Improvements in longline observer data
 - Minimum longline observer-reported interactions and mortalities (2022)
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- To improve bycatch catch estimates by longline gear, reporting must be improved

INTER-AMERICAN TROPICAL TUNA COMMISSION
SCIENTIFIC ADVISORY COMMITTEE
12TH MEETING
(by videoconference)
10-14 May 2021

DOCUMENT SAC-12-09

IMPROVING SPECIES AND CATCH DATA REPORTING ([RESOLUTION C-03-05](#))

This draft document aims to initiate discussion with Members on improving IATTC data reporting. See Section B.3. Data Collection in [SAC-12-16](#) for the staff's recommendations on general data provisions in 2021.

INTER-AMERICAN TROPICAL TUNA COMMISSION
**1ST WORKSHOP ON DATA IMPROVEMENT (C-03-05):
INDUSTRIAL LONGLINE**
(by videoconference)
09-11 January 2023

DOCUMENT WSDAT-01-01

**WORKSHOP ON DATA PROVISION IMPROVEMENT: INDUSTRIAL
LONGLINE FISHERIES IN THE EASTERN PACIFIC OCEAN**

INTER-AMERICAN TROPICAL TUNA COMMISSION
SCIENTIFIC ADVISORY COMMITTEE
14TH MEETING
La Jolla, California (USA)
15-19 May 2023

DOCUMENT SAC-14 INF-Q

**1ST WORKSHOP ON IMPROVEMENTS IN DATA COLLECTION AND PROVISION:
INDUSTRIAL LONGLINE FISHERY**

INTER-AMERICAN TROPICAL TUNA COMMISSION
SCIENTIFIC ADVISORY COMMITTEE
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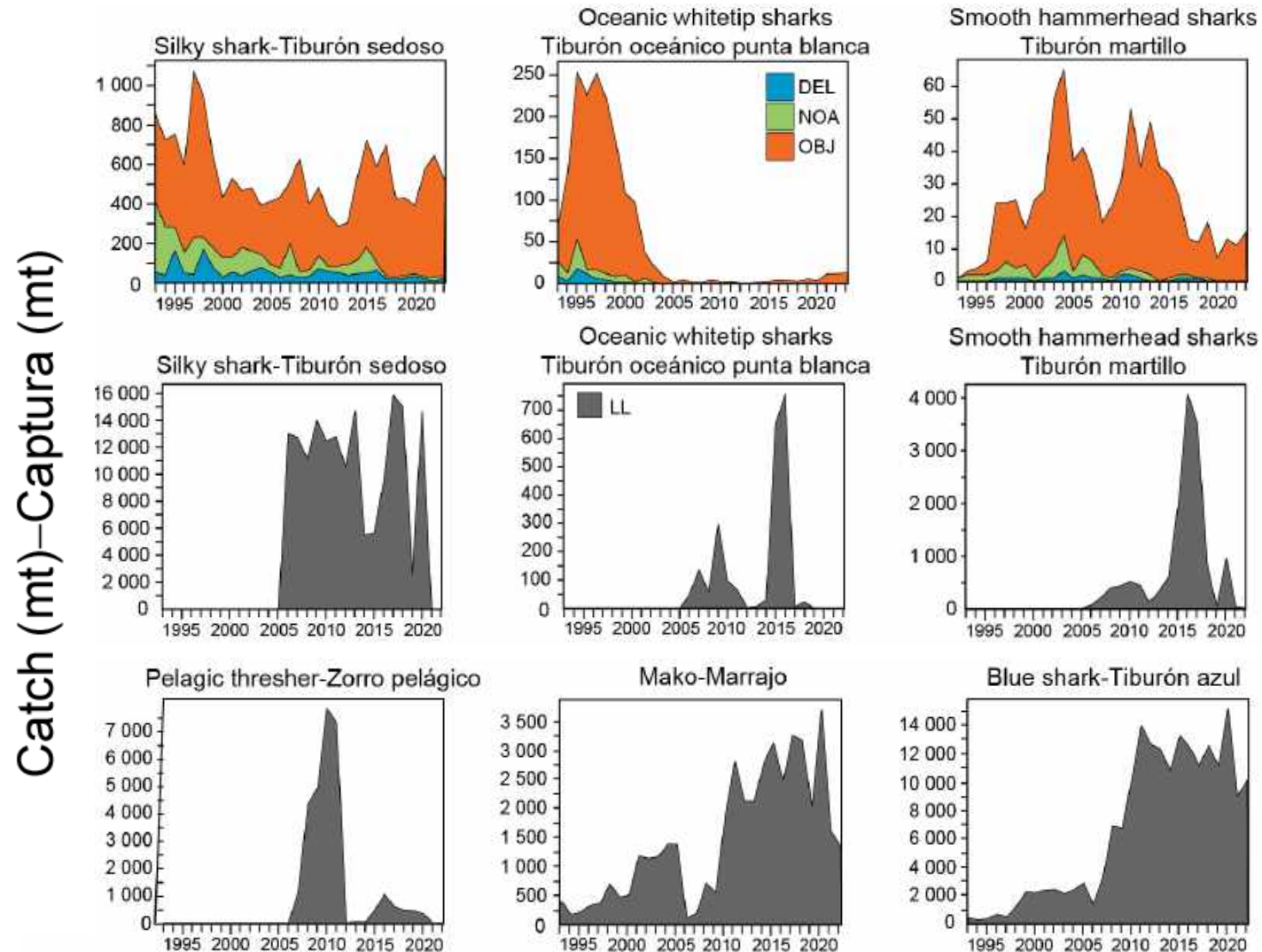
DOCUMENT SAC-14 INF-J

**IDENTIFYING DATA GAPS AND OPPORTUNITIES FOR UPDATING
MORPHOMETRIC RELATIONSHIPS AND COLLECTING BIOLOGICAL SAMPLES FOR
PRIORITY SPECIES IN EASTERN PACIFIC OCEAN TUNA FISHERIES**

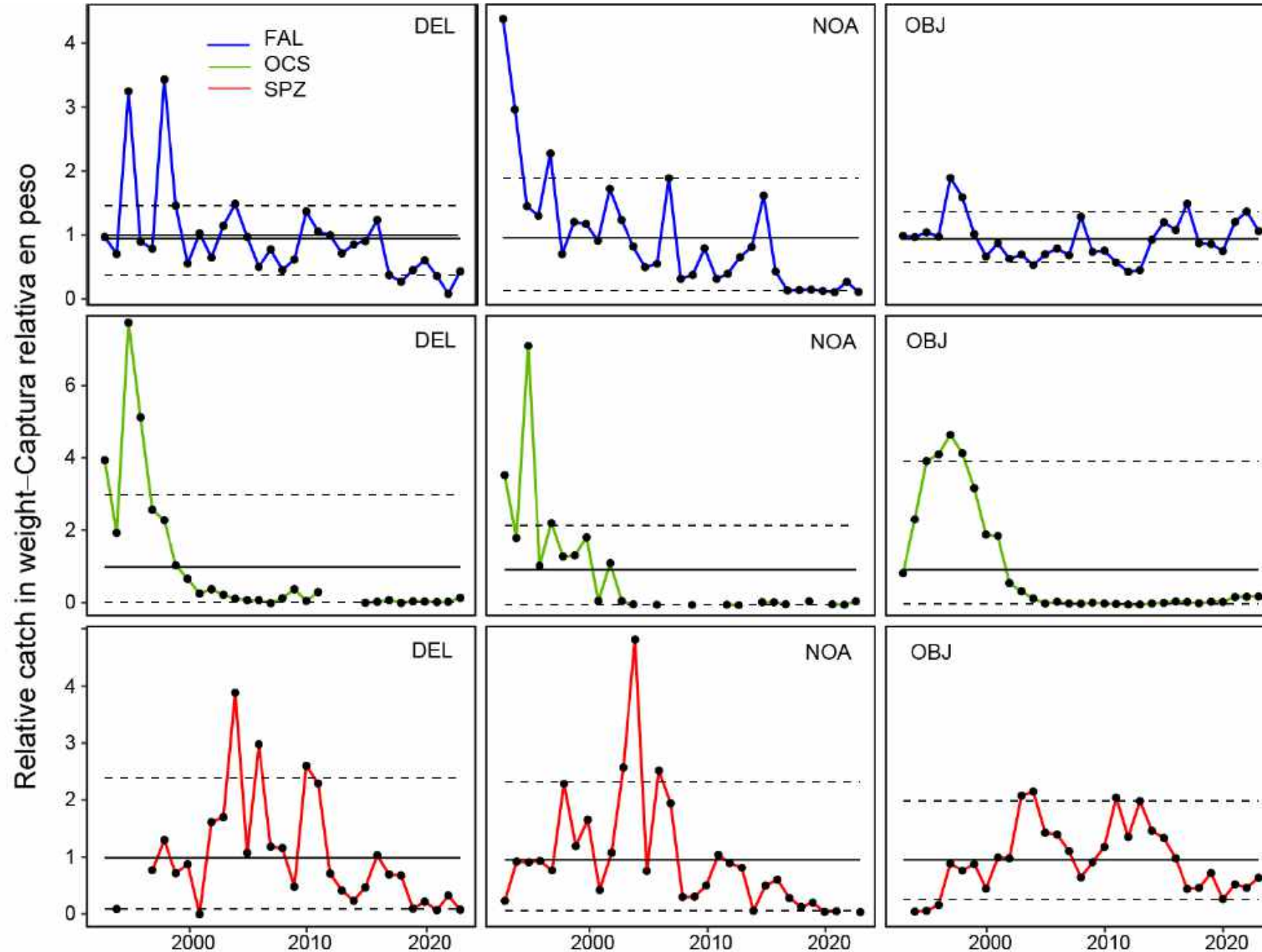


Reporting of bycatch species: Shark example

- Catches (mt) by the large purse-seine fishery and minimum estimates by longline
- PS data through 2023; LL data through 2022

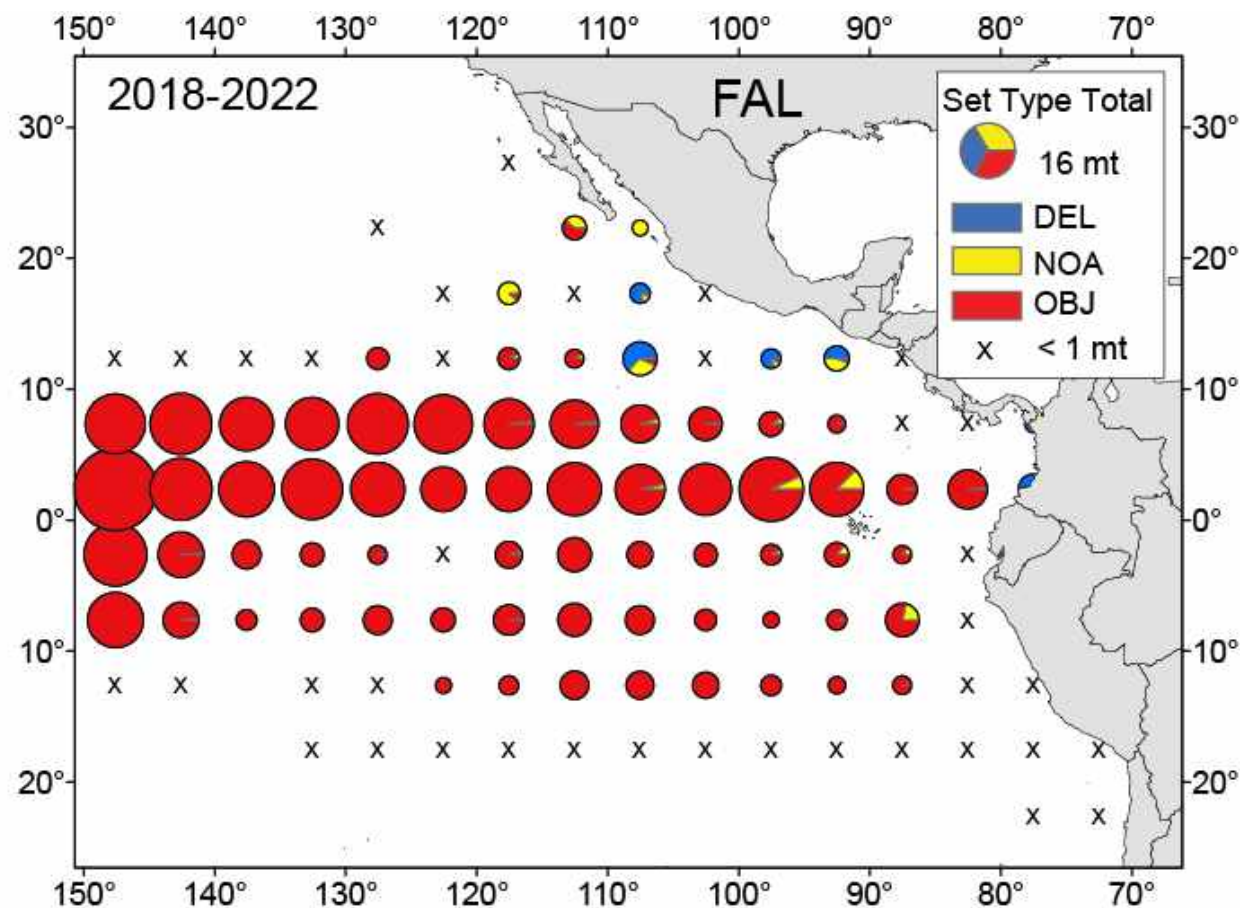
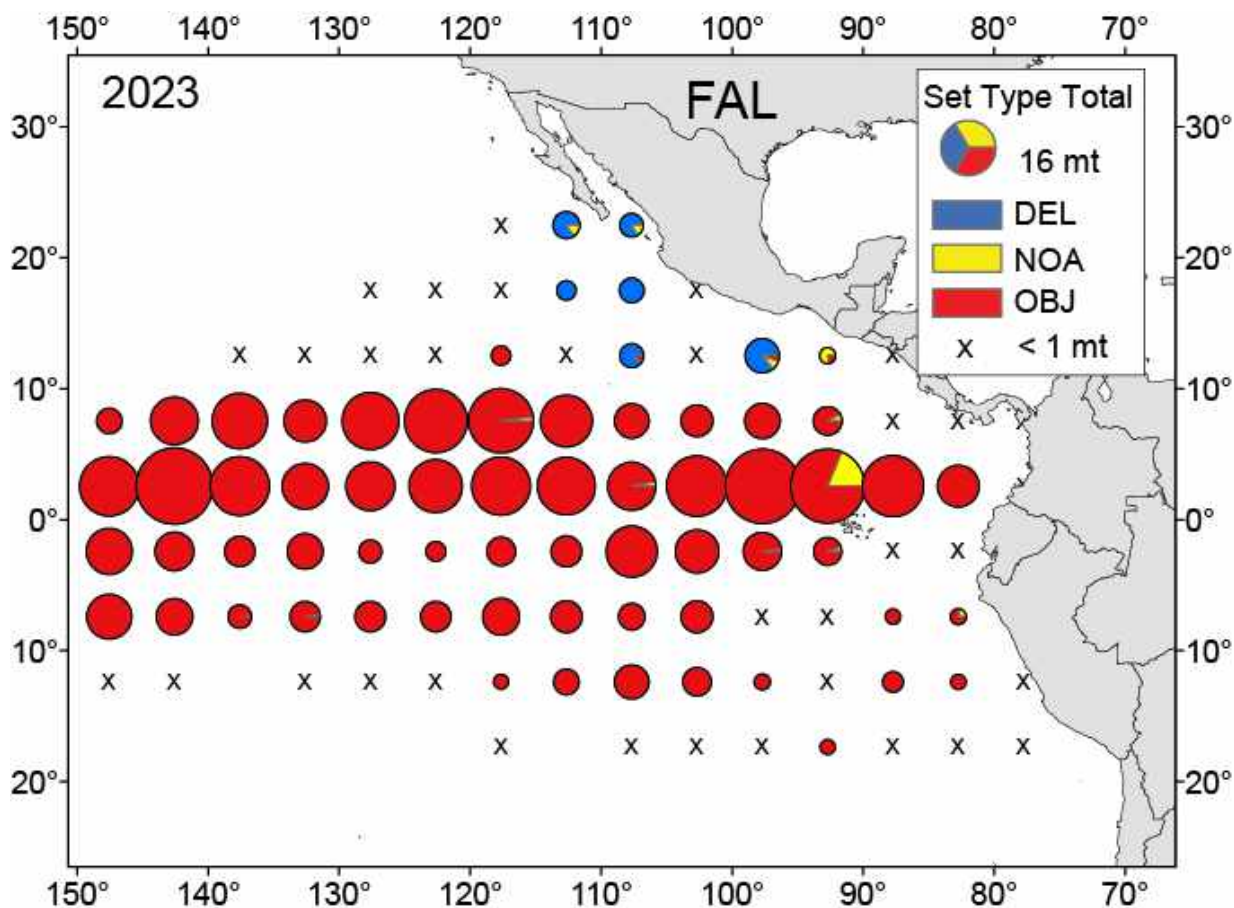


Reporting of bycatch species: Shark example, PS Class-6



Reporting of bycatch species: Shark example, PS Class-6

Silky shark 5x5 spatial distribution of catches for the previous year (2023) and the 5-year average (2018–2022)



Reporting of bycatch species: Small purse-seine fishery (2023)

- Minimum reported catches (mt) from limited observer data
- Data reporting for these vessels has been improving
- 44% of trips were observed (34% from voluntary TUNACONS vessels)
- Analyses planned to determine whether data are representative of fleet characteristics to expand to fleet totals

Broad group	Common name	Scientific name	Set type	
			OBJ	NOA
Sharks	Silky shark	<i>Carcharhinus falciformis</i>	30	<1
	Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	<1	
	Other Carcharhinidae spp.	Carcharhinidae spp.	<1	
	Smooth hammerhead shark	<i>Sphyrna zygaena</i>	3	
	Scalloped hammerhead shark	<i>Sphyrna lewini</i>	3	
	Great hammerhead shark	<i>Sphyrna mokarran</i>	<1	
	Hammerhead shark, nei	Sphyrna spp.	<1	
	Pelagic thresher shark	<i>Alopias pelagicus</i>	<1	
	Mako shark	Isurus spp.	<1	
	Other shark		<1	
Large fishes	Dorado	<i>Coryphaenidae</i> spp.	268	<1
	Wahoo	<i>Acanthocybium solandri</i>	36	
	Rainbow runner	<i>Elagatis bipinnulata</i>	4	
	Amberjack, nei	Seriola spp.	3	
	Jacks, crevalles, nei	Caranx spp.	<1	
	Amberjack, jack, crevalles, nei	Seriola, Caranx spp.	<1	
	Tripletail	<i>Lobotes surinamensis</i>	<1	
	Mola, nei	Molidae spp.	<1	
	Other large fish		<1	
Small fishes	Bullet and frigate tunas	<i>Auxis</i> spp.	253	
	Triggerfishes, Filefishes	Balistidae, Monacanthidae spp.	122	
	Sea chubs	Kyphosidae spp.	1	
	Small carangid, nei	Carangidae spp.	2	
	Epipelagic forage fishes		1	
	Other small fish		<1	

Reporting of bycatch species: Seabird example, LL observer data (2022)

- Minimum reported EPO interactions & mortalities
 - limited observer data (5% coverage)
- Observer data currently insufficient for reliably estimating annual bycatches ([BYC-10 INF-D](#))
- Some CPCs suspended observer programs due to COVID-19
 - resumed in 2023

Common name	Scientific name	Interactions	Mortalities
Boobies and gannets nei	Sulidae Fam.	31	31
Black-footed albatross	<i>Phoebastria nigripes</i>	19	19
Grey petrel	<i>Procellaria cinerea</i>	4	4
Laysan albatross	<i>Phoebastria immutabilis</i>	3	3
Petrels	<i>Procellaria</i> spp.	3	3
Albatross nei	<i>Diomedea</i> spp.	2	2
Cape petrel	<i>Daption capense</i>	2	2
Wandering albatross	<i>Diomedea exulans</i>	2	2
Light-mantled sooty albatross	<i>Phoebetria palpebrata</i>	1	-
Petrels or shearwaters nei	Procellariidae	1	1
Terns nei	<i>Sterna</i> spp.	1	1
Wilson's storm petrel	<i>Oceanites oceanicus</i>	1	1
Total numbers		70	69

Data Improvement Workshops: SAC-12-16 Recommendation

- Staff collaborated on [SAC-12-09](#) on improving species and catch data reporting
- Staff reviewed Data Provision Resolution ([C-03-05](#))
 - Mandates submission of majority of fisheries data
 - Needs updating to align with mandates of Antigua Convention, IATTC's SSP, the FAO and other t-RFMOs

RECOMMENDATION: Through a series of workshops planned and facilitated by the staff, revise resolution C-03-05 in consultation with CPCs, taking into consideration the elements presented in SAC-12-09. These workshops will be organized by main fishery with the purpose of discussing improvements in data collection, any required additional resources and capacity building activities.

Data Improvement Workshops: SAC-12-16 Recommendation

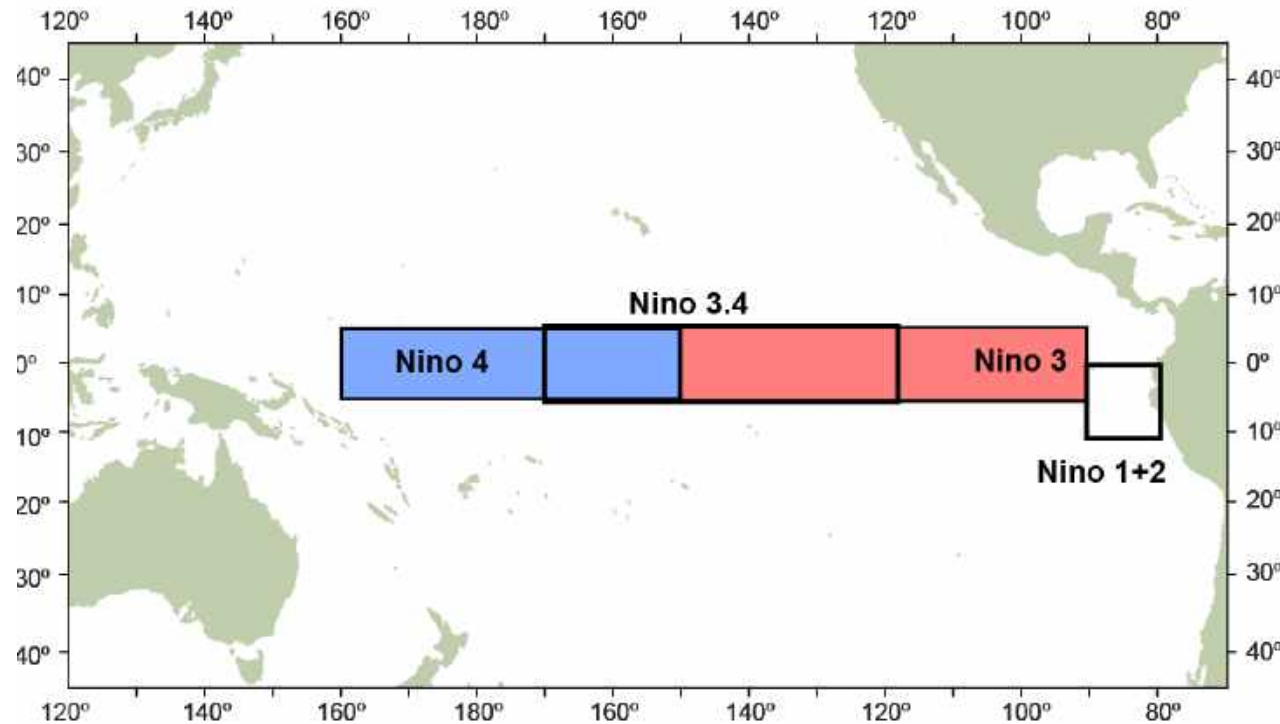
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- 1st Workshop (2023): Industrial LL fishery ([WSDAT-01-01](#); [WSDAT-01-RPT](#))
 - Discussions focused on feasibility of collecting desirable data types, including interactions with bycatch
 - Recommendations from this workshop provided in [SAC-14 INF-Q](#); endorsed by SAC ([SAC-14-16, Para 7.1](#))
 - Need support from CPCs to update C-03-05 and improve data reporting in response to workshops
 - Staff continue to recommend increased observer coverage to improve bycatch data reporting
 - Implementation of EM may also facilitate data improvements

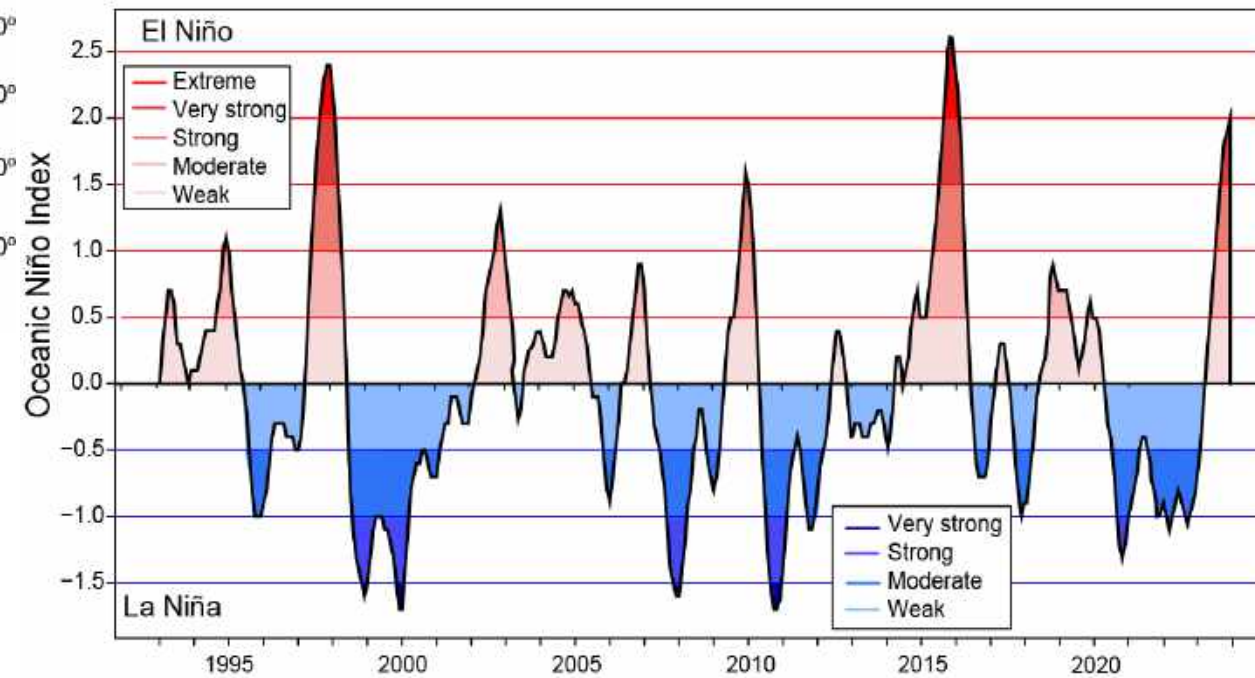
Physical Environment

- Oceanographic indices to describe SST anomalies
 - Shorter-term, interannual events (e.g., climatology, ENSO events)
 - Longer-term, interdecadal events (e.g., Pacific Decadal Oscillation (PDO))
- Primary indicator of warm El Niño and cool La Niña conditions
 - Oceanic Niño Index (ONI), Niño 3.4 region
- PDO tracks large-scale interdecadal patterns of environmental changes
 - Primarily in NPO, secondary signatures in tropical Pacific
- Resolution on Climate Change adopted in 2023 ([C-23-10](#))
 - Workplan towards climate resilient fisheries ([SAC-15-12](#))

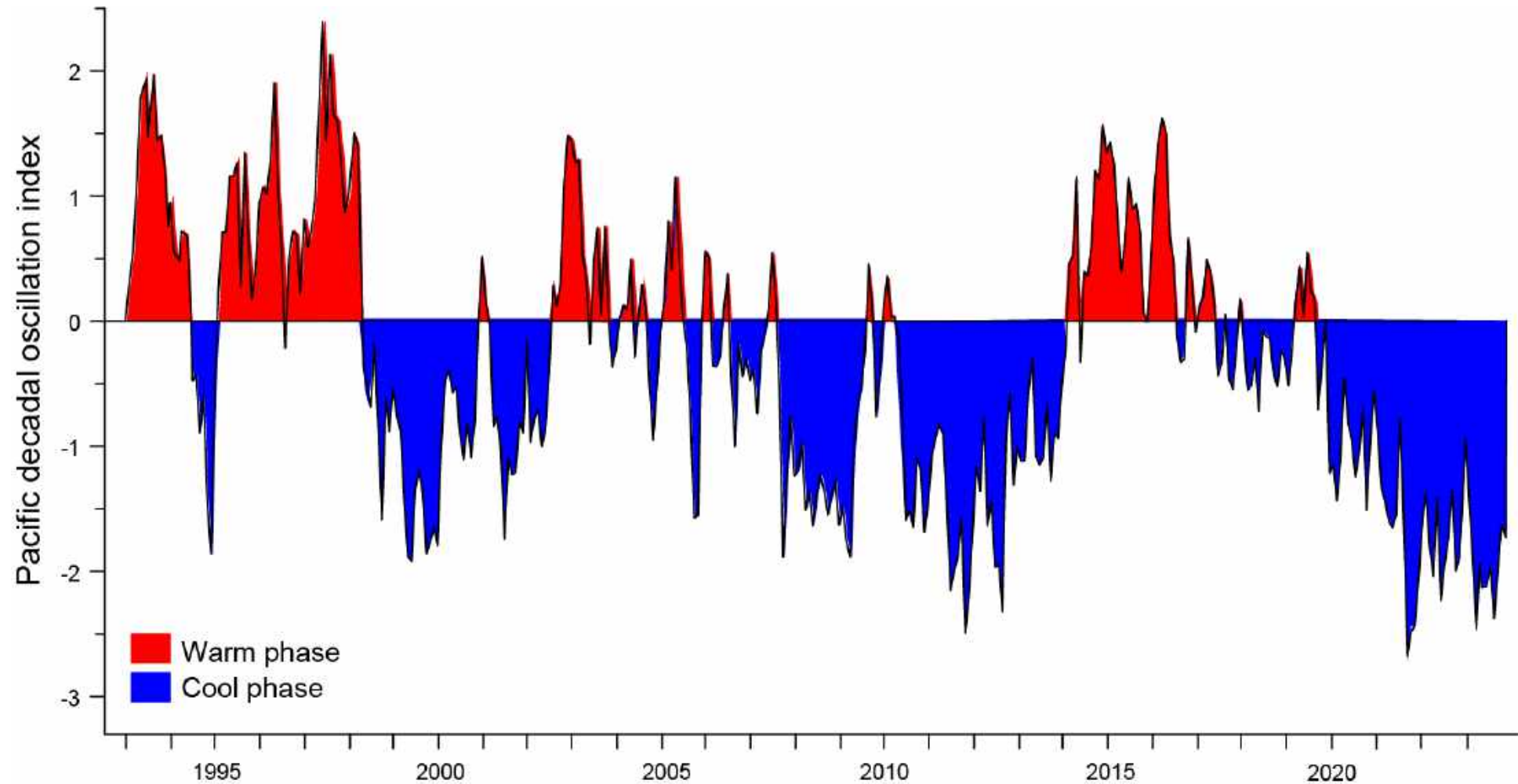
Physical Environment : Oceanic Niño Index (ONI)



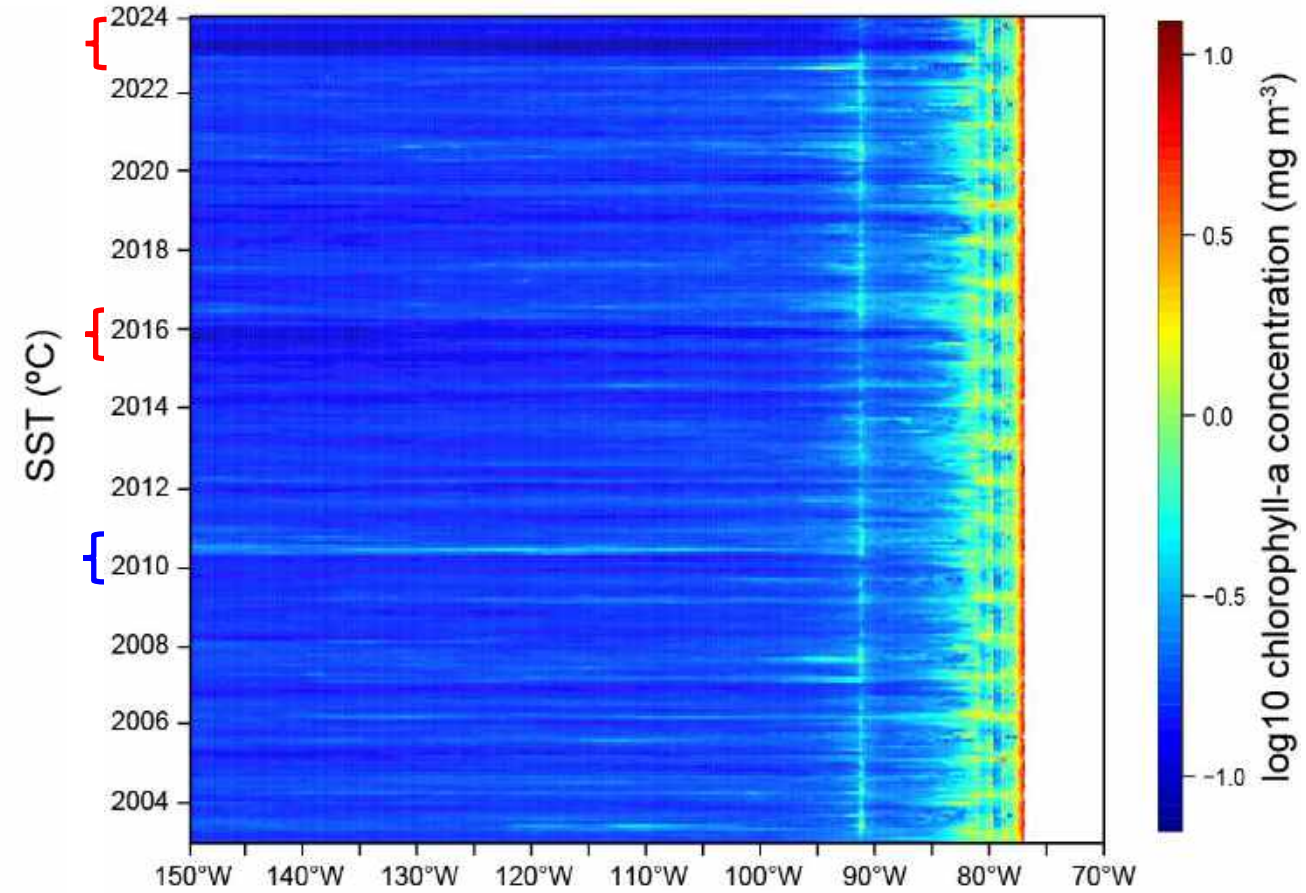
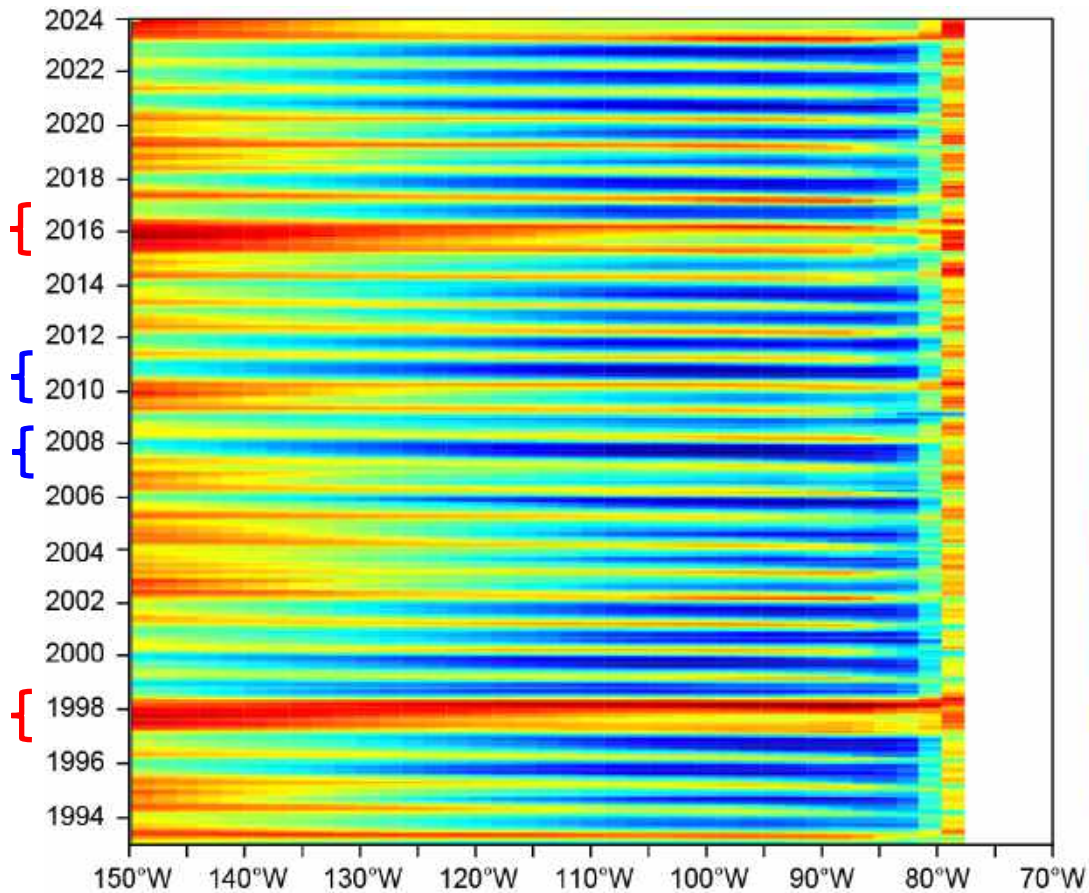
“Very strong” El Niño Conditions (2023)



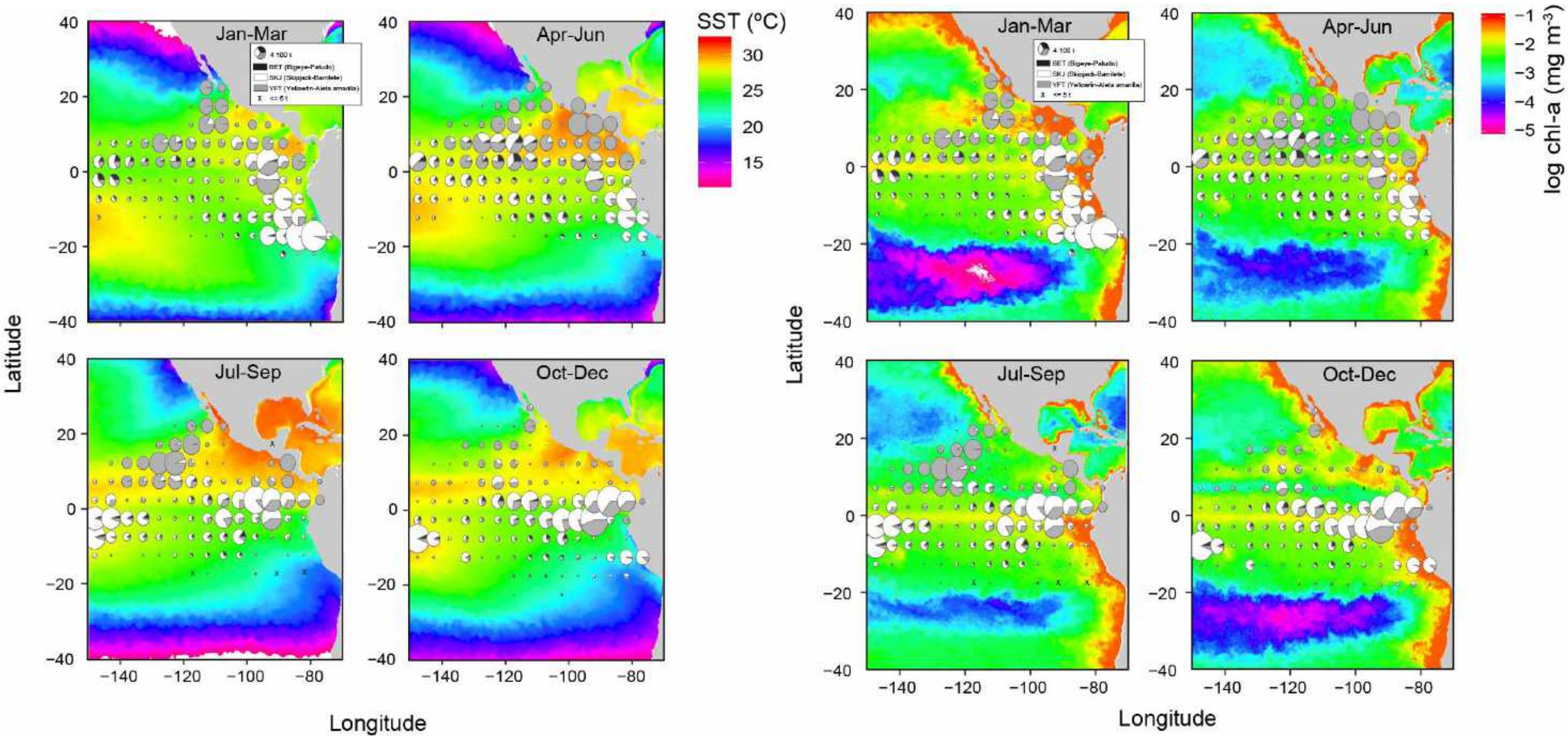
Physical Environment: Pacific Decadal Oscillation Index (PDO)



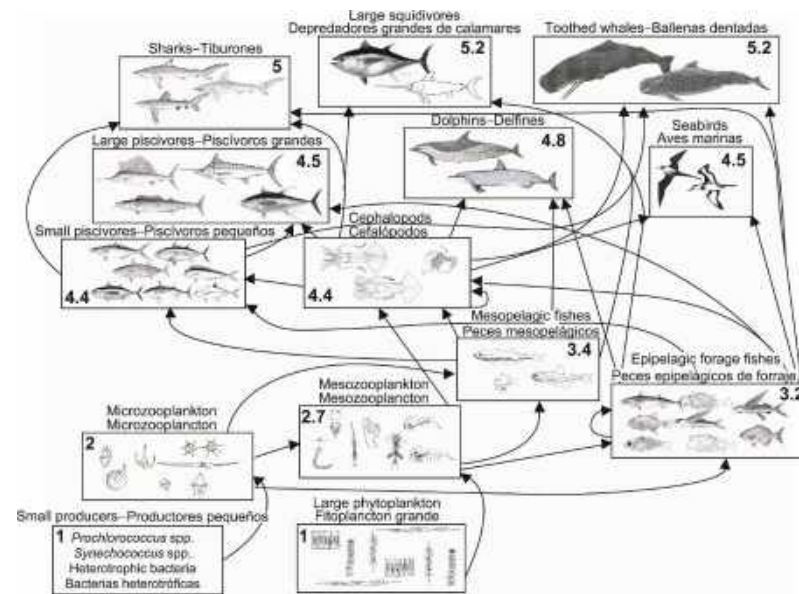
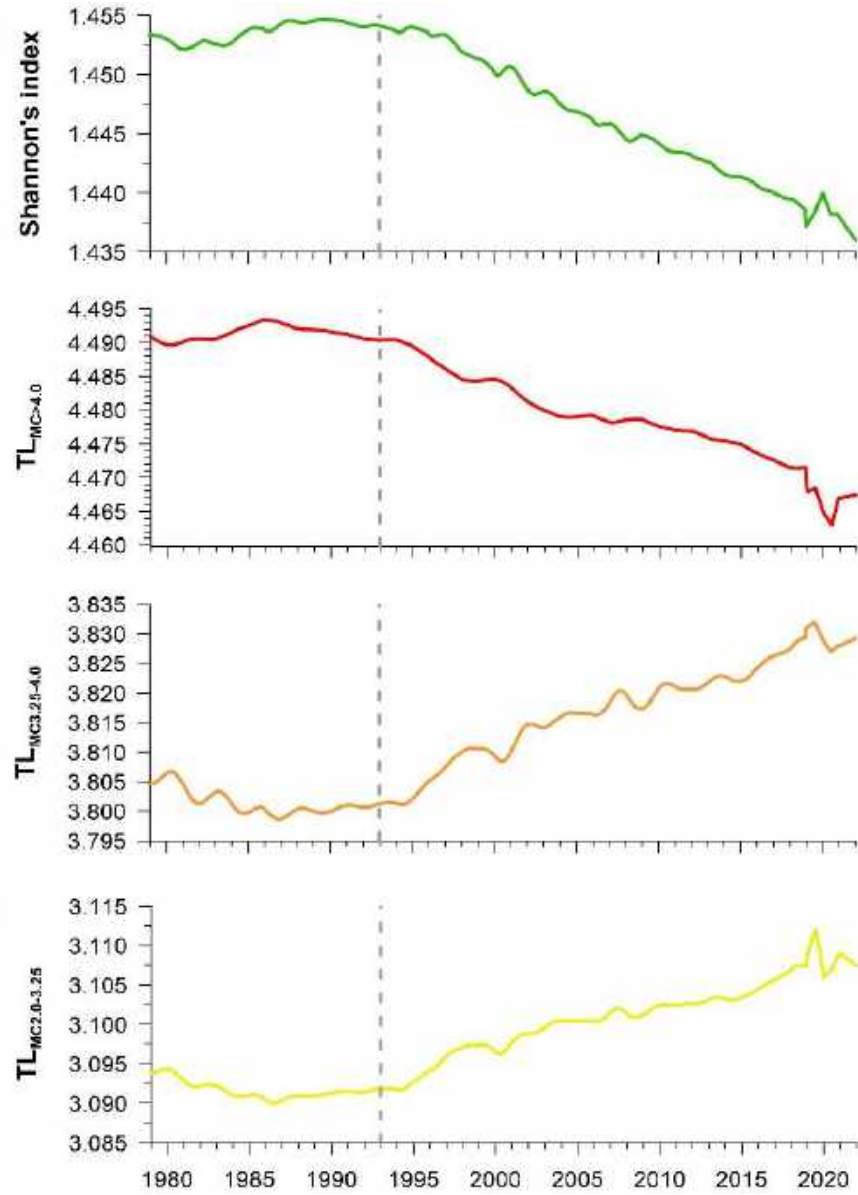
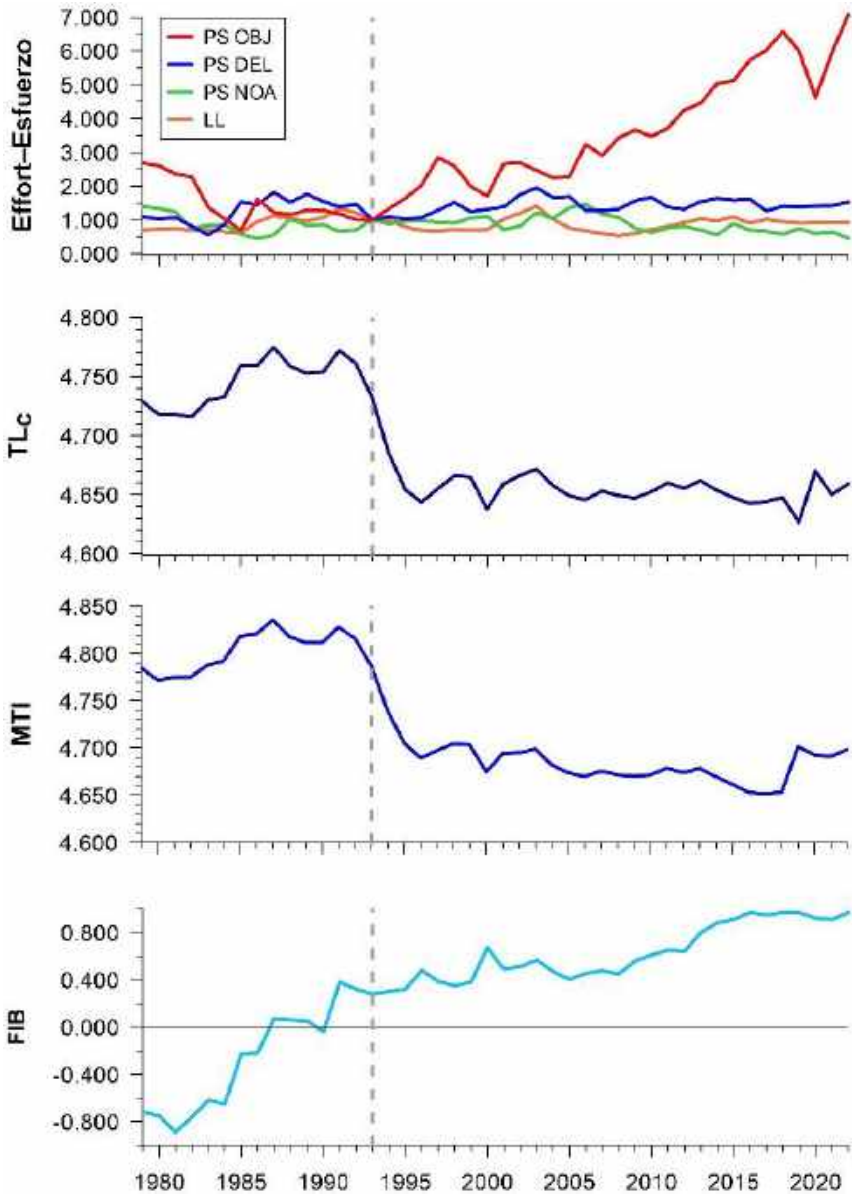
Physical Environment: SST and chl-a time series



Physical Environment: Quarterly SST and chl-a (2023)



Ecosystem model updates: ecological indicators



Future research priorities

- Continued development of EASI-Fish and its application to 100+ bycatch species
- Establish a longer-term strategy for undertaking studies to fill data gaps
([SAC-14 INF-M: ABNJ Phase 2](#); [Project F.3.a](#); [SAC-14 INF-J](#))
 - Spatially-explicit catch and effort data, especially for artisanal fisheries for SDMs and assessments
 - Morphometric (e.g., L-W, L-L, W-W) sampling to improve models and catch estimates
 - Biological (e.g., stomachs, tissues) sampling to update diet matrix in spatially-explicit ecosystem model
- Continuation of workshops to develop clear data reporting standards and update [C-03-05](#)
([WSDAT-01-01](#); [WSDAT-01-RPT](#); [SAC-14 INF-Q](#); [SAC-15 INF-R](#))
- Improve communication of ecosystem status ([EB-02-02](#))
 - Restructure the EC report into two ecosystem-advice products
 - Ecosystem report card ("*EcoCard*")
 - Ecosystem status assessment



Questions