Ecosystem considerations (SAC-13-10)

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Outline

- Review of IATTC ecosystem mandates and the Ecosystem Approach to Fisheries (EAF)

- Reporting of bycatch by taxonomic group

- History of bycatch data collection (Special Report #25)

- Continued need for improved data reporting on bycatch (SAC-12-09 and collaborative workshops)

- Reporting of physical environmental indicators

- Ecological Risk Assessments (ERA) (BYC-11-02, SAC-13-11)

- Summary

- Future developments

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 the ecosystem

- IATTC proactive in pursuing EAF and ecological sustainability
  - Dolphin mortality limits (DMLs)

  - Monitoring catches of incidentally-caught species

  - Resolutions pertaining to such species (*e.g.* silky and oceanic whitetip sharks, mobulid rays)

  - Research on trophic ecology

  - Development of the ETP ecosystem model (Olson and Watters, 2003); model updates (*e.g.* SAC-12-13)

  - Development and application of new ecological risk assessment methods (*e.g.* EASI-Fish; BYC-11-02; SAC-13-11)
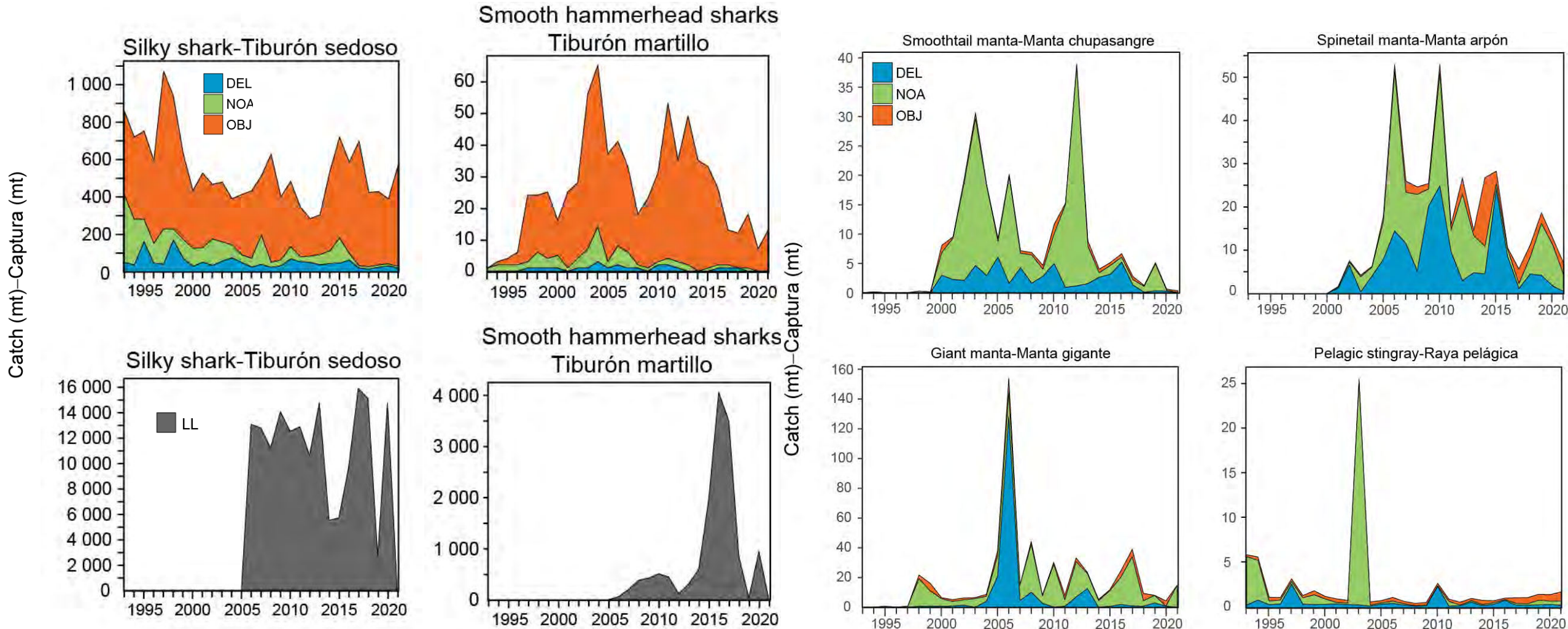
Reporting of bycatch species

- Provide transparency and context to the relative magnitude of change of bycatch (PS fishery)
    - Species-specific catches (1993-2021)
    - History of bycatch data reporting (IATTC Special Report 25)

- Inclusion of <u>minimum catch estimates</u> by longline vessels
    - Obtained using "Task I" data of gross annual removals (time series where available)
    - Iterative process to improve LL data reporting

        (see SAC-08-07b, SAC-08-07e, SAC-09 INF A, SAC-10 INF-H, SAC-12-04)
    - Observer data currently insufficient for reliably estimating annual bycatches (BYC-10 INF-D)
    - <u>Minimum</u> longline observer-reported interactions and mortalities (2020)

- Inclusion of <u>minimum catch estimates</u> by small purse-seine vessels
    - Limited observer data (27% of trips carried an observer; 2021), mostly TUNACONS vessels

- To improve catch estimates, bycatch reporting must be improved (see SAC-12-09; Project F.3a)

- Mortalities (mt) from the purse-seine fishery (sharks and rays) and <u>minimum estimates</u> by longline (sharks) – PS data through 2021; LL data through 2020

- Mortalities (mt) from limited observer data

- Data reporting for these vessels is aimed to be improved in the near future

			Set type	
Broad group	Common name	Scientific name	OBJ	NOA
Sharks	Silky shark	*Carcharhinus falciformis*	17	<1
	Blue shark	*Prionace glauca*	<1	<1
	Other Carcharhinidae	Carcharhinidae spp.	<1	<1
	Smooth hammerhead	*Sphyrna zygaena*	1	-
	Scalloped hammerhead	*Sphyrna lewini*	4	<1
	Hammerhead, nei	*Sphyrna spp.*	<1	-
	Pelagic thresher shark	*Alopias pelagicus*	-	<1
	Mako shark	*Isurus* spp.	<1	-
	Other shark		3	<1
Rays	Smoothtail manta	*Mobula thurstoni*	<1	-
	Spinetail manta	*Mobula mobular*	<1	<1
	Munk's devil ray	*Mobula munkiana*	-	<1
	Chilean devil ray	*Mobula tarapacana*	<1	<1
	Giant manta	*Mobula birostris*	1	<1
	Mobulidae ray, nei	Mobulidae spp.	<1	<1
	Pelagic stingray	*Pteroplatytrygon violacea*	<1	<1
	Stingray, nei	Dasyatidae spp.	<1	<1
Large fishes	Dorado	Coryphaenidae spp.	157	1
	Wahoo	*Acanthocybium solandri*	13	<1
	Rainbow runner	*Elagatis bipinnulata*	<1	<1
	Amberjack, nei	Seriola spp.	1	<1
	Jacks, crevalles, nei	Caranx spp.	<1	-
	Amberjack, jack, crevalles, nei	Seriola, Caranx spp.	<1	-
	Mola, nei	Molidae spp.	-	<1
	Tripletail	*Lobotes surinamensis*	<1	-
	Other large fish		<1	-
Small fishes	Bullet and frigate tunas	*Auxis spp.*	102	3
	Triggerfishes, filefishes	Balistidae, Monacanthidae spp.	4	-
	Sea chubs	Kyphosidae spp.	<1	-
	Small carangid, nei	Carangidae spp.	<1	-
	Epipelagic forage fishes		<1	-
	Other small fishes		<1	-

- Mortalities (numbers) from limited observer data (5% observer coverage)

- BYC-10 INF-D shows 5% observer coverage is insufficient for estimating total catch of data-rich YFT and BET, so estimates for bycatch are less reliable due to less data (i.e., data poor)

Table J-3b. Minimum number of seabird interactions in 2020 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 eastern Pacific Ocean. All reported seabird interactions resulted in mortalities (i.e., disposition was reported as "Discarded", "Injured", or not reported).

Seabird taxa	Interactions	Mortalities
Laysan albatross, *Phoebastria immutabilis*	37	37
Black-footed albatross, *Phoebastria nigripes*	32	32
White-chinned petrel, *Procellaria aequinoctialis*	17	17
Boobies and gannets nei, Sulidae	16	16
Wandering albatross, *Diomedea exulans*	16	16
Cape petrel, *Daption capense*	5	5
Albatross nei, Diomedea spp.	2	2
Buller's albatross, *Thalassarche bulleri*	1	1
Total numbers	126	126

SAC-12-16 Recommendation on General Data Provisions

- 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

- Staff concluded C-03-05 needs updating to align with mandates of:

  - Antigua Convention, IATTC's SSP, the FAO, and other RFMOs

- Initial steps towards improvements: Collaborate with CPCs through a series of workshops

  - Assess feasibility of collecting desirable data types and develop data collection templates

  - Develop clear standards and procedures for data submission that include interactions with bycatch

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.
Initiation of workshops planned for 2022

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

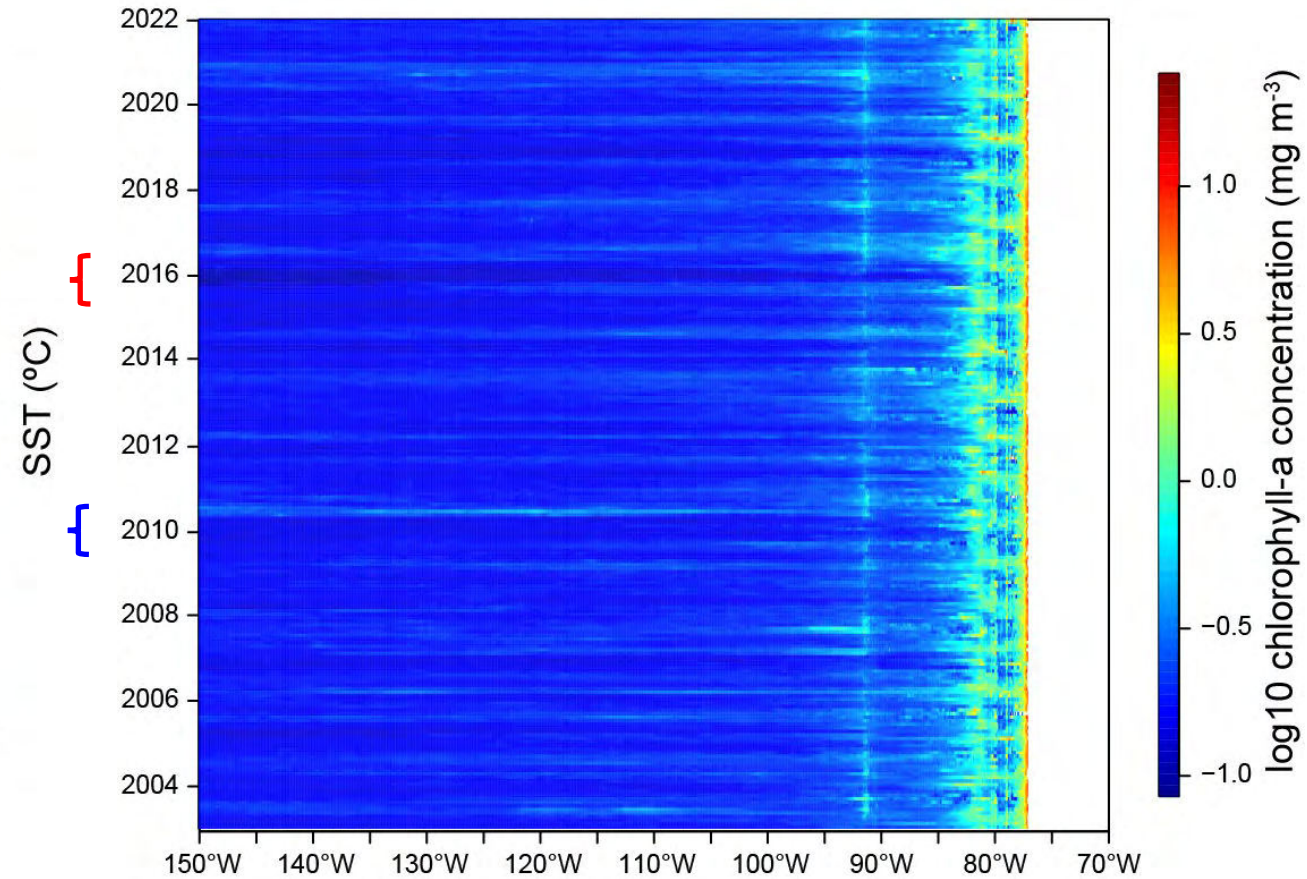 - Primarily in NPO, secondary signatures in tropical Pacific
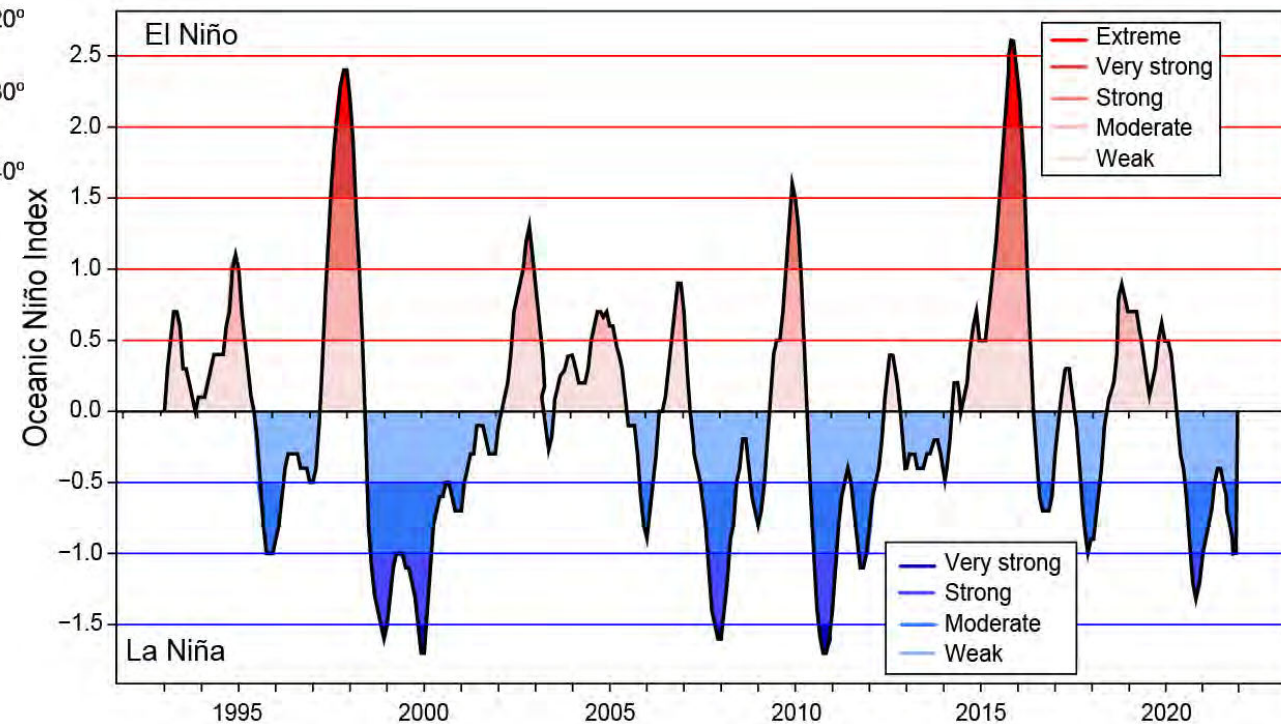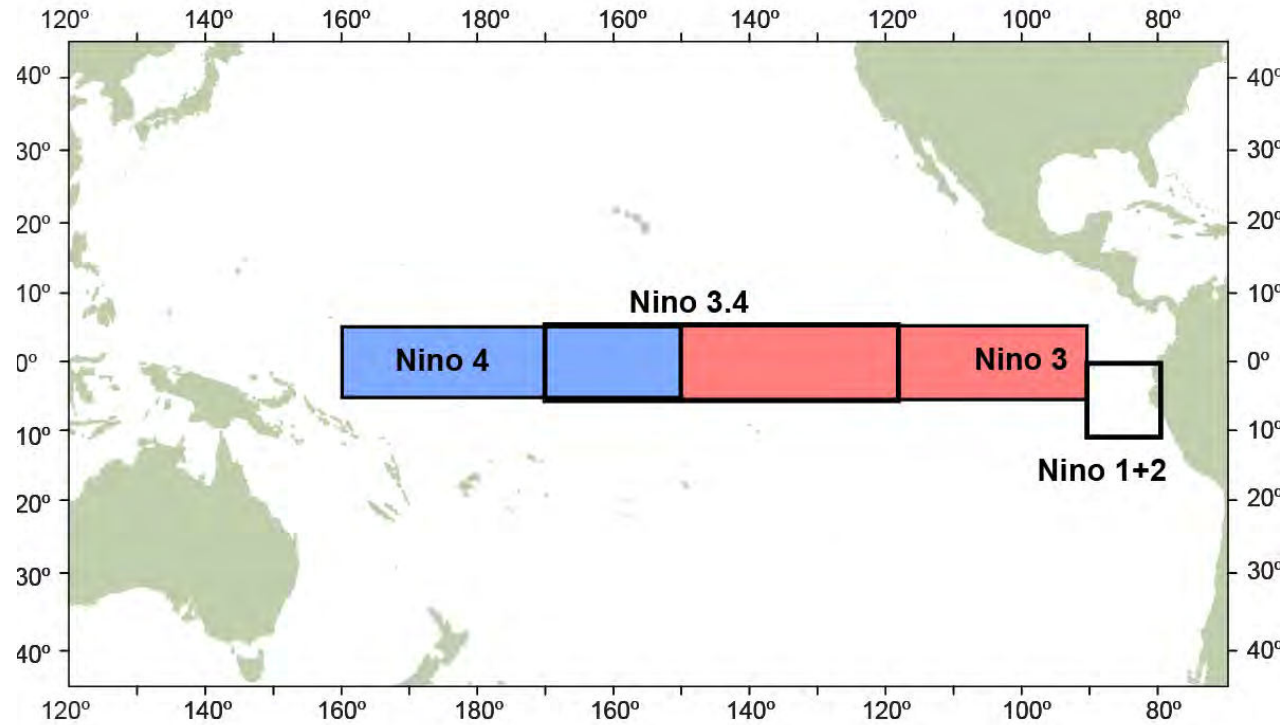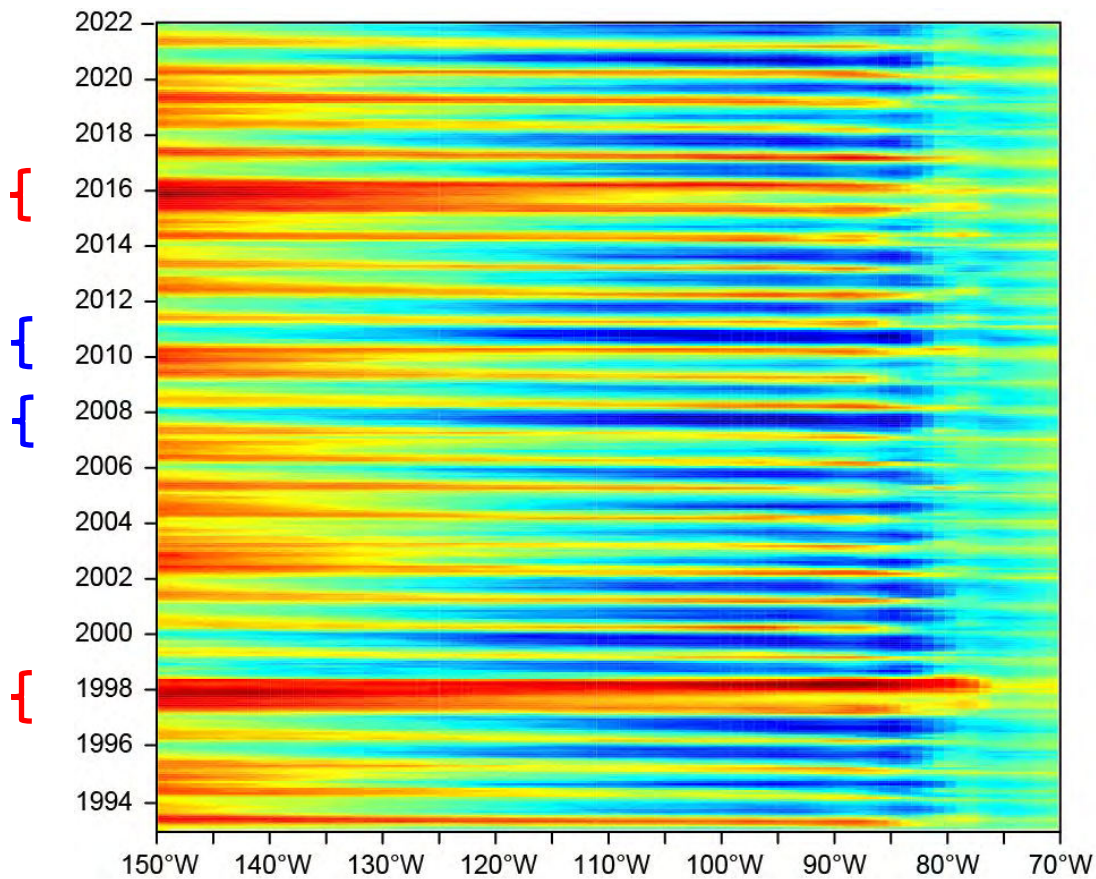
Physical Environment: Pacific Decadal Oscillation Index (PDO)
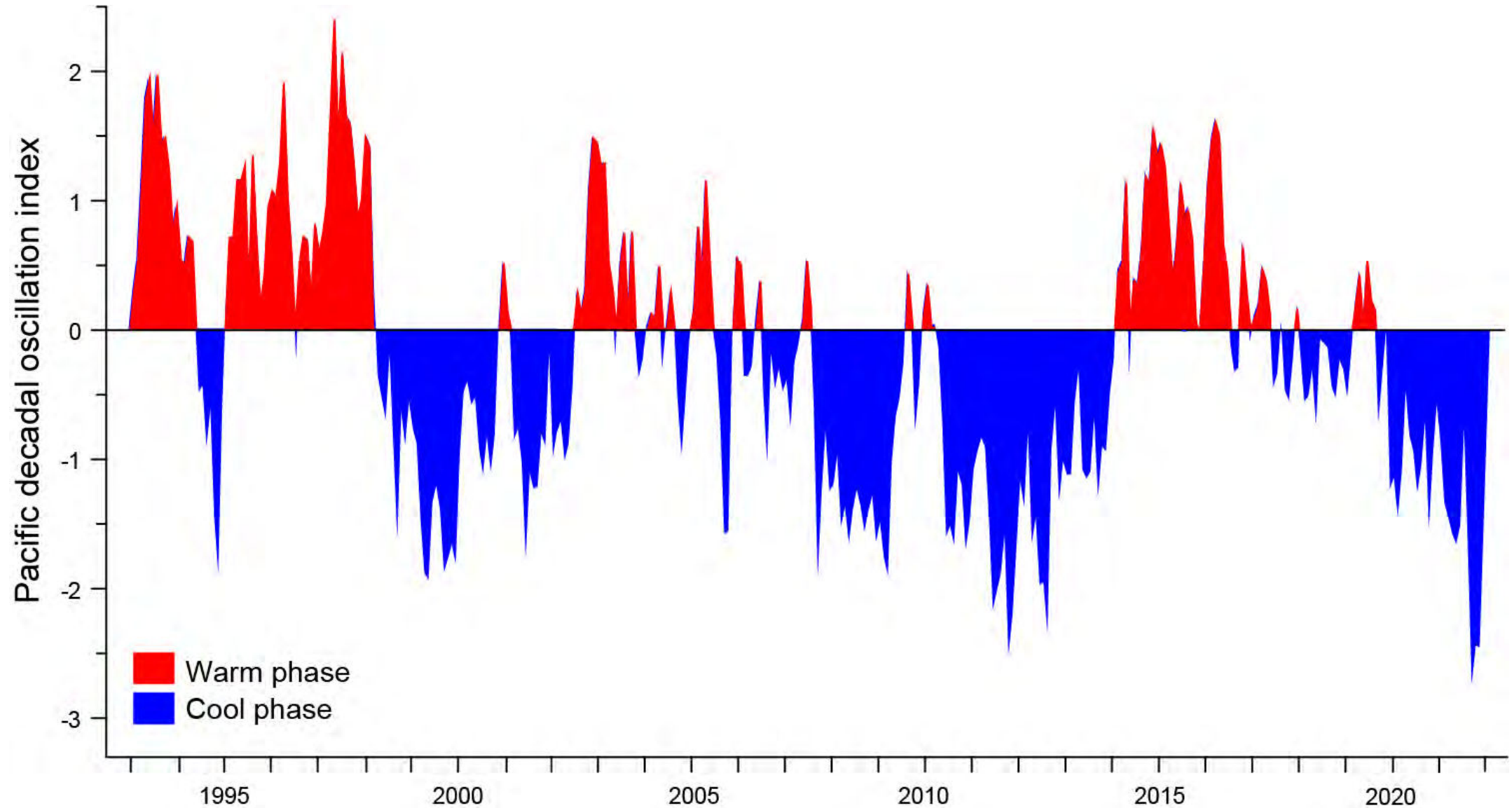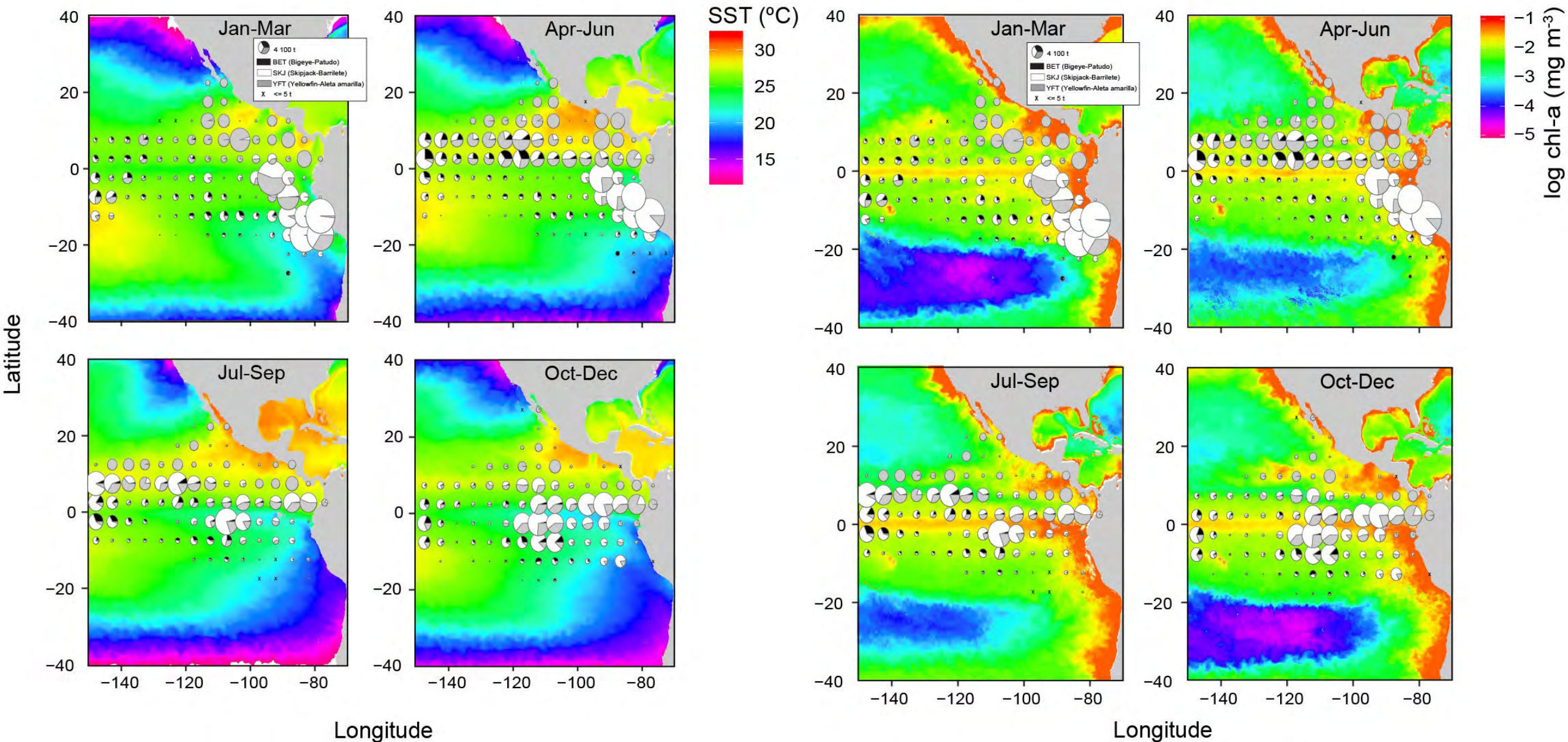
Vulnerability status (not to be confused with stock status)
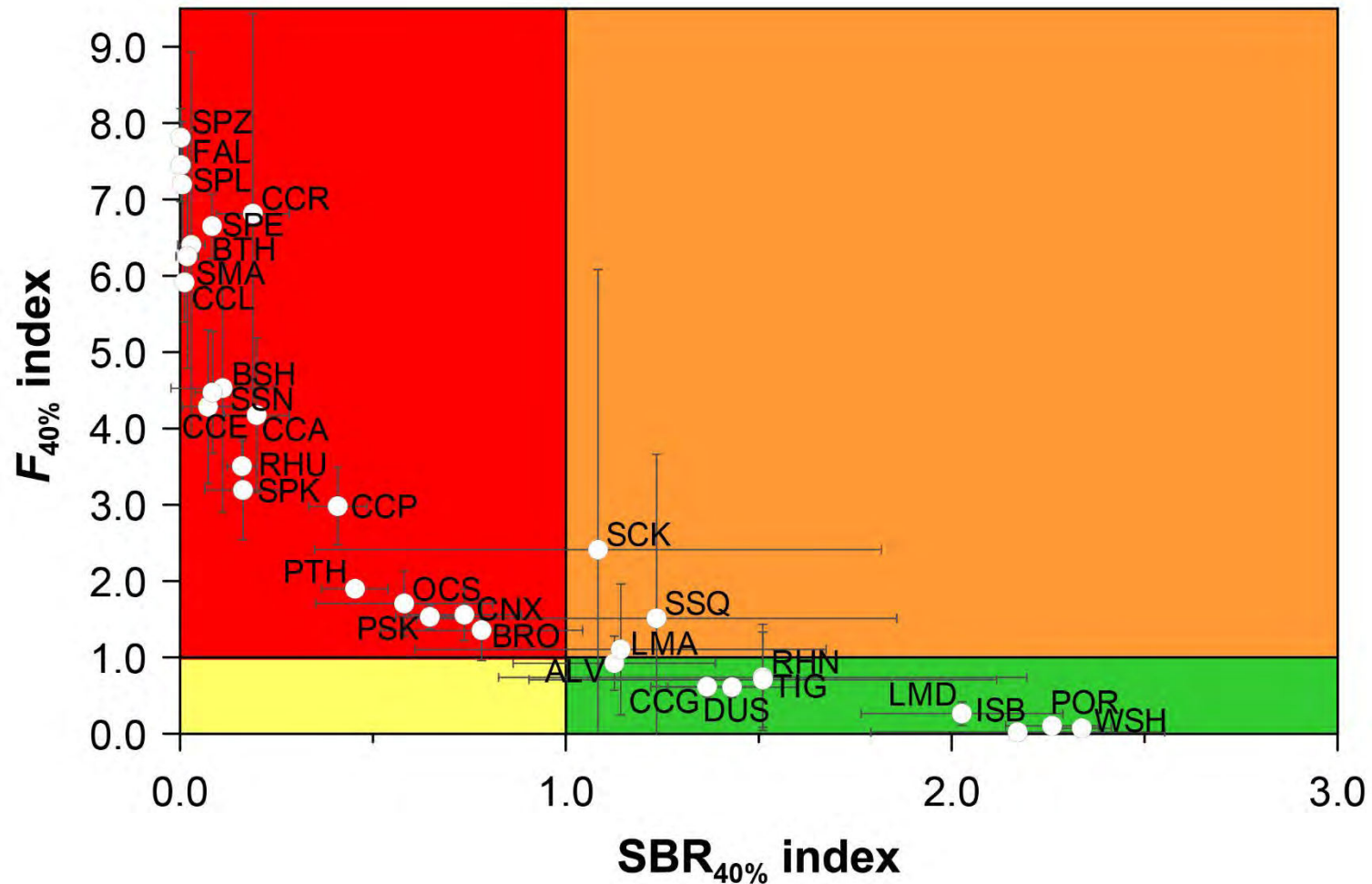
Summary of reporting improvements

- Reporting of non-target species

    - Time series provides greater transparency of catches; warning system for potentially vulnerable species

- Reporting of environmental indicators

    - Assists in explanation of changes in catch

- Improving ERAs (EASI-Fish) for prioritizing vulnerable species for mitigation and research

    - spinetail devil ray: BYC-09-01; leatherback turtle: BYC-11-02; 32 shark species: SAC-13-11

- But, to further improve bycatch estimates, ERAs and ecosystem models, data collection must continue to be improved (SAC-12-09; initiation of workshops in 2022)

- These provide transparency in how we deliver against our science goals and mandates to consider ecological impacts of EPO fisheries

Future developments: Prioritized research areas

- Continued development of EASI-Fish and it's application to 100+ bycatch species
  - Strategy to assess species groups: sharks, rays, sea turtles, marine mammals, sea birds, large fishes
- EASI-Fish to explore the potential efficacy of hypothetical CMMs for "most vulnerable" species (e.g. silky and hammerhead sharks SAC-13-11)
- Establish a longer-term strategy for undertaking studies to fill data gaps (Project F.3.a)
  - Spatially-explicit catch and effort data, especially for artisanal fisheries for SDMs and assessments
  - Morphometric (e.g. length-weight, length-length) sampling to improve models and catch estimates
  - Biological (e.g. stomachs, tissues) sampling to update diet matrix in spatially-explicit ecosystem model
- Continue to explore adaptive bycatch mitigation/management options
  - (e.g. Dynamic Ocean Management: SAC-10 INF-D, Pons et al 2022, BYC-11-01, BYC 11-04, Druon et al 2022)
- Facilitate workshops to develop clear data reporting standards and revise C-03-05
  - Align IATTC's responsibilities in Antigua Convention (i.e. to ensure sustainability of dependent species)
  - Improve catch estimations and reporting of bycatch in the *Ecosystem Considerations* report

Questions