



## A proposed IATTC shark research plan (2026-2030): integrated assessment and bycatch mitigation framework

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3<sup>rd</sup> EBWG meeting – 26-27 May 2025



# Outline

- Background.
- An integrated assessment and bycatch mitigation framework.
- Sharks and the IATTC – a brief description of the shark research plan.

# Background

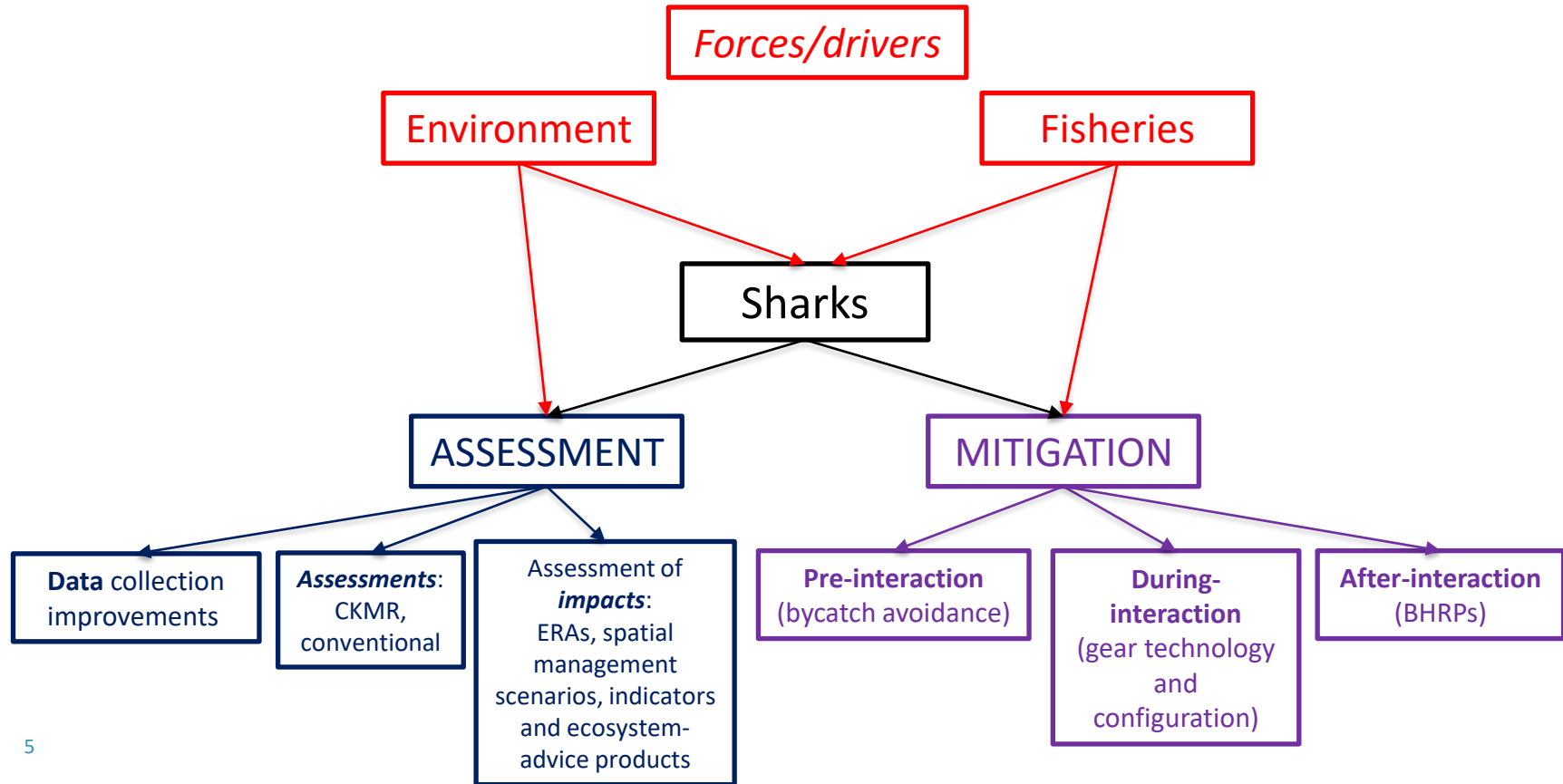
- Sharks are some of the **most vulnerable taxa** that interact with tuna and tuna-like fisheries.
- An **integrated assessment and bycatch mitigation framework is needed** to better understand the impacts and develop solutions that are practical, feasible and meaningful.
- The IATTC: has adopted **several shark Resolutions** (e.g., C-24-05) and the **Antigua Convention** expands the mandate to also consider non-target species.

# Background

- The IATTC requested (C-24-05) the IATTC staff to develop and recommend, in collaboration with the EBWG and the SAC a **shark research plan**.

15. In 2025, the IATTC, Scientific Staff in collaboration with the IATTC SAC and EBWG shall develop and recommend to the Commission a Shark Research Plan that will prioritize research activities for *Carcharhinus longimanus* and *C. falciformis*, *Sphyrna lewini*, *S. zygaena*, *Alopias pelagicus*, *Alopias superciliosus*, *Prionace glauca*, and *S. mokarran*, and as appropriate, the other species listed in Annex 4. This Shark Research Plan will include timelines and financial considerations for stock assessments, ecological risk assessments, and recommended management strategy evaluations. This plan will also identify opportunities for collaboration with the Western and Central Pacific Fisheries Commission (WCPFC) for Pacific-wide stocks.

# An integrated assessment and bycatch mitigation framework



# IATTC's shark workplan – previous SSP (2019-2025)

	Target/Project	Timeline & Status					
		2019	2020	2021	2022	2023	2024
<b>DATA</b>							
Goal B: Conduct a review of current IATTC shark data collection programs, identify and prioritize opportunities to improve data quality and expand data types and coverage.							
B.1. Improving current species identification tools							
B.2. Expand on board data collection to small purse vessels							
B.3. Individual Vessel Log pilot study							
Goal C: Facilitate the improvement of data quality, coverage, and reporting by CPC data collection programs.							
C.1. Anticorrel Fisheries Council: developing CPDs							
C.2. Improving data collection for Central American shark fisheries: develop sampling protocols for catch and effort estimates (PAC-SEA ADRI project)							
C.3. Identify all processing sites and obtain orders of magnitude estimation of total catch and effort							
C.4. Design and test sampling protocols for species and size composition sampling							
C.5. Long-term sampling program for shark catches of artisanal fisheries in the Pacific Ocean							
C.6. Improve the monitoring and assessment of shark stocks in the Eastern Pacific Ocean: expansion to Ecuador, Mexico and Peru.							
A.3. Series of workshops on improvements in data collection and provision to provide recommendations for updating the data provision Resolution C-90-105.							
Goal D: Investigate the use of new technologies to improve data quality.							
D.1. Pilot study of electronic monitoring of the activities and catches of purse-seiner vessels							
<b>LIFE HISTORY DATA</b>							
F.1. Investigate the movement, behavior, and habitat utilization of silky sharks in the EPO							
F.2. Developing conceptual models for sharks in support of assessment and mitigation of ecological impacts							
<b>MONITORING POPULATION STATUS AND MANAGEMENT ADVICE</b>							
Goal H: Improve and implement stock assessments, based on the best available science							
H.1. Undertake the research necessary to develop and conduct stock assessment assessments for selected species (assessments of silky and hammerhead sharks in the EPO)							
H.2. Review the estimation methods for parameterizing shark catch in the EPO							
Goal I: Evaluate the ecological impacts of shark fisheries							
I.1. Identifying species characteristics essential to model shark bycatch in the eastern Pacific Ocean							
I.2. Develop habitat models for bycatch species caught in the EPO to support ecological risk assessments (ERAs)							
I.3. Develop a flexible spatially-explicit ERA approach for quantifying the cumulative impact of shark fisheries on designated bycatch species within the EPO							
I.4. Develop and update Productivity-Susceptibility Analysis (PSAs) of shark fisheries in the EPO							
I.5. Vulnerability assessment of shark bycatch in EPO tuna fisheries using the Risk Index approach							
I.6. Assessing the efficacy of potential management options for highly vulnerable shark species in the EPO							
I.7. Development of a draft list of shark species under the purview of the IATTC							
Goal N: Improve our understanding of the interactions among environmental drivers, climate, and fisheries							
N.1. Archive EPO bycatch data to assess the influence of environmental drivers on catches and vulnerability							
<b>BYCATCH MITIGATION</b>							
Goal M: Mitigate the ecological impacts of shark fisheries main bycatch stakeholders							
M.1. Evaluate the effect of the depth of retention of the hook in sharks in relation to 1. and bycatches of other species in the purse-seine fishery							
M.2. Developing and testing bycatch release devices in the purse-seine fishery							
M.3. Evaluate the post-release survival of silky sharks captured by longline fishing gear, results in the equatorial zone, using boat-handling practices							
M.4. Develop best handling practices for minimizing post-release survival of silky sharks in longline fisheries, and identification of silky shark pupping areas for bycatch mitigation							
M.5. Monitor and develop post-release survival, movement ecology, and genetic population structure							
M.6. Evaluating knowledge and data gaps to the implementation of best handling and release practices for vulnerable species in IATTC fisheries							
M.7. Investigating post-release survival of silky sharks captured in class 2-N purse-seine fishery							

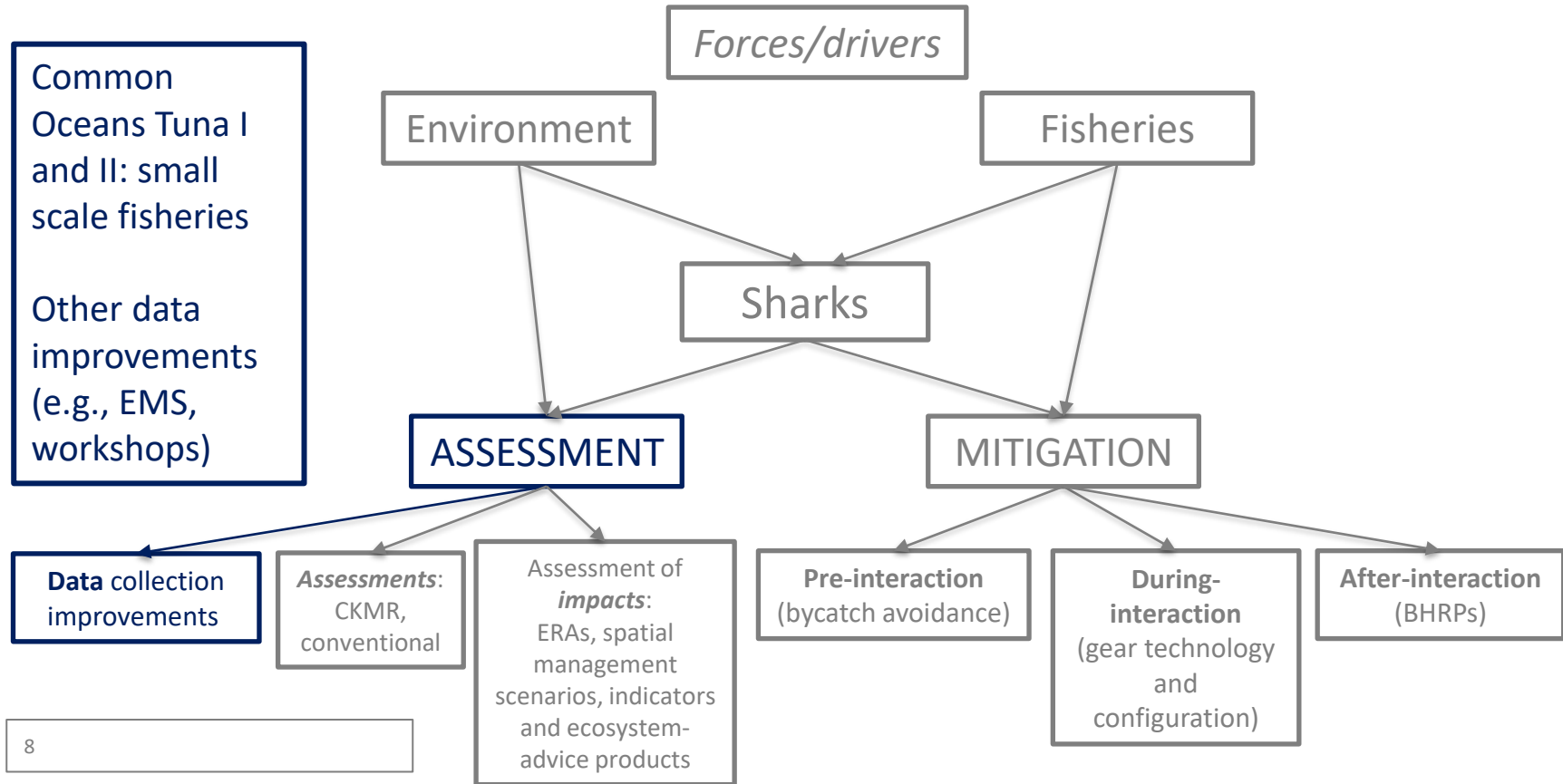
- **Compilation of 28 projects**, roughly on:
- **Data improvement:**
  - Common Oceans Tuna I and II: **small scale fisheries in Central America and Mexico, Ecuador and Peru.**
  - Data improvement **workshops.**
- **Life history:**
  - Movement, behavior and **habitat utilization.**
  - Develop **conceptual models** for key species.
- **Monitoring population status:**
  - Ecological Risk Assessments: **EASI-Fish.**
  - **Annual indicators.**
  - **Close Kin Mark Recapture (CKMR)** feasibility study.
  - **Shark list** under the purview of the Commission.
- **Mitigation of impacts:**
  - **Post release survival studies** (all fleets).
  - **Best practices and devices.**
  - **Environment-based solutions (SDMs-DOM).**

# IATTC's shark workplan – new SSP (2026-2030)

		Tentative chronogram				
		2026	2027	2028	2029	2030
<b>Data</b>						
Goal	Complete the design and implement a standardized data collection					
Target	Small-scale coastal fisheries					
Goal	Continue to support the IATTC in the development and implementation of an EMS for tuna fisheries in the EPO					
<b>Assessment</b>						
<b>Stock assessment</b>						
Goal	Conduct a close-kin mark-recapture stock assessment for silky shark					
Target	Complete the CKMR development phase.					
Target	Implement the CKMR program.					
Target	Conduct the stock assessment.					
Target	Explore the applicability of silky shark CKMR framework to other prioritized shark species					
Goal	Address Commission's request to conduct conventional stock assessments of prioritized species, as needed, through collaboration with external organizations					
Target	Prioritized shark species in Resolution C-24-05 (e.g., ISC, COPS)					
<b>Assessment of impacts</b>						
Goal	Conduct ERAs of EPO fisheries to identify and prioritize species at risk and evaluate the impact of different management scenarios					
Target	Conduct ERAs for prioritized shark species in Resolution C-24-05					
Goal	Develop a toolbox to inform the use of spatial management efforts by the Commission, including options proposed under the BBNJ					
Target	Develop good practices for data, models, and evaluation					
Target	Develop and parameterize a toolbox for spatial management models					
Target	Improve understanding on species movement dynamics and stock					
Target	Improve understanding on spatial fleet dynamics					
Goal	Design and provide ecosystem-advice products to support operationalization of EAFM					
Target	Identify and establish criteria for ecoregions and indicators					
Target	Develop ecoregions and indicators					
Target	Establish guidelines and develop pilot ecosystem-advice products					
Target	Initialization of the Pacific Marine Specimen Bank for prioritized species					
<b>Mitigation of impacts</b>						
Goal	Develop tools for the Commission-managed fisheries to reduce fisheries					
Target	Develop a library of species distribution models for prioritized bycatch					
Target	Develop spatio-temporal environmental multi-species models for bycatch					
Target	Test and operationalize a first version of the tool (e.g., eco-informatics)					
Goal	In collaboration with the industry, conduct scientific experiments to identify technologies that would reduce mortality of prioritized bycatch					
Goal	Complete the development of science-driven standardized best handling and release practices for all vulnerable taxa and fisheries managed by the Commission, including training programs for onboard crew					
Target	Sharks					

- **10 strategic goals (7 specific for sharks) on:**
- **Data improvement:**
  - Common Oceans Tuna I and II: **small scale fisheries in Central America and Mexico, Ecuador and Peru.**
  - Support for **other data improvements** (e.g., workshops, EMS).
- **Assessment:**
  - Stock assessment*
    - **Close Kin Mark Recapture (CKMR)** for silky shark. Framework for other species.
    - Conventional assessments (e.g., ISC, CPPS)
  - Assessment of impacts*
    - Ecological Risk Assessments: **EASI-Fish.**
    - Impacts of potential **spatial management** scenarios.
    - Annual **indicators and ecosystem-advice** products.
- **Mitigation of impacts**
  - **Pre-set** (tools for bycatch avoidance).
  - **During the set** (gear configuration and technology).
  - **Post-set** (BHRPs).

# An integrated assessment and bycatch mitigation framework







# Common Oceans ABNJ Tuna 1 project: Central America

- Main Results
  - Maps with **locations of interest**.
  - **Sampling design** for the artisanal and semi-industrial fleets.
  - **Order of magnitude** for key species caught by the small scale fisheries.
- **Unfunded proposal C.4.d** for a data collection program in Central America.

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

11<sup>TH</sup> MEETING

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

14<sup>TH</sup> MEETING

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

14<sup>TH</sup> MEETING

La Jolla, California (USA)

15-19 May 2023

INTER-AMERICAN TROPICAL TUNA COMMISSION

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Single-cluster systematic sampling designs for shark catch size composition in a Central American longline fishery

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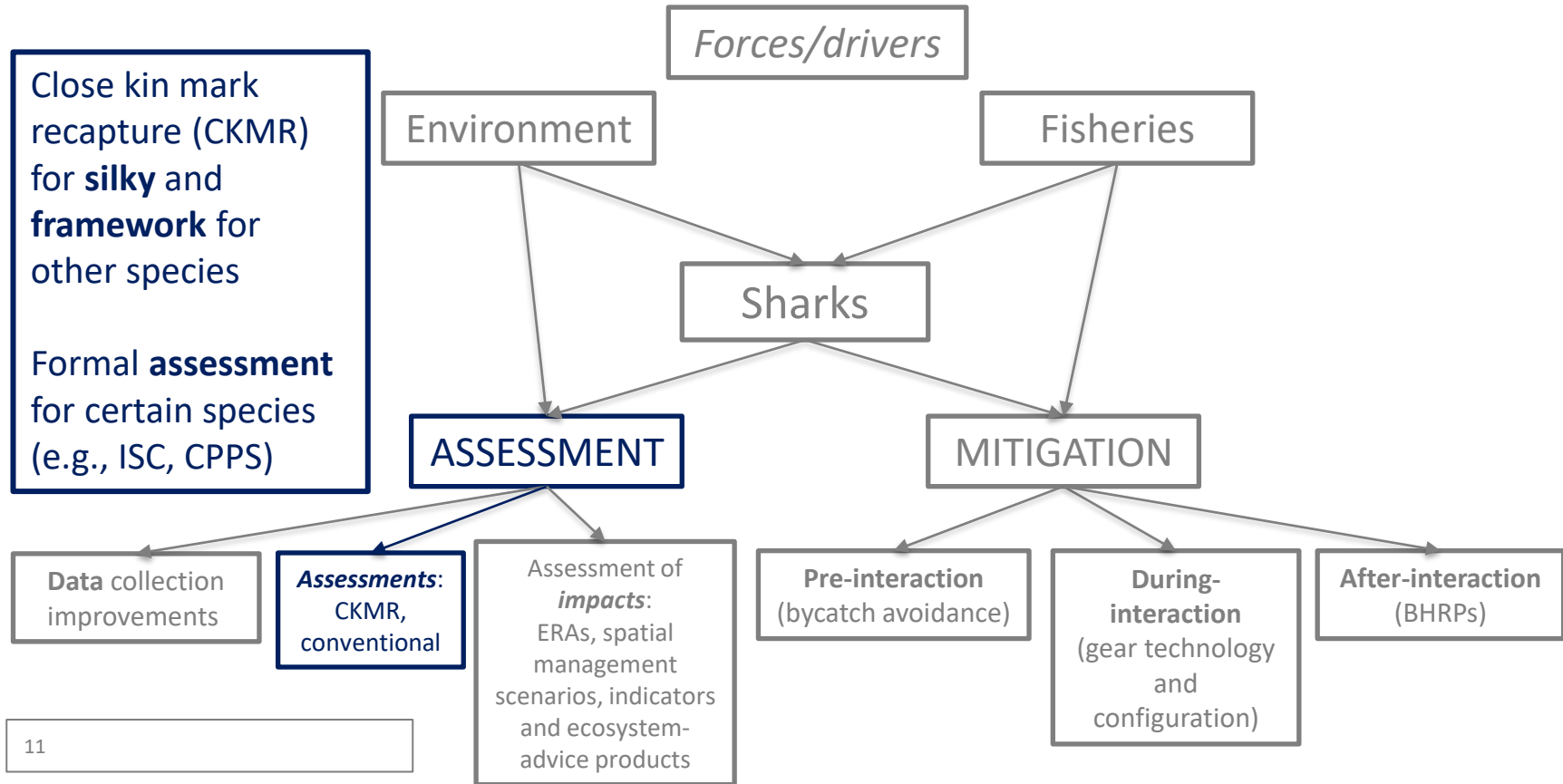
<sup>c</sup> Instituto del Mar de Perú, Callao, Perú

<sup>d</sup> Instituto Costarricense de Pesca y Acuicultura (INCOPECA) of Costa Rica, Puntarenas, Costa Rica

<sup>e</sup> Wotter, Rockville, MD, USA

<sup>f</sup> Fisheries and Aquaculture Division, Food and Agriculture Organization of the United Nations, Rome, Italy

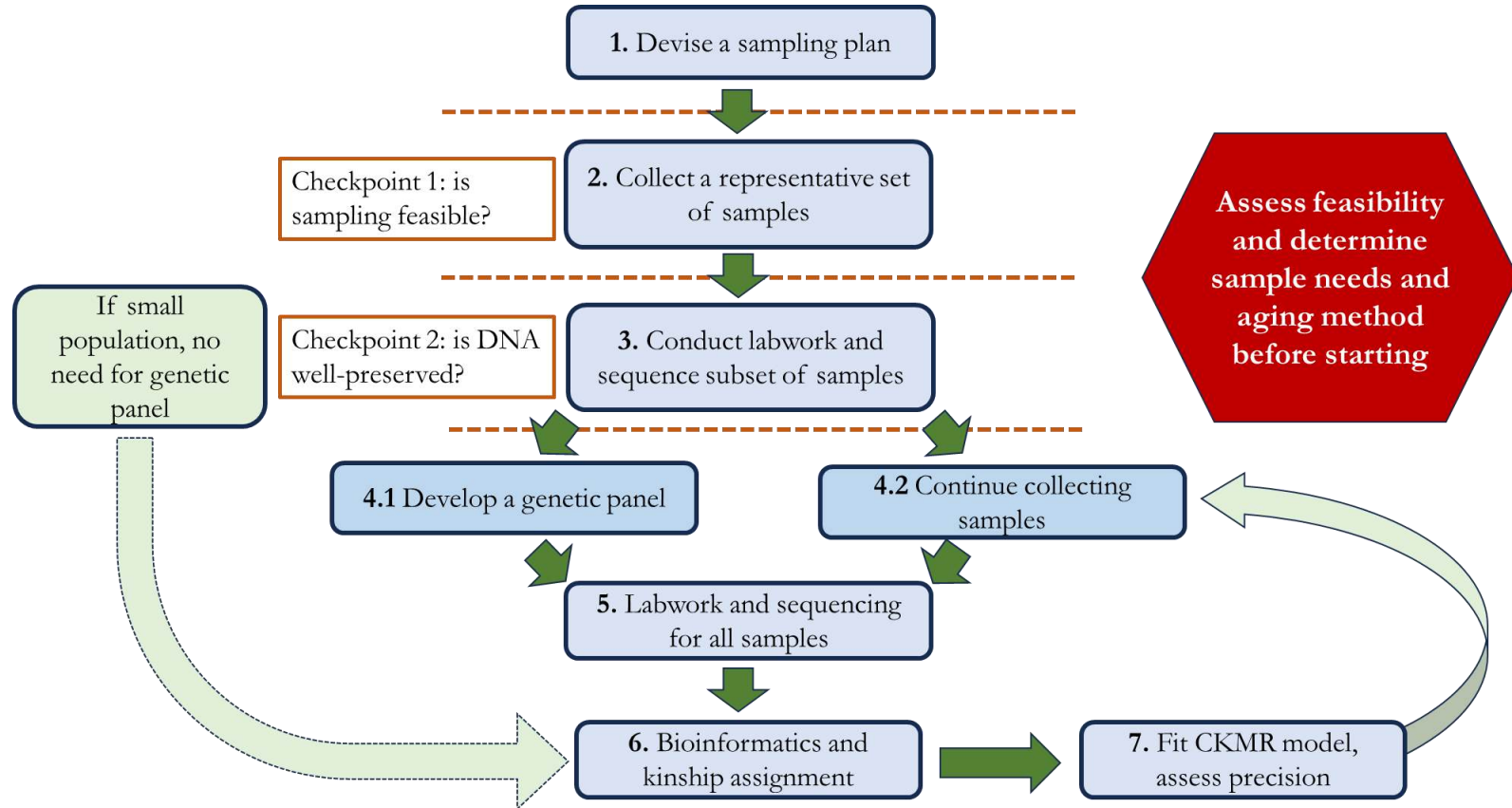
# An integrated assessment and bycatch mitigation framework



# Close Kin Mark Recapture – what is it?

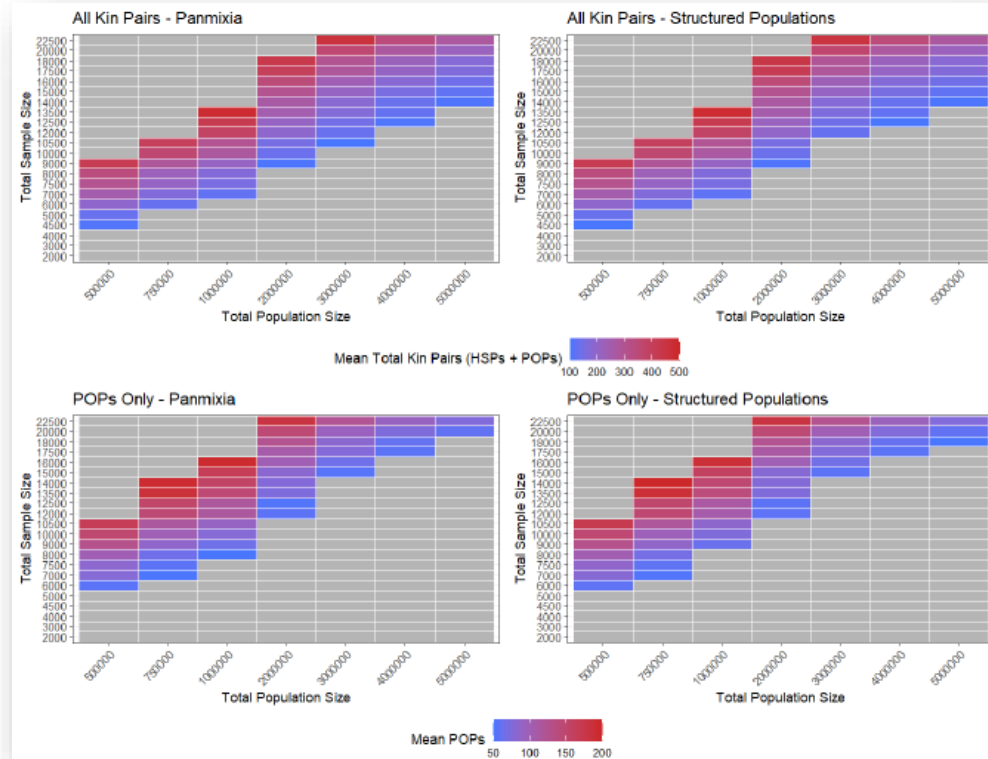
- Genetics-based method for **estimating absolute adult abundance, mortality** and other population parameters
  - Modified version of conventional capture-mark-recapture that relies on probabilities of kinship
  - Offspring tag their parents (or vice versa)
- **Highly flexible** framework
  - Can technically make use of **any type of relative**, contingent on the ability to
    - reliably identify kin, and
    - construct an appropriate kinship probability
  - Can generate **a time-series of abundance estimates** from a single sampling occasion

# Close Kin Mark Recapture – feasibility study

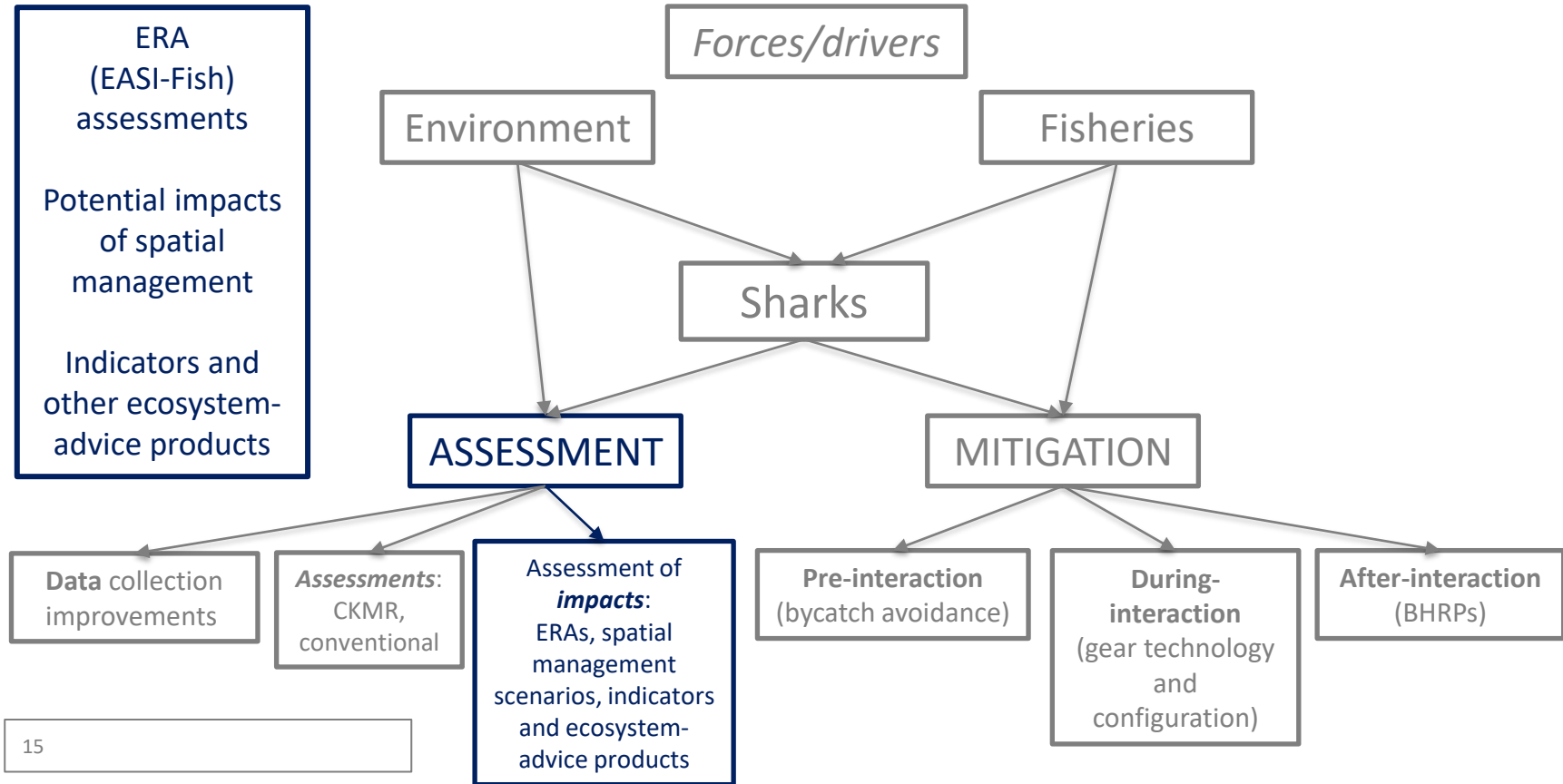


# Close Kin Mark Recapture – feasibility study

- Ran individual-based **simulations** of different population sizes with and without population structure and compared the number of kin pairs for different sampling schemes
- Now we're working on getting **sampling** supplies into the hands of observers
- Full study – **unfunded proposal H.7**

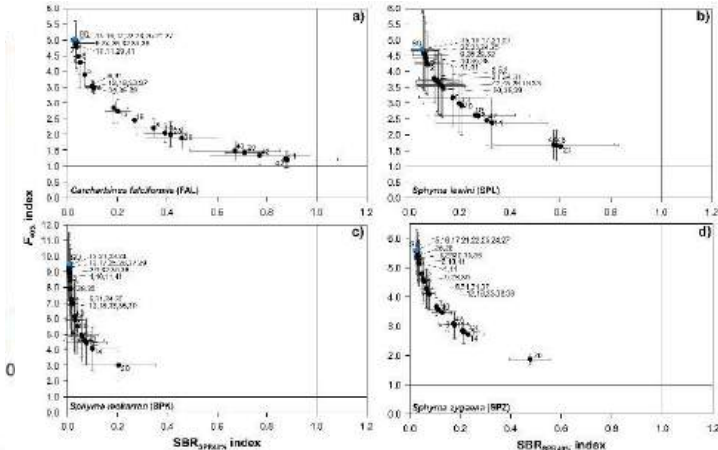
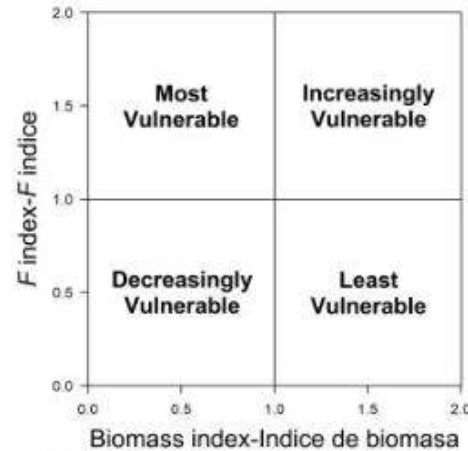


# An integrated assessment and bycatch mitigation framework



# Ecological Risk Assessments: EASI-Fish

- Ecological Risk Assessments (e.g., EASI-Fish) to
  - (i) **identify** potentially vulnerable **species** that become a priority for **data collection, management and conservation**.
  - (ii) **test the efficacy of hypothetical CMM scenarios** and guide management advice.
- Two EASI-Fish exercises so far: a general one (**SAC-13-11**) and one on silky and hammerheads (**SAC-14-12**)





# Indicators and ecosystem advice products: Ecosystems Considerations, Ecosystem models, EcoCards

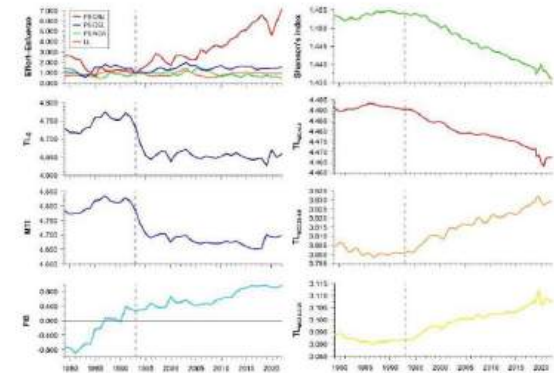
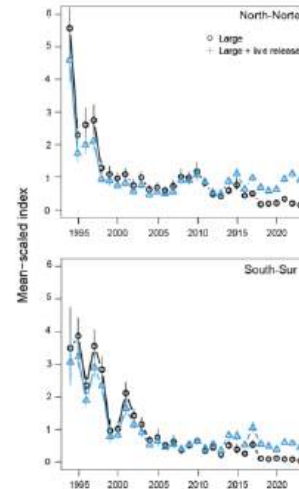
- **Prepared annually** for the consideration of the Working Groups and the Commission.
- Cover **indicators** on shark catches and other climate and ecosystem elements on a regular basis. Plan to transition to *Ecocards* and other ecosystem-advice products (EB-02-02).

INTER-AMERICAN TROPICAL TUNA COMMISSION  
WORKING GROUP ON ECOSYSTEMS AND BYCATCH  
2<sup>ND</sup> MEETING  
La Jolla, California (USA)  
05-06 June 2024

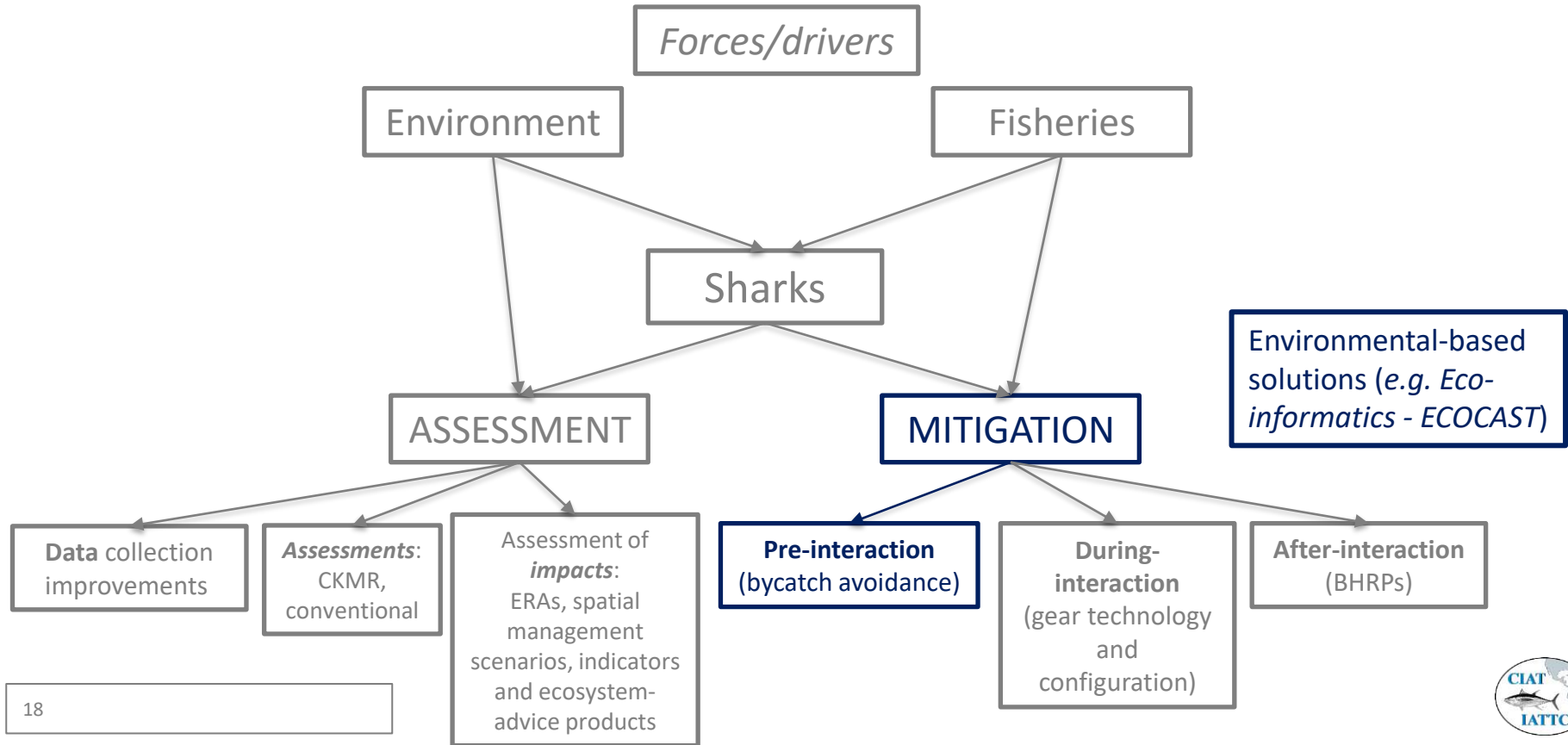
DOCUMENT EB-02-01  
ECOSYSTEM CONSIDERATIONS

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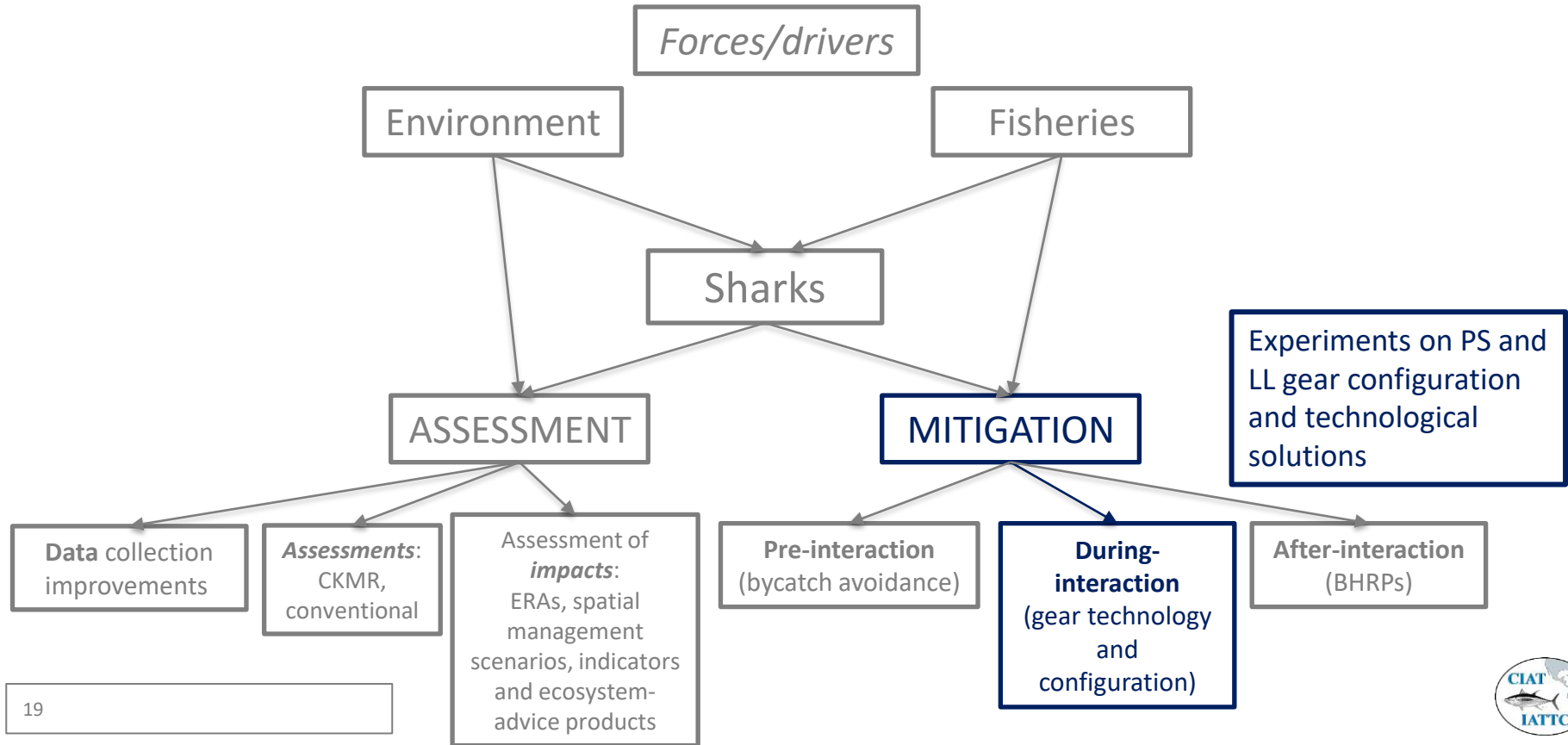
DOCUMENT WGEB-02-02  
REVIEW OF T-RFMO ECOSYSTEM RESEARCH TO INFORM A WORKPLAN ON  
ECOCARDS FOR THE EPO



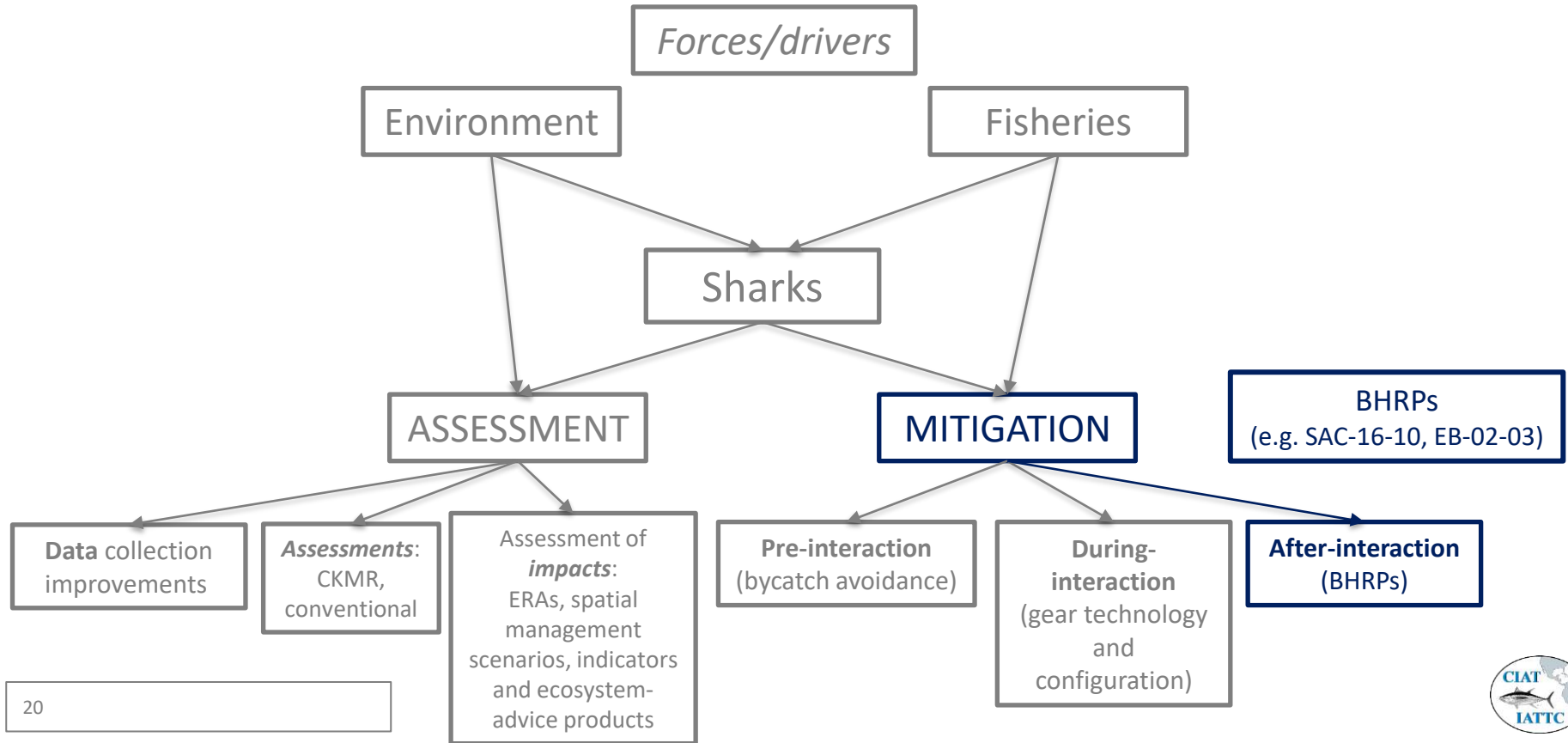
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Target	Sharks					

- **10 strategic goals (7 specific for sharks).**
- Effective **bycatch conservation and management** requires both accurate **assessment and mitigation** options.
- Independent but **inter-connected strategic goals** : from data improvement to a better understanding of population status and impact on the species, as well as development and application of mitigation options based on the best science advice.
- Long term **commitment and vision**, not many viable short-term solutions.

# Preguntas – Questions?

