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

Jon Lopez, Salvador Siu, Shane Griffiths, Dan Crear, Dan Ovando, Leanne Fuller, Marlon Roman, Melanie Hutchinson and Alexandre Aires Da Silva

3rd 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.

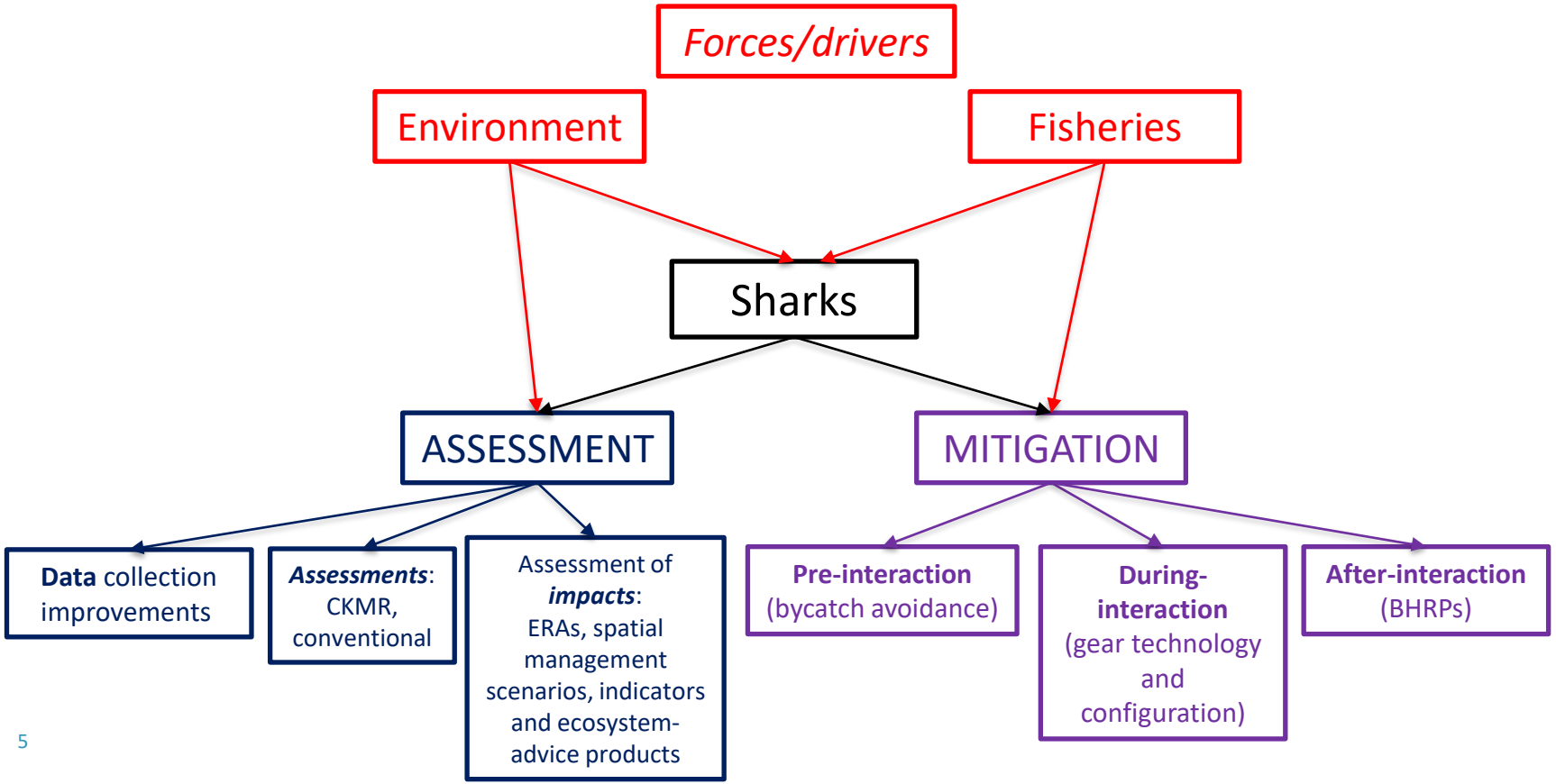
- The IATTC: has adopted **several shark Resolutions** (e.g., C-24-05) and the **Antigua Convention** expands the mandate to also consider non-target species.

Background

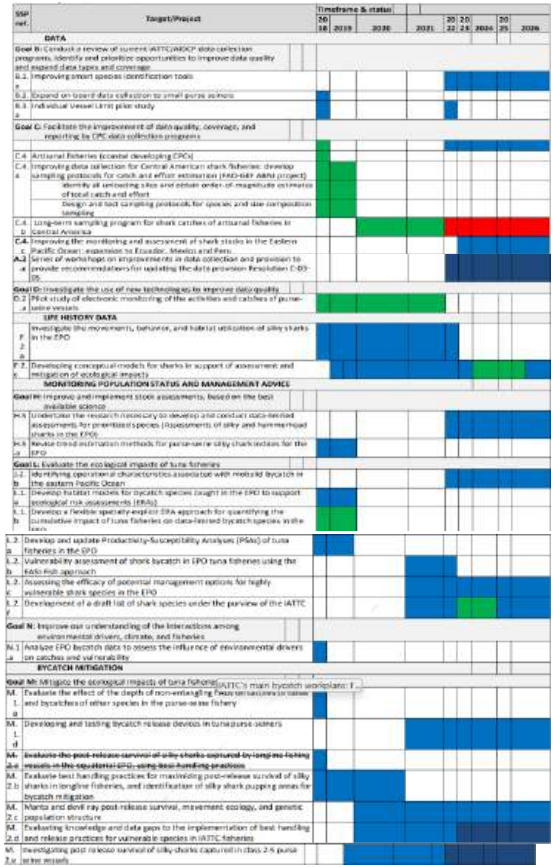
- The IATTC requested (C-24-05) the IATTC staff to develop and recommend, in collaboration with the EBWG and the SAC a **shark research plan**.

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 supercilicious, 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)



- **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)

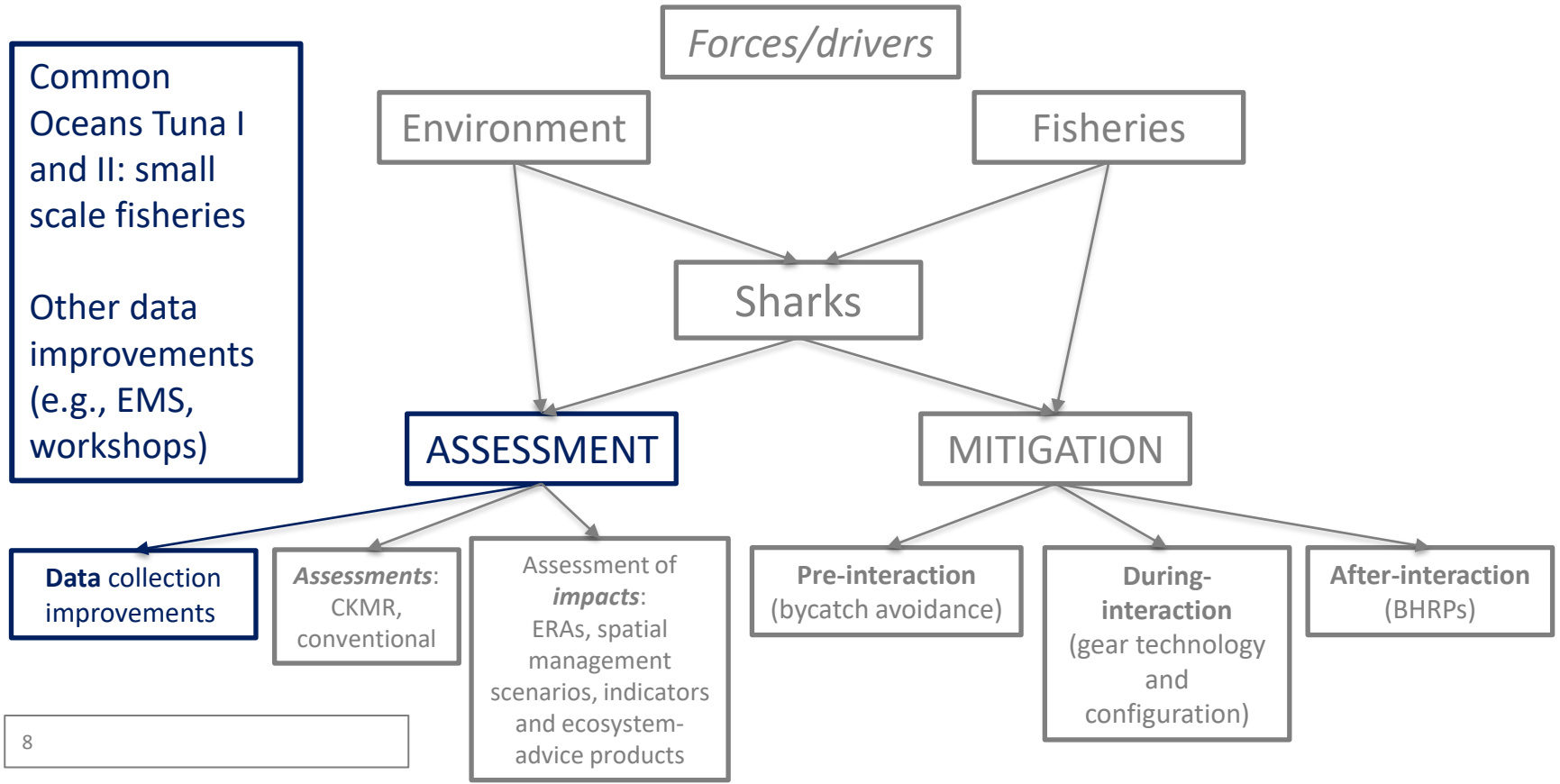
		Tentative chronogram				
		2026	2027	2028	2029	2030
Data						
Goal	**Complete the design and implement a standardized data collection**					
Target	Small-scale coastal fisheries					
Goal	**Continue to support the IATTC in the development and implementation of an EMS for tuna fisheries in the EPO**					
Assessment						
Stock assessment						
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, CCPS)					
Assessment of impacts						
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					
Mitigation of impacts						
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**:

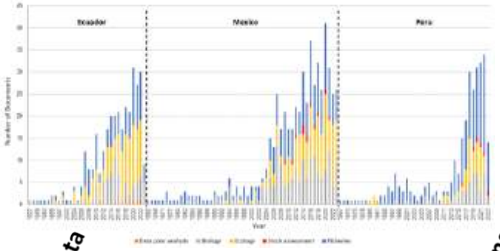
  Stock assessment
  - **Close Kin Mark Recapture (CKMR)** for silky shark. Framework for other species.
  - Conventional assessments (e.g., ISC, CPPS)

  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 projects: Central America (I) and Ecuador, Mexico and Peru (II)



Metadata

Challenges

Recommendations

Capacity building

Sampling program

Site of interest maps

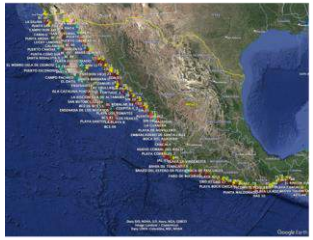
Catch and effort (interviews/ sampling)

Sampling design (artisanal and semi-industrial)

Pilot on sampling

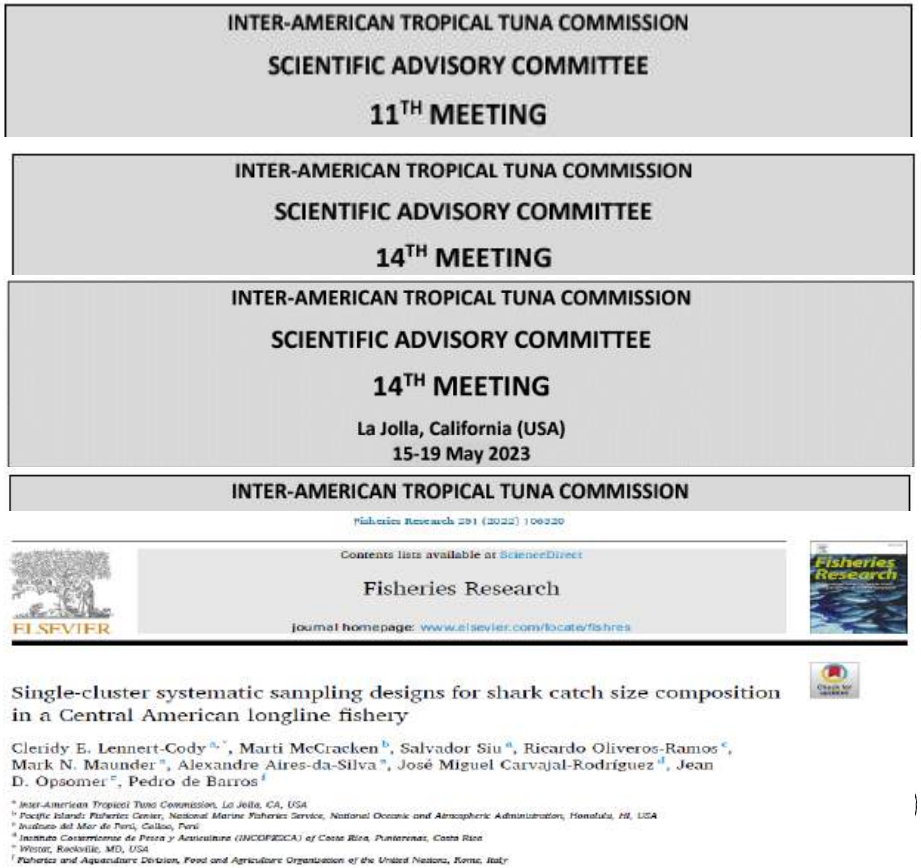
Feasability on biological sampling

Order of Magnitude



Common Oceans ABNJ Tuna 1 project: Central America

- Main Results
  - Maps with **locations of interest**.
  - **Sampling design** for the astisanal 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

11TH MEETING

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

14TH MEETING

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

14TH MEETING

La Jolla, California (USA)
15-19 May 2023

INTER-AMERICAN TROPICAL TUNA COMMISSION

Fisheries Research 251 (2022) 106320

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/fishres

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

Cleridy E. Lennert-Cody [a,*], Marti McCracken [b], Salvador Siu [a], Ricardo Oliveros-Ramos [c], Mark N. Maunder [a], Alexandre Aires-da-Silva [a], José Miguel Carvajal-Rodríguez [d], Jean D. Opsomer [e], Pedro de Barros [f]

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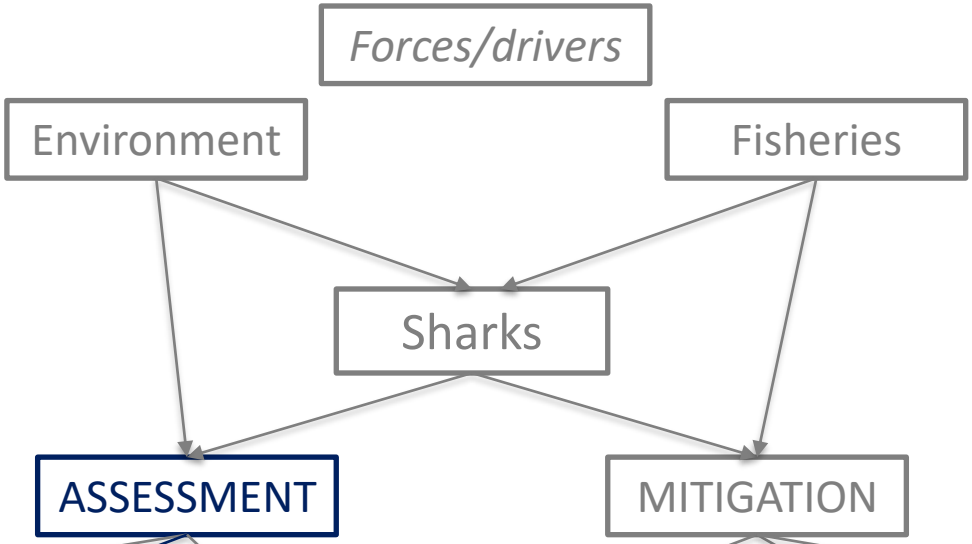
An integrated assessment and bycatch mitigation framework

Close kin mark recapture (CKMR) for **silky** and **framework** for other species

Formal **assessment** for certain species (e.g., ISC, CPPS)

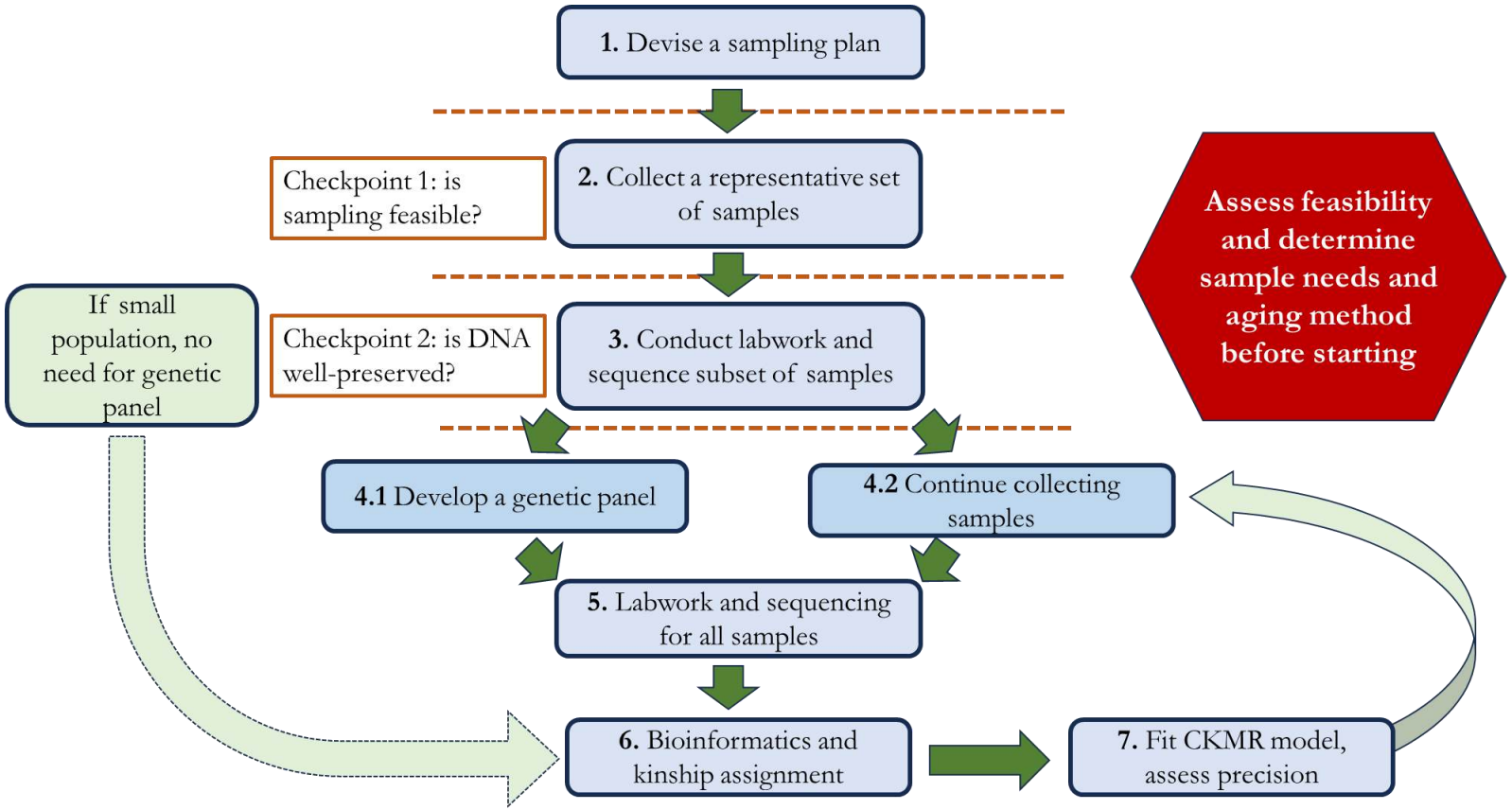


Close Kin Mark Recapture – what is it?

- 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)

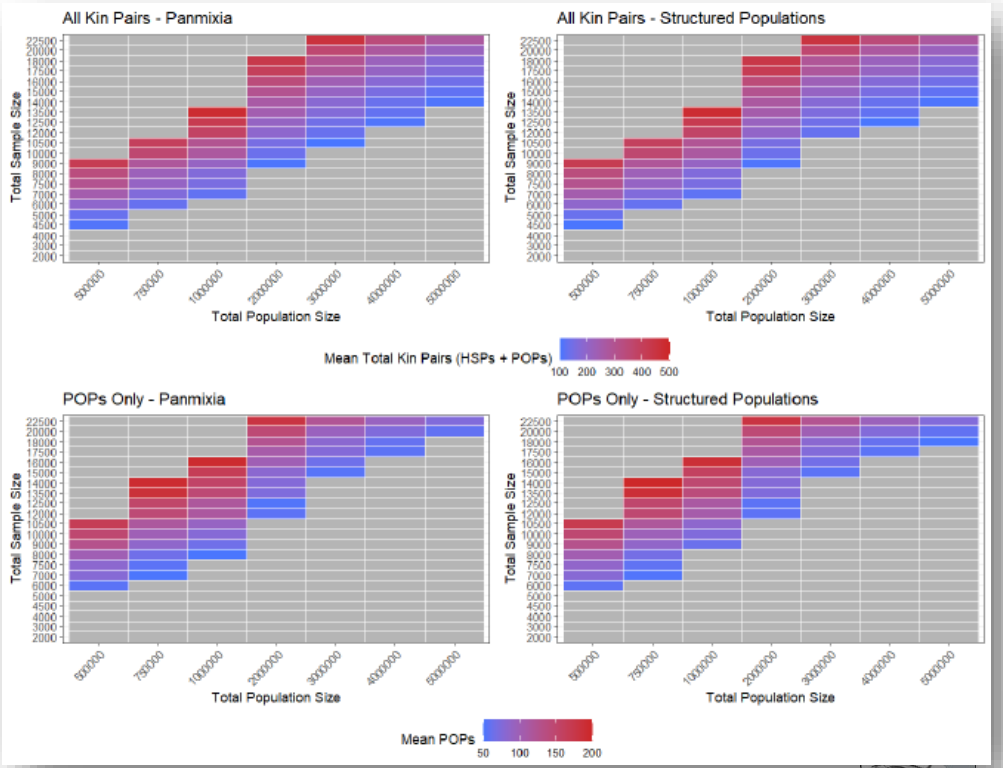
- **Highly flexible** framework
  - Can technically make use of **any type of relative**, contingent on the ability to
    - reliably identify kin, and
    - construct an appropriate kinship probability
  - Can generate **a time-series of abundance estimates** from a single sampling occasion

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



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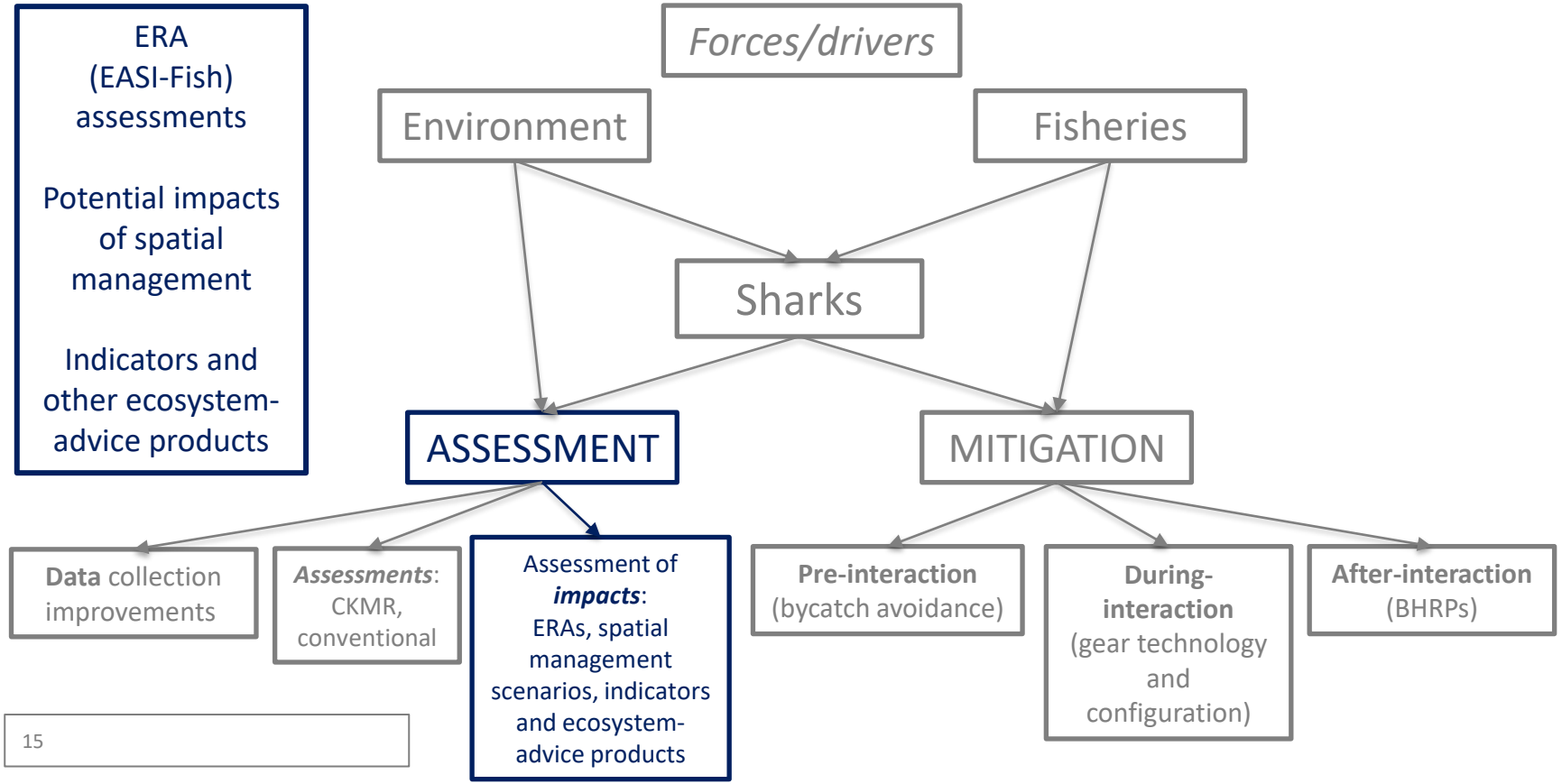
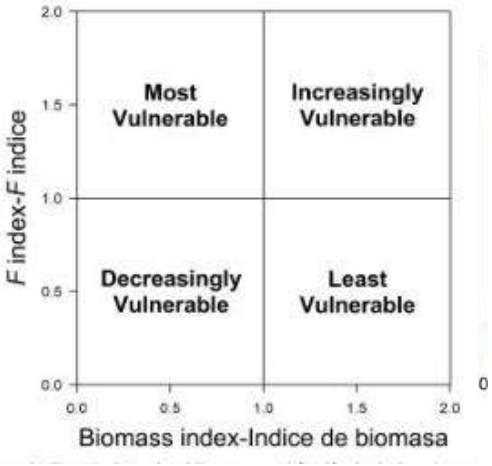
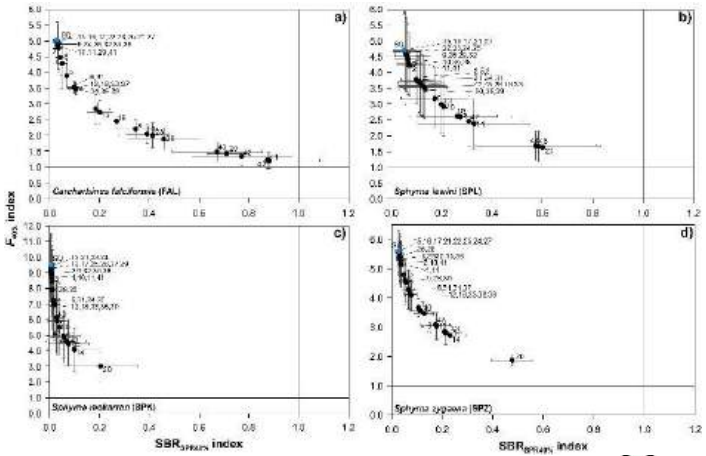


Ecological Risk Assessments: EASI-Fish

- 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**)

SAC-14-12; Griffiths et al. 2023





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

2ND MEETING

La Jolla, California (USA)
05-06 June 2024

DOCUMENT EB-02-01

ECOSYSTEM CONSIDERATIONS

INTER-AMERICAN TROPICAL TUNA COMMISSION

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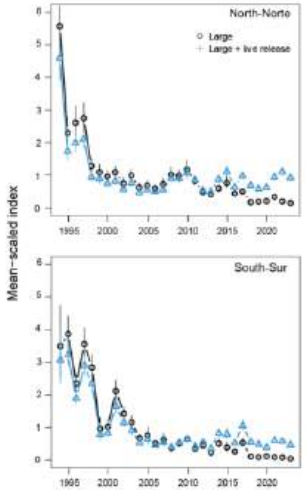
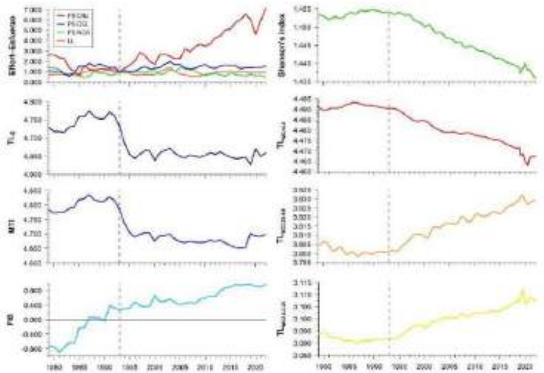
2ND MEETING

La Jolla, California (USA)
05-06 June 2024

DOCUMENT WGEB-02-02

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





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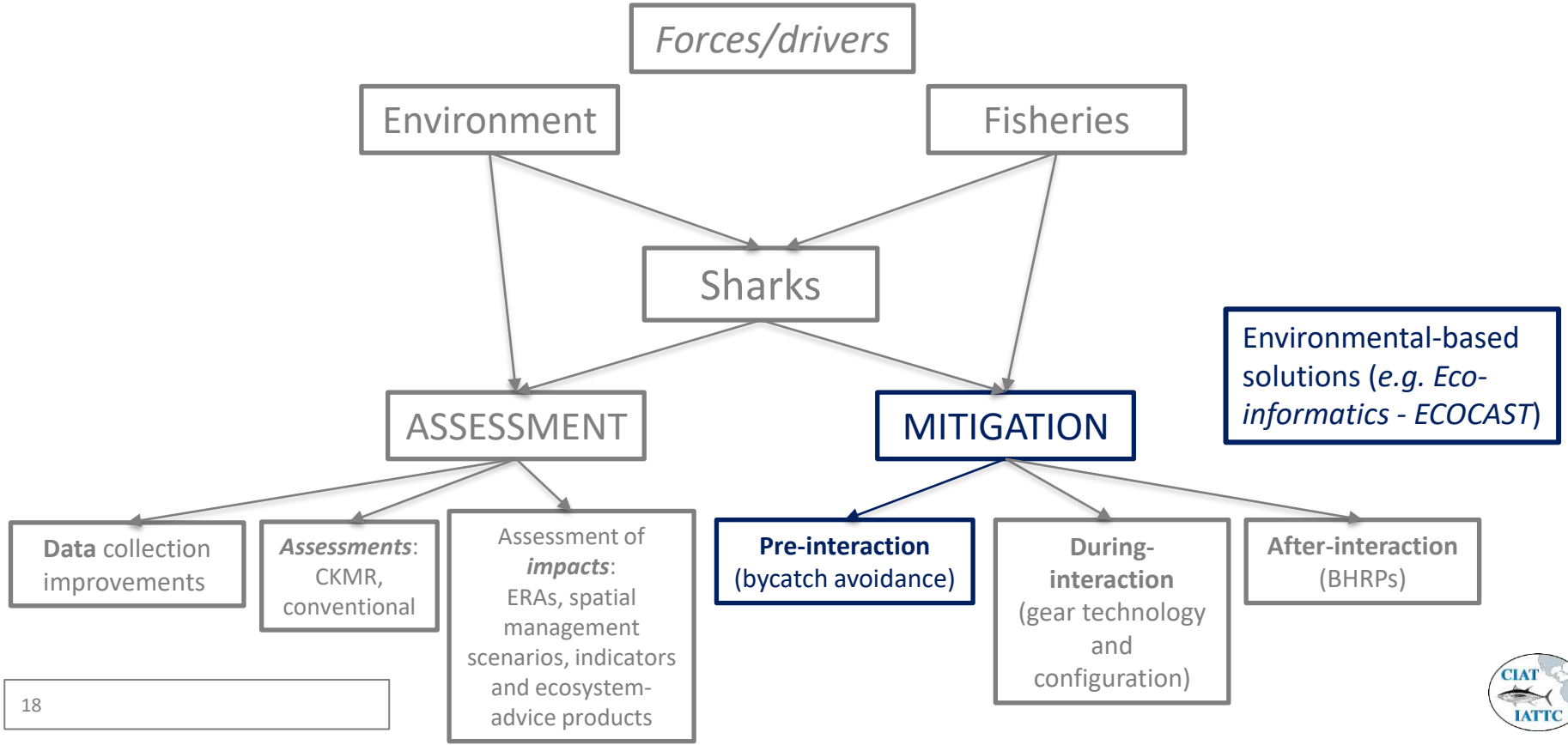

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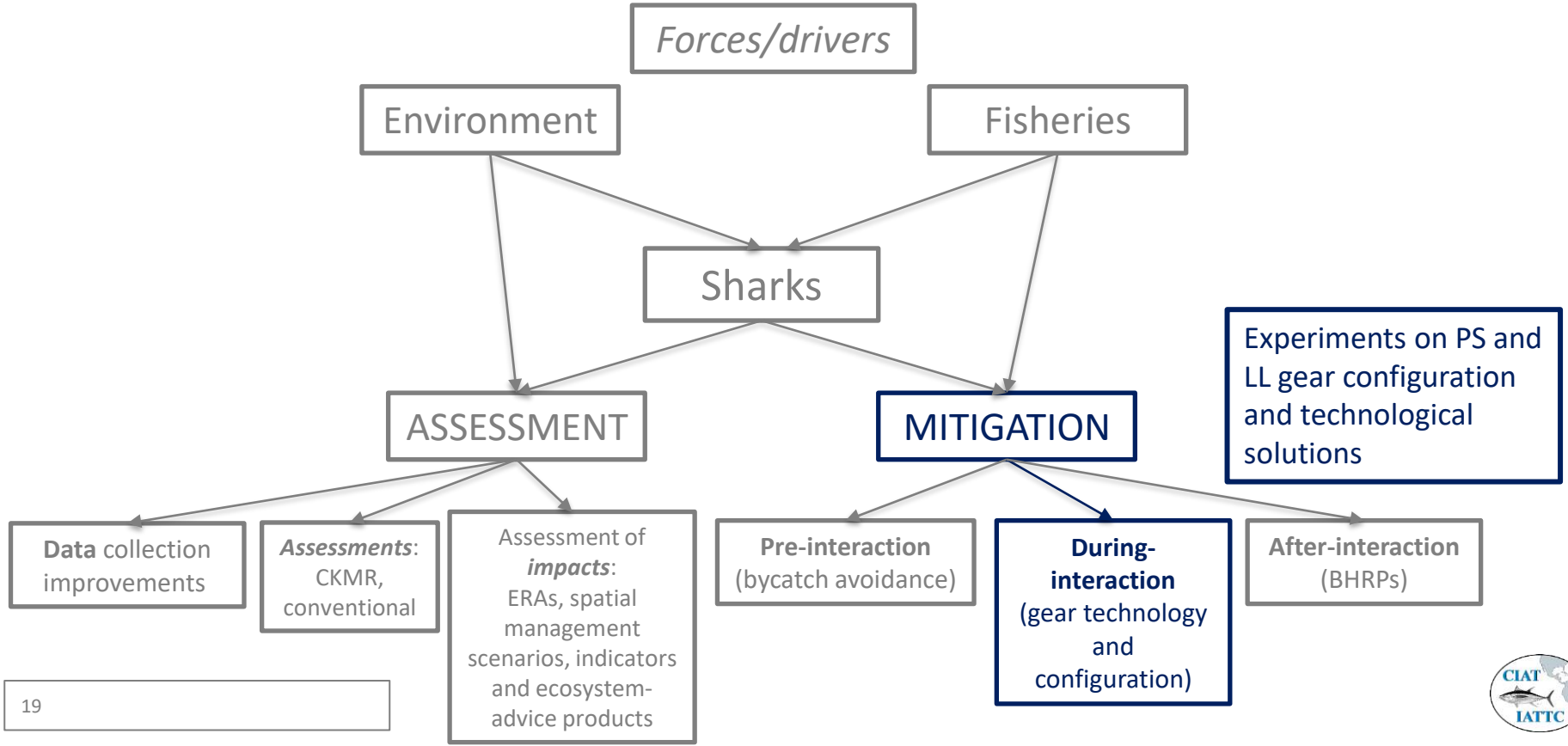

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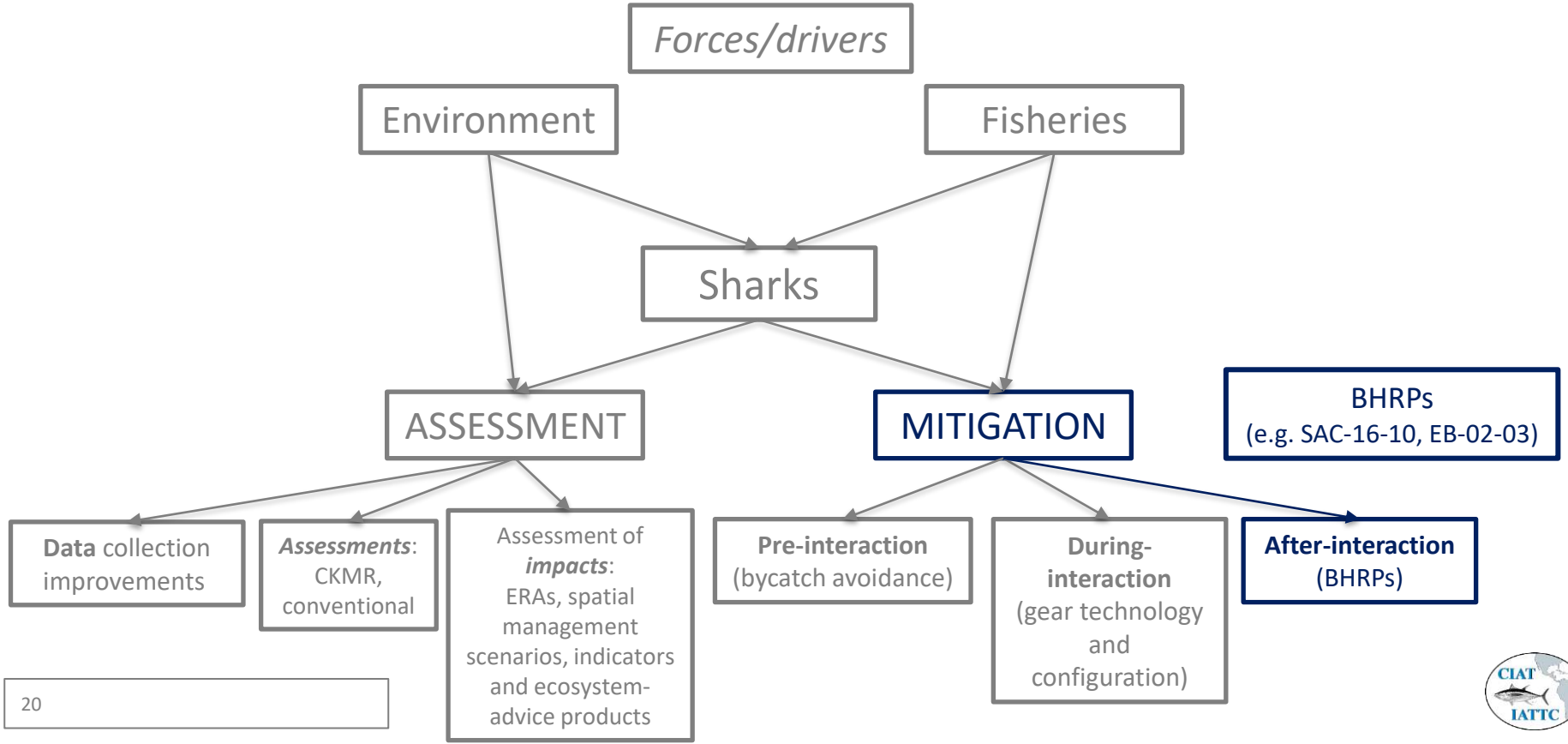

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Target	Sharks					

- **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?