Development of Options for a Shark Data Collection Program for IATTC Fisheries: Lessons And Opportunities

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Resolution C-23-07

- **Resolution C-23-07 - Conservation Measures for the Protection and Sustainable Management of Sharks**

14. *"In 2024, the IATTC scientific staff, in consultation with the IATTC SAC and EBWG <u>shall implement a data collection program for sharks</u> associated with fisheries managed by the Commission, making use of existing research and data collection mechanisms and programs where possible. The program will include the <u>monitoring of shark catches by small scale fisheries in coastal countries</u> and the establishment, maintenance and strengthening of standardized data management databases, considering appropriate assistance to those CPCs"*

Small scale coastal fisheries

- IATTC have various data collection programs for 'industrial' longline and purse-seine fisheries in the EPO

- But very little data for small scale multispecies coastal fleets
  - Vessels <20 m LOA
  - Not considered "tuna fisheries"
  - Little domestic data collection

- But, thousands of vessels

- Thousands of access points

- Significant shark catches

SAC-14 INF-L
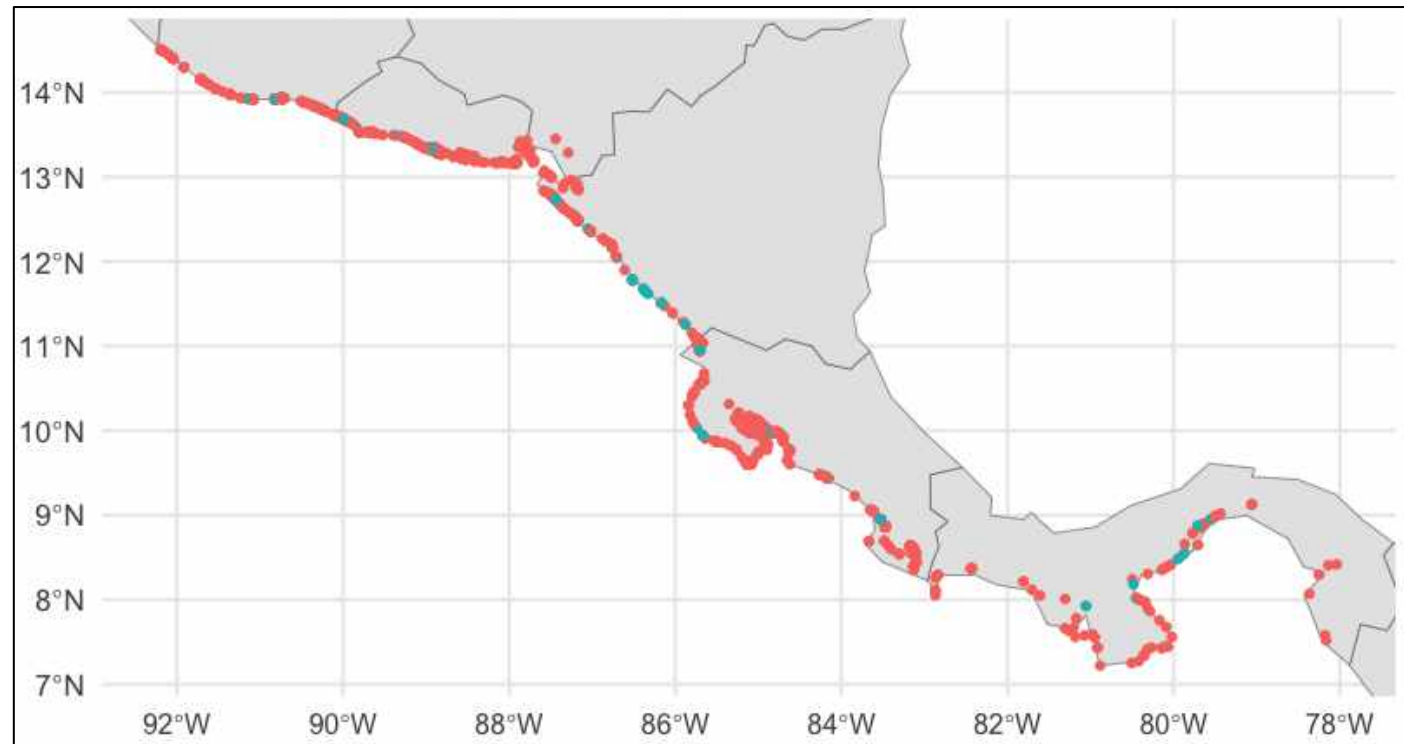
An overview of survey methods

- Artisanal fisheries is a new research area with few specific survey methods

- Marine recreational fisheries studied for decades and share many sampling difficulties with artisanal fisheries

  - Fishers dispersed across thousands of kilometres of coastline

  - Hundreds to many thousands of access points

  - Fishers often not required to report catch and/or effort

  - Lack of a licence or permit to provide a complete list frame for sampling

- Established cost-effective methods could transfer to artisanal fisheries

An overview of survey methods

- ## On-site survey methods
  - Access point surveys where fishers intercepted on-site – very precise catch, effort, biologicals
  - Generally, very expensive due to labor and travel costs to visit many access points
  - Catch rate data requires an estimate of total fishery effort for expansion

An overview of survey methods

- ## Off-site survey methods

  - Longitudinal diary survey (hardcopy/telephone) collects daily/trip data – cheap but reporting burden

  - Retrospective recall survey – cheap but suffer from recall bias beyond 2-3 months

  - Satellite imagery – cheap high resolution instantaneous vessel counts for large areas

  - Fisher or vessel license frames – a complete list of participating fishers/vessels

An overview of survey methods

- ## Complementary survey methods
  - A combination of methods (e.g. on-site survey for catch rates + vessel licence frame for effort)

On-site catch rate data

+

Off-site satellite imagery for effort

ABNJ Tuna 1 project (GTM, SLV, NIC, CRI, PAN)

2015-2017

CIAT
IATTC

IATTC FAO/GEF ABNJ Project

OSPESCA
Organización del Sector Pesquero y
Acuicola del Istmo Centroamericano

Metadata

Challenge and Recommendations for improvement

Capacity building

FAO gef ABNJ COMMON OCEANS

ABNJ Tuna 1 project (GTM, SLV, NIC, CRI, PAN)

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Landing site in Central America
Fishery landing site in each country of Central America

2015-2017

2018-2019

Metadata

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Pilot study for shark sampling program

Mapping shark landing sites using satellite imagery

Landing sites characterization

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IATTC FAO/GEF ABNJ Project

- Metadata
- Challenge and Recommendations for improvement
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Pilot study for shark sampling program

- Mapping shark landing sites using satellite imagery
- Landing sites characterization
- 2019 On-site recall survey for catch and effort
- Order-of-magnitude estimates-survey
- Catch sampling designs

Landing site in Central America
Fishery landing site in each country of Central America

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2020-2021

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Long-term Shark Sampling Program

- 2020-21 Order-of-Magnitude sampling data
- Access point survey for catch sampling in artisanal fleet
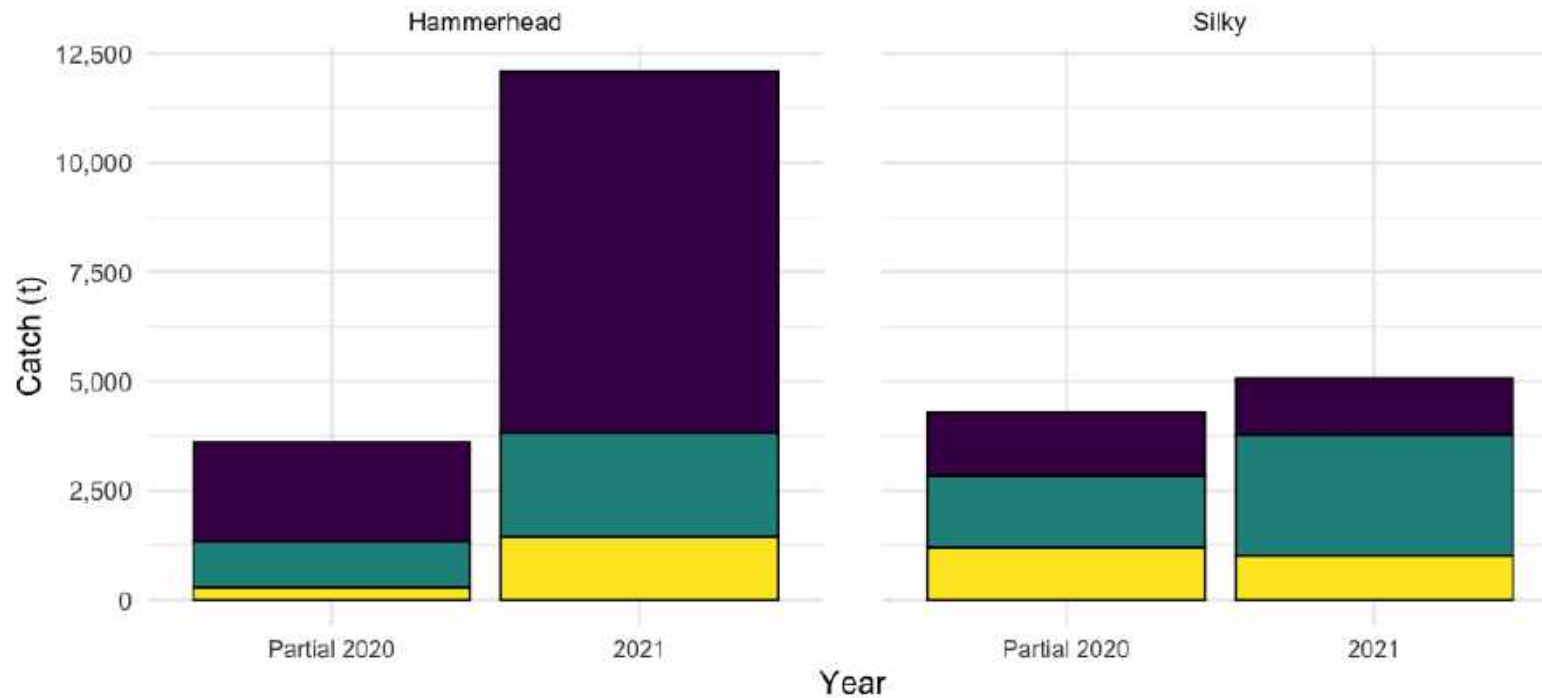- Catch sampling design for medium and advanced fleet
- Pilot tissue sampling (Mobulidae)

- Analysis of ABNJ Tuna 1 datasets
  - Produce order-of-magnitude estimates of catches for silky and hammerhead sharks (SAC-14 INF-L)

Overview of research
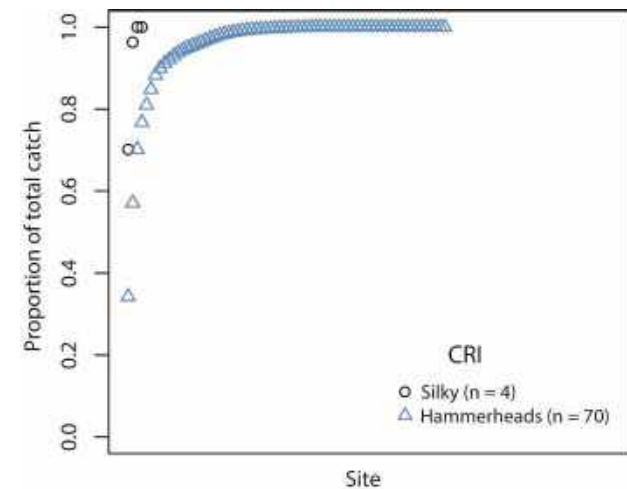
- Analysis of ABNJ Tuna 1 datasets
  - Produce order-of-magnitude estimates of catches for silky and hammerhead sharks (SAC-14 INF-L)
  - Analysis of 2020-21 data to guide the design of a data collection program (SAC-14 INF-P)
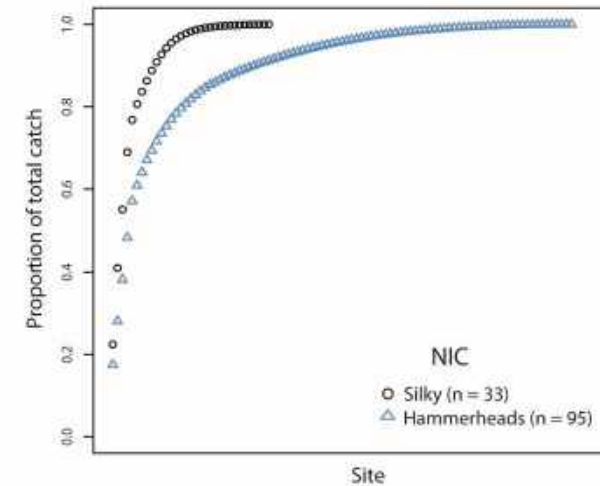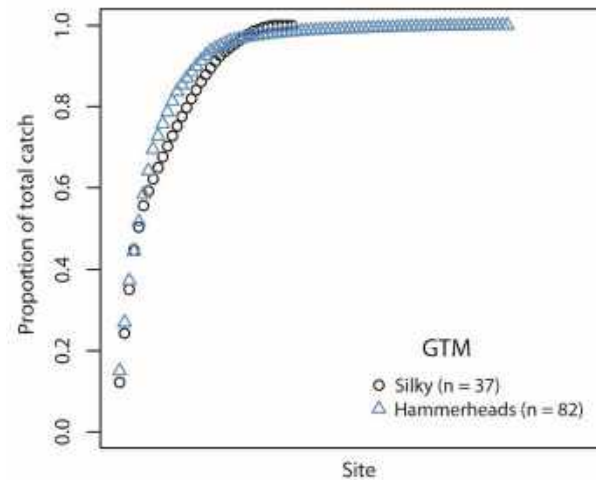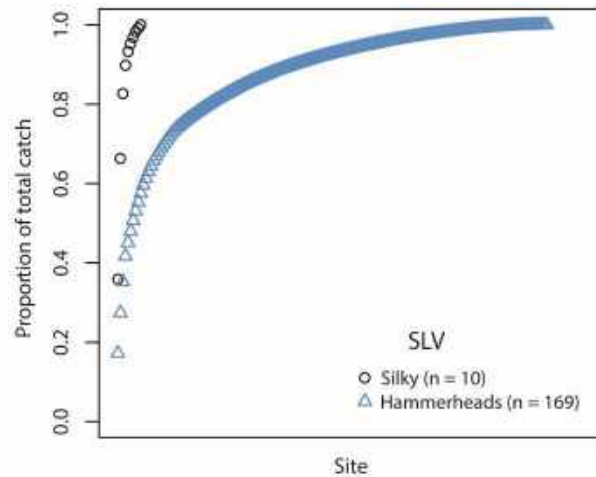
ABNJ Tuna 2 project (MEX, ECU, PER)

- ABNJ Tuna 2 project (2023-2025)

    1. Use satellite imagery to identify all visible vessel access points in each country

    2. Staff currently visiting shark landing sites for verification

    3. In 2024-25, ABNJ1 survey methods will be applied

- Seek common issues in ABNJ1 and ABNJ2

- Develop a robust shark monitoring program

Lessons learned from ABNJ

- Thousands of access points to sample

- Surveys focused on priority species (e.g. silky and hammerhead sharks)

- Sampling focused at 'Primary' sites, rather than 'Secondary' and 'Tertiary'

- Importance of landing sites can change over time (season or market prices)

- Therefore, surveys must be flexible to capture spatial shift in effort

- It must also be fit-for-purpose relating to the species of interest

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1. Will a sampling program focus on priority species?

2. Or all species under the IATTC's purview (minimum 19 species; SAC-15-09)

Priority species

- On-site methods from ABNJ1 may sufficiently sample 'primary' sites

- Precise catch rates and biological data (e.g. CKMR) can be collected

- Sample 'Primary' sites and less sampling at 'secondary' and 'tertiary' sites

- But, pilot surveys required if priority species change (e.g. silky to threshers) and will disrupt the continuity of data time series

- Ancillary surveys required for total fleet effort (vessel registration frame?)

- Cost depends on country size, but USD$100-300k per year (without CKMR)

All shark species

- Thousands of sites require sampling to cover spatial-temporal variability in catches of all species. On-site methods will likely be cost prohibitive

- Cost-effective 'complementary survey' design required, such as

  - Longitudinal diary survey for catch rates

  - Satellite imagery or vessel register for effort

- Additional on-site sampling required for size and biological data (e.g.CKMR)

- Despite being 'cheaper', catch precision likely to be lower for most species AND cost is likely hundreds of thousands $USD per year

Strategic vision for sharks

- **Short term** (1–3 years)

  - Apply EASI-Fish to data-poor species and iteratively improve with new data

  - Apply sampling protocols from ABNJ1 and ABNJ2 and CKMR feasibility study

- **Medium term** (3–5 years)

  - Implement CKMR sampling as stock assessment tool for shark species in the EPO

  - Update morphometrics and collect biological samples for data-limited assessments

  - Model-based estimates of catches (SAC-14 INF-L) from ongoing catch monitoring

- **Long-term** (10–20 years)

  - High-quality stock assessments using CKMR and supported by conventional fisheries data. This will be possible if a sampling program is implemented and maintained by EPO coastal states

Conclusions

- Large scale and fleets makes sampling logistically difficult and expensive

- Surveys are fit for purpose and depend on species to sample

- Initially catch, effort, size time series required for stock assessment

- However, CKMR supersedes stock assessment requiring different data

- ABNJ2 underway and will further our understanding of coastal fisheries

- Ideally, for the Convention Area, postpone implementation of a program until completion of ABNJ2 and the CKMR feasibility, but resume ABNJ1 in Central America as soon as possible

Preguntas – Questions?