

Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission



Strategic Science Plan (2019-2023), SAC-09-01

Outline

- Why do we need a *Strategic Plan*
- *Strengths-Weaknesses-Opportunities-Threats (SWOT)* analysis
- Staff statements
 - Mission, vision, values
- Strategic framework
 - Notes on terminology
 - The 7 “pillars” of our Strategic Science Plan
 - Relationship with Biennial Research Plan (Staff Activities Report)
- Outline of the Strategic Plan
- Biennial Staff Activities Plan, summaries by Heads of Programs and Groups



Why do we need a *Strategic Plan*?

- We've been asked to do it
- “Road map” for planning research activities
- Prioritizing activities
- Present to stakeholders
- Budgeting
- Performance evaluation



Strategic framework – link with two other strategic documents

INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

NINTH MEETING

La Jolla, California (USA)
14-18 May 2018

DOCUMENT SAC-09-02

STAFF ACTIVITIES AND RESEARCH WORK PLAN

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Publications	



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UNFUNDED PROPOSALS

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Strategic framework – Biennial Workplans

DOCUMENT SAC-09-02

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PROJECT E.1.a: Evaluation of potential improvement of growth model for bigeye in the EPO based on presumed annuli counts from otoliths of large fish	
THEME: Life-history studies for scientific support of management	
FOCUS: E. Life history, behavior, and stock structure of tropical tunas	
TARGET: E.1. Age and growth of tropical tunas	
EXECUTION: Biology and Ecosystem Program	
Objectives	Evaluate the potential improvement in accuracy of the growth model for bigeye in the EPO resulting from including more age-at-size data for large fish
Background and statement of the problem	<ul style="list-style-type: none"> The existing growth model for bigeye is based on validated daily increment counts from otoliths and corroborated with extensive tagging data, but there is a shortage of age-at-size data for larger fish (150- 200 cm FL) The numbers of tag returns with high-confidence recapture data for bigeye >150 cm FL are insufficient The National Research Institute for Far Seas Fisheries (NRIFSF) of Japan's collections of otoliths from larger bigeye captured in the EPO are now available for evaluating age estimates from counts of presumed annuli
Key reference(s)	Schaefer and Fuller (2006) : IATTC Bull. Vol. 23, No. 2 Aires-da-Silva et al. (2014) : Fish. Res. 163
Relevance for management	Improving the accuracy of the bigeye growth model, particularly for larger fish, would help resolve some of the uncertainty regarding the status of the stock, and improve the framework on which management advice is based
Duration	2018 (in progress)
Work-plan and progress report (for ongoing projects)	<ul style="list-style-type: none"> Since November 2017, Fish Ageing Services (FAS) in Australia counted the annuli on 140 pairs of bigeye otoliths from up to 20 fish within each 10 cm FL interval between 110 and 200 cm FL and estimated the ages of the fish The age estimates from FAS for fish of 110 to 150 cm FL will be compared to the published age-at-size data from validated daily increment counts, and corroborated with tagging data If the results do no conflict, growth rates for 150 to 180 cm FL fish based on EPO tagging data will be compared with growth rates based on the FAS annual age estimates. If the results also do no conflict, the annual age estimates from otoliths of fish 150 to 200 cm FL will be combined with the existing data set and used in an integrative growth model.
External collaborators	Keisuke Satoh, NRIFSF, Japan
Challenges encountered and anticipated	There is no validation of bigeye otolith annual increments from tropical waters
Deliverables	<ul style="list-style-type: none"> Presentation for SPC-OPP bigeye pre-assessment workshop, 2018 Potential update of bigeye growth model for use in stock assessments
Budget	Staff time: 2 staff members (0.05 FTE; 0.05 FTE)

Mission statement

Mission – To undertake *state of the art* scientific research to inform sound management advice aiming at the conservation and sustainable use of the marine species and ecosystems covered by the Antigua Convention



Vision statement



Vision – Our vision includes the following states:

- Harvest Strategies that are rigorously tested using Management Strategy Evaluation (MSE) are adopted for the tuna species and progress is made for other species covered by the Antigua Convention
- Mortality of non-utilized by-catch species is minimized, thus reducing impacts on the ecosystem
- An established scientific framework to identify potentially vulnerable species so that data collection, scientific research activities and mitigation are prioritized
- Fishing impacts on ecosystem integrity and functioning are minimized while maintaining profitable and sustainable use of target species
- Communication exchange between the scientific staff and CPCs is clear and ongoing, resulting in effective management advice
- Sufficient data is available to undertake sound scientific research for management advice at IATTC
- Attract, retain, and educate staff that can produce *state of the art* science

Values statement



VALUES

Values –

- We conduct unbiased, transparent and innovative scientific research
- We value collaboration across IATTC Programs, experts with CPCs, other t-RFMOs and stakeholders
- We seek to effectively communicate our scientific research to scientific and non-scientific audiences
- We keep up to date with state-of-the-art scientific research methodologies
- We are agile and adapt to changing scientific research needs
- We are committed to strengthen the scientific research capacity of our developing CPCs



SWOT analysis

Strengths

- Permanent, high-level scientific staff
- Unique institutional framework: headquarters, several field offices, as well as a field research office
- Strong science outcomes
- Successful observer Program
- Highly dedicated scientific staff
- Success of AIDCP
- Successful transition to the Antigua Convention
- Collaboration with tRFMOs



Weaknesses

- The IATTC science program could provide even more value
- Member scientists do not feel adequately connected to or involved in IATTC scientific activities
- Limited observer data from longline, small purse seine, and artisanal fishing vessels
- Transparency



Opportunities

- Improve scientific work
- Improve data collection for longline, small purse-seine and artisanal fisheries
- Improve participation of CPCs
- Conduct periodic external peer reviews
- Develop a strategy to address succession planning and document procedures for key positions



Threats

- Insufficient financial support relative to mandates
- A high number of impending retirements present a both risk and opportunity to the Secretariat



Strategic framework – notes on terminology



• Themes: The “pillars” of our Science Program



- Strategic goals: Main objectives we want to achieve by 2023, at the latest



- Targets: Major tasks that need to be accomplished to achieve the strategic goals



- ✓ Projects: Operational units of our research program (can be tied to budget)

DOCUMENT SAC-09-02
STAFF ACTIVITIES AND RESEARCH WORK PLAN

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Strategic framework – 7 strategic pillars

MISSION

VISION

Data collection for scientific support of management

Life-history studies for scientific support of management

Sustainable fisheries

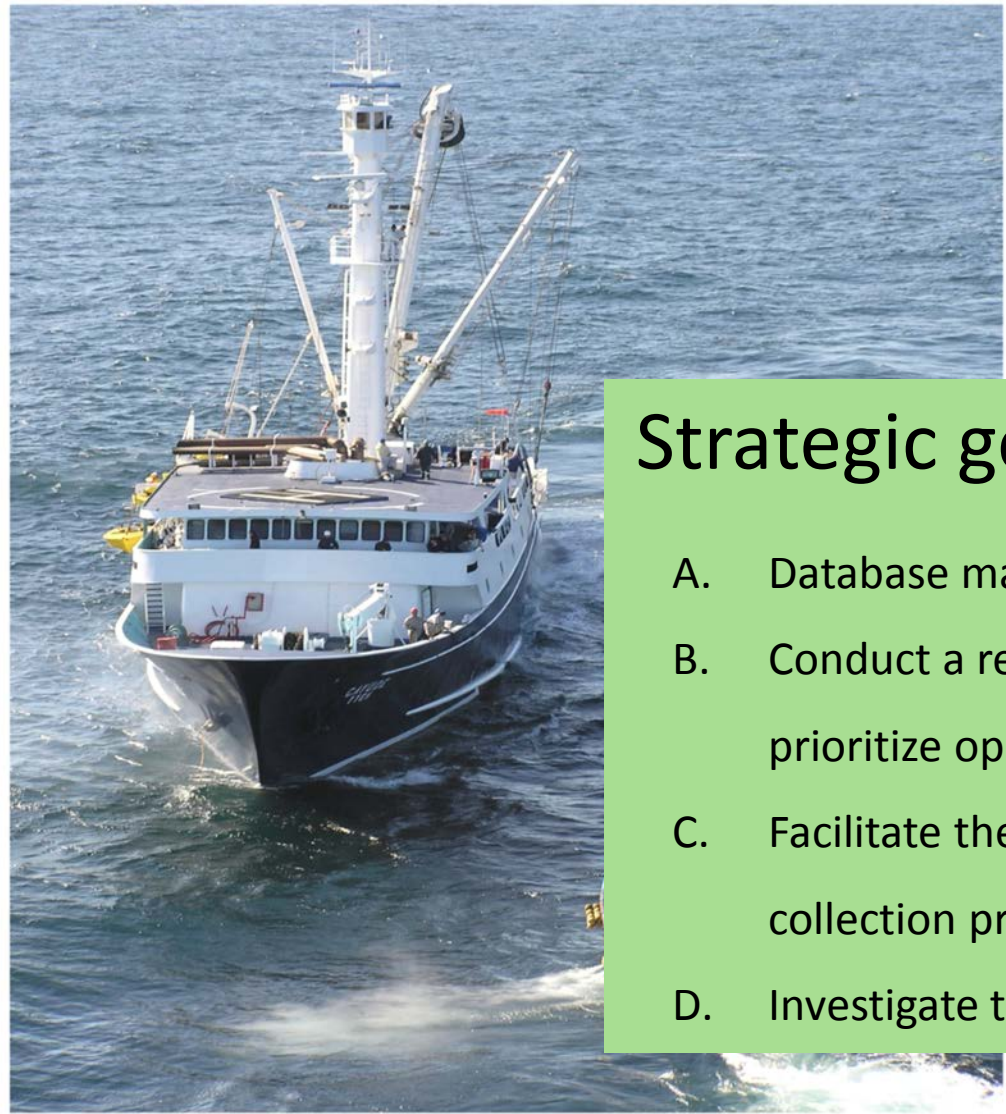
Ecological impacts of fisheries: assessment and mitigation

Interaction between the environment, the ecosystem and fisheries

Knowledge transfer and capacity building

Scientific excellence

Data collection for Scientific Support of Management



Strategic goals:



- A. Database maintenance, preservation, and access
- B. Conduct a review of current IATTC/AIDCP data collection programs, identify and prioritize opportunities to improve data quality and expand data types and coverage
- C. Facilitate the improvement of data quality, coverage, and reporting by CPC data collection programs
- D. Investigate the use of new technologies to improve data quality

Data collection for Scientific Support of Management

Strategic goal A: Database maintenance, preservation and access

A.1. Routine work (a)

A.2. Improve internal documentation

A.3. Standardize and automate data submissions (a, b)

Data collection for Scientific Support of Management

Strategic goal B: Conduct a review of current IATTC/AIDCP data collection programs, identify and prioritize opportunities to improve data quality and expand data types and coverage

Targets

- B.1. Evaluate and improve data collected by the purse-seine On Board Observer Program for scientific research
- B.2. Expand on-board data collection to small purse seiners
- B.3. Evaluate and improve the port sampling data collection program
- B.4. Develop and implement a long-term life-history data collection program to support scientific research for stock assessment and management



Data collection for Scientific Support of Management

Strategic goal C: Facilitate the improvement of data quality, coverage, and reporting by CPC data collection programs



Targets

- C.1. Longline fisheries (a)
- C.2. At-sea transshipments
- C.3. Artisanal fisheries (coastal developing CPCs) (a)
- C.4. Other fisheries

Data collection for Scientific Support of Management

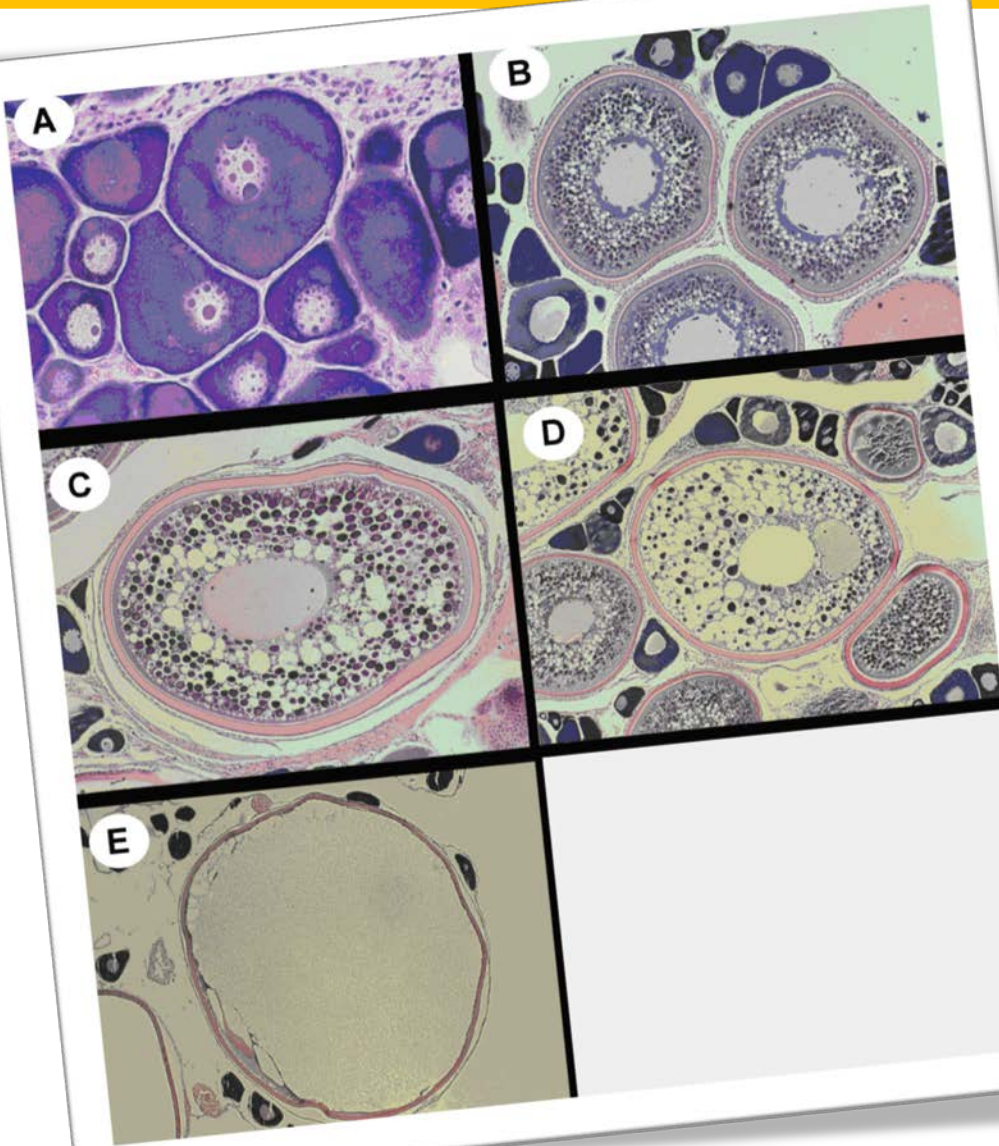
Strategic goal D: Investigate the use of new technologies to improve data quality

Targets

- D.1. Evaluate the functionality of electronic data collection and reporting systems
- D.2. Evaluate the feasibility of implementing on-board electronic monitoring (EM) systems for data collection purposes (a, b, and c)



Life-history studies for scientific support of management



Strategic goals:



- E. Obtain life history and stock structure information for spatially-structured stock assessments for tropical tunas
- F. Obtain key life history information for assessment and mitigation of ecological impacts on prioritized species
- G. Investigate the early life-history of tunas to improve understanding of recruitment processes to improve assessments and management

Life-history studies for scientific support of management

Strategic goal E: Obtain life history and stock structure information for spatially-structured stock assessments for tropical tunas

Targets

- E.1. Initiate a long-term age and growth data collection and research program for tropical tunas (a)
- E.2. Conduct spatio-temporal research on the reproductive biology of tropical tunas (a)
- E.3. Analyze historical tagging data to improve the assumptions about movement and stock structure in spatially-structured stock assessments of tropical tunas (a)
- E.4. Initiate a multi-year tagging program for tropical tunas
- E.5. Conduct genetic studies to improve the assumptions about life history and stock structure in stock assessments of tropical tunas (a, b, and c)



Life-history studies for scientific support of management

Strategic goal F: Obtain key life history information for assessment and mitigation of ecological impacts on prioritized species

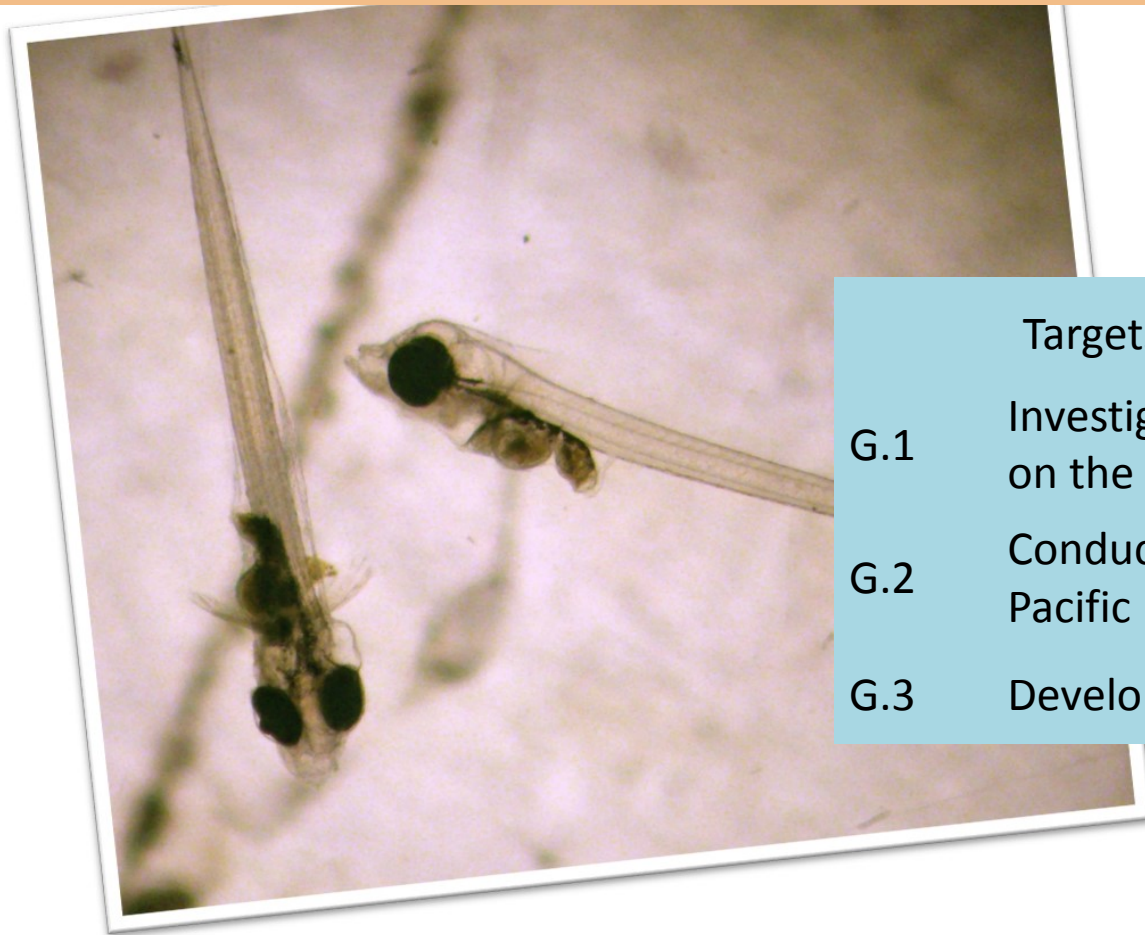
Targets

- F.1. Conduct life-history studies of dolphins under the AIDCP
- F.2. Conduct life-history studies of shark species (a)
- F.3. Conduct life-history studies of prioritized species



Life-history studies for scientific support of management

Strategic goal G: Investigate the early life history of tunas to improve understanding of recruitment processes to improve assessments and management



Targets

- G.1 Investigation of the effects of density dependence and the environment on the pre-recruit survival of yellowfin tuna (a, b)
- G.2 Conduct comparative studies of the early life histories of yellowfin and Pacific bluefin tunas (a)
- G.3 Develop tools to forecast recruitment (a)



Strategic goals:



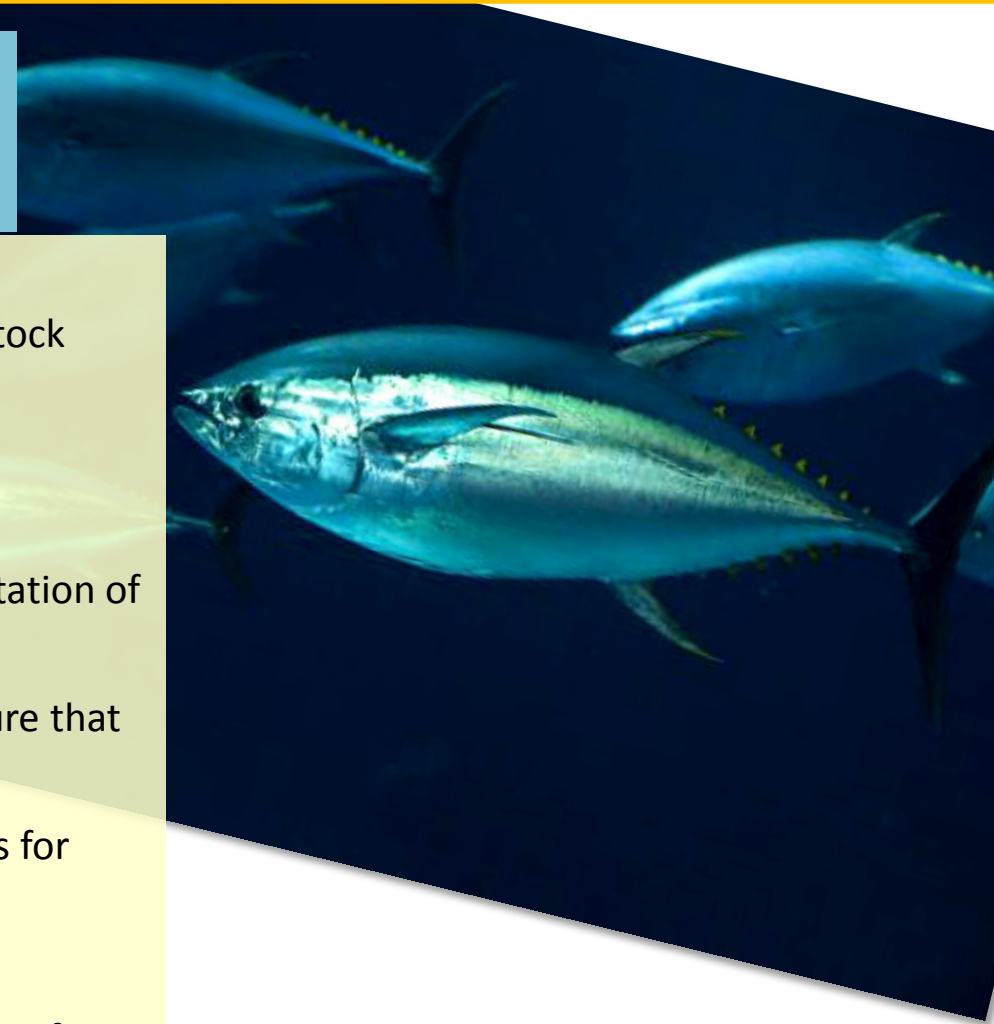
- H. Improve and implement stock assessments, based on the best available science
- I. Test harvest strategies using Management Strategy Evaluation (MSE)
- J. Improve our understanding of the effects of the operational characteristics of the fishery on fishing mortality, stock assessments, and management advice
- K. Improve our understanding of the socio-economic aspects of sustainable fisheries for tropical tunas

Sustainable fisheries

Strategic goals H: Improve and implement stock assessments, based on the best available science

Targets

- H.1 Undertake the research necessary to develop and conduct at least one benchmark stock assessment for yellowfin and bigeye tunas (a, b, c, and d)
- H.2 Develop a spatially-structured stock assessment model for bigeye tuna as a basis for management advice, and initiate a similar model for yellowfin tunas
- H.3 Develop a benchmark stock assessment for skipjack tuna (conditional on implementation of tagging program, E.4)
- H.4 Develop update assessment and/or stock status indicators for tropical tunas to ensure that management advice is current (a)
- H.5 Undertake the research necessary to develop and conduct data-limited assessments for prioritized species (a)
- H.6 Maintain active participation in ISC stock assessments (a)
- H.7 Develop conventional stock assessments for data-rich prioritized species and species of specific interest (a, b)
- H.8 Assess the status of Eastern Tropical Pacific dolphin stocks (a)



Sustainable fisheries

Strategic goal I: Test harvest strategies using Management Strategy Evaluation (MSE)

Targets

- I.1 Conduct a comprehensive MSE for bigeye tuna and plan MSEs for the other tropical tuna species, including the multi-species fishery for tropical tunas (a)
- I.2 Collaborate with ISC in Pacific-wide MSEs for albacore and Pacific bluefin tunas (a)
- I.3 Initiate MSE work to evaluate indicator-based harvest strategies for prioritized species and species of specific interest (a)

Sustainable fisheries

Strategic goal J: Improve our understanding of the effects of the operational characteristics of the fishery on fishing mortality, stock assessments, and management advice



Targets

- J.1 Identify and monitor changes in technology and fishing strategies to improve stock assessments and management advice
- J.2 Improve our understanding of the relationship between the operational characteristics of the purse-seine fishery and fishing mortality (a)
- J.3 Study the impact of FAD operations on fishing mortality to improve FAD management advice

Sustainable fisheries

Strategic goal K: Improve our understanding of the socio-economic aspects of sustainable fisheries for tropical tunas

Targets

K.1

Collaborate in socio-economic studies by other organizations (a)



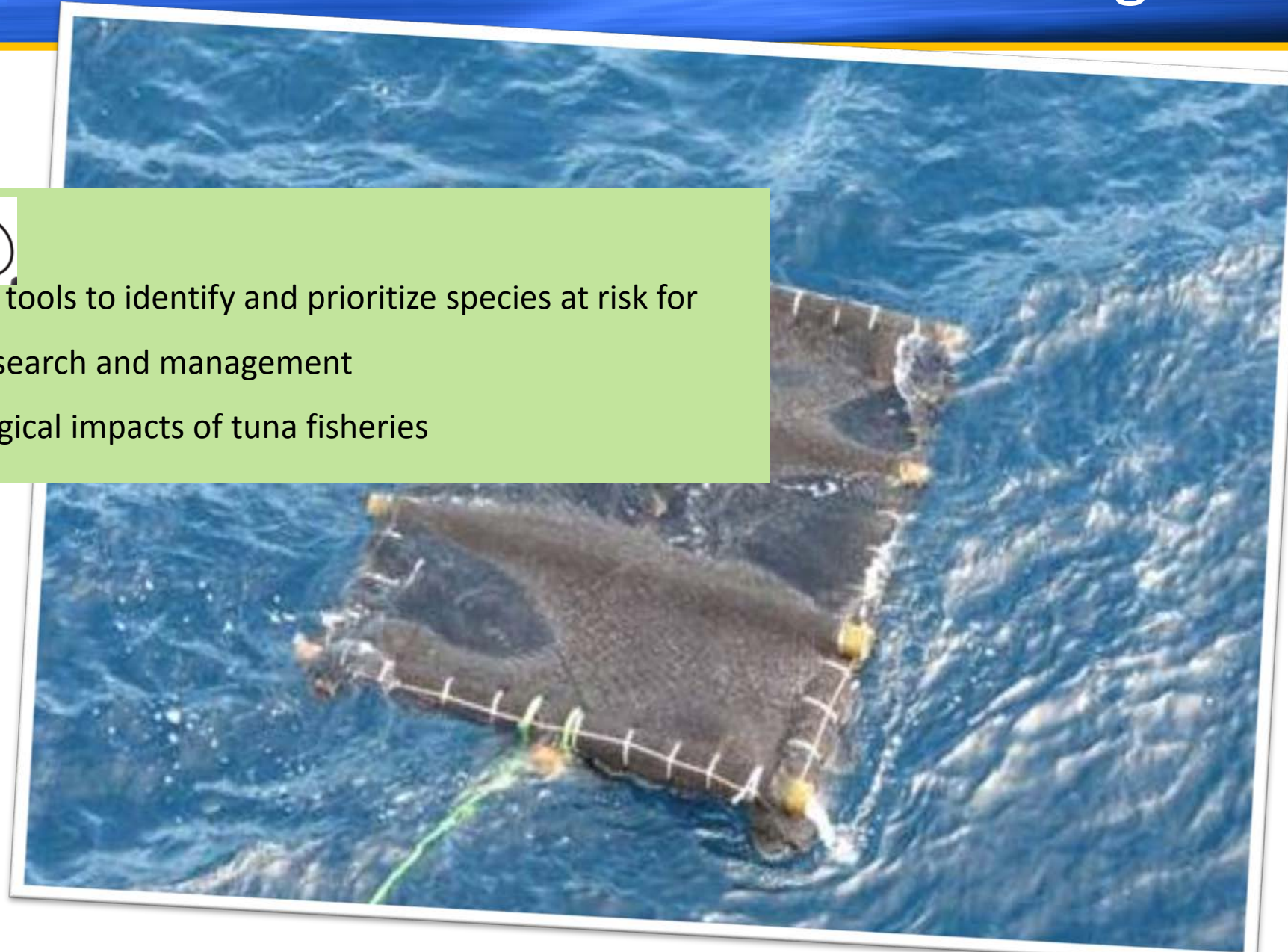
Ecological impacts of fisheries: assessment and mitigation



Strategic goals:



- L. Develop analytical tools to identify and prioritize species at risk for data collection, research and management
- M. Mitigate the ecological impacts of tuna fisheries



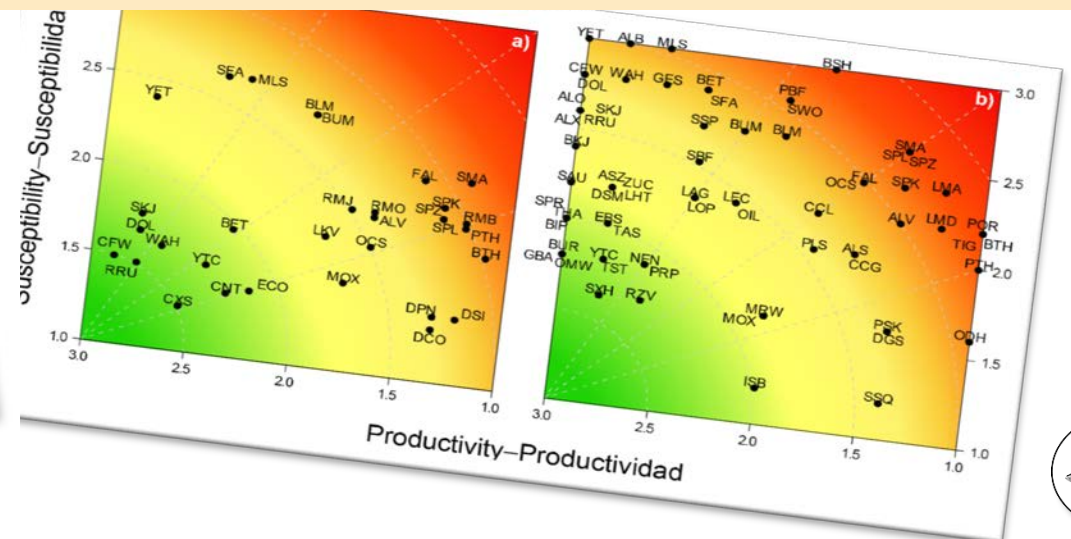
Ecological impacts of fisheries: assessment and mitigation



Strategic goal L: Evaluate the ecological impacts of tuna fisheries

Targets

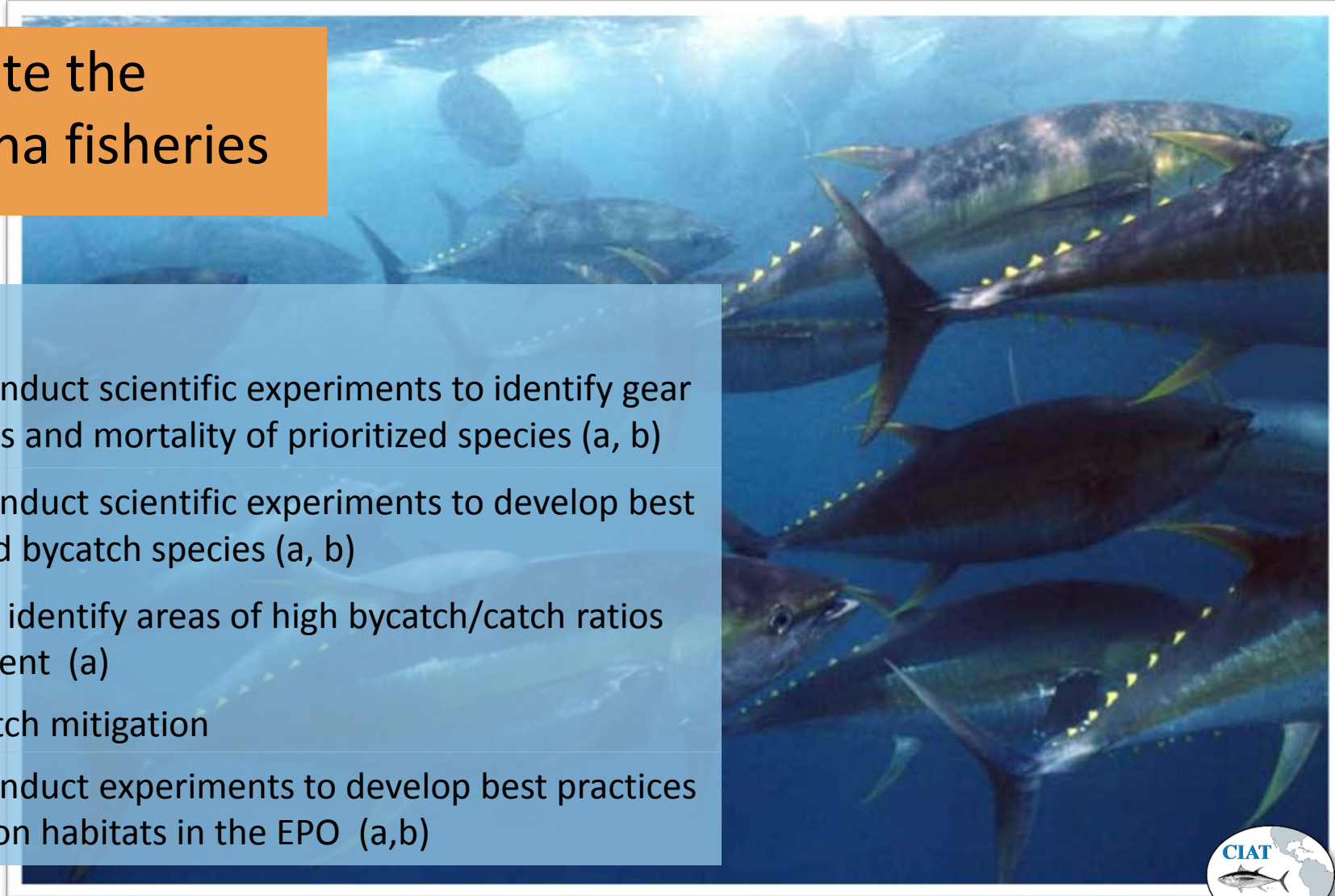
- L.1 Develop analytical tools to identify and prioritize species at risk for data collection, research and management (a, b)
- L.2 Conduct ERAs of EPO fisheries to identify and prioritize species at risk (a)



Ecological impacts of fisheries: assessment and mitigation

Strategic Goal M: Mitigate the ecological impacts of tuna fisheries

	Targets
M.1	In collaboration with the industry, conduct scientific experiments to identify gear technology that will reduce bycatches and mortality of prioritized species (a, b)
M.2	In collaboration with the industry, conduct scientific experiments to develop best practices for the release of prioritized bycatch species (a, b)
M.3	Conduct spatio-temporal analyses to identify areas of high bycatch/catch ratios for potential use in spatial management (a)
M.4	Investigate alternative tools for bycatch mitigation
M.5	In collaboration with the industry, conduct experiments to develop best practices for mitigating the impacts of fishing on habitats in the EPO (a,b)



Interactions among the environment, the ecosystem and fisheries

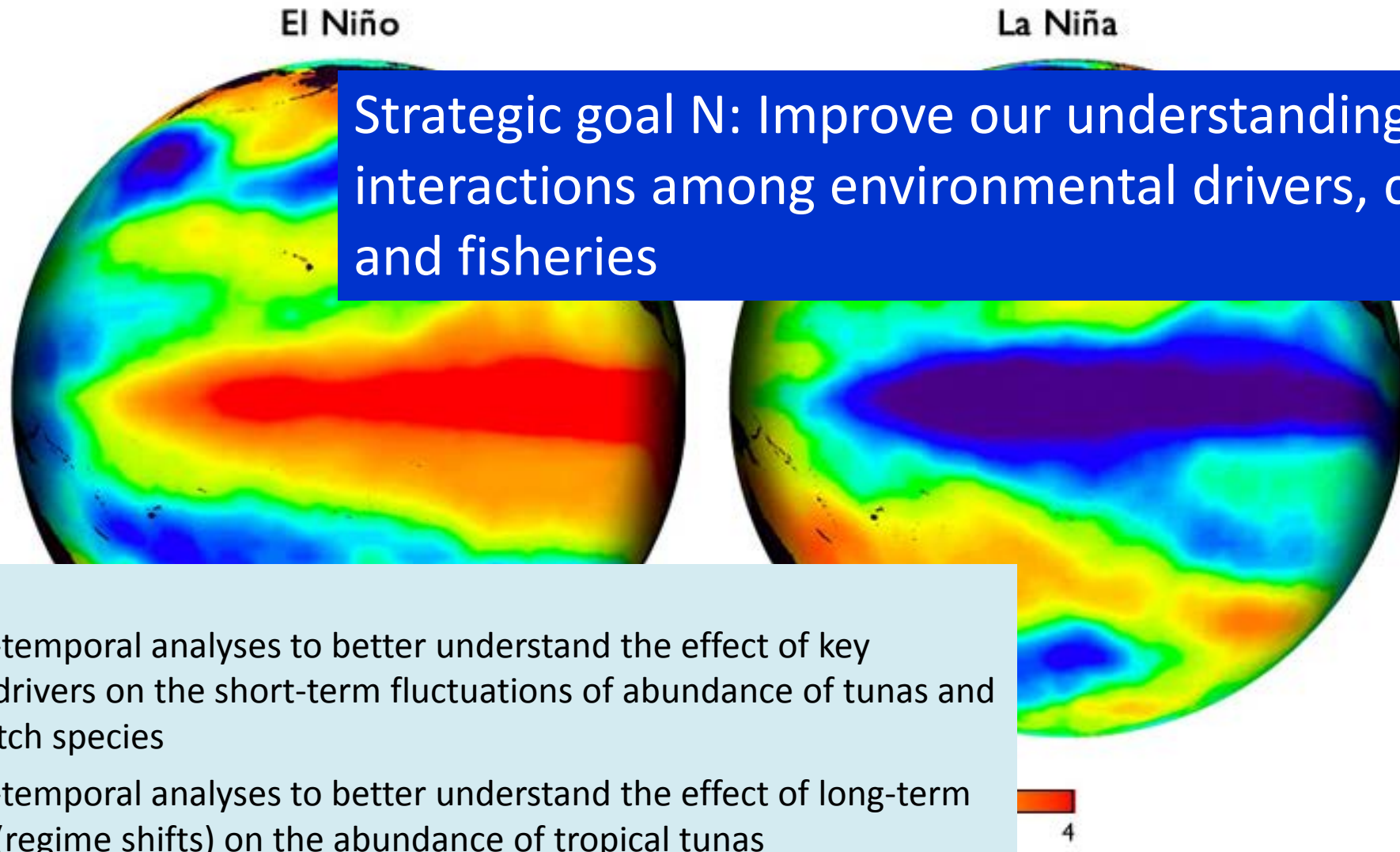


Strategic goals:



- N. Improve our understanding of the interactions among environmental drivers, climate, and fisheries
- O. Improve our understanding of the EPO ecosystem

Interactions among the environment, the ecosystem and fisheries

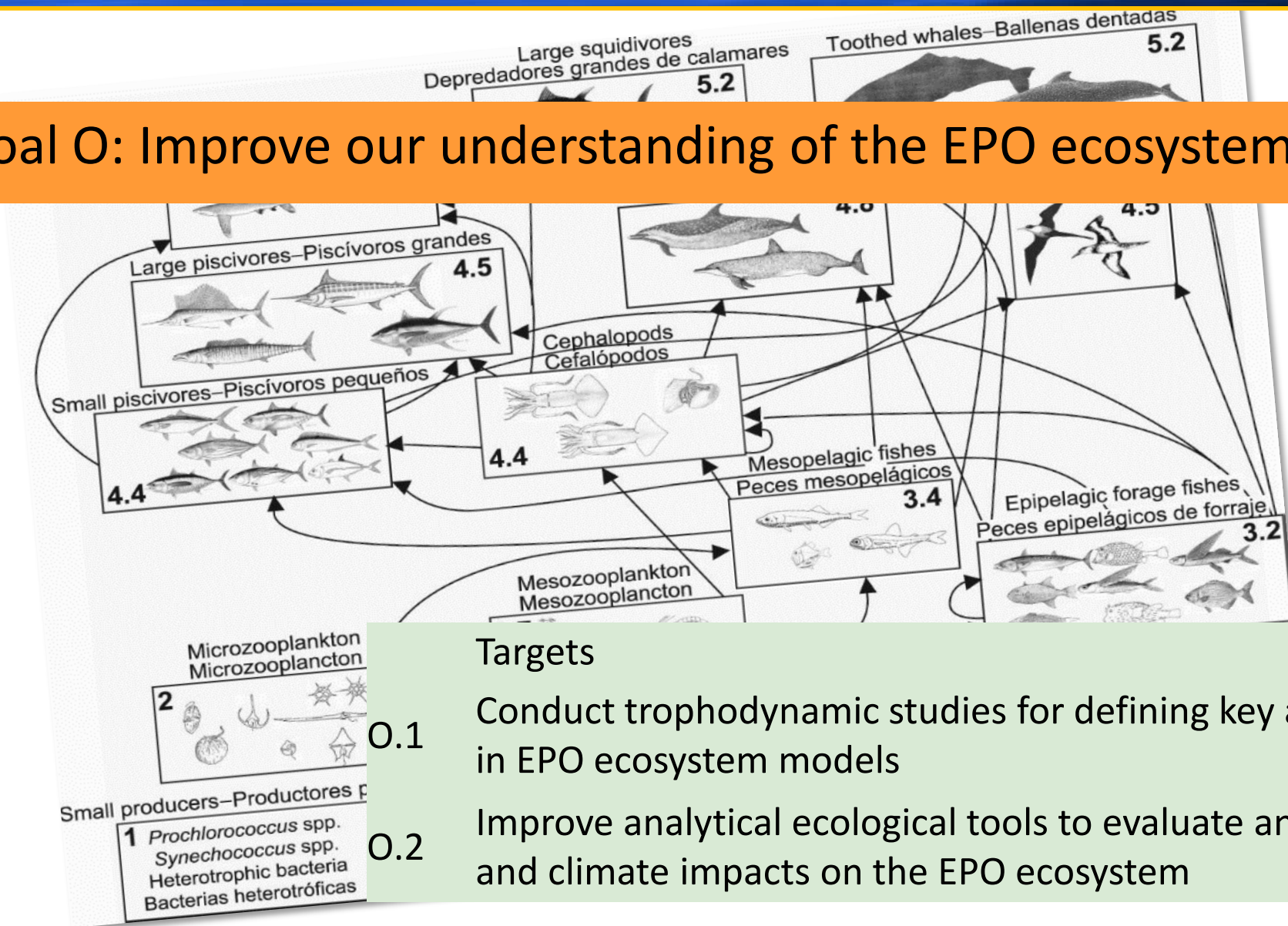


Targets

- N.1 Conduct spatio-temporal analyses to better understand the effect of key environmental drivers on the short-term fluctuations of abundance of tunas and prioritized bycatch species
- N.2 Conduct spatio-temporal analyses to better understand the effect of long-term climate drivers (regime shifts) on the abundance of tropical tunas

Interactions among the environment, the ecosystem and fisheries

Strategic goal O: Improve our understanding of the EPO ecosystem



Targets

0.1 Conduct trophodynamic studies for defining key assumptions in EPO ecosystem models

0.2 Improve analytical ecological tools to evaluate anthropogenic and climate impacts on the EPO ecosystem

Knowledge transfer and capacity building



Strategic goals:



- P. Respond in a timely manner to external requests for information and technical support
- Q. Provide training opportunities for scientists and technicians of CPCs
- R. Improve communication of scientific advice
- S. Facilitate participation of CPCs in the scientific process and in training events

Knowledge transfer and capacity building

Strategic goal P: Respond in a timely manner to external requests for information and technical support

Targets

- P.1 Respond to requests by CPCs (a, b)
- P.2 Respond to requests from other organizations



Knowledge transfer and capacity building

Strategic goal Q: Provide training opportunities for scientists and technicians of CPCs



Targets

- Q.1 Host visiting scientists and students from CPCs (a)
- Q.2 Implement the IATTC capacity-building scholarship
- Q.3 Facilitate training workshops

Knowledge transfer and capacity building

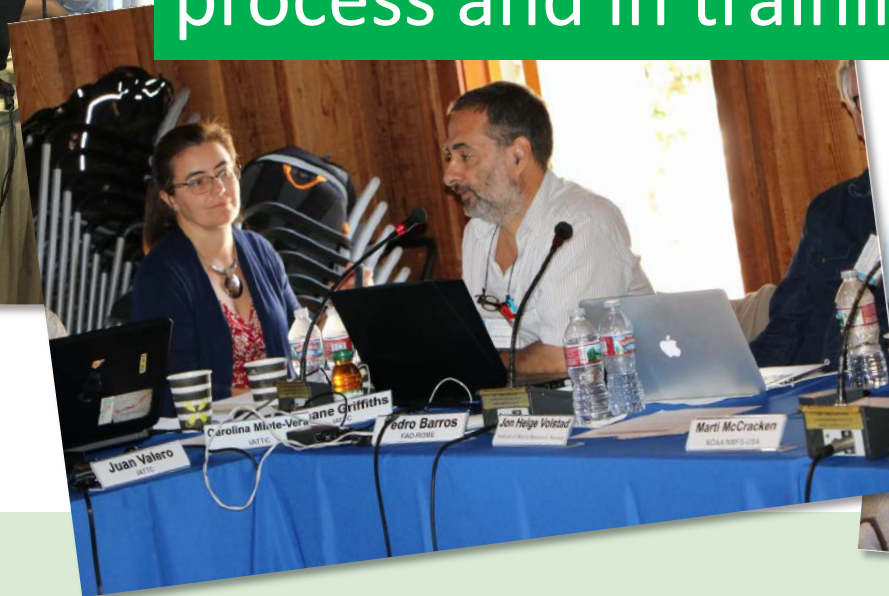
Strategic goal R: Improve communication of scientific advice

Targets

- R.1 Improve communication of the staff's scientific work to CPCs
- R.2 Participate in global initiatives for the communication of science

Knowledge transfer and capacity building

Strategic goal S: Facilitate participation of CPCs in the scientific process and in training events



Targets

- S.1 Improve communication and coordination with the Scientific Advisory Committee and scientific and technical working groups
- S.2 Facilitate participation of scientific and technical personnel from developing CPCs at IATTC scientific meetings and training events (IATTC capacity building fund)

Scientific excellence



Strategic goals:



- T. Implement external reviews of the staff's research
- U. Strengthen research at the Achotines Laboratory
- V. Recruit and retain highly-qualified personnel
- W. Promote training and advancement of scientific staff
- X. Promote the advancement of scientific research



Scientific excellence



Strategic goal T: Implement external reviews of the staff's research

Targets

- T.1 Facilitate external reviews of stock assessments
- T.2 Facilitate external reviews of scientific studies

Scientific excellence

Strategic goal U: Strengthen research at the Achotines Laboratory



Strategic goal V: Recruit and retain highly-qualified personnel



Strategic goal W: Promote training and advancement of scientific staff

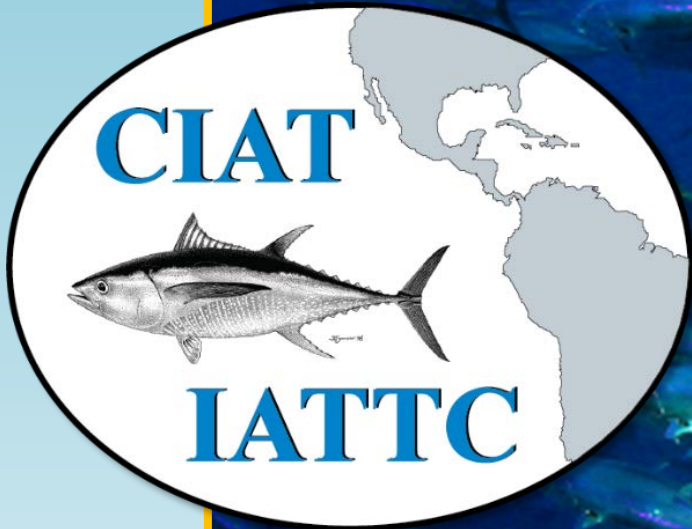


Scientific excellence

Strategic goal X: Promote the advancement of scientific research



Targets
X.1 Continue the annual CAPAM workshops



Questions?



Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission



Staff Activities and Research Workplan, SAC-09-02

Research Programs

- Data Collection and Database Program (N. Vogel)
- Stock Assessment Program (M. Maunder)
- Biology and Ecosystem Program (D. Margulies)
 - Early life-history (D. Margulies)
 - Biology (K. Schaefer)
 - Ecosystem (S. Griffiths)
- Biology and IDCP (M. Hall)



DATA COLLECTION AND DATABASE PROGRAM

DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

- Conversion of all remaining Visual Basic 6 (VB6) computer programs to Visual Basic Net (VB.net) A.3.a
- Develop databases of biological and fisheries parameters to support Ecological Risk Assessment and ecosystem models A.3.b
- PROPOSAL:** Developing an effective and reliable FOB marking scheme to assist scientific advance C.1.a
- Develop database and data entry/error check tools for FAD data collected under resolutions C-16-01 and C-17-02
- Pilot study of electronic monitoring (EM) of the activities and catches of Class 1-5 purse-seine vessels D.2.a
- PROPOSAL:** PROP Pilot study on the use of electronic monitoring (EM) for data collection aboard EPO Class-6 tuna purse-seine vessels D.2.c

KNOWLEDGE TRANSFER AND CAPACITY BUILDING

- Fulfil requests for development of database and data processing applications for entities outside the IATTC P.1.a



STOCK ASSESSMENT PROGRAM

DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

- PROPOSAL:** Developing an effective and reliable FOB marking scheme to assist scientific advance C.1.a
- Improving data collection for Central American shark fisheries C.3.a
- PROPOSAL:** Long-term sampling program for shark catches of artisanal fisheries in Central America C.3.b

SUSTAINABLE FISHERIES

- Conduct routine stock assessments of tropical tunas H.4.a
- Participate in assessments of shared species by the International Scientific Committee H.6.a
- South Pacific swordfish assessment H.7.a
- Improve the bigeye tuna stock assessment H.1.a
- Improve the yellowfin tuna stock assessment H.1.b
- PROPOSAL:** Investigation of potential changes in the selectivity of the longline fleet resulting from changes in gear configuration H.1.c
- PROPOSAL:** Improve indices of abundance based on longline CPUE data H.1.d
- Revise trend estimation methods for purse-seine silky shark indices for the EPO H.5.a
- PROPOSAL:** Workshop series on data compilation and assessment model development for hammerhead sharks H.5.b

STOCK ASSESSMENT PROGRAM



SUSTAINABLE FISHERIES	
PROPOSAL: Develop priors for shark stock-recruitment relationships	H.7.c
Design of survey for dolphins in the eastern tropical Pacific Ocean	H.8.a
Conduct a Management Strategy Evaluation (MSE) for tropical tunas in the EPO	I.1.a
Evaluation of potential reference points for dorado in the EPO	I.3.a
Quantification of the relationship between vessel operational characteristics and fishing mortality	J.2.a
POSEIDON Project	K.1a
KNOWLEDGE TRANSFER AND CAPACITY BUILDING	
Respond to requests for scientific analyses (Stock Assessment Program)	P.1.b
Workshop on training, communication and evaluation of management strategies for tuna fisheries in the EPO	R.1.a
SCIENTIFIC EXCELLENCE	
PROPOSAL: Bigeye tuna external review	T.1.a
Workshop to advance spatial stock assessments of bigeye tuna in the Pacific Ocean	X.1.a
PROPOSAL: Workshop on operating models for management strategy evaluation	X.1.b

STOCK ASSESSMENT PROGRAM



Species	Last assessed	2018	2019	2020	2021	2022	2023
IATTC							
Yellowfin tuna	2017	Update	Indicators/ Exploratory	Benchmark	Update	Update	Update
Skipjack tuna	2004	Indicators	Indicators	Indicators	Indicators	Indicators	Indicators/ Tagging*
Bigeye tuna	2017	Update	Indicators/ Exploratory/ Review	Benchmark	Update	Update	Update
Striped marlin	2010						
Swordfish (south EPO)	2011				Benchmark		
Swordfish (north EPO)							
Sailfish	2013						
Black marlin	Never						
Silky shark	Never	Indicators	Benchmark/ Indicators	Indicators	Indicators	Indicators	Indicators
Hammer head sharks	Never						
Dorado	2016						
COLLABORATIONS							
Pacific bluefin tuna	2016	Update	Projections	Benchmark	Projections	update	Projections
Albacore tuna	2017						
Blue marlin ¹	2013 (full) 2016 (update)						
Blue shark	2017						
Shortfin mako	2015	Benchmark					
Swordfish (north Pacific)	2014						

*Conditional on multi-year tagging program

BIOLOGY AND ECOSYSTEM PROGRAM - EARLY LIFE HISTORY

LIFE-HISTORY STUDIES FOR SCIENTIFIC SUPPORT OF MANAGEMENT

Investigation of the spawning ecology of captive yellowfin tuna, using genetic analyses	E.5.b
Studies of pre-recruit survival and growth of yellowfin tuna, including expanding studies of early-juvenile life stages	G.1.a
Development of comparative models of pre-recruit survival and reproductive patterns of Pacific tunas	G.2.a
Development of a larval growth index to forecast yellowfin recruitment	G.3.a

INTERACTIONS AMONG THE ENVIRONMENT, THE ECOSYSTEM, AND FISHERIES

Investigation of the effects of wind-induced microturbulence on yellowfin larval survival	N.1.b
Develop models of the effects of climate change on pre-recruit life stages of tropical tunas	N.2.a
PROPOSAL: Investigation of the effects of pollutants on pre-recruit survival of yellowfin tuna	O.2.c

KNOWLEDGE TRANSFER AND CAPACITY BUILDING

Achotines Laboratory support of Yale University's Environmental Leadership Training Initiative (ELTI) in Panama	Q.1.a
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LIFE-HISTORY STUDIES FOR SCIENTIFIC SUPPORT OF MANAGEMENT

Evaluation of potential improvement of growth model for bigeye in the EPO based on presumed annuli counts from otoliths of large fish E.1.a

PROPOSAL: Investigation of spatiotemporal variability in the age, growth, maturity, and fecundity of yellowfin tuna in the EPO E.2.a

Investigation of geographic variation in the movements, behavior, and habitat utilization of yellowfin tuna in the EPO E.3.a

PROPOSAL: EPO Regional Tuna Tagging Program E.4.a

Evaluation of the Pacific-wide population structure of bigeye and skipjack tunas, using genetic analyses E.5.a

PROPOSAL: Investigation of the population structure of skipjack and yellowfin tunas in the EPO, using genetic analyses

Investigation of the movements, behavior, and habitat utilization of silky sharks in the eastern Pacific Ocean F.2.a

ECOLOGICAL IMPACTS OF FISHERIES: ASSESSMENT AND MITIGATION

Evaluate performance of shallow non-entangling versus normal depth FADs with respect to catches of tunas and non-tuna species in the EPO purse seine fishery M.1.a

Evaluate the post-release survival of silky sharks captured by longline fishing vessels in the equatorial EPO, using best handling practices M.2.a

Evaluate best handling practices for maximizing post-release survival of silky sharks in longline fisheries, and identification of silky shark pupping areas for bycatch mitigation M.2.b

BIOLOGY AND ECOSYSTEM PROGRAM - ECOSYSTEM

DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

Develop databases of biological and fisheries parameters to support Ecological Risk Assessment and ecosystem models A.3.b

ECOLOGICAL IMPACTS OF FISHERIES: ASSESSMENT AND MITIGATION

Development of habitat models for bycatch species caught in the EPO to support ecological risk assessments (ERAs) L.1.a

Development of a flexible spatially-explicit ERA approach for quantifying the cumulative impact of tuna fisheries on data-limited bycatch species in the EPO L.1.b

Conduct ERAs of EPO fisheries to identify and prioritize species at risk L.2.a

INTERACTIONS AMONG THE ENVIRONMENT, THE ECOSYSTEM, AND FISHERIES

Analyze EPO bycatch data to assess the influence of environmental drivers on catches and vulnerability N.1.a

PROPOSAL: Development of a fishery-dependent ecological sampling program for EPO tuna fisheries O.1.a

Development and implementation of analytical tools for understanding the trophic ecology of apex predators O.2.a



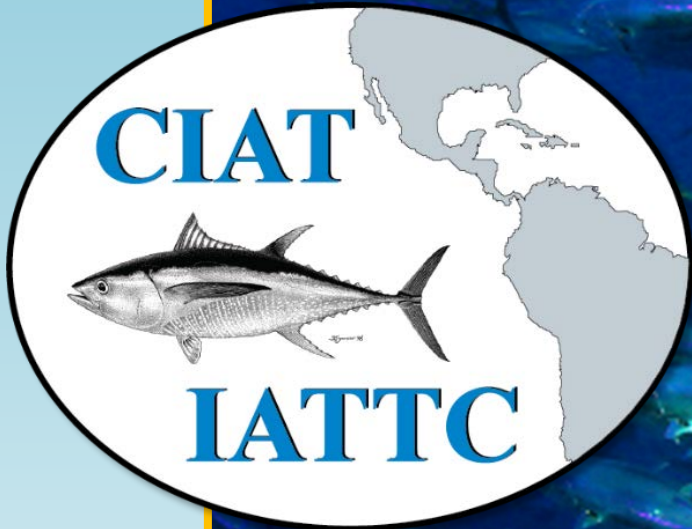
BYCATCH AND IDCP PROGRAM

DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

Routine activities of the Bycatch and IDCP Program	A.1.a
Pilot study of electronic monitoring (EM) of the activities and catches of Class 1-5 purse-seine vessels	D.2.c

ECOLOGICAL IMPACTS OF FISHERIES: ASSESSMENT AND MITIGATION

PROPOSAL: Tests of hookpods to reduce seabird and sea turtle bycatches in longlines	M.1.b
PROPOSAL: Estimate bycatch and discard rates at FADs, by species, and identify “hot spots”	M.3.a
Development and testing of non-entangling and biodegradable FADs	M.5.a
Reducing losses, and fostering recovery, of FADs in the purse-seine fishery in the EPO	M.5.b
PROPOSAL: Evaluate and reduce post-release mortality of Mobulid rays	M.5.c



QUESTIONS?

