INTER-AMERICAN TROPICAL TUNA COMMISSION

SCIENTIFIC ADVISORY COMMITTEE

NINTH MEETING

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DOCUMENT SAC-09-02b

UNFUNDED RESEARCH PROJECTS

CONTENTS

INTRODUCTION

At its 8th meeting in May 2017, the Scientific Advisory Committee (SAC) made the following recommendation to the Commission**:**

> *"The SAC recommends that the scientific staff prepare a strategic science plan for the 2018-2022 period, which includes clear objectives, specific priorities, strategies, actions, responsibilities, and resources, including a tentative budget."*

In accordance with this recommendation, the staff has developed a Strategic Science Plan (SSP), which establishes research goals, activities, and priorities for the 2019-2023 period. In the plan, the staff's activities are classified into seven main areas, called *Themes*:

1. Data collection
2. Life-history studies for scientific support of management
3. Sustainable fisheries
4. Ecological impacts of fishing: assessment and mitigation
5. Interactions among the environment, ecosystem, and fisheries
6. Knowledge transfer and capacity building
7. Scientific excellence

Each *Theme* is divided into goals and objectives (*Goals*), and the work that will be carried out to achieve a particular goal or objective within the plan's five-year window is called a *Target*. Not specified in the SSP is the staff's concrete work plan, and the current and planned activities (called *Projects*) that will achieve these strategic goals; they are elaborated in this document.

The general *Themes*, and the more specific *Goals*, reflect what the staff considers to be its primary

responsibilities, and form a permanent part of the five-year SSP. Whether any *Projects* are undertaken under a particular *Goal* or *Target* in any given period will depend on the staff's research priorities, the human, logistic, and financial resources available, and any specific instructions from the Commission.

Research projects that are funded and under way are included in Document SAC-09-02; this document contains details of projects that the staff considers important, but lacks the resources, human, technical, or financial, to undertake.

A. OUTLINE OF THE IATTC STRATEGIC SCIENCE PLAN

This section lists the *Goals* (A-Y) and *Targets* (A.1, A.2, *etc*.) corresponding to each of the SSP's seven *Themes*; for details of each individual *Project*, see the relevant section of the document.

1. DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

Goal A: Database maintenance, preservation, and access

- A.1. Routine work
- A.2. Improve internal documentation
- A.3. Standardize and automate data submissions

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

- 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

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

- C.1. Purse-seine fleet
- C.2. Longline fisheries
- C.3. At-sea transshipments
- C.4. Artisanal fisheries (coastal developing CPCs)
- C.5. Other fisheries

Goal D. Investigate the use of new technologies to improve data quality

- 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

2. LIFE-HISTORY STUDIES FOR SCIENTIFIC SUPPORT OF MANAGEMENT

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

- E.1. Initiate a long-term age and growth data collection and research program for tropical tunas
- E.2. Conduct spatiotemporal research on the reproductive biology of tropical tunas
- E.3. Analyze historical tagging data to improve the assumptions about movement and stock structure in spatially-structured stock assessments of tropical tunas
- 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

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

F.1. Conduct life-history studies of dolphins under the AIDCP

F.2. Conduct life-history studies of shark species

F.2.a. Investigate the movements, behavior, and habitat utilization of silky sharks in the EPO

F.3. Conduct life-history studies of prioritized species

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

G.1. Investigate the effects of density dependence and the environment on the pre-recruit survival of yellowfin tuna

G.2. Conduct comparative studies of the early life histories of yellowfin and Pacific bluefin tunas

G.3. Develop tools to forecast recruitment

3. SUSTAINABLE FISHERIES

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

H.1. Undertake the research necessary to develop and conduct at least one benchmark stock assessment for yellowfin and bigeye tunas

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

H.4. Develop update assessment and/or stock status indicators for tropical tunas to ensure that management advice is current

H.5. Undertake the research necessary to develop and conduct data-limited assessments for prioritized species

H.6. Maintain active participation in ISC stock assessments

H.7. Develop conventional stock assessments for data-rich prioritized species and species of specific interest

H.8. Assess the status of dolphin stocks in the eastern tropical Pacific

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

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

I.2. Collaborate with ISC in Pacific-wide MSEs for albacore and Pacific bluefin tunas

I.3. Initiate MSE work to evaluate indicator-based harvest strategies for prioritized species and species of specific interest

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

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

J.3. Study the impact of FAD operations on fishing mortality to improve FAD management advice

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

K.1. Collaborate in socio-economic studies by other organizations

4. ECOLOGICAL IMPACTS OF FISHERIES: ASSESSMENT AND MITIGATION

Goal L: Evaluate the ecological impacts of tuna fisheries

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

Goal M: Mitigate the ecological impacts of tuna fisheries

- M.1. In collaboration with the industry, conduct scientific experiments to identify gear technology that will reduce bycatches and mortality of prioritized species
- M.2. In collaboration with the industry, conduct scientific experiments to develop best practices for the release of prioritized bycatch species
- M.3. Conduct spatiotemporal analyses to identify areas of high bycatch/catch ratios for potential use in spatial management
- 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

Goal N: Improve our understanding of the interactions among environmental drivers, climate, and fisheries

- N.1. Conduct spatiotemporal 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 spatiotemporal analyses to better understand the effect of long-term climate drivers (regime shifts) on the abundance of tropical tunas

Goal O: Improve our understanding of the EPO ecosystem

- O.1. Conduct trophodynamic studies for defining key assumptions in EPO ecosystem models
- O.2. Improve analytical tools to evaluate anthropogenic and climate impacts on the EPO ecosystem

5. KNOWLEDGE TRANSFER AND CAPACITY BUILDING

Goal P. Respond in a timely manner to external requests for information and technical support

- P.1. Respond to requests by CPCs
- P.2. Respond to requests from other organizations

Goal Q. Provide training opportunities for scientists and technicians of CPCs

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

Goal R: Improve communication of scientific advice

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

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

- 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)

6. SCIENTIFIC EXCELLENCE

Goal T. Implement external reviews of the staff's research

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

Goal U. Strengthen research at the Achotines Laboratory

Goal V. Recruit and retain highly-qualified personnel

Goal W. Promote training and advancement of scientific staff

Goal X. Promote the advancement of scientific research

X.1. Continue the annual CAPAM workshops

B. UNFUNDED PROJECTS, BY THEME

1. DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

Goal A: Database maintenance, preservation, and access

- A.1. Routine work
- A.2. Improve internal documentation
- A.3. Standardize and automate data submissions

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

- 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

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

- C.1. Purse-seine fleet
  - C.1.a. (**PROPOSAL**) Develop an effective and reliable floating-object marking scheme to assist scientific advance
- C.2. Longline fisheries
- C.3. At-sea transshipments
- C.4. Artisanal fisheries (coastal developing CPCs)
  - C.4.b. (**PROPOSAL**) Long-term sampling program for shark catches of artisanal fisheries in Central America
- C.5. Other fisheries

Goal D. Investigate the use of new technologies to improve data quality

- 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
  - D.2.c. (**PROPOSAL**) Pilot study of electronic monitoring (EM) of the activities and catches of Class 6 purse-seine vessels

PROJECT C.1.a: Develop an effective and reliable floating-object marking scheme to assist scientific advance		
THEME: 1. Data Collection **GOAL:** C. Improve quality and expand coverage of data-collection programs **TARGET:** C.1. Purse-seine fleet **EXECUTION**: Bycatch and IDCP Program & Stock Assessment Program		
Objectives	Establish a robust and reliable marking scheme to accurately identify and track floating objects throughout their lifetime	
Background	• Current FAD data collection forms and procedures at sea are inadequate to properly mark, identify and track floating objects throughout their lifetime. • This is impeding scientific progress in many fields (*e.g.* ecological impacts, operational characteristics and effort, stock assessment). • All tuna RFMOs, and other international organizations like FAO and United Nations, recognize the need for floating objects an efficient and reliable marking scheme for all fishing gears, including FOBs. • Very little progress has been made in this area worldwide.	
Relevance for management	An adequate scheme for marking and identifying floating objects would help refine analyses to develop recommendations for managing tropical tunas in the EPO.	
Duration	18 months	
Work plan and status	• [M 1-3] Define various floating-object marking prototypes. • [M 3-4] Discuss options with stakeholders, fishing industry, observers and captains in a dedicated workshop and adopt the best prototype for testing. • [M 6/8-12/14] Obtain materials and conduct sea trials with a sample of (ideally all) the fleet and a sample of their floating objects. • [M 12/14-16] Analyze data and feedback from observers and captains. • [M 16-18] Make improvements to the marking system and develop recommendations where necessary. • [M 16-18] Prepare for modifications or potential implementation and, likely, for a second stage that considers a web-based floating-object registration database.	
External collaborators	Fishing industry, technology companies	
Deliverables	• Proposal on an efficient and reliable floating-object marking scheme and a summary of pros and cons of all the methodologies considered. • Reports and documents for the WG on FADs, the SAC and the Commission, including recommendations to improve data quality and collection and best marking options.	
Budget (US$)	Regional workshop	30,000
	Technician for field office (12 months)	25,000
	Material for prototypes (2000 marks + materials + shipping)	40,000
	Travel	7,500
	Total	**102,500**

PROJECT C.4.b: Long-term sampling program for shark catches of artisanal fisheries in Central America		
THEME: 1. Data Collection **GOAL:** C. Improve quality and expand coverage of data-collection programs **TARGET:** C.4. Artisanal longline fleet EXECUTION: Stock Assessment Program		
Objectives	Establish a long-term monitoring program for shark catches by artisanal fisheries (longline, gillnet) in Central America.	
Background	• Assessment modelling for shark species in the EPO is severely hampered by a lack of reliable data on shark catches. • Previous work by IATTC staff has identified specific data gaps and data collection needs, including the critical need for catch data from Central American artisanal fisheries, which generate a large fraction of the EPO catches of sharks. • The current ABNJ-GEF-funded project on developing sampling designs for artisanal fisheries in Central America will be completed in 2019. • No funding is available to implement long-term monitoring based on these sampling designs. • Without data provided by a long-term sampling program of Central American artisanal fisheries, the IATTC will not be able to meet the goal of Resolution C-16-05 of EPO assessments of silky and hammerhead sharks.	
Relevance for management	Data collected under a long-term monitoring program will allow for development of stock status indicators and conventional assessments of key shark species, such as silky and hammerhead sharks	
Duration	5 years	
Work plan and status	• 2019 - 2020: Establish infrastructure for long-term sampling program. • 2020 - 2023: collect data for estimation of species and size compositions of shark catches by Central American artisanal fisheries.	
External collaborators		
Deliverables	• Annual estimates of the species and size composition of shark catches in Central American artisanal fisheries. • A progress report on establishment of infrastructure and initial sampling to be presented at SAC-11 in 2020. • Preliminary and final estimates will be presented at SAC meetings in years 2021-2023.	
Budget (US$)	Scientist to process stomach contents and stable isotope samples 3 years @ US$80,000	240,000
	Collection, transport, storage of samples	10,000
	Total	**250,000**

PROJECT D.2.c: Pilot study of electronic monitoring (EM) of the activities and catches of Class-6 purse-seine vessels		
THEME: Data Collection **GOAL:** D. Investigate use of new technologies (pilot studies) **TARGET:** D.2. Electronic monitoring **EXECUTION**: Bycatch and IDCP Program		
Objectives	Establish what routine data EM can collect with as much accuracy as the observer, thus freeing observers to collect biological samples and/or other information necessary to improve stock assessments and stock status indicators.	
Background	• Estimating indices of relative abundance for tuna stocks based on CPUE data requires high-resolution spatial-temporal size-composition data. These data need to be collected at sea because of the low spatiotemporal resolution of port-sampling data from vessel wells that may contain fish from multiple sets. • Observers collect length data for certain species only, due to limited time.	
Relevance for management	• Improved indices of relative abundance for tuna stocks will improve tuna stock assessments, and therefore management advice. • Stock status indicators based on length data for species that are not assessed will provide a better basis for management advice for those species. • Collection of other biological data to improve stock status indicators.	
Duration	25 months (September 2018-September 2020)	
Work plan and status	• Sep-Oct 2018: Solicit bids from EM companies for equipment, installation, and data archiving services. • Nov 2018-Jan 2019: Identify large purse-seine vessels willing to participate in the study; purchase EM equipment • Feb-Nov 2019: Trips with simultaneous collection of EM and observer data. • Dec 2019-Apr 2020: Processing of EM data • May-Sep 2020: Statistical comparisons, write report.	
External collaborators	Industry and other stakeholders; scientists with experiences in other oceans	
Deliverables	• Progress reports for SAC meetings (May 2019 and 2020) • Project report (September 2020)	
Budget (US$)	Materials, EM equipment, logistics, travel	**170,000**

2. LIFE-HISTORY STUDIES FOR SCIENTIFIC SUPPORT OF MANAGEMENT

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

- E.1. Initiate a long-term age and growth data collection and research program for tropical tunas
- E.2. Conduct spatiotemporal research on the reproductive biology of tropical tunas
  - E.2.a. (**PROPOSAL**) Investigate spatiotemporal variability in the age, growth, maturity, and fecundity of yellowfin tuna in the EPO
- E.3. Analyze historical tagging data to improve the assumptions about movement and stock structure in spatially-structured stock assessments of tropical tunas
- E.4. Initiate a multi-year tagging program for tropical tunas
  - E.4.a. (**PROPOSAL**) Multi-year tuna tagging study
- E.5. Conduct genetic studies to improve the assumptions about life history and stock structure in stock assessments of tropical tunas
  - E.5.c. (**PROPOSAL**) Investigate the population structure of skipjack and yellowfin tunas in the EPO, using genetic analyses

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

- F.1. Conduct life-history studies of dolphins under the AIDCP
- F.2. Conduct life-history studies of shark species
  - F.2.a. Investigate the movements, behavior, and habitat utilization of silky sharks in the EPO
- F.3. Conduct life-history studies of prioritized species

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

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

PROJECT E.2.a: Investigate spatiotemporal variability in the age, growth, maturity, and fecundity of yellowfin tuna in the EPO		
THEME: Life-history studies for scientific support of management **GOAL:** E. Life history, behavior, and stock structure of tropical tunas **TARGET:** E.2. Reproductive biology of tropical tunas **EXECUTION**: Biology and Ecosystem Program		
Objectives	Estimate age, growth, maturity, and fecundity of yellowfin from four distinct areas of the eastern Pacific for use in spatially-structured stock assessment models	
Background	• Current estimates of age, growth, maturity, and fecundity of yellowfin are based on otolith and ovarian tissue samples collected over 30 years ago. • During 2009-2016 observers collected otolith and ovarian tissues samples at sea throughout the EPO • Tagging and morphometrics data indicate there are multiple stocks of yellowfin in the EPO, probably with different life history characteristics • Heavily-exploited fish stocks often show trends towards earlier maturation • Spatially-structured stock assessments should incorporate geographically-explicit life history parameters	
Relevance for management	Spatially-structured stock assessments based on geographically-explicit life history parameters will provide a more accurate basis for the staff's management advice	
Duration	4 years; initiated in 2017	
Work plan and status	• 2017-2019: Preparation and reading of otolith samples for age estimates • 2018-2019: Preparation and reading of ovarian tissues for fecundity estimates • 2019-2020: Analyses of age and growth and reproductive biology data, and preparation of manuscripts	
External collaborators	None	
Deliverables	• Presentation for SAC-10 • Updated, geographically-explicit life-history parameters for use in spatially-structured stock assessments	
Budget (US$)	Scientific technician (1 year)	**60,000**

PROJECT E.4.a: Multi-year tuna tagging study		
THEME: Life-history studies for scientific support of management **GOAL:** E. Life history, behavior, and stock structure of tropical tunas **TARGET:** E.4. Initiate a multi-year tagging program for tropical tunas **EXECUTION**: Biology and Ecosystem Program		
Objectives	• Obtain data that will contribute to, and reduce uncertainty in, EPO tuna stock assessments, particularly for skipjack tuna; • Obtain information on the rates of movement, dispersion, and mixing of skipjack, yellowfin, and bigeye tunas in the EPO, and between this region and other adjacent regions of the Pacific basin; and • Obtain estimates of sex-specific growth, mortality, abundance, selectivity, and exploitation rates for those species of tuna in the EPO	
	This project is described in detail in Appendix 2 of Document CAF-05-04, prepared for the meeting of the Committee on Administration and Finance in July 2017	
Duration	3 years (2019-2021)	
Budget (US$)		**7,300,000**

PROJECT E.5.c: Investigate the population structure of skipjack and yellowfin tunas in the EPO, using genetic analyses		
THEME: Life-history studies for scientific support of management **GOAL:** E. Life history, behavior, and stock structure of tropical tunas **TARGET:** E.5. Genetic studies on stock structure **EXECUTION**: Biology and Ecosystem Program		
Objectives	Collect and analyze skipjack and yellowfin tuna tissue samples from three discrete areas of the EPO, to determine whether significant genetic heterogeneity is present	
Background	• Although large scale tagging experiments provide the best information for defining stock structure and mixing rates among stocks for assessment purposes, it is beneficial to utilize other complimentary methodologies, particularly genetics, to evaluate and/or corroborate the results from tagging experiments • Historical investigations of the genetic population structure of tropical tunas in the Pacific and elsewhere using protein electrophoresis, mitochondrial DNA, and DNA microsatellite loci, lacked sufficient resolution to assess genetic heterogeneity among discrete locations including between ocean basins, but now there are more powerful methods for analyzing genetic discrimination • Future stock assessments for skipjack and yellowfin tunas should be spatially structured and based on current understanding of stock structure for those species in the EPO from tagging experiments and genetic discrimination	
Relevance for management	Management advice for skipjack and yellowfin tunas in the EPO should recognize there are multiple stocks for those species in the EPO with different population dynamics that are experiencing different levels of exploitation	
Duration	2018-2020	
Workplan and progress report (for ongoing projects)	• IATTC observers aboard purse-seine vessels collect 100 white muscle tissue samples from skipjack and yellowfin tunas in each of three areas in the EPO (North of 15°N, 5°N to 5°S, South of 10°S). • Process samples at CSIRO to extract and sequence DNA • Analyze the resulting genetic data, using high resolution analytic software specifically designed for evaluating genetic heterogeneity in population structure of SNP data	
External collaborators	CSIRO, Hobart, Australia	
Deliverables	• Relevant scientific information on putative genetic population structure for skipjack and yellowfin tunas in the EPO for informing future stock assessments • Manuscripts for publication in scientific journals	
Budget (US$)	**Total** as co-financing to CSIRO	**50,000**

3. SUSTAINABLE FISHERIES

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

- H.1. Undertake the research necessary to develop and conduct at least one benchmark stock assessment for yellowfin and bigeye tunas
  - H.1.c. (**PROPOSAL**) Investigate potential changes in the selectivity of the longline fleet resulting from changes in gear configuration
  - H.1.d. (**PROPOSAL**) Improve indices of abundance based on longline CPUE data
- 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
- H.4. Develop update assessment and/or stock status indicators for tropical tunas to ensure that management advice is current
  - H.4.a. Conduct routine stock assessments of tropical tunas
- H.5. Undertake the research necessary to develop and conduct data-limited assessments for prioritized species
  - H.5.b. (**PROPOSAL**) Workshop series on data compilation and assessment model development for hammerhead sharks
- H.6. Maintain active participation in ISC stock assessments
- H.7. Develop conventional stock assessments for data-rich prioritized species and species of specific interest
  - H.7.c. (**PROPOSAL**) Develop priors for shark stock-recruitment relationships
- H.8. Assess the status of dolphin stocks in the eastern tropical Pacific

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

- 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
- I.2. Collaborate with ISC in Pacific-wide MSEs for albacore and Pacific bluefin tunas
- I.3. Initiate MSE work to evaluate indicator-based harvest strategies for prioritized species and species of specific interest

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

- 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
- J.3. Study the impact of FAD operations on fishing mortality to improve FAD management advice

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

- K.1. Collaborate in socio-economic studies by other organizations

PROJECT H.1.c: Investigate potential changes in the selectivity of the longline fleet resulting from changes in gear configuration		
THEME: Sustainable fisheries ~~**FOCUS**~~**GOAL:** H. Research and development of stock assessment models and their assumptions **TARGET:** H.1. Improve routine tropical tuna assessments **EXECUTION**: Stock Assessment Program		
Objectives	Evaluate potential changes in targeting on the size composition of the longline catches of bigeye and yellowfin	
Background	• The current yellowfin stock assessment shows a pattern of residuals for the recent longline length-composition data • Analyses of operational-level longline data from the Japanese fleet have identified possible changes in targeting that may affect the indices of relative abundance and size composition of the catch • The changes in targeting appear to be related to changes in longline gear configuration. • The effect on catch rates and species composition is being investigated in related collaborative research between the IATTC staff and NRIFSF, Japan	
Relevance for management	Currently, the longline indices are the main information in the stock assessments of yellowfin and bigeye, therefore unaccounted-for changes in the longline selectivity may compromise management advice	
Duration	12 months	
Work plan and status	• Month 1: match set-by-set gear characteristics and catch data with the size-composition data from the Japanese fleet • Months 2-3: analysis of the set-by-set data • Months 5-11: Apply the lessons learnt from the set-by-set data to the aggregated level data used in the stock assessment	
External collaborators	NRIFSF, Japan	
Deliverables	• Presentation for SAC-10, 2019 • Procedure to be used in the next full assessment of yellowfin	
Budget (US$)	Travel	**10,000**

PROJECT H.1.d: Improve indices of abundance based on longline CPUE data		
THEME: Sustainable fisheries **GOAL:** H. Research and development of stock assessment models and their assumptions **TARGET:** H.1. Improve routine tropical tuna assessments **EXECUTION**: Stock Assessment Program		
Objectives	• Improve the yellowfin and bigeye indies of relative abundance from longline data • Determine methods to identify targeting in longline fisheries • Develop spatio-temporal models for creating indices of relative abundance from longline data • Develop appropriate longline length composition data for the index of abundance and for the catch	
Background	• Indices of relative abundance derived for longline CPUE data are the most important piece of information in the bigeye and yellowfin stock assessments • Only the Japanese data are currently used to create these indices • The characteristics, tactics, and spatial distribution of the fishery have been changing over time • The same length composition data is used for the index and for the catch, but these could differ • New methods, such as spatio-temporal modelling, have been developed and should be used in the creation of the indices	
Relevance for management	The indices have direct impact on the stock assessment and any improvements in the indices will directly improve the management advice for bigeye and yellowfin	
Duration	18 months, starting June 2018	
Work plan and status	• June-Dec 2018: Evaluate the data available in the IATTC database and implement the spatio-temporal models • Jan-Feb 2019: Hold a one-week workshop to discuss approaches to resolve issues in using the longline CPUE data • May-June 2019: Hold a two-week working group to analyse the data	
External collaborators	• NRIFSF, Japan • Invited speakers	
Deliverables	• Workshop report • Working group report • Indices of relative abundance • Project report to SAC	
Budget (US$)	Postdoctoral researcher	223,000
	Workshop expenses and invited participant travel costs	50,000
	Working group expenses	50,000
	Computer equipment	20,000
	Total	**343,000**

Project H.5.b: Workshop series on data compilation and assessment model development for hammerhead assessments		
THEME: Sustainable fisheries **GOAL:** H. Research and development of stock assessment models and their assumptions **TARGET:** H.5. Research to develop and conduct data-limited assessments for prioritized species **EXECUTION:** Stock Assessment Program		
Objectives	• To bring together shark scientists, fisheries organization and industry representatives with EPO data on hammerhead shark species in a series of technical workshops to: • Collate data and prepare assessment databases; • Develop assessment model structure.	
Background	• Prior to the silky shark assessment in 2013, the IATTC arranged a series of technical workshops on data preparation/collation and assessment model development. • This workshop series was critical for the identification and preparation of all data types required in assessment because some data sources, e.g., for biological parameters, were not be available in the primary scientific literature. • The quality of the management advice that will be produced by the hammerhead shark assessments in 2023 is highly dependent on identification of all available data sources necessary for assessment modeling. • Previous work by IATTC staff to identify fisheries data gaps and compile available fisheries information for sharks in 2016 will serve as a starting point for this workshop series.	
Relevance for management	The results of the hammerhead assessment will be key in the development of improved management plans for sharks in the EPO.	
Duration	18 months	
Work plan and status	• Spring 2020: plan workshop series. • Fall 2020: First workshop to identify all sources of data relevant to the assessment and plan a timeline for data compilation. • Fall 2021: Second technical workshop to review progress on data compilation and database creation.	
External collaborators	Numerous individuals from scientific institutions, fisheries organizations and industry.	
Deliverables	• Workshop reports • Final report describing technical findings.	
Budget (US$)	Workshop expenses and travel cost for participants	**100,000**

Project H.7.c: Develop priors for shark stock-recruitment relationships		
THEME: Sustainable fisheries **GOAL:** H. Research and development of stock assessment models and their assumptions **TARGET:** H.7. Develop conventional stock assessments for data-rich prioritized species **EXECUTION:** Stock Assessment Program		
• Objectives	• Assemble the available information from theory and data about density dependence in the stock-recruitment relationship for low fecund species • Develop priors for shark stock-recruitment relationships	
Background	• Sharks and a major conservation concern in the EPO and world wide • Stock assessment have been developed for several species and are planned for many more • The IATTC has conducted its own assessments and collaborates with assessments conducted by the ISC • One of the main uncertainties in shark stock assessments is the stock-recruitment relationship • A stock assessment relationship that is based on density dependent survival has been developed for low fecund species and is applicable to sharks • The low fecund stock-recruitment relationship has been implemented in Stock Synthesis, the general stock assessment program that is used for several shark stock assessments • The low fecund stock-recruitment relationship has one more parameter than the traditionally used stock-recruitment relationship and it is difficult to estimate all three parameters in most, if not all, applications. • Prior information on the stock-recruitment parameters are needed.	
Relevance for management	• The stock-recruitment relationship is a main determinant of management reference points • Better understanding of the stock-recruitment relationship will improve assessments and management of sharks	
Duration	24 months, starting January 2019	
Work plan and status	• Jan-June 2019: Assemble and review all relevant information on the theory of density dependent recruitment for low fecund species • July-Dec 2019: Assemble and review all relevant data on density dependent recruitment for low fecund species • Jan-June 2020: Assemble and review all relevant information on the theory and data of density dependent recruitment in sharks • July-Dec 2020: Assimilate all the information to determine priors for the low fecundity stock-recruitment relationship with respect to sharks.	
External collaborators	ISC	
Deliverables	Project report to SAC	
Budget (US$)	Post-doctoral researcher, 2 years @ US$104,000	208,000
	Relocation costs	5,000
	Travel	10,000
	Computer equipment	10,000
	Total	**233,000**

4. ECOLOGICAL IMPACTS OF FISHERIES: ASSESSMENT AND MITIGATION

Goal L: Evaluate the ecological impacts of tuna fisheries

L.1. Develop analytical tools to identify and prioritize species at risk for data collection, research and management

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

Goal M: Mitigate the ecological impacts of tuna fisheries

M.1. In collaboration with the industry, conduct scientific experiments to identify gear technology that will reduce bycatches and mortality of prioritized species

M.1.b. (**PROPOSAL**) Test hookpods to reduce seabird and sea turtle bycatches in longlines

M.2. In collaboration with the industry, conduct scientific experiments to develop best practices for the release of prioritized bycatch species

M.3. Conduct spatiotemporal analyses to identify areas of high bycatch/catch ratios for potential use in spatial management

M.3.a. (**PROPOSAL**) Estimate bycatch and discard rates at FADs, by species, and identify "hot spots"

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

M.5.b. (**PROPOSAL**) Reducing losses, and fostering recovery, of FADs in the purse-seine fishery in the EPO

M.5.c. (**PROPOSAL**) Evaluate and reduce post-release mortality of Mobulid rays

PROJECT M.1.b: Test hookpods to reduce seabird and sea turtle bycatches in longlines		
THEME: Ecological impacts of fisheries: assessment and mitigation **GOAL:** N. Mitigating ecological impacts **TARGET:** N.1. Investigate gear technology to reduce bycatch and bycatch mortality **EXECUTION**: Bycatch and IDCP Program		
Objectives	To reduce seabird and sea turtle bycatches in longline fisheries for tunas and other species covered by the Antigua Convention.	
Rationale and Relevance for management	• In some regions, endangered sea birds and sea turtles are caught in longlines when they try to steal the bait from the hooks being deployed by a longliner. • Hookpods are devices that cover the hooks, and open up only at a predetermined depth. They have been very successful at reducing seabird bycatches. By opening the pods at a depth of 20m we may be also able to reduce sea turtle bycatches. • This research will enable to inform alternative recommendations for managing bycatches in longlines.	
Relevance for management	If successful, the use of hookpods will significantly contribute in the mitigation of incidental catches of birds and sea turtles in the longline fishery.	
• Work plan and status	• August – October 2018: Identify longline vessels willing to cooperate in an experiment. • November 2018 – May 2019: In a pilot study, deploy hookpods following an alternating design in portions of the longlines to compare catch and bycatch rates. • June – August 2019: Perform statistical comparisons of catch and bycatch rates. • September – November 2019: Study the feasibility of their use by the fleets, and the impacts they may have on the fishing operations.	
Duration	16 months	
External collaborators	Observer program implemented by TUNACONS collects the data	
Deliverables	• May 2019: IATTC SAC documents. • November 2019: Project report.	
Budget (US$)	Hookpods: 1,500 @ US$7	10,500
	Data processing, statistical analysis	20,000
	Travel, shipping	10,000
	Total	**40,500**

PROJECT M.3.a: Estimate bycatch and discard rates at FADs, by species, and identify "hot spots"		
THEME: Ecological impacts of fisheries: assessment and mitigation **GOAL:** M. Mitigating ecological impacts **TARGET:** M.3. Spatiotemporal studies to determine areas of high bycatch/catch ratios **EXECUTION**: Bycatch and IDCP Program		
Objectives	Sub-regional study on discard and bycatch rates and species composition at FADs sets and identification of hot spots.	
Rationale and Relevance for management	• Provides area-specific information on the potential impacts of FADs on by-catch species. • Provides a scientific basis for spatial management approaches. • This research will enable the development of alternative recommendations for managing tropical tunas in the EPO and provide the commission with additional tools when developing management measures.	
Work plan and status	• The proposed work program will study the spatial and temporal distribution of bycatch rates and bycatch to catch ratios. • Statistical analysis to identify hotspots, and habitat use, of the different by-catch species and the spatial-temporal distribution of large densities of by-catch (catch rates). Identify data gaps for by-catch data collection and provide advice on potential areas of additional data collection to improve future analyses.	
Duration	6 months	
Budget (US$)	Full-time researcher (6 months)	52,000
	Travel	10,000
	Equipment (laptop, office supplies, etc)	3,000
	Total	**65,000**

PROJECT M.5.b Reducing losses, and fostering recovery, of FADs in the purse-seine fishery in the EPO		
THEME: Ecological impacts of fisheries: assessment and mitigation **GOAL:** M. Mitigating ecological impacts **TARGET:** M.5. Develop best practices to mitigate anthropogenic impacts on EPO habitats **EXECUTION**: Bycatch and IDCP Program		
Objectives	Identify the key issues to prevent the loss or to recover FADs and propose a plan to mitigate the impacts	
Background	• The members of the IATTC have expressed interest in reducing the number of lost FADs at sea, and the strandings in areas of ecological or touristic value, by promoting their recovery, and to minimize their ecological impacts: creation of marine debris, ghost fishing, strandings in sensitive habitats. • If losses or strandings cannot be prevented, alternatives to implement recovery programs should be considered.	
Relevance for management	• The Antigua Convention strive for implementing the standards of the Code of Conduct for Responsible Fisheries adopted by the UN's FAO which includes, inter alia, the promotion of use of selective and environmentally safe fishing gear and practices, and the conservation of aquatic ecosystems. • Habitat destruction and its effect on fisheries by derelict fishing gear has been identified as a detrimental consequence of discarded fishing gear.	
Duration	1 year	
Work plan and status	• Identification of possible stranding sites affected by lost FOs associated with the fishery for tunas. • Attend a 2-day workshop convened by ISSF that will focus on FAD research in general. • Conduct surveys with fishing entities and operators from the region, and from the western and central Pacific areas, to estimate the degree of lost gear, and the predominant locations, periods. • Conduct surveys with possible stakeholders affected in coastal areas to assess the level of impact. • Identify the feasibility to use drift models to identify possible areas of impact of abandoned/lost FADs. • Conduct a two-day seminar with relevant stake holders, to identify possible options for mitigation, retrieval, and/or clean-up of areas impacted by abandoned/lost FADs.	
External collaborators	An oceanographer to model movements of FADs based on observer data, and drift models to predict impacted areas.	
Deliverables	December 2018: Report for IATTC staff review.	
Budget (US$)	Oceanographer 3 months	26,000
	Travel of oceanographer to identify the model to use and the characteristics of the data	5,000
	Cost of surveys	5,000
	Cost of regional workshop	40,000
	Total	**76,000**

PROJECT M.5.c: Evaluate and reduce post-release mortality of Mobulid rays		
THEME: Ecological impacts of fisheries: assessment and mitigation **GOAL:** M. Mitigate ecological impacts **TARGET:** M.5. In collaboration with industry, conduct experiments to develop best practices to mitigate fisheries impacts on EPO habitats **EXECUTION**: Bycatch and IDCP Program		
Objectives	• Quantify post-release mortality of Mobulid rays and the factors influencing their survival. • Reduce post-release mortality by creating science-based handling and release guidelines. • Improve species identification of Mobulid rays using genetic methods.	
Background	• Mobulid populations are experiencing steep declines in many regions including the tropical eastern Pacific, and bycatch is a significant threat. • Post-release mortality of Mobulid rays fisheries is currently considered 100%; available data from other regions suggest lower, species-specific mortality rates.	
Relevance for management		
Duration	36 months	
Work plan and status	• Train IATTC observers to deploy survivorship satellite tags and collect tissue samples and relevant biological data from Mobulid rays. • Deploy survivorship tags and collect tissue samples. • Work with captains that are using cargo nets, stretchers, and ramps to quantify mortality rates using these release methods • Compare genetic identification to observer-reported species ID to evaluate identification quality, misreporting rates for bycatch models, and training needs. • Quantify effects of handling and release methods, species, and environmental covariates on Mobulid post-release mortality. • Develop handling and release guidelines that can be disseminated to the fleets. • Use movement data generated by survivorship and archival tags to identify Mobulid hotspots independent of fisheries data to assess spatial bycatch risk.	
External collaborators	Univ. California Santa Cruz, Monterey Bay Aquarium, Scripps Institution of Oceanography	
Deliverables		
Budget (US$)	Survivorship Satellite Tags 100 @ US$2,000	200,000
	Archival Satellite Tags 50 @ US$4,000	200,000
Anticipated co-funding from: Monterey Bay Aquarium, Save Our Seas Foundation	Satellite fees	5,000
	Tagging kits 50 @ US$50	2,500
	Observer tagging rewards 150 @ US$100	15,000
	Miscellaneous tag costs (e.g. shipping, deployment tips)	7,000
	Travel for training workshops 2 @ US$5,000	10,000
	Genetic sample processing 750 @ US$30	22,500
	Observer sampling rewards 750 @ US$20	15,000
	Sample shipping	1,000
	Graduate student support 2yrs @ US$15,000	30,000
	Miscellaneous genetic costs (e.g. reagents, lab equip.)	5,000
	Total	**513,000**

5. INTERACTIONS AMONG THE ENVIRONMENT, THE ECOSYSTEM, AND FISHERIES

Goal N: Improve our understanding of the interactions among environmental drivers, climate, and fisheries

N.1. Conduct spatiotemporal 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 spatiotemporal analyses to better understand the effect of long-term climate drivers (regime shifts) on the abundance of tropical tunas

Goal O: Improve our understanding of the EPO ecosystem

O.1. Conduct trophodynamic studies for defining key assumptions in EPO ecosystem models

O.1.a. (**PROPOSAL**) Develop a fishery-dependent ecological sampling program for EPO tuna fisheries

O.2. Improve analytical tools to evaluate anthropogenic and climate impacts on the EPO ecosystem

O.2.c. (**PROPOSAL**) Investigate the effects of pollutants on pre-recruit survival of yellowfin tuna

PROJECT O.1.a: Develop a fishery-dependent ecological sampling program for EPO tuna fisheries		
THEME: Interactions among the environment, the ecosystem. and fisheries **GOAL:** O. Improve understanding of the EPO ecosystem **TARGET:** O.1. Conduct trophodynamic studies for defining key assumptions in EPO ecosystem models **EXECUTION**: Biology and Ecosystem Program		
Objectives	• Develop a comprehensive ecological monitoring program for species impacted by EPO fisheries to improve our understanding of the potential ecological effects of fishing and climate change. • Use collected data to develop ecological indices and parameterize ecological risk assessment and ecosystem models for supporting EBFM.	
Background	Studies on trophic ecology, using stomach contents, stable isotopes and fatty acids, are essential for parameterizing ecosystem models and for developing ecological indices to assess the ecological impacts of fishing. Mid-trophic forage species for example form critical trophic linkages from the bottom to the top of the food web, but are poorly understood, therefore limiting overall efficacy of forecasting changes in ecosystem structure under fishing and/or climate change scenarios.	
Relevance for management	Accurate depictions of trophic connections are the foundation of ecosystem models that represent and quantify the complexity of ecological interactions among species or functional groups. Improving our understanding of the trophodynamics of the pelagic EPO by undertaking comprehensive trophic ecology studies for populating ecosystem models provides an important step towards evaluating ecological sustainability under the Antigua Convention.	
Duration	5+ years	
Work plan and status	• Late 2018: identify species and tasks, develop proposal • 2019: develop external collaborations for collecting and analysing samples (share research proposal), research logistics (e.g. cost, storage, supplies, etc.), and design sampling protocol • 2020: implement sampling protocol; develop database to house sampling information; begin stomach contents identification • 2021: continue sampling, analysis, and database development • 2022: continue sampling, analysis, and database development	
External collaborators	CPCs, fishers, universities, government agencies, etc.	
Deliverables	• Development of an ecological sampling program and a • comprehensive biological database	
Budget (US$)	**Total**	**250,000**

PROJECT O.2.c: Investigate the effects of pollutants on pre-recruit survival of yellowfin tuna		
THEME: Interactions among the environment, the ecosystem. and fisheries **GOAL:** O. Improving our understanding of the EPO ecosystem **TARGET:** O.2. Undertake assessments to evaluate anthropogenic and climate impacts on the EPO ecosystem **EXECUTION**: Biology and Ecosystem Program		
Objectives	Describe and estimate the levels of common pollutants occurring in early life stages of yellowfin tuna, and address the question of whether pollutant loads are transferred between yellowfin adults and progeny	
Background	• Investigations of pollutant levels in tropical tunas have focused mostly on mercury levels, and the few studies of other common pollutants in tunas have focused on the effects of pollutants on human health after consumption of tuna • There is a lack of information on the levels of common persistent organic pollutants, such as pesticides and PCB's, occurring in tropical tunas and whether those pollutant loads are transferred to eggs, larvae and early-juveniles and are prevalent enough to influence mortality • The Achotines Laboratory provides a center for investigations of pollutant levels occurring in tropical yellowfin tuna and estimates of pollutant loads in eggs, larvae, early-juveniles and adult fish	
Relevance for management	The ability to estimate the levels of common pollutants in early life stages of tropical tunas provides key information on potentially lethal or sub-lethal effects of pollution on tuna populations, and these investigations are expandable to examine potential regional differences in pollution effects on tuna populations	
Duration	21 months	
Work plan and status	• There is no work plan currently in place for this project • April 2018-September 2018: Planning discussions will continue to develop a research plan for the project • October 2018-December 2019: Sampling can be conducted at the Achotines Laboratory, samples analysed at Scripps Institution of Oceanography, and a manuscript completed	
External collaborators	Scripps Institution of Oceanography	
Deliverables	• Presentations for SAC09, SAC10 and SAC11 • Publication of results in a scientific journal	
Budget (US$)	**Total**	**75,000**

6. KNOWLEDGE TRANSFER AND CAPACITY BUILDING

Goal P. Respond in a timely manner to external requests for information and technical support

P.1. Respond to requests by CPCs

P.2. Respond to requests from other organizations

Goal Q. Provide training opportunities for scientists and technicians of CPCs

Q.1. Host visiting scientists and students from CPCs

Q.2. Implement the IATTC capacity-building scholarship

Q.3. Facilitate training workshops

Goal R: Improve communication of scientific advice

R.1. Improve communication of the staff's scientific work to CPCs

R.2. Participate in global initiatives for the communication of science

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

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)

7. SCIENTIFIC EXCELLENCE

Goal T. Implement external reviews of the staff's research

T.1. Facilitate external reviews of stock assessments

T.1.a. (**PROPOSAL**) External review of bigeye tuna assessment

T.2. Facilitate external reviews of scientific studies

Goal U. Strengthen research at the Achotines Laboratory

Goal V. Recruit and retain highly-qualified personnel

Goal W. Promote training and advancement of scientific staff

Goal X. Promote the advancement of scientific research

X.1. Continue the annual CAPAM workshops

X.1.b. (**PROPOSAL**) Workshop on operating models for management strategy evaluation

PROJECT T.1.a: External review of bigeye tuna assessment		
THEME: Scientific Excellence **GOAL:** T. Implement external reviews of the staff's research **TARGET:** T.1. Facilitate external reviews of stock assessments **EXECUTION**: Stock Assessment Program		
Objectives	• Review the assessment model used for bigeye tuna • Improve the assumptions made in the assessment	
Background	• The bigeye tuna stock assessment was last independently reviewed in 2010 • Several issues have been identified in the stock assessment • The CAPAM workshop series has identified several modelling good practices that should be incorporated into the bigeye tuna assessment • Major improvements to the stock assessment are underway, including modelling of spatial structure • Review of the assessment is important to get external input into improving the assessment	
Relevance for management	• The results of the bigeye assessment are used for management advice • Improvements in the stock assessment will improve the management advice	
Duration	The project will extend over 2019, but the workshop will be a single week in Fall	
Work plan and status	• Early 2019 identify review panel • Mid 2019 prepare documents describing major developments in the model • Fall 2019 Hold workshop • Fall 2019 Write workshop report	
External collaborators	Independent reviewers	
Deliverables	Workshop report	
Budget (US$)	Workshop expenses and invited participant travel costs	50,000
	Honorariums for 4 invited experts @ US$10,000	40,000
	Total	**90,000**

Project X.1.b: Workshop on operating models for management strategy evaluation		
THEME: Scientific Excellence **GOAL:** X Promote advancement of scientific research **TARGET:** X.1 Continue the CAPAM workshops **EXECUTION**: Stock Assessment Program		
Objectives	Improve the operating models used for management strategy evaluation (MSE)	
Background	• Operating models are used in MSE to evaluate the performance of alternative harvest strategies • Operating models are typically, but not necessarily, based on stock assessment models, but often include more sources of uncertainty • Appropriate operating models need to be used otherwise the MSE will be biased • Methods to appropriately represent uncertainty need to be further developed • MSE is currently being developed for bigeye, albacore, and bluefin tunas and planned for other species	
Relevance for management	MSE will be used to select harvest strategies for multiple species	
Duration	18 months	
Work plan and status	• Winter 2019 – invite keynote speakers • Winter 2019 – prepare background material • Summer 2019 – Conduct workshop • Fall 2019 – Write workshop report • May 2020 – report to SAC	
External collaborators	Invited speakers	
Deliverables	Workshop report	
Budget (US$)	Workshop expenses and invited participant travel costs	**50,000**

Appendix 1.

The work of the IATTC staff is divided into four programs: Stock Assessment; Biology and Ecosystem; Data Collection and Database; Bycatch and International Dolphin Conservation Program (IDCP).

The principal responsibilities of these programs are as follows:

Stock Assessment

- Determine whether tuna stocks in the eastern Pacific Ocean are fully fished or overfished, and whether increases in fishing capacity and/or fishing effort would threaten their conservation;
- Evaluate measures to prevent or eliminate overfishing and excess fishing capacity and to ensure that fishing effort is compatible with the sustainable use of the fish stocks covered by the IATTC Convention;
- Evaluate measures to ensure the long-term conservation and sustainable use of the fish stocks covered by the IATTC Convention and to maintain or restore the harvested species at levels of abundance that will produce the maximum sustainable yield.
- In collaboration with Scripps Institution of Oceanography and the US National Marine Fisheries Service, the IATTC founded the Center for the Advancement of Population Assessment Methodology (http://www.capamresearch.org/) to conduct research on fisheries stock assessment.

Biology and Ecosystem

- Carry out scientific research on the abundance, biology and biometry of fish stocks covered by the IATTC Convention and of associated or dependent species, and the effects of natural factors and human activities;
- In coordination with the bycatch program, develop conservation and management measures for species belonging to the same ecosystem that are affected by fishing for, or dependent on or associated with, the fish stocks covered by the IATTC Convention, in order to maintain or restore such species above sustainable levels.

Data Collection and Database

- Develop standards for the collection, verification, exchange, and reporting of data on the fisheries covered by the IATTC Convention;
- Establish a comprehensive program for data collection and monitoring;
- In coordination with the IDCP, manage the on-board scientific observer program, the data collected by observers, and the activities of the field offices;

Bycatch and IDCP

- Develop measures to avoid, reduce and minimize waste, discards, catch by lost or discarded fishing gear, catch of non-target species, and impacts on associated or dependent species, in particular endangered species;
- Develop measures to avoid, reduce and minimize the incidental mortality of dolphins associated with the tuna fishery.