INTER-AMERICAN TROPICAL TUNA COMMISSION

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DOCUMENT IATTC-93-06c REV

UNFUNDED PROJECTS

This document lists proposed projects that are not currently funded. The IATTC scientific staff's current and planned research activities and work plans are listed in Document IATTC-93-06b, and Its broader and longer-term goals are set out in Document IATTC-93-06a, Strategic Science Plan.

CONTENTS

A. INTRODUCTION

This document presents brief summaries of 23 research projects that the staff considers important, but lacks the resources, human, technical, or financial, to undertake. The summaries include, for each project, background information, a work plan, and a status report, as well as details of its relevance and purpose, external collaborators, duration, deliverables, and an indicative budget.

Research projects that are funded and/or under way are included in IATTC-93-06b, which also contains the staff's work plans, which include many of the projects listed in this document.

The staff's research activities are no longer structured in accordance with the Commission's four research programs[1], as in previous years. Instead, they are classified into the seven main areas of research, called *Themes*, of the proposed Strategic Science Plan (SSP; IATTC-93-06a). In addition to better accommodating a strategic planning approach, this new structure is intended to foster stronger collaboration among the different programs (recommendation 17 of the 2016 IATTC Performance Review), with researchers from different programs contributing to activities under a common *Theme*. The seven *Themes,* the strategic pillars of the SSP, are the following:

1. Data collection for scientific support of management
2. Life history studies for scientific support of management
3. Sustainable fisheries

[1] Stock Assessment; Biology and Ecosystem; Data Collection and Database; Bycatch and International Dolphin Conservation Program (IDCP)

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 strategic *Goals*, and the principal tasks that will be carried out to achieve a particular goal within the SSP's five-year window are called *Targets* (IATTC-93-06a) The specific activities that the staff will carry out in order to fulfil those tasks are called *Projects*, which are in some cases grouped into *Work Plans* aimed at achieving a broad objective not limited to a particular *Theme* or *Goal*.

The general *Themes*, and the more specific *Goals*, reflect what the staff considers to be its primary responsibilities, and form an integral part of the five-year SSP. The more focused *Targets*, and the concrete *Projects*, are generally of shorter duration, and operate on a biennial cycle. 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.

B. UNFUNDED PROJECTS, BY THEME

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1. DATA COLLECTION FOR SCIENTIFIC SUPPORT OF MANAGEMENT

PROJECT C.1.a: Develop an effective and reliable floating-object marking scheme to assist scientific advance		
THEME: 1. Data collection for scientific support of management **GOAL:** C. Facilitate the improvement of data quality, coverage, and reporting by CPC 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 the United Nations, recognize the need for an efficient and reliable marking scheme for all fishing gears, including FADs. • 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 for scientific support of management **GOAL:** C. Facilitate the improvement of data quality, coverage, and reporting by CPC data collection Programs **TARGET:** C.4. Artisanal fisheries (coastal developing CPCs) EXECUTION: Stock Assessment Program		
Objectives	Establish infrastructure for, and initiate, 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 FAO-GEF-funded pilot project to develop sampling designs for those fisheries will be completed in 2019. • No funding is available to implement a long-term monitoring program based on these sampling designs. • Without data from such a long-term program, meeting the goal of Resolution C-16-05 of assessments of silky and hammerhead sharks in the EPO will not be possible • The current FAO-GEF-funded pilot study finishes in early 2019, but final sampling designs, coverage, and budget will not be ready for consideration by the Commission until August 2019, and could not be funded until January 2020. • Without funding to cover this period, the staff already hired and trained under the FAO-GEF pilot project could not be retained. • If the staff are not retained, the functional infrastructure needed to begin long-term sampling could not be developed by target date of January 2020.	
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 (2019-2023)	
Work plan and status	• 2019-2020: Establish infrastructure for long-term sampling program (funding requested below). • 2020-2023: Collect data for estimation of species and size compositions of shark catches by Central American artisanal fisheries (funding to be requested in August 2019).	
External collaborators	OSPESCA	
Deliverables	• 2019: Proposal for long-term sampling program for shark catches by artisanal fisheries in Central America (including budget). • Progress report on establishment of infrastructure and initial sampling to be presented at SAC-10 in 2019.	
Budget (US$)	Total	213,000

PROJECT D.2.c: Pilot study of electronic monitoring (EM) of the activities and catches of Class-6 purse-seine vessels		
THEME: Data collection for scientific support of management **GOAL:** D. Investigate the use of new technologies to improve data quality **TARGET:** D.2. Evaluate the feasibility of implementing on-board electronic monitoring (EM) systems for data collection purposes **EXECUTION**: Bycatch and IDCP Program and Data Collection and Database 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

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. Obtain life history and stock structure information for spatially-structured stock assessments for tropical tunas **TARGET:** E.2. Conduct spatiotemporal research on the 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		
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.2.b: Workshop to evaluate differences in bigeye tuna age estimation methods and resulting growth models utilized in current stock assessments by the IATTC and WCPFC		
THEME: 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 **TARGET:** E.2. Conduct spatiotemporal research on the reproductive biology of tropical tunas **EXECUTION**: Biology and Ecosystem Program		
Objectives	Resolve concerns about differences in age estimation methods and resulting growth models used in bigeye tuna stock assessments by IATTC and WCPFC	
Background	Although there are documented differences in the life history characteristics of the bigeye stocks from the EPO and WCPO, the magnitude of the discrepancies in the estimated length-at age data, growth models, and L_∞ estimates used in the recent IATTC and WCPFC stock assessments, along with the dramatic shift in stock status of WCPO bigeye population is concerning. The estimated L_∞ from the WCPO bigeye growth model is 157 cm, unrealistically low, and is highly influential in the assessment model and resulting stock status determination.	
Relevance for management	Age and growth models and their estimates of L_∞ are highly influential in assessing the status of bigeye in integrated assessment models	
Duration	2 days	
Work plan and status	Workshop to be held in La Jolla, November 2018, or as soon as possible in 2019	
External collaborators	SPC; CSIRO and FAS, Australia; FSFRL, Japan; PIFSC	
Deliverables	A workshop report to be shared with all interested parties	
Budget (US$)		30,000

PROJECT E.4.a: Multi-year tuna tagging study	
THEME: 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 **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. Obtain life history and stock structure information for spatially-structured stock assessments for tropical tunas **TARGET:** E.5. Conduct genetic studies to improve the assumptions about life history and stock structure in stock assessments of tropical tunas **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	• Large-scale tagging experiments provide the best information for defining stock structure and mixing rates among stocks for assessment purposes, but other complementary methodologies, particularly genetics, are useful for evaluating and/or corroborating the results from tagging experiments • Historical investigations of the genetic population structure of tropical tunas in the Pacific and elsewhere 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 of 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	
Work plan and status	• Observers on purse-seine vessels collect 100 white muscle tissue samples from skipjack and yellowfin tunas in each of three areas in the EPO. • 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	
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

PROJECT H.1.c: Investigate potential changes in the selectivity of the longline fleet resulting from changes in gear configuration		
THEME: Sustainable fisheries **GOAL:** H. Improve and implement stock assessments, based on the best available science **TARGET:** H.1. Undertake the research necessary to develop and conduct at least one benchmark stock assessment for yellowfin and bigeye tunas **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. Improve and implement stock assessments, based on the best available science **TARGET:** H.1. Undertake the research necessary to develop and conduct at least one benchmark stock assessment for yellowfin and bigeye tunas **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. Improve and implement stock assessments, based on the best available science **TARGET:** H.5. Undertake the research necessary to develop and conduct data-limited assessments for prioritized species **EXECUTION**: Stock Assessment Program		
Objectives	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.a: Pacific-wide bigeye tuna exploratory assessment		
THEME: Sustainable fisheries **GOAL:** H. Improve and implement stock assessments, based on the best available science **TARGET:** H.7. Develop conventional stock assessments for data-rich prioritized species and species of specific interest **EXECUTION**: Stock Assessment Program		
Objectives	Conduct a Pacific-wide assessment for bigeye tuna	
Background	• There is substantial movement of bigeye between the EPO and WCPO • Assessment and management of bigeye may be sensitive to the movement across the management boundary • Development of a spatial stock assessment model for bigeye in the EPO will facilitate the development of a Pacific-wide assessment • There have been several previous attempts to conduct a Pacific-wide assessment, but none has included a comprehensive analysis of the EPO component • Previous assessments have indicated that the Pacific-wide assessment produces results similar to the EPO assessment	
Relevance for management	A Pacific-wide bigeye stock assessment is needed to determine whether management based on an EPO assessment is adequate.	
Duration	2020-2021	
Work plan and status	• Conduct workshop in 2020 to obtain data and determine model configuration • Conduct assessment • Report to SAC-12 in 2021	
External collaborators	SPC	
Deliverables	Report to SAC-12 in 2021	
Budget (US$)	Workshop	50,000

PROJECT H.7.b: South Pacific swordfish assessment		
THEME: Sustainable fisheries **GOAL:** H. Improve and implement stock assessments, based on the best available science **TARGET:** H.7. Develop conventional stock assessments for data-rich prioritized species and species of specific interest **EXECUTION**: Stock Assessment Program		
Objectives	Conduct an assessment for South Pacific swordfish	
Background	• The South Pacific swordfish stock has not been assessed since 2011. • The longline fishery has recently increased targeting of swordfish • An updated assessment is needed to provide management advice	
Relevance for management	The stock assessment is needed to provide management advice	
Duration	2020	
Work plan and status	• Obtain data • Conduct assessment • Report to SAC-12 in 2021	
External collaborators		
Deliverables	Report to SAC-12 in 2021	
Budget (US$)	Workshop	50,000

PROJECT H.7.c: South Pacific albacore stock assessment		
THEME: Sustainable fisheries **GOAL:** H. Improve and implement stock assessments, based on the best available science **TARGET:** H.7. Develop conventional stock assessments for data-rich prioritized species and species of specific interest **EXECUTION**: Stock Assessment Program		
Objectives	Conduct a stock assessment of South Pacific albacore tuna	
Background	• The IATTC has not conducted a stock assessment of South Pacific albacore • SPC has conducted assessments of South Pacific albacore • There has not been a comprehensive analysis of the EPO component of the stock • Stock structure has been identified in several albacore stocks, indicating that there is likely to be structure to the South Pacific albacore stock that needs addressing in the assessment and management of this stock • There is increasing interest in the assessment and management of the EPO component of this stock	
Relevance for management	A stock assessment is needed to manage the EPO component of the South Pacific albacore stock	
Duration	2021-2022	
Work plan and status	• Conduct workshop in 2021 to obtain data and determine model configuration • Conduct assessment • Report to SAC-13 in 2022	
External collaborators	SPC	
Deliverables	Report to SAC-13 in 2022	
Budget (US$)	Workshop	50,000

PROJECT H.7.d: Develop priors for shark stock-recruitment relationships		
THEME: Sustainable fisheries **GOAL**: H. Improve and implement stock assessments, based on the best available science **TARGET**: H.7. Develop conventional stock assessments for data-rich prioritized species and species of specific interest **EXECUTION**: Stock Assessment Program		
Objectives	• Assemble the available information from theory and data about density dependence in the stock-recruitment relationship for low-fecundity species • Develop priors for shark stock-recruitment relationships	
Background	• Sharks and a major conservation concern in the EPO and worldwide • Stock assessments 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-recruitment relationship that is based on density-dependent survival has been developed for low-fecundity species and is applicable to sharks • The low-fecundity stock-recruitment relationship has been implemented in Stock Synthesis, the program used for several shark stock assessments • The low-fecundity 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 is 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-fecundity species • July-Dec 2019: Assemble and review all relevant data on density-dependent recruitment for low-fecundity 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

PROJECT H.8.b: Survey for dolphins in the eastern tropical Pacific Ocean (ETP)	
THEME: Sustainable fisheries **GOAL:** H. Improve and implement stock assessments, based on the best available science **TARGET:** H.8. Assess the status of dolphin stocks in the eastern tropical Pacific **EXECUTION**: Stock Assessment Program	
Objectives	Implement a ship-based line-transect survey for ETP dolphin species, both a trial survey and a main survey, and produce new estimates of dolphin abundance and updated abundance trends.
Background	• Population dynamics modelling has been the preferred approach for evaluating the stock status of ETP dolphins, and those models have relied on estimates of abundance from fishery-independent surveys that were conducted by the US National Marine Fisheries Service (NMFS). • As a result of a hiatus in the NMFS surveys since 2006, there are currently no reliable indicators with which to monitor the status of ETP dolphin populations. • This lack of information poses obvious problems for management. For example, the Antigua Convention requires that the status of all species potentially impacted by the tuna fisheries in the EPO be monitored. • In addition, abundance estimates are needed to ensure that incidental dolphin mortalities are both sustainable and insignificant because the AIDCP stock mortality limits are based on estimates of abundance. • These needs provide impetus for a new ship-based line-transect survey to obtain new estimates of absolute abundance so that population trends can be updated.
Relevance for management	Improve the management of dolphin stocks in the ETP
Work plan and status	• September 2018 – April 2020: plan and conduct trial survey; analyze trial survey data; plan main survey. • May 2020 – November 2021: plan and conduct main survey; estimate abundance and update populations trend estimates. • Full project details are presented in Document MOP-37-02.
Duration	38 months (September 2018 – November 2021)
External collaborators	University of St Andrews, Scotland; HiDef/BioConsult; Ocean Associates; Vasile Tudoran Transport; Precision Aviation; other collaborators that will be determined once survey vessels are identified
Deliverables	• Presentations for SAC-11, SAC-12, and SAC-13 (May 2020, 2021, 2022) • Final report for December 2021
Budget	See Document MOP-37-02

4. ECOLOGICAL IMPACTS OF FISHERIES: ASSESSMENT AND MITIGATION

PROJECT M.1.c: Test hookpods to reduce seabird and sea turtle bycatches in longlines		
THEME: Ecological impacts of fisheries: assessment and mitigation **GOAL:** M. Mitigate the ecological impacts of tuna fisheries **TARGET:** M.1. In collaboration with the industry, conduct scientific experiments to identify gear technology that will reduce bycatches and mortality of prioritized species **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.	
Background	• 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 20 m 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: documents for SAC-10 • 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. Mitigate the ecological impacts of tuna fisheries **TARGET:** M.3. Conduct spatiotemporal analyses to identify areas of high bycatch/catch ratios for potential use in spatial management **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 bycatch 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	• 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 bycatch species and the spatial-temporal distribution of large densities of bycatch (catch rates). Identify data gaps for bycatch 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.c: Evaluate and reduce post-release mortality of Mobulid rays		
THEME: Ecological impacts of fisheries: assessment and mitigation **GOAL:** M. Mitigate the ecological impacts of tuna fisheries **TARGET:** M.5. In collaboration with the industry, conduct experiments to develop best practices for mitigating the impacts of fishing on habitats in the EPO **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 in 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
Anticipated co-funding from: Monterey Bay Aquarium, Save Our Seas Foundation	Archival satellite tags 50 @ US$4,000	200,000
	Satellite fees	5,000
	Tagging kits 50 @ US$50	2,500
	Observer tagging rewards 150 @ US$100	15,000
	Miscellaneous tag costs (shipping, deployment tips, etc.)	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, 2 yrs @ US$15,000	30,000
	Miscellaneous genetic costs (reagents, laboratory equipment, etc.)	5,000
	Total	513,000

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

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 our understanding of the interactions among environmental drivers, climate, and fisheries **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 ecosystem-based fisheries management.	
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 • 2021-2022: 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. Improve our understanding of the interactions among environmental drivers, climate, and fisheries **TARGET:** O.2. Improve analytical ecological tools 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 SAC-09, SAC-10 and SAC-11 • Publication of results in a scientific journal	
Budget (US$)	Total	75,000

6. KNOWLEDGE TRANSFER AND CAPACITY BUILDING

PROJECT R.1.b: Technical development, communication and evaluation of management strategies (MSEs) for tropical tuna fisheries in the EPO involving managers, scientists and other stakeholders	
THEME: Knowledge transfer and capacity building **GOAL**: R. Improve communication of scientific advice **TARGET**: R.1. Improve communication of the staff's scientific work to CPCs **EXECUTION**: Stock Assessment Program	
Objectives	• Continue support of IATTC staff on technical development of MSE for tropical tunas. • Provide training and enhance dialogue / communication among scientists, managers and other stakeholders regarding the MSE process for tropical tunas through the facilitation of a series of workshops. • Elicit candidate reference points, harvest control rules, and performance measures from stakeholders to be tested in addition to the interim ones.
Background	• The IATTC Performance Review , the Strategic Science Plan, and the SAC all recommended improving knowledge sharing, human-institutional capacity building and communication of scientific advice. • MSE is a major objective of the IATTC and other organizations. Part of the MSE process is highly technical and done by scientists. Another part, such as defining objectives, performance metrics and candidate management strategies, requires input and participation of managers and other stakeholders. Those two parts evolve in synergy. • Stakeholder participation throughout the MSE process is central to its success and will be facilitated by the understanding of the MSE process, its components and by strengthening the communication among scientists, managers and other stakeholders. • Initial workshops on MSE where held in 2015 and 2018 but were restricted to Latin-American developing countries and focus on understanding of the process. • Currently no dedicated channels of communication about MSE within the IATTC.
Relevance for management	• Key elements of IATTC's current management strategy, such as its control rule and reference points, along with alternatives, are currently being evaluated via MSE. • The technical support will allow for better model development and directly influence the relevance of the MSE results. • Workshops will improve scientists, managers and other stakeholder communication. • The current proposal will advance a comprehensive MSE process for tropical tunas to assess the performance of interim Harvest Control Rule (HCR) and alternatives. • Results will facilitate adopting a permanent HCR for tropical tunas as per Res. C-16-02
Duration	18 months (from second half of 2019 through 2020).
Work plan and status	• Continue support of IATTC Staff on technical development of an MSE for bigeye. • Development/tailoring of MSE Workshop materials and online resources to EPO tropical tuna fisheries including presentations and hands-on working sessions. • Conduct two Workshops in 2019 (Asia in English, Latin America in Spanish) with managers and other stakeholders aiming to improve understanding of the MSE process, elicit objectives, performance metrics, alternative control rules, and risk.

	• Conduct two 2020 Workshops with managers and other stakeholders to show initial results and gather feedback, plus a technical Workshop		
External collaborators	External contractor, other external tuna and communication experts		
Deliverables	• Reporting to SAC of MSE development, progress, and preliminary results. • Series of Workshops, Workshop reports and associated training and online materials.		
Budget (US$)	Full-time researcher		198,000
	Workshops: Travel & lodging for staff and contractor only;	2019	40,000
	excludes venue and participant costs.	2020	60,000
	Total		**298,000**

7. SCIENTIFIC EXCELLENCE

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 (MSE)		
THEME: Scientific Excellence **GOAL**: X. Promote the advancement of scientific research **TARGET**: X.1 Continue the annual 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