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**Oceanic Fisheries Programme
Annual Report 2008 and Work Plan 2009**

Marine Resources Division
Secretariat of the Pacific Community
Noumea, New Caledonia

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6TH SPC HEADS OF FISHERIES MEETING, 9–13 FEBRUARY 2009, NOUMEA, NEW CALEDONIA
6^e CONFÉRENCE DES DIRECTEURS DES PÊCHES DE LA CPS, 9–13 FÉVRIER 2009, NOUMÉA, NOUVELLE-CALÉDONIE



Oceanic Fisheries Programme
Secretariat of the Pacific Community

Annual Report 2008

and

Work Plan 2009

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ACRONYMS

CES	Catch and Effort Query System
CLIOTOP	Climatic Impacts on Top Predators Project
CRGA	Committee of Representatives of Governments and Administrations
CROP	Committee of Regional Organisations of the Pacific
EAFM	Ecosystem Approach to Fisheries Management
EC	European Community
EEZ	Exclusive Economic Zone
ERA	Ecological Risk Assessment
FAD	Fish Aggregation Device
FFA	Forum Fisheries Agency
FPF	French Pacific Fund
GEF	Global Environment Facility
MULTIFAN-CL	Computer software used for regional stock assessments
NTFSR	National Tuna Fishery Status Report
OFP	Oceanic Fisheries Programme of the SPC
PFRP	Pelagic Fisheries Research Programme of the University of Hawaii
PICT	Pacific Islands Countries and Territories
POFM	Pacific Oceanic Fisheries Management Project
PTTP	Pacific Tuna Tagging Programme
SC	Scientific Committee of the WCPFC
SEAPODYM	Spatial Ecosystem and Population Dynamics Model
SPC	Secretariat of the Pacific Community
SPREP	South Pacific Regional Environment Programme
TMP	Tuna Management Plan
TUFMAN	Tuna Fishery Data Management System
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean

1. Introduction

1. The Oceanic Fisheries Programme (OFP) is part of the Marine Resources Division of the Secretariat of the Pacific Community (SPC) and is based in Noumea, New Caledonia. It contributes to the Division's aim of helping achieve the vision of the Pacific Islands Regional Ocean Policy: *"A healthy ocean that sustains the livelihoods and aspirations of Pacific Island communities"*. This vision is shared by all of the CROP agencies working towards the achievement of ocean-related objectives in the region.

2. The OFP is made up of three sections: Stock Assessment & Modelling, Statistics & Monitoring, and Ecosystem Monitoring & Assessment. The Programme currently consists of 24 professional staff, 11 research assistants and data entry technicians and 2 administrative staff (Annex 1). In addition, the programme currently employs a number of short-term consultants to carry out specific tasks. In 2008, the OFP had an approved budget of CFP Units 5.155 million (approximately AUD 8,000,000).

3. The OFP provides scientific services relating to oceanic (primarily tuna) fisheries management to its membership. These services include fishery monitoring and data management, ecosystem and biological research relevant to the fisheries, and stock assessment and evaluation of species- and ecosystem-based management options. The most important programme outputs are information (e.g., reports on the status of fisheries, stocks and ecosystems), infrastructure (e.g., databases, monitoring programmes), advice (e.g., regarding appropriate levels of fishing), and national capacity building in Pacific Island Countries and Territories (PICTs).

4. These services are provided at both the national and regional levels. At the national level, the OFP provides scientific support to national Tuna Management Plans (TMPs) primarily through support of national fishery monitoring and database systems, provision of advice on appropriate levels of catch or effort, and associated human resource development. At the regional level, the OFP provides scientific services (data summaries and analyses, stock assessments and management advice) to the Forum Fisheries Agency (FFA) for its various regional tuna fisheries management initiatives, including the US Tuna Treaty, the Palau Arrangement and coordination of FFA inputs into the Western and Central Pacific Fisheries Commission (WCPFC). The OFP also provides services directly to the WCPFC in the areas of data management and stock assessment. Service provision to both the FFA and WCPFC is governed by inter-organisational memoranda of understanding.

5. This report contains the annual report of the OFP (including all core- and programme-funded activities and projects being undertaken by the Programme) for the year 2008, the third year of the Strategic Plan for 2006–2008 (subsequently extended to run through 2009) approved by CRGA 35, and the work plan for 2009.

2. Annual Report for 2008

6. The 2008 Work Plan¹ is guided by the approved Strategic Plan for 2006–2008², which notes that the goal of the OFP is that **fisheries exploiting the region's resources of tuna, billfish and related species are managed for economic and ecological sustainability using the best available scientific information.**

7. To help Pacific Community members achieve this goal, the OFP has focused on three objectives for the three-year period from 2006 to 2008:

¹<http://www.spc.int/oceanfish/Docs/Donors/OFP%202007%20annual%20report%20and%202008%20work%20plan.pdf>

²<http://www.spc.int/mrd/org/ofp-stratplan-2006-8-1.pdf>

- High-quality scientific information and advice for regional and national fisheries management authorities on the status of, and fishery impacts on, stocks targeted or otherwise impacted by regional oceanic fisheries;
- Accurate and comprehensive scientific data for regional and national fisheries management authorities on fisheries targeting the region's resources of tuna, billfish and other oceanic species; and
- Improved understanding of pelagic ecosystems in the western and central Pacific Ocean, with a focus on the western tropical Pacific.

8. The Strategic Plan foresees a number of outputs associated with these objectives. These are listed below, along with the key performance indicators. The 2008 activities, with performance indicators, are listed comprehensively in matrix form in Tables 1–3/2008, corresponding to the three objectives. In the text below, some of the highlights for 2008 are described in more detail to give the reader a flavour for the work of the Programme. In annex 2, a summary of country-specific service delivery is given, classified by each of the three objectives (OFP sections).

Objective 1 – High-quality scientific information and advice for regional and national fisheries management authorities on the status of, and fishery impacts on, stocks targeted or otherwise impacted by regional oceanic fisheries

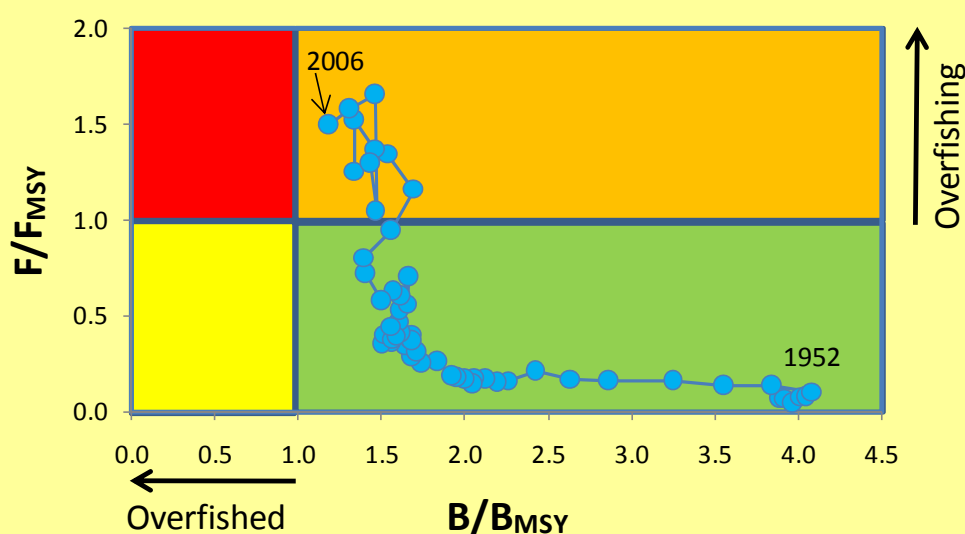
9. This objective is pursued by the OFP's Stock Assessment & Modelling Section. In producing the outputs described below it also draws on the outputs of the other two OFP objectives — the data compiled by the Statistics & Monitoring Section and the understanding of basic ecosystem and biological processes generated by the Ecosystem Monitoring & Assessment Section.

Output 1.1: Regional stock assessments and associated analyses

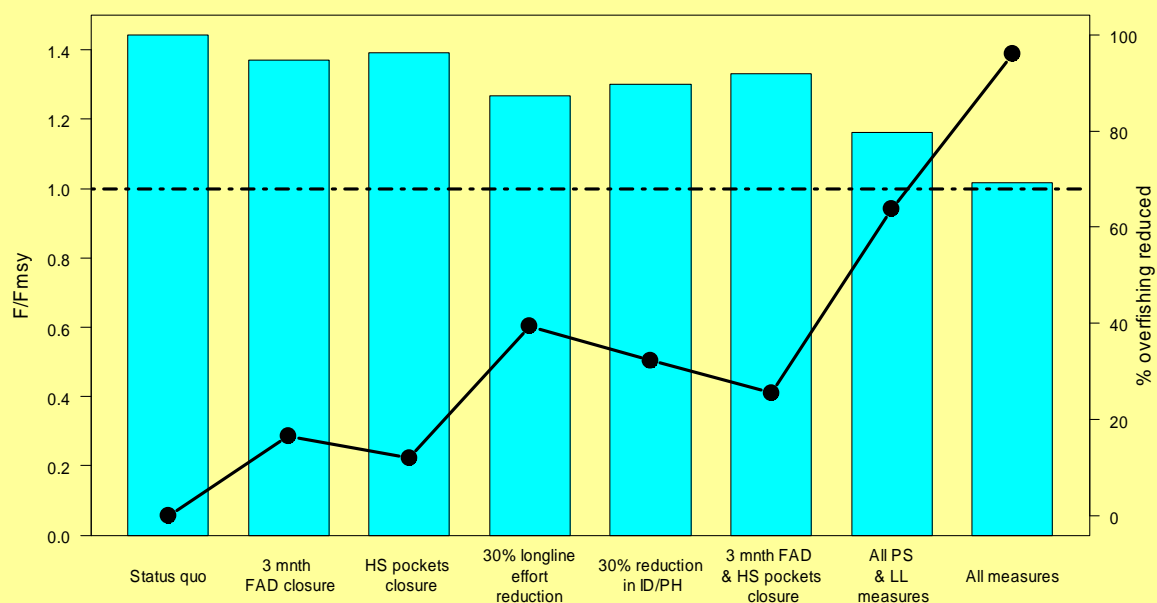
10. This output is the culmination of a range of activities involving the development of stock assessment methodology and associated computer software, assembling and verifying data used in the assessments, estimating the parameters of the models based on the data and other information and interpreting the model results to provide fishery management advice. The key performance indicator is the production and presentation of stock assessment reports to the WCPFC and its Scientific Committee, various meetings of the FFA, and meetings of the SPC Heads of Fisheries. Since the assessments are provided as part of a package of services to the WCPFC, their quality will be verified by regular peer review. In 2008, the OFP's work towards this output was focused on the preparation of regional stock assessments and related analyses for presentation to the WCPFC Scientific Committee meeting in Port Moresby in August, where three detailed stock assessments were presented, supported by 12 working and information papers. Further analyses in support of the development of a Conservation and Management Measure for bigeye and yellowfin tuna were undertaken throughout the remainder of the year leading up to the annual WCPFC meeting held in Busan in December.

2008 highlight – Updated bigeye tuna stock assessment and evaluation of management measures

A detailed stock assessment for bigeye tuna was undertaken for the WCPFC in 2008. The assessment concluded that current exploitation levels were well above maximum safe levels, with almost certainty that overfishing is occurring. Significant reductions in fishing mortality are required to reduce the risk that the stock will be reduced to below the level that will support the maximum sustainable yield. In support of this assessment, further analyses were undertaken to evaluate the potential effectiveness of management measures. Stock assessments were also undertaken for skipjack tuna and South Pacific albacore and SPC-OFP provided support and input to the Southwest Pacific swordfish assessment.



1. Temporal trend in annual stock status of bigeye tuna, relative to biomass (x-axis) and fishing mortality (y-axis) reference points, for the assessment model period (1952–2006). Current fishing mortality is well above the overfishing reference level, and biomass is approaching overfished conditions.



2. Estimated ratio of current fishing mortality to that which is sustainable for the various potential management measures, separately and in combination, for bigeye tuna. Bars that cross the horizontal line (i.e. values of the ratio that are above 1) indicate that overfishing is still estimated to occur in that scenario. The secondary x-axis indicates the proportion of overfishing estimated for the status quo which is removed for each set of management measures.

Output 1.2: National tuna fishery status reports (NTFSR) and associated analyses

11. This output is the principal vehicle by which scientific information and advice is delivered at the national level. NTFSRs are comprehensive reports that describe the fisheries and physical characteristics of the EEZ, and analyse the performance of fisheries in relation to regional stock status, environmental influences and local fishery conditions. The reports are tailored to the requirements of the country concerned, and may, if requested, provide specific advice on appropriate levels of fishing in the EEZ. In 2008, NTFSRs were extended to include additional information on regional and local scale oceanographic influences on fisheries, some of the OFP's recent work on seamounts, ecological risk assessment and the ecosystem approach to fisheries generally. For FFA member countries, the production of NTFSRs are now closely aligned with the implementation of the Ecosystem Approach to Fisheries Management, while for other SPC members, production is generally aligned with the revision of fishery management plans. Outputs from NTFSRs are typically presented at in-country workshops and briefing sessions (either EAFM workshops or Tuna Management Plan workshops) to promote local uptake of the findings. The involvement of national counterparts in the production of the reports is also encouraged both as a capacity building exercise and because of the valuable insights into the fishery that scientists can gain through such collaboration. The key performance indicator is the production and presentation of NTFSRs. In the past year, NTFSRs for Niue, Palau and Tonga were finalised, and the reports for Federated States of Micronesia (FSM) and Nauru are near completion. Reports for Kiribati and Samoa were initiated and progressed. In-country presentations of reports or preliminary information were made in FSM, Nauru, Niue, Palau, Kiribati and Samoa. In 2009, work is expected to commence on NTFSRs for Marshall Islands, Solomon Islands and Tuvalu.

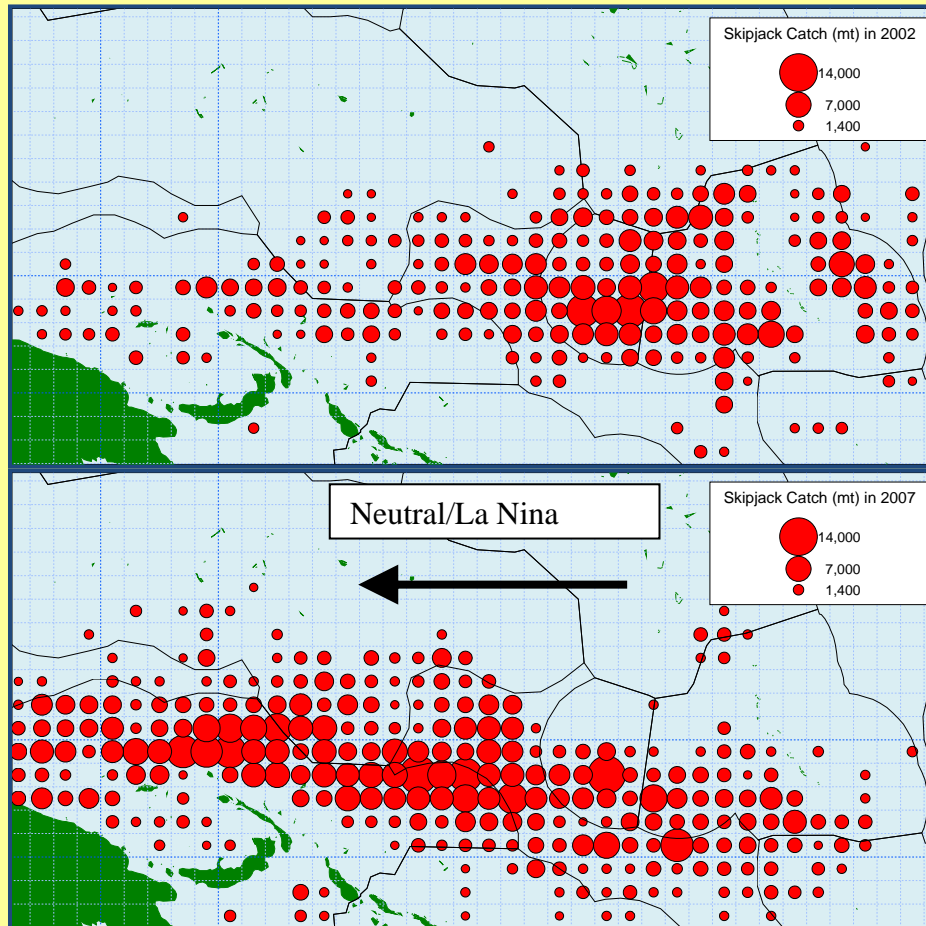
Output 1.3: Enhanced capacity of PICTs to interpret stock assessment information and advice

12. This output, which addresses a long-term need of PICTs, is a result of involvement of national fisheries staff in output 1.2, as well as dedicated activities such as regional workshops on stock assessment methods and interpretation. Performance data will be difficult to compile. However, indicators of success would be that NTFSRs influence national fisheries management decisions and the quality of PICT participation in WCPFC processes is improved. In 2008, the OFP ran the 3rd regional stock assessment workshops for PICTs (see below). Attachments to participate in the preparation of NTFSRs are sometimes difficult to organise primarily because of the now extensive meeting commitments of many PICT fishery department staff. Small departments in particular find it difficult to make staff available for such attachments.

13. The online learning initiative, consisting of online revision and exercises for stock assessment workshop participants, was continued in early 2008, as a means of reinforcing knowledge gained at the workshops themselves. After a promising start, participation in online learning fell away in the first half of 2008; it appears to be difficult for PICT fisheries staff to find the time to participate in the online learning initiative. As a result, the initiative has been temporarily suspended pending discussion of its future.

2008 highlight – National Tuna Fisheries Status Reports

National tuna fishery status reports (NTFSRs) typically include analyses of the impact of climatic and oceanographic conditions upon fisheries effort and catch distribution and catch rate trends over time. The example below shows the differing spatial distribution of purse seine catch (>1000mt) of skipjack tuna under example El Nino (2002) and La Nina/Neutral (2007) climate conditions. Such analyses provide information regarding fishery variability at a national (i.e. EEZ) level.



Distributions of skipjack tuna catch during El Niño (upper panel) and La Niña (lower panel) periods. The arrows represent the impact of oceanographic conditions associated with these events on tuna stock and fishery distributions.

2008 highlight – 3rd Regional Stock Assessment Workshops

The 3rd Regional Stock Assessment Workshop was held for 2 weeks in June–July at SPC headquarters, utilising funding from Japanese Government funded “WCPFC Project on Capacity Building in Fisheries Statistics, Regulation and Enforcement for Small Island Developing States” (as administered by the WCPFC) along with funding from SCIFISH OCT and SPC. This year, the workshop was broken into two parts – an introductory and an advanced workshop. Nineteen participants from 17 PICTs attended the workshop, which was designed to enhance understanding of regional tuna assessments. Staff from the FFA Secretariat, from the Philippines Bureau of Fisheries and Aquatic Resources and from the Indonesian Ministry of Marine Affairs and Fisheries also participated, while the workshops were also attended and reviewed by Dr Ziro Suzuki (Manager of the WCPFC Project). These workshops are a key element of the OFP’s stock assessment capacity building strategy, which seeks to enhance participation of PICTs in WCPFC processes and enable the consideration of regional stock status in national management initiatives. It was pleasing to note that a large number of the workshop participants attended the WCPFC Scientific Committee meeting in Port Moresby. SPC members have strongly supported the continuation of these workshops, and additional workshops will be held in June/July 2009.



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5. *Scenes from the 2008 Stock Assessment Workshops.*

Objective 2 – Accurate and comprehensive scientific data for regional and national fisheries management authorities on fisheries targeting the region’s resources of tuna, billfish and other oceanic species

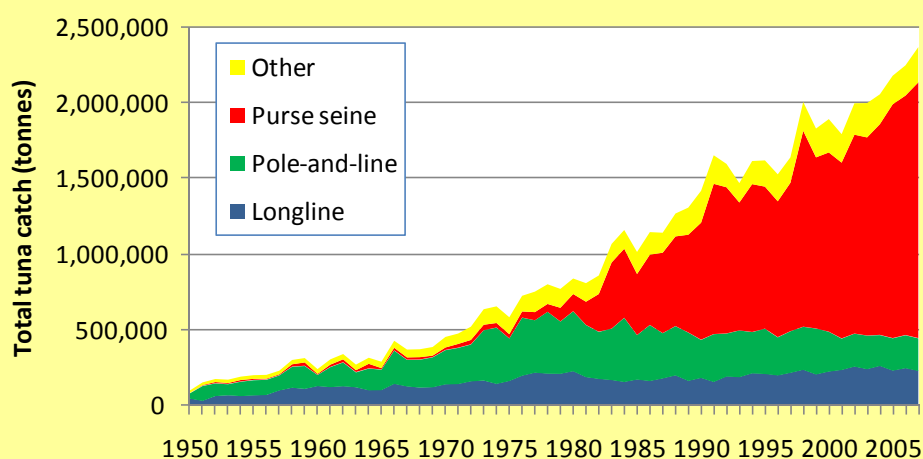
14. This objective is pursued by the OFP’s Statistics & Monitoring Section. It provides the fundamental basis for the Programme’s assessments of oceanic species, as well as providing direct outputs essential to national and international oceanic fisheries management. The objective incorporates regional data management services provided by the Programme to the WCPFC.

Output 2.1: Regional oceanic fishery data management services provided to the WCPFC

15. The OFP has a long history of compiling and managing regional oceanic fisheries data provided by PICTs and fishing nations. The data include operational level catch and effort data provided on daily logs, sampling data collected in port and by scientific observers at sea, and catch and effort data aggregated by area-time strata. The range of activities supporting this output include data entry, database software development and maintenance, coordination and quality control of data collection, data dissemination at appropriate levels of resolution in accordance with policies on data confidentiality, and the production of statistical bulletins, data summaries and data products. As this output is governed by a WCPFC service agreement, the key performance indicator will be the fulfilment of the terms of reference of that agreement and its annual renewal. In 2008, the OFP worked closely with the WCPFC Secretariat on a range of data issues, including the estimation of total annual catches, the compilation of data submitted to the WCPFC, the development of the WCPFC website to display the status of the provision of data by members, cooperating non-members and other entities, preparation for an analysis of data gaps and others.

2008 Highlight – Compilation of scientific data provided to the WCPFC

The WCPFC's policy on the provision of scientific data was accepted at its second regular session in December 2005; during 2008, the OFP again compiled these data on behalf of the Commission. The quality of annual catch estimates, stratified catch and effort data, and size composition data continues to improve, although some Commission members did not meet the April 30 deadline. The verification of reported catches with comprehensive unloadings data is gaining increased importance and is likely to be a focus of the future work programme on regional tuna fisheries statistics.



6. *Total tuna catches in the WCPFC Convention Area, by gear type.*

Output 2.2: Enhanced national fishery monitoring and data management systems

16. The development and enhancement of national fishery monitoring and database systems has long been the core business of the OFP. This output encompasses the implementation of customised national fishery monitoring systems covering logsheet data collection, unloadings and vessel activity data collection, observer and port sampling programmes, the development and maintenance of national database systems, data processing assistance and data quality assessment. These activities involve extensive in-country work in systems development, review and maintenance, and training of national staff. As this output is focused on enabling countries to meet both their data provision obligations to the WCPFC and their own domestic fishery management requirements, the key performance indicators are that these obligations and requirements are met. In 2008, initiatives implemented under the GEF-funded Pacific Oceanic Fisheries Management Project, including the support of national tuna data coordinators and the development of national tuna data procedures documents, were continued.

Output 2.3: Enhanced capacity of PICTs to monitor fisheries, manage and use data

17. This output is a result of involvement of national staff in output 2.2. The output is achieved by a range of training activities, including regional workshops in fishery monitoring, observer and port sampling training courses, attachment training of national fisheries statistics staff at SPC headquarters, and in-country training in the use of database systems. The achievement of this output will be important for the long-term sustainability of national fishery monitoring systems and its success will ultimately be measured in these terms. In 2008, the OFP continued its programmes of training attachments in fisheries statistics and observer training (courses held in Papua New Guinea (3), Solomon Islands, FSM, Vanuatu, Fiji and French Polynesia).

2008 Highlight – Trials of spill samples for collecting species composition data onboard purse seiners

Species composition data are collected onboard purse seiners by observers of the national programmes of several SPC members and the regional programmes under the US Treaty and the FSM Arrangement. These data are used to correct the catch estimates determined from logsheets completed by the vessel's crew. The corrected catch estimates are an improvement; however, recent analyses by the OFP have suggested that the usual method of sampling may be subject to biases. Observers typically grab five fish per brail as the fish are transferred from the set to the vessel; thus, the representativeness of the sample depends on the ability of the observer to select fish in a completely random manner. To avoid this dependence on the observer's randomness, the OFP began trials in March 2008 with a new sampling technique wherein fish are spilt from the brail directly into a bin. The observer then measures all of the fish in the bin and the resulting sample is not subject to any bias due to the non-random selection of fish by the observer. To test the new sampling technique, four trips were conducted in Papua New Guinea during which both techniques were used. The data clearly indicate that the grab samples are indeed subject to bias and that the species composition determined from the spill samples are considerably more accurate. The OFP will therefore recommend that spill sampling be introduced in the national and regional observer programmes during 2009. Additional trips will also be conducted using both techniques to provide data that can be used to adjust the historical observer data collected with grab samples. Improvements to the current and historical purse-seine catch estimates as a result of spill sampling will be reflected in more accurate assessments of skipjack, yellowfin and particularly bigeye tuna.



Conducting a spill sample aboard a purse seiner in Papua New Guinea.

Objective 3 – Improved understanding of pelagic ecosystems in the western and central Pacific Ocean, with a focus on the western tropical Pacific

18. This objective is pursued by the OFP's Ecosystem Monitoring and Analysis Section, which undertakes research on the biology of selected tuna and by-catch species, and on the ecosystem in which they live. Information on tuna biology, such as age & growth and movement, is incorporated directly into regional tuna stock assessments. As assessments for important by-catch species are developed, similar biological information will also be required for these species. The nature and impacts of ocean climate variability and bathymetric features such as seamounts on tuna fisheries are also a focus of the section's work, with modelling techniques used to integrate basin-scale observations and models of physical and biological oceanography with the biology and physiology of tunas. The outputs of this work and the general fisheries oceanography research undertaken by the section is used directly in the preparation of NTFSRs and included in the package of advice that OFP provides to members preparing management strategies under the EAFM framework. Research is also underway to characterise and model the western tropical Pacific warm pool ecosystem in a holistic way, focusing on defining the trophic relationships among the broad assemblage of pelagic species inhabiting the system. This work in conjunction with ecological risk assessment is critical to the provision of advice on the consequences of ecosystem change due to fisheries policies. Highlights in 2008 included the commencement of Phase 2 of the Pacific Tuna Tagging project, the commencement of research into the ecology and biology of South Pacific albacore, a Pacific-wide analysis of spatial heterogeneity in trophic structure and the inclusion of robust statistical methods in the ecosystem model SEAPODYM.

Output 3.1: Data on the biological characteristics of oceanic species and their environment

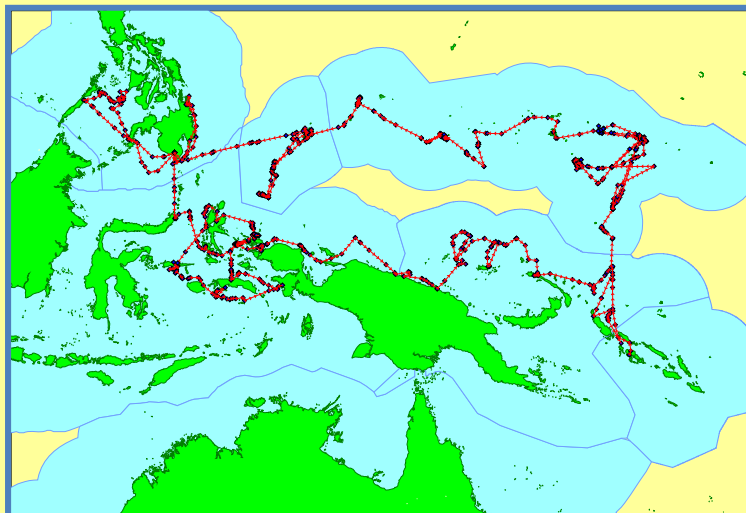
19. This output encompasses a range of research or data-gathering activities that provide information for either single-species assessments or ecosystem monitoring. A particular focus is on the collection of information on trophic relationships in the pelagic ecosystem. These relationships will, to a large extent, govern the qualitative and quantitative response of the overall ecosystem to the removal by fisheries of target species, which are usually the larger predators from the upper trophic levels, or to changes in the environment (cascading effect). Our ability to understand and predict such fishery and environmental impacts will be critically dependent on an understanding of these trophic relationships and their variability.

20. Tuna tagging is critical to the achievement of this output. Tagging provides important information on current levels of exploitation, stock structure, movement, growth, natural mortality and exploitation rates of tropical tunas. The OFP has begun to exercise the mandate given by CRGA 35 and CPC 4 in Palau through the implementation of the Pacific Tuna Tagging Programme (PTTP). Phase 1 of the PTTP was carried out in PNG and Solomon Islands from mid-2006 to early 2008. Phase 2 of the PTTP began in mid-2008 and is tagging skipjack, yellowfin and bigeye tuna across the equatorial western and central Pacific Ocean. A second tagging program focussing upon South Pacific Albacore has also commenced.

21. Seamounts are habitats of considerable international interest. They are being investigated in the context of trophic ecology, tuna tagging and fisheries data analysis in order to provide specific management advice as to their ecological significance and impacts on pelagic species and fisheries.
22. Age, growth and reproductive parameters are influential in stock assessments and good estimates increase the accuracy of stock assessment models. Work is currently being undertaken for both the tropical tunas and South Pacific Albacore. Training observers in biological sampling methods to increase capacity within SPC member Countries is a priority of this work.
23. A key performance indicator for this output will be improvement of single-species assessments and ecosystem models resulting from the new data collected. Additionally, the quality of the scientific information produced will be measured by publication of results in the peer-reviewed scientific literature and by the WCPFC Scientific Committee's review of the work.

2008 highlight – Pacific Tuna Tagging Project Phase 2

The OFP was successful in attracting in excess of USD 5 million in donor support to implement Phase 2 of the Pacific Tuna Tagging Programme (PTTP) in the equatorial western and central Pacific Ocean. A five-month tagging cruises was held between June – November 2008 using a pole-and-line vessel, *Soltai 105*, chartered from Soltai Fishing and Processing Ltd of Solomon Islands. Tagging was undertaken in the Federated States of Micronesia, Palau, Philippines, Indonesia, Papua New Guinea and the Solomon Islands. A total of 56,680 tuna were tagged using a combination of conventional dart tags and data archiving electronic tags. A one-month cruise was also conducted using a vessel, *Double D*, chartered from Hawaii to target difficult to access areas of the central Pacific to improve overall spatial coverage of PTTP tag releases. A total of 1,909 tropical tunas, most of which were bigeye tuna, were tagged and released. At the completion of these cruises, the total number of tuna tagged as part of the PTTP is over 160,000. As at 17 January 2009, 18,209 tag recaptures have been reported to the OFP. The PTTP has been an outstanding success and efforts are now focused on tag recovery, data analysis and the tagging of fish in the Marshall Islands, Kiribati, Tuvalu, French Polynesia and the high seas area between Papua New Guinea and the Federated States of Micronesia.



7.

8. *Track of the 5 month Soltai 105 tagging cruise conducted in 2008.*

Output 3.2: Improved ecosystem models that incorporate available data

24. Ecosystem models have the potential to enable better understanding of the dynamics of the interaction between large predators such as tuna, their forage, and their biological and physical environment. The main approach taken by the OFP to date has been the development of a Spatial Environmental and Population Dynamics Model (SEAPODYM), which integrates information on Pacific basin-scale oceanography and productivity with data on the fisheries and population dynamics of the target species. The model shows considerable promise for understanding the mechanisms that drive the variability in tuna stocks and fisheries. Ultimately, it is hoped that the model will be useful in addressing a number of important management questions (see output 3.3). In 2008, we continued to participate in the development and analysis of the SEAPODYM model. The model now includes a statistically robust method to estimate the parameters used in the tuna population dynamics model. The inclusion of this method provides greater diagnostic capabilities and capacity to use the model to address specific fisheries management questions (e.g., climate change impacts, protected areas/closures). This work will be continued as a key activity of this and the next strategic plan cycle and will involve substantial international collaboration.

25. An additional approach being investigated involves the development of energy-transfer models utilising the trophic information being collected under output 3.1. As a first step, existing models (ECOPATH/ECOSIM) are being trialled; however, it may be desirable to develop a new, more statistically rigorous approach to ecosystem modelling in the longer term. This work will continue to involve substantial international collaboration.

26. The key performance indicators for this output will be publication of analyses in the peer-reviewed literature and production of working papers for the WCPFC Scientific Committee.

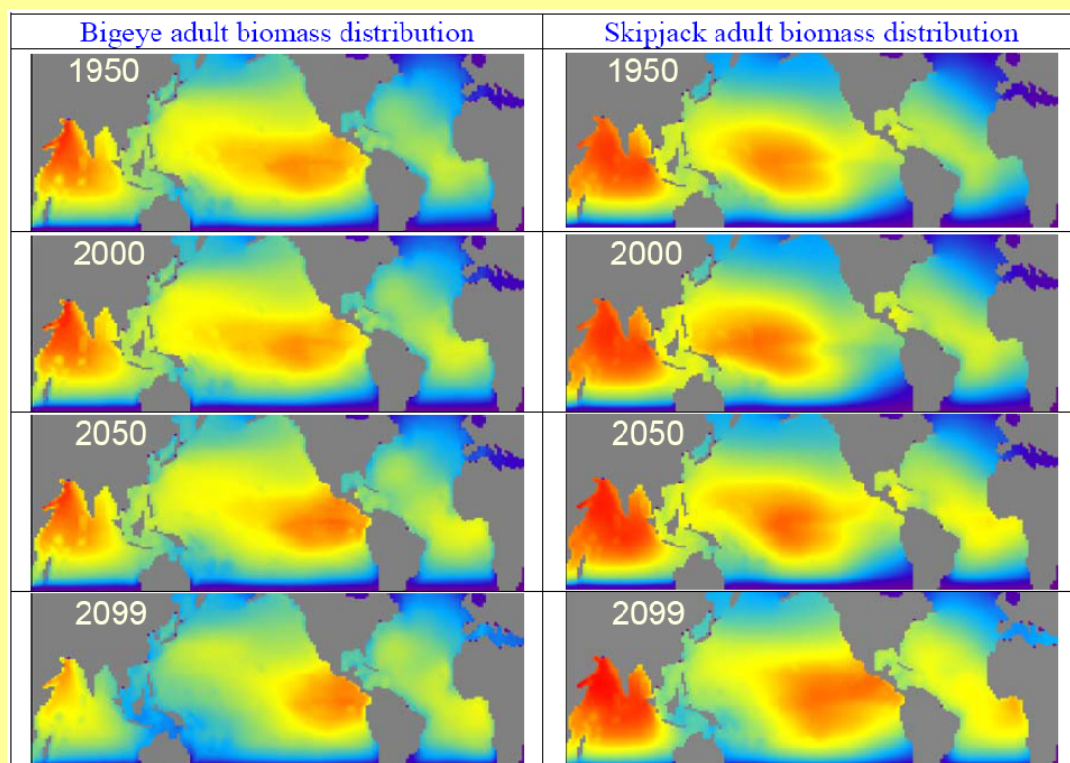
Output 3.3: Scientific advice on ecosystem-based management options using available models and data

27. This output represents the packaging of the research data and analyses produced in outputs 3.1 and 3.2 to provide specific advice to PICTs, FFA and the WCPFC on ecosystem-based management options. The types of activities envisaged include advice on fishery impacts on important non-target species or species groups, advice on management options with respect to habitats of special concern such as seamounts, advice on the efficacy of specific ecosystem management measures such as marine protected areas and advice on the possible impacts of long-term climate change on oceanic fish stocks and fisheries.

28. The key performance indicators for this output will be publication of analyses in the peer-reviewed literature, production of working papers for the WCPFC Scientific Committee and FFA meetings, and the incorporation of advice on ecosystem-based management options in National Fishery Status Reports. In 2008, a key activity was the continuing implementation of the ecological risk assessment (ERA) methodology. The work focussed upon the application of ERA at the national level, providing PICTs with a scientific basis for the application of the Ecosystem Approach to Fisheries Management.

2008 highlight – Preliminary Analysis of Climate Change on tropical tuna distribution

The OFP developed SEAPODYM model was used to examine the projected IPCC (Intergovernmental Panel on Climate Change) scenarios on tuna distribution. The preliminary study has been carried out for skipjack and bigeye adult biomass using the SRESA2 IPCC scenario, i.e, atmospheric CO₂ concentrations reaching 850 ppm in the year 2100, and historical data between 1860 and 2000. The simulation is driven by physical-biogeochemical fields predicted from a global Earth system simulation. The projection of this simulation under the so-called A2 scenario for the 21st century shows a decline in primary productivity and an increase in temperature in both equatorial and sub-tropical regions correlated to an increase in the euphotic layer. The decline of productivity in the tropical region is compensated by an increase in higher latitudes where the greater vertical stability increases the length of the growing season of phytoplankton in the euphotic layer. The dissolved oxygen concentration, a critical variable constraining tuna habitat, is also predicted to decrease under this A2 scenario almost everywhere. The primary reason for the simulated decrease in oxygen is the reduction of transport to depth due to increased vertical stability and solubility changes due to warmer waters. The decrease in primary productivity predicted during the 21st Century is particularly strong in the western tropical Pacific. A parameterization based on estimation over the period 1985-2000 was used for the whole climate simulation (1860-2100), without fishing effort, to investigate the spatial distributions associated with environmental changes under the increasing forcing of atmospheric CO₂. The result is a clear decrease in adult biomass of both species in the western Pacific and for biomass to remain stable or increase slightly in the eastern Pacific.



Change in spatial distribution of bigeye and skipjack adult biomass under the IPCC (SRES A2) scenario. (From Lehodey et al. 2008. SEAPODYM. V2: A Spatial ecosystem and Population dynamics model with parameter optimization providing a new tool for tuna management. EB-WP-10. 4th Regular Session of the WPCFC Scientific Committee, Port Moresby, August 11-22).

3. Finances

29. The Oceanic Fisheries Programme received funding (including carry over from 2007 and less project management fees on new funding) of 5,250,462 CFP units for its operations in 2008. The table below gives a breakdown of the funding by donor and work area.

Oceanic Fisheries Programme funding for 2008 (CFP units)

Funding source	Stock Assessment & Modelling	Statistics & Monitoring	Ecosystem Monitoring & Assessment	Programme Management	TOTAL
Core				157,000	157,000
Programme					
AusAID	312,500	312,500			625,000
France	0	140,000	140,000		280,000
NZAID	42,500	0		42,500	85,000
<i>Sub-total</i>	<i>355,000</i>	<i>452,500</i>	<i>140,000</i>	<i>42,500</i>	<i>990,000</i>
Project					
EU	78,465	549,255	863,115	78,465	1,569,300
GEF	105,314	158,477	429,609		693,400
Pacific Tuna Tagging					
NZAID			640,000		640,000
France			55,762		55,762
<i>Sub-total</i>			<i>695,762</i>		<i>695,762</i>
WCPFC	221,000	221,000	221,000		663,000
Japan	67,500	112,500	45,000		225,000
PFRP (Univ. of Hawaii)			68,800		68,800
Misc. project funding	62,733	62,733	62,733		188,200
<i>Sub-total</i>	<i>535,012</i>	<i>1,103,965</i>	<i>2,386,020</i>	<i>78,465</i>	<i>4,103,462</i>
TOTAL	890,012	1,556,465	2,526,020	277,965	5,250,462

TABLE 1/2008.

Objective 1: High-quality scientific information and advice for regional and national fisheries management authorities on the status of, and fishery impacts on, stocks targeted or otherwise impacted by regional oceanic fisheries

2008 Work Programme Activities	Performance Indicators and/or Means of Verification	2008 Achievements
Output 1.1: Regional stock assessments and associated analyses		
<p>1.1.1 Provision of stock assessment and related analytical services to the WCPFC. In 2008, these services shall include:</p> <ul style="list-style-type: none"> – Undertake analyses of longline catch and effort data, including where appropriate operational-level data, to improve the standardisation of effort and the construction of indices of stock abundance for bigeye, yellowfin and South Pacific albacore tuna. – Undertake full stock assessment for target and non-target species as requested by the Commission (bigeye, SP albacore and skipjack in 2008). – Continued exploration of sensitivity of stock assessment outcomes to structural assumptions in models and data issues, including the comparison of various stock assessment models. 	<ul style="list-style-type: none"> • Stock Assessment preparatory workshop hosted and outcomes documented. • SC 4 working papers • Tuna Fishery Assessment Report (TFAR) published following 2008 assessments. • Input into WCPFC management meetings as required. • WCPFC satisfied with services provided. • Favorable review of OFP scientific services by WCPFC consultant. • Publication of a scientific paper relating yellowfin recruitment to oceanographic conditions (submitted). 	<ul style="list-style-type: none"> • Pre-assessment workshop held 25-29 February 2008 with participants from five external agencies represented. Report prepared for SC4: • A. Langley and S. Hoyle. 2008. Report from the stock assessment preparatory workshop, Noumea, February 2008. WCPFC-SC4-SA-IP-5 • Twelve papers were presented to WCPFC-SC4 in Port Moresby including: • Langley, J. Hampton, P. Kleiber, S. Hoyle. 2008. Stock assessment of bigeye tuna in the western and central Pacific Ocean, including an analysis of management options. WCPFC-SC4-SA-WP-1 • A. Langley, J. Hampton. 2008. Stock assessment of skipjack tuna in the western and central Pacific Ocean. WCPFC-SC4-SA-WP-4 • S. Hoyle, A. Langley and J. Hampton. 2008. Stock assessment of albacore tuna in the south Pacific Ocean. WCPFC-SC4-SA-WP-8 • B. Molony and K. Sisior. 2008. The use of principal components analyses to assist in selecting variables to include in a catch rate standardisations. WCPFC-SC4-ME-IP-1. • J. Hampton and P. Williams. 2008. Compendium of fishery indicators for target tuna species. WCPFC-SC4-SA-WP-9.

<ul style="list-style-type: none"> – A comparison of MFCL and SS-2 stock assessment models for bigeye tuna. – Advice and input, as requested and as time allows, to proposed southwest Pacific swordfish assessment to be undertaken by CCMs. – Development of recruitment indices independent of the MFCL model, including the investigation of recruitment and oceanographic trends. – Development and reporting of stock indicators for those key species not formally assessed (yellowfin tuna in 2008). 		<ul style="list-style-type: none"> • A. Langley and R. Methot. 2008. A preliminary stock assessment of bigeye tuna in the western and central Pacific Ocean using stock synthesis 3 (SS3); a comparison with MULTIFAN-CL. WCPFC-SC4-SA-WP-2. • S. Hoyle, A. Langley and J. Hampton. 2008. General structural sensitivity analysis for the bigeye tuna stock assessment. WCPFC-SC4-SA-WP-3. • S. Hoyle and S. Nicol. 2008. Sensitivity of the bigeye tuna stock assessment to alternative biological and reproductive assumptions. WCPFC-SC4-ME-WP-1. • S. Hoyle. 2008. Adjusted biological parameters and spawning biomass calculations for albacore tuna in the south Pacific, and their implications for stock assessments. WCPFC-SC4-ME-WP-2. • S. Hoyle and P. Sharples. 2008. Length frequency sampling data and its influence on the south Pacific albacore stock assessment. WCPFC-SC4-ST-IP-3. • Molony, B. 2008. Fisheries biology and ecology of highly migratory species that commonly interact with industrialised longline and purse seine fisheries in the western and central Pacific Ocean. WCPFC-SC4-EB-IP-6. • Bigelow, K. and S. Hoyle. Standardized CPUE for distant-water fleets targeting south Pacific albacore. WCPFC-SC4-ME-WP-3 • SPC-OFP hosted the Southern WCPO Swordfish Assessment workshop in May 2008
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<ul style="list-style-type: none"> – Further review of spatio-temporal aspects of catches of juvenile bigeye and yellowfin tuna caught in association with fish aggregating devices (FADs). – Undertake evaluations of management options as specified by WCPFC. 		<ul style="list-style-type: none"> • Aside from WCPFC-SC4- ST-WP-3, no specific activities were undertaken with respect to juvenile tuna spatio-temporal distributions. Work is planned for early 2009 in conjunction with a continuation of the research reported in WCPFC-SC4- ST-WP-3. • Considerable work was undertaken in support of evaluation of management options with respect to Drafts of the BET/YFT CMM both prior to, and during the WCPFC TCC and Annual Commission meetings. The following papers were produced: • J. Hampton, and S Harley. 2008. Predicted impact of potential management options on stock status and catches of bigeye, skipjack and yellowfin tunas in the western and central Pacific Ocean WCPFC-TCC4-2008-14 suppl. • SPC-OFP. 2008. Evaluation of potential bigeye tuna management measures. WCPFC5-2008/IP13.
<p>1.1.2 Management and development of the MULTIFAN-CL stock assessment software and associated visualisation software, including networked processing, testing and documentation of new features.</p>	<ul style="list-style-type: none"> • Updated stock assessment modeling software and documentation posted on the MULTIFAN-CL website www.multifan-cl.org. • SC 4 Working Paper, including any future research plan for the refinement of assessment models. 	<ul style="list-style-type: none"> • Some of the improvements to MFCL are covered in: • A. Langley and S. Hoyle. 2008. Report from the stock assessment preparatory workshop, Noumea, February 2008. WCPFC-SC4-SA-IP-5 • Updated version of the executables used in the assessments were posted on the MULTIFAN-CL website (http://www.multifan-cl.org) prior to SC4. • Work will be ongoing and a MULTIFAN-CL workshop is scheduled for two weeks over January-February 2009 and any changes to the software will be documented in a paper to SC5 and the new executables will be put on the MFCL and OFP websites.

<p>1.1.3 Outputs from stock assessments provided for inclusion in other OFP and regional activities, e.g. FFA Management Options workshops, ecosystem modeling, management processes, etc.</p>	<ul style="list-style-type: none"> • Participation in relevant meetings, forums, as required. 	<ul style="list-style-type: none"> • A. Langley and N. Davies completed tuna assessment model inputs to bio-economic models for the FFA in-house training workshop, Sep 2008. • OFP attended three FFA Sub-Regional Management Options Workshops, the FFA Scientific Working Group (pre-SC4), the fourth FFC Sub-Committee on South Pacific Tuna and Billfish Fisheries, the fourth FFA Management Options Consultation, and the FFC68. • Papers presented included: • North SR-MOW/ WP 4 - Status of Tuna Stocks and their Management Measures • West SR-MOW/ WP 4 & 7 - Status of Tuna Stocks and their Management Measures • East SR-MOW/ WP 5 - Status of Tuna Stocks and their Management Measures • SC-SPTBF4/ WP.5. State of SP albacore, swordfish and striped marlin stocks • SC-SPTBF4/ WP.6. Swordfish and Striped Marlin catch and effort characterization • SC-SPTBF4/ WP. 7. Characterisation of longline effort in relation to CMM2005-02, CMM2006-03, CMM2006-04 – supplementary paper • MOW4/ WP.2. Scientific Committee – Relevant Management Advice & Related Outcomes. & Analysis • FFC/WP.10. Constraints on access to WCPO tuna fisheries data for SPC/FFA joint analyses
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Output 1.2: National fishery status reports and associated analyses		
1.2.1 NTFSRs completed for Tonga, Palau, FSM, Nauru, Niue and Kiribati and commenced for Samoa and RMI.	<ul style="list-style-type: none"> 6 fishery status/summary reports that are used to inform management decision-making at the national level progressed or finalised per year. Improved integration within the FFA/SPC EAFM work programme. 	<ul style="list-style-type: none"> NTFSRs for Niue, Palau and Tonga completed, NTFSR for FSM drafted and under review, NTFSR for Nauru near completion, NTFSRs for Kiribati and Samoa progressed, and for RMI initiated.
1.2.2 Participate in national stakeholder workshops for delivery of NTFSRs.	<ul style="list-style-type: none"> Effective participation in the national EAFM and TMP processes and other relevant national meetings. 	<ul style="list-style-type: none"> EAFM and tuna management plan stakeholder workshops attended in FSM, Nauru, Niue, Palau, Kiribati, and Samoa
1.2.3 Completion of summary of biology of key pelagic species.	<ul style="list-style-type: none"> SC 4 paper presenting results for a number of key species. Completion of report and publication in an appropriate format (e.g. OFP Technical Report). 	<ul style="list-style-type: none"> Paper completed and submitted to WCPFC-SC4 Molony, B. 2008. Fisheries biology and ecology of highly migratory species that commonly interact with industrialised longline and purse seine fisheries in the western and central Pacific Ocean. WCPFC-SC4-EB-IP-6.
Output 1.3: Enhanced capacity of PICTs to interpret stock assessment information and advice		
1.3.1 Summary reports of stock assessment results provided to PICTs at relevant fora, e.g. HoF, FFC, Management Options workshops, etc.	<ul style="list-style-type: none"> Improved understanding of OFP work at the national level. Tuna Fishery Assessment Report published 	<ul style="list-style-type: none"> Summary reports of regional stock assessments presented by OFP to: <ol style="list-style-type: none"> 1. FFC meetings 2. All FFA Subregional MOW meetings 3. FFA regional MOW workshop 4. FFA SWG meeting 5. Sub-Committee on South Pacific Tuna and Billfish meeting 6. Scientific Committee Meeting No 4 In addition, a new Tuna Fishery Assessment Report was published, in addition to a revised South Pacific Albacore Fishery paper

1.3.2	Ongoing development of material for a course to provide a general introduction to fisheries stock assessments and their management implications with a focus on WCPO tuna assessments in particular.	<ul style="list-style-type: none"> • Liaise with USP staff to evaluate potential collaboration in training of PICT fisheries staff. 	<ul style="list-style-type: none"> • Materials for two one week stock assessment workshops were developed in the first half of 2008, with the materials used during the workshops in mid-2008 • Discussions regarding USP collaboration were held during the GEF Steering Committee Meeting, however collaborative training has not been undertaken as yet.
1.3.3	Hold a regional stock assessment workshop at SPC headquarters.	<ul style="list-style-type: none"> • Workshop report • Development of remote learning initiatives. 	<ul style="list-style-type: none"> • Two one-week workshops were held at SPC in June/July 2008, attended by 23 participants in total. The workshop report was presented to SC4 and can be obtained at: • http://www.wcpfc.int/SC4/pdf/SC4-GN-WP6.pdf • In addition, an online portal was used to facilitate revision exercises and preparation for participants leading into the workshops.
1.3.4	Assist in the preparation and presentation of scientific briefs to preparatory meetings of PICTs for the WCPFC.	<ul style="list-style-type: none"> • Improved participation of PICTs in SC and WCPFC meetings 	<ul style="list-style-type: none"> • OFP SPC provided scientific briefs/papers to: • 1. All FFA Subregional MOW meetings • 2. FFA regional MOW workshop • 3. FFA SWG meeting • 4. Sub-Committee on South Pacific Tuna and Billfish meeting
1.3.5	Host attachments of national technical staff to participate in regional stock assessment work and preparation of NTFSRs.	<ul style="list-style-type: none"> • Attachment reports • Improved understanding of regional assessments leading to improved participation in WCPFC and in national management decision making 	<ul style="list-style-type: none"> • OFP hosted national technical staff for 1-2 week attachments from Kiribati, Samoa, Palau and Niue during 2008

TABLE 2/2008.

Objective 2: Accurate and comprehensive scientific data for regional and national fisheries management authorities on fisheries targeting the region's resources of tuna, billfish and other oceanic species

2008 Work Programme Activities	Performance Indicators and/or Means of Verification	2008 Achievements
Output 2.1: Regional oceanic fishery data management services provided to the WCPFC		
2.1.1 Incorporate data provided by Commission members under the Commission's data provision policy (e.g., annual catch estimates, operational-level logsheet data, size data, etc.) into existing databases and facilitate access of Commission secretariat staff to those data as appropriate.	<ul style="list-style-type: none"> Amount of data added to database, as documented in the <i>Tuna Fishery Data Catalogue</i> 	<ul style="list-style-type: none"> Data (logsheet, aggregate catch and effort, observer data, size data, and others) were continually incorporated to OFP-managed databases. Database status updated in Tuna Fishery Data Catalog: http://www.spc.int/oceanfish/Html/Statistics/DataCat/DATACAT.htm
2.1.2 Compile estimates of catch and effort in support of the functions of the Commission and its subsidiary bodies.	<ul style="list-style-type: none"> SC4 working paper on estimates of annual catches by species, gear type and flag. SC4 information paper and report to the Secretariat on estimates of annual catches by vessel flag, EEZ, and archipelagic waters, for use in determining the catch component (for 2005-2007) of the Commission's assessed contributions. Summary data will be presented in both table and figure at WCPFC5 on estimates of catch and effort in support of Conservation and Management Measures. 	<ul style="list-style-type: none"> P. Williams and P. Terawasi (FFA). Overview of tuna fisheries in the western and central Pacific Ocean, including economic conditions – 2007. WCPFC-SC4-GN-WP-1 [and] .SPC. Estimates of annual catches in the WCPFC Statistical Area. WCPFC–SC4–ST–IP–1. Prepared and provided to the Commission on 18th September 2008 Provided input to (1) Secretariat. Data relating to purse seine effort on the high seas and in the zones of non-PNA member CCMs. WCPFC-SC4-ST-WP-4; (2) Secretariat. Review of CCMs' Implementation of, and Compliance with, CMMs. WCPFC-TCC4-2008/10; (3) Secretariat. High Seas and non-PNA CMM Purse Seine Effort. WCPFC-TCC4-2008/13; and (4) Secretariat. Purse Seine Effort in the Zones of Non-PNA CCMs and on the High Seas. WCPFC-TCC4-2008/13 suppl.

2.1.3	For catches for which estimates are not otherwise available, conduct statistical analyses to estimate catches, particularly in regard to purse-seine catches of bigeye tuna, discards of target tuna species, and catches of non-target species.	<ul style="list-style-type: none"> • SC4 working paper. 	<ul style="list-style-type: none"> • (1) SPC. Estimates of annual catches in the WCPFC Statistical Area. WCPFC-SC4-ST-IP-1; and (2) Lawson T. 2008. Factors affecting the use of species composition data collected by observers and port samplers from purse seiners in the western and central Pacific Ocean. WCPFC-SC4- ST-WP-3.
2.1.4	Contribute to the development of draft data standards for port sampling and observer programmes in association with WCPFC Secretariat for subsequent consideration by CCMs.	<ul style="list-style-type: none"> • IWG-ROP and SC4 working paper on justification of SC3 provisional observer data standards. 	<ul style="list-style-type: none"> • Peter Sharples provided a report to the Secretariat on the justification of the data standards proposed at SC3 and attended IWG2 to provide technical advice on observer data standards and other issues. His report was re-issued at SC4 by the Secretariat as Draft Minimum Data Fields as Revised and Proposed by the Second Inter-Sessional Working Group Regional Observer Programme (Rev. 1). SC4-ST-IP-5.
2.1.5	Review current unloadings data forms used in the region, and the proposed WCPFC transshipment reporting form, to determine their adequacy for scientific purposes.	<ul style="list-style-type: none"> • SC4 working paper. 	<ul style="list-style-type: none"> • SPC. Review of the WCPFC transshipment reporting form for collection data for scientific purposes. SPC, Noumea, New Caledonia. SC4-ST-IP-4.
2.1.6	On request, advise the WCPFC Executive Director regarding the further development of Rules and Procedures for the Protection, Access to and Dissemination of Data and the Information Security Policy.	<ul style="list-style-type: none"> • Advice provided to the Executive Director on request. 	<ul style="list-style-type: none"> • On several occasions, advice on the RaP, particularly in regard to the issue of the three-vessel minimum, was provided to the Executive Director by John Hampton and Tim Lawson, and advice on the ISP was provided by Peter Williams.
2.1.7	Determine the status of the provision of scientific data to the Commission.	<ul style="list-style-type: none"> • Updates on the status of the provision of scientific data on the WCPFC website and a summary report provided to the Secretariat for consideration at TCC4 and WCPFC5. • Continued refinement of the web-based utility to identify data gaps. 	<ul style="list-style-type: none"> • SPC. Scientific data available to the Western and Central Pacific Fisheries Commission. WCPFC-SC4-ST-IP-2 • The WCPFC Data Provisions Database System was developed by SPC-OFD during 2008. This system is used to enter the provisions of WCPFC scientific data and highlight gaps through the assignment of a comprehensive set of data gaps categories. The system also caters for the generation of PDF reports which are regularly published on the WCPFC “Status of data provisions” web pages to inform WCPFC, CCMs and CNMs on the gaps in the provision of data.

2.1.8 Identify known data / information gaps in the current stock assessment, particularly in relation to operational level CPUE data.	<ul style="list-style-type: none"> • SC4 working paper. 	<ul style="list-style-type: none"> • The SC4 information paper WCPFC-SC4-ST-IP-2 (Scientific data available to the Western and Central Pacific Fisheries Commission) provides a summary on the status of the provision of scientific data to the WCPFC, highlighting the most important data gaps.
2.1.9 Provide support, as requested, to support 'A study on the Causes of Data Gaps'.	<ul style="list-style-type: none"> • Participation in the project. 	<ul style="list-style-type: none"> • Extensive background information was provided to the consultants and the draft text of their report was reviewed.
2.1.10 Participate in the Indonesia and Philippines Data Collection Project and the compilation of information on the tuna fisheries of Vietnam.	<ul style="list-style-type: none"> • Technical support provided and documented in reports of relevant duty travel, meetings of the Steering Committee and IPDCP workshops. • Advice provided to the Secretariat on request. 	<ul style="list-style-type: none"> • P. Williams participated in the Steering Committee Meeting Monitoring and Assessment of Indonesia's Tuna Fisheries held in Jakarta, 27-28 May 2008 • P. Williams participated in the 2nd East Indonesia Tuna Fisheries Workshop held in Jakarta, 29th May 2008 • P. Williams participated in the 1st Philippines/WCPFC Tuna Statistics Review Meeting (2-3 June 2008) • SPC-OFP installed the TUFMAN database system in the Philippines (June 2008) and continued to support the system and data collection in the Philippines throughout 2008.
2.1.11 Produce and publish on the WCPFC website two issues of the Western and Central Pacific Tuna Bulletin, containing estimates of monthly catch rates for WCPO fleets, based on the most recent data available.	<ul style="list-style-type: none"> • Western and Central Pacific Tuna Bulletin posted on the WCPFC website in January and July. 	<ul style="list-style-type: none"> • The WCPO Tuna Bulletin, January 2008, was posted on January 24. The WCPO Tuna Bulletin, July 2008, was posted on August 4.
2.1.12 Produce and publish on the Commission's website the Tuna Fishery Yearbook 2007, containing annual catch estimates by gear type, flag and species.	<ul style="list-style-type: none"> • Tuna Fishery Yearbook, 2007, posted on the WCPFC website in late 2008. 	<ul style="list-style-type: none"> • Draft posted on the OFP website on November 6 and submitted to Publications for editing. Final will be posted to the WCPFC website in January 2009.
2.1.13 Maintain the Commission's website, including the dissemination of public domain catch, effort and size data on the Commission's website at agreed level of resolution.	<ul style="list-style-type: none"> • WCPFC website updated as required. • Public domain data posted on the WCPFC website as data become available. 	<ul style="list-style-type: none"> • WCPFC website updated on a regular basis. • Public domain catch and effort data have not been posted on the WCPFC website because of issues related to the three-vessel minimum.

Output 2.2: Enhanced national fishery monitoring and data management systems		
2.2.1 Provide regional coordination of national fishery monitoring and data management systems through the provision of a template for integrated national tuna fishery monitoring, data collection forms, computer software, newsletters and other information, and through a meeting of the SPC/FFA Data Collection Committee.	<ul style="list-style-type: none"> Information provided to National Tuna Data Coordinators. Report of the DCC meeting. 	<ul style="list-style-type: none"> The 'Fork Length' newsletter was created. It will be published in early 2009. Data summaries on the national pages on the OFP website were accessed on 37 occasions during 2008. The report of the Seventh Meeting of the Tuna Fishery Data Collection Committee, November 2007, was published in March http://www.spc.int/oceanfish/Html/Meetings/DCC7/Final%20DCC7.pdf Tuna data sampling workbooks and pads were printed, and 308 items shipped to 10 member countries during the year. New debriefing forms were publishing and placed on the website in August. The 2007 edition of the Longline Observer Guide was updated. It will be edited and published in 2009.
2.2.2 Develop or enhance national tuna fishery data management systems, such as TUFMAN.	<ul style="list-style-type: none"> TUFMAN installed or updated in member countries and territories 	<ul style="list-style-type: none"> Ten SPC members received TUFMAN updates on CD. TUFMAN was updated in Kiribati, Marshall Islands and Palau during in-country visits by OFP staff.
2.2.3 Develop or enhance national observer programmes.	<ul style="list-style-type: none"> Staff travel reports Monitoring system audits 	<ul style="list-style-type: none"> MOUs for technical and financial support were renewed for Cook Islands, Marshall Islands, and Tonga. Sampling material was provided to PNG, Solomon Islands, Vanuatu, Samoa, Fiji, Palau, FSM, Tonga, Marshall Islands, New Caledonia, French Polynesia. OFP staff visited PNG, Solomon Islands, Palau, Fiji and Vanuatu to provide technical support for observer programmes. No national systems were audited for lack of resources.
2.2.4 Develop or enhance national port sampling programmes.	<ul style="list-style-type: none"> Staff travel reports Monitoring system audits 	<ul style="list-style-type: none"> MOUs for technical and financial support were renewed for the Marshall Islands and Tonga. Sampling material was provided to Tonga. OFP staff visited Fiji and Vanuatu to provide technical support for port sampling programmes. No national systems were audited for lack of resources.
2.2.5 Develop procedures for the auditing of national tuna fishery monitoring.	<ul style="list-style-type: none"> Auditing procedures document drafted 	<ul style="list-style-type: none"> A first draft of auditing procedures was completed.

Output 2.3: Enhanced capacity of PICTs to monitor fisheries, manage and use data		
2.3.1 Provide ongoing support to National Tuna Data Coordinators, including follow-up of issues arising at the Tuna Data Workshop and further development of national tuna data procedures documents.	<ul style="list-style-type: none"> Support documented in staff appraisals 	<ul style="list-style-type: none"> The Second Tuna Data Workshop was held in April. A first version of 'Guidelines for the Design and Implementation of Robust, Legally enforceable Data Collection Regimes' (a workshop recommendation) was completed. OFP staff visited Kiribati, Palau and Solomon Islands to support NTDCs. MOUs for technical and financial support for National Tuna Data Coordinators were renewed or prepared for Fiji, Solomon Islands, Palau and Kiribati.
2.3.2 Train national tuna fishery data management staff in the use of TUFMAN and other database and sampling programme management software.	<ul style="list-style-type: none"> National staff trained Training documented in staff appraisals 	<ul style="list-style-type: none"> OFP staff conducted TUFMAN training during visits to Kiribati and Palau. 8 new TUFMAN tips were posted on the website http://www.spc.int/oceanfish/html/statistics/tufman/index.htm
2.3.3 Hold up to eight national and sub-regional observer training workshops.	<ul style="list-style-type: none"> Number of certified new observers Staff travel reports 	<ul style="list-style-type: none"> Three observer training workshops were held in Papua New Guinea, while one each was held in Fiji, French Polynesia (including participants from New Caledonia), Palau (including participants from Federated States of Micronesia) and Vanuatu (including participants from Fiji, Samoa and Tonga). Refresher training was conducted in Fiji and training material and advice provided to the Marshall Islands for a self-run in-country observer training course.
2.3.4 Provide observer de-briefing support and training in-country.	<ul style="list-style-type: none"> Improved quality of observer data Staff travel reports 	<ul style="list-style-type: none"> Observer debriefers were trained in Papua New Guinea. Observers were debriefed by OFP staff in Palau.
2.3.5 Hold a regional observer coordinator's workshop.	<ul style="list-style-type: none"> Workshop report 	<ul style="list-style-type: none"> The Seventh Observer Coordinators Workshop was held in July, with participants from 13 SPC members.
2.3.6 Host six training attachments in fisheries monitoring and statistics at SPC headquarters.	<ul style="list-style-type: none"> Attachment reports POFM project quarterly reports 	<ul style="list-style-type: none"> Staff from Papua New Guinea, Samoa and Solomon Islands were trained on attachment. Training attachments of staff from Cook Islands, Tonga and Vanuatu were deferred to 2009.
2.3.7 Develop standards for competency-based training of observers.	<ul style="list-style-type: none"> Standards for competency-based training of observers drafted 	<ul style="list-style-type: none"> A consultant was contracted to develop CBT standards and a final report is due in January 2009.

TABLE 3/2008.

Objective 3: Improved understanding of pelagic ecosystems in the western and central Pacific Ocean, with a focus on the western tropical Pacific

2008 Work Programme Activities	Performance Indicators and/or Means of Verification	2008 Achievements
Output 3.1: Data on the biological characteristics of oceanic species and their environment		
<p>3.1.1 Provision of quantitative data on the population dynamics of tropical tunas. In 2008, these services shall include:</p>	<ul style="list-style-type: none"> • Completion of 6 week Solomon Islands tagging cruise for deployment of conventional and archival tags 	<ul style="list-style-type: none"> • 4 week cruise in Solomon Islands EEZ completed with 17,037 fish tagged with conventional dart tags. Archival tagging comprised 11 yellowfin 63-81cm with MK9 tags, and one bigeye (60cm) with the single LTD 2310 tag. A second 2 weeks cruise was also conducted in the Solomon Islands EEZ to trial a new larger vessel, the Soltai 105, to assess its suitability for the Phase 2 activities of the Pacific Tuna Tagging Programme (PTTP) throughout the wider western and central Pacific. The trial of the vessel proved highly successful. An additional 12,944 fish were conventionally tagged during this trial.
<p>a. Implementation of BET, YFT and SKJ research in WCPO waters to obtain data on local exploitation rates and the influence of FAD and seamounts on stock fidelity, movement and distribution</p>	<ul style="list-style-type: none"> • Planning and implementation of a 5 months western Pacific tagging cruise (Solomon Islands, FSM, Indonesia and PNG cruise) for deployment of conventional and archival tags. 	
<p>b. Commencement of Albacore research in WCPO to obtain information on stock fidelity and movements</p>	<ul style="list-style-type: none"> • PTTP Progress report presented to SC4. 	<ul style="list-style-type: none"> • Western Pacific Cruise 1 (WP1, 5 month) commenced in June 2008 and was completed in November 2008. Tagging was carried out in Federated States of Micronesia (11,721), Palau (7,285), Philippines (1,914), Indonesia (25,197) and Papua New Guinea (10550). The total tag releases for WP 1 was 56,680. Archival tag releases comprised 24 small and 25 large sized electronic tags.
<p>c. Commencement of Albacore research in WCPO to obtain information on exploitation rates.</p>	<ul style="list-style-type: none"> • 2008 project plan for Albacore biology and tagging research prepared and presented to SCIFISH Steering Committee. 	<ul style="list-style-type: none"> • Central Pacific Cruise 1 (WP1, 1 month) commenced in May 2008. Tagging was carried out on the NOAA TAO oceanographic buoys south of Hawaii along the 155°W meridian and east of the Line Islands of Kiribati. The objective of this cruise and other sub-regional components of the PTTP is to target difficult to access areas of the Central Pacific (including French Polynesia) to improve overall spatial coverage of PTTP tag releases. A total of 1909 tropical tunas were tagged and released. 50 Archival tag were released.
	<ul style="list-style-type: none"> • Tagging Technician appointed • Albacore Biologist appointed • Peer reviewed publication submitted that describes tropical tuna vertical behaviour, including FAD behaviour • Peer reviewed publication submitted that describes tropical tuna horizontal movements as derived from Archival tags • Archival Tag database established • Preliminary analysis of PNG 	<ul style="list-style-type: none"> • Tag recovery officer appointed (Mr Brian Kumasi) and Pacific-wide recovery procedures implemented. Tag lotteries conducted in association with Infofish Tuna 2008 conference in Bangkok and in Papua New Guinea (Madang, Lae and Wewak) and Solomon Islands (Noro). Specific visits to promote and facilitate tag recovery have been undertaken in the Thailand, Solomon Islands, Palau, Marshall Islands, Indonesia, Philippines and Papua New Guinea. Recovery arrangements have been formalized for Indonesia (4 agents). Fish measuring and processing equipment and instructional material (tag recovery manual) provided to all recovery agents. Tagging Database Analyst (Mr

	<p>tagging data completed and report drafted</p> <ul style="list-style-type: none"> • Tag recovery procedures improved (lotteries, measurement equipment provided to strategic agents and recovery points) • Tag recovery analysis and quality control measures implemented to minimise poor reporting • Tag seeding experiments scoped and implemented to estimated reporting rates • Report characterizing the variability and extent of catches of non-target species from purse seine catches in PNG completed 	<p>Sylvain Caillot) appointed (commencing Feb 2009) to provide data quality support for returned tag information.</p> <ul style="list-style-type: none"> • Tag seeding has been undertaken across the western Pacific in conjunction with the implementation of Phase 2 of the PTPP. The emphasis for 2008 has been training observer in the necessary methods for tag seeding. Training has been conducted in conjunction with the OFP Observer Training Program (New Caledonia, French Polynesia, PNG, Vanuatu, Fiji, RMI, FSM, Palau, Tuvalu, Kiribati, Tonga, Samoa). 32 kits deployed in 2008 (FSM, RMI, Kiribati, PNG, Am Samoa) and 100 planned for 2009 depending upon the availability of qualified observers. The locations of the tag seeding experiments are to be associated with the main unloading areas in the WCPO. • PTPP progress reports presented to SC4. See http://www.wcpfc.int/sc4/pdf/SC4-GN-IP2%20PTTP.pdf http://www.wcpfc.int/sc4/pdf/SC4-GN-IP3%20[Review%20PTTP%20Phase%201].pdf http://www.wcpfc.int/sc4/pdf/SC4-GN-IP4%20[PTTP%20Operational%20Plan].pdf http://www.wcpfc.int/sc4/pdf/SC4-GN-IP5%20[PTTP%20Tag%20Recovery%20issues].pdf • Archival tag database established. Tagging Database Analyst appointed to oversee archival tag database. • Analysis of Phase 1 electronic tagging completed and accepted for publication (Leroy et al. 2008) in <i>Reviews: Methods and Technologies in Fish Biology and Fisheries</i>. • Preliminary analysis of PNG tagging data rescheduled to 2009 to align activity with ACIAR reporting requirements • Contract negotiated with Collecte Localisation Satellite (CLS), Toulouse, France to undertake geo-location data analysis for horizontal movements negotiated. Analysis delayed due to requirement for further method development and scheduled for 2009. Horizontal movements publication subsequently rescheduled to 2009. • Report characterizing the variability and extent of catches of non-target species from purse seine catches in PNG completed and forwarded to ACIAR for publication in their Technical Report Series. • Albacore biologist (Dr Ashley Williams) appointed and commenced in May 2008. Project plan for Albacore biology and tagging research prepared and presented to SCIFISH Steering Committee.
3.1.2 Provision of quantitative data on the environmental drivers of distribution for	<ul style="list-style-type: none"> • 2008 project plan for Albacore distribution analysis prepared and 	<ul style="list-style-type: none"> • Fisheries Oceanographer (Ms Karine Briand) appointed and commenced in Feb 2008.

<p>tropical tunas. In 2008, these services shall include:</p>	<p>presented to SCIFISH Steering Committee.</p>	<ul style="list-style-type: none"> • Ecosystem Modeller (Dr Jesus Jorado Mollina) appointed and commences in Feb 2009
<p>a. Commencement of Albacore research in WCPO to obtain data on the influence of bathymetry, oceanographic and geographic drivers on tuna movement and distribution.</p>	<ul style="list-style-type: none"> • 2008 project plan for BET, YFT and SKJ distribution analysis presented to SCIFISH Steering Committee. 	<ul style="list-style-type: none"> • Spatial Analyst (Dr Telmo Morado) appointed and commenced in Oct 2008
<p>b. Commencement of BET, YFT and SKJ research in the WCPO to obtain data on the influence of bathymetry, oceanographic and geographic drivers on tuna movement and distribution</p>	<ul style="list-style-type: none"> • 2008 research plan for characterising the relationship between seamounts and historical fishing data. 	<ul style="list-style-type: none"> • SCIFISH research and work plan presented and approved by Steering Committee.
<p>c. Characterising the relationship between seamounts and historical fishing data (this activity contingent on the reallocation of GEF resources to OFP from IUCN).</p>	<ul style="list-style-type: none"> • Appointment of Spatial Analyst to undertake seamount – historical fishing analysis (contingent on IUCN agreement) 	<ul style="list-style-type: none"> • Preliminary analysis of PS and LL fishing data and 4000 WCPO Seamounts undertaken. Preliminary results have not detected the strong association reported in the Atlantic & EPO for pelagic predators CPUE and seamount presence.
<p>3.1.3 Provision of quantitative data on ecosystem and trophic dynamics. In 2008, these services shall include:</p>	<ul style="list-style-type: none"> • Updated priority list of spatial locations for stomach sampling. 	<ul style="list-style-type: none"> • Stomach sampling strategy reviewed and priorities identified for collection by observers and tagging cruises.
<p>a. Identification of functional groups and influence of latitudinal, bathymetry and oceanographic effects</p>	<ul style="list-style-type: none"> • Continued co-ordinations of observer sampling of stomachs and tissues & their analysis 	<ul style="list-style-type: none"> • 402 samples were collected by observers and 229 samples from observer trips were analysed.
<p>b. Identification of natural isotope tags for studying tuna movement</p>	<ul style="list-style-type: none"> • Continued collection of stomachs and tissues & their analysis from tagging cruises. • Maintain prey item reference collection • 4 Member country newsletters updating results of trophic and diet analysis and tagging. • Isotope map for tuna in WCPO submitted for publication in scientific literature. • Influence of sampling gear on stomach content and isotope signature 	<ul style="list-style-type: none"> • 789 samples were collected during the tagging cruises and 604 samples from tagging cruises were analysed • Issue #5- 8 of the SPC Biological Sampling Newsletter distributed over 2008 • 12 new species were added in the reference collection • Analysis completed for isotope mapping and manuscript approaching submission standard (Graham, B., R. Olson, V. Allain, F. Galvan, B. Popp and B. Fry (In preparation) Bulk d15N biogeography: a novel approach to estimating net movements of tropical tunas in the equatorial Pacific Ocean) • Analysis completed for sampling gear effects on stomach analysis and manuscript approaching submission standard (Allain V. et al., (In preparation): Implications of sampling gears for the compilation and comparison of stomach content data: case study of tuna in the western equatorial Pacific) • Analysis of regime shift project was finished in 2007. Scientific manuscript preparations were not conducted in 2008.

	<p>submitted for publication in scientific literature.</p> <ul style="list-style-type: none"> • Analysis of regime shifts in tuna diet completed and scientific manuscript drafted for internal OFP review. • Analysis of FAD impacts on diet, isotope signatures and fat content completed and report provided to OFP. • Final presentation of Trophic structure project to PI-PFRP meeting 	<ul style="list-style-type: none"> • FAD impact on diet study in progress. Isotope analysis not yet provided by the consultant; no funding available to complete the fat content calibration • Final presentation of the PFRP project: Allain, Olson, Galvan, Graham, Popp and Fry. 2008. Tuna diet in the equatorial Pacific Ocean East to West. PFRP-PI meeting. Honolulu Hawaii 18-19 Nov 2008. • 2 stagaires were trained in taxonomic identification and stomach contents analysis.
<p>3.1.4 Provision of quantitative data on age and reproduction of tropical tunas. In 2008, these services shall include:</p> <p>a. Continue to receive and archive otoliths for future analysis comparing observed and estimated growth</p> <p>b. Develop comprehensive research plan for bigeye reproduction biology for WCPFC (contingent on WCPFC approval of project)</p> <p>c. Commencement of Albacore research in WCPO to obtain data on age-growth relationships and spawning fidelity</p> <p>d. Gap analysis for reproductive biology for YFT as part of SA structural sensitivity analysis.</p>	<ul style="list-style-type: none"> • 2008 project plan for Albacore biology and tagging research prepared and presented to SCIFISH Steering Committee. • Central repository/database for all otoliths data improved to include the meta data for otoliths analysis • Research plan for bigeye reproductive biology • Gap analysis of YFT provided to Stock Assessment 	<ul style="list-style-type: none"> • SCIFISH research and work plan for Albacore biology presented and approved by Steering Committee. In country observer training for biological sampling has occurred in New Caledonia, French Polynesia, Fiji, Vanuatu and Samoa. Trained observers issued with sampling kits. • Improved meta data incorporation into O-Danger rescheduled until the commencement of the Tagging Database Analyst • Research Plan for a Pacific Wide Study of Bigeye Reproductive and Growth Endorsed by SC4. See http://www.wcpfc.int/sc4/pdf/SC4-BI-WP7%20Rev3%20[BET%20Reproductive%20Biology%20Research%20Plan-revision%203].pdf • GAP analysis of YFT altered to BET to align with SA and WCPFC priorities. See http://www.wcpfc.int/sc4/pdf/SC4-ME-WP1-[BET%20reproductive%20&%20growth%20sensitivity].pdf
<p>3.1.5 Provision of oceanographic data for OFP activities. In 2008, these services shall</p>	<ul style="list-style-type: none"> • FSM, Nauru, Niue, Kiribati, PNG 	<ul style="list-style-type: none"> • WCPO Fisheries Oceanography introduction prepared for NTFSRs.

include:	assistance provided	<ul style="list-style-type: none">• Fisheries oceanography analysis undertaken for Samoa and PNG• Assistance provided for Nauru, FSM and Kiribati NTFSRs• The spatial ecosystem and population dynamics model SEAPODYM was used to simulate the distribution of bigeye and skipjack tuna in the WCPO. The outputs from these simulations have been average between 1980 and 2004. This averaged data is currently being used to estimate TAC for each EEZ as part of the National Tuna Fishery Status Reporting.• Bathymetric maps with seamount list, location and available characteristics provided for NTFSRs
a. Oceanographic assistance for NTFSRs in FSM, Nauru, Niue, Kiribati, PNG		
Output 3.2: Improved ecosystem models that incorporate available data		
3.2.1 Provision of ecosystem models that describe the pelagic environment and allow the consequences of ecosystem change and fisheries management to be explored. In 2008, these services shall include:	<ul style="list-style-type: none">• Scientific manuscript documenting the competing model structures for a WCPO warm-pool ecopath with ecosim model drafted and submitted for OFP internal review.• Completion of SEAPODYM code revisions (consultancy to P. Lehodey).• SEAPODYM Mixed-resolution version is operational and available on website (consultancy to P. Lehodey).• SEAPODYM Version with statistical parameter estimation is operational and available on website (consultancy to P. Lehodey).• ZONECO fisheries oceanographer appointed and oceanographic input into New Caledonia trial version of mixed resolution SEAPODYM completed• 2008 project plan for scenario analysis prepared.• Fisheries Oceanographer appointed• Ecosystem Modeller appointed	<ul style="list-style-type: none">• Fisheries Oceanographer (Ms Karine Briand) appointed and commenced in Feb 2008.• Ecosystem Modeller (Dr Jesus Jorado Mollina) appointed and commences in Feb 2009• Analysis of trophic uncertainties and spatial heterogeneity in trophic pathways completed. (Dambacher, J.M., J.W. Young, R.J. Olson, V. Allain, M.J. Lansdell, and S.P. Cooper (Accepted with major changes, under revision): Analyzing pelagic food webs leading to top predators in the Pacific Ocean: a graph-theoretic approach. Progress in Oceanography, CLIOTOP special issue.)• Technical documentation of revised SEAPODYM Model completed. Optimisation documented in Senina et al. in press, Progress in Oceanography, and general developments documented in Lehodey et al. 2008 WCPFC Scientific Committee EB-WP-10 - http://www.wcpfc.int/sc4/pdf/SC4-EB-WP10%20[SEAPODYM-V2].pdf. Revised SEAPODYM available from website• Parameterisation and initial simulations completed for skipjack (Senina et al. 2008, Progress in Oceanography) and bigeye Lehodey et al. 2008, Progress in Oceanography.• Catch and length data prepared for yellowfin and parameterization of yellowfin model scheduled to be completed by February 2009.• ZONECO Fisheries Oceanographer appointed (Dr Xavier Couvelard). Initial albacore model parameterized. CPUE and length frequency data currently being recompiled for final parameterization.• Fine resolution grid of oceanographic data generated for New Caledonia EEZ to trial mixed resolution version. The approach is using the high resolution PISCES-ROMS bio-geochemical model to develop the environmental forcing grid for SEAPODYM.• Project plan for scenario analysis as follows Jan - Jun 09
a. Identification of trophic uncertainties in WCPO pelagic ecosystem		
b. Identification and inclusion of drivers of spatial heterogeneity in trophic pathways		
c. Identification of tropical tuna feedback mechanisms, ecosystem correlates and species at risk from predator removal		
d. Develop regional version of SEAPODYM		
e. Scenario analysis to forecast the impacts of altered management (including closures & MPAs) on oceanic fisheries and its effects on pelagic ecosystems		

		<p>Analysis of MPA impact Analysis of Climate Change impact Assistance to ZoNeCo project Jul - Dec 09 Assistance for implementing mixed-grid configuration with a zoom on French Polynesia and Kiribati</p>
<p>3.2.2 Develop individual/single species population models for exploring management implications and knowledge uncertainty. In 2008, these services shall include:</p>	<ul style="list-style-type: none"> Scientific manuscript submitted. 	<ul style="list-style-type: none"> Analysis completed, manuscript production currently with first author.
<p>a. Pacific leatherbacks and loggerhead turtles</p>		
<p>3.2.4 Develop descriptions of the pelagic ecosystem for quantitative and qualitative risk assessments. In 2008, these services shall include:</p>	<ul style="list-style-type: none"> National-scale analyses and training in ERA for SIDS (FSM, Nauru, Niue, Kiribati, PNG); Sub-regional analysis of western tropical Pacific; Assistance to other WCPFC members (USA, NZ) in developing national ERAs; Implementation report submitted to the Secretariat and Working Paper for EB-SWG and SC4. Scientific manuscript submitted introducing ERA in the WCPO. 	<ul style="list-style-type: none"> Assistance provided for the development of EAFM-based National Management Plans for Kiribati and Samoa. This involved the participation in the stakeholder consultations and presentation on biological information and provision of expert advice on non-target species and the ecosystem components at these consultations National-level ERAs for non-target associated and dependent species (i.e. bycatch) incorporated into NTFSRs for Federated States of Micronesia, Nauru, Kiribati, Papua New Guinea. This included inclusion of ERA-based advice into national management decisions for non-target species, consistent with WCPFC-agreed policies. Regional workshop on ERA held in June 2008 to familiarise SPC and other WCPFC member countries with ERA methods and their application. The two-day workshop was held in conjunction with the 2008 Stock Assessment Workshops. Twenty-one attendees from PICTs, from Indonesia and from Philippines, one FFA employee, and the administrator of the Japan Trust Fund attended. ERA implementation report presented to SC4. See http://www.wcpfc.int/sc4/pdf/SC4-EB-WP1%20Kirby.pdf Participation in a workshop on ERA for Hawaii longline fisheries. Subsequent collaboration with Hawaii-based scientists to carry out an ERA for these fisheries. Participation in a workshop on ERA for New Zealand longline fisheries. Subsequent collaboration with New Zealand-based scientists to carry out an ERA for these fisheries. Options for developing species identification guides for bycatch in WCPO tuna fisheries were presented to SC4 and discussed with individual delegations. Successful development of a series of project proposals under the FFA Sea Turtle Action Plan, to be implemented during 2009.
<p>a. In association with other qualified organizations or CCM research agencies with a view to securing a broad-based consultation, continue implementation of the multi-year ERA, including PSA, for WCPO tuna fisheries.</p>		
<p>b. Provide additional detailed analysis of high risk spp. from PSA analysis.</p>		

		<ul style="list-style-type: none"> • Successful development of a proposal to populate a Bycatch Information System for WCPFC • Manuscript production for peer-reviewed journals carried over to 2009
Output 3.3: Scientific advice on ecosystem-based management options using available models and data		
3.3.1 Delivery of scientific advice on tuna population dynamics to industry, management, scientific and executive audiences	<ul style="list-style-type: none"> • Presentation of results of ecosystem analysis to wider scientific community and fisheries management organisation. • Presentation of information on national and regional implications of results of ecosystem analysis to Pacific SIDS • Ecosystem sessions at Stock Assessment Workshops • 3 SC4 presentations • 2 OFP technical reports • 8 Scientific papers • Web-site updates • 4 newsletters • Levels of by-catch in the WCPO oceanic fishery analysis updated. 	<p>12 presentations on the results of recent ecosystem analysis to wider scientific community, and fisheries management organisation and Pacific Island SIDS.</p> <p>Two-day Regional workshop on ERA held Twenty-one attendees from PICTs, from Indonesia and from Philippines, one FFA employee, and the administrator of the Japan Trust Fund attended.</p> <p>9 papers presented at SC4</p> <p>1 OFP/ACIAR Technical Report</p> <p>Scientific publications (1 published, 2 accepted, 1 accepted subject to revision, 3 drafted, 2 rescheduled to 2009)</p> <p>Web-site rescheduled to 2009</p> <p>4 Quarterly newsletters published</p> <p>1 SPC New Projects Brief published</p> <p>Levels of by-catch in the WCPO oceanic fishery analysis updated.</p> <p>See http://www.wcpfc.int/sc4/pdf/SC4-ST-IP1%20Annual%20Catch%20Estimates.pdf</p>
3.3.2 Provide regional training in population tuna ecology and ecosystem research		
3.3.3 Estimates of levels of by-catch in the WCPO oceanic fisheries		

4. Programme Management

30. A number of significant events impacting upon programme management and programme activities occurred during 2008.

- A new European Community 9th EDF funded project, entitled “Scientific Support for Oceanic Fisheries Management in the Western and Central Pacific Ocean” or SCIFISH, began in early 2008. The SCIFISH project provides 4 million euros over 4 years from the ACP envelope and 2.6 million euros over 4 years from the OCT envelope. The project provides further support in the critical areas of national fishery monitoring, tuna tagging, ecosystem modelling and (through a component being implemented by FFA) fisheries surveillance. The Financing Agreement for the project was signed in late 2007, allowing implementation of the project to begin in early 2008.
- The Pacific Tuna Tagging Programme continued to be successfully implemented during 2008. Funding is being provided by the SCIFISH project and by a substantial contribution of NZD5 million by NZAID. In December 2008, the Government of Korea announced a contribution of 1 billion Korean Won (approximately USD730,000 in January 2009) to the project over five years. Thus far, more than 160,000 tuna have been tagged and in excess of 18,000 recoveries received. The field programme will continue through 2009.
- The provision of scientific services by the OFP to the WCPFC continued in 2008. A general framework for cooperation between SPC and the WCPFC, as well as the details of provision of services and funding was agreed in a Memorandum of Understanding signed by the chief executives of both organisations in 2005. Annual service agreements detail the annual work plan conducted by OFP on behalf of WCPFC and the funding support to be provided. The Secretariat views this arrangement positively, and considers that ongoing OFP involvement in scientific service provision to the WCPFC can only enhance the quality or service that it can deliver to SPC members at the national level, or via FFA. In 2008, a review of the WCPFC science processes commented favourably on the performance of the OFP in its delivery of scientific services and recommended that the WCPFC enter into a longer-term arrangement for continued scientific service provision with the OFP.
- The FFA is a key OFP client, with OFP providing scientific support to the FFA for most of its tuna fisheries management activities. The scope of FFA activities has expanded greatly in recent years, with a number of new initiatives involving the implementation of the Ecosystem Approach to Fisheries Management, tuna management options analysis, and others. With AusAID support, a new Fisheries Scientist position has been established in the OFP to increase our capacity to support FFA fisheries management activities. Despite this additional capacity, the demand for scientific support continues to grow, and the Programme continues to struggle to meet this demand.

5. 2009 Budget

31. Core funding to the OFP in 2009 is expected to remain at similar levels to 2008, providing support for the Programme Manager's position only. Due to unfavourable exchange rate movements towards the end of 2008 (primarily a decline in the AUD and NZD against the CFP), the level of programme funding to the OFP in 2009, as for all SPC programmes, will decline by approximately 20%. This shortfall in 2009 is largely filled by a one-off contribution by AusAID to the SPC Fisheries Programmes. However, the situation beyond 2009 remains very uncertain. In particular, it appears that the additional support provided by AusAID in 2008 for a new position to bolster the Programme's capacity to provide scientific support to the FFA may not be continued beyond 2009.

32. In terms of project funding, the GEF-funded POFM project will continue in 2009, as will funding by the WCPFC. The new EDF 9-funded SCIFISH project that began in early 2008, will continue to provide support in a number of key areas, including capacity building in tuna fishery monitoring, tuna tagging and ecosystem modelling. Several other project funding initiatives are being pursued by Programme management. It appears that the heavy reliance of the OFP on project funding to pursue its core business activities is likely to continue for the foreseeable future. While this is an unsatisfactory situation in some ways, it has actually lessened the impact of SPC's programme funding crisis on the OFP relative to many other SPC programmes.

6. 2009 Work Plan

33. The 2009 work plan is summarised in the following tables.

TABLE 1/2009.

Objective 1: High-quality scientific information and advice for regional and national fisheries management authorities on the status of, and fishery impacts on, stocks targeted or otherwise impacted by regional oceanic fisheries

2009 Work Programme Activities	Performance Indicators and/or Means of Verification	2009 Achievements
Output 1.1: Regional stock assessments and associated analyses		
1.1.1 Provision of stock assessment and related analyses (mostly to the WCPFC). In 2008, these services shall include:	<ul style="list-style-type: none"> • Review of WCPFC-SPC service agreement prepared for WCPFC-6 • WCPFC satisfied with services provided. 	•
– Undertake full stock assessment for target and non-target species as requested by the Commission (yellowfin, SP albacore, and bigeye in 2009).	<ul style="list-style-type: none"> • Stock Assessment preparatory workshop hosted and outcomes documented as an information paper to SC5 • Tuna Fishery Assessment Report (TFAR) published following 2008 assessments. • SC5 working papers • Input and output files for key model runs posted on the OFP website prior to SC5 	•
– Determine feasibility of undertaking stock assessments for key shark species	<ul style="list-style-type: none"> • SC5 working papers 	•
– Continued exploration of sensitivity of stock assessment outcomes to structural assumptions in models and data issues.	<ul style="list-style-type: none"> • SC5 working papers • Journal publication submitted 	•
– Undertake comparisons of different stock assessment modelling approaches for bigeye, yellowfin, and South Pacific albacore tuna	<ul style="list-style-type: none"> • Parallel stock assessments undertaken or progressed using alternative software (e.g. Stock Synthesis) and/or on different spatial scales (e.g. Pacific-wide assessments for bigeye and albacore tuna) • SC5 working / information papers 	•

– Undertake analyses of longline catch and effort data, including where appropriate operational-level data, to improve the standardisation of effort and the construction of indices of stock abundance for bigeye, yellowfin and South Pacific albacore tuna.	• SC5 working / information papers	•
– Development and reporting of stock indicators for those key species not formally assessed.	• SC5 working / information paper	•
1.1.2 Analysis of the conservation benefits and implications of current and potential WCPFC Conservation and Management Measures		•
– Review of spatio-temporal aspects of catches of juvenile bigeye and yellowfin tuna caught in association with fish aggregating devices (FADs).	• SC5 working paper	•
– Undertake evaluations of management options as specified by WCPFC.	• Working papers and presentations for SC, TCC, Commission meetings, and any other ad-hoc meetings as required	•
1.1.3 Management and development of the MULTIFAN-CL stock assessment software and associated visualisation software, including networked processing, testing and documentation of new features.	<ul style="list-style-type: none"> • Host MULTIFAN-CL workshop in Jan-Feb 2009 with outcomes documented as an information paper for SC5 • Updated stock assessment modeling software and documentation posted on the MULTIFAN-CL website www.multifan-cl.org. • Further development of the GFORGE MULTIFAN-CL website 	•
1.1.4 Analytical work to support FFA fisheries management work at regional and subregional levels. In 2009, these services shall include:		
– Technical analysis in support of the Purse seine Vessel Days Scheme (VDS) of the Parties to the Nauru Agreement (PNA) including the Third Implementing Arrangement	• Papers and presentations to FFC, its relevant subcommittees (e.g. PNA and/or SPTBF), the Management Options Workshop, and subregional workshops as required	•

– Feasibility study in support of the development of a Longline Vessel Days Scheme (LL-VDS) for the Parties to the Nauru Agreement (PNA)	• Papers and presentations to FFC, its relevant subcommittees (e.g. PNA and/or SPTBF), the Management Options Workshop, and subregional workshops as required	•
– Characterisation of fishing effort in relation to Conservation and Management Measures	• Papers and presentations to FFC, its relevant subcommittees (e.g. PNA and/or SPTBF), the Management Options Workshop, and subregional workshops as required	•
– Economic optimizations of with-in zone tuna management plans for selected members of the Southern Tuna and Billfish Committee	• Papers and presentations to FFC, its relevant subcommittees (e.g. PNA and/or SPTBF), the Management Options Workshop, and subregional workshops as required	•
– Generation of inputs and associated technical support for bioeconomic modelling	• Papers and presentations to FFC, its relevant subcommittees (e.g. PNA and/or SPTBF), the Management Options Workshop, and subregional workshops as required	•
– Reference Point project (phase 1 and 2)	• Papers and presentations to FFC, its relevant subcommittees (e.g. PNA and/or SPTBF), the Management Options Workshop, and subregional workshops as required	•
1.1.5 Stock assessment and related information and advice provided to NGOs and other national or international fora, e.g. WWF, Western Pacific Regional Fishery Management Council, International Sustainable Seafood Foundation, etc.	• Participation in relevant meetings, forums, as required	•
Output 1.2: National fishery status reports and associated analyses		
1.2.1 NTFSRs completed for FSM, Nauru, Kiribati, Samoa, Marshall Islands, Tuvalu and Solomon Islands.	<ul style="list-style-type: none"> • 6 fishery status/summary reports that are used to inform management decision-making at the national level progressed or finalised per year. • Improved integration within the FFA/SPC EAFM work programme. 	•

1.2.2	Provide scientific support to national scoping and stakeholder workshops for the implementation of the Ecosystem Approach to Fisheries Management or revision of Tuna Management Plans, including the delivery of relevant information from the NTFSRs.	<ul style="list-style-type: none"> • Effective participation in the national EAFM and TMP processes and other relevant national meetings. • Where possible, adjoin NTFSR specific workshops to EAFM workshops 	•
1.2.3	Provide draft overview of fisheries and stock status for inclusion in FFA EAFM final reports, including providing review/comments of the draft EAFM Reports prior to finalization.	<ul style="list-style-type: none"> • Draft overviews of fisheries and stock status provided to FFA for inclusion in EAFM Reports for each country implementing EAFM • Review comments provided to FFA on draft EAFM Reports 	•
Output 1.3: Enhanced capacity of PICTs to interpret stock assessment information and advice			
1.3.1	Summary reports of stock assessment results provided to PICTs at relevant fora, e.g. HoF, FFC, Management Options workshops, etc.	<ul style="list-style-type: none"> • Improved understanding of OFP work at the national level. • Tuna Fishery Assessment Report published 	•
1.3.2	Ongoing development of material for workshops to increase understanding of fisheries stock assessments and their management implications, with a focus on WCPO tuna assessments in particular. Investigation of potential transfer of materials to accredited courses (e.g. at USP).	<ul style="list-style-type: none"> • Development of workshop materials • Discussion held at HoF to determine PICT preferences for the long-term future of the workshops/courses. • Liaise with USP staff to evaluate potential collaboration in training of PICT fisheries staff. 	•
1.3.3	Hold regional and (when possible) opportunistic in-country stock assessment workshop(s).	<ul style="list-style-type: none"> • Workshop report • Opportunistic in-country training detailed in trip reports. • Continued development of remote learning initiatives, dependant on participation levels. 	•
1.3.4	Assist in the preparation and presentation of scientific briefs to preparatory meetings of PICTs for the WCPFC.	<ul style="list-style-type: none"> • Improved understanding of stock assessments demonstrated by PICTS during SC and WCPFC meetings (e.g. via participation in discussions of assessments, and ability to review/question the assessments). 	•

<p>1.3.5 Host attachments of national technical staff to participate in regional stock assessment work and preparation of NTFSRs.</p>	<ul style="list-style-type: none"> • Attachment reports • Co-authorship by national technical staff on NTFSR chapters on Stock Status and Management Implications. • Improved understanding of regional assessments and increased consideration of stock assessment information in national management decision making processes. 	<ul style="list-style-type: none"> •
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TABLE 2/2009.

Objective 2: Accurate and comprehensive scientific data for regional and national fisheries management authorities on fisheries targeting the region's resources of tuna, billfish and other oceanic species

2009 Work Programme Activities	Performance Indicators and/or Means of Verification	2009 Achievements
Output 2.1: Regional oceanic fishery data management services provided to the WCPFC		
2.1.1 Incorporate data provided by Commission members under the Commission's data provision policy (e.g., annual catch estimates, operational-level logsheet data, size data, etc.) into existing databases and facilitate access of Commission secretariat staff to those data as appropriate.	<ul style="list-style-type: none"> • List of amounts of data incorporated during 2009 and link to the <i>Tuna Fishery Data Catalogue</i> • List of system development activities undertaken, e.g., development of database for annual catch estimates consistent with the OFP system. 	<ul style="list-style-type: none"> •
2.1.2 Compile estimates of catch and effort in support of the functions of the Commission and its subsidiary bodies.	<ul style="list-style-type: none"> • Link to SC5 information paper on estimates of annual catches by species, gear type and flag. • Link to SC5 information paper on estimates of annual catches by vessel flag, EEZ, and archipelagic waters. This report is used by WCPFC Secretariat for determining the catch component (for 2006-2008) of the Commission's assessed contributions. • Link to SC5 information paper on indicators for non-assessed species. • List of tables and figures presented at WCPFC6 on estimates of catch and effort in support of Conservation and Management Measures. 	<ul style="list-style-type: none"> •
2.1.3 For catches for which estimates are not otherwise available, conduct statistical analyses to estimate catches, particularly in regard to purse-seine catches of bigeye tuna, discards of target tuna species, and catches of non-target species.	<ul style="list-style-type: none"> • Link to SC5 working paper on analysis of spill and grab samples, and application to revision of estimates of purse-seine catches. • Link to SC5 working paper on estimation of shark catches determined from observer data. • Link to SC5 working paper on estimates of shark catches determined from fin trade data. 	<ul style="list-style-type: none"> •

2.1.4	On request, advise the WCPFC Executive Director regarding the further development of Rules and Procedures for the Protection, Access to and Dissemination of Data and the Information Security Policy.	<ul style="list-style-type: none"> • List of instances of advice requested by and provided to the Executive Director. • Link to SC5 working paper on the status of public domain data held by the Commission. 	•
2.1.5	Determine the status of the provision of scientific data to the Commission and identify known data / information gaps in the current stock assessment.	<ul style="list-style-type: none"> • Link to the utility on the WCPFC website documenting the status of the provision of scientific data. • Link to SC5 working paper on data gaps. • Reference to date that a summary report on data gaps was provided to the Secretariat for consideration at TCC5 and WCPFC6. 	•
2.1.6	Participate in the Indonesia and Philippines Data Collection Project and the compilation of information on the tuna fisheries of Vietnam.	<ul style="list-style-type: none"> • List of technical support provided. • Links to reports of relevant meetings. • List of advice requested by and provided to the Secretariat. 	•
2.1.7	Produce and publish on the Commission's website the Tuna Fishery Yearbook 2008, containing annual catch estimates by gear type, flag and species.	<ul style="list-style-type: none"> • Link to the Tuna Fishery Yearbook, 2008. 	•
2.1.8	Maintain the Commission's website, including the dissemination of public domain catch, effort and size data on the Commission's website at agreed level of resolution.	<ul style="list-style-type: none"> • List of modifications made to the WCPFC website. • Link to public domain data posted on the WCPFC website. At the time of writing (January 2009), public domain data are currently unavailable due to problems associated with the three-vessel minimum specified in the Rules and Procedures for the Protection of, Access to and Dissemination of Data by the Commission. 	•

Output 2.2: Enhanced national fishery monitoring and data management systems		
2.2.1 Provide regional coordination of national fishery monitoring and data management systems through the provision of a template for integrated national tuna fishery monitoring, data collection forms, computer software, newsletters and other information, and through a meeting of the SPC/FFA Data Collection Committee.	<ul style="list-style-type: none"> • List of members supported and information provided. • Link to report of the Eighth Meeting of the Tuna Fishery Data Collection Committee. DCC8 has been tentatively scheduled for late 2009. 	•
2.2.2 Develop or enhance national tuna fishery data management systems, such as TUFMAN.	<ul style="list-style-type: none"> • List of members supported and types of support provided. In-country visits for TUFMAN support in 2009 have been proposed for Vanuatu, Kiribati, Palau, Nauru, and Tonga. Report on TUFMAN workshop for National Observer Managers Coordinators tentatively scheduled to follow the Observer Coordinators' Workshop in Noumea in July. 	•
2.2.3 Develop or enhance national observer programmes.	<ul style="list-style-type: none"> • List of members supported and type of support provided. In-country visits to support observer programmes in 2009 have been proposed for PNG, Kiribati, the Solomon Islands and Vanuatu. In addition to ongoing support, the types of support proposed for 2009 include (i) implementation of spill sampling by observers onboard purse seiners in selected ports of departure; (ii) paired spill and grab samples conducted to examine variances in species compositions among school associations, geographic areas and observers; and (iii) investigation of modifications to the current spill sampling technique. 	•

2.2.4	Develop or enhance national port sampling programmes.	<ul style="list-style-type: none"> List of members supported and type of support provided. An in-country visit to support observer programmes in 2009 has been proposed for Vanuatu. A port sampling programme in Noro, Solomon Islands has been proposed to examine accuracy of species composition of cannery receipts and will be implemented pending the availability of resources. Link to document on issues related to sampling of purse seiners in ports of transshipment, e.g. well mixing, subject to the availability of relevant information. 	•
2.2.5	Develop procedures for the auditing of national tuna fishery monitoring.	<ul style="list-style-type: none"> Link to finalised auditing procedures document. List of presentations of auditing procedures made to members, e.g., during the Third Tuna Data Workshop. 	
2.2.6	Provide technical support for the development of data collection from artisanal tuna fisheries..	<ul style="list-style-type: none"> List of members supported and type of support provided. Support of artisanal tuna fisheries data collection in the Federated States of Micronesia and Kiribati in 2009 is under discussion and will be subject to the availability of resources. 	
2.2.7	Provide technical support for various FFA initiatives.	<ul style="list-style-type: none"> List of support provided to FFA, e.g., for the development of EAFM. 	
Output 2.3: Enhanced capacity of PICTs to monitor fisheries, manage and use data			
2.3.1	Provide ongoing support to National Tuna Data Coordinators, including follow-up of issues arising at the Tuna Data Workshop and further development of national tuna data procedures documents.	<ul style="list-style-type: none"> List of members supported and support provided. 	•
2.3.2	Train national tuna fishery data management staff in the use of TUFMAN and other database and sampling programme management software.	<ul style="list-style-type: none"> List of members supported and numbers of national staff trained. In-country visits for TUFMAN training in 2009 has been proposed for Vanuatu, Kiribati, Palau, Nauru, and Tonga. Report on TUFMAN workshop for National Observer Managers Coordinators tentatively scheduled to follow the Observer Coordinators' Workshop in Noumea in July. 	•

2.3.3	Hold up to six national and sub-regional observer training workshops, a debriefer training workshop and provide support for nationally run training workshops.	<ul style="list-style-type: none"> List of workshops held, with date, location and number of certified observers and debriefers. In 2009 National workshops have been proposed for Papua New Guinea, Kiribati, Federated States of Micronesia and the Solomon Islands, whilst regional and sub-regional workshops are proposed to be held in the Solomon Islands, Vanuatu and Fiji. 	•
2.3.4	Hold a regional observer coordinator's workshop.	<ul style="list-style-type: none"> List of participating members and link to workshop report. 	•
2.3.5	Host up to six training attachments in fisheries monitoring and statistics at SPC headquarters.	<ul style="list-style-type: none"> List of attachments and type of training. Attachment training in 2009 has been proposed for Cook Islands, Tonga, Papua New Guinea and Vanuatu. POFM project quarterly reports 	•
2.3.6	Develop standards for competency-based training of observers.	<ul style="list-style-type: none"> Competency-based training (CBT) standards for observers published online (SPC, FFA, WCPFC websites). Link to report on standards for debriefer CBT. 	•

TABLE 3.

Objective 3: Improved understanding of pelagic ecosystems in the western and central Pacific Ocean, with a focus on the western tropical Pacific

2009 Work Programme Activities	Performance Indicators and/or Means of Verification	2009 Achievements
Output 3.1: Data on the biological characteristics of oceanic species and their environment		
3.1.1 Provision of quantitative data on the population dynamics of tunas. In 2009, these services shall include:	<ul style="list-style-type: none"> • Planning and implementation of PTPP Phase 2 for deployment of conventional and archival tags. <ul style="list-style-type: none"> – 3 month WP 2 – 3month WP 3 – 6 week CP 2 – 6 week CP 3 • PTPP Progress report presented to SC5. • Technical report documenting the analysis of PNG tagging data. • Peer reviewed publication submitted that describes tropical tuna horizontal movements as derived from archival tags • 50 to 100 Tag seeding experiments implemented to estimated reporting rates for PTPP • Tag recovery operations implemented for PTPP • Albacore tagging cruise implemented for deployment of conventional tags <ul style="list-style-type: none"> – First cruise implemented – Second cruise planned • Albacore tag recovery procedures 	<ul style="list-style-type: none"> •
a. Implementation of BET, YFT and SKJ research in WCPO waters to obtain data on local exploitation rates and the influence of FAD and seamounts on stock fidelity, movement and distribution		
b. Implementation of Albacore research in WCPO to obtain information on exploitation rates and movements		
c. Development of Albacore research in WCPO to obtain information on stock fidelity and movement.		

	<p>implemented.</p> <ul style="list-style-type: none"> • Albacore Tagging progress report presented to SC5. • Implement TDR study to estimate tuna habitat utilization in relation to LL operations 	
<p>3.1.2 Provision of quantitative data on the environmental drivers of distribution for tunas. In 2009, these services shall include:</p>	<ul style="list-style-type: none"> • Development of a robust CPUE for ALB that incorporates spatial variability in distribution. • Analysis of ALB distribution at EEZ scales in relation to oceanography • Analysis of BET, YFT and SKJ distribution at EEZ scales in relation to oceanography. • Manuscript documenting the comprehensive examination of the hypothesis that tuna, other pelagic predators and by-catch CPUE is positively associated with the presence of seamounts in the WCPO. 	
<p>a. Implementation of Albacore research in WCPO to obtain data on the influence of bathymetry, oceanographic and geographic drivers on tuna movement and distribution.</p>		
<p>b. Implementation of BET, YFT and SKJ research in the WCPO to obtain data on the influence of bathymetry, oceanographic and geographic drivers on tuna movement and distribution</p>		
<p>c. Characterising the relationship between seamounts and historical fishing data.</p>		
<p>3.1.3 Provision of quantitative data on ecosystem and trophic dynamics. In 2009, these services shall include:</p>	<ul style="list-style-type: none"> • Continued co-ordinations of stomachs and tissues & their analysis (objectives: 500 samples collected and 500 analysed if staff/funding available) • Maintain prey item reference collection • 4 Member country newsletters updating sampling status, section activities & results. • Analysis of pelagic predator diet and trophic position in WCPO ecosystem 	
<p>a. Identification of functional groups and influence of latitudinal, bathymetry and oceanographic effects</p>		
<p>b. Identification of natural isotope tags for studying tuna movement</p>		

	<p>with production of final reports/manuscripts for:</p> <p>Isotope map for tuna in WCPO.</p> <p>Influence of sampling gear on stomach content and isotope signature.</p> <p>Analysis of FAD impacts on diet, isotope signatures and fat content.</p> <p>Latitudinal comparisons of diets of pelagic species from the Pacific Ocean</p>	
3.1.4 Provision of quantitative data on age and reproduction of tunas. In 2009, these services shall include:	<ul style="list-style-type: none">• Central repository/database for all otoliths data improved to include the meta data for otoliths analysis• Implementation of ALB age and reproductive biology research• Implementation of BET growth and reproductive biology research (subject to WCPFC funding)• Prepare manuscript discussing influences of biological uncertainty upon tuna stock assessments	
a. Continue to receive and archive otoliths for future analysis comparing observed and estimated growth		
b. Implement tuna age-growth-reproductive research		
c. Document the uncertainty in tropical tuna growth and reproductive biology for SA structural sensitivity analysis.		
3.1.5 Provision of oceanographic data for OFP activities. In 2009, these services shall include:	<ul style="list-style-type: none">• Samoa, Marshal Islands assistance provided	
a. Oceanographic assistance for requested NTFSRs		
Output 3.2: Improved ecosystem models that incorporate available data		

3.2.1 Provision of ecosystem models that describe the pelagic environment and allow the consequences of ecosystem change and fisheries management to be explored. In 2009, these services shall include:	<ul style="list-style-type: none"> • Report/manuscript describing the feasibility of using the high resolution PISCES-ROMS model for developing the forcing grid for mixed-resolution SEAPODYM modeling. • Analysis of MPA benefits/impacts on tuna distribution and abundance • Analysis of Climate Change impact on tuna distribution and abundance • Implementing mixed-grid configuration within SEAPODYM with a zoom on New Caledonia, French Polynesia, PNG and Kiribati • Discussion paper (including recommendations) on plausible ecosystem indicators for application in EAFM 	
a. Develop regional version of SEAPODYM for examining EEZ scale trends in tuna distribution.		
b. Scenario analysis to forecast the effects of altered management (including closures & MPAs) on oceanic fisheries and its impacts on pelagic ecosystems.		
c. Examination of plausible ecosystem indicators for application in EAFM.		
3.2.2 Develop descriptions of the pelagic ecosystem for quantitative and qualitative risk assessments. In 2009, these services shall include:	<ul style="list-style-type: none"> • National-scale analyses and training in ERA for SIDS; • Implementation report submitted to the Secretariat and Working Paper for EB-SWG and SC5. • Manuscript submitted to Marine Policy presenting ERA project for WCPFC. • Scientific manuscript submitted for Hawaii fish species ERA • Scientific manuscript submitted for New Zealand seabird ERA • Complete feasibility study for shark stock assessments in WCPO. • Provide estimate of annual catches of shark, using both observer data and fin trade information. 	
a. Continue development of multi-species Productivity-Susceptibility Analyses (PSAs) at national and regional scales		
b. Provide additional detailed analysis of high risk spp. from PSA analysis.		

Output 3.3: Scientific advice on ecosystem-based management options using available models and data		
3.3.1 Delivery of scientific advice on tuna fisheries ecology and ecosystem-based management options to national counterparts and regional meetings.	<ul style="list-style-type: none"> • ERAs integrated into NTFSRs and FFA EAFM process, providing Pacific SIDS with scientific advice about ecosystem impacts of fishing. 	
3.3.2 Provide training in ecological aspects of tuna fisheries and ecosystem research	<ul style="list-style-type: none"> • Analysis of WCPFC Conservation & Management Measures (CMMs) for seabirds, turtles, sharks, and other non-target fish species. 	
3.3.3 Improve by-catch species identification, monitoring and management in WCPO tuna fisheries a. Implementation of the multi-year Ecological Risk Assessment (ERA), project for WCPFC, including associated Bycatch Information System b. Implementation of SPC projects under FFA Sea Turtle Action Plan. c. Scientific support to consultant developing Pacific Islands Regional Plan of Action (PI-RPOA) on Sharks.	<ul style="list-style-type: none"> • Develop maps of spatial overlap of seabirds with WCPO tuna fisheries • Document technical details of longline fishing operations • Develop species identification guides for seabirds vulnerable to WCPO tuna fisheries • Update SPC/SPREP publication on sea turtle interactions with WCPO tuna fisheries, including the bibliography of mitigation methods. • Populate the WCPFC Bycatch Information System with information on sharks and turtles; obtain input from BirdLife Int. for seabird bycatch mitigation. • Contribution to chapters in the climate change vulnerability assessment for Pacific fisheries. • Include ERA and other ecosystem-based management sessions in annual OFP training workshops. • Provide consultant developing PI-RPOA Sharks with information on shark species composition, distribution, catch estimates and 	

	<p>ecological risk assessments.</p> <ul style="list-style-type: none">• Presentation of results of ecosystem analysis to wider scientific community through publication in peer-reviewed journals.• 5 SC5 presentations• 1 OFP technical reports• 4 Scientific papers• Web-site updates• 4 newsletters.	
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7. Acknowledgements

34. The OFP would like to acknowledge the ongoing support of its traditional donors and the support and encouragement received during the year from our key clients, the fishery departments of Pacific Island Countries and Territories, and the secretariats of the Forum Fisheries Agency and the Western and Central Pacific Fisheries Commission.

ANNEX 1. Current staffing of the Oceanic Fisheries Programme.

Position	Name	Nationality	Funding Source
Programme Management			
OFP Manager	John Hampton	Australia/France	Core
Programme Administrator	Kay Parry	France/New Zealand	EC
Programme Assistant	Hélène Ixeco	France	Programme
Stock Assessment & Modelling			
Principal Fisheries Scientist	Shelton Harley	New Zealand	Programme
Senior Fisheries Scientist	Don Bromhead	Australia	Programme
Senior Fisheries Scientist	Simon Hoyle	New Zealand	WCPFC
Fisheries Scientist	Nick Davies	New Zealand	Programme
Fisheries Scientist	Michael Manning	New Zealand	GEF
Research Officer	Fabrice Bouyé	France	EC
Statistics & Monitoring			
Principal Fisheries Scientist	Tim Lawson	Canada/France	Programme
Fisheries Database Supervisor	Peter Williams	Australia	Programme
Fisheries IT Specialist	Emmanuel Schneider	France	WCPFC
Fisheries IT Specialist	Colin Millar	Australia	Programme
Port Sampling and Observer Supervisor	Peter Sharples	U.K./New Zealand	EC
Port Sampling and Observer Trainer	Siosifa Fukofuka	Tonga	EC
Fisheries Monitoring Supervisor	Deirdre Brogan	Ireland	GEF
Data Entry Technician	Sonia Savea	France	GEF
Data Entry Technician	Nathalie Lemesle	France	Programme
Data Entry Technician	Christine Nguyen	France	Programme
Data Entry Technician	Stephanie Chuvand	France	Programme
Data Entry Technician	Sylvie Le Pironnec	France	Programme
Data Entry Technician	Gabrielle Kari	France	EC
Monitoring Supervisor (NC)	Hugues Gossuin	France	EC
Monitoring Supervisor (PF)	Marie Yonger	France	EC
Ecosystem Monitoring & Assessment			
Principal Fisheries Scientist	Simon Nicol	Australia	Programme
Senior Fisheries Scientist	David Kirby	U.K.	EC
Fisheries Scientist	Valerie Allain	France	GEF
Fisheries Scientist	Bruno Leroy	France	PTTP
Fisheries Oceanographer	Karine Briand	France	EC
Ecosystem Modeller	Jesus Jurado-Molina	Mexico	EC
Fisheries Scientist	Ashley Williams	Australia	EC
Spatial Analyst	Telmo Morato	Portugal	GEF
Research Assistant	Caroline Sanchez	France	EC
Research Assistant	Aude Chenet	France	FFA/FPF
Laboratory Assistant	Under recruitment		PTTP
Tag Recovery Officer	Brian Kumasi	Papua new Guinea	EC
Tagging Database Officer	Sylvain Caillot	France	PTTP

ANNEX 2. Summary of services provided to SPC members by the Oceanic Fisheries Programme in 2008. This excludes services or work undertaken for multiple members as a part of regional activities.

SPC Member	Stock Assessment & Modelling	Statistics & Monitoring	Ecosystem Monitoring & Assessment
American Samoa		<ul style="list-style-type: none"> • Processing of port sampling data • Provision of data forms and sampling materials to port sampler 	<ul style="list-style-type: none"> • National-level ERA (Western Pacific Regional Pacific Management Council Workshop) • Participation in ERA workshop
Australia			
Cook Islands	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation (2) in Tuna Data Workshop • Processing of tuna fishery data • Provision of data forms • TUFMAN and CES updates and support • Funding of one full-time observer 	<ul style="list-style-type: none"> • Provision of PSAT tags for swordfish tagging • Participation in ERA workshop
Federated States of Micronesia	<ul style="list-style-type: none"> • NTFSR near completion (under review) • EAFM and tuna management plan stakeholder workshops attended • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation in Tuna Data Workshop • Processing of tuna fishery data • Provision of data forms • TUFMAN and CES updates and support • Participation in sub-regional observer training course (Palau) • Participation in regional observer coordinator's workshop 	<ul style="list-style-type: none"> • Participation in ERA workshop • National-level ERA for NTFSR (EAFM) • Tagging conducted in national waters
Fiji Islands	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation in Tuna Data Workshop • Processing of tuna fishery data • Provision of data forms • TUFMAN and CES updates and support • Participation in sub-regional observer training course (Vanuatu) • Refresher training provided to observers • Participation in regional observer coordinator's workshop • Provision of 2 computers 	<ul style="list-style-type: none"> • Biological sampling training • Participation in ERA workshop

France			
French Polynesia	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Funding of national observer/port sampling coordinator • Participation in observer training course for French Polynesia and New Caledonia (Papeete) • Processing of tuna fishery data • Provision of data forms • Operational support for observers and port sampling • Participation in Tuna Data Workshop • CES updates and support 	<ul style="list-style-type: none"> • National-level ERA • Biological sampling training • Participation in ERA workshop
Guam			
Kiribati	<ul style="list-style-type: none"> • In country stock assessment training course. • Two attachments hosted for NTFSR development • NTFSR work initiated • EAFM and tuna management plan stakeholder workshops attended • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Review of tuna fishery statistical system • TUFMAN installation and training conducted • CES updates and support • Processing of tuna fishery data • Provision of data forms • Participation in Tuna Data Workshop • Participation in sub-regional observer training course (Vanuatu) 	<ul style="list-style-type: none"> • Biological sampling training • EAFM stakeholder workshop • National level ERA for NTFSR (EAFM) • Participation in ERA workshop • Tagging conducted in national waters
Marshall Islands	<ul style="list-style-type: none"> • NTFSR work initiated • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation in Tuna Data Workshop • Processing of tuna fishery data • Provision of data forms • Part-funding of National Observer Coordinator • TUFMAN and CES updates and support • Participation in regional observer coordinator's workshop 	<ul style="list-style-type: none"> • Participation in ERA workshop • Biological sampling training

Nauru	<ul style="list-style-type: none"> • NTFSR near completion • EAFM and tuna management plan stakeholder workshops attended • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation in Tuna Data Workshop • Processing of tuna fishery data • TUFMAN and CES updates and support 	<ul style="list-style-type: none"> • National-level ERA for NTFSR (EAFM) • Participation in ERA workshop
New Caledonia		<ul style="list-style-type: none"> • Funding of national observer/port sampling coordinator • Operational support for observers and port sampling • Participation in observer training course for French Polynesia and New Caledonia (Papeete) • Processing of tuna fishery data • CES updates and support 	<ul style="list-style-type: none"> • Biological sampling training • Participation in ERA workshop
New Zealand			<ul style="list-style-type: none"> • National ERA workshop
Niue	<ul style="list-style-type: none"> • Attachment hosted for NTFSR development • NTFSR completed • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Processing of tuna fishery data • CES updates and support 	<ul style="list-style-type: none"> • Participation in ERA workshop
Northern Mariana Islands			<ul style="list-style-type: none"> • National-level ERA (Western Pacific Regional Pacific Management Council Workshop)
Palau	<ul style="list-style-type: none"> • Attachment hosted for NTFSR development • NTFSR completed • EAFM and tuna management plan stakeholder workshops attended • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Processing of tuna fishery data • Provision of data forms • TUFMAN and CES updates and support • Participation in sub-regional observer training course (Palau) • Participation in regional observer coordinator's workshop • Participation in Tuna Data Workshop • Funding support for one data entry operator • In-country TUFMAN training and data system review 	<ul style="list-style-type: none"> • Participation in ERA workshop • Biological sampling training • Tagging conducted in national waters

Papua New Guinea	<ul style="list-style-type: none"> • Participation (2) in stock assessment training workshops 	<ul style="list-style-type: none"> • National observer training courses (3) and competency-based training standards developed • Participation in Tuna Data Workshop • Processing of tuna fishery data • Provision of data forms • Attachment training of Observer Officer • CES updates and support 	<ul style="list-style-type: none"> • National-level ERA and by-catch analysis conducted • Tagging conducted in national waters • Participation in ERA workshop
Pitcairn			
Samoa	<ul style="list-style-type: none"> • Two attachments hosted for NTFSR development • NTFSR work initiated • EAFM and tuna management plan stakeholder workshops attended • Participation (2) in stock assessment training workshops 	<ul style="list-style-type: none"> • Processing of tuna fishery data • Provision of data forms • Participation in Tuna Data Workshop • Participation in sub-regional observer training course (Vanuatu) • CES updates and support • Participation in regional observer coordinator's workshop • Attachment for fishery statistics training 	<ul style="list-style-type: none"> • Biological sampling training • Oceanography analysis for NTFSR (EAFM) • Participation in ERA workshop
Solomon Islands	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Review of national tuna fishery statistical system • Processing of tuna fishery data • Provision of data forms • National observer training course • Participation in Tuna Data Workshop • Funding of National Tuna Data Coordinator • Funding of 2 data entry operators • TUFMAN and CES updates and support • Participation in regional observer coordinator's workshop 	<ul style="list-style-type: none"> • Tagging conducted in national waters • Participation in ERA workshop
Tokelau	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Processing of tuna fishery data • CES updates and support 	<ul style="list-style-type: none"> • Participation in ERA workshop

Tonga	<ul style="list-style-type: none"> • NTFSR completed • Participated in stock assessment training workshops 	<ul style="list-style-type: none"> • Processing of tuna fishery data • Provision of data forms • Participation in Tuna Data Workshop • Operational support for observers and port sampling • Participation in sub-regional observer training course (Vanuatu) • TUFMAN and CES updates and support 	<ul style="list-style-type: none"> • Participation in ERA workshop
Tuvalu	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation in Tuna Data Workshop • Processing of tuna fishery data • TUFMAN and CES updates and support • Participation in sub-regional observer training course (Vanuatu) • Participation in regional observer coordinator's workshop 	
United States of America			<ul style="list-style-type: none"> • Hawaii ERA (Western Pacific Regional Pacific Management Council Workshop)
Vanuatu	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 	<ul style="list-style-type: none"> • Participation in Tuna Data Workshop • Processing of tuna fishery data • Participation in sub-regional observer training course (Vanuatu) • Training and other assistance given to commence routine port sampling in Port Vila • TUFMAN and CES updates and support • Participation in regional observer coordinator's workshop • Funding of National Tuna Data Coordinator 	<ul style="list-style-type: none"> • Biological sampling training
Wallis and Futuna	<ul style="list-style-type: none"> • Participation in stock assessment training workshops 		