MPR-1/IWP/2002/W.P. 1a

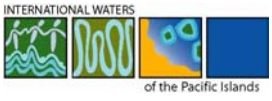
GLOBAL ENVIRONMENT FACILITY
UNITED NATIONS DEVELOPMENT PROGRAMME
SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

STRATEGIC ACTION PROGRAMME (SAP) FOR THE INTERNATIONAL WATERS OF THE PACIFIC SMALL ISLAND DEVELOPING STATES

FIRST MULTIPARTITE REVIEW (MPR-1)
27 July, 2002
Robert Reimers Hotel
Majuro, Republic of Marshall Islands

Agenda Item 1a.

Working Paper 1a
Summary Report – Oceanic Component

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Summary Report – Oceanic Component

Background

1. The Strategic Action Programme (SAP) for the International Waters[1] of the Pacific Small Island Developing States (the IWP) received its final endorsement from the Global Environment Facility (GEF) on 18th January 2000. At the same time, UNDP (Apia) was delegated authority by GEF to sign the Project Document on behalf of UNDP. The Project officially commenced on 16th February 2000, the day the Project Document was signed by SPREP, the executing agency and UNDP, the implementing agency.

2. The IWP has two components. The Oceanic Component (OFM) specifically targets the management and conservation of the tuna resource in the Western and Central Pacific. Responsibility for this aspect of the IWP rests with the Secretariat for the Pacific Community (SPC) and the Forum Fisheries Agency (FFA). Administrative arrangements for implementation of this component of the Project are the subject of Letters of Agreement negotiated between SPREP and SPC and SPREP and FFA. Within SPREP, the Project Coordination Unit (PCU) is responsible for the International Waters Programme.

3. The second Component is concerned with integrated coastal watershed management (ICWM). The PCU is responsible for execution of this Component. It involves the implementation of 14 community-based Pilot Projects - one in each country participating in the Programme (Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall

[1] The SAP defines international waters to include oceans, large marine ecosystems, enclosed or semi-enclosed seas and estuaries as well as rivers, lakes, groundwater systems, and wetlands with transboundary drainage basins or common borders. The water-related ecosystems and critical habitats associated with these waters are integral parts of the system. International Waters extend far inland and far out to sea. This is because the global hydrological cycle links watersheds, airsheds, estuaries, and coastal and marine waters through transboundary movement of water, pollutants and living resources.

This definition of International Waters fits precisely the reality of the Pacific Islands. Although separated by vast distances, these islands are linked and controlled by the vast marine environment. The land to sea ratio is generally so small that Pacific islands are wholly coastal in character. The importance of the health of International Waters to the islands cannot be overstated. Work undertaken during the SAP process resulted in the identification of three priority transboundary concerns related to International Waters:

- Degradation of their quality
- Degradation of their associated critical habitats
- Unsustainable use of their living and non-living resources

Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu).

4. The Programme aims to assist participating island States, and their communities:
- To improve capacity to manage transboundary water resources,
- To create improved processes to address environmental degradation, and
- To promote resource sustainability.

Programme Status

5. In consultation with the implementing agency, UNDP, the Project Document Logical Framework has been revised twice since Project inception. This has been done to refine the descriptive elements of the Programme and improve the potential for achieving the objectives and outcomes of the Programme as described in the Project Document. The revised Logical Framework (Information Paper 4) serves as the basis for reporting on progress with implementation of the Coastal Component of the IWP to the MPR.

Long-term Objectives

• Achieve integrated sustainable development and management of International Waters	• An enhanced framework for regional and national co-operation on critical transboundary management issues. • Improved national and regional capacities for the long-term sustainable development of ocean fisheries and improved ICWM capabilities in the Pacific Region.

Project Purpose

• Address the root causes of degradation of International Waters through a programme focused on improved OFM and ICWM.	• Country participation on committees and workgroups associated with OFM and ICWM activities. • Collaborative arrangements with other stakeholders, for example other CROP agencies and NGOs.

6. Participating countries are fully engaged in the Oceanic Component of the IWP. This is demonstrated through regional collaborative efforts to develop new institutional arrangements for the management and conservation of Western and Central Pacific migratory fish stocks. These activities are largely supported by the IWP.

7. Although principally inter-governmental in nature, other stakeholders are taking an active interest in ocean policy and institutional developments in this region. To the extent formal negotiating processes permit, broad stakeholder consultation is promoted in support of ocean policy development in the region.

8. In relation to the ICWM, participating countries are in early stages of establishing consultative arrangements to support the Programme. In many countries consultative processes to support the IWP will build on established consultative arrangements, such as those established for NBSAP. In others, new consultative arrangements, which accommodate broad representation from Government and civil society, are in the process of being established.

9. The Programme continues to provide the CROP Marine Sector Working Group with copies of Quarterly Narrative Reports. As the scope and design of Pilot Projects are finalized with participating countries there is significant potential to engage other regional

organisations (such as SPC, USP and SOPAC), and national and international NGOs in Project execution.

Current Status – Oceanic Component (OFM)

Secretariat of the Pacific Community (SPC)

Summary

By June 2002, nearly two years into the project, SPC primary activities under the project had been successfully implemented, with significant progress achieved towards key objectives.

In terms of enhancing national fishery monitoring capacity, existing observer and port sampling programmes have been improved and extended, through on-site, course and attachment training, and several new programmes initiated; data collection and quality procedures have been established, and a range of information disseminated in support of regional capacity building.

In terms of improved scientific advice relating to regional tuna stocks:

- An operational stock assessment model has successfully been developed to test the efficacy and performance of the existing model routinely used for regional assessments, and good progress made with the development of a range of reference points as required in fisheries management using the existing model.
- Following the design of an appropriate approach to biodynamic modeling of the warm pool ecosystem, biological sampling of ecosystem components, food web analysis and trophic level determination have been initiated as the first step in the process. The project has been successful in leveraging additional complementary funding to extend collaborative work to the entire Pacific over a longer time frame.

Work in other secondary project activities with FFA has made steady progress.

Expenditure to date is considerably less than projected but is expected to increase as the project becomes fully operational in all respects this year. There will be a project balance and an extension to the original timeframe project will be sought to enable objectives to be met as far as possible. Objectives for the remaining year of the project and beyond are outlined.

Nouméa,
June 2002

Introduction

10. The Oceanic Fisheries Management (OFM) component of the Strategic Action Programme (SAP) of the Pacific Small Island Developing States has the following objective:

> "To enable the conservation and sustainable yield of ocean living resources", with particular reference to oceanic fisheries supported by the Western Pacific Warm Pool ecosystem.

11. Planned outputs are regional-level methodologies and best practices for the conservation and sustainable yield of ocean fisheries. The SAP is being implemented at a time

when a Convention for the conservation and management of highly migratory fish stocks in the western and central Pacific has been adopted and the ensuing Commission is under development.

12. Within the OFM component of the SAP, the Oceanic Fisheries Programme of the Secretariat of the Pacific Community (SPC) has primary responsibility for two activities:

- Activity 3.3 Provide training and advice to strengthen fisheries monitoring capabilities with participating countries to secure added regional benefits through national and regional oceanic fisheries management arrangements.

- Activity 3.5 Improved scientific advice relating to regional tuna stocks, non-target species and the oceanic ecosystem available to support management decision-making.

- and cooperates in the execution of several others with the Forum Fisheries Agency ie

- Activity 3.1 Provide support and training, at FFA and SPC and within participating countries, to develop capacity for increased regional effectiveness in global ocean fisheries negotiations

- Activity 3.4 Provide support to enhance national capacity to manage tuna stocks within EEZs. This will include the convening of in-country fisheries management workshops.

- Activity 3.6 Support FFA member country efforts to develop and implement arrangements for a new regional tuna conservation and management body

- Activity 3.8 Prepare a project proposal to catalyze and replicate methodologies and best practices for sustainable ocean fisheries management based on an evaluation of project capacity building activities. This activity necessitates a study of the baseline situation at project commencement.

- Activity 3.9 Coordinate and refine consultative processes among FFA member countries with the objective of strengthening regional capacity. This is an activity that will be implemented and financed by FFA and SPC and will be undertaken through a series of joint FFA/SPC international meetings.

13. Implementation of OFP activities under the SPC/OFM component commenced in July 2000; some adjustment was made to project activities as stated in the project document to more closely reflect work to be undertaken.

14. Progress and achievements in the first two operational years of the project are summarized by activity in the following narrative.

Activities July 2000 – June 2002

Activity 3.3 Providing training and advice to strengthening fisheries monitoring capabilities within participating countries to secure added regional benefits through national and regional fisheries management arrangements

15. This key activity provides support primarily at the national level to improve the monitoring of all aspects of the WCPO tuna fishery, including catches of non-target species (currently not well monitored), through the development of more effective at-sea observer and catch (port) sampling programmes, both existing and planned. Information collected will, inter alia, contribute to the quality of scientific advice provided to assist management

decision-making (activity 3.5). One position, the Fishery Monitoring Supervisor (FMS), is directly associated with this activity, which has three main related components:

3.3.1 Support for national port sampling and observer programmes

16. Prior to initiating any activities under the project, a commitment was made to reviewing all existing national observer and port sampling programmes in the region, and developing strategies for their improvement and expansion. On-site reviews of existing port sampling and observer programmes, to evaluate the present quality of data collection and to institute changes as needed, were undertaken in Tonga, Samoa and Fiji (August-September 2000), and in Palau, Guam, Marshall Islands and Kiribati (November 2000). An eight day observer trip was undertaken in Samoa during this time to provide additional information on that fishery. Detailed reports are available for these reviews, as a result of which improvements have been instituted to most programmes, and an overall plan for regional coverage developed.

17. After this review, follow-up to the improvements instituted has been maintained, and supplemented with on-site and formal course training to support monitoring programmes. On-site port sampling training was provided in Samoa, American Samoa and New Caledonia, and need and capabilities assessed in Vanuatu and Fiji. An advanced training course for regional observers (13) was held in Port Vila, Vanuatu, in November 2000 (non-project funding). A refresher training course for observers and port samplers in FSM was requested of SPC and FFA. This was provided for one week at the start of July 2001. The course was attended by 18 participants, all of whom are presently continuing in active service.

18. One week was spent in the Marshall Islands, during July 2001, in an effort to assess and subsequently augment the performance of the purse-seine port samplers in one of the busiest ports in the region for purse-seine unloading at the present time. Longline observer training was then held in the Marshall Islands for one week in November 2001. Due to the urgent nature of the request and lack of notice to SPC, who had already paid an in-county visit earlier during the current reporting period, a consultant from MFA in FSM was engaged for one week to carry out the training. The training materials, course outline and the training schedule were provided by OFP.

19. A two week training course was also held in Kavieng, PNG in March 2002, in conjunction with the National Fisheries Authority of PNG, for 16 Senior Observers and Fishery Officers. The de-briefing form used to check data quality was further developed as a result of this training along with the observer database - which will flag data quality of incoming observer and port sampling data continued with over 60 batches of port sampling data and 40 observer data checked and prepared for data entry. General observer training, in cooperation with FFA and involving a Pacific Island consultant supported by project funds, was provided in Kiribati (May 2001) and most recently, Fiji (June 2002).

20. On-site training is being supplemented with attachment training to upgrade skills and capacity of key personnel associated with the execution of national programmes. The first attachment training visit was made in February 2001, with George Diau, the Solomons Islands Observer Coordinator coming to Noumea for a two week period. Training concentrated on registration and entry of observer data and data quality checks prior to data entry. A second attachment involved data quality training, with the Observer Coordinator (Steve Retalmai) from the Federated States of Micronesia visiting the Oceanic Fisheries programme during January 2002. Training was provided to assist the large FSM programme to be able to flag, correct and to give feed back to port samplers and observers,

21. National observer (and port sampling) coordinators are being identified and supported by the project to provide on-site supervision and build national capacity where relevant. An

appraisal of relevant country needs in terms of national co-ordinators was made, with Vanuatu, Fiji, Samoa and American Samoa visited over a three week period in October 2001. An initial commitment was made to the recruitment of coordinators for Papua New Guinea and Kiribati. William Kewo, the new deputy observer coordinator of PNG was recruited and began work in June 2002. A Kiribati national coordinator is under recruitment, and most recently, a national observer coordinator is in the process of being identified and recruited in Fiji.

22. General support for the established national observer and port sampling programmes is provided as required, or if problems arise. This support includes the printing and postage of data forms, the shipping of calipers, and the delivery of current MOUs for port samplers funded from elsewhere. Two new senior port samplers were recruited with non-GEF funds for Tonga and Noumea, New Caledonia, and subsequently trained for these duties. In an effort to improve the large amount of inadequate port sampling data coming from the Marshalls Islands, a one week intensive training course was conducted including both field and class work.

3.3.2 Supervision of data collection and data quality

23. National observer and port sampling programmes need to collect fishery and associated data, on target and non-target species, in agreed format and according to established priorities, and subject such data to quality control processes.

24. *Data collection:* A regional Data Collection Forms Committee, to standardize regional data collection approaches for catch–effort logsheets, observer and port sampling, met in early December 2000.Changes to existing data collection forms as advised by the Forms Committee were subsequently made to both the observer and port sampling forms. A full set of these new forms were then printed and distributed to the region at the beginning of May 2001. The forms were distributed with a new cover, featuring a new logo which is hoped will help to identify all the observer and port sampling training and resource material and draw it together.

25. A daily logsheet, for use by the longline fleet in the Western and Central Pacific, was also formatted. Data forms were printed and distributed.

26. *Data quality:* Existing national observer data held at SPC was subjected to initial quality control checks – observer reports for PNG (76) were assessed for data quality, and feedback provided to these observers, ensuring improved data quality in the future. 115 trips made by SPC observers were also sorted and verified, and all data quality issues resolved. All observer data held at SPC before August 2000, just after the project commencement, have been checked for data quality and assigned for data entry. All new and previously verified data have since been incorporated in the regional observer/port sampling database.

27. Data quality supervision has continued, mainly involving incoming port sampling data from the ports of Pago Pago, Majuro, Noumea, Guam, Chuuk, Pohnpei, Levuka and Suva. As noted, arrangements were made with FSM/MFA to have the National Observer Coordinator from FSM to travel to OFP during January 2002, as an attachment trainee for data quality work.

28. All longline port sampling data received up to November 2001 have been checked for data quality and entered in the regional database. Due to necessary changes and maintenance required by the purse-seine port sampling database, the quality checking of these pusre seine data has been set aside for the time being.

29. In conjunction with OFP's database team, database-generated data quality flags were sent to the observer and port sampling database for checking purposes. Although good progress was made, some sections need to be completed, and work in this area will be pursued more vigorously during 2002.

30. It was envisaged that a 'Data Quality Manual' would be produced. However, given ongoing errors associated with the use of new forms, it was felt that development of a detailed debriefing form, to be used by national co-ordinators and senior observers to debrief observers when they return from sea, would be more useful. Two new debriefing forms for both purse seine and longline observers were produced and have been trialled in FSM with good results. A list of possible and recurring observer errors were also documented to allow scientists to appreciate where possible errors arise in observer data. The methods used to detect and control errors and the database flags used for such erroneous data were also documented.

3.3.2 Information dissemination and regional capacity building

31. The second issue of a regional port sampling/observer information newsletter Forklength", to inform national programmes about activities throughout the region and provide information on a range of relevant topics was prepared and distributed during August 2000. A third issue of the newsletter was produced in October 2001. Distribution was initially held back so to enable inclusion of a report on the "Third Meeting of Observer Co-ordinators from the Forum Fisheries Agency Member Countries National Observer Programmes". The edition was printed and posted to all National Observer Programmes. It is also available on the website (www.spc.int/oceanfish/).

32. A commitment was made, early in the project, to the production of a 'Port Sampling Manual', an important reference source for national programmes. The detailed document, which is high demand, has recently been finalised and printed, and will shortly be distributed.

33. The "Third Meeting of Observer Co-ordinators from the Forum Fisheries Agency Member Countries National Observer Programmes" was held in Pohnpei at the end of June 2001, as noted. Another is planned for July 2002

34. Participants from the SPC/ Nelson Polytechnic Pacific Island Fishery Officers Training course were also given an overview of Port Sampling and Observer work in the region.

35. Other information dissemination activity during this time were the distribution of resource material (a field guide to the Indo-Pacific billfishes), the establishment of new terms and conditions for port samplers in both Tonga and Samoa, itemising IUU vessel reports, and preparation and distribution of resource material and sampling equipment.

36. A significant time commitment was made to participation the 14th SCTB during August 2001. An active role was played during this meeting including giving an overview on shark fishing in the Pacific, and reviewing the current state of National Observer programmes.

37. A paper reviewing the sampling protocols of the SPC statistical area was compiled and submitted for use by the OFP Fisheries Statistican. An analysis of the use of wire traces by fleet was prepared for the PNG IPOA on sharks. The Fishery Monitoring Supervisor also attended the Wespac Turtle workshop and presented a review of turtle bycatch in the western and central Pacific Ocean tuna fisheries, commissioned by SPREP.

38. As a result of support provided under the project, effective port sampling and observer programmes are in place in numerous countries in the region, with data generated

subject to routine quality checks and incorporated in regional databases, to assist in the generation of management information and inform regional processes.

Activity 3.5 Improved scientific advice relating to regional tuna stocks, non-target species and the oceanic ecosystem available to support management decision-making.

39. Two complementary positions are associated with this activity – the Stock Assessment Specialist (SAS), and the Fisheries Research Scientist (Ecosystems). The former position is primarily involved with the analysis and interpretation of biological and statistical data pertaining to the assessment of tuna species harvested in the WCPO. The later undertakes biological research on the ecosystem supporting the WCPO tuna fishery, particularly the non-target species, and assess the impacts of fishing on these species, through the application of biodynamic models.

Statistical analyses and development of analytical models

40. Since beginning in September 2000, the SAS familiarised himself with various features of the MULTIFAN-CL model (MFCL for short), the length-based age-structured statistical catch-at-age model developed by the SPC/OFP and now routinely used for tuna stock assessment in the WCPO. This includes the user interface, the essential data requirements, the underlying mathematical and statistical basis, the C++ code structure and numerical libraries etc. During this exercise, the list of variables and functions used in the latest version of the model was upgraded, and areas where the model could be modified to improve clarity were identified.

41. The first working version of an operational model was completed in March, 2001. This model contains approximately 3000 lines of C++ code (+ numerical libraries), and is designed to run on several platforms (PC/NT, PC/LINUX, Mac/OS9), with commonly available compilers (Borland, Metrowerks, VC++, etc.). The model can simulate key aspects of the dynamics of the WCPO yellowfin tuna (YFT) fishery, as described in Hampton and Fournier (2001)[2]. The model includes components for recruitment, growth, natural mortality, spawning, fish movement, and exploitation by 16 fisheries with different gear types, catchabilities and selectivity patterns. Environmental data are used to adjust recruitment patterns, and all commercial effort series available to SPC are used to represent the historical and spatial trends in exploitation. The model also makes use of data from tagging programs conducted by SPC staff in the region, and predicts the expected tag recovery patterns in various time/area/fishery strata. The model can generate a wide variety of outputs on key components of the fisheries or the stock, under specific hypotheses concerning environmental effects and user-specified levels of process and observation errors.

42. Since the model became operational, new features were progressively added to conduct specific tests. The first series of tests (>70) was conducted to determine if there were any logic or programming errors in the code that would translate into unreliable outputs. By and large, the fishery data sets generated were found to adequately represent the YFT fishery in the WCPO. The simulated catch trends matched the observed patterns for all fisheries. The same was true for the tag attrition rates and the catch length frequencies. Several data sets were generated and used as input files for MFCL analysis. Most of the parameters estimates were comparable the values used to generate the data. In some cases, substantial discrepancies were detected, and resulted from the model's inability to reproduce certain features of the fishery. This deficiency was corrected by adding new functions to the simulator, and by further calibrating some of the model components.

[2] Hampton, J., and D. Fournier. (2001). A spatially disagregated, length based, age-structured population model of yellowfin tuna (*Thunnus albacares*) in the western and central pacific Ocean. Mar. Freshwater Res., 2001, 52, 937-963.

43. Starting in June 2001, the YFT fishery operational model was used to conduct a second series of tests to determine the reliability of MFCL estimates of stock status under a variety of progressively complex scenarios concerning the fishery and the stock conditions. Initially, these tests indicated that the MFCL set-up procedure used for assessment purposes had to be slightly modified to ensure that the entire parameter space of the test conditions was being searched properly.

44. Subsequently, the tests indicated that the MFCL estimates of biomass, mortality, growth, gear selectivity, recruitment, fishery impacts were close to the actual values, when the simulations were made under fairly simple conditions (no differential growth, no measurement/observation errors, recruitment series with modest log-normal error, etc.). These simulations revealed that the availability of mark-recapture data improved the accuracy of the biomass estimates, presumably because this ancillary source of information helps quantify the effects of various mortality agents on the structure of the untagged population. Under more complex simulation conditions, the reliability of some estimates decreased to a greater or lesser extent. Efforts were made to identify the types of adjustments necessary to improve the accuracy of the estimates under such conditions, and in some cases, changes made to the MFCL code lead to substantial improvements. This should not be interpreted as evidence of deficiencies or serious errors in the MFCL code itself. This assessment model is very complex, with some components still being developed, so ongoing testing and adjustments are necessary.

45. Good progress has thus been made on evaluating the model used for routine tuna stock assessment in the region, and identifying possible improvements.

Development of precautionary reference points for selected fish stocks

46. Having completed the basic tests aimed at identifying areas where improvements were necessary or desirable, efforts then focused on determining the reliability of MFCL estimates of precautionary reference points (PRPs). In 2001-02, the latest versions of MFCL were modified to generate reference points, as now routinely required for fishery management under the application of the precautionary approach (see Restrepo et al. 1998, for overview)[3]. A prototype extension was successfully added to the model to perform a production analysis and determine the level of MSY associated with hypothetical exploitation patterns as might occur in the future. Additional changes were made to estimate biomass trends in absence of exploitation into the future. The preliminary results were encouraging, and strongly suggest that this sophisticated stock-assessment model can be modified for additional forecasting purposes.

47. Since 2002, a new series of tests were conducted to operational model serve to test the accuracy of the estimated reference points. For this purpose, new functions were added to the operational model to produce comparable values (added weight frequencies of catches, age allocation of tagged groups modified, new output formats for testing and data visualisation purposes, etc.). During this process, some of the changes made lead to even closer fits between the estimated and actual trends in M-at-age, which had been identified previously as a source of concern. Computer scripts were then produced to allow the sequential production and analysis of simulated datasets (with different random number series) on the OFP's Unix-driven computer. This was necessary to conduct Monte Carlo

[3] Restrepo, V., G. G. Thompson, P. M. Mace, W. L. Gabriel, L. L. Low, A. D. MacCall, R.D. Methot, J. E. Powers, B. L. Taylor, P. R. Wade, J. F. Witzig. 1998. Technical guidance on the use of precautionary approaches to implementing national standard 1 of the Magnuson-Stevens fishery conservation and management act: NOAA Technical Memorandum NMFS-F/SPO-31. Washington, DC. 18 pp.

simulations more efficiently, which is the procedure selected to determine the accuracy, precision and bias associated with various estimates produced my MFCL over a range of plausible fishery realisations.

48. A cursory examination of the Monte Carlo simulation results obtained from 10 different tests conducted under the same [simple] fishery conditions showed that some reference point estimates had small levels of bias (10-15% for $B_{current}/B_{start}$), while others had slightly larger levels (25% for M-at-age and F-at-age). The results are encouraging, because such levels of bias are considered to be relatively minor, and far lower than what other investigators have obtained under similar situations with different assessment models.

49. Additional simulations are underway and will continue throughout 2002 to determine what combination of factors yield biased reference points estimates (if any), and the magnitude of the bias. In principle, this could help adjust the MFCL estimates of reference points if the principle investigators believe that data deficiencies or model limitations are primarily responsible for the estimate biases. In the immediate future, efforts will focus primarily on conventional Biomass-based, F-based and M-based reference points such as $B_{current}/B_{start}$ and F_{age}/M_{age}. Current plans are to present the preliminary results at the upcoming SCTB meeting held in Honolulu in July 2002. Feedback from the participants will be crucial in determining the most important fishery scenarios that need to be simulated for testing purposes in the immediate future. This is now considered a priority since generating and assessing a single data set of a complex scenario can take as much as 2.5 d of computing time on a relatively fast PC (800 mz CPU). This suggests that extensive tests of complex data sets could take as much as 100 d of computing time to complete, so there is a genuine need to focus on the most important scenarios as early as possible to get meaningful and useful results.

50. All the tests conducted prior to SCTB are based on the existing model structure where recruitment is largely independent of spawning biomass. After the SCTB meeting, a stock-recruit function will be added to the operational model to provide more biological realism, and serve to compute MSY-based reference points ($B_{current}/B_{msy}$, $F_{current}/F_{msy}$). The later will then be compared to those estimated by MFCL using a stock-recruitment function with the same structure. This exercise could also help determine the reliability of reference points estimated by means of proxies, as done by fishery agencies when MSY figures can't be quantified with certainty ($F_{msy} = 0.8\ M_{average}$, and $B_{msy} = 0.4\ B_o$).

Inputs to the MHLC process and succeeding arrangements

51. Scientific inputs were provided to the April 2001 meeting of the 1st Preparatory Conference, when possible arrangements for the provision of scientific advice were explored.

52. Scientific inputs were also provided to the 2nd meeting of the Preparatory Conference, held in Madang, PNG, in February/March 2002, particularly in terms of inputs to the activities of Working Group II, Scientific Structure and Provision of Scientific Advice.

Biological research on Warm Pool ecosystem components

53. The FRS initially reviewed all available information on the Warm Pool ecosystem and its biotic components, available data on by-catch collected by observer programmes and held in regional databases, and established contact/ dialogue with other relevant agencies and research programmes. In collaboration with colleagues it was decided that the study of the food web (trophodynamics) was a priority for the understanding of the warm pool ecosystem. This requires the implementation of a sampling programme to collect stomachs and tissue samples, the examination of the fish stomach contents to establish diet of the different components of the ecosystem, and the isotopic analyses of muscle and liver samples to

determine the trophic level of the fish. This information, when incorporated in biodynamic models should allow modelling of the tuna ecosystem to assess the fishing impact on the ecosystem and target tuna stocks. Field research, to collect and analyse necessary information to address the objectives of the ecosystem work, then commenced following the initial review and planning period.

54. The draft food web study of the Western and Central Pacific tuna ecosystem was presented in three meetings for comment and criticism. An oral presentation was made at the 14th Standing Committee on Tuna and Billfish (hosted by SPC) in August 2001 at Noumea, New Caledonia and at the Pelagic Fisheries Research Program Principal Investigators workshop (hosted by JIMAR-University of Hawaii SOEST) in December 2001 at Honolulu, Hawaii. A poster was displayed at the Reykjavik conference on Responsible Fisheries in the Marine Ecosystem (hosted by FAO-Iceland-Norway) in October 2001 at Reykjavik, Iceland. Contacts were established with scientists at these meetings and several collaborations are under discussion with D. Pauly and V. Christensen (University of British Columbia- Canada) for the Ecopath/Ecosim biodynamic model, with K. Holland (University of Hawaii), M. Seki (NMFS- Hawaii USA) and F. Galvan (CICIMAR- Mexico) for biological sampling and isotope analysis, among others.

55. Contacts were established with scientists from throughout the Pacific Ocean to collaborate on a wider study of the "Trophic structure and tuna movements in the pelagic ecosystem of the equatorial Pacific". This study includes diet analysis, stable isotopic compositions, food–web modelling and stable isotope markers to trace tuna movements and trophic level variation in the western, central and eastern Pacific Ocean. Collaborators involved in this study are Robert Olson (IATTC, La Jolla, USA), Felipe Galvan (CICIMAR, La Paz, Mexico), Brian Popp (University of Hawaii, Honolulu, Hawaii) and Brian Fry (Institute of Pacific Islands Forestry, Honolulu, Hawaii). The project was developed during first quarter 2002, and the proposal was approved for funding by PFRP (Pelagic Fisheries Research Program of the University of Hawaii) during second quarter 2002. Funding has been approved for this project, which should start in early 2003 and is expected to last for three years, it will help in sampling program and isotope analysis of the different collaborators of the project. This strong collaboration should allow an improved understanding of the ecosystem of the equatorial Pacific Ocean.

Biological sampling programmes

56. Several research streams – sampling programme implementation, food web analysis and isotope analysis to provide the necessary biodynamic model inputs – are serviced by the sampling activity.

57. *Coordinated sampling programme:* The FRS undertook two fishing trips, the first one during the first quarter 2001 on a New Caledonian longliner and the second one during the second quarter 2001 on a Korean purse-seiner. According to information gathered during these trips, stomach and muscle sampling procedures were established and matched to the two primary fishing methods. In coordination with the FMS, a pamphlet explaining stomach and muscle sampling procedures for the observers was completed. This pamphlet as well as the tuna ecosystem study have been presented by the FMS to observer coordinators of several Pacific countries during a meeting held at the end of second quarter 2001 in the Federated States of Micronesia. The sampling protocol designed for observers was modified according to the suggestions of the observer coordinators during third and fourth quarter 2001. In conjunction with colleagues from Hawaii and the Eastern Pacific, it was decided to collect liver samples for isotope analysis, the sampling of liver was then added in the sampling protocol during first quarter 2002. Final corrections, revision and edition of the pamphlet were completed during the first quarter 2002, and pamphlets in colour were printed on waterproof paper during the second quarter 2002. Forms for sampling were also prepared for

the observers. New purse-seine and longline stomach/muscle/liver sampling forms were edited and printed during fourth quarter 2001and second quarter 2002 respectively.

58. Minor equipment for sampling has been purchased during second quarter 2002 and part of the equipment should be purchased by the observer coordinators in the different countries participating to the programme.

59. The implementation of sampling procedures was discussed with Federated States of Micronesia and Marshall Islands observer supervisors during meetings in Pohnpei and Majuro respectively. The observer supervisors of Papua New Guinea and of the US Multilateral Treaty were contacted and agreed to contribute to the collection of samples. Training was provided to one observer from New Caledonia and one from Marshall Islands. Shipping of samples from Pacific Islands back to Nouméa is problematic, as the samples are perishable material; this problem is still awaiting resolution. As an example, the samples collected in May 2001 and stored in a freezer in Ponhpei were sent to Noumea in December 2001, the transportation solution found was not ideal the best as the samples arrived defrosted.

60. During 2001, four fishing trips were undertaken to collect samples: 2 trips by the FRS (1 longline, 1 purse seine) and 2 trips by an observer (2 longline). Larger sampling over the region should start as soon as equipment and pamphlets are available, and it is expected to begin during the third quarter 2002.

61. Another protocol was established to sample Particulate Organic Matter (POM) as well as phytoplankton, and zooplankton during first quarter 2002. Those samples should allow us to obtain stable isotope value for low trophic level components of the ecosystem. Equipment for zooplankton sampling was borrowed from the French Institute of Research for Development (IRD) from Nouméa, New Caledonia, and have been modified and fitted during second quarter 2002. Equipment for POM, zooplankton and phytoplankton sampling has been purchased during the second quarter 2002.

62. *Tuna ecosystem food web analysis by stomach content examination:* During the four trips done in 2001, 393 stomachs were examined and sampled when non-empty. They belong to 3 species of tuna (skipjack, yellowfin, and bigeye) and to 20 by-catch species (billfish, sharks, rays and others). Laboratory equipment ordered during the first quarter 2001 was received in June 2001, and the wet laboratory was fully equipped at the end of third quarter 2001. A protocol for stomach examination was established according to information found in scientific publications and in collaboration with colleagues from IRD. The

South Pacific Forum Fisheries Agency

Summary

The implementation of the technical activities of the IW Project for which FFA is responsible is substantially on track, and the work undertaken in the first two years has been highly successful in addressing the Project objectives at both national and regional levels.

The technical highlights include:

- Effective Pacific Island participation in the conclusion of negotiations on a new convention for regional tuna management, and the first stages of work in an international Preparatory Conference to establish a new regional tuna management Commission
- Strengthened capacities and arrangements for tuna management and development at the national level in most FFA Member countries

- A quickening of the pace of tuna development in several FFA member countries which is bringing important economic gains.

Earlier problems with the administrative and financial implementation of some of the activities arising from a lack of clarity in the Project Document, have been resolved and the administrative and financial aspects of the Project are running smoothly, although reporting requirements are more complex than expected.

In the first two years, just under 50 per cent of the three year budget has been spent, with some major activities planned for the next half year. Within the overall programme, funding for some activities is fully committed, while funding for some other activities is projected to be underspent.

In response, the Agency proposes:

In the short term:

- some balancing adjustments to budgets for items within FFA-implemented activities, specifically to increase the budget for International Meetings and Attachments and reduce the budgets for Regional and National Fisheries Management Workshops; and
- an extension of the term for the Oceanic Fisheries Management component by 6 months to December 2003.

In the longer term:

- a top-up from additional or diverted funds to extend FFA-implemented activities to December 2004, with an extension of the term of the Oceanic Fisheries Management component to December 2004; and
- preparation of a proposal for a new 3-5 year programme of work on FFA-implemented activities

Introduction

63. The Strategic Action Plan (SAP) for International Waters of the Pacific Islands Region identified oceanic fisheries management as a key target area within the SAP goal of integrating national and regional sustainable development priorities with shared global environmental concerns for protecting the International Waters of the region.

64. The Forum Fisheries Agency (FFA) is responsible for the implementation of three IW-funded activities as set out in the Project Document:

- Activity 3.1: Provide training to FFA to develop and implement project-related management arrangements
- Activity 3.3: Provide support to develop appropriate national ocean fishery management regimes
- Activity 3.5: Provide training in fisheries management capabilities
- Activity 3.6: Improve regional surveillance and enforcement of ocean fisheries

65. These activities involve 3 streams of work:

- At the regional level;
- At the national level; and

- Within the FFA Secretariat

Supporting The Development Of New Regional Tuna Management Arrangements

Background

66. The members of the South Pacific Forum, acting as members of the South Pacific Forum Fisheries Agency (FFA) have for a long time been recognised as playing a leading role globally in the development of innovative approaches to regional tuna management. Until now, these arrangements have focused on ensuring the compliance of foreign vessels with the laws of Pacific Island States and with strengthening the exercise by Pacific Island States of their rights over the tuna resources in their waters.

67. In response to growing international concern over fishing on fish stocks in the high seas, the international community has taken a number of steps to address problems of overfishing generally, and of conservation of fish stocks of the high seas in particular. The major legal instrument developed in this process has been the UN Fish Stocks Agreement. The Agreement sets down details of arrangements for cooperation between coastal states and states involved in fishing in the high seas, and in particular calls for the establishment of regional organizations to be responsible for the conservation and management of fish stocks occurring in the high seas. Following the conclusion of the UN Fish Stocks Agreement at the global level, the Member countries of the South Pacific Forum initiated a process of negotiations on a Convention that would establish a new Commission for the conservation and management of tuna in the Western and Central Pacific region. The Convention includes well-defined mechanisms that can be applied to ensure the conservation and effective management of the resources of tuna and related species in the Western and Central Pacific, and powerful provisions for strengthening the capacity of FFA states to benefit from the tuna resources of their EEZs and for promoting their rights to participate in tuna fishing in the high seas.

Progress to Date

68. The South Pacific Forum and FFA States have played a major role in the negotiating process leading to the conclusion of the new Convention to establish the Commission, and in the preparatory work for the establishment of the Commission. The IW Project provides resources to support this process. Major thrusts of this support from IW have been:

- funding of Pacific Island participation in the last two rounds of negotiations for the new Convention, and the first two meetings of the Preparatory Conference set up to undertake the work necessary for the establishment of the new Commission;
- funding of senior Pacific Island fisheries specialists to attend and learn from meetings of tuna commissions in other regions including the Inter-American Tropical Tuna Commission, the Indian Ocean Tuna Commission and the International Commission for the Conservation of Atlantic Tunas, and provision of related technical advice
- organisation of regional technical consultations on:
    - a regional monitoring, control and surveillance scheme which is expected to provide the basis for the compliance and enforcement regime of the Commission. While the details still need to be negotiated with fishing state partners in the process, the FFA states' initiative seems likely to put in place the most comprehensive arrangements for regional fisheries monitoring, control and

surveillance anywhere in the world, establishing a new global standard for regional fisheries compliance and enforcement

- data issues related to the new Convention at which FFA states set out a framework for the collection of fisheries data and provision of data to the Commission
- administrative arrangements for the Commission at which FFA States developed proposals for the way in which the new Commission would operate, focusing in particular on ensuring that the rules of the Commission would require it to function in a way that enables effective participation by small Island states, and on a system of financial contributions and budgeting that would ensure the costs are largely met by fishing nations and boat owners

69. The Convention establishing the new Commission was finalised at the last round in September 2000. It has been signed by 19 of 25 states eligible to participate, including 15 of the 16 Member States of the FFA, and the United States, and it has been warmly welcomed by all responsible fishing nations operating in the region. The value of the support provided by the IW Project in enabling full participation by Pacific Island States in this process has been formally recognised by the Forum Fisheries Committee, the governing body of the FFA.

70. The new Convention is:

- **nationally important**, and for some countries critically so, because it will both establish a framework for conservation to maintain the abundance of a resource that is centrally important to the future welfare of all Island states; and it will provide new opportunities for Island states to develop their own fishing industries and derive greater benefits from the tuna resources in their waters – already the pace of domestic tuna industry development is quickening in a number of Island states as important players in the global tuna industry seek to establish new sources of tuna supply and new arrangements with Island states anticipating arrangements that will strengthen the role of Island countries in tuna development; and
- **globally important** both because it will establish the framework for the management of the world's most important tuna stocks, providing over half of the world's supplies of tuna, and because it is the first new arrangement in the world concluded under the UN Fish Stocks Agreement. As they carry this work forward, the countries of the region, with the fishing states as partners, will be taking decisions and putting in place processes for regional fisheries management that will have a substantial impact as precedents in fisheries management in other parts of the world.

Work Ahead

71. The next step in the process is the third meeting of the Preparatory Conference which will make the necessary arrangements for establishment of the Commission, including its rules of procedure and regulations and may undertake preliminary work towards the scientific and compliance aspects of the work of the Commission. This will be held in the Philippines in November 2002. Project funds will be used to support Pacific Island participants to this session, but this will exhaust funding for this activity under the existing budget. Two further sessions of the Preparatory Conference are expected during 2003, and a proposal is made below to reallocate uncommitted Project funds from Regional Workshops to support Pacific Island participation in these two sessions. The Preparatory Conference is now entering into a critical stage – the main thrust of the structure, budget and programmes of the Commission

with options have been laid out in the first two sessions– from now on the states participating in the Conference will have to start taking some hard decisions on programmes and priorities.

72. Related activities include further attachments of Pacific Island fisheries specialists to gain experience in international fisheries management.

Strengthening National Fisheries Management Capacities

Background

73. The new regional tuna management regime brings both new responsibilities and new opportunities for the countries of the region, and the impact will be greatest on some of the smallest states with large fishery resources.

Progress to Date

74. The IW Project provides assistance to Pacific Island States to strengthen their fisheries management capacities through direct technical advice and training from an expert provided to FFA by the Project, focusing in particular on the preparation of tuna development and management plans and assistance in legal reviews; through the holding of in-country fisheries management workshops; and through a programme of attachments enabling key Pacific Island to participate in relevant FFA activities. IW Project assistance has been provided so far through these activities to:

- Cook Islands – technical advice on tuna management and fisheries law
- Fiji – technical advice on tuna management
- Niue – national workshop on tuna management and fisheries law
- Papua New Guinea – technical advice and national workshop on tuna management
- Tuvalu – preparation of a national tuna plan and advice on tuna management
- Vanuatu – advice on tuna management and a national workshop on tuna management and fisheries law

Work Ahead

75. Substantial activities are planned over the next year in Kiribati, Marshall Islands and Palau as well as further assistance to all of the countries listed above.

Strengthening The Forum Fisheries Agency

Background

76. Since its establishment in 1980, born out of the deep-seated changes in oceanic fisheries management flowing from the negotiations on the UN Convention for the Law of the Sea, the FFA has led the way internationally in promoting cooperation among coastal states in managing tuna stocks. Some of the programmes it has developed as part of this work have become international standards. FFA was the first regional tuna organization to develop a regional vessel register for compliance purposes and the new UN Fish Stocks Agreement will now require such registers in all regions where there is high seas fishing covered by the Convention. And the FFA developed and ran the first regional satellite-based vessel monitoring system, now also becoming an international standard for regional fisheries management organizations.

77. The major objectives of the Agency's work since its establishment have been securing compliance by foreign vessels with the laws of FFA Member States, and assisting

Member States to develop their own domestic tuna industries based on the resources of their EEZs. But a wider responsibility has always loomed for the FFA members. That responsibility is to cooperate with fishing states to ensure the conservation and management of tuna resources throughout their range including the high seas. The new Convention provides a framework for this – a framework which at the same time can be used to strengthen the exercise of the sovereign rights of FFA Member States over tuna in their EEZs and empower them to participate in high seas fishing for tuna.

Progress to Date

78. For the FFA Secretariat the conclusion of the new Convention means developing new capacities in fisheries management, and the Project provides this through the services of one fisheries management expert and short term advisory fellowships. The Fisheries Management Adviser supports FFA's participation in the process to establish new regional tuna management arrangements and leads the FFA's work in assisting FFA Member States to develop Tuna Development and Management Plans described above. Visiting experts funded under the fellowship scheme provide advice and training on specific technical issues. To date these have included the operation of regional fisheries commissions, and the design of vessel register and vessel monitoring systems.

79. The Project is also funding assistance to improve the quality of the surveillance and enforcement information that FFA provides to its Members.

Work Ahead

80. Planned activities in FFA for the third year of the Project involve principally a third year of work by the Fisheries Management Adviser aimed at the joint targets of assisting Pacific Island states to develop and articulate positions on issues related to the establishment of the new Commission; and assisting in strengthening in-country tuna management capacities. The other major initiatives will be a review of the quality of data in the monitoring, control and surveillance databases to ensure that these systems are operating effectively as new arrangements come into place and development of a draft MCS Scheme under the Convention.

Administration Of Project Activities

81. Within, FFA, the Corporate Services Manager serves as the Project Coordinator for FFA-implemented Project activities. This person is a senior staff member, reflecting the importance attached by the Agency to the Project, and to careful stewardship of the resources that it provides; and he maintains a close working relationship with the Project Manager.

82. In the earlier stages of the Project, significant problems were experienced due to inconsistencies between the Input Budget in Table 1 of the Project Document and the Output Budget in Table 3 of the Project Document. These problems have now been substantially resolved, and the administrative and financial aspects of the FFA-implemented aspects are running smoothly. Additional UNDP reporting requirements beyond those originally anticipated have increased the reporting task.

Financing Of Project Activities

83. Detailed updated information on financial aspects of FFA-implemented activities will be reported separately, but in brief:

- After two years of the planned three year programme, just under 50 per cent of the budget for FFA-implemented activities has been spent;

- Some major activities are planned for the next 6 month period, including support for Pacific Island participants to the third meeting of the Preparatory Conference, a regional monitoring control and surveillance workshop, and a heavy programme of attachments
- Financing for supporting Pacific Island participation to the Preparatory Conference and attachments will be fully spent by the end of 2002, leaving no financing within the existing budget for support for expected meetings of the Preparatory Conference or attachments in 2003.
- The budgets for regional and national workshops are underspent, largely because it has been possible to use in-country experts and regional experts that are already funded for these workshops. Funding can be reallocated from these activities to supporting Preparatory Conference participation and additional attachments without reducing the workshop programme. It is therefore proposed to switch under-committed funds from the national and regional workshops to Preparatory Conference support (International meetings) and attachments.
- In addition, a short extension of the FFA-implemented activities is proposed to December 2003. This can be funded within the existing budget of US$1.92 million for the FFA-implemented activities.
- Beyond this, there will continue to be a strong need for the further extension of the kinds of activity that have been funded by the IW Project through FFA. It is planned to develop a proposal for a further 3-5 years of funding for this purpose. In the meantime, an increase in the budget of around $415,000 would enable the activities to be extended until December 2004.

Further Project Development

84. When the IW Project in its present form was being designed in the mid-1990s, the negotiation of the new regional tuna management convention was in its earliest stages, and there was substantial uncertainty about the nature of the outcome, the scope of any new arrangements that might emerge, the future role of the FFA, and the impact of any new arrangements on Pacific Island countries. This uncertainty was a major reason for limiting the time frame for planned assistance under the IW Project to three years while the Project as a whole covered five years.

85. At this point, the uncertainty is greatly reduced and there is a much clearer basis for future planning of the development of regional tuna fisheries management.

86. Major points for future planning include:

- The result of the Multilateral High Level Conference and Preparatory Conference will be a tuna management Commission and regulatory regime that is legally binding and broadly, based involving all the major coastal states of the region and most of the fishing states;
- The Commission will have a strong scientific programme based on the efforts of its own directed technical secretariat staff rather than on voluntary efforts by scientists employed by Member States as is the case in most existing regional fisheries management organisations
- The Commission will apply the first comprehensive compliance and enforcement programme to a major fishery operating in the high seas as the first application of the UN Fish Stocks Agreement
- The bulk of the costs of the Commission operations and the programmes that it will be responsible for, will be borne by fishing states and boatowners
- The FFA will broadly maintain its role with its Members making up one of the two chambers on which the decision-making process of the Commission

will be based – it will have to give greater priority to fisheries management issues in its work programme, while giving more attention to assisting Pacific Island counties to generate economic gains through tuna development from the opportunities that the new Commission will create – but it is also likely to be contracted to provide services to the Commission in 2 major areas – the operation of the vessel register and the satellite-based vessel monitoring system

- Pacific Island States face new responsibilities and new opportunities – most now have plans in place to meet these responsibilities and take up the new opportunities – but there will be a need for a large volume of assistance to build national capacities in tuna management to realise these plans.

87. With country endorsement, the FFA will work with SPC to develop a proposal for a new programme of GEF-financed assistance to extend the reach of the Strategic Action Programme for International Waters of the Pacific Islands Region for a further 3-5 years based on these points.

Recommendation

88. The MPR is invited to:

- discuss the implementation of the Oceanic Component of the IWP,
- note the issues associated with Programme implementation, and
- endorse the proposal to seek GEF support for a 3-5 year follow-up activity for the Oceanic Component.