PREPARATORY CONFERENCE FOR THE COMMISSION FOR THE CONSERVATION AND MANAGEMENT OF HIGHLY MIGRATORY FISH STOCKS IN THE WESTERN AND CENTRAL PACIFIC

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REPORT OF THE SCIENTIFIC COORDINATING GROUP

1. In accordance with the terms of reference agreed by the Preparatory Conference at its second session (WCPFC/PrepCon/15, Annex V), the first meeting of the Scientific Coordinating Group took place at Honolulu, Hawaii, from 29 to 31 July 2002, immediately following SCTB15. The list of participants is at Annex I. It was agreed that the Chairman of WG.II, Dr John Kalish (Australia) would act as Chairman of the SCG for the first meeting, without prejudice to the position of any participant with respect to the chairmanship of future meetings of the SCG.

2. The matters considered by the SCG during its first meeting included:

(a) guidelines and format for reporting to the Preparatory Conference on stock status and other scientific and technical issues;

(b) the provision of interim scientific advice to the Preparatory Conference on the status of the four primary tuna stocks in the Convention Area; and

(c) the fisheries and scientific data needs of the Preparatory Conference.

3. The following documents and reports were made available to the SCG to assist it in its deliberations:

(a) Final Draft Executive Summary, SCTB15, http://www.spc.int/OceanFish/Html/SCTB/SCTB15/ExecSum.pdf;

(b) Report of the Technical Consultation on the Collection and Exchange of Fisheries Data, Tuna Research and Stock Assessment, Noumea, 1996;

(c) Data Requirements of the SPC Oceanic Fisheries Programme and Status of Data, OFP Internal Report No. 47, Noumea, 2002, http://www.spc.int/oceanfish/Docs/Internal/IntRep47.pdf;

(d) IATTC 3rd Meeting of Science Working Group, http://www.iattc.org/IATTC3rdMeetingoftheScientificWorkingGroupENG.htm;

(e) ISC Report of Statistics Working Group

(f) Agreement for the implementation of the provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks, annex I.

Interim Scientific Advice

4. The SCG considered that existing arrangements for stock assessment and the provision of scientific advice in support of management, including advice provided by SCTB, provide a sound basis for the provision of advice to the Preparatory Conference on the status of the four primary tuna stocks. In this regard the SCG adopted a format for reporting to the Preparatory Conference on the status of stocks and other scientific and technical issues as follows:

- Key attributes
- Recent developments in the fishery
- Trends
  - Catch and effort
  - Fishing mortality
  - Biomass
  - Recruitment
  - Sizes (in the future)
- Stock status
- Management implications
- Interactions
- Glossary

5. Based on a review of the conclusions of the SCTB and taking into account information provided by other existing bodies, including SPC/OFP, IATTC and ISC, the SCG adopted the summary statements on the status of skipjack, yellowfin, bigeye and South Pacific albacore stocks and other scientific and technical information pertaining to such stocks at Annex II.

6. The SCG recognized that the stocks assessments used to provide advice on the status of the WCPO stocks are subject to uncertainty, the results of uncertainty in the inputs and model specification and structure. Quantification of the uncertainty associated with stock structure is complex, but is a high priority for stock assessments.

7. The SCG acknowledged the ongoing need for development, testing and review of assessment methods. Several processes are in place to ensure that these development, testing and review activities continue including the work of the methods working group of the SCTB, peer review through cooperation with other organizations involved in stock assessment and formal peer review and publication in the international scientific literature.

8. In discussing the stock assessments for yellowfin and bigeye stocks in particular, both of which are nearing full exploitation, the issue of uncertainty is significant. The SCG recognized that the true status of stocks may be overestimated or underestimated by current assessments. Significant management implications flow from this uncertainty.

Fisheries and Scientific Data Needs of the Preparatory Conference

9. The SCG considered the fisheries and scientific data needs of the Preparatory Conference, noting that, in accordance with Resolution I, the needs of the Preparatory Conference related primarily to the four main tuna stocks. The meeting noted that the SPC/OFP compiles several types of fisheries and biological data to support a comprehensive programme of research on tuna fisheries in the WCPO (including statistics and monitoring, stock assessment and modelling, and tuna biology and ecology).

10. The SCG recognized that the priorities for fisheries data are (1) estimates of annual catches; (2) catch and effort data, preferably on an operational level (e.g. longline sets, purse-seine sets); and (3) size composition data (length or weight). It was noted that these priorities are consistent with the recommendations concerning a scientific data collection programme made at the 1996 Technical Consultation on the Collection and Exchange of Fisheries Data, Tuna Research and Stock Assessment and with annex I of the UNFSA. It was noted, however, that the 1996 recommendations refer to the collection of data by flag states, but not by coastal states, whereas the OFP compiles data from both sources and annex I refers to collection of data from areas under national jurisdiction and on the high seas.

11. The SCG recommended that the data available for stock assessment should be improved by:

(a) Strengthening of data collection (improved catch, effort and size composition data) from Indonesian and Philippine domestic fisheries;

(b) Improved sampling of the proportion of bigeye and yellowfin tuna in purse-seine catches;

12. Noting that one of the highest priorities is the strengthening of data collection covering the domestic fleets of Indonesia, the SCG developed a proposal for a port sampling programme in the Pacific waters of Indonesia. The draft proposal is at Annex III to the present document.

13. The SCG recognized that the existing regional arrangements for the compilation and dissemination of data, coordinated by the SCTB, are suitable in the interim. These existing arrangements include:

(a) the provision of fisheries data by flag states and coastal states to the OFP;

(b) processing and management of these and other data by the OFP;

(c) the dissemination of data according to procedures established by the SCTB Statistics Working Group, including the dissemination of public-domain catch and effort data on the SPC/OFP website and the regular publication of statistical bulletins (Regional Tuna Bulletin and Tuna Fishery Yearbook) by the OFP.

14. While the SCG focused its discussions on the immediate fisheries and scientific data needs of the Preparatory Conference, it was noted that the SCTB had also highlighted a number of other issues of importance. These included the need for more reliable statistics on catches of non-target species through improved observer coverage and other means; the need for continued acquisition of data on bigeye tuna habitat through archival and pop-up satellite archival tagging and the incorporation of these data into habitat models; and the need for additional conventional tagging of the four main tuna species to provide additional information on fishing and natural mortality, movements and other parameters. In this regard, the SCG noted the ongoing work being done by SPC/OFP and noted with approval the reports and recommendations of the SCTB relating to these issues.

Data needs of the Commission

15. The SCG did not have sufficient time to consider this agenda item. It was noted that further information relevant to this item would be made available to SCG in due course. In this

regard, the secretariat provided information to SCG on the steps being taken to compile and disseminate the information that had been requested by WG.II at the second session of the Preparatory Conference. The SCG was informed that this information would be made available prior to the third session of the Preparatory Conference, when it would be considered by WG.II.

Other matters

16. Noting that it had not been able to complete the tasks assigned to it by WG.II, the SCG agreed to recommend to WG.II and PrepCon that it continue its work at further meetings; the time and place of such meetings to be determined by PrepCon. It was further noted that, in accordance with the procedures adopted by PrepCon, any delegation would be able to nominate a candidate for chairmanship of the SCG and that any such nominations should be notified to the chairman of WG.II. The need for adequate meeting facilities to allow for full and transparent participation in meetings of the SCG was also noted, as well as the need for continued financial support.

17. The SCG also agreed to recommend to WG.II that it add to its list of tasks a consideration of the special requirements of developing States in relation to data needs and scientific research.

18. It was agreed that all SCG participants could continue to consult on an informal basis intersessionally through electronic communication on the work of the group, provided that was done in a transparent manner. One task that may be completed intersessionally was the preparation of a concept paper to develop a tagging programme for the four main tuna species. Dr John Hampton agreed to coordinate the preparation of a such a paper.

Annex I

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Annex II

SUMMARY STATEMENTS ON THE STATUS OF SKIPJACK, YELLOWFIN, BIGEYE AND SOUTH PACIFIC ALBACORE STOCKS AND OTHER SCIENTIFIC AND TECHNICAL INFORMATION PERTAINING TO SUCH STOCKS

SKIPJACK TUNA

Key attributes
Skipjack are fast growing, reach maturity at early age, have high and variable natural mortality, and are highly productive. Like yellowfin tuna, they occasionally exhibit long distance movement, but large scale mixing of the population is likely to be more limited.

Recent developments in the fishery
There has been an increase in purse seine operations on drifting FADs since 1996. Economic issues are likely to have prevented further increases in catches of skipjack in recent years.

Trends

Catch and effort
The total WCPO catch of skipjack tuna was about 1,200,000 mt in 2001 with the purse seine fishery accounting for 69% of the total and the remainder taken by pole-and-line (24%) and other gears (7%). The magnitude of the total catch is in some doubt due to considerable uncertainty about catches in purse seine and ring net fisheries in the Philippines and the pole-and line fishery in Indonesia. Purse seine CPUEs are variable with an increasing trend in CPUE for fishing operations on logs and FADs in recent years. CPUEs have been stable in pole-and-line fishing and purse seine operations on free-swimming skipjack.

Fishing mortality
Recent assessments using a MULTIFAN-CL (MFCL) model indicate a general increase in fishing mortality since the 1970s. There have been decreases in some recent years, probably due to economic factors. The analysis indicates that current fishing mortality is less than 20% of the level of fishing mortality that would produce MSY.

Biomass
The trend in biomass, as computed in the MFCL model, is directly affected by the trend in recruitment. The MFCL model indicates that adult biomass currently is considerably higher than the biomass producing MSY.

Recruitment
The MFCL analysis indicates that recruitment has been at a relatively high level since the mid-1980s. The elevated recruitment is possibly due to a higher frequency of El Niño events, but this requires further investigation.

Stock status
The skipjack stock appears to be capable of sustaining the current catch without adverse effects to the overall stock and this conclusion is not affected by different model assumptions considered by the SCTB.

Management implications
Given the relatively low level of exploitation of WCPO skipjack tuna, there are currently no concerns with respect to the skipjack stock status. However, transient local depletion could occur in areas where concentrated high catch rates exceed the rate of immigration. However, the purse seine fisheries targeting skipjack also catch small yellowfin and bigeye tuna, which are more heavily exploited. Hence, accurate monitoring of the skipjack purse seine fisheries is essential. Improvements in monitoring of catch and catch composition are especially critical in the fisheries of Indonesia and the Philippines.

YELLOWFIN TUNA

Key attributes
Yellowfin tuna are fast growing, mature at about two years of age and are highly fecund. Yellowfin can grow to 180 cm in length and weigh over 100 kg when they are about six years of age or older. The majority of the catch is taken from the equatorial region where they are harvested with a range of gear types, predominantly purse seines and longlines.

Recent developments in the fishery
There have been large increases in the catches of juvenile yellowfin tuna by the purse seine FAD fishery and the Indonesian domestic fishery.

Trends

Catch and effort
Longline fisheries developed in the early 1950s, with a major change in depth of fishing in the late 1970s to better target bigeye tuna. Purse seine fisheries developed in the early 1980s. Purse seine and fisheries in Philippine and Indonesia tend to catch smaller yellowfin tuna than those caught by longline. Approximately 45-50% of the current reported yellowfin comes from the purse seine fishery. Longline fisheries take mostly adult fish.

In 2001, the catch was about 475,000 mt, slightly less than the peak historical catch of 494,000 mt in 2000. High variability in nominal CPUE for purse seine fleets are believed to be due to environmental variation that affects recruitment and catchability. Standardized catch rates for the Japanese longline fleet also display large interannual variability with no overall long-term trend.

Fishing mortality
Yellowfin tuna in the WCPO are not considered to be overfished, although fishing mortality for juveniles has increased strongly since about 1992. This increase is attributable to increased catchability of juvenile yellowfin in purse seine fisheries and catches in the domestic Indonesian and Philippine fisheries.

Biomass
The current biomass of yellowfin in the WCPO is estimated to be about 35% less than the level that would have occurred in the absence of fishing, with the greatest reduction in biomass, about 50%, evident in the western equatorial Pacific. Greater depletions in biomass in the west may be associated with high rates of fishing and relatively low rates of immigration to the region.

Recruitment
Recent declines in recruitment and increased catches, following a period of relatively high recruitment in the late 1970s and 1980s, have produced a decline in biomass of around 30% since 1997. Whether this is a function of a stock-recruitment relationship or environmental variation is unclear.

Stock status
The assessment for yellowfin indicates that the stock is likely to be nearing full exploitation.

Management implications
Any increases in fishing mortality particularly on juveniles are likely to move the yellowfin stock to an overfished state. If future evidence supports a shift to lower recruitment, a decrease in fishing mortality is likely to be required.

BIGEYE TUNA

Key attributes

Bigeye tuna are relatively slow growing and mature when approximately three years old. These and other characteristics make them less resilient to exploitation than skipjack and yellowfin tuna. Bigeye grow to about 200 cm and over 180 kg when eight years or older. They have a wide distribution between 40°N and 40°S and vertically between surface and 1000 m due to their tolerance of low oxygen levels and low temperatures. There is believed to be a single Pacific-wide stock of bigeye tuna. Longline caught bigeye tuna are the most valuable of the tropical tunas.

Recent developments in the fishery

There has been an increase in purse seine catches of juvenile bigeye tuna owing to increased FAD sets and the Indonesian domestic fishery.

Trends

Catch and effort

The total bigeye tuna catch in the WCPO was about 115,000 mt in 2001, about 60% of the Pacific-wide total. Available statistics indicate that 62% of the WCPO catch was taken by longline gear, and most of the remainder by purse seine and by the domestic fisheries of Indonesia and the Philippines.

The total catch of small bigeye tuna in purse seine gear is poorly known, due to the fact that they are often misidentified as yellowfin. There is also considerable uncertainty in the estimation of the Indonesian and Philippine catch due to inadequate species composition sampling.

Nominal (unadjusted) CPUE for WCPO bigeye tuna derived from longline data has been stable over recent years. The CPUE trend based on adjustments for depth of longline gear over time, however, indicates a decline in adult bigeye abundance.

Fishing mortality

There has been a strong increase in fishing mortality on juvenile bigeye tuna since 1992 due, in part to the purse seine fishery, but also linked to Indonesian and Philippine fisheries. Estimates of fishing mortality on adult bigeye have been relatively constant since the early 1990s. Recent fishing mortality rates, particularly in the tropical regions are near or above commonly used reference points.

Biomass

Total bigeye tuna biomass in the WCPO declined to around 60% of its early 1960s level, but there appears to have been an increase recently due to above average recruitment in the late 1990s. In the late 1990s the biomass is estimated to have been 35% below the level it would have been if fishing had never occurred. The greatest reduction in biomass is estimated to be in the more heavily fished tropical region.

Recruitment

There are no clear trends in recruitment for WCPO bigeye tuna, although recruitment in the late 1990s was estimated to be at above average levels.

Stock status

The assessment for bigeye tuna indicates that the stock is nearing full exploitation. The catches and fishing mortality of juveniles have increased greatly over the past decade, due primarily to increased catches in Indonesia, Philippines and the international purse seine fishery. In respect of the purse seine fishery, the increased use of drifting FADs has increased juvenile mortality of bigeye tuna.

Management implications

Further increases in fishing mortality are unlikely to result in long-term increases in the average yield of the fishery with the current pattern of age-specific exploitation. Any increases in juvenile fishing mortality are likely to move the stock to an overfished state.

SOUTH PACIFIC ALBACORE TUNA

Key attributes
Albacore are moderately long-lived tunas with relatively low natural mortality and productivity compared with skipjack and yellowfin tunas. They typically make long-range seasonal movements.

Recent developments in the fishery
The longline catch of albacore from Pacific Island countries (PICs) has increased dramatically in recent years and now accounts for about 50% of the total longline catch of albacore in the South Pacific.

Trends

Catch and effort
In 2001 the total albacore catch was about 52,000 mt including a record 46,200 mt caught by longline fleets and 5,500 mt by troll fleets. The longline catch has grown since 1996 largely due to expansion of PIC longline fleets. The CPUE of Taiwanese vessels, which account for most of the longline catch, increased slightly during the 1990s on mid- and high-latitude fishing grounds. It has declined slightly in lower latitudes, where the Taiwanese fleet has directed more longline effort toward bigeye and yellowfin in recent years. CPUE in the coastal troll fishery of New Zealand has been relatively stable. CPUE in the offshore troll fishery of the U.S.A. has been more variable.

Fishing mortality
A recent assessment using MFCL indicates that the current fishing mortality is well below the level of fishing mortality that would produce MSY. Fishing mortality is considerably higher for adult albacore exploited by longliners than for juveniles, caught mainly by the troll fleets.

Biomass
The MFCL model indicates that the current level of adult biomass is still about 85% of the biomass that would be expected in the absence of fishing.

Recruitment
Estimates of annual recruitment generated by the MFCL model indicate considerable year-to-year variation, with a slight increase in recruitment during the early 1990s followed by reduction since the mid-1990s; estimates for the most recent years are accompanied by higher uncertainty.

Stock status
The MFCL assessment indicates that albacore appear to be only lightly exploited and this conclusion is not affected by different model assumptions considered by the SCTB.

Management implications
Given the relatively low level of exploitation of WCPO albacore tuna, there are currently no concerns with respect to the status of the stock.

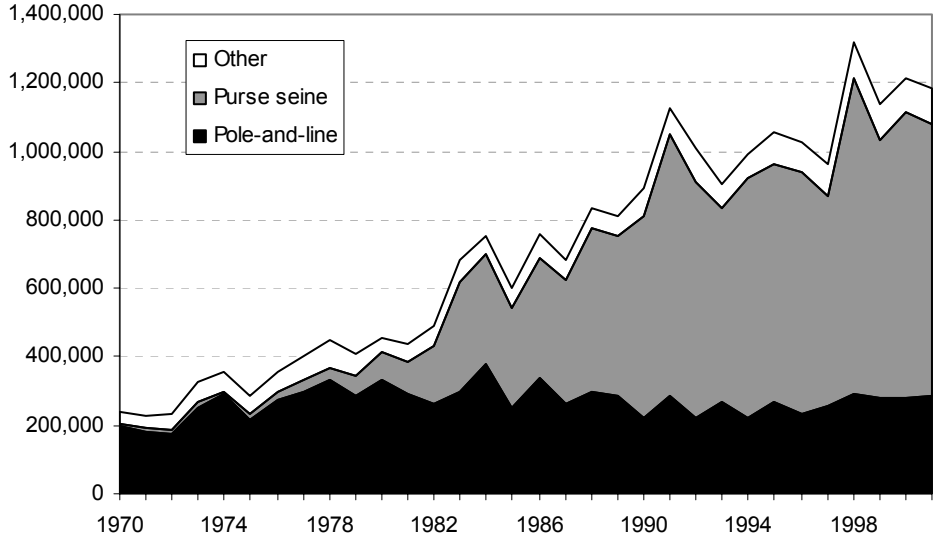

Figure 1. Annual catch (mt) of skipjack tuna in the western and central Pacific Ocean (WCPO) by fishing method. Source: OFP/SPC.

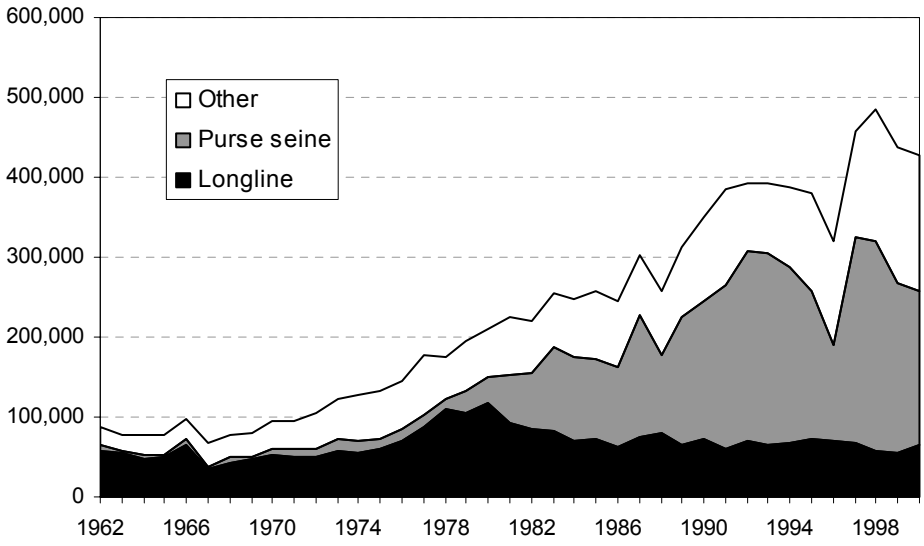

Figure 2. Annual catch (mt) of yellowfin tuna in the western and central Pacific Ocean (WCPO) by fishing method. Source: OFP/SPC.

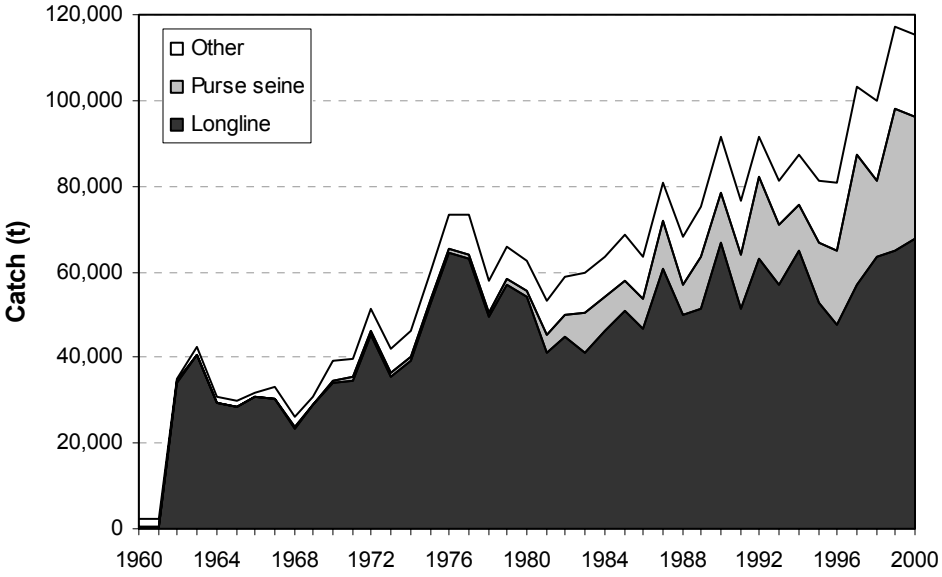

Figure 3. Annual catch (mt) of bigeye tuna in the western and central Pacific Ocean (WCPO) by fishing method. Source: OFP/SPC.

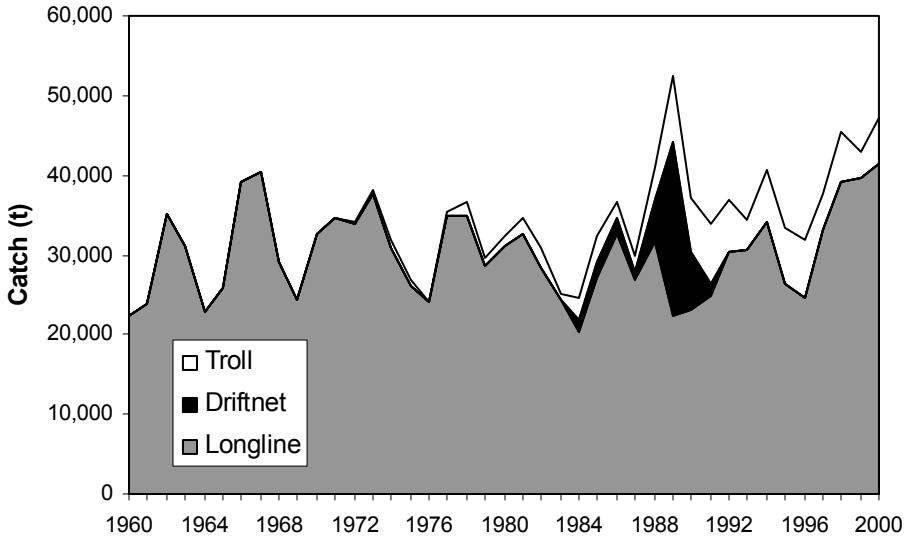

Figure 4. Annual catch of albacore tuna in the South Pacific Ocean by fishing method. Source: OFP/SPC.

Annex III

PROPOSED INITIATIVE TO CHARACTERIZE INDONESIA'S TUNA CATCH IN THE PACIFIC OCEAN

Need

At SCTB 15 and the first meeting of the Preparatory Conference Scientific Coordinating Group (SCG) important gaps in the understanding of Indonesian tuna fisheries in the Pacific Ocean were identified. Indonesia provided SCTB with an estimate of 361,384 tonnes for its total tuna catch in the Pacific Ocean, consisting of 215,656 tonnes of skipjack and 145,728 tonnes of "other tunas". However, the category "other tunas" is an aggregate of all tunas and provides little useful information required for stock assessments. In addition to the uncertainty over species composition, data on effort, relative importance of different gears, geographical distribution of the fisheries, and the size composition of the catches are not available. These gaps are critical uncertainties in the stock assessments of yellowfin, bigeye and skipjack tunas in the WCPO. As the SCG concluded that yellowfin and bigeye are nearing full exploitation in the WCPO, the uncertainties over Indonesian catch require urgent attention.

To bridge the gaps, the SCG endorsed the development of a proposal to undertake a program aimed at collecting of the critical data required for stock assessments. The SCG recognized that an essential element of such a program is capacity building in Indonesia for undertaking routine monitoring for stock assessment.

In developing the program for the WCPO, it was noted that a collaborative program between the Indian Ocean Tuna Commission (IOTC), the Indonesian Research Institute of Marine Fisheries (RIMF), Australia's CSIRO and Japan's Overseas Fisheries Cooperation Fund (OFCF) is currently establishing a monitoring program for the Indonesian tuna fisheries operating in the Indian Ocean. As the data requirements and logistical issues for the IOTC and SCG initiatives are similar, the Indonesian Directorate for Capture Fisheries (DGCF) would be the agency responsible for both programs, and there is overlap in the capacity building requirements, we recommend to the extent possible that the two programs aim to co-ordinate activities.

Proposed activities

The program would have three elements; 1) Status report on Indonesian fisheries in the Pacific Ocean, 2) Interim port sampling program for Pacific and Banda Sea ports, and 3) Integrated catch monitoring of the Indonesian Pacific Ocean tuna fishery. The first two elements would run concurrently while the third would build on the outputs of the first two to form a fully functioning sampling and fishery data collection program. A time frame and budget for the program would be developed after the Preparatory Conference discusses these elements. However, a program to monitor a similar-sized fishery in the Indian Ocean is planned to run over a five year period, at a cost in the order of US$ 85-120,000 per annum depending on the number of ports that are monitored.

Status report on Indonesian tuna fisheries in the Pacific Ocean (including the archipelagic waters of the Banda Sea and linked tuna habitats). This would include summaries of available data on catch, effort (DGCF register for vessels over 30 tonnes, for smaller vessels data are held by provincial governments), methods etc, identification and assessment of the efficiency of current data collection methods; recommendations on improvements to these methods where necessary, design and logistical requirements for a routine catch and effort monitoring program (eg. port sampling, logsheets, database requirements etc.), and a consideration of requirements for capacity

building in RIMF and associated agencies. The IOTC program is currently undertaking a similar exercise for Indian Ocean fisheries, focusing on both “industrial” and “artisanal” components.

Interim port-sampling program for major Pacific Ocean and Banda Sea ports.
Given the urgent need for data on catch composition, size composition of the catch, total landings, and the relative contribution of different gears to the total catch, it is considered important to begin collection of data at major offloading ports as soon as possible. Trained enumerators would collect these data as part of an integrated port sampling/monitoring program, following the model developed for the Indian Ocean program. At this stage it isn’t clear how many ports/fleets would need to be monitored.

Integrated catch monitoring the Indonesian Pacific Ocean tuna fishery to provide catch, effort and size monitoring for all major fisheries.

Drawing together the outcomes of the status report, and the output of the interim catch monitoring, the program would move into this consolidation phase of collection of data adequate for inclusion of Indonesian data in WCPO stock assessments. As part of a capacity building focus, Indonesian scientists trained by the program would take more of the leading roles in the collection and analysis of data.