

**Fourteenth Meeting of the
STANDING COMMITTEE ON TUNA AND BILLFISH**

Noumea, New Caledonia

9 – 16 August 2001

EXECUTIVE SUMMARY

The fourteenth meeting of the Standing Committee on Tuna and Billfish (SCTB14) was held from Thursday 9th August to Thursday 16th August in Noumea, New Caledonia, at the invitation of the Chairman, and hosted by the Secretariat of the Pacific Community. SCTB 14 was attended by participants from Australia, Federated States of Micronesia, Fiji, France, French Polynesia, Guam, Kiribati, Korea, New Caledonia, New Zealand, Papua New Guinea, the Peoples Republic of China, Samoa, Solomon Islands, Taiwan, United States of America, and Vanuatu. Representatives from various regional and international organisations also attended the meeting. These included the Food and Agriculture Organisation (FAO) of the United Nations, Inter-American Tropical Tuna Commission (IATTC), and the Forum Fisheries Agency (FFA).

The meeting agenda, working papers presented at the meeting and list of participants are provided in Appendices 1, 2 and 3, respectively. The meeting convened as eight working groups – the Statistics Working Group (SWG), the Fishing Technology Working Group (FTWG), the Methods Working Group (MWG), the Skipjack Research Group (SRG), the Albacore Research Group (ARG), the Yellowfin Research Group (YRG), the Bigeye Research Group (BRG), and the Billfish and Bycatch Research Group (BBRG).

The initial overview of Western and Central Pacific Ocean (WCPO) tuna fisheries noted that the estimated total catch for 2000 for the four main tuna species was 1,862,269 mt, the third highest annual catch on record after 1998 (2,014,106 mt) and 1999 (1,873,042 mt). The 2000 WCPO catch of skipjack (1,163,417 mt) was slightly higher than in 1999, but below the 1998 record catch (1,306,671 mt) and as usual dominated the total catch (62%). The yellowfin catch (426,909 mt) was slightly less than in 1999. South Pacific albacore catches (47,308 mt) were higher than in 1999, and the WCPO bigeye catch (115,264 mt) declined slightly from the record high in 1999 (117,121 mt). National fishery reports provide further details of these catches.

Reports on relevant activities of other organisations were received from Bureau of Rural Sciences (BRS–Australia), Commonwealth Scientific & Industrial Research Organisation (CSIRO–Australia), Inter-American Tropical Tuna Commission (IATTC), the United Nation’s Food and Agriculture Organisation (FAO), and the Pelagic Fisheries Research Program (PFRP) of the University of Hawaii.

The directives to the SWG made during SCTB13 were reviewed. These concerned the compilation of annual catch estimates for small-scale fisheries; the compilation of

catch estimates for the South China Sea; the availability of data in Indonesia and the Philippines; a review of Japanese logsheets; an OFP project to scan logsheets in member countries to improve the timeliness of data submissions; the availability of tuna and billfish data on sex ratios and length data by gender; the compilation of factors for converting processed weights to whole weights; the compilation of information on illegal, unreported and unregulated (IUU) fishing; the level of predation of longline-caught fish by sharks and whales; a review of vessel and gear attribute data on the FFA Regional Register; the classification of purse-seine effort by school association; the sampling of yellowfin and bigeye species composition for purse seine; the estimation of bigeye catches by purse seiners using regression trees; the compilation of data covering the American Samoan longline fleet and the Canadian troll fleet; the revision of catch and effort data for the Taiwanese distant-water longline fleet; targeting of albacore by the Taiwanese distant-water longline fleet; sampling of longline-caught albacore in Samoa; the estimation of catches of billfish under mandatory release; the estimation of tagged and released catches in recreational fisheries; the revision of billfish catch estimates; the compilation of annual catch estimates for species of special interest, such as sharks, marine reptiles, marine mammals and sea birds; the availability of data that can be used to estimate catches of non-target species; and the role of SCTB in national and regional observer programmes.

The five Research Groups considered regional fishery developments, advances in research, stock assessment and research co-ordination and planning for those species or species. Summary statements on these matters are provided for each research group. The SCTB14 was presented with applications of the MULTIFAN-CL length-based assessment model to all four target tuna species in the WCPO, and to the North Pacific blue shark (*Prionace glauca*), and Pacific blue marlin (*Makaira mazara*).

Recognising the continuing concern of the SCTB about the status of yellowfin and bigeye tuna stocks in the WCPO, and recognising the increasing catchability of juveniles of these species in surface fisheries, particularly those using FADs, SCTB 14 recommended that there be no increase in fishing mortality in surface fisheries on these species in the WCPO until uncertainty in the current assessments has been resolved.

It also strongly reinforced the value of large scale tagging experiments to provide information on movement, natural mortality and exploitation rates. As this will reduce the uncertainty in existing assessments, SCTB recommended that funding be sought to undertake such work.

The objectives of the SCTB Statistics Working Group (SWG) are to co-ordinate the collection, compilation and dissemination of tuna fisheries data. Data compiled by the OFP on behalf of the SCTB include annual catch estimates, catch and effort data, length data, and other types of data. The SWG Co-ordinator reported that progress in data compilation had been achieved, although no annual catch estimates for 2000 had been provided by Japan, and the most recent estimates covering the domestic fisheries of the Philippines are for 1997. It was reported that the level of coverage of catches in the WCPO in recent years by observer data held by the OFP is only 0.18 percent for longliners and 3.9 percent for purse seiners, so coverage must be increased to obtain reliable catch estimates for non-target species, including those of special interest, such as sharks and rays, marine reptiles, marine mammals and sea birds.

This year, two new Working Groups met in preparatory meetings, just prior to SCTB14, to review and discuss key aspects of fishing technology and analytical methods. The terms of reference and summary of presentations for each working group are given in separate sections.

The objective of the first Fishing Technology Working Group (FTWG) was to discuss the status and direction of this new working group. Ten working group papers were presented to the twenty participants covering the development of the FTWG, comparable programs, technical data holdings and accessibility, country reports, recent entrants and developments in regional fisheries, and the status of regional purse seine management measures and developing bigeye tuna management plan for the WCPO. During the preparatory meeting, the terms of reference were drafted and later approved by the plenary. These TORs and a brief report of the WG are attached to meeting report.

The objectives of the first Methods Working Group (MWG) were to review the terms of reference (drafted at SCTB13), and discuss recent developments concerning the testing of stock-assessment methods. Two papers were presented (MWG-1, YFT-4). The first of these outlined the recent changes made to MULTIFAN-CL to improve its capabilities. The second paper described the features of a new operational model of the WCPO yellowfin fishery that is used specifically to assess the accuracy and precision of MULTIFAN-CL estimates. The group recognised the need to conduct further testing of MULTIFAN-CL under various scenarios, and to compare the reliability of the estimates obtained with alternative models using simulated datasets. Recognising the value of bringing the MULTIFAN-CL model into the public domain, in view of its increasing application to stock assessment, the group recommended that funding be sought to make this possible. A report of the WG is attached to the meeting report.

The Second Ocean Atlas Users Workshop was held on August 14, 2001. This workshop was chaired by Dave Foley (Univ. of Hawaii/JIMAR), and open to all SCTB participants. The aim of the workshop was to refine project goals and enhance the utilisation of the end products of this atlas, currently being developed by the NMFS Fisheries Research Laboratory in Honolulu, and the University of Hawaii Pelagic Fisheries Research Laboratory. A report of the workshop is appended to the meeting report.

The meeting was also provided with an update of the Preparatory Conference (PrepCon) process, in particular the expected requests for the provision of interim scientific advice and other information by SCTB. Procedures for providing such information were agreed, and a continuing role for a small working group in co-ordinating the provision of such advice was noted. Some concern was expressed over the reduced role of the SCTB in the provision of scientific advice in this process.

The SCTB Chairman and Working Group and Research Group Co-ordinators for SCTB14 were as follows:

SCTB Chairman :	Mr Bernard Thoulag
Albacore RG :	Dr Talbot Murray
Skipjack RG :	Dr Gary Sakagawa
Yellowfin RG :	Dr Robert Campbell
Bigeye RG :	Dr Chi-Lu Sun
Billfish and Bycatch RG :	Mr Paul Dalzell
Statistics WG :	Mr Tim Lawson
Methods WG :	Dr John Sibert
Fishing Technology WG :	Mr David Itano

The venue and the dates for the 15th SCTB meeting to be held in 2002 were not confirmed, but would be communicated to participants at a later date. The meeting closed on Thursday 16 August at 16:00 hrs.

ALBACORE RESEARCH GROUP (ARG) – SUMMARY STATEMENT

Albacore caught in the South Pacific constitute a single stock. Longline, primarily catching adults, accounts for most albacore catches (88%) in the South Pacific with trolling catching the rest (12%). The total albacore catch, estimated at 47,308 mt in 2000, was greater than in 1999 (10% increase). In 2000 longline catches were 41,436 mt and troll catches were 5,750 mt. Longline catches of several South Pacific island States and territories, particularly Fiji, French Polynesia and Samoa, continue to increase and together contribute substantially to the total albacore catch. The combined albacore longline catch in 2000 by South Pacific Islands (17,171 mt) accounts for 41% of all albacore longline catches in the South Pacific. A substantial increase in catch to 2,918 mt (81% increase) was also reported for Canadian and USA troll vessels fishing the STCZ in the 1999/00 season relative to 1998/99. Troll caught albacore in the New Zealand EEZ are also estimated to have increased by 83% over the same period to 2,832 mt.

There has been no dedicated field research on albacore since the OFP research programme in 1991/92. Biological data on albacore is regularly collected, however, in observer and port sampling programmes in the region, although some of these data have not been compiled. Length frequency data from port sampling is a critical input to the length-based age-structured stock assessment model (MULTIFAN-CL). This model has been extended to cover the period 1962-2000 and can incorporate tag recovery information. Previous results from this model were believed to have been strongly influenced by a small number of tags recovered (135 recoveries). Model runs conducted with and without tagging data give similar results for recruitment but not for biomass trends or estimates of average fishing mortality. Results of the current MULTIFAN-CL model suggest a marked decline in recruitment and biomass in the mid-late 1970s and 1980s by about 50% that is followed by an increase in the 1990s. Results also suggest that biomass is largely distributed south of 10° S and that biomass may be driven by recruitment. An alternative stock production model using Taiwanese longline catch and effort data, raised to South Pacific wide coverage, gave broadly similar results with respect to trends in biomass, but attributed the change to fluctuations in the fishery. An investigation of the assumptions made in both models would assist in resolving the apparent discrepancies.

A number of areas requiring further work prior to the next SCTB meeting were identified. These areas include: incorporate data from additional fleets; review the adequacy of observer coverage; analyse longline data to determine if retention practices have changed in some fleets; develop extensions to the MULTIFAN-CL model; develop procedures for standardising CPUE; improve estimates of effective effort; evaluate the need for further tagging; evaluate the use of reference points in assessing stock status using MULTIFAN-CL and other models; and work to agree on a standard model structure and diagnostics for evaluating models.

No information was presented to indicate a change in interpretation of stock status of South Pacific albacore. Although model results are considered uncertain, exploitation rates appear to be moderate and current catches are likely to be sustainable.

SKIPJACK RESEARCH GROUP (SRG) – SUMMARY STATEMENT

Skipjack tuna are the most important tuna resource in the WCPO, in terms of contribution by weight to the total catch. In the past decade, skipjack catches have been approximately 1 million mt per year, contributing about 65 % of the total tuna catch in the area. The 2000 catch was about 1.2 million mt, which was only slightly less than the record catch in 1998 of 1.3 million mt. Purse seiners provided the majority of this catch (70 %) with 24% from pole-and-line fleets.

The CPUEs for purse seine and pole and line vessels have been highly variable. Nominal CPUEs for Japanese and USA purse seiners have shown nearly identical increasing trends for FAD sets and a decreasing trend for unassociated sets. Nominal CPUEs for Taiwan purse seiners, in contrast, have shown increasing trends for both unassociated and FAD sets. Korean purse seiners continue to set mostly on unassociated schools. The interpretation of CPUE trends was not possible because their standardisation was incomplete and on going.

Skipjack are concentrated in the tropical waters, but seasonally expand to subtropical waters north and south. Their fast growth, early maturity, high fecundity, spawning year around, relatively short life span, highly variable recruitment and few age classes on which the fishery is dependent makes the species unique among the main tuna species. Ongoing fisheries oceanographic studies have been continuing to provide a better understanding of environmental influences on the availability and productivity of skipjack in WCPO. They suggest a positive impact of El Nino on skipjack recruitment, particularly when followed shortly by La Nina, as occurred in 1998.

Tag based assessments from the early 1990's suggested low to moderate exploitation at catch levels slightly lower than those in recent years. Recent results from MULTIFAN-CL , including tagging and other information from the northern part of the area, were consistent with the tag based assessments, but additionally, indicated that fishing mortality have been increasing since the early 1970s. Nevertheless, estimates of fishing mortality at age have been smaller than those of natural mortality. The impact of fishing on the total biomass of skipjack is estimated to be low, with estimates of recent recruitment and stock biomass being at historically high levels.

Future advances in the basic biology, data collection and stock assessment of skipjack should be encouraged to substantiate the knowledge required for the fisheries management of this economically and ecologically important species.

BIGEYE RESEARCH GROUP (BRG) – SUMMARY STATEMENT

Bigeye tuna account for a relatively small proportion of the total tuna catch in the Pacific Ocean, but their economic value probably exceeds US\$ 1 billion annually. Bigeye may comprise a single Pacific-wide stock and this is reflected in data collection and assessment approaches. The year 2000 total Pacific catch of bigeye was an estimated 208,173 mt, an historical high, with 115,264 mt (55%) and 92,909 (45%) mt taken in the WCPO and EPO respectively. The catch in the WCPO declined slightly compared to 1999, while the catch in the EPO increased. Purse seine catches of mostly larger bigeye in the EPO increased to record levels (69,745 mt); no year 2000 data were available on the EPO longline catch, which has however been declining steadily in recent years. The WCPO purse seine catch of bigeye, associated with the increasing use of FADs, remained high (28,843 mt) and combined with the largest longline catch yet recorded (67,792 mt), resulted in the highest bigeye catch on record for the WCPO. The Pacific total bigeye catch continues an upward trend since 1998.

Limited ecological and biological research has lead to improved understanding of some parameters e.g. age and growth, dynamics of aggregations etc. No new information was provided on environmental effects on catchability and stock productivity, although results of archival tagging work in progress are expected to provide useful information on the former and could be utilized in longline effort standardization.

Several nominal and standardized CPUE time series were examined by the group; the purse seine CPUE trends for the main fleets generally reflect the extent to which associated sets, especially drifting FADs (which have produced higher juvenile bigeye catches in recent years), are fished. Longline CPUEs since 1980 for the Japanese fleet, both nominal and standardized according to several habitat models, are relatively flat in the EPO but more variable in the WCPO. Over longer time periods i.e. since the beginning of the fishery, a much greater decline in these CPUEs is evident.

An elaboration of the collaborative Pacific-wide application of the integrated statistical MULTIFAN-CL model was presented, incorporating some new features and considerable additional data. Results should be regarded as preliminary, but indicate that recruitment shows considerable temporal variation, and been has declining, particularly in recent years in both the EPO and WCPO. Biomass also shows a declining trend over time and current levels (total and adult biomass) may be at around 50% of initial levels. The overall impact of fisheries on the population was considered moderate. Given however the importance of some key assumptions to model outputs e.g. standardized longline effort, it was recognized that further investigation regarding the appropriateness of these assumptions is required.

A preliminary application of the A-SCALA method to WCPO bigeye was also presented. The results were indicative of a larger impact of the fisheries on the stock than suggested by the MULTIFAN-CL analysis. The assessment indicated that the

average fishing mortality has increased since 1980 due to an expansion of the purse seine fisheries. It further suggested that the decline in relative abundance was due to fishing rather than to a decline in recruitment. Analyses conducted during the meeting suggested that there is no fundamental difference in the MULTIFAN-CL and A-SCALA approaches. The differences in the results appear to be due largely to different assumptions and data used in the analyses. In particular, (i) the tagging data used in the MULTIFAN-CL analysis implies lower estimates of fishing mortality than those obtained in the A-SCALA analysis, which does not use the tagging data; and (ii) the levels of natural mortality assumed in the A-SCALA analysis are lower than those estimated in the MULTIFAN-CL analysis, which causes further divergence in the two sets of results. Further research is required to identify the most appropriate set of assumptions to use in future assessments. In this respect, additional tagging data accompanied by high tag-reporting rates for all fisheries would provide valuable information on bigeye tuna stock dynamics and exploitation.

Given the continuing increase in Pacific bigeye catches in both surface and longline fisheries, indications of recent low recruitment and declining biomass, and possible significant fishery impacts on the stock, the Group reiterated its concern that the condition of the stock be closely monitored and that efforts to develop reliable assessments at Pacific-wide and regional level be regarded as a priority task. It was noted that concerns about bigeye stocks driven by similar factors are common to tuna fisheries in all areas and have already resulted in management interventions in most cases.

Recognising the continuing concern of the SCTB about the status of bigeye tuna stocks in the WCPO, and recognising the increasing catchability of juveniles of this species in surface fisheries, particularly those using FADs, SCTB 14 recommended that there be no increase in fishing mortality in surface fisheries on bigeye in the WCPO until uncertainties in the current assessments have been resolved.

The group recommended that the following research leading to improved stock assessment be continued in the following areas: (i) acquisition of more detailed catch / effort and size composition data from the fisheries of Indonesia and the Philippines (ii) improved/refined estimates of bigeye catches from WCPO purse seine fisheries (iii) improvement to effort standardization utilizing data from archival tagging and other studies providing information on habitat preferences (iv) investigations of key assumptions to stock assessment models and continued elaboration of the MULTIFAN-CL and other models (v) characterization of effective effort on juvenile bigeye taken mostly in association with FADs and (vi) large scale tagging to provide information on key parameters and to assist in discriminating between alternative hypotheses and model assumptions.

YELLOWFIN RESEARCH GROUP (YRG) – SUMMARY STATEMENT

Catches of yellowfin tuna represent the second largest component (23%) of the total catch of the four main target species in the WCPO. Yellowfin tuna are also believed to constitute a single stock in the WCPO.

The catch of yellowfin tuna in the WCPO first exceeded 200,000 mt in 1980. With the expansion of the purse seine fishery during the 1980s catches almost doubled to reach

around 350,000 mt by 1990. Since this time yellowfin catches in the WCPO have varied between 320,000 and 480,000 mt with the catches during the last four years being at historical high levels, exceeding 420,000 mt during each year. Purse seine vessels harvest the majority of the yellowfin catch (46% by weight during 2000), while longline and pole-and-line fisheries caught 15% and 4% respectively and various other gears accounted for 35% (mostly eastern Indonesia and the Philippines).

Nominal catch rates of yellowfin for purse seine fleets are characterised by strong inter-annual variability but indicate no clear trend in the available time series of data. While it is suspected that variability in yellowfin catch rates may be associated with variation in environmental conditions associated with the El Niño Southern Oscillation cycle, catch rates for some fleets since the mid-1990s may have benefited from efficiencies associated with the increased use of drifting FADs.

Nominal catch rates of yellowfin for the Japanese longline fleet show a steady decline during the 1980s while catch rates for the Korean longline fleet displayed high inter-annual variability but no overall trend. However, nominal catch rates for both fleets reached historical lows in 1999 but recovered somewhat during 2000. After accounting for the increased targeting on bigeye tunas since the mid-1970s, standardised catch rates for the major longline fleets in most regions of the WCPO display large inter-annual variability but no overall long-term trend.

Biological research undertaken in recent years has led to an improved understanding of age and growth and reproductive dynamics. However, further work is required to understand habitat preferences, trophic dynamics and the influences of recent increases in fishing efficiencies (e.g. the increased use of FADs) to help improve the standardisation of catch rates.

Tag-based assessments from the early 1990s found exploitation levels of yellowfin tuna to be low to moderate at catch levels at that time about 10-20 percent below those in recent years. However, more recent assessments of the yellowfin stock using the MULTIFAN-CL model indicate that fishing mortality may have increased significantly since this time, largely as a result of catchability increases in the purse seine fisheries. While the overall estimates of fishing mortality-at-age remain considerably smaller than the corresponding estimates of natural mortality-at-age, the analyses indicate that recent recruitment may have declined significantly. This in turn has produced a significant decline of around 35% in overall stock biomass since 1997. Biomass levels in 2000 are estimated to be the lowest since the mid-1970s. The decline in biomass is most evident in the main catch regions of the western equatorial Pacific where current biomass is estimated to have declined by over 50 percent since the mid-1990s. For the WCPO in total, the current biomass is estimated to be around 30% less than that which would have occurred in the absence of fishing.

Attempts to estimate an MSY for yellowfin are currently hampered by uncertainty in the stock-recruit relationship and the age-specific exploitation patterns as well as other uncertainties in the stock assessment models. Depending on the assumptions used, estimates of MSY vary between 40% above to 40% below current catch levels.

The reasons for the large declines estimated to have occurred in recruitment in recent years remain unknown, though the possibility that the estimated declines in both recruitment and biomass in recent years may be associated with a shift to a lower

productivity regime was discussed. Such a shift in productivity may have occurred in the past, as the significant increases in average annual recruitment and biomass estimated to occur after the mid-1970s might have been associated with a regime shift in oceanographic conditions in the Pacific around this time. Although there has been a dominance of La Nina conditions in recent years, it remains unknown at this time whether this is associated with a shift to new regime and whether or not the estimated recent declines in recruitment and biomass may be associated. However, if a shift to a lower productivity regime has occurred, it is possible that present catches may not be able to be maintained.

Due to the short time-series on which they are based, estimates of stock parameters and stock conditions in the most recent years are the most poorly determined. As a result, additional research will be needed to determine the significance of the present results, especially in terms of future stock productivity. Until the uncertainties associated with present stock assessments are resolved, the Group recommends a precautionary approach, and that there be no further increases in fishing mortality (particularly on juvenile yellowfin) in the WCPO, and that the condition of the stock be closely monitored over the next few years.

The Group also recommends that current research on yellowfin stock assessments be continued as a matter of priority. This research will include (i) the acquisition of data required as input into the stock assessment models (particularly from the Philippines and Indonesia); (ii) a greater understanding of the trophic and ecosystem dynamics of yellowfin (particularly in relation to aggregating devices); (iii) a greater understanding of the habitat preferences of yellowfin; (iv) refinement of the methods used to standardise CPUE; and (v) further development of stock assessment models, particularly MULTIFAN-CL. In addition to this work, the Group also saw the need for additional large-scale tagging to provide information on yellowfin movement, natural mortality and exploitation rates to support future stock assessment analyses.

BILLFISH AND BYCATCH RESEARCH GROUP (BBRG) – SUMMARY STATEMENT

The Billfish and Bycatch Research Group (BBRG) has a more varied perspective than the single species research groups. Issues include non-targeted catches in pelagic fisheries, protected species interactions and the catch estimation and stock assessment of billfish. The potential for bycatch issues to have major impacts on pelagic fisheries was noted, citing the closure of the swordfish-targeting sector of the Hawaii longline fishery in 2000/2001. The BBRG reviewed progress on statistical issues since SCTB 13 and during the 14th SCTB dealt with three non-target catches in WCPO pelagic fisheries namely sharks, turtle and “other species”.

Shark bycatch in WCPO pelagic fisheries

The OFP provided an overview of shark catches in WCPO longline fisheries based on observer data collected from the Marshall Islands, PNG and New Caledonia. There was some targeting of sharks for retention of trunks, but the majority of retained sharks were finned. Species composition of longline shark catches depends on latitude. As in the Hawaii longline fishery (HLL) shark catches are greatest in shallow longline sets. Member country participants commented on planned or ongoing data

collection and research programs for shark bycatch in domestic and distant water pelagic fisheries.

A collaborative stock assessment of blue shark in the North Pacific, based on a MULTIFAN-CL analysis of US, Taiwan, Korean and Japanese data was presented to the BBRG. The stock assessment suggested that North Pacific blue shark landings are moderate compared to the production potential of the population. There was discussion of the data requirements for the MULTIFAN-CL and the properties of the model. Other simpler approaches such as surplus production models were suggested, but the more complex MULTIFAN-CL model permitted incorporation of operational changes in the fisheries catching blue shark.

Turtle bycatch in WCPO pelagic fisheries

An overview of the status of marine turtle populations in the Pacific noted that populations of leatherbacks, eastern Pacific black and loggerhead turtle populations were in a serious state of decline. Olive Ridley and Hawaiian green turtles were in much better shape and had growing populations. The decline in turtle populations was due to a combination of factors, including harvest of adults and eggs on nesting beaches, loss of nesting habitat, fishery bycatch and marine debris. Some recent population modeling by the NMFS Honolulu Laboratory had noted the importance of protecting nesting females and eggs for leatherback turtle recovery.

The results of a qualitative review of OFP data conducted on behalf of SPREP were presented. There was little information on the nature of fishery interactions with longliners, e.g. tangling or hooking. In general, interactions were more frequent in tropical areas and adjacent to nesting sites. Depth was another major factor in interactions, with shallow set longlines set at night catching an order of magnitude more turtles than deep sets made in the day. Purse seine turtle catches were an order of magnitude lower than those of longliners. Purse seine crews made every effort to release turtles before encountering the power-block. Olive Ridley and green turtles were the most frequently encountered turtles. The review listed recommendations on a variety of improvements including fishery observer coverage, species identification, collection of turtle biometrics, interaction descriptions, crew education and awareness.

Member country participants commented on planned or ongoing data collection and research programs for turtle bycatch in domestic and distant water pelagic fisheries

The BBRG was presented with an account of the recent litigation involving the US federal government and environmental groups through which swordfish fishing by the Hawaii-based longline fishery was banned, north of the equator, and tuna longlining constrained in April and May each year. The BBRG also heard how the NMFS Honolulu Laboratory was coordinating a wide variety of research activities to rehabilitate swordfish longlining and to generally reduce turtle longline interactions. This included gear research, potential new longline methods to catch swordfish during the day and behavioral and physiological research on turtles and target species.

The expansion of longline fishing off the Australian East Coast had likely increased fisher interactions with turtles. The BBRG heard how Australian fishery managers are seeking solutions to the problem and actively involving the fishing industry in finding these solutions. Examples were given of similar work in the Australian northern

prawn trawl fishery that successfully used industry volunteers to tag and collect information on captured turtles.

Other species bycatch in WCPO pelagic fisheries

The BBRG discussed a preliminary MULTIFAN-CL stock assessment on Pacific blue marlin. The results of the stock assessment were greatly influenced by whether selectivity in the various fisheries data was constrained or not. Unconstrained selectivity produced an improbably large stock size. Yield estimates with constrained selectivity would suggest that the stock was fully exploited, which is consistent with previous assessment results presented in other fora. Discussion focused on the effects of data quality and assumptions used in the model

A new OFP project generated through Global Environmental Fund (GEF) funding was aimed at collecting data required for ecosystem based fishery management. The project used fishery observers to collect target catch, bycatch, stomach contents and muscle samples from longline, purse seine and pole and line fisheries in the WCPO. These data will be used to provide inputs for ecosystem models such as ECOPATH, ECOSIM and SEPODYM.

A review of the US fisheries catching blue and striped marlins in the WCPO was presented to the BBRG. The review noted that there were several decades of data covering longline and small scale pelagic fisheries over wide area of the WCPO. The data collected also included weight frequencies, which together with catch could be included in Pacific-wide MULTIFAN-CL analyses of blue and striped marlins.

Recommendations

The BBRG recommends that a strong focus should continue to be maintained on regional billfish catches, both in commercial pelagic fisheries and from recreational fisheries. The reduction in domestic swordfish landings in the USA may represent export opportunities for Pacific Island countries developing their longline industries. However, the BBRG also notes potential competition from expanding longline fishing in East and Southeast Asia, recognizing the need to obtain more information on swordfish production from these fisheries. The BBRG recommends that efforts be made to improve the overall level and quality of observer coverage in WCPO pelagic fisheries in order to obtain more reliable statistics on catches. Member countries might begin by initially improving data collection on pelagic sharks caught in domestic and distant pelagic fisheries, using the FAO IPOA framework as a guideline.

The BBRG also recommends that risk analysis be conducted on non-target species to identify those species which may be the most vulnerable, and guide future BBRG priorities.

The BBRG recommends that member countries should also strengthen data collection on turtle interactions in pelagic fisheries in order to refine estimates of the interaction problem, due to concerns regarding the population status of turtles. The BBRG recommends that member countries should also liaise with the appropriate government and regional agencies to compile an inventory on turtle nesting sites, domestic harvests of turtles, habitat destruction and other impacts (e.g. feral pigs).

The BBRG recommends that a watching brief be maintained on other bycatch issues as they arise, e.g. FAO IPOA on seabird-fishery interactions, or a future IPOA on turtle-fishery interactions. The BBRG notes that powerful US environmental legislation may be used to influence seafood exporters to the US to conform with various bycatch mitigation measures.