

ANNEX 9***REPORT OF THE SIXTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN***

Plenary Session, March 23-27, 2006
La Jolla, California U.S.A.

**Report of the Bycatch Working Group Meeting
(March 20-22, 2006, La Jolla, California, U.S.A.)****INTRODUCTION**

The meeting began with introductions of participants from the U.S.A., Japan, Korea, Mexico, the Philippines, and the IATTC (Annex 1). An agenda beginning with general reports on bycatch by participants, followed by specific reports and discussion on sharks, sea turtles, and seabirds was adopted (Annex 2). The importance of these discussions to develop a general work plan was emphasized. It was agreed to hear a short U.S.A. report on marine mammal interactions. A suggestion that reports and discussions consider all important fisheries (e.g. purse seine as well as longline) was accepted and a short report by IATTC on purse seine bycatch in the eastern tropical Pacific was added to the agenda after pointing out that the WCPFC and its Committee on Bycatch and Ecosystems has a greater interest and responsibility than ISC for tropical species and purse seining in general. It was noted that bycatch in tropical fisheries may well impact the same populations as the fisheries of concern to the Northern Committee of the WCPFC and to the BYCATWG.

The Working Group reviewed and accepted its terms of reference, as set by the ISC (ISC/06/BYCATWG/Info-01). To be most effective the Working Group agreed to focus its work plan on fisheries and species where scientific inquiry suggests that bycatch may have important biological or ecological impacts. It was noted that prepared documents, and other references provided for information (see Annex 3) would be made available on a secure site (password required), and that unpublished documents would not be cited outside of the WG.

MEMBER PRESENTATIONS ON BYCATCH**U.S.A., Hawaii Region**

Chris Boggs described bycatch monitoring and research being conducted by scientists at the Pacific Islands Fisheries Science Center in Honolulu, HI. The U.S. Central Pacific longline fishery is based mostly in Hawaii and American Samoa. These fisheries are monitored with logbooks and observer programs. Logbooks include data on discarded bycatch, which analysis has shown can provide counts of fish discards that are fairly

representative for sharks and other common fish species. However, analysis has clearly shown that observer data is needed to accurately estimate interactions with sea turtles and seabirds. The shallow set swordfish fishery in Hawaii has 100% observer coverage and the deep set Hawaii tuna longliners have 15-20% coverage with a much smaller coverage rate in the deep set American Samoa longline fishery targeting albacore. Other fisheries such as trolling, handline, and pole and line are monitored through self-reported catches by fishermen and fish dealers and provide little or no bycatch information.

Sea turtle, seabird, and marine mammal interactions with longline gear are routinely provided. The 100% observed swordfish fishery, interactions are simply tallied, whereas estimates with confidence intervals are derived from observed catch rates and logbook effort in the Hawaii tuna and American Samoa albacore longline fisheries. Fish bycatch has not been rigorously estimated on a routine basis, but will be in the future. The U.S.A. will update its National Bycatch Report by the end of 2007, which will include rigorous extrapolation of bycatch CPUE to total effort by each fishery (e.g. observer data on CPUE x effort from logbooks). For poorly monitored fisheries the procedure will be to use whatever data does exist, from anecdotal reports, surveys, or research fishing data.

Research on reducing bycatch and bycatch injury has focused on seabirds, sea turtles, and sharks. Seabird research included the application of blue dyed bait as a deterrent, the use of weighted branch lines, night setting, setting through an underwater chute, and side setting. Extensive turtle bycatch mitigation research has been conducted using alternate hooks and bait, and collaborative work is underway on a chemical that deters sharks from taking bait. It seems to bother only sharks, not teleosts. The challenge will be to produce enough chemical in a timed release fashion to cover the entirety of longline operations.

Population modeling work has been undertaken for sea turtles (ISC/06/BYCATWG/Info-09) that indicates that current levels of turtle bycatch in the Hawaiian fishery has relatively minor effect on the viability of turtle populations.

Research at the Pacific Islands Fisheries Science Center (PIFSC) is also trying to get at post-release mortality of longline-caught sharks, marlins, and sea turtles using pop-up satellite archival tags (PSATs). These PSATs drop off the tagged animals at depths interpreted to represent mortality (sinking to near tag failure depth). Blood chemistry is being investigated to see if fish that die soonest after release indicate greater stress in their blood at release. A correlation might provide a tool for indexing post-release mortality in much larger samples of released animals than would be cost-effective to tag with PSATs.

The PIFSC has only recently become involved in population survey and bycatch mitigation research on cetaceans, due to recent agency concerns over fisheries interactions.

PIFSC researchers are also investigating the age and growth of bycaught fish like lancetfish (*Alepisauris*), and snake mackerel (*Gempylis*) to see if they might be long-lived

and thus less productive and more vulnerable to fishing impacts. So far all of the species examined appear to have life spans typical of tuna and tuna-like species.

DISCUSSION

It was pointed out that biological studies alone can't evaluate the impact on fisheries bycatch on populations, and that to do so, the ISC needs to obtain comprehensive data in three categories of descending priority: 1) Urgently needed estimates Removals (bycatch of sea turtles, seabirds, sharks, and other bycatch species); (2) Catch and effort data and other logbook-type data; and 3) Biological data (size, age, gender) most often obtained through observer programs or research fishing.

U.S.A., West Coast Region

Suzanne Kohin described the U.S. west coast-based fisheries for tuna and tuna-like species. Due to restrictions, many of the formerly active fisheries for tuna and tuna-like species out of the U.S. west coast have diminished. Gear currently utilized includes longline, purse seine, and troll/baitboat fishing in international waters, and drift gillnet, coastal purse seine, troll/baitboat fisheries targeting albacore, harpoon, and nearshore recreational fisheries within the U.S. EEZ. Bycatch is most common in the drift gillnet and longline fisheries and not considered much of a problem in the other fisheries. In the drift gillnet fishery the bycatch species caught in the greatest number is the ocean sunfish (*Mola mola*), followed by the blue shark. All fisheries have logbook programs, and some have observer programs. Observer coverage of the drift gillnet fishery is roughly 20% annually and for the longline fishery is 100%. Time and area restrictions are in place for the drift gillnet fishery to protect turtles and large thresher sharks.

The research activities of the SWFSC regarding bycatch were described. Some of the projects include: abundance surveys for juvenile common thresher, shortfin mako and blue sharks; developing a predictive model of blue shark habitat based on catch distribution and oceanographic features; age and growth studies on shortfin mako and common thresher sharks; diet studies on blue, shortfin mako and common thresher sharks; electronic tagging to study movements of blue, shortfin mako and common thresher sharks; post-netting mortality of blue sharks, and a recreational angler survey and tagging program for billfish.

DISCUSSION

Purse seining was not mentioned in the U.S. presentations. It was brought up that the impacts on populations of sharks, skates, rays, mahimahi, and other species might be important and that the ISC should get information on this from SPC (e.g. Molony's study, reported to the WCPFC, which will be revisited with greater statistical rigor over the next year).

Japan

Masashi Kiyota of Japan presented paper ISC/06/BYCATWG/02 summarizing its activity on the by-catch issue. Japan is collecting logbook data on sharks, sea turtles and seabirds, but the data have problems in species identification and reporting rate. Japanese research and training vessels are collecting scientific data both on target and non-target species in the North Pacific. Based on these data, stock assessments of pelagic sharks are conducted according to the scope of Japan's NPOA-Shark. Currently, no onboard scientific observers are deployed on Japanese longline vessels operating in the North Pacific Ocean. An observer program exists for the Japanese purse-seine fishery operating in the western Central Pacific Ocean.

Japan has been taking a holistic approach to manage sea turtle populations for their coexistence with fisheries. Mitigation studies, protection of spawning habitat, and education of fishers are promoted in Japan. Reduction of the incidental mortality of seabirds in longline fisheries is the major scope of Japan's NPOA-Seabirds. A variety of mitigation measures have been developed in Japan, and side setting experiments using a large vessel are being planned. Japan's NPOA-Seabirds requires the use of at least one mitigation measure in the North Pacific north of 20 degree north, and use of two or more mitigation measures in the specific area around the breeding colony of the short-tailed albatross.

DISCUSSION

Problems with broader use of side setting by larger, more mechanized longline operators were mentioned. The layout of work areas and machinery could make rearrangement costly. Widespread use should not yet be expected, considering the initial testing of this method was very recent. Anecdotal observation of small artisanal longliners that traditionally side set among seagulls off the South American coast indicates little or no bird bycatch.

The extent of bycatch data from Japan's longline training vessels amounts to about 2,000 longline days per year mostly from the central N. Pacific, north of Hawaii and around Johnston Island. It might be fruitful to compare capture rates of turtles, sharks, and other species between the U.S. Hawaii-based fleet and Japanese training vessels in these areas of overlapping operations. There is a lot of uncertainty in estimating turtle and other species bycatch rates because information is not available from all fisheries. Extrapolation from one fishery to another has been used in many cases (see ISC/06/BYCATWG/Info-16 and ISC/06/BYCATWG/Info-17). It would be helpful for future modeling efforts to compare rates by different fishing styles.

The U.S. PIFSC would like to collaborate with Japan by supplying NRIFSF with Hawaii longline observer data on detailed effort along with fish discards and protected species interaction data for a comparative study with similar data from the Japan fishery training vessels. The study could be initiated this year, and might indicate very different hooking rates for the two styles of fishing in the same time/area strata.

Philippines

Noel Barut described the bycatch related monitoring and research being conducted in the Philippines. By-catch monitoring is presently included under the National Stock Assessment Program (NSAP). There is no specific project directly monitoring by-catch in the country. NSAP collects catch and effort and biological data of commercially exploited fin fishes in major and minor landing sites all over the country basically to assess the status of these species to support management interventions. In addition, the program also collects all other catches landed during sampling days like shark, invertebrates, etc. but information recorded are only up to genus level, or sometimes recorded as shark only.

The Southeast Asia Fisheries Development Center (SEAFDEC) funded a one year study on the monitoring of catch and effort and biological data for shark in selected landing sites facing the South China Sea. The study was to support the member countries in the preparation and drafting of their National Plan of Action for shark (NPOA-Shark). The project observed that large sharks are landed finless, without head and tail and gutted as well as cut into pieces to fit in the container box. Smaller sharks are landed whole and weight could easily be taken as compared to the large sharks. Large sharks are normally targeted species while small/juvenile sharks are mostly incidental catch in the gill net fisheries.

Several measures are now being undertaken and promoted nationwide in order to reduce incidence of by-catch or incidental catch in both small scale and commercial fishing operations. Among those are the promotion and use of turtle excluder device (TED) and the juvenile and trash excluder device (JTED), which were basically introduced among trawl operators. Recently, the Bureau of Fisheries and Aquatic Resources also conducted training on the use of circle hooks for long liners, a measure that is expected to reduce sea turtle by-catch in long line fishing operation, which traditionally uses tuna hooks.

DISCUSSION

Virtually everything caught in Philippines fisheries is utilized, bringing into question whether any of the catch is properly considered bycatch (depending on the definition, but the catch is not wasted). Exceptions include whale shark, for which the traditional fishery was stopped before this shark was listed, manta ray, and sea turtles (all are protected). Mola mola are caught but unlike off California, they are completely utilized.

A lack of manpower and funds prevents turtle monitoring. However, the WWF has a project to collect turtle bycatch data in the Philippines which will be reported on at the Sea Turtle Symposium in April. The Philippine fisheries might be productive candidates for an externally funded observer program.

Korea

Jeongrack Koh described the bycatch monitoring and research being conducted in Korea. An experiment is being conducted comparing traditional hooks with size 15/0 and 18/0

circle hooks for their efficacy in reducing bycatch in the Korea longline fishery. The experiment began in August 2005 and will be completed in 2007, totaling 225,000 hooks set. The data collected so far in this experiment are insufficient to be conclusive. Korea has initiated an observer program with 5 observers trained by NOAA Fisheries Service Pacific Islands Regional Office. They are observing in 3 oceans, and observed 8 longline trips and 3 purse seine trips in the Pacific Oceans in 2005. New protected species identification books have been provided.

DISCUSSION

Very preliminary results may indicate higher marlin catch, bigeye about the same and maybe lower catches of yellowfin compared with the traditional hooks, particularly for the largest circle hooks.

In the eastern Pacific, east of 120° E, 2-3 turtles have been observed. The U.S.A. will continue to sponsor observer training opportunities and observer exchange with other nations.

Mexico

Michel Jules Dreyfus-Leon described the Mexican fisheries monitoring and research. The purse seine fishery of Mexico in the EPO is dominated by vessels of 363 tons of carrying capacity and higher, with 100% observer coverage which has proved to be of great use to get and improve bycatch data. Mexico is applying the purse seine observer experience in several other fisheries, as was done in the past with the longline fishery of Baja California. In the case of small purse seiners data is available from logbooks. In the purse seine fishery of Mexico, bycatch is relatively low and particularly with turtles, major success has been achieved in reducing mortality to insignificant levels all over IATTC region. In relation to medium size longline vessels, the fisheries institute (INP) has been carrying research in relation to circular hooks; preliminary results seem to suggest no detriment to the fishery by switching to circular hooks while reducing turtle bycatch.

SHARK REPORTS AND DISCUSSIONS

GENERAL DISCUSSION

There is a lack of clarity regarding the consideration of sharks under the bycatch group, since they are targeted in many fisheries. However, the definitions of bycatch are varied and since we the WG is concerned with the biological and ecological impact of shark mortality, and sharks are under the WG's TOR, the issue need not be resolved. Fishery reported data can be useful for sharks, based on the Hawaii fishery reporting experience, but all data collection systems need better species identifications on sharks. Improvement should be sought over market monitoring which is very poor for gilled and gutted sharks and useless for discards. In contrast to data on shark and other fish discards

that can be usefully obtained from fishery self-reporting (catch reports and logbooks) observer programs are needed to estimate protected species interactions.

For fish discard data, as long as logbook programs are designed to record discards, they can provide useful data on bycatch of the more common species if they maintain the same minimum standards as required for monitoring target species. There are really not many special requirements (besides tallying discards) for logbook programs beyond what is needed anyway for target species. One special requirement is to increase the number of species accurately identified, and the full range of bycatch species is probably obtainable only via observer programs.

Again, with regard to observer programs there are few special requirements beyond what is needed for monitoring of target species. But among the most valuable additions could be details of bait and gear that may provide insights to selectivity for unwanted catch, such as instrumented measurement of catch depth and timing.

Consideration of Request from the German Ministry regarding Porbeagle and Spiny Dogfish (ISC/06/BYCATWG/Info-02)

The WG discussed the letter addressed to the ISC Chair concerning support for CITES listing of porbeagle sharks and spiny dogfish. The decided that listing of these sharks is a policy matter not within the WG TOR. The group does not advise on the status of these sharks since the porbeagle is not found in the North Pacific, and neither species is a highly migratory (pelagic) species (i.e. tuna or tuna-like) according to the Law of the Sea Convention Annexes (ISC/06/BYCATWG/Info-03). The working group will inquire of its members if any of the fisheries for tuna or tuna-like species has an appreciable bycatch of spiny dogfish in the North Pacific, but the data and statements in the documents provided do not indicate so. For the eastern North Pacific, the local population is not in bad condition, and no pelagic fishery in that region catches any spiny dogfish except very rarely. The WG recommends the Plenary respond that this issue is not within its TOR.

Report on North Pacific Blue Shark Assessment

Shelley Clarke presented preliminary results from a cooperative North Pacific blue shark stock assessment being undertaken by the United States and Japan. Concerns regarding blue sharks arise from their being the most commonly caught shark in longline fisheries and the largest identifiable component of the global fin trade. The study represents an update to a previous study (Kleiber et al. 2001) which found that the stock appears to be in good condition. Data for the assessment were gathered from Japan, Chinese-Taipei and Hawaii longline fleets; other fisheries were accounted for by using SPC effort data as a proxy. Japanese longline data were “pre-processed” using a method called filtering designed to remove false zero records and provide species-specific records for years prior to recording of sharks by species in logbooks. Catch estimates compiled from logbooks were found to be about twice the size of estimates based on the shark fin trade and the Kleiber et al. (2001) study. Catch and catch rate data, subset into shallow-set and deep-

set series, were applied to a Bayesian surplus production model. The shallow series, which showed a trend of increasing CPUE at the end of the time period, could not be run in the model due to poor convergence diagnostics. The results for the deep series showed that current stock biomass is similar to stock biomass in the early 1970s and the current fishing mortality rate is less than the estimated MSY level. These results are thus similar to the Kleiber et al. (2001) study and also consistent with a recent CSIRO study of blue sharks in the Southwest Pacific.

DISCUSSION

The eastern Pacific catch is lacking in the data set used for this analysis, which was based on catch and effort to 130W. An update might try to incorporate eastern Pacific data. The procedure used to estimate which of the shark data represented blue sharks is not applicable for use on other species since the blue shark's occurrence in the shark catch and low-value carcass resulted in a distinct logbook reporting behavior. For many species there are no useful time series of data. Investigation of other shark species status may require creative modeling approaches and the use of such models to design tagging programs and other research to test model assumptions and predictions. There are drawbacks as well as opportunities in extrapolating information on catch rates from fisheries or fishery sectors with better CPUE data to those with poorer CPUE data, or only effort data. The WG needs to encourage collection of improved species identifications for shark catch data now, to provide opportunities for assessments in the future.

Report on the IATTC Proposal for Population Modeling of Key Shark Populations

Simon Hoyle presented a short summary of a proposal to do creative modeling with the objective of identifying alternative approaches to looking at key shark stocks, such as silky, blue, mako, bigeye thresher, and oceanic whitetip. The objective is to catalogue current knowledge relevant to stock assessment and to compile and analyze available fishery data. Sensitivity analysis will be conducted to identify critical data elements and to provide greater direction on needs from tagging and other studies. Gaps in this information will be identified and the best way to fill the gaps will be explored. Different modeling approaches, such as surplus production models and integrated analysis, will be compared concerning their data requirements and results.

DISCUSSION

There was a brief discussion concerning the need to identify possible locations, such as nursery areas, that can aid in quantifying the stocks. It was also mentioned that in the Hawaiian swordfish longline the current CPUE of blue sharks is noticeably lower than the historical level that existed prior to the mitigation efforts to reduce turtle bycatch. It is likely that circle hooks tend to hook a shark in the mouth versus in the gut; therefore, it is expected that the post-hook mortality would be lower for circle hooks. There is anecdotal information that fishers in Latin America tend to believe that sharks may escape less when using circle hooks.

Japan introduced the results of their experiments on the effect of circle hooks on shark catch in longline fishery (ISC/06/BYCATWG/Info-14). Results of 31 experimental operations showed little difference between the catch rate and size composition of blue shark between conventional 3.8 sun tuna hook and two different sizes of circle hooks (4.3 and 5.2 sun).

SEA TURTLE REPORTS AND DISCUSSIONS

PIFSC Turtle Bycatch Reduction Research

Chris Boggs reported on turtle bycatch reduction research conducted by the Pacific Islands Fishery Science Center. Cooperative research on gear modifications to reduce sea turtle bycatch is being undertaken by PIFSC with cooperating fishermen, scientists, and non-governmental organizations in many countries, as reported in an appendix to the most recent WCPFC document on sea turtle conservation (ISC/06/BYCATWG/Info-06). Large circle hooks have been found to reduce the rate of sea turtle bycatch and smaller circle hooks alone reduce injury if not hooking rate. Measures are in place that effectively reduce sea turtle bycatch in the Hawaii shallow set fishery, and these are being tested and promoted for other shallow-set fisheries for swordfish around the world (e.g. Brazil and Spain) but potential measures need to be tested of the deep set fishery. Although deep set fishing tends to capture turtles at a much lower rate than shallow set, deep set fisheries are so extensive around the world that they probably catch substantial numbers of turtles. Preliminary results of a very large study in Hawaii indicate that large 18/0 hooks do not seem to catch fewer bigeye tuna than tuna hooks. Other studies are underway to control the depth of branchline hooks so that none are deployed shallower than about 100 m. Similar research is underway in Japan (ISC/06/BYCATWG/Info-13). PIFSC will be soliciting vendors to conduct additional experiments around the world in the coming month, and the solicitation will be circulated to the BYCATWG.

Report on Turtle Population Status

Peter Dutton of the Southwest Fisheries Science Center reviewed the status of leatherback turtles which are of great concern due to strong evidence of their precarious situation. The eastern Pacific nesting stock has been so low for so many years that they could rapidly disappear. This stock is not much impacted by North Pacific fisheries, which primarily catch turtles that nest on beaches in the western Pacific in Papua New Guinea, Irian Jaya, and the Solomon Islands. These stocks were underestimated in the recent past and new surveys indicating additional nesting sites should not be mistaken as evidence of increasing numbers. Despite evidence of some stability now that efforts are underway to protect nesting habitats, nestling production is still so low, and has been low for so long, that there is still some potential for a population crash at any time.

DISCUSSION

In gauging the relative concern over North Pacific loggerheads as compared to Western Pacific nesting leatherbacks, Dutton warned that recent increases in loggerhead nesting have been too short in duration to give much security to a population that has declined so radically in the last half-century.

In the western Pacific, low nestling production is partly due to natural beach erosion, a feature of their environment that leatherbacks are adapted for at normal population levels. But commercial harvest and destruction by predators is more than the population has been able to compensate for.

Report on IATTC bycatch issues

Martin Hall described several resolutions passed by the IATTC concerning bycatches of the different groups of interest to the ISC bycatch group (ISC/06/BYCATWG/Info-21-26). A brief review of purse seine bycatch (estimates, research in progress or in the planning stages) was presented. Then, sea turtle bycatch in artisanal longlining was discussed, in particular the regional programs being carried out in the eastern Pacific by a coalition of institutions (IATTC, NOAA, OFCF (Japan), WWF, and national fisheries agencies and NGOs from the countries). Finally, the promising results from a recent experiment using a circle hook with an added wire appendage (ISC/06/BYCATWG/Info-07) were discussed. This small modification of the hook may help reduce sea turtle hooking rates.

DISCUSSION

Large numbers of some fish species are caught as bycatch by purse seiners under FADs. There are also many species of fish bycatch caught by longliners. These species are not recorded by many logbook programs, and prompted many discussions of which other fish species require data collection and stock investigation. Skates and rays, including *Morbula* and *Dayatis*, mahimahi (*Coryphaena*), wahoo (*Acanthocybium*), carangids like *Seriola* and *Elagatis*, lancetfish (*Alepisauris*) and snake mackerel (*Gempylis*) were mentioned. Some of these species should be included in future work plans of the WG.

SEABIRD REPORTS AND DISCUSSIONS

Seabird Interactions with U.S. Longline Fisheries

Kim Rivera of the Alaska Regional Office of NOAA Fisheries presented information on seabird interactions with the U.S. longline fisheries of the North Pacific. The submitted report (ISC/06/BYCATWG/01) focused on the three albatross species taken in North Pacific longline fisheries and addressed the following key topics: affected bird species (species profiles, life history information, population status and trends); monitoring bycatch; bycatch estimates; bird distribution as it overlaps with longline fisheries; mitigation research; and seabird priorities for scientific research activities. Bycatch of black-footed albatross (*Phoebastria nigripes*) and Laysan albatross (*P. immutabilis*) occurs and is reported in the Hawaii-based pelagic longline fisheries for tuna and

swordfish and the Alaska demersal longline fishery for groundfish. The endangered short-tailed albatross (*P. albatrus*) has been documented taken in the Alaska longline groundfish fishery.

Bycatch reporting and data collection was discussed in the context of a NMFS workshop in 2004 on best practice data collection for longline observer programs (recommended minimum and optimum data variables) and a comprehensive U.S. national bycatch report that is being developed in 2006 and 2007. For international fisheries where bycatch data is not collected or not available, overlays of fishery effort with albatross distribution can provide good indications of where bycatch may potentially occur, particularly if effective mitigation measures are not in use. Current U.S. mitigation practices and requirements were discussed. The following research priorities were identified: Bycatch data collection (best practice, of specified standard and methodology); improved understanding of the movements and the overlap of albatrosses with fisheries, for a better understanding of the seabird marine distribution; and continued development of seabird mitigation measures for pelagic longline vessels, particularly those that may have broad geographic applications to distant water fleets.

DISCUSSION

The research on measures for reducing seabird interactions in the Japanese longline fishery and the requirements for their use in the fishery in specified areas and seasons (ISC/06/BYCATWG/02) were summarized and discussed.

REPORT AND DISCUSSION ON MARINE MAMMALS

Marine Mammal Bycatch in U.S. fisheries

Jim Carretta presented background information on marine mammal bycatch in the U.S. west coast drift gillnet and Hawaii longline fisheries. Discussion focused on the fact that there are a few marine mammal stocks of local concern because annual levels of fishery mortality exceed potential biological removal levels set under the MMPA. The working group discussed that in the case of false killer whales near Hawaii, it has been difficult to obtain abundance estimates that adequately reflect the frequency with which this species interacts with longlines. Recent advances in concurrent acoustic and visual line-transect surveys may offer a partial solution for obtaining better estimates of population size for such species where local environmental conditions (i.e. persistent trade winds) may hinder the effective visual detection of groups.

DISCUSSION

The possible seriousness of impacts to marine mammals needs clarification, particularly regarding the methods for estimating the population size. Good technologies are lacking for reducing fishery interaction with marine mammals. The WG will include an expert on these subjects for the next meeting. Presently, some presumed impacts of mammal

takes may be artifacts of poor knowledge of true population sizes. The WG does not recommend broadening its focus to marine mammal interactions at this time.

WORK PLAN OBJECTIVES

As this was the first meeting of the Bycatch Working Group, the WG decided to develop a list of general objectives in order to help focus future research priorities. The Bycatch Working Group plans to agree on specific activities and collaborations that address the following more general objectives at its next meeting.

1. **Bycatch Estimation:** Members are encouraged to initiate or continue the estimation of bycatch (turtles, sea birds, sharks, and other bycatch species) in all major fisheries for pelagic species in the North Pacific based on logbook data, observer data, or any other available information.
2. **Priority Data for Bycatch Assessment:** Members are encouraged to provide any available bycatch information in three categories of descending urgency. These are: 1) the most urgently needed estimates of removals (see objective 1. above); (2) Catch and effort data and other logbook-type data; and 3) Biological data (size, age, gender, etc.).
3. **Observer Programs:** Provide scientific and technical guidance towards the development and standardization of observer programs and the training of observers in all relevant fisheries in collaboration with other commissions.
4. **Identify Fishery Information Necessary to Monitor Bycatch:** Such details might include additional species of interest (e.g. mahimahi) the recording of discards in logbooks, and observation of the condition of bait (frozen or thawed), the condition of discards (alive or dead) and other such details.
5. **Assess Data Poor Species:** Develop and apply stock assessment models for data poor bycatch species.
6. **Inter-fishery Comparisons of CPUE:** Comparisons between different operational characteristics within fishing styles (i.e. monofilament versus multifilament longlines, etc.) can help for many assessment and estimation models where data are incomplete for one style or the other. Calibration research is encouraged.
7. **Collaboration with Other Commissions:** Encourage ongoing cooperation to assess bycatch in other areas by fisheries capturing tuna and tuna like species. The BYCATWG will rely on those efforts to provide bycatch of species that contribute to total bycatch of populations also impacted temperate fisheries of more direct concern to the BYCATWG.
8. **Gear Research:** Continue development and testing of alternative fishing gear to reduce bycatch.

9. Bycatch Handling and Release: Outreach and local adaptation of bycatch handling and release guidelines to improve survival of released bycatch.

10. Provide Additional References as Links: A list of additional informational references will be provided to be linked through the ISC web site.

11. Marine Mammals: Invite further input and discussion on the possible seriousness of impacts to marine mammals at the next working group, particularly regarding improved technologies for estimating the population size and regarding any promising new ideas for mitigation technology. The WG will include an expert on this for the next meeting. (Presently, some presumed impacts of mammal takes seem likely to be artifacts of poor knowledge of true population size. The WG does not recommend broadening its focus to marine mammal interactions at this time.)

CLOSE OF MEETING

The draft Working Group Meeting Report was reviewed by participants. Particular attention was given to developing the consensus list of work plan priorities. Further revisions were accepted on the sections describing participant presentations. The meeting was adjourned on Weds. March 22 at 12:00.

Annex 1

Participants in the First Meeting of the ISC Bycatch Working Group

JAPAN

Masashi Kiyota

National Research Institute of Far Seas
Fisheries
5-7-1 Orido, Shimizu-Ku
Shizuoka, 424-8633
Japan
kiyo@affrc.go.jp
81-543-36-6000

Naozumi Miyabe

National Research Institute of Far Seas
Fisheries
Mathematical Biology Section
Division of Pelagic Fish Resources
5 chome, 7-1 Orido, Shimizu-ku
Shizuoka, 424-8633
Japan
miyabe@fra.affrc.go.jp
81-543-36-6000

Yuji Uozumi

National Research Institute of Far Seas
Fisheries
5-7-1 Orido
Shimizu-Ku, Shizuoka 424-8633
Japan
uozumi@fra.affrc.go.jp
81-543-36-6000

Harumi Yamada

National Research Institute of Far Seas
Fisheries
5-7-1 Orido
Shimizu-Ku, Shizuoka 424-8633
Japan
hyamada@fra.affrc.go.jp
81-543-36-6034

KOREA

Kang-seok Hwang

Headquarters for Fisheries Resources
Management and Enhancement
National Fisheries Research and
Development Institute
408-1, Shirang-ri, Gijang-up
Gijang-gun, Busan 619-902
Korea
kshwang@nfrdi.re.kr
82-51-720-2287

Jeongrack Koh

Headquarters for Fisheries Resources
Management and Enhancement
National Fisheries Research and
Development Institute
408-1, Shirang-ri, Gijang-up
Gijang-gun, Busan 619-902
Korea
jrkoh@nfrdi.re.kr
82-51-720-2334

MÉXICO

Michel Jules Dreyfus-Leon

PMB-070
P.O. Box 189003
Coronado, CA 92178
United States
dreyfus@cicese.mx
52-646-1745637

UNITED STATES**Christofer Boggs**

NOAA Fisheries
 Pacific Islands Fisheries Science Center
 2570 Dole Street
 Honolulu, HI 96822
 United States
 christofer.boggs@noaa.gov

James Carretta

NOAA Fisheries
 Southwest Fisheries Science Center
 8604 La Jolla Shores Drive
 La Jolla, CA 92037
 United States
 jim.carretta@noaa.gov
 858-546-7171

Shelley Clarke

NOAA Fisheries
 Pacific Islands Fisheries Science Center
 C/O National Research Institute
 of Far Seas Fisheries
 5-7-1 Orido, Shimizu-Ku
 Shizuoka, 424-8633
 Japan
 sclarke@fra.affrc.go.jp

Paul Crone

NOAA Fisheries
 Southwest Fisheries Science Center
 8604 La Jolla Shores Drive
 La Jolla, CA 92037
 United States
 paul.crone@noaa.gov
 858-546-7069

Peter Dutton

NOAA Fisheries
 Southwest Fisheries Science Center
 8604 La Jolla Shores Drive
 La Jolla, CA 92037
 United States
 peter.dutton@noaa.gov
 858-546-5636

Tomo Eguchi

NOAA Fisheries
 Southwest Fisheries Science Center
 8604 La Jolla Shores Drive
 La Jolla, CA 92037
 United States
 tomo.eguchi@noaa.gov
 858-546-5615

Suzanne Kohin

NOAA Fisheries
 Southwest Fisheries Science Center
 8604 La Jolla Shores Drive
 La Jolla, CA 92037
 United States
 suzanne.kohin@noaa.gov
 858-546-7104

Marti McCracken

NOAA Fisheries
 Pacific Islands Fisheries Science Center
 2570 Dole Street
 Honolulu, HI 96822
 United States
 marti.mccracken@noaa.gov
 808-983-5736

Kim Rivera

NOAA Fisheries
 Protected Resources Division
 P.O. Box 21668
 Juneau, AK 99802
 United States
 kim.rivera@noaa.gov

Dale Squires

NOAA Fisheries
 Southwest Fisheries Science Center
 8604 La Jolla Shores Drive
 La Jolla, CA 92037
 United States
 dale.squires@noaa.gov

IATTC

Martin Hall

IATTC
8604 La Jolla Shores Drive
La Jolla, CA 92037
United States
mhall@iattc.org

Simon Hoyle

IATTC
8604 La Jolla Shores Drive
La Jolla, CA 92037
United States
shoyle@iattc.org

Cleridy Lennert-Cody

IATTC
8604 La Jolla Shores Drive
La Jolla, CA 92037
United States
clennert@iattc.org

PHILIPPINES

Noel C. Barut

National Fisheries Research and
Development Institute
940 Quezon Avenue
Quezon City, 1103
Philippines
noel_c_barut@yahoo.com

Sammy Malvas

National Fisheries Research and
Development Institute
940 Quezon Avenue
Quezon City, 1103
Philippines
formerwgrfp@yahoo.com

Annex 2

AGENDA

Bycatch Working Group of the ISC
First Meeting, March 20-22, 2006
La Jolla, CA U.S.A.

Chair: Chris Boggs

Registration in the Large Conference Room, SWFSC

Convene in Martin Johnson House (SIO Building T-29)

Introductions and Opening Remarks

Review and Revision of Draft Agenda and Assignment of Rapporteurs

Review of the Terms of Reference of the Working Group

Review of Activities

General Reports of Bycatch Monitoring and Research by ISC Members
(the Chair requests that presenters not elaborate on seabird work until Tuesday)

U.S.A. Pacific Islands - Chris Boggs

U.S.A. West Coast Fisheries - Suzanne Kohin

Japan - Masashi Kiyota

Philippines - Noel Barut

Korea - Jeongrack Koh

Mexico - Michel Dreyfus-Leon

Sharks – Reports and Discussion

Blue Shark Stock Assessment - Shelley Clarke

Draft for CITES listing of Porbeagle and Spiny Dogfish

Modeling of Key Shark Populations - Simon Hoyle

Sea Turtles – Reports and Discussion

Collaborative Research on Methods to Reduce Sea Turtle Bycatch in Longline Fisheries - Chris Boggs

Work on Population Trends of Pacific Sea Turtles - Peter Dutton

Report on IATTC Bycatch Issues - Martin Hall

Seabirds – Reports and Discussion

Seabirds that Interact with U.S. Longline Fisheries in the N. Pacific – Kim Rivera

Other items

Marine Mammal Bycatch - James Carretta

Development of Work Plan

Review and Adoption of Work Plan (all areas)

Annex 3

List of Documents and References for the Bycatch Working Group of ISC-6

- ISC/06/BYCATWG/01: Seabirds that interact with U.S. longline fisheries in the North Pacific. By Kim Rivera
- ISC/06/BYCATWG/02: Summary of Japanese activities for the management of pelagic sharks and for the mitigation of incidental catch of seabirds and sea turtles in longline fishery. By Masashi Kiyota
- ISC/06/BYCATWG/Info-01: Bycatch Working Group-Terms of Reference

Shark References

- ISC/06/BYCATWG/Info-02: CITES letter to ISC on draft listing
- ISC/06/BYCATWG/Info-03: Law of Sea Convention 1982 Annex I. HMS
- ISC/06/BYCATWG/Info-04: WCPFC Shark conservation and management: actions by the Commission, relevant regional fisheries management organizations and other international initiatives. WCPFC/TCC1/18 Suppl.3.

Sea Turtle References

- ISC/06/BYCATWG/Info-05: Fishing methods to reduce sea turtle mortality associated with pelagic longlines. By John Watson et al., Can. J. Fish. Aquat. Sci. 62: 965-981 (2005).
- ISC/06/BYCATWG/Info-06: WCPFC Sea turtle conservation and management: actions by the commission, relevant regional fisheries management organizations and regional fisheries bodies. WPCFC/TCC1/18 Suppl. 2.
- ISC/06/BYCATWG/Info-07: A comparison of various fish hooks and fish hooks fitted with wire appendages and their effects on reducing the catch of small and gut hooked snapper (*Pagrus auratus*) by recreational fishers in the Hauraki Gulf of New Zealand. By P.D.L. Barnes et al.
- ISC/06/BYCATWG/Info-08: Different ways to measure hook width by C. Boggs.
- ISC/06/BYCATWG/Info-09: Population trends and viability analyses for Pacific marine turtles. By Melissa Snover, PIFSC Internal Report IR-05-008.
- ISC/06/BYCATWG/Info-10: New leatherback conservation project in Papua, Indonesia. By Hiroyuki Suganuma et al., Marine Turtle Newsletter No. 109, 2005.
- ISC/06/BYCATWG/Info-11: Management of longline fishery to mitigate interactions with ecologically related species. By Masashi Kiyota,

- Daisuke Shiode, and Hideki Nakano, Proceedings of the 3rd Workshop on SEASTAR 2000. p1-5, 2003.
- ISC/06/BYCATWG/Info-12: Assessment of mitigation measures to reduce interactions between sea turtles and longline fishery. By Masashi Kiyota, Kosuke Yokota, Takahiro Nobetsu, Hiroshi Miname, and Hideki Nakano. Proceedings of the International Symposium on SEASTAR 2000 and Bio-lapping Science, P24-29, 2005.
- ISC/06/BYCATWG/Info-13: Midwater float system for standardizing hook depths on tuna longlines to reduce sea turtle by-catch. By Daisuke Shiode et al., Fisheries Science 2005; 71:1182-1184.
- ISC/06/BYCATWG/Info-14: Does circle hook affect shark catch in pelagic longline fishery? (DRAFT) By Kosuke Yokota, Masahi Kiyota, and Hiroshi Minami, National Research Institute of Far Seas Fisheries.
- ISC/06/BYCATWG/Info-15: Measurement-points examination of circle hooks for pelagic longline fishery to evaluate effects of hook design (DRAFT). By Kosuke Yokotoa, Hiroshi Minami, and Masashi Kiyota. National Research Institute of Far Seas Fisheries.
- ISC/06/BYCATWG/Info-16: A risk assessment for Pacific leatherback turtles (*Dermochelys coriacea*). By Isaac. C. Kaplan, Can. J. Fish. Aquat. Sci. 62: 1710-1719 (2005).
- ISC/06/BYCATWG/Info-17: Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. By Rebecca L. Lewison et al., Ecology Letters, (2004) 7:221-231.
- ISC/06/BYCATWG/Info-18: Understanding impacts of fisheries bycatch on marine megafauna. By Rebecca L. Lewision et al., Trends in Ecology and Evolution, Vol. 19 No. 11, Nov. 2004.
- ISC/06/BYCATWG/Info-19: Intrinsic rebound potentials of 26 species of Pacific sharks. By Susan E. Smith et al., Mar. Freshwater Res., 1998, 49, pp. 663-78.
- ISC/06/BYCATWG/Info-20: Incorporating uncertainty into demographic modeling: Application to shark populations and their conservation. By Eric Cortes, Conservation Biology, 16(4), pp. 1048-1062 (2002).

IATTC Resolutions

- ISC/06/BYCATWG/Info-21: IATTC Resolution C-04-05 (Revised), Consolidated Resolution on bycatch.
- ISC/06/BYCATWG/Info-22: IATTC Resolution C-05-03, Resolution on the conservation of sharks caught in association with fisheries in the eastern Pacific Ocean.

- ISC/06/BYCATWG/Info-23: IATTC Resolution SAR-7-10 (Draft): Proposal for a comprehensive assessment of key shark species caught in association with fisheries in the eastern Pacific Ocean.
- ISC/06/BYCATWG/Info-24: IATTC Resolution C-04-07, Resolution on a three-year program to mitigate the impact of tuna fishing on sea turtles.
- ISC/06/BYCATWG/Info-25: IATTC Resolution C-05-01, Resolution on incidental mortality of seabirds.
- ISC/06/BYCATWG/Info-26: WCPFC Resolution on the incidental catch of seabirds. December 2005.

Sea Bird References

- ISC/06/BYCATWG/Info-27: Update on short-tailed albatross satellite telemetry studies North Pacific Albatross Working Group Meeting. By R. Suryan et al, February 2006.
- ISC/06/BYCATWG/Info-28: Distribution of albatrosses and petrels in the Western & Central Pacific & overlap with WCPFC longline fisheries. By Clea Small, Prepared for the first meeting of the WCPFC Ecosystems & Bycatch Specialist Working Group, Noumea, 13 August 2005.
- ISC/06/BYCATWG/Info-29: U.S. Fish & Wildlife Service Seabird Conservation Plan-Pacific Region (status of short-tailed albatross, black-footed albatross, and Laysan albatross), pp. 173-178.
- ISC/06/BYCATWG/Info-30: Comparison of three seabird bycatch avoidance methods in Hawaii pelagic longline fisheries. By Eric Gilman et al., In Press, 2006, Fisheries Science.
- ISC/06/BYCATWG/Info-31: Update on short-tailed albatross new colony establishment (Torishima decoy site and proposed Bonin Island site), North Pacific Albatross Working Group Meeting. By G. Balogh and P. Sievert, February 2006.
- ISC/06/BYCATWG/Info-32: Hawaiian Islands National Wildlife Refuge and Midway Atoll National Wildlife Refuge-annual nest counts through hatch year 2005. By Elizabeth Flint, Pacific Remote Islands National Wildlife Refuge Complex.
- ISC/06/BYCATWG/Info-33: Table of estimated incidental take and actual numbers of seabirds observed taken in the Aleutian Islands fishery management region groundfish Demersal longline fishery, 1993 through 2004. From NOAA Fisheries Alaska Region.

Others

- ISC/06/BYCATWG/Info-34: Development of best practices for the collection of longline data to facilitate research and analysis to reduce bycatch: draft executive summary from the report of a workshop held at the International Fisheries Observer Conference,

Nov. 8, 2004, Sydney, Australia. By Kimberly S. Dietrich et al., Agreement on the Conservation of Albatrosses and Petrels. ACAP/AC1/Inf. 19.

ISC/06/BYCATWG/Info-35: Estimate of marine mammal, sea turtle, and seabird mortality in the California drift gillnet fishery for swordfish and thresher shark, 1996-2002. By James V. Carretta et al., Marine Fisheries Review 66(2)