REPORT OF THE SHARK WORKING GROUP WORKSHOP

International Scientific Committee for Tuna and Tuna-like Species
in the North Pacific Ocean

July 6-8 & 11, 2013
Busan, Korea

1.0 INTRODUCTION

The Shark Working Group (SHARKWG or WG) of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) held a 4-day meeting in advance of the ISC Plenary meeting at Hotel Novotel in Busan, Republic of Korea, July 6-8 & 11, 2013. The primary goal of the workshop was to finalize stock status and conservation information based on the SHARKWG's North Pacific blue shark Bayesian Surplus Production (BSP) stock assessment. Other goals included 1) reviewing an age-structured alternative stock assessment of North Pacific blue sharks, 2) reviewing shortfin mako shark catch distribution by size and sex, 3) reviewing new information on the biology and life history of shortfin mako sharks, 4) tentatively deciding on a modeling approach to use for assessing shortfin mako shark, 5) establishing a shortfin mako shark assessment work plan, and 6) conducting work for the Plenary including updating Plenary Catch Tables for blue and shortfin mako sharks.

Suzanne Kohin, SHARKWG Chair, opened the meeting. Participants included members from Chinese Taipei, Japan, Mexico, the Republic of Korea, the United States of America (USA) and the ISC Chairman (Attachment 1). Dr. Zang Geun Kim, head of the Korean delegation and local host, welcomed SHARKWG participants to Busan and wished the group a productive meeting.

2.0 DISTRIBUTION OF MEETING DOCUMENTS

Four working papers and one information paper were distributed and numbered (Attachment 2). Several oral presentations were also made during the meeting. The authors of ISC/13/SHARKWG-3/01 and ISC/13/SHARKWG-2/INFO-01 agreed to have their papers posted on the ISC website where they will be available to the public. The authors of the other Working Papers declined posting on the ISC website.

3.0 REVIEW AND APPROVAL OF AGENDA

The draft meeting agenda was reviewed and adopted with minor revisions (Attachment 3).

4.0 APPOINTMENT OF RAPPORTEURS

Rapporteuring duties were assigned to M. Kai, S. Kohin, K. Piner, Y. Semba, S. Teo, and S.-C. Yoon. The approved agenda (Attachment 3) indicates the rapporteurs for each item in parentheses.

5.0 SUMMARY OF THE APRIL 2013 WORKSHOP

The Chair of the SHARKWG provided a summary of the April 2013 workshop held in Shizuoka, Japan. The primary goal of the workshop was to complete a Bayesian Surplus Production (BSP) stock assessment for blue sharks in the North Pacific and develop tentative conservation information for the ISC Plenary. Other goals included 1) developing plans for a preliminary age-structured assessment of blue sharks in the North Pacific that will be completed by the next SHARKWG meeting in July and 2) gathering information and discussing assessment plans for shortfin mako shark. Seven working papers and one information paper as well as several oral presentations were discussed. Relatively minor changes to some of the final catch data time series for the assessment were reviewed and accepted. A couple of papers on alternative CPUE indices developed by Clarke et al. were discussed. Although the WG was unable to carefully review the analyses, and the CPUE indices had already been chosen for the blue shark assessment, the WG made a few observations. It was noted that the majority of the data for one (published in Conservation Biology) was from the Hawaii longline fishery and showed a similar trend to that of the Hawaii index developed by this WG. The second, derived from Japan research training vessel data, was from relatively few vessels, covered a smaller area than the Hawaii index, and there were some concerns about complete data recording in recent years, thus the WG considered the Hawaii index a better representation for a fishery with similar operational characteristics. The WG spent considerable time discussing the choice of input priors for the BSP model. Specifically there is much uncertainty about the life history characteristics of blue sharks and what may be the best choices for the productivity parameters *r* and *n*. The WG chose what they believed to be the most plausible input parameters based on information from WG scientists as well as data from the Atlantic. The BSP modeling team had made excellent progress on the assessment. The WG reviewed preliminary runs, suggested additional runs and ultimately completed the assessment with the finalized data by the end of the meeting.

6.0 SS MODELING OF NORTH PACIFIC BLUE SHARK

Members of the ISC SHARKWG and SPC (Secretariat of the Pacific Community) had previously agreed to collaborate on an age-structured model of North Pacific blue sharks using Stock Synthesis (SS) (reference report from May 2013). The purpose of the SS modeling efforts was to help the WG understand possible effects of the age and sex structures on stock assessment results because the BSP model used in the current assessment does not account for these effects.

The WG discussed the executive summary and key figures and tables for the base case age-structured SS3 model of North Pacific blue sharks (ISC/13/SHARKWG-3/INFO-01). However, the WG was unable to review the collaborative SS3 model and its results because a full report detailing the SS model was not provided to the WG by the previously agreed upon deadline or even by the start of the meeting. In addition, the executive summary did not contain enough technical detail for the WG to understand and review the scientific and technical aspects of the model. Therefore, the WG was unable to endorse the SS3 model for developing conservation

and management advice. **The WG requests that presentation of the SS3 model results to the WCPFC be postponed until SC 10 so that the WG has an opportunity to review the model adequately. The WG welcomes further collaborative refinement of the modeling and submission of the full assessment report for review at a future WG meeting.**

The WG recognized that a draft of the detailed assessment report for the WCPFC was received on 9 July 2013. The paper was not accepted as a submission for this meeting because it was received too late to be taken up by the WG, in particular given the need to thoroughly review the technical details of the assessment. The WG agreed to review the paper on the SS model (or a revised version, if submitted) at the next WG meeting tentatively scheduled for January 2014.

7.0 FINALIZE BSP ASSESSMENT REPORT INCLUDING CONSERVATION INFORMATION AND EXECUTIVE SUMMARY

The WG reviewed and accepted the Executive Summary, Stock Status and Conservation Advice.

8.0 PEER REVIEW OF NORTH PACIFIC BLUE SHARK ASSESSMENT

The SHARKWG Chair asked members whether they favored a desktop peer review of the North Pacific blue shark assessment as has been conducted for all ISC stock assessments since the 2011 albacore assessment. The objectives of the review would be to critique and provide feedback of the assessment with the intent to improve future assessments. The review could be conducted through the Center for Independent Experts (CIE) established by NOAA Fisheries to strengthen and ensure high quality of their fisheries science products. Terms of Reference for the review would be developed to be appropriate for the international nature of the ISC assessment process and be modeled after those recently written for the ISC Pacific bluefin tuna assessment peer review. **All members present agreed that the peer review should proceed.** T. Sippel and N. Takahashi were identified as the technical contacts if questions arise from the reviewers and the WG Chair will serve as the principal contact. The WG Chair will work with the ISC Secretariat to finalize all necessary documents. The review is planned to be completed by ISC 14.

9.0 SHORTFIN MAKO SHARK SPATIAL DISTRIBUTION BY SIZE/SEX

9.1 USA

Size composition and spatial distribution of shortfin mako sharks by size and sex in U.S. West Coast fisheries. (ISC/13/SHARKWG-3/01)

Summary

The objective of this working paper is to examine the size composition and the sex and size-specific spatial distributions of shortfin mako sharks from U.S. West Coast fisheries. This information will help the ISC SHARKWG better understand the size and sex segregation, if any, of this stock and help in the development of the assessment model structure. The size compositions and spatial distributions of shortfin mako sharks along the U.S. West Coast were

developed from four data sources: 1) market size samples of landed shortfin mako sharks from the drift gillnet fishery; 2) onboard observers of the drift gillnet fishery; 3) conventional tag deployments, primarily from the recreational fishery; and 4) size samples and satellite tag tracks from SWFSC juvenile shark longline surveys. Size compositions from the drift gillnet fishery, juvenile shark longline survey, and the conventional tag reports show that shortfin mako sharks from U.S. West Coast fisheries are primarily juveniles and sub-adults. The length distributions of males and females were similar from all data sources. A slight bias in the sex ratio towards male shortfin makos was observed, with approximately 1.2 to 1.3 males per female. Juvenile and sub-adult shortfin mako sharks did not show substantial sex-specific differences in their spatial distributions in the eastern North Pacific Ocean.

Based on these preliminary results, if an age-structured model is to be used for the shortfin mako shark assessment, it is recommended that the SHARKWG consider having the U.S. West Coast fisheries share a single selectivity, and that the selectivity be fitted to the most robust size composition data available, which represents the catches of the most important fisheries on the U.S. West Coast, e.g., the drift gillnet fishery. If a sex-specific model is used for the assessment, the SHARKWG could consider using a shared selectivity curve for both sexes, albeit with an offset for the male or female selectivity, in order to represent the slight bias towards males in these U.S. West Coast fisheries. Relative to the large spatial scales relevant in the upcoming stock assessment, we do not observe strong sex and/or size specific differences in the spatial distribution of shortfin mako sharks in the NEP. However, this tentative conclusion pertains only to the size classes, namely juvenile and sub-adult shortfin makos of both sexes, and the range of the data examined in this study. It should also be noted that these datasets lack sufficient adult female sample sizes to make robust conclusions about their spatial distribution.

Discussion

The WG questioned what information was used to divide juvenile and subadults. The authors clarified it was based on previously published work. The authors also noted that southern California is an important pupping area for many species of sharks, which may reflect oceanographic influences. The WG continued the discussion on the importance of the size-sex spatial patterns for the stock assessment. The authors considered the spatial patterns for shortfin mako less important than for blue shark. **The WG requested the US scientists re-examine the HI longline size/sex composition information regarding potential size/sex distribution patterns.**

9.2 JAPAN

Outline of shortfin mako shark size distribution in the North Pacific judging from Japanese longline and drift net data (oral presentation)

The size distribution pattern of shortfin mako sharks in the North Pacific was investigated using logbook and size sampling data collected from Japanese longline and drift net fisheries. The smallest sharks, which were presumed to be the young-of-the-year, were observed in the areas off northeast Japan and California. In the northwest and central Pacific area, the average size of shortfin mako gradually increased from the area off northeast Japan in the eastern and southerly directions. The largest shortfin makos were caught in the northeastern area of the Hawaii Islands. Seasonal variability of CPUE and average sizes was also observed, especially in the subtropical

and temperate areas in the northwest Pacific where Japanese offshore surface longliners fish. Like blue shark, the highest CPUEs were observed in the subtropical and the temperate areas in the northwest Pacific. Though the amount of catch and value of CPUE were not so high, shortfin mako catches were constantly observed in the tropical and the subtropical area in the north central and the eastern Pacific where Japanese distant-water tuna longliners were operated, which was not observed in the blue shark data. This may be due to the relatively higher market values of frozen shortfin makos than blue shark in Japan.

Spatial distribution pattern of shortfin mako (Isurus oxyrinchus) caught by Japanese fisheries in the North Pacific. (ISC/13/SHARKWG-3/04 and Appendix)

Summary

This document reviewed the size data and processed weight data from 260,288 shortfin mako sharks caught by Japanese fisheries in the North Pacific from 1993 through 2012. In this document, we present size frequencies and sex ratios for driftnet, offshore longline (shallow longline), research and training vessel (RTV), and distant-water longline (commercial deep longline) fisheries. Juveniles dominated in the waters between 140E and 160E above 20N, while the number of sharks >=150 cm increased toward the eastern area. A latitudinal difference was observed, especially in the area between 140E and 160E, with an increase in the mode from the north to the south. East of 160E, the latitudinal shift was less obvious. Generally, in the size range between 150 and 230 cm, the proportion of males was greater throughout the area. However, in the area east of the dateline where larger sharks are more prevalent, females dominated the catch of sharks over 230 cm. The sex ratio in the offshore longline (west of 160 W) for sharks between 150-200 cm in size showed a slight predominance of females between 140-160E gradually changing to a predominance of males east of 160E. The sex ratio observed north of Hawaii indicated male dominance between 150-200 cm and female dominance > 200 cm in the area between 30-40N, but the proportion of females was constantly higher than males in the area between 20-30N. In this document, it was suggested that both sexes spend the nursery period probably in even sex ratio until about 150 cm in the area between 140E and 160E, and males move to the east and/or south earlier than females and females may also move to the east as they grow. The results of this document indicate a clear ontogenetic shift of spatial distribution and possible sex-specific distribution patterns, but detailed spatial distribution pattern by sex (especially in females) is still unknown. Further collection and analysis of sex-specific size data in the area south of 30N and east of the dateline, and combined tagging research would progress the understanding of sex-specific distribution pattern of this species.

Discussion

The WG noted that the large spatial maps of fishing effort and CPUE are very informative. Furthermore, the WG noted that information from around the Hawaiian Islands was missing. **The WG recommended that Japanese and US scientists collaborate to fill in the missing information on fishing effort, size, sex and distribution of shortfin mako sharks from Hawaiian waters.** The WG also noted that the distribution of CPUE suggested a wide and relatively continuous distribution of shortfin mako sharks in the entire Pacific. However the authors noted that there is evidence of spatial and temporal separation of northern and southern hemisphere pupping grounds, supporting separate northern and southern stocks. The authors also noted that movement of male sharks appears to be uni-directional (west to east) while movement

of females may include more complex patterns. This tentative inference is based on a limited catch of adult females, as described in ***ISC/11/SHARKWG-1/01***, and any such movements were not fully investigated in this study. The authors further clarified that their result on movement is based on the sex ratio and size structure of regional fishery catches. The WG also noted that sexual dimorphism is likely based on the sex ratios by size with females growing to larger sizes.

9.3 KOREA

Korea contributed size and sex information for blue sharks and shortfin makos from their distant water longline fishery; these data have been collected by scientific observers since 2005. The data were collected opportunistically, but Korea is implementing a more systematic data collection with both a scientific observer program and logbooks this year. The data were reviewed and **it was acknowledged that they will provide useful information regarding the Korea longline catch composition for these two species. The WG requested that the data be summarized for a future meeting and compiled in the size templates provided.**

10.0 SHORTFIN MAKO SHARK LIFE HISTORY

10.1 AGE AND GROWTH

Estimation of growth curve from length composition of juvenile shortfin mako, Isurus oxyrinchus, in the western and central North Pacific Ocean.(ISC/13/SHARKWG-3/02)

Summary

This paper presents the validation of the growth curve for juvenile shortfin mako, *Isurus oxyrinchus*, in the western and central North Pacific Ocean. The data were the shortfin mako length compositions for shortfin mako caught by Japanese offshore surface longliners and the coastal drift net fishery based on Kesennuma fishing port in 2005–2011. The pooled monthly sex and length compositions were decomposed into size (age) groups by fitting mixture Gaussian distribution curves. Mean, standard deviation, and the mixture weight of each component were estimated and simulation data of precaudal length at ages was generated from them. Parameters of von Bertalanffy growth function were fitted to the simulation data and estimated to be 461.6 cm, 0.09, and -1.7 years for L_∞, k, and t_0, respectively. The growth curve was compared with the representative curves in the western and central North Pacific Ocean and off southern California. Results from the comparisons revealed that growth of younger fish were similar to the growth observed off southern California. Shortfin makos grow rapidly in the first 6 months of life, with an estimated size of 164 cm for both sexes combined and estimates of 153 cm for males and 156 cm for females, respectively. A previous study had estimated sizes of approximately 131 cm for males and 126 cm for females in the western and central North Pacific Ocean.

Discussion

In this paper, growth of juveniles of the first 3 age classes as estimated from size composition data was faster than that estimated in a previous study from vertebrae counts. Growth estimates closely matched estimates of growth of juveniles off southern California from tag-recapture and size composition data. The consistency of this study with the California study suggests the

growth models developed from vertebral band counts may underestimate growth and need to be revised. While the current study, in combination with the OTC validation study (Wells et al. 2013), provides greater certainty in ageing young fish, the growth of older fish (>150 cm), and hence the value of L_∞, is highly uncertain because the length compositions only represent the first 3 year classes. It is not advisable to extrapolate growth curves to older ages based on data from only young fish. The WG discussed problems with estimating ages of shortfin makos based on vertebral counts, including the possibility of an ontogenetic change in band periodicity pattern at some life history stage, or the potential biases in counting more bands near the centrum origin in young fish relative to old fish. Further discussion was taken up after the subsequent presentation.

Preliminary results of cross-reading of shortfin mako vertebrae between USA and Japanese scientists. (oral presentation)

Summary

The ongoing cooperative work on cross-reading between USA and Japan was introduced. Japan provided 10 vertebrae collected from Northwest Pacific Ocean to USA to compare the counts between different enhancing methods. Japan and USA adopted the shadowing method on half-cut centrum and X-raying on whole centrum and transverse section, respectively. The result indicated relatively good agreement in the size range < 150 cm but the count by Japan tended to be larger than that of USA in larger size classes. Further cross-reading and clarification on the reason of the discrepancy for the large sharks is necessary.

Discussion

These preliminary results demonstrated that the two methods used to read vertebral bands do not consistently result in the same readings, although the number of samples analyzed was very small. **The WG recommended continuing with the cross-reading study** but suggested that, due to uncertainty in counting bands and assigning ages based on band counts, ageing should be confirmed using independent methods like tagging and chemical marking. The uncertainty in estimating ages from length frequency data beyond 3 years emphasizes the need to conduct further studies.

Due to the importance of establishing a growth curve for shortfin mako sharks to use in the stock assessment, **the WG recommended holding the Second ISC Shark Age and Growth Workshop with a focus on shortfin mako sharks in the near future. At that Workshop, the age and growth specialists should strive to come to a consensus on the appropriate growth model(s) to be used for the assessment. In addition, if it is determined that vertebral counts cannot reliably be used to estimate ages of shortfin mako shark, research should focus on finding alternative methods. If consensus on a growth model cannot be reached, the modelers should incorporate the range of plausible growth models into the assessment, based on the advice of the age and growth scientists.**

10.2 LENGTH-WEIGHT AND LENGTH-LENGTH CONVERSIONS

M. Tsai is collating all original shortfin mako size data from WG members in order to facilitate selection of conversion factors to use in the upcoming assessment. **The WG recommended that all ISC member countries send length-weight and length-length (e.g., fork length to total length; fork length to precaudal length) relationship data to**

M. Tsai as soon as possible. The data will be summarized and circulated for WG input on the conversion factors to use. The WG Chair will archive all the original size data.

10.3 MATURITY AND FECUNDITY

The WG did not have any new information on the maturity and fecundity of mako sharks at this meeting.

10.4 GENETICS

Global population genetic structure of shortfin mako (Isurus oxyrinchus) inferred from microsatellite DNA markers. (ISC/13/SHARKWG-3/03)

Summary

A total of 613 tissue samples of shortfin mako was collected from eleven sampling areas in the North Atlantic, the Indian and, the North and South Pacific Oceans, and analyzed for fourteen microsatellite loci to estimate the global population genetic structure of shortfin mako. Mean allelic richness and expected heterozygosities in each population ranged from 5.33 to 5.52 and from 0.70 to 0.75 respectively, which were quite similar among populations. The pairwise R_{st} estimates and the exact test of population differentiation based on allele frequencies did not show any differentiation between populations. The clustering analysis performed by program STRUCTURE also did not indicate any population stratification. These results suggested a lack of genetic differentiation of shortfin makos on inter-oceanic scale. Considering the significant maternal differentiation of the shortfin mako in the North Pacific from other ocean groups indicated in the previous mitochondrial studies, it would be appropriate to consider that the North Pacific shortfin mako is managed separately from ones in the other oceans.

Discussion

It was clarified that although an early version of the document contained a map showing the locations of samples used in the analyses, samples from California and Mexico were both analyzed and pooled for inclusion in the analysis. The WG noted that the results provide support to the WG's assumption that shortfin makos in the North Pacific are a separate stock from those in the South Pacific. The significant maternal differentiation of makos in the North Pacific suggests that these female makos pup only in the North Pacific. The lack of microsatellite differentiation suggest that male makos from both hemispheres may mix across the equator but the low mako CPUE along the equatorial areas suggest that this rate is likely to be low, even if there is mixing of males. Based on this discussion, **the WG recommended that the upcoming assessment assume that there is a distinct North Pacific stock of shortfin makos**, while noting the potential for low level of mixing across the equator, especially for male makos. **The WG also recommended that WG continue work on the stock structure of mako sharks in the Pacific Ocean.**

10.5 NATURAL MORTALITY

The WG noted that natural mortality estimates are often related to the growth and other life history parameters of the stock. Since the growth model for North Pacific should be better

defined after the proposed age and growth workshop, **the WG recommended that the WG scientists work on providing natural mortality estimates after the age and growth workshop.** Scientists from the US and Japan volunteered to perform a meta-analysis of natural mortality estimates after consensus growth curves are established.

11.0 SHORTFIN MAKO SHARK MODELING APPROACH

The WG discussed the modeling approach for the upcoming North Pacific mako shark stock assessment as well as the biological input parameter values and appropriate input data structure. The WG chairperson noted that size and sex data for fisheries of all nations were not available for review at the current meeting. For the next meeting, **WG members were asked to summarize catch, and size data based on areas as best defined by the catch composition and fishery practices. Since most of the available data has not yet been compiled and made available to the WG, the decision on the modeling approach was postponed to the next WG data preparation meeting, when such data will be made available.**

12.0 COORDINATION WITH WCPFC AND IATTC

The WG reiterated the desire to continue working collaboratively with other organizations. The understanding among the ISC, IATTC and WCPFC upon establishment of the SHARKWG identified the ISC as taking the lead on the temperate north Pacific shark species, specifically blue and shortfin mako sharks, in collaboration with the other organizations. Nevertheless, the WG faced challenges in advancing a single ISC north Pacific blue shark assessment. **The WG requested that the ISC Chair take up the issue of collaboration and coordination with the IATTC and WCPFC leadership.** The WG Chair or her designee will continue to attend WCPFC and IATTC Science Committee meetings to keep informed of shark related assessment and research plans.

13.0 SHORTFIN MAKO SHARK ASSESSMENT WORK PLAN

In light of the blue shark assessment, the WG recognizes the difficulty in estimating shark catch and discards and the challenges presented by spatial segregation by size and sex. Because data compilation will be time-consuming, the WG does not expect to complete the shortfin mako shark data compilation and stock assessment before ISC 14. The WG revised the shortfin mako shark assessment workplan developed at the April 2013 meeting on the basis of this realization.

In advance of the next meeting:

1. Compare prior L-L and L-Wt conversions with raw data submitted. Conversion equations will be circulated to members at least 1 month before the meeting. *(Tsai)*
2. Each nation provide reviews of estimated catch and size (in PCL) and sex data for their fisheries based on the appropriate stratification taking into account size and sex structure of the catch *(all WG members and observers)*
3. Combine size and sex data for fisheries in the NEPO and NWPO in order to examine spatial patterns of the stock more fully (Japan, US, Taiwan)
4. Age and growth specialists plan 2nd workshop to address challenges in ageing shortfin makos, and continue work on comparing methods across studies. (*Semba, Liu, Kohin*)

5. Chair works with SPC and IATTC, other national delegation leads, and other species WG Chairs to come up with effort, catch and/or size data for fisheries with non-reported catch (*Kohin*).

Next meeting fall/winter (Age and growth workshop to precede this)

1. Review additional information on the size and sex composition of shortfin mako sharks
2. Review catch data and catch estimation procedures.
3. Review abundance indices for potential use in assessment.
4. Review progress on biological studies and prioritize studies based on assessment needs and greatest uncertainty.
5. Decide on modeling approach and area stratification given information on stock structure.

ISC SHARKWG Second Age and Growth Workshop (tentative objectives)

1. Compare results of cross validation for shortfin mako vertebral counts (*Semba, Wells, others*)
2. Compare results of reference vertebrae collection readings for shortfin mako and blue shark (prioritizing shortfin mako work for upcoming assessment)
3. Develop process for combining raw data given the results of the reference collection comparisons
4. Combine raw data based on regional and/or sex-specific growth hypotheses
5. Propose candidate growth curve(s) for shortfin makos for use in the stock assessment
6. Explore alternative methods for ageing sharks.

Spring 2014: final data prep meeting

1. National scientists submit provisional data in the templates provided for the assessment given the agreed upon modeling approach (e.g. catch, size/sex by fisheries and quarters defined).
2. Complete and agree upon all data and procedures to estimate catch and abundance indices.
3. Review and accept catch estimation procedures for non-reporting fleets.
4. Finalize life history parameters to use for assessment.
5. Review and accept size data and definition of fisheries.
6. WG modelers provide proposal(s) for base case run, sensitivities, and projections.
7. Conduct and review preliminary runs.

Fall/winter 2014: shortfin mako shark assessment meeting

1. Conduct and review base case assessment modeling (subgroup meeting in advance of WG meeting if needed).
2. Conduct and review sensitivity results.
3. Conduct and review future projections.
4. Develop stock status conclusions and conservation information.
5. Prepare assessment report.

13.a DEVELOP DATA SUBMISSION TEMPLATES AND DEADLINES

The WG developed some preliminary catch and size templates for shortfin mako shark data submission. At this stage, the WG is not requested to submit the data until they are presented and reviewed in summarized form at the next meeting.

13.b FUTURE SHARKWG MEETINGS

A tentative schedule for upcoming WG meetings was adopted:

January 9-11, 2014 Location in eastern Pacific TBD (tentatively La Jolla CA USA)	Second ISC Shark Age and Growth Workshop
January 13-18, 2014 Location in eastern Pacific TBD (tentatively La Jolla, CA USA)	Review of SS3 north Pacific blue shark assessment Shortfin mako data review and selection of modeling approach
June 2-9, 2014 Keelung, Chinese Taipei	Shortfin mako data prep meeting
July 2014, 1 day At ISC Plenary venue	Conduct work for the Plenary
Fall/Winter 2014 Location TBD	Shortfin mako assessment meeting

14.0 PLENARY CATCH TABLES

Draft Plenary Catch Tables for blue and shortfin mako sharks were circulated to all members with a request to provide all available retained catch data. The catch tables were finalized by the end of the meeting. It was noted that there is a lack of data for most years and nations because species-specific shark landings data were not routinely collected until recent years in many countries.

15.0 OTHER MATTERS

National SHARKWG contacts were revised. The contact for Korea is Sang Chul Yoon. The contact for Japan is Kotaro Yokawa. No other changes were noted.

16.0 CLEARING OF REPORT

The Report was reviewed and the content provisionally approved by all present. The Chair will make minor non-substantive editorial revisions and circulate a revised version to all WG members within 3 weeks. The report will be finalized within 30 days.

17.0 ADJOURNMENT

The Chair thanked all participants for attending and extended a special thanks to the Korean Delegation for hosting and providing meeting support. She said she looks forward to seeing everyone again at the planned SHARKWG meetings and Shark Age and Growth Workshop.

The meeting was adjourned at 15:12, July 11, 2013.

Attachment 1: List of Participants

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Attachment 2. Meeting Documents

WORKING PAPERS

ISC/13/SHARKWG-3/01	Size composition and spatial distribution of shortfin mako sharks by size and sex in U.S. West Coast fisheries. L. Urbisci, T.Sippel, S. Teo, K. Piner and S. Kohin (suzanne.kohin@noaa.gov)
ISC/13/SHARKWG-3/02	Estimation of growth curve from length composition of juvenile shortfin mako shark, *Isurus oxyrinchus*, in the western and central North Pacific Ocean. M. Kai, K. Shiozaki, Y. Semba and K. Yokawa (kaim@affrc.go.jp)
ISC/13/SHARKWG-3/03	Global population genetic structure of shortfin mako (*Isurus oxyrinchus*) inferred from microsatellite DNA markers. M. Taguchi and K. Yokawa (tagu305@affrc.go.jp)
ISC/13/SHARKWG-3/04	Spatial distribution pattern of shortfin mako (*Isurus oxyrinchus*) caught by Japanese fisheries in the North Pacific. Y. Semba and K. Shiozaki (senbamak@affrc.go.jp)

INFORMATION PAPER

ISC/13/SHARKWG-3/INFO-01	Stock assessment of blue sharks in the north Pacific Ocean using Stock Synthesis: Executive Summary. J. Rice and S. Harley (JoelR@spc.int)

Attachment 3: Meeting Agenda

SHARK WORKING GROUP (SHARKWG)

INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC

INTERCESSIONAL WORKSHOP AGENDA

6-8 & 11July, 2013
Novotel Hotel, Ballroom C
Busan, Korea

Meeting will start at 10:00 am on July 6 and at 9:00 am everyday thereafter.

Saturday – Monday, July 6-8

1. Opening of SHARKWG Workshop
   a. Welcoming remarks
   b. Introductions
   c. Meeting arrangements
2. Distribution of documents and numbering of Working Papers
3. Review and approval of agenda
4. Appointment of rapporteurs
5. Summary of the April 2013Workshop
6. SS3 modeling of north Pacific blue shark (*Teo*)
   a. Progress to date
   b. Plan for use of SS3 model results for Plenary and WCPFC SC
7. Finalize BSP assessment report including Conservation Information and Executive Summary (*Piner*)
8. Peer review of north Pacific blue shark assessment (*Kohin*)
9. Review shortfin mako shark spatial distribution by size/sex (*Kai, Piner*)
10. Review shortfin mako shark life history (*Semba, Teo*)
    a. Age and growth and workshop plans
    b. Length-weight conversions
    c. Maturity
    d. Genetics
11. Decide on shortfin mako shark modeling approach including spatial extent and regional areas for catch estimation and size/sex aggregation, and biological input parameter values (Kai, Yoon)

12. Discuss coordination with WCPFC and IATTC (*Kohin*)
13. Develop shortfin mako shark assessment work plan (*Kohin*)
    a. Develop data submission templates and deadlines
    b. Future SHARKWG meetings
14. Review data for Plenary Table 1 (official landed catch) for blue and shortfin mako sharks

Thursday, July 11

15. Finalize presentation of blue shark assessment results for Plenary and WCPFC SC
16. Finalize Tables 1 for Plenary
17. Other matters
18. Clearing of Report
19. Adjournment