Annex 9

REPORT OF THE ALBACORE WORKING GROUP WORKSHOP

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

12-13 July 2010
Victoria, Canada

1.0 INTRODUCTION

1.1 Welcome and Introduction

A two-day meeting of the International Scientific Committee – Albacore Working Group (ALBWG) was held 12-13 July 2010 in conjunction with the 10th Meeting of the ISC Plenary in Victoria, Canada.

Eighteen **(**18) participants from Canada, Chinese-Taipei, Japan, Mexico, the United States, and an observer from the WCPFC attended the meeting (Appendix 1).

The WG Chair, John Holmes, welcomed all participants to Victoria, Canada, and outlined the objectives of the meeting.

The objectives of this meeting were to:

1. Update fisheries statistics (through 2009),
2. Complete the new spatial/temporal fishery definitions for the next stock assessment,
3. Provide advice on stock status,
4. Provide advice on potential biological reference points for north Pacific albacore, and
3. Plan for the next North Pacific albacore stock assessment.

1.2 Approval of agenda

A provisional agenda was circulated prior to the meeting for comments. One additional item was added under Other Matters and the revised agenda was adopted for the meeting (Appendix 2).

1.3 Distribution of Documents

Seven working documents and two oral presentations were presented and were distributed to the working group (Appendix 3).

1.4 Appointment of Rapporteurs

John Childers, Michel Dreyfus, Hui-hua Lee, John Holmes, Momoko Ichinokawa, Suzy Kohin, Peter Miyake, Steve Teo, Koji Uosaki, Vidar Wespestad, and Zane Zhang served as rapporteurs.

2.0 REVIEW OF RECENT FISHERIES

2.1. Review and update of fisheries statistics by country and gear

The ALBWG catch table (Appendix 4 - Table 1) by country and gear was updated to 2009 based on data provided by participants.

2.1.1. Canada

John Holmes reported fishery statistics from the 2009 Canadian fishery for north Pacific albacore (ISC/10/ALBWG-2/05). Total annual catch and effort were 5,685 t and 6,631 vessel-days respectively. More than 90% of the catch and effort occurred in the coastal waters of the United States under access provisions in the recently renegotiated Canada/United States Albacore Tuna Treaty. Nominal CPUE in this fishery has averaged about 850 kg/v-d since 2006. An on-board size sampling program was implemented in 2009 and resulted in 11,717 fork length measures from the Canadian catch (1.46% of the reported catch was sampled). These measurements were dominated by a single mode corresponding to 3-year old fish 64-66 cm FL (5.76 kg). Reported bycatch consisted of 59 yellowtail (*Seriola lalandi*) and 9 Pacific bluefin tuna (*Thunnus orientalis)*. Although more than 4,000 skipjack tuna (*Katsuwonus pelamis*) were reported as by-catch by a single vessel, this may be a misidentification of bonito (*Sarda chiliensis lineolata*) and is currently under investigation to determine the correct species.

The WG asked about the licensing of Canadian vessels. Canadian vessels can be licensed to fish in Canadian waters and highseas or US waters. Only vessels with a Canadian issued license for the US EEZ (110 vessels in 2009) are permitted to enter US waters to catch albacore. The number of US-licensed vessels increased from 94 to 110 in 2009, the first year of under the provisions of the new treaty. It was clarified that the length sampling program was an on-board program in which fishermen measure the first 10 fish landed daily and that 38 out of 135 vessels participated in this program.

2.1.2. Japan

Takayuki Matsumoto presented Japanese albacore catch and effort data for the north Pacific (ISC/10/ALBWG-2/01). These data were compiled from two sources: the Annual Report of Catch Statistics by the Japanese government, and logbooks. Albacore is mainly caught by the pole-and-line and longline fisheries. A preliminary estimate of total Japanese catch in 2009 is 54,286 t, which is about 10,000 t higher than the 2008 catch and was higher than average for the past 5 years. This increase in catch primarily occurred in the pole-and-line fishery, which had the highest catch of all gears in 2009 (32,421 t) as a result of the development of good fishing grounds at 32-34°N, 142-143°E from May through June in 2009. Although albacore catch by the pole-and-line fishery exhibits large variation in recent years, catch by the longline fishery has been relatively stable over the same period. Fishing effort by mid-sized (20-119 GRT) pole-and-line vessels decreased, whereas that by large-sized (over 120 GRT) vessels fluctuated. Longline catch in 2009 (17,518 t) was smaller than the catch in 2008 (22,386 t). Fishing effort by large longline vessels (over 200 GRT) and small coastal longline vessels (10-19 GRT) has been stable except for recent years, whereas fishing effort by mid-sized longline vessels (20-199 GRT) has

decreased. Nominal longline CPUE differs depending on the area and season, and exhibits a rapid declining trend in the first quarter between 2001 and 2004 on the fishing grounds north of Hawaii.

The WG questioned how fishing effort was determined for North Pacific albacore in this working paper. Albacore effort for the Japan longline fisheries is characterized as total effort in the area north of 10 °N and target-species was not considered. However, albacore effort for the Japan pole-and-line fisheries was separated into albacore- and skipjack-targeted effort. The recent decreasing trend in catch for the northeast Pacific observed in the longline fishery is partly due to a switch in targeting from albacore to bigeye tuna and a subsequent shift in vessels to the south. The WG noted that a decrease in catch was observed in 2009 relative to 2008 for the distant water longline fishery due to a decrease in the number of vessels. Catch for the driftnet fishery, which operates with the coastal waters of Japan, increased substantially in 2008 and 2009. It was suggested that this increase could be related to changes in oceanographic conditions, but further investigation is needed.

2.1.3. Mexico

Michel Dreyfus noted that the catch of albacore by Mexico is very low and occurs sporadically by purse seiners targeting yellowfin and Pacific bluefin tunas. The preliminary 2009 catch is estimated to be 17 t. The US sport fishery also operates within Mexican waters and the US sport fishery association has provided catch in numbers to Mexico in the past Although a recent update is not available, sport fish catches in Mexican waters are included in the US catch report.

The WG acknowledged the new information and did not comment further on the Mexican report.

2.1.4. Chinese-Taipei

Eric Chang reported on preliminary 2009 catch data from the TWN LL fisheries. The distant water longline fishery (DWLL) caught 1866 t, which is about 600 t less than was caught in 2008. This reduction in catch is related to a reduction in effort resulting from a government fleet reduction program and high fuel prices. The small longline vessels in the offshore fleet caught about 512 t in 2009, which is about the same level of catch as reported in 2008. The size range measured from the catch by the small longline vessels in 2009 was about the same as in 2008 (90-100 cm), but more larger fish were observed in 2009 relative to 2008. Nominal CPUE was stable but standardized CPUE increased (see ISC/10/ALBWG-2/07).

The WG acknowledged the new information and did not comment further on the Chinese-Taipei report.

2.1.5. United States

John Childers made an oral presentation summarizing preliminary fishery statistics for the US troll and pole and line fisheries. Preliminary catch in the troll fishery was 10,686 t in 2009, which is approximately the same as in 2008. Pole and line catch is estimated to be 2,084 t in 2009. Much effort has been put into separating pole and line catch from troll catch. Often the same boats will use both troll and pole and line gear on the same trip (sometimes on the same

day). Landing slips from Washington and Oregon, where much of the catch is landed, do not distinguish between pole and line and troll gears and as a result logbooks must used to devise catch ratios by gear in order to separate these catches. At present, reasonable estimates of pole and line catches are available for 2008 and 2009 only.

The WG discussed the new technique used to separate pole and line fishery catches from troll fishery catches based on logbook catch ratios. This new procedure was first applied to the 2008 data and is an ongoing task. The US will provide a working paper to describe the new estimation method at a future WG workshop. The WG also noted that these two fisheries, troll and pole-and-line fisheries, catch the same size of fish on the same fishing grounds. Some vessels switch between troll and pole and line gears on the same day. This switch is recorded in logbooks, but not on landing slips from which fishery catches are estimated. It was suggested that the definitions of the albacore troll fishery and troll and handline fishery should be clarified in the WG's catch table (Appendix 4 – Table 1). The albacore troll fishery refers to the commercial fishery that presently operates along the coast of North America whereas the troll and handline fishery refers to small artisanal fisheries operating in Hawaii. It was noted that more than half of the sport fishery catch occurred in coastal waters off California and that sport fish catches have increased recently in Washington and Oregon waters. A comparison of the size data reported for the US and Canadian troll fisheries, which operate in the same area at the same time, showed that there were some differences: the Canadian size frequency data show a clear mode corresponding to 3-yr old fish and a less pronounced mode corresponding to 4-yr old fish whereas clear modes for both 3-yr old and 4-year fish were evident in the US size data. It was suggested that these differences may be related to differences in sampling since the US size data were collected exclusively by port sampling on frozen fish and the Canadian data are on-board measurements made by the fishermen on fresh fish. Further consideration of double counting of fish in the US by including size data from onboard sampling and port sampling is needed.

2.2. Bycatch

The WG did not discuss this agenda item as no members had data present at the meeting.

2.3. Review of metadata by country and gear

The WG discussed the footnotes used for the total catch table (Appendix 4 - Table 1). Partial catch for the US pole-and-line fishery was combined in the US troll fishery prior to 2008. Although there is new method on separating catch in 2008, a footnote should be provided in the table. Other details on the metadata will be addressed in the ISC Statistics working group meeting. It was noted that there should be consistency in the data held in the central ISC database and the working group database.

3.0 CURRENT STOCK STATUS

The Working Group reviewed a paper examining various treatments of Japanese longline data for a potential index of spawning stock abundance. Also, catch trends, and effort in the form of trends in number of vessels engaged in the fishery were examined to attempt to gauge the current status of the NP albacore stock.

3.1. Review JPN LL age 6-9+ CPUE as a potential index of spawning stock biomass

ISC/10/ALBWG-2/03 - Standardization of age-specific abundance indices of albacore caught by Japanese large and small longline fisheries (L-LL and S-LL) in the north Pacific (all area, northwest and southwest area) during 1966-2009 was conducted in order to assess these indices as potential indicators of trends in spawning stock biomass,. The effects of area, season (quarter), fishing gear (number of hooks per basket) and several interactions between these variables were used in the standardization of CPUE time series. Age aggregated abundance indices were generally stable during 1960s-1980s, increased during 1990s, decreased during early 2000s, and then gradually increased in all areas. Trends of abundance indices of adult fish (6-9+) were similar to those of all ages except for northwest area.

The Working Group noted that this analysis compiled the CPUE in the Japanese longline fishery in various regions of the north Pacific and examined differing age compositions. The Working Group agreed with the analysis that the North Pacific Japanese long line index for ages 6-9+ is a potential index for inter-assessment monitoring of trends in albacore spawning stock biomass in the North Pacific.

Discussion of the index centered on its representativeness based on CPUE in the southwestern area where most of the north Pacific albacore spawning is believed to occur; and, on a broader index that incorporates a larger area of the north Pacific and probably all spawning biomass. The WG determined that the southwest age 6-9+ longline index may be the most representative of north Pacific albacore spawning biomass, but that it may also be prudent to continue to examine local CPUE against the broader north Pacific CPUE trend. There was also discussion about using the SW age 6-9+ index in stock assessment modeling. The WG concluded that catch-age modeling should continue to be based on specific catch and effort data for the individual fisheries included in the model. Therefore, the age 6-9+ longline index is considered to be an independent indicator separate from model estimated trend data. The WG noted that this index was used as an indicator of trends, averaging over the most recent three years, rather than using a single year point estimate, to provide a qualitative update on stock status.

3.2. Others

The Working Group briefly discussed other datasets that could be used as potential indicators for qualitative monitoring of stock status. These data included catch by fishery, total catch, and a crude measure of nominal effort in the form of the number of vessels in each fleet (Appendix 4 – Table 2). Both catch and nominal effort as vessels have been stable or declined slightly in the last 2-3 years.

4.0 ADVICE FOR ISC10

4.1. Stock status

The working group discussed a qualitative review of total catch and total effort (number of vessels by fishery) and concluded that both catch and effort were either stable or declined slightly in recent years. Based on the age 6-9+ index, spawning stock biomass appears to have declined from previous high levels and appears to be relatively stable since the last stock

assessment. Previous advice from the working group was that there should be no increase in effort and that ultimately F would have to be reduced because with the current F show SSB gradually reduced to the long-term average by the mid 2010s. The qualitative review of the WG suggests that recent data are slightly more optimistic, but at present no change in the working group's advice to ISC plenary is warranted.

It was noted that the working group now has a standardized CPUE index rather than only nominal CPUEs to consider along with data through 2009. The group reviewed and discussed the bulleted list of conclusions from last year's advice to plenary (ISC 9 Plenary Report):

1. A new stock assessment will be necessary to fully understand the implications of the new data available since the last stock assessment. The following conclusions are based on data after 2005 that were presented at this meeting;

2. The 2006 stock assessment (ISC7 Plenary Report, Annex 5) estimated that albacore spawning biomass reached an historical high in 2005. The working group's qualitative interpretation of new data neither supported nor refuted this estimate;

3. The working group's qualitative interpretation of new data neither supported nor refuted a decline in spawning biomass after 2005 that was projected in the 2006 stock assessment;

4. The working group's qualitative interpretation of new data neither supported nor refuted the relatively strong recruitment from the 2001 and 2003 year-classes estimated in the 2006 stock assessment; and

5. Nominal albacore effort in most fisheries appears to have declined since 2005 and catches since 2004 (with the exception of 2007) have been substantially lower than in the previous decade. This could mean that F_{2008} is now less than the F ($0.75\ yr^{-1}$) used in the 2006 stock assessment projections. Alternatively, F may be as high as the value used in the stock assessment projections since the level of recruitment after 2005 is not known.

It was suggested that items 2 and 3 above should be combined and updated. It was also noted that item 5 should be modified to reflect the recent review of nominal effort (number of vessels). It was suggested that the working group's advice should change to reflect a recent change in perception that spawning stock biomass is not declining but has stabilized (based on recent CPUE indices). The Chair suggested moving the statement on new evidence of SSB to the 5 bulleted conclusion points. Based on this discussion, the WG offers the following conclusions:

1. A new stock assessment will be necessary to fully understand the implications of the new data available since the last stock assessment. The following conclusions are based on data after 2005 that were presented at this meeting;

2. The 2006 stock assessment (ISC7 Plenary Report, Annex 5) estimated that albacore spawning biomass reached an historical high in 2005 and then projected a decline thereafter. The age 6-9+ index shows that SSB has declined from previous high levels and appears to be relatively stable since the last stock assessment;

3. The working group did not focus on recruitment in its latest qualitative review of status and so is unable to provide conclusions on recruitment in recent years beyond observations in previous Plenary reports; and

4. Nominal effort in most fisheries (as measured by the number of vessels) appears to have declined slightly or been stable since 2005. Although catches exhibit more interannual variability than effort, with the largest variation occurring in the Japan pole-and-line fisheries, most fisheries catches have declined or remained relatively stable over the same period. This could mean that F_{2009} is now less than the $F_{2002\text{-}2004}$ ($0.75\ yr^{-1}$) used in the 2006 stock assessment projections. Alternatively, F may be as high as the value used in the stock assessment projections since the level of recruitment after 2005 is not known.

4.2. Potential biological reference points for NPALB

The WG was reminded that discussion on biological reference points was completed at the April 2010 workshop (ISC 10 Plenary Report, Annex 6) and that it was not the intention of the Chair to reopen discussion at this meeting. Rather the Chair requested advice on the key points that should be emphasized in summarizing the reference point discussion at the ISC 10 Plenary session.

The WG was reminded that their focus has been on limit and precautionary reference points. The WG needs to know management goals for a stock in order to recommend a suitable reference point. The present request from the Northern Committee is not specific with respect to management objectives and as a result the WG has presented information on a variety of reference points in previous stock assessments. The group discussed the ISC Chair's request for species specific reference points and noted that an interim objective to maintain the spawning stock biomass (SSB) above the average level of its ten historically lowest points (ATHL) with a probability greater than 50% has been established for north Pacific albacore and that the associated F-based reference point, FSSB-ATHL, will be estimated in future stock assessments. It was suggested that an historical explanation of reference points related to F_{SSB}, including $F_{SSB\text{-}ATHL}$, be provided to the Plenary. The F_{SSB} reference point concept was first discussed by the WG in 2005 (Conser et al. 2005; ISC-ALBWG/05/06) to ensure that SSB in future years remains within the range of the historically 'observed' SSB that supported productive, large-scale fisheries in the North Pacific for many years. At that time, the WG examined the minimum observed SSB and the lower 10^{th} and 25^{th} percentiles as potential limit reference points and concluded that the minimum would not be suitable, but did not make a recommendation on either the 10^{th} or 25^{th} percentile. The threshold level of ATHL is with a few hundred tonnes of the lower 10^{th} percentile of spawning biomass. However, the WG notes that the 10^{th} or 25^{th} percentile thresholds are more robust statistically than ATHL. The WG will also present the F_{SSB} reference point framework (Ichinokawa et al. 2010; ISC/10-1/ALBWG/10) because it illustrates the tradeoffs between SSB thresholds, equilibrium and non-equilibrium dynamics, and the level of certainty in not exceeding a threshold on the associated F_{SSB} reference point. The framework is also a useful tool for eliciting feedback from the Northern Committee that the WG needs to make further progress on reference points, namely the SSB threshold, the level of certainty required (50% vs. 95%), and the projection period that should be used.

5.0. FINALIZE SPATIAL/TEMPORAL STRATIFICATION OF FISHERIES

5.1. Japan pole-and-line fishery definition(s)

ISC/10/ALBWG-2/06 - Catch per unit effort (CPUE) standardization for albacore caught by the Japanese pole-and-line fishery was conducted with generalized linear modelling using logbook data from 1972 to 2009. Zero catch data and area stratification were reconsidered and a delta-lognormal model was used for standardization. The southern fishery (PL1) was not used in this analysis because of high zero catches, exceeding 80% after 1977. Abundance indices in PL2 and PL3 were calculated by the delta-lognormal model separately.

The WG tentatively agreed on the pole and line fishery definitions for the upcoming stock assessment. The Japanese pole-and-line fishery will be divided into two fisheries: 1) PL3 will be defined as a separate fishery with its own catches, length compositions, and standardized abundance index, and 2) PL1 and PL2 will be combined into a single fishery with combined catch and length compositions but data from PL2 alone will be used for the standardized abundance index due to the large number of zero-catch data in PL1. These definitions are similar to previous base case scenarios. The WG requested clarification on the residuals and other diagnostics of the delta-lognormal model (e.g., the ANOVA table), as well as which explanatory variables were used in the models. There was also concern that some of the explanatory variables such the number of poles may have been correlated with CPUE, since the text indicated that effort was calculated as fish/pole-day. Additional concern was raised about the potential problem of negative correlations between CPUE for PL2 and PL3. The authors were not able to clarify these issues during this meeting, thus the WG requested that the CPUE standardization be revisited in October 2010. The authors were also asked to provide the SE of the CPUE for the next meeting. The WG also suggested using month rather than quarter as an explanatory variable in the models.

5.2 Review and decision on Chinese-Taipei LL fishery definition

ISC/10/ALBWG-2/07 - This study attempts to elucidate trends in CPUE and age composition of North Pacific albacore exploited by Chinese-Taipei longline fisheries, 1995-2008. Based on a clustering analysis of the catch composition, the nominal catch statistics can be clearly categorized into two groups. Group 1 is characterized by higher albacore CPUE (averaging 28.56 fish/1,000 hooks), smaller size of fish, and operations in temperate waters with 9-13 hooks per basket. Group 2 is characterized by lower albacore CPUE (averaging 0.21 fish/1,000 hooks), larger size of fish, and operations in tropical waters using more than 14 hooks per basket on sets. These groups were further confirmed by discriminant analysis with only 3% error. Standardized albacore CPUE was then obtained by applying GLM to the Group 1 data. Based on Suda's (1966) growth equation, a knife-edge cutting method was applied to Chinese-Taipei length measurements of albacore to estimate the age composition of the North Pacific albacore exploited by this fishery.

The WG recommended that the Chinese-Taipei distant water longline fishery remain as a single fishery for the upcoming stock assessment. However, the standardized abundance index should be determined from Group 1 catch and effort data only. The WG noted that the length

compositions appeared to be inconsistent with previous length compositions from the same fishery (cf. Anonymous 2002; NPALBWG/02/13) and the Japanese longline fisheries that overlap in space and time. It was clarified that the length composition data presented are consistent with previously reported size compositions with the exception that tropical data were excluded from the current analysis. Further examination of the source of the length composition data revealed that in three years lengths were not representative of the catch across the entire season and area fished. The WG agreed that for those years with poor length sampling (unrepresentative data), length data would not be used for the Chinese-Taipei longline fishery in SS3 runs. SS3 is able to make estimates of selectivity when some data are missing. For the VPA, the catch-at-age matrix will be derived for the Chinese-Taipei longline fishery using the available length data from the Chinese-Taipei longline fishery, but substituting Japan distant water longline size compositions for the unrepresentative years. Regarding sizes of albacore caught in the Chinese-Taipei longline fishery, it was noted that many Chinese-Taipei vessels unload north Pacific albacore in Pago Pago before moving to the southern hemisphere to fish south Pacific albacore. If NMFS port samplers measure these catches, then additional size data may be available in NMFS holdings and they should be extracted for examination by the WG. The WG also requested that some clarifications on the methods used to standardize the CPUE index be provided at the next meeting. For example, the area factor for the GLM was not defined and the degrees of freedom for the interactions were not consistent with first-order variables (e.g., DF(Month*Area) is not equal to DF(Month)*DF(Area)). The WG also agreed on the definition of the Chinese-Taipei coastal (small boat) longline fishery (STLL), which should remain as a single fishery, with catch and length compositions from the fishery; however, an abundance index will not be derived for this fishery.

5.3. Review results of recommended work and decision on USA LL fishery

Steve Teo provided an oral presentation examining the length composition data of the USA longline fishery to finalize the definition of this fishery for the upcoming stock assessment. In a previous working paper (Teo et al. 2010; ISC/10-1/ALBWG/06), it was shown that the deep-set longline sets targeted at tunas caught relatively larger albacore than shallow-set longline sets targeted at swordfish. In this presentation, it was shown that the USA longline fishery could be divided geographically ($<30°N$, $\geq 30°N$) to obtain very similar length compositions. Subsequent SS3 runs comparing base case to this definition showed that length composition fits and selectivities were similar. It is therefore recommended that the USA longline fishery remain as a single fishery, especially since the catches of the fishery are a relatively small proportion of the total north Pacific albacore catch. The presentation also showed that the current base case used upper edge bins for the SS3 length composition data. SS3 currently expects the length composition data using lower edge bins. In the future, the base case will be developed using lower edge bins instead of upper edge bins. It is recommended that the length composition data from other fisheries be re-examined to ensure that lower edge bins are used.

The WG recommended that the USA longline fishery remain as a single fishery with all lengths pooled. Size data will be weighted by catch from the different areas. The CPUE index will be based on the data from the south only. The WG also agreed that length composition data from other fisheries should be re-examined to ensure that lower edge bins are used.

5.4. Review of JPN Miscellaneous fisheries

ISC/10/ALBWG-2/02 - The definition of the combined Japanese "miscellaneous" and gillnet (driftnet) fisheries was reviewed to determine if it is appropriate for SS3 analyses during the next full stock assessment. Based on the amount of albacore catch by fishery within this category, the gillnet, purse seine and troll fisheries were considered. Catch of albacore by the gillnet fishery ranged from the western (Japanese coastal waters) to the eastern Pacific. On the other hand, the distribution of albacore catch by the purse seine and troll fisheries was limited to the western Pacific (mainly in Japanese coastal areas). The fish caught by gillnets ranged from 35cm to 80cm FL and were smaller than the fish caught by purse seine and troll gears, which ranged from 70cm to 100cm and 50cm to 85cm, respectively. Based on these differences, it is suggested that Japanese gillnet and miscellaneous fisheries should not be pooled for SS3 analyses, that the miscellaneous category should be separated into a gillnet (driftnet) fishery and a miscellaneous fishery combining the purse seine and troll fisheries as before.

The WG agreed that the gillnet fishery should be kept separate from the troll and purse seine fisheries. For the troll and purse seine fisheries, measured size data would be used; however, it was noted that the gillnet fishery had very limited length composition data and those data demonstrate relatively small fish. The WG tentatively suggested that length compositions from the pole-and-line fishery for small fish (PL3) be used for the gillnet fishery in SS3, based on the similar areas fished and the overlap in sizes. The WG suggested performing sensitivity analysis to compare the effect of using length compositions from the Japan pole-and-line fishery versus the drift gillnet fishery in order to validate the substitution.

5.4. Review TWN, KOR, other (TKO) LL fisheries

The Chinese-Taipei longline fisheries were reviewed in Section 5.2 and the WG decided to tentatively define small and large fish fisheries separately. No new information on the Korean or other (largely south Pacific Islands) fisheries was presented, so the WG opted to retain this fishery as the KO (Korean and other) LL fisheries.

5.5. CPUE indices

5.5.1 Japanese longline CPUE index

ISC/10/ALBWG-2/04 - CPUE standardization for the Japanese longline fisheries was conducted based on new fishery definitions for SS3 analyses decided at the ISC Albacore Working Group meeting in April 2010. Japanese large and small longline fisheries (L-LL and S-LL) in the western Pacific were combined and then divided into two fisheries based on fish size rather than operational characteristics of the fleets. GLM was used for CPUE standardization. Several interaction terms are incorporated into standardization. Trends in CPUE for both new fisheries were similar except for early period (1966-1970), where a large declined in standardized CPUE was observed in the small fish fishery (F1). General aspects of Japanese longline operations and fish size for both fisheries defined are also reviewed.

The WG noted that the Q4 length data from the northeast area in the F1 fishery is relatively large and comparable to length compositions of the F2 fishery. Therefore, the WG suggested that F1 the northeast Q4 data should be moved to F2. The WG was also concerned about the relatively steep decline in the F1 index between 1966 and 1971 and suggested that potential reasons for the

decline be investigated further by the next meeting. The decline appears to be limited to Age 5 fish, as indicated in working paper ISC/10/ALBWG-2/10 (discussed above). A small workgroup was established to discuss the steep decline in order to make recommendations on whether to use those data in the SS3 runs.

5.5.2 Examination of the USA and Canada Troll fisheries CPUE indices

Steve Teo orally presented the results of analysis examining combining the Canadian and US troll fishery CPUE data for standardization. Catch and effort data from the Canada Troll fishery are very similar to those for the USA Troll fishery. The data for the period 1995 to present were provided to develop a CPUE index for the Canada fishery using methods identical and agreed upon for the USA Troll fishery. The resulting Canada CPUE index was very similar to that for the USA Troll fishery. A few minor divergences were noted early in the time series. A combined index was developed. It was recommended that the USA and Canada catch and effort data be combined to provide a single CPUE index for the USA/Canada Troll.

The WG agreed to combine the USA/Canada catch and effort data into a single CPUE index.

Fishery definitions for the next stock assessment are summarized in Table 1. These definitions reflect discussions at the previous WG Workshop in April 2010 (ISC10 Plenary Report, Annex 6) and the present meeting. The WG has tentatively identified 12 distinct fisheries. Decisions on CPUE indices for some fisheries and length compositions will be made at the upcoming October data preparation meeting, based on the results of research requested at this meeting.

6.0 RESEARCH RECOMMENDATIONS and UPDATED WORK PLANS

6.1. Biological Research

Biological studies needed for the future improvement of stock assessment are discussed. In particular, stock structure and movement between the Eastern and Western Pacific, updates for age and growth, exploring sex-specific growth were raised as the tasks with high priority. With the purposes, sampling programs, research survey for larva and continuing tagging studies are encouraged. It was noted that Japan is not releasing archival tags at present because there were no returns of these tags in the last few years. Also, further alternative modeling efforts were encouraged.

6.2. Work plans

The next WG Workshop is the data preparation meeting for the next stock assessment and is currently scheduled for 19-26 October 2010 in La Jolla. It was proposed to the WG to shift the meeting by a week to 12-19 October so that the workshop does not overlap with the PICES annual meeting in Portland, OR. No decision was made concerning dates, but the WG agreed to make a final decision through email by 01 August. The WG Chair will send out an email to all members to remind them to check their calendars and make their views known.

September 1 - deadline for submission of preliminary data up to 2008 for VPA (CAA, CPUE, Table 1) and SS3 (catch, size, CPUE)

December 1 - deadline for the submission of finalized data up to 2009 for both the VPA and SS3

VPA data should be sent to Takayuki Matsumoto and SS3 should be sent to Hui-hua Lee.

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Preliminary data up to 2008 will be available and the WG will examine configurations of the stock assessment model with results from preliminary runs. The WG notes that the issues listed below must be addressed for final decisions at this workshop:

- Clarification of how standardized CPUE values are calculated for the Chinese-Taipei longline fishery when data are missing and clarification of the area definition used in the standardization procedure. Based on the results of this work, the WG will determine whether the standardized Chinese-Taipei longline CPUE will be used for the next stock assessment;

FISHERY	FISHERY DESCRIPTIONS	FISHERY BOUNDARIES AND TEMPORAL COVERAGE	TARGET SIZE	CATCH DATA	BIOL. DATA	FITTED	CPUE DATA	FITTED	REFERENCE
1	USA/CAN troll (A)	10-55°N latitude by 160°E - 120°Wlongitude	60-80 cm	√	√ 1966-	√	√ 1966-	√	ISC/10-1/ALBWG/05
2	USA LL	10-45°N latitude by 170°E-130°E longitude	> 100 cm	√	√ 1994-	√	√ 1991-	TBD	ISC/10-1/ALBWG/06
3	EPO miscellaneous	E.E.Z. along US, Canada west coast and Mexico west coast	N.A.	√	N.A.		N.A.		
4	JPN PL (larger fish)	25-35°N latitude by 130°E-180° longitude in Q2	≥ 90 cm	√	√ 1966-	√	√ 1972-	TBD	ISC/10/ALBWG-2/06
5	JPN PL (smaller fish)	35-45°N latitude by 140°E-180° longitude in Q2 and Q3	60-90 cm	√	√ 1966-	√	√ 1972-	TBD	ISC/10/ALBWG-2/06
6	JPN LL (Fishery I - smaller fish)	offshore and coastal: 25-40°N latitude by 120°E-180° longitude in Q1 and Q2 offshore: 25-40°N latitude by 120°W-180° longitude in Q1	80 cm	√	√ 1966-	√	√ 1966-	√	ISC/10-1/ALBWG/04 ISC/10/ALBWG-2/04
7	JPN LL (Fishery II - larger fish)	offshore and coastal: 25-40°N latitude by 120°E-180° longitude in Q3 and Q4 offshore: 25-40°N latitude by 120°W-180° longitude in Q2-Q4 offshore and coastal: 10-25°N latitude by 120°E-120°W longitude all year round	100 cm	√	√ 1966-	√	√ 1966-	√	ISC/10-1/ALBWG/04 ISC/10/ALBWG-2/04
8	JPN gill net	20-55°N latitude by 120°E-160°W longitude	60 cm	√	√ 1990-1991	TBD	N.A.		ISC/10/ALBWG-2/02
9	JPN miscellaneous	E.E.Z. along Japan coasts		√	N.A.		N.A.		ISC/10/ALBWG-2/02
10	TWN LL	10-55°N latitude by 120°E-120°W longitude		√	TBD	TBD	√ 1995-	TBD	ISC/10/ALBWG-2/07
11	KOR, others (KO) LL	10-55°N latitude by 120°E-120°W longitude		√	N.A.		N.A.		
12	TWN, KOR (TK) gill net	20-55°N latitude by 120°E-180° longitude		√	√ 1988-1990	X	N.A.		

A checkmark (√) in a data column indicates that these data will be used in modelling and a checkmark (√) in a fitted column indicates that the model will be fitted to this time series. TBD indicates a decision will be made at the October 2010 workshop in La Jolla, CA.
(A) Includes USA pole and line catch.

- Move the Japanese longline Q4 catch and length data from the Eastern Pacific in F1 to F2. In addition, re-examine the Japanese CPUE in F1 prior to 1970 and attempt to determine an explanation for the steep decline. Based on this analysis, create the most reliable CPUE time series for F1 and F2. After reviewing this work, it will be determined what CPUE will be used for VPA;
- For Japanese pole-and-line CPUE, appropriate diagnostics should be provided, the effect of month instead of quarter on standardization should be assessed, appropriate interaction terms should be chosen, and SE for the estimated CPUE values should be provided. Also, an examination of the reason for the negative correlation between PL2 and PL3 is requested. After reviewing this work, the WG will make a final decision on pole-and-line fishery stratification.

22-29 March 2011

This Workshop is the stock assessment workshop. A full stock assessment with Stock Synthesis will be conducted. A base case scenario will be run with the VPA using almost the same fishery data as used in SS for comparison of model-induced differences. The modeling subgroup will meet 16-21 March to conduct runs to determine base case.

July 2011

The WG tentatively agreed to the need for a three day meeting prior to the next ISC plenary in July 2011. This meeting will focus on preparing the stock assessment results for Plenary review.

7.0 Administrative matters

7.1. Clearing of report

A draft of the report was reviewed by the ALBWG prior to adjournment of the WG meeting. After the WG meeting, the Chair distributed a second draft of the report via email for review, comment, and approval by the participants. Subsequently, the Chair evaluated suggested revisions, made final decisions on content and style, and provided the report for the ISC10 Plenary to review.

7.2. Other Matters

No other matters were raised by members of the Working Group.

8.0 ADJOURNMENT

The Chair expressed his appreciation to participants for their efforts, which ensured a successful meeting. ALBWG participants collectively thanked the hosts (Canada) for their hospitality and overall meeting arrangements.

The meeting of the ISC-ALBWG was adjourned at 16:35 on 13 July 2010.

9.0 LITERATURE CITED

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APPENDIX 1
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APPENDIX 2

ALBACORE WORKING GROUP WORKSHOP, 12-13 July 2010, Victoria, Canada

Revised Agenda

(Sectional Rapporteurs in Parentheses)

1. Introduction (**Holmes**)
    - 1.1. Welcome and introduction
    - 1.2. Approval of agenda
    - 1.3. Distribution of documents
    - 1.4. Appointment of rapporteurs

2. Review of Recent Fisheries (**Lee/Dreyfus**)
    - 2.1. Review and update of fisheries statistics, 1965-prelim 2009
        - 2.1.1. Catch and effort by country and gear (Table 1)
        - 2.1.2. Size composition by country and gear
        - 2.1.3. CPUE indices
        - 2.1.4. Bycatch
    - 2.2. Review of metadata by country and gear

3. Review of current stock status (qualitative) (**Wespestad/Uosaki**)
    - 3.1. Review potential JPN LL age 6-9+ CPUE index
    - 3.2. Others

4. Advice for ISC10 (**Childers/Miyake**)
    - 4.1. Stock status
    - 4.2. Potential biological reference points for NPALB

5. Finalize spatial/temporal stratification of remaining fisheries (**Kohin/Teo**)
    - 5.1. Review and decision on Japan pole-and-line fishery definition(s)
    - 5.2. Review and decision on Chinese-Taipei LL fishery definition
    - 5.3. Review results of recommended work and decision on USA LL fishery
    - 5.4. Review TWN, KOR, other (TKO) LL fisheries
    - 5.5. CPUE indices

6. Research Recommendations and Updated Work Plan (**Zhang/Ichinokawa**)
    - 6.1. Biological Research
    - 6.2. Work plans for Oct 2010 and Mar 2011 Workshops

7. Administrative matters (**Holmes**)
    - 7.1. Clearing of report
    - 7.2. Other Matters

8. Adjournment

APPENDIX 3

Document Number	Title	Authors	Availability
ISC/10/ALBWG-2/01	A review of Japanese albacore fisheries in the North Pacific as of June 2010	Takayuki Matsumoto and Koji Uosaki	Author names and contact details at present, approval sought for full release
ISC/10/ALBWG-2/02	Consideration of albacore fishery definition of Japanese "miscellaneous" fisheries for SS3 analyses	Takayuki Matsumoto	Author names and contact details at present, approval sought for full release
ISC/10/ALBWG-2/03	Abundance indices for albacore spawning stock biomass in the north Pacific caught by the Japanese longline fishery, 1966-2009	Takayuki Matsumoto	Author names and contact details at present, approval sought for full release
ISC/10/ALBWG-2/04	Standardization of north Pacific albacore CPUE by Japanese longline corresponding to newly defined fishery definition for SS3 analyses	Takayuki Matsumoto	Author names and contact details at present, approval sought for full release
ISC/10/ALBWG-2/05	Canadian Fishery Statistics for North Pacific Albacore from the 2009 Fishery	John Holmes	Full paper on website
ISC/10/ALBWG-2/06	Standardized CPUE for albacore caught by the Japanese pole and line fisheries in the northwestern North Pacific	Hide Kiyofuji and Koji Uosaki	Author names and contact details at present, approval sought for full release
ISC/10/ALBWG-2/07	Standardized CPUE trend and age composition of North Pacific albacore exploited by Taiwanese longline fisheries, 1995-2008	Chiee-Young Chen, Fei-Chi Cheng, and Shean-Ya Yeh	Author Names and contact details
Oral presentation	Summary of the 2009 U.S. albacore Troll and Pole-and-line fisheries	John Childers	N/A
Oral presentation	Examination of the USA and Canada Troll fisheries CPUE indices and size frequency composition of the USA longline fisheries	Steve Teo	N/A

APPENDIX 4

Table 1. [1] North Pacific albacore catches (in metric tons) by fisheries, 1952-2009. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

Year	Japan							Korea		Chinese-Taipei		
	Purse Seine	Gill Net	Set Net	Pole and Line	Troll	Longline	Other	Gill Net	Longline	Gill Net	Distant Water	Offshore Longline
1952	154		55	41,787	--	26,687	182					
1953	38		88	32,921	--	27,777	44					
1954	23		6	28,069	--	20,958	32					
1955	8		28	24,236	--	16,277	108					
1956			23	42,810	--	14,341	34					
1957	83		13	49,500	--	21,053	138					
1958	8		38	22,175	--	18,432	86					
1959			48	14,252	--	15,802	19					
1960			23	25,156	--	17,369	53					
1961	7		111	18,639	--	17,437	157					
1962	53		20	8,729	--	15,764	171					
1963	59		4	26,420	--	13,464	214					
1964	128		50	23,858	--	15,458	269					
1965	11		70	41,491	--	13,701	51					
1966	111		64	22,830	--	25,050	521					
1967	89		43	30,481	--	28,869	477				330	
1968	267		58	16,597	--	23,961	1,051				216	
1969	521		34	31,912	--	18,006	925				65	
1970	317		19	24,263	--	16,222	498				34	
1971	902		5	52,957	--	11,473	354		0		20	
1972	277	1	6	60,569	--	13,022	638		0		187	
1973	1,353	39	44	68,767	--	16,760	486		3		--	
1974	161	224	13	73,564	--	13,384	891		114		486	
1975	159	166	13	52,152	--	10,303	230		9,575		1,240	
1976	1,109	1,070	15	85,336	--	15,812	270		2,576		686	
1977	669	688	5	31,934	--	15,681	365		459		572	
1978	1,115	4,029	21	59,877	--	13,007	2,073		1,006		6	
1979	125	2,856	16	44,662	--	14,186	1,139	0			81	
1980	329	2,986	10	46,742	--	14,681	1,177	6	402	--	249	
1981	252	10,348	8	27,426	--	17,878	699	16		--	143	
1982	561	12,511	11	29,614	--	16,714	482	113	5,462	--	38	
1983	350	6,852	22	21,098	--	15,094	99	233	911	--	8	
1984	3,380	8,988	24	26,013	--	15,053	494	516	2,490	--	--	
1985	1,533	11,204	68	20,714	--	14,249	339	576	1,188	--	--	
1986	1,542	7,813	15	16,096	--	12,899	640	726	923	--	--	
1987	1,205	6,698	16	19,082	--	14,668	173	817	607	2,514	--	
1988	1,208	9,074	7	6,216	--	14,688	170	1,016	175	7,389	--	
1989	2,521	7,437	33	8,629	--	13,031	433	1,023	27	8,350	40	
1990	1,995	6,064	5	8,532	--	15,785	248	1,016	1	16,701	4	
1991	2,652	3,401	4	7,103	--	17,039	395	852	0	3,398	12	
1992	4,104	2,721	12	13,888	--	19,042	1,522	271	1	7,866	--	
1993	2,889	287	3	12,797	--	29,933	897		21		5	
1994	2,026	263	11	26,389	--	29,565	823		54		83	
1995	1,177	282	28	20,981	856	29,050	78		14		4,280	
1996	581	116	43	20,272	815	32,440	127		158		7,596	
1997	1,068	359	40	32,238	1,585	38,899	135		404		9,119	337
1998	1,554	206	41	22,926	1,190	35,755	104		226		8,617	193
1999	6,872	289	90	50,369	891	33,339	62		99		8,186	207
2000	2,408	67	136	21,550	645	29,995	86		15		7,898	944
2001	974	117	78	29,430	416	28,801	35		64		7,852	832
2002	3,303	332	109	48,454	787	23,585	85		112		7,055	910
2003	627	126	69	36,114	922	20,907	85		146		6,454	712
2004	7,200	61	30	32,255	772	17,341	54		78		4,061	927
2005	850	154	97	16,133	665	20,420	234		420		3,990	483
2006	364	221	55	15,400	460	21,027	42		138		3,848	469
2007	5,682	226	30	37,768	519	22,336	44		56		2,465	451
2008	825	1,531	101	19,060	549	22,386	(15)		365		2,490	579
2009	(2,151)	(1,531)	(101)	(32,421)	(549)	(17,518)	(15)		(365)		(1,866)	(512)

1 Data are from the ISC albacore working group July 12 2010, except as noted

APPENDIX 4

Table 1. (Continued)

Year	United States								Mexico		Canada	Other		Grand Total
	Purse Seine	Gill Net	Pole and Line [2]	Albacore Troll [3]	Tropical Troll & Handline	Sport	Longline	Other	Purse Seine	Pole and Line [4]	Troll	Troll [5]	Longline [6]	
1952				23,843		1,373	46				71			94,198
1953				15,740		171	23				5			76,807
1954				12,246		147	13							61,494
1955				13,264		577	9							54,507
1956				18,751		482	6				17			76,464
1957				21,165		304	4				8			92,268
1958				14,855		48	7				74			55,723
1959				20,990		0	5				212			51,328
1960				20,100		557	4				141			63,403
1961			2,837	12,055		1,355	5	1	2	39	4			52,649
1962			1,085	19,752		1,681	7	1	0	0	1			47,264
1963			2,432	25,140		1,161	7		31	0	5			68,937
1964			3,411	18,388		824	4		0		3			62,393
1965			417	16,542		731	3	1	0		15			73,033
1966			1,600	15,333		588	8		0		44			66,149
1967			4,113	17,814		707	12				161			83,096
1968			4,906	20,434		951	11				1,028			69,480
1969			2,996	18,827		358	14		0		1,365			75,023
1970			4,416	21,032		822	9		0		390			68,022
1971			2,071	20,526		1,175	11		0		1,746			91,240
1972			3,750	23,600		637	8		100	0	3,921			106,716
1973			2,236	15,653		84	14		0		1,400			106,839
1974			4,777	20,178		94	9		1	0	1,331			115,227
1975			3,243	18,932		640	33	10	1	0	111			96,808
1976			2,700	15,905		713	23	4	36	5	278			126,538
1977			1,497	9,969		537	37		3	0	53			62,469
1978			950	16,613		810	54	15	1	0	23			99,600
1979			303	6,781		74	--		1	0	521			70,745
1980			382	7,556		168	--		31	0	212			74,931
1981			748	12,637		195	25		8	0	200			70,583
1982			425	6,609		257	105	21	0	0	104			73,027
1983			607	9,359		87	6		0	0	225			54,951
1984	3,728		1,030	9,304		1,427	2		107	6	50			72,612
1985	26	2	1,498	6,415	7	1,176	0		14	35	56			59,100
1986	47	3	432	4,708	5	196			3	0	30			46,078
1987	1	5	158	2,766	6	74	150		7	0	104			49,051
1988	17	15	598	4,212	9	64	307	10	15	0	155			45,345
1989	1	4	54	1,860	36	160	248	23	2	0	140			44,052
1990	71	29	115	2,603	15	24	177	4	2	0	302			53,693
1991	0	17	0	1,845	72	6	312	71	2	0	139			37,320
1992	0	0	0	4,572	54	2	334	72	10	0	363			54,833
1993		0	0	6,254	71	25	438		11	0	494			54,125
1994		38	0	10,978	90	106	544	213	6	0	1,998	158		73,345
1995		52	80	8,045	177	102	882	1	5	0	1,763	94		67,947
1996	11	83	24	16,938	188	88	1,185		21	0	3,316	469	1,735	86,207
1997	2	60	73	14,252	133	1,018	1,653	1	53	0	2,168	336	2,824	106,756
1998	33	80	79	14,410	88	1,208	1,120	2	8	0	4,177	341	5,871	98,229
1999	48	149	60	10,060	331	3,621	1,542	1	0	57	2,734	228	6,307	125,542
2000	4	55	69	9,645	120	1,798	940	3	70	33	4,531	386	3,654	85,052
2001	51	94	139	11,210	194	1,635	1,295		5	18	5,248	230	1,471	90,189
2002	4	30	381	10,387	235	2,357	525		28	0	5,379	466	700	105,224
2003	44	16	59	14,102	85	2,214	524		28	0	6,861	378	(2,400)	92,804
2004	1	12	127	13,346	157	1,506	361		104	0	7,856	--	4,096	90,316
2005		20	66	8,413	175	1,719	296		0	0	4,845	--	4,168	63,052
2006		3	23	12,524	95	385	270		109	0	5,832	--	5,039	66,249
2007		4	21	11,887	98	1,225	250		40	0	6,075	--	3,510	92,687
2008	0	1	1,050	10,672	29	257	353	0	10		5,478		2,777	68,528
2009	(39)	(3)	(2,084)	(10,686)	(99)	(541)	(203)	(0)	(17)		(5,685)		(1,553)	(77,900)

2 Albacore pole-and-line catches for 2008 and 2009 are estimated from new procedures.
3 Albacore troll catches prior to 2008 contain an unknown proportion of pole and line catch.
4 Mexico Pole and line catches for 1999 and 2000 include 34 and 4 metric tons, respectively from longline.
5 Other troll catches are from vessels registered in Belize, Cook Islands, Tonga, and Ecuador.
6 Updates for Other Longline 2004-2009 from Peter Williams, pers. com.

APPENDIX 4

Table 2. Number of vessels fishing for albacore in the North Pacific Ocean

	Canada	Japan										Taiwan			USA		
Year	Troll	Longline				Pole-and-line			Purse seine			Distant-water Longline			Troll	Pole-and-Line	Longline
		Small 10-19 GRT	Offshore2 0-119 GRT	Distant water 120- GRT	Total	Offshore 20-119 GRT	Distant water 120- GRT	Total	50-199 GRT	200- GRT	Total	200-500 GRT	500-1000- GRT	Total			
1970																	
1971									33	4	37						
1972						161	209	370	12	-	12						
1973						187	248	435	18	-	18						
1974						182	240	422	11	-	11						
1975						174	238	412	17	-	17						
1976						233	255	488	49	-	49						
1977						192	258	450	27	-	27						
1978						236	256	492	27	-	27						
1979						238	236	474	25	-	25						
1980						258	205	463	23	-	23						
1981						248	182	430	9	-	9				1,837		
1982						261	142	403	26	-	26				759		
1983						168	128	296	26	1	27				1,622		
1984						163	118	281	41	-	41				1,126		
1985						163	110	273	32	-	32				792		36
1986						152	99	251	43	-	43				419		39
1987						114	106	220	42	-	42				486		37
1988						103	64	167	35	-	35				531		50
1989						108	78	186	40	-	40				338		88
1990						107	75	182	32	1	33				368		138
1991						78	50	128	32	1	33				172		141
1992						94	50	144	25	-	25				602		125
1993						75	47	122	24	2	26				608		129
1994		339	163	243	745	83	51	134	19	2	21				721		156
1995	287	338	150	229	717	53	45	98	19	1	20				471		132
1996	292	326	119	223	668	80	51	131	12	3	15	12	4	16	676		118
1997	197	315	116	193	624	80	54	134	21	4	25	12	4	16	1,172		130
1998	214	346	126	182	654	84	52	136	16	1	17	12	4	16	841		147
1999	233	320	161	174	655	82	56	138	22	10	32	12	4	16	776		130
2000	238	317	107	171	595	52	55	107	23	8	31	15	5	20	645		129
2001	244	314	100	161	575	66	54	120	22	7	29	12	4	16	860		125
2002	228	283	116	161	560	69	55	124	18	8	26	16	8	24	644		123
2003	189	294	124	139	557	61	53	114	10	2	12	13	10	23	729		129
2004	221	303	128	124	555	67	52	119	21	10	31	15	9	24	695		125
2005	213	302	110	107	519	55	53	108	13	6	19	0	0	0	541		126
2006	174	327	96	106	529	54	44	98	13	2	15				601		128
2007	198	315	74	99	488	55	45	100	14	8	22				628		130
2008	134	291	63	100	454	48	43	91	14	3	17				466	87	130
2009	(135)	(247)	(50)	(96)	(393)	(44)	(40)	(84)	(12)	(9)	(21)				(652)	(145)	(128)