Annex 11

REPORT OF THE ALBACORE WORKING GROUP WORKSHOP

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

14 July 2011
Sapporo, Japan

1.0 INTRODUCTION

1.1 Welcome and Introduction

A one day meeting of the International Scientific Committee – Albacore Working Group (ALBWG) was held 14 July 2012 in conjunction with the 12th Meeting of the ISC Plenary in Sapporo, Japan.

Twenty (20) participants from Canada, Chinese-Taipei, Japan, Mexico, the United States, and the Western and Central Pacific Fisheries Commission (WCPFC) were present (Appendix 1).

The ALBWG Chair, John Holmes, welcomed all participants to Sapporo and outlined the objectives of the meeting:

1. Update fisheries statistics (through 2011),
2. Monitor and review progress on high priority research,
3. Update workplans based on CIE reviews,
4. Develop workplans and schedule up to 2014,
5. Develop stock status and conservation advice recommendations, and
6. Hold an election for Chair

1.2 Approval of agenda

The ALBWG Chair circulated an agenda at the meeting and asked for comments, noting that he thought that the WG would be able to complete the agenda in one-day and would not need the second day (July 15) scheduled for the ALBWG. No revisions to the agenda were suggested and it was adopted for the meeting (Appendix 2).

1.3 Distribution of Documents

Two working papers were distributed electronically to the ALBWG working group prior to the meeting (Appendix 3).

1.4 Appointment of Rapporteurs

Vidar Wespestad (Section 2), Hidetada Kiyofuji (Section 3), Suzy Kohin (Section 4) and Kevin Piner (Section 7) were appointed 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 2011 based on data provided by participants.

2.1.1 Canada

John Holmes reviewed the 2011 Canadian albacore troll fishery (ISC/12/ALBWG/01) and also reported that recent reanalysis of catch and effort data resulted in small revisions to these data prior to 2005 (± 5 t or vessel-days, ± 2 vessels in the fleet) and larger changes in data collected since 2005 (up to 590 t of catch). The primary cause of revision is due to late reporting of logbooks, which has occurred over several years, and the need to reconcile preliminary estimates of catch weight based on logbook estimates with more accurate and reliable sales slip weights, which are the basis for payment between a buyer and the fisherman landing catch. Since 2005, there have been delays in obtaining sales slip data owing to the way they are processed by the Catch Statistics Unit of Fisheries and Oceans Canada. Although these delays are expected to continue in the future, they will be shorter as Canada will monitor this process more closely.

Total annual catch and effort in 2011 were 5,393 t and 8,568 vessel-days respectively, and the fleet consisted of 177 vessels. Approximately 86% of the catch and 76% of the effort occurred in the US EEZ in the vicinity of the Columbia River plume and 2011 catches occurred in slightly cooler waters (14-18 °C) than in previous years (15-19°C). An on-board size sampling program measured 14,373 fork lengths for a sampling rate of 1.72% of the reported catch. These measurements were dominated by a single mode corresponding to 2-year old fish at 64-66 cm FL in size frequencies from the highseas and US EEZ, but in the Canadian EEZ a second mode corresponding to 3-year old fish at 74-78 cm was also prominent.

The Working Group accepted the revised Canadian data and agreed that the procedure employed by Canada result in the best available scientific catch data.

There was discussion about the different size data in the Canadian EEZ and it was noted that these data could reflect two different sized groups migrating into Canadian waters, one group of smaller fish following transition zone waters up the coast and the other larger fish migrating directly from the offshore into Canadian waters. Archival data published by US scientists are consistent with this observation.

A question was asked about the 2012 fishery and Canada reported that the 2012 fishery could be very different than in past years due to a lack of agreement with the US on albacore fishing access to each others EEZs.

2.1.2 Japan

Keisuke Satoh reviewed albacore catch and effort in the north Pacific by Japan (ISC/12/ALBWG/02). Albacore is mainly caught by pole-and-line and longline fisheries. Japan reported that preliminary 2011 catch of 51,513 t, which was about 10,000 t higher than 2010 catch and was nearly equal to average of past 5 years. Most of the catch increase occurred in the pole and line fishery due to target switching from skipjack to albacore because skipjack availability was lower in 2011 than in 2010. It was noted that the pole and line catch fluctuates interannually, largely because of the target switching, but the longline catch is relatively stable. Fishing effort by medium-sized (20-199 GRT) pole-and-line vessels has been decreasing recent years, whereas that by large (> 200 GRT) vessels fluctuated. Preliminary longline catch is 21,167 t (note that the figure for 2011 in the working paper is incorrect), which is similar to the catch in 2010 (21,882 t). Fishing effort by longline vessels > 20 GRT has decreased in the last 5 years, whereas effort in the coastal longline (10-19 GRT) fleet is stable over the same period. Trends in nominal longline CPUE differs depending on area, and shows strong declining trend in the first quarter since 2002 in the northeast Pacific. The spatial distribution of catch was similar to prior years.

The ALBWG noted that Japan's working paper was very comprehensive and thorough. There was some discussion of the size of fish caught by the different longline fleets and it was noted that fish size depends on the area of fishing. It was noted that there was very little effort in the northeast Pacific in 2011.

2.1.3 Chinese-Taipei

Zhong-Yo Chen provided an oral report summarizing Chinese Taipei albacore fisheries and noting that catch and effort in 2011 were quite similar to 2010 figures. Albacore are caught by the longline fleets, which consist of the large-scale tuna longline fleet (LTLL) and the small-scale tuna longline fleet (STLL). The LTLL fleet that targets albacore consisted of 20 vessels in 2010 and 21 vessels in 2011 and reported albacore catches of 2,281 and 2,972 t in 2010 and 2011, respectively. The STLL fleet reported an albacore catch of 462 t in 2011. Most of these catches are incidental catches in fisheries targeting other species.

It was noted that in the last 5-6 years there has been a shift in the operations of the STLL and LTLL fleets from splitting effort in the south Pacific and north Pacific Oceans to putting almost all effort into the north Pacific Ocean. This shift seems to be related to fuel prices.

2.1.4 United States

Steve Teo provided an oral report summarizing the albacore fisheries of the United States for 2011. He reported that the U.S. troll and pole and line fishery harvested 11,273 t of albacore, most off of the U.S. west coast states of Oregon and Washington. The U.S. longline fishery caught 687 t. The U.S. also reported revised sport fishery catch data for 2007, which decreased from 1,225 t to 461 t. Catches of north Pacific albacore from all other U.S. fisheries were also reported in Table 1.

The ALBWG accepted the revised estimate of 2007 sport fishery catch.

2.1.5 Mexico

There were no reported albacore catches by Mexican vessels in 2011.

2.1.6 Korea

No one from Korea attended the meeting.

2.1.6 Other Countries

The ALBWG Chair presented 2010 and 2011 catch data from an ISC member country (China) and non-member countries received from the WCPFC data manager through the STATWG Chair. Small catches (under 200 t) are reported for several non-member countries. The ALBWG was concerned about the Chinese catch data (910 t in 2010, 1,836 t in 2011) and the 2011 catch reported by Vanuatu (8,102 t) as these figures are several times higher than any previously reported by either country. These catches might represent recent expansions in the fisheries of both countries or they may be total albacore catches (south Pacific and north Pacific albacore combined). The Working Group recommends that the veracity of these catch figures be confirmed with the WCPFC data manager and tasked the ALBWG Chair to work with the STATWG Chair on this matter.

2.1.7 Update ALBWG Catch Table (Table 1)

ALBWG members updated catch data for 2010 and 2011 in the Catch Table (Appendix 4). Changes relative to 2010 are shown in yellow. The ALBWG Chair retrieved catch data for Korea from it's country report submitted to the ISC12 Plenary. All countries then confirmed the 2010 data and preliminary figures for 2011.

2.2 Bycatch

There was no discussion of this agenda item.

2.3 Review of metadata by country and gear

There was no discussion of this agenda item.

3.0 QUALITATIVE REVIEW OF STOCK STATUS

3.1 Catch and Effort Trends

The Working Group reviewed total catch (Figure 1), catch by major gear type (Figure 2) and nominal effort (number of vessels, Figure 3). The average catch between 1981 and 2010 is 72,535 t. Preliminary total catch for 2011 is 83,142 t, which is approximately 14,100 t greater

than total catch in 2010 (68,984 t). It was noted that this increase in 2011 reflects two events: (1) an increase in JPN pole-and-line catch due to switching from skipjack to albacore, and (2) the inclusion of catch reported by Vanuatu, which is of concern to the ALBWG. Catch by troll has been relatively constant since the mid-2000s while catch by longline and pole and line fleets has increased recently or been variable since the mid-2000s, respectively (Figure 2. Nominal effort by ISC member countries longline fleets has been decreasing since 1994 while troll and pole-and-line fleets seem relatively stable through the 2000s (Figure 3).

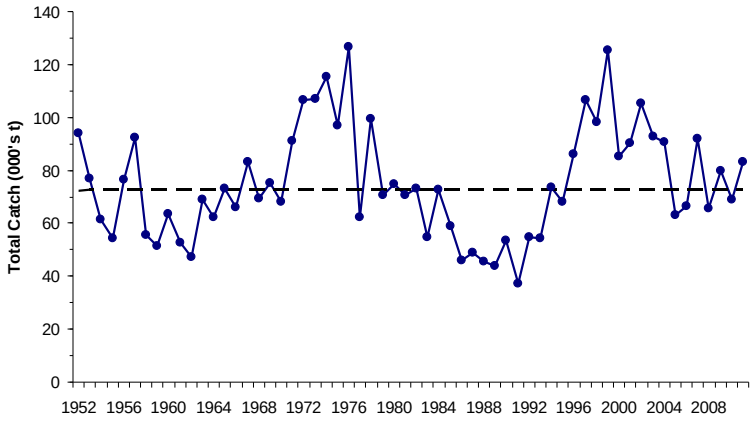

Figure 1. Total catch of north Pacific albacore from all sources, 1952-2011. The dashed line is the 30-year average for 1981-2000, 72,535 t.

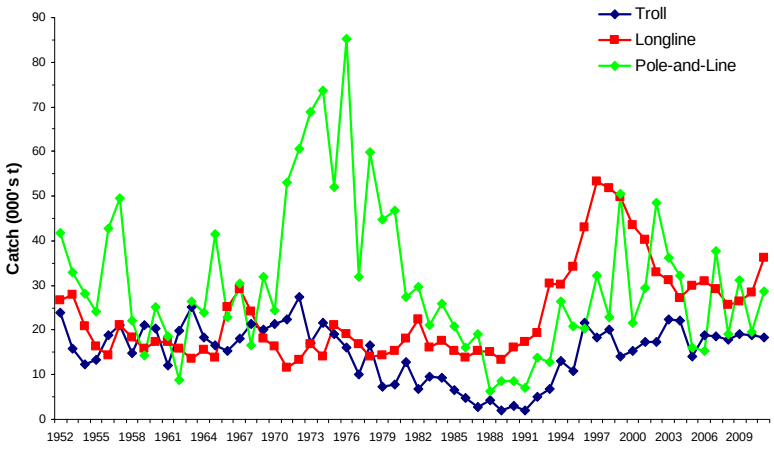

Figure 2. Total catch of north Pacific albacore by three major gear types. Catch data for minor gear types are not shown.

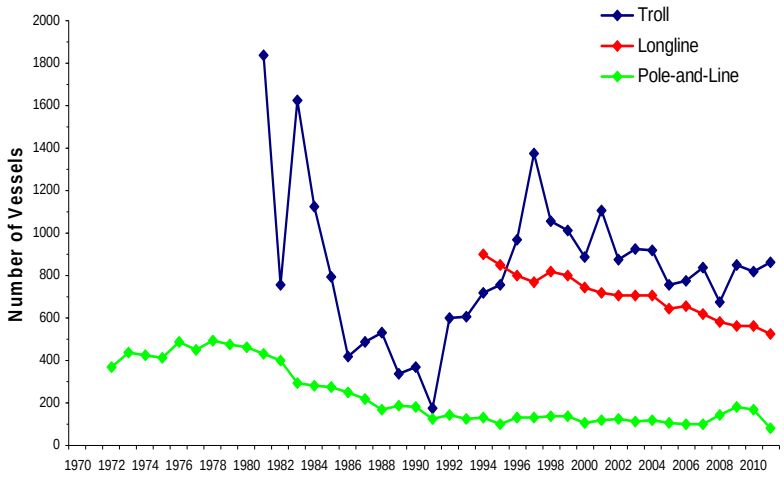

Figure 3. Nominal effort of ISC member countries measured as the number of vessels in fleet for the major gear types catching north Pacific albacore.

3.2 Strength of Recent Year-classes

This item was not discussed as no new data were presented at the meeting.

3.3 CPUE Trends

No data were available at the meeting to assess trends in CPUE.

3.4 Other Stock Status Indicators

The ALBWG did not discuss other stock status indicators

4.0 PROGRESS ON HIGH PRIORITY RESEARCH

The ALBWG reviewed the list of high priority research topics in the 2011 stock assessment document and offered some updates regarding ongoing research. The Chair emphasized that many of the topics must be addressed, in particular some of the specific research needed to improve the abundance indices, size compositions, selectivity, and fishery definitions.

The US indicated that they have improved upon the Wells et al. (ISC/11/ALBWG/02) age and growth study by adding more samples for large fish obtained both from Japanese colleagues and samples from the Hawaii longline fishery. In addition, they have counted daily increments on a subset of the otoliths in order to verify determination of annular rings. Japan added that they have collected a number of age-1 fish from their pole-and-line fishery that they can offer to improve the information for small fish. The Taiwanese study has now been published and once the US study is also published, the WG scientists will make an effort to combine the data.

The US indicated that they are continuing to deploy archival tags on juvenile albacore in the eastern Pacific. The US and Japan continue to discuss collaborations to deploy archival tags on albacore in the western Pacific, but due to other workload priorities, nothing has been initiated over the past year. The US has pop-off archival tags to deploy on large albacore near Hawaii, but for the past two seasons, the availability of large fish in the hand-line fishery has been low at the time of their research trips. Canada plans to deploy up to 50 pop-up satellite tags during two seasons in the coastal eastern Pacific and out to 150°W. The US has conducted microchemistry analyses of otoliths from fish caught in the southern (off California and northern Mexico) and northern (off Oregon and Washington) areas. Analyses demonstrate partitioning by the age of 2-4, but core sampling has not demonstrated distinctions in chemical signals at birth. In order to address the possibility that spawning occurs in the central Pacific, the US is conducting larval tows in waters near Hawaii where larvae have previously been found.

Japan noted that it has sampled the otoliths from approximately 30 small age-1 albacore caught by pole-and-line vessels. These otoliths are valuable and address a key research need.

The US is also starting a collaborative study to examine the influence of the North Pacific Current on the spatial distribution and availability of albacore in the northeast Pacific Ocean. They expect to develop 1) an environmental time series that indicates albacore availability to US surface fisheries, and 2) integrate the time series into future stock assessment models. Canada described an ongoing study to examine the effect of climatic indices (Pacific Decadal Oscillation (PDO), North Pacific Gyre Oscillation (NPGO), Multivariate El Niño Southern Oscillation Index (MEI), Northern Pacific Index (NPI), and Western Pacific Index (WPI)) on the productivity of albacore using fishery data from 5 fleets. Preliminary results show a statistically significant relationship between NPGO and r (intrinsic rate of increase, used as a measure of stock productivity) when NPGO is lagged three years relative to r. As this might be a recruitment effect, further work is ongoing to investigate recruitment more directly.

5.0 ASSESSMENT OF CIE REVIEWS OF 2011 STOCK ASSESSMENT

5.1 Strengths/weaknesses identified by reviewers

The ALBWG Chair electronically circulated prior to the meeting a table in which the comments of the CIE reviewers were collated. During the meeting he proposed that the ALBWG prepare responses to the reviewers comments using a three point scale. The scale was:

1 – ALBWG agrees with the comment and this issue is a priority,
2 – ALBWG agrees with the comment, but this issue is not a priority at this time,
3 – ALBWG disagrees or the comment is wrong with respect to the context or it is not possible to address the comment.

Responses to the comments and a brief explanation of the response are shown in Appendix 5.

5.2 Additions to research plan

Based on this appraisal of reviewer comments, it was proposed that an investigation the drivers of biomass scaling in the assessment model be added to the research plan. The ALBWG agreed with this proposal.

6.0 WORKPLANS AND SCHEDULE FOR 2012-2014

The Bluefin WG Chair, Yukio Takeuchi, briefly described a proposal that will be recommended by the PBFWG for a tuna ageing workshop. Dr. Abe has been tasked with developing the proposal, which will be forwarded and discussed at the ISC12 plenary. The goal of the workshop is to develop best practices and standardization of procedures, as far as possible, for tuna ageing. As albacore age determination has similar issues, the PBFWG Chair asked the ALBWG to join the PBFWG in supporting the need for the workshop, which would primarily target age determination specialists in member countries. Japan has tentatively offered to host the ageing workshop sometime in the fall of 2013. The ALBWG agreed with the rationale for this workshop and recommends that the ISC12 plenary support the tuna ageing workshop.

6.1 Workshop and meeting schedule, 2012-2014

The ALBWG developed and recommends the workplans shown below to the ISC12 Plenary.

1. Intersessionl Workshop, March 19-25, 2013 - to review priority research results and determine how this results will be incorporated into the next assessment. Location: Canada offered to host this workshop in Nanaimo.

2. Administrative Meeting, July 2013 – 1-2 day meeting to update fishery statistics and complete annual administrative tasks

3. Tuna Ageing Workshop/Data preparation Workshop, Oct/Nov 2013 – Tuna ageing workshop followed by data preparation meeting for the next assessment. Location: Japan has offered to host

4. Stock Assessment Workshop, April 14-28, 2014 – Stock assessment workshop consisting of modelling subgroup meeting of 4-5 days followed by full ALBWG workshop to conduct stock assessment. Location: USA offered to host this workshop in La Jolla.

5. Administrative Meeting, July 2014 – 2 day meeting to prepare stock assessment presentation, update fishery statistics and complete annual administrative tasks.

7.0 RECOMMENDATIONS FOR THE ISC12 PLENARY

7.1 Stock status

The information reviewed by the ALBWG requires no change to their view of stock status as a result of the 2011 stock assessment. The WG noted that the qualitative review of catch and effort

showed no indications of concern about either catch or effort trends, except for a concern about reported catch in 2010 and 2011 from China and some WCPFC non-member countries because their catches were significantly higher than previous years and require further investigation. The ALBWG notes, however, that albacore stock status may be related to recruitment and that it has no information with which to monitor recruitment between assessments.

The ALBWG recommends no changes to its stock status determination in 2011, i.e., the stock is considered healthy and it not likely overfishing is not occurring and that the stock likely is not in an overfished condition, although biomass-based reference points have not been established for this stock.

7.2 Conservation advice

The WG noted that it has not received any new information since the 2011 stock assessment that requires a change to previous (2011) conservation advice. The ALBWG recommends no changes to the conservation advice formulated at ISC11 and shown below:

1. The stock is considered to be healthy at average historical recruitment levels and fishing mortality ($F_{2006\text{-}2008}$).
2. Sustainability is not threatened by overfishing as the $F_{2006\text{-}2008}$ level (current F) is about 71% of $F_{SSB\text{-}ATHL}$ and the stock is expected to fluctuate around the long-term median SSB (~400,000 t) in the short- and long-term future.
3. If future recruitment declines by about 25% below average historical recruitment levels, then the risk of SSB falling below the SSB-ATHL threshold with $F_{2006\text{-}2008}$ levels increases to 54% indicating that the impact on the stock is unlikely to be sustainable.
4. Increasing F beyond $F_{2006\text{-}2008}$ levels (current F) will not result in proportional increases in yield as a result of the population dynamics of this stock.
5. The current assessment results confirm that F has declined relative to the 2006 assessment, which is consistent with the intent of the previous (2006) WG recommendation.

7.3 CIE Stock Assessment Reviews - Lessons Learned

The ALBWG offers the following recommendations concerning an independent stock assessment review process based on its experience with the CIE reviews of the 2011 assessment.

1. Improved documentation of the assessment process relative to current practice, especially data review and preparation, is important for any review process.

2. A face to face review would be preferable to the desktop review that was used, although the it was noted that this would be challenging logistically and financially since the ISC is a volunteer organization.

3. There was a difference in the quality of the reviews obtained through the CIE process and the ALBWG recommends that future stock assessment reviews consider the inclusion of reviewers with more knowledge of tunas and tuna assessment methodology.

7.4 Other Issues Needing Plenary Attention

The Chair noted that he had communicated two recommendations to the STATWG on behalf of the ALBWG: (1) that the STATWG Chair verify the accuracy of the 2010 and 2011 data obtained from the WCPFC data manager, and (2) that the STATWG recommend that the ISC implement an exchange of data inventories with the IATTC, as is done with the WCPFC, to ensure that species working groups have complete catch histories. The ALBWG agreed with this recommendations.

8.0 ADMINISTRATIVE MATTERS

8.1 Update National ALBWG Contacts

Canada – John Holmes, Zane Zhang
China – L. Song
Chinese Taipei - S.-Y. Yeh, C.-Y. Chen
Japan - Keisuke Satoh
Korea - Sang Chul Yoon
Mexico - Michel Dreyfus, Luis Fleischer
USA – Kevin Piner, Steve Teo
IATTC – Alex Aires da Silva
SPC – Simon Hoyle
Data Manager – John Childers

8.2 Clearing of report

The Chair prepared a draft of the report after the meeting adjourned and circulated via email on July 15 for review, comment, and approval by the participants. Comments and approval were by 17:00 on July 16. Subsequently, the Chair evaluated suggested revisions, made final decisions on content and style, and provided the report for the ISC12 Plenary to review.

8.3 Other Matters

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

9.0 ELECTION OF THE CHAIR

The three-year term of the current Chair concludes at the end of this meeting. An election for a new Chair was conducted by the Chair of the ISC, Gerard DiNardo. John Holmes was re-elected for a second term as the ALBWG Chair.

10.0 ADJOURNMENT

The Chair expressed his appreciation to Working Group members for their efforts, which ensured a successful meeting. ALBWG participants collectively thanked the hosts (Japan, and Hidetada Kiyofuji in particular) for their hospitality and overall meeting arrangements.

The meeting of the ISC-ALBWG was adjourned at 14:40 on 14 July 2012.

Appendix 1. List of Meeting Participants

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Appendix 2. Agenda

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

ALBACORE WORKING GROUP MEETING

Takasago Rm, 3rd Floor
Sapporo Park Hotel
Sapporo, Japan

14-15 July 2012

Provisional Agenda (June 25, 2012)

1. Introduction
    - 1.1 Welcome and introduction
    - 1.2 Approval of agenda
    - 1.3 Distribution of Documents
    - 1.4 Appointment of rapporteurs

2. Review and update fisheries statistics for 2010 and 2011
    - 2.1 Fishery stastics by country and gear (Table 1 and 2)
    - 2.2 CPUE indices
    - 2.3 Bycatch
    - 2.4 Metadata by country and gear

3. Qualitative review and update of stock status
    - 3.1 Catch and effort trends
    - 3.2 Strength of recent year-classes
    - 3.3 CPUE trends
    - 3.4 Other stock status indicators

4. Progress on high priority research to improve the next albacore stock assessment

5. CIE Independent Desktop Reviews of 2011 stock assessment
    - 5.1 Strengths/weaknesses identified by reviewers
    - 5.2 Additions to research plan

6. Workplans and schedule for 2012-2014
    - 6.1 Workplans for completion of high priority research prior to next assessment in 2014
    - 6.2 Workshop and meeting schedule, 2012-2014

7. Recommendations for ISC12 Plenary
    - 7.1 Stock status
    - 7.2 Conservation advice

7.3 CIE Stock Assessment Reviews - Lessons Learned
7.4 Other Issues Needing Plenary Attention

8. Administrative matters
   8.1 Update National ALBWG Contacts
   8.2 Clearing of report.
   8.3 Other Matters

9. Election of the Chair

10. Adjournment

Appendix 3. Working Paper List

Document Number	Title	Authors	Availability
ISC/12/ALBWG/01	Revised Canadian Albacore Fishery Statistics, 1995-2010, and Provisional Fishery Statistics for the 2011 Albacore Troll Fishery	John Holmes	On ISC website
ISC/12/ALBWG/02	A review of Japanese albacore fisheries in the North Pacific as of June 2012	Keisuke Satoh, Koji Uosaki, Takayuki Matsumoto and Hiroaki Okamoto	Author names and contact details at present, approval sought for full release

Appendix 4

Table 1. [1] North Pacific albacore catches (in metric tons) by fisheries, 1952-2011. 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 [2]	Distant Water Longline	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	1190	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	482
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	19,092	15		365		2,490	579
2009	2,076	149	33	31,172	410	21,995	43		365		1,866	512
2010	330	24	42	19,561	588	21,167	37		109		2,281	(537)
2011	(330)	(24)	(42)	(28,610)	(588)	(21,882)	(37)		(87)	(3)	(2,972)	(462)

1 Data are from the ISC Albacore Working Group, July 14, 2012 except as noted.
2 Chinese-Taipei gill net catches

Table (Continued)

Year	United States of America [2]								Mexico		Canada	Other		Grand Total
	Purse Seine	Gill Net	Pole and Line	Albacore Troll [3]	Tropical Troll & Handline	Sport	Longline	Other [4]	Purse Seine	Pole and Line [5]	Troll	Troll [6]	Longline [7]	
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		2,718	15	24	177	4	2	0	302			53,693
1991	0	17		1,845	72	6	312	71	2	0	139			37,320
1992	0	0		4,572	54	2	334	72	10	0	363			54,833
1993		0		6,254	71	25	438		11	0	494			54,125
1994		38		10,978	90	106	544	213	6	0	1,998	158		73,345
1995		52		8,125	177	102	882	1	5	0	1,761	94		67,945
1996	11	83		16,962	188	88	1185		21	0	3,321	469	1,735	86,212
1997	2	60		14,325	133	1,018	1653	1	53	0	2,166	336	2,824	106,754
1998	33	80		14,489	88	1,208	1120	2	8	0	4,177	341	5,871	98,229
1999	48	149		10,120	331	3,621	1542	1	0	57	2,734	228	6,307	125,542
2000	4	55		9,714	120	1,798	940	3	70	33	4,531	386	3,654	85,052
2001	51	94		11,349	194	1,635	1295		5	18	5,248	230	1,471	90,189
2002	4	30		10,768	235	2,357	525		28	0	5,379	466	700	105,224
2003	44	16		14,161	85	2,214	524		28	0	6,861	378	(2,400)	92,873
2004	1	12		13,473	157	1,506	361		104	0	7,857	–	4,375	90,626
2005		20		8,479	175	1,719	296		0	0	4,888	–	4,315	63,337
2006		3		12,547	95	385	270		109	0	6,008	–	5,136	66,576
2007	77	4		11,908	98	461	250		40	0	6,667	–	3,539	92,622
2008	--	1		11,761	29	418	353	0	10		5,476		2,812	65,467
2009	39	4		12,938	100	677	201	0	17		5,690		1,581	79,868
2010	--	5		12,634	55	704	405	19	25		6,552		3,857	68,984
2011	(41)	(8)		(11,172)	(88)	(424)	(687)	(37)	(0)		(5,393)		(10,156)	(83,142)

2 USA estimates updated July 2012.
3 Albacore Troll estimates include catches caught with Pole-and-Line gear.
4 Other includes catches by Purse Seine.
5 Mexico Pole-and-line catches for 1999 and 2000 include 34 and 4 metric tons, respectively, from Longline.
6 Other Troll catches are from vessels registered in Belize, Cook Islands, Tonga, and Ecuador.
7 Other Longline data for 2004-2009 are from Peter Williams, SPC, for non-member nations. Other Longline also includes data provided by China.

Appendix 5

Responses: 1 – agree and priority for ALBWG; 2 – agree but not priority at this time; 3 – disagree, not possible or not relevant

Recommendations from a Desktop Review of the 2011 North Pacific Albacore Stock Assessment and ALBWG Responses		
1.0 Age and growth modeling	**ALBWG Response**	**Explanation of Response**
1.1 Growth heterogeneities by sex warrant a sex-specific growth model for this stock. Regional growth differences should be investigated between EPO and NPO	2	Spatial differences in growth high priority (see 7.2 of research plan)
1.2 Spatial variability in growth – Evaluate the impacts of spatial and temporal variability of growth on the assessment with MSE.	2	Long-term goal
1.3 Back-calculate length-at-age - Given the relative small number of samples, back-calculate length-at-age data using otoliths to derive length at each age for each fish with its respective otolith sample.	3	
1.4 Ageing error - Ageing errors and variations should be estimated outside the SS3 model.	1	Has been completed, but not well documented in assessment
1.5 Cross-validation of growth - conduct a cross validation analysis that leaves some of the growth data out of the SS modeling for testing the growth model estimated within the SS.	3	Relevance of procedure questioned.
2.0 Spatial Patterns Analysis		
2.1 Movement - Examine the existing tagging data and plan further tagging studies to estimate movement and biological parameters in different regions.	3,	Long-term need, but requires new data to address. Existing tagging data has been thoroughly reviewed
2.2 Biological Parameters - evaluate spatial and temporal variability in life history parameters and fisheries data	1 or 2	Will require time and proper sequencing with new tag data
2.3 Habitat model - develop a habitat model to identify key environmental variables that regulate the spatial distribution of albacore.	3	Intent of comment not clear
3.0 CPUE Analysis		

3.1 Spatial CPUE standardization - CPUE standardization should incorporate spatial autocorrelation since fishery/survey data are dependent spatially. Failed to identify the applied GLM method in this assessment in the process of CPUE standardization.	2	Improved documentation of process is important; fisheries defined spatially so spatial auto-correlation not an issue. See 7.3.v in research plan
3.2 CPUE coherence - evaluate the coherence of CPUEs to identify factors that may influence the quality of the CPUE data and possible discrepancy among different sets of CPUE data.	1	Identified by ALBWG, see 7.3.iv in research plan
3.3 Catchability - Not much discussion about catchability. Changes in catchability may be reflected in changes in selectivity, but believe impacts should be evaluated separately.	1	High priority for ALBWG by next assessment
3.4 Time blocks for selectivity - The choice of time block for selectivity is not always justifiable. Need to evaluate one fleet at a time for its temporal trend while holding others constant.	1	Need to review and evaluate
3.5 Catchability assumption - The assumption of constant catchability for CPUE time series extending from 1966 or 1972 to 2009 is suspect.	1	Important structural issue and will be address for next assessment
3.6 CPUE quality – Some CPUE time series contradict each other. A CPUE time series should not be used unless it can be defended	1	More thorough data analysis and preparation is high priority for next assessment
3.7 CPUE Documentation - The CPUE documents were inadequate. The raw data need to be thoroughly analyzed and presented and strengths and weaknesses of data noted.	1	Better documentation is high priority for the next assessment
5.0 Data Issues		
5.1 Bias correction of back-transformation from the estimated length-weight relationship - there is a bias associated with this back-transformation, which is dependent on the estimated variance and correlation between the parameters as well as the specified length to be predicted.	3	Used nonlinear fit so comment is not relevant, but improved documentation of procedures will be made for next assessment
5.2 Data weighting - Consider weighting length composition data by long-term catch to correct for spatial variability in fisheries	3	ALBWG is uncertain about what comment means
5.3 Data weighting - The weighting factors for some of the likelihood components were determined rather arbitrarily. There is a need to develop some guidelines/principles for determining weighting factors	1	High priority, broader than data type weighting; see 7.6.i in research plan

5.4 Input data quality - evaluate data quality and consistency between different fisheries and reduce the uncertainty in the data before they are used in modeling.	1	Important data preparation function
5.5 Discards - It is highly likely that part of the catch is discarded at sea. No estimates were derived for the discards and discards were not included in this assessment.	2	Low probability of discards but some highgrading cannot be ruled out.
5.6 Input data quality - both multinomial and normal or lognormal-based likelihood functions tend to be sensitive to outliers. Explore robust likelihood functions to identify outliers	2	Reasonable to do, but not in near-term
5.7 Catch-at-length - The calculation of the catch-at-length data should involve scaling raw length samples up to the numbers in the sampled catch and then to the numbers in suitably defined strata. Documentation of procedure was inadequate	2	Improved documentation is high priority. Relative to how length compositions put together
6.0 SS3 Model Improvements		
6.1 Incorporate oceanic conditions - Future projections are dependent on oceanic conditions and regime shifts. Sensitivity runs for this stock under different environmental conditions are recommended.	2	Reasonable to do, but not likely finished prior to next assessment; see 7.6.v in research plan
6.2 Steepness parameter - It is known that there is parameter confounding between steepness and other parameters in the stock-recruitment relationships.	3	Steepness will be estimated outside the model; see 7.6.ii of the research plan.
6.3 Assessment model convergence and parameter confounding - The WG concluded that “the model was caught on a local rather than global minimum in the log-likelihood space”.	3	Wrong interpretation. ALBWG concluded the opposite, but text was confusing.
6.4 Estimates of Parameter Uncertainty - Uncertainty estimates for future projections not provided in assessment.	3	Incorrect, stochastic projections used and uncertainty included.
6.5 Natural mortality- M is fixed at 0.3 for current assessment. A plausible way to estimate M is to use tagging studies external to SS which again bring back the importance to analyze the existing tagging data as well as planning future statistically designed tagging studies.	2	M estimates recognized issue for most tuna assessments. Cannot estimate M with existing tagging data; new data needed
6.6 Management strategy evaluation (MSE) - Suggest developing a management strategy evaluation (MSE) framework to evaluate the performance of the SS model in quantifying albacore stock dynamics	3	Good point, but not practical at this time; Important long term goal, but rather than MSE consider

and key input data and model assumptions that may significantly influence the model performance.		a simulation to assess model performance
6.7 Length-frequency bins - Explore the dynamic binning option in the SS to address issues of having too many zero observations for small and large size bins.	3	Implemented, but not properly documented in report
6.8 Parameter uncertainty - This assessment is based on maximum likelihood estimators; suggest that Bayesian estimators be used to incorporate uncertainty from all sources	2 –	Feasible but is alternate approach rather than valid criticism of assessment
6.9 Penalty functions - No description about penalty functions, which are usually applied to constrain recruitment deviations and prevent the model from yielding biologically unrealistic values	1 –	Implemented, but not properly documented in report
6.10 Recruitment modeling - More appropriate to measure the fishery recruitment as the number of fish at an age group at which fish are subject to fishing mortality (e.g., number of fish at age 3).	3	Not a relevant scientific issue, only relevant to interpretation of non-scientists
6.12 Age vs length structured model - With the extensive catch-at-length data available it would be better to use a length structured model.	3	Growth needs improvement but not in this manner.
6.13 Initialization - The model was started in 1966 with annual recruitment (age 0) estimated from 1966 to 2009 and assumed to be in equilibrium in 1966.	1.	Need to consider different way to initialize, perhaps delinking strong equilibrium assumption. Catch data available back to 1952
7.0 Other Recommendations		
7.1 Documentation - Suggest that ALBWG lists all model assumptions, explicit and implicit	1 –	Relevant to important assumptions of assessment
7.2 Projections - evaluate retrospective errors for the total stock biomass and recruitment because they are more likely to be subject to retrospective errors than SSB and need to use an earlier year (e.g., year 2000) as the reference year.	2 –	Implemented, but not well documented; did not see strong retrospective pattern
7.3 Projections - Need to consider possible impacts of SSB on the recruitment in the projection;	3 –	Based on model assumptions was OK
7.4 Develop harvest control rules, including reference points.	3	Not scientific issue; advice has been provided to managers

7.5 Sensitivity runs - Sensitivity runs should have included lower values for historical catch, and alternative, but realistic, growth parameters (given the new growth data).	3 –	How much more is needed to investigate model sensitivities?
7.7 Presentation of assessment results - Useful to also present SSB trajectories in terms of percentage of virgin SSB. in 1999.	3 –	Presentation consistent with international standards for tunas
7.8 Reference points - The reference point used, an *F*-limit designed to keep biomass above the average of the 10 lowest historical estimates, is conceptually inappropriate.	3	This point has been communicated to managers. .