Annex G1

Report of the Working Group on the In-depth Assessment of Western North Pacific Common Minke Whales, With a Focus on J-Stock

Members: Kitakado (Convenor), An, Apostolaki, Baba (I), Baker, Bøthun, Butterworth, Childerhouse, Choi, Cooke, Cipriano, Double, Fujise, Funahashi, Goodman, Goto, Gunnlaugsson, Hammond, Hatanaka, Hedley, Ishizuka, Kanda, Kasuya, Koya, Leaper, Matsuoka, Miller, Miyashita, Moon, Morishita, Okada, Okamura, Palka, Pampoulie, Park, Pastene, Shimada, Simmonds, Skaug, Víkingsson, Wade, Waples, Yamakage (I), Yasokawa (I).

1. ELECTION OF CHAIR
Kitakado was elected Chair.

2. APPOINTMENT OF RAPPORTEURS
Hammond was appointed rapporteur.

3. ADOPTION OF AGENDA
The adopted Agenda is given as Appendix 1.

4. DOCUMENTS AVAILABLE
Documents available to the Working Group were SC/60/NPM1-7.

5. DISTRIBUTION AND ABUNDANCE

5.1 Report of recent surveys

Miyashita presented SC/60/NPM4, which described the results of the IO sighting survey using *Shonan maru* No.2 conducted in the Japanese Exclusive Economic Zone (EEZ) in the Sea of Japan and Sea of Okhotsk from 18 May to 28 June in 2007. Following the suggestion made last year, attempts were made to record observations of cookie cutter shark scars. During searching effort of about 1600 n. miles, which was 92% of the designed track line, a total of 39 schools (47 animals) of common minke whales were primarily sighted. The species was abundant in the shallow waters in the Sea of Okhotsk, but there were no minke whale sightings in the deep waters where fin whales were found, a result which has been reported in past sighting surveys. In the Sea of Japan, common minke whales were widely distributed from coastal to offshore waters, again the same as previously found. Two difficulties emerged in the observation of cookie cutter shark scars; first it was very difficult to differentiate between no scars and a very small number of scars and second, observations on the ventral side are impossible. It was concluded that recording data on cookie cutter shark scars from the survey vessel to estimate the mixing rate of stocks was premature at this stage.

The Working Group expressed its appreciation for the survey report and especially to Miyashita for his oversight on behalf of the Committee. It looked forward to receiving estimates of abundance, including $g(0)$, at next year's meeting.

In discussion, it was confirmed that the attempt to collect data on cookie cutter shark scars was to investigate the presence of O stock animals that typically live in deeper waters, as does the cookie cutter shark, but that quality of the photographs taken was insufficient to record the presence of scars. It was suggested that, as well as taking high-quality photographs, a standardised body area on the flank/back be defined as a way to systematise data that might be collected in future; this has proved valuable in studies of killer whales in the eastern North Pacific. It was confirmed that Dall's porpoise and killer whales were seen on the survey but no other large cetaceans.

An presented SC/60/NPM1, which described a sighting survey conducted in Korean waters from 24 April to 28 May, 2007 to obtain information on distribution and abundance of minke whales and other cetaceans. During the survey period, the research vessel searched 1,043.2 n. miles and four species of cetaceans were sighted. Twenty-one primary sightings of 22 minke whales were observed and 3 secondary sightings were made. Sighted minke whales were aggregated in coastal waters of survey block A3; only three were observed in offshore waters in survey block A5. A semi-IO passing mode trial using two channel radios was attempted to collect data for estimation of $g(0)$ but this trial failed. Short-beaked common dolphins were observed in survey block A3 as a secondary sighting – this was the first record of this species in the East Sea. Some schools of Pacific white-sided dolphins were seen in survey blocks A3 and A4 and a pod of finless porpoises was observed in coastal waters in the survey block A1.

The Working Group expressed its appreciation to Korea scientists for the report of the survey and especially to An for his oversight on behalf of the Committee. The Working Group noted that this area had now been surveyed seven times since 1999 using the same vessel and the same protocol. This time series is potentially very valuable for investigating trends and the Working Group recommended that surveys continue in this manner in this area. The Working Group expressed regret that the IO trial had failed and encouraged that modifications be made to survey protocols to facilitate success in future surveys. Data from this survey had been analysed and presented in SC/60/NPM2 (Item 5.2).

5.2 Abundance estimation

An presented SC/60/NPM2, which described abundance estimates of minke whales from a survey conducted in Korean waters of the East Sea in 2007 (SC/60/NPM1 – Item 5.1). The effective search half width (*esw*) was estimated using several models for the detection function (half-normal, hazard-rate, uniform) and the half-normal model with cosine adjustment was chosen based on AIC. The *esw* was estimated at 0.211 n.miles (CV=0.14). Expected group size was estimated to be 1.06 (CV=0.04) individuals based on regression of log (group size) on detection probability. Abundance was estimated at 501 (CV=0.38, 95% CI=239-1,048) individuals. This estimate is not corrected for $g(0)$ and applies to only 6.3% of sub-area 6. Some distance and angle experiment data were collected but not used.

In discussion, An informed the Working Group that the reason the distance/angle experiments data had not been analysed was because they were not extensive; nevertheless, the Working Group recommended the analysis of these data as far as possible to investigate possible biases in distance and angle estimation. It was noted that the AIC for the half-normal and uniform detection model fits were almost identical and suggested that model averaging might be appropriate. In addition, results would be more informative if reported by block as well as for the whole survey area, particularly because of the poor coverage in the offshore block. More generally, the Working Group noted that these points also applied to previous surveys and, additionally, sightings could be pooled over years for estimation of *esw*. Further discussion and recommendations on this issue are recorded below.

An presented SC/60/NPM6, which described the results of analyses to estimate the abundance of minke whales from recent surveys conducted by Korea in the Yellow Sea (sub-area 5) and the East Sea (sub-area 6). In the Yellow Sea surveys (sub-area 5), the half-normal model with cosines adjustment was selected by AIC for the detection function for 2001 and hazard rate model for 2004. The *esw* was estimated at 0.272 n. miles (CV=0.14) and 0.141 n. miles (CV=0.54) in 2001 and 2004, respectively. Abundance was estimated at 1,685 (CV=0.24, 95% CI=1,042-2,726) in 2001 and 1,287 (CV=0.65, 95% CI=385-4,303) in 2004.

In the East Sea surveys (sub-area 6), half-normal model with cosines adjustment was selected by AIC for detection function for 1999, 2000 and 2007, the hazard rate model for 2003 and 2005, and the uniform model for 2002 and 2006. The *esw* was estimated at 0.130 n. miles (CV=0.540) in 1999, 0.209 n. miles (CV=0.15) in 2000, 0.214 n. miles (CV=0.11) in 2002, 0.081 n. miles (CV=0.62) in 2003, 0.075 n. miles (CV=0.46) in 2005, 0.129 n. miles (CV=0.16) in 2006 and 0.211 n. miles (CV=0.14). Abundance was estimated at 527 (CV=0.20, 95% CI=61-4,565) in 1999, 738 (CV=0.41, 95% CI=299-1,824) in 2000, 437 (CV=0.33, 95% CI=230-830) in 2002, 758 (CV=0.68, 95% CI=208-2,762) in 2003, 1,349 (CV=0.52, 95% CI=200-3,640) in 2005, 1,286 (CV=0.31, 95% CI=707-2,340) in 2006 and 501 (CV=0.38, 95% CI=239-1048) in 2007. These estimates are not corrected for $g(0)$. Distance and angle experiment data were collected but not used.

The Working Group expressed appreciation of this analysis, particularly the presentation of a comparison of estimates in one paper. In discussion, it was noted that the area surveyed in each year was different and that the blocks also changed from year to year. In particular, the boundaries of and coverage within the offshore blocks were highly variable from year to year. The inshore area covered is more consistent but has also changed over time to a lesser extent.

The Working Group recommended that data from the Korean surveys in sub-area 6 be analysed in as consistent a manner as possible in order to investigate trends in abundance over time. The survey platform has been the same in all surveys so data can readily be pooled, using covariates such as sea state, year, and possibly observer as well as perpendicular distance in models to estimate *esw*. Model averaging may also be appropriate, as mentioned above. It may be appropriate to select a common area that had been surveyed consistently over all years. The Working Group looked forward to results of such an analysis at next year's meeting.

Miyashita presented SC/60/NPM5, which described abundance estimates of common minke whales in Japanese waters in sub-areas 6 and 10 using conventional line transect methods ($g(0)$ assumed equal to 1). Data from 2002, 2003 and 2006 were selected for analysis because there were greater than 15 primary sightings. Two research vessels *Kurosaki* and *Shonan-maru 2*, were used for sighting surveys in 2002 and 2003, but because the number of sightings from one vessel was small, *esw* was estimated by combining data from both vessels in each year. Two top men in the top barrel were the primary observers and scientists on the upper bridge recorded sightings. Methods followed the Guidelines for conducting sighting surveys under the RMP and were under Committee oversight. After correction for measurement error, the *esw* was estimated using program DISTANCE. Japanese waters in sub-area 6 were divided into two blocks; 6EN in the north and 6ES in the south. Sub-area 10 was divided into a Japanese block 10E and a Russian block 10W. The outer boundaries of these blocks were fixed in all years so the results are directly comparable. Abundance estimates in block 6EN were almost the same at 1,441 (CV=0.54) in 2002 and 1,319 (CV=0.37) in 2003. In block 6ES, abundance was estimated as 365 (CV=0.73) animals in 2002 and 111 (CV=0.50) animals in 2003. In block 10E, the estimates in 2002 and 2003 were very different: 1,441 (CV=0.57) in 2002 and 401 (CV=0.64) in 2003, which might be explained at least partially by much colder sea surface temperature in 2003 than in 2002. In block 10W, abundance was estimated at 2,891 (CV=0.32) in 2006. These estimates are neither corrected for $g(0)$ nor for whales in unsurveyed waters on the continental side of the sea.

The Working Group expressed appreciation of this analysis, particularly the presentation of a comparison of estimates in one paper. In discussion, it was noted that if data were pooled over years, in a similar manner to discussed above, a common detection function could be estimated and estimates could be made for years in which there were insufficient data for independent analysis. Miyashita confirmed that this work was planned for surveys after 2000 but before that year the surveys were in summer and the Working Group had agreed to focus on surveys in April/May/June. It was noted that esw in 2002 and 2003 might better be estimated by using vessel as a factor rather than simply pooling data over vessel. Miyashita agreed that platform height might be an important factor and confirmed that this will be explored in the future. The Working Group recommended that these analyses be conducted and results presented to next year's meeting.

Okamura presented SC/60/NPM7, which described updated abundance estimates, including $g(0)$ estimation, in Russian waters of sub-area 10 using the 2006 IO survey data. Last year, the Working Group had recommended the use of covariates, such as weather, and also the presentation of graphical diagnostics. SC/60/NPM7 re-analysed the 2006 IO survey data using the OK method, a hazard probability model that was developed to estimate Antarctic minke whale abundance (SC/60/IA8 and Annex G). This method includes estimation of $g(0)$ using the IO survey data and takes into account the effects of various covariates. The performance of the OK method was investigated by running many simulation trials over years so that the model provided near unbiased density estimates under considerable uncertainty and heterogeneity. The fact that common minke whales generally consist of single animals makes the model much simpler than the Antarctic version. The authors used Beaufort sea state as an environmental covariate. AIC suggested that weather conditions did not greatly affect detection probability. The diagnostic plots for the no-covariate and with-covariate models generally showed a good fit, but the model predicts more sightings than observed at short perpendicular distances. The estimated $g(0)$ was 0.67 for the Top barrel, 0.56 for the IO platform, 0.23 for the Upper bridge, and 0.73 for the combination of Top barrel and Upper bridge. These values are much higher than those estimated for North Atlantic minke whales; the reason for this difference is not clear and this requires further investigation. The estimated abundance in the Russian waters was 3,322 (CV=0.41) for the no-covariate model. The estimate from the with-covariate model was similar.

The authors noted that adding data from the 2007 survey would be important to increase the sample size. In addition, some simulation trials should be useful.

The Working Group expressed appreciation for this analysis in response to a recommendation last year. In discussion, in relation to the lack of fit at short perpendicular distances, it was queried whether the form of the hazard rate model was the most appropriate and whether the use of other covariates might be useful. Okamura responded that the small sample sizes probably precluded the inclusion of additional covariates but this would be investigated. In terms of presentation of results, it was suggested that estimates of *esw* and the % variance due to *esw* and encounter rate would be informative, as would the sighting effort under the different weather conditions. Furthermore, it was also suggested that the results presented here for North Pacific minke whales, where mean school size was close to one, might be informative for Southern Hemisphere minke whales where mean school size is higher.

5.3 Plans for future surveys

Choi presented NPM3, which described plans by the Korean Cetacean Research Institute to conduct a sighting survey using the research vessel *Tamgu 3* (360 GT, 1,600HP) in the East Sea, April-May 2009. The survey area will comprise coastal and offshore waters in the East Sea bounded by longitude 128˚09´E and 130˚50´E and by latitude 34˚18´N and 38˚32´N. The survey area will be divided into four coastal blocks and one offshore block. The starting points of each block will be randomly selected and the total transect planned is 1,488.5 nautical miles; several transect lines in the offshore block will be restricted to the Korea EEZ. The survey will be conducted using semi-IO passing mode using the two channel radios. Although semi-IO passing mode will be employed for minke whales, closing mode will be used for sightings of other cetaceans for identification and school size estimation. Other non-lethal research activities will be conducted including biopsy sampling for genetic studies, water temperature and salinity profiling with CTDs for oceanographic description and photography and video recording for identification.

The Working Group welcomed this survey plan and appointed An to provide oversight on behalf of the Committee. It looked forward to a report of the survey at next year's meeting. In discussion, An confirmed that data collection protocols would be improved to ensure that the IO trial would be successful. Choi confirmed that the survey area and blocks would be similar to those in 2006 and 2007. In terms of survey design, the Working Group recommended that cruise tracks were selected to provide equal coverage probabilities within each block and that the direction of surveying was from north to south, i.e. against the direction of migration. Noting that the method for $g(0)$ estimation requires information on surfacing rates, the Working Group encouraged the collection of dive time data.

Miyashita reported on the activities of the intersessional email Working Group on collaboration between countries to obtain complete survey coverage of the region. Japan is not conducting a survey in this region this year. An reported that two Chinese scientists had participated on the Korean survey this year and had been invited to participate on the survey next year. He also reported that he was in communication with Chinese scientists with regard to a possible survey in Chinese waters but that there seemed little prospect of this in the near future. No progress had been made on cooperation with North Korea. The Working Group thanked the intersessional email Working Group for their work and encouraged future efforts to obtain complete survey coverage in the region. The intersessional email Working Group was re-established with members: Miyashita (convenor), An, Butterworth, Kitakado, Okamura and Park.

5.4 Future work

Last year, an ad-hoc Working Group had been established to examine methods for estimating abundance, including taking additional variance into account, when combining multi-year surveys. This ad-hoc Working Group was re-established with members: Skaug (convenor), Okamura, Kitakado, An, Miller, Butterworth & Miyashita.

Methods for estimating abundance by survey block were proposed (Appendix 2). In discussion, it was clarified that focusing on the surveys conducted in mid-April to early-June (or alternatively early-May to late-June) would lessen possible double-counting of animals during the northward and southward migrations. In addition, because the surveys were partially conducted from north to south during the northward migration, double-counting during the surveys themselves should be lessened. However, further consideration of migration in relation to which abundance estimates to use is needed. The Committee encouraged the work proposed to be completed and looks forward to receiving the results at next year's meeting.

6. STOCK STRUCTURE

6.1 Genetic analyses

Two years ago, the Working Group had agreed a set of tasks that should be undertaken to try to distinguish among a set of stock structure hypotheses (JCRM 9 (suppl.): 185-186). Progress had been made in achieving some of these tasks (JCRM 10 (suppl.): 197-198) but some work remained to be completed. No new analyses were received at this year's meeting. Plans for future work are described under Item 6.3.

6.2 Specification of stock structure hypotheses for J-stock

The Working Group recalled the four stock structure hypotheses agreed two years ago (JCRM 9 (suppl.): 186). There was considerable discussion about whether other hypotheses were appropriate to investigate, in particular to account for animals east of Japan; the Working Group had discussed this issue a number of times in previous meetings. It agreed that it would be valuable to create maps to clarify stock structure hypotheses previously specified and the additional hypotheses being proposed. Baker undertook to do this; the resulting maps and descriptions are given in Appendix 3. The Working Group agreed that the maps for hypotheses 1-4 in Appendix 3 were accurate representations of hypotheses about J stock. The Working Group agreed that the figures in Appendix 3 did not attempt to specify fully the possible stock structure of minke whales in the Pacific Ocean east of Japan; these hypotheses were specified in the completed North Pacific common minke whale *Implementation* (JCRM 6 (suppl.): 79). Goto introduced Appendix 4, which described some members concerns about listing additional hypotheses (5 and 6 in Appendix 3).

The Working Group discussed whether or not the additional hypotheses 5 and 6 in Appendix 3 should be added to the agreed list given in JCRM 9 (suppl.): 186. Baker believed it was appropriate to agree these hypotheses now so that there was a full set of hypotheses that covered the range of possibilities that could be considered as a basis for future work. Other members disagreed, referring to the previous agreement of the Working Group at the 2006 meeting to focus first on stock structure in the Sea of Japan/Yellow Sea and then, when the work previously specified in JCRM 9 (suppl.): 185-186 (and further discussed under Item 6.3) had been completed, to consider additional hypotheses that included animals along the Pacific coast of

Japan. The Chair summarised that there was no agreement to include hypotheses 5 and 6 in Appendix 3 and that the list should therefore remain the same as agreed in 2006. However, after the results of analyses described under Item 6.3 and results from the JARPN-II review are presented next year, the Working Group should consider these additional hypotheses.

6.3 Future work

Goto presented plans for work to be accomplished by Japanese and Korean scientists in the coming year.

(1) Standardise Japanese and Korean microsatellite data (end of 2008);

(2) Conduct heterogeneity tests on samples stratified by month and season, as well as sex;

(3) Include recent data from 2005-2007 to increase sample sizes and power for mtDNA and microsatellite analyses;

(4) Investigate whether previously found heterogeneity is due to the 1999 data in general or just a few individuals in this year;

(5) Analyse the 1982 Korean commercial samples (27) together with recent samples (recommended at SC59); and

(6) Include samples from the Pacific side of Japan in work related to the JARPN-II review.

The Working Group welcomed these plans and looked forward to the results of new analyses at next year's meeting.

The Working Group recalled that there is still a lack of information on stock structure in sub-areas 10 and 11; information on this was very important to the in-depth assessment. The Working Group reiterated its strong recommendation that the Russian Federation be requested as a matter of priority to give permission for biopsy samples to be taken during surveys in its waters in these areas. The Working Group also recommended that attempts continue to investigate the presence/absence of cookie cutter shark scars on minke whales in these areas.

7. ASSESSMENTS

7.1 Catch data

No new information on catch data was received. An reported that attempts were continuing to find missing information related to Korean CPUE data. The Working Group reiterated its encouragement for these attempts to continue because of the importance of this information for the in-depth assessment.

7.2 Plans for future assessments

As last year, no information was available under this item, which was kept open for next year's meeting.

8. OTHER

The Working Group noted that, as last year, no progress had been made on investigating variation in the length and sex of bycaught animals or on the estimation of growth curves. It again looked forward to receiving information on these topics next year.

9. WORK PLAN AND BUDGET REQUEST

The Working Group agreed that its work plan for the coming year included the work on abundance estimation, including $g(0)$ estimation, under Item 5 and the work on stock structure listed under Item 6.3. The latter should enable the Working Group to conclude its discussions about stock structure in the Sea of Japan; it would then look at new information on J-stock animals along the Pacific coast of Japan.

A number of additional issues were considered under this item.

The question of how information on reported bycatch and other sources of human-induced mortality would be incorporated into the assessment was raised. Time series of historical bycatch estimates was important information for the assessment, and could be useful for the in-depth assessment. The Working Group recalled its discussion over a number of years on the possibility of generating time series of bycatch per unit effort. The Working Group was informed that a revision in the law in Japan meant that bycatches now had to be included in the DNA register so the Japanese Progress Report do include all information on bycatches. Meanwhile, in Korea, information on all the bycatch is reported and concern about unreported catch was raised. The Working Group recommended that work be undertaken to attempt to generate such time series.

The Working Group recalled that at last year's meeting the Committee had noted that if efforts to find additional information on Korean CPUE data were unsuccessful it would need to consider what inference can be drawn from existing data. There was no time at this year's meeting to consider this but the Working Group agreed to place it on the agenda for next year's meeting.

The Working Group agreed that more complete information on the migration of minke whales through the Sea of Japan (sub-areas 6 and 10) would greatly assist the assessment and encouraged members to provide any new relevant information on this topic.

10. ADOPTION OF REPORT

The report was adopted at 15:20 on 8 June 2008. The Chair expressed appreciation to all members of the Working Group for their help in the progress made this year, and thanked Hammond for his assistance with rapporteuring. The Working Group thanked Kitakado for his able Chairmanship.

Appendix 1

AGENDA

1. Election of Chair
2. Appointment of rapporteurs
3. Adoption of Agenda
4. Documents available
5. Distribution and abundance
    - 5.1 Report of recent surveys
    - 5.2 Abundance estimation
    - 5.3 Plans for future surveys
    - 5.4 Future work
6. Stock structure
    - 6.1 Genetic analyses
    - 6.2 Specification of stock structure hypotheses for J-stock
    - 6.3 Future work
7. Assessments
    - 7.1 Catch data
    - 7.2 Plans for future assessments
8. Other
9. Work plan and budget request
10. Adoption of report

Appendix 2

REPORT OF THE AD·HOC WORKING GROUP ON THE INTEGRATION OF AVAILABLE ABUNDANCE ESTIMATES FOR J-STOCK COMMON MINKE WHALES

Members: Skaug (Convenor), An, Butterworth, Kitakado, Miller, Miyashita, Okamura.

An *ad-hoc* Working Group discussed the model proposed last year, and it was agreed that only surveys from the period mid April to early June (or alternatively early May to late June) should be considered for the integration of available abundance estimates (Table 1). This was to avoid double counting of individuals due to migration from south to north later in the year. Hence, the season effect was deleted from last year's model. Instead, a yearly trend in abundance will be included. The model will be fitted to the abundance estimates under the assumption that $g(0)=1$. The area is shown in Fig. 1.

Table 1. Seasonal coverage of sighting surveys for abudance estimate of the J-stock common minke whales.

Area	Season	R/V	April			May			June			July		
			E	M	L	E	M	L	E	M	L	E	M	L
5E	2001	Tamgu 3		■	■	■	■							
	2004				■	■	■	■	■					
6WS	1999									■	■	■	■	
	2000					■	■	■	■					
	2002						■	■	■					
	2003				■	■	■	■						
	2005				■	■	■	■						
	2006				■	■	■	■						
	2007				■	■	■	■						
6ES	2002	Kurosaki		■	■	■								
	2003			■	■	■								
6EN	2002	Shonan-maru No.2								■	■			
	2003									■	■			
10E	2002						■	■	■					
	2003						■	■	■					
	2007						■	■	■	■				
10W	2006	Kaiko-maru					■	■	■	■				

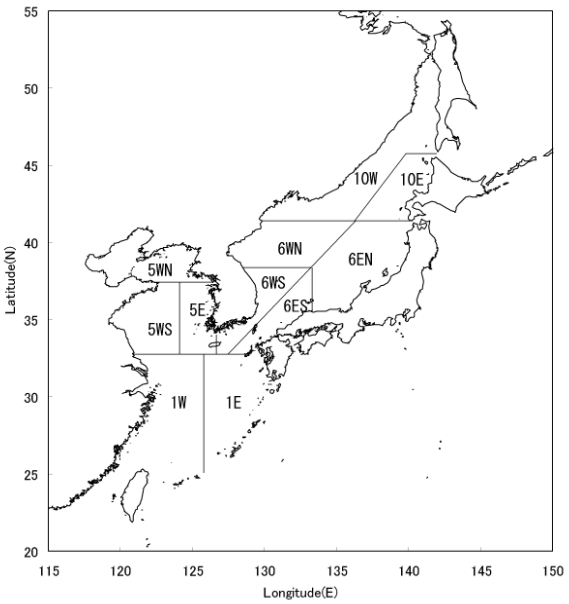

Fig. 1. Area definition.

Appendix 3

PLAUSIBLE STOCK STRUCTURE HYPOTHESES FOR THE IN-DEPTH ASSESSMENT OF THE WESTERN NORTH PACIFIC COMMON MINKE WHALE, WITH A FOCUS ON J STOCK

C.S. Baker

Fig. 1 shows a graphical interpretation of the four hypotheses (H) described in Annex G1 (J Cetacean Res Manage 9 (Suppl.) 2007 pg 186) and proposes two additional hypotheses that should be considered to cover the range of plausible scenarios for western North Pacific minke whales. H1-H4 are two- and three-stock models, including the western North Pacific O stock, as otherwise described in Annex G1. H5 extends the previous H3, taking into account the available information showing a high proportion of 'J-type' whales along the Pacific coast of Japan. H6 extends the previous hypothesis presented by SC/57/NMP5, taking into account evidence of differences between each coast, as represented in frequencies of mtDNA and sex ratios from surveys of Korean and Japanese markets. Although available samples may be insufficient to evaluate all of these hypotheses, initial analyses could help to direct future sampling through improved experimental design.

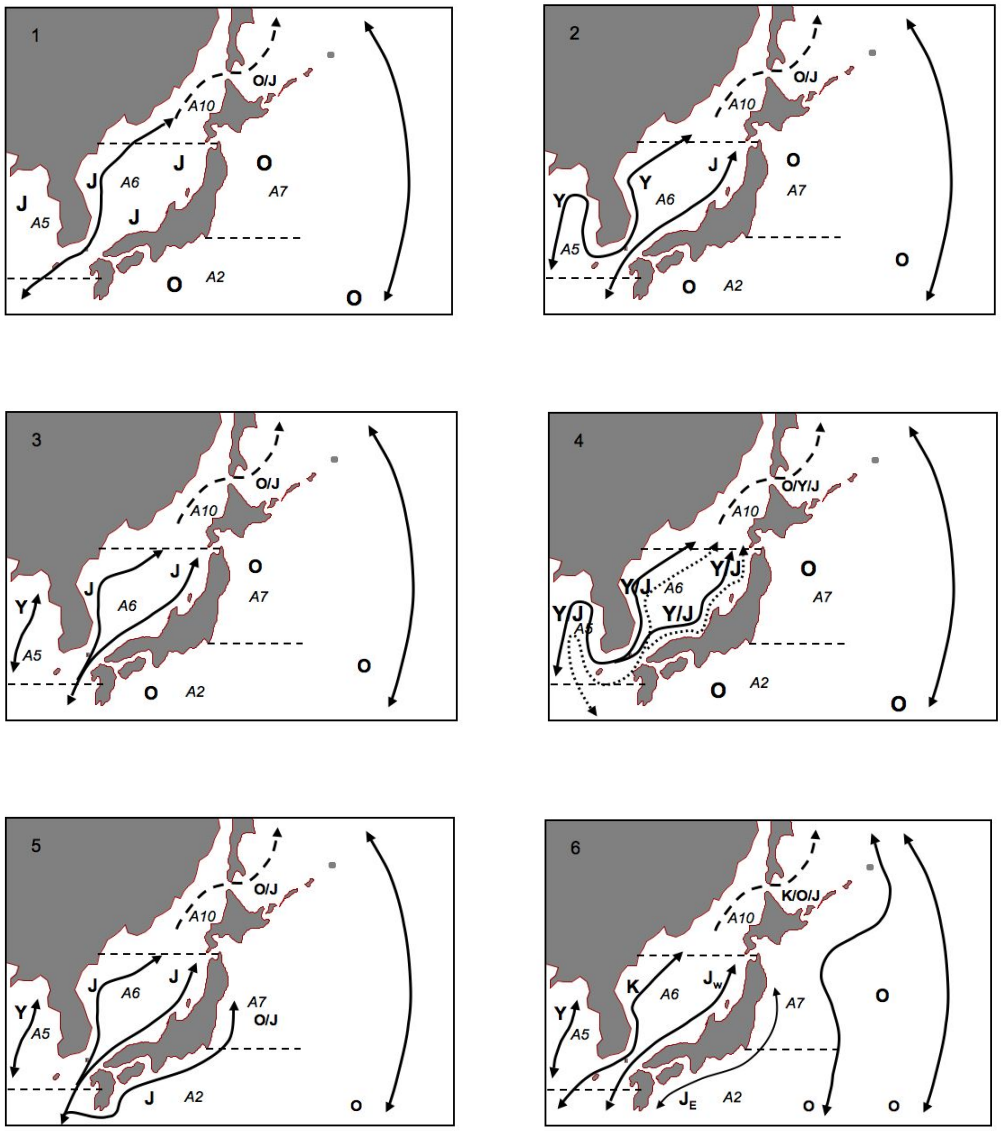

Fig. 1: Six stock structure hypotheses for common minke whales in the western North Pacific. A dashed line indicates temporal overlap of different stocks. Hypothetical stocks are referred to by the letters Y, K, J (west and east, J_W, J_E), and O. The predicted genetic characteristics of temporal and geographic sampling are indicated by letter referring to different hypothetical stocks. Note: These figures do not attempt to specify fully possible stock structure of minke whales in the Pacific Ocean east of Japan; these hypotheses were specified in the completed North Pacific common minke whale *Implementation* (JCRM 6 (suppl.): 79).

Appendix 4

CONCERN FOR LISTING ADDITIONAL POSSIBILITIES OF J STOCK DISTRIBUTION

M. Goto, J-Y Park, N. Kanda

Appendix 3 listed two additional possibilities of J-stock distribution in addition to the previously listed four hypotheses (see IWC, 2007). These possibilities, especially the 2nd new one (Fig. 1-H6 in Appendix 3), are not worth considering because they were proposed without any clear and supportive evidence.

Fig.1-H6 in Appendix 3 assumes migrations of minke whales from different stocks: one into the Yellow Sea, one along the Korean coast, one along the west side of Japan and one along the east side of Japan based on SC/57/NPM5. However, we cannot find any evidence from this document that support raising this possibility.

SC/57/NPM5 separated Korean and Japanese market samples into four groups based on the mtDNA control region sequence and tested for genetic differences among them using mtDNA and microsatellite genetic variations. These four groups were Korea-J type (hereafter KJ), Korea-O type (KO), Japan-J type (JJ), and Japan-O type (JO). Microsatellite analysis found no genetic difference between the KO and KJ, indicating that the KO and KJ individuals came from the genetically same group of minke whales. Therefore, SC/57/NPM5 just suggested genetic differences among whales migrating along Korean coast, those migrating along Japanese coast, and those migrating in the Pacific Ocean (O-stock).

Any possibilities or hypotheses without supportive evidence and information should be deleted.

REFERENCES

IWC 2007. Report of the Scientific Committee. Annex G1. J. *Cetacean Res. Manage.* 9(Suppl.) p179-187.

Lavery *et al.* 2005. Hidden population structure and undocumented exploitation of Western North Pacific minke whales inferred from genetic analysis of Japanese and Korean market products. Paper SC/57/NPM5 presented to the Scientific Committee.