

Report of the Initial Workshop in the Use of Market Sampling to Estimate Bycatch of Large Whales

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The two-day Workshop was held at the Lotte Hotel in Ulsan, Republic of Korea, 27-28 May 2005, immediately prior to the meeting of the IWC Scientific Committee. The list of participants is given in Annex A.

1. CONVENER'S OPENING REMARKS AND TERMS OF REFERENCE

Berggren welcomed the participants to the Workshop. The Commission has decided that catch limits calculated under the Revised Management Procedure (RMP) shall be adjusted downwards to account for human-induced mortalities including bycatches and ship strikes. It has also stated that such adjustments shall be based on an estimate provided by the Scientific Committee (SC) of the size of adjustment required to ensure that total removals over time from each population and area do not exceed the limits set by the RMP (Resolution IWC 1998-2; IWC, 1999). The SC has given priority to developing methods to provide estimates for those species and geographical areas where the RMP is likely to be implemented should the moratorium be lifted, i.e. common minke whales (*Balaenoptera acutorostrata*) in the northwestern Pacific and the northeastern Atlantic. Since none of the market survey methods considered at the Workshop are able to distinguish between whales entering the market through unreported fisheries bycatch from other unreported takes, the term bycatch in this report refers to all unreported sources. The SC has recognised that a full discussion of the use of market surveys to estimate bycatch will require the advice of outside experts with detailed knowledge of market sampling issues. The SC had also agreed (IWC, 2002a, p.16) that the use of market surveys to improve on minimum estimates of bycatch and to provide more realistic unbiased estimates will necessitate an adequate sampling design and include information on: (i) whale bycatches and the fisheries involved; (ii) methods of storage, collection and analysis of genetic samples (including existing DNA registers); (iii) the outlets for whale meat in specified countries and the pathways to those outlets (including direct whaling and bycatches); (iv) the statistical design and analysis of market or other sampling. In 2004, the SC agreed that it should go forward with holding a Workshop on the use of market sampling to estimate fisheries bycatch of large whales as described in the proposal for the Workshop (IWC, 2005, p.265). A Steering Group (Berggren, Donovan, Hammond, Zeh) were appointed by the SC, who contacted potential invitees through the Secretary of the Commission to participate in a planning meeting that was to take place during Autumn 2004. At that meeting, the intention was that information needs for the Workshop would be reviewed, papers needed to provide background for workshop would

be identified, a list of participants would be finalised, and meeting logistics would be arranged. However, it was not possible to find dates when most of the invited participants to the planning meeting were available. The Steering Group therefore decided that the planning meeting and Workshop would be replaced by a two-stage Workshop of which an initial Workshop would be held during two days before the 2005 SC meeting, followed by a second Workshop at a later date as decided by the outcome of the initial Workshop. The initial Workshop would identify information about the markets that would be required for a market sampling approach and review the possible approaches to bycatch estimation and their relative precision.

The objectives of the two-stage Workshop are:

- (1) to review available methods that have been used to provide estimates of large cetacean bycatches via market samples, including a consideration of their associated confidence intervals in the context of the RMP;
- (2) to identify information about the markets that would be required for a market sampling approach; and therefore
- (3) to provide advice as to whether market-sampling-based methods can be used to reliably estimate bycatch for use in addressing the Commission's objectives regarding total removals over time and, if so, the requirements for such methods.

2. ELECTION OF CHAIR AND APPOINTMENT OF RAPPORTEUR

Berggren was elected Chair and Leaper agreed to act as rapporteur.

3. ADOPTION OF AGENDA

The adopted Agenda is given as Annex B.

4. REVIEW OF DOCUMENTS

Scientific Committee Plenary documents considered at the Workshop were SC/57/BC4, SC/57/BC5 and SC/57/NPM6.

5. BACKGROUND INFORMATION

5.1 Summary of present state of knowledge on the use of genetic methods to identify market products to species and correct for multiple samples from the same individual

Genetic methods to identify market products to species level are now well established. The SC has previously had extensive discussions on the issue of assignment to individual. These are summarised in (IWC, 2002c). Assignment of a market sample to a particular individual can be complicated by the variable quality of the products.

¹ Presented to the meeting as SC/57/Rep4.

Recent studies of highly processed products have generally focussed on mitochondrial DNA for species identification rather than microsatellites for assignment to individual. The microsatellites currently in use by DNA registers and market surveys could be improved following similar examples in the field of human forensics. Many of the recent studies of market samples have been guided by the specification of the Norwegian DNA register which was based on the primer sets available at the time. It was noted that even if better markers can be developed it is essential that there is overlap with the markers used in DNA registers.

5.2 Summary of the present state of knowledge of the ability of analytical tools for allocation to stocks and/or areas

The Committee has previously discussed allocation to stocks in some detail (IWC, 2005). Recent developments in techniques for assignment of individuals to particular stocks are also reviewed in Manel *et al.* (2005). Baker outlined the mixed-stock approach used in SC/57/NPM6 and previously in Baker *et al.* (2000). In this approach, a maximum likelihood solution is found to explain the haplotype frequencies of a mixed sample based on a proportional contribution from two or more 'source' stocks. This approach does require data on the source stocks, which in this case were assumed to be the O and J stocks.

6. REVIEW OF METHODS USED IN PREVIOUS FOOD MARKET SAMPLING STUDIES DESIGNED TO ELUCIDATE MARKET STRUCTURE

For the purposes of improving sampling design, information on the both temporal and spatial aspects of market structure need to be gathered. The Workshop reviewed a number of possible methods for obtaining such data.

6.1 Questionnaire and direct interview approaches

Examples of questionnaire surveys include two conducted in Japan in 1999 and 2000. The first survey was started by TRAFFIC Japan, who designed a questionnaire that was sent to various market related groups by the Japan Whaling Association (JWA). The second survey was done by JWA alone. Both surveys aimed to estimate the quantity of whale products in storage at the end of November each year. The questions asked included the quantities of products by species, year and source. In addition, for species that are not included in the current scientific catches or bycatch, the questions included the method of preservation, the likely rate at which products would be sold, the expected number of years to exhaust the stockpile, and the reason these products had been retained. Some of the responses are summarised in Tables 1 and 2.

Table 1
Cetacean Products Stockpile survey by JWA, 2001.
Response rate by dealers.

Group	Number of dealers surveyed	Number of dealers answered
Oroshi	108	102
Nakaoroshi*	381	328
Processing	58	58
Tonya**	9	9
Restaurant	28	27
Total	588	528

*Nakaoroshi and participants were surveyed via Oroshi; **Tonya holding processors are grouped as Processor. Source: Press Release, Japan Whaling Association, 17 May 2001.

Table 2
Number of dealers who kept stockpiles among those that answered questionnaire from JWA survey, 2001.

Group	Dealers who answered	Dealers who answered and have stockpile
Oroshi	102	11
Nakaoroshi	328	112
Tonya	9	6
Processing	58	46
Restaurant	27	26
Total	528	204

Source: Press Release, Japan Whaling Association, 17 May 2001.

Funahashi explained the different categories of wholesaler listed in Table 1. For example, the *Oroshi* are licensed wholesalers who can either sell directly to retailers or to *Nakaoroshi* who are intermediate wholesalers that sell on to processors, retail outlets and consumers. *Nakaoroshi* may also buy products direct from fishermen. There are thus many levels in the chain between a whale being landed and reaching the final consumer and many different pathways that the product may follow. These are described further in Item 6.3. Williams noted that traditional market pathways are no longer followed in some cases, as the market structure has become progressively simplified over the years. Some whale products now go directly from whaling communities to large retail chains (see Fig. 1 below).

Much of the information described in Item 6.3 below, about the markets in both Japan and Korea has come through direct observations, personal contacts and word of mouth. Although the questionnaires in Japan had achieved a high rate of response, these surveys had been conducted through the JWA and it cannot necessarily be expected that questionnaires from other sources would solicit such a good response. There are also numerous examples of statistics based on market survey questionnaires that cannot be considered reliable. The Workshop **agreed** that while interviews may be productive, questionnaires *per se* were unlikely to generate useful quantitative data on market structure. If questionnaires are used at all, they should include questions where the answers are known to allow some level of cross-validation.

6.2 Analysis of official statistics for outlets and available products

One source of official statistics identified in Japan is the Annual Statistics of Fisheries Product Markets published by the Statistics Division of the Ministry of Agriculture Forestry and Fisheries. This includes the following of relevance to the market for whale products:

- (1) total quantity and value of 'whale meat' by Consuming Area Central Markets;
- (2) landing amount and price of 'marine mammals' by major Fisheries ports;
- (3) monthly wholesale amount and price for 'whale meat' at Central Wholesale markets of ten cities;
- (4) 'whale products' entering Consuming and Producing area by month;
- (5) 'frozen whale products' in stockpiles, monthly, by city;
- (6) trends in price for 'whale meat' at wholesale level; and
- (7) amount of canned 'whale products' by prefecture.

Much of the information listed above is pooled across broad categories such as 'marine mammal' or 'whale' and so presents problems in extracting data specific to large

whales. It is also difficult to know exactly what is included within the different classifications and whether this may vary by area. In addition, landings at minor ports are not listed in these statistics. Nevertheless, some of these data may be useful in examining market pathways. For example, seasonal patterns in monthly stockpiles vary between prefectures giving some indication of regional differences in the throughput of products.

No sources of official statistics for whale product outlets were identified for Korea.

Both Japan and Korea have reporting systems for bycatch of large whales and data are summarized in annual Progress Reports. These reporting systems have been described to the Committee at previous meetings (IWC, 2002b).

6.3 Direct observation of markets and market pathways

Williams presented a schematic of the likely pathways from source to consumer for bycaught whales on the Japanese market based on recent data from a range of sources including personal interviews (Fig. 1).

Williams stressed that this was a simplified representation that did not include all the possible pathways. In contrast to products from scientific catches that are distributed around the country before entering the market, the market pathway for a bycaught whale will start at the place of landing. The relative probability of whale products following the different pathways shown in Fig. 1 will be dependent on many factors including the species, size of whale, current whale supplies in the market, time of year, and the location of whale catch in relation to local demand. Further, carcass breakdown could occur at either the landing location or at the wholesale market. Only some storage locations are shown in Fig. 1; however, products may also be stored at other points in the pathway. The Workshop thanked Williams for this information and encouraged his on-going research.

Ma described the market system in Korea which deals only with bycaught whales. In contrast to Japan where most fishing gear involved in bycatch is owned by a fisheries cooperative, in Korea the gear usually belongs to an

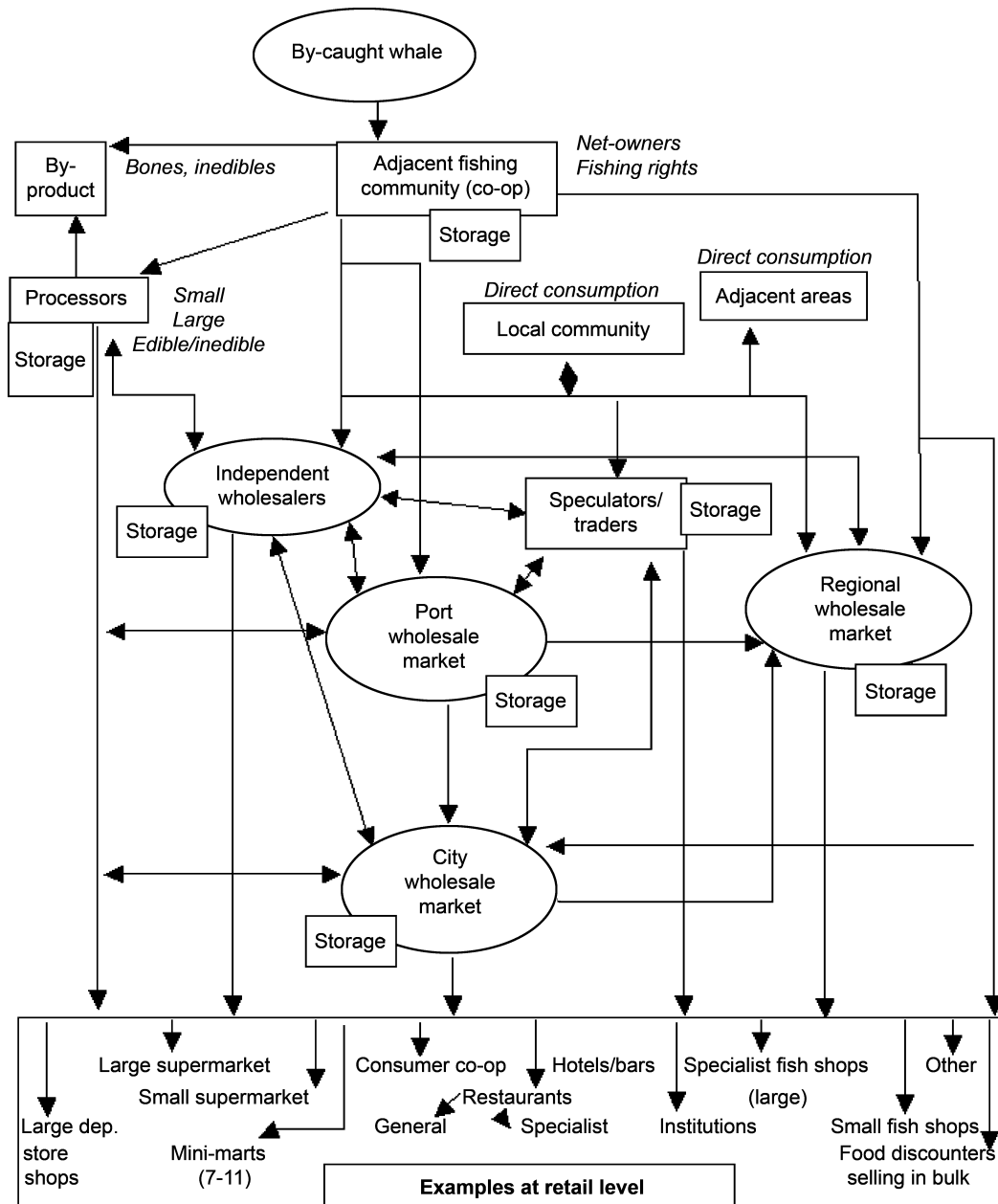


Fig. 1. Japanese market pathways.

individual. Typically, a local fisherman brings a whale to port and calls the Maritime Police for an inspection. The fisherman would then take the whale to the market himself. There are relatively few (perhaps around 10) wholesalers dealing in whale products, and these are primarily located in the SE of Korea around the cities of Busan, Pohang and Ulsan. The majority of whale meat outlets are also located in this region. Although it is possible for consumers to buy whale products, the vast majority of consumption is within restaurants. There are of the order of 100 whale meat restaurants in Korea of which nearly half are in Ulsan. Whales which are bycaught and landed in other areas of the country are likely to be transported directly to wholesalers in Busan, Pohang or Ulsan. These market pathways are illustrated in Fig. 2. The Workshop thanked Ma for his contribution.

Cipriano presented SC/57/BC4 which examined mean package sizes and per-item costs of market samples purchased in Japan stratified by species and region of origin. Across most species and areas the most common package size purchased was around 100g at a cost of about 1000-1500 yen. It was noted that price did not correspond closely to species of origin as identified by DNA analysis. The aim of this work was to inform on likely number of packages that might originate from a single whale and the possible costs of market surveys.

In discussion it was noted that this analysis did not take into account any choices on package size or price made by the purchasers. It is possible that samples of a particular size (probably towards the smaller end of the size distribution) were preferentially selected for the purposes of genetic analysis and reducing costs. Ma reported that whale meat prices in Korea fluctuated and had increased substantially in the last year. Unofficial reports suggest that previously a minke whale had been worth between \$US30,000 and US\$50,000, but some animals had been valued in 2004 at over US\$100,000. Any trends in prices would have implications for the costs of future market surveys. These could be investigated further. Funahashi noted that she had not noticed any clear trends in prices in Japan.

6.4 Tracking individual whales through market

An alternative approach to describing market pathways could be to use data from market surveys to ‘track’ individual whales through the market. This would likely require a rather different sampling design to that needed to estimate bycatch, including sampling at a number of levels in the market between the source, wholesaler and retailer. The Workshop did not consider these sampling issues in detail, but noted this as a potential method for gaining an understanding of the markets. However, it was noted that such an experiment would require tracking of a large sample of animals to obtain reliable results. Large samples sizes of whales entering the market would be most effectively achieved if data were available from DNA registers.

7. SAMPLING AND ANALYTICAL METHODS

Obtaining reliable estimates requires appropriate sampling design and analysis techniques. The Workshop considered these issues and also the use of simulation studies for both refining and testing methodologies.

7.1 Sampling design considerations (temporal and spatial)

Baker described market surveys to investigate the temporal and geographic distribution of North Pacific minke whale products purchased on Japanese markets from December 1997 to February 2004 (SC/57/NPM6). The overall proportion of J-type individuals was high, representing 44% of all market individuals purchased in 15 prefectures over the seven years of surveys. No significant change in this proportion was found since 2001 despite a 4- to 5-fold increase in reported bycatch and the 50% increase in scientific catch since that time. Moderate differences were found in the proportion of J-type in prefectures bordering three coastal regions, which may reflect local sale of bycatch. A mixed-stock analysis was used to generate a maximum likelihood estimate for the J-type proportion on

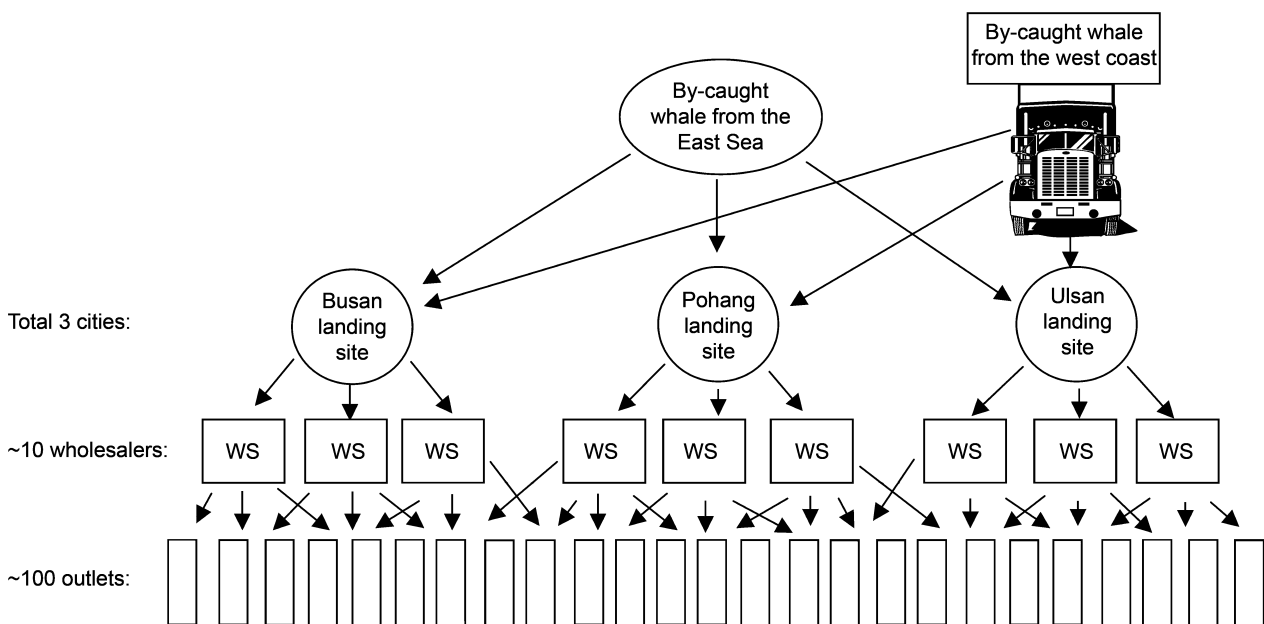


Fig. 2. Korean market pathways. WS=wholesaler.

the market, which was used to calculate a minimum estimate for the total take of J-stock minke whales over the seven year survey period.

Clarke described her studies to estimate species composition and number of sharks used by the shark fin trade based on market surveys (Clarke *et al.*, 2004). This approach relied heavily on data from traders in the world's largest shark fin trading centre in Hong Kong to produce estimates of biomass and numbers in the global trade. A large sample (10,000 records) describing shark type, fin position, fin size and fin weight was translated and statistically modelled using Bayesian Markov Chain Monte Carlo methods (WinBUGS). These methods allowed a robust estimation of missing information in individual auction records, as well as of entire auctions for which no data were available, through a hierarchical model with uninformative priors.

Bayesian type approaches may be relevant to market sampling for whales to recreate missing information from traders, but it relied on a high level of co-operation and information from the traders that may not be possible in the whale market.

Clarke had also used molecular genetic methods to examine the concordance of market names for shark products with species or genus (Clarke *et al.*, 2005). This had allowed a targeted sampling design of particular product types. The Workshop thanked Clarke for this information.

A similar targeted design for whale products based on labelling may be possible, but a number of issues were identified with respect to labelling. Where concordance between labelling and species on the Japanese market had been investigated, this had revealed a substantial level of discrepancy and many products were not labelled with information on species origin. New food labelling regulations introduced in recent years may have resulted in an improvement in labelling, and the Workshop **agreed** that concordance analysis of recent samples would be useful to determine whether labelling could inform the design of market surveys in Japan. Funahashi confirmed that data for such an analysis are available from past market surveys.

7.2 Analytical techniques (including precision and power)

Baker summarised SC/57/BC5, which described a genetic capture-recapture analysis to estimate bycatch levels of minke whales from market surveys in Korea. Capture-recapture analysis of market products are not directly analogous to those of living populations, because a member of the population does not 'die' suddenly, but is gradually sold off. This necessitated an alternative capture-recapture model using within- and between-survey matches to estimate both the rate of entry of individuals onto the markets and the rate at which products from individuals are sold off or otherwise leave the market.

Using between-survey recaptures only, data from 12 market surveys between 1999 and 2003 yielded an estimate of a total supply of 679(SE, 241) minke whales for this five-year period. Using both within- and between-survey recaptures yielded an equivalent estimate of 827(SE, 164). Several factors that cause a negative bias and one factor that could cause a positive bias were identified.

The Workshop considered these sources of bias and whether these could be addressed through improved sampling design based on a better understanding of the markets.

Sources of negative bias:

- (1) Heterogeneity in the quantity of marketed product per individual.

This will affect all market surveys based on capture-recapture techniques and more data on markets is unlikely to help overcome this. However, the effects of this heterogeneity will be reduced by sampling as many individuals as possible.

- (2) Heterogeneity in the accessibility to market surveys of outlets.

If products from some individuals are sold to outlets that have a higher chance of being included in a market survey, while products from other individuals are sold to less accessible outlets, then certain individuals will have a greater chance of being sampled. Improved knowledge of the market including listings of all the possible retail outlets would allow a sampling design with a more even probability across outlets.

- (3) Heterogeneity in the sales' volume of outlets to which different individuals are sold.

If products from some individuals are sold to outlets with a high volume of sales, then these individuals will have a reduced probability of being sampled compared to those sold in low-volume outlets. Improved knowledge of the market, including sales' volumes of typical outlets would allow a sampling design that weighted the probability of sampling according to sales' volume.

- (4) Heterogeneity in the geographical distribution of products from individuals.

Products from certain individuals may only be sold locally while others may become widely distributed. For example, small whales may be more likely to be consumed locally. These considerations may affect the temporal and spatial design of sampling if data are available on the relative number of whales that follow different distribution paths.

- (5) Heterogeneity in the length of time that individuals are on the market.

Some individuals may be completely consumed fresh within a short period, whereas products from other individuals may enter long-term storage and be released slowly to the market. Based on the market pathway information available to the Workshop it appears that minke whales (or at least some products from most whales) generally pass through the market quite quickly. For example, in SC/57/BC5 the estimated 'half-life' for whales on the market in Korea was less than two months. Nevertheless, further information on how many whales enter long-term storage could allow improved sampling design.

A positive bias in the type of capture-recapture estimate presented in SC/57/BC5 using within-survey recaptures could result if each outlet is sampled a maximum of once and products from each individual are only sold in a very limited number of outlets. This would result in fewer than the expected number of recaptures. Based on the information available to the Workshop it appears that most individuals would be fragmented into separate products at the wholesale stage. However, further market information on the distribution of products from individuals across retail outlets could allow improved sampling design.

These sources of bias all relate to heterogeneity in capture probability. As with all capture-recapture studies the aim is to reduce this heterogeneity. One difference with other mark

recapture studies is that 'marked' whales are only available to be 'captured' for the limited time that they are on the market. Thus in general for market sampling, small numbers of samples collected with short time interval between surveys will be preferable to larger surveys at longer time intervals. With greater knowledge of market pathways for different types of product it may also be possible to reduce heterogeneity through selection of product type. However, it is also necessary to have sufficient information to ensure that selection by product type does not increase heterogeneity if particular product types are more likely to be derived from whales from particular sources. For some surveys, selection of identifiably fresh products that could only have been on the market for a limited time, may be preferable.

An important consideration in estimating total bycatch is whether any unreported bycatch will follow the same market pathways as bycatch that is reported. There are several reasons why bycaught whales may not be reported and some of these may also have a seasonal component. For example, the incentive for not reporting related to tax reasons may relate to the timing of the financial year.

The capture-recapture approach considered in SC/57/BC5 relied purely on sampling retail outlets. The value of sampling further back in the marketing chain in addition to sampling retail outlets was also discussed. This could potentially be used for a single mark, multiple-capture type analysis, where 'captures' came from samples from retail outlets but the 'marks' came from earlier in the market chain. Such methods would be most efficient, and least biased due to issues like heterogeneity in quantity of products per individual, if the number of initial marks could be maximised. The Workshop **agreed** that samples taken at source would provide the best data for this type of analysis. Thus the availability of samples from DNA registers would greatly enhance the precision and reduce the bias in bycatch estimates from market surveys based around mark-recapture methods. In particular, it was noted that if the first 'mark' was from a register, then only heterogeneities in 'capture' probability that were correlated with whether a whale was on the register or not, would matter. Even if data from diagnostic registers are not available the availability of any samples taken at source (e.g. by inspectors such as the Marine Police in Korea, at the flensing location, or very early in the distribution system) would still allow improved estimates. If no samples are available before whales enter the market chain then it seems unlikely that sampling at the wholesale level in Japan would improve estimates due to the overall complexity of the market pathways. The situation in Korea appears rather different with much simpler pathways and a limited number of wholesalers. The Workshop **agreed** that if samples at source in Korea were not available then there would be value in obtaining samples from whales as they passed through the wholesalers. However, it was also recognised that obtaining such samples would require a high level of co-operation from wholesalers and may not be possible.

7.3 Simulations

One possible way for optimising sampling design is to investigate the performance of different sampling designs and their sensitivity to the assumptions that have been made regarding market characteristics through simulation. Simulation exercises may also help in identifying the data requirements on markets that are most critical for obtaining unbiased estimates. Although further information on markets will be required for detailed simulation studies,

some simple simulations may still be of value with the current state of knowledge. In addition, the development and application of simulation models is likely to be an iterative process and would benefit from being initiated as soon as possible in preparation for further information becoming available.

Simulation studies may be carried out at a number of levels. Clarke suggested that a model of the market pathways might be developed based on a Bayesian belief network. Such techniques have been applied to markets for sea turtle products (Chaloupka, pers. comm.). This type of market model could be followed by a statistical simulation of sampling design.

The Workshop did not have time to discuss detailed specification for simulations, but Leaper **agreed** to conduct some simple initial trials related to survey design to present to the next Workshop or next year's meeting. More detailed simulations would need to be contracted to appropriate experts.

8. DATA AND INFORMATION REQUIREMENTS ABOUT THE MARKETS

Key information to developing a sampling design for markets in Japan to reduce the potential sources of bias discussed in Item 7 include:

- (i) Refine the information on which the pathways in Fig. 1 were based and try to quantify the products following different routes. This would assist in developing a sampling design to reduce heterogeneity due to important types of outlets having a low probability of being sampled.
- (ii) Classify retail outlets by type according to their relative sales' volume and estimate the number of outlets within an area. This would assist in developing a design that weighted sampling probabilities by outlet according to sales' volume. Sales' volume should be subdivided into fresh or frozen products to allow for the temporal variation in the time different products take to pass through the market. Careful consideration needs to be given to the way that sales' volume is defined. For example, sales' volume measured in financial turnover, weight of products sold or number of packages all have different implications for market surveys.

Obtaining complete information for the complex market situation in Japan is clearly not possible but the Workshop identified the following data that are believed to exist and would be valuable to compile:

- (a) Allocation of scientific catch by area including the timing and quantity of release of products to the market.
- (b) Timing (by date) and location (by co-ordinates or fishing community) of bycaught whales that are destined for the market.
- (c) An overview of seasonal changes in demand and consumption by area, including any areas with particular annual festivals that might create a seasonal demand, or where whale meat is considered a seasonal dish.
- (d) Average per capita consumption by prefecture

The Workshop **agreed** that these sources of data should be investigated and that market experts would need to be contracted to make progress on (i) and (ii). The Workshop identified a number of experts who could potentially be contacted, and Williams also expressed an interest in continuing the research that he had presented.

The Workshop recognised that the market situation in Korea was much simpler than in Japan, but that there may be aspects of the market that had not become apparent. Key information to developing a sampling design for markets in Korea to reduce the potential sources of bias discussed in Item 7 include:

- (i) Improved estimates of the total number of shops or restaurants that sell whale products in Korea and their estimated sales' volume.
- (ii) Improved estimates of the total number of wholesalers in each of the three major cities involved in handling whale products, and the relative quantities that are sold fresh or enter long-term storage.
- (iii) Timing (by date) and location (by co-ordinates or fishing community) of bycaught whales that are destined for the market.

Obtaining these data would require participation by market experts in Korea. Ma indicated that he would be willing to conduct further investigations.

For both Japan and Korea it is important to attempt to document any ways in which the source, seasonal occurrence, size, marketing of their products, or other characteristics of unreported whales may be different to those from whales that have been reported as bycatch.

9. CONCLUSIONS AND RECOMMENDATIONS

The Workshop noted that two of the papers presented provided estimates regarding levels of bycatch based on market sampling and concluded that market sampling is a potentially useful method. The Workshop also **agreed** that bycatch estimates from market surveys could be improved considerably if data from DNA registers on whales entering the market were available. In addition, the approaches considered would be much more powerful if such diagnostic DNA register data could be incorporated into the design of experiments to determine the necessary requirements that would enable market-sampling-based methods to reliably estimate bycatch. Whilst the Workshop recognises the political sensitivity of market-related issues in an IWC context it respectfully requests relevant governments to consider a collaborative effort to investigate these methods as a potentially valuable source of information for management and use in the RMP.

The information available to the Workshop was mainly limited to the markets of Japan and Korea and it was clear from considering these two very different cases that each market needed to be considered on a case by case basis. The Workshop **agreed** that information from other countries with domestic markets for whale products should be

encouraged. These countries include Norway and Iceland in the northeast Atlantic. In addition, bycatch in China may also impact on J stock minke whales.

Further information on the markets in both Japan and Korea is needed, and the Workshop **agreed** that the planned follow-up Workshop would be very valuable. However, such a Workshop would be more successful if progress had been made on addressing the data requirements in Item 8 and on developing suitable simulation frameworks for sensitivity analyses and to test sampling design.

10. PLANNING FOR NEXT WORKSHOP

It was **agreed** that progress on addressing the data requirements about markets identified in Item 8 was necessary prior to the next Workshop. This work should begin as soon as possible and will have budget requirements. The Steering Group will review progress and decide a date for the next Workshop intersessionally.

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Annex A

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Annex B

Agenda

1. Convenor's opening remarks and terms of reference
 2. Election of chairperson and appointment of rapporteur
 3. Adoption of agenda
 4. Review of documents
 5. Background information
 - 5.1 Summary of the present state of knowledge on the use of genetic methods to identify market products to species and correct for multiple samples from the same individual
 - 5.2 Summary of the present state of knowledge of the ability of analytical tools for allocation to stocks and/or areas
 6. Review methods used in previous food market sampling studies designed to elucidate market structure
 - 6.1 Questionnaire and direct interview approaches
 - 6.2 Analysis of official statistics for outlets and available products
 - 6.3 Direct observation of markets and market pathways
 - 6.4 Tracking individual whales through market
 7. Sampling and analytical methods
 - 7.1 Sampling design considerations (temporal and spatial)
 - 7.2 Analytical techniques (including precision and power)
 - 7.3 Simulations
 8. Data and information requirements about the markets
 9. Conclusions and recommendations
 10. Plans for second stage Workshop
 11. Adoption of report
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