Report of the Scientific Committee

Bled, Slovenia, 24 April-6 May 2018

Annex U
Statements Related to Item 19, Special Permits

**This report is presented as it was at SC/67b.
There may be further editorial changes (e.g. updated references, tables, figures)
made before publication.**

International Whaling Commission
Bled, Slovenia, 2018

Annex U

Statements Related to Item 19, Special Permits

Annex U1

SUMMARIES OF REPORTS ON ONGOING RESEARCH UNDER NEWREP-A

SC/67b/SP08. Results of the third biological field survey of NEWREP-A during the 2017/18 austral summer season
SC/67b/SP08 presented the results of the biological sampling of Antarctic minke whales during the third NEWREP-A survey conducted in Area VI (170°W-120°W, south of 60°S) during the 2017/18 austral summer season. Two sighting and sampling vessels (SSVs) and one research base vessel engaged in the survey for 83 days. A total of 392 sightings (involving 925 individuals) of Antarctic minke whale were made during 4,164 n.miles of searching distance. A total of 333 Antarctic minke whales (152 males and 181 females) were sampled, and a number of biological samples and data required for the two main objectives of NEWREP-A were obtained from each whale taken. In Area VI-East, the survey was conducted early in the season (December to January) for the first time since the start of JARPA survey in 1987/88. A total of 44 Antarctic minke whales (26 males and 18 females) were sampled in Area VI-East. The obtained samples will contribute to elucidation of the stock structure of Antarctic minke whales, especially to elucidation of the eastern boundary of P-stock. A total of two blue, four humpback and one killer whales were photo-identified and one biopsy sample was collected from a blue whale in the research area. The samples and data collected in this survey are available for interested national and international scientists under the guidelines for research collaboration posted at the home page of the Institute of Cetacean Research (ICR): *http://www.icrwhale.org/NEWREP-AProtocol.html*.

SC/67b/SP04. Results of the feasibility study on biopsy sampling and satellite tagging of Antarctic minke whales under NEWREP-A
SC/67b/SP04 presented the results of the feasibility study on biopsy sampling and satellite tagging of Antarctic minke whales following the recommendations of the NEWREP-A review workshop. The feasibility study was conducted during the first three NEWREP-A surveys between the 2015/16-2017/18 austral summer seasons. The feasibility study was aimed in comparing the efficiency of biopsy sampling in comparison to lethal sampling. First, the Success Proportions of biopsy and lethal sampling was estimated, next the efficiency between the two approaches was assessed using a Generalized Linear Model (GLM) considering the following response variables: sampling methods (biopsy and lethal sampling), Beaufort scale, visibility and sampling area. The explanatory variable in the best fitted model included only 'sampling method'. This result suggested that environmental variables did not have a significant effect. The estimated Success Proportions for biopsy sampling (0.434±0.050) were much lower than that for lethal sampling (0.967±0.006). Furthermore the time spent on the experiment on biopsy sampling was approximately three times longer than that spent on lethal sampling. This result showed that the efficiency of biopsy sampling for Antarctic minke whales targeted under a random sampling procedure in NEWREP-A is much lower than that of lethal sampling. Given these results, no additional experiments on biopsy sampling will be conducted in future NEWREP-A surveys. However additional biopsy samples could be collected opportunistically to increase the sample size and then consider other variables in the statistical analysis in the future. Given the results on satellite tagging additional tagging trials will be conducted in the future to respond specific research questions. A final evaluation of these techniques will be carried during the mid-term review of the NEWREP-A following an established protocol (Mogoe *et al.*, 2016).

SC/67b/SCSP05. Determining sexual maturity in female Antarctic minke whales during the feeding season based on concentrations of progesterone in blubber
SC/67b/SP05 reported the results of a study on the relationship between concentration of progesterone in blubber and reproductive status in the Antarctic minke whale. The study was based on 230 female Antarctic minke whales sampled during the 2015/16 austral summer survey of the NEWREP-A. The study was conducted in response to a recommendation from the NEWREP-A review workshop to 'Examine use of hormones in blubber to detect sexual maturity'. Progesterone concentrations in blubber of the sampled whales were related to their reproductive status determined by the traditional method of examining reproductive organs (56 immature, 11 resting, 6 ovulating and 157 pregnant females). Significant differences were found in median progesterone concentration between all reproductive categories except in the case between ovulating and pregnant females. However, the ranges of progesterone concentration overlapped between each reproductive status with the exception of the cases immature/ovulating and immature/pregnant. The results of the present study indicate that the progesterone concentration in blubber samples, which potentially can be obtained by biopsy sampling, cannot be used as an absolute diagnostic index to discriminate between mature and immature female Antarctic minke whales. A final evaluation of this technique will be carried during the mid-term review of the NEWREP-A following an established protocol (Mogoe *et al.*, 2016).

Annex U2

STATEMENTS ON THE NEWREP-A REPORTED RESULTS

The feasibility of biopsy sampling: A response to Yasunaga *et al.*

Clapham, P., De La Mare, W., Double, M., Hoelzel, R., Ivashchenko, J., McKinlay, J. and Wade, P.

Yasunaga *et al.* (SC/67b/SCSP04) reported the results of a feasibility study on biopsy sampling of Antarctic minke whales, and concluded that such sampling 'is not a feasible technique that could contribute to the NEWREP-A research objectives'. In support of this, the authors indicated that biopsy sampling took longer than lethal sampling, and also stated that the quantity of tissue obtained in a biopsy was insufficient to permit multiple analyses to be conducted (e.g. genetics, stable isotopes, fatty acids and hormone analysis).

There are several factors which render the paper's overall conclusion invalid. First, the overall premise of the paper is fallacious: that one technique takes longer than another should not lead to the conclusion that the more time- consuming technique is infeasible. However, the contention that biopsying a whale takes longer than lethal sampling is itself derived from a spurious comparison of the two processes. The way in which the time involved in obtaining a sample in the two techniques was not explicitly defined, but apparently employed a misleading comparison that involved only the time involved between inception of a chase and the striking of the whale (with either a biopsy dart or a harpoon). This does not take into account processing time, which is considerably longer and far more labour-intensive for lethal sampling (up to an hour with numerous individuals working on deck, versus a few minutes by a single individual to process a biopsy sample); even ignoring the carcass processing time, a catcher still has to deliver the whale to the factory ship before resuming the hunt for another animal. If one instead adopts a more reasonable definition of experimental time as the period between inception of the chase and the point at which the sample is secured and the sampling vessel is free to move on to target another animal, biopsy sampling would emerge as the faster technique.

Second, the authors' statement that the quantity of tissue yielded by a typical biopsy is insufficient for multiple analyses is demonstrably false; other researchers routinely obtain enough material for a variety of experiments of different types, with results providing acceptable levels of precision. For example, a typical minke whale whole biopsy sample yields approximately 60-100 µg of DNA and sometimes much more; the quantity of tissue required for hundreds of genetic experiments is far less (e.g. 20-200 nanograms for 20 microsatellite loci, and 300 nanograms/sample for 5,000-15,000 loci using RAD sequencing). Therefore, even for a low yield from ½ of the biopsy sample (30µg) and a high-coverage method (RAD sequencing) there would be 100 times more DNA than required. Stable isotopes can be analysed from a small portion of the biopsy (as little as 1mg). After identification of the appropriate markers (typically done by methylome sequencing of animals of known age and identifying highly informative loci), as little as 10-100 ng of DNA (depending on the number of loci) would be sufficient for age determination. Note that following the careful selection of loci, this can show a very close correlation to age (e.g. r2 = 0.84 in Hannum *et al.* 2013; and see also Jarman *et al.* 2015). The age determination technique is continually being improved and will likely result in consistently precise results in the near future.

Third, the decline in the time to obtain a biopsy sample, as shown in the authors' Table 2, suggests continued use of insufficiently experienced shooters; the ability to accurately hit a target is one of the most important factors involved in this process.

The definition of feasible is 'capable of being done, effected, or accomplished'; consequently, it is inaccurate to state that biopsy sampling is not a 'feasible' technique, and one that 'cannot contribute' to NEWREP-A's research objectives. Biopsy sampling has been widely, routinely and extensively used on the great majority of cetacean species for more than three decades. Furthermore, even if one accepts the statement that lethal sampling is faster, it is worth noting that, using SCSP04's stated average time of 26 minutes to obtain a single biopsy, it would require only 144 hours to sample 333 minke whales (and this does not take into account the option of simultaneously employing multiple shooters and/or sampling vessels). Given that NEWREP-A cruises typically last for up to three months, this is certainly not an undue time burden with which to obtain a statistically robust sample size. Given the much shorter processing time of a biopsy relative to a whole whale, it is conceivable that much larger sample sizes could be obtained during the course of a typical NEWREP-A cruise.

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Progesterone can be used to estimate the percent mature in a sample of Antarctic minke whales

Wade, P., McKinlay, J., De La Mare, B., Double, M., Archer, E., Clapham, P.

In paper SC/67b/SCSP05 (Inoue *et al.*, Determining sexual maturity in female Antarctic minke whales during the feeding season based on concentrations of progesterone in blubber), the authors have conducted a study examining progesterone levels for different maturity and reproductive states (as determined by examination of ovaries): immature, pregnant, ovulating, resting. We consider this a useful investigation into the potential for non-lethal methods to accurately determine reproductive status.

However, we disagree with their main conclusion, which was that progesterone value cannot be used to categorize whales as immature or mature. The authors apparently reach this conclusion based on a small amount of overlap in the distribution of progesterone values between the immature and resting categories. However, the great majority of the mature whales are in the pregnant or ovulating categories (162 whales), whereas only 11 whales were categorized as mature but resting (not pregnant or ovulating). Therefore, it is worthwhile to examine how much difference a small amount of misclassification would make to the estimation of the % mature in the sample.

If one examines Fig. 1, it can be seen there is no overlap in the inter-quartile ranges (25-75% percentiles, the 'boxes') between the immature and resting categories; there is only overlap in the extreme values. It is not possible to tell from the figure how much overlap in distribution there is between immature and resting categories. A histogram with different colours representing immature, pregnant, ovulating, and resting would be useful to show how much overlap there is in the categories. We request that the authors of SC/67b/SCSP05 make such a plot for the consideration of the SC at this meeting. From such a histogram it would also be simple to directly test how well progesterone levels would serve to categorize whales into immature or mature classes.

Since we know the sample size in each reproductive class (Table 1 in SC/67b/SCSP05), as well as that each 'whisker' can contain no more than 25% of the data in the distribution of each category, we can approximate what the likely misclassification rate would be. From Figure 1 we can guess (for illustration purposes) the amount of overlap between immature and resting stages. For example, if one proposed using a value of 1.0 ng/g to define immature vs. mature, it looks like (assuming an approximate uniform distribution between the box and whisker) roughly 25% of the 11 resting whales would be misclassified, which would be 2.75 whales (rounding to 3).

Similarly, roughly one-third of the upper 25% quartile, or 8.3% of the 56 immature whales would be misclassified as resting, which would be 4.6 whales (rounding to 5). Therefore, with 3 whales moving from resting to immature, and 5 whales moving from immature to resting, there is a net gain of 2 whales being misclassified, resulting in an estimated 54 immature and 13 resting. Adding in the pregnant and ovulating states, the estimated percent mature whales would be 76.4% ((156+6+13/229) based on progesterone, versus 75.5% ((154+6+11/229) based on examination of ovaries, for a difference of 0.9%, less than 1%.

In reality the values are unlikely to be uniformly distributed between the 75 percentile (for immature) and the extreme high value, or similarly between the 25th percentile (for resting) and the extreme low value. Therefore, the true amount of misclassification would likely be less than what we calculate here, so the difference is likely even less than 0.9%. We conclude that the amount of misclassification in immature vs. mature using progesterone values would be very small, and could be corrected by using the data and results from this study. Therefore, in contrast to the authors of SC/67b/SCSP05, we conclude that progesterone could be used very effectively to classify Antarctic minke whales as to their maturity state.

Clarifications and responses regarding NEWREP-A studies on biopsy sampling (SC/67b/SCSP04) and blubber progesterone (SC/67b/SCSP05) on Antarctic minke whales

Yasunaga, G., Inoue, S., Tamura, T. and Pastene, L.A.

BACKGROUND

First, these two studies were carried out in direct response to recommendations from the NEWREP-A review workshop. Experiments in both studies were designed based on specific suggestions from the NEWREP-A review workshop (IWC, 2016, pp.515-16 for biopsy sampling and pp.519-20 for blubber progesterone).

The suggested deadline for completing these analyses was after the completing the third NEWREP-A survey. Consequently, results of both studies were submitted to the 2018 IWC SC meeting after the 2017/18 NEWREP-A survey had been completed.

While encouraging the studies conducted, some members disagreed with our preliminary conclusions on the biopsy sampling study (see Clapham *et al.,* I) and blubber progesterone study (see Wade *et al.*). Responses to these WPs are provided in the third and fourth sections below.

FINAL EVALUATION OF NON-LETHAL TECHNIQUES IN THE CONTEXT OF NEWREP-A OBJECTIVES, USING A PROTOCOL

As noted above, at this stage preliminary conclusions were provided by the proponents and a final conclusion will be provided by the mid-term review workshop; this will be based on i) some additional field data taken opportunistically; ii) additional analysis and iii) the protocol to evaluate non-lethal techniques presented to the IWC SC at the 2016 annual meeting by Mogoe *et al.* (2016).

The protocol above was developed following a recommendation from the JARPNII review workshop (IWC, 2017, p.86), and it was presented and discussed at the 2016 IWC SC meeting (IWC, 2017, p.82-83). Systematic application of such a protocol to evaluate non-lethal techniques is an efficient and constructive approach because, even though the feasibility and practicability of non-lethal means have been repeatedly discussed, conclusions were often difficult to reach due to a lack of an objective evaluation scheme.

In the protocol above, four questions were established to evaluate the feasibility and practicability of non-lethal methods. The primary questions are whether tissue and other samples can be obtained by a non-lethal method (Question 1); whether enough samples for statistical analysis can be obtained by that non-lethal method (Question 2); whether the sample obtained by the non-lethal method can produce as much scientific information as that produced by a lethal sampling method (Question 3); and whether the cost for obtaining the sample/producing scientific information is reasonable (Question 4). Unless all of these four questions are satisfied together for a particular non-lethal method, such a method is not considered satisfactory to replace lethal methods, and therefore a lethal method is necessary (see details in Mogoe *et al.*, 2016).

While final responses and conclusions on these two studies will be provided at the mid-term review of NEWREP-A following the protocol above, we respond preliminarily below some of the technical questions/criticism in Clapham *et al.,* I, and Wade *et al.*

RESPONSES TO CLAPHAM *ET AL.*, I (BIOPSY SAMPLING)

Clapham *et al.,* I, argued that:

(a) The way in which the time involved in obtaining a sample in the two techniques was not explicitly defined, but apparently employed a misleading comparison that involved only the time involved between inception of a chase and the striking of the whale (with either a biopsy dart or a harpoon).

(b) The contention that quantity of tissue yielded by a typical biopsy is insufficient for multiple analyses is demonstrably false; other researchers routinely obtain enough material for a variety of experiments of different types, with results providing acceptable levels of precision.

(c) The decline in the success proportion of a biopsy sample, as shown in the authors' Table 2 in SC/67b/SCSP04, suggests continued use of insufficiently experienced shooters; the ability to accurately hit a target is one of the most important factors involved in this process.

Our responses to those points are:

Response to (a)

First of all, it should be noted that 'the efficiency' of sampling techniques was defined as 'Success Proportion' rather than 'Time of experiment' in SC/67b/SCSP04 because 'Success Proportion' can represent a better indicator of the efficiency. In light of the purposes of NEWREP-A, random sampling is required in which generally only one animal from a school is sampled. Thus, the most important question is the certainty that a particular method can take a sample from the targeted animal, and time necessary to take the sample is less important. For this reason, 'Success Proportion' was used as the response variable in the GLM analysis in SC/67b/SCSP04.

Therefore, the allegation in Clapham *et al.*, I, that 'the overall premise of the paper is fallacious: that one technique takes longer than another should not lead to the conclusion that the more time-consuming technique is infeasible' ignores the statistical analysis already conducted by the proponents.

Notwithstanding this, we provide details of 'time of experiment' in our study in order to clarify further. First, 'Time of experiment (min.)' in Table 2 in SC/67b/SCSP04 was defined as following:

Biopsy sampling: A time period from the time of the starting a chase of whale to the time of having retrieved a biopsy sample on a deck.

Whale (lethal) sampling: A time period from the time of the starting the chase of a whale to the time of having kept a whale body on a side deck.

The time spent in transporting the whale to the base vessel was not considered in the analysis because the catcher vessel does not necessarily return to the base vessel after catching a whale, but can immediately start the search for a further whale to capture or biopsy.

Further analyses will be carried out and evaluated under the protocol for evaluation of non-lethal techniques indicated above, by the mid-term review.

Response to (b)
We agree that the amount of epidermal tissue collected by biopsy sampling is enough for the requirement of genetic, epigenetic and stable isotope analyses. However, we have pointed out that the amount (median of weight: 0.8g) of an adipose tissue collected by biopsy sampling is not large enough to measure progesterone (Objective I-(II)), lipid content (Objective II-(III)) and fatty acid (Objective II-(III)) of NEWREP-A.

Response to (c)
We disagree that success proportion of biopsy sampling is declining allegedly because the use of insufficiently experienced shooters. One of our reasons, is that median of time of experiment (min) did not change substantially. In order to examine this factor further, the differences in success proportion in biopsy sampling experiment only were assessed by a GLM for the response variables of outcome of sampling (failure; success). Explanatory variables were considered with research seasons as an ordered variable (2015/16; 2016/17; 2017/18). Table 1 shows results of a GLM analysis based on the binomial distribution assumption. The coefficients for each years were not significant, suggesting that the differences of success proportions between of 2015/16 and 2016/17, and 2017/18 are not statistically significant and consequently provide no evidence that shooters' experience has decreased over the three research seasons.

Table 1

Results of generalized linear model analyses in the best fitted model involved only research season as explanatory variables of biopsy sampling for Antarctic minke whales in the NEWREP-A (2015/16 - 2017/18).

	Estimate Std.	Error	z value	Pr (>|z|)
2015/16	0.3567	0.4928	0.724	0.4692
2016/17	-0.1054	0.4595	-0.229	0.8186
2017/18	-0.4855	0.2594	-1.871	0.0613

Null deviance: 137.24 on 99 degrees of freedom; Residual deviance: 133.05 on 96 degrees of freedom

RESPONSES TO WADE *ET AL.* (BLUBBER PROGESTERONE)
Wade *et al.* argued/suggested that:

(a) 'A histogram with different colours representing immature, pregnant, ovulating, and resting would be useful to show how much overlap there is in the categories.'

(b) Based on assumptions which are a 'value of 1.0 ng/g to define immature vs. mature', 'one-third of the upper 25% quartile' and '8.3% of the 56 immature whales would be misclassified as resting', the difference of true amount of misclassification would likely be less than 0.9%.

Our responses to those points are:

Response to (a)
A histogram with different colours representing immature, resting, ovulating and pregnant is shown in Fig.1.

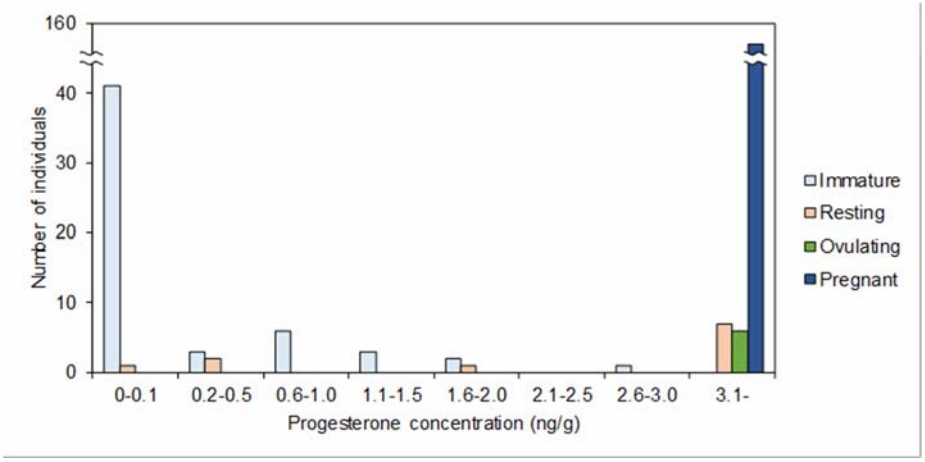

Fig. 1. A histogram with different colours representing immature, resting, ovulating and pregnant of female Antarctic minke whales sampled in 2015/16 NEWREP-A.

Response to (b)
Based on the assumption of cut off values (1.0 ng/g) of progesterone set in Wade *et al.*, six of 56 immature whales and three of 11 resting whales were misclassified. Misclassification ratios are 10.7% and 27.2%, respectively, and they are not negligible.

As mentioned earlier, final evaluation of this technique will be made at the mid-term review workshop based on the protocol developed for evaluating non-lethal techniques.

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Assessing the Efficiency of Biopsy versus Lethal Sampling

Clapham, P., Leaper, R. and Wade, P.

The paper on the feasibility of biopsy sampling by Yasunaga *et al.* (SC/67b/SCSP04) generated considerable discussion, much of which was centered on the comparative speed with which biopsy sampling and lethal sampling are achieved, and the method used to assess this. Here, we propose a standard metric for measuring the efficiency of biopsy sampling, and to compare this to the process of lethal sampling.

METRICS FOR BIOPSY SAMPLING

Obtaining a biopsy sample from a whale involves several stages:

(1) selecting a target whale (or group of whales) and initiating a chase;

(2) attempting to successfully take the biopsy with either a crossbow or gun; and

(3) retrieving and processing the sample.

We suggest that a fair way to measure the time taken to obtain a biopsy is to use the time from initiation of the chase to the time the sample (i.e. the biopsy dart) is retrieved.

One could also add the time taken to process the sample, but this is typically very short and in fact usually does not need to be accomplished on the sampling vessel. A biopsy tip can be removed from the arrow and placed with the intact sample into a plastic bag that is tagged with a unique number of some kind, linked by the data collector to other information on the whale recorded at the time of sampling (e.g. sample number, date and time, group number, whale number et cetera). The sample can be removed from the biopsy tip and processed, with others, later.

If a sample is processed immediately after retrieval - i.e. it is removed from the tip and placed into a pre-labeled vial with preservative - this typically adds a few minutes. In such case, this time should be recorded as the end point of the process, but only if that process prevents the vessel crew from resuming another biopsy attempt[1].

In cases where a biopsy is not obtained, the time between initiation of the chase and suspension of attempts on the whale/group concerned should also be recorded.

In many cases, a sampling vessel encountering an associated group of whales can obtain multiple biopsy samples from the same group. In these cases, the efficiency of subsequent samples should be measured from the time when the previous sample has been secured to the time when the next biopsy is taken, until all members of the group have been sampled or the vessel suspends operations and searches for another whale/group.

METRICS FOR LETHAL SAMPLING

Obtaining a lethal sample from a whale also involves several stages:

(1) selecting a target whale (or group of whales) and initiating a chase;

(2) attempting to kill the whale with a harpoon;

(3) towing the dead whale back to the factory ship;

[1]If multiple clean tips are taken into the field, there is no need to clean tips that have already been used until the end of the day.

(4) winching the carcass onto the flensing deck; and,

(5) taking and processing the sample.

Presumably a catcher is free to resume targeting another whale only after it has delivered the first carcass to the factory ship. Consequently, a reasonable way to measure the time taken to obtain a lethal sample is to use the time from initiation of the chase to the time the carcass is delivered to the factory ship, thus freeing the catcher to attempt further lethal sampling. It is not necessary to include the processing time of the carcass, since that is independent of the chase, which presumably can resume immediately after delivery of the dead whale.

In cases in which the catcher does not succeed in killing the whale, the time between initiation of the chase and suspension of attempts on the whale/group concerned should also be recorded.

OTHER NOTES

For both methods, meteorological variables (notably wind and sea state) should be recorded so that the efficiency of each method can be assessed relative to environmental conditions.

If the sampling design requires whales observed from pre-determined track lines to be sampled, then the time to return to the track line and resume searching after either recovering the biopsy dart or leaving the factory ship, should also be recorded.

Scientists conducting biopsy sampling of any cetacean are encouraged to record the metrics described above so that a robust sample size can be gathered with which to assess the efficiency of biopsy on different species.

Annex U3

SUMMARIES OF REPORTS ON ONGOING RESEARCH UNDER NEWREP-NP

SC/67b/SCSP06. Results of the first cruise of the New Scientific Whale Research Program in the western North Pacific (NEWREP-NP) in the 2017 summer season - offshore component

SC/67b/SCSP06 presented the results of the first biological survey of sei and common minke whales under the offshore component of NEWREP-NP. The survey was conducted in part of sub-Areas 7(7WR and 7E), 8 and 9 (-170°E), north of 35°N from June to September 2017. Two sighting sampling vessels (SSVs) and one research base vessel were engaged in the survey for 100 days. A total of 56 sightings (involving 61 individuals) of common minke whale and 320 sightings (involving 407 individuals) of sei whales were made during 5,307 n.miles of searching distance. A total of 43 common minke and 134 sei whales were sampled as originally planned. Biological samples and data required for the two primary objectives of NEWREP-NP were obtained from each whale sampled. In particular earplugs for age determination and reproductive organs for sexual maturity determination were collected for all individuals. SP06 also presented the preliminary results of biological analyses of the whales sampled. Eight blue and one humpback were photo-identified, and biopsy samples were collected from five blue, one humpback and 17 sei whales. Satellite tags were deployed on 15 sei whales and tracking was possible for eight individuals. The samples and data collected in this survey will be available for interested national and international scientists under the guidelines for research collaboration in NEWREP-NP.

SC/67b/SCSP02. Cruise Report of the New Scientific Whale Research Program in the western North Pacific (NEWREP-NP) in 2017- Pacific coastal component off Hachinohe and Kushiro

SC/67b/SCSP02 presented the results of the first survey of the coastal component of NEWREP-NP conducted in sub-areas 7CS off Sanriku (Hachinohe) and 7CN off Kushiro, in the Pacific side of Japan. The survey in Hachinohe was conducted from 18 July to 20 August 2017, using two small-type whaling catcher boats as sighting/sampling vessels and six small fisheries boats supporting sighting activities. The survey in Kushiro was conducted from 1 September to 31 October 2017, using four small-type whaling catcher boats as sighting/sampling vessels. Searching for common minke whales and sampling took place in coastal waters about 50n. miles from Hachinohe and Kushiro Ports. All common minke whales sampled were landed at the NEWREP-NP research stations established in Hachinohe and Kushiro, where biological examination was conducted. During the survey in Hachinohe, a total of six primary sightings (six individuals) and two secondary sightings (two individuals) of common minke whale were made during 4,297.1 n.miles of searching distance (456.2 hours). Three common minke whales (one immature and two mature males) were sampled. During the survey in Kushiro, a total of 43 primary sightings (45 individuals) and two secondary sightings (two individuals) of common minke whale were made during 7,038.5 n.miles of searching distance (724.0 hours). A total of 35 common minke whales were sampled (22 males and 13 females). Biological samples and data required for Primary Objective I and Ancillary Objectives I and II of NEWREP-NP were obtained from all animals sampled. The target sample size of 80 common minke whales however could not be attained, because both surveys were greatly affected by bad weather and sea conditions.

SC/67b/SCSP07. Cruise report of the New Scientific Whale Research Program in the western North Pacific (NEWREP-NP) in 2017 - coastal component off Abashiri in the southern Okhotsk Sea

SC/67b/SCSP07 presented the results of the first coastal NEWREP-NP survey in the southern Okhotsk Sea (sub-area 11), which was conducted from 11 June to 6 July 2017. The survey was carried out using five small-type whaling catcher boats as sampling vessels, in coastal waters mainly within about 40 n. miles from Abashiri port. Common minke whales collected were landed at the NEWREP-NP research station for biological examination. During the survey, a total of 2,449.9 n. miles (243.4 hours) was searched and 128 schools (132 individuals) of common minke whales were sighted. Sightings of 39 schools (55 animals) of fin, four schools (10 individuals) of humpback, two schools (two animals) of blue, and one of sperm whales were also made. Of the 132 common minke whales encountered, 47 animals were sampled. Earplugs and eye lenses for age determination and reproductive organs for determination of sexual maturity were collected from all the whales. Sex of animals caught was biased towards the female (9 males and 38 females). Average body length was 6.92m (SD=0.55, range=5.62-7.55m) and 7.35m (SD=0.85, Range=4.96-8.18m) for males and females, respectively. Of nine males, eight were sexually mature (88.9%) and 30 of 38 females were mature (78.9%). A total of 25 females were pregnant. Stock assignment was conducted from nuclear microsatellite data. Of 47 animals collected, 28 were assigned to J stock and 17 were identified as O stock. The remaining two animals could not be assigned. Proportion of J stock animals increased from June (53.6%) to July (76.5%). Sex ratio of males was higher in the J stock animals (28.6%) than in the O stock animals (5.9%). In females, the proportion of mature animals was higher in the O stock (93.8%) than in the J stock (65.0%). Conception date was estimated using a growth formula and fetus body length data. Animals migrating into the Okhotsk Sea have two breeding seasons: autumn breeding season and winter breeding season prolonged to spring. Pregnant females with autumn conception date were genetically assigned to the J stock. All females genetically assigned to the O stock conceived in a period from winter to spring. Dominant prey species was krill (89.4%), followed by Copepoda (4.3%) and walleye pollock (2.1%). Animals feeding on copepods were genetically assigned to the O stock. An individual that fed on walleye pollock was genetically assigned to the J stock.

SC/67b/SCSP03. Results of satellite monitored tagging experiments on North Pacific sei whales conducted during the 2017 NEWREP-NP offshore survey

SC/67b/SCSP03 reported the results of the satellite tagging on North Pacific sei whales conducted during the 2017 NEWREP-NP survey. A total of 44 tagging trials were conducted using SPOT6 type tags with LKArts system for attachments from *Yushin-Maru*-type sighting/sampling vessels. A total of 15 tags were deployed on sei whales, and eight whales were tracked. Two sei whales were tracked for more than 35 days, and these two whales showed a longitudinal movement. In general the tagging experiment of penetrate-type tags from sighting/sampling vessels seems to be practical. However some technical improvements are identified, which could increase the tracking period.

[Tables from NEWREP-A are still being finalised editorially and will be added later]

Annex U4

SUMMARY OBJECTIVES TABLES FOR NEWREP-A AND NEWREP-NP

Table 1

NEWREP-NP: Summary of the Panel's conclusions in light of Annex P – Part 1. PO=Primary Objective; SO=Secondary Objective. NB: items that are crossed out refer to sub-objectives in the proposal reviewed by the Panel that have now become ancillary objectives in the revised proposal submitted at the present meeting.

Lethal	Importance: scientific prospective	Importance: conservation and management	Achievable with non-lethal methods	Equivalent objectives that can be achieved non-lethally?	Lethal components: magnitude and relevance for conservation and management	Design and implementation reasonable to achieve objectives?
PO I: Contribution to optimising the establishment of a sustainable catch limit for common minke whales in the coastal waters of Japan						
Y	Yes	Yes	In part (see below)	-	-	-
SO I (i): Investigate the spatial and temporal occurrence of J stock common minke whales around Japan, by sex, age and reproductive status						
Y	Yes, particularly given availability of age structure. New compared to past programmes.	Not needed to run *CLA*, but increase accuracy of ISTs.	Currently not feasible, but current developments may change the situation in near future.	Replacing age with length is possible but not as precise.	Magnitude and relevance of improving and understanding of spatial and temporal occurrence of J stock is useful but lethal components contribution not likely to be as substantial for overall management as addressing stock structure uncertainty and improving estimates of abundance.	The inshore sampling design makes analysis challenging and this has not been addressed. Field and laboratory implementation is reasonable.
SO I (ii): Estimate the abundance of the J and O stocks in coastal waters of Japan						
-	Yes	Yes, for *CLA* and ISTs	NA	NA	NA	Yes. The split of abundance estimate to stock depends on appropriate modelling framework that includes stock structure.
SO I (iii): Verify that there is no structure in the O stock common minke whale in the Pacific side of Japan						
Y	Yes	Yes, for ISTs	Yes	NA	Substantial impact. The performance of few RMP variants are critically dependent on whether there are one or two O stocks.	The design of the sampling scheme does not maximise the information available to assess whether there is a stock structure within O stock. The analysis of more genetic loci on the existing samples is more likely to meet the objective then additional sampling.
SO I (iv): Improve RMP trials by incorporating age data in their conditioning						
Y	Yes	Yes, for ISTs	Much of the age data already exist but has not been included in past ISTs. Age data for the future currently not feasible, but current developments may change the situation in near future.	The past age data could be included without collecting additional lethal samples.	Unclear because there are substantial historical samples which may be sufficient to improve conditioning without additional samples being collected.	Yes, this is a modelling exercise.
PO II: Contribution to the RMP/IST for North Pacific sei whale						
Y	Yes	Yes (eventually)	Yes	-	-	-
SO II (i): Abundance estimates for North Pacific sei whale taking account additional variance						
-	Yes	Yes, for IA	NA	NA	NA	Yes
SO II (ii): Estimation of biological and ecological parameters in North Pacific sei whales for RMP *Implementation*						
Y	Yes	Yes, for developing models for this species and IA.	Considerable age data already exist. Age data for the future but currently not feasible, but current developments may change the situation in near future.	The past age data could be included without collecting additional lethal samples.	Unclear because there are substantial historical samples which may be sufficient to improve conditioning without additional samples being collected.	Yes
SO II (iii): Study of the pattern of movement of whales of the 'pelagic stock' within the feeding grounds and between feeding and breeding grounds [Note: this objective was refined from 'Additional analyses on stock structure in North Pacific sei whale for RMP *Implementation*']						
~~*Y*~~	~~*Very limited.*~~	~~*Yes, for IA*~~	~~*Limited*~~	~~*Yes*~~	~~*No*~~	~~*Yes*~~
SO II (iv): Specification of RMP *ISTs* for North Pacific sei whale						
-	Yes	Yes		Yes	NA	NA

Table 2

NEWREP-NP: Summary of the Panel's conclusions in light of Annex P – Part 2. PO=Primary Objective; SO=Secondary Objective.

Lethal	Degree of coordination with related projects?	Effects of catches on stocks	Intermediate targets	Any other relevant matter for the SC
PO I: Contribution to optimizing the establishment of a sustainable catch limit for common minke whales in the coastal waters of Japan				
Y	-	-	-	-
SO I (i): Investigate the spatial and temporal occurrence of J stock common minke whales around Japan, by sex, age and reproductive status				
Y	Build extensively on JARPN II	Not fully evaluated. If it is a single O stock the effect of catches is minimal. However, the analysis presented did not consider possibility of two O stocks.	Unclear the intermediate target for biopsy sampling feasibility study	Unlikely to be used for the 2018 *Implementation Review* but it could feed into that in 2024
SO I (ii): Estimate the abundance of the J and O stocks in coastal waters of Japan				
	Yes	NA	Sufficient	Abundance relevant to much SC work. Surveys could provide information on other species.
SO I (iii): Verify that there is no structure in the O stock common minke whale in the Pacific side of Japan				
Y	Builds extensively on JARPN II	If it is a single O stock the effect of catches is minimal. Unknown as the analysis presented did not consider possibility of two O stocks.	OK if sufficient analyses are carried out.	Small NEWREP-NP sample are expected to be available to be used for the 2018 IR, but it could feed in the 2024 IR.
SO I (iv): Improve RMP trials by incorporating age data in their conditioning				
Y		If it is a single O stock the effect of catches is minimal. Unknown as the analysis presented did not consider possibility of two O stocks.	Sufficient	This require coordination with the SC in the upcoming *Implementation Review*
PO II: Contribution to the RMP/IST for North Pacific sei whale				
Y			-	-
SO II (i): Abundance estimates for North Pacific sei whale taking account additional variance				
	Yes	NA	Sufficient	Abundance relevant to much SC work. Surveys could provide information on other species.
SO II (ii): Estimation of biological and ecological parameters in North Pacific sei whales for RMP *Implementation*				
Y	Yes	Negligible	Adequate	-
SO II (iii): Study of the pattern of movement of whales of the 'pelagic stock' within the feeding grounds and between feeding and breeding grounds [Note: this objective was refined from 'Additional analyses on stock structure in North Pacific sei whale for RMP *Implementation*']				
~~Y~~	~~*Yes*~~	~~*Negligible*~~	~~*Adequate*~~	-
SO II (iv): Specification of RMP *ISTs* for North Pacific sei whale				
	NA	NA	Adequate	-