SC/67A/REP/02

Report of the Planning Meeting for the 2017 IWC-POWER Cruise in the North Pacific with initial discussion for the 2018 and 2019 cruises, 15-17 September 2016, Tokyo, Japan

International Whaling Commission

INTERNATIONAL
WHALING COMMISSION

Report of the Planning Meeting for the 2017 IWC-POWER Cruise in the North Pacific with Initial Discussions for the 2018 and 2019 cruises

Contents

The meeting was held in Tokyo from 15-17 September 2016. The list of participants is given as Annex A.

1. OPENING REMARKS AND WELCOMING ADDRESS

Kato (as Convenor) and Okazoe (on behalf of the Fisheries Agency of Japan) welcomed participants to Tokyo and to the meeting.

Okazoe noted that the seventh IWC-Japan Joint Cetacean Sighting Survey Cruise (IWC-POWER) had been completed successfully with the return of the vessel on 30 August 2016. On behalf of the Fisheries Agency of Japan, he thanked all the researchers who participated in the cruise and also the Government of the USA for issuing the research permit in its EEZ. He also welcomed the participants in the planning meeting and expressed his wish to have a good discussion in preparation for the next three cruises in the Bering Sea.

On behalf of the IWC, Donovan expressed his pleasure at once again being present at such a meeting. He particularly wished to thank the organisers for providing the excellent facilities in the Japanese Fisheries Agency Crew House. He also wanted to express continued appreciation to the ship's crew on behalf of the researchers; their cooperation on the cruises is essential for the continued success of the research. The IWC-POWER cruises are extremely important to the IWC; a considerable amount of very valuable information is being accrued (e.g. see Annex D) and the programme continues to provide an excellent example of international cooperation. He looked forward to a successful planning meeting for the 2017 cruise as well as discussions on the 2018 and 2019 cruises – the three together will provide a comprehensive cover of the Bering Sea and complete the first phase of the IWC-POWER programme.

The meeting was pleased to note that this year it had been possible for Semii and Tsuda (Chief Radio Operators) of Kyodo Senpaku Co. Ltd. were able to be present on the final day. Crew members are welcome at all planning meetings where their practical experience is extremely valuable.

2. APPOINTMENT OF CHAIR AND RAPPORTEURS

Kato was elected Chair. Clapham and Donovan acted as rapporteurs, with assistance from Matsuoka.

3. ADOPTION OF AGENDA

The agreed Agenda is given as Annex B.

4. ORGANISATION OF MEETING

Kato thanked the organisers for providing such excellent facilities.

5. REVIEW OF AVAILABLE DOCUMENTS

Documents available are listed in Annex C.

6. REVIEW OF DISCUSSIONS AT IWC/66B

Donovan noted that the report of last year's Technical Advisory Group (IWC, 2017a) had been taken into account in the discussions and recommendations made at the Scientific Committee meeting. He provided a brief summary of the recommendations of the Committee relevant to the 2017-2019 period. Details are provided under the relevant agenda items below. Perhaps the most important recommendation for the Planning Meeting was that the plan to cover the Bering Sea between 2017-2019 was endorsed (see Fig. 1) as well as the use of passive acoustic monitoring using sonobuoys. Logistical details and planning of blocks, strata and cruise tracks was referred to this Planning Meeting.

Matsuoka (Cruise Leader) reported that the 7th annual IWC-POWER cruise was successfully conducted between 02 July to 30 August, 2016 in the central North Pacific (north of 20°N, south of 30°N, between 160°W and 135°W including US EEZ – see Fig. 2) using the Japanese Research Vessel *Yushin-Maru No.3*. Survey coverage was 97.2% and a total of 2,237.5 n.miles was surveyed in the research area in the Passing with abeam closing mode (NSP) and the Independent Observer passing mode (IO). Additionally, 626.2 and 580.1 n.miles were surveyed during transit to and from the research area respectively. Sightings of: Blue (1 school/1 individual), sei (1/1), Bryde's (28/32), sperm (32/125), Cuvier's beaked (2/5), Mesoplodon spp. (2/3), Ziphiidae (7/11), short finned pilot (2/31), pigmy killer (1/16) whales; Risso's (2/19), bottlenose (1/37), common (8/217), striped (5/378) and spotted (1/133) dolphins were observed.

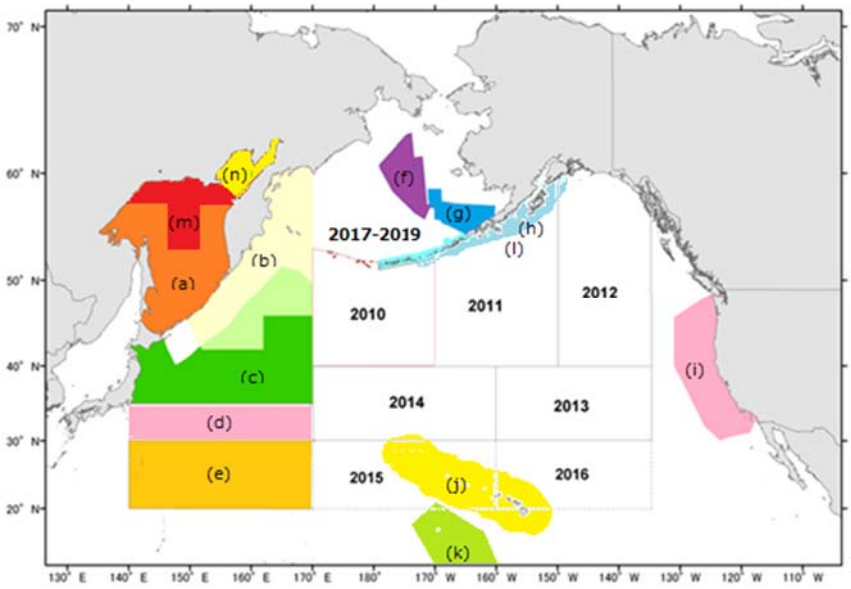

Fig. 1. Schematic showing the proposed areas for coverage in the 2016-2019 period prior to the medium term period. Coloured areas represent surveys conducted in the North Pacific in recent years: (a) Miyashita and Berzin (1991); (b) Miyashita (2006); (c) Pastene *et al.* (2009); (d) Matsuoka *et al.* (2013); (e) Matsuoka *et al.* (2014); (f) Moore *et al.* (1999); (g) Moore *et al.* (2002); (h) Zerbini *et al.* (2007); (i) Barlow and Forney (2007); (j) (Barlow (2006a; Bradford *et al.* (2013); (k) Barlow (2006b); (l) Rone *et al.* (2016); (m) Myasnikov *et al.* (2016); and (n) Guschcherov *et al.* (to be submitted to SC/67a).

6.1 Progress during the intersessional period

6.1.1 Distance and angle experiments

Distance and Angle Experiments (DAE) are a routine component of line transect surveys because possible biases in distance and angle observations cause over-/under-estimation of the effective strip width and hence of the population density/abundance. About eight observers were subject to the DAE before/during IWC-POWER sighting surveys, and the observers were not informed of their performance.

At the TAG meeting last year, some issues were raised for the DAE, primarily related to: (i) if there is homogeneity/heterogeneity in performance of measurements across observers; and (ii) if there is any difference between results of DAE with newly equipped GPS approach and the conventional radar system. In IWC-POWER cruises, a conventional radar system has been used for measuring the true distance and angle to the target object until last year. Intersessionally, a voluntary working team consisting of Kitakado and his students group (Katayama, Murata, Otsuyama, Zhou, Chiba, Seike and Ga), called 'Team DAE', was established and conducted analyses for examining the above issues by developing better statistical models. Katayama provided an excellent summary of the preliminary results given the limited time. At this stage only the perpendicular distance data (not the direct distances and angles) have been analysed.

The team firstly investigated basic measurement error models to account for linearity and nonlinearity in the 'bias' of observed errors with respect to the true distance. Two variance structures in the observation were tested. Platform effects (Top/IO or Bridge) were also incorporated into the model. The parameters were estimated with the maximum likelihood method and model selection was performed by the AIC. Secondly, a hierarchical model was developed to account for observer effects (here assumed as random effects) for better estimation of parameters in the model as well as for comparison of overall performance among years. For this purpose, Bayesian estimation with an MCMC algorithm was employed. In addition, comparison of difference between results of DAE with GPS and radar systems were conducted using 2015 data, where the both of systems were used in the experiment.

As a result, a straight line intersecting at the origin was selected as the best model for the expectation of perpendicular distance (PD) although it was quite similar with other estimated nonlinear curve. A model with standard error depending on the true PD was selected. These outcomes are not counterintuitive, but the platform effects were not necessarily significant in some years. Regarding the observer effects, the posterior distributions showed that inter- and intra- observer effects differed among years (e.g. the observer effect looks significantly large in 2010, but it is not the case in 2013). Finally, whilst it is better is to use GPS comparison of the results shows that they are similar and thus the results of the previous experiments with the radar have an acceptable quality.

The meeting thanked Team DAE for these preliminary results and encouraged further work. In particular, it noted the importance of:

(1) considering both platform and observer effects;
(2) examining both radial distance and angle data;
(3) examining the performance of the same observers across years;
(4) taking into account environmental conditions should there be sufficient data to do so;
(5) examining the impact of the errors with respect to abundance estimation.

6.2 Update on future work plan

It was agreed that this would be provided by Kitakado with assistance from Donovan after the meeting and provided as Annex F in early 2017.

7. PRELIMINARY RESULTS FROM THE 2016 CRUISE

The Estimated Angle and Distance Training Exercises and Experiments were completed with improvements following Scientific Committee and Technical Advisory Group suggestions. Photo-identification data for 12 Bryde's whales, 2 sperm whales were collected. A total of 23 biopsy (skin and blubber) samples was collected from 1 blue, 1 sei, 16 Bryde's whales and 5 sperm whales using the Larsen-system. A total of 153 objects of marine debris items were observed.

The meeting thanked Matsuoka, as Cruise Leader, the researchers and the crew, for their hard work that had made the cruise a success, especially the great efforts made to conduct as much IO mode as possible and to improve the distance and angle experiments. It noted that the lack of sightings of Bryde's whales in the research area, whilst disappointing for the researchers on the vessel, was an extremely valuable piece of scientific information. It also noted the sightings of both sei and Bryde's whales at a similar latitude (around 38N). It congratulated Matsuoka and his colleagues on producing such a comprehensive report at such short notice.

The meeting **agreed** that a final definitive version of the Cruise Report would be prepared for circulation to steering group members for their comments, noting that final responsibility for the report rests with the authors.

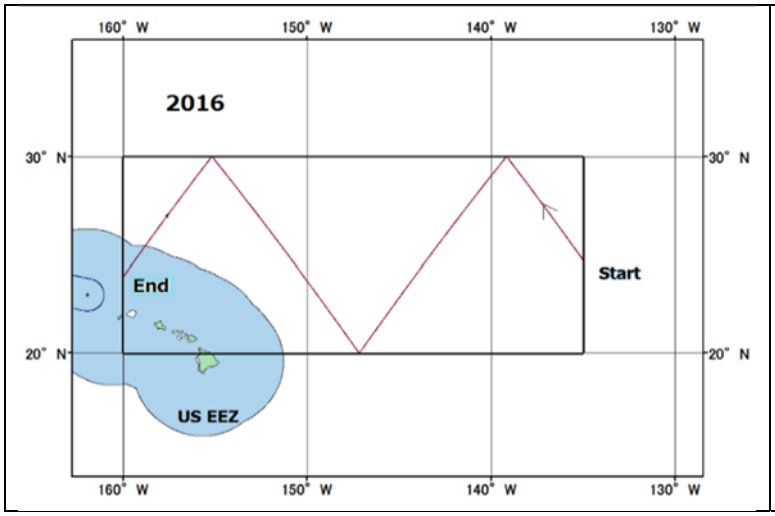

Fig. 2. The 2016 research area (black bold line) and pre-determined trackline (red) with start and end points.

8. AVAILABILITY OF RESEARCH VESSELS

8.1 Research vessel offered by Japan

Okazoe noted that while a *Yushin-Maru No.3*-type vessel will be available, the Fisheries Agency of Japan is still discussing the possibility of getting the status of an international vessel. A final decision on whether the vessel will be able to get the international status for the cruise next year will be made during September 2016. He expressed his hope to share the decision with the participants soon after the planning meeting. Discussions are also underway with Kyodo Senpaku Co. Ltd. with respect to the addition of an extra cabin to allow for an additional researcher.

As noted in the draft initial proposal developed by Japanese scientists for the period 2017-2019, if international vessel status is obtained this will allow refuelling and provisioning of the vessel in foreign ports with an extension of the time the vessel can be away from its home port. The maximum period that the vessel can be away without refuelling is 60 days – with international status it will be possible for the vessel to be away for 85 days with a maximum of 60 days in the research area (without this the time in the research area will be around 20 days less).

The Planning Meeting **greatly appreciated** the consideration of this issue by the Government of Japan and **strongly encouraged** obtaining international status and having space for one more researcher. It **stressed** the considerable benefits to the IWC-POWER programme not only for the 2017-19 period but for the medium to long-term programme. These benefits include:

(a) the ability to improve coverage by about 30% - the concomitant increased sample size will lead to *inter alia* more precise and accurate abundance estimates which will increase the power of the surveys to estimate trends, should they occur;

(b) the ability to take advantage of developments in acoustic technology to improve understanding of distribution of several species, assist with studies of rare and endangered species/populations (e.g. North Pacific right whales) by improving the ability to detect and find them for targeted studies;

(c) the ability to expand the studies undertaken at present (e.g. to take into account other habitat-related work to improve understanding of spatial distribution and interpret possible trends) and to test and use new technologies e.g. drones, telemetry to improve the ability of the cruises to meet the agreed objectives of the programme; and

(d) to include scientists from more range states on the cruises to improve capacity within the region.[1]

8.2 Other possibilities

The meeting was informed that there were no dedicated US or Russian cetacean cruises expected in the Bering Sea in 2017.

9. PRIORITY FOR THE 2016 CRUISE

The meeting confirmed that the 2017 cruise objectives would be broadly the same as in previous years with the important addition of an acoustic component, as endorsed by the Scientific Committee. Thus the cruise will focus on the collection of line transect data to estimate abundance as well as collection of acoustic, biopsy and photo-identification data. This will make a valuable contribution to the work of the Scientific Committee on the management and conservation of populations of large whales in the North Pacific in a number of ways, including providing:

(a) information for the in-depth assessments of North Pacific sei, humpback and gray whales in terms of abundance, distribution and stock structure;
(b) information on the critically endangered North Pacific right whale population in the eastern Pacific;
(c) completion of coverage of the northern range of fin whales following on from the IWC-POWER cruises in 2010-12;
(d) baseline information on distribution, stock structure and abundance for a poorly known area for several large whale species/populations, including those that were known to have been depleted in the past but whose status is unclear;
(e) essential information for the development of the medium-long term international programme in the North Pacific in order to meet the Commission's long-term objectives.

10. REVIEW OF THE BUDGET

The meeting **noted** the discussions under Item 8.1 regarding vessel availability and length of the cruise.

The detailed budget for expenditure of Commission funds is provided in IWC (2017b). The Scientific Committee has requester £38,000 for the years 2017 and 2018.

Donovan reiterated the importance of the POWER programme to the Scientific Committee and the Commission.

11. CRUISE PLAN

11.1 Priorities and allocation of research effort

The broad priorities for 2017, most of which are also applicable to 2018 and 2019, are given under Item 9. Taking into account the likely weather in the regions, the Meeting agreed that it was reasonable to plan for the vessel being able to cover 40 n.miles per day in the research area. Given that decisions have yet to be made regarding the vessel and the length of the survey (see Item 8.1) it is not possible to finalise precise details of transit times and the allocation of the research effort.

[1]After the meeting, the TAG was informed that the Government of Japan decided that;

- *Yusin-Maru No.2* will be engaged for the 2017 (-2019) POWER cruises, with international status.
- For the 2017-2019 cruise plan using Dutch Harbor port, a total of maximum 85 days for the entire cruise from Japan to Japan is available, including 60 days for the research area, as proposed in the planning meeting (Tables 1-3). For only 2017 cruise, vessel will depart from Shimonoseki.
- For the 2018 or 2019 cruise plan using Petropavlovsk-Kamchatskiy port, a total of maximum 76 days for the entire cruise from Japan to Japan is available, including 60 days for the research area, as proposed in the planning meeting (Table 3, option 2).

In the discussions below, it is assumed that the vessel will be upgraded to be able to enter international ports and the total at sea period will be 85 days (this longer period will only be possible if the vessel used has international clearance as it will allow for refuelling and obtaining new supplies). If this is not the case, the cruise will be limited to 60 days. The Meeting **authorised** the Steering Group is authorised to modify the proposed tracklines and itinerary as necessary by correspondence.

11.2 Itinerary

To minimise transit time, maximise research time and minimise the period of time that researchers have to spend on the vessel (thus maximising the benefit of the budget in terms of activity in the research area), the proposed home port for the eastern (2017) and central (either 2018 or 2019, see below) blocks is Dutch Harbor. For the western block in the waters of the Russian Federation, two options are given related to permitting issues, one using Petropavlovsk-Kamchatskiy on the Kamchatka peninsula and the other using Dutch Harbor (noting the need not to cross US-Russia borders for permitting purposes the former is preferred). The proposed itineraries (see discussion under Item 11.1 for assumptions) are shown in Tables 1-3.

Table 1
Revised proposed itinerary for the 2017 IWC-POWER cruise in the eastern Bering Sea assuming 85 days (see text). For reasons of refuelling and supplies the maximum time in the research area will be about 60 days.

Date	Event
3 July 2017	Vessel departs Shimonoseki
13 July	Vessel arrives Dutch Harbor, Unalaska Island, Alaska, USA
15 July	Pre-cruise meeting
16 July	Vessel leaves Dutch Harbor (60 days in the research area)
18 July	Vessel start the survey in the research area
08 September	Vessel completes the research area
13 September	Vessel arrives Dutch Harbor
15 September	Post-cruise meeting
16 September	Vessel leaves Dutch Harbor
25 September	Vessel arrives Shimonoseki

Table 2
Revised proposed itinerary for the IWC-POWER cruise in the central Bering Sea assuming 85 days (see text). For reasons of refuelling and supplies the maximum time in the research area will be about 60 days.

Date	Event
3 July 2018 or 2019	Vessel departs Shiogama
12 July	Vessel arrives Dutch Harbor, Unalaska Island, Alaska, USA
15 July	Pre-cruise meeting
16 July	Vessel leaves Dutch Harbor (60 days in the research area)
20 July	Vessel start the survey in the research area
07 September	Vessel completes the research area
13 September	Vessel arrives Dutch Harbor
15 September	Post-cruise meeting
16 September	Vessel leaves Dutch Harbor
25 September	Vessel arrives Shiogama

Table 3
Revised proposed itinerary for the IWC-POWER cruise in the western Bering Sea assuming 85 days (option 1) and 76 days (option 2, see text). For reasons of refuelling and supplies the maximum time in the research area will be about 60 days for both option. Two options are provided for the homeport although the Kamchatka port is preferred will depend on permitting (see text).

Option 1		Option 2	
Date	**Event**	**Date**	**Event**
3 July 2018 or 19	Vessel departs Shiogama	12 July 2018 or 19	Vessel departs Shiogama
12 July	Vessel arrives Dutch Harbor	17 July	Vessel arrives Petropavlovsk-Kamchatskiy
15 July	Pre-cruise meeting	19 July	Pre-cruise meeting
16 July	Vessel departs Dutch Harbor	20 July	Vessel departs Petropavlovsk-Kamchatskiy
20 July	Vessel starts survey in research area	25 July	Vessel starts survey in research area
07 September	Vessel completes the research area	15 September	Vessel completes the research area
13 September	Vessel arrives Dutch Harbor	17 September	Vessel arrives Petropavlovsk-Kamchatskiy
15 September	Post-cruise meeting	19 September	Post-cruise meeting
16 September	Vessel leaves Dutch Harbor	20 September	Vessel leaves Petropavlovsk-Kamchatskiy
25 September	Vessel arrives Shiogama	25 September	Vessel arrives Shiogama

11.3 Research area

The research area proposed for the 2017-19 period and agreed by the Scientific Committee is shown in Fig.3. After some discussion the meeting **agrees** with the boundaries for the eastern, central and western blocks which were based largely upon practical considerations of EEZs and research coverage.

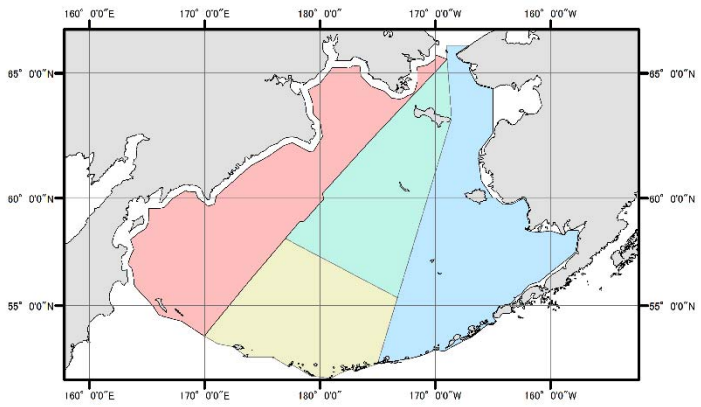

Fig. 3. Survey blocks and strata for the 2017-2019 IWC-POWER cruises (Western, Eastern and Central blocks).
The Central block was divided into northern and southern strata so that area sizes are as similar as possible.
The suggestion is that the Eastern block is covered in 2017, the Central in 2018 and the Western in 2019.

11.4 Research vessel

As noted in footnote 1, after the meeting it was agreed that *Yushin-Maru No. 2* with international clearance will be available. Specifications are given in Table 4.

Table 4
Specifications for *Yushin-Maru No. 2.*

Call sign	JPPV	
Length overall	69.61m	
Gross tonnage	747	
Barrel height (m)	19.5m	
IO Barrel height	13.5m	
Upper bridge height	11.5m	
Bow height (m)	6.5m	
Engine power	5280/3900(PS/kW)	

11.5. Other matters

There were no matters to discuss under this item.

12. DETAILS OF THE CRUISE

12.1. Cruise track design

The Meeting reviewed a draft proposal for cruise track design for the 2017, 2018 and 2019 surveys developed using program DISTANCE (Ver. 6.2) The lines were reviewed in the light of the guidelines for good track design included in the Requirements and Guidelines for Surveys under the RMP (IWC, 2012) and in particular the need to take into account the distribution of priority species and the objectives of the survey, the need to ensure that lines did not follow features that might result in a bias (e.g. by following a coastline where the density of whales decreased with distance from the coast), as well as practical considerations such as time that would need to be spent on transit. As the initial proposals for each block did not meet these criteria, program DISTANCE was used to provide some alternative options which did.

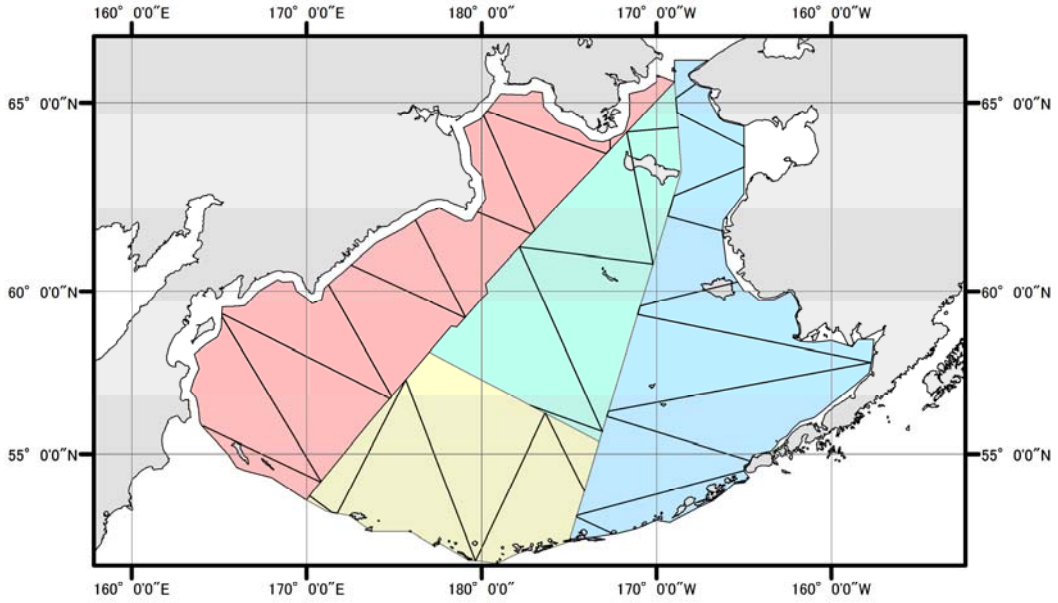

Fig. 4. Proposed tracklines for the three blocks under the assumptions noted in Item 11.1.

The meeting **agreed** the cruise track designs shown in Fig. 4 for the three blocks assuming that international clearance is obtained (see Items 8.1 and 11.1). It recognised that there may need to be modification of the tracks for the eastern block following review of the initial draft of a formal proposal (see below).

As there is no expected migration of large whales during the survey period, it was **agreed** that the cruise leader will decide on the direction of each survey depending upon weather or other logistics, including minimising transit distance from the home port. For the 2017 eastern survey, a south-to-north survey should be conducted if the weather was favourable at the beginning; if weather is poor, transit to the north followed by a north-to-south survey would be preferable. *Inter alia,* this would offer the best chance to survey North Pacific right whale critical habitat in good weather. For the Central block, the optimum strategy would be to travel north-to-south.

12.2. Survey mode and research hours

Activities are classified into two principal groups: 'on-effort' and 'off-effort'. On-effort activities are times when full search effort is being executed and conditions (such as weather and sea conditions) are within acceptable parameters to conduct research. Off-effort activities are all activities that are not on-effort. All sightings recorded while the ship is on-effort are classified as primary sightings. All other sightings are secondary sightings. The meeting re-iterated that if sightings are made outside official research hours (e.g. before sightings effort begins in the morning), then these should be recorded as 'off-effort' sightings as they can contribute useful information on distribution even though they are not suitable for abundance estimation.

For the 2017-2019 surveys, following advice from the Scientific Committee and the TAG, the survey will alternate modes between Normal Closing Mode (NSP) and Independent Observer Mode (IO) (*ca* every 50 n.miles). However, in the Bering Sea many high density areas of large whales (e.g. fin, humpback whales) are expected. When the high density of whales in the area causes problems for the observers in discriminating between the same and different schools while conducting IO mode survey, searching mode will be changed to NSP.

Research hours during the cruise will be the same as on previous POWER cruises. This will involve a maximum 12 hours per day between 6:00 and 19:00, including 30 minutes for meal times (lunch and supper) during only IO mode. Days will begin 60 minutes after sunrise and end 60 minutes before sunset. As in the SOWER programme, for biopsy sampling/photo-identification work on priority species (see Item 12.8), there may be occasions when it is beneficial to extend the research activities outside the normal research hours. The basis for any such extension of research hours will involve mutual agreement between the captain and cruise leader and an allocation of equivalent time-off the following morning or evening.

The research day in transits will begin 30 minutes after sunrise and end 30 minutes before sunset, with a maximum of a 12-hour research day. Time-zone changes will be in 30-minute intervals, coming into effect at midnight.

In transit, the research day will begin 30 minutes after sunrise and end 30 minutes before sunset, with a maximum of a 12-hour research day. Time-zone changes will be in 30-minute intervals, coming into effect at midnight.

12.3 Number of crew on effort
As in the previous cruises, two topmen will observe from the barrel at all times in passing mode. Two primary observers will be in the barrel whenever full searching effort using reticle binoculars and angle board is conducted. Two primary observers (Captain and helmsman) will be at the upper bridge with binoculars with reticles, regardless of the research mode. Also present on the upper bridge, whenever the sighting survey is conducted, will normally be the Chief Engineer (or an alternate). With four researchers on board, the Cruise Leader should ensure that the number of researchers searching from the Upper Bridge is standardised. In IO mode, there would be an additional person in the IO platform (e.g. researcher). The number of researchers to be used is discussed further in Item 13.1 below.

12.4 Navigation and research speeds
As in 2016, 11.5 knots (through the water) will be maintained during research. It was noted that in conditions of heavy swell, searching speed might have to be reduced.

12.5 Acceptable weather conditions
In accord with the recommendation of the 2013 TAG report, the usual guidelines will apply, i.e. visibility (in principle for seeing common minke whales) >2.0 n. miles; wind speed <21 knots; sea state < Beaufort 6. These conditions are not suitable to reliably see common minke whales but are sufficient for the other large whale species.

12.6 Estimated angle and distance experiment
The experiment is designed to calibrate and identify any biases in individual observers' estimation of angle and distance. The experiment should be conducted during weather and sea conditions representative of the conditions encountered during the survey. Following the TAG recommendations, procedure of this experiment was improved from 2015 cruise; (1) use of relatively inexpensive GPS technology (for a waterproof tough model) on the buoy to improve detectability (a) at greater distances and (b) in more realistic sea/weather conditions than may be possible using the present radar system; (2) use of two buoys which can (a) reduce the potential lack of independence with one buoy with the correct experimental protocols and (b) allow increased efficiency which will assist when having a greater distance range and when including researchers as well as the crew in the experiment (multi-buoy experiments have been successfully conducted in the North Atlantic). With respect to the additional buoy, the TAG suggested that a smaller buoy than the one currently used (to simulate a whale's body rather than the blow) was provided on the vessel in 2015. The detailed protocol was discussed in the planning meeting and found in the Guide for Researchers.

12.7 Data format
The survey will be conducted using data forms modified in accordance with previous recommendations. The exception is that the old acoustics data forms from the SOWER cruises will be reviewed and updated intersessionally with advice from researchers at the Alaska Fisheries Science Center.

It was **agreed** that Donovan and Matsuoka should update the Guidelines for Researchers accordingly.

12.8 Biopsy sampling
12.8.1 Priority of species
The highest priority species for biopsy sampling are the North Pacific right whale, followed by the blue whale and the sei whale; all three are unlikely to be encountered often so when detected every effort should be made to obtain biopsy samples. The right whale population is critically endangered and may number only about 30 animals, and genetic information is urgently required. Blue whales are unlikely to be encountered except rarely, but are of considerable interest given their conservation status and uncertainty regarding population structure. Sei whale samples will contribute to the to the IWC's ongoing in-depth assessment. Also of high priority are gray whale given the IWC's ongoing basin wide assessment.

Medium-priority species include sperm, fin and killer whales.

With respect to humpback whales, the priority is to obtain samples from animals encountered north of 60 N; the origin of the animals in this northern portion of the Bering Sea is unclear. In the southern Bering Sea, humpback whales have been sampled in previous years in large numbers; consequently, the species is considered low priority for biopsy in that area, although (as for other large whale species encountered) opportunistic samples are useful.

12.8.2 Equipment and collection
Biological sample collection will be by using biopsy sampling (skin/blubber collected by projectile dart). Projectile biopsies will be collected using either a compound crossbow or the Larsen gun system. During any single encounter, no more than five biopsy sampling attempts per individual will be made. It is rare that an animal would be targeted for biopsy more than twice during one encounter, but conservatively five sample attempts will be allowed as necessary. If signs of harassment such as rapid changes in direction, prolonged diving and other behaviours are observed from an individual or

a group, biopsy will be discontinued on that individual or group. The animals to be sampled will either approach the vessel on their own or be approached by the research vessel during normal survey operations. The projectile biopsy sample will be collected from animals within approximately 5 to 30m of the bow of the vessel.

For large cetaceans, small samples (<1 gram) will be obtained from free-ranging individuals using a biopsy dart with a stainless steel tip measuring approximately 4cm in length with an external diameter of 9mm and fitted with a 2.5cm stop to ensure recoil and prevent deeper penetration (so that only 1.5cm of the tip is available to penetrate the animal). Between sample periods, the biopsy tips are thoroughly cleaned and sterilized with bleach following the established protocol. Biological samples may be collected from adults, juveniles, females with calves and calves. The same size biopsy dart would be used for calves as for adults. No biological samples will be taken from newborn calves. The age of a calf would be determined by the subjective judgment of the biologists who have 20+ years' experience in the field. They would (and would be instructed to) err on the side of caution and not biopsy an animal that appeared too young.

12.8.3 Keeping of samples
As for the 2015 cruise, all samples would be frozen and stored in cryo-vials. For at least the eastern and central blocks, each sample will be split into skin and blubber, the latter not being required for genetic analysis. For at least the eastern and central blocks, if possible under the US-Japan agreement with respect to CITES, the skin sample will be divided at sea with the IWC samples being retained at Dutch Harbor – the Japanese sample can remain onboard for storage by ICR. The blubber sample will be retained whole (i.e. not be split) and held at ICR; analyses of blubber (e.g. for contaminants, hormones, fatty acids) generally require larger amounts of tissue and splitting already small quantities may render such analyses impossible. The meeting **re-iterated** that the question of future analysis of blubber samples, and access to them by researchers, should follow the agreed procedure for accessing IWC samples (see *www.iwc.int*).

12.9. Photo-identification studies
As appropriate and decided by the Cruise Leader, research time will be given for photo-identification and /or video taping of large whales, with the priority by species as for biopsy sampling (see above). The estimated daily number of miles to be steamed in searching mode has a built-in allowance for such work. Generally, large whales will be approached within approximately 15-20 metres. Photo-identification of adult and juveniles will occur. If the opportunity arises, females accompanied by calves may be approached for photo-identification, but efforts will cease immediately if there is any evidence that the activity may be interfering with pair bonding, nursing, reproduction, feeding or other vital functions.

Recommended improvements to the equipment (based upon the 2015 and 2016 cruise reports) will be depend on the resources available (see below).

12.9.1 Priority of species
The priorities follow those discussed for biopsy sampling agreed above.

12.9.2 Keeping of data
As noted last year, a master set of all photographs taken on the IWC-POWER cruises is kept at the IWC Secretariat within an Adobe Lightroom database; these are copyright of the IWC. Even if a researcher uses their own camera, the photographs remain the property of the IWC.

Photographs that have been examined and catalogued as individuals for identification purposes will also be archived within a set of IWC-POWER Catalogues. As discussed during the TAG meeting, it is important to share such information with other researchers working in the North Pacific *through* the IWC protocol (www.iwc.int) to apply for use of the photographs (available from the IWC Secretariat and is available through the IWC-POWER pages on the IWC website as well as via the Scientific Committee Handbook). The final decision on access is made by the IWC-POWER steering group. All researchers wishing to use the photographs must obtain formal permission from the Secretariat.

12.10 Acoustic studies
As recommended by the Scientific Committee, the meeting examined logistics and **agreed** that acoustic work using sonobuoys would be a priority for at least the eastern and central blocks, recognising permitting difficulties for the western block make use of sonobuoys unlikely.

Clapham presented information on the use and logistical requirements for sonobuoys, with the idea of conducting passive acoustic monitoring (PAM) on the 2017 and 2018 surveys. The meeting **endorsed** the Scientific Committee's recommendation to incorporate acoustic detection into the eastern and central surveys (IWC, 2017b), recognising that: (a) sonobuoy deployment does not require the vessel to slow down and so does not interrupt the visual survey; and (b) it can be conducted in all weathers and at night i.e. when visual surveying is impossible.

All necessary equipment will be provided by the Alaska Fisheries Science Center (AFSC), including sonobuoys, laptop computer, antennae, cables, and analytical software. AFSC would also provide a dedicated, experienced acoustic observer to conduct all acoustic monitoring operations on the cruise (see Item 13.2).

It was agreed that the general acoustic schedule will involve deployment of one sonobuoy every 3 hours, as well as one at night, leading to 6 buoys per day under good conditions. When drifting for fog, then no new deployment would be necessary unless the battery runs out. Thus the maximum number of sonobuoys required will be around 360 (6x60 days) but given the likely prevailing conditions, may be somewhat less.

The sonobuoys are shipped in crates of 48 (1.3 m^2, 680kg) and thus allowing for possible failures, a maximum of 8 crates will be required. In discussion, it was agreed that the crew will investigate the best way to store the sonobuoys on board.

It was **agreed** that Donovan, Matsuoka and Crance will confer to ensure that the Guidelines for Researchers are updated with an acoustics protocol and updated data records (and see Item 12.7). Crance will liaise directly with Japan regarding equipment specifications and practical details of installation including timing. In order to avoid problems with comparability with previous surveys and possible biases, the acoustic observer will not ordinarily transmit information to visual observers, except when high-priority species (right and blue whales) are detected.

Although the preferred position for the acoustic operator is in the bridge, if this is not possible having the equipment in a cabin is acceptable. It was **agreed** that technical details (including when, where and how to wire the vessel and antennae) will be handled by a small group comprising the Cruise Leader, crew and the acoustics expert. In terms of logistics, it is by far the simplest and most cost effective to load the sonobuoys in Dutch Harbor. If international clearance cannot be obtained, then considerable effort (and cost) will be needed to ship them safely to Japan although this is possible as witnessed by the previous experience with SOWER cruises.

12.11 Oceanographic studies
Since sufficient time cannot be devoted to oceanographic studies to collect worthwhile data, the meeting **agreed** with past conclusions that no such studies should be undertaken. Consideration can be given to external requests for simple sampling if considered practicable.

The meeting recalled that last year the TAG had agreed that the use of equipment such as SeaGliders should be considered when designing the medium-term programme. It noted that this will be facilitated by the ability to have a vessel with international clearance.

12.12 Satellite tagging
No activities are planned for the 2017 cruise. The TAG had agreed that the use of such equipment should be considered when designing the medium-term programme.

12.13 Marine debris
The meeting reiterated the importance of observations of marine debris in non-IWC contexts such as modelling the predicted movement of debris from the 2011 Tsunami across the Pacific. The protocol adopted for recording such material (15 minutes in every hour) will continue in 2017 to prevent compromising cetacean sightings searching effort.

13. INTERNATIONAL RESEARCHERS AND ALLOCATION RESEARCH PERSONNEL

13.1 Number of researchers
As noted under Item 8.1, the meeting strongly recommended that, if possible, space be made for a fifth observer to allow for an acoustic observer to join the cruise without adversely affecting the workload of the researchres with respect to the line-transect, photo-identification and biopsy sampling components. Cabin-sharing by two researchers is a possible, although not optimal short-term option. The meeting **agreed** that if five is not possible, one of the four researchers should be an acoustician, recognising that this reduction in the size places additional work upon the remaining researchers.

13.2 Nomination and allocation of researchers
For 2017 the following framework for researcher involvement was **agreed**:

(1) Japan (IWC-POWER range state, vessel provider, Matsuoka appointed Cruise Leader)

(2) USA (IWC-POWER range state, acoustic, Jessica Crance)

(3) IWC (Taylor, UK/USA, Secretariat contractor for photographic catalogue)

(4) Japan (IWC-POWER range state, Yoshimura)

(5) Russia (IWC-POWER range state, to be confirmed).

14. GENERAL PREPARATIONS FOR THE 2017 CRUISE

14.1 Identification of the home port organiser
It was **agreed** that for Dutch Harbor, Crance would undertake this role. Alternative arrangements will be made by the Steering Group should Shiogama or Petropavlovsk-Kamchatskiy be the home ports.

14.2 Entry and other permits

The meeting noted that the 2017 cruise will be within the US EEZ and Okazoe undertook to file the necessary documents, including the need for biopsy sampling, within the necessary time limit (at least six months prior to the cruise).

A decision on whether or not the 2018 cruise will be in the central (US EEZ and high seas) or the western block (Russian EEZ) will depend on the availability of entry permits. Zharikov provided a valuable summary of the permit process for the Russian Federation (see Annex E).

As this will be the first time an IWC-POWER cruise will apply for permission to enter Russian waters it was agreed that it would be important to work closely with Russian authorities and scientific institutions to obtain advice. It was also agreed to apply for permission to work in both the western and central blocks in 2018; if a problem occurred with the application to work in Russian waters then the central block could be covered and the western block then surveyed in 2019 after re-application for the permit, correcting any errors.

Work to develop a permit application for Russian waters will begin as soon as possible to allow time for consultation (the formal application will be submitted in December 2017). The meeting noted and **strongly endorsed** the Scientific Committee's strong request for the Russian authorities to facilitate the permit process as part of its contribution to IWC-POWER. Zharikov and Donovan will discuss the matter further with the Russian Delegation at the forthcoming IWC Biennial Commission meeting.

A working group comprising Zharikov, Matsuoka, Okazoe, Brownell, Clapham and Donovan was established to begin work to develop entry permit requests for the western and central blocks and to develop the strategies for CITES permits under different scenarios of home ports etc.

14.3 Review of recommendations from the 2016 cruise

It was **agreed** that Donovan and Matsuoka would review the recommended items for purchase and decide what could be met from available funds. It was also noted that work to improve the ship's email system was underway.

15. IN TRANSIT SURVEY

15.1 Home port to research area and back

As for 2016, while recognising the need to move rapidly to and from the research area, the meeting **re-iterated** that should the opportunity arise, biopsy and photo-identification could be undertaken on right, gray and blue whales, in that order of priority for the high seas. It will not be possible for biopsy/photo-identification effort in US waters in transit as no US scientists will be on board. The CITES system for importing/exporting will be dealt with by the appropriate authorities. Standard passing mode will be adopted during transit and this will be noted on the permit application (see Items 12.2 and 12.3).

16. TRANSPORTATION OF DATA, SAMPLES AND EQUIPMENT

16.1 Equipment

Donovan and Matsuoka will arrange for additional Larsen darts to be obtained. Information for researchers will be updated by Matsuoka and Donovan in consultation with Crance.

16.2 Data and samples and necessary permits

Within two months of the end of the cruise, all validated sightings data will be forwarded to IWC by the Cruise Leader (Matsuoka). Matsuoka will also submit all identification photographs/videos and accompanying data to IWC. Crance will ensure that a hard drive of the acoustic data will be shipped to the IWC for archiving purposes. The Cruise Leader will ensure that any borrowed equipment (except IWC cameras and lenses) will be returned to its owners. The Cruise Leader and Crance will ensure that the IWC samples left in Dutch Harbor are sent to SWFSC in La Jolla, California, in accordance with the appropriate CITES provisions. NRIFS will be responsible for sending the IWC portion of any samples collected on the return high seas transit leg to SWFSC.

17. COMMUNICATIONS

17.1 Safety aspects (daily reports)

Daily vessel position reports will be submitted to ICR, NRIFS, the Fisheries Agency and Kyodo Senpaku Co Ltd. There will also be regular contact with the US Coast Guard by the US researcher.

17.2 Between the Cruise Leader and the IWC

As in previous years, weekly reports (every Monday) will be provided to the IWC Secretariat and members of the Steering Group.

The IWC Secretariat will establish a mailing list so that one address can be used for all.

17.3. Fog and sea temperature information
It was **agreed** that fog information will be required and Clapham will liaise with Matsuoka regarding obtaining the latest NOAA information, otherwise the same arrangements as in 2016 will apply.

17.4. Other official communication
Given that there will be operations within the US EEZ, arrangements will be made to comply with any requirements specified in the permit. The US researcher will be responsible for communicating with the US authorities.

17.5. Private communication
Researchers may send and receive private communications, including e-mails, at their own expense. Prepaid cards such as the KDDI card (super world card) can be used for private voice communications.

17.6. Terms of payment of communication costs
Private accounts must be paid by researchers before departing the home port at the end of the cruise. Payment must be in cash (Japanese yen or US dollars depending upon home port).

18. MEETINGS

18.1 Pre-cruise meeting
A pre-cruise meeting will be held in Dutch Harbor on 14 July 2017. In addition to the researchers and crew, at least all US members of the Steering Group are encouraged to attend.

The Cruise Leader will ensure that the report is circulated to the IWC-POWER Steering Group when completed.

18.2 Post-cruise meeting
The post-cruise meeting will be held at Dutch Harbor when the vessel return to the port.

18.3 Home port arrangements and responsible persons
Crance will co-ordinate the home port arrangements in Dutch Harbor in co-operation with the Cruise Leader. This will include arrangements for hotels and a meeting room. Agents will be organised by Kyodo Senpaku Co. Ltd. who will inform the home port organiser.

19. REPORTS

19.1 Planning meeting report
The agreed report will be tabled at the IWC/SC meeting in 2017.

19.2 2016 Cruise report
The 2016 cruise report was drafted on the return journey of the cruise following the guidelines provided by Donovan last year. As discussed in Item 7, that report will be circulated to the Steering Group before final preparation by the authors; the final version will be sent to the Secretariat for submission to the IWC Scientific Committee as in the past. The 2017 Cruise Report should be handled in the same way.

20. OTHER LOGISTICS

20.1 Press releases
As in 2016, the Cruise Leader in consultation with the IWC and the US will prepare a press release before and after the cruise. The IWC, ICR, US and Japan Fisheries Agency press releases should be released simultaneously. The IWC website will also include a press release pointing to the relevant IWC-POWER cruise web page; consideration will also be given to providing a weekly review of activities on the website as the cruise progresses, and a summary at the end of the cruise.

20.2 Security and safety
Based on previous experience, no security problems are anticipated. The IWC banner will be readily visible.

It was noted that for safety, life vests are to be worn for all activities below the bridge, e.g. during any operations on the foredeck, e.g. during biopsy sampling.

20.3 Accommodation and food costs
The IWC will cover the accommodation and food costs for the scientists involved; the cost (¥2,500 per day) remains unchanged from previous years.

20.4 Other matters
None were raised.

21. OTHER

21.1 Data validation and analysis

21.1.1 Validation

Work on data validation continues at the Secretariat. Where difficulties have arisen, these are being dealt with in cooperation with the Cruise Leader.

21.1.2 Killer whale samples

A request to use the IWC-POWER killer whale samples was approved.

21.2 IWC website

Donovan reported that the IWC-POWER pages will be updated in light of the present meeting and the Scientific Committee meeting.

22. CONCLUDING REMARKS

As last year, Kato noted that the 2016 cruise will complete the first stage of the POWER programme south of the Bering Sea. Future planning will need to take into account operations within the EEZs of both the USA and Russia, although for the latter only in years two and three.

A list of action points arising from the meeting is given as Table 5.

Kato thanked the meeting members for their participation and looked forward to a successful cruise in 2016.

On behalf of the IWC, Donovan thanked all those who had participated in the meeting. The IWC-POWER cruises are a particularly important component of the IWC's work. As the meeting has recognised, they are an excellent example of international collaboration. He stressed the importance of an enthusiastic and efficient crew, without whom the cruises could not succeed. He asked that the meeting's appreciation to the crew be conveyed to them. He thanked the Government of Japan for providing such excellent facilities, and in particular the Chair and the interpreters who had performed their difficult tasks with their customary efficiency and good humour. The meeting had been facilitated by the very good cruise report.

The meeting adopted the report, and concluded its business, at 13:50 hrs, 17 September 2016.

Table 5
Summary of actions including responsible persons and due dates.

Item	Action point	Responsibility	Due date
6	Develop updated future work plan based on previous TAG report	Kitakado and Donovan	Early 2017
7	Prepare definitive version of the Cruise Report for circulation to the steering group members	Matsuoka and authors	ASAP but certainly by SC67a
11.1, 12.1	Modify proposed tracklines if necessary	Steering Group	ASAP
12.7; 12.10,	Update information for researchers and data sheets, especially with respect to acoustics	Matsuoka, Donovan and Crance	Spring 2017
13.2	Complete appointments for researchers for 2016 cruise	Kato, Donovan, Bannister, Matsuoka	ASAP, by early new year
12.9, 14.3, 16.1	Review list of recommended purchases from 2016 cruise and decide what could be bought with available funds	Donovan and Matsuoka	By SC67a
14.2	Apply for US permits for 2017	Okazoe	End of 2016
14.2	Begin process for Russian permits and investigate CITES options	Zharikov, Matsuoka, Okazoe, Brownell, Clapham and Donovan	Begin early 2017
17.2	Establish a mailing list for the weekly reports including the steering group and Secretariat	Donovan/Miller	By early New Year
21.2	Update website	Donovan/Wilson	ASAP

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Annex A

List of Participants

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Saemi Baba	Interpreter, Japan
Hiroko Yasokawa	Interpreter, Japan

Annex B

Agenda

1. OPENING REMARKS AND WELCOMING ADDRESS
2. APPOINTMENT OF CHAIR AND RAPPORTEURES
3. ADOPTION OF AGENDA
4. ORGANIZATION OF MEETING
5. REVIEW OF AVAILABLE DOCUMENTS
6. REVIEW OF DISCUSSIONS AT IWC 66b AND TAG REPORTS
   - 6.1 Progress during intersessional period
   - 6.2 Future work
7. PRELIMINARY RESULTS FROM THE 2016 CRUISE
8. AVAILABILITY OF RESEARCH VESSELS
   - 8.1 Research vessel offered by Japan
   - 8.2 Other possibilities
9. PRIORITY FOR THE 2017 and 2018 CRUISES
10. REVIEW OF THE BUDGET
11. CRUISE PLAN
    - 11.1 Priorities and allocation of research effort
    - 11.2 Itinerary
    - 11.3 Research area
    - 11.4 Research vessel
    - 11.5 Other matters
12. DETAILS OF THE 2017 and 2018 CRUISES
    - 12.1 Cruise track design
    - 12.2 Survey mode and research hours
    - 12.3 Number of crew on effort
    - 12.4 Navigation and research speeds
    - 12.5 Acceptable condition
    - 12.6 Estimated Angle and Distance Experiment
    - 12.7 Data format
    - 12.8 Biopsy sampling
      - 12.8.1 Priority of species
      - 12.8.2 Equipment
      - 12.8.3 Keeping of samples
    - 12.9 Photo-id studies
      - 12.9.1 Priority of species
      - 12.9.2 Equipment
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    - 12.10 Acoustic studies
    - 12.11 Oceanographic studies
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13. INTERNATIONAL RESEARCHERS AND ALLOCATION OF RESEARCH PERSONNEL
    - 13.1 Number of researchers
    - 13.2. Nomination and allocation of researchers
14. GENERAL PREPARATIONS FOR THE 2017 CRUISE
    - 14.1 Identification of home port organiser
    - 14.2 Entry and other permits
    - 14.3 Review of recommendations from the 2016 cruise
15. IN TRANSIT SURVEY
    - 15.1 Home port to research area and back
16. TRANSPORTATION OF DATA, SAMPLES AND EQUIPMENT
    - 16.1 Equipment
    - 16.2 Data and samples and necessary Permits
    - 16.3 Responsible persons
17. COMMUNICATIONS
    - 17.1. Safety aspects (daily report etc.)
    - 17.2 Between Cruise leader and IWC
    - 17.3 Weather and sea temperature information
    - 17.4 Other official communication
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18. MEETINGS
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19. REPORTS
    - 19.1 Planning meeting report
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20. OTHER LOGISTICS
    - 20.1 Press release
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    - 20.3 Accommodation and food costs
    - 20.4 Other matters
21. OTHER
    - 21.1 Data validation and analysis
    - 21.2 IWC website
22. CONCLUSION REMARKS

Annex C

List of Working Papers

1. International Whaling Commission. 2017. Report of the Meeting of the IWC-POWER Technical Advisory Group (TAG), 7-9 October 2015, Tokyo, Japan. *J. Cetacean Res. Manage. (Suppl.)* 18:459-76.
2. International Whaling Commission. 2017. Report of the Planning Meeting for the 2016 IWC-POWER Cruise in the North Pacific, 9-10 October 2015, Tokyo, Japan. *J. Cetacean Res. Manage. (Suppl.)* 18:477-87.
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6. Draft Cruise Report of the 2016 IWC-Pacific Ocean Whale and Ecosystem Research (IWC-POWER).
7. Summary of IWC-POWER surveys (2010-16).
8. Proposal for 2017-19 IWC-POWER in the Bering Sea.
9. IWC-POWER 2017 required equipment.
10. Data analysis for distance and angle experiment.
11. Necessary permits to conduct POWER cruise in EEZ of Russian Federation.
12. Candidate cruise track design by strata.

Annex D

Summary of IWC-POWER Results 2010-2016

Table 1

Some key characteristics of the two vessels used thus far.

Vessel	*Kaiko-Maru* (2010)	*Yushin-Maru No.3* (2011-16)
Call sign	JGDW	7JCH
Length overall [m]	61.9	69.61
Molded breadth [m]	11.0	10.8
Gross tonnage (GT)	860.25	742
Barrel height [m]	19.5	19.5
Upper bridge height [m]	9.0	11.5
Bow height [m]	6.5	6.5
Engine power [PS / kW]	1471	5280 / 3900

Table 2

Summary of sightings.

Year	2010		2011		2012		2013		2014		2015		2016		Total	
Vessel	*Kaiko-Maru*		*Yushin-Maru No.3*		*Yushin-Maru No.3*		*Yushin-Maru No.3*		*Yushin-Maru No.3*		*Yushin-Maru No.3*		*Yushin-Maru No.3*			
Searching effort (n.miles)	1,816.2		2,397.8		2,126.1		3,035.9		3,233.0		3,248.5		2,237.5		18,095.0	
Species	sch	ind	sch	ind	sch	ind	sch	ind	sch	ind	sch	ind	sch	ind	sch	ind
Blue whale	3	3	9	9	4	4	0	0	1	1	0	0	0	0	17	17
Fin whale	23	48	80	139	114	169	1	1	0	0	0	0	0	0	218	357
Sei whale	53	31	38	73	81	151	0	0	1	1	0	0	0	0	173	256
Bryde's whale	0	0	0	0	0	0	6	6	88	98	27	32	1	1	122	137
Like Bryde's	-	-	-	-	-	-	-	-	3	3	2	2	0	0	5	5
Common minke whale	8	8	2	2	2	2	0	0	0	0	0	0	0	0	12	12
Like minke	1	1	2	2	0	0	0	0	0	0	0	0	0	0	3	3
Humpback whale	5	8	76	133	7	7	0	0	0	0	0	0	0	0	88	148
North Pacific right whale	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
Sperm whale	67	84	57	74	45	52	33	50	65	137	11	50	6	30	284	477
Baird's beaked whale	1	20	0	0	0	0	0	0	0	0	0	0	0	0	1	20
Cuvier’s beaked whale	0	0	0	0	0	0	2	6	5	8	3	6	2	5	12	25
Longman's beaked whale	0	0	0	0	0	0	0	0	0	0	1	110	0	0	1	110
Stejneger’s beaked whale	0	0	0	0	0	0	1	4	0	0	0	0	0	0	1	4
Mesoplodon spp.	3	6	6	22	3	9	8	20	7	13	1	2	2	3	30	75
Zhiphiidae	4	9	12	20	22	42	28	51	35	73	4	4	2	2	107	201
Killer whale	6	53	6	66	12	42	0	0	1	3	1	4	0	0	26	168
Unid. large whale	27	43	59	95	44	70	8	8	9	9	3	3	0	0	150	228

Table 3

Summary of angle and distance experiments undertaken.

Year	2010	2011	2012	2013	2014	2015	2016	Total
Barrel distance	36	42	42	42	36	60	72	330
Barrel angle	36	42	42	42	36	60	72	330
IOP distance	-	-	-	-	-	60	72	132
IOP angle	-	-	-	-	-	60	72	132
Upper distance	36	24	37	37	24	40	60	258
Upper angle	36	24	37	37	24	40	60	258
Total	144	132	158	158	120	320	408	1,440

Table 4

Summary of the photo-identification work undertaken (number of individuals).

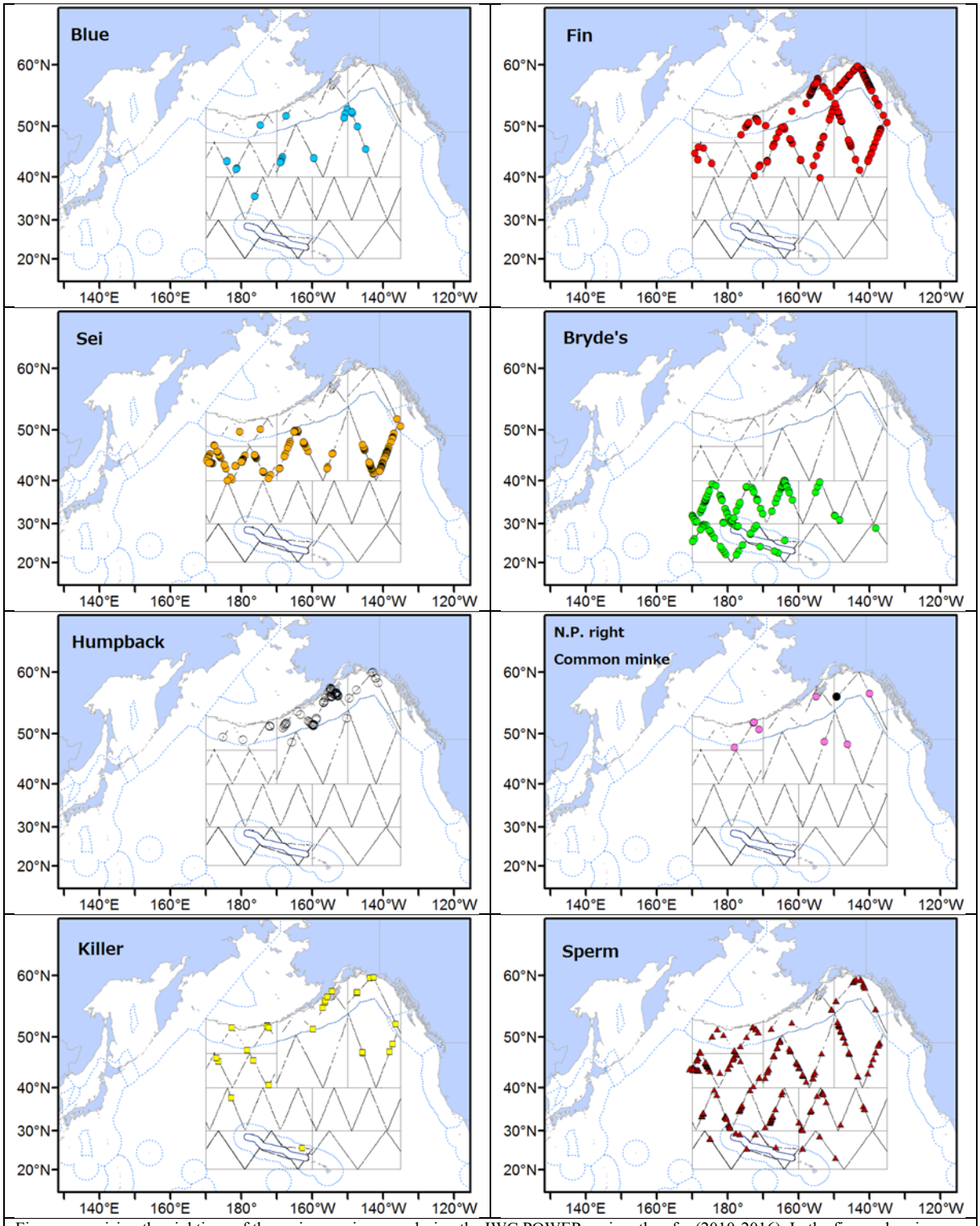
Photo-ID	2010	2011	2012	2013	2014	2015	2016	Total
Blue whale	3	9	4	0	1	0	1	18
Fin whale	0	25	59	3	0	0	0	87
Sei whale	0	27	51	2	0	0	1	81
Bryde's whale	0	0	0	6	73	49	12	140
Common minke whale	0	0	0	0	0	0	0	0
Humpback whale	5	48	26	0	0	0	0	79
North Pacific right whale	0	0	1	0	0	0	0	1
Sperm whale	0	0	1	0	4	22	2	29
Killer whale	45	18	50	0	3	4	0	120
Total	53	127	192	11	81	75	16	555

Table 5

Summary of the biopsy work undertaken (number of samples).

Biopsy	2010	2011	2012	2013	2014	2015	2016	Total
Blue whale	1	4	2	0	1	0	1	9
Fin whale	2	12	12	1	0	0	0	27
Sei whale	13	31	36	0	0	0	1	81
Bryde's whale	0	0	0	6	78	34	16	134
Common minke whale	0	0	0	0	0	0	0	0
Humpback whale	0	1	0	0	0	0	0	1
North Pacific right whale	0	0	0	0	0	0	0	0
Sperm whale	0	0	0	0	0	1	5	6
Killer whale	2	0	1	0	1	2	0	6
Total	18	48	51	7	80	37	23	264

Sighting maps



Figs summarising the sightings of the major species seen during the IWC POWER cruises thus far (2010-2016). In the figure showing both North Pacific right whales and common minke whales, the former is indicated by a black circle and the latter by pink circles. NB that the small number of common minke whale sightings is a reflection of the fact that the survey continues in sea state conditions sub-optimal for common minke whales.

Annex E

Permits to conduct an IWC-POWER Cruise in the EEZ of the Russian Federation

According to 2017-2019 POWER cruise plan it is supposed to conduct a sighting survey, including sighting experiments, biopsy sampling and photo-ID studies in Russian EEZ. There will be needed two permits from appropriate Russian authorities. The first one is a permit to conduct marine bioresource research in Russian waters (including biopsy sampling), the second is CITES export permission.

Permit to enter Russian EEZ and to conduct studies
The cruise plan should include EEZ and exclude territorial waters of Russian Federation. They are defined by domestic and international laws as 12 nm zone off the coastal line (including islands), and outer border of these waters is considered as a state border of Russia. In case of gulfs, sounds, straits, river estuaries, etc. which mouths are less than 24 nm width, basically the territorial waters are measured from line, connecting the furthermost points of the mouth facing to open sea in the lowest tide.

The list of actual points and lines from which the 12 mile territorial waters are measured is adopted by the Government of Russia and available through the Internet: (*http://structure.mil.ru/structure/forces/HYDROGRAPHIC/ESIM.htm*)

Whale sighting surveys like POWER cruise are considered as marine bioresources studies in Russian legislation. In this case the deadline for submission of cruise plan through the diplomatic channel is 6 months. However it seems reasonable to start preparation of the draft well before in order to meet all requirements. The main data required for submission are listed below.

(1) The name of research program
(2) Information about program developers and participants (full name of organization, state, address, phone, fax, e-mail)
(3) Goals and purposes of the program, information on the matter of study.
(4) Brief characteristics of methods and processing of acquired data
(5) Planned dates of start and ending of the research
(6) Area of study (fishery zone, including maps, waypoints, etc.)
(7) Species planned for studies
(8) Information about research vessel and equipment intended to use during studies
(9) Information on taking/sampling animals
(10) Other information
(11) Some extra data may also be required in the process of consideration.

The permit for conducting sighting survey might be issued with correction of initial waypoints and tracklines according to requirements of Russian authorities and inner regulations. Sampling option in Russian EEZ is included in this permit, but export of samples will be discussed separately below. Also the obligatory condition of issuing the permit is presence of Russian representative onboard the vessel and sharing all acquired data.

Permit to export biopsy samples (CITES) from Russian EEZ
Essential point in the process of CITES permit is a memorandum on cooperation or any kind of agreement with appropriate Russian scientific institute (exporter). Basing on such a memorandum or agreement Russian or corporate foreign institute (importer) will submit a request to export samples.

The submission must include Japanese (owner of the vessel) import permit and it is a crucial item. Appropriate records in IWC SC report could be very helpful. Main items of submission are as follows:

(1) Purpose of import/export
(2) Species
(3) Sample description
(4) Number of samples
(5) Sample origin
(6) Transportation and storage issues
(7) Postal addresses of exporter and importer and contact phones
(8) Recommendation of Scientific CITES body in Russia
(9) Legal basis for import/export (Memorandum or agreement between research institutes)
(10) Documents confirming legal sampling (permit #1)
(11) Fees receipt

The timing of consideration by Russian CITES body is 20 days after submission (if no additional information is required, in that case timing may be prolonged up to 20 days more). The CITES export permit expiry time is 6 months.

The CITES export permits are issued separately for each species. Therefore, it is reasonable to estimate preliminary the maximum number of samples which could be possibly taken from each whale species.