Report of the IWC POWER Planning Meeting 2021

Virtual Meeting, 9-10 December 2021

Report of the IWC-POWER Planning Meeting: 2021[1]

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1. INTRODUCTORY ITEMS

1.1 Opening remarks and welcoming address including notes from the IT support team

Matsuoka (Convenor) opened the virtual meeting, welcomed the participants from Japan, Russian Federation, the USA, the Secretariat and IWC Scientific Committee and thanked them for their time particularly in the current COVID-19 situation. The List of Participants is given as Annex A. He noted the plan had been to hold this meeting in Tokyo but that had not been possible. Moronuki (Fisheries Agency of Japan) on behalf of the Government of Japan also welcomed the participants to the meeting. He noted the long history of the POWER programme with successful results and its importance to conservation and management of cetaceans. He hoped that the meeting 2022 would be a great success.

On behalf of the IWC and its Scientific Committee, Staniland (Head of Science, Conservation and Management at the IWC Secretariat) thanked Matsuoka for organising the meeting and to everyone for giving their time to support the IWC-POWER. He highlighted how important the programme has been to the work of the IWC and its Scientific Committee. He noted the international effort involved, and thanked Japan in particular for their support in providing a vessel and crew without which the important programme could not be run.

1.2 Election of the Chair

Matsuoka was elected Chair.

1.3 Adoption of the Agenda

The adopted Agenda is given as Annex B. Given the relatively short time available to the meeting and the hope that an in-person Technical Advisory Group meeting could be held in 2022, ideally before SC68D, the Chair noted that given the focus of the meeting was planning for the 2022 cruise, Items 2 and 3 would be dealt with relatively briefly and focus primarily on aspects relevant to 2022 rather than the programme as a whole.

1.4 Appointment of rapporteurs

Staniland, Donovan, Palka, Murase and Crance were appointed as rapporteurs.

1.5 Review of documents

The List of Documents is given as Annex C.

2. REVIEW OF CRUISE DISCUSSIONS AT SC68C AND THE TAG MEETING (SC/68C/REP01)

2.1 Review of Scientific Committee recommendations

The importance of the IWC-POWER data was reiterated at SC68C e.g. in its contributions to the Comprehensive Assessments of North Pacific humpback and sei whales (IWC, 2022a). In addition to abundance estimates obtained from the programme, the biopsy sampling component was of great value in understanding the stock structure of large whales in the North Pacific and further collection of samples, especially from blue and fin whales, was encouraged in future surveys.

The Scientific Committee had also thanked the Governments of Japan (ship, crew and researchers) and the USA (equipment and researchers) for their continued support to the programme. It commended the work undertaken by the Steering Group and Japan to ensure that the 2021 cruise went ahead, and strongly encouraged the efforts being made by Japan, Russia and the USA to enable international participation despite the problems of COVID-19. The Committee also noted the proposal of the Steering Group and TAG to hold a workshop or pre-meeting to develop more detailed plans for the post-2021 cruises. The results of the 2020 cruise (Matsuoka *et al.*, 2020) were welcomed and the Committee looked forward to receiving abundance estimates based on the data obtained. The plan for the 2021 cruise (IWC, 2022b) was endorsed (see Fig. 1).

2.2 Objectives and priorities

2.2.1 Long-term

The IWC agreed (IWC, 2012a) that the long-term IWC-POWER programme:

[1]Presented to the Scientific Committee as SC/68D/Rep/03.

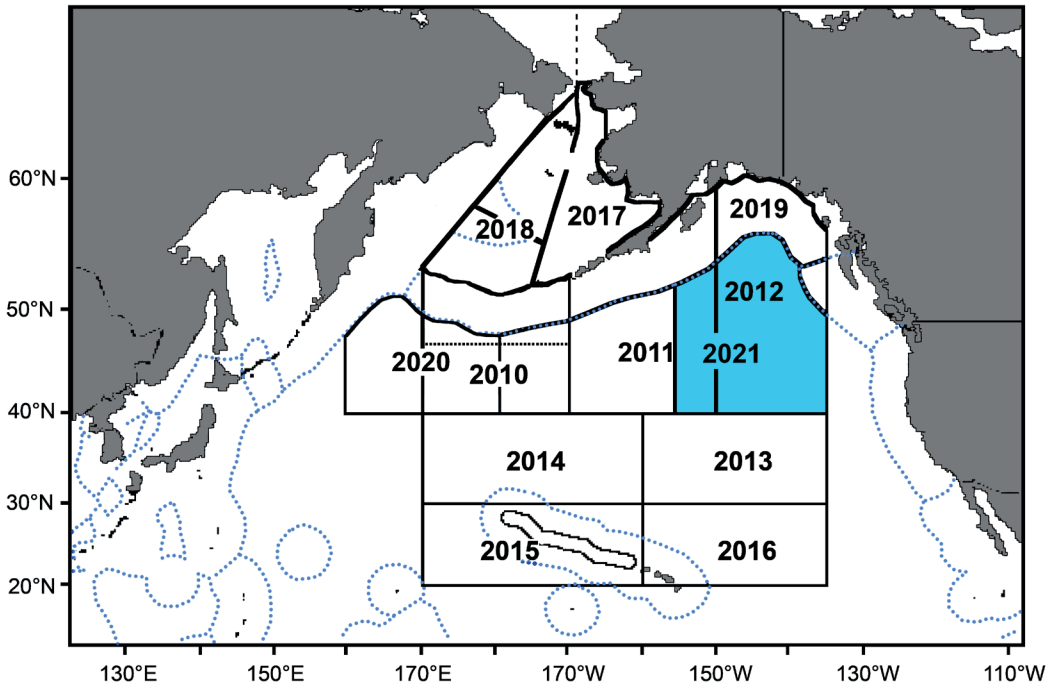

Fig.1. Research area and transit for the 2021 IWC-POWER cruise.

'will provide information to allow determination of the status of populations (and thus stock structure is inherently important) of large whales that are found in North Pacific waters and provide the necessary scientific background for appropriate conservation and management actions. The programme will primarily contribute information on abundance and trends in abundance of populations of large whales and try to identify the causes of any trends should these occur. The programme will learn from both the successes and weaknesses of past national and international programmes and cruises, including the IDCR/SOWER programme.'

2.2.2 Short-term

The identified 'least studied' areas of the central and Eastern North Pacific will soon have been covered under the IWC-POWER (pending permission to operate in Russian waters of the Bering Sea and east of the Kuril archipelago off Kamchatka), thereby completing the 'short-term' objectives (IWC, 2012b). Analyses of these data will form the basis of the medium-term plan and may also result in one or two more cruises aimed at filling specific knowledge gaps before implementing the medium-term programme.

2.2.3 Medium-term

The medium-term objectives were reviewed and updated by the TAG in January 2020 with regard to the results of the programme so far. These are given in table 1 of IWC (2021). These objectives may be reviewed and updated by the TAG in spring 2022 in light of the results obtained through the past research cruises, that will be presented at that time.

3. RESULTS OF THE 2021 CRUISE

The 12th annual IWC-POWER cruise was conducted between 2 August and 30 September 2021 in the high seas waters of the eastern North Pacific between 40°00'N and US and Canadian EEZ boundaries, 135°00'W and 155°00'W. Alexander Somov (VINRO, Russia) had been nominated as one of the international researchers but unfortunately could not participate at the last minute due to personal reasons. He would have been the first Russian researcher to participate in the IWC-POWER programme. Russia and the IWC had worked cooperatively in the process of the nomination and the meeting hoped that a Russian researcher would be able to participate in next year's survey.

3.1 Sightings

The 2021 survey was conducted aboard the Japanese R/V *Yushin-Maru No. 2* and despite poor weather, about 77% (1,563 n.miles) of the expected trackline was covered, some 53% in Passing with abeam closing mode (NSP) and 47% in Independent Observer passing mode (IO). Sightings of blue (6 schools/7 individuals), fin (79/115), sei (25/40), Bryde's (20/22), sperm (19/22) and killer (1/4) whales were made. Blue and fin whales were mainly in the north of the research area, sei whales in the middle and Bryde's whales in the southern part of the research area. The Angle and Distance Estimation Training Exercise and Experiment was conducted before commencing the sighting surveys. In addition, a total of 88 objects of marine debris were observed.

3.2 Biopsy sampling

A total of 19 biopsy (skin and sometimes blubber) samples were collected from 3 blue, 9 fin, 4 sei, 2 Bryde's and 1 killer whale.

3.3 Photo-identification

Photo-identification data were collected for: 7 blue, 31 fin, 15 sei 13 Bryde's and 3 killer whales. These data are preliminary, pending further processing and photo-identification confirmation.

3.4 Other

No acoustic survey was conducted during the cruise.

A feasibility satellite telemetry experiment to obtain dive data of potential use for correcting abundance estimates behaviour was conducted at the discretion of Japan. Tags (SPLASH10-F-333, Wildlife Computers, US) were deployed on two fin and two sei whales. The data collected have not yet been analysed. To improve data collection in future, Japan is considering installing a Mote (Wildlife Computers, US) stationary listening station on the vessel to allow continuous data logging. The results of the feasibility experiment will be presented to the IWC/SC in the future and the meeting strongly encouraged provision of a report on this important work to SC68D, including information on data availability as appropriate.

In conclusion, the Planning Meeting thanked the Cruise Leader (Murase) and the researchers (Gilpatrick and Yoshimura) for the prompt provision of the draft cruise report and thanked them and the crew for undertaking a successful cruise under difficult circumstances. It was confirmed that all sighting survey electric data including photographs in hard-drive were already sent to the IWC secretariat on 9 December by ICR (Matsuoka).

3.5 Recommendations from cruise team

A number of recommendations were provided by the researchers (see Annex D).

The meeting recognized the importance of the practical improvements suggested by the 2021 cruise researchers. Several related to the photo-ID work and some (e.g. validating the value of the photo-ID approach for the non 'traditional' species such as fin, sei and Bryde's whales) have been made previously but not yet completed, largely due to funding issues. It agreed that a small group of experts could undertake this work and a proposal could be developed for submission at SC68D. The problem of the large number of almost identical photographs in a short time that could be taken using the digital cameras was noted – if they are all imported into the IWC Lightroom catalogue this makes data processing unnecessarily time consuming. It was suggested that the researchers on board could select a limited number of high-quality images for import into the catalogue. The meeting agreed that Secretariat and Steering Group should ensure that the most recent version of Lightroom should be downloaded onto the cruise computer prior to each cruise along with updated manuals, and that a virtual training session on its use should be provided to researchers.

4. 2022 CRUISE: GENERAL ISSUES

4.1 Availability of research vessel(s) from Japan and elsewhere

For the 2022 survey, Japan provisionally offered the same type of vessel as used in the 2021 survey.

4.2 Budget (including accommodation and food costs)

Staniland reported that including unused funds from previous cruises, the total budget for the IWC-POWER programme was £32,320.

4.3 Research permit for Russian waters

In 2021, a research permit to survey waters East of the Kuril archipelago had been applied for 6 months prior to the cruise in accord with the Russian Government guidelines but this had not been granted. As unfortunately was also the case for previous applications to operate in Russian waters in the Bering Sea, to date no explanation had been received as to why the permit had been refused and further information would be sought. The representatives of VNIRO (Bizikov and Sidorov) stated that they would do as much as possible to assist with the application and **agreed** to work with the planning meeting participants upon receipt of a formal request letter addressed to VNIRO from the IWC Secretariat. In this case they suggested developing a letter of support that would be sent to the relevant authorities and that could also be attached to the Japanese permit application. Staniland also **agreed** to write a letter of support on behalf of the IWC to the Russian Commissioner that could be attached to the application. It was also suggested that the Japanese Embassy in Moscow could liaise with their counterparts in the relevant Russian ministry/ies in advance and after submission of the application.

The representatives of VNIRO noted that whilst they had not been involved with cases of foreign research vessels working in Russian EEZ, they had worked with a Japanese researcher in the Okhotsk Sea using a Russian vessel. They noted that the use of a Russian vessel might increase the chances of a successful receipt of permission. In discussion it was observed that a change of the style of vessel may have implications for the research methods used and also that the programme was heavily dependent on the donation by Japan of a vessel and crew; IWC funds only cover the costs of international participants and planning meetings - there is nowhere near enough money to fund a vessel and crew.

4.4 Research permit for US waters

The back-up plan will be within the US EEZ. As noted under Item 5, Iida will file the necessary documents, including the need for biopsy sampling, within the necessary time limit (at least six months prior to the cruise).

5. 2022 SURVEY -PRIORITIES AND CRUISE PLAN

5.1 Research priorities (Original and back-up plan)

The IWC POWER short-term plan identifies 'least studied' areas of the Eastern North Pacific that depend on permission to operate in Russian waters and these remain the current objectives (IWC, 2012b), although the need for a backup plan that contributes to the overall objectives of the programme (see Item 2.2) as in previous years is recognized and both the original and backup plans are discussed below.

5.2 Research area(s) (original and back-up plan)

The proposed areas for the 2022 cruise will focus on the collection of line transect data and biopsy/photo-identification/acoustic data in the area shown in Fig. 2 since the areas had either not been covered (original plan) or not covered for 12 years (back-up plan). In neither area are IO data available to allow for $g(0)$ correction.

- These areas represent an important information gap for several large whale species.
- IO mode data are not available for these areas.

Table 1
Proposed plans for 2022.

Plan	No. of days	Research area	Home port	International researchers	Biopsy	Acoustic	Remarks
Original plan	60	East of Kuril archipelago and Kamchatka Peninsula (Russian EEZ) (No port call)	Shiogama/ Shiogama	Russia (2), Japan (2), US (1)	No*	No	Reapply following 2021. *If biopsy permission is given, biopsy samples will be analyzed on board within Russian EEZ.
Back-up plan	60	South of Aleutian Island (US EEZ)	Shiogama/ D.H./D.H./ Shiogama	US (2), Russia (1), Japan (1),	Yes*	Yes	Port calls twice in Dutch Harbor (D.H.) for Acoustic equipment (30 days for the research area). In case of one time port call in D.H., 38 days for research area. Average distance per day is reduced from 50 n.miles to 40 n.miles, and this is a little more room than in 2021 cruise.

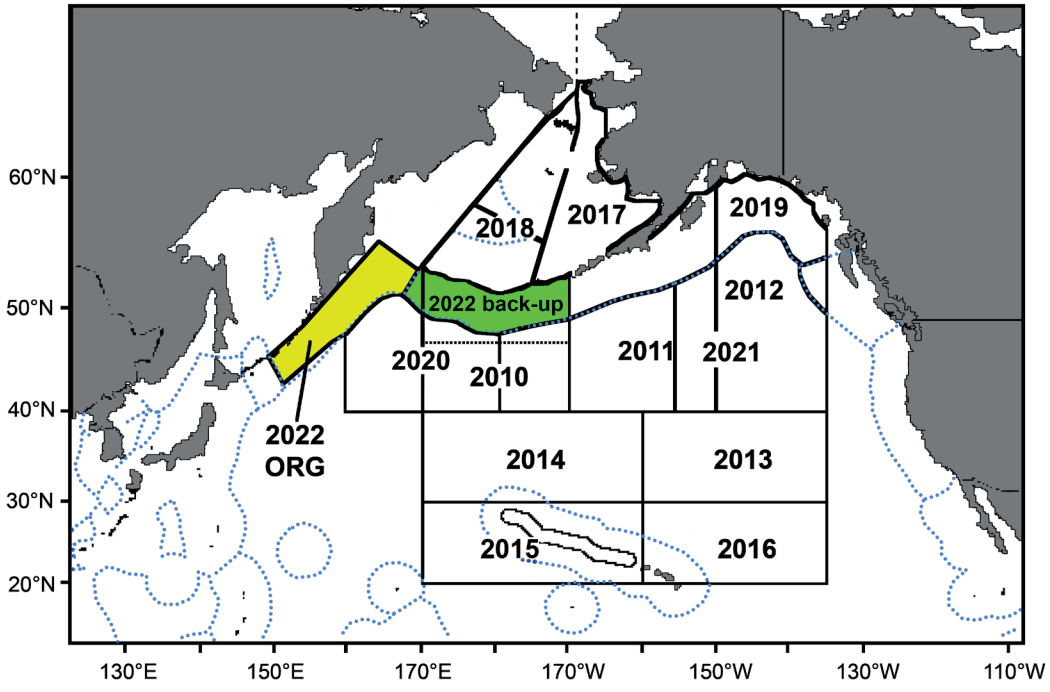

Fig. 2. Proposed 2022 plan with previous research area from 2010 to 2021.

5.3 Research vessel and days available (general itinerary)

For both proposed plans, a total cruise period of 60 days (including transit time) using home ports with refuelling/resupplying/researchers on-offboard has been allowed for (Table 1). Based on experience elsewhere in the North Pacific (e.g. north of 48°N), and allowing for expected poor weather conditions an average of around 40-50 n.miles per day (primary search effort) is expected. About six days is anticipated for 'experiments' - 1 day for the Distance and Angle Experiment and 5 days for photo-ID (and biopsy experiments in back-up plan only).

Table 2
Proposed cruise schedules for 2022.

Original plan		Back-up plan	
Date (ship's time)	Event	Date (ship's time)	Event
01 Aug. 2022	Pre-cruise meeting at Shiogama	01 Aug. 2022	Pre-cruise meeting at Shiogama
02 Aug. 2022	Vessel departs Shiogama	02 Aug. 2022	Vessel departs Shiogama
08 Aug. 2022	Vessel starts the survey in R.A.	10 Aug. 2022	Vessel arrives D.H.
27 Sep. 2022	Vessel completes the survey in R.A.	13 Aug. 2022	Vessel departs DH
30 Sep. 2022	Vessel arrives Shiogama	16 Aug. 2022	Vessel starts the survey in R.A (170W)
01 Oct. 2022	Post-cruise meeting at Shiogama	14 Sep. 2022	Vessel completes the survey in R.A. (168-09E)
		16 Sep. 2022	Vessel arrives D.H.
		19 Sep. 2022	Vessel departs D.H.
		(22 Sep. 2022)	(Vessel complete R.A. to Shiogama)*
		30 Sep. 2022	Vessel arrives Shiogama
		01 Oct. 2022	Post-cruise meeting at Shiogama

*One port call in (Dutch Harbor [D.H.]).

5.4 Cruise track design (original and back-up plan)

The cruise track for the original plan has already been approved by the IWC SC and no changes were needed. Coordinates delimiting the outline of the survey area (the green line in Fig. 3a) is shown in Table 3.

Table 3
Coordinates delimiting the outline of the survey area (the green line in fig. 3a).

	Latitude	Longitude		Latitude	Longitude
Point (see Fig. 3a)	(in degrees, minutes and fractions of minutes)		Point (see Fig. 3a)	(in degrees, minutes and fractions of minutes)	
1	53°13,'00	170°00,00'	8	45°17,'40	149°33,'24
2	51°25,'00	165°00,'00	9	47°05,'50	152°55,'60
3	48°48,'00	161°14,'00	10	47°23,'70	153°13,'90
4	47°37,'00	159°18,'00	11	49°43,'90	155°36,'40
5	45°30,'00	157°00,'00	12	51°01,'90	157°38,'00
6	44°48,'00	156°15,'00	13	53°54,'30	161°33,'20
7	42°43,'38	152°15,'36	14	55°10,'00	164°00,'00

In the case of the backup plan, whilst the overall area is agreed, the meeting **recommends** that flexibility as to the order in which an agreed cruise track is to be covered is required given the unpredictable weather in the area and that this should be at the discretion of the Captain and Cruise Leader. The importance of covering all parts of the research area with no large gaps in the transects was highlighted. Option 3 was suggested considering whale distribution and transit distance is reduced (Fig. 3b). The possibility of an initial port call at Dutch Harbor and returning directly to the home port in Shiogama rather than returning to Dutch Harbor was discussed. This would allow for 8 more survey days (average distance per day is reduced from 50 n.miles to 40 n.miles, and this is a little more room than in 2021 cruise) but this has some implications e.g., with permits for collecting and landing biopsy samples, acoustic buoy disposal, cruise track design and costs for foreign researchers. The meeting agreed that Matsuoka, Murase, Brownell, Crance and Staniland will investigate this and provide a final proposal for consideration by the Steering Group by the end of December.

5.5 Sighting survey (including transit)

5.5.1 Survey modes and allocation of effort (including number of crew, research speed)

For the 2022 survey, following previous advice from the Scientific Committee and the TAG, the survey will normally alternate modes between NSP and IO mode (*ca.* every 50 n.miles). However, use of IO mode should be flexible and at the Cruise Leader's discretion. If there are situations where the high density of whales causes problems for the observers in discriminating between different schools under IO mode, then the searching mode will be changed to NSP.

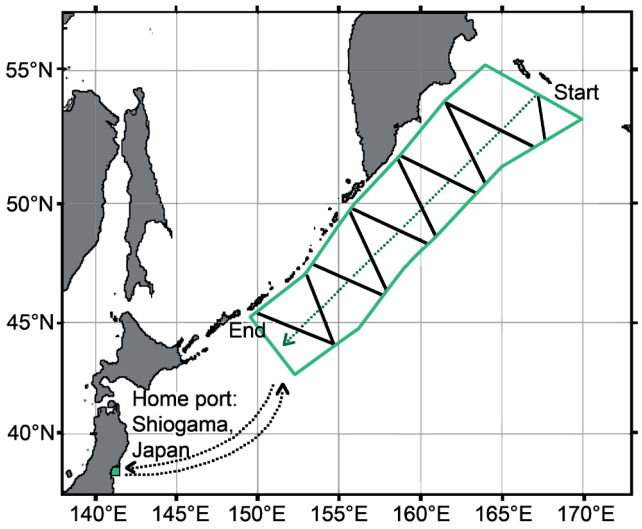

Fig. 3a. Proposed tracklines for 2022 original plan (East of Kuril archipelago).

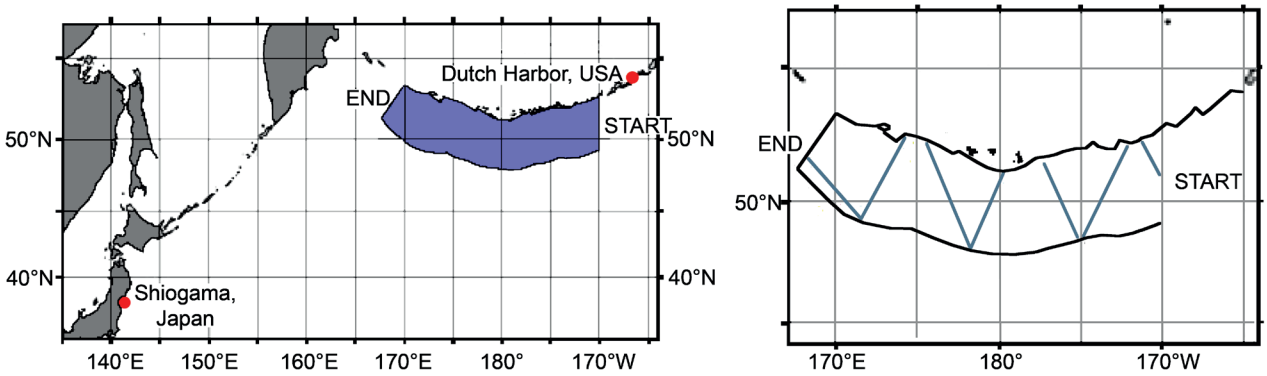

Fig. 3b. Proposed tracklines for 2022 buck-up plan (Southern Aleutian Islands).

Research hours during the cruise will be as in recent cruises (a maximum 12 hours per day between 06:00 and 19:00 (including 30 minutes meal times (lunch and supper) during only IO mode; beginning 60 minutes after sunrise and ending 60 minutes before sunset). For biopsy sampling/photo-identification work on priority species (blue, fin, sei, North Pacific right, and humpback are higher priority for these cruises) there may be occasions when it is beneficial to extend research outside the normal research hours. The basis for such special 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. Details of photo-identification and biopsy work are shown under Items 5.6 and 5.7.

During 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.

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 TOP barrel (and IOP barrel when IO mode) 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 reticules, 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.

5.5.2 Acceptable conditions

As in 2021, 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. The usual guidelines for acceptable conditions will apply, i.e. visibility (to see a minke whale) is greater than 2.0 n.miles and wind speed is <21 knots; the sea state should be <Beaufort 6; the ultimate decision as to 'acceptable' is taken by the Cruise Leader.

5.5.3 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, the experimental procedure was improved from that used in the 2015 cruise through the use of: (1) relatively inexpensive GPS technology 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) two buoys which can: (a) reduce the potential lack of independence with one buoy under the correct experimental protocols; and (b) allow increased efficiency and a greater distance range by including both researchers and 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 can be found in the Guide for Researchers.

5.5.4 Data recording and format

The survey will be conducted using the same data forms (see the Guide for Researchers) as the 2021 POWER cruise

5.6 Biopsy sampling

It was agreed that advice from Japan and Russian authorities about the CITES situation were necessary if the cruise takes place in Russian waters. It should be done by Iida and Bizikov. This includes advise from Russia on whether biopsy sampling onboard would be a better option.

Bizikov commented that permission for taking biopsy samples in Russian waters from species that are currently included in CITES and Russian Red list in the Russian EEZ is issued by the Ministry of Natural Resources and Ecology of Russia. He advised the inclusion of a biopsy sampling component in the 2022 research plan and that a formal request, together with the copy of application, should be sent to the Russian Commissioner to the IWC (I.B. Fominykh; Ministry of Natural Resources and Ecology) asking her for help in arranging permission for biopsy sampling.

5.6.1 Priority species

As appropriate and decided by the Cruise Leader, research time will be given for biopsy sampling of blue, fin, sei, common minke, humpback, North Pacific right and gray whales. Biopsy of killer and sperm whales will be attempted on an opportunistic basis.

5.6.2 Equipment

Projectile biopsies will be collected using the Larsen system. As noted in Item 5.5.1, the estimated daily number of miles to be steamed in searching mode has a built-in allowance for such work. 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 the option for five sample attempts is to allow for occasional low success rates. If signs of harassment such as rapid changes in direction, prolonged diving and other behaviours are observed from an individual or a group, the biopsy activities 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 main research vessel during normal survey operations. The projectile biopsy sample will be collected from animals within approximately 10 to 50m 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 will be thoroughly cleaned and sterilized with bleach. 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 our field biologists who have up to 20+ years' experience in the field.

Murase and Matsuoka will investigate whether additional darts and/or tips are required and if so will liaise with Larsen on their supply and Staniland with respect to budget.

5.6.3 Sample storage

Samples collected for molecular genetic analyses are to be divided in half, with one half of the sample for IWC (to be sent to the SWFSC) and the other half for Japan (ICR). All samples will be frozen. In addition, when biopsy samples have a significant amount of blubber attached, the blubber is to be separated from the skin, wrapped in aluminium foil, and frozen. Details can be found in the 'Information for researchers'.

5.7 Photo-identification studies

5.7.1 Priority species

As appropriate and decided by the Cruise Leader, priority research time will be given for photo-identification and/or video taping of North Pacific right, blue, and humpback whales. As noted under Item 5.5.1, the estimated daily number of miles

to be steamed in searching mode has a built-in allowance for such work. It is also expected that fin, sei and Bryde's whales will also be photographed for possible photo-identification, at least when approached for biopsy sampling. Killer whales are 'non-target' species which are lower priority and will be photographed on an opportunistic basis. Photographs will be available under the standard IWC Guidelines. Generally, large whales will be approached within approximately 15-20 meters. Photo-identification of adult and juvenile males and females 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.

5.7.2 Equipment and collection

The rules for data availability, shipping and storage will be the same as for the previous IWC-POWER cruises. It also noted that existing IWC equipment used in the 2020 cruise could be used on the 2022 cruise if allowed/required. All records will be discharged in Japan and will be sent to the IWC Secretariat under the responsibility of the cruise leader and ICR.

5.7.3 Analysis and archiving

All photo-ID digital photographs of this cruise are to be sent to IWC and shared to Japan (ICR) as with previous IWC/SOWER and POWER cruises. As possible, researchers will incorporate photographs into the IWC Lightroom database during the cruise according to guidelines provided. In terms of data availability, Japan and the IWC share all the data from IWC-POWER cruises, and these are available to Scientific Committee members upon request.

5.8 Acoustic studies

It was agreed that within the original plan no acoustic survey would take place to avoid issues with permit applications. If the backup area is surveyed, passive acoustic monitoring using sonobuoys will occur (approval for their use from the Government of Japan was confirmed for the 2022 back up plan). Sonobuoys will be deployed every ~25 n.miles along the trackline to ensure even coverage within the survey area.

5.8.1 Priority species

The acoustic buoys will be able to pick up large and small cetacean calls. If high priority species are acoustically detected (i.e. North Pacific right and blue whales), the acoustician will alert the Chief Scientist, and at their discretion, the vessel will cease standard visual survey operations and break trackline. Additional sonobuoys will be deployed simultaneously to attempt to localize on the calling animal. If an estimated position is obtained, the acoustician will alert the Chief Scientist, and the vessel will proceed to that location.

5.8.2 Equipment

For the back-up plan, all necessary equipment will again 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 6.1). 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, the vessel can remain in range of the sonobuoy for the full 8 hour lifespan of the buoy, so the number of buoys deployed will be less. Thus the maximum number of sonobuoys required will be around 180 (6x30 days) but given the likely prevailing conditions, will be somewhat less (usually average 4 per day). The sonobuoys are shipped in crates of 48 (1.3 m^2, 680kg); allowing for possible failures, three or possibly 4 crates will be sufficient. The Planning Meeting noted that it would be helpful if some solution could be found to the problem of trash generated through use of the sonobuoys, given that it is expensive to dispose of this in Dutch Harbor.

5.7.3 Analysis and archiving

Sonobuoys will be monitored and analysed in real time, and all recordings will be saved to an external hard drive that is backed up daily. Raw acoustic data will be stored at the Alaska Fisheries Science Center in Seattle, WA. Digitized datasheets of sonobuoy deployment, recording, and species detection information will be given to the Chief Scientist at the end of the survey.

5.9 Other studies

5.9.1 Marine debris

The protocol adopted for recording such material (15 minutes at the beginning of every hour) will continue in 2022 to prevent compromising cetacean sightings searching effort.

5.9.2 Oceanographic studies

Only basic oceanographic information (e.g. SST) is to be collected during the cruise. However, the TAG noted that oceanographic data from remote sensing has proved valuable in spatial modelling approaches.

5.9.3 Satellite tagging studies

As last year, the Scientific Committee had recognised the potential of carrying out satellite tagging studies to address specific questions, especially for the mid-term programme. It was agreed that such studies were voluntary and should be

at the discretion of Japan. The cruise leaders will decide whether such work should take place during the cruise with the understanding that the line transect survey is the highest priority. In 2021 satellite tags had been successfully deployed and collected dive data import to understand availability analyses (see Item 3.4).

6. 2022 CRUISE-LOGISTICAL ISSUES (ORIGINAL AND BACKUP PLAN)

6.1 International researchers and allocation of research personnel

It was agreed that under the original plan 2 Russian, 2 Japanese and 1 US researchers would participate and under the backup plan 2 US (Crance received permission to use sonobuoys), 2 Japanese and 1 Russian researcher would participate.

6.2 Transportation of data, samples and equipment including permits

6.2.1 Home port organiser and entry/exit permits

The home port will be Shiogama and the home port organiser in Japan will be Takahashi. For the backup plan Crance will act as home port organizer in Dutch Harbor.

6.2.2 Sightings: equipment, data, permits and responsible persons

As in previous years, ICR (Matsuoka) and Kyodo Senpaku (Yoshimura) will check the sightings equipment to ensure that all is working/available. Within two months of the end of the cruise, all validated sightings data will be forwarded to IWC by the Cruise Leader and ICR (Matsuoka).

6.2.3 Biopsy: equipment, samples, permits and responsible persons

When biopsying is appropriate, the biopsy samples will be taken using the Larsen system. Matsuoka will ensure that the necessary equipment, including darts, plugs and vials are available (see Item 5.6.2). ICR (Taguchi and Matsuoka) will ensure that the IWC samples are sent to the SWFSC (the IWC repository) in accordance with CITES procedures. Issues related to CITES permits for both options are being worked upon by the relevant authorities in Russia, the USA and Japan depending on where the cruise takes place and whether permission to undertake biopsy sampling is given.

After issues in logistics imposed by Covid, all efforts to ship samples from previous cruises between Japan and the SWFC will be continued.

6.2.4 Photo-identification: equipment, permits and responsible persons

As in previous years, ICR (Matsuoka) and Kyodo Senpaku (Yoshimura) will check the camera equipment to ensure that all is working/available. Staniland and Matsuoka will ensure that the additional equipment agreed under Item 3.6 is purchased/serviced as possible. No permits are required. Matsuoka will submit all identification photographs/videos and accompanying data to IWC within three months of the cruise.

6.2.5 Acoustics: equipment, permits and responsible persons

Sonobuoys will be provided by the Alaska Fisheries Science Center. Iida has confirmed that when deployed in US waters, and brought aboard in a US port, the use of sonobuoys on a Japanese vessel is allowed. As such, sonobuoy use will proceed as it has in the past. However, importing sonobuoys to Japan, or deploying them in Japanese waters falls under Japanese law and requires the equipment to be certified by the Ministry of Internal Affairs and Communications. Crance has provided a wealth of data on this but the ministry has requested raw data on the sonobuoys including their frequency by each channel, occupied bandwidth and maximum antenna power output from actual measurements and not the general specifications in the manual. Crance has begun communication with a suitable laboratory in the US to obtain these data to ensure sonobuoys can be used in future POWER cruises. Iida and Crance will remain in contact to try and resolve this matter.

Crance will install antennae on the vessel as in previous years. Existing cables on the vessel are prone to damage and degradation over time; Yoshimura will be responsible for checking these and ensuring any repairs or replacements are carried out.

6.2.6 Other

There was no particular discussion.

6.3 Communications

6.3.1 Safety aspects (daily report etc.)

The vessel will be equipped with AIS. Daily vessel position reports will be submitted to ICR, the Fisheries Agency and Kyodo Senpaku Co Ltd. For the Russian option, daily reports may be necessary depending on the area, and in this case the designated Russian representative (Bizikov) will be responsible for contacting the relevant authorities. For the back-up the US researcher (Crance) will coordinate regular communication with the US Coast Guard when in the US-EEZ.

6.3.2 Between Cruise leader and IWC

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

6.3.3 Weather and sea temperature information
It was agreed that fog information will be required and this will be obtained as usual via a Japanese agency as official communication.

6.3.4 Other official communications
For the Russian option, arrangements will be made to comply with any requirements specified in the permit. Iida and Staniland will investigate this. There are no additional requirements for the backup option.

6.3.5 Private communications
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. 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).

6.4 Meetings (including responsible persons)
6.4.1 Pre-cruise meeting
For the original plan all researchers will join the vessel in Japan and the pre-cruise meeting will be held in Shiogama and organised by Takahashi. For the back-up plan there will be an additional pre-cruise meeting in Dutch Harbor organized by Crance.

The Cruise Leader will ensure that the report of the pre-cruise meeting(s) is/are circulated to the IWC-POWER Steering Group when completed.

6.4.2 Post-cruise meeting
For the original plan, the post-cruise meeting will be held in Shiogama when the vessel returns to port; it will be organised by Takahashi. For the backup option, a post-cruise meeting will be held in Shiogama and organised by Takahashi, and in Dutch Harbor (organized by Crance if another port call is to be made after completing research cruise in the survey area), depending on the final plan chosen (see Item 5.4).

6.5 Reports
6.5.1 Planning meeting report
This planning meeting report will be uploaded onto the IWC website as a report for SC68D.

6.5.2 Cruise report
As usual, the cruise report will be drafted on the return journey of the cruise following the previous guidelines. The report will be discussed at the next planning meeting and then a final version will be sent to the Secretariat for submission to SC68D in 2022.

6.6 Press releases
The Cruise Leader (or representative) in consultation with the IWC (Kate Wilson and Iain Staniland) and, if necessary, Russia will prepare a press release before and after the cruise. The IWC, ICR, Russia if required, 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 be given to providing a weekly or bi-weekly review of activities on the IWC website as the cruise progresses, along with a summary at the end of the cruise. Any additional press releases during the cruise precipitated by unusual observations (e.g. the finding of right whales) will be circulated for comment and approval to the Steering Group and the Cruise Leader prior to release.

6.7 Security
For the original plan, the Fisheries Agency of Japan, ship agents and the designated Russian representative will investigate the situation and ensure that adequate security measures are in place. When in port or needed the IWC banner will be readily visible, this is already on stored on the vessel.

The same procedures adopted in previous visits to Dutch Harbor will be followed if the backup plan is used.

7. OTHER

7.1 Data validation and analysis
Work on data validation continues at the Secretariat. Where difficulties arise, these are dealt with in cooperation with the Cruise Leader.

7.2 IWC website
The Secretariat will ensure that the IWC website is updated as appropriate.

7.3 Other
There was no particular discussion.

8. WORKPLAN

8.1 Plan for a workshop before SC68D

It was agreed that an in-person meeting of the Technical Advisory Group was needed to discuss the complex issues around the development of the medium-term plans for the IWC-POWER programme. It is preferable to hold this before SC68D but it could be delayed until later in the calendar year if this is not possible. It would not be possible to do this between 11 April and the start of SC68D because of other commitments. All agreed that planning could begin well before the meeting including drafting an agenda and the compilation of documents and a list of key people.

8.2 Timeline to develop medium-term planning

There will be at least two more cruises (depending on the Russian Permit situation) required to complete the initial programme. However, it is essential to begin the planning for the next (medium-term) phase as soon as possible (see Item 8.1) with a view to completing the planning by 2024.

8.3 Suggestion from Russia for the future survey

Bizikov suggested time was needed to consider any future surveys and efforts should concentrate on the application for the 2022 cruise. The Committee has already agreed the need to complete coverage of the Bering Sea by covering the waters of the Russian Federation there. The planning meeting confirmed that this was still a high priority area.

8.4 Other

The need to expedite the finalisation of the report was emphasised and a deadline for completion by 20 December 2021 was agreed.

9. CONCLUDING REMARKS AND ADOPTION OF REPORT

Bizikov informed the group that Dr. Zharikov who had worked in the POWER programme for many years had retired for his illness. Bizikov agreed to pass on the regards and gratitude of the planning meeting to Dr. Zharikov for all his work over the years.

Moronuki confirmed that the Japan's position had not changed since the withdrawal from the IWC and it continued to work with international organisations to support science and international management of cetaceans. The IWC POWER programme was an important part of this and would continue to be supported as before. Staniland thanked Moronuki for his encouraging words noting the IWC and its Scientific Committee looked forward to working with Japan and the international researchers on this important programme.

Matsuoka thanked the participants for their hard work over the two days. The participants in turn thanked Matsuoka for his excellent chairing of the meeting. The meeting adopted the report (subject to final editorial work) and concluded its business at 22:00hrs (UTC) on 20 December 2021.

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Annex A

List of Participants

Robert Brownell, Southwest Fisheries Science Center, USA
Jessica Crance, Alaska Fisheries Science Center, USA
Greg Donovan, Emeritus Head of Science, IWC
Pavel Gushcherov, Russian Federal Research Institute of Fisheries and Oceanography (TINRO), Russia
Takashi Hakamada, Institute of Cetacean Research, Japan
Takeru Iida, Fisheries Agency of Japan
Masaki Kadota, Fisheries Agency of Japan
Hidehiro Kato, Institute of Cetacean Research, Japan
Taiki Katsumata, Institute of Cetacean Research, Japan
Natalie Kelly, Australian Antarctic Division, Australia
Sidorov Lev. Konstantinovich, Russian Federal Research Institute of Fisheries and Oceanography (VNIRO), Russia
Koji Matsuoka, Institute of Cetacean Research, Japan
Hideki Moronuki, Fisheries Agency of Japan
Hiroto Murase, Tokyo University of Marine Science and Technology, Japan
Debra Palka, Northeast Fisheries Science Center, USA
Yurie Sawasaki, Fisheries Agency of Japan
Iain Staniland, Head of Science, Conservation and Management, IWC
Megumi Takahashi, Institute of Cetacean Research, Japan
Mioko Taguchi, Institute of Cetacean Research, Japan
Bizkov V. Alexandrovich, Russian Federal Research Institute of Fisheries and Oceanography (VNIRO), Russia
Isamu Yoshimura, Kyodo Senpaku Co. Ltd
Midori Ohta, Interpreter, Japan
Saemi Baba, Interpreter, Japan

Annex B

Agenda

1. Introductory items
   - 1.1 Opening remarks and welcoming address including notes from the IT support team
   - 1.2 Election of the Chair
   - 1.3 Adoption of the Agenda
   - 1.4 Appointment of rapporteurs
   - 1.5 Review of documents
2. Review of cruise discussions at IWC 68C and the TAG meeting (SC/68C/Rep01)
   - 2.1 Review of Scientific Committee recommendations
   - 2.2 Objectives and priorities
     - 2.2.1 Long-term
     - 2.2.2 Short-term
     - 2.2.3 Medium-term
   - 2.3 Progress since last planning meeting
   - 2.4 Other
3. Results of the 2021 cruise
   - 3.1 Sightings
   - 3.2 Biopsy sampling
   - 3.3 Photo-identification
   - 3.4 Other
   - 3.5 Recommendations from cruise team
4. 2022 cruise: general issues
   - 4.1 Availability of research vessel(s) from Japan and elsewhere
   - 4.2 Budget (including accommodation and food costs)
   - 4.3 Research permit for Russian waters
   - 4.4 Research permit for US waters
5. 2022 survey - priorities and cruise plan
   - 5.1 Research priorities (original and back-up plan)
   - 5.2 Research area(s) (original and back-up plan)
   - 5.3 Research vessel and days available (general itinerary)
   - 5.4 Cruise track design (original and back-up plan)
   - 5.5 Sighting survey (including transit)
     - 5.5.1 Survey modes and allocation of effort (including number of crew, research speed)
     - 5.5.2 Acceptable conditions
     - 5.5.3 Angle and distance experiment
     - 5.5.4 Data recording and format
   - 5.6 Biopsy sampling
     - 5.6.1 Priority species
     - 5.6.2 Equipment
     - 5.6.3 Sample storage
   - 5.7 Photo-identification studies
     - 5.7.1 Priority species
     - 5.7.2 Equipment and collection
     - 5.7.3 Analysis and archiving
   - 5.8 Acoustic studies

- 5.7.1 Priority species
- 5.7.2 Equipment
- 5.7.3 Analysis and archiving

5.9 Other studies
- 5.9.1 Marine debris
- 5.9.2 Oceanographic studies
- 5.9.3 Satellite tagging studies

6. 2022 cruise logistical issues (original and backup plan)
   - 6.1 International researchers and allocation of research personnel
   - 6.2 Transportation of data, samples and equipment including permits
     - 6.2.1 Home port organiser and entry/exit permits
     - 6.2.2 Sightings: equipment, data, permits and responsible persons
     - 6.2.3 Biopsy: equipment, samples, permits and responsible persons
     - 6.2.4 Photo-identification: equipment, permits and responsible persons
     - 6.2.5 Acoustics: equipment, permits and responsible persons
     - 6.5.6 Other
   - 6.3 Communications
     - 6.3.1 Safety aspects (daily report etc.)
     - 6.3.2 Between Cruise leader and IWC
     - 6.3.3 Weather and sea temperature information
     - 6.3.4 Other official communications
     - 6.3.5 Private communications
   - 6.4 Meetings (including responsible persons)
     - 6.4.1 Pre-cruise Meeting
     - 6.4.2 Post-cruise Meeting
   - 6.5 Reports
     - 6.5.1 Planning meeting report
     - 6.5.2 Cruise report
   - 6.6 Press releases
   - 6.7 Security
7. Other
   - 7.1 Data validation and analysis
   - 7.2 IWC website
   - 7.3 Other
8. Workplan
   - 8.1 Plan for a workshop before SC68D
   - 8.2 Timeline to develop medium-term planning
   - 8.3 Suggestion from Russia for the future survey
   - 8.4 Other
9. Concluding remarks and adoption of report

Annex C

List of Documents

01. Timetable (Ver20211129).
02. Excerpt from 2021 Scientific Committee Report (SC/68C SC Report).
03. Report of the Meeting of the IWC-POWER Technical Advisory Group (TAG) and 2021 Planning Meeting: November 2020 (SC/68C/Rep01).
04. Report of the Steering Group of the IWC-POWER (North Pacific Ocean Whale and Ecosystem Research Programme) Programme to SC68C (SC/68C/ASI/17).
05. Cruise report of the 2021 IWC-POWER (Murase *et al.*).
06. Proposal for original plan (east off Kamchatka, Russian EEZ) of 2022 survey (Revised SC/68C/Rep01).
07. Proposal for backup plan (south of Aleutian Islands, US-EEZ) of 2022 survey (Takahashi and Hakamada).
08. Task list for the 2022 cruise.
09. Request for marine scientific research.

Annex D

Recommendations from the Researchers of the 2021 POWER Cruise

1. STRATIFICATION OF THE RESEARCH AREA

The 2021 IWC-POWER was conducted from the middle of August to the middle of September which was assumed to be the end of the northbound migration season. It covered three different waters: subarctic and subtropical waters, and the transition zone between them (subarctic-subtropical transition zone). It appeared that distributions of four baleen whale species were related to these waters: blue and fin whales in the subarctic water, sei whales in the transition zone and Bryde's whales in the subtropical water. Allocation of the planned tracklines in each water zone was apparently limited in this cruise given the size of the survey area. It is recommended that the survey designers reconsider the survey timing and stratification of the research areas when formulating a medium-term plan, taking into account the objectives, target species, season, oceanography and the past results of the IWC-POWER cruises. In 68C IWC/SC, it was pointed out that the research area of the 2021 IWC-POWER might be too large to obtain a good estimate given the number of days available (IWC, 2021b).

2. SCHEDULE OF THE SURVEY

Initially, there was an option that *YS2* called to Kodiak, US for refuelling and joining/leaving researchers (IWC, 2021a). However, it was decided that the 2021 IWC-POWER would be conducted for 60 days without refuelling considering the COVID-19 pandemic situation at the time of departure from Japan. This decision limited the total research days to 30 days. Furthermore, *YS2* reduced the ship's research speed to 10.5 knots to conserve fuel although it was in the range of accepted speed for the sighting survey. Reducing the ship's speed affected the total searching distance. It was recommended that port calls outside of Japan should made in the future survey to maximize survey effort in the research area if the situations allow. This consideration is especially important when the research area is considerably distant from Japan.

3. PHOTOGRAPHIC DATABASE PROCESSING IN LIGHTROOM (LR)

As in the case of 2021 cruise, images collected during the cruise were uploaded to LR and preliminarily coded. By processing images directly in LR, post-cruise processing time is greatly reduced. Furthermore, it allows for real-time photo-analysis summaries and expedites image access/sharing. It is recommended that researchers on future cruises continue LR processing. However, processing images would overwhelm researchers if a large number of images are taken in a high-speed consecutive shot mode. It is recommended that photographers try to take only 'high-quality images' as much as possible to minimize number of images for LR processing. It is recommended that guidance documents specific for photo-processing during the cruise and the IWC LR Photographic Database Manual are kept up-to-date and that hard and electronic copies are made available on future cruises. It is recommended that newest version of LR at the beginning the survey is installed on the IWC-POWER laptop with an up-to-date catalogue prior to future IWC-POWER cruises. It is recommended that the IWC secretariat holds a workshop of LR for researchers in advance of each cruise so that database manager and researchers can have mutual understanding on management of images in LR.

4. CAMERA EQUIPMENT

A Canon EOS 5D Mark II camera with 100-400mm lens (courtesy of SWFSC) was used as one of the primary cameras for photo-identification during the 2021 IWC-POWER survey. However, because it was identified that the SWFSC's lens was not functioning properly, the ICR's lens was used in conjunction with the SWFSC's camera. It is recommended that in accord with usual practice, all cameras be carefully checked well before the survey.

5. ASSESSMENT OF FEASIBILITY OF PHOTO IDENTIFICATION FOR FIN, SEI AND BRYDE'S WHALES

Target species for photo-ID are North Pacific right, blue, gray and humpback whales although photos of all other species were obtained opportunistically. Generally, it is believed that photo identifications of fin, sei and Bryde's whales are extremely difficult one because they do not have unique features for the identifications and the other because matching is difficult considering their abundance. Their photos have taken since the beginning of this programme without assessment of the feasibility. It is recommended that the feasibility of their photo identifications be assessed before continuing this practice in the future cruises. This is also important consideration on workload of researchers.

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