Annex D

Report of the Standing Working Group on Abundance Estimates, Stock Status and International Cruises

1. INTRODUCTORY ITEMS

Participants: Givens (Convenor), New (Co-convenor), Aguilar Arakaki, Allison, Baba, Babey, Bell, C., Bell, E., Biuw, Bouzouma, Branch, Brandão, Braulik, Brownell, Butterworth, Calambokidis, Cañadas, Castro, Charlton, Chauca Huánuco, Choi, Cipriano, Citta, Collins, Constantine, Cooke, Cubaynes, Diallo, Domit, Doniol-Valcroze, Donovan, Doumbouya, Fewster, Fiogbe, Fortuna, Fyfe, Gallego, Galletti, Genov, Goetz, Gushcherov, Hansen, Hielscher, Iida, Iñíguez Bessega, Jaramillo Legorreta, Jiménez, Jones, L., Katara, Katsumata, Kelly, Kinzey, Kitakado, Lang, Leal, Leaper, Lee, K-L, Lee, M-K, Leslie, Lundquist, Mallette, Matsuoka, Miller, Minton, Mizroch, Murase, Nelson, O'Loughlin, Øien, Olson, Palka, Panigada, Park, Pastene, Peltier, Porter, Punt, Reeves, R., Reeves, S., Ridoux, Robbins, Rogan, Salvador, Scheimreif, Schubert, Scordino, Seakamela, Sigurðsson, Simmonds, Slooten, Solvang, Soro, Stack, Staniland, Sucunza, Suydam, Tai, Tamura, Taylor, Tulloch, Vazquez, Vermeulen, Wade, Walløe, Weinrich, Weller, Wilberg, Wilson, Witting, Yasokawa, Yoo, Yoshida, Zerbini.

1.1 Opening remarks

The convenor, Givens, welcomed the participants to the meeting, recalling that the Scientific Committee (SC) had agreed in 2016 to form the Standing Working Group (SWG) for Abundance Estimates, Stock Status, and International Cruises (ASI) to ensure that abundance estimates used by the SC receive a consistent level of formal review. Since then, ASI has worked to develop a suitable review process and has undertaken many such reviews.

It had quickly become apparent that the workload for ASI was greater than could be accomplished during the annual SC meeting. Accordingly, in 2019 the SC agreed to form the Abundance Steering Group (ASG) to coordinate an intersessional review process. The ASG held a pre-meeting to SC69A during 21-23 April, and its report (SC/69A/REP/02, hereafter 'the ASG Report') informed ASI discussion this year.

Givens thanked the participants for contributing their expertise to the meeting, and he offered special thanks to the 25 independent reviewers (listed in the ASG Report) whose thoughtful reviews, voluntarily contributed intersessionally, were an important basis for ASG and ASI recommendations.

1.2 Election of the Chair

Givens was elected Chair. New was elected Co-chair.

1.3 Appointment of Rapporteurs

Kelly and Doniol-Valcroze were appointed rapporteurs. Givens thanked them for their continuing commitment to helping ensure the success of ASG and ASI, and the outstanding work they contribute each year.

1.4 Adoption of the agenda

The agenda, as adopted, is given as Appendix 1.

1.5 Documents available and online schedule

In addition to the ASG Report, the following documents were available: Bradford *et al.* (2021), Brandão *et al.* 2023, Calambokidis and Barlow (2020), Constantine *et al.* (2021), Eguchi *et al.* (2022), Hamabe *et al.* 2023, Harris *et al.* (2022), Jackson *et al.* (2015), Jackson *et al.* (2016), Monnahan *et al.* (2019), Palka (2006), Palka (2020), Romero *et al.* (2022), SC/69A/ASI/01/Rev1, SC/69A/ASI/02, SC/69A/ASI/03/Rev2, SC/69A/ASI/04-09, SC/69A/ASI/10/Rev1, SC/69A/ASI/11-14, SC/69A/ASI/15/Rev1, SC/69A/ASI/16-18 SC/69A/ASI/19/Rev2, SC/69A/ASI/20-21, SC/69A/IST/01 and SC/69A/REP/01-04. Reviews of documents presenting abundance estimates were also available and have been archived by the Secretariat.

1.6 New ASG/ASI process to reduce redundancy

Last year, the ASG pre-meeting and ASI sessions in SC68D were challenged by the online format forced by the Covid-19 pandemic, and the severely limited session count and hours. After reflecting on that experience, the convenors felt that there were redundancies in the ASG/ASI process that could be eliminated.

For SC69A, the convenors experimented with a new approach. Specifically, for each paper ASG reviewed during its pre-meeting, ASG assigned a label of either 'Needs further review by ASI' or 'Does not need further review', in addition to the standard recommendations about endorsement and categorization. The 'Needs further review' label was intended for estimates that ASG concluded might be controversial or where ASG discussion failed to resolve lingering questions or concerns or where the quality of the overall review would be enhanced by discussion among the wider audience of ASI. If ASG was uncertain about which label should apply, it chose 'Needs further review'.

As no specific requests were received to address any of the estimates ASG had satisfactorily categorised, these were endorsed en masse. ASI discussed only those estimates identified as needing further review.

ASI considered that this new procedural approach had been effective and agreed to continue this approach in future meetings.

Attention: SC-ASI, SC-ASG

*The Working Group **agreed** to a revised process to review abundance estimates.*

(1) Abundance estimates are initially reviewed by the Abundance Steering Group (ASG).

(2) The ASG recommends whether each abundance estimate reviewed requires further consideration by ASI.

(3) ASI will consider any estimates identified as needing further review by either ASG or ASI.

(4) The remaining abundance estimates are then endorsed en masse without further discussion by ASI.

2. REVIEW OF ABUNDANCE ESTIMATES

Attention: SC, S, C

*The SWG recognises that the IWC Table of Accepted Abundance Estimates is an important tool for the work of the Committee and the Commission. The SWG **recommends** that the following estimates should be endorsed during the 2023 meeting (SC69A), incorporated intersessionally into that table, uploaded to the IWC website when indicated, and endorsed by the Commission. Specifically, these estimates are:*

- *Māui dolphins in 2021 along the northwest coast of the North Island of Aotearoa New Zealand: 48 (95% CI 40-57). Category 3[1].*
- *Southwest Atlantic right whales: 3,652 (95% CI 2,884-4,448) in 1999; 4,217 (95% CI 3,749-4,755) in 2009; and 4,633 (95% CI 3,849-5,681) in 2019. Category 1A, and the 2019 estimate should be added to the webpage.*
- *Southern right whales (New Zealand): 2,762 (95% CI 2,100-3671) in 2009 and 4,742 whales (95% CI 3,853–6,013) in 2020. Category 1A.*
- *Southern right whales (South Africa): 1,226 (SE 52) in 1990; 2,332 (SE 77) in 2000; 4,401 (SE 151) in 2010; and 6,470 (SE 285) in 2020. Category 1A, and added to the webpage.*
- *Antarctic blue whales (circumpolar): 2,050 (95% CI 1,135 - 3,704) in 2019. Category 3[2].*
- *Eastern North Pacific gray whales: 20,720 (95% CI 18,954-22,720) in 2010 and 16,650 (95% CI 15,170-18,335) in 2022. Category 1A. The entire time series should be added to the webpage (revising any previous estimate since 2007 that has changed as a result of this update, Table 1).*
- *Pacific Coast Feeding Group gray whales: 147 (CV 0.09) in 2000, 201 (CV 0.09) in 2010, and 212 (CV 0.08) in 2020. Category 1A. The entire time series should be added to the webpage (revising any previous estimate that has changed as a result of this update, Table 2).*
- *Bowhead whales in the West Greenland feeding area: 888 (CV 0.46) in 2022. Category 1A, and added to the webpage.*
- *Franciscana in FMA IVb: 3,448 (CI 723-16,343) in 2019; 5,710 (CI 1,200-27,174) in 2022. Category 2.*
- *Franciscana in FMA IVc: 1,866 (CI 400-8,946) in 2019. Category 2.*
- *Franciscana in Brazil portion of FMA III: 13,137 (CV 0.327) in 2021. Category 1A.*

- *Franciscana in Uruguay portion of FMA III: 30,011 (CV 0.354) in 2023. Category 1A.*
- *Franciscana in FMA III: 43,148 (CV 0.311) in 2022. Category 1A, and added to the webpage.*
- *Franciscana in FMA Ia: 1,183 (CV 0.76) in 2018. Category 1A, and added to the webpage.*
- *Franciscana in FMA Ib: 1,590 (CV 0.53) in 2011; and 1,521 (CV 0.47) in 2017. Category 1A, and added to the webpage.*
- *Franciscana in FMA II: 9,284 (CV = 0.28) in 2009. Category 1A and added to the webpage.*
- *Franciscana in FMA III along the Brazilian portion of the range of the stock: 9,437 (CV 0.34) in 2014. Category 2.*
- *Humpback whales in the eastern North Pacific (along the US west coast): 502 (CV 0.08) in 1989; 1,083 (CV 0.06) in 1998; 1,982 (CV 0.08) in 2008; and 4,973 (CV 0.05) in 2018. All as Category 1A.*
- *Short-finned pilot whales in the U.S. Exclusive Economic Zone (Hawaiian Islands): 11,566 (95%CI 6,054-22,098) in 2002; and 17,583 (95%CI 8,014-38,576) in 2010. Category 1A.*
- *Bryde's whales in the U.S. Exclusive Economic Zone (Hawaiian Islands): 1,794 (95%CI 1,035-3,109) in 2010. Category 1A.*

*[1]The SWG **recommends** an update to the fit of the individual-based population model (Cooke et al. 2019) to the Māui dolphin genetic capture-recapture data.*

*[2]The SWG **recommends** that the data from this study (SC/69A/ASI/01Rev) be endorsed as Category 4 and **agrees** that this decision could be revisited next year when the wording and implications of this new category were further considered (see item 4.2).*

*The SWG **agreess** that all of these abundance estimates meet the definition of an Evaluation Extent of 1 ('examined in detail by the Committee').*

2.1 Abundance estimates

2.1.1 Māui dolphins

Constantine *et al.* (2021) report the results from continued genetic monitoring of Māui dolphins during 2020 (Feb) and 2021 (Feb-Mar), which aimed to estimate the abundance and effective population size. Using a Lincoln-Petersen estimator with Chapman's correction, the census abundance of Māui dolphins in 2020– 2021 was estimated to be 54 individuals aged 1 year or older (95% CI 48–66) within the survey area. The SWG concluded that a mortality correction should be applied to improve comparability with the currently accepted estimates of Māui dolphins included in the IWC Table of Agreed Abundance Estimates. The SWG **recommended** that the new, mortality-corrected abundance estimate for Māui dolphins of 48 (95% CI 40-57), corresponding to 2021, be endorsed as Category 3 because it anticipates that a fully integrated analysis will be provided to the Committee in the future. Specifically, the SWG **recommended** an update to the fit of the individual-based population model (Cooke *et al.* 2019) to the Māui dolphin genetic capture-recapture data. The SWG further **recommended** that the Constantine *et al.* (2021) estimate of 48 dolphins be footnoted in the IWC Table with reference to this recommended update.

Attention: R-Cooke

*The SWG **recommended** that the individual-based population model analysis of Māui dolphin genetic capture-recapture data (Cooke et al. 2019) be updated using recent data and presented at SC69B.*

2.1.2 Southern right whales

Romero *et al.* (2022) presents a model-based assessment and abundance estimation for southwest Atlantic right whales. Although the ASG considered that this study was well documented and the modelling appropriate, it recommended further discussion by ASI to consider the modelling more fully and to compare the results with existing capture-recapture abundance estimates in Cooke (2013). In discussion, the SWG noted the substantial difference in the rates of increase estimated for Southwest Atlantic right whales in Cooke *et al.* 2015 (SC/66A/BRG/23) (0.065 +/- 0.002) and Romero *et al.* (2022) (0.014; 95% CI 0.001 to 0.034).

The Cooke *et al.* assessment is based on capture-recapture, and therefore estimates the total size of the population to which the whales observed at Península Valdéz belong, even though not all of the population visits the study area each year. The Romero *et al.* assessment uses direct estimates from aerial surveys of the number of whales actually present in the area at the time of the survey. Therefore, the trends estimated by the two methods are not directly comparable and would not necessarily be expected to coincide.

The SWG **recommended** that the survey-based estimates of southwest Atlantic right whale abundance in Romero *et al.* (2022) be endorsed as Category 1A. The estimates are 3,652 (95% CI 2,884-4,448) for 1999; 4,217 (95% CI 3,749-4,755) for 2009; and 4,633 (95% CI 3,849-5,681) for 2019, based on the Committee's 'informal rule of thumb' for such time series to select one estimate roughly every 10 years, with a link in the IWC Table to the full series (IWC, 2023; item 11.3.6).

To update the estimate of the population trend for southwest Atlantic right whales, the SWG **recommended** that the photo-id based population assessment last presented in SC/66A/BRG/23 be updated to include more recent data, and the results presented to SC69B. Sufficient model outputs from that analysis should be provided to show whether the extent to which the difference in estimated trend between the capture-recapture and survey-based methods is consistent with the fitted population model.

Attention: R-Cooke

The SWG recommended that the photo-id population assessment and abundance estimates for southwest Atlantic right whales provided by Cooke (2013) be updated to include more recent data and the results presented to SC69B.

Jackson *et al.* (2016) describes an integrated population-level assessment of the whaling impact and pre-exploitation abundance of New Zealand southern right whales using a Bayesian population dynamics model that integrated multiple data sources. In discussion, the SWG considered the analysis to be of high quality and **recommended** the New Zealand southern right whale abundances based on New Zealand-only catches, with a high historical catch rate, be classified as Category 1A. The estimates are 2,762 (95% CI 2,100-3,671) for 2009 and 4,742 whales (95% CI = 3,853-6,013) for 2020; these should be added to the website. Other abundance estimates included in Jackson *et al.* (2016) would also be endorsable, if different assumptions related to region and catch were preferred, and could be used in assessments as appropriate.

Brandão *et al.* (2023) reported on a photo-identification-based assessment model of southern right whales surveyed in South African waters, with a focus on recent low counts of cows with calves. The final fit of the model supported the inference of a lengthening calving interval as an explanation for such a decline. In review, the modelling approach described in Brandão *et al.* (2023) was considered appropriate and well implemented. The SWG noted the complexity of the modelling used in Brandão *et al.* (2023), but also recognised that similar models have been used in Committee work for two decades (e.g., Cooke *et al.* 2003). The SWG **recommended** the South African southern right whale abundances of 1,226 (SE 52) for 1990; 2,332 (SE 77) for 2000; 4,401 (SE 151) in 2010; and 6,470 (SE 285) in 2020 be classified as Category 1A. These estimates should also be added to the website.

2.1.3 Southern hemisphere humpback whales

Monnahan *et al.* (2019) described a study of abundance and survival for a persistent feeding aggregation of humpback whales in the Magellan Strait in southern Chile (part of Breeding Stock G; BSG), using Bayesian robust-design mark-recapture models (assuming closure) fit to photographic data from 2004 to 2016. The analysis had been well conducted and used current methodology. However, whilst the feeding aggregation may have high site fidelity, the SWG was informed that the photo-ID study itself did not cover the spatial extent of the feeding aggregation, and any inter-annual variation it might display. Therefore, the SWG **recommended** that the abundance estimates for humpback whales of the Magellan Strait feeding aggregation be classified as 'Not Suitable'.

Attention: SC, S, C

*The SWG **recommends** that the abundance estimates of Monnahan et al. (2019) for humpback whales of the Magellan Strait feeding aggregation from 2004 to 2016 be classified as Category NS.*

2.1.4 Antarctic blue whales

An initial capture-recapture analysis of the series of Antarctic blue whale photo-identification data was presented in Olson *et al.* (2018), which was reviewed by ASI in 2018 (IWC 2019, Annex Q, section 3.1.1.9). A subsequent updated capture-recapture analysis of the Antarctic blue whale photo-identification data was presented in Olson *et al.* (2021), and reviewed by ASI in 2021 (IWC 2022, section 11.1.4). Following feedback from the 2021 review, SC/69A/ASI/01Rev presented estimates of population abundance and growth rate of Antarctic blue whales throughout the circumpolar Antarctic based on the revised capture-recapture analysis of photo-identification data from 2003/2004 to 2018/2019. Two capture-recapture models, POPAN and Pradel, were applied to data from the left- and right-sides to estimate superpopulation abundance, recruitment-immigration, and probability of capture from the POPAN model and probability of capture and population growth rate from the Pradel model. The SWG thanked the authors for their efforts over multiple years and **recommended** that the circumpolar abundance estimate of Antarctic blue whales of 2,050 (95% CI 1,135 - 3,704) for 2019 (based on assumed annual survival of 0.92) be endorsed as Category 3 because of concerns regarding the estimation of uncertainty elaborated in the ASG Report (SC/69A/REP/02). Despite these concerns about the abundance estimate, the SWG **recommended** that the data from this study be endorsed as Category 4 and **agreed**

that this decision could be revisited next year when the wording and implications of this new category were further considered (see item 4.2).

Hamabe *et al.* (2023) reported abundance estimates for Antarctic blue whales south of 60°S from 70°E to 170°W using data collected during JARPA (1989/90-2004/05) and JARPAII (2005/06-2013/14). The SWG noted the substantial changes in estimated abundance for some years, relative to earlier analyses of the same survey data (Matsuoka *et al.* 2006; Matsuoka and Hakamada 2014) and suggested that authors provide an analysis to identify and quantify the reason(s) for the differences and to consider the implications of the small number of sightings in various years. The SWG, therefore, **recommended** that Antarctic blue whale abundance estimates for Areas IV and V (Tables 5 and 6, respectively, in Hamabe *et al.* (2023)) be categorized as provisional, Category P, until the planned re-analyses are completed and reviewed by the SWG.

Attention: SC, S, C

*The SWG **recommends** that Antarctic blue whale abundance estimates for Areas IV and V (Tables 5 and 6, respectively, in Hamabe et al., 2023) be categorized as Provisional.*

2.1.5 Eastern North Pacific gray whales

Eguchi *et al.* (2022) presents a new estimate of abundance for eastern North Pacific (ENP) gray whales (*Eschrichtius robustus*) based on a well-tested and previously reviewed analysis of shore-based surveys. Having noted that the estimated abundance had declined from 2016 to 2022 by more than 40%, the SWG reiterated the importance of this long time series of comparable estimates to support the provision of subsistence whaling management advice developed by ASW and IST. For these reasons, the SWG **strongly recommended** that continued, annual surveys of this whale population be funded, conducted, and reported to the SC, with additional effort undertaken to update the estimates of detection probability, the proportion of night-time passage, and the availability bias correction factor for offshore whales.

Attention: CG-USA

*The SWG **strongly recommended** that continued, annual surveys of eastern North Pacific gray whales be funded, conducted, and reported to the SC, with additional effort undertaken to update the estimates of detection probability, the proportion of night-time passage, and the availability bias correction factor for offshore whales.*

The SWG **recommended** that the 2022 estimate of 16,650 (95% CI 15,170-18,335) be endorsed as Category 1A. The entire time series should be added to the webpage (revising any previous estimates that have changed as a result of this update, Table 1).

Harris *et al.* (2022) provide updated abundance estimates for gray whales from the Pacific Coast Feeding Group (PCFG), a small group of ENP whales that has been recognized by the SC as demonstrating strong seasonal fidelity to the Pacific Northwest. Noting that the methodology has been consistently applied over time and despite concerns about the nature of the opportunistic data and the heterogeneity in sampling effort, the SWG **recommended** that the 1998-2020 estimates for the area from northern California to northern British Columbia be endorsed as Category 1A (Table 2). The entire time series (1998-2020) should be added to the webpage (revising any previous estimates that have changed as a result of this update).

[Tables on following page]

Table 1

Abundance estimates of eastern North Pacific gray whale abundance based on shore-based surveys (Eguchi *et al.* 2022). For the 'Durban' method, the modeling approach uses all data since 2006/07 to estimate parameters that are shared among yearly datasets. Consequently, analysis of the data collected since 2006/07 with the 2021/22 data resulted in annual estimates that were slightly different from those provided in previous reports.

Year	N	LCL	UCL	Method
1968	13,426	10,952	15,900	Laake
1969	14,548	12,267	16,829	Laake
1970	14,553	12,186	16,921	Laake
1971	12,771	10,744	14,799	Laake
1972	11,079	9,060	13,099	Laake
1973	17,365	14,642	20,088	Laake
1974	17,375	14,583	20,168	Laake
1975	15,290	12,773	17,807	Laake
1976	17,564	14,603	20,525	Laake
1977	18,377	15,496	21,259	Laake
1978	19,538	16,168	22,908	Laake
1979	15,384	12,972	17,796	Laake
1980	19,763	16,548	22,978	Laake
1985	23,499	19,400	27,598	Laake
1986	22,921	19,237	26,605	Laake
1988	26,916	23,856	29,976	Laake
1993	15,762	13,661	17,863	Laake
1994	20,103	17,936	22,270	Laake
1996	20,944	18,440	23,448	Laake
1998	21,135	18,318	23,952	Laake
2001	16,369	14,412	18,326	Laake
2002	16,033	13,865	18,201	Laake
2007	19,126	16,464	21,788	Laake
2007	20,655	18,564	24,016	Durban
2008	19,040	16,675	24,205	Durban
2010	20,720	18,954	22,720	Durban
2011	20,790	18,975	22,640	Durban
2015	23,260	21,210	25,465	Durban
2016	26,640	24,310	29,161	Durban
2020	20,720	18,865	22,640	Durban
2022	16,650	15,170	18,335	Durban

Table 2

Abundance estimates of PCFG gray whale abundance and CV using 1996-2020 data from northern California to northern British Columbia (Harris *et al.* 2022).

Year	N	CV
1998	133	0.10
1999	145	0.10
2000	147	0.09
2001	182	0.07
2002	210	0.11
2003	209	0.08
2004	224	0.09
2005	208	0.14
2006	195	0.10
2007	185	0.15
2008	217	0.09
2009	208	0.10
2010	201	0.09
2011	213	0.08
2012	229	0.07
2013	249	0.07
2014	245	0.08
2015	257	0.07
2016	244	0.10
2017	224	0.10
2018	211	0.12
2019	228	0.11
2020	212	0.08

2.1.6 West Greenland bowhead whales

A proportion of the East Canada-West Greenland population of bowhead whales (*Balaena mysticetus*) spends January-June off West Greenland. SC/69A/ASI/03 reports on visual aerial line-transect surveys covering this local winter aggregation in 2022. Abundance was estimated using mark-recapture distance sampling (MRDS) with correction for both perception and availability biases (incorporating time-in-view and dive data). The SWG **recommended** that the MRDS estimate (with time-in-view correction) of 888 (CV 0.46) in 2022 be endorsed as Category 1A and included on the webpage as the 'West Greenland feeding area'.

2.1.7 Franciscana dolphins

Franciscanas (*Pontoporia blainvillei*) live only in the shallow, coastal waters of the southwestern Atlantic of Brazil, Uruguay, and Argentina. Their range is divided into a series of management areas, as shown in Fig. 1.

A pre-meeting held in 2021 to advance the Committee's evaluation of the status of the franciscana identified a series of tasks to improve estimates of abundance of franciscanas (IWC, 2021, Item 3.8, p.12). Two documents presented to the SC in 2023 address these tasks specifically: SC/68A/ASI/2 and SC/68/ASI/15.

The Franciscana Management Area (FMA) IV in Argentina was subdivided following a review of the stock structure (SC/69A/REP/01). SC/69A/ASI/02 presents results for new surveys conducted in October 2019 and March 2022 in two of the five subareas, FMA IVb and IVc (Figure 1).

The SWG **agreed** that a single detection function should be fitted to all of the distance data with survey year and subarea as covariates, and that the availability correction factor and the group size correction factor developed for other FMAs (Sucunza *et al.* 2022) should be applied to the FMA IV estimates. No correction factor for perception bias is available specifically for FMA IV, but because the observers were experienced, the perception bias was likely lower than 20%.

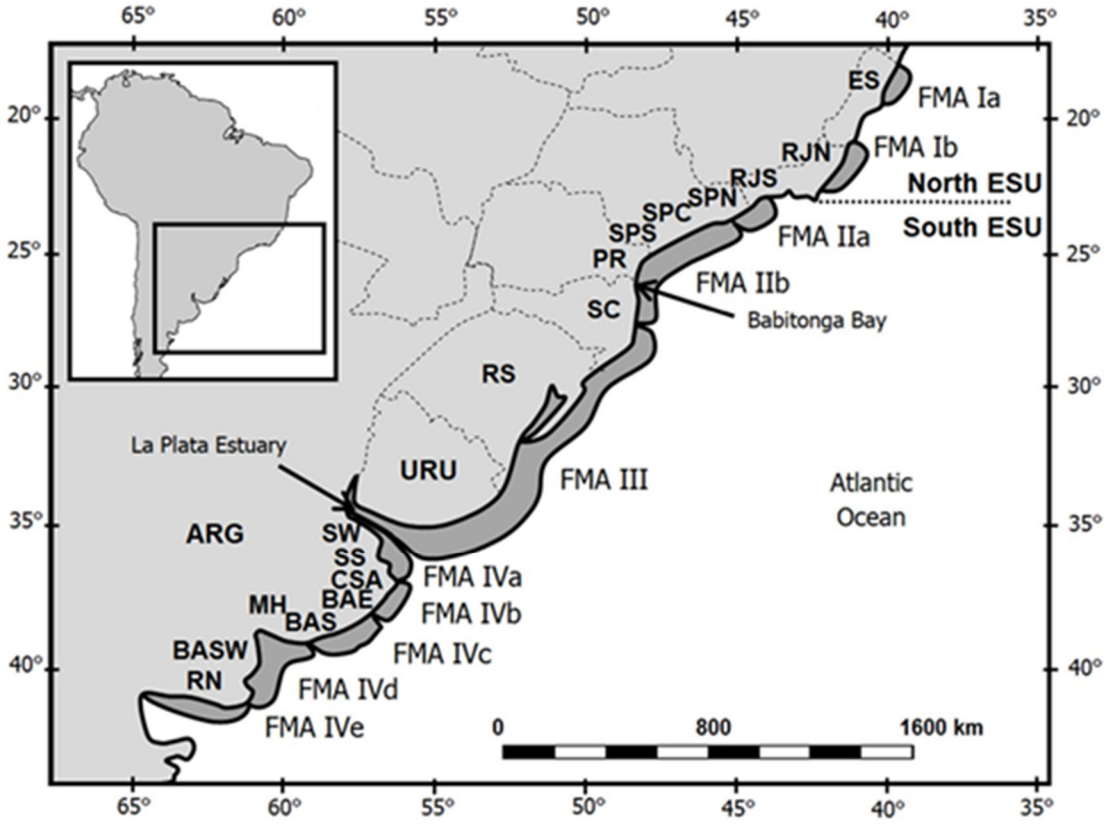

Fig. 1. Map showing the 11 proposed management units for franciscana, including the ten labelled FMA subdivisions and Babitonga Bay (Cunha *et al.*, 2020b; Cunha *et al.*, 2020c, SC/69A/REP1).

The authors proposed extrapolating beyond the area covered by the survey transects in the offshore area of FMA IVb and in the southern part of FMA IVc, explaining that based on specimens collected by fishing vessels and the homogeneity of the environmental conditions, there was no reason to believe that density of franciscana differed beyond the surveyed lines. The SWG **thanked** the authors for their work on revising the estimates and acknowledged the challenging logistics of surveying that area but considered that the endorsed estimates should pertain to density and abundance only in the area covered by the completed transects. Appendix 2 presents a re-analysis of SC/69A/ASI/02 that addresses the analytical concerns raised by ASG and ASI and provides the estimates with no spatial extrapolation.

The SWG **recommended** that the estimates of 3,448 (CI 723-16,343) in 2019 and 5,710 (CI 1,200-27,174) in 2022 for FMA IVb, and the estimate of 1,866 (CI 400-8,946) for FMA IVc in 2019, all be endorsed as Category 2 to account for the partial coverage of the stock's range.

SC/69A/ASI/19 provides the first stock-wide estimate for franciscana in FMA III, based on aerial surveys conducted in 2021 along the coast of southern Brazil and in 2023 in Uruguay. The surveys were partially funded by the Committee and also aimed at building capacity by training new scientists for survey and analysis methods. A portion of FMA III was not covered in these surveys, but flights were conducted both north and south of the gap. Assuming the distribution of franciscana in 2021 was similar to that in 2014, extrapolation to areas uncovered by the survey was warranted in this case, since the authors demonstrated that the encounter rates of a 2014 survey (Sucunza *et al.* 2020b) were identical across all areas.

The Working Group **recommended** that the area-specific estimates for Brazil in 2021 (13,137, CV=0.327), Uruguay in 2023 (30,011, CV=0.354) and FMA III as a whole (43,148, CV=0.311, 95% CI = 23,786-78,271) be endorsed as Category 1A. The combined estimate is considered to apply to the year 2022, since the surveys were conducted in different years (2021 and 2023). The estimate for FMA III as a whole should be added to the webpage.

SC/69A/ASI/15 addresses recommendations made by the Committee to improve correction factors used to estimate the abundance of franciscana and update past estimates with the improved correction factors. The correction factor for both visibility and group size bias was revised to 4.76 (CV=0.25). Previous estimates for FMA Ia (Sucunza *et al.* 2020c) and Ib (Danilewicz *et al.* 2020) had been endorsed by the Committee (IWC 2022) but categorized as Provisional until these new correction factors could be applied. Similarly, the estimate for FMA II in 2009 (Sucunza *et al.* 2020a) was categorized as Provisional until it was corrected for group size bias using the 1.36 factor with a recalculated CV of 0.11. Finally, the estimate for FMA III along the Brazilian portion of the range of the stock in 2014 (Sucunza *et al.* 2020b, IWC 2022), which had been endorsed as Category 2, was corrected for visibility and group size bias.

The Working Group noted that all of these estimates are now fully corrected for all of the known biases (availability, perception and group size) and therefore **recommended** that the estimates for FMA Ia (1,183, CV=0.76) in 2018 and Ib in 2011 (1,590, CV=0.53) and 2017 (1521, CV=0.47), as well as the estimate for FMA II in 2009 (9,284, CV = 0.28) all be endorsed as Category 1A and that the IWC Table be updated accordingly. The estimate for FMA III along the Brazilian portion of the range of the stock in 2014 (9,437, CV = 0.34) should remain as Category 2. The estimates for the following areas should be added to the webpage: Ia, Ib (for both 2011 and 2017) and II.

The Working Group congratulated the many contributing researchers, and the participants in a series of franciscana workshops and working groups, for engaging with the Committee and reaching the conclusion of an intense multi-year effort to study and assess this species throughout its range.

2.1.8 Western North Atlantic cetaceans

Palka (2006) and Palka (2020) present density estimates for marine mammals from aerial and shipboard surveys in several areas of the northwest Atlantic Ocean. Palka informed the SWG of her intention to create a list of abundance estimates by combining all the relevant surveys that have used similar methods in the northwest Atlantic Ocean, and to apply the most recent correction factors where and when appropriate, thus making older estimates comparable to newer ones. However, this list will not be ready until 2024.

The SWG thanked Palka for volunteering to perform this work and **agreed** that the survey methods and analyses for these surveys are of high quality and have been reviewed satisfactorily. Given that updated abundance estimates are anticipated next year, the SWG **recommended** that the estimates in Palka (2006) and Palka (2020) for minke, fin, humpback, blue and sei whales be endorsed as Category P. Once the SC receives the list of revised estimates and time series it will re-evaluate them (including small cetacean species if needed), but the methods will not have to be reviewed again during the intersessional period.

Attention: SC-ASI

*The SWG **agreed** that the survey and analysis methods of Palka (2006) and Palka (2020) were appropriate, and that updated estimates from the analysis of these data, for minke, fin, humpback, blue and sei whales in the northwest Atlantic Ocean (U.S. waters), could be endorsed in appropriate categories next year without further review of the methods. Until then, the SWG **recommended** Category P.*

2.1.9 North Pacific humpback whales

Calambokidis and Barlow (2020) provide updated abundance estimates for humpback whales on the US West Coast from mark-recapture estimates based on photo-identification. Noting that this document was reviewed at SC68D for blue whales and that the methods used were similar for humpback whales (with larger sample sizes), the SWG recalled that previous evaluation of the survey and analysis was positive. Therefore, the SWG **recommended** that the humpback

whale abundance estimates of 502 (CV 0.08) for 1989, 1,083 (CV 0.06) for 1998, 1,982 (CV 0.08) for 2008, and 4,973 (CV 0.05) for 2018 be endorsed as Category 1A and be included in the IWC Table.

2.1.10 North Pacific sei whales and other cetaceans

Bradford *et al.* (2021) report on abundance estimates for 21 species of cetaceans in the U.S. Exclusive Economic Zone of the Hawaiian Islands using ship-based, line transect surveys conducted in 2002, 2010, and 2017. The SC reviewed the blue whale estimate from this paper at SC68D and considered that while the survey was well designed and implemented, the number of sightings was insufficient to provide a reliable estimate. After a review of the estimates for sei whales from the same paper was subsequently requested, it was decided to broaden the review to examine estimates for a variety of species of potential interest to the Committee.

Many of the abundance estimates were derived from very few on-effort sightings. The SWG acknowledged that valuable information may be available from small sample sizes when the survey methods and coverage themselves are of high quality and such data might be useful for SC efforts such as In-depth Assessments. Therefore, the SWG **recommended** that a new Category 4 be established to classify the data in these situations (see item 4.2). Sample sizes in Bradford *et al.* (2021) were reviewed to determine whether some of the data (but not the estimates) qualified for Category 4 endorsement, acknowledging that such evaluations take into account the quality of the survey methods, coverage and environmental conditions, and therefore need to be done on a case-by-case basis.

The SWG **recommended** that the short-finned pilot whale estimates of 11,566 (95%CI 6,054-22,098) in 2002 and 17,583 (95%CI 8,014-38,576) in 2010, and the Bryde's whale estimate of 1,794 (95%CI 1,035-3,109) in 2010 be endorsed as Category 1A. The SWG also **recommended** that the data for Risso's dolphins, Fraser's dolphins, pygmy sperm whales, dwarf sperm whales, Cuvier's beaked whales, minke whales, sei whales, fin whales, and blue whales in 2002, 2010 and 2017, as well as the data for short-finned pilot whales in 2017 and Bryde's whales in 2002 and 2017, be endorsed as Category 4 data.

Attention: SC, S, C

*The SWG **recommends** that the data on low cetacean abundance in the U.S. Exclusive Economic Zone of the Hawaiian Islands during the summer-fall period, provided by Bradford et al. (2021), be endorsed as Category 4 data, without the endorsement of specific abundance estimates, for the following species and years.*

- *Risso's dolphins: 2002, 2010, 2017.*
- *Pygmy sperm whales: 2002, 2010, 2017.*
- *Dwarf sperm whales: 2002, 2010, 2017.*
- *Cuvier's beaked whales: 2002, 2010, 2017.*
- *Common minke whales: 2002, 2010, 2017.*
- *Sei whales: 2002, 2010, 2017.*
- *Fin whales: 2002, 2010, 2017.*
- *Blue whales: 2002, 2010, 2017. These recommended endorsements of the data as Category 4 do not alter the Committee's decision last year to categorise the corresponding blue whale abundance estimates as 'Not Suitable'.*
- *Short-finned pilot whales: 2017.*
- *Bryde's whales: 2002, 2017.*

2.2 Review process

2.2.1 Supplemental wording and examples to explain category selection

In 2021, the SWG agreed to improve the descriptions for the categories used to classify abundance estimates. Following work by an ICG, improvements to category descriptions and advice to reviewers were agreed by the Committee (IWC 2022). This year, an additional Category was suggested under 4.2. The SWG agreed that no further supplementary text or examples are needed. Therefore, the SWG thanked the ICG for completing its work.

2.2.2 Review of estimates regularly updated in long-term studies using consistent methods

The SWG discussed long-term studies for which regular abundance estimates are routinely provided (e.g., annually) as more data are collected, using the same survey and analysis methods as in prior years. To reduce the workload for reviewers, the SWG **recommended** that such papers be routed via the 'alternative review path' (i.e., not soliciting intersessional independent written reviews) if the requesting convenor and the ASG convenor agree that the paper is a

routine update. It is the responsibility of the requesting subgroup convenor, in consensus with ASI convenors, to verify that methods have remained unchanged (including communicating with the authors if necessary).

Attention: SC, SC-ASI

For papers presenting abundance estimates that the requesting convenor and the ASG convenor agree constitute routine updates to previously approved estimates using the same survey and analysis methods, the SWG recommended that these be routed directly to final review by ASG/ASI without soliciting independent written reviews intersessionally.

2.2.3 Software submission

The SC Procedures for Submission, Review, and Validation of Abundance Estimates (IWC, 2020) provide instructions for authors and convenors requesting ASI review of a paper to provide the relevant code, input, and output files to the IWC Secretariat. However, none of the papers submitted to ASG/ASI in the last three years have complied with this requirement.

The SWG considered that data requirements are useful to ensure the consistency of the work of the Committee and that complete reproducibility of the analyses should be the ideal standard but recognized that this is not always feasible and that requirements should not constitute a barrier to submission of new work. Procedures for data and code provision relevant to ASI could be woven into the Committee's revised Data Availability Agreement (DAA) and therefore postponed further consideration of this issue until planned DAA revisions have been considered by the Committee.

2.2.4 Adapting to biennial SC meetings

The heavy workload of the SWG has required regular ASG pre-meetings and numerous sessions at each annual SC meeting. With the change to biennial meetings, a two-year accumulation of abundance estimates and other continuing work may make this workload unmanageable.

The SWG drew attention to its concern that ASI is one of the subgroups that will suffer the greatest negative impact from the reduced frequency of Scientific Committee meetings, and the reduced productivity by ASI will in turn severely impact the work of the other Committee subgroups that rely on its work (e.g., ASI endorsement is needed for the use of estimates in the IST and IA sub-committees). The SWG also emphasized that it would not be able to complete its work without regular, funded ASG meetings. It therefore **strongly recommended** the continued funding of annual ASG meetings (i.e., intersessional meetings in odd years, and pre-meetings in even years). The SWG also noted that the Status of Stocks Initiative is important to the Commission, but its development will be significantly slowed by biennial meetings, and further slowed if the accumulated abundance estimate review list increasingly dominates ASI business.

Attention: SC

*Noting that ASI is one of the subgroups that will suffer the greatest negative impact from the reduced frequency of Scientific Committee meetings, and the reduced productivity by ASI will in turn severely impact the work of the other Committee subgroups that rely on its work, the SWG **strongly recommended** the continued funding of annual meetings of the Abundance Steering Group (i.e., intersessional meetings in odd years, and pre-meetings in even years).*

The SWG also considered creative potential alternatives such as quarterly meetings in hybrid or remote format. The logistical challenges of such options were acknowledged, but it was noted that meetings focusing on a particular set of species or issues might not need all of the ASG members to participate in each meeting, and might result in a more even distribution of abundance estimates to review over the course of the biennial cycle, although some members were skeptical that the current deadline-oriented submission cycle for papers would change much.

2.2.5 Suggestions and other matters

During review of the IWC Table it was noted that some abundance estimates categorized as Provisional pertained to surveys conducted many years or even decades ago, for which the analyses are unlikely to be revisited. Some members questioned whether a Provisional rating should eventually expire, at which point the estimate might become Not Suitable. The SWG agreed to add this issue to its agenda for SC69B.

Attention: SC-ASI

The SWG agreed to consider at SC69B whether a rating of Provisional for an abundance survey should eventually expire.

3. IWC TABLE OF AGREED ABUNDANCE ESTIMATES AND ABUNDANCE WEBPAGE

3.1 Updates to IWC Table completed or proposed intersessionally

3.1.1 Report from Secretariat Lead for Statistics and Modelling

Katara provided a report on a variety of changes to the IWC Table of Agreed Abundance Estimates.

3.1.1.1 Additions, Removals, and Revisions Recommended at SC68D

Katara reported that she had completed the additions, removals, revisions and minor corrections to the IWC Table agreed by the Committee last year. This includes adding the estimates endorsed by the Committee last year.

3.1.1.2 Additions, Removals, and Revisions Proposed Intersessionally

Katara noted an estimate of abundance of blue whales in the Gulf of St. Lawrence that had no category or evaluation extent indicated in the IWC Table (NOAA, 2020). The SWG **agreed** to delete this estimate from the Table because it is not an actual estimate but represents a count of the number of different individuals photo-identified, and there are better abundance estimates available from other surveys.

Katara also drew attention to an estimate of north Atlantic blue whales in the Iceland/Faroes region (Pike *et al.* 2019). The SWG **agreed** to her suggestion to categorize this estimate as 1A with evaluation extent 1, and to add this estimate to the website, given that we have looked at other estimates from this survey and endorsed them as Category 1A.

The SWG was reminded that an 'A' label was used in the IWC Table to indicate estimates that had not received a Category from ASI but had been previously agreed prior to the establishment of ASI. These estimates, however, are also lacking an Evaluation Extent (or the field is filled in inconsistent manner). Even though it is assumed that most agreed estimates have gone through some level of evaluation in the past, the SWG **agreed** that the Evaluation Extent field should be left blank in these cases because of the lack of records and the lack of consistency of past review processes.

Katara presented a list of Southern Hemisphere humpback whale estimates in the IWC Table that do not have a category, and it was unclear whether these estimates had been discussed by the Committee. Such estimates could be categorised as ND (not discussed) and kept in the IWC Table. The SWG **encouraged** Katara and Butterworth to examine the history of these estimates intersessionally and propose a resolution next year.

Attention: S-Katara

The SWG encouraged Katara and Butterworth to examine the historical review of Southern Hemisphere humpback whales estimates in the IWC Table of Agreed Abundance Estimates that do not have an assigned Category, and provide a proposal to SC69B for possible Category assignment.

The SWG **agreed** to three additional revisions to the IWC Table, as follows:

- Sei whales, 2001, Iceland and Faroes (NAMMCO, 2020): update the Table estimate to reflect a corrected value endorsed by NAMMCO due to a slight correction in survey area.
- Sperm whales, 2007, Iceland and Faroes (NAMMCO, 2020): update the Table estimate to correct a typographical error in the source document.
- Sperm whales, 2014-2018, area 'NO mosaic' (Leonard and Øien, 2020): update the Table estimate to correct a typographical error in the source document.

Katara noted an estimate in the IWC Table for West Greenland bowhead whales in 1998 (Heide-Jørgensen and Acquarone, 2002) that had neither a category nor an evaluation extent. In discussion, the SWG noted that whilst a new abundance estimate for West Greenland bowhead whales had been reviewed (SC/69A/ASI/03), it should not fully replace the 1998 abundance estimate. The SWG **recommended** that Katara assign the 'A' label to the 1998 estimate if it had been reviewed by the Committee prior to ASI being established.

3.1.2 ICG on IWC Table Text on Spatial Extent for Mark-Recapture and Line Transect Estimates progress

An estimate thought to represent an unknown fraction of the sub-stock of BS B2 humpbacks had raised concerns during SC68D about potential policymaker misunderstanding the area to which this mark-recapture estimate applied, given that another, larger stock was nearby (IWC 2023, item 11.2.2). Therefore, the Committee had agreed in 2022 that the IWC Table of Agreed Abundance Estimates should be supplemented with text explaining the differences between abundance estimates based on line transect surveys and those based on mark-recapture models, in terms of how they apply to the area and stock being estimated. The SWG established an intersessional correspondence group to propose such text for SC69A (SC/68D/ASI/07, item 11.8) and deferred recategorization of the BS B2 humpback estimate until such text could also be considered.

After further consideration, the SWG determined that if text related to mark-recapture estimates were to be included in the IWC Table of Agrees Abundance Estimates, its drafting and inclusion should be delayed until after the completion of guidelines to be developed as described in item 4.1.

3.1.3 Accommodating requests for the IWC Table

The Secretariat is working towards a spatial database to: (i) communicate abundance data efficiently to the public; and (ii) make the data accessible to the scientific community. While this project is in progress, the Secretariat proposes the publication of a document that lists a version of the IWC Table with references for each estimate, maps of the areas the estimates pertain to, and an explanation of those values that are sums of estimates from survey strata at the scale of a medium or large area or other combinations of estimates.

The Committee agreed to this proposition and advised adding a column to the IWC Table to facilitate filtering of the relevant estimates. The Committee requested that Katara generate and present a new version of the document at SC69B.

3.1.4 Post hoc combination of estimates for public presentation

Katara introduced several abundance estimates displayed on the IWC website that are derived by summing abundances of North Atlantic common minke whales in area 'C', noting that there was uncertainty as to how these combined estimates were derived. Allison reported that other Committee sub-groups had originally made those computations, and they were published on the IWC website to avoid presenting a very large number of small-area abundances for North Atlantic common minke whales. In discussion, the SWG recalled the agreement that only abundances for whole stocks or very large ocean regions be presented on the IWC website (see item 3.2.1). Furthermore, the SWG noted that it was the role of other sub-groups to decide how to combine abundance estimates from different areas. The SWG, therefore, **requested** that Katara and Allison identify and investigate the origins of any abundance estimates from combined areas for review at the next SC meeting, and recommended that the responsibility for providing combined estimates moving forward was with the individual sub-committees.

Attention: S-Katara

*The SWG **requested** that Katara and Allison identify and investigate the origins of any estimates in the IWC Table of Agreed Abundance Estimates that are the result of post hoc combining of several small-area estimates by other Committee subgroups, so that the SWG can consider at SC69B the best practices for the post hoc generation of such combined estimates and whether to recommend inclusion/removal on the IWC website.*

3.1.5 Maps, tables for smaller areas, references, and other IWC Table content

While a spatial database and related dashboard are being developed, the table of abundances on the website is being updated. Abundances for large and medium areas are presented as these are of interest to a wider public. Exceptions are made for smaller areas of interest for conservation.

Along with the 'simplified' tables on the website, the Secretariat proposed the publication of a document that lists a version of the table with references for each estimate, maps of the areas the estimates refer to and an explanation of those values that are sums of estimates from survey strata at the scale of a medium or large area or other combinations of estimates. For clarity, it is proposed to include tables that list the abundance estimates that are summed to derive estimates for the larger areas. References were added to all the abundance estimates.

The SWG **endorsed** the approach suggested by the Secretariat and appreciates Allison's offer to help to review all the abundance estimates.

3.2 Updates to IWC webpages on abundance proposed intersessionally

3.2.1 Guidelines for inclusion of estimates on website

All endorsed abundance estimates are added to the IWC Table. ASI also recommends which endorsed estimates should be published on the IWC webpage about abundance, which is intended for the public. Last year the SC agreed that estimates that represent very large areas or nearly complete populations, and are believed to have no severe biases, should be published on the webpage. An intersessional correspondence group (ICG) was established to finalise this specification and to review the estimates already on the webpage to ensure a consistent approach.

The ICG and additional experts met during a meeting of IST in Copenhagen in May, 2022. The ICG agreed that in addition to the SC's proposed criteria, smaller sub-units or subregions of particular interest to the Commission or the public may also be included.

The SWG **endorsed** the ICG's criteria and agreed to their immediate application. In what follows, unless explicitly stated otherwise, ASI does not recommend webpage inclusion.

Attention: S, SC, SC-ASI

*The SWG **agreed** that abundance estimates that represent very large areas or nearly complete populations, and are believed to have no severe biases, should be published on the webpage. Smaller sub-units or subregions of particular interest to the Commission or the public may also be included.*

3.2.2 Intersessional changes

Two IWC Table entries for BSB2 humpback whales, from 2001 and 2001-2007, were identified as requiring review due to missing information. It was determined that these two records should be removed from the Table and replaced with an abundance estimate of 324 (95% CI: 117-471) for BSB2 humpbacks in 2005 based on the information in JCRM (2012, Table 3 pg 400) as Category 1A, Evaluation Extent 2.

Attention: S-Katara

*The SWG **agreed** that two IWC Table entries for BSB2 humpback whales, from 2001 and 2001-2007 should be removed from the Table and replaced with an abundance estimate of 324 (95% CI: 117-471) for BSB2 humpbacks in 2005 based on the information in JCRM (2012, Table 3 pg 400), as Category 1A, Evaluation Extent 2.*

3.2.3 Wording on confidence intervals

A previous description of a confidence interval on the IWC website was incorrect. At SC68D, the ASI established an ICG to revise the wording. The SWG **agreed** to temporarily replace the old text while the ICG continued to improve the wording and add levels of detail.

Attention: S-Wilson

The SWG recommends replacing the text on the IWC website page on whale abundance that describes how to interpret a confidence interval with the following:

'It is impossible for cetacean abundance estimates to be completely precise and IWC estimates are presented as a 'best estimate' figure, accompanied by a 95% confidence interval, showing a range of plausible values for the population's actual abundance. As an example, the 1991/2-2003/4 abundance estimate for Antarctic blue whales is 2,300 with a 95% confidence interval of 1,150 - 4,500. This means that the range 1,150 – 4,500 was computed using a method that has a 95% chance of including the population's actual abundance.'

3.3 Review of IWC Table of Agreed Abundance Estimates to identify any required re-categorisations

The SWG reviewed the IWC Table to consider re-categorizations of certain abundance estimates suggested by Katara.

Attention: S-Katara

*The SWG **agreed** to the re-categorizations of certain estimates in the IWC Table as detailed in Appendix 4 and requested Katara to update the Table.*

4. METHODOLOGICAL ISSUES

4.1 Mark-recapture abundance estimation and diagnostic methods

In 2019, the SWG established an ICG to consider diagnostic methods (e.g., model fit) and analytical challenges for fitting mark-recapture models to estimate abundance, including situations with long-term and/or heterogeneous survey effort (IWC, 2020). Little progress has been made on these issues although mark-recapture techniques have seen numerous developments in recent years and are pervasive in the work of the Committee. After considering the guidelines for model-based abundance estimation outlined in SC/69A/ASI/20 (see item 6.1), the SWG noted that an equivalent resource for mark-recapture methods would be useful for supporting its work.

The SWG **recommended** that the mark-recapture ICG (Table 6; item 4.1) develop guidelines for the use of mark-recapture techniques to estimate cetacean abundance, including considerations on study design, photo-identification and matching, mark-recapture models, software, and related issues. Following this work, a shorter set of guidelines could be developed to provide a checklist of recommendations specific to the work of ASI.

Attention: SC-ASI, R

*The SWG **recommended** that a document providing guidance on the use of mark-recapture techniques to estimate cetacean abundance be developed and presented to the Committee in SC69B to help progress the work of ASI and welcomed the offer of Kelly and Wade to coordinate this effort.*

4.2 Minimum sample sizes

During the evaluation of Bradford *et al.* (2021), Palka (2006), Palka (2020), and Hamabe *et al.* (2023), it became apparent that the existing classification system was not sufficient to provide advice to Committee subgroups in cases where well designed and implemented surveys yielding small sample sizes (due to the scarcity of whales in the surveyed area) resulted in abundance estimates that the SWG considered insufficiently trustworthy for direct use in Committee assessments or management procedures, but nevertheless constituted reliable information about (low) abundance. The SWG, therefore, **recommended** the creation of a new Category 4 to allow endorsement of the data or information from such surveys with low sample sizes without endorsing the resulting estimates. The updated list of category descriptions is provided as Appendix 3.

Attention: SC, SC-ASI

*The SWG **recommends** that Category 4 be added to the list of options for Committee categorization/endorsement of abundance estimates and associated data, described as follows:*

Category 4: This category, for survey data, is for cases when too few sightings (or recapture data) were obtained to provide an endorsable abundance estimate, because whales were scarce in the surveyed area. However, the survey design and analysis were of sufficient quality to provide reliable information about the (low) number of whales in the area, and these data could be used for fitting population models or in-depth assessments despite not yielding a reliable abundance estimate. Because the RMP allows the use of abundance estimates with few or zero sightings, Category 4 also includes abundance estimates derived from Category 4 data, specifically for use with the RMP.

*The SWG **agrees** to review this wording at SC69B and refine it if necessary.*

5. STATUS OF STOCKS INITIATIVE

5.1 Progress from ICGs

The Committee has been asked to provide information on the status of whale stocks for the Commission and the general public. Originally planned as a biennial document, a Status of Stocks Website was deemed more practical and useful in Committee discussions, and ASI began its development in 2017. The project has been deemed the Status of Stocks Initiative (SOSI).

The aim of SOSI is primarily to summarise completed Committee work for presentation on the IWC website. SOSI will also provide information on how such assessments are conducted by the Committee, with methodology and results provided at increasing levels of detail up to that which may be useful for scientific researchers.

The goal of SOSI is not to replace or contradict existing IWC web pages, nor to replicate either the intent of or the material contained in other sources of information such as the IUCN Red List. Instead, the Committee wishes to highlight its intensive, scientific stock assessments, especially those reliant on quantitative modeling, which provide a view of status that is different to those provided elsewhere. In many cases, the information provided in the Status of Stocks Website will be based on the Committee's In-depth Assessments, *Implementations* and *Implementation Reviews* for the RMP and AWMP, modelling used for the development of AWMP *SLA*s, and other *Comprehensive Assessments*.

The working group **thanked** the members of the SOSI Intersessional Correspondence Groups (ICGs) for all the hard work they have contributed towards this important issue for the SC.

5.1.1 Steering Group

SC/69A/ASI/07 reports on intersessional progress of the SOSI Steering Group, which was established to oversee the SOSI project and ensure consistency and communication among the relevant ICGs. The Steering Group received broad and diverse input on SOSI priority stocks from experts. Three types of populations were prioritised: small critically endangered stocks that do not require complex assessment, stocks that have undergone RMP/AWMP assessment that require simple updating, and more complex situations where different modelling approaches have been used. The following list of priority cases was established: eastern North Pacific gray whales, North Atlantic minke whales, Bering-Chukchi-Beaufort Seas bowhead whales, western North Pacific Bryde's whales, vaquita, eastern North Pacific right whales, Okhotsk Sea bowhead whales, and Southern Hemisphere humpback whales. Two additional priority cases will be added if feasible: western North Pacific right whales and eastern North Atlantic right whales.

The Steering Group established the goal that the first SOSI web pages could be published 'live' for the public shortly after IWC69 (autumn, 2024). To achieve that, all difficult decisions about design, modeling, and content will need to be agreed, or nearly so, at SC69A, with final approval of fine-tuned content and other minor issues settled during SC69B.

The Committee is not the owner of iwc.int; rather the website is an outreach tool of the Commission, managed by the Secretariat. Therefore, it is important to view the SOSI design process as the Committee providing advice to those entities about how best to communicate the work of the Committee to Commissioners and the general public. The

Secretariat has expressed strong support for the planned SOSI website as an effective means of public communication that would help address some of the most common questions about whales they received from the public.

5.1.2 Modelling

The Modelling ICG is tasked with specifying, conducting, and generating summary results for model-based SC assessments for SOSI populations. Intersessionally, the Modelling ICG compiled information on the status of assessment models developed by the Committee and undertook the revision of existing modeling software that will be used to compute the final SOSI results for two populations: eastern North Pacific Gray and Southern Hemisphere humpback whales.

5.1.2.1 EASTERN NORTH PACIFIC GRAY WHALES

SC/69A/IST/01 describes updates made to the models developed during the Gray Whale Rangewide Review that formed the basis for evaluating the performances of the Gray Whale *SLA*. The occurrence of a new unusual mortality event starting in 2019 raised the possibility that the set of scenarios used to evaluate *SLA* performances needs to be revised to include new information on the potential magnitude and frequency of such events. New operating models for eastern North Pacific gray whales were developed to include a 2019-2022 mortality event and new abundance data. These models will also be useful for updating the assessment of gray whales for SOSI.

5.1.2.2 SOUTHERN HEMISPHERE HUMPBACK WHALES

The Working Group noted that the last in-depth assessment of southern hemisphere humpback whales culminated in 2016 and that Jackson *et al.* (2015) provided an excellent summary of the assessments conducted for all seven of the breeding stocks concerned. For each stock, Bayesian assessments were conducted using age-aggregated production models that assume initial abundances to be at pre-exploitation levels, require information on catches, and fit to data related to both relative and absolute abundance. Complications associated with these assessments include the mixing of stocks in the high latitude catches on the feeding grounds off Antarctica, sub-stock structure and relatively slow but nevertheless important movements between stocks and sub-stocks (Jackson *et al.* 2015). New information has become available since the in-depth assessment however the agreed process for SOSI is to use completed in-depth Assessments or *Implementation Reviews*, rather than having to update or initiate new assessments. Thus, it was **agreed** that for south-hemisphere humpback whales, SOSI should work with the information available from Jackson *et al.* (2015).

Attention: SC-ASI

*The working group **agreed** that the Status of Stocks Initiative should use the assessment methods and results summarized by Jackson et al. (2015) when preparing content for Southern Hemisphere humpback whales.*

5.1.2.3 OTHER STOCKS

Of the other stocks prioritized for SOSI, the possibility of re-running the conditioning process for the North Atlantic common minke whale *Implementation Simulation Trials* in the coming year, using new data obtained since the last *Implementation Review,* is being assessed. It will be necessary to revise the population model for the BCB bowhead whales due to problems reconciling plausible values for carrying capacity with recent abundance estimates and the long historical catch record. Such a reassessment will need to be reviewed by the Committee before it can be reported as part of SOSI. The trials for western North Pacific Bryde's whales could be re-run using new catch data obtained since the *Implementation* and any new estimates of abundance that are approved by ASI.

The SWG also noted the need to update published SOSI content. For some simpler cases, the SOSI information could be updated with new abundance estimates (e.g., gray whales). For more complex situations, where it is unrealistic to apply frequent updates, the Committee needs to determine the best timing for each stock, to coordinate between finishing an assessment and passing on the appropriate information to SOSI. It will be important to include time-stamps on the SOSI website to indicate how recently the information has been updated.

5.1.3 Content

ASI **thanked** Cipriano and Wilson for the enormous amount of work the ICG on Language, Terminology, and Website Content Development (the 'Content ICG') had completed during the intersessional period, as summarized in SC/69A/ASI/06. This document has two primary purposes: (1) to inform the Committee on the background of the project and progress to date, and (2) to present recommendations on new and revised SOSI content (item 5.2).

It is important to note that the examples in SC/69A/ASI/06 are initial mock-ups constructed to illustrate the goals of the project. An overview was presented of the different component pages, illustrating how various status assessment information could be displayed at several levels of technical detail. The Secretariat's support for this initiative was highlighted, noting how it would address the most common questions about whales raised by both Commissioners and the public (IWC 2023, p.83).]

5.1.4 IWC/IUCN Coordination

Although the IWC/IUCN Coordination ICG was established by the Committee for general purposes, it is highly relevant to ASI to help ensure that SOSI and the IUCN Red List are distinct, yet consistent and complementary. The Content ICG consulted with members of the IWC/IUCN Coordination ICG during the year to develop language about IUCN and IWC evaluations of the status of stocks, and the SWG endeavoured to strengthen connections between the two ICGs going forward.

5.1.5 Extinction Initiative Coordination

The SWG discussed possible coordination with the Extinction Initiative (EI) and whether it could provide useful information for SOSI regarding highly endangered stocks, especially when data are scarce or no formal stock assessment has been completed by the Committee. The EI is meant to be a tool for rapid communication on topics relating to populations in peril, but it is not an assessment tool. The EI will focus on either species or populations at risk of extirpation, and therefore some of its cases should align well with those prioritized by SOSI. It was noted that proposals for EI statements need to be endorsed by the Commission and that the full approval process is still being developed. The SWG agreed that the relationship between the two initiatives (SOSI and EI) was promising, and that communication should continue.

5.2 New proposals for design and content

The SWG discussed the new recommendations regarding SOSI content and design proposed in SC/69A/ASI/06, and additional matters arising in discussion. The SWG made several decisions (see 5.2.1 - 5.2.25) with regards to advice to the Secretariat on how SOSI development should continue.

Attention: SC, SC-ASI

The SWG draws attention to a large number of agreed specifications and recommendations about the continued development, content and design for the SOSI website, as elaborated in items 5.2.1-5.2.25 of Annex D.

In what follows, informal names for potential web pages are drawn from SC/69A/ASI/06, namely the *Welcome Page*, *Status Summary*, and *Status Details* pages. These represent three levels of detail, with the *Welcome Page* being the simplest and most visual, and the *Status Details* page being the longest and most technical. The table of thermometer plots (see SC/69A/ASI/06), is a specific visual representation of status assessment, and would likely be a component of the *Welcome Page*. These thermometers will display the Relative Abundance and Recent Change metrics, two key statistics to describe the status of stocks.

5.2.1 Point of entry to SOSI web content

The point-of-entry page (i.e., the *Welcome Page*) will be the first SOSI content seen by interested visitors and may be the only content that many read. Two proposals have been made for this point-of-entry: the first one leads with brief text, the table of thermometers (for Relative Abundance and Recent Change), summary statements, links for more information, and other minor elements, with detailed material about SOSI deferred; the second option leads with a longer text page explaining SOSI, with the thermometers much less visible below the lengthy text, or on a separate page altogether.

The SWG **agreed** that while it is important to introduce the topic properly, the point-of-entry page should grasp the public's attention quickly and thus that the introductory text should be kept short (i.e., leaning towards the first option). However, since the Committee is a scientific body, care should be taken that deliberative background and expository material is not sacrificed for the sake of visual appeal. Extensive use of collapsible text boxes, links to further detail, and so forth should be used to balance these competing objectives.

5.2.2 Fate of the existing 'status' page (https://iwc.int/about-whales/population-status)

The current IWC website already has a page providing information about status (*https://iwc.int/about-whales/population-status*) that is not part of SOSI. The Content ICG noted that it would be important to reconcile this content with SOSI content. It is unclear how to do so because: (a) the existing page contains information about more species/stocks than SOSI will in the near term; (b) some of the existing content may conflict with SOSI or need to be updated; and (c) some of the content is not, strictly speaking, about status.

The SWG **agreed** that information on this page is valuable and should be made consistent with the short text that will be presented for each stock or species in the SOSI thermometer table or the *Status Summary* pages. It will be necessary to ensure the proper citations and links (e.g. to the *Status Details* page) are provided for the new content.

5.2.3 Merge or separate status summary and details

The Secretariat mock-ups offered two approaches to presenting the species-specific *Status Summary* and *Status Detail* pages. *Status Summary* pages employ plain language and summarize assessment results pooled over trial scenarios. *Status Detail pages* are longer, more technical, explain the various scenarios used, and present scenario-specific results.

The SWG **agreed** that *Status Detail* content should not be presented on the same page as the much simpler *Status Summary*; instead the *Status Detail* content should be a separate page (accessed via hyperlink) or a downloadable file.

5.2.4 Small, unmodeled populations and poor-data cases

Although the purpose of SOSI is to report on completed work by the IWC, the Committee has struggled with the question of whether and how SOSI should also address stocks for which small population size raises serious conservation concerns but for which one or more comprehensive population models are not available (e.g., vaquita). The SWG was reminded that members of the general public do not know which stocks have been reviewed by the Committee but expect the IWC to be a source of reliable, timely information. However, it is not feasible to include all the stocks of small cetaceans on the SOSI site and to keep those pages up to date. There are cases where the Committee has carefully evaluated the relevant information for such a stock, and made strong recommendations to the Commission, even in the absence of a model-based assessment, and that it is appropriate to include these stocks in SOSI.

For data-limited stocks without full assessment modelling results, the SWG **agreed** that a qualitative assessment, including some information on abundance and trend, would be sufficient and the status information would not need to be highly detailed. However, concern was expressed that the initial SOSI drafts for the vaquita and Rice's whale (chosen as examples for development) did not match the tone and level of detail of other draft examples. The SWG **agreed** that this concern could be addressed by simplifying the language on the introductory pages and moving the more detailed description to less visible pages.

The SWG reviewed a subsequent revision to the draft content for the vaquita to further consider the appropriate approach. At the level of the *Welcome Page* (i.e., the thermometer table), the SWG **agreed** that the table should use a thermometer rather than the actual number of animals because it preserves consistency with other stocks. The SWG **agreed** with the general content and style for the *Status Summary* page and the *Status Details* page in this new draft, and with the inclusion of links to the relevant pages of the IUCN Red List on the *Status Summary* page. It was suggested that, in cases where a set of abundance estimates is presented, it would be advisable to add a comment on the *Status Details* page about their comparability if there are important differences among the estimates (e.g., in terms of survey methodology) in the time series.

5.2.5 Maps and artwork

A set of species illustrations had been commissioned specifically for the IWC Whale-Watching handbook and these can be used for SOSI, but these do not include maps. Challenges associated with including maps to delineate population ranges include the cost of copyrights, concerns over accuracy, visual appeal, and consistency. Possible options include approaching members of the Committee who could contribute their time and technical skills to producing tailored maps in the future or using a combination of open-source maps (e.g., Wikimedia Commons) and material that can be obtained from partners (e.g., NOAA), with proper agreements and credits. Suggestions for other sources included Committee members with links to academia, material from the Communications Initiative (see item 8.2), and in-depth assessments completed by the Committee. The SWG **agreed** that maps on SOSI pages should correspond to the stocks being assessed (as opposed to species-wide maps) and have a consistent style.

Another issue is the lack of consensus on the definition of the range of a population (e.g., areas where the species is present versus areas where it is frequent). The Committee must first establish what is meant by 'range' before trying to map ranges. The SWG **agreed** that appropriate Committee subgroups should be tasked to define the scientific meaning of 'range' and to work on delineating ranges for stocks considered by SOSI.

Attention: SC, NH, SH, SM, SDDNA

The SWG agreed that appropriate Committee subgroups should be tasked to define the scientific meaning of 'range' and to work on delineating ranges for stocks considered by SOSI.

5.2.6 Use of the terms 'stock' and 'population'

The Content ICG has recommended that the historical context (within the IWC) and meaning of the term 'stock' be explained, for example on the Glossary and Terminology pages. However, the introductory SOSI should avoid using the term 'stock', instead using 'population' to maintain accessibility to the public and because SOSI aims at reporting on stocks at the scale of ocean basins or whole populations as much as possible. However, the SWG noted that management stocks do not always coincide with biological populations and that, in some situations, it will be difficult to avoid using 'stock' (e.g., when there are multiple hypotheses on stock structure in the models). Moreover, the term 'stock' is likely to be needed for more technical (practitioner level) pages and thus proper usage should be considered carefully, including in relation to the use of the term in RMP documentation.

The SWG recognized that a diversity of opinions was expressed but **agreed** that the use of either term will need to be decided on a case-by-case basis, favouring 'population' when possible, especially for the most public-facing content. The SWG **agreed** that the Glossary and Terminology pages should present clear definitions of both terms.

5.2.7 Use of the term 'assessment'
The Content ICG acknowledged that the term 'assessment' has a particular meaning in an SC context and recommends that SOSI should use it where it is most appropriate but should favour alternate wording on public-facing pages because the term's scientific meaning does not match the typical layperson's understanding.

The SWG **agreed** that the use of 'assessment' should be limited on SOSI pages, though it might be needed on the *Welcome Page*. Although 'evaluation' is among the possible alternatives, it was noted that this term has also been proposed to help distinguish the content of the IUCN Red List from the assessments of the Committee (see item 5.2.17). The SWG **agreed** that the Content ICG should select alternative option(s), and 'appraisal' was suggested to be a potentially suitable alternative.

5.2.8 Time period for Recent Change
A time-span of 30 years for the Recent Change statistic was originally proposed during SC68C, but it was suggested in 2022 that a shorter time span of 10-20 years, or perhaps the generational time for a species, might be more appropriate. Annualized trend numbers were considered as well but their use would make it too difficult to compare the thermometers across populations.

The SWG **recommended** a time-span of 20 years, noting that brief text can be added to the *Status Summary* to explain special cases (e.g., short generation times, data series shorter than 20 years, or UMEs).

5.2.9 Choice of sub-stocks to report
The SC has previously agreed that SOSI would report on population sub-units that have been assessed by the IWC or are of concern due to their small population size. The prioritization is established by ASG/ASI, through the SOSI Steering Group, but the SWG acknowledged that it should also consider the expectations of the public since small stocks are usually the ones generating the most questions from visitors to the website, and the IWC may lose credibility if SOSI did not report on critical situations.

5.2.10 Relative Abundance labels
Relative Abundance depicts the level of depletion, but its scale is reversed for SOSI because it is easier for the public to understand that low values correspond to low abundance, and high to high. The text labels for the Relative Abundance categories had not been decided yet, as the chosen numerical ranges and labels can imply value judgments and members of the SC have had differing perspectives. For instance, 'very high' could imply that numbers are excessive, while 'abundant' would be misleading for populations that are small but not depleted.

The SWG **agreed** the numerical ranges and labels: 0.01-0.19 [very low], 0.20-0.39 [low], 0.40-0.59 [moderate], 0.60-0.79 [good], 0.80+ [very good], which has the additional advantage that this is distinct from IUCN categories.

5.2.11 Thresholds for Recent Change statistic
Because of the recommended switch to a 20-year period to characterize Recent Change (see item 5.2.8), the thresholds for this thermometer needed revision. The SWG also recognized that it was important to choose thresholds and labels that would be understood easily by the public and Commissioners.

The SWG **recommended** the following scale for cumulative 20-year change relative to the starting point: '≤ -20%, -20% to -10%, -10% to 10%, 10% to 20%, ≥ 20%', but noted that in cases of very sharp declines or increases, some annotation or footnotes might be required. SC/69A/ASI/06 explains how key thresholds in this choice roughly correspond to annual rates of 1% increase and decrease.

5.2.12 Use of confidence intervals
The SWG was reminded that the labels for Relative Abundance and Recent Change are determined from the point estimate for each stock and that the corresponding confidence limits are displayed in the thermometers (*Welcome Page* and *Status Summary*) and the tables (*Status Summary* and *Status Details*).

5.2.13 Lists of content for status summary and details
The Content ICG considered how future SOSI pages would be developed. To help with that task, the ICG used the examples developed already to identify the components of the *Status Summary* and *Status Details* pages in outline format. The result was as follows.

Structure of *Status Summary* pages

- [Title]
- [Image and Range Map]
- [header information on general abundance, distribution, recognized populations]
- Status Results (Relative Abundance and Recent Change), with table if warranted and with trend plot(s)]

- [status summary statement]
- [data quality rating, and links to more info.]

Structure of *Status Details* pages

- [some of the material above]
- [model type used for assessment]
- [named stock structure distinctions/assumptions]
- [map showing geographic distribution of named stocks]
- [trial specifications table]
- [table of summary statistics, by relevant areas and overall, for each trial]
- [table of summary statistic medians averaged over trial (plus upper and lower bounds) for abundance, depletion, 20-year change summary statistics
- [references]

The SWG considered the possibility of adding absolute abundance to the *Welcome Page* in addition to the Relative Abundance thermometer but **agreed** not to do this, to avoid unnecessary clutter. However, for stocks with extremely low abundance, that number could be added to the brief status statement in the table on the *Welcome Page*. An abundance estimate is already included on the *Status Summary* page.

5.2.14 Text explaining status assessment
Explanatory text on how IWC assesses population status (intended for the point-of-entry page, see item 5.2.1) was provided in SC/69A/ASI/06. The SWG reviewed the text and referred suggested edits back to the Content ICG.

5.2.15 Text explaining scientific uncertainty
During SC discussions in 2021 (IWC 2022, pp. 236-240), concern was expressed about uncertainties inherent in assessing the status of a stock, and the risk of giving a false impression of high precision. Therefore, the Content ICG drafted a proposal for the text explaining the concept of 'scientific uncertainty'. The SWG reviewed the text, acknowledged the need for brevity and the importance of using terms that are understandable by the public and referred suggested edits back to the ICG. The revised proposed text is as follows:

> 'Uncertainty is a fundamental aspect of research in almost any field of science. The IWC's Scientific Committee has developed a range of techniques and guidelines to assess populations and quantify uncertainty. When reading about these assessments, it is important to look at the ranges of uncertainty provided, in addition to the central estimates, in order to fully understand what we know and don't know about population status.'

The Content ICG consider should also consider appending verbiage like the following: 'Furthermore, the marine environment can be unpredictable. A cetacean population that has been stable or increasing for many years may undergo a sudden downturn whose cause is not immediately evident. The information on this website may not reflect recent sudden changes.'

5.2.16 Text introducing SOSI and explaining the thermometer table
On the Secretariat's mock-up point-of-entry (see item 5.2.1), a prominent box highlights an explanation of SOSI. This text was also provided in SC/69A/ASI/06. The SWG reviewed the text and referred suggested edits back to the ICG.

5.2.17 Text comparing SOSI, IUCN Red List, other assessments
The IWC and IUCN use the term 'assessment' to describe processes that differ in their objectives and criteria. The IUCN/IWC Coordination Group and the Content ICG were tasked with developing text to explain the differences between IUCN Red List assessments and IWC population status assessments. The SWG reviewed the current draft text, which had not yet been fully approved by those ICGs, and made suggestions. It also noted that the IUCN Red List does not always rely on model-based stock assessments and thus describing Red List entries as 'evaluations' might be more appropriate.

The SWG **agreed** that the two ICGs should finalize the wording shortly after SC69A, as this is a key component of the SOSI website where consensus is needed.

5.2.18 Adding a brief status statement to the thermometer table
For the *Welcome Page*, two thermometers with single-word labels summarizing population status have been proposed. For the trajectory plots on *Status Summary* pages, it was suggested that a short, simple sentence describing the depletion, recovery and trend shown in the plot might also help convey status in plain language (IWC 2022, pp. 236-

240). Adjacent to the trajectory plot, the *Status Summary* page would include a summary statement about recovery/status (IWC 2023, p.237).

The SWG **agreed** with this approach and **recommended** that an even shorter text summary statement be included in each row of the thermometer table on the *Welcome Page*.

5.2.19 Glossary and Terminology
During the next intersessional period, the Content ICG will finalize a draft Glossary and Terminology page for terms relevant to SOSI and, when necessary, explain their history within the IWC (e.g., 'stock', 'sub-stock', 'carrying capacity', 'depletion'). The SWG suggested that convenors of each of the four ICGs relevant to SOSI nominate one person from their group to form a Glossary ICG, with additional volunteers welcome.

5.2.20 Data quality classification
The Content ICG revised the draft text explaining the different ratings of data quality. The most notable change was the inclusion of information on human-induced mortality as one of the criteria. The SWG reviewed the proposed text and **recommended** clarifying that not every criterion must be met to qualify for a category and suggesting that the criteria be presented instead as a list of factors that will be taken into account when classifying the assessments. It was also noted that the stocks prioritized by the SOSI Steering Group include some that will qualify as poor data quality, and in such cases, the *Status Summary* might present abundance estimates (e.g. Category 3) that would not be typically included on the IWC website.

5.2.21 Options to add Red List labels or links
The SWG discussed whether IUCN Red List labels (or links to the relevant Red List pages) should be added to SOSI pages. It was noted that there is no one-to-one correspondence between Red List entries and SOSI stocks. The Red List contains an evaluation for each species and additionally for some regional populations, only some of which coincide with stocks recognized by the IWC or its Scientific Committee. Furthermore, links to the Red List are already included for many whales on the species-specific information pages on the existing IWC website.

The SWG **agreed** that Red List labels and links could be added to *Status Summary* pages, when appropriate. When provided, the link should point to the Red List evaluation for the particular species, subspecies or population, not to a generic page about the Red List or IUCN. The SWG *agreed* that Red List labels and links should not be added to the *Welcome Page* with thermometers.

The SWG further **agreed** that links to the relevant Extinction Initiative pages could be used as well.

5.2.22 ICG memberships: Steering, Modeling, Content, IUCN/IWC
Changes to the membership of the four SOSI ICGs were **agreed** (see Annex V, Email Groups).

5.2.23 Timestamps
The SWG discussed the importance of indicating the dates of the assessments on the SOSI pages to avoid misrepresenting the available information, especially for cases where the period of Recent Change may not represent the last 20 years. The SWG **agreed** that a single year timestamp should be added to the thermometer table and the *Status Summary* pages. For small stocks, the actual abundance in the year of the most recent available estimate could be reported in the brief summary statement on the thermometer page.

5.2.24 Stocks not assessed with full population dynamics models
The SWG discussed the case of stocks for which a full population dynamics model assessment is not available. Since the information presented in the thermometers relies on the results of these models, it is unclear how the values for Relative Abundance and Recent Changes would be obtained. Trends could be estimated from a series of abundance estimates, but relative abundance will be problematic if there are no reliable estimates of carrying capacity or historical abundance. Although the evaluation and endorsement of trend estimates do not currently fit within the remit of ASI, the SWG has sufficient expertise to, for example, generate estimates from simple, weighted, exponential fits over appropriate time periods. The SWG **agreed** that these situations should be handled on a case-by-case basis until the scope and nature of the problem is better understood.

5.2.25 Scale and labels for Recent Change
Unlike the Relative Abundance thermometer, the scale for Recent Change has no natural upper or lower bound. Using the same scale for all stocks is essential to avoid misleading comparisons, but in some cases the needle (or its confidence interval) would need to be off the chart. One remedy could be to use a broader range to accommodate the most extreme cases, but then most of the thermometers would look similar. The SWG suggested that for these extreme cases, the needle would be placed at the maximum end of the scale with a symbol (e.g., an asterisk) next to it and that a different colour could be used for the confidence interval, with the actual values provided elsewhere.

The SWG **agreed** that the labels for the Recent Change statistic be revised to reflect that they do not reflect current or future trends (e.g., changing 'increasing' to 'has increased'). It was also suggested that the Content ICG consider whether

negative rates of change are sufficiently clear to the public (e.g., that -10% means a stock is at 90% of its previous abundance).

5.3 Future workplan

The SWG considered that its existing ICG structure had been effective in facilitating SOSI progress. In the 2022-2023 intersessional period, all SOSI ICGs should finalize content, model results for the initial stock(s) presented, language, and design, so that the Committee is in a position to endorse publication of initial SOSI web pages shortly after IWC69, in autumn 2024. The SWG thanked the ICG members for their continued efforts to make this project a success.

6. PROGRESS ON PREVIOUS RECOMMENDATIONS

6.1 RMP guidelines for model-based abundance estimates

A set of guidelines for undertaking surveys within the Revised Management Scheme were first agreed by the Committee in 1994 (IWC 1994), with a subsequent update in 2012 (IWC 2012, section 5.5), which was accompanied by the suggestion that a review be undertaken to explore model-based abundance estimation in theory and practice, and its relation to the design-based approach. A review was undertaken by Hedley and Bravington (2014), which led to a workshop in 2017 on spatial model-based approaches and software (IWC 2018). Satisfied that model-based abundance methods were useful and reliable for abundance estimation, the Committee noted that there was a need for RMP guidelines on surveys to be modified to incorporate spatial modelling approaches to estimate abundance (IWC 2019, item 12.3.1).

SC/69A/ASI/20 offered an overview of spatial model-based abundance estimation from distance sampling line transect surveys, including a review of models and estimation approaches, diagnostics, uncertainty estimation, results presentation, and available software. The Committee noted SC/69A/ASI/20 was an excellent resource for its abundance estimation work and that while the overview did not recommend specific changes to the RMP guidelines on surveys, it will assist with abundance work more broadly.

The Committee had considered a previous version of SC/69A/ASI/20 last year, but that paper had not been archived and the Committee discussion was not summarized in the meeting report. Now, the new version has been archived for future reference. The question of whether specific RMP guidelines (i.e., 'rules') should be developed on the basis of the general practitioner advice in SC/69A/ASI/20 was referred to the IST sub-committee.

SC/69A/ASI/21 provides a comprehensive history of the 'Requirements and Guidelines for Conducting Surveys and Analysing Data within the Revised Management Scheme' (IWC, 2012) document, and the recent work towards updating it to provide guidance on the use of spatial models for abundance estimation.

The Committee thanked Miller and Kelly for their efforts in developing the overview of model-based estimation approaches for abundance estimation, and for collating the history of the RMP guidelines on surveys.

6.2 North Pacific sei whale review

During SC68D, ASI reviewed Hakamada *et al.* (2009) and Hakamada and Matsuoka (2016), both presenting abundance estimates for sei whales in the JARPNII survey area (east of Japanese coast, west of 170°E, north of 35°N, south of Russian and US EEZ), based on ship-based multi-species sighting surveys. Due to the migration pattern of sei whales in the area suggested by the sighting survey data, abundance was estimated separately for the early and late seasons. These two documents were originally reviewed in the 2020-21 intersessional period and first considered by ASG and ASI at SC68C (item 11.1.6 of IWC (2022)). At that time, the Committee concluded that additional information was required before the estimates could be fully evaluated. Information provided by the authors was reassessed during the 2021-2022 intersessional period and was deemed to have clarified the methodological questions that had been raised, although some concerns remained.

In discussion during SC68D, the Committee focused on Hakamada *et al.* (2009) as it was recognized that the two papers have similar methods but differ in some aspects (sample size, detection functions), and that separate evaluations should be made for each. However, at the time, no endorsement was made due to potential issues related to combining estimates based on small sample sizes across areas and years with potential biases due to migration (IWC 2022, item 11.1.6). The Committee established an intersessional correspondence group to investigate these issues (IWC 2022, item 11.8). Clarifications were sought on the methods and raw data, as concerns were raised about inconsistencies between the abundances and years presented in Hakamada *et al.* (2009) and those in the current models used by the IA sub-committee (IWC 2022, item 8.1.1.2).

The ICG on 'Synthesis of the abundance estimates of North Pacific sei whales' noted that while there were still some uncertainties regarding how the results from survey areas and years were combined and the influence of whale migration on abundance estimates, that this did not preclude categorization of the (non-combined) abundance

estimates for each area and year. The IA subcommittee might further consider the combination of the endorsed estimates.

The proposed categories can be found in Tables 3 and 4. It should also be noted that while 7WRS in 2012 (Table 3) has too few sightings and is recommended as Category 4, subarea 7 as a whole can be endorsed as 1A if that estimate is available.

Table 3

Estimates from Hakamada and Matsuoka (2016). For Category 4 endorsements, only the data are endorsed, not any estimate.

Year	Research area	***P***	CV(P)	95%LL	95%UL	Reference	Category
2008	7 Coast of Japan - 150°E	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2008	8 150°E-157°E	**908**	0.635	261	3,158	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	1A
2008	9 157°E-170°E	**4,119**	0.444	1,721	9,854	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	1A
2009	7 Coast of Japan - 150°E	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2009	8 150°E-157°E	**614**	0.683	136	2,768	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	1A
2009	9 South of 45°N - 157°E-170°E	**3,756**	0.182	2,551	5,530	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	1A
2011	8 150°E-157°E	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2011	9S South of 43°N - 157°E-170°E	**2,174**	0.376	904	5,231	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	1A
2012	7WRS South of 41°N in 7WR	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2012	7E 147°E-150°E	**543**	0.740	67	4,390	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	1A
2011	9N North of 43°N - 157°E-170°E	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2012	7CS	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2012	7CN	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4
2012	7WRN North of 41°N in 7WR	**data**	n/a	n/a	n/a	Hakamada and Matsuoka (2016) (SC/F16/JR12) Table 3 on page 6	4

Table 4

Estimates from Hakamada *et al.* (2009). For Category 4 endorsements, only the data are endorsed, not any estimate.

Year	Research area	***N***	CV(N)	Reference	Category
2002&2003	7 Coast of Japan - 150°E	**data**	n/a	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	4
2002&2003	8 150°E-157°E	**data**	n/a	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	4
2002&2003	9 157°E-170°E	**4,291**	0.323	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3
2004&2005	7 Coast of Japan - 150°E	**data**	n/a	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	4
2004&2005	8 150°E-157°E	**1,187**	0.822	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3
2004&2005	9 157°E-170°E	**6,413**	0.677	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3
2006	7 Coast of Japan - 150°E	**data**	n/a	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	4
2006	8 150°E-157°E	**2,635**	0.354	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3
2006	9 157°E-170°E	**6,827**	0.280	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3
2007	7 Coast of Japan - 150°E	**data**	n/a	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	4
2007	8 150°E-157°E	**1,106**	0.507	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3
2007	9 157°E-170°E	**1,673**	0.650	Hakamada *et al.* (2009) (SC/J09/JR15) Table 3 on page 8	3

Attention: SC, S, C

*The SWG **recommends** that the abundance estimates or datasets (for Category 4) pertaining to North Pacific sei whales in years from 2002 to 2012 listed in Tables 3 and 4 of Annex D be endorsed as the indicated Categories. The SWG **agrees** that all of these abundance estimates meet the definition of an Evaluation Extent of 1 ('examined in detail by the Committee').*

6.3 Progress on simulation software to evaluate methods for abundance estimates from surveys

The Committee has used simulated data to evaluate novel analysis methods for line transect abundance, and while the datasets were archived, the original executable code is now outdated. The Committee provided financial support for a project to document, update and streamline the code so that it is compatible with current compilers. Smith and Palka (2021) describe the updating process, which is now complete, and the code will become available via GitHub (IWC 2023, item 11.4.2).

SC/69A/ASI/16 describes an implementation of this 'Transim' marine mammal survey simulation suite on a Windows system, including the steps necessary to use it and interpret the output, as it was originally developed under Unix. The Windows System for Linux, Ubuntu Linux 22.04, and some additional elements needed to enable compiling and running the suite in a Windows environment were set up on a Dell laptop running Windows 10 v. 21H2. The g++/gcc code for the suite was then recompiled and invoked by shell scripts to cycle it through multiple replicates. Output from an example scenario comprising such replicates closely matched that generated from the Linux-only versions of the suite in past years. The SWG thanks the authors for completing the work for this contract.

Two original motivations for this project were: (i) to avoid obsolescence of code/data used by the Secretariat, and (ii) to enable ASI to test new and existing abundance estimation approaches under a variety of conditions. In discussion, the SWG noted that the second motivation is ambitious and would seem in conflict with the existing heavy workload for ASI.

The burden of training and upkeep for the software was questioned, but the authors noted that the software was intended to be used infrequently. The SWG noted that regular use of the simulation software will help ensure it is maintained. Smith and Palka described plans to develop a user manual, and the SWG endorsed their effort and requested that they present it to the Committee in the future.

7. INTERNATIONAL CRUISES

7.1 Surveys that include IWC funding and/or support, including IWC-POWER and IWC-SORP

The Committee welcomed the results of the 13th annual IWC-POWER cruise (SC/69A/ASI/09), which was conducted between August 2 and September 30, 2022 south of the Aleutian Islands. The cruise was organized as a joint project between the IWC and Japan. The cruise plan was endorsed at the SC68D. Researchers from the IWC, the US, and Japan participated in the survey. The survey was conducted using methods based on the guidelines of the Committee. Passive acoustic methods were included for the fourth time to acoustically monitor for the presence of marine mammals, with importance place on detecting and locating North Pacific right whales. Survey trackline coverage was 62 % (917.3 n.miles of a planned distance of 1.486.4 n.miles), with a total of 491.2 n.miles in Passing with abeam closing mode (NSP) and 426.1 n.miles in Independent Observer passing mode (IO). During the entire the cruise there were sightings of: blue (22 schools/24 individuals), fin (56/78), sei (25/27), common minke (3/3), Bryde's (3/3), humpback (18/53), sperm (41/41), killer (16/76) whales. No North Pacific right whales were seen or acoustically detected. Photoidentification data were collected for: 16 blue, 7 fin, 8 sei, 6 humpback and 8 killer whales. A total of 16 biopsy samples were collected from 4 blue, 4 fin, 6 sei and 2 humpback whales. A total of 34 sonobuoys were deployed, of which 33 were successful, for a total of over 210 monitoring hours. Species detected include sperm and fin whales, which were detected on 31 buoys (93.9%), killer whales (23, 69.6%), blue whales (18, 54.5%), and humpback whales (7, 21.2%). The Estimated Angle and Distance Training Exercise and Experiment were completed. Finally, a satellite-linked dive behaviour tag was deployed on a sei whale, which will inform availability estimates for the species. This cruise was successfully and safely completed, and provided important information on cetacean distribution in poorly known and logistically difficult areas.

In discussion, it was confirmed that half of each biopsy sample was stored at NOAA's Southwest Fisheries Science Centre, on behalf of the IWC, and the other half is stored in Japan. The photo-ID data are also available via application. It was noted that poor weather conditions and logistical constraints limited the number of biopsy and photo-ID sampling that could occur. The authors also noted the plan to consider SPOT tags for future surveys.

The SWG thanked the cruise leader, Laura Morse, for her excellent leadership, and the scientists and crew for their hard work in helping to make the voyage a success, despite the challenging conditions in the survey area. The SWG recognised the value of the data collected during POWER voyage.

The IWC-POWER Technical Advisory Group (TAG) presented a report on a workshop for planning for the medium-long-term IWC-POWER surveys. A summary is provided in Appendix 4.

SC/69A/REP/03B is the report of the meeting, chaired by Matsuoka, whose primary task was to finalise the detailed plans, logistics and protocols for the 2023 IWC-POWER cruise that was recommended by the Committee in 2022. The Government of Japan will kindly supply the vessel as it has throughout the programme thus far. The survey area in the Gulf of Alaska (high seas) overlaps the 2010 and 2011 cruises (Fig. 1 of SC/69A/REP/03B) and has not been covered in 12 years; IO data are still needed to allow for g(0) correction. The cruise will take place between 27 July and 6 October with a stop in Dutch Harbour to pick up researchers and acoustic equipment donated by the Government of the USA. Some 39 days will be spent in the study area. The Workshop also considered a potential study area for 2024 in part of the northern Bering and Chukchi Seas. It identified the information that would be needed at a 2023 Workshop, which is expected to be held in October in Tokyo, to finalise the study area and detailed plans. This information includes: the extensive aerial and vessel survey work in the region; likely sea ice conditions at the time of the planned cruise; permitting requirements; and advice on liaising with the Alaska Eskimo Whaling Commission in order to ensure that the cruise does not interfere with the fall hunt in any way.

The importance of the IWC-POWER programme was highlighted by the SWG, noting the international effort as one of the key strengths of the programme providing priceless information on cetaceans for over a decade. The sightings data, biopsy samples and photo-ID photographs feed directly into the work of the Committee and underpin a great deal of the advice provided to the Commission. The programme could not operate without the generous support of the Japanese Government who provide the vessel, crew and some of the scientists. Without this financial and logistical support, the IWC-POWER programme would not be able to operate and our understanding of cetacean populations in the North Pacific would be severely limited. The SWG thanked the members of the Technical Advisory Group, the scientists from numerous countries and the Government of Japan for making this programme such a success. Finally, the SWG encouraged all Member Governments and Range States to support IWC-POWER either financially or in-kind – in particular, this might be achieved by providing additional vessels and/or co-ordinating existing research fieldwork with that of IWC-POWER.

Attention: C

*The Committee reiterates to the Commission the great value of the data contributed by the IWC-POWER cruises which have covered many regions of the North Pacific Ocean not otherwise surveyed in recent years. The programme addresses important information gaps for several species, and has already contributed greatly to the ongoing assessment work of the Committee. The Committee **endorses** the report of the Steering Group (SC/69A/REP/03A and SC/69A/REP/03B) and **recommends** that the programme continues.*

*Furthermore, the Committee **encourages** all Member Governments and Range States to support IWC-POWER either financially or in-kind to further enhance the value of the cruise.*

The IWC has developed a programme of work to encourage collaboration with West African Countries and in particular the Ministerial Conference on Fisheries Cooperation among African States bordering the Atlantic Ocean (COMHAFAT/ATLAFCO). An ICG has worked on capacity building identifying areas where SC members could provide training and workshops to help COMHAFAT scientists. At IWC68 a Memorandum of Understanding (MoU) between the secretariats of COMHAFAT and IWC was signed. Under this protocol, an intern from Morocco was hosted by the Secretariat during IWC68 and African scientists were encouraged to attend the Scientific Committee meetings and seek support where appropriate. COMHAFAT shared the results of the fourth cetacean sighting survey in the coastal waters of Guinea Bissau, Guinea and Sierra Leone that took place from December 30, 2022, to January 09, 2023 (SC/69A/ASI/04) and plans for the upcoming 2023 cetacean sighting survey between Liberia and Ghana (SC/69A/ASI/05). There was also an appeal to Committee members and IWC members to consider hosting African scientists on their cruises and within their institutions to help with training and capacity building. The SWG notes that the authors of SC/69A/ASI/04 and SC/69A/ASI/05 were unable to be present at the time the papers were discussed and looks forward to an update from them at the next SC meeting.

Attention: C, COMHAFAT

*The Committee thanks COMHAFAT for the provision of their cruise report and plans, and **encourages** further such submissions at SC69B. The data collected by the COMHAFAT cruises is valuable, covering areas in which few systematic surveys have been done, with the potential to greatly contribute to the Committee's work. Furthermore, the Committee continues to offer its support in the planning, training, implementation and reporting for the cetacean surveys in the region and **encourages** Member Governments and Range States to consider hosting African scientists on their cruises and within their institutions to help with training and capacity building.*

7.2 Surveys that seek IWC funding and/or request IWC oversight
No documents were submitted pertaining to this agenda item.

7.3 Surveys that seek advice from the Committee regarding survey or analysis methods
No documents were submitted pertaining to this agenda item.

7.4 Surveys seeking Committee endorsement
SC/69A/ASI/17 reports on a sighting survey conducted in the southwestern part of the Sea of Okhotsk from August 4 - September 2022 (32 days) in coordinates 44°00N and 50°00N to 142°00E and 150°00E. The total searching distance was 1438.03 nautical miles in closing mode and 590.52 nautical miles in passing mode, providing 95.5% coverage of the planned distance. During the voyage 9 species were observed, and preliminary analysis of the photo-ID data for four species has led to three potentially resighting animals.

The SWG thanked the authors for presenting the results of their research voyage.

SC69A/ASI/18 describes a plan for a voyage in 2023 in the Shelikhov Bay, the north-eastern Sea of Okhotsk and the coastal waters west of the Kamchatka Peninsula. As in the cases of the last surveys, the Russian research vessel, *Vladimir Safonov* will be used in the survey. A total of 24 crew will participate. The pre-determined track line was set from the randomly selected start point using Distance software. The planned survey distance is 444.2 n.miles in block C (Shelikhov Bay) and 629.3 n.miles in block D (waters west of the Kamchatka Peninsula), respectively. The vessel will start in the north of block C, and move south to the southern end of block D. The waypoints and/or track lines are subject to change due to force majeure. Normal closing mode will be used in the research area. Two observers will undertake searching using the naked eye and confirm with binoculars. Three observer teams will operate in two-hour shifts. The survey will be conducted for a maximum of 14 hours per day, when the weather conditions are suitable for observations (i.e., visibility better than 1.5 n.miles and the wind speed less than 7.5 m/s). The vessel speed is planned to be 9.5 knots with adjustment to avoid vibration of the vessel. Distance and angle measurement training is planned in the earlier part of the survey. An experiment to evaluate measurement error is to be conducted around the middle of the survey. When gray whales, North Pacific right whales, humpback whales or killer whales are encountered, photo-identification data will be collected.

The SWG **endorsed** the survey proposal.

SC/69A/ASI/10Rev1 described the results of a sighting survey conducted in the North Pacific (between 35°-44°N and 140°-154°E.) from 2 August to 30 September 2022. The total searching distance in the research area was 4,485.8 nautical miles. Photo-ID images, biopsy skin samples and satellite tagging were not obtained in this survey because there were no opportunities to conduct these experiments.

The SWG thanked the authors for presenting their work expressed appreciation to the sponsors of this survey that provided important contributions to cetacean research.

SC/69A/ASI/12 outlined Japan's plan for a systematic vessel-based sighting survey in the North Pacific in 2023. The main objective of this survey is to estimate the abundance of large whale species in the North Pacific Ocean for management and conservation purposes. The survey will be conducted using the research vessels *Yushin-Maru* (YS1) and *Kaiyo-Maru* No.7 (KY7) in late July to early October 2023 and will cover the area comprised between 20°N-30°N, 140°E-180°. Distance and angle estimations, photo-ID, biopsy, and satellite tagging experiments will be also conducted.

The SWG **endorsed** the plans for this survey.

SC/69A/ASI/13 described the results of the sighting survey of the Japanese Abundance and Stock structure Survey in the Antarctic (JASS-A) conducted using line transects and distance sampling methods from 10 January to 6 February 2023 in the western part of Area VI East (145°-130°W). The survey included coastal ice-free areas, south of 71°30'S and the total effort was 2,168.6 nautical miles. In addition to collecting systematic sighting and oceanographic data, biopsy, photo-ID, and satellite tracking experiments were conducted.

In discussion, the SWG noted with interest the plan to derive potential $g(0)$ corrections (availability) from the reported tag dive-time data. The SWG thanked the authors for presenting their work expressed appreciation to the sponsors of this survey that provided important contributions to cetacean research.

SC/69A/ASI/14 outlined the objectives and survey procedures of the 2023/2024 line transect whale sighting survey under the Japanese Abundance and Stock structure Surveys in the Antarctic (JASS-A program). The main research objectives of JASS-A are i) the study of the abundance and abundance trends of large whale species, and ii) the study of the distribution, movement and stock structure of large whale species. JASS-A also has several secondary research objectives related to oceanography, marine debris and whale biology. The aim of SC/69A/ASI/14 is to outline the

objectives, survey procedures and schedule of the 2023/2024 JASS-A survey in Area IV-West (70°-100°E) in the Indo sector of the Antarctic, including backup plans.

The SWG thanked the authors for extending an invitation to foreign scientists to participate in the voyage. The SWG also expressed appreciation for Japan submitting information regarding the JASS-A surveys, and seeking review by the Committee. The SWG **endorsed** the plans for this survey.

7.5 Other survey reports and plans

SC/69A/ASI/08 describes a visual and acoustic survey of baleen whales around the sub-Antarctic island at 54°15'S 36°45'W in July 2022 as part of a two-year project investigating the abundance and density of krill and krill-feeding predators around the island in the austral winter. Observations of marine mammals and seabirds were also made in May, July and September 2022. Acoustic surveys using DIFAR sonobuoys were also conducted to obtain broader scale information on distribution patterns beyond the survey transects in July. Analyses of this work are ongoing in order to relate observed distributions of baleen whales to krill occurrence and density, with a second year of surveys taking place in 2023.

In discussion, it was noted the biopsy and photo-ID data was collected on an ad hoc basis because the survey vessel was required to maintain krill acoustic transect effort. The SWG thanked the authors for presenting their results, recognising the difficulty of undertaking such a survey in winter.

SC/69A/ASI/11 reported proposed cruise plans for the Korean Sighting Survey in 2024, but was not discussed given timing conflicts. The SWG noted that the report does not represent an official position of the IWC on the legal nature and designation of the waters to be surveyed.

8. BIENNIAL WORKPLAN

8.1 Plastics Resolution

The Committee is considering ways in which to incorporate IWC Resolution 2022-1 (Resolution on Marine Plastic Pollution) into its work. Although data collection to estimate plastic distribution and density has been undertaken using whale survey platforms, the SWG noted its focus was abundance estimation for whales and not for plastic, and so ASI is not the best group to contribute to this project. However, if another Committee subgroup needs information on whale abundances in a certain area, e.g., to correlate with measures of plastic pollution, the IWC Table of Agreed Abundance Estimates may be a useful resource. Also, for the SOSI website, the SWG will consider marine plastic pollution among the potential threats to a stock when determining which threats to list in each *Status Summary*.

8.2 Communications Initiative

The Committee is developing a Communications Initiative to improve the way it communicates with the Commission, and each subgroup within the Committee has been asked to highlight components of their work to bring forward. The SWG suggested the following for featured topics.

1. The process ASI has developed for rigorous and standardized evaluation of abundance estimates, coupled with relevant images from cetacean abundance surveys.
2. SOSI, including mock-up webpages appropriately 'sanitized' so they do not provide inaccurate or outdated information, or other assessment information identifiable to a real cetacean stock (since the private mock-up pages currently use such inaccurate content, merely for illustrating design choices.)
3. Specific new abundance estimates that may be of interest to the news media, such as estimates indicating dramatic increases or decreases in abundance, or estimates for charismatic species.

A request was also made for members of the SWG to volunteer their photos, graphics, or other relevant images and content to contribute to the submissions the SWG must compile for the Communications Initiative.

8.3 Recommendations database

The SWG noted that many of their existing recommendations were ones that could not easily be considered complete, as they are guidance on how the SWG should conduct its business, generalized conclusions about analysis methodology, reminders for the annual update of the IWC Table of Accepted Abundance Estimates, or other bookkeeping decisions about data, tables, web pages, and so forth. Given the lack of time to consider the sizable list of past database entries, and the additional entries that will be generated by the adoption of this report, the SWG determined that decisions regarding the recommendations database would be made by the Convenors intersessionally after further consultation with the Secretariat and Chair and Vice Chair of the Committee. Discussions will seek to determine how to resolve the existing list and avoid the further accumulation of recommendations that can never be considered complete.

8.4 Workplan

Last year, the SWG agreed to a biennial workplan. That workplan, revised appropriately to reflect past progress and new plans made at SC69A is provided in Table 5. For details of intersessional working groups for 2023-24, refer to Annex V; their terms of reference identify additional workplan tasks.

Table 5

Biennial workplan for ASI.

Item	Topic	Intersessional 2022-23	SC69A	Intersessional 2023-24	SC69B	Agenda Item
1	Review of Abundance Estimates	ASG to coordinate the review of the abundance estimates as requested by SC sub-group convenors	Reviewed abundance estimates following the ASG/ASI process (completed)	ASG to coordinate the review of the abundance estimates as requested by SC sub-group convenors	Review abundance estimates following the ASG/ASI process	2.1
2	Update the IWC Table of Accepted Abundance Estimates	Update the table with estimates accepted at SC68D and receive any intersessional revisions to past entries for consideration by SC69A (Katara)	Reviewed progress and endorsed intersessional revisions (completed)	Update the table with estimates accepted at SC69A and receive any intersessional revisions to past entries for consid-eration by SC69B (Katara)	Review progress and endorse intersessional revisions	3
3	Abundance Review Process	ICG will develop supple-mental wording and examples explaining the choice of categories for endorsed abundance estimates	Wording was agreed, ICG was disbanded			2.2.1
4	Franciscana Abundance Review	ICG will continue coordination of the review of estimates of franciscana abundance to complete the review of the status of the species by the SC meeting in 2023	Reviewed ICG report and complete the review of franciscana abundance estimates. ICG was disbanded			2.1.7
5	Develop simulation software to evaluate methods for abundance estimates	Finish development of software to make the code user friendly and functioning on modern Windows computers, and to make the code accessible via GitHub (Palka and Smith)	Development complete. Authors propose to draft user manual	Authors draft user manual	Review user manual	6.3
6	Consider matters related to mark-recapture models for abundance estimation	ASI establish an ICG, and ICG to begin work	ICG produced preliminary review. Comprehensive guidelines document sought	ICG drafts comprehensive guidelines document for consideration by SC69B	Review document	4.1
7	Provide Commission with advice on status of stocks	Develop content for the Status of Stocks Initiative website	Review progress and endorse content for any stocks completed	Develop content for the Status of Stocks Initiative website	Review progress and endorse content for any stocks completed	5
8	Host a three-day pre-meeting for the Abundance Steering Group	Make preliminary recommendations to ASI on papers reviewed by ASG intersessionally, and develop content for the Status of Stocks Initiative website in collaboration with ICGs	Pre-meeting held, limited to review of estimates due to budget, time limitations	Make preliminary recommendations to ASI on papers reviewed by ASG intersessionally, and develop content for the Status of Stocks Website in collaboration with ICGs	Host pre-meeting	2.1
9	Update ASI rules about data/code provision for reviewed estimates	n/a	ASI convenor to join ICG on DAA	Givens participate in ICG and determine how to reconcile data/code rules of ASI and DAA	Discuss ASI data/code rules in light of ICG progress	2.2.3
10	Prepare content for Communications Initiate	n/a	Topics identified at SC69A	Givens and New prepare 2023 Communications Initiative materials	Identify topics for 2024 Communications Initiative	8.2
11	Resolve problems with database of recommendations	n/a	Issues identified at SC69A prevented database update	Consultation with Secretariat and SC leadership; update database accordingly	Report to ASI in SC69B and adopt new practices to prevent future problems	8.3
12	Revise a document with estimates, maps, and references from the IWC Table of Agreed Abundance Estimates	n/a	First draft reviewed	Revise draft (Katara)	Review revision	3.1.5

9. ADOPTION OF REPORT

The report was adopted at 17:00 on 2 May 2023.

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Appendix 1

AGENDA

1. Introductory items
   - 1.1 Opening remarks
   - 1.2 Election of the Chair
   - 1.3 Appointment of Rapporteurs
   - 1.4 Adoption of the agenda
   - 1.5 Documents available and online schedule
   - 1.6 New ASG/ASI process to reduce redundancy
2. Review of abundance estimates
   - 2.1 Abundance estimates
     - 2.1.1 Māui dolphins
     - 2.1.2 Southern right whales
     - 2.1.3 Southern hemisphere humpback whales
     - 2.1.4 Antarctic blue whales
     - 2.1.5 Eastern North Pacific gray whales
     - 2.1.6 West Greenland bowhead whales
     - 2.1.7 Franciscana dolphins
     - 2.1.8 Western North Atlantic cetaceans
     - 2.1.9 North Pacific humpback whales
     - 2.1.10 North Pacific sei whales and other cetaceans
   - 2.2 Review process
     - 2.2.1 Supplemental wording and examples to explain category selection
     - 2.2.2 Review of estimates regularly updated in long-term studies using consistent methods
     - 2.2.3 Software submission
     - 2.2.4 Adapting to biennial SC meetings
     - 2.2.5 Suggestions and other matters
3. IWC Table of Agreed Abundance Estimates and Abundance Webpage
   - 3.1 Updates to IWC Table completed or proposed intersessionally
     - 3.1.1 Report from Secretariat Lead for Statistics and Modeling
       - 3.1.1.1 Additions, removals, and revisions recommended at SC68D
       - 3.1.1.2 Additions, removals, and revisions proposed intersessionally
     - 3.1.2 ICG on IWC Table Text on Spatial Extent for Mark-Recapture and Line Transect Estimates progress
     - 3.1.3 Accommodating requests for the IWC Table
     - 3.1.4 Post hoc combination of estimates for public presentation
     - 3.1.5 Maps, tables for smaller areas, references, and other IWC Table content
   - 3.2 Updates to IWC webpages on abundance proposed intersessionally
     - 3.2.1 Guidelines for inclusion of estimates on website
     - 3.2.2 Intersessional changes
     - 3.2.3 Wording on confidence intervals
   - 3.3 Review of IWC Table of Agreed Abundance Estimates to identify any required re-categorizations
4. Methodological issues
   - 4.1 Mark-recapture abundance estimation and diagnostic methods
   - 4.2 Minimum sample sizes
5. Status of stocks initiative
   - 5.1 Progress from ICGs
     - 5.1.1 Steering Group
     - 5.1.2 Modeling
       - 5.1.2.1 Eastern North Pacific gray whales
       - 5.1.2.2 Southern Hemisphere humpback whales
     - 5.1.3 Content
     - 5.1.4 IWC/IUCN Coordination
     - 5.1.5 Extinction Initiative Coordination
   - 5.2 New proposals for design and content
   - 5.3 Future workplan
6. Progress on previous recommendations
   - 6.1 RMP guidelines for model-based abundance estimates

6.2 North Pacific sei whale review
6.3 Progress on simulation software to evaluate methods for abundance estimates from surveys
7. International cruises
7.1 Surveys that include IWC funding and/or support, including IWC-POWER and IWC-SORP
7.2 Surveys that seek IWC funding and/or request IWC oversight
7.3 Surveys that seek advice from the Committee regarding survey or analysis methods
7.4 Surveys seeking Committee endorsement
7.5 Other survey reports and plans
8. Biennial workplan
8.1 Plastics Resolution
8.2 Communications Initiative
8.3 Recommendations database
8.4 Workplan
9. Adoption of Report

Appendix 2

REVISED ESTIMATES OF ABUNDANCE FOR FRANCISCANAS IN FMA IVb and IVc

Enrique A. Crespo, Magdalena Arias, Nicolás Sueyro, M. Florencia Grandi and Mariano A. Coscarella

Document SC/69A/ASI/2 presented abundance estimates computed from aerial surveys conducted off the northern coast of Argentina (FMA IVb and FMA IVc, Fig. 1) between October 11 and 16, 2019, and March 12 and 14, 2022. This document was reviewed by the Abundance Steering Group (ASG) during a pre-meeting held before the 2023 IWC Scientific Committee meeting (SC69A). As part of this review, the ASG made the following requests to better evaluate the estimates provided in document ASI/2:

1. Estimate a single detection function using Multiple Covariate Distance Sampling (MCDS) using survey year as a covariate.
2. Correct the abundance estimates using the correction factor for group size developed by Sucunza *et al.* (2022).
3. Present estimates that only account for the effectively surveyed areas without extrapolation to adjacent areas.

In this document we address all the points raised, presenting the corrected information. Also, regarding point 3 we provide additional information in Adjunct 1 that we believe justifies an extrapolation of estimates of density in the surveyed area to the adjacent (not-surveyed) region. We thank all comments and suggestions made by the ASG review panel. Below you will find the results that have changed with regards to the original paper submitted.

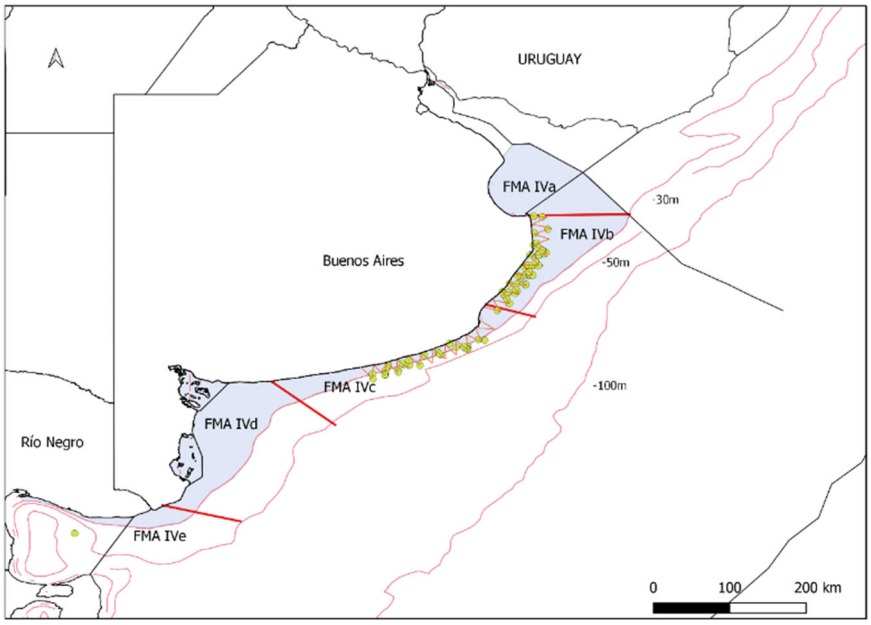

Fig. 1: Map showing the sub-areas within FMA IV. The sampling transects surveyed both in 2019 and 2022, the limits of the proposed FMA IV, and the isobaths of 30, 50 and 100m are shown. The circles denote the observed cluster of franciscana dolphins during both surveys.

Point 1: MCDS model

Perpendicular distance data fit with an MCDS half-normal model using year as a covariate is illustrated in Fig. 2. Average detection probability (*P*) was estimated at 0.39 (CV = 0.09). This is comparable to the estimates of parameter *P* for the models used to fit perpendicular distance data in each year individually as presented in paper ASI/2. *P* was estimated at 0.36 (CV = 0.14) and 0.41 (CV = 0.12) for 2019 and 2021, respectively.

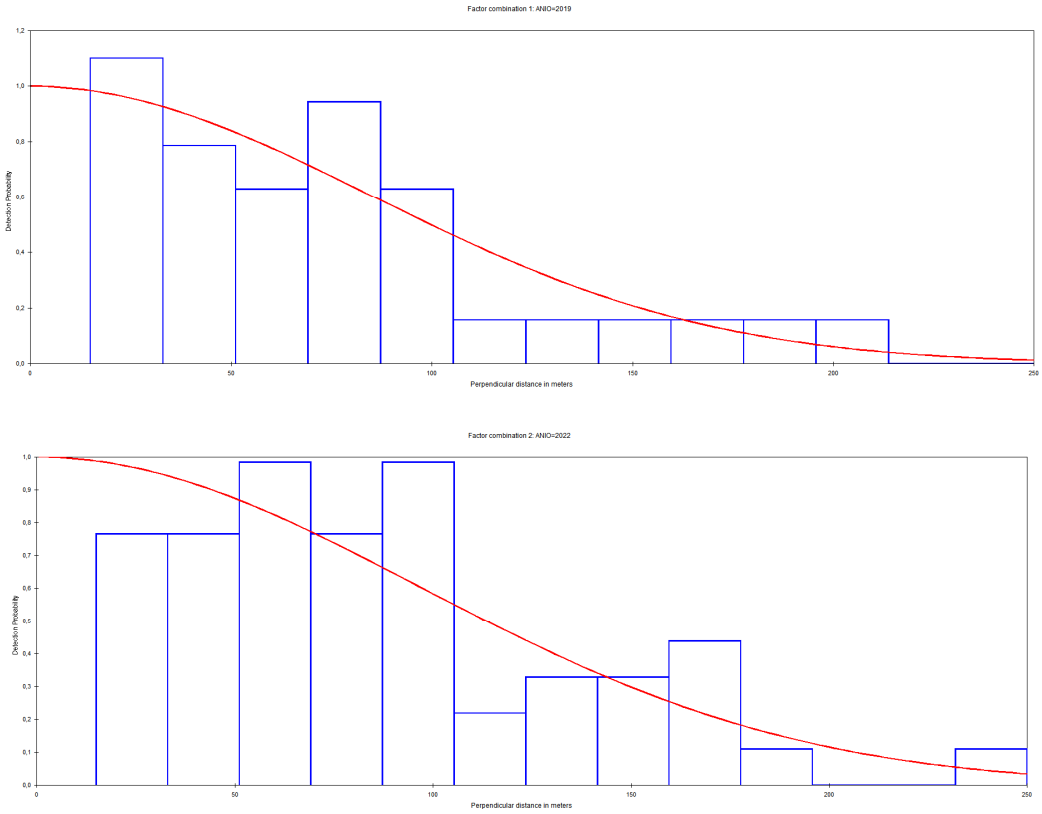

Fig. 2: Detection probability function of franciscana sightings for the FMA IVb and FMA Ivc surveys for 2019 (upper panel) and 2022 (lower panel) as estimated by the MCDS.

Density estimates computed with the CDS model (in ASI/2) and MCDS model illustrated above are provided in Table 1. Density estimates were nearly identical and not statistically different for both FMAIVb and FMAIVc.

Table 1

Density estimates (corrected for availability bias as described in ASI/2) computed with the original CDS detection probability model and the MCDS model requested by the ASG.

Region	D_c (CDS)	95% CI	D_c (MCSD)	95% CI
FMA IVb	0.80	0.54-1.17	0.78	0.54-1.11
FMA IVc	0.29	0.16-0.52	0.30	0.18-0.51

Points 2 and 3: Correction for group size and estimated abundance in the surveyed area

Table 2 provides estimates of abundance computed with the MCDS model described above corrected using the correction factor for group size bias presented by Sucunza *et al.* (2022) (CF = 1.36, CV = 0.11). Variance was calculated with the delta method as proposed by Crespo *et al.* (2010). Abundance was computed for both the surveyed area (as requested by the ASG) and, for comparison, for the extrapolated area (as originally described in ASI/2).

	Surveyed area			Extrapolated area		
Region	Area (km^2)	N	95% CI	Area (km^2)	N	95% CI
FMA IVb	4,650	4,932	1,037-23,207	10,488	11,125	2,340-52,348
FMA IVb (2019)	4,650	3,448	723-16,343	10,488	7,779	1,632-37,068
FMA IVb (2022)	4650	5,710	1,200-27,174	10,488	12,880	2,706-61,290
FMA IVc	4,575	1,866	400-8,946	8,003	3,625	699-15,650

Reference

Sucunza, F., Danilewicz, D., Andriolo, A., de Castro, F.R., Cremer, M., Denuncio, P., Ferreira, E., Flores, P.A.C., Ott, P.H., Perez, M.S., Pretto, D., Sartori, C.M., Secchi, E.R. and Zerbini, A.N. 2022. Assessing bias in aerial surveys for cetaceans: Results from experiments conducted with the franciscana dolphin. *Front. Mar. Sci.* 9:1016444. [Available at: https://doi.org/10.3389/fmars.2022.1016444].

ADJUNCT 1

Arguments to justify extrapolation beyond the surveyed area (from the coast up to 15 nautical miles)

Our survey was conditioned by the limited funding, safety conditions of the aircraft used and the places with fuel availability. For this reason, we limit the surveys to a distance of 15 nautical miles from the coast. However we knew that Franciscana distribution extended beyond 15 n.miles.

(1) For more than 40 years, Franciscana specimens have been collected by fishing vessels, many of them were caught off 30 nautical miles from the coast in deep areas. For example, the Necochea – Claromecó fishing fleet (Perez Macri and Crespo 1989; Franco-Trecu *et al.* 2019). Franciscanas had also been satellite tagged and moved beyond the 15 n.mile distance (Wells *et al.* 2013).

(2) The marine environment to which we extrapolated density, maintains homogeneity and conservation of oceanographic conditions from the coast to the continental slope. These include the physical-chemical and biological conditions regarding its flora and fauna (Falabella *et al.* 2009).

(3) When we refer to the marine environment, we mean a sub-area within the region between Florianopolis (Brazil) and Península Valdés (Argentina). To the north of Florianopolis there is a net influence of the Brazil Current and to the south of PV there is a net influence of the Malvinas current (Falabella *et al.* 2009). Between Florianopolis and PV there is reciprocal influence of the two marine currents with many continental runoffs, of which the two most important are Laguna de los Patos in RS and the Rio de la Plata between Uruguay and Argentina. This physical-chemical and biological system ends at the continental slope where the conditions change.

We appreciate the suggestions of the ASG reviewers. However, we would like that the ASG panel take into account, that we have made the extrapolation based on our conviction that Franciscana is present there, our in-depth knowledge of the area and the reference literature. We agree with the ASG reviewers that the estimate should be based on evidence, but the extrapolation to the area where it was not flown can be a hypothesis very robust, and that this information is needed to be provided to our management authorities.

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Wells, R., Bordino, P. and Douglas, D.C. 2013. Patterns of social association in the franciscana, *Pontoporia blainvillei. Marine Mammal Science*, 29(4): E520-E528.

Appendix 3

CATEGORIZATION OF ABUNDANCE ESTIMATES REVIEWED BY ASI

The categories used by the Committee to classify and potentially endorse estimates of abundance (or other data/information from abundance surveys) are as follows.

Category 1A: An estimate which is acceptable for use in in-depth assessments or for providing management advice using the RMP, AWMP or other modelling or analysis. This (and category 1B) may include estimates with minor or possibly competing small biases (e.g. assuming $g(0)=1$ when it may be slightly less), provided that these biases are recognised.

Category 1B: An estimate which pertains to a 'very small' population, and is acceptable for providing management advice in that context, which includes situations where no sophisticated modelling or analysis is required.

Category 2: An estimate which may be acceptable for 'conservative' management (e.g., in the AWMP where the user objective is expressed as an absolute number of catches/strikes with no need to eventually maximise catches/strikes, or in an assessment of whether a given level of bycatch will lead to recovery or further depletion of a population). The estimate may be subject to considerable negative bias for reasons such as limited spatial coverage (compared to the range of the population for the season in question) or lack of correction factor(s) (e.g. related to $g(0)$).

Category 3: An estimate which is informative, but not acceptable for inclusion in (1A), (1B) or (2). This category includes estimates with an unquantified bias which is likely to be too severe to allow inclusion in Category 2, as well as relatively unbiased estimates that are adequate to provide some general indication of abundance while still not qualifying for (1A) or (1B). Such estimates may be used when fitting population models, but are not for use as estimates in actual implementations of IWC management procedures (i.e., the RMP CLA or AWMP SLAs).

Category 4: This category, for survey data, is for cases when too few sightings (or recapture data) were obtained to provide an endorsable abundance estimate, because whales were scarce in the surveyed area. However, the survey design and analysis were of sufficient quality to provide reliable information about the (low) number of whales in the area, and these data could be used for fitting population models or in-depth assessments despite not yielding a reliable abundance estimate. Because the RMP allows the use of abundance estimates with few or zero sightings, Category 4 also includes abundance estimates derived from Category 4 data, specifically for use with the RMP.

Category P: A preliminary estimate, not suitable for use at the time of review, but which may provide an acceptable estimate once finalised. It will be omitted from published tables until finalised and assigned a category from (1) to (4).

Category NS: An estimate reviewed by the Scientific Committee, but agreed not to be suitable for acceptance due to factors such as: insufficient data (including inadequate coverage achieved of the area planned to be surveyed); insufficient methodological information presented; concerns about survey design; concerns about conduct or interpretation of analyses; lack of an appropriate measure of uncertainty; failure to account for large potential biases; or assumptions that are unreasonable or clearly violated. These will be omitted from published tables.

Category X1: Category 1A or 1B estimates that have been superseded by revised estimates. They will be omitted from published tables.

Category ND: An estimate which was not discussed. Used to indicate estimates which have not been discussed by the Scientific Committee, but which may be discussed in future. They will be omitted from published tables.

Appendix 4

SUMMARY OF 'REPORT OF TECHNICAL ADVISORY WORKSHOP ON PLANNING FOR THE MEDIUM-LONG TERM IWCPOWER PROGRAMME, TOKYO, 6-10 SEPTEMBER 2022' (SC/69A/REP03A)

Donovan summarised the report of the Technical Advisory Group (TAG) Workshop on Planning for the Medium- Long-Term IWC-POWER Programme held in Tokyo from 6-9 September 2022 at the kind invitation of the Government of Japan and chaired ably by Matsuoka and Kitakado (co-chair). The IWC-POWER programme began in 2010 and the Committee has frequently stressed the great value of the data contributed by the IWC-POWER cruises which have covered many regions of the North Pacific Ocean not surveyed in recent years if at all. It contributes greatly to the ongoing assessment work.

The primary focus of the Workshop was to continue the planning for the next phase of IWC-POWER (medium to long-term) by:

(1) reviewing the general and species-specific outcomes to date of the almost complete phase 1;

(2) reviewing progress on already identified analyses (and identifying any additional analyses) required to complete planning for the second phase by 2024; and

(3) updating the medium-term objectives for the programme and in the light of these providing a broad outline of what phase 2 might look like to guide intersessional work.

The Workshop examined the approaches used to date obtain information on the primary objectives of Phase 1 of the programme i.e. abundance, stock structure distribution and movements (Item 4, SC/69A/Rep03A). It discussed, and where appropriate identified further analyses related to, distance sampling including survey design, $g(0)$, survey mode, distance and angle experiments, design- and model-based approaches, and power analyses to examine ability to detect trends, as well as the contribution of IWC-POWER individual identification data to mark-recapture abundance estimation efforts. Acoustics has not been used directly in abundance estimation but has been used to assist in special efforts to find rare species such as North Pacific right whales to allow targeted photo-ID and biopsy sampling. Genetic analyses from biopsy samples have contributed greatly to wider efforts to examine the stock structure of several species within the Committee. The Workshop noted that the primary research methods used to date (distance sampling, biopsy sampling and photo-identification were likely to remain the primary methods for the next phase) along with, depending on logistics and priorities, consideration of newer techniques such as telemetry, sea gliders or targeted surveys using acoustics. It also noted the value of surveying further north in light of potential changes in distribution arising from climate change.

Under Item 5 (*ibid*) the Workshop reviewed the information obtained by species. On the basis of the discussions under Items 4 and 5, the Workshop developed an updated table of medium-term objectives that it commended to the Committee (see Table on next pages). It also developed a targeted workplan under Item 9.4 (*ibid.*).

Table 1

Updated medium-term priorities based upon results from Phase 1 for IWC-POWER.

*Refers to likelihood of obtaining an abundance estimate at least in some areas. **Refers to likelihood of obtaining biopsy and/or photo-ID data from encountered schools. N.B. consideration of the effect of possible distribution changes due to climate change will be a general priority for most species (e.g. by extending the surveyed areas to the north). See Item 5 for more details and recommendations by species. The rationale/comments below represent only a brief summary of key factors discussed.

Initial priority/feasibility	Rationale/comments
Blue whale (High) High direct*, high opportunistic**	- Depletion level in the west is unknown but may be high given past catches. The population in the east is estimated to have recovered to 62-99% of its unexploited level Monahan *et al.*, 2015) with abundance at about 2-3,000 based on mark-recapture estimates from long-term studies south and east of the IWC-POWER survey area. - Initial line transect abundance estimates from IWC-POWER (still being finalised) suggest around one thousand animals in the surveyed area. - Results of genetic analyses of existing samples (43 IWC-POWER samples in conjunction samples from other programmes e.g. samples collected by Japan in the west) will inform on population structure and management units. Consideration of other data sources (e.g. 'songs' – see Monnahan, 2014) to complement genetic studies should be undertaken including analysis of existing sonobuoy data collected under IWC-POWER. - Given the size of the line-transect abundance estimate, the probability of obtaining mark-recapture estimates using data from the northern waters and in co-operation with the existing data from the USA and Japan is high if focussed cruises (or parts of cruises) are undertaken in specific areas in the east and west to collect photo-ID and biopsy samples. Opportunistic studies on other cruises should continue. - Continued collaboration with existing photo-id work e.g. US and Japanese national programmes is important and the possibility of a single catalogue should be investigated as a priority. - Telemetry studies will be considered for long-term movements (relevant to distribution, movements within the surveyed area and identification of breeding areas) and diving behaviour (to investigate availability bias in line-transect estimates, although the primary method for obtaining abundance estimates is likely to be mark-recapture).
Fin whale (High) High direct*, high opportunistic**	- Depletion level was thought to be high based upon the catch history at the start of IWC-POWER. As a result of IWC-POWER (and other work), the North Pacific fin whales are now a potential Comprehensive Assessment candidate and this will enable the present depletion level to be established. - Initial line transect abundance estimates from IWC-POWER (still being finalised) suggest tens of thousands of fin whales in the North Pacific. - Results of genetic analyses (there are 142 IWC-POWER samples) will make an important contribution to understanding stock structure and management units in the North Pacific. These are expected within two years. This will help to develop future survey strategy as well as a Comprehensive Assessment. Incorporation of existing data from the USA, Japan and Korea is important. - Co-ordination with national programmes in Japan, Korea and USA should continue and be strengthened. Work in Russian Federation waters provided appropriate permits can be obtained is very important. - Telemetry studies will be considered for long-term movements (relevant to distribution, movements within the surveyed area and identification of breeding areas) and diving behaviour (to investigate availability bias in line-transect estimates).
Right whale (High) High direct*, high opportunistic**	- Depletion level: highly depleted based on catch history, especially in the east (data from US studies and IWC-POWER). - Absolute numbers in the east are well below 100 and the valuable data collected thus far from IWC-POWER should be incorporated and focussed studies in the east should continue. - Numbers in the west are ~~believed to be~~ considerably higher and whilst obtaining abundance from line-transect surveys is feasible this would require permits to operate in Russian waters including those close to the coast which is unlikely to be granted. Focussed studies to obtain photo-ID and biopsy samples in international waters in the west (e.g. international waters to the south and east of Kamchatka) should be undertaken. Collaboration with work by Japan and the USA is important and the possibility of a single catalogue should be investigated as a priority. - Telemetry studies will be considered for long-term movements (relevant to distribution, movements within the surveyed area and identification of breeding areas) provided that safeguards are in place (c.f. the telemetry programme for western gray whales off Sakhalin).
Sei whale (Medium) High direct*, high opportunistic**	- Depletion level: this is being investigated as part of the ongoing IWC Comprehensive Assessment to which IWC-POWER data (abundance, distribution, genetics) have proved invaluable. - Initial abundance estimates from IWC-POWER (still being finalised) and Japan are in the tens of thousands. - Analysis of genetic and other data have thus far led to two stock structure hypotheses – a single stock or a five stock-hypotheses with a single pelagic stock in the areas covered by IWC-POWER and Japan and five postulated coastal stocks. - Results of the Comprehensive Assessment will help focus future IWC-POWER medium-term strategy and priority for this species. - Whilst obtaining biopsy samples from the postulated coastal stocks will be very valuable, a targeted strategy to obtain these is infeasible given the very low densities in such areas covered by IWC-POWER thus far. - Telemetry studies will be considered for long-term movements (relevant to distribution, movements within the surveyed area and identification of breeding areas) and diving behaviour (to investigate availability bias in line-transect estimates).

Initial priority/feasibility	Rationale/comments
Humpback whale (Medium) High direct*, high opportunistic**	- Good information already available from SPLASH and national programmes suggests overall high abundance (genetic and photo-ID mark-recapture) hence medium priority. - IWC-POWER has contributed valuable data/samples to existing genetic and photo-ID databases and this should continue. - Ongoing Comprehensive Assessment will assess status and potential depletion of populations in the North Pacific. - Abundance estimates from IWC-POWER (still being finalised) can provide interesting 'snapshot' estimates to compare with the primary mark-recapture estimates by population/feeding aggregations. - The results of the Comprehensive Assessment will assist in developing medium-term strategy and priority for this species by population within IWC-POWER. - Telemetry studies will be considered for diving behaviour (to investigate availability bias in line-transect estimates).
Sperm whale (Medium) Medium direct* and low opportunistic**	- Depletion level: unknown but possibly high given catch history. - Lack of good information on population structure and status although good distributional data from IWC-POWER. - Obtaining abundance estimates from visual surveys can be problematic due to long dive times and other issues but if certain assumptions are made they can provide a suitable index of abundance. Uncorrected abundance estimates provide minimum estimates and initial line transect abundance estimates from IWC-POWER (still being finalised) suggest tens of thousands of sperm whales in the North Pacific. - Obtaining biopsy samples and photo-ID has proved to be difficult under IWC-POWER and priority is low given this combined with the high population size. - Possibility of using towed acoustic arrays in some years in the longer term could be considered depending on availability of equipment, suitable vessels. and practicality in light of other priorities.
Bryde's whale (Medium) High direct*, high opportunistic**	- Suggest low priority for first six or so years of next phase of POWER because: • Recently completed IR shows good population status and apparently low level of threats. • Removing from target species allows a great reduction in size of priority research area to north of 40ºN. - A targeted survey or surveys is to be considered from 2029 in light of analysis of the existing data. - Telemetry studies will be considered for long-term movements (relevant to distribution, movements within the surveyed area and identification of breeding areas) and diving behaviour (to investigate availability bias in line-transect estimates).
Common minke whale (Low) Suggest only opportunistic	- Depletion level (probably low east/central based upon catch history) and in west dealt with by national programmes. - From the outset of IWC-POWER it was agreed that common minke whales were a low priority for the programme thereby allowing acceptable sighting conditions to be set at higher sea states than optimal for minke whales to increase effort for the larger whales species. - However, if Okhotsk Sea is able to be covered for high priority species (e.g. right whales) then would provide valuable information incl. biopsy samples. - If permission granted by Russian Federation then consider modifying present 'acceptable' conditions as at the present high range they are unsuitable for estimating abundance for this species.

The Workshop highlighted the importance of the participation of other range states in IWC-POWER and Co-ordination with other research activities. The first phase of IWC-POWER has set a valuable baseline for meeting the long-term objective of understanding stock structure and estimating trends in several populations and determining where conservation priorities might lie. The ability to detect trends in a reasonable timeframe is largely dependent on the effort that is available. The Workshop had reiterated previous recommendations to the Committee that it:

(1) encouraged all Member Governments and Range States to support IWC-POWER either financially or in-kind – in particular this might be achieved by providing additional vessels and/or coordinating existing research field work with that of IWC-POWER; and

(2) encouraged the IWC to increase efforts to advertise its willingness to share IWC-POWER data for integrated analyses (e.g. biopsy and photo-ID data, data on marine debris), especially where analyses of such data alone will provide only limited information.

Finally, Donovan thanked the Government of Japan for its long-standing commitment and extreme generosity towards the IWC-POWER programme.

Appendix 5

RECATEGORIZATIONS IN IWC TABLE OF AGREED ABUNDANCE ESTIMATES

The SWG reviewed the IWC Table to consider re-categorizations of certain abundance estimates, following suggestions from Katara.

The SWG **agreed** that some Category 1 estimates (using the prior system) having an Evaluation Extent of 1 should be recategorized as 1A. Specifically, Southern Ocean Antarctic minke abundance estimates derived from data from the IDCR/SOWER programme, were recategorized; these are listed in Table 1.

Table 1

Southern Ocean Antarctic minke abundance estimates to be recategorized as Category 1A.

Area	Category	Extent	Years	Estimate	CV	References
Area I	1A	1	1994, 2000,1	38,930	0.20	IWC (2013, p.26-9); Okamura and Kitakado (2012); Bravington and Hedley (2012)
Area II	1A	1	1981/2	67,140	0.330	IWC (2007, p.23-6); Branch (2006, SC/58/IA18)
Area II	1A	1	1986/7	130,083	0.14	IWC (2013, p.26-9)
Area II	1A	1	1997,8, 2000	57,206	0.19	IWC (2013, p.26-9); Okamura and Kitakado (2012); Bravington and Hedley (2012)
Area III	1A	1	1979/80	130,813	0.244	IWC (2007, p.23-6); Branch (2006, SC/58/IA18)
Area III	1A	1	1987/8	93,215	0.20	IWC (2013, p.26-9)
Area III	1A	1	1993,5	94,219	0.15	IWC (2013, p.26-9); Okamura and Kitakado (2012); Bravington and Hedley (2012)
Area IV	1A	1	1978/9	120,163	0.186	IWC (2007, p.23-6); Branch (2006, SC/58/IA18)
Area IV	1A	1	1988/9	55,237	0.17	IWC (2013, p.26-9)
Area IV	1A	1	1995,9	59,677	0.34	IWC (2013, p.26-9); Okamura and Kitakado (2012); Bravington and Hedley (2012)
Area V	1A	1	1980/1	159,572	0.260	IWC (2007, p.23-6); Branch (2006, SC/58/IA18)
Area V	1A	1	1985/6	300,214	0.13	IWC (2013, p.26-9)
Area V	1A	1	1992, 2002,3,4	183,915	0.11	IWC (2013, p.26-9); Okamura and Kitakado (2012); Bravington and Hedley (2012)
Area VI	1A	1	1983/4	99,779	0.228	IWC (2007, p.23-6); Branch (2006, SC/58/IA18)
Area VI	1A	1	1990/1	55,617	0.22	IWC (2013, p.26-9)
Area VI	1A	1	1996, 2001	80,835	0.14	IWC (2013, p.26-9); Okamura and Kitakado (2012); Bravington and Hedley (2012)
Circumpolar, S of 60S	1A	1	1978/9-1983/84	645,000	0.143	IWC (2007, p.23-6); Branch (2006, SC/58/IA18)
Circumpolar, S of 60S	1A	1	1985/6-1990/91	720,054	0.08	IWC (2013, p.26-9)
Circumpolar, S of 60S	1A	1	1991/2-2003/4	514,782	0.09	IWC (2013, p.26-9)

For bowhead whales in the Okhotsk Sea, the IWC includes an estimate for 2016 by Cooke *et al.* (2017). That study actually presents a time series of abundance estimates. Following the Committee's 'informal rule of thumb' for such time series to select one estimate roughly every 10 years, with a link in the IWC Table to the full series (IWC, 2023; item 11.3.6), the SWG **agreed** also to include the estimate for 1995. Furthermore, the SWG **requested** Katara to inquire with Cooke about whether the entire time series of estimates, with covariances, could be made available. The SWG also **agreed** that all estimates from this study should have their Category updated from 1 to 1B.

Attention: S-Katara

The SWG requested that Katara inquire with Cooke about whether the entire time series of abundance estimates from Cooke et al. (2017) for Okhotsk Sea bowhead whales could be made available.

References

Branch, T.A. 2006. Abundance estimates for Antarctic minke whales from three completed circumpolar sets of surveys, 1978/79 to 2003/04. Paper SC/58/IA18 presented to the IWC Scientific Committee, May 2006 (unpublished). [Paper available from the Office of this Journal].

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