

Annex G

Report of the Sub-Committee on the Other Northern Hemisphere Whale Stocks

Members: Robbins (Convenor), Aoki, Archer, Baba, Baker, Bjørge, Brownell, Buss, Butterworth, Charlton, Cipriano, Cooke, Debrah, Donovan, Fujise, Goetz, Goto, Hakamada, Haug, Hosoda, Iñiguez, Jackson, Kato, Kim, Kishiro, Lang, Lee, Lent, Lundquist, Maeda, Mallette, Matsuoka, Mattila, Miyashita, Mizroch, Morita, Moronuki, Nakamura, Naylor, Nelson, Nio, Øien, Palka, Pastene, Punt, Reeves, Reyes Reyes, Rojas-Bracho, Simmonds, Širović, Slooten, Sohn, Stachowitsch, Stack, Suydam, Suzuki, Taguchi, Takahashi, Tiedemann, Urbán, van de Water, Walløe, Walters, Weinrich, Weller, Yasokawa, Yoshida, Zerbini.

1. INTRODUCTORY ITEMS

1.1 Opening remarks

Robbins welcomed the participants.

1.2 Election of Chair

Robbins was elected as Chair.

1.3 Adoption of Agenda

The adopted Agenda is given as Appendix 1.

1.4 Appointment of Rapporteurs

Goetz was appointed as rapporteur.

1.5 Review of available documents

The documents available to the sub-committee were identified as: SC/68A/NH/01-07rev1, SC/68A/SH/05, SC/68A/SH/08, SC/68A/ASI/04, Huijser *et al.* (2018) and MacKay *et al.* (2019).

2. EVALUATION OF POTENTIAL NEW IN-DEPTH ASSESSMENTS

2.1 North Pacific blue whales

An intersessional e-mail correspondence group, convened by Branch, provided an update on the data available to assess North Pacific blue whales (SC/68A/NH/07rev1). Blue whales in the North Pacific comprise at least two populations, and possibly three, based largely on song type. The best studied is the eastern North Pacific population, which has a reliable catch time series and a previous assessment. For the less-studied central and western North Pacific there are recent surveys and catch data, and many locations where song type has been recorded, including off Hokkaido. Assessments of blue whales in the central and western North Pacific will be possible once abundance estimates are obtained from the POWER and JARPN/JARPNII cruises. There is the possibility of a third Japanese population west of 145-155°E, and a unique third song type recorded off Hokkaido at 145°E. This area around Japan was the basis of substantial whaling, followed by a lack of sightings west of 155°E in JSV data from the 1960s to the 1980s. There were no catches for several decades, leading to the possibility of extirpation. Blue whales have since been regularly sighted in the 145-155°E region during the JARPN/JARPNII

cruises, forming a continuous distribution that spans from the site where the new song type was recorded eastwards into the area off Kamchatka. More hydrophones are needed in the region of 130-155°E to determine the extent of whales making the new song type and to determine the extent and status of this possible Japanese population.

The sub-committee welcomed this report and thanked the intersessional e-mail correspondence group for their efforts. In response to a question, Matsuoka clarified that abundance estimation based on IWC-POWER, as well as JARPA/JARPN-II data is underway and will be available to the sub-committee at SC/68B. If possible, the IWC-POWER estimates will incorporate data from the 2019 survey, and the JARPN/JARPN-II based estimates will include all programme years.

Most of the photo-identification analysis has been completed, with the exception of the 2018 images from IWC-POWER. However, the sub-committee agreed that clarification is required regarding the status of comparison of catalogues held by Cascadia Research Collective and the Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional (CICIMAR-IPN).

Long-term photo-identification studies can produce estimates of life history parameters that are important for assessment modeling, such as age at sexual maturity and calving intervals. The Mingan Island Cetacean Study Research Station and CICIMAR-IPN hold relevant catalogues and the sub-committee **recommended** that updated parameter estimates be produced based on those data.

The sub-committee **agreed** that it remains unclear whether there are one or two stocks of blue whales in the western North Pacific. Unfortunately, available data are limited for answering this question. As reported to the sub-committee last year in SC/67b/NH/01, analysis of recordings collected during seismic studies off Japan detected a possible new blue whale song off the Pacific coast of Hokkaido. In this meeting, Širović reported on one year of acoustic data recorded in the Philippine Sea (approximately 500 miles E of Taiwan) in 2010/11 which was analysed for presence of blue whale song. The data, collected as part of an acoustic tomography experiment, were located as part of a search for more past acoustic recordings in the western North Pacific for which the primary focus was not cetacean research. Recordings were collected on 2% duty cycle and there was a lot of noise in the recordings, further reducing amount of usable data. No blue whale songs of any type were found in the data. While these findings do not allow the conclusion that blue whales were not present, it is likely that if present, they were not common in this area during 2010/11 period. Širović also noted in discussion that a recording from Wake Island, east of Guam, from 10 years ago has been confirmed to be a central North Pacific song.

The sub-committee **encouraged** the collection of acoustic data in the western and central North Pacific for the purpose of clarifying stock structure. It also **encouraged** additional analyses of blue whale song, especially data collected by the NMFS Pacific Islands Fisheries Science

Center across the central and western Pacific (with a focus on the Northern Mariana Islands) for presence and fine-scale patterns in the song.

Another recommendation of SC/68A/NH/07rev1 for better understanding blue whales in the western North Pacific was to map older whaling catches (i.e. prior to 1920) in Japanese waters, especially west of 145°E. Kasahara (1950) published catch data from western North Pacific land stations grouped by area. The sub-committee **agreed** that access to the original station data would be helpful, for example to examine the seasonality of catches at specific stations. Kato and Ohsumi have searched for the original data, but reported that many materials stored at the Sanriku Branch of Institute of Cetacean Research (ICR) have been moved or destroyed in the wake of the Japanese tsunami of 2011. Kato indicated that they would continue the search and the sub-committee **encouraged** these additional efforts.

In conclusion, the priority items identified in SC/68A/NH/07rev1 formed the basis of the sub-committee's recommendations, as follows.

*The sub-committee agreed that the following data and tasks are still **recommended** to advance a future assessment of North Pacific blue whales:*

Attention: SC

- (1) *abundance estimates from IWC-POWER cruise data, which are expected for review at SC/68B;*
- (2) *abundance estimates from JARPEN and JARNPII surveys, which are expected for review at SC/68B;*
- (3) *genetic analysis of biopsy samples, expected for review at SC/68B, using the US (ENP), IWC-POWER and ICR samples collected during JARNPII and NEWREP-NP; and*
- (4) *map older catches (prior to 1920) in Japanese waters, especially west of 145°E.*

Attention: SC, R

- (1) *compare photo-identification data, including new 2018 photos, between POWER, Cascadia Research Collective, JARPEN/JARNPII and other ENP catalogues;*
- (2) *review of new acoustic locations and information and conduct fine-scale analysis of song features for western and central Pacific blue whale calls, with particular focus on calls around Japan; this would include data collected by the NMFS Pacific Islands Fisheries Science Center across the central and western Pacific (with a focus on the Northern Mariana Islands); and*
- (3) *estimate blue whale life history parameters from long-term photo-identification datasets held by the Mianan Island Cetacean Study Research Station and CICIMAR-IPN.*

*The sub-committee **agreed** that the intersessional correspondence group continue to review data needed for an assessment of North Pacific blue whales be reappointed under Branch (see Annex T).*

2.2 North Atlantic sei whales

Sei whale (*Balaenoptera borealis*) movements, distribution, stock structure, and population size are not well-understood in the North Atlantic. This year, the sub-committee received new information from passive acoustics, sighting surveys, strandings and molecular genetics. It also received information on a new photo-identification catalog.

The sub-committee received new information from the Northeast Fisheries Science Center (NEFSC) on passive acoustic monitoring off the US east coast. This presentation

was a follow-up to SC/67b, in which preliminary results were presented from 30 passive acoustic recorders (MARUs, Cornell University) that were systematically deployed along the US continental shelf, as well as three high-frequency Acoustic Recording Packages (HARPs, Scripps Institute Oceanography) deployed off the shelf break of Georges Bank. This year, information was presented from 8 HARPs deployed along the shelf break from Georges Bank to the Blake Plateau (off the southeast US coast) from April 2016 through May/June 2017. Information was also available from one passive acoustic mooring deployed in deep water near Bear Seamount (south of Georges Bank) from April 2016 through June 2018, as part of NOAA's Ocean Noise Reference Station (NRS) network. Passive acoustic data are being analysed using the low-frequency detection and classification system (LFDCS) (Baumgartner and Mussoline, 2011) to identify acoustic detections of sei whale down-sweeps. Detections were manually reviewed by day for each site, and sei whales were considered 'present' if there were at least three positive detections on that day. Acoustic presence data were considered to represent minimum occurrence of animals at any given time. Preliminary analysis of 2016 deployments indicate a strong seasonal presence of sei whales south of New England and along the shelf break margins of Georges Bank, with winter presence extending to the offshore region of the Blake Plateau. During winter months, sei whales were present at all shelf break and offshore sites. Final deployments of MARUs and HARPs are planned in Spring 2019.

Additional work underway by the NEFSC includes both visual and passive acoustic data collection throughout the US East Coast region. A manuscript is in review that describes new vocalisations associated with sei whales in the western North Atlantic and is expected to improve future acoustic assessments of sei whale occurrence. A collaboration has been initiated with researchers from the Cape Verde Islands to evaluate presence and acoustic characteristics in the Eastern North Atlantic. Additional datasets from that region are still being sought.

The sub-committee thanked the NEFSC for sharing preliminary results and welcomed updates at future meetings. It was noted in discussion that the Atlantic Marine Assessment Program for Protected Species (AMAPPS) program has generated distribution maps and seasonal average abundance estimates for sei whales covering the US Atlantic Outer Continental Shelf, from Maine to the Florida Keys (Palka *et al.*, 2017). These maps and associated data can be interrogated and downloaded at: <https://www.nefsc.noaa.gov/AMAPPSviewer/>. The same habitat-density models have been used to create habitat-suitability maps (Chavez-Rosales *et al.*, 2019).

A question was asked about the possibility of joint analyses of these acoustic data with visual sighting data. It was clarified that the acoustic data in this study only indicated the presence or absence of sei whales and so could not be explicitly used for abundance estimation. One potential application of acoustic data is that an array can be towed behind a vessel during a visual survey to estimate availability bias. However, this method is still in development.

Malette provided an update on recent sei whale sightings off Virginia (the US mid-Atlantic coast). Virginia Aquarium documented four sei whale strandings between 2013 and 2019. Three were found within Chesapeake Bay and one was on the Atlantic coast of Virginia. Two initially stranded alive and later died. The latest, in May 2019, was a ~20 ft whale. Skin samples for genetics were obtained from

these strandings. Live sightings of sei whales have been a relatively recent phenomenon in this area. In the last year, five sightings were recorded from aerial and vessel surveys in offshore waters of Virginia. One of the research teams, HDR Inc., also obtained photo-identification data from one of these sightings.

Palka relayed information that Canadian ship and aerial surveys conducted on the Scotian Shelf, Gulf of St. Lawrence and around Labrador in 2016 only yielded four sei whale sightings, all off the Labrador coast. These limited data precluded an abundance estimate for those waters.

The Northeast Fisheries Science Center (NEFSC, Woods Hole, MA) has established a sei whale photo-identification catalogue. This catalogue currently has contributors from several sites along the East Coast of North America, including the Gulf of Maine/Bay of Fundy, the Scotian Shelf and the Gulf of St. Lawrence. It has also received contributions from the Azores. Contributions have come from the NEFSC's own research, collaborating researchers and whale watching naturalists. The NEFSC welcomes additional contributions and collaborations throughout the North Atlantic. Interested parties may contact Peter Duley at Peter.Duley@noaa.gov.

In discussion of the catalogue, it was noted that holdings from an earlier sei whale photo-identification catalogue curated by the Whale Center of New England (and currently housed at the Center for Coastal Studies) will also contribute to this new effort. The sub-committee encouraged submissions to this new catalogue and welcomed further updates.

Huijser *et al.* (2018) reported on a molecular genetic analysis of stock structure in the North Atlantic. Details of the sub-committee's discussion of this paper and a related study (SC/68A/SH/08) are provided in Annex I, Item 4.2.

2.3 North Atlantic right whales

SC/68A/NH/01 provided an update on recent scientific research related to the status of the North Atlantic right whale. This species continues to decline, with a current estimate of 411 (95% Bayesian credible interval 389-430) individuals at the end of 2017. In 2018, no calves were observed. As of 12 May 2109, seven calves have been born in the winter 2019 season. A series of management measures were implemented by the Government of Canada in 2018 in response to elevated mortalities in the Gulf of St. Lawrence in 2017. No right whale carcasses were detected in Canadian waters in 2018, despite substantial survey effort. In 2019, those management measures have been slightly modified and there are additional plans to conduct substantial survey effort to look for right whales. Recent research has indicated that the apparent increased occupancy in the Gulf of St. Lawrence was in response to prey shifts driven by ecosystem and climate changes. Two recent studies assessed the extent to which the recovery of this species has been constrained by anthropogenic mortality (Kenney, 2018; Pace *et al.*, 2017). Additional research has provided further evidence that anthropogenic mortalities and morbidity are the primary proximate causes of poor calving success, and the chronically low annual survival of North Atlantic right whales.

SC/68A/NH/06 summarised additional US management efforts to recover North Atlantic right whales. NOAA Fisheries convened an expert working group in May 2018 to gather input on how to evaluate the effectiveness of US management efforts to reduce ship strikes and entanglements. A US/Canada Bilateral Right Whale Working Group has furthered collaboration in research and management. NOAA

Fisheries is currently undertaking a review of the vessel speed rule that will include assessments of biological effectiveness, compliance, economic impacts, and navigational safety impacts of the rule. A workshop will be convened in June 2019 to improve knowledge of North Atlantic right whale health and to advance right whale recovery through a better understanding of drivers and contributing factors influencing health trends. NOAA Fisheries convened Atlantic Large Whale Take Reduction Team meetings in October 2018 and April 2019. After intense discussions, the Team reached near unanimous consensus on a package to reduce mortality by 60% by reducing vertical buoy lines, requiring the use of lines with an equivalent of a 1,700-pound (lbs) breaking strength, and expanding gear marking specifications on US trap/pot fishery buoy lines throughout US East Coast waters. The next step is for the NOAA Fisheries to develop regulations using these recommendations. The Northeast and Southeast Recovery Plan Implementation Teams have been developing action plans. This includes developing an assessment tool by spring 2020 that will characterise the extinction risk to North Atlantic right whales by taking into account current and future threats and allowing inquiries into how much improvement to present-day mortality and reproduction schedules would be needed to improve population trajectories.

The sub-committee thanked the US for providing these updates on North Atlantic right whale status and on efforts to reduce human impacts in US and Canadian waters.

Attention: SC

The sub-committee **recognised** that significant efforts have been underway in both the US and Canada to understand North Atlantic right whale status and to mitigate human impacts. It **encouraged** the submission of further updates on these efforts and their outcomes to SC/68B.

Attention: S, CG, G

Nevertheless, the sub-committee **reiterated** its serious concern over the status of right whales in the western North Atlantic, likely the only viable population of this species. It particularly noted that the two primary threats to North Atlantic right whale recovery are entanglement in fishing gear and vessel strikes. It therefore **strongly reiterated its previous recommendation** that the US and Canada make every effort to reduce human induced injury and mortality in the population to zero.

The sub-committee also **requested** that the IWC Executive Secretary notify the US and Canada of its willingness to share expertise and to participate in on-going or planned processes to assess North Atlantic right whales and their threats.

The sub-committee further discussed the frequency of mouth entanglements in this species, as well as how lower breaking strength rope might reduce the types of injuries that can lead to lethal and sub-lethal effects. Right whale entanglements frequently involve the mouth, and these have had a tendency toward negative outcomes, for example (Robbins *et al.*, 2011; 2015). It was clarified that the proposed 1,700lb breaking strength modification was based on a rope strength study conducted by Knowlton *et al.* (2016) that found more serious injuries and deaths when entangled in rope with greater breaking strength. The authors hypothesised that a lower breaking strength would allow an entangled whale to break anchor earlier, before the full weight of the gear has an opportunity to result in a complicated entanglement configuration and cause significant injuries.

The authors noted that this gear modification is most likely to help large whales and may not be as effective for right whale calves and smaller whale species.

It was also further clarified in discussion that ropeless fishing solutions have also been discussed by the Atlantic Large Whale Take Reduction team, but this technology may not yet be ready for large-scale implementation and so remains a longer-term goal. Among the logistical issues is that current US law requires a buoy line to mark the gear at the surface and there are concerns about conflicts among fisheries, such as in areas where fixed and mobile gear are being deployed at the same times in the same areas.

On the subject of gear marking, the sub-committee discussed Food and Agriculture Organization guidelines (FAO, 2019) in the context of recommendations of a workshop co-sponsored by IWC on Global Assessment of Large Whale Entanglement and Bycatch Reduction in Fishing and Aquaculture Gear (SC/67b). FAO guidelines are general and voluntary, but the IWC Secretariat has provided input on the need to consider whale entanglement as it develops gear-marking schemes and the FAO is expected to add more specific advice based on that, and other feedback. The sub-committee noted that there would be benefit in regions working together to make gear markings compatible.

2.4 North Pacific right whales

SC/68A/ASI/04 provided North Pacific right whale sightings during 2018 IWC-POWER cruise. The 9th annual cruise of this program was successfully completed and provided important information on cetacean distribution, particularly for North Pacific right whales, in a poorly-understood area where limited survey effort has been conducted due to logistical difficulties. An acoustic survey was conducted for the second time to monitor the presence of marine mammals, with particular emphasis on detecting and locating right whales. Survey trackline coverage was 75.3% (planned distance of 2,237.9 n.miles) of the original trackline, with a total of 1,685.5 n.miles in passing mode with abeam closing mode and independent observer passing mode. During the cruise, there were three sightings of right whales (three individuals). One North Pacific right whale was sighted north of 64°N near St. Lawrence Island in the Central Bering Sea, the northern-most sighting in recent years. An additional two right whale sightings were made in the 'Critical Habitat' area in the western Bering Sea. Photo-identification data were collected for all three right whale sightings. One was matched to the catalogue maintained at the Marine Mammal Laboratory, Alaska Fisheries Science Center and the two others were confirmed as new animals. Two of three right whale sightings were detected and located using acoustics, and biopsy samples were collected from all three individuals. A total of 253 sonobuoys were deployed, for a total of almost 700 monitoring hours, and North Pacific right whales were detected by 27 buoys (12.4%). Combining data from the three IWC-POWER surveys has resulted in a total of 11 recorded sightings (19 individuals): 1 sighting (1 individual) in 2012, 7 sightings (15 individuals) in 2017, and 3 sightings (3 individuals) in 2018. Sighting summaries and abundance estimates will be available in the near future.

The sub-committee thanked the authors for this new information and welcomed future sightings and abundance estimates. In response to a question, it was clarified that fishing gear and marine debris are recorded when they are sighted during IWC-POWER cruises. However, no gear and few debris were found this year in the survey area and little was observed during transit to and from Japan.

2.5 North Atlantic humpback whales

The Comprehensive Assessment of North Atlantic humpback whales was completed in 2002 (IWC, 2002; 2003). The assessment was facilitated by the results of an international, ocean-basin wide study of this species in the North Atlantic in 1992-93 (the YONAH project). Although the assessment greatly increased knowledge about North Atlantic humpbacks, the results of that work and a subsequent revised assessment model (Punt *et al.*, 2007) failed to completely capture observed population trends relative to predicted carrying capacity (Punt *et al.*, 2007). One possible reason given for these results was an incomplete understanding of breeding stock structure in the North Atlantic.

A follow-up study to YONAH (the MONAH project) was undertaken in 2003-05 using a reduced sampling design informed by YONAH results. The Scientific Committee has awaited the results of this study, and especially planned estimates of population abundance and trend, for a possible in-depth assessment of the North Atlantic population and for providing management advice on aboriginal subsistence whaling in St. Vincent and The Grenadines. Preliminary MONAH estimates were provided by Clapham and Wade in SC/67b along with concerns about the appropriate uses of those estimates given the underlying data and stock structure assumptions (IWC, 2019, Annex E, Item 5.8.2).

SC/68A/NH/02 responded to a request for additional detail on MONAH methods and results in the specific context of aboriginal subsistence whaling. The paper clarified that the MONAH project design did not have the benefit of recent evidence that there may be two breeding stocks of humpback whales in the Caribbean. Photo-identification research indicates that whales occupying the southeast Caribbean appear later in the breeding season and exhibit preferential exchange with Eastern North Atlantic feeding grounds (Stevick *et al.*, 2018) as well as exchange with the Cape Verde Islands (Stevick *et al.*, 2016). Breeding ground sampling in MONAH was limited to a single western Caribbean site (Silver Bank) under the assumption of a panmictic West Indies breeding population. As such, it had insufficient spatial and temporal coverage to provide information on the southeast Caribbean where aboriginal subsistence whaling occurs.

SC/68A/NH/02 also described a multi-institutional cross-Caribbean survey using passive acoustic recorders (Caribbean Humpback Acoustic Monitoring Project, CHAMP, Heenehan *et al.*, 2019) intended to further these questions. Between December 2016 and June 2017, nine acoustic recorders were deployed off Silver Bank (Dominican Republic), St. Martin, Guadeloupe, Martinique, Aruba and Bonaire. Humpback song was detected at all sites except Aruba and Bonaire. Song was detected in December on Silver Bank, but started four to six weeks later off Guadeloupe and Martinique. Song was detected into May at all sites, and into June at St. Martin at which time the recorder was retrieved. These results confirm a later breeding season in the eastern Caribbean. In addition, results suggest that humpback whales are present in the waters off the Dominican Republic later than assumed, until at least May, although the occurrence of calls is greatly reduced on Silver Bank after mid-March.

In discussion, the sub-committee **encouraged** further analysis of the MONAH data but **recognised** that it would not specifically improve understanding of the eastern Caribbean. MONAH nevertheless generated valuable data that will contribute to other work of relevance to the sub-committee. This includes a 16-year series of population

abundance and trend in the Gulf of Maine, and updated ocean scale studies of exchange and genetic structure expected to be available for sub-committee review in SC/68B. The latter are described below.

The sub-committee noted the importance of resolving breeding stock structure in the North Atlantic, and that song analysis has the potential to provide particular insight. The sub-committee therefore **recommended** comparative analysis of CHAMP song data and welcomed a report of those results when available.

Mackay *et al.* (2019) provided details on humpback whale exchange between Puerto Rico, a low-density western breeding site sampled in YONAH, and other parts of the Caribbean breeding range. Eighty-seven individuals were identified through photo-identification at Puerto Rico from 2012-16. Exchange was confirmed with other western Caribbean sites (82.4%) and the Eastern Caribbean during the same period. Two of the latter matches were to Guadeloupe and one was a within-season match to Anguilla, 34 days after the sighting at Puerto Rico. All Eastern Caribbean sightings were in February or March.

The sub-committee welcomed this recently published information on exchange between the western and eastern Caribbean.

The sub-committee received summaries of the current holdings of two ocean-scale archives with the potential to inform a future assessment. SC/68A/NH/04 summarised the North Atlantic Humpback Whale Catalog curated by the Allied Whale, College of the Atlantic, while SC/68A/NH/05 describes North Atlantic humpback whale molecular genetic sample archives curated by Palsbøll and Bérubé at the University of Groningen.

As described in SC/68A/NH/04, the North Atlantic Humpback Whale Catalogue currently includes images of 9,500 individually identified whales contributed by over 700 collaborators between 1978 and 2018. Sample sizes are largest for the western North Atlantic, but breeding ground holdings from outside of the western Caribbean have increased substantially since the Comprehensive Assessment. There are now 320 individuals identified in the eastern Caribbean, including those referenced by MacKay *et al.* (2019), and 221 individuals catalogued from the Cape Verde Islands. Additionally, there are more data on winter sightings outside of primary breeding grounds, such as off the US mid-Atlantic states.

SC/68A/NH/04 also described an analysis of these data to estimate transition probabilities among all major areas of humpback whale aggregation in the North Atlantic Ocean through 2015. The results further support the findings of Stevick *et al.* (2018) that suggest the presence of distinct breeding populations in the Greater Antilles and the southeastern Caribbean. Migratory patterns between feeding areas and the southeastern Caribbean were more similar to those from the CVI breeding segment than the geographically-closer area in the Greater Antilles. Breeding to feeding area transition probabilities were highest from the Greater Antilles to western feeding grounds, from the southeastern Caribbean to eastern feeding grounds, and from CVI to eastern feeding grounds. Detailed methods and results are expected by the time of the next Scientific Committee meeting.

SC/68A/NH/05 describes the numbers and distribution of molecular genetic samples in the North Atlantic, as well as the types and resolution of genetic analyses. Since the Comprehensive Assessment of North Atlantic humpback whales in 2001-02, the number of samples has increased

from approximately 3,700 to the current total of 8,624 samples. The data per sample has also increased from 6 to 21 microsatellite loci. These data are currently being analysed for better understanding of stock structure in the North Atlantic, and those results are expected to be available in SC/68B. As with the photo-identification data, genetic sample sizes are greatest for areas in the western North Atlantic, and the authors of SC/68A/NH/05 recommended prioritizing further sampling in the low latitude areas of the eastern Caribbean, the eastern North Atlantic, western Africa and low to mid-latitude migratory corridors.

Overall, the sub-committee welcomed these papers and recognised that significant new photo-identification and genetic data have become available since the Comprehensive Assessment, and that new analyses are pending. It particularly **recommended** additional photo-identification and genetic sampling (including live animals, strandings and aboriginal subsistence whaling) in the eastern Caribbean and from the eastern North Atlantic to northern Africa. It also noted that passive acoustics (see above) and telemetry studies have been underway that also have the potential to improve understanding of stock structure in the North Atlantic Ocean. The sub-committee **agreed** to form an intersessional correspondence group (Annex T) to work to identify existing data and analyses that could be available for review by the sub-committee at the next meeting.

As reported last year, humpback whale mortalities have been elevated off the US east coast since January 2016, with 93 deaths now reported through mid-April 2019¹. The cause of this Unusual Mortality Event is still under investigation by a team of specialists lead by NOAA, but approximately half of examined cases have showed evidence of ship strike or entanglement prior to death. Most of the carcasses have been detected outside of the Gulf of Maine, including along the US mid-Atlantic states. This area is a seasonal, relatively low-density area of feeding stock mixture previously described by Barco *et al.* (2002). A new photo-identification catalogue for this region, the Mid-Atlantic Humpback Whale Catalog (MAHWC), led by the Virginia Aquarium, is currently facilitating matches of these individuals to prior live sightings within that region and to collaborating catalogues in other North Atlantic areas. Mallette provided an update on the progress of MAHWC development.

Attention: SC

*The sub-committee **agreed** that a considerable amount of new information has accumulated since the Comprehensive Assessment of North Atlantic humpback whales, and that further work should be undertaken to collect and review those data for a possible future in-depth assessment.*

*New information since the last assessment (e.g. Stevick *et al.*, 2018) suggests the need to further evaluate humpback whale stock structure in the North Atlantic, most notably the relationship of the southeastern Caribbean to other North Atlantic breeding areas. To this end, the sub-committee **recommended** comparative analysis of existing CHAMP song data from the eastern and western Caribbean. It also **encouraged** the collection and analysis of additional data (photo-identification, genetic, acoustic and telemetry) from less well-understood areas of the North Atlantic, with particular attention on the southeastern Caribbean, low-latitude areas of the eastern North Atlantic, northern Africa and migratory corridors. Desirable photo-identification and*

¹<https://www.fisheries.noaa.gov/national/marine-life-distress/2016-2019-humpback-whale-unusual-mortality-event-along-atlantic-coast>.

genetic sampling would include live animals, strandings, and animals caught during aboriginal subsistence whaling.

While the sub-committee **encouraged** further analysis of the MONAH data, it **recognised** that those data would not directly answer questions about breeding stock structure outside of the western Caribbean.

The sub-committee **agreed** to form an intersessional correspondence group under Mattila to identify existing data and analyses for review in SC/68B.

Finally, the sub-committee **expressed concern** about a multi-year mortality event off the US East Coast and **requested** that any new information on causes and impacts be provided to the sub-committee in SC/68B.

3. NEW INFORMATION ON OTHER NORTHERN HEMISPHERE STOCKS

3.1 Gulf of Mexico Bryde's whales

SC/68A/NH/03 presented a brief response to the IWC recommendations made last year with regard to the Gulf of Mexico (GOMx) Bryde's whale. This included the news that on 9 April 2019, the GOMx Bryde's whale was listed as Endangered under the US Endangered Species Act. Given this new US legal status, NOAA Fisheries must consult with other federal agencies that carry out, fund or authorise activities such as seismic surveys, fishing, and shipping. In late spring/early summer a draft Deep Horizon Oil Spill Programmatic Damage Assessment and Restoration Plan will be released for public comment. Once final, restoration projects to benefit this species will be implemented. NOAA Fisheries' Southeast Fisheries Science Center has a variety of ongoing research projects aimed at improving our understanding of GOMx Bryde's whale distribution, range and habitat use. These projects will document the total geographic range, and will include six passive acoustic studies and other research to improve understanding of the physical, oceanographic, and biological features defining critical habitat.

Further information was collected through a full necropsy performed on a Bryde's whale that stranded off Florida in January 2019.

In discussion of the Bryde's whale stranding, a question was asked about body colouration, as this can vary with geographic location; e.g. pink or carotene body colour on the ventral surface can be seen among Bryde's whale in some neritic waters. It was noted in response that a necropsy report should be available soon and that photos of the ventral surface will be available.

Attention: SC, S

The sub-committee welcomed news that the Gulf of Mexico Bryde's whales has been listed as Endangered under the US Endangered Species Act, and **recognises** that this will provide a basis for maximal protection under US law.

However, it also **requested** that the IWC Executive Secretary write to inform the US of the sub-committee's **serious continuing concern** about this small and isolated population, thus far only known to occur in US waters.

The sub-committee also **requested** that the US provide any new information on population abundance, status and critical habitats at SC/68B, as well as the details of legal protections afforded from seismic surveys and other anthropogenic threats.

3.2 North Pacific fin whales

SC/68A/ASI/04 reported on fin whale sightings during the 2018 IWC-POWER cruise. Survey trackline coverage was 75.3% (planned distance of 2,237.9 n.miles) of the original trackline, with a total of 1,685.5 n.miles completed. A total of 135 fin whale sightings (199 individuals) were recorded. Fin whales were the most frequently sighted whale species in the research area, especially in the southern stratum in the Central Bering Sea. Photo-identification data and biopsy samples were collected from 69 and 24 individuals, respectively. A total of 253 sonobuoys were deployed, for a total of ~700 monitoring hours, and fin whales were detected at 101 buoys (46.5%). An abundance estimate using these data will be produced in the near future.

The sub-committee thanked the authors for providing this update and welcomed future information and estimates of abundance.

New information on fin whale genetic structure in the Northern and Southern Hemispheres is provided in SC/68A/SH/05 and sub-committee discussion may be found in Annex I, Item 4.3.1.

3.3 Omura's whales

There was no new information available to the sub-committee.

3.4 North Atlantic blue whales

There was no new information available to the sub-committee.

Attention: SC, G

The sub-committee **drew attention** to previous discussion on lack of data on interchange between blue whales in the eastern and western North Atlantic, and **reiterated its recommendation** from SC/67b that US and Icelandic colleagues conduct a new comparison of blue whale photo-identification catalogues. The sub-committee also **encouraged** Canadian colleagues to generate a new population abundance estimate as soon as feasible, and looked forward to updates on passive acoustics, visual sightings, and stock structure in SC/68B.

4. WORK PLAN

The sub-committee prioritised three Northern Hemisphere stocks for intersessional work to accumulate data for future in-depth assessments: North Pacific blue whales, North Atlantic sei whales and North Atlantic humpback whales. Intersessional correspondence groups were established for each to advance that work (see Annex T).

For SC/68B, the sub-committee particularly welcomed and prioritised the review of new information on North Atlantic right whales and Gulf of Mexico Bryde's whales in light of concerns about their population status and recent implementation of protective management efforts. The sub-committee will also prioritise review of previously recommended information on North Atlantic blue whales, should it become available in SC/68B. North Atlantic minke whales in the western North Atlantic were added as a stock of interest for new information in SC/68B, particularly in light of elevated mortalities along the east coast of the US since 2017² Otherwise, the sub-committee plans to continue to review available new information as it becomes available

²<https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2019-minke-whale-unusual-mortality-event-along-atlantic-coast>.

for other Northern Hemisphere stocks that are not subject to directed takes. The sub-committee noted that its work would be facilitated by a central, standing document tracking new information received for this large number of stocks. This document will be developed next year, likely in the form of an online spreadsheet.

5. ADOPTION OF REPORT

The report was adopted at 11:24 on 17 May 2019. Robbins thanked the sub-committee and the rapporteur for her hard work, and the sub-committee expressed its thanks to the chair.

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Appendix 1

AGENDA

1. Introductory items
 - 1.1 Opening remarks
 - 1.2 Election of Chair
 - 1.3 Adoption of Agenda
 - 1.4 Appointment of Rapporteurs
 - 1.5 Review of available documents
2. Evaluation of potential new in-depth assessments
 - 2.1 North Pacific blue whales
 - 2.2 North Atlantic sei whales
 - 2.3 North Atlantic right whales
 - 2.4 North Pacific right whales
 - 2.5 North Atlantic humpback whales
3. New information on other Northern Hemisphere stocks
 - 3.1 Gulf of Mexico Bryde's whales
 - 3.2 North Pacific fin whales
 - 3.3 Omura's whales
4. North Atlantic blue whales
5. Work plan
6. Adoption of Report