

## Progress Report on the intersessional working group Multi-ocean assessment of southern right whale demographic parameters and links to environmental correlates, June 2019 to May 2020.

C. Charlton, E. Vermeulen, E. L. Carroll, D. Butterworth, J. Cooke, A. Ross-Gillespie, A. Brandao, K. Groch, R. Leaper, W. Rayment, V. Rowntree, M. Sironi, G. Vandenberg, M. Watson, M. Double, J. Jackson



INTERNATIONAL  
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# Progress Report on the intersessional working group “Multi-ocean assessment of southern right whale demographic parameters and links to environmental correlates”, June 2019 to May 2020.

Claire Charlton<sup>1</sup>, Els Vermeulen<sup>2</sup>, Emma L. Carroll<sup>3</sup>, Doug Butterworth<sup>4</sup>, Cooke Justin<sup>5</sup>, Andrea Ross-Gillespie<sup>4</sup>, Anabela Brandao<sup>4</sup>, Karina Groch<sup>6</sup>, Russell Leaper<sup>7</sup>, Will Rayment<sup>8</sup>, Vicky Rowntree<sup>9</sup>, Mariano Sironi<sup>10</sup>, Gideon Vandenberg<sup>2</sup>, Mandy Watson<sup>11</sup>, Mike Double<sup>12</sup>, and Jennifer Jackson<sup>13</sup>.

<sup>1</sup> Curtin University, Centre for Marine Science and Technology, Western Australia

<sup>2</sup> University of Pretoria MRI Whale Unit, South Africa

<sup>3</sup> School of Biological Sciences, University of Auckland, New Zealand

<sup>4</sup> University of Cape Town, South Africa

<sup>5</sup> Centre for Ecosystem Management Studies, Germany

<sup>6</sup> Instituto Australis, Brazil

<sup>7</sup> International Fund for Animal Welfare

<sup>8</sup> University of Otago, New Zealand

<sup>9</sup> Whale Conservation Institute/Ocean Alliance, University of Utah, USA

<sup>10</sup> Instituto de Conservación de Ballenas/Whale Conservation Institute/Ocean Alliance

<sup>11</sup> Department of Environment, Land, Water and People Victoria, Australia

<sup>12</sup> Australian Antarctic Division, Department of Environment and Water

<sup>13</sup> British Antarctic Survey, UK

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## BRIEF SUMMARY

The International Whaling Commission Scientific Committee (IWC SC) Southern Hemisphere (SH) subcommittee intersessional working group (WG) was established during SC68A and aimed to: seek funding to enable the project to advance, collate relevant southern right whale (SRW, *Eubalaena australis*) photo and genotype identification datasets and document regional progress of demographic assessments in SH wintering grounds as a critical step towards meeting the overall project objectives.

The project objective is to compare SRW population demographics across the main SH wintering grounds, by applying a common demographic model to the SRW populations in each region, and ultimately investigate correlations between SRW abundance trends/calving intervals and environmental variables in the Southern Ocean.

In summary, the key progress made between June 2019 and May 2020 includes:

- IWC Southern Ocean Research Partnership (IWC-SORP) funding proposal submitted in January 2020 to facilitate project advancement

- A SRW workshop was held at the World Marine Mammal Conference (WMMC) in Barcelona on 8 December 2019 during which a proposed common model approach was presented by Butterworth (see SC68b/SH/XX for workshop report).
- Photo identification comparison of SRWs in Brazil and Argentina with funding awarded during SC/68A and has been completed (see SC68b/CMP/XX).
- Nearly completion of the revised population model for South African SRW population by Brandao, Ross-Gillespie and Butterworth.
- Progress made towards assessing links between demographics and climate in South Africa (Vermeulen et al. in prep), Argentina (Agrelo et al. in prep) and New Zealand (Johnston et al. in prep).
- Progress made towards collation and standardisation of existing SRW photo identification datasets in Australia through a National Environmental Science Program (NESP) funded project to assess national abundance and connectivity of SRWs.
- Completion of a revised population estimate of SRWs in the southeast of Australia by Stamation et al. (2020, SC/68a/ForInfo43) along with an assessment of calving intervals, site fidelity and long-range movements of SRWs in eastern Australia (Watson et al. in review).

## EXTENDED SUMMARY

The WG was established at IWC SC 68a in Nairobi, 2019 and is co-convened by Els Vermeulen and Claire Charlton. Working group members include: Doug Butterworth; Cooke Justin; Anabela Brandao; Emma Carroll; Mike Double; Karina Groch; Russell Leaper; Will Rayment; Andrea Ross-Gillespie; Vicky Rowntree; Mariano Sironi; Gideon Vandenberg; Els Vermeulen; Mandy Watson and Jen Jackson.

The project objective is to compare population demographics across the main SH wintering grounds by applying a common demographic model to the SRW populations in each region, and ultimately investigate correlations between SRW abundance trends/calving intervals and environmental variables in the Southern Ocean. This work contributes to the scope of the IWC-SORP theme 6 (SC/68b/SH/XX – IWC SORP report). The project was endorsed by IWC SC in 2018, although the funding application to the IWC was unsuccessful at SC67B. IWC (In press) Annex H provided information on the progress made in 2019.

This multi-ocean collaborative project utilises up to 50 years of data from SH wintering grounds to inform the IWC-SH subcommittee priority species assessment for SRWs, and key priority areas for IWC-SORP. The regional populations with available long-term photo identification databases to be included are: (1) South West Atlantic (Brazil/Argentina); (2) South East Atlantic (South Africa); (3) Australia and (4) New Zealand.

The purpose of this report is to present a summary of the WG progress made between June 2019 and May 2020, to the IWC SC/68b virtual meeting in May 2020.

A summary of key progress milestones for each region is outlined below.

## All Regions

An IWC-SORP funding proposal related to this WG was submitted in January 2020. Specific outcomes of the proposed work include:

- i. Establishment of a circumpolar SRW photo identification consortium for the development of data quality control standards, identification of analytical biases, and facilitation of multi-ocean collaboration.
- ii. Specification of a common demographic model to estimate life history parameters for the main breeding populations, including: calving interval, age at first parturition, mortality (of calves and non-calves) and population growth.
- iii. Obtaining comparable estimates of the key parameters of the demographic model and of population growth rates for the populations at each of the major wintering grounds.
- iv. Collation of published and available information in a desktop review of contemporary feeding grounds to inform the selection of environmental variables for further investigation of links between demographic parameters (i.e. reproductive success) and climate.

A SRW workshop was held during the WMMC in Barcelona on 8 December 2019 (SC/SH/68b/XX). Priority research and recommendations in relation to the “multi-ocean assessment of SRW demographics and links to environmental correlates” programme were discussed and outputs captured in the IWC-SORP proposal.

A proposed simple common model for comparing recovery in SRW developed by Doug Butterworth and Andrea Ross-Gillespie was presented at the WMMC workshop and discussed between researchers, including input from Justin Cooke (ref to the WMMC workshop report SC/68b/XX). Further development of this approach is proposed through the IWC-SORP funding application.

### **South West Atlantic (Argentina/Brazil)**

Funding was obtained at the SC/68a meeting in May 2019 in Nairobi to compare the Brazil and Argentina SRW photo identification catalogues as a critical step towards achieving the project's objectives. This project is complete and detail is provided in SC/68b/CMP/XX. Briefly, 896 SRWs photo-identified off Brazil from 1987 through 2017 were searched in the 3,813 whale catalogue of SRW photo-identified off Argentina from 1971 through 2017. A total of 124 matches were made, indicating that 13.8% of whales photo-identified off Brazil have also been sighted off Argentina. The percent of Brazilian right whales seen off Argentina has declined with time (15.3% in 2004 and 13.8% in 2010), however the percent found in the current comparison is the same as in 2010. An update on population demographics and assessment is underway for Argentine data up to 2019, including parameters: survival, fidelity, population growth rate and abundance using mark-recapture likelihood-based methods and taking into account individual variations (sex, gull lesions).

In Argentina, Agrelo et al. are preparing publications on: sex and age-specific survival modelling, effects of local and global threats on trends and whale recovery, and the effect of climate change on female survival, trends and population recovery.

### **South West Atlantic (South Africa)**

A revision of the demographic model for South African SRW was presented to the WG by Butterworth to account for low probabilities of sighting females with calves during low abundance years observed during 2015 to 2017 (SC/67b/SH/22). Analyses by Brandao, Ross-Gillespie and Butterworth based on a refined model, which includes data up to 2019 and will provide updated estimates of demographic parameters and variables, is now nearing completion.

A further in-depth assessment of South African population dynamics in relation to foraging ecology based on stable isotope data and habitat modelling is underway.

In relation to assessing links between demographic parameters and environmental variates, work is being conducted in South Africa to assess possible linkages between SRW reproductive success and Southern Ocean climate conditions and productivity.

### **Australia**

Ongoing expansion and development of the Australian Right Whale Photo Identification Catalogue (ARWPIC) is underway. The Australian Government Department of the Environment and Energy's NESP Project estimating abundance and assessing connectivity of SRW off Australia is facilitating the input of regional Australian catalogues into ARWPIC. Catalogue integration is underway and includes data up to 2012 from the Western Australian Museum aerial surveys, all reproductive females from the Head of Bight catalogue (1991-2018), and almost the complete catalogues up to 2018 for the southeast of Australia (including Victoria, New South Wales and Tasmania). Use of the funding awarded will include a full merge of the Western Australian Museum aerial survey data (up to 2018). Additional funding is required for integration of the outstanding dataset of non-parous females from Head of Bight and other small and emerging calving grounds, i.e. Fowlers Bay (Charlton), Flinders Bay/Geographe Bay (Salgado Kent), historical aerial survey data from South Australia (Kemper, South Australian Museum).

A revised population estimate of SRWs in the southeast of Australia was completed by Stamation et al. (2020, see SC/68a/ForInfo43) along with an assessment of calving intervals, site fidelity and long range movements of SRWs in eastern Australia (Watson et al. in review).

### **New Zealand**

A publication on the size structure of the population visiting the Auckland Islands in 2016, based on aerial photogrammetry is in review (Johnston et al. in review) and analyses of variations in abundance related to environmental correlates in the Southern Ocean are underway. Estimation of demographic parameters (abundance, survival, temporary emigration) from lateral photo-ID data 2006-2013 is underway (Rayment & Linden).

New field work to the Auckland Islands continuing genetic monitoring of New Zealand southern right whales, started by the University of Auckland in 1995, is expected to begin in July 2020. The research, funded by the Royal Society of New Zealand and led by Carroll, will use close kin mark recapture (Bravington et al. 2016) to estimate abundance and population growth rate. This follows on from work that estimated annual population growth to be 7% (95% CI 5-9%) for 1995-2009 from genotypic mark-recapture modelling (Carroll et al. 2013).

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