

SC/67b/RP30

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SH - Multi-ocean analysis of southern right  
whale demographic parameters and  
environmental correlates



INTERNATIONAL  
WHALING COMMISSION

## PROJECT PROPOSAL REQUEST

### 1. PROPOSAL TITLE

#### **Multi-ocean analysis of southern right whale demographic parameters and environmental correlates**

### 2. BRIEF OVERVIEW OF THE PROPOSAL AND ITS EXPECTED OUTCOME

This study aims to compare population demographics of southern right whales in Southern Hemisphere wintering grounds and investigate correlations between reproductive success and abundance trends, and environmental variables.

This study is a component of the proposed SORP project - The right sentinel for climate change: linking foraging ground variability to population recovery in the southern right whale.

Outcomes:

Phase 1

- Development of a common population model for southern right whales.
- Complete photo identification catalogues for Argentina (1971-2017); Brazil (1987-2017); Australia (1991-2017), and; South Africa (1979-2017 *complete*)
- Comparison of southern right whale demographic parameters including: abundance trend, calving interval, age of first parturition, survival and mortality
- Assessment of available information on feeding grounds to inform selection of environmental variables for assessment of links to abundance trends and calving intervals

Phase 2

- Assessment of links between environmental variables and southern right whale abundance trends and calving intervals in the Southern Hemisphere

*This proposal is for Phase 1 of the project only.*

### 3. RELEVANT IWC SCIENTIFIC COMMITTEE GROUPS OR SUB-GROUPS

*List all the IWC Scientific Committee groups or sub-groups that the outcomes of this work would be relevant to and provide a brief (1-2 lines) explanation of how it would contribute more widely to their ongoing programmes of work. Where possible, do not simply list only the sub-committee within which or for which the project proposal was generated.*

Southern Hemisphere – multi-ocean analysis of southern right whales to compare demographic parameters including abundance trends and changes to calving intervals.

ASI – development of a common model for future use of assess southern right whale recovery

**4. TYPE OF PROJECT (PLEASE TICK)**

Research project	X
Modelling	X
Workshop/meeting	
Database creation/maintenance	
Compilation work/editing (e.g. on whalewatching regulations, SOCER, etc.)	
Other (please specify below)	

**5. BRIEF DESCRIPTION OF THE PROPOSAL AND ITS CONNECTION WITH SCIENTIFIC COMMITTEE RECOMMENDATIONS (DO NOT EXCEED 1500 WORDS)**

<p><b>(A) BACKGROUND, RATIONALE, AND RELEVANCE TO THE PRIORITIES IDENTIFIED BY THE IWC SCIENTIFIC COMMITTEE:</b></p>
<p><i>Provide a clear explanation of the background and rationale for the proposal and its relevance to Scientific Committee identified priorities. Clearly identify the most relevant and recent Scientific Committee recommendations.</i></p> <p>Long-term photo identification studies have been ongoing at southern right whale wintering grounds in South Africa (1979-2017, 2083 whales individually identified), Argentina (1971-2017, 3,200 whales individually identified), Brazil (1987-2011) and southwest Australia (1993-2017, over 2000 whales individually identified). SHWP12 recommends undertaking analysis of these datasets using a single analytical framework to produce comparative estimates of growth rates and reproductive parameters.</p> <p>Southern right whales forage over a variety of latitudes, including low, mid and high latitude feeding locations e.g. (e.g., SC/67b/CMP17, Valenzuela et al. 2009; Carroll et al. 2015), so the environmental relationships are likely to be complex. Available information on feeding grounds will inform appropriate environmental variables for future analysis (Phase 2).</p> <p>Southern right whales are a priority species for the IWC SC67b. This proposal meets key priorities of the IWC. It is a multi-ocean, multi-national collaborative project that utilises almost five decades of annual southern right whale photo identification and sightings data from four countries and three continents. Established models developed for southern right whales will be used and adapted to create a common model applicable for all right whale populations included in this study. The proposed work is of high conservation significance, with changes to the trend in calving intervals, mortality and rate of increase observed for southern right whales</p>

in recent years. A comparative study of population demographics of southern right whales in the southern hemisphere will improve our understanding of species status, and strengthen information to inform conservation management.

The SH sub-committee of the IWC SC67b recommended full catalogue matching between the Brazilian and Argentine catalogues in order to provide the best available data on calving rates, abundance and trend. They also recommended reconciliation of the Head of the Bight survey data with the additional survey data collected off Australia. An initiative to collate the Australian dataset is already underway, funded by the Australian Government.

As a caveat for the success of this research proposal, if complete data collation between Brazil and Argentina is not available in year 2, then the datasets can be used independently. The outputs of the research will not be compromised, although it would be ideal for the catalogues to be collated.

Two models will be applied for this analysis and therefore, in the event that one model cannot provide outputs, there is a back up to ensure project outcomes can be met.

Recent publications and reports from the collaborative group on this topic include:

- Bannister, J. 2018. Population trend in right whales off southern Australia 1993-2010. SC/S11/RW10
- Brandão, A, Best, P. B. and Butterworth, D. S. 2011. Monitoring the recovery of the southern right whale in South African waters. International Whaling Commission document SC/S11/RW18.
- Brandão A, Vermeulen E, Ross-Gillespie A, Findlay K, Butterworth D. 2018. Updated application of a photo-identification based assessment model to southern right whales in South African waters, focussing on inferences to be drawn from a series of appreciably lower counts of calving females over 2015 to 2017. SC/67b/SH\_22
- Carroll EL, Baker CS, Watson M, Alderman R, Bannister J, Gaggiotti OE, Gröcke DR, Patenaude NJ, Harcourt R. 2015. Migratory traditions shape the genetic structure of southern right whales around Australia and New Zealand. Sci Rep-Uk 5:16182.
- Charlton C, J Bannister, R McCauley<sup>1</sup>, R.L Brownell Jr, R Ward, C Salgado Kent, SBurnell. Demographic parameters of southern right whales (*Eubalaena australis*) off Australia. SC\_67B\_INFO\_22
- Cooke, J. G., Rowntree, V. J., Payne, R. 2001. Estimates of demographic parameters for southern right whales (*Eubalaena australis*) observed off Peninsula Valdes, Argentina. Journal of Cetacean Research and Management (Special Issue) 2:125-132
- Cooke, J., Rowntree, V., Payne, R. 2003. Analysis of inter-annual variation in reproductive success of South Atlantic right whales (*Eubalaena australis*) from photo-identifications of calving females observed off Peninsula Valdes, Argentina, during 1971-2000. International Whaling Commission document SC/55/O23.
- Cooke J.G., Rowntree V.J. and Sironi M. 2015. Southwest Atlantic right whales: interim updated population assessment from photo-id data collected at Península Valdéz. International Whaling Commission Scientific

Committee Document SC/66a/BRG 23.

- Valenzuela LO, Sironi M, Rowntree VJ, Seger J. 2009. Isotopic and genetic evidence for culturally inherited site fidelity to feeding grounds in southern right whales (*Eubalaena australis*). *Mol. Ecol.* 18:782-791.
- Vermeulen E, Wilkinson C, Thornton M, Peters I, Findlay K. 2018. Report on the mammal research institute whale unit southern right whale survey – 2017. SC\_67B\_SH\_01

**(B) SPECIFIC OBJECTIVES OR TOR AND DELIVERABLES/OUTCOMES:**

*Provide the specific objectives and the expected deliverables. In the case of workshops and meetings, include the Terms of Reference (ToR) and expected outcomes.*

Broad objectives:

Phase 1: Complete a comparative study of demographic data using common models generated by Cooke et al (2015) and Brandao et al (2018), for Southern Hemisphere southern right whale populations. Specifically, demographic parameters include: abundance trend, calving intervals, age of first parturition, survival and mortality.

Phase 2: Investigate correlations between SRW abundance trends/calving intervals and environmental variables in the Southern Ocean

Deliverables include:

- i. IWC paper - Comparing demographic parameters of southern right whales off South Africa using two modelling approaches (Cooke et al 2015 and Brandao et al 2018 as in SC/67b/SH\_22) for validation of common model (Year 1&2).
- ii. IWC paper – Comparing demographics of southern right whales off South Africa and South Australia (Year 1)
- iii. IWC paper - SRW demographics off Argentina/Brazil using common model (Year 2)
- iv. IWC paper - SRW demographic comparison between South Africa, Australia and Argentina (or Argentina/Brazil). Involves inclusion of southwest Atlantic data in common model framework and comparison with South Africa and Australia. (Year 2)
- v. IWC paper – comparison of abundance trends, calving intervals and mortality across all populations of SRW (South Africa, Argentina, Brazil, Australia, New Zealand) and complete assessment of available information on feeding grounds and appropriate environmental variables for further modelling. (Year 2)

**(C) METHODOLOGICAL APPROACH/WORK PLAN/ADMINISTRATIVE DETAILS**

*Specify the methods to be applied (novel methods require more explanation than standard ones) and the broad workplan – the detailed timetable appears under Item 5 below.*

*In the case of workshops and meetings, include the broad work plan including any pre-requisites for the workshop/meeting to take place (apart from funding, e.g. completed*

analyses, papers etc.) and administrative details (e.g. location, dates, number of participants).

Refer to work plan SC67B/SH/WP12 - Small group discussion on how to implement a multi-ocean analysis of southern right whale calving rates and trends based on the Cooke calving model

Proposed steps to fulfill the broader project objectives are outlined below:

- i. Comparison of models used to estimate demographic parameters of SRW (Cooke et al 2015; Brandao et al 2018). Need to consider process in ASI for model 'validation'. Plan to model South African data using both models (Year 1 & 2)
- ii. While awaiting photo-identification analysis for the Argentine and Brazil population, conduct SRW demographic comparison between South Africa and Australia. Involves adapting model for Australian dataset and comparing with already analyzed South Africa data. Trial to include Head of Bight dataset is underway between Butterworth and Charlton et al (2017/2018). (Year 1)
- iii. Photo identification cross matching between a) Argentine and Brazilian catalogues, and b) Australian catalogues (Year 2)
- iv. Modeling SRW demographics off Argentina/Brazil using common model (Year 2)
- v. SRW demographic comparison between South Africa, Australia and Argentina (or Argentina/Brazil). Involves inclusion of southwest Atlantic data in common model framework and comparison with South Africa and Australia. (Year 2)
- vi. Use raw data to compare abundance trends, calving intervals and mortality across all populations of SRW (South Africa, Argentina, Brazil, Australia, New Zealand) and complete assessment of available information on feeding grounds and appropriate environmental variables for further modelling. This could be a paper for SC/68a. Data can be included from Els Vermeulen's honours student project assessing environmental correlates for South Africa. (Year 2)
- vii. Model environmental variables to investigate correlations between SRW abundance trends/calving intervals and environmental variables in the proposed feeding grounds in the Southern Ocean (Phase 2)

#### (D) SUGGESTIONS FOR OUTREACH

Please, note that successful proponents will be requested to produce ad hoc material that will be used by the IWC Secretariat for dissemination and outreach.

Outreach opportunities include:

- Intern or student project to generate educational material
- Presentation of results at conferences such as SMM 2019
- Media and communications via newspapers, radio interviews, television, social media to provide results of study

## 6. TIMETABLE FOR ACTIVITIES AND OUTPUTS

Specify the timetable for project activities and expected outputs separately. For projects with multiple distinct elements please indicate interim goals and timeframes. Add as many rows as you need to the tables below. If publications are an expected output please note whether you will submit the manuscript to the IWC's Journal of Cetacean Research and Management.

Activity to be undertaken	Key person(s)	Start(mm/yy)	Finish (mm/yy)
Validation of model and development of common model for assessing southern right whale demographics	Justin Cooke, Doug Butterworth, Anabela Brandao	07/18	04/20
Modelling South Africa and South Australia southern right	Doug	Started 06/17	04/19

whale demographics – in process	Butterworth, Anabela Brandao, Andrea Ross- Gillespie Claire Charlton, Els Vermeulen		
Catalogue maintenance of photo ID datasets – Argentina and Brazil.  <i>(Collation of Australian datasets is planned for 2018/2019 with funds from the Australian Government)</i>	Vicky Rowntree/ Karina Groch	07/18	07/19
Southern right whale demographic comparison between South Africa, Australia and Argentina (or Argentina/Brazil). Involves inclusion of southwest Atlantic data in common model framework and comparison with South Africa and Australia	Justin Cooke, Doug Butterworth, Anabela Brandao et al	04/19	04/20
Comparison of abundance trends, calving intervals and mortality across all populations of SRW (South Africa, Argentina, Brazil, Australia, New Zealand) and	Els Vermeulen Mariano Sironi Claire Charlton	01/19	04/20
Complete assessment of available information on feeding grounds and appropriate environmental variables for further modelling	Els Vermeulen	01/19	04/20

Expected outputs	Completion date (mm/yy)
Validation of common model	04/20
Comparing demographics of southern right whales off South Africa and South Australia	04/19
Photo ID data maintenance complete and sighting history datasets available for model input	06/19
IWC paper - SRW demographic comparison between South Africa, Australia and Argentina (or Argentina/Brazil). Involves inclusion of southwest Atlantic data in common model framework and comparison with South Africa and Australia.	04/20
IWC paper – comparison of abundance trends, calving intervals and mortality across all populations of SRW (South Africa, Argentina, Brazil, Australia, New Zealand) and complete assessment of available information on feeding grounds and appropriate environmental variables for further modelling.	04/20

## 7. RESEARCHERS' (OR STEERING GROUP) NAME(S) AND AFFILIATION

Please, also specify if the project team has any direct connection (e.g. same research group or institute, collaborator on common project) with people involved or likely to be involved in taking the funding decision (e.g. IWC SC heads of delegations, SC convenors, etc.). Add as many rows as you need to the table below.

Name	Affiliation	Connection with decision
Justin Cooke	Centre for Ecosystem Management Studies, Mooshof	
Doug Butterworth	University of Cape Town	
Anabela Brandao	University of Cape Town	
Andrea Ross-Gillespie	University of Cape Town	
Els Vermeulen	University of Pretoria, South Africa	
Mariano Sironi	Instituto de Conservacion de Ballenas/Whale Conservation Institute/Ocean Alliance	
Vicky Rowntree	University of Utah	
Karina Groch	Projeto Baleia Franca/Instituto Australis	
Claire Charlton	Curtin University, Western Australia	
John Bannister	Western Australian Museum	

## 8. TOTAL BUDGET

Breakdown into: (1) salaries/wages (include name/position of each individual and breakdown of time and duties i; (2) travel/subsistence expenses (breakdown by person and justification) unless for IPs for workshops where a total estimate based on an average for the total number of

IPs is acceptable; (3) services (e.g. aircraft/vessel time, consultancy fees, ARGOS fees, etc.); (4) reusable capital equipment (e.g. reusable equipment such as a hydrophone, cameras, etc. Note that this equipment will have to be registered at the IWC Secretariat and will remain property of the IWC at the end of the project), (5) expendable capital equipment (e.g. consumables, tags, stationery), (6) shipping costs, (7) insurance costs, (8) in kind co-funding (specify whether other funding is available for personnel/name, equipment, venues, etc.). Note that "Overheads" are not admissible. Add as many rows as you need to the table below.

Type	Detailed description	2018/19	2019/20
(1) Salaries (by person)	Justin Cooke – modelling	£3,500	£3,500
	Doug Butterworth/Anabela Brandao et al population modelling	£8,000	£8,000
	Karina Groch personnel time for matching catalogue	£750	£750
	Vicky Rowntree personnel time for matching catalogue	£1,250	£1,250
	Claire Charlton – data provision, project coordination and reporting	£800	£800
	Els Vermeulen – data provision, reporting	£800	£800
(2) Travel/subsistence (by person or est. total for IPs)			
(3) Services (by item)			
(4) Reusable equipment			
(5) Consumables			
(6) Shipping (by Item)			
(7) Insurance (by item)			
(8) Co-funding			
(9) Other			
<b>Total</b>		<b>£15,100</b>	<b>£15,100</b>

## 9. DATA ARCHIVING/SHARING

Please state your plans for data archiving and sharing. Note that data collected primarily under IWC grants are considered publicly available after an agreed period of time for publication of papers, usually about two years. The work of the IWC depends on the voluntary contribution of data to the various databases and catalogues IWC supports. Please consult the Secretariat ([secretariat@iwc.int](mailto:secretariat@iwc.int)).

Metadata to be provided to IWC.

## 10. PERMITS (PLEASE TICK)

Do you have the necessary permits to carry out the field work and have animal welfare considerations been appropriately considered?	N/A
Do you have the appropriate permits (e.g. CITES) for the import/export of any samples?	N/A

If 'Yes' please provide further details and enclose copies where appropriate:



## Appendix 2 – DRAFT SCORING SHEET

If a project presents multiple primary objectives which are achieved using sub-projects, a sheet should be used to evaluate each single sub-project. Note that not all criteria are equally applicable depending on the nature of the project (e.g. field work versus workshops).

IWC SCIENTIFIC COMMITTEE PROPOSALS FOR FUNDING - REVIEW CRITERIA - TEST				
TITLE OF THE PROJECT/sub-projects:				
PRINCIPAL INVESTIGATOR:				
Key criteria	Explanation of scoring	Score	Supporting Remarks	
<i>Relevance to Scientific Committee priorities</i>				
1	How well aligned are the scientific outcomes of the project/activity with the current SC priority areas?	1 - Not aligned/poorly aligned (e.g. too vague or generic reference to general SC priorities) 2 - Reasonably aligned (e.g. some aspects may be vague or links are not clear) 3 - Well aligned (e.g. outcomes clearly deliver in the most part on priority areas, may also address longer term or potential future issues). 4 - Closely aligned (e.g. of interest for multiple sub-groups or delivers on specific SC high priority topics/recommendations in the immediate or short term).		
2	To what extent will the outcomes of the project/activity contribute to improvements in the conservation and management of cetaceans?	1 - Not at all 2 - Poorly 3 - Reasonably or over the longer term 4 - Well or over the medium term 5 - Excellently or to almost immediate effect		
<b>Note:</b> if in each of the two above key criteria under this section the project does not score singularly at least 2 points, do not proceed in further evaluation. Of course, proposals within a sub-group would only be developed if in their estimation scores were of 4 or above.				
<i>Approach and methodology</i>				
3	What degree of scientific merit/value is there in carrying out the work?	1 - Not demonstrated or of low scientific value 2 - Useful/basic scientific value 3 - Very good scientific value 4 - Excellent/innovative scientific value		
4	Is the proposed methodology scientifically sound and feasible in terms of field and analytical methods?	1 - Feasibility unrealistic & poor methodology or not properly addressed 2 - Feasibility & methodology acceptable but would benefit from some substantial amendments		

		3 - Feasibility & methodology good, some small changes beneficial 4 - Feasibility & methodology excellent or a highly promising innovative approach to an important question facing the Committee		
5	What is the likelihood of success based on the proposed overall approach and methodology?	1 - No chance of success 2 - Low chance of success/better approaches available 3 - Medium chance of success/some changes to the approach necessary 4 - High chance of success/little or no changes to the approach necessary		
5a	Are objectives of the research likely to be achieved within the proposed time-frame?	1 - No or unlikely 2 - Partially or potentially ambitious 3 - Yes with some minor suggestions 4 - Yes		
5b	Are any proposed intermediary targets timely and achievable?	1 - No or unlikely 2 - Partially 3 - Probably 4 - Yes		
5c	Is the proposed time-frame/work necessary (e.g. can the project produce results in a shorter time period)?	1 - No or unlikely 2 - Partially 3 - Probably 4 - Yes		
5d	Is the sample size adequate to achieve the stated objectives?	1 - Not demonstrated/not properly addressed 2 - No or unlikely (too low/too high) 3 - Probably (additional analysis needed) 4 - Yes		
6	Is the project likely to affect adversely the population(s) involved?	1 - Not properly addressed/ unknown 2 - Yes severely 3 - Possibly at a low level 4 - No		
6a	<b>IF YES</b> , are analyses provided on simulations of the effects using different time-frames for the project if applicable?	1 - No 2 - Partially 3 - Yes		
<b>Note:</b> if in each of the above key criteria under this section the project does not score singularly at least 2 points, do not proceed in further evaluation. Of course, proposals within a sub-group would only be developed if in their estimation scores were of 3 or above.				
<b>Project team and Project management</b>				

7	To what extent does the team have the relevant expertise, experience, and balance?	1 – Poor or not demonstrated 2 – Sufficient 3 - Very good 4 - Excellent		
8	Contingency plan: To what extent have potential problems/risks been considered and appropriate mitigation proposed?	1 – Poor or not demonstrated 2 – Sufficient but could be improved 3 - Fully or requiring only minor suggestions or not applicable		
<b>Value for Money</b>				
10	Does the project represent good value for money?	1 – No or significant amendments would be needed 2 – Yes but with some minor amendments 3 – Yes		
11	Have sufficient links been made to the wider research community/other organisations/capacity building.	1 – No 2 – Some but significant amendments needed 3 – Yes but with some minor additions 4 – Yes or not applicable		