

SC/68B/RP/08

CMP - Songs of Arabian Sea humpback
whales off the west coast of India

IWC



INTERNATIONAL
WHALING COMMISSION



135 Station Road, Impington, Cambridge, UK, CB24 9NP;
Tel: +44 1223 233397 - Fax: +44 1223 232876
E-mail: secretariat@iwc.int

PROJECT PROPOSAL REQUEST

1 . PROPOSAL TITLE

Songs of Arabian Sea humpback Whales off the west coast of India

2 . BRIEF OVERVIEW OF THE PROPOSAL AND ITS EXPECTED OUTCOME

Give a very brief overview (max 150 words) on your proposal and its expected outcomes. Use bullet point to list outcomes. Be succinct and clear as this may be used to summarise your project for the report.

Since the initiation of the IWC funded Arabian Sea humpback whale (ASHW) research in India in 2015, five hotspots for the species have been identified along the west coast of India; and two ASHWs from the Oman catalogue have been confirmed from Indian waters. The team deployed an autonomous archival acoustic recorder (SoundTrap 300HF, OceanInstruments, NZ) in one ASHW hotspot off Netrani island, Karnataka, India from November 2019 to March 2020; preliminary analysis of acoustic data indicated humpback whale song during this time. The team plans to deploy acoustic recorders off Kanyakumari, Tamil Nadu and off Dwarka, Gujarat in early 2021. This proposal covers SoundTrap deployments, retrievals, data management and analysis from November 2020 to May 2021 in India. These deployments will allow for comparison of songs during the same season within India, and with Oman as per funding availability for collaborators there.

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.

This proposal is relevant to the CMP scientific committee. A joint IWC-CMS CMP between India and Oman has been proposed to build on the CMS Concerted Action for ASHWs. This proposal and previous work carried out by this team will help fill the research gaps that inform future conservation action in the Arabian sea for long term protection of ASHW habitat in the Arabian sea countries.

4 . TYPE OF PROJECT (PLEASE TICK)

Research project	<input checked="" type="checkbox"/>

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

(A) BACKGROUND, RATIONALE, AND RELEVANCE TO THE PRIORITIES IDENTIFIED BY THE IWC SCIENTIFIC COMMITTEE:

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.

The seas surrounding the Indian subcontinent are known to host 29-31 species of cetaceans and one sirenian, the Dugong (Sutaria et al 2015, Sathasivam 2004). Of these 31 cetacean species, four are the confirmed baleen whale species – Blue whales, Humpback whales, Omura’s whales and Bryde’s whales. While Bryde’s whales and Blue whales are found both on the east and west coasts of India; Omura’s whales are rare with confirmed records only from the Andaman sea; and Arabian Sea humpback whales (ASHW) have been confirmed only from the west coast of India. ASHW are designated as endangered on the IUCN Red List of threatened species (Minton et al. 2008), but assessments of the population’s current distribution, genetics and population size are based almost exclusively on research conducted off the coast of Oman (e.g. Minton et al. 2011, Pomilla, Amaral et al. 2014). The IWC SC has repeatedly recommended that dedicated vessel-based and acoustic surveys be conducted in other parts of the population’s range, particularly along the west coast of India (see, for example, IWC/67/Rep01(2018), Annex O).

In the past two years ASHWs have been designated as a priority species for recovery for the Ministry of Environment, Forests and Climate Change, India. The population is also the focus of a Convention of Migratory Species (CMS) Concerted Action, and long-standing recommendations for an IWC CMP (e.g. IWC 2016). In the IWC68, a joint CMS-IWC CMP has been proposed between Oman and India for future research and conservation of this endangered and isolated population of humpback whales in the Arabian sea.

In 2015, the IWC (71481Res) funded Sutaria et al to initiate exploratory surveys for humpback whales, along the western (Arabian Sea) coast of India to ascertain the distribution, habitat preference and movement of the humpback whales, towards a regional assessment of ASHW in the Arabian sea. Literature surveys, interview surveys, participatory informant networks and more recently Passive Acoustic Monitoring (PAM) under the 2015 project, confirmed records of ASHWs along the west coast of India (Figure 1) with hotspots off Dwarka, Gujarat; Grande island, Goa; Netrani island, Karnataka; southern Kerala, and Kanyakumari, Tamil Nadu (Sutaria et al 2017, 2018, 2019). Specifically, in Gujarat, Karnataka, and Tamil Nadu, humpback whales have been reported within 15km from shore. Preliminary comparisons between opportunistically collected recordings of humpback whale song from India and Oman indicated similarities (Mahanty et al., 2015; Cerchio et al., 2018; Madhusudhana et al., 2018), and led to the 2018 SC recommendation that further comparisons be conducted to help determine whether the whales occurring off the coast of India are likely part of the same breeding population as those occurring in Oman (see IWC/67/Rep01(2018), Annex O).

Currently, a new recording effort off Oman commenced in March of 2020 using a SoundTrap 500 STD recorder and is projected to continue through the 2020/2021 humpback whale singing season and beyond. If recordings also take place in India, this represents the first opportunity for concurrent PAM efforts on both sides of the Arabian Sea. In addition there is also currently an extensive PAM effort in the southwest Indian Ocean under the IndoCet research consortium, with the goal of defining humpback whale presence and song structure variation in six separate range states across four years (2018-2021). Therefore this is an ideal time to advance the acoustic monitoring in India and is a critical research priority.

This proposal requests support to continue the PAM component of ongoing research, supported in part by the IWC, to deploy and manage archival acoustic recorders (SoundTraps, www.oceaninstruments.co.nz) at two more hotspots - in Tamil Nadu and in Gujarat, and manage the SoundTrap already deployed in Karnataka. It falls within the Objectives of the IWC-CMP and the CMS-CA.

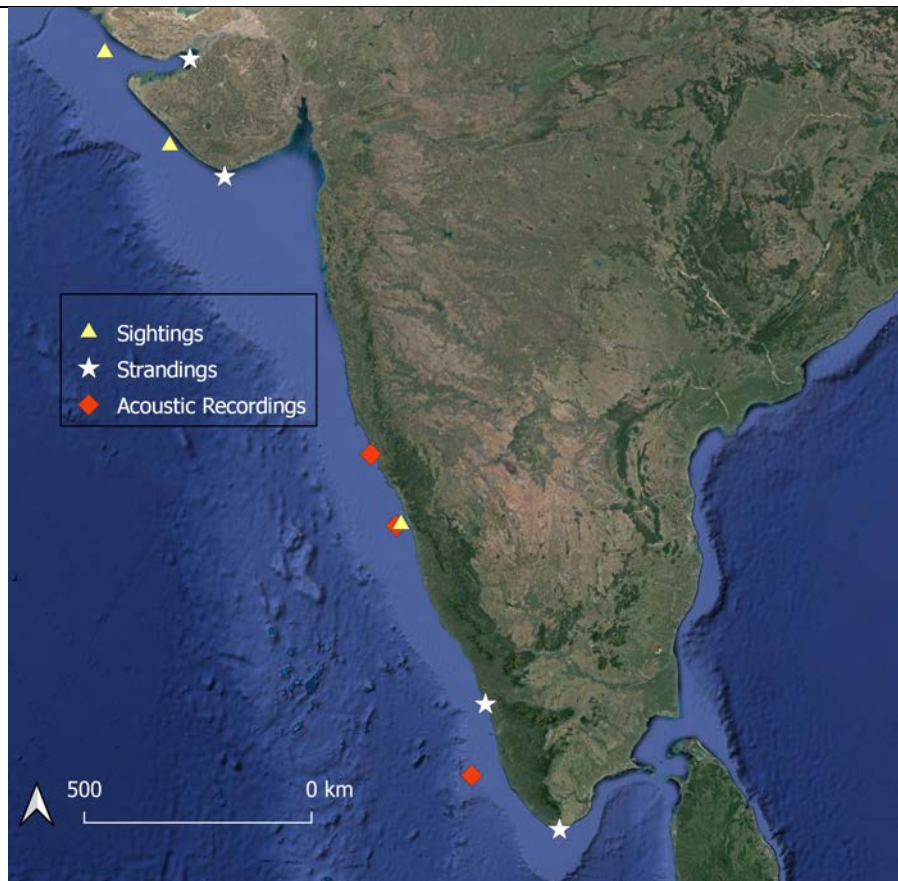


Figure1 shows all records of ASHW's along the west coast of India (North to South: Gujarat, Goa, Karnataka, Kerala, and Tamil Nadu)

(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.

Objective

1. To archive and analyse humpback whale song and assess ASHW occurrence and seasonality along the western coast of India

Outcomes

1. Allow comparison of recorded humpback whale song across locations in India and on funding availability across populations in the Arabian Sea and Northern Indian Ocean.
2. At least one publication in a peer-reviewed journal reporting on the results of the PAM work, with a focus on presence/absence in Indian waters, and comparison of song between India and other parts of the Arabian Sea and/or Indian Ocean

(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.

Deployment of acoustic device

We have already acquired two PAM devices (SoundTrap 300HF and SoundTrap ST300 + battery pack, allowing for long term deployment) in the previous project and have proposed to acquire one more in this proposal. The SoundTrap 300HF without a battery pack already deployed at Netrani island, Karnataka in November 2019 will be sent to OceanInstruments, New Zealand for maintenance and then will be re-deployed, ideally with a new battery pack acquired via this grant.

Another SoundTrap ST300 equipped with a battery pack will be deployed in the ‘hotspot’ off Kanyakumari, Tamil Nadu.

The SoundTrap with a battery pack acquired via this grant will be placed off Dwarka, Gujarat. to record vocalisations and monitor presence of Humpback whales. The three locations will adequately cover the western coast of India to monitor occurrence patterns of ASHW and their possible movement along the coastline (Figure 2). All three devices will be deployed simultaneously to maintain temporal coverage across the three locations.

The SoundTraps with battery packs will be deployed for a period of 76 days on a continuous duty cycle with a 24kHz sampling rate. At every recovery, data will be downloaded to an external drive and the device will be deployed in the same location on the following day to maintain continuity in data collection.

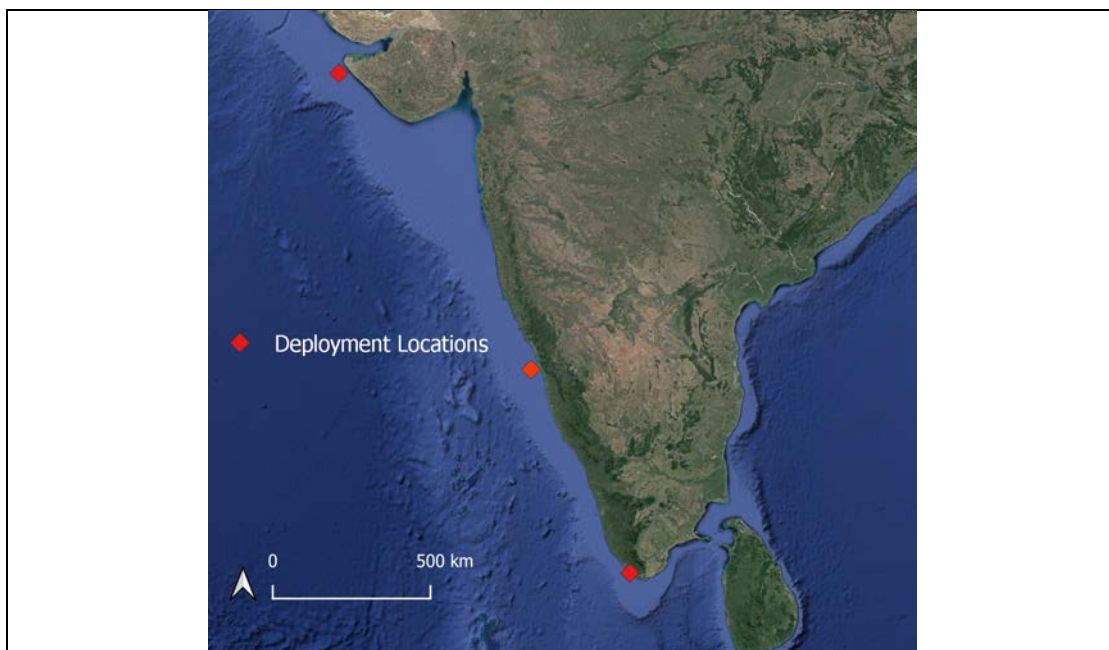


Figure 2 indicates possible deployment locations for three SoundTraps along the west coast of India. (North to South: Dwarka, Gujarat; Netrani, Karnataka; and Kanyakumari, Tamil Nadu)

Data Analysis

All recorded acoustic data will be screened visually and aurally in acoustic software such as Raven Pro (Center for Conservation Bioacoustics, Cornell University) or via custom written scripts. A qualitative analysis of songs from each location will be carried out to characterize the phrases that make up each song, and assess variability within locations; phrase content will then be compared across time and space to assess common phrase types and lineages, and check for variability in phrase occurrence between locations and years. A more quantitative analysis of time-frequency features will be conducted if similarities are detected at a later stage - including measurements of time and frequency characteristics of homologous units within phrases (variation at the unit level), phrase duration and number of units (variation at the phrase level), and occurrence, order and composition of phrases within songs (variation at the theme/song level).

With concurrent recordings taking place in Oman in 2020-2021, we hope to carry out a regional comparison in 2021-22. This will be dependent on the availability of funding at the time.

(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

Whale Song recordings
Any visual surface or underwater footage and photographs of whales that are collected
Popular articles in local languages in magazines and newspapers

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)
Travel to and from field sites (Ahmedabad-Kanya Kumari; Ahmedabad-Netrani; Ahmedabad-Dwarka)	Dipani Sutaria	11/2020	05/2021
Identifying deployment locations in Dwarka and Karnyakumari	Dipani Sutaria, Umeed Mistry	11/2020	01/2021
Constructing a mooring as per the deployment location	Dipani Sutaria, Umeed Mistry	11/2020	02/2021
Deployment	Dipani Sutaria, Dive staff	12/2020	05/2021
Retrieval	Dipani Sutaria, Dive staff	12/2020	05/2021
Data download and management	Dipani Sutaria, Isha Bopardikar	12/2020	05/2021
Analysis of acoustic files	Isha Bopardikar, Dipani Sutaria	12/2020	05/2021
SoundTrap service	Dipani Sutaria	07/2020	08/2020

Expected outputs	Completion date (mm/yy)
Preliminary/progress report to IWC SC	05/2021
Final report and submission of manuscript to peer-reviewed journal	05/2022

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
Dipani Sutaria PI	Marine Mammal Research and Conservation Network of India; Centre for Environment Planning and Technology, India and James Cook University, Australia	
Isha Bopardikar Data analyst	Indian Institute of Science, Education and Research, Tirupati, India	

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	Cost in GB pounds
(1) Salaries (by person)	Salary for PI – one time payment Salary for data analyst	1000 1000
(2) Travel/subsistence (by person or est. total for IPs)	Travel to three locations from Ahmedabad and Bangalore: 25000Rs/trip. One trip per month from November 2020 to May 2020.	1893
(3) Services (by item)	Diver fees Boat hire per month (7713Rs/per month/per location)	1000 1750
(4) Reusable equipment	SoundTrap 300STD with battery pack (US\$4300) Additional battery pack for existing SoundTrap recorder (US\$1500)	3524 1230
(5) Consumables	2TB hard drives ; two per site: 4000Rs/HD	270
(6) Shipping (by Item)	shipping for SoundTrap and battery pack (140\$)	115
(7) Insurance (by item)		
(8) Co-funding	PI and data analyst for project activities not funded by this proposal (in kind)	2000
[(9) Other	SoundTrap to be sent and returned from NZ for fixing. Internal battery issue. (140\$)	115
Total		13897
Total requested from IWC		11897

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).

- Data will be stored on external hard drives
- Recordings will be shared with collaborators in Oman for comparison
- And provided to IWC as required after 2 yrs or earlier and after publication in a peer-reviewed journal

10 . PERMITS (PLEASE TICK)

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

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

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- Sutaria, D., M. Sule, K. Jog, I. Bopardikar, A. Jamalabad, and D. Panicker. 2017. *Baleen Whale Records from India*. SC/67A/CMP/03_Rev, Bled, Slovenia.

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:		DIPANI SUTARIA	
Key criteria		Explanation of scoring	Score
Relevance to Scientific Committee priorities			
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	
Note: 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.			
Approach and methodology			
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	IF YES, are analyses provided on simulations of the effects using different time-frames for the project if applicable?	1 – No 2 – Partially 3 - Yes		
<u>Note:</u> 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.				
Project team and Project management				

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		
<i>Value for Money</i>				
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		