INTERNATIONAL WHALING COMMISSION

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PROJECT PROPOSAL REQUEST

1 . PROPOSAL TITLE

Please provide the title of the project or the name of the workshop/meeting.

Continuation of field deployments in 2023-2024 for Passive Acoustic Monitoring for Humpback, Blue and other baleen whales off Oman

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.

Use of passive acoustic monitoring techniques are considered essential for resolving population identity, connectivity and seasonal presence for blue and humpback whales in the Northern Indian Ocean. Illegal Soviet whaling in the 1960's depleted both stocks, potentially severely. This project proposes to build on historical archives (2011-2014) and IWC SC funded passive acoustic monitoring (PAM) in deep water off the coast of Oman in 2020, 2021 and 2022 by allowing for deployment and recovery of 4 units off the Arabian Sea coast of Oman from April 2023 to April 2024 with the following objectives:

- Continue a dedicated research program for ASHWs and NIO blue whales in the waters of Oman, in accordance with previous IWC recommendations
- Describe seasonal variation in presence of ASHWs and blue whales in the Arabian Sea and how this relates to what is known about other IO populations
- Provision of archived data to assess occurrence of other cetaceans (including Bryde's and Sperm whales) in the study area

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.

CMP – This work will provide data for the status assessment of: Arabian Sea Humpback whales, ASHW, currently the subject of a CMP initiative, specifically to provide data on the spatiotemporal distribution off the coast of Oman; and NIO blue whales, as a stock that can be considered for a CMP, and specifically address the question of which stock(s) were reduced by illegal Soviet whaling and may be threatened and in need of conservation action. .

SH –This work will fill data gaps identified in the context of the population assessments of non-Antarctic blue whales, and thereby inform catch allocations for the North Indian Ocean Populations, describing occurrence of an Oman acoustic population and assessing whether other acoustic populations may be present in the western Arabian Sea.

4 . TYPE OF PROJECT (PLEASE TICK)

Research project	X
Modelling	
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)

(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.

Existing genetic, demographic and behavioural evidence indicates that Arabian Sea humpback whales (ASHW) represent an isolated and unique population (Minton et al 2011, Pomilla, Amaral et al. 2014). The population exhibits a Northern Hemisphere breeding cycle, is believed to feed year-round, and lacks the typical latitudinal migrations and seasonal separation of breeding and feeding ecology exhibited by other populations of humpback whales globally. The population has been the subject of a standing agenda item and numerous recommendations for research and conservation actions in the IWC's Scientific Committee since 2010. These recommendations include the formation of a Conservation Management Plan for the population (e.g. IWC, 2016).

Previous acoustic monitoring of ASHW off Oman (SC/66b/SH32) in Hallaniyats Bay during 2011/2012, and the Gulf of Masirah during 2012/2013, indicated detection of song primarily from November through May, congruent with the Northern Hemisphere breeding cycle. Singing was heard in both sites, separated by approximately 400km, indicating that the population utilizes both of these regions; however, there was a stronger presence in Hallaniyats Bay, suggesting that the Hallaniyats Bay might serve as a more important habitat for breeding activity than the monitored region of the Gulf of Masirah. There also appeared to be a subtle northward shift in distribution of detections as the singing season progressed, both within Hallaniyats Bay, and from Hallaniyats Bay to the Gulf of Masirah, suggesting a seasonal shift in distribution for at least singing males and likely for the population as a whole. Vessel based studies in March 2021 failed to encounter ASHW in the Hallaniyats Bay area, a finding anomalous to previous survey work (SC/68C/CMP/04). Elevated sea surface temperatures were considered related to this observation. The continued deployment of PAM instrumentation in the area is considered important to detect changes in habitat utilisation that could be linked to oceanographic processes affected by climate change.

Blue whales in the Indian Ocean (IO) comprise two or three subspecies (Antarctic, *Balaenoptera musculus intermedia*; pygmy, *B. m. brevicauda*; and North Indian Ocean, NIO, *B. m. indica*) (Rice 1998). The classification of a NIO population as a separate subspecies, *B. m. indica*, as opposed to a population of pygmy blue whale, is debated and without scientific consensus (Rice 1998, Branch and Mikhalev 2008). Irrespective of taxonomic classification, a population reportedly resides year round in the northern Indian Ocean, ranging from the Arabian Peninsula in the west, to at least Sri Lanka in the east, and south at least to the Maldives (Baldwin 2003, Branch et al. 2007b, Branch and Mikhalev 2008, Anderson et al. 2012, Ilangakoon and Sathasivam 2012, de Vos et al. 2014, Willson et al. 2019).

Populations of IO blue whales are thought to be defined by diagnostic song-types (McDonald et al. 2006). Pygmy blue whales are thought to be structured into at least 4 populations each with a diagnostic and spatially overlapping song-type, including

a Northwest IO ("Oman" song), and Central IO ("Sri Lanka" song). The Sri Lanka acoustic population had been assumed to be synonymous with the northern Indian Ocean population, or subspecies (Branch et al. 2017b, Anderson et al. 2012). However, recent long-term PAM studies indicated a new putative blue whale song-type in the western Indian Ocean (NWIO song) predominately detected off Oman (Cerchio et al. 2020). The discovery of the NWIO song-type has particular relevance to the history of exploitation and conservation of NIO blue whales. A period of illegal whaling by the Soviet Union during 1963-1967 captured 1,294 blue whales in the northwest IO (Mikhalev 1996, 2000). The largest numbers of catches in the Arabian Sea was in the Gulf of Aden and the Arabian Peninsula, with additional smaller clusters in the central-eastern Arabian Sea off Lakshadweep/Maldives/western Sri Lanka and the Indus Canyon. These catches are generally allocated to the Sri Lanka acoustic population (Branch et al. 2007a, 2019, Anderson et al. 2012). However, timing of presence of the NWIO song-type off Oman suggests that the Soviet whaling targeted this population as well, and not only the more widely spread Sri Lanka acoustic population.

Furthermore, the potentially restricted range, intensive historic whaling, and the fact that the song-type has been previously undetected, suggests a small population that is in critical need of status assessment and conservation action.

The recordings from Oman that contributed to the identification of the new song type (Cerchio et al. 2020) were made from a shallow water recorder perched on the edge of the shelf-break, and consequently were limited in detection range and provided song occurrences that were degraded due to propagation loss associated with the shelf. Through partial funding from IWC SC in 2020, and a loan of equipment, additional PAM effort was conducted in the deep water (~300m) on the shelf slope off Dhofar, Oman in 2020 and 2021. Recovered data yielded recordings from March to October 2020, and May to October 2021. Preliminary analysis of these recordings has revealed the detection and extensive presence of NWIO blue whale song, as well as intermittent periods of CIO (Sri Lanka) blue whale song. The finding supports rationale for an extended period of monitoring across a multi-year period to better understand intra and inter annual presence of these populations across the Arabian Sea coast of Oman.

The proposed work has particular relevance to the priorities of the CMP and SH subcommittees. In context of ASHW, the project directly addresses the draft recommendation made by the CMP subcommittee during SC68C to ensure that research includes:

continuous and simultaneous passive acoustic monitoring in identified ASHW habitat in both the western Arabian Sea (different parts of Oman's waters) and eastern Arabian Sea (Pakistan, India and Sri Lanka) to better understand the population's spatiotemporal distribution and potential connectivity across a larger area of suspected range, as well as to understand if range or distribution shifts begin to emerge as a result of climate change and other threats.

In the context of the ongoing population assessments of non-Antarctic blue whales in the SH subcommittee, the results of this study will provide critical new information

for current efforts to assign catch allocations to IO populations (SC/68C/SH/17). In addition, the work is of relevance to the CMP subcommittee, specifically addressing the question of which stock(s) were reduced by illegal Soviet whaling and may be threatened and in need of conservation action. Given the large number of blue whales taken in the Arabian Sea, it is likely that this NWIO blue whale population may be as threatened as the Arabian Sea humpback whale (which was taken by the Soviet whalers in far fewer numbers; Mikhalev 1997; Mikhalev 2000), and thus should also be considered for a CMP.

Specifically, this project addresses component (2) of recommendation SC2063, made by the SH subcommittee for northern and western Indian Ocean blue whales during IWC SC 68B:

Reiterating its advice that the distribution and population isolation of blue whales is poorly understood in the northern and western Indian Ocean (IWC 2019b:21), the sub-committee encourages researchers and range states to address the following research priorities:
(1) continued photo-identification and genetic sampling of blue whales off Oman,
(2) passive acoustic monitoring to determine seasonal presence, population abundance and trends;
(3) comparison of blue whale photographic catalogues with other blue whale catalogues in Oman, India, Sri Lanka and any others available in the Indian Ocean (and possibly the Antarctic);
(4) collection and analysis of tissue samples, to better understand the taxonomy and stock structure of Arabian Sea blue whales.

It is the intention of the research team that this acoustic work will be embedded in concerted efforts to ensure that research in Oman addresses humpback whale and blue whale conservation management needs, addressing all of the recommendations above.

(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.

Objectives:

1. Collect one year of PAM data from 3 or 4 locations off the continental slope waters of the western Arabian Sea during April 2023 to April 2024. This effort is viewed by the P.I.s as an extension of an on-going effort to assess humpback and blue whales in the western Arabian Sea.
2. Collect acoustic data on Arabian Sea Bryde's whales and other cetaceans (e.g., Sperm whales, delphinids), to be analysed under separate funding.
3. Validate data in preparation for assessment of blue whale and humpback whale presence on multiple temporal scales (monthly, daily, hourly). Detailed analysis to be conducted under separate funding to be sought for 2024.

Deliverables

1. Report to the IWC Scientific Committee on the success of deployment interventions at each location.

2. Provide the PAM data to partner organisations to enable analysis and drafting of peer-reviewed publication submission.

(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).

PAM data collection has already commenced off Dhofar, Oman, with the deployment of an Ocean Instruments SoundTrap 500-STD autonomous archival recorder (oceaninstruments.co.nz) at 260m depth in the Hallaniyats Bay on March 6, 2020. The unit was recovered on 14th March 2021 and subsequently redeployed from 20th May to 21st November 2021. Provisioning of a second unit by partner organisations and a third unit from IWC funding in 2021 is facilitating two deployments of 6 months from May 2022 to May 2023, with recovery and redeployment in November 2022. For the 2022 plan, instrument '1' will be redeployed off the shelf break in Dhofar, Hallaniyats Bay at a position 17.38°N, 55.31°E, at a bottom depth of 300m. Instrument '2' will be deployed approximately 450 km to the northeast of the first unit off the shelf break to the east of the Gulf of Masirah at approximately 20.00°N, 58.60°E. Instrument '3' will be deployed at a similar depth approximately 1 km off Ras Al Hadd at approximately 22.54 °N, 59.83°E, with the intention to monitor the junction between the Arabian Sea and the Gulf of Oman. With the acquisition of a fourth SoundTrap, instrument '4' will be deployed at a similar depth approximately 250 km to the west of Salalah at approximately 16.55°N, 53.5°E, with the intention to monitor as close as possible to the eastern most distribution of Soviet whale catches from the Gulf of Aden (Mikhalev 2000). This spatial configuration (Figure 1) will monitor a large portion of the habitat of Arabian Sea humpback whales and blue whales off Oman, as indicated by Soviet whaling records (Mikhalev 2000, and IWC Catch records), vessel-based survey data (e.g. Minton 2011), and satellite telemetry data (Willson et al. 2017).

Figure 1. Proposed deployment locations of passive acoustic monitoring units for 2023-2024.

Acoustic recorders will be SoundTrap ST500-STD (2 in possession) and ST600-STD (1 in possession and 1 to be acquired), with a flat response from 20Hz-60kHz (+/- 3dB), a 34dB re 1V µPa-1 noise floor and a full scale response of 174.1 dB re 1V µPa-1 including system gain. The SoundTrap recorders will be tethered above INNOVASEA/Vemco Ascent acoustic release units and suspended above the anchor using an 11" deep water trawl float. These rigs will be recovered using the Vemco VR100 surface communication station. Recording parameters will be set for 75% duty cycle (45min every 60min) and 24kHz sample rate; at this parameter setting the expected recording endurance is approximately 231 days for the ST500. This provides some precaution with the target deployment duration scheduled for 180 days.

The resulting sound files will be down-sampled to 2kHz to reduce size and increase manageability of the data set for low-frequency analysis. After acquisition of funding for analysis during 2023 and 2024, manual evaluation of spectrograms will be conducted in Raven Pro for review of baleen whale vocalizations and logging for hourly presence as conducted for Cerchio et al. (2020).

(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.

Results of the proposed work will be highlighted and publicised by the Environment Society of Oman, Five Oceans Environmental Services, Future Seas and the African Aquatic Conservation Fund, each having outreach capacity that ranges from their local region to global in scope. Materials will be made available for to the IWC Secretariat to disseminate and use for outreach.

6 . TIMETABLE FOR ACTIVITIES AND OUTPUTS

Specify the timetable for project activities and expected out puts 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)
Deployment of ST500 & ST600 recorders off 4 deployment sites in Oman.	A. Willson, S. Cerchio	04/23	05/23
Recovery and redeployment of ST500 & ST600 recorders after first deployment[1]	A. Willson, S. Cerchio	10/23	11/23
Validation of first six months of data	S. Cerchio	01/24	04/24
Final recovery of ST500 & ST600 recorders	A. Willson, S. Cerchio	04/24	05/24
Validation of second six months of data	S. Cerchio	06/24	09/24
Preparation of final report of deployment summary	A. Willson, S. Cerchio	09/24	12/24
Analysis of data (under separate funding)	S. Cerchio	09/24	09/25

Expected outputs	Completion date (mm/yy)
Progress Report to IWC Scientific Committee, SC 69A	05/24
Final Report to IWC Scientific Committee	05/25
Submission to peer-reviewed journal	11/25

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
Andrew Willson, P.I.	Future Seas Global SPC (FSG)	None
Salvatore Cerchio, P.I.	African Aquatic Conservation Fund (AACF)	None
Danielle Cholewiak	NOAA Northeast Fisheries Science Center (NEFSC)	Convenor of E

8 TOTAL BUDGET

Project Budget									
						Please indicate when funds will be needed			
	Description	Cost per unit	Number of units	Total Cost GBP		2023	2024+		Co-funding
(1) Salaries by person	Andrew Willson - PM (prep and deployments)	342	16	5472		3762			1710
	Sal Cerchio - Project supervision, data validation	342	5	1710		684			1026
	Assistant	190	12	2280		2280			0
(2) Travel/ subsistence (by person est. total for Ips	Field team expenses (food)	15	18	270		270			0
	Boat fuel	38	8	304		152			152
	Boat hire	143	10	1430		858			572
	Car rental	67	14						938
	Car fuel	143	4	572		429			143
(3) Services by item	n/a			0		0			0
(4) Reuseable equipment	Vemco VR100 surface station	6547	1	6547		0			6547
	Vemco Ascent Acoustic release	3576	4	3576		3576			10728
	SoundTrap ST600-STD PAM recorder for deep water	4246	4	4246		4246			12738
(5) Consumeables	Batteries	28	6	168		168			0
	Mooring	57	4	228		228			0
(6) Shipping & customs (by items)	Shipping and import tax for acoustic gear	1250	1	1250		1250			0
(7) Insurance (by item)									
(8) Other									
			Total	52,487		17,903	0		34,554

Co-funding Memo

Source	Purpose of Funding			Amount		Secured/ Tentative
Future Seas	In kind coverage of salary, car and field expenses			3515		Secured
AACF	In kind coverage of salary,			8848		Secured
NOAA Fisheries	Loan of equipment (Vemco VR 100, 2 Ascents, and 2 SoundTrap ST500s)			22,191		Secured
				34,554		

Total Value of Project:		**GBP**
Funds requested from IWC		17,903
Co-funding		34,554
	Total	52,457

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 archived by the African Aquatic Conservation Fund and Future Seas, with a backup copy maintained by NOAA Northeast Fisheries Science Center, and requests for further sharing agreements can be made to the project PI's.

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
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:

References

Alling A, and Payne, R (1987) Songs of Indian Ocean blue whales, Balaenoptera musculus. Paper presented to the Scientific Meeting to review the Indian Ocean Sanctuary, Seychelles, February 1987 (unpublished)

Anderson C, Branch TA, Alagiyawadu A, Baldwin R, Marsac F (2012) Seasonal distribution, movements and taxonomic status of blue whales (Balaenoptera musculus) in the northern Indian Ocean. J Cetacean Res Manag 12: 203-218

Baldwin RM (2003) Whales and dolphins of Arabia. Mazoon Printing Press, Muscat, Oman. 116pp.

Branch TA, Abubaker EMN, Mkango S, and Butterworth DS (2007a) Separating southern blue whale subspecies based on length frequencies of sexually mature females. Mar Mamm Sci 23: 803–833

Branch TA, Mikhalev YA (2008) Regional differences in length at sexual maturity for female blue whales based on recovered Soviet whaling data. Mar Mamm Sci 24: 690-703

Branch TA, Monnahan CC, Širović A, Balcazar N, Barlow D, Cerchio S, Double M, Gavrilov A, Gedamke J, Hodge K, Jenner C, McCauley R, Miksis-Olds J, Samaran F, Shabangu F, Stafford K, Thomisch K, Torres L, Tripovich J (2019) Further analyses to separate pygmy blue whale catches by population. Paper SC/68A/SH/15 presented to the International Whaling Commission Scientific Committee.

Branch TA, Stafford KM, Palacios DM, Allison C, Bannister JL, Burton CL, Cabrera E, Carlson CA, Galletti Vernazzani B, Gill PC, Hucke-Gaete R (2007b) Past and present distribution, densities and movements of blue whales Balaenoptera musculus in the Southern Hemisphere and northern Indian Ocean. Mammal Rev 37: 116-175

Cerchio S, Willson A, Leroy E, Muirhead C, Al Harthi S, Baldwin R, Cholewiak D, Collins T, Minton G, Rasoloarijao T, Rogers T, Sarrouf Willson M. In review. A new blue whale song-type described for the Arabian Sea and Western Indian Ocean. Presented to the IWC SC at SC/68B/INFO/28

Ilangakoon AD, Sathasivam K (2012) The need for taxonomic investigations on Northern Indian Ocean blue whales (Balaenoptera musculus): implications of year-round occurrence off Sri Lanka and India. J Cetacean Res Manag 12: 195–202

Leroy, E. C., Samaran, F., Stafford, K. M., Bonnel, J., & Royer, J. Y. 2018. Broad-scale study of the seasonal and geographic occurrence of blue and fin whales in the Southern Indian Ocean. Endang Species Res 37: 289-300

McDonald MA, Mesnick SL, Hildebrand JA (2006) Biogeographic characterization of blue whale song worldwide: Using song to identify populations. J Cetacean Res Manag 8: 55-65

Mikhalev YA (1996) Pygmy blue whales of the northern-western Indian Ocean. Paper SC/48/SH/30 presented to International Whaling Commission Scientific Committee, 30pp

Mikhalev YA (1997) Humpback whales, Megaptera novaeangliae in the Arabian Sea. Mar Ecol Prog Ser 149: 13–21

Mikhalev YA (2000) Whaling in the Arabian Sea by the whaling fleets Slava and Sovetskaya Ukraina. In: Yablokov AV, Zemsky VA (eds) Soviet Whaling Data [1949-1979], Center for Russian Environmental Policy, Marine Mammal Council, Moscow, pp. 141-181.

Minton G, Collins TJQ, Findlay KP, Ersts P., Rosenbaum HC, Berggren P, Baldwin RM (2011) Seasonal distribution, abundance, habitat use and population identity of humpback whales in Oman. J Cetacean Res Manag, Special Issue on Southern Hemisphere Humpback Whales, 185–198.

Rice DW (1998) Marine Mammals of the World. Systematics and Distribution. Special Publication No. 4, The Society for Marine Mammalogy, Allen Press Inc., Lawrence, Kansas. 231pp.

Samaran F, Adam O, Guinet C (2010) Discovery of a mid-latitude sympatric area for two Southern Hemisphere blue whale subspecies. Endanger Species Res 12: 157–165.

Samaran F, Stafford KM, Branch RA, Gedamke J, Royer J-Y, Dziak R P, and Guinet D (2013) Seasonal and geographic variation of southern blue whale subspecies in the Indian Ocean. PLoS One 8: e71561

Stafford KM, Chapp E, Bohnenstiehl DR, and Tolstoy M (2011) Seasonal detection of three types of 'pygmy' blue whale calls in the Indian Ocean, Mar Mamm Sci 27: 828–840

de Vos A, Pattiaratchi C, Harcourt R (2014) Inter-annual variability in blue whale distribution off southern Sri Lanka between 2011 and 2012. J Mar Sci Eng 2: 534-550

Willson, A., R. Baldwin, T. Collins, B. J. Godley, G. Minton, S. Al Harthi, S. K. Pikesley, and M. J. Witt. 2017. Preliminary ensemble ecological niche modelling of Arabian Sea humpback whale vessel sightings and satellite telemetry data. Document presented to the Scientific Committee of the International Whaling Commission SC/67A/CMP/15, Bled, Slovenia.Willson A, Minton AG, Collins T, Al Harthi S, Sarrouf Willson M, Cerchio S, Braulik G, Baldwin R (2019) Oman Research Update; documenting cetacean diversity and blue whale feeding habitat in Dhofar, southern Oman, Paper SC/68A/CMP/08 presented to the International Whaling Commission Scientific Committee, 14 pp