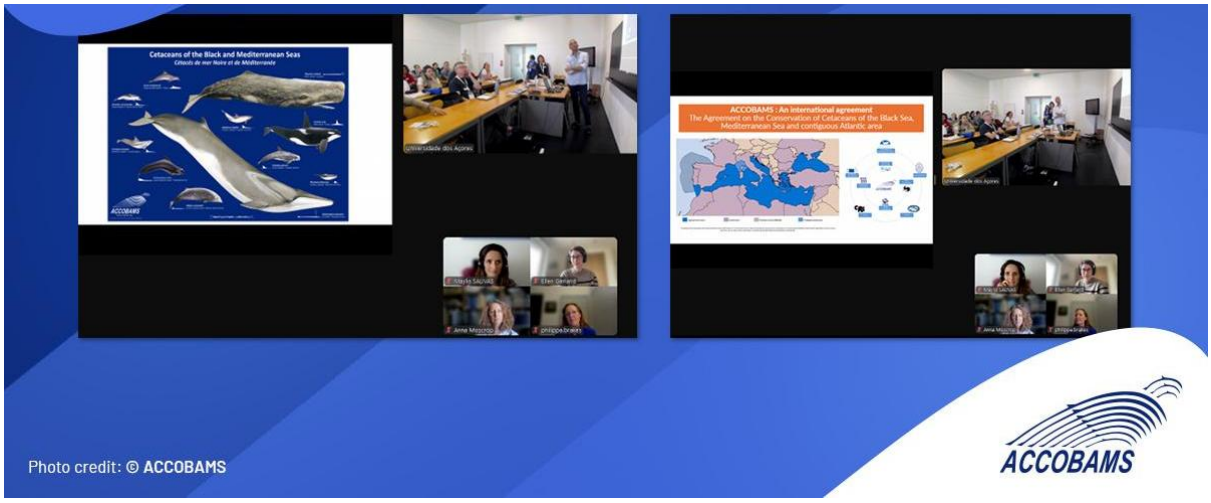
Report of the ECS-ACCOBAMS Workshop on

Cetacean Culture: Navigating Change in the ACCOBAMS Region and Beyond

Held at the 36th Conference of the European Cetacean Society
Ponta Delgada, Azores & online
13 May 2025



Conveners: Laetitia Nunny (OceanCare), Maÿlis Salivas (ACCOBAMS), Simone Panigada (ACCOBAMS), Philippa Brakes (WDC/University of Exeter), Heidi Frisch-Nwakanma (CMS) and Mark Simmonds (University of Bristol)

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Introduction

At the Sixteenth Meeting of the ACCOBAMS Scientific Committee in December 2024, the topic of animal culture and social learning was raised, noting that cetaceans are among the species known to have populations that can be defined by their cultural traits (ACCOBAMS, 2024). The Convention on the Conservation of Migratory Species of Wild Animals (CMS) invited ACCOBAMS to consider how incorporating knowledge of cetacean culture can contribute to the conservation of cetaceans in the ACCOBAMS area.

Specifically, under Conclusion 30 "*the Scientific Committee welcomed the new issue noting the invitation from CMS to engage in this and recommended that a working group would be established to allow for further discussion of this issue and the potential to hold a workshop at the next meeting of the ECS will be explored. The ACCOBAMS working group on Culture and Social learning will consider the potential importance of social learning and culture for cetacean conservation in the ACCOBAMS region and will liaise as appropriate with the CMS expert group. It will review available information and seek to provide concrete recommendations. The working group will report back on progress to the next Scientific Committee Meeting*".

Laetitia Nunny (Member of the CMS Expert Working Group on Animal Culture) was invited to convene the working group and she subsequently co-organised a hybrid workshop with Maÿlis Salivas (ACCOBAMS Executive Secretary), Simone Panigada (Chair of ACCOBAMS Scientific Committee), Philippa Brakes (Chair of the CMS Expert Working Group on Animal Culture), Heidrun Frisch-Nwakanma (Animal Culture Lead, CMS Secretariat), Giuseppe Notarbartolo di Sciara (Member of the CMS Expert Working Group on Animal Culture) and Mark Simmonds (Member of the CMS Expert Working Group on Animal Culture), which took place on Tuesday 13th May 2025 in Ponta Delgada, São Miguel island in the Azores, ahead of the 36th Conference of the European Cetacean Society and online via Zoom. The workshop agenda is provided in Annex 1. Forty-one people attended the workshop (see Annex 2 for participant list).

Introductory presentations

Laetitia Nunny welcomed participants to the workshop and highlighted that this was the first workshop to be held at ECS focusing on cetacean culture (hereafter 'culture'). She drew participants' attention to the fact that this year culture was a major topic at the conference and that there would be three presentations on culture during plenary talks, including a keynote by Luke Rendell and other presentations by Hal Whitehead and Mark Simmonds.

Laetitia explained that the aim of the workshop was to consider the potential importance of social learning and culture for cetacean conservation in the ACCOBAMS region and to provide advice to the ACCOBAMS Scientific Committee for the work programme.

Simone Panigada, Chair of ACCOBAMS Scientific Committee, gave a brief introduction to ACCOBAMS, describing the Agreement area, the Parties and the cetacean species present in the region.

Heidrun Frisch-Nwakanma, from the CMS Secretariat, explained the work done to date by the Convention on the Conservation of Migratory Species of Wild Animals (CMS). In 2014, a Workshop on the Conservation Implications of Cetacean Culture was held in London which led to Resolution 11.23 on "Conservation Implications of Cetacean Culture" and the establishment of the Animal Culture Expert Group. Based on the advice of the Expert Group, the Resolution was amended in 2017 to include all taxonomic groups "Conservation Implications of Animal Culture and Social Complexity" (Resolution 11.23 Rev. COP12).

CMS Parties have mandates including to "apply a precautionary approach by considering cultural processes as relevant for the conservation of all species for which there is evidence for social learning," and "where specific cultural groups have been identified, give specific attention to threats (including human-wildlife conflict) and good practices that might be specific to this particular cultural unit" (CMS Decision 14.227).

The Expert Group has various mandates, including to:

- "promote the practical application of the increasing knowledge about animal culture and social learning in conservation management"
- "support research on animal culture and social learning e.g., by developing guidance on methodology for detecting social learning"
- "make use of the potential synergies with CMS Agreements/MOUs/Initiatives"
- "increase collaboration with IUCN on matters related to animal culture" (CMS Decision 14.229)

The ACCOBAMS Scientific Committee meeting in December 2024 was the first time that the issue of animal culture and conservation had officially been explored through a CMS daughter agreement, and there are plans to outreach to other daughter agreements.

Science of animal culture presentations

An introduction to animal culture and conservation
Philippa Brakes (Whale & Dolphin Conservation / University of Exeter / Chair of the CMS Expert Working Group on Animal Culture)

Philippa Brakes gave a presentation on the science of animal culture and conservation. She provided some background for the discussion in terms of the emerging field of animal culture and conservation. Definitions for culture and social learning were suggested that have been used to guide the work of the Expert Group on Animal Culture and Social Complexity under CMS during the work it has been conducting in this space over the last decade.

Specifically, Philippa highlighted the publication of a special issue on "Animal culture: conservation in a changing world" with contributions from many members of the CMS Expert Group, which included nine taxonomic reviews for vertebrate species and a number of papers on cross-cutting issues, methods and conservation initiatives.

She presented a framework for integrating evidence on social learning and culture into conservation and drew particular attention to how widespread the evidence on social learning is across vertebrate species, noting that published evidence is now available in evolutionary distant taxonomic groups. She noted that gaps in the evidence were not necessarily evidence of absence, but many may be related to effort and the practicalities of studying particular species. In particular, she highlighted the diversity of evidence across cetaceans, including putative evidence in Baird's beaked whales (*Berardius bairdii*).

Drawing attention to taxonomic reviews in the special issue for odontocetes and mysticetes, Philippa noted research by Hersh and colleagues (2025) that identified 55 putative, socially learned foraging tactics in odontocetes. Further, a review of evidence of social learning in mysticetes by Garland et al. (2025), identified evidence from migration, foraging and communication which expert opinion evaluated should be taken into consideration for the conservation of a number of baleen whale species, whilst also identifying remaining knowledge gaps.

Finally, she outlined some of the (many) available methods for studying animal culture across different conservation settings, habitat types and species and referred participants to the methods toolkit in the special issue authored by Whiten and Rutz (2025) and emphasised the need for individual-based and longitudinal datasets.

Philippa summarised that the conservation of culture is not intended to supplant traditional conservation measures, but instead to augment and increase the efficiency of some of these efforts. Social learning and culture can, in specific circumstances, inform cetacean conservation by helping to define units to conserve. However, she also emphasised that every effort should be made to ensure that cultural capacity within and between populations is conserved to provide opportunities for adaptation.

Why cetacean culture matters

Giuseppe Notarbartolo di Sciara (Tethys Research Institute and IUCN Marine Mammal Protected Areas Task Force)

Giuseppe Notarbartolo di Sciara subdivided the subject of culture in cetaceans into different aspects: a) understanding cultural traits that have conservation significance (including cultural traits as conservation tools and cultural traits as elements of vulnerability in a human-dominated landscape), and b) cultural traits as conservation targets.

Examples of cultural traits as conservation tools he gave included: orca (*Orcinus orca*) ecotypes, in which culturally-mediated population structure has important implications for conservation efforts, as it can influence species-wide phenotypic diversity and adaptability to changing conditions (Whitehead and Ford 2018); and Eastern Tropical Pacific (ETP) sperm whales (*Physeter macrocephalus*) , where monitoring the presence/absence of cultural groups allowed detection of major population shifts (Cantor et al. 2016). However, it appears that in a human-dominated landscape the emergence of cultural traits might result in a disadvantage, such as if baleen whale migratory culture can become detrimental in an era of climate change if it is too fixed to respond to rapid resource shifts due to climate change or other anthropogenic activities, or when orcas taking advantage of tuna fishing in the Strait of Gibraltar became disadvantaged when fishing activities declined (Esteban et al. 2016). Examples of cultural traits as conservation targets include the need to avoid anthropo-dependence in some specific cases (cooperative fishing in Brazil: Daura-Jorge et al. 2013; provisioning in Shark Bay, Australia: Mann and Kemps 2003).

In conclusion, a greater awareness and understanding of how cetacean societies function and behave can considerably enhance our conservation abilities. Examples from the Important Marine Mammal Area (IMMA) effort remind us that culture is not limited to what we have been able to detect so far. We should assume that species exhibiting culture do so in many ways that may not be evident to us. Once we realise that a species exhibits culture based on our observations, we should assume that this species is likely to apply culture to other functions: in other words, that particular species is a wholeheartedly cultural species. If culture is adaptive, there is no compelling reason why it should not be more widespread across the animal kingdom. We are still prone to consider cultural examples in non-human animals to be exceptions, but – in many species at least - they may represent the rule instead. Therefore, management decisions should be cautious and assume that even in the absence of data, populations may exhibit distinct cultural elements of conservation significance that warrant careful consideration.

Integrating culture in sperm whale conservation in the Eastern Tropical Pacific: threats, challenges, and solutions

Ana Eguiguren (Biology Department, Dalhousie University)

Ana Eguiguren spoke about the implications of culture for the conservation of sperm whales in the Eastern Tropical Pacific (ETP), broadly defined as the eastern waters of the Pacific basin between northern Mexico and central Peru. In this region, sperm whales are highly nomadic, with home ranges spanning 1000s of kilometres, but lacking any predictable migration patterns (Whitehead 2003). Ana drew from the recently published review by Eguiguren et al. (2025).

Sperm whales have a complex, multi-level social structure in which adult males are mostly solitary and females spend their life with a combination of life-long and casual associates (Whitehead 2003). At the base of sperm whale society is the 'social unit,' which consists of around 10 females that spend most of their lives together (Figure 1). Individuals of different social units sometimes interact with each other, forming temporary 'social groups.' But individuals of different units only form groups with other individuals that belong to the same vocal 'clan.' Clans can consist of hundreds to thousands of individuals who share similar vocal repertoires, as well as movement patterns, social behaviours, and distributions (Rendell and Whitehead 2003). There is strong evidence that these behavioural differences result from social transmission, and can, therefore, be considered cultural.

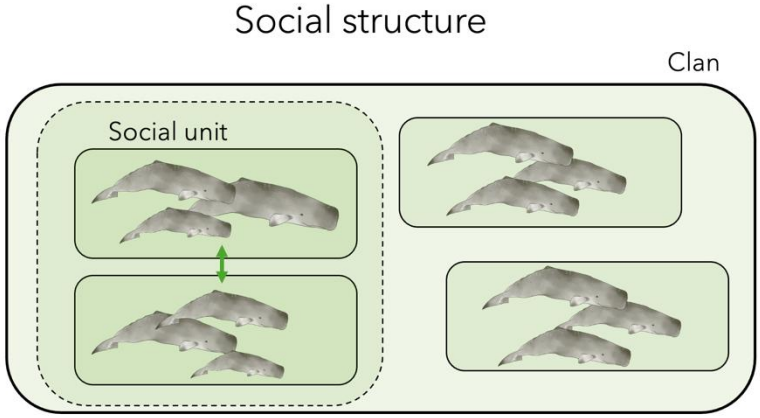

Figure 1: Social structure of ETP sperm whales (Rendell and Whitehead 2003)

A cultural dimension of sperm whale behaviour can affect their vulnerability and our assessments of their status through three main avenues:

1. Population structure: Sperm whale clans can be considered as culturally distinct units as they are stable, heritable, impact demographic structure, and influence fitness (Whitehead et al. 2023). While there is strong evidence that the clan structure meets the first three criteria, whether behavioural differences between clans result in fitness consequences that could impact their vulnerability to human activities has been harder to prove. Sympatric clans off the Galápagos Islands have had different responses when faced with changing oceanographic conditions, which may provide a preview of how they may respond to global climate change (Whitehead and Rendell 2004). But whether this translates to other clans or is stable over time is unknown.
2. Social learning and adaptability: The ability to transmit new behaviours can allow populations to better respond to human threats (Whitehead et al. 2021). Conversely, novel behaviours with negative impacts on sperm whale fitness can spread through the same mechanism (Schakner et al. 2014).
3. Key individuals: Individual sperm whales may act as 'knowledge' repositories, holding important ecological information that can increase the fitness of members of their social unit (Brakes et al. 2019). Thus, older individuals that may not contribute to the population through fecundity may be of particular value to the survival of their associates.

Ana highlighted the challenges in translating the implications of culture to conservation actions and decisions due to knowledge gaps relating to:

- the distribution and impact of specific threats on sperm whale populations in the ETP,
- clan-level movements, distribution, population status, and exposure to threats throughout their habitat,
- movements and threats faced by the mature males that mate with female ETP sperm whales.

These gaps arise from the oceanic habitat of sperm whales, which is inherently hard to monitor, as well as from a lack of funding and enforcement abilities of nations of the ETP, most of which are emerging economies.

Ana recommended:

- international collaboration among researchers,
- use of emerging technologies (including Artificial Intelligence and Passive Acoustic Monitoring) which allow the processing of acoustic and photo-identification data across the region,
- capacity-building and funding for local researchers to ensure that sperm whales can be monitored at an adequate temporal and spatial scale,
- sharing of research.

To conclude, Ana highlighted that determining and identifying cultural transmission in wild cetacean populations can be challenging and time-consuming. However, delaying conservation actions until there is certainty regarding the role of social transmission in a new behaviour or level of demographic structure is not desirable. Recognising the potential impact of social transmission on demographic structure, behavioural plasticity, and vulnerability can better inform conservation decisions. For instance, the effect of culture on demographic structure may not reflect traditional methods of delineating population units (e.g., distribution, genetics, phenotype), but when stable behavioural differences are detected, these should inform the delineation of units to conserve. Additionally, accounting for the potential for socially learning new behaviours can equip us to take an adaptive approach in the face of a changing ocean (e.g., new distributions, migratory routes, foraging behaviours, etc.). Thus, while a full understanding of the many ways in which culture and conservation interact may not be feasible, acknowledging and, where available, applying an understanding of culture to our assessments and decisions can enhance the effectiveness and relevance of conservation measures.

Humpback whale song culture

Ellen Garland (Sea Mammal Research Unit, Scottish Oceans Institute, School of Biology, University of St Andrews)

Ellen Garland explained how culture, the sharing of behaviours or information within a community acquired through some form of social learning from conspecifics, represents a 'second inheritance system'. Male humpback whales (*Megaptera novaeangliae*) sing a long, stereotyped, and culturally transmitted song display. At any point in time most males within a population will sing the same version (arrangement and content) of this complex sexual display. However, the song is continually evolving and males must constantly learn and incorporate these changes into their own song to maintain cultural conformity. In addition to evolutionary change, song also undergoes radical 'revolutions' where a novel song introduced from a neighbouring population rapidly and completely replaces the existing song. Multiple humpback whale song revolutions have spread across the South Pacific region from the east coast of Australia across to French Polynesia, with a one to two-year delay. This has occurred regularly, rapidly and repeatedly across the region; however, we still have a limited understanding of the underlying mechanisms driving this cultural phenomenon. Using empirical data, Ellen presented the current understanding of the mechanisms involved in the song learning process, and the conservation implications for this cultural phenomenon.

For further details see Garland et al. 2025.

<u>Breakout group activity</u>

Following a short question and answer session, the workshop split into breakout groups to discuss specific questions. Below, the questions and results of these discussions are presented.

Group A: Culture and Distinct Population Conservation

- How does culture influence population structure, social cohesion, and resilience to environmental changes?
- Can a focus on the conservation of cultures aid conservation in the ACCOBAMS or wider region?

The group discussed different case studies, focusing on fin whales (*Balaenoptera physalus*) in the Mediterranean. They discussed that when a new behaviour is observed in cetaceans, it should be considered whether it is socially learned because we are dealing with social species. However, it is difficult to know whether a new behaviour is cultural. The importance of social cohesion for some species was also discussed, as well as differences in behaviour between males and females.

Group B: Cultural traits as elements of vulnerability

- Do cultural behaviours affect migration patterns, habitat use, or foraging efficiency in ways that impact survival?
- How do human-induced pressures (e.g., climate change, noise pollution, habitat degradation) impact culturally significant behaviours?

Group B discussed human-induced pressures and considered underwater noise as a potential issue which could seriously impact culturally significant behaviours. They considered to what extent and how fast cetaceans might be able to adapt and noted that the speed of climate change may make it hard for populations to adapt to change. Habitats and habitat degradation were considered deserving of more attention in their links to culture and how it is impacted.

The group considered that it is likely that residency may be socially learned in the same way as migration.

They questioned whether the sperm whale population in the eastern Mediterranean is a distinct population and the value of the analysis of codas in Türkiye and Greece to see if they are different.

The group considered that cultural behaviours affect migration patterns, habitat use or foraging efficiency in ways that impact survival, but that culture is not the only factor, and that other factors also need to be considered.

Group C: Cultural traits as conservation targets

- How do cultural differences shape interactions with human activities (e.g., fisheries, shipping lanes, ecotourism)?
- Can disruption of social networks through human pressures lead to cultural loss and population declines?

Group C focused their discussion on two bottlenose dolphin (*Tursiops truncatus*) populations in Slovenian waters and near Rome, Italy. They highlighted that there is a lot of social variability and complexity within and across the populations and that this can impact individuals' exposure to human threats. An example of a difference is that behaviour is influenced by sex in the Rome population but not in the Slovenian population.

In both populations some animals interact with fishing activities and others do not. This could impact energetic intakes but also increase their vulnerability to injury or death.

In the Northern Adriatic, the population is marked by temporal differentiation (overlapping in space but not in time e.g. morning group and evening group) which means that one segment of the population might be more affected by anthropogenic threats than the other (or each group might face different threats).

In the Rome population, barrier feeding techniques used by the dolphins can be interrupted by humans, for example when there are more boats present in the summer.

Culturally transmitted behaviours might become eroded or lost as the result of habitat degradation or if opportunities to carry out the behaviour is lost. This could be considered a loss of cultural diversity (loss of the cultural behaviours) or loss of cultural capacity (opportunity to exhibit the behaviours). Not all socially learned behaviours are necessarily adaptive, some might come and go quickly, i.e., cultural fads.

Regarding cultural capacity, the group suggested that we might need to know the minimum number of individuals needed to carry a cultural behaviour into the future. On the other hand, the group wondered whether there was a 'cultural carrying capacity', meaning that as a behaviour becomes popular, it might cease to be viable for the individuals that started it.

Group D: Culture in ACCOBAMS Region/IMMAs

- What is the evidence of cultural units in the ACCOBAMS region and in IMMAs?
- What further research is needed in the ACCOBAMS region?
- How can cultural traits be used for conservation in the ACCOBAMS region/in IMMAs?

Group D made a list of potentially culturally distinct units in the ACCOBAMS region some of which need further research:

- Eastern Mediterranean sperm whales,
- orcas in the Strait of Gibraltar (not all individuals in the population use the same strategy for feeding on tuna and not all interact with sailing boats),
- bottlenose dolphins in Slovenia,
- bottlenose dolphins near Rome,
- critically endangered bottlenose dolphin population in the Gulf of Ambracia (part of the population seems to have adapted to foraging around fish farms),
- fin whales and their migration through the Strait of Gibraltar, acoustic differences indicate that there is possibly a North Atlantic population coming in and a Mediterranean population going out. The ACCOBAMS conservation management plan (CMP) for fin whales is investigating the drivers for fin whale movements in and out of the Mediterranean. It will be interesting to see if there is evidence that the migrations are culturally driven.
- Black Sea harbour porpoises (*Phocoena phocoena relicta*) are different to those in the Marmara Sea – could there be differences that are driven by culture?
- long-finned pilot whales (*Globicephala melas*) in the Strait of Gibraltar – the presence of cultural traits should be investigated.

It was noted that a conservation management plan (CMP) for Mediterranean sperm whales is being developed by ACCOBAMS.

Regarding how cultural traits can be used for conservation in the ACCOBAMS region, they could be used to define specific measures for species. The concept of culture can also be used to provide arguments for public awareness and education, informing people about the complex societies and cultures that these species have. This would potentially facilitate conservation engagement.

ONLINE Group:

- What are the practical implications of cultural conservation?
- What does cultural capacity mean?
- Supporting cultural capacity in the ACCOBAMS region

The Online Group discussed how cultural capacity in the ACCOBAMS region can be supported. They agreed that it is important to maintain transmission routes, social structure and to protect holders of ecological knowledge.

They discussed the importance of habitat diversity as it relates to cultural factors, noise and acoustic space for animals to hear each other. Distance, noise and disturbance can influence the ability of cetaceans to hear and copy each other's vocalizations (it was mentioned that there is some evidence that humpbacks stop singing sometimes when there is too much noise). The impact on breeding of whales that stop singing due to noise is unknown and therefore a precautionary approach should be applied (because by the time we identify that whales that have stopped singing due to noise have also stopped breeding it might be too late). The relationship between noise and vocal transmission will differ between species and so we need specific recommendations for species and their habitat needs.

The group explored prey diversity as another element of habitat protection and considered some possible trade-offs that might occur in relation to fisheries. They wondered how this might differ from simply conserving prey diversity for conservation.

They considered the concept of cultural habitat e.g., particular critical feeding or breeding habitat, migratory corridors or locations where particular tools are used.

Regarding the value of understanding cetacean culture for conservation, as an example, it was suggested that fin whale migratory routes could be overlaid with threats such as fisheries or shipping routes to see if there is risk of cultural behaviour being eroded or lost.

It was also suggested that human-cetacean interactions in the ACCOBAMS region could be mapped so that approaches and perspectives across the region could be harmonised.

Workshop close

After the groups had reported back, Laetitia thanked the presenters, participants and volunteers and the workshop was closed.

Recommendations to take to ACCOBAMS Scientific Committee

From the group discussions, the following points are recommended for consideration by the ACCOBAMS Scientific Committee:

- Include consideration of culture in the sperm whale CMP,
- Include consideration of culture in the fin whale CMP,
- Encourage researchers in the region to consider whether their focal populations demonstrate indicators of social learning and/or culture,
- Encourage consultation with the CMS Expert Group when there is doubt about whether a behaviour is socially learned,
- Consider how threats (underwater noise, habitat loss, prey reduction, etc.) could impact the transmission of cultural behaviours important to survival or reproduction of cetaceans in the ACCOBAMS area,
- Conservation actions should ensure that cultural transmission routes and social structure are maintained and should aim to protect holders of ecological knowledge (e.g., often, older individuals),

- Mapping of migratory routes along with threats for migratory cetacean species in the region, e.g., fin whales, may provide greater detail on risk and could indicate where specific conservation actions should be taken,
- Conservation actions should consider the species-specific habitat requirements for different cultural behaviours to be expressed e.g. the impacts of noise on the ability for cetaceans to be able to hear/communicate, will differ,
- Knowledge of cultural behaviour in specific species/populations is an important educational tool and can be used to explain to the public/decision-makers why this particular species/population needs protecting.

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Annex 1: Agenda

European Cetacean Society Workshop
Cetacean Culture: Navigating Change in the ACCOBAMS Region and Beyond

Date: Tuesday May 13th 2025
Place: Medicina, Sala A0015 - Universidade dos Açores (Rua da Mãe de Deus, 9500-321, Ponta Delgada) and online
Time: 14:00 – 18:00 Online participants can check their time zone here

14:00 **Welcome and Introductions**
Welcome and introduction to the workshop – Laetitia Nunny (OceanCare)
Welcome from ACCOBAMS – Simone Panigada (ACCOBAMS)
Culture and the Convention on the Conservation of Migratory Species – Heidi Frisch-Nwakanma (CMS)

The Science of Animal Culture
14:15 *An introduction to animal culture and conservation* – Philippa Brakes (Whale & Dolphin Conservation/ University of Exeter) [online]
14:40 *Why cetacean culture matters* – Giuseppe Notarbartolo di Sciara (Tethys Research Institute)

Case studies
15:00 *Integrating culture in sperm whale conservation in the Eastern Tropical Pacific: threats, challenges, and solutions* - Ana Eguiguren (Biology Department, Dalhousie University)
15:15 *Humpback whale song culture* – Ellen Garland (Sea Mammal Research Unit, Scottish Oceans Institute, School of Biology, University of St Andrews) [online]

15:30 **Coffee Break**

16:00 **Questions and Answers Session**

16:30 **Break-Out Groups** (Activity led by Mark Simmonds, OceanCare/University of Bristol)

17:10 **Feedback from Groups / Discussion**

17:40 **Conclusions / Taking matters forward**

18:00 **End**

Annex 2: Participants list

*indicates online participation

Organisers

Philippa	Brakes*	WDC / University of Exeter
Heidrun	Frisch-Nwakanma	CMS
Giuseppe	Notarbartolo di Sciara	Tethys
Laetitia	Nunny	OceanCare
Simone	Panigada	ACCOBAMS
Maÿlis	Salivas*	ACCOBAMS
Mark	Simmonds	University of Bristol

Participants

Aylin	Akkaya	Marine Mammals Research Association (DMAD)
Ayaka	Amaha Ozturk	Istanbul University
Karthik	Ashok	University of St Andrews
Katharina	Baumhoefener	-
Louisa	Breimann	UNEP/CMS
Daan	de Leur	UNEP/CMS
Joe	Dennett	Chelonia Limited
Elyne	Dugeny	University of Padua
Ana	Eguiguren	Biology Department, Dalhousie University
Ellen	Garland*	Sea Mammal Research Unit, Scottish Oceans Institute, School of Biology, University of St Andrews
Pauline	Gauffier	Madeira Whale Museum
Tilen	Genov	Morigenos
Guido	Gnone	Acquario di Genova
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Maria Silvia	Labriola	Sapienza University of Rome
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