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RECEIVED 20 February 2024  
ACCEPTED 04 March 2024  
PUBLISHED 08 March 2024

CITATION  
Báez JC (2024) Editorial: Biology and ecology of marine air-breathing animals: challenges for their conservation.  
*Front. Mar. Sci.* 11:1388682.  
doi: 10.3389/fmars.2024.1388682

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# Editorial: Biology and ecology of marine air-breathing animals: challenges for their conservation

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## KEYWORDS

marine mammal, seal, sea turtle, Cetacea, heatwave

## Editorial on the Research Topic

[Biology and ecology of marine air-breathing animals: challenges for their conservation](#)

Air-breathing marine animals, which include marine reptiles (i.e. turtles, snakes, and crocodiles), seabirds and marine mammals (i.e. cetaceans, sirenians, pinnipeds, otters), are distributed throughout the world occupying habitats ranging from the coast to the open sea (Favilla and Costa, 2020). Throughout history, humans have been captivated by the awe-inspiring presence of air-breathing marine animals, drawing inspiration from their majestic presence and enigmatic behaviors. These animals play essential roles as keystone species, influencing ecosystem structure and function (Rhodes-Reese et al., 2021). In general, air-breathing marine animals share certain traits, such as being long-lived, some with late maturation and low reproductive rates, so their populations are heavily affected by anthropogenic sources of mortality. There are many anthropogenic threats to these animals, but climate change rises as a source of primary concern for the sustainability of their populations (in this Research Topic Gálvez et al.; Hastings et al.). Recognizing the importance of understanding the biology, ecology, and conservation challenges of air-breathing marine animals, we are proud to present this Research Topic dedicated to this crucial subject. The Research Topic assembled here addresses aspects of the biology and ecology of the green sea turtle (1), cetaceans (4), and pinniped (3).

Two of the most important topics in this Research Topic are the effect of marine heatwaves, and the study of isotopic niches. The effect of the marine heatwave during 2015–2016 on the mortality in the Guadalupe fur seal *Arctocephalus townsendi*, and Steller sea lion (*Eumetopias jubatus*) from Gulf of Alaska, are investigated by Gálvez et al., and Hastings et al., respectively. Fernandes et al. investigated the differential isotopic niches of green turtles in Brazil highlighted the importance of considering oceanographic characteristics to understand different behavior at different life stages, while Plint et al. found evidence of competition for resources from overlapping populations of different dolphin species, driven by climate change in the Northeast Atlantic.

Measurements of body volume and mass are essential for assessing marine mammal health status, energy capacity, metabolic expenditure, thermoregulatory demands, diving

response, on-board oxygen storage and swimming cost. Zhang et al. explore the utility of 3D modeling techniques for estimating body volume in marine mammals, using finless porpoises (*Neophocaena asiaeorientalis sunameri*) as a model species. Through direct measurements and 3D modeling validation, the researchers demonstrate the accuracy of Blender-generated models (Blender Online Community, 2016) in estimating body volume compared to conventional methods. Their study highlights the potential of 3D modeling as a tool for non-invasive morphometric analysis in marine mammal research and conservation.

The study by Dönmez et al. delves into the molecular adaptations of harbor porpoises (*Phocoena phocoena*) in response to parasitic infestations in their respiratory tract. By employing transcriptome RNA sequencing, the researchers identified elevated responses to oxidative stress in the muscles of parasitized porpoises, suggesting a potential compensatory mechanism to mitigate the effects of enhanced reactive oxygen species production. These findings provide valuable insights into the physiological responses of marine mammals to parasitic infections and highlight the importance of understanding molecular adaptations in the face of anthropogenic stressors.

Athayde et al. contribute to our understanding of killer whale (*Orcinus orca*) ecology off the Brazilian coast, providing new insights into their movements, feeding habits, and social behavior. Through long-term observational data, the researchers document the presence of killer whales along the Brazilian coastline and characterize their group dynamics and feeding preferences. These findings enhance our knowledge of killer whale ecology in tropical and subtropical waters and underscore the importance of continued monitoring efforts to inform conservation strategies.

Kydyrmanov et al. conduct a comprehensive screening of pathogens in wild Caspian seals (*Pusa caspica*), providing valuable insights into disease prevalence and potential threats to population health. Through molecular and serological assays, the researchers identify evidence of infection by various pathogens, including Canine Distemper Virus, Phocine herpes virus, and Influenza A. Their findings underscore the importance of disease surveillance in marine mammal populations and highlight the need

for proactive conservation measures to protect vulnerable species like the Caspian seal.

In conclusion, the articles presented in this Research Topic offer valuable insights into the biology, ecology, and conservation of air-breathing marine animals. By advancing our understanding of these fascinating creatures and the threats they face, we can better inform conservation efforts and work towards safeguarding their future in our oceans. We hope that this Research Topic serves as a catalyst for continued research and collaboration in the field of marine science, ultimately leading to more effective conservation strategies and a brighter future for marine biodiversity.

I extend my gratitude to the authors, and reviewers whose contributions have made this Research Topic possible. Through continued research and conservation efforts, we can safeguard the future of air-breathing marine animals and the ecosystems they inhabit.

## Author contributions

JB: Writing – original draft.

## Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## References

Blender Online Community (2016). *Blender - a 3D Modelling and Rendering Package* (Amsterdam: Blender Foundation).

Favilla, A. B., and Costa, D. P. (2020). Thermoregulatory Strategies of Diving Air-Breathing Marine Vertebrates: A Review. *Front. Ecol. Evol.* 8. doi: 10.3389/fevo.2020.555509

Rhodes-Reese, M., Clay, D., Cunningham, C., Moriles-Miller, J., Reese, C., Roman, J., et al. (2021). Examining the Role of Marine Mammals and Seabirds in Southeast Alaska's Marine Ecosystem Dynamics. *Front. Mar. Sci.* 8. doi: 10.3389/fmars.2021.720277