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Editorial: Rebounding marine mammal species and conservation recovery challenges

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Editorial on the Research Topic
Rebounding marine mammal species and conservation recovery challenges

1 Introduction

Marine mammals have been valued for millennia for their cultural significance, cognitive capabilities, ecological role, and resource value. At this complex social-ecological intersection, marine mammal populations worldwide have been shaped by historical exploitation, followed by more recent decades of protection and conservation, enabling the rebound and recovery of numerous (though not all) marine mammal populations (Magera et al., 2013; Roman et al., 2013). Yet, as marine mammals celebrate recent growth in abundance and distribution, conflicts have emerged across diverse ecological, sociological, economic, and political contexts. These conflicts include ship strike, depredation, bycatch, impacts of ecotourism, competition for resources, changing cultural values and political challenges to marine mammal conservation (Nelms et al., 2021). A lack of understanding of historical baselines, differences between ecological and social carrying capacity, and perceptions of "overabundance," whether referring to 1,200 Hawaiian monk seals or 7 million harp seals, fuels discord. While further studies of contemporary and historical marine mammal ecology can address some of the relevant knowledge gaps, these emerging conflicts also require interdisciplinary approaches and the inclusion of social science to address conservation recovery challenges. Despite this need, conflicts in the marine environment are often overlooked in human dimensions of wildlife research (Johnston et al., 2020; Jackman et al., 2023; Wallen et al., 2024).

Our aim with this Research Topic was to further emergent discussions on how to best address complex socio-ecological issues related to marine mammal recovery. The articles in this Research Topic, coming from a variety of disciplinary perspectives, tackle challenging questions such as, how do we measure and document recovery? How do we assess and address social-ecological impacts of recovery? And how do conflicting perceptions of

marine mammal population recovery shape "problem" definitions and policy approaches? From this growing body of literature, it is evident that we will need to consider often-opposing values and interests in the development of solutions, and engage diverse stakeholders in decision-making processes.

2 Documenting marine mammal recovery

Marine mammal abundance and distribution have traditionally been surveyed by a combination of visual and acoustic methods. However, established best practices for these survey methods often require significant resources (e.g., vessels, acoustic equipment, time, money) that can limit their broad-scale application. As communities grapple with growing marine mammal populations and the associated conflicts, new methods of documenting marine mammal recovery are therefore emerging, and becoming increasingly accepted in the scientific and management arenas.

Emerging tools (e.g., machine learning, AI, drones, eDNA) and the use of alternative data sources (e.g., opportunistic sightings, historical records, local and traditional ecological knowledge) have the potential to increase accuracy as well as engage a broader audience (Hodgson et al., 2018; Dujon et al., 2021; Suarez-Bregua et al., 2022). Rannankari et al. highlight how long-term data collection archives, combined with the use of contemporary emerging technologies, can elucidate historical ecological shifts with important management implications for species in recovery in areas that now overlap with modern anthropogenic threats. Particularly within a historical context of heavy hunting, tensions between the line of recovering and recovered can fuel concerns about down-listing rebounding marine mammal populations given the modern threats that persist.

Engaging citizen scientists can further increase capacity and public scientific literacy, as well as engage the communities potentially in conflict with rebounding marine mammals (Puskic et al.). Olson et al.'s use of long-term opportunistic sighting records to document spatiotemporal shifts in mysticete presence exemplifies how citizen science can be effectively incorporated into community-driven local monitoring. Their approach not only allows for the tracking of regional trends but also fosters collaboration across geopolitical borders for the collective benefit of ocean stewardship.

3 Marine mammal recovery in a social-ecological context

As top predators or mesopredators in many coastal ocean ecosystems, shifts in marine mammal abundance and distribution as the species recover are likely to have broad-reaching social-ecological impacts. Considering these diverse impacts, including complex interactions between marine mammals, their prey, humans, and the environment in which they all co-exist, is important to both defining the challenges associated with marine mammal recovery and developing solutions.

Across a broad array of diet studies and field observations, we see that the ecological impacts of marine mammal populations are highly context-dependent, they can vary significantly in magnitude and direction, and they are often unexpected. Thus, regional studies that consider the impact of marine mammal recovery on both commercially exploited species (e.g., Lyssikatos and Wenzel) and species or habitats of conservation concern (e.g., Leach et al.) are critical to describing trophic interactions that support ecosystem-based management (Townsend et al., 2019) and can help address misperceptions of marine mammal impact.

While traditionally provided as input to trophic models, novel application of social-ecological systems (SES) models parameterized with trophic interaction data can also be used to predict impacts of marine mammal recovery and identify factors that support and threaten system resilience (García-Castañeda et al.). SES models can consider not only predator-prey interactions, but also impacts of changing environmental conditions, and connections between marine mammals and human activities. Novel insights gained from the SES framework may therefore facilitate the development of adaptive management strategies that can both support recovering marine mammal populations and mitigate associated challenges.

4 Perceptions of marine mammal recovery

In these complex social-ecological systems, understanding how diverse stakeholders perceive rebounding marine mammal populations is critically important. When they return to the marine environments from which they were extirpated, pinnipeds, for example, are often greeted by human populations who have no social memory of their historical presence. This phenomenon of "shifting baseline syndrome" drives conflicts as oceans depleted of large marine predators are viewed as the norm and rebounding populations are perceived as intruders (Pauly, 1995; Roman et al., 2015). The consequences include not only social conflict and dismantling of legal protections, but also direct violence against marine mammals (Konrad et al.).

Social construction and social identity frameworks can help explicate conflict dimensions. Konrad et al. identified the competing social constructions underlying conflicts over rebounding populations of Hawaiian monk seals, where seal rescue volunteers on the Hawaiian Islands view the seals as innocent victims of human-caused destruction in contrast with fishers who see the seals as resource competitors and a proxy for federal fishing restrictions. Because Hawaiian monk seals were extirpated so early in Hawaiian history, they do not play a role in traditional culture and are perceived as invaders and vectors of colonialism by Native Hawaiians. Awareness of these conflict drivers and deliberative management approaches that focus on engagement and communication can be of value to managers.

In the coastal areas of the Northwest Atlantic, stakeholders also hold conflicting views of seals. Still, stakeholder groups are not monolithic; individuals may hold multiple social identities at the same time (Lute and Gore, 2018). In a study of perceptions of

residents, tourists and commercial fishers, most commercial fishers simultaneously adhered to non-consumptive (animal protection, environment) and consumptive (angler, hunter) social identities (Bratton et al.). Shared mutualistic values toward marine mammals even among divergent stakeholder groups further suggests some common ground for coexistence with marine mammals and stakeholder collaboration (Jackman et al., 2023).

5 Future directions

The story of the recovery of North Pacific gray whale populations followed by population declines that Garcia-Castaneda et al. relate offers a cautionary tale about the precarious nature of rebounding marine mammal populations, especially in the global context of climate change (Davis, 2022). Even with substantial rebounds in some marine mammal populations, species face anthropogenic threats to conservation gains (Bogomolni et al., 2010; Precoda and Orphanides, 2022). Moreover, in the current political climate, hard-won national and international legal frameworks that protect marine mammals and healthy ecosystems are in jeopardy.

The need for coalitions and collaboration to preserve conservation gains has never been greater. Interdisciplinary research and communication with and among stakeholder groups are critical to this endeavor. Evidence of the historical abundance of marine mammal populations can help address misperceptions about their return to coastal waters (Cammen et al., 2018). Increased awareness of the ecological benefits of marine mammals increases opposition to lethal management (Jackman et al., 2024). Valuing both experiential expertise and empirical data on the extent to which marine mammals interact with fisheries can contribute meaningfully to management conversations, particularly with a community science approach that involves fishermen, managers and scientists together (Bogomolni et al., 2021). Beyond direct benefits to addressing these emerging human-wildlife conflicts, community connection with rebounding populations can further foster empathy, help to mitigate ecological grief, and have broad reaching impacts for our coastal communities.

Author contributions

AB: Conceptualization, Writing – original draft, Writing – review & editing. KC: Conceptualization, Writing – original draft, Writing – review & editing. JJ: Conceptualization, Writing – original draft, Writing – review & editing.

Conflict of interest

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

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

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