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Placing knowledge equity at the heart of the UN Ocean Decade: an Early Career Researcher perspective

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The UN Ocean Decade provides a framework for stakeholders and rights-holders to come together to develop transformative ocean solutions for sustainable development. We are a group of Early Career Researchers (ECR) from diverse backgrounds with a shared commitment to working toward the Ocean Decade outcomes. Our article offers an ECR perspective on the fundamental importance of knowledge equity for achieving the Ocean Decade's vision of "the science we need for the ocean we want." Knowledge equity is imperative for confronting the "business as usual" approach to ocean sustainability as it requires us to confront and dismantle extractive practices of knowledge production. We reflect on how the dominance of western science in research and policy and the systematic marginalization of diverse knowledge systems has led to inequitable outcomes for ocean-dependent people. Using real-world examples, we demonstrate the progress we can make toward ocean sustainability when we place knowledge equity at the heart of our work. We conclude with a call to action to ensure that knowledge equity is embedded as both a principle and a practice within the Ocean Decade framework. We invite all ocean professionals to join us in: (1) adopting an intentional practice of reflexivity in our work; (2) confronting colonial ways of thinking, knowing, and doing; and (3) dismantling knowledge hierarchies that permeate ocean science and practice. By implementing these actions, we can create meaningful and inclusive spaces for collaboration and become a more respectful and effective global ocean community.

KEYWORDS

knowledge equity, diverse knowledge systems, ocean sustainability, UN Ocean Decade, Early Career Researcher, knowledge hierarchy, Western science, coloniality

1 Introduction

Recognizing the urgency of reversing the decline in ocean health, the United Nations (UN) declared 2021–2030 as the Decade of Ocean Science for Sustainable Development (hereafter, the Ocean Decade). The Ocean Decade provides a framework for scientists, governments, rights-holders, industry, business, and civil society to

come together to design transformative ocean solutions that deliver on the vision of "the science we need for the ocean we want." Within this global initiative, the term "ocean science" encompasses natural and social science disciplines and embraces local and Indigenous knowledge (UNESCO-IOC, 2021). At the 2024 Ocean Decade Conference, the global ocean community made firm commitments to this broad definition. The main outcome of the event, the Barcelona Statement, highlighted the need to "enhance the recognition and role of all knowledge systems" and "continue enhancing the principles of inclusivity, equity, and diversity" in order to achieve the Ocean Decade objectives (Decade Coordination Unit, 2024). These commitments are also embedded in the operational framework of the Ocean Decade, known as the Vision 2030 process, which sets out a series of White Papers, one for each Ocean Decade Challenge. All of the White Papers highlight the importance of embracing diverse knowledge systems (UNESCO-IOC, 2024), while several make specific reference to co-designing solutions in partnership with ocean stakeholders and rights-holders as a way of achieving their respective objectives (e.g., Agostini et al., 2024; Haugan et al., 2024).

While we are encouraged by commitments to knowledge diversity and co-design within the Ocean Decade framework, there is a risk that they will remain statements of intent while a business-as-usual approach to ocean sustainability persists. We understand ocean sustainability as the conservation, management, and sustainable use of the ocean and seas for the health and wellbeing of all living things. Here, the term "business as usual" refers to the current dominant approach to ocean sustainability that privileges, and ultimately relies upon, western science as the foundation for research and policy development while emphasizing top-down, technocratic approaches. Western science—a form of scientific knowledge that descends from early European civilizations (Cannon et al., 2024)—is based on, and continues to be informed by, western values of truth and objectivity (Smith, 2008; Seth, 2009). These values are woven throughout the Vision 2030 White Papers as Ocean Decade priorities related to the production of technical datasets and data products, the development of global forecasting, predicting, and modeling applications, and the establishment of public-private partnerships to support these priorities. Although we acknowledge the important role of global ocean data in setting high-level policy agendas, we consider these priorities as indicators of a business-as-usual approach that further marginalizes diverse knowledge systems and draws attention away from community-based, rights-based, or justice-oriented sustainability solutions. Moreover, the Vision 2030 White Papers fail to properly acknowledge the deep work needed by the global ocean community to dismantle the social and political structures and systems that continue to position western science as superior to other forms of knowledge. The classification of knowledge systems in relation to their perceived status, value, and legitimacy—referred to as knowledge hierarchies (Nieusma, 2007; Niner et al., 2024)—has contributed to the ongoing and deliberate marginalization of non-western ways of thinking, knowing, and doing. Given the global pervasiveness of knowledge hierarchies, we believe that the Ocean Decade framework needs a clearer pathway for achieving equity between all knowledge systems, knowledge holders, and knowledge users.

Here, we offer an Early Career Researcher (ECR) perspective on the fundamental importance of knowledge equity for achieving the Ocean Decade's vision of "the science we need for the ocean we want." We first came together as a group at a Future Oceans workshop, which was held at the inaugural Sustainability Research and Innovation Congress in 2021 in support of the launch of the Ocean Decade. Over the past 3 years, we have continued to meet regularly to discuss ocean sustainability challenges and share our ideas and experiences. Although we come from diverse cultures and disciplinary backgrounds—including physical oceanography, marine ecology, biodiversity conservation, marine social science, and international relations—our interests are primarily aligned with Ocean Decade Challenges Three (Sustainably nourish the global population) and Four (Develop a sustainable, resilient and equitable ocean economy). By coming together to discuss these Challenges, we have built an interdisciplinary network of ECRs who share a commitment to developing transformative solutions in support of the Ocean Decade outcomes.

We begin our perspective piece by sharing our understanding of knowledge equity and reflecting on how the reliance on western science as the dominant knowledge production system has hindered the world's ability to sustain a healthy and productive ocean. Next, we share our perspective on the importance of knowledge equity for strengthening ocean sustainability and as a pathway for redressing historical injustices. We conclude with a call to action to ensure that knowledge equity is embedded as a principle and a practice within the Ocean Decade framework and beyond (Figure 1). We invite all ocean professionals—including scientists, ECRs, and practitioners—to join us in: (1) adopting an intentional practice of reflexivity in our work; (2) confronting colonial ways of thinking, knowing, and doing; and (3) dismantling knowledge hierarchies that permeate ocean science and practice.

2 Knowledge equity as a principle and a practice

In simplest terms, equity can be defined as the fair and just treatment of others (Equity, 2025). However, what is considered "fair" and "just" depends on the worldviews, identities, and value systems of the individuals making these judgments (Clayton and Opotow, 2003; Fisher et al., 2018; Gurney et al., 2021). Therefore, historically marginalized people are likely to have distinct perspectives on equity that reflect both their generational and lived experiences (Sikor et al., 2014; Fischer et al., 2022; Ruano-Chamorro et al., 2024). When these distinct perspectives are not fully considered by decision-makers, social hierarchies can be reproduced or reinforced, even by well-intentioned policies or practices (e.g., Richmond, 2013). In practice, ocean policies are largely equity-blind (Österblom et al., 2020), which allows powerful actors to disregard equity concerns. Historical and contemporary power relations also determine the extent to which equity outcomes are possible. For example, equity considerations were central to early conceptualizations of the Blue Economy, but over time, the concept has been increasingly shaped by powerful interests, often prioritizing narrow economic goals over broader equity outcomes (Farmery et al., 2021; Croft et al., 2024). In view of the contested

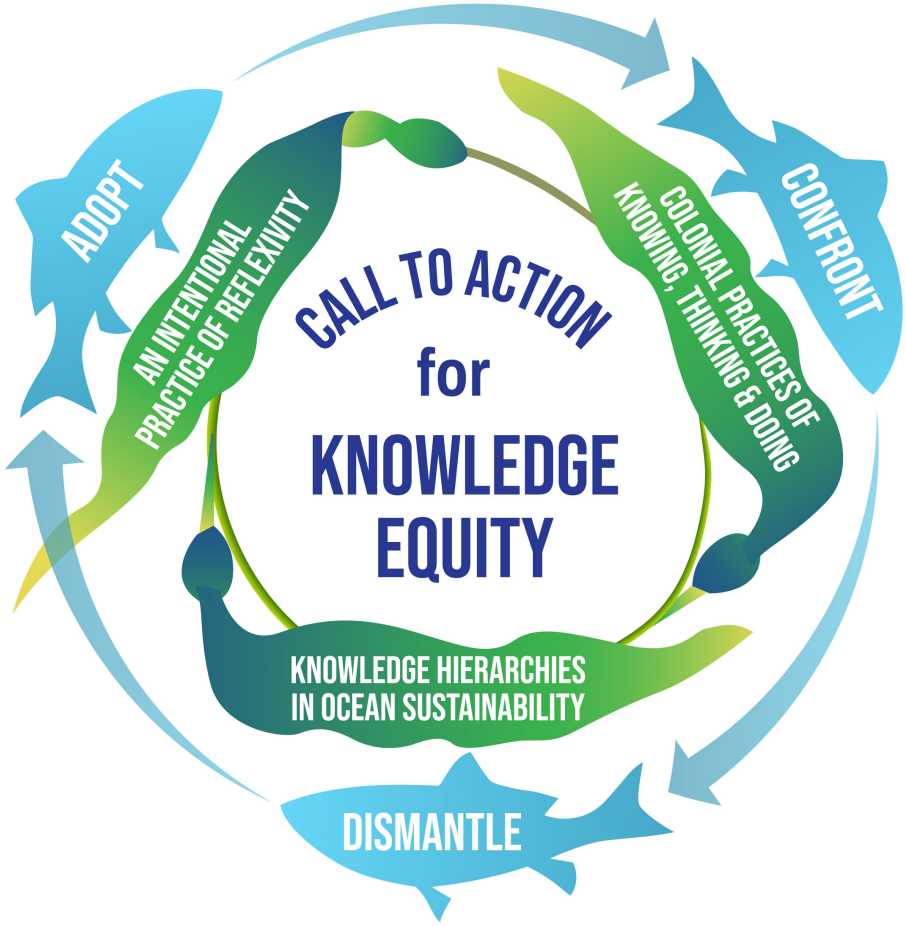

FIGURE 1
A call to action to ensure that knowledge equity is embedded as a principle and a practice within the Ocean Decade framework and beyond.

nature of equity and equity outcomes, we align with Alexander et al. (2022) in acknowledging a pluralism of understandings and believe that ocean-dependent people have the right to determine what equity means to them and how best it can be achieved within their own contexts.

In the conservation literature, equity is generally understood as a multidimensional concept (Hampton-Smith et al., 2024). Recognitional, procedural, and distributional equity form the basis of many equity frameworks (e.g., Pascual et al., 2014; Schreckenberg et al., 2016; Franks et al., 2018), although Bennett et al. (2021) include additional dimensions for advancing equity in a marine conservation context. Recognitional equity refers to the acknowledgment and respect of the rights, values, visions, needs, and knowledge systems of all stakeholders and rights holders (Bennett, 2022; Croft et al., 2024) and is considered by several scholars to be foundational to all other dimensions (Martin et al., 2016; Lau et al., 2021; Ruano-Chamorro et al., 2022). Equitable access to information, opportunities for knowledge exchange and transfer, and diverse input into decision-making and policy processes are essential pre-conditions for recognitional equity (Crosman et al., 2022; Croft et al., 2024; Riechers et al., 2024) and together, contribute to *knowledge equity*. Drawing on our understanding of recognitional equity, we can begin to define knowledge equity as the acknowledgment and respect of all knowledge holders and their knowledge systems based on locally-grounded understandings of what equity looks and feels like. A commitment to knowledge equity requires that we interrogate the historical context of western science and its dominant position in knowledge hierarchies. Therefore, we understand knowledge equity as both a principle and a practice.

Normative approaches to achieving knowledge equity assume that recognizing and engaging with the multiplicity of worldviews, values, and ways of knowing will influence how knowledge is produced, distributed, and accessed (Hall and Tandon, 2020; Kruschick and Schoch, 2023). However, the pathway to knowledge equity goes beyond simply recognizing and engaging with diverse knowledge systems. We concur with scholars such as Jaffe (2017) and Baker et al. (2024) who argue that we cannot achieve knowledge equity if we continue to rely on the same systems that created knowledge *inequity* in the first place. Our efforts to embed knowledge equity in the Ocean Decade and beyond must therefore focus on actively dismantling and re-envisioning how knowledge is generated, valued, and used. With our call to action (Section 5;

Figure 1), we draw attention to three actions all ocean professionals can take to begin this process.

3 Reliance on western science hinders ocean sustainability

To advance knowledge equity, we must first understand how and why western science is regarded as superior to other ways of knowing, as demonstrated by its hegemonic influence in multiple arenas, including environmental policy-making (e.g., Chakraborty and Sherpa, 2021; Wiegleb and Bruns, 2023), education (e.g., Morgan, 2003), and healthcare (e.g., Hollenberg and Muzzin, 2010). The core values and practices of western science were imposed on populations around the globe by centuries of European military conquest and colonization, a process that was legitimized as a "civilizing mission" (Seth, 2009). Colonizing powers actively constructed a knowledge hierarchy by promoting western science as a universal tool for understanding the world while simultaneously devaluing and silencing different ways of knowing (Held, 2023). The act of suppressing and silencing diverse knowledge, including knowledge held by Indigenous peoples, and replacing it with western-centric models of knowledge production represents a form of epistemic violence (Spivak, 1988), whereby the colonized were denied their rights to self-expression and self-determination (Dotson, 2011). The legacy of colonialism continues to determine how different types of knowledge are valued by western scientists and decision-makers. For example, many western scientists view Indigenous knowledge as an archive from which they can extract and apply the information that is useful to them (Whyte, 2013). Western scientists often enter communities with a predefined agenda: their research questions developed, methods planned, and desired outcomes identified. This practice is known as "parachute science," where the needs and priorities of the communities are considered secondary to the goals of the researcher (Breckwoldt et al., 2021; de Vos and Schwartz, 2022). Indigenous scholars reject these extractive practices and argue that Indigenous knowledge is relational and cannot be readily transferred outside of its original context (Brayboy et al., 2012; Whyte, 2013).

Conceptualizing knowledge production as a situated practice stands in stark contrast to a foundational principle of western science in which knowledge is considered separate from the social-cultural context in which it is produced (Reiss and Sprenger, 2020). Consequently, science is often viewed as objective, an assumption that underlies the positivist paradigm of knowledge production (Maguire, 1987; Brayboy et al., 2012). Positivism is commonly associated with the so-called "hard" (or natural) sciences, which are concerned with observing, measuring, and predicting natural phenomena and rely on empirical evidence to support knowledge claims (Park et al., 2020). The dominance of the positivist paradigm has created a hierarchy within science whereby "hard" sciences are valued over "soft" sciences (i.e., the social sciences; Shapin, 2022). This represents another level of the knowledge hierarchy that hinders the pursuit of ocean sustainability because it leads to the routine omission of social sciences from ocean research, conservation, and management.

Contemporary fisheries management exemplifies the dominance of the positivist paradigm in ocean science and its role in perpetuating knowledge inequity. Rooted in capitalism and imperialism, fisheries science grew as a discipline during the 20th Century to address the priorities of western nations (Silver et al., 2022). The simultaneous development of fisheries science and the wide-ranging industrial fleets of countries like Great Britain and the United States served to maximize profits, influence international law, and even justify colonization of the high seas (Finley and Oreskes, 2013). The concept of "maximum sustainable yield" and an emphasis on statistical modeling became the standard in fisheries policy (Silver et al., 2022), which cemented positivist values of objectivity and universality into fisheries management. These kinds of top-down, technocratic approaches legitimized the fisheries management goals of wealthy western nations and, in doing so, disrupted or even outlawed the diverse knowledge systems and practices that have supported ocean sustainability for generations, including customary marine tenure systems, selective harvesting, and the use of rituals, taboos, and laws (Turner et al., 2013; Martin et al., 2019; Atlas et al., 2021).

4 An Early Career Researcher perspective

Our initial discussions about the Ocean Decade Challenges accentuated our diverse disciplinary epistemologies, practices, and perspectives, yet we all agreed that a business-as-usual approach will fail to restore ocean health. It is precisely because of our different cultures, academic disciplines, and lived experiences that we reject the idea that there is only one "correct" way of knowing and doing. We also reject the positivist notion of science as objective. The questions we ask as researchers, the methods we choose to address them, and the answers we obtain and share with others are all shaped by our upbringing, personal values, and social and cultural experiences (Moon and Blackman, 2014; Jamieson et al., 2023), as well as the direction given by funding agencies (Braun, 1998). Furthermore, we believe that exclusively "hard" science approaches to ocean sustainability, underpinned by positivist thinking, lead to decontextualized solutions that fail to comprehend the human dimensions of ocean systems and ultimately lack the knowledge and cultural sensitivity needed for just, effective change. Therefore, we affirm the need to center the "science we need for the ocean we want" around the rights, needs, and priorities of ocean-dependent people.

We concur with Bennett et al. (2024) who argue that the human right to a healthy ocean is inextricably linked to the respectful inclusion of diverse forms of knowledge into decision-making. Indigenous communities have been ocean stewards for millennia, and therefore, their knowledge, traditions, and cultural heritage are inseparable from the solutions needed for a healthy and sustainable ocean (Atlas et al., 2021; Pihana et al., 2022). Moreover, Indigenous knowledge is often intergenerational (Whyte, 2013; Jessen et al., 2022) and extends over longer timescales than datasets gathered by western scientists (Frid et al., 2023). These kinds of knowledge, rooted in place-based expertise and historical perspectives, can complement western science to provide crucial insights into

climate and environmental changes (as demonstrated by the Two-Eyed Seeing framework in Reid et al., 2021). Where place-based knowledge has been coupled with western science, the positive outcomes for ocean sustainability are undeniable. Ban et al. (2018) highlight a transdisciplinary collaboration between Indigenous fishers and university researchers in British Columbia, whereby Indigenous knowledge was combined with ecological modeling to generate evidence of long-term declines in a commercially important crab fishery. Similarly, a transdisciplinary collaboration between scientists and Indigenous communities in the Northern Territory of Australia produced the first systematic assessment of marine mammals in the Gulf of Carpentaria (Grech et al., 2014). While there are countless additional examples, these two demonstrate the tangible progress we can make toward ocean sustainability when western science and Indigenous knowledge are brought together and valued for their own unique contributions to ocean research and management. However, integrating Indigenous knowledge solely for the purposes of improving current research and management practices (for a review see Loch and Riechers, 2021) risks reproducing instrumental logics and perpetuating extractive approaches. Therefore, we argue that meaningful and respectful engagement with different forms of knowledge and the centering of knowledge equity must also be driven by a desire to redress historical injustices related to self-expression and self-determination.

5 Call to action

To achieve the Ocean Decade vision, the global ocean community must cultivate a moral and ethical responsibility to *all* kinds of knowledge holders and knowledge systems. This requires a fundamental shift from extractive research practices that aim to fill knowledge gaps and extend theories, to research practices that are bottom-up, collaborative, and shaped by mutually beneficial learning (Neilson and São Marcos, 2019; Trisos et al., 2021; Singeo and Ferguson, 2023). We seek to disrupt the exclusionary business-as-usual approach to ocean sustainability and, instead, foster ways of thinking and working that have knowledge equity embedded at their core. To achieve this, we call on all ocean professionals, including scientists, ECRs, and practitioners, to (1) adopt an intentional practice of reflexivity; (2) confront colonial ways of thinking, knowing, and doing; and (3) dismantle knowledge hierarchies that permeate ocean science and practice (Figure 1).

5.1 Adopt an intentional practice of reflexivity

Our positionality—understood as the position we take on a given task according to our respective identities, worldviews, and life experiences (Holmes, 2020)—influences our motivations for practicing ocean science and shapes our research choices. Our positionality changes over time according to our life experiences, as does the combination of identities that are salient in a particular research context (Soedirgo and Glas, 2020). Therefore, we urge ocean professionals to adopt an intentional practice of reflexivity so that we are better equipped to critically examine our positionalities and understand that our multiple, shifting identities are part of the research context (Chavez, 2008). Declaring our identities in the form of a positionality statement is a common reflexive practice, yet it can reproduce power inequalities and reinforce "material, assumed, or imagined" hierarchies (Gani and Khan, 2024) by centering the researcher and obscuring the role of local partners. For that reason, we encourage researchers to critically engage with the colonial roots of positionality statements while focusing on the non-performative aspects of reflexive practice so that we become accustomed to asking ourselves challenging questions throughout the research process, including: What assumptions do I/we have about this research topic? Why did I/we make that methodological choice? How am I/we interacting with participants, and how could they interpret our interactions? Who is benefiting from this work? We recommend the practice of continuously documenting responses to these questions, as the dual process of reflecting and writing can provide valuable insights into the emotions and thoughts stirred by our work, such as pride, joy, fear, or shame (Punch, 2012). In our personal practice of reflexive writing, we have found that documenting our emotional responses serves as a reminder that something important is being shared, which, in turn, enhances our sensitivity to the lived experiences of others.

In addition, we advocate for the creation of spaces for interpersonal dialogue about our positionalities where we can challenge normative assumptions that positionality is static (Soedirgo and Glas, 2020). While these kinds of discussions are likely to be confronting and challenging, they can foster learning and build trust within collaborations (Sacedon et al., 2025). Through these reflexive practices, binary descriptions like "researcher" and "participant" become less prescriptive and, instead, we can open ourselves up to the possibilities of common ground and empathetic encounters (Mezzenzana and Peluso, 2023).

For further guidance on reflexivity in a conservation context, see Montana et al. (2020), Beck et al. (2021), and Pienkowski et al. (2023).

5.2 Confront colonial ways of thinking, knowing, and doing

A crucial dimension of practicing reflexivity is interrogating how coloniality impacts our ways of thinking, knowing, and doing. We must confront our assumptions about what counts as knowledge and constantly challenge ourselves by questioning whose objectives we are trying to meet through our work. Furthermore, we call on the global ocean community to engage with the problematic history of ocean science so that we avoid reproducing past inequalities. We must develop new intellectual practices that foreground non-western epistemologies, histories, and worldviews and confront existing practices that perpetuate epistemic violence. This includes creating inclusive spaces where diverse knowledge holders can provide meaningful input into project design, as well as a willingness to silence ourselves appropriately while actively elevating the voices of our local collaborators. Given the historic marginalization of local voices in policy processes (Parsons et al., 2021), this is especially important

during research dissemination where western scientists often interact with influential decision-makers. We can learn from the Indigenous concept of deep listening (Brearley, 2015; Moreno-Cely et al., 2021; Robinson et al., 2021) to guide us in this endeavor so that we become respectful and responsible listeners.

As ECRs, we are taking steps to confront the pervasive influence of coloniality in our work. An essential part of our research preparations involves actively learning about the historical and contemporary contexts in which we work, recognizing that our research partners are not a homogenous entity with a single experience of marginalization. Individually, we have lived and worked in a range of geographical contexts, each with its own unique histories and experiences of colonialism. We also practice consistent and intentional self-education, mainly by engaging with scholarship from a wide range of disciplines, geographies, and social-cultural contexts. Through our educational and professional experiences as students, researchers, and practitioners, we have gathered the following resources that have helped us to envision different and more expansive ways of thinking, knowing, and doing: Mignolo (2009), Akena (2012), Raj (2013), Maldonado-Torres (2016), de Vos (2020), Gopal (2021), Reid et al. (2021), Trisos et al. (2021), de Vos and Schwartz (2022), and Magalhães Teixeira (2024). We recommend these references as a starting point, as well as Cannon (2019) for a curated reading list on decolonizing conservation.

5.3 Dismantle knowledge hierarchies that permeate ocean science and practice

Fundamental to our work as ECRs is to acknowledge and grapple with the influence of coloniality on academia. Its influence is reflected in who has access to the university (students and academics), reading lists and curricular content, teaching and learning methods, and publishing rules and practices, all of which reproduce dominant ways of knowing and contribute to epistemic exclusion (Ndlovu, 2018; Begum and Saini, 2019; de Sousa Santos, 2019). We believe that a necessary first step in dismantling knowledge hierarchies between disciplines and departments is through engagement in facilitated interdisciplinary dialogues on the history and philosophy of ocean science and practice. In our experience, these dialogues can help to bridge disciplinary silos (e.g., between natural and social sciences) and ensure that different epistemologies, theoretical approaches, and methodologies are valued and respected for the contributions they make to knowledge production. Furthermore, we advocate for early and purposeful engagement with theories of knowledge so that students in higher education settings have the necessary skills to critically engage with the values and assumptions that underpin disciplinary norms and practices and to challenge ways of thinking that sustain knowledge hierarchies. Recognizing epistemological plurality within western science provides a foundation for looking beyond western ways of knowing to acknowledge and denounce institutional systems and structures that allow knowledge hierarchies to persist. The challenges facing the world's ocean demand much more than the single-lensed approach of positivist science that currently situates itself at the top of the academic knowledge hierarchy. Therefore, we concur with other scholars (e.g., Bennett, 2019; Singh et al., 2021; Partelow et al., 2023) who have called for ocean sustainability initiatives, including the Ocean Decade, to place greater emphasis on the social sciences. We also urge researchers to go beyond western social science and draw upon diverse methodologies (e.g., Ruwhiu et al., 2022; Strand et al., 2022; Lobo and Parsons, 2023) so that we can work in a more ethical and contextually-sensitive manner and ensure our objectives are fully aligned with the needs and priorities of ocean-dependent people. In our own work we have employed participatory arts-based methods, including community theater and photo-voice, and we have found these methods to be invaluable for initiating open dialogue and supporting self-expression on issues of environmental, economic, and social concern.

6 Conclusion

By offering our perspective, we are confronting the risk of a business-as-usual approach to achieving ocean sustainability. To embed knowledge equity into the Ocean Decade framework, we must first understand how and why particular ways of knowing are considered superior to others and recognize that knowledge equity requires much more than adapting our methods to ensure participation or building mechanisms for knowledge integration. It requires a complete unlearning and relearning of the way we approach research and practice. We acknowledge that adopting new ways of thinking and doing is messy and uncomfortable, but we encourage researchers and practitioners to embrace the uncertainty that it brings. Furthermore, our call to action should be viewed not as a short-term objective, but rather as a continuous commitment to embedding knowledge equity in the Ocean Decade and beyond. Although the ideas and actions that we put forth in this perspective paper are aligned with many others in the global ocean community, for some, actively seeking to deconstruct historical methods of doing science and the institutionalized privilege of western science may seem radical. As ECRs, we are the next generation of ocean scientists, practitioners, and decision-makers, and so we must take on an active role in transforming the systems and structures that perpetuate knowledge inequity while mobilizing ourselves and others to halt the decline in ocean health.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

LW: Conceptualization, Writing – original draft, Writing – review & editing. NC: Conceptualization, Funding acquisition, Project administration, Visualization, Writing – original draft, Writing – review & editing. MK: Conceptualization, Funding acquisition, Writing – original draft, Writing – review & editing.

MP: Conceptualization, Project administration, Writing – original draft, Writing – review & editing. JD: Conceptualization, Writing – original draft, Writing – review & editing. CG: Conceptualization, Writing – original draft, Writing – review & editing.

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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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