



OPEN ACCESS

EDITED BY

Beatriz Morales-Nin,
Spanish National Research Council
(CSIC), Spain

REVIEWED BY

Michael Gilek,
Södertörn University, Sweden
Audrey J. Geffen,
University of Bergen, Norway

*CORRESPONDENCE

Stacy K. Baez
✉ sbaez@pewtrusts.org

RECEIVED 07 January 2025

ACCEPTED 19 February 2025

PUBLISHED 06 March 2025

CITATION

Baez SK (2025) Harnessing diversity for
sustainable ocean futures.

Front. Ocean Sustain. 3:1557056.
doi: 10.3389/focsu.2025.1557056

COPYRIGHT

© 2025 Baez. This is an open-access article
distributed under the terms of the [Creative
Commons Attribution License \(CC BY\)](#). The
use, distribution or reproduction in other
forums is permitted, provided the original
author(s) and the copyright owner(s) are
credited and that the original publication in
this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

Harnessing diversity for sustainable ocean futures

Stacy K. Baez*

The Pew Charitable Trusts, Washington, DC, United States

KEYWORDS

diversity and inclusion, equity, gender, international conservation, representation

In small island developing states such as my native country of Trinidad and Tobago, healthy oceans are crucial for food security, livelihoods, and climate. Growing up on an island shaped my deep appreciation for the ocean and its profound importance to our society. Many Sundays were spent relaxing at the beach with my family. Fresh fish and seafood were always accessible, even to communities relatively far from the coast. These early experiences sparked my desire to learn more about our oceans and their connection to community wellbeing. However, pursuing a career in ocean or fisheries sciences was not a common path for women, and many questioned whether this was even possible, leading me to seek higher education in the United States.

College in the US brought many opportunities, including the joy of learning how to swim. But the transition from the Caribbean also came with challenges. Adapting to being a minority in science meant facing limited mentorship opportunities and constantly proving my capabilities in a predominantly male and white field. Ocean and fisheries sciences, in particular, have historically fallen short in considering diversity, equity, and inclusion (DEI; [Johri et al., 2021](#)). Despite these challenges, my graduate studies in a woman-led research group at Old Dominion University in Virginia provided a welcoming space. I had the opportunity to study the otoliths of spotted seatrout (*Cynoscion nebulosus*) to unravel migratory patterns, age, growth, and diet, providing valuable ecological insights for fisheries management in the Chesapeake Bay. I also attended several public fisheries management council meetings that reinforced the principle that robust science is the cornerstone of decision-making. But at the time these meetings were not staffed, or attended, by many people of color. Given the complex nature of fisheries management and the socioeconomic implications of management decisions, these meetings emphasized the need for more diverse perspectives in shaping effective fisheries policies ([Arismendi and Penaluna, 2016](#)).

My passion for ocean conservation and sustainable fisheries has grown along with my belief that good research and sound policy are strengthened through the inclusion of women and diverse voices. In my current role as a scientist at an NGO, it took some time to find my voice. I often felt self-doubt from imposter syndrome and routinely questioned whether I was good enough. However, I have come to realize that my perspective and experiences are invaluable assets. Conservation efforts are inherently stronger and more effective when they reflect the diverse communities they aim to serve. As diverse perspectives lead to more innovative solutions and inclusive policies, making space for women, advancing cultural representation, and removing systemic barriers are essential steps in creating a welcoming space in conservation and ocean sciences in general.

One of the key areas where diverse perspectives can make a significant impact is in the conservation of coastal wetlands. Seagrass, mangroves, and saltmarshes are important biodiversity hotspots and offer numerous climate adaptation and mitigation co-benefits. The conservation of these ecosystems contributes to multiple United Nations sustainable development goals (SDG). Safeguarding seagrasses alone can help countries advance 10 SDGs including supporting life below water, bolstering economies, improving food

security, reducing poverty, and improving gender equity (Unsworth et al., 2019; Fortes et al., 2020). Yet many countries lack the essential baseline data required to support coastal wetland conservation. My work focuses on building research partnerships to address these data gaps, enabling countries to incorporate the conservation of these ecosystems into their Nationally Determined Contributions (NDCs) to the Paris Agreement.

A key tenant I try to employ across all research partnerships is ensuring that local researchers are prioritized in projects. I am particularly keen to avoid “parachute science,” when research by organizations from wealthy nations takes place in under-resourced nations with little to no collaboration or input from local researchers, or fail to recognize local expertise, governance, or other social structures (de Vos, 2020; Ahmadiya et al., 2021). Prioritizing genuine collaboration across countries is undoubtedly challenging. It requires willingness to listen to diverse ideas, openness to different cultures and perspectives, and strength of character to accept that outcomes may not always align with initial plans. Yet equitable research and conservation partnerships can more readily advance both science and local priorities (de Vos, 2020).

Local researchers are the experts on the ground and hold deep knowledge about fisheries and marine ecosystems in their countries. They bring a wealth of firsthand experience and understanding of the unique environmental, social and cultural contexts of their regions. Leading to a more informed project in both the development and execution phases. For example, my organization supported the Belize Blue Carbon project that aimed to estimate the carbon held in mangrove forests. The field campaign for this project took place in 2021 when the impacts of COVID-19 were still very relevant. However, our local collaborators led a team that included international and local researchers, technical government staff, and local NGO representatives across the country of Belize with very little hiccup. The resulting publication from this project recognizes the contribution of all collaborators, many of whom helped guide and shape the project from the start (Morrisette et al., 2023).

While a common approach is to consider collaborations upon arrival in-country, instead practitioners should consider the benefits of developing a shared research agenda (Rayadin and Burivalová, 2022; de Vos et al., 2023). As local researchers engage in and lead projects, it opens the doors for local government to better recognize project outcomes and associated data. Research outcomes from this type of approach are often accepted more readily by respective country policymakers. For example, the Belize Blue Carbon research project helped to inform the Government of Belize’s commitment to protect 12,000 ha of mangroves and restore 4,000 ha by 2030 in the country’s 2020/2021 updated NDC (Government of Belize, 2021).

For systemic reasons, the global research community remains dominated by Western researchers, primarily men (Hughes et al., 2023). As such, scientists from under-resourced countries are underrepresented on the global stage with compounded inequality for women, disabled, Indigenous, cultural and other groups (Larivière et al., 2013; Mammides et al., 2016; Maas et al., 2021; Graves Jr et al., 2022). Prioritizing local researchers can change perspectives of the way our global society views expertise and

narrow the geographical diversity gap (de Vos, 2022). However, for these opportunities to be impactful they must equally value the contributions of local researchers and students. Cultural differences, conscious and unconscious biases, as well as imbalances in power structures, can perpetuate inequities. For example, in academic publications, local researchers, particularly students, can be inadvertently excluded from co-authorship or leading authorship roles simply because they did not explicitly state their interest (Logan et al., 2017).

Voices from local communities are also key to informed policy decisions, particularly those around fisheries and climate issues. Fishing communities possess extensive knowledge about fisheries and marine ecosystems and are often the first to notice changes in species assemblages and habitat degradation. Fishing is not always just about providing food. In some contexts, it can be deeply intertwined with cultural heritage and community wellbeing (Cubillo et al., 2023). Insights from these communities are invaluable for sustainable fisheries management and ocean governance (Bock et al., 2022; Delgado-Ramírez et al., 2023). By engaging with policymakers, these communities can be strong advocates for policies that incorporate local objectives and knowledge, even within national level frameworks such as the NDC.

The inclusion of local knowledge can have surprising and long-term conservation impact. I had the opportunity to engage with local and international partners for work in Seychelles, an island archipelago in the Indian Ocean with vast seagrass meadows that lacked a field-verified seagrass map. Local partners that were a part of our Seychelles Seagrass Mapping and Carbon Assessment and blue carbon policy projects pointed out that in Seychelles Creole the same word was used to describe both seagrass and algae. A nation with lush extensive seagrass meadows did not have a unique name to call this critical ecosystem. Our colleagues at the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT) undertook a nationwide campaign to develop culturally appropriate names of different functional groups of seagrasses (Pew Charitable Trusts, 2022). This campaign led to the development of unique names for five groups of seagrasses that have now become part of the country’s official Creole dictionary (Mortimer et al., In prep). Unique Creole words allow for citizens to establish a sense of ownership of seagrass and highlights the importance of including diverse voices in conservation efforts.

While my perspectives are informed from lived experience as a woman of color working primarily in an international context, it is important to acknowledge the gender, race and other diversity gaps that continue to persist here in the United States within ocean science and conservation spaces (Johri et al., 2021). DEI challenges exist at all levels, and the barriers that lead to them can be complex and often require systemic changes, but actions for fostering DEI across the ocean sciences, related policy arenas, and the conservation space are paramount. There is a growing body of work identifying solutions such as creating opportunities for students and collaborators from diverse backgrounds, considering mentorships for early-career professionals, being an ally for women in science, ensuring representation across panels and workshops, addressing toxic culture such as harassment and

bullying, de-colonizing science, and engaging with equitable international projects and networks, to name a few (Smith et al., 2017; Behl et al., 2021; Crandall et al., 2021; Shiffman et al., 2022).

The challenges facing our oceans are complex, requiring collaborative efforts that include a diverse range of voices in the ocean conservation and policy space. By bringing together different perspectives, experiences and expertise, we can create a more effective conservation community for our oceans and the communities that depend on them.

Author contributions

SB: Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

References

- Ahmadia, G. N., Cheng, S. H., Andradi-Brown, D. A., Baez, S. K., Barnes, M. D., Bennett, N. J., et al. (2021). Limited progress in improving gender and geographic representation in coral reef science. *Front. Mar. Sci.* 8:731037. doi: 10.3389/fmars.2021.731037
- Arismendi, I., and Penaluna, B. E. (2016). Examining diversity inequities in fisheries science: a call to action. *BioScience* 66, 584–591. doi: 10.1093/biosci/biw041
- Behl, M., Cooper, S., Garza, C., Kolesar, S. E., Legg, S., Lewis, J. C., et al. (2021). Changing the culture of coastal, ocean, and marine sciences. *Oceanography* 34, 53–60. doi: 10.5670/oceanog.2021.307
- Bock, E., Hudson, L., Isaac, J., Vernes, T., Muir, B., Whap, T., et al. (2022). Safeguarding our sacred islands: traditional owner-led sea country governance, planning and management in Australia. *Pac. Conserv. Biol.* 28, 315–329. doi: 10.1071/PC21013
- Crandall, C., Baumann, J., Cooney, P., Croteau, A., Croxton, A., Flaherty-Walia, K., et al. (2021). How to be an ally to women in fisheries science. *Fisheries* 46, 140–144. doi: 10.1002/fsh.10565
- Cubillo, B., Stacey, N., and Brimblecombe, J. (2023). How is nutrition, health and wellbeing conceptualised in connection with seafood for coastal Indigenous Peoples? *Food Policy* 116:102434. doi: 10.1016/j.foodpol.2023.102434
- de Vos, A. (2020). *The Problem of 'Colonial Science'*. Scientific American. Available online at: <https://www.scientificamerican.com/article/the-problem-of-colonial-science/>
- de Vos, A. (2022). Stowing parachutes, strengthening science. *Conserv. Sci. Pract.* 4:e12709. doi: 10.1111/csp2.12709
- de Vos, A., Cambronero-Solano, S., Mangubhai, S., Nefdt, L., Woodall, L. C., and Stefanoudis, P. V. (2023). Towards equity and justice in ocean sciences. *NPJ Ocean Sustain.* 2:25. doi: 10.1038/s44183-023-00028-4
- Delgado-Ramírez, C. E., Ota, Y., and Cisneros-Montemayor, A. M. (2023). Fishing as a livelihood, a way of life, or just a job: considering the complexity of “fishing communities” in research and policy. *Rev. Fish Biol. Fisheries* 33, 265–280. doi: 10.1007/s11160-022-09721-y
- Fortes, M., Griffiths, L., Collier, C., Nordlund, L., de la Torre-Castro, M., Vanderklift, M., et al. (2020). “Policy and management options,” in *Out of the blue: the value of seagrasses to the environment and to people*. UNEP, Nairobi.
- Government of Belize (2021). *Belize Updated Nationally Determined Contribution*. Available online at: <https://unfccc.int/sites/default/files/NDC/2022-06/Belize%20Updated%20NDC.pdf>
- Graves Jr, J. L., Kearney, M., Barabino, G., and Malcom, S. (2022). Inequality in science and the case for a new agenda. *Proc. Natl. Acad. Sci.* 119:e2117831119. doi: 10.1073/pnas.2117831119
- Hughes, A. C., Than, K. Z., Tanalgo, K. C., Agung, A. P., Alexander, T., Kane, Y., et al. (2023). Who is publishing in ecology and evolution? The

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.

Generative AI statement

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

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

underrepresentation of women and the global south. *Front. Environ. Sci.* 11:1211211. doi: 10.3389/fenvs.2023.1211211

Johri, S., Carnevale, M., Porter, L., Zivian, A., Kourantidou, M., Meyer, E. L., et al. (2021). Pathways to justice, equity, diversity, and inclusion in marine science and conservation. *Front. Mar. Sci.* 8:696180. doi: 10.3389/fmars.2021.696180

Larivière, V., Ni, C., Gingras, Y., Cronin, B., and Sugimoto, C. R. (2013). Bibliometrics: global gender disparities in science. *Nature* 504, 211–213. doi: 10.1038/504211a

Logan, J. M., Bean, S. B., and Myers, A. E. (2017). Author contributions to ecological publications: what does it mean to be an author in modern ecological research? *PLoS ONE* 12:e0179956. doi: 10.1371/journal.pone.0179956

Maas, B., Pakeman, R. J., Godet, L., Smith, L., Devictor, V., and Primack, R. (2021). Women and global south strikingly underrepresented among top-publishing ecologists. *Conserv. Lett.* 14:e12797. doi: 10.1111/conl.12797

Mammides, C., Goodale, U. M., Corlett, R. T., Chen, J., Bawa, K. S., Hariya, H., et al. (2016). Increasing geographic diversity in the international conservation literature: a stalled process? *Biol. Conserv.* 198, 78–83. doi: 10.1016/j.biocon.2016.03.030

Morrisette, H. K., Baez, S. K., Beers, L., Bood, N., Martinez, N. D., Novelo, K., et al. (2023). Belize blue carbon: establishing a national carbon stock estimate for mangrove ecosystems. *Sci. Total Environ.* 870:161829. doi: 10.1016/j.scitotenv.2023.161829

Mortimer, J. A., Baez, S. K., Faure, A., Harlay, J., Morel, C., Rowlands, G., et al. (In prep). *Formalizing Creole Names for Seagrasses in Seychelles Enhances Public Perception of Ecosystem Value as Defined by Mapping, Carbon Assessment and National Policy*.

Pew Charitable Trusts (2022). *Seychelles' 'Grass-Roots' Effort to Name Seagrass Supports Conservation Effort*. Available online at: <https://www.pewtrusts.org/en/research-and-analysis/articles/2022/03/28/seychelles-grass-roots-effort-to-name-seagrass-supports-conservation-effort>

Rayadin, Y., and Burivalová, Z., (2022). What does it take to have a mutually beneficial research collaboration across countries? *Conserv. Sci. Pract.* 4:e528. doi: 10.1111/csp2.528

Shiffman, D. S., Arguedas Álvarez, T., Bangle, C. W., Boyt, R., Côté, I. M., Daly-Engel, T. S., et al. (2022). What can professional scientific societies do to improve diversity, equity, and inclusion: a case study of the American Elasmobranch Society. *Front. Educ.* 7:842618. doi: 10.3389/feduc.2022.842618

Smith, N. S., Côté, I. M., Martínez-Estevéz, L., Hind-Ozan, E. J., Quiros, A. L., Johnson, N., et al. (2017). Diversity and inclusion in conservation: a proposal for a marine diversity network. *Front. Mar. Sci.* 4:234. doi: 10.3389/fmars.2017.00234

Unsworth, R. K. F., Nordlund, L. M., and Cullen-Unsworth, L. C. (2019). Seagrass meadows support global fisheries production. *Conserv. Lett.* 12:e12566. doi: 10.1111/conl.12566