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# Inspiring women in small-scale fisheries from ocean to table

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Globally, the demand for seafood and plant-based blue foods is increasing along with the growth of the human population (Naylor et al., 2021). Yet, sustainable harvest of blue foods from the ocean is challenged by climate change, illegal fishing, habitat destruction, and social inequality (Nash et al., 2021). Amid these pressures, women, long silent contributors to ocean sustainability, are now leading vital efforts to heal the ocean. Often associated with femininity in global literature and mythology, the ocean symbolizes strength, resilience, and the capacity to sustain life (Milam, 2019), maybe why it is referred to as the Mother Ocean. Like a caring mother, what if the key to healing our ocean lay in recognizing and empowering women's roles in fisheries and aquaculture?

In Mexican small-scale fisheries (SSF), women play vital yet underappreciated roles, accounting for up to 43% of the total workforce when direct and indirect jobs are considered (Solano et al., 2021). Despite their contributions as fishers, scientists, producers, and artisans, women remain underrepresented in fisheries management and decision-making, limiting their influence in shaping the industry's future (Lentisco and Lee, 2015). Recognizing and empowering women's roles, particularly in pre- and post-production activities, is essential to addressing gender disparities, fostering innovation, and ensuring a sustainable blue food system. Amid growing pressures on the ocean from climate change, illegal fishing, and social inequality, women are uniquely positioned to blend traditional knowledge with innovation to heal the ocean.

For two decades, I dedicated my career to the recovery and protection of endangered migratory species, with a particular focus on sea turtles. Much of sea turtle conservation is centered on protecting nesting beaches, likely due to accessibility. While this is a vital component of species recovery, the most significant threats to sea turtles occur in the water, where they spend 99% of their life cycle (Laloë et al., 2022). These threats include habitat loss in key foraging areas and entanglement in fishing gear, known as bycatch, which not only endangers sea turtle populations but also undermines the sustainability of fisheries (Wallace et al., 2010). In tropical waters where sea turtles range, artisanal fisheries represent one of the largest ocean economies worldwide, supporting millions of coastal and island livelihoods (Cohen et al., 2019). Addressing bycatch is therefore critical for both species conservation and the long-term viability of coastal livelihoods.

During my PhD research on the susceptibility of accidental entanglement in fishing gear, I had the privilege of working with many artisanal fishing communities throughout the Northwest Mexico region. I was impressed by the amazing conservation-focused work of the fishermen I met, their kindness in accepting a foreign woman scientist into their communities. Yet, I especially felt inspired by the women, often quiet, seemingly shy,

in the background. Although men dominated the interviews and informal conversations, the women's contributions to their communities were undeniable. Their efforts to improve coastal resilience, protect sea turtles and their foraging habitats in heavily fished areas, and quietly lead initiatives for a sustainable ocean economy profoundly inspired my research. This article celebrates the women whose work exemplifies the intersection of traditional knowledge and innovative conservation strategies, highlighting their indispensable role in addressing the challenges facing our shared ocean.

I collaborated with fisherfolk who are actively and passionately volunteering as citizen scientists with the non-profit Grupo Tortuguero de Las Californias (GTC) to study sea turtle foraging populations in fishing zones. Among them, Melina Maldonado-Sandoval, an indigenous Mayo-Yoreme fisherwoman from northern Sinaloa, México, stood out as an inspiring conservation leader. This heavily fished region (Ramírez-Rodríguez et al., 2014) is critical for understanding sea turtle bycatch, a key threat to the recovery of five endangered species.

Melina's efforts go beyond fishing (Figure 1); she rescues sea turtles from poachers, often exchanging gasoline for their safe release, and meticulously collects scientific data for researchers before releasing them back to the ocean. Her work, blending traditional knowledge with innovative practices, highlights how women are quietly driving meaningful change in marine conservation. Melina's story exemplifies the transformative role of women in fisheries and their critical contributions to sustaining the health of our shared ocean.

I was deeply inspired by women scientists working tirelessly in fisheries, including Dr. Dinorah Herrero-Pérezrul, who collaborated with artisanal fishers on the management, conservation and sustainability of sea cucumber fisheries (Herrero-Pérezrul and Chávez, 2024). Dinorah served as both my PhD advisor and mentor. Another example of women inspiring women, she herself was inspired to work in SSF back in the 90/s by Isabel Calderin. Together they were women pioneers in Baja California Sur (BCS) sea cucumber fisheries recruiting and fostering a more responsible practice. Dr. Agnese Mancini, integral member of my PhD committee whose research and community-based solutions to addressing sea turtle threats in some of Mexico's most challenging fishing communities (Mancini et al., 2012) has been an inspiring mentor through my research experience. I also learned from Dr. Johanna Alfaro, whose innovative methods to engage Peruvian fishers in bycatch mitigation included the use of existing technologies including a VHF relay system and remote electronic monitoring, exemplifying the creative approaches women bring to fisheries conservation (Alfaro-Shigueto et al., 2011). Her work inspired me to adopt her successful methodologies and receive grants to purchase VHF radios, lifejackets, and electronic monitoring cameras for a few of the GTC fishers to improve data collection and advance sea turtle conservation research.

Beyond scientists, I encountered women like Margarita Garcia from La Reforma, Sinaloa, and Doña Mattie from Las Pacas, Baja California Sur (BCS), who play vital roles in their family artisanal fishing businesses. Their dedication reflects the broad spectrum of contributions women make to fisheries, from on-the-water efforts to behind-the-scenes operations. Together, they represent

a growing movement toward more inclusive and sustainable fisheries. During fisher exchanges as part of the cross-border *MARES Comunidad* project addressing sea turtle bycatch in México, I had the privilege of meeting remarkable women like Diana Arely Ramos de la Torre from Teacapán, Sinaloa. A leader in her community, Diana conducts interviews with fishers to gain deeper insights into their perspectives on bycatch through Rapid Bycatch Assessments (Proyecto MARES Comunidad, 2024). She also goes fishing with her father and brothers to better understand what fishing means firsthand. As part of her approach, she plans to spend more time on the water with fishers, recognizing that direct experience is essential to fully grasp bycatch challenges and develop meaningful solutions.

These interactions with women from different backgrounds, communities, and roles through the blue foods supply chain helped me identify a critical gap in Mexican SSF, particularly in small, family-based cooperatives: the lack of recognition for their voluntary conservation efforts in the final seafood products reaching consumers. This realization motivated me to explore blue food programs led by women and to find ways to highlight these invaluable contributions.

Each of these women, through their unique contributions, is rewriting the narrative of the blue economy. They skillfully blend traditional practices with innovative conservation strategies to reduce bycatch, protect endangered species, and build sustainable livelihoods. Their dedication has profoundly deepened my understanding of fisheries and inspired me to see their work as platforms for transformative and inclusive change in ocean sustainability. To round out my PhD research, I developed "Pesca Blue", a unique seafood brand designed to honor and recognize the invaluable contributions of these fishers—both men and the remarkable women across the supply chain. This consumer-facing "ocean-to-table" seafood brand celebrates their efforts while offering a brand especially dedicated to reducing endangered sea turtle bycatch threats while honoring and recognizing the voluntary contributions.

Yet, making the shift from sea turtle bycatch research to a conservation-driven business required a new level of mentorship and education. This transition aimed to provide not only an incentive to recruit more women but also a financial means to amplify their voices in sustainable fisheries and promote equal opportunities. In 2024, Pesca Blue participated in the Women in Ocean Foods (WIOF) Innovation Studio, co-hosted by Hatch Blue and Conservation International Ventures. This opportunity, supported by women leaders like Mariana Flores-Vargas, Gracie White, Maria Elvira López, and Karlotta Rieve facilitated connections with the SAGE (Social and Gender Equity) organization, which is driving efforts to bridge the gender gap in fisheries sustainability. It has been a game changer for Pesca Blue and the female-led inspiration I needed to shift from researcher into "oceanpreneur". I felt completely guided and supported by other women, where we shared our voice and passions in a safe space for women.

Through WIOF, I connected with other women-led cooperatives such as Guardianas del Conchalito from BCS and Almejeras from Sinaloa. These initiatives motivated me to expand Pesca Blue to one day include their seafood products, providing these women with access to premium seafood markets



FIGURE 1

Melina Maldonado-Sandoval, a conservation leader of an indigenous community in Sinaloa, México, and her father Emilio Maldonado-Vaquez.

in México. By creating a platform for women to showcase their innovations, amplify their creative voices, and step into leadership roles, Pesca Blue aims to foster transformative solutions for the future of blue foods and marine conservation.

Globally, women are blending traditional knowledge with modern science, taking on challenges head-on, and redefining what it means to work toward a sustainable ocean. While these global initiatives are empowering women at a large scale, my personal journey has shown me how deeply transformative their contributions can be at the grassroots level. It is within these communities that I've witnessed the power of women's leadership to create sustainable, inclusive solutions that honor their unique roles and advance ocean conservation.

## Ethics statement

Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

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SR: Conceptualization, Writing – original draft, Writing – review & editing. MH-P: Project administration, Resources, Supervision, Validation, Visualization, Writing – review & editing. MF-V: Validation, Writing – review & editing.

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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.

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