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# Emotions for Sustainable Oceans: Implications for Marine Conservation

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**Abstract**

This essay examines emotions as a critical, yet underutilized, dimension in marine conservation and ocean sustainability science. Drawing on cognitive neuroscience, social psychology, human geography, and political ecology, we argue that integrating emotional dimensions into research, policy, and practice can enhance both understanding and action toward marine conservation and ocean sustainability. We conceptualize emotions, and explore their experiential and functional implications in marine contexts. Using targeted case examples and theories, we identify both opportunities and challenges for applying emotional insights in research, policy, and practice, including barriers posed by dominant rationality models of human decision-making. We present intellectual pathways as well as research, methodological and policy agendas to integrate emotions into marine conservation research and strategies. Our analysis responds to gaps in the literature and provides actionable recommendations for researchers, policymakers, and practitioners during the UN Decade of Ocean Science for Sustainable Development.

**Keywords:** emotions; marine conservation; rationality; ocean governance; marine protection; human dimensions

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## 1. Introduction

Emotions are present in every interaction we have with each other and with nature [1,2], shaping sustainability through our perceptions, decisions, and actions in profound ways [3–5]. Despite the ubiquity of emotions, ocean sustainability and marine conservation studies have been slower to engage with the emotional dimensions of human–ocean relationships. The literature includes some emphasis on emotions in fisheries (e.g., [6–10]) and limited research connected to the human dimensions of marine conservation, largely demonstrating and linking emotions to the implementation of marine protected areas (e.g., [11–13]). With the long-standing emotions research in fields such as psychology and neuroscience and increasingly attention to emotions in sustainability science [3], opportunities exist to support stronger integration of emotions in diverse sustainability contexts, such as in coastal and marine systems, including marine conservation.

Emotions can be best thought as part of the human dimensions that help translate values and other cognitive elements into action in broader environmental, psychological, social, cultural, economic, and institutional contexts and factors [5] that fundamentally shape sustainability outcomes [14,15]. Trends in the literature support integration of emotions in marine conservation. Coastal and marine researchers are beginning to integrate

individual and group decision-making and behavior to better understand the influence of thought and action on human–nature interactions and social–ecological changes [14–16]. Interdisciplinary researchers employ concepts related to emotions including well-being, attitudes, beliefs perceptions, images, identity, subjectivity, among others [17–23]. The literature positions these concepts to ground and guide ocean sustainability and marine conservation policy via a nuanced understanding of the human experience, motivations, behavior, and interactions. This essay builds on the interest in stronger understanding of subjective dimensions of marine conservation and leverages emerging examples about the utility of emotions in marine conservation [24]. Drawing on interdisciplinary perspectives, we share how research can deepen and more meaningfully connect to emotions. We demonstrate below that emotions play a role in informing and influencing the interactions that produce sustainable outcomes.

We argue that emotions are a core variable at the foundation of ocean sustainability, and are central to effective and meaningful marine conservation. We emphasize emotions' relevance to how people connect to marine areas, their collaborative motivations, their marine conservation experiences, and thus how they respond to conservation and sustainability rules, including their support and compliance, key inputs for successful conservation initiatives and social license for new conservation approaches [11–13]. Yet, as we discuss below, emotions are often neglected or discounted generally in sustainability research and in policy dialog based on outdated assumptions. The assumptions relate to ideas about cognition and decision-making processes, including how they function in complex or dynamic contexts. These assumptions have been connected to gaps in research and practice for ocean sustainability and marine conservation. These include the limited engagement with theoretical traditions outside of ocean and marine contexts, efforts that connect nuanced understanding of emotions with behavioral outcomes, the influence of social/cultural contexts on emotion and behavior, and the connection of emotions to the policy and governance for marine conservation [5,6,8–12,24]. In response to these gaps, our essay conceptualizes emotions, and highlights dominant framings and alternative research, methodological, and policy challenges for marine conservation and ocean sustainability.

We propose that interdisciplinary studies on emotions and emotions' expressions offer opportunities to help advance global pursuit of ocean sustainability and commitments to marine conservation and ocean protection. This is especially timely within Aichi Targets and the 30 × 30 commitments as well as the United Nations Decade of Ocean Science for Sustainable Development, aimed at the "science we need for the oceans we want" [25] (p. 2). Under the UN Decade, collaborations and partnerships are being encouraged to move beyond technical solutions and toward changing "how we think and act" [26]. By examining conventional understandings of emotion and exploring its interdisciplinary foundations, we can then provide guidance to help researchers and policymakers more effectively harness emotions' power to better understand thought and action in the con marine conservation and ocean protection research and policy dialog. Our essay is guided by three questions: (1) How can emotions be conceptualized to inform ocean sustainability research and policy? (2) What dominant ways of thinking and alternatives inform how emotions are understood in marine contexts? (3) How can emotion be applied to improve marine conservation research and practice?

## 2. How Can Emotions Be Conceptualized to Inform Ocean Sustainability Research and Policy?

The 1992 cod collapse in Newfoundland, Canada, triggered one of the most profound social and ecological crises in Atlantic Canada, displacing tens of thousands of fishers and reshaping the fabric of coastal communities [27,28]. Beyond economic loss, the moratorium

ignited deep emotional currents—anger toward government regulators, grief over the loss of livelihoods and cultural identity, and mistrust between industry, policymakers, and communities [29–31]. Similar dynamics have surfaced in other fisheries conflicts across the region, from snow crab quota disputes to contested marine conservation measures, where feelings of betrayal, injustice, and fear of future uncertainty often drive as much of the conflict as the formal policy issues themselves [32]. While emotions are accepted as part of these tensions and conflicts, they are sometimes viewed as peripheral to the central issues about trade-offs between economic and conservation goals, even though emotions can be observed to shape negotiations, influence compliance, and affect the long-term prospects for collaborative governance [33]. In addition to emotions' direct and indirect implications in the expression of conflict [34], there are many different research opportunities for conceptualizing emotions, including their influence on the mind, sense of well-being, behavior, and willingness to participate and enable marine conservation rules and approaches, as described below. Building from Ahmed [35] and discussed by González-Hidalgo et al. [36], these perspectives allow us to explore what emotions are, how they are experienced, and what they do to thought and action in dynamic coastal and marine contexts.

In research and dialog there are productive grounds for debate about how to effectively leverage emotions, and how this can be useful for informing policy. Among the challenges for conceptualizing emotions is whether the focus should be on types of discrete emotions, such as pride or fear (e.g., [37]), a phenomenon emerging with topics like Ocean Joy and Blue Fear at ocean related conferences and meetings. Disagreements also exist on the definition and role of affect, a disagreement between disciplinary perspectives. As well, contention exists on whether and under what conditions it is possible to recognize specific emotions reliably and predictably identify their influence on specific sustainability behaviors, especially in research and policy contexts where quantitative assessments are preferred (e.g., [38]). While we acknowledge that these challenges and debates are important, our perspective considers foundational entry points for emotions in research and policy, with the aim of addressing their nascence in ocean sustainability and marine conservation studies. We highlight three intellectual pathways for emotions research—Cognitive-Affective Pathway, the Social Psychological Pathway, and the Human Geography Pathway, drawing on a range of subfields that inform emotions research.

### *2.1. Cognitive-Affective Pathway*

According to cognitive-affective research, emotions can be understood as brain–body biochemical signals that influence decision-making, perception, and action. These signals are then interpreted and expressed socially and culturally, informing individual and group-level decision-making [1,2,38–44]. Emotions are neurophysiological states measurable through indicators such as heart rate variability, cortisol levels, and brain imaging, and observational techniques where emotion expressions are observed and assessed. Cognitive science researchers—now using FMRIs and other brain imaging technologies—have found that emotions can be powerful determinants of supposedly rational decisions [45–47]. Emotions organize and structure the mind because the brain manages—selects, processes, edits, interprets, and constructs—the physical and social environmental signals in which we are immersed [48]. This emotional signal is then projected upon the world, manifesting overtime as belief systems, societal norms, preferences, and customs (e.g., [49]), and in turn, facilitate other cognitive elements central to decision-making, including perceptions [1,50], values [51,52], beliefs [53,54], and attitudes [55,56]. For example, in a study of recreational fishers in Spain, increased time spent fishing was linked to reduced perceived stress and lower negative affect, suggesting that the activity fostered emotional restoration and well-

being [8]. Another study surveyed ocean-going fishermen in China, and found that stronger perceived social support and more adaptive emotion regulation strategies were associated with higher reported quality of life [9]. These examples focus on the role of emotions and relationships to other elements like perceptions of marine environments as sources of personal and social value, which can, in turn, influence experience and decision-making in the ocean environment.

### *2.2. Social Psychological Pathway*

From a social-psychological perspective, emotions are experienced at both individual and group decision-making, shaped by valence (positive–negative) and intensity [2,56], making emotions policy and governance relevant [57]. As individuals, conscious decision-making is influenced by how we reconcile our priorities to generate internal emotional coherence. Emotional coherence is when we consciously maximize our satisfaction of multiple demands or constraints [58] through self-evaluation and inferring others' stated or unstated goals. From this perspective, we must also recognize emotional valence—the positive or negative tint to an emotion—and emotional intensity play roles too because those characteristics allow us to understand how intuition, belief systems, and rationality directed decision-making for individuals and groups. While there are alternative explanations of how emotions transfer within a group [59,60], one compelling explanation is that individual-to-group decisions are made once conscious or unconscious option coherence is established, such as when an option with a strong positive emotional valence emerges and is agreed upon [61,62]. As an example, a longitudinal study of fishers' perceptions toward marine protected area implementation found that emotional responses shifted over time—from initial frustration and resistance to eventual support—as trust in policymakers grew and benefits became more apparent among the groups [12]. In this thread, recognition and applications are also growing in the literature on addressing climate change (e.g., [63]), focusing on why people deny climate change as well as resist mitigation and adaptation efforts [64], how emotions can predict climate policy support [65], and how emotions are expressed under conditions of rapid change [66,67], including in the ocean [68]. Such insights will be important approaches to advance ocean sustainability, especially since marine conservation studies are examining how marine conservation areas can contribute to climate action [68,69].

### *2.3. Human Geography Pathway*

This pathway looks at how emotions are produced by and manifest because of interaction in with social, cultural, economic, and political contexts of human behavior and interaction, largely from perspectives and subdisciplines related to human geography [36,37]. For instance, researchers from cognitive and behavioral geographies consider how psychological phenomenon is distributed across space because of people's attachment and experiences in social and environmental settings [70,71], how emotions shape human behaviors connected to specific in spaces and times [72], how emotions are shared, transferred, and influenced through social and cultural processes [73,74], and how emotions are inextricably linked to social, cultural, economic, and political structures and processes that shape identity [37]. For instance, narrative interviews with multispecies fishers in Newfoundland and Labrador revealed how emotions such as pride, anxiety, and hope were embedded in responses to ecological shifts, market fluctuations, and evolving fisheries policies [6]. These emotional narratives reflected not only personal and family experiences but also broader social, cultural, and institutional contexts, shaping how fishers adapted their livelihoods. González-Hidalgo et al. [36] highlight several theoretical traditions connected to feminist political ecology, focusing on the ways emotions are inextricably linked to social,

cultural, economic, and political structures and processes that shape identity, power and political relations, and collective action. For instance, extensive participant observation and key informant interviews with Tongan fishers in the Ha'apai Group showed that shared environmental models, cultural values, and emotional norms—such as pride in stewardship and shame over overharvesting—reinforced collective restraint and cooperation in resource management [7]. These emotions operated as social regulators, aligning individual behavior with community-based conservation goals. This case illustrates how culturally grounded emotional norms can underpin collective action for sustainable marine resource use.

## 3. What Dominant Ways of Thinking and Alternatives Inform How Emotions Are Understood in Marine Contexts?

Across the multi-dimensional understanding of emotions, there are some challenges associated with leveraging these pathways to consider emotions in ocean sustainability and marine conservation. If emotions are thought of at all, they can be deemed irrelevant, messy, and variable to be useful in science and evidence-informed planning and policy dialog, as demonstrated in research linking emotions to environmental decision-making and policy [3–6,8–12,17,19,39,40,48,57,64], and consistent among debates about emotions (e.g., [1,75,76]). Table 1 is a summary of this literature, showing dominant misunderstandings associated with emotions research—rationality bias, predictability bias, and context-ignorance—and highlights alternative positions drawn from an interdisciplinary synthesis.

**Table 1.** A summary of misunderstandings and alternative positions to the role of emotions in research and dialog for marine conservation policy.

| Misunderstandings and Implications | Evidence-Based Alternative Positions |
| --- | --- |
| Emotions can be rejected in favor of the dominant rationality paradigm. Emotions are either unknowable or unreliable for use in marine conservation and ocean sustainability and policy research. This is a rationality bias. | Technology (fMRI) shows emotion function within the brain.<br>Biochemistry and physiology can track emotions within the body.<br>Emotions can be observed to influence attitudes and behaviors<br>Explicit emotions can be categorized and characterized using intensity, valence. |
| The experience of individual emotions is sometimes seen as independent from collective experiences and actions, and thus on aggregate, rational decision-making can be anticipated. This is the predictability bias. | Emotional coherence within a group, across different individuals, is necessary for the group to decide.<br>Emotions are dynamic, shared and transferred through social interaction including about the environment<br>Emotions drive social, cultural, and environmental change and vice versa, through individual and group decision-making |
| The influence of emotions on behavior and human activity are sometimes seen discounted as context, along with the cultural and social processes in which the emotions are based. This is a context-ignorance bias | Emotions are inextricably linked to the cultural, social, economic, and political structures and processes that are informed by and shape environmental outcomes<br>Emotions are mediating, informing, and shaping relationships people have with one another on coasts and oceans, and they have with coastal and marine resources<br>Emotions are source and expression of behaviors that shape governance outcomes, conflict and cooperation |

A graphical representation of these biases are provided in Figure 1. The figure illustrates side-by-side depiction of the dominant rational actor model where emotions are excluded based on the biases described in Table 1, and the emotionally realistic model, where emotions are integral to understanding policy outcomes, based on the alternatives depicted in Table 1.

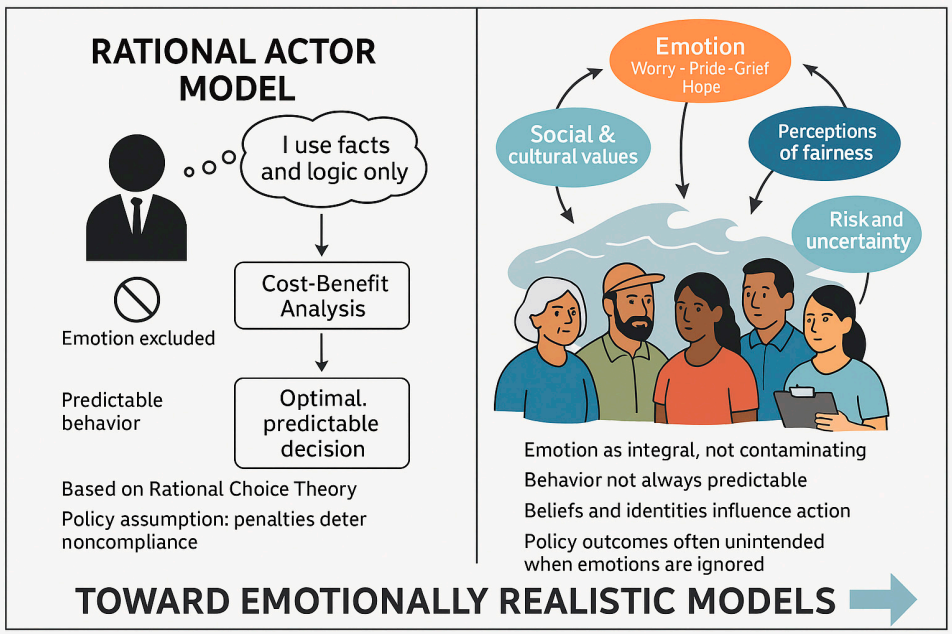



**Figure 1.** A graphical representation of two models of human decision-making, comparing the rational actor model and the emotional realistic model.

### *3.1. Rationality Bias*

The rationality bias is the projection of rationality onto people. Researchers, policy-makers and coastal and marine users and leaders are often seen as rational actors who rely on forms of cost–benefit analysis to generate options and make decisions [77,78]. Any emotions implicated in these processes are viewed as causally inconsistent or determined by peoples' external preferences, explanations that are easily dismissed or even ridiculed. The assumption that if actors are provided more or better information then, inevitably, that information will be used to make the best—i.e., rational—decisions [79,80]. In many societies, this perspective maintains a pervasive and normative influence where "emotion should have no place in policy design/implementation" [81] (p. 12) (see also [82,83]). This collective image of what the human mind is and how it works which, in turn, drives theory development [2,40,84], like Rational Choice Theory [85,86], including in environmental research [69]. Theories based on the rationality bias are widely critiqued and demonstrated to be limited in experiential and observational research [82], particularly when related to individuals' shifts in fundamental belief systems and attitudes toward complex and value-laden environmental problems [64,87].

### *3.2. Predictability Bias*

The predictability bias is the assumption that rational decision-making can be anticipated in empirical models and policy-making processes. The individual experience of emotions is sometimes seen as independent from collective experiences and actions, where variations on emotional in individuals aggregate toward rational decision-making. Even though individuals and the diversity of experience in a group can influence outcomes, marine conservation research, policies and intervention programs are often based in empirical and conceptual models that incorporate idea of aggregate rationality in assumptions about decision-making. This can lead to unanticipated social and behavioral outcomes [88] including in the context of compliance with marine conservation rules [89]. As a counterpoint to this bias, we argue that assumptions about decision-making need to be compared with the evidence and through methods provided by a wide range of disciplines with recognition of intragroup diversity and variation, as described above. For example, Brosch

argues that "behavior change interventions need to be theoretically grounded in affective psychology" [90] (p. 15), which includes emotions, and is recognized in as one of the knowledge inputs needed for compliance [91]. Without an understanding of emotions, policies are more likely to create outcomes that are typically thought as unintended for marine conservation, especially when it is assumed that their behavior can be easily predicted on aggregate. For example, emotions can influence the willingness to remain pursuing fishing livelihoods past the point when it is economically viable, an influence often missed when it is assumed that fishers are largely profit maximizers [6]. Another example is when emotions inform collaborations or conflicts in response to new rules and their potential impacts to rights, values, and lifeways [92], a present but also long-lasting influence of emotions coastal actors' memories and feelings of connectedness to marine conservation issues [33].

### *3.3. Context-Ignorance Bias*

The context-ignorance bias is the rejection of emotions along with the diverse psychological, cultural, social, and institutional processes in which they are based. In other words, emotions along with other non-ecological and -economic dimensions may not be deemed to be relevant in empirical models and policy-making for marine conservation and ocean sustainability. Yet, coastal and marine systems where behavior and emotions are expressed are much more interactional, complex, dynamic, and uncertain than is typically appreciated [93,94]. Human dimensions researchers try to elicit a stronger understanding of these qualities and the challenges for ocean governance [95,96]. Correspondingly, understanding emotions' expression requires stronger engagement with knowledge about the diverse structures and processes across coastal and marine systems and their governance shaping that expression. For example, Nightingale highlighted how emotional expressions in thought and action differ according to coastal and marine settings, because of attachments and experiences in those settings [97,98]. The differences help explain contradictions between what fishers may say they want for conservation vs. their actual actions on their coastal water. According to Nightingale [97,98], emotions need to be located in space and time to understand their influence on conservation outcomes.

## 4. How Can Emotion Be Applied to Improve Marine Conservation Research and Practice?

For broad appreciation and incorporation of emotions in ocean sustainability, we need to overcome these biases in the context of marine conservation, including by amplifying examples and the source literature. There are many instruments that advance conservation, including spatial controls like Marine Protected Areas and temporal controls like fisheries openings and closures. Essential to these instruments' success is high quality interactions and a deep understanding of ocean users' priorities, experiences, and activities, including their implicit or explicit emotions vis a vis these instruments and the governance that enables their application [11–13,85,86,99]. These examples bring attention to the need and opportunities to understand, depict, and anticipate the interactions among ocean users, actors, and leaders, via a nuanced understanding of emotions. In this section, we highlight the importance of emotionally aware research and decision-making in strategic and practical outcomes for marine conservation. We focus on opportunities for research and dialog to understand the role of emotions in shaping marine conservation outcomes.

### *4.1. Recognizing What Emotions Are for Marine Conservation*

With greater clarity offered by the literature described above, research and practice can develop more emotionally realistic assessments and explanations of how marine conser-

vation outcomes unfold, in places people care about and through policy and instruments that may be contested. For example, research has found that fear and resistance often arise when emotional needs about livelihood security, identity, or equity are overlooked in policy design [34]. Environmental decision-making researchers, including related to marine conservation, have focused on the role of how we view the world as the basis for many decision-making outcomes, including our experiences, behavior, support for policies, and the quality of engagement and collaboration [100,101]. How we view is often characterized by concepts like mental models [102] and more deeply, the images people hold in their mind about conservation problems and solutions [103]. These then have implications for why, what and how to govern [104], along with where and what emotions are expected, how they are expressed, and how they are understood and shared [97,98,105].

The interdisciplinary literature shows that there is compelling evidence for why we should recognize emotions' influence on belief systems, internal identity, and emotional coherence in decision-making across diverse environmental, sociocultural, economic, and political structures or processes related to coastal and marine systems. Understanding the potential for emotions in explanatory and predictive research and modeling can support two outcomes. First, emotions influence perceptions, experience, identity, and actions in context. Second, engaging with emotions will help effectively understand, negotiate, and leverage diverse contextual elements in marine conservation research and policy dialog. Emotionally informed research strategies—like narratives and story-telling, participatory planning, use of a range of media, and emotional mapping—can help advance marine conservation as more legitimate, equitable, and effective [6,57,58,106].

### *4.2. The Experience of Emotions Is the Experience of Marine Conservation*

Emotions are fundamental to how individuals and groups connect to the aspects and issues shaping marine conservation, as well as how they relate the coastal and ocean space and resources, such as their place attachments, emotional health, their compassion for marine conservation issues, and their subjective well-being associated with their relationship to the ocean. Emotions also influence behavioral change for coastal users, actors, and leaders. Individuals' emotions along with other internal and external drivers shape the timing and direction of behavioral change. In fisheries, for example, emotion can influence changes in fishing effort, such as when fishers harvest (i.e., timing) and how hard (i.e., intensification), including the risks they take [7]. Emotions have also been linked to changing locations of fishing (i.e., extensification) [10], as well as significant shifts in the direction of behavior such as through in individual participation in the fishery (e.g., investing in and exiting the fishery), and outmigration from adjacent communities [6]. All of these examples produce emotionally laden outcomes, which have implications for social, cultural, and economic dimensions of marine conservation.

Emotions can demonstrate the current and future support for conservation policies and other rules, such as spatial controls. Both ocean users and leaders show support (or not) in many ways for conservation policies, programs, and initiatives that influence conservation objectives. In planning meetings, decision-makers can offer verbal and non-verbal support, which often express implicit or explicit emotions of interest and satisfaction. When these policy priorities, processes, and rule outcomes align (or not) with reality, ocean actors experience this emotionally. For example, users may be upset and suspicious, or happy and engaged. New rules may displace, discourage, and limit access to resources, and the persistence of livelihoods and lifeways dependent on access, which can in turn emotional response, trauma, and need for different supports and care, as demonstrated by how fish harvesters talk about justice in small-scale fisheries [89], and highlighted in terrestrial feminist political ecological research related to avenues for therapy [107]. Some

researchers have explored emotions in encouraging consent to new rules of the public, often conceptualized as social license [108]. The emphasis has been on incorporating perceptions, beliefs, and feelings about what might happen with a proposed policy, rule or program as ways to understand social license from perspectives of environmental users, actors and leaders [109]. More fundamentally, emotions research shows how emotions can underpin, transfer, and mediate these perspectives, and suggest, emotional involvement is under-recognized in the literature as a driver of social license [110].

### *4.3. Emotions Influence, and Are Influenced by, the Social and Cultural Aspects of Marine Conservation*

Emotions can influence a group's interpersonal interactions in collaboration, engagement and, ultimately, successful outcomes in marine conservation efforts, which remain essential to advance marine conservation. To collaborate and engage, people interact with one another in communities and policy-making venues such as during the establishment of Marine Protected Areas. When people experience high quality interactions—those interactions that are pleasant, productive, timely, and well-managed—they more often feel like they can trust and respect one another, and support respectful negotiation of difference. These interpretations are all based on emotions. For example, positive emotions during interactions increase trust, whereas negative emotions decrease trust [111]. Other researchers have even conceptualized trust, respect, and the related emotion of loyalty as 'social emotions' [112] or collective emotions [59]. In this setting, emotions are indivisible from actively constructed human interactions [60], as relationships determine how emotions are shared, distributed, and collectively expressed, along with social, cultural, and institutional norms that shape when, how, and to what extent collective emotions are developed and expressed [60]. The reverse is also likely. When negative emotions emerge, frustrations or animosity grows, and planning or progress stalls. Without effective management of these emotions, perspectives can harden and undermine feelings of trust and goodwill among those with potentially contradictory perspectives. In communities' decisions may be lauded or not well-received, and community members may respond in multiple ways, including undertaking individual and collective political action.

Emotions can galvanize conflict and cooperation. Therefore, the emotion variable should be understood as an important determinant of how and why people interact, and what they do as a result of those interactions in the development and implementation of marine conservation actions. Accordingly, researchers have urged caution in how research and dialog leveraged and mobilizes extreme emotional spectrums, such as hope and fear. In research communication and policy dialog, emotions can help or hurt attempts to bridge silos and differences for marine conservation in the common interest: fear can divide, hope sometimes disappoints, but awe can inspire collaboration and partnerships. Research connecting emotions and marine conservation has highlight empathy and emotional engagement (e.g., through messaging, pledges, shared values) can foster support, stewardship, and proactive conservation behavior.

## 5. Conclusions and Next Steps

This article has conceptualized emotions for ocean sustainability and marine conservation research and policy dialog. We drew on interdisciplinary insights from emerging examples in ocean sustainability and marine conservation contexts, research on the subjective and human dimensions in these contexts, and three intellectual pathways to understand emotions. Our perspective argues that emotions are not only measurable—through physiological indicators such as heart rate variability, cortisol levels, and brain imaging—but also observable in the ways people express themselves in particular contexts. These signals structure cognition, guide beliefs, and shape values, while being interacting by social

norms, cultural practices, and environmental conditions. Based on this conceptualization, we argued emotions play a critical influence for individual decisions, collective responses, community cohesion, and ultimately the trajectories of policy processes, while highlighting examples in fisheries [6–10] and marine conservation [11–13]. Our essay highlights opportunities to examine and document emotions for understanding behavioral change in marine and coastal settings [6,97], compliance to marine policy and rules [89,90], engagement and even social license for conservation areas and other instruments [107,110], and collaboration and collective action [92,107].

Emotions remain an underutilized lens in ocean sustainability science and marine conservation research. Our synthesis shows that overlooking emotions perpetuates rationality, predictability, and context-ignorance biases. In turn, these biases can limit the effectiveness and meaningfulness of the design and implementation of marine conservation strategies and approaches [3–6,8–12,17,19,39,40,48,57,64]. By addressing these biases, researchers and practitioners can better understand how emotional responses—ranging from ecological grief and anger to pride, awe, and empathy—shape conservation initiatives. This understanding is relevant to urgent challenges associated with marine conservation such as the need to support climate action [63–67], to establish conservation policy and areas [11–13], and to more effectively navigation of conflicts [34,97]. In each of these areas, we argue, emotions underpin both resistance and cooperation, and provide signals about values, beliefs, and perceptions that may not be in alignment with assumptions in conservation policy and rulemaking.

Moving forward, research agendas must explicitly embed emotions in the human dimensions of ocean sustainability and marine conservation. Future work should identify and name discrete emotions, analyze their cultural and contextual specificities, and integrate them into models of human behavior and governance change. Cross-cultural, place-based research is particularly needed to capture Indigenous and other coastal lifeways and avoid category errors rooted in Western assumptions. At the same time, careful distinctions should be made between emotions and related constructs such as identity or connectedness to the ocean.

Methodologically, there is great promise in adopting mixed-method approaches that bridge diverse disciplines and knowledge types. Combining cognitive-affective mapping, social media sentiment analysis, and physiological measurement with storytelling, art, and drama can capture both explicit and implicit emotional flows. Such approaches make it possible to trace how emotions translate into actions such as compliance, stewardship, or advocacy, while also revealing feedback loops across entire policy cycles.

Finally, practice and policy must evolve to explicitly recognize emotional realities. Emotions must be treated as more than "soft" or secondary concerns. Policy-makers can integrate emotion mapping into marine planning, incorporate emotionally laden stories into engagement processes, and develop trauma-informed protocols can strengthen trust and empathy in conservation. Ethical guidelines should support policymakers in using emotional framing responsibly, ensuring that engagement neither exploits nor dismisses the affective realities of communities. By engaging emotions early and explicitly, governments, NGOs, and communities can co-develop conservation approaches that resonate with people's lived emotional realities, deepen collaboration based on these realities, and build the social capacity necessary for sharing positive and negative emotions associated with transformative change.

Emotions are central to how people engage with the ocean, yet they remain overlooked in marine conservation and ocean governance. Recognizing the role of emotions in structuring cognition, guiding behavior, and shaping collective outcomes opens a new frontier for marine conservation research and practice. Advancing this frontier requires

interdisciplinary collaboration, methodological innovation, and ethical attentiveness. By doing so, marine conservation and ocean governance can more effectively engage with the lived experiences of people, thereby supporting just and emotionally informed pathways to sustainable oceans.

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