

The colour of seawater: colour perception and environmental change in Dominican seascapes[★]

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The colour of seawater is a topic of daily discussion among diver fishermen in the Dominican Republic, who navigate shifting ocean environments alongside conservation politics. While conservation policies often target fishing as the main cause of declines in the health of marine ecologies, fishermen use colour to create alternative narratives about changing climates. Describing the sea as blue, black, brown, green, whitewash, purple, and chocolate, divers point to the broader causes of shifting seascapes while chronicling their affective and embodied consequences. Based on ethnographic fieldwork among Dominican diver fishermen, this article explores the colour of seawater as a lens for understanding the physical, affective, social, and political consequences of changing climates for communities who are deeply entangled in shifting sea ecologies. For diver fishermen, whose engagements with the sea depend on visibility, colours provide ways of interpreting fishing possibilities, navigating ocean spaces, and measuring the effects of changing environments. Given the centrality of colour perception in fishermen's lives, this article argues that colours provide an alternative narrative about changing climates, linking shifting marine conditions to global systemic problems, rather than blaming changes in environmental conditions on supposedly irresponsible practices of local people.

Estero Salado, a Dominican fishing town that sits across the border from Haiti, is animated by the hues of the ocean. At the bridge over the fishermen's wharf – the highest point along the beach – motorcycles lined the curb. Arriving mid-morning, I asked what everyone was doing here. 'The usual', Ramón,¹ a diver fisherman responded, waving an arm towards the sea, 'looking at the ocean when we can't fish'. Rain and higher than usual seas in the past weeks had stranded a significant number of Estero Salado's normally amphibious community on land. 'Even though it's dirty, we come to watch'. For Ramón and others whose livelihoods depend on the ability to navigate the underwater, dirty water affects their ability to see the fish they hunt with spearguns along the region's labyrinth of reefs, shoals, and seamounts. The colours of the sea refigure quotidian ways

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that fishermen relate to one another and to the environment. I followed the collective gaze out to sea, looking north towards the British territory of Turks and Caicos. ‘You don’t see the dirtiness out there?’ another fisherman asked me, pointing towards the horizon, ‘Look. Look at all that’. Félix, with whom I fished frequently the past summer, explained, ‘You see it as blue, but out there it’s dirty, the water is black’. From his post, leaning against the rail, another diver pitched in an explanation.

What happens is that in here, close to shore, there’s mud. That’s why you see it as brown. But out there, there’s sand. The sea is stirred up and it lifts the sand up from the bottom. From above you see it as clean, but when you sink to the bottom, you can’t see anything.

Perhaps the physics student Franz Boas would have benefited from a conversation with Dominican diver fishermen as he sought to answer the question in his 1881 dissertation: ‘What is the colour of seawater?’ (Boas 1881). His inability to objectively answer this question led to a successful career in anthropology, and a profound transformation for the discipline. Seawater – Boas argued after having examined absorptions, reflection, and the polarization of light – was a ‘matter of cultural construal, rather than of sheer empiricity’ (Helmreich 2011: 133). Although he didn’t cite the aqueous interactions of mud and sand that Félix explained above, Boas pointed to the situational aspects that shaded visual perception, arguing that what psychophysics had assumed to be quantitative was actually qualitative, thereby ‘call[ing] into question the very possibility of a general measure of all perceptions’ (Stocking 1982 [1968]: 142–3).

Blue, black, yellow, green, whitewash, purple, and chocolate are all words used by diver fishermen to describe the colour of seawater at different times, and under changing circumstances. Colours indicate the strength of the swell, the direction of the current, or heavy rains inland that spread fresh water and sediment into the sea. Below the surface, colours signal depth and the geography of the seafloor, as well as the canvas against which marine life practises the art of survival. Whereas certain seasons used to coincide with predictable aquatic colour palettes, fishermen in recent years have noted drastic changes in both the colours and the conditions of the ocean. Warming nearshore temperatures and sedimentation from the nearby river mouth have left their fishing grounds a permanent yellow-white hue, and driven fish populations into deeper water. Swells from exaggerated hurricane seasons turn the normally tranquil bay brown for months at a time, whereas in the past the sea regained its azure composure within a week.

This article centres colour perception as one way that communities most impacted by changing sea environments narrate the physical, affective, social, and political consequences of climate change in their lives. Perceiving colour at sea is more than just a visual experience. Knowing colour is a way of knowing ocean environments at multiple scales, knowing how marine changes manifest, and knowing what such changes mean for those most deeply entangled in ocean ecologies. Marine ecologies are widely understood to be exceptionally vulnerable in the Caribbean (Moore 2019). As I discuss below, much of the dialogue surrounding conservation attempts and environmental governance centres on the fishing behaviours of coastal communities in the Dominican Republic, where overfishing is assumed to be the predominant cause of declining coastal ecologies. This article is firmly moored in the idea that we should attempt to understand changing climates from the perspectives of those who have the most at stake in such changes. By focusing on the colours of seawater and how they indicate shifting weather

patterns, pollution from waterways shared with agricultural industries, and rising water temperatures, other possible narratives about ecological decline emerge, specifically ones that link marine degradation to global systemic problems, rather than to the irresponsible behaviours of local people.

Colour, culture, and the sea

Colours are crucial to how we understand the ocean. The vibrant hues of coral reefs have become synonymous with visual economies of paradise and the wonders of the oceans (Elias 2019), so much so that declines in the ecological health of our seas are often equated with a lack of colour, in the case of coral bleaching. In recent decades, blue has become a cultural association almost synonymous with the ocean – a trend epitomized through contemporary branding such as the blue economy, blue ecology, or blue humanities. Yet as historians have documented, the ocean has long been described by colours other than blue. Old English terms for white were used to describe the sea, and scholars note the absence of blue in the Ancient Greek lexicon, where the ocean was often described as ‘wine-red’ (Jue 2020; Sassi 2017). As Boas deduced, and as others later corroborated, these differing ways of perceiving colour are not anatomical, but, rather, tied to both cultural and affective contexts that shape how people name and categorize colour (Sassi 2017).

Following Boas, anthropologists have studied colours and colour perception as a crucial aspect of culture. For some, colours are semiotic codes that organize and give meaning to social relations (O’Neale & Dolores 1943; Sahlins 1976). Others point to the importance of socio-environmental factors in the way people perceive colour (Bille & Sørensen 2007; Conklin 1986; Ingold 2005), or the affective experiences of colour (Joy 2015). In his comparative colour study, Victor Turner concluded that colours and the way people see them are not simply different visual perceptions. Rather, they are ‘condensations of whole realms of psychobiological experience involving reason and all the senses’ (Turner 1967: 91). Rephrased, Turner’s research suggests ‘color is fundamentally involved in the making of culture from the human body’ (Taussig 2006: 35). Michael Taussig (2006) describes the role of colour in culture as deeply affective and embodied, constituting a kind of immersive and experiential knowledge.

The scholarship on colour and culture is expansive, but in this article I aim to revisit Boas’s original question, keeping in mind that his inability to answer it led to anthropological research in the Arctic. This research trip shifted his focus from questions of physics to more general considerations of how people perceive their environments (Timreck 1980). This article explores colour as a lens with which to engage the interplay of environmental knowledge and embodied experience. In the context of changing ocean environments, talking about colours is one way that Dominican fishermen articulate narratives about changing ecologies and the lived consequences of these changes.

Narrating climate change

‘The sea has lost its colour’, Luis attested, recounting the recent history of marine declines as we sat on his patio, repairing fishing gear. ‘When you would motor out five miles, the water would be blue – but do you know what a *real* blue is? They used to sell a bottle of rum, Brugal, the glass was a *blue* blue. Beautiful’. He made a gesture of aesthetic appreciation, a kiss to the universe off the tips of his fingers for having created such beauty. ‘The sea doesn’t get that colour any more’. Luis had been a diver fisherman

for over twenty-five years, and in the past fifteen years he has noticed changes to the hues of his aquatic environment. For him, colours allow for a way of sensing environmental changes, but these shifts in marine ecologies have also been the focus of conservation projects in the region.

In the past decade, a wave of state-sponsored and NGO-driven conservation programmes seeking to manage marine spaces and populations have increasingly focused their attention on Dominican seascapes. These conservation-driven programmes have focused on small-scale commercial fishing as a threat to ecological health, targeting certain fishing practices (mesh size of nets, the use of a compressor for diving), while simultaneously placing fishing bans, both permanent and seasonal, on certain species. Under these internationally funded conservation regimes, fishermen watch their labour grow increasingly illegal, but without respectable alternatives for income, they continue to fish despite the legal risks. In the two years during which I resided and conducted ethnographic research in Estero Salado, four educational meetings and five sustainable fishing workshops were held, and eighteen new fishing bans were implemented. Little to no attention was directed towards other sources of anthropogenic environmental changes. Each meeting or workshop was made public through Facebook or Instagram posts chronicling the activities of state agencies and NGOs, cultivating a narrative of environmentally responsible intervention into the lives of rural fishermen.

Many Caribbean communities, including Estero Salado, live amongst growing scientific interest in ocean ecosystems, fisheries, and resource management initiatives, projects that habitually seek to quantify ocean environments and fishermen's roles in changing seascapes. Often funded by large US or European environmental organizations with explicit sustainable development goals, conservationists and fisheries management scientists tend to quantify underwater ecologies. I regularly accompanied diver fishermen who were enlisted to lead biologists or conservationists to certain reef banks, where they would count the numbers of urchins or parrotfish, or measure the size of bleached reefs. These data are used to support a broader regional narrative that advocates for ecological education and intervention in the cultural practices of coastal communities who depend on marine resources.

Assumptions about Afro-Caribbean communities and their inability to be responsible stewards of vulnerable ecosystems abound in the Caribbean, where cosmopolitan environmentalism (Braverman 2015; Lorimer 2015) often understands rural communities as in need of intervention (Connell 2020; Holmes 2010; Price 2006). While marine conservation programmes and policies have been long in the making in the Caribbean (Crawford 2020; Elias 2019), their recent success and flurry of activity at regional and local scales have been attributed to the rise of what Amelia Moore (2019) terms 'global change science'. Recognizing both the urgency of depleted marine ecosystems and the economic opportunities promised by ecotourism, the Dominican Republic has been quick to participate in regional collaborations such as the Caribbean Challenge Initiative (CCI). Launched by the Nature Conservancy and international funding partners, the CCI established the Caribbean Biodiversity Fund, which provided access to an endowment of US\$42 million to Caribbean nations which committed to putting 20 per cent of their nearshore environments under legal protection by 2020. Recognizing its unique nearshore and coastal environment, conservation organizations identified Estero Salado as a site with much potential for protection and ecotourism.

National reports on the health of Dominican seascapes have titles such as 'Fishing consumes marine life' (Mejía & del Cid 2015). Interventions have sought to manage fishermen's engagements with marine environments through increased state surveillance of the coastal region, a flood of new catch laws and restrictions, and a wave of funding to put certain areas off limits to fishing, often to use them as ecotourism destinations. Conservation projects have proposed to replace jobs in fishing with jobs in ecotourism, but as these initiatives have developed nation-wide, very few fishermen in Estero Salado have been folded into networks of the tourism economy.²

Amid increasing attention to ocean environments, colour is a means through which fishermen describe the same ocean conditions that interest marine biologists and conservationists, yet in a more holistic manner. As they forefront colour, divers express their own narratives of changing marine environments, pointing to broader anthropogenic causes of shifting seas, including the effects of river runoff from agricultural industries or the subaquatic damages of hurricanes, both of which directly affect their bodies, their health, and their ability to make a living in risky environmental conditions. Through an analysis of colour experiences and understandings, I argue that colour perceptions reframe ecological, affective, and political conceptualizations of changing climates. In privileging the explanatory models of diver fishermen, this article brings marginalized perspectives and experiences of changing climates to centre stage,³ diving deeper into what exactly is seen, felt, or embodied through colour at sea.

Dive fishing as immersive environmental perception

Unlike fishing with a hook and line or with nets, spearfishing revolves around the ability to see through and immerse the body in water. In this way, colour is not just a visual experience, but an immersive environmental perception. In the town of Estero Salado, which includes less than 7 miles of coastline, there are 120 diver fishermen who spearfish using two methods. The first and oldest means of spearfishing is by freediving, where fishermen swim with fins, a mask, a snorkel, a speargun, and a metal wire with a stopper on the end that they string fish onto once they have been caught. (Fig. 1). Freediver fishermen must dive down to the seafloor (6 to 60 feet in depth) on a breath hold to stalk and spear fish. Depending on the conditions, freedivers may fish individually from the shore, swimming for up to seven hours along nearshore banks, reefs, and small cays, or they may collectively rent an outboard-motored skiff to reach small islets and reef banks between 3 and 8 miles offshore. Skiffs belong to fishmongers, and using one means that the fishermen must forfeit a portion of their earnings for the cost of petrol and a cut of their catch that goes to the owner of the boat.

The other means of dive fishing is with a compressor. Fishing with a compressor means that divers do not have to depend on a breath hold, since a hose connects them to an endless air supply on the surface, and compressor fishing allows them to fish deeper waters (from 30 to 120 feet) more productively, although with significantly more risk. Where freedivers may bring in a catch of 1,200 Dominican pesos (US\$22) with 14–18 pounds of fish, compressor fishermen in a day's work make upwards of 3,000 DOP (US\$60) with 30–40 pounds of catch. The compressor as a fishing technology has been determined as a source of overfishing by conservation organizations (Mejía & del Cid 2015; Pavlowich & Kapuscinski 2017), yet it is also the surest way that fishermen can earn income in a region where warming temperatures in the shallows have pushed fished populations into deeper, cooler water. When nearshore waters are dirty and



Figure 1. A diver holds up a catch line. (Photo by the author.)

freediving is impossible, those who can often turn to compressor fishing to make ends meet. Both compressor divers and freedivers are between the ages of 15 and 50, and few of them have completed high school. As the sons of poor families in a rural part of the country where jobs are scarce, they begin fishing as teenagers to support their families, forgoing school. Despite their lack of formal education, divers are keen observers of marine ecologies and experts of their environments.

In five years of ethnographic research among the northern Dominican coast's rhythms of commercial fishing – which included interviews, participant observation, and my own endeavours to learn to spearfish – the colour of seawater was mentioned every day in conversations among my interlocutors. Given the centrality of colour perception in these people's lives, I explore colour as a local analytic for changing marine ecosystems, and as a register for the affective and embodied consequences of such change. As fishermen navigate the colours of seawater, they vocalize an environmental knowledge that runs contrary to dominant environmental narratives. Whereas the regional politics of conservation depicts fishermen as threats to healthy reefs and oceans, fishermen use colours as ways of talking about their physical, affective, historical, and communal ties to ocean environments, revealing broader ecopolitical conditions and the deeply personal consequences of climate change.

While this article intends to describe the ethnographic weight of colour perceptions as they relate to ocean environments, Table 1 provides the reader with a consolidated ecological vocabulary with terms used most frequently by fishermen alongside their sea-specific meaning.⁴

Conducting subaquatic ethnography

Estero Salado suffers from perpetually blue skies. As I surfaced air just offshore one afternoon while accompanying a recreational dive excursion led by former fishermen,

Table 1. Colour meanings for ocean conditions.

Colour	Meaning
Blue <i>Azul</i>	The water is clean, clear.
Purple <i>Morado</i>	The water surpasses clean. Used to describe clear, deep water especially.
Yellow/yellowish <i>Amarillo/amarillento</i>	When the river brings an increase in streamflow and fresh water enters the sea, mixing with the ocean current.
Green <i>Verde</i>	When the water is slightly turbulent. The pools (spots where there is sand within a turtlegrass meadow) look green from far away.
Chocolate <i>Chocolate</i>	When the water is opaque as a result of strong swells and storms. Dive fishing is not possible.
Whitewash/milky/white <i>Alechá/blanco</i>	When the sea has an undercurrent (different from surface swells).
Black <i>Negra</i>	Similar to chocolate in that the water is opaque. Used to describe the sea when swells rip up the turtlegrass from the seafloor, often sloshing it onshore.

I looked up to find, unusually, an overcast white sky. Within a few minutes, the sky turned pale blue again as my eyes adjusted to the hues of the surface. Colours, as my senses indicated, depend on relations, and the way they are read has more than aesthetic consequences. On surfacing after a period in which my eyes had been inundated by the blue of 80-foot-deep water, I made the mistake of thinking that the colour of the sky, misread in relation to the colour of the sea, indicated something about the weather. This experience characterizes my own ethnographic immersion in seascapes of colour, environments where I expected to be able to navigate brilliant spectrums of coral colours amidst the dependable ocean blue. This was not the case. Monotone reefs, stripped of their colour after 10 feet, provided impossible camouflage for the fish I was trying to learn to catch, and my interlocutors rarely saw the sea as blue.

Attuning the body to other ways of seeing, communicating, and sensing is a mainstay in the methodology of most ethnographers. Immersed in seawater, learning to see and sense fish, and learning to navigate my own body through marine environments and their colours provided the data I use to make arguments about colour and its fluid perceptions. But conducting ethnographic research underwater requires different tools. The classic pen-and-paper combo is useless in seawater, and attempts to jot down notes on a bucking outboard-motored boat are, as I discovered, a recipe for seasickness. As I followed fishermen below the surface, a water-housed GoPro Hero 3 became my main tool of data collection, and one lens through which to think about colour. The photos I took during participant observation at sea were often a surprise once I arrived back on land (the Hero 3 had no viewfinder), and I would regularly share the images with the divers present when the pictures were taken. One such image featured Ramón, surfacing from a dive to the seafloor on a clear day, wearing a crimson long-sleeved shirt 8 feet below the surface (Fig. 2). What I loved about this image was the contrast in colour, what I saw as crimson against the deep, saturated blue of the water column. ‘Why isn’t Ramón wearing a shirt?’ his brother, also a freediver fisherman, asked when I proudly showed him this image. I began to second-guess my vision as still others asked the same question, assuming from the image that Ramón was shirtless.



Figure 2. Ramón surfacing from a dive. (Photo by the author.)

Red is the first colour filtered out by seawater, the first colour that one cannot see as one descends towards the ocean floor. Most of the stunning images of coral jungles, rainbow reef fixtures, and brilliant schools of fish portray a colour spectrum that you would not see if you dived down to the same spot where the image was taken.⁵ In order to restore the reds, oranges, and yellows that begin to disappear after only 10 feet, subaquatic photography depends on colour filters and flashlights. In essence, you must take the colour red or crimson down with you to depths at which it does not appear. As I looked at the image of Ramón, however, it was my memory of his shirt that filtered my perspective, convincing me that it was crimson when everyone else saw a colour akin to skin tone.⁶

If the colours that fishermen see from above disappear as they sink deeper into the sea, colour's experience must then be beyond one of immediate light or vision. My exploration of the multiple ways of sensing and engaging colour stem from encounters like this one, where fishermen described colour changes that I could not recognize, point to sea life that I found invisible, or where my own vision – saturated by one colour or the memory of colour – changed the way I saw other colours. The photographs I took became a mainstay in an ongoing collaborative analytic process regarding colour, perspective, and the navigation of both. Our sometimes-misaligned capacities to see colour in such contexts offered a fault line in assumptions about vision: that we *see* the same thing, only to deploy different interpretations informed by our cultural and experiential fields. As anyone knows who has ever tried to capture a sunset with a camera, photographs can be unreliable, since 'colors are always constructed in a picture, never simply reproduced' (Bogost 2020). Subaquatic photography provided the fault line through which I was able to explore how people see colour, and how these

perspectives were entangled with the shifting affects, embodiments, and knowledge of changing seascapes, topics that I further analyse in the sections to follow.

Affects and embodiments of immersion

The familiar scent of chocolate milk often greeted me as I arrived in the evenings at the homes of fishermen and their families. Although divers' work can be lucrative, ocean conditions dictate their ability to earn money, meaning that fishermen cycle through times of economic hardship. The chocolate milk I often saw simmering in deep aluminium pots is high in calories and cheap to buy, making it popular during times of financial difficulty, especially for families with small children. The colour of this easy meal, though, is one fishermen would rather not see from the shore.

'Chocolate', Manuel groaned in disgust as we looked seaward from the bridge over the fishermen's wharf. 'The colour of chocolate.' The ocean, having recently borne the brunt of hurricanes Irma and Maria, had an audience today, as twenty diver fishermen gathered informally to see if there was a chance of clear water on the horizon. Heavy rains mean that the river mouth of the Yaque del Norte, just west of Estero Salado, deposits a deluge of muddy water into the Atlantic, leaving the brackish mess at the mercy of the currents. High winds and turbulent seas that are also symptoms of hurricanes heighten the opacity of the sea. While many fishermen 'accompany the ocean', as they describe it, from the bridge on days when diving is impossible (Fig. 3), others avoid looking at all. I hadn't seen Manuel in the wake of the hurricane season, absent as he was from the bridge and beach. Impatient, I stopped by his home to check in and to ask why he had been avoiding the sea. I found him in a funk. 'If I see it, I despair a bit', he explained, hurting not only financially but also affectively from dirty water.

Swathes of dirty water tend to coagulate near the shore in Estero Salado. With such chocolate tides come parallel currents of ill-ease, restlessness, and disenchantment. Fishermen don't know when or if they will be able to meet their financial needs and the basic needs of their families. Accustomed to highly athletic work on a daily basis, divers get restless when they are stuck on shore and at home. Increasing instances of dirty water caused by weather incidents remind them that their livelihoods are inescapably threatened by climate change. Such sentiments were tangible at the bridge as slump-shouldered divers gathered in the morning, looking for hope on the horizon or taking solace in the shared experience of being stuck on land without the possibility of work.

Chocolate is one hue of what fishermen refer to as 'dirty water'. Chocolate indicates waters that have been thrashed by storm systems, with swells picking up silt, mud, turtlegrass, and even marine life, sloshing it all together where it sits along the shore, sometimes for weeks after the storm has passed. Yellow, in contrast, indicates a different source of opacity. Yellow means that the nearby river has flooded from rains inland, bringing runoff from the (often toxic) rice fields irrigated by the river alongside human waste. Fresh water floats on top of salt water, so yellow water can mean that work is possible, since fishermen may dive past the layer of yellow to find clear water below. Yellow water creates physically taxing labour conditions, since fishermen must dive down continually to see the seafloor. Divers who work in yellow water report debilitating ear infections and skin rashes, conditions I, too, experienced when accompanying divers through yellow seas. Similar to Teresa Montoya's account of toxic mining pollution in rivers of the Navajo Nation, yellow represents 'the slow violence of



Figure 3. Accompanying the ocean. (Photo by the author.)

environmental contamination' (2017: 92), and how some bodies are more vulnerable to this than others.

Colours are immersive environments for diver fishermen. As such, they chronicle both the affective and embodied experiences of shifting environmental conditions. Chocolate waters cause feelings of disenchantment, despair, and economic dread, while yellow seas have physiological impacts on divers' bodies.

Scholars have argued that attuning to affect provides a way to register the connections between people and their environments (Navaro-Yashin 2012; Whatmore 2013), largely because affect registers 'public feelings', not simply an individual's emotions (Luna 2018; Stewart 2007). Public feelings, however, have only played a minor role in narratives of conservation or global change science. This is especially so in the Global South, where vulnerable environments are often framed as precarious resources in need of protection for their role in biodiversity, or their long-term local economic impact. At one meeting held by the Ministry of Environment in Estero Salado, a spokesperson from the ministry explained the rationale behind a new ban on parrotfish, a species that made up between 30 and 40 per cent of fishermen's catch. 'A few years back, parrotfish was a third-class fish', she narrated to the group of fishermen attending the meeting. 'No one ate it. We started eating parrotfish because we finished off the other species. But parrotfish clean the reef, and they are the primary producers of sand ... So while they are cleaning ..., the biodiversity of the other marine species can develop more quickly'. This instance was one of many meetings held by conservation organizations or the Ministry of Environment that sought to educate fishermen about what species were key to national and regional biodiversity goals, and which they should thus avoid catching. In the environmental narratives made public by these organizations, fishermen feature

as ecological deprecators, their practices the object of intervention. These ways of explaining environmental decline obscure both the affective and embodied connection that fishing communities have to ecologies in flux. Environmental losses for local communities have impactful emotional tolls, as Suzanne Kent and Keri Vacanti Brondo (2020) demonstrate. Documenting this ecological grief, they argue, is imperative for imagining more inclusive and less imposing models of environmental conservation.

The emotional fabric of Estero Salado's fishing community shifted dramatically alongside the colours of seawater. While chocolate water invoked general feelings of restlessness, disenchantment, or irritability, blue and purple water produced excitement, camaraderie, and confidence as fishermen felt in their element. Boats leaving port for blue water were animated by the good humour of divers who filled the boat with laughter as they told stories, joking with and teasing each other. On a more promising day for fishing, I motored out with eight divers to an archipelago 7 miles from the coast. All heads leaned over the sides of the small boat, looking down as we approached the sloping reef of one island. '*Morado*', Ramón crooned, 'purple. Leave me here'. Marooned on land for weeks, his reaction at seeing purple water was both affective and deductive. High visibility would facilitate a more profitable day's work, but it would also allow him to embody the skills and expertise of his vocation.

In contrast, chocolate or yellow water means that the decision to go out to sea includes heightened economic and bodily risks. In order to arrive at certain offshore fishing spots, a group of fishermen use a boat belonging to one of the town's well-established fishmongers and successful businessmen. Fishermen take out a loan from the fishmonger in the morning to buy the petrol that will get them to these spots, paying off the petrol with the catch they bring in the afternoon. If the conditions yield a bad catch, fishermen are left owing the fishmonger the money they borrowed for petrol. They have spent the day working and instead of earning money, they must pay for the unproductive labour, leaving them deeper in debt.

Perceiving the colour of dirty water, however, is not so simple. While the shades of the sea often looked the same to me from the bridge, fishermen distinguished between water turned dirty by high seas (chocolate), by the river (yellow), or by undercurrents (whitewash). Since the succession of hurricanes in 2017 sent swells pounding against the shores of the northern coast, this meant that neither fish nor fishermen were able to *andar*, or walk about. Dirty water caused by high seas harms fish, which in October 2017 were sloshed out of the sea and onto Estero Salado's breakwater. In contrast, the opaque water that always seems to hang over the reefs and rocks nearest to the river mouth cloaks the abundant fish and other marine life that live there, keeping fishermen at bay. When currents shift and this fishing spot clears up – once or twice a year at most – the excitement is tangible as divers hunt fish that do not fear them, since they are not socialized to read the intentions of humans in the water. In spots that are regularly fished, conditions that are too blue mean that fish are able to see fishermen from afar, hiding before they come close enough to spear them. Thus, successful fishing depends not only on the colour of seawater, but also on how it coincides with the disposition of communities of fish in particular spots. Fishermen know the nuance of colour through their corporeal engagements with the sea, an embodied and affective understanding that they gain through experiences of relativity both to the environment and to their fellow inhabitants of this environment.

As we stood waiting on the bridge for the day's outboard-motored boats to return during a period of dirty water, the group of fishermen pointed to various spots of

potential blue on the horizon, theorizing when and under which conditions such clean water might enter places reachable by divers. ‘The water will be clean over there’, one fisherman pointed north towards Turks and Caicos, ‘there are no rivers’. When the nearshore water is chocolate or yellow, fishermen from across the northern coast of the Dominican Republic motor over to Turks and Caicos on trips with high risk and high payoff. Fishing in Turks and Caicos is illegal and, if caught, fishermen lose their boat, gear, and three months of their lives to provincial jail time. They often wait for high seas, where rough swells hide their skiffs from view of patrol ships. Following the disastrous hurricane season of 2017, five or six boats left daily from Estero Salado’s shores, the fishermen having calculated a low probability of patrol boats in the water since the neighbouring islands were busy dealing with the damage of the storms.

After weeks of dirty water and impossible fishing conditions, Manuel’s disenchantment with the chocolate sea led him to join a boat headed for Turks and Caicos, a routine but clandestine trip lasting two days in open ocean. In the hours before he left, he was irked and anxious, and upon his return, he could barely sit as a result of the violent crashing of the small boat over high swells, his spine exhausted from absorbing the impact from the fibreglass benches, and the rest of his body from trying to minimize the impact. ‘I thought we were going to flip over, I thought that was *it*’, he recalled, shaking his head as he remembered contending with his mortality.

As they read and react to ocean colours, fishermen demonstrate how people navigate the affective and embodied cross-currents of economic, meteorological, and corporeal conditions. Manuel couldn’t articulate why he made the decision to go to Turks and Caicos, but at the crux of his experience, he reminded me that those who live from the sea are also always in danger of dying by it. Colours chart the local experiences and knowledges of changing climates and shifting ocean conditions. Beyond indicating environmental changes, they illuminate the shifting stakes and possibilities for people surviving such changes, where chocolate-coloured water and its accompanying affects push Manuel and many others into increasingly precarious positions.

Navigating colour: competing spatial imaginaries

Dead batteries for the GPS stalled the departure of the eco-tourism boat, set to take three recreational freedivers to an offshore reef for a fishing excursion. Luis, a close interlocutor, was conscripted as a subaquatic guide by the dive centre leading the excursion. I looked at Luis, who never used a GPS when he fished. ‘Do you know how to get there without a GPS?’ I asked. He nodded, ‘Of course, but it’s good to have it in case it gets cloudy’. With new batteries, we pushed off from the shore, the GPS safely stored away. ‘You’ll see’, Luis winked and pointed to the distant peak that had to align with the nearshore cay in order to mark our position on the reef. The second bearing, he explained, was a crevice in the mountain range that had to align with the edge of the region’s notable headland. ‘It’s over there, Yohán’, Luis called to the captain as the bearings started to align. These bearings marked not a single location, but a means of moving towards a location. When one bearing aligned, we moved in a different direction to make the other align.

After an unfruitful dive, the crew decided to motor to another bank. Elvis, one of the tourists, had a spot marked on his iPhone, and he looked down at the screen image of a three-dimensional seafloor, pointing his arm like a rudder in the direction the phone

indicated with his head hanging over his device. He still had his arm extended when Yohán cut the engine and announced that we were at the shallowest part of the bank. 'We're 500 feet away from the top of the bank,' Elvis said to one of his colleagues in English, imploring him to translate into Spanish, still gripping his smartphone, 'can you just tell him to go 500 feet that way?' Yohán shrugged, agreeing to take them where Elvis's phone indicated, but he pointed to the surface of the water, citing its greyish colour. 'Look, you can see the bank here.' Yohán waved a hand in the direction that Elvis wanted to go, pointing to what was to him and to Luis an obvious change in the blue hue of the water that indicated greater depth. At Elvis's iPhone co-ordinates, the tourists dipped an echo sounder over the rail, measuring the depth of the spot at 216 feet. Elvis's colleagues laughed as Yohán motored the boat over to where he had originally stopped, at which point the echo sounder recorded 49 feet, a viable freediving depth.

Navigation depends on a bricolage of senses and skills. Luis, who must normally find rocks, reefs, and banks from the surface of the water as he swims, looks to points of relation on land: bearings. Yohán, who worked for decades as the captain of a fishing boat, reads colours on the surface of the water that reflect characteristics of the seafloor. Navigation occurs relative to the bodies of the navigators, but the means of navigation itself (bearings, GPS, colour) are also relative to the conditions afforded by the sea and atmosphere. Blue water allows Yohán to navigate using colour gradients; proximity to the shore allows Luis to use bearings; while dirty water and bad weather would require both Luis and Yohán to fall back on the GPS.

As tourists, conservationists, and fisheries researchers increasingly visit the northwestern coast, the ways that fishermen understand, move through, and relate to maritime space collide with conflicting means of understanding and navigating the ocean, as demonstrated by the above vignette. In the recent tide of conservation projects filling into Estero Salado, community meetings and workshops with fishermen often involve state officials or contracted biologists presenting images from Google Earth. In these images, they draw lines around banks and reefs, spaces they propose to make into no-fishing zones. Such projects imagine ocean spaces and their inhabitants (human and otherwise) through conservation practices and theories established via elite networks (Holmes 2010), sometimes coupled with brief underwater excursions conducted locally. Their conceptualization of the region's seascapes varies drastically from that of fishermen, who navigate subtle colour changes and relations daily.

Maps as seascape imaginaries have long been shaped through colonial encounters. Western imperial projects, for example, created the notion of the island as small and isolated in the expansive sea, even though this notion ran contrary to local ideas about the ocean as a connector of communities (Diaz 2015; Diaz & Kauanui 2001; Hau'ofa 1998). These notions of remoteness in the Pacific and in the Caribbean were meant to highlight the importance of establishing US or European military bases on islands. Maps played an important role in colonial expansion, but in places like the Caribbean, delineations of the empire or the nation were continually contested through the practices of those traversing such boundaries (Bragadir 2014; DeLoughrey 2007; Hernández González 2006). Perhaps because of the difficulty of patrolling borders in the ocean, Caribbean seascapes have been at the centre of resistant ways of relating to and across spaces (Bassi 2016; Bonilla 2013; Glissant 1997; Tinsley 2008). While a conservation project such as the CCI encourages nations like the Dominican Republic to put 20 per cent of their aquatic territory under protection, where maps delineate the borders of no-take zones, it says little about

how people engage with marine environments from these spaces, often despite the law.

As technoscience and global mapping reach deeper into the world's seas, fishermen's attention to colours as a means of navigation reminds us how prevailing spatial imaginaries of the present moment often develop in tension with other ways of understanding and interacting with space. Divers' embodied knowledge of maritime spaces and their interactions with seascapes despite legal borders conflict with maps depicting the ocean as a dividable resource commons.

In the twenty-five years since Luis began fishing, he has taught many of the diver fishermen who work from the shores of Estero Salado. Teaching someone to fish, though, is more often about teaching them to navigate the sea, to recognize one's place in a relative environment. As I learned to spearfish with Luis, what struck me was his ability to find places under the sea as he swam on the surface of the water. Early on in my research, I intended to include maps as a method for analysing perceptions of ocean space. I asked Luis if he would draw a map of the small archipelago of offshore islands and the fishing spots surrounding them. He shook his head, refusing my outstretched paper and pen. 'I know where every bank is, and I know how to navigate it, but to draw? No'. I asked him if he used bearings in the islands like he did to find the reef banks offshore, measuring how two points on land line up in relation to others, but he shook his head again. He just knows when he arrives, he explained. As Karin Amimoto Ingersoll writes (2016: 5-6), communities whose lives and livelihoods are immersed in the ocean cultivate a 'seascape epistemology', an 'embodied literacy' that drives their understanding and ability to navigate oceans, winds, and tides. After years navigating the surface and depths of the region, Luis's sensorium takes him to particular destinations, a technique of bodily navigation and a sense of space that does not fit onto a two-dimensional spatial imaginary.

Luis, along with the rest of the fishing community, attended many of the meetings held by state and international conservation organizations, where marine management officials show slides of the nearshore seascape, delineated based on proposed or existing no-fishing zones. The spatial imaginary put forward by these officials means very little to diver fishermen, who have never looked at a map of the areas they fish. Instead, Luis and others survey the colours and conditions of the sea, making decisions that allow them to navigate the cross-currents of dirty water, heavy patrols, and opportune weather. Unlike the maps produced and referenced by the Dominican state and the conservation organizations working in the Dominican northwest, the colours Luis and others use to navigate their immediate environments are neither fixed nor reproduced, because colours and what they communicate ebb and flow with the maritime conditions at play in any given place and moment. Maps delineating no-fishing zones have colonial precedence, and they are based on economic and resource management perspectives. In using colour and sensory relationality to navigate seascapes, diver fishermen demonstrate ecological thinking in relation to their seascape environments (see Valdéz-Pizzini & García-Quijano 2009).

I gave up the method of annotating nautical maps alongside diver fishermen. Luis declined a pen to draw the location of his spots; instead he offered me a speargun. As I frequented the places in the reef that he could not locate with the lines of a map, I began to be able to find these places as well from the water column, following the oranges of fire coral, avoiding always-brown swathes of water, and recognizing the pale blue colour of seawater that reflected sand banks at a distance.

The colour of climate change

Fernando and Quique carefully laid pieces of fibreglass onto the hull of a skiff in Fernando's yard. The smell of resin drowned out the normal odours of Fernando's patio, a mix of sea-saturated fishing gear and *pollo guisado* wafting out from the kitchen. Quique and Fernando had pooled their funds to buy the boat, an investment that they hoped would free them from the whims of the town's fishmongers and their skiff power struggles. It was July, a month that normally offered clear waters and ideal fishing conditions in exchange for sweltering heat on land. This year, despite unusually high temperatures and a seven-month drought, the nearshore waters seemed never to fully clear, making fishing a frustrating endeavour. Using a skiff to motor 5 to 7 miles to offshore reefs removed from the silty shoreline and the fishing masses seemed the only way the freedivers could make enough money to cover more than their breakfast and petrol.

'The sea has lost its colour, 90 per cent of its colour,' Fernando commented as he and Quique took a break to let the resin dry on the hull. 'The quality of sea has been in decline for years now,' Fernando continued. 'It used to be methylene blue. Do you know what methylene blue is like?' I did not. 'Look it up. It's so clean its almost purple. That's what the colour of the sea was like,' Quique reminisced alongside Fernando, recalling years when the ocean was colder, but stayed clear year-round, a time when spearfishing generated more adrenaline than frustration.

Methylene blue is a colour, as I assumed Fernando meant, but it is also the common name for the chemical compound methylthioninium chloride, a medicine and a dye used to treat methaemoglobinaemia, a condition where not enough oxygen reaches the body tissues. Fernando's claim that the sea had lost its colour was not descriptive, but *diagnostic* of changing ocean environments. The river that flows through the northwestern region of the Dominican Republic, the nation's second largest city, and 70 miles of highly fertilized rice farms runs into the ocean at Estero Salado's coastline. As fishermen explain the changes in the colour of seawater, they also diagnose hypoxic conditions that result from fertilizer runoff. Hypoxic conditions from eutrophication (increase in chemical nutrients in the water) yield excessive blooms of algae that deplete underwater oxygen levels, conditions that have also been documented by biologists in this region's waterways (Phillips, Russell & Turner 2007).

'What caused the changes?' I asked Fernando, following his comment on the ocean's loss of colour. 'Pollution, mainly,' he responded definitively. 'Pollution everywhere. There's no quality control anywhere here, that's only in developed countries'. Quality control of sewage runoff, waste collection, or even coastal development depended on clientelist relationships, as Fernando pointed out. Corruption plagued the coasts of Estero Salado and the nation, where environmental laws (among most other laws) only applied to those unable to pay bribes to state officials tasked with enforcing them. Fishermen and those of a similar economic class had little expendable income. Fernando continued, 'Another reason is the ice melting in places like Alaska, the fresh water mixes with the salt water, and the sea doesn't want anything to do with fresh water'.

As scholars across the disciplines have demonstrated, changing climates have higher stakes for island societies (Lazrus 2012), where rising sea levels threaten to displace entire islands (Kempf 2009), and increasing storm systems have devastating consequences both for infrastructures and for human health (DeLoughrey 2018; Schultz, Sands, Kossin & Galea 2020). Like many of us, Fernando watches the Discovery Channel, tuning in to global discussions about changing climates. While common

themes of global conversations on changing climates inform a part of his ecological habitus, talk of melting ice caps and pollution only reinforces ecological conditions he knows through his firsthand and deeply immersed experiences with the colours of seawater. As Manuel Valdéz-Pizzini and Carlos García-Quijano have shown, small-scale fishers in the Caribbean, ‘just like fishery scientists and managers ... “think ecologically” when they engage with coastal ecosystems’ (2009: 370). Considering colours like methylene blue as diagnostic rather than simply descriptive adds important nuances to discussions of changing ocean ecosystems. Where most coastal conservation programmes in the Dominican Republic are aimed at intervening in the practices of fishing communities, understanding the meanings of methylene blue redirects regional conversations that have a tendency to blame small-scale fishers for marine degradation. The knowledge produced through attention to colour traces the more difficult factors of environmental decline, corporate interests, and agricultural powerhouses. Attention to the colour of seawater is a way of knowing ecological conditions that scale between local, regional, and global seascapes.

Often when fishermen talk about ocean ecology, they explain conditions in terms of the ocean’s desire. Conversations among divers express a distinct kind of sea agency: ‘What does the sea say today?’ ‘The sea doesn’t want anything to do with the cold.’ ‘The sea doesn’t want anyone to fish her’. Rather than simply anthropomorphizing, as fishermen attribute desire to the sea, they recognize the ocean as an ecological body with a broader logic of its own, a logic with which they are constantly in conversation (see also Neimanis 2013). Colours reveal the unequal terrain of environmental politics at a time when climate change is reshaping human-environment relations with magnified consequences for those whose lives and livelihoods are deeply immersed in environments in flux.

Conclusion

Despite their combined decades of fishing experience, and despite weather forecasts from smartphones and other fishermen, the ocean had everyone gambling on its colour. Trips to the offshore islands were a risk, and more than once the week before, fishermen had come back to shore after a day’s work owing money to the fishmonger for the petrol they used to motor out to chocolate-watered fishing spots. The high-pitched squeal of the Yamaha 40 outboard motor deafened the sounds of the sea on this particular morning as we headed towards the Cays, taking the risk. Ery stood in the middle of the skiff as it slid over the silty brown-green water, using his lanky height in an attempt to see if and where the water was clean.

‘Look, Julio, it’s clean over there’, Ery said as he pointed towards the seven cays that normally offered reprieve from difficult nearshore fishing conditions. Julio shook his head from his seat on the rail, gazing in the same direction, but with his eyes fixed on the river mouth. ‘It’s dirty’, he replied. Ery cited the water below them, arguing that the current was working in their favour. ‘The river [water] is flowing down [west], Dead Cay has got to be clean.’⁷ Their debate lasted the 25 minutes it took to motor from the mainland to the periphery of the islands. ‘It’s yellow here’, Julio pronounced, looking down at the hazy seafloor through sedimented water as the skiff slowed. Ery, still standing lookout, pointed towards an island outside of the swathes of river water that mixed with the sea. ‘Over there it’s clear’, he said, pointing further out towards the horizon, ‘Purple’.

Ery and Julio were not able to reach the purple water that day. As a result of debts piling up with the fishmonger after weeks of difficult fishing, he had refused to lend them enough money for petrol so that they might be able to reach the outskirts of the islands, confining them to the river water mixed into the ocean. They chose to fish the shallow parts of the cays, swimming through yellow waters as they searched the already-overfished octopus grounds, picking up small *langostino* along the way.

Colour provides a way to navigate relativity at sea and a way of diagnosing shifting human-environment entanglements. Like the others mentioned in this article, Ery and Julio use it to anticipate diving conditions, but their uses and perceptions of colours also index affect, relativity, and broader changes to the environments upon which they depend. Julio, already cynical from days of fruitless labour, sees only yellow, chocolate waters. Ery, still hopeful, looks further to the horizon, seeing the possibilities of purple waters. Where Ery and Julio find themselves in relation to such seascapes depends on the conditions that have shaped their financial limitations for the time being, stuck in a cycle of unproductive yellow and chocolate tides. Engagements with the colours of seawater indicate changing relations with seascapes in flux. The shades of blue associated with camaraderie, adventure, and financial gain of years past have been replaced by the constant and disheartening shades of whitewash, yellow, and chocolate: unfishable waters. As the yellow waters of the river – coloured by the runoff of industrial agriculture – meet increasingly chocolate tides of the storm-plagued Caribbean, fishermen watch their relations to the seascape shift. Catch lines grow shorter, and divers are identified as ‘overfishers’ by state and regional policies that render their labour increasingly illegal.

This article has illuminated how engagements with the colour of seawater illustrate a sensorial knowledge moored in fluid relations, and how attention to colour as more than descriptive illuminates the deep environmental entanglements of communities on the front lines of changing climates. How people interpret and experience colour, I argue, matters for how we understand relations between communities, the environments they are entangled with, and the politics regulating these relationships.

Blue, purple, chocolate, green, and whitewash are colours, but they are also affective, spatial, and environmental relations in the daily lives of coastal communities. As fishermen experience affective reactions to the colour of their marine environment, they show that colour’s indication is not simply a map of what is possible at the given moment. Rather, colour illuminates broader entanglements with the sea that are conditioned by changing ocean environments, shifting regional politics, and deeply felt affective ties. The colours of seawater indicate an ecological knowledge that accounts for the toll of changing ecosystems on affective relations, the ways that people position themselves within competing spatial imaginaries, offering more holistic and perhaps more humanizing narratives about the causes and experiences of changing global climates.

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NOTES

¹ All names are pseudonyms.

² This is in part because of the financial prerequisites of providing tourism activities (gear, permits, etc.) and in part because tourism as a business functions through clientelist relations – to which fishermen rarely have access. See Gregory (2006) for an account of the unequal implementations of tourism's 'benefits' in the Dominican Republic.

³ Conservation researchers and climate change scientists have much to say about the causes and consequences of declining marine health and vulnerable ecologies as well as possible responses to them. Unlike fishermen, these groups have access to broad regional and global audiences through journals, social media, funding networks, and state employment, making their environmental analyses both easily accessible and politically salient. My decision to privilege the voices of fishermen in this article is a response to the unequal politics of environmental representation, where rural, non-professional, and Afro-Dominican people are seldom offered the opportunity to narrate their experiences and perspectives, despite the fact that they are the most consistent observers of the ecologies in question.

⁴ Spanish to English translations are my own. Spanish-speakers will notice that some colours are gendered masculine (*morado*), while others appear in the feminine (*negra*, *alechá* – short for *alechada*). Fishermen in Estero Salado consistently referred to the sea as both '*la mar*' and '*el mar*', a gender-ambiguous body of water. While it is not the focus of this article, linguists have explored the semantics of colour translations in depth elsewhere (see Biggam 2012).

⁵ See Elias (2019) for a history of the 'visual ecology' of coral reef systems and how colourful tropical reefs grew into a salient public imaginary.

⁶ Perceptual and sensory psychologists have long researched the relation between memory and colour perception. See Witzel & Gegenfurtner (2016) for further discussion of the ways in which memory shapes and interacts with visual perceptions of colour.

⁷ '*El río está pa'bajo, Cayo Muerto tiene que estar limpio*'.

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La couleur de l'eau de mer : perception des couleurs et changements écologiques des paysages marins dominicains

Résumé

La couleur de l'eau de mer est un sujet de conversation quotidien pour les pêcheurs en plongée de la République Dominicaine, qui naviguent à la fois dans un milieu océanique changeant et au gré des politiques de protection de l'environnement. Alors que celles-ci pointent souvent la pêche du doigt comme principale cause de la mauvaise santé des écosystèmes marins, les pêcheurs se servent de la couleur pour mettre en récit différemment les changements climatiques. En décrivant la mer comme bleue, noire, marron, verte, blanchâtre, violette ou chocolat, ils pointent du doigt les causes plus larges de changement des paysages marins, tout en relatant les conséquences affectives et physiques de ceux-ci. Sur la base d'un travail de terrain ethnographique parmi les pêcheurs en plongée dominicains, cet article explore la couleur de l'eau de mer comme prisme pour comprendre les conséquences physiques, affectives, sociales et politiques du changement climatique pour ces communautés étroitement imbriquées dans des écosystèmes marins changeants. Pour les pêcheurs en plongée, qui ont besoin de visibilité dans leurs relations avec la mer, les couleurs sont un moyen d'interpréter les chances de prise, de naviguer dans les espaces océaniques et de mesurer les effets des changements de leur environnement. Les couleurs perçues, centrales dans la vie des pêcheurs, fournissent un récit différent des changements du climat, liant l'état changeant de la mer à des problèmes systémiques planétaires au lieu de faire porter la responsabilité des changements écologiques sur des pratiques censément irresponsables des populations locales.

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