

# Extracted and Conflated Research Foci in the Global Displacement of Small- Scale Fishers:

A Comparative Analysis of Context  
Rhetoric in UN Marine Biodiversity Policy  
Development

**David Robledo<sup>1</sup>**

<sup>1</sup> Texas Tech University

## **Abstract**

*Small-scale fishers comprise nearly all capture fishery jobs, bring known benefits to biodiversity management, and, until recently, have provided humanity with the large majority of its seafood. Despite these well-documented benefits, small-scale fishers face increasingly intense displacement because of the marine closure pathway for biodiversity repair that is forwarded in the first draft of the Post-2020 Biodiversity Framework. In this paper, I analyze and contextualize conflated and extracted informational foci in marine science policy documents in order to illustrate that diminishing contexts for small-scale fisher value move through biodiversity policy texts to occupy priority positions in the first draft of the Post-2020 Biodiversity Framework.*

## Introduction

The rhetoric of contexts for evaluative information that are being used in the development of the United Nations' biodiversity framework is displacing the world's small-scale fishers, a workforce that provides most of the developing world's fish, which works 90 percent of all capture fishery jobs, and which benefits marine biodiversity in numerous ways (FAO 2020, FAO 2021, Plank et al. 2017, Teh and Sumaila 2013). In this paper, I exemplify the ways in which conflation and extraction of information that is used by the UN in its policy evaluation and development carries a rhetorical power which culminates in the deterioration of the small-scale fisher way of life and culture. Displaced by policy that is intended to stave off the collapse of commercial fisheries (Secretariat 2021, 58), small-scale fishers bear the brunt of the UN's marine biodiversity restoration effort as it is outlined in the first draft of the Post-2020 Biodiversity Framework (CBD 2021 "First Draft," 6, Targets 1–3). Driven by the UN's new zeal for scientific biodiversity assessments and climate catastrophe warnings, closing fisheries is part of a core UN goal to restore nature amidst the global decline of biodiversity (Mrema 2021), a stopgap for the accelerating decline of the world's commercial fish stocks (Secretariat 2021, 58). The fishery closure pathway is problematic because the Post-2020 Biodiversity Framework also calls for biodiversity policy that benefits people and communities, especially those such as small-scale fisher communities whose cultural nutrition economies depend on access to natural resources (CBD 2021, "First Draft," 7-10, Targets 9, 20, & 21). That some governments have effectively implemented marine management that draws on the biodiversity benefits of small-scale fishers might seemingly provide an answer to this UN call for biodiversity policy that is equitable to communities and that ensures food security. Nonetheless, a pathway for small-scale fisher integrated management is not stipulated in the Post-2020 Biodiversity

Framework, a document that in parts and as a whole acts rhetorically against small-scale fisher integrated biodiversity management.

It is not a slight or wry irony that small-scale fishers can benefit marine biodiversity yet they face intensifying displacement from the UN's biodiversity framework, because small-scale fisher displacement drains the life of coastal villages, leaves fishers and their families destitute, and severs long established conduits of nutritive cultural economy, as exemplified in Hoorweg and Muthiga (2009, 6), Cross (2016), Tuda, Rodwell, and Stevens (2007,16), Versleijen and Hoorweg (2009, 80), and Feodoroff, Barbesgaard, and Pedersen (2014). Globally, small-scale fishers have been displaced by as much as 50 percent within the last three decades (Birkan and ÖNdes 2020, 262; Lloret et al. 2018, 177; Macfadyen, Salz and Cappell 2011), a rough estimate that is complicated by statistics that often do not distinguish between small-scale fishers, large-scale industrial fishers, and aquaculture workers (Lozano and Heinen 2016, 759; Symes, Phillipson and Salmi 2015). Such conflation of small-scale fisher employment with job statistics from other industries is but one of several research contexts that rhetorically obscure the contributions of small-scale fishers. Policy papers and academic research that inform UN decision making on marine protections typically do not focus on the nutritive economy and biodiversity benefits that small-scale fisher activity yields. Rather, such research and reporting often conflates small-scale fisher biodiversity impacts with those of significantly more destructive industrial fishing, yet another informational framing that carries a rhetorical power for small-scale fisher displacement. Although the informational contexts that drive the UN's marine policy dialogue present rapid and expansive fishery closures as science's best solution to the fishery depletion problem, science itself is not decided about this issue. Rather, the UN extracts and latches on to research that forwards fishery closures and that minimizes small-scale fisher value from a

broader scientific dialogue which extensively documents the benefits of small-scale fishing to biodiversity and to community nutrition economies. Because of the prevalence of value extractions and conflated contexts of research and reporting that are used at varying stages of the UN's information uptake and policy development, the biodiversity potential of small-scale fishers remains obscured in the UN's biodiversity policy pathway.

In this paper, in order to establish the extent of these conflated rhetorical contexts, I trace and illustrate them in UN member biodiversity reports, marine science policy research, and in the draft of the Post-2020 Biodiversity Framework. Furthermore, in order to develop needed stasis background contexts of quality and fact with which to delineate and separate small-scale and industrial fishing, in this paper I also contrast research that diminishes small-scale fisher value against marine research that considers small-scale fisher integrated management as the best choice for biodiversity repair. Additionally, in order to establish stasis background contexts about the quality and quantity of the small-scale fisher displacement problem, in this paper, I use secondary research to piece together a picture of extensive small-scale fisher displacement and a seemingly severe disruption to the global nutritive economy system that small-scale fishers support, contextual research that is needed because there is a lack of aggregated data that offers a clear global picture of these issues. Finally, in order to illustrate the rhetorical process of political marginalization of the small-scale fisher, in this paper I exemplify that the UN's Convention on Biological Diversity, in its drafting of the Post-2020 Biodiversity Framework, extracts and latches on to a contested marine science conclusion that supports marine closures while marginalizing the compelling research that forwards small-scale fisher integrated management. Ultimately, the rhetorical impact of informational contexts that contribute to political marginalization and to geographical displacement of small-scale fishers is made possible when the Convention on Biological

Diversity extracts the fishery closure solution from a broader marine science policy debate.

The effort to use rhetorical analysis of science and policy for social impact has deep roots in our Technical Communication field (Cagle and Tillery 2015, Simmons and Grabill 2007). For example, Smallman (2020) points out that science policy terminology is difficult for the public to interpret and that rhetorical analysis of scientific language is needed in order for the public to engage in policy debates about the societal implications of scientific conclusions. Additionally, the need for a clearer understanding of science policy communication processes and impacts echoes in the field of marine science research itself, as seen in Beem (2009), Haward (2001), and Madrigal-Ballesteros et al. (2017). However, the analysis of marine policy rhetoric in this paper, while focused on providing scientific background and clarification to biodiversity policy, has a specific relevance to the journal *Reflections* and its documentation of research about community writing, especially to the current “language, access, and power” themed edition. Particularly, in this paper, I am illustrating a process through which the UN’s community of member states composes informational contexts whose rhetorical power sets the stage for extensive displacement of small-scale fishers.

While the Convention on Biological Diversity (CBD) is working toward finalization of the Post-2020 Biodiversity Framework, its references in this paper are specifically to the first draft of the treaty (CBD 2021, “First Draft”; CBD 2022).



Figure 1. Magnificent Frigate Birds follow a small-scale fisher craft in Costa Rica.

## The Problem of Small-Scale Fisher Displacement

In this section of the current study, I use secondary research to establish the political context and the biodiversity problem of fishery collapse, the qualitative and quantitative extent of small-scale fisher displacement, and the differences in biodiversity impacts between small-scale and industrial fishing. Establishing the marine research policy context of the fishery collapse problem and establishing the extent of small-scale fisher displacement are necessary because there is a lack of quantitative data that would clearly depict the global extent and the policy impact to these problems. Additionally, providing a clear depiction of small-scale fishing is needed in order to separate this industry from UN frameworks that conflate small-scale fishing with much more destructive industrial fishing. While the policy frameworks that displace small-scale fishers may ultimately be socially minded, intended to slow the accelerating trend of fishery collapse, the CBD's long term policy goals for fishery productivity present

extensive problems to the world's 22 million small-scale fishers, as well as to the approximately 120 million workers in the broader small-scale fishing industry. As a result, qualitative and quantitative background is needed in order to establish small-scale fisher benefits and the policy threat to the small-scale fishing nutritional economy, as well as to establish the extent and the trajectory of the global deterioration of small-scale fishing.

## **Fishery Collapse and the Marine Closure Solution**

Our fisheries are depleting so rapidly that some scientists are predicting their complete collapse within three decades. Defined as a greater than 90 percent loss of a specific species in a marine region, fishery collapse is characterized by severe ecosystem imbalance, including species extinction. Currently, at least one-fourth of the world's fisheries have collapsed, and science predicts that most, if not all, commercial fisheries will have collapsed by the year 2050 unless effective marine policy management is urgently implemented (Teh et al. 2017, 121-124; Worm et al. 2006, 788; Worm et al. 2017). Addressing the problem of fishery collapse is primarily a political issue as governments have been concertedly enacting marine management policy since the UN's 1992 Rio Convention. While there are dozens of policy terms that designate specific types of marine protected zones, such as Marine Protected Areas, Marine Reserves, Responsible Fishing Marine Areas, and many others, these protected zones can be categorized into two basic types: areas that ban fishing or areas which allow for some commercial fishing (Sala et al. 2018, 12, sec. 3).

With less than three percent of the ocean now under effective restoration (Sala et al. 2018), the UN's eight-year deadline for protecting 30 percent of the ocean and for intensely protecting 20 percent of all degraded marine areas signals an oncoming wave of highly intense displacement for small-scale fishers (CBD 2021, "First Draft," 6, Targets 1-3). Fishery closures, the dominant quick

fix solution to the fishery collapse problem, has diminished the small-scale fishing industry by as much as 50 percent or more in the last two to three decades. Because small-scale fishers, at least until recently, have harvested most of the seafood that people eat and because they continue to comprise nearly all capture fishery jobs, the displacement of small-scale fishers stresses the important nutritive economy conduits that are outgrowths of their coastal fishing lives and cultures (Kolding and van Zwieten 2011, Plank et al. 2017, FAO 2020). By presenting the pathway of marine closures as the most effective approach in marine biodiversity repair, the UN weakens the political value of small-scale fishers and facilitates policy decisions for the marine closures that will displace them.

### **The Intensity of Small-Scale Fisher Displacement**

Extensive regional research documents the problem of small-scale fisher displacement, a workforce that has no international definition but that is typically set apart from industrial fishers by their use of small boats about 12 feet long and their low impact, hand harvesting techniques (FAO 2020, 99; Macfadyen, Salz, and Cappell 2011, 23; Jentoft and Eide 2011, 29; INCOPESCA). While the extent of small-scale fisher displacement is difficult to assess because job data is often incomplete (Lozano and Heinen 2016, 759; Symes, Phillipson, and Salmi 2015), reviewing the rates of regional displacement offers a window into the problem. For example, Turkey's displacement ranges from 15 percent to 50 percent depending on the region of coastline (Birkan and ÖNdes 2020, 262). Costa Rica's decline is estimated at 50 percent (Araya 2013, 322; Jorge and Papageorgiou 2019). Europe's total loss in the previous decade is estimated at 20 percent, while Norway's is estimated at 60 percent (Macfadyen, Salz, and Cappell 2011). In this section of the current study, I illustrate that trans-decade job estimates point to an acute global displacement of small-scale fishers as well as to an extreme shift in small-scale fisher localization within a nutrition



economy system that has seemingly experienced severe degeneration in the last two to three decades.

Despite the lack of aggregated data that would present a clear picture of the global trend of small-scale fisher displacement across decades and regions, data which is particularly lacking from underdeveloped countries where the small-scale fisher economic driver is often most important, regional reports suggest that small-scale fisher displacement has occurred at a rate of between 20 percent and 50 percent of a global workforce of approximately 22 million fishers, central actors in a broader coastal nutritive economy system that employs approximately 120 million restaurateurs, fish marketers, and other tangential coastal economy workers (Teh and Sumaila 2013). The problem of small-scale fisher displacement is seemingly severe because the 120 million workers who comprise the small-scale fishing economy were approximately 250 million workers in the previous decade. While in the previous decade, reports estimated that the 250 million workers employed through broader small-scale fisher activity provided humanity with about 70 percent of its seafood (Teh and Sumaila 2013; Plank et al. 2017, 213), statistics relevant to the current decade forward that there are about 120 million people employed through broader small-scale fisher activity, providing humanity with about half of its seafood or less (FAO 2021). This apparent loss of more than half of the small-scale fishing nutrition economy workers in the last 20 to 30 years suggests an acute deterioration of a global nutrition economy, albeit one that policy seems to be addressing to some degree through the promotion of aquaculture programs (FAO 2020, 4).

Additionally, according to some research, the result of the increase of marine closures from biodiversity policy is not that displaced small-scale fishers are necessarily finding other sources of employment but that both displaced and newcomer fishers are saturating fewer available fishing areas while expending more

energy for a diminishing return (Berkes 2021, 60; Eide, Bavinck, and Raakjær 2011; Miller 2007; Teh and Sumaila 2013). That small-scale fisher numbers may be increasing while the occupation holds diminished financial promise, and while the nutritive economy system that the industry supports may be intensely deteriorating, highlights the importance of small-scale fishing to the often impoverished regional economies where small-scale fishers work.

### **Small-Scale Fisher Benefits versus Industrial Impacts**

In this sub-section of the current study, I survey secondary research in order to establish the biodiversity benefits of small-scale fishers as well as the destructive character of industrial fishing. Contrasting these two very different sectors of the commercial fishing industry is needed in order to separate the impacts of these industries from the UN's conflated informational frameworks. As extensive research attests, the species depletion and habitat destruction of industrial fishing is disproportionate to its employment of 10 percent of the world's capture fishery workforce. While marine researchers point to the damage of industrial fishing and to the biodiversity potential of the small-scale fisher, these distinct fishing sectors are not depicted clearly in a UN marine policy dialogue which forwards expansive fishery closures as the best way to achieve marine biodiversity regeneration.

The biodiversity benefits of small-scale fishers are well known. Using low-impact hand-harvesting methods on small-boats near shore, small-scale fishers are often the only available monitors for marine pollution and illegal fishing, especially for governments with limited marine management resources (Berkes 2021, 82-102, 192-204; Ulate et al. 2018, 100-109). In contrast to the destructive gear of industrial fishing, small-scale fishers' gear harvests little bycatch while minimally impacting sea bottoms and reefs (Alms and Wolff 2019, 142-152; Munga et al. 2012, 210). The biodiversity, nutritive economy, and environmental surveillance benefits of small-scale

fishers comprise a fertile area of research that contrasts with equally prevalent research that documents the inordinate devastation of industrial fishing on species and habitat. As research attests, bycatch (the non-target fish that are caught and destroyed in the industrial harvesting of specific commercial species) is one of the most culpable actors in the fishery collapse crisis as is the inordinate devastation of industrial fishing on marine habitats (Alms and Wolf 2019, 152; Munga et al. 2012, 209; Williams et al. 2020, 1–22; HallSpencer et al. 2002, 507–11; Victorero et al. 2018). While research that documents industrial fishing’s damage to biodiversity is telling, the most telling may be research that demonstrates how quickly fisheries regenerate in areas where small-scale fishing is allowed but where industrial fishing is curtailed, as exemplified in Munga et al. (2012, 209–19) and in Whitmarsh et al. (2004, 489–497). Furthermore, the marine management strategy of allowing small-scale fishers to fish while banning industrial harvesting is the key approach for the national marine biodiversity programs for some countries such as Belize, whose national identity draws from the cultural richness of the small-scale fisher’s nutrition economy system.

Because small-scale fishing supports existing nutrition economies and provides a tenable pathway to biodiversity management, numerous initiatives and organizations provide research and policy models that are intended to facilitate the integration of small-scale fishers in marine management programs. For example, Europe’s Marine Strategy Framework Directive works to regulate specific practices of small-scale fishers that may be particularly harmful to biodiversity while offering support to small-scale fisher adaptation to new fishing methods or equipment (Lloret et al. 2018, 178–79, sec. 2.3). The UN Food and Agriculture Organization has developed the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries (FAO 2020, 176). Additionally, the Too Big To Ignore information system collects, compiles, and disseminates marine research that specifically addresses small-scale fisher

issues of biodiversity, community life, and policy (TBTI 2022). Despite such programs and resources, a small-scale fisher pathway to marine biodiversity management is absent from the Post-2020 Biodiversity Framework.

## **Conflated Rhetorical Contexts in Small-Scale Fisher Displacement**

Conflated evaluative information permeates the CBD's marine policy dialogue, a condition that lays the rhetorical groundwork for UN biodiversity policy that forwards marine closures as the solution to fishery collapse. In this section of the current study, I illustrate the development of a CBD marine biodiversity framework whose end result is the displacement of small-scale fishers by analyzing a policy development of rhetorical contexts for information that minimize small-scale fisher benefits. In order to survey information that illustrates the UN's data uptake in the policy drafting process, I analyzed UN member biodiversity reports that inform the development of *Global Biodiversity Outlook 5*, a key UN biodiversity assessment document. In this section of the current study, I illustrate that the diminishing contexts found in UN member biodiversity reports carry rhetorical contexts to *Global Biodiversity Outlook 5* that eventually occupy priority positions in the information architecture of the first draft of UN's Post-2020 Biodiversity Framework, and I define the contexts and language in this framework by exemplifying their usage within a broader marine science policy dialogue.

Overall, informational conflation results in the rhetorical framing of two negative policy values for the small-scale fisher: that they are of little economic importance and that they are destructive to marine habitat. These specific negative values constitute most of the evaluative informational contexts for small-scale fishers that

can be found in national biodiversity reports used in the CBD's drafting of *Global Biodiversity Outlook 5*.

## **Rhetorical Minimization of Small-Scale Fisher Benefits in UN Biodiversity Reporting**

In order to assess the prevalence and the sources of the conflated evaluative information for small-scale fishers that is reified in the Post-2020 Biodiversity Framework, I analyzed 12 UN member biodiversity reports from nations with a significant coastline that were submitted to the UN in the drafting process of *Global Biodiversity Outlook 5*, a central document used in drafting the Post-2020 Biodiversity Framework (Secretariat 2021). Overall, my research in this microstudy finds that informational categories in UN member biodiversity reporting predominantly conflate the devastating impacts of industrial fishing with the impacts of small-scale fishing, and they also conflate small-scale fisher economic impacts with other industries, facilitating political decisions to close marine zones when small-scale fisher economic value is dwarfed by production value of competitive industry. In this subsection of the current study, I discuss the research and conclusions of this microstudy.

Two types of biodiversity reports constitute submissions to the Conference on Biodiversity for use in drafting *Global Biodiversity Outlook 5*, a Fifth National Report and a National Biodiversity Strategy and Action Plan, which are available at the CBD web page <https://www.cbd.int/reports/search/>. In my microstudy, I selected 12 total of either national biodiversity reports in a random manner using a Google search phrase for "UN national biodiversity reports" as well as by scrolling down the list of available reports on the CBD website and selecting from the earliest posted to the latest posted reports by nations with a significant coastline. Through the analysis of selected reports, I found that 10 of the 12 reports framed small-scale fisher activity in negative contexts, and one report,

while framing small-scale fishing positively, was submitted by a country that had already displaced many small-scale fishers through marine policy implementation. Belize is the only nation in this microstudy whose biodiversity reporting positively depicts small-scale fishers, within a national marine management program that bans industrial fishing (Belize 2014, 89).



**Figure 2. Small-scale fishers work through an evening storm in the Gulf of Nicoya.**

In these national biodiversity reports, governments predominantly blame small-scale fishers for detrimental impacts to marine biodiversity and they frame small-scale fishing mostly in contexts of marine depletion, as exemplified in Papua New Guinea (2020, 36-37), Montenegro (2014, 6, 22-24), Egypt 2014 (42-60), and Trinidad and Tobago (2016, 87). Similarly, some states conflate small-scale and industrial fishing when they discuss marine biodiversity damage, as exemplified in Saint Lucia (2018, 61), Barbados (2021, 11), Fiji (2020, 7), Monaco (2022, 11-12), New Zealand (2020, 20), and Trinidad and Tobago (2016, 87). While some reports may not frame small-scale fisher activity as destructive, small-scale

fishers may have already been displaced well before the reporting time frame through the prior implementation of protected marine zones, as is the case with Australia (Australia 2014, 89; Larcombe and Martin 2016).

Additionally, the contributions of small-scale fishers tend to be overshadowed in these reports by those of other industries, which further diminishes the perception of small-scale fisher value and which blurs the poignancy of small-scale fisher nutritive culture economy. For example, in its latest biodiversity report to the UN, Montenegro (2014) conflates the nation's economic output from small-scale fishers with outputs from industrial fishing, agriculture, and forestry, juxtaposing the €425 million sum with tourism's €700 million value (6–22). As a result, because tourism is framed as being of more value to the gross national product than fishing and agriculture, political decisions to close land and water through biodiversity policy are facilitated, especially when these closures are described as pathways for economic development in tourism or aquaculture.

Such diminishment of small-scale fishers can be seen in a broader marine policy dialogue. For example, in a marine policy report for the Central American region, Madrigal-Ballester et al. (2017) discuss small-scale fishers as a labor force whose displacement is a “trade off” between fishing and tourism sectors (787). Similarly, Kawarazuka and Béné (2010) conflate fishing and aquaculture in their research about the community nutrition benefits of seafood (343–57). Often, while a research or policy paper may mention the importance of small-scale fishers to cultural economy or to biodiversity, these discussions happen within an extractive framework. Macfadyen, Salz, and Cappell (2011), for example, mention the “cultural and social” importance of small-scale fishers in their evaluation of Europe's small-scale fishing sector, but they quantify the value of small-scale fishers using only their contribution to national economy (16). Overall, in the UN member

biodiversity reports that informed *Global Biodiversity Outlook 5*, small-scale fishing is depicted as an insignificant part of national economies and as an industry that brings destructive impacts to biodiversity.

### **Context Rhetoric Diminishment of Small-Scale Fishers in *Global Biodiversity Outlook 5***

A summary of biodiversity strategy and progress of UN member states, *Global Biodiversity Outlook 5* serves as a base of biodiversity knowledge that the CBD uses in drafting the Post-2020 Biodiversity Framework. Because of the conflated informational frameworks in the member state biodiversity reporting that inform *Global Biodiversity Outlook 5*, the minimization of small-scale fisher value is subsequently rooted in the policy language and information architecture of the Post-2020 Biodiversity Framework. In this section of the current study, I conduct a rhetorical analysis of marine policy items in *Global Biodiversity Outlook 5* in order to illustrate the prevalence of informational contexts in this document that diminish small-scale fisher value.

*Global Biodiversity Outlook 5* does tangentially acknowledge the importance of the small-scale fisher when it points to the importance of “marine ecosystems” to “human well-being” and to “food and livelihood security.” Additionally, the report highlights the importance of traditional food sources to human nutrition because of their “symbiotic relationship” with the human immunodeficiency system (Secretariat 2021, 156 & 176). Furthermore, the report warns that one-tenth of humanity suffers from food insecurity (Secretariat 2021, 64). However, although *Global Biodiversity Outlook 5* consistently posits the need for policy to support human nutrition and food security, a need that would seem to beckon to small-scale fishers, the report diminishes small-scale fisher value by forwarding marine closures as the superior



pathway for marine regeneration. Characterizing management approaches that utilize small-scale fishers as ineffective, *Global Biodiversity Outlook 5* does not address small-scale fishers by name throughout the report, and it contextualizes their economic impacts and biodiversity potential in diminishing informational frameworks that relegate small-scale fishers to the outskirts of its marine management dialogue.

The policy threat to small-scale fishers surfaces distinctly in the first few words of the report's summary of the global transition to sustainable fisheries. In this summary, closing fisheries is presented as the top policy priority, as the summary begins with a charge to "protect and restore" marine fisheries, goals that are achieved by UN member states through the marine closures that displace small-scale fishers. The pressure on the small-scale fisher intensifies in this two-sentence summary when it calls for a "rebuilding" of fisheries, signaling management approaches that rebuild biodiversity by closing marine zones. Additionally, this guiding summary for the world's marine management framework specifically mentions aquaculture as a solution to the world's marine nutrition needs, but it does not mention that small-scale fishers currently provide global food security, often within management frameworks that have proven successful at promoting biodiversity (Secretariat 2021, 156).

The minimization of small-scale fisher integrated management is similarly abrupt in *Global Biodiversity Outlook 5* when the report conflates marine management that utilizes small-scale fishers with other marine management approaches that the report describes as "arguably" effective (Secretariat 2021, 54-57). The marine research that the report describes as arguable, however, presents scientific information that depicts small-scale fisher driven biodiversity approaches as "win-win solutions allowing for high levels of both fishery harvest and conservation" (Hilborn et al. 2021, 2271).

Yet another rhetorical context in *Global Biodiversity Outlook 5* that excludes the small-scale fisher is one in which small-scale fishers are simply not admitted into the discussions that are about them. This relegation of the small-scale fisher to the perimeter of the marine biodiversity dialogue in *Global Biodiversity Outlook 5* happens, for example, when the small-scale fishers of Belize are not named in a discussion that is about Belize's effective marine biodiversity management. In this section of the report, Belize is held out as an example of effective fishery management for its implementation of fishing restrictions on "traditional users" (Secretariat 2021, 61). Not mentioning that traditional users are small-scale fishers, the CBD also does not mention that Belize is a lighthouse in the small-scale fishing biodiversity dialogue because of its national fisheries program that bans industrial fishing (Belize 2014, 89). Rather than point to the banning of industrial fishing as a key element in Belize's marine management effectiveness, *Global Biodiversity Outlook 5* instead forwards that Belize's effectiveness is due to restrictions on the small-scale fishers who remain unnamed in the report.

Additionally, the sequence for marine biodiversity repair that is expressed in *Global Biodiversity Outlook 5* is yet another rhetorical context that effectively evicts small-scale fishers, a linguistic sequence of temporality that calls for marine biodiversity repair now in order to ensure that fisheries will be useful to humanity at a later date. This linguistic sequence provides a rhetorical context for fisheries management that aims to close marine zones temporarily in order to ensure long-term future use of marine resources for humanity, a prediction that is seemingly needed in order for the UN to address its goals for biodiversity policy that benefits traditional communities (Secretariat 2021, 156; CBD 2021, "First Draft," 8-9, Targets 9, 20 & 21). For example, in its summary of the sustainable fisheries and ocean transition, *Global Biodiversity Outlook 5* calls for protecting and regenerating the ocean in order to "enhance food security and livelihoods" as a long-term goal. In this

summary, “protecting” the ocean, a goal that UN member states achieve through fishery closures, occurs first. The resulting fishery regeneration that marine closures intend to facilitate would then benefit people at a future time. Similarly, in its discussion of a sustainable oceans transition, *Global Biodiversity Outlook 5* calls for enacting marine protected areas as a way of “ensuring adequate human capacity.” Here, again, the report suggests a need for fishery closures now in order to ensure biodiversity for the future. Similarly, in the report’s assessment of sustainable aquatic management, the reduction of fishing effort is depicted as a catalyst in fishery recovery, suggesting that restrictions must be imposed on fishers through the implementation of marine management policy in order for fisheries to continue to benefit humanity at a later date (Secretariat 2021, 59). This temporal linguistic sequence that contextualizes marine closures within biodiversity regeneration that is to be enjoyed by humanity at a later date echoes in some marine policy research. For example, Lloret et al. (2018) describe Europe’s efforts to reduce fishing effort as being consistent with “long term sustainability” (78, sec. 2.3), modeling a marine management effort to restrict fishers and to close marine zones in order to ensure future benefits to people.

By separating the small-scale fisher from its marine biodiversity dialogue and by painting small-scale fisher impacts in a poor light, the CBD misses the opportunity to simultaneously support biodiversity policy that benefits people and communities, as called for in Action Targets 9, 20, and 21 of the Post-2020 Biodiversity Framework. Rather than blur the perception of small-scale fishers by conflating them with other subsistence fishers (Secretariat 2021, 58-63,157), *Global Biodiversity Outlook 5* could be identifying small-scale fisher biodiversity benefits and highlighting the differences between the low-impact methods of small-scale fishing and the species and habitat decimation of industrial fishing (Munga et al. 2012; Whitmarsh et al. 2003, 489–490). Because *Global Biodiversity Outlook 5* provides a base of biodiversity knowledge that the CBD

uses in drafting the Post-2020 Biodiversity Framework, the CBD's pathway for fishery closures and a diminished small-scale fisher value occupy priority positions of information in architecture in the Post-2020 Biodiversity Framework.

## **Post-2020 Biodiversity Action Targets for Marine Closures**

Policy initiatives for fishery closures can be found in the top three 2030 Action Targets that the Post-2020 Biodiversity Framework presents as critical to achieve before the year 2030. In this subsection of the current study, I illustrate ways in which the top three Action Targets in the Post-2020 Biodiversity Framework constitute an information architecture that forwards small-scale fisher displacement. In order to exemplify this condition, I illustrate the usage of 2030 Action Target marine policy terminology in secondary marine research and UN member biodiversity reports to show that the Action Target terminology for biodiversity repair creates a rhetorical framework for the marine closures that displace small-scale fishers.

Calling for the implementation of global spatial biodiversity planning, 2030 Action Target 1 portends what are often eco-tourism developments that restrict specific fishing areas or that impose fishing restrictions in order to facilitate multiple users (such as tourists) of a marine zone, as illustrated in Tuda, Rodwell, and Stevens (2007, 64) and Pelagos (2022). Calling for the restoration of one-fifth of degraded marine areas, Target 2 portends strict marine closures that are used to achieve marine restoration. Target 3, which calls for the protection of 30 percent of the ocean, signals yet further marine closures, especially because some argue that all policy protected marine zones should be synonymous with enforced marine closures (Sala et al. 2018).

Of the three 2030 Action Targets governing small-scale fishing, Action Target 2 presents the most focused threat. From reading the

explicit language of Target 2, it might at first glance be difficult to understand the threat that this specific policy item presents to small-scale fishers. While not addressing small-scale fishers directly, this biodiversity target calls for urgent restoration of 20 percent of all degraded ocean by 2030. The restorative marine areas that Target 2 calls for is a problem for small-scale fishers, because in the UN's biodiversity dialogue, marine restoration is synonymous with the fishery closures that displace small-scale fishers. For example, in policy reporting of their marine restoration efforts, the Netherlands highlights the creation of a marine heritage site (Netherlands 2014, 13), Australia cites its creation of a marine park (Australia 2014, 32), and Trinidad and Tobago point to their establishment of protected marine zones (Trinidad and Tobago 2016, 15, item 7.6), which are all types of marine restoration programs that ban small-scale fishing. Furthermore, technical definitions of marine restoration that are used in the marine science dialogue describe absolute fishing prohibitions in closed marine zones (Alvarado et al. 2012, 135; Sala et al. 2018, 12-13). Additionally, the threat of small-scale fisher displacement is escalated because the "degraded" marine areas that Target 2 seeks to restore are likely to be the underdeveloped areas where small-scale fishers work, areas that struggle with insufficient resources for marine management policy implementation (Alvarado et al. 2012; Ulate et al. 2018, 101, 2.1).

In addition to the intense displacement that Action Target 2 poses to small-scale fishers in its call for restoring 20 percent of degraded marine zones in fewer than eight years, further small-scale fisher displacement is signaled by Action Target 3 in its call for the protection of 30 percent of all oceans in the same time frame. Although the marine protected areas that are called for in Action Target 3 may allow small-scale fishers to harvest specific species with traditional low-impact, sustainable gear (Hoorweg and Muthiga 2009, 6; Tuda, Rodwell, and Stevens 2007, 16; Versleijen and Hoorweg 2009, 80) and may also reserve some marine area for

small-scale fishers, such management frameworks still displace small-scale fishers (Hagan and Williams 2016, 9; Versleijen and Hoorweg 2009, 81-89; Larcombe and Marton 2016).

## **An Extracted Research Context in Science Driven Biodiversity Policy**

The UN's broad adoption of scientific warnings of depletion and environmental catastrophe provide a foundational ideology for the information architecture of the Post-2020 Biodiversity Framework, particularly for marine closure policy items that displace small-scale fishers. Finally accepting the scientific warnings of biodiversity collapse and climate catastrophe has engendered a central ideological rhetoric for expansive biodiversity policy as outlined in the UN's three major environmental treaties: the Glasgow Pact, the United Nations Convention to Combat Desertification 2019-2030 Strategic Framework, and the Post-2020 Biodiversity Framework. In this section of the current study, I illustrate that the embracing of scientific climate catastrophe warnings paves the way for the UN to latch on to and extract a contested marine science conclusion that facilitates small-scale fisher displacement, and I contrast the closeted research scope of science that drives this fishery closure conclusion with the social and community research scope of marine science that forwards a small-scale fisher pathway for marine biodiversity.

Because each of the UN pathways for biodiversity face a scenario in which decades-long policy efforts have failed, UN climate policy leaders are suggesting unfavorable scenarios for the future. According to Alok Sharma, President of the Glasgow Pact's ratifying convention, the potential for UN success in dealing with the climate problem looks "bleak," admitting that he has so far been party to a "fragile" climate solution that is only marginally alive (UN 2021). As described by UN Secretary General Guterres,

the impact of climate change has been so severe that the planet must be “rescued” (Secretariat 2021, 4). Nonetheless, the UN clings to a hope that it will accomplish its rescue of the world from climate catastrophe by adequately responding to the predictions of science through the urgent enactment of policy as outlined in its three major environmental treaties.

## **Rhetorical Urgency in the Green New Deal of the Post-2020 Biodiversity Framework**

The UN has a long history of not allowing scientific conclusions and warnings about biodiversity collapse to guide its policy (UK Government 2021). Finally accepting the climate warnings of science has provided the UN with a foundation for the rapid enactment of biodiversity policy. With biodiversity regeneration front and center in policy purpose, the catastrophic warnings of science provide the UN with a need for urgent action, as outlined in the 2030 Action Targets for biodiversity that are the heart of the Post-2020 Biodiversity Framework. This political urgency can be seen in the extremely short timeline for significant policy adoption. In fewer than eight years, the UN hopes that its member states will have enacted sufficient effective policy to trigger the reversal of biodiversity deterioration so that “by 2050, the shared vision of living in harmony with nature is fulfilled” (CBD 2021, “First Draft,” 3, sec. A1). The rhetorical urgency to heed the catastrophe predictions of science, the likes of which are evidenced in works such as Bonneuil (2018), is plainly stated as the main impetus for the UN’s efforts to rapidly enact a biodiversity framework. As stated in the treaty, the CBD is “alarmed by the continued loss of biodiversity and the threat that this poses to human well-being.” Because of this alarm, the CBD therefore “adopts the Post-2020 Global Biodiversity Framework” (CBD 2021, “First Draft,” 11).

Biodiversity has been groomed as the centerpiece for the Post-2020 Biodiversity Framework, as seen in the Kunming Declaration, a

statement of the UN values and overall goals that drive the development of the Post-2020 Biodiversity Framework. In this declaration, the CBD contends that biodiversity must be repaired and regenerated because it supports “ecosystem functions” and “all forms of life on Earth.” In this core UN imagery for an invocation subtitled “Ecological Civilization: Building a Shared Future for All Life on Earth,” nature is a charitable giver of life and people are the fortunate receivers of nature’s gifts (CBD 2021, “Kunming Declaration”). The deification of purpose for the policy appropriation of natural resources is nothing new. Baake (2019), for example, reminds us that early oil industrialists claimed to “be chasing something from God” in their pursuit of oil in the 1800s, quoting scripture to justify their oil development plans (31-32). In a time of practical existentialism for the interdependencies of new materialism, nature itself provides the UN with a divinity that can transcend socio-political religious boundaries. This essential supreme value for biodiversity is seen clearly in the foundational ideas of a Post 2020 Biodiversity Framework whose central goal is the protection of ecosystems and species (UN 2021, “First Draft,” 5, sec. F, Goal A).

Ultimately, the displacement of small-scale fishers by the UN’s biodiversity policy is made possible by this supreme valuation for nature, placed literally above a value for the continued use of ecosystem services by the communities that have historically depended on them. In the information architecture of the Post 2020 Biodiversity Framework, policy items for biodiversity repair occupy the top Action Target positions while items to ensure that traditional communities benefit from biodiversity policy are found further down and to the end the Action Target list.



## Small-Scale Fishing in an Unsettled Marine Research Debate

The fishing bans and marine closures that are called for in the Post-2020 Biodiversity Framework are driven by a specific scientific warning that fits within the broader scientific predictions of biodiversity collapse that are driving the UN's biodiversity policy. Particularly, the warning that the world's commercial fisheries are expected to collapse by 2050 serves as an umbrella for the marine policy frameworks that close marine zones to small-scale fishers (CBD 2021, "First Draft," II, par. 2). In this subsection of the current study, I illustrate a process through which the UN latches on to and extracts a contested marine science conclusion that facilitates policy displacement of small-scale fishers, and I illustrate essential differences in the research frameworks that arrive at competitive conclusions about the best marine management pathway.

Promising a future benefit to humanity that the UN assumes it will be able to achieve through fishery closures, despite the ongoing and widespread difficulties of marine closure policy to date, the Post-2020 Biodiversity Framework embraces a contested marine science conclusion that has been extracted from an unsettled marine biodiversity debate. While some research does forward that fishery closures may provide the surest pathway to biodiversity regeneration, equally prevalent research contends that small-scale fisher integrated management is a better choice for its combination of tenability and food security. While the UN moves forward with policy to enact fishery closures, marine science continues a longstanding debate about the best way forward in marine restoration.

Two conclusions about the best marine biodiversity pathway exist within two distinct marine science research camps. Each of these two camps analyze "hard data" about biodiversity and either explicitly or implicitly suggest ways forward for marine policy.

While one camp contends that closing fisheries is the best way forward because it promises the most potential regenerative impact, the other camp contends that small-scale fishing approaches are best because they are tenable in regions with few management resources and because they bring biodiversity benefits that drive and support existing nutritive economies. The camp that forwards small-scale fishers as a tool for biodiversity regeneration typically applies research frameworks that include the social contexts of biodiversity data, contexts such as political limitations for marine policy enforcement, social and nutritional dependencies of communities on small-scale fisher activities, and other environmental and social systemic interactions and limitations. The camp that forwards fishery closures as the best choice, in contrast, does so with research that looks explicitly at biodiversity regeneration, in studies that have found that the greatest rate of biodiversity regeneration can be found in marine zones that are strictly and fully enforced (Sala et al. 2018).

Marine science that considers the broader social context of cultural economy and nutrition, for example, can be seen in Bystrom, Naranjo-Madrigal, and Wehrtmann's (2017) multi-year study on a small-scale snapper fleet. Finding no negative small-scale fisher impact, the report's conclusion is reached through a rigorous biodiversity data record that integrates the social context of small-scale fisher economic impacts in a specific community. Not only is this biodiversity research presented within a detailed analysis of the small-scale fleet's social and economic importance to a community, but the report also presents suggestions for ways in which this fishery can be improved using specific adaptations to small-scale fisher gear. Similarly, Ulate et al. (2018) contend that small-scale fisher integrated marine management is a viable path to biodiversity by comparing biodiversity levels in several marine managed areas that use very different management strategies. In their study, the researchers observe that marine protected zones in the Gulf of California that utilize federal fishery closures and

restrictions demonstrate lower measured biodiversity than areas co-managed by small-scale fishers. Furthermore, the research narrative contextualizes the study within the interdependencies of the small-scale fisher communities and enclaves that are impacted by marine policy that closes marine zones. As the researchers explain, the nutritive economy of fishing has “molded the communities surrounding the Gulf and crafted much of the complex social-ecological feedbacks of this region” (Ulate et al. 2018, 101, sec. 2.1). As a result, the research team suggests that small-scale fisher integrated marine management is a viable option for the Gulf of California, where the dominant federal management model of fishery closures and restrictions is also the most ineffective model. The low-impact fishing techniques and monitoring services for pollution and poaching that can be accomplished through marine management that integrates small-scale fishers, and the dependencies of culture and economy on this activity, is documented extensively by marine science through longitudinal biodiversity research analyses that include small-scale fisher economy and culture as a key context, as illustrated in Berkes (2021), Jentoft and Eide (2011), Plank et al. (2017), and Hilborn et al. (2021).

On the other side of the research coin, Sala et al. (2018) point to data that represents the effectiveness of fully enforced marine protected areas to make their case for fishery closures, finding that “strongly or fully protected areas . . . are the only ones achieving the goal of protecting biodiversity.” While the zones that Sala et al. refer to may be effective, they do not represent the actual state of marine management but are rather zones that are exceptions to the general rule of marine management failure. Furthermore, using strict biodiversity regeneration as the criteria for marine management modeling should be problematic for the UN because the militarized marine reserve may be the most effective for achieving sheer biodiversity regeneration (Ulate et al. 2018, 101, sec. 2.1). While the militarized marine reserve is perhaps the most successful

model for biodiversity, as described in Ulate et al.'s (2018) account of an island prison marine area that is patrolled by the Mexican Navy, the militarized marine reserve is likely not what the UN seeks when it calls for biodiversity policy to ensure nutrition, food security, and livelihoods, "especially for the most vulnerable through sustainable management" (CBD 2021, "First Draft," Action Target 9). Nonetheless, in order to achieve global targets for marine biodiversity regeneration, Sala et al. give policymakers a directive to implement fully protected marine zones (Sala et al. 2018).

While Ulate et al. (2018) contextualize their research amidst the living nutritive economies of small-scale fishing communities (105), Sala et al. (2018) contextualize their research against a futuristic economic indicator by positing that closing fisheries creates new jobs (12, sec. 3). This future benefit of tourism or other jobs that fishery closures can yield is a common context in the marine policy research that forwards marine closures as the best biodiversity pathway. Such research points to expectations and futuristic predictions of economic prosperity from marine closures. For example, in "Marine Protected Areas in Costa Rica: How do Artisanal Fishers Respond," Madrigal-Ballesteros et al. (2017) contend that expanding the near-shore marine protections that will displace small-scale fishers "can produce high wages through increased tourism" (787).

Overall, the marine research that points to the effectiveness of small-scale fishers constitutes a distinct and rich space in a marine biodiversity dialogue that has found it difficult to establish a foothold within policy frameworks of marine closures and fishing restrictions (Berkes 2021, 3-14). Nonetheless, the mantra of fishery closures as the most effective biodiversity choice dominates the UN's marine policy dialogue. In this dialogue, the debate about what constitutes scientific truth has been settled by a policy framework that excludes the research field of small-scale fisher integrated management. As a result, the UN's extracted scientific

conclusion for fishery closures is reified within the bedrock language and information architecture of the draft of Post-2020 Biodiversity Framework.

## **Suggestions for 2030 Action Target Vertical Alignment**

While the current study is an analysis of rhetorical contexts, in order to troubleshoot the problems of these contexts and to suggest solutions, we can turn to theory and technique in context framing for problem solving, an area of theory and practice in the design and the production of information architecture that is intended to solve specific policy problems (Weedon 2019). While effective information architecture allows policy to make things work (Hinton 2014, 253-63), context framing design for information architecture allows for policy problems to be targeted and to be solved. As a result, the following discussions of context design theory and technique are intended to facilitate vertical Action Target alignment that may carry more immediately balanced policy benefits to biodiversity and to traditional communities.

### **Policy Context Framing for Small-Scale Fisher Integrated Management**

In order to frame marine biodiversity policy that can draw from small-scale fisher benefits, the CBD should work to identify specific points in the information architecture of the Post-2020 Biodiversity Framework that exclude or diminish the viability of small-scale fisher integrated management. By reworking the language of the treaty at the specific information architecture sites of the document that exclude a small-scale fisher biodiversity pathway, many of which are detailed in this paper, the UN may be able facilitate vertical alignment of biodiversity policy items with

the 2030 Action Targets that seek to ensure benefits to traditional communities (CBD 2021, “First Draft,” 8, Targets 9, 20, & 21).

Additionally, because some marine policy and research promises future though vague benefits to meeting people’s needs through marine closures, the CBD might also consider revising the second subdivision of its 2030 Action Target list to add the word *immediate* before the word “needs,” to read as such: *Meeting people’s immediate needs through sustainable use and benefits sharing*. Going deeper, the CBD might consider reframing the role of biodiversity policy in order to seek a benefit from people and communities whose cultural and economic practices may support biodiversity, rather than, as is currently stated, to provide a benefit to people by meeting their needs. As a result, revision to the second Action Target subdivision that would facilitate small-scale fisher integrated management as a policy option might read as such: *Benefitting from immediate or ongoing contributions of communities to biodiversity and food security*. Such a framework for establishing the value of community benefits to biodiversity may be further facilitated by integrating a phrase in Action Targets 9, 20, and/ or 21 that would support the continuation of *traditional or ongoing nutrition economy activity*, especially when such activity carries identifiable benefits to biodiversity.

## Inscription for Assessing Research and Reporting

SAMPLE RUBRIC FOR CBD RESEARCH AND REPORT 2030 ACTION TARGET ALIGNMENT	
0 1 2 3	Reducing threats to biodiversity
0 1 2 3	Meeting people's immediate needs through sustainable use and benefits sharing
0 1 2 3	Tools and solutions for implementation and mainstreaming
_____	TOTAL SCORE
NOTE: A score of 0 signifies no evidence of the Action Target goal in the research or report that is being evaluated, while a score of 3 signifies extensive evidence.	

Figure 3. A sample rubric for CBD scoring of research and reports.

Additionally, because the policy displacement problem that faces small-scale fishers is essentially a problem of informational context, the CBD might consider the use of an inscriptive criteria for policy context development that is vertically aligned with the 2030 Action Targets (Latour 1987; Weedon 2017). Developing an inscriptive criteria for information uptake in context development could involve using the CBD's 2030 Action Targets as a rubric with which to score research and reports that the CBD uses, cites, or creates in the development of its biodiversity framework. While applying 21 criteria in a single rubric may not be feasible, the CBD breaks down its 21 Action Targets into three major subdivisions for policy purpose: 1) Reducing threats to biodiversity, 2) Meeting people's needs through sustainable use and benefits sharing, and 3) Tools and solutions for implementation and mainstreaming (CBD 2021, "First Draft," 6-8). Potentially, scores from the use of a rubric that applies these three subdivisions could provide the CBD with an inscriptive judgement criteria for the uptake of research and reports in biodiversity policy formulation and context

development, as well as for the CBD's drafting of specific policy items (See Figure 3).

## **Acknowledgement**

Sincerest appreciation is extended to CoopeSoliDar R.L. ([www.coopesolidar.org](http://www.coopesolidar.org)) for pointing out to me that the UN's biodiversity framework is diminishing the small-scale fishing industry. Observations and discussions conducted with CoopeSoliDar R.L., one of many small-scale fisher labor collectives that work for humanistic and environmental goals, were important in the development of the themes in this study.



## References

- Alms, Viola, and Matthias Wolff. 2019. "The Gulf of Nicoya (Costa Rica) Fisheries System: Two Decades of Change." *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 11(2): 139-61. <https://doi.org/10.1002/mcf2.10050>
- Alvarado, Juan José, Jorge Cortés, María Fernanda Esquivel, and Eva Salas. 2012. "Costa Rica's MPAs: Status and Perspectives." *International Journal of Tropical Biology* 60(1): 129-142. <http://dx.doi.org/10.15517/rbt.v60i1.2657>
- Araya, Sergio Salazar. 2013. "Situación Actual de la Pesca Artesanal en Costa Rica." *Anuario de Estudios Centroamericanos* 39: 311-42. <https://revistas.ucr.ac.cr/index.php/anuario/article/%20view/11809/11131>
- Australia. 2014. "Australia's Fifth National Report to the United Nations Convention on Biological Diversity." Department of the Environment. [www.cbd.int/doc/world/au/au-nr-05-en.pdf](http://www.cbd.int/doc/world/au/au-nr-05-en.pdf)
- Baake, Ken. 2019. "Petroleum Prodigals: How to Recover from Too Much of a Good Thing." *Christianity Today* 63(5): 30-32.
- Barbados. 2021. "National Biodiversity Strategy and Action Plan 2020." The Ministry of Environment and National Beautification. [www.cbd.int/doc/world/bb/bb-nbsap-v2-en.pdf](http://www.cbd.int/doc/world/bb/bb-nbsap-v2-en.pdf)
- Beem, Betsi. 2009. "Leaders in Thinking, Laggards in Attention? Bureaucratic Engagement in International Arenas." *Policy Studies Journal* 37: 3, 497-519.
- Belize. 2014. "Fifth National Report to the United Nations Convention on Biological Diversity." Ministry of Forestry, Fisheries and Sustainable Development. [www.cbd.int/doc/world/bz/bz-nr-05-en.pdf](http://www.cbd.int/doc/world/bz/bz-nr-05-en.pdf)

- Berkes, Fikret. 2021. *Toward a New Social Contract. Community Based Resource Management and Small-Scale Fisheries.* TBTI Global. <http://toobigtoignore.net/toward-a-new-social-contract-by-fikret-berkes/>
- Birkan, Rıza, and Fikret ÖNdes. 2020. "Socio-Economic Characteristics of Small-Scale Fisheries in the Aegean Sea, Turkey (Eastern Mediterranean)." *Acta Ichthyologica Et Piscatoria* 50(3): 257–68.
- Bonneuil, Christophe. 2018. "The Geological Turn: Narratives of the Anthropocene." In *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch.* Edited by Clive Hamilton, François Gemenne, and Christophe Bonneuil, 22-30. Oxfordshire: Routledge.
- Bystrom, Andy Benjamin, Helven Naranjo-Madrigal, and Ingo Wehrmann. 2017. "Indicator-Based Management Recommendations for an Artisanal Bottom-Longline Fishery in Costa Rica, Central America." *Revista De BiologiaTropical* 65(2): 475-92. doi:[10.15517/RBT.V65I2.25757](https://doi.org/10.15517/RBT.V65I2.25757)
- Cagle, Lauren E, and Denise Tillery. 2015. "Climate Change Research Across Disciplines: The Value and Uses of Multidisciplinary Research Reviews for Technical Communication." *Technical Communication Quarterly* 24(2): 147-63. <https://doi.org/10.1080/10572252.2015.1001296>
- CBD. 2018. "Decision 14/1." Memo. Conference of the Parties to the Convention on Biological Diversity, Nov. 30. [www.cbd.int/doc/decisions/cop-14/cop-14-dec-01-en.pdf](http://www.cbd.int/doc/decisions/cop-14/cop-14-dec-01-en.pdf)
- CBD. 2021. "First Draft of the Post-2020 Global Biodiversity Framework, CBD/WG2020/3/3." United Nations Convention on Biological Diversity July 5: 1–12. [www.cbd.int/doc/c/914a/eca3/24ad42235033f031badf61b1/wg2020-03-03-en.pdf](http://www.cbd.int/doc/c/914a/eca3/24ad42235033f031badf61b1/wg2020-03-03-en.pdf)
- CBD. 2021. "Kunming Declaration." United Nations Convention on Biological Diversity October 30.

<https://www.cbd.int/doc/c/9c06/4639/c6170066e6b3dcd9acf7926e/cop-15-05-add1-en.docx>

- CBD. 2022. "Preparations for the Post-2020 Biodiversity Framework." <https://www.cbd.int/conferences/post2020>
- Cross, Helen. 2016. "Displacement, Disempowerment and Corruption: Challenges at the Interface of Fisheries, Management and Conservation in the Bijagós Archipelago, Guinea-Bissau." *Oryx* 50(4): 693–701. <https://doi.org/10.1017/S003060531500040X>
- Egypt. 2014. "Fifth National Report to the United Nations Convention on Biological Diversity." <https://www.cbd.int/doc/world/eg/eg-nr-05-en.pdf>
- Eide, Arne, Maarten Bavinck, and Jesper Raakjær. 2011. "Chapter 2, Avoiding Poverty: Distributing Wealth in Fisheries." In *Poverty Mosaics: Realities and Prospects in Small-Scale Fisheries*. Dordrecht, Netherlands: Springer.
- FAO 2015. "Small-scale Fisheries." Food and Agriculture Organization of the United Nations. <https://www.fao.org/3/au832e/au832e.pdf>
- FAO. 2020. "The State of World Fisheries and Aquaculture: Sustainability in Action." Food and Agriculture Organization of the United Nations. Rome. [doi.org/10.4060/ca9229en](https://doi.org/10.4060/ca9229en)
- FAO. 2021. "Sustainable Small-Scale Fisheries." Policy Support and Governance Gateway. Food and Agriculture Organization of the United Nations. [www.fao.org/policy-support/policy-themes/sustainable-small-scale-fisheries/en/](http://www.fao.org/policy-support/policy-themes/sustainable-small-scale-fisheries/en/).
- Feodoroff, Timothé, Mads Barbesgaard, and Carsten Pedersen. 2014. "Marine Protected Areas in South Africa — Ocean Grabbing by Another Name." *The Ecologist* November 21. <https://theecologist.org/2014/nov/21/marine-protected-areas-south-africa-ocean-grabbing-another-name>

- Fiji. 2020. "National Biodiversity Strategy and Action Plan 2020–2050." Government of Fiji, Department of Environment. [www.cbd.int/doc/world/fj/fj-nbsap-v2-en.pdf](http://www.cbd.int/doc/world/fj/fj-nbsap-v2-en.pdf)
- Hagan, Kristin, and Samantha Williams. 2016. "Oceans of Discourses: Utilizing Q Methodology for Analyzing Perceptions on Marine Biodiversity Conservation in the Kogelberg Biosphere Reserve, South Africa." *Frontiers in Marine Science* 3(188): 1–13. doi.org/10.3389/fmars.2016.00188
- HallSpencer, Jason, Valerie Allain, and Jan Helge Foss. 2002. "Trawling Damage to Northeast Atlantic Ancient Coral Reefs." *Proceedings of the Royal Society. B, Biological Sciences* 269(1490): 507–11. <https://doi.org/10.1098/rspb.2001.1910>
- Haward, Marcus. 2001. "Developing an Australian Oceans Policy," *Ocean Yearbook 15*, Edited by Elizabeth Mann Borgese, Aldo Chircop and Moira McConnell, University of Chicago Press, 523–539.
- Hilborn, Ray, Caitlin Allen Akselrud, Henry Peterson, and George A Whitehouse. 2021. "The Trade-off between Biodiversity and Sustainable Fish Harvest with Area-based Management." *ICES Journal of Marine Science* 78(6): 2271–279. <https://doi.org/10.1093/icesjms/fsaa139>
- Hinton, Andrew. 2014. *Understanding Context: Environment, Language, and Information Architecture*. O'Reilly Media.
- Hoorweg, Jan and Nyawira Muthiga, eds. 2009. *Advances in Coastal Ecology: People, Processes, and Ecosystems in Kenya*. Leiden, Netherlands: African Studies Centre.
- INCOPESCA. 2022. "Pesca comercial." Instituto Costarricense de Pesca y Acuicultura. [www.incopescas.go.cr/pesca/pesca\\_comercial.aspx](http://www.incopescas.go.cr/pesca/pesca_comercial.aspx)
- Jentoft, Svein and Arne Eide, editors. 2011. *Poverty Mosaics: Realities and Prospects in Small-Scale Fisheries*. Dordrecht, Netherlands: Springer.

- Jorge, Miguel Angel and Stavros Papageorgiou. 2019. "A Blue Future for Costa Rica's Fisheries." World Bank Blogs (October 21). <https://blogs.worldbank.org/latinamerica/blue-future-costa-ricas-fisheries#:~:text=The%20%2490%20million%20Sustainable%20Fisheries,coastal%20and%20oceanic%20fishing%20communities.>
- Kawarazuka, Nozomi and Christophe Béné. 2010. "Linking Small-scale Fisheries and Aquaculture to Household Nutritional Security: An Overview." *Food Security* 2(4): 343–57. <https://doi.org/10.1007/s12571-010-0079-y>
- Kolding, Jeppe and Paul A.M. van Zwieten. 2011. "The Tragedy of Our Legacy: How do Global Management Discourses Affect Small Scale Fisheries in the South?" *Forum for Development Studies* 38(3): 267–97. <https://doi.org/10.1080/08039410.2011.577798>
- Larcombe, James and Nic Marton. 2016. "Commercial Fishing Displacement under the Panel-recommended Commonwealth Marine Reserve Zoning Scheme." Australian Government, Department of Agriculture and Water Resources, Australian Bureau of Agricultural and Resource Economics and Sciences.
- Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, MA: Harvard University Press.
- Lloret, Josep et al. 2018. "Small-Scale Coastal Fisheries in European Seas Are Not What They Were: Ecological, Social and Economic Changes." *Marine Policy* 98: 176–186. <https://doi.org/10.1016/j.marpol.2016.11.007>
- Lozano, Alejandro J. García and Joel T. Heinen. 2016. "Identifying Drivers of Collective Action for the Co-Management of Coastal Marine Fisheries in the Gulf of Nicoya, Costa Rica." *Environmental Management* 57(4): 759–769. <https://doi.org/10.1007/s00267-015-0646-2>

- Macfadyen, Graeme, Pavel Salz and Rod Cappell. 2011. Characteristics of Small-Scale Coastal Fisheries in Europe. Fisheries, Structural and Cohesion Policies Department B, Directorate General for Internal Policies, European Parliament.  
[www.europarl.europa.eu/RegData/etudes/etudes/join/2011/460059/IPOL-PECH\\_ET\(2011\)460059\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2011/460059/IPOL-PECH_ET(2011)460059_EN.pdf)
- Madrigal-Ballester, Róger, Heidi J Albers, Tabaré Capitán, and Ariana Salas. 2017. "Marine Protected Areas in Costa Rica: How Do Artisanal Fishers Respond?" *Ambio* 46(7): 787-96.
- Miller, Margaret. 2007. "Apparent Rapid Fisheries Escalation at a Remote Caribbean Island." *Environmental Conservation* 34(2): 92-94. <https://doi.org/10.1017/S0376892907003852>
- Monaco. 2022. "Stratégie Nationale Pour la Biodiversité Horizon 2030." Gouvernement Princier Principauté de Monaco.  
<https://www.cbd.int/reports/search/>
- Montenegro. 2014. "The Fifth National Report to the United Nations Convention on Biological Diversity." Ministry of Sustainable Development and Tourism.  
[www.cbd.int/doc/world/me/me-nr-05-en.pdf](http://www.cbd.int/doc/world/me/me-nr-05-en.pdf)
- Mrema, Elizabeth Mruma. 2021. "Statement by the Executive Secretary of the Convention on Biological Diversity on the occasion of the event: Road to Kunming, Building a Shared Future for All Life on Earth." Proceeding of the United Nations Convention on Biological Diversity, United Nations Headquarters, New York, May 21.  
<https://www.cbd.int/doc/speech/2021/sp-2021-05-21-newyork-en.pdf>
- Munga, Cosmas, Stephen Ndegwa, Bernerd Fulanda, Julius Manyala, Edward Kimani, Jun Ohtomi, and Ann Vanreusel. 2012. "Bottom Shrimp Trawling Impacts on Species Distribution and Fishery Dynamics; Ungwana Bay Fishery Kenya before and after the 2006 Trawl Ban." *Fisheries Science* 78(2): 209-19.  
<http://dx.doi.org/10.1007/s12562-011-0458-0>

- Netherlands. 2014. "Convention on Biological Diversity Fifth National Report of the Kingdom of the Netherlands." Ministry of Economic Affairs. [www.cbd.int/doc/world/nl/nl-nr-05-en.pdf](http://www.cbd.int/doc/world/nl/nl-nr-05-en.pdf)
- New Zealand. 2020. "Te Mana o te Taiao: Aotearoa New Zealand Biodiversity Strategy 2020." New Zealand Government Department of Conservation.
- Papua New Guinea. 2020. "National Biodiversity Strategic Action Plan 2019-2024." Conservation and Environment Protection Authority of Papua New Guinea. [www.cbd.int/doc/world/pg/pg-nbsap-v2-en.pdf](http://www.cbd.int/doc/world/pg/pg-nbsap-v2-en.pdf)
- Plank, Michael J, Jeppe Kolding, Richard Law, Hans D Gerritsen, and David Reid. 2017. "Balanced Harvesting Can Emerge from Fishing Decisions by Individual Fishers in a Small-scale Fishery." *Fish and Fisheries* 18(2): 212-25. <http://hdl.handle.net/10793/1405>
- Pelagos. 2022. "Management Plan." Sanctuaire Pelagos. <https://www.sanctuaire-pelagos.org/en/about-us/management-plan>
- Rife, Alexis N, Brad Erisman, Alexandra Sanchez, and Octavio Aburto-Oropeza. 2013. "When Good Intentions Are Not Enough ... Insights on Networks of 'Paper Park' Marine Protected Areas." *Conservation Letters* 6(3): 200-12. <https://doi.org/10.1111/j.1755-263X.2012.00303.x>
- Saint Lucia. 2018. "Revised Second National Biodiversity Strategy and Action Plan: Second NBSAP (2018–2025) for Saint Lucia." Government of Saint Lucia. [www.cbd.int/doc/world/lc/lc-nbsap-v2-en.pdf](http://www.cbd.int/doc/world/lc/lc-nbsap-v2-en.pdf)
- Sala, Enric, Jane Lubchenco, Kirsten Grorud-Colvert, Catherine Novelli, Callum Roberts, and U. Rashid Sumaila. 2018. "Assessing Real Progress towards Effective Ocean Protection." *Marine Policy* 91: 11-13. <https://doi.org/10.1016/j.marpol.2018.02.004>

- Secretariat. 2021. Global Biodiversity Outlook 5. Secretariat of the Convention on Biological Diversity. Montreal. <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf>
- Simmons, W. Michelle and Jeffrey T. Grabill. 2007. "Toward a Civic Rhetoric for Technologically and Scientifically Complex Places: Invention, Performance, and Participation". *College Composition & Communication* 58(3): 419-48. <https://www.jstor.org/stable/20456953>
- Smallman, Melanie. 2020. "Language, Power, and Public Engagement in Science." In *The Routledge Handbook of Language and Science*, 75-84. 1st ed. Vol. I. Routledge.
- Symes, David, Jeremy Phillipson, and Pekka Salmi. 2015. "Europe's Coastal Fisheries: Instability and the Impacts of Fisheries Policy." *Sociologia Ruralis* 55(3): 245-57. <https://doi.org/10.1111/j.1467-2979.2011.00450.x>
- TBTI. 2022. "About TBTI." Too Big To Ignore: Global Partnership for Small-Scale Fisheries Research. <http://toobigtoignore.net/about-tbti/>
- Teh, Lydia C. L. and U.R. Sumaila. 2013. "Contribution of Marine Fisheries to Worldwide Employment." *Fish and Fisheries* 14(1): 77-88. <https://onlinelibrary.wiley.com/doi/10.1111/j.1467-2979.2011.00450.x>
- Teh, Louise SL, William WL Cheung, Villy Christensen, and U.R. Sumaila. 2017. "Can We Meet the Target? Status and Future Trends for Fisheries Sustainability." *Current Opinion in Environmental Sustainability* 29: 118-30. <https://doi.org/10.1016/j.cosust.2018.02.006>
- Trinidad and Tobago. 2016. "Fifth National Report to the United Nations Convention on Biological Diversity." Government of the Republic. [www.cbd.int/doc/world/tt/tt-nr-05-en.pdf](http://www.cbd.int/doc/world/tt/tt-nr-05-en.pdf)
- Tuda, Arthur O., Lynda D. Rodwell, and Tim Stevens. 2007. "Conflict Management in Mombasa Marine National Park and Reserve, Kenya: A Spatial Multicriteria Approach." In



Proceedings of the Workshop on a Regional Perspective on MPAs in the Western Indian Ocean May 9-4: 63-72. <http://natureseychelles.org/knowledge-centre/scientific-papers-database/proceedings-of-the-workshop-on-a-regional-perspective-on-mpas-in-the-western-indian-ocean/viewdocument/146>

Ulate, Karol, Teresa Alcoverro, Rohan Arthur, Octavio Aburto-Oropeza, Carlos Sánchez, and Leonardo Huato-Soberanis. 2018. "Conventional MPAs Are Not as Effective as Community Co-managed Areas in Conserving Top-down Control in the Gulf of California." *Biological Conservation* 228: 100-09. <https://doi.org/10.1016/j.biocon.2018.09.033>

UK Government. 2021. "COP 26: The Negotiations Explained." UN Climate Change Conference UK 2021 in Partnership with Italy. <https://ukcop26.org/wp-content/uploads/2021/11/COP26-Negotiations-Explained.pdf>

UN. 2021. "COP President Concluding Media Statement." United Nations Climate Change Conference November 29. <https://ukcop26.org/cop-president-concluding-media-statement/>

UN. 2022. "Conferences: Environment and Sustainable Development." United Nations. <https://www.un.org/en/conferences/environment>

Versleijen, Nicole and Jan Hoorweg. 2009. "Chapter 5, Marine Conservation: The Voice of the Fishers." *Advances in Coastal Ecology: People, Processes, and Ecosystems in Kenya*. Leiden, Netherlands: African Studies Centre. 79-98.

Victorero, Lissette, Les Watling, Maria L Deng Palomares, and Claire Nouvian. 2018. "Out of Sight, But Within Reach: A Global History of Bottom-Trawled Deep-Sea Fisheries From >400 M Depth." *Frontiers in Marine Science* 5(98). <https://doi.org/10.3389/fmars.2018.00098>

- Weedon, Scott. 2017. "Representation in Engineering Practice: A Case Study of Framing in a Student Design Group," *Technical Communication Quarterly* 26(4): 361-78.
- 2019. "The Core of Kees Dorst's Design Thinking: A Literature Review." *Journal of Business and Technical Communication* 33(4): 425-430. <https://doi.org/10.1177/1050651919854077>
- Whitmarsh, David, Carlo Pipitone, Fabio Badalamenti, and Giovanni D'Anna. 2003. "The Economic Sustainability of Artisanal Fisheries: The Case of the Trawl Ban in the Gulf of Castellammare, NW Sicily." *Marine Policy* 27(6): 489-97. [https://doi.org/10.1016/S0308-597X\(03\)00062-9](https://doi.org/10.1016/S0308-597X(03)00062-9)
- Williams, Alan, Franziska Althaus, Kylie Maguire, Mark Green, Candice Untiedt, Phil Alderslade, and Malcolm R Clark. 2020. "The Fate of Deep-Sea Coral Reefs on Seamounts in a Fishery-Seascape: What Are the Impacts, What Remains, and What Is Protected?" *Frontiers in Marine Science* 7: 1-22. <https://doi.org/10.3389/fmars.2020.567002>
- Worm, Boris et al. 2006. "Impacts of Biodiversity Loss on Ocean Ecosystem Services." *Science (American Association for the Advancement of Science)* 314(5800): 787-90. <https://www.jstor.org/stable/20031683>
- Worm, Boris, Heike K. Lotze, Isabelle Jubinville, Chris Wilcox, and Jenna Jambeck. 2017. "Plastic as a Persistent Marine Pollutant." *Annual Review of Environment and Resources* 42(1): 1-26. <https://doi.org/10.1146/>

## About the Author

**David Robledo** is a PhD student in Technical Communication and Rhetoric at Texas Tech University, concentrating in Latin American policy and new media analysis in the biodiversity sciences. A 2021 Fulbright graduate fellow for science communication studies of Costa Rica's small-scale fishing industry, his comparative social-science research builds from a professional career in media and research for small-scale environmental economy in Latin-x communities.

© 2022, David Robledo. This article is licensed under the Creative Commons Attribution 4.0 International License (CC BY). For more information, please visit [creativecommons.org](https://creativecommons.org)