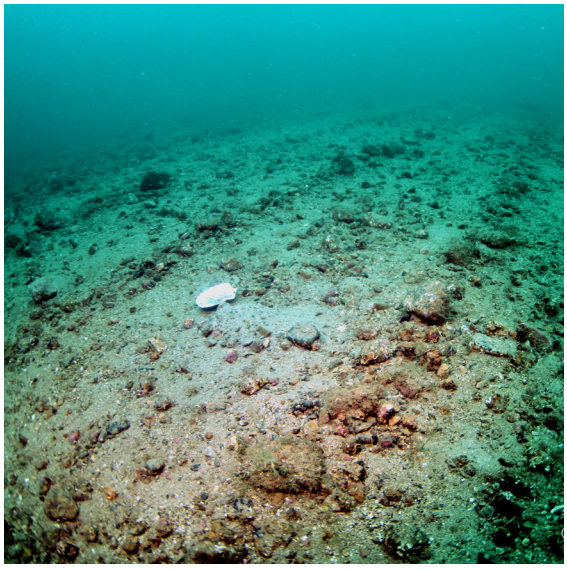
REPORT 2021

New perspectives on an old fishing practice: Scale, context and impacts of bottom trawling



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CONTRIBUTIONS

DS, JT, VRV, and FL conceptualized the report and coordinated its writing, editing, and review. DP, MLDP, and NB provided the reconstructed catch data and provided thought partnership for the report, as well as long-term investments into the SAU platform. ML provided expertise on bottom trawling in China and edited the report. JV contributed original content through the West Africa case study, guidance on methods for the social impacts section, and substantial comments on the report draft. SR and TC provided additional comments on the report draft. The authors would also like to thank Celeste Leroux of Virgil Group for her thought partnership, Mark Michelin of CEA Consulting for his review of materials, and Comms Inc. for its copy editing, report design, translation, and other communications support. Funding for this report was provided by Oceans 5, Oak Foundation, and Oceankind.

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Executive summary

Bottom trawling is a globally widespread fishing practice responsible for 26 percent of the total marine fisheries catch.[1] Bottom trawling is a method for catching aquatic animals that involves dragging a weighted net or rigid structure from a vessel along the seafloor. It is fundamental to the supply of a multitude of food (shrimp, whitefish, flatfish) and non-food (fishmeal and fish oil) commodities. It has played an outsized role in the industrialization and globalization of the fishing sector, becoming a mainstay of fishery economies in Europe, North America, South and Southeast Asia, East Asia, and West Africa. The vast majority of the fish caught by bottom trawlers (99 percent) is caught under the jurisdiction of coastal countries, in their exclusive economic zones (EEZs).

Bottom trawling has always attracted opposition and controversy. From 14th century "proto-trawling" to modern shrimp trawling, these fisheries have been consistently associated with social conflict (particularly in displacing traditional fishing practices), environmental degradation (in terms of contact with and penetration of the seabed as well as impacts on sensitive species) and lack of selectivity (in terms of indiscriminately catching a range of species). As a result, those involved with the practice have at times sought to minimize or obfuscate some of these impacts, while those seeking to limit it have sometimes been hyperbolic and unrealistic in their criticisms and solutions. Yet there is a surprising level of consensus among the fishing industry, researchers, governments, civil society, and NGOs that bottom trawling presents unique and critical challenges to environmental, social, and climate goals for fisheries.

This report seeks to provide new perspectives on this historical controversy by presenting the most up-to-date synthesis of available data and evidence on bottom trawling's extent, impacts, and solutions in order to inform constructive policy-making. Specifically, it uses novel data analysis from Sea Around Us to map the global extent of bottom trawling; a synthesis of peer-reviewed literature to elucidate environmental, social, and climate impacts; and insights from more than 40 global experts on what a constructive future might look like that manages or severely

[1] This statistic includes catch caught both in the exclusive economic zones of countries (EEZs) as well as on the high seas. Bottom trawling is also responsible on average for 26 percent of the catch within EEZs globally. There is also some bottom trawling in freshwater fisheries (e.g., Lake Victoria) but that practice is not included in this report.

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limits the worst impacts of this practice, while also ensuring a just and equitable society and a healthy food system.

Key findings of the report include:

- **Bottom trawlers catch 26 percent of the total global marine fisheries catch.** In the most recent decade for which there is data (2007-2016[2]), more than 99 percent of all bottom trawling occurs in the EEZs of coastal countries, and less than 1 percent on the high seas. The total amount of seafood caught by bottom trawling annually in EEZs is roughly equivalent to all of the seafood caught by the world's artisanal fishers.
- **Bottom trawling is most intense (as measured by catch per unit area) within the territorial seas of coastal states.** Approximately 20 percent of bottom trawling within EEZs occurs less than 12 nautical miles from shore (areas defined as territorial seas), despite territorial seas making up less than 10 percent of total EEZ area. The average trawling intensity in territorial seas is on average double the average trawling intensity within EEZs overall. Areas close to shore also tend to be fished by artisanal and small-scale fishers, which may contribute to conflict between artisanal fishers and industrial bottom trawlers.
- **Asia is the locus of fish caught by bottom trawls; 50 percent of all bottom trawled fish is caught in the EEZs of Asia or by the foreign fleets of Asian countries.** China, Vietnam, Indonesia, India, and Morocco are the top five bottom trawling countries, as measured by average catch over the most recent decade for which there is complete data (2007-2016). China alone catches 15 percent of the total bottom trawled catch. Whereas bottom trawling is growing rapidly in Asia, it is declining or staying constant in most other parts of the world.
- **Distant water fishing fleets catch 22 percent of all the fish caught by bottom trawlers in EEZs.** These fleets are predominantly of Asian or European origin, and fish in the EEZs of Africa and Oceania. In 34 countries – mostly in Africa – over 90 percent of the catch caught by bottom trawlers is caught by foreign-flagged vessels. These figures could be even higher, given the significant amount of distant water fishing that is thought to be illegal, unreported, or unregulated.
- **There is general agreement that the environmental impacts of bottom trawling represent unique challenges when compared to other fishing gears.** The practice stands alone among fishing gears in that it can be conclusively linked to all three of the major impacts of fishing on marine biodiversity: overfishing, bycatch, and seabed contact. It is the only gear type that requires sustained contact with and often penetration of the seafloor in a manner that can degrade and destroy marine habitats. Despite this agreement between academia, NGOs, the fishing industry, and fisheries managers, major areas of contention remain. These include bottom trawling's spatial footprint, the local character of its impacts (historic and present-day), and which solutions are viable or desired given competing goals for fisheries.
- **Bottom trawling contributes to greenhouse gas emissions through its high fuel use and the disturbance of carbon-containing sediments on the seafloor.** Of the major gear types used in global fisheries, bottom trawling has the highest emissions from fuel use. Seafood caught by bottom trawling has equivalent or higher associated greenhouse gas emissions than most meat, except lamb and beef. Novel, early-stage research on the disturbance of sediments caused by bottom trawling suggests it could contribute up to 1.46 Gt CO_2-eq in annual emissions, a level of emissions that would put it on par with the aviation sector.
- **Bottom trawling is also associated – positively and negatively – with social impacts including economic impacts, violence and conflict, food security, human rights abuses, and occupational health and safety.** While these impacts are not well studied and can vary by context, bottom trawling presents a unique threat to the livelihoods, cultural practices, and well-being of small-scale fishers, especially those in the tropics.
- **Solutions to address environmental impacts of bottom trawling typically fall into two categories: efforts to manage impacts, and efforts to limit the practice.** Fisheries management measures have been demonstrated to be effective in reducing (but not eliminating) many negative environmental impacts from bottom trawling, at relatively minimal social or economic cost. However, the effectiveness of these measures is largely a result of good governance – which tends to be absent in the regions of West Africa and Asia where most bottom-trawled seafood is currently caught. Efforts to limit the practice can more comprehensively address the full range of bottom trawling's environmental impacts, but they can be highly contentious and often do not include viable social or economic solutions for those who are displaced by the changes.
- **More work is needed to identify solutions that can avoid, minimize, or mitigate the social and economic outcomes associated with bottom trawling.** Although an increasing number of frameworks and tools exist to address the pervasive social challenges associated with fisheries more broadly, these frameworks are far from being widely adopted and are not specific to the

[2] Since the bulk of the work on this report was completed, the Sea Around Us data have been updated to 2018; the update did not alter any of the patterns and trends reported here.

Executive summary

challenges associated with bottom trawling. Human rights due diligence, exclusive access for small-scale fishers in nearshore waters, and just transition economic packages are just some examples of solutions that may help to guard against negative social or economic outcomes for fishers, fishworkers, and others involved in the sector.

- **The marine conservation and fisheries management communities need to look beyond purely technical measures for solving the challenges inherent to bottom trawling.** Bottom trawling is an entrenched global practice, and solutions that fail to adequately consider or address the key political, social, or economic dynamics at play in the sector are unlikely to succeed and will make it harder to achieve Sustainable Development Goals associated with fisheries.

Building on these insights, the report concludes with a set of recommendations for constructive action, to transform the status quo around bottom trawling (under the acronym "TRANSFORM"). These recommendations for fisheries decision-makers, managers, fishing industry leaders, and advocates include:

- **Transition the system:** Bottom trawling supports a set of complex, distinct food and non-food commodity systems that are globally interconnected. Solutions must consider broader dynamics – such as broad social changes in fishing culture, the rise of the global seafood trade, and food consumption patterns – in order to avoid unintended consequences, such as effort displacement. Solutions to manage or limit bottom trawling should not be viewed in isolation by policymakers, fishery managers, NGOs, or communities.
- **Respect human rights: To catalyze meaningful improvement in bottom trawl fisheries requires a human-centered approach.** This means respecting both the civil and political rights, as well as the economic, social and cultural rights of those working in and affected by such fisheries. Bottom trawl fisheries – and policy changes relating to them – must abide by a minimum standard of "do no harm." More baseline research into socio-economic impacts and possible solutions (especially distributional impacts) should accompany these efforts.
- **Accelerate the transition to best practices:** Modern management practices – from gear innovation to enhanced observer coverage – have dramatically improved the performance of some bottom trawl fisheries, particularly in stabilizing overexploited stocks, increasing selectivity, and reducing seabed pressure especially in Vulnerable Marine Ecosystems (VMEs). Urgent efforts are needed to export these practices to regions that require them most, particularly in low and middle-income countries in the tropics.
- **Negotiate political action:** Decision-makers must recognize the unique biodiversity, climate and social conflict challenges associated with bottom trawling and legislate for it as a special case – both through national policies and international standards and agreements. As well as making bold, gear-specific policy decisions, this should also include acknowledging the significant investments and trade-offs needed to adequately resource any transition away from bottom trawling.
- **Stop harmful subsidies:** Definitions of "harmful" subsidies must include those accessed by specific fisheries using the highest impact practices, including bottom trawl fisheries. Conversely, subsidies supporting transition out of (or to improve) practices such as bottom trawling should be considered "beneficial."
- **Freeze the footprint:** Given the multitude of unresolved challenges around bottom trawling – at global and local levels – any new or expanded fisheries should be regarded as politically, socially, environmentally, and economically inappropriate.
- **Open up dialogue:** Discourses around bottom trawling from the fisheries and conservation sectors do not tend to emphasize common ground. Bold alliances and painful but necessary compromise are needed to meet the twin climate and biodiversity crises, including between sectors with different material interests.
- **Restrict appropriately:** Ecologically and culturally sensitive areas must be protected from bottom trawling through a coherent area-based approach to such fisheries, encompassing inshore and offshore exclusion zones as well as all classifications of marine protected areas (MPAs).
- **Monitor impact to support adaptive management:** While all best-practice fisheries require significant volumes of real-time information, bottom trawling management (with its reliance on expensive and complex seabed sensitivity data) necessitates robust, collaboratively funded research. As well as near-term management-focused monitoring, special attention should be directed to emerging areas of trawling research, especially life cycle analysis and carbon emissions arising from seabed disturbance.

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