

Most Long-Distance Fishing in Foreign Waters Dominated by Only a Few Governments

New atlas data shows China, European Union among the five political entities responsible for most subsidized distant-water fishing worldwide

Overview

Despite increased overfishing around the world, governments pay their fishing sectors US\$35 billion each year—more than US\$22 billion of which are “harmful subsidies,”¹ or subsidies that allow vessels to travel farther, stay at sea longer and catch more fish than they could normally afford to, resulting in a depletion of fish populations beyond sustainable levels. These subsidies often enable distant-water fishing (DWF) efforts, in which countries fish beyond their own territories—meaning that a small number of nations end up exploiting resources in other countries’ waters and on the high seas.

To show the magnitude—and the spatial distribution—of subsidies that prop up DWF, The Pew Charitable Trusts commissioned researchers at the University of California, Santa Barbara to develop the [DWF Subsidy Atlas](#), an interactive, online tool for learning how much DWF is taking place and where. New data visualized in the atlas reveals that the five political entities providing the most harmful subsidies for DWF in other countries’ waters are China, the European Union (EU), Japan, South Korea and Chinese Taipei. In 2018, the most recent year for which complete data is available, these five entities collectively spent an estimated US\$1.5 billion in harmful subsidies supporting their DWF activity and more than 2 billion kilowatt hours of effort (the hours spent fishing multiplied by the power of the engine vessel, abbreviated as kWh). That’s more DWF activity than from the remaining 130 distant-water fishing nations (DWFNs) combined.

Members of the World Trade Organization (WTO) are negotiating an agreement that could curb harmful fisheries subsidies, which may include new rules to prohibit harmful subsidies for DWF outside of a country’s own jurisdiction and on the high seas. Such a move would protect the ocean and its valuable resources—and the coastal communities that depend on them.

Overfishing harms people and the ocean alike—and damaging subsidies are a key driver

Overfishing remains a global threat to those who depend on the ocean’s resources for food and job security. A 2020 United Nations (U.N.) Food and Agriculture Organization (FAO) study found one-third of all global fish populations to be overfished, and that another 60% are being fished at maximally sustainable levels with no room for increased fishing activity.² The study also revealed that fish represents almost 20% of the average per capita intake of animal protein for 3.3 billion people around the world. In developing countries such as Bangladesh, Cambodia, the Gambia, Ghana, Indonesia, Sierra Leone, Sri Lanka and some small island developing states, fish accounts for more than 50% of total animal protein intake.

Harmful fisheries subsidies are a key driver of overfishing and overcapacity. Governments subsidize their fishing sectors to support small-scale vessels and operators as well as large-scale industrial fishing operations, often intending to help supplement income or lower costs, but only 19% of the US\$35 billion in annual subsidies goes to the small-scale fishing subsector, which includes artisanal and subsistence fisheries.³ Vessels in the large-scale subsector often use their payments to travel far distances or stay on the water longer, catching more fish than they would without the financial support. The latest global subsidy estimates reveal that only seven political entities provide more than two-thirds (67% or US\$14.8 billion) of the world’s harmful subsidies: China, Japan, the EU, South Korea, Russia, the United States and Thailand.

Recognizing the damage that harmful subsidies cause to the marine environment, world leaders committed in 2015—under U.N. Sustainable Development Goal (SDG) 14—to reach an agreement at the WTO by 2020 that eliminates subsidies to illegal, unreported and unregulated fishing and prohibits subsidies that contribute to overfishing and overcapacity. Although COVID-19 caused unforeseen delays in the WTO negotiations process, causing governments to miss the SDG deadline, those discussions have now reached the final stages as world leaders make critical progress towards an agreement that is now overdue.

Research from the University of California, Santa Barbara shows that a WTO agreement to eliminate all US\$22.2 billion in harmful subsidies could result in a 12.5% global fish biomass increase by 2050.⁴ This could be the single greatest collective undertaking that governments can take right now to restore ocean health.

How was the DWF Subsidy Atlas made?

Not all countries disclose how many of their subsidies support their DWF efforts. Atlas researchers overcome this limitation by using global subsidy estimates for the large-scale fishing sector, then assigning those estimates to DWF vessels in proportion to their fishing effort.

The atlas uses satellite data transmitted by automatic identification systems (AIS) on board boats to estimate where most large-scale vessels are fishing and for how long. All vessels 300 tons or more and traveling in international waters are required by the International Maritime Organization to use AIS.

The nonprofit organization Global Fishing Watch models the AIS transmissions to make inferences about a vessel’s fishing activity. The DWF Subsidy Atlas then uses Global Fishing Watch’s vessel information to calculate annual fishing effort in units of kWh, which allows for a more comparable metric across vessels of different gear types and sizes.

The atlas then estimates harmful subsidies towards DWF activity by calculating the subsidies given for large-scale fishing in each flag State (the jurisdiction under whose laws the vessel is registered or licensed, thus deemed the nationality of the vessel). Only large-scale subsidy estimates were used because these contribute

to DWF effort, and all subsidy and vessel data comes from the most recently available information from 2018. Developers of the atlas then produced a ratio (in \$USD/kWh) for each flag State based on how much it spends on its subsidies and how long its ships are distant-water fishing. Using these ratios, the atlas shows subsidized rates of fishing activity in other countries' waters—also known as exclusive economic zones (EEZs)—and on the high seas (the ocean that lies beyond any particular country's EEZ), as well as the geographic distribution of that activity.

A handful of large subsidizers conducts the majority of DWF around the world

The atlas reveals that the top five political entities using the most harmful subsidies for DWF in other countries' waters are China, the EU, Japan, South Korea and Chinese Taipei. (See Table 1.) Together they spent more than a combined US\$1.5 billion in harmful subsidies towards DWF in 2018, the most recent year for which complete data is available, and more than 2 billion kWh of collective effort, using more than 6,700 large-scale vessels to fish in other countries' waters. That's more than from the remaining 130 DWFNs—which, combined, spent approximately 1.9 billion kWh on their long-distance fishing efforts in other countries' waters in 2018.

Table 1

In Other Countries' Waters, Just 5 Political Entities Are Responsible for More Than US\$1.5 Billion in Subsidized Distant-Water Fishing

These governments are also among the world's largest providers of harmful subsidies

Government	Harmful subsidies (in millions of dollars)	Fishing effort (in thousands of hours)	Fishing effort (in millions of kWh)	Number of vessels
China	629	962	579	4,615
EU	279	581	529	964
Japan	240	207	173	221
South Korea	217	135	157	333
Chinese Taipei	175	665	590	634
Total	\$1,540	2,550	2,030	6,767

Source: K.D. Millage et al., "Distant-Water Fishing Subsidy Atlas," accessed on Feb. 25, 2022, <http://www.dwfsubsidyatlas.org>

Note: Certain figures in this brief have been subject to rounding adjustments.

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The majority of the governments that engage in the most subsidy-driven DWF (Table 1) are also among the political entities that provide more than two-thirds of the world's harmful fisheries subsidies. And four out of the five top DWF governments are in Asia, a region that dominates seafood production—also known as global marine capture production. According to the most recent data, China remains the top capture producer in the world, accounting for roughly 15% of the global total—more than the second- and third-ranked entities combined.⁵ China also tops the list of harmful DWF subsidy providers, spending more than twice as much as the EU, the second-ranked government. And China has the most DWF vessels by far, totalling 4,615, as estimated using data from Global Fishing Watch.

The atlas also shows the amount of fishing effort in each of the 19 FAO-designated high seas areas by flag State, total number of vessels, their effort and the harmful subsidies estimated to be associated with that fishing activity. The same entities responsible for the most DWF effort in foreign EEZs—China, Japan, Chinese Taipei, South Korea and the EU—also spend the most on the high seas in harmful subsidy amount and fishing effort (pure hours and kWh). Combined, those governments’ vessels spend over 5 million pure fishing hours—the equivalent of 624 years—on the water annually, enabled by over US\$3.6 billion in harmful subsidies. (See Table 2.)

Table 2

On the High Seas, the Same 5 Subsidizers Also Spend the Most Time and Money

Government	Harmful subsidies (in millions of dollars)	Fishing effort (in thousands of hours)	Fishing effort (in millions of kWh)	Number of vessels
China	1,740	1,700	1,600	947
Japan	695	717	502	471
Chinese Taipei	477	2,250	1,610	805
South Korea	450	339	326	130
EU	240	467	359	355
Total	\$3,600	5,470	4,400	2,708

Source: K.D. Millage et al., “Distant-Water Fishing Subsidy Atlas,” accessed on Feb. 25, 2022, <http://www.dwfsubsidyatlas.org>

Note: Certain figures in this brief have been subject to rounding adjustments.

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Though China ranks first in terms of harmful subsidy amount and number of vessels for fishing on the high seas, Chinese Taipei has the edge in fishing hours and kWh, suggesting that boats from Chinese Taipei spent less in harmful subsidies but more time on the water with more efficient vessels.

A 2018 study showed that over half (54%) of high seas fishing grounds—areas outside the jurisdiction of individual countries—would not be profitable without harmful subsidies.⁶ Fuel subsidies—such as detaxation schemes, direct payments, or other mechanisms that offset the costs of fuel for vessels—are considered by fishery subsidy experts to be the worst of all harmful subsidies, making up the largest type at 22% of the global total of harmful subsidies.⁷

The Eastern Central Pacific Ocean (FAO High Seas Area 77), shown below in Image 1, is the top recipient of DWF according to subsidy amount and total effort. Chinese Taipei is responsible for more than a quarter (318 million kWh) of the total 1.1 billion kWh effort, and China’s fleets receive more than one-third (\$343 million) of the US\$919 million total harmful subsidies pumped into fishing in the Eastern Central Pacific high seas.

The Eastern Central Pacific Ocean Is the Top Recipient of Subsidized DWF on the High Seas

The Eastern Central Pacific Ocean is the top recipient of subsidized DWF effort

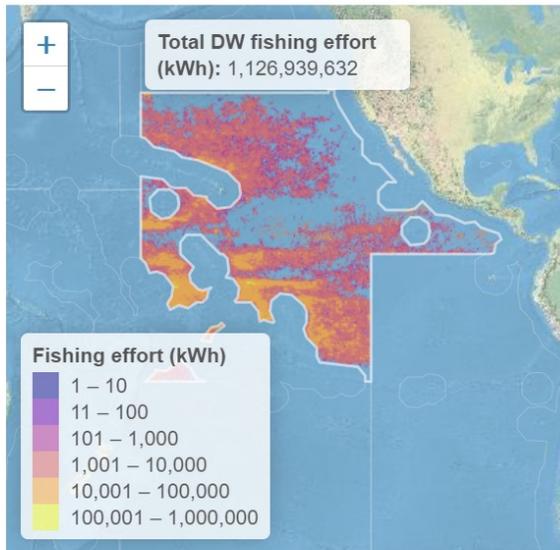
Summary i
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AIS-observed distant-water fishing in the high seas area of FAO Major Fishing Area 77 (2018)

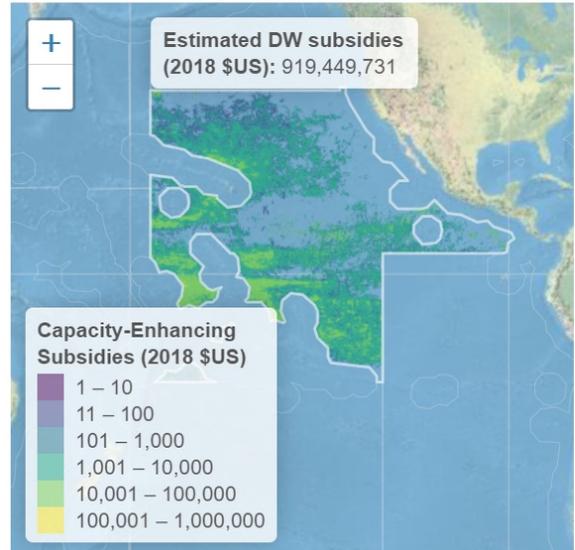
Totals

Different DW vessels: 783
 Total DW vessel capacity (kW): 815,955
 Total DW vessel tonnage (gt): 423,391
 Total DW fishing effort (hours): 1,371,974
 Total DW fishing effort (kWh): 1,126,939,632
 Estimated DW subsidies (2018 \$US): \$919,449,731

All DW vessels



All DW vessels



FAO-designated High Seas Area 77: The Eastern Central Pacific Ocean is the top recipient of DWF effort according to total fishing hours, total kWh and harmful subsidy amount. The DWF Subsidy Atlas provides a summary of the number of unique vessels, their engine capacity and fishing effort and the estimated harmful subsidies found in each EEZ and high seas area in the tool.

Source: K.D. Millage et al., "Distant-Water Fishing Subsidy Atlas," accessed on Feb. 25, 2022, <http://www.dwfsubsidyatlas.org>

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Small and developing nations feel the impact of DWF most acutely

Developing nations are often the target of DWF activity. Three of the top five EEZs that receive the most DWF effort by harmful subsidy amount—Papua New Guinea, Micronesia and Mauritania—are developing nations with small economies. The U.N. designates Papua New Guinea and Micronesia as small island developing states and Mauritania as a least-developed country. These small nations are then left to compete against powerful foreign fleets that are funded by harmful subsidies, a situation that jeopardizes livelihoods and food security in local fishing communities.

Even governments that give large amounts in subsidies themselves can still be the targets of large-scale subsidized fleets from other countries or entities. For example, non-EU countries spend US\$165 million in harmful subsidies to fish in the EU's waters—making EU waters the fourth-largest recipient of subsidized DWF effort—even though the EU itself is in the top five of government entities that give harmful subsidies.

Subsidized DWF effort puts Papua New Guinea at an economic disadvantage

Papua New Guinea (PNG), a Pacific island nation north of Australia, has an extensive and valuable fisheries sector that includes large deep-water tuna fisheries. The country's fishers range from the artisanal community to medium-sized domestic prawn and tuna longline operators to fleets of large international purse seine (a type of fishing involving a large wall of netting deployed around a school of fish).

Compared with 70 purse seine and longline vessels carrying the PNG flag, the DWF Subsidy Atlas showed a total of 164 unique distant-water vessels from other countries active in PNG waters in 2018, according to estimates from Global Fishing Watch. It is important to note that the number of foreign vessels found could be an underestimation, as not all vessels are equipped with AIS. The DWF effort from the 164 foreign vessels is estimated at over 167 million kWh, supported by over \$251 million in estimated harmful subsidies from 13 flag States, making PNG the top EEZ in terms of foreign fleet investment. Only six foreign flags make up the vast majority (more than four-fifths) of the vessels found in PNG's waters: Japan (46), Chinese Taipei (33), the Philippines (17), China (17), South Korea (14) and the U.S. (12), and almost the entire total (over US\$248 million) of the estimated distant-water subsidy to the area.

The PNG government disburses just US\$28 million in subsidies to its fishing sector, miniscule compared with the foreign fleets. The total average annual market value of PNG catch is estimated by the national fisheries authority at 350 million to 400 million Papua New Guinean kina (US\$101.2 million to US\$115.7 million), but determining the actual value of artisanal fisheries is difficult. Significant value swings caused by cyclical factors and commodity price movements, especially for tuna, occur year to year. Thus, even if this value is an underestimate, the total amount of subsidies countries are spending to fish in PNG's waters is a substantial percentage of the value of all fisheries there, clearly underscoring that this DWF effort would not have been profitable or economically feasible without taxpayers' money supporting it.

The atlas shows that foreign vessels, aided by harmful subsidies, fish right on the PNG coast. When these powerful, long-distance vessels encroach onto the coasts of the countries they visit, domestic fleets struggle to compete. Rather than continuing the status quo where governments race to give more harmful, unsustainable forms of support, an ambitious multilateral agreement on subsidy reform could help level the playing field for fishers and help fish populations rebound. Without this type of multilateral action, local fishers will be left to continue to compete for access to fishing grounds that are heavily exploited by foreign industrial fleets, and it is unlikely that local fishers will ever be able to outspend them—or even come close.

Papua New Guinea Receives the Most DWF Effort According to Harmful Subsidy Amount

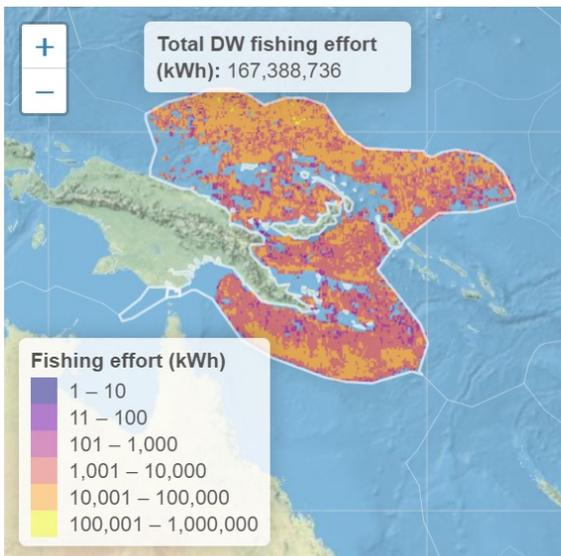
[Summary](#) [Vessel Origins](#) [Fishing Effort](#) [Subsidies](#)

AIS-observed distant water fishing in the EEZ of Papua New Guinea (2018)

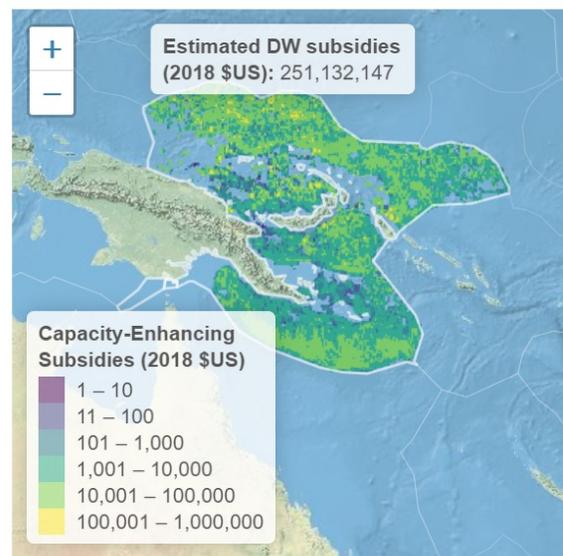
Totals

- Different DW vessels: 164
- Total DW vessel capacity (kW): 399,590
- Total DW vessel tonnage (gt): 197,016
- Total DW fishing effort (hours): 137,083
- Total DW fishing effort (kW hours): 167,388,736
- Estimated DW subsidies to EEZ (2018 \$US): \$251,132,147

All DW vessels



All DW vessels



Papua New Guinea, with its valuable fisheries sector, attracts the most DWF effort in its waters from foreign governments. Areas of yellow in the images above indicate the highest intensity of fishing effort and harmful subsidies, and when this high intensity occurs close to the coast, domestic fishers—who are often in the artisanal or subsistence sector—are left to fish for the remains.

Source: K.D. Millage et al., "Distant-Water Fishing Subsidy Atlas," accessed on Feb. 25, 2022, <http://www.dwfsubsidyatlas.org>

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Subsidy-enabled DWF also affects Mauritania, a least-developed country

The Islamic Republic of Mauritania, in northwest Africa, is renowned for the large number, diversity and commercial significance of the fisheries off its Atlantic Ocean coastline. Roughly 600 fish species have been identified in Mauritanian waters, of which 200 can be commercially exploited. Depending on the year, fishing can be responsible for between 4% and 10% of Mauritania's gross domestic product and between 35% and 50% of its exports.⁹ Most fishers are in the artisanal sector, with the total number of fishers estimated at 180,400,¹⁰ and operate in waters less than 6 miles from the coast. However, Mauritania's industrial fishing fleet is responsible for 90% of the domestic catch. Despite dominating the catch, the industrial sector's impact on local job creation from post-harvest fish processing and storage is limited.¹¹ Therefore, even though Mauritanian industrial fishing vessels catch most of the country's fish, benefits such as livelihood opportunities don't tend to reach local fishing communities.

According to the International Commission for the Conservation of Atlantic Tunas' biennial report published in 2019, Mauritania's large-scale domestic fleets don't target tuna, leaving that valuable species for foreign fleets operating under bilateral agreements and free license arrangements. These fleets, making up 47 tuna vessels in 2018, brought their fish catch to foreign ports. Coastal tuna species were taken as bycatch by high seas vessels that target small pelagic fish (schooling species such as herring, sardines and anchovies), and bycatch of high seas tuna taken by the high seas fishery in 2018 amounted to 10,107 tons.¹² Essentially, the volume of catch made by Mauritanian fleets remains limited because they mainly focus on bottom fishing (for crustaceans and octopus, for example) while the remaining catch is made by long-distance vessels under various access agreements.

The DWF Subsidy Atlas showed a total of 135 unique foreign DWF vessels active in Mauritania's waters in 2018, according to Global Fishing Watch data—an effort estimated at over 94 million kWh and supported by over US\$110 million in estimated harmful subsidies from 29 flag States. Foreign vessels in Mauritania's EEZ from these 29 flag States come from various parts of Europe, Asia, Latin America, the Caribbean and Africa. As such, Mauritania's EEZ rounds out the top five global recipients of DWF effort by subsidy amount. Mauritania also ranks third in the sub-Saharan African region in terms of number of foreign-flagged vessels active in its EEZ. The atlas shows that just four foreign flags make up 83% of all harmful subsidies that underpin DWF activity in the Mauritanian EEZ, and these four foreign flags also make up 63% of the vessels found in Mauritania's EEZ: Spain (\$33.7 million and 45 vessels), China (\$31.5 million and 26 vessels), Japan (\$5.3 million and 12 vessels) and Indonesia (\$21.3 million and two vessels).

The intensity and concentration of effort and subsidies increases as foreign-flagged vessels approach the Mauritanian coast, leaving the artisanal sector—which makes up the bulk of Mauritania's fishers—to compete against larger, more powerful DWF boats with far greater fishing capacity and jeopardizing the resources that small-scale fishers rely on for daily subsistence.

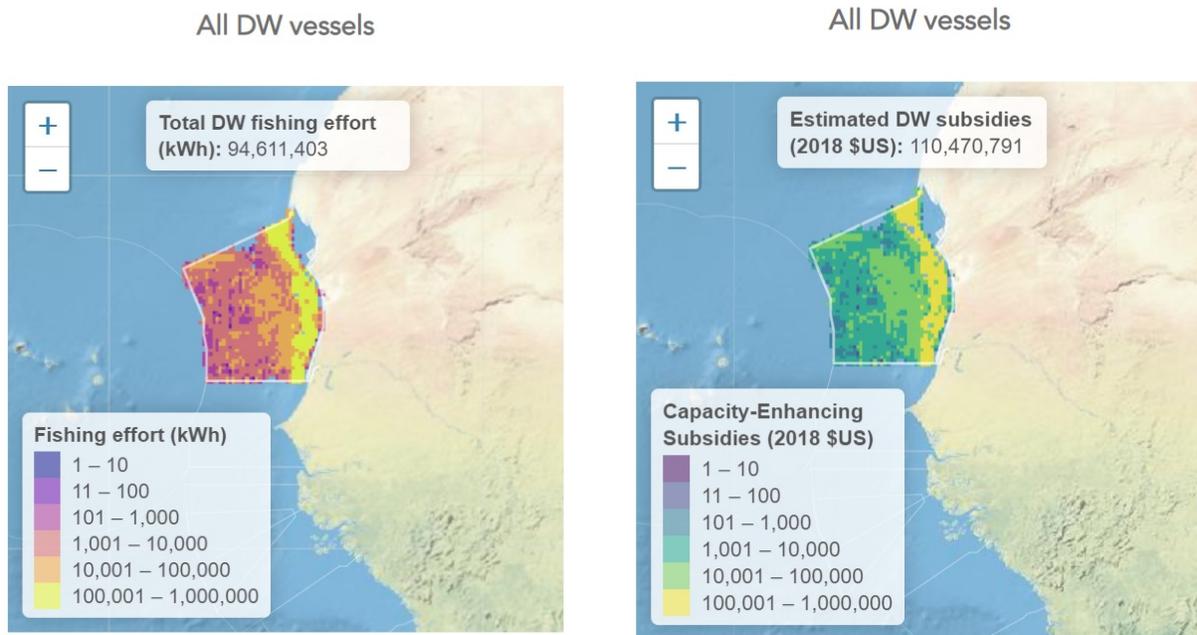
The Mauritanian Coastline Is Under Pressure From Foreign Vessels

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AIS-observed distant water fishing in the EEZ of Mauritania (2018)

Totals

- Different DW vessels: 135
- Total DW vessel capacity (kW): 330,998
- Total DW vessel tonnage (gt): 277,844
- Total DW fishing effort (hours): 153,498
- Total DW fishing effort (kW hours): 94,611,403
- Estimated DW subsidies (2018 \$US): \$110,470,791



Mauritania’s EEZ receives the fifth-most DWF effort in the world according to harmful subsidy amount, with the most intense pressure concentrated on the coast where subsistence fishers depend on healthy fish stocks for their daily food consumption.

Source: K.D. Millage et al., “Distant-Water Fishing Subsidy Atlas,” accessed on Feb. 25, 2022, <http://www.dwfsubsidyatlas.org>

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Conclusion

The livelihoods of fishers and coastal communities around the world are increasingly threatened as fish populations decline. In many developing countries, local fishers find themselves competing with foreign fleets that, having depleted fish populations in their own waters, use subsidies from their governments to fund often unprofitable fishing activity in other countries' EEZs and on the high seas. Effective fisheries management both underpins and depends on subsidy reform: A multilateral WTO agreement that ends harmful fisheries subsidies could help level the playing field for developing countries and fishers around the world, preventing wealthier nations from using taxpayer funds to support overfishing. In particular, strong rules that remove harmful subsidies to DWF activity are critical to the overall effectiveness of an agreement.

To explore the DWF Subsidy Atlas, please visit <http://www.dwfsubsidyatlas.org>.

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Endnotes

- 1 U.R. Sumaila et al., "Updated Estimates and Analysis of Global Fisheries Subsidies," *Marine Policy* 109 (2019), <https://doi.org/10.1016/j.marpol.2019.103695>.
- 2 Food and Agriculture Organization of the United Nations, "The State of World Fisheries and Aquaculture 2020" (2020), <http://www.fao.org/documents/card/en/c/ca9229en>.
- 3 A. Schuhbauer et al., "The Global Fisheries Subsidies Divide Between Small- and Large-Scale Fisheries," *Frontiers in Marine Science* 7, no. 792 (2020), <https://www.frontiersin.org/article/10.3389/fmars.2020.539214>.
- 4 K.D. Millage et al., "SubsidyExplorer: A Decision-Support Tool to Improve Our Understanding of the Ecological and Economic Effects of Reforming Fisheries Subsidies," *PLOS ONE* (forthcoming).
- 5 Food and Agriculture Organization of the United Nations, "The State of World Fisheries and Aquaculture 2020."
- 6 E. Sala et al., "The Economics of Fishing the High Seas," *Science Advances* 4, no. 6 (2018), <https://www.science.org/doi/10.1126/sciadv.aat2504>.
- 7 Sumaila et al., "Updated Estimates."
- 8 National Fisheries Authority Papua New Guinea, "Western and Central Pacific Fisheries Commission, Scientific Committee, 15th Regular Session, Annual Report to the Commission, Part 1: Information on Fisheries, Research, and Statistics, Papua New Guinea," accessed Aug. 20, 2021, https://www.spc.int/DigitalLibrary/Doc/FAME/Meetings/WCPFC/SC15/AR_CCM_19_PNG.pdf.
- 9 Directorate General for Internal Policies of the Union, "Research for PECH Committee - Fisheries in Mauritania and the European Union" (2018), [https://www.europarl.europa.eu/RegData/etudes/STUD/2018/617458/IPOL_STU\(2018\)617458_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2018/617458/IPOL_STU(2018)617458_EN.pdf).
- 10 Fisheries Division, Food and Agriculture Organization of the United States, "Fishery and Aquaculture Country Profiles: The Islamic Republic of Mauritania," <http://www.fao.org/fishery/facp/MRT/en>.
- 11 Directorate General for Internal Policies of the Union, "Fisheries in Mauritania and the European Union."
- 12 International Commission for the Conservation of Atlantic Tunas, "Report for Biennial Period, 2018-19 Part II (2019) - Vol. 2 English Version SCRS" (2020), https://www.iccat.int/Documents/BienRep/REP_EN_18-19_II-2.pdf.

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