Never-Ending Voyages: Vessels Spending Years at Sea

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Introduction

As the global demand for seafood surges, the threat of illegal, unreported, and unregulated (IUU) fishing persists, risking the health of our oceans, the security of the world's food supply, and the livelihoods of fishing communities. IUU fishing can include using banned fishing gear, ignoring catch limits, fishing in closed areas, misreporting catch, or fishing for unmanaged species or in unmanaged places. The risks associated with IUU fishing extend far beyond environmental degradation; they are also linked to human rights abuses, including forced labor. As vessels venture further to remote locations and stay out to sea longer in search of valuable catch, such as tuna or squid, they often operate beyond the reach of effective oversight and accountability. Prolonged periods at sea exacerbate the impact of IUU fishing and increase the risk of crew members being subjected to egregious human rights and labor abuses.

With advances in technology, like refrigeration, industrial fishing vessels can now stay at sea for extended periods of time. Some vessels have been reported to go on voyages of several years before returning to port, often trapping workers aboard.[1] There are currently an estimated 4.1 million fishing vessels operating on the world's oceans,[2] and while most stay close to shore on short voyages that last a few days or weeks, there is a growing trend of vessels fishing increasingly far from shore and beyond areas of any national jurisdiction. This area is known as the "high seas." Overfishing and destructive fishing practices can be impossible to identify or prevent with vessels engaged in extended voyages on the high seas. Spending long periods of time at sea without going to port limits opportunities for authorities to inspect and enforce regulations, permitting IUU fishing to continue unabated while undermining existing fisheries management. Extended time at sea, where vessels stay on the water for months and sometimes years at time, also keep workers far from shore.

Currently, an estimated 128,000 fishers are trapped in forced labor situations at sea worldwide.[3] Crew members are often migrants, or drawn from vulnerable populations, and can endure grueling conditions, including long hours, inadequate rest or safety measures, and even abuse. Such circumstances not only jeopardize their physical and mental well-being, but also make them vulnerable to forced labor, human trafficking, and other forms of exploitation. Prolonged periods at sea can intensify these conditions by amplifying the isolation, coercion, and exploitation faced by workers who are often lured into these ventures under false pretenses or economic desperation without the ability to leave the ship or seek help.

Ports are a critical part of a fishing vessel's journey. Vessels can use ports to offload their catch, get repairs, refuel, and exchange crew. Yet beyond these practical functions, ports hold a deeper significance in safeguarding our oceans and human rights. Ports are also crucial for safety, as they provide a checkpoint where authorities can inspect vessel catch, observe crew, and see shipboard conditions. Moreover, extended time at sea raises pressing concerns regarding the well-being and rights of crew members, from labor exploitation to unsafe working conditions. It is imperative that we closely monitor and regulate these voyages, using ports as crucial checkpoints to ensure

adherence to sustainable practices and respect for human rights. By doing so, we not only protect the fragile balance of our oceans, but also uphold the dignity and welfare of those who depend on them.

Methodology

Using data from Global Fishing Watch (GFW)* — an independent nonprofit founded by Oceana in partnership with Google and SkyTruth — Oceana analyzed Automatic Identification System (AIS) data to identify the length of time commercial fishing vessels are at sea. AIS is a vessel tracking system that transmits a vessel's location, behavior, and identity. AIS devices provide myriad information, including the name, unique vessel identifier, callsign, size, and flag size of a vessel, along with its speed, direction, and geographical position. AIS serves as the proverbial "eyes" of the boat, enabling vessels to "see" each other's location and activity to avoid collisions at sea. This analysis focused on fishing vessels engaged in extended voyages longer than 180 days (approximately six months). For this report, a voyage is defined as the time a vessel spends at sea between leaving one port and arriving at another port. This analysis used the over 160,000 ports and/or anchorages identified by GFW which are defined as at least 20 vessels in one place within a defined area. Voyages either began, ended, or occurred entirely in 2023. The complete methodology and details of this analysis can be found in Appendix A.

Extended Time at Sea

Oceana's analysis found over 2,700 fishing vessels that spent more than 180 days at sea and conducted nearly 2,800 voyages. Specifically, the analysis found:

- 617, or almost 23%, remained at sea for more than one year.
- Over 120 vessels spent more than two years at sea, with the longest voyage lasting almost 1,100 days (Figure 1).
- On average, vessels with voyages longer than 180 days spent almost 330 days at sea on each voyage. The four longest voyages in this analysis crossed the Pacific Ocean twice on trips lasting around 758 days (Figure 2). This ocean, at its widest point, is approximately 12,000 miles wide. Just one of the four voyages that crossed the Pacific Ocean twice would be the equivalent to driving across the United States more than eight times.
- Another vessel had a 730-day voyage that circumnavigated the entire globe (Figure 3). The majority of fishing vessels that engaged in long voyages were flagged to China, with approximately 1,500 vessels traveling an average of nearly 350 days without visiting a port (Figure 1).
- Taiwan had the second-largest number of long voyages (265 vessels with 285 voyages), followed by Japan (99 vessels with 106 voyages), South Korea (98 vessels with 103 voyages), and Canada (94 vessels with 96 voyages).

Vessels carrying trawls, drifting longlines, and squid jiggers were the most common gear used on vessels with extended time at sea. Approximately 40% of all squid jigger vessels in this analysis had a voyage lasting longer than one year. Squid jiggers are specialized squid fishing boats with large lights that attract squid to the surface at night and use lines with multiple hooks to catch squid by the tons.[4] There are two methods of trawling: mid-water, which drags a net through the water column, and bottom trawling, which drags heavy weighted chains along the seafloor – both

indiscriminately capturing any species in their path.[5, 6] Longlining targets valuable stocks, like swordfish and tuna, but has high rates of bycatch, using fishing lines with thousands of baited hooks that can be longer than 20 miles drifting through the ocean. [6, 7]

Flag State	Number of Voyages	Longest Voyage (days)	Most Common Gear Type	Average Voyage Length (days)
China	1502	1093.70	Trawlers	347.93
Taiwan	285	1091.81	Drifting Longliners	294.79
Japan	106	767.95	Drifting Longlines	311.76
Korea	103	705.92	Drifting Longlines	373.30
Canada	96	1017.54	Fishing	337.38

Figure 1: Extended Voyages by Top Flag States and Most Common Fishing Gear

Transshipment and Why It Matters

Not every fishing vessel regularly visits ports. Many engage in a process called transshipment. During transshipment, fishing vessels meet with large, refrigerated carrier vessels known as reefers. During these encounters, the fishing vessel's catch can be offloaded before the vessel is refueled and resupplied, all while remaining at sea. Crew members can also be exchanged during transshipment events, extending the amount of time they remain working at sea. Fishing vessels can stay at sea even longer after these encounter events. Transshipping that occurs at sea – away from the scrutiny of port officials and fisheries managers – increases the risk of illegal and harmful practices at sea. The catch from these vessels is often combined with catch from other vessels, a practice that can facilitate fish laundering, where illegally and legally caught fish are mixed.

Fishing vessels with long voyages had potential transshipment events with over 220 carrier vessels. The carrier vessels were primarily flagged to Panama, China, Taiwan, Russia, and Liberia. There were 726 voyages that had over 3,800 potential transshipment events. Panama and Liberia are often cited as a flag of convenience countries, a situation where owners from one country can pay to have their vessel operate under another country's often weaker laws and regulations.[8] Panama and Liberia also have a "yellow card" from the European Union for failing to control the behavior of vessels using their flags.

Several ports were hot spots for vessels with extended voyages. Most extended voyages started in Tanjung Pelepas, Malaysia (193 voyages). The port where most vessels ended their long journey was in Port Louis in the Republic of Mauritius (96 voyages). Other frequented ports include Busan in South Korea, Callao in Peru, Shidao in China, and Ningbo in China. Mauritius, South Korea, and Peru are party members to the Agreement on Port State Measures (PSMA), which is aimed at combatting IUU fishing.[9] Vessels are subject to inspection and compliance measures under the PSMA if they enter a port of a member state, which can include requirements for documentation of their fishing activities, verifying the legality of their catch, and allowing inspections by port authorities to ensure compliance with international regulations.

Descriptions of Long Voyages

A 758-Day Journey

In April 2021, a squid jigging vessel left China's Ningbo Port (Figure 2) and traveled to the middle of the Pacific Ocean, halfway between the U.S. and Russia, where it immediately began fishing. Just three months into its two-year-long journey, it encountered its first carrier vessel and potentially transshipped with a vessel flagged to China. This would be the first of 26 encounters and potential transshipment events along its extended voyage, and one of three encounters in five months with this same carrier vessel. The fishing vessel traveled back towards Russia, stopping to fish near the southern border of the Russian Exclusive Economic Zone (EEZ) and appeared to fish within Russia's waters. The vessel then traveled across the Pacific Ocean, stopping just west of the Galapagos Marine Protected Area (MPA) to fish. It then traveled south to fish near the protected Dorsal de Nazca MPA. The vessel had near-constant encounters with carrier vessels, averaging one encounter event a month for the trip's duration. The fishing vessel encountered reefers from China, Panama, and Liberia, with the latter two known as flag of convenience countries. Three carrier vessels, flying Chinese and Panamanian flags, encountered the squid jigger a combined 14 times. Finally, in May 2023, over two years after it originally left, it returned to the port of Ningbo. During the 758 days between port visits, the vessel did not appear to ever come closer than 150 nautical miles (NM) to land.

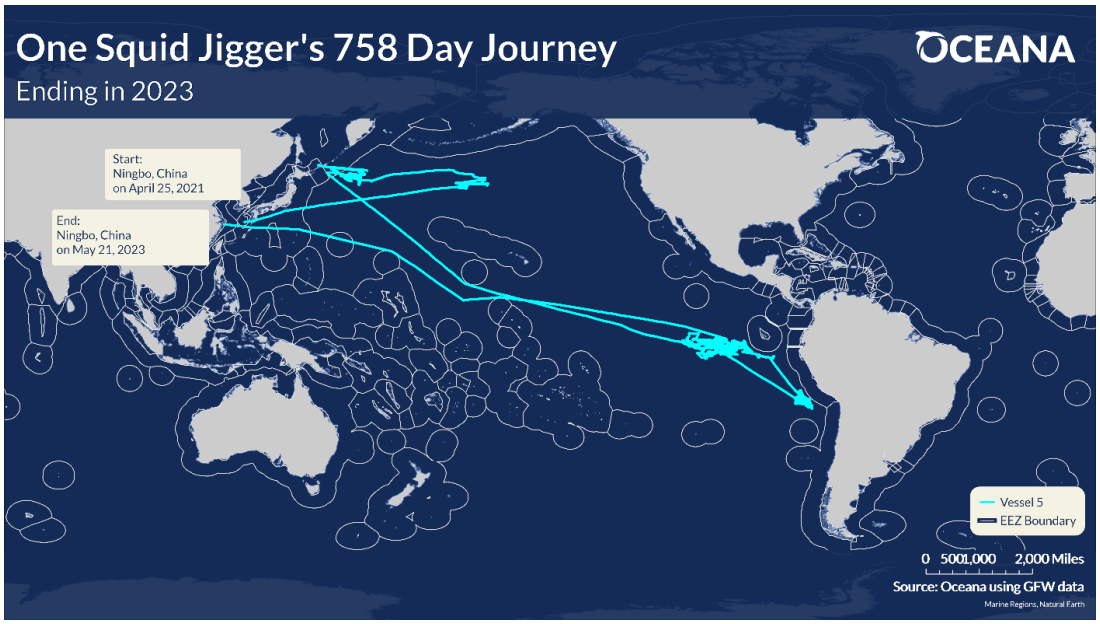

Figure 2: Extended Voyages by a squid jigger on a 758-day voyage.

One Squid Boat's Voyage

In early July 2021, another squid fishing vessel left the Busan port in South Korea, which was the second-most prolific port to both start and end voyages (Figure 3). It traveled across the Pacific Ocean towards South America's coast and spent August through November regularly fishing off the Peruvian EEZ, at times only 130 NM from the protected Galapagos Islands MPA. The vessel encountered and potentially transshipped with a Panamanian-flagged carrier vessel in late October 2021. The vessel traveled around Cape Horn before settling in along the EEZ of

Argentina, spending January through April 2022, during the area's squid fishing season, with visible fishing activity only one nautical mile from the Argentine EEZ. In April 2022, it traveled back to its exact fishing grounds from the previous year along the Peruvian coast (encountering a carrier vessel along the way). The ship continued to fish there for the remainder of the year.

In January 2023, it repeated its exact journey around Cape Horn to return to its previous Argentine squid fishing grounds, where it remained until May and encountered another carrier vessel, before traveling through the Atlantic Ocean to reach China's Shidao port a full two years since its initial departure in July 2021. Throughout multiple fishing seasons and multiple potential transshipment events, the vessel never stopped at port to unload its catch or its workers. The ship had visible encounters with four vessels flagged to three countries (Panama, China, and Vanuatu) throughout its extended voyage.

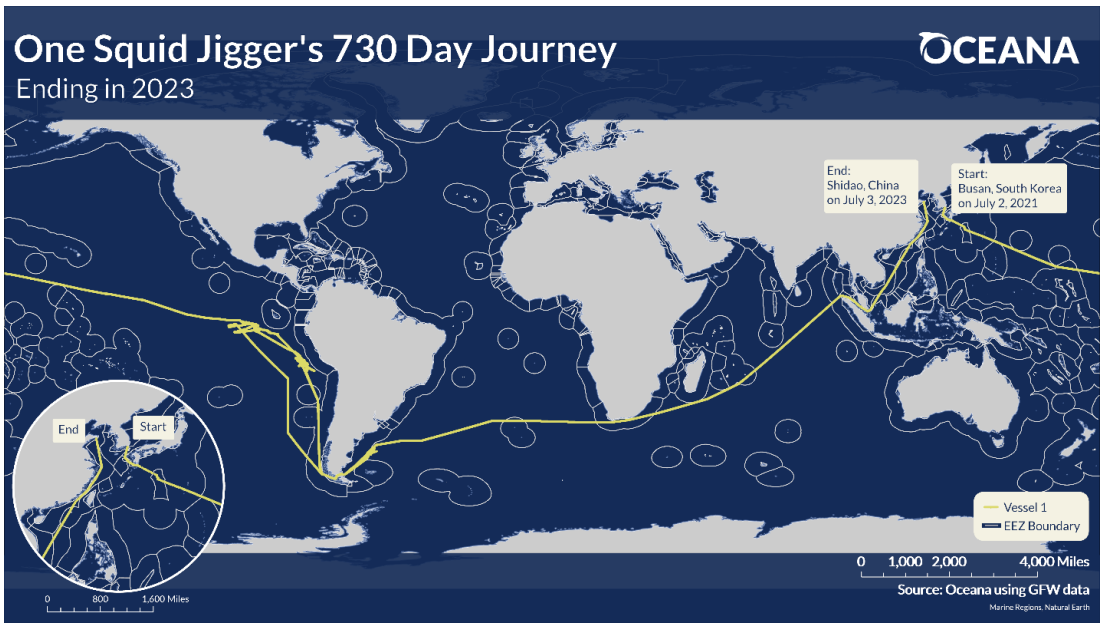

Figure 3: Extended Voyages by squid jigger leaving Busan, South Korea.

What Can Be Done?

Extended time at sea raises the risk of IUU fishing and abuses faced by the crew on fishing boats. To both reduce the risk for our oceans, and those who depend up on them, Oceana recommends that the United States and other government adopt policies to increase transparency at sea. This includes requiring stronger catch documentation, enhancing traceability through mandated vessel tracking, and better regulating transshipments.

Specifically, countries should:

1. **Mandate Transparency by Requiring AIS Use**: Governments and regional fishery management organizations should require the constant use of tamper-resistant AIS devices on all fishing vessels. These tracking systems are essential for transparency of

global fishing operations. In addition, they improve maritime safety, help combat illegal fishing, and increase compliance of laws and regulations.

2. **Require IUU Fishing and Human Rights Information for Imports**: Major market states should require key data elements, like time at sea and more information about transshipping events, as part of the catch documentation required for imported seafood.
3. **Prohibit Unobserved Transshipment at Sea**: Governments and fishery managers should require that transshipping only occurs at ports, where authorities can closely monitor the exchange. This would reduce the incidence of illegal transshipments associated with IUU fishing and human and drug trafficking.
4. **Publicly Release VMS Data**: Publicly sharing vessel monitoring system data helps improve surveillance and encourages vessels to comply with regulations. Unauthorized vessels, and those with a history of non-compliance, can be identified more easily and prioritized for inspections, while vessels that turn off tracking devices can be held accountable when they come into port.

Appendix A – Methodology

AIS data from Global Fishing Watch (GFW)* was analyzed. Voyages were defined as the times a vessel spends at sea between port visits. Using GFW's port events data with a minimum confidence level of four (the highest level), the voyage data analyzed for this report also utilized a confidence level of four. Port visits with a level four confidence level must have a visible port entry and visible port exit, and the vessel must either stop near the port (travel less than 0.1 knots) or have an apparent gap that lasts for at least four hours while within 3 kilometers of a known port or anchorage.[10] Anchorages or port visits during the voyages that did not meet the confidence four level requirements were not included in this analysis.

Port visits were determined using GFW's database of 166,497 defined ports globally. Ports or anchorages are defined by GFW as at least 20 vessels that stay in one place within a 0.5km grid and use names from multiple data sources, including the World Port Index, Geonames 1000 database, KKP references (Indonesia), the most common AIS destination field, and manual review.[10] It is possible for vessels to come to shore at locations not identified within this database.

For this analysis, only voyages that were completed, ended, or started in the year 2023 were included. To check for vessels that started or ended a voyage before or after 2023, voyage data from November 30, 2022, to February 1, 2024, was analyzed. Long voyages for this analysis were defined as journeys at sea that lasted longer than 180 days (approximately six months) in duration and less than three years.

Vessels may have apparent gaps in their AIS transmission due to technical issues, such as being in a crowded port or in an area with low satellite coverage, or due to the intentional disabling of the vessel's AIS device. For this analysis, there are two categories of fishing voyages: 1) those with apparent gaps while fishing and 2) those without apparent gaps while fishing. Voyages with apparent gaps did not have any additional processing and can include voyages that only have a few apparent gaps, as well as voyages that do not have any AIS signals outside of the vessel entering and leaving a port. Fishing voyages without apparent gaps met more stringent criteria, including no gaps in AIS transmission that last longer than two hours while fishing. Vessels without apparent gaps also needed to have more active AIS hours (during which the vessels travel over 0.1 knots)

than trip duration hours. Apparent gaps for vessels with longer voyages while fishing were pulled from November 30, 2022, to February 1, 2024, matching the voyages' query. Roughly 75 voyage tracks that had the longest trip durations were manually inspected using the GFW platform to check for consistency of the transiting tracks, in addition to the fishing tracks. Even with these parameters, it is important to note that there was not always consistent AIS usage while fishing and/or transiting for all vessels. This analysis does not and cannot infer where a vessel goes or what a vessel does when it does not use its AIS device.

Over 91% of the voyages in this analysis appear to have gaps in their AIS signals while fishing. Potential gaps in AIS transmission allow vessels to disappear and hide their activities at sea. This makes it extremely difficult to detect a vessel's fishing and transshipments. AIS gaps, or "going dark", can mask illicit activities like IUU fishing. It also presents challenges for monitoring vessel behaviors that can impact a crew's well-being – like time at sea – because enforcement agencies cannot know exactly what is happening when a vessel skirts monitoring systems.

Potential encounters, or when two vessels using AIS appear to interact with each other through possible transshipments, were also analyzed for any vessels that appeared to have these long-haul fishing trips. Any of the vessels that spent at least two hours traveling parallel at 2 knots, within 500 meters of another vessel – like a known carrier vessel – while at least 10 km from an anchorage or port were marked as a potential encounter.[11, 12, 13] Potential encounter data ran from January 1, 2020, to February 1, 2024, for any vessels that had long voyages. This longer period was used to ensure all encounters during the long voyages that ended in 2023 were accounted for. Only encounters that occurred during the vessels' long voyages were kept.

This analysis is limited in that it cannot identify what is happening on board vessels that spend extended time at sea. However, with recent reports of prevalent human rights abuses in many seafood supply chains, this report highlights the large number of long voyages that can occur even when targeting only one year. Further investigations into these voyages are needed to ensure proper compliance with the vessel country's laws and regulations regarding human rights and IUU fishing.

*Global Fishing Watch, a provider of open data for use in this article, is an international nonprofit organization dedicated to advancing ocean governance through increased transparency of human activity at sea. The views and opinions expressed in this article are those of the authors, which are not connected with or sponsored, endorsed, or granted official status by Global Fishing Watch. By creating and publicly sharing map visualizations, data and analysis tools, Global Fishing Watch aims to enable scientific research and transform the way our ocean is managed. Global Fishing Watch's public data was used in the production of this publication.

Global Fishing Watch uses data about a vessel's identity, type, location, speed, direction and more that is broadcast using the Automatic Identification System (AIS) and collected via satellites and terrestrial receivers. AIS was developed for safety/collision-avoidance. Global Fishing Watch analyzes AIS data collected from vessels that our research has identified as known or possible commercial fishing vessels and applies a fishing presence algorithm to determine "apparent fishing activity" based on changes in vessel speed and direction. The algorithm classifies each AIS broadcast data point for these vessels as either apparently fishing or not fishing and shows the former on the Global Fishing Watch fishing activity heat map. AIS data as broadcast may vary in

completeness, accuracy, and quality. Also, data collection by satellite or terrestrial receivers may introduce errors through missing or inaccurate data. Global Fishing Watch's fishing presence algorithm is a best effort mathematically to identify "apparent fishing activity." As a result, it is possible that some fishing activity is not identified as such by Global Fishing Watch; conversely, Global Fishing Watch may show apparent fishing activity where fishing is not actually taking place. For these reasons, Global Fishing Watch qualifies designations of vessel fishing activity, including synonyms of the term "fishing activity," such as "fishing" or "fishing effort," as "apparent," rather than certain. Any/all Global Fishing Watch information about "apparent fishing activity" should be considered an estimate and must be relied upon solely at your own risk. Global Fishing Watch is taking steps to make sure fishing activity designations are as accurate as possible. Global Fishing Watch fishing presence algorithms are developed and tested using actual fishing event data collected by observers, combined with expert analysis of vessel movement data resulting in the manual classification of thousands of known fishing events. Global Fishing Watch also collaborates extensively with academic researchers through our research program to share fishing activity classification data and automated classification techniques.

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