# Supply Chain Risk Project

## PHASE 2 FINAL REPORT

June 2, 2023

## Executive Summary

The Supply Chain Risk Project (SCRP) is a data-driven solution that aims to illuminate illegal, unreported and unregulated (IUU) fishing risks and subsequent due diligence in global supply chains by aggregating multiple data sources and enabling a company's products to be cross-referenced with those databases. During Phase 2 of SCRP, the project team conducted risk assessments of nine unique supply chains using key data elements shared by five companies with the purpose of testing the solution's ability to identify risk in data rich and data poor supply chains. When vessel level data was provided, the project team used the Global Fishing Watch Map and Vessel Viewer to assess high-risk and medium-risk indicators (e.g., fishing in marine protected areas, intentional disabling of vessel's Automatic Identification System, or AIS). Of the vessels analyzed, 34% had AIS available, and likely intentional disabling of AIS (i.e., when Global Fishing Watch models estimate that AIS was intentionally turned off) was the risk indicator identified most frequently across the data rich supply chains. Working with supply chains with a range of species, gear and vessel types, and regions allowed the team to identify various challenges to IUU fishing risk analysis. The findings from the pilot projects demonstrate that regardless of species, gear, or geographic region, for all supply chains, it is critical for companies to know their vessels in order to effectively assess the risk of IUU fishing in their supply chains. SCRP provided due diligence recommendations to companies to encourage more robust data collection and supply chain engagement, and companies have identified actions they will take to improve their current risk assessment processes. SCRP has transitioned from the pilot projects and is now using the lessons learned to promote public-private partnerships to further strengthen governments' and companies' ability to fight IUU fishing, as well as build the technology and data integration capabilities for wider industry application.

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# I. Context

Seafood buyers are a critical part of the blue economy and are concerned about IUU fishing as a real risk to triple bottom line impacts. Current practices for assessing IUU fishing risks in seafood supply chains are analogue, resource-intensive, and often lack the vessel-level data and analytical power needed to monitor and meet industry sustainability commitments. Vessels and fisheries associations, especially in under-resourced countries, struggle to meet the stringent data requests of buyers in some of the largest global seafood markets, such as the U.S., EU, and Japan, in order to demonstrate supply chain compliance across their fleets. To strengthen ocean governance for the sustainability of crucial marine resources and the communities that rely on them, producers and seafood companies need new ways to understand and mitigate IUU fishing risks in their operations and source regions.

The Supply Chain Risk Project (SCRP) is a data-driven solution that aims to illuminate IUU fishing risks and subsequent due diligence in global supply chains by aggregating multiple data sources and enabling a company's products to be cross-referenced with those databases. It is a partnership among the Friends of Ocean Action at the World Economic Forum, FishWise (FW), Global Fishing Watch , and Stanford's Center for Ocean Solutions (COS). During the second phase of the project (April 2022-March 2023), the project team assessed IUU fishing risk in supply chains, with a particular emphasis on supply chains that operate in developing countries. In this report, we describe the methodology used for the pilot projects, the key findings, and due diligence recommendations.

# II. Pilot Project Methodology

The pilot projects were run by COS and FW. The methodology used by both organizations to conduct the pilot projects is summarized in Figure 1 and further detailed below. The analysis looked at two main areas: data completeness and data richness of each supply chain.

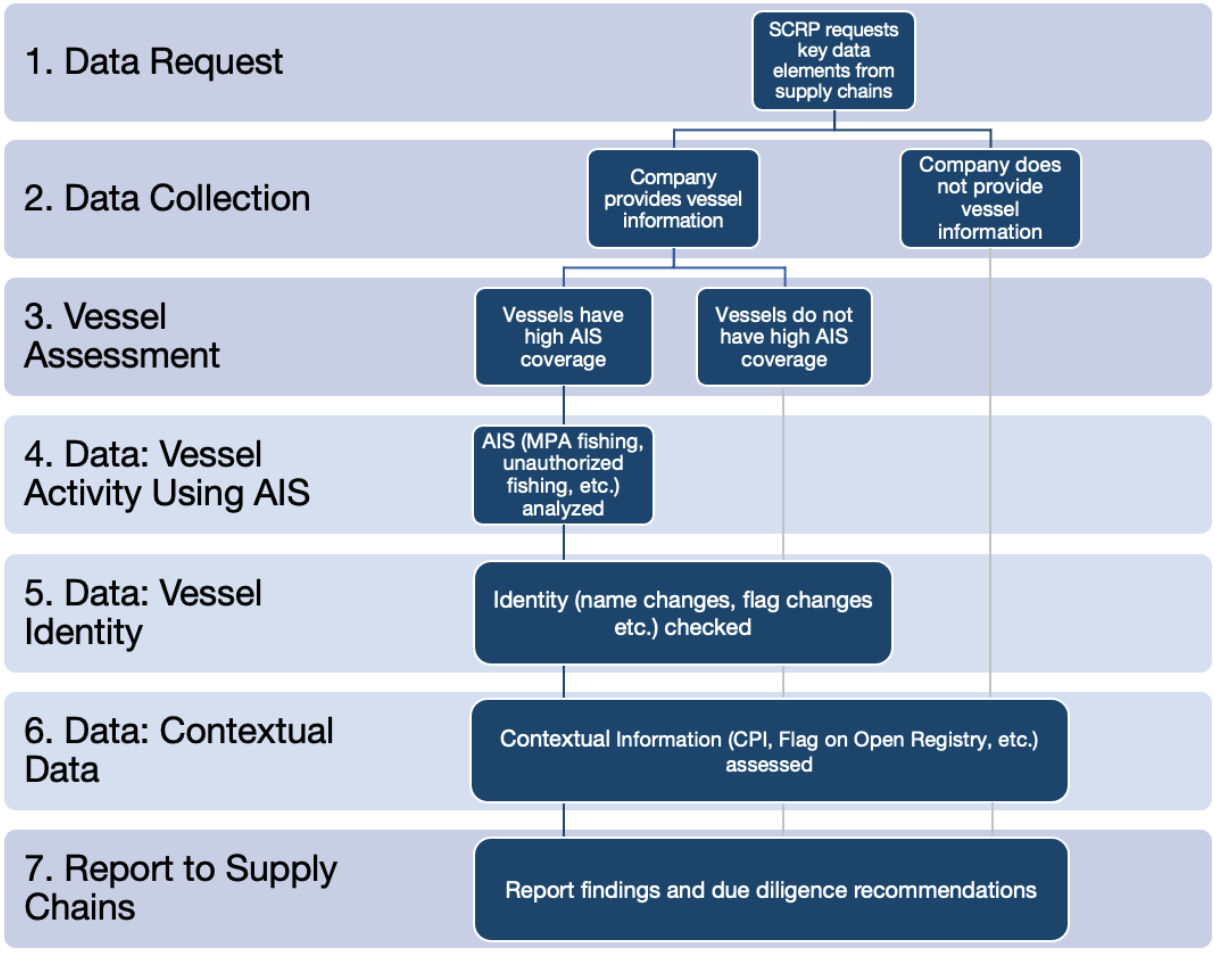


*Figure 1. Chronological methodology (top to bottom) used by COS and FW to conduct the pilot projects. COS and FW requested data from selected supply chains.*

## Data Completeness

The project team first requested data of nine supply chains, from five different companies. Companies were selected because they either had previous engagements with SCRP or because they reached out to SCRP after learning about the project during various outreach events. Companies and SCRP jointly selected supply chains that were high priority for the companies and based in official development assistance (ODA) eligible countries. SCRP requested key data elements (KDEs) from the companies, and companies then provided data they currently collect for each supply chain (Table 1). The KDEs were defined through consultations with experts, subsequent refinement by project partners, and finally validation by experts at a virtual workshop during Phase 1 of the project. The percentage of KDEs supplied for each supply chain determined the data completeness of that supply chain.

| Category | KDE (requested) |
|---|---|
| Species | Common name |
| | **Scientific name** |
| Location | **Harvest in EEZ vs high seas** |
| | **RFMO** |
| | **Country of harvest** |
| | **FAO region** |
| | FAO subregion (optional) |
| Certification (if applicable) | Certification name |
| | Certification number / code |
| FIP (if applicable) | FIP profile / hyperlink |
| Vessel: identity & history | **Vessel name** |
| | **IMO number** |
| | **MMSI** |
| | Call sign (optional) |
| | Flag state (optional) |
| Vessel: Operations & AIS (if applicable) | Y / N transshipment |
| Vessel: Ports | **Landing port name** |

*Table 1. Key data elements (KDEs) the SCRP requested of companies. In bold are those KDEs applicable and required for all supply chains. The remaining KDEs were only requested when applicable to the supply chain.*

## Data Richness

We then determined if the supply chain was 'data rich' or 'data poor' (see inset box). When information on vessel identity was known, FW and COS used the Global Fishing Watch Map and Vessel Viewer to assess a set of high-risk and medium-risk indicators (Table 2). Like the KDEs, the indicators and their categorization (high-risk, medium-risk, and contextual risk indicators) were defined by COS and FW during Phase 1 of the project through surveys, interviews, and a workshop with stakeholders to identify and rank potential indicators according to their relevance to understand and act upon IUU fishing risk.

**Data Richness**

**Data rich supply chains:** Supply chains with vessel lists that consistently transmitted Automatic Identification System (AIS), meaning at least 10% of vessels had greater than 0% coverage.

**Data poor supply chains:** Supply chains with little to no vessel data or no vessels have any visible AIS activity.

High-risk indicators were perceived by the stakeholders as highly relevant to understanding IUU fishing risk, whereas medium-risk indicators were perceived as slightly less relevant, but still important when identifying risk. Contextual risk indicators were included to assess risk at the country or species level. Contextual risk refers to events, factors, or dynamics that occur in the broader environment which might be beyond the control of a single company. However, they remain important to provide a backdrop for the global IUU fishing landscape, help a company illuminate broader risks associated with a seafood product, and inform a company's risk mitigation strategies.

It should be noted that the indicators in this analysis are not evidence of wrongdoing; instead their presence represents an increased likelihood that a vessel may be engaged in or supporting IUU fishing. For example, there are legitimate reasons for a vessel to change its flag, yet a history of flag hopping can suggest a higher risk of the vessel being involved in IUU fishing. Similarly, if a vessel has apparent transshipment events in an RFMO with no known RFMO authorization (i.e. that vessel is not, to the best of our knowledge, on an RFMO registry), this may suggest a higher risk than a broader country- or species-based indicators (contextual risk). It is important to note that risk is relative to a specific company and their supply chains. Risk can vary based on vessel activity, species sourced, and due diligence actions taken, as well as a company's own risk threshold and sustainability goals.

Some indicators for data rich supply chains can only be assessed if there is a high enough transmission of AIS. For example, a vessel may have had zero transshipments in the last year, but their AIS coverage is very low at 15%. Thus, we cannot confidently state that there were zero transshipments because AIS was not active for the majority of the voyages at sea. In these insufficient data cases, "I" was used instead of 0.

| High-Risk Indicators |
| --- |
| RFMO IUU blacklisted vessels |
| Potential fishing events in RFMO with no known authorization |

| |
|---|
| Potential transshipment events in RMFO with no known authorization |
| Potential fishing events in Marine Protected Areas (MPAs) |
| **Medium-Risk Indicators** |
| Vessels intentionally disabling AIS |
| Vessels with long fishing voyages (>11 months in last 1 year) |
| Vessel name changes (within 1 year) |
| Vessel flag changes (within 1 year) |
| **Contextual Risk Indicators** |
| Corruption Perceptions Index (CPI) |
| Agreement on Port State Measures (PSMA) ratification |
| EU carding status |
| U.S. listing status |
| Seafood Import Monitoring Program (SIMP) species |
| IUU fishing risk score for species |
| ProActive Vessel Register (PVR) |
| Open Registries |

*Table 2. Indicators used as part of the SCRP IUU fishing risk assessment.*

COS and FW provided detailed reports for each supply chain, outlining data completeness (i.e., presence/absence of KDEs) based on information the company shared, assessment of risk using the above indicators, and detailed due diligence recommendations. The project team then presented the results to the company and discussed next steps that the company could take based on the results of the pilot project findings.

# III. Trends and Key Findings from the Pilot Projects

Below are the general findings on data completeness and data richness for the supply chains:

## Data Completeness

Data completeness (defined by percentage of KDEs provided by the company) ranged between 34% - 92%, meaning companies provided on average 6 out of 9 required KDEs from Table 1. Even if a company supplied the majority of other KDEs, which can provide useful insight, if a company is unable to verify vessel behavior and activity, many risk indicators are still unknown, which can leave a company exposed.

## Data Richness

There was little correlation between data completeness and data richness of supply chains. The difference between data rich and data poor supply chains was whether the supply chain provides vessel identification information and these vessels transmit AIS data consistently. Below are the general findings for data rich and data poor supply chains:

## Data Rich

- Four of the five tuna supply chains assessed are considered data rich, compared to one of 4 non-tuna supply chains.
- Of all the vessels analyzed, 34% had AIS available (including vessels from data rich supply chains). In addition to addressing any applicable risks found in these supply chains, it is also important to understand if companies source from vessels that have the *ability* to use and transmit AIS, but *chose not to do so*, as that is a risk in and of itself.
- Intentional disabling was prevalent in 4 of the 5 of the data rich supply chains.

## Data Poor

- Data poor supply chains were generally smaller vessels fishing in EEZs and used hook and line, gill net, or trawling fishing gear.
- Like data rich, if companies source from vessels that have the *ability* to use and transmit AIS, but *chose not to do so*, that is a risk in and of itself.
- For two supply chains that provided vessel-level information, there was either no AIS coverage or very limited AIS coverage found for those vessels, making them data poor

| **Supply Chain Assessed** | **Data Completeness* of Relevant Indicators** | **Data Rich or Data Poor** | **Number of Vessels Provided** | **Number of Vessels with AIS Coverage** | **Average AIS Transmission Rates**** |
|---|---|---|---|---|---|
| **Red Shrimp** Argentina | 65% | Data Rich | 22 | 19 | 88% |
| **Mahi Mahi** Vietnam | 53% | Data Poor | None | NA | NA |
| **Skipjack Tuna** Micronesia | 50% | Data Rich | 4 | 4 | 15% |
| **Blue Swimming Crab** Indonesia | 40% | Data Poor | None | NA | NA |
| **Yellowfin Tuna** Maldives | 82% | Data Poor | 57 | 3 | 71% |
| **Yellowfin Tuna** Sri Lanka | 92% | Data Rich | 127 | 14 | 17% |
| **Corvina** Suriname | 87% | Data Poor | 19 | 0 | 0% |
| **Tuna** Malaysia | 45% | Data Rich | 6 | 6 | 25% |

| | | | | | |
|---|---|---|---|---|---|
| **Tuna**<br>Fiji | 34% | Data Rich | 30 | 30 | 71% |

*Table 3. List of supply chains assessed*
*Not all KDEs are applicable to every supply chain. For example, transshipment records would not be applicable to a near-shore blue swimming crab fishery, just as not every product is sourced from a Fishery Improvement Project (FIP).
**NA denotes that no vessel list was provided, and 0% AIS coverage means that vessels were provided, but no AIS coverage or activity was found in Vessel Viewer. Sometimes no AIS is not the fault of the vessel (e.g. Class B device, poor reception, density of vessels)

| **Indicators** | Percent | Supply Chains |
|---|---|---|
| Vessels with AIS | 34% | 5 |
| High Risk | | |
| RFMO IUU fishing blacklisted vessels | 0% | 0 |
| Unauthorized RFMO fishing | 5% | 2* |
| Unauthorized RFMO transshipment | 0% | 0* |
| Fishing in an MPA | 5% | 3* |
| Medium Risk | | |
| Vessels with intentional disabling | 25% | 4 |
| Vessels with long trips | 2% | 1* |
| Vessel name changes | 11% | 2 |
| Vessel flag changes | 2% | 1 |

*Table 4. Percent of data rich supply chain vessels with high or medium risk indicators*
*Due to low AIS transmission coverage, the Micronesia tuna supply chain was not assessed for unauthorized RFMO fishing, unauthorized transshipments, fishing in an MPA, or long trips.

**The findings from the pilot projects demonstrate that regardless of species, gear, or geographic region, for all supply chains, companies need to know their vessels in order to effectively assess the risk of IUU fishing in their supply chains.** As companies begin to map their supply chains back to the vessel level and collect vessel identifiers, IUU fishing risk assessments such as the SCRP are able to provide vessel-based outputs. The vessel-level outputs will be a value-added for companies who typically are only able to assess risk at a less granular level. The findings also highlight that availability of AIS is not enough. AIS coverage of a vessel voyage is directly related to the analysis confidence, and will also be true for VMS analyses. Gaps in AIS coverage coming from operational behaviors or because of geographic location lowers the confidence that such IUU assessments accurately characterize vessel behavior. Companies should work to verify and promote consistent use of tracking devices.

# IV. Due Diligence Recommendations

The unique value add of the SCRP goes beyond the ability to just provide companies risk findings and vessel insights. By also providing due diligence recommendations, these pilot projects provided companies interpretation of risk results and key questions to initiate conversations with supply chain managers. Due diligence is a journey; by working through tailored due diligence recommendations and embedding them in day-to-day operations, risks can be addressed in a timely manner, and incremental yet impactful progress can be made. While the focus now for SCRP is on the impact on the environment, this process can also help inform future due diligence on labor and human rights. On average, there are three sets of due diligence recommendations the SCRP provided its partners: 1) those to address specific risks unique to a data rich supply chain, 2) those to address specific risks unique to a data poor supply chain, and 3) those that address the larger landscape of traceability and transparency best practices.

Examples of due diligence recommendations provided to companies with vessel-level analytics (i.e., data rich supply chains) include:

- When fishing in a no-take Marine Protected Area was found, a company should bring to its suppliers' attention vessel activity in these areas and confirm whether fishing activity, transshipment, and/or loitering took place in these areas (and why).
- When vessels were found intentionally disabling their AIS , a company should work with its suppliers to determine if there are flag state or RFMO protocols for AIS equipment malfunctions. Additionally, they should familiarize themselves with the PAS 1550 flow diagrams for AIS/VMS (Vessel Monitoring System) to understand best practices and resources in vessel tracking operations and protocols.
- A company is encouraged to work with governments in regions where they operate to publish registries and authorizations so those datasets can be included in future assessments.

Examples of due diligence recommendations provided to companies without vessel-level analytics (i.e., data poor supply chains) include:

- When no vessel-level data was provided, a company and it suppliers should "know its vessels" by encouraging its suppliers to obtain vessel lists for each supply chain that includes, at minimum, all vessels' names, flags, and unique identifiers (e.g., IMO number, MMSI, call sign, or other registration number).
- When fisheries known to have low vessel and/or fisher registration are found, a company should work with its suppliers (and/or FIP members, if applicable) to support stronger updates of vessel registration and support local governments in their existing efforts to simplify and streamline registration.

Examples of landscape (i.e., big picture) and contextual risk due diligence recommendations provided to companies that align with current industry best practices include:

- A company should create work plans for both low-risk and high-risk sourcing areas for products known to have traceability, tracking, and mislabeling challenges. These products should undergo higher levels of and more frequent risk assessments, data verification activities, and supplier outreach.

- A company and its suppliers should establish and communicate clear expectations and data requirements regarding data collection, sharing, and transparency. These expectations should 1) outline what KDEs must be collected and shared for robust risk analysis, 2) outline expectations around vessel activity and authorized harvest, and 3) provide guidelines and expectations around data transparency.

**Overall, supply chains that have access to both vessel identity information (i.e. a vessel list) *and* vessel activity information (i.e. consistent AIS coverage) are going to support more robust data analyses and subsequently, more tailored and actionable due diligence recommendations.** However, not all fisheries are trackable using AIS, as is the case with small-scale fisheries. Vessels may use AIS, but messages are obfuscated or missed based on their location because of poor coverage from land or satellite receivers, or high-density vessel operations. Although vessel-by-vessel analyses can be difficult without AIS, there are still actionable due diligence recommendations a company can consider incorporating into its due diligence plans. In data poor-scenarios, the first step for companies is to improve the collection and sharing of analytically-impactful supply chain information by knowing their source vessels. VMS is also a valuable tool for vessel analyses and will eventually be used in addition to AIS. As VMS sharing expands, as too will the insight Global Fishing Watch data can give on vessel activity. Not all vessels are mandated to use AIS, but many more are mandated to use VMS in coastal waters.

As companies begin to collect more information about their source vessels and experience increases in vessel registration and vessel transparency within its supply chains, companies will begin to see the benefits of more accurate risk assessments. They can then get ahead of potentially risky vessel practices and continue encouraging their supply chains to be more transparent. These risk assessments and due diligence recommendations are an interactive, cyclical process, growing more robust and actionable each time.

## V. Areas of Opportunities

The pilot projects conducted during Phase 2 of the SCRP demonstrated the value of companies incorporating vessel-level data when assessing IUU fishing risks. With vessel-level data, companies are able to move beyond country-or species-level indicators of risk. This more detailed risk assessment allows companies to better target and prioritize due diligence activities, saving time and resources for the companies as they work to reduce risk of IUU fishing in their supply chains.

The five pilot project companies were receptive to the results of the risk assessments and identified actions they would take. Some examples of those actions include:

- Examining carefully current supplier questionnaires and identifying where data requests could be more specific, particularly in relation to Unique Vessel Identifiers
- Exploring why suppliers are not providing certain data even when required by specific import regulations (e.g., the U.S.'s Seafood Import Monitoring Program)
- Explore longer-term integration of Global Fishing Watch data into supply chain risk assessments

These actions help increase traceability and transparency in the companies' supply chains, although companies also expressed that full traceability will require collaboration with governments in the collection and public sharing of supply chain data, especially national vessel lists and VMS.

SCRP is now using the lessons learned to promote public-private partnerships to further strengthen governments' and companies' ability to verify vessel behavior. For example, industry groups can encourage governments of the countries where they operate to publish vessel lists, mandate AIS, or share VMS so that those industry members have consistent and reliable vessel-level data they can use to better identify potential risks of IUU fishing and take actions to reduce those risks. SCRP has demonstrated the utility of using Global Fishing Watch data in company risk assessment processes. There is an opportunity for fishing companies, industry associations, and governments to share data with Global Fishing Watch to further inform at-sea vessel activity.

Digitization of fisheries and seafood supply chain data is happening at an increasing pace. As companies begin to implement interoperable, electronic traceability systems, projects like the SCRP, which highlight the need for vessel-level information to support due diligence efforts, will need to ensure that the nomenclature and data standards they use will support implementation of these systems.