FishWise Final Insights Report

Detecting Human Rights Risk In Seafood Supply Chains
via Global Fishing Watch Vessel Activity and Insights API

1. What insights were gained during the duration of the project?

In the seafood industry, companies are increasingly making commitments to source responsibly and prevent illicit activity in their supply chains. To help our retail partners and their suppliers meet these commitments, FishWise provides a service with guidance on social responsibility and traceability best practices that go beyond what is possible from traditional tracebacks or desktop audits. We do this by monitoring the availability of supply chain data, counter-illegal, unreported, and unregulated (IUU) fishing policies and procedures, and human and labor rights policies and practices from upstream suppliers.

We validate vessel-level identity and activity data via Global Fishing Watch's Vessel Viewer. Through this data approach, we can help partners identify where and how to prioritize their actions and resources across their supply chains and where seeking worker perspectives and experiences is most critical. However, the manual workflow makes it challenging to assess multiple vessels simultaneously, so we decided to rethink our data approach. We found a gap in the seafood sustainability space for a scalable vessel analytics product that illuminates the risk in a company's source vessels or fisheries.

The goal of our work with the Patrick J. McGovern Foundation (PJMF) was to produce a proof of concept and a minimum viable product for an automated data-driven solution that provides essential vessel-level information to inform companies' risk assessment processes to drive greater transparency and management of seafood supply chains and enable actionable due diligence.

We have created Tableau visual dashboards powered by the Global Fishing Watch application programming interfaces (APIs) to display all vessels in a partner's supply chain and help demonstrate which vessels may be participating in illicit activities. At the top of the dashboard (*Figure 1*), you will find a table that displays counts of each potential IUU fishing or human rights violation key data element (KDE) by vessel. This table can apply sorting by any of the KDE columns and use a multi-select filter by any vessel row(s). Below this table is a write-out of the counts for each potential IUU fishing or human rights violation KDE, which changes values based on filtering the table rows above.

At the bottom of the dashboard (*Figure 2*), we have a geographic map of the vessel location(s) where the potential violation occurred, such as encounter, fishing, or intentional automated identification system (AIS) disabling events. All relevant geometries, such as exclusive economic zones (EEZs) and regional fisheries management organization (RFMO) zones, are also displayed to give geographic context to potentially violating events. For potentially intentional disabling events, we have visualized those as lines with start and end events and hover details that display the time and duration of the disabling event. Encounter and fishing

events are visualized as lines and points, respectively, with hover details that show these events' time and duration. Lastly, the map and the relevant events and geometries filter according to the vessel rows selected in the table of violation KDE counts.

Vessel Fishing Events and Risk Indicators

Vessel Name	Vessel Flag	Gear Type	Fishing Events	Encounter Events	Port Visits	Time at Sea > 11 Months	Intentional Disabling	Fishing Unauthorized RFMO	Fishing No Take MPA	Encounter Foreign EEZ	Encounter Unauthorized RFMO
CENTURY PRIDE	NRU	tuna_purse_sei..	121	0	20	0	38	0	0	0	0
CFA 22	FSM	drifting_longlines	0	0	0	0	0	0	0	0	0
CFA23	FSM	drifting_longlines	637	0	11	0	0	0	0	0	0
CFA26	TWN	drifting_longlines	617	0	6	0	12	0	0	0	0
CFA27	TWN	drifting_longlines	479	0	1	0	0	0	0	0	0
CHING FENG NO.767	TWN	tuna_purse_sei..	36	0	6	0	6	0	0	0	0
CROMWELL 1	FSM	tuna_purse_sei..	240	4	38	0	31	0	0	0	0
CROMWELL 101	FSM	tuna_purse_sei..	90	0	39	0	5	0	0	0	0
EASTERN MARINE	NRU	tuna_purse_sei..	367	0	9	0	0	0	0	0	0
EASTERN STAR	NRU	tuna_purse_sei..	270	0	24	0	6	0	0	0	0

330 Fishing Events | 4 Encounters | 77 Port Visits
36 Intentional Disabling Events | 0 Extended Time at Sea Events | 0 Fishing Events in Unauthorized RFMO | 0 Encounters in Foreign EEZ

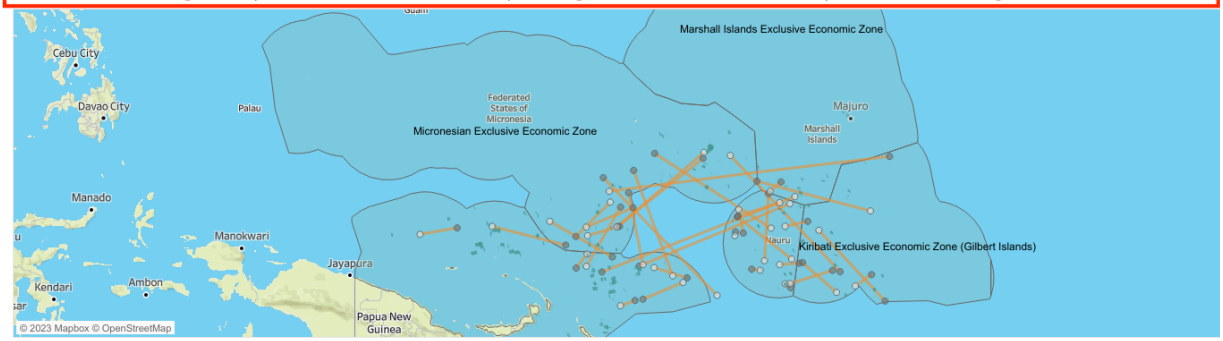

Figure 1 - Top View of Vessel Fishing Events and Risk Indicators Dashboard

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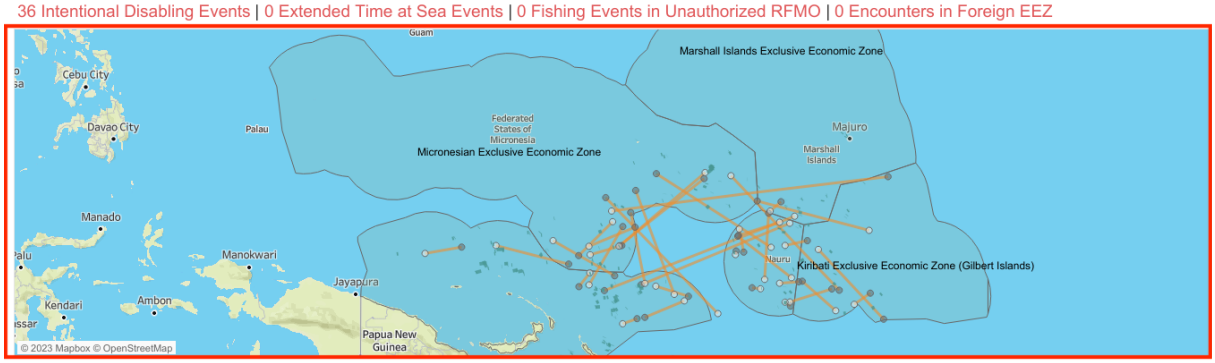

Figure 2 - Bottom View of Vessel Fishing Events and Risk Indicators Dashboard

2. **How might these insights advance the safeguarding of human rights?**

IUU fishing and forced labor are often linked, so uncovering fishing violations can help us unlock information related to human rights abuses in seafood supply chains. Vessel data can provide a better understanding of what is happening on the water, illuminate suspicious activity, and provide our retail partners with the relevant knowledge to inform action and support responsible sourcing decisions. By gaining insight into key pieces of data, such as time at sea, transshipment events, and fishing efforts, we can better understand the conditions and challenges workers face at sea. These insights can help companies determine where to investigate further and prioritize action and how to protect workers' rights more effectively.

FishWise's mission is to sustain ocean ecosystems and the people who depend on them by transforming global seafood supply chains. Our approach to push this mission forward is to foster sustainability leadership within the seafood industry, so the primary audience of this project would be our retail partners. Our main goal with this project was to know what human rights risks could occur in our retail partner's seafood supply chains and to make our partners aware and able to understand these risks rapidly.

Using the insights obtained from our vessel analytics solution and based on specific values in KDEs, our partners can filter down to a particular set of vessels with a higher risk of violating human and labor rights. This solution removes the huge lift on our partners and on our team to gather and analyze massive amounts of vessel-level data to evaluate potential IUU fishing and human rights violations occurring in their seafood supply chain. With this shift in resource allocation, we aim to create a positive feedback loop for our partners to more closely investigate product sources of concern and be proactive in either making procurement changes, collaborating with relevant seafood companies/suppliers to make positive changes in their practices, support the advocacy of applicable human rights policies, and promote worker rights and worker-led approaches to social responsibility, especially in high-risk supply chains. We hope this impact will move down the chain, help change the practices of fishing vessels, and reduce the overall occurrence of human rights violations in the industry as a whole.

Although the project, under the accelerator scope of work, aims to utilize vessel data and automated analytics to identify and prioritize potentially illicit actors in our retail partners' supply chains, provide next-step due diligence actions, positively impact decision-making, and drive better management of supply chains, we acknowledge there is a missing component of the worker's voice. As part of the deeper dive investigation of potentially illicit vessels, we aim to integrate and utilize initiatives that focus on uplifting worker-centered voices and experiences.

3. **How will your experience with this data approach serve your team or organization's work in the future?**

As we previously mentioned, the service FishWise provides our retail partners to help them meet their commitments to source responsibly and remove illicit actors from their seafood supply chain is very important but resource-intensive for our team, especially with the current manual data approach we utilize in this workstream. However, participating in the accelerator program has served our team and our organization's future work in many ways.

When FishWise conducts verification exercises, we manually obtain identity, activity, and legality data for vessels one at a time using Global Fishing Watch's Vessel Viewer. One could imagine how time-intensive this work is when certain supply chains, like shelf-stable tuna, can be sourced from over 100 vessels. By replacing this manual workstream with automated data collection via the Global Fishing Watch APIs, we can now allocate more of our limited resources towards translating and analyzing the data into meaningful and actionable recommendations to support our partners' seafood programs.

The API-backed Tableau dashboards built during the accelerator will also provide additional improvement to our team's work in the future. With help from the visual dashboards, our team can quickly see all the relevant vessel data and analyses essential to catalyzing deeper investigation. The dashboards will improve our team's ability to prioritize and speed up vessel analysis in response to regulatory notices or media exposes, improve our team's ability to help our retail partners proactively understand risks, and streamline our translation and communication of this data into action. These improvement points will help us lead our partners to identify risks and combat IUU fishing and human rights violations more effectively.

As an organization, this accelerator project has opened up many new potential opportunities for FishWise. This data approach has provided us with excellent results with minimal manual interference. We can now scale up our service offering around IUU fishing and human rights in our partners' seafood supply chains. With this data scaling, we can branch out our services to reach other segments of the seafood industry.

Hopefully, as we continue this work past the grant period, we can explore how to give this solution even more analytical power by connecting the vessel data to our retail partners' seafood products. We also work within three pathways: direct supply chain engagement, collective industry engagement, and governance reform. We hope we can push this project to have an impact within all three of these pathways. We also view this experience with PJMF as an opportunity to open more doors within FishWise to apply a similar data approach to other aspects of our work and services to scale our positive impact throughout the organization.

4. **How might your use case and learnings be applied to other nonprofits that face similar data challenges?**

Although the mission of FishWise and the work we produced may be unique, other non-profits that face similar data challenges may be able to apply the learnings we gained from the accelerator program. Other non-profits who face the challenge of relying on resource-intensive manual data approaches to provide essential services to their clients could replicate our model for their work. There would need to be a couple of additional considerations to account for because there were complications when working with the Global Fishing Watch APIs and Tableau.

REST APIs are most commonly encoded in JavaScript object notation (JSON) format. When beginning your project, you may not fully understand what data elements will be helpful, so consider the storage needs of your API results.

- What is the viability of the data?
    - Are there time or cost constraints?
- Are there concerns about the future availability of data via API?
    - Could the data become stale, or are there privacy/terms-of-use considerations?

Storing your API results in a solution, such as Amazon's S3, could be helpful for future analysis and prevent the requirement of re-querying. Other storage solutions that can natively digest JSON are available but at a cost, e.g., Redshift and Postgres.

Once the API response is stored, you can deserialize the data later. Additionally, JSON can be unnested from its raw format into useable tables using structured query language (SQL) views. If you are utilizing Redshift as a storage solution, you can use this method to create materialized views for an efficiency gain.

There may also be challenges with displaying geospatial data in many data analysis platforms. For our project, we used Tableau; however, we also used the accelerator program to test the capabilities of Amazon's Quicksite. We found that platforms have different or limited capabilities when rendering geospatial polygons/multi-polygons and that documentation on these capabilities is sparse.

Different database solutions also provide different levels of support as well. Both Postgres and Redshift have good support with geographic information systems (GIS). However, there is a limitation in the size of Redshift's super data type. Currently, one cell cannot exceed one megabyte of data. We found that larger GeoJSON strings can easily exceed these limits, so we used reduced-resolution polygons instead. Large data sources like geospatial data sets can be complex to process in an analytics platform. For our project, we utilized Tableau's extract feature to assist significantly in rendering views.