

Supply Chain Risk (SCR) Project

Technical Glossary and Methodology



Technical Glossary

Overview

This technical guide provides the definitions, caveats, and methodology for the Supply Chain Risk (SCR) Project pilot risk assessments and subsequent reports (Phase 2 of this work). This document will explain what the data fields found in Global Fishing Watch's Vessel Viewer and Map means and assist the reader in understanding and interpreting the data found in their reports.

Identity Indicators

Corruption Perceptions Index: The CPI, hosted by Transparency International, ranks 180 countries and territories worldwide by their perceived levels of public sector corruption, and results are given on a scale of 0 (highly corrupt) to 100 (very clean).

Due Diligence: A systematic and ongoing risk management process that enables companies to proactively address their environmental and human rights impacts and conduct their business in a responsible manner.

EU third-country carding process: The EU Regulation to prevent, deter and eliminate IUU fishing entered into force on 1 January 2010 and includes a third-country carding process. The IUU Regulation enables the EU to issue a "yellow card" and enter into dialogue with non-EU countries that are found to be inadequately fighting IUU fishing in their fisheries. If these countries fail to put the required reforms in place in a timely manner, the EU issues a "red card": sanctions, including trade bans on their fisheries products, can be imposed.

IUU blacklist: A compilation of regional fisheries management organization (RFMO) lists of vessels that have been blacklisted for illegal, unreported, or unregulated (IUU) fishing-related offenses. A vessel will be flagged if it is listed on any of the official RFMO vessel lists below.

Caveats:

- This indicator covers the official RFMO IUU vessel lists of CCAMLR, CCSBT, GFCM, IATTC, ICCAT, IOTC, NAFO, NEAFC, NPFC, SEAFO, SPRFMO, SIOFA, WCPFC.
- Vessels with a history of suspected or proven IUU or other non-compliance, but have never been IUU listed by an RFMO, will not be flagged.

IUU Fishing Risk Score (Petrossian & Clarke, 2014)¹: A global research study by Petrossian, G. A., & Clarke, R. V. (2014) explores why certain fish are at risk of being taken illegally by commercial fishers. 58% of illegally caught species were individually matched with 58 control species, and after applying the CRAVED model of theft, those species were ranked on a scale of 0 (low risk) to 11 (high risk).

Open Registry: Also known as 'flags of convenience', this is a flagship registry system in certain countries that allow vessel owners to register their vessel under the flag of that country, despite there being no 'genuine link' between the flag state and the vessel

Port States Measures Agreement (PSMA): The PSMA is the first binding international agreement to target IUU fishing specifically. Its objective is to prevent, deter and eliminate IUU fishing by

¹ Petrossian, Gohar A., and Ronald V. Clarke. "Explaining and controlling illegal commercial fishing: An application of the CRAVED theft model." *British Journal of Criminology* 54.1 (2014): 73-90.

preventing vessels engaged in IUU fishing from using ports and landing their catches. In this way, the PSMA reduces the incentive for such vessels to continue to operate while it also blocks fishery products derived from IUU fishing from reaching national and international markets.

ProActive Vessel Registry (PVR): When included in the PVR, vessels undergo annual Level 1 auditing to assess the vessel attributes and compliance. Through random selection approximately every three years, each vessel undergoes a Level 2 (more detailed) audit, while level 3 audits are onsite inspections that occur if a risk factor is triggered during Level 1 or 2 audits. All audits are performed by MRAG Americas, ISSF's independent third-party auditor.

Regional Fisheries Management Organization (RFMO): International bodies made up of countries that share a practical and/or financial interest in managing and conserving fish stocks in a particular region. These include coastal states, whose waters are home to at least part of an identified fish stock, and 'distant water fishing nations' whose fleets travel to areas where a fish stock is found.

Seafood Import Monitoring Program (SIMP): A U.S. trade monitoring program that establishes reporting and recordkeeping requirements for imports of 13 seafood species groups to combat IUU fishing and/or misrepresented seafood from entering U.S. commerce. The 13 species groups have been identified as particularly vulnerable to IUU fishing, seafood fraud, or both. NOAA uses the International Trade Data System (ITDS), the U.S. government's single data portal for all import and export reporting, to trace these species back to the point of harvest or production and verify whether they were lawfully harvested or produced.

U.S. country identification process: Every two years, the National Oceanic and Atmospheric Administration (NOAA) releases its Biennial Report to Congress on international fisheries management, including IUU fishing and bycatch. These reports identify nations for activities related to IUU fishing and begin a two-year process for those nations to take the necessary steps to address IUU fishing. If the nations take appropriate steps and actions, they will receive a positive certification in the next report, and if a nation does not adequately address IUU fishing, they will receive a negative certification.

Vessel name and flag change: A vessel has been flagged in Vessel Viewer if its name or flag has changed within the last 12 months. Like a car's license plate, fishing vessels have names and registration numbers. However, a fishing vessel owner can easily change its name, registration number, call sign, or flag to potentially obscure its identity and owner details, making it harder for authorities to track these vessels.

Activity Indicators

AIS: AIS stands for [Automatic Identification Systems](#). AIS is a GPS-like device that large ships use to broadcast their position to avoid collisions. There are two main types of AIS transmissions: position and identity. More than 400,000 AIS devices each year broadcast vessel location and other information on vessel identity, course, and speed. Ground stations and satellites pick up this information, meaning a ship's movements can be followed even in the most remote parts of the ocean. Global Fishing Watch data goes back as far as 2012.

AIS coverage: AIS is a type of tracking device for vessels to broadcast their positions. The AIS coverage metric is a percentage representing the proportion of one-hour blocks a vessel is in a voyage and has at least one AIS transmission. An 'Unknown' value for coverage is because there is no reported activity for that vessel in the previous year. The AIS coverage metric provides contextual insights on how likely the available AIS summary information is to represent the full



scope of the vessel's actual activities.

How is the AIS Coverage Metric calculated?

- To calculate the coverage, all voyages linked to a vessel in the last year (i.e. 12 months) are segmented into one-hour blocks, and the total number of blocks with at least one AIS transmission are counted.

Caveats

- Coverage is calculated for vessels during detected voyages, and if a vessel's port entry or port exit is not detected (due to a vessel turning AIS off entering or leaving port, or from low AIS reception), a vessel's voyage may not be accurately captured, and coverage results may be skewed.
- Note there are legitimate reasons for a vessel to turn off its AIS or have low coverage:
 - For safety of crew and catch if operating in an area with piracy risks
 - Areas known to have poor reception due to high density of vessels, such as the South China Sea.
 - Class B devices, often used in under-resourced countries, are of lower quality than Class A AIS devices, and thus can impact coverage rates for a vessel.

Apparent Fishing ('Fishing events'): Global Fishing Watch analyzes AIS data collected from vessels its research has identified as known or possible commercial fishing vessels and applies a fishing detection algorithm to determine "apparent fishing activity" based on changes in vessel speed and direction.

Fishing events are defined using the following restrictions:

- Consecutive positions identified as fishing are grouped together into a single event
- Fishing positions that appear consecutively but are 10 km apart or more than 2 hours apart are separated into distinct events.
- Fishing events within 1 hour *and* 2 km of another fishing event but possibly having intermittent transit points are grouped together into a single event.

Finally, the dataset is restricted by removing fishing events that are brief and fast, as these are less likely to indicate a realistic fishing event. The following short fishing events are removed:

- Events less than 20 minutes
- Events comprised of five or fewer positions;
- Events that cover a distance of less than 0.5 km (for all gears except estimated squid gear)
- Events that cover a distance of less than 50m (for estimated squid gear)

Any and all references to "fishing" should be understood in the context of Global Fishing Watch's fishing detection algorithm, which is a best effort to determine "apparent fishing effort" based on data from the AIS collected via satellites and terrestrial receivers. As AIS data varies in completeness, accuracy, and quality, it is possible that some fishing effort is not identified and, conversely, some fishing effort identified is not fishing. For these reasons, Global Fishing Watch qualifies all designations of vessel fishing effort, including synonyms of the term "fishing effort," such as "fishing" or "fishing activity," as "apparent" rather than certain.

Event detected inside a Marine Protected Area (MPA): Fishing and potential transshipment events are cross-referenced with the boundaries of MPAs to create this indicator. Boundaries are taken

from the [World Database on Protected Areas \(WDPA\)](#). WDPA is the official source maintained by the UN Environment Programme (UNEP) and the International Union for the Conservation of Nature (IUCN) in collaboration with governments, non-government organizations, academia, and industry. The indicator is flagged if there is apparent fishing or potential transshipment activity within the boundaries of an MPA.

Caveats

- The indicator does not distinguish between no-take MPAs (where no fishing is permitted) and MPAs that allow some fishing, such as during certain seasons or using certain gear types. For more information on the management measures and relevant fishing permissions or restrictions for a particular area, a user may refer to Protected Seas.
- Global Fishing Watch uses a mean AIS position to determine whether an event occurs within a given boundary. Because of this, events close to boundary lines may be reported as being inside a boundary when, in fact, they occurred outside of it. Global Fishing Watch recommends that a user check the vessel positions on the Vessel Viewer Map and add the MPA layer to see the boundaries and confirm exactly where the vessel operates.
- Encounter events in MPAs cover MPAs that are 10 nautical miles or more from shore or more. This is due to the quality of AIS transmissions and the 'noise' that is often generated from the density of vessels that appear closer to shore. Please see Global Fishing Watch's "Our Technology" page for more information.

Events detected inside RFMOs by vessels without known authorization: [Fishing events](#) and potential transshipment events ([referred to by Global Fishing Watch as encounters](#)) are cross-referenced with authorization information compiled from 7 RFMOs (see below). The indicator is flagged if a vessel has fished and/or encountered a vessel in an RFMO in which there is no known authorization for them to be operating. For encounters, the event is flagged if BOTH the carrier and fishing vessel are not listed on an RFMO registry. Where the boundaries of two different RFMOs overlap (e.g. parts of NPFC and WCPFC), the carrier and fishing vessel in question must be authorized to at least one common RFMO.

Caveats

- Vessels detected in a flagged encounter event may be authorized to be active in the RFMO. The indicator is flagged if *both* vessels detected in the event are not authorized. For example, if a fishing vessel is authorized to fish in IOTC and encounters a carrier vessel with no known authorization, this will be flagged.
- This indicator currently cross-references against 7 RFMO authorization lists: CCSBT, IATTC, ICCAT, IOTC, NPFC, SPRFMO, and WCPFC
- This indicator only covers RFMO authorizations; it does not cover national registration or licensing lists that Global Fishing Watch does not have access to at this time. Subsequently, only high seas encounters and fishing events are evaluated for authorization status.
- The indicator identifies a vessel as authorized if listed on an RFMO registry and does not currently distinguish between RFMO authorizations to fish and tranship. Global Fishing Watch makes its best effort to provide the most accurate and up-to-date information possible. However, delays, reporting, or administrative errors can sometimes result in incorrect information displayed at the RFMO and in Vessel Viewer. For this reason, Global Fishing Watch always recommends a user refer to additional data sources or request authorization records from a vessel to confirm any findings.

Likely disabling event: Global Fishing Watch has developed a model that predicts when a vessel's AIS may have been intentionally shut off, or, in other words, where a vessel has 'gone dark' (as opposed to poor signal or similar factors). This is called a 'likely disabling event'.

A gap in the transmission is classified as 'likely disabling' if it meets the following criteria:

- The gap event must be at least 12 hours
- The gap must start at least 50 nautical miles from shore
- The gap must start in an area with a satellite reception quality greater than 10 positions per day
- The vessel must have at least 14 satellite positions in the 12 hours before the gap

Caveats:

- This indicator only covers likely disabling events that are 50 nautical miles or more from shore. Closer to shore, challenges from variable terrestrial AIS coverage and signal interference in crowded waters complicate the reliable detection of disabling events.
- The dataset has attempted to remove gaps resulting from poor coverage, reception quality, and similar factors beyond the vessel's control.

Port visit event: Ports are based upon the Global Fishing Watch anchorages dataset, a global database of anchorage locations where vessels congregate. The dataset contains over 160,000 individual anchorage locations, which are further grouped into nearly 32,000 ports. A vessel is considered to have visited a port when it is within three kilometers of an anchorage location and has stopped (speed of less than 0.2 knots). The vessel may subsequently exit the port when it travels more than four kilometers from the anchorage. AIS transmission quality, satellite reception coverage in a specific region, and activity within a port can all impact the consistency of a vessel's AIS signal near Global Fishing Watch-identified anchorages. Please see the Global Fishing Watch [webpage](#) for more information on how anchorages and voyages are estimated.

Potential transshipment events ('encounters'): Global Fishing Watch has developed a way to identify encounters between two vessels. At the moment, this includes encounters between a carrier and a fishing vessel or a fishing support vessel and a fishing vessel. Encounters may indicate potential transshipment activity between two vessels.

A potential transshipment, or encounter event, is defined as when two vessels are:

- Detect within 500 meters of each other
- For at least two hours
- Travelling at a median speed of less than 2 knots
- While at least 10 km from a coastal anchorage

Caveats

- Encounters that do not meet the current thresholds to be flagged as an event will not be captured in the AIS event summary (e.g. when a vessel's transshipment activity is shorter than 2 hours).
- In addition to the transshipment of catch, there are other reasons for a vessel encounter, including the exchange of crew, supplies, and other factors.

Voyage: This represents the period between two port visits and is referred to as 'trips' in the data schema. A voyage starts when a vessel exits a port, and a voyage ends when the vessel enters a port following the previous port exit. AIS transmission quality, satellite reception coverage in a specific region, and activity within a port can all impact the consistency of a vessel's AIS signal near Global Fishing Watch identified anchorages. Please see the Global Fishing Watch [webpage](#) for more information on how anchorages and voyages are estimated.

Methodology

Overview

The supply chain information a company provides is matched to risk indicators and enabling data (see table below). Fishing level data includes general descriptors of the species, area of harvest, and additional contextual information. When information on vessel identity is known, the SCR team members use Global Fishing Watch (GFW) tools and data to assess vessel level indicators. Enabling data includes public datasets, standardized lists maintained by the Center for Ocean Solutions (COS), and Global Fishing Watch's Map and Vessel Viewer.

Using Global Fishing Watch Resources

Vessel Viewer is a beta tool jointly developed by Global Fishing Watch and Trygg Mat Tracking (TMT). The tool integrates TMT fishing vessel identity and risk profile with Global Fishing Watch's positional data and algorithms. Combined, these data sources provide users with information on a vessel's identity, fishing activity, port visits, and transshipments. They also allow users to identify and cross-check information about a vessel and its fishing operations.

IUU fishing blacklists, vessel name and flag changes, AIS coverage, disabling events, unauthorized encounters (transshipments), unauthorized RFMO fishing, and MPA fishing are examples of quantified metrics in Vessel Viewer.

Calculating trips longer than 11 months requires manual review using the Global Fishing Watch Map. Long trips are defined by entry and exit into a port. However, AIS is not available close to ports due to the high volume of traffic, and entry to a port is not always visible even when there is high confidence a port visit did, in fact, occur based on vessel movements (straight tracks toward ports without fishing activity). SCR team members manually review vessel tracks to calculate with higher certainty the number of long trips for a given vessel. When a company reports port visits, SCR team members use a similar method to check AIS records.

Information Requested	Indicator	Enabling Data	Risk Category
Fishing Level			
Species name	IUU species risk based on global research by Petrossian and Clarke (2014)	Petrossian and Clarke, 2014	Contextual

	SIMP import requirements to combat IUU fishing and/or misrepresented seafood from entering U.S. commerce for 13 seafood species groups	NOAA SIMP website	Contextual
EEZ vs. high seas harvest Country of harvest FAO region FAO subregion	Fishing in EEZ vs. high seas	NA	N/A
	PSMA ratification status	COS updated database	Contextual
	EU carding status	COS updated database	Contextual
	U.S. country identification status	COS updated database	Contextual
Vessel Level			
Landing port name	Verification of reported port visits	Vessel Viewer	Contextual
Vessel name IMO number MMSI Flag state	IUU blacklisted vessel	Vessel Viewer	High risk
	Vessel name changes within 1 year of analysis	Vessel Viewer	Medium risk
	Vessel participation in ISSF's Proactive Vessel Register (PVR) (tuna vessels only)	ISSF PVR	Contextual
	Vessel flag changes within 1 year of analysis	Vessel Viewer	Medium risk
	Vessel flag	Vessel Viewer	N/A
	Current flag carded by EU	COS updated database	Medium risk
	Current flag identified by U.S.	COS updated database	Medium risk
Vessel activity	AIS transmission rates	Vessel Viewer	Data completeness
	Operations within authorized RFMO	Vessel Viewer	High risk
	Operations within reported country	Vessel Viewer	Medium risk
	Operations/fishing activities within MPA in the last year and dependent on regulations	Vessel Viewer	High risk
	Intentional disabling events	Vessel Viewer	Medium risk
	11 months threshold in the 5 years of the current owner	GFW Map	Medium risk
Transshipment	Number of visible and unauthorized encounters (transshipment) events	Vessel Viewer	High risk