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Sustainable Fisheries Management Begins with Vessel Tracking

International agreement to track vessels will bring greater accountability, build compliance and help protect fishers

Overview

Despite being a global, publicly shared resource, there is little transparency about what takes place across the ocean—especially when it comes to fishing on the high seas. Vessel tracking is a key method to understanding this activity, but Global Fishing Watch has revealed that about 75 percent of industrial fishing vessels do not appear in public monitoring systems.

At Global Fishing Watch, we believe that transparency—making information available and accessible to everyone it affects—is crucial to good ocean governance. We urge all States to support the establishment of a binding agreement that requires fishing vessels operating outside of their flag State's waters to be publicly tracked. Such an agreement should be based on transparency, allowing vessel tracking data to be shared beyond just governments.



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Challenges in vessel tracking

Vessel tracking enables us to better understand what is happening on the water by providing information on a given vessel as well as its whereabouts and activities. It allows for the monitoring, control and surveillance (MCS) of fishing activity, both authorized and unauthorized, giving fisheries managers the ability to obtain a comprehensive picture of what is happening on the water and better target inspection activities. Vessel tracking also supports wider ocean governance by providing crucial evidence and data that helps inform decisions to protect sensitive marine habitats and biodiversity, conduct marine spatial planning, and ensure the safety of fishers at sea.

But the current system of vessel tracking is broken, leaving many fisheries managers without adequate information to enforce regulations. Developed in an *ad hoc* manner over time, the framework for vessel tracking is fragmented, creating a growing level of opacity around which vessels are operating where and for how long. Without a robust mechanism to detail where vessels are on the water, authorities are not equipped with the information needed to deliver equitable outcomes, protect the ocean and sustainably manage its resources. This lack of transparency feeds an already-present data void in ocean management, creating significant hurdles to effective and equitable governance. But an internationally agreed policy on vessel tracking will help provide a standardized path forward—a milestone for fisheries management and ocean governance.

Types of vessel tracking

Fishing vessels are primarily tracked by two different types of broadcasting systems: the automatic identification system (AIS) and the vessel monitoring system (VMS). When used correctly, each system provides an accurate picture of vessel activity at sea. But along with their strengths, each has weaknesses. The integrity, accessibility and reliability of the data, all contribute to a vessel tracking system's effectiveness.

AIS

AIS was originally designed as a collision-avoidance system, providing a live, public record of a vessel's movements—direction, speed, location as well as identification information—to ensure ships could be spotted amid unfavorable weather conditions. Information is transmitted from one vessel to another as well as to satellite and shore-based receivers. While first intended to bolster safety at sea, use of AIS as a monitoring mechanism has grown in recent years. Only two percent of the world's roughly 2.9 million fishing vessels are equipped with AIS, but they are responsible for over half of the fishing effort that takes place more than 100 nautical miles from shore—and as much as 80 percent of the fishing that occurs on the high seas. But AIS has a number of limitations.



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While affordable and simple to install, AIS devices are not always mandated by flag States, leaving a crucial management gap for authorities in the absence of other tracking data, and a safety gap for fishers. The system is designed to be open and is not encrypted, making it easy to manipulate data—like a vessel's name or position—or be switched off completely. Users can tamper with information via a corrupted transmission or deliberately misrepresent vessel information to conceal unscrupulous activities. In some circumstances, such as in the case of piracy, AIS can be legitimately and temporarily disabled to protect the safety and wellbeing of a crew. These instances should be recorded in a ship's logbook and the flag State should be informed.

Like any broadcasting system, AIS depends on signal coverage—the varying likelihood of a signal being received by satellites, terrestrial antennas or antennas on other vessels. In areas with low coverage, or conversely high vessel activity, signals can be lost. There are two main types of classifications of AIS devices—class A and class B—both of which have different capabilities. Class A provides the most reliable signal and best coverage, while class B uses less power and transmits at a lower frequency. For vessels over 24 meters operating outside national jurisdiction, Global Fishing Watch recommends the use of class A transponders.

Size also comes into play. AIS tracking performs significantly worse on smaller vessels when they operate with class B devices and either lack onboard electricity or face insufficient aerial quality. Therefore, only a small fraction of vessels under 15 meters, which account for the vast majority of fishing vessels around the globe, actually use AIS, limiting our overall picture of global fishing activity.





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VMS

Unlike AIS, vessel monitoring systems were created specifically for managing fisheries. Data transmitted using VMS, which is specific to a region or fishery and decided by governing bodies, is proprietary and only available to certain parties.

VMS enables fishing vessels to be tracked at designated intervals for both inshore and offshore fleets. The devices, which can include additional anti-tampering and safety features, allows a private flow of information between the fishing vessel, its operators and owners, and the relevant fisheries authorities. Even within a single jurisdiction, VMS is not necessarily required for all fishing vessel classes—distinguished by size or gear—making it challenging to put together an accurate picture of fishing activity at sea. There is also an increasing trend to expand VMS onto small-scale vessels, often referred to as inshore VMS, and these devices can incorporate solar charging and use a variety of methods to transmit data to the fisheries monitoring center.

Future forms of tracking

As technology develops, it is likely that other forms of tracking and monitoring will emerge. Electronic monitoring, which consists of cameras and a variety of activity sensors positioned on vessels, is one example. And satellite technology that uses images to make vessel detections is another, perhaps becoming more relevant as the technology becomes more viable and affordable. While both of these systems have their advantages and may prove to be cost effective, they are still in their infancy. To date, the prominent forms of tracking industrial-sized fishing vessels are AIS and VMS.

An international framework for vessel tracking

A central problem with the current vessel tracking system is its patchwork nature. Developed over time by States, regional fisheries management organizations (RFMOs) and international bodies, tracking regulations are inconsistent and variably applied. As a result there is a proliferation of requirements for different vessels, making it difficult for vessel operators to know what they should have on board and who they are meant to report it to. This opens the door for unscrupulous actors to take advantage of the system and slip through regulatory gaps.

Vessel tracking data is a powerful tool in combating illegal, unreported and unregulated (IUU) fishing, but current tracking methods have weaknesses that reduce their efficacy as a surveillance tool.

In 2022, Global Fishing Watch found that AIS disabling was highest in geographic areas often associated with IUU fishing. Vessels were more likely to have their AIS disabled near the borders of exclusive economic zones, particularly contested ones, suggesting a pattern of AIS disabling in areas where vessels are not authorized.

There is no comprehensive international mandate for fishing vessel tracking. While treaties such as the U.N. Convention on the Law of the Sea or the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas require States or regional groups to establish measures to manage the activity of their vessels, it is not defined how they should do this. Other international instruments, such as the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing or the FAO Code of Conduct for Responsible Fisheries, include vessel tracking as an element of fisheries management, but these are not binding instruments and therefore do not provide a comprehensive international framework.



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The International Convention for the Safety of Life at Sea treaty does have provisions for the use of AIS for vessels over 300 gross tonnes on international voyages, but fishing vessels can be exempted from this by flag States. States also retain the option to require smaller fishing vessels to use AIS but there is no binding international requirement.¹ While RFMOs provide crucial regional management of shared stocks and the high seas, they rarely require AIS devices on vessels operating in their convention areas. And the VMS that are used vary significantly across management bodies with the data itself remaining private. As RFMOs are responsible for managing areas across the high seas and outside of national jurisdictions, this data should be made publicly available.

Given the problems with the current system, a transformation in how vessel tracking functions is needed. A new, international regime is required that will create a universal framework for minimum vessel tracking standards. This would level the playing field for all fishers and States and address the numerous problems encountered by the current system.

¹ Some states have taken this critical step. The U.S., for example, has required all commercial fishing vessels over 20 meters in length to be equipped with a class B transponder since 2015.





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Regional Vessel Tracking Requirements

Management Body	Tracking Requirements
Western and Central Pacific Fisheries Commission (WCPFC)	VMS is required for all fishing vessels that fish for highly migratory fish on the high seas within the convention area. Polling rates vary depending on vessel, season or location and while the default is every four hours many flag States require a more frequent polling rate.
International Convention for the Conservation of Atlantic Tuna (ICCAT)	VMS is required on all vessels exceeding 20 meters between perpendiculars, 24 meters length overall (LOA) or vessels over 15 meters LOA that are authorized to fish in waters beyond jurisdiction of the flag. Transmissions should be collected and transmitted once every hour for purse seiners and every two hours for all other vessels.
Indian Ocean Tuna Commission (IOTC)	VMS is required for all vessels over 24 meters, and less than 24 meters for vessels operating outside their Exclusive Economic Zone (EEZ) when fishing for species covered by IOTC. The minimum polling rate is a transmission to the fisheries monitoring centre (FMC) once every four hours, although this data is not shared with a centralized system within IOTC, only with FMCs.
North East Atlantic Fisheries Commission (NEAFC)	VMS is required on all vessels over 24 meters in length fishing or planning to fish in the regulatory area, and must report the vessel's location every four hours.
Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)	All vessels licensed to fish in the CCAMLR convention area are required to have a VMS device that reports every hour as well as an AIS device. CCAMLR also adopted a measure mandating that all vessels operating within the convention area be fitted with and have switched on, an AIS.
South Pacific Regional Fisheries Management Organisation (SPRFMO)	All authorized vessels included in the Commission Record of Vessels in the SPRFMO Convention Area and/or the adjacent buffer zone must use a VMS device. Position reports will be transmitted to the FMC and secretariat at least once an hour.



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Transparency-based vessel tracking leads to better ocean governance

A transparency-based vessel tracking system can improve ocean governance in numerous ways. It will benefit decision makers engaged in fisheries management and MCS officers by enhancing the tracking data available to them. Policymakers will have a clearer picture of activity in their waters, and supply chain actors can conduct improved due diligence, ultimately safeguarding those on the front line who put their lives at risk to make a living. Fundamentally, it improves access to data which provides accountability for what is happening on the ocean.

Data sharing and fisheries management

The current data sharing system between fisheries authorities is neither efficient nor effective when it comes to fisheries management. As its primary function is safety, AIS is publicly available—anyone can access the data. But signal coverage is unreliable, data can be manipulated and units can easily be switched off. Alternatively, VMS is effective at providing insight on vessel activity, but the data is often considered proprietary. While some States have made the laudable step of publishing their VMS data, it often remains closed and inaccessible.

Some RFMOs self-manage their VMS data, allowing members to share their data with other parties when relevant—typically for port inspections or patrol planning—or directly with the RFMO secretariat for compliance and management purposes.

However, if two States are not connected by an RFMO, the transmission of VMS data depends solely on the data sharing arrangements between those States. Sometimes this is formalized, supported by an efficient flow of communication between databases and systems that smoothly interact. In other instances, there may be a closer, interpersonal relationship that facilitates the sharing of necessary data.

But when States lack a data sharing arrangement—formal or informal—it can be challenging for parties to obtain the tracking data needed to get a full picture of fishing activity. This absence of tracking data undermines effective fisheries management and marine protections, and makes states vulnerable to IUU fishing, which depletes fish stocks and threatens local communities. In the case of the Agreement on Port State Measures (PSMA), which aims to prevent IUU fish being landed by foreign-flagged vessels, implementation continues to be a challenge. Where data sharing arrangements are lacking, IUU fishing vessels can slip through the gap because without access to tracking data, port officials struggle to know where a vessel has been and what it has been doing. The absence of tracking data is particularly acute for coastal States that lack the resources for an independent maritime domain awareness (MDA) program that would include the technology to identify vessels in their waters or in high seas areas. Without transparency, these States struggle to identify when vessels are entering their EEZs and what they have been doing. Transparency and access to data is crucial for these nations.

With a transparency-based vessel tracking system, coastal and port States would no longer need to rely on data sharing agreements or expensive MDA systems. Data would be publicly available, ensuring that fisheries managers were making informed decisions on the best available evidence, helping maximize the efficiency of their operations and hold IUU fishers to account.

Improved equity in decisions on the use of the ocean

The current tracking system creates an absence of equity in decision making and management. When vessel tracking information is only available to flag States, other stakeholders are excluded from information they need to engage effectively in decision making processes.

As competition for space in the ocean intensifies—with fish stocks on the move and new industries like wind power rivalling space—a common understanding of fisheries activity becomes crucial, especially for small-scale fishers that seek to defend their rights and fishing grounds. Evidence also suggests that tracking data can be useful for effective marine spatial planning, but if tracking data is not publicly accessible, it limits the involvement of fishers.

Conversely, under a transparency-based vessel tracking system, data is there for all stakeholders to see, use and analyze, creating fundamental equity and accountability in decision making. Ensuring that all affected parties have access to the same data is crucial in making certain that fishing activity is properly understood and managed. And it also enables the effective creation, designation and management of marine protected areas, especially on the high seas.

Improved decision making information for industry

Transparency benefits the fisheries supply chain. When vessel tracking is not made publicly available, seafood buyers and traders cannot do the required due diligence on products they are purchasing, which risks illegally caught fish entering markets. If vessel tracking data were made publicly available, seafood companies would be better equipped to make informed sourcing decisions. Ensuring transparency within supply chains creates accountability, improves company credibility, and pushes the market toward seafood that is sourced both responsibly and sustainably.

Safety at sea

Fishing has long been regarded as one of the most dangerous jobs in the world, with over 100,000 fishing-related deaths each year. Since AIS is not required on all vessels, even those operating on the high sea, an even larger risk to fishers is posed as vessel positions remain unknown. Beyond collision-avoidance, broadcasting AIS also assists with search and rescue operations. Without an AIS tracking requirement, coupled with the absence of international safety at sea laws in general, the need for a global, binding treaty on fishing vessel tracking becomes essential in preventing significant loss of life.



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Making transparency-based vessel tracking a reality

The path to a new transparency-based international agreement on vessel tracking has already begun. At the 35th Session of the U.N. Food and Agricultural Organizations (FAO) Committee on Fisheries (COFI), Norway formally proposed a binding global agreement that requires use of vessel tracking systems on board fishing vessels and mandates the sharing of positional data between relevant governments. The benefits articulated include improved MCS, support for the implementation of the PSMA, and guidelines on transshipment and the 2005 Rome Declaration on IUU Fishing.

Supported by a number of States, the FAO Committee subsequently agreed to a global study that will serve as the basis for discussions in a consultative process with policy and technical experts. This process will assess the different options to improve the current international vessel tracking system. But the path ahead is not straightforward and there remain three major challenges.

Cost and effort

Cohering the international community around a new, transparency-based international agreement on vessel tracking will be a significant effort exhausting both time and resources from the FAO and its member States—the PSMA took over a decade to agree from first being suggested to completing the negotiations. But this only strengthens the case to begin now. Our current system is failing, and the future of ocean governance will require having accurate, transparent data on

which to base decisions. Many of the implementation hardships seen with international policies, such as the PSMA, would be significantly improved through a comprehensive vessel tracking agreement. While there are costs to developing a new agreement, they are eclipsed by the threats caused by inaction—the harm to our ocean, its vast resources, and the billions of people that depend on it for sustenance and well-being.

Risks to personal data protection

There are concerns that the publication of vessel tracking information is in breach of personal data protection—this is a reasonable concern as vessel tracking information can also include details about vessels such as their name and International Maritime Organization number.

However, a legal analysis commissioned by Global Fishing Watch finds the likelihood that mandated public vessel tracking would violate personal data regulations to be low. The analysis finds the vessel master and crew to be the most exposed in terms of personal data, as they are the individuals whose location would be revealed. However, given that crew lists are rarely made available, an individual's location would be difficult to determine through the publication of a vessel's location.

This risk can be further mitigated by using license conditions to gain consent or regulations to specify that the public benefits outweigh the personal data risk.

Simply put, the risk can be minimized by making transparency explicit in laws or regulations. Furthermore, the vessels already publicly broadcasting their location, either through AIS or VMS, have not yet presented personal data protection issues, reinforcing the assessment that this is a low-risk, high-reward scenario.

Commercial sensitivities

The commercial fishing industry is full of heavily guarded knowledge that extends from worthwhile fishing spots to lucrative times of the day to fish. This information is often considered the intellectual property of fishers that has been developed over years of fishing. Even divulging the simple location of fishing vessels is often more information than a vessel master may want to share, as it could draw in competition from other vessels. The fishing industry provides more than 33 million jobs to the global economy and provides 3 billion people with their primary source of protein, so it is important that these concerns are taken seriously and addressed.

One effective way to ensure fishing knowledge is protected would be to aggregate any VMS data that is published so that no single vessel's activity is ever identified in a specific location. Alternatively, delays in publishing the vessel tracking data can mitigate the risk for certain fisheries. For instance, tuna species move frequently, meaning the location of fishing sites is less privileged knowledge. By working collaboratively with the fishing industry to understand and address their concerns, it is possible to identify solutions that alleviate commercial sensitivities, noting that AIS devices already broadcast some vessel's location.

Transparency should not be seen as a threat to the fishing industry. Ultimately the level of transparency within an international framework agreement will need to be negotiated and agreed across stakeholders. Global Fishing Watch's position is that transparency—in this case the publication of VMS data—is crucial when a vessel is fishing outside its own waters, as the benefits far outweigh the limited risks involved.



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Transparency for ocean governance

The current patchwork system of vessel tracking regulations—developed over time by States, RFMOs and international bodies—is inconsistent and often fails to provide the comprehensive data necessary for effective ocean governance. This fragmented approach creates significant regulatory gaps that unscrupulous actors can exploit, undermining efforts to combat IUU fishing. The lack of a comprehensive international mandate for vessel tracking leaves many stakeholders without the information they need to engage effectively in fisheries management and enforcement activities.

A new, international agreement on vessel tracking is essential to address these challenges. Such an agreement would standardize tracking requirements and make data publicly accessible, thereby enabling all stakeholders to participate in fisheries management.

The path forward, initiated by Norway's proposal at the COFI35, offers a critical opportunity to create a robust framework that protects our ocean resources and the people that depend on them. Despite the costs and challenges, the benefits of a comprehensive and transparent vessel tracking system offset the risks involved, making it a crucial step towards sustainable ocean governance.

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Global Fishing Watch is an international nonprofit organization dedicated to advancing ocean governance through increased transparency of human activity at sea. By creating and publicly sharing map visualizations, data and analysis tools, we aim to enable scientific research and transform the way our ocean is managed. We believe human activity at sea should be public knowledge in order to safeguard the global ocean for the common good of all.

