SUSTAINABILITY THROUGH TRANSPARENCY: THE CASE FOR REMOTE ELECTRONIC MONITORING IN MEDITERRANEAN FISHERIES

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The Mediterranean Sea plays a critical role in supporting fisheries, ensuring food security, and sustaining the livelihoods of coastal communities. However, important challenges such as overfishing, bycatch and illegal fishing, threaten the sustainability of fish stocks and the well-being of coastal communities. Remote Electronic Monitoring (REM) technology offers a promising solution to address these challenges, and support data-driven decision-making in the region.

This briefing highlights the benefits of REM, including enhanced data collection, better bycatch monitoring and improved compliance. Despite limited engagement on REM in the Mediterranean, progress in other Regional Fisheries Management Organisations (RFMOs) and a pilot project in Cyprus demonstrate its potential to promote sustainable practices and enhance fisheries management in the Mediterranean.

We call on the GFCM to constitute a formal Working Group to discuss the role of at-sea monitoring tools such as REM in supporting efforts to ensure compliance with existing fisheries management rules and sustainability of fishing more broadly, as well as to facilitate initiations of new pilot projects to test the technology across the region.

The Mediterranean Sea is a vital resource for fisheries, supporting the livelihoods of hundreds of thousands of people and providing essential food security for coastal communities. The sector provides employment directly or indirectly to around 457,000 people. According to the GFCM Fleet Register, nearly 20% of fishing vessels operating in the Mediterranean have a length overall (LOA) exceeding 12 meters. The sector is also estimated to produce revenues of USD 7.8 billion.[1]

However, the biodiversity that underpins the sustainability of the fishing sector in the Mediterranean Sea faces significant challenges, key among them being overfishing, high levels of bycatch and Illegal, unreported, and unregulated (IUU) fishing. Without accurate and timely data on fishing activity, we cannot responsibly manage our fisheries.

Remote electronic monitoring (REM) - the use of onboard video cameras, GPS and sensors to monitor and verify fishing activities - and human observers can strengthen transparency and provide critical data needed for the sustainable management of fisheries and the safeguarding of ocean wildlife.

- Despite progress over the years, current fishing pressure in the GFCM area of application has led to 58% of fish stocks being overexploited and fishing pressure remains twice what is considered sustainable, according to the data available.[2]
- Concerning bycatch, existing estimates are worrying: from 2008 to 2019, in the Mediterranean Sea alone, a total of 25,312 elasmobranchs (including sharks and rays) from various conservation-priority species were reported as bycatch. Additionally, up to 132,000 sea turtles were incidentally caught each year, with an estimated 44,000 of them potentially resulting in death.[3]
- IUU fishing depletes fish stocks, destroys marine ecosystems, puts legitimate fishers at an unfair disadvantage and jeopardises the livelihoods of coastal communities.[4]

1 How can electronic monitoring support the fight against IUU fishing and promote effective and transparent fisheries management in the Mediterranean?

While it is difficult to determine the exact extent of IUU fishing, conservative estimates attribute up to 20% of the global catch to illicit fishing.[5] In some cases, such as demersal and shrimp fisheries, this can represent up to 50% of catches.[6] IUU fishing thrives in the opaque operating environment and in situations of weak governance that characterise the global fishing industry. The fight against illegal fishing requires a broad portfolio of measures, with improved transparency in fisheries governance and management, in line with the Global Charter for Fisheries Transparency,[7] being at the centre of it.

Robust monitoring, control and surveillance (MCS) systems that ensure seafood is legal and traceable from boat to plate and conform to relevant catch management measures are a key element for ensuring enhanced transparency of fishing operations. Traditional monitoring methods (e.g., patrol vessels, aerial surveillance, landing inspections, etc.) can only partially cover the activities of the fishing fleets they have to monitor. By cost-effectively providing large amounts of real-time data on fishing activity to relevant stakeholders, notably governments and fisheries management agencies, REM is a powerful MCS measure.

REM systems involve the use of imagery, net sensors, and GPS fitted onboard fishing vessels to independently monitor fishing operations, effort, and/or catch by collecting large amounts of data (*Figure 1*). The data gathered automatically is then stored and can be accessed securely by competent authorities. Fishing vessels can also review footage and verify the reported information through logbooks. In addition, electronic monitoring can also support the sharing of information on fishing operations with different actors in supply chains at a time when retailers are increasingly demanding more sustainably sourced food.

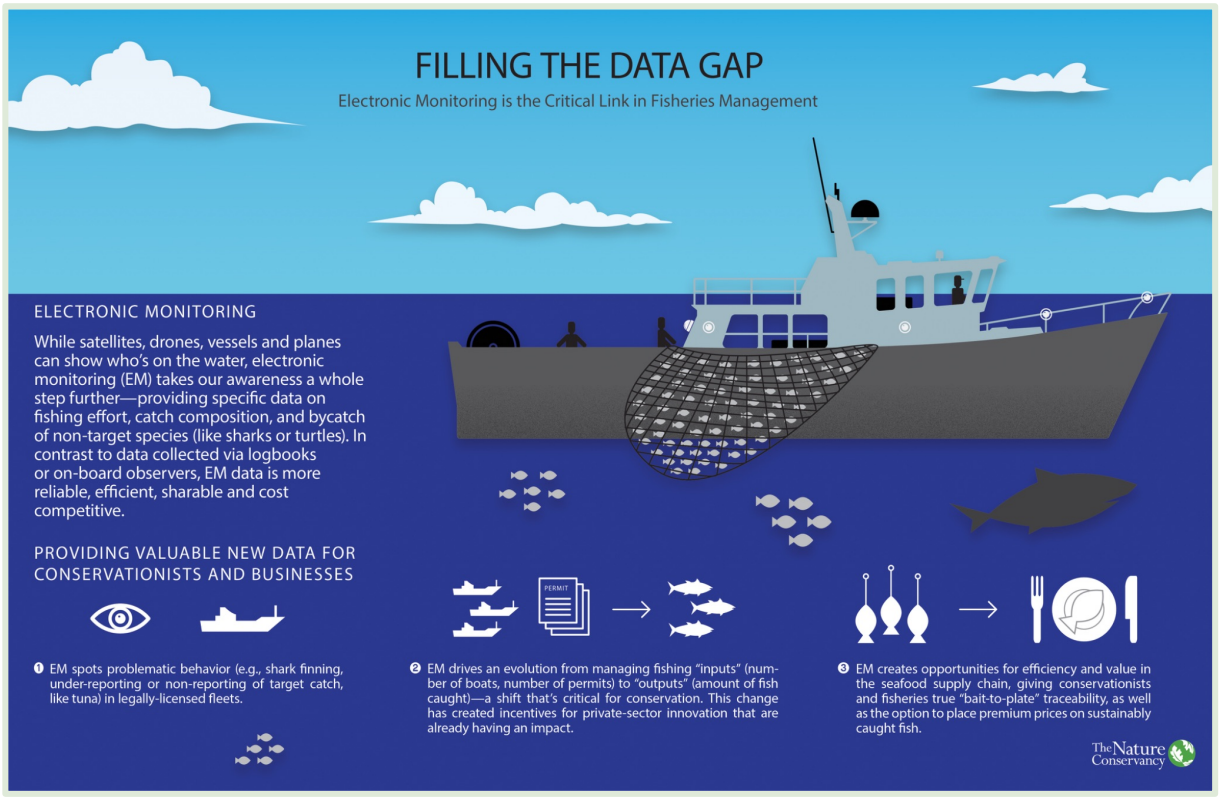

Figure 1: REM system in action

This technology therefore has the potential to revolutionise fisheries management in the Mediterranean, offering a cost-effective, transparent, and data-driven approach to monitoring and compliance. All in all, REM represents a giant leap in sustainable fisheries management.

(i) REM enhances data collection and results in improved and more responsive fisheries management.

To properly assess the status of fisheries, the collection of data, particularly independently verified data, is key. Generally speaking, data collection is done at landing or marketplaces, on commercial vessels by fishers themselves

(fishery-dependent data) and to a lesser extent by scientific or research vessels. Fishery-dependent data remain the primary source used to manage fisheries. However, misrecording may occur due to various reasons, including the lack of training of fishers for data reporting and fishing operations taking place in difficult at-sea conditions.[8] As a result, a range of additional data collection programmes have been implemented to ensure the accuracy of reporting and verifying the logbook data and/or the activities at sea, including human observer programmes. However, it is estimated that these methods can only cover between 1% to 5% of fishing activity.[9]

This is where electronic monitoring can add value: REM systems generate automated and detailed information on fishing operations, including vessel location, gear type, catches and environmental conditions, and its functioning is not influenced by conditions at sea. Near real-time monitoring facilitates the assessment of the health of fish stocks, allows identification of fishing grounds, and supports evaluating the effectiveness of management measures. By providing comprehensive, timely, and accurate data and independently verifying logbook information, REM can provide greater confidence in catch and effort data, leading to more responsive and better-informed decision-making in fisheries management.

(ii) REM supports bycatch reduction efforts.

Despite bycatch being one of the most significant threats faced globally by sensitive marine species, not enough is known about the extent of the problem. Nevertheless, existing observations are concerning: in the Mediterranean Sea alone from 2008 to 2019, a total of 25,312 elasmobranchs (sharks and rays) belonging to various conservation-priority species were reported as bycatch; and up to 132,000 sea turtles have been incidentally captured every year, with 44,000 considered potentially dead. These figures may actually underestimate existing bycatch levels, as many geographical areas and vessel types are underrepresented in currently available data.[10] Bycatch, among other factors such as noise pollution or the use of illegal fishing gear, has also led to 77% of resident subpopulations of cetaceans in the Mediterranean being threatened with extinction.[11] These high bycatch levels can risk the ability of countries to export to key markets, such as the US market by 2026.[12]

Estimating bycatch levels is difficult given that these captures are not systematically reported, and human observer programmes only cover a fraction of the fleet. By providing high-quality data, REM can help identify bycatch hotspots, address their potential causes, and improve existing practices. This has already been demonstrated by trials in other jurisdictions: for example, a pilot study in Denmark found REM's bycatch detection rate to be much higher (92%) than what fishers' logbooks suggested (63%).[13] A 2019 analysis of logbook-reported catch in Australia's Eastern Tuna and Billfish Fishery and the Gillnet Hook and Trap sector of the Southern and Eastern Scalefish and Shark Fishery found significant differences in reported interaction rates before and after the implementation of REM. Reported interactions with protected species increased up to 1,100 percent[14]. Providing more information about interactions between fishing activity and sensitive species, electronic monitoring also allows for the development of better methods for bycatch mitigation.

(iii) REM improves compliance with management measures and other fisheries rules.

Providing insight into on-the-water activity, including information on catch sizes, incidental catches and discarding, and enabling the verification of the accuracy of reported data, REM facilitates authorities' monitoring and control of the fleet's compliance with fisheries management regulations and enforcement action when vessels fail to adhere to established rules. It is also a tool for fishers to improve their practices: fishers can review footage from their vessels, better monitor their compliance with regulations, compare and report data more accurately in their logbooks and identify areas for improvement in their operations.[15] In Denmark, 80% of surveyed fishery inspectors and 58% of REM-experienced fishers expressed positive views on REM as an important tool to improve compliance.[16]

2 Costs of REM technology

Depending on the vendor and the type of system installed, REM can represent a cost-effective tool for monitoring large areas of the sea on a wide range of fishing vessels (from artisanal boats to larger commercial fleets). For instance, implementing a 10% video review monitoring system across the fleet over 10 meters in the UK would amount to approximately £5.01 million. This represents a quarter of the expenditure allocated to conventional systems.[17] This scalability also makes REM suitable for countries with limited resources for fishing monitoring or remote fishing grounds, where traditional monitoring methods may be less feasible. REM is also able to provide observation 24 hours a day 7 days a week, offering a wider coverage at a cheap rate.[18]

Case study: How REM is improving the fisheries sustainability in Cyprus

To improve fisheries management, Cyprus initiated in 2023 a pilot project on REM in the Mediterranean Sea in collaboration with the fishing community and technology providers. This project aims to test the feasibility and effectiveness of REM systems in monitoring fishing activities, promoting sustainable practices, and enhancing compliance with fisheries regulations.

The project will last 4 years and currently involves 2 longliners operating in the Central Mediterranean. Another 3 vessels will soon join the programme. This presents an opportunity to assess REM use on different kinds of vessels, each of which presents unique challenges for REM system installation and operation. For instance, these challenges can arise from variations in vessel design and differing connectivity requirements.

The project has already provided promising results and revealed certain practices by vessels that were not in full conformity with national and/or international rules. With this in mind, project leaders in coordination with vessel captains and operators implemented changes to address such illegalities. This has led to logbooks and landing declarations being precisely verified, and discards being comprehensively recorded and properly identified (distinguishing between turtles, different shark species, and undersized specimens). Other practices such as ocean littering have been eliminated as well.

Despite initial concerns about the effectiveness of the technology, fishers demonstrated cooperation and engagement with the REM systems, undertaking maintenance tasks and recognising their potential benefits for fisheries management and the future of fisheries. Fishers have benefited from data-driven feedback on their activities, enabling them to adapt and improve their practices in alignment with regulations and sustainability objectives.

This GFCM-awarded pilot program[19] is already enhancing more responsible practices and is providing fisheries management authorities with invaluable information that will contribute to the recovery of Mediterranean fish stocks and preserve its unique biodiversity.

3 Considering the use of REM to monitor and control fishing activity in the Mediterranean

The current GFCM MCS framework is built on port monitoring, observer programmes for scientific purposes and catch documentation schemes for certain species, joint inspection schemes and the Authorised Vessel list (AVL). Important gaps in this framework exist, including the lack of mandatory electronic logbook reporting, the absence of an observer program for compliance purposes, and noting work is underway, GFCM is yet to implement a Vessel Monitoring System (VMS) programme. In this context, REM represents an opportunity to strengthen GFCM's MCS framework and support efforts to address IUU fishing throughout the region while enhancing data collection and tackling incidental catches and discarding. So far, only one REM trial is being conducted in the Mediterranean, by Cyprus ('Case study'). Despite promising initial results on the usefulness of REM to control compliance and support science-based, well-informed and responsive fisheries management, we are yet to witness a general interest by fisheries authorities and decision-makers of GFCM contracting parties in mandating the use of electronic monitoring to support better management and regulatory decisions in the region.

This limited engagement with REM systems in Mediterranean fisheries until now is set to change, and the move from pilots to fishery-wide application of electronic monitoring technologies is slowly underway. From January 2028, certain types of EU vessels of 18 metres or more in length will have to implement REM systems under the recent revamp of the EU Fisheries Control Regulation.[20] The potential use of REM systems as part of MCS efforts and for data collection is currently being discussed in formal working groups of many RFMOs, including the South Pacific RFMO, with minimum standards having been agreed at the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC), and the Inter-American Tropical Tuna Commission (IATTC), enabling contracting parties to use REM to increase at-sea monitoring coverage and meet their reporting requirements.

Given the overlap between the ICCAT and the GFCM areas of application, special attention must be paid to ICCAT. In 2022, ICCAT established a working group through a '*Resolution by ICCAT for the establishing of an ICCAT Working Group on the use of Electronic Monitoring Systems (WG EMS) (Res. 21-22)*'.[21] The work of the group led to the approval of *Recommendation 23-18*,[22] establishing minimum standards and programme requirements for the use of REM in ICCAT

fisheries. These requirements aim to describe what REM systems must adhere to, so they meet ICCAT requirements for scientific data collection and/or compliance monitoring, such as the type of information required to be monitored or technical specifications on sensors, GPS use, etc.

Recommendations

REM is an effective at-sea monitoring tool that, combined with other existing measures such as logbooks, VMS or joint inspections, can bring a more comprehensive approach to MCS in the GFCM. Electronic monitoring has also the potential to enhance data collection and address the alarming levels of bycatch in the GFCM area of application. Overall, REM can decisively contribute to better fisheries management in the Mediterranean, as the promising initial results of the ongoing REM pilot programme in Cyprus indicate. The progress achieved in other RFMOs on REM, such as IOTC, ICCAT and IOTC, can also inspire GFCM to update its MCS framework and bring it to the forefront of RFMOs.

We call on GFCM CPCs to:

- **Agree at the 48th Session of the GFCM to set up a joint Scientific Committee and Compliance Committee Working Group to discuss at-sea monitoring tools such as REM to enhance the GFCM's MCS framework and improve fisheries management and compliance.**
- **Promote the initiation of REM pilot projects with contracting parties of the GFCM in the Mediterranean.**

These are the first steps towards assessing the potential use of these technologies while taking into account the specificities of fisheries in the Mediterranean Sea and the socio-economic differences across the region. With the appropriate support and collaboration among institutions, fishing communities and other relevant stakeholders, REM can contribute to the long-term health and resilience of the Mediterranean Sea, ensuring its continued prosperity for future generations.

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Contact
Jesus Urios Culiañez
jesus.urios@ejfoundation.org
+34 673 82 29 96