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# Enhancing Seafood Traceability: Solutions and Industry Challenges

MMO1425a



# MMO1425a: Enhancing Seafood Traceability: Solutions and Industry Challenges, February 2026

**Report prepared by:**  
Marine Management Organisation



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# Executive Summary

## Context and scope

In the UK it is a legal requirement for fish to be traceable from catch to consumption or export. As the regulator for England's seas, the Marine Management Organisation (MMO) has the responsibility to effectively manage fishing activity, for which correct and timely data from industry is required. In practice, compliance with reporting regulations is highly variable. This report aims to review the traceability research the MMO has undertaken to date as well as summarising case studies that have improved traceability in real world settings, from the UK as well as internationally.

## Programme Approach

The MMO's Traceability Programme seeks to research and address the causes of non-compliance with industry data submission and improve traceability throughout seafood supply chains. After an initial evidence base was built, a wide range of benefits of traceability were identified in MMO1329\_1, which can be categorised into health, wealth and environmental benefits. However, several challenges to improving traceability were also recognised. MMO1329\_2 investigated three UK supply chains in detail, comprising Scottish mackerel, Bridlington crab and lobster and south-west sole. A range of technological solutions were identified in MMO1329\_3 that have the potential to improve traceability in seafood supply chains, including QR codes and Radio Frequency Identification (RFID) tags. The Programme is now looking at a number of different initiatives to strategically improve traceability in the English seafood supply chain, this report being one element.

## Opportunities

The MMO is keen to facilitate the fishing sector to increase supply chain traceability and introduce greater tracking of fish and data throughout the supply chain. The best way for the MMO to help with this may be by providing grants and funding for traceability systems or initiatives.

The examples summarised in this review demonstrate ways that traceability in the seafood sector can be improved, which may be beneficial to English businesses who would like to implement improved traceability.

## Uncertainties and areas for further research

There are very few examples of full end-to-end traceability in operation, since most initiatives to improve traceability have addressed one aspect of the system or supply chain. Further research is therefore needed as to how a whole system of end-to-end traceability could be implemented in English seafood supply chains. It is also necessary to investigate the costs and benefits of a real-world end-to-end traceability system, such as the cost for seafood businesses to implement and maintain such a system and the benefits that offset this.

## Next steps

A number of potential changes in MMO systems have been identified which could make traceability easier. Trials of new technology and ways of working on English supply chains will be investigated with industry to further demonstrate how

processes can be automated, made easier and information used for mutual benefit to all parties.

# Contents

<b>Executive Summary .....</b>	<b>4</b>
<b>Contents.....</b>	<b>6</b>
<b>1. Introduction .....</b>	<b>8</b>
1.1 Traceability .....	8
1.2 Seafood Traceability Programme .....	8
<b>2. Types of supply chain.....</b>	<b>11</b>
<b>3. Benefits of traceability.....</b>	<b>13</b>
<b>4. Challenges for the seafood sector.....</b>	<b>14</b>
<b>5. Technological solutions .....</b>	<b>16</b>
5.1 QR codes.....	16
5.2 Radio Frequency Identification (RFID).....	17
5.3 Desktop demonstrator .....	19
5.4 Blockchain .....	20
5.5 Conclusions .....	21
<b>6. Demand and Drivers for change .....</b>	<b>22</b>
<b>7. Opportunities for MMO facilitation .....</b>	<b>24</b>
7.1 Funding schemes .....	24
7.2 Technical demonstrations .....	24
7.3 MMO Traceability systems .....	25
7.4 Stakeholder Engagement .....	25
7.5 Articulating the value of traceability .....	25
<b>8. Conclusions.....</b>	<b>26</b>
<b>9. References .....</b>	<b>27</b>

## Figures

Figure 1: UK Dover sole seafood supply chain based out of the southwest of England (from MMO1329_2). .....	11
Figure 2: Benefits of traceability to seafood stakeholders (from MMO1329_1). .....	13
Figure 3: Example of a project generated QR code. ....	16
Figure 4: Example of a QR code and RFID tag (the tag is on right hand side beside Vessel ID). .....	18
Figure 5: Example consumer display viewable from reading the QR code on a box or tag on high value fish.....	19
Figure 6: Diagram showing a centralised database compared to blockchain (decentralised), demonstrating that blockchain is maintained across an entire network of computers rather than being controlled by a single entity. Image taken from ScyllaDB (2025). .....	20

## Tables

Table 1: MMO Traceability Projects. ....	9
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# 1. Introduction

## 1.1 Traceability

The United Nations Food and Agriculture Organisation defines traceability as “the ability to follow the movement of a food through specified stages of production, processing and distribution” (FAO, 2025). This is applied within food control systems as a tool to control food hazards, provide reliable product information, and guarantee authenticity.

## 1.2 Seafood Traceability Programme

The MMO is the regulator for England’s seas. To effectively manage fishing activity, correct and timely data is needed through industry submission. Late and inaccurate statutory fisheries returns are an increasingly high-profile and high-risk issue for the MMO due to new post-EU exit export requirements. The MMO’s Traceability Programme seeks to research and address the causes of non-compliance with industry data submission and improve traceability throughout seafood supply chains.

Since the programme’s inception in 2021 a variety of research and engagement has taken place (as shown in Table 1). This has found that technological solutions exist to alleviate these issues, however there isn’t currently the demand or drivers for businesses to invest in new systems and ways of working to improve the accuracy and timeliness of catch and sales data. As such moving forward the MMO is seeking to improve traceability through four activities:

1. Increasing industry understanding of the value of traceability information to encourage more accurate and timely submission.
2. Investigating what changes could be made to MMO systems to allow Industry data submission to be automated where possible.
3. Investigating what changes could be made to MMO systems to ensure Industry data submission duplication is removed.
4. Facilitating the fishing industry to track fish end to end in the supply chain.

This report forms part of Activity 4 whereby the MMO is making the case for increasing the flow of digital information in seafood supply chains above and beyond the current ‘one up – one down’ standard to improve data quality for regulatory purposes.

**Table 1: MMO Traceability Projects.**

<b>Project</b>	<b>Summary</b>
<b>MMO1223</b> - MMO Traceability (in press)	A proposed traceability system based on global best practice.
<b>MMO1265_1</b> - Supply chain community-led identification of traceability solutions (in press)	Engagement with the English fishing sector to understand their perspective on the challenges of traceability.
<b>MMO1265_2</b> - Radio frequency identification (RFID) tag traceability system - Feasibility study (in press)	A series of interviews to understand how RFID tags have been used to track fish in Denmark and Belgium.
<b>MMO1329_1</b> - Seafood Traceability: Benefits & Challenges (in press)	An articulation of the benefits and importance of traceability information.
<b>MMO1329_2</b> - Mapping Supply chains (in press)	Three UK seafood supply chains were mapped out along with instances of good practice and challenges in the wider UK supply chain.
<b>MMO1329_3</b> - Seafood Traceability: Linking seafood to data (in press)	Technologies available to track fish in a supply chain were investigated and a pilot was carried out.

This is the first of two complementary reports on traceability in the seafood industry. It aims to review the evidence collected in the programme so far, investigate what the challenges and drivers for traceability are, and to identify how government can facilitate the English fishing industry to improve the traceability of seafood.

The objectives of the work are to:

1. Review the MMO Traceability Evidence base and lessons learned so far on the following:
  - Types of English supply chain
  - Challenges to traceability for industry
  - Value of traceability information
  - Possible technological solutions
2. Describe challenges to traceability for the fishing sector.
3. Analyse the demand and drivers needed for change.
4. Propose solutions and opportunities for the MMO to facilitate the fishing sector tracking fish and data throughout the supply chain (e.g. grants, initiatives).

This report consists of the following sections:

- [Section 2 - Types of supply chain](#)
- [Section 3 - Benefits of traceability](#)
- [Section 4 - Challenges for the fishing sector](#)
- [Section 5 - Technological solutions](#)
- [Section 6 - Demand and drivers for change](#)
- [Section 7 - Opportunities for MMO facilitation](#)
- [Section 8 - Conclusions](#)

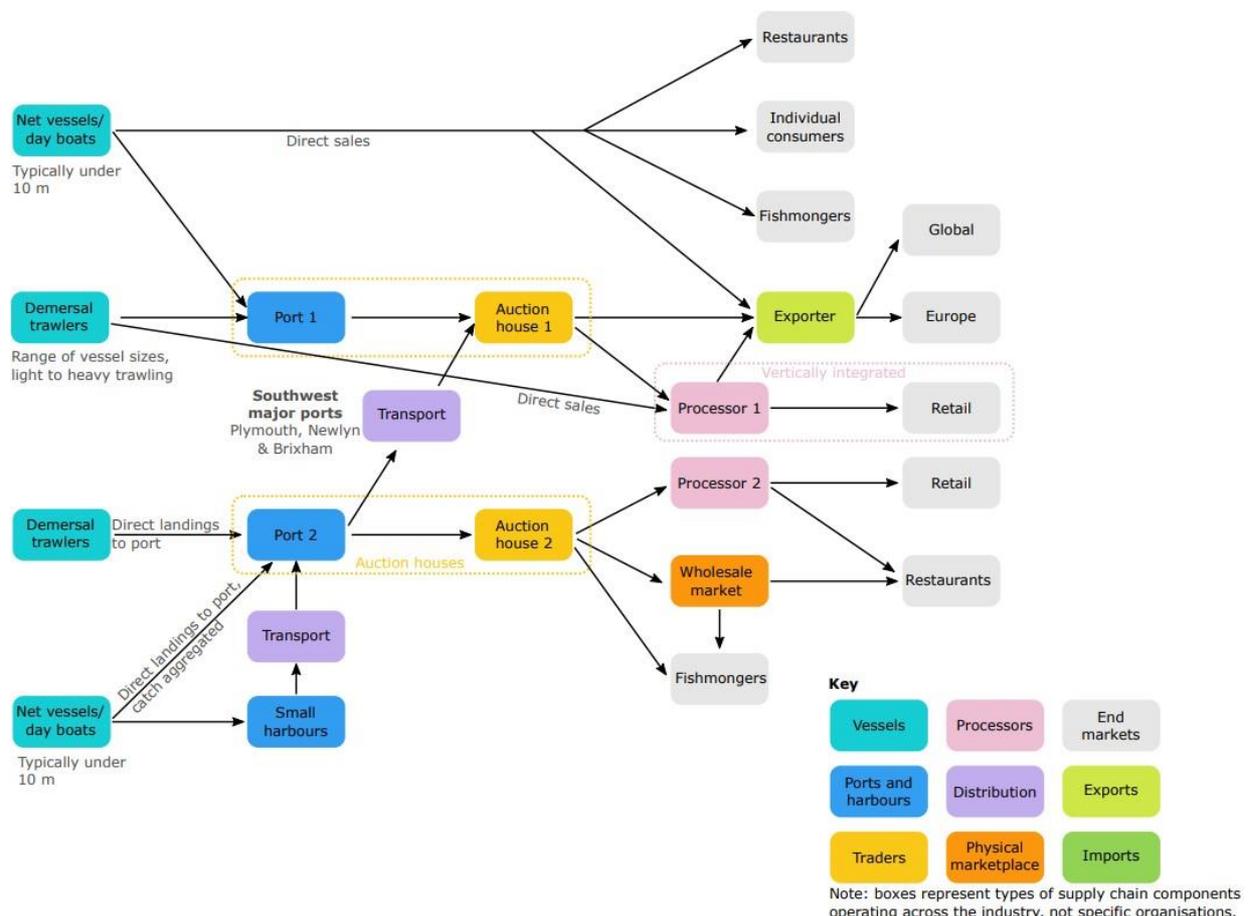
The associated report (MMO1425b) is published alongside this and contains details of real world examples of seafood supply chains that have made efforts to improve end-to-end traceability and digitisation as well as examples of seafood companies that have introduced QR codes into their products.

## 2. Types of supply chain

MMO1329\_2 investigated English seafood supply chains and found that traceability happens in some chains, but the amount of data available depends on the supply chain and market context. The project then looked in more detail at three specific supply chains: south-west sole, Scottish Mackerel and Bridlington crab and lobster. The findings of this project are published in Hopkins et al. (2024).

In some supply chains traceability can only be achieved to a group of vessels. For example, in the Dover sole supply chain in south-west England traceability information can be passed on from the auction houses (shown in yellow in Figure 1), but when dealing with larger volumes this means that it may not be possible to keep the catch from individual vessels separate during transport and processing.

**Figure 1: UK Dover sole seafood supply chain based out of the southwest of England (from MMO1329\_2).**



Other supply chains have more effective traceability due to vertical integration of its vessels and primary processors. One example of vertical integration is the Scottish mackerel supply chain in Peterhead where batch codes (fish of the same species from one vessel) and production codes are used to achieve batch level traceability.

Many supply chains demonstrate 'one up - one down' traceability where products can be traced internally from a customer back to the supplier of the product. However, traceability in these cases can only identify back to a vessel group at best, so cannot identify an individual vessel who caught a specific product. It is also very challenging and time consuming to carry out, which means that it is not feasible to routinely trace back products through supply chains where only 'one up – one down' traceability is available. The crab and lobster sold in Bridlington are an example of this reduced level of traceability.

### 3. Benefits of traceability

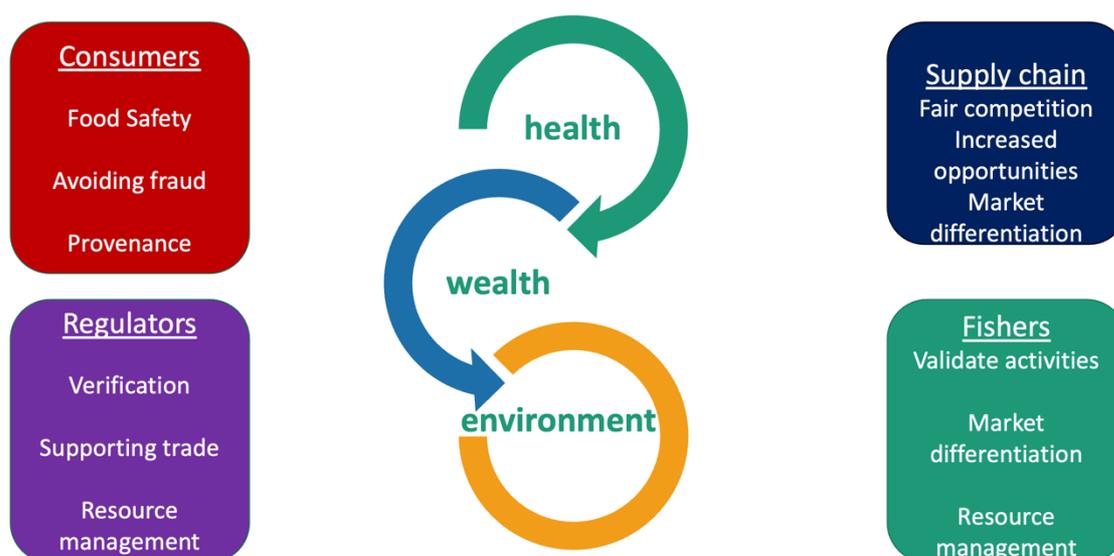
In MMO1329\_1, a range of benefits of traceability were identified and these were grouped into three broad categories – health, wealth and environment. The importance of these benefits may vary among stakeholders.

**Health** – This includes protecting consumer health, since any unsafe products can quickly be identified and removed from sale, therefore minimising the chance of illnesses. Traceability can also ensure that workers' rights are protected by verifying that products were produced where working conditions meet minimum principles. Unsafe practices during food preparation and processing can also be highlighted and products produced under these conditions can be prevented from entering the supply chain.

**Wealth** – This includes preventing food fraud by confirming the authenticity of products and enabling market access by allowing producers to meet the requirements to sell their products in global or national markets. Traceability can also result in cost savings due to reducing the need for monitoring and checks by individual operators as well as reducing the scale of recalls needed. Being able to efficiently track products and data through the supply chain allows businesses to better understand their inventory needs, meet demands and maximise their sales.

**Environment** – Traceability benefits the environment by providing important information on the amount of fish caught from each area or stock, which allows removals to be monitored and informs scientific advice on the status of stocks. Effective traceability also prevents Illegal, Unreported and Unregulated (IUU) fish products being sold on global markets. Furthermore, traceability recognises good environmental practice and allows consumers to make informed buying choices.

Figure 2: Benefits of traceability to seafood stakeholders (from MMO1329\_1).



## 4. Challenges for the seafood sector

MMO1329\_1 and MMO1265\_1 identified a range of challenges to industry that prevent improved traceability, which includes:

### Reporting

- **Reporting duplication** - fisheries data has to be recorded and submitted through a number of different systems, which may require the submission of duplicated information to more than one regulatory body. For example, many aspects of the information required on a landing declaration is also required on a sales note. This makes it time consuming for industry to report traceability information which can impact data quality.
- **Reporting burden** - fishers have expressed that they find the MMO reporting requirements burdensome, so the addition of new technology and associated new tasks to improve data is likely to be poorly received.
- **Experience with technology** - some fishers have limited expertise in using new digital platforms, and some smaller fishing vessels do not have a computer or printer, so the masters may find it challenging to use the technology required for traceability.
- **No one-size-fits-all solution** - a key issue in improving overall data quality is the varied nature of the fishing industry, so some systems and ways of working are more suited to some operators than others.

### Supply Chain

- **Aggregation of fish from different catches** - landings over a weekend when there is no market taking place may mean that catches from multiple days are combined for the next sale. Therefore, often buyers cannot differentiate between catches landed on different days and traceability may be limited to a group of landing dates. If the correct landing date cannot be identified this restricts the ability to implement end-to-end traceability, as well as limiting the ability to conduct automated data checks due to mismatches between declared datasets (for example the landing date may differ between the landing declaration and sales note). However, it may be challenging for catches to be kept separate due to storage restrictions or time constraints for processing at the market. Additionally, catches of fish from different vessels may be aggregated after the first point of sale, limiting traceability to a group of vessels rather than individual vessels.
- **Catches do not remain in the same boxes throughout the supply chain** - catches are moved into different boxes from capture through to retail sale, for example they may be landed in one box, moved to another during processing/sorting/grading, moved into another when purchased at the market, and then possibly moved again once at that merchant.
- **Timing of weighing of fish vs statutory deadlines** - accurate weights are required for landing declarations, and there are requirements within the regulations in respect of how and when fish/fisheries products should be

weighed. Delays in weighing and/or business practices which do not align with the regulation may mean that vessels do not receive accurate weights for their catches until after their landing declaration submission deadline has passed. In a similar way, deadlines for sales note submission can be missed if the price is not agreed in time due to mis-aligned business practices. Therefore, deadlines for the submission of information to the MMO can be missed where the processes during capture, landing, weighing, sale and export don't mirror the legislative requirements.

- **Data quality in a sequential chain** - the quality of data submitted in logbooks, landing declarations and sales notes may affect the ability to achieve good traceability further down the supply chain. For example, if the information submitted on the catch certificate by the exporter does not match the earlier landing data, this may prevent records from being matched up and therefore end-to-end traceability would not be achieved. It could also potentially prevent the exporter from obtaining a validated catch certificate on the Fisheries Export Service.
- **Trust in the use of data** - stakeholders often have concerns about how their data will be used and that it is secure for commercial sensitivity.

### **Industry-driven improvement**

- **Lack of consumer demand** - some in the fishing industry believe that most consumers buy products based on lower price rather than pay a premium for provenance.
- **Cost of new technologies** - there may be significant costs for industry associated with implementing improved traceability systems, in some cases with no immediate benefit to fishers since retailers and wholesalers often benefit from improved traceability but financial rewards are not necessarily passed on to fishers. Also, in some cases the set-up costs of new technology may be a barrier to small businesses.
- **Lack of drivers** – there is a perceived lack of drivers for industry to implement end-to-end traceability (see [Section 6](#)).

## 5. Technological solutions

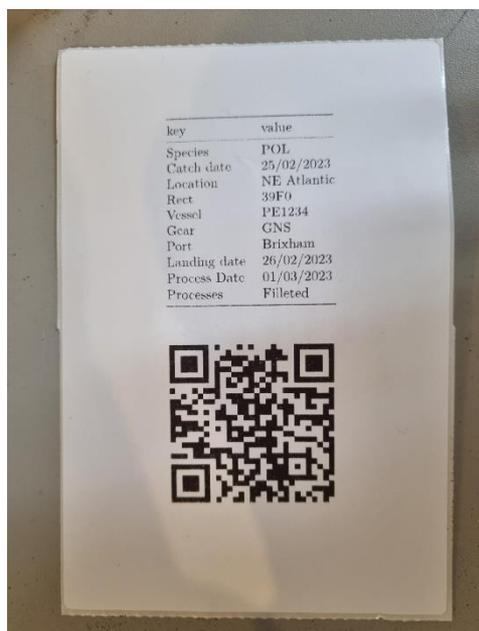
MMO1223 anticipated that there was a technological solution to all the challenges around traceability, however subsequent research (MMO1265\_1) suggested that the issues were more social and business related in nature, indicating that it may be a more complex issue to solve.

MMO1329\_3 looked at technological solutions to allow the linking of seafood in a supply chain with associated data. The objectives were to investigate examples of technology being used to track seafood from catch/landing through the supply chain to wholesalers/consumers and to produce recommendations for application in the UK seafood chain.

### 5.1 QR codes

MMO1329\_3 investigated the use of QR codes and human readable labelling to reduce the reporting burden through digitising and reusing information. A QR-based demonstrator was created which included a waterproof label printer, QR scanning software (e.g. mobile phone) and a web app or mobile app for accessing and appending traceability events to consignments.

**Figure 3: Example of a project generated QR code.**



Waterproof high-definition label printers can be purchased at around £200-£250 and can be operated from a laptop. They allow both a QR code and human readable information to be fixed to a crate for a short duration in relatively harsh environments. QR codes could be printed at 'tag' size (e.g. 35mm x 35mm) so that they could be attached to larger high value items such as lobsters, turbot or seabass.

During testing, QR codes printed on the waterproof label printer could be read by an Android smart phone at distances of 30cm to 40cm and labels remained legible when immersed in water and ice for 24 hours.

A version 4 QR code (33x33 modules) is considered sufficient to hold reference to a Unique Resource Indicator (URI) which provides an internet address and unique page identifier required to access all information held on each fish box in circulation (allowing for a history for circa 12 months).

Most modern smartphones fitted with a camera have the capability to read QR codes. However, for more intensive use or in harsh environments, a dedicated label reader may be more practical. These typically cost around £150-£250. They also have the advantage of rapid processing and can be used for triggering automated processes at the quayside or processing facility in order to associate the code with a process or event such as entry or exit from a freezer or premises. This would allow sales notes, certificates or a processing action to be easily attached to the QR code.

QR codes have been shown to increase efficiency and consumer engagement, as well as potentially improving brand trust and loyalty. According to a consumer research study by Merck (2022), 84% of people are somewhat or very willing to pay 5% extra for transparency when buying food products and 2 in 3 consumers say transparency and traceability are extremely important when shopping for animal protein. Furthermore, 53% of consumers said they want to know where their fish was sourced from. Seafood brands can also collect anonymised consumer engagement data through each scan.

## **5.2 Radio Frequency Identification (RFID)**

In 2020, MMO1223 examined the challenges of seafood traceability and identified technologies that could be applied to resolve them. It was proposed that Radio frequency identification (RFID) tags were a viable option to improve traceability in English fishery supply chains. Therefore, a further project was carried out in 2023 (MMO1265\_2) to expand on this research. In-depth analysis of RFID technology was carried out using one-to-one interviews with a range of stakeholders in the fisheries supply chain in three case study countries – Belgium, Denmark and Sweden. The findings suggested that RFID technology could in theory improve timeliness and accuracy of data and could enable full end-to-end traceability. However, there were found to be implementation and adoption challenges that limited its uptake in practice. Supply chain stakeholders did not see a strong business case for use, so the high cost and their lack of willingness to continue to pay for end-to-end traceability meant that the system is no longer fully in use in Denmark and Belgium - it is only used to track fish crates.

Therefore, RFID technology was investigated in MMO1329\_3 only where the costs were as low as possible to mitigate this issue. Low-cost adhesive passive tags were used (those that do not require a power source). This was due to the acceptable detection range, even when applied to crates or boxes holding high water content, for a low cost.

**Figure 4: Example of a QR code and RFID tag (the tag is on right hand side beside Vessel ID).**



Read and writeable RFID tags and a low cost (under £200) RFID tag reader/writer were obtained for testing. This technology operates in the 960MHz region which provides reasonable coverage at ranges of up to 5 metres and therefore could be a suitable solution for tracing products in a large fish market or fish processing plant.

Tests demonstrated that, in addition to holding the reference to information as described for QR codes above, further data could be written to the tag meaning that provenance could be preserved even when isolated from the web. Multiple reads of several tags (up to 12 or more) could be achieved in less than 1 second. However, these tests are in laboratory conditions and the same performance may not be achievable in a representative environment.

A disadvantage of RFID technology is that it performs less well where large amounts of metallic or aqueous materials are present. Therefore, tests were carried out to assess how significant this would be in a fish market or fish processing environment where ice, trolleys and refrigeration plants would be used extensively.

Tests were set up to measure the range and speed of acquisition of tag information when in the presence of aqueous material. The tests used readily available components which were suitable for use in indoor areas such as market halls.

The tests demonstrated that detection was sensitive to obstruction by conducting material, including people, fish and water. Crates half filled with water could only be read when the tag was in line of sight of the antenna at ranges of up to 4 metres. This was only when the tag was mounted 10mm away from the crate (i.e. an air gap existed between the tag and the crate wall). With no air gap the detection range reduced to 1 metre.

These results indicate that detection sensitivity to water content is a significant concern for this application. Gates would need at least two sensors mounted on either side of the gate and tags would need to be placed on at least two sides of the crate. There would also be limitations in the number of crates or boxes that would be visible on a pallet.

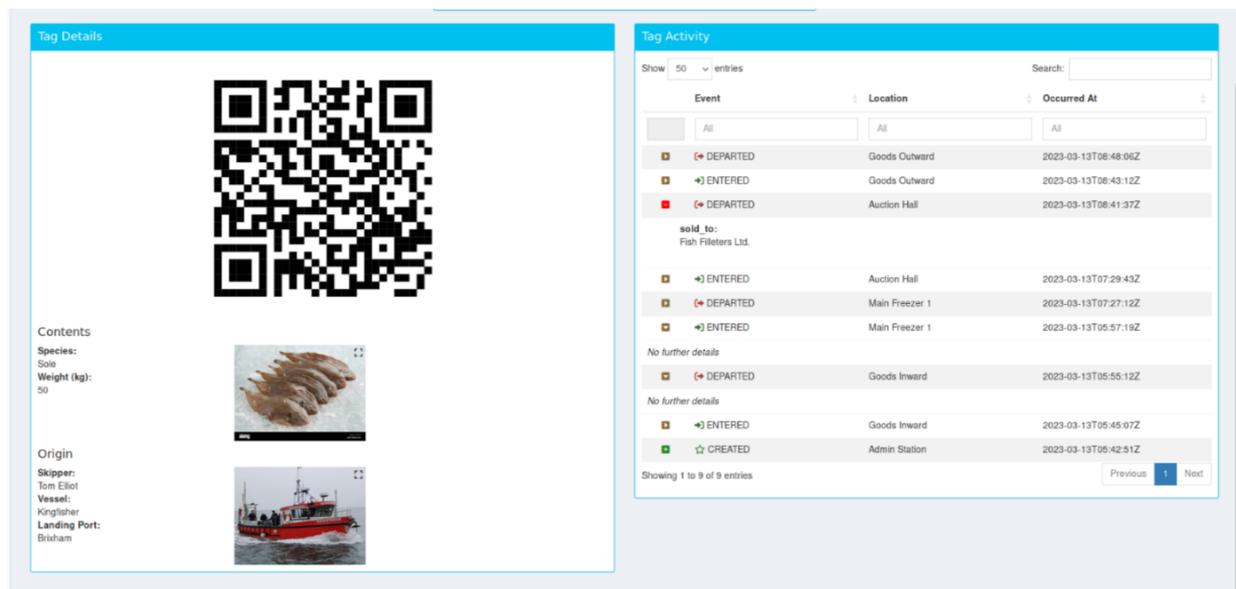
### 5.3 Desktop demonstrator

As part of the project, a desktop demonstrator of processing stages of the supply chain was prototyped to provide integration between labelling technologies, a centralised database and consumer visibility of information.

The scope of the demonstrator included:

- Generation of QR coded tags with the ability to add RFID tags where required for fishers to attach to crates
- Tagging and annotating the catch details of a fish using a GPS/camera enabled smart phone with an internet connection – maintaining traceability through the first point of sale and into the wholesale distribution process
- Tracking the movement and processing of the fish with a smart phone or laptop
- Exploitation of the data linkage for the fisher, consumer and regulator including the automated generation of movement records and export control documentation.

**Figure 5: Example consumer display viewable from reading the QR code on a box or tag on high value fish.**

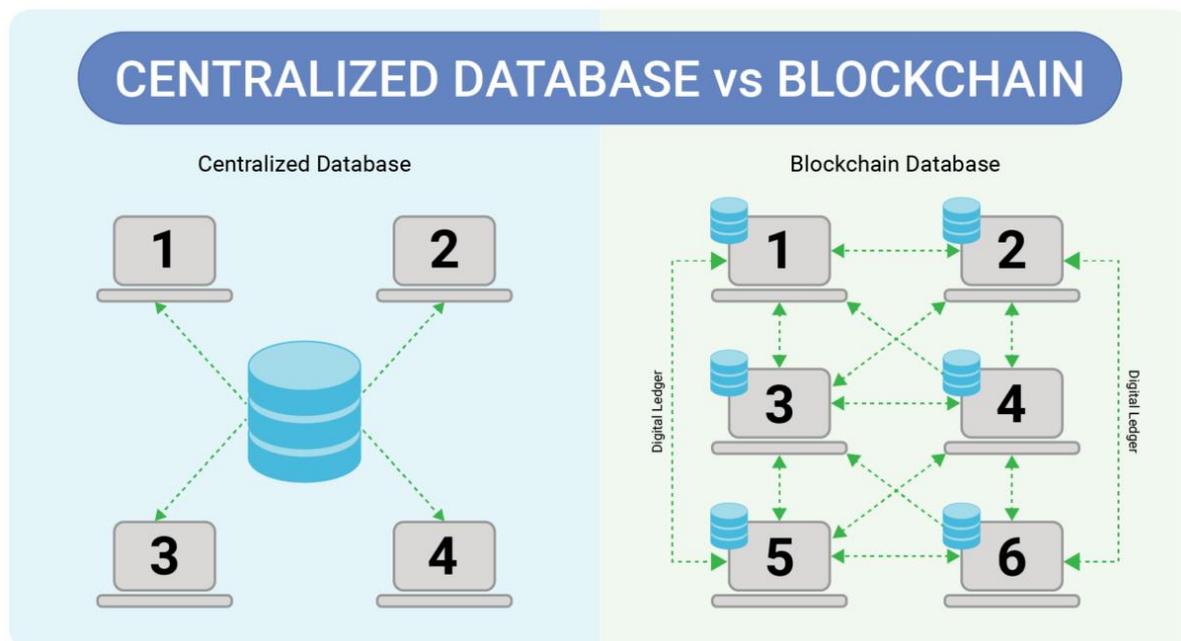


## 5.4 Blockchain

Blockchain is a digital record of transactions that is immutable, so it is permanent and cannot be altered retrospectively. It stores transactions in a decentralised way, which means that the functions, control and information are distributed among the blockchain members instead of centralising them in a single entity (as shown in Figure 6). Each member has a copy of the exact same data, so if a member's data is altered or corrupted in any way it will be rejected by the majority of the blockchain members. These blockchain features make it very difficult to alter or delete a transaction once it has been recorded, because any changes would need to be approved by all computers in the blockchain network of computers (ScyllaDB, 2025).

Blockchain cannot remove the problem of false or incorrect data being entered into the system, but it enables everyone in the system to view the data that people have entered earlier in the supply chain and so allows verification by others and may identify where incorrect data has been entered. Therefore, blockchain increases the trust and transparency of traceability data.

**Figure 6: Diagram showing a centralised database compared to blockchain (decentralised), demonstrating that blockchain is maintained across an entire network of computers rather than being controlled by a single entity. Image taken from ScyllaDB (2025).**



Using blockchain technology reduces the time taken to trace the origin of a product from days to just a few seconds, which could be hugely beneficial in situations such as where unsafe products need to be recalled. This has benefits for the retailers since it would save both time and cost to trace products back through the supply chain.

Therefore, blockchain has the potential for consumers to buy seafood without concerns about the safety, sustainability or authenticity of products since they can be confident of the information claimed.

Blockchain is already widely used for terrestrial food products but is not in such widespread use for seafood (Meera et al., 2023).

## 5.5 Conclusions

MMO1329\_3 researched and tested technologies that offer the greatest promise in delivering end-to-end traceability, including the use of QR code labelling and Radio Frequency Identification (RFID) connected to a secure cloud-based centralised database. The project also developed a prototype end-to-end traceability system to demonstrate how it could be used by industry to track fish and seafood products from catch through to the consumer.

QR codes can facilitate an end-to-end traceability solution where there is ready internet access and they offer a low-entry-cost method of tracking fish through the supply chain.

Despite the problems of detectability in the real-world environment, RFID offers multiple benefits to the seafood supply chain, such as the ability to write data to the tag as well as read data and the ability to read multiple tags simultaneously, which make it worthwhile continuing to investigate the use of RFID for seafood traceability.

Through the development of a desktop prototype, it was concluded that a cloud-based, centralised non-blockchain information architecture was the most cost-effective method of managing the traceability data.

Blockchain is in use in a number of seafood supply chains (see examples in associated report MMO1425b - Enhancing Seafood Traceability: Case Studies, Section 3). There are documented advantages to the technology, but the startup and maintenance cost of blockchain systems may be a barrier to adoption. The approximate cost for implementing a blockchain solution is \$40,000 to \$60,000 for a low complexity project, although costs may be higher for a more complex project, plus ongoing costs for the deployment infrastructure (\$0.01/transaction plus ~\$750 for public blockchain or around \$1500 per month for private blockchain) (Webisoft, 2025).

However, MMO1329\_3 demonstrated that end-to-end traceability can be achieved without the use of blockchain using relatively low-cost technology, which has the potential to enable traceability at a more affordable cost.

## 6. Demand and Drivers for change

There is a wide range of drivers for change towards greater traceability of seafood, of which the main ones are described below:

- **Compliance with [traceability regulations](#)** – better traceability systems could improve industry’s ability to demonstrate compliance with current traceability regulations and avoid enforcement.
- **[EU revised control regulation](#)** - one of the most important drivers is the recent change in the EU fisheries control system. The regulation entered into force in January 2024, although there was a transition period whereby most provisions of the amended regulation apply from 10 January 2026. The revised control regulation aims to modernise the way fishing activities are controlled for both EU vessels and those fishing in EU waters by bringing them in line with technological developments and making EU fishing more sustainable. Importantly, one of the main changes relates to improved traceability of catches by making use of the best available technology. For the first time, full digital traceability along the supply chain is mandatory, which will enable authorities to detect illegal fishing more effectively. It is mandatory for both fresh and frozen fishery and aquaculture products and will gradually be expanded to include processed fishing and aquaculture products too. The revised rules on traceability apply to all fishery and aquaculture products, including imports, which is of great significance to UK producers who want to export products into the EU. This is therefore a very important driver towards improving seafood traceability in the UK, otherwise products being imported to the EU may be delayed or refused.
- In relation to the EU revised control regulation above, new **[EU Illegal, Unreported, and Unregulated fishing \(IUU\) requirements](#)** mean that UK exporters need to provide additional information on catch certificates from 10 January 2026. Additional information requirements include the start date of the fishing trip, category and type of gear used to catch each fishery product, more specific information about the catch area and transport details. Improved traceability systems and processes would make it easier and more streamlined for exporters to provide this information, which is essential for anyone exporting fishery products to the EU.
- **Growing risk of illegal fishing** – Illegal, unreported and unregulated (IUU) fishing damages the entire fishing industry by hampering trade agreements and fair price competition. IUU fishing also has detrimental environmental and social impacts by fishing inside protected areas, fishing without permits or using forced labour. Accurate traceability information is vital for combatting illegal fishing.
- **Risk of seafood fraud** – widespread mislabelling has been found in fish and seafood products (Miller and Mariani, 2010; Naaum et al., 2016; Pardo et al., 2016; Warner et al., 2016; Interpol/Europol 2018; FAO, 2018), which creates issues for pricing, retail, restaurants and consumers. Traceability greatly improves the ability to detect seafood fraud and mislabelling.
- **Sustainability information for stock management** – traceability that extends back to the point of capture or farm of origin rather than just to

processors would provide the data that is needed for governments to manage fishery stocks and reduce the cost of enforcing fishery laws.

- **Expanding market and regulatory requirements** – there is a growing need for product information to meet voluntary standards set by large buyers and regulatory requirements established by governments, such as export and trade rules.
- **Customer attitudes** – consumer demand for sustainable seafood products is increasing, which requires traceability to verify sustainability claims. With the aquaculture industry growing and taking a more prominent role around the world, consumers want assurance of where their seafood comes from. News of problems with fish diseases in fish farms and the conditions in which fish are kept in farms are becoming more publicly known, so consumers are also demanding more information on the welfare conditions of farmed fish.
- **Marketing** – traceability can add value to products by giving consumers an origin story. They may identify more with the human element of seafood such as reading the biography of the fisher who harvested it, which may increase the sales potential.
- **Food safety** – when not properly handled or from tainted waters, seafood can cause many foodborne illnesses, so traceability is required to provide food safety information and ensure that seafood products are safe for consumers.
- **Human rights** – illegal fishing can be linked to human rights issues, such as unsafe working conditions, little or no pay for fishermen and trafficking of fishers and children. Comprehensive traceability information allows the countries of harvest and processing for seafood products to be identified and therefore find out which are at high risk for trafficking or forced labour.
- **The need for more efficient operations management** – fishing and aquaculture processes often use highly manual processes to record data. If traceability technologies are integrated this can automate these manual processes, providing improved efficiencies and better access to information.

## 7. Opportunities for MMO facilitation

There are several opportunities for the MMO to facilitate the fishing sector to increase seafood traceability throughout the supply chain. For example, by giving demonstrations of technological solutions to traceability and communicating the benefits of traceability. There are funding schemes that may fund projects aiming to improve supply chain traceability and help the fishing sector introduce greater tracking of fish and data throughout the supply chain. The Fishing and Coastal Growth Fund will be open for applications in 2026 and is discussed in more detail below.

### 7.1 Funding schemes

#### 7.1.1 Fishing and Coastal Growth Fund

The Fishing and Coastal Growth Fund was announced by the UK Government in May 2025 (Defra, 2025) and will invest £360 million into the fishing industry over 12 years. The fund aims to drive growth and boost the sector for the future.

The Fund will invest in new technology and equipment to modernise Britain's fishing fleet, deliver new training and skills to back the next generation of fishers and promote the seafood sector to export our high-quality produce across the world. The priorities are still being developed with feedback from stakeholder engagement, but in year 1 of the Fund priorities include strengthening trade and market access, for which traceability is important, and infrastructure development that supports long term industry productivity and sustainability. Traceability initiatives could therefore be included within the Fund's priorities and could also possibly be included within the remit of priorities still in development for future years.

The Fishing and Coastal Growth Fund will start from the financial year 2026 to 2027, delivered by the Marine Management Organisation in England through the existing Fisheries and Seafood Scheme (FaSS). From year 2 of the Fund, the budget in England will not be limited to delivery through the FaSS.

More information and guidance about the Fishing and Coastal Growth Fund can be found at [Fishing and Coastal Growth Fund - GOV.UK](#).

### 7.2 Technical demonstrations

Following the technology demonstration developed as part of project MMO1329\_3 in Brixham which was well received, the MMO could deliver further sessions to demonstrate to industry how technology systems can be used to improve traceability in their businesses. The MMO could also organise sessions delivered by other businesses who have already implemented traceability solutions to show what they have done.

## **7.3 MMO Traceability systems**

The MMO are looking to investigate the possibility of allowing fishers to access insights from their previously submitted data to answer questions such as what is their remaining allowance for different species in that month, what are the annual total amounts caught per species and which areas or days have the highest catch amounts per year. This would therefore offer benefits of user insights, improved efficiencies and market access.

The MMO is also looking to investigate the use of automated data collection on vessels, which would make it easier for fishers to comply and would encourage timely and complete submission of catch data. The project would investigate technology that exists that could automate catch data collection and then conduct a trial of the recommended technology in a real supply chain.

Another area that the MMO is looking to investigate is the use of automation to reduce duplication in traceability documentation, which would lessen the reporting burden on the fishing industry and therefore encourage the timely and complete submission of traceability data. A reduction in reporting burden may also benefit fishers, merchants and other stakeholders by allowing increased productivity and efficiency in their businesses. However, some duplication is intentional and is used by the MMO, for example, for independent verification of information.

## **7.4 Stakeholder Engagement**

The MMO is keen to engage with stakeholders to hear about the practical limitations and challenges of implementing technological traceability systems in real business scenarios. This would mean that modifications and solutions could be developed so that systems could better address the needs of the fishing and seafood industry.

## **7.5 Articulating the value of traceability**

The MMO is looking to further articulate why traceability information is both important and beneficial to all parties in the supply chain. This information is already part of the training for new MMO marine officers and there is great potential to further communicate these materials.

Further research into the financial benefits of traceability and public interest would help further evidence the benefits of the sector embracing improved traceability for their products.

## 8. Conclusions

Full traceability is now a requirement for seafood products in the EU, as per [Section 6](#) on drivers, which has major implications for England's seafood industry who export products to the EU. Therefore, the MMO is making the case for increasing the flow of digital information in seafood supply chains above and beyond the current 'one up – one down' standard, which would improve data quality for regulatory purposes.

Many benefits of traceability to industry have been identified, such as preventing food fraud, increased market access, assisting the sustainable management of fisheries and enabling quick identification of unsafe products.

However, there are also many challenges facing the industry and the MMO in improving seafood traceability. The cost and additional burden of using new technologies as well as complications around aggregation of fish after first sale and concerns over data security are all challenges that need to be overcome before full traceability can be achieved in England.

Although there are few examples of full end-to-end traceability implemented in English supply chains, significant progress towards this has been made in a range of cases, which demonstrates that it is possible to implement improved traceability in seafood supply chains. The case studies described in the associated report provide many useful lessons for future implementation of technological solutions for traceability in the English seafood industry.

Full-chain traceability has the potential to unlock huge opportunities for the seafood industry in England in the coming years. Although there are challenges to be faced in achieving this, the MMO's goal is to support the fishing sector in taking this positive step towards becoming increasingly viable and resilient in the future.

## 9. References

Defra (2025). Press release: Government to launch £360m Fishing and Coastal Growth Fund. Available online at <https://www.gov.uk/government/news/government-to-launch-360m-fishing-and-coastal-growth-fund>, accessed on 10 September 2025.

European Commission (2024). The EU fisheries control system gets a major revamp. Available online at [https://oceans-and-fisheries.ec.europa.eu/news/eu-fisheries-control-system-gets-major-revamp-2024-01-09\\_en](https://oceans-and-fisheries.ec.europa.eu/news/eu-fisheries-control-system-gets-major-revamp-2024-01-09_en), accessed on 10 September 2025.

FAO (2018). Overview of food fraud in the fisheries sector, by Alan Reilly. Fisheries and Aquaculture Circular No. 1165. Rome, Italy. Available online at [www.fao.org/3/i8791en/l8791EN.pdf](http://www.fao.org/3/i8791en/l8791EN.pdf).

FAO (2025). Food safety and quality: Traceability & Recalls. Available online at <https://www.fao.org/food-safety/food-control-systems/supply-chains-and-consumers/traceability-and-recalls/en/>, accessed on 10 September 2025.

Hopkins, C.R., Roberts, S.I., Caveen, A.J., Graham, C. and Burns, N.M. (2024). Improved traceability in seafood supply chains is achievable by minimising vulnerable nodes in processing and distribution networks. *Marine Policy*, 159: 105910. Available online at <https://doi.org/10.1016/j.marpol.2023.105910>.

INTERPOL/EUROPOL (2018). Operation OPSON VII - Analysis Report. Targeting counterfeit and substandard foodstuff and beverage. Available online at <https://www.europol.europa.eu/publications-events/publications/operation-opson-vii-analysis-report>.

Meera, M.S., Deepankar, C., Raju, T.B. and Haldiya, J. (2023). Barriers towards blockchain adoption in seafood exports. *Sustainable Operations and Computers*, 4: 192-199. Available online at <https://doi.org/10.1016/j.susoc.2023.12.001>.

Merck Animal Health, Research on file, 2022: Transparency in Animal Protein. A Quantitative Consumer Research Report.

Miller, D. D. and Mariani, S. (2010). Smoke, mirrors, and mislabeled cod: poor transparency in the European seafood industry. *Frontiers in Ecology and the Environment*, 8: 517-521.

MMO (2025a). Enhancing Seafood Traceability: Case Studies. MMO Project No: MMO1425b, September 2025, 23pp

MMO (2025b). Guidance: Traceability and labelling information for fisheries products. Available online at: <https://www.gov.uk/government/publications/how-to-trace-weigh-and-distribute-fish-products/traceability-and-labelling-information>, accessed on 29 September 2025.

MMO (2025c). Guidance: EU IUU Regulation 2026 Changes. Available online at <https://www.gov.uk/guidance/eu-iuu-regulation-2026-changes>, accessed on 10 September 2025.

MMO (2025d). Guidance: Fisheries and Seafood scheme. Available online at <https://www.gov.uk/guidance/fisheries-and-seafood-scheme>, accessed on 10 September 2025.

MMO (in press). MMO Traceability, Parts 1, 2 and 3. Reports produced for the Marine Management Organisation, MMO Project No: 1223, June 2020.

MMO (in press). Supply chain community-led identification of traceability solutions. A report produced for the Marine Management Organisation, MMO Project No: 1265\_1, February 2023, 23pp excluding annexes.

MMO (in press). Radio frequency identification (RFID) tag traceability system - Feasibility study. A report produced for the Marine Management Organisation, MMO Project No: MMO1265\_2, February 2023, 60pp.

MMO (in press). Seafood Traceability: Benefits and Challenges. A report produced for the Marine Management Organisation, MMO Project No: 1329\_1, April 2023, 43pp.

MMO (in press). Traceability in the UK Seafood chain. A report produced for the Marine Management Organisation, MMO Project No: MMO1329\_2, March 2023, 109pp.

MMO (in press). Seafood Traceability: Linking seafood to data. A report produced for the Marine Management Organisation, MMO Project No: 1329\_3, April 2023, 36pp.

Naaum, A. M., Warner, K., Mariani, S., Hanner, R. H. and Carolin, C. D. (2016). Seafood Mislabeling Incidence and Impacts. In: Seafood Authenticity and Traceability: A DNA-based Perspective. Academic Press.

Pardo, M. Á., Jiménez, E. and Pérez-Villarreal, B. (2016). Misdescription incidents in seafood sector. Food Control, 62: 277-283.

ScyllaDB (2025). Blockchain Database Definition. Available online at <https://www.scylladb.com/glossary/blockchain-database/>, accessed on 11 September 2025.

Warner, K., Mustain, P., Lowell, B., Geren, S. and Talmage, S. (2016). Deceptive dishes: Seafood swaps found worldwide. Oceana. Available online at <https://usa.oceana.org/publications/reports/deceptive-dishes-seafood-swaps-found-worldwide>.

Webisoft (2025). Blockchain Cost: Key Factors & Budgeting for Development. Available online at <https://webisoft.com/articles/blockchain-cost/>, accessed on 10 September 2025.