![Marine Management Organisation logo]

Enhancing Seafood Traceability: Case Studies

MMO1425b

MMO1425b: Enhancing Seafood Traceability: Case Studies, February 2026

Report prepared by:
Marine Management Organisation

Marine Management Organisation

Project funded by:
Marine Management Organisation

Marine Management Organisation

Information about this publication and further copies are available from:

Marine Management Organisation
Tyneside House
Skinnerburn Rd
Newcastle upon Tyne
NE4 7AR

Tel: 0300 123 1032
Email: info@marinemanagement.org.uk
Website: www.gov.uk/mmo

Disclaimer:
This report contributes to the Marine Management Organisation (MMO) evidence base which is a resource developed through a large range of research activity and methods carried out by both MMO and external experts. The opinions expressed in this report do not necessarily reflect the views of MMO nor are they intended to indicate how MMO will act on a given set of facts or signify any preference for one research activity or method over another. MMO is not liable for the accuracy or completeness of the information contained nor is it responsible for any use of the content.

When referencing this publication, please cite as:
MMO (2026). Enhancing Seafood Traceability: Case Studies. MMO Project No: MMO1425b, February 2026, 23pp

Contents

Figures

1. Introduction

The objective of this report is to describe cases study examples (ideally English or wider UK) of seafood supply chains where information is above and beyond one-step-up and one-step-down, i.e. towards net-to-plate traceability.

This report is published alongside an associated report (MMO1425a - Enhancing Seafood Traceability: Solutions and Industry Challenges) that aims to review the evidence collected in MMO's traceability 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.

2. Seafood supply chain case studies

This section contains descriptions of eight real world examples of supply chains that have made efforts to improve end-to-end traceability and digitisation. There appears to be limited use of enhanced traceability systems in England, since very few examples could be found. The associated report MMO1425a (Section 4) describes the many challenges to implementing traceability in the seafood industry, which may explain the limited use. Therefore, the case studies in this report are global. Each has been described along with some details around the chosen methodology for traceability and points to consider in the English context.

2.1 The Global Dialogue on Seafood Traceability (GDST)

2.1.1 Background

The GDST is a non-profit foundation, managing the very first global seafood industry standard for digital interoperable traceability. The GDST was specifically developed to support wild caught and aquaculture seafood supply chains, and was based on the GS1 Traceability Standard that has been supporting international business in a range of different industries for the last 50 years.

The GDST's 'Core Normative Standard' was first published in 2020 and was developed in partnership with more than 60 seafood companies and associations from across the global seafood supply chain as well as civil stakeholders. The Standard has been adopted by multiple global seafood companies and industry groups, and has been endorsed by other stakeholders in sustainable seafood including the FAO.

The main goals of GDST are:

- To enable interoperability between software systems across the seafood supply chain, enabling full chain traceability.
- To communicate standardised data from each stage of the supply chain, including information on sustainable, ethical, safe and responsible processes, which in turn supports regulatory compliance, internal sourcing requirements and data requests from governments, NGOs and actors in the supply chain.
- To improve visibility of information, that in turn builds trust in fishery and aquaculture supply chains.

2.1.2 Methodology
The GDST Standard consists of two main parts:

1. Key Data Elements (KDEs) – the minimum data that need to be captured at each stage in the supply chain and transmitted within GDST-capable seafood supply chains.

2. A common language – supports interoperability between software systems and enables data to be shared digitally. Sets out standards governing the technical formats and terms to use for sharing data among interoperable traceability systems.

The standard consists of internationally agreed key data elements (KDEs) to be routinely associated with seafood products. At each stage in the supply chain there are different KDEs. For example, at the point of capture KDEs include the vessel name, catch area, gear type, date of capture etc, and at landing KDEs include landing location, landing date and species among others.

These standards are voluntary and industry led. The evolution of the Standard continues to be industry led through GDST Dialogue sessions that run throughout the year. GDST Partners have the opportunity to support new KDEs relating to ethical, safe, sustainable or responsible seafood processes through submitting an expansion framework. These are then presented at the Dialogues for industry feedback, prior to technical review by the GDST Technical Council.

2.1.3 Key Points

Digital interoperability successfully supports business-to-business operations in many different industries. The GDST provides a standard for digital interoperable traceability for the seafood industry, and overcomes inconsistent demands for data from different stakeholders. It also has the potential to greatly improve the trust in data from fishery supply chains, by supporting greater visibility of sustainable, ethical, safe and responsible processes within seafood supply chains. Furthermore, it could help improve data quality for regulatory purposes. Several organisations in England have signed up to be a partner of GDST including MarinTrust, OceanMind, Sainsburys and Sea Farms, and Thistle Seafoods in Scotland have also joined.

Businesses can align their data collection to GDST standards at no cost and there are potential cost savings to be made from improved efficiencies from using a system that adheres to GDST standards. However, there may be an initial cost associated with purchasing a GDST capable system or in getting their internal software system to become GDST capable.

2.2 MSC certification

2.2.1 Background

There are a wide range of sustainability certification programmes and rating schemes, including some that operate in the UK such as the Marine Stewardship Council (MSC - whose global headquarters are in London) and The Marine Conservation Society's Good Fish Guide. Others that operate outside of the UK include Monterey Bay Seafood Watch and Friend of the Sea. Some of these schemes provide assurances that the fish are sourced from stocks that are sustainably managed, and others give guidance on which species, stocks and catch methods should be considered sustainable or not. This provides consumers with a variety of tools they can use to help buy fish and seafood products responsibly.

The [Global Sustainable Seafood Initiative (GSSI)](#) is an independent benchmark for the credibility of sustainable seafood certification programmes, and the MSC is included as one of the programmes that has been recognised under this scheme.

2.2.2 Methodology

The MSC provides a global wild-caught fisheries certification programme that meets both the best practice requirements set out by the [UN's Food and Agriculture Organisation](#) and [ISEAL](#), the verification body for sustainable standards.

The MSC's certification is based on the [MSC Fisheries Standard](#), which is used to assess if a fishery is well managed and sustainable.

Fisheries are scored against three key principles of the MSC Fisheries Standard:

- Sustainability of the stock – fisheries must operate in a way that allows fishing to continue indefinitely without overexploiting the resource.
- Ecosystem impacts – fisheries must be managed to maintain the structure, productivity, function and diversity of the ecosystem upon which the fishery depends, including other species and habitats.
- Effective management – fisheries need to meet all local, national and international laws, and have an effective management system in place.

Fisheries are assessed by accredited independent certifiers. There are 25 performance indicators that fall under the three principles of the MSC Fisheries Standard (version 3). The fishery is scored against each of these indicators. To become certified the fishery must score at least 60 for each of the 25 performance indicators as well as scoring an average of 80 across all performance indicators under each principle. If the fishery scores between 60 and 79 for any performance indicator, it will be required to take appropriate action as a condition of certification so that it scores 80 or above. Usually, the timeframe stipulated to make these improvements is five years or less, with progress on these improvements audited annually.

Fish and seafood products are often transported through highly complex supply chains from point of catch to the final consumer. At each point in the supply chain there is a risk of products being mislabelled or MSC certified and non-certified products being mixed up. Supply chain businesses are assessed for MSC certification based on the [Chain of Custody Standard](#), which ensures an unbroken chain where certified products are easily identifiable, kept separate from non-certified products and can be traced back to a certified business. For products to have the blue MSC label, every company in the supply chain must have a valid Chain of Custody certificate. This gives consumers confidence that seafood products with the MSC label have come from a fishery certified as sustainable.

To become certified, businesses are assessed against five principles:

- Certified supply – businesses must ensure that certified products are purchased from a certified supplier.
- Identifiable – certified products must be clearly identifiable.

- Separation – certified products must be kept separate from non-certified products.
- Traceable and recorded – certified products must be traceable, and volumes must be recorded.
- Good management – a management system must be in place that addresses all requirements of the Standard.

Globally, over 47,000 supply chain sites are certified to handle MSC certified products and over 20,000 products are sold with the blue MSC label indicating that they are certified as sustainable. Certified businesses are audited every year to ensure they continue to meet the requirements of the Chain of Custody Standard. The integrity of MSC labelled products is also verified through testing samples to ensure they are labelled as the correct species and through investigations to trace products back through the supply chain.

2.2.3 Key Points

Sustainably certified products are readily available MSC-labelled products accounted for almost 60% (by volume) of all wild-caught fish and seafood sold in UK retail in 2024 (MSC, 2024), so. Almost all retailers are now committed to sourcing their seafood from certified sustainable sources, which demonstrates the success of the scheme. This has greatly improved consumers' ability to choose sustainably caught seafood and allows them to be confident that what they are purchasing is correctly labelled and from a certified source.

Furthermore, around 25% of the UK's national landings come from MSC certified fisheries (MSC, 2023), most of which are exported. Fisheries in England that are MSC certified include Cornish hake, Wash brown shrimp and Poole Harbour clam and cockle (MSC, 2025d)

MSC certified products can be traced back to a certified source, although not necessarily to an individual vessel. And MSC only certifies for environmental and ecological performance, the certification is not food safety assured.

2.3 Forensic origin tracing - Loch Duart

2.3.1 Background

Loch Duart is a premium farmed salmon brand based in Sutherland and the Hebrides. Loch Duart prides itself on high standards of fish welfare and low impact farming on small scale farms. Salmon from Loch Duart is selected by top chefs and high-end restaurants, so there is a risk that other salmon could be passed off as Loch Duart's by fraudulent suppliers.

In 2018, Loch Duart introduced a scheme in partnership with Oritain, a forensic and data science company, to trace the individual farm of origin for its salmon using scientific forensic techniques in order to protect its brand and expose food fraud. By creating a 'digital fingerprint' of their salmon, Loch Duart are able to test and verify the provenance of their salmon and provide customers with assurance that what they are buying is indeed Loch Duart salmon. However, the partnership with Oritain ended in 2023 and a different supplier is now used for this provenance verification.

2.3.2 Methodology

The traceability approach by Oritain measured stable isotopes and trace elements that occur naturally in the salmon since they are absorbed from the surrounding water at the farm where they are reared (Oritain, 2017). Therefore, salmon from each farm have a unique fingerprint that can be used to verify the origin of the fish. Using this traceability technique, Loch Duart could determine exactly where salmon originated from at any stage in the supply chain down to the individual farm. This prevents customers being misled and allows them to have confidence that they are purchasing authentic Loch Duart salmon when they ask for it by name. Loch Duart were the first fish farmer in the northern hemisphere to use this traceability technology.

Once the fingerprints for authentic Loch Duart salmon have been identified, samples were taken from different points in the supply chain and Oritain verified each of these samples against the claimed origin. These results could then be fed back to Loch Duart.

Loch Duart believed that their traceability approach was a very effective deterrent for food fraud in the UK. Therefore, they also extended this traceability scheme to North America and France where they could verify the farm of origin for salmon in these additional supply chains.

2.3.3 Key Points

Biochemical techniques, such as stable isotope and trace element analysis, have the potential to verify the origin of fish products (Gopi et al., 2019) and can add an additional layer of authenticity to give producers and consumers confidence that products are genuine. However, this relies on a reference database being created that contains data from all possible origin locations in order to compare the test samples to and determine the most likely origin (Cusa et al., 2022).

Oritain's method for Loch Duart is reactive upon request rather than using a QR code or similar where the vessel or catch details are readily available when scanned. Therefore, Loch Duart must make a request to obtain the traceability information for samples of interest, and customers cannot view this information. It would be very time consuming to test all samples for stable isotope and trace element composition, so it would be unrealistic for commercial settings to have this information for every item sold.

2.4 Data digitalisation – Fisheries Innovation & Sustainability

2.4.1 Background

Fisheries Innovation & Sustainability (FIS) conducted a pilot project in collaboration with Seafood Scotland and seafood traceability experts Verifact (Fleming, 2023). The aim was to understand whether a coordinated digitalised approach could be employed in seafood supply chains and to demonstrate that digital sharing between seafood businesses can provide benefits to the industry. Digitalisation in seafood supply chains refers to information that is captured once on a digital platform and

then shared with selected stakeholders and used many times by different users such as management, markets, certification bodies and scientists. The aim was to improve the efficiency, value and sustainability of supply chains, as well as enhance the competitive position of products. However, the large volumes of different data types from a range of sources all in different formats presented a challenge.

2.4.2 Methodology

The pilot project aimed to provide practical examples of digitalisation solutions, where existing technology could be employed to automate data transfer along the supply chain. Two species were used for the pilot – langoustine (*Nephrops norvegicus*) and haddock (*Melanogrammus aeglefinus*).

Two virtual machines were set up, which provided a test environment. The machines were configured to use cloud-based services which means that the system can be scaled up easily for future projects that may be developed. Verifact created a database that contains all the fields required to meet GDST standards and an online portal was developed that allows processors to upload data onto this database – the Processor Portal. Data were obtained from four seafood processing companies, which allowed the project to draw conclusions about current data gaps. Verifact also created a Vessel Details Database to capture vessel details such as sustainability and labour practices. This provided a benefit to those later in the supply chain by providing a tool to record information that retailers were looking for. User agreements were developed for obtaining data for the Vessel Details Database and Processor Portal. The project also provided the code to develop the portals, so it can easily be implemented for a similar project.

This pilot project developed a platform to deliver future digitalisation projects, which would make them more achievable and cost effective. The project found that basic data such as vessel name was not being passed on from fishers and primary producers to the next step in the supply chain, likely due to not being made aware of the importance of this type of data. Therefore, accurate vessel data are not easily accessible further along the supply chain in many cases. It proved difficult to obtain data from companies unless there was a clear benefit to them. However, large amounts of data were found to already be captured (e.g. through regulatory reporting), so it would be beneficial to investigate which information parties would want to be shared. The case studies used in the pilot demonstrated that processors often hold the majority of data required to meet the GDST standard, but they require resources to collate the information to allow it to be shared with others in the supply chain. At the time of the study, it was felt that the GDST standard was not a strong enough market driver in the UK, and furthermore there was at that time a low awareness of GDST within the fishing industry.

The project faced challenges around data sharing in a fairly advanced stage of the work, when significant costs had already been sustained. This has relevance as lessons learned for future similar projects.

As part of this project a toolkit was developed with tools to support future projects, such as draft policies on data sharing and a data questionnaire to be completed before a digitalisation project. These can be found in the report annexes.

2.4.3 Key Points

The report included the following recommendations:

- There should be clear communication of the type of data required at the retail level so that this is understood at all stages of the supply chain.
- Vessel details such as the participation in sustainability projects and labour policies should be recorded in the Vessel Details Database that was developed as part of the current project. This database should also be extended to allow vessel details to be recorded per trip.
- The use and sharing of data that is already collected should be investigated to address data deficits.
- To encourage participation, consideration should be given to how traceability projects can benefit companies individually as well as just the whole sector.
- When processors are changing or reviewing their current systems, they should be encouraged to consider how these could be improved to meet standards such as GDST.
- As part of this project, a digitalisation platform was developed, and this infrastructure should be maintained.
- Prior to undertaking similar projects, companies should carry out smaller projects as a trial to determine what data should be shared, why and with whom, since it is more costly to do this when a full project is already underway.

2.5 Local seafood traceability – Lyme Bay CIC

2.5.1 Background

The [Lyme Bay Fisherman's Community Interest Company](#) (CIC) is a not-for-profit organisation formed of a group of fishermen from four ports in the Lyme Bay area – Axmouth, Beer, Lyme Regis and West Bay. It was set up at the beginning of 2022 to help support the coastal communities and fishing industry across Lyme Bay. The CIC consists of 50 small-scale fishermen, including scallop divers, potters, trawlermen, anglers and netters.

2.5.2 Methodology

Local retailers want to buy fillets/processed products so are not willing to buy directly from fishers at local ports. Therefore, fish are transported to Brixham market and then after filleting, retailers in the Lyme Bay area buy the fish which they know were landed at ports in the area. The Lyme Bay CIC have plans to teach chefs to process fish, to register local restaurants to buy directly from fishers and to increase the marketing of using local catches.

The [Seafood Trail](#) was initiated by the Lyme Bay CIC to promote local fish products and is a commitment by local retailers and restaurants to buy locally caught fish. The businesses that have made this commitment are shown on the 'Where to eat' page on the CIC website so that customers can look up where to buy fish if they want to buy local.

2.5.3 Key Points

Where fish can be processed closer to the area where the fish were landed this saves cost, time and food miles. This case study demonstrates that logistical barriers may exist to selling locally and shows the importance of traceability systems to verify to consumers that fish and seafood was caught locally to the area it is sold, even when the supply chain appears to be short.

The lesson for wider England that can be taken from this is that investment in processing facilities close to ports where fish are landed would be beneficial to producers as well as consumers and the environment. Traceability systems in English seafood supply chains would help to reveal where inefficiencies lie within the supply chain and could also be beneficial for marketing of products since consumers would have more confidence that they are caught locally.

2.6 End-to-end traceability trial – Fijian Tuna

2.6.1 Background

The Worldwide Fund for Nature (WWF) completed a traceability project trialling blockchain technology in Fiji tuna fisheries in 2018 (Cook, 2018). Blockchain is a record of transactions that cannot be altered and increases the trust and transparency of traceability data (see associated report MMO1425a - Enhancing Seafood Traceability: Solutions and Industry Challenges, Section 5.4).

The project goal was to create a fully traceable and transparent supply chain for tuna using blockchain. WWF partnered with Viant (a technology company) for the blockchain technology, TraSeable Solutions (a Fijian ICT provider specialising in blockchain), and Sea Quest Fiji Ltd (a longline tuna fishing company operating out of Fiji). Sea Quest is a small fishing company that has six vessels, which provide tuna to a vertically integrated processing facility (where the processors also own the vessels that bring in the catch) and then sell fresh and frozen tuna products to well-defined high value markets. They produce high quality products with high ethical standards and are certified as sustainable through the MSC.

2.6.2 Methodology

During the trial, RFID tags and sensors were used to automatically capture data. Reusable RFID tags were attached to each piece of tuna and sensors were positioned onboard vessels and at processing facilities to automatically register the tag as it passes through. Subsequently, QR codes and NFC (Near Field Communication) tags were also tested as alternatives to the RFID tags for the same purpose.

The data from the tagged fish were transmitted via the internet to be recorded on the blockchain. Since the Fijian vessels did not have internet access, the crew used their own mobile devices to access the internet when they were in range of signal from nearby islands. The TraSeable app records the data on a mobile device when the tuna is tagged, and when internet reception becomes available it automatically transmits the recorded data for recording on the blockchain.

The tag stays with the fish through processing until the point of packaging, when it is usually replaced with a unique QR code. The products are then transported to the markets and retail outlets and to the final consumer, where users can trace the tuna back through the supply chain using either the TraSeable or Viant apps. The project successfully demonstrated this technology in the Fijian domestic market by tracing a fish from catch off the coast of Fiji through the supply chain to a retail market in Tamavua subdivision of Suva. An example of the traceability information that is accessible to consumers and supply chain actors can be found on the TraSeable website (FJ00001 - TraSeable Solutions), and a screenshot of part of the information is presented in Figure 1.

This project led to the formation of OpenSC, a joint venture between BCG Digital Ventures and WWF to establish a blockchain supply chain solution for fish and seafood.

Figure 1: Traceability information available to consumers and supply chain actors on the TraSeable website as part of the trial on blockchain technology in Fiji tuna fisheries (only part of the information is shown here – see TraSeable Solutions (2025) for full traceability information).

2.6.3 Key Points

The report included the following recommendations:
- The longline tuna fishery in Fiji is heavily reliant on paper-based documentation, but for successful traceability these processes would need digitalisation along the supply chain and a certain level of interoperability between systems.
- The project experienced problems with implementing RFID technology because no industry existed in Fiji to supply or install the RFID tags and sensors, meaning that they had to be brought in from Australia and a local

company with limited experience in the technology had to be used for implementation.

- It was challenging to map the supply chain since some fishing companies did not know where their products went beyond their international buyers.
- All supply chain actors must be in agreement about their involvement in traceability processes for full end-to-end traceability to be successful. Incentives may be needed to encourage participation.
- Feasibility of the technology may be limited by transaction times. The blockchain used in this project (Ethereum) is limited to a certain number of transactions per second, which at the time of the project may have limited the use of the system on a large scale. However, technology has rapidly improved so internet bandwidth and data access are no longer likely to be a limitation.
- The costs of implementing a traceability system may be a barrier to adoption by some companies. The basic material costs of implementation for the system used in this pilot project are estimated to be just below $12,000, but the additional costs for labour and existing digital infrastructure to support mean that the total cost was significantly more. Furthermore, the costs for future more complex systems are likely to be even higher.

This WWF-led pilot project demonstrated that blockchain technology can be successfully used to provide full end-to-end traceability in a seafood supply chain. The project found that RFID is not essential for implementing blockchain traceability, since QR codes can offer a similar level of data capture automation. However, the best technology to use in some cases is contextual, for example QR codes were impractical for whole tuna stored on ice or frozen where a more durable tag was required, whereas for a packaged product it makes economic and practical sense to use a QR code.

The pilot demonstrated a number of benefits to a range of supply chain actors. One of the main advantages of the system was the improved efficiency at all points along the supply chain due to the automated data capture, which would be expected to encourage participation. Sea Quest benefitted from blockchain since they could better identify the end markets for their products and so could make better business decisions. With the transparency provided by blockchain, buyers could be certain they are purchasing a premium product with high ethical and sustainability standards when sourcing products from Sea Quest. Fishers found an additional benefit of the technology, since it helped to address the issue of theft of catch onboard their vessels. It also allowed much more detailed knowledge of the fishing activity, which was beneficial to fishing companies when analysing their fishing effort.

However, scaling blockchain solutions proved difficult, not because blockchain is not technically feasible or economically viable, but due to political and philosophical resistance to transparency in some parts of the supply chain.

All of the above points have relevance to the English seafood industry. For example, the trial showed that there were difficulties in achieving traceability where some records were still on paper. In English supply chains a significant proportion of regulatory requirements are still submitted on paper by some fishers and merchants, such as vessels between 10 and 12 metres who still submit records in paper logbooks and some landing declarations and sales notes are also submitted on

paper. This demonstrates that digitalisation of records in England is crucial for improving traceability. Another lesson for England is that all members of a supply chain must be in agreement about their involvement for traceability to be successful, so consideration will have to be given to ways of encouraging participation. The difficulties faced with resistance to transparency are likely to also be very relevant to English supply chains, so consideration will be needed on what traceability data can be made transparent and what should only be accessible to certain parties such as regulators.

2.7 Use of Blockchain – Norwegian Salmon

2.7.1 Background

In Norway, the Norwegian Seafood Association and International Business Machines Corporation (IBM) have collaborated on a project that has introduced blockchain to provide transparent and traceable farmed salmon (IBM, 2020). Since the initiative began in 2020, ten fish farms have signed up. Partners in the project include fish crate manufacturers, logistics companies, processing plants, boat operators and a global manufacturer of marine feed. Blockchain records can show a wide range of information about the life of the salmon at the farm, such as oxygen levels and water temperature as well as the size and number of fish.

2.7.2 Methodology

One of the fish farms to have joined the initiative is Kvarøy Arctic, a family run business that has a focus on producing sustainable salmon with a low environmental footprint. The farm is using blockchain to improve transparency and traceability, and to make all the data collected along the supply chain available to consumers. Kvarøy's system uses QR codes that are printed onto its packaging, which can be scanned to give information on where the breed is from, ingredients in the feed, temperature and other variables, which are recorded all the way through the supply chain until it reaches the final customers. Traceability information is only available for corporate customers such as restaurants currently, but there are plans to launch a consumer app in the future. By partnering with Biomar, a global fish feed producer, Kvarøy has also made it possible to trace individual ingredients in the salmon feed using blockchain.

2.7.3 Key Points

This case study has successfully implemented end-to-end traceability of their products, with the information only available to those who are specified (corporate customers in this case). It also demonstrates the effective use of QR codes to make the traceability data easily accessible by scanning with a mobile phone.

In a recent global poll carried out by IBM it was revealed that over 75% of respondents want products that are environmentally responsible. Of this 75%, over 70% of people would pay a premium for products that were sourced in an environmentally responsible way (Haller et al., 2020). Blockchain enable the entire supply chain to be authenticated to prevent people from selling their products as Norwegian salmon when it originates from another location. This increases customers' trust in these products and prevents customers from being misled.

2.8 Use of Blockchain – scallops

2.8.1 Background

IBM and Raw Seafoods Inc. started a collaborative initiative in 2019, which aimed to enhance seafood traceability (IBM, 2019). The initiative started by digitalising the supply chain for scallops harvested from the Atlantic Sea Scallop Fishery in the USA. Traceability data stored on the blockchain helps fishers to plan their catches more strategically by giving them information on the final destination of their scallops.

2.8.2 Methodology

IBM's Food Trust traceability platform, which is based on the IBM Blockchain Platform, is used to store traceability data. Traceability information about the catch is uploaded by satellite even while the boat is at sea. The data uploaded includes information about when and where the scallops were harvested, when the boat landed the catch, when the scallops were hand graded, packed and shipped to their final destination. This information, together with photos and videos, are uploaded to the Food Trust platform, which allows supply chain actors to view the information. Only those with permission, such as distributors, suppliers and retailers, can access the platform.

Raw Seafoods also planned a consumer app, which would allow consumers to access information about their scallops directly at the restaurant or retail locations by scanning a QR code.

2.8.3 Key Points

A blockchain platform combined with a consumer app would allow consumers to view all traceability data associated with the seafood products they purchase, which would give them increased confidence in the safety, sustainability and authenticity of products.

3. Use of QR codes on seafood products

QR codes can be used for improved traceability of seafood products, tracking fish along the supply chain to ensure authenticity (see associated report MMO1425a - Enhancing Seafood Traceability: Solutions and Industry Challenges, Section 5.4). However, the seafood sector is behind that of terrestrial meat products due to a variety of challenges, as described in the associated report (MMO1425a Section 4).

Some examples of seafood companies that have introduced QR codes into their products include:

- Mowi, a large producer of Atlantic salmon, now include a unique QR code on all their products. Consumers can scan the QR code on the packaging which allows them to examine the supply chain in detail. Details that can be found on the QR codes include egg strain, marine production site, hatching date, sea temperature, vaccinations, and harvest date. Mowi own the entire supply chain from beginning to end, so it is easier for them to have clarity on all this information on their products. Through providing traceability information, Mowi aim to demonstrate to consumers their sustainable practices and minimal environmental impact.
- Harney Sushi in San Diego has started printing QR codes onto rice paper wafers using edible ink and placing these as smart garnishes on their dishes (LAist, 2025). These QR codes are species specific and give the diners additional information about the sustainability and origin of the fish they are about to eat by sending them to the National Oceanic and Atmospheric Administration's FishWatch website (NOAA, 2025). The feedback from customers has been overwhelmingly positive.
- Small scale fishers in Ecuador carried out a pilot project to improve the traceability of mahi-mahi (dolphinfish) using QR codes (FAO, 2023). The QR codes created a link between the fishers and consumers, whereby they can learn about the origin of the fish as well as the stories of the fishers and processors who worked to bring it to their plate. As a result of this and introducing other traceability technology, they were able to access a responsible fishing market and gain fair prices whereas previously they were unable to get decent prices for their catch.
- Princes wild caught seafood is all traceable back to the vessel that caught it. In 2020, Princes introduced QR codes on the packaging of MSC Tuna Chunks in the Netherlands. By scanning the QR codes, consumers can find out the story of the sustainability of their tuna from catch to can (Princes Group, 2021). This system relies on blockchain technology for end-to-end traceability and is being implemented for other products as well as tuna (Supply Chain Movement, 2020).
- Balfegó is a family-run bluefin tuna business in the northwest Mediterranean Sea that aims to have high sustainability standards. They use a digital traceability system that can identify each of their tuna and parts separately. This system allows consumers to scan a QR code to find out traceability information such as date of capture, weight and fat level, as well as access the health, quality and environmental sustainability certificates. Therefore Balfegó tuna can be guaranteed in terms of its sustainability, authenticity and legality.

- ABALOBI, a South African organisation, is a fisher-driven social enterprise that sells fully traceable seafood harvested by small-scale fishers using low-impact fishing methods. Their products have been named 'Fish With A Story' and consumers can scan a QR code on the packaging with their phone to find out the full story behind the seafood, including all the traceability information. They have also created a bespoke ABALOBI app for customers to buy their products.
- WWF trial (Fiji) - see Section 2.6.
- Kvarøy fish farm (Norway) - see Section 2.7.

4. References

ABALOBI (2025). Fish With A Story – By ABALOBI. Available online at https://fishwithastory.org/, accessed on 10 September 2025.

Balfegó (2025). Traceability system – Unique in the World. Traceability Balfegó. Available online at https://balfego.com/en/traceability/, accessed on 10 September 2025.

Cook, B. (2018). Blockchain: Transforming the seafood supply chain. WWF. Available online at https://wwf.org.nz/news/oceans/blockchain-tuna-project-2018.#

Cusa, M., St John Glew, K., Trueman, C., Mariani, S., Buckley, L., Neat, F. and Longo, C. (2022). A future for seafood point-of-origin testing using DNA and stable isotope signatures. Reviews in Fish Biology and Fisheries, 32: 597–621. Available online at https://doi.org/10.1007/s11160-021-09680-w

FAO (2025). Food and Agriculture Organization of the United Nations. Available online at https://www.fao.org/home/en/, accessed on 10 September 2025.

Fisheries Innovation and Sustainability (2025). Available online at https://fisorg.uk/, accessed on 10 September 2025.

Fleming, F. (2023). Piloting Digitalisation in Scottish Seafood Chains. A study commissioned by Fisheries Innovation & Sustainability (FIS). Available online at https://fisorg.uk/wp-content/uploads/2023/06/FINAL-FIS-Executive-Summary_Project-FIS040-.pdf

Friend of the Sea (2025). World Sustainability Organization Project - Certified sustainable products and companies contributing to marine conservation. Available online at www.friendofthesea.org, accessed on 10 September 2025.

GDST (2017). GS1 Global Traceability Standard. https://www.gs1.org/standards/gs1-global-traceability-standard/current-standard#3-Traceability-data-and-traceability-systems+3-3-Managing-traceability-data, accessed on 10 September 2025.

GDST (2023). Standards and Guidelines for Interoperable Seafood Traceability Systems. Core Normative Standards (Version 1.2). Global Dialogue on Seafood Traceability. Available online at www.thegdst.org/resources/standard/.

GDST (2025). Global Dialogue on Seafood Traceability. Available online at www.thegdst.org, accessed on 10 September 2025.

Gopi, K., Mazumder, D., Sammut, J. and Saintilan, N. (2019). Determining the provenance and authenticity of seafood: A review of current methodologies. Trends in Food Science & Technology, 91: 294-304. Available online at https://doi.org/10.1016/j.tifs.2019.07.010

GSSI (2025). Global Benchmark Tool. The Global Sustainable Seafood Initiative. Available online at https://ourgssi.org/benchmarking/, accessed on 10 September 2025.

Haller, K., Lee, J., and Cheung, J. (2020). Research Insights: Meet the 2020 consumers driving change. IBM Institute for Business Value. Available online at https://www.ibm.com/downloads/documents/us-en/10c31775c7540110, accessed on 10 September 2025.

ISEAL (2025). Empowering sustainability systems to drive global change. Available online at https://isealalliance.org/, accessed on 10 September 2025.

IBM (2019). Raw Seafoods Collaborate to Use Blockchain to Help Improve Seafood Traceability and Sustainability While Addressing Fraud. Available online at https://www.prnewswire.com/news-releases/ibm-raw-seafoods-collaborate-to-use-blockchain-to-help-improve-seafood-traceability-and-sustainability-while-addressing-fraud-300940340.html

IBM (2020). Kvarøy Arctic Using IBM Blockchain to Trace Norwegian Farmed Salmon to North American Stores. Available online at https://newsroom.ibm.com/2020-06-04-Kvar-y-Arctic-Using-IBM-Blockchain-to-Trace-Norwegian-Farmed-Salmon-to-North-American-Stores, accessed on 10 September 2025.

Kvarøy Arctic (2025). Pristine Waters Equals Pristine Fish. Available online at https://www.kvaroyarctic.com/sustainability, accessed on 10 September 2025.

LAist (2013). Edible QR Codes Help San Diego Sushi Diners Trace Origin Of Fish. Available online at https://laist.com/shows/take-two/edible-qr-codes-help-san-diego-sushi-diners-trace-origin-of-fish, accessed on 10 September 2025.

Loch Duart (2025). Unrivalled Scottish Salmon. Available online at https://lochduart.com/our-salmon/#traceability, accessed on 10 September 2025.

Lyme Bay Fisherman's CIC (2023). Latest news: Lyme Bay Seafood Trail Launches. Available online at https://lbfcic.com/lyme-bay-seafood-trail/, accessed on 10 September 2025.

Lyme Bay Fisherman's CIC (2025). Available online at https://lbfcic.com/home/, accessed on 10 September 2025.

Marine Conservation Society (2025). Good Fish Guide: Explore seafood ratings. www.mcsuk.org/goodfishguide/, accessed on 10 September 2025.

MMO (2025). Enhancing Seafood Traceability: Solutions and Industry Challenges. MMO Project No: MMO1425a, September 2025, 27pp

Monterey Bay Aquarium Seafood Watch (2025). Available online at https://www.seafoodwatch.org/, accessed on 29 September 2025.

Mowi (2025). Traceability: Transparency from plate right back to egg. Available online at https://mowi.com/products/traceability/, accessed on 10 September 2025.

MSC (2023). MSC UK and Ireland State of the Water Report 2023. Marine Stewardship Council, 50pp. Available at https://www.msc.org/uk/for-business/fisheries/msc-uk-and-ireland-state-of-the-water-report-2023

MSC (2024). MSC UK and Ireland Market Report 2024. 5th Edition, 36pp. Available online at: https://www.msc.org/uk/for-business/msc-uk-ireland-market-report

MSC (2025a). Marine Stewardship Council. Available online at www.msc.org/uk, accessed on 10 September 2025.

MSC (2025b). The MSC Fisheries Standard. Available online at https://www.msc.org/standards-and-certification/fisheries-standard?gad_source=1&gclid=EAIaIQobChMI4fqut63wiQMVMplQBh0j9wG9EAAYASAAEgJR1fD_BwE, accessed on 10 September 2025.

MSC (2025c). Supply chain certification guide. Available online at https://www.msc.org/for-business/supply-chain/chain-of-custody-certification-guide, accessed on 10 September 2025.

MSC (2025d). Marine Stewardship Council, Track a Fishery. https://fisheries.msc.org/en/fisheries/, accessed 04 September 2025.

NOAA Fisheries (2025). Sustainable Seafood. Available online at https://www.fisheries.noaa.gov/topic/sustainable-seafood, accessed on 10 September 2025.

OpenSC (2025). Verify low-carbon and sustainable food production at source. Available online at https://opensc.org/, accessed on 10 September 2025.

Oritain (2017). Loch Duart steps up the fight against food fraudsters. Available online at https://oritain.com/resources/news/loch-duart-steps-up-the-fight-against-food-fraudsters/, accessed on 10 September 2025.

Princes Group (2021). Wild caught responsibly caught seafood: Our progress towards responsible sourcing. Available online at https://www.princesgroup.com/wp-content/uploads/2021/01/Princes-Wild-Caught-Seafood-January-2021-final.pdf.

Supply chain movement (2020). Princes uses blockchain to create end-to-end transparency in tuna chain. Available online at https://www.supplychainmovement.com/princes-uses-blockchain-to-create-end-to-end-transparency-in-tuna-chain/, accessed on 10 September 2025.

TraSeable Solutions (2025). FJ00001: View on the blockchain. Available online at https://www.traseable.com/story/FJ00001/, accessed on 10 September 2025.