

FISHING IN THE DATA AGE

POLICY BRIEF NO. 20 - APRIL 2023

OVERVIEW

- Data collected by the fishing industry can help support the UK's objectives for sustainable fisheries management, but collaborative efforts are required to realise this.
- The need for involving the fishing industry in the co-design and co-management of data is recognised, but this is not necessarily easy to do in practice, particularly given the diversity of the UK fishing fleet.
- A number of successful collaborations exist, which provide lessons in how the fishing industry can be involved in ways that are both effective and fair.
- Key needs for data collaborations going forward relate principally to clarity and transparency around both data ownership and use; ensuring and demonstrating data quality; and human and financial resourcing needs.

BACKGROUND

Improvement of the evidence base for fisheries in the UK has been built into law through the Fisheries Act 2020 (1), with objectives 1–5 of the Act being dependent on capturing information from fishing activities. The Joint Fisheries Statement, which sets out how the UK's national fisheries authorities will achieve the objectives of the Act, encourages the authorities to proactively engage the fishing industry in data collection for sustainable fisheries management (2). Many such collaborations are already well underway, including ones co-designed

and co-managed with fishers. The fishing industry itself is often keen to drive data collaborations, particularly where key data gaps exist (3). However, there remain significant barriers to making these types of data collaborations the norm.

The first part of this brief explores the challenges, opportunities, and needs that have emerged through the experiences of partners involved in data collection collaborations to date. The second part provides case studies of data collaborations presented at the APPG on Fisheries' event, 'Fishing in the Data Age', held 21 February 2023.

This briefing summarises the output from the APPG on Fisheries open Parliamentary hybrid event, on 21 February 2023. The meeting brought together a variety of stakeholders to discuss ways to ensure fishing data is collected fairly and used effectively, and that collaboration is straightforward and mutually beneficial. This document is a synthesis of the discussions that took place at the event.

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KEY AREAS FOR CONSIDERATION

Data collaborations with the fishing industry should be co-designed and co-managed. This involves considering the industry as an equal partner and their input as essential to ensuring that collaborations achieve their purpose. This is well understood among policymakers, regulators, academics and other key marine stakeholders. Simultaneously, advances in technology are unlocking new opportunities to collect vast quantities of useful data on fishing activities and the marine environment. However, success in applying these technologies and ensuring that collaborations are inclusive of the industry depend on a range of key considerations, which are outlined below.

Mitigating data demands on fishers

Amid reports from fishers that regulations are becoming overburdensome (5, 6, 7), data collection collaborations should be designed with the intent of helping to address this issue. Public bodies are aware of this need. For example, the MMO is seeking to develop a range of self-service tools for fishers which would minimise how often they are asked to provide data (4), while Cefas is engaged in a consortium project with EU partners to explore the potential of imaging and Artificial Intelligence (AI) technology to automate identification of different fish species (4). Noting that several public bodies may collect data on fisheries and the marine environment in the course of their work – including the MMO, Cefas, Natural England, the Joint Nature Conservation Committee (JNCC), Defra, Seafish, and the Maritime and Coastguard Agency (MCA) – there is also a need for communication between these bodies to avoid duplication of effort by themselves or by fishers, and to ensure that data is shared where data sharing agreements and resources permit this (4).

Ensuring accessibility for smaller boats

As of 2021, 64% of the UK fishing fleet comprised vessels under 10 metres in length (8). It is therefore essential to involve these vessels in data collection efforts. However, two key needs must be considered: the space to physically accommodate equipment, and the time and capacity constraints for vessels crewed by only one or a few crew. The MMO and Cefas have both experienced challenges related to this, for example the difficulty of taking fish measurements on single-handed vessels. Both agencies are seeking to design data collection processes that reduce demands on small vessels. Cefas is exploring the use of mobile phones to capture images of fish to help with taking measurements, while the MMO's digital catch recording app for under-10-metre vessels allows for more experienced skippers to provide estimates rather than actual weights (4).



The importance of data sharing agreements

Discussions around data sharing should be held at the outset of any collaboration (4). These, along with formal data sharing agreements, should make clear to each party what data will be collected, how it will be used, who will own the data, and different roles and responsibilities with regards to the data. Data is not 'inert'; its collection and storage requires ongoing management and may also entail ownership and maintenance of hardware, and transmission fees (9). The UK General Data Protection Regulation (GDPR) (10) applies to any data collaboration, however, the sharing of fishing data comes with specific considerations including implications around confidentiality and business impact for fishers. It should therefore be agreed what level of anonymisation is to be applied to any data that may be published, in order to mitigate such risks. In the case of the I-VMS (Inshore Vessel Monitoring System) rollout being led by the MMO (see the MMO case study on page 5), there are no plans to make data from this publicly available; however, the MMO makes other types of data available and has said it is open to suggestions regarding what further data provision would be useful to stakeholders (4).

Transparency around potential uses of data

Transparency around other potential uses of the data are essential in maintaining the confidence, trust, and goodwill of fishers (3, 4). Certain technologies, particularly Remote Electronic Monitoring (REM), may also evoke strong emotions around perceived violations of privacy (9). Failure to ensure transparency around potential uses of data therefore poses a risk to existing initiatives, as well as opportunities for future collaborations (3). A particular concern may arise around the use of data from VMS (Vessel Monitoring System), a general term for technologies that enable the tracking and monitoring of vessel movements and activities. The MMO acknowledges to fishers that while data collected via its catch reporting schemes is collected primarily for scientific and management purposes, it could potentially be used to identify non-compliance (4); however, it is highly likely that such data would need to be combined with other types of data to justify prosecution.





Need for capacity and skills

There is a growing need for people with the technical skills to develop, test and implement new technologies in fisheries. AI is a prime example, and the potential of this technology is being explored both in the UK and internationally in projects such as SMARTFISH H2020 and EVERYFISH (4). Cefas continues to recruit for increasingly specialised roles, but reflecting the fast-moving nature of AI, the agency also works with an AI image analysis team at the University of East Anglia (4). Outsourcing skills and capabilities in this way can be efficient, but, again, requires funding. Concerns have been voiced by the Scottish Fishermen's Federation (SFF) that funding for fisheries science research is limited, especially in comparison to that available for offshore renewables (4). Policymakers could address such issues not only by making the necessary funding available, but also by working with public bodies to identify the most policy-relevant knowledge gaps to address and target (4).

Need for funding

Effective and fair data collaborations with fishers are financially costly. They are likely to require the development of new digital systems, the installation of equipment on vessels, training, and potentially the creation of new professional roles (4). For example, the Devon and Severn IFCA, which is piloting Remote Electronic Monitoring (REM) on a fishing vessel, has estimated that to roll out REM to 120 mobile gear fishers within its jurisdiction would require £362,000 to purchase and install hardware, with additional annual costs for maintenance and support (9). In certain cases, policymakers and regulators could explore the use of compensation for participating fishers, which could be either via remuneration or other forms of compensation, such as additional quota allocation (3). It is also noted that new data from technology with high initial costs could yield cost savings further down the line through automation and enhanced efficiency (9).



CASE STUDY 1: MARINE MANAGEMENT ORGANISATION (MMO)

Established under the Marine and Coastal Access Act 2009 (11), the MMO has responsibility for ensuring the sustainable use of marine resources in English waters, including fishing. The MMO is currently exploring the use of new technologies and digital processes for a range of its operations, including the following:

- I-VMS – This is currently being rolled out for the under-12-metre fleet. One quarter of the fleet has already been fitted with devices, with £250,000 in grants provided to fund this. The data obtained will potentially be used for regulatory purposes.
- Electronic catch recording service – This has been rolled out for the under-10-metre fleet. Uptake has been high, with over 2,500 registered users and a 96% compliance rate.
- Fish Export Service – This allows fish and seafood exporters to create the validated documents they need for exporting to, or landing in, the EU.
- Mobile Working App – Developed for the MMO's staff, this app allows notes to be captured directly into a database. This saves time, ensures data is standardised, and reduces the risk of errors.

CASE STUDY 2: CEFAS

Cefas, the Centre for Environment, Fisheries and Aquaculture Science, is an executive agency of Defra. Through its research activities, it provides data and advice to the UK Government and international partners. Similar to the MMO, Cefas uses data collected using VMS and I-VMS, but for research and science advice rather than enforcement. Other forms of data utilised by Cefas include skipper logbook data, data from observers on vessels, and scientific market sampling. These data require no additional activity from fishers, but are reliant on their support, and are used to power fish stock assessments, which inform quota levels. Combining these data allows for trends in catches to be viewed in space and time, for example with Cefas' GeoFISH tool, which is emerging as a key advisory tool for marine spatial planning.

Cefas also runs several active collaborations with fishers to generate data and evidence, including:

- Fish abundance surveys – Contracted fishing vessels carry out abundance surveys for stocks such as Western Channel plaice and sole, with the data feeding into ICES stock assessments.
- Celtic Sea otter trawl scientific Remote Electronic Monitoring (REM) programme – This involves integrated GPS, winch sensors, cameras, and a computer, with the aim of exploring how REM could help to address challenges in managing mixed fisheries.
- Fishing gear technology – Multiple projects are underway in this area, including a Fisheries Industry Science Partnerships (FISP) project with Nephrops fishers in Northeast England which is testing trawls to reduce unwanted fish catches.





CASE STUDY 3: THE SCOTTISH FISHERMEN'S FEDERATION (SFF)

The SFF is an umbrella organisation which seeks to promote the interests of its constituent fishing associations – representing a total of around 450 fishing vessels, of mixed lengths – and sustainable fisheries management. It leads or takes part in a range of data collaborations, including but not limited to Clean Catch UK, gear trials to improve selectivity, Marine Alliance for Science and Technology (MASTS), and various ICES working groups.

A flagship programme of the SFF is the Independent Fisheries Science Support Scheme (IFSSS), which is unique in being the UK's only fisheries-led observer programme. Currently funded by the Scottish government, the IFSSS enables the fishing industry to collect data at sea and onshore using observers. Its most significant component is a collection scheme which is jointly run with Marine Scotland Science and has been ongoing for over a decade. The most recent development has been a co-sampling pilot in which boats bring unsorted catches ashore so that observers can survey them on dry land as they would on a vessel. Data collected under the IFSSS are fed back into stock assessments and the annual Total Allowable Catch (TAC) setting cycle. In the long term, data from the IFSSS and previous schemes led by the SFF have enabled the Scottish fishing industry to gain and maintain fishing opportunities. The success of the IFSSS is accredited in part to the fact that former skippers are employed as the observers; as a result, the IFSSS maintains a good relationship with fishers.

CASE STUDY 4: SCOTTISH PELAGIC FISHERMEN'S ASSOCIATION (SPFA)

The SPFA represents the 22 member vessels of the Scottish pelagic fishing fleet. In 2016, it established the Scottish Pelagic Industry-Science Data Collection Programme in collaboration with Marine Scotland Science and UHI (University of the Highlands and Islands) Shetland. This arose from the desire among Scottish pelagic fishermen to be respected providers of scientifically credible data for use in assessing fish stocks, monitoring changes in the pelagic ecosystem, and supporting management decisions. Through the programme, skippers and crew carry out self-sampling and co-sampling onboard vessels, meaning that they are actively involved in generating data. A low-cost paperless data tool co-designed by fishermen and local electronic engineers, Echomaster Marine, has also been introduced to enable an efficient recording and transfer system. Each year, participating skippers and crew members meet with scientists to discuss their experiences and provide advice on improving the data collection process. The meeting is also an opportunity for each participating vessel to see the particular dataset they have collected, and for programme partners to present collective results based on these datasets in combination.

In January 2022, Marine Scotland's onshore pelagic catch sampling was replaced by the catch sampling undertaken at sea by crew. The Scottish Pelagic Industry-Science Data Collection Programme is the main source for biological information on pelagic catches provided by the UK to ICES for use in stock assessment and advice on fishing opportunities (12). In recognition of its success, the programme received the 2022 Ocean Leadership Award from the Marine Stewardship Council (MSC) UK.



CASE STUDY 5: EVERYFISH

EVERYFISH (12) is a Horizon Europe-funded project. The lead partner is SINTEF, based in Norway, while its UK partners are Cefas, the University of East Anglia, and the University of St Andrews (funded separately by UK Research and Innovation). The aim of the project is to explore the potential of using state-of-the-art imaging and AI on vessels to enable automatic identification of species within catches. If the technology can be rolled out widely, the resulting data would have a variety of uses in sustainable fisheries and marine resource management, including detecting changes in ecosystems, indicating when quotas may be reached, or providing real-time data to trigger closures of fishing grounds. The technology will be tested in a variety of large- and small-scale fishing fleets across Europe, to obtain the best possible understanding of implementation challenges and opportunities in different fishing contexts.



CONCLUSIONS

Appetite clearly exists among fishers, policymakers, regulators, academics, and others to establish meaningful data collaborations, especially with emerging innovations such as camera and AI systems offering unparalleled opportunities to collect data to support sustainable fisheries management. Data collaborations should form essential pillars of fisheries management in the UK under the Fisheries Act 2020 and the Joint Fisheries Statement. However, the complexities of the fishing industry mean that careful co-design and co-management are needed to ensure that data collaborations are efficient and equitable. Existing successful initiatives, including those co-led by the Scottish Fishermen's Federation and Scottish Pelagic Fishermen's Association, and others summarised in this policy brief, show that this can be achieved.

However, successful data collaborations do not come cheaply, in terms of both financial costs and technical resourcing needs, while the use of AI and other technology will still require significant investment before they can be implemented widely across fisheries. Policymakers have the opportunity to facilitate such investment, to ensure that all parts of the UK fishing fleet are enabled to take part in data collaborations, and to ensure that data collaborations adhere to best practices including the use and sharing of data. Ultimately, as noted by Steven Mackinson at the APPG on Fisheries' event, policymaker support for fishing data collaborations "needs to be about creating the conditions to allow co-management initiatives to flourish" (4).

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