

Working together to
promote sustainable
fisheries and address the
nature and climate crisis



This response to Scottish Government's consultation on **Enhancing Sustainable Fisheries Management - Remote Electronic Monitoring (REM)** was prepared by the Future Fisheries Alliance, a coalition of WWF, RSPB and Marine Conservation Society. This submission is supported by:

- Scottish Wildlife Trust
- National Trust for Scotland
- Whale and Dolphin Conservation

Executive Summary

WWF, RSPB and Marine Conservation Society have long advocated for the roll out of REM with cameras to deliver fully documented fisheries. It was **disappointing that the JFS did not deliver an explicit commitment to REM**, however, there is still an opportunity for a shared statement to commit to REM and set a date by which each administration will publish a roadmap for rolling it out.

While Scottish Government are to be credited for taking forward the current REM consultation, albeit on a smaller scale than has been called for, **we have concerns over the lack of application in some key high-risk fisheries** and the risk this poses to the overall sustainability of Scottish fisheries when considered alongside the proposed Future Catching Policy.

We welcome the framing of the document around the benefits that REM can deliver and wholeheartedly agree that **embracing this technology will deliver great benefits** to the fleet, supply chain and in turn the marine environment as it will underpin sustainable management.

REM is a **robust, tried and tested, cost-effective means of delivering fully documented fisheries**, providing data for management, evidencing compliance, best practice and transparency and in turn high levels of confidence in the sustainability of the fishery.

In order **to have confidence in Scottish caught fish, REM must be applied wherever and whenever vessels are operating**. Many Scottish registered fishing vessels fish outwith the Scottish zone, it follows therefore that Scottish vessels should be required to use REM when operating outwith the Scottish zone.

Roll out beyond the initial proposal offered by the Scottish Government should **prioritise implementation of REM on high-risk fleet segments**. These often present the biggest challenges to achieving related Good Environmental Status (GES) indicators and therefore swift action should be taken to improve management and reduce their environmental impact. For example, mixed species demersal trawlers and, for impacts on wildlife bycatch, gillnet and long line vessels should also be included in this high-risk category.

It is therefore our strong view, with respect to meeting the objectives in the UK Fisheries Act (including in particular minimising discards and sensitive species bycatch), that **REM should be applied to the demersal trawl fleet as well as gillnet and longline fleets**. We urge Scottish government and other administrations to publish a roadmap for the implementation of REM across these fleets with prioritisation given to those

that pose the highest ecological risk.

We **strongly oppose the use of reference fleets** as trials where reference fleets have been used show notable differences between data recorded by the REM reference fleet and non-REM vessels recording their own data.

In the UK and many other countries, it has become **standard practice to safeguard shared public resources and people through the use of cameras**. It is used in supermarkets, banks, public transport, streets, houses, in most work spaces, road junctions, in fact almost anywhere there is a perceived need. Moreover, cameras are also mandatory in slaughterhouses in Scotland, with recordings to be processed in line with data protection requirements to address privacy issues.

Full scale adoption of REM by the Scottish Government would demonstrate leadership in modern and sustainable fisheries management and would provide **the best guarantee of a sustainable fishing industry into the future**.

Consultation Response

1. Do you agree that Scottish vessels required to use REM in the Scottish zone should also have REM operational when operating outside of the Scottish zone?

Yes / No / Don't know

The consultation document states that “to have certainty over the current landings data, it is important to know that no slipping or discarding is taking place.”¹ This is to support confidence in the fact that Scottish vessels are fishing in line with quota and regulations. As such, in order to have confidence in Scottish caught fish this must apply wherever and whenever vessels are operating. As many Scottish registered fishing vessels fish outwith the Scottish zone, it follows therefore that Scottish vessels should be required to use REM when operating outwith the Scottish zone.

As interest in provenance of seafood is increasing, only requiring REM to be operational in the Scottish zone would not provide the levels of confidence needed to improve the marketability of Scottish catches and the reliability of scientific stock assessments and advice.

If Scottish Ministers are to deliver on their obligations under the by-catch objective of the UK Fisheries Act (2020) and ensure that catches are recorded and accounted for then Scottish vessels must be required to use REM at all times, regardless of whether they are operating within or outwith the Scottish zone.

We believe that fishing in Scottish, and UK waters, should operate a level playing field requiring that any REM requirements should apply to all vessels. We recognise that such a requirement would mean that vessels fishing in Scottish waters would have more monitoring technology than others operating outwith the Scottish zone but believe that such a requirement in Scottish waters could mean Scottish Government play an important leadership role in bringing about the acceptance of REM by other nation’s fleets. The EU’s fisheries control system, which ensures the Common Fisheries Policy is implemented and rules, including the Landing Obligation, are followed – is currently being reformed and as part of this, onboard cameras could become mandatory.² Mandating REM with cameras for all vessels fishing within the Scottish zone (and for Scottish vessels fishing outwith) could encourage and accelerate the adoption of REM across the EU.

2. Do you foresee any barriers to vessels meeting the costs associated with the REM systems themselves? This includes upfront and ongoing costs.

Yes / No / Don't know

The answer to this is not straightforward as made clear in the consultation document since different vessels will require different scales of operating systems and will have varying levels of finance available to them. Overall, operating costs have increased significantly with fuel price rises. Asking some vessel owners to take on further costs associated with REM systems is a barrier that needs to be addressed but as also stated in

¹ Marine Scotland, 2022. Available at: [https://www.gov.scot/publications/ensuring-long-term-sustainability-scotlands-marine-resources-remote-electronic-monitoring-rem-consultation/#:~:text=Publication%20%2D%20Consultation%20paper-,%20Marine%20resources%20%2D%20ensuring%20long%20term%20sustainability,remote%20electronic%20monitoring%20\(REM\)%20consultation&text=Remote%20electronic%20monitoring%20\(REM\)%20is,vessels%20to%20monitor%20fishing%20activity](https://www.gov.scot/publications/ensuring-long-term-sustainability-scotlands-marine-resources-remote-electronic-monitoring-rem-consultation/#:~:text=Publication%20%2D%20Consultation%20paper-,%20Marine%20resources%20%2D%20ensuring%20long%20term%20sustainability,remote%20electronic%20monitoring%20(REM)%20consultation&text=Remote%20electronic%20monitoring%20(REM)%20is,vessels%20to%20monitor%20fishing%20activity). [Last accessed 07.06.2022]

² WWF, 2022. Available at: <https://www.wwf.eu/?6393966/92-of-fish-discarded-in-EU-fisheries-linked-to-trawling---WWF-study#:~:text=The%20leading%20cause%20of%20illegal,swallow%20everything%20in%20their%20path>. [Last accessed 07.06.2022]

the paper there are options.

We fully support the statement in the consultation document that *“when considering the costs to businesses, we must also consider the benefits to industry from having REM on board, particularly in being able to demonstrate vessels are fishing sustainably and ethically, and in line with legislation. As a result, the quality and reputation of the Scottish fishing industry will benefit.”*³ As a general principle it is likely that there will be a need for some government support in the set-up phase but that replacement of technology should fall to operators as this will disincentivise intentional damage to technology at sea.

It is also worth bearing in mind that procurement at scale will reduce per vessel costings and technology is coming down in price as it improves. Developments in the REM marketplace, with new suppliers and equipment options becoming available have driven down both the initial and ongoing costs associated with the implementation of REM. Specific costs will differ depending on the needs of each programme as the objective will often determine the number of cameras required and subsequent effort needed to monitor the recorded information following fishing activities.^{4 5} There has recently been a move towards using additional cameras to enable greater transparency, resulting in some REM manufacturers now supplying systems that can use up to eight or even 12 cameras depending on the needs of the programme.

Noting that developments in REM continue to bring costs down, below we include estimated costs (based on average estimates received from three leading REM technology suppliers in 2017 who have been kept anonymous to protect commercial confidentiality) of rolling out and monitoring REM systems.⁶ The costs relate to systems fitted with six cameras - which reflected practices in the UK at the time - and include the annual salary (£25,000) of independent analysts, each of whom would review 10% of footage from 15 vessels. For cost estimates for REM systems designed specifically to address bycatch issues please see the WWF report [What's in the Net](#) from 2020.⁷

The overall cost of an REM system – software, staffing, installation, maintenance etc – fell between £3,785 and £5,290 per vessel in 2017 (depending on whether the government chose to subsidise the costs of hardware items using the European Maritime and Fisheries Fund (EMFF) or an equivalent). Despite a 38% increase in hardware costs due to increased specifications, there was still an overall reduction of approximately 19% from 2015 which demonstrates the downward trajectory in REM costing due, in part, to advancements in technology. These savings are likely to have increased further as advancements are also made in computer vision and image recognition software.

Value for money – using these estimates, it would have cost between £4.7m and £6.5m respectively to equip and monitor the whole UK over 10-meter fleet in 2017 (which comprised 1,236 vessels and accounted for over 90% of fish caught in the UK), while reviewing 10% of the video and obtaining 100% of the sensor

³ Marine Scotland, 2022. Available at: [https://www.gov.scot/publications/ensuring-long-term-sustainability-scotlands-marine-resources-remote-electronic-monitoring-rem-consultation/#:~:text=Publication%20%2D%20Consultation%20paper-,Marine%20resources%20%2D%20ensuring%20long%20term%20sustainability,remote%20electronic%20monitoring%20\(REM\)%20consultation&text=Remote%20electronic%20monitoring%20\(REM\)%20is,vessels%20to%20monitor%20fishing%20activity](https://www.gov.scot/publications/ensuring-long-term-sustainability-scotlands-marine-resources-remote-electronic-monitoring-rem-consultation/#:~:text=Publication%20%2D%20Consultation%20paper-,Marine%20resources%20%2D%20ensuring%20long%20term%20sustainability,remote%20electronic%20monitoring%20(REM)%20consultation&text=Remote%20electronic%20monitoring%20(REM)%20is,vessels%20to%20monitor%20fishing%20activity). [Last accessed 07.06.2022]

⁴ WWF, 2017. Available at: https://www.wwf.org.uk/sites/default/files/2017-10/Remote%20Electronic%20Monitoring%20in%20UK%20Fisheries%20Management_WWF.pdf [Last accessed 16/11/2020]

⁵ WWF, 2020. Available at: <whatsinthenetfinal.pdf> (www.wwf.org.uk) [Last accessed 07.06.2022]

⁶ WWF, 2017. Available at: https://www.wwf.org.uk/sites/default/files/2017-10/Remote%20Electronic%20Monitoring%20in%20UK%20Fisheries%20Management_WWF.pdf [Last accessed 07.06.2022]

⁷ WWF, 2020. Available at: <whatsinthenetfinal.pdf> (www.wwf.org.uk) [Last accessed 07.06.2022]

data.⁸ This is roughly a quarter of what was spent on more traditional observer monitoring systems at that time which delivered less than 1% at-sea coverage. It was also less than 1% of the value of seafood caught by these vessels.

REM systems have also been found to generate economic benefits for fishing industries and coastal communities. Prior to the implementation of REM systems in New Zealand, the government undertook a cost/benefit analysis in 2017 which identified monetised costs of NZ\$83.2m over 15 years (2018-32), compared to monetised benefits of NZ\$158.6m in the same period. The projected monetised benefits resulted in part from securing and increasing access for New Zealand's wild-caught seafood to premium markets that require assurance of sustainable fish production and better 'boat to plate' transparency – both of which could also benefit the UK fishing industry.

3. Are you aware of any issues we need to take account of when we apply REM across all pelagic fishing fleets fishing in Scottish waters on a level playing field basis?

Yes / No / **Don't know**

As noted in answer to question 2 we believe that fishing in Scottish, and indeed UK, waters should operate on a level playing field. This would mean requiring any pelagic fishing vessel operating in Scottish waters to carry REM. We also recognise that such a requirement would mean that pelagic vessels fishing in Scottish waters would have more monitoring technology compared to other pelagic vessels operating outwith the Scottish zone. However, we believe that such a requirement in Scottish waters could mean Scottish Government play an important leadership role in bringing about the acceptance of REM by other nations' fleets. The EU's fisheries control system, which ensures the Common Fisheries Policy is implemented and rules, including the Landing Obligation, are followed – is currently being reformed and as part of this, onboard cameras could become mandatory.⁹ Mandating REM with cameras for all vessels within the Scottish zone (and for Scottish vessels fishing outwith) could encourage and accelerate the adoption of REM across the EU.

This means that terms and conditions for the application of REM will need to be discussed and negotiated with the coastal states who have vessels fishing in Scottish waters. The issue of data sharing and transparency will also need to be negotiated. How much of an issue this represents is unclear to us but given that there is a general recognition beyond the UK that there is a role for REM in sustainable fisheries management we hope that Scottish leadership could secure such an arrangement.

4. Do you agree with the definition of pelagic vessels provided and are there any unintended consequences from using this definition?

Yes / No

No further comments on this.

⁸ WWF, 2017. Available at: https://www.wwf.org.uk/sites/default/files/2017-10/Remote%20Electronic%20Monitoring%20in%20UK%20Fisheries%20Management_WWF.pdf [Last accessed 16/11/2020]

⁹ WWF, 2022. Available at: <https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Meere/WWF-Report-The-Untrawled-Truth.pdf> [Last accessed 07.06.2022]

5. How much lead-in time should pelagic industry be given to prepare for compliance with the mandatory REM requirement?

It is undoubtedly the case that time will be needed to prepare, source and install REM equipment and supporting infrastructures. REM system procurement will be influenced to a degree by how much information is provided in the legislation and what flexibility is provided in terms of procurement and who has responsibility for this.

It will need to be clear what the requirements are as soon as possible for the non-UK vessels in order to support their access to pelagic quota in Scottish waters.

In other parts of the world working groups of all interested parties have been convened to help assist in the process of ensuring that the right system was agreed upon. These groups should include fishers, policy, managers, science, retailers and NGOs and could help agree legislative requirements and practical applications.

An important consideration will be to determine who will undertake the review and management of video footage. It may be that this is best outsourced to an agreed independent operator who can provide feedback and work with fishers to address problems where they arise. Clear communications with skippers will be an important element of the process. There is no point in fitting a REM system if the data and video are not reviewed diligently or if detected non-compliant behaviour is ignored and goes unaccounted for.

For purposes of lead in time the proposed 12 months sounds realistic but the legislation needs to be introduced as swiftly as possible in order to make the change on the water needed.

6. Do you agree with the scientific and compliance benefits of REM for the pelagic fleet as set out in this document? Are there other benefits which you can consider, including to industry, the environment, or local communities?

Yes / No

The benefits of using REM are widespread and systems can be adapted to reflect the objectives of policy or management objectives. This consultation rightly recognises that putting REM on pelagic vessels will result in science and compliance benefits, such as improved stock assessments and greater certainty that what is being caught is being landed, as well as the benefits around demonstrating sustainability and improved marketability of Scottish fisheries.

However, we feel the benefits of REM go further, and that there are additional benefits to those outlined in the consultation. If the Scottish Government's "strong belief that REM should be seen as a positive tool by the fishing industry"¹⁰ is to be realised, then it will be important to highlight those of most interest to the catching sector such as increased confidence in the supply chain, access to market and ground truthing claims at sea. In terms of gaining support more broadly all the benefits that REM can offer should be promoted.

1) REM as a tool for data collection – To ensure stocks are being harvested sustainably and to minimise, and where possible eliminate, negative impacts of fisheries on the wider marine environment, including

¹⁰ Marine Scotland, 2022. Available at: [https://www.gov.scot/publications/ensuring-long-term-sustainability-scotlands-marine-resources-remote-electronic-monitoring-rem-consultation/#:~:text=Publication%20%2D%20Consultation%20paper-,Marine%20resources%20%2D%20ensuring%20long%20term%20sustainability,remote%20electronic%20monitoring%20\(REM\)%20consultation&text=Remote%20electronic%20monitoring%20\(REM\)%20is,vessels%20to%20monitor%20fishing%20activity](https://www.gov.scot/publications/ensuring-long-term-sustainability-scotlands-marine-resources-remote-electronic-monitoring-rem-consultation/#:~:text=Publication%20%2D%20Consultation%20paper-,Marine%20resources%20%2D%20ensuring%20long%20term%20sustainability,remote%20electronic%20monitoring%20(REM)%20consultation&text=Remote%20electronic%20monitoring%20(REM)%20is,vessels%20to%20monitor%20fishing%20activity). [Last accessed 07.06.2022]

sensitive species bycatch, fisheries must operate in a fully transparent and accountable manner with fully documented catches. Rolling out REM would mean we would have better scientific data about what is being caught and discarded, which would provide invaluable insights into the status of commercial stocks. 60% of UK shellfish stocks have unknown status and data could also help inform the interactions with, and status of, vulnerable bycatch species for which there are large uncertainties due to low levels of monitoring of fishing activity at sea.¹¹ If the management or policy objective is to monitor sensitive species bycatch, then REM systems must be optimised to collect this data i.e., ensuring camera positioning is effective at capturing hauling activity to record all bycatch, including any animals that drop out of nets/off hooks before processing and to capture footage or sensory data to assess mitigation use while fishing. Key for data collection will be to ensure that those reviewing the data have the right level of knowledge to capture the data needed for management purposes. Artificial Intelligence (AI) and machine learning is now improving and should be able to help with this.

2) Supporting confidence in the supply chain - The roll out of cameras would provide fishers with the evidence with which they can demonstrate how their activities are sustainable and would deliver transparency for retailers and consumers who increasingly want this evidence when selecting seafood to buy. In response to concerns regarding their snapper fishery, the Ministry for Primary Industries in New Zealand has implemented a REM program on vessels participating in this fishery. The main objectives of the program are to: improve the reliability of data; gain a better understanding of numbers of juvenile snapper killed; and provide more transparency around commercial fishing operations, amongst other things.^{12 13}

3) Monitoring and mitigating sensitive species bycatch - In UK waters, thousands of animals, including cetaceans, seals, seabirds, turtles and elasmobranchs die every year, as a result of incidental capture and drowning in the gears of fishing vessels. Recent estimates of the annual UK fisheries toll include over 1,500 small cetaceans, predominantly comprising harbour porpoise and common dolphin, 400-600 seals,¹⁴ and concerning and increasing levels of entanglements of humpback and minke whales off the coast of Scotland.¹⁵ A recent study commissioned to inform the UK Seabird Bycatch Plan of Action is the first attempt to estimate seabird bycatch mortality from UK-registered fishing vessels in UK waters and found that fulmar and guillemot are most frequently caught with somewhere between 2,200 - 9,100 and 1,800 - 3,300 individuals respectively caught and killed each year - the former predominantly in UK-registered longlines operating in Scottish waters. The report highlights that at least 10 species were recorded as

¹¹ Defra, 2019. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921262/marine-strategy-part1-october19.pdf

¹² Ministry of Primary Industries, New Zealand, 2020. Available at: [https://www.mpi.govt.nz/fishing-aquaculture/sustainable-](https://www.mpi.govt.nz/fishing-aquaculture/sustainable-fisheries/snapper-1-management-plan/progress-of-electronic-monitoring-in-the-snapper-1-trawl-fishery/)

[fisheries/snapper-1-management-plan/progress-of-electronic-monitoring-in-the-snapper-1-trawl-fishery/](https://www.mpi.govt.nz/fishing-aquaculture/sustainable-fisheries/snapper-1-management-plan/progress-of-electronic-monitoring-in-the-snapper-1-trawl-fishery/)

¹³ Ministry of Primary Industries, New Zealand, 2020. Available at: [https://www.mpi.govt.nz/dmsdocument/28446-Reports-on-technical-](https://www.mpi.govt.nz/dmsdocument/28446-Reports-on-technical-fishes-and-progress-reported-for-the-electronic-monitoring-trial-in-the-SNA1-trawl-fishery)

[fixes-and-progress-reported-for-the-electronic-monitoring-trial-in-the-SNA1-trawl-fishery](https://www.mpi.govt.nz/dmsdocument/28446-Reports-on-technical-fishes-and-progress-reported-for-the-electronic-monitoring-trial-in-the-SNA1-trawl-fishery)

¹⁴ ICES, 2017. Available at:

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGBYC/wgbyc_2017.pdf

¹⁵ Ryan, C., Leaper, R. & Evans, P. G. H. 2016. Entanglement: an emerging threat to humpback whales in Scottish waters. Available at:

https://www.seawatchfoundation.org.uk/wp-content/uploads/2016/12/Ryan_et-al_IWC.pdf

bycatch and identifies bycatch hotspots in longlines operating in the northwest of Scotland and gillnets in the southwest and northeast of England. These preliminary findings are caveated with uncertainty due to poor monitoring. Nevertheless, they indicate a seabird bycatch problem that requires comprehensive monitoring and targeted action. Bycatch of other Endangered, Threatened, or Protected (ETP) species such as turtles, sharks and rays also occur, though likewise there is insufficient monitoring to determine rates of bycatch or the potential impact on populations. Tackling such bycatch is an essential component of achieving sustainable and responsible fisheries.

Effective monitoring is a key component of a successful strategy in order to assess bycatch rates and identify high-risk fisheries, assess the efficacy of mitigation and ensure compliance with best practice. UK monitoring of bycatch of ETP species under the Bycatch Monitoring Programme has been found to be not fit for purpose¹⁶ with monitoring coverage sitting at less than 1-5% of total UK annual fishing effort across three broad gear types.¹⁷ However, REM can supplement existing bycatch and stranding monitoring programs to offer better, unbiased coverage at a fraction of the cost. REM has been successfully trialled for monitoring cetacean bycatch in Denmark and the Netherlands, where bycatch rates were found to be higher than those documented by visual observers. Introducing REM as standard practice offers Scotland the chance to improve fisheries management and lead the way in monitoring bycatch of ETP species as well as ensuring wider fisheries sustainability and accountability.^{18 19} The monitoring of data for wildlife bycatch events will likely differ given the need for cameras and sensors to be effectively positioned to collect data on bycatch rates and mitigation use, and due to the sometimes unpredictable or rare nature of bycatch events. 100% reviewing of data will be required but using a fast forward screening of footage can be applied. AI is developing and should be able to help with this in time.

This is a clear example of how fisheries management can operate using an ecosystem-based approach by taking account of and mitigating impacts on non-target species rather than governments operating in a siloed fashion where sensitive species bycatch and mitigation is viewed as the responsibility of separate departments.

4) Tool for demonstrating best practice and responsive management - Cooperation between scientists, managers and fishers is key to a well-managed fishery, and the roll out of REM provides fishers the opportunity to contribute the most data at the lowest cost whilst demonstrating their commitment to best practice. REM provides unbiased and fully documented evidence to support challenges faced by the industry and allows for the implementation of adaptive and dynamic management strategies as fisheries authorities have much quicker access to data collected through REM than they do to traditional observer data. Currently observer coverage for scientific research purposes is low but costs are high; and the data takes time to be manually entered on to a database, checked and then formatted for annual stock assessment purposes. This process can take up to a year to complete. REM sensor and positional data can

¹⁶ WWF, 2017. Available at: https://www.wwf.org.uk/sites/default/files/2017-10/Remote%20Electronic%20Monitoring%20in%20UK%20Fisheries%20Management_WWF.pdf [Last accessed 17/11/2020]

¹⁷ Northridge, S., Kingston, A., and Coram, A. 2020. Preliminary estimates of seabird bycatch by UK vessels in UK and adjacent waters. Report prepared for the Department for Environment Food and Rural Affairs (Project Code ME6024).

¹⁸ WWF, 2017. Available at: https://www.wwf.org.uk/sites/default/files/2017-10/Remote%20Electronic%20Monitoring%20in%20UK%20Fisheries%20Management_WWF.pdf [Last accessed 17/11/2020]

¹⁹ WWF, 2020. Available at: [whatsinthenetfinal.pdf \(wwf.org.uk\)](#) [Last accessed 07.06.2022]

be available in near-real time, while video review data can be completed and uploaded within two weeks of receipt of the raw data. This can allow managers to respond more quickly to events on the fishing grounds and give fishers the best opportunities based on what they are currently (or very recently) experiencing, rather than historical events.²⁰ REM is regarded as a cost-effective monitoring tool for at-sea monitoring and when utilised alongside other technologies such as artificial intelligence and machine learning for data analysis, there is potential for costs to be reduced further. [Bartholomew et al. \(2018\)](#) found that ‘based on the estimated costs of the observer programme and electronic monitoring systems including installation, servicing, data storage and wage costs, REM offered savings of approximately 50% per vessel monitored.’²¹ The study highlighted savings in wages in particular, as data analysts could review a day’s fishing activity in half an hour, compared to observers that had to be at sea for the duration of the trip. This study suggests that as technology advances and costs decrease, REM is likely to become an even cheaper alternative to onboard observation.

5) Establish greater trust in management decisions and bridge the gap between fisheries managers and fishers. There are ongoing counter-claims around the health of fish stocks, with scientific assessments stating that levels are worryingly low while fishers claim that more cod are being detected in more grounds than before.²² If REM were applied across the vessels involved in the fishery, then robust, representative, independent data could be gathered and analysed, to evidence the true situation and in turn be used to monitor any mitigation measures and management that is introduced. The degree to which REM with cameras is applied will be a key factor in the fishing industry’s ability to adapt to the impacts of climate change.

6) Improved staff welfare - The presence of REM can help incentivise good health and safety compliance and where human observers are already present can be used to support the first-hand observations on vessel practices. It has been acknowledged that the Covid pandemic has affected observer programmes around the world with observers unable to go to sea due to safety risks associated with a lack of social distancing. REM should be viewed as a useful and reliable alternative to sending observers to sea in many circumstances.

7) Adapting to Climate Change - The inclusion of the ‘climate change objective’ in the UK Fisheries Act is a world first: there are no other examples of governments being legally required to manage their fisheries and aquaculture in such a way that they contribute to tackling climate change.²³ This is an opportunity to show world leadership and set the standard for what ‘climate-smart fisheries’ could look like. Every sector must contribute to delivery of net zero and Cabinet Secretary, Mairi Gougeon, stated that “fisheries must play a leading role.”²⁴ While certain fisheries are vulnerable to the impacts of climate change, the sector also contributes to anthropogenic driven climate change, due to emissions from fossil fuel use as well as the disturbance of marine ecosystems and disruption to vital blue carbon - the carbon captured and stored in coastal and marine ecosystems.²⁵ The Future Fisheries Alliance’s report on [Climate Smart Fisheries](#) shows

²⁰ WWF, 2017. Available at: https://www.wwf.org.uk/sites/default/files/2017-10/Remote%20Electronic%20Monitoring%20in%20UK%20Fisheries%20Management_WWF.pdf [Last accessed 17/11/2020]

²¹ Bartholomew et al., 2018. Available at: <https://www.sciencedirect.com/science/article/pii/S0006320717307899> [Last accessed 07.06.2022]

²² [Fisheries Management and Conservation Group \(FMAC\) minutes: 17 November 2021 - gov.scot \(www.gov.scot\)](#)

²³ [Climate Smart Fisheries Report | WWF](#)

²⁴ Meeting of the Parliament: 09/12/2021 | Scottish Parliament Website

²⁵ [Climate Smart Fisheries Report | WWF](#)

how REM can help provide a more comprehensive picture of the impact that fisheries have on climate change and enable more effective climate mitigation strategies while also helping the industry to better adapt to climate change.

7. Do you agree that the system as outlined in section 3.4.2 (System specification) should be able to meet the benefits described in Section 3.3?

Yes / No

Yes, we agree with the specifications set out in 3.4.2 which address the key factors required when monitoring pelagic operations – verifying no discarding or slipping, that quotas are not being overshot and that non target incidental capture of sensitive species and mitigation use is possible to detect with appropriate placement of technology.

8. Do you foresee any specific operational problems with the system specification set out within the document?

Yes / No

From the description provided this seems to make good sense.

9. Do you believe that we should require net sensor data as part of the system specification at this point?

Yes / No

We agree with the statement in the consultation that there is considerable benefit to be gained from having access to net sensor data given the increased confidence that this will provide for both *science* and *compliance* purposes. Given the scale of pelagic operations and the relatively small domestic numbers we are dealing with, 22, we believe that modest additional costs should not be considered a barrier to preventing inclusion of net sensor data as part of system specification. We are entering a new era for Scottish fisheries and a desire to establish them as world leading on sustainability and, in so doing, helping ensure that they are strongly competitive on the global market. Detailed information on vessel operations including hours fished/soak time, gear configuration (including number of hooks and mesh size) and mitigation deployment paired with information on vessel tracking and bycatch rates will be essential for fully quantifying and managing sensitive species bycatch, particularly for longlines and gillnets. This additional data should be seen in light of this aspiration and adopted from the outset in order to maximise the benefits of new REM technologies.

10. Are you aware of any issues we need to take account of when we apply REM requirements consistently across all scallop dredge vessels in the Scottish zone, regardless of scallop species being targeted or number of dredges being deployed?

Yes / No

We firmly support the intention to install REM with cameras "to all vessels (Scottish and non-Scottish) carrying and/or deploying scallop dredge gear in the Scottish zone, regardless of scallop species being prosecuted and number of dredges being deployed" which must be done urgently. Four years after the

2017 regulations, it was disappointing that only [30 - 40% of Scottish scallop dredge vessels](#) were fitted with REM systems including cameras, particularly in the context of several [reported breaches of marine conservation orders](#) in some of Scotland's Marine Protected Areas.^{26 27} In fact, the figure may have been even lower, since the BRIA states "scallop dredge vessels already installed with REM comprised 11-13% of the scallop dredge vessels active in the Scottish zone in 2018-2020." Whilst it is welcome that, whatever the figure, this has increased to over 80% of over 10m vessels, as announced by the Cabinet Secretary at the launch of this consultation, the current figure for smaller vessels, which due to greater manoeuvrability in some circumstances potentially pose a higher risk of damaging fragile, stable or complex inshore habitat, is not clear.²⁸ Funding and confidence that the REM equipment will be procured and urgently rolled out to all the fleet, both over 10m and under 10m, as soon as possible is therefore a potential issue. Once REM with cameras becomes mandatory for all scallop dredge vessels, as [repeatedly committed to](#),²⁹ Scottish Government must work with industry to guarantee that the funding is in place to make sure that there is urgent and comprehensive deployment of the REM technology across the entire fleet.

We recognise that this consultation is taking place in parallel with the Future Catching Policy consultation and strongly believe that REM with cameras is essential to ensure compliance of the scallop fleet with both existing regulations and future regulations needed to transform management of scallop fishing. We refer you to our response to the Future Catching Policy consultation for detail on what we see as prerequisite for sustainable scallop fishing, including ecosystem-based spatial management – to enable ocean recovery and address gear conflict – and effort reduction, urgently needed inshore in particular where there should be a presumption against the use of all bottom-towed gear across a significant area as per our response to the Future Fisheries Management discussion document.

11. Do you agree that REM requirements on vessels carrying and/or deploying scallop dredge gear in the Scottish zone should be broadly aligned to existing REM requirements provided for in Regulation 6 of the 2017 Order?

Yes / No

We could answer "No" here simply because the answer depends on interpretation of "broadly aligned". Since we would like to see REM with cameras applied to the entire scallop fleet, then Paragraph 3 of Article 6 (and therefore the exemptions to Article 4 as set out in Article 5) should be revoked. In that sense, removal of those exemptions could be said to mean that there is not "broad alignment". However, we understand that the intent is indeed to rollout REM with cameras to the whole scallop fleet. If interpreting the question to mean that Paragraphs 1, 2, 4-5 would apply, but that 3 is removed, and further detail added on there being a requirement of a minimum of 5 frames per second on installed cameras, as recommended, then we would agree that there is "broad alignment" if that is what is meant by this term. It is worth noting that the European Fisheries Control Agency (EFCA) [guidelines](#) recommend that in general, deck and overview cameras should be set to 1-5 fps (frames per second), and on more active areas like sorting belt

²⁶ [Written question and answer: S6W-00466 | Scottish Parliament Website](#)

²⁷ [Marine and fisheries compliance: reports of illegal fishing in marine protected areas - 26 May 2020 to 30 November 2021 - gov.scot \(www.gov.scot\)](#)

²⁸ [S5W-33763 | Scottish Parliament Website](#)

²⁹ Marine Scotland Mandatory monitoring for Scottish scallop dredge fleet - Marine Scotland (blogs.gov.scot)

and discard chute cameras should be set to 5-15 fps.

Bycatch can be as high as 53% in some UK king scallop dredge fisheries.³⁰ We therefore think that whilst two cameras may be sufficient to confirm the number of dredges being towed on each side of the boat, it is insufficient to also properly monitor what is being landed by the vessels, including potential bycatch such as brown crab, skates, rays and flatfish. There should, therefore, be at least four cameras, one for viewing gear haul-in on each side, and at least two to cover the deck and catch sorting area. This may need to be increased further depending on the size of the vessel and location of the catch sorting area and should have increased frames per second as recommended by EFCA.

In short, we support “all vessels carrying and/or deploying scallop dredge gear in the Scottish zone [to] have a fully operational REM system installed on-board that meets the standards required” provided there are at least four cameras. This system will need to include winch sensors, our recommendation of at least four digital cameras (see above) that can record video imagery of at least 5 frames per second at a resolution of 1080 pixels per frame with 5-15fps where needed, and GPS and other data on speed and direction. This is essential to enable responsible operators to demonstrate legal practice, recognising that we are in parallel calling for transformation of the spatial management of the scallop, and indeed entire capture fishery, sector, and to improve monitoring of catch, including bycatch, and compliance with fisheries and marine conservation regulations.

12. Do you consider that any other changes (in addition to the ability to record footage to a minimum of 5 Frames per Second) should be made to the REM system specification?

Yes / No

As highlighted in the answers to question 2 and 11, there has recently been a move towards using additional cameras to enable greater transparency. Some REM manufacturers now supply systems that can use up to eight or even 12 cameras depending on the needs of the programme. We are therefore concerned that two cameras is too few to be able to both record what is being hauled in on each side of the scallop dredge vessel and to record the catch being sorted. We would recommend at least four, two to monitor the gear being hauled in and at least two to monitor the catch sorting area, and potentially more depending on the size of the vessel.

13. What is your view in relation to the various options outlined for deployment of REM to parts of the demersal fleet as outlined in Section 5: REM for large demersal vessels?

It is our strong view that with respect to meeting the objectives in the UK Fisheries Act (including in particular minimising discards and sensitive species bycatch), that REM should be applied to the demersal trawl fleet as well as gillnet and longline fleets.

The European Fisheries Control Agency (EFCA) has repeatedly identified demersal trawls as high risk for breaching the landing obligation. Given the threat that this poses to stocks and wider marine environment we believe there is a strong case for REM application to this important fleet segment.

“EFCA [evaluations of compliance](#) with the LO done to date show a widespread low level of compliance in some fisheries. This has led to the recommendation by control experts from EU Member States (MS) to prioritise the use of Remote Electronic Monitoring (REM) including Closed Circuit Television (CCTV) as an

³⁰ [Regional variation in bycatches associated with king scallop \(Pecten maximus L.\) dredge fisheries – ScienceDirect](#)

efficient control and monitoring tool to improve compliance and enforcement of the LO implementation. REM systems have been identified by control experts as a tool that would provide the MS with the proportionate and effective operational solution for monitoring the compliance to the LO across fleet segments of the EU fishing fleet and tackling illegal discarding practices.”³¹

Effective application of REM in high-risk demersal fleet segments would help address both the discarding of undersize fish and high-grading of certain species, both of which contribute to overfishing.

With respect to sensitive species bycatch gillnet and longline vessels pose a high risk. On these vessels REM could be used to not only monitor vessels in order to provide a true understanding of impact but where mitigation can be applied it should and be monitored for use and efficacy. Prioritisation of vessels that pose a high risk to protected species would align the Scottish Government with the approach of fisheries managers in New Zealand, who have been phasing in REM through their Integrated Electronic Monitoring and Reporting System (IEMRS).

Our view on reference fleets - The use of reference fleets is often suggested as an alternative to the full implementation of REM across a fleet. We strongly oppose the use of reference fleets as trials where reference fleets have been used show notable differences between data recorded by the REM reference fleet and non-REM vessels recording their own data.³² The ability to fund a 100% coverage REM project is likely to be the main reason why a reference fleet approach may be considered. However, it is clear from the studies that those vessels with REM installed will be placed at a commercial disadvantage compared to those without REM in a reference fleet scenario. The vessels without REM will likely continue to discard undersize fish as well as high grade the less valuable smaller grades of marketable catch and will therefore be able to maximise the returns on their limited quota by ensuring that only the larger more valuable fish are landed against it. Given that the main costs associated with REM tend to be staff costs related to video review, a fairer solution would be to install REM on all vessels within a fishery but reduce the footage randomly selected for review. That way vessels will all be operating to the same conditions because no-one will know if they will be selected to have their catch declarations verified by video and so will not risk non-compliant activity. The presence of REM acts in a similar deterrent way to the average speed cameras on a motorway. Traffic slows to the stated limit as they don't know whether they will be picked up by the system or not.

Our view on the option of broader rollout of REM to fleet segments - Unwanted catch varies between fleet segments therefore as an overall approach the idea of addressing the problems associated with the different fleet segments should make good management more achievable as long as there is good dialogue and shared understanding of what the goal is.

The FCP consultation document recognises that the pelagic fleet “can be a clean, non-wasteful fishery.” We recognise that making REM mandatory on both the pelagic and scallop dredge fleets will help facilitate future roll out to other fleet segments, however, if Scottish Government want to reduce unwanted catch with urgency they must prioritise the roll-out of REM to the high-risk fleet segments. A recent WWF report ‘The Untrawled Truth’ found that 92% of the total discards recorded by the entire EU fleet were produced by vessels using active bottom-contacting gears. With that in mind, it is important to remember that one of the reasons the FCP is being developed is to improve the marketability of Scottish fisheries – decreasing associated risk and therefore making it easier for buyers to included them in their supply chains.

It is clear if we are to move towards high confidence in Scottish fisheries REM is a vital tool that must be

³¹ [Remote Electronic Monitoring \(REM\) | EFCA \(europa.eu\)](#)

³² Clara Ulrich, Hans Jakob Olesen, Heiðrikur Bergsson, Josefine Egekvist, Kirsten Birch Håkansson, Jørgen Dalskov, Lotte Kindt-Larsen, Marie Storr-Paulsen, Discarding of cod in the Danish Fully Documented Fisheries trials, ICES Journal of Marine Science, Volume 72, Issue 6, July/August 2015, Pages 1848–1860, <https://doi.org/10.1093/icesjms/fsv028>

embraced in order to underpin sustainability of the fishery.

14. Taking into account the Business Regulatory Impact Assessment (BRIA) supplementing this consultation, do you have any comments or views which you would like to put forward?

We note that the BRIA states “around 20 British registered fishing vessels which dredge for King Scallops have financed the on-board installation of an REM system so that they can deploy 10 dredges per side in the 6-12 nautical mile area within the Scottish zone... These scallop dredge vessels already installed with REM comprised 11-13% of the scallop dredge vessels active in the Scottish zone in 2018-2020.” We would welcome clarity as to how these figures compare to the Cabinet Secretary’s statement to Scottish Parliament that 80% of the over 10m scallop dredge fleet had REM with cameras installed. We assume that this was accounted for by a big increase in uptake once the Covid restrictions eased as mentioned by the Cabinet Secretary.

We do not have further detailed comments to make on the BRIA but agree with the broad conclusions that the benefit of rolling REM with cameras out across the pelagic and scallop fleets, whilst in itself we would see as an essential requirement for sustainable fishing activity, also vastly outweigh any small costs, whether borne by the industry, the taxpayer or a combination of both. The environmental and socio-economic cost of not improving monitoring to deliver fully documented fisheries in Scotland’s waters is far outweighed by the benefits of improving monitoring, supported by REM with cameras.

Full documentation should also be rolled out across all fleet segments, in tandem with Fisheries Management Plans, to give a clear picture of which vessels are fishing for which species and quota in which areas, and to ensure there are no licensing and regulatory breaches. Such an approach will give confidence to the fleet, to all businesses in the supply chain and ultimately consumers, who are increasingly concerned about the provenance of their seafood. Striving to ensure full documentation in the Scottish fleet can help demonstrate leadership on the global stage which should be rewarded with market advantage, but only if environmental criteria and regulations are strictly met and can be seen to be met.