TransparentSea

Protecting our ocean using Remote Electronic Monitoring with cameras

Fish are central to the health of our ocean and the livelihoods of fishing communities.

Each year, thousands of commercial fishing vessels navigate UK waters, hauling in catch ranging from Atlantic cod to giant spider crabs.

With only 35% of UK stocks fished within environmental limits[1], and bycatch recognised as a major threat to marine wildlife, we urgently need to ensure fishing fleets are properly managed and monitored.

These problems are often hidden in the depths of the ocean as a result of poor fishing practices and fish being illegally discarded at sea.
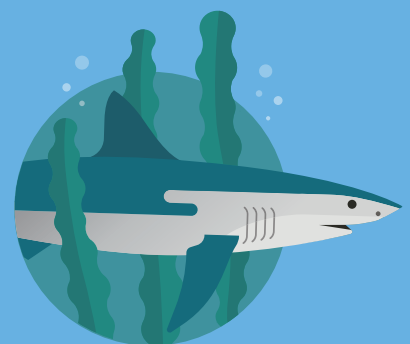
UK species threatened by bycatch:
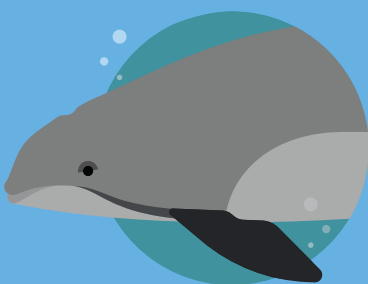
## CETACEANS   SEABIRDS   SHARKS

Effective monitoring on vessels with Remote Electronic Monitoring (REM) with cameras is essential if we are to eliminate bycatch as well as overfishing.

It should be a mandatory requirement to have REM with onboard camera coverage on all vessels fishing in UK waters to help tackle the nature and climate emergency we are currently facing.

Impacts of commercial fishing at a glance

65%
of UK stocks
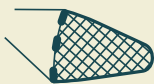are fished beyond environmental limits[1]
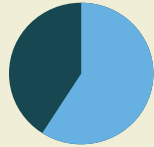
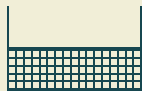*The four types of fishing gears largely responsible for bycatch in the UK:*

LONGLINING are literal 'long lines', many miles long, which can carry thousands of baited hooks.
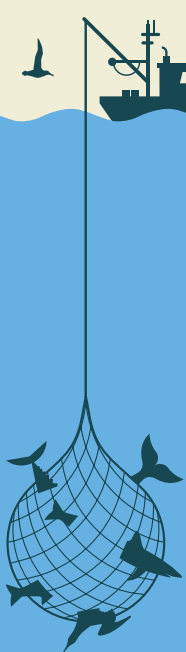
TRAWL fisheries drag large nets along the seabed, catching almost everything in their path.

GILLNETS are walls of nylon netting that are hard for animals to see and can be several miles long.

CREEL pots trap shellfish on the seabed. Wildlife can get entangled in the long lines linking the pots to buoys at the surface.

UK marine wildlife caught as bycatch:

DOLPHINS

WHALES

SEABIRDS

SHARKS

PORPOISES

SKATES

RAYS

SEALS

What is **discarding?**

Discarding is the wasteful practice of **dumping unwanted fish** back into the sea.

The true weight of **discards in UK waters** is unknown...

...but in 2021 Scottish vessels alone discarded nearly

8,000 tonnes
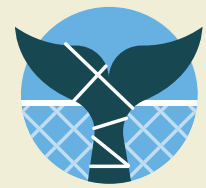
tonnes of unwanted catch[2] **including species** such as

HADDOCK

COD

What is **bycatch?**

Bycatch happens when marine wildlife accidentally gets **caught, killed** or **injured** in fishing gear.

Every year, an estimated

1000

whales, dolphins & porpoises are killed by UK fishing activity[3]

&

2,200–9,500 FULMARS

1,800–3,300[4] **GUILLEMOTS**

We don't currently know the true levels of bycatch. And we don't know how much fish is coming out of the sea.

But we do know that if fishing activity at sea is more effectively monitored, it will help fishers evidence a more sustainable approach to fishing. This will facilitate UK stock recoveries, help monitor and minimise bycatch, and promote a thriving and sustainable industry for generations to come.

And there is a tangible technology available that will help answer these questions, once and for all.
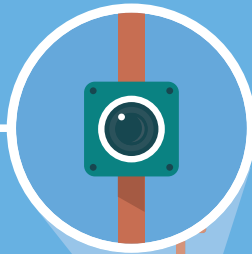
Protecting our ocean using
Cameras at sea

Allowing us to see where, what and how fish and other marine wildlife are being removed from our ocean.
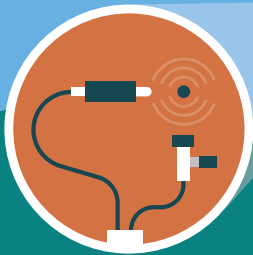
DIGITAL CAMERAS

In key working areas above & below deck to record gear settings, gear hauling, & monitor catch handling.

GPS

Logs the boats positions & movements.

GEAR SENSOR

Monitors gear usage & fishing activity (hydraulic & drum-rotation sensors).

CONTROL CENTRE

Data from the cameras, sensors & GPS are combined on a central hard drive for UK fishing authorities to access remotely.

Remote Electronic Monitoring (REM) systems combine video and sensor technology to provide a full picture of fishing activity and catch handling.

This game changing technology will help shift from outdated, inefficient methods of monitoring catch to smart new methods that are more cost efficient and less labour intensive.

Using a combination of gear sensors and effectively positioned video cameras, REM can be used to monitor fishing activity and wildlife bycatch during the net hauling and fish sorting process.

These smart cameras at sea enable fisheries to expand data collection of their fishing fleets to assess bycatch levels and mitigation methods, fish and catch levels, conservation science data and to discourage discards overboard.

The Advantages of REM
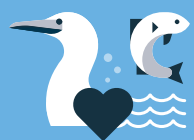
for wildlife, fishers, retailers & consumers

End discarding

Efficient monitoring of the net hauling & fish sorting process will encourage fishers to fish more selectively & discard less.

Protects wildlife

Helps to monitor & reduce bycatch levels and reduce impacts on marine wildlife such as sharks, seabirds & cetaceans.
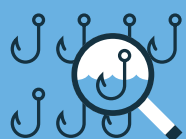
Healthier ocean

Helps to facilitate stock recoveries and support marine ecosystems, teeming with life, which will absorb more carbon from the atmosphere.

Confident fishers

Data supports decisions on stock management, enabling fishers to adopt sustainable harvest strategies.

Deter overfishing & illegal fishing activities

Will be used to support stronger enforcement tools & reward fishers who are using best practices at sea.

Confident consumers, responsible retailers

Provides fishers with verifiable evidence of what they are seeing, haul-by-haul, to evidence responsible practices at sea.
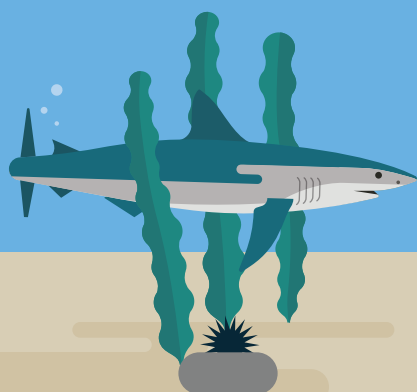
Improved scientific data

REM can capture widespread data to provide a full picture of fishing activity & help us better understand our seas.

Safeguards Marine Protected Areas (MPAs)

GPS, sensors & video can monitor fishing gear and help protect key marine habitats & help us understand the impacts of fishing on wildlife.

It should be a mandatory requirement to have **REM with onboard camera coverage** on all vessels fishing in UK waters to support sustainable fishing and **safeguard our ocean**.

Thousands of marine wildlife are caught and killed by UK vessels as bycatch every year[3], but the true scale of the problem in UK seas is unknown.

We currently use human observers to understand how many animals are killed as bycatch in UK waters. However, targeted monitoring for wildlife bycatch is extremely low across all fleets, with observers covering <5% of annual UK fishing effort.

Current estimates on the number of animals that are killed as bycatch in UK waters could be the tip of the iceberg.

Gillnets pose a high risk of bycatch to a variety of species, but over 95% of the UK gillnetting fleet consists of smaller <12 metre vessels which have extremely limited monitoring[5]. We don't collect data from non-UK vessels either. This means there are big gaps in our knowledge.

REM offers an opportunity to address this. Increased data collection from cameras on all vessel sizes would give us better data, and could be used to help tackle known issues.

Solutions exist to prevent bycatch of marine wildlife and unwanted catches of fish. REM can be used to monitor both their use and effectiveness.

Positioned correctly, REM can collect a wealth of information on both wildlife bycatch and fish discards, providing transparency and accountability for consumers, retailers, fishers and decision makers.

Better data means better management. If solutions to bycatch exist and are used elsewhere, then why aren't they used in UK waters?
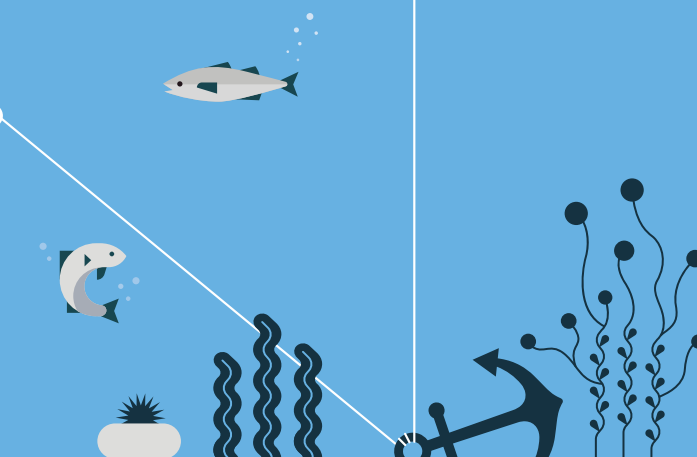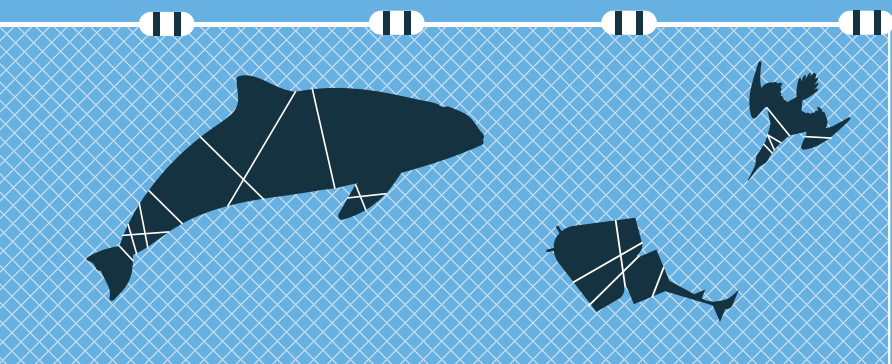
Concious consumers, responsible retailers

Cameras at sea can provide fishers and suppliers with verifiable evidence that can be used to maintain access to key clients such as supermarkets, restaurants, and fish and chip shops.

Consumers are increasingly environmentally aware and willing to support sustainable practices[6]. REM offers a new way to build trust, ensure sustainability, and potentially improve market access for fishers.

We envisage a world where consumers can confidently buy seafood over the counter, knowing that their product doesn't come with a side of unwanted wildlife bycatch or discarded fish before arriving on their plate.

> " The SSC... called for clear commitments by the UK Governments to fully implement Remote Electronic Monitoring (REM) in domestic fisheries. "

**SSC – A coalition of businesses in the seafood supply chain[7]**

An ocean of solutions

Today's technological evolutions can help us solve old problems in new ways.

Camera systems are now common practice in many food production facilities across the UK, with intelligent video analytics used to monitor food production rates, identify production line errors and monitor decontamination areas. Food manufacturing plants use it to preserve brand reputation and customer trust. Why should wild capture fish production be any different?

It is time for fisheries to use onboard cameras to support decisions to manage their stocks, enabling them to adopt sustainable harvest strategies, stronger enforcement tools, and reward fishers who are using best practices at sea.
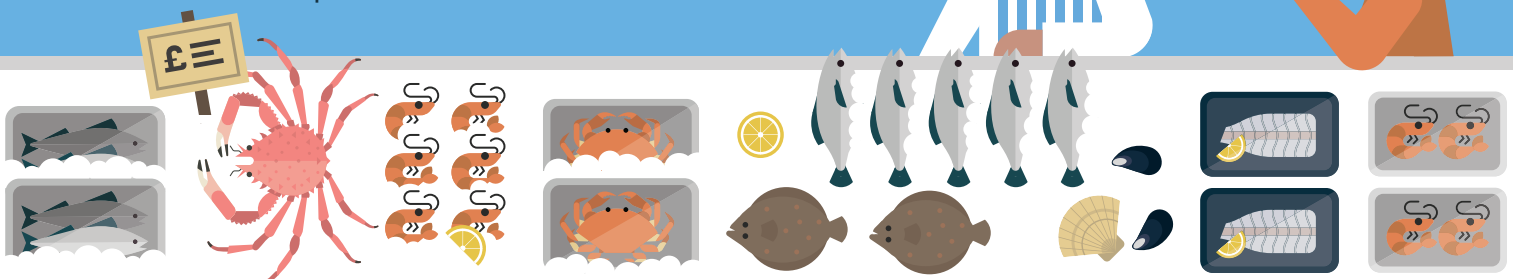
A collaborative, cooperative approach

Healthy relationships between managers, scientists, enforcement agencies and fishers will be key to safeguarding the future of our ocean and fisheries.

Instead of the traditional approach of top-down policy and enforcement, camera monitoring systems offer a new collaborative, cooperative approach with everyone sharing a common goal: a healthy, thriving ocean with sustainable fish stocks.

With ongoing developments in technology, we envisage a day where scientific data will be accessed by fisheries, managers and fishers alike, in real-time, after each haul.

REM can empower fishers who are operating in accordance with best practice by evidencing sustainable practices through objective, verifiable data.

# A trustworthy technology for better fisheries management

Monitoring fisheries is challenging, especially when boats operate far from shore.

A conventional method of monitoring a fishing vessel's activities is to send onboard observers to collect independent information.

TRADITIONAL OBSERVERS

|	
Unverified values	❌
More expensive	❌
Requires space onboard	❌
Subject to weather conditions	❌
Snapshots of daily catches	❌
Requires safety equipment	❌
Observers need to sleep	❌
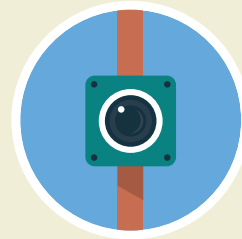
ONBOARD CAMERAS

Verified values	✅
More cost effective	✅
No additional space required	✅
Not influenced by the weather	✅
Continuous presence	✅
Safety equipment not required	✅
Available for monitoring 24/7	✅

One of the major benefits of REM is that data can be collected and evidenced on a haul by haul basis, replacing traditional observer data.

Cameras at sea have therefore emerged as a cost effective means of monitoring fisheries, reducing the need for human observers and bringing additional benefits for fishers.
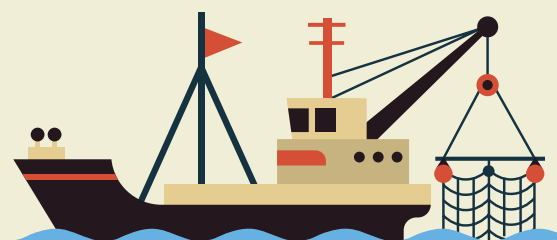
Extending the reality of cameras at sea

Countries around the world have seen the benefits of using REM[8].

After 2 decades of extensive trials, REM has become a vital and irreplaceable tool that has been successfully implemented in various fisheries worldwide and we are already witnessing its transformational impact.

For the UK to have world-class fisheries management, as promised by UK governments[9], REM needs to be adopted to bring the UK in line with other worldwide fisheries.

## FISHERIES IN DENMARK

Case study

In Denmark, fisheries have successfully trialled REM as a technology and they are now beginning to roll out REM across their fishing fleets[10].

They fish in the same waters as UK fleets. After their successful trial, they are now rolling it out more widely in similar fleets to those that we have in the UK. The technology they are applying could be feasibly used in UK fisheries.

> I believe REM is the solution. It's easy to use and it's very reliable on a technical level.

**Mogens Schou, Fisheries Consultant[11]**
Aquamind, Copenhagen
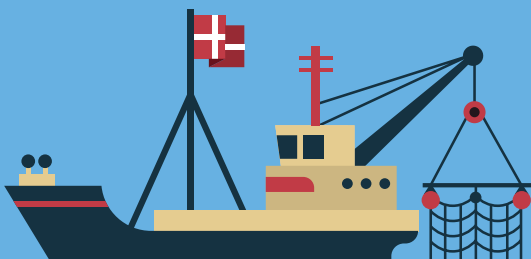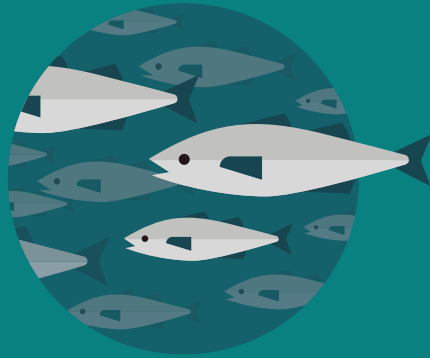
> Now REM has given us a chance to prove what we are reporting and claiming in almost real time... We now have a chance to show video and data from our last trip that is indisputable, and the managers should put in place systems that allow them to act on that information as quickly as possible.

David Stevens, (UK fisherman)
Owner of the *FV Crystal Sea*[12]
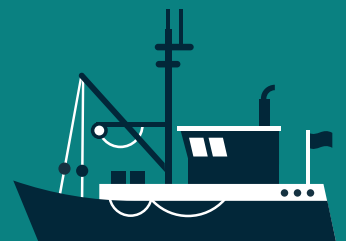
This is a golden opportunity for the UK to lead the way in sustainable fishing

There is growing public support for greater marine protection in the UK[6]. Now that the UK has left the EU, it has stated its intention to have world leading fisheries management[9].

To appropriately apply this framework requires an increased level of monitoring, which can be achieved by the wide scale use of cameras at sea. By using this progressive approach, UK fisheries could lead the way and become synonymous with sustainable practice.

Snapshot of the UK fishing fleet
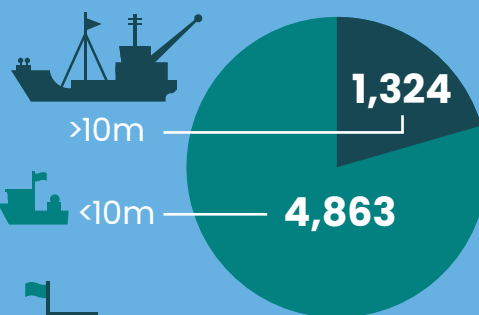
The UK fishing fleet has

1,324

vessels > 10m

> 10m

These vessels account for roughly

94%

of the **total UK catch** by weight[12]

The majority of UK vessels are **below 10m** in length:

>10m — **1,324**

<10m — **4,863**

However, **smaller vessels** still have **high impact** because they:

- Use a range of gear types
- Catch a diverse range of species (including wildlife bycatch)
- Fish in places of high biodiversity

And this is just the UK fleet. There are still thousands of other vessels operating in UK waters. As an independent coastal state, the UK can set the bar high, so if foreign vessels wish to fish UK waters they must abide by the rules set by UK administrations and prove they are compliant with the same standards as UK vessels.

In doing so, they will set positive trends that will in time create level playing fields across shared seas.

A cost effective solution

REM systems have the potential to vastly increase monitoring coverage, whilst saving tax-payers money.

REM costs equate to around 25% of the cost of traditional systems which deliver less than 1% at-sea coverage[12]. The financial argument clearly shows that REM is a viable option:

REM systems equate to roughly

1/4

the cost of traditional monitoring

To provide 10% monitoring on

1,324

UK vessels > 10m would cost approximately

£5 million

per year using REM systems[12]

By contrast, it would cost around

£20 million

per year to achieve less than 1% of at sea footage using traditional monitoring methods[12]

Traditional monitoring methods provide an estimated:

1% at sea monitoring

whereas REM systems provide:

100% at sea monitoring

Roughly **10% of this video footage** will be reviewed by remote analysts for anomalies.

10%

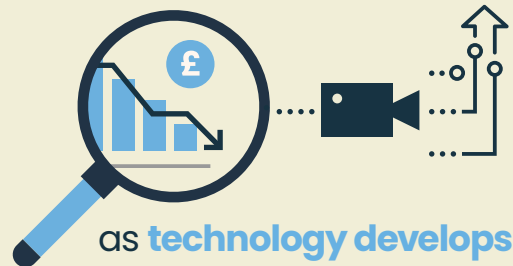Annual costs* of REM are falling:

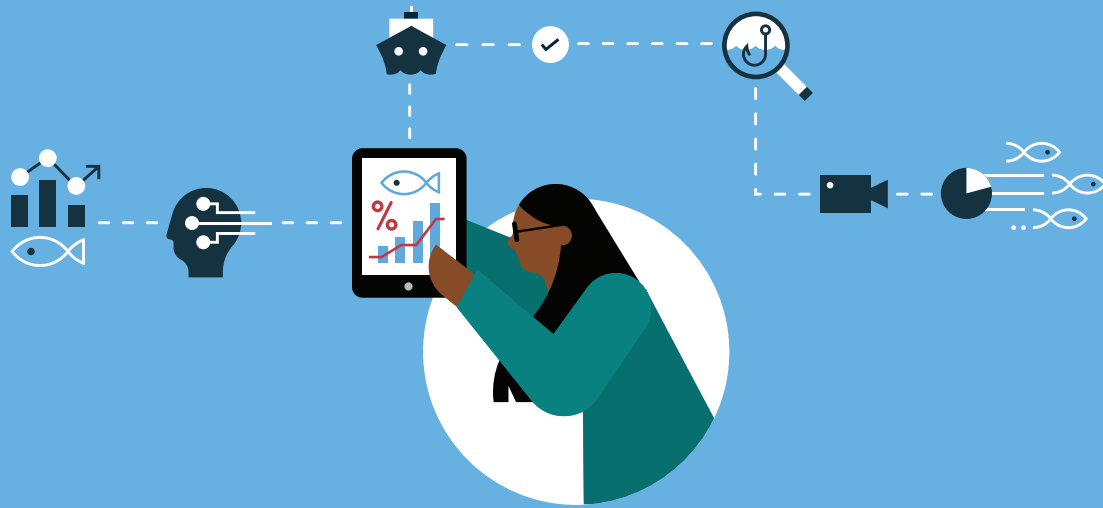**£4,697** per vessel — **2015**

£3,785 per vessel — **2017**

This trend is forecast to continue

as **technology develops & scales up** over time

*Costs to install system and randomly review 10% of activity

Source: WWF: Remote Electronic Monitoring in UK Fisheries Management (2017)

A bank of rich, indisputable scientific data

The data collected from REM will provide an ocean of solutions to benefit fisheries, managers and marine scientists alike. Some of the advantages include:
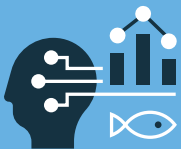
Data Trends
Patterns relating to fishing gear issues, fish stocks, & biological data can be identified over a long-time scale.

Non-biased data
In comparison to traditional methods where fishers & observers can interpret the catch information differently.
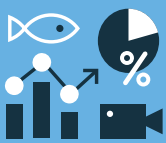
AI tools
Can identify specific species for conservation surveys & verify whether species are subject to landing obligation.

Cheaper data
REM systems allow data to be gathered at a fraction of the cost in comparison to traditional systems.

Increased and improved data
Rather than a 'snapshot' of sampling, REM captures video data of all hauls which can be stored & reviewed at a later date.
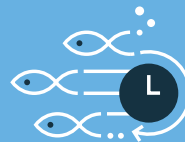
Faster access and response to data
Managers can respond quicker to events & give fishers the best opportunities based on what they are currently experiencing.

Meeting marine conservation targets
REM systems can help fish stocks to recovery by encouraging more selective fishing & minimise impacts on marine wildlife & habitats.

Mitigation use
REM reveals if fishers are following mitigation measures & whether it is working to help reduce wildlife bycatch.

A win-win-win for wildlife, fishers and the consumer

Intelligent cameras at sea are an effective, value-for-money tool to assess fishing activities, collect data and assure sustainable best practice. When standardised and correctly implemented, REM can provide:

Cost savings
Greater coverage, data & confidence for significantly less money than other monitoring methods.

Improved sustainability
Bycatch levels are reduced & stocks are fished within environmental limitations.

Modern data management
The digitalisation of data will set a new standard in today's technological age.

Employment
By hiring people to review data, communicate with fishers and maintain systems.

Compliance
By helping to evidence conformity with conservation and management measures.

Data integrity
REM is not susceptible to observer & deployment effects, bribery, intimidation, or coercion.

Transparency
By allowing vessel owners or fishing companies to monitor catches & share information with supply chains.

Climate resiliency
By capturing widespread data we can understand how climate change is impacting our ocean.

Levels playing field
A set of standards that everyone complies to so all fisheries have the same monitoring regime.

Cameras at sea

Protecting the future health of our ocean and fisheries

REM will help to protect marine ecosystems and prevent unsustainable fishing, whilst increasing long term yields and profits for fishing communities.

REM offers the UK a chance to improve fisheries management and lead the way in the adoption of progressive technology that delivers sustainability, accountability and confidence in the supply chain.

REM is a gamechanger and could position the UK as a world leader in sustainable fisheries management, and help to ensure marine biodiversity is protected for generations to come.

Design & illustration by edharrison.co.uk

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

WWF

RSPB

MARINE CONSERVATION SOCIETY

Visit **mcsuk.org/transparent-seas** for references and source materials