

## Annex A: Defra group remote electronic monitoring projects and trials to date

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2011	Catch quota trial	Marine Management Organisation (MMO)	Complete	15	Beam trawl, gillnet, otter trawl, pair trawl, longline	North Sea (ICES area 4) and Western Channel (ICES area 7e)	12 vessels in North Sea monitored for cod and three vessels in Western Channel monitored for sole. To test the operational management and capabilities of remote electronic monitoring as a means of verifying catch records and monitoring discards.
2012	Catch quota trial	MMO	Complete	19	Beam trawl, scallop dredge, gillnet, otter trawl, pair trawl	North Sea (ICES area 4) and Western Waters (ICES area 7)	To monitor potential impacts of discard bans on industry and regulators, particularly in mixed fisheries. To further the development of remote electronic monitoring as a monitoring tool in the context of full catch documentation.

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2012	Under 10 metre vessels trial	MMO	Complete	2	Demersal trawl and gillnet	Whitehaven (ICES area 7a)	Technical trial to assess reliability of remote electronic monitoring equipment and compare remote electronic monitoring data collected by an onshore observer with the self-reported catch records kept by the skippers.
2013	Catch quota trial, North Sea cod	MMO	Complete	12	11 trawlers (demersal otter trawl and pair trawl) 1 gillnet	North Sea (ICES area 4)	To analyse and quantify North Sea cod discard levels, verify self-reported data of undersized catch retained, potential to quantify discards of other species, and develop a scoring system for quality of data.
2013	Catch quota trial, Western haddock	MMO	Complete	1	demersal otter trawl	Celtic Sea (ICES area 7b-k)	To monitor levels of discards of haddock and the levels of juvenile haddock in the fishery.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2013	Catch quota trial, Southwest beam trawl	MMO	Complete	9	Beam trawl	Southwest Channel (ICES area 7e)	To test new remote electronic monitoring kit by completing analysis of video collected to quantify discards observed for selected species. To verify self-reported skippers' records. To compare grading data in the fishery, to evaluate the impact of a plaice discard ban at fleet level, undertaking sea trips to provide quality control data and further research data.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2014	Catch quota trial, North Sea	MMO	Complete	16	15 demersal trawls 1 gillnet	North Sea (ICES area 4)	To investigate the potential of catch quota management to reduce discard levels with particular focus on how mixed fisheries will be affected. To provide evidence and experience in advance of the landing obligation. Enhance data collection to improve fisheries advice, investigate the potential for species at risk of choke in North Sea mixed demersal fisheries.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2014	Catch quota trial, Western haddock	MMO	Complete	1	Demersal otter trawl	Celtic Sea (ICES areas 7b-k)	Further assessment of the impact of a discard ban on ICES Area 7b-k haddock in the context of a mixed demersal trawl fishery. To monitor gear selectivity trials to determine the best gear configurations to reduce catches of undersize haddock. To study discards of other potential choke species. To report on incidental reduction in squid catches from gear modified for haddock selectivity.
2014	Pelagic freezer trawl	MMO	Complete	1	Pelagic trawl	North Sea (ICES area 4)	One trip for a large pelagic freezer trawler monitored for the duration.

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2015	Southwest beam trawl	MMO	Complete	4	Beam trawl	Southwest Channel (ICES areas 7d-7e)	To verify self-sampling data provided by skippers, demonstrating the application of self-reported discard data and remote electronic monitoring verification with value added length frequency analysis to study seasonal spatial and diurnal discard patterns in a mixed demersal fishery. To demonstrate the use of remote electronic monitoring to monitor the de minimis landing obligation exemption for dover sole.
2015/ 2016	Western Waters catch quota trial	MMO	Complete	1	Twin-rig trawl	Celtic Sea (ICES areas 7b-k)	To monitor testing of selective gear types and compliance with the landing obligation for haddock. To compare difference between a vessel using selectivity measures and one fishing in a manner equivalent to the non-incentivised otter trawl fleet.

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2015	Catch quota trial, North Sea	MMO	Complete	18	17 demersal trawls 1 gillnet	North Sea (ICES area 4a)	To provide evidence and experience from the scheme in advance of the demersal landing obligation being phased in from 2016, investigate the potential of using market grading data for reference fleet monitoring, better understand the impact of the catch quota trial and the landing obligation on the fishing industry.
2016	Catch quota trial, North Sea	MMO	Complete	17	16 demersal trawls 1 gillnet	North Sea (ICES area 4a)	To monitor compliance with the landing obligation for cod, hake, nephrops, northern prawn, plaice, sole, and saithe. Investigated use of risk-based auditing of footage.
2017	North Sea fully documented fisheries	MMO	Complete	12	11 demersal trawls 1 gillnet	North Sea (ICES area 4a)	2017 was the same as 2016 above but with the addition of Whiting under the landing obligation.

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2018	North Sea fully documented fisheries	MMO	Complete	14	12 demersal trawls 1 demersal trawl (nephrops) 1 gillnet	North Sea (ICES area 4a-b)	To monitor discards and compliance with landing obligation, including a trial of interspecies flexibility with particular focus on saithe. To trial monitoring discarding of juvenile fish covered by landing obligation recorded in logbooks.
2018	Marine instrument trial	MMO	Complete	1	Beam trawl	Southwest Channel (ICES areas 7d-e)	To compare two remote electronic monitoring systems and analysis software.
2018	Pelagic ring net trial	MMO	Complete	1	Ring net	Celtic Sea (ICES areas 7e-f)	To test if remote electronic monitoring can be used to monitor net slipping events before point of retrieval.



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2019	North Sea fully documented fisheries	MMO	Complete	11	10 demersal trawls 1 demersal trawl (nephrops)	North Sea (ICES area 4a-b)	To monitor discards and compliance with landing obligation covering all quota species. The dispensation to allow monitored discarding of juvenile fish was continued.
2020	North Sea fully documented fisheries	MMO	Complete	11	10 demersal trawls 1 demersal trawl (nephrops)	North Sea (ICES area 4a-b)	To monitor discards and compliance with landing obligation. Measuring of retained and discarded species to make comparisons between landed grades recorded and those observed, as well as checks on below minimum conservation reference size for discarded fish.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2021	Future fisheries – implementing remote electronic monitoring. Lessons from established fisheries	MMO	Complete	NA	NA	NA	To improve our understanding of implementation of remote electronic monitoring at scale by engaging with experts from the United States of America and New Zealand fisheries administrations to understand their experiences of implementing remote electronic monitoring at scale.
2022	Integration of digital scales	MMO	Ongoing	1	Demersal trawl (nephrops)	North Sea (ICES area 4b)	To integrate motion compensating digital weighing scales and a data input keypad with remote electronic monitoring system to automatically record catch weights. To investigate whether linking scales data to remote electronic monitoring improves analysis efficiency in an audit-based review system.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2023	Remote electronic monitoring data integration	MMO	Ongoing	NA	NA	NA	To explore how remote electronic monitoring data can be stored, processed, analysed and integrated into existing sources to enable wider impact across government.
Ongoing	Celtic Sea scientific remote electronic monitoring programme	Centre for Environment, Fisheries and Aquaculture Science (CEFAS)	Ongoing	5	Demersal otter trawl	Celtic Sea, Western Channel (ICES areas 7e-j)	To monitor catch composition of Celtic Sea mixed fisheries, with an additional focus on integrating remote electronic monitoring data into ICES advice.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2011	The English North Sea catch-quota pilot scheme	Cefas	Complete	6	3 demersal otter trawl 2 gillnet 1 gillnet and long-line	North Sea (ICES area 4)	To evaluate vessel activity and retained and discarded catch. The main aims were to assess the catch quota systems potential to reduce discards and encourage fishermen to fish more selectively and to evaluate the utility of remote electronic monitoring as a tool to verify vessel activity and reported total catches.
2017	Remote electronic monitoring used to validate fishermen's self-sampling records of skates and rays in the Bristol Channel.	Cefas	Complete	1	Demersal otter trawl	Bristol Channel (ICES area 7f-g)	To evaluate self-sampling of skate and ray catch. Analyses showed that the remote electronic monitoring video footage allowed for successful verification of the crews self-sampling records, with high agreement in the retained skate and ray catch in the Bristol Channel trawl fishery.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2022	Catch and release tagging programme (CHART)	Cefas	Complete	12	Rod and line	ICES area 7e	To use remote electronic monitoring to check fish handling in terms of animal welfare.
2019	English fisheries data enhancement project: southwest haddock selectivity trial	Cefas	Complete	3	Otter trawl	Celtic Sea, Western Channel (ICES areas 7e-j)	To monitor discard estimates for haddock in 7b-k, monitoring catch composition of Celtic Sea mixed fisheries (for example, cod), evaluation of gear selectivity to inform on a technical measure derogation.
2022	Smartfish	Cefas	Complete	2	1 demersal otter trawl 1 beam trawl	Celtic Sea, Western Channel (ICES areas 7e-j)	To develop artificial intelligence to identify, count and measure discarded fish from camera footage to generate discards data.

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2022	Smartfish	Cefas	Complete	3	Pots	Celtic Sea, (ICES areas 7e-j) North Sea (ICES area 4)	To develop artificial intelligence to identify, count and measure shellfish from camera footage to generate catch data.
Ongoing	Everyfish	Cefas	Ongoing	3	2 demersal otter trawls 1 research vessel	Primarily Celtic Sea (ICES areas 7e-j)	To build on work in Smartfish to create products that will generate data on discards using artificial intelligence.
Ongoing	Clean Catch UK	Cefas	Ongoing	4	3 gillnet 1 ring net	Celtic Sea, Western Channel (ICES areas 7e-j)	To monitor bycatch for sensitive species via industry self-sampling, with a smaller group validated using remote electronic monitoring.

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Ongoing	Insight360	Cefas	Ongoing	5	3 Ring net 2 Gillnet	Celtic Sea, Western Channel (ICES areas 7e-j)	To monitor cetacean bycatch using machine learning and voice recognition technology.
2021	Spurdog relative abundance survey, Southern North Sea	Cefas	Complete	5	5 longline	Southern North Sea (ICES areas 4c and 7d)	To conduct a fishery dependant spurdog relative abundance survey using remote electronic monitoring technology.
2019	Remote electronic monitoring of common skate bycatch	Cefas	Complete	1	Gillnet	Celtic Sea (ICES areas 7e-j)	To evaluate self-sampling of skate bycatch in the Celtic Sea.

Year	Project name	Organisation	Status	No. of vessels	Gear group	Location	Aims/Principles
2022	Risk-based approach to remote electronic monitoring for inshore fisheries	Natural England	Complete	N/A	N/A	N/A	To assess risks to the marine environment of inshore fishing metiers using good environmental status descriptors and develop a framework to identify the most efficient/effective remote electronic monitoring technologies for these vessels.