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# Revisiting UK Marine Protected Areas governance: A case study of a collaborative approach to managing an English MPA

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## Abstract

1. Case studies of MPA upscaling were solicited from participants of a workshop at the International Marine Protected Areas Conference held in Autumn 2013 in Marseille.
2. One such case study was Solandt, Jones, Duval-Diop, Kleiven, and Frangoudes (2014) which illustrated the role of science, NGOs, government and local regulators in applying systemic management measures for local MPAs based on risk, highlighting the importance of balancing top-down and bottom-up drivers.
3. Here we follow up on the UK example, illustrating the incentives and actors involved in developing centralized and subsequent fisheries management measures in UK waters. Forty local laws have been created to protect features in 143 inshore Marine Protected Areas between 2013 and 2019.
4. We illustrate best practice in delivering management, focusing on multiple practitioner involvement in a single MPA and the monitoring put in place after trawling and dredging were banned.
5. We reflect on how the governance mechanisms in place in English inshore waters can be used as a template to allow for progressive MPA management in other coastal states.

Keywords: Marine Protected Area, civil society, incentives, management, fisheries.

## Introduction and summary of 2014 Aquatic Conservation paper

Marine Protected Area (MPA) network development has been prevalent at regional and national scales for developed nations over the past 20 years in both metropolitan waters, and for overseas territories (e.g. UK, France, Australia, USA) (Fox et al., 2013; Solandt et al., 2014; Solandt, 2018). In the UK, MPAs have been designated under European Union Directives (i.e. Special Areas of Conservation (SACs) for habitats and species and Special Protection Areas (SPAs) for birds), and various domestic legislation (i.e. Marine Conservation Zones (MCZs) in English, Welsh, and Northern Ireland

waters; Nature Conservation MPAs (NCMPA) in Scottish waters). Such network planning and delivery, where nations rapidly increase the number, type and size of MPAs necessarily requires investment at different scales. The benefits derived from such wide-scale designation is dependent on effective interaction and information exchange between government bodies, society and extractive industries - often at the site level (Sievanen et al., 2011; Terry, Lewis, & Bullimore, 2017). This requires a balance of top-down and bottom-up responsibility and intervention (Gaymer et al., 2014; Jones, 2014).

The Third International Marine Protected Area Congress in Marseille in 2013 explored the role of civil society, academics and governments in the protection, management, and governance of MPAs (Solandt et al., 2014). Twelve examples from around the world provided experiences from multiple practitioners on MPA network implementation, and their governance. Here we define governance as the various levels of society, government, markets and incentives that exist to influence MPA management decisions and activities (*sensu* Jones, 2014). One of the main conclusions of that paper was that a balance is required between top-down government or legal actions and participation within *each* Marine Protected Area by local stakeholders. One significant conclusion from the Marseille workshop was that on a day to day basis, local balanced groups of stakeholders should lead on decision-making processes in MPAs, but top-down measures are required to meet conservation objectives for sites when local groups fail to deliver management (e.g. Jones, 2014; Solandt, Appleby & Hoskin, 2013). A further element revealed by the workshop was that when MPAs and networks are scaled up to national from local sites, governance mechanisms, and the bodies that drive day-to-day management also need sufficient resources, clear terms of membership, targets and objectives (Marine Ecosystems and Management, 2014). One of the key messages from Solandt et al. (2014) was that the results of MPA management must be reviewed and reported back to stakeholders (e.g. Vasconcelos et al., 2013). Whilst data-gathering is often expensive, this paper illustrates a collaborative approach where different stakeholders have combined assets to investigate the biological response to MPA management measures.

The formation of the English Inshore Fisheries and Conservation Authorities – and their equivalents overseas - are examples of bodies with the necessary powers and constitution to effectively implement MPA management (Figure 1). This is achieved by a constitution that balances socio-economics with conservation, whilst applying the law (be that conservation or fisheries legislation).

## Managing English MPAs

MPAs are often regarded as ‘conservation measures’ by resource users rather than integral to ecosystem-based natural resource management (Earll, 2018; Weigel et al., 2014). This significantly affects buy-in from politicians, and local fisheries management groups who trade-off short-term economic gain with long-term biodiversity recovery (Brownlie, King, & Treweek, 2013).

Much of the UK continental shelf was industrially fished before the advent of significant MPA designation (Kroodsma et al., 2018). As such, setting the 'baseline condition' of MPAs in Europe has been unclear, and generally 'set' at time of designation, when it could be argued that the marine environment had already been changed by human activity (e.g. Roberts, 2008; Thurston, Brockington, & Roberts, 2010). Although there are 355 UK MPAs covering 25% of the marine estate, a consequence of using recent ecological 'baselines' for UK seas set at the time of MPA designation is that the majority can be legally trawled (Solandt, 2018). Moving from consideration of this as a 'normative state' to one of a need for MPAs to recover biomass, diversity and productivity has proven difficult for scientific, political and socio-economic reasons (Appleby & Harrison, 2019; Caveen, Gray, Stead, & Polunin, 2013; Clark, Humphries, Solandt, & Weller, 2016).

Implementing governance, enforcement and science in the marine environment at such a scale is thus very different to the needs associated with terrestrial habitat and species management (Lindholm & Barr, 2001). The marine environment is more expensive and complex to research and 'manage' than the land. It is vast, ecologically interconnected, and there is little or no private ownership of the sea (Earll, 2018).

One recommendation from the 2013 workshop was the need to monitor responses to MPA management and apply this learning to different MPAs in order to increase the support for them. The subsequent learning from Solandt et al. (2014) in the UK has promoted a number of collaborative projects between NGOs, academics and local regulators that were initially provided momentum by top-down government intervention in management (Clark, Humphries, Solandt, & Weller, 2016). The results of various MPA studies from around England have recently been reported to national forums, and different regulators via the use of printed, scientific, and social media (AIFCA, 2018).

## Governance at different scales

Due to the vast spatial scale of the UK MPA network, remote sensing tools are employed as cost-effective means to control access for offshore fishing vessels. Vessel Monitoring Schemes (VMS) use satellite technology to record ship movements, and fishing activity (Dureuil, Boerder, Burnett, Froese, & Worm, 2018). At the smaller coastal scale, more 'people-oriented' socio-economic stakeholder interaction is essential to ensure conservation measures are effective (e.g. Giakoumi et al., 2018). Emerging technologies such as hybrid VMS are increasingly being used to aid UK regulators to monitor fine-scale fishing activity inside MPA boundaries.

In the UK, conservation is devolved between the different countries (Northern Ireland, Wales, Scotland and England). Of these only England has regional fisheries and conservation groups called 'Inshore Fisheries and Conservation Authorities' (IFCAs) (Clark et al., 2016; Solandt, 2018; Figure 1) that manage, enforce and govern MPAs on a day-to-day basis (Terry et al., 2017). IFCAs meet one of the recommendations from the Marseille workshop in 2013, that there is representative stakeholder engagement

and that they provide a mechanism for delivery of top-down government policy with local knowledge.

Here, we focus on the case study of one Marine Protected Area: The Eddystone to Start Point Special Area of Conservation that lies in Cornish and Devon waters off the south-west coast of England (Figure 2). Elements of top-down and bottom-up interventions have enabled a wide network of supporters (e.g. wildlife charities, academics) and funding sources (charitable trusts, and luxury yacht companies) to help the IFCA. The learning from 2013 has been applied in this case study to 'operationalize' a Marine Protected Area, helping to move it from being a 'paper park' to being 'actively managed'.

## Establishment of the Eddystone to Start Point Marine Protected Area

As the site was designated through an EU Directive, designation involved UK and European levels of qualification. The UK Government agreed to submit the area as a 'candidate site' for designation to the European Commission in 2010. The Commission agreed in 2011, and the site was awarded full SAC status in November 2017. Once the site was proposed by the UK to the European Commission in 2010, the site was legally protected, and measures were required to: 1) avoid deterioration, and 2) prevent any new activities ('plans or projects') that could damage the site (Clark et al., 2016; Solandt et al., 2013).

The Eddystone Rocks lie some 20 km south of Plymouth Sound (Davies, 1998), are Devonian in age and consist of flat-faced, submerged cliffs and overhangs (Irving, 1996) (Figure 2). The Eddystone and surrounding reefs lie in 50-60 m of water and rise steeply, and in the case of the Eddystone, break the surface. The seabed sediments comprise a range of deposits, from coarse muddy-sand to fine gravel and shelly-gravel immediately around Eddystone Rocks (Holme,1953). Surveys have shown the habitat to be fragmented, consisting of five reefs (Eddystone Reef, Hand Deeps, Middle Rock, Phillips Rocks and Hatt Rock (Axelsson, Dewey, Chaddock, & Duke, 2006). Although the individual reefs are relatively small (both on a national and local scale), they are ecologically diverse and represent a locally significant area (in terms of their size) of permanently submerged reef habitat.

Initial surveys of the site by UK recreational divers in shallow waters (e.g. Seasearch – see Pikesley et al., 2016), coupled with deep-water surveys commissioned by Natural England (camera and sidescan sonar) revealed the extent of the reef feature and surrounding sediments and are some of the most biologically diverse in the UK, with excellent zonation (Natural England, 2011). They support the most northerly extent of some Lusitanean species, such as the gorgonian coral *Eunicella verrucosa*. The site also hosts deep-water species such as the cushion star *Porania pulvillus* and slipper lobster *Scyllarus arctus*.

## Economic use of the area

The area around the reefs is extensively trawled and dredged for scallops (Pikesley et al., 2016). It is also fished using pots (for crab, lobster and swimming crab) nearer to and on top of the reefs themselves and gill-nets are occasionally set, however, this involves considerable risks of loss of gear because of extensive wave action and currents in the area. The site also attracts recreational scuba divers and anglers. There is little or no industrial activity at or near to the site, although there is a dredge spoil dump ground approximately 10 km to the north.

The site lies in English waters, straddling the 6 to 12 nm zone and three bodies are involved in its management: 1) The Cornwall Inshore Fisheries and Conservation Authority (who manage UK fishing activities in the 0-6 nm zone); 2) The Marine Management Organization (who manage UK fishing activities in the 6-200 nm; and 3) Natural England (the statutory nature conservation adviser) who provide advice on activities that may affect the site's conservation objectives.

Systemic failures of management

Scallop dredging and other forms of towed bottom contact fishing gears continued to damage coastal many MPAs throughout the 2000s (e.g. Fal and Helford – England, 2006-2008; Lyme Bay – England, 1997-2005; Firth of Lorn, Loch Creran, Lismore and Treshnish – Scotland, 2004-2007; Strangford Lough - Northern Ireland the late 1990s; and Pembrokeshire – Wales, 2008-2009) (Dineson & Morton, 2014; Rees et al., 2013; Solandt et al*.,* 2013; Terry et al., 2017). These examples received a mixed management response, often only dealing with the situation once dredging had already taken place. Resources from regulators and conservation agencies directed towards these events neglected other MPAs, some of which were reportedly being trawled and dredged without any ecological assessment of the potential impacts.

UK NGOs (ClientEarth and Marine Conservation Society) argued between 2010 and 2012 that offering licences to fish throughout SACs before an ecological assessment was conducted was in breach of EU laws (the Habitats Directive) (Clark et al*.,* 2016). The legal challenge from UK NGOs subsequently resulted in a 'revised approach' to managing fishing in EU marine sites by the UK Government in September 2012 (Solandt et al., 2014).

As a result of this pressure, a 'revised approach' to government policy was established through scientific documents and briefings including a 'risk-based approach' to managing fishing in European Marine Sites (Clark et al., 2016). A matrix of interaction between specific fishing gears and habitat types was created. This resulted in the establishment of different 'risk' interactions, from 'blue' (no interaction), 'green' (low risk), 'amber' (moderate/unknown risk) and 'red' (high risk) to different conservation features from specific fishing gears.

Successful implementation of site-based management measures

Solandt et al. (2014) described the nascent 'revised approach' to management of fishing in English MPAs as part of the compendium of case studies looking into managing MPA networks. At the time of writing that paper, the intention for delivery of management was clear from central government (Defra), but there was yet to be local delivery of management measures by the 10 IFCAs.

The revised approach required that 'red' (high) risk interactions had to be removed from sites by the end of 2013 (beam and otter trawling and scallop dredging was to be restricted from any area of a site that hosted reefs, biological encrustations, seagrass beds and correllagenous algae). In England, Defra devolved the responsibility of regulation in sites to the 10 local IFCAs for inshore waters. The 10 IFCAs created their own 'risk matrix' for each MPA in their catchments. By mid-2014, the 'revised approach' policy had resulted in 17 byelaws protecting 3,000 $km^2$ of seabed from bottom trawls and dredgers in 25 Marine Protected Areas (Figure 3). Defra subsequently expanded the 'revised approach' to Marine Conservation Zones as well. Thus, what started as a revised policy to address fisheries management issues for one type of MPA (i.e. European Marine Sites), developed into a wider policy to manage fishing throughout all of England's MPAs. Currently there are now 43 byelaws controlling fishing within 140 English inshore MPAs.

Assessing the initial response of local IFCAs to the 'revised approach' can be partially measured in the resulting regulatory measures (Figure 3). Local regulation from these groups varied based on the ecology, balance of 'high risk' to 'moderate risk' interactions, and ongoing socio-economic use of the sites.

Management of 'mosaics' of gravel and soft-sediment ('amber risk' interactions) habitat in protected areas has received a more varied response between regions than measures set up for reef sites. Some IFCAs have protected the entirety of sites that support habitat mosaics (e.g. South Wight Maritime near the Solent (Figure 3)), whereas other regions have protected a smaller proportion of sites to bottom-towed fishing (e.g. Kent and Essex, Eastern, and Yorkshire IFCAs) (e.g. ABPMer & Icthys Marine, 2015; Solandt et al., 2019).

This varying response to the 'revised approach' is in part a consequence of current trawling activity within sites conflated by a lack of understanding of habitat condition without trawling (Pauly, 1995). Whilst there has been a legal requirement to prevent damaging fishing activities, the regulatory response has been dependent on the current fishing activity within different MPAs, allied to the current physical and biological conditions of sites (Campbell, Gray, Hazen, & Shackeroff, 2009; Plumeridge & Roberts, 2017). NGOs have argued that historical fishing has likely impacted many sites before designation, whilst IFCAs are mindful of their statutory duties to seek to balance conservation with socio-economic needs.

Opportunities for collaboration

Regardless of the complexities surrounding the implementation of management measures in UK MPAs, there has been substantial progress since the revised approach (Solandt et al., 2014). The Eddystone site (Figure 2) was seen as an opportunity to test the ecological impact of closing an area to bottom towed fishing gears under the 'revised approach'. The MCS identified the Cornwall IFCA and University of Exeter as partners to monitor the seabed in protected areas.

Cornwall IFCA was tasked with identifying and reporting on the results of the regulation to close parts of the site to bottom towed fishing. It has the equipment (boats, cameras and personnel) that are required to capture images of the deep seabed (Figure 4). The University of Exeter provides the analytical expertise to process the 400+ images that the stills camera generates of the seabed each year whilst the Marine Conservation Society coordinates the project, provides MPA advocacy of the results, and promotes the project to the wider public. Whilst the survey work is funded by Cornwall IFCA within its own monitoring and staffing budgets to operate the survey vessel and deploy the drop-down camera for approximately three days per year, the MCS identified a charitable trust and a local luxury yacht company to provide the funds for the coordination of the project and the photo analysis. The funding was initially for three years from 2014 but has been extended through to 2020 to compare near and far reference areas to the 'treatment' (managed) area where the scallop dredging and trawling has been prohibited.

## Conclusions

The Eddystone project is one of a very few MPAs being monitored for impacts of demersal trawl closures on benthic biodiversity in the UK. Other locations are at Arran (Scotland), and Lyme Bay (Devon and Dorset). The collaborative and long-term nature of the project is essential to gain an understanding of the implications of MPA regulations.

The nature of the development of the Eddystone project and wider circumstances offers optimism since the original workshop (Solandt et al., 2014), from a historical position of attrition between the Cornwall Sea Fisheries Committee and the Marine Conservation Society over the lack of management (Solandt et al., 2013), to a period of collaboration through the monitoring of the Eddystone MPA. The evolution of the IFCAs from traditional Sea Fisheries Committees allied to an increasing evidence-base has very much helped this collaborative spirit. This has been fundamentally possible since management of fisheries in MPAs has been an explicit requirement within the role of the IFCAs.

The balance of top-down intervention (the revised approach) coupled with management and monitoring has led to a positive outcome. The 'revised approach' and the evolution of risk-based management has provided scope for IFCAs to implement management more readily (R. Clark, *pers comm.*, Chief Officer, Southern IFCA). The balance has

shifted to progressing management before damage occurs which is apparent from the number of MPA-specific byelaws in place to protect inshore sites.

This approach can be replicated with similar MPA legislation throughout Europe – and effective local governance such as the need to develop the IFCA model elsewhere to manage fishing in inshore MPAs. The evolution of the Eddystone monitoring project is evidence that conservation is most effective when it involves multiple partners, skills and multiple levels of society and government (Jones, 2014).

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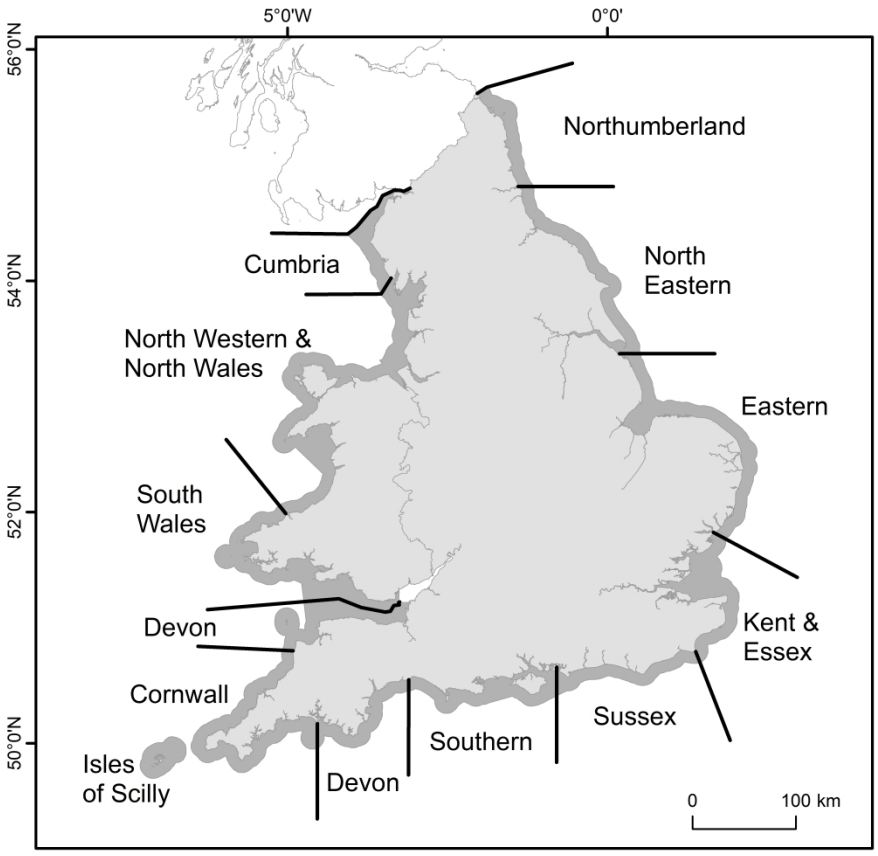


12 original 'Sea Fisheries Committees'. The English ones evolved into 10 'Inshore Fisheries and Conservation Authorities' in 2011.

There are 10 Inshore Fisheries and Conservation Authorities (IFCAs) around the coast of England. They were established in April 2011 under the Marine and Coastal Access Act 2009. They developed from the original 12 'Sea Fisheries Committees' (see Fig 1. below) that were founded in 1880s to manage inshore fishing activity within 6 nm of the coast of Wales and England. The Act provided greater clarity to the conservation responsibilities of the IFCAs. They are funded in part by central government (Defra) and primarily by local government authorities (councils). IFCAs have a permanent staff made up of enforcement, scientific and administrative teams. Their main assets are their sea-going capabilities with an average of 3 vessels per IFCA, made up of fast response enforcement vessels and scientific survey boats. IFCAs are governed by a committee made up, in equal number of local authority members (councilors) and government appointees. The latter are persons from stakeholder groups with an interest in the management of fisheries within each IFCA district and can be made up of, and not limited to, fishers, processors, recreational fishers and scientists. IFCAs have the power to introduce byelaws within their districts; these and other issues are discussed and agreed by the committee. IFCAs are empowered to enforce their own byelaws and with National and EU legislation and prosecute when breaches are identified.

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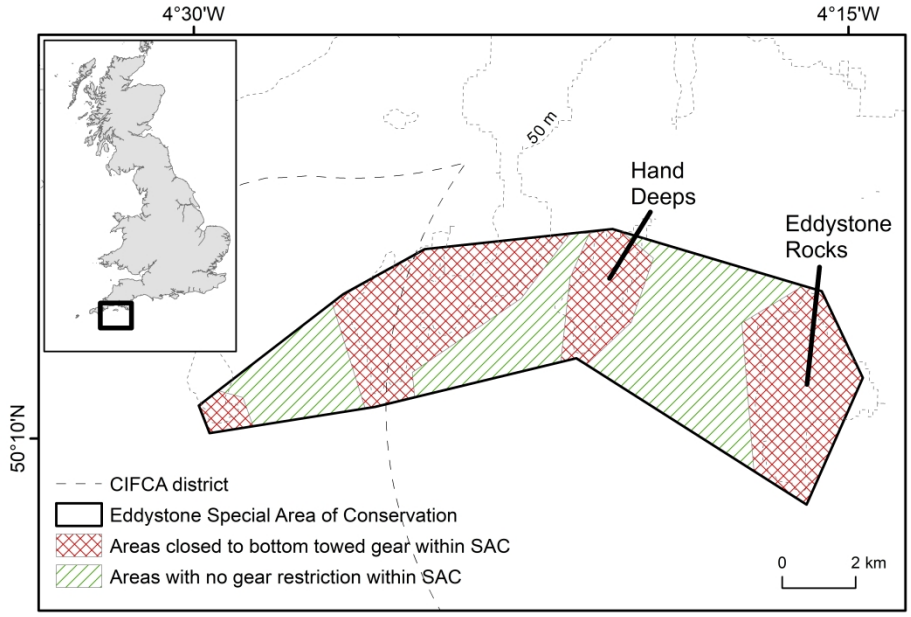
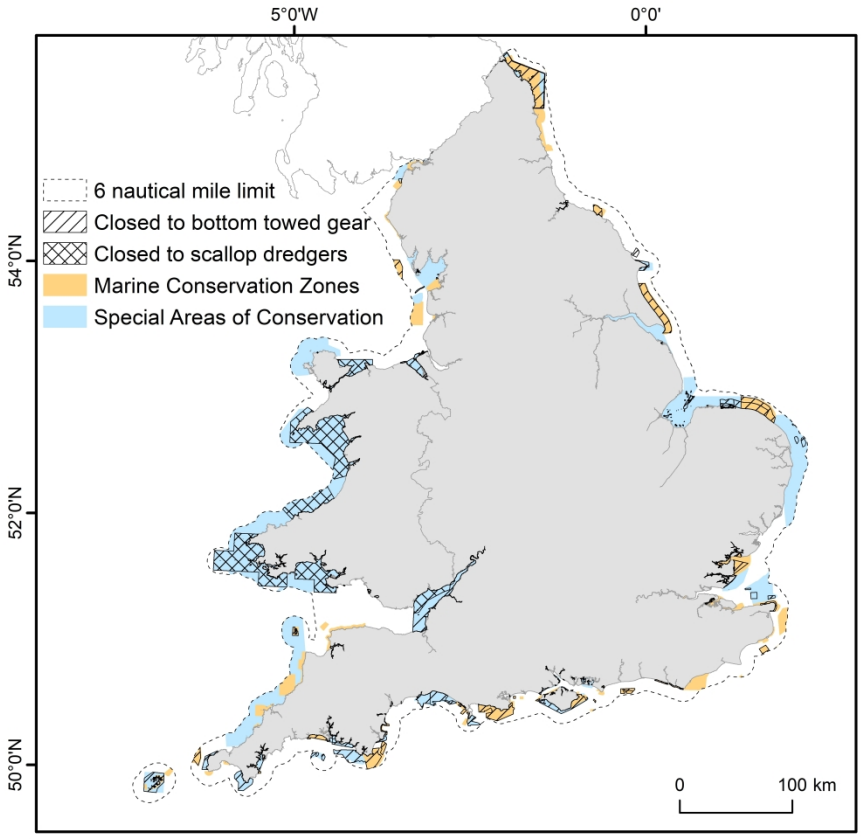


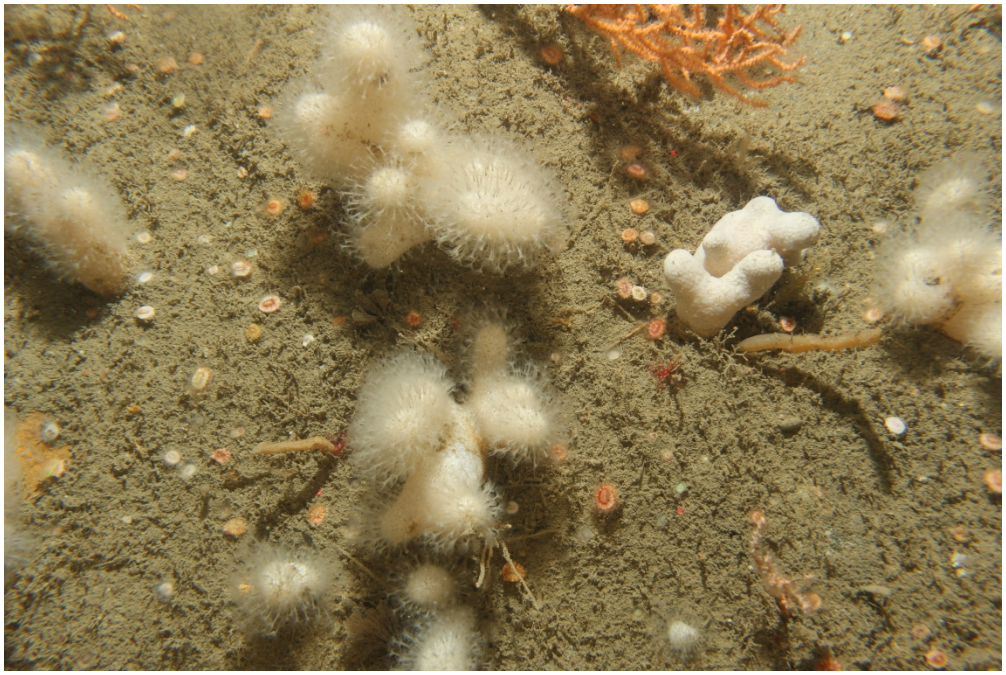

Eddystone to Start Point Special Area of Conservation (Eddystone section). Fisheries management measures are shown in the image, with areas closed to bottom towed fishing (in pink), and areas remaining open to such fishing (in green). The latter have been surveyed to show they contain sand habitat. The MMO manage fishing activities to the west of the dashed line, whilst the IFCAs manage fishing to the east of that line.

217x154mm (800 x 800 DPI)




Current regulatory response to enable the protection of sites within 6 nautical miles of the coast from bottom towed fishing gears following the 'revised approach' to fishing in MPAs in English waters. Wales prohibited all forms of scallop dredging from its MPAs in 2010. Marine Conservation Zones (yellow polygons), Special Areas of Conservation (blue polygons), areas closed to bottom towed gear (hatched polygons) and areas closed to scallop dredgers (cross hatched polygons). This map was accurate as of May 2020. Sites outside 6nm limit are subject to more complex negotiations to implement regulation between the UK and different EU member state vessels.

197x192mm (800 x 800 DPI)



An example of the images taken by the SeaSpider camera, capturing *Alcyonium digitatum* and *Eunicella verrucos*a, and a number of cup corals *Caryophyllia smithii*.

1828x1219mm (72 x 72 DPI)