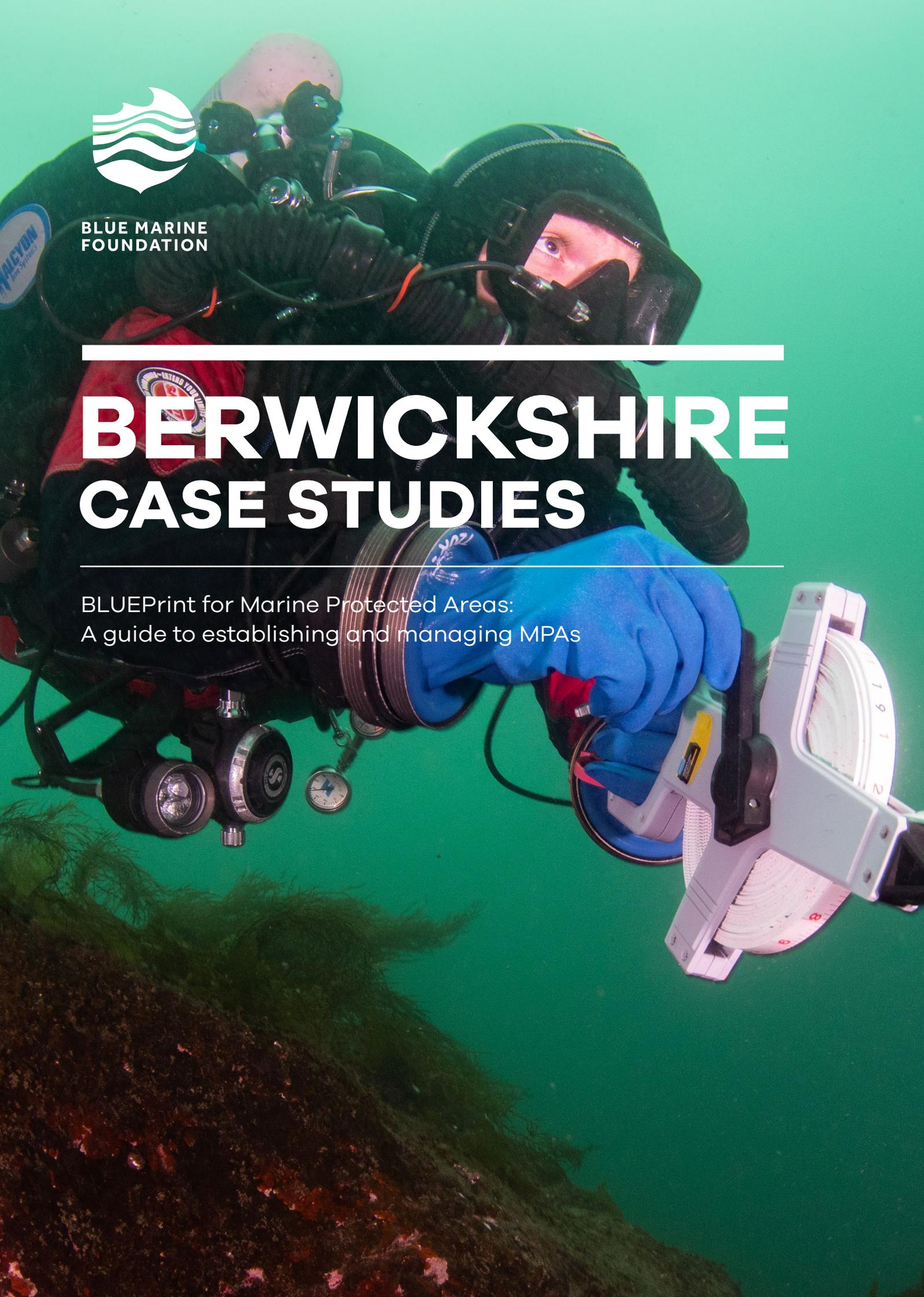




BLUE MARINE
FOUNDATION

BERWICKSHIRE CASE STUDIES

BLUEPrint for Marine Protected Areas:
A guide to establishing and managing MPAs



Located on the south-east coast of Scotland, Berwickshire's waters are unique, with cold and warm water currents converging to provide a diversity of marine life rarely found elsewhere in the UK. Devonshire Cup corals share space alongside Arctic wolffish and pods of bottlenose dolphins, giving scientists an opportunity to monitor the effects of climate change within a marine protected area. This stretch of coastline supports one of the most productive crab and lobster fisheries in Scotland as well as providing some of the best diving and recreational fishing opportunities in the UK.

The Berwickshire Marine Reserve lies within the Berwickshire and North Northumberland Special Area of Conservation, a 652 km² MPA designated to protect rocky reefs, grey seals, and sea caves.

Blue Marine is working with the community to create a template for well protected and sustainably managed Marine Protected Areas (MPAs) in Scotland. Our work focuses on developing a collaborative approach to monitoring and management of the MPA with fishermen, recreational anglers and divers. Blue Marine is working to establish a baseline of current conditions and understanding of the pressures and effects of different marine stakeholders on the MPA.



Wolf Fish pair by Jim Greenfield

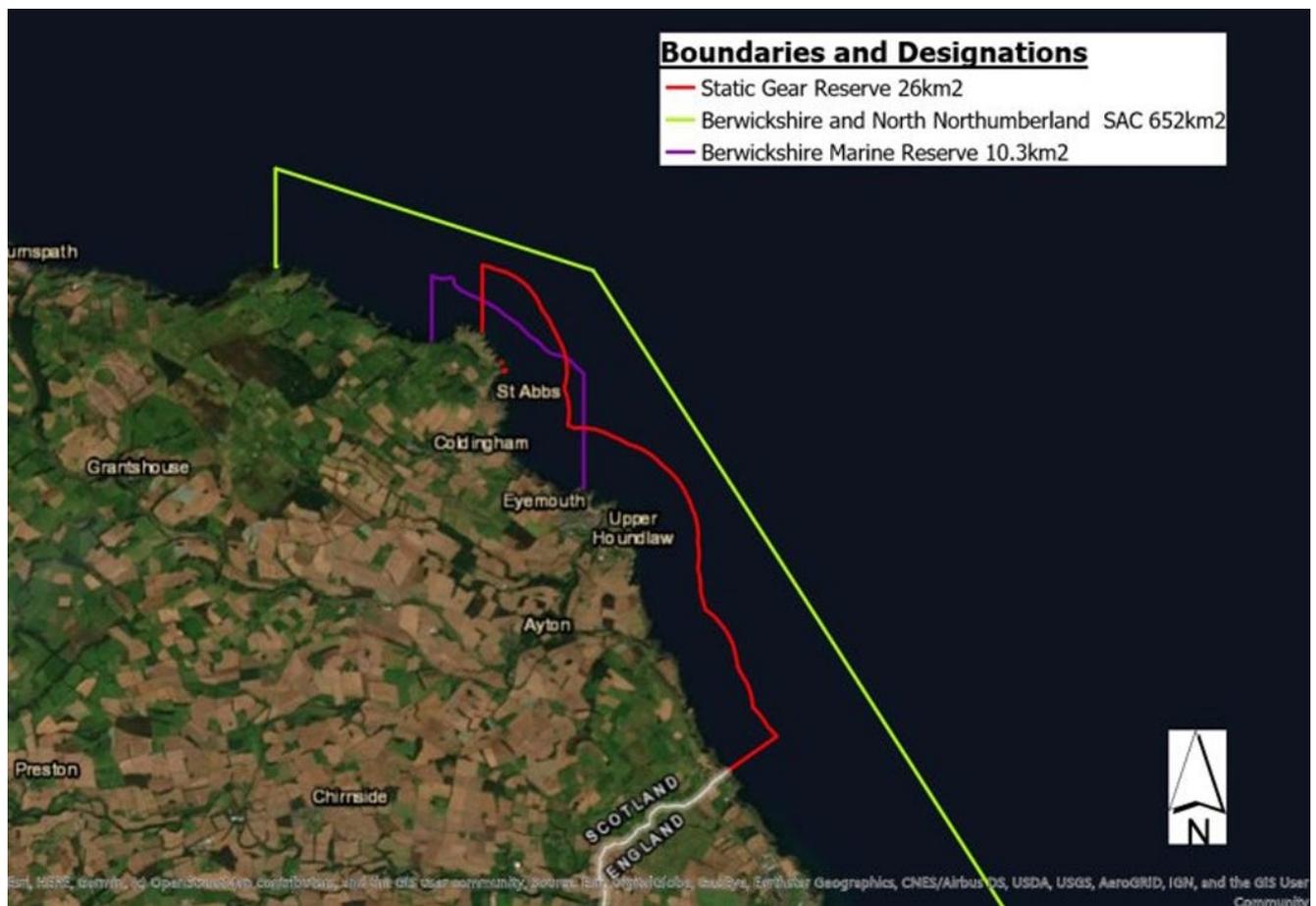
PEOPLE: STAKEHOLDER MAPPING

Pressure mapping stakeholder activities in the Berwickshire Marine Protected Areas (MPAs)

In 2018, at the start of the project, Blue Marine undertook research to understand the current ecological, social and economic baselines. An important factor of our baseline monitoring programme in Berwickshire was to identify and map pressures on biodiversity from key activities.

Pressure mapping stakeholder activity was conducted as part of questionnaires with the three main marine user groups of the MPA

(recreational divers, recreational fishermen and commercial fishermen). Questionnaires were designed to gather primary data to quantify the recreational pressures inside the MPA and help to underpin a suitable long-term management strategy in partnership with local stakeholders. These questionnaires were designed in partnership with the Berwickshire Marine Reserve and the University of Plymouth, based on the FisherMap style tool which has been successfully used at Blue Marine's other UK sites. Data was collected on effort, landings, spatial distribution, temporal changes, and perceptions of the MPA [*Berwickshire commercial fishermen questionnaire 2019*](#).



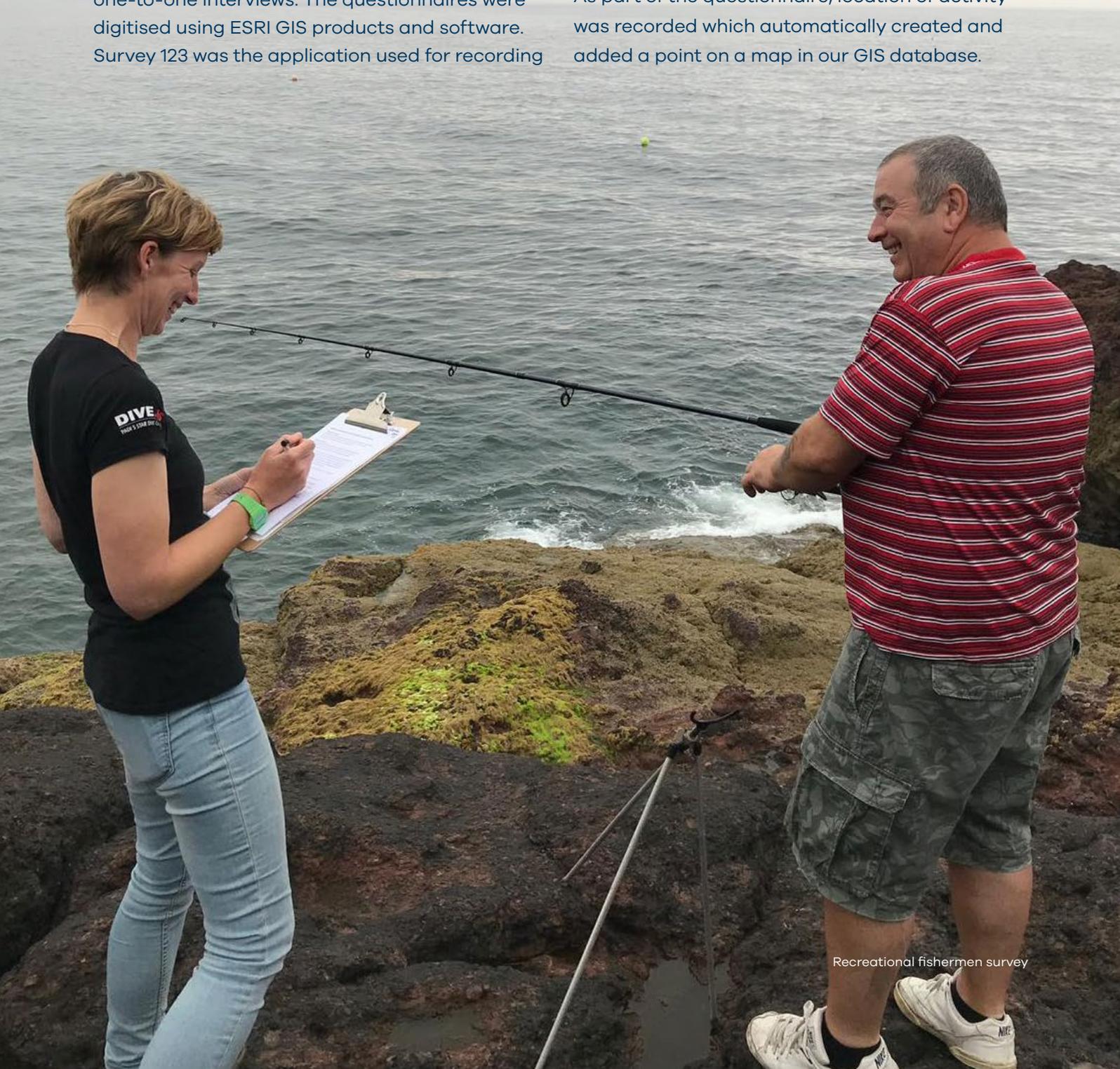
Berwickshire MPA boundaries

INFORMATION: CITIZEN SCIENCE & STAKEHOLDER ENGAGEMENT

Citizen Science diver and fishermen surveys

Data was gathered using questionnaires and one-to-one interviews. The questionnaires were digitised using ESRI GIS products and software. Survey 123 was the application used for recording

the recreational marine stakeholder data. Digitising the questionnaires using Survey 123 enabled data collection to be carried out in the field on tablets and mobile phone devices. As part of the questionnaire, location of activity was recorded which automatically created and added a point on a map in our GIS database.



Recreational fishermen survey

One-to-one interviews with recreational divers and fishermen were conducted by project partners and formed part of a Masters students project at Heriot Watt University. In addition to one-to-one interviews, the survey was shared online through various social media groups, email and local dive clubs. This was made easier as the questionnaires were already digitised.

The majority of the recreational diving in the Berwickshire MPA occurs from dive boats. Another survey, on Survey 123, was created for all the recreational dive boat skippers in the area to simply capture location and number of divers, taking no longer than 30 seconds to complete. This provided data on location of dive sites and number of divers at these sites during the dive season (Figure 1).



Divers being interviewed

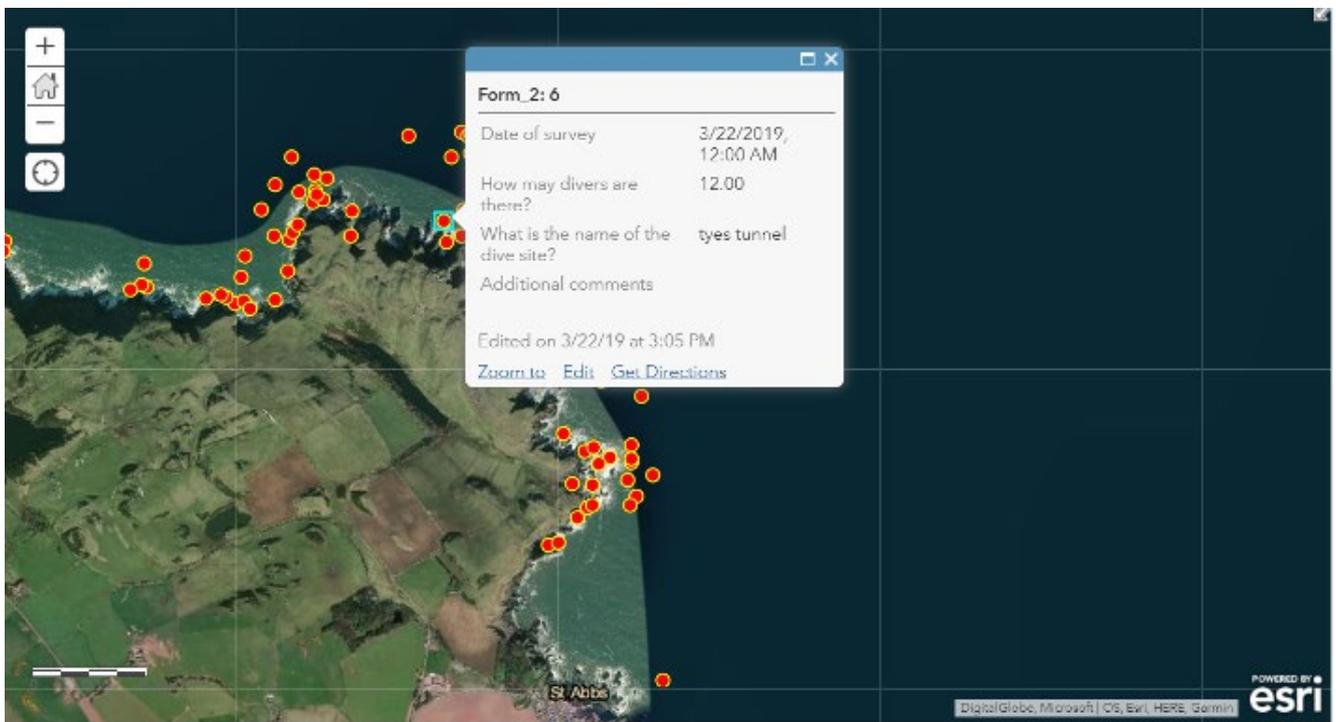


Figure 1 – Screenshot of dive locations and number of divers from the data input by recreational boat skippers. Example showing how this is automatically mapped on a GIS database.

In addition to conducting commercial fishing questionnaires using Survey 123, we used another ESRI product, Collector.

This application enabled us to design a feature map layer (which could be used offline) that allowed local commercial fishermen to draw areas on the map (on tablet or mobile device) to indicate where they fished. There was also a set of questions associated with each area, designed to capture specific information about that fishing site i.e. number of pots they fished, bait they used, target species, soak time (Figure 2). The spatial data was then mapped and integrated into our GIS database automatically.



Fishermen questionnaire and mapping workshop

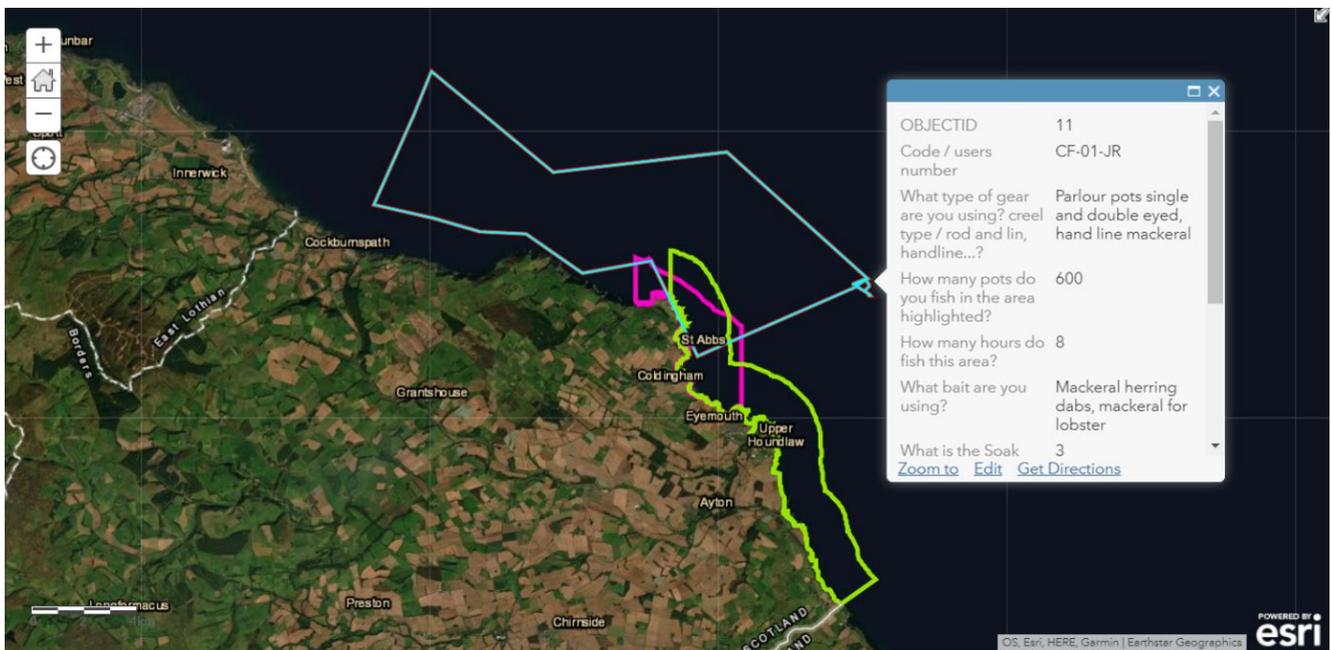


Figure 2: Screen shot showing how the area drawn by fishermen, and associated information on type of gear, number of pots, bait etc, is presented in our GIS database.

Using ESRI GIS products to conduct surveys allowed all data to be stored in the same place. Any spatial data recorded through these products was mapped and integrated into GIS automatically, reducing time during the collection and analysis phase.

The data collected from these surveys can be overlaid on a baseline habitat map which contains all the ecological and spatial data collected for the area. This has allowed us to identify intensity hotspots (Figure 3) and is used to assess potential ecological impacts to inform management decisions and future research.

Any spatial data recorded through these products was mapped and integrated into GIS automatically

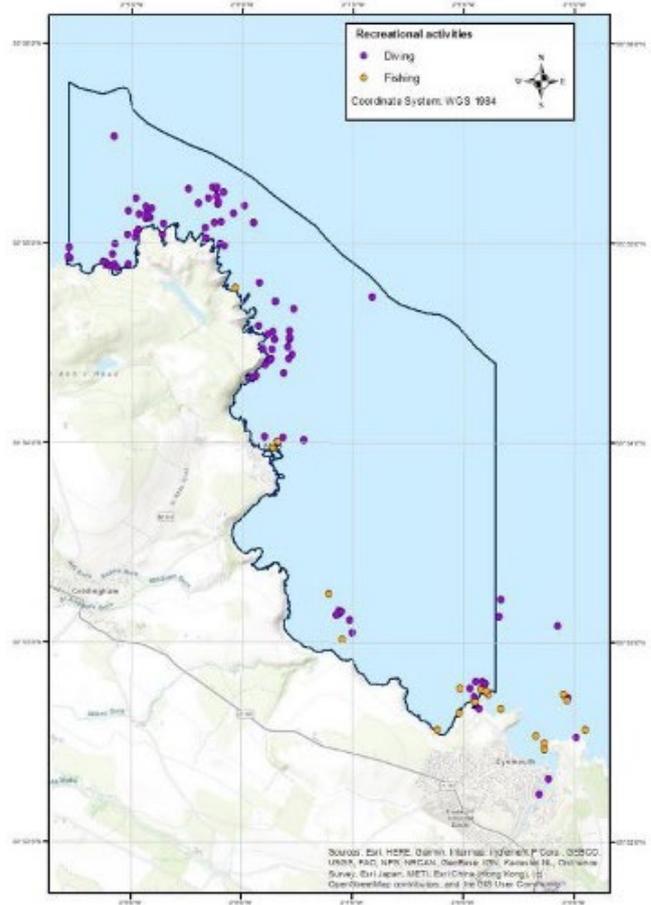


Figure 3: Commercial fishermen potting intensity map using data from the Collector app.

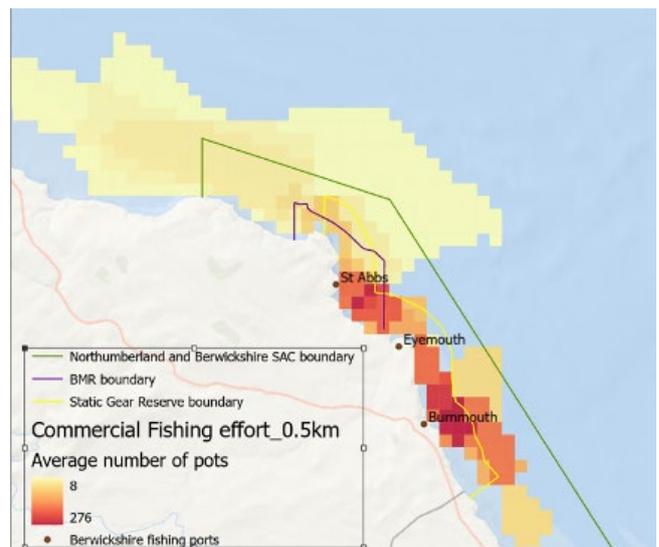


Figure 4: Representation of outputs from the spatial pressure mapping exercise with static gear fishermen in Berwickshire. Note these are preliminary and incomplete results and are not an accurate representation of local fishing effort. This figure is designed to provide a understanding of what outputs can be achieved from the spatial pressure mapping method.

PEOPLE: EDUCATION

Berwickshire Ocean Observatory

In 2022, Blue Marine started developing the “Berwickshire Ocean Observatory”, an online platform to showcase the Berwickshire MPA’s underwater world. The observatory consists of two parts; the first being a continually evolving archive of high-resolution underwater footage, captured using a variety of scientific methods such as dive transect surveys and baited remote underwater video (BRUV). The best of these videos are highlighted in the observatory’s second element, the “Science Centre”. This education portal provides worksheets and fact files suitable for use by children in upper primary and lower secondary school (9–12-year-olds), both in the classroom and independently at home. Skills learnt within the “Science Centre” link closely with the UK Science curriculum, in particular with regards to “working scientifically”, a theme which runs through all key stages. These activities will allow children to practice real scientific methods in an interactive online setting, which prepares them well for further study, or for contribution to conservation projects as a citizen scientist.

The observatory is being rolled out in schools and with conservation groups across Berwickshire and we plan to scale this up across Scotland in due course. The online microsite is free to all users and will be promoted across our existing network of educators. The observatory platform is also well-suited for exhibition at events, community centres, and science festivals.

These activities will allow children to practice real scientific methods in an interactive online setting

CRUSTACEANS

Crustaceans in Berwickshire underpin important fisheries and support ecosystem health...

EDIBLE CRAB



credit @ Jim Greenfield : Ocean Eye Photo

VELVET SWIMMING CRAB



credit @ Lawson Wood: Ocean Eye Films

COMMON LOBSTER



credit @ Lawson Wood: Ocean Eye Films

LONG-CLAWED SQUAT LOBSTER

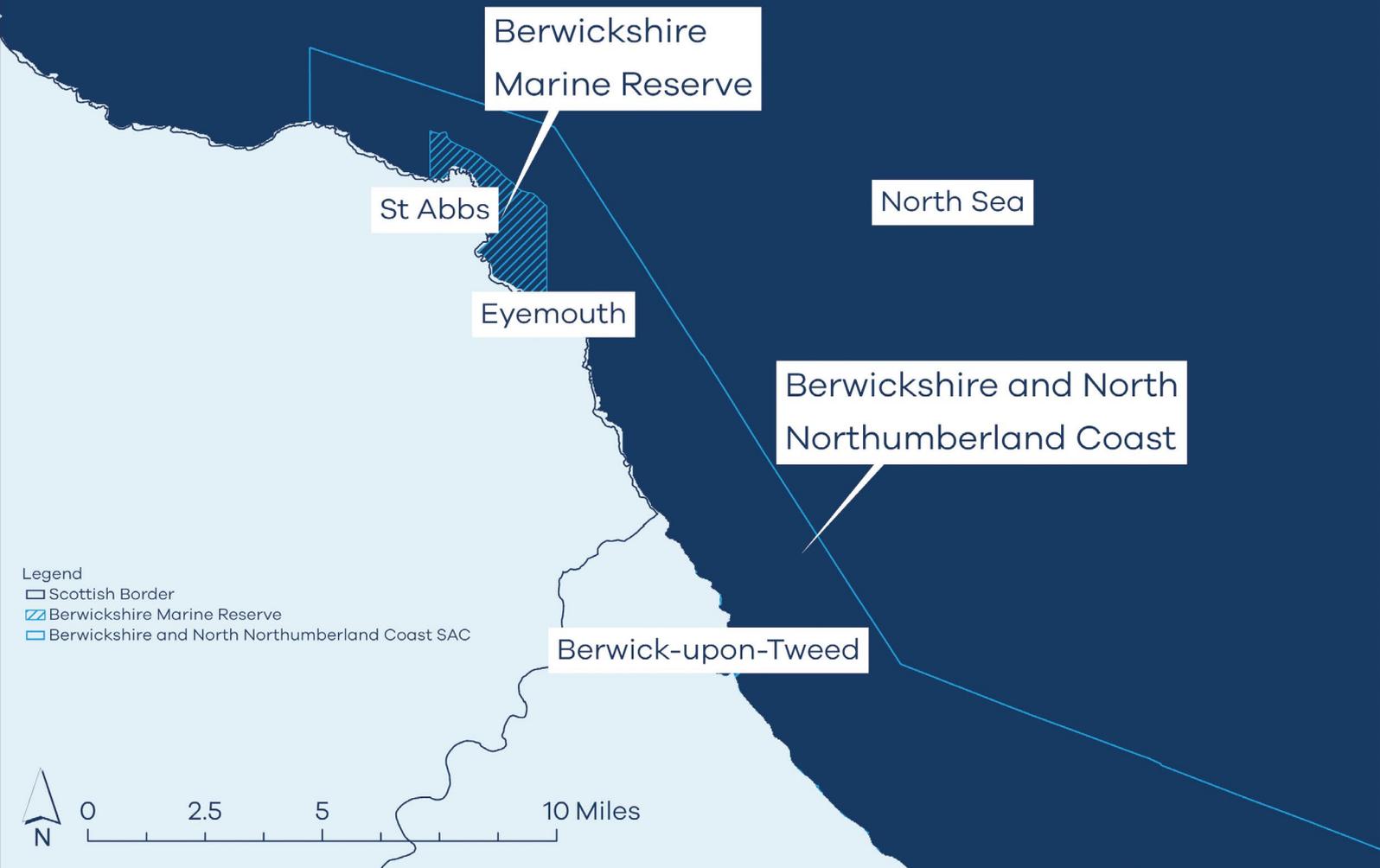


credit @ Lawson Wood: Ocean Eye Films

ENTER THE SCIENCE CENTRE

Welcome to the Berwickshire Ocean Observatory Science Centre! The deep-dive discovery packs below will introduce you to a range of species, habitats, survey methods and data collection techniques. Have you got what it takes to be an ocean explorer? Follow the steps below to find out:





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