

Engaging the Fishing Industry in Marine Environmental Survey and Monitoring: An EMFF Funded Project



Fish traps being offloaded from vessel



Orange dead men's fingers, pink encrusting algae and brittlestars on tide-swept bedrock captured on a drop down video survey

Introduction

The focus of this three-year project was to survey marine life in and around Scotland's network of Marine Protected Areas (MPA's), and covered three broad themes:

- recording of seabed habitats with a Drop-Down Video camera
- monitoring juvenile fish abundance in relation to habitat types using fish traps and underwater cameras
- tracking the movement of flapper skate using acoustic tags

Fishers were invited to tender for the survey work, and they also helped the project by sharing their local knowledge on the location of various seabed habitats.

Drop-Down Video surveys of the seabed:

Life on the seabed was recorded using a Drop-Down Video camera (DDV) designed to be deployed from a fishing vessel. A total of eight DDV surveys were completed; four in 2018 (Inner Sound and Loch Alsh, Wester Ross, the Small Isles,

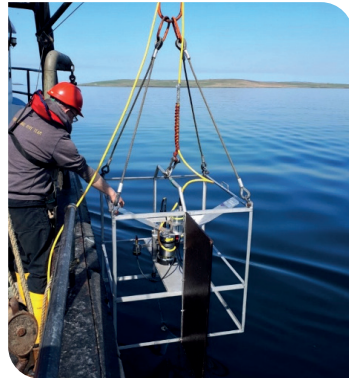
and Arran and Clyde Sea), and four in 2019 (Inner Sound and Loch Alsh, Orkney, Shetland and the Sounds of Islay and Jura). This extensive sampling effort resulted in 130 hours of video footage, and 16,676 photographs, being recorded from 1,206 different sites around Scotland's coasts.

A huge diversity of marine life was observed, from flame shells, maerl beds and sea fans, to seagrass beds and volcano worms, and much more. One of the main highlights was filming herring spawn (once abundant on the west coast, now rarely observed) that had settled onto a bed of maerl just north of Loch Torridon (March 2019).

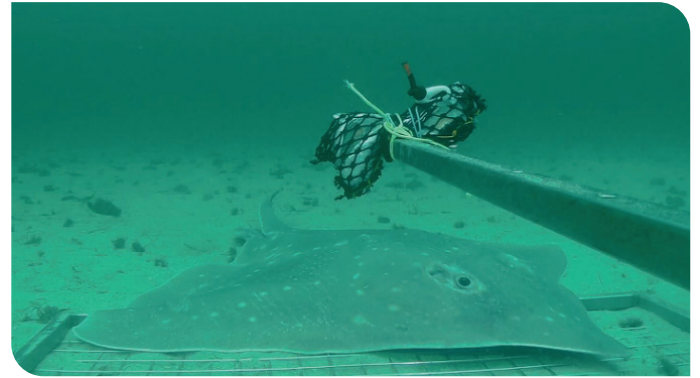
The raw video footage from the DDV surveys has been processed to identify habitats, and produce detailed maps of where they occur. The data will be used to help determine whether conservation objectives are being met within MPAs, and if management measures are proving effective. More widely, it will improve our knowledge on the distribution of Priority Marine Features (PMFs) in Scottish waters, and will contribute towards the PMF review.



Lady Nicola, vessel chartered to carry out DDV survey work



C-Technics DDV system being deployed



Flapper skate (*Dipturus intermedius*) visiting baited underwater video camera in Loch Ewe

Surveys of juvenile fish in MPAs:

Juvenile fish use Scotland's sea lochs as 'nursery areas' to shelter from predators and find food while they grow, and researchers have been trying to find out which habitats they prefer. The focus was on 'gadoids' (typical dinner-plate fish) such as cod, haddock and whiting, on the west coast of Scotland.

A total of 10 surveys were carried out;

- four in 2017 (two in the Small Isles MPA and two in South Arran MPA)
- four in 2018 (two around the South Arran MPA and two in the Wester Ross MPA)
- two in 2019 (in Loch Ewe, Wester Ross MPA)

Baited fish traps were used to capture juvenile fish, and the seabed type was recorded with a simple drop-down camera. Stereo Baited Remote Underwater Video Camera (SBRUV) frames also recorded fish abundance and size over different habitat types. Catch rates of juvenile fish were very mixed and variable across all locations. Poor cod and whiting were generally the most abundant species captured, and cod, haddock, pollack and saithe were recorded in far lower numbers (generally <10% catch combined). The next step is to analyse the data to interpret habitat associations.

Skate Tagging Project:

Flapper skate (*Dipturus intermedius*, a sub species of common skate), are a slow-growing species that can weigh upwards of 100kg and reach up to 2.5m in length. Once common around the coast of Britain, they are now locally extinct in many areas and are classed as Critically Endangered. However, a good number of flapper skate are still found in the Loch Sunart to the Sound of Jura MPA, which was designated for their protection in 2014.

This project used acoustic tags to track the movement of skate within the MPA, to get a better understanding of how they use different habitats and help identify whether the MPA is an important breeding ground. Ten skate were tagged with acoustic transmitters in 2018, and a further 22 were tagged in 2019. Acoustic receiver units were also deployed at ten locations within the MPA, to log the presence of the skate as they swim past (within a range of 500m).

During the EMFF project, data was downloaded from the receivers around every six months, after which they are serviced and returned to sea to continue logging data. This setup of acoustic transmitters and receivers is capable of gathering data on skate locations within the MPA for up to ten years, and will contribute to long-term monitoring of the species.

