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# **Developing an ecosystem approach to the management of Manx fisheries**

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## Introduction

Six main fisheries are prosecuted in Manx waters, which are: great scallop *Pecten maximus*, queen scallop *Aequipecten opercularis*, common whelk *Buccinum undatum*, common lobster *Homarus gammarus*, brown crab *Cancer pagurus* and Norway lobster *Nephrops norvegicus*. It is important that interactions between these fisheries and the habitats which support them are identified to allow for their sustainable management. Dredging surveys have been conducted biannually for the past 16 years in Manx waters to assess scallop stocks. Visual surveys complement such data by providing information on seabed habitat and, with sufficient sampling, more precise abundance estimates of numerous species. This report outlines preliminary results obtained from a multi-disciplinary survey conducted from RV Prince Madog on behalf of the Isle of Man Department of Agriculture, Fisheries and Forestry to collect seabed imagery and physical oceanographic data.

## Multi-disciplinary survey

The aims of the survey were threefold: (1) to map seabed habitats, (2) to provide stock estimates of fished species, and (3) to identify relationships between environmental parameters, primary production and species' distributions. Towed video and high-resolution digital stills imagery was collected at 120 survey stations. Real-time counts of mega-fauna were made during video tows, and a photograph of the seabed was taken every 9 seconds. In addition, several environmental parameters were measured including temperature, salinity, chlorophyll fluorescence and benthic chlorophyll concentrations.

The mean abundance of *P. maximus* was  $0.8 \pm 0.2$  individuals  $\cdot 100\text{m}^{-2}$ , with numbers ranging from 0 to 24  $\cdot 100\text{m}^{-2}$ ; *A. opercularis* was more common, with a mean abundance of  $16 \pm 6$  individuals  $\cdot 100\text{m}^{-2}$ , and numbers ranging from 0 to 612  $\cdot 100\text{m}^{-2}$ . *P. maximus* was found from close inshore out to the limits of the survey area although distribution was patchier on the west coast. *A. opercularis* was the most ubiquitous of the fished species, being found in four distinct but extensive areas. *B. undatum* occurred predominantly over small areas to the south-east and north. *N. norvegicus* was only present to the west of the island on muddy sediment in deeper water. It is clear that there may be interactions between the queen and great scallop fisheries and the whelk fishery. The effects of habitat damage and loss due to fishing activity in Manx waters are uncertain. However, *A. opercularis* occupies much of the ground that is fished for *P. maximus* and appears to be tolerant of scallop dredging.

## Conclusions

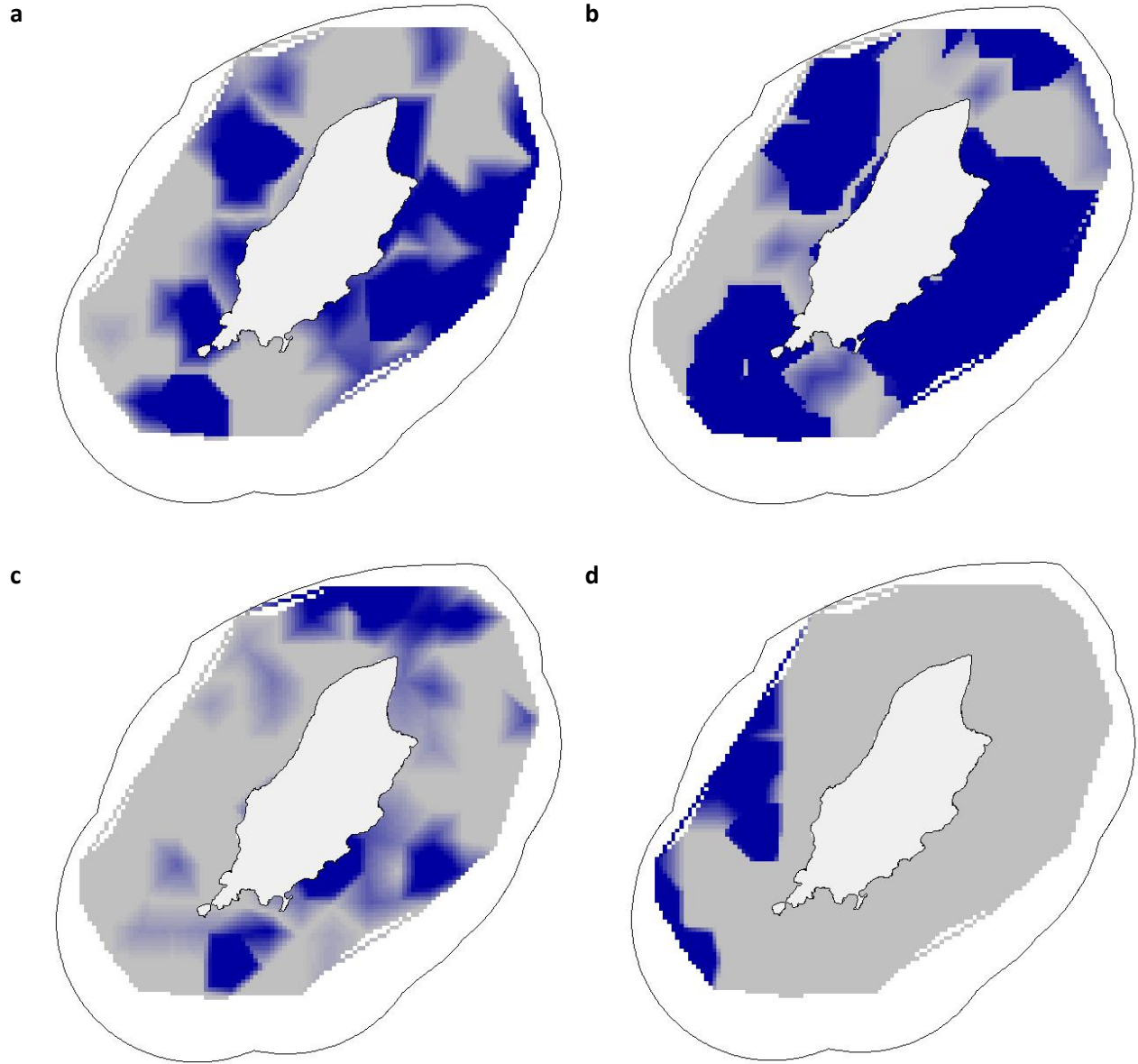
The imagery collected will allow habitats to be mapped and associations between these habitats and fauna to be identified. Further surveys are planned to extend coverage over more of the 12 nm territorial sea. Accurate stock assessments of crabs are imperative as these commercially important animals are likely to be particularly sensitive to habitat loss. Towed underwater video provides a valuable tool with which to assess scallop populations and other fauna, allowing rapid estimation of species distribution and abundance. Samples collected by dredging used in conjunction with visual survey data will allow comprehensive stock assessments to be undertaken in an ecosystem context.

## Further information

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Examples of digital still images taken from the towed video sledge (scales vary)



Distribution of commercially important species in Manx waters, estimated from video surveys, indicated by dark areas; grey area shows extent of survey area. a) *Pecten maximus*, b) *Aequipecten opercularis*, c) *Buccinum undatum* and d) *Nephrops norvegicus*. Boundary line indicates 12 nm territorial sea.