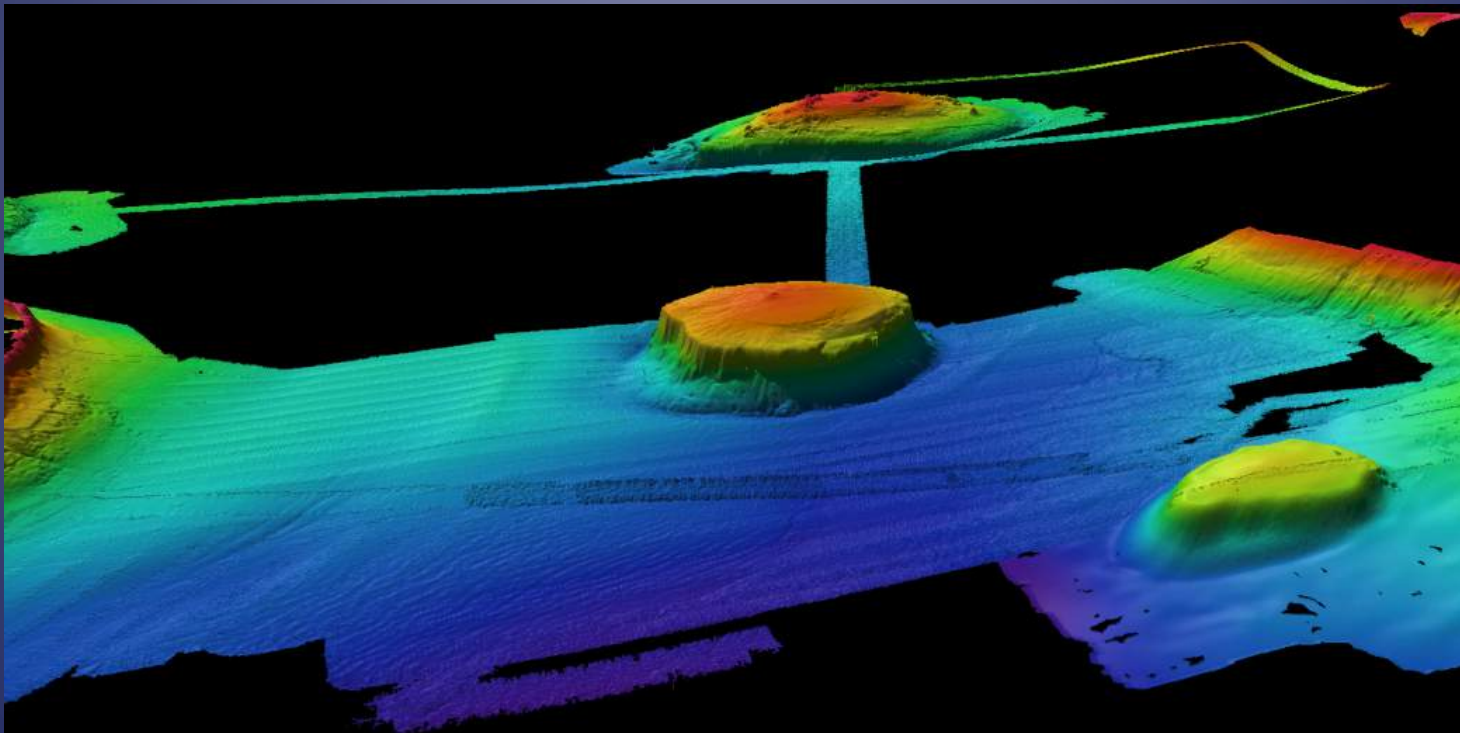


Mapping the Deep:

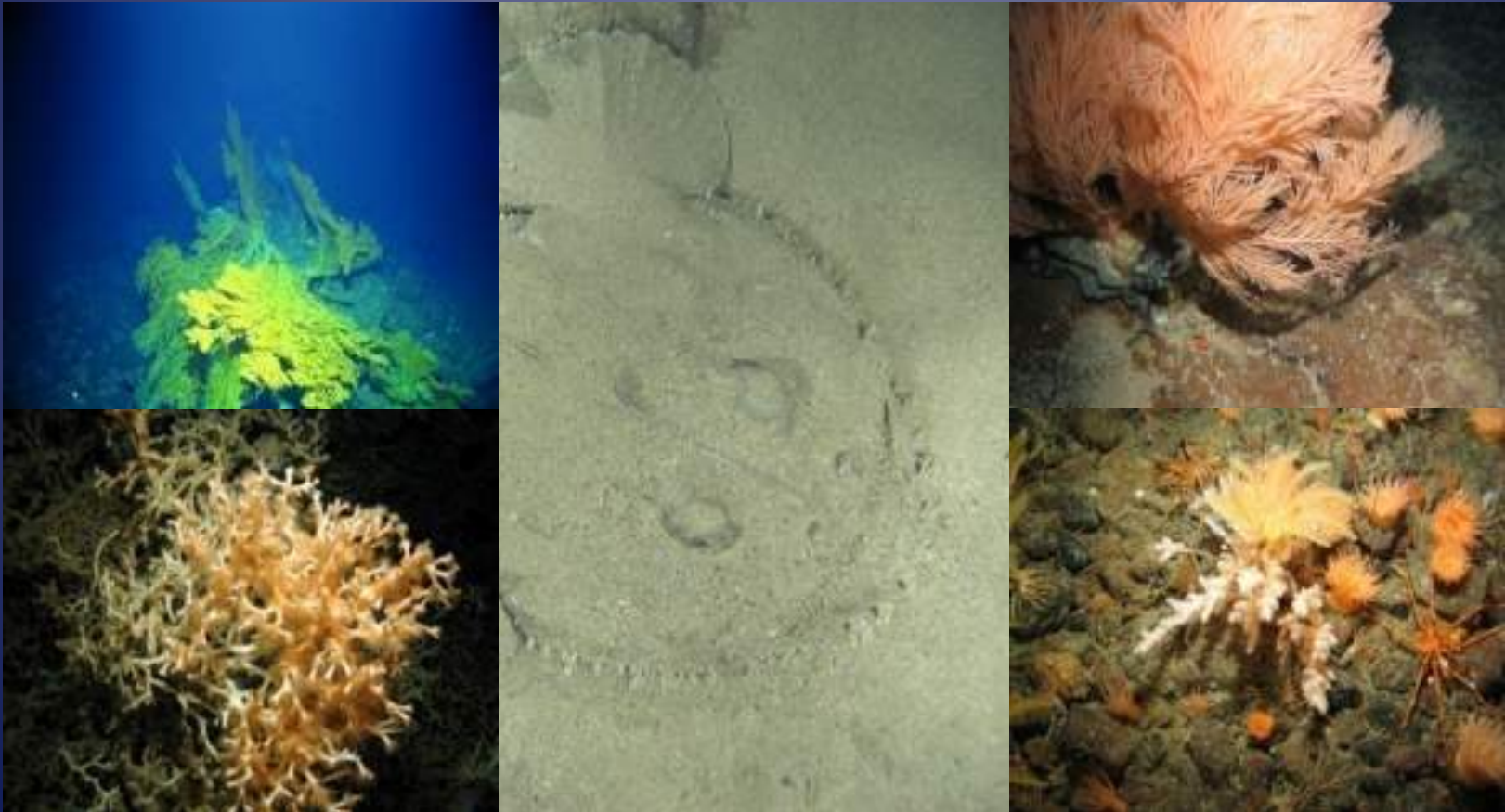
Use of predictive habitat modelling to assess the distribution and extent of the current protection of 'listed' deep-sea habitats



Dr Kerry Howell, Rebecca Ross

Introduction

We aim to provide the scientific evidence base for the conservation and sustainable use of the deep-sea



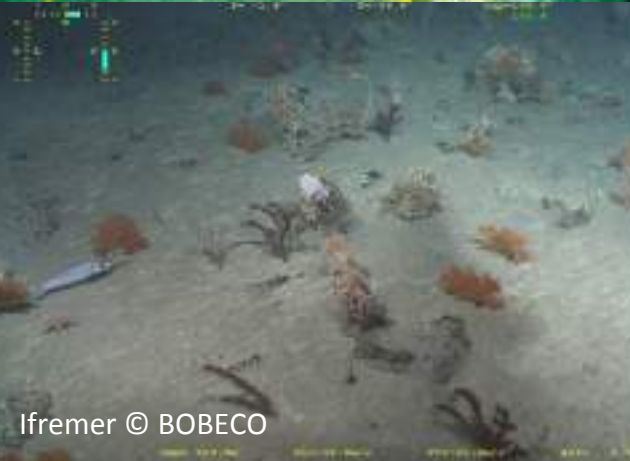
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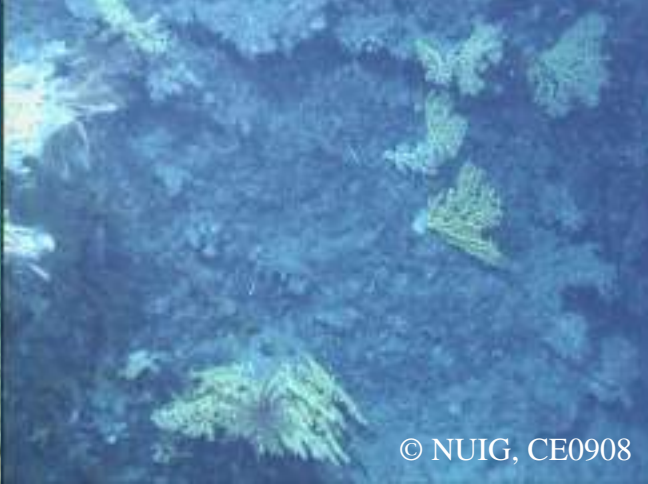
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Deep Sea Habitats



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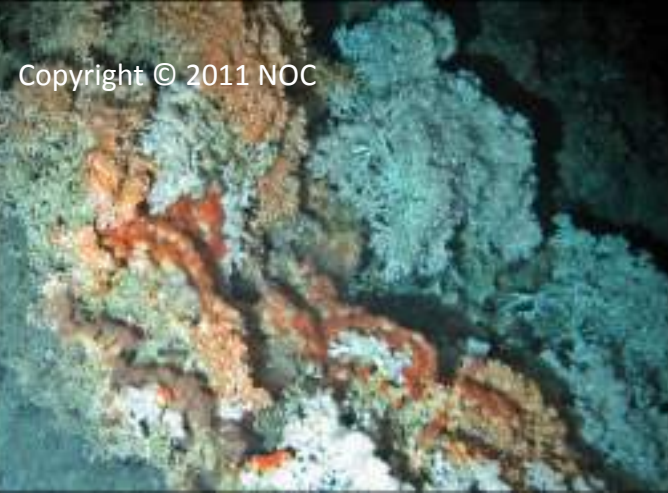
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Cold water coral reef



Deep-sea sponge aggregation



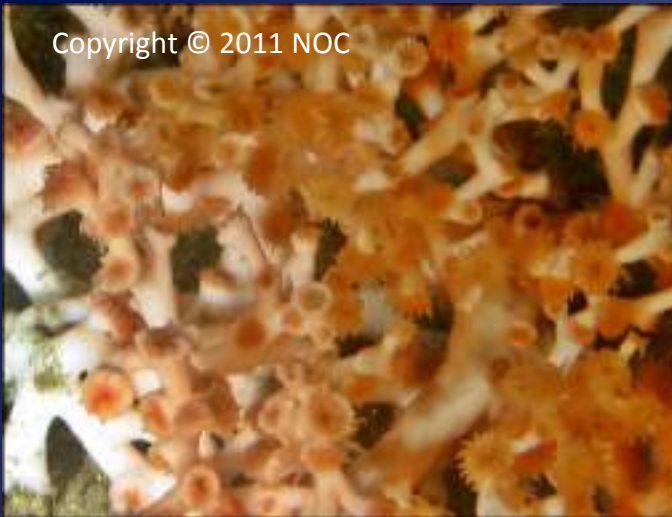
Xenophyophore aggregation

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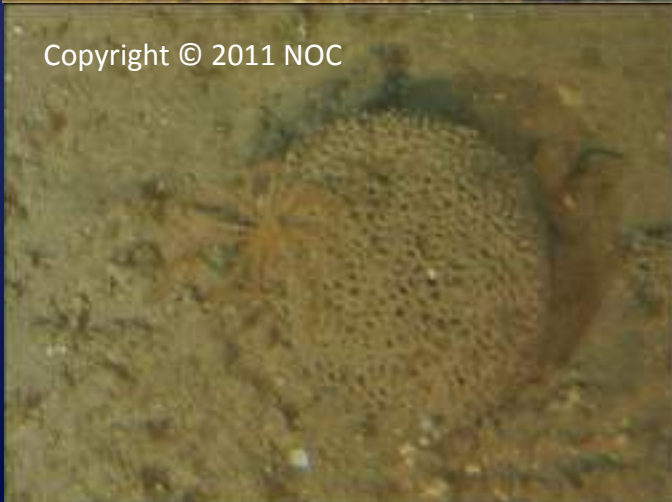
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All three habitats are important because:

They provide food and shelter for many other species

They play a role in recycling nutrients so that other plants and animals can make use of them

Some of the associated species may contain important chemicals useful in medicine.

All three habitats are vulnerable to disturbance

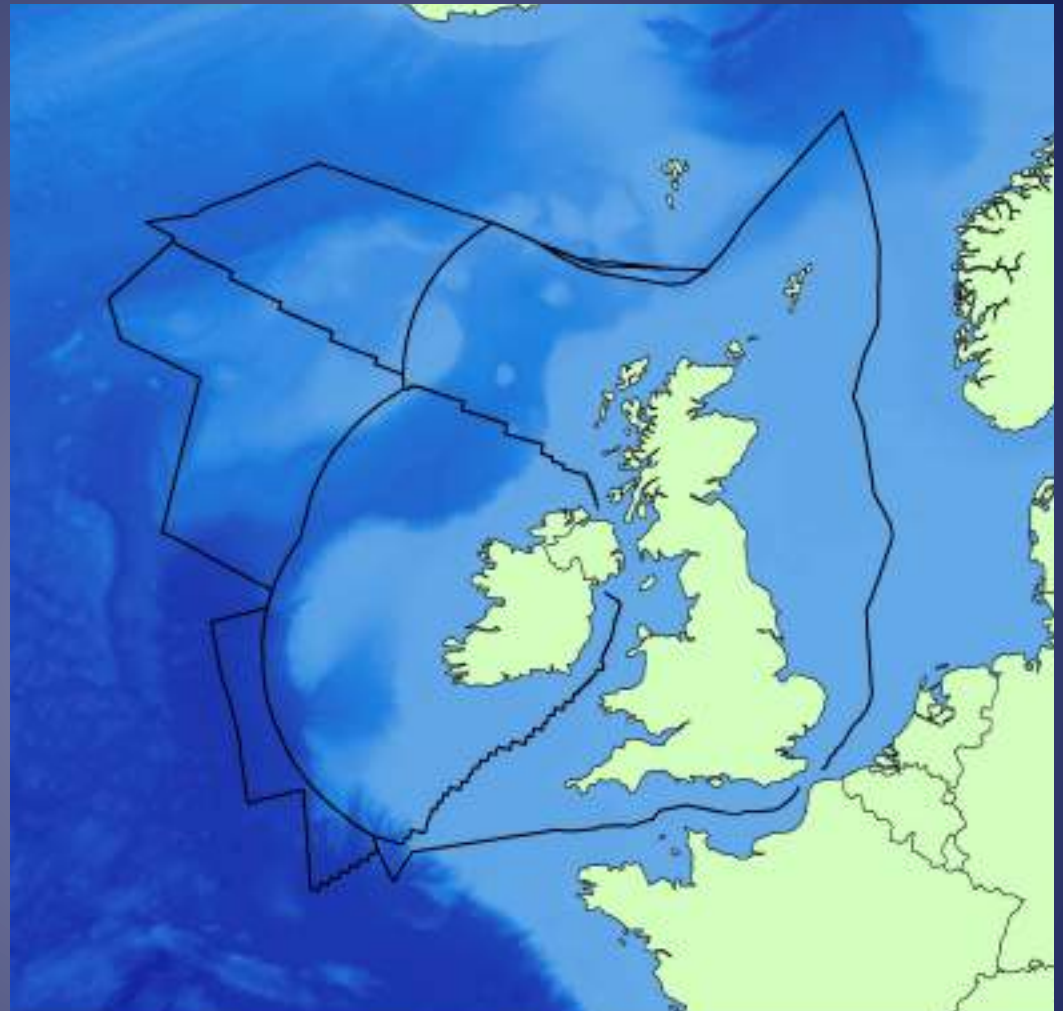
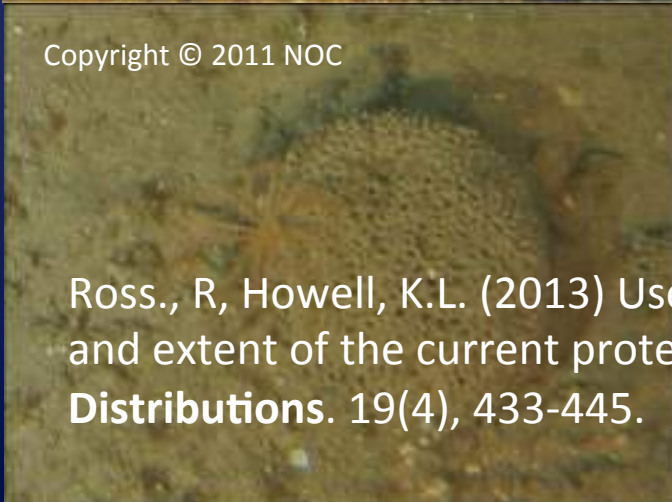
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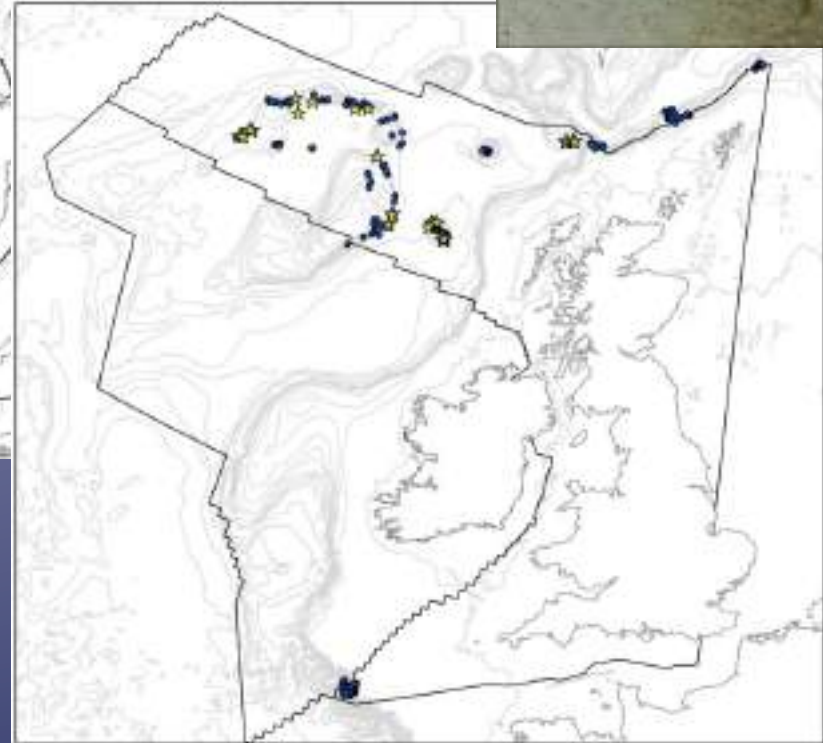
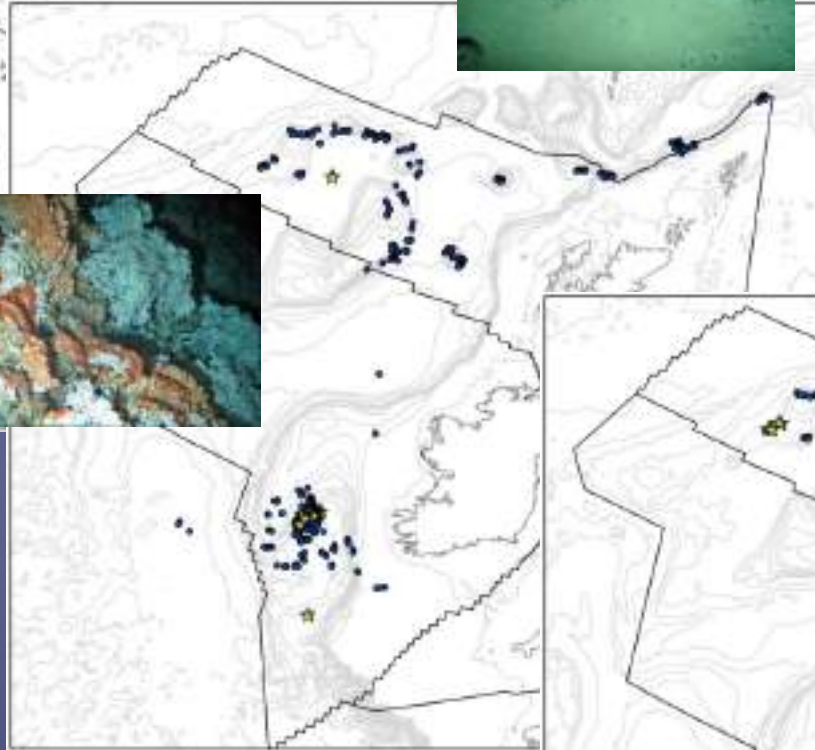
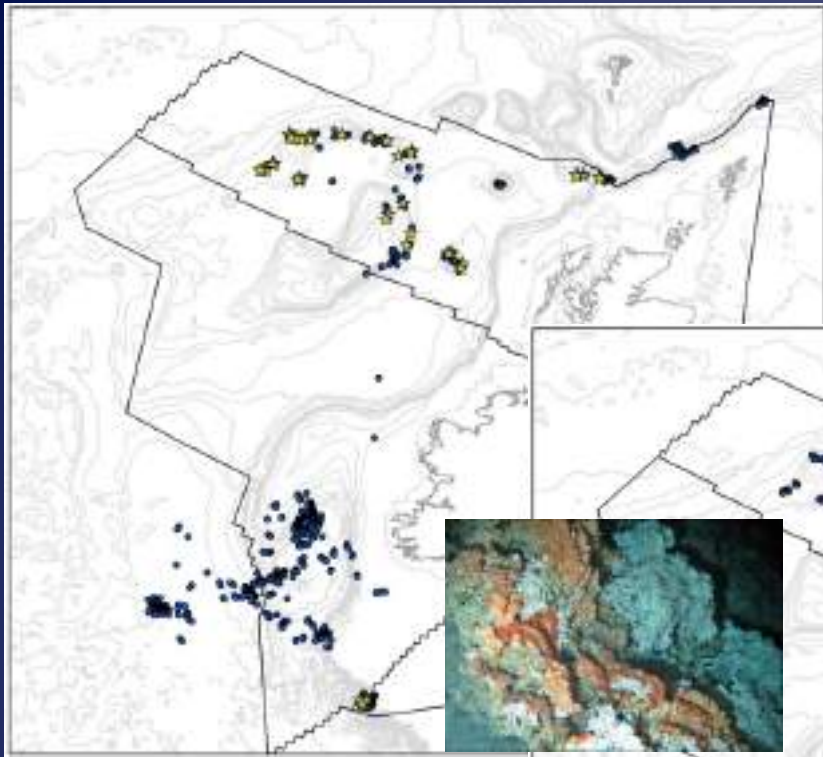


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Ross, R, Howell, K.L. (2013) Use of predictive habitat modelling to assess the distribution and extent of the current protection of 'listed' deep-sea habitats. **Diversity and Distributions**. 19(4), 433-445.

Point maps are useful but only tell us about places we have looked



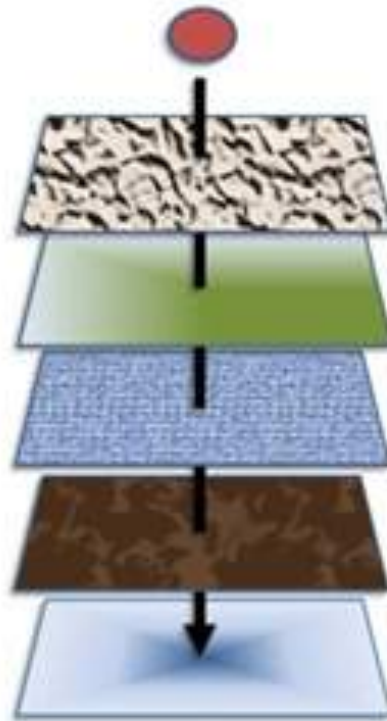
We need a method of producing maps for the whole area.

Habitat suitability modelling



THIS IS HIGHLY
UNLIKELY

Habitat suitability modelling



Cold-water Coral Reef Found.

It lies on rugged ground ...

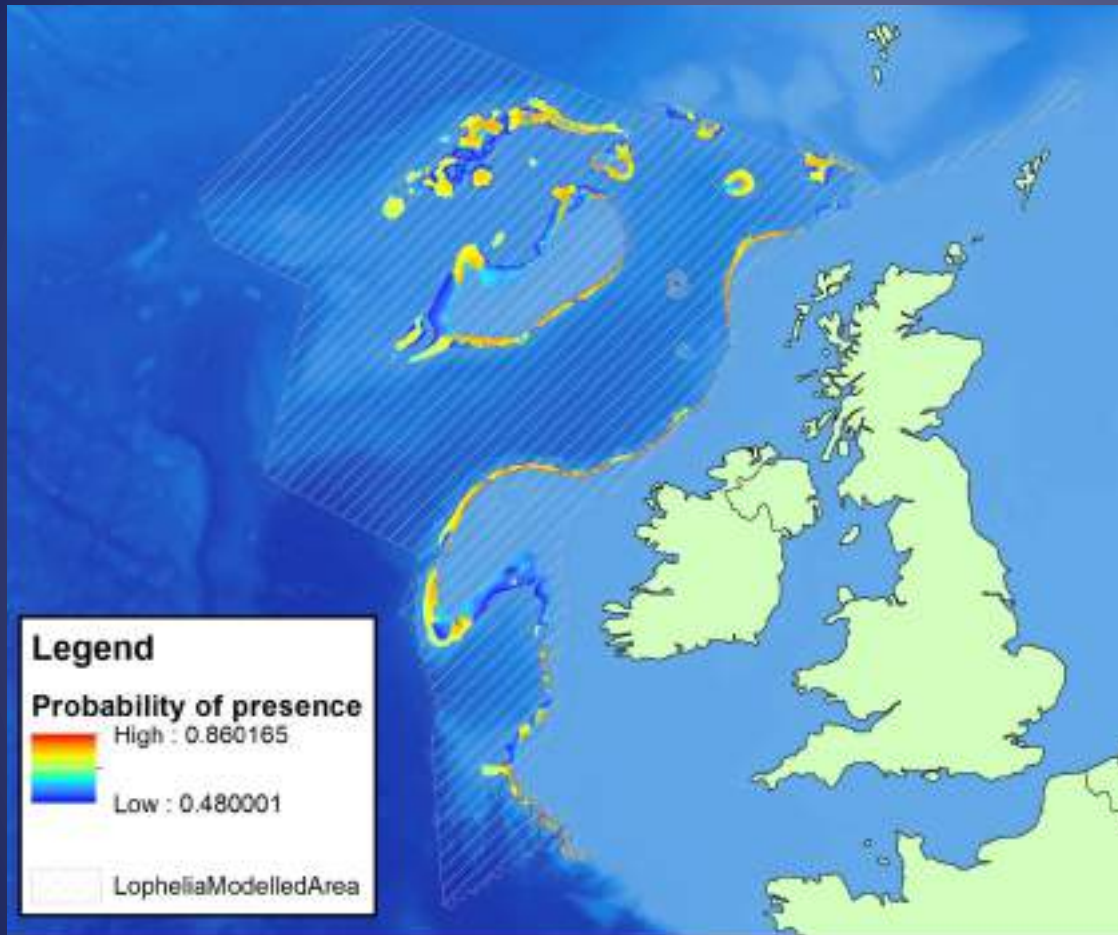
... at the top of a slope ...

... in cold water...

... on bedrock ...

... 900m below the surface of
the sea.

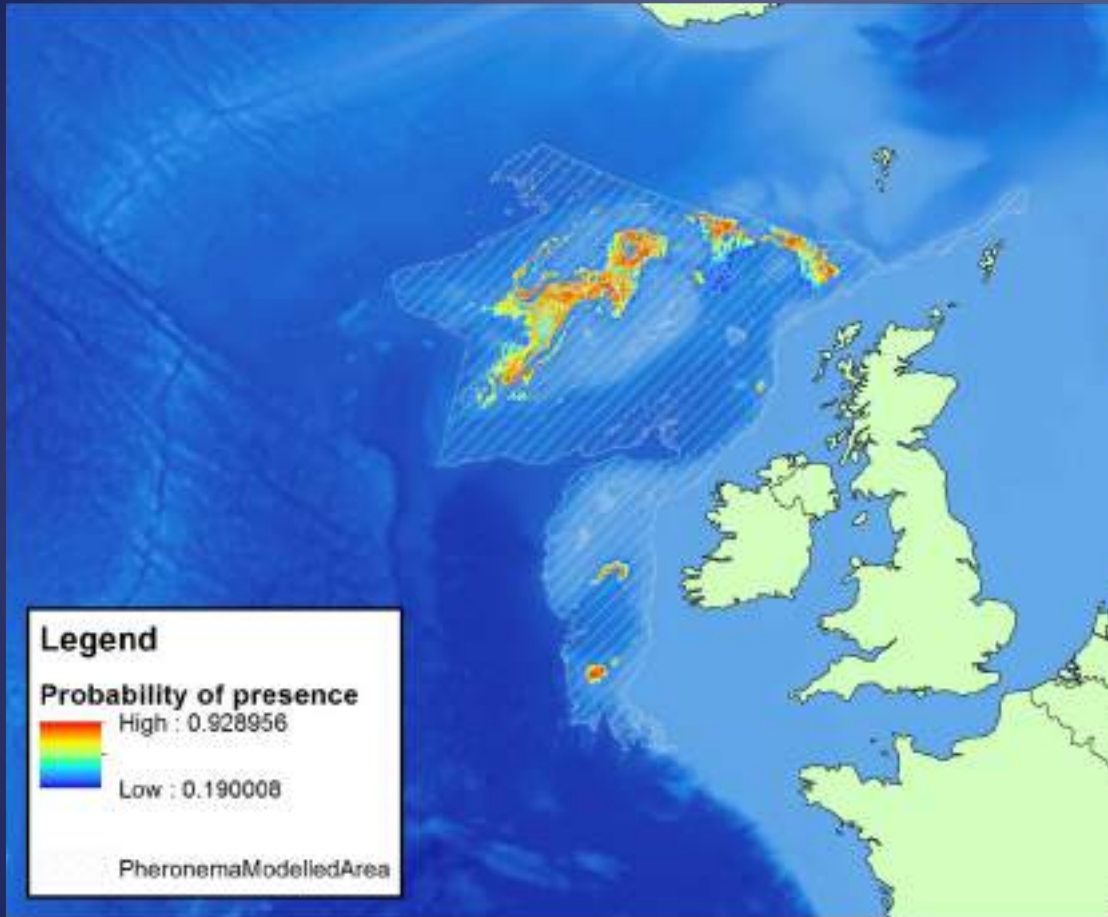
Mapping the deep project



Predicted distribution of cold water coral reef in UK and Irish deep sea



Mapping the deep project



Predicted distribution of deep-sea sponge aggregations (*Pheronema carpenteri*) in UK and Irish deep sea

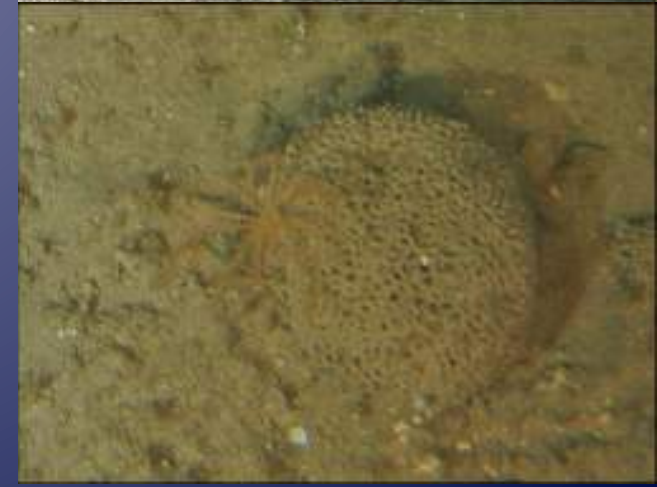
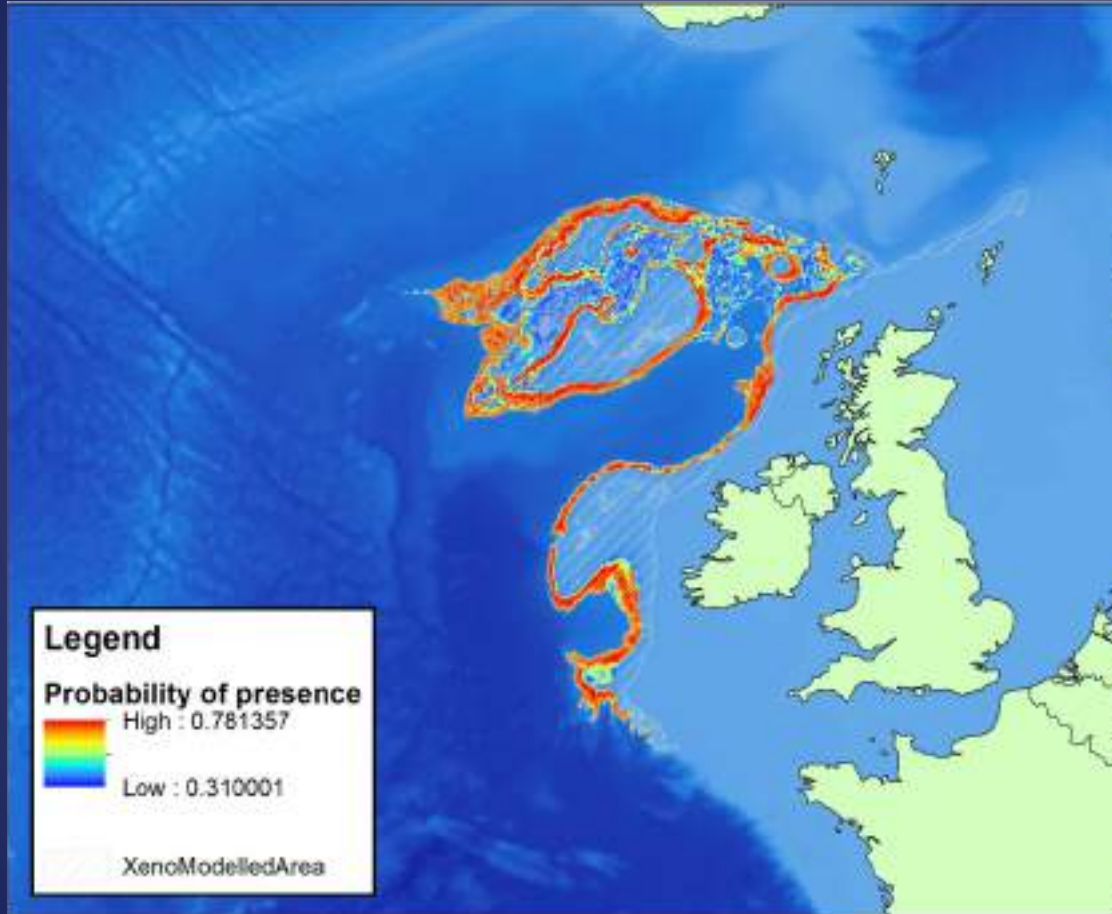


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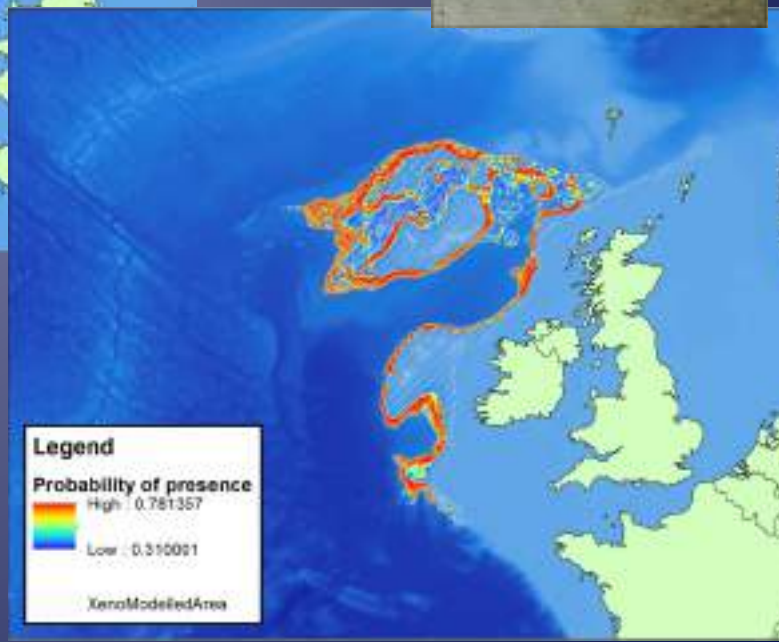
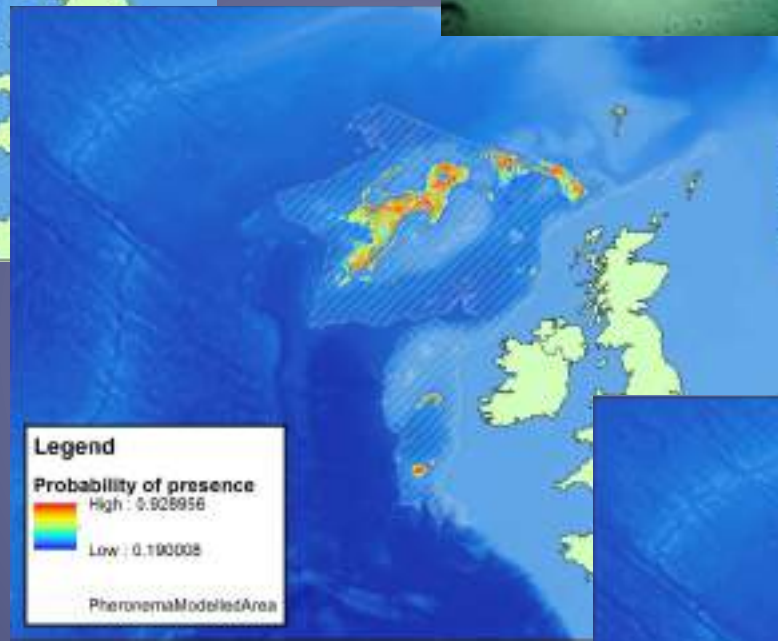
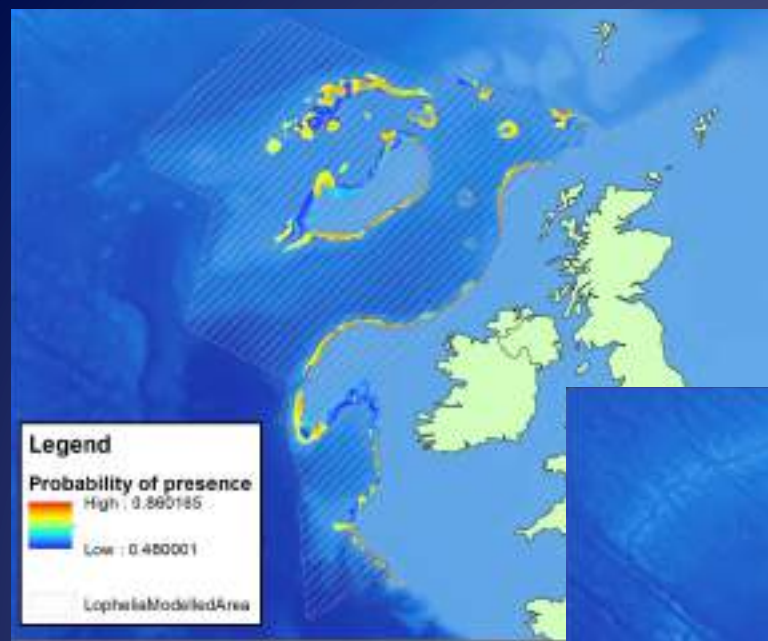


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Mapping the deep project



Predicted distribution of xenophyophore aggregations in UK and Irish deep sea



All models were validated and were assessed as good or excellent.

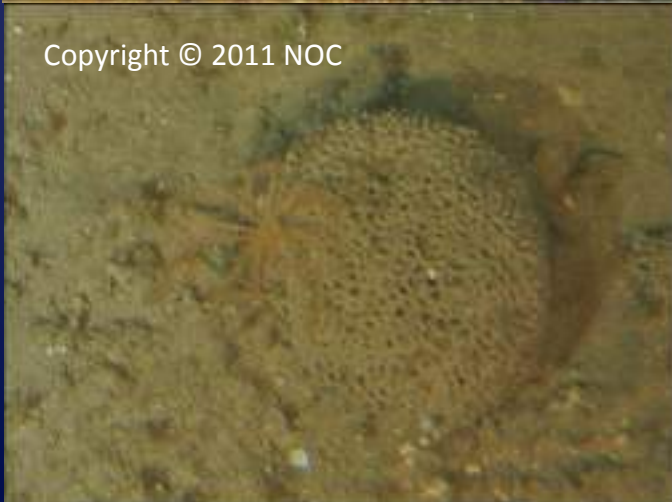
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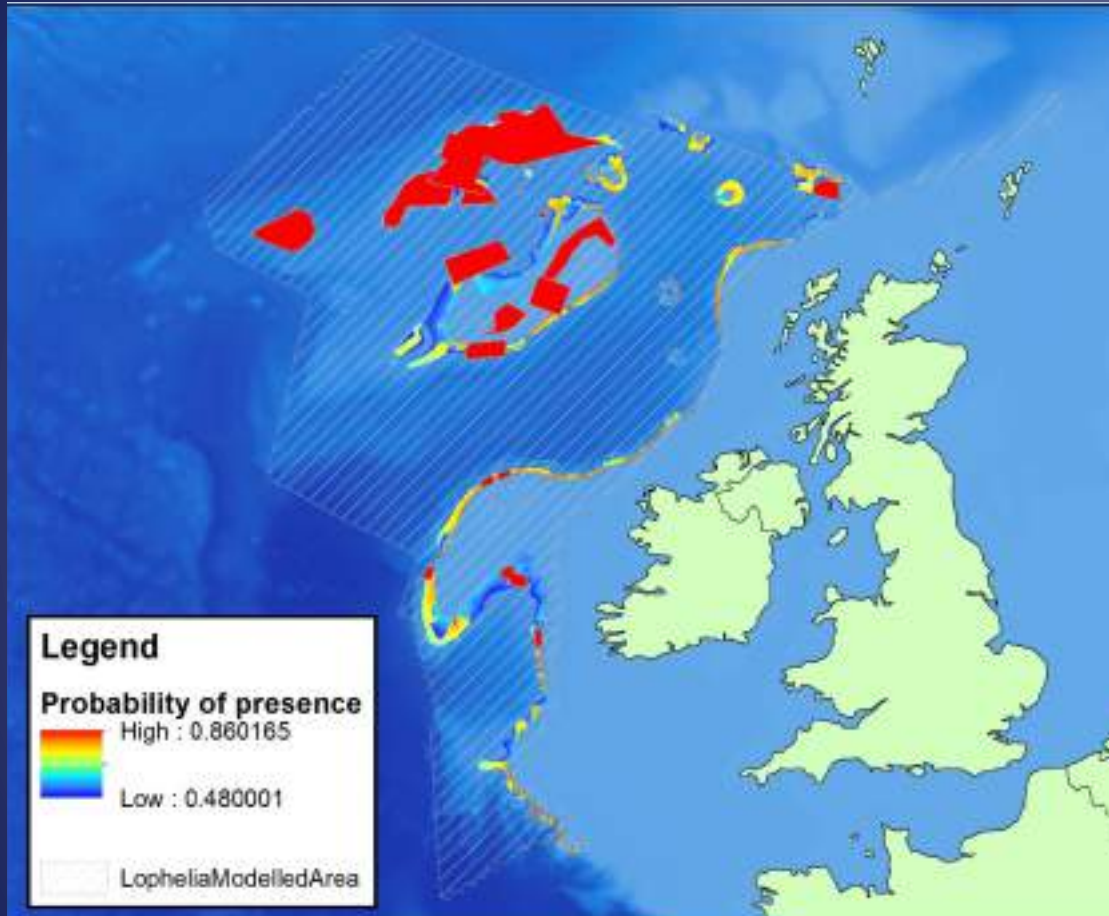
DSCC asked us to calculate the following:

1) What percentage of each habitat type is protected by the existing closures to bottom trawling?

2) What percentage would be protected if in addition to existing areas closed to bottom trawling, MCZs, Scottish MPAs and SACs were also closed to bottom trawling?

3) What percentage would be protected if we simply banned bottom trawling below 600m..

Mapping the deep project



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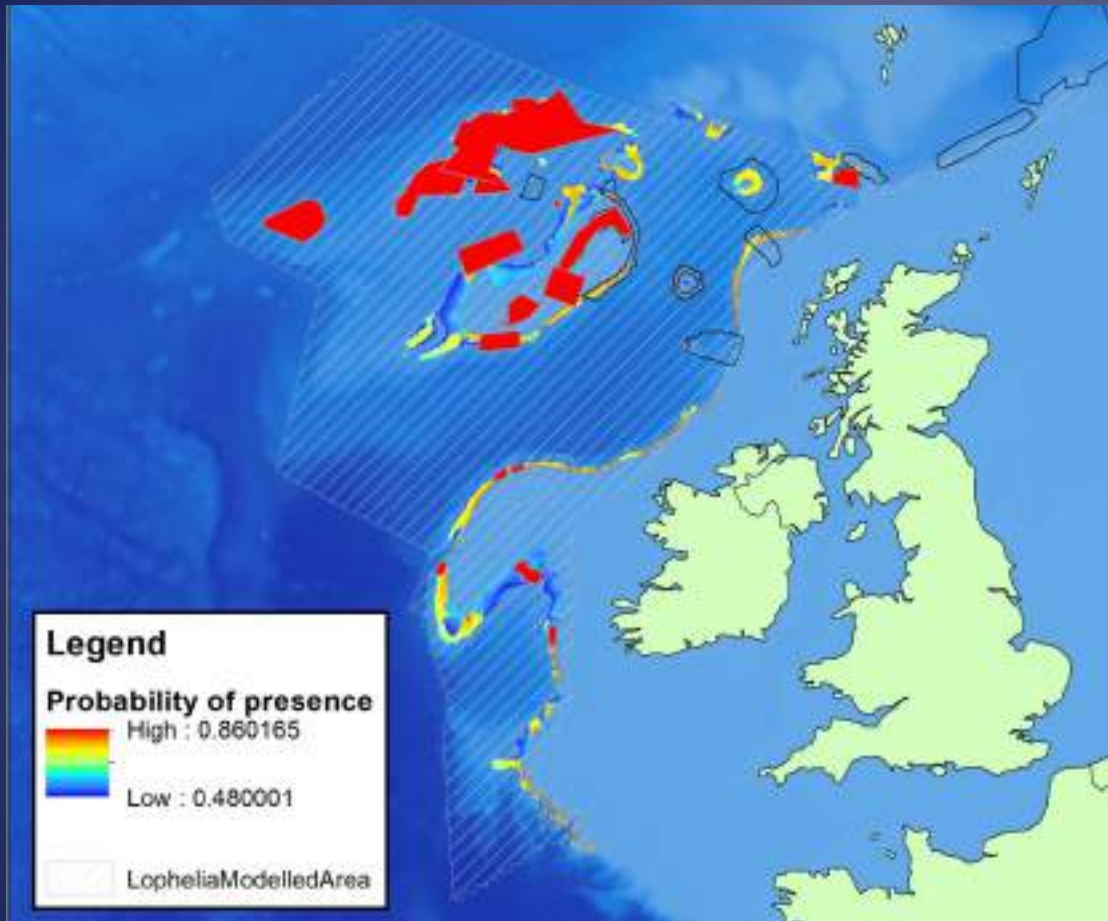
Percentage of predicted habitat protected

UK 41%

Ireland 15%

Areas currently closed to bottom trawling

Mapping the deep project



Areas currently closed to bottom trawling and existing MCZs and Scottish MPAs

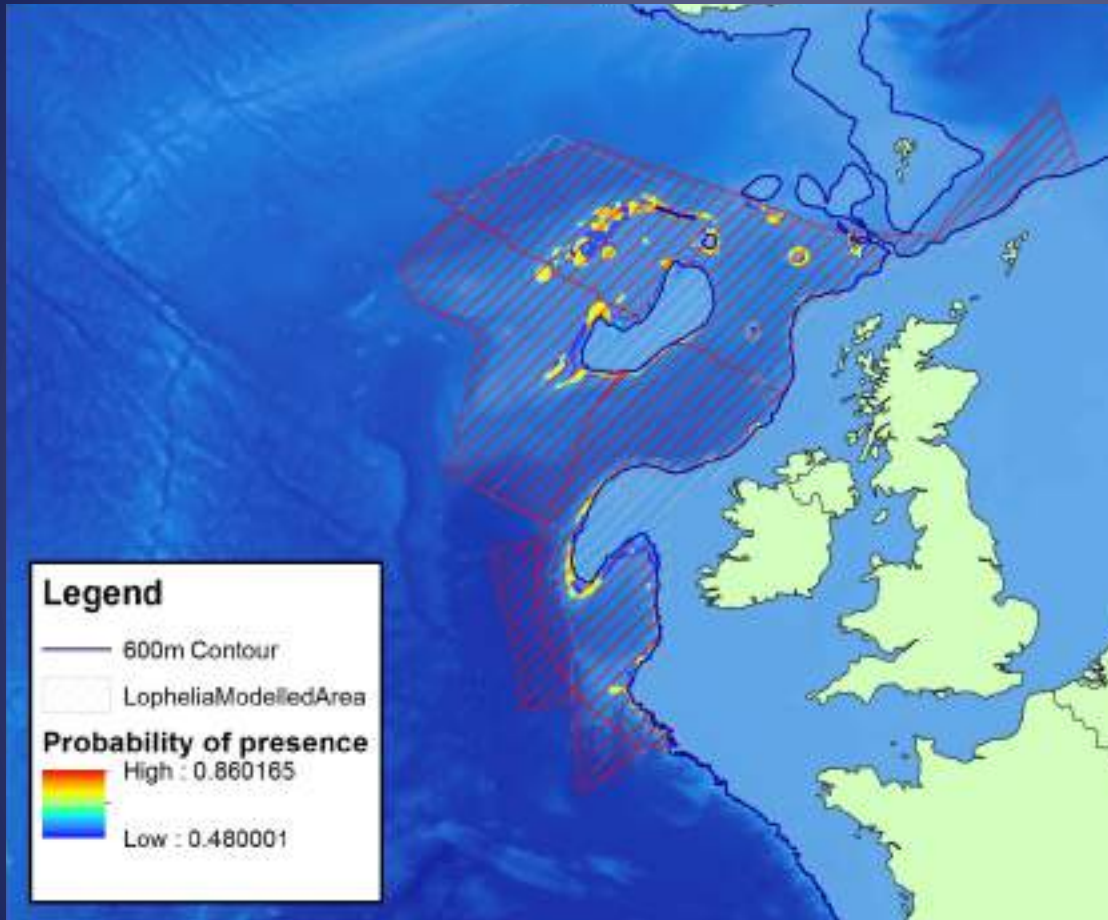


Percentage of predicted habitat protected

UK 55%

Ireland 15%

Mapping the deep project



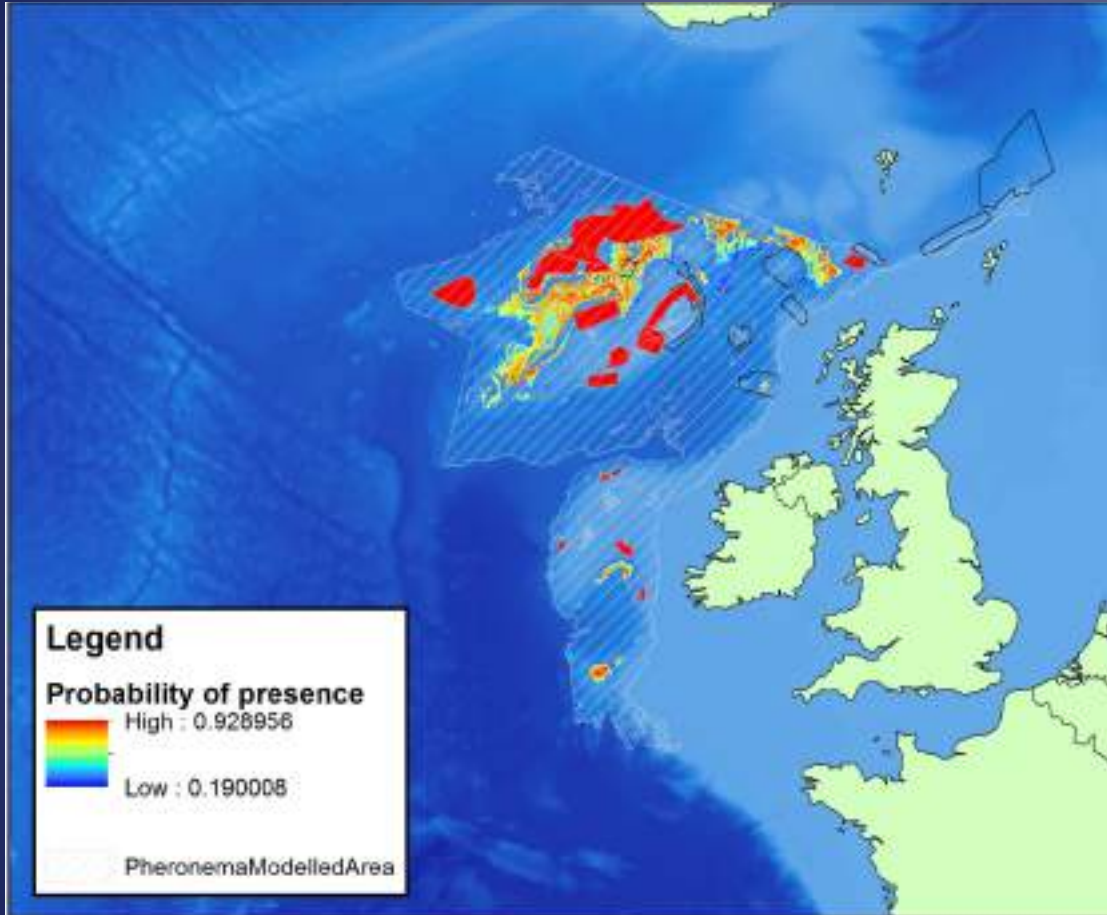
Percentage of predicted habitat protected

UK 88%

Ireland 84%

Closing the area below 600m to bottom trawling

Mapping the deep project



Areas currently closed to bottom trawling and existing MCZs and Scottish MPAs

Percentage of predicted habitat protected by existing closed areas

UK 11%

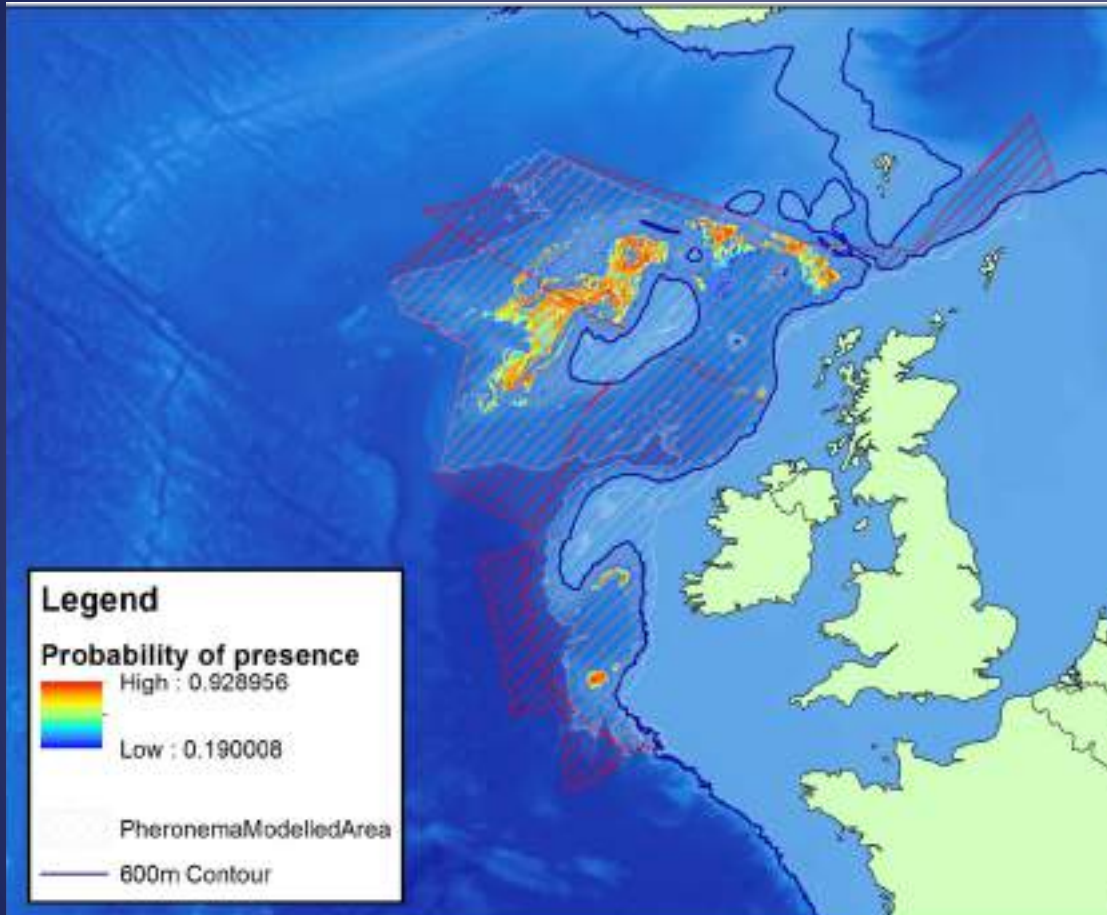
Ireland 2%

Percentage of predicted habitat protected by existing closed areas and MCZs / MPAs

UK 14%

Ireland 2%

Mapping the deep project



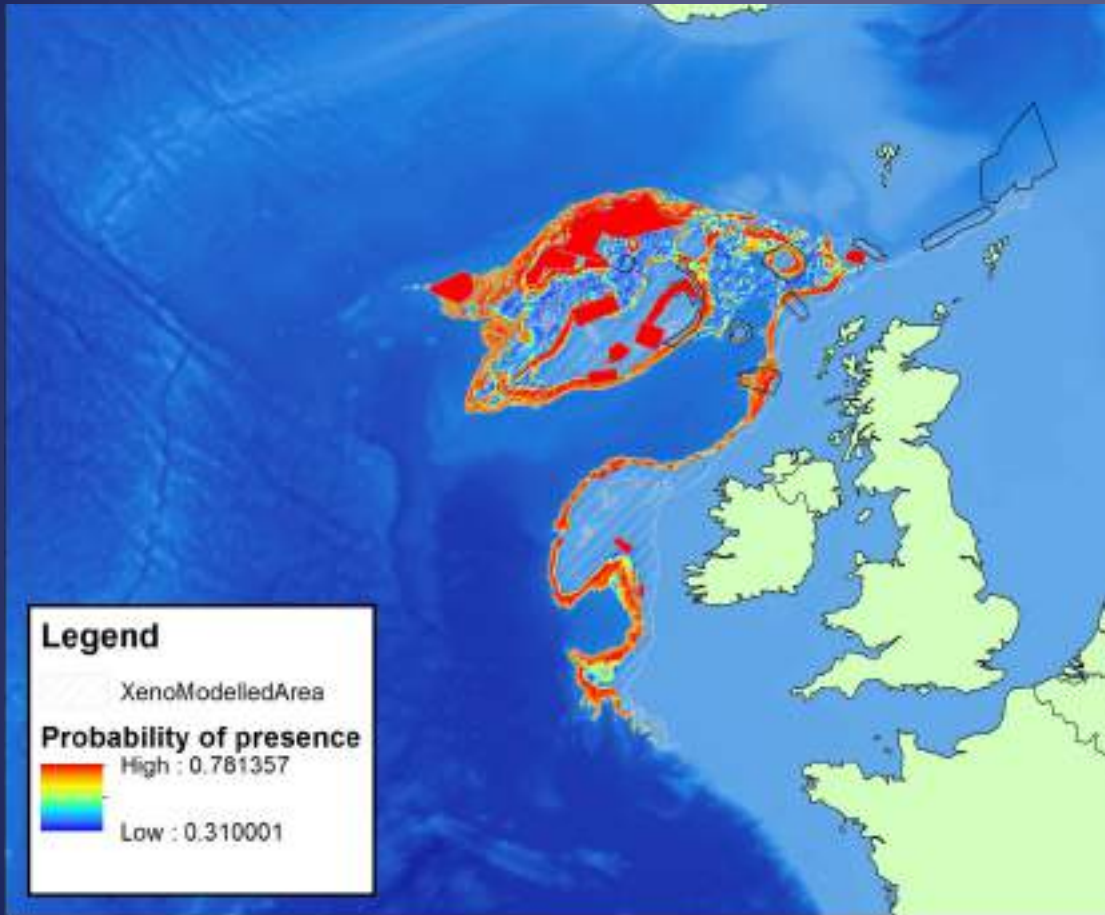
Percentage of predicted habitat protected

UK 100%

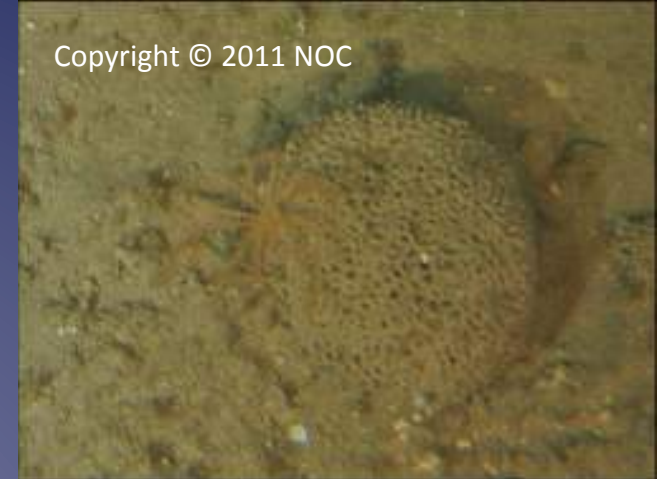
Ireland 100%

Closing the area below 600m to bottom trawling

Mapping the deep project



Areas currently closed to bottom trawling and existing MCZs and Scottish MPAs



Percentage of predicted habitat protected by existing closed areas

UK 13%

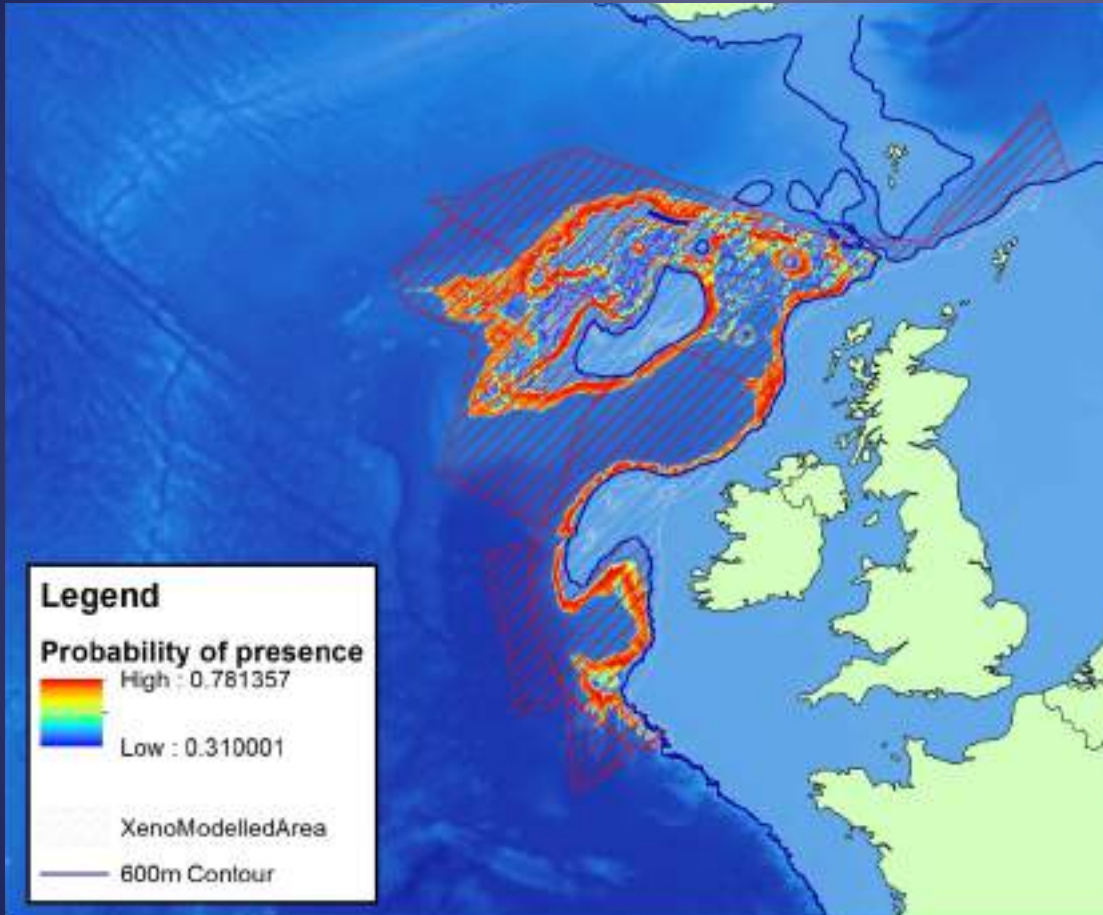
Ireland 7%

Percentage of predicted habitat protected by existing closed areas and MCZs / MPAs

UK 23%

Ireland 7%

Mapping the deep project

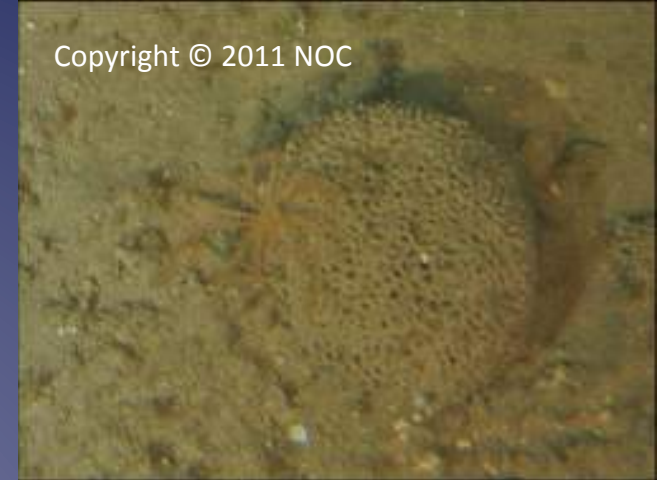


Percentage of predicted habitat protected

UK 100%

Ireland 100%

Closing the area below 600m to bottom trawling





| | Cold water coral reef | Deep-sea sponge aggregation | Xenophyophore aggregation |
|---------|---|-----------------------------|---------------------------|
| | Percentage protected by existing closures | | |
| UK | 41 | 11 | 13 |
| Ireland | 15 | 2 | 7 |
| | Percentage that would be protected by bottom trawl ban in UK SACs and Scottish MPAs | | |
| UK | 55 | 14 | 23 |
| Ireland | 15 | 2 | 7 |
| | Percentage that would be protected by a bottom trawl ban below 600m | | |
| UK | 88 | 100 | 100 |
| Ireland | 84 | 100 | 100 |

Caveats

Model resolution is coarse (750m x 750m) thus cannot resolve coral thickets on summit of Rockall Bank

Metrics used to assess models are known to over inflate apparent model performance

Models with similar performance can produce quite different spatial output

We do not advocate the use of these models for local scale decision making without adequate ground truthing.

Thanks!



The Scientists, officers, crew and Government workers involved in the collection of the data used in the original paper, including but not limited to: Heather Stewart, Colin Jacobs, Neil Golding, Jaime Davies, Nils Piechaud, Veerle Huvenne.

Ross, R, Howell, K.L. (2013) Use of predictive habitat modelling to assess the distribution and extent of the current protection of 'listed' deep-sea habitats. **Diversity and Distributions**. 19(4), 433-445.