Title:	**Case Study: Marine Spatial Planning Pilot. Scenario - Tidal Stream Energy**
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Summary:	The Case Study describes part of a pilot study investigating Marine Spatial Planning (in the Irish Sea). Scenarios were used to indicate how information might be used to make spatial allocations for certain future uses. Areas of potential tidal resource were overlain with other interests or sectoral uses which might occupy the same area of sea and/or form a conspicuous constraint to deploying tidal energy devices. One such interest was the location of potential Natura 2000 sites based on habitat maps indicating presence of reefs or sandbanks. The 'policy' decision taken in this simulated scenario was that conflict between tidal energy and other spatially constrained interests would be avoided by the latter taking precedence.
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Related information:	Workshop report and additional case studies: Report to Natural England; MSPP Consortium (2005) Scenario 1: Tidal Stream Energy. ABP Marine Environmental Research Ltd (ABPmer), Terence O'Rourke, Risk & Policy Analysts, Geotek, Hartley Anderson and Coastal Management for Sustainability. 20pp. http://mspp.abpmer.co.uk/mspp/index.asp

1. Introduction

Part of a pilot study to determine the feasibility and practicality of developing and applying a Marine Spatial Plan. Scenarios, presented as a series of maps, were used to indicate how information might be used to make spatial allocations for certain future uses.

This scenario focused on tidal steam. Suitable seabed areas were identified and these were mapped together with spatial constraints. One end product was a map identifying locations of least constraint in the Irish Sea which might be considered for the exploitation of tidal stream energy.

The MSP Project was carried out over a one year period in 2004/5. Scenarios were developed towards the end of the project.

2. Aims and objectives

To use information from the Irish Sea Pilot Plan to identify preferred locations for tidal stream power generation which help to implement Government policy on marine renewables and which minimise conflict with other current and future use-related activities. Mapping the overlap of suitable locations for tidal stream power with habitats that might be protected as Natura 2000 sites was one of the tasks.

A specific objective of the tidal stream scenario was to integrate policy with spatial information and to see whether the outputs (in the form of maps) could help guide decision making on where tidal stream exploitation might be acceptable.

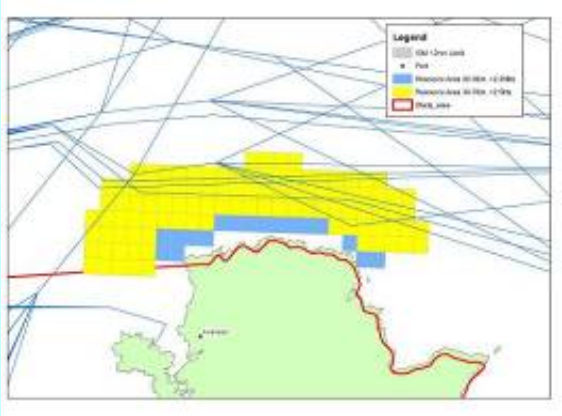
3. Technical outline

Using around 200 sets of spatial information on key marine resources (eg. marine landscapes, water column features, seabirds, marine mammals) and sea user activity (eg. shipping routes, oil and gas platforms), possible areas for deployment of tidal devices were identified. These were based on a number of assumptions relating to tidal flows using data taken from the Marine Renewable Energy Atlas[1]together with depth range, distance from shore, minimum farm size and minimum area determined through discussion with the industry sector.. The data were held in held in Arc GIS9 and the scenario simulation used the same grid cell size as the Atlas (approx 3km2).

The initial map of potential tidal resource areas for exploitation was overlain with other spatial data to identify what other interests or sectoral uses might occupy the same area of sea and/or form a

[1] ABPmer, 2004. Atlas of UK Marine Renewable Energy Resources: Technical Report for DTI. ABP Marine Environmental Research Ltd, Report No. R.1106. Southampton, June 2004. Available at http://www.dti.gov.uk/energy/sources/renewables/renewables-explained/wind-energy/page27403.html

a



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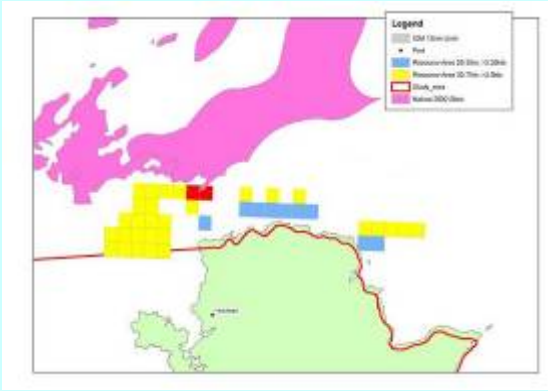

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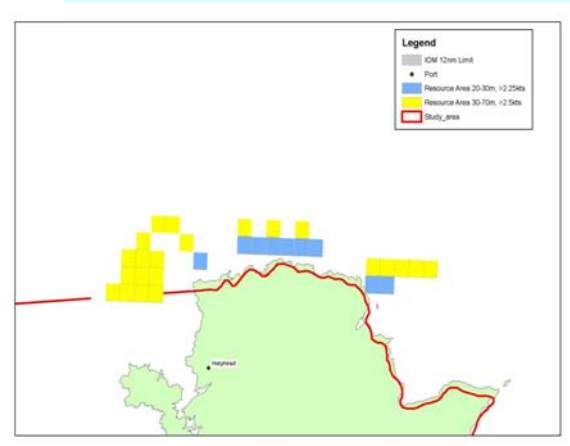

Figure 1 Suitable resource areas for tidal stream energy extraction (a) prior to overlay of potential constraints (b) showing cells which overlap with potential Natura 2000 sites (red) (c)after mapping and removing overlap in areas of constraints due to shipping routes, known wreck sites, and potential Natura 2000 sites (from ABPMer 2005, MSP Scenario 1)

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planning (identifying potential locations for tidal stream energy extraction).

5. Did mapping help meet the objectives and if so how?

Mapping in general, including habitat maps and their potential expression as marine protected areas, was essential to achieving the objectives because;

- It was critical to visualising the scenario
- It enabled different data sets to be superimposed and therefore suggest spatial options
- The assumptions help set up criteria which could be mapped.

The scenario has demonstrated that it is possible to identify areas of suitable resource where known constraints from other uses are lower.

6. Key lessons

- Sufficient spatial information is available to develop and support MSP.
- MSP CAN provide the framework for integrating environmental and socio-economic considerations and provides the mechanism for delivering national/international policy targets and commitments.
- Spatially mapping uses of the sea, potential future requirements for allocated space (safeguarding resources), identifying areas where connectivity is critical (e.g Ports, shipping lanes) and linking these together against the backdrop of environmental designations,

ecologically sensitive and/or important areas, marine landscapes etc provides an important, if not crucial, tool for dealing with the complex and disparate use of the sea area around the UK. This is true in terms of both conflict resolution and the identification of synergies for dual (or more) use of a given area of seabed.

7. Conclusions

7.1. Outcomes – strengths

The mapping exercise was an invaluable tool for visualising how policies have spatial implications. It was also a very useful way of highlighting the difficulties of planning when there are multi sectoral interests. It also demonstrated that the use of spatial mapping, such as bringing spatial data on habitats and on human activities together, can provide the framework within which to develop a spatial plan in the marine environment and the potential for the allocation of strategic areas for specific development types.

7.2. Outcomes – weaknesses

Mapping Scales: There were areas where economically viable tidal resource exists but which were not captured within the Renewables Atlas due to the grid cell size (3km2). Actual projects would need more detailed site-specific information on constraints, such as seabed habitats which might be subject to conservation measures as well as extent of human activities, to inform the consenting/ development process i.e. MSP/SEA and will also not negate the need for EIA.

The very conservative approach taken by the study (ie grid squares excluded if there was overlap with any potential constraint, even if the constraint was likely to be localised with the grid square) does not bring out other zoning possibilities.

The robustness of the proposed allocations is dependent on the quality of data on the tidal stream resource and on other use constraints such as extent of habitats which may be subject to conservation measures. Precise locations for some uses such as fishing and recreational sailing are not well resolved in the plan, with broad areas indicated within which these activities occur. As with all spatial allocations within a system of MSP, stakeholder consultation will be essential in refining provisional allocations made on the basis of plan data.

Collation and validation of the data and identifying and obtaining the necessary permission for its use proved to be an onerous and lengthy task. In particular a number of conflicts were identified between supposedly authoritative data sources for the same data set.

There were gaps in the information on habitat mapping and limited integration with landward issues.

7.3. What would you have liked MESH to provide?

MESH aims to compile available seabed habitat mapping information across north-west Europe and harmonise it according to European habitat classification schemes.

Better definition of habitat types would certainly help future scenario building of this type as would more detailed marine landscape classification to enable interpretation at a local level. Better knowledge of the seasonal distribution of mobile species such as birds, marine mammals and fish would also have been useful

Data on the distribution of some key economic resources was incomplete however MESH is probably not the best type of programme to provide this, as it would dilute its effort which should be focused on biological/physical information rather than data on human activities.

7.4. How might this work help the MESH project?

Demonstrate how MESH data could be used in any future system of MSP and points to the level of detail required and the scales which would be useful in any MSP.

There were significant issues concerning data availability. This highlights the importance of projects such as MESH and the work of the Marine Data and Information Partnership (MDIP) in seeking to develop common standards for data and metadata and the development of a readily accessible data portal through which such data can be obtained.

8. Further information

MSPP Consortium (2005) Scenario 1: Tidal Stream Energy. ABP Marine Environmental Research Ltd (ABPmer), Terence O'Rourke, Risk & Policy Analysts, Geotek, Hartley Anderson and Coastal Management for Sustainability. 20pp.

9. Acknowledgements

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