

VISUALISING COASTAL ENVIRONMENTS

Chen Wang¹, Gillian Donaldson-Selby¹, John Howe², David Miller¹, Paula Horne¹

¹James Hutton Institute, Craigiebuckler, Aberdeen, AB15 8QH

²Scottish Association for Marine Science, Scottish Marine Institute, Oban, PA37 1QA · Contact: chen.wang@hutton.ac.uk



Aims

The development of a computer representation of areas of coastal Scotland to support interpretation of subsurface features, the discussion of potential issues relating to land use change and potential impacts on coastal waters, and multiple uses of sea lochs.

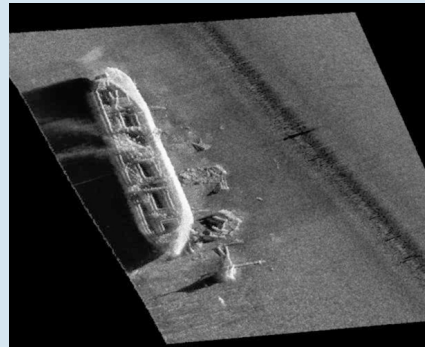
Coastal Scotland

Coastal Scotland is the interface between land and marine environments, generally with discrete management, designations and ownership. Yet, uses of land, lochs and coastal waters can be interdependent for tourism and recreation, economic activity and environmental impacts.

- 45% of Scotland's population live within 5km of the coast
- Significant contributions to Scotland's rural economy, such as: aquaculture and shellfish £600m, plus 1,500 jobs; Sailing £101m, 2,700 jobs; wildlife tourism £100m, 2,700 jobs; sea angling £141m
- Scotland's sea lochs are an integral part of the its seascape and landscapes, and its cultural heritage, as diverse as the Machair and associated crofting landscape, designated war graves in Scapa Flow, and renewable energy in the form of tidal, wave and offshore wind



Crofting and aquaculture in west coast Scotland



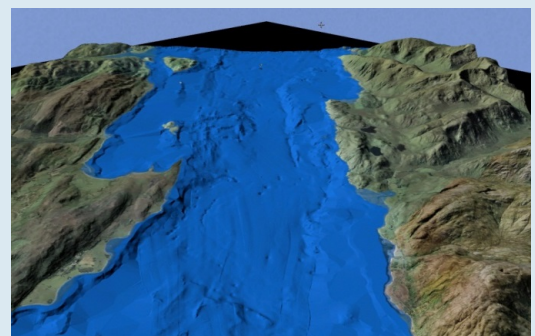
Sonar image of Shipwreck off Oban, SS Breda

Multi-functional land and sea use

The Scottish Land Use Strategy and Marine (Scotland) Act provide policy contexts for engaging communities in planning and decisions relating to the management of natural resources. Although we often we consider land use and sea use separately each can be closely interconnected. For example, fishing and farming are both characteristics of a many crofting landscapes. However, debates arise of the compatibility of other uses of land and sea such as forest expansion with water quality, or marine renewable energy with tourism.

Visualisation

To aid in the communication and interpretation of coastal environments, visualisation tools have been used, an example of which is for Loch Linnhe on Scotland's west coast. These enable the presentation of contexts of the topography of the land and sea floor, land and sea use, land and marine designations, and the introduction of potentially new features such as forestry, fish farms, renewable energy.

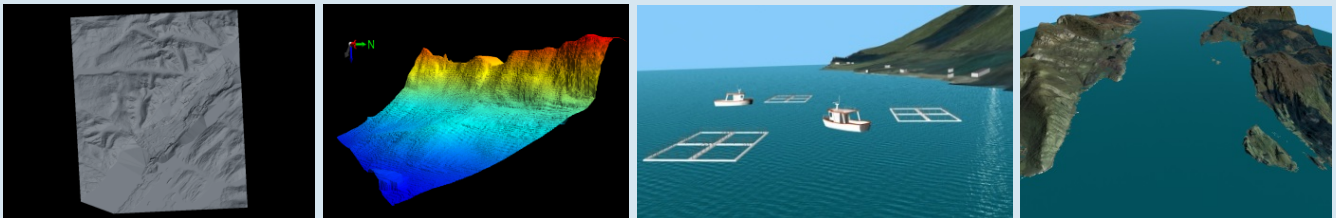


VISUALISING COASTAL ENVIRONMENTS



Model creation

A model was created of the sea floor and surrounding land of Loch Linnhe in 4 steps. This used data of above and below the water line, and the addition of 3D model features, for use in a virtual reality environment.



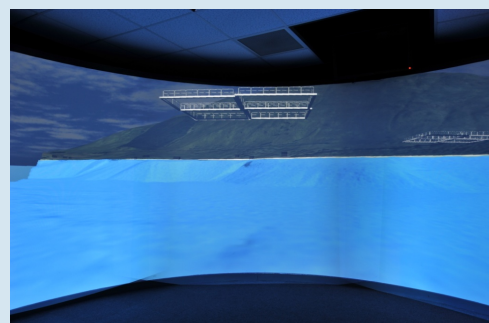
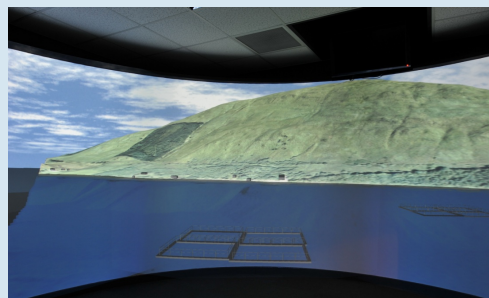
Public engagement

Engaging with stakeholders and the public enables discussion, explanations and opinions to be exchanged, and feedback on land and sea use, now and in the future.



Shared issues, on- and offshore

Audiences identified a range of issues of potential compatibility and incompatibility on inspection of the models.



Examples include:

Does woodland expansion increase nutrients in sea water and cause problems for fish farms?

Are habitats on the sea floor influenced by changes in habitat onshore?

Does onshore and offshore farming have the same effects on landscape character?

Next steps

The model is being expanded and updated using a new survey of the sea floor of Firth of Lorn undertaken by SAMS, covering 553km². This will be used along with scenarios of potential future uses of land and sea to test for differences in perceptions of land and seascapes for views from land and sea, and multi-functional uses of natural resources across land and sea.

Acknowledgments

Model creation was a collaboration between the James Hutton Institute and Scottish Association of Marine Sciences. Data was provided by SAMS through the NERC MAREMAP programme. Thanks also to participants at events in Aberdeen (September 2011) and the Festival of the Seas (Oban, May 2012). This work is funded by Scottish Government Rural and Environment Science and Analytical Services – Work Package 3.5 Optimising multi-functional land use.