

FishMap Môn – bespoke application development case study



Astun enables Natural Resources Wales to build a unique application to show the distribution of fishing activity and its impact upon seabed habitats.

FishMap Môn is a pilot project funded by the European Fisheries Fund and run in partnership between Natural Resources Wales (NRW) and the fishing community in North Wales. Project partners include the North Wales Fisherman's Cooperative Limited, Bangor Mussel Producers Limited and the Welsh Federation of Sea Anglers. The project sets out to inform the sustainable management of the Welsh marine environment by collecting and mapping fishing activity and combining it with information on seabed habitats and their sensitivity to such activity. The outcome is a web mapping application, the FishMap Môn Guidance Tool, developed by Astun Technology in 2013 using Open Source technology. Astun also host the data and the application. The geographic area of focus is located between Nefyn in the West and the Great Orme in the East extending out to the 12 nautical mile limit around Anglesey. As well as enabling the viewing of the project's results, the tool enables stakeholders to create fishing activity scenarios and establish the resultant sensitivity of seabed habitats to those scenarios.

Data Collection and Base Mapping

The data gathered for this project is the result of wide collaboration between fishermen and Natural Resources Wales. Extensive interviews were carried out with both commercial and recreational fishermen to understand the distribution and intensity of fishing activity in the Project area.

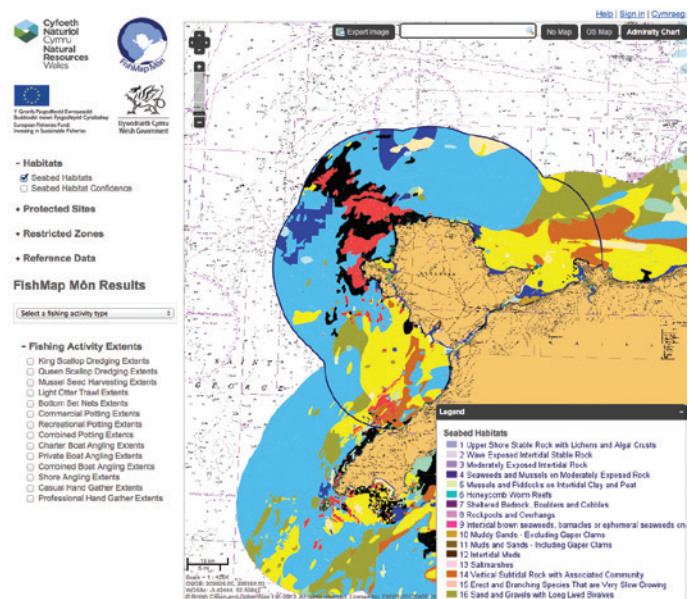
NRW provided the raw spatial data and algorithms to be incorporated into the application by Astun. The outputs from the official survey work carried out by NRW can be displayed together with contextual data and the results of a user creating their own fishing scenario. Results based on user scenarios are generated using algorithms, developed in conjunction with

Liverpool University to calculate the intensity and sensitivity of different fishing activities on different habitats. Various other contextual layers such as the locations of wrecks and Special Areas of Conservation were also accommodated. Base mapping consists of No Map (a simple coastal outline), OS Mapping or Admiralty Charts which extend beyond the project area to include the whole of the Welsh coastline.

The Application

The application has been designed to be open both to the public and fishermen and policy makers via the web. It has a clean and simple interface, familiar pan and zoom tools for map navigation and the ability to select different base mapping and multiple data layers – habitats, protected sites, restricted zones and other reference data. All the public data is generalised to a 1km grid. Precise, detailed data, with additional attributes, are available via a login issued by NRW. The application can be viewed in the Welsh Language or English.

To view the FishMap Môn survey results on the map the user simply selects a fishing type which shows where this activity takes place. There is then a choice to view information on the number of vessels involved, the fishing intensity, the habitat sensitivity and the confidence layer. In each case a contextual legend is available to explain the meaning of the resultant colour fills.

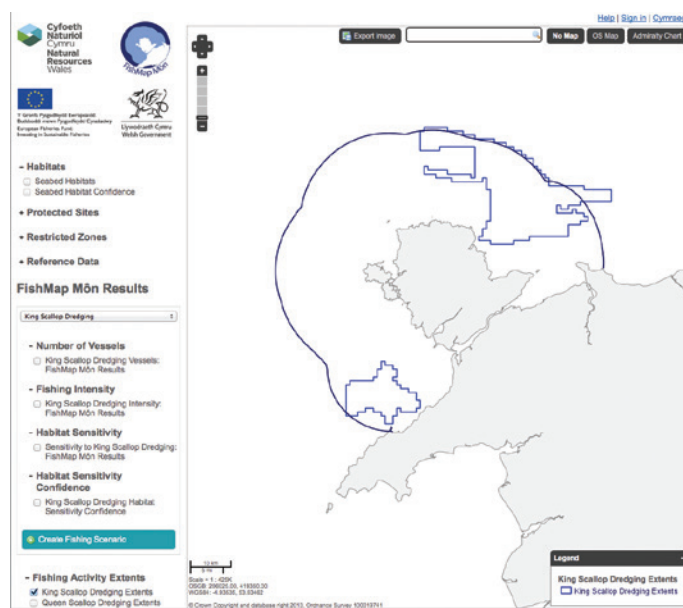


Seabed Habitats using the Admiralty charts as the base map

The application also enables users to run different scenarios

Astun case study: FishMap Môn – bespoke application development case study

based on the precise fishing activity using the algorithms mentioned above. The user first selects the type of fishing activity then clicks on the Create Fishing Scenario button to reveal a panel where the data relating to the scenario can be entered, simple instructions lead the user through the process – draw the area on the map, enter the days per month, the nature of the gear used, the duration and speed and the number of vessels involved – run the scenario. The area drawn on the map is filled with a colour appropriate to the intensity of the fishing activity explained by the legend. Clicking on the area reveals the precise intensity scores. The application enables the scenario to be viewed on its own or together with the FishMap Môn survey results for simple comparison.



The application enables users to run different scenarios based on the precise fishing activity

At any point a one button click (Export Image) will create a printable image file of the information displayed on screen. A further click will download the file to the user's computer. The image file is more than just a screen shot, presenting the map and legends in a useful format.

Under the hood

Considerable work was done to prepare the base mapping, particularly the Admiralty Charts for the application. This involved raster image conversion and manipulation to create a tile set. The application uses the Open Source components – Postgres with the PostGIS extension as the database and MapServer using styled layer descriptors (SLDs) to do all the styling. All the calculations used to create the fishing scenarios are carried out using the SQL functions in Postgres.

MapProxy is used for all the tile rendering. During development Astun made a small enhancement to enable offline rendering and subsequent cache loading to the server, helpful during commissioning. Another enhancement enables the application of effects, such as a watermark to the

images produced by MapProxy. The code for these two enhancements has been contributed to the MapProxy project. The web application itself was built using a Python framework called Flask. To maintain security everything is filtered through the web application leaving the data behind unexposed and secure.

The data and the application are hosted entirely using Astun Cloud Services on Amazon servers.

Open Source

This is one of the first projects in which NRW, or its predecessors (Countryside Council for Wales, EA Wales, Forestry Commission Wales) has set out to use Open Source technology. Following project completion the application code was submitted to GitHub, the world's largest Open Source community. There are several reasons for doing this. Since this application was written specifically for NRW it provides them with access to the work Astun has done, a fair and open approach to developing bespoke software. For NRW it provides the flexibility to develop the application further, either in house, with Astun or with a partner. For the wider Open Source community the ability to reuse all or part of the work in other projects or to simply learn from the code is a bonus given that there are relatively few complete applications available at present on GitHub.

The application was launched at a special event hosted by Natural Resources Wales in December 2013. The project will be maintained until 2015. If the local fishing industry recognises the usefulness of the tool, it could help in the delivery of an ecosystems based approach to fishery and conservation management across a wider area. If successful, the tool could assist fishermen to plan their fishing with confidence if it was not causing environmental damage to sensitive habitats and could also be used to pilot the use of web based mapping applications for stakeholder engagement and marine spatial planning.

"The development of this application has enabled us to reach our target audience, delivering the results of the project in a clear and easy to understand interface. The ability to create additional scenarios and interact with the application is quite unique, and will enable all sectors to model fishing activities and plan for the future."

With Astun Technology Ltd. hosting the application on a cloud based server, and delivering it through an Open Source stack of technology, will allow us to keep the running costs over the lifetime of the project to a minimum, and to also develop other applications as the need might arise."

Bruce Jackson, FishMap Môn GIS and Data Officer, Natural Resources Wales

To view the application please visit:

<http://fishmapmon.naturalresourceswales.gov.uk/>