

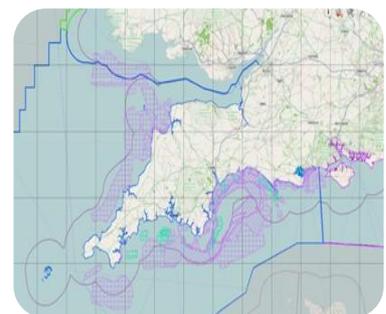


The use of decision support tools and participatory GIS in MPA site selection

Workshop handbook

Sarah Gall, Louise Lieberknecht, Shaun Lewin, Tom Mullier, Will McClintock, Greg Vaughan, Tony Pettit, Tom Hooper

19 November 2011



Guidelines

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[Published by]	Finding Sanctuary www.finding-sanctuary.org & JNCC Joint Nature Conservation Committee http://www.jncc.gov.uk/

Work quotation: Sarah Gall, Louise Lieberknecht, Shaun Lewin, Tom Mullier, Will McClintock, Greg Vaughan, Tony Pettit, Tom Hooper, November 2011. The use of decision support tools and participatory GIS in MPA site selection, Workshop handbook. Finding Sanctuary – JNCC – MAIA, Exeter, UK.

This publication is supported by the European Union (ERDF European Regional Development Fund), within the Interreg IV B Atlantic Area Programme, under the Objective 2.2. "Sustainable management and protection of the resources of marine spaces".

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1. Introduction

The importance and awareness of the application of decision support tools and participatory Geographic Information Systems (GIS) for Marine Protected Area (MPA) site selection is increasing. If implemented appropriately and effectively these tools can be very valuable in the process of MPA site selection, processing complex data relating to sea use and biodiversity and allowing it to be presented in a simplified manner. Participatory GIS in particular is seen as an effective way to increase stakeholder engagement and the efficiency, transparency and effectiveness of the MPA planning process.

Following the Marine and Coastal Access Act in 2009, the UK established the Marine Conservation Zone (MCZ) project to select sites in English inshore waters and English, Welsh and Northern Irish offshore waters which could be designated as MCZs. These sites have the aim of protecting nationally important marine wildlife, habitats, geology and geomorphology and the project was established to recommend locations of MCZs by putting sea users and interest groups at the centre of the site selection process. The goal of the project was to produce a network of sites that could be established with minimum impact on sea users and maximum benefit for conservation (JNCC, 2010). Four regional projects were established, Finding Sanctuary in the south-west, Balanced Seas in the south-east, Net Gain for the North Sea and Irish Sea Conservation Zones for the Irish Sea. Finding Sanctuary was already established when the project was created and its experiences aided the development of the methodologies used.

This report considers the use of decision support tools and participatory GIS in MPA planning and discusses the advantages and limitations of the different techniques. It focuses on the tools that have been used by the UK regional MCZ projects, in particular Finding Sanctuary and Balanced Seas, and also those used in the MPA planning process in California.

The tools considered are desktop GIS including FisherMap and StakMap developed by Finding Sanctuary, and ArcFish developed by Balanced Seas; web-based interactive GIS including the MCZ Project Interactive Map used by all four regional UK MCZ projects, MarineMap developed by the University of California Santa Barbara Marine Science Institute, Ecotrust and The Nature Conservancy; SeaSketch developed by the University of California Santa Barbara Marine Science Institute; and the decision support tool Marxan developed by the University of Queensland.

1.1. Decision support tools and participatory GIS

Decision support tools and participatory GIS have historically been designed and used by those with specialised knowledge to enable the visualisation, analysis and modelling of geospatial information. More recently they have been adapted for use by planners and stakeholders in MPA site selection to increase the transparency and efficiency of MPA planning.

Stakeholder engagement in the MPA planning process is crucial, with the success of the MPA often linked to the success of the stakeholder engagement process (Pomeroy & Douvère, 2008). If the stakeholders do not agree with or understand the reasons behind the implementation of an MPA or if there is a lack of justification in its location then stakeholder support will be low, possibly resulting in a failure of the MPA. To avoid this it is crucial that any output from decision support tools and participatory GIS must be meaningful to the stakeholders and transparent so that the decision making process is understood and the location of MPAs accepted. It is also crucial that any tools developed are easy to use and meaningful.

When designed and used effectively these tools can:

- Be cost effective, saving time and resources
- Increase stakeholder participation and satisfaction
- Increase transparency in the site selection process
- Increase awareness of alternative solutions allowing the optimum decision to be reached
- Facilitate the dissemination of information and knowledge from planners to stakeholders

1.2. Use in MPA site selection

The World Summit on Sustainable Development in 2002 set targets to create representative networks of MPAs globally by 2012 which has resulted in an increase in the need for effective methods by which to determine and agree MPA site selection.

Historically, protected sites have been designated using an ad-hoc approach with site selection driven by aspects such as conservation urgency, ease of designation and often the avoidance of areas that are politically or economically costly (Ardron *et al.*, 2010). In the marine environment in particular, the designation of protected areas for conservation goals is a reasonably new concept, with management historically targeted towards fisheries, and conservation coming second to economic imperatives (Roberts *et al.*, 2005). However, with recent legislation and the need to create representative networks of MPAs, the methods of designation have necessarily become more robust and have taken into account a wider range of conditions.

The UK has a goal of creating an ecologically coherent network of MPAs by 2012, and the four regional MCZ projects have produced recommendations of sites that will contribute to this network. Unlike the designation of SACs and SPAs, MCZ designation is able to take into account social and economic considerations, and therefore the involvement of stakeholders in the process is key. Consequently the decision making process is highly complex, with considerations encompassing ecological, social and economic factors, and there has been a need to develop successful and cost effective methodologies for these processes that can be utilised in future planning.

The success of an MPA is strongly influenced by its acceptance by stakeholders. Recent experience has shown that the inclusion of stakeholders from the early planning stages onwards is crucial. The development of effective tools that can enhance the involvement of stakeholders, increase transparency of the site selection process and increase the sharing of information between planners and stakeholders is therefore of great importance.

2. Review of tools

This section considers the different tools, providing a brief description of their use and a discussion of the advantages and limitations which specifically relate to each tool.

2.1 Desktop GIS

Desktop GIS tools e.g. ESRI ArcGIS have been successfully used following consultation with stakeholders to produce maps of spatial sea use for different stakeholder groups. These can then be used to produce detailed spatial use maps to aid the determination of optimum MPA locations. Biological data is used to produce habitat maps which can be overlaid with sea use data allowing the determination of areas of high priority for conservation and where the disruption to stakeholder activities would be minimal.

Sea use data gathering requires the collection of data from stakeholders by liaison officers using paper maps and questionnaires, and then the digitisation of these maps by office staff.

2.1.1. FisherMap and StakMap (Finding Sanctuary)

Finding Sanctuary developed two tools, FisherMap for fishing activity and StakMap for recreational activity which facilitated the collection and mapping of spatial activity data. FisherMap originally had the broad aim of surveying fishing activity to inform the development of MCZs. This developed into two main objectives, to review the under 15 m fishing fleet activity for use within the decision making processes, and secondly to be included in a socioeconomic impact assessment of commercial fishing. Stakmap was developed with the aim of mapping sea use for recreational fishers, divers, charter boat operators, water sports users, and amateur naturalists.

Both software programmes were developed in ESRI ArcGIS as a method of digitising the sea use information gathered by Finding Sanctuary liaison officers. Individual use data for each stakeholder was digitised and combined to produce use data for the south-west region by sea use type. For FisherMap this was broken down into fishing gear type and for StakMap into recreational use type. This produced maps where use data is displayed as entered (Figure 1a), and can then be combined with data from other sources such as Marine Management Organisation (MMO) landings data and data from the Cornish Fish Producers Organisation (CFPO) to produce detailed use maps for the region (Figure 1b).

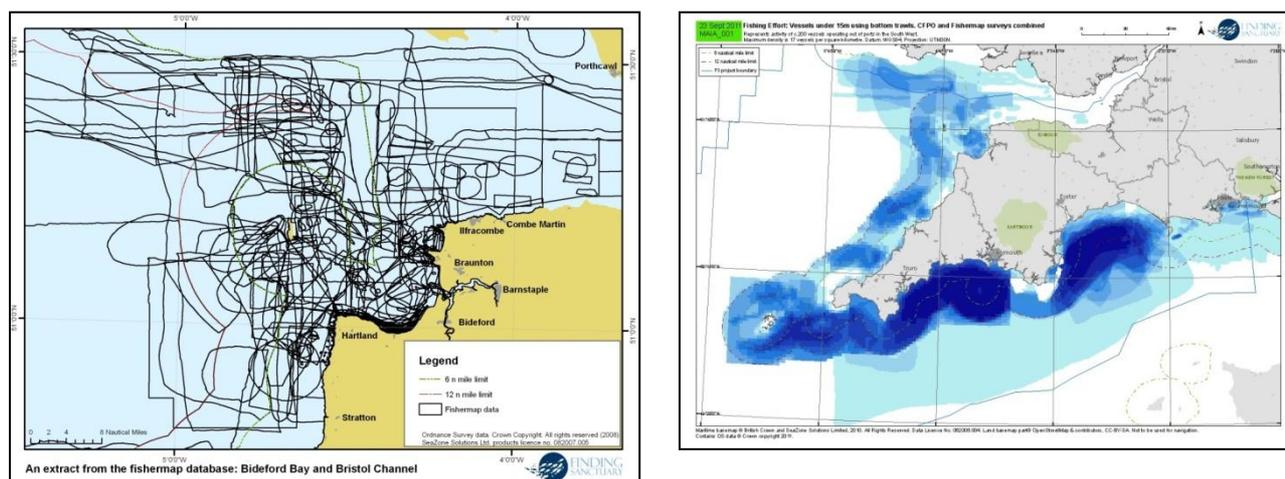


Figure 1: a) Example of FisherMap showing fishing data as collected from stakeholders on the north Devon coast and b) FisherMap data combined with data from the MMO and CFPO to produce detailed sea use maps.

2.1.1.1. Advantages

Stakeholder familiarity with data collection: The use of paper maps and acetates which can be drawn directly onto by stakeholders is familiar, accessible and interactive. This process enables the involvement of a wide range of people and therefore encourages participation and increases transparency.

Face-to-Face data collection: The face-to-face interview process has the advantage of direct interaction with the stakeholders. This provides liaison officers with the opportunity to ensure that the stakeholder understands the aims of the project and to discuss the mapping process and provides the stakeholder with the chance to ask questions they may have. This increases transparency and should aid acceptance of the process.

Low start-up costs: As this process does not require the use of technology in the field, start-up costs are lower and there is less reliance on technology which can be crucial as liaison officers often have to conduct interviews in locations such as cafes, or aboard boats.

Less reliance on technology: The removal of the reliance of the liaison officers on technology when working in the field can be beneficial as technology can be problematic and if it fails then the interview cannot be completed unless the liaison officers carry back-up paper copies.

2.1.1.2. Potential problems and limitations

High processing costs: The costs associated with processing of the data are substantial both in terms of money and time and require specialised office staff.

Time consuming interview process: The interview process can be very time consuming depending on the amount of information required from the stakeholder. Finding Sanctuary found that due to their broad original aims the interview process was long winded and produced a very large database, not all of which was relevant. Over time their focus narrowed more and more towards providing the essential data which reduced both interview time and processing time. The value of having clear aims established from the outset was therefore realised, although the nature of many MPA projects means that the aims evolve over the duration of the project and this is therefore difficult.

Provision of support materials: Initially, Finding Sanctuary developed regional profiles which provided information relevant to the south-west region which stakeholders could refer to during planning meetings. These were however, very substantial and the volume of the document and its

complexity deterred people from using it. The team had invested a lot of time and money into the production of these documents but found that they were providing too much information and so restricted their use to when appropriate.

Dissemination of data: The data layers produced following the digitisation process are very complex, and the scale of mapping and the limited ability to zoom in on fine detail can mean that it is difficult for stakeholders to directly interact with maps during planning meetings. Finding Sanctuary developed interactive PDFs in ESRI ArcMap which allowed the biological and socio-economic data to be viewed simultaneously and proved a successful compliment to the paper maps used previously. Furthermore, as they required interaction from the stakeholders they added an extra dimension to planning meetings.

2.1.2. ArcFish (Balanced Seas)

The south-east UK MCZ regional project Balanced Seas used software called ArcFish which was developed as a person to person data gathering tool. This desktop tool was intended to complement the face to face interview process and reduce the processing time following an interview. It was used to map the sea use of stakeholders and this was then combined to produce sea use maps for each stakeholder group which fed into the MCZ designation process.

The software was developed using ESRI ArcGIS and used bathymetry and nautical charts as well as administrative information, buoy locations, and diving marks. Stakeholders then mapped their sea use with the liaison officer directly into the software and provided information relating to how they used each area and when (Figure 2).

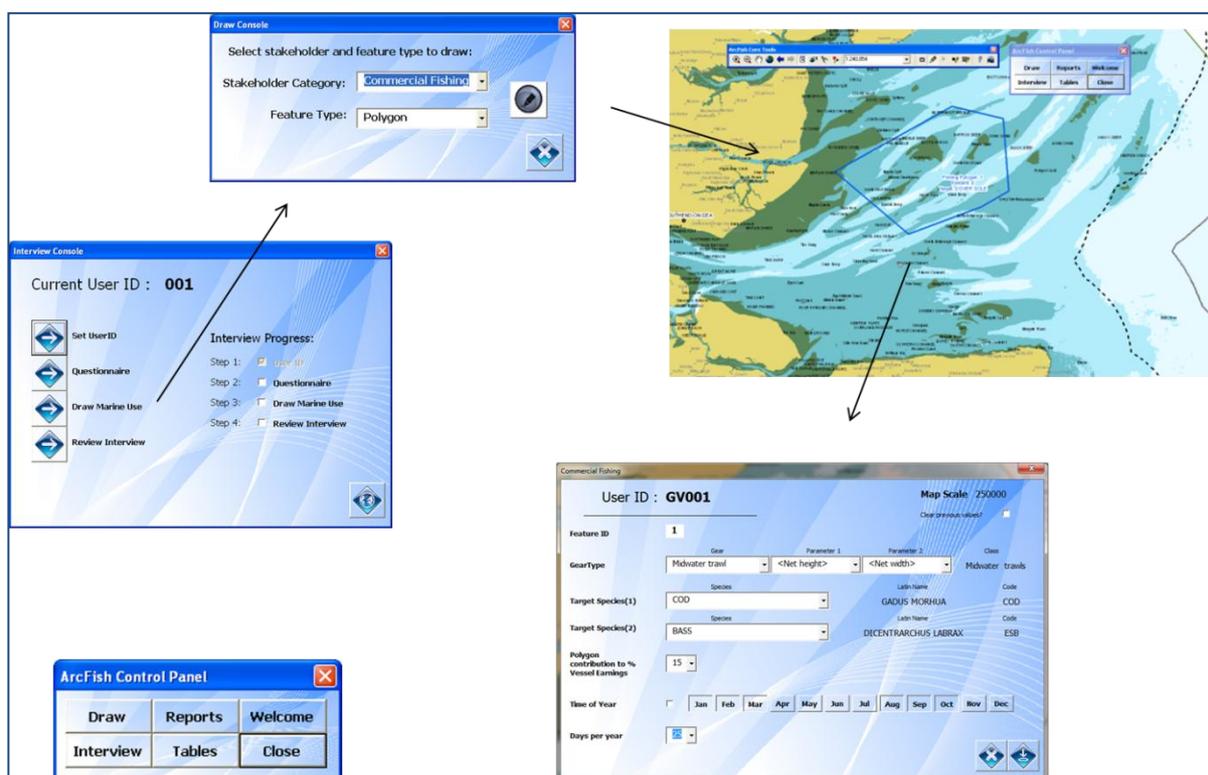


Figure 2: Example of the ArcFish software showing the data entry process enabling the user to provide detailed information about their use of each particular area.

2.1.2.1. Advantages

Direct data entry: As the mapping was completed whilst the interview was being conducted the chance of mapping errors was reduced. This meant that stakeholders could verify their data at the time of entry and increased the transparency of the MCZ planning process.

Data security: Following each interview the data is automatically backed up to a removable drive ensuring its security, and data is also directly stored on the ESRI file geodatabase.

Standardised data entry: The use of the ArcFish software meant that the interview process was guided, and the liaison officer could select from pre-determined lists to enter the answers provided by the stakeholder. This ensured consistency in the format of answers within each stakeholder group and simplified the analysis process.

Software guided interview process: As the interview was carried out using the software as a guide, it ensured that the interview process was consistent between stakeholders and that all interview questions were completed.

Easily adapted: The ArcFish software is simple to use and also simple to modify, making it available to users with varied skills and backgrounds. It has been successfully used by Marine Scotland and the Countryside Council for Wales, with interest also expressed by other organisations including the MMO and Inshore Fisheries and Conservation Authorities in the UK. Its use is only limited by the resolution of the background data and the time available.

2.1.2.2. Potential problems and Limitations

Reliance on technology: The use of technology during the interview process means that if it fails the interview is compromised. However, liaison officers carry paper maps and acetates as backups should this happen.

Data issues: The ArcFish software is limited by the available maps and their accuracy. Problems can also be associated with the symbolism on the maps used if they are not in a format that is already familiar to the stakeholders. It would also be beneficial for the maps to include features that the stakeholders could then select such as wrecks, rather than requiring them to draw them in.

ArcGIS approach: Currently ArcFish is embedded in the ArcGIS desktop, however, if it could be developed as an ArcGIS engine independent application then it would widen its use.

2.2. Web-based interactive GIS

Web-based interactive tools can be used as a platform both to allow stakeholders to view the data that has already been gathered and to enter their own information relating to their use of the sea. They can also be used as a method of disseminating information about the project to the stakeholder, providing a means to increase the transparency of the process.

Their use however, relies on the stakeholders having access to the internet and the ability to use the tool. To ensure the success of these tools it is essential that they are user friendly and well designed.

2.2.1. MCZ Project Interactive Map

The UK regional MCZ projects shared a common web-based interactive GIS system which was managed at a national level by the software management company exeGesIS. It was designed both as a tool to provide information to the stakeholder and as a resource for stakeholders to upload their information directly onto the system.

The tool allows users to select the relevant regional project and the user groups of interest and view data relating to their sea use. It is also possible to overlay information relating to different users and following the completion of the project, to see the recommended MCZ locations.

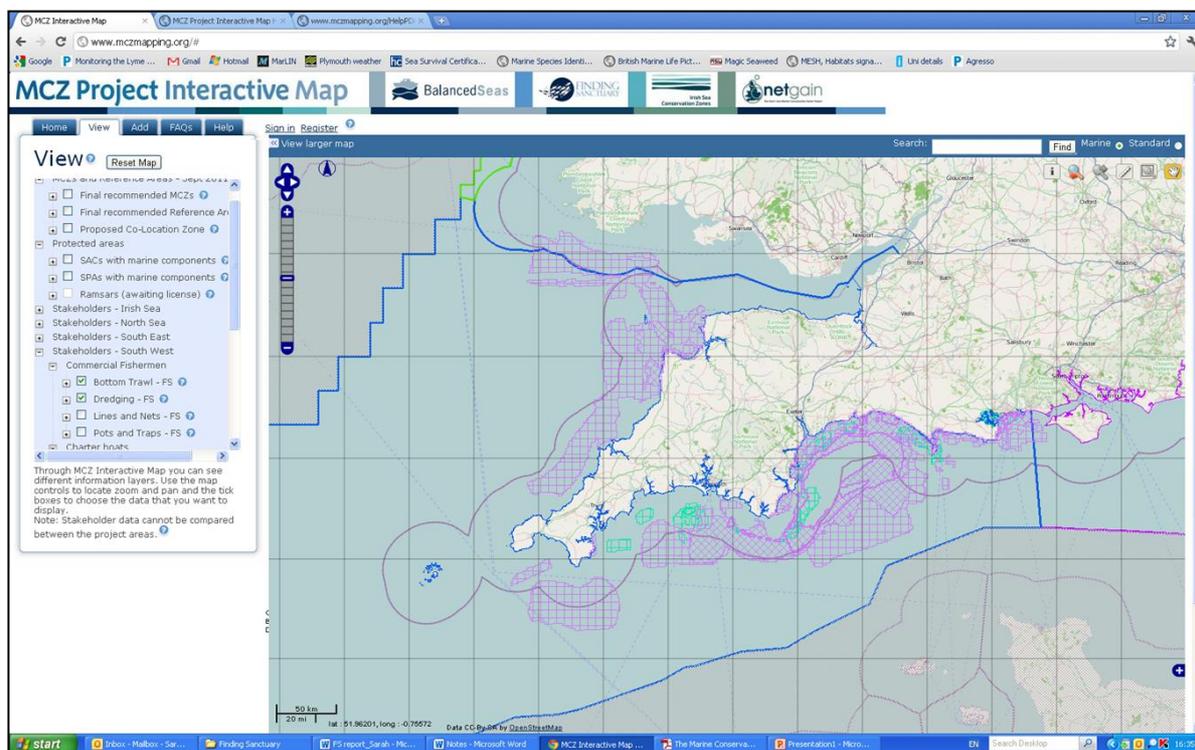


Figure 3: MCZ Project Interactive Map showing an example of Finding Sanctuary data on commercial fishing activity.

2.2.1.1. Advantages

Dissemination of information: The Interactive Map was found to be very useful to disseminate information to the stakeholders and to keep them updated and informed about how the process was progressing. It was accessible to a wide range of users, including government departments and non-governmental organisations (NGOs) as well as the general public. It was also beneficial as a means to share data between stakeholders and partners, allowing them to comment on each other's data and ideas.

Central information source: The provision of a central data store meant that all the data from the four regional projects was located in one easy to use interface.

User friendly: The Interactive Map was user friendly which encouraged its use by stakeholders.

2.2.1.2. Potential problems and Limitations

National management: The management of the system at a national level was not found to be as beneficial as management at the project level might have been. The tool was thought to be too complex, and the lack of standardisation and differences in terminology used between the four regional projects resulted in difficulties as the data sets.

Lack of stakeholder awareness: Publicity for the tool was undertaken but it did not end up being activated until a few months after publicity was completed which meant that many of the stakeholders did not appreciate its use. Furthermore, the control at national level meant that it was difficult to maintain an information base that responded to the needs of the Finding Sanctuary stakeholders specifically. If each of the regional projects had had access to their own GIS management system then this would have had the potential to be more successful. However, this would also have cost significantly more.

Wide range of browsers to support: this presented a problem as the wide range of web browsers display HTML and complex controls differently presenting challenges in ensuring that all users can navigate the site and upload their sea use data successfully.

Problems of data: A wide range of data formats were used which increased the complexity of processing mapping information. The automatic conversion from ArcGIS to MapServer styles was unreliable and if it did not work the files then needed to be converted by hand. Problems also occurred with the layering of maps and ensuring that whatever combination the user wished to view them in worked. The complexity of the data meant that the maps presented to the user were complex and not easy to understand for all stakeholders.

2.2.2. MarineMap

MarineMap was developed through a partnership between the Marine Science Institute at UC Santa Barbara, Ecotrust and The Nature Conservancy following the California Marine Life Protection Act of 1999 which required the state of California to design and implement a network of MPAs.

MarineMap incorporates oceanographic, biological, geological and human data and was aimed at facilitating the involvement of stakeholders in the MPA planning process, providing them with access to large amounts of geospatial information and the opportunity to contribute to the planning of boundaries of MPAs to meet the objectives of the Act. It aimed to put stakeholders at the centre of the planning process to encourage stakeholder participation and therefore increase transparency and the investment of stakeholders in the MPA planning process.

The tool allows stakeholders to put forward ideas for MPA networks, compare them to alternatives and evaluate their suitability, thereby enhancing the level of engagement with stakeholders and ensuring that their views are considered.

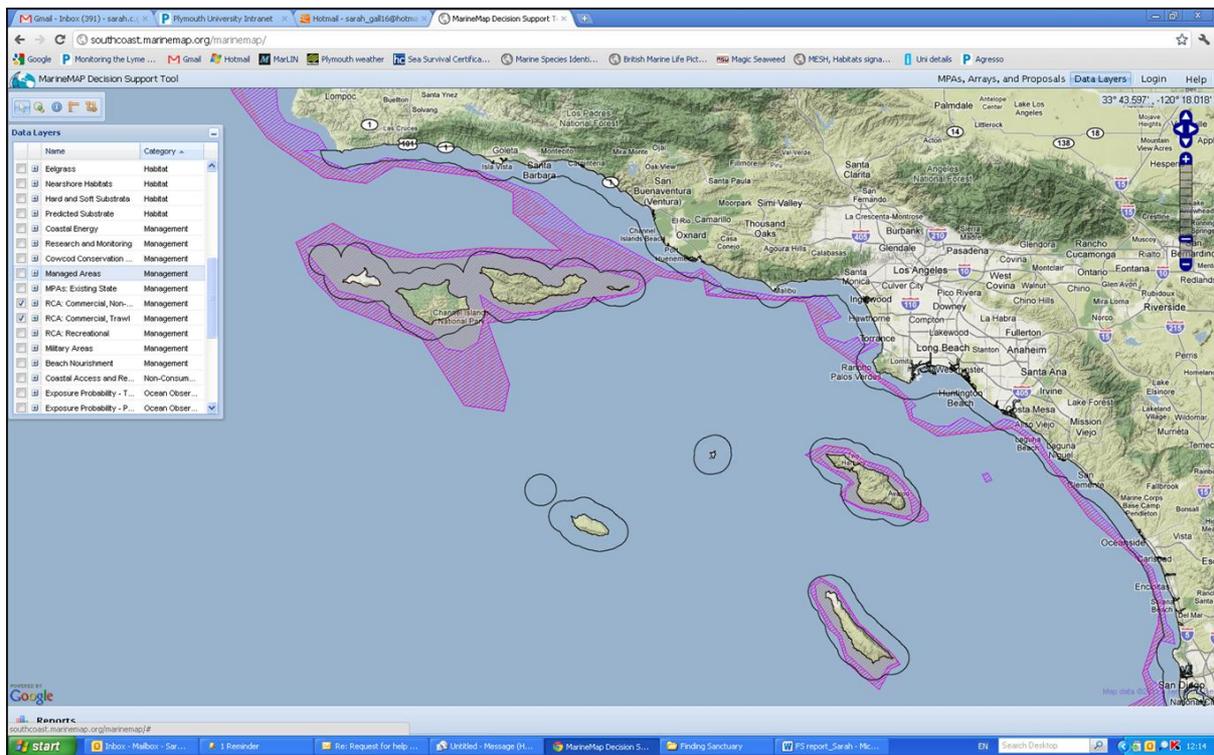


Figure 4: Screen shot showing MarineMap as used in California with commercial fishing data displayed

2.2.2.1. Advantages

Immediate feedback: The key advantage of MarineMap is that when the stakeholder draws a prospective MPA they are immediately provided with feedback detailing whether it meets the scientific guidelines and would therefore be accepted as an MPA. This has the considerable advantage that any stakeholder who participates in the process can submit proposals that they know meet the guidelines, which considerably reduces the amount of time they have to spend in meetings. In addition this feedback also allows stakeholders to determine the exact economic impact that certain MPAs or MPA networks would have, thus reducing levels of speculation and allowing meetings to focus on real issues.

Easy to use: as MarineMap was developed for use by stakeholders from a variety of backgrounds, some of whom had no experience with GIS software, a lot of investment and time was put into ensuring that the interface was user friendly. The developers were involved in the entire process which enabled them to refine the software during the planning process and following feedback from stakeholders, resulting in software that was accessible and easy to use.

Helps build consensus: MarineMap has had very positive feedback from stakeholders. In Southern California alone it resulted in 20,000 prospective MPA designs, all of which were immediately evaluated against scientific and feasibility guidelines. The transparency of the process helped to gain approval from stakeholders and resulted in the successful designation of 129 new MPAs.

2.2.2.2. Potential problems and limitations

Requires a plug-in: MarineMap requires a Google Earth plug-in. To install this, the user needs to have administrative privileges on their computer, and this can be problematic for stakeholders in government agencies and other locations where computer access is limited.

Uses non-standard technology: MarineMap is complicated and to develop and implement it requires an understanding of Javascript and Python code and of open source technologies such as Google Earth, API and GeoDjango. Setting up and maintaining MarineMap in new areas requires

individuals that are familiar with these technologies and providing support is a very time consuming process as use in each area is independent.

KLM: KLM is a format that is used by the Google Earth plug-in to transform stylised shapefiles as there are currently no good tools available to do this automatically. It is however, a time consuming and costly process.

Expensive: MarineMap is expensive to purchase as it specifically caters for each planning process, and the analytics and the reports displaying the results of the analytics require a custom code to be developed.

2.2.3. SeaSketch

Seasketch (previously OceanPlanner) is a new software programme which is being developed by the University of California Santa Barbara Marine Sciences Institute to improve on MarineMap and is scheduled for release in 2012. It will improve on MarineMap in several ways as outlined below:

‘Software as a Service’: Deploying the tool as ‘Software as a Service’ means that there will no longer be multiple copies of the software as with MarineMap, thus removing the problems of time consuming set up and the necessity for maintenance by skilled people.

Map based discussion forum: this means that users will be able to view a map and discuss it at the same time. Users will also be able to share designs through the forum which will promote the understanding of why MPA designs were created, and the rationale for changing them over time.

Trade-off analysis: Plots will be included that show the distribution of virtually all possible MPA designs, including those that provide optimum trade-offs between differing objectives, for example conservation and fishing. This then enables stakeholders to decide how much of each different objective they would like to capture in their MPA plan and then see alternative designs that work towards the optimum solution.

Data improvements: Tools are being included in SeaSketch that allow the users to create new datasets, view and improve upon existing datasets and reconcile differences between them. This is especially of benefit for areas where existing data sets are limited or non-existent.

Facilitation features: Planners and process facilitators will be able to see how stakeholder groups and individuals share information and where communication is not working well. This will enable them to focus attention on improving communication between certain stakeholders as and when necessary to aid agreement between conflicting groups and promote their agreement on possible solutions.

Integration of data: There is a wealth of data available on ArcGIS Online, and this will be integrated into SeaSketch to increase the ability of the stakeholders to search for new data to add to their maps.

2.2.3.1. Advantages

Aside from the advantages of the modifications described above, the advantages of SeaSketch include:

No Plug-in required: Unlike MarineMap, no plug-in is required, meaning that the software can be accessed by those without the means for installing the plug-in (e.g. employees of government agencies).

Capitalise on existing infrastructure: SeaSketch uses Esri-based infrastructure such as ArcGIS Online, stand-alone instances of ArcGIS Server and datasets that are stored as shapefiles and GRIDS.

Software as Services: This means that the long term costs associated with maintenance are lower.

2.2.3.2. Potential problems and limitations

Costs: The costs associated with the development of process-specific analytics and reports is potentially costly, requiring adequate funding if the tool is to be used to its full potential.

2.2.4. Marxan

Marxan is a decision support tool developed by the University of Queensland, Australia. It was originally designed to identify a network of locations for MPAs that meet minimum targets of biodiversity for the smallest possible social and economic cost. It is used to help evaluate different options and determine how well each meets conservation and socio-economic objectives, allowing trade-offs to be examined and the optimum solution reached.

Marxan uses algorithms to aid the decision making process and provide solutions to complex reserve design problems by offering a range of alternatives that are near-optimum for consideration by stakeholders and planners (Possingham *et al.*, 2000; McDonnell *et al.*, 2002). It produces an output that details how often each potential site was selected, allowing an importance threshold to be set e.g. areas selected more than 50 % of the time can be thought of as important.

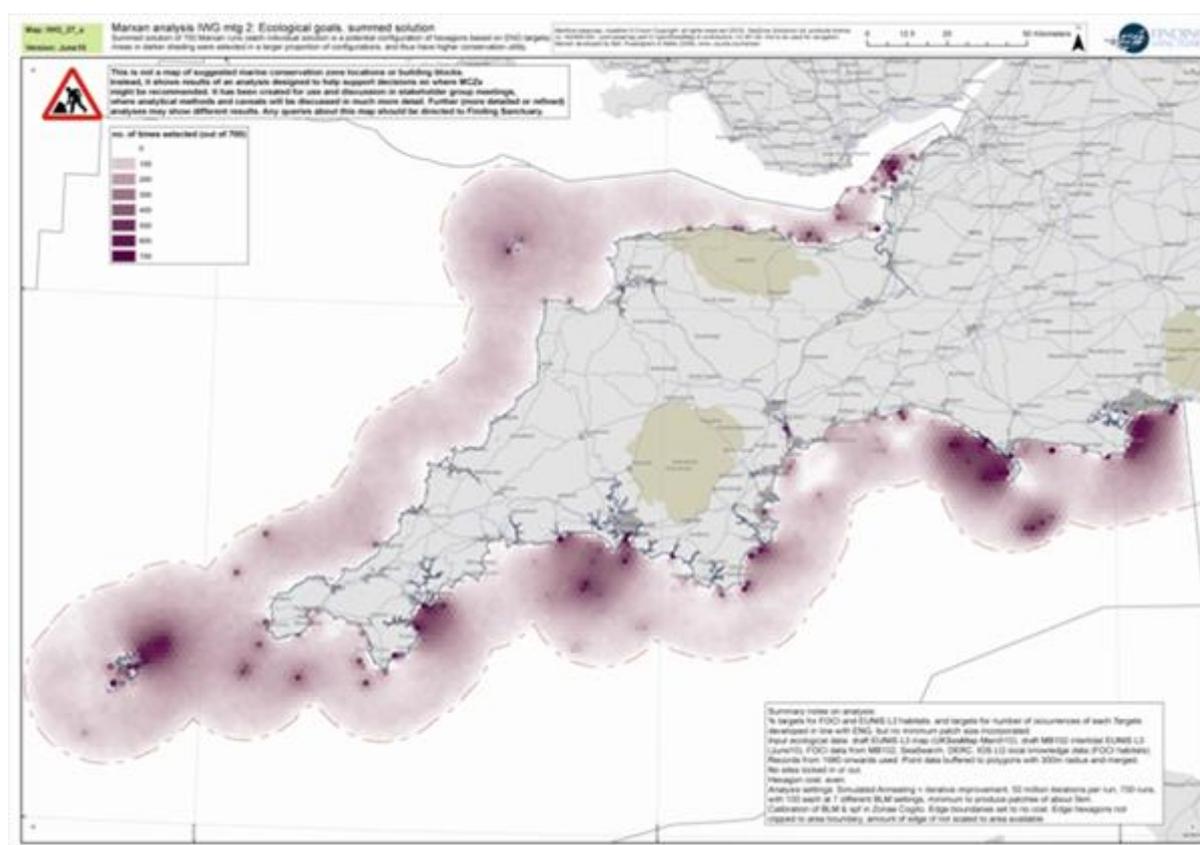


Figure 5: Example of the Marxan software as used by Finding Sanctuary showing fishing intensity. The darker the shade of purple the greater the fishing intensity.

Marxan has been used successfully but to varying degrees by both Finding Sanctuary and Balanced Seas. Planning had already begun at Finding Sanctuary by the time the software was introduced

and to use Marxan would have involved backtracking and beginning another analysis which was not feasible. However, it was used successfully in the preliminary analysis stage as it was adapted to produce a map of areas of key importance to the fishing industry through the use of fishing activity data from the initial FisherMap results and the MB106 Vessel Monitoring System (VMS) data layers in the place of ecological data (Figure 5). This proved to be a positive in the engagement of the fishermen in the stakeholder process as it was a way of providing evidence that Finding Sanctuary were trying to select areas to protect which would have minimum impact on the fishing industry.

Balanced Seas had more success with Marxan than Finding Sanctuary as they had a major update to a key dataset relatively late in the process and had to backtrack their analysis. This provided an opportunity to generate outputs through Marxan and moderate what they had already achieved.

2.2.4.1. Advantages

Generation of multiple reserve configurations: Marxan is able to generate multiple reserve configurations, all of which meet conservation targets, enabling planners to determine the optimum solution.

Flexible, rigorous, transparent and repeatable: Marxan can deal with highly complex information and increases the rigour, transparency and repeatability of the MPA selection process. It allows decisions to be made such as whether it is better to have fewer, larger MPAs or a greater number of smaller MPAs and ensures that the resulting configurations conform to the stated guidelines and therefore that targets for conservation are met at minimum cost.

Free of charge: Marxan is a free decision support tool, with a user manual and good practise handbook and has technical support available through a list-serve.

Facilitation of discussions: Finding Sanctuary used Marxan to process the complex fishing, habitat distribution and MPA guidance data to determine a series of building blocks which then facilitated working group discussions and decisions. Had Marxan not produced these then it is likely that the discussions would not have taken place and progress could have been significantly slower.

Moderation of outputs: As it is not possible to include aspects that don't exist in spatial format in Marxan, it cannot include all possible information and criteria. Once outputs are produced this information can, however, be considered separately which provides a benefit to the designation of the network of MCZs through positive modifications.

2.2.4.2. Potential problems and limitations

Requires a high level of technical skill: Marxan is not designed for use by stakeholders and is therefore a more complex tool requiring specialist skills. The results are also often not self-explanatory and can require time to explain.

Data limitations: Marxan is not able to deal with stochastic and temporal data meaning that data used represents a single moment in time or an aggregation of multiple moments. It is therefore not simple to account for temporal variation.

Single type of cost: Marxan can only process a single type of cost. If more than one type of cost needs to be included then they must be combined prior to being imported into the analysis.

Time consuming: The preparation of data for inclusion in Marxan is time consuming, and this, as well as the learning process associated with using it can take more time than expected. It has been suggested by Finding Sanctuary staff that it would be beneficial to have one person dedicated to Marxan if it was to be used to its maximum potential, and that the project may benefit from this being an independent person.

3. Discussion

Every decision support and participatory GIS tool has advantages and limitations, and it is always possible to improve on existing tools once they have been used in the MPA site selection process through experience gained by their use. This section will discuss the general advantages and limitations of the use of these tools, the consideration of which may be beneficial in the development of future MPA site selection tools.

All the tools discussed in this review have been successfully used to inform the designation of MPAs and are therefore all valuable in the site selection process. Figure 6 shows the MCZ recommendations provided by Finding Sanctuary, where successful stakeholder consultation resulted in the selection of sites to recommend for inclusion in the UK's MPA network that minimised socio-economic impacts and maximised conservation benefit.

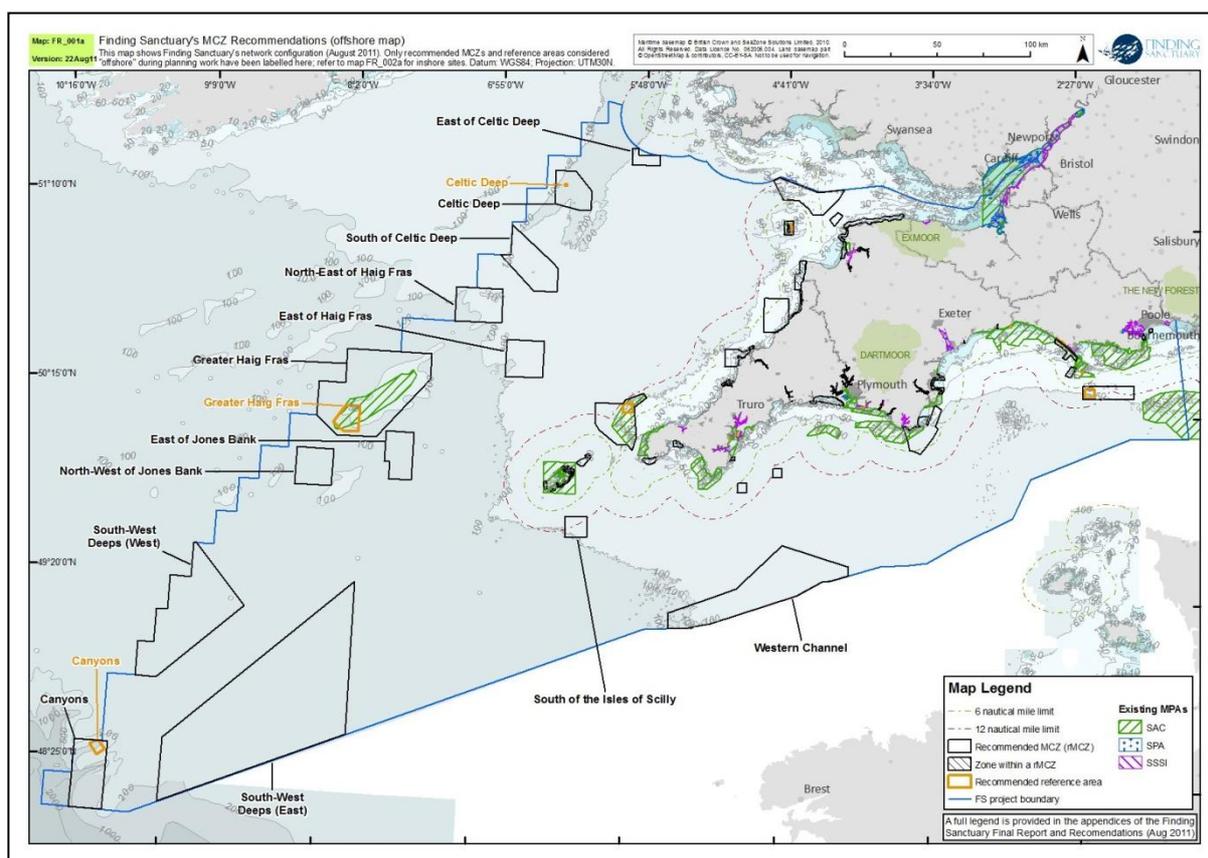


Figure 6: An example of the MCZ map created by Finding Sanctuary showing their recommendations for MCZ locations around the south-west UK.

The value of these tools is immense, allowing extensive data sets to be displayed simply and facilitating discussions with stakeholders. Through the experience gained from the production of

recommendations for MPA locations, planners are able to develop good practise, accumulate extensive knowledge of the process of stakeholder engagement and assess the advantages and limitations of the tools they used. The experience of projects like those mentioned here highlights the power and fundamental importance of the effective use of these tools within a stakeholder consultation process, and enables the pitfalls to be identified, aiding future tool development.

It must be remembered however, that these tools only play a part in the site selection process and facilitate the decision making process by presenting the data in a coherent way that can be understood by all stakeholders. They are not designed to provide the final decisions themselves.

The limitations and drawbacks associated with these tools mainly relate to the available resources and the management associated with each. Prior experience of the stakeholders is also key, with the success of engagement strongly influenced by the attitude of stakeholders towards the planning process. This can be illustrated by the experience of Finding Sanctuary who found that there was a degree of mistrust and hard feeling towards them due to the closure of an area to bottom towed fishing gear in their regional area (the Lyme Bay Designated Area (Fishing Restrictions) Order 2008). As a result they were unable to include questions relating to socio-economic valuation in their questionnaire as the liaison officers who had been working with the stakeholders felt that were this to be included, many people would refuse to participate. To overcome this problem they used data from the CFPO and MMO and combined it with data produced by FisherMap to address the economic impact question.

Determination of clear goals from the beginning of the project is highly beneficial, and increases the efficiency of the site selection process. The UK regional MCZ projects for example, began with an extensive interview process for recreational users, but towards the end of the project it became clear that the information that was critical to the project was the location of anchoring. Prior knowledge of this would have streamlined the interview process and made it much more efficient. It is often the case, however, that the lessons learnt during the site selection process play a key role in shaping the requirement of the final goals of the project, meaning that they evolve with time. It is likely that the efficiency of MPA planning will increase and the lessons learnt from other projects will enable future projects to begin with a clearer idea of their goals.

The key to stakeholder engagement and therefore acceptance of any MPA is transparency in the site selection process. The tools discussed here can all be used to increase transparency and therefore promote good feeling amongst their users, and if used appropriately and with an understanding of their limitations they are able to provide positive assistance with the MPA site selection process.

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Useful links

- UK MPA interactive map: www.mczmapping.org
- MarineMap: www.marinemap.org
- SeaSketch: <http://mcclintock.msi.ucsb.edu/projects/seasketch>
- Marxan/Marxan with Zones: <http://www.uq.edu.au/marxan/>
- Finding Sanctuary website: www.finding-sanctuary.org
- archive version available at: tna.europarchive.org/*/http://www.finding-sanctuary.org/
 - output documentation available at: findingsanctuary.marinemapping.com

MAIA

Marine protected areas
in the Atlantic arc

Towards an Atlantic network of Marine Protected Areas

The purpose of the European Marine Protected Areas in the Atlantic arc (MAIA) project is to create a **network of MPA managers and stakeholders**, who will take initiatives on an international level in terms of designation, governance and management. This will be to enhance the **development of a consistent, efficient and accepted MPAs network** in the Atlantic arc.

MAIA is structured in four main technical lines of work:

- Establishing a status report on the existing MPAs
- Setting up common monitoring strategies
- Implementing management plans
- Involving stakeholders

MAIA gathers 9 partners from 4 countries: United Kingdom, France, Spain and Portugal, **involved in MPAs designation and management.**

As lead partner, the French Marine Protected Areas Agency, coordinates the project implementation.

The 2010 – 2012 Action Plan

Organisation of technical workshops on common MPA management issues in the Atlantic arc.

Site visits in each partner country to enhance the sharing of information, knowledge and know-how.

Overview reports to compare MPAs' situation in the Atlantic arc.

Field studies to be carried out by MAIA partners, promoting the exchanges within the network.

Creation of a dedicated website, including a private collaborative space, a document database and a GIS database used to establish a baseline on the status of MPAs in the Atlantic arc.

Production and dissemination of document resources.

www.maia-network.org



ATLANTIC AREA Transnational Programme
ESPAÇO ATLÂNTICO Programa Transnacional
ESPACE ATLANTIQUE Programme Transnational
ESPAÇO ATLÂNTICO Programa Transnacional



European Union
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