







**MAIA Project WP4** 

# Tools and techniques for stakeholder involvement in MPA planning

September 2010

Authors: Beth Henshall, Louise Lieberknecht, Tom Hooper, Tom Mullier, Shaun Lewin, Alana Murphy

Acknowledgements: We are grateful to Juan Freire (Fismare), Perrine Ducloy (CNP-MEM), Sophie Elliot (JNCC) and Sarah Wiggins (Natural England) for their comments and guidance in the development of this report.

# **Contents**

1.	Introd	uction	3
2.	The Im	nportance of Stakeholder Involvement	4
3.	Data		6
	3.1.	The Importance of good data	6
	3.2.	Scientific data	6
	3.3.	Sea Use Mapping	7
	3.	3.1. Desktop mapping	8
	3.	3.2. Face to face mapping	.10
		3.3.2.1. Arranging mapping interviews	.10
		3.3.2.2. The mapping process	10
	3.	3.3. Online mapping	.12
	3.4.	Validation	13
	3.5.	Impact Assessment	14
	3.6.	Publicity	15

4.	Decisio	ons		17
	4.1.	A repre	sentative stakeholder decision-making group	17
	4.2.	Local G	roups	21
	4.3.	Workin	g groups	21
	4.4.	Process	Groups	21
	4.5.	Advisory Panel	21	
	4.6.	Decisio	n Support Tools	23
		4.6.1.	GIS analysis tools as a method of presenting data	23
		4.6.2.	Marxan	24
		4.6.3.	Building Blocks	26
		4.6.4.	Marine Map	.27
5.	Refere	nces		29

This report looks at how Marine Protected Area (MPA) planning can be achieved with stakeholder involvement. It examines the processes that can be used to ensure that involvement takes place in a manageable, transparent and meaningful way. It explores several of the techniques that can assist in the gathering of scientific and spatial sea use data, as well as some of the existing support tools for use during the complex decision making processes associated with marine protected areas planning.

The report summarises the experiences and lessons learnt by the south-west England MPA project; Finding Sanctuary.

For a network of Marine Protected Areas (MPAs) to be successful and meet their objectives, they not only need to be based on the best available science, but also require the support and acceptance of stakeholders. The best way to gain this support is through the involvement of stakeholders from the outset, to promote understanding of the aims of the decision making process, and to provide an opportunity for stakeholders to influence the project outcomes.

Stakeholder engagement should be central to the MPA planning process because:

- 1. Stakeholders can provide an insight into their spatial patterns of sea use which should be considered in the MPA planning process, to ensure decisions seek to minimise the impacts on stakeholder activities. Data showing how the sea is used for commercial and recreational activities is often very limited; therefore, stakeholder engagement through the use of discussions, questionnaires and mapping exercises can record this important information. Engagement can ensure the planning process is transparent which can build trust, and can promote communication between stakeholder groups to raise awareness and encourage compromise.
- 2. Stakeholders often have a wealth of ecological information about the areas that they carry out their activities in, which traditionally has not been collected. For example, fishermen may be knowledgeable about the location of spawning grounds, and divers may be aware about the location of fine scale habitats. This local knowledge can feed invaluable information into the process, which can provide depth to existing scientific data, especially where gaps in data sets exist.
- 3. Stakeholder participation can encourage support for decisions, which promotes compliance and self ownership, and can potentially reduce the reliance on enforcement of MPA regulations. If stakeholders are given the opportunity to engage and have their opinions and needs represented and considered, they are more likely to accept the outcomes, and the MPA network will have more chance of success.



Figure 1: Flow diagram to explain the MPA planning process and the use of specific tools that will be discussed throughout this report

## 3.1. The importance of good data

It is important that marine spatial planning decisions are based on the best available science and use the highest quality datasets available. Low quality data is generally inaccurate or underrepresentative, which can lead to bias in the decision making process and ill-informed decisions. Decisions based on low quality data will be more likely to pose negative impacts on the environment, stakeholder activities, or the economy of the project region. Therefore, it is important that the quality of data is assessed and monitored, so that bias can either be eliminated, or decision-makers can be made aware of any issues to ensure that they are taken into consideration throughout the decision making process. Good data can prove instrumental in ensuring that stakeholders make the best decisions and that they understand spatial relationships.

However, MPA planning has to be conducted within the confines of the data that is available, which often creates a limitation for the scope of the process. In addition, the uncertainties associated with unavailable datasets can often prove very frustrating for decision-makers. The inability to use certain datasets or situations where data is missing may be due to a number of reasons, for example, the financial costs associated with obtaining a certain dataset may be too high, the data may not yet have been collected, the data may be in the wrong format, or the owner of the data may choose to withhold it from the project. These uncertainties need to be understood and acknowledged from the outset by the stakeholder group. It may be that the datasets available change over the course of the project as technology improves for measuring activities, or new surveys are conducted. Therefore, it is important that the process begins utilising the best available data at the time, with the recognition that any new data will be utilised by MPA planners as and when it becomes available.

Despite the importance of quality, data will only be useful when it is presented in a suitable manner and in an accessible format to fulfil its objectives. It is also very important that the most appropriate datasets are used to address the questions asked of them. In marine protected area planning, data is commonly presented in the form of maps, which are a clear and simple way to present data, are quick to understand and access, and allow spatial relationships to be understood. The use of maps in the decision making process will be further discussed in section 4.6.1.

## 3.2. Scientific data

MPAs need to be based on the best available scientific knowledge, which in MPA planning often requires collating information from a range of different sources. In South-West England, these sources have included NGO's, charities, scientific research institutions and Government agencies. There has also been a coordination of effort through the UK Government and Government Nature Conservation Bodies to gather data from a range of sources in a consistent format, which has included biological, biophysical, economic and human use data.

It is important that only appropriate and relevant data is presented to stakeholder groups. Before such data can be used in the decision-making process, MPA planners must consider how useful the data will be, based on its quality, relevance of use, and in some cases, license costs. The processing

of datasets into an acceptable format for use can prove a very time consuming process, so it is important that these factors are considered from the outset.

## 3.3. Sea Use Mapping

Limited information exists regarding the spatial patterns of use by stakeholders in the marine environment, and it is widely accepted that questionnaires are one of the most successful techniques for collecting such data. The use of questionnaires to map sea use can be successful in two ways; firstly, they provide an effective way of building up an understanding of spatial sea use by different sectors which can underpin and improve MPA planning. Secondly, questionnaires can provide a platform for constructive engagement with marine stakeholders. By agreeing to share personal data as part of the mapping process, the questionnaire becomes the first step that stakeholders take in becoming actively involved in the MPA planning process. It is important that MPA planners do not underestimate the significance of stakeholders handing over personal information which may be sensitive or of commercial importance. By sharing such information, stakeholders are identifying that they understand the process and are willing to participate.

The use of full time Liaison Officers with particular professional experience of key sector activities such as fishing, diving or sea angling has proven to be particularly important in South West England. This role is distinct from an 'interviewer' in that their role goes beyond just collecting data. It is important that Liaison Officers understand the language and background of the activities that are taking place, sensitivities that may exist around MPAs and the significance of any information of data that is handed over. Furthermore relationships and trust need to be built up with stakeholders before data can be collected.

Many stakeholders have first hand ecological knowledge of their local sea area and questionnaires can also be used to collect this information. In particular, fishermen and anglers may be knowledgeable about the locations of spawning and nursery grounds, and the times of year that species will be present in certain areas. Divers may be aware about particularly diverse marine habitats or where they have seen rare species. Local and lay knowledge has traditionally been omitted from protected area planning, yet it can add depth to existing scientific data, particularly in areas where scientific knowledge is limited.

The Participatory Mapping process can also act as an information exchange; whereby interviewers can explain to stakeholders the process that is being used to plan MPAs and the legislative background, as well as providing the opportunity for stakeholders to share their thoughts and opinions. Interviewers can explain the importance of collecting sea use data and how it will be used, further engaging stakeholders and fostering support for the project. This is particularly the case in situations when Liaison Officers meet with stakeholders directly, but information can also be shared through remote sources.

Spatial sea use mapping can be conducted in many different ways, but it is important that the actual process of sea use mapping adopts a technique that is familiar to stakeholders, is versatile, cost effective and easily transferrable. The following tools can be used to map sea use, but it must be recognised that tools are not mutually exclusive and can be used in combination to maximise the level of stakeholder engagement.

- Desktop mapping systems allow stakeholders to directly map their sea use activities into a GIS system. This process can save time but can be expensive because all liaison officers require access to a computer and GIS (Geographical Information System) software. An explanation of how Balanced Seas (the south-east England MCZ planning project) has used a desktop mapping system to collect sea use data is presented in section 3.3.1.
- Face to face interviews which use a pen and map to record sea use utilise a technique which all stakeholders will be familiar with. However, the technique requires the transferral of data recorded on maps into an electronic format before use, which requires additional staff and can be time consuming. A description of how Finding Sanctuary has utilised face to face interviews is explained in section 3.3.2
- Online mapping systems can provide an opportunity to reach a large and more varied audience, and can increase the number of stakeholders who can contribute information. Online mapping tools can be used to simply display data, which can enhance the user's knowledge of the project area and provide information about spatial relationships; or they can be more interactive by gathering stakeholder information. There are an increasing number of open source options available for collecting and presenting data online, such as Google Maps. The facility to present collated data online (in an anonymous and amalgamated format) can assist with the validation of data, which is further explored in section 3.5. Online tools are particularly beneficial for those stakeholders who may not be based within the study region, and therefore, might not be available for a face to face mapping interview.

However, some stakeholders may feel less comfortable using such tools, especially if they are not particularly user-friendly, or if the user is not comfortable using computers. Also, some stakeholders may be less likely to make the time to go online to share information, whereas prompts from a Liaison Officer and the more structured arrangement of a meeting would ensure the data was collected. Interactive online tools in particular can be expensive to develop, and may be prone to technological problems. Information about the Online GIS developed by Finding Sanctuary for the south-west is explained in section 3.3.3.

Whilst computer based tools have the potential to create a barrier to those who are not familiar with such technology, there is a growing number of people who are computer literate. Finding Sanctuary identified that in general, many of the sea user sectors were comfortable with the use of computers as seen by the number of sea users who utilise the internet to access sector specific online forums. In addition, many commercial fishermen are familiar with using a number of electronic aids whilst fishing, and are generally comfortable with the computer use.

## 3.3.1. Desktop Mapping

Balanced Seas (the south-east England Marine Conservation Zone planning project) have developed a program called ArcFish which allows Liaison Officers to map sea use directly into a GIS program. ArcFish is a customisation of the interface of ESRI ArcGis which presents information such as bathymetry, navigational marks, wrecks, settlements, and the names of key areas of water, for the extent of the project area. ArcFish uses the same questionnaire that is being used by all four regional MCZ projects in England, and allows responses to the text based questionnaire and the mapping of spatial sea use to be entered directly into the program. However, the stakeholder consent form remains paper based for signature by the participant.

Elle Edit Yew Bookmarks Insert S	Antina Basta Mindan Alala		Contract in
0000000000000	New Stakholder Questionnaire		Archish Control Para
	User ID : TEST		Draw R
			Interview
	Interview Consent Details Concercial Mating Sea Argies: Water Sports Doe	ra Charter Basta Widdle Driftoniets Comments	
100	Water Spo	rts	
1			
	Organisational / Club Details		
	Group Type:	ented by this interview:	
1 - A - A - A - A - A - A - A - A - A -			
	Club Name C	Jub Details Do you represent this dub?	
	1		
	2.	-	
	Activity Details		
	How many years have you been doing water sports:	0.	
	On average, how many days per year do you spend doing w	ater sports: 0 •	
>			
	Do you have access to a (non-charter) boat:		
	<b>V</b>		
B 2 # 4			
anceled		Pos	

Figure 2: Screen print to show electronic copy of ArcFish questionnaire used by Balanced Seas

With guidance from the participant, ArcFish allows the Liaison Officer to map the areas used by the sea user directly onto the map, either as a point, line or polygon feature (Figure 3A), and then to record associated information about the feature in a table (Figure 3B).



Figure 3A (Left): Screen print to show mapping of sea use in ArcFish Figure 3B (Right): Screen print to show function to input data associated with sea use feature in ArcFish

Balanced Seas have found ArcFish to be a highly successful methodology for recording stakeholder sea use data. ArcFish is operated by a Liaison Officer who has been trained to use the program, which reduces the technological barrier as the participant does not have to be a competent computer user to share their information. The program is very quick to use and transparent because the participant can see exactly what information the Liaison Officer is recording. ArcFish allows stakeholders to map activity beyond the Balanced Seas project boundary, and where necessary, this information can then be passed on to the relevant regional MCZ project. Data is inputted directly into the GIS and there is no need for digitisation of paper maps, therefore, the opportunities for inaccuracy or margins of error are reduced and data provided by the stakeholder will be the final version. Data from completed interviews can be emailed in a zipped file format directly to the Project Team who can immediately access the information and add it to the dataset.

However, it must be recognised that this methodology is heavily reliant on technology; there is the chance that the laptop may fail or run out of battery. Consequently, Liaison Officers always have a paper copy of the questionnaire and a large map of the project area in the event of a technical

problem. In addition, it is necessary that data is regularly backed up, as a paper copy of the information is not available for consideration if the computer were to be lost or broken.

# 3.3.2. Face to face mapping

# 3.3.2.1. Arranging mapping interviews

In South-West England, it initially took time for Liaison Officers to arrange mapping meetings with stakeholders, mainly owing to the size of the various sectors and the difficulties in contacting the relevant people and getting them to commit to an interview. However, with time the momentum surrounding the project grew and it became easier to arrange interviews as stakeholders became more aware of the project. However, Liaison Officers needed to be very persistent; it often took multiple emails and answer phone messages before it was possible to get through to the correct person to organise an interview. Even then, meetings could be cancelled multiple times before the interview took place, an issue which was commonly associated with weather conditions. Planning and arranging interviews was found to be a much more time consuming process than initially anticipated, which generally required more time than conducting the interview itself. Liaison Officers had to be flexible when arranging meetings, which often took place during the evening and at weekends, to fit around an individual's schedules. The location of meetings was also important to fit in with the stakeholder's activities, consequently, interviews were held in a wide range of locations, including cafes, clubhouses, homes, pubs, onboard vessels and shops.

Finding Sanctuary also identified that stakeholders were often hesitant to share information with outsiders and that building up rapport between the interviewer and stakeholders was important in encouraging participation. This highlights the importance of using individuals for liaison who have participated in the particular activity in the past, may have the respect of stakeholders, and can make an interview more comfortable with the use of familiar terminology and information exchange. It is also recognised that various stakeholder sectors each have their own organisational structure and culture, and consequently data collection for each sector requires a tailored approach.

## 3.3.2.2. The mapping process

In the face to face mapping system used by Finding Sanctuary stakeholders were interviewed using a series of base charts of the project area, available at three different scales according to their suitability for the interviewee's activities (Figure 4). These were overlaid with clear acetate, onto which stakeholders could record their spatial information with a series of coloured pens, whilst the interviewer completed the paper questionnaire with the corresponding information. All acetates were marked with reference points for future orientation, and information to ensure that all acetates could be traced to their interviewee.



Figure 4: Example of a small scale base map used in participatory mapping interviews, with examples of the medium and large scale catalogues of background charts used by Finding Sanctuary. Maritime basemap, coastline © Crown Copyright, all rights reserved (2010). SeaZone Solutions Ltd. Products license no. 042006.003. Land basemap part © OpenStreetMap & contributors, CC-BY-SA.



Figure 5: Photograph of participatory mapping interview with a commercial fisherman in Devon. Interviews were conducted at times and locations convenient to the relevant stakeholder groups. In the case of commercial fishing interviews were conducted onboard vessels, in cafes and pubs.

In contrast to Desktop Mapping Tools which allow for data to be entered directly into a GIS system, the use of pen and paper mapping processes require techniques to enter both tabular and spatial information into GIS. Finding Sanctuary used a large format digitising table and ESRI ArcGIS to enter spatial data from acetates (Figure 6), and written information was inputted into a MS Access Database created with bespoke forms, quality assurance and export routines, both of which were

time consuming processes. The export function of the Access system removed any personal data from the database before it was included in the central database, to ensure entries in the database were anonymous. Interviewees were all informed about how their data would be used, and were required to give informed consent before a mapping interview was conducted.



Figure 6: Photograph of the digitisation process used to enter spatial data from acetates into the GIS by Finding Sanctuary

## 3.3.3. Online mapping

In South-West England, an online interactive tool (WebGIS) to record and display data was developed by a specialist company exeGeIS. This tool was available to all stakeholders to record their spatial patterns of sea use (Figure 7), their ecological knowledge, and suggestions of areas they thought would benefit from protection. The tool was also used to present collected scientific and sea use data for the interest of stakeholders.



Figure 7: Example of a stakeholder mapping their fishing activities using Finding Sanctuary's WebGIS tool.

Experience gained by Finding Sanctuary through the development of the WebGIS, highlighted the importance of ensuring the tool was as user-friendly, simple, and reliable as possible, to encourage its use by stakeholders. This led to the development of an online tuition section to guide stakeholders through the process, with a series of FAQs (Frequently Asked Questions) to assist those who felt less confident with the technology. The WebGIS is interactive to engage stakeholders by allowing them to view information in the form of different layers and providing the opportunity to record their own data. However unlike the MarineMap program used in California (see section 4.6.2.), the WebGIS has no facility for data analysis or to provide direct feedback on suggested areas for protection. The use of the WebGIS for validation is presented in the following section.

### 3.4. Validation

The validation of collected data is important in ensuring that data provides an accurate representation of the actual distribution of an activity. When dealing with a large project area, time constraints often mean that only a sample of stakeholders in each activity group can map their sea use; it is therefore important that collected data is validated to ensure it represents the activities of the wider sector. Validation is also important when representatives are used to map activities on behalf of a wider group of people. For example, if an angling club chairman maps angling activities of behalf of club members, validation is necessary to ensure that group members agree with the information provided and that it is representative of their activities. Validation can also provide an active feedback loop, to determine whether any gaps exist in the collected dataset. Where possible, this can focus future data collection to address such gaps, or at least can ensure that planners are made aware of these issues during the decision process.

In South-West England, validation of spatial sea use data occurred at two different levels; the first being the Quality Assurance process completed by the MPA project team. This process was used to ensure that spatial information corresponded with tabular information collected during face to face mapping interviews. It was applied to both the face to face mapping and WebGIS collected data to ensure the recorded data appeared realistic with no obvious mistakes. The second stage of validation required the involvement of stakeholders to determine whether collected data adequately represented their activities. Summaries of collected information were presented to stakeholder groups on a sector basis at validation meetings (Figure 8). These events provided a further opportunity for stakeholder engagement and a chance to update sea users with the progress of the project. Validation workshops can also be used to seek additional information that can add depth to collected data, and can also provide an opportunity to form a socio-economic baseline for use in further analysis or impact assessments.



Figure 8A (Left): Photograph of one of Finding Sanctuary's validation meeting with commercial fishermen Figure 8B (Right): Photograph of a group at Finding Sanctuary's validation meeting with the recreational sector

Finding Sanctuary, and more recently the other regional MCZ projects, have used the WebGIS tool as a format for displaying data. By presenting collected datasets, stakeholders can view layers of information and provide feedback on information they believe to be missing or incorrect. The presentation of sea use data in the form of anonymous and amalgamated datasets (Figure 9A); allows individuals to determine whether they feel their activities have been sufficiently represented. In situations where this may not be the case, the GIS provides stakeholders with the opportunity to map their sea use activities, thus addressing any gaps in the datasets and maximising the level of representation of the data. The online GIS tool also allows MPA planners to present scientific datasets to stakeholders who may have specific knowledge regarding local areas, and may be able to provide valuable feedback.



Figure 9A (Left): Screen shot of collected sea angling data in North Devon. Sea anglers can access this information via the WebGIS and determine whether it sufficiently represents their personal activities, providing a further opportunity for data validation.

Figure 9B (Right): Screen shot of the national MCZ Project Interactive Map presenting information about the location of broad scale habitats in the south-west

The face to face mapping, validation and data presentation techniques were based on work by Dr Sophie Des Clers and Dr Jeff Ardron and developed in collaboration with them. See Reference lists for further details on reports and publications.

### 3.5. Impact Assessment

For MPA design to be viable, it is important that decision makers consider the economic impacts of the recommended MPA network. In the UK, the legislation under which further MPAs will be introduced stipulates that MPAs should meet their ecological considerations whilst seeking to 'minimise any adverse social and economic impacts and wherever possible to work with the grain of sustainable economic use of the seas' (Ministerial Statement, March 2010).

The collection of the vast amount of information required for an impact assessment can be a very time consuming and complex process; however, it also provides a further opportunity for stakeholder engagement. Particularly in MPA planning when the process is iterative, the publication of Impact Assessments to accompany each MPA planning scenario promotes stakeholder participation through encouraging stakeholders to share information in situations where data is limited, or by providing feedback on predicted impacts. Thus, stakeholder involvement can improve the accuracy and detailed understanding of Impact Assessments. In the UK, Impact Assessments to accompany MPAs will consider the future implications of MPAs, to determine what the impacts on wide scale issues might be in the future, for example, what the impacts on renewable energy developments might be, or how changes to the Common Fisheries Policy will be affected.

## 3.6. Publicity

In order to achieve effective stakeholder engagement, it is important to maximise awareness of the project within all stakeholder sectors, and ensure that stakeholders know how they can contribute to the MPA planning process. In South-West England, the following techniques were used to publicise the project:

• Drop-In Days - Not all stakeholders are available at the same time of day; for example, fishermen will carry out their activities at different times dependant on the weather, seasons and tides. Drop-In Days provide an opportunity for a wide variety of people from different stakeholder groups to attend an event at a time and location that it convenient to them. Figure 10 presents the distribution of Drop-In Days held across South-West England by Finding Sanctuary. As they are held throughout the day and evening they can maximise coverage and provide stakeholders the opportunity to find out about the project, and meet liaison staff to share questions and opinions. Drop-In Days often bring together individuals from different stakeholder groups at one event which can enhance individuals understanding of the needs of different sectors. Finding Sanctuary has found these events to be very successful.



Figure 10: Map of Finding Sanctuary Drop-In Days in South-West England.

• Presentations – Giving presentations to a group of stakeholders can provide an effective technique for raising stakeholder awareness. They can be particularly useful in situations where a representative from a club or group has been interviewed, to provide an opportunity for the rest of the group's members to learn about the project.

• The Internet – Social networking sites such as Twitter and Facebook can prove successful in informing sea users about forthcoming events and progress developments. In addition, sector specific forums provide an effective method for informing sea users about how they can contribute to the project, and the information presented on the forum can be tailored to the sector.

• Newsletter – Regular updates informing stakeholders about the project development and successes allows sea users to continue to engage and hear how their data is being used, which can encourage support for the outcomes.

• Media coverage – In order to maximise stakeholder engagement, a range of different media outlets can be used to promote online tools, events, and the importance of stakeholder's involvement in the project. Media coverage can either focus on a more general overview of the project to encourage support from the general public, or can be sector specific to encourage stakeholders to engage in the process and share information. The media can be a highly effective method for reaching a wide audience, and may inform people who may not otherwise have been aware of the process.

• Printed materials – The use of posters, cards and brochures distributed at events and available in specially chosen locations can prove highly effective in raising awareness of a project among the general public. Printed materials can be very cost effective and can reach a wide audience.

# 4. Decisions

Many lessons have been learnt from MPA decision-making processes worldwide, and it is clear that successful planning processes favour the use of a clear and transparent process, realistically set targets, and decisions that are made at a local level. Transparency throughout the decision making process is important, with all stakeholder parties feeling that they have access to information, and explanations of why specific decisions have been made. This can partially be achieved by sharing information such as meeting agendas and minutes, reports and collected data online.

The steps of this decision making process will be explored throughout the next section, which will particularly examine who should be responsible for making these decisions, introduce several of the existing Decision Making Tools, and how they should feed into the decision making process.

### 4.1. A representative stakeholder decision-making group

Stakeholders are more likely to support and comply with MPAs if they have played an instrumental role in the planning process from the outset. Possibly the most effective way of achieving this, is for the key decisions about MPAs to be made by stakeholders themselves. It would be impractical to involve every single stakeholder within a project region in the final decision process because it would not be economically feasible and it would be impossible to reach a consensus. However, by bringing together a group of stakeholder spokespersons to represent the interests of their sector, stakeholders can ensure that their interests are being represented. The bringing together of a wide range of people with differing opinions on a regular basis allows individuals to listen to and share information with the various stakeholder sectors, which can help foster awareness of each others' needs and help lead towards consensus. This concept has been used by numerous protected area planning projects around the world, and proved particularly successful in the MPA planning project in California.

It is important that stakeholder groups are balanced, fair and representative, consisting of an optimum number of members. If the group is too small, an insufficient number of stakeholder groups would be represented, whereas if the group is too large, it would be challenging to make progress, and there is the risk that a few individuals would dominate discussions. Membership of stakeholder groups must be carefully considered; in some cases it is possible to identify an individual who can represent the interests of a small consigned group of common interests, however, it is often not possible to represent a greater variety of interests. This can often be in the case in the commercial fishing industry where a substantial variation between the different fisheries and gear types exists, all of whom need representation. Therefore, it is important to find a balance between strong sub-regional and technical variation, whilst trying to limit the stakeholder group to an optimum size.

Many of the successful stakeholder groups have utilised facilitators to act as a neutral party to encourage the full participation of stakeholders and support the group in reaching inclusive solutions. Stakeholder meetings require facilitation to ensure that discussions are balanced and all members are given the opportunity to share their point of view, rather than the meetings being dominated by those few with the loudest voices. The meetings must also be planned and delivered in a manner which ensures the tools and language used can be adapted to suit the audience,

avoiding scientific jargon to ensure that all members can understand and contribute to the discussions. Where scientific terminology is unavoidable, glossaries or explanations of key terms at the beginning of each session can prove beneficial.

Selecting stakeholders for a decision making group should be undertaken using a formal and structured stakeholder analysis. This is a step by step approach that has been recommended by Facilitator and Process consultant Rob Angell in his report for the MAIA project:

1. Determine the appropriate stakeholder categories which could include:

Affect- directly affected, indirectly affected, able to affect the work/issue
Sector - public, private, voluntary, community
Function - user, service provider, regulator, landowner, decision-maker
Geography - living within postal district Y, living in flood risk area;
Socio-economic - income, gender, age, length of time living in area

- 2. Populate the categories with a long list of possible stakeholders in each.
- 3. Select the most important criteria for the work To help identify the most relevant stakeholders, you need to agree on the most important criteria for involving them. Examples of criteria include:

**Influence:** who can influence others or have an influence on the decision or work **Affected:** who will be affected (positively or negatively) or may think that they are affected? **Interested:** who could be interested?

**Environmental impact:** who will have an impact on the environment (positively or negatively)? **Reputation:** who will affect our reputation (positively or negatively)?

Supporters/objectors: who is likely to support or object to the work? Funding: who can help fund the initiative?

4. Refine your stakeholder list, for example:

Put your chosen criteria on an axis. Write the name of each stakeholder on a post-it note, and place each it in the appropriate position on the flip chart axis. This is a very practical way of finding out which stakeholders are particularly important, based on your objectives. Draw 2 lines on your axis as shown below. This should help you identify which stakeholders fall into 'standard' and 'enhanced' levels of involvement.



By doing such a stakeholder analysis it will be possible to know who to involve in an enhanced way i.e. as "core" stakeholders, by inviting them to participate in the deliberative process and who to involve at "standard" level by for example, as Named Consultative Stakeholders.

Named Consultative Stakeholder status has been set up by the regional Marine Conservation Zone (MCZ) projects in the UK to allow regional or national stakeholders who may not be able to resource attendance at Regional Stakeholder Group meetings to play a less intensive role in the development of MCZ recommendations. At key stages they will be asked for their views on the MCZ recommendations being developed by the RSG and their comments will be recorded and fed into the planning process. However, the stakeholders in this category would be giving up their direct role in the development of MCZ recommendations.



Figure 11: A meeting of the Finding Sanctuary Steering Group

In South-West England, Finding Sanctuary's stakeholder representative decision-making group is known as the Steering Group. Members of the Steering Group have been nominated by their sector because they are knowledgeable about their sector's activities and interests, have the time to dedicate to the project, and have the respect of their sector. It was made clear that Steering Group members should not adopt the role lightly because it requires a significant commitment of both time and effort. Finding Sanctuary asked all Steering Group members to agree to a set of Terms of Reference, and to be responsible for the dialogue between the Steering Group and their sector. It must be recognised that each Steering Group member has a slightly different agenda as a result of representing their sector; some may seek to minimise the impacts on their sectors activities (e.g. Fishermen), whereas others may aim to maximise the outcomes (e.g. conservation bodies).

During their first few meetings, Finding Sanctuary Steering Group was confronted with an issue regarding the membership of the group, whereby members who were unable to attend meetings were sending substitutes in their place. This was found to hinder the progress of the group, by affecting the groups' dynamics and the consistency required to build stronger relationships, both at a personal level and as an understanding of the different sectors. Substitute members often lacked an understanding of the history of the process and the prior decisions that had been agreed upon. Therefore, a decision was made that Steering Group members were permitted to nominate only

one substitute to attend meetings in their absence, and this substitute must be kept up to date with the progress of the project to minimise disruption of any meetings they attend.

Stakeholder decision making groups are there to explore a series of different scenarios that meet a set of environmental, social or economic targets within a specific series of parameters and try to work towards a degree of consensus on their recommendations. This process requires members to be open-minded and seek to understand the interests and needs of their fellow Steering Group members.

It is important to recognise that some Steering Group members are there not because they share a common interest with others; but they share the same task. They may be there to minimise the impacts to their own interests and activities; but at the same time recognise the need to meet the specific targets they have been given.

In the UK, Statutory Nature Conservation Bodies have put together the Ecological Network Guidance (ENG) which stipulates percentages of certain habitats and species which must be protected by the final MPA network. The Steering Group must work within these criteria whilst exploring the different options of MPA networks, and also attempting to minimise the impacts on stakeholder activities. In contrast, the Science Advisory Panel in the California MPA project developed a series of design guidelines which centred on size and spacing criteria that the MPA network had to meet. Either way, experience suggests that the more specific the parameters, the more achievable the end targets will be.

Although Steering Group members are knowledgeable about their own sector, they cannot be expected to be knowledgeable about the activities of different sectors or detailed scientific information in the project area. The Steering Group members were provided with relevant scientific and spatial sea use data in a 'Regional Profile' of information for consideration during the decisionmaking process. It would be possible to present a vast array of information to Steering Group members; however, it is important that the data is carefully selected to ensure the right level of complexity is provided, and that members are not overloaded. Maps presenting habitat information, bathymetry, seafloor characteristics, sea surface temp fronts, biological data, human use and economic data and stakeholder mapping information could all be beneficial in a MPA planning project. Finding Sanctuary found that they had over-estimated the general knowledge of stakeholders about the project region, therefore, it was found to be useful to present an array of information to Steering Group members at the beginning of the project to ensure all members had access to background data. However, as the project progressed, the data provided was streamlined, simplified and summarised where possible to ensure that members were not overloaded.

Traditionally, stakeholders have only been 'consulted' on the final stages of a project, with little influence over the outcomes. Finding Sanctuary Steering Group members were initially overwhelmed with the enormity of their task when they realised that they would have to begin the process by drawing lines of a map. It took time for Steering Group representatives to fully comprehend the level of influence they potentially had over the MPA planning process, but this realisation was an important step in the decision making process and the engagement of stakeholders.

### 4.2. Local Groups

Although Steering Groups provide an effective way of engaging stakeholders, when dealing with a large project area, it is impossible for Steering Group members to have a detailed knowledge of situations at a localised level. Input from local stakeholders can provide valuable detailed knowledge of situations and activities, which can be fed back to the Steering Group in the planning process. Inclusion of local stakeholders also expands the extent of stakeholder engagement. In South-West England, Local Groups, comprising of stakeholder group representatives similar in composition to the Steering Group but at a local level, provided an instrumental role in putting forward suggestions for MPA locations and protection measures, as well as providing feedback on Steering Group recommendations. However, the decision making for sites remains at a regional level.

## 4.3. Working Groups

One of the main constraints of working with a sizable Steering Group is that progress can be slow. Stakeholder representatives will often be contributing on a volunteer basis; therefore, the number of meetings that individuals will feasibly be able to commit to will be limited. Also, the very nature of a group of stakeholder sector representatives suggests that opinions will be varied, and thus discussions will be complex, and it is a lengthy process to ensure that all members are able to represent their views. The creation of a series of smaller Working Groups of specialists in a particular area can help to make headway with the progress of the project. These groups can then feedback options and summaries for consideration by the wider Steering Group.

### 4.4. Process Groups

It is recognised that MPA planning projects are complex, particularly when dealing with a large number of stakeholders with a wide range of factors to consider. In order to ensure that the process is managed collectively, Finding Sanctuary in the South-West developed a Process Group. The group's responsibilities lay in determining the process that will be used in the project and to ensure that the work was consistent with the needs of the Steering Group and national objectives. The group assisted with the design of the process to examine how any objectives could be met, and to address any practical or logistical issues. The work of the group also proved instrumental in reducing the length of Steering Group meetings, as the specifics of the process could be discussed, and a summary of the options presented to the Steering Group for their consideration.

## 4.5. Science Advisory Panel

Despite the importance of stakeholder driven decisions, it is crucial that MPAs also meet their scientific conservation objectives. This can be ensured by the peer review of MPA network considerations by a group of leading independent scientists. This group can determine whether MPA recommendations are meeting their target within agreed parameters, and in doing so, can provide advice and feedback to the Steering Group.

A diagram presenting the roles played by the various groups in the Finding Sanctuary project is presented in Figure 12.



Figure 12: Diagram to present the various groups involved in the Finding Sanctuary MPA planning process

#### 4.6. Decision Support Tools

A number of tools are currently available to support and enhance MPA planning. Several of these tools are widely accepted and have been used in large scale MPA planning programs worldwide. Decision Support Tools can provide a series of unbiased outputs to provide a starting point for discussion; this can especially make the planning task appear less daunting for decision-makers, and can potentially save time in the wider process. The tools can provide decision-makers with a different perspective or angle of choices which may not have previously been considered, and may also draw attention to gaps in data which can lead to re-evaluation of datasets.

However, many Decision Support Tools are computer based; which may lead to distrust by stakeholders if they believe that the decisions have been made by computers rather than stakeholders, potentially undermining the whole process. There is also the risk that too much emphasis will be placed on such tools at the detriment of considering stakeholders' opinions. Decision tools require high quality datasets within which clear parameters must be set; this may not always be achievable and such tools cannot compensate for gaps in datasets. It is therefore very important to recognise that Decision Support Tools only play one small part in the MPA decision-making progress, and should not be used as a substitute for stakeholder lead decisions. It is also important that stakeholders are made aware that Decision Support Tools are not decision **making** tools, and should be used with the appropriate caution.

In England, the MPA planning process is iterative (ie a number of developing versions), whereby each new iteration will be created from newly gathered information and stakeholder feedback, as well as scientific advice and comments from the Science Advisory Panel. During each set of iterations, Decision Support Tools will be utilised to examine alternative options for consideration by the various project groups. This process will facilitate the evolution of discussions about recommendations towards the final MPA network, involving stakeholders at every stage.

The next section will examine several of the Decision Support Tools in more detail.

### 4.6.1. GIS analysis tools as a method of presenting data

Data can be presented in a range of different formats depending on how the information is going to be used, for example, whether a chart is going to be drawn on, or if they are intended to enhance stakeholder's knowledge of existing features. In marine protected area planning, data is most commonly presented as maps, providing a highly effective way of presenting complex spatial information in a simple format, whilst informing the user about spatial relationships between features.

A number of different techniques can be used to simplify the presentation of scientific and sea use data. Finding Sanctuary found that colour was a highly effective way of presenting complex information in a simple format, particularly through the use of 'heat maps' to show intensity, or the use of a wide range of different colours to depict different features such as habitats on base maps. Finding Sanctuary's background charts were coloured and designed to mimic nautical charts, a format that the majority of stakeholders were familiar with. These maps were designed at an appropriate scale for use, depending on whether they would be used for discussions at a local level or at the scale of the entire project region. Finding Sanctuary also recognised the benefits of printing large format maps for use in groups meetings, on which information could still be seen if the map was on the wall or in the middle of a group of people. Large format maps were particularly useful when presenting information for the entire project area at a suitable scale, or when working at a local level they afforded a suitable degree of detail. Finding Sanctuary also used acetates to overlay different layers of information onto various base maps (Figure 13), which allowed stakeholder to interact with data.



Figure 13: Example of an acetate overlay to present data which can then be overlaid over multiple base maps

Finding Sanctuary presented their collected sea use spatial data using two specific methods. The first of which, footprint maps (Figure 14A), were used to show the total extent of an activity, which can quickly inform the user as to where an activity is occurring, for example, whether it is in inshore or offshore areas, whether it extends around the majority of the coast or whether it is restricted to a few key estuaries. This form of map could also help determine activity overlaps where potential

conflicts could arise. The second method involved density maps (Figure 14B), using shading or contours to represent the relative number of people who took part in a certain activity in specific area. This quickly gives the user an impression of hotspots of activity which would potentially be important areas for the stakeholder group to take into consideration during the planning process.



Figure 14A (Left): Footprint image of motor cruising activity in the south-west Figure 14B (Right): Intensity map of lobster potting activity in Dorset.

### 4.6.2. Marxan

Marxan (Ball *et al.* 2009) is a powerful decision support tool that has been used in the planning of protected areas worldwide.

Marxan is available free of charge at: <u>http://www.ecology.uq.edu.au/?page=20882&pid</u>=

The Marxan Good Practices Manual is available at: <a href="http://www.uq.edu.au/marxan/docs/Marxan%20Good%20Practices%20Handbook%20v2%202010.pdf">http://www.uq.edu.au/marxan/docs/Marxan%20Good%20Practices%20Handbook%20v2%202010.pdf</a>

The Marxan Technical Manual is available at: <a href="http://www.uq.edu.au/marxan/docs/Marxan\_User\_Manual\_2008.pdf">http://www.uq.edu.au/marxan/docs/Marxan\_User\_Manual\_2008.pdf</a>

Marxan allows planners to divide their project region into a series of planning units of a suitable size and shape, from which a network of MPAs can be calculated to satisfy a specified range of ecological, social or economic criteria. Factors that might be considered in an MPA design might include; that certain species or habitats are protected within a network, that areas of cultural heritage such as noteworthy ship wrecks are included in the network, or perhaps that the network poses a minimal impact on the industries based within the planning region.

The program relies upon clearly defined objectives, requiring distinct targets for conservation, and clear economic measurements. These targets are dealt with as constraints; the impact becomes the

cost of the design, and Marxan seeks to create a design with the minimal costs possible. Social costs are less easily quantified; where possible these are divided into aspects which an economic cost can be assigned to, or perhaps the conservation of features where it is possible to do so. Those factors which do not fall into a category are omitted from Marxan and are dealt with by the user either preceding or following analysis. Factors can also be applied to data to experiment with different reserve shapes and sizes. These might consider the costs of having many small MPAs against few large MPAs, or may use the Boundary Length Modifier (BLM) to consider the compactness of survey designs, through the assumed importance of a spatially cohesive network of sites (Figure 15).



Figure 15: Examples of the use of BLM to consider the compactness of survey designs

Marxan can use two different methods for designing MPA networks. The first of which uses a heuristic technique, which sequentially adds MPAs to a network until the entire predefined target are met. The second method uses an objective technique, whereby any collections of planning units are awarded a rating dependant on their success at meeting the MPA's targets. An optimisation method is then used to determine which network of MPAs has the best rating dependant on the objective function (Ball and Possingham, 2000). MPA planners would generally use the second of these methods to optimise the benefits of network designs.

Marxan uses a 'simulated annealing' algorithm, whereby each planning unit is examined for the values it contains. By running the algorithm numerous times, it is possible to determine the outputs after 100 or 1000 runs (Figure 16A). This enables the user to sum outputs to determine those areas that come up time and time again, and therefore, would be important areas to put forwards to the stakeholder groups for discussion (Figure 16B).



Figure 16A (Left): Output from 100 runs for a certain scenario. Figure 16B (Right): Summed outputs for a certain scenario

Marxan can deal with highly complex information, is flexible, transparent, and a repeatable process. It can provide a useful starting point for stakeholder discussions and can prove beneficial when working with many complex layers of information. However, some stakeholders may be suspicious of the use of Marxan, and it can be a very time consuming tool to use. It is very important to recognise that Marxan is just one tool in the wider MPA decision making process. Finding Sanctuary's MPA planning team were surprised that Steering Group members specifically requested the use of Marxan as they viewed it as an unbiased tool.

CLUZ (Conservation Land-Use Zoning) software is a user-friendly interface for Marxan which can be ArcView GIS. The free to used in conjunction with tool is download from http://www.kent.ac.uk/dice/cluz/register.html and was developed by DICE (Durrell Institute of Conservation and Ecology) at the University of Kent. CLUZ was designed to enable Marxan data to be imported and displayed in ArcView, allowing users to utilise interactive functions to modify protected area networks whilst CLUZ automatically determines whether the proposed network meets predetermined conservation objectives. A tutorial is also available on the University of Kent website which provides an explanation of how to use CLUZ.

## 4.6.3. Building Blocks

The beginning of MPA planning discussions can be seen by some Steering Group members as a daunting process, and some may feel reluctant to be the first to put suggestions forward. In the South-West England project, both the Steering Group and Local Groups were initially asked to put forward suggestions for areas they thought should and should not become MPAs. Many representatives felt they had insufficient knowledge or expertise to contribute suggestions, and were reluctant to take the first step by actually 'putting lines on maps'.

Following these meetings, Finding Sanctuary recognised the importance of using Decision Support Tools as a starting point, to facilitate discussion within stakeholder groups and alleviate the perceived pressure on members. Finding Sanctuary Project Team used Marxan to process complex commercial fishing data, habitat distribution and the MPA guidance (ENG) to put forward a series of building blocks (Figure 17). When the building blocks were presented to the Inshore and Offshore Working Groups, they proved successful in facilitating a structured discussion between stakeholders. Nonetheless, Working Group members remained hesitant in providing direct feedback on each of the individual building blocks; instead they decided they needed to further consult their sector before providing direct feedback. The building blocks were more generally discussed, and key themes were extrapolated from conversations and recorded in the meeting minutes.



Complex commercial fishing information was processed using Marxan to determine fishing utility in the Finding Sanctuary project area. Information was presented in the form of a heat map, with areas of red representing the areas of highest fishing utility.

The Finding Sanctuary project team highlighted areas where specific habitats outlined in the conservation targets (ENG) coincided with areas of low fishing utility. These areas were enclosed as an MPA envelope. Despite efforts to reduce the impacts of MPAs on fishing activity, in a couple of situations where a habitat type was rare, it was not possible to avoid areas of highest fishing utility.

These envelopes were then further divided into smaller building blocks for consideration and comment by the Working Groups. Colour was used to highlight existing protected areas or building blocks over unique habitat types. These building blocks were then traced onto clear acetate (Figure 10), so they could overlay a series of base maps presenting different ecological and socio-economic information. This allowed stakeholder representatives to determine the potential impact of each building block.

Figure 17: The process used to create a set of building blocks, for consideration by the Inshore and Offshore Working Groups

#### 4.6.4. MarineMap

MarineMap is an interactive WebGIS tool that was recently used in the California MPA network process, under the Marine Life Protection Act (MLPA). The tool is available for use by any stakeholder and presents oceanographic, biological, geological, chemical and human data in the Californian marine environment (Figure 18). Consequently, MPA ideas can be shared, and instant feedback can be provided to determine whether MPA design criteria have been met, enhancing the level of engagement with stakeholders.

The tool was purposefully designed for use in California, however, the tool is expensive to purchase, and therefore, despite its success, it is yet to have been used for any other MPA planning projects worldwide.



Figure 18: Snapshot of MarineMap with an example of a suggested MPA and its success in meeting network criteria.

Ardron, J., Marchand, A., and Liedtke, M. (2005) Gathering Spatial Knowledge from Local Experts. A Handbook for Interviewing Fishermen. Version 2.2 Living Oceans Society

Ardon, J., (2005) Quantifying Local Knowledge for Use in Marine Planning: A Pilot Project in British Columbia's South Central Coast. MSc Royal Roads University

Ball, I.R., Possingham, H.R. and Watts, M. (2009). Marxan and relatives: Software for spatial conservation prioritisation. Chapter 14: Pages 185-195 in: Spatial conservation prioritisation: Quantitative methods and computational tools. Eds Moilanen, A., K.A. Wilson, and H.P. Possingham. Oxford University Press, Oxford, UK.

Ball, I.R. and Possingham, H.P. (2000). Marxan (v1.8.2): Marine Reserve Design Using Spatially Explicit Annealing. Manual.

Des Clers, S., and Stead S., (2005) Fishermen's Knowledge and Participation to improve fisheries governance. Powerpoint Presentation

Des Clers, S (2007) Connecting with Fisheries: Coastal Fishermen's maps and ecosystem description