Developing a participatory approach to the management of fishing activity in UK offshore Marine Protected Areas

Project Report

March 2020

JNCC · Marine Management Organisation · Natural England · nffo The National Federation of Fishermen's Organisations · Prifysgol Bangor University · CAG Consultants

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1 Background

The seas around the UK are home to some of the most biologically diverse habitats and species in Europe. They are a key natural asset, providing us with food, income, raw materials, and opportunities for leisure and recreation. Marine protected areas (MPAs) are one of the ways in which this natural capital can be conserved and enhanced for future generations, while seeking to enable the sustainable use of resources.

Detailed information on the effect of fishing on sedimentary seabed habitats protected within MPAs (such as sandy or gravelly sediments) is limited in the offshore environment. There is uncertainty around the presence and extent of specific habitats, the impacts that fishing activity can have on habitat condition and the patterns of fishing activity associated with those habitats. This is a particular problem in the offshore marine environment where issues of scale and availability of evidence are most acute. Uncertainty affects our ability to make appropriate management decisions, and as such it can have a detrimental effect on both the livelihoods of those reliant on the marine environment as well as delivery of the conservation goals upon which management is based. In the face of this uncertainty, fisheries managers have applied precaution in their approach to management measures to ensure seabed protection. However, there is also a desire for management to allow continued sustainable use of marine resources within MPAs where this is compatible with conservation goals.

Where specific fishing activities pose a risk to the condition of sedimentary MPA features, UK legislation requires that fisheries management measures are introduced to reduce this risk. In the offshore region (beyond 12 nautical miles), a zonal approach to management of fishing over most sedimentary features has been adopted. This approach aims to minimise the risk of an MPA not achieving its conservation objectives, whilst not disproportionately impacting the fishing industry and involves identifying those zones within a site where features are most at risk from deterioration by specified gear types. Based on the level of risk, those gear types are proposed to be restricted from varying proportions of the feature which in total represent the full diversity of the habitat or species. As we reduce uncertainty through better knowledge of feature condition, sensitivity to impact and exposure to activities such as fishing, we can adapt management accordingly to ensure continued conservation benefits and sustainable use.

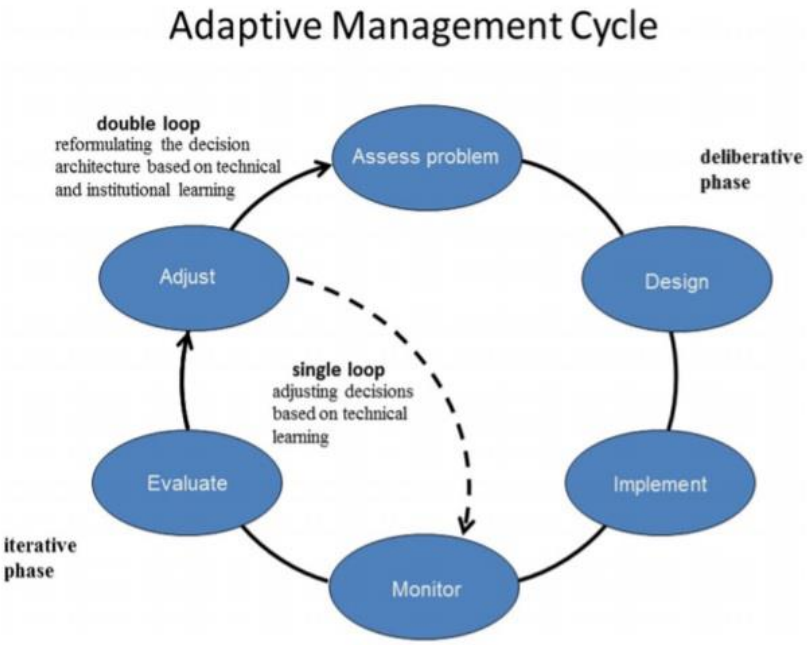

Figure 1: Adaptive Management Cycle

The Adaptive Management Cycle is a framework through which ecosystems can be managed, even in the face of multiple uncertainties. When new or improved evidence is available, the iterative phase (Figure 1), which is the cornerstone of adaptive management, provides opportunities to adapt management in a proportionate manner.

It is important to effectively engage stakeholders in management decisions and improve awareness and support for MPAs. We also need to understand how best to use stakeholder information in the decision-making process. Exploring these issues in a collaborative environment aims to build consensus and improve awareness of both the cultural and economic importance of the fishing industry as well as the value of protecting marine biodiversity.

JNCC and partners the Marine Management Organisation, Natural England, the National Federation of Fishermen's Organisations and Bangor University have completed a two-year project, funded by the European Maritime Fisheries Fund (EMFF) exploring participatory processes to aid stakeholders and decision makers in establishing, evaluating and adapting fisheries management measures in MPAs that include sedimentary habitats as protected features.

The overarching aim of the project was to develop and trial a framework and tools to deliver a participatory approach to managing fishing activity in MPAs, ensuring fair and effective management in the face of uncertainty. The project did not aim to draw conclusions about the validity of policy-decisions for MPA management measures, rather to develop and test a participatory process for making management decisions, ensuring that this is fair, transparent and uses the best available evidence.

The project brought together the fishing sector, regulators, scientific advisors, environmental non-governmental organisations (eNGOs) and academic researchers to explore the challenges of managing sedimentary habitats in MPAs in light of scientific uncertainty. Stakeholders were split into two regional groups: North-West (Lancaster) and South-East (Norwich) using two case study sites (West of Walney MCZ and North Norfolk Sandbank and Saturn Reef SAC), respectively) to aid the development of an MPA Fisheries Management Toolkit. The project focussed on mechanisms for enabling the fishing sector to engage positively with the management process and bring their perspectives and knowledge to the table. Opportunities for improving communications and raising societal awareness of the value of protecting marine biodiversity were also explored.

The main project outcome was to produce a framework for MPA management and associated tools to deliver a participatory approach for managing fishing activity in offshore MPAs. The delivery of this framework was split in to three parts:

1. Delivery of a participatory process to integrate stakeholders within the management review process, seeking to build awareness and consensus;
2. Development of a model to predict ecological outcomes of different management scenarios;
3. Development of an MPA management toolkit to guide advisors, regulators and stakeholders in future management reviews looking to engage in a participatory approach.

2 Process

Figure 2: Developing a participatory approach to managing fishing activity in UK offshore MPAs - the project's process

2.1 Project Governance

The first step in the project was to establish the project governance (see Figure 3).

The Project Management Group was made up of all project partners and met on a ~monthly basis to review project progress and develop project deliverables. As an initial step, project partners undertook a stakeholder mapping and audit exercise, for guidance on this process please see the **Stakeholder Engagement component** of the MPA Fisheries Management Toolkit which provides our recommendations for future use and transferability of this process to other approaches.

The Project Advisory Group comprised of representatives from the following:

- UK and International Fishing Industry
- Conservation / environmental NGOs
- Regulators
- Scientific Advisors

The group met on a ~6monthly basis throughout the project to review project deliverables and discuss progress of the project and to help guide workshop discussions.

Project Governance

Project Management Group
- Comprised of representatives from Project Partners.
- Group will review progress against project plan, assess risks and issues, and monitor budgets.
- Group will meet monthly / as required via Skype.

Project Advisory Group
- Composed of project partners and wider stakeholder groups (fishing industry representatives, NGOs etc).
- This group will provide technical expertise and advice to the project.
- This group will meet every 6 months, mostly via skype but it may be necessary to hold some meetings face to face.

Regional Stakeholder Group 1 – Irish Sea
- Comprised of stakeholders with an interest in the Irish Sea case studies.
- Could include representatives from national and regional stakeholders, as well as other Member States.

Regional Stakeholder Group 2 – Southern North Sea
- Comprised of stakeholders with an interest in the Southern North Sea case studies.
- Could include representatives from national and regional stakeholders, as well as other Member States.

Figure 3: Project Governance Structure

A variety of stakeholders were contacted after the stakeholder audit and mapping. These were decided on by the Project Management Group and approved by the Project Advisory Group to ensure there was a good range of stakeholders from relevant backgrounds to contribute to the project. Figure 5 summarises the key stakeholder groups identified within this project for developing a participatory approach to the management of fishing activity in UK offshore MPAs.

Approximately 60 stakeholders were contacted to take part in the project workshops with 46 attending (Figure 4). Details of workshop attendance is available in the following section.

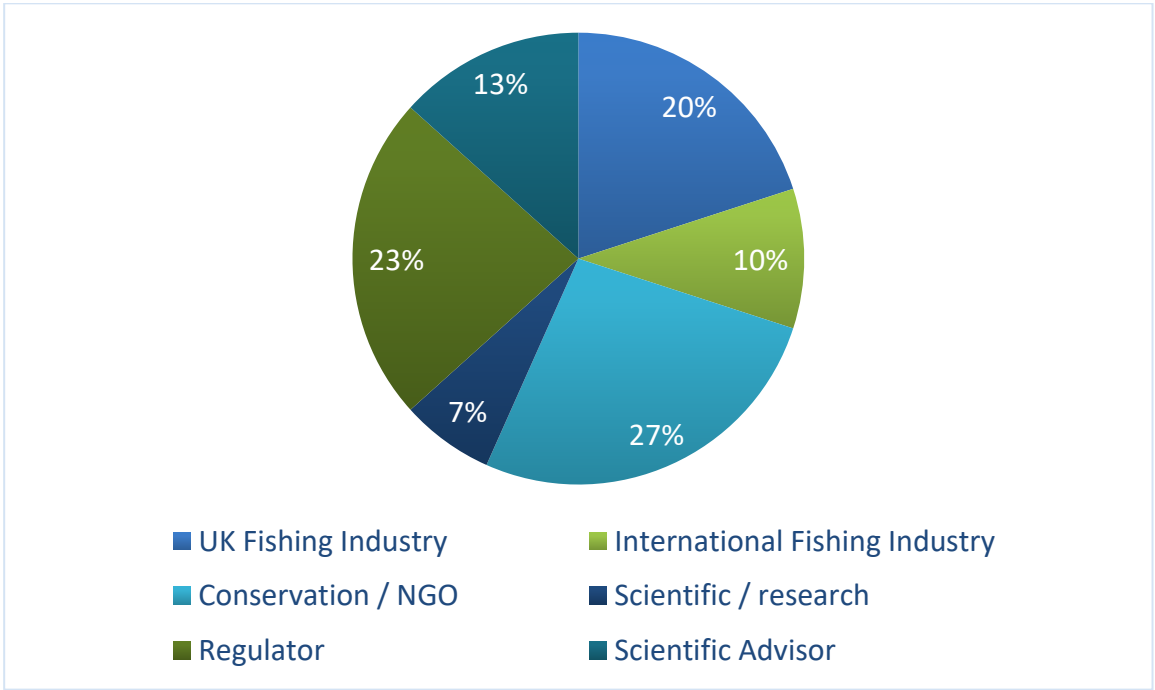

Figure 4: Stakeholder distribution across different sectors

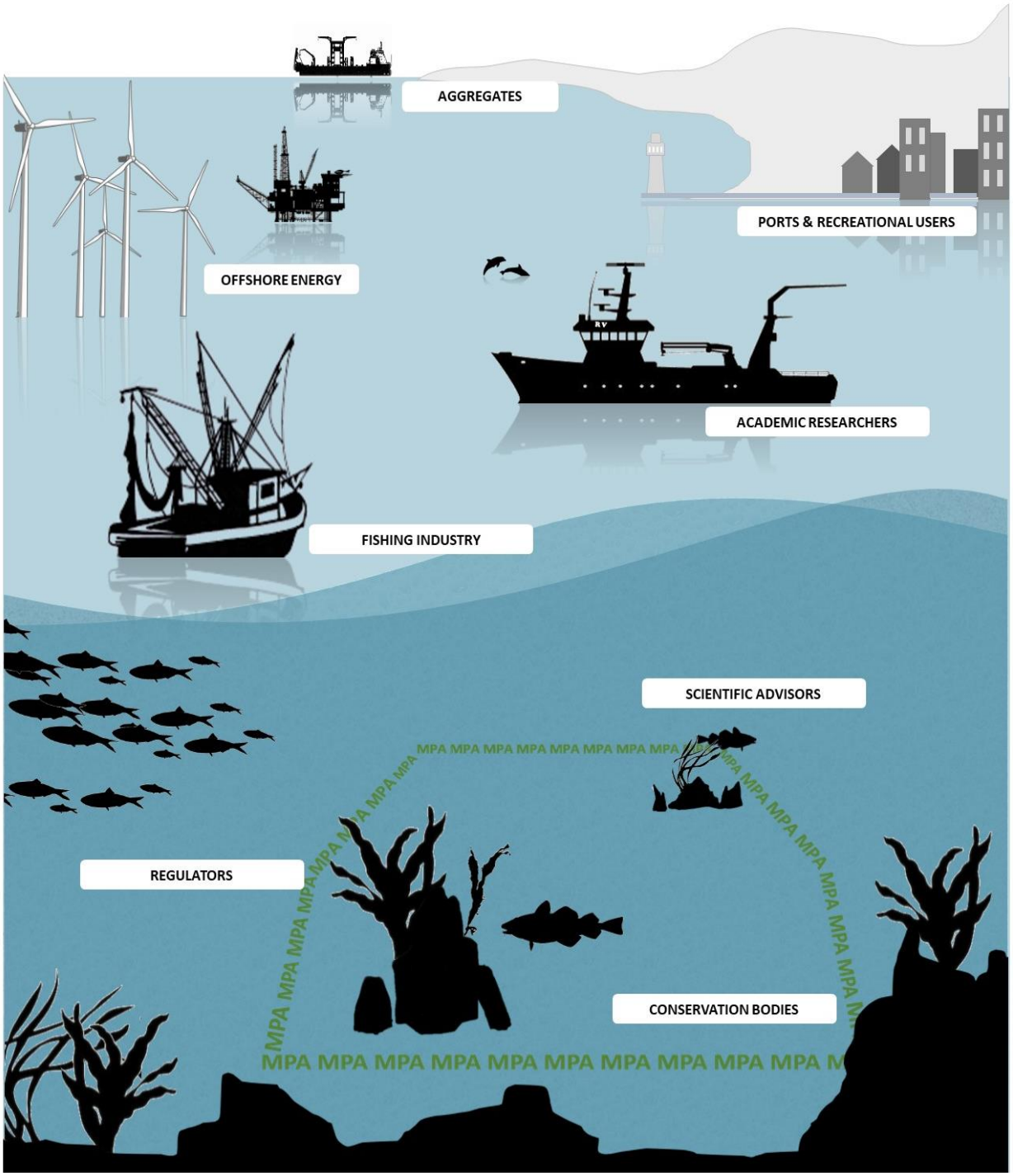

Figure 5: Key stakeholder groups identified for developing a participatory approach to the management of fishing activity in UK Marine Protected Areas

2.1.1 Case Study Sites

Two case study sites were selected to provide a regional focus to discussions. Site selection criteria for the case studies were for both sites to

a) be offshore / have offshore areas (>12 nautical miles) with sedimentary habitats and
b) have fishing activities currently occurring within them.

A variety of MPAs were evaluated for suitability, considering the following:

- Region

- Site size
- Depth range
- Feature distribution
- Habitat data
- Fisheries data
- Relevant stakeholders
- Fisheries management, including stage of management process and timeline
- Risks and
- Mitigations

Two case study sites were chosen: West of Walney Marine Conservation Zone (MCZ) for the North-West regional case study and North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (SAC) for the South-East regional case study.

The available site datasets were reviewed and selected to ensure productive discussions and for use in the Benthic Impacts Tool.

Both sites had existing management plans and thus the aim of the project was not to develop a new plan but consider options for implementing a participatory approach to adapt management as/when new information becomes available. As such, both case-study sites were used in a purely hypothetical sense to give context for the discussions in the regional workshops and provide real-world examples to work through.

West of Walney Marine Conservation Zone was designated in January 2016 and straddles the 12 nautical mile (nm) boundary located in the Irish Sea. It covers an area of 388km^2 with a depth range from 15m to 33m below sea level. The designated protected features are **subtidal sand**, **subtidal mud** and **seapens and burrowing megafauna communities**. The conservation advice package for West of Walney MCZ is hosted on Natural England's designated sites system.

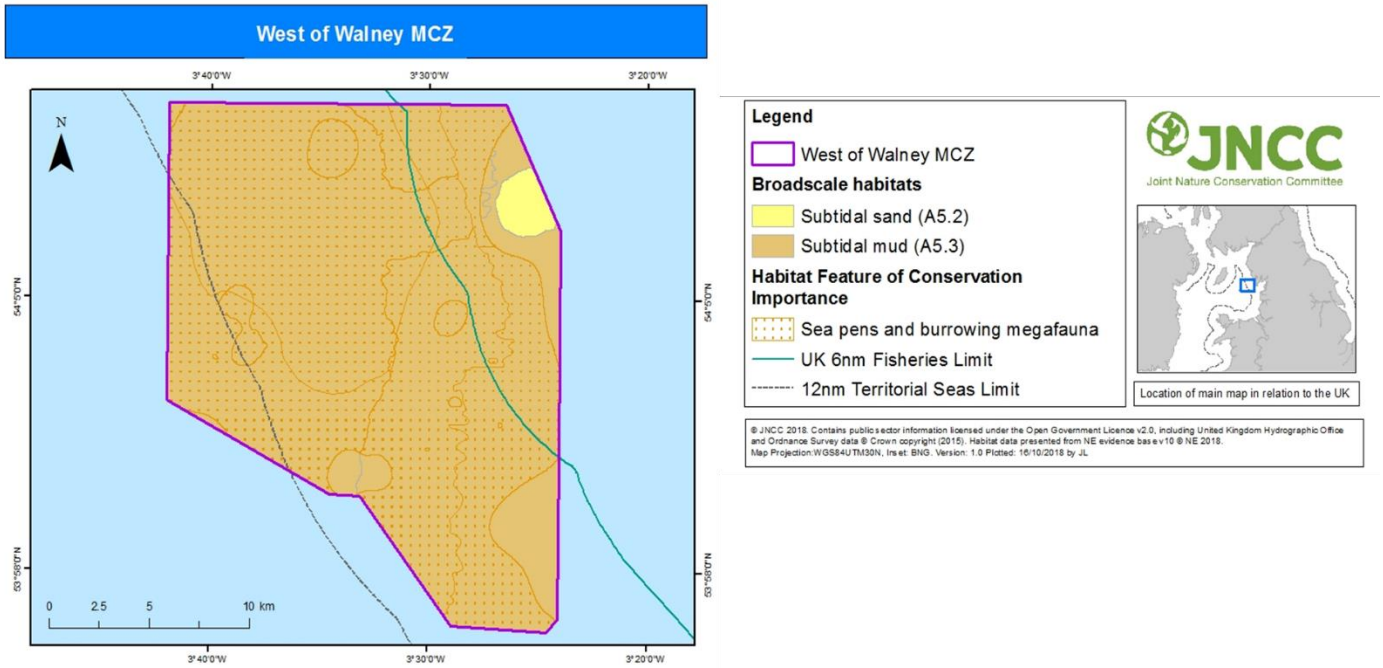

Figure 6: North-West case study West of Walney MCZ

The available data met the Benthic Impacts Tool data requirements and included:

- Full coverage habitat map from survey.
- Survey data includes acoustic, video and stills, sediment and faunal samples.

- Full fishing vessel effort coverage via VMS.

The mud habitat within the site is of high commercial fishing interest as it is a supporting habitat for Norway lobster *Nephrops norvegicus*. Fishing activity is predominantly from UK registered vessels with low levels of activity from Irish and Belgian registered vessels.

The site management proposal at the time of the workshops included a restriction (MMO / IFCAs) on all bottom towed gears in the inshore (0-12nm) portion of the site, leaving the offshore portion (~20%) open to fishing. This management proposal was not discussed during the course of the project.

North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (SAC) was submitted to the European Commission in August 2010 and designated in September 2017. The site is located offshore (>12nm) in the Southern North Sea and has an area of 3,603km^2 with a depth range of 3m to 60m below sea level (Figure 7). The designated protected features are **Annex I Sandbanks which are slightly covered by seawater all of the time and Annex I Reefs (biogenic *Sabellaria spinulosa* reef).** The entirety of the MPA is considered a representative functioning example of the Annex I feature Sandbanks which are slightly covered by sea water all the time and so the whole SAC is designated and viewed as one integrated sandbank system. The conservation advice package for North Norfolk Sandbanks and Saturn Reef SAC is hosted on the JNCC website.

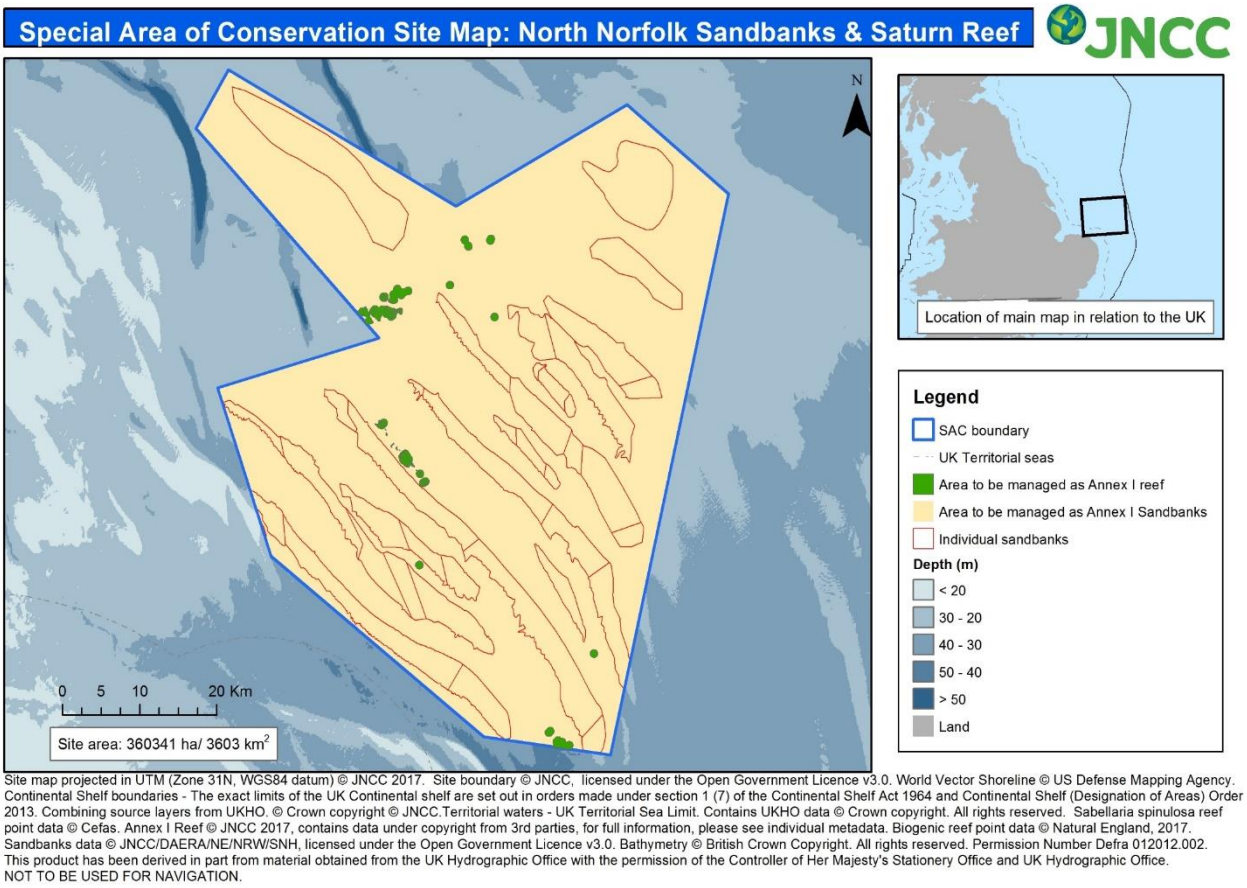

Figure 7: South-East case study. North Norfolk Sandbanks and Saturn reef SAC

The available data met the Benthic Impacts Tool data requirements and included:

- Full modelled habitat map coverage UKSeaMap 2016.
- Survey data includes acoustic, video and stills, sediment and faunal samples.
- Fishing vessel effort coverage via VMS.

There was evidence of mobile demersal, static and pelagic effort from UK and non-UK registered vessels in the site. Fisheries management was not yet in place at the time of the meeting, but a proposal had been developed in line with the Common Fisheries Policy Joint Recommendation process. This included restrictions on the use of bottom contacting towed gears covering 54% of the entire site with 54% of the sandbank and 100% of the reef feature included. This proposal was not discussed during the course of this project apart from being used as an example scenario in the Benthic Impacts Tool exercise. The majority of fishing activity is from Dutch registered vessels with additional activity from UK, Belgian, Danish, French, German and Norwegian registered vessels.

2.2 **Project Workshops**

Developing the framework for a participatory process to MPA management was delivered through a series of four regional workshops (see Figure 8).

Figure 8: Delivery of a participatory process

These workshops were designed around collective discussion, with a focus on the regional specific options for adaptive MPA management and enabled participants to build some shared understanding of each other's issues and concerns. External facilitators were used (CAG Consultants) to run the workshops and collate the discussions into a series of workshop reports published on the webpage along with workshop agendas and presentations.

The logistics of the workshop venue were selected on the basis of proximity to the majority of the stakeholders, accessibility to public transport and reasonable accommodation. National venues were selected in London for a central location and ease of travel arrangements.

Figure 9 presents a word cloud of the main reasons that participants stated for taking part in the project.

Figure 9: Word cloud representing stakeholders' reasons for attending the workshop

2.2.1 National Workshops

Two national workshops were held bringing together stakeholders involved in the regional workshops and stakeholders with a national focus. The first national workshop (Workshop 1, November 2018) was convened to lay out the project objectives and approach, and the second (Workshop 4, November 2019) to review the outputs from the regional workshops. The split of representations for each national workshop is shown in Figure 10.

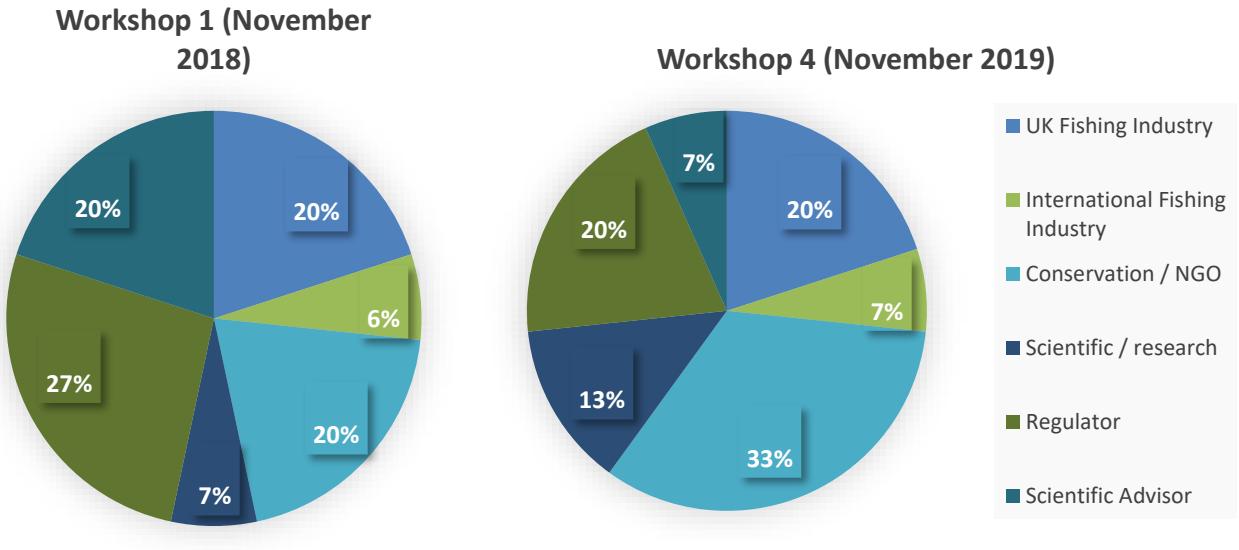

Figure 10: Attendance at National workshops

In the national workshops, the groups identified some of the main issues and proposed improved ways to integrate key stakeholders, such as fishers, into management decision making. Using clear objectives for each workshop the groups worked through a range of core elements including:

- developing a clear communication process and achieving a shared understanding of the project objectives, principles and the wider adaptive management process;
- discussing the different types of governance on a regional level that could be used to develop a participatory approach;
- developing a process and framework for decision-making and
- improving understanding of adaptive decisions in the context of uncertainty.

Through consensus building and shared understanding, the information gathered in the workshops has informed a large number of outputs that are being delivered through MPA Fisheries Management Toolkit.

Figure 11 presents the main issues raised within the workshops, which could affect a participatory approach to MPA management.

Figure 11: Word cloud representing stakeholder views on issues affecting a participatory approach to MPA management

2.2.2 North-West Regional Workshop

The North-West regional stakeholders met in Lancaster to discuss the West of Walney MCZ case study site (see Section 2.1.1) within two workshops (February 2019 and May 2019). Stakeholders invited to the two regional workshops which discussed this case study included:

- Fishing organisations from the UK countries adjacent to the area
- Fishing organisations from other countries who fish in these waters
- Seafish, the non-departmental public body supporting the seafood sector
- Regulators, e.g. regional IFCAs, MMO, Defra, Marine Scotland,
- Advisors, e.g. JNCC, Natural Resources Wales, Natural England
- Researchers, e.g. Cefas, relevant UK universities
- Environmental/conservation organisations, e.g. WWF, MCS, MSC

Nine of these stakeholders attended the North West regional workshop 2a, and six attended workshop 3a. In addition, each workshop was also attended by advisory board members and project partners. In total 2a had 16 participants and 3a had 13.

The split of stakeholder categories that attended either of the regional workshops is provided in Figure 12:

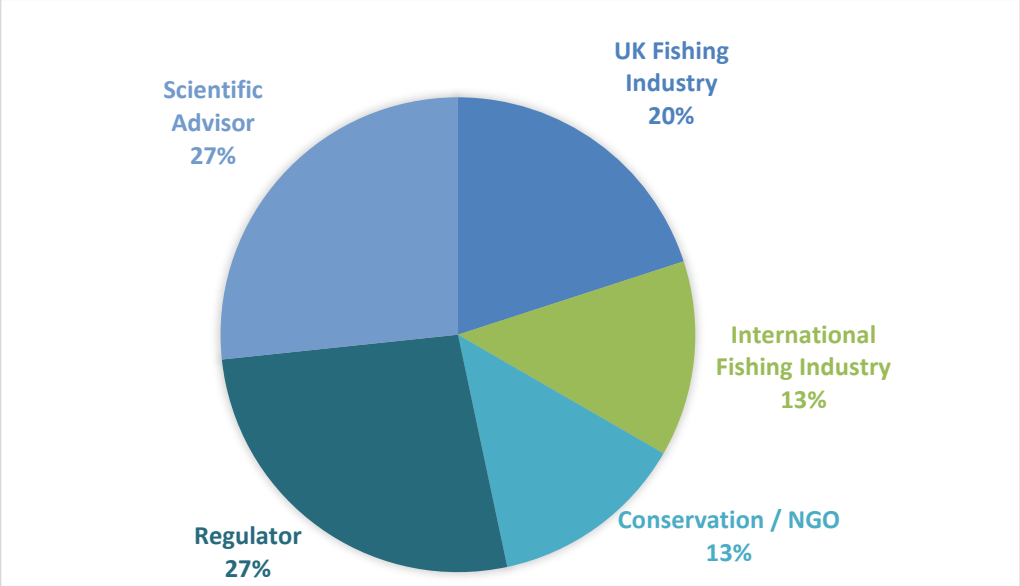

Figure 12: Attendance at North-West regional workshops 2a and 3a

The attendees of each workshop are listed in the associated Workshop Reports (Workshop Report 2a and Workshop Report 3a) which also outline the key discussions. A summary table of actions resulting from key discussions within all workshops is provided in Table 1.

The Relative Benthic Status was calculated for this case study and four potential management scenarios considered (with some small variations within scenarios):

1. Complete spatial / temporal closure
2. Closed Area
    a. Lowest fishing activity (by %) with and without displacement of fishing activity
    b. Highest fishing activity (by %) with and without displacement of fishing activity
3. Closed areas where sea pens occur (with and without displacement)
4. Gear modification (remove sweeps)

Discussions around each of these scenario outputs are presented in the Workshop Report (Workshop Report 3a).

As a case study, hypothetical governance structure was discussed using the approaches set out in the MPA management participation ladder. More information on the MPA management participation ladder and related governance structures is available in the MPA Fisheries Management Toolkit within the **Roles and Responsibilities component**: Guidance on High Level Governance Options. West of Walney MCZ is a site which straddles the nearshore and offshore areas with interests from local and national stakeholders. The key stakeholders for this site are considered to be the fishing industry and NGOs.

The co-managed approach was considered the best governance option for this site. This approach was considered to be the most flexible and therefore offers a much broader appeal. It can work in a lot of different ways and there is more scope to compromise between the two extremes of governance (state direction (doing-to) or community-based (delegate-doing)) making this approach more suitable to adaptive management.

Financial resources need to be sustainable to ensure the longevity of the process. Logistics of developing participatory approaches are provided in the **Logistics component** of MPA Fisheries Management Toolkit. Potential incentives were discussed in addressing the limiting factor of financing the governance. Existing practices such as security of resources in agriculture (where farmers are paid to manage their land sustainably) would be challenging to apply in a marine

context. However examples such as the New Zealand fisheries incentive could be adapted (Mace, Sullivan & Cryer, 2013).

2.2.3 South-East Regional Workshop

The South-East regional stakeholders met in Norwich to discuss the North Norfolk Sandbank and Saturn Reef SAC case study site (see Section 2.1.1) within two workshops (February 2019 and June 2019). Stakeholders invited to the two regional workshops which discussed this case study included:

- Fishing organisations from the UK countries adjacent to the area
- Fishing organisations from other countries who fish in these waters
- Seafish, the non-departmental public body supporting the seafood sector
- Regulators, e.g. regional IFCAs, MMO, Defra,
- Advisors, e.g. JNCC, Natural England
- Researchers, e.g. Cefas, relevant UK universities
- Environmental/conservation organisations, e.g. WWF, MCS, MSC

Nine of these stakeholders attended the South-East regional workshop 2b, and six attended workshop 3b. In addition each workshop was also attended by advisory board members and project partners. In total 2b had 16 participants and 3b had 12.

The split of stakeholder categories that attended either of the regional workshops for the South East case study is listed in Figure 13.

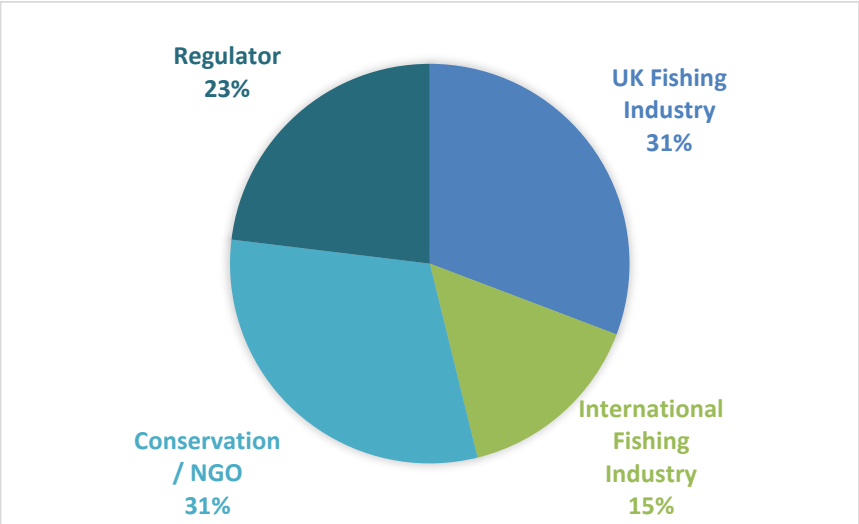

Figure 13: Attendance at South-East regional workshops 2b and 3b

The attendees of each workshop are listed in the associated Workshop Reports (Workshop report 2b and Workshop Report 3b) which also outline the key discussions. A summary table of actions resulting from key discussions within all workshops is provided in Table 1.

The Relative Benthic Status was calculated for this case study and four potential management scenarios considered (with some small variations within scenarios):

1. Gear modification
2. Spatial zoning
    a. Current joint recommendation management proposal
    b. Fishing industry Management proposals
3. Complete site closure
4. Displacement after closure (within remainder of MPA)

Discussions around each of these scenario outputs are presented in the Workshop Report (Workshop Report 3b).

The North Norfolk Sandbanks and Saturn Reef Special Area of Conservation (NNSSR SAC) is an offshore site with interests from national and international stakeholders. The key stakeholders for this site are considered to be the fishing industry and NGOs.

As a case study, hypothetical governance structure was discussed with a group of stakeholders involving fishing, industry, NGOs, Government, regulators and SNCBs. The co-managed approach was considered the best governance option for this site. This was largely due to the size of the site and the extent of international stakeholder interest. The ideal proposal for governance structure would be to pick and choose the best options from different approaches. It was considered essential to balance stakeholders and ensure professional facilitation.

It is important to note that the focus of the group is MPA fisheries management and representation of stakeholders should be proportionate to the issues being discussed. For example, using existing groups as spokespeople for other industries (such as the Seabed Users Development Group).

A formal regional group could be suited to handle multiple sites, especially in regard to NNSSR SAC where other SACs in the area have the same qualifying features. This would also encourage consistency across sites and enable discussions around effects from management proposals (such as displacement) to other MPAs in the region. However, combining sites would need flexibility in stakeholder attendance to ensure the relevant people were included in relevant discussions. An option could be to have satellite groups to discuss specific issues which feed into the regional group through elected spokespersons.

Coordination of the group is a key component to ensure efficiency and successful participation. Having project officers to act as catalyst for engagement and meeting attendance as well as to monitor progress and potentially feed into a national network of groups.

Table 1: Key Workshop Discussions and Resulting Actions

Key Discussions	Actions undertaken
Evidence base (increasing data collection / monitoring, increasing confidence, and consistent approaches to interpretation)	Open discussions within workshops to highlight areas of concern and propose potential solutions using consensus building. The different types of data relevant to management discussions, their limitations, ways these could be incorporated into management discussions and guidelines for data formats and confidence measures are presented within the MPA Fisheries Management Toolkit (see **Data and Evidence component**).
Shared understanding (access to simple and effective information resources explaining the drivers and issues associated with MPA management, including legislation, policy and evidence)	Open discussions within workshops to seek consensus on what products would be helpful as a resource when developing a participatory approach. Published an Acronym Buster (Glossary of Terms), posters summarising MPA legislation and roles & responsibilities in MPA Management and a review of the current context of Adaptive Risk Management in UK MPAs. These have been updated through the course of the project and included in the MPA Fisheries Management Toolkit.
Principles for **communication** (creating opportunities for constructive dialogue, being timely concise and engaging, using plain English and establishing effective feedback mechanisms)	Throughout this project we have provided regular updates on the project's progress and invited all stakeholders to each of the workshops, circulating workshop reports for comments and providing feedback where appropriate. Discussions around principles for communication are presented within the MPA Fisheries Management Toolkit (**Stakeholder Engagement component**)
Triggers for Management Review (considerations for setting triggers or thresholds to initiate a review of management measures based on the Adaptative Management Cycle, looking at ecological and effort based data)	Presented adaptive management review trigger types and discussed other factors that might trigger a review. These Triggers and Thresholds as Indicators for Management Review have been incorporated into the MPA Fisheries Management Toolkit (**Decision Making component**). Laid out principles on how stakeholders can inform periodic site management reviews of fishing activity - and ecological condition. These are included in the MPA Fisheries Management Toolkit (**Decision Making component**)
Governance Structures (the way in which decisions are made and informed looking at varying levels of participation	Costs, benefits and considerations of different governance types, including the relevant participants and communication styles were discussed (presented in Appendix 1 of workshop report 3a and 3b). The co-design approach was preferred by a majority of participants, however, the ability to deliver such an approach is heavily influenced by funding and time resource constraints.

Key Discussions	Actions undertaken
and discussing the benefits and limitations of different approaches)	Guidance on governance structures (as a result of the workshop discussions) is included within the MPA Fisheries Management Toolkit (**Roles and Responsibilities component**).
Benthic Impacts Tool (a web-based application for providing support for quantitative, evidence-led decision making)	The tool has been updated as a result of discussions on the Relative Benthic Status. The tool has been modified for adaptive management by allowing the tool user (e.g. a regulator) to modify gear types and/or spatial closures within Marine Protected Areas. These modifiable management scenarios will allow tool users to see the potential change in benthic impact (i.e. Relative Benthic Status) given a range of options dependent on evidence by regulators. As a group, we also agreed that the displacement of fishing activity needed more in-depth research/discussion and is therefore omitted from the final Benthic Impacts Tool, but should still be considered as part of the assessment process. Discussions also resulted in visual changes to the tool to make it more user friendly, such as changes in colours for maps etc. A User Manual for the Benthic Impacts Tool is provided on the Project webpage for further information. The R script behind the Benthic Impacts Tool and associated user manual is available on request. The code will be provided though GitHub. Knowledge of the R software is required for use of this option. Please contact Jan Geert Hiddink (Bangor University) for further information and access. The Benthic Impacts Tool has been designed to be a web based application and may be made available as such in the future.

2.3 Project Deliverables

2.3.1 Project webpage

A dedicated webpage[1] was set up at the start of the project providing a project overview, information on each of the project partners and a summary of the intended delivery through the workshops. The web page has been kept up to date throughout the project, publishing outputs/resources as they were developed. These included:

- A review of the current context of Adaptative Risk Management outlining some useful background information about adaptive risk management;
- Acronym buster - including terms and acronyms used throughout the project ensuring common language;
- Two posters summarising MPA legislation and roles & responsibilities in MPA Management - infographics were used to cut down on text whilst including a good level of detail to still be useful;
- Workshop reports & presentations - a useful resource to show what we discussed and how.

2.3.2 Workshop reports and presentations

Discussions at actions from the workshops were compiled into a workshop report by CAG consultants, reviewed by project partners and workshop participants before being published on the project webpage. All presentations have also been published on the project webpage, available for use in future work.

2.3.3 MPA Fisheries Management Toolkit

The MPA Fisheries Management Toolkit encompasses all deliverables within this project including the Benthic Impacts Tool. The toolkit is available on the project webpage and has been promoted through presentations at various events (see Legacy Materials). The audience for the toolkit (and predicted users) are those involved in management reviews (regulators, advisors and stakeholders). The toolkit provides:

- An outline of the principles of participatory management
- Guidance on implementing a participatory approach to management decision making
- A framework for delivering an effective process for reviewing management of UK MPAs
- Mechanisms for all parties to bring information to the decision making table and build capacity within the industry to contribute to the management process.

The presentation of the toolkit is fundamental to the legacy of the project. Through discussions and feedback from the project stakeholders the key requirements identified included:

- Clear concise language
- Engaging and varied format
- Easily identifiable products geared towards their audience, making it clear who should use what and when.

2.3.4 Benthic Impacts Tool

The Benthic Impacts Tool is a web-based application for providing support for quantitative, evidence-led decision making. The tool was developed by Bangor University once stakeholders were informed about the potential of the Relative Benthic Status within adaptive marine protected area management.

Relative Benthic Status is used within the Benthic Impacts Tool to forecast the potential impacts of different management scenarios on benthic communities in a quantitative way. Throughout the project we have discussed other available tools used for quantitative analysis or citizen science

[1] https://jncc.gov.uk/our-work/mpa-adaptive-management/

purposes such as the tools developed by Cefas using similar methodologies (Rshiny). Another indicator was developed by OSPAR called BH3 which is focused on providing indicators for the extent of damage on predominant species and habitats. The Benthic Impacts Tool is the first of its kind, to our knowledge, which allows users (e.g. the regulators) to upload their own data, analyse this and modify the outputs based on potential management scenarios and is also based on rigorous peer-reviewed scientific literature.

The outputs of the Benthic Impacts Tool were presented and discussed within the regional and national workshops (2, 3 & 4) where useful feedback was provided on the usability of the tool.

As with all tools derived from models, certain caveats and limitations apply and require understanding before presenting and discussing the outputs within a management group. A dedicated technical training workshop was provided to a target audience of regulators, scientific advisors and project partners to facilitate the future use of the tool. A user manual for the Benthic Impacts Tool is available for further information. The R script behind the Benthic Impacts Tool and user manual is available on request though GitHub. Knowledge of the R software is required for use of this option. Please contact Jan Geert Hiddink (Bangor University) for further information and access. The Benthic Impacts Tool has been designed to be a web based application and may be made available as such in the future.

2.4 **Legacy Materials**

The project has been promoted through Twitter and Facebook as well as through articles and presentations. The following conferences / working groups were attended by project partners to promote the project:

- North Sea Advisory Council Ecosystem Working Group (March 2019)
- SeaFish Common Language Group meeting (July 2019)
- MASTs (October 2019)
- Coastal Futures (January 2020)
- Introduction to Sustainable Fishing (January 2020)
- Association of IFCAs MPA Management Conference (March 2020)
- University of Aberdeen Science sharing event (March 2020)
- Nature News Article (Spring edition 2020)
- Submission of abstract to the World Fisheries Congress, unconfirmed inclusion (October 2020)

Additional legacy materials are also provided as project deliverables including a short video capturing key messages from the project stakeholders and a presentation on the project. These are available on the project webpage. The components of the MPA Fisheries Management Toolkit are summarised in posters available at the start of each section. These can be extracted for use as posters / flyers.

3 Successes

3.1 Participation

Throughout the project there has been positive and continued support and engagement from a variety of stakeholders. This success has stemmed from effective stakeholder mapping and audit exercises as well as a detailed communication strategy.

The project relied on the willingness and commitment of participants to take time away from their daily work, though the funding agreement for the project allowed for reimbursement of travel, subsistence and accommodation costs. This financial incentive was considered fundamental to the good attendance levels of the workshops and mentioned as a key element of continued effective engagement in any future participatory approach to management.

Each workshop was planned ahead with information circulated to all potential attendees on the aim of the workshop. The workshops were run in an informal manner, with minimal PowerPoint presentations and a focus on open discussions. External facilitators were used to ensure everyone was able to voice their opinions.

The accessibility of the venues was commended by stakeholders as this gave everyone the opportunity to input and provided a welcoming space for people to present views, even when negative. A ‘safe space’ was created where all felt comfortable to share their views and provide valuable input and feedback on deliverables that the project team were developing. It is essential to create this welcoming environment and to look at the discussions from other people’s point of view. The principles of consensus building were introduced at the initial workshops and referred back to at the start of each workshop to remind everyone of the process. Allowing people the time to express their point of view took any potential heat out of discussions and helped us to build and gain trust.

In the final workshop, stakeholders reported that it had been a positive process and appreciated the opportunity to have so much input into the deliverables. This is shown in the project video which captures key views of stakeholders and lessons learnt. Attendance at the workshops ensured the information presented and discussed was memorable and relevant to stakeholder’s current work areas. Many stakeholders implemented the discussions within their daily work outside of the project, for example Natural Resources Wales participant mentioned in the final workshop where lessons learnt through this process have been used in current negotiations with fisheries management.

This project has produced useful guidance to draw on in a resource-limited time, highlighting how best to engage effectively and efficiently and judging the right level for those involved and for the intended outcome. Information presented and discussed at the workshops was found by the stakeholders to be interesting and helpful, providing useful context to aid discussions where strong opinions, ideas or interpretations were held by the different stakeholder groups. Visualising the links between the engagement process and the current fisheries byelaw making process was useful. Throughout the project there were clear links made to implementing adaptive risk management and the benefit of using this as a framework through which ecosystems can be managed. Adopting an iterative process to MPA management review provides stakeholders with opportunities to adapt management in a proportionate manner in light of prevailing uncertainties.

By taking a participatory approach, the project managed to capture a range of views, highlighting some of the difficulties associated with management negotiations, and utilising a variety of consensus building approaches to negotiating a path that accommodated all views. Engaging with fishers has opened up dialogue and developed core skills in using an adaptive management approach which has been very positive.

3.2 The Benthic Impacts Tool

The Benthic Impacts Tool was well received by stakeholders throughout the workshops, and it was lauded for the advances that are inherent in using this tool to test scenarios and compare differences in levels of risk mitigation whilst taking account of other precaution, proportionality and unintended consequences that may arise from displacing activities. The tool shows promise when used in a participatory setting to assist in examining management trade-offs and building consensus-based decision-making.

The Benthic Impacts Tool was considered a very useful and a positive starting point for decreasing uncertainty. However, it relies heavily on the experience of the user and it is essential that the caveats are clearly understood. These are provided in the Benthic Impacts Tool User manual. Having a shared model that others can use and adapt is very useful, ensuring there is commonality within different groups means lessons learned are more transferable and examples easier to follow.

3.3 Project Partners

JNCC acted as Project Co-ordinator for the work, which provided a consistent point of contact for project logistics and reporting. The Project Partners all worked well together with commitment to the project throughout. Productive meetings ensured project outputs were well thought through, captured all points of view and were presented in an informative and engaging manner.

As part of the application process, an in-depth technical specification was developed with well mapped project work packages. This was useful as a project planning reference throughout the project and was helpful for all partners to ensure that deliverables were well planned and remained on track. Realistic planning at the start of the project, and through each work package was a key to the success of this project; ensuring that all partners were on the same page and progressing towards a definitive goal.

4 Project Limitations

Overcoming the following limitations and other theoretical limitations were discussed with stakeholders over the course of the project and those discussions and lessons learnt have informed the production of guidance documents for the MPA Fisheries Management Toolkit. Components of the MPA Fisheries Management Toolkit such as Stakeholder Engagement provide some detail on how to avoid issues such as those described below.

4.1 Managing expectations

One of the main limitations of the project was our ability to manage expectations effectively at the outset of the work. As this project was set up to explore participatory processes to design proposals for fisheries management in offshore MPAs, some stakeholders thought that discussions would include existing management proposals which were in fact outside the scope. This resulted in reticence from some sectors to get involved in the work. Throughout the process the project team spent time addressing any pre-conceived ideas and clarified the main aims of the project in introducing each workshop.

The inability of the project to conduct a real-life pilot study to review and change/adapt existing management in the offshore was a limitation in testing how the process would work in reality. In only using theoretical discussions to base a management framework it is possible to miss out on key lessons that can only be learned in running a true process. Because the work was theoretical it was harder to get fishers engaged and involved. Also, some of the hypothetical scenarios tested with the Benthic Impacts Tool were not considered to be feasible options in reality.

Although the fishing industry was represented, some individual fishers disengaged from the process as they did not believe that they could influence management decisions. Although this project has highlighted these concerns and given some guidance on how a shared understanding, effective communication and expectation management can tackle this issue, it has not addressed a feeling of disenfranchisement and effort is needed to build this trust.

Communication is integral to a participatory approach, however, using a common language to suit all is challenging. The use of technical language, necessary for transparency of reasoning in some sectors is hard to access by other sectors. For example, the language used in providing conservation advice and outputs from models such as the Benthic Impacts Tool can be different and difficult for non-specialists to understand.

4.2 Stakeholder engagement

For each of the workshops, we encouraged as diverse attendance as possible from the various stakeholder groups participating in the project. Unfortunately, it is not possible to guarantee an even mix of attendees at each workshop. Some feedback from participants was that the majority of attendees at the workshops had a more scientific background and therefore tended to use language and arguments which others were unable to engage with. As a consequence, representatives from the industry felt at a disadvantage. This was compounded by the greater presence of environmental NGO representatives and regulators compared to fishers.

Resource is always a limiting factor within any project. Finding a suitable time for the majority of participants to commit a full day to a workshop is challenging. Although workshop outputs were published on the project webpage and disseminated to those who could not attend in person, it is difficult to absorb the information without the full context. The project outcomes were therefore limited to the feedback of those who could attend and there remains a risk that views and opinions of potential users for the MPA Management Toolkit were not adequately captured.

5 Lessons Learnt

5.1 The participatory process

A participatory process is easier to deal with in smaller communities / areas. When this is extended regionally / nationally / internationally, it becomes more challenging to provide the 'personal touch' and introduces additional logistical complexities. Discussions should be broken down into smaller groups to be effective and to achieve a working feedback mechanism so that those who have spent time contributing to the process are aware of how their input has been taken onboard.

Initially, there was less involvement from NGOs as they perceived the project to be focussing more on adaptive risk management, however the element of social science / participation was considered to be missing from the subtext of the project briefing. A key lesson learnt here is to ensure project briefings (and invitations for collaborations / contributions from stakeholders) are clear and concise with no potential for misinterpretation. This stems from accurate planning and ensuring the key objectives of the study are clearly laid out at the concept phase of the work.

5.2 Balancing points of view

Despite entrenched differences between stakeholders, the willingness and commitment of all to participate was key in finding common ground within this project. When there is a need for a solution to be found people will spare the time to get involved. The difficulty comes in sustaining that level of engagement, especially when discussions become reflective. Involving external facilitators helps break out of circular discussions.

Lessons from this project are applicable in considering when to engage and which methods to use in developing and sustaining participatory approaches. These could have resulted in a better outcome for projects such as the Dogger Bank Steering Group where participants were underprepared for discussions due to an insufficient evidence base. The Benthic Impacts Tool would also have improved discussions within the Dogger bank Steering Group.

5.3 Flexibility and future proofing discussions

Legislation and the driving purpose of MPA Management discussions can be impacted by policy changes; the focus is not solely on the evidence base and reducing uncertainty but also about adapting to changes in policy.

In general, an improved understanding is required of the social impacts of management to facilitate productive discussions. The MPA Fisheries Management Toolkit will help regulators to understand how and when to engage stakeholders. The Toolkit provides a framework to deliver an effective process for reviewing management and establishing mechanisms for all parties to bring information to the decision-making table, building capacity within the industry to contribute to the management process.

5.4 Communication and resources

A common limitation in these types of projects is how to get the discussions closer to the quayside and the relevant communities affected. Dissemination of information needs to be targeted to ensure that key stakeholders and potential users are not missed out. As opposed to a scattergun approach to publishing information, targeted updates to key groups is essential to ensure the legacy of the work. Champions and ambassadors of groups of stakeholders can be useful to ensure a high level of information reaches the relevant individuals.

Through existing forums (e.g. Coastal Futures, SeaFish, MASTS, Association of IFCA MPA Conference) this project has focussed its awareness-raising and ensured relevant information is included in topical discussions.

Time and financial resources are important to plan for when considering the transferability of products to facilitate recycling of information in the future. We created summary posters for the MPA Management Toolkit which could be used as handouts in other projects. A balance is needed to provide concise yet informative summaries with links to the detail for those who wish to know more about the technicalities of the steps involved. We addressed this through combining the toolkit into one accessible document, providing the summary of each component on the web page to explain to readers what each component contained, the key audience and how and when this would be used.

5.5 **Project Reporting**

All financial reporting submissions were met on time. It is advised to remain organised and plan ahead for finance deadlines to ensure all invoices are submitted on time. Delays to the payment process were incurred due to claim submissions being audited. It is advised that at the start of the project, a kick-off meeting is held with the funders to ensure exactly what is covered in the claims is clearly defined and understood by all parties. The submission deadlines were provided, however the payment process and schedule were not provided. This resulted in some delays of up to 10 months from claim submission to payment.

6 Recommendations for future processes

The litmus test of this project will be if the products are actually put into practice. The project has produced a series of educational materials for users to ensure that the legacy of the project experiences and learning continues beyond the end of the project into future MPA management review processes. These materials have been targeted at stakeholders that may be involved in management planning and management review processes in other geographical locations. They will be delivered in an accessible manner using a variety of tools including short videos, webinars, social media and printed material, and will form part of the MPA Fisheries Management Toolkit. Each component of the MPA Fisheries Management Toolkit highlights who the information is most relevant for, for example regulators and/or stakeholders.

There is a need to be **realistic and manage expectations** on how the approaches trialled in this project may be incorporated into future processes recognising that participatory approaches place financial and human resource demands on managers as well as stakeholders. Ultimately, as the competent bodies for implementing management, it is the decision of the regulator to decide how MPA management discussions will progress, who will be involved and to what extent. There is an appetite from policy makers and regulators to consider participatory approaches to management due to the recognised potential benefits of delivering greater buy-in for potential measures, however, as participation levels increase so too do financial, time and resource commitments which are challenging and complex to effectively manage.

The communication aspect of participatory approaches was frequently highlighted as the key element of successful engagement. Having a transparent and easily understandable approach is key to making discussions more accessible. Frequently in any management process (including MPA Management) there will be a perception (and a reality) that there are both winners and losers, so it is imperative to manage the expectations of all participants and to ensure balance in discussions. Failure to do this can result in stakeholders developing unrealistic expectations of how they can influence decisions, with the result that they feel disappointed with the process and do not buy into the outcomes.

One of the recommendations from this project would be to establish a **real-world trial.** There are risks involved in progressing a project from the thinking to the doing, which can create reluctance to engage in hypothetical pilot studies. The next phase would enable regulators to test how participation of stakeholders might work in reality. Equally real-life trials can help provide evidence to assess the trade-offs between greater participation and availability of resources.

One of the main motives for this project was to develop a participatory process for MPAs where there is a high level of scientific uncertainty around the impact of fishing (typically broad-scale sedimentary habitats) in order to build consensus around management measures. However, developing a working process for participatory management has been the end goal, and the pilot study should attempt to establish a working process and establish buy-in from stakeholders in the first instance. It was suggested by stakeholders that for an effective pilot study, it would be helpful to start at a middle ground, for example using intertidal case studies where there is more certainty in evidence related to ecological variables (such as habitat location and extent), smaller communities of relevant stakeholders and established participatory processes and techniques. The scale involved, particularly in relation to monitoring, and the pre-existence of good working relationships will make the process easier to evaluate before taking on larger sites with greater uncertainties. Such a pilot could lay the groundwork for discussions around uncertainty of fishing impacts on sedimentary habitats. The next step would then use the process developed in the smaller pilot and apply it to a more complex offshore site.

Accessibility is a key issue for engagement. Discussions need to be **closer to the quayside**. Attention needs to be given to how to achieve this. It could be through remote forums such as

social media or establishing a proactive feedback mechanism for small local groups to feed into larger discussions. There is motivation from stakeholders to progress the work of this project closer to the quayside however it would be challenging to implement due to associated costs and resource restrictions.

A **well-managed change log** is recommended for all management discussions, and for these to be made freely available to ensure there is a wider communication of the discussions and resulting decisions that have taken place. This would reduce common misunderstandings and repetitive discussions which can lead to stakeholder disengagement.

Management plans are included in the site information centres for each marine protected area; however it is felt that these are not always up to date or include the level of detail needed to explain current status of management in MPAs.

Highlighted throughout the project, the Benthic Impacts Tool is just one model that has been developed to aid management discussions and there are many more available, at varying stages of development. A useful future work area would be to **review and collate the various models**, highlighting the uses and technical specifications of each model / tool and progress this thinking into potentially **combining various models** into a 'super-tool' or tool repository for use by regulators. This would ensure consistency of approaches and create a broader understanding of outputs. For the Benthic Impacts Tool and other similar models to be most useful, there is a need to **quantify other elements essential to management discussions such as conservation objectives.**

There are also a number of ways which were discussed in the workshops to enhance the ecological model. For example:

- Move towards a more **ecosystem-based approach**, include food-web / ecosystem functions into the model
- Build more of a **proportionate response** / detail into the displacement of fishing activity into the model. For example, displacement of activity from one MPA may have effects on neighbouring MPAs, so these should be considered in the model
- Make better use of **alternative data sources** from industry and the public
- Refinement of the tool to allow **site specific flexibility**
- Undertake **ground-truthing surveys** to verify the predicted outputs from the tool.

As with any tool, there are limitations and caveats associated with the Benthic Impacts Tool, and these have been outlined in the Benthic Impacts Tool user manual along with information on application of the tool. Better provision of supporting data from monitoring and directly from stakeholders would help strengthen the evidence base, improving the tool's accuracy and application.

The participatory approach developed through this project has been well received and a final recommendation would be to look **how this approach is transferable to incorporate other industries / human activities which impact MPAs**. The underlying core principles of stakeholder engagement would remain the same, however a further bit of work would be to review and summarise the key legislative drivers behind management of other industries. The guidelines presented in the MPA Management Toolkit could be used to base national standards for MPA Management.

Summary of Recommendations

- Be realistic and manage expectations
- Establish a real-world trial
- Get discussions closer to the quayside
- Use a well-managed change log for management discussions
- Review and collate available models to assess common ground and possibility of combining complimentary tools
- Quantify other elements essential to management discussions- particularly conservation objectives
- Recommendations for future ecological models
    - Use an ecosystem based approach
    - Enable more of a proportionate response
    - Make better use of alternative data sources
    - Increase capacity for site specific flexibility
    - Undertake ground-truthing surveys
- Transfer approach to incorporate other activities impacting MPAs
    - Review & summarise key legislative drivers behind management of other activities
    - Use MPA Fisheries Management Toolkit to base national standards for MPA management

7 References

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