

MPA Fisheries Management Toolkit



MPA Fisheries Management Toolkit

1 Introduction

The seas around the UK are home to some of the most biologically diverse habitats and species in Europe. They are a rich source of natural capital, providing us with food, a valuable 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 for future generations, while seeking to enable the sustainable use of resources.

JNCC and partners the Marine Management Organisation, Natural England, the National Federation of Fishermen's Organisations and Bangor University have explored participatory processes for establishing, evaluating and adapting fisheries management measures in MPAs that include sedimentary habitats as protected features as part of an EMFF funded project '[Developing a participatory approach to the management of fishing activity in UK offshore Marine Protected Areas \(MPAs\)](#)'. The content of this toolkit has been developed through the work of this project. Details of the project including the process followed, lessons learnt and recommendations for future work can be found in the [project report](#), available on the webpage.

The project focussed on offshore waters around England, however, components of the toolkit are readily transferable and could be used to inform adaptive management projects and co-design approaches to fisheries management throughout UK waters.

The aim of this toolkit is to provide a resource for those involved in, and affected by, fisheries management decision-making, laying out the key elements to consider in establishing a participatory approach to implementing management in MPAs. The toolkit addresses the rationale for management as well as providing a framework for effective stakeholder engagement and governance. By creating a discrete information resource for each stage in the process, it aims to support the building of capacity within the fishing industry to contribute to the management process.

A variety of stakeholder experience was drawn on to identify what would be useful to include in the toolkit. The graphic below presents the key components identified and the table of contents provides a summary and links to the various sections within each component, detailing the target audience and when the information could be used.

The toolkit has also been designed as a guide to help regulators assess the suitability of establishing a participatory approach, including governance structure, stakeholder balance, management objectives, cost and logistics. Each section within a component of the toolkit comes complete with a standalone summary poster to provide key information at a glance. This is designed to help users take away the key messages. Equally, to enable each toolkit component to be accessed independently, all material referenced is listed at the end of each individual section. Relevant links between sections / components of the toolkit are provided to reduce repetition within the document. A Glossary of Terms is provided in the supporting material to explain acronyms and provide a common understanding of terms used.

MPA Fisheries Management Toolkit



Toolkit Component	Description	Target Audience	Application Phase
Driving Purpose	Adaptive Risk Management in the context of Marine Protected Areas	Stakeholders and regulators	Project Start-up
	MPA Legislation Summary		
Roles and Responsibilities	MPA Management: Roles and Responsibilities	Stakeholders and regulators	Project Start-up
	Guidance on High-Level Governance Options		
Stakeholder Engagement	A guide to good practice in developing active stakeholder participation in MPA management	Stakeholders and regulators	Project Start-up
Logistics	A guide to the logistics of a participatory approach	Regulators	Project Development
Data and Evidence	Data and Evidence Recommendations	Stakeholders and regulators	Project Implementation
Decision Making	An assessment of Triggers and Thresholds as Indicators for Management Review	Regulators	Project Implementation
	A review of the process of Fisheries Management Decision making		
Supporting material	Flow Charts for implementation of management and byelaws in English waters	Stakeholders and regulators	Project Implementation
	Case Studies		Project Implementation
	Glossary of Terms		All stages of a project

Driving Purpose



Driving Purpose

Adaptive Risk Management in the context of Marine Protected Areas

The marine environment is a valuable resource, integral to our economy and our way of life. Marine Protected Areas (MPAs) are increasingly being used as a management tool to protect this environment and by extension, the services it provides.

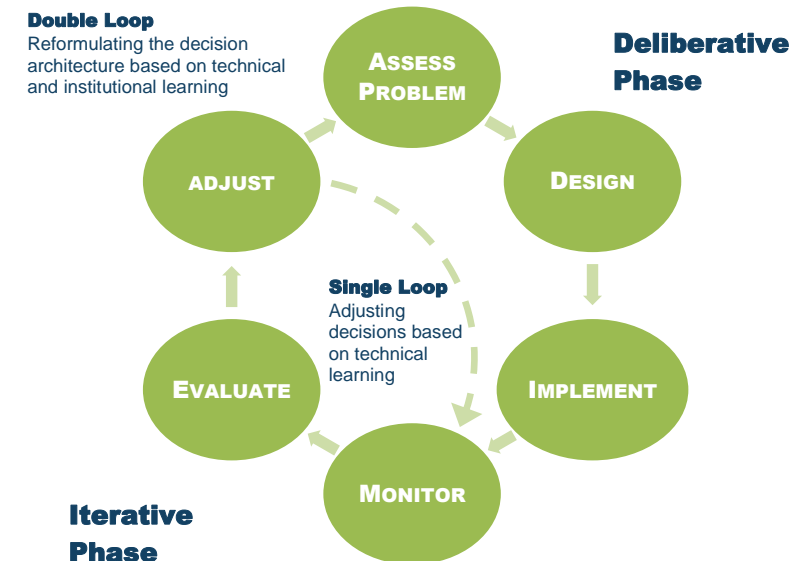
However, the marine environment is a dynamic, frequently data poor, space and there can be substantial uncertainties in the evidence base underpinning the management of sites necessary to achieve the conservation objectives.

There is considerable uncertainty relating to the condition and extent of some MPA features and the impacts of fishing on features can be poorly understood. This is particularly the case for sedimentary habitats, which also represent the areas of highest fishing activity in the UK. Equally, despite fishing being a dynamic activity, assessments of fishing activities to support management are often static. Knowledge of trends and patterns of fishing activity and how they change over time can be critical in delivering effective management.

For management to be effective, it is important that a process exists to ensure that fisheries advice and management continues to evolve as our understanding of these factors improves.

Adaptive management can loosely be summarised as 'learning by doing'. Adapting fisheries management measures based on learning, can maximise the opportunity to achieve the site conservation objectives while minimising the impact on the fishing industry. This approach incorporates feedback loops which can increase the rate at which new information can aid management decisions and creates a shared understanding among scientists, policymakers, stakeholders and managers.

Adaptive Management Cycle



Adaptive Risk Management - A Review of ARM in the context of Marine Protected Areas

1 Background and Introduction

Our seas and oceans are an integral part of our history, economy and way of life and it is important that we recognise the many benefits of these natural resources and maintain them into the future. Acknowledging this, the UK Government and Devolved Administrations have jointly published the UK Marine Policy Statement¹ of a shared UK vision for clean, healthy, productive and biologically diverse seas and oceans.

To secure this vision, Defra's 25-year plan² states that in Secretary of State (SoS) waters³ they will “*achieve good environmental status⁴ of our seas while allowing marine industries to thrive...*”, establishing an “*ecologically coherent network of well-managed marine protected areas (MPAs)*” as one tool which can help to achieve this. The plan also highlights Defra's ambition for more collaborative management by “*joining forces with local stakeholders to find the most appropriate ways of drawing down the riches of the sea in a sustainable way*”. In 2017, the independent Barber Review⁵ to Treasury highlighted the benefits of engaging service or resource users (such as sea users) in delivering management outcomes and demonstrated that neglecting to do so can frustrate the process, making successful delivery of outcomes challenging.

In 2013, Defra introduced the Revised Approach⁶, a structured approach for the assessment and management of fishing activities in European Marine Sites (EMS) and laterally, Marine Conservation Zones to ensure compliance with Article 6 of the EU Habitats Directive and the Marine and Coastal Access Act 2009 (MCAA). Adaptive Risk Management (ARM) builds on structured, evidence-based management approaches in order to enable managers to assess the ongoing suitability and effectiveness of management measures in light of new and changing evidence. From a fisheries perspective, this includes changes in fishing patterns as well as changes in our understanding of how fishing impacts on the marine environment as well as an improved understanding of the natural processes influencing habitat condition.

The end goal of MPA management is delivery of effective, legally compliant measures which meet the conservation objectives set for the site and ensures that the network of MPAs is well managed and achieving their goals and objectives.

¹ Available at: <https://www.gov.uk/government/news/uk-marine-policy-statement-published>

² Available at: <https://www.gov.uk/government/publications/25-year-environment-plan>

³ English inshore and offshore waters and Northern Ireland offshore waters.

⁴ Information on the Marine Strategy Framework is available here:

http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm

⁵ Available at: <https://www.gov.uk/government/publications/delivering-better-outcomes-for-citizens-practical-steps-for-unlocking-public-value>

⁶ Revised Approach to the management of Commercial Fisheries in European Marine Sites (EMS). Available at: <https://www.gov.uk/government/publications/revised-approach-to-the-management-of-commercial-fisheries-in-european-marine-sites-overarching-policy-and-delivery>

2 Uncertainty and MPA Management

Consideration of risk and uncertainty are often key factors in management decision making (further discussed in the [Fisheries Management Decision Making](#) section of this toolkit). Uncertainty presents a challenge due to the difficulty in accurately determining ecosystem states and predicting the outcomes of management actions (Prato, 2006).

In the marine environment, uncertainty about the ecological impact of human activities may exist for several reasons. Experience from the UK has identified the following common sources of uncertainty:

- Information on the protected features: Information on feature extent and distribution can be limited as offshore surveys and habitat mapping is resource intensive. Modelled and predictive maps are key resources, but they are static representations of an often-dynamic environment, where features can move around, and need to be regularly updated and refined to reflect changes in our understanding of feature extent and distribution.
- Information on activities: Lack of information on the spatial distribution and intensity of an activity is a large contributor to uncertainty.
- Pressure-State information: Information and understanding of the interaction between features and gear types and the associated impacts on features can vary.
- Gaps in data: Gaps in data and other evidence can also hinder the decision-making process. Identifying if features are progressing towards achieving their conservation objectives can be a large cause of uncertainty where this is dependent on incomplete information on feature sensitivities and condition from monitoring.

As an ongoing and evolving activity, the impacts of fishing on the achievement of MPA conservation objectives is a source of uncertainty for many sites. For sedimentary habitats, the relationship between fishing pressure and feature condition is often uncertain; although gears may often be considered to have a low unit impact⁷, they may generate a significant impact depending upon the level and distribution of effort taking place across the protected feature(s). These habitats are often also economically important areas for both licensed and unlicensed activities and have significant ecological value for their ecosystem service provision and multiple European and national MPAs have been designated for a range of sedimentary habitats to ensure their protection.

This section of the Driving Purpose component in the MPA Fisheries Management Toolkit explains the ARM approach and its relevance in SoS waters in relation to the assessment and management of fishing activities within MPAs.

⁷ the instantaneous impact implied by contact between a fishing gear and conservation feature at a single point in time.

3 What is Adaptive Risk Management?

Successful management in a dynamic marine environment must evaluate uncertainty associated with determining ecosystem states and predicting the outcomes of management plans based upon a systematic analysis of impacts associated with human activities so that management is proportionate and non-discriminatory but sufficiently precautionary. Within this framework, adaptive risk management offers a rigorous and intensive process to develop, trial or test multiple effective management options (Walters & Hilborn, 1978; Cook *et al.*, 2016).

Adaptive management aims to manage changes in uncertainty over time. As uncertainty is reduced, measures can be *adapted* to achieve better conservation outcomes and maximise sustainable use. There are various reasons why management in MPAs might need to be adapted due to a change in uncertainty, including (but not limited to) the following:

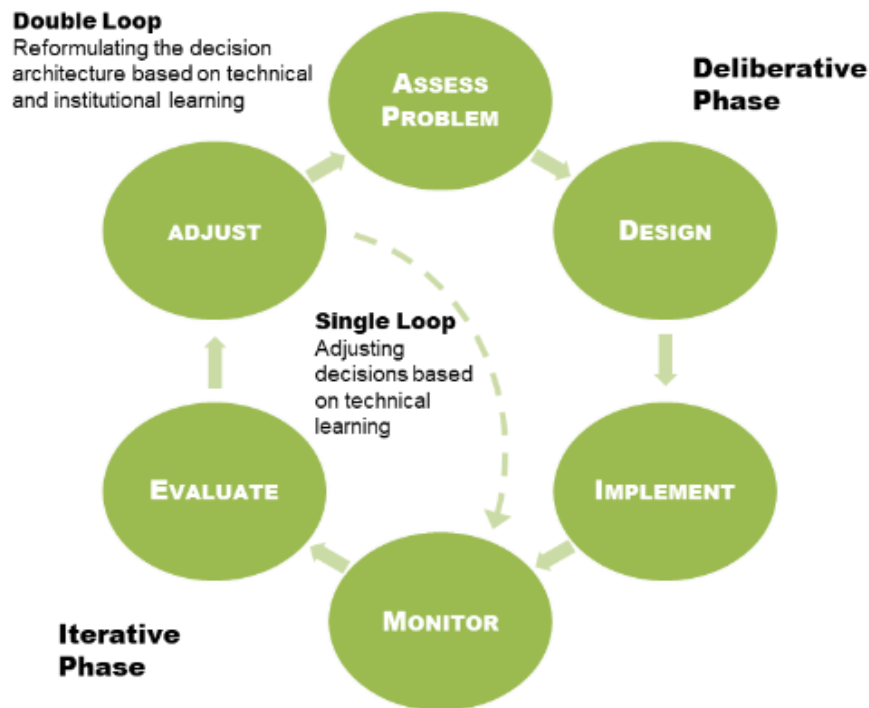
- New information on feature extent/distribution;
- New information on level/type of activity occurring;
- New information on feature condition evidence (e.g. from site monitoring surveys) or wider evidence relating to fisheries impacts (e.g. scientific literature)

Adaptive management provides a framework to support the planning of management interventions as well as routine MPA monitoring and review. The United States Department for the Interior⁸, has described adaptive management as “*exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions. Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable resource systems.*”

This may be understood as a cycle with a double-loop (*Driving Purpose Figure 1*; Williams & Brown (2014, 2018)), including the decision-making architecture (deliberative phase) and system response to management (iterative phase). The deliberative phase is a planning phase in which the critical components of adaptive decision-making are formulated, whilst the iterative phase uses these elements in an ongoing cycle of learning. Uncertainty can be present in both the deliberative phase (initial planning of management) and the iterative phase (reviewing over time). As the MPA management cycle incorporates a decision-making process at each stage where information is presented and assessed, there is the opportunity to adapt management based on how it is performing. The potential exists to introduce information at any of the key points in the cycle.

⁸ [Adaptive Management Applications Guide](#) - April 2012 (US Department of the Interior)

Adaptive Management Cycle



Driving Purpose Figure 1: Steps in adaptive resource management (adapted from Williams & Brown, 2018)

Adaptive management is a process of 'learning by doing'. Williams & Brown (2018) state that "Adaptive management addresses uncertainty about the processes influencing resource dynamics, as well as the elements of decision making itself". It is therefore an approach to ensure that any changes in our understanding can be fed back into the decision-making process. The approach can increase the rate at which acquired knowledge aids management decisions, promoting a shared understanding among scientists, policy-makers, stakeholders and managers (Holling, 1978; Prato, 2006, 2008).

Adaptive management provides a proportionate mechanism for managing risks posed by a fishery, entailing a process of monitoring, reviewing and feedback into management decision making. This should be linked to wider statutory obligations to assess the conservation status of sites and any measures should be based on the extent of risk to achievement of the conservation objectives.

Managers in England have frequently proposed an adaptive "zonal" approach to management of fisheries on sedimentary features within MPAs in Secretary of State waters. This has been based on prevailing evidence regarding the impacts of fishing activities on sedimentary features and reflects the uncertainty regarding the extent of risk. Delineating zones strikes a balance between minimising risk to achieving the site's conservation objectives whilst not disproportionately impacting the fishing industry where the evidence of impacts is uncertain. In most instances a clear monitoring and review plan is in place to assess the effectiveness of such measures.

4 Stakeholder Participation in Adaptive Risk Management

As ARM provides an approach for managing evidence in order to inform and justify management decisions, it provides a means for providing confidence to stakeholders that their interests are being appropriately accounted for. Therefore, participation in decision-making associated with ARM is often desirable to help build trust-based relationships with stakeholders, promoting stewardship and a shared understanding among sea users. It also provides a means to enable stakeholders to become more involved in the provision of evidence.

Guidance on Developing Active Stakeholder Participation in MPA management is available in the [Stakeholder Engagement](#) component of this toolkit to support participatory approaches to adaptive management.

5 Implementing Adaptive Risk Management

The following precautions have been identified for the effective application of adaptive fisheries management and endorsed by the Defra Fisheries in MPA project board in 2015:

- Management measures must be appropriate with respect to the scale of risk posed to the feature's conservation objective. Decisions about the nature, scale, timing, duration and location of measures to be introduced should aim to prevent deterioration or significant disturbance, where it is thought that these are occurring.
- Management zones should be identified to ensure that they contribute to the delivery of the conservation objectives. In the absence of detailed information on the biotopes present the management zones should cover, as far as practicable:-
 - (i) the range of habitat types of the designated features that occur within the site;
 - (ii) cover the geographic spread of the habitat within the site;
 - (iii) where possible, include large areas of continuous feature rather than smaller, fragmented areas; and
 - (iv) ensure that closures cover a range of differing fishing intensity of those gear types considered to be likely to cause deterioration within the site.
- The ability to monitor and detect change must be considered when proposing adaptive measures. Any monitoring programme should be capable of delivering evidence of sufficient scientific quality to underpin decisions on the setting of conservation objectives or advice on management measures – if it is not, or if funding is unavailable, a more precautionary management approach should be considered. It may be possible to transfer experiences from monitoring one site to other sites with similar habitats, conservation objectives and management measures. Regulators should work collaboratively to ensure that evidence is shared and accessible to other partner organisations. It is unlikely that the current condition monitoring to be undertaken by JNCC and Natural England will meet the monitoring requirements for adaptive management. EU funding streams could be considered to assist with the implementation of the adaptive management approach.
- As far as possible, measures should be designed in a transparent and inclusive manner and allow engagement in the design process from a range of organisations.

- It is recommended that there should be an ongoing programme of research to determine fisheries feature impacts, combining the monitoring evidence with experiments such that decisions about changing measures through adaptation are not only made on a site by site basis.

Fisheries managers, scientific advisors and stakeholders all have a role in the MPA management process. At the start of planning for management interventions or reviewing them, it is important to consider:

- Who needs to participate in decision-making, what is their role/remit, and what steps are important to wider stakeholder participation?
- What information is required and in what format, to make decisions regarding management?
- How do the parties bring their information into the decision-making process?
- Where does uncertainty impact and/or impede the process, and is there any mitigation available?
- How do we embed a truly collaborative approach/mind set between stakeholders?

Answering these questions forms part of the deliberative phase for developing a framework and associated guidance for adaptive management. To support this, guidance on [Roles and Responsibilities](#), [Stakeholder Engagement](#), [Data and Evidence Needs and Requirements](#), and [Fisheries Management Decision Making](#) are available in other components of this toolkit to support developing participatory approaches to adaptive management.

6 References

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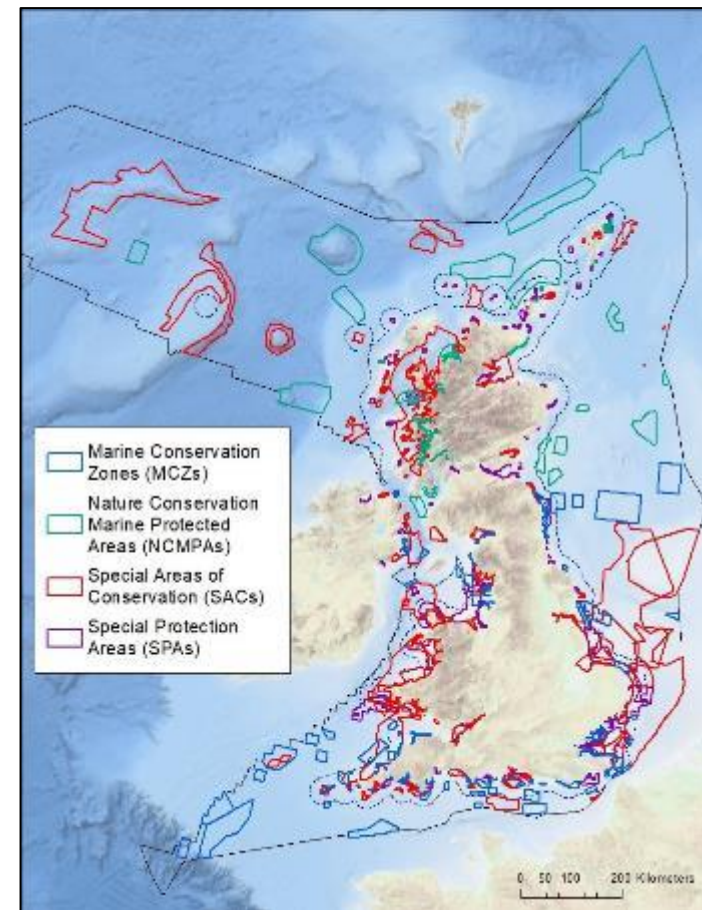
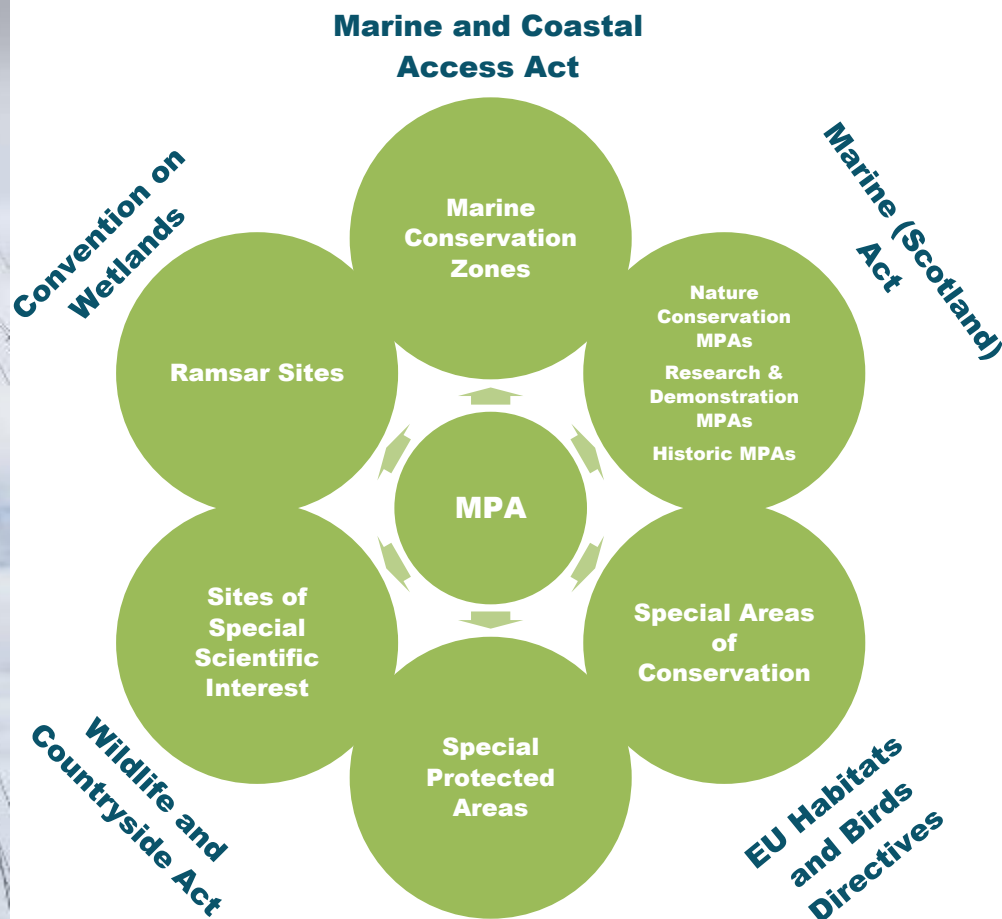
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Driving Purpose

MPA Legislation Summary

Our seas are home to some of the most biologically diverse habitats and species in Europe. Marine Protected Areas (MPAs) can help us to protect the marine environment, whilst also enabling its sustainable use, ensuring it remains healthy in the future. The UK is committed to making its contribution to a well-managed network of MPAs in the North-east Atlantic region and there are a range of domestic and international legal and policy commitments underpinning this.



There are multiple legislative instruments which contribute to the UK's MPA network of over 200 MPAs (Image 2020)

UK MPA Legislation Summary

UK Marine Protected Area	Location	Legislation				Management	
		National	International	Inshore	Offshore	Inshore	Offshore
Marine Conservation Zone (MCZ)	England, Wales & Northern Ireland	✓		Marine and Coastal Access Act 2009 & Marine Act (Northern Ireland) 2013		In England, the IFCAs (0-6nm) and the MMO (6-12 nm) are responsible for management and can introduce measures (e.g. Byelaws) to manage fishing activity where appropriate. Such measures would be developed following individual site assessments and subsequent stakeholder engagement. In Wales, the Welsh Government manage using Orders for Protection and in Northern Ireland DAERA manages through Byelaws.	Currently*, management in offshore sites (12-200nm) is agreed by EU Member States following Article 18 of the EU Common Fisheries Policy (CFP). Management of these sites is lead by the MMO (England), Marine Scotland (Scotland), Welsh Government (Wales) and DAERA (Northern Ireland).
Nature Conservation MPA (NCMPA)	Scotland	✓		Marine (Scotland) Act 2010	Marine and Coastal Access Act 2009	Marine Scotland are the lead authority regarding the implementation of, and compliance with, any measures to manage fishing activity. Management of these sites is through Marine Conservation Orders.	
Special Area of Conservation (SAC)	UK		✓	EU Habitats Directive		In England, IFCAs manage within 0-6nm and the MMO manages within 6-200 nm. In Wales the Welsh Government manage through Orders for Protection. In Northern Ireland DAERA manage through byelaws and in Scotland, Marine Scotland manage through Marine Conservation Orders.	
Special Protected Area (SPA)	UK		✓	EU Birds Directive			
Site of Special Scientific Interest (SSSI)	UK	✓		Wildlife and Countryside Act 1981	N/A	In England, IFCAs manage. In Wales, the Welsh Government manage, in Northern Ireland DAERA manage and in Scotland, Marine Scotland manage.	
Ramsar Site	UK		✓	Ramsar Convention	N/A		

MPA Legislation Summary

A Marine Protected Area (MPA) is defined by the IUCN as a “*clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*”. The UK is committed to making its contribution to a well-managed network of MPAs in the North-east Atlantic.

Multiple legislative instruments have been used to contribute to the UK’s MPA network of over 200 sites. These sites vary in size, location and purpose and different types of MPA can spatially overlap.

1 Legal Frameworks for Marine Protected Areas

The legal mechanism for Government(s) to designated MPAs (at the time of printing – March 2020) are:

1.1 European legislation

Directives are statutory instruments adopted by the European Union that bind all Member States. They are binding as to the results to be achieved but give flexibility to Member States over the means used to achieve those results. In relation to wildlife and nature conservation, the key directive which provides for the protection of animal and plant species of European importance and the habitats which support them, applicable to UK offshore waters, is [Directive 92/43/EEC](#) of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. This Directive is transposed into UK law as the ‘[Habitats Regulations](#)’ and enables the establishment of a network of protected sites, called the [Natura 2000 network](#). [Special Areas of Conservation \(SACs\)](#) and [Special Protection Areas \(SPAs\)](#) are designated under the transposed EC Habitats Directive for habitats and species listed in Annex I and II of the Directive. SACs with marine components are sites that contain [qualifying marine habitats or species](#).

1.2 National legislation

The [Marine and Coastal Access Act 2009](#) (MCAA) gained Royal Assent on 12th November 2009 and provides the legal mechanism to help ensure clean, healthy, safe, productive and biologically diverse oceans and seas by putting in place a new system for improved management and protection of the marine and coastal environment. The Marine Act, which mainly applies to England and Wales, comprises eight key elements, including powers which enable the designation of [MCZs](#) in the territorial waters adjacent to England and Wales and UK offshore waters. The Act created both the Marine Management Organisation (MMO) and Inshore Fisheries and Conservation Authorities (IFCAs), granting powers to these organisations in relation to the implementation of, and compliance with, any fisheries management measures. Equivalent legislation is in place for Scotland and Northern Ireland. In Scotland, the [Marine \(Scotland\) Act 2010](#) and the [Marine and Coastal Access Act 2009](#) grant Scottish Ministers (via Marine Scotland) with powers to designate and manage Nature Conservation MPAs ([NCMPAs](#)). Northern Ireland (via DAERA) are granted powers to designate and manage MCZs through the [Marine Act \(Northern Ireland\) 2013](#).

Roles and Responsibilities



Roles and Responsibilities

MPA Management: Formal Roles and Responsibilities in English waters



Department
for Environment
Food & Rural Affairs

Defra

In English waters, the Department for Environment, Food and Rural Affairs (Defra) is the government department responsible for marine environmental protection and fisheries.



Marine
Management
Organisation

Marine Management Organisation

The MMO are the lead domestic regulator regarding any implementation and compliance with fisheries measures within 6-200nm.

Inshore Fisheries and Conservation Authorities

The Marine and Coastal Access Act (2009) places a clear duty on IFCAs to sustainably manage sea fisheries resource and protect marine ecosystems in their Districts.



Joint Nature Conservation Committee (JNCC) has the responsibility for the provision of nature conservation advice in the offshore area (12 – 200nm). JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.



Natural England (NE) is the government's statutory advisor on nature conservation in English waters out to 12nm. Regulators are required to seek the advice of NE regarding the achievement of MPA conservation objectives and how any impacts may be mitigated.



MPA Management: Formal Roles and Responsibilities in English waters

Government and Fisheries Regulators are the competent authorities responsible for managing fishing in Marine Protected Areas (MPAs). The competent authorities are obliged to ensure that activities which could adversely affect the conservation objectives for the MPAs are managed in a manner that ensures compliance with the law. The approach and responsibility for conservation and management in English waters varies depending upon location, driven by differences in legislation and the competent authorities responsible for management.

1 Department for Environment, Food and Rural Affairs (Defra)

Defra is the government department responsible for marine environmental protection, and fisheries in English waters. The Secretary of State is responsible for confirming and revoking byelaws and initiating hearings.⁹

2 Marine Management Organisation (MMO)

The MMO is an executive non-departmental public body, sponsored by Defra, created by the Marine and Coastal Access Act (MCAA). The MMO acts as the marine planning authority on behalf of UK Government, delivering marine functions in English territorial waters and UK offshore waters (for matters that are not devolved) such as marine licensing and enforcement of marine legislation. The MMO is responsible for regulating most activities and enforcing sea fisheries regulations, nature conservation measures and licensing legislation.

3 Inshore Fisheries and Conservation Authorities (IFCAs)

The IFCAs were created under the Marine and Coastal Access Act (MCAA), reflecting a greater responsibility for conservation of the marine environment in conjunction with fisheries management and enforcement duties in England. Their purpose is to lead, champion and manage a sustainable marine environment and inshore fisheries, by successfully securing the right balance between social, environmental and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry. IFCAs are either committees or joint committees of the local authorities that fall within an IFCA district. There are a total of 10 IFCAs. They are tasked with the sustainable management of inshore sea fisheries resources in their local area. They are made up of representatives from the constituent local authorities (who provide funding for the IFCA), along with people from across the different sectors that use or are knowledgeable about the inshore marine area, such as commercial and recreational fishermen, environmental groups and marine researchers, who offer their time voluntarily.

Sections 155 of the MCAA gives IFCAs the provisions for the creation of byelaws. Section 156 of the 2009 Act sets out a non-exhaustive list of the types of activities for which IFCAs may make byelaws (including emergency byelaws) to manage sea fisheries resources in their district. Provisions that may be made by a byelaw include prohibiting or restricting the

⁹ Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/182343/ifca-byelaw-guidance.pdf

exploitation of sea fisheries: (a) in specified areas or during specified periods; (b) limiting the amount of sea fisheries resources a person or vessel may take in a specified period.

4 Statutory Nature Conservation Bodies

Statutory nature conservation bodies (SNCBs) provide advice to government and regulators on Conservation Objectives and activities that may impact the achievement of these. Statutory advisers will have the responsibility to update their advice in the light of feedback on existing management success/failure and the evolving evidence base and have a key role in examining the effectiveness of management measures.

4.1 Natural England (NE)

Natural England is the government's statutory adviser on nature conservation out to 12nm in English waters (established through the [Natural Environment and Rural Communities \(NERC\) Act 2006](#)). Both the Habitat regulations and the Marine and Coastal Access Act requires regulators to consult the advice of Natural England regarding how any conservation objectives stated for an MPA may be furthered, or how the achievement of any such objectives may be least hindered, and how any impacts may be mitigated.

4.2 Joint Nature Conservation Committee (JNCC)

JNCC has responsibility for the provision of nature conservation advice in the offshore¹⁰ area. JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation. JNCC is also legally constituted through the Natural Environment and Rural Communities (NERC) Act 2006. In relation to MPA management, JNCC's specific responsibilities for offshore marine nature conservation are set out in the [Conservation of Offshore Marine Habitats and Species Regulations 2017](#), [Offshore Marine Conservation \(Natural Habitats, &c.\) Regulations 2007](#), and the [Marine and Coastal Access Act 2009](#).

¹⁰ 'Offshore' is defined as beyond 12 nautical miles (nm) from the coastline to the extent of the United Kingdom Continental Shelf (UKCS).

Roles and Responsibilities

Guidance on High Level Governance Options

Governance is the process through which decision-making powers and responsibilities are defined and delivered.

Governance approaches can range from highly participatory (e.g. co-management or delegation) to minimal participation (e.g. 'top-down' or 'state-led').

There are several factors to consider when choosing a governance structure, in terms of evidence availability, scale and logistics e.g.

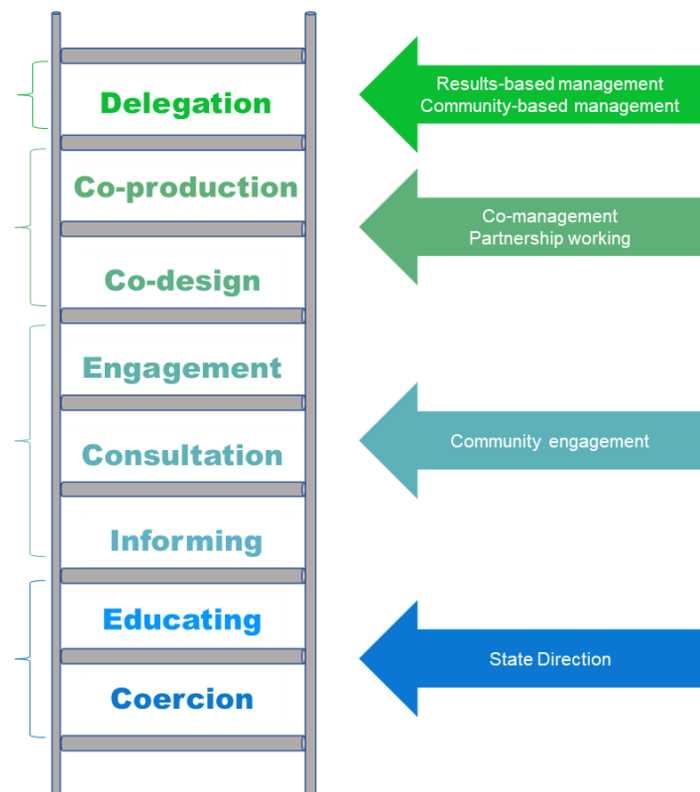
- uncertainty in evidence base
- complexity of the site,
- site condition/site objectives)
- stakeholder variety
- geographical scale
- capacity
- cost
- time
- facilitation options

Delegate doing
Allowing people to lead

Doing with
Equal and reciprocal partnerships

Doing for
Engaging and involving people

Doing to
State led, no engagement



For MPA fisheries management in England, while the regulator retains overall responsibility, there are many ways in which stakeholders can be involved in the decision-making process.

Guidance on High-Level Governance Options

1 Background and Introduction

Governance structures are ways of working which help define roles and responsibilities and support processes to input into management decision making. Although the end decision still remains the legal responsibility of the regulator, participatory governance structures can allow for a more inclusive process in decision making. This can include the provision of activity and ecological evidence and the development of mechanisms to measure management effectiveness. Mechanisms can include providing the framework to adapt management as well as an assessment of the effectiveness of different management tools in achieving desired outcomes. (e.g. achieving the conservation objectives of the MPA). Participatory governance structures can also help promote better understanding of the purpose of MPAs and their benefits to the wider marine environment and also to communities and livelihoods.

It is important to appreciate the difference between governance and management. The management process for MPAs is largely legally defined by statutes such as the Habitats Regulations and Marine and Coastal Access Act¹¹. However, the options for governance in implementing management are typically discretionary. Although the overarching roles of the decision maker (the MMO) and statutory advisers such as JNCC and Natural England are defined within statute, how they operate is less prescriptive.

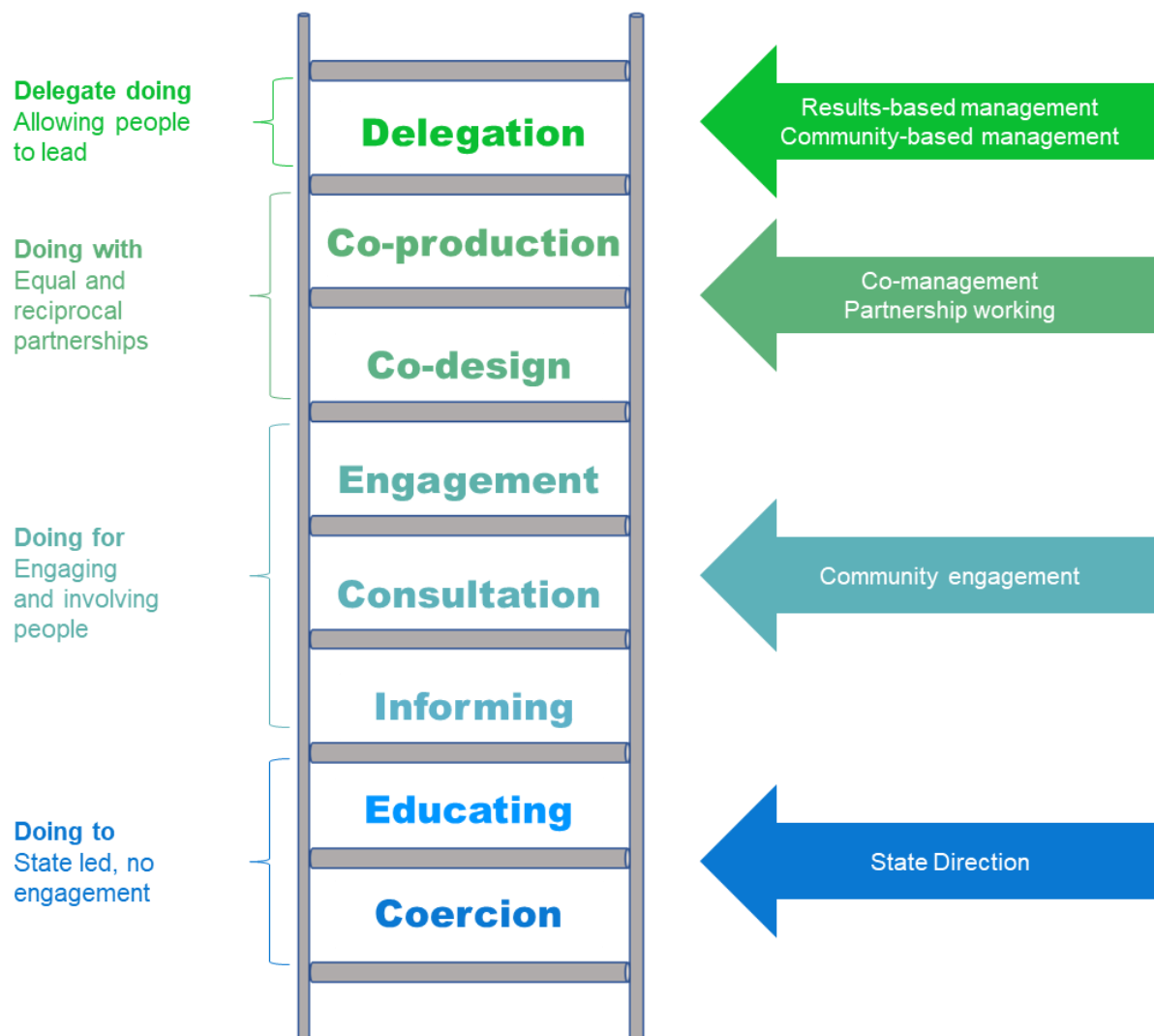
There have been numerous philosophies on governance, which generally tend to focus on an increase in participation in line with a movement away from a 'top-down' or 'state-led' approach. The most effective combination of these approaches will differ for each MPA and will likely depend on several associated factors such as, political will, community involvement, financial status, legislation and the capacity for enforcement.

For effective MPA governance, it is important that the structure created is relevant to each individual MPA to address its specific challenges. Inevitably, the evidence base related to any given MPA and the activities that might affect it will evolve, thus creating the need for management to be reviewed and adapted (see the [Adaptive Risk Management in the context of Marine Protected Areas](#) and the [Triggers and Thresholds for Management review](#) sections in this toolkit).

¹¹ Conservation of Offshore Marine Habitats and Species Regulations 2017 available at <http://www.legislation.gov.uk/ukxi/2017/1013/contents/made>
 Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 available at: <http://www.legislation.gov.uk/ukxi/2007/1842/contents/made>
 Marine and Coastal Access Act 2009 available at: <https://www.legislation.gov.uk/ukpga/2009/23/contents>

2 Types of Governance Structures

Roles & Responsibilities Figure 1¹² shows the terms used within this project to describe different types of governance structures, and to what extent they involve shared control. 'Doing to' is the highest level of governing body control (i.e. the Top-down approach, with no engagement). 'Doing with' increases participation and moves into the Co-management approach (Co-design and Co-production) with the Bottom-up (community based) approach presented as 'Delegate doing'.



Roles & Responsibilities Figure 1: The MPA management participation ladder

To date, the development of offshore MPA fisheries management proposals in Secretary of State (SoS) waters have taken a community engagement approach, but management has remained state directed (i.e. decision making, and enforcement is set out under a legal framework).

¹² *Roles and Responsibilities* Figure 1 is an interpretation of Arnsteins' ladder of citizen participation (Arnstein, 1969), which has been adapted from the Think Local Act Personal (TLAP) co-production ladder Think Local Act Personal (TLAP) Co-production ladder. Available at: <https://www.thinklocalactpersonal.org.uk/>

Roles & Responsibilities Table 1 provides further explanation of the different governance structures, highlighting relevant considerations and examples from Secretary of State waters where applicable. In the [Supporting Material](#) of this toolkit the existing processes for implementation of management and byelaws in English waters are presented in a series of flow diagrams along with case study / examples of the varying participation levels used in management decisions within the UK.

Roles & Responsibilities Table1: Examples of MPA governance structures, with specific examples from English sites.

Participation Level	Description of Governance Structure	Considerations	Examples [discussed in Supporting Material]
Doing to (no participation)	State Direction Also 'hierarchical governance', it is highly centralised, top down, and bureaucrat & scientist led. Stakeholders are not engaged, except to tell them when new directives are issued with which they need comply.	'Doing to' management processes can instil a lack of trust and co-operation from stakeholders; however, it can be efficient in resource limited scenarios.	As all UK MPA management options have involved some form of consultation with stakeholders there are no strict examples of a 'Doing to' (State led, no engagement) governance option.
Doing-for (minimal participation)	Community engagement Development of a working relationship between governing body and other organisations. Still primarily centralised, top down, and bureaucrat and scientist led, but efforts made to adapt directives based on feedback of other groups and stakeholders. Power occasionally devolved on specific and bounded issues.	Communication is key to ensure stakeholders feel valued for their contributions and efforts in attendance.	MMO byelaw making process, includes support from SNCBs and public consultation. MMO and Secretary of State have end decision and responsibility of enforcement MMO/Defra offshore joint recommendations process for MPA management. Includes support from SNCBs and extensive stakeholder engagement. Defra/MMO have end decision on measures to put through the joint recommendation process [Shell Flat and Lune Deep Special Area of Conservation]
Doing-with (active participation)	Partnership Working Multiple groups coming together to achieve common purpose. Not necessarily a 50/50 division of control but there is always some degree of spreading control. Co-management Power is partially devolved, with control shared between state institutions, other organisations, and stakeholders. Decisions-making is mutual and equal.	Increased levels of resource and co-ordination required, however considered flexible and offers a broader appeal to stakeholders.	[Lyme Bay scallop dredging, Cumbrian Coast MCZ, the Community Voice Project & Southern IFCA Poole harbour]

Participation Level	Description of Governance Structure	Considerations	Examples [discussed in Supporting Material]
Delegate-doing <i>(authoritative participation)</i>	<p>Community-based management A hybrid of co-management (see above) involving all stakeholders where power mostly devolved to local communities. Community takes decisions, but often with governing body support or within governing frameworks.</p> <p>Results-based management The majority of power devolved to stakeholders. Governing body defines acceptable outcome range and leaves stakeholders to identify the means to meet the requirements and to document the effectiveness of the means, and ultimately achieve the requirements.</p>	Limits to bottom-up approaches include when the evidence base informing decisions is non-conclusive, where differences among stakeholders' perspectives cannot be overcome, and when decision-making authorities appear remote from the deliberations of stakeholders.	[Dogger Bank SAC]

3 Considerations when Selecting Governance Structure

When deciding which structure/mechanism to use, there are a number of factors which likely need to be considered, including:

- Level of management uncertainty,
 - Sites where the impacts from fishing are uncertain will require greater stakeholder input
- Site objectives and condition,
 - Noting the complexities of sites - how much activity is occurring over the distribution of the protected features
 - Ensuring best available evidence is used and incorporating local knowledge into existing data sources.
- Cost
 - Participatory processes are often reliant on funding. If attendance is incentivised then commitments increase, however when funds run out this can lead to a weighting of the continued management group to be defined by wealth / available resource.
- Stakeholder engagement
 - Level of participation required or indeed possible
 - Variety of stakeholders (local / national / international)
- Time
 - Relative considering the steps involved for the site in question and the level of management required.
- Scale
 - It is easier to identify the stakeholder cohort if the spatial scale for engagement is defined. For example, small scale (islands) can be well suited to community-based governance structures.
- Facilitation of governance
 - Ensuring the chair of the group is independent and unbiased will increase commitment to the process.
- Wider considerations
 - Finding synergy by grouping sites within a region or by similar MPA designation and / or feature.

Governance options are not necessarily exclusive and are more representative of points on a scale; some sites may suit an approach somewhere between state direction and co-management (much like the current offshore approach), while others (such as the smaller inshore sites with a strong community of users) may favour something between co-management and community based. A move towards a combination of co-management and community-based approaches could take several forms, including the formation of devolved groups at a range of scales (e.g. site specific, regional, sites of similar features). These groups could focus upon particular issues or be more formalised, requiring clear terms of reference, membership and roles and responsibilities.

A successful participatory approach can ultimately prove more capable at producing fairer and more effective decisions that take account of stakeholder views and the needs of those affected by regulation.

Once these factors are considered, the governance structure can provide a guideline for the engagement mechanisms that would work best. The [Stakeholder Engagement](#) component of this toolkit outlines options for stakeholder engagement with guidance and best practice to facilitate participatory approaches to management.

4 References

Arnstein, Sherry R.(1969) 'A Ladder Of Citizen Participation', Journal of the American Planning Association, 35: 4, 216 — 224.

Stakeholder Engagement



Stakeholder Engagement

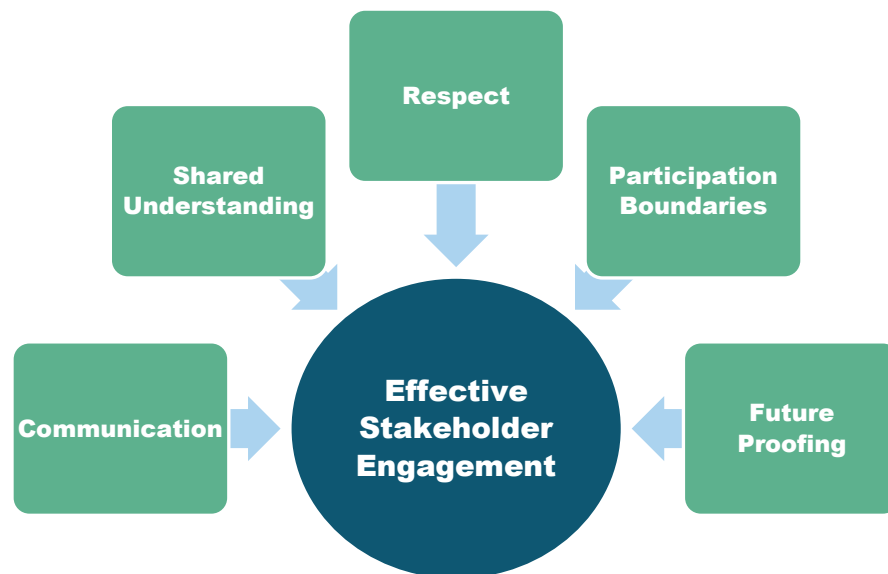
Developing active stakeholder participation in MPA Management

Active stakeholder participation in management empowers key stakeholders to contribute to the development and review of management. However, developing an effective approach to engage stakeholders can be challenging and there are many factors to consider.

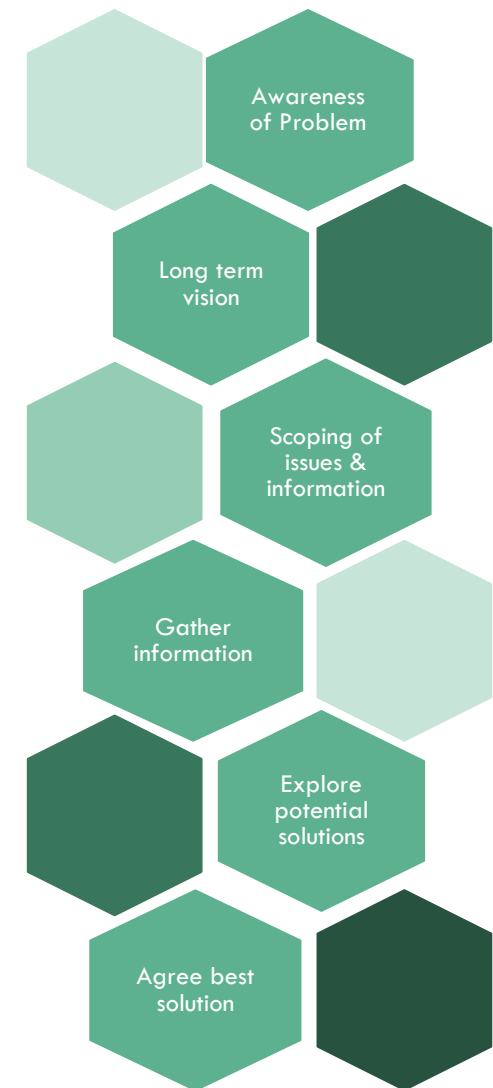
Engaging stakeholders in the development of MPA management is crucial because MPA management has consequences for a wide range of stakeholders, impacting their social, economic and ecological environment.

No one engagement methodology fits all stakeholders and processes. The engagement methodology must be tailored to suit individual groups, cultures, traditions, and political contexts.

Principles of stakeholder engagement



Problem solving using Stakeholder engagement



Developing active stakeholder participation in MPA Management

1 Introduction

Participatory management is the practice of empowering key stakeholders to take part in analysing problems and discussing solutions to support the development of management strategies. This type of management has been used in many areas such as public administration, urban planning, and public policy making. While group leaders (competent authorities) still retain final decision-making authority, participatory management aims to achieve a collaborative consensus as a group, with communication, inclusion and transparency all playing key roles.

Successful stakeholder engagement offers the potential to help bring about systemic change towards sustainable management of the marine environment.

Effective stakeholder engagement can:

- Lead to more equitable and sustainable development by giving those who have a right to be heard the opportunity to be considered in decision-making processes;
- Lead to better quality decisions, with fewer challenges;
- Create a sense of ownership of the process and its outcomes;
- Increase the chance of successful implementation of agreed actions;
- Allow for pooling of resources (knowledge, people, technology) to solve problems and reach objectives that cannot be reached by single organisations;
- Enable better understanding of the complex marine environment;
- Enable better understanding of the human influences on MPAs;
- Deepen mutual understanding about the problems and challenges in MPAs;
- Enable regulators to learn from stakeholders, and vice versa, resulting in process and policy improvements;
- Inform, educate and influence stakeholders to improve their decision-making and actions that impact on the marine environment;
- Build trust between the different stakeholders and a willingness to share responsibilities, knowledge and information;
- Encourage cooperation between stakeholders;
- Identify new options and solutions that may not have been identified in single-sector planning;
- Result in lasting change.

By definition participatory management requires effective stakeholder engagement and creating and sustaining a productive and comfortable environment. The emphasis of this process is to sustain the engagement of a range of stakeholders and encourage the sharing of information from diverse and different perspectives.

Stakeholder engagement is the process used by an organisation to engage relevant stakeholders for a clear purpose to achieve agreed outcomes. It is now also recognised as a fundamental accountability mechanism, since it obliges an organisation to involve stakeholders in identifying, understanding and responding to sustainability issues and concerns, and to report, explain and answer to stakeholders for decisions, actions and performance.

AA1000 Stakeholder Engagement Standard, 2015¹³.

Engaging stakeholders in the development of MPA management is crucial because MPA management measures have consequences for a wide range of stakeholders, impacting their social, economic and ecological environment. Management should therefore be considerate of stakeholders' expectations and the opportunities and potential conflicts which may occur.

When implementing this in practice, uncertainty must be practically managed in order to avoid conflict generated by misinterpretation, lack of clarity when it comes to communication or questions concerning values, relationships, and goals. Communicating values and having a transparent process along with a genuine and concerted effort to succeed in developing and implementing sustainable management, should be at the foundation for managers aiming to use a participatory approach as a successful tool.

Issues differ across stakeholder groups and the need to understand both the issues themselves and approaches to stakeholder engagement from multiple perspectives is important. This component of the MPA Fisheries Management Toolkit draws on insights gained from representatives of a variety of stakeholder groups (fishing, industry, environmental NGOs, Government, regulators and SNCBs) to provide a guide to best practice in developing a participatory approach to management of MPAs. This guide is designed to support active stakeholder participation in MPA Management. Its purpose is to support practitioners and managers wishing to embark on a participatory approach to the management of fishing within MPAs, introducing the principles of effective stakeholder engagement and providing guidance on developing a stakeholder engagement strategy.

Where relevant, reference has been made to additional materials available, such as the Account Ability AA1000 Series of Standards¹³, which themselves were developed and agreed upon through a multi-stakeholder process to support stakeholder participation.

The AA1000 Series are principles-based standards and frameworks used by a broad spectrum of organisations to demonstrate leadership and performance in accountability, responsibility and sustainability. The AA1000 Stakeholder Engagement Standard 2015¹⁴ provides guidance on how to use stakeholder engagement to deal with issues of material significance to stakeholders, and how to align stakeholder engagement with an organisation's core strategy. The AA1000 Framework is organised around the overarching principle of 'inclusivity'.

¹³ AA1000 Series of Standards: <https://www.accountability.org/standards/>

¹⁴ AA1000 Stakeholder Engagement Standard 2015: https://www.accountability.org/wp-content/uploads/2016/10/AA1000SES_2015.pdf

Striving for inclusivity means that an organisation is committed to reflect, at all stages of a process, the views and needs of all Stakeholder groups. Stakeholder views are obtained through an engagement process that allows them to be expressed without fear or restriction. Inclusivity requires the consideration of 'voiceless' stakeholders including future generations and the environment.

AA1000 Stakeholder Engagement Standard, 2015.

The principles and process frameworks presented in this guide are transferrable to similar situations where initiating and sustaining stakeholder engagement and participation are key. Links are made throughout to the other elements of the MPA Fisheries Management Toolkit.

2 The Principles of Effective Stakeholder Engagement

A summary of the principles for quality stakeholder engagement is presented in *Stakeholder Engagement Table 1*. The characteristics of each principle for stakeholder engagement draw on established stakeholder engagement guidelines, and from lessons learned and best practice applied in stakeholder engagement projects.

Stakeholder Engagement Table 1: Principles of Stakeholder Engagement

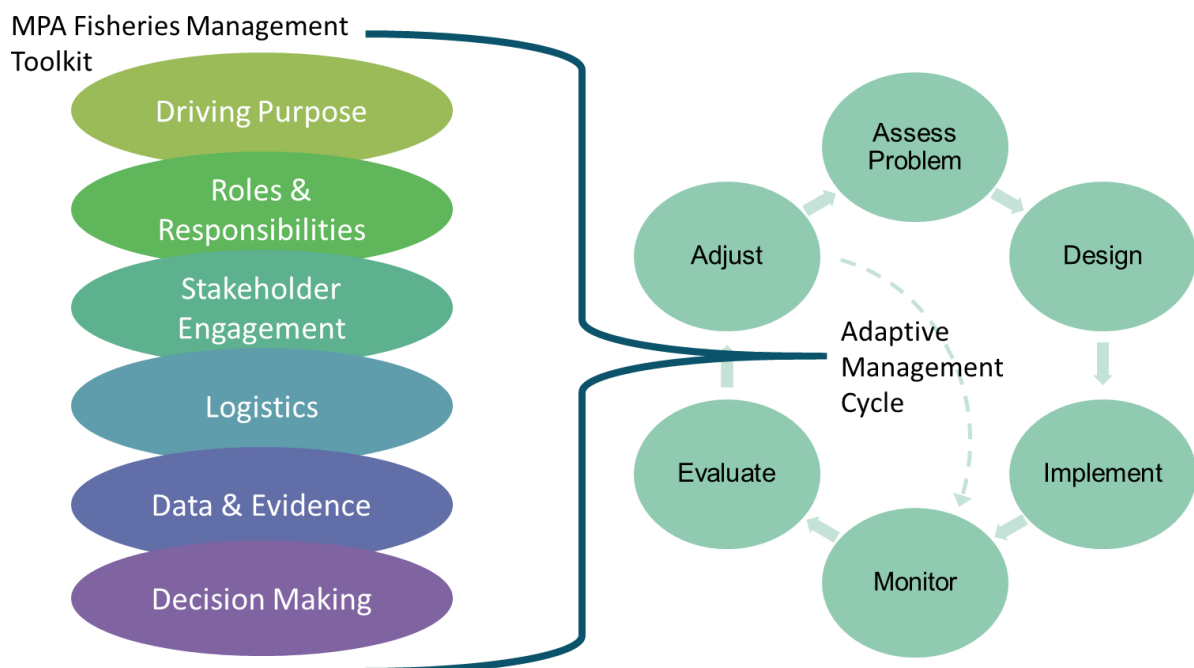
Principle	Characteristics
Communication	Communication should: <ul style="list-style-type: none"> • Create opportunities for dialogue • Be timely • Use plain English • Be concise and engaging • Establish feedback mechanisms
Shared understanding	Shared understanding should: <ul style="list-style-type: none"> • Encourage transparency • Focus on issues material to the MPA and/or its stakeholders • Use consistent terminology • Be clear and open process for sharing resources
Respect (for the process and each other)	Respecting the process by: <ul style="list-style-type: none"> • Having a clearly defined scope • Showing commitment to established principles of the Accountability Principles Standard (AA1000APS¹⁵) • Using a process appropriate to the stakeholders engaged • Encouraging inclusive ownership of decisions Respecting each other by: <ul style="list-style-type: none"> • Listening • Appreciating other's point of view • Using consensus building • Being ready to compromise • Having an open mind
Participation boundaries	Participation boundaries should: <ul style="list-style-type: none"> • Provide defined roles and responsibilities • Include agreed decision-making process • Be integral to organisational governance
Future proofing	Future proofing should: <ul style="list-style-type: none"> • Be flexible and responsive • Add value both for the management of the MPA and the stakeholders

¹⁵AA1000 Accountability Principles Standard:

https://www.accountability.org/wpcontent/uploads/2016/10/AA1000APS_english.pdf#targetText=The%20AA1000%20AccountAbility%20Principles%20are,and%20improve%20its%20sustainability%20performance.

3 Principles in Practice

When developing a participatory approach to MPA management, the principles of stakeholder engagement can be applied within all components of the MPA Fisheries Management Toolkit in support of the Adaptive Risk Management (ARM) cycle (see [Adaptive Risk Management - A Review of ARM in the context of Marine Protected Areas](#) for more information). *Stakeholder Engagement Figure 1* presents the adaptive risk management cycle and the MPA Fisheries Management Toolkit to show how they support each other. For example, when assessing the problem, it is important to consider the **driving purpose**, defining the **roles and responsibilities**, ensuring the correct people are involved (**stakeholder engagement**), whilst being aware of site-specific considerations within **decision making** on next steps, such as the design of the management measures.



Stakeholder Engagement Figure 1: The MPA Fisheries Management Toolkit in support of Adaptive Risk Management

A summary of stakeholder engagement considerations for each component of the MPA Fisheries Management Toolkit is provided in the following sections with further information available in the relevant toolkit component.

3.1 Driving Purpose

The end goal of developing a participatory approach to management of fishing activity is delivery of effective, legally compliant management which best meets / balances the needs of all stakeholders. This can best be achieved where there is a clear understanding among stakeholders of the reasons for implementing management, the baseline management needs, and the mechanisms used to introduce measures. Developing a shared understanding of these driving factors helps to manage expectations around management decisions and encourages a shared ownership of the information being used to support these decisions.

To support understanding of the driving purpose behind MPA management, this toolkit contains a number of guidance documents for stakeholders, including [Adaptive Risk](#)

[Management in the context of MPAs](#), the [Glossary of Terms](#), and the [MPA Legislation Summary](#). Guidance for stakeholders on collecting and sharing data to inform management is provided in the [Data and Evidence Recommendations](#) component of this Toolkit.

3.2 Roles and Responsibilities

The roles and responsibilities of all the stakeholders (including regulators) need to be made clear and incorporated into the terms of reference for any proposed management group. Firstly, it is necessary to clarify the legal obligations of regulators to deliver management and scientific advisors to provide conservation advice as well as the relevant mechanisms available to them to do so.

This toolkit contains a summary of [MPA Management Roles and Responsibilities](#) which illustrates the roles of relevant regulators and scientific advisors involved in managing fisheries in English waters.

It is important to recognise that the regulator has the legal responsibility for any final decision, however the approach to a participatory process involves key inputs and steer from the stakeholders and clearly identifies where and when those inputs might influence outcomes.

Stakeholders can influence decision making and outcomes in a number of ways. Participation involves sharing understanding, views and perspectives and developing solutions through a transparent process. Where local knowledge is necessary for the decision making process, it is important to identify appropriate stakeholders that can bring the relevant material and knowledge to the table, and this may be achieved through stakeholder audit and mapping exercises set out in the [stakeholder engagement strategy](#).

Stakeholders should have a clear understanding of group governance structure - who has what role and how they relate to one another. Governance structures are ways of working which inform and input into management decisions. An effective governance framework clearly delineates who is accountable for performing certain tasks. Roles and responsibilities are assigned for those participating in governance and those bound by the governing body. The authority of the participants must be defined. All those involved must recognise who is in charge and who has been empowered with decision making ability and authority.

Guidance on [Governance Structures](#) can be found in the roles and responsibilities component of this toolkit. The form of governance structure will influence the level and nature of stakeholder engagement in a decision-making process.

A process framework is recommended to give focus to discussions, setting standards, thresholds and agreeing key terms. A process framework outlines the ways of working within the group, helping to manage expectations and define participation boundaries. At key stages the process framework should be reviewed to ensure it is working efficiently and that all participants are still committed.

Participation parameters

The limits of decision making need to be defined so participants are aware of how their input will be received and used. Each group may be different; however it is important to note the legal / statutory obligations and responsibilities of some participants (such as regulators and SNCBs). Be completely honest from the outset about who is ultimately responsible for the process and who will make final decisions regarding the MPA.

Participation parameters can be addressed in the terms of reference for any group (clearly defining roles and responsibilities) and incorporated into a management plan to give focus to discussions, setting standards, thresholds and agreeing key terms.

3.3 Stakeholder Engagement

This component of the toolkit focuses on Stakeholder Engagement; who should be engaged and how participation can be encouraged through a stakeholder engagement strategy ([Section 4, Stakeholder Engagement](#)). It draws on lessons learned and best practice employed during stakeholder engagement projects.

3.4 Logistics

Logistics of developing successful participatory approaches should be considered from the outset including funding, timing and accessibility. Demands on resource (time and money) generally increase with the level of engagement in any participatory process. However the benefits of stakeholder engagement can offset the increases resource such as increasing compliance and using best available evidence. Balancing the benefits of stakeholder engagement and pressures on resources are further explored in the [Logistics](#) component of this toolkit.

3.5 Decision Making

The key aim of implementing management measures within a site is to further the achievement of the conservation objectives¹⁶. In the initial phases of developing a participatory approach it is first important for consensus to be achieved in accepting the conservation objectives of the site(s) as these provide the rationale for implementing measures, driving decisions on fisheries management in MPAs. How site specifics are used to inform fisheries management decisions is further discussed in the [Fisheries Management Decision Making](#) section of this toolkit.

Under current legislation in the UK, any decision to implement management measures must have a statutory consultation period which is defined in the underpinning legislation. Flow diagrams depicting the byelaw processes are presented in the Supporting Material of this toolkit. Where participatory approaches are used to inform management in MPAs, consensus building techniques can play an important role in reaching effective management decisions which build stakeholder stewardship and ownership of the measures.

Consensus building aims to reach agreement through collaboration, cooperation, inclusivity, and participation. Group decisions made by consensus seek resolutions that are satisfactory to all group members and meet all of their concerns, although in reality that may not always be possible, and a degree of compromise may be necessary. A consensus-based approach to decision making is not adversarial or competitive, but rather seeks to do what is best for the group.

The following information box provides some general guidelines for consensus building which can be useful to refer to throughout a project to ensure collaborative discussions.

¹⁶ Conservation Objectives of an MPA set out the broad ecological aims of the site's protected features and are available online via the [JNCC](#) or [Natural England](#) websites.

Guidelines for consensus building

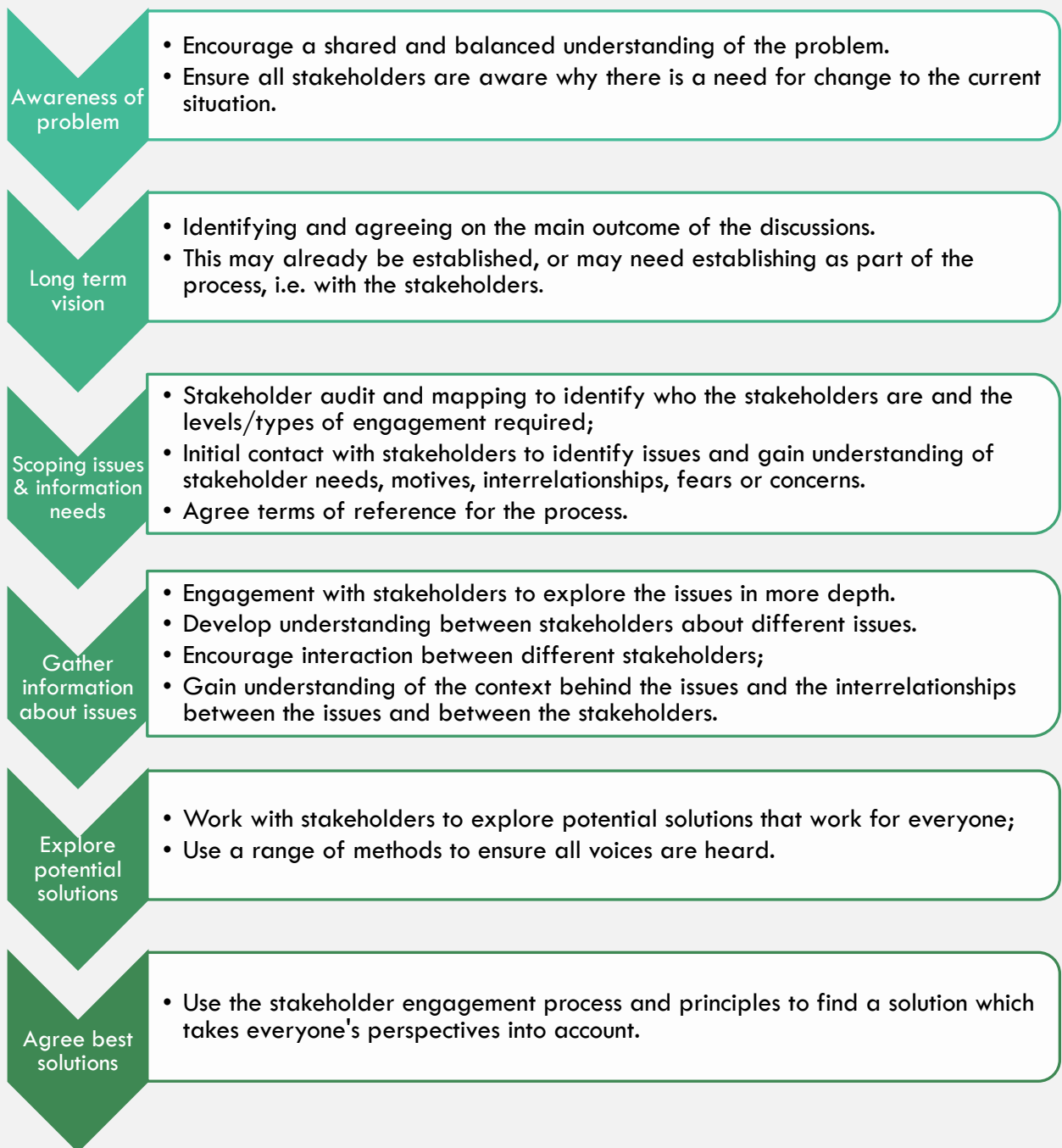
- If you don't understand something, don't be afraid to say so
- Be willing to work towards the solution that's best for everyone, not just what's best for you.
- Help to create a respectful and trusting atmosphere. Nobody should be afraid to express their ideas and opinions.
- Explain your own position clearly. Be open and honest about the reasons for your viewpoints. Express your concerns early in the process so that they can be considered in any proposals.
- Listen actively to what people are trying to say. Make a deliberate effort to understand someone's position and their underlying needs, concerns and emotions.
- Think before you speak, listen before you object. Self-restraint is essential in consensus – sometimes the biggest obstacle to progress is an individual's attachment to one idea.
- Don't be afraid of disagreement. Disagreements can help a group's decision. With a wide range of information and opinions, there is a greater chance the group will find suitable solutions.
- Easily reached consensus may cover up the fact that some people don't feel safe, or confident enough to express their disagreements.

Using consensus building in decision making is discussed further in in the [Fisheries Management Decision Making](#) section of this toolkit.

Problem Solving Through Participation

Effective stakeholder engagement can be seen as an iterative cycle, which may include multiple stages through which participants contribute to the procedure and its outputs. Note, these stages can apply on a range of scales from dealing with focussed issues within a management process; for example, reviewing the evidence base, through to wider issues such as implementing and monitoring management measures. Any of these stages may need to be visited more than once in order to achieve the desired outcomes.

Engagement is achieved through a process of reflection, exploration and discussion.



4 Stakeholder Engagement Strategy

An engagement strategy should be prepared before starting to engage with your stakeholders. This should address three key questions:

- **What** is the purpose?
- **Who** should we engage?
- **How** should we engage them?

4.1 What is the purpose?

It is important that those initiating the stakeholder engagement are clear on the driving purpose of the engagement process, and what needs to be achieved. They should consider planning to involve stakeholders in reviewing the purpose of the engagement at the start of the engagement process which can help to promote understanding of their role in the process and adjust the process to suit the group of stakeholders if necessary.

4.2 Who should we engage?

The starting point of a successful participatory process is to identify who should be involved and how. An organisation, project or process may have many stakeholders, each with distinct attributes and often with diverse and conflicting interests and concerns.

Relevant stakeholders are those individuals, groups of individuals or organisations that affect and/or could be affected by an organisation's activities, products or services and by the associated performance with regard to these issues addressed by the engagement.

Stakeholder audit and mapping exercises are a useful way to identify individuals and/or groups that are likely to influence and be affected by MPA management. The most common way to map stakeholders is to initially carry out a stakeholder audit, followed by a mapping exercise to plot levels of influence and interest, which will in turn inform methods of engagement. This process identifies the range of key stakeholders required for a truly representative group.

Stakeholder Engagement Figure 2 outlines a framework for a stakeholder audit exercise. Within the framework the scope of the stakeholder group is defined detailing stakeholders that may be impacted by the management measures of an MPA along with those that have a direct interest in and/or influence the management discussions. Within this scope [Roles and Responsibilities](#) of the stakeholders can be defined. Stakeholders can then be categorised into groups such as industry, regulators, advisors, environmental / conservation organisations. This is useful to ensure there is adequate representation from key stakeholders within the final group. Information collected as part of the audit includes a brief description and relevance of project to the stakeholder, these are useful to highlight key interests of stakeholders and also to capture any further information; for example ways in which the stakeholder prefers to be communicated with.

Stakeholder audit framework								
Scope	Organisations, groups and individuals within the project 'area', particularly those that will be impacted by the project and those that have a direct interest in and/or influence on the project.							
Categories of stakeholders	<ul style="list-style-type: none"> Fishing organisations from the UK countries adjacent to the MPA Fishing organisations from other countries who fish in these waters Other parts of the industry, e.g. Sea Fish Regulators, e.g. MMO, IFCA Advisors, e.g. JNCC, Natural England Researchers, e.g. Cefas, relevant UK universities Environmental/conservation organisations, e.g. WWF, MCS, MSC 							
Information to be collected	Type of organisation / category of stakeholder	Name of organisation	Contact and job title	Address	Email	Phone number	Brief description (where not obvious)	Relevance of project to stakeholder

Stakeholder Engagement Figure 2: An example of a stakeholder audit framework for a participatory MPA management process

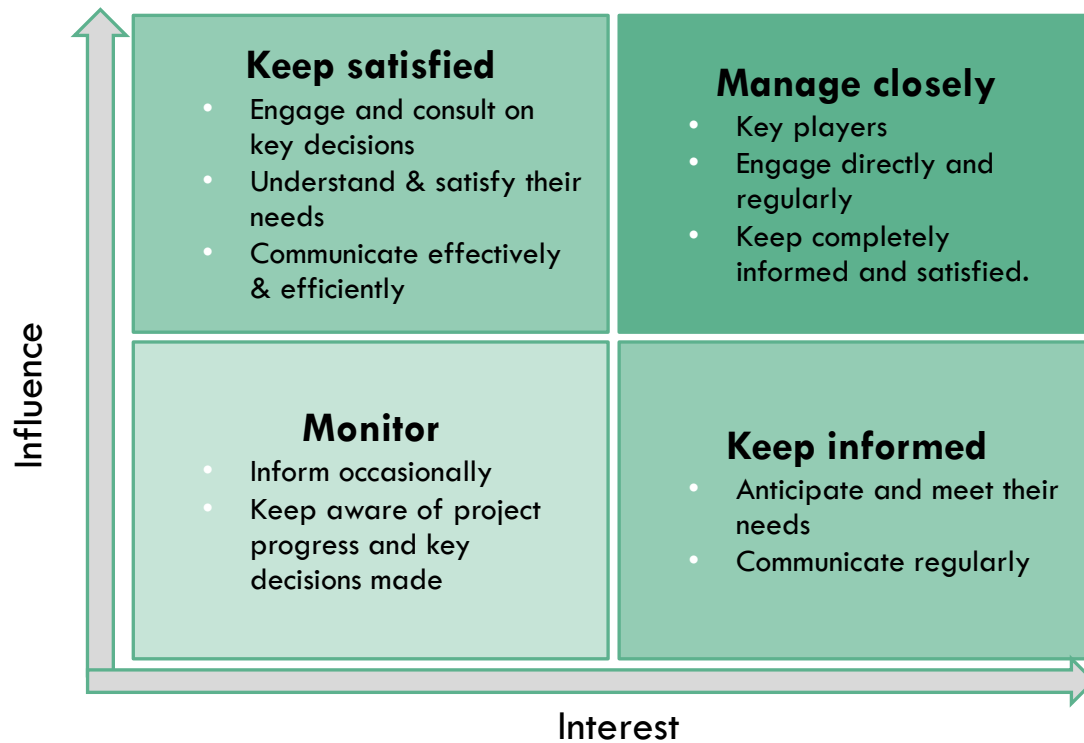
Some questions to consider when identifying potential stakeholders:

- Who is responsible for the wider project or policy?
- What individuals, groups or organisations have a stake or an interest in the issue?
- Who is influential in the area or policy arena?
- Who makes the decisions (currently)?
- Who can influence decisions?
- Who is critical to delivery?
- Who will potentially be impacted by the outcomes?
- Who can slow or stop the project?
- Who is excluded and may not have been considered?
- Have you considered the voiceless, marginalised and harder to reach stakeholders?

It is not always possible, appropriate or necessary to engage every stakeholder to the same degree and using the same methods, but your final group of stakeholders should be well balanced, reflecting the social/cultural, economic and ecological interests of the MPA.

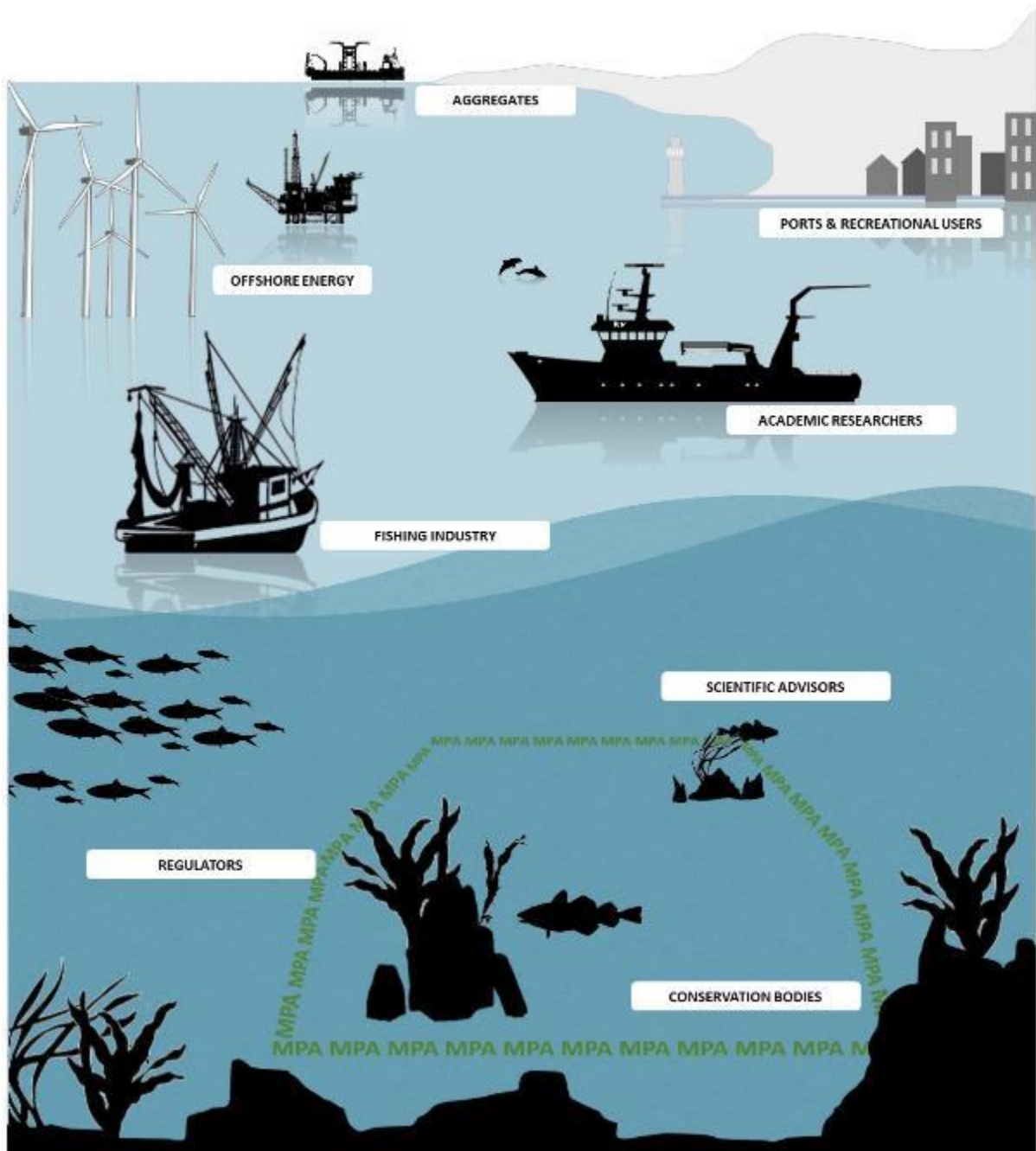
Once the stakeholder audit has been completed, a stakeholder influence and interest mapping exercise may be undertaken, whereby individual stakeholders are mapped according to their level of influence and/or interest (*Stakeholder Engagement Figure 3*). The results of this will then inform the methods of engagement.

It is important to remember that no one engagement methodology fits all stakeholders and processes. The engagement methodology must be tailored to suit individual groups, cultures, traditions, and political contexts.



Stakeholder Engagement Figure 3: Stakeholder mapping exercise

When considering management of fishing activity, it is important that input is sought from relevant stakeholders with direct experience/knowledge of the area to be managed. Representation from the fishing industry is a key element, but there are a number of stakeholder groups whose interests and competence in marine issues make their participation an important to the process (*Stakeholder Engagement Figure 4*).



Stakeholder Engagement Figure 4: Key stakeholder groups identified for developing a participatory approach to the management of fishing activity in UK Marine Protected Areas

4.3 How and to what degree should we engage the stakeholders?

How stakeholders are engaged is largely dependent on the resources that can be committed to engagement and what is necessary in order to achieve the desired outcomes. Different types or levels of stakeholder engagement can be thought of as a spectrum of engagement as referred to in the [Guidance of High Level Governance Options](#) section.

Stakeholder Engagement Table 2 sets out the key types of engagement on the spectrum and suggests some suitable methods for achieving each level of engagement. The specific methods of engagement used will depend on the specific circumstances of the issue being considered.

Regardless of the chosen approach, communication is fundamental to achieving successful participation. Some key factors to consider for effective communication are displayed in the word cloud in *Stakeholder Engagement Figure 5*.



Stakeholder Engagement Figure 5: Key factors for successful communication

Stakeholder Engagement Table 2: Levels of engagement and corresponding methods

	Inform	Consult	Involve	Collaborate	Empower
Stakeholder engagement goals	To provide balanced, objective, accurate and consistent information to assist stakeholders to understand the problem, alternatives, opportunities and/or solutions	To obtain feedback from stakeholders on analysis, alternatives and/or outcomes	To work directly with stakeholders throughout the process to ensure that their concerns and needs are consistently understood and considered	To partner with the stakeholder including the development of alternatives, making decisions and the identification of preferred solutions	To place final decision-making in the hands of the stakeholders. Stakeholders are enabled/equipped to actively contribute to the achievement of the outcomes
Promise to stakeholders	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how stakeholder input influenced the outcome.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how stakeholder input influenced the outcome	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the outcomes to the maximum extent possible	We will implement what you decide. We will support and complement your actions
Methods of engagement	<ul style="list-style-type: none"> • Fact sheets • Newsletters, bulletins, circulars • Websites • Social media • Speeches, conference and public presentations • Existing channels of communication (Fishing News / IFCA meetings) 	<ul style="list-style-type: none"> • Public meetings • Surveys • Digital engagement 	<ul style="list-style-type: none"> • Opinion gathering workshops • Multi-stakeholder forums • Advisory panels • Focus groups • Deliberative polling • Online engagement tools 	<ul style="list-style-type: none"> • Facilitated workshops • Focus groups • Interviews/in-depth conversations • Consensus building • Participatory decision making • Online collaborative platforms 	<ul style="list-style-type: none"> • Dialogue with decision makers • Facilitated workshops • Consensus decision making • Capacity building • Skills sharing • Integration of stakeholders into governance, strategy and operations of the organisation

Beyond face to face / active meetings, regular communication is key and there are a number of ways this can be achieved. *Stakeholder Engagement Table 3* provides some options; however, this is by no means an exhaustive list. Considerations around each method have been provided to help you decide which mediums would be most suitable.

Where a meeting is the preferred option for engagement it is useful to 'warm up' participants prior to an event. This can easily be done by circulating information through existing channels of communication. An agenda, along with information on the aims of any meetings should be circulated with the invite. Providing background reading for participants ahead of meetings will enable people to collate opinions / feedback from their peers and means that discussions within the meeting will be more focussed and engaged. Targeted one to one engagement with key stakeholders can also prove effective to ensure communication methods are meeting their expectations.

It is important to start early in building trust and cooperation between participants in any process. Equally, it is useful to establish a feedback mechanism to allow participants to see how input has been captured and used; this encourages continued support of the process.

Circulating minutes of meetings helps to keep those who could not attend up to date with discussions. Minutes should be kept brief outlining the main discussions / decisions and actions. Detailed minutes capturing points of view can be included as an Appendix for further information. Before minutes are circulated widely, they should be reviewed by those who attended the meeting to ensure participants are happy with how the discussions have been captured.

In Summary

When developing a participatory approach to the management it is important to remember that one size does not fit all. Developing a participatory approach cannot be prescribed. There are a variety of important elements which need to be considered and which will be specific to the issue under consideration. This MPA Management Toolkit outlines the important elements and provides a broad range of options and considerations which can be incorporated into building a successful participatory approach.

Stakeholder Engagement Table 3: Communication channels and considerations

Communication Channel	Considerations	
	Positives	Negatives
Dedicated webpage with options for online interaction	<ul style="list-style-type: none"> • Reduced costs • Open to all • Options for anonymity • Encourage data and information sharing • Transparency 	<ul style="list-style-type: none"> • Difficult to gauge engagement levels • Accessibility constraints • Users may not be proficient at online tools • Requires dedicated maintenance and collation of comments
Mobile Application to download and use as discussion forum / information sharing	<ul style="list-style-type: none"> • Open to all • Options for anonymity • Discussions can happen in real time without constraining people to travel 	<ul style="list-style-type: none"> • Time and resource required to design • Accessibility constraints • Users may not be proficient at online tools • Requires dedicated maintenance and collation of comments
Newsletters / Emails	<ul style="list-style-type: none"> • Reduced costs • Reduced time • Members feed in when they have time and issues which are relevant to them. • Familiarity 	<ul style="list-style-type: none"> • Requires dedicated maintenance and collation of comments • Can be considered non-interaction (2 dimensional)
Social media (Twitter, Facebook etc)	<ul style="list-style-type: none"> • Easy to link and highlight relevant information • Provide opportunity for discussion 	<ul style="list-style-type: none"> • Time and resource required to maintain • Difficult to provide enough information in length of messages
Non-written materials such as videos	<ul style="list-style-type: none"> • Engaging material • Useful to highlight key factors • Open to all 	<ul style="list-style-type: none"> • Can't be used as discussion platform
Physical media to circulate awareness to a wider area (i.e. posters in ports etc)	<ul style="list-style-type: none"> • Engaging material • Useful to highlight key factors • Open to all 	<ul style="list-style-type: none"> • Not a regular medium for communication • Associated more with specific events
Remote meetings using video conferencing (e.g. Skype)	<ul style="list-style-type: none"> • Limited costs and disruption to daily work • Open to all 	<ul style="list-style-type: none"> • Requires access to software • Technical difficulties can lead to frustration • Difficult to chair and ensure active participation from attendees
Using existing channels of communication (such as Fishing News or IFCA meetings).	<ul style="list-style-type: none"> • Efficient use of time • Ensure links made between similar discussions 	<ul style="list-style-type: none"> • Can lead to longer discussions and distractions in meetings set up for specific cause • Restricted access to existing participants

Logistics



Logistics

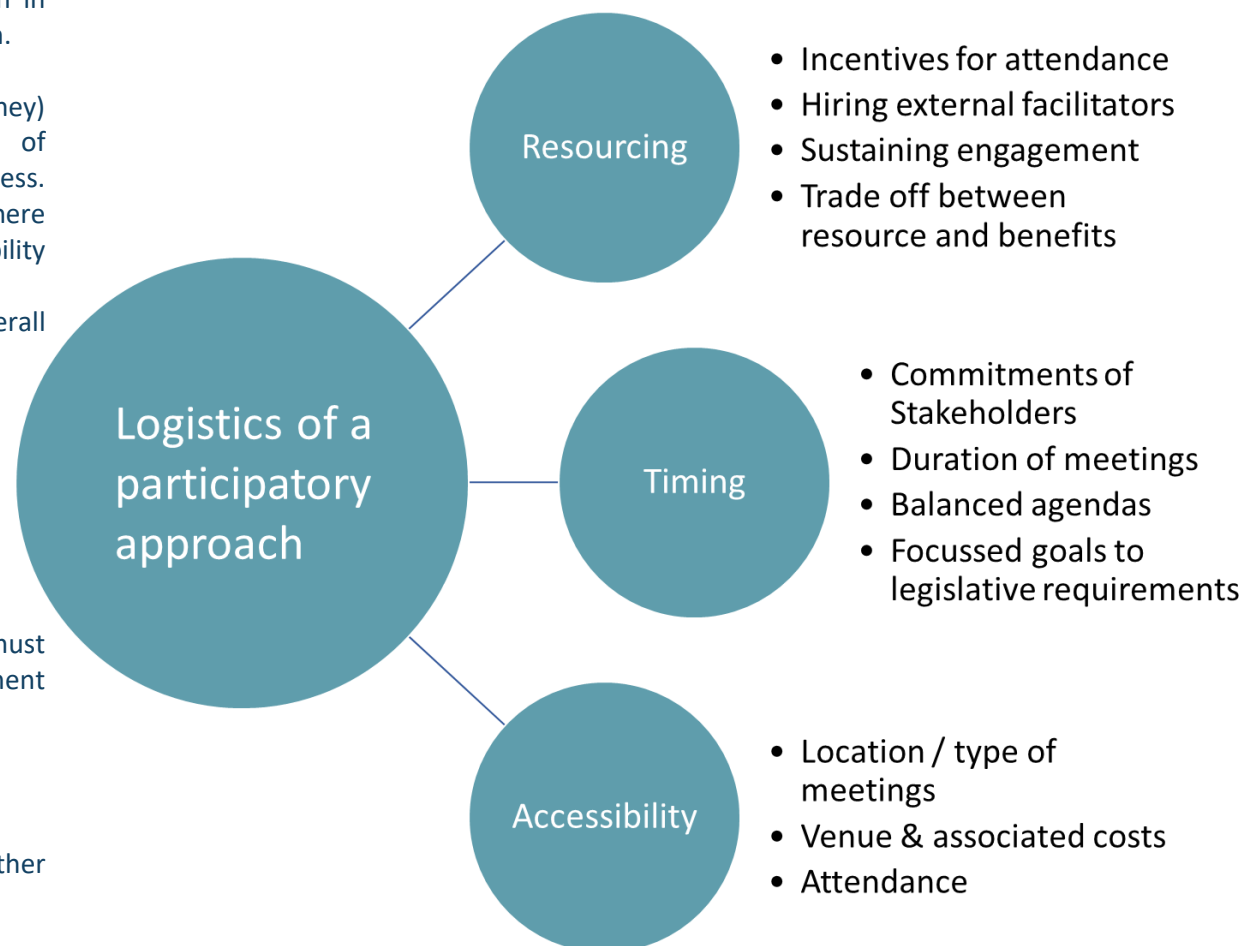
Logistics of a participatory approach

Logistics are an important consideration in choosing the right participatory approach.

Demands on resource (time and money) generally increase with the level of engagement in any participatory process. However, there may be circumstances where delegation of management responsibility (e.g. community-based management) can lead to lower costs overall

The extent of stakeholder engagement must be weighed in terms of management outcomes including:

- Increased compliance
- Best available evidence
- Transferability of process to other MPAs



Logistics of a participatory approach

1 Introduction

A pragmatic approach needs to be considered when planning an effective participatory process. Constraints on finances, time and level of understanding might all impact effective and sustained stakeholder participation. Face to face meetings, whether they are open to all stakeholders or held in focus groups with agendas, minutes and materials circulated to the wider group are useful but not the only option. Workshops, community displays, events and drop-in surgeries may also be relevant.

The use of external facilitators has proved effective in ensuring a balanced approach to discussions within stakeholder groups. External facilitators / project coordinators can then have a defined commitment to the project to ensure the smooth running of communication and associated engagement such as chairing meetings and collating minutes for circulation.

This component of the toolkit outlines some of the key elements to consider when developing a participatory approach to the management of fishing activity in UK MPAs.

2 Resourcing

One of the key elements to consider is the funding required to support engagement throughout the process. The funding resources should be reviewed and allocated to suit the governance structure, for example including funds to hire external facilitators.

The level of engagement required to deliver effective management is likely to vary from site to site and it is likely that funding may need to be weighted in favour of sites with greatest stakeholder complexity. As many stakeholders will need to take time away from their paid jobs to attend meetings, addressing financial barriers is key in maintaining attendance and buy in. Financial barriers can vary between stakeholders and these should be reviewed and assessed as part of the stakeholder engagement strategy considering:

- Location - how easy is it for stakeholders to travel from their main residence / place of work?
- Accessibility- do stakeholders have access to online resources such as emails or would other types of engagement be preferred?
- Motivation- are the stakeholders aware of the issues and how their input will be valued?

Options to address these financial barriers include:

- Holding online forums;
- Allowing remote access to meetings through online software (e.g. [Skype](#), [GoToMeeting](#), [Zoom](#));
- Paying a day rate to attend meetings; or
- Covering travel & subsistence costs.

It is advised to address financial limitations and solutions as early on in the process as possible. Highlighting potential costs involved in being an active member will help to manage expectations. Engagement in meetings can also be pursued by circulating an agenda for comments in advance and inviting feedback on any minutes of the meeting.

Financial resources need to be sustainable to ensure the longevity of the process. Potential incentives should be 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 in selecting more collaborative governance structures less resource may be required from the state. For example, fishing producer organisations could manage the quota on behalf of their members, raising a levy to do so which would reduce costs incurred to Government in performing the same function.

Although there may be greater upfront costs in pursuing a more participatory approach to management of fishing activity in UK MPAs, subsequent costs around monitoring / implementing management decisions may be reduced as a result of better decisions with stakeholders empowering stakeholder stewardship via good compliance.

Using existing materials to support stakeholder engagement will reduce financial pressures. For example the statutory nature conservation bodies and environmental NGOs have dedicated web pages on Marine Protected Areas. Regulators such as IFCAs, the MMO and Defra also hold information on management considerations and existing management proposals. Further information on these organisations is available in the [Roles and Responsibilities](#) component of this toolkit.

There are examples where participatory programmes for adaptive management in the marine environment have had some initial success but due to lack of funds could not be sustained long-term. Lessons learnt from these examples include:

- Being realistic of resource required;
- Use existing material;
- Circulate material to other groups so more can benefit of progress made through collaborative working.

The [GAP2](#) project brought scientists, fishermen and policy makers together to demonstrate the role and value of stakeholder driven science within the context of fisheries governance. The project developed a number of conference style talks and events that fishermen could attend remotely while they were at sea and have published a good practice guide for participatory research in fisheries science (Mackinson *et al.*, 2015). The principles applied in this guide are similar to those outlined in this study.

3 Timing

To ensure maximum attendance, meetings / newsletters / updates should be planned to accommodate the other commitments of stakeholders wherever possible. For example, if fishing activity is seasonal in the site, stakeholder engagement could be planned for quieter months of the year. School / National holidays are also another consideration which can affect attendance / engagement.

When considering physical or remote meetings, the duration should reflect achievable outcomes. A balanced agenda will ensure discussions are kept on track and avoid numerous, diverse topics which could be viewed as overwhelming to address productively in a short time. When organising a virtual meeting it is recommended to keep the meetings under 2 hours in length to ensure maximum engagement and focus from participants. If other factors (such as driving purpose) allow, outcomes can be staggered over a series of virtual meetings providing time for discussions within discreet groups in between.

The driving purpose behind management is often legislative with associated deadlines and or commitments. These should be clearly understood by all participants to ensure expectations are managed accordingly.

4 Accessibility

Choosing the right level of accessibility is key to ensuring good levels of engagement. Consideration of the accessibility for key stakeholders should be taken into account, for example taking discussions to the quay-side can encourage greater attendance from fishers. During stakeholder mapping exercises in the development of the [Stakeholder Engagement Strategy](#) the needs and preferences of stakeholders should be reviewed and meetings planned accordingly.

Having a central location for any face to face meetings helps to keep travel and other costs to a minimum. Reasonable options for accommodation should be nearby and the area should have good transport links.

Selecting a suitable venue is key to ensuring a productive environment for face to face meetings. The venue should be easy to find and accessible via public transport. A large room with plenty of natural light and flexibility for layout is preferable. There are a variety of virtual meeting software's available which enables participants to engage remotely; for example [Skype](#), [GoToMeeting](#), [Zoom](#).

If the group elects to use online media as their engagement tool online material should be easily accessible, clearly laid out and regularly updated / maintained. It is recommended that any services provided (for example websites, newsletters, online applications) should meet Government accessibility guidelines¹⁷. Accessibility is about making sure your service can be used by as many people as possible.

To ensure a good attendance rate, meetings can be arranged using online tools (e.g. [DoodlePoll](#)). Potential dates (and/or venues) should be circulated at least a month in advance with requests made for participants to source a suitable replacement if they cannot attend. Ideally if the governance structure has been defined effectively with roles and responsibilities clearly defined, important / regular meetings can be planned further in advance to increase likelihood of attendance.

5 References

Mackinson, Steven & Raicevich, Saša & Kraan, M.L. & Magudia, R. & Borrow, K.. (2015). Good Practice Guide: Participatory Research in Fisheries Science

¹⁷ Making your service accessible: An introduction from UK Government. Available at: www.gov.uk/service-manual/helping-people-to-use-your-service/making-your-service-accessible-an-introduction

Data and Evidence



Data and Evidence

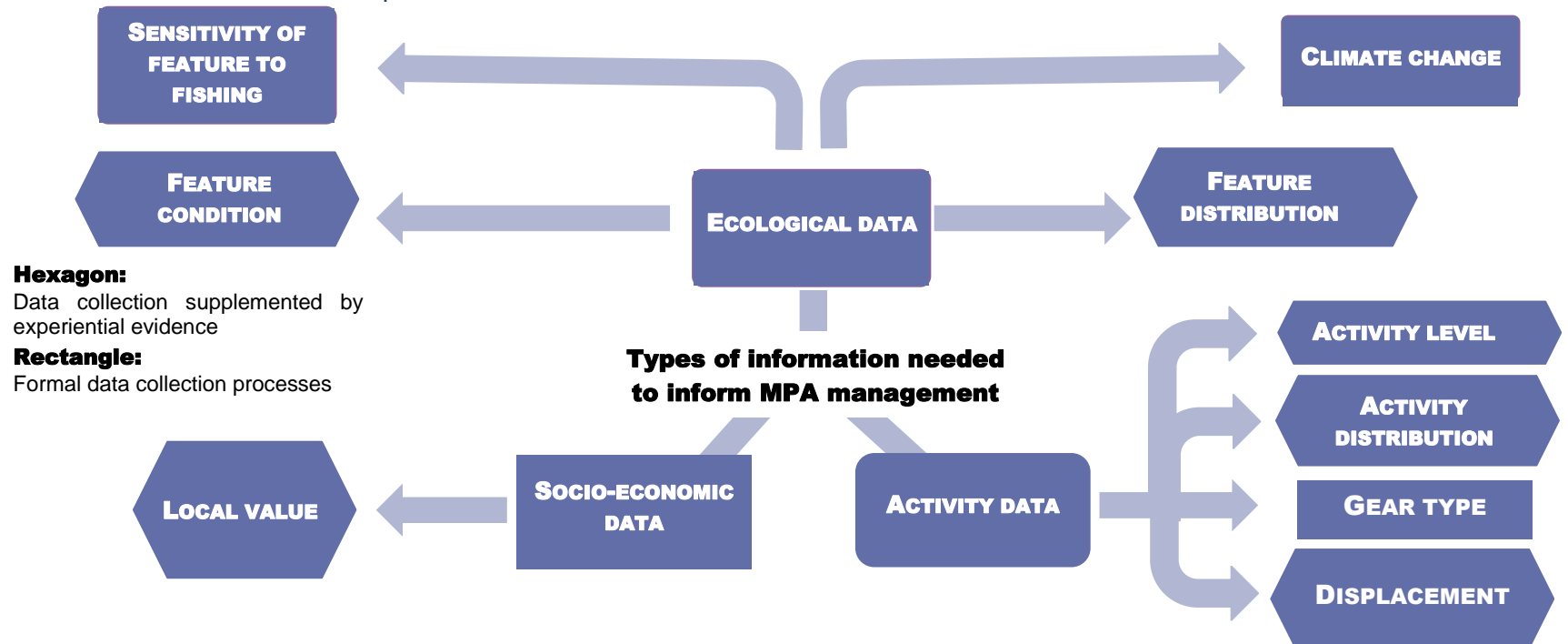
Data and Evidence Recommendations

Gathering information and ensuring evidence is robust is crucial for an effective management process. Gaps in data lead to increased uncertainty that can hinder the decision-making process.

Stakeholders have the potential to play a greater role in filling evidence gaps in various areas e.g.

- feature condition
- fishing activity distribution
- fishing impacts
- socio-economic impacts

Processes are required to ensure scientific evidence requirements do not become a barrier to provision of data. Adaptive Risk Management (ARM) provides a framework through which the fishing industry may collate and mobilise their information to contribute to future work. The provision of such evidence could help to inform the development of measures and to trigger periodic review.



Data and Evidence Recommendations

1 Background and Introduction

Gathering information and ensuring evidence is robust is crucial for an effective management process, however the purpose and use of data collection must be transparent and agreed within the process. Many fishers in the UK have expressed interest in contributing data as scientific evidence to help improve management of fishing activities. However, there exist concerns in the industry about the data collection process as well as commercial sensitivities around ownership of data. Working in partnership benefits both industry and science as co-creation of data builds trust in the process.

Through the adaptive risk management process, evidence gaps can be highlighted, and processes put in place to involve the industry in data collection. Robust fishing activity data, for example, can supplement the validation of implemented management schemes and can provide evidence to support new or the reintroduction of activities to an area.

This component of the MPA Fisheries Management Toolkit explores the types of data used in fisheries management decision making, providing guidance on data suitability and outlining processes to encourage greater stakeholder participation in data collection for management.

2 How and When to Include Data and Evidence in the Process

In order to build a coherent picture of the site and increase our understanding of the response to management there is a need to consider long-term data, trends and patterns particularly when reviewing management in an MPA. Comprehensive datasets can help to validate whether management is effective and helping to achieve the conservation objectives of the features they protect. Evidence can also be used to determine whether to permit new activities or reintroduce previously restricted activities.

To support management development and review, evidence of trends and changes relating to the following factors are of particular importance:

- Activities affecting MPAs and their protected features, bearing in mind these activities may not be inside the site boundary;
- Technology and changes in technology;
- Commercial factors;
- Environmental factors.

Stakeholder data relating to some of these factors can be used to inform decision making during this key phase, or under certain circumstances, to trigger a review (see [Triggers and Thresholds for Management Review](#)). For example, fishermen using modified gears may be able to collect data on changes to catch which can inform the evidence base for gear impacts. Further details on some of the types of data which stakeholders can provide are given in *Data & Evidence Table 1*.

Site specific considerations help to highlight current ecological condition, existing activities affecting the site and management measures. Undertaking an initial data review is a useful means to establish what information is currently available and to highlight any gaps in the evidence. By marine industries sharing knowledge and evidence on the distribution of features, feature condition and fishing activity levels, alongside infrastructure levels and locations, uncertainty in the combination/cumulative effects of industry activity within a site may be addressed.

Data & Evidence Figure 1 represents the range of data types and how these can be fed into an adaptive management cycle, showcasing the key stages of the cycle in which stakeholder evidence can inform decision making. Stakeholder evidence can primarily be fed in when the management of a site is either first developed or during an iterative stage when the management is reviewed. Evidence collected through formal data collection processes may be enhanced by the provision of experiential evidence from fishers. This can help to reduce uncertainty and ensure a more proportionate approach to management can be taken. When precautionary management decisions have been made in the face of uncertainty of the evidence, new information can be fed into the process, triggering a review of the management to support tighter or more relaxed restrictions on activity.

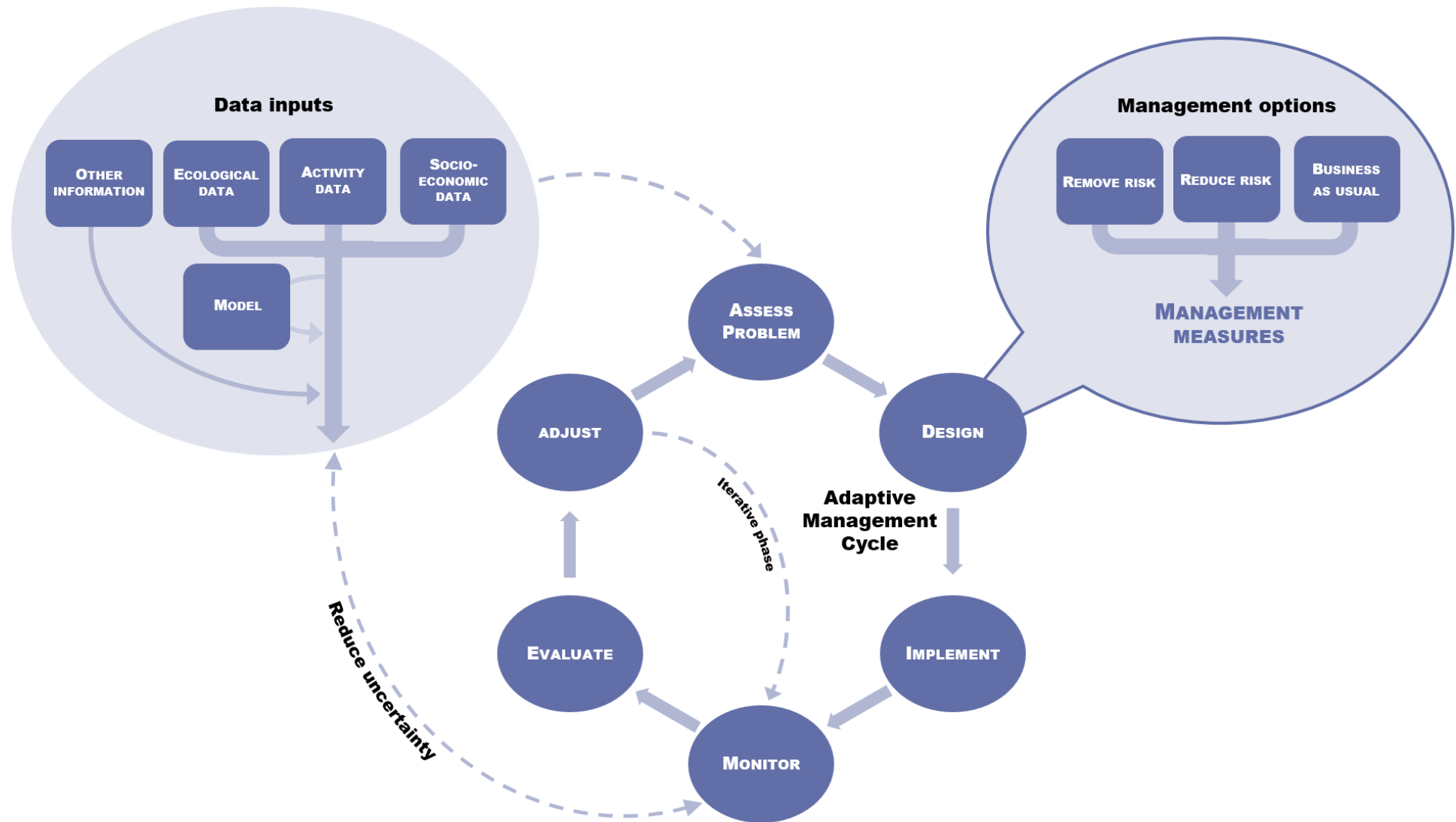
To ensure information is treated appropriately, is fit for purpose, and stakeholders are aware of how their data will be assessed and used; a process for the review and use of evidence should be agreed with transparent guidelines. When developed with stakeholders, this may identify stakeholder data collection capabilities and limitations, explore issues associated with data sensitivity and usage requirements and address expectations over the application of the data.

Guidelines for Industry-Science Data Collection¹⁸ (Mackinson et al, 2017) provide step-by-step instructions to help fishers generate credible and relevant data which can be applied as scientific evidence in fisheries management. The guidance emphasises collaboration between fishers, scientists and managers through an engagement process and is underpinned recognising fishery presents a unique set of management challenges to address.

The Marine Management Organisation has produced a Marine Protected Areas Fisheries Assessments Methodology¹⁹ as part of an approach to ensure that a strong evidence base is used to implement the management of commercial fisheries within MPAs. Alongside formal fisheries activity data and ecological information, it is also possible to incorporate experiential self-reported patterns of activity into the evidence base. In the absence of more detailed spatial data on fishing activity for the small scale fleet this stakeholder evidence can provide managers with an indication of patterns of fishing activity within sites and help to inform an understanding of fishing activity/feature interactions.

¹⁸ Guidelines for Industry-Science Data Collection Available at: https://www.fishingintothefuture.co.uk/wp-content/uploads/2017/07/Data-Protocols-Guidance_FINAL-CLEAN.pdf

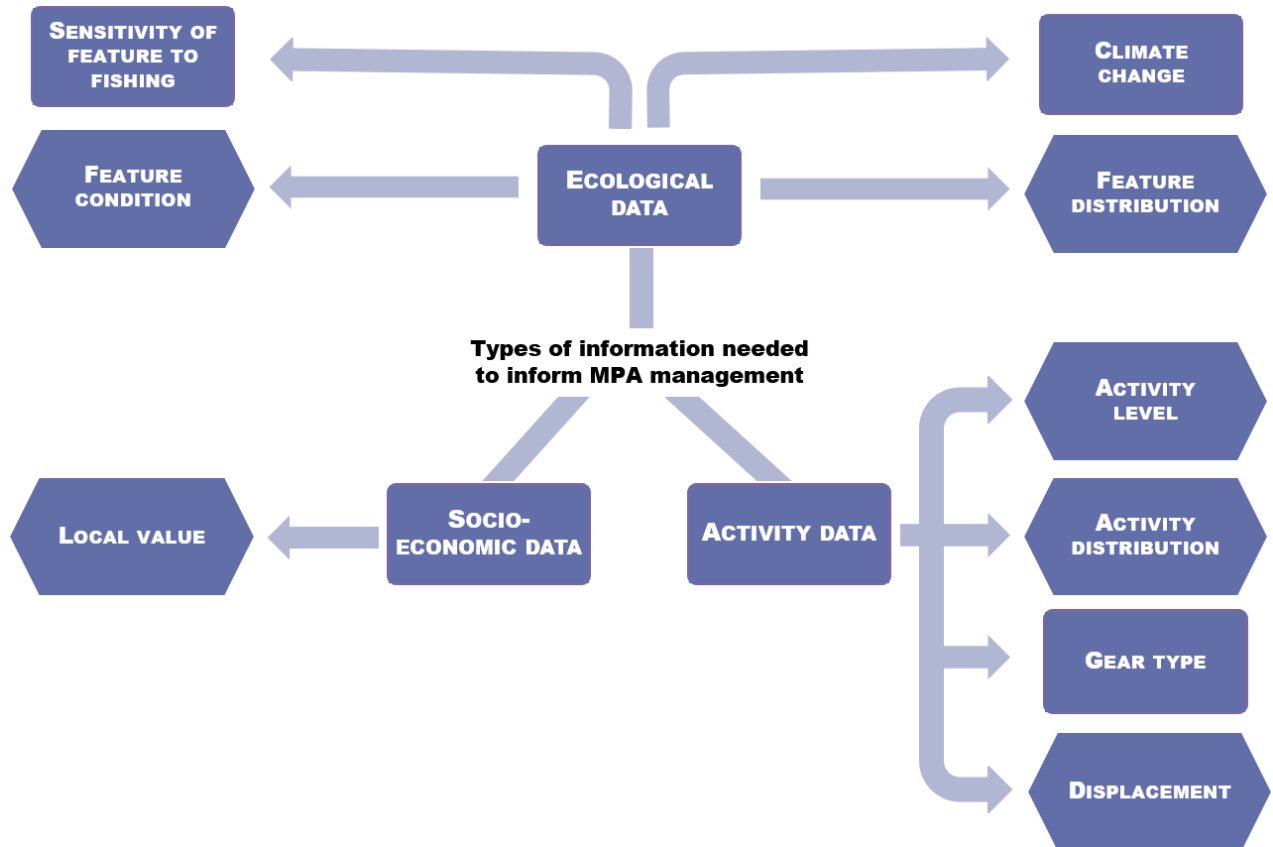
¹⁹ MMO Marine Protected Areas Fisheries Assessments Methodology available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/640427/The_MMO_MPA_Fisheries_Assessment_Methodology.pdf



Data & Evidence Figure 1: Data flow diagram for an adaptive management cycle, highlighting the use of stakeholder evidence within the cycle. Diagram adapted from Williams & Brown (2018)

3 Types of Information and Practical Considerations

The information needed to fully support adaptive management of fishing activities in MPAs is illustrated in *Data & Evidence Figure 2* including ecological, activity and socio-economic. Data, knowledge, and information under these categories may come in many forms, originating from either formal data collection processes (e.g. scientific survey and data analysis) or via the collection or sharing of experiential knowledge from stakeholders.



Data & Evidence Figure 2: Types of knowledge and data needed to inform management

Although the quality of data available may vary, all sources of information have the potential to enhance management decision making. As part of a participatory process, a framework to critically appraise evidence may be applied and discussed with stakeholders so that data may be integrated as part of the evidence base to inform decision making. The framework can also be used to clearly identify the limitations around how information can be used which are important to include in discussions before the evidence is used.

Information may be generic and/or site specific and should be:

- From a reliable source
- Fit for purpose
- Best available
- Accompanied by an assessment of any limitations, gaps and areas of uncertainty.

Collecting and assessing such information can present challenges. These should be considered early in the decision making process and agreement reached on how they can be addressed.

Key challenges include:

- The time and cost required to collate information, review it and assess confidence;
- Establishing trust between stakeholders and managers;
- Understanding how much information is needed to reduce or remove uncertainty and prioritising data needs;
- How and when to extrapolate relevant information across and between sites.

The following table (*Data & Evidence Table 1*) outlines some of the types of data used for management and their potential limitations, providing clarification on how different data types can and can't be used. Discussing these limitations can help to manage expectations of using experiential data within the management process.

Data & Evidence Table 1: Limitations of Data Types

Data variable	Limitations	Data collection type
Fishery distribution, intensity & gear type (Activity data)	Resolution: VMS provides a position every 2 hours, but for vessels under 12m distribution of effort is at a much broader scale. Confidence: There are issues around confidence of interpolation of fishing tracks from VMS and relating to gear use. Commercial sensitivity: In areas with few fishers there may be issues over sharing data due to commercial confidentiality.	Formal
Displacement (Activity data)	Confidence: Difficult to forecast displacement patterns. Commercial sensitivity: There may be issues sharing information on displacement patterns due to commercial confidentiality.	Formal & Experiential
Feature distribution, sensitivity and condition (Ecological Data)	Resolution: Data collection is costly. Confidence: Use of modelled data, expert judgement and proxies reduce confidence in these data.	Formal & Experiential
Climate change (Ecological Data)	Confidence: Difficult to forecast impacts from climate change in a way that can meaningfully inform management.	Formal
Experiential data	Data type: Qualitative data can be difficult to include in combined data reviews. Confidence: Experience of source can dictate the effectiveness of the data. Commercial sensitivity: Lack of trust from industry on uses of their information.	Experiential
Scientific research	Resolution: Scale of the research varies, and statistical analysis used / sampling equipment can be incomparable. Confidence: Use of modelled data Resources: Scientific material can easily become outdated due to funding/ resources being unavailable to update site information.	Formal
Natural variation	Confidence: May be difficult to disentangle from human impacts.	Formal

When considering data for management the following questions can help guide discussions and prioritise next steps to ensure sufficient data is acquired for use in the process:

- What types of data are missing?
- How would this help reduce / remove uncertainty?
- What are the limitations / risks of using the data?
- What is the time and cost required to collect and collate data or information, review it and assess confidence?
- Do the data have relevance to only one MPA or is of relevance to other sites as well?

Once data has been identified it is important to establish the priority of obtaining that data. Data priorities can be mapped using the following matrix in *Data & Evidence Table 2*.

Data & Evidence Table 2: Data priority matrix

	Easy to get	Hard / costly /time-consuming to get
Essential	High priority	Low priority - Pause until we have it or make agreed assumptions, act and monitor
Nice to have	Medium priority	Not worthwhile

4 Understanding Evidence Risks

Risk can be reviewed in two different ways when it comes to considering evidence for MPA management; a) Risk relating to data confidence (confidence in the evidence that is used) and b) Risk to achieving the conservation objectives (ensuring that the evidence used to justify management measures is robust and that the management measures will minimise the risk of not achieving the conservation objectives).

4.1 Risk relating to data confidence

Understanding the risks associated with data is a fundamental in pulling evidence together and informing discussions with stakeholders. When there is high confidence in the underlying data, greater certainty over the conclusions from the assembled evidence may be drawn. Conversely, where there is low confidence in the data, there is less certainty in the conclusions and a higher risk of misplaced dependence on the data. To ensure evidence is reviewed and considered consistently, it needs to be presented with consideration of the limitations and should follow a standard format. This allows managers to accurately assess data risks.

The [Ecological Network Guidance](#) used in the MCZ designation process provides guidance on the importance of using best available evidence, which is in line with the precautionary principle in ensuring that a lack of full scientific certainty should not be a reason for postponing decisions. The type of evidence and the level of detail (number of measurable variables) required increases as the process moves from the initial identification (economic effect is low), through designation to implementation (economic effect potentially high) ([JNCC & Natural England, 2011](#)).

During the process for designating marine conservation zones in Secretary of State waters, Natural England and JNCC drafted a series of protocols to explain the process and ways of assessing confidence in datasets used, due to the range of sources data was submitted from. [Protocol E: Assessing the scientific confidence in the presence and extent of features in proposed and recommended Marine Conservation Zones](#) explains how evidence was assessed and rated in confidence. These guidelines may be a useful example on how to incorporate various data types in an offshore fisheries management scenario.

The guidelines for [Industry-Science Data Collection](#) also provide a comprehensive level of detail on data formats and how to discuss and address data limitations (Mackinson *et al.* 2017).

4.2 Risk to achieving the conservation objectives

This risk is again underpinned by data confidence; assessment of this risk is closely linked to the level of certainty that the data underpinning management decisions are valid. As the data used to inform management decisions can be complex and have varying levels of associated confidence, it is generally not possible to quantify the degree of risk to achieving the conservation objectives posed by the different management options. It is, however, possible to identify where risk may exist and where they could be minimised through the introduction of management measures.

When direct evidence relating to the impact of a fishing activity is limited, management options may be subject to amendment as and when new evidence becomes available. During the process for developing proposed management measures for offshore MPAs under the Common Fisheries Policy, for those sites in which there was uncertainty regarding the impacts of a fishing gear on the structure and function of a habitat and its long-term survival, an adaptive management approach was proposed. In these scenarios, a proportion of the feature was proposed to be closed to gears and subsequently monitored to improve understanding of

the impacts and inform future cycles of iterative management. [Fisheries Impacts Guidance](#) was used to inform on the risks posed by using different management options, and this guidance informed the creation of site-specific Fisheries Management Options papers to support discussions around suitable management options at the start of the process. This guidance may provide a useful example of the degree of evidence required to ensure confidence in management decisions.

5 Data Storage

There is potential for considerable amounts of data to be submitted through a participatory management process. Therefore mechanisms for data ownership, storage, privacy and access need to be developed during the planning stage.

There are a number of public databases currently available which could be used. Data hubs such as the Marine Environmental Data and Information Network²⁰ (MEDIN) promotes open sharing of and improved access to a wide array of marine data used by different organisation as well as the Fisheries Data Archive Centre²¹ (FishDAC), held by Cefas.

Wherever data is stored, a data agreement should be put in place for all contributors, project partners and stakeholders to ensure adequate levels of protection and access are agreed. The cost of maintaining and updating evidence databases also needs to be considered.

6 References

JNCC & Natural England, 2011. Levels of evidence required for the identification, designation and management of Marine Conservation Zones. Marine Conservation Zone Project. Available at: <https://hub.jncc.gov.uk/assets/c812bf90-1e37-4623-ab6a-e97f471a2492#MCZ-LevelsOfEvidence-2011-JNCC-NE.pdf>

Mackinson, S., Mangi S., Hetherington, S., Catchpole, T., Masters, J. 2017. Guidelines for Industry-Science Data Collection: Step-by-step guidance to gathering useful and useable scientific information. Fishing into the Future report to Seafish. 65p. June 2017.

Williams, B. K. & Brown, E. D., (2018). Double-Loop Learning in Adaptive Management: The Need, the Challenge, and the Opportunity. Environ Manag, p1-12.

²⁰ MEDIN available at: <https://www.oceannet.org/>

²¹ FishDAC available at: <https://www.cefas.co.uk/cefas-data-hub/fishdac/>

Decision Making



Decision Making

Triggers and Thresholds as Indicators for Management Review

To implement an effective adaptive management approach, a series of **triggers** or **thresholds** may be required to initiate periodic review of existing management measures.

Two approaches to monitoring:

Effort based

- VMS
- Landings
- Surveillance
- Expert knowledge

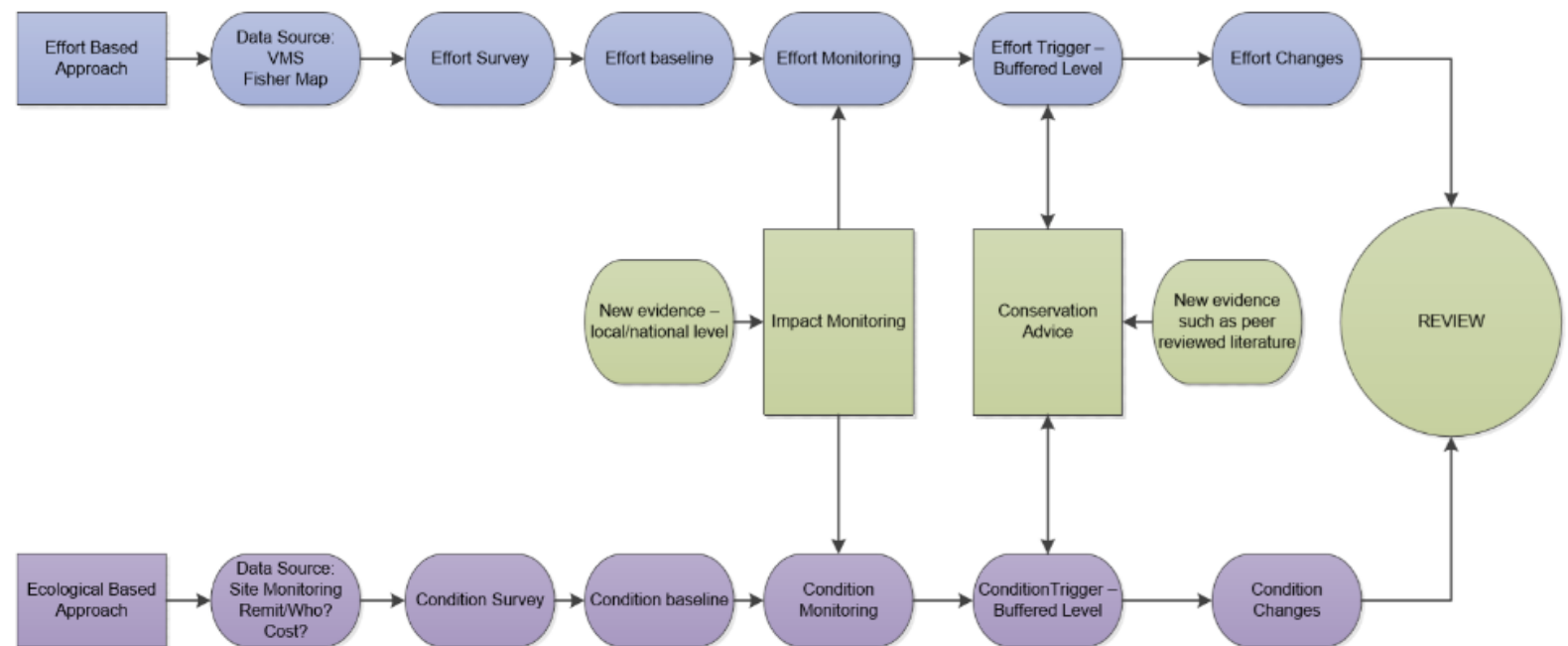
Ecological based

- Condition assessment
- Feature specific data
- Environmental data
- Ecological modelling

Trigger factors

Factors which may trigger a review of management include:

- New information on feature location, sensitivity or condition
- Change in conservation objective
- Change in fishing activity



Triggers and Thresholds as Indicators for Management Review

1 Background and Introduction

The Government is committed to delivering a 'Blue Belt' of well-managed Marine Protected Areas (MPAs) around our coasts. The MMO and IFCA support this by assessing the impacts of fishing in each MPA and identifying, implementing, and enforcing management measures to support achievement of conservation objectives in MPAs.

MPA management measures for fishing can include, but are not limited to: voluntary measures, MMO byelaws to control activities in MPAs between 0 and 12 nautical miles (nm)²², IFCA byelaws between 0 and 6 nm, and (until January 2021) EC Regulations to manage fishing activities in offshore MPAs 12-200 nm. The byelaw processes are outlined in the [Guidance on Governance Options](#) document within this Toolkit.

As part of a typical assessment and management cycle for fisheries in MPAs, the MMO and IFCA establish monitoring programmes to:

- monitor compliance with any management measures (MMO or IFCA byelaws);
- facilitate ongoing understanding of activities in order to inform risks and trends, and refresh assessments or develop management accordingly (the focus of this paper).

IFCAs have primary responsibility for monitoring fishing activity in MPAs between 0 and 6 nm and the MMO has primary responsibility for this monitoring between 6 and 200 nm. This monitoring feeds into the iterative phase of the adaptive management cycle outlined in the [Adaptive Risk Management-a review in the context of MPAs](#).

Both the MMO and IFCA will review all MPA assessments and management measures at least every five years. However, a review may also be initiated at any time if significant new information is received that triggers a review, which may lead to a revised assessment of the risks posed to MPAs. Further information on this style of adaptive management is outlined in the [Adaptive Risk Management-a review in the context of MPAs](#).

A review is different from a revision, a review can result in no change being required to management measures. In the cases where a review results in revisions to management measures being required then these revisions will be assessed (according to the level of difference proposed). A balance is required around the need for review and the resources the review will require; high risk sites should be prioritised for more frequent review.

²² Under sections 129-133 of the Marine and Coastal Access Act 2009.

2 Triggering a Review of Management Measures

The factors which might trigger a revised assessment of the risks posed to MPAs, which could result in new management measures being developed, include the following:

- New information on feature location (e.g. from stakeholders or through SNCB²³ survey work);
- New information on feature sensitivity (e.g. through new SNCB advice);
- Revised/updates on conservation objectives (provided as part of SNCBs statutory obligation, see [Roles and Responsibilities](#));
- Revised/updates on feature condition (provided as part of SNCBs statutory obligation, see [Roles and Responsibilities](#));
- Change in fishing operations from that assumed in previous MPA assessments, for example:
 - Significant increase or decrease in activity levels (e.g. where improved data capture or information from stakeholders' results in a change to previously measured or assumed activity levels or where there is a verifiable permanent/long-term change in fishing patterns)
 - Significant change in seasonal patterns and/or distribution of activity
 - Significant change in gear type, gear modifications and/or fishing practices
 - Significant new information regarding potential impacts (e.g. new evidence relating to the impact of gears that may not have previously been considered as having an impacting)
- Modelled data on the impact of fishing displacement;
- Fisheries data (i.e. catch per unit effort) for review of seasonal closures.

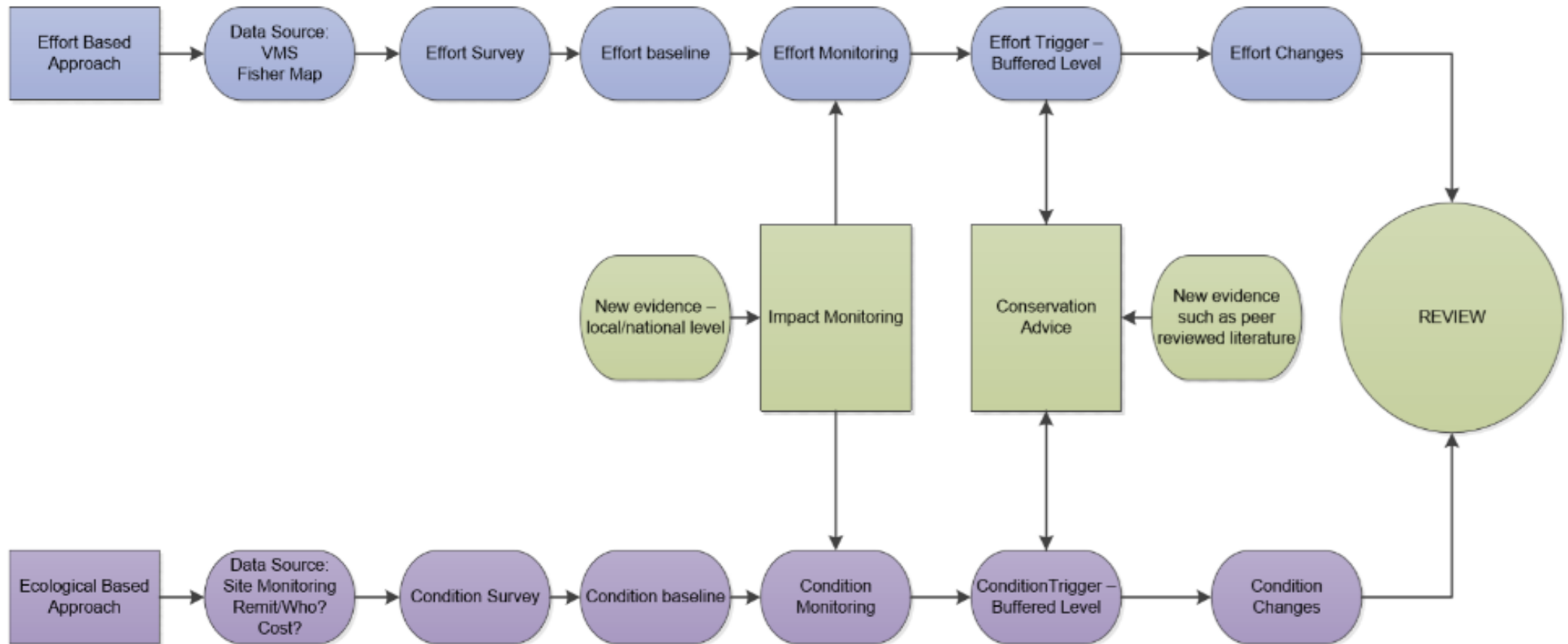
The MMO and IFCAs will work with SNCBs to establish the most effective way in which new information will be factored into the framework for MPA assessments.

The triggers identified fit broadly into two categories; effort and ecological based (*Decision Making Figure 1*). In both cases there are actions which could apply, such as impact monitoring, the establishment of precautionary trigger levels for relevant triggers through SNCB advice and application of such levels. The establishment of site/feature/effort trigger levels would be explored as part of the initial site assessment by the regulator but could be refined (up or down) during the adaptive management process. The levels would be set at a precautionary level, to ensure reviews are conducted before harmful condition/effort levels were actually reached.

In terms of the review process, it is envisaged this could be a two-step process, commencing with an initial review which would be an internal process led by the regulators. If the review results in the need to revise management this would follow the normal management procedures which have a much broader participatory scope.

Data collection to improve the evidence base for MPAs could contribute to both the effort and ecological base data requirements. The [Data and Evidence Recommendations](#) section provides further information on what and how stakeholders could contribute relevant data.

²³ Statutory nature conservation bodies (SNCB): Natural England (0-12 nm) and the Joint Nature Conservation Committee (12-200 nm).



Decision Making Figure 1: Adaptive management review trigger types

Effort Based Monitoring (fishing activity)

A risk based, intelligence led approach is typically applied to MPA monitoring and control. Each site is assigned a suite of surveillance and intelligence led monitoring and control measures that are proportionate to the risks posed to MPA features.

Effort based monitoring may include the following:

- Review of vessel monitoring system (VMS) data from vessels which are 12 m or over in length.
- Increased VMS reporting rates can be applied to increase the precision of data available.
- Automatic VMS notifications can be applied to alert managers when vessels enter a defined area.
- Landings data recorded in vessel logbooks or provided as a requirement under an IFCA or MMO byelaw.
- Targeted or opportunistic monitoring carried out by patrol vessels and surveillance aircraft (e.g. IFCA, MMO and Royal Navy fisheries patrol vessels and Boarder Enforcement patrol vessels). Here all activities (including fishing) within the MPA is recorded.
- Expert local knowledge from coastal MMO and IFCA officers used to verify and establish ongoing activity levels, particularly for under 12 m fleets.
- All VMS data, landings data, MPAsum inspections and intelligence is reviewed and reported on annual for each MPA (MPA annual reporting).

Ecological Based Monitoring (feature/environmental data)

Nature conservation bodies such as Natural England (NE) and the Joint Nature Conservation Committee (JNCC) have a statutory responsibility to produce advice to assist in monitoring UK MPAs. Data is collected with a range of partners to deliver MPA monitoring surveys including scientific bodies such as Cefas, academic institutions or industry. The evidence is used to assess the condition of habitats in MPAs, report on whether the MPAs are meeting their conservation objectives and support advice on MPA management.

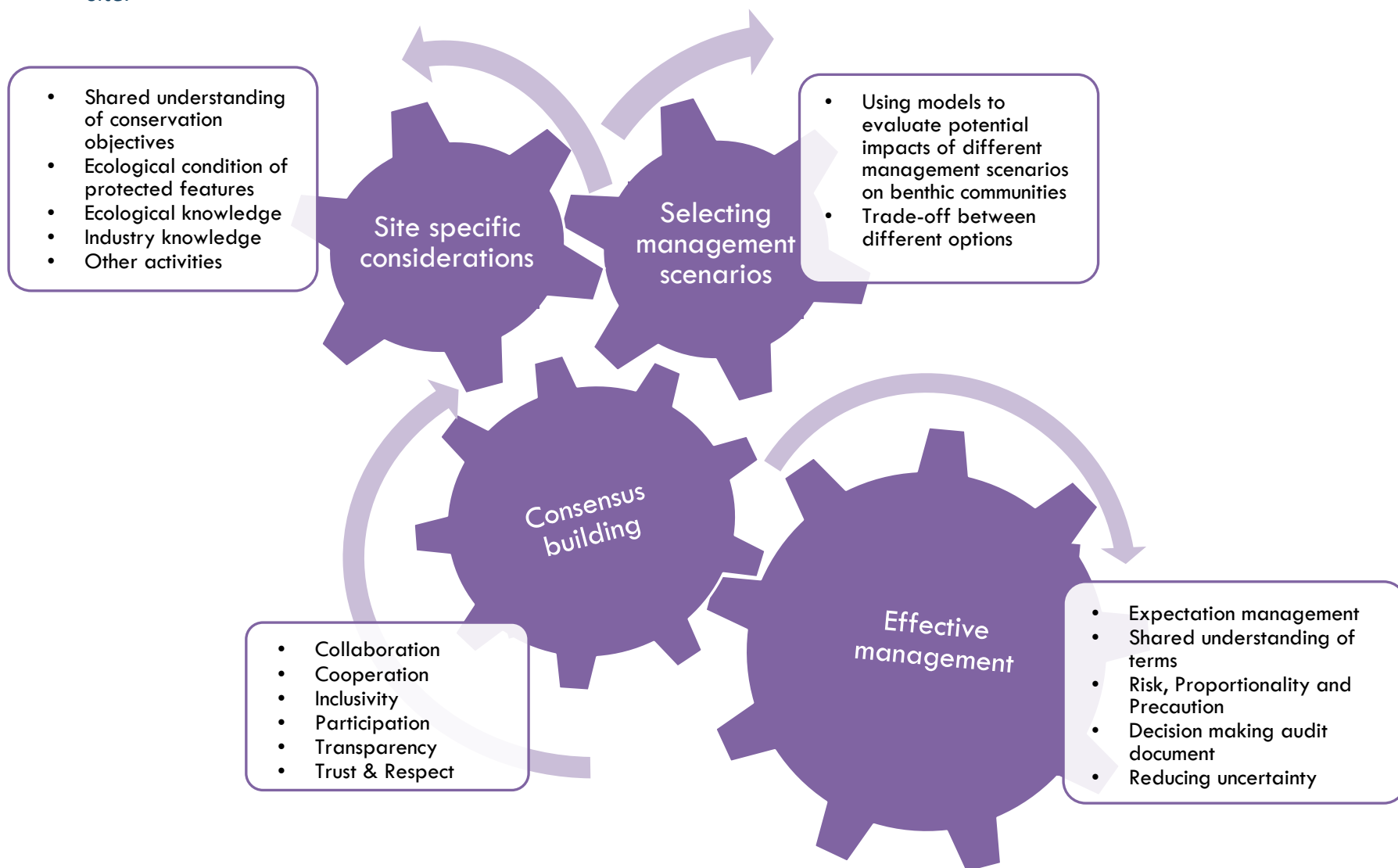
Ecological based monitoring may include the following:

- MPA condition assessments
- Feature presence, extent and distribution data
- Feature sensitivity data
- Environmental data (as a proxy for future changes in feature distribution/sensitivity), for example smelt are a protected feature in some MPAs but due to temperature changes smelt are moving outside of site boundaries
- Modelled ecological data (habitats, species and environmental)
- Potential impact focussed monitoring (data collected alongside fishing effort data)

Decision Making

Fisheries Management Decision Making

The end goal of developing a participatory approach to management of fishing activity is delivery of effective, legally compliant management which best meets the needs of all stakeholders and meets the conservation objectives set for the site.



Fisheries Management Decision Making

Depending on the characteristics of the MPA and the type of fisheries occurring, a range of management options may be available to managers, differing in the degree of restriction they place on fishing operations and the risk they pose to achieving the conservation objectives within an MPA. Applying the best available evidence should make it possible to identify where risks may exist, and where these could be reduced through the introduction of management measures so that significant risks of achieving conservation objectives are appropriately mitigated.

Additional evidence identified during the decision-making process can help to reduce residual uncertainty, and this should be flagged at the earliest opportunity to scope stakeholder involvement in gathering evidence. Recommendations and requirements when considering data and evidence within a participatory process are outlined in the [Data and Evidence Recommendations](#) section of this toolkit.

1 Preparing for a Participatory Decision-making Process

Decision-making in the management of MPAs is guided by legal requirements and official guidelines providing for evidencing, formal assessment and consultation. In Secretary of State (SoS) waters these processes, as they relate to the making of byelaws, are laid out as flow diagrams in the [Supporting Material](#) of this toolkit. Although there is no requirement to adopt a participatory approach into formal decision-making, there are many examples throughout the UK where such an approach has been taken in the development of MPA fisheries management proposals.

Establishing and managing participatory approaches are covered within this toolkit including establishing [roles and responsibilities](#) and preparing an [engagement strategy](#). Although most sites will have a legally defined review period to assess the condition of protected features, all actors participating in management decision-making may wish to agree on specific [triggers and thresholds](#) upon which management review may be invoked.

2 Effective Management

Effective MPA management can be defined as the degree to which management actions are furthering the Conservation Objectives of the site being managed. Effective management should be proportionate to the risks posed by the fishery while being suitably precautionary in mitigating the risks to achieving conservation objectives in the face of uncertainty.

Participants involved in a decision-making process need to have a shared understanding of the uncertainties involved and the extent of risk associated with management outcomes. This will assist in helping to manage expectations regarding outcomes (decisions) and will also encourage shared ownership of those outcomes.

Clear agreements on terms used should be put in place to support key decisions made. The [Glossary of Terms](#) in the Supporting Material of this toolkit has been developed to provide descriptions of common terms and language used in developing participatory approaches to management of fishing activity in MPAs.

The current regulatory framework surrounding designation and management of UK MPAs is complex. All stakeholders involved in the decision-making process should be made aware of

the relevant legislation that drives the process of MPA management and understand the legal obligations of regulators. Please refer to the Driving Purpose component where a [summary of MPA legislation](#) is provided.

Management objectives should be made clear and effectively communicated, and this may be assisted when key management concepts are also conveyed, including risk, precaution and proportionality described in the key concepts box below.

Key concepts in environmental risk management

Risks are assessed using likelihood of something happening, the magnitude of impact if it does and the reversibility of the effect. The level of uncertainty in the information available also needs to be clarified. Understanding risk in deciding on management options requires reviewing changes in the evidence base and the implications of those changes. Discussions on risk, uncertainty and precaution are required using consensus building techniques to ensure there is a shared understanding within the group.

Proportionality means this idea should be applied in a proportionate way (reflecting risk) - when it matters - and not used as a tool to unnecessarily stop all human activities. The assessment of proportionality is based on factoring in the level of risk to meeting a conservation objective taking into account the level of uncertainty in the context of the expected social and economic outcomes of a decision.

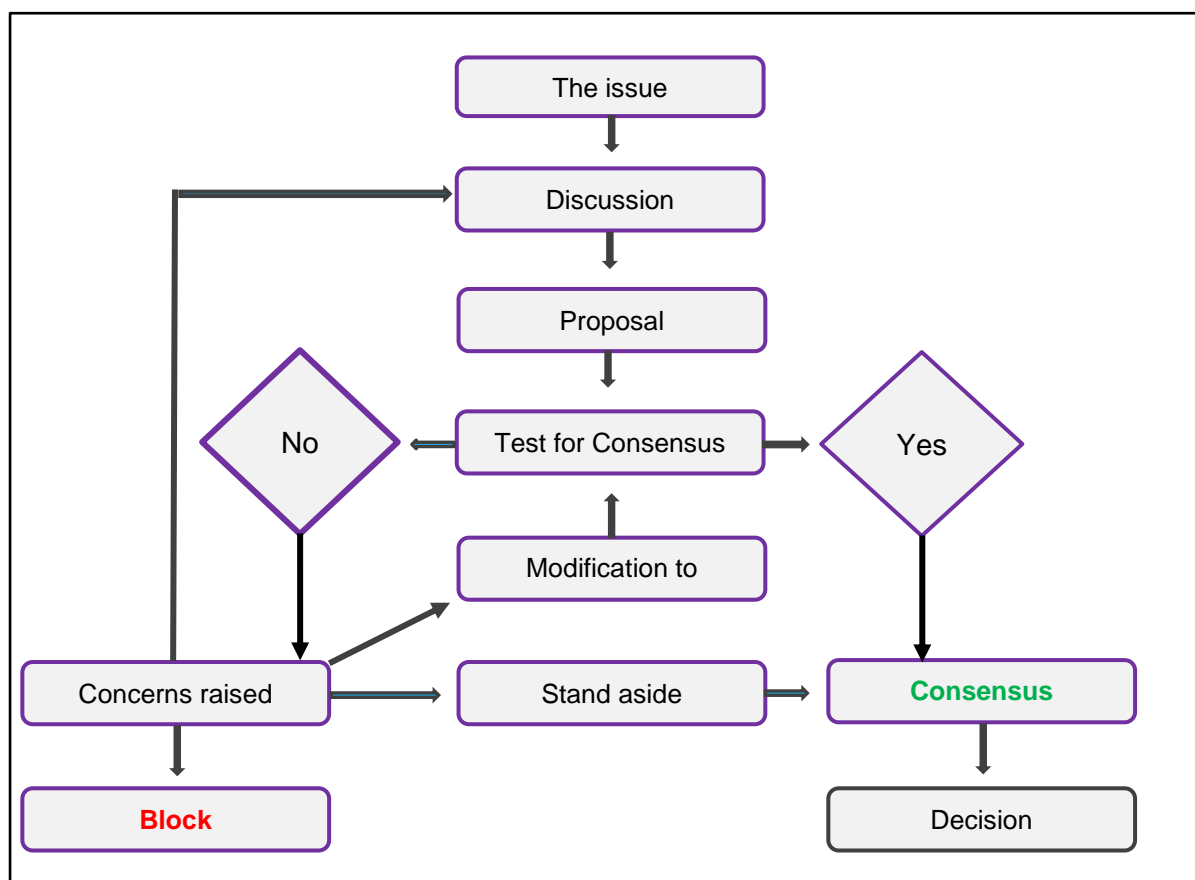
Using **precaution** in environmental decision-making means not doing something to the environment if the effect that action / activity will have is unknown. The precautionary principle generally defines actions on issues considered to be uncertain and can be applied in assessing risk management.

There is no universally accepted definition of the precautionary principle, however the 1992 Rio Declaration on Environment and Development is frequently referred to: *'Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation.'*

3 Promoting Consensus Building within the Decision-making Process

Depending on the legal obligations of regulators and advisors, the time, [logistic requirements](#) and resources available, a process aimed at building consensus with stakeholders may be an appropriate approach to fisheries management decision making. High level guidelines for consensus building are provided in the [Stakeholder Engagement](#) component of this toolkit.

The decision-making process presented in *Decision Making Figure 3* depends on which stage of the management cycle the site is currently in; whether the aim is to design new measures for management or review existing measures.



Decision Making Figure 3: A consensus based approach to decision making

Throughout the decision-making process, the approach should be transparent. For sensitive issues it is often beneficial to consult key stakeholders individually, prior to the 'official' stakeholder engagement process, in order to assess the perceptions and opinions about what is being proposed. These will assist in gaining insight on who will support and who will oppose potential management interventions and their reasons. It will also highlight key issues among stakeholders as well as differing opinions.

Trust and respect between managers and stakeholder groups is key. Participatory approaches using consensus decision making aim to build trust and encourage shared ownership of work

being undertaken in a group. This leads to a high level of commitment which is linked to respect for the process.

The essence of a participatory process should therefore be inclusive - everyone's opinions need to be heard and acknowledged. Discussions around management issues can often lead to disagreement and if not managed with respect can then lead to conflict and hinder progress. Fostering a comfortable environment for members by creating transparency and building new relationships supports broad participation and respect in the process.

Respected decisions require clear understanding of why and how those decisions have been made. Objective decision making should be evidence based. An audit document of decision making should be maintained throughout a participatory process. Due to challenges associated with applying participatory approaches (such as attendance and continued engagement), an audit can provide a concise summary of discussions and decisions to date, which can then be used as a reminder for participants in the process and convey how decisions have been reached for new participants or those unable to attend regular meetings.

4 Site Specific Considerations

The characteristics of an MPA and the nature of fisheries taking place will influence whether and how a participatory approach may be applied as part of decision-making. This may be informed by undertaking a preliminary assessment of fishing activities when planning initial MPA measures; or conducting an initial data review, as part of a management review process that will also establish what information is currently available and highlight any evidence gaps. Please refer to the [Data and Evidence](#) component of the toolkit for guidelines and helpful tips on data and evidence recommendations.

Conservation advice is available for most UK MPAs and provided by statutory nature conservation bodies (SNCBs). These resources should be used in conjunction with local stakeholder knowledge to build a detailed picture of site-specific considerations, establishing what data / evidence/ anecdotal information is available and where any data gaps exist.

Natural England provides conservation advice packages²⁴ for nearshore MPAs (<12 nautical miles) and the Joint Nature Conservation Committee hosts the Site Information Centres²⁵ for offshore MPAs (>12 nautical miles).

The Conservation Objectives of a site set out the broad ecological aims for the site's protected features. It is important to build a common understanding within a participatory process on the conservation objectives, as these form the end goal of management implementation. The risks in not achieving the conservation objectives for a site are commonly referred to within a management process. Perceptions of evidence on fishing impacts and levels of uncertainty in the current evidence base need to be addressed within the group to encourage a shared understanding of the site specifics.

Other site-specific considerations should include:

- Ecological knowledge e.g. from scientific surveys, site condition assessments;
- Industry knowledge e.g. locations of features, where fishing is occurring etc.
- Information on other relevant activities.

²⁴ Natural England Designated Sites System available at: [conservation advice packages](#)

²⁵ JNCC Site Information Centres available at: <https://jncc.gov.uk/our-work/offshore-mpas/>

Supporting information and tools are also available to help reduce the levels of uncertainty when discussing site specifics. These include tools such as the Benthic Impacts Tool which has been developed as part of this MPA Fisheries Management Toolkit and existing resources such as the pressures and activities database²⁶ and sensitivity assessments²⁷ relevant to protected features.

5 Selection of Management Scenarios

A range of potential management options and scenarios may be identified to explore potential trade-offs and preferences. Any preliminary assessment or data review will help to inform the risk profile for a particular fishery and so scope what scenarios form realistic options that strike the right balance in terms of addressing risk to achieving conservation objectives for the site and socio-economic trade-offs.

This information may then be used as part of a participatory process to refine scenarios and take into account stakeholder preferences. Stakeholders should be involved in agreeing the methods used to formulate scenarios and the processes used to assessing their effectiveness and impact.

5.1 Using models to evaluate management scenarios

Models that can be easily manipulated to predict outcomes from alternative scenarios are a valuable tool to support decision-making and participatory processes. For sedimentary habitats where fishing gears are considered to have relatively low unit impact, but impact significance is determined principally by the extent and distribution of the activity, spatial analyses of fishing activity will help to inform appropriate management measures. Models may therefore focus on analysing spatial and temporal distributions of activities and habitat combinations to assess the level of risk to conservation objectives and predict the effects of different scenarios and explore trade-offs.

The following should, however, be taken into account when using models:

- Fisheries managers and stakeholders should appreciate the scientific basis, concepts, and assumptions that lie in the model.
- Models are simplifications of reality and are unlikely to account for all cause and effect relationships:
 - The quality of data inputs:- It may not be possible to include all site-specific data within a model, or data may be absent or of poor resolution, for instance.
 - The context in which a model is applied should be considered and outputs and trade-offs implied closely scrutinised.
 - The implications and knock-on effects as a result of model outputs may need to be considered separately, for example, the implied consequences of displacing existing activities from an area.
- Model outputs are compared to other types of assessment, for example, sensitivity matrix-based approaches.

²⁶ Marine Activities and Pressures Evidence Available at: <https://jncc.gov.uk/our-work/marine-activities-and-pressures-evidence/>

²⁷ Marine Evidence based Sensitivity Assessment (MarESA) available at: www.marlin.ac.uk/sensitivity/sensitivity_rationale

The Benthic Impacts Tool

The concept of Relative Benthic Status (RBS) is at the core the of the Benthic Impacts Tool developed by Bangor University (Pitcher *et al.*, 2017). The tool provides an estimate of benthic status relative to an unimpacted state and can be used to explore and assess the impact of fishing on seabed ecosystems in a *quantitative* way. The tool uses:

1. gear and sediment specific **depletion rates** drawn from published assessments of the relationship between gear penetration depth and depletion of benthic species biomass (Hiddink *et al.*, 2017);
2. **fishing effort** presented as gridded swept area ratios (SAR); and
3. benthic species **recovery rates** drawn from the findings of peer reviewed studies assessing the longevity (lifespan) and sensitivity of benthic species (Hiddink *et al.* 2019).

Fishing pressure may be manipulated within the tool to mimic expected changes in fishing patterns under different management scenarios. This allows a direct comparison of the predicted benthic status values resulting from each scenario, in order to forecast and compare different potential outcomes. The model outputs from the tool can provide an indication of both the trajectory and scale of potential change in RBS in response to the various management scenarios and a projected time to full recovery if fishing were to cease in the area of assessment. The availability and spatial resolution of fishing and habitat data, gear types and inferred depletion rates and recovery rates will all have an influence on the predictive strength of outputs.

Model outputs are only as good as the model inputs, meaning that if poor quality data is input into the Tool then poor quality outputs are expected (for example: poor spatial data resolution or incomprehensive fauna biomass data).

The tool should be used in conjunction with other evidence to assist fisheries managers to consider how a habitat may respond to management and how risks may be sufficiently minimised or mitigated when developing management measures. It may be used to assess multiple options, predicting which options may most likely meet the conservation objectives and which management options may have least impact on fisheries, helping to explore management trade-offs.

As risks and MPA features may change over time, the tool may also assist with monitoring and control functions and management reviews. Therefore, it may also be useful for MPAs where management is in place, as the current level of management would influence the current status quo (i.e. current fishing effort and current habitat) and therefore act as the baseline for further risk assessment. A user manual alongside the Benthic Impacts Tool will be available which goes into further detail about the technicalities, data inputs and also the limitations and assumptions of the RBS model within the tool.

Examples of scenarios using the RBS model are available in the [Supporting Material](#) of this toolkit.

A [User Manual](#) for the Benthic Impacts Tool is provided on the [MPA Fisheries Management Toolkit webpage](#) for further information. The R script behind the Benthic Impacts Tool is available on request and provided through 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.

5.2 Selecting the preferred option

The merits of different scenarios will need to be considered, taking into account:

- The extent to which risks to conservation objectives are mitigated including taking account in-combination effects with other activities;
- The potential displacement of fishing activities and effects of including ecological and socio-economic and associated. Guidelines on assessing displacement effects is available from the ABPmer 2017 report on displacement of fishing effort from marine protected areas (AMPmer, 2017);
- The practicalities of implementing measures taking into account compliance and ease of control and enforcement.

When undertaken as part of a participatory process, stakeholders should be able to help inform these considerations and adjust their preferences accordingly. Residual evidencing issues may be directed to monitoring and control strategies which may be developed as part of the participatory process to determine the preferred option.

It is desirable to aim for consensus over the selection of a preferred option. Ultimately, however, the fisheries management authority will need to be confident that any proposed set of measures sufficiently address the risks to meeting conservation objectives, and where a consensus proposal is not obtainable, take a decision in light of such circumstances.

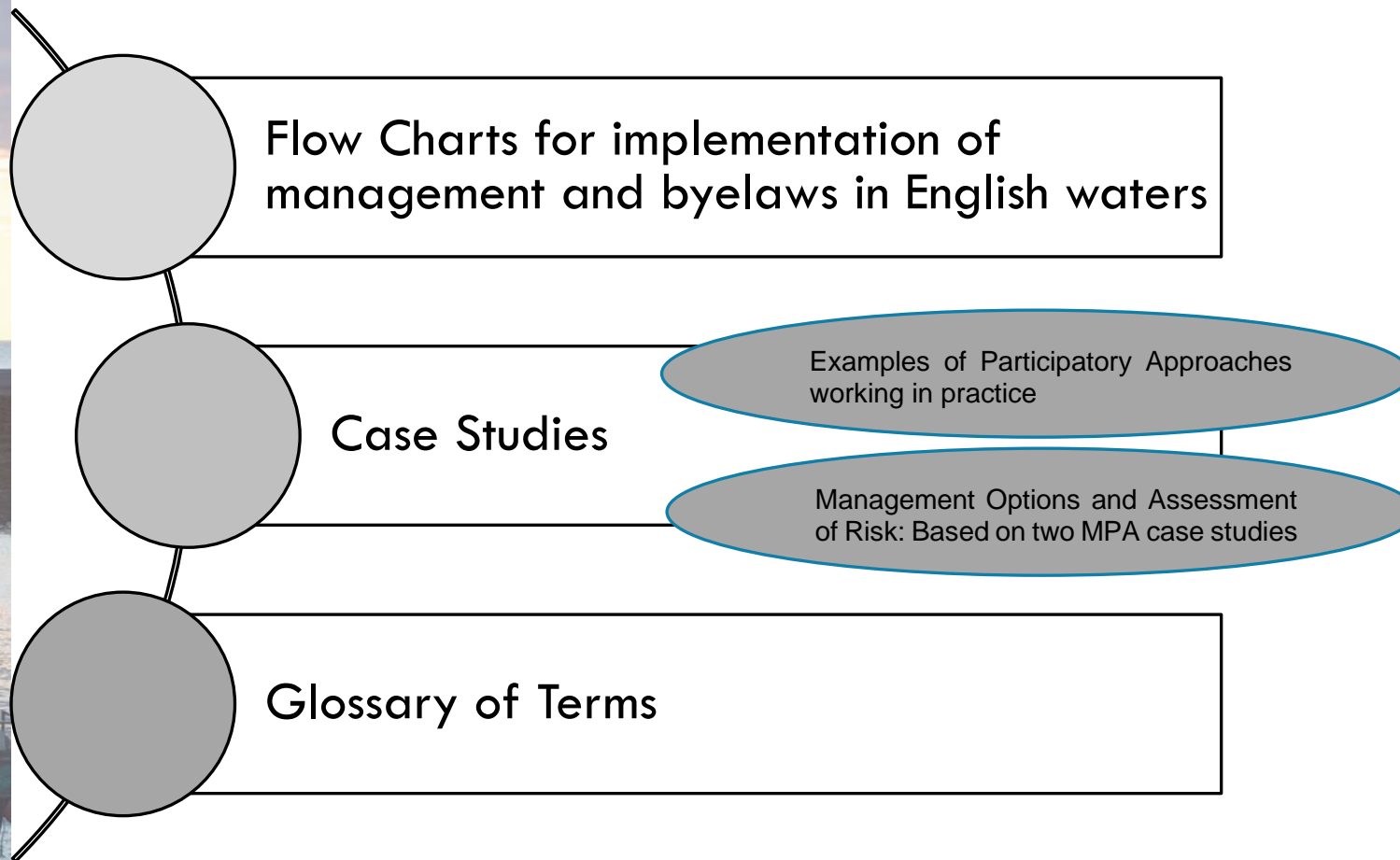
When a preferred option has been selected preparation of formal proposals, assessments and public consultation exercises may progress. If further amendments to proposals are necessary as a result of conducting these formal steps, it may be desirable to re-engage stakeholders involved in earlier participatory processes accordingly.

6 References

- ABPmer, (2017). [Displacement of Fishing Effort from Marine Protected Areas](#), ABPmer Report No. R.2790. Commissioned Reports, Number 241. York.
- Pitcher, C.R., Ellis, N., Jennings, S., Hiddink, J.G., Mazon, T., Kaiser, M.J., Kangas, M.I., McConnaughey, R.A., Parma, A.M., Rijnsdorp, A.D., Suuronen, P., Collie, J.S., Amoroso, R., Hughes, K.M. & Hilborn, R. (2017) Estimating the sustainability of towed fishing-gear impacts on seabed habitats: a simple quantitative risk assessment method applicable to data-limited fisheries. *Methods in Ecology and Evolution*, 8, 472-480.
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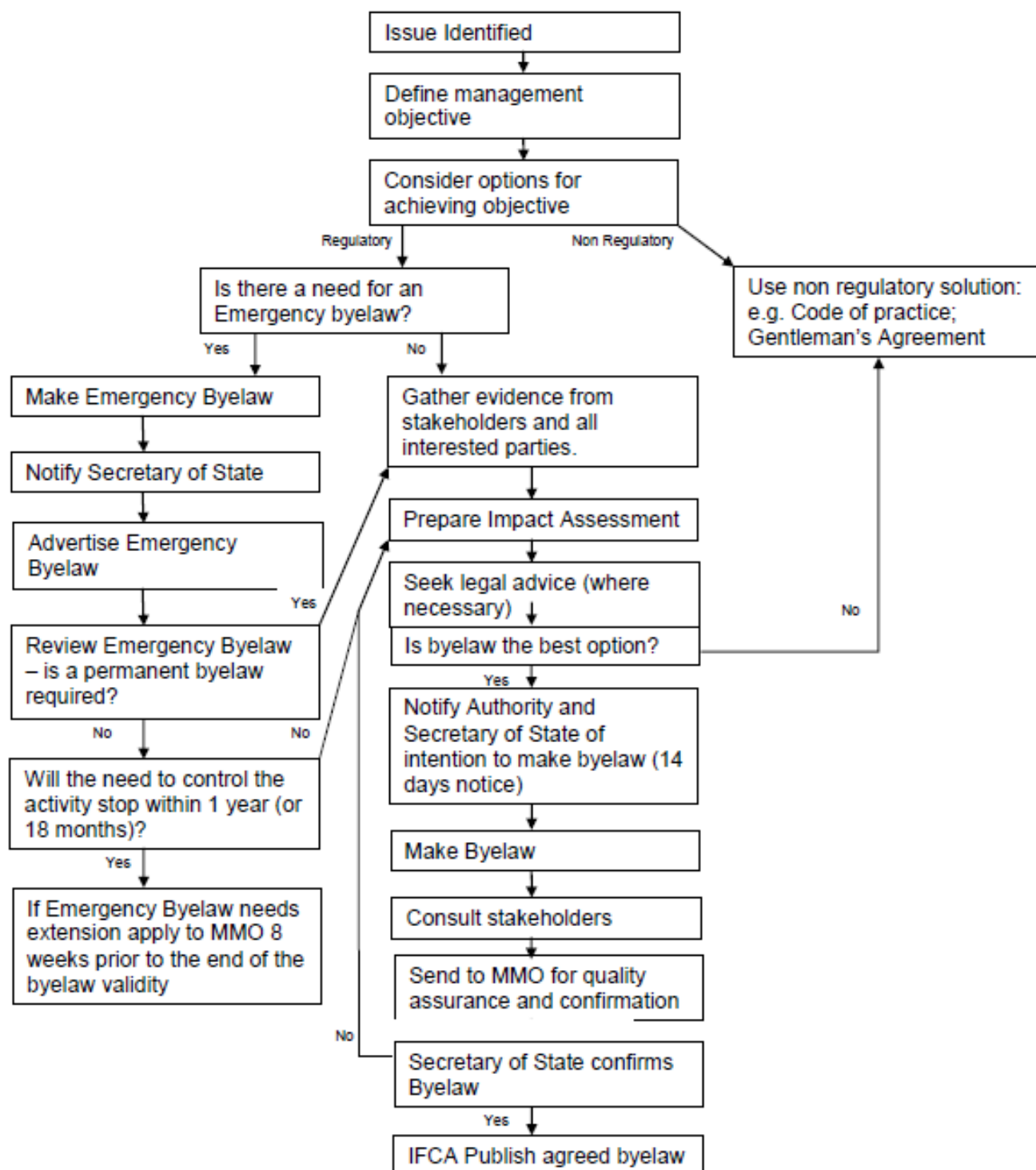
Supporting Material

Flow Diagrams, Case Studies & Glossary of Terms



Flow Charts for implementation of management and byelaws in English waters

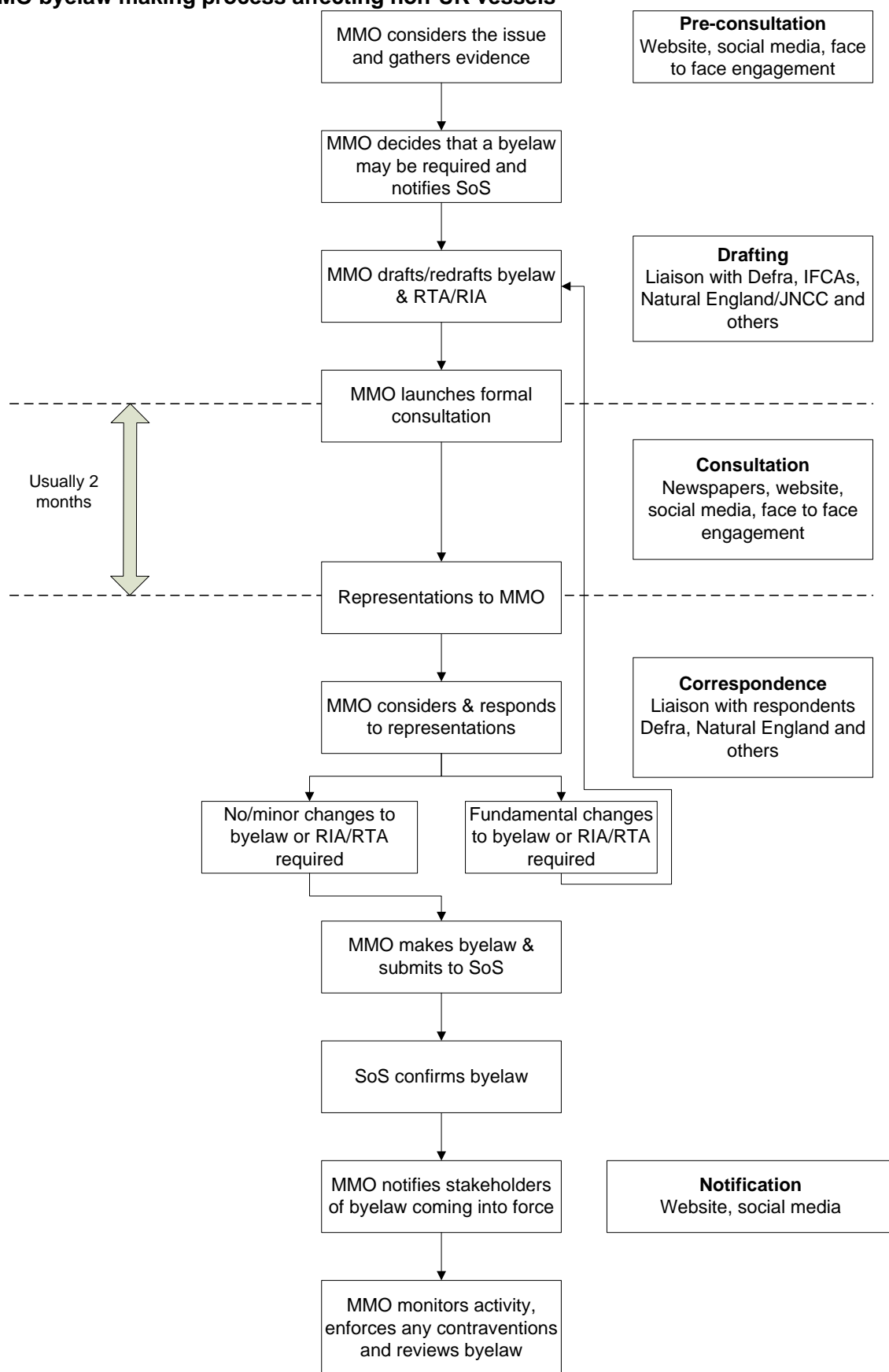
IFCA byelaw making process. Please note this process is currently under review.²⁸



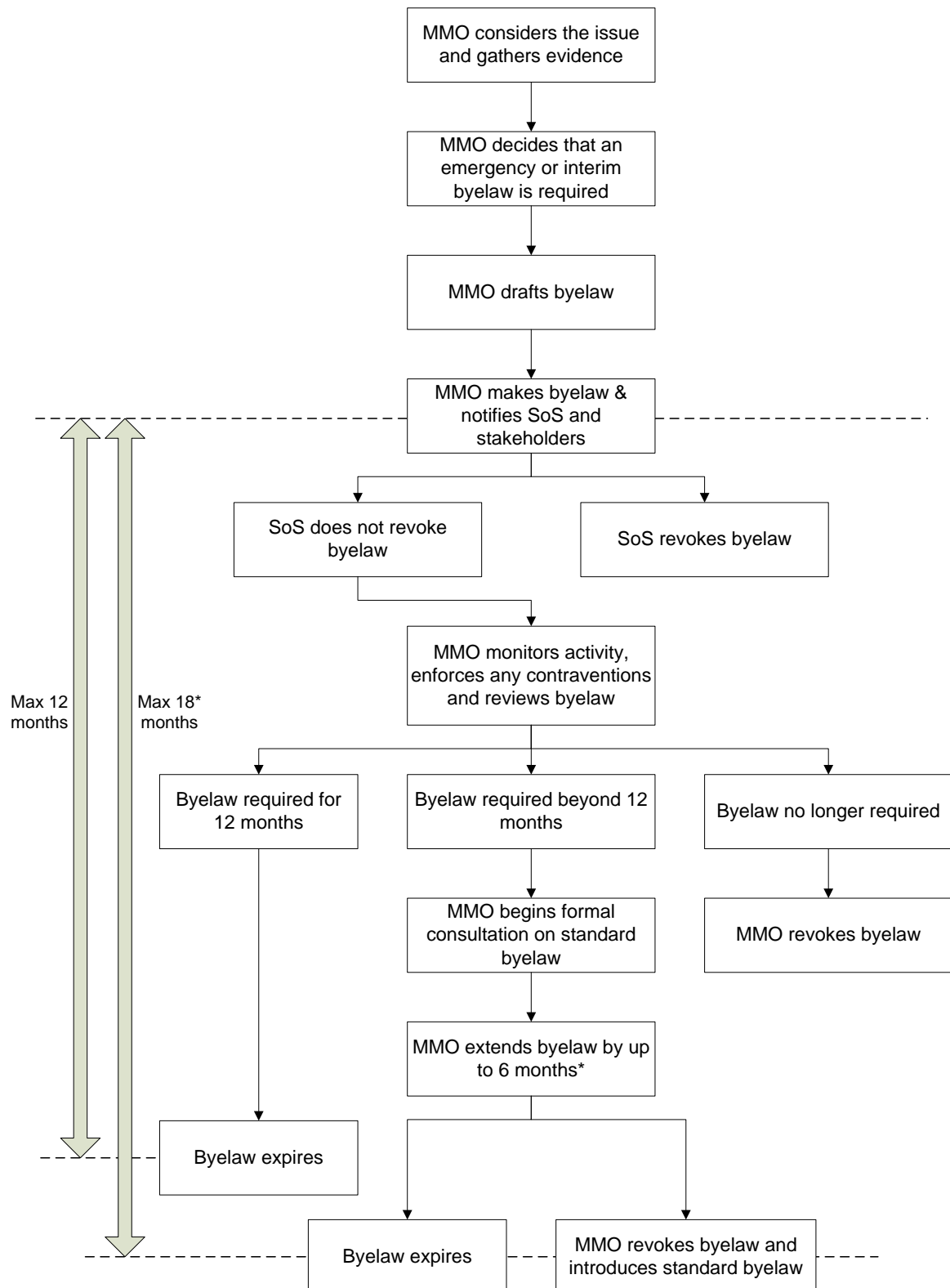
²⁸ Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/182343/ifca-byelaw-guidance.pdf

MMO byelaw making process affecting non-UK vessels

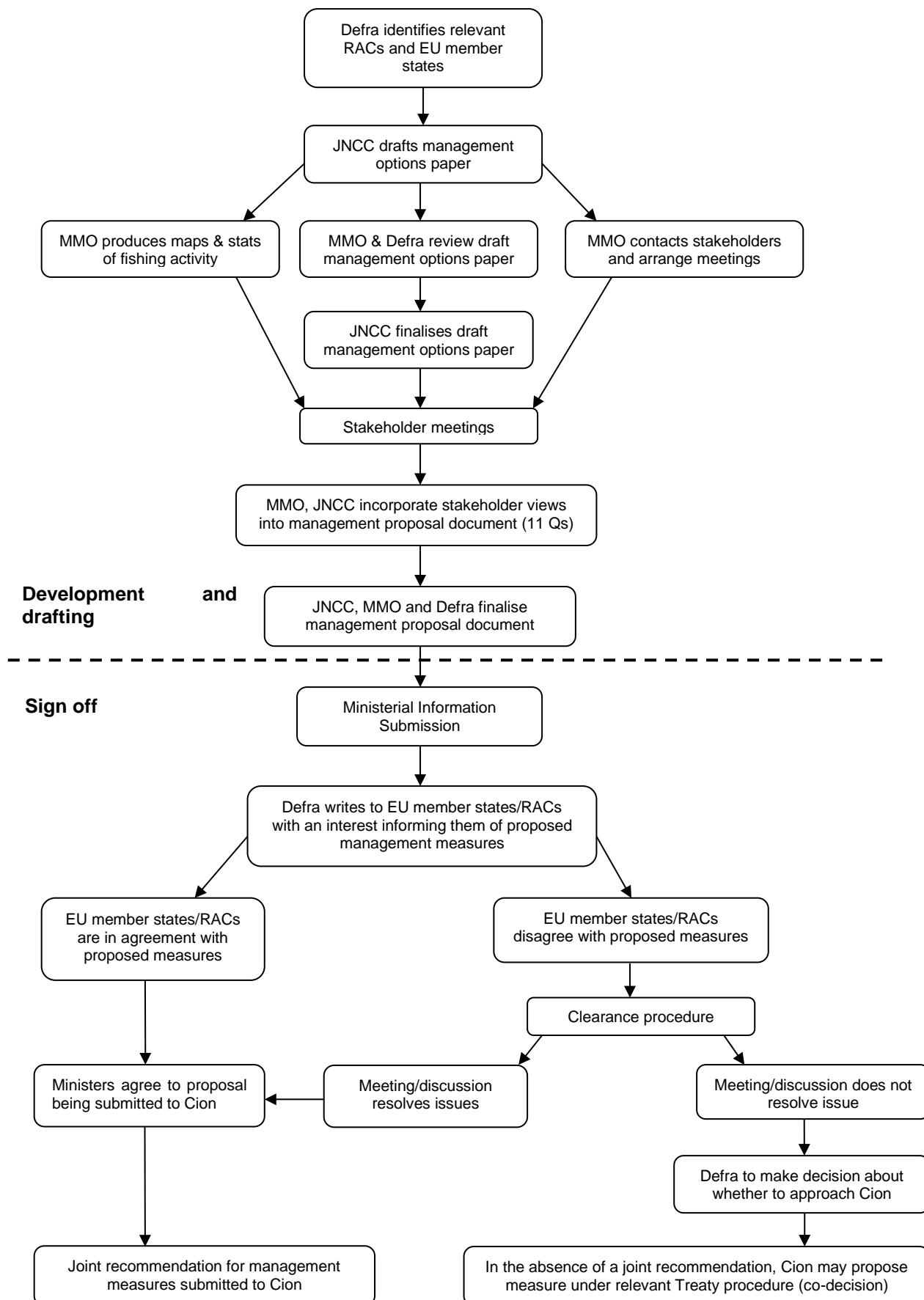


MMO emergency interim byelaw making process



* Emergency byelaws only. Interim byelaws cannot be extended beyond 12 months, unless the Secretary of State directs that it remains in force pending designation of the area as an MCZ

Offshore Joint Recommendation Process



Case Studies

1 Examples of Participatory Approaches Working in Practice

Where possible examples of the various forms of participatory approaches have been provided using examples from around the UK. These show a scale of participation which link to the governance options presented in the toolkit ([Guidance on High-Level Governance Options](#)). As fisheries management options for all known UK MPAs involve some form of statutory consultation with stakeholders there are no examples that we are aware of that represent a 'Doing to' (State led, no engagement) governance option. The [Evaluation of Marine Protected Area Management Measures Concerning Fishing report](#) (MMO, 2019) reviewed successful examples of approaches and measures of managing fisheries in relation to MPAs from relevant countries around the world that were comparable in context to the UK, including good practice which could be applied in English waters to continue to improve the management of fisheries in MPAs. The Bering Sea-Aleutian Islands Alaska Flatfish Fishery (Bowen *et al.* 2015) case study explains the implementation of an extensive observer programme and closed areas likely to be a top-down (state-led) method.

1.1 Doing for (Engaging and involving people) [Shell Flat and Lune Deep Special Area of Conservation](#)²⁹

Lune Deep is a submarine canyon located in the Eastern Irish Sea, off the coast of Blackpool. The protected features within the site are Annex I reefs and sandbanks which are slightly covered by sea water all the time. The reef feature is present on the northern flanks of Lune Deep and represent a good example of boulder and bedrock reef. Due to the sensitivity and exposure of the reef to bottom trawl gears, the feature was considered to be at risk.

A byelaw was proposed applying proportional management through zoned restrictions to bottom towed gears. The local IFCA discussed the byelaw with the fishermen who explained that the bottom of the canyon (non-feature area) was the target of their fishing activity. Fishermen informed the local IFCA that they actively avoided reef areas due to the hazards it imposed on the gear (snagging nets etc). This resulted in a refined understanding of the activity occurring in the site. A grandfather clause was introduced into the byelaw so that experienced skippers who knew the site could continue to fish without damaging the feature. An agreed permit approach based on the skills of fishermen was used to enable fishing adjacent to the reef but not on it.

The problem with access arrangements under the 'grandfather rights' clause is that it applies to fishermen working the ground at the time and therefore when an involved vessel is sold that right does not apply to the new owner which has consequences for the fishery in the long term.

This effective process was reliant on trust between the parties involved, using effective dialogue and all stakeholders having high confidence in the evidence used. Pragmatism and the ability to control fishing activity via permitting was critical. Fishermen were trained in data collection and demonstrated their ability to avoid damaging the protected rocky reefs. It was a

²⁹ Shell Flat and Lune Deep SAC conservation advice available at:
<https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0030376&SiteName=shell%20flat&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=>

successful outcome which led to little change on the ground for existing fishers, and a good outcome for the protected features.

The Lune Deep byelaw has been identified as a good example of how a participatory approach can lead to improved management of risks and fishing practices. The approach that was agreed demonstrates that both the industry and regulators can work together in a trust partnership.

1.2 Doing with (equal and reciprocal partnerships)

Lyme Bay Fisheries and Conservation Reserve

The Lyme Bay voluntary scallop dredging agreement was developed by a working group consisting of fishermen, conservationists, scientists and regulators and was formally established as a Consultative Committee in 2013. The Committee set out to achieve the establishment of a multiple use marine protected area where fishing was sustainable and well-managed, important habitats and features were protected and the fishing community receiving benefits from fishing responsibly. Measures led to statutory order followed by establishment of a Special Area of Conservation (Lyme Bay and Torbay SAC).

Limited numbers of boats operate under a memorandum of understanding and adhere to a voluntary code of conduct which complements the regional IFCA statutory regulation of the scallop fishery. Fishermen restrict pots and nets to agreed levels in the interest of the environment and in line of the conservation objectives. Fish handling facilities have been provided in each port to improve quality, shelf-life and consequent value of landed catches. Monitoring studies have been conducted in the areas since 2008 by the university of Plymouth Marine Institute in partnership with the fishers and IFCA. These studies have shown reef and fish stocks to be recovering. An annual potting study commissioned by Defra has shown a four-fold increase in the number of reef species since 2008, a doubling of scallop landings and a quadrupling of juvenile lobsters with a 2.5 increase in landings of brown crab. Fishers have experienced increased catches, improved infrastructure and a higher catch per unit of effort.

The evidence gathered on the ecological health of the Reserve has proved invaluable to both regulators and fishers and helped make more informed management decisions. Equally, robust fishing data helps fishers to argue their corner when there is disagreement about management measures. The overall result is better decision-making, buy-in from fishers and local stakeholders and an established forum for discussion and debate.

Cumbrian Coast MCZ³⁰

The Cumbrian Coast MCZ at St Bees Head is a good example of working with regulators on a voluntary basis. The site was designated in 2013 to protect a range of broad-scale habitats, intertidal biogenic reefs (including honeycomb worm reefs) and razorbills.

A voluntary code of practice is in place to protect the razorbills from static gear nets. A recent meeting of the North-West IFCA reported there was 100% compliance with the voluntary code of practice.

The Eastern IFCA partnered with the Marine Conservation Society (MCS) to produce a Community Voice film with the assistance of The Wash and North Norfolk Coast European Marine Site (WNNC EMS) management scheme. The aim of the project was to:

³⁰ Cumbrian Coast MCZ conservation advice available at:
<https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UKMCZ0005&HasCA=1&NumMarineSeasonality=0&SiteNameDisplay=Cumbria%20Coast%20MCZ>

- Bring together diverse stakeholders (i.e. including fishermen and other sea-users, those with specialist knowledge and those responsible for decision-making and implementation) that can provide input into discussion particularly about MPA management;
- Share information and build understanding of the dynamics and possibly conflicting needs of stakeholders and the environment;
- Capture a diverse range of values of MPAs (e.g. use and non-use, monetary and non-monetary) that give all stakeholders an equitable and credible voice in considering management of sites.

Community Voice Project

Community Voice Method (CVM) has been used in a range of diverse settings to consider everything from land use issues in North Carolina in the USA to traditional turtle fishery management in the Turks and Caicos Islands and development of management measures for MCZs in Sussex. CVM provides an opportunity to capture the values that diverse stakeholders attach to the marine environment. It is also useful in supporting informed and equitable decision-making that takes account of a broader range of stakeholders and types of value.

Eastern IFCA has used CVM to support and develop stakeholder-informed decision making regarding fisheries management, including site specific management, and also to capture monetary and non-monetary values.

Voluntary Agreement case Study: Southern IFCA Memorandum for Bait Digging within Poole Harbour

This memorandum has established the basis for a joint approach to the management of bait digging activity within Poole Harbour between the Southern IFCA, nature conservation bodies, relevant stakeholders and their representatives. This agreement has enabled the development and maximisation of the protection and improvements to the marine environment of the inshore waters in Poole Harbour and to further the sustainable use for the purpose of the conservation of biodiversity, recreation, amenity and education.

The wording and provisions in these agreements were formed through the Bait Working Group with stakeholder involvement in determining the sensitive closed areas, time periods and other provisions. Southern IFCA has found so far that there has been greater understanding of the agreement and compliance through this approach.

1.3 Delegate doing **(allowing people to lead):**

Dogger Bank SAC

The Dogger Bank is a sand bank feature in the central North Sea spanning UK, Dutch and German waters and protected by three separate but contiguous SACs across the feature. In March 2011, the Dogger Bank Steering Group comprised of representatives of the UK, Dutch and German government departments invited a transnational stakeholder group to formulate its own proposal for an international fisheries management plan. The Dogger Bank Steering Group encouraged stakeholders (primarily representatives from the fishing industry and environmental groups) to use the North Sea Regional Advisory Council to agree on a proposal for a fisheries management plan for the Dogger Bank. This was a good example of using existing forums for launching participatory approaches.

The negotiating process constituted a novel bottom-up process which was dominated by stakeholders rather than governmental and EU institutional actors (such as the European Commission). The aim was to produce a stakeholder endorsed proposal for a fisheries management plan. The process brought together stakeholders with conflicting interests and

views. Within the North Sea Regional Advisory Council, the main conflict ran between users (the fishing industry) and those stakeholders who wanted to achieve as high a level of environmental protection as possible (environmental groups). It was found challenging to achieve a consensus-based decision due to the differences in views and interests amongst the stakeholders who participated.

Consequently the Dogger Bank Steering Group, and later the Scheveningen Group of member states formed to make joint recommendations for the North Sea under the 2013 revision of the Common Fisheries Policy, took over decision-making on a proposal. However, like the stakeholders involved in the Dogger Bank, the different member state government departments at times had different perspectives on the nature of management measures suited to meeting site conservation objectives across the three SACs.

This example demonstrated that in some instance's participation by stakeholders in the negotiations of fisheries management plans can require significant investment in terms of staff, time and commitment. It is unrealistic to expect quick results from a novel and complex learning-by-doing negotiating process between stakeholders with different interests.

Strong terms of reference, drawing upon a systematic assessment of the evidence base is needed for this type of process and a good facilitator – people coming to the process need to be willing to contribute information and not to negotiate from an entrenched position. Conflict resolution strategies need to take into account the different interests of the main stakeholders and be sensitive to cultural differences and environmental policy styles.

In the interest of resolution this example shows that sometimes, when consensus options have been exhausted without productive progress it is ultimately necessary for management authorities to take the final decision. Although the process subsequently became one handled by the member state government departments, the final proposal did draw upon the elements put forward by the stakeholders, who were also consulted on the proposal.

2 Management Options and Assessment of Risk: Based on 2 MPA case studies

Over the course of project '[Developing a participatory approach to managing fishing activity in UK offshore MPAs](#)', stakeholders were tasked to develop different management scenarios to be assessed using the Relative Benthic Status model. During the project workshops, a range of MPA fisheries management options were proposed, differing in the degree of restriction they would place on fishing operations. Details around the discussions are available in the workshop reports on the project webpage.

The fisheries management options for the case study MPAs included:

1. complete spatial and temporal closure of the sites,
2. zoned closures, and
3. mitigation through gear modification.

Several variations on these basic measures were explored for the different case study sites and the impacts assessed through the model.

The following section uses the results from these case studies to provide a more general assessment of the risks of not achieving the site Conservation Objectives under each of the broad management options explored as outlined above. Seasonal closures were not explored within this study, but these may also be explored using a similar approach and a brief discussion around the risks associated with this type of scenario is also given below.

2.1 Assessing risk for fisheries management scenarios:

Scenario 1: Complete spatial/temporal closure

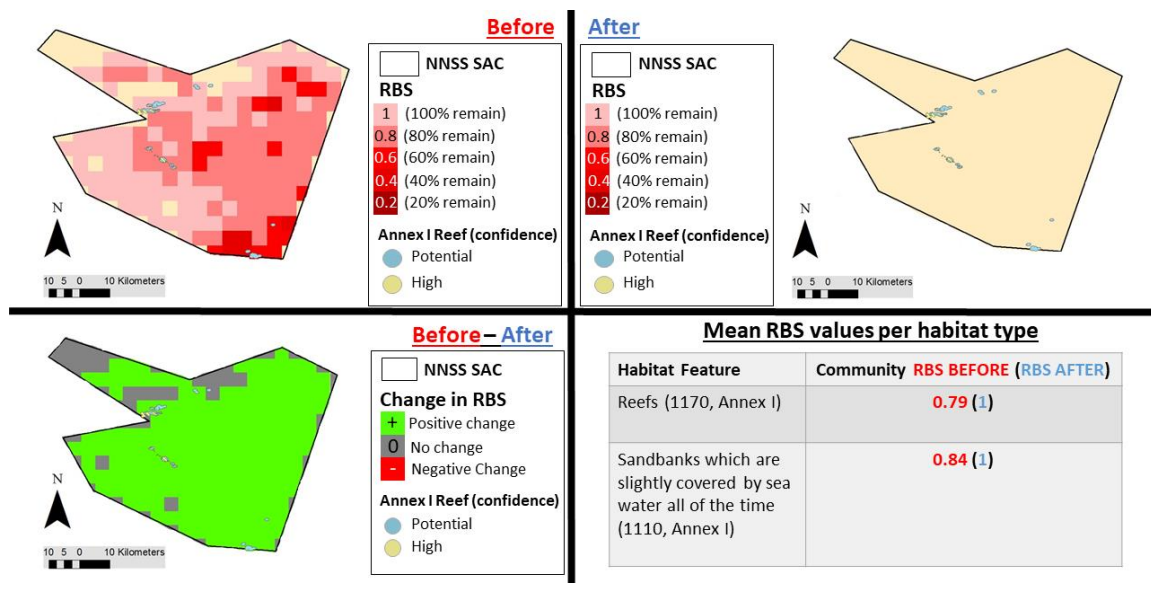
Given a suitable recovery time, this management option theoretically results in a return to un-impacted state for all features as the pressure from fishing activity is completely removed (benthic footprint is reduced to 0 which equates to an RBS of 1). This option would therefore reduce the risk of not achieving the conservation objective to the lowest possible levels for all features of the site.

An example of the results from the model for this type of scenario is given in Box 1 for the [North Norfolk Sandbanks and Saturn Reef SAC](#).

Box 1: Scenario modelling for North Norfolk Sandbanks and Saturn Reef SAC – Scenario 3: complete site closure.

During the second workshop for the “Developing a participatory approach to the management of fishing activity in offshore Marine Protected Areas” project held in Norfolk, stakeholders developed several fisheries management scenarios. The RBS model was then used to forecast the likely benthic state resulting from each scenario. Scenario 3 assessed the change in RBS under a site-wide closure to abrasive fishing activities.

Under this scenario, the RBS values for both the **reef** and **sandbank** features increased to 1, indicating a complete recovery to an unimpacted state. This option would therefore reduce the risk of not achieving the conservation objective to the lowest possible levels for all features within the site.



Scenario 2: Zoned Closures

Zoned closures are restrictions which operate over part of a site. The zoned closure approach offers considerable flexibility, and many different options can be developed with the potential to reduce the risk of achieving a sites conservation objectives while simultaneously minimising the impact to the fishing fleet. Although zoned approaches add considerable complexity to the assessment of conservation risk, the RBS model can help to disentangle some of this complexity making it a particularly useful tool when considering a zoned approach to management. One of the key benefits of the RBS model is the flexibility to explore options that may have different socio-economic trade-offs for the effected fishing fleets and forecast the potential risks and benefits of each in meeting the conservation objectives.

Typically, zoned closures focus on protecting certain features and may offer complete coverage of more sensitive features while only protecting a proportion of the remaining features within a site. In such instances, this option would result in total recovery of the RBS for any feature which is fully protected by the zoned closure (similar to scenario 1) and the risk of not achieving the conservation objective would be reduced to the lowest possible levels. However, the forecast for other features which have only partial restrictions depends on the extent to which fishing effort is reduced or displaced:

- If the closures protect a proportion of these features and fishing effort in these closures is removed from the site, then this option would reduce, but not entirely eliminate, the risk of not achieving the conservation objective for those features.
- If a proportion of these features is closed but there is no/little fishing effort (i.e. RBS = 1) ongoing in that area, then the risk of not achieving the conservation objective for these features would remain the same.
- If a proportion of these features is closed but fishing effort is displaced to other areas within the site where these features occur then the outcome is highly dependent on the level of fishing activity and the proportion of the feature protected and the risk of not achieving the conservation objective for these features could decrease, remain the same, or increase accordingly. This option is further complicated when different levels and patterns of displacement are explored, but any reduction in fishing effort within the site is likely to decrease the risk of achieving the conservation objectives for the features effected.

Scenario 3: Mitigation through Gear Modification

The intent of gear modification is to reduce the penetration depth or area of impact of fishing gears in order to reduce the overall benthic impact. Like scenario 2, the forecast RBS values depend on whether fishing effort remains stable or changes as a result of the modification. Gear modification options which reduce the penetration depth or benthic footprint of fishing activities and maintain the same level of fishing effort within the site would reduce, but not entirely eliminate, the risk of not achieving the conservation objective for all features within the site.

However, if gear modifications result in reduction in target catch then fishing effort may increase to compensate for lost opportunity/revenue and the risk of not achieving the conservation objectives would likely remain or possibly increase. Any gear modification within the model would need substantial evidence and discussions with local fisheries experts before the Benthic Impacts Tool outcome was used to determine management modifications.

An example of the results from the model for this type of scenario is given in Box 2 for the [West of Walney MCZ](#).

Other discussed scenarios: Seasonal closures

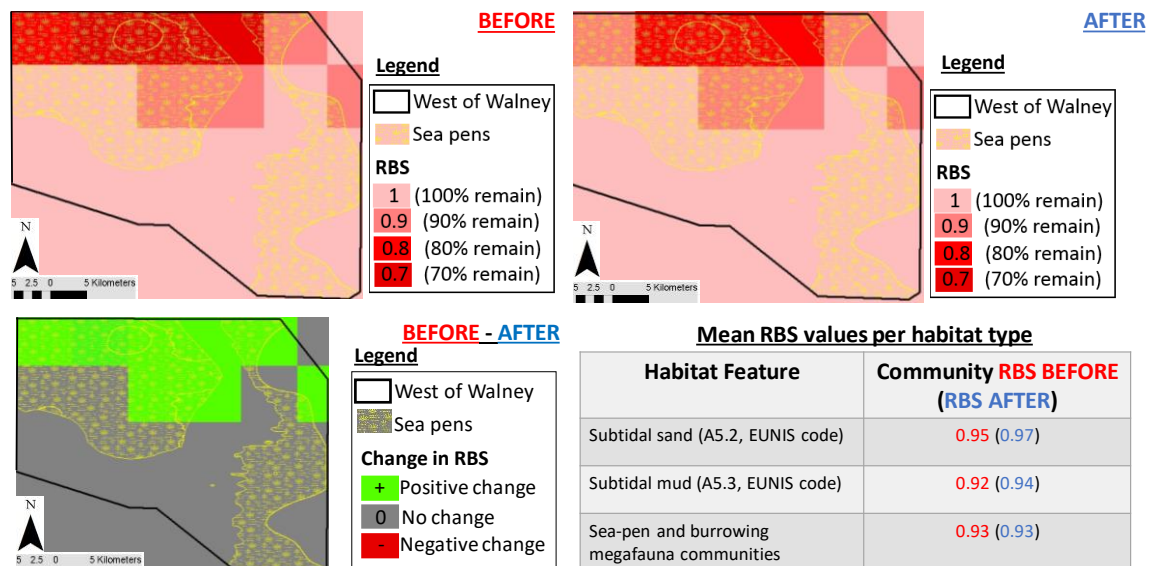
Seasonal closures offer protection to features for a set time period. Much like the options discussed above, the forecast for these types of closures are strongly linked to effort. If effort is removed from the site, then the risk of not achieving the conservation objective will be reduced for features protected within the closure. If, however, the effort removed during the closed period is displaced back into the site during the open period, or there is no/little fishing effort (i.e. existing RBS = 1) in that area during the closed period, then the risk of not achieving the conservation objective for these features would remain stable.

At the moment, seasonal closures are not advised to be run through the Benthic Impacts Tool. Typically, a seasonal closure would not give enough time for a species to recover (other than very short-lived species i.e. less than 1-year lifespan), resulting in unrealistic model outputs. During the workshops, we discussed the possibility of using 'weighted data' i.e. being able to highlight intense periods of fishing and make those times more important for running through the RBS model than times of no fishing. However, further research would be required to determine how best to go about calculating the weighting of the data and therefore outside the realms of this study.

Box 2: Scenario modelling for West of Walney MCZ– Scenario 4: gear modification.

During the second workshop for the “Developing a participatory approach to the management of fishing activity in offshore Marine Protected Areas” project held in Lancaster, stakeholders developed several fisheries management scenarios. The RBS model was then used to forecast the likely benthic state resulting from each scenario. Scenario 4 assessed the change in RBS when sweeps are removed from fishing rigs to reduce benthic impact. This scenario assumes that fishing effort remains constant.

Under this scenario, the RBS values for the **subtidal sand** and **subtidal mud** and **sandbank** features show an increase, indicating some recovery. The RBS value for **sea-pen and burrowing megafauna communities** was unchanged under this scenario. This option would reduce, but not entirely eliminate, the risk of not achieving the conservation objective for **subtidal sand** and **subtidal mud**, and there would remain a risk of not achieving the conservation objective for **sea-pen and burrowing megafauna communities**.



3 References

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Glossary of Terms

AC	Advisory Councils – stakeholder led organisations that provide the Commission and EU countries with recommendations on fisheries management matters
Annex I Reef	A designated feature of SACs , there are three subtypes (Bedrock, Stony and biogenic)
Annex I Sandbanks	A designated feature of SACs , they are sandbanks which are slightly covered by seawater all of the time
ARM	Adaptive Risk Management
AIS	Automatic Identification System – An automatic tracking system that uses transponders on ships to record their location.
BIT	Benthic Impacts Tool
Cefas	Centre for Environment, Fisheries and Aquaculture Science
Cion	Shorthand for European Commission
CVM	Community Voice Method
DAERA	Department of Agriculture, Environment and Rural Affairs
Defra	Department for Environment, Food and Rural Affairs - government department responsible for marine environmental protection, and fisheries in the UK
Depletion	The depletion rate, d , relates to the fraction of organisms killed by a trawl pass
EC	European Commission
EIA	Environmental Impact Assessments
EMFF	European Maritime Fisheries Fund
EMS	European Marine Site – term used to refer to MPAs designated under European legislation
Experiential data	Information from experience (similar to anecdotal), rather than conceptual data
Environmental Quality	"Environmental Quality" is a set of properties and characteristics of the environment, either generalized or local, as they impinge on human beings and other organisms. It is a measure of the condition of an environment relative to the requirements of one or more species, any human need or purpose. Environmental quality includes the natural environment as well as the built environment, such as air, water purity or pollution, noise and the potential effects which such characteristics may have on physical and mental health.
EU	European Union
Fishery	A fishery is an activity leading to harvesting of fish. It may involve capture of wild fish or raising of fish through aquaculture. It is typically defined in terms of the "people involved, species or type of fish, area of water or seabed, method of fishing, class of boats, purpose of the activities or a combination of the foregoing features. The definition often includes a combination of fish and fishers in a region, the latter fishing for similar species with similar gear types
FishDAC	Fisheries Data Archive Centre
GDPR	General Data Protection Regulation
ICES	International Council for the Exploration of the Sea
IUCN	International Union for Conservation of Nature
IFCA	Inshore Fisheries and Conservation Authority - lead, champion and manage a sustainable marine environment and inshore fisheries, by successfully securing the right balance between social, environmental

	and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry
JNCC	Joint Nature Conservation Committee - statutory adviser on nature conservation in the offshore area
Longevity	The lifespan of a species in years
Unit Impact (of fishing gear)	The instantaneous impact implied by contact between a fishing gear and conservation feature at a single point in time.
MCAA	Marine and Coastal Access Act
MCZ	Marine Conservation Zone – An MPA designated under national legislation
MCSS	Monitoring Control and Surveillance System
MMO	Marine Management Organisation - competent marine planning authority on behalf of UK Government
MOD	Ministry of Defence
MPA	Marine Protected Area. Marine protected areas (MPAs) are a globally recognised tool that can help support the conservation of marine habitats and species whilst promoting sustainable use. The aim of the UK network of MPAs is to protect the range of marine habitats and species for which MPAs are considered an appropriate conservation tool.
MPAsum inspection	An MPAsum inspection is a snap-shot of activity occurring within an MPA at a given point in time. They can be completed on land or from a vessel at sea, where an observer scans the MPA (larger sites completed in sections) and records in that instance all activity occurring within the MPA
MSC	Marine Stewardship Council - An independent non-profit organisation which sets a standard for sustainable fishing. Read more at www.msc.org
NE	Natural England - statutory adviser on nature conservation out to 12nm in English waters
NERC	Natural Environment and Rural Communities
NFFO	National Federation of Fishermen's Organisations – a representative body for fishermen in England, Wales and Northern Ireland
NGO	Non-Governmental Organisation
nm	Nautical Miles
NNSSR	North Norfolk Sandbanks and Saturn Reef- Special Area of Conservation used as North-East case study
OMS	Other Member States (in relation to European marine protected areas)
OSPAR	The Unified Oslo and Paris Conventions
Population Model	A mathematical model which is applied to the study of population dynamics.
RAC	Regional Advisory Councils – stakeholder led organisations consisting of management units based on biological criteria. They cover sea areas which are the concern of at least two Member States
RAG	Red-Amber-Green used in traffic light system for risk assessment
Ramsar Site	A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention
RBS	Relative Benthic Status- proportion of biomass remaining relative to an un-impacted baseline. The RBS of a grid cell indicates what proportion of the benthos has been removed. An RBS of 1 means there has been no depletion, a value of 0 means a grid cell is totally depleted.

Recovery Rates	The recovery rate, r , relates to the ability of an organism to recover after disturbance.
Recovery Time	The time taken for a habitat to recover to full (100%) or 80% (MSC standard) carrying capacity after the cessation of fishing (Hiddink et al., 2018).
RIA	Regulatory Impact Assessment
RTA	Regulatory Triage Assessment
SAC	Special Area of Conservation – a type of MPA
SAR	The swept area ratio (SAR, also defined as fishing intensity) is the cumulative area contacted by a fishing gear within a grid cell over one year divided by the surface area of the grid cell. SAR provides a mean value for whole cell. A SAR of 0.5 means that on average half of the cell is swept once per year.
SEA	Strategic Environmental Assessments
SoS	Secretary of State waters: English inshore and offshore waters and Northern Ireland offshore waters.
SPA	Special Protection Areas - a type of MPA
SSSI	Site of Special Scientific Interest – a type of MPA
SNCB	Statutory Nature Conservation Body
SUDG	Seabed User & Developer Group
Shapefile	A vector data storage format for storing the location, shape and attributes of geographic features. This includes a set of related files.
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
UKSeaMap	Created by JNCC, UKSeaMap gives a broadscale overview of different seabed habitats in the UK
VME	Vulnerable Marine Ecosystems - Areas that may be vulnerable to impacts from fishing activities.
VMS	Vessel Monitoring System – a satellite based monitoring system which provides data on the location, course and speed of vessels
WNNC EMS	The Wash and North Norfolk Coast European Marine Site
WoW	West of Walney Marine Conservation Zone used as North-West case study
25YEP	25Year Environment Plan

MPA Fisheries Management Toolkit



Project Title: Developing a participatory approach to managing fishing activity in UK offshore Marine Protected Areas (MPAs) PAs

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