University of Exeter

SMMR Sustainable Management of UK Marine Resources

UK Research and Innovation

Resilience of Coastal Communities

Trade-off Analysis of Management Measures in the Bass Fishery Management Plan

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Executive Summary

Background

The UK's exit from the European Union led to reforms in fisheries governance, including requirements for Fisheries Management Plans (FMPs) under the Fisheries Act 2020. The Bass FMP, published in December 2023, introduces potential new management measures that will affect different stakeholder groups in varying ways. The Joint Fisheries Statement (UK Government, 2022) emphasises increased industry involvement in management decisions, yet traditional consu ltation approaches often struggle to effectively engage stakeholders in considering complex trade-offs.

Under the SMMR Resilience of Coastal Communities (ROCC) project, and in collaboration with the Plymouth Fishing and Seafood Association (PFSA), this study piloted the Marine Planning Trade-off Analysis (MaPTA) tool to:

- Assess stakeholder perceptions of trade-offs arising from proposed Bass FMP management measures
- Evaluate the potential of participatory trade-off analysis for supporting industry engagement in fisheries management
- Gather insights for PFSA to inform responses to the Bass FMP proposals

Methodology

A full-day workshop was conducted in Plymouth on 18 October 2024, engaging commercial bass fishermen using different gear types (hook and line, fixed nets, and trawls). The workshop used MaPTA to assess:

- Participants perceptions of the current status of the bass stock, ecosystem features, and stakeholder wellbeing
- Trade-offs of removing the bass authorization system and 5% trawl bycatch limit
- Alternative management measures and their acceptability

Key Findings

1. Perceptions of status of stakeholders and ecosystems

- Commercial fishermen generally perceived the bass stock and ecosystem to be healthy, though this contrasted with more cautious scientific assessments. Some fishermen expressed concerns about declines in bait species, such as mackerel, herring, and pilchards.
- Stakeholder wellbeing varied significantly by gear type, with hook and line fishermen particularly vulnerable due to the recent introduction of a zero total allowable catch (TAC) for pollack increasing their dependence on the bass fishery.
- Fixed netters and hook and line fishermen were widely seen as disadvantaged under current regulations.
- Trawlers were generally considered to be doing well, but technology efficiency could be improved related to selectivity.

2. **Trade-offs of proposed measures**

- Removing the authorisation system would increase fishing opportunities for new entrants, but risks devaluing existing entitled vessels and individual catch limits being reduced by regulators to maintain stock sustainability.
- Removing the 5% trawl bycatch limit could reduce wasteful discards and increase income for trawlers but risks increased targeting of bass, threatening stock sustainability and potentially leading to reduced catch limits. An increased supply of bass to markets may also drive down prices, with fish traders favouring cheaper bass caught by trawls.
- Ecological trade-offs were generally considered acceptable by participants, while socioeconomic impacts on certain gear types were deemed unacceptable.

3. **Alternative Measures**

Five primary alternative approaches emerged:

1. Permitting multiple gear types with equal catch limits
2. Bass license caps (including recreational licensing) with redistribution of excess allocation
3. Increased access to alternative species (bluefin tuna, pollack)
4. Maintaining but adjusting bycatch limits for trawls or implementing a quota rollover system
5. Adjusting fixed net regulations to allow intentional targeting of bass with increased mesh sizes

Benefits of MaPTA

- **Facilitating dialogue and understanding:** Created a structured environment where fishermen using different gear types could share perspectives, fostering greater awareness of varying vulnerabilities and capacities to cope with and adapt to changes to management measures.
- **Revealing complex factors influencing perceptions of fairness:** Highlighted how different conceptions of fairness shaped views on management measures, with some valuing equality (equal shares regardless of type of fishing) and others prioritising equity (measures should account for the variable statuses and vulnerabilities of types of fishing).
- **Supporting identification of compromise solutions:** Helped participants develop creative alternatives that addressed collective concerns while minimising harm to vulnerable groups.
- **Increasing transparency in trade-off considerations:** Made explicit the trade-offs associated with management decisions and documented the rationale behind different groups' perceptions on their acceptability.

Limitations and challenges of MaPTA

- **Representation challenges:** Imbalanced representation (particularly underrepresentation of trawlers) affected outcomes, and the focus exclusively on commercial fishermen meant recreational fishermen' perspectives were not captured.
- **Time-intensive process:** The multi-step process sometimes created confusion and was challenging to complete within the available time.
- **Balancing ecological and socioeconomic considerations:** Discussions heavily emphasised socioeconomic impacts, with limited attention to ecological concerns, highlighting the need for diverse knowledge sources to be represented, including fisheries and conservation scientists.
- **Stakeholder scepticism about their influence**: Many participants expressed doubt about whether their input would actually influence final decisions, reflecting longstanding trust issues in fisheries management.

Recommendations

1. Integrate MaPTA within broader stakeholder engagement strategies
2. Ensure balanced stakeholder representation or conduct separate sessions with specific fisher and other stakeholder types
3. Streamline the process while maintaining key benefits
4. Provide clear communication about how the input of participants will influence decisions, encourage presence of key decision-makers, and demonstrate outputs have been followed up
5. Test the approach with a broader range of stakeholder groups (e.g., recreational fishermen)
6. Improve integration of scientific and industry knowledge

CONCLUSION

The pilot demonstrated that participatory trade-off analysis can valuably support fisheries management stakeholder engagement, particularly in facilitating dialogue and identifying acceptable solutions. While practical challenges exist, there was strong stakeholder support for such approaches in future FMP development. Success will require careful attention to representation, process design, and expectation management. After the conclusion of the workshop, in January 2025, the bycatch limit for trawls was increased from 5% to 10% by the EU and UK governments, reflecting the relevance and credibility of solutions proposed by fishermen in the workshop.


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Contents

1. Introduction

The exiting of the United Kingdom (UK) from the European Union, i.e. Brexit, led to reforms in the governance of fisheries in the UK. The UK is no longer required to comply with the Common Fisheries Policy (CFP), the framework that governs shared fisheries management in the EU (Rees et al., 2020). The Fisheries Act (2020) now provides the UK's new legal framework and the Joint Fisheries Statement the policies for the protection and recovery of fish stocks, development of a sustainable fishing industry and conservation of the marine environment (UK Government, 2020). The Fisheries Act 2020 requires the UK fisheries policy authorities (Department for Environment, Food and Rural Affairs, and the devolved administrations in Northern Ireland, Scotland and Wales) to publish fisheries management plans (FMPs). FMPs are evidence-based action plans, developed in collaboration with the fishing sector and other stakeholders. Their purpose is to deliver sustainable fisheries for current and future generations.

The management measures in the FMPs change the rules and management practices governing access to and use of the respective fishery/fisheries. In doing so, the distribution of benefits and costs (or trade-offs) for the fishing sector versus the sustainability of the marine environment, or between different types of fishermen utilising the fishery is likely to change. Those that lose out may oppose or resist the management measure.

The Joint Fisheries Statement emphasizes that "that [the fishing] industry should play a greater role in managing fisheries. This can include… being more actively engaged in fisheries management decisions, and co-designing future policy." (p26). Being actively engaged in fisheries management decisions implies greater involvement of the fishing industry in considering and weighing up the pros and cons, the benefits and costs, of different management measures rather than only the government deliberating and making hard choices between who wins and who loses as a result of management measures.

The Resilience of Coastal Communities (ROCC) Project, led by University of Exeter, collaborated with Plymouth Fishing and Seafood Association (PFSA) to engage fishermen in assessing the trade-offs of potential management measures proposed in the Bass FMP, published in December 2023. This involved piloting a new participatory trade-off analysis tool – Marine Planning Trade-off Analysis (MaPTA) (Fortnam et al., 2022) – at a full-day workshop at Plymouth Marine Laboratory, Plymouth on 18 October 2024. MaPTA is a low-tech, participatory tool designed to lead managers and/or stakeholders step-by-step through a process to identify the trade-offs arising from management measures. Participants assess and decide the extent to which trade-offs are acceptable, or unacceptable, to different stakeholders. It can also identify response options to address potentially harmful and unacceptable outcomes of proposed measures.

The aims of the workshop were to:

1. Understand the benefits and costs of the removal of the authorization system and removal of the 5% bycatch provision on trawlers for different bass fishery stakeholders and marine ecosystems, and discuss potential alternative management measures
2. Gather the insights and experiences of bass fishery stakeholders (and their respective organisations) to help PFSA respond to proposals from MMO and Defra regarding the bass FMP.
3. Explore the potential of participatory trade-off analysis as an approach to increase participation of the fishing industry in fisheries management and finding solutions that meet the aims of the Fisheries Act
4. Introduce MaPTA to MMO and Defra partners to understand the potential for MaPTA to support the development and implementation of the bass FMPs and other FMPs

This report presents the results of that workshop and provides reflections on the use of the MaPTA tool for undertaking trade-off analysis and supporting participation of the fishing industry in FMP design and stakeholders in marine management. First, it provides background on the bass stock, fishery and FMP. Second, it provides further details on the MaPTA methodology, before, third, presenting results of the workshop. Finally, it discusses the results and provides reflections on the use of MapTA as tool for fisheries management.

2. Background

2.1 Distribution of bass stock

European sea bass (*Dicentarchus labrax*), hereafter labelled 'bass', has a wide distribution occurring in the Northeast Atlantic, from Scandinavia to Northwest Africa, and in the Mediterranean and Black Sea (Pickett & Pawson, 1994). The northern stock of bass can be found in English and Welsh waters (ICES divisions, IVb-c and VIIa, d-h) (Figure 1), with England's south coasts serving as pivotal nursery and spawning areas (Hyder et al., 2018).

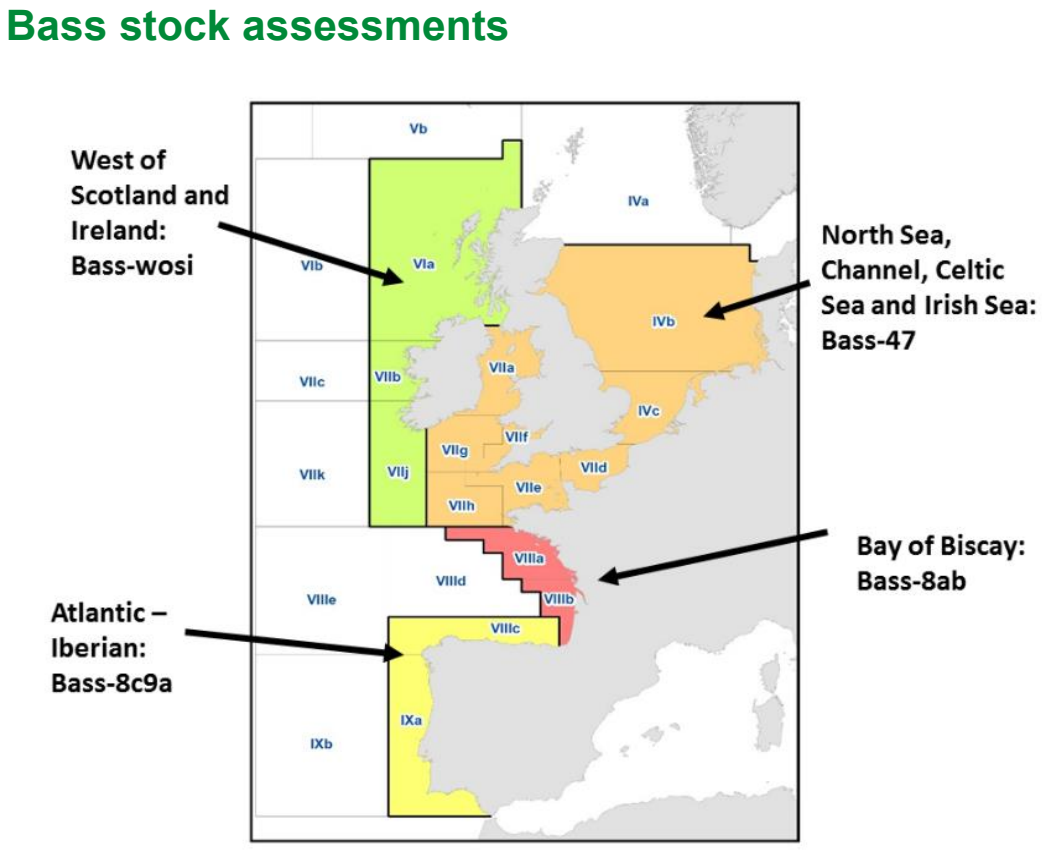

Figure 1: ICES divisions for European sea bass. Source: Defra & Welsh Government (2023a)

2.2 The bass fishery

Bass has high socioeconomic value for both the commercial and recreational sectors in several European countries, including the UK (Figure 2). Historically, the bass fishery in France was responsible for the majority of bass commercial landings, due to the pelagic trawl fishery operations that excluded UK vessels (Williams et al., 2018). In most recent years, the UK share of the bass fishery has increased (ICES, 2024) (Figure 3).

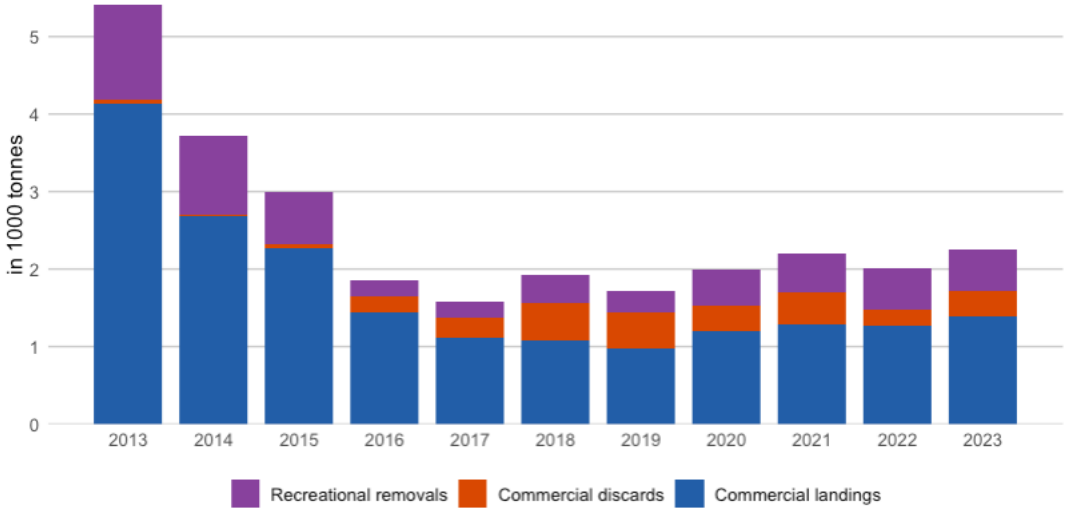

Figure 2: Trends in the catching and landing of bass for the commercial and recreational sectors between 2013-2023. Data for ICES divisions IVb-c and VIIa, d-h. Data reconstructed using ICES, 2024.

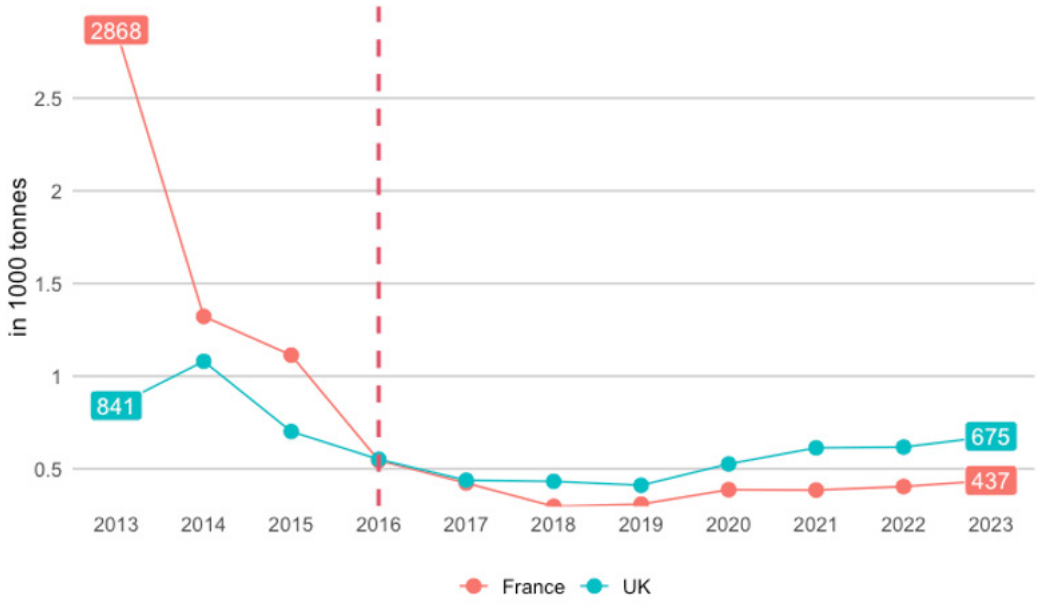

Figure 3: Commercial bass landings by France and the UK between 2013-2023. Red vertical line represents the year a seasonal ban on pelagic trawling came into effect. Data reconstructed using ICES, 2024.

In the UK, landed bass in 2019 was valued at £4 million which increased in 2020 and 2021 (Defra & Welsh Government, 2023a). Most bass landings are made by English vessels (82-90% between 2016 – 2021), followed by Welsh vessels. During this time, landings were primarily made by under-10m vessels (84-93%). In 2023, hook and line landed the largest volume of bass and fetched a higher price per ton (£10,047) compared to fixed nets (£8,368) and otter trawls (£7,692). As of 2024, there are approximately 1,037 vessels authorised to catch bass with over 1,000 being under-10m vessels (Personal communication, 2024). From 2016 - 2021, most boats were not reliant on bass (<5% of their landing value); but among the vessels that rely on bass for more than 20% of their income, the majority were under 10-m vessels (9 in 2021). (Defra & Welsh Government, 2023a).

Bass is considered a premier target species for recreational anglers, but there is limited understanding of their impact on bass stock sustainability. The International Council for the Exploration of the Sea (ICES) estimated that recreational removals for bass was 545 tonnes, based on past survey data from 2012 (ICES, 2024). As a result, information on recreational removals of bass is limited. (ICES, 2024). The European Anglers Alliance has previously estimated the recreational socioeconomic value of bass to be EUR €200 million a year (European Anglers Alliance, n.d.; European Commission, 2020).

2.3 Bass stock trends and management measures

The commercial bass fishery in the UK opened in the 1970s. Since then, there has been periodic declines of the bass stock due to low recruitment and overfishing (Graham et al., 2023; Pawson et al., 2005). The combination of management interventions aimed at reducing the landing of undersized bass, strong year classes (most notably in 1989), and potential climate change-induced increases in sea temperatures, led to the growth of the bass biomass in the 1990s (Ares, 2016; Defra & Welsh Government, 2023b; Pawson et al., 2005). Since 1990, bass nursery areas were introduced to promote the long-term conservation and management of bass in England, primarily to prevent the catch of bass below 36 cm. Currently, 37 estuary and coastal sites have been designated as bass nursery areas in England and Wales (Hyder et al., 2018).

Between 2009-2018 the bass stock faced a rapid decline, driven by overfishing and repeated poor year classes (Wright et al., 2024). In response, the UK government submitted a formal request to the EU through the Common Fisheries Policy. In 2014, emergency measures were introduced to protect the bass stock. The measures included: i) a catch limit per month for each gear type, ii) an increased minimum landing size of 45 cm, and iii) a three fish-a-day limit for recreational anglers. In 2016, additional measures were agreed upon: i) a seasonal ban for pelagic trawling; ii) fishing restrictions (1 ton maximum); and iii) catch and release for anglers (Ares, 2016).

These measures have been revised annually between the UK and EU, which has generated a significant increase in bass biomass. Recruitment, however, remains low and the stock has not fully recovered to pre-2010 recruitment levels (Defra & Welsh Government, 2023b; Graham et al., 2023).

In 2024, the agreed management measures include: i) a minimum conservation reference size of 42 cm; ii) a closed season (February to March); iii) annual catch limits for trawls and seines (3.8 tonnes); fixed nets (1.6 tonnes); and hook and line (6.2 tonnes); iv) recreational bag limits (2 fish a day); v) a minimum mesh size of 100mm for fixed nets; vi) bycatch allowed to be retained by net gear and a 5% live weight per trip for trawls and seines; and vii) a track record of bass landings during a reference period (1 July 2015 to 30 September 2016) (MMO, 2024a).

In addition to the joint management approach for bass, regional management is led by the Inshore Fisheries and Conservation Authorities (IFCAs) through multiple byelaws across the different IFCAs (Defra & Welsh Government, 2023b). The

total allowable catch (TAC) advice, published by ICES, has fluctuated over the years but since 2020, TAC advice has increased the TAC for bass in ICES divisions IVb-c and VIIa, d-h (2024).

2.4 The Bass FMP

In 2023, the Bass FMP led by Defra and the Welsh government was published and summarises the goals for achieving the sustainable management of bass (Box 1) (Defra & Welsh Government, 2024). As outlined in the Bass FMP, existing measures such as the domestic authorisation system will be reviewed and new interventions will be introduced, subject to monitoring and review (Defra & Welsh Government, 2024).

BOX 1: BASS FMP MANAGEMENT GOALS

1. Inclusive stakeholder engagement structures to inform management of the bass fishery
2. Equitable access to the bass fishery, while prioritising stock sustainability
3. Minimise discarding of bass bycatch where survival rates are low
4. Ensure full compliance with bass regulations
5. Maximise the benefits of bass fishing for local coastal communities
6. Sustainable harvesting of the bass stock in line with scientific advice
7. Protecting juvenile and spawning bass
8. Minimise the impact of bass fishing on the wider marine ecosystem
9. Mitigate against and adapt to the impact of climate change on bass fishing

Source: Defra & Welsh Government (2024)

Stakeholder engagement in the Bass FMP

Stakeholder consultations and engagement regarding the Bass FMP were conducted between March 2022 and January 2023, with over 1400 stakeholders across England and Wales asked to review the current bass measures and contribute to the design of the Bass FMP (Defra & Welsh Government, 2024). The main groups engaged included commercial and recreational fishermen comprised of different fishing gears, fisheries regulators (MMO, IFCAs, Welsh Government enforcement teams); scientists (Cefas, Welsh Government scientists, independent academics); government (Environment Agency, Natural England, Joint Nature Conservation Committee, Natural Resources Wales); representatives of the bass supply chain (buyers and sellers: fish markets, restaurants; charter boat operators; tackle shop owners); environmental groups and NGOs; policymakers (Defra, Welsh Government) and industry authorities (Seafish) (Defra & Welsh Government, 2024).

As detailed under Annex 4 of the Bass FMP, the stakeholder engagement process illustrates divergent views between bass fishery stakeholders (Defra & Welsh Government, 2024). Several concerns emerged including the state of the current authorisation system, bycatch and discards, and trust in scientific evidence.

Multiple points of tension are perceived among bass fishery stakeholders on the involvement and representation of stakeholders in engagement processes. Commercial fishermen resent the influence of the recreational sector in fisheries management decisions that impact the commercial fishing sector, and recreational fishermen believe that management measures are biased towards the commercial fishing sector. The commercial fishing sector is heterogenous, resulting in disparate opinions from within, prompting difficulties in presenting a unified front. For instance, some commercial fishermen and recreational fishermen propose an outright ban on netting and trawling to protect the stock and wider ecosystem. Additionally, many commercial

fishermen are experiencing stakeholder fatigue and do not believe their involvement makes a tangible impact on fisheries management decisions. Despite these challenges, many stakeholders expressed a willingness to work collaboratively across sectors, suggesting ideas to improve relationships such as councils, a shared code of conduct, and participatory co-design of workshops.

Commercial bass fishermen collectively agree that licensing is important for preserving bass stocks but report mixed experiences with the current licensing regimes, including the authorisation system. Many commercial fishermen consider the authorisation system to be unfair. Some commercial fishermen mentioned the flawed nature of the reference period, especially for those who previously caught bass but were not able to provide evidence of their track record because of personal circumstances (e.g. temporary break from fishing), and new entrants to the bass fishery. Under the current system, bass entitlements are tied to the vessel, making it difficult for fishermen to change or upgrade their vessels due to the risks of losing their authorisations. Some recreational fishers and commercial fishermen support licenses for recreational fishing activities, however, some recreational fishers are not in agreement with this and believe their access rights should be preserved. Many fishermen and enforcement officers report that non-licensed unpowered under-10m vessels are illegally fishing for bass (MMO, 2024b).

Many fishery stakeholders agree that bycatch regulations are challenging to address and lead to the unnecessary discarding of bass (Defra & Welsh Government, 2024). This is perceived to be wasteful since dumped bass could be used for food and result in lost income for fishermen. Various fishermen believe the ambiguity of "accidental bycatch" is difficult to follow and enforce, resulting in noncompliance with bycatch regulations. Some stakeholders think improved data and evidence surrounding bycatch and discards is necessary to understand the impact on the bass stock. Several recommendations were proposed such as mesh size reductions, a quota-based approach, and bass quota allocations for fishermen who do not currently have bass entitlements as potential measures to address the issue.

Agreement on a science-led approach was evident among bass fishery stakeholders, though there is considerable distrust on how scientific evidence is collected and used. Many commercial fishermen feel that their practical knowledge and observations are ignored in scientific evidence and believe it should be incorporated into evidence collection. Both commercial and recreational fisher stakeholders are concerned that scientific evidence is misused to carry out policy objectives. Commercial fishermen believe evidence is biased against the commercial sector, while recreational fishermen are of the opinion that findings are disregarded in favour of the commercial sector.

3. MaPTA methodology

The workshop (18 October 2024) aimed to explore commercial bass fishermens' perceptions of trade-offs of proposed management measures published in the Bass FMP in collaboration with PFSA and researchers from the ROCC project. MaPTA was used to frame discussions on the acceptability of trade-offs and potential response options to concerning outcomes. An online survey was distributed prior to the workshop to streamline the MaPTA process for the workshop, understand the initial perceptions of proposed management measures among bass fishery stakeholders and gather the general views on fisheries engagement processes in England (Annex 1). The process followed was adapted from the MapTA handbook (Fortnam et al., 2022).

The interventions of focus were: the removal of the authorisation system and 5% bycatch composition for trawls, noting that monthly catch limits remain the same. The primary interventions were chosen by the PFSA because the interventions directly address some of the main and supporting goals published in the Bass FMP (notably Goal 2 and 3) and are relevant for all gear types represented at the workshop. They were also selected to provide strawmen for participations to critique and then consider alternatives if the authorization and bycatch limit were removed.

In three small discussion groups (n=5-6 in each group), participants were asked to assess the current status of bass fishery stakeholders, the bass stock, and the associated ecosystem features. Participants determined the wellbeing status of bass fishery stakeholders using 'people' icons to depict low wellbeing and high wellbeing. They then decided how healthy the stock and associated ecosystem features are using 'fish' and 'habitat' icons to represent features they believe are degraded or healthy (Figure 5).

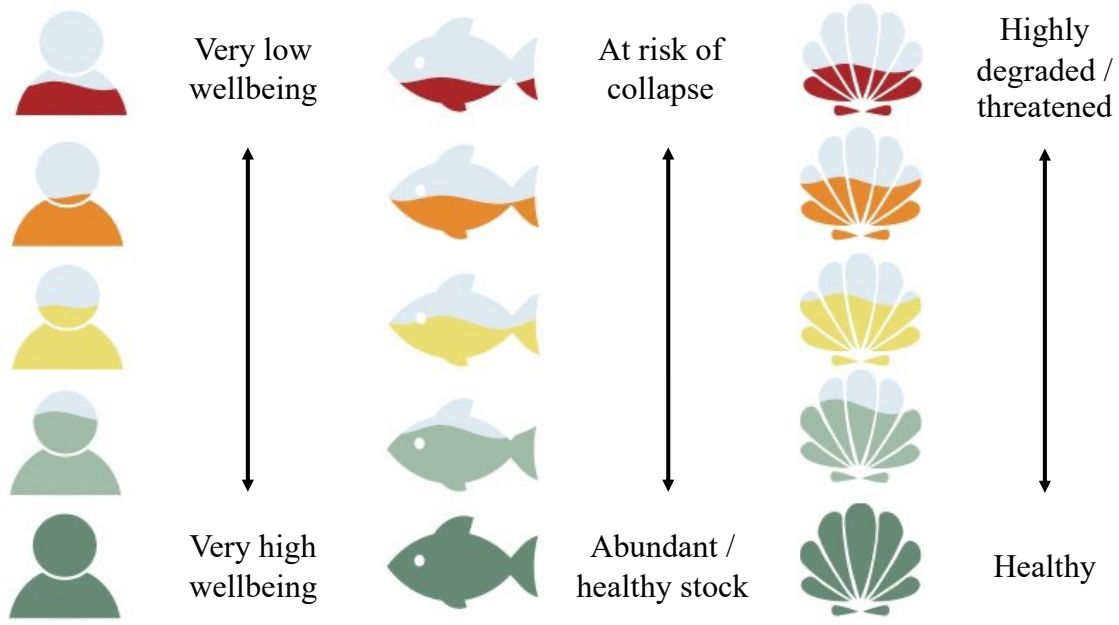

Figure 5: Example of icons used to determine the current status and future status of different ecosystem features and bass fishery stakeholders.

Initial ecosystem features were proposed based on internal discussions between the PFSA and researchers. Bass fishery stakeholders included in the workshop were chosen based on findings from the pre-workshop survey where respondents were asked to disclose which stakeholder groups they wanted to discuss during the in-person workshop (Table 1). Participants were able to change or add additional ecosystem features and stakeholder groups on the day of if they felt it was important to the discussions. Thereafter, following a structured process, they considered the positive and negative impacts of the intervention (the trade-offs) and how concerning and acceptable the potential trade-offs and outcomes were to them. Finally, they deliberated on alternative response options they deemed more acceptable. They prioritised these alternatives and then considered the trade-offs of those. At the end of the workshop, attendees were asked to fill out an evaluation form to share their opinions on the workshop and the MaPTA tool (Annex 1).

Initial ecosystem features and bass fishery stakeholders

Ecosystem features	Bass fishery stakeholders
Bass stock	Hook and line fishermen
Other fish bycatch	Fixed netters
Non-fish protected species bycatch	Trawlers
Pollack	Fish sellers
Wider ecosystem	Recreational fishermen
	Fixed net and hook and line gear users

Features and stakeholders added by individual groups

Ecosystem features	Bass fishery stakeholders
Bluefin tuna	Trawlers (day/otters)
Seals	Beam trawlers
Baitfish (pilchards)	New entrants

Table 1: List of ecosystem features and bass fishery stakeholder groups discussed during the workshop.

The workshop participants were comprised of commercial bass fishermen using hook and line, fixed nets, and trawls to catch and land bass. Personnel from the Marine Management Organisation (MMO) and South Western Fish Producer Organisation (SWFPO) attended in person, while a representative of Defra's Bass FMP policy team joined the workshop online to observe the proceedings. Researchers from the University of Exeter, Plymouth Marine Laboratory, and the PFSA facilitated the group discussions, which were recorded through written notes and audio recordings. Quantitative outputs from the pre-workshop survey and evaluation form were analysed using R and qualitative outputs from the questionnaires and workshop were analysed thematically based on initial research questions formulated by researchers and policy objectives outlined by the PFSA.

4. MaPTA results

The results are structured by the key elements of the MaPTA process: assessment of current status of bass stock, ecosystem features and bass fishery stakeholders; perceptions on the acceptability of synergies and trade-offs of removal of bass authorisation system and 5% trawl bycatch limit; and proposed alternative management measures and their respective trade-offs.

4.1 Perceived current statuses

4.1.1 Bass stock and associated ecosystem features

The three groups discussed the status of the bass stock and ecosystem features associated with the stock, such as bycatch species and habitats. Figure 6 shows that, despite some concerns for the wider ecosystem and abundance of pilchards by one group, commercial bass fishermen perceived the bass stock and associated ecosystem features to be healthy (indicated by green and filled up icons). Despite this unanimity, contrary scientific evidence presented by Cefas at the workshop shows that the spawning biomass of bass is still in a vulnerable state requiring a precautionary approach to setting catch limits.

Impacted feature	Current status		
	Group 1	Group 2	Group 3
Bass stock			
Other fish bycatch		Missing	
Non-fish protected species bycatch		Missing	
Pollack			
Wider ecosystem			
Bluefin tuna			
Seals			Not discussed
Baitfish (pilchards)	Not discussed	Missing	

Figure 6: Perceptions of the status of the bass stock and associated ecosystem features

The commercial fishermen said that the bass stock is healthy because current management measures have been effective (e.g. ban on paired trawls) and they have observed a wider distribution of bass and increased juvenile fish. A small minority voiced concerns, however, that these observations do not necessarily mean the stock is healthy, referencing that an observed increase in the numbers of juvenile Pollack was a precursor to the collapse of the pollack fishery.

Bycatch and no-bycatch fish species were also considered in good health, attributed to the use of specialised fishing gear that minimizes accidental bycatch, voluntary measures such as pingers to deter cetaceans, and limited interactions with seabirds due to the timing of fishing activities. For groups who did discuss the status of pollack, it is believed the stock is healthy, with some reporting discarding large volumes of pollack because of the zero TAC on pollack.

Some groups expressed some negative impacts on the wider ecosystem. For some, the impacts are negligible due to bass being a pelagic species, while others believe the state of baitfish are an indicator of ecosystem change. Two groups added baitfish as an additional ecosystem feature expressing concern. Some fishermen shared that the effect of ring net fishing has negatively impacted pilchards because this reduces food sources for other species. Others revealed that it has become much harder to catch live bait such as mackerel, herring, and pilchards. The loss of baitfish in Plymouth Sound and Mevagissey is being felt by commercial bass fishermen.

Every group added bluefin tuna as an ecosystem feature of interest. The presence of Eastern Atlantic bluefin tuna *(Thunnus tynus)* was believed by participants to have major impacts on the ecosystem and the future of fisheries. Concerns include that bluefin tuna, as a top predator, prey on commercially important fish stocks and drive behavioural changes in other fish species when nearby (such as forcing them to move deeper). Many cautioned about the uncertainties of the longevity of bluefin tuna's presence in UK waters and the potential management of the emerging fishery.

Throughout the discussions, many fishermen shared their general distrust in scientific environmental data, which is consistent with the findings from the pre-workshop survey. Many fishermen believe the data collected by scientists does not align with their day-to-day observations or knowledge and expressed frustrations with decisions based on this evidence. Some participants throughout the workshop questioned the underreporting of recreational removals of bass based on figures shared by Cefas at the beginning of the workshop. A small minority of participants questioned the discrepancy between what is caught and what is allowed to be caught. For some, this information is vital for discussing the ecological impacts.

4.1.2 Bass fishery stakeholders

Perceptions of the wellbeing status of the different bass fishery stakeholder groups mainly differed among groups (Figure 7). There were notable differences in opinions on the perceived wellbeing among hook and line fishermen, trawlers, and combined gear users but consensus that fixed netters are disadvantaged and fish sellers and recreational fishermen have high wellbeing.

Impacted stakeholder	Current status		
	Group 1	Group 2	Group 3
Hook and line users			
Fixed netters			
Trawlers		See 'trawlers (day/otter)' and 'beam trawlers'	
Hook and line + fixed net gear users			
Fish sellers			
Recreational fishers			
Trawlers (day/otter)	Not discussed		Not discussed
Beam trawlers	Not discussed	Missing	Not discussed
New entrants	Not discussed		Not discussed

Figure 7: Perceptions of the status of bass fishery stakeholders

Hook and line fishermen were said to have been severely impacted by the pollack ban, which has increased their reliance on the bass stock, making them increasingly vulnerable to any stock changes and/or catch limits. However, some participants believed hook and line fishermen should be doing reasonably well if they are maximizing their effort to reach their allocated catch limit. Some non-hook and line gear users perceive the differential catch limits by gear types to be unfair.

Under the current regulations, it was collectively expressed that fixed netters do not have enough bass allocation to make a living. The participants widely agreed the current 5% bycatch limit on trawlers is unfair, leads to wasteful discards, and negatively impacts their fishing activities. One group believed that day/otter trawlers are struggling because the 5% bycatch limits them from targeting bass, and in order to be allowed to land the incidental bass that they do catch, they must spend additional time and effort targeting low-value fish to ensure their bass catch falls within their 5% limit. Additionally, the number of independently owned trawlers have decreased in their lifetime. However, some fishermen felt that trawler livelihoods are better than other gear types because they have increased options for targeting and landing a variety of fish stocks.

Many workshop attendees felt that combined gear type users face the same challenges as hook and liners and fixed netters. Having both gear types was said by some participants to allow fishermen to catch more bass, but others thought this benefit is curtailed by the current restriction of one single gear type being permitted per fishing trip. One participant acknowledged the practicality of this restriction for monitoring and enforcement purposes. For some fishermen, the ability to use two gear types was seen as a significant advantage and believed these fishermen are doing the best out of all the commercial bass fishermen.

The fishing activities and involvement of recreational fishermen in fisheries management decisions was viewed as unfair by most participants. Many participants believed recreational fishermen break regulations, such as catching more than the permitted one bass per day, because of the lack of enforcement. Some participants were frustrated that recreational fishermen have access to pollack and felt they should not be involved in influencing fisheries management decisions that financially impact commercial fishermen. Everyone agreed that fish sellers are doing well because they are able to purchase farmed bass from overseas to offset any changes to catch volumes from the UK bass fishery.

4.2 Acceptability of synergies and trade-offs of the removal of the bass authorisation system and 5% trawl bycatch limit

Once the participants had assessed the current statuses, participants assessed in their groups the degree of impact on each of the bass stock, ecosystem features and fishery stakeholders from the proposed management measures: the removal of the current bass authorisation system and the 5% bycatch limit for trawls, with existing catch limits still in place. The colour coded analysis on the MaPTA trade-off dashboard showed what/who could potentially benefit from these measures and what/who could experience a cost and thus showed the synergies and trade-offs at a system level. The following synthesises the perceived synergies and trade-offs for each of the authorisation system removal and 5% trawl bycatch limit in turn.

4.2.1 Removal of authorisation system

Findings from the pre-workshop survey and workshop revealed varied opinions on the authorisation system. Some fishermen believed the authorisation system is well-established; commercial fishermen who want to catch and land bass have already invested in the entitlements to do so. Others found it unfair because of the unequal catch limits among different gear types and difficulties in upgrading or changing vessels.

Removing the authorisation system provides an advantage for new entrants of the bass fishery because it would reduce the financial capital needed to fish for bass. Although, the removal will come at the expense of the authorised inshore hook and line and fixed net vessels because bass entitled vessels will significantly depreciate. Due to the influx of vessels joining the fishery, an increase in supply could result in reductions in catch limits and potential decreases in market price for bass, since merchants will have more options for cheaper bass.

4.2.2 Removal of the 5% bycatch composition for trawls

Commercial bass fishermen believe the dumping of dead bass is wasteful and a significant problem. Similar to the authorisation system, views on the 5% bycatch composition on trawls were wide-ranging. Some expressed that trawlers should be able to land bass when they catch it, meanwhile others thought that removing bycatch limits would result in the increased targeting of bass by trawlers and impact other fishermen negatively.

Removing the 5% bycatch composition for trawls will benefit trawlers by enabling them to land and sell higher volumes of high value bass and will benefit consumers by increasing supply to market of cheaper bass products. However, these benefits could come at the expense of other fishermen because bass may become a target species by trawls, risking the sustainability of the stock and thereby forcing regulators to decrease catch limits for bass. An increased supply of bass to markets may drive down bass prices, and merchants will favour cheaper trawl-caught bass, reducing the profitability of other types of bass fishermen.

4.2.3 Acceptability of the potential management measures

The ecological trade-offs of the potential interventions were deemed acceptable but the socioeconomic trade-offs were considered unacceptable, especially to the inshore fleet using hook and line and fixed net gears. The primary ecological trade-off recognised by commercial bass fishermen was the increase in pressure on the bass stock but a decrease in pressure on other species, due to the intentional targeting of bass by trawls and fixed nets. Overall, the negative impacts on the bass stock and associated ecosystems were considered negligible and acceptable.

The potential impact on the inshore hook and line and fixed net gear types was perceived to be unacceptable by many participants. The financial impacts of potential catch limit reductions and lower market prices was said to put at risk the ability of these fishermen to make an adequate living from fishing. These impacts are especially unacceptable to those, notably hook and line fishermen, already affected by the pollack ban; hook and line participants already indicated their current status as precarious, making any further impacts unacceptable. However, a handful of fishermen believed that the costs of removing the authorisation system are acceptable (if catch limits remain the same) because it would promote equal access to bass, regardless of gear type. Some commercial fishermen believed the impact on market prices will decrease in the short term but will eventually level out, and therefore would be acceptable.

The costs of removing the 5% bycatch composition are considered unacceptable by many participants because it is considered economically unfair that trawls would be able to provide cheaper bass. There is a sentiment that fishermen highly reliant on catching bass, especially the hook and line fishermen, are generally struggling. They are not able to afford to land less bass (due to perceived decreases in catch limits) nor sell bass at a lower price.

4.3 Alternative management measures

Having identified the trade-offs of the two strawman management measures, participants were asked to propose adjustments to those or alternative management measures, recorded on a table of response options. In each group, individual participants then voted (each with three votes) on the potential measures identified by their group that they considered to have the most potential to be acceptable and then assessed the trade-offs and acceptability of those interventions following the same steps. Alternative measures 1-3 below are the three most voted for measures and their trade-offs, while alternative measures 4 and 5 refer to two additional alternatives proposed after further consideration by participants. It is important to note that the trade-offs identified, and their acceptability are dependent on the group and its composition – if assessed by another group different perceptions may have been conveyed.

4.3.1 ALTERNATIVE MEASURE #1

Permitting the use of multiple gear types and setting equal catch limits for hook and line, fixed nets, and trawls (current authorisations)

No concerning outcomes for the bass stock were identified by participants because access to the bass stock is redistributed among the same group of fishermen (there would be no new entrants).

This alternative measure increases competition among fishermen, benefitting fixed netters and trawlers, potentially at the expense of hook and line fishermen, though some participants believed that hook and line fishermen will adapt.

Fixed netters benefit the most because they can increase the number of bass they can land and have the opportunity to use rod and line, thus increasing their income. Trawlers benefit from this measure since they have a higher catch limit and their income increases.

These benefits may negatively affect hook and line fishermen due to the increased competition. The negative impacts of the measure were considered acceptable by the group considering this measure because it was considered a necessary step toward achieving fairness. Additionally, the group expressed that if the total allowable catch for bass was determined in line with their observations (i.e. stocks are more abundant than assessed), no fisher would suffer under the conditions of the measure.

4.3.2 ALTERNATIVE MEASURE #2

A bass license cap for hook and line where excess allocation and bycatch is distributed to fixed netters and trawlers and implement rod licenses for recreational fishermen

Impacts on the bass stock are acceptable because the stock remains regulated and there are no perceived negative impacts on other ecosystem features.

Overall, the alternative measure is generally favourable for all commercial bass fishermen but livelihood concerns remain for hook and line fishermen, who are now solely reliant on bass due to the pollack ban. Commercial bass fishermen will be satisfied that there are additional regulations on recreational fishermen. The group believed 'law abiding' recreational fishermen will also be content with rod licenses because it will promote a more sustainable fishery. Fixed netters and trawlers will benefit because they will be able to land more bass, thus resulting in increased wages. The measure may still create challenges for new entrants, but the group believed this is acceptable because new entrants can invest in an authorisation to fish for bass. Hook and line fishermen are still struggling under this measure because they are very few options for diversification and any changes to the stock or individual catch limits will disadvantage them.

4.3.3 ALTERNATIVE MEASURE #3

Increase access to bluefin tuna and pollack (all vessels and only under-8m vessels)

Ecological impacts are acceptable because access to bluefin tuna and pollack will ease pressure from the bass stock.

Permitting access to bluefin tuna stocks could provide an alternative target species to offset the impacts on bass fishermen from reduced bass (and pollack) by providing additional income, which could be especially beneficial for hook and line gear users (most affected by the pollack ban). However, there are significant knowledge gaps on the sustainability of the bluefin fishery; whether the presence of bluefin tuna is temporary or what the market price for bluefin tuna is in the UK. At this moment, some participants said there are too many unknown variables to determine if this is a feasible or acceptable alternative to the proposed measures.

4.3.4 ALTERNATIVE MEASURE #4:

Maintain but adjust bycatch limits for trawls

As discussed above, completely removing the 5% bycatch limits for trawls was considered unacceptable because it could result in a "free-for-all" for trawlers to target bass, risking the sustainability of the stock, and negatively impacting other fishermen due to potential individual catch limit decreases and cheaper bass market prices. Nonetheless, all groups discussed increasing the bycatch limits for trawls to reduce the volume of bass discarded.

Trawlers would benefit from raising the bycatch limit from 5% because they would be able to catch and land more bass and it could reduce discards without completely opening the fishery to trawlers. Other gear types may be negatively impacted due to the increased landing of cheaper trawl caught bass and changes to the stock, but some participants felt this effect would be modest if the bycatch limit was set at an appropriate level. One group also suggested a 'quota rollover' system, whereby trawls can accumulate their % bycatch across trips to account for unpredictability in catches, i.e. if their bass bycatch is below the % limit for one trip, they can utilise the unused limit in future trips where it might be over the 5%. There was wide agreement that these options would be more acceptable than the removal of the limit or the status quo.

4.3.5 ALTERNATIVE MEASURE #5:

Adjust fixed net regulations

The current bycatch limits for fixed nets are perceived to be unacceptable, as fixed netters are struggling to earn sufficient income under the current bass regulations. Some groups identified management measures to address the issue such as allowing fixed nets to target bass if mesh sizes increase and increasing the bycatch percent limit for fixed nets. Permitting these measures would benefit fixed netters, but at the expense of hook and line fishermen because of the increased pressure and potential decreases in how much they can land and catch.

Allowing fixed netters to intentionally target bass will result in a more selective and higher value fishing trip, increasing their wages, and reducing bass discards produced by nets. However, some participants questioned the feasibility of increasing mesh sizes because fixed net gears are already highly specialised and would require more capital to change/replace nets, which could be unaffordable for many fishermen in the absence of assistance. The increase in bycatch limits would enable fixed netters to catch and land more bass, but risks increasing the landing amounts for other commercial species, which may have negative knock-on effects for other fishermen because of the increased supply of other commercial stocks, resulting in multiple market price decreases.

5. Benefits and limitations of MaPTA

The pilot application of the Marine Planning Trade-off Analysis (MaPTA) tool to explore commercial bass fishermen's perceptions of proposed management measures in the Bass FMP demonstrated both the potential and limitations of participatory trade-off analysis in fisheries management, which has implications for the future application of MaPTA in UK fisheries management.

5.1 Benefits of the MaPTA approach

5.1.1 Facilitating dialogue and understanding between fishermen using different gear types

The MaPTA process created a structured environment where commercial fishermen using different gear types could share their perspectives and experiences. The workshop evaluation revealed that many participants valued the opportunity to hear from and engage with fishermen using different gear types. This was particularly important in the bass fishery context, where hook and line, fixed nets, and trawl fishermen often have different interests and are affected differently by management measures.

The process revealed significant differences in perceptions about the wellbeing status of different fishing groups, with some stakeholders unaware of the challenges faced by others. For example, while some participants emphasised how the pollack ban had severely disadvantaged hook and line fishermen who became more dependent on bass, others did not recognise this vulnerability and assumed hook and line fishermen should be doing well given their higher catch allocation. These exchanges fostered greater awareness of the varying degrees of vulnerability and adaptive capacity among different fishing groups.

5.1.2 Revealing complex factors influencing perceptions of fairness

The MaPTA process highlighted how different conceptions of fairness shaped participants' views on the acceptability of management measures. Some participants viewed fairness through a lens of equality, desiring equal access and catch limits regardless of gear type. Others held a more equity-centred view, recognising that different gear types have different impacts and vulnerabilities that may justify different treatment.

Fairness perceptions were also influenced by individual circumstances and vulnerabilities. Those more adversely affected by proposed changes were more likely to view current protections as fair, while those disadvantaged by current arrangements were more inclined to see change as fair. The MaPTA process made these different perspectives on fairness explicit, allowing for more informed discussions about acceptable compromises.

5.1.3 Supporting identification of compromise solutions

Despite strongly held views on the existing management system, the MaPTA process helped participants identify potential compromise solutions that addressed collective concerns while minimising harm to vulnerable groups. For example, while most participants agreed that the bass discard issue needed addressing, they recognized that completely removing the 5% trawl bycatch limit could negatively impact other fishermen. This led to the development of alternative measures such as increasing (rather than removing) bycatch limits or implementing a quota rollover system.

The identification of five alternative management approaches through the MaPTA process demonstrated that, given appropriate structure and facilitation, stakeholders can move beyond entrenched positions to develop creative solutions that balance multiple interests.

5.1.4 Increasing transparency in trade-off considerations

The MaPTA approach made the trade-offs associated with management decisions more transparent. The visual and structured process documented the rationale behind different groups' conclusions and the values that informed their discussions. This transparency can help build trust in decision-making processes, which participants identified as currently lacking in fisheries management.

The workshop also revealed differences between fishermen' observations and scientific assessments, particularly regarding the bass stock status. Making these differences explicit provides an opportunity to address mistrust in scientific evidence and explore ways to better integrate fishermen' knowledge into management decisions.

5.2 Limitations and challenges of the MaPTA approach

5.2.1 Representation challenges affecting outcomes

The pilot workshop faced challenges with balanced representation, with hook and line fishermen being better represented than trawlers. This imbalance likely influenced the workshop outcomes, particularly in groups with little or no trawler representation. Future applications of MaPTA would benefit from ensuring more balanced representation across stakeholder groups or acknowledging and adjusting for representational imbalances when interpreting results.

Additionally, the pilot focused exclusively on commercial fishermen, excluding recreational fishermen and other stakeholders with interests in the bass fishery. While this focus was intentional given the specific aims of the workshop, it means the full range of perspectives on the Bass FMP was not captured.

5.2.2 Time-intensive process requiring streamlining

The MaPTA process proved time-intensive, with participants and observers noting that the tool would benefit from simplification. The multi-step process, while thorough, sometimes created confusion and was challenging to complete comprehensively within the available time. Future applications could benefit from streamlining while maintaining the key benefits of structured trade-off analysis and deliberation.

5.2.3 Balancing ecological and socioeconomic considerations

The workshop discussions heavily emphasised socioeconomic impacts, with participants generally considering ecological trade-offs acceptable. This may reflect commercial fishermen' primary concerns with livelihood impacts, but also highlights a potential limitation of the approach in adequately addressing environmental considerations without additional expert input or representation from conservation interests.

5.2.4 Stakeholder scepticism about influence

Despite generally positive feedback on the MaPTA tool itself, many participants expressed scepticism about whether their input would influence final decisions. This scepticism reflects well known issues of trust in fisheries management in the UK that could limit the effectiveness of participatory approaches if not addressed. Participants noted that previous engagement efforts had not resulted in perceptible changes to management decisions, leading to stakeholder fatigue and disillusionment. For MaPTA to be effective, there needs to be clear communication about how stakeholder input will influence decisions and demonstrable follow-through.

5.3 Implications for future applications of MaPTA

5.3.1 Integration within broader stakeholder engagement strategies

MaPTA should be viewed as one component of a stakeholder engagement strategy rather than a standalone approach. It could be complemented by other methods that address its limitations, such as expert panels to strengthen ecological considerations or broader consultations to increase representation.

5.3.2 Importance of process design and facilitation

The effectiveness of MaPTA depends significantly on process design and facilitation. Clear explanations of the purpose and expected outcomes are essential, as is skilled facilitation to ensure balanced participation and constructive dialogue. The pilot demonstrated that, with appropriate facilitation, MaPTA can foster productive discussions even among stakeholders with potentially competing interests.

5.3.3 Managing expectations and demonstrating impact

To address stakeholder scepticism, it is important to be clear about how MaPTA results will influence decision-making. This includes being transparent about constraints (e.g., legal requirements) and providing feedback on how stakeholder input was considered in final decisions. Demonstrating that participation through MaPTA has tangible impacts on management decisions would help build trust in the process and increase stakeholder willingness to engage in future exercises.

5.3.4 Potential for broader application and development

Despite the challenges identified, the generally positive evaluation of MaPTA by participants suggests it has potential for application in UK fisheries management. Future development could include creating simplified versions for different contexts, expanding to include a wider range of stakeholders, and developing approaches to better integrate scientific and industry knowledge.

6 Conclusion

The MaPTA pilot demonstrated that participatory trade-off analysis can valuably support fisheries management stakeholder engagement, particularly in facilitating dialogue between different gear types and identifying potentially acceptable solutions. While practical challenges exist with representation, process design, and balancing different considerations, there was strong stakeholder support for such approaches in future FMP development. In January 2025 the bycatch limit for trawls was increased from 5% to 10% by EU and UK governments, highlighting the relevance and credibility of solutions proposed in this workshop.

Success in future applications will require careful attention to representation, process design, and expectation management. By addressing these challenges, MaPTA has the potential to contribute to more transparent, inclusive, and acceptable fisheries management decisions that better balance the diverse interests at stake in complex fisheries like the UK bass fishery

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Annexes

Annex 1: Pre-workshop results

Background

The survey was distributed between May 2024 – October 2024. It was open to members of the PFSA involved in the bass fishery and/or those planning to be involved in the in-person workshop on 18 October 2024. The survey was hosted on Microsoft Forms. The following annex details the results of the pre-workshop survey.

Demographic information

In total there were 16 respondents, all of whom were commercial fishermen with bass entitlements. Most respondents (75%) only have authorisation to use one gear type for catching bass while 25% of respondents are using two gear types. For single gear types, the most common gear type used among respondents are hook and line (50%) and fixed nets (33%) with some using trawls or a combination of hook and line and fixed nets or fixed nets and trawls. Table 1 details the distribution of gear use.

Single gear use		
Gear types	Count	Percentage
Hook and line	6	50%
Fixed nets	4	33%
Trawls	2	17%
2-gear use		
Hook and line + fixed nets	3	75%
Trawls + fixed nets	1	25%

Table 1: Distribution of gear use among respondents

The majority of respondents (81%) are operating under-10m vessels with a small group working on over-10m vessels (19%). When asked how long they have been commercially fishing for, most folks responded over 15 years (75%) with 19% fishing between 5-15 years and 6% for less than 5 years.

Dependency on the bass fishery

Most of the survey respondents expressed a dependency on the bass fishery, with only 12% expressing neutrality (Figure 1). The majority of respondents (87%) are dependent on the bass fishery with over half (56%) demonstrating high dependency, while 31% are fairly dependent. Everyone using hook and line and fixed nets as a single gear type has expressed dependency on the bass fishery. Of those who answered 'neutral' the gear types used are hook and line and fixed nets and a trawl.

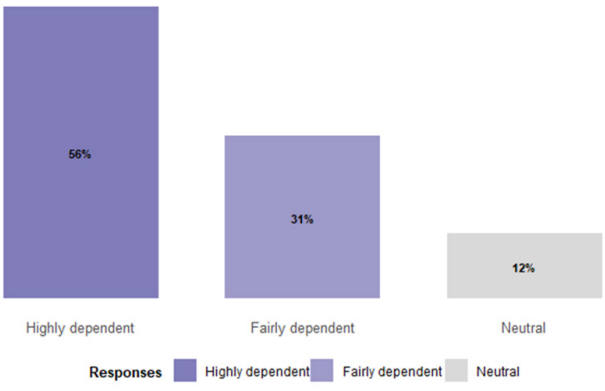

Figure 1: Responses to "To what extent is your livelihood dependent on the bass fishery?"

Acceptability of different management measures

i) Quantitative responses

The Bass FMP proposes several different management measures. The survey asked respondents to explain why some of the proposed management measures are considered acceptable or unacceptable. The four management measures we asked respondents to provide opinions on acceptability are:

1. The introduction of a quota system for bass
2. The introduction of a % catch composition for netting
3. Removal of the % catch composition for trawls
4. Require all bass bycatch landed over catch limits / quota at no profit

Across the four different management measures, there was no clear agreement on acceptability as each measure was considered acceptable or unacceptable for different reasons **(Figure 2)**. The two most acceptable management measures that emerged were the removal of the % bycatch composition for trawls (62%) and the introduction of a quota system (50%). The requirement for all bass bycatch landed over catch limits was unacceptable to 62% of respondents and the introduction of a % catch composition for netting was considered unacceptable to half of the respondents (50%). However, each measure has a notable distribution of opinions between acceptability, unacceptability, and neutrality, indicating a mix of opinions.

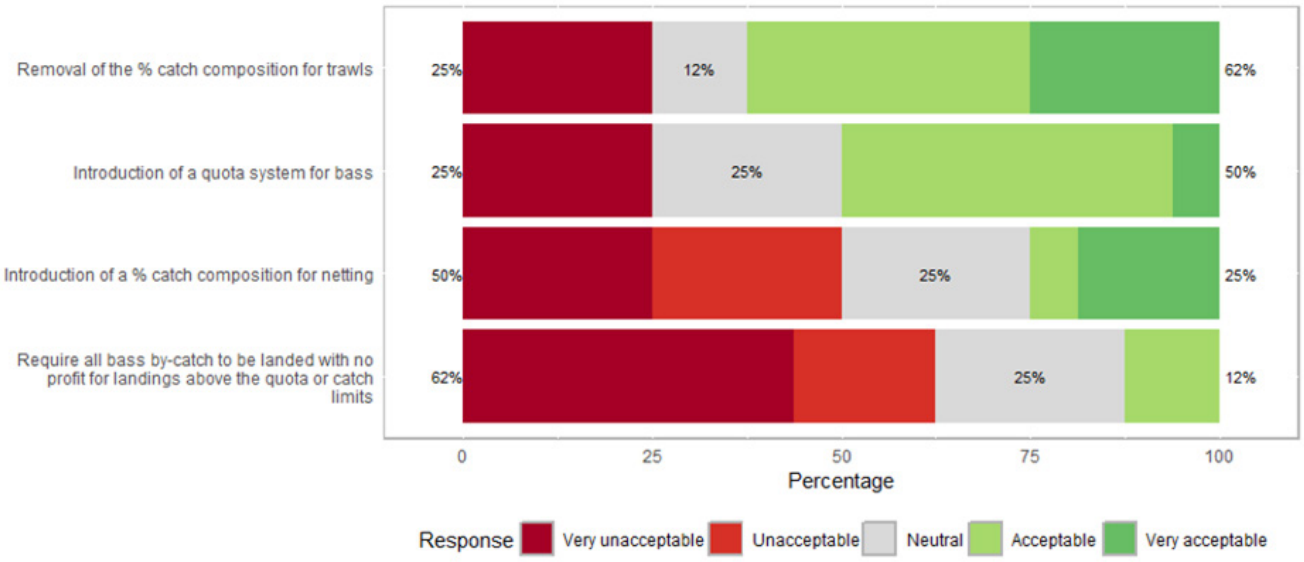

Figure 2: Likert-plot of the acceptability of proposed management measures

ii) Qualitative responses

Unsurprisingly, if a management measure had a perceived positive impact on livelihoods, it would be deemed more acceptable while if it had a perceived negative impact, it would be considered unacceptable.

For instance, half of the respondents (50%) consider the introduction of a quota system to be acceptable partially due to it being a better alternative to the authorisation system, which is impacting upward mobility in the industry.

> *"I would rather see a quota for all boats instead of just the boats with an entitlement, my vessel has a bass entitlement but I would like to sell and buy a slightly larger vessel but I can't transfer the entitlement. This is a ludicrous situation and is stopping a lot of people wanting to move forward in the industry."*

On the other end, unacceptability was often expressed by respondents due to perceived negative impacts on livelihoods. Those who consider it unacceptable cite reasons related to maintaining the livelihoods of those who fish using rod and line, suggesting that an increase of the quota should be introduced but only for vessels that have bass entitlements.

> *"The quota should be increased with the hugely increased stocks of bass but only for the bass entitled vessels this will maintain the high value of bass and allow the rod and line bass entitled fleet to continue to earn a living"*

The introduction of a % catch composition for netting was deemed unacceptable by half of the respondents (50%). As expected, 88% of fixed net users consider the measure unacceptable. For some, netting bass is a large portion of their yearly turnover and introducing a % catch composition would negatively impact livelihoods, especially with the pollack ban in place.

> *"In a very mixed fishery, it's very hard to avoid plus later in the year There is very little else around with the current Pollock ban on as well. Pretty much leaves me one species of fish to catch this year, which is Ray as I'm a small under 8 m netter and I only fish along the shore in winter months."*

While many folks find the removal of the % catch composition for trawls acceptable (63%), a small minority do find the intervention unacceptable based on the negative knock-on effects it could have on other fishermen because it may result in the targeting of bass by trawlers [protectionist].

> *"taking away the the % catch will push trawlers to, target bass when they are on the ground and therefore if there was a said new quota system is in force, this would cause quota to be reduced due to over fishing and again putting pressure onto rod and line fishermen who soley rely on bass for a living"*

Similarly, for the introduction of a % catch composition for netting, a quarter of respondents (25%) feel that the measure is acceptable because it would stop the targeting of bass by netters which is perceived to have negative impacts on rod and line fishermen [protectionist].

> *"this should of been put into place when the rulings were put into place originally, as many inshore netters continued to actively target bass, in known bass areas, as there has been no policing of the rules due to loop holes."*

Over 60 percent of respondents (63%) believe landing bass bycatch over catch limits for no profit is unacceptable. The primary reason for unacceptability is that it would negatively impact earnings as it would drive the bass prices down and the effort to cost ratio would make it "useless" to bring bass ashore.

> *"Fishing is very hard work with enough periods of low earnings so no one should have to give away fish when they need the income it can generate"*

For some folks who considered a management measure to be neutral (neither acceptable nor unacceptable), concerns for livelihoods were still expressed or pondered upon in almost all of the neutral responses. For instance, one respondent claims that a quota system would be fine as long as it maintains the same current measures and is not a catalyst for decreasing fishing effort, indicating a level of distrust as well.

"as long as the quota is still[l] the same as the current measures in place then i see no reason to not have a quota system, just as long as this is not a stealth way to reduce efforts in years going onward."

In the removal of the % composition for trawls measure, respondents who answered neutral speculate that the measure would have a negative impact on others as it would cause bass prices to decrease.

"if it was scrapped i think the bass prices could drop having an impact on others"

Connected to livelihoods, value judgements were made by some respondents in support of a quota system citing beliefs in access for all fishermen to catch bass.

"I believe all fishermen should have access to bass as everyone needs every species to make a living"

Across every single management measure, concerns over bass discards were mentioned, and a factor in influencing acceptability. For instance, removal of the % catch composition for trawls was regarded as acceptable by a large portion of respondents (63%) because the number of discards is seen as a serious issue among fishermen across all gear types.

"The unavoidable catch of bass by trawler is increasing as the stock grows and spreads across the ground chasing feed dead fish being thrown back does not help stocks."

Even respondents who consider the removal of the % catch composition for trawls to be unacceptable or feel neutral about the measure recognize the issue of trawls dumping dead fish.

"We're not a trawler. but dumping several tonnes of dead fish is definitely not acceptable."

The introduction of a % catch composition on netting is partially considered unacceptable because of the perceived increase in discards.

"That is unacceptable . Netting is not like that and bass is a scholing fish... You catch mutilple species and you would never have a % catch. You would be chucking back dead fish."

Similar to livelihood impacts, some value judgements were made on why discarding bass is unacceptable. One respondent regards the increase of discards as "morally wrong", while another considers it "unfair".

"Its completely unfair trawlers dumping dead bass. Its a mixed fishery here and boats are trying to avoid bass during the cuttle season and still accidentaly catch large numbers of bass."

Another value judgement being made regarding discards is the perception of sustainability. Many find the dumping of bass to be unsustainable even for those not using trawls as a gear type.

"I'm not trawling but can see the need for direct quota as again low value species are targeted to allow bass retention."

The same arguments are made for why a % composition for netting is unacceptable. An example of the targeting of low-value species is given to articulate the point on unsustainability:

"This leads to targeting of other species to allow bass to be landed, leads to needless capture of low value species like wrasse and dogfish. With no pollack available this doesn't add up to sustainable fisheries"

Further, one respondent argues that netting for bass is highly specialised and done sustainably.

"using larger mesh sizes means we only catch the larger fish which makes sustainable ."

While it is clear that increasing discards is unpopular among respondents, when given between the choice of landing all bass bycatch caught over limits at no profit or discarding bass, the dumping of bass does emerge as the more desired choice. Reasons for this include the perception that it is more sustainable than the former; it will have a better chance of survival rather than ending up in a discard bin at a market or can be used as feed for other organisms.

"Surely all over quota stock has better chance of survival if returned to sea, rather than retained and ending up as landfill"

Previous measures that address the discards problem have resulted in acceptability (e.g. removal of the % catch composition on trawls) or unacceptability if it is seen to exacerbate the issue (e.g. introduction of a % catch composition for netting), indicating a shift in priorities when given a set of choices. This may indicate that despite discards being undesirable, the outcomes of landing all bass bycatch caught over limits at no profit are perceived more unfavourably due to the perceived added effort and costs, and possibly. Opinions on fairness and sustainability influence respondents' opinions on discards.

The status of the bass stock formed the basis for some determinations of acceptability and unacceptability for the introduction of a quota system measure.

For some respondents, a quota system is seen as acceptable because there is proof that previous management measures have worked and the stock needs to be protected, as some folks believe it still has not fully recovered.

> *"Clearly the increased size,close season and ban on pair trawling have had a positive effect on the bass stock"*

On the contrary, for folks who consider the introduction of a quota system as unacceptable, a quota system is seen as unnecessary as the stock is perceived to be abundant and healthy.

> *"There's more bass in the SW than there has ever been."*

While the status of the stock has not come out as strongly as previous factors (e.g. livelihoods and discards) for determining acceptability, it is evident that there are differing opinions on the status of the stock which may influence aspects of what is considered acceptable or unacceptable.

In three out of four of the management measures, neutrality makes up 25% of responses. For the introduction of a quota system and the landing of all bass bycatch over catch limits at no profit measures, one of the reasons mentioned is the uncertainty of impacts. For instance, in the case of a quota system, while it is recognised that the authorisation system is flawed it is better to navigate a situation you are familiar with than one that is unknown.

> *"better the devil you know than the devil you don't"*

Questions over the criteria of landing over catch limit bass at no profit emerge as there are many uncertainties involved.

> *"Hard to answer without more information. What would be done with the fish landed? What would be an outcome for the fishermen landing it?"*

For those who expressed neutrality, more information on the specifications of the measures and potential outcomes may influence how someone ultimately decides whether a measure is acceptable or not.

Fairness of the authorisation system

Opinions on fairness of the authorisation system are split evenly between it being a fair system and an unfair system (44% on either end) with a small minority regarding it neutrally (12%) **(Figure 3)**. Gear type is not correlated with fairness as several different groups of gears consider the system fair and unfair. Perceptions of fairness follow similar perceptions mentioned before such as impacts on livelihoods and status of the bass stock. However, inequality between gear types authorised to catch bass emerges as a significant point of unfairness.

Those who consider the system fair believe that fishermen who want to fish for bass have invested in the entitlements while those who are not interested have chosen not to. Additionally, they believe if the authorisation system were to be removed it would have a negative impact on the value of vessels, increase pressure on the stock, and result in lost livelihoods.

> *"if this authorisation was taken away more pressure would be put onto the current bass stocks and this would reduce the amount that we are currently allowed to catch and rely on our wage for. without this authorisation anyone could purchase a commercial boat and fish for bass, which will happen if this system is taken away again putting more pressure on fish stocks."*

For respondents who feel that the authorisation system is unfair, believe the system is inherently flawed. Some reasons include believing that all vessels should be able to access bass regardless of gear type and the inability to allow authorisation transfers to another boat.

The overwhelming perception of unfairness stems from the different catch limits between gear types. Fixed netters feel that it is unfair that hook and line fishermen are allocated a catch limit of 6.2 tonnes while netters are only allowed 1.6 tonnes. Trawlers feel that it is unfair that they have to discard bass compared to hook and line and fixed net gear types.

> *"Your letting hook and line and netted bass land what they catch until quota gone but you are telling trawlermen to throw it all away because of lack of other fish"*

It is apparent that there are diverging views on fairness among respondents, as perceived livelihood outcomes and status of the bass stock influence views on fairness, similar to previous questions. However, a distinct factor influencing opinions on unfairness are the different catch limits between gear types authorised to catch bass.

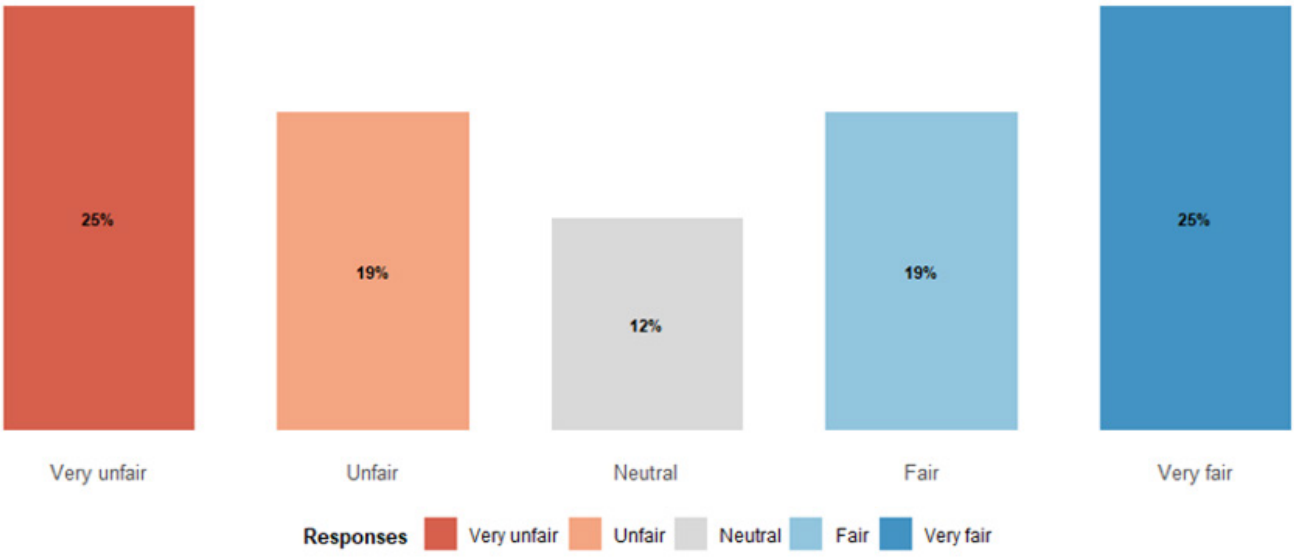

Figure 3: Responses to "Do you think the authorisation system is fair?"

The acceptability and effects of removing the authorisation system and the 5% bycatch limits on trawls

In this section of the survey, respondents were asked to answer a series of questions specific to the management measures that were the focus of the in-person workshop, including acceptability, the effect of the measure, and how the measure could be made more acceptable.

Overall, both measures had high amounts of acceptability among respondents. Allowing all gear types to catch bass was acceptable to 56% of respondents and 50% found the removal of the 5% bycatch composition for trawls to be acceptable. However, for both the permitting of all gear types and removal of the 5% bycatch composition for trawls, there is a significant minority of respondents (38% for both) who find the measures unacceptable, pointing to different opinions on acceptability (much like the proposed measures before). Especially, for the removal of the 5% bycatch composition for trawls, 31% feel strongly about it, labeling the measure as very unacceptable. This is more or less aligned with the previous question about trawlers in the section above as 25% felt the measure was very unacceptable. However, acceptability for the removal of the 5% bycatch composition for trawls is lower than when previously asked by 12%.

Interestingly, despite acceptability being reasonably high for the permitting of all gear types to catch bass measure, 50% of respondents believe it would negatively affect them. Similarly, over 56% of folks do not think the removal of the 5% bycatch composition for trawls would affect them but there is a small minority (38%) who believe the measure would affect them negatively while only one respondent believes that it would positively affect them (6%), when acceptability is reasonably high.

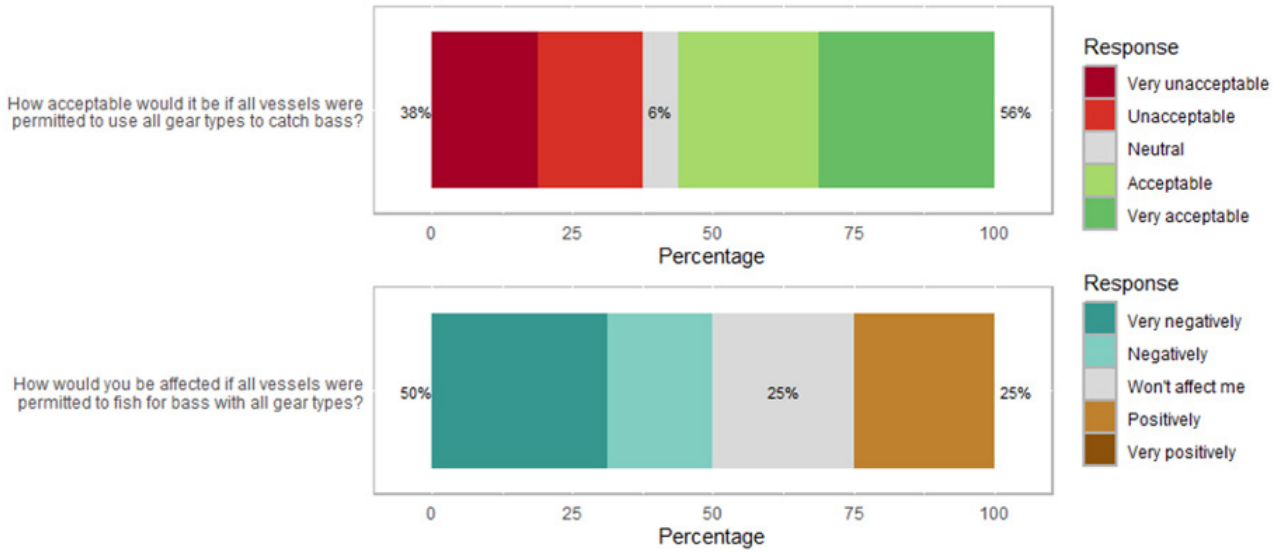

Figure 4: The acceptability and effect of removing the authorisation system

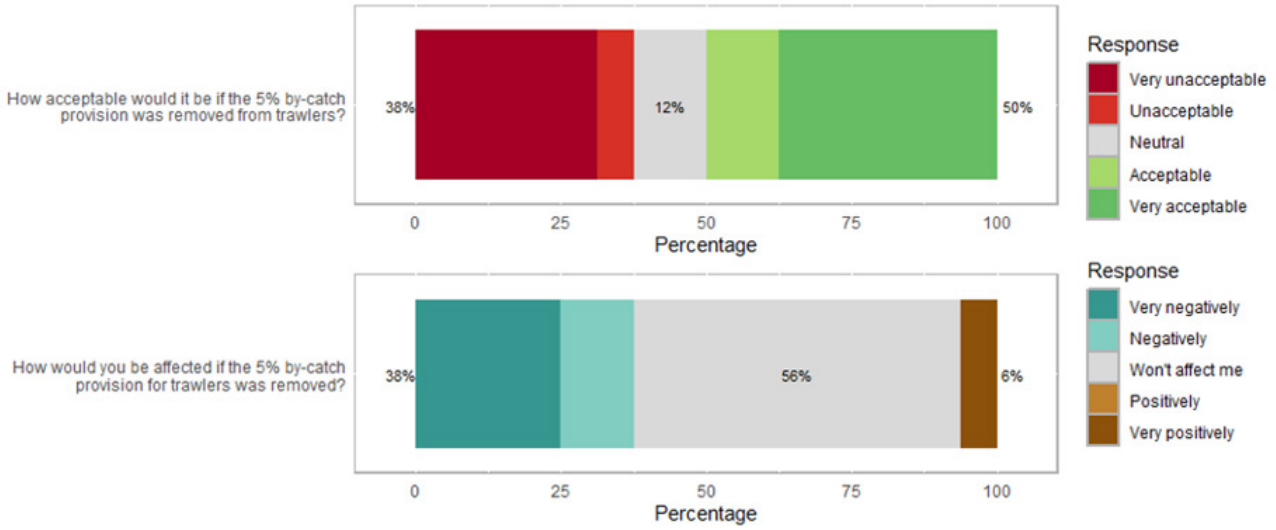

Figure 5: The acceptability and effect of removing the 5% bycatch composition on trawls

I) Qualitative responses

The process of determining what is acceptable and unacceptable was subjective and varied, similar to the previously proposed measures. For instance, the impacts on livelihoods and concern over discards were still a determining factor for deciding acceptability and unacceptability. For instance, when either measure was deemed unacceptable, a drop in bass prices due to the landing of more bass was commonly cited.

> *"Bass prices will drop when more is landed."*

Specifically for the removal of the 5% bycatch composition on trawls, many believe that this measure was put in place for a reason even suggesting an alternative being to increase the % catch composition instead of removing it altogether.

> *"would be better to increase this % by-catch as allowing trawlers to land all bass will lead to massive winter landings of bass which again will reduce prices and eventually quotas. trawler dump tonnes of bass each year, its better to allow them to land more % which can be managed instead of allowing a free for all."*

Similar to before, decreasing the number of discards influenced acceptability.

> *"Trawlers should be allowed to land bass when they catch it , they don't catch it very often but when they do it is often a lot more than the 5% bycatch."*

When asked how the measures could be made more acceptable, some folks stated that the measures would never be acceptable. Related to the removal of the bass authorisation system one respondent says:

> *"There is not an acceptable situation.There would be no control measure and it would be a free for all. Look whats happened to the crab and shellfish industry. The fishery has collapsed."*

For those who consider the removal of the 5% bycatch composition on trawls to be unacceptable, the only suggestions for improving acceptability were to enforce quota or catch limits at a minimum or less than what they are receiving now.

Interestingly, those who considered the measures acceptable provided more suggestions for improving acceptability than those who considered them unacceptable. Those who consider the removal of the authorisation system acceptable provided additional suggestions such as ensuring that the quota for netters is not smaller, the quota should be based on data and evidence, and measures are put in place to ensure that multiple gear types are not "double or triple dipping".

> *"This should be based on sensible historical records and the vessel itself... Quota would need to be set to stop double/triple dipping. Current rules already apply here"*

Some suggestions that emerged from those who consider the removal of the 5% bycatch composition on trawls acceptable were a tie-up system, a minimal quota (a similar suggestion provided by the unacceptable group), replacing the % bycatch composition with a quota system, and a data collection requirement.

> *"Possibly a tie up system if they have a big catch of high value bass"*

However, there seems to be a discrepancy between acceptability and effect. For example, the removal of the authorisation system measure was acceptable to 56% of respondents, but only 25% of respondents think the measure would have a positive affect.

Unsurprisingly, everyone who said the measure would have a positive impact said the measure was acceptable. There were a mix of other impacts across the acceptable responses ranging from 'won't affect me' and 'negatively'. Three respondents who considered the measure acceptable said the measure would not affect them and two respondents who said the measure was acceptable said it would have a negative impact. The group who said that the measure won't affect them said that trawlers do not operate in the same areas. However, one respondent from this group said that the measure would negatively affect them if the quota were set lower. Those who answered 'negatively' stated that they were concerned about the increase in bass landings and price reductions, specifically by trawlers.

> *"more fish being landed by the bigger trawlers even during bad weather while the smaller boats cant get out and flooding the markets and in turn reducing the price"*

Although the removal of the 5% bycatch composition from trawlers was considered acceptable by half of the respondents, only one respondent claimed it would have a positive affect. For most folks, the measure was perceived to have no affect on them (56%), which makes up 75% of those who claimed the measure is acceptable. Interestingly, two of the three respondents using trawls as a gear type said that the measure would not affect them. One reason being that they rarely go over the 5% bycatch composition limit.

> *"Makes managing my yearly fishery easier, however very rare I'm over 5% in bass"*

The majority of folks who claim that the measure will not have an effect on them state that they are not trawlers or don't operate in the same areas as trawlers. Only one respondent said the impacts of the measure are completely unknown, which would be in line with previous findings of neutrality in the survey.

Unsurprisingly, anyone who said the measure was unacceptable felt that the effect was negative. Reasons include justifications mentioned before such as a negative impact on livelihoods (increase in bass prices, decrease in quota), with one rationale on how it would specifically impact rod and line fishermen, and the status of the stock (concerns over increased pressure).

> *"Price of bass down. Increase in pressure on bass stocks offshore. Decrease bass moving inshore to more sustainable fisheries of netting and hook and line."*

Several thoughts emerge. Some folks will still determine something as acceptable or unacceptable beyond direct impact. In both measures, those who stated that the measure would not affect them, most of them did consider the measures to be acceptable. This was especially true for the removal of the 5% bycatch measure for trawlers as 75% of those who considered the measure acceptable said that the measure wouldn't affect them. A rationale for this was often not given, but there are some context clues as to why this may be the case. The first being that the measure may align with their own individual views on fairness. For instance, two respondents who said the removal of the authorisation system measure would not affect them had previously given value judgements on fairness, believing that all fishermen should have equal access to bass. Another observation is that the effect of a measure is conditional and can change. One respondent mentioned that the removal of the authorisation system would impact them negatively if the quota is lower, indicating a perceived future implication. The measure does not currently affect them negatively based on the specific conditions. Similarly, this may also explain the negative effect despite acceptability group. Respondents in this group may generally find the measure acceptable but believe there are conditions that need to be met or concerns that need to be addressed to ensure it impacts them as intended, making the measure only conditionally acceptable.

Bass FMP stakeholder engagement

The majority of respondents (69%) were not involved in the development of the Bass FMP. The small group that was involved, three of them were engaged through consultations while the other two participated in in-person meetings.

Satisfaction with the process was quite low among these participants as three respondents were very dissatisfied with the process (60%) while one person felt satisfied, and another individual felt neutrally about the overall experience.

The commonly cited reason leading to dissatisfaction was the perceived unequal representation of commercial fishermen and recreational fishermen, as respondents felt more attention is given to recreational fishermen. One respondent felt that the process was poorly executed, and it was a waste of time and money.

> *"There was far too much non commercial engagement when involving commercial fishing these surveys involved a high number of recreational fisherman who seemingly have it against the commercial sector"*

The respondent who felt neutral about the experience expressed that they found the science difficult to understand at times and the one individual who was satisfied with the process felt it was done well.

General opinions on the bass FMP and the bass fishery

The survey asked respondents to answer a series of likert-scale questions to determine their baseline opinions on other fishermen in the bass fishery, transparency of the Bass FMP goals and management measures as well as if they believe decision-makers are using the most current scientific evidence (Figure 6).

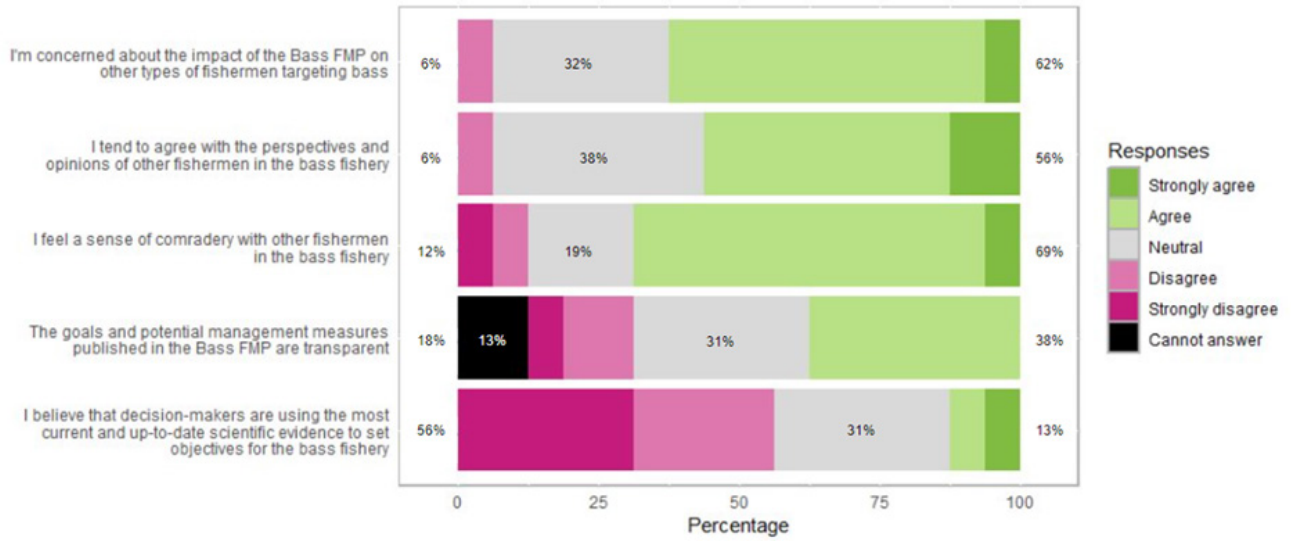

Figure 6: Likert-plots for general opinions of the bass fishery and the Bass FMP

Overall, the majority of respondents are empathetic toward other fishermen in the bass fishery. For instance, over 69% of respondents feel a sense of comradery with other fishermen in the bass fishery and 62% are concerned about the impact of the Bass FMP on other fishermen. Just over half of the respondents (56%) shared that they tend to agree with the perspectives of other fishermen in the bass fishery. While disagreement was low among respondents for all three questions related to empathy, both the concerns of impact question and agreement of perspectives question have a significant portion of neutral responses (32% and 38% respectively), indicating a lack of both agreement and disagreement.

There was low agreement among respondents when asked if they think the objectives and management measures of the Bass FMP are transparent (38%). A small minority do not think they are transparent at all (18%), while 31% feel neutrally about transparency and a smaller group feeling they could not answer (13%).

More than half of the respondents (56%) do not believe decision-makers are using current and up-to-date scientific evidence to set objectives in the Bass FMP. A very small group (13%) believe decision-makers are using relevant scientific data but 31% feel neutrally about this.

General opinions on fisheries decision-making

Opinions are mixed among respondents regarding fisheries management decisions (Figure 7). Regarding involvement that results in meaningful and tangible impacts, respondents are split evenly (38% disagree, while 37% agree with the statement). A small minority (25%) feel neutral.

Half of the respondents (50%) feel dissatisfied with their level of engagement and involvement in fisheries management. Only a small percentage of respondents (31%) feel satisfied while 19% feel neutral.

More than half of the respondents (56%) feel that fisheries management decisions are unfair while 31% feel neutral about the fairness of fisheries management decisions. Only 1 respondent (6%) felt that fisheries management decisions are fair.

Nobody in the survey said that they wanted less involvement in fisheries decision-making, with the majority wanting more involvement (69%) and 31% wanting the same level of involvement (Figure 8).

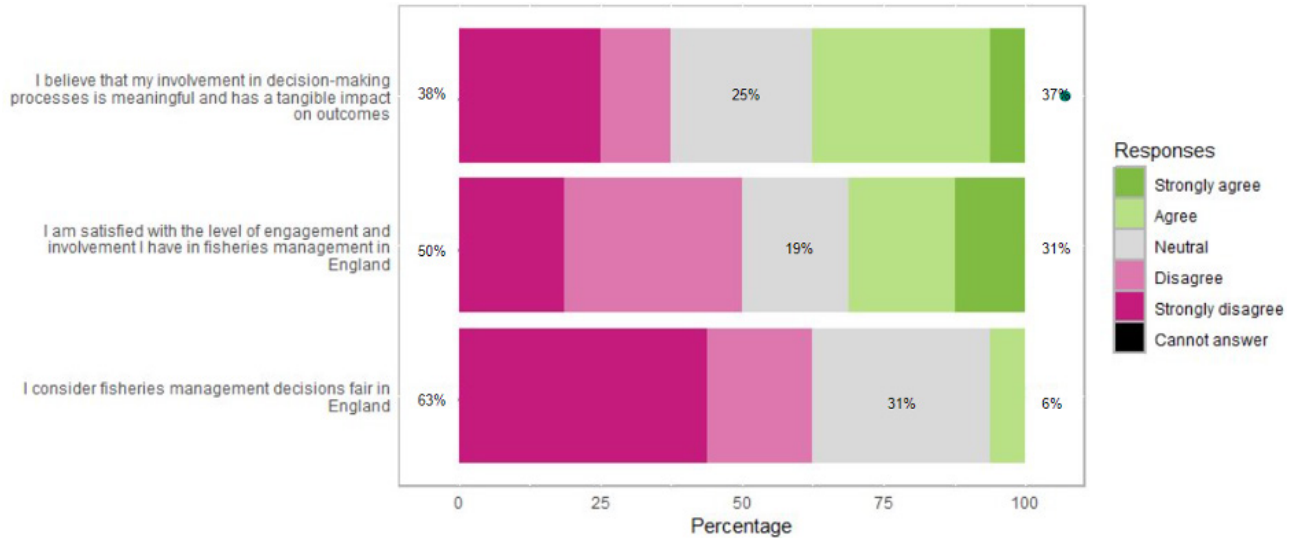

Figure 7: Likert-plot for general opinions on fisheries decision-making

Figure 8: Responses to "How much involvement would you like to have in fisheries management decisions?"

A reason for wanting more involvement is the desire to protect their livelihoods, referencing the collapse of the pollack fishery indicating how difficult fishing can be for those who depend on it.

> *"I've been fishing for pollock for 40 years (14 generations of the same family have also been fishing from Mevagissey) - 2 weeks notice for a complete ban having spent multiple thousands getting ready for the winter season. Need I say more?"*

Additionally, respondents feel that their first-hand knowledge is well positioned for understanding what is happening to the stocks and should be accounted for in decisions. Respondents are also concerned about using the most relevant evidence available, which they feel they have, especially with the re-introduction of bluefin tuna in the UK and the changing distribution of bass.

> *"we as rod and line fisherman have been seeing the changes over the last decade which need to be documented as evidence to the impact of an invasive species and the changing habits of bass. using any historical information will be flawed if major decisions are being made with it."*

Others feel that it is an obligation to be more involved because of concerns over other stakeholders having influence on decisions that affect commercial fishermen – most notably the recreational sector.

> *"As a commercial fisherman I think there are too many other " stakeholders" ie anglers and NGO's with no financial interest involved in decisions that affect us."*

The amount of time it takes to be engaged was the only reason given by one respondent who feels they want the same level of involvement.

> *"Time, everything relating the commercial fishing is becoming more time consuming, catch apps, MCA Compliance, staying ahead of legislation from Government, MMO and Local IFCA groups"*

One respondent feels slightly discouraged by being involved, as they perceive decisions are being made based on what decision-makers want.

> *"They do what they want anyway"*

While it can be difficult to determine how to implement participatory approaches into decision-making processes, it is evident that fishermen want to be involved because decisions made on fisheries management impact them directly and they are concerned about how decisions are made and believe they have knowledge and perspectives that should be better accounted for in decision-making.

Annex 2: Evaluation form results

Workshop evaluation

The vast majority of participants considered the workshop to be good or very good (94%) **(Figure 1)**. Many participants enjoyed working in small groups and hearing perspectives from other bass fishermen using different gear types, promoting greater representation. Specifically, folks appreciated the opportunity to voice their concerns and being involved in developing their own solutions.

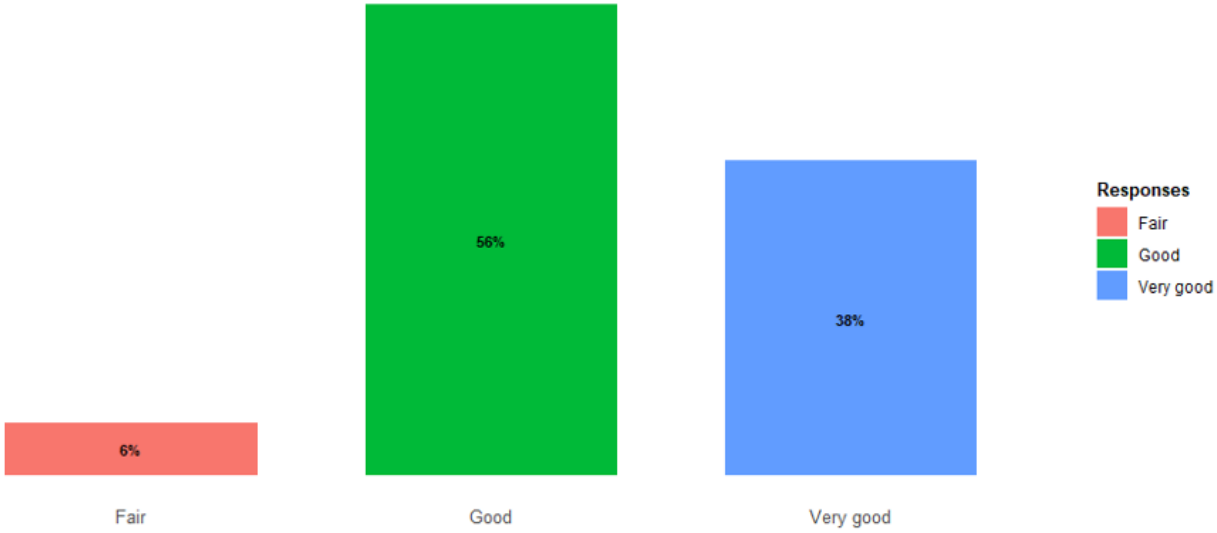

Figure 1: Responses to "Please rate your overall experience of the workshop"

Observers of the workshop felt that the workshop was interactive and informative, utilising an engagement approach that is not often used in stakeholder engagement processes.

Suggestions for improvement put forth by participants include the tool needing to be simplified as some of the discussions and steps were confusing and more direct and factual questions being directed at participants to make the process more understandable. Several participants believed there should have been more stakeholders involved and/or more diverse stakeholders such as trawlers and recreational fishing representatives.

Similar suggestions were proposed by observers to streamline the process since it was time-consuming. Other recommendations included more balanced representation, applicability (i.e. how the process can be fed into the Bass FMP), and having experts available to answer questions from participants at each table.

Evaluation of using MaPTA

Overall, most participants found MaPTA to be useful as most questions had high amounts of agreement (=>75%) **(Figure 2)**. An increase in understanding of the Bass FMP and their potential impacts and trade-offs had lower levels of agreement (69%).

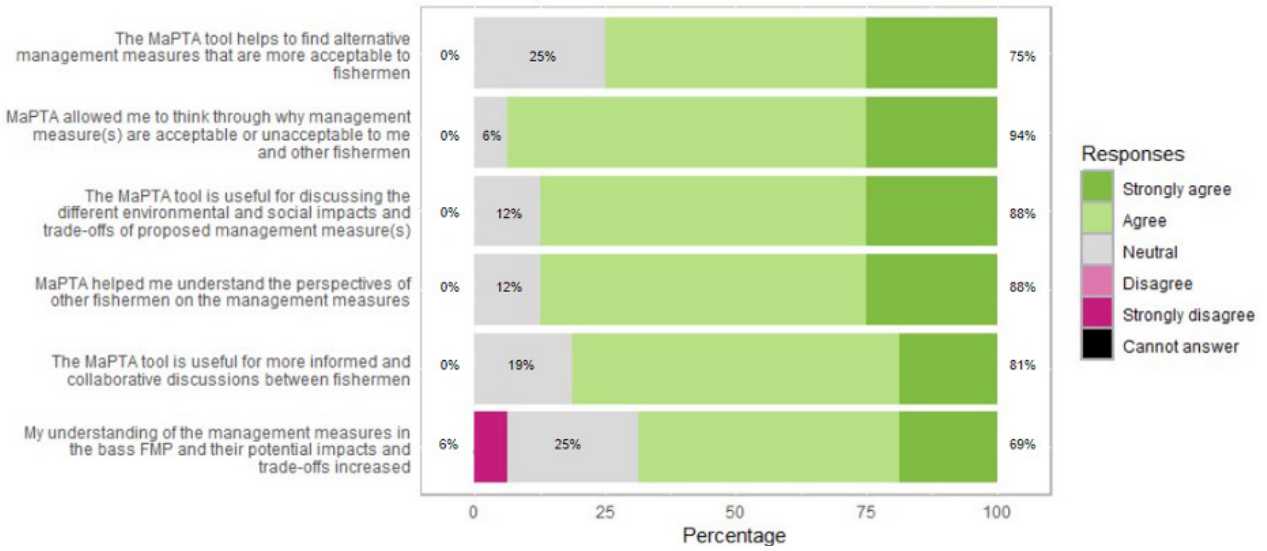

Figure 2: Likert-plot for opinions on using MaPTA

Did the opinions on the acceptability of measures change?

Most respondents to the evaluation form stated that their opinions on the acceptability of the measures stayed the same post-workshop. However, some folks shared that they did not realize the discard numbers were a big issue and believe this should be addressed but needs to be approached carefully without negatively impacting other fishermen. Others re-affirmed beliefs that the bass authorisation system should not be removed.

Can MaPTA support fairer fisheries management decisions?

Approximately three quarters of participants (77%) believe MaPTA could make fisheries management decisions fairer while 23% claim it would make no difference. Those who claim it would make no difference feel that their opinions will not be heard by the government regardless of the process or that it is difficult to change a fisher's mind. Reasons for increased fairness included the ability to be directly involved in their future, being able to share ideas, and increased representation. One person claims that the tool is easy to use.

The majority of observers felt MaPTA helps support fairer fisheries management decisions with one respondent saying it would make no difference. This respondent has very little faith in the decision-making process. Others felt that it enabled them to hear diverse perspectives and what fishery stakeholders would consider a fair trade-off. One observer felt it made the FMP proposals more transparent and provided an easier avenue for stakeholders to engage in the decision-making process.

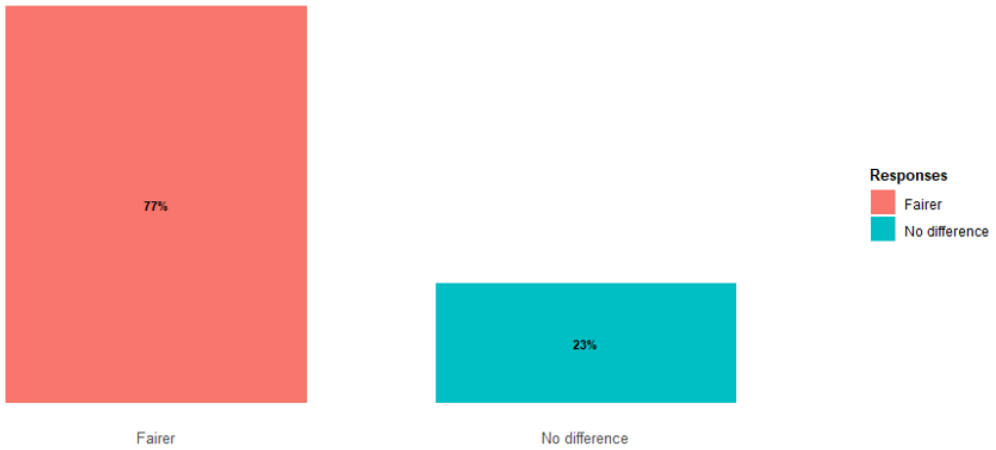

Figure 3: Responses for "To what extent do you think MaPTA could support fisheries management decisions to be fairer?"

Risks of increased conflicts and disagreements using MaPTA

The majority of participants (64%) did believe MaPTA could potentially worsen conflicts and disagreements among fishermen and between fishermen and fisheries managers. A few felt that it definitely will (18%) while another group felt that it wouldn't (18%). Those who said the tool could potentially increase conflicts and disagreements claim that if findings from the workshop are shared more widely with others it will be detrimental. Others feel that when gathering lots of people, there will be an increase of different opinions which will always be a risk. Those who answered 'yes' felt that the fishery stakeholders who have the most to lose may be negatively impacted by using MaPTA. Those who answered 'no' felt it can only be a good thing to involve more people.

The majority of observers believed the tool would not increase conflicts and disagreements, but one felt it will. Those who believe the tool would not increase conflicts believe that it is positive to have different views gathered together to develop solutions. The observer who believes that inherently opening up discussions in this nature will lead to conflicts in opinions, especially between recreational fishermen and recreational fishermen.

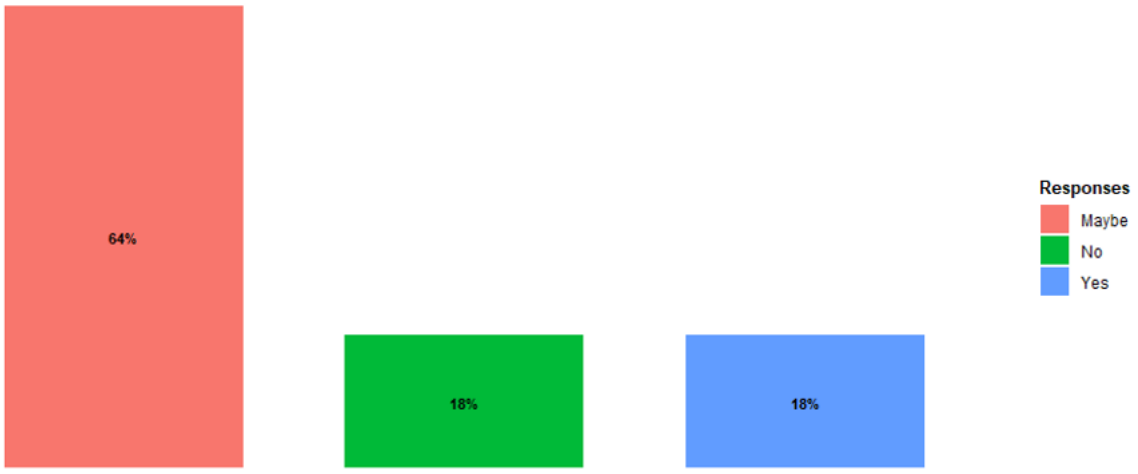

Figure 4: Responses to "Do you think there is a risk that using MaPTA in FMP decisions could worsen conflicts/ disagreements among fisheries stakeholders (e.g. between different types of fishermen and/or fisheries managers)?"

Other problems and risks of using MaPTA

Some folks felt that using MaPTA will not result in other problems and risks, however, some felt that it will be dependent on how the information is used, it may result in too many opinions, and fears that it could negatively affect livelihoods.

One observer feels that it could potentially make stakeholders believe that their views could/should become policy but it may also inform policymakers to avoid potential misunderstandings.

Recommending MaPTA for future stakeholder engagement processes

The vast majority of participants said they would recommend using MaPTA for future stakeholder engagement processes in the FMPs, sharing that it is a good way of getting thoughts and opinions on paper and inclusion of fishery stakeholders **(Figure 5)**.

All of the observers recommend using the MaPTA tool for future engagement processes, as it is useful for generating discussions and insights into stakeholder perspectives.

Figure 5: Responses to "Would you recommend that the MaPTA tool is used for future stakeholder engagement processes in the FMPs?"


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