

MSPACE Knowledge Sharing and Future Planning Workshop: East of England Offshore

Report

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MSPACE

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Background

The East of England Offshore (EEO) Workshop took place in York on 29 September 2023, from 9:30 to 16:00. Dr. Ruth Parker, Senior Scientist (Biogeochemistry, CEFAS – in person) and Dr. Christopher Sweeting (Evidence Team, MMO – in person), the MSPACE EEO case leads, welcomed the workshop organizers and participants to the DEFRA building – Foss House in York, which was equipped to allow virtual participants via Microsoft Teams as well as in-person attendance. The workshop was comprised of 8 virtual and 19 in-person participants as well as 1 virtual and 6 in-person MSPACE team members. Participants represented the 3 key MSPACE sectors (fishing, aquaculture, conservation), renewable energy, marine planners, and other marine planning stakeholders.

Presentations took place in the morning (WPs1-3). Throughout the presentations presenters solicited feedback, which was readily given by participants. This feedback was gathered by each WP presenter, a recording of the plenary session and workshop groups, and through note taking by MSPACE researchers Pat Danahey Janin and Océane Marcone during the presentations.

The morning presentations sought to accomplish the following:

- Present an overview of MSPACE, followed by the outcomes of WP1 - Climate smart marine planning, WP2 – Governance maps, values, and preferences for the region, WP3 – Economic input-output model applied to the maritime sector. Introduce through the presentations the next steps with WP4 and ASPACE in year 2024.
- Obtain feedback from the participants on the utility of the work, possible specialised reports geared towards regional preoccupations and priorities, additional data sources, and potential future representations of the governance maps. This feedback helps work towards the MSPACE project central goal (triple bottom line): advising policy makers regarding climate-smart, economically viable and socially acceptable marine planning strategies.

A worksheet exercise and interactive discussion took place in the afternoon over approximately 90 minutes. Participants were divided into 3 groups – aquaculture (online) and conservation and fisheries (in person). Participants were asked to fill out a worksheet first from the point of view of an assigned role in the sector and then from their own professional role and point of view. This feedback was gathered by each group lead during the group discussion, and through a recording of the group discussion session and a plenary discussion session.

The afternoon workshop sought to accomplish the following:

- Consult stakeholders to learn their perceptions of the synergies/opportunities/trade-offs that they and other stakeholders have regarding the MSPACE key sectors and to reflect on how those differ/align with each other.
- Engage stakeholders with some of the ideas to be raised during the upcoming MSPACE WP4 work and activities. Inspire continued contact between stakeholders and MSPACE team.

A pre- and post- survey was administered to assess the impact of the workshop.

Workshop Presentation Feedback

WP1 Feedback

Following the WP1 presentation on how the MSPACE project seeks to deliver a decision support system to enable climate-smart marine spatial planning with no-regrets decisions, participants were asked to give their feedback on the presentation and the interest of the information. Feedback came in the form of questions/answers and centred on general questions about data and very specific questions on the climate smart features of refugia, hotspots, bright spots, and the consequences of this research for species change and marine restoration and conservation. The following paragraphs summarize the exchanges.

Data

One general question about the MSPACE project asked about new data. *What new data is included in the project (for example the recent report on climate and the CCS data which is a key resource for E. England Marine Planning), and are there any plans to keep the database live and updated with new data?* MSPACE PI Ana Queiros replied that the project team has looked at publicly available climate modelling and additional data for particular types of habitats (blue carbon habitats for example). Additionally, MSPACE is working with stakeholders directly to address their specific concerns. Currently, for example, work is being carried out with the planning team at the Orkney Islands Council where they are looking at new specific data related to Orkney fisheries and aquaculture resilience. She explained the data will be secure for 5 years after the lifetime of the project. Data sets are available to use, and the climate change assessment and GIS data will also be available. The GIS data will be connected to IMAR Net. There will be the opportunity to feed in different climate modelling data, alter value assessment data and update input output data.

Refugia

One participant asked about the typical characteristics of a refugia. Ana Queiros explained the special methodology, spatial meta-analysis, used to identify refugia. It is a technique that measures the emergence of a climate signal and looks at when the ecosystem enters a state of long term refugia – the mean of variability in the future is within the range of variability today (baseline). Those mechanisms can remain working efficiently. Having a refugia does not mean that all species will remain, but collectively as a system it will remain within the realm of the current variability – some of the species may decline and others increase.

A second participant asked if we could assume a refugia demands some protection. Ana Queiros responded that *refugia* are particular areas that could continue to be fished for example, not just put into conservation. If fisheries were managed spatially, protecting those areas for access in the future, this form of management would be most useful to the fisheries sector in the long run. The idea is to focus restrictions on the refugia areas. For example, if there were two license applications, it would be important to consider where it would be least impactful for the fishing sector. There is a double perspective: conservation and maritime sector fisheries and aquaculture.

Hotspots

A clarification question was raised around hotspots which refer to the variability in changes due to climate change. Ana Queiros clarified bright spots and hot spots where the marine system enters a state outside of variability. For the nomination of bright spots and hotspots, the system enters a new state. For hotspots there is warming, Ph decline, and decline in oxygen as expected. For bright spots

it is the opposite, there is cooling where one would expect warming, oxygen when one would expect it to decline etc. The bright spot denomination has primarily to do with changes in circulation. Nearer term policy can capitalize on those areas but not in the long term.

Habitat and Marine Restoration

A participant asked whether the data sets included intertidal habitats and linked this query to asking if MSPACE had considered habitat and marine restoration. Restoration's next stage would be to include climate change considerations. Ana responded that they do not consider intertidal habitat specifically, but some information could be used for it. This is an area which shows the limits of the domain of data sets. However, they did consider restoration activities for oyster species and other benthic species. Some species' locations do overlap with refugia.

Replacement of Species

A participant acknowledged that marine environments are complicated and asked whether in terms of biodiversity the data show replacement if a species changes. Ana responded that the analysis is primarily on the decline of current species – not future species. The composition of catch in the UK is changing. Some of those new species are low in catch values so not included. We do know what prey species eat now, and their habitats now. The analysis does not include new species or adaptation, due to little evidence.

Implications of this research for protected areas

A participant wondered whether there might be value in changeable or variable protected areas. Ana responded that protection in policy is about the distribution of species, and while the boundaries can be changed, in practice that does not happen often. This report points to where you could consider moving these protected areas. For example, the report points to sensitivities and shows HPMA sites are climate sensitive which highlights the need to look at longer term climate sensitive data.

WP2 Feedback

The presentation of WP2 came in two halves, focusing on governance maps and values and preferences.

Following the portion focused on governance maps of Conservation, Fisheries, and Aquaculture in East of England, participants were asked:

- What do you think of the sequence of concentric rings to represent the governance structure?
- We could ask people who they interact with to create a network analysis. Would extra network mapping be of interest?
- What would you like the maps to show that they don't already?

Governance maps

The governance maps were considered useful and were appreciated widely by participants in the room. Participants thought the network analysis may reveal things people don't know or could be helpful to figure out contacts within the organisation, and show whom to contact if a reader did not know. In response to Co-I Gina Yannitell Reinhardt's question about whether people would engage with the governance map if each person could input their own information on the data, participants felt it would be more resilient to use the role instead of the person since the network represents a busy work

area, and the network would change quite a lot. Gina then asked what participants thought of the static map and whether it should be restructured. One participant responded that the halos differed from power influence maps, which tell the reader the role of a stakeholder period. He thought it would be interesting to see whether people perceive to have the power others attribute to them and how the nodes aggregate an organisation's influence and its networked-ness. Questions such as, "*Does the view of our network correspond to others?*" seek to understand if the organisation has an efficiency of networking (ie DEFRA centralizes information that MMO counts on). This network map would need to be refreshed and replanned every 4-6 years – a timing that allows to take stock of changes. Another participant noted that if this was applied to DEFRA and BEIS, it would show how siloed Government is. However, the key question is *what do we do with that information?* One example would be to use that analysis to try and get departments to put in place better processes to ensure greater coordination around policy implementation.

The second part of the presentation addressed the question of values and preferences of the different stakeholders with the objective of recommending untapped avenues for interaction to pursue most important and shared values. This work contributes to WP4.1 which will include a longer survey to ask stakeholders about their values as well as the following questions:

- What criteria do they use to evaluate climate smart marine spatial plans?
- What opportunities they see the marine plan offering?
- What trade-offs do they think the plans will ask them to make?

Feedback – values and preferences

After the presentation, participants asked questions related to the how people responded to the survey questions. *Did they answer personally or in their role, and was there a difference in the ratings due to personality type?* Co-I Gina Yannitell Reinhardt responded that interviewees responded according to their role, the survey was not standardised, and the results were meant to guide the work. One participant brought up the Horrendogram (Boyes and Elliott, 2014)¹ and how it had helped in understanding the function of each stakeholder related to marine governance in the UK. The RACI Matrix (Responsible – Accountable – Consultable – Informed) was suggested as a useful framework to qualify the stakeholders. Ana Queiros pointed out that governance maps are important, but values are most important since MSPACE will use the value assessment to design policy alternative scenarios, and they will also help to score alignment of scenarios in the region considering a UK-wide value structure.

WP3 Feedback

WP3 presented the input/output model to analyse ocean related activity. Participants raised a question about the missing data for the identified marine sectors in the East of England and mentioned that it would be useful to put a note for identified sectors that cannot be updated indicating the sectors have not been excluded (i.e.. Marine aggregates and cables). A participant asked what type of data was being used for the greenhouse gas

¹ Boyes, S.J. and Elliott, M. (2014) 'Marine legislation – The ultimate "horrendogram": International law, European directives & national implementation', *Marine Pollution Bulletin*, 86(1–2), pp. 39–47. Available at: <https://doi.org/10.1016/j.marpolbul.2014.06.055>.

emission by sector. Researcher Alberto Roca Florido welcomed the suggestions and indicated that the greenhouse gas emission data comes from the National Statistics Office.

WP3 researchers handed out a feedback form for participants to fill out after the presentation on input/output economic analysis of ocean related activity. The following six questions were asked:

Q1: How could you use this analysis to help your decision making?

Q2: What would make this analysis more useful to you?

Q3: What are the things that limit the usefulness of this analysis for you?

Q4: Do you think we are making any major errors because of the assumptions we have made?

Q5: Looking at the figures, are these what you would roughly expect to see?

Q6: Is there anything else you would like to share with us?

Seven participants responded to the feedback form. One of these respondents answered all six questions.

Q1: Respondents indicated that the input/output economic analysis could help in their decision making in the following ways:

- To inform likely and potential consequences and trade-offs of decisions. Useful for industries to prioritise for different management goals.
- To understand which activities add value from a marine planning perspective.
- To see the employment vs emissions interactions of these sectors.
- To demonstrate the relatively low GVA of marine sectors.
- To understand sectors' contributions to local economy/national economy by employment/output/multiplier.
- To visualise some of the economic impact that policy may have on local areas.

Q2: Respondents indicated the analysis would be more useful if:

- It had the scope to incorporate natural capital at the input end of the model and would align with marine natural capital assessments. This would help to understand how functioning ecosystems underpin the outputs of many of these industries.
- It included all industries, or provided clear caveats or a footnote of industries not included and why they can't be. Key sectors in the East MP areas missing include offshore wind, marine minerals, aggregates, telecoms & cables, Oil & Gas, Carbon Capture and Storage. It would be valuable to refer to the East Marine Plans to ensure all important sectors are covered.
- It helped to understand industry value and the environmental impact (more broadly than carbon intensity)
- It included the GVA and employment impact of offshore wind. This is likely to be significantly higher than any of the sectors currently considered.
- It provided more explanation of how those GHG emission values have been found providing assurance into those numbers. This would be a huge additional piece of work on supply chains and use of end products (e.g., burning of oil/gas).

Q3: Respondents found the usefulness of this analysis was limited by:

- The missing key sectors, including those with the largest employment & GHG emission impacts in East MPs. The many gaps in industries considered leads to very small numbers of individuals affected and identified in 'total employment effects'.

- Not including offshore wind as a sector. This means the model is likely to distort any subsequent analysis and effective marine spatial planning.
- The lack of confidence in GHG. Would be interested in additional axis on environmental impact/biodiversity as well as GHG. Want to include environmental impact of sectors as much as climate (perhaps through natural capital).
- The resolution of area and the resolution of sector²

Q4: Respondents indicated the following errors and comments due to assumptions made:

- Uncertain about the linear relationship assumptions. Many of the underpinning ecological relationships will have thresholds and tipping points (i.e., collapse of a stock and employment consequences for a fishery). Also, not all industries will have a linear input and there is rapid development of efficiency in some sectors.
- Knowing uncertainty and understanding omissions could be critical.
- This model isn't yet complete enough to get a view of the overall marine economy due to missing sectors.
- Not including offshore wind as marine sector will distort analysis and decision making.
- Would need to understand more detail on GHG assumptions to be able to query.

Q5: Respondents were asked to indicate whether the figures were roughly what they expected to see, and commented:

- One out of the seven respondents answered. The response was yes.

Q6: Respondents shared following additional comments:

- Please consider MMO 1012 and MMO 1075 evidence reports. Out of date now but explored data availability and ONS.
- There is a lot of analysis on potential impact of OWF on GVA produced by the OWF industry groups that will be relevant.

² The researcher has interpreted this comment as the act of separating or being separated into clearly different parts both for the marine area and the sectors.

Afternoon Workshop Analysis

In the afternoon workshop, each in-person participant was assigned to a table/sector. Each person then chose a role by picking a card from the centre of the table. Each card listed one role. The roles were created to be relevant to the appropriate sector. The on-line group was also assigned a sector and picked a number from 1 to 8. Each number corresponded to a specific role relevant to the sector.

Table 1. Workshop sectors and roles

Conservation (in-person)	Aquaculture (online)	Fisheries (in-person)
<ul style="list-style-type: none"> • ecosystem specialist • marine biologist • citizen scientist • charitable or voluntary organisation • recreational user • regulator • statutory authority or wildlife trust • marine planner 	<ul style="list-style-type: none"> • marine farmer or husbandry manager • processing operation • consumer • supplier • recreational user • regulator • statutory authority or wildlife trust • marine planner 	<ul style="list-style-type: none"> • corporate fishery • local/artisan fisher • consumer • supplier • recreational user • regulator • statutory authority or wildlife trust • marine planner

First, each participant was asked to answer questions posed on a worksheet from the point of view of the role they had been assigned and considering the topic of climate smart marine planning. Each small group was then engaged in a discussion around each item on the worksheet.

Second, participants were asked to respond to an identical worksheet from their own professional point of view. A short discussion ensued to explore the extent of any differences in their responses.

The list of items on the worksheet are as follows:

- 1) Given your role in this sector, please write down your thoughts regarding the opportunities and synergies you think climate smart marine planning presents for you and the people you represent.
- 2) Given your role in this sector, please write any trade-offs that you think will be necessary to achieve climate smart marine planning and management. You may want to consider these trade-offs in terms of important opportunities or rights that you would want to retain or hate to have to lose.
- 3) If you have any additional comments about any of the above, please write them below.

A total of 18 worksheets were completed (7 worksheets for the conservation group, 7 worksheets for the fisheries group, and 5 worksheets for the on-line aquaculture group). The results from these worksheets were put in an excel table format by group.

Each group facilitator produced workshop notes according to a template. The group leader notes and recorded group discussions were used to validate and enrich information from the worksheet responses. The final excel table was analyzed in Dedoose³, first by sector represented and then across sectors for similarities, differences, and common themes. Multiple themes were extracted using the following method:

1. A regrouping of comments from all sets of notes according to workshop objectives.

³ Dedoose Version 9.0. 17, cloud application for managing, analyzing, and presenting qualitative and mixed method research data (2021).

2. A first round of coding in Dedoose according to dominant themes.
3. Synthesis of major themes determined by frequency of references.
4. A separate line by line coding per table to differentiate assigned and professional responses, cross checking with dominant themes in Dedoose.

Below we discuss themes arising in the qualitative analysis of climate smart marine planning opportunities and synergies on the one hand, and trade-offs on the other hand. The analysis is divided into 3 steps, as follows:

1. Examine opportunities and synergies for assigned roles by sector, then for actual professional roles by sector, to determine within-group similarities and differences at both individual and group levels.
2. Investigate trade-offs for assigned roles by sector, then for actual professional roles by sector, to determine within-group similarities and differences at both individual and group levels.
3. Summarise the dominant themes for opportunities, synergies, trade-offs and risks of full group.

1. Summary Opportunities, Synergies and Trade-offs

An analysis of within-group responses to the worksheet questions taking on an assigned role and then assuming their professional role reveals little difference in each group between the thematic focus of responses for opportunities and synergies. Within each group a climate smart approach to marine planning triggered responses of preservation and conservation of current sector activities, calls for the prioritization of each sector over others and a desire for recognition of the contributions of the sector in responding to social, environmental and economic needs. Within each group, the key differences between assigned roles and professional roles lay in the specific opportunities within each stakeholder's sector, for example technology in fishing, evidence in conservation, and co-location in aquaculture. Additionally, these perceived opportunities extended to marine planning for that stakeholder's sector in the form of protection of areas for fishing, improved knowledge in conservation and spatial distribution of activities in aquaculture when a climate smart approach is adopted. However, it is apparent in the comparison that each stakeholder's priority was difficult to let go despite adopting another role and in many cases a sector different from their own. The preoccupation with data for example in conservation came through in both the assigned and professional roles.

When considering trade-offs, a within group analysis of responses reveals the importance of inter-sector relations (fisheries and conservation), data collection for conservation and the perception of sector specific issues like higher costs due to changes in aquaculture operations. The differences between assigned and actual roles are most interesting since they reveal where each stakeholder assumes a trade-off can be made: diversifying the fishing sector, regulations for other sectors affecting conservation, and changes in operations in the aquaculture sector are a few examples.

Table 2 summarizes the analysis of opportunities and synergies, trade-offs, and risks for assigned roles by sector, then for actual professional roles by sector, to determine similarities and differences at both within-group and then between-group levels.

Table 2. Within-group comparison of assigned and actual role for perceived opportunities, synergies, trade-offs of climate smart (CS) approach

	Fishing		Conservation		Aquaculture	
Opportunities & Synergies	<i>Similarities Assigned Role</i>	<i>Similarities Professional Role</i>	<i>Similarities Assigned Role</i>	<i>Similarities Professional Role</i>	<i>Similarities Assigned Role</i>	<i>Similarities Professional Role</i>
	<ul style="list-style-type: none"> • Preservation/enhancement of current fishing activity and approach 	<ul style="list-style-type: none"> • Top of mind preoccupations for own sector (sector contributions, data, technology, protection, planning) 	<ul style="list-style-type: none"> • Advancing different elements of conservation (scientific contributions, data collection, biodiversity) 	<ul style="list-style-type: none"> • Improved knowledge and evidence for marine plans 	<ul style="list-style-type: none"> • Assurance for continued activity • Recognition of social economic and environmental actions • Co-location 	<ul style="list-style-type: none"> • Spatial distribution of activities • Future adaptation of aquaculture
	<i>Differences Assigned Role</i>	<i>Differences Professional Role</i>	<i>Differences Assigned Role</i>	<i>Differences Professional Role</i>	<i>Differences Assigned Role</i>	<i>Differences Professional Role</i>
	<ul style="list-style-type: none"> • Scale of fishing activity • Fishing Access • Industry needs • Consumer behaviour • Preoccupation with conservation concerns 	<ul style="list-style-type: none"> • Integrating CS approach to all sectors • Including their sector in the MP process • Anticipating MPA boundary changes • Integrating ecosystem approach in conservation 	<ul style="list-style-type: none"> • Focus on marine planning certainty and risks • Provision of information for long term • Anticipating MPA boundary changes 	<ul style="list-style-type: none"> • Climate smart marine planning link to policy • Revision of practices • Use for ecosystem assessment • Facilitate development and consenting processes 	<ul style="list-style-type: none"> • Focus on supply chain elements • Link between planning, regulation, and trade 	<ul style="list-style-type: none"> • Concerns around specimen research models, data and effectiveness
Trade-offs	<i>Similarities Assigned Role</i>	<i>Similarities Professional Role</i>	<i>Similarities Assigned Role</i>	<i>Similarities Professional Role</i>	<i>Similarities Assigned Role</i>	<i>Similarities Professional Role</i>
	<ul style="list-style-type: none"> • Redefine relationship between fisheries and conservation • Determine what is to be prioritized 	<ul style="list-style-type: none"> • Each sector's objectives seen as MP priority over other considerations • BAU vs Flexibility 	<ul style="list-style-type: none"> • Climate smart MP needs research and data collection • Targets vs CS flexibility 	<ul style="list-style-type: none"> • MP process and decision-making imperatives 	<ul style="list-style-type: none"> • Anticipation of higher costs 	<ul style="list-style-type: none"> • Focus on issues within sector (conflict, parasites, disease)
	<i>Differences Assigned Role</i>	<i>Differences Professional Role</i>	<i>Differences Assigned Role</i>	<i>Differences Professional Role</i>	<i>Differences Assigned Role</i>	<i>Differences Professional Role</i>
	<ul style="list-style-type: none"> • Place OWFs where no fishing • Diversification of fishing industry • Loss of access rights for fisheries 	<ul style="list-style-type: none"> • Protection of existing vs future fisheries • Prioritization and resources for MP vs fair decision-making 	<ul style="list-style-type: none"> • Regulations of other sectors vs conservation • Change and discontent 	<ul style="list-style-type: none"> • Industry interests • Conservation imperatives 	<ul style="list-style-type: none"> • Change in activity • Supply chain effects • Competition between sectors 	<ul style="list-style-type: none"> • Focus on decision making process for MP • Changes in operations

2. Between-group similarities and differences

A between-group comparison reveals a strong focus of fisheries and aquaculture on opportunities and trade-offs that will affect the way these sector's activities are carried out – scale of areas, access to areas, diversification for fisheries and operating costs, supply chain changes, and more competition for aquaculture. The conservation group is particularly focused on evidence through data gathering, delimitations of boundaries and certainty. Lastly, for trade-offs, each group raised the issue of MP needs, processes, and decision-making with fisheries more focused on fair decision making, conservation concerned with necessary elements (imperatives) for MP to take place and aquaculture concerned with decision-making and trade.

Please see Appendix for further details.

3. Across-group opportunities, synergies, and trade-offs

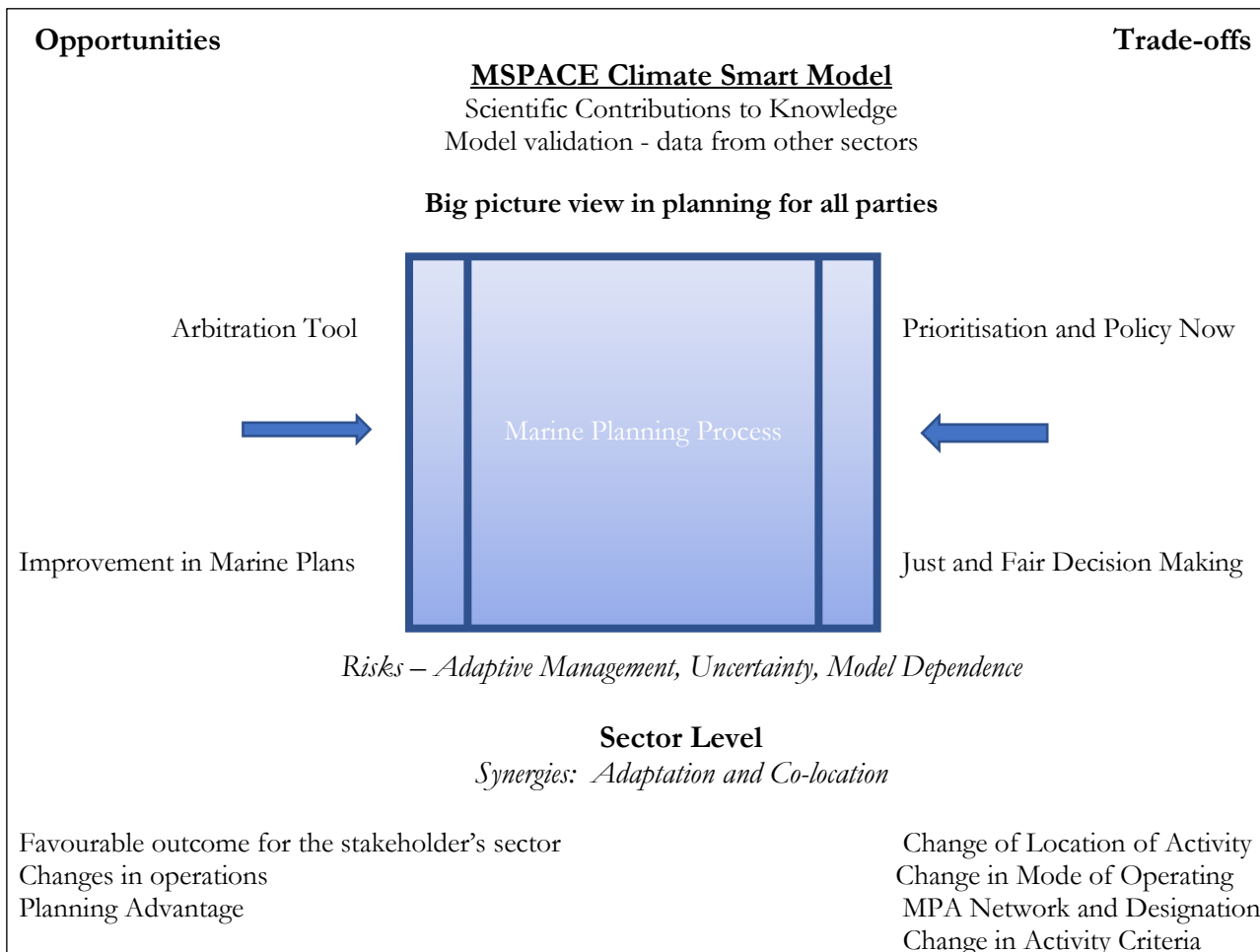
There were common perceived opportunities, synergies, and trade-offs among all three sectors (Fishing, Aquaculture, Conservation) in respect to Climate Smart Marine Planning. These common elements are listed in Table 3 below.

Table 3. Summary of perceived opportunities, synergies, and trade-offs

	Opportunities	Synergies	Trade-offs
Sector level	<ul style="list-style-type: none"> Favourable outcome for the stakeholder's sector 		<ul style="list-style-type: none"> Change in Mode of Operating
	<ul style="list-style-type: none"> Changes in operations 	<ul style="list-style-type: none"> Allows adaptation measures to be taken 	<ul style="list-style-type: none"> Change in Activity Criteria
	<ul style="list-style-type: none"> Planning Advantage 	<ul style="list-style-type: none"> Co-location 	<ul style="list-style-type: none"> MPA Network and Designation
			<ul style="list-style-type: none"> Change of Location of Activity
Proposed Climate Smart Model	<ul style="list-style-type: none"> Scientific Contributions to Knowledge 	<ul style="list-style-type: none"> Model validation with additional data from other sectors 	
Marine Planning	<ul style="list-style-type: none"> Arbitration Tool 	<ul style="list-style-type: none"> Big picture view in planning for all parties 	<ul style="list-style-type: none"> Prioritisation and Policy Now
	<ul style="list-style-type: none"> Improvement in Marine Plans 		<ul style="list-style-type: none"> Just and Fair Decision Making

These elements and their link to the model, marine planning and the sectors are visualized in a figure as illustrated below in Figure 1. Perceived risks have also been included.

Figure 1. Workshop perceived opportunities, synergies, trade-offs and risks



Plenary Group Discussion

The whole group reconvened for a plenary discussion of salient points raised in the work groups. The discussion revolved around change, time horizons, displacement effects for food production, future proofing, no regrets decisions, and adaptation opportunities.

Interpreting Change and Policy Options

A word of caution was raised around interpreting change and the resulting policy options and outputs in relation to time scales and species movements. For example, if current focus is on opportunities declining around specific species or in geographical areas, it is important to keep in mind that species may move in and out of areas. This may raise questions like, *Do we want to protect a resilient area and keep everything in the resilient area to have other development opportunities in the changing areas?*

Time frames and time horizons

Several participants pointed to the differences in vantage points on how time frames and time horizons factor into the overall landscape. Four telling examples were given:

- The renewable energy sector has a 30–50-year perspective which calls for a nature inclusive design including nature restoration.
- Marine planning in England works on a 20-year horizon considered a medium scale planning horizon.
- Fish stocks and climate variability are considered by scientists over periods of 5, 10, 15 years.
- Management/regime shifts are linked to climate variability, not climate change. Other industries have a 5-year horizon which may put into question how they will adjust to climate change and whether they have a climate change horizon in mind.

The time scale differential between stakeholders influences their perception of how climate change impacts their activities. The fishing and offshore wind industries are examples of stakeholders with very different perceptions of time scales. One participant noted that while there is hope that the fishing industry will continue to be as flexible as it is currently, climate change may require the industry to determine priorities. These examples demonstrate that it is hard to provide enough flexibility with those different time horizons.

Displacement Effects of Food Production

One participant raised the point that when considering GHG emissions of different sectors in marine industry, one must consider and be cognisant of the displacement effect of producing other forms of protein food production (beef, eggs, chicken) on land. A displacement of food production from marine to terrestrial may be less sustainable and less climate smart with a negative outcome.

Future Proofing

The climate smart approach to marine plans was seen by several participants as a way of future proofing marine plans. This approach may engender and incorporate innovative methods and synergies between fields and sectors, and opportunities for validating output with citizen science. However, one participant raised a warning about the risk of the uncertainty level of the model and the possibility of outcomes not turning out as predicted. The risk of placing too much emphasis on one model also raises the possibility of looking at other ways to use this information. It could contribute to defining an adaptive or iterative process, looking at different types of access, considering hotspots for other activities or transforming some area into refugia if they are able to be restored.

Opportunities for adaptation constitute another form of future proofing. Climate hotspots might provide some mitigation and give habitats and species time to recover. Hotspots as HPMA's with no activities and the non-refugia areas might see an afflux of other species and provide adaptation opportunities. Additionally, management mechanisms could also provide resilience and opportunities for adaptation. Participants recognized nonetheless that different sectors might have varying capacities to adapt citing the example of artisan fisheries compared to corporate fisheries.

No Regrets Decisions

Participants raised several points to consider when approaching a no regrets decision making process. First, it is important to understand the no regrets decision making approach is in respect to the decision makers who may decide to take a short-term loss if the longer-term outcome will be positive overall. Marine plans are reviewed every four years to include new evidence. Participants widely acknowledged there will be winners and losers. Integrating this climate smart approach will translate into looking at a range of scenario's rather

than relying on only one scenario. This presents a challenge for renewable energy making it harder to make longer term decisions given the threats.

Workshop Achievements and Outcomes

Strengths

The workshop went smoothly, with participants actively engaged. The worksheet instructions and exercise were clear to the participants both present in the room and on-line. Participants appeared to speak freely, and no open antagonisms were present. All in-person participants stayed until the end of the workshop.

Challenges

There were no particular challenges for this workshop. The hybrid nature of the meeting presented a few technical glitches, however, overall the meeting went smoothly. The on-line afternoon participatory session group experienced a large drop off rate and incompleteness of worksheets.

Potential Improvements

Suggested changes for the morning session:

- No suggested changes

Suggested changes for the afternoon session:

- No suggested changes

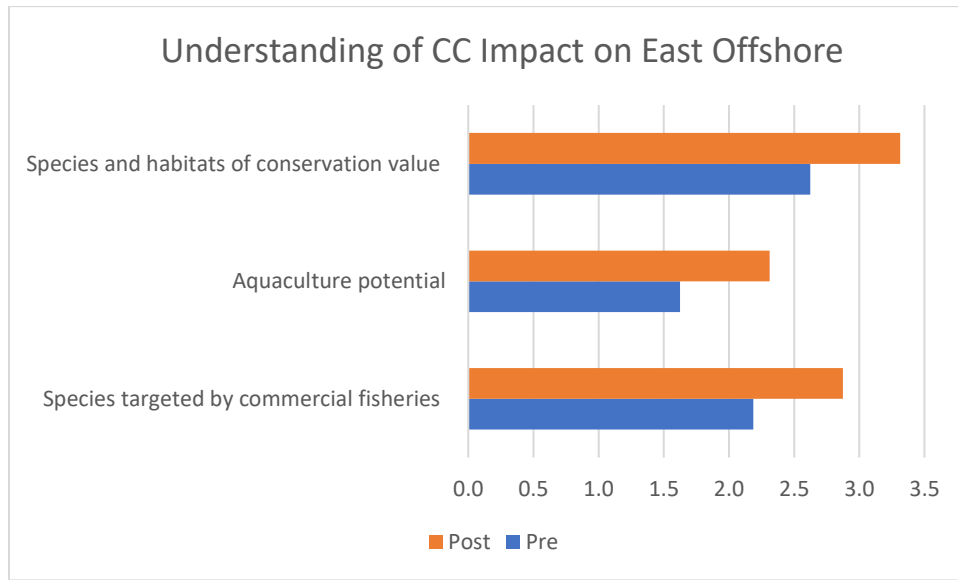
Logistical Considerations

- Recording the break-out group conversations was particularly helpful for the analysis. It brought nuance and additional information to the notes and worksheets resulting in a rich description of perceived opportunities, synergies, risks and trade-offs.

Pre- and Post-session Survey Results

To help track impact, the team asked participants to complete a survey twice – once at the end of the morning session, and again at the end of the afternoon session. Sixteen of the 19 participants filled out both the pre- and post-session surveys, thus generating 32 completed surveys for 16 matched pairs. The following figures display results from these responses.

How well do the participants understand the likely impacts of climate change for East of England Offshore in terms of 3 issues of key interest to MSPACE?



**Responses on a scale of 1-5 (1 not at all – 5 completely)*

Figure 2. Pre- and post-session average understanding of the likely impacts of climate change for East of England Offshore in terms of 3 issues of key interest to MSPACE

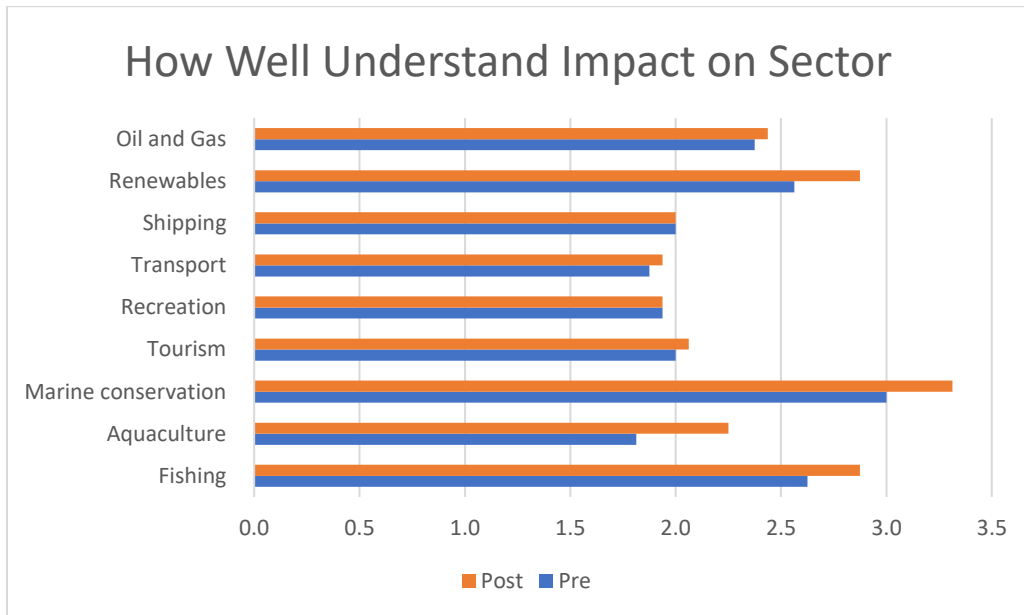
Figure 2 reflects the fact that the average perceived understanding of the group improved after the workshop, compared to before the workshop, in terms of the likely impact of climate change for East Offshore marine area on species and habitats of conservation value, aquaculture potential, and species targeted by commercial fisheries.

These changes seen here are statistically significant for the three sectors of focus for MSPACE. Table 3 shows the difference of means using a paired two-tailed t-test, demonstrating average change in understanding the likely impact of climate change on each sector.

Table 3. Pre- and post-session understanding of the likely impacts of climate change for East of England Offshore in terms of 3 issues of key interest to MSPACE, difference of means	
	difference (std. err.)
Fisheries	.6875 (.2183)***
Aquaculture	.6875 (.1760)***
Conservation	.6875 (.2845)**

p*<.05, *p*<.01

How well do the participants understand the likely impacts of climate change by sector?



Note. Responses on a scale of 1-5 (1 not at all – 5 completely)

Figure 3. Pre- and post-session average of how well participants understand likely impacts for climate change by sector

Figure 3 shows that the average perceived understanding of the group improved after the workshop, compared to before the workshop, in terms of the likely impact of climate change on the following sectors: oil and gas, renewables, transport, tourism, marine conservation, aquaculture, and fisheries.

We see no improvement for the average perceived understanding of the group of the likely impact of climate change on shipping and recreation.

These changes seen here are statistically significant for aquaculture. Table 4 shows the difference of means using a paired two-tailed t-test, demonstrating average change in understanding the likely impact of climate change on each sector.

Table 4. Pre- and post-session average of how well participants understand likely impacts for climate change for aquaculture sector	
	difference (std. err.)
Aquaculture	.4375 (.1281)***

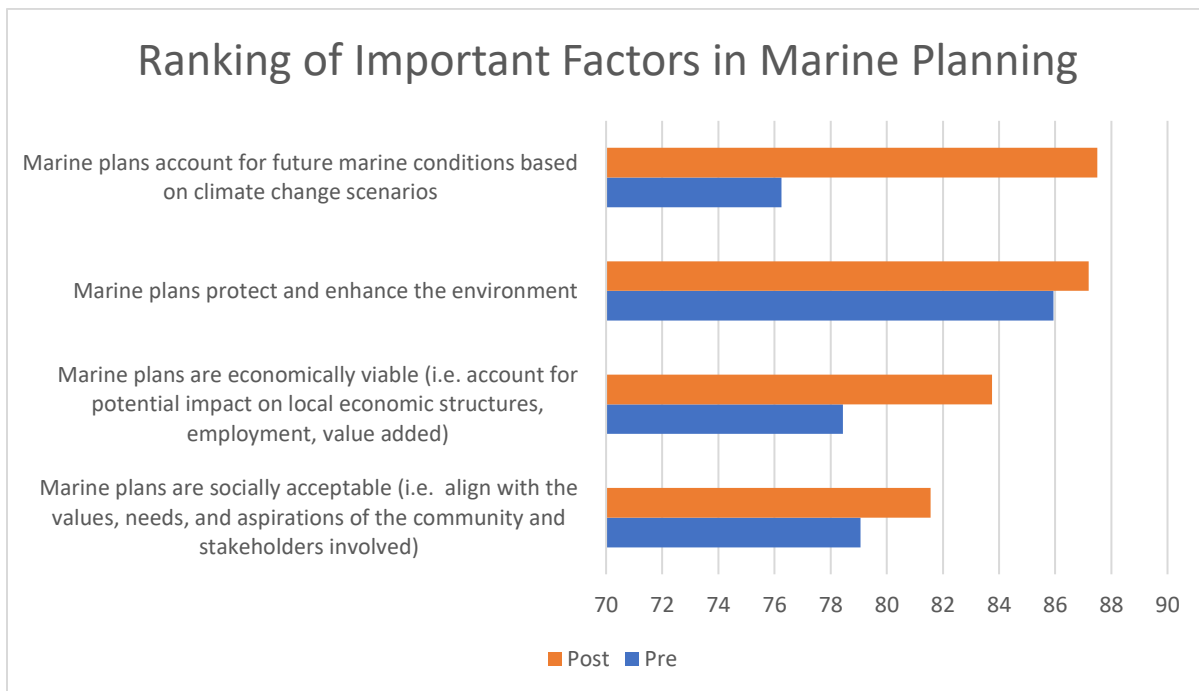
** $p < .05$, *** $p < .01$

Despite the lack of statistically significant differences at the individual level for the remaining sectors, several participants felt that their understanding was improved after the workshop. Table 5 below reflects participants self-assessment of improvement.

Table 5. Participant Self-Assessment of Level of Understanding for each Sector

Sector	Number (of 6) who felt their understanding of the likely impacts of climate change improved for the sector
Fisheries	9
Aquaculture	5
Marine Conservation	7
Tourism	1
Recreation	2
Transport	1
Shipping	1
Renewables	3
Oil and gas	0

How have the participants' perceptions of the importance of 4 key considerations for marine planning changed as a result of the workshop?



Note. Responses on a scale of 100 (100 indicating highest importance)

Figure 4. Pre- and post-session average ratings given to key considerations of marine planning

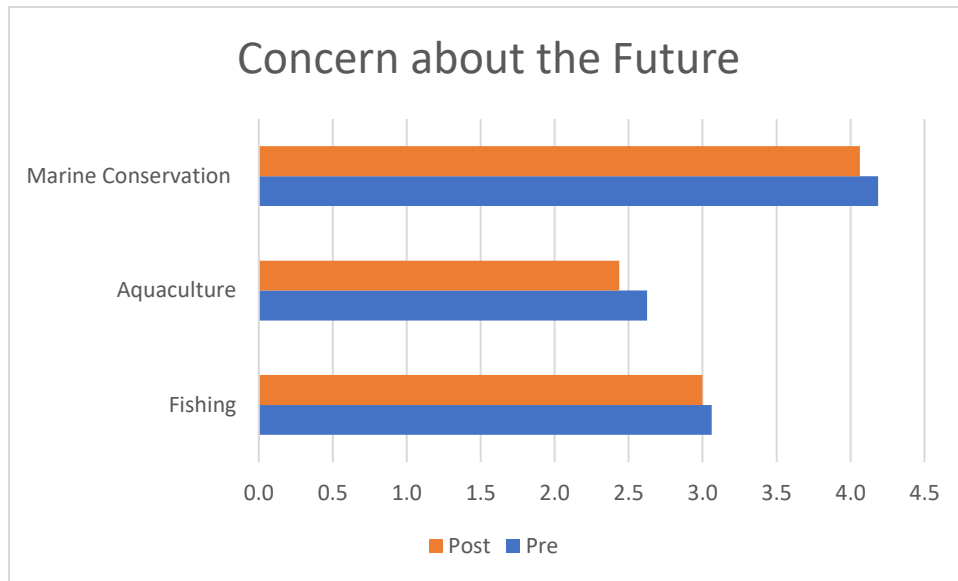
Figure 4 shows the average pre- and post-session ratings of four considerations that are relevant to marine planning. Each participant was asked to rate each consideration from 0 to 100. The average rating of climate change scenarios, environmental enhancement, social acceptability, and economic viability all increased.

Further, the average range of ratings, which stretched from 76 to 86 (10 points) before the session, became less dramatic (lesser in range), stretching from 82 to 88 (6 points) after the session.

In examining the average change in ratings between pre- and post- session questionnaires, there was no statistically significant difference for any of the factors.

A majority of respondents agreed strongly with the statement 'management decisions that consider Climate Change can have different implications for different sectors', both pre- and post-session.

How concerned are participants about the future of 3 sectors key to MSPACE?



Note. Responses on a scale of 1-5 (1 not at all – 5 completely)

Figure 5. Pre- and post-session on concern for the future of 3 sectors Fishing, Aquaculture and Marine Conservation

Figure 5 shows that the average group concern about the future of each sector decreased slightly after the workshop, compared to before the workshop, in all 3 sectors of key interest to MSPACE.

In examining the average change in ratings between pre- and post- session questionnaires, there was no statistically significant difference in concern for any of the sectors.

A few participants felt that their concern was lessened after the workshop. Table 6 below reflects participants’ self-assessment of a lessening of their concerns.

Table 6. Participant Self-Assessment of Level of Concern about Future for each Sector

Sector	Number (of 6) who felt their concern about the future was lessened
Fisheries	0
Aquaculture	1
Marine Conservation	3

Additional Comments from Participants

Pre-Session	
Any further comments?	Under Q.4 it is key to understand the balance between social, economic and nature considerations actions agencies and other stakeholders.
	Q4. Not that I think others are less important exactly but want to acknowledge that there will likely be trade-offs.
	Good environment status for the marine environment is critical to industry, the worse things are, the more challenging it is for industry to mitigate and compensate for its impacts. This adds risk to consenting for future projects.
Post-Session	
What did you find most useful about workshop?	
	Knowledge of the new model and interaction and engagement with stakeholders at the workshop.
	Interaction with others and getting others' viewpoints. Seeing how evidence is considered by MSPACE and that new research shall continue to feed into the tool.
	The breakout group exercise where we were asked to answer questions as representatives of a stakeholder different from our actual role.
	Time to think about other considerations. Thinking natural sciences, economics, social considerations. How my own work can support and feed into this approach. Thinking more broadly than my immediate job role.
	The small group discussion, changing roles and perspectives. Talks were great, lunchtime networking opportunity much appreciated too.
	Meeting a range of people from different sectors/ areas of expertise (learnt from each other)/Having outputs present, workshops in afternoon- great to think from a different perspective other than your own, important to consider other points of view.
	Learning about MSP in relation to Climate change learning about different peoples' perspectives of issues related to climate change depending on what sector they work in.
	Hearing perspectives of other attendees from different sectors/backgrounds
	Hearing from different perspectives
	Presentation of climate management, inputs and insights. Discussion with the group and potential applications, particularly for marine habitat improvements.
	A great intro to the work, that I knew nothing about previously.
	The overview of the whole project and outputs and the group discussions.
	I really found the workshop useful as aquaculture is an area, I'm not so knowledgeable on. Hearing other people's opinions and ideas was really interesting and gave me a lot of things to consider and think about.

Conclusions

The East of England Offshore workshop was the fourth of a series of four programmed workshops seeking to first present Climate Smart MSP Work Package progress to date and receive feedback on the outcomes. The afternoon participatory session in this case sought to capture participant perceptions of opportunities, synergies and trade-offs when they assume an assigned role that is different from their actual professional role to assess a climate smart marine plan. Participants provided commentary on the exercise and the overall workshop experience.

Each WP received constructive feedback after the WP presentation indicating participant engagement with the material and the usefulness of the information presented. Participants provided numerous suggestions to clarify and improve the proposed information documents, maps and scenarios.

The afternoon participatory session yielded concrete information around the opportunities, synergies and trade-offs. Across the groups opportunities were identified at the sector level, for the proposed climate smart model and for marine planning. At the sector level, stakeholders identified opportunities for a favourable outcome for both the group's assigned sector (fishing, aquaculture, and conservation) as well as the sector they currently operate in (planning, fisheries, aquaculture, renewable energy, conservation and more). They also pointed to changes in the sector's operations including criteria currently used as guidelines for the sector (species, boundaries, location). Finally, with the climate smart approach they identified a planning advantage for their sector due to the specific designations (refugia, hotspots, bright spots) allowing a change in current designations that may be limiting. The proposed climate smart model also presented opportunities for scientific contributions to knowledge about the marine ecosystems. Finally, marine planning opportunities included using the climate smart approach as an arbitration tool for decision making in sector activity and an overall improvement in marine plans. The groups identified synergies created with the climate smart approach that allow adaptation measures to be taken in each sector and co-location of activities in specific areas. Potential synergies for the model lie in the possibility for other sectors (and actors) to contribute data to validate or disprove the model. The marine planning sector would benefit from synergies of the approach to gain a big picture view in planning for all parties. Lastly, the trade-offs identified around using this climate smart approach for the sectors are a change in the mode of operating, a change in activity criteria, in MPA network and designations and finally a change in the location of the sector's activities. Trade-offs in marine planning were identified in the prioritisation of sectors in an immediate time scale as well as the necessity to apply and demonstrate just and fair decision making backed up by evidence.

The plenary group discussion dove further into these issues. Participants pointed to the change in outputs and policy options, differing sector time frames and time horizons, the GHG displacement effects for food production when comparing land food production and marine food production, and finally the future proofing of marine plans with no regrets decisions. Participants widely acknowledged there will be winners and losers. However, integrating this climate smart approach allows for a range of scenario's rather than relying on only one scenario and one model.

Pre and post survey responses indicate that the average perceived understanding of the group improved after the workshop for the likely impacts of climate change for East of England Offshore in terms of 3 issues of key interest to MSPACE (species and habitats of conservation value, aquaculture potential and species targeted by commercial fisheries). Additionally, the average change exhibited statistically significant improvements at the individual level.

Pre and post survey responses indicate that the average perceived understanding of the group improved after the workshop, compared to before the workshop, in terms of the likely impact of climate change on the following sectors: oil and gas, renewables, transport, tourism, marine conservation, aquaculture, and fisheries. We see no improvement for the average perceived understanding of the group of the likely impact of climate change on shipping and recreation. In terms of the average change, we see a statistically significant difference in the agriculture sector only.

The average pre- and post-session ratings of four considerations that are relevant to marine planning indicate that climate change scenarios, environmental enhancement, social acceptability, and economic viability all increased. Finally, the average group concern about the future of each sector decreased after the workshop, compared to before the workshop, in all 3 sectors of key interest to MSPACE. There was no statistically significant change in concern for any of these issues at the individual level.

Overall, the outcome is constructive with engaged, supportive and interested participants.

Appendix

1. Opportunities and Synergies

One key aim of the workshop was to examine opportunities and synergies for assigned roles by sector, then for actual professional roles by sector, to determine similarities and differences at both individual and group levels.

Individual Level Comparisons, by Sector:

This section reports the results of comparing responses within the group between assigned and actual roles.

Fisheries – similarities

There were 7 complete pairs of responses (assigned and actual) for this in-person group. Similarities in participant responses when assigned roles in the fishing group focused primarily on the opportunity to focus on the preservation or enhancement of the current fishing activity and approach. Three extracts from the worksheets illustrate this:

“Prioritise opportunities for UK fishing fleet and employment, way of life, institutional growth”

“Preservation of areas for local fisheries (spanning in nursery grounds) resilient to climate change”

“Be more adaptive/ responsive to changing industry needs & new changing opportunities”

Similarities in participant responses when assuming their actual roles in the fishing group focused primarily on the opportunities the climate smart approach to marine planning brings to the overall planning process and each specific sector. Three extracts from the worksheets illustrate this:

“Increasing complexity which challenges the lack of resources will lead to organisational level change and new ways of doing things for uncertainty changing vision”

“Seabed mapping data underpins decisions and feed information into model to support/ disprove.”

“Positive outcomes through new tech or management (co-management), results-based management.”

Fisheries – differences

There is one key difference between the responses from assigned roles versus actual roles within the fisheries group. First, when assuming assigned roles, most participants focused on one focal area of opportunity for fisheries: the preservation or enhancement of the current fishing activity and approach as mentioned previously. In their actual professional sector roles which included planning, fisheries, conservation, offshore renewable energy, they focused on several focal areas: integrating the climate smart approach to all sectors, including their sector in the planning process, anticipating MPA boundary changes and integrating an ecosystem approach in conservation.

Aquaculture – similarities

Of the five worksheets filled out for this on-line group, there were only 3 complete pairs of responses (assigned and actual). Two worksheets provided assigned role responses only. The similarities within the

group in participant responses when assuming their assigned roles in the aquaculture group focused primarily on the opportunity to assure a continuation in the activity of aquaculture, spatial distribution, and effective use such as co-locating activities. Three extracts from the worksheets illustrate this:

“Certainty of crop production in future” and “Peace of mind for future.”

“Adaptation measures: artificial lagoons to protect coastlines, doubling as clam or other species cultivation sites with recreational amenity.”

“Co-location of wind farms and aquaculture providing shelter from onshore winds making coastal waters less rough and improving safety.”

Similarities in participant responses when referring to their actual roles in the aquaculture group focused primarily on the opportunities the climate smart approach provides to spatial distribution of activities in marine planning and the efficiency, effectiveness, and sustainability of aquaculture and other sectors due to a climate smart approach. Two extracts from the worksheets illustrate this:

“Identify areas suited to colocation in the future for aquaculture.”

“Improve efficiency and sustainability of production and other sectors through having this approach.”

Aquaculture - differences

The one notable difference between the responses from participants for their assigned role and their actual professional role in the online aquaculture group lies in the focus of discussion. When taking on assigned roles, the group focuses on assuring aquaculture continues as an activity through co-location, improvements to practices and productivity. When assuming one’s actual professional viewpoint, the focus turns to the contributions of science to the overall approach of marine activity.

Conservation – similarities

There were 7 complete pairs of responses (assigned and actual) from this in-person group. Similarities in participant responses when assuming their assigned roles in conservation focused primarily on the opportunity to assure conservation thanks to scientific contributions, and on the climate smart tool assuring areas for other activities such as fishing, heritage and recreation. A second prominent focus in responses was the opportunity to improve marine planning through information, more certainty and including other actors like citizen scientists. Four extracts from the worksheets illustrate these points:

“Increase MPAs (restoration, resilience)”

“Continuity and access for users and nature resilience”

“Improve MP certainty in decisions for today and future”

“Citizen Science can increase interest / engagement/ support of general public (bridge MP and general public)”

Similarities in participant responses when assuming their actual roles in the conservation group focused primarily on the opportunities the climate smart approach brings to spatial plans and decision making, as well as the link to policy it provides. The responses also highlighted specific opportunities for the actual

professional sector (assessment, planning, offshore wind farms). Four extracts from the worksheets illustrate this:

“Holistic interdisciplinary approaches/framework leading to adaptation/development of evidence base / decision making tools to ensure Climate Change is considered”

“Capitalize on natural resilience to achieving government targets in multiple sectors”

“Future proof climate adaptation & mitigation knowledge across planning areas”

“Link OWF and biodiversity enhancement/restoration”

Conservation - differences

There are 2 key differences between the responses from participants for their assigned role and their actual professional role in the conservation group. The first set of differences focused on the multiple perceived advantages of this climate smart approach for conservation - increase in MPAs, enhanced conservation through scientific contributions, better data collection, better information, assurance of long-term conservation, linking of scales. The second set of differences lies in how the planning process will be improved – through holistic approach, joining up sectors, designating hotspots, refugia and bright spots to prioritise conservation actions.

Group Level Similarities and Differences, between Sectors:

This section reports the results of comparing responses at a group level.

Similarities

All three groups provided a response about opportunities that assures the continuity and preservation of the sector group they were in (fishing, aquaculture, conservation). They also focused on the planning process enhancements and sectoral advantages.

Differences

A between group comparison reveals a strong focus of fisheries and aquaculture on opportunities that will affect the way these sectors’ activities are carried out – scale, access, diversification for fisheries and operating costs, supply chain changes, and more competition for aquaculture. In comparison, the conservation group appears particularly focused on evidence through data gathering, delimitations of boundaries and questions around certainty.

Tensions

A few participants expressed internal and external tensions with the Wildlife Trust actor in both assigned and actual professional roles. Internally, the Wildlife Trust organization’s objectives and the climate smart approach would create tensions around how best to achieve these objectives and may necessitate internal changes in operations. Externally, tensions were signalled between the Wildlife Trust, the wider NGO lobby, and the regulator. The corporate fisheries actor expressed concern about the political power of the wildlife trust and the artisan fisheries expressed negativity towards the Wildlife Trust. Additionally, participants signalled conflictual relations between artisan and corporate fisheries.

2. Trade-offs

A second aim of the workshop was to investigate trade-offs for assigned roles by sector, then for actual professional roles by sector, to determine within-group similarities and differences at both individual and group levels.

Individual Level Comparisons, by Sector:

Fisheries – similarities

There were 7 complete pairs of responses (assigned and actual) for this in-person group. The similarities in participant responses about trade-offs for their assigned role in the fishing group focused primarily on the trade-offs between which sector of activity gets priority in area designation (conservation, fishing, energy), species fished and local diversified fishing or loss of generational traditions and skills in local communities. Four extracts from the worksheets illustrate this:

“Protect what is critical and decide what may be let go.”

“Prioritise food security, business continuity. Prioritize energy over food security.”

“Changes to the type or amount of fish a consumer eats”

“Devastating loss of traditions and skills in community of generational specialisation of local fishers on specific techniques/species. Diversifying may be essential.”

The similarities in participant responses about trade-offs for their actual professional role in the fishing group focused primarily on the trade-offs between sector prioritisation (windfarms, conservation, fishing), current and future criteria for activity and the marine planning process (timing, sub-optimum solutions and uncertainty). Four extracts from the worksheets illustrate this:

“Policy and prioritisation decisions will be necessary as space gets busier, cannot wait.”

“Need to prioritise designated areas for offshore renewable energy development. Need to speed up consenting offshore wind activities to mitigate climate change. Wind farms should not be prevented from necessary maintenance because of conservation concerns.”

“Loss of certain MPA network features which are important now but may be less so in the future due to changing of habitats and species ranges.”

“Simplification of policy and scope or resource; inability to identify perfect/optimal solutions”

Fisheries - differences

There are two key differences between the responses from participants about trade-offs for their assigned versus actual roles in the fisheries group. The first difference in trade-offs focused on maintaining access for fisheries when species change because of migration or new incoming stocks. Maintaining access may require relocation of fishing areas and/or fleet changes seen as options compared to conservation of these

areas. The second difference in trade-offs was the suggestion that fisheries would need to diversify or be allowed priority areas to avoid the loss of cultural heritage and skills in a local fishing community.

Aquaculture – similarities

Of the five worksheets filled out for this on-line group, there were 3 complete pairs of responses (assigned and actual). Two additional worksheets provided assigned role responses only. The similarities in participant responses about trade-offs for their assigned role in the aquaculture group focused primarily on space size, species, changes in operations, and competition between sectors (aquaculture and fishing). Three extracts from the worksheets illustrate these trends:

“Competition for space - may lose out. May move to more suitable grounds.”

“Reconsider approach to supplier journeys for climate (short journeys vs one long journey) and how that affects work time (time on and time off) (climate impacts of products). Shorter travel journeys that may lead to change in pay (less)”

“Planning might create competition for areas of the sea between aquaculture and fishing. Result is a greater use of specific designation for fishing activities”

Similarities in participant responses for their actual professional role about trade-offs in the aquaculture group focused primarily on the trade-offs between conflicts between sectors, balance in decision making, and aquaculture specific issues (mono-species focus). Two extracts from the worksheets illustrate the focus:

“Conflict between MPAs & aquaculture”

“Address sector vulnerability and diversify and recalibrate aquaculture industry to move away from a sole focus on salmon”

Aquaculture - differences

There is one notable difference between assigned and actual roles in the online aquaculture group. The group focused on general issues of location when taking on their assigned roles, and on more aquaculture specific issues linked to production (species, disease) when assuming their actual roles.

Conservation – similarities

There were 7 complete pairs of responses (assigned and actual) from this in-person group. Similarities in participant responses about trade-offs for their assigned role in the conservation group focused primarily on trade-offs involving data collection and provision as evidence base for decision making and monitoring, and on the climate smart designation of specific areas for conservation which may change the criteria for MPA designation and render boundaries more flexible. Three extracts from the worksheets illustrate these points:

“Mobilise fishing for map data collection update from mobile MPAs”

“Use citizen science in MP development for monitoring data to engage public with cc topics”

“Change approach to MPA designation from feature-based (rigid boundaries) to site based (flexibility)”

Similarities in participant responses about trade-offs for their actual professional role in the conservation group were a focus on the trade-offs around spatial and technological constraints requiring more explicit prioritisation of activities and a more prescriptive approach in planning. A second similar element in responses is the need for evidence to back up decisions. Three extracts from the worksheets illustrate these points:

“Irreplaceable habitats to be prioritised for conservation”

“Not develop (OWF) in areas that may be refugia or bright spots”

“Deciding services and sectors for co-existence/location; Provision of evidence in management decisions”

Conservation - differences

There are two key differences between assigned and actual roles in the conservation group. The first set of differences focused on the importance of data and the ways it would be gathered and used as evidence to back up the decision-making process for marine planning. Fishers and citizen scientists were proposed as potential actors in data collection. The second set of differences lies in the “how” of marine planning. The outcome of taking a climate smart approach will affect the marine planning process by adding to the workload, changing the role of monitoring and arbitrating based on the area designation (hotspot, refugia, bright spot) according to the climate smart model.

Group Level Similarities and Differences, between Sectors:

This section reports the results of comparing responses at a group level for the assigned and actual professional role by group.

Similarities

All three groups provided a response about trade-offs that focuses on the prioritisation of sectors, including size of areas per sector and balancing decisions in the Marine Planning process.

Differences

The three groups differed in perceived trade-offs for sector prioritisation, sector specific location designation and the importance of data and evidence to back up decisions.

Risks

Participants identified two types of risks in adopting the climate smart approach in marine planning: 1) The move towards adaptive management which creates uncertainty; and 2) Too much dependence on the climate smart model and information with a level of uncertainty as to actual outcomes.