Suffolk Pioneer Workshop #2 Workshop Report

Tuesday 11 June 2019, Ipswich Town FC, Portman Road, Ipswich, Suffolk, IP1 2DA.

Authors: Daryl Burdon, Sue Boyes, Tavis Potts & Pete Cosgrove.

The Suffolk Marine Pioneer was established by Defra to test the application of a natural capital approach in practice. In doing so, the Pioneer's purpose is to inform the implementation and iteration of the Government's 25 Year Environment Plan. The Pioneer is delivering this objective by examining how the implementation of natural capital thinking applies locally – on the basis that any intervention to improve the state of the environment will affect people living, working and recreating in that environment.

The University of Hull, in collaboration with the University of Aberdeen, were commissioned to run two participatory mapping workshops. The workshops were co-developed with the Suffolk Marine Pioneer Project with the aim to:

- expand the role of participatory mapping and deliberation for the enhancement of natural capital;
- initiate discussions with local stakeholders on the enhancement of natural capital assets for the Deben Estuary; and
- strengthen the relationships and knowledge exchange with stakeholders via the Suffolk Marine Pioneer network.

This report provides a summary of the second workshop, with the first workshop having taken place on Wednesday 27 March 2019. The second workshop was attended by 19 stakeholders, representing 17 organisations, many of whom also attended the first workshop (Table 1).

Table 1: Workshop attendees and organisations (* indicates having attended the first workshop).

Name	Organisation
Daryl Burdon*	University of Hull (Facilitator)
Sue Boyes*	University of Hull (Facilitator)
Tavis Potts*	University of Aberdeen (Facilitator)
Phoebe Atkins*	Environment Agency
Christine Block*	Deben Estuary Partnership
Steve Colclough*	Institute of Fisheries Management
Peter Cosgrove*	Suffolk Marine Pioneer
Conor Crowther	East Suffolk Council
Iain Dunnett	New Anglia Local Enterprise Partnership
James Eminson*	Robertson's Boatyard/Melton
Jane Herbert*	Essex & Suffolk Rivers Trust
Rachel Holtby*	Northumbria University
David Keeble*	Deben Rowing Club
David Kemp	Environment Agency
Beverley McClean*	DV & SCH AONB
Dee McLeavy*	Pioneer Assistant
Martin Rogers*	University of Cambridge
Geoff Smith	Specto Natura
Richard Steward*	Blyth Estuary Partnership
Stephen Thompson*	E-IFCA
Robert Whitehouse*	Waldringfield Sailing Club
Robin Whittle*	River Deben Association

Session One: Introduction

Daryl Burdon welcomed the group, introduced the project team and outlined the structure of the day, which comprised of four sessions, including four interactive activities.

Activity 1: Review of Features

This first interactive activity allowed the stakeholders to sense check the categorisation of the natural, modified/managed and built features identified and mapped during the first workshop. The group divided themselves between three tables with each table completing the same task. Any amendments were noted on the A1 map with the outputs of this activity being used to refine the interactive pdf.

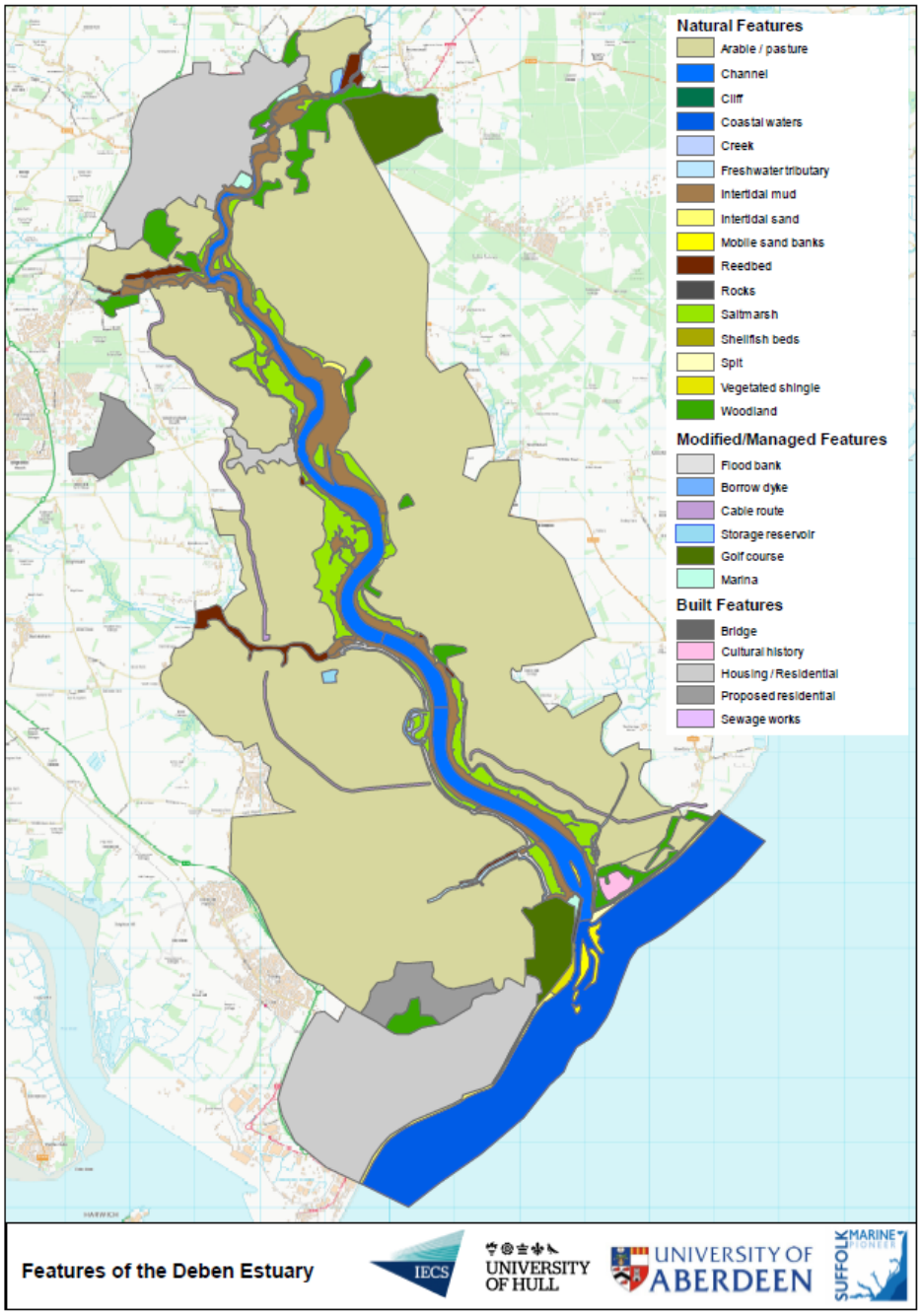


Figure 1: Digitised features within the Deben Estuary identified by the stakeholders during Workshop #1.

Activity 2: Review of Benefits

The second interactive activity allowed the stakeholders to sense-check the relationships between features and benefits that they had identified during Workshop #1. There were 16 natural features and 26 benefits identified and therefore the full matrix (Figure 2) was divided between the three tables. Table 1 commented on Arable/Pasture to Creeks (Natural Features 1-5), Table 2 commented on Freshwater Tributaries to Reed beds (Natural Features 6-10) and Table 3 commented on Rocks to Woodland (Natural Features 11-16). Green squares represent the benefit is provided by the feature and white squares represent the benefit is either not provided by feature or was not scored during Workshop #1. All amendments were noted by the facilitator on each table using a 'X' in the relevant cell (Figure 2) and were then used to refine the interactive pdf post-workshop.

All Tables	Ecosystem Services & Benefits																	Abiotic Benefits					Economic		
Natural Features	Primary production	Nutrient cycling	Formation of species habitat	Formation of seascape	Natural hazard regulation	Waste breakdown and detoxification	Carbon segestration	Food (wild, farmed)	Wildlife feed (wild, farmed, bait)	Healthy climate	Prevention of coastal erosion	Sea defence	Tourism/nature watching (general)	Spiritual and cultural wellbeing	Aesthetic benefits	Education, Research	Physical health benefits	Psychological health benefits	Renewable energy	Sand supply (process)	Dredging materials (product)	Water resources (quantity and quality)	Archaeology / Geology / Geomorphology	Place to live	Place to work / Employment	Biodiversity
Arable / pasture	X	X				X	X					X					X		X			X	X			
Channel	X	X																	X			X	X			
Cliff	X		X		X				X		X						X									
Coastal waters	X	X	X			X	X		X					X			X			X						
Creeks	X	X																	X		X	X	X	X	X	
Freshwater tributary	X	X			X																	X				
Intertidal mud	X	X					X				X												X			
Intertidal sand											X												X			
Mobile sand banks											X			X												
Reedbed	X	X					X	X																		
Rocks			X	X	X						X	X	X													
Saltmarsh								X													X					
Shellfish beds		X			X						X	X		X		X		X							X	
Spit					X						X			X												
Vegetated shingle	X	X	X		X	X	X				X			X			X									
Woodland	X	X	X		X	X	X				X			X			X									

Figure 2: Matrix of Features versus Benefits. Green cells represent a relationship between the feature and the corresponding benefit. 'X' marks the changes made during the workshop.

Session Two: Scenarios Assessment

The session began with two introductory presentations:

- Pete Cosgrove provided a background presentation on the Suffolk Marine Pioneer Project including the main drivers and pressures which are currently faced within the Deben Estuary (Annex 1).
- Daryl Burdon introduced the Matrix Approach and Scenarios Assessments. This provided a brief overview of two tools which were to be applied within the future scenarios assessments (Annex 2).

Scenarios Assessments

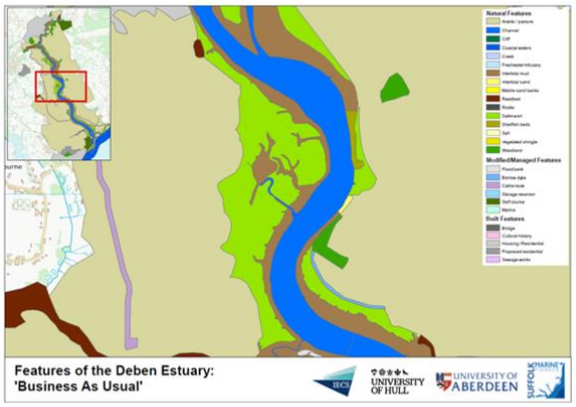
Given the uncertain development of activities in the marine environment and the associated ecosystem response, future scenarios assessments can be used to investigate whether current marine policy measures are robust and sustainable to aid future management decisions. Future scenarios assessments provide a valuable tool to enable new ways of thinking and to model changes in society, however for scenarios to be a useful tool, they must all be plausible and credible, thus requiring local knowledge gained through stakeholder engagement (Burdon et al., 2018[1]). Activities 3 and 4 compared the delivery of benefits under two hypothetical futures scenarios against 'Business as Usual'. The 'Business as Usual' scenario reflects the current delivery of benefits by the natural features of the Deben Estuary. This was captured during Workshop #1 and is presented in the interactive pdf. Under this scenario it is assumed that all natural features, modified/managed features and built features remain the same, and any current management initiatives remain in place.

Activity 3: Trade-off Analysis – Change in Feature Type

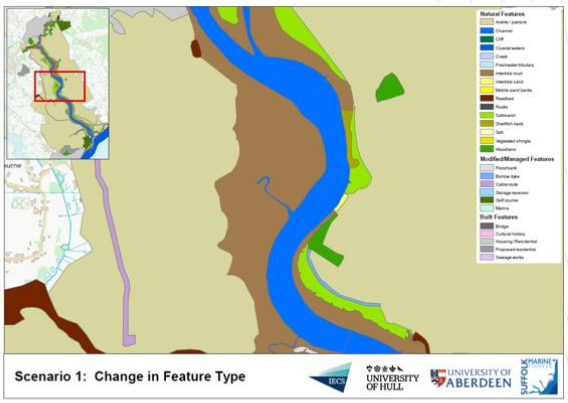
This scenario is site specific and focusses on an area in the middle Deben Estuary around Waldringfield (Figure 3). With current estimates of sea level rise (estimated around 2mm per year) it is likely that if no intervention is made, then areas of saltmarsh which are currently eroding within the Deben Estuary may be lost within the next few decades. For the purposes of this scenario, it is assumed that 82 ha of saltmarsh may be lost from the western bank, resulting in an increase in intertidal mud from 57 ha to 139 ha (illustrated in Figure 3).

In order to inform the stakeholder discussions, all stakeholders were provided with copies of an Ecosystem Service Assessment outputs for UK saltmarsh and intertidal mud, which illustrate the relative importance of each feature in providing a range of ecosystem services and benefits (Figure 4a-d). With this information to hand, the stakeholders were asked to make an assessment of the change in benefits, a description of why this change may occur, an assessment of the confidence in their assessment, and a description of which stakeholders may be affected. The same task was undertaken at all three tables, with the results from each assessment merged post-workshop. The raw results for the scenarios assessments are presented in Table 2. The scores represent the change in delivery of each benefit from the Business as Usual case e.g. -2 = large decrease, -1 = small decrease, 0 = stay the same, +1 = small increase, +2 = large increase, ? = unknown. The confidence in the scoring was assessed for each benefit (high, medium, low). The results and discussion from both scenarios assessments are presented as brief case study factsheets as an agreed output of the project.

[1] Burdon, D., Boyes, S.J., Elliott, M., Smyth, K., Atkins, J.P., Barnes, R.A. & Wurzel, R.K., 2018. Integrating natural and social marine science to manage sustainably vectors of change: Dogger Bank transnational case study. *Estuarine, Coastal and Shelf Science*, 201, pp. 234-247.



57 ha Mudflats and 108 ha Saltmarsh



139 ha Mudflats and 26 ha Saltmarsh

Figure 3: Maps of Business as Usual and Change in Feature Type scenario.

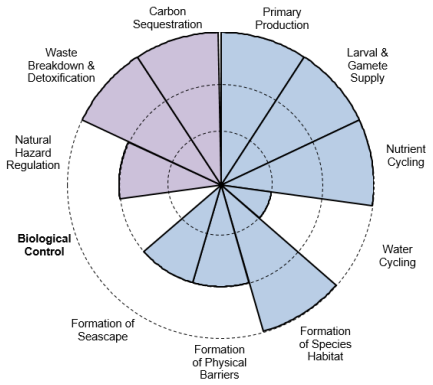


Fig 4a: Relative importance of saltmarsh in providing intermediate ecosystem services

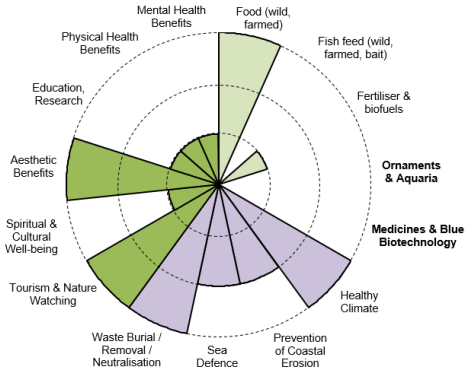


Fig 4b: Relative importance of saltmarsh in providing benefits

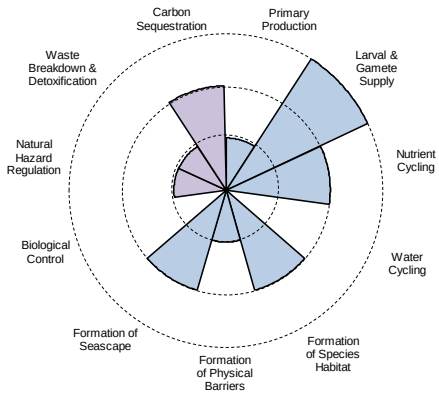


Fig 4c: Relative importance of intertidal mud in providing intermediate ecosystem services

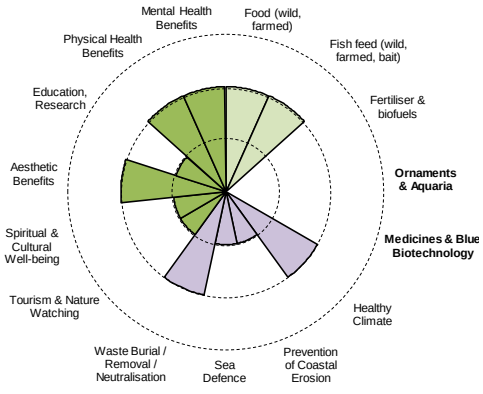


Fig 4d: Relative importance of intertidal mud in providing benefits

Figure 4a-d: Fan charts illustrating the relative importance of saltmarsh and intertidal mud in providing a range of intermediate ecosystem services and benefits (after Potts et al., 2014[2]).

[2] Potts, T., Burdon, D., Jackson, E., Atkins, J.P., Saunders, J., Hastings, E. & Langmead, O., 2014. Do marine protected areas deliver flows of ecosystem services to support human welfare? *Marine Policy*, 44, pp. 139–148.

Table 2: Summary results for the trade-off assessment from each Table for Activity 3.

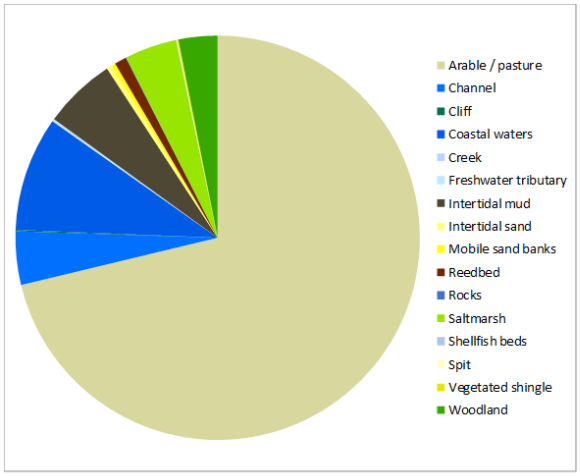
Benefits		Table 1		Table 2		Table 3	
		Score	Confidence	Score	Confidence	Score	Confidence
1	Primary production	-1/-2	H	-2	H	-2	H
2	Nutrient cycling	-1	M	-1	M	-1	H
3	Formation of species habitat	-1	H	-1	H	-1	H
4	Formation of seascape	0	M	0	H	0	L
5	Natural hazard regulation	-1	H	-2	H	-2	H
6	Waste breakdown and detoxification	-1	M	-2	H	-2	H
7	Carbon sequestration	-1	M	-2	H	-2	H
8	Food (wild, farmed)	-1	H	-2	H	-1	H
9	Wildlife feed (wild, farmed, bait)	+1	M	+2	H	-2	H
10	Healthy climate	-1	H	-1	M	0	L
11	Prevention of coastal erosion	-1	M/L	-2	H	N/A	-
12	Sea defence	-1	H	-2	M	-2	H
13	Tourism/nature watching (general)	-1	M	+1	M	-2	H
14	Spiritual and cultural wellbeing	0	L	0	L	-1	-
15	Aesthetic benefits	+1/-1	L	0	L	0	H
16	Education, Research	+2	H	0	H	-2	M
17	Physical health benefits	0	L	0	M	0	-
18	Psychological health benefits	0	L	0	M	0	-
19	Renewable energy	0	H	0	M	N/A	H
20	Sand supply (process)	0	H	0	-	N/A	H
21	Dredging materials (product)	+1	L	0	-	N/A	H
22	Water resources (quantity and quality)	0 Quant -1 Qual	M	?	-	N/A	H
23	Archaeology / Geology / Geomorphology	0	L	?	-	-1	L
24	Place to live	0	H	0	-	0	H/M
25	Place to work / Employment	0	H	0	-	0	M
26	Biodiversity	-1	H	-1	-	-2	H

Session Three: Scenarios Assessment

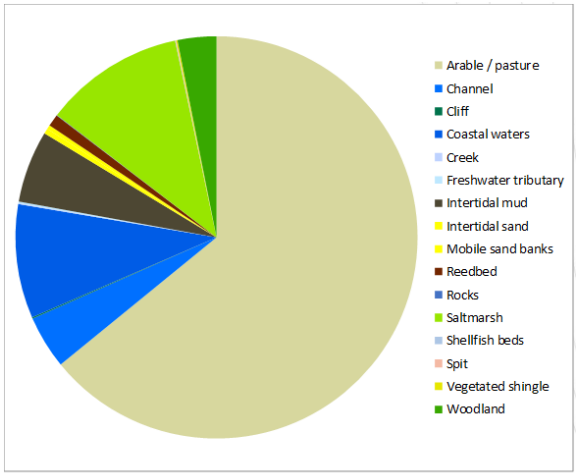
The third session of the day focussed on a second future scenarios assessment relating to flood mitigation.

Activity 4: Trade-off Analysis – Flood Mitigation

The second scenario reflects the likely future requirement for flood mitigation within the Deben Estuary given the predicted rise in sea level. One potential option could be to apply managed realignment within the catchment. This is a purely hypothetical situation, with no plans to undertake such a mitigation option. Under this scenario, it is proposed that 10% (approx. 504 ha) of arable/pasture land would be breached resulting in an increase in saltmarsh within the Deben Estuary from 294 ha to 798 ha (Figure 5).



Business as Usual: 5,036 ha Arable/Pasture and 294 ha Saltmarsh



Scenario 2: 4,532 Agriculture (c. 500 ha decrease) and 798 ha Saltmarsh (c. 500 ha increase)

Figure 5: Business as Usual (left) and Flood Mitigation scenario (right).

The Matrix Approach (Potts et al., 2014) focussed on coastal and marine features and as such did not include an assessment of the benefits provided by arable/pasture land. Therefore, the first task for each table was to generate their own fan chart for arable/pasture land which they could use to compare the benefits provided with those provided by saltmarsh (Figures 4a-4b above). The raw data collected from each table is presented in Table 3. The numbers relate to: 0 = no contribution; 1 = low contribution; 2 = moderate contribution; 3 = high contribution; and ? = unknown.

The two fan charts (i.e. arable/pasture and saltmarsh) were then used to assess the change in benefits, a description of why this change may occur, an assessment of the confidence in their assessment, and a description of which stakeholders may be affected. The same task was undertaken at each of three tables, with the results from each assessment merged post-workshop. The raw data gathered from each table is presented in Table 4.

At the workshop, one table of stakeholders did not feel confident completing the task for Scenario 2 and therefore they discussed the scenario and provided a set of discussion points instead; some of these discussion points will be incorporated into the scenario factsheets.

The results and discussion from both scenarios assessments are presented as brief case study factsheets as an agreed output of the project.

Table 3: Summary of the data collected for the importance of arable/pasture land in providing intermediate ecosystem services and benefits (as defined by Turner et al., 2015[3]).

Intermediate ecosystem services	**Table 1**	**Table 2**	**Table 3**
Primary production	3	2	2
Larval & gamete supply	1	3	0
Nutrient cycling	2	1	0
Water cycling	2	1	0
Formation of species habitat	3	1	1
Formation of physical barriers	2	1	0
Formation of seascape	3	0	2
Biological control	2	1	0
Natural hazard regulation	2	1	0
Waste breakdown & detoxification	1	2	0
Carbon sequestration	2	3	1
Benefits	**Table 1**	**Table 2**	**Table 3**
Food (wild, farmed)	3	3	3
Fish feed (wild, farmed, bait)	1	0	2
Fertiliser & biofuels	3	2	1
Ornaments & aquaria	0	0	0
Medicines & blue biotechnology	1	1	0
Healthy climate	?	3	0
Prevention of coastal erosion	?	0	0
Sea defence	?	0	0
Waste burial / removal / neutralisation	1	2	0
Tourism & nature watching	3	3	1
Spiritual & cultural well-being	1	3	2
Aesthetic benefits	3	3	3
Education, research	3	3	2
Physical health benefits	2	2	3
Mental health benefits	2	2	3

[3] Turner, R.K., Schaafsma, M., Mee, L., Elliott, M., Burdon, D., Atkins, J.P. & Jickells, T., 2015. Chapter 2. Conceptual framework. In: Turner, R.K. & Schaafsma, M. (Eds.) *Coastal zones ecosystem services: from science to values and decision making*. Studies in Ecological Economics, Volume 9, Springer, Switzerland.

Table 4: Summary results for the trade-off assessment on each Table for Activity 4.

Benefits		Table 1		Table 2		Table 3	
		Score	Confidence	Score	Confidence	Score	Confidence
1	Primary production	-1	H	+1	H	No scores were provided by Table 3 but the scenario was discussed and notes were captured by the facilitator	
2	Nutrient cycling	-1 / +1	L	+2	H		
3	Formation of species habitat	0	L	+2	H		
4	Formation of seascape	+1	H	+1	H		
5	Natural hazard regulation	+1	M	+2	H		
6	Waste breakdown and detoxification	+1	H	+2	H		
7	Carbon sequestration	+1	L	+2	-		
8	Food (wild, farmed)	-2	H	-1	M		
9	Wildlife feed (wild, farmed, bait)	-1	M	0	L		
10	Healthy climate	+1	H	+2	H		
11	Prevention of coastal erosion	+1	H	+2	H		
12	Sea defence	+1	H	+1	L		
13	Tourism/nature watching (general)	+1	M	+1	M		
14	Spiritual and cultural wellbeing	+1	L	?	L		
15	Aesthetic benefits	+1	M	+1	M		
16	Education, Research	0 / +1	M	+1	H		
17	Physical health benefits	0	M	0	L		
18	Psychological health benefits	0	M	0	L		
19	Renewable energy	-2	H	0	H		
20	Sand supply (process)	0	H	0	H		
21	Dredging materials (product)	0	H	0	H		
22	Water resources (quantity and quality)	0 Quan +1 Qual	L	+1	H		
23	Archaeology / Geology / Geomorphology	0	H	0	L		
24	Place to live	+1	L	-1	M		
25	Place to work / Employment	-1	H	?	L		
26	Biodiversity	0	L	+2	H		

Session Four: Discussion

Daryl Burdon outlined that the project deliverables will include:

1. A brief workshop report.
2. A refined version of the interactive pdf based on stakeholder feedback.
3. A 2-page case study factsheet for each of the two future scenarios assessments.
4. A methods briefing paper for Defra/MMO (led by Aisling Lannin at The MMO).

An open discussion session was then held in plenary, with stakeholders invited to reflect on the two participatory mapping workshops, the wider Marine Pioneer Project and the management of the Deben Estuary and surrounding area. The key points raised by the stakeholders are presented below:

- The stakeholders felt that there was a language barrier created when introducing the Matrix Approach and the underlying Ecosystem Service Framework. The availability of definitions on each table did help, but it would have been better to circulate definitions before the workshop.
- The Matrix Approach was developed at the UK generic level for coastal and marine features and therefore there were some challenges when trying to apply this approach at the local level.
- The stakeholders found the scenarios assessments challenging, particularly Scenario 2 when two very different habitats/features were being compared (i.e. arable/pasture and saltmarsh).
- Stakeholders rejected the value of hypothetical discussion. Many wanted a genuine worked example with information on consequence. Several felt the options presented were a binary choice of intervene or not, which would output conclusions that were too simplistic to infer meaning from.

- The definitions for intermediate ecosystem services and benefits were coastal and marine focussed and therefore did not necessary transfer well between estuarine and terrestrial habitats. Stakeholders, in several cases, couldn't get beyond a comparison of marine and terrestrial and this perhaps underlines the disassociation with the marine environment.
- The stakeholders were concerned that economics was not taken into account during the scenarios exercises and the scenarios could be further developed to provide an estimate of potential costs under the Business as Usual and Future Scenarios assessments. For example, the costs to physically change arable/pasture land into saltmarsh under Scenario 2.
- The stakeholders had a desire to understand actual economic cost of interventions as well as the desire to understand the economic benefits of the completed interventions (with discount rate).
- Stakeholders also raised issues regarding the timeframe for the scenarios, as at the local level, they felt it could take up to 150 years for arable/pasture land to be converted into saltmarsh given the low levels of natural accretion in the Deben Estuary.
- The stakeholders recognised the need to discuss the negative benefits (or 'disbenefits') as well as the positive benefits for example changing from arable/pasture land to saltmarsh (under Scenario 2) there are dis-benefits for the farmer (and the wider agricultural industry) in terms of reduced food production but there may be positives for other stakeholders such as wildfowlers and birdwatchers who may gain benefits form the change in habitat.
- A point was made that the problem requiring the intervention is often what defines the benefit/dis-benefit options. What your intervention is and how you plan to do it will invariably affect the decision you take.
- Issues were raised regarding who would pay for the maintenance of seawalls. For example, during the 2013 surge event, holes were created in the seawalls. The Local Enterprise Partnership (LEP) representative responded to say that they had contributed £30 million into flood defence upgrades.
- The stakeholders felt that their knowledge was much greater for understanding the consequences of Scenario 1 (changing saltmarsh into mudflat) than it was for Scenario 2 (changing arable/pasture land into saltmarsh).
- Issues regarding the scale of Scenario 2 were raised i.e. a loss of 500 ha of arable/pasture land. The scenario was developed in the abstract which made it more challenging for the stakeholders and perhaps it would have been easier to understand if a local geographically focussed case study was included (although the stakeholders acknowledged this was a controversial issue). This perhaps demonstrates the need for better integration across land and sea – farming (NFU were invited) interests were not in the room however it is potentially difficult to get all relevant stakeholders in the room if the workshop is billed as marine or coastal event.
- The broad applicability of the methods was recognised by the stakeholders in that it can be applied to any estuary. The review of the Deben Estuary plan is upcoming and it was felt applying a similar approach would be useful to provide more meaningful values into the process by engaging local stakeholders into the process.
- Concern was raised as to the challenge of using the information generated during the workshops, which was based on theoretical exercise, into valuable information to feed into management and policy.

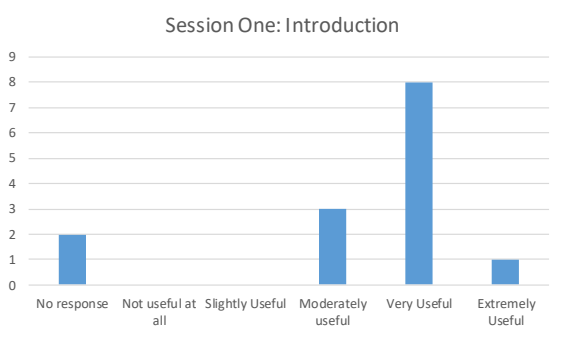
- The stakeholders recognised that trade-offs are necessary (e.g. between a farmer and the wider society) and that in practice large benefits arising from the natural environment are often only received by a few stakeholders.
- When assessing the benefits from arable/pasture land, the wider picture needs to be recognised which reflects the importance of the supply chain and all the associated jobs within the agricultural and food processing/supply industry.
- The stakeholders recognised that the delivery of the services is dependent on the future scenario in question. Intervention will only happen if an issue needs to be addressed. In the case of the Deben Estuary plan, this could be revised to get the plan in line with the LEP.
- There is a lack of integration between terrestrial and marine planning and it was felt that the Marine Pioneer helps to address this and put this area on the map. By linking with research currently being undertaken by UK Universities (e.g. East Anglia, Cambridge, Hull, Aberdeen) this could be used to strengthen the local knowledge base.
- The Marine Pioneer Project aimed to apply a participatory mapping approach due to a lack of local evidence for the Deben Estuary. In order to ensure this approach continues to be successful then a broad range of stakeholders are required, for example there was a lack of agriculture specialists at this workshop which would have been valuable, and a common language between the range of stakeholders is essential.
- The stakeholders recognised that this is a difficult area to work in. The majority of decisions in environmental management are based on economics, however by helping to educate locals on understanding the wider benefits that the natural environment provides, this produces a common ground to continue working together going forwards.
- Stakeholders were interested in whether the work of the Marine Pioneers will feed into other policies and strategies apart from the 25 Year Environment Plan. It is hoped that the outputs and outcomes from the Marine Pioneers will contribute to other policy and plans, however at this stage, it is unclear how this will happen.

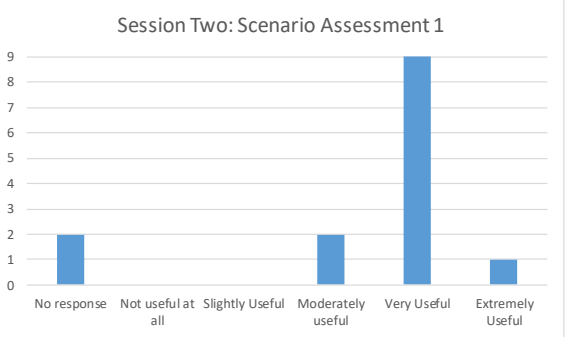
Both Pete and Daryl thanked all of the attendees for their valuable contributions to the two workshop and the meeting was closed at 16:00.

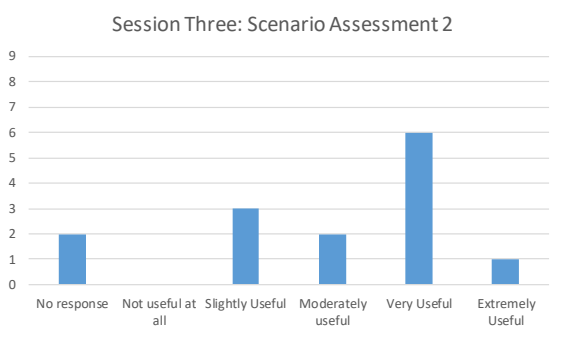
On reflection post-workshop, the authors have identified a number of potential areas for further development of the work going forwards, including:

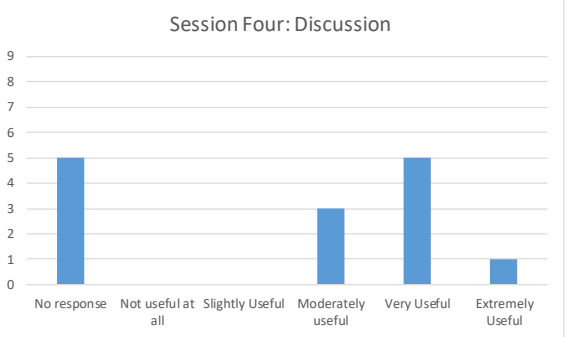
- Incorporating features / benefits data into relevant plans (e.g. Local estuary or shoreline management plans);
- Further quantification and modelling of changes in service provision under the different scenarios;
- Expanding the role of stakeholder engagement regarding the Deben Estuary and the development of locally applicable future scenarios;
- Informing local development control / strategy; and
- Feeding into and engaging with community councils, community planning initiatives, etc.

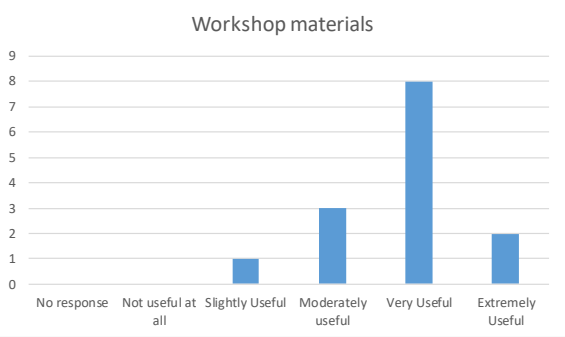
Workshop Feedback (n=14)

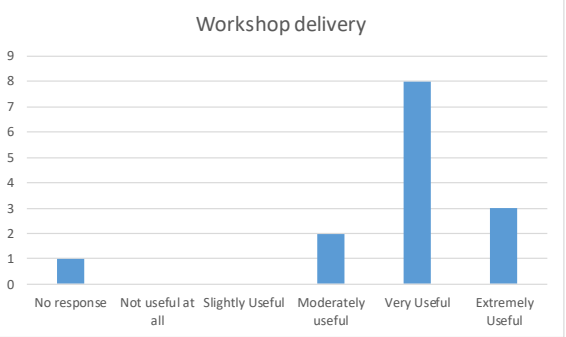


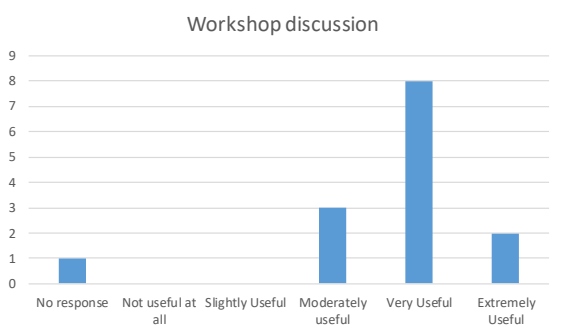


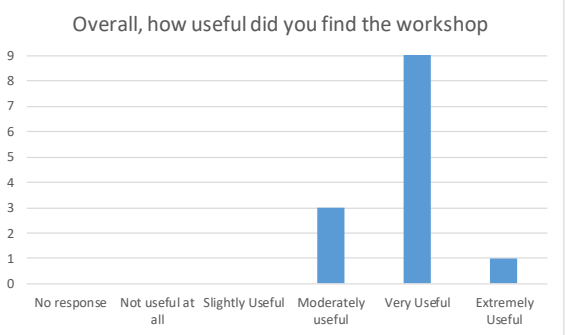


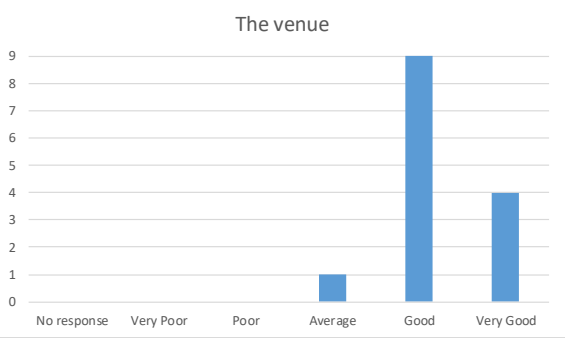


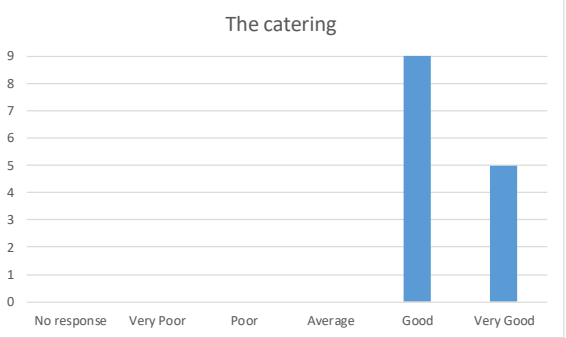




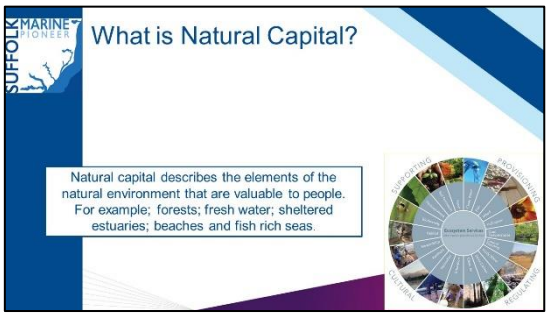


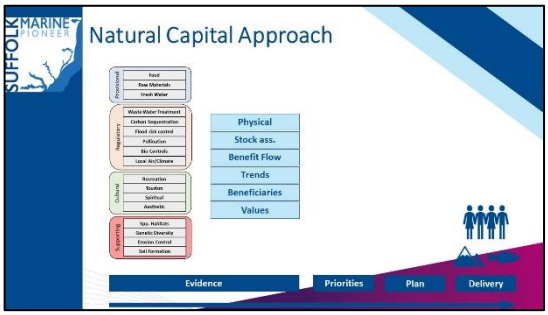


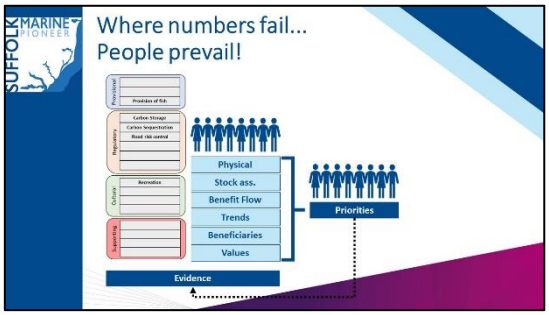


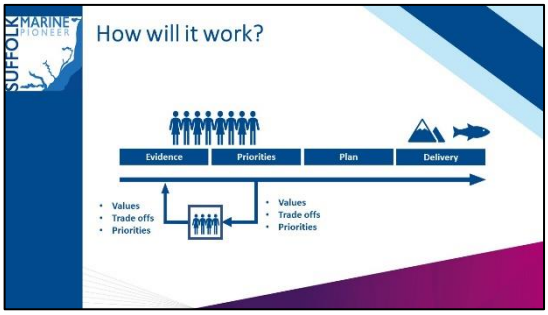


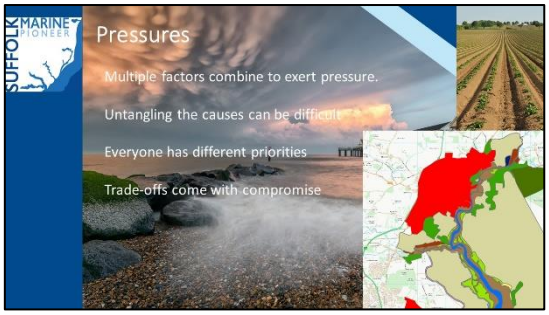
Annex 1: Presentation - Values & Priorities Workshop #2











Annex 2: Presentation - The Matrix Approach and Scenarios Assessments.