

**Draft Marine Aggregate Regional Environmental Assessment of the Anglian Offshore Region as at July 2011.**

**Original report produced by EMU Ltd on behalf of Anglian Offshore Dredging Association.**

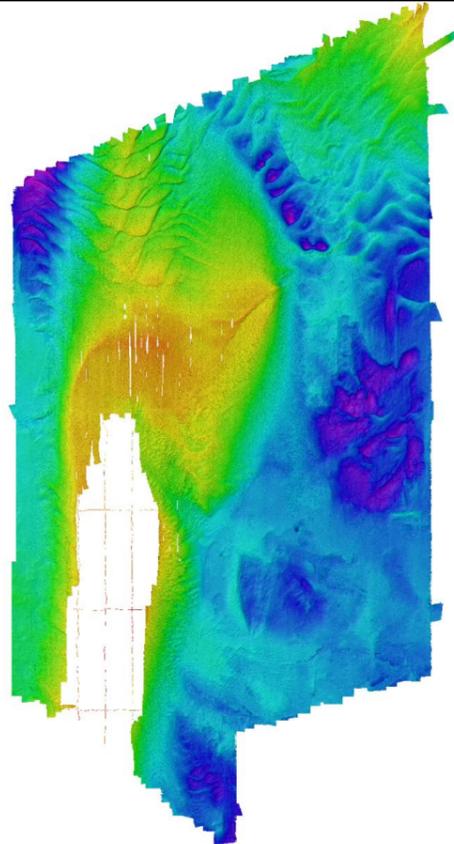
Summary of comments received on the above report from: **Cefas, JNCC, Natural England, English Heritage**

**General Comments**

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Response	RAG response	MAREA Updates
All	Clear detailed headings to be used for all figures, tables etc. The graphics need to be stand-alone	Reviewed and addressed within the report	Comments suitable for any graphics in EIA too	We can address this with the designers if AODA feel appropriate.		Reviewed throughout and data sources etc added where relevant
Overall comments on the report EH (Archaeology)	<p>The report delivers on the main aim to provide a context and basis for site specific EIA's; it presents a thorough level of characterisation drawn from a wide variety of sources and supporting studies.</p> <p>The archaeological characterisation section of the report (Section 17 Archaeology) contains detailed information on the prehistoric, maritime and aviation archaeology of the Anglian dredging region. It is a well researched study of known and potential marine archaeology within the study area. The details of this characterisation may be used as the context for the archaeological characterisation presented in licence specific EIA's. The key results and findings from the MAREA should be presented rather than simply providing a reference to this MAREA. However, in line with advice provided on previous MAREA's, it should be noted that the results of this regional study are not sufficient to replace the detailed archaeological studies required to support site specific EIA's.</p> <p>An assessment of the cumulative effects of marine aggregate dredging on the marine historic environment at a regional scale has also been provided. We have concerns over the way that the methodology for the assessment of impact significance has been conducted and presented. The way that determinations of significance are reached is not clear from the discussion in the relevant chapters. There is no discussion of the way that magnitude of effects, exposure and sensitivity scores have been combined to reach the final determinations of impact significance (see detailed comments for Section 28 below). In this way any subjective decisions or professional judgements based on experience that are made by the authors are less transparent and clear.</p>	See following detail in individual sections	See following detail in individual sections	<p>Noted.</p> <p>Methodology chapter amended and will be reviewed as part of the south coast REA process.</p>		Chapter 3 amended and all CIA tables updated to reflect the categories of Tolerance, Adaptability and Recoverability value and spatial overlap
Overall comments on the report (JNCC)	<p>The REA document provides a thorough characterisation of the region through amalgamation of a number of data sources and REA dedicated survey work. JNCC commend the effort in acquiring cross-industry datasets in the REA study area to inform the baseline chapters included in the draft document. Overall, the data and information collected and collated for the report are sufficient to describe the distribution and importance of regional resources and to assess the potential impacts from past and proposed future extraction activities on these resources. However, we believe that some of the analyses undertaken to characterise the area and to determine the significance of dredging impacts are deficient or incomplete. This needs to be resolved to assess the significance of impacts effectively.</p> <p>The following list of comments has been compiled to address specific issues and is broken down into sections. Comments in bold within the REA column of the table are our key concerns. Comments highlighted in grey must be addressed to enable determinations for the short term Marine Licence renewals. JNCC would like to refer to the formal CEFAS response to address any issues within Chapter 6: Modelling the Physical Effects of Dredging, Chapter 7: Regional Hydrographic Environment, Chapter 8: Regional Coastal and Geological Characterisation, Chapter 9: Fish and Shellfish Ecology,</p>			<p>Noted.</p> <p>Noted.</p>		

	<p>Chapter 19: Impact Assessment - Coastline and Offshore Banks, Chapter 21 - Impact Assessment: Fish and Shellfish, and Chapter 25: Impact Assessment - Commercial &amp; Recreational Fisheries.</p> <p>The REA provides a suitable level of information to enable a good characterisation of the environment associated with the region and proposed activity footprint. Appropriate data have been acquired to inform the determination of important or sensitive regional resources and receptors. Importantly the data allows an appropriate assessment of the historical and proposed marine aggregate extraction and the interaction with the receptors identified. However Natural England believes that further analyses need to be conducted to support some of the impact assessments presented in the report. These will need to be addressed to enable a clear assessment of significance of environmental effects.</p> <p>Natural England recommends that the MMO refers to the South Coast REA and its addenda as these may address some of our concerns regarding the methodology used for assessing regional cumulative effects. In-particular the presentation of the magnitude matrices and lack of transparency on the number of combinations of determinations that can be amalgamated to result in significance determinations. This was a particular deficiency in early drafts of the SC REA and only addressed in the final addenda. Natural England would expect that these underlying assessment processes and protocols should have been addressed as they are the same between the reports. It is anticipated that a full review of the „signed off“ SC REA should be cross-referenced with the AO REA so that a „quick-fix“ can be achieved. It is disappointing that this has not already been conducted as it will result in an inevitable delay in production of a transparent and suitable REA for the Anglian Offshore region.</p> <p>Overall the Anglian MAREA provides a reasonable characterisation of the Anglian offshore environment and dredging practices in the region.</p> <p>The original RAG guidelines saw the REA as a 'living' document to be updated, perhaps with addendums, as scientific knowledge increased and technology advanced. It would be of use to all parties if the document could be 'future proofed' to support its relevance and usefulness over time. It is also not clear how the REA will link with any future regional monitoring plans. It needs to be recognised that over time the REA will be of less use to supporting site specific EIAs and additional work will be likely to validate the information provided within the REA.</p>			<p>Comments have been cross checked with the South Coast REA and all relevant sections will be updated in line with south coast comments.</p> <p>To be advised by AODA, to be discussed further if appropriate.</p>	
Overall comments on the report (NE)				<p>This will be addressed in redrafted methodology chapter, the level of uncertainty in data was detailed for each assessment, and revisions will ensure that is clear that where data is unavailable or deficient, then the role of expert judgement has been used. Where a high level of uncertainty exists, EMU have taken a precautionary approach and assigned higher levels of significance than would otherwise have been used to reflect this and to highlight need for additional data collection at site specific level.</p>	
Overall comments on the report (CEFAS)	<p>Significant sections of the report present the results of <b>subjective</b> analyses assessing various interactions between human activities and different biological and physical receptors in the form of matrices. Whilst this is not unreasonable (due to the present lack of more routine objective methodology to assess such interactions), it must be clearly understood (and acknowledged in the report) that there remains, in some instances, considerable uncertainty in the conclusions reached.</p> <p>The EIA process, including scoping, needs to be compliant with the EIA directive so it is important that all decisions to scope in or out topics are well evidenced. The site specific EIAs need to function as stand alone documents, and should make best use of pulling out the salient points from the REA. A statement 'see REA' will not be sufficient.</p> <p>In each of the impact assessment chapters under 'Screening effect-receptor interactions' there needs to be more explanation how this method of screening receptors in or out has been applied to each receptor, i.e. need to show working here also to give confidence to these statements. Similarly, much supporting information is only contained within the appendices and not described or referenced in</p>			<p>The screening tables used data provided within previous baselines to screen out any receptors where there was no overlap between receptor and effect footprint and also where no effect/receptor pathway was known. More generic groupings of receptor were adopted to ensure that specific receptors under each receptor group could be captured and assessed.</p> <p>EMU would request further clarification on what is required.</p> <p>Noted.</p> <p>We accept this but acknowledge that timings for delivery prevented any cross checking. However, now that</p>	

	<p>the main report. Again, for site specific EIAs, this information will have to be pulled out of the appendices and fully described and referenced within the ES.</p> <p>The in-combination assessment will need to be undertaken on a site-specific basis, as this is a statutory requirement under the EIA directive. However, as a detailed cumulative assessment has been undertaken, the outputs of this will assist in site-specific in-combination assessments. In-combination effects will change over time, while the cumulative assessment undertaken will remain valid for longer. This is a positive output of the REA and will assist with site-specific assessments. The difficulties in undertaking in-combination assessments are well accepted, and therefore it is understandable that this would have been difficult to assess on a regional scale.</p> <p>We acknowledge the non-statutory nature of the REA process and are grateful for the opportunity to comment on the draft document. However it is disappointing that many of the earlier comments made in relation to the South coast REA have not been incorporated into the Anglian REA.</p> <p>Our advice includes minor comments and typos where noted as it is important that these are noted and recognised for the final REA and the application of information into site specific EIAs.</p> <p><b>Physical Environment</b></p> <p><b>Physical Processes</b></p> <p>While impacts to the coastline have been dealt with in detail within the REA, there will need to be clear and auditable validation of these results within the site specific EIA process. It will be important to validate the site specific dredging scenario against 15 year future bathymetry modelled within the REA. Where there are likely differences in future bathymetry, and in particular in location it will need to be proven that the results and conclusions are still valid.</p> <p>Licence areas of concern with regards to coastal impacts that have been highlighted in the REA are the western licence area's 202, 319 and 251 (and possible western edge of application area 454) there is a potential 5-10% change in wave height arising from these areas and an overlap with sensitive receptors. Detailed monitoring undertaken at Area 202 has shown that at present (2009) there is little interaction with inshore sandbanks (see Figure 1). Whilst "past performance is no predictor of future impacts" these results do give confidence that with the present conditions and current extraction rates that impacts on the bank are insignificant. Any other current data regarding the existing dredging impacts should be utilised in the REA not only to support the overall assessment and provide historical evidence but also so this can be used for the short-term licences.</p> <p>There are a number of issues that need detailed analysis before this REA can proceed. The main issue is that the sand banks off the Cromer to great Yarmouth frontage are key in extracting wave energy out of the system during storms. They are naturally dynamic systems and the impacts upon these sandbanks can be subtle and linked in complex patterns. Therefore confidence is needed in the analysis that leads to the conclusions made in this REA and we would also recommend that this detailed analysis is completed for the short-term licences.</p>		<p>comments have been received for both documents, cross-checking has been undertaken to ensure consistent approach.</p> <p>We will address any minor comments and typos in the revision of the document.</p> <p>Noted.</p> <p>Noted.</p> <p>A careful assessment of potential impacts on sandbanks, due to their critical importance in protecting the coast, was conducted – full details in Chapter 19. A combination of different hydrodynamic numerical modelling scenarios, which have been validated and calibrated, was undertaken using extremely conservative assumptions. The inshore sandbanks were mapped based on the most recent SeaZone data (which includes all recent publicly available swath bathymetry data) down to a depth of 15 m below sea level. Furthermore, a careful assessment of regional sediment transport directions was undertaken, with special emphasis on mobile sandy areas, including inshore sandbanks (refer to Chapter 8 – Sediment Transport).</p> <p>EMU feels that an appropriate assessment has been conducted using the latest survey and numerical modelling techniques. The regional historical evolution of these inshore sandbanks is difficult to describe because it is only recently that researchers have been able to map these features relatively accurately i.e. the regional evolution of these features is mostly unknown, although site-specific sandbank evolution may be available from monitoring studies (e.g. Area 202). However, it is beyond the scope of the REA to discuss site specific changes, although these should have been discussed in the REC if they have regional implications.</p>		<p>Addressed as Box 2 in Chapter 19.</p> <p>Box 3 in Chapter 19 has been added to provide confidence in the assessment that impacts are not predicted for the area between Cromer / Great Yarmouth and inshore banks.</p>
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**Figure 1** - Area 202 swath bathymetric survey in 2009. Note the linear feature of the active dredging area not impacting on the dynamics of the bank.

Discussion should be provided on the confidence in the spatial area of the banks. It is known that in these dynamic areas the location and shape of the inshore banks change over time. What dataset was used to spatially define the inshore banks and can this be confirmed by available local monitoring data? Understanding the confidence is required as it relates to the spatial extent of impacts and potential for interaction between receptors and effects.

In relation to the discussion on the plume model results the interaction between multiple dredgers in adjacent areas should be undertaken (i.e. it is understood that in this region up to 4 dredgers can be working in a relatively close area at the same time).

The resolution of the figures makes it particularly difficult to review the scale of effects. In this region the impacts are demonstrated to be relatively small, but as the receptors are close to the dredging areas, a detailed integration of the spatial extent is required – currently this cannot be achieved with the figures provided. I recommend that all the data presented should also be provided in GIS format to allow for a detailed look at where the overlap is with potential sensitive receptors, especially in Area 202 for example.

Greater use should be made of existing monitoring reports, especially 100% swath bathymetry surveys, which give a good indication of changes in sediment transport patterns and pathways.

19. A full review cannot be made of the impact assessment chapter

The most recent SeaZone Hydrosatial data was utilised, down to a depth of 15 m below sea level. This is probably the best regional bathymetry dataset that is currently and publicly available.

Addressed separately with Dr Bellamy, HR Wallingford and Cefas.

Any areas of overlap which currently are not clear will be expanded and produced in higher resolution in the final document (e.g. using inset figures). GIS data can be requested from AODA.

Seazone data includes available high resolution multibeam data – however, since this is a regional assessment, site-specific monitoring survey results are beyond the scope of this project but need to be considered within licence-specific assessments. We presume the East Coast REC provides additional detailed information on sandbanks and seabed morphology/evolution – if so; some of the results/outputs can be incorporated into the REA.

The final figures will clearly show any overlap with changes in effects and sensitive receptors such as Sandbanks. GIS data can be requested directly from AODA. The sensitivity of sandbanks and magnitude of change of effects which may impact sandbanks has been discussed in detail in Chapter 19.

Addressed in Box 1 of Chapter 19.

GIS data have been provided to Cefas. All relevant images have been enlarged.

Area 202 monitoring has been included in Box 2 of Chapter 19.

All issues / comments addressed

	19 with respect to physical processes until the specific comments below have been addressed, in particular providing GIS layers to undertake detailed assessments of the adaptability of the sandbanks.					including provision of GIS data.
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### Specific comments

#### Chapter 2 - The Anglian Offshore MAREA

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	RAG response	MAREA Updates
<b>Table 2.1 – Key issues examined in MAREA</b>	Table should be broken down to represent how the historic environment is discussed later in the report; <ul style="list-style-type: none"> <li>- Prehistoric</li> <li>- Maritime</li> <li>- Aviation.</li> </ul>	Should be amended in final report to add clarity to document.	<b>Table 2.1 – Key issues examined in MAREA</b>	To be actioned		Actioned
<b>2.5 - Evolution of the MAREA process</b>	Text states that there were 156 consultees for scoping yet figure 2-3 states 380. It would also be beneficial to include a table of those who responded so as to determine the spread across organisation/individual types.	Should be amended in final report to add clarity to document.		To be actioned		Actioned
Section 2.6, The MAREA and licensing regulations, 3 <sup>rd</sup> paragraph	Since April 2011, applications for permission to extract marine minerals are made under The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).	Should be amended in final report to make the text factually correct.		To be actioned		Actioned - Chapter has been revised to reflect changes in regulations and terminology

#### Chapter 3 – Methodology for Assessing Regional Cumulative and In-combination Impacts

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Table 3.1 Magnitude of physical effects	It is unclear how the determinations of magnitude have been achieved? The categories and thresholds are unexplained and thus can appear subjective. The evidence to underpin the determinations should be presented / referenced clearly. Any confidence with the allocation of magnitudes should also be made clear. This will give greater assurance to the determinations presented. Would also benefit from a glossary and explanation of the terms used. Currently it is unclear what some of the descriptors mean  There is no discussion in this section of how the magnitude scores for the different physical effect categories have been determined. As a result magnitude scores look like they have been assigned subjectively and therefore the reader must assume that there is a large uncertainty in the outcome of the impact assessment. <b>Evidence used to determine magnitude of effects should be presented and clearly referenced.</b> Any uncertainties associated with the determinations should be presented in the report. In addition, the meaning of effect categories (e.g. strong behavioural response vs mild behavioural response) should be explained so the reader understands what is being assessed.	Essential to be clarified at REA level.  Must be addressed at the REA stage to ensure magnitude scores are appropriate and impact assessments are valid.		Revised chapter has been produced for the South Coast and will be circulated for agreement.	Chapter revised as per agreed South Coast version
Section 3.1.3, Applying EIA principles to MAREA, last paragraph	"... to identify migration measures" should read "... to identify mitigation measures"	Should be amended in final report.		Actioned.	Actioned

<p>Section 3.2 – explanation of the Step-by-step process</p> <p>Section 3.2, – Predicting Effect Magnitude</p> <p>Section 3.2.2, Box 3, Magnitude of effects</p>	<p>This section needs cross-referencing with the similar section in the SC REA and amended accordingly.</p> <p>Whilst it is acknowledged that the present method is subjective, It should be stated that in the absence of fully objective and quantitative methods to assess the magnitude of regional scale impacts there remains a level of uncertainty associated with the conclusions presented in the report.</p> <p>Extent - site specific: In the notes section, it should read "... the industry term often used is Active Dredging Zone - ADZ ..." instead of "... Aggregate Dredging Zone.."</p>	<p>Essential to be clarified at REA level. To be dealt with following the meeting at Crown.</p> <p>Essential to be clarified at REA level. To be dealt with following the meeting at Crown.</p> <p>Should be amended in final report.</p>	<p>The uncertainty with the current approach adopted should be recognised when applying the results to site specific EIAs</p>	<p>As above, methodology chapter revised as per South Coast.</p> <p>As above – also note that uncertainty is a specific category that is included in the Regional EIA process</p> <p>Actioned.</p>
<p><b>3.2.3 – Step 3: Map overlap between effects and receptors - Last Paragraph</b></p>	<p>1 - 'Maritime Archaeology' can be mapped spatially to a point and where it is possible it should be done so.</p> <p>2 - Is this section referring to maritime archaeology as a whole (Prehistoric, Wrecks, Aviation) or to maritime archaeology specifically as defined in chapters 17 &amp; 28? This distinction needs to be made early on and consistency maintained throughout the report.</p>	<p>Must be addressed at MAREA scale</p>		<p>Reference is to maritime archaeology as a whole,</p> <p>Actioned, reference to maritime archaeology removed. Known archaeological sites have been mapped within the baselines in Chapter 17.</p>
<p>Figure 3.3</p>	<p>As per comment above the combinations within the matrices for effects, receptor and assigning significance are unclear. This was a particular issue with SC REA and synthesis of the appropriate addenda to that REA was expected to have been made in this report.</p> <p><b>Clarification is required as to how the various combinations of frequency, duration and extent of effects in Matrix A and tolerance, adaptability, recoverability and receptor value from Matrix B have been combined to reach the final determinations of magnitude of effects and receptor sensitivity, respectively.</b> We note that Emu have provided additional information on how the determinations of sensitivity were reached for the South Coast MAREA (letter from Paul English to the MMO dated 18<sup>th</sup> October 2011). We would expect a similar level of detail in the Anglian MAREA to enable transparency in peer-reviewing the significance determinations</p>	<p>Fundamental issue that needs to be addressed by adopting the revisions presented in the SC REA addenda (see letter from Emu Ltd., Paul English, 18 October 2011.</p> <p>Must be addressed at REA level.</p>		<p>Noted, revised chapter for South Coast REA will be adopted for AODA.</p> <p>As above, methodology chapter revised as per South Coast.</p>
<p><b>Figure 3.3</b></p>	<p>At present it is unclear from this diagram as to how the various combinations and permutations from Matrix A and Matrix B have been combined to reach the final determinations of magnitude of effects, receptor sensitivity, and final impact significance. This matter has already been the subject of some discussion during review of the South Coast MAREA and we note that the consultants have provided additional information on how the determinations of sensitivity were reached for the South Coast MAREA (letter from Paul English to the MMO dated 18th October 2011). Similar information must be provided for the Anglian MAREA to enable transparency in how the final determinations of impact significance have been reached.</p>	<p>Addendum to be produced or further information should be brought into final report to include tables detailing all possible outcomes from matrices A and B.</p>		<p>Noted, revised chapter for South Coast REA will be adopted for AODA.</p> <p>As above, methodology chapter revised as per South Coast.</p>

## Chapter 4 – Marine Aggregate Dredging Methods

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Figure 4.2  Section 4.2.5, Dredging zones, 1 <sup>st</sup> paragraph	This figure is very useful for allowing a view to primary effects associated with activity from 1999-2009.  2 <sup>nd</sup> sentence should read "Figure 4.2 shows ..."	Recommend to be presented in the Humber REA.  Should be amended in final report.	Useful reference for individual EIAs.	Noted  Sentence is correct in MAREA, Figure 4.3 is referenced and accurate.	Actioned

## Chapter 5 – Potential Effects of Dredging: Conceptualisation

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Fig. 5.1	The diagram shows physical effects on the environment from the dredging. It is not clear whether <i>tidal residual</i> and <i>far field change in tides and currents</i> are limited to the areas within the arrows in the diagram, there is a possibility of misleading readers into assuming that (for example) far field change in tides and currents are limited to the area encompassed by the arrows on the diagram.	Similar comment presented for the SC REA. To be included in the report		This has been addressed for South Coast and revision will be included within AODA.	Figure has been updated.
Figure 5.3	At present it is unclear from this figure as to how Archaeology is linked to Bathymetric change. As this is a secondary effect with the potential to impact on archaeological receptors there must be a direct link made in this figure.	Should be amended in final report to add clarity to document.		Noted	EMU consider the diagram does illustrate a secondary effect link between archaeology and bathymetry as per other receptors.
Section 5.3.3,	"Typically ~30 cm of sediment will be removed in a single pass (BMAPA, 2010)." I presume that this is meant to read that depth of sediment removed will be ~30cm?	Errata – exactly the same comment made in the SC REA.			Actioned.
Section 5.5.1, Immediate changes, Noise and Vibration	There is no reference to the NPL noise study, which undertook comprehensive field measurements of underwater sound generated during extraction operations (MEPF Study 08/P108 - <i>Measurement of underwater noise arising from marine aggregate operations</i> , NPL).	Results from the NPL noise study should be summarised and referenced in the REA to provide a more accurate assessment.		Reference was been made to this report within individual impact assessment chapters, reference will be made to key conclusions in Section 5.5.1.	Actioned.
5.5.1 – Seabed Removal, Sediment Plume & Bathymetric changes	At present these sections do not adequately cater for archaeology. Detail should be included on how the historic environment may be impacted upon by the physical process of dredging.	Should be amended in final report to add clarity to document.		This section will be reviewed.	Actioned.

Section 5.5.3- Sediment flux, page 6.	Throughout this section it is discussed how unlikely it is that dredging will impact sediment flux. They do not however mention any effects that may be felt in areas with finer grained sediment or areas with higher sediment availability. If this is because these areas are unlikely to be dredged then this should be mentioned to make this clear, or any impacts that may be felt on these types of environments need to be mentioned so that this report is balanced and covers all possible issues. "In previous studies the effects of aggregate dredging on sediment transport have been found to be localised and are only significant within, or very close to the particular dredging area. More importantly, the effects of aggregate dredging in changing tidal flows and associated sediment transport have not previously been predicted to affect UK coastlines (HR Wallingford, 2009)". This does not rule out the fact that changes may not be felt or predicted in the future, however unlikely this may be it still needs to be mentioned.	Needs to be clarified within the report		This has been addressed within the South Coast and will be amended in final AODA document.	Updated as per South Coast but please note that EMU does not agree with the comment that dredging is unlikely to impact sediment flux - careful consideration has been taken in describing potential changes in sediment flux due to aggregate extraction and how these changes may impact sensitive receptors – refer to Chapters 5 and 6 and all relevant IA chapters. Furthermore, sediment flux has been modelled using state-of-the-art models to make sure any potential changes in sediment transport are captured.
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## Chapter 6 – Modelling the Physical Effects of Dredging

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
6.2.1	In the output section it states that 'six worst case wave climate and aggregate extraction scenarios are presented', however it then only presents one '1 in 200 wave events approaching from north-northeast, east and south-southeast at MHWS and MLWS'.	Clarification is required in this section.		Six scenarios have been presented as follows (Figures 6.6 – 6.9):  i) 1 in 200 from NNE at MLWS ii) 1 in 200 from NNE at MHWS iii) 1 in 200 from E at MLWS iv) 1 in 200 from E at MHWS v) 1 in 200 from SSE at MLWS vi) 1 in 200 from SSE at MHWS	These scenarios have been updated within the text.
6.3.3	What are the causes of natural variation in tidal currents near scoby sands? Is it possible there is a feedback loop where dredging in Area 251 and Area 319 causes acceleration in natural variations?	It is recommended that this is addressed within the REA to support the assessment.	To be addressed at EIA stage.	HRW response - This feedback loop is unlikely. There is already so much variation in currents on a day by day basis. We do not see it necessary to comment on the causes of natural variation in currents as this would require a treatise	Addressed in Box 1 Chapter 8.
Figure 6.14 and 6.15	Need to see the residual tidal flux measurement as % change. This would provide a useful indication of natural variability in the region that can be compared to predicted effects.	It is recommended that this is addressed within the REA to support the assessment.		EMU feels this request is not appropriate since:  i) Sediment flux has been reproduced as kg/m/tide for the SCREA, the Thames REA and the current EC REA – it is particularly important to maintain consistency and to have an approach which is in line with other locations for comparative purposes, especially from a regulator perspective;  ii) These outputs are not incorrect;  iii) It would require considerable modification to the document to accommodate this request – potentially across numerous baseline chapters and all impact assessment chapters where receptors may be sensitive	A new flux percentage figure (Figure 6.16) has been added.

				<p>to changes in sediment flux;</p> <p>iv) The approach and outputs associated with changes in sediment flux/transport were agreed during the RAG/REA kick off process; and</p> <p>v) This request has not been noted previously – e.g. the SCREA.</p>	
6.4.1	Need to be confident that the input to the plume model is correct, and this is reliant on two clarifications. The tidal velocity input requires clarification in relation to the calibration required with current meter data. Also, as discussed above the potential interaction between multiple nearby dredgers in this region needs to be considered (data regarding worst case dredger size has been received by Cefas on 28/10/2011 from Andrew Bellamy, further review to follow).	Clarification required at the REA stage.		<p>This has been addressed separately with HR Wallingford and Cefas.</p> <p>HR Wallingford response:</p> <p>From a regional perspective the plume modelling is sufficient. The potential interaction between plumes is already covered in Section 8.1 of Technical Note 03.</p>	Box 1 has been added to discuss plume dispersion from larger vessels.
Section 6.4.1, Table 6.3, Measurements of plume data from aggregate areas in the UK	<p>According to information in Table 6.3 plumes in Area 430 have been measured to travel up to 300 metres from their origin. However, Newell <i>et al.</i> (2004) state that ADCP measurements undertaken in Area 430 suggest that surface plumes can extend to distances between 1000 and 2000 metres (Newell <i>et al.</i>, 2004. <i>Impacts of overboard screening on seabed and associated benthic biological community structure in relation to marine aggregate extraction</i>. MESL). Similar plume excursion was detected for Area 106. We would welcome clarification on the validity of the data presented in the report.</p> <p>A full review of this section cannot be accomplished until two key issues have been addressed: Fig 6.14 and 6.15 need to be reproduced as a % of sediment flux of natural rates rather than absolute levels. GIS layers are produced to identify key areas and under detailed assessments of the adaptability of sand banks.</p>	<p>Should be clarified and amended if required. Relevant information from Newell <i>et al.</i> (2004) should be included in the REA.</p> <p>Need to be addressed as cannot assess this section as it stands.</p>	Must be addressed at EIA level.	<p>HR Wallingford response:</p> <p>This comment based on Newell <i>et al</i> 2006b in our original report; a plume maybe has gone that far based on measurement. This is not the same as saying the sediment plume has gone that far. At any rate the excess concentration at 1km cannot be greater than 10 mg/l based on the method used by HRW, even if it was predicted to extend as far as 1km because it is already at 10mg/l at 300m and will only reduce with further distance.</p> <p>The reference to Newell <i>et al</i> 2004 is 2004b in our original report.</p> <p>The comment above on Area 430 measurements applies directly to Area 106 too.</p> <p>The comment on % change in flux was addressed above.</p> <p>Sandbanks naturally extract wave energy and are moulded by currents. However, even if there are minute changes in current speeds and fluxes the banks will still be banks. They have a high level of adaptability.</p>	A new flux percentage figure has been included and all relevant GIS data submitted to Cefas.

## Chapter 7 - Regional Hydrographic Environment

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
7.2.2	It is recommended that the longer data set from the Southwold approaches should be utilised rather than from the Sizewell wave buoy (this information is publicly available, published by the Environment Agency, but may not be shown on WAVENET).	Include the longer dataset for more robust evidence.		Can be actioned.	Difficulty obtaining Southwold Approached data.
Figure 7.12	Why in Figure 7.12 is tidal diamond data shown (which is generally of uncertain quality)? When in Appendix A (HR report TN DDR4472-05) in section 2.2.1 reference is made to the good calibration with both tidal elevations and long-term high quality current meter records (as in SNS2).	Need to confirm that current meter data was used in model calibration and validation for this for the MAREA Region.		Tidal diamond data are only used to illustrate tidal residual movements and how they differ across the Anglian region. Tidal diamonds/Admiralty data were <b>not</b> used to calibrate models. This will be made clear in the text/caption.	Actioned.

Figure 7.14	It would be useful to have included the aggregate areas on these figures.	To be addressed.		Can be actioned although EMU feels the figure would be excessively busy and should not be modified since it was produced by someone else. It should be noted that there are many figures within document which show the location of aggregate areas.	Actioned.
7.4.3	It is recommended that additional, detailed and up-to-date data on regional suspended sediment concentrations should be utilised. i.e. reference to the Dolphin et al. (2011) study and associated GIS dataset (available through <a href="http://www.marineaisf.org.uk">http://www.marineaisf.org.uk</a> ). This will help to set the context of natural variation within the region.	The REA should make best use of available data and it is recommended that this dataset is incorporated.		Noted, 2011 report can be reviewed and data updated to reflect new studies. However, the report was not available when draft REA report was completed.	Actioned and referenced in text.
7.5	The longer term temperature dataset (Joyce, 2004) should be used and referred to.	Include the longer dataset and reference for more robust evidence.		This can be actioned - however more recent temperature data over two years was reported on which EMU feels is more appropriate and relevant to the Anglian region. It should be noted that temperature will not be impacted by aggregate extraction, and as such, is not a sensitive receptor.	Actioned and referenced in text.
7.6	Similar for salinity please refer to Rotterdam/Felixstowe line (Joyce, 2004).	Include the longer dataset and reference for more robust evidence.		As above.	Actioned and referenced in text.

## Chapter 8 – Regional Coastal and Geological Characterisation

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
	Nothing substantive to add from the advice provided by other RAG members. Natural England's main information need from this chapter is an understanding of how the various data has been amalgamated to arrive at the mapping and subsequent determinations. As provided by RAG members this is less than clear in certain sections. A key point for Natural England is confidence in statements associated with sediment and bedform mobility. Many of the coastal and Marine Protected Areas in close proximity to the licence areas are dependent upon maintenance of natural sediment systems. The report should present clearer detail on the coastal and seabed natural geomorphological processes. This will enable an understanding of the „natural state“ of the region thus allowing better assessment of effects associated with the historic, current and proposed marine aggregate activity.			Clearer detail on the coastal and seabed natural geomorphological processes will be incorporated if this has been addressed within the REC – however there is some uncertainty on what is being required here. It is very important to note that it is only recently that these features have been mapped from a regional perspective – regional scale natural geomorphological processes are mostly unknown and are beyond the scope of the REA. A careful assessment of potential sediment transport directions (especially around the inshore sandbanks), based on available high-resolution geophysical data, is detailed in Chapter 8.	
8.4	In the Cart Gap (Eccles) to Great Yarmouth section it states that 'this may be evidence of an offshore loss of sediment from the beaches just north of Winterton Ness'. This is a key area of coastal sensitivity and concern and it is recommended that this issue is explored further and a fuller discussion on the evidence in relation to the Winterton offshore transport. What is the magnitude, frequency and direction of sediment transport and what is the significance of this?	This is an important issue in relation to coastal sensitivity and it is recommended that this is explored and discussed further.		EMU considers this to be a site specific, not a regional, issue. Reference can be made to the REC if it is addressed within the characterisation. Furthermore, Winterton Ness is located close to shore and very far north from the main cluster of aggregate sites. As a result, it will not be impacted by dredging operations – reference can be made to wave, tide, plume and sediment transport model outputs which clearly show this to be the case.	Comment added within section to describe that offshore sediment transport is a natural process that commonly occurs during storm weather conditions.
8.4	"The shingle forming the wide beaches in front of the Pakefield cliffs" is incorrect. There are considerable shingle areas but on the lower part of the beach it is almost exclusively sandy mixtures.	This is an important issue in relation to coastal sensitivity and it is recommended that this is explored and discussed further.		Noted, text to be revised.	Text revised and updated.
Figure 8.15 and Fig 8.16	Whilst there is a significant transport of sand in a southerly direction eventually ending in the Thames, an unknown proportion (would the MAREA like to estimate?) moves in a zigzag fashion offshore in the outer banks (lemon etc).	This is an important issue in relation to coastal sensitivity and it is recommended that this is explored and discussed further.		Reference can be made to the REC which presumably discussed this issue. EMU and their specialists prefer not to estimate sediment transport rates moving in a zig-zag pattern in the outer offshore banks – it is beyond the scope of the study to address this. However, if estimates have been published, EMU can	Sediment transport in Outer Gt Yarmouth banks discussed in Box 1 of the chapter.

				add these estimates to the REA.	
8.4	Whilst discussing beach sediment long shore transport, beach sediment cross-shore transport and near shore sediment transport, no reference is made to the outputs of the BLINKS project (Dolphin & Vincent et al., in progress), which provides very relevant information in relation to the exchange between banks and processes. This is a key area for public concerns.	This is an important issue in relation to coastal sensitivity and it is recommended that this is explored and discussed further		Is this report or its findings available? Note this is <b>in progress</b> . If captured within the REC or is currently published/publicly available, main results/conclusions can be incorporated into the REA.	Literature not published/ available at time of publication, suggest incorporate findings at EIA level when available and/or where relevant.
8.5	'5 ka' needs to be changes to '5,000 years ago'.	Need to change the language as not all readers will know what 5 Ka means.		Noted and will be amended.	Amended in text.
Fig 8.30	This is a particularly good picture of sediment transport directions and adds significantly to SNS2.			Noted.	Noted
8.6	It needs to be made clear that the ALSF funded the REC not AODA. More accurate referencing should be used.	AODA REC needs to be changed to ALSF REC throughout the document.		Noted and will be amended.	Amended in text and figure captions.
Section 8.8, Seabed characterisation, Figure 8.21	More detail on how the different datasets were integrated to create the regional surface sediment map would be useful. For example, clarification is needed as to how the grab sample results were integrated with the REC and REA data.  The current resolution of the map is too low to distinguish between data collected by Emu and those collected by BGS.	The REA would benefit if this issue is addressed to give the reader confidence in the validity of the map outputs.		EMU feels the methodology described is more than sufficient to describe and map seabed sediment distribution – reference can be made to Section 8.8.  To be reviewed – final figures will be amended and improved.	Clarification on methodology included within Section 8.8
Section 8.8, Seabed characterisation, Sand and slightly gravelly sand, 1 <sup>st</sup> para	The report states that the sand and gravelly sand areas within the MAREA study area are occupied by large to very large dunes. Information on the height of the dunes should be provided within the report.	The REA would benefit if this issues is addressed to provide a robust characterisation of the region.	To be described at site specific level as required.	Heights of some dunes will be added in text.	Actioned across chapter.
Section 8.8, Statistical Analysis of Sediment Grab samples	Some discussion would be useful as to how the grab sample data compare to the BGS data and sidescan sonar interpretations and how the different datasets (BGS, REC sidescan sonar interpretations & grab samples) were combined to derive estimates for the area covered by different sediment types. For example, we note that muddy sands & gravels made up ~16% of the grab samples while at the regional scale this sediment type is reported to comprise ~7% of the study area. Further discussion of these results and their importance at regional and local scale would add value to the report.  Section 8.8 (1 <sup>st</sup> para) states that over 400 grab samples were imported into GIS to characterise seabed sediments but it appears that only 186 sediment samples were used in the statistical analysis (Table 8.1). Clarification is needed as to which samples were used in the analysis. Also, some discussion would be useful as to why not all grab data were used.	Must be addressed at REA level to provide robust characterisation of region and ensure validity of baseline against which significance determinations are made.  Clarification is needed to ensure validity of characterisation.	At EIA level, more detailed delineation of seabed sediment types is expected.	REC and REA grab data was used in statistical analysis (Table 8.1 – refer to caption) in order to represent the regional seabed sediment distribution – if aggregate sample data had been added to Table 8.1, the results would have been skewed towards numerous samples comprising coarse (sandy gravel, gravelly sand and gravel) sediments. The spatial distribution of seabed sediments is not only related to sediment type – sidescan sonar was used to help delineate different seabed sediment types. Text will be amended to clarify this.  BGS data were used as a baseline and seabed sediment distribution was subsequently refined with the additional REC/REA and aggregate sample data - this will be noted in the text.	Text updated to reflect this.
Section 8.9 Seabed sediment transport & description of cross-sectional profiles	We are pleased to see that the report includes information on bedforms and sediment movements. However, we feel that the information is presented rather disjointed throughout the section and therefore suggest including a general section describing the types of bedforms/geomorphological features present in the study area and their location. In addition, we consider that the assessment on the natural mobility of sediments and bedforms in the region should be extended as we feel that the current level of information and the format in which it is presented makes it difficult to set aggregate extraction activities within the bounds and context of natural sediment and bedform mobility.	The REA would benefit from further discussion and evidence on the natural mobility of seabed sediments and bedforms. This would add confidence in the validity of the significance determinations that are presented in later sections.	To be described at site specific level as required.	EMU consider the approach to be fit for purpose with detailed consideration of the regional seabed sediment transport and bedforms, covering more than twelve A3 pages.  If additional information is required and available, reference can be made to the REC.	Detail included where relevant on the heights and locations of bedforms.

Section 8.9, Illustrative Cross-sections	It would be easier for the reader if each profile is shown on one page instead of spanning over two pages.			This presents an issue with scale and presentation – AODA to advise.	Figures kept as original A3 spanning 2 pages.
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## Chapter 9 – Benthic Ecology & Appendix B

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
	<p>As previously stated. The characterisation component of the report is good quality and will aid to the understanding of the environmental context of this part of the Southern North Sea region. It will assist with the assessment of environmental effects, alone and in-combination, monitoring programmes at a regional scale and also provides an excellent base to link to marine planning and requirements under the Marine Strategy Framework Directive.</p> <p>As per comments from JNCC and Cefas, Natural England is similarly concerned with parts of the data analyses and subsequent determinations of impact significance. As suggested by the RAG commentary, treatment groups should be reviewed and refined to allow a clearer determination of impacts versus the natural variation known to occur within the region.</p> <p>From nature conservation perspective the report needs to draw more strongly on the characterisation information presented in the East Coast Regional Characterisation report. Data pertaining to the extent of certain nature conservation significant habitats is not presented at the same resolution as within the REC report. Variations between habitat mapping in the REA and REC reports needs to be presented to allow a more complete understanding of these discrepancies.</p> <p>Natural England does acknowledge that the REC had resources available to target specific nature conservation important habitats that may not have been present to the development of the REA. Therefore it is entirely appropriate (expected) that specific reference to these features should be amalgamated and presented within the REA e.g. the report would benefit greatly from more detailed inclusion of the information presented in the REC for <i>Sabellaria spinulosa</i> reef habitat.</p> <p>The Anglian Offshore MAREA provides a good regional approach to characterising benthic habitats and species using own survey data and other relevant sources, including data from site specific monitoring and the REC. The report will significantly add to the understanding of the distribution of habitats and species in the region, and the data will be invaluable in putting site specific and local impacts into a regional context and in assessing potential cumulative and in-combination effects.</p> <p>However, we are concerned about the approach taken to analyse whether there is an impact on the seabed habitats and macrofaunal assemblages at the regional and sub-regional level. In particular, we believe that the way sample sites were assigned to treatment groups does not allow appropriate analysis of potential impacts of dredging activity. We acknowledge the difficulties associated with comparing data gathered using varying sampling and analysis methods however the analyses appear rather un-structured. We strongly recommend that the analysis is repeated taking account of the comments provided in the table below. This is particularly important as we need to be confident in the spatial and temporal extent of effects before making determinations on impact significance.</p> <p>We appreciate the use of REC data, however we believe that more information from relevant REC chapters should be discussed in this report, in particular information relating to bedforms, seabed mobility, and the distribution and extent of habitats and species. This would, in our opinion, provide the reader with a greater understanding of the physical and biological resources of the region. In addition, there appear discrepancies in the biotope determinations between the REC report and this study (see specific comments below).</p> <p>Finally, we feel that the main report would benefit from a more detailed summary of the data analyses that were undertaken to investigate the effects of dredging activities and define habitats and biotopes. At the moment, this information is only contained within the appendices and not described or referenced in the main report. Inclusion of this information in the main sections would improve the report's overall accessibility.</p> <p>The report provides a good background of the available information for this MAREA area. It includes the historic and current work undertaken in this field by the Anglia Offshore Dredging Association (AODA) initiative.</p> <p>Historic and contemporary datasets are generally analysed via different methods and to</p>			<p>Noted.</p> <p>General comment – EMU request further discussion with relevant RAG members to resolve this issue. Please refer to the Technical Note submitted in November 2011 for more detailed response.</p> <p>General comment as noted previously – the REC data was not available at time of publication of draft, this can be addressed.</p> <p>As above.</p> <p>Noted.</p> <p>Noted, please refer to Technical Note and request for further discussion.</p> <p>Noted please refer to general comment above.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted.</p>	<p>Treatment groups redefined and used in the re-analysis.</p> <p>Text from the REC report has been included to support information.</p> <p>Text from the REC report has been included to support information.</p> <p>The biotope discrepancies were dealt with following agreement that in re-analysis approach where EMU considered REC biotopes (as designated) and addressed them through available EUNIS code biotope descriptions. A subset of these data were presented in the addendum to show how EMU interpretation agreed / partially agreed / disagreed with the REC output.</p> <p>Treatment groups redefined in Box 1 of Chapter 9.</p>

	<p>different levels of classification, therefore agreement is met with the adopted approach of standardising the existing datasets in this REA, which is to a level of presence/absence.</p> <p>Chapter 9 focusing on Benthic Ecology in the MAREA region includes details of the data gathered for long-term assessments (1973-2007) since dredging occurred in this area. This is useful to understand the processes and variability of the communities present and their environment. This evidence is sufficient to document change/resilience of these communities present in the MAREA region. However the biological information presented is based on biotope level and descriptions, as opposed to a robust scientific analysis. This biotope information could be useful for industry outreach/dissemination purposes.</p> <p>However, the report currently suffers from a major omission, namely the lack of hypothesis testing in relation to the benthic data. As such, there is no objective assessment, using the full multivariate dataset, of whether there are differences between these areas. This is key to understanding the effect of aggregate dredging at both the local and the regional level.</p> <p>The data gathering exercise has identified gaps in this field and a new complimentary survey will need to be undertaken to inform these identified gaps. An analysis of the temporal variability is required to demonstrate how benthic systems have changed over time as a result of dredging practices against the background natural variation. The analysis of the data to characterise the i) PIZ, SIZ and the ADZ, ii) the use of reference areas, iii) use of existing surveys and iv) the use of strata need to be updated to reflect the temporal aspects and significance of assessments through statistical analysis (as per Cefas' responses in the South Coast MAREA). This information would assist the survey planning stage and will ensure a cost-effective suite of benthic sampling.</p> <p>The information on the presence of <i>Sabellaria spinulosa</i> in the MAREA region and coding as a single species is useful to inform this assessment. Although, it should acknowledge that single polychaete tubes could also potentially aggregate in the future with favourable conditions to form a reef structure. This process has been observed at Hastings for example.</p> <p>The information on species of conservation importance is detailed and shows the wide range of species inhabiting the MAREA region. At the EIA site-specific stage there will be the need to look closely at the recruitment stages and timing of these species to avoid disturbance in some areas.</p> <p>Regarding the acoustic information provided, it would be useful to understand the current/localised foot print of the aggregate activity in relation to other human activities to gain an overview of the human pressures in the MAREA region.</p>			<p>See Technical Note.</p> <p>See Technical Note.</p> <p>Noted, see specific comments on <i>Sabellaria</i> below.</p>	<p>Approach to in combination agreed and not considered within report, to be identified at EIA level.</p>
Section 9.4 – Habitats and Biotopes	<p>It would be easier if the biotope names and or description were included at least the first time they are mentioned in the text, not just the codes. It makes reading it very confusing other wise and cumbersome looking up all the different biotopes. Increased transparency of the report</p>	<p>To be included in the report. This was an express requirement for the AO and Humber REAs stated by Natural England during review of the SC REA. It is disappointing to have to keep repeating this.</p>	<p>Can be mentioned here</p>	<p>This can be addressed in baseline but both biotope names and descriptions are included within Table 9.1, this will be reviewed to ensure all biotope codes referenced are captured and reference made in the text to the table.</p>	<p>The table has been updated to include all biotope codes according to the text.</p>
Figure 3.1 and Figure 3.2	<p>These figures are informative to outline the impact assessment and the MAREA process, respectively; however the text in places is difficult to read.</p>	<p>Ensure that all text is visible against the background to enable these figures to be used correctly.</p>		<p>AODA to advise – if relevant EMU to discuss with designers and identify options for improvement.</p>	<p>Figure 3.2 text amended to black</p>
Table 9.1	<p>It is good to see correlation between the MNCR habitat classification and the EUNIS system.</p> <p>There is a comprehensive level of coverage for some of the areas within the MAREA region with respect to benthic sampling. At the temporal scale, there are different sampling stations over some areas, however there needs to be a comparison of 'like with like'. This information is valid to assess the change in distribution of the community types though.</p>	<p>To be addressed.</p>		<p>As there are differing sample locations within sites and between years, creating a like with like dataset is problematic. In addition, whilst there appears to be some clustering of locations based on folk and wentworth for sediment classification, temporal clustering does not occur throughout the dataset. The region is relatively amorphous with a constantly changing substrate of sands to gravels, thus temporal change in datasets is masked by natural fluctuation as acknowledged in REC.</p>	<p>Comment included in the text.</p>

Section 9.1.2, Regional sedimentary environment	There is no link to the data presented in Chapter 8. Instead, new information (e.g. from Cooper et al, 2007) is presented and discussed in relation to the distribution of benthic communities within the region. This is very confusing. It would make the report much easier to understand if all sedimentary information that is used for the characterisation of benthic habitats and their associated communities would be presented in one section.	The REA would benefit if this issue is addressed to increase the report's overall accessibility.		Noted and acknowledged, an additional figure similar to that presented in the EMU Thames REC document will be presented to address this issue.	Actioned. Figure 9.3 and brief supporting text included.
Figure 9.2	It is unclear what data has been used to produce this figure.  Figure caption is insufficient. It should list all data sources used to develop the habitat map.	Needs to be clarified within the report  Please amend caption		This can be reviewed but the number of sources may make the legend unworkable, EMU to advise on formatting.	Caption has been amended.
Section 9.4.1, Historic review, 2 <sup>nd</sup> paragraph	The report states that the broad pattern of sediment coarsening in a southerly direction observed by Cooper <i>et al.</i> (2007) could not be confirmed by the data analysed as part of the MAREA. It would have added value to the report to discuss the likely reasons for this.			Data used to draw conclusions does not support the observations by Cooper, any comment as to why would be supposition and this was avoided.  This hypothesis was checked within data and conclusions stand. It was felt inappropriate to comment further.	No action required.
Section 9.4.2	Closer correlation between the biotope identification and supporting habitat types needs to be detailed. Currently there are inconsistencies between the determinations present in chapter 9 and the underlying data described in chapter 8.	Needs to be reviewed and clarified within the report.		As above - Noted and acknowledged, EMU can provide an additional figure similar to that presented in the Thames REC document, using the sediment interpretations from Chapter 8 as a base map for biotopes and then based on this figure include some text to provide an assessment of the relationship between habitat and biotopes.	Actioned. Figure 9.3 and brief supporting text included.
Section 9.4.2; Table 1	Biotope presence is useful to indicate the main sediment type and assemblages found. However the use of biotope characterisation is limited. There needs to be a more robust analysis of species assemblages conducted to ascertain the changes and variability within the MAREA region. The analysis of the data to characterise the i) PIZ, SIZ and the ADZ, ii) the use of reference areas, iii) use of existing surveys and iv) the use of strata need to be updated to reflect the temporal aspects and significance of assessments through statistical analysis( as per Cefas' responses in the South Coast MAREA).	There is a large species assemblage dataset collected from benthic samples for this study. Statistical analysis is required of this data to demonstrate potential impacts from dredging activities alone and in combination.	Section 9.4.2; Table 1	Addressed in Technical Note – requires further discussion.	Treatment zones have been reidentified and analysis redone.
Section 9.4.2; Figure 9.3 & Technical Report – Section 3.7	We acknowledge that assessment of <i>Sabellaria spinulosa</i> reef is not easy, but it is achievable as mentioned within the report. It is concerning that reef assessment is apparently deficient in determination of extent of the features. One cannot determine reef without this key parameter. Given the uncertainty in the data used, Natural England would have expected a more clear acknowledgement of the REC reef assessments and presentation of these data more transparently within the report.  It is unclear on the confidence assigned to the reef assessments. Presentation of confidence will enable advisers/stakeholders to more effectively use the data presented.  It is stated that 60% of sites comprise slightly gravelly to gravelly sand and a further 26% of sites is classified as sandy gravel. This appears to contradict the data presented in Chapter 8 - for example, in Section 8.8 it is estimated that sandy gravels make up ~12% of the study area (with ~16% of the 186 analysed grab samples actually classified as sandy gravel). Clarification is needed as to which data was used for the different estimates. Also, there is no discussion at the sub-regional level.  Overall, it is very confusing to be presented with various descriptions and references for seabed sediments in different sections. It would be more user-friendly to have one section where relevant information in relation to the distribution of seabed sediments and habitats is presented and discussed.  This section states (with reference to Figure 9.2) that no clear geographical pattern or bathymetry associations were observed for biotopes assigned. However, no objective assessment of whether communities are associated with seabed features is included in	Needs to be reviewed and more clear presentation of the REC reef data.  Clarification of this issue is required at REA level.  The REA would benefit if this issue is addressed to aid understanding and increase the report's	The uncertainty with the approach adopted should be recognised when applying the results to site specific EIAs	REC not available at time of publication of draft.  This work can be undertaken but EMU cannot see the added value, surveys were not designed to identify extent of any reef feature. Given the ephemeral nature of reef structures, it is considered this is more appropriate as site specific level where relevant.  Report can be reviewed to make it clear where reef features have been recorded as part of existing monitoring but it is likely that where recorded as site level this is captured in routine monitoring anyway.  If new reef was recorded in the REC, this can reviewed and acknowledged.  As noted previously, this will be addressed through additional figure.	Relevant text has been added re <i>Sabellaria spinulosa</i> to both technical report and Section 9.4.2 of Chapter 9.

<p>Section 9.4.2, Anglian MAREA study results, 5<sup>th</sup> paragraph</p> <p>Section 9.4.2, Anglian MAREA study results, 7<sup>th</sup> paragraph</p>	<p>the report. In addition, there appears to be no reference to the REC habitat chapters. The REC report provides a very good characterisation of the area, and we would have expected the REA to discuss the MAREA survey data together with the REC data and other compatible historic datasets.</p>	<p>overall accessibility.</p> <p>Clarification is required at REA level as to how conclusions were made. Relevant REC data should be discussed.</p>		<p>REC report not available at time of publication, this can be reviewed and detail added where relevant.</p>	
<p>Technical Report, Table 2.1, Page 7</p>	<p>Clarification is required as to how the benthic datasets were reconciled. The datasets used in the analyses have been sourced from different surveys so they should be tested for their compatibility to ensure that samples are not grouped based on, for example, differences in sampling season and level of taxonomic identification or changes in nomenclature.</p>	<p>Must be addressed at the REA stage to ensure validity of the test results.</p>		<p>Data were reconciled prior to analysis. All data were returned to a common taxonomic level, and where only family level was available some data were rejected as not supporting appropriate analysis. Reconciling to the same nomenclature was undertaken exhaustively, including ensuring that EMU were using the latest taxonomic name by checking on the WoRMs database.</p>	<p>Paragraph has been reworded to address comment.</p>
<p>Section 9.5 &amp; Section 3 of Technical Report – Selection of Treatment Zones for Data Analysis</p> <p>Section 9.5 &amp; Section 3 Technical Report -</p>	<p>Please refer to the detailed comments from Cefas &amp; JNCC. We are very concerned with the treatments between the Primary and Secondary Impact Zones. Proper determination of these zones is critical. PIZ should be determined at least from the footprint detailed in figure 4.2 dredged areas 1999-2009. Any further pre-dating historical footprint data should also have been analysed to expand this 1999-2009 footprint. SIZ should then be determined using the modelled sediment plume data linked to hydrological and sediment transport knowledge. This would then enable a sensible statement about reference condition. The latter being highly important for the region given the consolidation/concentration of historic/current licenses in a block. Particularly, re-evaluation of the data analyses and impact zone treatments will benefit any subsequent proposal by AODA re: regional-scale monitoring to inform individual licence operational monitoring programmes.</p> <p><b>We think the way sample sites were assigned to treatment groups is not appropriate to investigate potential impacts of extraction activities.</b></p> <p><b>Selection of Primary and Secondary Impact Zone</b></p> <p>According to Figure 3.2, all sample sites located within licence areas were assigned to the PIZ treatment group. Not all areas within Licence Areas or even Active Dredge Zones have been subject to dredging in the past, and inclusion of these areas in the PIZ group has the potential to mask possible impacts. PIZ sites for the purpose of this assessment should be sites that have been subject to dredging activity, i.e. areas that have been directly affected by the draghead. SIZ sites should be sites that are affected by settlement and dispersion of sediment as a result of dredging and should be defined by available sediment transport data or, in the absence of these data or sediment models, by using one tidal excursion from the active dredge zone. EMS data could be used to identify PIZ sites.</p> <p><b>Selection of Reference Areas</b></p> <p>All areas outside primary and secondary impact zones were treated as reference areas irrespective of their environmental characteristics. Reference areas should represent the faunal communities present in the impact zones so prior to any analysis sites should be</p>	<p>Fundamental. Has to be reviewed and more clear presentation re-analysed data.</p> <p>This is one of our key concerns, which must be addressed at the REA stage. We consider that it is very important that a well-thought-out and structured analysis of</p>		<p>Please see Technical Note – suggested approach outlined for further discussion.</p> <p>NB: Cefas were requested to comment on the survey design but no comments were noted.</p> <p>NB: Comments are contradictory; we feel this warrants further discussion as a priority.</p>	<p>Analysis has been redone using the treatment groups specified in the Technical Note.</p>

<p>Selection of Treatment Zones for Data Analysis</p>	<p>assessed for their suitability to act as reference.</p> <p><b>Use of repeat survey data</b></p> <p>Clarification is required as to how repeat survey data was used when characterising seabed habitats and communities, and analysing regional differences between treatment groups. For those surveys repeated over several years inclusion of pre-dredge data or data collected during the first years of dredging may mask possible dredging-induced changes.</p> <p><b>Consideration of strata</b></p> <p>It would add value to the analysis if comparison of different treatments within selected broadscale strata could be carried out. As outlined by Cefas in their response to the South Coast MAREA (letter to the MMO, dated 30<sup>th</sup> May 2011), the rationale for this request is that the lumping of samples from different habitats into each of the impact treatments has the potential to mask possible impacts at the level of individual habitat/biotope. The additional analyses requested will allow this concern to be addressed. In addition, it might identify differences in the sensitivity of the different macrofaunal communities, thus helping to identify where impacts are likely to be of more or less concern. The results from such an analysis could help in the forthcoming licence renewals process, particularly in relation to any EIAs for the forthcoming 18 months renewal applications.</p>	<p>historical effects is included within the report. This is to understand whether any significant effects have occurred so far due to past dredging activities, and also to understand the significance of potential future effects.</p> <p>Tests for differences in sediment characteristics, diversity indices, and macrofaunal community structure and composition between treatment zones should be revisited taking into account the comments made in this table. We acknowledge that there might be constraints in analysing the data (such as temporal and methodological variation in data collection) and the power of the analysis may be low but any constraints should be clearly explained and presented in the report or technical appendix.</p>			
<p>Technical Report, Section 3.2, Temporal trends - Seabed sediments, 2<sup>nd</sup> paragraph</p>	<p>Between year analyses for Areas 401/2, 254 and 436/201 were conducted but it is unclear which test has been applied. Multivariate two-way tests are recommended to examine the interaction between years and impact zones.</p> <p>There is no mention of data for Licence Area 430. Several monitoring surveys have been carried out in this area since commencement of dredging in 1998. The data should be included. Available reports include: (1) MES (2007). <i>Assessment of the Impacts of Aggregate Dredging on Marine Benthos. Licence Area 430 Southwold</i>. Prepared for United Marine Dredging Limited and CEMEX UK Marine Limited. September 2007; (2) MES (2007). <i>Licence Area 430 Southwold Benthic Baseline Report</i>. Prepared for United Marine Dredging Limited and CEMEX UK Marine Limited. March 2007; (3) MES (2007). <i>Licence Area 430 Southwold Benthic Monitoring Report</i>. Prepared for United Marine Dredging Limited and CEMEX UK Marine Limited. March 2007; and (4) MES (2008). <i>Licence Area 430 (Southwold): Supplementary Report on the Impacts of Aggregate Dredging on the Marine Benthos</i>. Prepared for United Marine Dredging Limited &amp; CEMEX UK Marine Limited.</p>	<p>Clarification on this issue is requested.</p> <p>Relevant data/information from Area 430 should be included in the REA to inform the regional and sub-regional assessment.</p>		<p>The data were run through 1 way ANOSIM for the factor year for each of these sites.</p> <p>Further discussion is required in response to the Technical Note.</p> <p>NB: The problem reverts back to natural temporal variability and to some extent that sites are not totally spatially independent (they cant be) thus what happens in one, may affect another, we may be able to run a robust one way ANOSIM using years as replicates and the impact zone as the site descriptor, however this warrants further discussion.</p> <p>With respect to Area 430, no analysis was undertaken for temporal change as no sampling sites were found to match,</p>	<p>Data from Area 202 were received and included in the analysis. Results have been included in the technical addendum.</p>

	November 2008.			thus temporal analysis inappropriate, in 2007 when 10 samples were taken, but in 2006, 113 were taken.  We have not used data pre 2002 as this is when sampling was standardised (see DTLR, 2002). This was documented in the AODA survey specifications which were circulated for comment prior to the survey being undertaken.	
Technical Report, Section 3.2, Palaeochannels and Geology, Page 37	The report concludes that "any relationships with fauna are unlikely to be explained by the underlying geology as it does not outcrop anywhere in the Anglian MAREA region ..." Clarification is required if the REC data have been considered in this assessment.	Clarification is needed.		REC report not available at time of publication, can be reviewed.  This was reviewed thoroughly using available data.	Text from REC incorporated into relevant sections.
Technical Report, Section 3.3, Macrofaunal Grab Data, Page 45, 3 <sup>rd</sup> paragraph onwards	There is no textual summary of total species, individuals and biomass distribution.	REA would benefit if this issue is addressed for completeness.		Noted will address.	Summary table added to the Technical Report.
Technical Report, Section 3.4, Page 50	It would be useful to include the sample dendrogram within the technical report to aid understanding.  None of the appendices referred to in the report are attached.			Sample dendograms were avoided due to complexity, EMU can provide, agree with comment in principle but it was felt more appropriate to use MDS.  EMU can provide as a reference but we would recommend against inclusion within Technical report or main report due to complexity.	Dendrogram produced during reanalysis. Included in Addendum to Technical Report.
Technical Report, Section 3.4, Figures 3.15 & 3.16	It would be helpful if in both figures infaunal groups were depicted by the same symbol.			Noted will review.	Figure 3.16 has been updated accordingly.
Technical Report, Temporal trends, Page 58, 1 <sup>st</sup> paragraph	It is stated that repeat survey data for Area 430 was not analysed because no similar sample sites were surveyed. MES compared sediment composition and benthic infauna and epifauna for a subset of common stations sampled in 2003 and 2006. This data and other relevant information from the Area 430 monitoring reports should be included and discussed to complement the assessment.  For example, MES (2007). <i>Licence Area 430 Southwold Benthic Monitoring Report</i> . Prepared for United Marine Dredging Limited and CEMEX UK Marine Limited.	Must be addressed at REA stage, in particular to inform the sub-regional assessment.		Please see comments above for Area 430 analysis (data only available for 2006 and 2007) We did not have immediate access to the MES dataset for 2003, we have included data from 2006 and 2007 where available, if this data is available it can be incorporated if dataset suitable. This can be investigated further.	Reanalysis has been undertaken to include the missing dataset and results are presented in Addendum to the Technical Report.
Technical Report, Temporal trends, Page 58 onwards, Analysis of repeat year datasets for temporal differences	Firstly, clarification is needed as to how temporal differences were investigated. There appears to be no distinction between impact zones and no consideration of reference areas. Appropriate two-way tests should be applied to investigate interactions between impact zones and years.  Secondly, the potential reasons for the observed differences are not well discussed. For example, the report does not mention that changes in macrofaunal assemblages result primarily from the direct removal and damage of sediment and associated communities by the passage of the draghead.	Must be addressed at REA stage to ensure determinations of significance are appropriate.	Must be addressed at EIA stage; community data should be presented within the scale of the EIA with adequate analysis; for licence renewals assessments of historic impacts should be included.	EMU consider this approach is more relevant to EIA site specific studies. The data can be rationalised but the dataset would be significantly reduced given the need to use sites where at least 2-3 repeat surveys have been undertaken.  We have identified how both spatial (PIZ, SIZ and reference sites) and temporal (year comparisons) analyses were undertaken. ANOSIM was undertaken for temporal data, very low differences were found for 2006 and other years based on the amalgamated dataset, but significance was low and overall temporal analysis did not highlight notable change apart from that discussed. EMU await the responses to the technical note to establish what further action may be taken.  Temporal analysis indicated that community composition was slightly different in earlier years. Investigation comprised an MDS into temporal faunal and PSA data and a related test to ascertain a correlation between the two – no relationship was found (see technical page 58) – further discussions advised.	Spatial and temporal analysis was carried out on the dataset, including the Area 430 data from 2002.

<p>Technical Report – Section 3.6</p> <p>Technical Report, Section 3.6, Biotopes</p>	<p>No direct comparison between the REA assessment of communities/biotopes and those presented in the REC report. This is problematical given the apparent differences in mapping of biotopes between the two reports. It is unclear how much this is due to difference hierarchical coding and how much is due to analytical differences. The lack of commentary to explain any differences makes it extremely difficult for readers/stakeholders/advisers to know which maps to use (between REA &amp; REC).</p> <p><b>There is no discussion of the REC biotope characterisation work, which is disappointing.</b> The data collected as part of MAREA could have been compared with the EUNIS habitat maps produced by the REC work. It would also have been a good opportunity to test the accuracy of the modelled REC bottom-up habitat map with the MAREA data.</p> <p><b>Furthermore, there appear to be differences in the biotopes assigned by this study and the REC results.</b> The REC identified 14 assemblage classes; biotopes/habitats assigned to the classes include mussel bed on sediment, circalittoral sandy mud, deep circalittoral sand, and <i>Ophelia</i> in circalittoral fine sand (latter assemblage was the most represented and widely distributed). Some of these have not been identified in this study. Also, the MAREA data has not been coded out as far as the REC data. More explanation and justification as to why it has not been attempted is needed.</p> <p><b>Overall, the differences in the assigned biotopes and level to which biotopes were classified raise concern on the validity of the REA analysis. Clarification and further discussion is required.</b></p>	<p>Clarification is needed.</p>		<p>REC report not available, this can be undertaken.</p> <p>A very thorough analysis was undertaken to assign the correct and appropriate level of biotopes. The natural variability of the area plus the somewhat limited classifications available for marine offshore biotopes meant that the person who helped develop Bioscribe (Peter Barfield) did not feel it appropriate to go further than the biotope levels given.</p> <p>We feel this warrants further discussion.</p>	<p>A comparison of the biotopes assigned by the REC and EMU have been undertaken on a selection of sites. The results are presented in the Addendum to the Technical Report.</p>
<p>Technical Report, Video data</p>	<p>It is understood that drop down video was acquired at each faunal grab location. However, it appears that these data have not been analysed, neither qualitatively or quantitatively. It would add value to the report if this is done.</p>	<p>Clarification is requested as to why seabed imagery was not analysed.</p>		<p>There were no temporal video data sets with which to compare (see pages 77-78 of technical report, however if warranted a visual biotope assessment could be made, though it is suspected that there will be little value in this as refining to biotope classification was often not possible thus complex or habitat level was ascribed.</p>	<p>Text has been added to the Technical Report.</p>
<p>Technical Report – Section 4.1</p> <p>Technical Report, Section 4.1, Species and habitats of conservation importance</p>	<p>Regarding the species and habitats of conservation significance. Evidence to support conclusions and statements within this section need to be clearly presented. As per the JNCC comment, cursory statements such as “subtidal sand and gravels are extremely well represented outside the licensed areas...and therefore not considered to be under any threat from localised dredging activities” needs to be evidence-based. Particularly as this makes no consideration of in-combination effects with other seabed user related activities.</p> <p>Page 106, 6<sup>th</sup> paragraph, concludes that “subtidal sands and gravels are extremely well represented outside the licensed areas and ... therefore they are not considered to be under any threat from localised dredging activities”. Any evidence used to draw this conclusion should be presented and clearly referenced in this section.</p>	<p>Must be rectified at REA level.</p> <p>Must be addressed at REA level.</p>		<p>The REA was never intended to provide in combination assessment with other activities, this will be undertaken at an EIA level.</p>	<p>Subtidal sands and gravels evidence for ubiquitous nature is provided throughout MAREA and Technical Report. In both cases, the statements are referenced and justified in both a UK context and site survey context</p>
<p>Section 20.1, Basis for cumulative impact assessment</p>	<p>The impact assessment is based on the biotopes identified in Chapter 9. This is currently problematical, as we consider that there are still outstanding issues regarding benthic data analyses and biotope determinations. We are concerned that until the issues have been resolved then the significance of impacts cannot be assessed effectively.</p>	<p>We strongly encourage industry to resolve the outstanding points in relation to the benthic data analyses and habitat/biotope determinations raised in this letter. This is to ensure that any conclusions regarding the significance of past and potential future effects of dredging are valid.</p>		<p>See Technical Note. EMU consider that the assessments undertaken for the REA are more robust than for the REC.</p> <p>This warrants further discussion.</p>	<p>No changes to impact assessment based on re-assessment of biotopes</p>

Section 20.2, Cumulative impact assessment, 3rd column, 2nd paragraph, <i>S. spinulosa</i> reef	It appears that the REC data have not been considered when describing and assessing the distribution of <i>S. spinulosa</i> reef features.	Should be clarified. Relevant REC data must be included in the REA.	Additional work at EIA level will be required to validate the information provided within the REA.	The REC report was not available, this can be addressed.	All data sources have been identified in the paragraph including the REC and have concluded that this should be addressed at the appropriate EIA level.
Section 20.2.1, Seabed removal, Significance statement	<p>Firstly, the report states that around 7% of the overarching habitat and associated biotopes may be affected by seabed removal. We request clarification as to how this has been calculated; have potential future dredging scenarios been considered including dredging in new areas? This is currently not clear from the wording in the text. This is a common problem throughout this section where impact significance statements are presented without an explanation as to how future dredging scenarios have been considered. In relation to benthic habitats and communities, an assessment and discussion should be included as to how historical impacts might compare to potential future impacts considering likely future dredging scenarios.</p> <p>We also consider that the impact chapters would benefit from a more detailed discussion in the text as to how the sensitivity and magnitude scores were assigned. Magnitude of effects, receptor value and sensitivity (tolerance, adaptability and recoverability) and areas of interaction should be clearly referenced so subjective decisions or professional judgements based on experience of the authors are transparent and clear. For example with regards to the impacts from seabed removal, justification should be included as to how the author concluded high tolerance, high adaptability and high recoverability of sublittoral coarse sediment and sand habitats and their associated communities. While some species of benthic invertebrates are able to escape damage by the draghead, mortality of some individuals is likely, which in turn may lead to a reduction in species diversity, number of individuals or biomass at site-specific level. The tolerance and adaptability scores do not reflect this. Also, recoverability will vary depending on the nature of seabed sediments and their associated community, and may exceed the one year currently assigned. We feel that each of the biotopes/biotope complexes per habitat type should be presented and assessed separately. This is a general problem in Chapter 20. Currently, assessments are made per habitat type but different biotopes per habitat type can/will have different sensitivities and possibly exposures. To cluster them results in a loss of relevant information useful to interrogate any impact assessments made within the report.</p> <p>As described above, there are still outstanding issues regarding benthic data analysis. Impact assessments should be revisited when additional test results are available.</p> <p>With regards to <i>Sabellaria</i>, it would be useful to distinguish between reef and non-reef features. Individually <i>S. spinulosa</i> is not as vulnerable to anthropogenic disturbance as reef. As a consequence the sensitivity scores assigned to the species will be insufficient for addressing reef. For example, <i>S. spinulosa</i> individuals will recover much quicker than a reef system of consolidated individuals. We feel this could be acknowledged in the report.</p> <p>There appears to be no sub-regional assessment.</p>	<p>Must be addressed at REA level.</p> <p>Must be addressed at REA level. Determinations of feature sensitivity, magnitude of effects and impact significance should follow a transparent and robust methodology and should clearly be presented within the REA in order to give the reader confidence in the validity of the determinations. Determinations based on scientific evidence should be fully referenced. We think this is currently not the case for some of the assessments.</p> <p>Must be addressed at REA level.</p> <p>Should be addressed at REA level. Applies to all impact assessments.</p>	<p>Additional work at EIA level will be required to validate the information provided within the REA.</p> <p><i>S. spinulosa</i> reef will need to be assessed at the site-specific EIA level with relevant scientific references throughout.</p>	<p>This will be reviewed and clarification provided in text where relevant.</p> <p>EMU keen to avoid going down to biotope level as not considered appropriate or valid for mobile habitats. REC recognises this point. EMU consider that this has been undertaken to appropriate and realistic detail reflecting the changing nature of the region and the limited number of offshore biotope descriptions available.</p> <p>This can be undertaken but unlikely to affect outcome. Please see comments in Technical Note.</p> <p>This has been undertaken, the assessment is based on reef, this will be clarified within the text.</p>	<p>Clarification added. Please refer to addendum text, however it should be noted that temporal analysis is somewhat masked by natural change, as indicated in the REC.</p> <p>Sensitivity was identified through Marlin where available and referenced.</p> <p>Communities and diversity are poor in relation to the natural mobile habitat as recognised in the REC, the biotopes were taken to an appropriate level and the potential impacts were considered as appropriate.</p> <p>The addendum has addressed this, found no basis for further analysis even with the new agreed and tried multivariate structure and the REC biotopes are not workable.</p> <p>The regions are largely amorphous, through the addendum analysis has broken this down into sub-regional (based on separate analysis for the southerly and northerly sites), thus this has been undertaken.</p>
Figures 20.1 to 20.4	It is understood that these figures show impact significance for SS.SBR.PoR.SspMX. The caption should include this information.			Noted and will be addressed.	Caption has been updated.
Section 20.2	It shows that the main <i>Sabellaria spinulosa</i> reef areas are within and around Area 430, Area 401/2 and Areas 202/254. Further assessment at these sites using acoustic and video techniques will be needed at the EIA level to determine accurately the potential impact on this receptor.		Further assessment at EIA level.	Noted and acknowledged in REA.	Noted
Section 9.5.1	Need to demonstrate more clearly the ANOSIM results as the results state 'low and unreliable'.	Need to demonstrate whether the ANOSIM results are significant or not.	.	<p>ANOSIM is a multivariate test that requires interpretation as its outputs are not strictly related to the significance value given, it is an amalgamation of knowledge, the significance value, the Global R value and knowledge of the sample number taken which allows overall judgment on the validity of the ANOSIM output.</p> <p>The Global R value from the ANOSIM test was extremely low</p>	Comment accepted, no action required.

				<p>signifying that's the differences between treatments was negligible. Test outputs available if requested.</p> <p>The next version of the REA can provide relevant R values and associated p values together with an interpretation of the results within the context of total sample size. Clarke &amp; Warwick provide a good guide for interpretation of the outputs of ANOSIM which can be referenced within the revised REA.</p>	
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## Chapters 11 & 22 – Marine Mammals and Turtles

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Section 11.1, 4 <sup>th</sup> paragraph	<p>The report states, with reference to SWF (2010) that deeper water species such as killer whales, sperm whales and northern bottlenose whale have been recorded within the wider region. These are deep water species and it is unlikely that they are found in the Anglian Offshore region. The study area of the SWF report extends to the Scottish border, which explains inclusion of the species listed above. The MAREA should focus on species naturally occurring in the Anglian region.</p> <p>We note that only marine mammal species regularly occurring in the study area have been considered in the impact assessment.</p>	To note	To note	Noted. The screening exercise takes forwards only those species where live sightings have been recorded. Given the mobile nature of marine mammals it was decided all species noted from references were included for completeness.	Noted
Section 11.1, 2 <sup>nd</sup> column, last paragraph	<p>"Happisburgh, Hammond and Winterton cSAC" should read "Haisborough, Hammond and Winterton cSAC"</p> <p>The report correctly states that grey seals and harbour porpoises are non-qualifying features of the Haisborough, Hammond and Winterton cSAC. This means that both species have been assessed as occurring in non-significant numbers within the site. This in mind, I recommend removing the sentence as it could confuse the reader as to its meaning/importance. Features that will need to be considered in licence-specific Habitat Regulation Assessments are (1) sandbanks), and (2) reefs. With regards to marine mammals, an assessment will need to be undertaken of whether dredging activities will cause any offences to species listed under Annex IV.</p>	To note	To note		<p>Noted and reference to Annex IV made.</p> <p>The potential for conservation significance adds to the 'value' rating and was included for completeness.</p>
Section 11.2, Box 1, Annex IV	I would recommend extending the Annex IV section to "... The keeping, sale or exchange of such species is an offence, as is deliberate capture, injury, killing and disturbance." to include the disturbance offence.		To note		Actioned
Figure 11.1	We would welcome clarification as to which data sources have been used to derive the sightings map. Standard references we would expect to be included are: SCANS I & II, Atlas of Cetacean Distribution (Reid <i>et al.</i> , 2003) and SeaWatch Foundation data. Information on how the presented data was collected and analysed should also be provided to give the reader some indication on the quality of the data.	The REA would benefit if this issue is addressed.		<p>Agree. As noted on the map legend, sightings data in the MAREA region from SeaWatch Foundation and European Seabirds at Sea (ESAS) since 1975 have been mapped. This will be clarified. Sighting and distribution data from Reid <i>et al.</i> (2003) will also be considered.</p> <p>As SCANS I &amp; II survey outputs are as abundance and density of species within a survey block, and not individual sightings data, these data will be presented separately and discussed.</p>	Reference to Reid <i>et al.</i> added throughout. Maps from SCANS ii added for harbour porpoise and minke whale,
Section 11.4, Pinnipeds	We feel that more quantitative seal distribution data should be included. Seal sightings data can be obtained from the NBN gateway; reports published by the Special Committee on Seals (SCOS) may also include useful information to complement the assessment. In addition, Sharples <i>et al.</i> (2008) <i>Distribution and movements of harbour seals around the coast of Britain: Outer Hebrides, Shetland, Orkney, the Moray Firth, St Andrews Bay, The Wash and the Thames</i> include useful telemetry data on the travel distances of harbour seals.	The REA would benefit if this issue is addressed to provide a more robust characterisation.		Noted, the additional references will be reviewed.	Additional data added to pinniped receptor boxes
Section 22.3.1, Seabed removal, 2 <sup>nd</sup> paragraph	The report states that seals travel up to 45 km from their haul out sites for foraging. Please refer to Sharples <i>et al.</i> (2008) for latest tracking data.	The REA would benefit if this issue is addressed to provide a more robust		Noted, the additional references will be reviewed.	Additional data added to pinniped receptor boxes

		characterisation.			
Section 22.3.3, Noise and vibration	<p>We feel the likelihood of dredging resulting in disturbance to cetaceans needs to be explored a little bit further. The source levels created by dredging activities should be described (including data from Robinson <i>et al.</i>, 2011). The noise assessment should then relate the predicted noise levels arising from dredging activities to the disturbance criteria presented in Southall <i>et al.</i> (2007) for those species regularly present in the study area. Southall <i>et al.</i> conducted a comprehensive review of the impacts of underwater noise on marine mammals, which has now become widely recognised within the scientific community as appropriate precautionary noise criteria to predict the onset of permanent hearing damage and a behavioural response. When assessing the significance of behavioural responses consideration should be given to the duration of the activities and if the behavioural changes are such that this would trigger an offence under UK Regulations.</p> <p>In the significance statement, it is assessed that marine mammals have a high tolerance to noise. Whilst this might be true for the noise levels created by dredging activities, other marine activities emit higher source levels with could cause injury or even death of cetaceans. The statement should be amended to reflect the situation against which the significance assessment was made.</p> <p>There is no discussion on the magnitude of potential noise effects. We also note, that in Table 3-1 (Section 3) a distinction is made between "strong behavioural response" and "mild behavioural response" from noise and vibration. These response categories have not been explained nor considered in the impact assessment.</p>	<p>Should be addressed at REA level to set basis for EIAs.</p> <p>Whilst not invalidating the MAREA it would be useful to amend this section to make the text factually correct.</p> <p>Should be addressed and clarified at REA stage.</p>	<p>Impacts to marine mammals should be discussed in site-specific EIAs in the context of 'deliberate disturbance' to European Protected Species. The focus of this assessment should be on the potential for in-combination effects with other marine users, predominantly offshore wind farm construction activities.</p>	<p>Robinson <i>et al</i> and Southall studies were reviewed and referenced within the noise section, this section will be reviewed again.</p> <p>Noted, text to be amended to reflect relevance to aggregates derived noise.</p> <p>Noted, section reviewed accordingly.</p>	<p>Additional detail added to assessment sections</p>
Section 22.4.1, Sub-regional and regional impacts	<p>The text reads "... all species appear to be less common in the MAREA region than the rest of the English Channel." This sentence doesn't make sense in the context of the Anglian MAREA.</p>	<p>To be amended detracts from integrity of the doc</p>		<p>Noted, to be amended.</p>	<p>Amended</p>

Chapters 12 – Ornithology

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
Section 12.1	<p>Natural England has not been able to assess these chapters as thoroughly as it would like due to the absence of its Seabird Ornithologist (due to health issues). However it is acknowledged that the statements regarding nationally important populations and generally sound, particularly concerning coastal associated species. To re-iterate points made by JNCC, the report will benefit from further consideration regionally important aggregations and populations of birds.</p> <p>It would be useful to have links established identifying bird-important habitats areas offshore and relationship to any known aggregations/distributions of birds. These data would enhance conclusions about regionally important populations/sub-populations and relationship to areas of interest or within impact footprints of marine aggregate production activities. In turn this would strengthen conclusions of significant effects (see below).</p> <p>Of concern is the general lack of evidence to support many of the statements. These become increasingly of concern when making statements of significant effect (see Section 23 comments). Appropriate determinations and statements are made regarding the disposition of the renewal area and designated nature conservation sites/marine protected areas.</p> <p>This section would benefit from inclusion of the data and conclusion presented in <i>Cook, A. S.C. P. &amp; Burton, N. H. K. (2010) A review of the potential impacts of marine aggregate extraction on seabirds. Marine Aggregate Levy Sustainability Fund, Marine Environment Protection Fund Project 09/P130.</i></p>	Recommend to be included in revised analyses.	Useful reference for individual EIAs.	<p>Noted, can be reviewed where additional data available.</p> <p>Noted, can be reviewed where additional data available. This may require additional consultation to define appropriate data sources and identify those not already captured.</p> <p>Noted, report accessed and will be reviewed.</p>	<p>Additional details provided throughout chapter</p> <p>Cook and Burton reviewed and additional detail/maps provided,</p>
Section 12.1, Regional overview	It is estimated that MAREA region holds 1% or more of the nationally important populations of inshore seabirds. Please include reference(s) for this statement. It would also be useful to list the inshore bird species included in this estimate.	It would be useful to address this issue at REA level.		This statement is calculated from the Seabirds 2000 Atlas, this reference will be incorporated into the text.	Additional detail provided
Figure 12.1	The report states that a range of datasets were used to characterise the distribution of seabirds and waterbirds within the region including ESAS data. However, only Seabird Count Data was used to map the distribution of species, which appear to underestimate the density and diversity of bird species within the region. We recommend including relevant data from the data sources listed in Section 12.3. Overall, we feel that more use should be made of graphs/figures to display the distribution of key species. The report prepared by Cook & Burton (2010). <i>A review of the potential impacts of marine aggregate extraction on seabirds.</i> Marine Environment Protection Fund (MEPF) Project 09/P130 includes some useful information to complement this section.	Should be addressed at REA level		<p>As above, EMU will reference the report, in addition following initial contact with BTO we have received the following response and will follow up if timescales are appropriate.</p> <p><i>Many thanks for your data request that Peter Lack has forwarded to me. The data that you require (i.e. indicative foraging ranges for seabirds) have been compiled as part of a review paper led on by Chris Thaxter that will shortly be published in Biological Conservation. We will forward this on to you once the paper has been published (hopefully no more than a few weeks)."</i></p> <p>This section will be cross referenced against nature conservation chapter.</p>	Cook and Burton reviewed and additional detail/maps provided,
	There is a large emphasis placed on identifying the value of ornithological receptors based on nationally important bird populations. JNCC agree that it is important to identify nationally important bird populations; however species should also be assessed on a regional and local scale identifying species that are associated with SPA populations. We also feel that more information on the feeding/breeding/overwintering areas of birds in the MAREA and surrounding area should be provided to enable an assessment of direct/indirect effects in relation to the area available for the species to feed/breed etc.	The REA would benefit if this issue is addressed.	Should be included in site-specific EIAs	The data is available within the nature conservation chapter, this will be reviewed.	References to relevant SPAs provided throughout and cross referencing made with Nature conservation chapter.
Section 23.2, Cumulative impact assessment, 3 <sup>rd</sup> paragraph	<p>It is concluded that there are no impacts from current aggregate extraction activities on marine and coastal bird populations within the MAREA region. No evidence for this statement is provided. Overall, many of the conclusions in Section 23 seem fairly cursory and lacking in an evidence base.</p> <p>The text refers to baseline data from Chapter 8; however the ornithological baseline is presented in Chapter 12.</p>	<p>Should be addressed at REA stage.</p> <p>Should be amended as it detracts from integrity of the document.</p>	At EIA level, any determinations or conclusions need to be transparent and investigable.	This can be reviewed on the back of additional information, the new approach to methodology should address the concern regarding evidence base.	Additional detail provided throughout

Section 23.2.1, Seabed removal	<p>Currently, assessments are made for birds as a whole but different species or seabird groups will/can have different sensitivities and possibly exposures. To cluster them results in a loss of relevant information useful to interrogate any impact assessments made within the report.</p> <p>Seabed removal and noise and vibration has the potential to disrupt spawning and nursery areas for forage fish species, which may in turn impact on prey availability for some seabird groups. The report acknowledges that a disruption to prey availability could occur but lacks further discussion on this issue. Impacts on bird species as a result of changes to the distribution and availability of fish and shellfish should be discussed in more detailed. For this purpose, it would be useful if a brief summary of the conclusions from the fish and shellfish impact assessment is included in this section to set the context for the impact assessment of the ornithological receptors.</p>	The REA would benefit if these issue are addressed to ensure validity of the final significance determinations.		<p>The assessment was undertaken for different bird groups e.g. gulls, terns, auks etc and it is considered that life strategies of grouped species are very similar, key species have been identified throughout and data specific to these noted and assessed.</p> <p>This can be reviewed.</p>	Additional detail on specific receptors provided throughout where relevant.
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### Chapter 13 – Nature Conservation, Protected Areas and Species

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
	<p><b>Chapters 13 &amp; 24, and Appendix C - Nature conservation, protected areas and species</b></p> <p>This section provides a good high-level overview of internationally and nationally designated conservation sites, potential future conservation sites, and non-statutory conservation initiatives within the region. At EIA level, more detailed information on designated features and their subfeatures would be required for those sites that are likely to be significantly affected by extraction activities. Overall, all nature conservation topics will need to be explored fully at the EIA stage to meet the requirements of an EIA. This means that full justification and references to relevant scientific publications will need to be provided at the site specific EIA level when screening in or out nature conservation designations from the impact assessment process and making decisions in relation to feature sensitivity and impact significance.</p>				Noted.
Section 13.2	<p>Natural England advises that the REA provides sufficient overview of the notified and designated sites needed to be considered. We have provided a list of the sites that should be considered and advise that these are provided to the AODA to ensure that all receptor sites are considered. As per the advice provided by JNCC, we concur that more detailed consideration will need to be provided at licence-specific EIA. In-particular reference to the conservation objectives (detailed in Habitats Regulation 33 and 35 advice) will have to be assessed. This will ensure full compliance with Habitats Regulation 61 appropriate assessment screening (Habitats Regulations Assessment).</p> <p>This section would benefit from inclusion of SPAs in a wider context. Many of the bird species associated with English SPAs have a wide dispersion and migrate / utilise areas wider than the site itself. Therefore reference to table 1 in this minute is required to include some SPAs that have not covered within the current characterisation and impact assessment.</p>	Included in revised analyses.	Reference for individual EIAs.	<p>Noted.</p> <p>Noted, this can be reviewed.</p>	Review of SPAs provided in detail
<p>Section 13.2, International designations</p> <p>Appendix C, Offshore Csac Figure 13.2</p>	<p>Please list qualifying features of Haisborough, Hammond and Winterton cSAC – these are (1) Sandbanks which are slightly covered by seawater all the time, and (2) Reefs (<i>S. spinulosa</i> reef)</p> <p>The status of the Haisborough, Hammond and Winterton cSAC should read “candidate” instead of “possible”; the site contains two Annex I habitat features: sandbanks and reefs</p> <p>“pSAC” should read “cSAC”, “pSPA” should read “SPA”</p>	<p>Should be included in REA for completeness.</p> <p>Whilst not invalidating the MAREA it would be useful to amend relevant sections to make the report factually correct.</p>	<p>Must be addressed at EIA stage.</p> <p>Must be addressed at EIA stage.</p>		Actioned.

Section 13.2, SACs and SPAs, final paragraph & Appendix C	The Outer Thames Estuary SPA and the Haisborough Hammond and Winterton cSAC have been submitted to the European Commission in August 2011.	Not essential to be clarified at MAREA level but detracts from integrity of the document.	To be clarified at EIA stage.		Actioned.																										
Appendix C, SAC site status	The term "classified" is only used for Special Protection Areas. Please use relevant terms for SACs (e.g. dSAC, pSAC, cSAC or SAC).	Whilst not invalidating the MAREA it would be useful to amend relevant sections to make the report factually correct.	Must be addressed at EIA stage.		Actioned and amended within Appendix.																										
Section 13.2, SPAs	The report correctly lists SPAs within the MAREA area. However, we would welcome clarifications as to whether areas directly and indirectly affected by past and future dredging activities fall within the foraging range of qualifying species of SPAs outwith the study area (e.g. North Norfolk Coast SPA and Flamborough Head and Bempton Cliffs SPA).	The REA would benefit if this is addressed.	At the EIA level, any SPA species whose foraging range overlaps with the REA region should be considered. Impacts should be assessed against the conservation objectives of that site	This can be reviewed in light of any updates to the ornithology chapter, receptors were considered in terms of their 'value' as a designated species but this can be made clearer within Chapter 13 and more detail provided in relation to SPA sites.	Additional detail provided with foraging distances provided in relation to SPAs within and outside of the MAREA.																										
Section 13.4	<p>Natural England wish to a more full consideration of the new Marine Conservation Zones to be presented. The draft MCZs have now been submitted to Defra for review. They are now referred to as „recommended" MCZs.</p> <p>Table 1. Full list of notified and designated sites that need to be considered within the REA report.</p> <table border="1" data-bbox="379 1054 1074 1894"> <thead> <tr> <th>Site of Special Scientific Interest (SSSI)</th> <th>Special Area of Conservation (SAC)</th> </tr> </thead> <tbody> <tr> <td>Hap is urch C iffs</td> <td>Winterton-Horsey D ne</td> </tr> <tr> <td>Gre t armouth North Denes</td> <td>Benacre to Easton Bavents Lagoons</td> </tr> <tr> <td>Corton Cliffs</td> <td>Minsmere-Walberswick Heaths &amp; Marshes</td> </tr> <tr> <td>Minsmere-Walberswick Heaths &amp; Marshes</td> <td>Orfordness-Shingle Street</td> </tr> <tr> <td>Pakefield to Easton Bavents</td> <td>Haisborough, Hammond &amp; Winterton</td> </tr> <tr> <td>Sizewell Marshes</td> <td></td> </tr> <tr> <td>Leiston-Aldeburgh</td> <td><b>Special Protection Area (SPA)</b></td> </tr> <tr> <td>Alde-Ore Estuary</td> <td>Flamborough Head &amp; Bempton Cliffs</td> </tr> <tr> <td></td> <td>North Norfolk Coast</td> </tr> <tr> <td><b>Ramsar</b></td> <td>Great Yarmouth North Denes</td> </tr> <tr> <td>Minsmere-Walberswick</td> <td>Breydon Water</td> </tr> <tr> <td></td> <td>Benacre to Easton Bavents</td> </tr> </tbody> </table>	Site of Special Scientific Interest (SSSI)	Special Area of Conservation (SAC)	Hap is urch C iffs	Winterton-Horsey D ne	Gre t armouth North Denes	Benacre to Easton Bavents Lagoons	Corton Cliffs	Minsmere-Walberswick Heaths & Marshes	Minsmere-Walberswick Heaths & Marshes	Orfordness-Shingle Street	Pakefield to Easton Bavents	Haisborough, Hammond & Winterton	Sizewell Marshes		Leiston-Aldeburgh	<b>Special Protection Area (SPA)</b>	Alde-Ore Estuary	Flamborough Head & Bempton Cliffs		North Norfolk Coast	<b>Ramsar</b>	Great Yarmouth North Denes	Minsmere-Walberswick	Breydon Water		Benacre to Easton Bavents	Update the REA to conclude a more detailed consideration of the specific MCZs that fall within the REA. Natural England can assist AODA with the appropriate level of review.		<p>All new sites to be reviewed from the table provided as per comment above.</p> <p>No information on the MCZs was available at time of publication but this can be addressed. The following sites have been considered as they fall within the AODA MAREA boundary:</p> <ul style="list-style-type: none"> <li>Cromer Shoal Chalk (rMCZ NG2) has been proposed for the following features: high energy infralittoral rock, moderate energy infralittoral rock, moderate energy circalittoral rock and subtidal chalk (Net Gain, 2011);</li> <li>North Norfolk Blue Mussel Beds (rMCZ RA1) has been proposed for the following features: moderate energy infralittoral rock, blue mussel beds, subtidal chalk and subtidal sands and gravels (Net Gain, 2011);</li> <li>The Orford Inshore (rMCZ NG1b) has been proposed for the following features: subtidal mixed sediments (Net Gain, 2011); and</li> <li>Alde Ore Estuary (rMCZ NG1c) has been proposed for the following features: estuarine rocky habitat, sheltered muddy gravels and smelt (Net Gain, 2011).</li> </ul> <p>It is noted that none of the rMCZs described above, nor any other rMCZs, overlap with the dredging areas within the AODA MAREA boundary .</p> <p><b>We are not aware of any additional sites but if information is available or likely to become available in the immediate future then we would welcome notification.</b></p>	<p>Detail provided for MCZs as discussed and agreed with JNCC. References to future assessment required at EIA level noted within assessment chapter.</p> <p>All additional sites included and reviewed.</p>
Site of Special Scientific Interest (SSSI)	Special Area of Conservation (SAC)																														
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Minsmere-Walberswick								
Alde-Ore Estuary								
Outer Thames Estuary								
Section 13.4, Potential future designations	<p>JNCC on behalf of the country agencies is working on the identification of further areas qualifying as SPAs. This includes work in support of identifying possible marine SPAs for breeding terns, offshore aggregations of seabirds and inshore aggregations of non-breeding waterbirds. More information on ongoing work can be found at the following sites</p> <p><a href="http://jncc.defra.gov.uk/page-4184">http://jncc.defra.gov.uk/page-4184</a>  <a href="http://jncc.defra.gov.uk/pdf/SPA_AOS_Maps%2020100304.pdf">http://jncc.defra.gov.uk/pdf/SPA_AOS_Maps%2020100304.pdf</a>  <a href="http://jncc.defra.gov.uk/default.aspx?page=1414">http://jncc.defra.gov.uk/default.aspx?page=1414</a>. The MAREA study area overlaps with some Areas of Search currently investigated. It would be useful if the MAREA acknowledges this.</p>	Whilst not invalidating the MAREA it would be useful to acknowledge ongoing work on the identification of further areas qualifying as SPAs.	Must be addressed at EIA stage as required.	Any additional data will be reviewed and included, it is recommended that all EIAs undertake a review of new or proposed sites as a matter of course.	Additional data provided			
Section 23.2.2	<p>Regarding vessel presence, it states that 'This effect was screened out of the assessment because there was no direct or indirect pathway to receptors'. Garthe &amp; Hüppop (2004) identified that Red-throated divers (designated feature of Outer Thames Estuary SPA) are especially sensitive to disturbance at sea and usually avoid boats. Therefore there need to be more evidence to support this statement.</p>	To be addressed.			<p>EMU consider this has been addressed within the current document.</p> <p>The assessment for disturbance has been incorporated for the purposes of the MAREA under the noise and vibration effect. The vessel presence effect was screened out of the assessment because there was no direct or indirect pathway to receptors, and under the definitions of the MAREA this effect is defined simply as the displacement of other vessels from the licence area when the dredging vessel is undertaking extraction activities. This was reported under section 23.1.1.</p> <p>The assessment incorporates findings of Garthe and Hüppop (2004) and states that the study developed a sensitivity index for seabirds in relation to offshore wind farms that identified red throated divers as one of the most sensitive species, followed by sandwich terns. Although these studies relate directly to operational wind farms, disturbance associated with marine aggregate extraction and related vessel presence could have similar effects for these seabirds. Garthe and Hüppop (2004) stated that red throated divers are especially sensitive to disturbance at sea and avoid boats.</p> <p>The receptors, seaducks (common scoter), and divers (red throated divers) are assessed as having a moderate level of tolerance, moderate adaptability and high recoverability to the effects of noise and vibration. Their value as designated species is noted and in terms of spatial overlap, the area affected is small, relative to the area of the MAREA region, the precautionary principle dictates that the potential impact of displacement on these receptors is considered to be of Minor Significance for both sub-regions.</p>			
Section 24.2	<p>Need to refer to the most up to date draft Marine Conservation Zones (MCZs) (Net Gain's Final recommendations, July 2011) in the Anglian area. More explanation is needed behind the reason for screening out future MCZs as some areas overlap with this receptor (draft zone NG1B and NG1C).</p>	To be addressed.		The most recent draft MCZs were not available at time of draft submission; however these will be included in the final version. See comment above under 13.4.	Detail provided for MCZs as discussed and agreed with JNCC. References to future assessment required at EIA level noted			
24.4.	<p>There has been no assessment on any potential impacts to the red-throated diver's prey species. This is a potential sensitive receptor therefore there needs to be a significance assessment of any potential impact associated.</p>	To be addressed.			<p>EMU consider this has been addressed within the current document.</p> <p>The seabed removal effect included an assessment for sandwich terns and red throated diver feeding grounds. The assessment adopted the precautionary principle, and states that the potential impact due to seabed removal to potential feeding grounds of the sandwich tern colonies and red throated diver is considered Minor Significance for both sub-</p>			

					regions. Rationale was provided that both species are considered specialist feeders targeting sandeels and herring respectively as two of their main sources of prey. Spatially, both species are known to forage to a distance offshore that overlaps with the licence areas in both sub-regions. Value takes consideration of the nature conservation status given that both species are protected through SPAs located within the region.
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## Chapter 14 – Commercial and Recreational Fisheries

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
	<p><b>Commercial fisheries and fish resources</b></p> <p>Comments provided here are in addition to those provided by Cefas which has the main remit regarding advice concerning this chapter.</p> <p>Natural England advises that it would be beneficial to highlight, within this chapter, any species of nature conservation importance that are found within the region. Whilst it is acknowledged that this information is considered within the other nature conservation chapters it is important that such species are also indicated within this chapter. This recommendation was made in relation to the SC REA and proposed to be adopted in subsequent REAs.</p> <p>The report provides a suitable regional characterisation of fish and shellfish species, and a history of commercial fisheries in the area. It is evident that a significant amount of research has been undertaken to characterise the commercial fisheries and this is particularly obvious from Appendix D.</p> <p>Resolution may not be adequate for site specific issues, thus site specific assessments (drawing in all available survey data, either in the form of an addendum or separately for each EIA) will be needed to inform an EIA - especially as spawning/nursery areas can change. Spatial overlaps can change, so borders of areas will need to be considered at a site specific level. Most of our commercial fishery concerns are answered by the consultation with industry during every site specific EIA.</p> <p>It is good that the limitations of the VMS data have been highlighted. With the majority of the commercial fishing fleet active in the area using under 10 m vessel's communication with the local fishermen is paramount.</p> <p>With regard to shellfisheries, the possible presence of small landings of other <i>Pandalus</i> or <i>Crangon</i> species is not significant within the remit of the MAREA, although any information on this is of interest biologically.</p> <p>The in-combination and cumulative section is brief and lacks information for how the expected cumulative effects would potentially impact individual receptors. As there are a number of activities and developments in this area we would expect these to be fully assessed at the site specific stage.</p> <p>The REA does provide enough information in some instances that it can be used to inform site specific EIAs but further information at a local scale is required at the site specific level (see below comments).</p> <p>At the site specific EIA level a review of current information for the site/area is expected, including a full consultation with local fishing industry to identify fisheries carried out within and surrounding the site. Recent commercial fisheries data should be presented and can be compared with the REA to highlight similarities or differences from the REA.</p>			<p>NOTED, as a general point, all biological sections will be cross referenced with the nature conservation chapter and additional information provided in relevant chapters, this will enable the 'value' with respect to designations to be more transparent.</p> <p>Noted.</p> <p>Noted, this was noted early in the MAREA process and accepted that EIAs would need to undertake fisheries assessments using relevant up to date data.</p> <p>Noted, the MAREA took the approach of undergoing a fisheries consultation exercise to account for this likely discrepancy in the data. The report acknowledges this limitation but also attempts to address this by providing spatial data provided as part of the consultation.</p>	<p>Cross referencing provided between fish ecology and nature conservation with additional detail provided throughout</p> <p>Noted.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted</p>
Section 5.5	<p>It is stated that 'the key to mitigating the effects is to establish an effective mechanism for liaison e.g. the fisheries liaison process through which BMAPA in association with the Crown Estate produces twice yearly active dredge charts defining areas where dredging takes place'. It is important to maintain effective communication with the fishermen, particularly as it has been defined that this is the key to mitigating effects.</p>	To be noted.			Noted

Section 5.5	It states that 'hearing specialists such as herring and generalists that are relatively sensitive to sound such as cod would potentially be much more affected than generalists with relatively poor hearing such as dab or perhaps sole. It is currently unknown how coupling of vibrations to the substrate will affect bottom dwelling flatfish and very little is known about the hearing capabilities of elasmobranchs (sharks, rays and skates) and invertebrates, so potential conflicts are very difficult to assess'.		This lack of information should be acknowledged and where possible addressed.	.	Noted
Section 10.2	As well as species mentioned sole, thornback ray and plaice also undergo forms of migration.	To be addressed.		Is this a general statement or are there any specific references available for the region?	Detail provided where relevant and/or available.
Section 10.3	Species are identified as being conserved under the UKBAP. Clarification that some species form part of the grouped plan for commercial marine fish, rather than are a priority species should be made.	To be addressed.		Noted, will be amended as per general comment above.	
Section 10.6	The report does not adequately address species of conservation concern or importance that may or may not be present in the MAREA area. For example, shads, eels, lampreys, migratory and transient species such as salmon and trout. These species should be acknowledged and relevant information regarding them included within the report.	Section 10.6	The report does not adequately address species of conservation concern or importance that may or may not be present in the MAREA area. For example, shads, eels, lampreys, migratory and transient species such as salmon and trout. These species should be acknowledged and relevant information regarding them included within the report.	As above.	Section included on migratory species where information available.
Table 10.2	It would be useful to place references utilised for table 10.2 within the table to allow review if necessary.	To be addressed.		Noted and will be amended where possible.	
Section 14	Generally crustacean fisheries in the area are modest and likely the majority of the pot gears used will be either very close inshore and/or targeted at lobsters around wrecks. Therefore they are very unlikely to be impacted by dredging operations.	To be noted.	To be noted.		Noted
Section 14.1.1	The addition of data from the registration of buyers and sellers (2006) would be welcomed.		To note for EIAs.		No action at MAREA level.
Table 14.1	The recognition of the restrictions of the fisheries distribution mapping for the MAREA area i.e. that 92.7% of the vessels in AODA region are under 10 m and are not covered by the data is important.	To be addressed.			<p>EMU consider this point has been addressed.</p> <p>Section 25.1 states that fishing in the Anglian offshore MAREA region is characterised predominantly by small inshore vessels under 10 m length that are currently not captured by official statistics. To capture the knowledge of this inshore fleet, a dedicated consultation exercise was undertaken at all regional ports, and these data were considered in context with findings from previous studies from historical licence applications and renewals and other regional studies. It is considered that these data, taken in parallel with official statistics, are sufficient to provide an indicator of the overall regional distribution of activity, and inform this assessment.</p> <p>It is noted that the consultation exercise undertaken, although extensive in geographical range across the region, only provides representative data for fisheries contacts. Given the dynamic and opportunistic nature of the fleet, caution in using the spatial extents as fixed boundaries is recommended. The assessment takes the precautionary approach, assuming activity is widespread across the region, with preferred areas identified through consultation taken as areas of greatest intensity.</p>

Section 14.	International landings data for vessels fishing in the MAREA area could be included to insure the interests of the international fishermen who may utilise the area are represented.	To be incorporated.		These data can be shown; international vessels were included as part of the total landings data and these can be shown.	Data included
Section 21	The potential impact of dredging on spawning of important commercial shellfish species, including <i>Cancer pagurus</i> and lobster needs further consideration. The spawning period is down as summer months for lobster and November-December for the edible crab. Whilst this is technically correct, the equally important phase in the edible crab's life cycle is the incubation period between spawning in December and hatching in July within the MAREA. Whilst there is no evidence of widespread crab spawning and incubation in the licensed area from larvae surveys and fishing activity, this should be considered in future EIAs.	To be noted.	Section 21	All assessments took note of the incubation period, this can be clarified within the MAREA to inform EIAs.	Noted
Section 21.4.1	It states that sandeel have high tolerance, high adaptability and high recovery to the effects of seabed removal at sub-regional and regional scales (within the MAREA), indicating that as sandeel grounds are extensive across the region and beyond that they have a low intensity use of the MAREA area.	Evidence is required to validate this.	Section 21.4.1	Evidence can be provided to show the extent of sandeel grounds and their level of intensity, this can be referenced in the doc. Further clarification can be provided on sensitivity of the receptor.	Detail provided where relevant and available.
Section 21.4.1	The report discusses that the physical nature and integrity of the herring spawning grounds should be maintained to prevent any re-colonisation from being restricted. This should also be maintained to allow any herring spawning occurring with the area to continue.		Site specific assessments of potential (and current) herring spawning are required.	The most recent data has been reviewed on spawning grounds (Cefas Technical Report 147) and it is noted for herring that the new figures within the report shows larval data to the south of the AODA region but no data to show spawning grounds for 2010 either high or low intensity.	Reference to need to maintain integrity of grounds included throughout
Section 21.4.1	The REA has been subdivided into sub regions and the herring impact assessment for the Yarmouth sub region was given a minor significant category. As the herring grounds overlap a number of areas the impact assessment may be too generic, with some areas having a minor impact and some a major impact.	To be addressed.	To be addressed.		The assessment took the precautionary approach and acknowledged the uncertainties in the data; EMU considers that this approach is sufficient to trigger an assessment at the EIA level which is more appropriate.
Section 21.4.1	The section states 'of particular relevance within the MAREA region are the presence of herring and sand eel spawning areas, both of which may also be targeted for aggregate extraction'.		Sensitive species, as identified in the MAREA, which use specific substrate for spawning should be considered in depth i.e. herring and sand eel.	It is noted as above for herring that the new figures within the Cefas Technical Report 147 report show larval data to the south of the AODA region but no data to show spawning grounds 2010 either high or low intensity.	Additional detail on sensitive receptors provided throughout where available and relevant
Section 21.4.2	It is noted that the MAREA recognises that herring larvae have high sensitivity to noise and therefore they should be assessed thoroughly. It is good to see that the Yarmouth sub region was assessed separately and herring were recognised as being minor significant.		It is expected this will be further explored in the site specific EIAs.	.	Noted
Section 21.4.4	The MAREA identifies the minor significance of sediment dispersion in the Yarmouth sub region. Herring reproduction success can be affected by sediment deposition (Gubbay, 2003) and fertilisation, embryonic and larval development may become subject to abnormalities resulting from impacts of suspended sediments (Griffen et al., 2009).	This needs to be recognised and adequately assessed.	Section 21.4.4	Additional references to be included.  Gubbay 2003 states herring produce eggs that become attached to clean gravel substrates. The deposition of fine sediment in such areas on a regular basis could affect the reproductive success in specific gravel beds.  Griffen <i>et al</i> report has been reviewed , findings noted and will be incorporated, it should also be noted that the results from this study contradict the literature concerning suspended sediments and herring reproductive biology which suggest that embryos and larvae tolerate concentrations of suspended sediments up to 1000mg/l. Discrepancies arise with regard to the timing of release of eggs in relation to the effect and this raises further uncertainties. This will be acknowledged within the text.	Additional references and detail provided.
Section 21 and 25	De Groot (1996) predicted that increases in marine gravel extraction will cause a threat to marine commercial fisheries, mainly those for herring and sand eel. The secondary impacts to fisheries interests as a result of impacts to herring spawning resulting from gravel extraction should also be considered when mitigation is reviewed and required. Data on the distribution of herring eggs and larvae for the southern North Sea over one year is included	To be utilised.		Report obtained, reviewed and will be incorporated as a reference where appropriate.	Additional references and detail provided

	in the IMARES 2011 report.				
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## Chapter 15 - Navigation and Shipping

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Section 15.8, Existing Dredging Activity	This section provides a very good baseline of current shipping activity and navigational risks within the region. Are there any estimates available as to a potential increase in vessel (dredger) traffic resulting from a potential increase in dredging activity? This information would be useful for future site specific assessments with regard to potential effects on the over-wintering red throated diver population of the Outer Thames Estuary SPA.		At EIA level, information on potential increase in vessel traffic should be included, as required, to inform nature conservation assessments.	All assessments were undertaken on the basis of a precautionary maximum permitted development scenario, this reflects an assessment of about 4 times the current production levels for the region. Assumptions of dredging activity in relation to vessels on site/transit etc are detailed in Table 4.3.	Reference made to maximum tonnage in Section 15.8

## Chapter 16 - Infrastructure and other marine users

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Figure 16.2	It would be useful if figure caption lists data sources.			To be actioned.	Actioned
Section 16.3, Potential infrastructure developments	We are pleased to see that the report lists potential future infrastructure developments within the region. It is likely that additional infrastructure / activities not described within the REA will be installed / carried out within the region over the coming years. Licence-specific EIAs will need to consider these activities.	To note	At EIA stage, most up to date activity data must be used for in-combination assessments.	Noted.	Updates on developments provided where relevant

## Chapter 17 – Archaeology

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
<b>17 – Archaeology</b>	<p>Accepting the satisfactory resolution of the detailed comments below, we are prepared to accept that the archaeological characterisation provided in this section will be sufficient to provide the context for characterisation in individual EIA's. These studies should present the key results and findings of the MAREA rather than simply state "see MAREA". However, individual site specific EIA will still need to present site specific historic environment characterisation on a more detailed level, and not expect to be able to present just the results of this chapter of the MAREA.</p> <p>This chapter remains very much a regional, broad scale study without the level of site specific detail required for EIA. Such detail will still be provided for by producing an archaeological study to support EIA. This is required in order to gauge the precise nature and significance of submerged prehistoric remains and wreck material within specific licence areas. This allows English Heritage, in collaboration with the MMO and industry to work together to determine appropriate and practical management approaches (including mitigation measures and monitoring programmes).</p>	N/A	Continue to deliver archaeological assessment reports at EIA level to support and build on the findings of the MAREA	Noted.	Noted
<b>17.5.1 – Last paragraph on page 17-4.</b>	The statements made in this section are far too generalised and cannot be made with such certainty. Whilst we accept that it is highly unlikely that there was a hominin presence during the height of the Anglian glaciation, we do not accept that the potential is 'non-existent'. The reworking of sediments during marine transgressions and regressions has been shown to transport materials to areas previously thought to be of little archaeological interest. The discovery of a worked flint from a core taken by the British Geological Survey on West Viking Bank to the North East of Scotland demonstrates that chance finds of prehistoric archaeological materials may be made virtually anywhere. For further information see	This section should be amended in final report.		Section to be reviewed.	Chapter reviewed and amended throughout

	Flemming 2003 – <i>The scope of Strategic Environmental Assessment of Continental Shelf Area SEA4 in regard to prehistoric archaeological remains</i> and Long et al, 1986, BAR International Series No. 296.				
<b>17.5.2 – Last Paragraph/ 17.5.3 – First Paragraph –</b>	The text at the end of 17.5.2 and the beginning of section 17.5.3 requires evidence to support the statements made. A reference needs to be included.	Should be amended in final report to add clarity to document.		Reference to be included.	Chapter reviewed and amended throughout
<b>17.5.5 - Archaeological Potential in the MAREA Region</b>	1 - The section detailing 110,000BP to 13,500BP appears to be missing. If this is deliberate then there needs to be a sentence detailing the reasons why. See point on section 17.5.1 above.  2 - The archaeological potential of the MAREA area does not seem adequately concluded and could be clearer and more definite towards the end of each section. Further details on the discussion of archaeological potential in Appendix F should be brought forward into the relevant sections.	Should be amended in final report to add clarity to document.		Section to be reviewed.	Chapter reviewed and amended throughout
<b>17.5.5 - general</b>	We do not believe that best use has been made of the work funded via the ALSF in Area 240. Given the importance of this work for demonstrating the potential of the region, further information from the 'Seabed Prehistory: Site Evaluation Techniques (Area 240)' project must be included and considered within this section. This study demonstrates the potential for archaeologically significant finds and deposits to be found within the region during the process of aggregate extraction and has implications for the potential significance of impacts in the region on submerged prehistory.	Should be amended in final report and prior to use for short term licence applications.		The report was not available at the time of publication but will be reviewed and incorporated into the revised document	Chapter reviewed and amended throughout
<b>17.5.6 – Prehistoric archaeology; Summary</b>	Given the detailed level of discussion that precedes this section, this summary is too brief. It should be used to define the main points from the section and sum up the potential. Further inclusion and consideration of ALSF funded Area 240 work should also be included in this section.	Should be amended in final report to add clarity to document.		Section to be reviewed.	Chapter reviewed and amended throughout
<b>17.6 / Figure 17.3</b>	The figures seem to be in strange places, for example figure 17.3 is included in the discussion for maritime archaeology. It would be easier for the reader if each figure/diagram were included alongside, or as close as possible to, the text to which it relates.	Should be amended in final report to add clarity to document.		Noted, design options will be reviewed.	Chapter reviewed and amended throughout
<b>17.6 – First paragraph</b>	Cargo needs to be mentioned specifically when defining maritime archaeology. It is often the case that the cargo of ships or boats that have been wrecked or sunk is the only remaining evidence of the vessel.	Should be amended in final report to add clarity to document.		To be addressed.	Chapter reviewed and amended throughout
<b>17.6.1 – Designated Historic Wreck Sites</b>	More detail is required about the Protection of Wrecks Act (1973) and the Protection of Military Remains Act (1986) so as to demonstrate the level of protection these afford the vessels.	Should be amended in final report to add clarity to document.		Section to be reviewed as per South Coast.	Chapter reviewed and amended throughout
<b>Figure 17.4 / figure 17.5</b>	It would have added value to identify each of the designated wreck sites in the region in this figure, including those protected under both the Protection of Wrecks Act 1973, and the Protection of Military Remains Act 1986.	N/A	N/A	To be reviewed.	Chapter reviewed and amended throughout
<b>17.6.8 – Maritime Archaeology; Summary</b>	The maritime archaeology summary is cursory and lacking in significant detail from the preceding discussion.	Should be amended in final report to add clarity to document.		Section to be reviewed.	Chapter reviewed and amended throughout

<b>17.7.5 – Aviation archaeology: summary</b>	The aviation archaeology summary is cursory and lacking in significant detail from the preceding discussion.	Should be amended in final report to add clarity to document.		Section to be reviewed.	Chapter reviewed and amended throughout
<b>17.8 – summary of baseline and key sensitivities</b>	This overarching summary should be expanded further to provide a better level of detail from the chapter. At present fails to provide an adequate summation of the key results and findings presented in the earlier sections and Appendix F.	Should be amended in final report to add clarity to document.		Section to be reviewed.	Chapter reviewed and amended throughout

### Chapter 20 – Impact Assessment: Benthic Ecology

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
	<p>It is not effectively possible to agree with detailed significance assessments in this chapter at this time. This is due to the concerns highlighted in the commentary for chapter 9. Fundamental is the need to revise the data analyses pertaining to identification of biotopes and the impact zone treatments. Until these areas are revised and submitted for comment it is difficult to agree or refute many of the impact assessments.</p> <p>A further point is regarding the transparency of the impact assessment process itself as highlighted in our comments under chapter 3. Natural England knows how these assessments have been conducted as we have been party to the revisions provided in the SC REA addenda. However, obviously many stakeholders are not party to this level of detailed knowledge and the AO REA must be a stand-alone report. Therefore until such time that the addenda regarding the explanation of magnitude of effect assessments and subsequent significance testing are provided Natural England has no further comments to make regarding chapter 20.</p> <p>Natural England's advice is that this chapter cannot currently make impact assessments that can be supported by ourselves. Revisions required to the SC REA need to be adopted and the re-analyses conducted as per comments from Cefas, JNCC and contained in this minute (see chapter 9 advice).</p>			This will be revisited once other points in relation to baseline have been addressed.	Chapter reviewed in light of changes to baseline and data review.

### Chapter 23 – Impact Assessment: Ornithology

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
Section 23.2	<p>It is not effectively possible to agree with detailed significance assessments in this chapter at this time. This is due to the concerns highlighted in the commentary for chapter 12. Fundamental is the need to provide a more detailed evidence base to substantiate the conclusions of significance reported in the REA. More detail is required regarding the distribution and extent of offshore areas/habitat likely important to birds (as per comments from JNCC and in this minute for chapter 12).</p> <p>Revise the data analyses pertaining to identification of biotopes and the impact zone treatments. Until these areas are revised and submitted for comment it is difficult to agree or refute many of the impact assessments. This section would benefit from more clear reference to the bird distribution maps in chapter 12 and pressure footprints associated with the proposed marine aggregate activity. It is difficult to see how displacement/disturbance pressure has been screened. Statements to support this screening are not clear. If it is to be screened out then we expect more clear and substantive statements. Consideration latered transit routes, increase in dredging activity etc need to more demonstrably considered.</p>	<p>Clarifications required and provision of evidence (where available referenced). Confidence in assessments clearly detailed. Consideration of future escalation of dredger presence and passage to be provided/made clear.</p>	<p>Useful reference for individual EIAs. Licence-specific interactions with birds will still be required given the current information provided.</p>	Will be reviewed once all previous comments addressed.	Chapter reviewed in light of additional data in baseline.

## Chapter 24 - Impact Assessment: Nature Conservation

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
Section 24.2	Screening out of all coastal SPAs. Need a clear presentation of the evidence used to make this assessment. Particularly with species from coastal SPAs that forage offshore within the region e.g. tern species.	Clarifications required and provision of evidence (where available referenced). Confidence in assessments clearly detailed. Consideration of future escalation of dredger presence and passage to be provided/made clear.		To be reviewed and linked to revisions from ornithology chapter.	SPAs screened in and assessed accordingly.
Section 24.4.2	Require more detail on future predicted dredger movements (transit routes, intensity, dredging occupancy etc.). This should be clearly referenced where presented elsewhere in the report.	Additional clarification needed within the REA.	EIA will be dependent upon these conclusions from the REA.		All assessments were undertaken on the basis of a precautionary maximum permitted development scenario, this reflects an assessment of about 4 times the current production levels for the region. Assumptions of dredging activity in relation to vessels on site/transit etc are detailed in Table 4.3.
Section 24.4.3 & 24.4.4	These determinations regarding the Haisborough, Hammond and Winterton cSAC should be provided in relation to the site's Habitats Regulation 35 conservation objective advice.	Strongly suggest that considerations of significance in relation to the HHW cSAC are presented in relation to the site's conservation objectives.	If not addressed adequately within the REA then high level of information per EIA will be required. More onerous at EIA level wrt in-combination effect determination.	This will be addressed and reference made to the Version 4 (August 2010) draft conservation objectives.  Confirmation of whether these objectives have been finalised and/or likely timescales would be appreciated.	Addressed with additional detail provided on sub features and features.
<b>28 – Impact Assessment: Archaeology</b>	We note and welcome the effects that have been screened in to this archaeological assessment as detailed in section 28.1.1. To recap the effects screened in were; <ul style="list-style-type: none"> <li>• Seabed removal – a direct effect of dredging on archaeological receptors;</li> <li>• Bathymetric changes – an indirect effect of dredging on archaeological receptors;</li> <li>• Sediment flux – an indirect effect of dredging on archaeological receptors.</li> </ul>		Full consideration of the potential for sediment transport and bathymetric changes to affect the stability of archaeological sites to be included in archaeological section of site specific EIA's.	Noted.	Noted
<b>28.1 – Basis for cumulative impact assessment</b>	It is felt that the baseline presented in Chapter 17 failed to make best use of the ALSF funded 'Seabed Prehistory: Site Evaluation Techniques (Area 240)' project (see comment on section 17.5.5 – 'general' above). It is also felt that Chapter 17 failed to adequately pull together and summarise the data to provide an appropriate assessment of potential, particularly with regards to the way that the information presented has been summarised for unknown and unrecorded sites. See comments on sections 17.5.5 (comment 2), 17.5.6, 17.6.8, 17.7.5 and 17.8 above.	Additional details from Area 240 project work and from Appendix F should be brought forward into relevant summary sections of chapter 17.		Noted, will be reviewed.	Detail provided throughout

<b>28.2 Cumulative Impact assessment</b>	<p>Whilst section 28.2 does consider the value and sensitivity of receptors there is no consideration of magnitude of effects within the discussion. As such it is at present unclear from this section how the final determinations of impact significance have been reached, with little evidence provided to support the statements presented. As already stated in the general comments above, this methodology has been the subject of some discussion during review of the SC MAREA report. We note that the consultants have provided additional information on how the determinations of sensitivity were reached for the South Coast MAREA (letter from Paul English to the MMO dated 18th October 2011).</p> <p>Similar information must be provided for the Anglian MAREA to enable transparency in how the final determinations of impact significance have been reached.</p>	Addendum to be produced to demonstrate how the outcomes from Matrix A and Matrix B in figure 3:3 have been combined to reach the final determinations of impact significance.		Methodology chapter revised.	Additional details for TAR provided in CIA tables to provide transparency required
<b>Section 28, Table 28:2</b>	<p>As three archaeological receptors have been determined as being potentially subject to major impacts from the effects of regional seabed removal, it is clear that this issue will require further consideration at EIA level. We recognise that there are a number of well established measures and tools available to industry to mitigate for impacts on the marine historic environment, such as reporting protocols and exclusion zones.</p> <p>In respect to the major impact on Pleistocene fluvial gravels that has been determined at this regional scale, this study highlights the clear importance of early reporting of archaeological material as it is discovered either on vessels or more likely at wharves. In this way areas where in situ Palaeolithic/prehistoric remains are discovered can be clearly delineated and exclusion zones implemented. The case of Area 240 and the good practice followed in that instance is particularly pertinent here.</p>	N/A	Mitigation measures to address impacts to archaeology to be agreed at EIA level. To include the adoption of good working practice, observing the procedures & processes defined in the Reporting Protocol (BMAPA and EH 2005) and the Guidance Note – <i>'Marine Aggregate Dredging and the Historic Environment'</i> (BMAPA and EH 2003).	Noted.  Noted.	Noted
<b>28.3 – Bathymetric changes</b>	Bathymetric changes are not adequately catered in terms of the historic environment. Mitigation seems to be through the avoidance of areas that might be affected, however there may be an indirect effect resulting from seabed changes regardless of whether the specific receptor is targeted. We therefore do not agree with some of the determinations of impact significance attributed in this section. For example, the assessment states that 'known chartered shipwrecks' are not likely to be affected by bathymetric changes – we disagree with this statement as sediment transport resulting from bathymetric change has been shown to destabilise such sites in the past.	This section should be revisited as it does not adequately consider the potential for impacts on archaeological sites from this indirect dredging effect.		Section to be reviewed.	Assessment of bathymetric changes reviewed and updated

## Chapter 29 – In-combination Impact Assessment

Section	Issue	Addressed at Regional Scale	Addressed at EIA Scale	EMU Ltd. Response	MAREA Updates
	<p>Natural England acknowledges that there is little consensus (even at international level) on appropriate levels of in-combination assessment. The interactions of pressures between activities presented in the REA is appropriate. We suggest that it would be useful to have some spatial representation of overlap between the historic, current and proposed marine aggregate production and other sectors presented within this chapter. Although some of these data are now only surfacing due to marine planning and such data acquisition and analyses a spatial assessment of activity footprint can be presented.</p> <p>It is clear that a full level of in-combination assessment will have to be delivered by individual EIAs. This shift of burden from the REA to the EIA stage should be noted by the MMO. It may be that discussions concerning assessment of in-combination effects as part of the 18 month Marine Licence application process can be informative.</p> <p>This section identifies the potential for interaction of effects arising from marine aggregate extraction activities with effects from other ongoing or planned activities across the region. The results of this analysis will assist site-specific in-combination assessments at the EIA stage. We accept that there is currently no defined consensus on how best to approach in-combination assessments, and therefore it is understandable that it would have been difficult</p>			<p>We can review and look at logistics of a spatial figure, although we may not have sufficient detail to provide appropriate footprints for all or any effects and impacts.</p> <p>Noted, it was our understanding from the start of the REA process that this would be what was expected.</p> <p>Noted.</p>	<p>Figure 29.1 included to display spatially other activities in the region.</p> <p>Noted</p> <p>Noted</p>

	to undertake such an assessment on a regional scale. However, it should be noted that in-combination assessments should be an integral part of each EIAs, and effects should be given equal weight with other factors in the decision-making process.				
Table 29.1	Renewable energy devices, surface laid cables and pipelines, oil and gas infrastructure, and infrastructure protection measures will contribute to permanent seabed loss. This appears not to be covered in the table.	To be clarified.	Full consideration of the potential of temporary or permanent seabed alteration or seabed loss to significantly affect the distribution of benthic habitats and communities within the region should be included in the in-combination sections of any site specific EIA.	Noted and will be reviewed.	Given the overlap of footprints, all sectors mentioned are considered to have low potential but have been assessed and included within Tables 29.2 and 29.3

### Other Specific comments

Section	Issue	Addressed at regional scale	Addressed at EIA scale	EMU Ltd. Response	MAREA Updates
Figure 3.3	Further details are required to fully clarify how the magnitude of effects and receptor sensitivities were calculated.	To be addressed.		Chapter reviewed in line with comments and the south coast.	Chapter 3 updated and detail provided within all CIA tables for each receptor.
Chapter 29	No reference is made to Scroby Sand offshore wind farm.	This needs to be included in the assessment due to its close proximity to the area.		Noted, this will be addressed.	Scroby Sands was included in the assessment, specific reference now made to the OWF.
Table 29.1	Under Renewable The analysis of the data to characterise the i) PIZ, SIZ and the ADZ, ii) the use of reference areas, iii) use of existing surveys and iv) the use of strata need to be updated to reflect the temporal aspects and significance of assessments through statistical analysis( as per Cefas' responses in the South Coast MAREA). It is classed as having a low potential for sediment removal. This may be the case for monopiles but as turbine bases change and technology develops the use of alternative bases, such as gravity bases will have a greater impact on sediment removal and these need to be considered.	To be considered.		It was considered inappropriate to comment on developments where no specifics were available; the MAREA was intended to identify the potential for in combination impacts and not to provide any detail.  EIA will need to consider in combination assessments in detail and this can be addressed at the more appropriate local level.	Reference to monopoles included for clarification
	It would be useful to include a map with all the activities and developments in the area and the surrounding region to show the potential in-combination and cumulative impacts.	To be addressed.		This can be considered, however it is likely to date the document as the situation changes and it is felt this would be more appropriate at EIA level.	Figure 29.1 included for all hard constraints e.g. those activities that have a fixed boundary or extent or where sufficient information available eg sailing/cruising routes.

### General Minor Comments

					MAREA Updates
Section 3.1.2	Change migration to mitigation.	To be corrected.		Noted and amended.	Actioned
Section 3.2.2	Should aggregate dredge zone be changed to active dredge zone?	To be corrected.		Noted and amended.	Actioned

Section 7.7	Remove the coma at the end of the paragraph.	To be corrected.		Addressed in formatted version of the chapter.	Actioned
Figure 8-1, 8-2, 8-3, 8-15, 8-16 and 8-17	The wording is unclear and difficult to read.	To be corrected.		Noted and will be reviewed.	Actioned where possible but figures are from a third party and not EMU derived.