



Marine
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North East Inshore and Offshore Marine Plan Areas Sustainability Appraisal Options Assessment Report





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Sustainability Appraisal Options Assessment Report

April 2018

Report prepared by: ClearLead Consulting Ltd., WSP and MarineSpace

clearlead 



MarineSpace
Making Sense of the Marine Environment™



Project funded by: Marine Management Organisation

Version	Author	Note
A	Johanna Mitchell	
1	Various	Draft for MMO comment
2	Various	Revised
3	Various	Draft Final
4	Various	Final

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If referencing this document, please cite it as: North East Inshore and Offshore Marine Plan Areas Sustainability Appraisal Options Assessment Report, 26th April 2018.

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1 Introduction

1.1 The Purpose of this Report

ClearLead UK Ltd, working in association with WSP and MarineSpace, were awarded a contract in June 2017 to carry out tasks relating to the Sustainability Appraisal of the Marine Plans for the North East, the North West, the South East and the South West plan areas.

This report provides detail on the assessment of the options for the North East Marine Plan Areas. The options were presented as part of the Iteration 2 Stakeholder engagement process in February / March 2018. The options were organised under a series of groupings which are detailed in Section 1.4.

This report is organised in four sections:

- Section 1 sets out the purpose of this report and details of the options being assessed for the Marine Plans;
- Section 2 outlines the methodology of the SA options assessment;
- Section 3 summarises the results of the SA options assessment; and
- Section 4 outlines the next steps in the plan making and SA processes.

1.2 Background to the Marine Plans and SA process

The Marine Management Organisation (MMO) was established in 2010 following the publication of the Marine and Coastal Access Act (MCAA) 2009 and one of its delegated responsibilities is to prepare marine plans for the English inshore and offshore waters. Marine plans seek to provide greater coherence of policy and a forward-looking, proactive and spatial approach to the management of the marine area, its resources and the activities and interactions that take place within it. Marine plans and their reflection of the Marine Policy Statement (MPS), form part of a planned regulatory system for marine activities, which is in the early stages of being established. The MMO has now completed marine plans for the East Inshore and Offshore and the South Inshore and Offshore marine planning areas and is currently progressing the seven remaining plan areas simultaneously.

The remaining Marine Plan Areas include the:

- North East Inshore and Offshore;
- North West Inshore and Offshore;
- South West Inshore and Offshore; and the
- South East Inshore.

These Marine Plans will set out how the UK MPS will be implemented in these Marine Plan Areas. They will reflect the MPS at the sub-national level, taking into account the social, economic and environmental factors that affect each Marine Plan Area and the communities that are dependent on or have an interest in the Marine Plan Areas.

The requirement for SA in the marine plan process is outlined in the Marine and Coastal Access Act 2009, which stipulates that all marine plans are subject to SA, and that it is undertaken in line with the procedures prescribed by the SEA Directive.

The first stage of SA (scoping) for the remaining Marine Plans has been completed. This stage included extensive collation of baseline data into an SA Database. Key issues were recorded into 'Report Cards' for each plan area and an SA Scoping Report.

The SA Scoping Report was published for consultation with statutory consultees for a 5-week period between 11th April and 13th May 2016. Following consultation, the Scoping Report was revised in response to comments received and the final version is available to download from the MMO website, here:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/535172/SA_scoping_report_NE_NW_SE_SW.pdf

The SA Database was updated in August 2017.

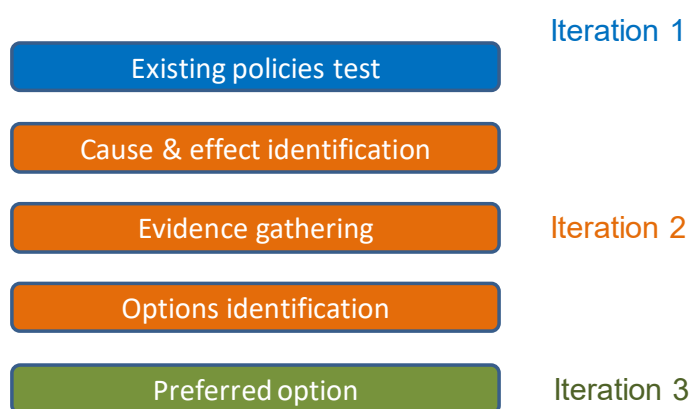
1.3 Development of Marine Plan Options

The legal requirement for undertaking the options stage of planning comes from the [Strategic Environmental Assessment Directive](#) and the UK Regulations of this Directive, which requires those developing a plan or programme to consider 'reasonable alternatives taking into account the objectives and geographical scope of the plan'. The Directive requires that plan-makers must look at different ways of achieving the objectives of the plan in a reasonable manner.

The options stage is a significant phase in the planning process; it considers the different ways of delivering the vision and objectives and is the mechanism that determines how marine plans will respond to issues in each plan area.

This stage is part of iteration 2. Each option is tested against the SA Framework and potential significant sustainability effects identified. The feedback from the SA at this stage will feed into the work in Iteration 3, 'Preferred Options'. Figure 1.1 below shows this process.

Figure 1.1 Development of Marine Plan Options



This is the first stage where each marine plan area will be considered on its own, because although there may be common responses to issues, these may not be suitable for achieving the different marine plan area visions. A decision was made

early in the planning process to not develop specific marine plan objectives, but to use the High Level Marine Objectives (HLMOs). Marine plans are expected to deliver the HLMOs through sector/activity specific policy, so there is no need to develop marine plan area objectives. The additional advantage of having static objectives is that the preferred option can be developed around the issues under each of the objectives. The differences in the spread of the issues between the HLMOs within each marine plan area is where the marine plans become area specific.

Prior to options development, key issues were identified within the [Issues and Evidence Database](#) and arranged into themes:

- **Economy:** ports, dredging, oil and gas decommissioning, beneficial use of dredged material, blue growth, tidal lagoon development.
- **Environment:** coastal squeeze, marine litter, invasive non-native species, water quality, and compensatory habitat.
- **Governance:** marine plan integration, monitoring and enforcement, port management, new marine infrastructure.
- **Social:** flood protection, tourism opportunities, management of recreational access, social deprivation, fishing industry decline.

The issues under these themes are not exclusive and others are included as appropriate when issues and supporting evidence are identified through the planning process.

Once key issues were identified, options for delivering the HLMOs in the context of the issues or groups of issues were raised. From this, realistic and deliverable alternatives were created which align with the MPS and other relevant legislation, as well as addressing current and future issues in marine plan areas. As a result, each of the marine plan areas has a variety of different 'groupings' (eg coastal change) and each 'grouping' has a number of potential options. The groupings and options reflect key issues in each marine plan area, and therefore vary across marine plan areas.

1.4 Groupings & Options

The North East consists of 32 groupings. Four groupings (Cumulative Effects, Governance, Evidence Gaps and Implementation) contain options which are not possible to assess through the SA. The remaining 28 groupings contain 252 individual options which have been assessed. The groupings and number of options assessed are set out in Table 1.1 below.

Table 1.1: Assessment Groupings & Options			
Grouping	Number of Options	Grouping	Number of Options
Access	12	Fisheries	8
Air Quality	6	Habitat Loss	18
Aquaculture	5	Historic Environment	9
Climate Change – Infrastructure	10	Infrastructure	10
Climate Change – Species	6	Litter	7
Coastal Change – Infrastructure	7	MPA Geodiversity	15
Coastal Change – Natural Processes	11	Non-Native Species	7
Co-existence	13	Ports and Harbours	4
Disturbance	10	Renewables- Cables	8
Dredge Disposal	4	Seascape	5
Dredge Harbours and Ports	4	Shipping	8
Ecosystem Approach	7	Species	13
Employment	15	Tourism and Recreation	9
Energy	9	Water Quality	12

2 Assessment Methodology

2.1 Introduction

This stage of the SA has involved assessment of options against the SA framework (which was developed at the scoping stage of the SA) (Table 2.1 below), taking into account the evidence base.

The assessment of the marine plan options has been designed to

- Be proportionate;
- Focus on identifying key potential significant effects to inform the decision making between options; and
- Refer to the baseline database to provide quality assured evidence as the basis of the assessment.

Each of the 28 groupings and 252 options for the North East Marine Plan Areas have been assessed to the same level of detail. The assessment has been organised within an Excel workbook which ensures a rigorous, evidenced based approach to the assessment.

Table 2.1: SA framework	
Overarching SA topic	SA Sub Topic
Physical and Chemical Aspects	
Cultural heritage	<ul style="list-style-type: none"> • Heritage Assets within marine plan areas • Heritage Assets adjacent to marine plan areas
Geology, Substrates and Coastal Processes	<ul style="list-style-type: none"> • Seabed substrates and bathymetry • Coastal features and processes
Seascape and landscape	<ul style="list-style-type: none"> • Effects on seascape and landscape
Water	<ul style="list-style-type: none"> • Tides and currents • Water temperature and salinity • Pollution and water quality • Marine litter
Air quality	<ul style="list-style-type: none"> • Air pollutants
Climate	<ul style="list-style-type: none"> • Greenhouse gas emissions • Climate change resilience and adaptation
Social and Economic Aspects	
Communities, health and well being	<ul style="list-style-type: none"> • Health and wider determinants of health Effects on communities • Effects on protected equality groups

Table 2.1: SA framework	
Overarching SA topic	SA Sub Topic
Economy	<ul style="list-style-type: none"> • Ports and shipping • Fisheries and aquaculture • Leisure / recreation • Tourism • Marine manufacturing • Defence • Aggregate extraction • Energy generation and infrastructure development • Seabed assets
Ecological Aspects	
Biodiversity, Habitats, Flora and Fauna	<ul style="list-style-type: none"> • Protected sites and species • Benthic and inter-tidal ecology Fish and shellfish • Marine mega fauna • Plankton • Ornithology • Non-indigenous species

An assessment spreadsheet was prepared for each marine plan area, which included all the relevant groupings. The assessment of options was undertaken in two stages: screening and assessment of significant effects, with the main focus of the assessment on the identification of significant effects. These steps are described in more detail in Section 2.3.

2.2 Involving the Advisory Group

The SA Advisory Group (SAAG) has been involved with the development and review of the approach to the options assessment. The Iteration 1 SAAG was held on 15th August 2017 at which the group reviewed and commented on the causes and effects relating to issues identified for further validation. The Iteration 2 SAAG was held on the 28th February 2018. As part of this session the SAAG members were invited to comment on the approach being taken to the options assessment and examples of some of the completed assessments of the groupings were provided.

The advisory group consists of the following organisations:

- Royal Yachting Association;
- Chamber of Shipping;
- Devon maritime forum;
- The Wildlife Trusts;
- Environment Agency;
- The Crown Estate;
- Natural England;
- Historic England;
- Thames Estuary Partnership;
- North West Coastal Forum;
- Wildlife and Countryside Link;
- World Wildlife Foundation;
- Severn Estuary Partnership;
- Association of Severn Estuary Relevant Authorities; and
- Durham Heritage Coast Partnership.

2.3 Stages in the Options Assessment Methodology

Screening of SA sub-topics

Prior to the assessment of options, a screening process was carried out to determine whether the SA sub-topics were relevant to the specific grouping.

In order to determine this, assessors carried out a brief review of the SA Database for relevant information. Following this, the assessor selected either 'Yes' or 'No' to indicate whether each SA sub-topic is screened in or out. This then subsequently greyed out the row within the assessment spreadsheet, to avoid accidental inclusion within the assessment process.

For any sub-topics which were deemed to be irrelevant to the grouping, a justification was entered into the worksheet. To ensure consistency, only two justifications were used:

- No key baseline issue of relevance; or
- No potential impact pathway.

Justification was not provided for the sub-objectives screened in, as the assessment process provides the required validation.

Identifying the Sustainability of the Options

The second step was to identify the potential significant effects and uncertainties of the options. Each option was considered against the relevant SA Framework sub-topics. Expert judgement and the updated SA Database (developed at the scoping stage of the SA process and refreshed prior to this assessment) was used as evidence for the assessment.

The North East assessment workbook contains separate tabs for each grouping, with all options listed (A, B, C, D etc.) across the top row of each grouping tab. As mentioned previously in Section 1.3, the number of options varies between groupings. Each option was assessed in turn. To provide consistency, assessors have used the following significance criteria for the assessment of each option:

- Potential significant positive effects (ie the existing situation would be much improved by the option, resulting in a significant positive outcome);
- Potential significant negative effects (ie an existing negative effect would be made worse by the option, resulting in a significant negative outcome);
- No significant effects (either only minor positive or negative effects, or no effect);
- Uncertain (depending on implementation); and
- Uncertain (lack of evidence).

Justification for significance was provided by reference to the SA Database. Assessors identified relevant issues and baseline data and provided at least one relevant topic identifier (eg Cultural_167) from the 'SA Database Topic Identifier' columns. Justification was not required for options that were deemed 'Not Significant' as there was no baseline data which would give rise to a significant effect.

For each of the groupings, the first option was always ‘do nothing’ and final option was always ‘none of the above’. The ‘none of the above’ options are all unknown and therefore the assessment records an ‘uncertain (depending on implementation)’ effect against each SA sub-topic for these options.

Following the completion of the assessment, assessors provided a commentary which justified the assessment and highlighted any potential significant effects resulting from specific options.

Mitigating Potential Negative Effects of Options

At the options assessment stage of the SA the key recommendation is to avoid taking forward options which the SA has identified could result in significant negative effects. It is also recommended that policy authors select the options which enhance the significant positive effects and seek to provide sufficient detail to minimise the uncertainty associated with the implementation of a policy.

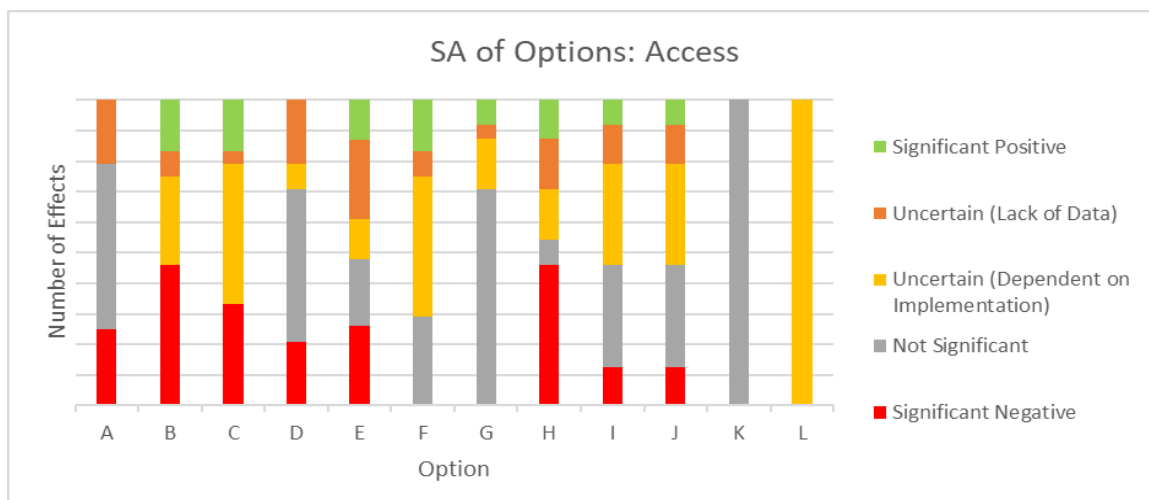
In addition, the assessors have highlighted, where possible, mitigation which can be considered to assist in the identification and development of the preferred options for the North East Marine Plan Areas.

Mitigation for the potential negative and uncertain effects of policies will be dealt with when preferred options have been developed and assessed in detail through the SA.

Assessment Outputs

The assessment spreadsheet has generated a pivot table for each grouping and an interactive graph for each marine plan area. The table counted the number of effects (i.e. significant positive, significant negative, not significant, uncertain depending on implementation and uncertain lack of data). An example of this is shown in Figure 2.1 below. These graphs provide a quick visual representation of the findings of the assessment for each grouping, allowing a comparison to be made of the relative performance of options.

Figure 2.1: Example Output



3 Results of the Assessment

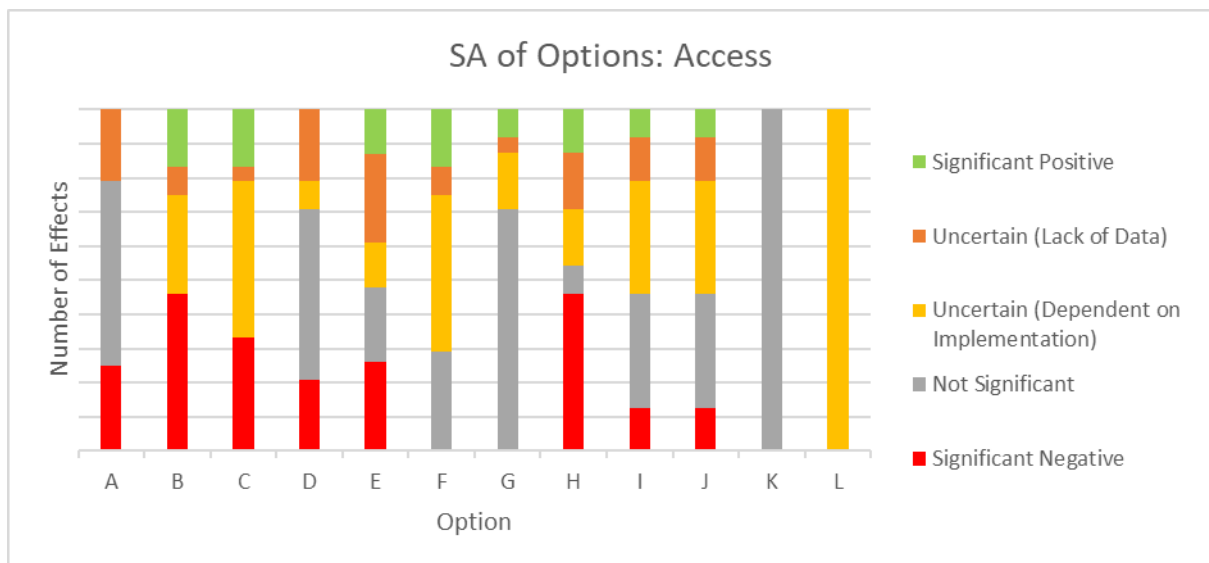
3.1 Introduction

The following sections set out the results of the options assessment for the North East Marine Plan Areas. Each section presents the comparison of the performance of options assessed for each grouping. The assessment has focused on identifying significant positive and negative effects and highlighting where there is a large amount of uncertainty, either due to a lack of data or due to how the policy could be implemented.

For each grouping a comparative graph is provided which shows the performance of each of the options. A narrative of the assessment is also provided to aid the interpretation of the graph which makes reference to the relevant SA Sub-Topics.

For detail on the results of the assessments, including the references to the supporting data which justify the assessment, please see Appendix A: North East Inshore and Offshore Marine Plan Areas Assessment Spreadsheet.

3.2 Access



The assessment of the access grouping of options has identified that there is the potential for significant negative effects with relation to Options A and D, whereas Options F and G have the potential to give rise to significant positive effects. Options B, C, E, H, I and J have the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

The presence of, and access to, heritage assets is increasingly recognised as being important to wellbeing (Cultural_179, Cultural_186). Marine development may however have adverse impacts on the marine historic environment (Cultural_176), and as such, there is a potential for heritage assets to be negatively affected by increased access and associated development (Cultural_176). Conversely, there is also potential for some features to be better protected through increased investment, knowledge and education which would accompany increased access. Although none of the options would have a significant effect on heritage assets within the marine plan area, nor adjacent to the marine plan area, an increase to access must be executed in a sustainable manner to avoid risk of degradation to heritage assets.

There are four known locations across Druridge Bay and Seaton Sluice where quicksand and sump holes exist, and there is a potential for similar occurrences at other sites within the North East (Geol_230). Intertidal construction can affect coastal processes (Geol_228), and so Options B, C, D, I and J which encourage access could exacerbate the issues within the baseline database.

Increased access could lead to more litter as detailed by baseline issue Economy_630, and therefore significant negative effects have been identified for the options which maintain or increase access (Option A and Options B, C, D, G, H, I and J respectively).

Increased shipping activity, port expansion and associated industry growth could lead to increased Sulphur Oxides, Nitrous Oxides and Greenhouse Gas Emissions at coastal locations (Air_19). Increased access would exacerbate this. Significant

negative effects on both the Air Pollutants and Greenhouse Gas Emissions SA Sub-Topics are therefore identified for Options B, C, D, E, H, I and J.

There is a relationship between coastal access, coastal defence and the effects of climate change such as coastal squeeze (Climate_129). It may not be possible to increase access in certain places where coastal squeeze is occurring or where intervention is needed to protect the coast.

Despite access to high quality open spaces and opportunities for sport and recreation making an important contribution to the health and well-being of communities (Communities_46), the regulation and management of access to the marine areas is currently inadequate to be sustainable into the future (Communities_160). Options G, I and J will especially result in positive effects on health and an aging population by ensuring sustainable access development.

It is not possible to anticipate future commercial opportunities, and so capacity needs to be provided at a wide range of port facilities and locations, to provide the flexibility to match the changing demands of the market (Economy_430). Increasing access, for example, to recreational boating, could conflict with future requirements for ports and shipping activities, hence significant negative effects on ports and shipping are identified for Options B and H.

Fishing activity is sensitive to changes in other sea uses and marine developments especially have the potential to prevent, displace or encourage fishing activities (Economy_628). Significant negative effects of increased access, associated development and activities on fisheries and aquaculture are again identified for Options B and H.

The sea can provide a variety of recreational, leisure and tourism opportunities (Economy_482) – there is an opportunity to support enhanced access to the coastal and marine area because without access there are many unrealised potential ecosystem services (Communities_159). Increasing access would be beneficial for leisure, recreation and tourism, hence significant positive effects are identified for Options B, C, E, F and H which will increase access.

Non-defence activities in the marine area have the potential to impact the MoD elsewhere (Economy_633), so an increase to access could cause conflict with defence activities. Limitations of activities and access may be required in certain areas. Options B and H are identified as having potential for significant negative effects with regards to defence.

There is an existing issue for protected sites and species caused by recreational pressures at Flamborough Head Special Protection Area (Biodiv_736), which could be exacerbated by all options unless adverse effects on protected sites and species are carefully managed. Option F, which promotes an ecosystem services approach and Options I and J, which promote natural capital approaches would benefit protected sites and species, but the overall effect could depend on implementation. Similarly, Options F, I and J could provide a potential positive effect to benthic and inter-tidal ecology and fish and shellfish, which are under general pressure from

factors such as climate change and economic activities such as shipping. Again, there is some uncertainty depending on implementation and lack of evidence.

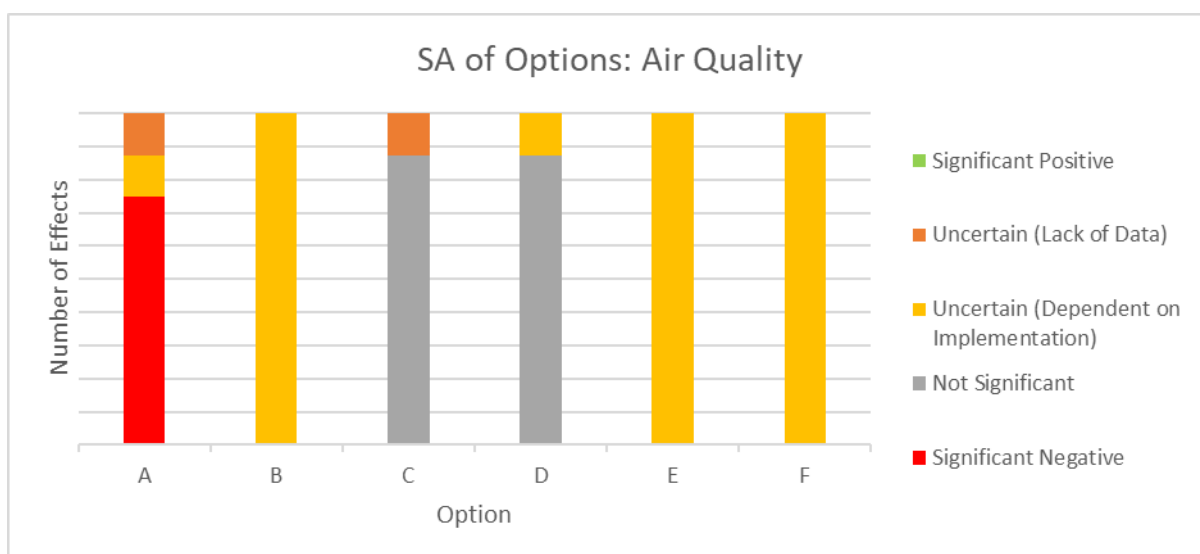
Increased disturbance to marine mammals is caused by sightseeing and pleasure boats, leading to vessel avoidance, increased dive time, increased energy expenditure, reduced resting time and potential abandonment cetacean habitats. This potentially results in a reduction of energy reserves which could affect foraging efficiency, overall fitness and reproductive capacity (Biodiv_546, Biodiv_547, Biodiv_554, Biodiv_555, Biodiv_556). This baseline issue would be exacerbated by all options, and there is uncertainty over whether ecosystem services and natural capital approaches could provide mitigation.

Most species of waterbird, but especially waders, can be affected by habitat loss due to activities which include the construction and extension of marinas or harbour developments (Biodiv_453). This baseline issue would be exacerbated by all proposed options, as they encourage increased access and would likely see construction within or adjacent to the marine environment. Option A is the only exception to this. Similarly, all options excluding A would also exacerbate the spread of invasive species. It is uncertain how the Option F ecosystem services approach and Options I and J natural capital approaches could mitigate for these issues.

Mitigation

- Measures are needed to avoid increases in private motorised transport to access the coast on land, and to reduce both air pollution and greenhouse gas emissions from ships.
- A balanced approach must be taken when considering maintaining or increasing access to the coast. This is of particular importance when adapting to climate change, protecting the interests of ports and shipping and also protecting the interests of fisheries and aquaculture. In addition, defence activities could require limitations of access in certain areas.
- Increased access has a significant potential to disturb marine species. Access to protected sites needs to be carefully controlled in order to ensure that the species and habitats they are designated for remain protected. Marine mega fauna should be afforded protection from disturbance by sightseeing and pleasure boats, which is a current issue highlighted within the baseline. Measures are needed to control disturbance of bird species, particularly in key locations such as Special Protection Areas.
- Monitoring could be needed to identify a link between human activity in the marine environment and adverse effects on plankton.
- Control measures are needed to reduce the risk of invasive species entering the marine plan areas from recreational boating and other access routes.

3.3 Air Quality



The assessment of the air quality grouping of options has identified that there is the potential for significant negative effects with relation to Option A. No further options have given rise to any significant effects.

Air and sea temperatures have risen in the North East Atlantic over the last 25 years with the largest increases of both sea surface and marine air temperature of all UK waters (Climate_117). There are ongoing challenges with air quality from transport emissions which is contributing further to climate change. Climate change is predicted to exacerbate pollution and water quality (Water_300) which contributes to rising sea temperatures and ocean acidification.

For these reasons significant negative effects have been identified in relation to Option A 'do nothing', for water temperature and salinity, pollution and water quality, air pollutants, greenhouse gas emissions, climate change resilience and benthic and inter-tidal ecology, fish and shellfish.

Minor positive effects have been identified in relation to Option C as it offers a more draconian approach to greenhouse gas emissions and puts the onus on public authorities. However, none of the options directly address Nitrous Oxide (Nitrous oxides) gasses, which also contribute to worsening of air quality. Option C has had an uncertain effect on ports and shipping as there is potential for negative effects as a result, however, there is not enough information within the baseline to support this. Option B is similar to Option C and could result in some minor positive effects. However, due to weaker wording, the assessment has identified uncertainties.

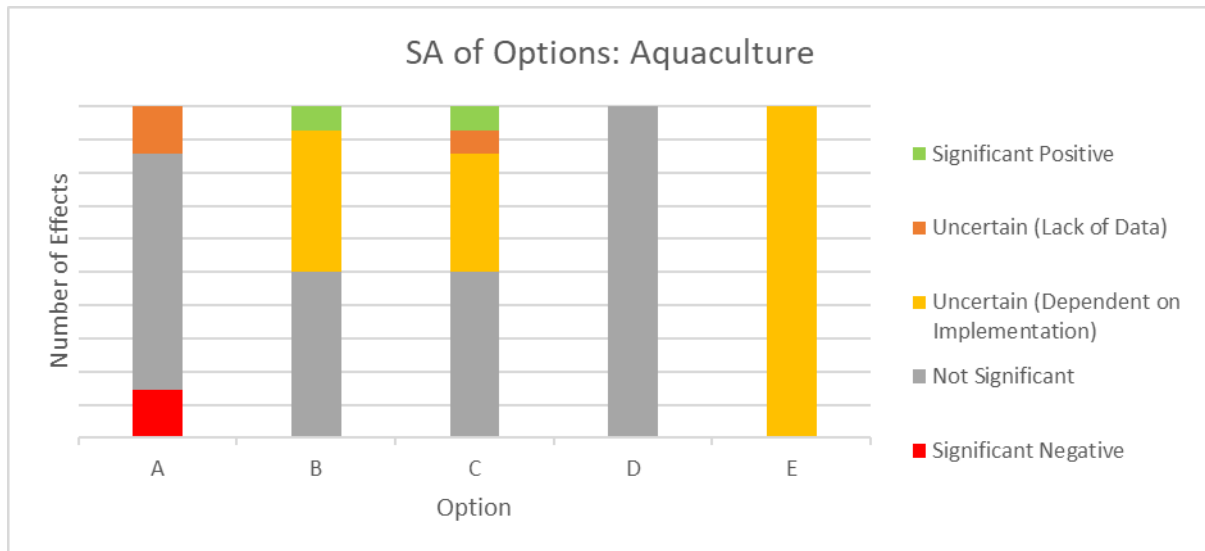
Although, shipping plays a huge part in the contribution to air pollutants and greenhouse gas emissions, it is an essential and valuable economic activity in the North East Marine Plan Areas. Limits made to emissions could have a negative impact on the sector, however, this would depend on how the options would be implemented. Option E signposts to Defra's clean air strategy, which aims to introduce electrification where it would be economically worthwhile to do so. It is uncertain the effect that this might have on the industry.

Intertidal and estuarine species and habitats are at particular risk from a variety of diffuse atmospheric pollutants. Persistent contamination can reduce biodiversity, resulting in impoverished communities composed of pollution-tolerant organisms (Biodiv_420). Minor positive effects have been identified in relation to Options C and D, as a reduction in greenhouse gas emissions could work towards protecting the benthic intertidal environment. This is not specifically mentioned within the policies and is therefore dependent upon how they would be implemented.

Mitigation

No specific mitigation has been identified.

3.4 Aquaculture



The assessment of the aquaculture grouping of options has identified that there is the potential for significant negative effects with relation to Option A. Options B and C have the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

The aquaculture sector is a key contributor of marine litter. It is expected that aquaculture developments could generate more waste with a risk of pollutants entering the marine environment. Litter may include that produced by aquaculture and commercial fishing and plastics (Biodiv_467). The SA database reports issues related to ingestion of or entanglement in marine litter for marine mammals and turtles (Biodiv_467). The lack of policies could make the situation worse or significantly worse and therefore a significant negative effect has been identified for Option A, with regards to marine litter and marine mega fauna.

Shellfish and algal culture can improve local water quality as these activities require good quality water if sold for food and the industry recognises the importance of being neutral or positive regarding water quality. For most of the options, no significant effects are predicted for water quality or the outcome is deemed to be uncertain due to the lack of information on the proposed options. However, these are likely to not be significant given the environmental benefits of aquaculture and the scale of this type of development.

Uncertainty has been recorded for the assessment of ports and shipping. Aquaculture can represent a constraint for eg increased competition for sea space, navigational safety issues (Economy_621) and also opportunities as it can promote economic development for the port and shipping sectors. For small ports, aquaculture could be a proportionately more significant revenue stream than for larger ports. It is also very geography dependent, as ports only benefit if near aquaculture locations.

The North East has the least aquaculture activity out of the four marine plan areas; there are only two shellfish sites (for native oyster and pacific oyster around Holy Island) (Economy_300 and 462). Options B and C present opportunities that are

likely to improve the existing situation for the fishing and aquaculture sector in the NE. For these reasons, significant positive effects have been identified.

There are potential interactions identified in the database between aquaculture and recreational stakeholders (Economy_631). Further aquaculture developments could result in trade-offs with recreational activities (Economy_639). However, this would be dependent upon the type, size and location of developments that come forward, therefore, uncertainty has been recorded for this assessment.

There is no evidence in the database that aquaculture represents a key issue for energy generation and infrastructure. However, this grouping may have an impact on the development of energy projects at sea and within the coastal environment. The potential effects are unlikely to be significant.

Aquaculture can contribute to the introduction of non-native species and is reported to be among the key pathways (as outlined in Economy_629; Biodiv_636). For this reason, Options B and C have resulted in significant negative effects for non-indigenous species, as they support further development of aquaculture and fisheries.

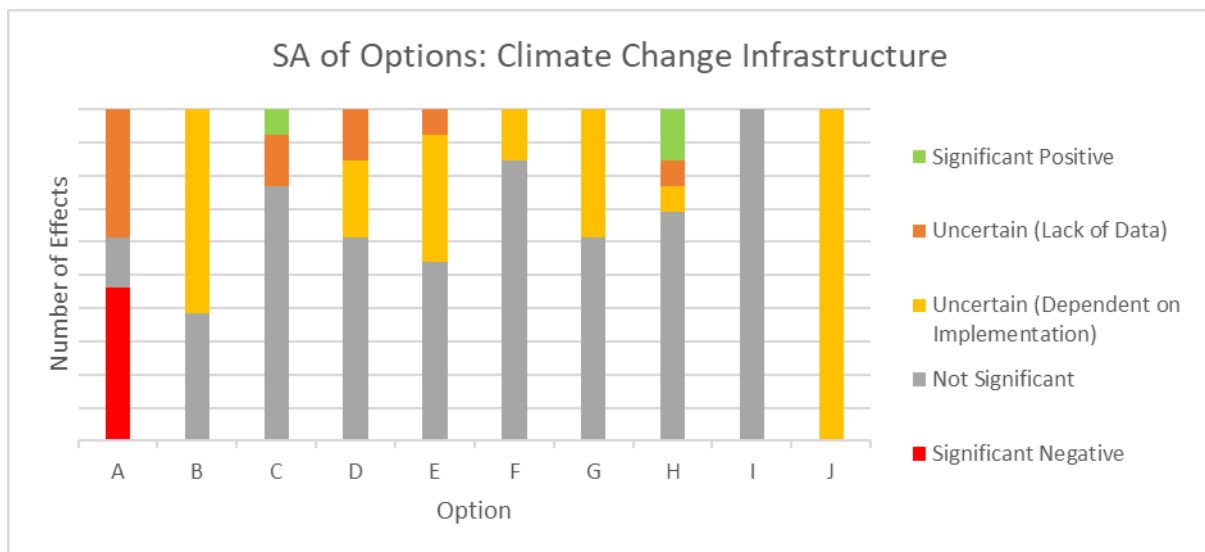
Aquaculture can influence primary and secondary productivity and can start a series of cascade effects on water column, including benthic species and phytoplankton (Economy_629). Effects of pollution from aquaculture can also affect both benthic species and plankton. However, aquaculture can also have positive effects on the marine environment, particularly water quality. Uncertainty has been recorded for the assessment of benthic and inter-tidal ecology fish and shellfish and plankton.

The SA database reports an issue related to the marked reductions in waterbird survival as a result of shellfish harvesting (Biodiv_452). It is unclear if this statement refers to commercial or recreational harvesting of shellfish and therefore an uncertain effect is identified. Without specific proposals targeting this issue, the problem could become worse.

Mitigation

- Refer to marine plan policies which target the reduction of marine litter.
- Refer to marine plan policies which protect birds.

3.5 Climate Change – Infrastructure



The assessment of the climate change infrastructure grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options C and H have the potential to give rise to significant positive effects.

Adverse effects of natural processes including the direct consequences of climate change are having a direct impact on heritage assets both on and close to shorelines, in intertidal areas, and may be having indirect impacts on submerged material (Cultural_168, Cultural_174, Cultural_181). Option A would therefore have significantly negative impacts on heritage assets both within and adjacent to the shoreline as it does not address issues highlighted within the baseline database. If more stringent, Options D and G could have a significant positive impact.

Increased storminess and sea level rise are forecast as a result of climate change and this could lead to coastal change and inundation of land, partially through impacts on hydrological systems exacerbating the effects of tides and currents (Geol_227, Water_298). In developed areas, this brings the risk of damage to infrastructure and houses (Geol_233). Sea defences require investment in order to continue to be effective. Degradation of ageing defences may increase erosion of remaining infrastructure, further increasing the cost of maintenance work (Geol_234), coast protection, flood defences and intertidal construction, all of which can affect coastal processes and so have broader negative impacts (Geol_228). Implementation of Option A would likely have significant negative effects on coastal features and processes as it fails to address these issues as highlighted within the baseline database.

Climate change is predicted to exacerbate pollution and water quality through fluvial flows, flooding and sewer overflows (Water_300), all of which will require the provision of adequate infrastructure. Significant negative effects are likely if Option A is implemented as it does not address this key baseline issue.

The rate of coastal erosion is likely to increase as sea levels rise. This could lead to deeper water in near shore areas, which would in turn cause an increase in wave

energy reaching the coast. Impacts of coastal erosion on buildings and infrastructure located along the coast are therefore likely to increase (Climate_116). As coastal erosion and inundation in some areas may be uneconomic or undesirable to halt through engineering, the realignment of some coastal infrastructure and housing may be expected (Climate_131). Climate change impacts at the coast have wider environmental and social implications, and are derived from both inundation processes, and anthropogenic action including coastal defence and other coastal infrastructure (such as cable and pipe landfall, new port infrastructure) and sea-level change (Climate_134). Option A does not address key baseline issues related to climate change resilience and adaptation. Options B (existing policy X-CC-2) and C are likely to have significant positive impacts if more stringent.

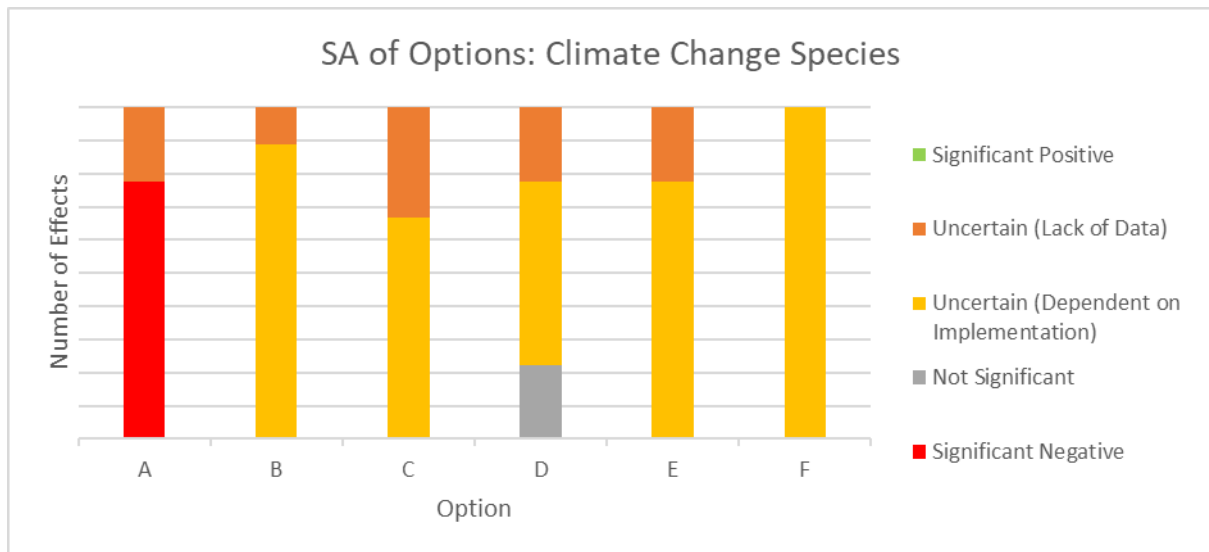
As an indirect effect of climate change, securing manufacturing investment and the associated supply chain for offshore wind in the UK will require ports with the required facilities and commercial land. This would provide an industrial hub for wind turbine manufacturers and their supply chain. Ports suited for Round 3 offshore wind farm development in the North East Marine Plan Areas are Newcastle Upon Tyne and Hartlepool (Economy_532). Climate change may also see marine aggregate contribution to energy security and economic development through provision of fill for major coastal infrastructure projects, for example ports, renewable energy and nuclear energy projects (Economy_479). Implementation of Option H could have significant positive impacts on both marine manufacturing and aggregate extraction.

An increase in extreme weather events as a result of climate change has the potential to adversely affect infrastructure attached to the seabed, for example from increased scouring around wind turbine foundations (Climate_212). To do nothing, as proposed by Option A, is likely to have a significant negative impact on energy generation and infrastructure development. Whilst not highlighted in the database, it should be noted that increased scour of the seabed around infrastructure eg wind turbines can have secondary adverse effects on the benthos.

Mitigation

If more stringent, Options D and G could have a significant positive impact. Options B (existing policy X-CC-2) and C are likely to have significant positive impacts if more stringent.

3.6 Climate Change – Species



The assessment of the climate change species grouping of options has identified that there is the potential for significant negative effects with relation to Option A. None of the options have the potential to give rise to significant positive effects. Implementation of Option A is likely to have significantly negative impacts on geology, substrates and coastal processes, would not alleviate coastal squeeze and would therefore not halt the loss of intertidal habitat as highlighted by baseline data Biodiv_521 and Geol_194. Option B (X-BIO-1) would have the potential to cause significantly positive impacts if more stringent.

Due to the broad nature of effects induced by climate change, climate change resilience and adaptation will have an equally large scope. Option A does not address the key baseline issues related to climate change resilience and adaptation (see Climate_115 and Climate_126), hence its implementation is likely to have a significant negative impact.

Climate change-induced sea temperature rises causes the redistribution of species. This presents opportunities for fisheries and aquaculture and challenges around predator-prey interactions, competition and population level impacts (Climate_206). It has caused a number of changes in the plankton communities surrounding the British Isles and North Sea, resulting in trophic mismatch between zooplankton and fish larvae, leading to fish recruitment failure (Biodiv_412). Although not explicitly stated in the database, this fish recruitment failure will likely impinge on currently active fisheries. There are also likely to be effects on fisheries if salinity changes in the future as this too will affect the range and distribution of many marine species (Water_328). Both positive and negative effects may be had on the future of fisheries and aquaculture as a result of climate change. Without further data collection, it is not possible to say whether the proposed options would have a significant effect on fisheries and aquaculture, nor whether this would be positive or negative. It does remain likely however that Option A would have a negative effect.

Coastal squeeze as a result of climate change, sea level rise, and increased erosion from storms results in loss of intertidal habitats and species which may require new

compensatory habitat to be created and/or designated in coastal areas, particularly estuaries (Biodiv_526). Option A does not address key baseline issues regarding protected sites and species, so its implementation is likely to have a significantly negative impact. If more stringent, Options B (X-BIO-1) and C in particular have the potential to have significantly positive impacts.

Broad-scale changes in habitats and species occur as a result of climate change and its associated increase in sea temperature, sea level rise, ocean acidification, coastal squeeze, storm events and creation of coastal defences. Effects include alteration and/or loss of habitat; reduced prey availability (for benthic and intertidal organisms) due to impacts on plankton; declining biodiversity; range shift of native species and increasing abundance of non-indigenous species, all of which ultimately alter the structure of communities and ecosystem processes (Biodiv_421, Biodiv_422, Biodiv_428, Biodiv_429, Biodiv_430, Biodiv_543). Sensitive intertidal areas are particularly vulnerable to the effects of climate change due to coastal squeeze (Biodiv_423, Biodiv_424, Biodiv_430), migratory fish face various challenges (Biodiv_726), and shellfish calcification is affected by ocean acidification.

Option A does not address the key baseline issues regarding benthic and inter-tidal ecology nor fish and shellfish, and as such, its implementation is likely to have a significantly negative impact. If more stringent, Options B (X-BIO-1 & X-FISH-4) and C in particular have the potential to have significant positive impacts.

Indirect effects of climate change are had on marine mammals. For example, species redistribution of fin and minke whales, and a southward shift in harbour porpoise populations, are likely to be a result of increasing sea surface temperature and varying food abundance (eg sandeels) (Biodiv_435, Biodiv_436, Biodiv_437). Reduced prey availability of marine mammals is exacerbated by ocean acidification impacts on plankton (Biodiv_431). Option A does not address the key baseline issues regarding marine mega fauna and would therefore be likely to have significantly negative impacts if it were to be implemented. If more stringent, options B X-BIO-1, X-BIO-2 and X-CC-1 in particular have the potential to have significant positive impacts.

Rising sea temperature has caused a number of changes in the plankton community surrounding the British Isles and the North Sea, which has led to trophic mismatch, failure of fish recruitment (Biodiv_412), and increased risk of Harmful Algal Blooms (Biodiv_623). Ocean acidification can also affect phytoplankton community structure and diversity by hindering the calcification process (Biodiv_622). Plankton can either ameliorate or increase the rate of climate change through feedback mechanisms with atmospheric greenhouse gases – they act as a carbon dioxide sink during photosynthesis and source during calcification. This feedback mechanism is complex and can be affected by additional processes including ocean acidification and increased sea surface temperature (Biodiv_646, Biodiv_417). Implementation of Option A would be likely to have widespread negative impacts as it does not address key baseline issues regarding plankton. If more stringent, Option B X-CC-1 in particular has the potential to have significant positive impacts.

Coastal squeeze has led to a loss of intertidal feeding resource, including that used by foraging birds (Biodiv_526, Climate_126). Seabird breeding failure (of black-legged kittiwake and seventy other offshore species, plus arctic skua and other

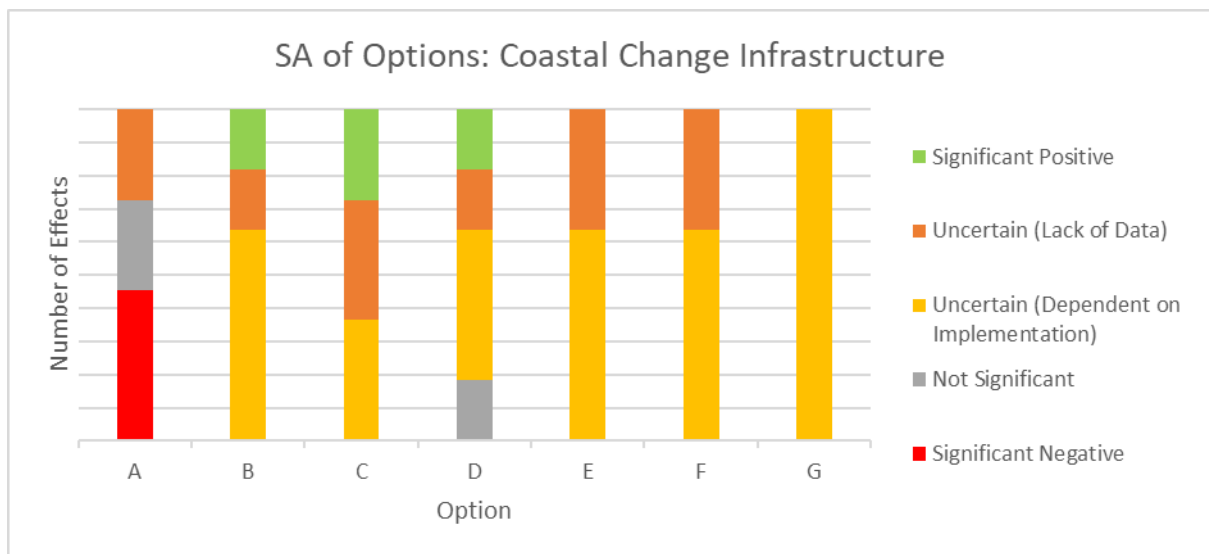
inshore species) observed in the North Sea has been linked to variations in food availability as a result of increased sea temperatures – more specifically, the decline in prey sandeels due to sea surface temperature affecting zooplankton population compositions (Biodiv_449, Biodiv_548). Option A does not address key baseline issues concerning ornithology, hence its implementation is likely to have significant negative impacts. If more stringent, Option B (X-BIO-1 and X-BIO-2) have the potential to have significant positive impacts.

There is a potential for invasive species to increase as a result of climate change. This includes both a greater number of species and a greater selection of areas (Biodiv_526, Biodiv_558). Species range shifts are largely due to changing sea temperatures, and/or the opening up of new niches to be exploited by invasive species as native species' populations become impoverished. Invasive species are generally considered a negative phenomenon, for example, the risk of pacific oyster spread from the South East and South West marine plan areas to the North West marine plan area is considered a significantly negative issue. The spread of this species may also be an issue for the North East Marine Plan areas, but the baseline database does not state this, nor does it explicitly state whether invasive non-native species are considered a positive or negative phenomenon for this marine plan area. Due to the lack of baseline data, the effects of the proposed policies on non-indigenous species within the North East Marine Plan areas cannot be determined.

Mitigation

Option B (X-BIO-1, X-BIO-2 and X-CC-1 & X-FISH-4) and Option C would have the potential to cause significantly positive impacts if more stringent.

3.7 Coastal Change Infrastructure



The assessment of the coastal change infrastructure grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options B, C and D have the potential to give rise to significant positive effects.

As climate and coastal change is having a direct impact on heritage assets on or close to shorelines (Cultural_174), Option A could give rise to significant negative effects in relation to heritage assets within and/or adjacent to marine plan areas. Changes in habitat condition and habitat loss through sea level rise, coastal squeeze, coastal change has resulted in significant negative effects for both ornithology and benthic and inter-tidal ecology, fish and shellfish. Negative effects with regards to Option A has also been identified in relation to climate change resilience and adaptation.

Significant positives effects have been identified for benthic and inter-tidal ecology, fish and shellfish and ornithology, in relation to Option B. This option aims to address key coastal change issues, enhance habitats and bring about overall gains in natural capital. Subsequently, this option is less favourable for energy generation, ports and shipping and aggregates and could result negative effect, depending upon implementation. This option could result in trade-offs for these industries as space and activities could be limited, in order to support biodiversity.

Further significant positive effects have been identified in relation to Option C with regards to seabed substrates and bathymetry, coastal processes and climate change resilience. This option has performed well as it considers the long-term effects of climate and coastal change and ensures that future developments are not impacted by climate change over its planned lifetime.

Option D is similar to Option C as it considers the long-term effects climate and coastal change, but it also considers long-term risks to people, infrastructure and components of the marine ecosystem that generate natural capital. This option has had a significant positive effect on climate change resilience, ornithology and for

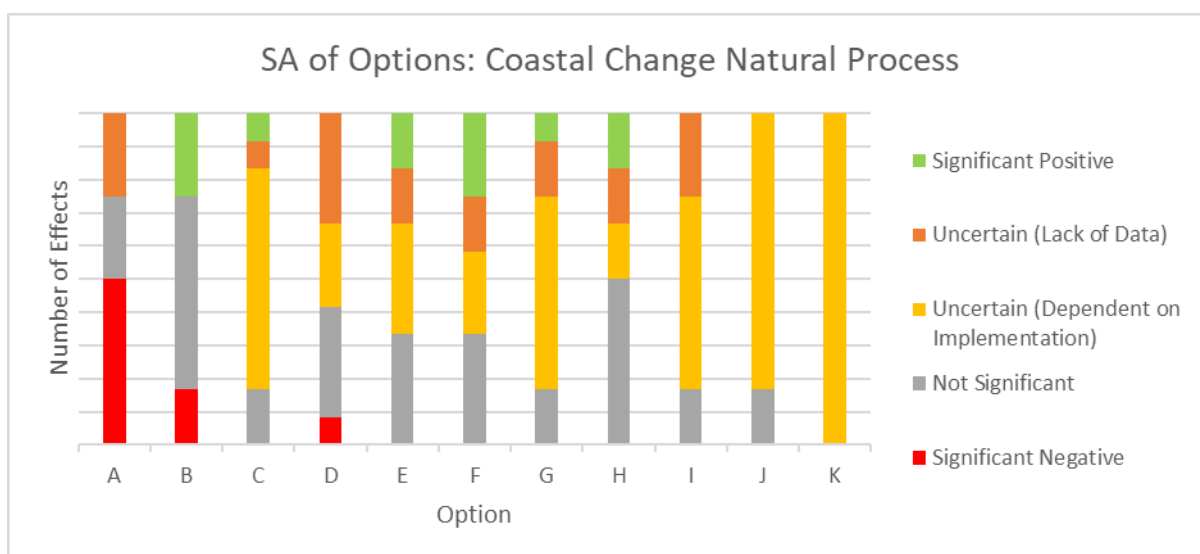
benthic and inter-tidal ecology, fish and shellfish. However, it is not clear what form of protection would be used to ensure that the coastlines are resilient to coastal change. There is potential for conflicts if a harder engineering approach is used.

No significant effects have been identified in relation to Options E and F. Both of these options aim to work with natural processes where possible. It is not clear as to what this could entail and has therefore resulted in uncertainties within the assessment.

Mitigation

- Protection of heritage assets within and/or adjacent to marine plan areas needs to consider the additional risks from climate and coastal change.

3.8 Coastal Change Natural Processes



The assessment of the coastal change natural processes grouping of options has identified that there is the potential for significant negative effects with relation to Options A and D whereas Options C, E, F, G and H have the potential to give rise to significant positive effects. Option B has the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

High levels of coastal erosion have led to reduced sediment input and intertidal sediment habitats being increasingly confined in estuarine areas. Intertidal habitats such as saltmarsh, mudflats and rocky habitats continue to be at risk (Climate_193). For these reason, Option A 'do nothing' has resulted in significant negative effects in relation to protected sites, ornithology and benthic and inter-tidal ecology, fish and shellfish.

Climate and coastal change is having a direct impact on heritage assets on or close to shorelines (Cultural_174), therefore significant negative effects have been recorded in relation to heritage assets within and/or adjacent to marine plan areas. Significant negative effects for Option A has also been identified in relation to climate change resilience, as it is assumed that coastal change and coastal flooding are likely to be exacerbated by climate change, with implications for activities and development on the coast. There are some instances where Option A could be beneficial for coastal processes, however, this is uncertain as it could lead for the need of protection further down the coastline.

Option B has resulted in a number of significant positives for biodiversity, as it aims to enhance coastal habitats and protect ecosystem services where possible. Subsequently, this option has had significant negative effects on energy generation and aggregates, as it is likely that future development would not be supported, and activities could be limited. Similarly, significant negative effects have been identified in relation to Option D with regards to aggregate extraction. It is likely that aggregate extraction will have adverse effects on existing processes at a sediment cell level, which Option D aims to protect. This could see a reduction in the number and/or yield of extractions in order to minimise effects on natural processes.

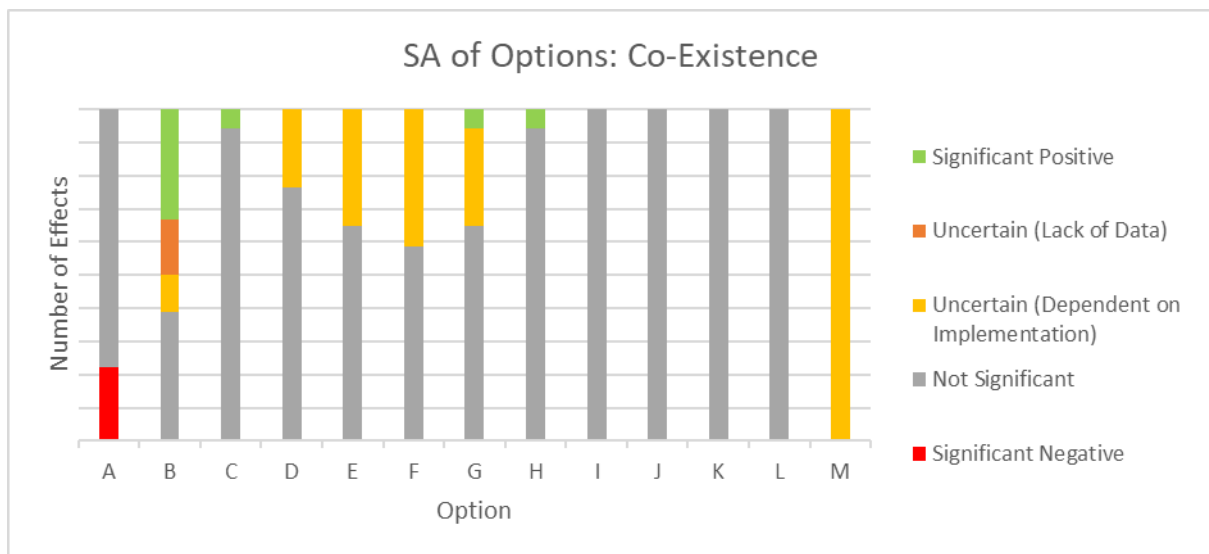
Significant positive effects have been identified in relation climate change resilience with regards to Options C and G. Both options consider the long-term climate and coastal change projections and works to ensure that appropriate development is not impacted by coastal change over its planned lifetime, nor lead to unnecessary increased demand for protection in the future. Option G is focuses more specifically on coastal and estuarine development.

Option F, E and H are similar to Options C and G as they too, focus on the long-term effects on climate and coastal change, but they are more focused on the potential negative effects on people, infrastructure and components of the marine ecosystem that generate natural capital. Options F and H have resulted in significant positive effects on climate change resilience, ornithology and benthic and inter-tidal ecology, fish and shellfish. There is more uncertainty surrounding Option E as allows the applicant to either avoid, minimise or mitigate, which could make Option E less stringent.

Mitigation

- Mitigation would be needed to ensure that development is sensitive to the historic environment, and any exposed assets would need to be carefully handled and preserved as much as possible.

3.9 Co-Existence



The assessment of the co-existence grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options B, C, G and H have the potential to give rise to significant positive effects.

Sand dune systems in the North East are threatened by several activities, including coastal squeeze, recreational activities, vehicle access for fisheries and overgrazing which all lead to erosion, and in the absence of adaptation (which may become prohibitively expensive), beaches will narrow, and some dune systems may be lost (Biodiv_706, Climate_129). Option A may have significant negative effects on coastal features and processes due sensitivity of certain ecosystems within the North East Marine Plan areas. Conversely, Option B may have significant positive effects, and there is evidence in the SA database to support the development of such proposals (Landscape_171).

The SA database identifies a range of physical changes relating to climate change resilience and adaptation which interact with one another, including sea level rise, storm events, and changes in the availability and movement of sediment. These can affect saltmarshes (Climate_193). Option A may have significant negative effects due to lack of action on important issues related to climate change resilience and adaptation. The database provides evidence that this is a pressing issue which require the development of specific policies (Landscape_171). There are also opportunities for cooperation to enhance the resilience of existing projects/infrastructure; however, there is a lack of evidence in the baseline database to support this.

Ports and shipping activity are affected by the competition for marine resources and sea space (Economy_621), although there is currently a reduction in import and export activity due to reductions in manufacturing (Economy_713). Certain trade-offs prevent port expansion projects, especially concerning the natural environment and recreation (Economy_715). Options B and C may have significant positive effects on ports and shipping, although there is no mention of any supporting information for the North East Marine Plan Areas in the SA Database. There are however some

issues relating to non-port related developments (eg housing) being approved next to ports and marine industry sites.

There is an opportunity for aquaculture products to be used for biofuel and cosmetics as well as a food source (Economy_768). Competition does however exist between fisheries and aquaculture and marine developments (Economy_628). In accordance with information provided in the baseline database (see Economy_769), Option B may have significant positive effects on fisheries and aquaculture.

Cumulative visual impacts of multiple existing and new activities and developments have implications for tourism, recreation, wellbeing and cultural values within and outside of the marine plan area (Landscape_170). The cumulative effects of climate change will too have an impact on tourism and related activities (Economy_747). In addition, a key issue exists concerning the combined effects of marine development on recreational activities, including boating (Economy_631). Implementation of Option B is likely to have significant positive effects on leisure, recreation and tourism.

Whilst Option D could have positive effects, it is unknown if these would be significant at the wider scale for the North East Marine Plan Areas, hence this option has been assessed as 'not significant'.

Seabed assets are part of larger energy and communication schemes, and as such are essential to support the operation and development of renewables as well as communications networks. Cumulative effects exist at landfall locations (Economy_627) and the SA database reports competition of space with other sectors (Economy_727, Economy_779). Implementation of Option A would likely worsen the key baseline issues over time as infrastructure grows, having significant negative effects. This is likely to require a change in policy to avoid/minimise potential cumulative effects between seabed assets and other marine developments.

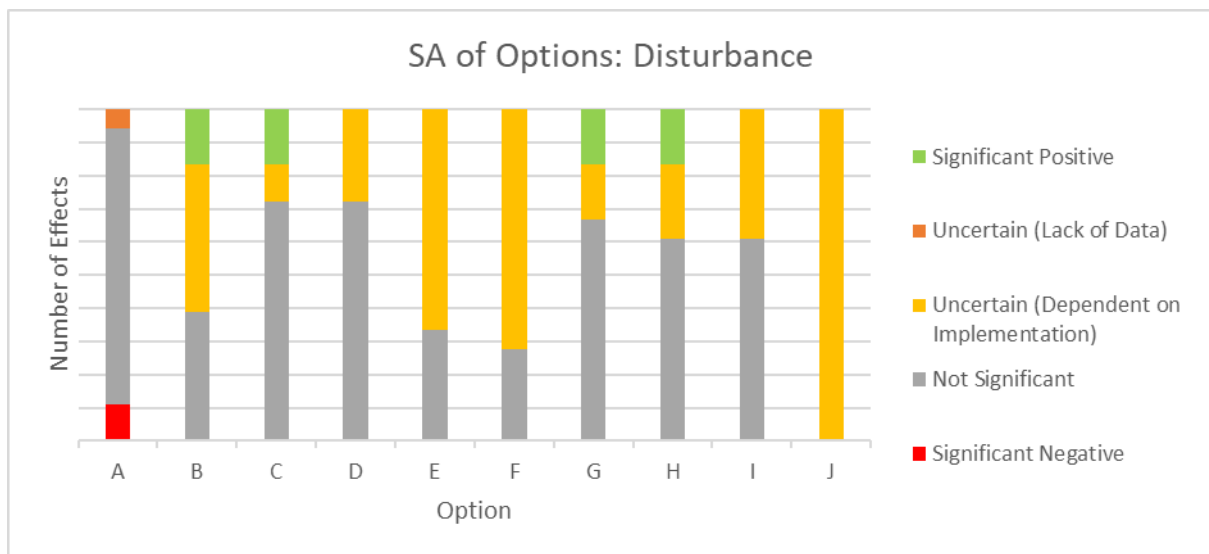
Sand dune systems in the North East are threatened by several activities, including coastal squeeze, recreational activities, vehicle access for fisheries and overgrazing, all of which lead to erosion (Biodiv_706). Implementation of Option A is likely to have significantly negative impacts on protected sites and species, as it would allow the key baseline issues to worsen over time. Options G and H are likely to have significant positive effects as their implementation would provide a response to potential adverse effects as identified within the baseline database.

Mitigation

- Proposals should ensure that the most vulnerable sections of the coastline will not be affected significantly by existing and new marine developments or users of coastal areas.
- Proposals should consider the current issues occurring as a result of climate change and factor these in for existing and new marine developments.
- Proposals should include appropriate measures to manage the issue surrounding seabed assets and also avoid/minimise potential cumulative effects between seabed assets with other marine developments over time.

- Proposals should include appropriate measures to manage the issues surrounding protected sites and species and also avoid/minimise potential cumulative effects in the long term on protected sites and species.

3.10 Disturbance



The assessment of the disturbance grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options B, C, G and H have the potential to give rise to significant positive effects.

Options B, C, G and H which aim to improve coherence or connectivity of protected sites have been scored significant positive. Other Options (E and G) that aim to minimise disturbance but don't refer to protected sites have scored uncertain as proposals within protected sites will be judged differently and there is a lack of detail as to how this will be managed.

The baseline indicates negative trends in terms of benthic ecology, marine megafauna and ornithology in the North East Marine Plan Areas based upon existing policy. Options (B, D, E and G) that propose to support proposals that enhance or facilitate coastal habitats and priority species have been judged to have a significant positive impact. Other options that suggest any disturbance must be avoided or damage minimised have been scored as uncertain as it is not clear what the impact of those options will be. Protection of priority habitats will prevent disturbance to seabed substrates and coastal features as a by-product, but effects are judged to be minor positive due to the difference in spatial scale.

The only option which is explicitly relevant to heritage is Option F: public authority decisions related to functions capable of affecting the North East marine area must ensure measures are implemented to avoid or minimise adverse effects on protected marine habitats, species and heritage assets. However, this wording could easily be added to other options.

Sunderland, Tees and Hartlepool, and Port of Tyne are major ports in the North East and most important interactions are potential noise and visual disturbance to highly mobile species and contamination to benthic habitats and water (Econ_373). There is also an interaction between increasing access to the marine area for recreation and tourism and protection of heritage and conservation sites. The extent to which these interactions impact the economy will be dependent on specific implementation.

There is uncertainty as to the extent of aquaculture in the North East due to commercial sensitivity (Economy_300) but there is a significant presence of UK and non-UK fishing vessels that are impacting benthic habitats and Marine Protected Areas (Biodiv_425).

Areas of manufacturing / heavy industry that affect the coastal zone in the North East include Tees and Hartlepool, Tyne and Wear, Redcar and Billingham. The main focus in this area is the chemical industry and energy industry (Econ_549). There is a potential interaction here between manufacturing and all biodiversity components. Aggregate wharves are within the North East (River Tees, River Tyne and Sunderland) (Economy_585). Aggregate dredging has the potential to interact with all biodiversity components, the extent of this interaction for several options will depend on specific implementation.

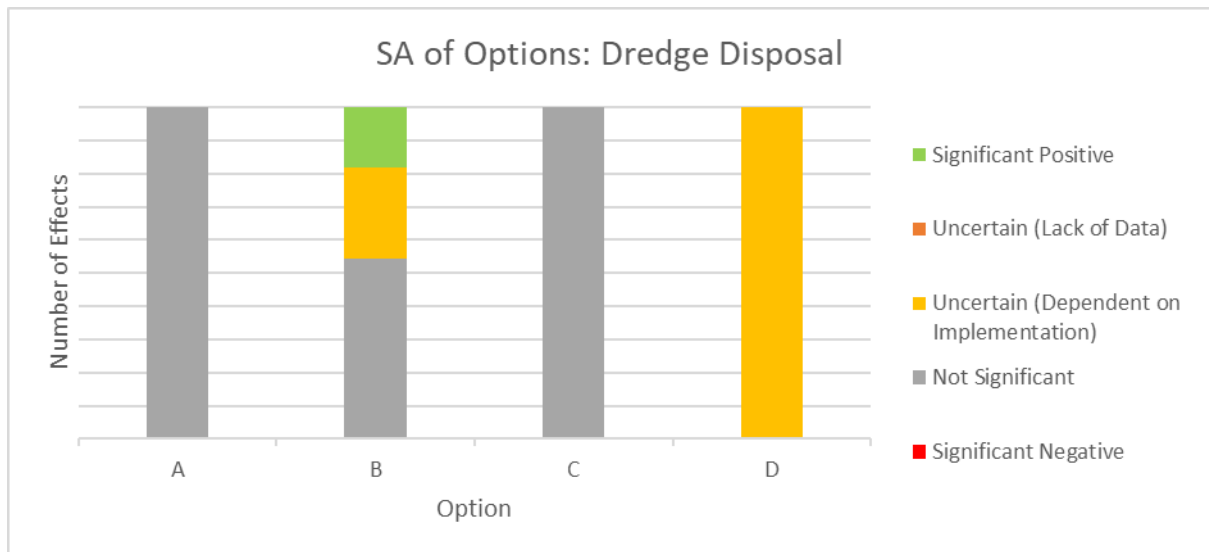
Defence activities that utilise the marine environment, directly or indirectly, in support of operational capability are diverse but include operational vessels and aircraft, HM Naval bases, surface and sub-surface navigational interests, underwater acoustic ranges, maritime exercises, amphibious exercises, coastal training ranges and coastal test and evaluation ranges (Econ_484). Although there is a potential interaction here it was felt that the proposed responses were unlikely to affect military activities due to their autonomy.

The North East is an area of wave and tidal, offshore wind (Energy_360), nuclear (Energy_361), and oil (Energy_368) energy generation. The North East also has a number of existing and planned pipelines, cables and interconnectors, connecting developments in the North Sea with the onshore grid and the UK with Europe (Economy_297, 298, 352, 471, 473). These projects have the potential to interact with all biodiversity components depending on implementation.

Mitigation

No specific mitigation has been identified.

3.11 Dredge Disposal



The assessment of the dredge disposal grouping of options has identified that there is the potential for significant positive effects with relation to Option B.

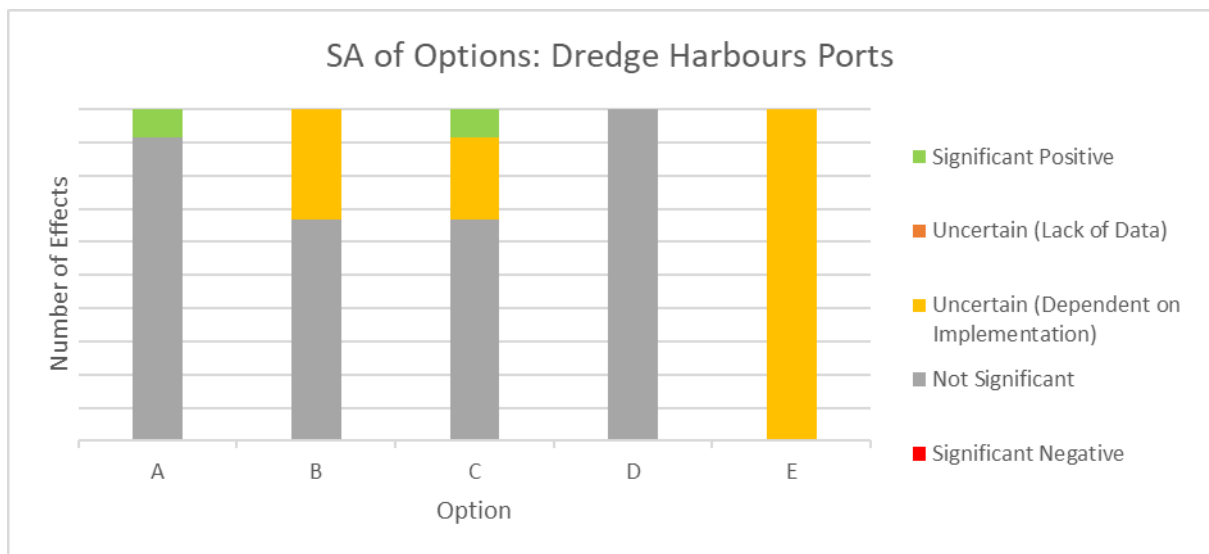
The consents for marine development such as dredging, and disposal have implications for the setting of heritage assets at the coast (Cultural_176, Cultural_183), and as such, implementation of Option B is likely to have significant positive implications on heritage assets both within and adjacent to the North East Marine Plan Areas.

The database does not identify a specific effect of disposal activities on the Biodiversity, Habitats, Flora and Fauna SA Topic. However, disposal activities can have noticeable effects on marine habitat and species. Most disposal activities occur within authorised disposal sites. These issues are addressed through the EIA and HRA processes, and MMO licensing.

Mitigation

- Potential opportunities exist for re-use of dredged materials which could benefit coastal features and processes, especially in relation to Option B.

3.12 Dredge Harbours Ports



The assessment of the dredge harbour ports grouping of options has identified that there is the potential for significant positive effects with relation to Option A and C.

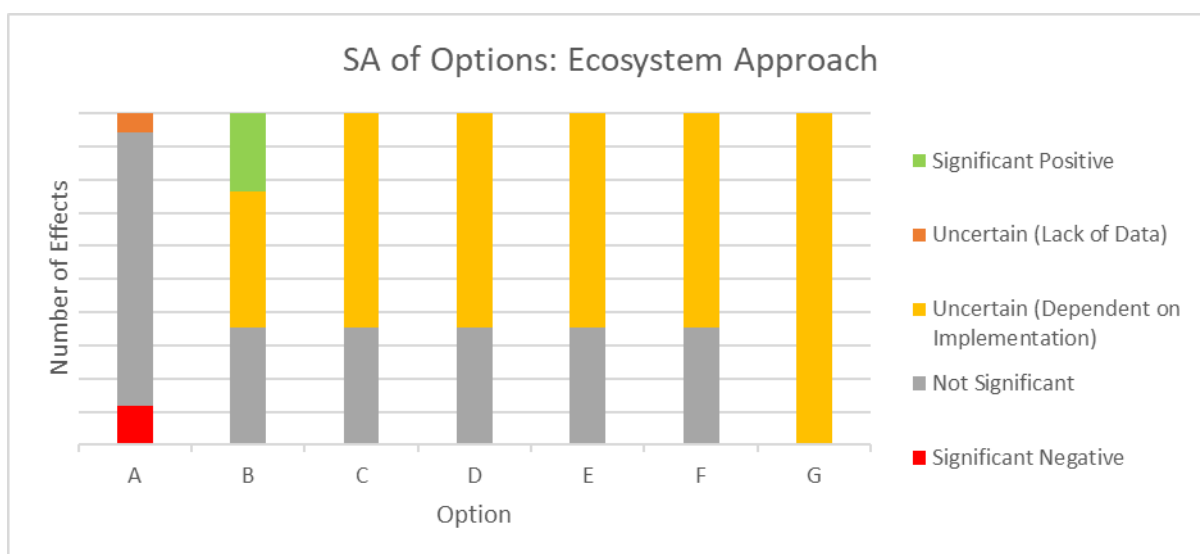
All ports in the North East Marine Plan Areas have dredged access channels enabling them to accommodate vessels. Maintenance and capital dredging are critical activities that the ports need to execute to facilitate safe navigation for sea users including shipping vessels (Economy_706, Economy_619). Implementation of Options A and C are likely to have significant positive effects on ports and shipping.

Dredging can have potential adverse effects on protected habitat and species, can cause mobilisation of poorly degradable and persistent chemicals and have adverse effects on marine mega fauna as a result of underwater noise (Biodiv_354, Biodiv_438, Water_171). These issues are addressed through the implementation of Marine Protected Areas (MPAs), the Habitats Regulation Assessment (HRA) process along with the Environmental Impact Assessment (EIA) process, and as such, none of the proposed options are likely to have a significant effect on the Biodiversity, Habitats, Flora and Fauna SA Topic.

Mitigation

No specific mitigation has been identified.

3.13 Ecosystem Approach



The assessment of the ecosystem approach grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Option B has the potential to give rise to significant positive effects.

Option B is the only response that aims to improve adaptation, migration, connectivity or ecosystem processes of protected sites and therefore has been scored significant positive. The baseline indicates a negative trend in terms of benthic ecology, marine megafauna and ornithology in the North East Marine Plan Areas based upon existing policy. Option B proposes to support proposals that enhance or facilitate coastal habitats and priority species and has been judged to have a significant positive impact. There is no specific relevant policy for plankton within this grouping, but an ecosystem approach should benefit all levels of the ecosystem.

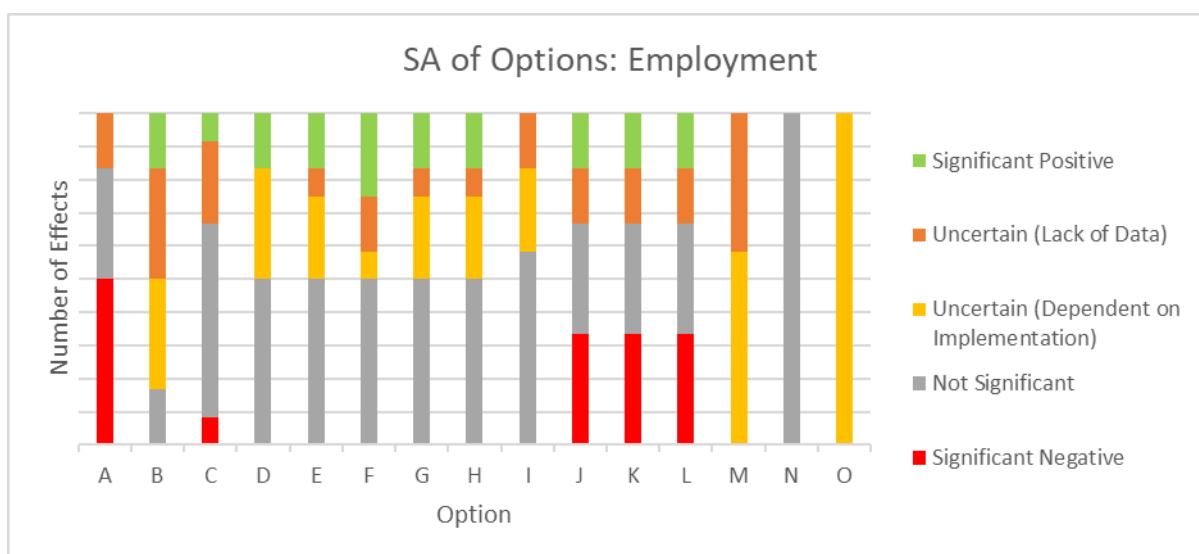
Areas of manufacturing / heavy industry that affect the coastal zone in the North East include Tees and Hartlepool, Tyne and Wear, Redcar and Billingham. There is a potential interaction here between manufacturing and all biodiversity components. Aggregate wharves are within the North East (River Tees, River Tyne and Sunderland) (Economy_585). Aggregate dredging has the potential to interact with all biodiversity components, the extent of this interaction for several options will depend on specific implementation.

The North East is an area of wave and tidal, offshore wind (Energy_360), nuclear (Energy_361), and oil (Energy_368) energy generation. The North East also has a number of existing and planned pipelines, cables and interconnectors, connecting developments in the North Sea with the onshore grid and the UK with Europe (Economy_297, 298, 352, 471, 473). These projects have the potential to interact with all biodiversity components depending on implementation.

Mitigation

No specific mitigation has been identified.

3.14 Employment



The assessment of the employment grouping of options has identified that there is the potential for significant negative effects with relation to Option A whereas Options B, D, E, F, G and H have the potential to give rise to significant positive effects. Options C, J, K and L have the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

There are high levels of deprivation within the North East Marine Plan Area including a large number of 'striving communities' (Communities_29). Poor health is linked to social and economic disadvantages, and for these reasons significant negative effects have been identified for health and wellbeing in relation to Option A.

Marine employment activities in the North East Marine Plan Areas, such as shipping, fishing, aggregate extraction and oil and gas production are having significant negative effects on biodiversity. Significant effects have been identified for protected sites and species, ornithology, mega fauna and benthic and inter-tidal ecology, fish and shellfish, for Option A.

Significant positive effects for health and wellbeing and protected equality groups, in relation to Option B. Option B aims to develop skills in related marine activities and bring about an overall net gain in employment. It is assumed that by the supply of further employment opportunities will help to improve health and deprivation in the North East Marine Plan Areas. There is potential for this option to support key industries in the area, by generating more jobs, but it would be dependent upon implementation.

Significant negative effects have been identified in relation to Option C with regards to fishing and aquaculture. Option C considers the long-term sustainability of marine related employment and promotes diversification of skills in areas where marine industries are in decline. Decline in employment in fish catching sector and improvement in education promotes employment in other sectors or emigration of younger generation from local fishing communities. Younger generation turning to other more secure jobs in the local and regional economy (Communities_52). This

option could see further declines in fishing. This option however, could have a significant positive effect on energy generation and infrastructure development. There is a need for diversification within the energy sector especially with the depletion of oil and gas fields within the North Sea. It is assumed that this option it will help to support the growing renewable sector within the North East Marine Plan Areas.

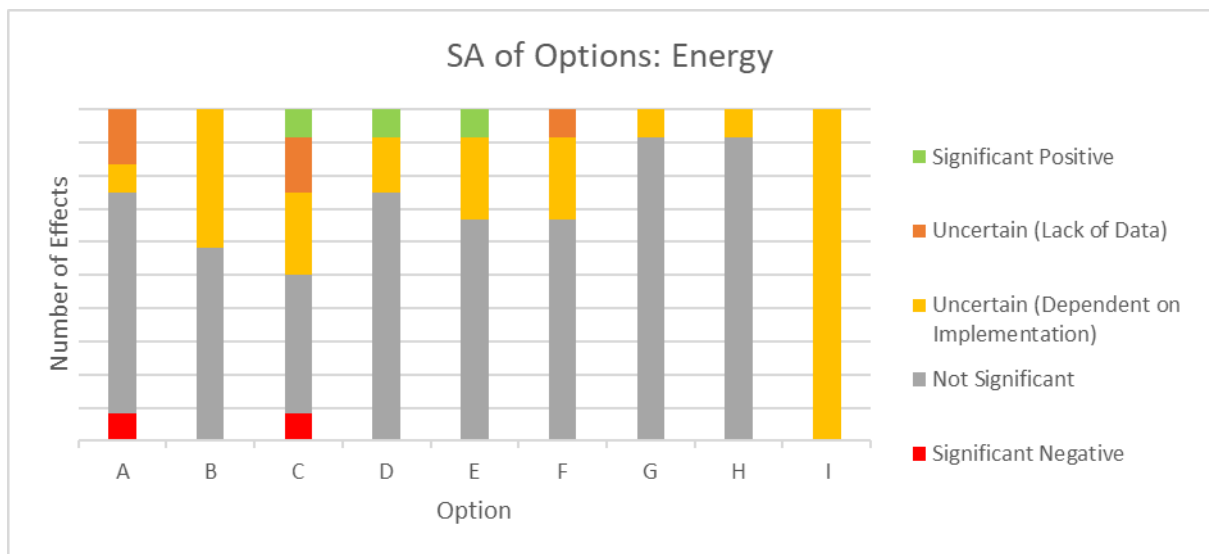
Option D aims to provide a net increase to marine related employment, particularly where employment opportunities are created beyond the lifetime of the project or development. This has resulted in significant positive effects for health and wellbeing and protected equality groups. Although dependent upon implementation, this option could also be beneficial to both the energy and fishing industries, as they are facing decline. Significant positive effects have been identified in relation to Option E, also with regards to health and wellbeing and protected equality groups. This option focuses specifically on employment opportunities in deprived areas, which is recognised as a key issue within the North East Marine Plan Areas.

Options J, K and L propose the extension of the tourism and recreation season. Due to the adverse effects of recreational disturbances on biodiversity, significant negative effects have been identified with regards to protected sites and species, ornithology, mega fauna and benthic and inter-tidal ecology, fish and shellfish. Mitigation would be required to minimise the effects if this option is to be taken forward. These options however have had a significant positive effect on leisure and recreation and tourism. Extending the tourism and recreation season could result in conflicts with shipping, fishing and aggregates, however, this would be dependent on how these policies would be implemented.

Mitigation

- Access to protected sites needs to be carefully controlled in order to ensure that the species and habitats they are designated for are protected.
- Existing issue of disturbance from sightseeing and pleasure boats needs to be improved.
- Measures needed to control disturbance of bird species, particularly in key locations such as Special Protection Areas.

3.15 Energy



The assessment of the energy grouping of options has identified that there is the potential for significant negative effects with relation to Options A and C and potential positive effects with relation to Options C, D and E.

Whilst there is no mention of issues relating to Greenhouse Gas Emissions (GHG) in the North East Marine Plan Areas, it is assumed that Options D and E may have a significant positive impact on the greenhouse gases SA Sub-Topic.

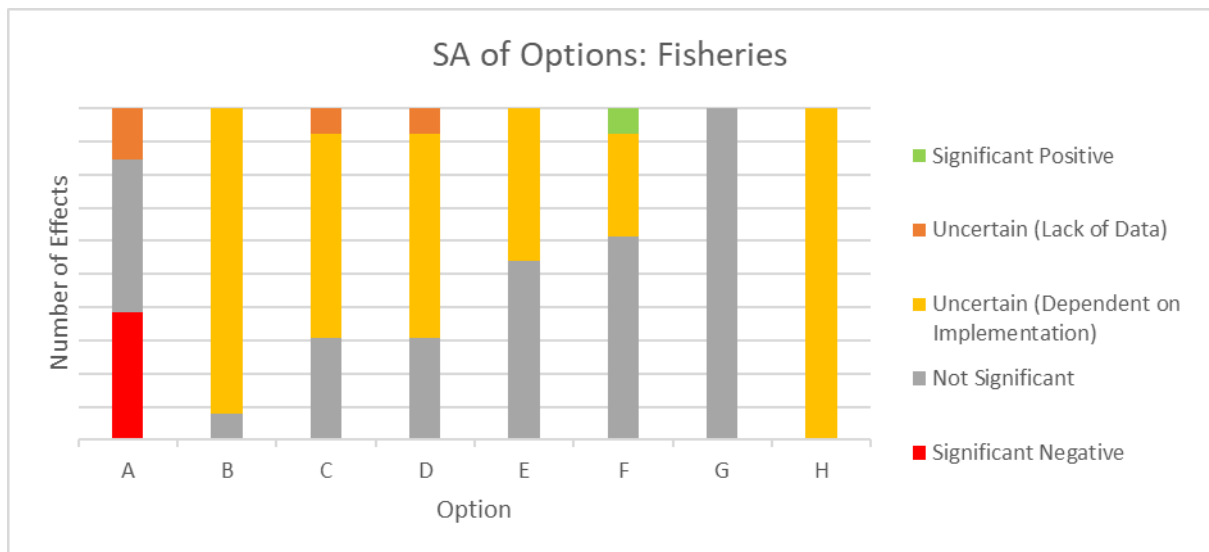
Carbon dioxide may be stored in a range of geological formations including depleted hydrocarbon reservoirs and saline aquifers, and the availability of sites for carbon dioxide storage is likely to increase in the coming years and has the potential to exploit existing infrastructure. The central North Sea, southern North Sea and East Irish Sea are presently most prospective due to the presence of suitable formations and proximity to areas of high carbon dioxide emissions. However, there is considerable uncertainty in the industry following the 2015 Chancellor's Autumn Statement confirming that the £1 billion ring-fenced capital budget for the Carbon Capture and Storage Competition is no longer available. The Committee on Climate Change's report, *The Future of Carbon Capture and Storage in the UK*, stresses the risk that removal of Carbon Capture and Storage competition funding has on the UK's ability to meet its carbon targets (Economy_303). Implementation of Options C would therefore have a significant positive impact on energy generation and infrastructure development.

Impacts on subtidal sediments from offshore industry (eg aggregate extraction, dredging, offshore energy production) is an issue for the North East Marine Plan Areas and therefore a significant negative effect in relation to benthic and inter-tidal ecology has been attributed to Option A. A significant negative effect is also identified in relation to Option C because it supports the deployment of new infrastructure which could adversely affect subtidal sediments and benthic ecology.

Mitigation

No specific mitigation has been identified.

3.16 Fisheries



The assessment of the fisheries grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Option F has the potential to give rise to significant positive effects.

Fishing activity is a key contributor to marine litter in all the North East Marine Plan Areas (Water_253, Water_233). Implementation of Option A would not see the introduction of specific measures to tackle this problem, hence is likely to have a significant negative effect on the Marine Litter SA Sub-Topic.

The redistribution of species as a result of climate change presents opportunities for aquaculture and fisheries (see Climate_206). However, no further evidence is provided within the baseline database to characterise this relationship, and as such, it cannot be determined if the proposed options are likely to have a significant effect as regards climate change resilience and adaptation.

Within the North East Marine Plan Areas, there is currently a baseline issue with over-exploitation of commercial fish stocks (Economy_628). The potential effects of the proposed options are largely uncertain at this stage; however, the outcome of Option F would likely have significant positive effects.

Cables are buried deep in the sea bed where possible and installers and operators promote marine safety and protection. However, cable installations on the UK continental shelf and surrounding waters can be subject to damage. Although this can be through natural causes, human activity is the main cause of submarine cable faults due to damage caused by fishing trawlers and anchors. Given the increased activity in the UK marine area there is a risk that the number of incidents may increase (Economy_627). It is likely that this situation will not improve without the implementation of specific measures to tackle this problem, hence Option A, to 'do nothing', is likely to have a significant negative effect as would not alleviate the baseline issue surrounding the vulnerability of seabed assets.

There is a lack of understanding of the purpose of Marine Conservation Zones within the fishing and aquaculture sector (Biodiv_702). The SA database also mentions that fisheries pose a threat to vulnerable or rare species (Economy_628). Without action (i.e. Option A), and given the current impacts on marine fauna, it is likely that this issue will worsen into the future, hence implementation of Option A would give significant negative effects on protected sites and species.

Commercial fishing has adverse impact on fish stocks (Biodiv_340), migratory fish (Biodiv_715) and the subtidal sediments (Biodiv_425), and as such, current fishing activity levels are not sustainable (Biodiv_345). As Option A would not alleviate these baseline issues affecting benthic and inter-tidal ecology nor fish and shellfish, its implementation is likely to have a significantly negative impact.

Ingestion of, or entanglement in, marine litter, of which the fishing sector is an important producer, is of importance to marine mammals and turtles (Biodiv_467).

Other interaction occurs between marine mammals and commercial fishing activity, largely through competition for food resources (Biodiv_536). As above, this situation will not improve without the implementation of specific measures to tackle this problem, hence Option A is likely to have a significant negative effect on marine mega fauna.

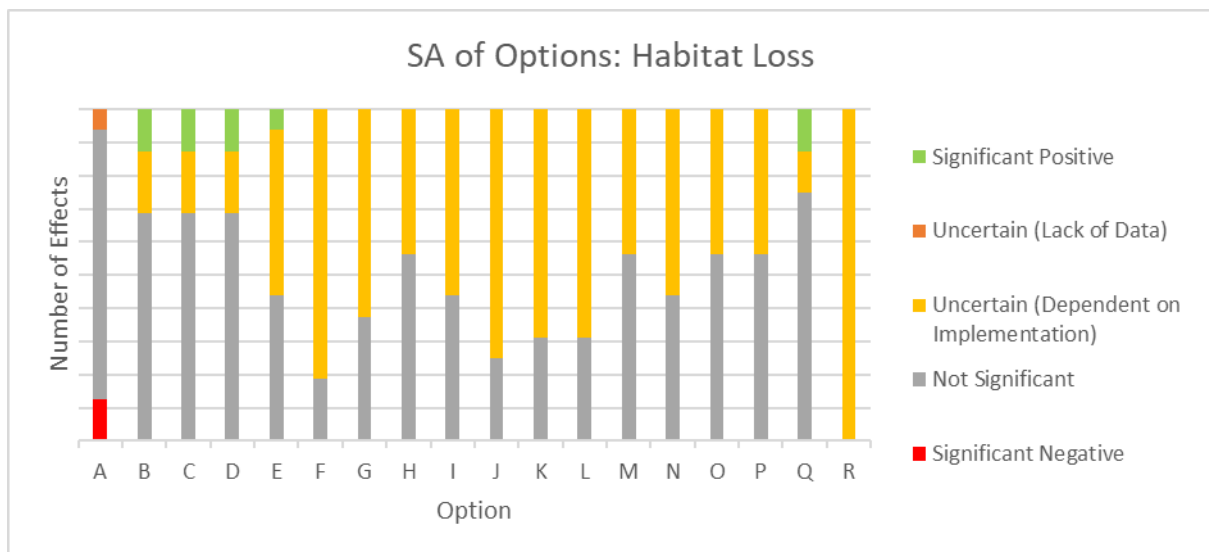
Commercial sandeel fishing in the western North Sea has a negative impact on nearby seabirds breeding (Biodiv_449). Issues are also reported in the North East Marine Plan Areas on seabirds falling victim to fisheries bycatch. It is uncertain how these issues will evolve in the future. Whilst negative interactions of fishing are known to occur on ornithology within this marine plan area, there is no further evidence in the SA database to further characterise this issue in relation the proposals, hence no significant effects are reported for this relationship in the assessment.

Mitigation

- Further consultation and engagement with stakeholders is recommended in order to find solutions to address the contribution of the fishing sector on marine litter. Proposals may consider:
 - (1) Education and awareness actions and campaigns. These should apply to the fishing sector and be received by both existing and future staff (eg part of training/education modules);
 - (2) Measures to ensure compliance with MARPOL Annex V.
- Proposals should include collaboration with key stakeholders/authorities to prevent and/or avoid the issue of fishing activities causing detriment to seabed assets. Such proposals may advocate use of zoning and marks at sea amongst others. Seabed assets are already clearly marked on marine charts and the likes of Kingfisher cable awareness charts. Cable protection is designed to reflect the risks posed by fishing. Seabed infrastructure may prove attractive to fish (as aggregation areas) and therefore attractive to fishermen. Other potential solutions could include restriction of fishing in some areas, or certain fishing methods, near infrastructure, but this is likely to be resisted by fishermen.

- Proposals should involve further consultation between regulators in charge of Marine Protected Areas and key representatives of recreational and commercial fisheries to find solutions to increase awareness and prevent/avoid potential effects of fishing activity on vulnerable or rare species.
- Proposals should involve further consultation between regulators in charge of fisheries and key representatives of recreational and commercial fisheries to prevent/avoid over-fishing and to find ways of better regulating these activities. The sustainability objectives of fisheries should be aligned with those defined for biodiversity.
- Proposals should involve further consultation between regulators in charge of fisheries and key representatives of commercial fisheries to raise awareness about marine litter and potential effects on marine mega fauna.
- Proposals should consider key feeding grounds for marine mammals and adapted protection measures to prevent/avoid competition between this receptor and commercial fishing activity.

3.17 Habitat Loss



The assessment of the habitat loss grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options B, C, D, E and Q have the potential to give rise to significant positive effects.

Options B, C and D aim to improve coherence or connectivity of protected sites have been scored significant positive. Other responses that aim to minimise disturbance but don't refer to protected sites have scored uncertain as proposals within protected sites will be judged differently and there is a lack of detail as to how this will be managed. Links to specific MMO and IFCA measures in Option Q have been assessed as significant positive.

The baseline indicates a negative trend in terms of benthic ecology and in the North East Marine Plan Area based upon existing policy. Options B, C and D that propose to support proposals that enhance or facilitate coastal habitats and priority species have been judged to have a significant positive impact, whereas it is uncertain what the impact of those options that suggest any disturbance must be avoided or minimised damage will be. Links to specific MMO and Inshore Fisheries and Conservation Authority measures in Option Q have been assessed as significant positive.

The baseline indicates a negative trend in terms of ornithology in the North East based upon existing policy. Option E that proposes to support proposals that enhance or facilitate coastal habitats and priority species has been judged to have a significant positive impact, whereas it is uncertain what the impact of those options (H and M) that suggest any disturbance must be avoided or minimised damage will be.

Protection of priority habitats will prevent disturbance to seabed substrates and coastal features as a by-product, but effects are judged to be minor positive due to the difference in spatial scale.

There is an interaction between increasing access to the marine area for recreation and tourism and protection of heritage and conservation sites. The extent to which this impacts the economy will be dependent on specific implementation.

Areas of manufacturing / heavy industry that affect the coastal zone in the North East include Teesport, Tyne and Wear, Redcar and Billingham. The main focus in this area is the chemical industry and energy industry (Econ_549). There is a potential interaction here between manufacturing and all biodiversity components. Aggregate wharves are within the North East (River Tees, River Tyne and Sunderland) (Economy_585). Aggregate dredging has the potential to interact with all biodiversity components, the extent of this interaction for several options will depend on specific implementation.

The North East is an area of wave and tidal, offshore wind (Energy_360), nuclear (361), and oil (368) energy generation. The North East also has a number of existing and planned pipelines, cables and interconnectors, connecting developments in the North Sea with the onshore grid and the UK with Europe (Economy_297, 298, 352, 471, 473). These projects have the potential to interact with all biodiversity components depending on implementation.

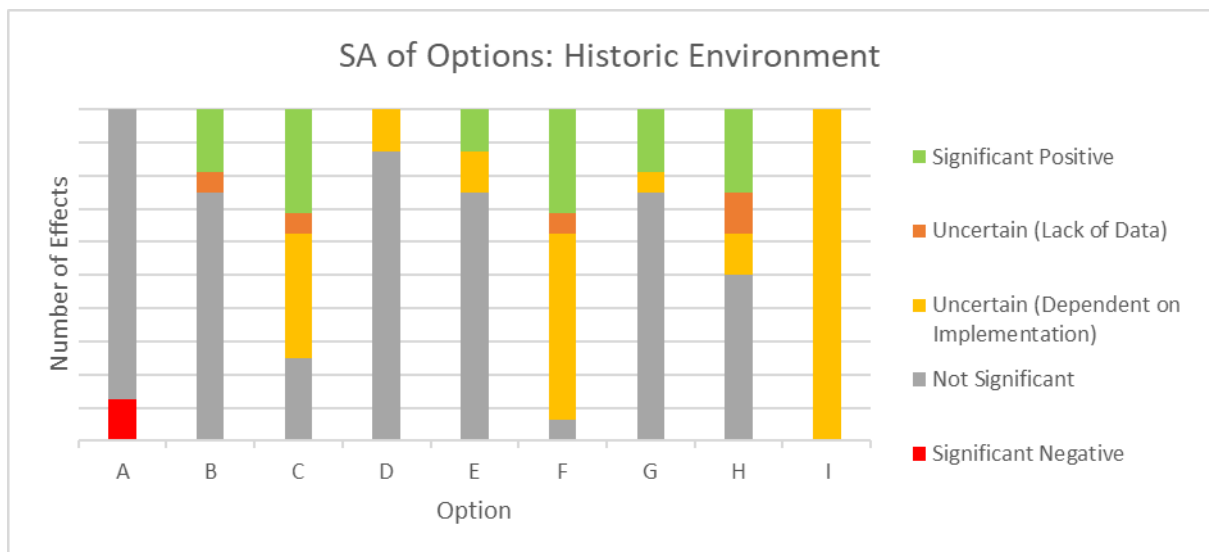
Mitigation

Significant negative effects were assessed for the 'do nothing' option as there was a negative trend in the baseline. Appropriate mitigation is any of the other policy responses.

The South West Marine Plan Options set out the following existing policies as options for consideration and it is suggested that these may also be an appropriate response for the North East Inshore and Offshore Marine Plan Areas. These have been included as potential mitigation to advise the development of the preferred options and the compatibility testing stage:

- X-MPA-1 Proposals that support the objectives of marine protected areas and the ecological coherence of the marine protected area network will be supported. Proposals that may have adverse impacts on the objectives of marine protected areas and the ecological coherence of the marine protected area network must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts, with due regard given to statutory advice on an ecologically coherent network.
- X-BIO-2 Proposals that incorporate features that enhance or facilitate natural habitat and species adaptation, migration and connectivity will be supported.
- X-MPA-2 Proposals that enhance a marine protected area's ability to adapt to climate change and so enhance the resilience of the marine protected area network will be supported. Proposals that may have adverse impacts on an individual marine protected area's ability to adapt to the effects of climate change and so reduce the resilience of the marine protected area network, must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts.

3.18 Historic Environment



The assessment of the historic environment grouping of options has identified that there is the potential for significant negative effects with relation to Option A whereas Options B, C, E, F, G and H have the potential to give rise to significant positive effects.

Negative effects to Heritage Assets within and adjacent to marine plan areas may be anticipated by doing nothing (Option A) as important assets will continue to be lost to natural and anthropogenic driven change. This would represent a missed opportunity to utilise marine planning to enhance protection and access to heritage. Significant positive effects may be anticipated arising from the implementation of policies C, E, F and H as these policies have potential to result in increased access, and development of greater understanding and awareness. The majority of the proposed policies will therefore result in positive effects for cultural heritage, including through increased protection and access, and therefore a combination of policies should be considered.

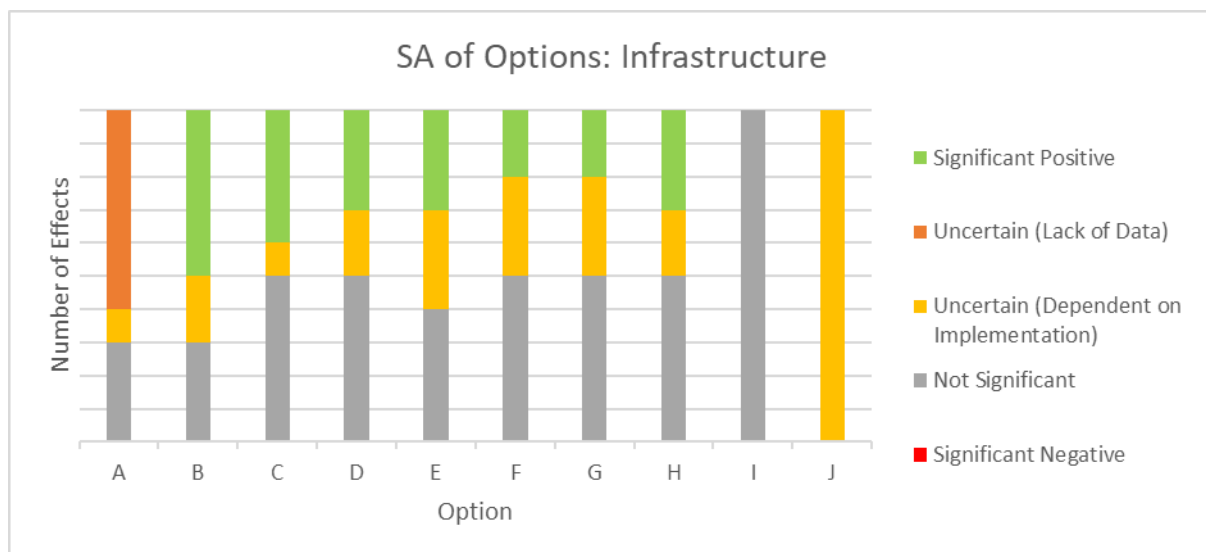
There is a general lack of evidence to assess how the implementation of historic environment policies will impact upon coastal features and processes, however Option G will deliver significant effects for coastal features and processes and the historic environment alike. Broadly speaking, policies that deliver benefits for the protection of historic environment will deliver benefits to landscape and seascape, derived from the contribution the historic environment makes to historic character, e.g. Policy D, G.

Policy G will have significant positive effects on coastal change resilience and adaptation through enabling action to be taken to alleviate the effects of coastal erosion and climate change whilst ensuring the protection of the historic environment. Significant positive effects have been identified for Options B, C, F and H, with regards to health and wellbeing. Policies such as these that enable enhanced access and recreation opportunities involving the historic environment will deliver wider benefits for health and wellbeing in local communities.

Mitigation

No specific mitigation has been identified.

3.19 Infrastructure



The assessment of the infrastructure grouping of options has identified that there is the potential for significant positive effects with relation to Options B, C, D, E, F, G and H. No significant negative effects have been identified within this assessment.

There are high levels of deprivation within the North East Marine Plan Areas including a large number of 'striving communities' (Communities_29). Poor health is linked to social and economic disadvantages. Significant positive effects have therefore been identified in relation to Options B, C and D with regards to health and wider determinants of health.

It has been announced that the Coastal Communities Fund is to be extended to 2020/2021 and at least a further £90 million will be available to help seaside towns revitalise areas, create jobs, and boost local economic growth. Seaside towns across the country will have a chance to bid for the additional government funding under measures announced by the Chancellor in the 2015 budget. Launched in 2012, the Coastal Communities Fund has already invested nearly £119 million on 211 projects local infrastructure and economic projects across the UK. This is helping to create almost 13,700 jobs and provide more than 10,280 training places and apprenticeships (Communities_42).

The location of ports in England and Wales has changed over time, in response to changes in global markets, in the size and nature of ships, and in the transport networks which support them. So, capacity needs to be provided at a wide range of facilities and locations, to provide the flexibility to match the changing demands of the market, possibly with traffic moving from existing ports to new facilities generating surplus capacity (Economy_430). Although ports and shipping are not specifically mention, it is assumed that Options B, C, D, E, F, G and H could have a significant positive impact.

Policies B to H could have a significant positive impact on marine manufacturing. More facilities may be required at ports as more offshore wind farms and potential

wave and tidal power schemes are realised. This could lead to more operations and maintenance bases, leading to the likelihood of more service vessels required.

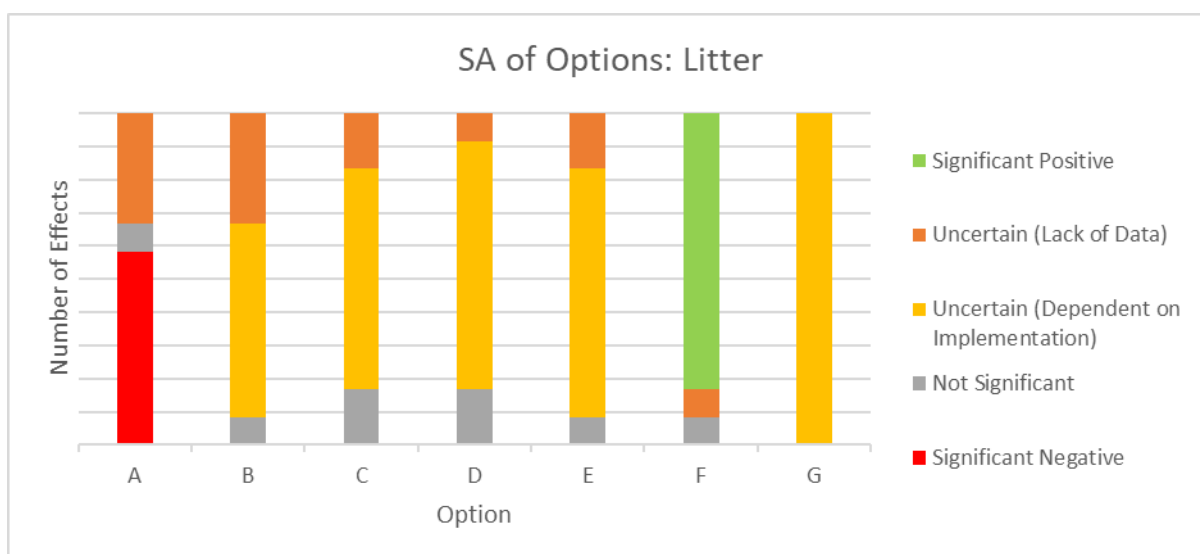
Oil and Gas decommissioning could have a similar impact as marine manufacturing. Options B, C, E and H have been identified as having a significant positive impact on energy generation and infrastructure development. The technology to enable wave and tidal energy generation is at an earlier stage of development than offshore wind. However, it is anticipated that the amount of wave and tidal energy being generated will increase markedly up to and beyond 2020 (Economy_542).

The UK Government has established a new offshore transmission regime to help ensure that the substantial investment required to connect offshore generation projects to the onshore grid is delivered in a cost-effective manner to maximise the benefits to consumers and renewable energy developers. The UK has signed up to the European Super grid plan (North Seas Offshore Grid Initiative). The UK is working with nine other European countries as part of the North Seas Offshore Grid Initiative (Economy_473). Option B draws upon the existing policy X-INF-1, which aims to support land-based infrastructure which facilitates marine activity (and vice versa). It is likely that this option could have a significant positive impact on seabed assets.

Mitigation

No specific mitigation has been identified.

3.20 Litter



The assessment of the litter grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Option F has the potential to give rise to significant positive effects.

The marine historic environment promotes increased leisure, recreation and tourism (Cultural_178). The associated effects of this, including litter generation, are detailed under the Leisure and Recreation and Tourism SA Sub-Topics below, which would see the same significant negative and positive effects had following implementation of Option A and F.

Marine litter acts as a source of persistent pollutions, other chemical derivatives, and adsorption surfaces which lead to biomagnification within marine organisms and have the potential to cause sublethal toxicological effects and endocrine disruption (Water_263). However, due to this issue being discussed in the baseline database in the context of the North West and South West marine plan areas only, the effects of proposed marine litter options on the pollution and water quality SA sub-topic within the North East cannot be determined.

It is recognised that there is little understanding of marine litter, biodegradability and toxicity (Water_244). Densities of beached litter, especially plastics, recorded in the UK have increased since monitoring commenced in 1994, and, in all areas in which surveys are systematically completed, are recognised as problematic by MSFD GES targets (Water_233, Water_240, Water_289). Microplastics have been found globally on beaches, in surface waters, sediment and a wide range of biota (Water_252), it is therefore recognised that both primary and secondary microplastics have the potential to pass into cells (Water_321). Evidence is missing regarding the bioaccumulation of microplastics along food chains, including from seafood to humans (Water_321). Chemical additives both contained within the plastic and adsorbed to the plastic can biomagnify with chronic effects had on marine organisms (Water_291). Option A does not address key baseline issues regarding marine litter so is likely to have significantly negative implications, whereas Policy F does tackle key baseline issues and so is likely to have significantly positive impacts.

Tourism can offer both benefits and costs to coastal communities, as contact with green spaces and the natural environment can benefit mental health (Communities_47, Communities_135). The protection of the natural environment must therefore be managed carefully, and there is an opportunity to increase training, skills, employment and community involvement in citizen science concerning environmental issues in the marine environment (Communities_161, Communities_166). Option A does not address the key baseline issues concerning the effects of marine litter on health, wider determinants of health nor effects on communities, and so its implementation is likely to have significantly negative impacts. Implementation of Option F on the other hand is likely to have significantly positive impacts.

Marine litter includes ghost fishing gear, so its generation is directly connected to fisheries and aquaculture (Water_234). Option A does not address the contribution of fisheries and aquaculture to marine litter, and so its implementation is likely to have significantly negative impacts. Option F is likely to have significant positive impacts.

The sea can provide a variety of tourism and recreational activities, which generate a considerable amount of income for the economy and many coastal towns. All coastal activities are enhanced by a well-managed and healthy marine environment, attractive and well-maintained beaches, seashore and clean bathing water, of which marine litter is a key driver (Economy_482). Enhanced tourism, population growth, the extension of the tourist season and associated growth in the leisure industry will have environmental impacts including pollution from litter, and so will have social and amenity impacts if not managed sustainably (Economy_630, Economy_746, Economy_762, Economy_763, Water_273). Option A does not ensure the sustainable management of leisure, recreation and tourism activities regarding marine litter, and so is likely to give rise to negative impacts. Option F would avoid litter entering the marine environment and so is likely to have significantly positive impacts if implemented.

Effects from fishing activities are seen on protected sites and species (Biodiv_474), which could include ghost nets (Biodiv_553, Biodiv_554). Option A does not address this key issue regarding protected sites and species, and as such is likely to have significantly negative implications if it were implemented. Policy F does address key baseline issues and so is likely to have significantly positive impacts if implemented.

Ingestion of, and entanglement by, marine litter can cause damage and death of marine species as well as reproductive and population impacts (Biodiv_476). Intertidal sediment habitats are deteriorating due to cumulative effects including beach litter (Biodiv_470, Biodiv_471). Option A does not address key baseline issues regarding the impacts of marine litter on benthic and inter-tidal ecology nor fish and shellfish, and so its implementation is likely to have significant negative impacts. Policy F does address baseline issues, and so is likely to have significantly positive impacts if implemented.

At present, ingestion of, or entanglement in, marine litter is considered a potential issue for marine mammals and turtles as although both ingestion of plastic by cetaceans has been recorded and plastic debris is commonly found in the turtle gut

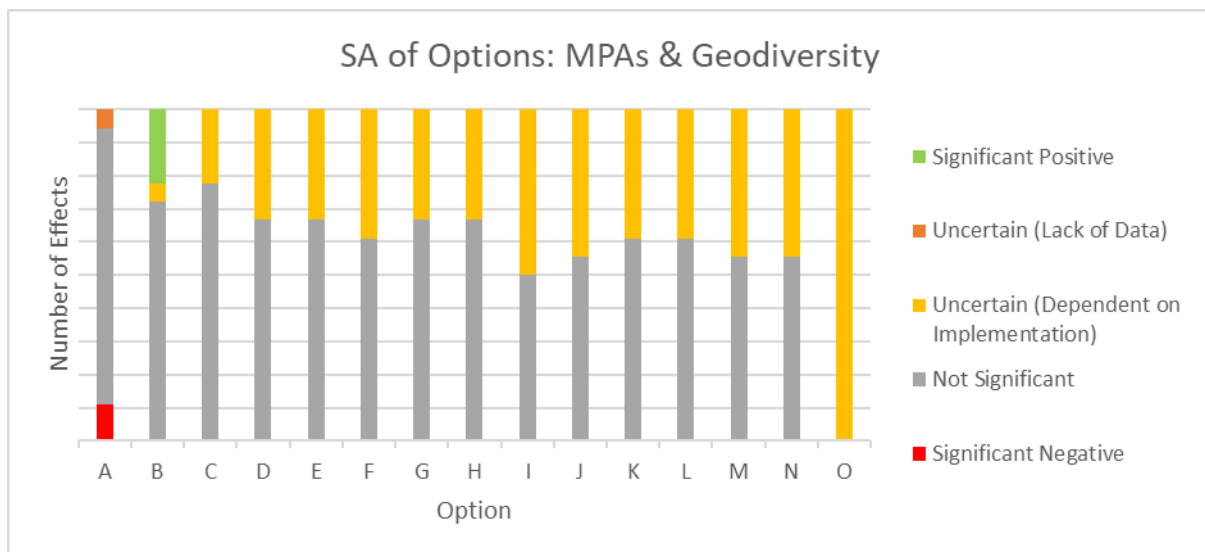
during post-mortem examinations, data is currently insufficient to adequately assess the impacts of this, and so impacts of marine litter on marine megafauna is not currently considered to be a significant pressure in UK waters (Biodiv_467, Biodiv_468, Biodiv_469, Biodiv_650). Entanglement and bycatch of seals can be caused by both active fishing nets and discarded or storm-damaged ghost nets (Biodiv_553, Biodiv_554). Option A does not address key issues surrounding marine litter and its impacts on marine mega fauna, and so its implementation is likely to have significant negative impacts. Option F does address key issues as discussed and would subsequently give rise to significant positive impacts.

Impacts on seabirds from litter are considered low at present (Biodiv_451) but have the potential to become exacerbated into the future, in which case Option A is likely to have the potential to have significant negative effects on ornithology.

Mitigation

- It is recognised that further action may need to be taken regarding marine litter should the MSFD Programme of Measures for achieving Descriptor 10 show that the effect of the combined measures will not deliver GES in line with expectations [Water_244].
- All policies bar Option A, if more stringent, could be used in addition to Option F to significant positive effect on marine litter.
- Options C and D must be used in conjunction with other policies which prevent waste entering the marine environment rather than just addressing waste which has already entered into, and been retrieved from, the marine environment.
- Option D could be replaced or altered in order to provide recycling facilities for nets to fisheries. This would reduce the amount of equipment discarded overboard, subsequently reducing the number of ghost nets etc. Impacts on marine species would be reduced, including those on protected species and sites as well as marine mega fauna.

3.21 Marine Protected Areas and Geodiversity



The assessment of the marine protected areas and geodiversity grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Option B has the potential to give rise to significant positive effects.

Responses that aim to improve coherence or connectivity of protected sites have been scored significant positive. Other responses that aim to minimise disturbance but don't refer to protected sites have scored uncertain as proposals within protected sites will be judged differently and there is a lack of detail as to how this will be managed. Option N signposts to MPA management plans.

The baseline indicates a negative trend in terms of benthic ecology, marine megafauna and ornithology in the North East based upon existing policy. Options that propose to support proposals that enhance or facilitate coastal habitats and priority species have been judged to have a significant positive impact, whereas it is uncertain what the impact will be from those options that suggest any disturbance must be avoided or damage minimised.

Protection of priority habitats will prevent disturbance to seabed substrates and coastal features as a by-product, but effects are mostly judged to be minor positive due to the difference in spatial scale. Options K and L refer specifically to geological features and processes.

Only Options B, F and I refer to mitigation of effects that could prevent the ability of marine protected areas, and priority habitats and species to adapt to climate change.

Sunderland, Teesport, and Port of Tyne are major ports in the North East and most important interactions are potential noise and visual disturbance to highly mobile species and contamination to benthic habitats and water (Econ_373). However, the effects on Marine Protected Areas and geodiversity will depend on specific activities. There is uncertainty as to the extent of aquaculture in the North East due to commercial sensitivity (Economy_300) but there is a significant presence of UK and non-UK fishing vessels that are impacting benthic habitats and Marine Protected

Areas (Biodiv_425), There is an interaction between increasing access to the marine area for recreation and tourism and protection of heritage and conservation sites. The extent to which this impacts the economy will be dependent on specific implementation.

Areas of manufacturing / heavy industry that affect the coastal zone in the North East include Teesport, Tyne and Wear, Redcar and Billingham. The main focus in this area is the chemical industry and energy industry (Econ_549). There is a potential interaction here between manufacturing and all biodiversity components. Aggregate wharves are within the North East (River Tees, River Tyne and Sunderland) (Economy_585). Aggregate dredging has the potential to interact with all biodiversity components, the extent of this interaction for several options will depend on specific implementation.

The North East is an area of wave and tidal, offshore wind (Energy_360), nuclear (361), and oil (368) energy generation. The North East also has a number of existing and planned pipelines, cables and interconnectors, connecting developments in the North Sea with the onshore grid and the UK with Europe (Economy_297, 298, 352, 471, 473). These projects have the potential to interact with all biodiversity components depending on implementation.

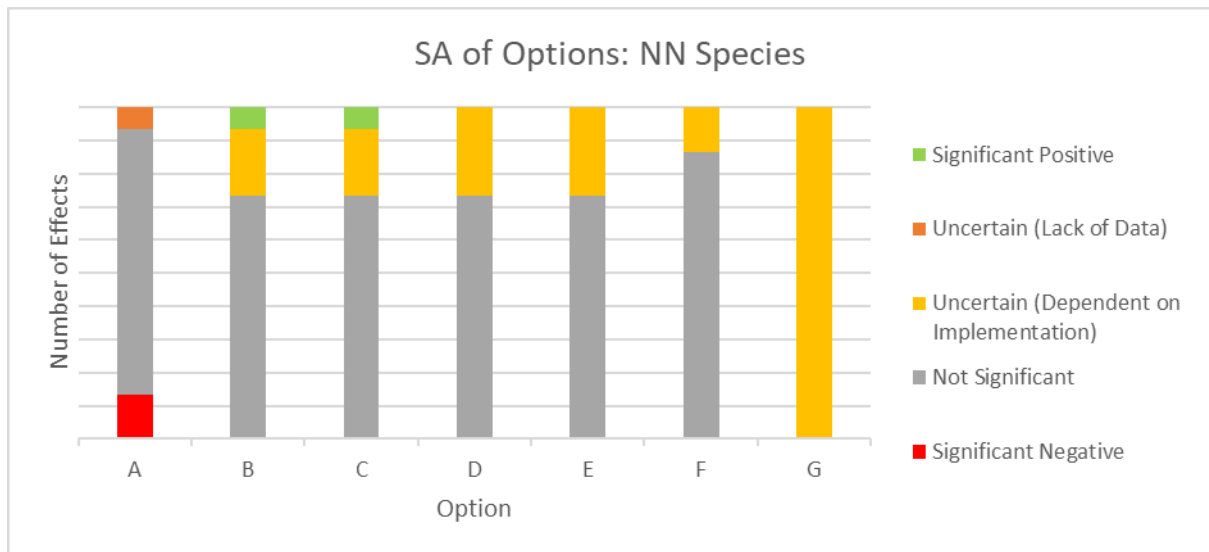
Mitigation

No specific mitigation has been identified.

The South West Marine Plan Options set out the following existing policies as options for consideration and it is suggested that these may also be an appropriate response for the North East Inshore and Offshore Marine Plan Areas. These have been included as potential mitigation to advise the development of the preferred options and the compatibility testing stage:

- X-MPA-1 Proposals that support the objectives of marine protected areas and the ecological coherence of the marine protected area network will be supported. Proposals that may have adverse impacts on the objectives of marine protected areas and the ecological coherence of the marine protected area network must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts, with due regard given to statutory advice on an ecologically coherent network.
- X-BIO-2 Proposals that incorporate features that enhance or facilitate natural habitat and species adaptation, migration and connectivity will be supported.
- X-MPA-2 Proposals that enhance a marine protected area's ability to adapt to climate change and so enhance the resilience of the marine protected area network will be supported. Proposals that may have adverse impacts on an individual marine protected area's ability to adapt to the effects of climate change and so reduce the resilience of the marine protected area network, must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts.

3.22 Non-Native Species



The assessment of the non-native species grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options B and C have the potential to give rise to significant positive effects.

The baseline indicates a negative trend in terms of benthic ecology and in terms of ornithology in the North East based upon existing policy therefore Option A which is do-nothing, will have a significant negative effect.

Options B and C that mention specific biosecurity measures have been scored significant positive, other more indirect measures have been scored uncertain as their effectiveness depends on the detail of how they are implemented.

Sunderland, Teesport, and Port of Tyne are major ports in the North East and most important interactions are potential noise and visual disturbance to highly mobile species, the introduction of structures and potential contamination to benthic habitats and water which could support non-native species over native species (Econ_373).

There is uncertainty as to the extent of aquaculture in the North East due to commercial sensitivity (Economy_300) but there is a significant presence of UK and non-UK fishing vessels that are impacting benthic habitats and Marine Protected Areas (Biodiv_425). These also have the potential for an interaction with the introduction of non-native species, however the impact of this is uncertain as it will depend on specific implementation.

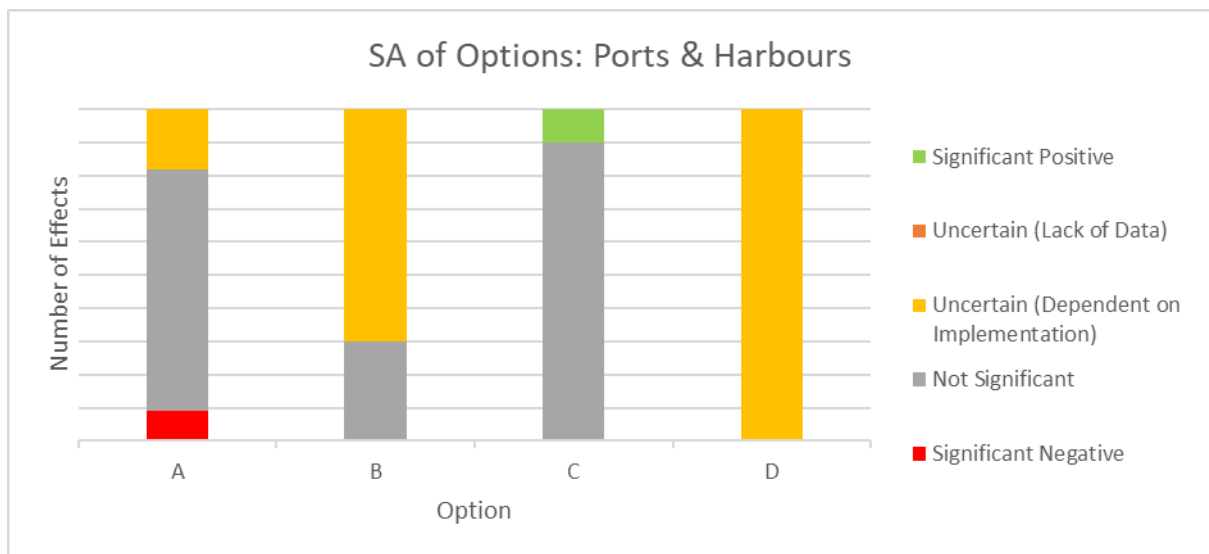
There is an interaction between increasing access to the marine area for recreation and tourism and the introduction of non-native species. However, the impact of this is uncertain as it will depend on specific implementation.

The North East is an area of wave and tidal, offshore wind (Energy_360), nuclear (361), and oil (368) energy generation. These also have the potential for an interaction with the introduction of non-native species, however the impact of this is uncertain as it will depend on specific implementation.

Mitigation

No specific mitigation has been identified.

3.23 Ports Harbours



The assessment of the ports and harbours grouping of options has identified that there is the potential for a significant negative effect with relation to Option A, whereas Option C has the potential to give rise to significant positive effects.

The location of ports in England and Wales has changed over time, in response to changes in global markets, in the size and nature of ships, and in the transport networks which support them. Currently, the largest container and ro-ro (roll-on, roll-off) terminals are in the South East, while the west coast has naturally been best placed to meet the needs of transatlantic and Irish traffic. Recent consents for container developments have been in or near deepwater ports in the main coastal estuarial locations. But it is not possible to anticipate future commercial opportunities. New shipping routes and technologies may emerge during the 20-year horizon of the North East Marine Plans. The needs of trading partners may change as their economic circumstances develop. So, capacity needs to be provided at a wide range of facilities and locations, to provide the flexibility to match the changing demands of the market, possibly with traffic moving from existing ports to new facilities generating surplus capacity.

Increased shipping activity, port expansion and associated industry growth could lead to increased sulphur oxides and nitrous oxides emissions at coastal locations, which in turn could contribute to the breach of national objectives for air quality. Although there are already stringent controls on fuels and emissions in European waters, these do not seem to be sufficient alone to respect existing emission limits/standards. For this reason, significant negative effects have been identified in relation to Option A.

A significant positive effect has been identified in relation to Option C with regards to health and wellbeing. Option C aims to bring about net increases to marine related employment in relation to current activity and future opportunity for expansion of port and harbour activities. There are high levels of deprivation within the North East Marine Plan Areas including a large number of 'striving communities'

(Communities_29). Poor health is linked to social and economic disadvantages, and for these reasons significant positive effects have been identified.

Oil and gas decommissioning will lead to an increase in offshore employment. There is currently a disconnect between port and activity and the preferred method for decommissioning of infrastructure. Other areas of employment growth include for example, Energy Central in Blyth, and Teesport growth as a possible Freeport.

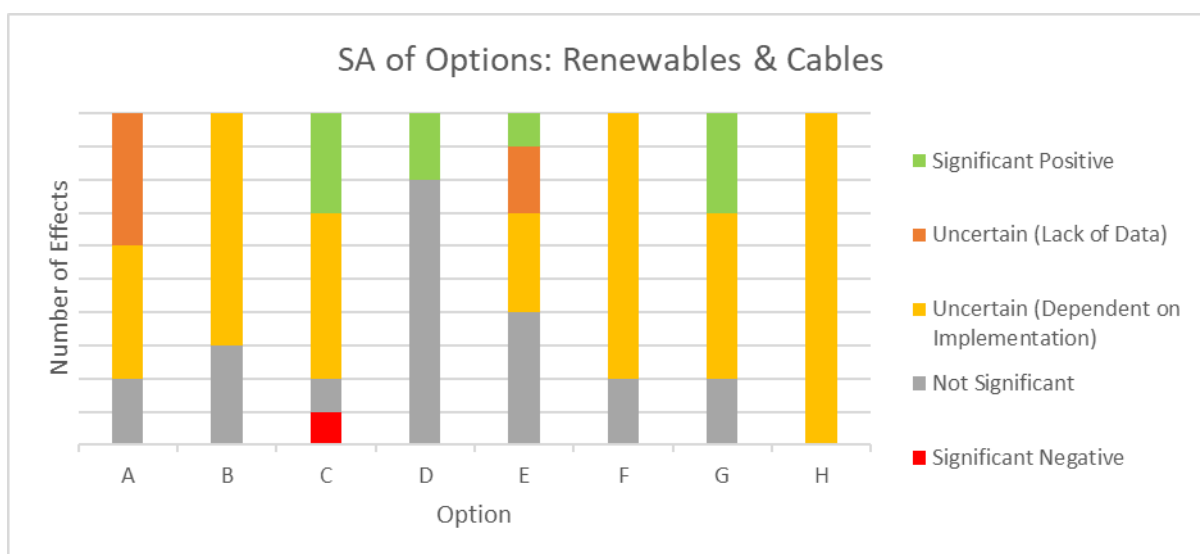
More port facilities may be required at ports as more offshore wind farms and potential wave and tidal power schemes are realised leading to the likelihood of more service vessels required and with that, more cargo entering the ports. Impacts on subtidal sediments from offshore industry (eg aggregate extraction, dredging, offshore energy production) could be an issue for the North East Marine Plan Areas.

Most species of waterbird, but especially waders, could potentially be affected by habitat loss due to activities such as coastal defence, land claim, construction of tidal barrages, and the construction and extension of marinas or harbour developments. However, this would be dependent upon how the options would be implemented and the location and type of developments that come forward.

Mitigation

- Define policies which are targeted to reducing air pollutants generated by this sector.
- Further consultation with the shipping and ports stakeholders are recommended on this approach (opportunities and constraints).
- Proposals should also promote the application of operational measures and implementation of technologies to reduce emissions of pollutants from ships. The use of shore-based power would reduce impacts but would have significant costs. A means of incentivisation should be considered.

3.24 Renewables Cables



The assessment of the renewables and cables grouping of options has identified that there is the potential for significant positive effects with relation to Options D, E and G. Option C has the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

Significant positive effects have been identified in relation to air quality with regards to Options C and G. Both of these options support offshore renewable energy generation and therefore will contribute to decreases in the amount of oil and gas activity which will have a positive effect on greenhouse gasses in reducing carbon dioxide emissions.

Options C, D and G support growth within the renewable energy sector and have therefore resulted in significant positive effects on energy generation and infrastructure development. These options with the addition of Option E, could also result in significant positive impacts on seabed assets. Impacts on subtidal sediments from offshore industry (eg aggregate extraction, dredging, offshore energy production) could be an issue for the North East Marine Plan Areas, however this would be dependent upon how options would be implemented and the location and type of developments that come forward.

Sea training is carried out within defined military practice and exercise (PEXA) training areas. The percentage of marine plan area covered by PEXA in the North East Inshore Marine Plan Area is 39% and North East Offshore Marine Plan Area: 54% (Economy_292, Economy_389).

It will be important to address the effect of new activities and development on MOD defence PEXAs. There is potential for increases in renewable energy generation and cabling to limit space for military training, however this would be dependent upon how the options would be implemented and the location and type of developments that come forward.

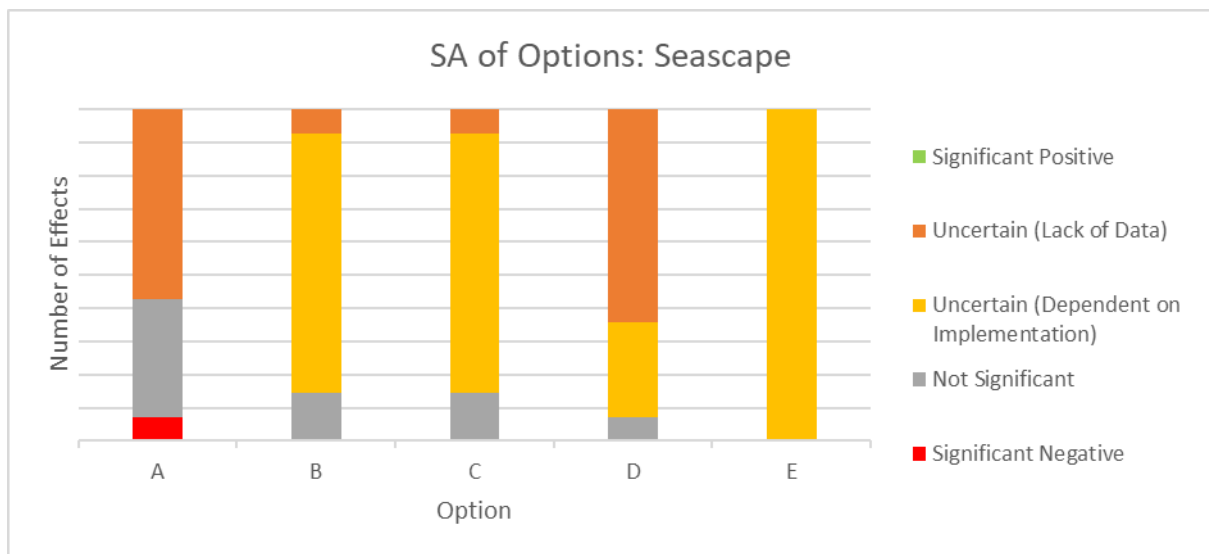
The North East Marine Plan Areas include waters targeted for offshore renewables, oil and gas exploitation, dredging and aggregate extraction. These activities have the

potential to be damaging to the marine environment including possible adverse effects on seabirds. Within this plan area, several large offshore windfarms are either proposed or under development which could have significant impacts on the Flamborough and Filey Coast pSpecial Protection Area seabirds and other species such as seaducks (eg common scoter and red-throated diver) through collision and displacement. For this reason, significant negative effects have been identified in relation to options A and G, with regards to ornithology.

Mitigation

- Mitigation is needed to limit the possible adverse impact of renewable energy and cabling development on birds.
- Development should try to avoid potential Special Protection Areas.

3.25 Seascape



The assessment of the seascape grouping of options has identified that there is the potential for significant negative effect with relation to Option A. No further significant effects have been identified in this assessment.

Option A, 'do nothing', has resulted in a significant negative effect on marine litter. Densities of beached litter recorded in the UK have increased since monitoring commenced in 1994, with an average of around 1000 items per kilometre in 1994 having almost doubled by 2007 (Water_233). It is assumed that by doing nothing the situation is likely to worsen.

The assessment has not identified any additional significant effects as options are not specific to SA topics, nor do they address key issues within the plan area. Options B and C aim to minimise significant effects on the landscape and/or seascape but this would not result in significant positive effects on landscapes and seascapes unless they aimed to enhance and address existing issues.

There is a close relationship between the presence of heritage assets and the character, value and appreciation of landscape / seascape. Options do not directly target heritage assets, but it is assumed that options aimed at protecting seascape/landscape could include them, but this would be dependent upon how policies would be implemented.

Seascape can provide a number of benefits to both physical and mental health. It is assumed that Options B, C and D which provide a positive contribution to seascape, will also have a positive contribution on health and wellbeing, but again this would be dependent upon implementation. Protecting seascape and landscapes is likely to have a positive effect on leisure, recreation and tourism. Policies B, C and D do not directly relate to tourism, leisure or recreation, so would depend on how the policies were implemented.

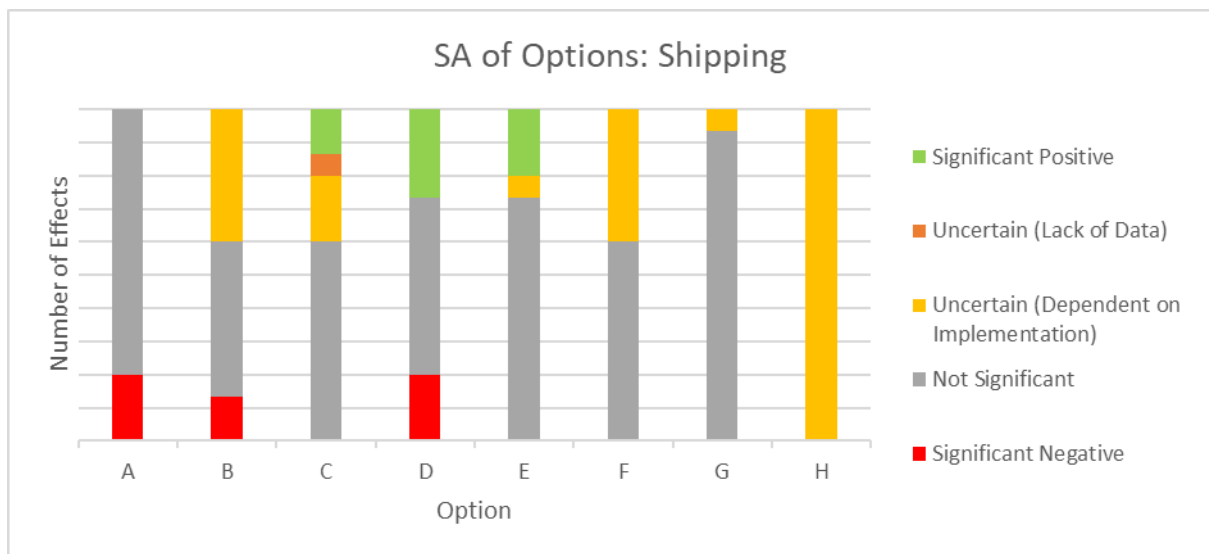
The seascape and coastal landscape will continue to be subject to change resulting from development including in relation to energy, industrial and ports developments. Seascape impact restrictions could potentially limit new and expanded port and

shipping developments, oil and gas and aggregate activities. Options B, C and D could result in negative effects on energy and infrastructure, but this is not known for certain and it would be dependent on how and where proposals are brought forward.

Mitigation

- Any potential developments will need to be assessed for visual impact and designed well to avoid any negative effect on heritage assets.
- Any potential developments will need to be assessed for visual impact and designed well to avoid any negative effect on the seascape and landscape.
- A natural capital approach would include consideration of the economic and wellbeing values of seascapes and landscapes.
- It is suggested that policy is developed to both enhance and protect seascapes and landscapes, such as through the support of coastal regeneration schemes.

3.26 Shipping



The assessment of the shipping grouping of options has identified that there is the potential for significant negative effects with relation to Options A and B whereas Options C and E have the potential to give rise to significant positive effects. Option D has the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

Shipping is having environmental impacts on water quality and marine litter through accidental or unlawful operational discharges (eg oil, waste or sewage) (Economy_421). The shipping sector is also identified as a potential contributor to offshore litter (e.g. rope, polypropylene twine and hard plastics) (Water_253) and also beach litter in general. This can have adverse effects on coastal and marine waters (Water_286) in the short and long term. Option A, 'do nothing', is likely to continue to worsen the current situation, and for this reason significant negative effects have been identified in relation to water quality and marine litter.

Greenhouse gas emissions are recognised as a national issue and affect all marine plans. These include emissions from the shipping sector. Shipping is recognised as a key contributor to nitrogen dioxide, sulphur dioxide, nitrate, sulphate aerosol and ozone (Air_31). Given the high shipping densities in the North Sea, this could lead to an increase in these emissions (Air_30). Emissions from shipping is expected to increase significantly by 2050 due to increase in global trade (Climate_110). Options A and B are likely to reinforce this adverse effect and therefore a significant negative effect has been identified for air quality.

Increased shipping activity, port expansion and associated industry growth could lead to an increase in these emissions (Air_19). Option D promotes the expansion of port facilities and support any new associated industries within changing markets. Options D is likely to increase adverse effects and for this reason significant negative effects have been identified in relation to air quality.

Short sea shipping should be encouraged for the transport of goods to reduce pressure on the terrestrial road network (Community_175). Option C supports Short sea shipping could reduce air pollutant emissions due to the reduction of road traffic.

In general, a move from freight by road to freight by water could result in an overall reduction in emissions, albeit more nationally / regionally than locally. Hence, the overall potential effect could be significant positive on air quality.

Ports and shipping have positive interactions on regional or local economies (including tourism and recreation) (Economy_620). There is potential for negative impacts from potential trade-offs between shipping and recreation within the North East, however, the SA database indicates that these can be minimised through careful project design (Economy_715). Other adverse effects include the risk of collision with recreational users of the sea, although this specific issue is not reported in the database (i.e. 'not significant'). Option E could have potential positive effects by avoiding any significant effects on navigation, hence reducing the risk of collision and subsequent impacts. Both Options D and E could reinforce these positive effects and therefore, significant positive effects have been identified for ports and shipping, leisure and recreation and tourism.

Ports and shipping are essential to support emerging industries such as renewable energy development (Economy_620). A number of options are likely to reinforce this positive effect such as Option D and potential significant positive effect has therefore been identified for this option, in relation to energy generation and infrastructure. There are however, particular issues with regard to shipping and offshore renewable energy installations. Navigational safety around these installations is essential. It is assumed that appropriate navigational safety measures are currently in place or will be put in place for future windfarm development.

Shipping can contribute to the introduction of non-native species and is reported to be among the key pathways (as outlined in Biodiv_636). It is likely that this situation will not improve without the implementation of specific measures to tackle this problem (hence the potential significant negative effect rating for Option A). Options B and D may also have significant negative effects and increase the risk of introduction of non-indigenous species.

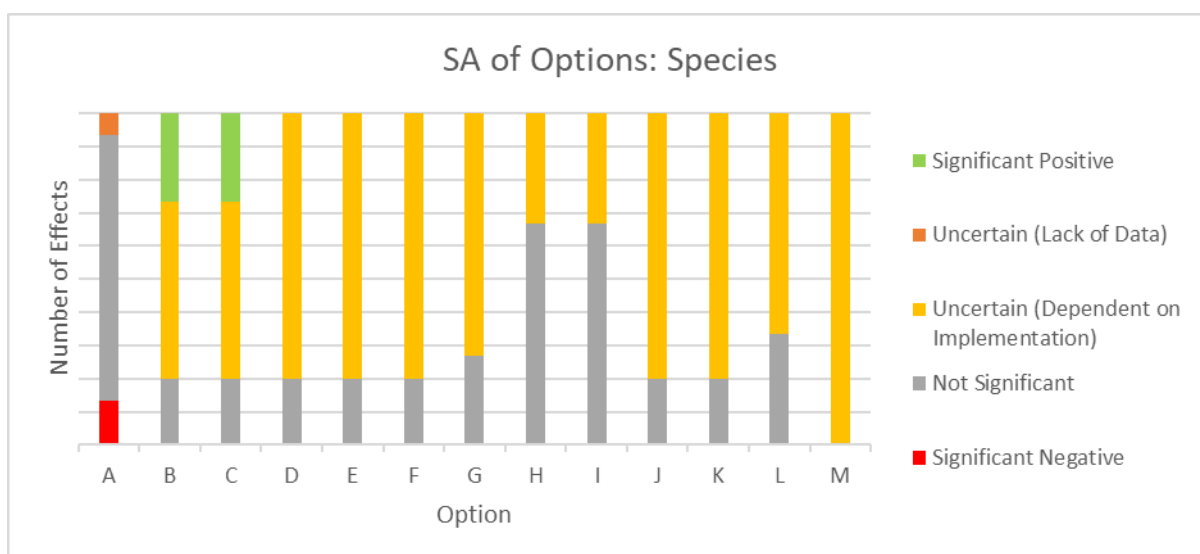
Displacement of species can result from shipping and this activity can have potential consequences to Special Protection Area and Special Area for Conservation mobile features (Biodiv_621). No significant effects are expected from the proposed options on this issue due to the mobility of a wide range of species.

Mitigation

- Define policies which are more targeted to reduce air pollutants generated by this sector. Further consultation with the shipping and ports stakeholders are recommended to consider their point of view on this approach (opportunities and constraints).
- Proposals should also promote the application of operational measures and implementation of technologies to reduce ships' emissions of pollutants.
- A number of policies already exist (eg use of certain fuels when entering European waters). This would need to be checked further with a specialist in the field. However, the introduction of cold ironing / shore power when in port could have a positive impact, but with implication on port and electricity grid infrastructure costs.

- Promote the application of operational measures and implement existing technologies to reduce ships' energy consumption and carbon dioxide emissions (see https://ec.europa.eu/clima/policies/transport/shipping_en).
- Proposals should consider appropriate measures to be developed in coordination with ports, shipping organisations and relevant stakeholders (eg authorities, IMO, etc.) to prevent the spread of invasive species. This would target the pathways for the transfer of aquatic invasive species, including vessel ballast water and hull fouling.

3.27 Species



The assessment of the species grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options B and C have the potential to give rise to significant positive effects.

The baseline indicates a negative trend in terms of benthic ecology and in terms of ornithology in the North East Marine Plan Areas based upon existing policy therefore Option A which is do-nothing, will have a significant negative effect. Options B and C that propose to support proposals that enhance or facilitate coastal habitats and priority species have been judged to have a significant positive impact, whereas it is uncertain what the impact will be of those options that suggest any disturbance must be avoided or damage minimised.

With relation to the impact on protected sites and species, Options B and C that aim to improve coherence or connectivity of protected sites have been scored significant positive. Other responses that aim to minimise disturbance but don't refer to protected sites and species have scored uncertain as proposals within protected sites will be judged differently and there is a lack of detail as to how this will be managed.

The baseline indicates a negative trend in terms of marine megafauna in the North East Marine Plan Areas however, the implications of Option A do-nothing is uncertain due to a lack of specific data. Options B and C that propose to support proposals that enhance or facilitate coastal habitats and priority species have been judged to have a significant positive impact, whereas it is uncertain what the impact will be of those options that suggest any disturbance must be avoided or damage minimised.

There is an interaction between increasing access to the marine area for recreation and tourism and protection of heritage and conservation sites and therefore their species. In addition, areas of manufacturing / heavy industry that affect the coastal zone in the North East include Teesport, Tyne and Wear, Redcar and Billingham (Econ_549). The main focus in this area is the chemical industry and energy industry. There is a potential interaction between manufacturing and all biodiversity

components. Aggregate dredging also has the potential to interact with all biodiversity components. In all these cases the extent of this interaction is uncertain.

The North East is an area of wave and tidal, offshore wind (Energy_360), nuclear (361), and oil (368) energy generation. The North East also has a number of existing and planned pipelines, cables and interconnectors, connecting developments in the North Sea with the onshore grid and the UK with Europe (Economy_297, 298, 352, 471, 473). These projects have the potential to interact with all biodiversity components depending on implementation.

Mitigation

No specific mitigation has been identified.

3.28 Tourism & Recreation



The assessment of the tourism and recreation grouping of options has identified that there is the potential for significant negative effects with relation to Option A whereas Options G and H have the potential to give rise to significant positive effects. Options B, C and D have the potential to give rise to a combination of both positive and negative significant effects depending on the receptors/SA sub-topics being considered.

Tourism and recreational disturbances are having adverse impacts on biodiversity. Physical damage to cetaceans and seals through collision with vessels and other recreational activities (Biodiversity_559) are common in the North East Marine Plan Areas. Recreation is also a key introduction pathway for invasive species (Biodiversity_636). For these reasons, significant negative effects have been identified for protected sites and species, marine mega fauna, ornithology and non-indigenous species, with regards to Option A.

Tourism and recreational pressures have the ability to damage the seascape and landscape character and contribute to the worsening of water quality and marine litter. Increased visitor numbers are likely to put more pressure on the water supply which could affect the quality and call for more infrastructure to support it. This is a particular issue in the North East as septic tanks are prominent and increasing tourism will increase their use and the risk over contamination to the nitric vulnerable area. (Water_350). For these reasons significant negatives for Option A have also been identified for seascape and landscapes, pollution and water quality and marine litter.

Options B, C and D have all resulted in significant negative effects on for protected sites and species, marine mega fauna, ornithology and non-indigenous species. These options aim to increase recreational activities through increased access and recreational boating. These options could worsen the current situation. Option C has performed worse than B and D as it focuses on the promotion of recreational boating, which is likely to have additional negative effects on ports and shipping, pollution and water quality and marine litter. Subsequently, these options have had a significant positive effect on tourism and leisure and recreation.

There is some uncertainty regarding Option E, and what an eco-tourism approach would entail. There is potential for this to have positive effects, especially on pollution and water quality, marine litter and biodiversity. Option F is similar as it aims to either avoid, minimise, or mitigate adverse impacts to components of the marine and coastal ecosystem that generate natural capital services, including services that support tourism and recreation. More stringent wording could result in Option F having positive effects on especially on pollution and water quality, marine litter and biodiversity.

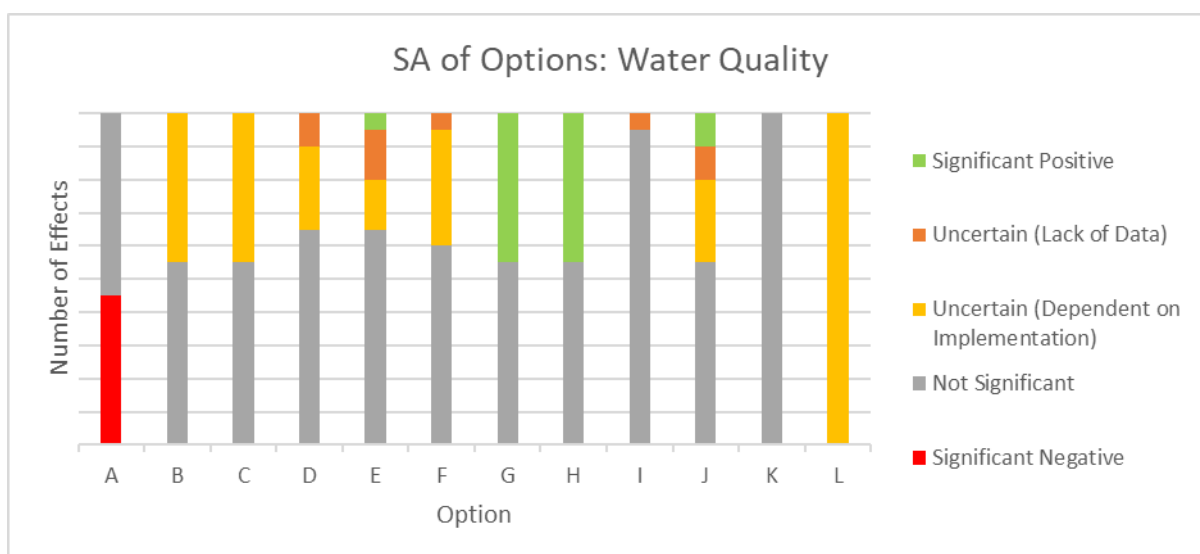
Significant positive effects have been identified for Option G in relation to protected sites and species, marine mega fauna and ornithology. This option has performed well as it aims to protect the marine and coastal ecosystems that support tourism and recreation and seek enhancement measures wherever possible.

Option H signposts to the English Sustainable Tourism Framework. This framework includes 12 key aims which takes into account the preservation and enhancement of cultural richness, enhancement of water and air quality, protection of the landscape, improvements in health and wellbeing and the protection and enchantment of biodiversity. Therefore, significant positive effects have been identified in relation to health and wellbeing, seascapes and landscapes, ornithology, marine mega fauna, protected sites and species, leisure and recreation, tourism, air quality, pollution and water quality and historic assets.

Mitigation

- Any development near or adjacent to heritage assets would need to be sensitively designed in order to avoid and adverse impact.
- Seascape and landscape character assessments may need to be carried out to identify the impact of potential tourism and recreation developments.
- Measures are needed in order to limit the pressure on water supplies and its effect on the overall quality.
- Measures are needed to control litter which is generated from public access.
- Access to protected sites needs to be carefully controlled in order to ensure that the species and habitats they are designated for are protected.
- Existing issue of disturbance from sightseeing and pleasure boats needs to be improved.
- Measures needed to control disturbance of bird species, particularly in key locations such as Special Protection Areas.
- More stringent wording could result in Option F having positive effects on especially on pollution and water quality, marine litter and biodiversity.

3.29 Water Quality



The assessment of the water quality grouping of options has identified that there is the potential for significant negative effects with relation to Option A, whereas Options E, G, H and J have the potential to give rise to significant positive effects.

Water quality is vital for tourism and human health (Water_176). There are 48 beaches classified as bathing beaches in the North East Marine Plan Areas – many are popular surfing beaches and 90% are classified as good or better (Water_204). The North East has two problem eutrophication areas: Seal Sands in the Tees Estuary and Lindisfarne National Nature Reserve (Water_208). Although baseline data concerning pollution and water quality is sparse, issues covered by the options document highlight some negative issues which would become exacerbated if Option A 'Do nothing', were implemented, hence Option A has been assessed as significant negative for the pollution and water quality SA Sub-Topic. Implementation of Options G and H are likely to have significant positive impacts but would be improved further if '...should seek to reduce inputs where possible', were altered to '...must reduce inputs'. If more stringent, Options C and F could have potential positive impacts.

Chemicals existing in the marine environment such as polychlorinated biphenyl (PCB), Dichlorodiphenyldichloroethylene (DDE) and nonylphenol have the potential to adsorb onto plastics (which themselves contain chemical additives including phthalates and parabens) and can become introduced into the marine food web and/or have chronic effects on marine organisms (Water_291). Option K, UK Water Environment Regulations 2017: 13.4, discusses water quality as needing to 'contribute to the high quality of shellfish products suitable for human consumption as the appropriate authority may direct', this is jeopardised by marine litter as there is associated chemical introduction into the food web as discussed in Water_291. Option A does not address the key water quality baseline issues which arise as a result of marine litter, and so its implementation is likely to have a significantly negative impact. Policies G and H have the potential to ensure significant positive impacts.

Effects of poor bathing water quality at Spittal affect the amenity value of the coastline (Communities_30). Implementation of Option A is likely to have significant negative effects on health and wider determinants of health and effects on communities as it does not address this key baseline issue. Policies G and H have the potential to ensure significant positive impacts on community health and wider determinants of health and other effects on communities.

Shellfish and algal culture require good water quality. Water quality is usually improved in order to support shellfish and algal culture rather than vice versa (Economy_629). Option A does not address key fisheries and aquaculture baseline data issues so is likely to have significantly negative impacts, whilst Options E, G, H and J would all have significantly positive impacts on fisheries and aquaculture as they support sufficiently improved water quality.

Bathing water quality is important for the local economy through leisure, recreation and tourism, and this could be improved by effective linkages being made between marine planning and existing regimes (Water_371). Septic tanks are prominent in the North East, and Northumbrian Water details that 31 out of 34 bathing beaches are affected by CSOs (Water_316). The Tees is currently failing the Bathing Water Standards (Water_207), and with increased tourism, there will be an increased risk of contamination to the nitric vulnerable area (Water_350). Option A does not address these key baseline issues and so its implementation would significantly negative implications on leisure, recreation and tourism. Implementation of Options G and H is likely to have significantly positive effects as they seek to reduce adverse effects on water quality.

Effects of pollution from marine activities are witnessed on benthic and intertidal habitats and species, and fish and shellfish. Intertidal and estuarine species and habitats are at particular risk from a variety of pollutants entering the marine environment through point discharges, diffuse atmospheric and riverine pathways and accidental spillages. Contaminants such as heavy metals, Tributyltin (TBT), pesticides and polychlorinated biphenyls (PCBs) can reach sublethal to lethal effects in marine organisms and lead to bioaccumulation in higher trophic levels. Persistent contamination can reduce biodiversity, resulting in impoverished communities composed of pollution-tolerant organisms (Biodiv_420). Option A does not address the key baseline issues regarding the effects of water quality on benthic and intertidal ecology nor fish and shellfish and so if implemented is likely to have significant negative impacts, whereas Options G, H and J would all positively impact benthic and inter-tidal ecology and fish and shellfish.

Impacts are had on marine mammals due to habitat degradation from pollution. Persistent organic pollutants such as polychlorinated biphenyls and flame retardants can disrupt endocrine systems resulting in susceptibility to disease and reduced reproductive success (Biodiv_432, Biodiv_433, Biodiv_434). Option A does not address this key baseline issue which affects marine mega fauna as a result of poor water quality, and so is likely to have significant negative impacts if it were implemented. Conversely, Options G and H would positively impact marine mega fauna, with significant results.

There is a risk of harmful algal blooms due to the influence of anthropogenic nutrient enrichment of coastal waters and climate change (Biodiv_623). Policy A does not address this key baseline issue, and so is likely to have negative implications if it were implemented, whereas both policies G and H would positively impact marine plankton.

Mitigation

- Options G and H perform well throughout the assessment. However, these options ought to be used in conjunction with one another as well as other policies, as they only address decisions related to public authority waste water management functions and public authority land management functions within river catchment areas.

3.30 Cumulative Assessment – North East Marine Plan Areas

The potential for cumulative effects has been difficult to consider at the options assessment stage as it is unclear which policies are likely to be taken forward and in which combination. Potential cumulative effects will be assessed in more detail at the next stage of the marine plan development, when the preferred options are being developed. However, as part of the development of marine plans, the MMO have been considering the potential for cumulative effects and have been considering options as to how this could be addressed.

These options include discussing the need for assessment of cumulative impacts from proposals in the introductory text of the marine plan, including the consideration of cumulative effects of certain proposals or in relation to, for example, seascape, in some options or signposting to the MMO Marine Information System or the MMO Report 1127 Futures analysis.

The SA would recommend the inclusion of specific wording within an appropriate overarching policy to ensure that cumulative effects of proposals are addressed as part of the consideration of applications or the granting of licenses. The larger applications which will be subject to separate processes, such as Environmental Impact Assessment (EIA), will address the potential for cumulative effects, however, the concern is that the smaller piecemeal developments may not take account of the potential for cumulative effects with other small developments.

4 Next Steps

The next steps for the development of the North East Marine Plans and the Sustainability Appraisal are described below. The work which will be undertaken to conclude the Iteration 2 Marine Plan development following the completion of the workshops will be:

- Collating the responses from the on-line stakeholder engagement and the workshops engagement;
- Reviewing the outputs from the Sustainability Appraisal of the options;
- Editing the draft vision for the North East Inshore and Offshore Marine Plan Areas;
- Developing and analysing the preferred options using the information from the sustainability appraisal and the stakeholder engagement; and
- Undertaking a compatibility testing of preferred options.

The output of the Iteration 2 work will be an improved vision for the North East Marine Plan Areas and the identification of a preferred option for each group of issues that is compatible at plan level and across plan boundaries. This work will be fed into the next stage of marine plan products, which is Iteration 3.

Iteration 3 development will take place during 2018 and 2019 culminating in an engagement in early 2019. During this stage the following activities will be undertaken:

- The draft policies will be refined;
- Iteration 3 Stakeholder engagement will take place which will involve a discussion on refinement of policies; and
- The Marine Officers will continue to engage throughout the process.

A Sustainability Appraisal will be undertaken of the preferred options and the draft North East Inshore and Offshore Marine Plans plus the Sustainability Appraisal Report (SA Report) will be produced.

The outputs of Iteration 3 will feed into the production of a North East Draft Marine Plan and accompanying SA Report ready for public consultation in 2019-2020.

There are several other supporting activities that will be taking place alongside the development of the Marine Plan. These include:

- Implementation work;
- Developing a monitoring approach and data gathering;
- Continued monitoring of the effectiveness of the East and South marine plans in achieving high level marine objectives and planning how best practice for monitoring can be applied in the North West /North East/South West/South East Plan Areas;
- Continuing data and evidence gathering; and
- Undertaking European Maritime and Fisheries Fund (EMFF) projects.