Marine Management Organisation

North East Inshore and Offshore Marine Plans Sustainability Appraisal. Non-Technical Summary. Final Report.

North East Inshore and Offshore Marine Plans Sustainability Appraisal. Non-Technical Summary Report. Final Report.

Report prepared by: ClearLead Consulting Ltd. in association with WSP UK Ltd. and MarineSpace Ltd.

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1. Introduction

1.1. This report

The Marine Management Organisation (MMO) has simultaneously prepared marine plans for England's north east, south west and north west inshore and offshore marine plan areas and the south east inshore marine plan area. The marine plans for the south inshore and offshore and the east inshore and offshore marine plan areas have already been published.

As part of the marine plan-making process, a Sustainability Appraisal (SA) has been undertaken. The SA process and subsequent report (including this Non-Technical Summary) is a requirement of the Marine and Coastal Access Act 2009 and incorporates the requirements of The Environmental Assessment of Plans and Programmes Regulations 2004.

This SA has been carried out by ClearLead Consulting Ltd, in association with WSP UK Ltd and MarineSpace Ltd. on behalf of the MMO.

This is the Non-Technical Summary (NTS) of the final North East Marine Plan Sustainability Report (SA Report).

The SA Report is split into a number of parts:

- Non-Technical Summary (this report)
- The SA Reports incorporating:
    - Part 1: Introduction and Methodology
    - Part 2: Scoping Information
    - Part 3: Results of the Assessment

1.2. What is a sustainability appraisal?

SA is a process, incorporating the requirements of the Strategic Environmental Assessment (SEA) Directive, which considers the economic, social and environmental impacts of an emerging plan (the three dimensions of sustainable development). The aim in undertaking SA is to identify a plan's likely significant effects and take steps to avoid and/or mitigate the negative effects as well as identify opportunities to maximise a plan's contribution to sustainability.

The SA Report and this NTS conform to the requirements of the SEA Directive, and so the layout and feel of both the full Report and this NTS is influenced by these requirements. The SA has been undertaken throughout the development of the North East Marine Plan and has informed the consideration of options as well as assessing the effects of the draft and final plans.

2. Background to the North East Marine Plan

2.1. Introduction

Marine plans set the direction for decision making to ensure efficient and sustainable use of our marine resources. Once prepared the marine plans will cover a 20 year period and will be reviewed regularly. Marine plans are intended to guide users to the most suitable locations for different activities, assist in managing marine resources to ensure sustainable levels and to ensure that a holistic approach to decision making is taken.

2.2. The North East Marine Plan

The UK Government vision for the marine environment is for, 'clean, healthy, safe, productive and biologically diverse oceans and seas'. The Marine Policy Statement (MPS)[1] is the framework for preparing Marine Plans and taking decisions affecting the marine environment. The UK high level marine objectives (HLMOs) [2], which form part of the MPS, set the broad outcomes for the marine areas in achieving this vision, and reflect the principles for sustainable development which are:

- achieving sustainable marine economy
- ensuring a strong, healthy and just society
- living within environmental limits
- promoting good governance
- using sound science responsibly.

The North East Marine Plan has a defined vision which is outlined in section two of the North East Marine Plan SA Report Part 1: Introduction and Methodology.

2.3. Relationship with other plans and programmes

The North East Marine Plan fits into an existing hierarchy of plans, programmes, strategies and environmental protection objectives and these are set out in detail in SA Report: Part 2. The North East Marine Plan has the following relationship with other plans and programmes:

- international legislation and policy which sets a number of targets, objectives and obligations which the North East Marine Plan should seek to contribute to
- national legislation and policy which outlines measures to achieve many of these obligations through setting regional and local targets for public bodies to achieve and by outlining principles which planning policies and decisions need to adhere to
- local and regional policy which sets outs more specific local targets and local actions needed to achieve them.

[1] Marine Policy Statement available at: https://www.gov.uk/government/publications/uk-marine-policy-statement

[2] HMG,NIE, WAG, SG (2009) Our Seas A Shared Resource - High Level Marine Objectives (online) available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/182486/ourseas-2009update.pdf

Particularly important for the North East Marine Plan is the following:

- the national MPS and the United Kingdom-wide High Level Marine Objectives which together provide the policy framework for the preparation of marine plans
- the National Planning Policy Framework and associated National Policy Statements
- the EU Maritime Spatial Planning Directive (2014/89/EU) which came into force in July 2014 in support of the Integrated Maritime Policy for the European Union. The Directive introduces a framework for maritime spatial planning and aims to promote the sustainable development of marine areas and marine resources. It also sets out a number of minimum requirements for marine plans.

As well as supporting the HLMOs set out in the MPS, the policies of the North East Marine Plan will support other relevant government aspirations such as those set out in the 25 Year Environment Plan, the Industrial Strategy, the Clean Growth Strategy and sustainable development[3] of the marine area.

Regulations require that the SA considers how environmental protection objectives are taken into account in the development of the plan or programme. For the North East Marine Plan SA, a full review of the key objectives within other plans and policy documents has been undertaken for each topic and is reported in Part 2 of the SA Report. These objectives have then been used to inform the development of an SA framework. The SA framework is then used to test the North East Marine Plan and recommendations are made to strengthen the plan.

2.4. Habitats Regulations Assessment (HRA)

The North East Marine Plan has also been subject to a Habitats Regulations Assessment (HRA), which aims to look at the implications of a proposed plan on one or more European designated sites in view of the sites' conservation objectives. The North East Marine Plan HRA process consists of screening of potential significant effects and a fuller assessment process. Further details can be found in the Appropriate Assessment Information Report.

All Appropriate Assessment reports are available at the following weblink: https://www.gov.uk/topic/planning-development/marine-planning

[3] As defined in United Kingdom Sustainable Development Strategy

3. The Sustainability Baseline

3.1. Introduction

It is important to understand the existing conditions (known as baseline conditions) and the key issues that should be covered as part of the SA process. The sustainability baseline comprises information on aspects of the environment, economy and society that could be affected positively or negatively by the implementation of the North East Marine Plan. Further information relating to the scope of each of the SA topics, background information and baseline issues ubiquitous to all marine plan areas is presented in sections 3-11 within the SA Report Part 2: Scoping Information. The baseline information identified which is specific to the North East Marine Plan, has been summarised in Table 1 below.

Table 1: Sustainability Baseline Summary: Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas.

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
Cultural Heritage
• there are very large numbers of heritage assets in the immediate vicinity of the marine plan area. They include both designated and non-designated heritage assets • there are numerous Scheduled Monuments, Listed Buildings and Registered Parks and Gardens, including in estuaries and tidal rivers within the inshore marine plan area • there are three wrecks protected under the Protected Wrecks Act 1973 within the north east inshore marine plan area • the Frontiers of the Roman Empire (Hadrian's Wall) World Heritage Site is within the north east inshore marine plan area • the Registered Battlefield of the Battle of Newburn Ford lies partly within the north east inshore marine plan area • designated heritage assets in the vicinity of marine plan areas include World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields • various activities in marine plan areas have implications for the conservation of heritage assets but are not subject to licensing or, directly, to public authority decision-making. Depending on circumstances, these may include activities such as anchoring, diving and some forms of fishing. The character and magnitude of effects on the marine historic environment arising from unregulated activities may not have been quantified. Marine plans will need to consider what indirect measures can be taken to conserve heritage assets in respect of activities that are not regulated directly.
Geology, Substrates and coastal processes
• hold the Line is the preferred management option for coastal erosion from the shoreline management plans in the north east inshore marine plan area (94 units), followed by No Active Intervention (76 units), and Managed Realignments (29 units) • a flood risk is posed by the Humber Estuary, the North Sea, and inland watercourses such as the Burstwick Drain, including the risk of surface water flooding • existing developments between Wilsthorpe and Skirlington, and Skirlington and Kilnsea are threatened by erosion and may require relocation • some parts of the coast (especially Yorkshire) are susceptible to erosion including areas prone to large landslips. In common with the UK in general, sea level is rising; the presence of seawalls (for example) in some locations has led to ‘coastal squeeze’ of intertidal sediment habitats • poor and declining condition of saltmarsh and mudflat habitats in estuaries is caused by land reclamation, erosion and coastal squeeze

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• in the inshore plan area, the seabed sediment matrix is a complex mixture of soft sediments including sandy gravel, muddy sand, gravelly muddy sand and gravelly sand. Patches of hard substrate, either exposed or near the surface, is present in some near-shore areas. Sand is the predominant seabed substrate in the offshore marine plan area along with patches of muddy sand, slightly gravelly sand and gravelly sand. These sediments are indicative of the wider North Sea basin as a whole • there are opportunities for Underground Coal Gasification off Teesside. Any future operations would impact on underground coal resources and may have wider environmental implications • development activities (e.g. aggregate extraction, fisheries, capital dredging, port expansion, cable and pipeline installation, renewable and other energy structures) have all had varying degrees of effect on the seabed and related habitats which have the potential to generate environmental issues • there are four known locations (Druridge Bay and Seaton Sluice) where quicksand and sump holes exist, which could be mining legacy issues. There is a potential for other similar sites within the inshore marine plan area which causes a public safety issue • geology and coastal processes are affected through the implementation of rock armouring and scour protection of wind farm turbines, cabling and pipeline protection, which in turn can alter subtidal habitats. This altering of coastal processes is likely to increase as coastal defences are further expanded to meet the needs of increasing populations.
Seascape and Landscape
• large areas of the coast are famous for their iconic landscapes and views • Durham Heritage Coast and wider Coastal Zone requires protection and enhancement • special attention should be given to protecting the remote character, nature conservation interest, wildlife value and marine environment of the north Yorkshire and Cleveland and Flamborough headland heritage coasts. There is a need to safeguard the Heritage Coast at Redcar and Cleveland • strong emphasis is placed on the protection and enhancement of local assets, including Durham and South Shields. • there is a potential for landscape issues relating to underground coal gasification • the Frontiers of the Roman Empire (Hadrian's Wall) World Heritage Site, including its setting, need protecting • coastal erosion in Whitby and Scarborough can have a negative impact on the seascape setting of built heritage assets in these coastal locations, for example, Whitby Abbey and Scarborough Castle. • several existing and nominated new sites for nuclear power within marine plan areas are under consideration. These include Hartlepool in the north east inshore marine plan area. All nuclear power stations within the United Kingdom are located at marine/estuarine sites and hence have a significant impact on seascape • seascape encompasses landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other.

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
Water
• surfing activities occur at various beaches within the north east marine plan area. It is an important sport in the region. These beaches can be affected by reduced water quality, and any pressures which cause hydromorphological changes could affect the integrity of the surfing breaks • the continued presence of structures in the North Sea will also have impacts on hydro-geomorphology • whilst unlikely to be directly impacted by climate change, sea level rise and storminess will impact upon hydrological processes and could exacerbate the impacts of tides and currents on coastal areas • warming in the north east has been identified to be between approximately 0.3 and 0.5°C per decade, over the last 3 decades. • oil and gas activities within the north east are responsible for carbon dioxide emissions that can result in acidification of the marine environment • issues regarding water quality exist around Fenham Flats • eutrophication is occurring around Holy Island and Budle Bay caused by high nutrient levels. Algae blooms are smothering seagrass beds and soft sediments, causing anoxic conditions in places. Aquaculture for Pacific oyster in this area is likely to be negatively impacted because water quality is falling below shellfish standards. Water Framework Directive targets are not being met and the condition of marine protected areas is suffering as a result. Marine plans could discourage proposals which add nutrients to this area • acid mine water discharge from historic coal mining at Saltburn Gill and Skinningrove is required to prevent contamination of drinking water aquifer, however it is negatively impacting water quality • aggregate extraction can have several potential impacts on various water quality parameters, including water chemistry, water movements and flows, and the impacts associated with increased suspended sediment concentration, turbidity and siltation. Potential local impacts may be had on the water environment, with knock on impacts had on biodiversity, particularly benthic fauna. In 2015, the north east had the largest area with an extraction lease (Potash Mine Lease). The Crown Estate has identified much of the inshore and offshore areas to have aggregate resources • toxicity of PCBs and other persistent pollutants to invertebrates and fish, sediment-dwelling organisms and bioaccumulation of PCBs in fish, birds and Annex II sea mammals with known sublethal toxicological effects; endocrine disruption in birds and sea mammals posing a hazard to populations of these animals. Evidence suggests particular problems of PCBs to killer whales, bottlenose dolphins and harbour porpoise around inshore waters of the UK • at present, the United Kingdom does not propose implementing measures to reduce persistent legacy contamination in sediments on the grounds that the actions would be disproportionately costly • persistent oestrogenic compounds in waters in estuaries have also been indicated as an increasing problem

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• in the north east, Cleveland Potash Ltd extract for production and supply of potash agricultural fertiliser. Exploration rights have been given for additional exploration for Potash, South of Boulby between Scarborough and Whitby • decommissioning of oil and gas infrastructure is forecast to increase dramatically, particularly post 2020. In the next three decades, 500 platforms will be decommissioned. 'Making safe' of facilities includes cleaning, freeing equipment of hydrocarbons, disconnection and physical isolation, and waste management • in the north east, Northumbrian Water detail that 31 out of the 34 bathing beaches are affected by combined sewer overflows • in the north east there are a total of approximately 43 beaches classified as bathing beaches. Approximately 95% of the beaches are classified as good or better. Tynemouth Cullercoats and Scarborough South Bay were rated as poor in 2019, and no beaches were classified as sufficient • there are 7 blue flag beaches located within the north east: King Edwards Bay Tynemouth, Long Sands Tynemouth, Roker (Whitburn South), Saltburn-by-the-Sea, Seaburn Beach (Whitburn North), Whitby and Whitley Bay • septic tanks are prominent in the north east area and increasing tourism will increase their use and the risk over contamination to the nitric vulnerable area • there is a problem with beach litter. It has social, amenity and biodiversity impacts. There is evidence to suggest that the problem is getting worse over time • most of the north east region has a tidal range of between 1m and 4m • there are likely to be effects on commercial fisheries if salinity changes in the future as this will affect the range and distribution of many marine species.
Air Quality
• the North Sea has one of the highest shipping densities in the world. Europe's three biggest harbours in Rotterdam, Hamburg, and Antwerp are located within this region. At any time, approximately 3000 ships are sailing in the North Sea. The steady increase in the number and size of ships leads to an increasing contribution of ships to air pollution in North Sea coastal areas • whilst the contributions from shipping to nitrogen dioxide and sulphur dioxide concentrations are restricted to the open sea and the coastal areas in the southern North Sea and in Denmark, secondary pollutants, nitrate and sulphate aerosol particles as well as ozone, are transported far more inland. Their relative contribution to concentrations at the coast is however lower compared to nitrogen dioxide and sulphur dioxide • ongoing challenges with air quality (from transport emissions amongst others) in Air Quality Management Areas at the coast and on land could lead to eutrophication of the marine environment and acid deposition effects

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• there is increasing pressure upon the maritime sector to reduce its carbon and pollutant emissions. In 2020 a sulphur cap came into force. The International Maritime Organisation (IMO) has recently agreed ambitious global targets for at least 50% carbon reduction by shipping by 2050.
Climate

• by the 2050's the following climate impacts are predicted for the region:
  ○ increased summer temperatures, reduced summer rainfall, and more erratic rainfall patterns are expected
  ○ inundation of coastal agricultural areas and storm surge heights
  ○ low water availability in the summer, increased flooding and coastal erosion
  ○ sea level rise and storm surges will mean that coastal defences have a greater chance of being overtopped
• the impacts of climate change are already being observed, and impacts are predicted to continue
• there is also evidence of a shift in aggregation areas in response to climate change causing rising sea levels and loss of intertidal feeding areas, with estuaries and coasts to the north-east being favoured by some species
• fisheries may also be impacted by seasonal changes and mismatch in food availability at key times, leading to poor stock health
• presence of Chinese Mitten crab and effect on flood defences surrounding the River Tyne
• Yorkshire and the Humber has 351km of coast, with 203km (56%) eroding, but only 156km (43%) with defences or artificial beaches
• without any further investment in flood defences, the number of properties in England at medium or high risk could rise from 0.75 million to 1.29 million in 50 years.

Communities, health, wellbeing
• fishing appears to be most important in Blyth, North Shields, Whitby and Scarborough (although it should be noted these are the ports into which catches are taken and not necessarily where boats are registered) • tourism appears to be most important in Berwick-upon-Tweed and Scarborough (based on overnight or longer stays and holiday spend) • the north east experiences poor housing quality and high multiple occupancy levels • doctors in deprived coastal towns in the north and east of England are prescribing almost twice as many antidepressants as those in the rest of the country. Blackpool, Sunderland and East Lindsey, in Skegness, fill the top three spots for the most prescriptions out of England's 326 districts • the north east has an above national average proportion of people with a limiting long term illness • there is planned regeneration in South and North Tyneside

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• the north east marine plan areas have a growing manufacturing and engineering industry that facilitates development and decommissioning of offshore wind and oil (National Renewable Energy Centre, Port of Blyth, Teesport and Port of Tyne, Siemens Energy Service Training Centre, exports from the Nissan car manufacturing and the Whitby offshore renewables business management and harbour control centre). Marine plans may support local authorities and local enterprise partnerships, by identifying how these facilities can be promoted to enhance marine activities and increase skilled labour • social opportunities exist through the development of the North East 'Renewable Energy Coast' and 'Centre for Offshore Renewable Energy'
Economy
• dredging is an enabling activity which is essential to the functioning of ports and marinas and can have impacts on water and sediment pollution. Current safeguards have significantly improved the chemical status of the sediments around our coasts. This is due to reductions in the tonnage of contaminants which have been permitted to be disposed of at sea • shipping is an essential and valuable economic activity for the UK. There are significant movements of ships around the UK coast and its ports, serving the UK's economic interests • impacts are had on sensitive species from noise within the north east marine plan areas. For example, seismic surveys associated with extraction by Cleveland Potash Limited impacting lobster fisheries • the majority of marine aquaculture in England consists of shellfish farming, particularly mussel farms. Other species include scallops as well as pacific and native oysters • in addition to marine fish stocks associated with commercial sea fishing, the coastal environment is important as a corridor for migrating Atlantic salmon and European eel, and in providing the marine feeding ground for sea trout. These important species that support coastal and inland commercial fishing and recreational angling could be vulnerable to a wide range of coastal activities • under climate change scenarios more frequent extreme storms and waves may affect safety of fishing vessels and negative impacts may be exacerbated by low oxygen conditions, and presence of pollutants and marine contaminants. Sea temperature rise, ocean acidification, changes in fluvial flows (particularly in estuarine nursery grounds) and ocean currents may lead to a decrease in abundance, survival and growth of some exploitable fish species and an increase in abundance, survival and growth of non-indigenous pest species. This could affect fishery and aquaculture activity • seaside tourism makes an important contribution to overall tourism. It supports some 21,000 jobs and contributes £3.6bn to the economy • recreational and sport fishing is widespread although participation rates are highest in the south west, south east and north east regions

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• Seahouses has a lack of Blue Flag status beaches, but regardless illustrated a relatively high potential for beach activities as modelled by the MMO project, Modelling Marine Recreation Potential in England 2014 • modelling Marine Recreation Potential in England 2014 (MMO1064) also showed a high potential for surfing in Seahouses, windsurfing in Seahouses and Morecambe Bay, and diving around the Farne Islands • economic growth could be constrained by environmental limits of activities • with regards to industry in the coastal zone, the north east and north west inshore marine plan areas are particularly important. • sea training is carried out within defined military practice and exercise (PEXA) training areas. There are military practice areas in each of the plan areas • aggregate wharves in the north east include on the River Tees, River Tyne and Sunderland • mineral resources and related infrastructure will be managed and safeguarded to meet current and future needs, including safeguarding the existing transport and processing infrastructure at Howdon Wharf to allow for the continued transfer and movement of marine aggregates • Humber dredging area 5.05 million tonnes of material is permitted for extraction each year under existing licences. The Crown Estate identify that over the ten year period between 2002 and 2011 an average of 76% of the permitted dredging area has been dredged and there is an opportunity to supply approximately 2.1 million tonnes of extra material each year • wave and tidal demonstration facilities adjacent to the north east inshore include: National Renewable Energy Centre (Offshore Renewable Energy Catapult) located in Northumberland, part of a UK based innovation and research centre for offshore wind, wave and tidal energy (note the National Renewable Energy Centre's wave and tidal facilities are all terrestrial) • in February 2016, five-year life extensions were announced for Hartlepool Power Station, taking operation to 2024 • there are currently two operational offshore wind farms, the Blyth and the Teesside offshore wind farm. There is also one approved offshore wind farm, the Blyth offshore demonstrator offshore wind farm. The current combined offshore wind farm capacity for the north east marine plan area is 66.1 MW. The Hornsea Development Zone is in the north east offshore area, and is a 4GW wind project currently in development in Yorkshire. Offshore energy projects can result in effects on fish and cetaceans as well as birds • Teesside Collective is a cluster of energy-intensive industries (nearly 60% of the UK total) with a shared vision to establish Teesside as the go-to location for future clean industrial development by creating a carbon capture, usage and storage equipped industrial zone. The concentration of industrial emitters within Teesside and proximity to potential storage sites under the North Sea mean the area is industrially and geographically suited to be the starting place for large-scale industrial decarbonisation in the UK (Teesside Collective, 2017) • offshore energy projects can result in effects on fish and cetaceans as well as birds

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• to date, no wave or tidal activity has occurred or has been planned in the north east marine plan areas due to a lack of exploitable wave or tidal resource. It is therefore assumed that over the next 20 years, no wave or tidal developments will occur in the north east marine plan areas.
Biodiversity, Flora and Fauna
• potential new waste development along the river corridor and Tees Estuary could lead to an adverse impact on the integrity of SPA and Ramsar sites • effects of fishing activities on designated sites such as the Berwickshire and North Northumberland Coast Special Area of Conservation (SAC) and European Marine Site • effects of recreation affecting high tide roosts and feeding sites for wintering and passage waders as well as feeding grounds for breeding birds • there will be future effects of climate change on breeding and wintering seasons, and loss of intertidal feeding resource through coastal squeeze • effects of Hornsea windfarm on birds and use of jet skis near breeding colonies for seabird species near RSPB Bempton Cliffs • pressure from bait digging on numerous seabird and migratory bird species found along the coast of the plan area • sand dune systems in this plan area are threatened by several activities, including coastal squeeze, recreational activities, vehicle access and overgrazing which all lead to erosion • the Farne Islands and Coquet Island support wildlife watching boat trips which also occur along the cliffs of the Flamborough and Filey Coast Special Protection Area (SPA) providing local economic benefits • impact of shellfisheries on intertidal and subtidal rocky and estuarine habitats, including removal of non-target species and habitat damage or loss, including sensitive reefs and maerl beds. This is specific to the north east and south west marine plan areas. • drastic reductions have been seen in the harbour seal populations in Scottish waters, which is also important for the north east plan areas because these seals forage in the plan area • kittiwake populations have seen severe declines nationally, but specifically in this plan area this has impacted the population at Bempton Cliffs SPA, the reason for this is thought to be a loss of prey species • within the north east inshore plan area, the following marine protected areas are designated: - Berwick to St Mary's MCZ - Berwickshire and North Northumberland Coast SAC - Farnes East MCZ - Flamborough and Filey Coast SPA - Flamborough Head SAC

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
- Lindisfarne SPA and Ramsar - Northumbria Coast SPA and Ramsar - Northumberland Marine SPA - Runswick bay MCZ - Teesmouth and Cleveland Coast Extension SPA and Ramsar - within the north east offshore marine plan area, the following marine protected areas are designated: - Farnes East (MCZ) - North East of Farnes Deep (MCZ) - Swallow Sand (MCZ) - Fulmar (MCZ) - Southern North Sea (cSAC) • there is a decline in saltmarsh habitat around the Tyne and Tees Valley due to a lack of sediment supply, a lack of suitable sites for sediment accumulation and historical land reclaim • the bays and estuaries of this plan area are very important food sources and overwintering habitats for many species of birds, including the only breeding colony of black guillemots in the UK. There are opportunities to further develop bird related tourism, recreation and education, whilst ensuring that negative impacts upon the habitats and species are avoided • the proliferation of invasive non-native species can also prompt unwelcome changes in the wider ecosystem that climate change might further exacerbate. For example, invasive non-native filter feeders can multiply at such a rate that they strip phytoplankton and nutrients from water systems, altering the food web and habitat. They can also block pipes and filters, causing problems that water companies must pay to resolve • specific negative impacts of invasive non-native species in the plan area, including cord grass colonising mudflats resulting in habitat loss for waders and fowl (Lindisfarne) and Chinese mitten crab burrows eroding riverbanks (Tyne) • seabird populations are disturbed and impacted by a variety of activities, including disturbance by recreational users, offshore windfarms, bait digging and fisheries bycatch • impacts on subtidal sediments and their inhabitant flora and fauna from human pressures (e.g. aggregate extraction, dredging, and offshore energy production) is an issue • increasing levels of pollution and nutrient enrichment within benthic and intertidal sediments. Deteriorating intertidal sediment habitats in all inshore plan areas due to cumulative effects associated with historical land claim, presence of coastal structures, the presence of invasive non-native species and beach litter

Key Sustainability Baseline, Issues and Characteristics of the North East Marine Plan Areas
• change in the relative abundance of large fishes is likely to affect marine ecosystems in several ways. Fewer large fishes will reduce the amount of predation on smaller prey species and allow increases in their abundance and biomass. In turn this will affect the structure and stability of the ecosystem • impulsive sound sources have been observed to cause temporary displacement of small cetaceans (e.g. harbour porpoise), increased physiological stress in some fish species (e.g. European seabass), and developmental abnormalities in invertebrate larvae • broad-scale changes in habitats and species are increasingly likely, resulting from rising sea temperatures due to climate change • the UK seabird indicator stands at 22% below the 1986 baseline, with most of this decline occurring since the mid-2000s • habitat suitability around the UK for seabirds is projected to shift northward over the next century and bird distributions may shift with changing conditions. Declines in European ranges are also predicted.

4. How the Assessment was Undertaken

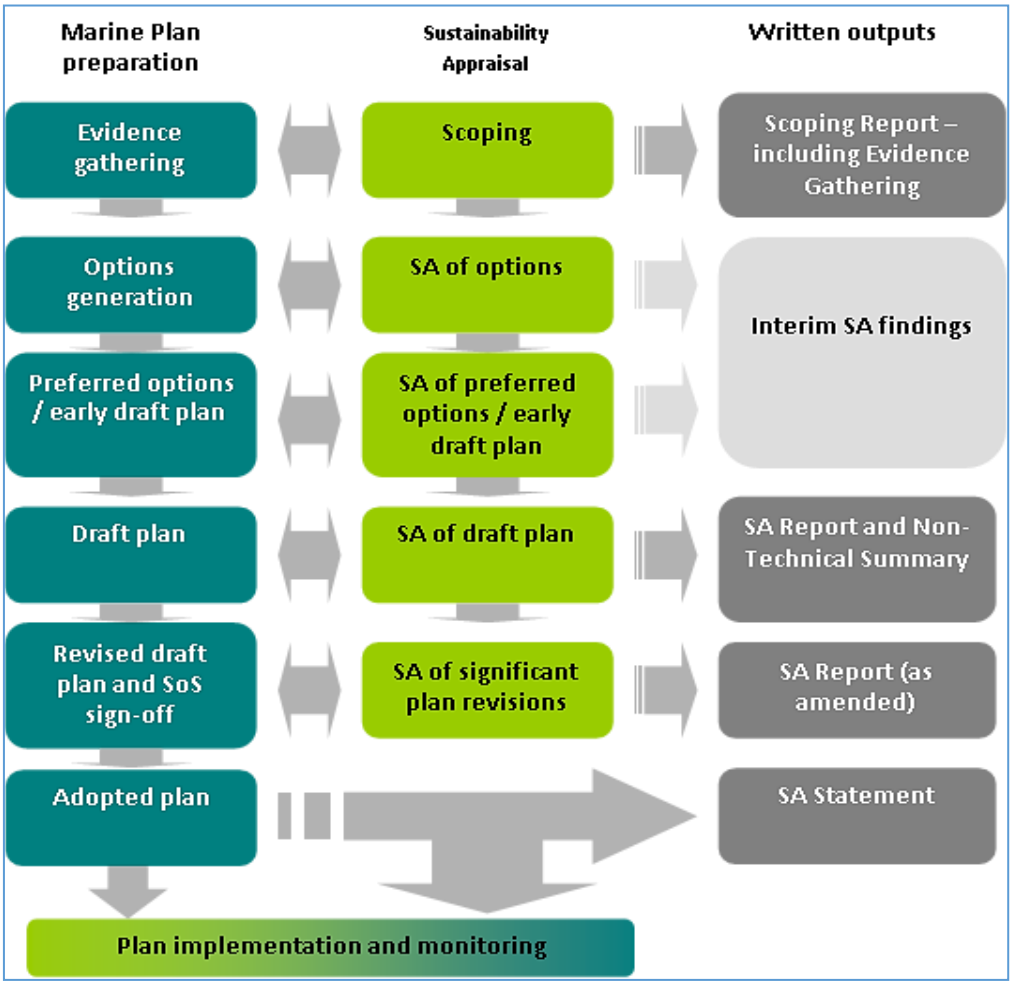
4.1 The SA Process

The stages in the SA process have been developed to take into account the five procedural stages of SEA:

- Stage A: (scoping) setting the context, establishing the baseline and deciding on the scope of the assessment
- Stage B: developing and refining alternatives and appraising the effects
- Stage C: preparing the SA Report
- Stage D: consulting on the SA Report and the North East Marine Plan and assessing any significant changes
- Stage E: monitoring the significant effects of implementing the North East Marine Plan

In practice, the SA is an iterative process which has been undertaken in parallel with the development of the North East Marine Plan and has fed into the development of the North East Marine Plan at appropriate intervals – see Figure 1.

Figure 1: Stages in the SA Process.



4.2 Stage A: Scoping

The purpose of the scoping stage was to decide the coverage (scope) and the level of detail of the SA. The scoping report was produced by a consortium composed of Ramboll Environ, ClearLead Consulting Ltd and Marine Planning Consultants (MPC) Ltd in April 2016. The draft scoping report was engaged on from 11 April 2016 to the 13 May 2016. Following some small factual changes, the final scoping report was published by the MMO. The scoping report forms part of the suite of documents which support this SA Report.

The scoping report outlines an SA framework which the North East Marine Plan and its alternatives are measured against in order to test their sustainability. The SA framework is set out in Table 2.

The scoping process also sets out the geographical and temporal scope of the SA:

Geographical: The north east inshore marine plan area covers an area of approximately 687 kilometres of coastline stretching from the Scottish border to Flamborough Head in Yorkshire, taking in over 6,000 square kilometres of sea. The north east offshore marine plan area includes the marine area from 12 nautical miles extending out to the seaward limit of the Exclusive Economic Zone, a total of approximately 50,000 square kilometres of sea.

Temporal: The North East Marine Plan covers a 20 year period, and therefore the SA has considered the effects of the plan over the next 20 years and beyond where possible.

The scoping report was issued to the following statutory bodies:

- Natural England
- Historic England
- The Environment Agency.

In addition to statutory bodies, the scoping report was issued to 20 organisations for comments. The full list is located within section 3 of Part 1 of the SA Report.

Table 2: SA framework.

	Overarching SA topic	SA sub-topic
Physical and Chemical Aspects	Cultural Heritage	• heritage assets within marine plan areas • heritage assets adjacent to marine plan areas.
	Geology, Substrates and Coastal Processes	• seabed substrates and bathymetry • coastal features and processes.
	Seascape and Landscape	• effects on seascape and landscape.
	Water	• tides and currents • water temperature and salinity • pollution and water quality • marine litter.
	Air Quality	• air pollutants.
	Climate	• greenhouse gas emissions • climate change resilience and adaptation.
Social and Economic Aspects	Communities, Health and Wellbeing	• health and wider determinants of health • effects on communities • effects on protected equality groups.
	Economy	• 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	• protected sites and species • benthic and intertidal ecology • fish and shellfish • marine megafauna • plankton • ornithology • invasive non-native species.

4.3 Stage B: Assessing the Options

The SEA Directive requires that the assessment identifies and evaluates reasonable 'alternatives' to what is proposed within the plan.

This stage involved assessment of the alternative options against the SA framework, taking into account the evidence base provided within the SA Database (Technical Appendix A). The key features of the options assessment approach were:

- an approach that assessed each option as a whole and to the same level of detail. 252 policy options were packaged into 32 policy groupings[4], and the assessment provided a comparison of the options within each grouping
- an evidence-led assessment which referred to the baseline information to provide quality assured evidence as the basis of the assessment
- a focus on identifying key potential significant effects to inform the decision making between options.

The assessment of options was undertaken in two stages:

Screening: a screening process was carried out to determine whether the SA sub-topics were relevant to the specific grouping
Assessment of significant effects: 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 in August 2017 prior to the assessment) were used as evidence for the assessment.

The options assessment of the North East Marine Plan was reported in an options assessment SA report which can be found here.

4.4 Stage B: Assessing the Draft and Final North East Marine Plan

The SA of the North East Marine Plan preferred policies has been undertaken as a 'baseline-led' assessment which considers how the baseline situation will change with the North East Marine Plan in place. This is shown in Part 3 of the North East SA Report.

A qualitative approach has been used, comprising the assessment and description of effects, rather than a quantitative approach which is not considered appropriate or feasible at this strategic level, in view of the form and content of the plan.

The SA of the draft North East Marine Plan focused on the preferred policies completed in July 2019. This consisted of 59 policies arranged within 29 groupings.

The same approach to assessment has been taken for the assessment of options, preferred policies and final policies:

[4] Four groupings (Cumulative Effects, Governance, Evidence Gaps and Implementation) contained options which are not possible to assess through the SA because they are overarching policies and the options were not distinct.

- options and policies have firstly been screened to identify sub-topics of relevance to the policy grouping
- an assessment of significant effects was performed in relation to the relevant sub-topics only.

The assessment criteria set out within Table 3 have been used to identify the potential effects of the North East Marine Plan.

Table 3: Policies Assessment Criteria.

Notation	Description
Degree to which baseline conditions may change (significance of effect) compared with the future baseline situation	
++	**Significant Positive Effect:** The plan policies are likely to lead to significant improvements in baseline conditions.
+	**Minor Positive Effect:** The plan policies are likely to lead to some improvements in baseline conditions.
0	**Neutral Effect:** The plan policies are unlikely to alter baseline conditions significantly.
-	**Minor Negative Effect:** The plan policies are likely to lead to a deterioration in baseline conditions.
--	**Significant Negative Effect:** The plan policies are likely to lead to a significant deterioration in baseline conditions.
?	**Uncertain Effect:** It is not known whether the plan policies would lead to an improvement or deterioration in the baseline conditions[5].
Direct/Indirect	
Direct	Effects that are a direct result of the plan policies.
Indirect	Effects that are secondary i.e. they occur away from the original effect or as a result of a complex pathway.
Reversibility of effects	
Reversible	It is considered that the effects upon the receptor group could be reversed if activities were to change in the future. The effects could be long-lasting, but the receptor may hence be able to recover or indeed improvements could be diminished.
Irreversible	It is considered that the effects upon the receptor group could not be reversed. This may apply to situations where, for example, features are destroyed forever, or systems/trends are irrevocably changed.
Permanence of effects	
Permanent	Effects could be lasting or intended to last or remaining unchanged indefinitely.
Temporary	Effects are not likely to be lasting or permanent.
Duration	
Short	Within three years of plan adoption – within the reporting period i.e. policy would have an immediate effect.
Medium	Within plan period (up to 20 years from adoption)

[5] Please note that for the purpose of this SA, uncertain effects have been treated as potentially significant and mitigation measures suggested

Notation	Description
Long	Beyond plan period (more than 20 years from adoption)
Spatial Extent	
Beyond both plan boundaries	Effects are predicted to extend beyond the plan boundaries (i.e. transboundary) and could affect the terrestrial environment, neighbouring marine plan areas or other states.
Inshore and offshore plan-wide	Effects are predicted to occur within the inshore and offshore plan areas.
Inshore plan-wide only	Effects are predicted to occur within the inshore plan area only.
Offshore plan-wide only	Effects are predicted to occur within the offshore plan area only.
Localised	Effects are predicted to have a relatively small spatial extent, confined to the local area, typically <5km from source, within the plan boundaries.
Magnitude of effects	
High	Likely total loss of or major alteration to the receptor in question The effects are predicted to be permanent and irreversible.
Medium	Partial loss of/alteration/improvement to one or more key elements/features/characteristics of the receptor in question The effects are predicted to be medium-long term but reversible.
Low	Minor loss/alteration/improvement to one or more key elements/features/characteristics of the receptor in question The effects are predicted to be reversible and short term.

Following consultation on the draft North East Marine Plan between January 2020 and April 2020, the plan and the SA Report have been updated in response to the consultee comments received and residual significant effects have been identified.

4.5 Stage C: Preparing the SA Report

The SA Report for the North East Marine Plan constitutes three parts:

- Part 1: Introduction and Methodology
- Part 2: Scoping Information
- Part 3: Results of the Assessment.

Material and documents generated as part of the SA process are available here.

4.6 Stage D: Consulting on the SA Report

The draft North East Marine Plan and accompanying SA Report were consulted on with the public and other key stakeholders between January 2020 and April 2020.

Following consultation, responses relating to the SA have been reviewed and responded to. Amendments to the SA have been undertaken in response to consultees' comments as appropriate.

4.7 Stage E: Monitoring

Monitoring the effects of the plan will be the responsibility of the MMO. Monitoring recommendations will be put forward for integration into the MMO's marine plan monitoring within the SA Adoption Statement. See Part 3 of the SA Report for further details on monitoring.

4.8 Difficulties encountered

The North East Marine Plan is a regional scale plan which is not intended to address site or project-specific details. The large majority of the policies in the plan are generic or criteria-based policies and do not have a clear spatial dimension.

This results in uncertainty when predicting the effects of activities and consequently strategic impacts can be identified with the most certainty, together with the extent to which the marine plan seeks to avoid or offset these impacts. Correspondingly, this SA's predictions and proposed mitigation measures are primarily at a strategic level.

5. Potential Significant Effects of the Plan

5.1 Introduction

This section presents a summary of the assessment findings of the North East Marine Plan by SA topic, the summaries of which are presented in Table 4 to Table 12. The full assessment of the North East Marine Plan can be found within Technical Appendix B to the full SA report.

Table 4: Assessment results: Cultural Heritage.

Cultural Heritage	
Uncertain Effects	**?**
• the heritage assets policy grouping aims to protect heritage assets from developments that could result in adverse effects. However, the last section of policy NE-HER-1 will allow for some harm to heritage assets to occur if harm to such assets cannot be avoided by development. Hence, an uncertain effect has been recorded for assets within and adjacent to the north east marine plan areas, as it will be dependent on implementation • policy groupings cables, dredging and disposal, oil and gas and renewables all aim to protect current activity and promote future activity within the north east marine plan areas. The baseline has identified the significant under exploited potential of buried heritage assets in the north east marine plan areas, as well as the potential for adverse effects on those heritage assets that are already uncovered, from cables, dredging and disposal, oil and gas and renewables. Policy NE-HER-1 could provide protection to heritage assets, however, it is uncertain which policy would have precedence • an uncertain effect has been recorded as a result of the cables policy grouping, on heritage assets adjacent to marine plan areas. This policy gives preference to buried subsea cables which could result in a negative effect on heritage assets adjacent to the marine plan areas. However, this would be dependent on implementation, therefore an overall uncertain effect has been recorded.	

Table 5: Assessment results: Geology, Substrates and Coastal Processes.

Geology, Substrates and Coastal Processes	
Significant Positive Effects	++
• the climate change policies seek to increase resilience of geology to the effects of climate change, minimise adverse impacts on coastal change adaptation measures and support proposals which have the potential to increase flood defence and carbon sequestering habitats. A significant positive effect has been identified for the coastal features and processes SA sub-topic.	
Uncertain Effects	?
• dredging and disposal activities have the potential to affect areas of seabed altering sediment processes and physical processes and creating sediment plumes. The dredging and disposal policy grouping aims to safeguard dredging activity within the north east marine plan areas, however, as dredging is an enabling activity which is essential to the functioning of ports and marinas, it is assumed that NE-DD-1 and NE-DD-2 will help dredging activity to continue. It is assumed that all new dredging proposals would be subject to an EIA, which would assess the potential effect on seabed substrate and bathymetry. This could help to mitigate potential negative effects. An uncertain effect, depending on implementation is recorded for the seabed substrates and bathymetry SA sub-topic • aggregate activity can significantly change the hydrodynamic regime, which in turn could alter coastal processes. There are currently no licensed aggregate extraction areas in the north east marine plan areas, but Dogger Bank (located within the north east offshore) has been included within Round 4 of The Crown Estates leasing rounds. Policies could help to safeguard this site for future aggregate developments. However, it is assumed that all new aggregate proposals will be subject to an EIA, and The Crown Estate leasing process also ensures that environmental receptors are considered. An uncertain effect, depending on implementation, has therefore been identified for the seabed substrates and bathymetry and coastal processes SA sub-topics • the effects of renewable energy installations on potentially sensitive environmental features are unknown at present. The installation of renewable technology and subsequent reduced contributions to climate change may help to appease the impacts of increased storminess such as coastal inundation within the marine environment. However, due to the unknown type and location of future renewable sites, an uncertain effect has been identified, for the coastal features and processes sub-topic.	

Table 6: Assessment results: Seascape and Landscape.

Seascape and Landscape	
Significant Positive Effects	**++**
• there is a close relationship between the presence of heritage assets and the character, value and appreciation of landscape and seascape. Heritage policies aim to protect heritage assets from future proposals, ensuring that the diversity of the marine environment, and its cultural heritage is protected • landscape and seascape policies aim to maintain and improve the seascape and landscape within the north east plan areas. Proposals which may harm the current seascape or landscape must demonstrate why this is necessary and mitigate adverse effects.	
Uncertain Effects	**?**
• oil, gas, and carbon capture, usage and storage (CCUS) developments have potential for negative visual effects on the seascape and landscape of the north east marine plan areas. Given the importance of the North York Moors and Northumberland Coast AONB, if development were to come forward, there is potential for oil and gas development to negatively affect seascape and landscape. Policies NE-OG-1 and NE-OG-2 may not directly result in further oil and gas developments within the north east marine plan areas, however, there are currently 15 licensed areas and 17 new blocks that have been provisionally awarded as part of the 31st licensing round. The 32nd round is currently in progress and may result in further blocks coming forward. Given that the oil and gas industry in the north east contributes significantly to the UK overall supplies, it is assumed that these policies will ensure that development will continue. Whether carbon capture usage and storage developments come forward as a result of policies NE-CCUS-1 and NE-CCUS-2 is currently uncertain. At this stage, there is no certainty that oil, gas and carbon capture usage and storage developments will occur, and for this reason an uncertain effect has been identified.	

Table 7: Assessment results: Water.

Water	
Significant Positive Effects	**++**
• marine litter is transboundary in nature, as litter moves in the marine environment and litter originating from one marine plan area or even country can affect another. The cross-border co-operation policy supporting text states that the alignment of marine planning with other planning, regulation and management bodies is necessary in order to manage pressures and aims to ensure transboundary impacts are minimised across international borders. This policy could therefore result in significant positive effects on the marine litter SA sub-topic • the water quality policy aims to enhance and restore water quality and ensure that new proposals are accountable for their potential negative impact on water quality. For this reason, a significant positive effect has been identified for the pollution and water quality sub-topic • a potential significant indirect positive effect has been identified in relation to the renewables policy grouping on the water temperature and salinity SA sub-topic. It is assumed that an increase in renewable energy generation could work to counter the advance of climate change and the associated effects on water temperature and salinity.	

Table 8: Assessment results: Air Quality.

Air Quality	
Significant Positive Effects	**++**
• potential significant positive effects have been identified in relation to the air quality policy as developments that contribute to air pollution will need to consider the need to protect good air quality.	

Table 9: Assessment results: Climate.

Climate	
Significant Positive Effects	**++**
• the climate change policies have resulted in a potential significant positive effect on climate change resilience and adaptation SA sub-topic, as it seeks to increase resilience and adaptation to the effects of climate change • the marine protected areas policies have resulted in a significant positive effect on the climate change resilience and adaptation SA sub-topic, as the policies directly address the issue of climate change adaptation, with clear preference for proposals which enhance the adaptability of marine protected areas to climate change • the renewables policies support energy generation from marine renewables which in turn could alleviate demand on greenhouse gas-emitting fossil fuel energy generation, resulting in significant positive effects on the greenhouse gas emissions SA sub-topic • the air quality policy aims to ensure that developments which contribute to greenhouse gas emissions will need to consider the need to protect air quality, resulting in significant positive effects on the greenhouse gas emissions SA sub-topic.	

Table 10: Assessment results: Communities, Health and Wellbeing.

Communities, Health and Wellbeing	
Significant Positive Effects	**++**
• the baseline has identified income and employment deprivation issues associated with coastal communities across the north east inshore marine plan area. It is assumed that the employment policy will help to provide employment opportunities for all, including those from protected equality groups, therefore significant positive effects have been identified for the effects on communities and effects on protected equality groups SA sub-topics • increased access to tourism and recreation activities, as a result of tourism and recreation policies, could provide significant social benefits for communities through, greater social cohesion, improved health and wellbeing (both physical and mental) and job creation. Significant positive effects have therefore been recorded in relation to the health and the wider determinants of health SA sub-topic • the cross-border co-operation policy aims for developments to consider cross-border impacts upon adjacent marine plan areas and the terrestrial environment including economic, social impacts. In order to achieve sustainable development, it is assumed that developments will need to consider their impact on communities (including health and wellbeing) in order to achieve sustainable development	

Communities, Health and Wellbeing
• the social benefits policy grouping has potential to tackle existing health problems within the north east inshore marine plan area, hence a significant positive effect has been recorded in relation to the health and the wider determinants of health sub-topic.

Table 11: Assessment results: Economy.

Economy	
Significant Positive Effects	++
• the aggregate policies could result in further aggregate extraction in the north east marine plan areas. The baseline has identified the significance of the UK marine aggregates and the importance they could play in the future for meeting housing demands and provision of fill for major coastal infrastructure projects, such as ports, coastal defences, renewable energy and nuclear energy projects, hence a potential significant positive effect has been recorded for the aggregates SA sub-topic • the infrastructure policy grouping aims to safeguard existing landing facilities within the north east inshore marine plan area, which are predominantly used for aggregate activity. The policy should therefore result in a significant positive effect on aggregate extraction and the ports and shipping SA sub-topics • the baseline has identified the importance of oil and gas to the UK economy. Oil and gas policies aim to safeguard areas for potential future oil and gas extraction within the north east marine plan areas, resulting in a significant positive effect on the energy generation SA sub-topic the implementation of the employment policy grouping could result in increased levels of employment across multiple sectors within the north east marine plan areas. This has led to significant positive effects for the energy generation and infrastructure; ports and shipping; fisheries and aquaculture; leisure and recreation; and tourism SA sub-topics • the fisheries policies will help to encourage further fisheries and aquaculture development within the north east marine plan areas, resulting in a significant positive effect on the fisheries and aquaculture SA sub-topic • an increase in access to the marine environment is predicted to result from the implementation of the access policy on leisure and recreation. This should allow for greater use of the natural environment for leisure and recreation; therefore the access policy has resulted in a significant positive effect on the leisure and recreation policy SA topic • all four ports and shipping policies support safeguarding port access and key navigational routes and could increase port and shipping activity within the north east marine plan areas, hence a potential significant positive effect has been recorded • the cables policies will help to enable further cable development within the marine plan areas and could ensure energy security for the future. Significant positive effects have been identified in relation to the energy generation and infrastructure development and seabed assets SA sub-topics	

Economy
• the tourism and recreation policies aim to protect existing leisure and recreational activities and could result in expansion and diversification of existing developments as well as new proposals. This has the potential to result in significant positive effects on both the leisure and recreation and tourism SA sub-topics • the renewable energy policies aim to safeguard areas for future renewable development and promote new renewable technologies. Significant positive effects have been identified in relation to the energy generation and infrastructure development SA sub-topic.

Table 12: Assessment results: Biodiversity, Flora and Fauna.

Biodiversity, Habitats, Flora and Fauna	
Significant Positive Effects	++
• the implementation of the marine protected areas policies could have potential for significant positive effects on the marine protected areas network, including benthic and intertidal ecology, as it may increase the adaptability of benthic and intertidal environments to the effects of climate change, and make suitable arrangements for the spatial changes in distribution of habitat types • the cumulative effects policy is predicted to have a significant positive effect on the benthic and intertidal and protected sites and species SA sub-topics, as it will address adverse cumulative effects from future proposals • the invasive non-native species policy grouping directly aims to prevent the introduction and increased spread (or increased distribution) of invasive non-native species throughout the plan area. Transport of invasive non-native species, as well as areas of potential colonisation are addressed within this grouping, which should help to form a well-rounded approach to tackling this issue • the north east marine plan areas are both nationally and internationally significant for bird populations. The baseline has identified the existing co-existence issues with aggregate extraction, dredging, mineral extraction and fishing. The co-existence policy grouping is likely to result in further protection for the north east bird populations.	
Uncertain Effects	?
• the co-existence policy aims to help protect habitats and species, but it also aims to protect industries that are damaging to benthic and intertidal habitats. There is no indication within the supporting text whether the protection of industries or the protection of habitats take priority. For these reasons, an uncertain effect has been identified, in relation to the co-existence policy grouping and benthic and intertidal ecology	

Biodiversity, Habitats, Flora and Fauna
• the oil and gas policies may not directly result in further oil and gas developments within the north east marine plan areas, however, it is assumed that these policies will ensure that existing developments will continue. The potential effects of carbon capture usage and storage are not fully known, however, the baseline states that these are likely to be similar to oil and gas. It is noted that the Net Zero Teesside project has the potential to adversely affect benthic and intertidal ecology, both within and beyond the plan areas. The production of noise in the marine environment can have varying effects on marine species. There is no certainty that the oil and gas policy grouping will result in development, hence an uncertain effect has been identified in relation to the benthic and intertidal ecology; marine megafauna; ornithology; and protected sites and species sub-topics • the disturbance policy does not protect benthic or intertidal habitats; or sessile species from the effects of disturbance, which has the potential to lead to the irreversible loss of benthic and intertidal environments within the north east plan area. The biodiversity policy grouping may have the potential to mitigate for this, however, it is uncertain whether this would include the effects of disturbance • the implementation of the underwater noise policy grouping could have significant negative effects on all parts of the food web and ecosystem, including marine megafauna, fish and shellfish, and protected sites and species. Policies in this grouping could lead to the development of proposals which directly alter fish movement patterns, therefore altering energy expenditure. Species which are not "highly mobile" would not be protected by this policy. This could lead to the irreversible loss of populations. The populations of species which are “highly mobile”, as well as those which are not could also be affected by activities that occur concurrently in key habitats, or at times or in areas that are crucial to part of their life-cycle e.g. spawning times. The policy grouping may also negatively affect the protected sites and species SA sub-topic, however, the effects would be dependent on implementation • sub-sea cables have the potential to adversely affect fish species, through disturbance during construction and through electromagnetic fields created during operation. There is potential for electromagnetic fields to alter migration, feeding and navigation in these organisms. However, the impact of electromagnetic fields on fish is not yet fully understood, hence an uncertain effect has been recorded • fisheries pose a threat to fish and shellfish, particularly vulnerable or rare species. Whilst the fisheries policies seek to protect essential fish habitat, it is unclear whether this would apply only to fish habitat of commercially important species or all fish. Therefore, an uncertain effect has been recorded for the fish and shellfish and protected sites and species sub-topics • renewable energy policies could result in further renewable developments within the north east marine plan areas, which could indirectly reduce the climate change impacts on plankton. Impacts could be dependent upon the type and number of developments, which is not known at this stage and there is also a lack of data concerning how renewable infrastructure could affect plankton

Biodiversity, Habitats, Flora and Fauna
• the seascape and landscape policy may have the potential to lead to the irreversible loss of habitats, due to the caveat within the policy which provides the potential for development not compatible with the seascape and landscape of the area to occur. However, the policy gives great weight to conserving and enhancing landscape and scenic beauty in National Parks and Areas of Outstanding Natural Beauty. An uncertain effect depending on implementation is therefore recorded for the protected sites and species SA sub-topic.

6. Cumulative Effects Assessment

6.1 Introduction

The SEA Regulations require an assessment of cumulative effects. Cumulative effects arise where:

- several individual effects of the plan have a combined effect on a single receptor
- several plans and policies each have insignificant effects but together have a significant effect.

The significance of cumulative effects resulting from a range of activities, or multiple incidences of one activity, may vary based on factors such as the nature of the projects proposed and the sensitivity of the receiving communities and environment.

The cumulative effects assessment therefore includes:

consideration of how different aspects of the North East Marine Plan may interact to cause cumulative effects on a receptor
how the North East Marine Plan can cause cumulative effects in association with other programmes, plans, policies and projects.

6.2 Potential Cumulative Effects of all Policy Groupings

Table 13 below summarises the potential significant positive, significant negative and uncertain cumulative effects identified for each SA topic from the assessment of policies.

The full details of the cumulative effects identified, as well as mitigation, for each of the SA topics in relation to the policy groupings, is outlined in Table 2 in section 13.2 of the SA Report: Part 3.

Table 13: Summary of Cumulative Effects.

SA topic	Associated Policy Groupings	Potential Negative of Uncertain Cumulative Effects	Potential Positive Cumulative Effects
Landscape and Seascape	seascape and landscape	N/A	Seascape and landscape policy grouping working in combination with the marine protected areas and heritage assets policy groupings, could result in positive cumulative effects.
Economy	invasive non-native species underwater noise	Economic activity could be restricted by the implementation of a combination of the environmental policy groupings, however the significance of these cumulative effects is not yet known. Environmental policies could inhibit economic activity (e.g. underwater noise restrictions and control of invasive non-native species). However, some of these environmental policies do contain caveats to allow for development in certain circumstances, which could help to mitigate potential adverse impacts on development.	N/A
Biodiversity	biodiversity	N/A	A potential significant cumulative positive effect has been identified in relation to the marine protected areas policy grouping working in combination with the biodiversity grouping.

6.3 Potential Cumulative Effects with other programmes, plans, policies and projects

Table 3 within Section 13 of the SA Report: Part 3, presents the relevant international, national and regional plans, policies and strategies which could give rise to potential cumulative effects in combination with the North East Marine Plan.

The majority of the policies and plans reviewed will result in positive cumulative effects. This is because they strengthen environmental protection, for example by reducing greenhouse gas emissions, improving air or water quality, protecting designated sites for nature conservation, landscape or the historic environment. However, there is potential for development to cause negative cumulative effects, particularly where development in adjacent terrestrial or marine areas can act in-combination to impact on receptors. There are a number of policies within the North East Marine Plan which do help to mitigate these effects:

- Cumulative Effects Policy NE-CE-1
- Co-existence Policy NE-CO-1
- Cross-border Co-operation Policy NE-CBC-1
- environmental protection policies
- economic development (including fisheries) policies.

In addition, cumulative impact assessments undertaken as part of the consenting and EIA processes would also address and mitigate for potential cumulative effects of projects.

7. Mitigation

Mitigation measures are measures suggested to prevent, mitigate, reduce or offset negative, cumulative or uncertain effects. Where significant negative or uncertain effects were identified within the policy assessment, mitigation has been provided via the following (either as standalone or in combination):

- **general mitigation:** this may be provided through other policies within the North East Marine Plan; existing plans and policies (such as local plans, national park management plans) or through other processes, for example, environmental impact assessment (EIA)
- **specific mitigation:** this mitigation type has recommended alterations to either the supporting text or policy wording.

Responses to mitigation for each of the SA topics can be found in section 14 in SA Report: Part 3 and further detail will be provided within the SA Adoption Statement.

The mitigation proposed falls into the broad categories below:

- in some cases, mitigation would be applied at the planning application stage and would rely on the EIA and/or The Crown Estate leasing processes. Uncertainty remains in the SA but is likely to be mitigated at the project level, therefore no further action is required at the plan level
- in some cases, changes to policy supporting text proposed in the SA to mitigate potential effects has been rejected because discussing potential impacts caused by every sector in the supporting text would lead to an unduly long plan. As stated in section 2.3 of the marine plan, the plan must be taken as a whole and no policy should be taken in isolation. Therefore, no further action will be taken in these cases
- several uncertain cumulative effects are likely to be mitigated by the implementation of one or more policies within the plan. In particular, the cumulative effects policy grouping could help to mitigate such effects. The final outcome may not become clear until the implementation of the plan. Therefore, no further action is required in the SA
- there may be not mitigation for all cumulative effects, particularly those which could restrict development in order to protect the environment (and vice versa). Instead, it may have to be accepted as an effect of implementing policies, specifically those which will protect the environment, hence no further action is required
- spatial and temporal changes to development proposals could help to prevent adverse impacts on marine organisms. However, this level of detail will be decided at planning application stage, thus no further action is required
- an uncertain cumulative effect may have been identified due to a lack of data concerning links between certain SA sub-topics. In such cases, no further action is required. Instead, uncertain effects may be mitigated when further scientific evidence is published to clarify potential interactions.

8. Monitoring of Residual Effects

The SEA Regulations require that the significant environmental effects of plans and programmes be monitored. This intends to allow the early identification of unforeseen adverse effects so that appropriate remedial action can be taken. Therefore, monitoring undertaken for the North East Marine Plan as part of the SA, and as part of the implementation and monitoring of the adopted North East Marine Plan, should help to:

- monitor the significant effects of the North East Marine Plan
- track whether the North East Marine Plan has had any unforeseen effects
- ensure that action can be taken to reduce/offset the significant negative effects of the plan.

The requirements of the SEA Regulations focus on monitoring the significant negative and unforeseen effects of the Marine Plan. Therefore, monitoring within these reports is only discussed within the context of residual effects which are significantly negative or uncertain.

The North East Marine Plan process will itself include a comprehensive monitoring programme which is focused on the achievement of the plan's objectives. This monitoring programme will enable The MMO to track the success of policies and also to monitor the baseline environmental, economic and social conditions of the marine plan areas. The monitoring also contributes to the three-yearly reporting to parliament, which in turn provides a mechanism for reviewing and amending the plan or individual policies.

The SA topics and sub-topics for which residual significant negative or uncertain effects have been identified in the assessment of the final policies will be presented in the SA Adoption Statement alongside suggested monitoring indicators. During the development of the Annex of Indicators, these suggestions will, if practicable, be integrated into the monitoring programme or new indicators will be created to assess these impacts. The Annex of Indicators will be developed following the publication of the North East, North West, South East and South West Approach to Monitoring and once completed will be available on request from the Marine Management Organisation.