Marine Management Organisation

North West Inshore and Offshore Marine Plans Sustainability Appraisal. Part 3: Results of the Assessment. Draft Report.

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

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Contents

Figures

Tables

Appendices

1. Introduction and Purpose of this Report

1.1 Introduction

The North West Marine Plan has been subject to an integrated Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) (hereafter referred to as SA) in line with the requirements of Statutory Instrument 2004 No. 1633: The Environmental Assessment of Plans and Programmes Regulations 2004.

This report is Part 3 of the SA Report. It presents the results of the assessment of the North West Marine Plan and its reasonable alternatives.

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

1.2 Structure of this Report

The SEA Regulations require that an assessment is carried out on a draft version of the North West Marine Plan and a statutory environmental report (an SA report under the English planning system) is produced and consulted on. This report sets out the SA process followed, outlines why alternatives were selected or rejected, reports on the assessment of the draft marine plan and outlines a programme for monitoring the effects of the marine plan. This SA Report has been produced alongside the production of the North West Marine Plan and is published for consultation at the same time, providing respondents with appropriate information to base their representations about the sustainability implications of the marine plan.

For the sake of clarity, this SA Report is split into a number of parts. This is Part 3 of the SA Report: Results of the Assessment. The other parts of the report are:

- Part 1: Introduction and Methodology
- Part 2: Scoping Information

A separate Non-Technical Summary is also available.

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

This report addresses the following:

- the reasons for selecting the alternatives dealt with
- the results of the assessment, including the effects of the plan objectives, alternative options and effects of the draft versions of the North West Marine Plan, and mitigation measures for each of the assessment topics, which are:
    - Cultural Heritage
    - Geology, Substrates and Coastal Processes
    - Seascape and Landscape
    - Water
    - Air Quality
    - Climate

    - Communities, Health and Wellbeing
    - Economy
    - Biodiversity Habitats Flora and Fauna
- Cumulative effects assessment
- Monitoring programme.

Sections 5 to 13 of this report present the potential significant effects of the North West Marine Plan by SA topic.

Full detailed assessments are available in a separate technical appendix (SA Report Appendix B: Assessment of the North West Marine Plan Preferred Policies). The technical appendix can be filtered in order to view particular parts of the assessment, SA topics or sub-topics or particular policy groupings. For example, in order to view the assessment of one policy grouping, column E can be filtered by clicking the 'button' in row 1 and selecting a grouping from the list that appears. Similarly, to view the assessment against an SA sub-topic, click the 'button' in row 1, column C and select the SA sub-topic from the list that appears.

The assessment of policies has been informed by the MMO's interactive marine planning tool, the Marine Information System (MIS). The MIS is to be superseded by an alternate service, Explore Marine Plans, which will also be accessible online. The MIS draws data from various sources including the MMO, delivery partners and industry, and compiles information on sectors and activities which support the development and implementation of marine plans.

2. The Reasons for Selecting Alternatives

2.1 Introduction

As part of the development of the North West Marine Plan, several reasonable alternative options for the policies within the North West Marine Plan were identified by the MMO and tested through the SA. As required by the SEA Regulations (Schedule 2), the SA Report identifies the reasons for the selection of the preferred options in preference to other alternative options.

In SA, this is interpreted as having two meanings:

1. why it was 'reasonable' to select the alternatives which were developed to be tested
2. why the preferred approach was selected in light of the SA of alternatives.

2.2 The Alternatives Developed

Prior to options development the MMO identified key issues, which were then categorised as opportunities or challenges across the north west marine plan areas, which were determined at an appropriate spatial and temporal scale. These key issues were then recorded within the Issues and Evidence Database and arranged into themes:

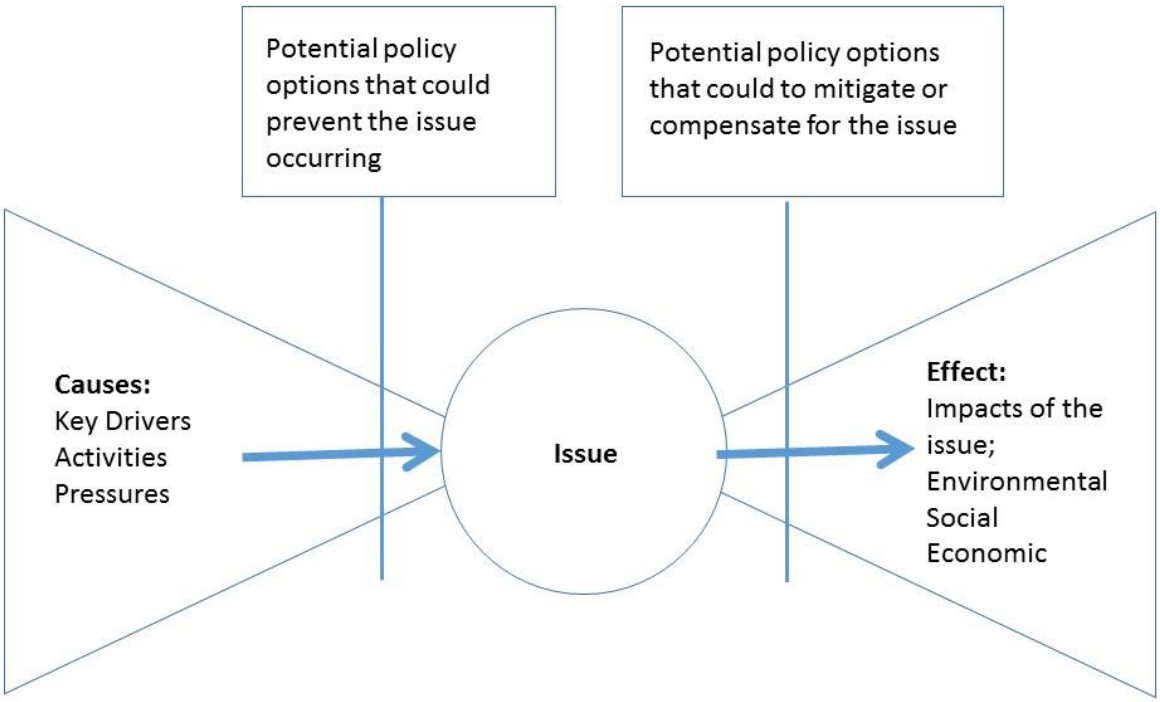
- **economy**: aquaculture, co-existence, ports and harbours, shipping, renewables, oil and gas, cables, infrastructure, aggregates
- **environment**: climate change, coastal change, air quality, disturbance, ecosystem approach, habitats, invasive non-native species, litter, marine protected areas (MPAs), geodiversity, species, water quality
- **governance**: cumulative effects
- **social**: access, employment, fisheries, historic environment, seascape, tourism and recreation, dredging and disposal, heritage assets, defence.

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

Once key issues were identified for the north west marine plan areas, the causes and effects of these issues were considered, and later validated by stakeholders. Using this, the MMO identified where the most appropriate policy intervention could sit, either preventing the cause of the issue, or where this can't be controlled by policies within the North West Marine Plan, addressing the effect of the issue.

This process is presented in Figure 1 below.

Figure 1: Methodology for Devising Policy Options.



From this, realistic and deliverable alternatives were created, which align with the Marine Policy Statement (MPS) High Level Marine Objectives (HLMOs)[1] and other relevant legislation, as well as address current and future issues in plan areas. As a result, each of the marine plan areas has a variety of different 'groupings' (for example, Access) and each 'grouping' had a number of potential options. The groupings and options reflect key issues in each of the marine plan areas, and therefore vary across plan areas. For the North West Marine Plan there were 29 groupings under which 261 individual options were assessed through the SA.

These options were subject to stakeholder engagement during Iteration 2 across the seven current marine plan areas. This took place between 29 January and 29 March 2018. Across these seven marine plan areas, a total of 1632 comments were received by the MMO in response to the Iteration 2 consultation. This stakeholder input, along with the SA's options assessment findings, was then used to identify a preferred and sustainable option for each grouping which could be developed into a detailed policy.

Following the identification of a preferred option for each grouping, compatibility checks were undertaken by the MMO, during which the preferred option for each grouping was compared with other preferred options to ensure compatibility with each other. Following this exercise, a gap analysis was undertaken which identified any policy gaps within each marine plan area. A policy gap is where policies existed in other plan areas that were deemed to be nationally relevant, so were therefore introduced in areas where they did not exist after the iteration 2 options process.

[1] HM Government, UK Marine Policy Statement, 2011

During the compatibility check and gap analysis exercises, some policy options were merged to create preferred policies compatible across the four marine plan areas and some additional preferred policies were introduced to some marine plans in order to fill an identified policy gap. In these cases, the policies had not been considered at the options (Iteration 2) stage as no marine plan issues had been identified in the earlier marine plan development stages. In these cases, there is not considered to be an alternative option to consider because the policy is required to fill a policy gap.

Through the development of the preferred set of policies for each marine plan area, options have been rejected for the following reasons:

- they were not identified as the most sustainable option in the SA
- they were not identified as compatible with other preferred policies, for example because they were a duplicate or overlapped with another policy (in which case some preferred policies were merged, or their strength changed)
- they were not favoured by stakeholders during the Iteration 2 engagement in February / March 2018.

Iteration 3 stakeholder engagement was then undertaken on a preferred set of policies with detailed policy content between 21 January 2019 and 29 March 2019. Following engagement, the preferred policies were edited to address consultee comments. The final set of preferred policies was then passed to the SA consultants for assessment. The methodology followed for undertaking this assessment is described in Section 3.3 Part 1 of the Sustainability Appraisal Report.

2.3 Reasons for Selecting the Alternatives

As mentioned above, stakeholder input, along with the SA's options assessment findings were used to identify a preferred and sustainable option for each grouping which was then developed into a detailed policy. Some of the preferred policies result from a combination of options assessed at the assessment stage and some have also been merged with other policy options.

2.4 Findings of the Assessment of Alternatives

The options assessment stage was undertaken between June 2017 and April 2018 by ClearLead Consulting Ltd working in association with WSP Ltd and MarineSpace Ltd.

The options stage was a significant phase in the marine planning process; it considered the different ways of delivering the vision and HLMO objectives and was the mechanism which determined how the marine plan responded to issues in the north west marine plan areas. The options assessment formed part of Iteration 2 of the SA of the marine plans, and the methodology for this is set out within Part 1 of the SA Report.

All reasonable policy options for the North West Marine Plans were assessed against each SA sub-topic. The SA Database was referred to throughout the

assessments to provide evidence of relevant issues and baseline data. The assessment focussed on identifying potential significant effects and providing a comparison between the options being considered for each policy grouping.

The key recommendations from the assessment of the options were to avoid taking forward options which were identified as having the potential to result in a significant negative effect on the SA sub-topic, and to opt for options which would enhance the significant positive effects identified. It was also recommended that policy authors minimise the uncertainty associated with the implementation of a policy. Where applicable, the assessors also identified further mitigation measures which could assist with the development of the preferred options.

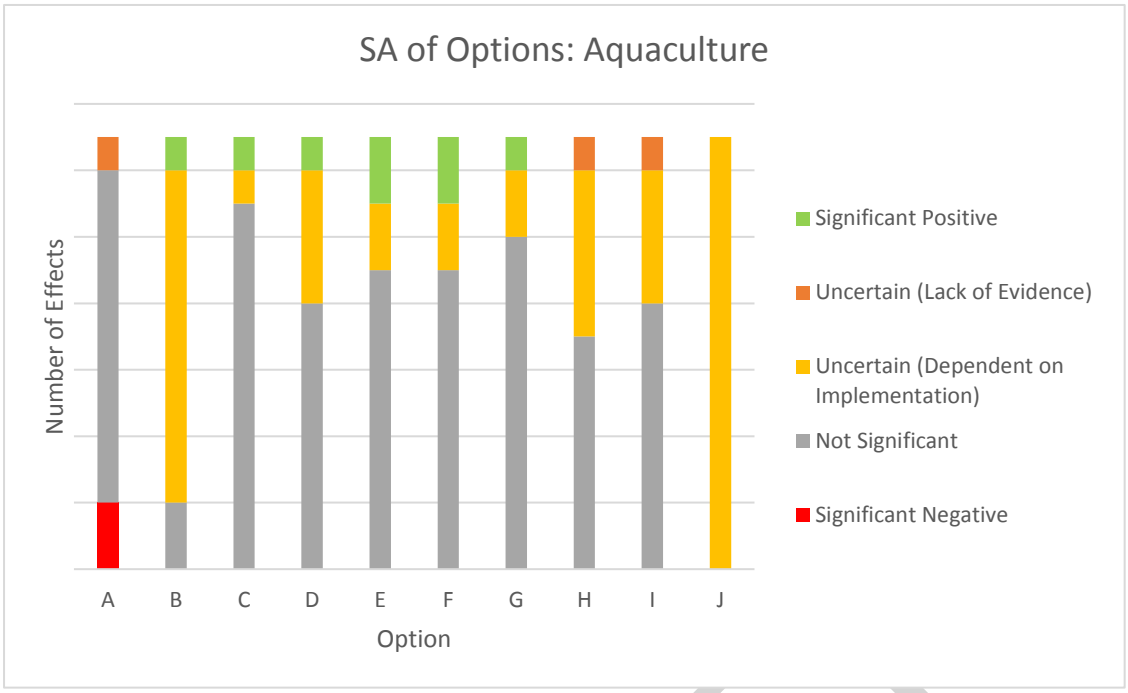
The assessment outputs from the options assessment stage comprised of an Excel workbook containing the assessments of the policy options for each grouping against the relevant SA sub-topics. This totaled 254 policy options across 29 groupings. From the completed assessments, a pivot table and chart were generated, providing a visual representation of the findings of the assessment for each grouping. An example is shown below. This allowed a quick comparison to be made of the relative performance of all options within a grouping (A – N of the x axis within the example provided below) against the relevant SA sub-topics (tallied in the y axis within the example provided below).

The options assessment of the draft North West Marine Plan was reported in an options assessment SA report which was published in June 2018. The report can be found here, and is organised in 4 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
- Section 4 outlines the next steps in the plan making and SA processes.

Within Section 3 of the report, the results of the SA options assessment are summarized by policy grouping, highlighting the potential significant or uncertain effects which may be had on any of the SA topics as a result of the implementation of any of the policy options within the individual policy grouping. It presents the comparison of the performance of options assessed for each grouping in the form of a pivot chart. The findings of the assessment of options has been used by the MMO to make decisions between options to be taken forward, with the aim being to take forward the most sustainable option (as identified within the assessment). The decision making has also considered the responses from stakeholders to the Iteration 2 engagement undertaken by the MMO. Figure 2 below shows an example of the options assessment output.

Figure 2: Example Options Assessment Output.



3. Summary of Preferred Policies Assessment Results

3.1 Introduction

This section presents a summary of the assessment findings of the North West Marine Plan. This section indicates the headline results, identifying the potential significant positive and negative effects of the SA topics and sub-topics against the policy groupings. The effects presented within the headline results take into account mitigation provided from other plan policies, but does not include possible mitigation from other existing plans and policies. The assessment results are described further for each SA topic in the subsequent sections to this report and presented in detail in Appendix B to this report.

The headline results of the assessment are summarised in Table 1.

Table 1: Headline Results of the Assessment.

	Policy Grouping																												
SA Topic/SA Sub-topic	**Access**	**Aggregates**	**Air Quality**	**Aquaculture**	**Biodiversity**	**Cables**	**Climate change**	**Co-existence**	**Cumulative effects**	**Defence**	**Disturbance**	**Dredging and Disposal**	**Employment**	**Fisheries**	**Cross Boundary Considerations**	**Heritage Assets**	**Infrastructure**	**Marine Litter**	**Marine Protected Areas**	**Natural Capital**	**Invasive non-native Species**	**Oil and Gas**	**Ports and Harbours**	**Renewables**	**Seascape and Landscape**	**Social benefits**	**Tourism and recreation**	**Underwater Noise**	**Water Quality**
Cultural Heritage																													
Heritage Assets within marine plan areas		?				--						--				++						--	?	?					
Heritage Assets adjacent to marine plan areas						--																							
Geology, Substrates and Coastal Processes																													
Coastal features and processes		?	?				++					--												?					
Seabed substrates and bathymetry		?										--								++									
Seascape and landscape																													
Effects on seascape and landscape																++				?		--		--	++				
Water																													
Marine litter														--	++												?		
Pollution and water quality								?												++			--						++

Water temperature and salinity																								++					
Air																													
Air pollutants			++																				?						
Climate																													
Climate change resilience and adaptation							++												++	++		?							
Greenhouse gas emissions			++																			?	?	++					
Communities, Health and Wellbeing																													
Effects on communities													++		++		++			++				?					
Effects on protected equality groups													++																
Health and the wider determinants of health																				++						++	++		
Economy																													
Aggregate extraction		++																		?				?					
Defence	?																												
Energy generation and infrastructure development			?										++						?			++		++					
Fisheries and aquaculture				?				++						++						?					?				
Leisure / recreation	++							++		?										?									
Marine manufacturing																			?										?
Ports and shipping																							++	?					
Seabed assets						++																							
Tourism										?																			
Biodiversity																													
Benthic and intertidal ecology		?		--		--		?	++		?	--		?								--		?					
Fish and shellfish		?		--								--		?							++								
Marine megafauna		?							?					--						?		--					?		?

Invasive non-native species											?										++									
Plankton					?																			?						
Protected sites and species		?							++					?								?					?		--
Ornithology		?						++	?			--							++									?		

4. Results of the Assessment - Cultural Heritage

4.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to cultural heritage. It covers heritage assets within the north west marine plan areas and those which are adjacent to the north west marine plan areas. Due to the similarities in performance across the cultural heritage SA sub-topics, the description of results have been grouped. The full assessment of the cultural heritage SA topic can be found in Appendix B.

4.2 Results of the Assessment of all Policy Groupings on Cultural Heritage

Figure 3: Effects on the Heritage Assets Within the Marine Plan Areas SA Sub-Topic.

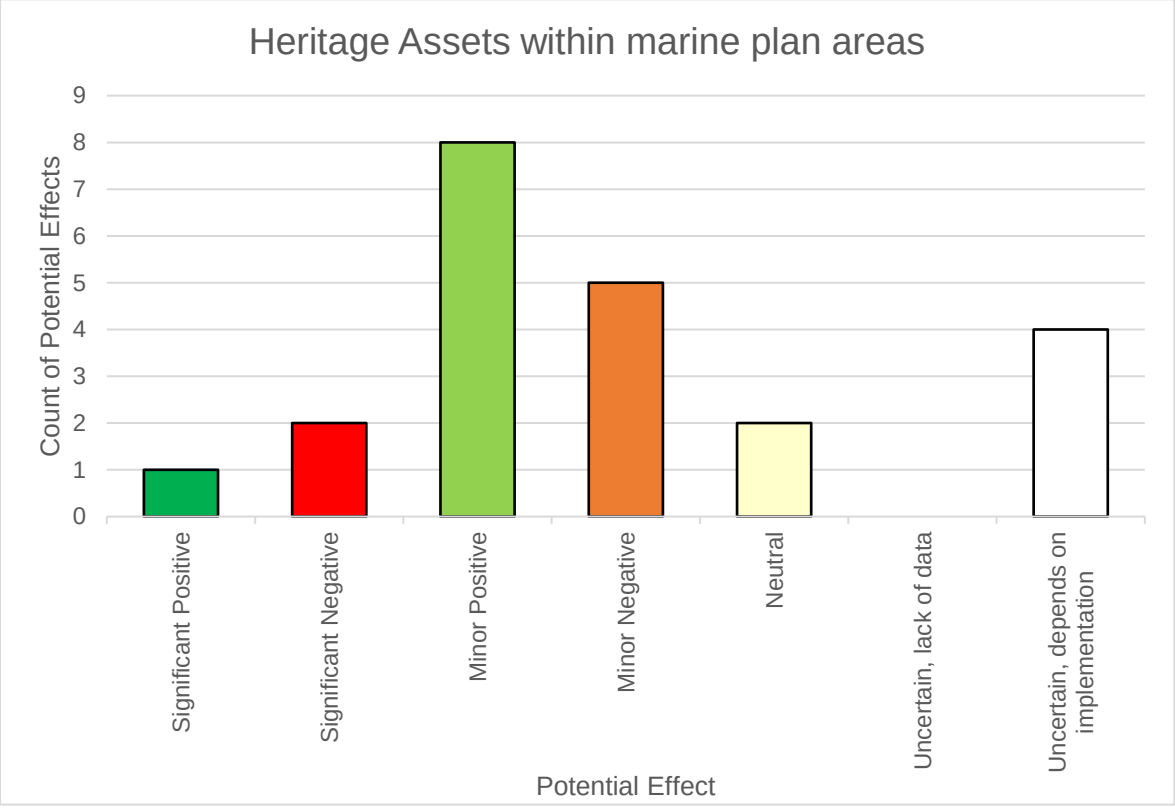
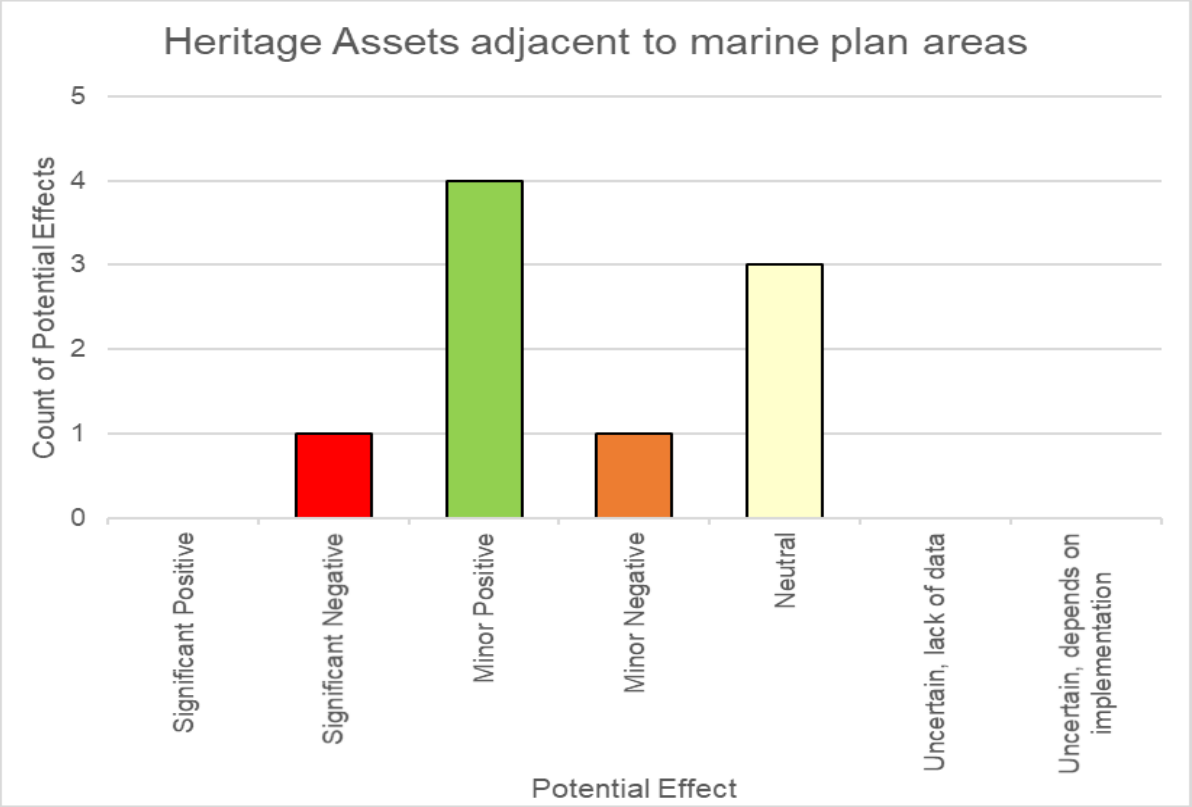


Figure 4: Effects on the Heritage Assets Adjacent to the Marine Plan Areas SA Sub-Topic.



The baseline has identified the north west marine plan areas as having increased visitor numbers due to the quality of its heritage assets, however it has underutilised heritage assets which could attract more visitors. A potential significant positive effect has been identified for the heritage assets within the north west marine plan areas SA sub-topic in relation to the heritage assets policy grouping. The significance of heritage assets in the immediate vicinity of the north west marine plan areas, is susceptible to the effects arising from activities within marine plan areas. The heritage assets policy grouping aims to protect heritage assets from developments that have the potential to result in adverse effects.

Potential significant negative effects have been identified for the heritage assets both within and adjacent to the north west marine plan areas SA sub-topics in relation to the cables policy grouping. Buried subsea cables have the potential to disturb both known and undiscovered archaeological sites. The policy states a preference for burying cables, which may have the potential to exacerbate disturbance on heritage assets, hence the significant negative effects identified.

Oil, gas and CCUS developments have potential to adversely affect buried heritage assets. Policies NW-OG-1 and NW-OG-2 may not directly result in further oil and gas developments within the north west marine plan areas, however, there are currently 23 licensed areas and 13 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 west region contributes significantly to the UK overall supplies, it is assumed

that these policies will ensure that development will continue, which has the potential to negatively affect heritage assets within the north west marine plan areas. Whether CCUS developments come forward as a result of policies NW-CCUS-1 and NW-CCUS-2 is currently uncertain.

There are ten ports in the north west inshore marine plan area, two of which have been classified as major ports[2], these are Heysham and Liverpool. Ports require navigational dredging to maintain safe navigational access. The baseline has identified the significant under exploited potential of buried heritage assets in the north west marine plan areas, as well as the potential for adverse effects on those heritage assets that are already uncovered, from dredging and disposal. Policies NW-DD-1 and NW-DD-2 aim to safeguard existing dredging activity within the north west marine plan areas, rather than increasing dredging activity. However, as dredging is an enabling activity which is essential to the functioning of ports and marinas, it is assumed that policies NW-PS-1 and NW-PS-2 will also help dredging activity to continue. As dredging activity at present is negatively affecting cultural heritage, it is assumed that at best, the current baseline situation will continue, and for this reason a significant negative effect has been identified.

An uncertain effect has been identified in relation to the aggregates policy grouping. There are currently no licensed aggregate extraction areas in the north west marine plan areas, however, there is one site located within the Irish Sea which has been included within Round 4 of the Crown Estates leasing rounds. Policies could help to safeguard this site for future aggregate developments, which have the potential to result in significant negative effects on heritage assets, however, there is no certainty on whether development will take place at this stage, and for this reason an uncertain effect has been identified.

An uncertain effect has been identified for the heritage assets within the north west marine plan areas SA sub-topic in relation to the renewables policy grouping. It is recognised that all marine renewable energy types have the potential to adversely affect heritage assets with the marine environment through their connection with the seabed, be this through the connection of the device itself with the seabed, such as the foundation of a turbine or the anchoring of a wave device, or through contact between any heritage asset and the cable which connects to the shore. The extent of these effects is largely dependent on the device used, and on the installation methods opted for, for example, if the cable would be submerged within a trench in the seabed, would have rock armour applied, or would simply lay across the seabed surface.

An uncertain effect has also been identified in relation to the ports and harbours (including shipping) policy grouping. Future ports, harbours and shipping activity have the potential to effect heritage assets, particularly those that may be buried and not yet uncovered. Associated port activities, such as dredging, could also be increased as a result. However, an uncertain effect has been identified as the policy and supporting text do not stipulate whether potential activity will be undertaken or where it would be located. It is however, understood that this will be identified in

[2] Futures Analysis for the North East, North West, South East and South West Marine Plan Areas (June 2017)

harbour master plans to be developed as part of Maritime 2050, which could allow for greater certainty, with regards to the effects on heritage assets.

4.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within the following table.

Table 2: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Cultural Heritage.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Heritage assets within north west marine plan areas Heritage assets adjacent to the north west marine plan areas (for Cables grouping only)	Cables, Aggregates, Dredging and disposal, Oil and gas, Ports and harbours (including shipping), and Renewables	There is an assumption that any proposals arising from these sectors will need to address the potential for adverse effects to arise on heritage assets through the Environmental Impact Assessment (EIA) process, where required under the Marine Works EIA Regulations 2017. Policy NW-HER-1 aims to provide protection to heritage assets, however, it is recommended that consideration is given to amending the policy supporting text to refer specifically to activities which may occur as a result of these groupings and related proposals.
Heritage assets within north west marine plan areas	Aggregates	The Crown Estate's leasing process and other required consenting schemes also ensures that cultural heritage receptors are taken into account during these processes and conditions frequently applied to limit effects.

5. Results of the Assessment - Geology, Substrates & Coastal Processes

5.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to geology, substrates and coastal processes. It covers seabed substrates and bathymetry, and coastal features and processes, these are both separate SA sub-topics. Due to the similarities in performance across the two SA sub-topics, the description of results have been grouped together. The full assessment of the geology, substrates and coastal processes SA topic can be found in Technical Appendix B.

5.2 Results of the Assessment of all Policy Groupings on Geology, Substrates and Coastal Processes

Figure 5: Effects on the Coastal Feature and Processes SA Sub-Topic.

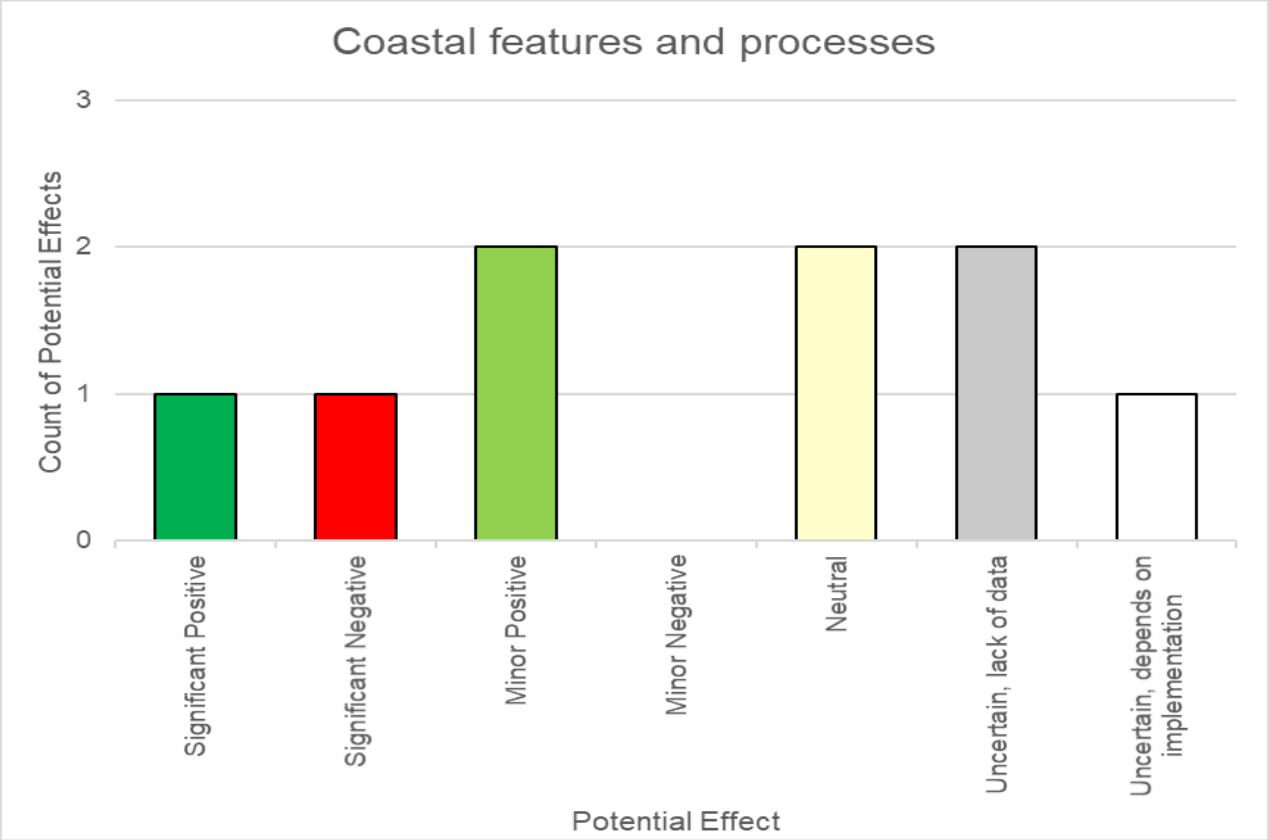
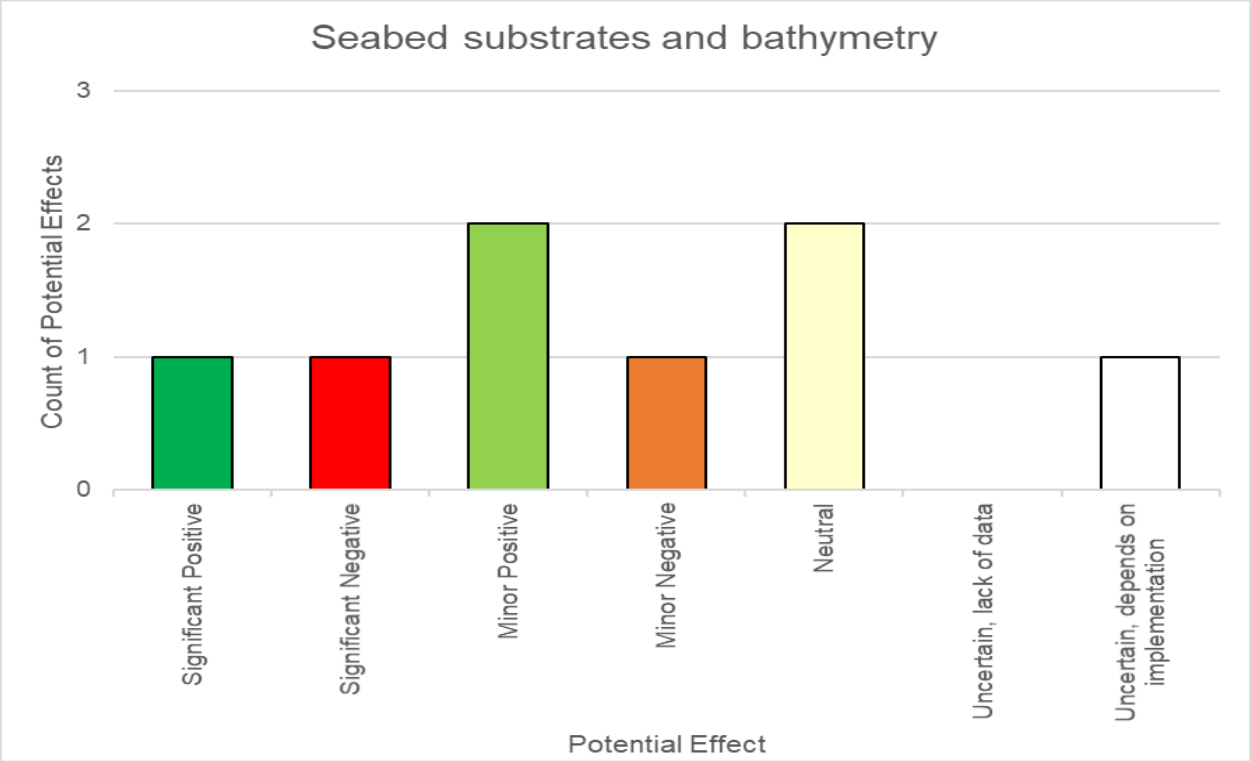


Figure 6: Effects on the Seabed Substrate and Bathymetry SA Sub-Topic.



Supporting services underpin all of the other services and occur throughout the north west marine plan areas. The seabed provides a role for both nutrient cycling and carbon sinks, the importance of which has been identified within the supporting text to policy NW-NG-1. As a result of this policy, it is assumed that the seabed substrates and bathymetry SA sub-topic would be offered protection, due to the importance of these assets, and for this reason, a significant positive effect has been identified.

A significant positive effect has been identified for coastal features and processes, in relation to the climate change policy grouping. Policies NW-CC-1, NW-CC-2, and NW-CC-3. NW-CC-5 and NW-CC-6 in combination, seek to increase resilience of geology to the effects of climate change, minimise adverse effects on coastal change adaptation measures and support proposals which have the potential to increase flood defence and carbon sequestering habitats.

The north west marine plan areas contain three Geological Conservation Review Sites, which represent the representing coastal geomorphology within the north west marine plan areas. These sites are indicative of 26 different processes, formations and regimes relating to sediment supply and transport, tides, waves, surveys, currents and sea-level history. Dredging and disposal activities have the potential to affect areas of seabed altering sediment processes and physical processes and creating sediment plumes as well as alter the hydrodynamic regime and consequently coastal processes. Potential increases in dredging and disposal activities have the potential to cause the loss of these important sites and significantly alter coastal processes, therefore a significant negative effect has been identified for both geology, substrates & coastal processes SA sub-topics.

Aggregate extraction has the potential to affect areas of seabed altering sediment processes and physical processes and creating sediment plumes. There are currently no licensed aggregate extraction areas in the north west marine plan areas, however, there is one site located within the Irish Sea which has been included within Round 4 of the Crown Estates leasing rounds. Policies have the potential to help to safeguard this site for future aggregate developments, which have the potential to result in significant negative effects, however, there is no certainty on whether development will take place at this stage, and for this reason an uncertain effect has been identified, for both geology, substrates & coastal processes SA sub-topics.

Coastal squeeze is an issue within the inshore north west marine plan area, which is often exacerbated through human activity and the presence of coastal defences. The issue is likely to be exacerbated further by climate change and sea level rise, and the need to protect the coastline. According to the baseline, the UK is locked into accelerated sea level rise, regardless of what we do about greenhouse gas emissions. Sea level rise has potential to give way to increased coastal erosion, inundation of the coastline and coastal squeeze. Due to the lack of evidence on future scenarios of coastal processes an uncertain effect has been identified, in relation to the air quality policy grouping.

Due to the current lack of evidence on future scenarios of coastal processes, an uncertain effect has been identified in relation to the air quality grouping and the coastal features and processes sub-topic.

The effects of renewable energy installations on potentially sensitive environmental features are unknown at present. Policies NW-REN-1, NW-REN-2 and NW-WIND-1 could result in the further renewable energy developments within the north west marine plan areas. Whilst the installation of renewable technology and subsequent reduced contributions to climate change may help to appease the effects of increased storminess such as coastal inundation and change, development within the marine environment, particularly the onshore may affect environmental features either directly or through alterations of coastal processes. 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.

5.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within the following table.

Table 3: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Geology, Substrates and Coastal Processes.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Coastal features and processes Seabed substrates and bathymetry	Aggregates, Dredging and disposal	Any proposals arising from these sectors will need to address the potential for adverse effects to arise on both coastal features and processes and seabed substrates and bathymetry, through the EIA process. Policy NW-MPA-4 could provide some protection, however, supporting text could be strengthened by making reference to Geological Conservation Review Sites.
Coastal features and processes	Air quality	Policies NW-CC-5 could provide some resilience, however, it is suggested that Policy NW-CC-5 supporting text should draw upon the latest climate change projections provided within the UKC18 Marine Report, as it currently refers to UKCPC09. The supporting text for NW-AIR-1 currently states that air pollution contributes to climate change, however, it does not detail the potential negative implications of climate change on coastal features and processes. It is suggested that the policy supporting text details the negative effects of climate change, of which air pollution can contribute to.
Coastal features and processes	Renewables	If future renewable energy proposals were to come forward, the potential negative effects on coastal features and processes will need to be addressed through the EIA process (for schedule 2 developments as classified by the EIA regulations, it is assumed that an EIA will be undertaken should the project be likely to give rise to significant environmental effects, be located in a sensitive area and is above the threshold specified in the EIA regulations).
Coastal features and processes, Seabed substrates and bathymetry	Aggregates, Renewables	The Crown Estate's leasing process and other required consenting schemes also ensures that cultural heritage receptors are taken into account during these processes and conditions frequently applied to limit effects.

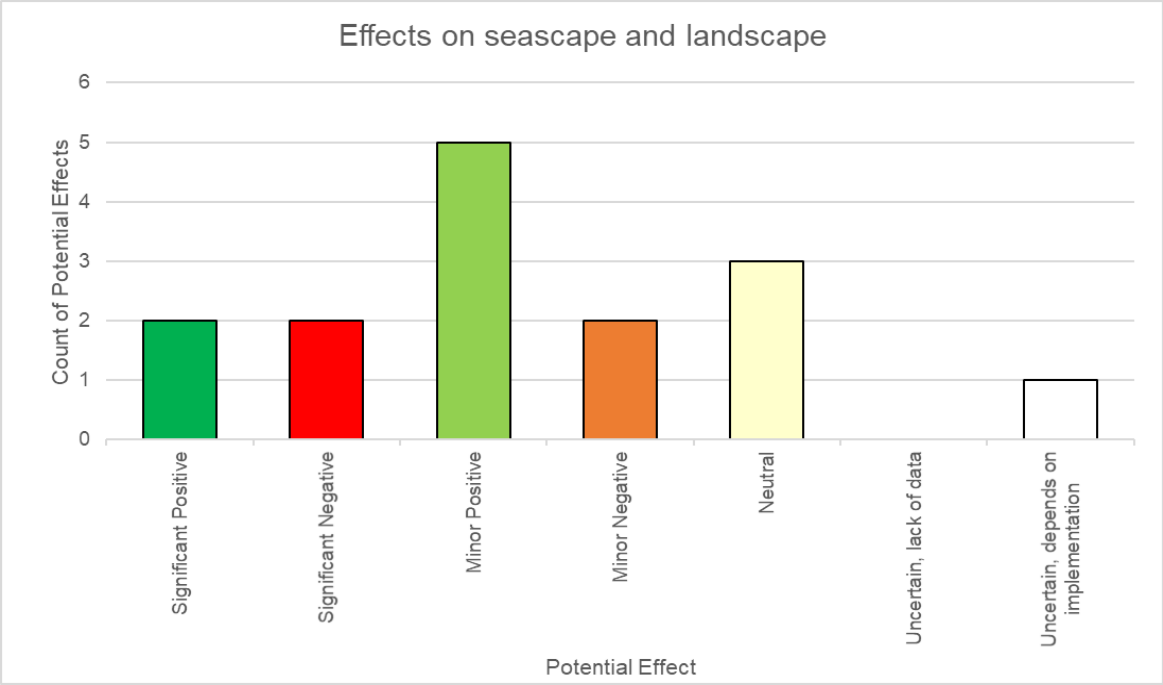
6. Results of the Assessment - Seascape & Landscape

6.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to seascape and landscape. There are no SA sub-topics for seascape and landscape. The full assessment of the seascape and landscape SA topic can be found in Technical Appendix B.

6.2 Results of the Assessment of all Policy Groupings on Seascape & Landscape

Figure 7: Effects on Seascape and Landscape SA Sub-Topic.



There is a close relationship between the presence of heritage assets and the character, value and appreciation of landscape and seascape. St Bees Head is the only part of the north west inshore marine plan area that is designated as a heritage coast. Policy NW-HER-1 aims to protect heritage assets from future proposals, ensuring that the diversity of the marine environment, and its cultural heritage, is protected. The policy supporting text has also identified how the setting of heritage assets may also be important to the significance of the asset. For these reasons, a significant positive effect has been identified, in regard to the heritage assets policy grouping.

Further significant positive effects have been identified in relation to the seascape and landscape policy grouping. Policy NW-SCP-1 aims to maintain and improve the seascape and landscape within the north west marine plan areas. Proposals which may harm the current seascape or landscape must demonstrate why this is necessary and mitigate adverse effects.

Oil, gas and CCUS developments have potential for visual effects and negatively effects on the seascape and landscape of the north west marine plan areas. Given the importance of the Lake District National Park and Solway Coast and Arnside and Silverdale AONBs, if development were to come forward, there is potential for significant negative effects. Policies NW-OG-1 and NW-OG-2 may not directly result in further oil and gas developments within the north west marine plan areas, however, there are currently 23 licensed areas and 13 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 west region contributes significantly to the UK overall supplies, it is assumed that these policies will ensure that development will continue, which has the potential to negatively affect seascape and landscape within the north west marine plan areas. Whether CCUS developments come forward as a result of policies NW-CC-1 and NW-CCUS-1 is currently uncertain.

Similarly, to oil and gas, renewable energy developments have potential to negatively affect the seascape and landscape character within the north west marine plan areas. However, it should be noted that attitudes of people observing the change and the resultant development typically also vary widely as this is as subjective matter. If development were to come forward, there is nonetheless the potential for negative effects on visual amenity to arise. Within the north west offshore marine plan area there are three operational Round 1 wind farm sites (Barrow, Ormonde and Burbo Bank), three Round 2 sites (Walney 1, Walney 2 and West of Duddon Sands) and three extensions (Burbo Bank, Walney 3 and Walney 4). Both the Irish Sea and North Wales have been included within the latest round from the Crown Estate (Round 4) for potential offshore wind developments. As there is potential for development to take place, and renewables developments are currently having adverse effects on seascape and landscape, it is assumed at best, the current baseline situation will remain, with the potential to be worsened by further development. For this reason, a significant negative effect has been identified on landscape and seascape.

The potential effect which may be had on seascapes and landscapes by policy NW-NG-1 is uncertain at present and dependent on its implementation. Seascapes and landscapes are vulnerable to adverse and cumulative effects from multiple sectors and activities. As a natural capital asset, seascapes and landscapes can provide benefits associated with tourism, recreation, wellbeing and cultural value. It is uncertain therefore whether the preservation of the quality of landscapes and seascapes as natural capital assets would take precedence over the activities which are dependent on the benefits and services which they provide.

6.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within Table 4.

Table 4: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Landscape and Seascape.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Landscape and seascape	Cables, Aggregates, Infrastructure, Oil and gas and Renewables	Any proposals arising from these sectors will need to address the potential for adverse effects to arise on both landscape and seascape, through the EIA process.
Landscape and seascape	Renewables Aggregates	The Crown Estate leasing process and other required consenting schemes also ensures that sensitive receptors are taken into account during these processes and conditions frequently applied to limit effects.

7. Results of the Assessment - Water

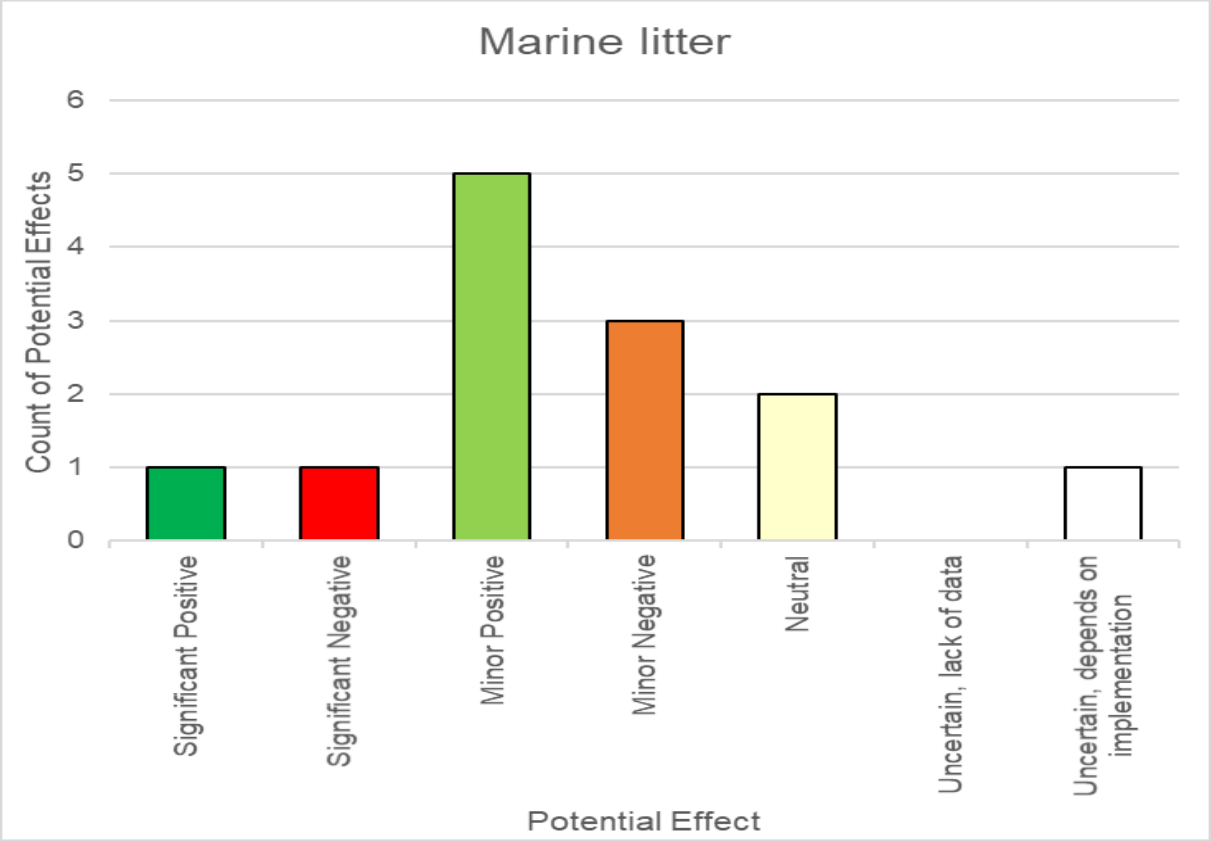
7.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to water. It covers tides and currents, water temperature and salinity, pollution and water quality (including eutrophication) and marine litter, which comprise four separate SA sub-topics. The full assessment of the water SA topic can be found in Technical Appendix B.

7.2 Results of the Assessment of all Policy Groupings on Water

7.2.1 Marine Litter

Figure 8: Effects on the Marine Litter SA Sub-Topic.



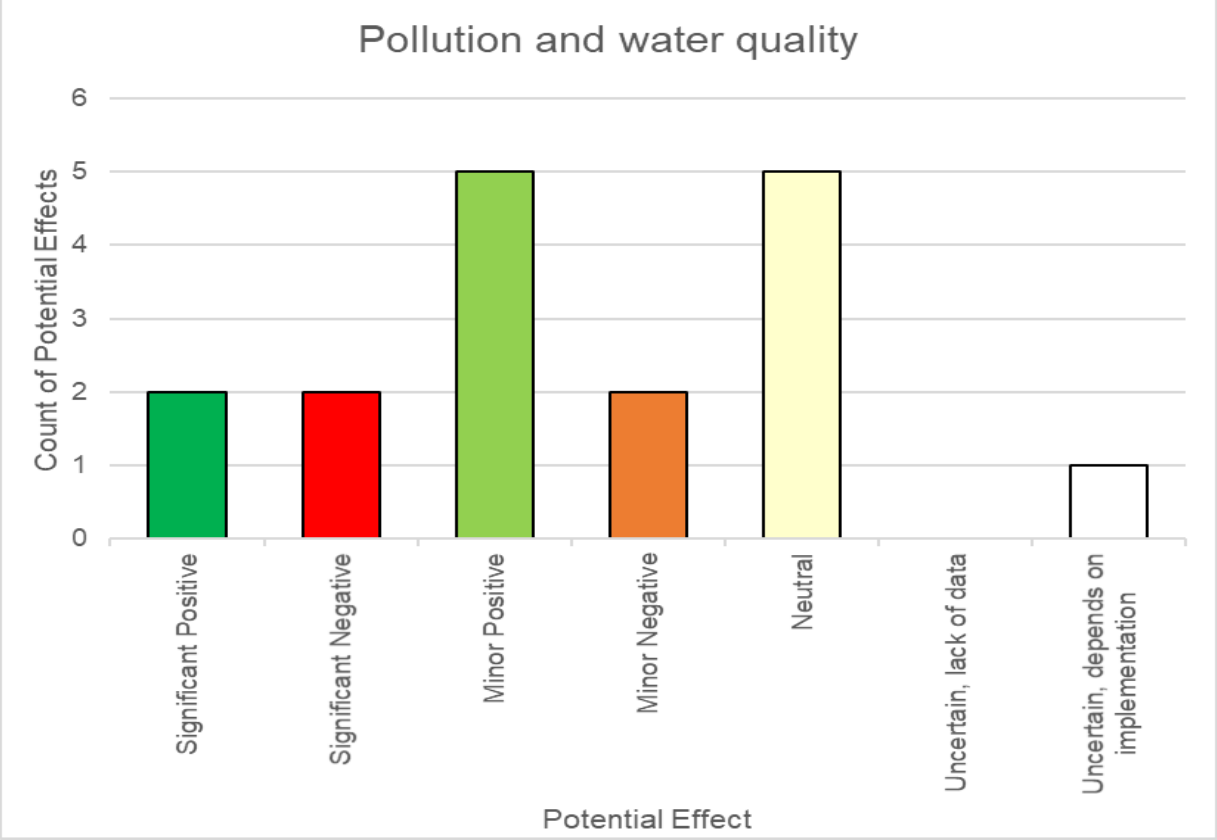
Marine litter is cross-boundary in nature as litter moves in the marine environment and litter originating from one marine plan area or even country can affect another. The European Commission has stated in order to tackle marine litter issues, a joined up approach is needed. The NW-CBC-1 policy supporting 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 cross-boundary effects are minimised across international borders. It is therefore considered that the cross-boundary policy has the potential to result in a potential significant positive effect on marine litter.

Significant negative effects have been identified in relation to the fisheries policy grouping and the marine litter SA sub-topic. Marine litter is a prevalent issue, of which the fishing industry is a key contributor. Ports and shipping can also contribute to marine litter. As policies NW-PS-1 and NW-PS-4 could result in increased shipping activity, there is potential for increases for in marine litter and thus a potential significant negative effect has been identified.

Bathing water quality is important for the local economy, particularly tourism and recreation. Increased levels of tourism have potential to increase levels of marine litter within the north west inshore marine plan area. Policy NW-TR-1 states that 'sustainable tourism and recreational activities' will be supported, however, it is not clear whether the policy will support improving marine litter. For this reason, an uncertain effect has been identified in relation to the tourism and recreation policy grouping and the marine litter SA sub-topic.

7.2.2 Pollution and Water Quality

Figure 9: Effects on the Pollution and Water Quality SA Sub-Topic.



The natural capital policy grouping has potential to result in a significant positive effect. Natural capital which can be affected by water quality includes that relating to recreational users of the marine environment (with associated health, tourism, economic benefits), and industries which rely on marine organisms (fish and shellfish, including commercial and recreational stocks, both wild and aquaculture stocks, and those associated with wildlife cruises). This policy should therefore discourage proposals which may have a significant adverse effect on the marine

environment and any natural capital which can be derived from this, and would thereby encourage improved water quality and pollution status of waters both within this marine plan areas and beyond.

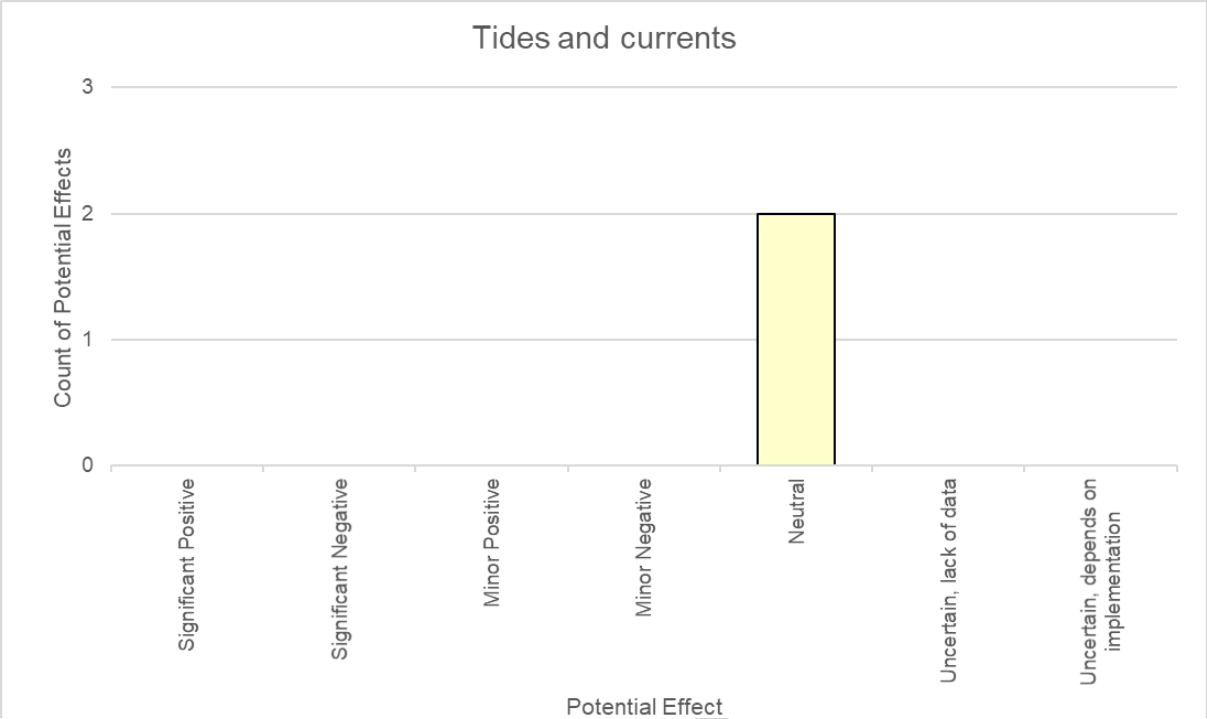
Policy NW-WQ-1 aims to enhance and restore water quality within the north west marine plan areas. Given that water quality is an issue across the north west marine plan areas, it is assumed that this policy will result in the improvement of water quality, therefore a significant positive effect has been identified in relation to pollution and water quality SA sub-topic and the water quality policy grouping.

Shipping can negatively affect water quality through the possible discharges from ships such as bilge water, ballast water, sewage and other residues in a ship. Spills of oils, lubricants, fuels and other oily liquids can also be sources of water pollution from both ports and ships. As policies NW-PS-1 and NW-PS-4 could result in increased shipping activity, there is potential for significant negative effects, particularly as water quality is an issue within the north west marine plan areas.

Bathing water quality is important for the local economy, particularly tourism and recreation. The north west inshore marine plan area has the lowest number of designated bathing waters and the highest number of waters designated as 'poor' compared to other five marine plan areas. The tourism and recreation policy could result in increased levels of tourism and recreation which have potential to worsen the poor water quality within the north west inshore marine plan area. For this reason, a significant negative effect has been identified.

7.2.3 Tides and Currents

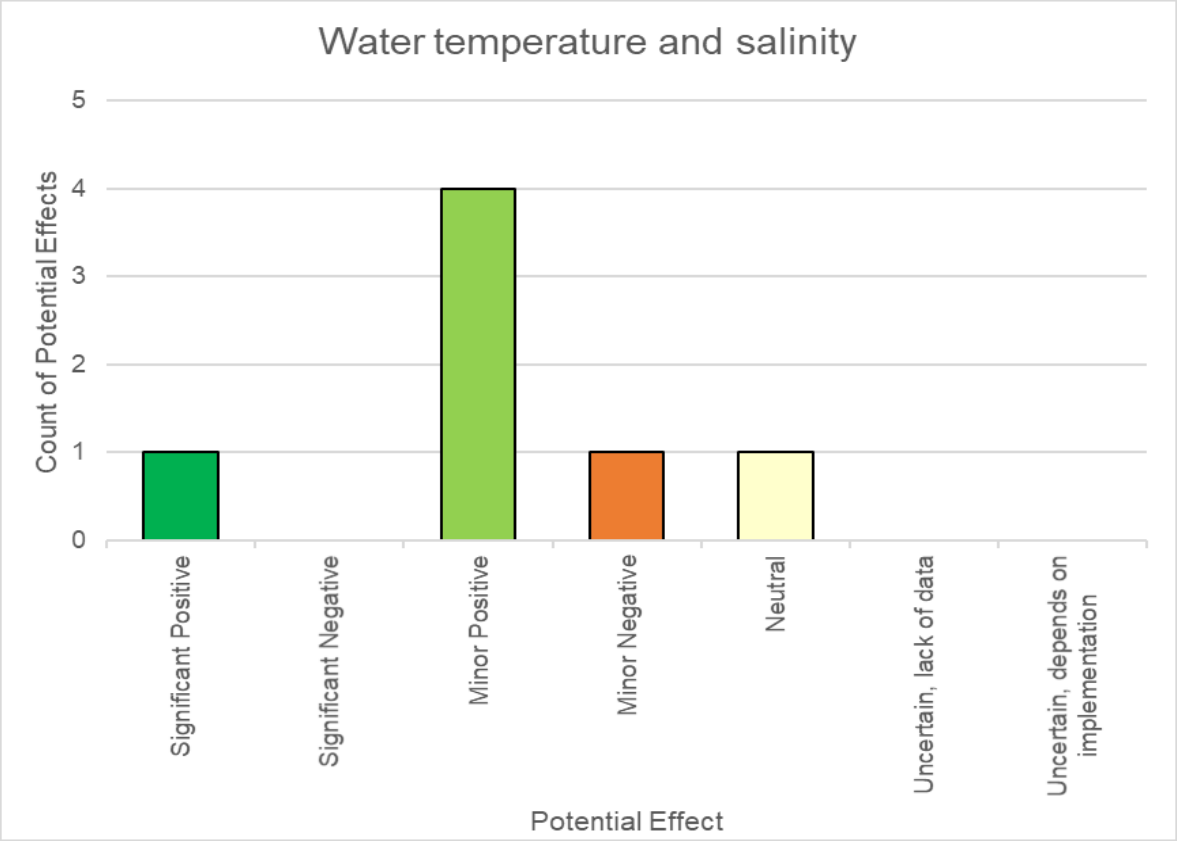
Figure 10: Effects on the Tides and Currents SA Sub-Topic.



No significant or uncertain effects have been identified for the tides and currents SA sub-topic.

7.2.4 Water Temperature and Salinity

Figure 11: Effects on the Water Temperature and Salinity SA 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 as those supported through policies NW-REN-1, NW-REN-2 and NW-WIND-1, could work to counter the advance of climate change and the associated effects on water temperature and salinity.

7.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within Table 5.

Table 5: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Water.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Marine Litter, Water Quality	Aquaculture and fisheries	Whilst it is recognised that marine litter can enter the marine plan areas from adjacent areas, policy NE-ML-3 seeks to minimise the potential release of litter from aquaculture sites within this plan area.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
		It is suggested that NE-ML-1 explicitly makes reference to the fisheries sector, or that a fisheries-specific policy is created which prevents the intentional release of gear into the marine environment and provides support for the retrieval of debris which has already become marine litter.
Pollution and water quality	Oil and gas and ports and shipping	As ports and shipping developments would classified as a schedule 2 development by the EIA Regulations, it is assumed that an EIA will be undertaken, should the project be likely to give rise to significant environmental effects, be located in a sensitive area and is above the threshold specified in the EIA regulations.
Pollution and water quality and Marine Litter	Tourism and recreation	Supporting text for policy NE-TR-1 needs to clearly identify what is meant by 'sustainable tourism and recreational activities' and highlight the importance of water quality to tourism and recreation.

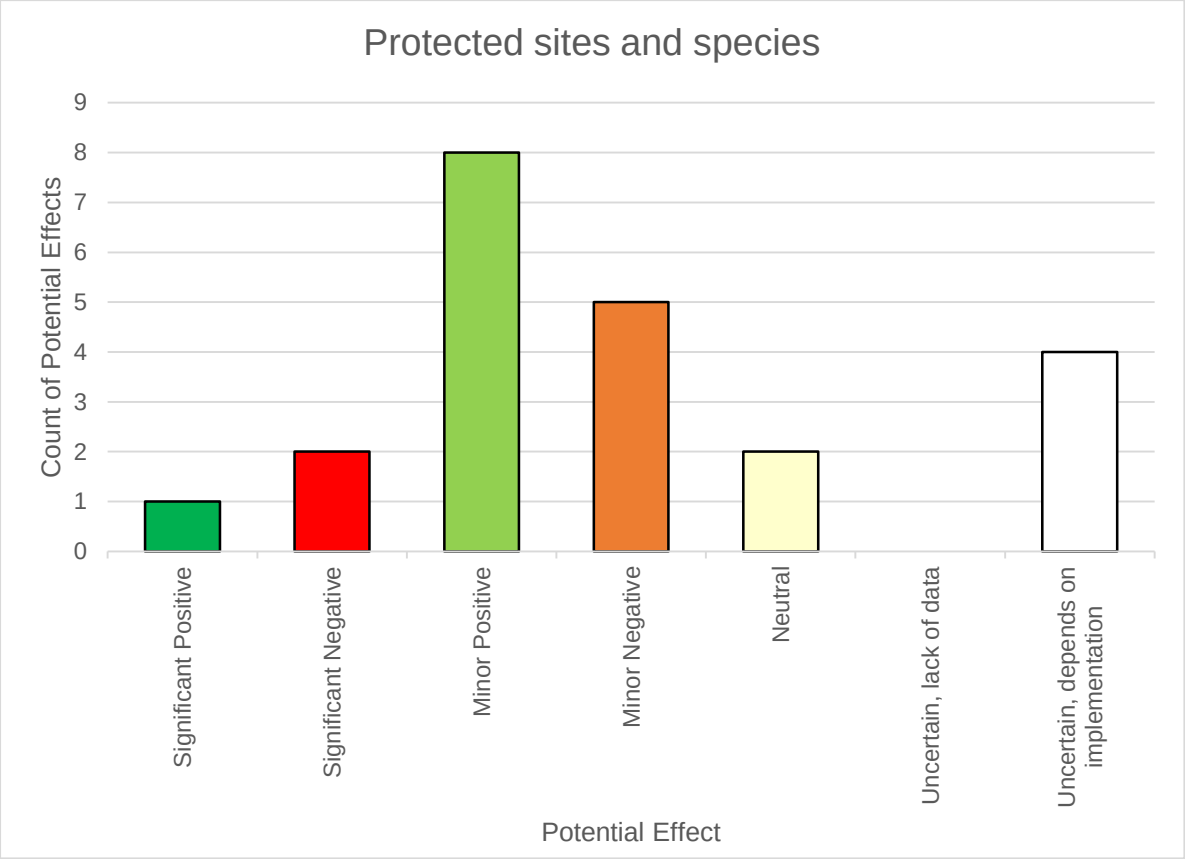
8. Results of the Assessment - Air Quality

8.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to air quality. It covers the air pollutant sub-topic. The full assessment of the Air Quality SA topic can be found in Technical Appendix B.

8.2 Results of the Assessment of all Policy Groupings on Air Quality

Figure 12: Effects on the Air Pollutant SA Sub-Topic.



Policy NW-AIR-1 could effectively help to reduce air pollution for future proposals. The policy aims for all proposals to demonstrate consideration of their contribution to air pollution, both direct and cumulative. Given that air pollution is an issue in the north west marine plan areas, the policy has the potential to effectively help to reduce air pollution therefore, a significant positive effect has been identified with regards to the air pollutants SA sub-topic and the air quality policy grouping. The policy is likely to be further supported by local planning policies as well as the Clean Air Strategy[3].

Ports and shipping activity contribute significantly to air pollution. Policy NW-PS-1 has the potential to result in further port and shipping activity in the region, and

[3] Department for Environment Food and Rural Affairs, Clean Air Strategy, 2019

subsequently negatively affect air pollution. There is some uncertainty regarding 'sustainable expansion' and whether this will contribute to a reduction air pollution. Policy NW-PS-4, encourages short-sea shipping, which has potential to benefit air quality particularly when compared with other forms of transport. This has the potential to result in significant positive effects on air pollutant levels, however, it is not clear on the preference of policies NW-PS-1 and NW-PS-4, as they could have differing overall effects on air pollution.

8.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within
Table 6.

Table 6: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Air Quality.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Air pollutants	Ports and harbours	As ports and shipping developments would be classified as schedule 2 development by the EIA regulations, it is assumed that an EIA will be undertaken, should the project be likely to give rise to significant environmental effects, be located in a sensitive area and is above the threshold specified in the EIA regulations.

9. Results of the Assessment - Climate

9.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to climate. It covers greenhouse gas emissions and climate change resilience and adaptation. Due to the similarities in performance across the two climate SA sub-topics, the description of results has been grouped. The full assessment of the Climate SA topic can be found in Technical Appendix B Results of the Assessment of all Policy Groupings on Climate

9.2 Results of the Assessment of all Policy Groupings on Climate

Figure 13: Effects on Climate Change Resilience and Adaptation SA Sub-Topic.

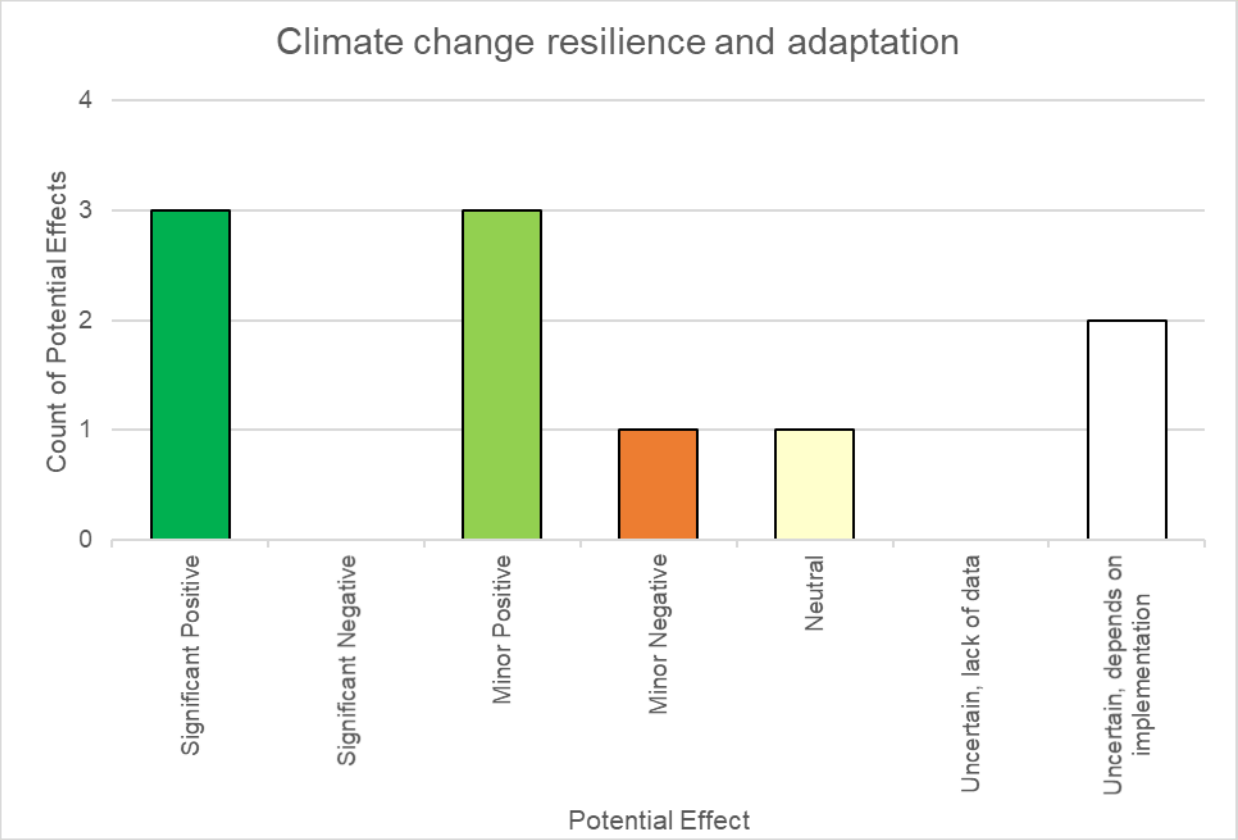
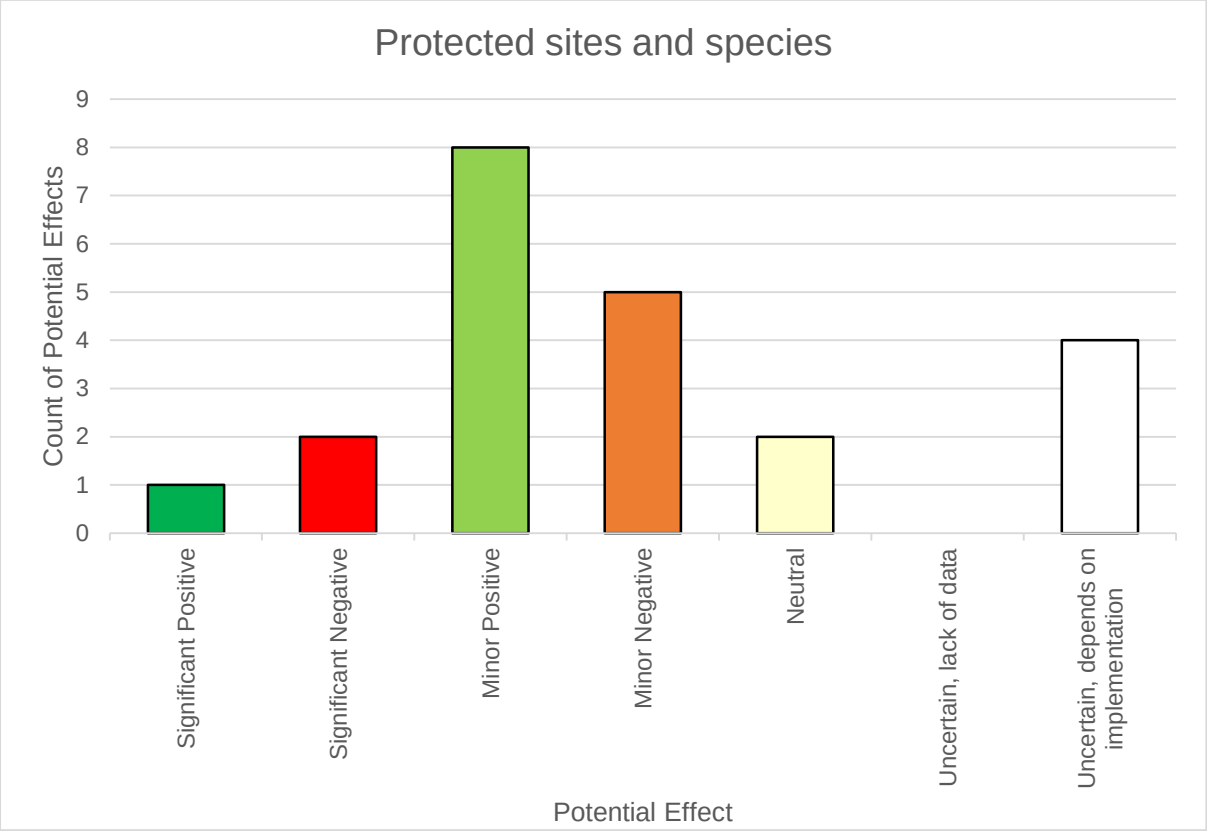


Figure 14: Greenhouse Gas Emissions SA Sub-Topic.



Policy NW-AIR-1 aims for all proposals to demonstrate consideration of their contribution to air quality and greenhouse gas emissions, both directly and cumulatively. Given that air pollution is an issue in the north west marine plan areas, the policy has the potential to effectively help to reduce air pollution. The policy is likely to be further supported by local planning policies as well as the Clean Air Strategy[4]. For this reason, a significant positive effect has been identified for the greenhouse gas emissions SA-sub-topic.

The climate change policy grouping has resulted in a potential significant effect on climate change resilience and adaptation SA sub-topic. In combination, policies NW-CC-1, NW-CC-2, NW-CC-3, NW-CC-5 and NW-CC-6 seek to increase resilience and adaptation to the effects of climate change. This includes the minimisation of adverse effects on coastal change adaptation measures and support of proposals which have the potential to increase flood defence and carbon sequestering habitats.

Potential significant positive effects have been identified, with regards to the marine protected areas policy grouping and the climate change resilience and adaptation SA sub-topic. The issue of climate change adaption is directly addressed, with clear preference for proposals which enhance the adaptability of marine protected areas to climate change.

A potential significant positive effect has been identified in relation to the renewables policy grouping on the greenhouse gas emissions SA sub-topic as these policies

[4] Department for Environment Food and Rural Affairs, Clean Air Strategy, 2019

support increased energy generation by marine renewables which in turn could alleviate demand on greenhouse gas-emitting fossil fuel energy generation. Natural flood defences provide regulatory natural capital services. In the north west mudflats in the Solway, Morecambe and Ribble estuaries, play an important natural role in protecting the coast from flood events by reducing wave energy and buffering flood waters. It is therefore assumed that as a result of the natural capital policy, natural flood defences in the north west inshore marine plan area will be protected, which in turn will provide climate change resilience.

Ports and shipping activity contribute significantly to greenhouse gas emissions. Policy NW-PS-1 has the potential to result in further port and shipping activity in the region, and increasing levels of greenhouse gas emissions. There is some uncertainty regarding 'sustainable expansion' and whether this will contribute to a reduction in greenhouse gas emissions. Policy NW-PS-4, encourages short-sea shipping, which has potential to benefit air pollution particularly when compared with other forms of transport. This could result in significant positive effects on air pollutants; however, this would depend on how the policy is implemented; if short sea shipping is used in conjunction with existing shipping, overall shipping could increase, and potentially worsen greenhouse gas emissions. For these reasons, uncertain effects have been identified in relation to the ports and harbours policy grouping and greenhouse gas emissions.

Policies NW-OG-1 and NW-OG-2 may not directly result in further oil and gas developments within the north west marine plan areas, however, there are currently 23 licensed areas and 13 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 west contributes significantly to the UK overall supplies, it is assumed that these policies will ensure that development will continue, which has the potential to contribute further to climate change. Conversely, policy NW-CCUS-1 have potential to result in carbon capture usage and storage which could reduce greenhouse gas emissions within the atmosphere. It is not clear on what type of development could come forward as a result of these policies, and given the conflicts between them, an uncertain effect has been identified, for both the climate change resilience and adaptation and greenhouse gas emissions SA sub-topics.

Whether CCUS developments come forward as a result of policies NW-CC-1 and NW-CCUS-1 is currently uncertain.

9.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within the following table.

Table 7: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Climate.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Climate change resilience and adaptation	Air quality	Policies NW-CC-5 could provide some resilience, however, it is suggested that Policy-CC-5 supporting text should draw upon the latest climate change projections provided within the UKC18 Marine Report, as it currently refers to UKCPC09.
Climate change resilience and adaptation and Greenhouse gas emissions	Ports and harbours	As ports and shipping developments would be classified as schedule 2 development by the EIA regulations, it is assumed that an EIA will be undertaken, should the project be likely to give rise to significant environmental effects, be located in a sensitive area and is above the threshold specified in the EIA regulations. Policy NW-AIR-1 could help to ensure that future ports and shipping proposals consider their effects upon air quality, which could mitigate potential negative effects.
Climate change resilience and adaptation and Greenhouse gas emissions	Oil and gas	As oil and gas developments are classed as Schedule 1 developments, under the EIA regulations, any oil and gas development that would come forward as a result of this policy, would be subjected to an EIA. The specific reference to greenhouse gas emissions in the EIA regulations seeks to address this issue with the intention of embedding climate change consideration.

10. Results of the Assessment - Communities, Health & Wellbeing

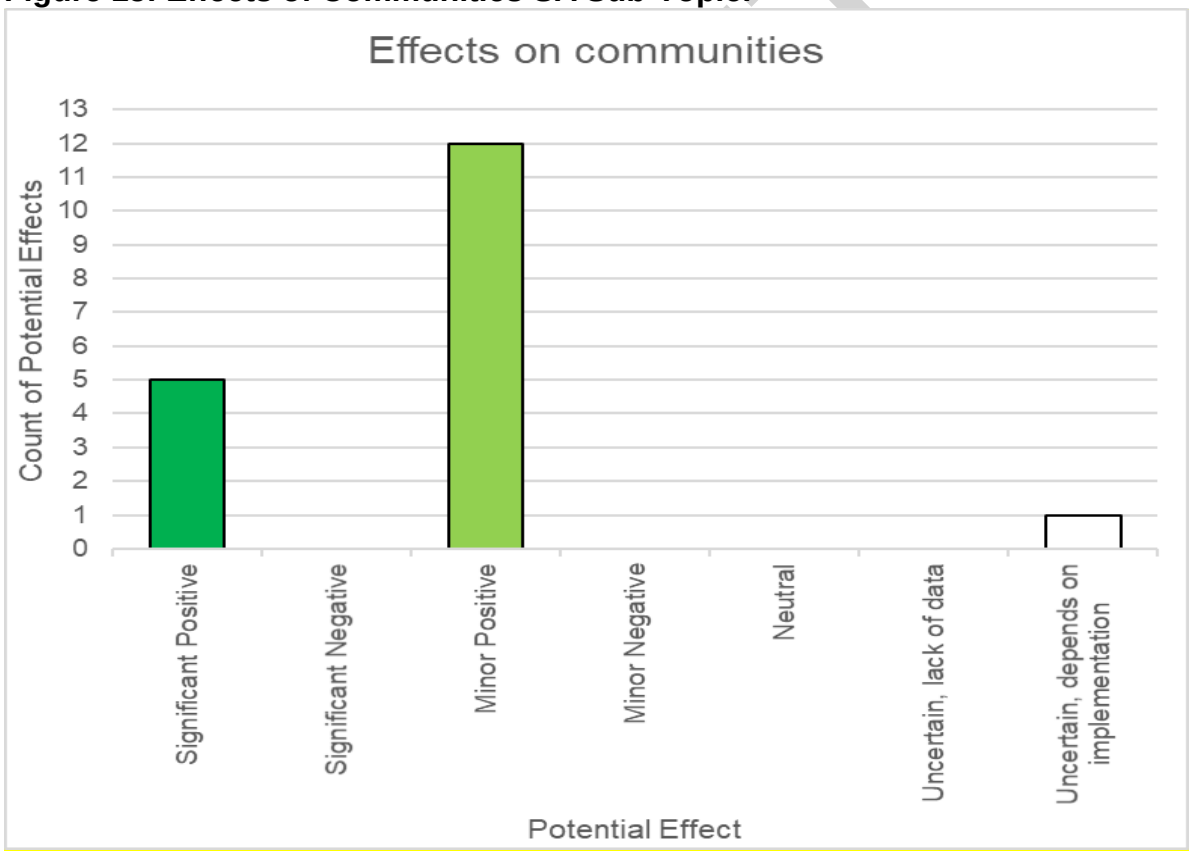
10.1 Introduction

This section of the report presents the performance of the North West Marine Plan in relation to communities, health and wellbeing. This topic covers health and wider determinants of health and effects on communities, which comprise one SA sub-topic, and effects on protected equality groups, which comprise a second SA sub-topic. Further details of the assessment for the communities, health and wellbeing SA topic can be found within Technical Appendix B.

10.2 Results of the Assessment of all Policy Groupings on Communities, Health & Wellbeing

10.2.1 Effects of Communities

Figure 15: Effects of Communities SA Sub-Topic.



The baseline has identified income and employment deprivation issues associated with coastal communities across the north west inshore marine plan area. As NW-EMP-1 is specifically aimed at areas of deprivation and focusses employment opportunities on local skill sets, a significant positive effect has been identified with regards to employment policy grouping and the effects on communities SA sub-topic.

Significant positive effects have been identified in relation to the tourism and recreation grouping. Increased access to tourism and recreation activities has the potential to provide significant social benefits for communities through, greater social cohesion, improved health and wellbeing (both physical and mental) and job creation.

Deprivation in relation to income, employment, education shows some more deprived lower super output areas (LSOA) on the coast compared to the rest of England[5]. Policy supporting text states that proposals that occur in the north west marine plan areas should consider the cross-boundary effects upon adjacent marine plan areas and the terrestrial environment including economic, social and environmental effects, in order to achieve sustainable development. It is therefore considered that all future proposals will need to consider their effect on communities in order to achieve sustainable development, and for this reason a potential significant positive effect has been identified in relation to NW-CBC-1.

Policy NW-INF-1 supports the diversification and regeneration of marine based industries. Given the high dependence upon the fishing sector and the declines the industry is now facing, it is assumed that the diversification and regeneration that the policy provides has the potential to result in significant positive effects, for the north west inshore marine plan area.

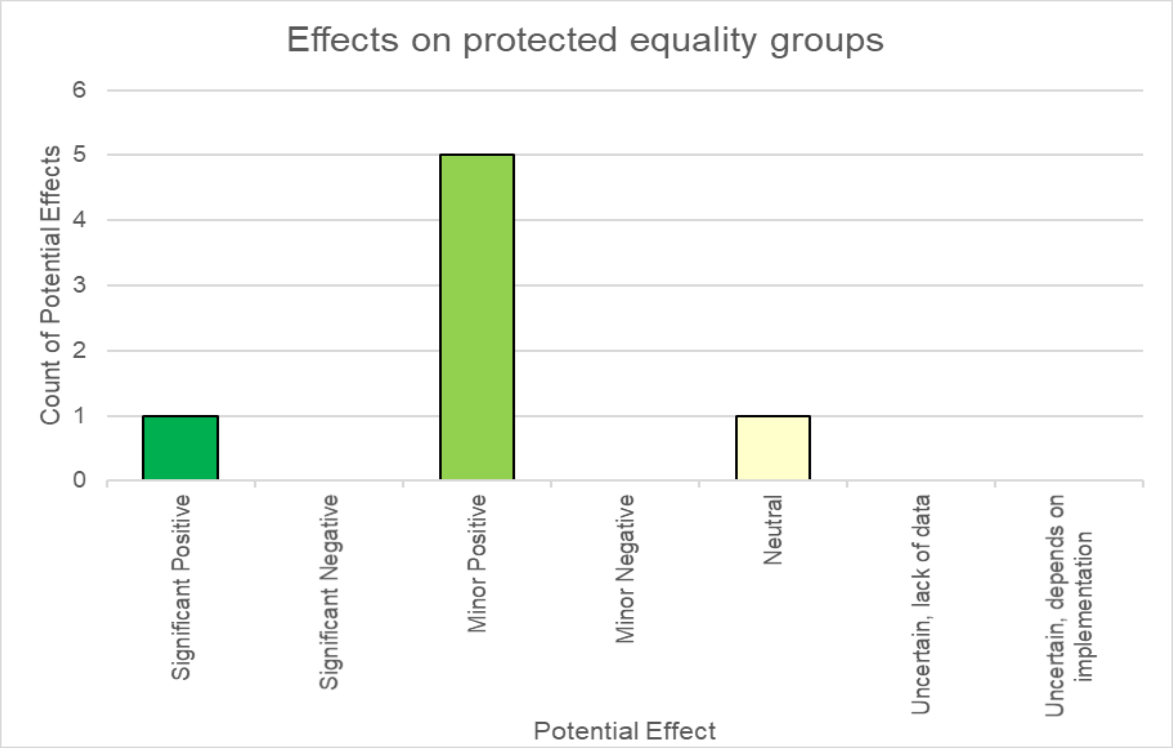
Communities derive a significant number of benefits from natural capital and the ecosystem services it provides. As the natural capital policy aims to protect natural capital within the north west marine plan areas, a significant positive effect has been identified. It is assumed that the 25 Year Environment Plan could also contribute to the achievement of this policy.

Policy NW-REN-1 aims to support associated renewable technology supply chains, which could result in increased employment opportunities. However, at this stage, it is not clear as to whether any proposals will come forward, and the likely available employment opportunities. For these reasons, an uncertain effect has been recorded with regards to the renewables policy grouping and effects on communities SA sub-topic.

[5] The Indices of Deprivation 2015 measures deprivation in small areas across England. These small areas are called Lower-Layer Super Output Areas (LSOAs) and are a standard way of dividing up the country – Ministry of Housing, Communities and Local Government (formerly the Department for Communities and Local Government), The English Indices of Deprivation 2015

10.2.2 Effects of Protected Equality Groups

Figure 16: Effects on the Protected Equality Groups SA Sub-Topic.

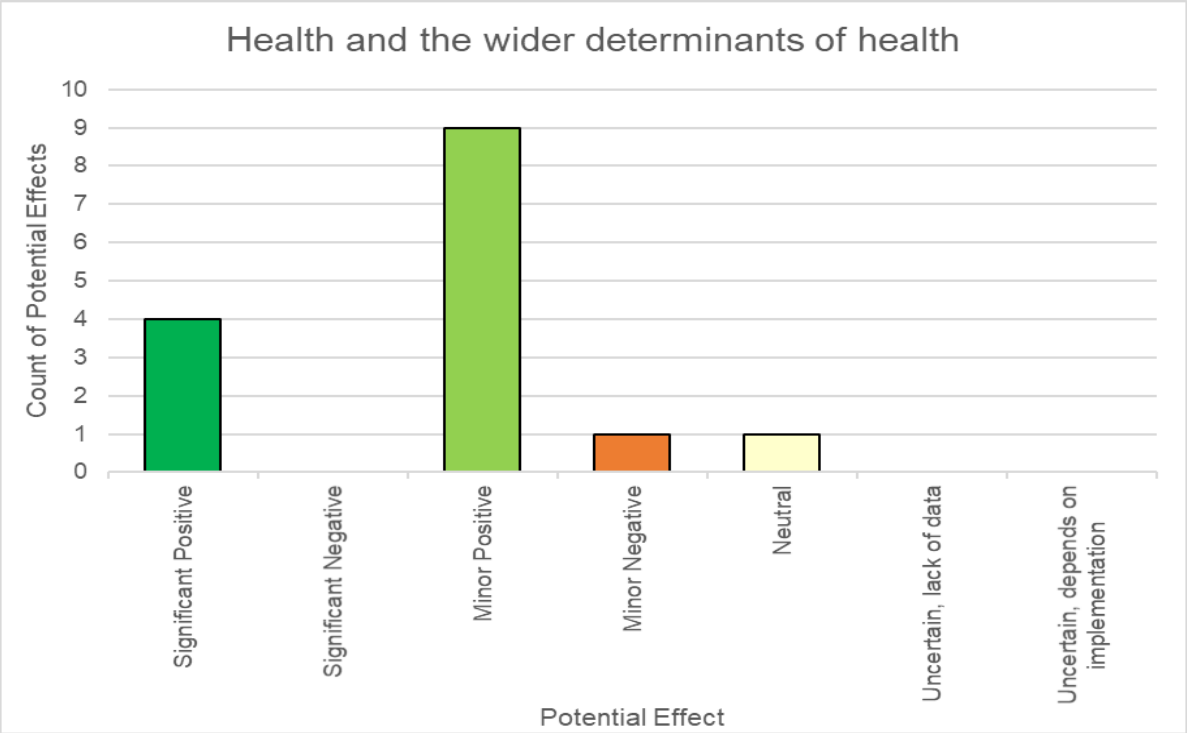


Under the Equalities Act (2010)[6], protected characteristics are age, disability, sex, gender reassignment, pregnancy or maternity, race, religion or belief, sexual orientation, marriage and civil partnership. Policy supporting text of NW-EMP-1 states it will encourage public authorities to consider the long-term employment benefits of a proposal and how the required skills equate to those of the north west inshore marine plan area. It will enable maximum sustainable activity, prosperity and opportunities for all, both now and in the future. It is therefore assumed that this policy will help to provide employment opportunities for all, including those from protected equality groups, and for this reason, a significant positive effect has been identified.

[6] Equality Act 2010 (Commencement No. 1) Order 2010 (SI 2010/1736)

10.2.3 Health and the Wider Determinants of Health

Figure 17: Effects on the Health and Wider Determinants of Health SA Sub-Topic.



The baseline has identified that health problems are more prevalent on the coast, with some of the most deprived lower super output areas (LSOAs) in England being located on the coast[7],with Blackpool topping the list of local authorities across England with the highest number of prescriptions of antidepressants. The north west marine plan areas have over 50 LSOAs within the top 10% of the most deprived areas in England, with regards to health deprivation and disability. Access to a high quality marine environment can make a significant contribution to the mental and physical health and wellbeing of communities. Given the issues identified in the baseline, the social benefit policy grouping has potential to tackle these and result in a significant positive effect.

The tourism and recreation policy aims to protect existing recreational and tourism developments from future proposals and support future recreation and tourism opportunities. As recreation plays such a vital role for health and wellbeing, a significant positive effect has been identified, for the tourism and recreation policy grouping. Similarly, the protection that the natural capital policy provides to natural capital assets, is likely to see natural capital assets that provide benefits to health and wellbeing protected, and for this reason a significant positive effect has been identified. The 25 Year Environment Plan could help contribute to the achievement of this policy.

[7] The Indices of Deprivation 2015 measures deprivation in small areas across England. These small areas are called Lower-Layer Super Output Areas (LSOAs) and are a standard way of dividing up the country – Ministry of Housing, Communities and Local Government (formerly the Department for Communities and Local Government), The English Indices of Deprivation 2015

The supporting text for the cross boundary considerations policy states that proposals that occur in the north west marine plan areas should consider the cross-boundary effects upon adjacent terrestrial environment including economic, social and environmental effects. As social, environmental and economic effects are taken into consideration, it is assumed that NW-CBC-1 has the potential to result in a significant positive effect on health, in particular the wider determinants of health.

10.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within the following table.

Table 8: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Communities, Health & Wellbeing.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Effects on communities	Renewables	Policy supporting text for NW-REN-1 should be expanded to better detail potential employment opportunities associated with renewable supply chains. If future renewable energy proposals were to come forward, the potential negative effects on communities will need to be addressed through the EIA process.

11. Results of the Assessment - Economy

11.1 Introduction

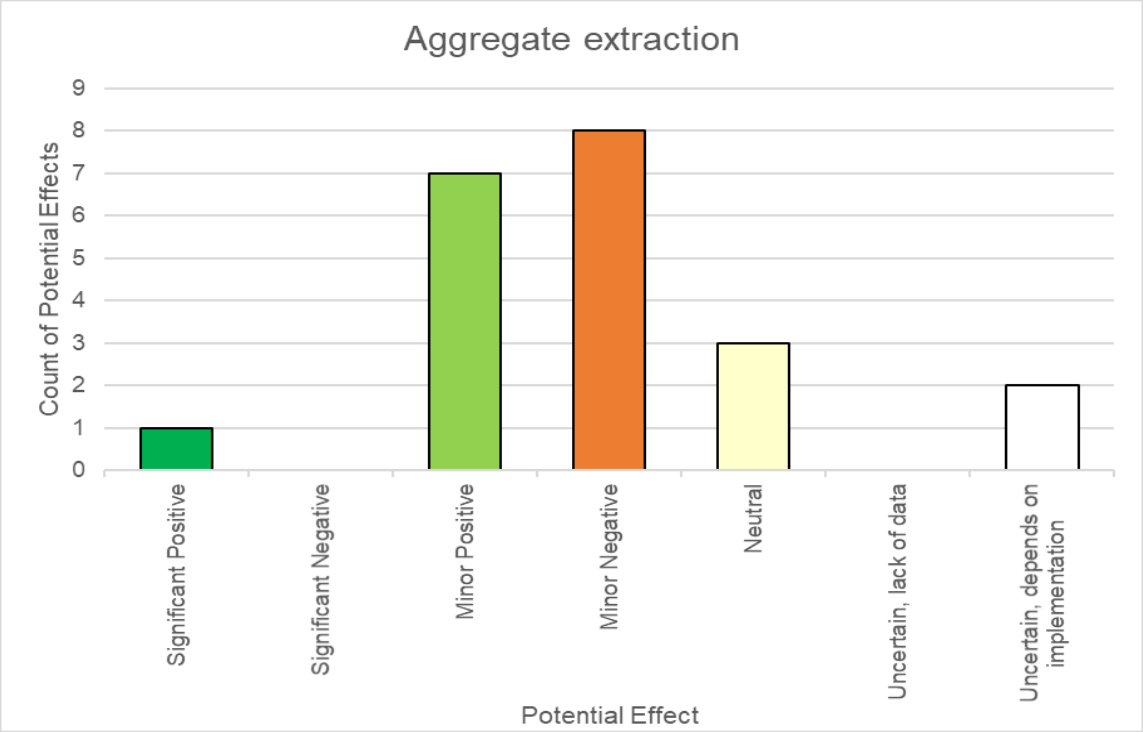
This section of the report presents the performance of the North West Marine Plan in relation to the economy. This topic encompasses ports and shipping, fisheries and aquaculture, leisure / recreation and tourism, marine manufacturing, defence, aggregate extraction, energy generation and infrastructure development (renewables, carbon capture usage and storage, nuclear and fossil fuels) and seabed assets. Each of these comprises a separate SA sub-topic, and all have been scoped in for SA of both the inshore and offshore north west marine plan areas.

Sub-section 11.2 is split into nine parts, reflecting the seven SA sub-topics. The full assessment of the economy SA topic can be found in Technical Appendix B.

11.2 Results of the Assessment of all Policy Groupings on Economy

11.2.1 Aggregate Extraction

Figure 18: Effects on the Aggregate Extraction SA Sub-Topic.



The aggregate policy grouping has the potential to result in higher levels of extraction across the north west 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. For these reasons a potential significant positive effect has been identified. Additional potential significant positive effects have also been identified in relation to the infrastructure policy grouping. Policy NW-INF-1 within the

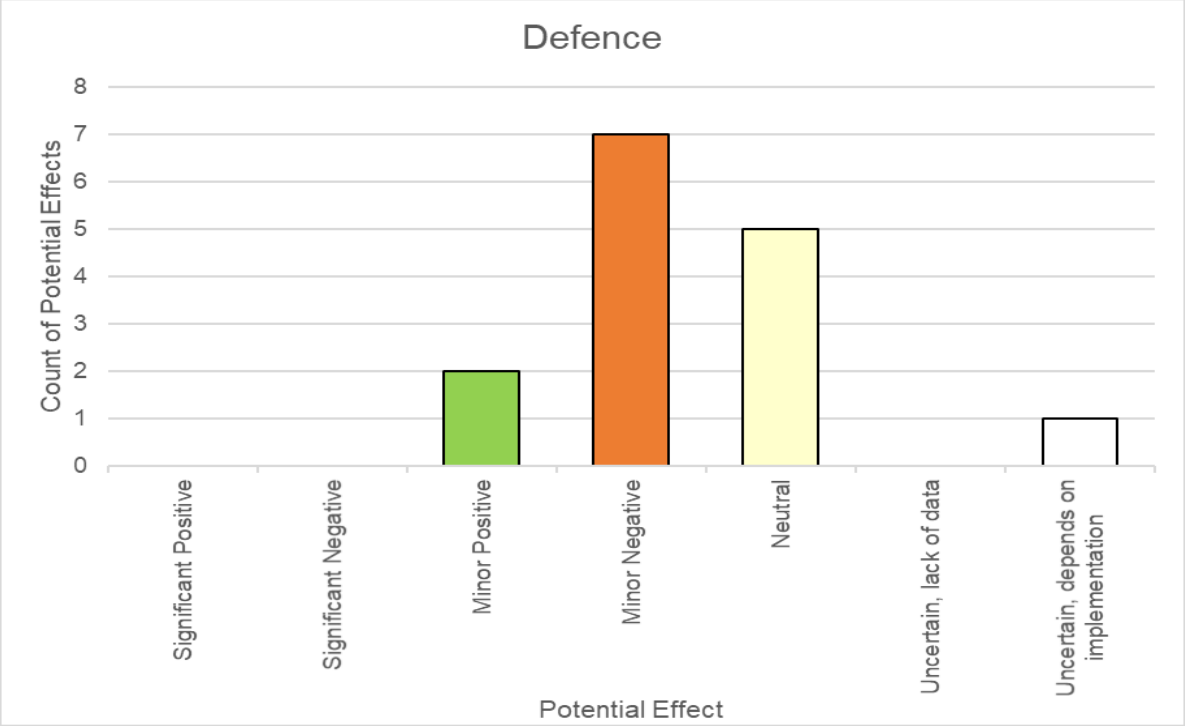
grouping aims to safeguard existing landing facilities within the north west marine plan areas, which at present are predominantly used for aggregate activity.

As marine aggregates contribute to provision of fill for major coastal infrastructure projects, including renewable energy projects, the aggregates policy grouping may have an indirect positive effect on the sector. However, NW-REN-2 may limit aggregate extraction in areas which are held under lease or an agreement for renewable energy generation installations. For these reasons, an uncertain effect has been identified as the effects of the renewables policy grouping on the aggregate SA sub-topic would be dependent on its implementation.

The potential effect which may be had on aggregate extraction by the natural capital policy grouping is at present uncertain, and would be dependent on its implementation. Aggregate extraction is dependent on, and benefited by, the natural capital which provides marine aggregates. However, it may have a significant adverse effect on other elements of marine and coastal natural capital such as biodiversity, and as such, may be affected by policy NW-NG-1.

11.2.2 Defence

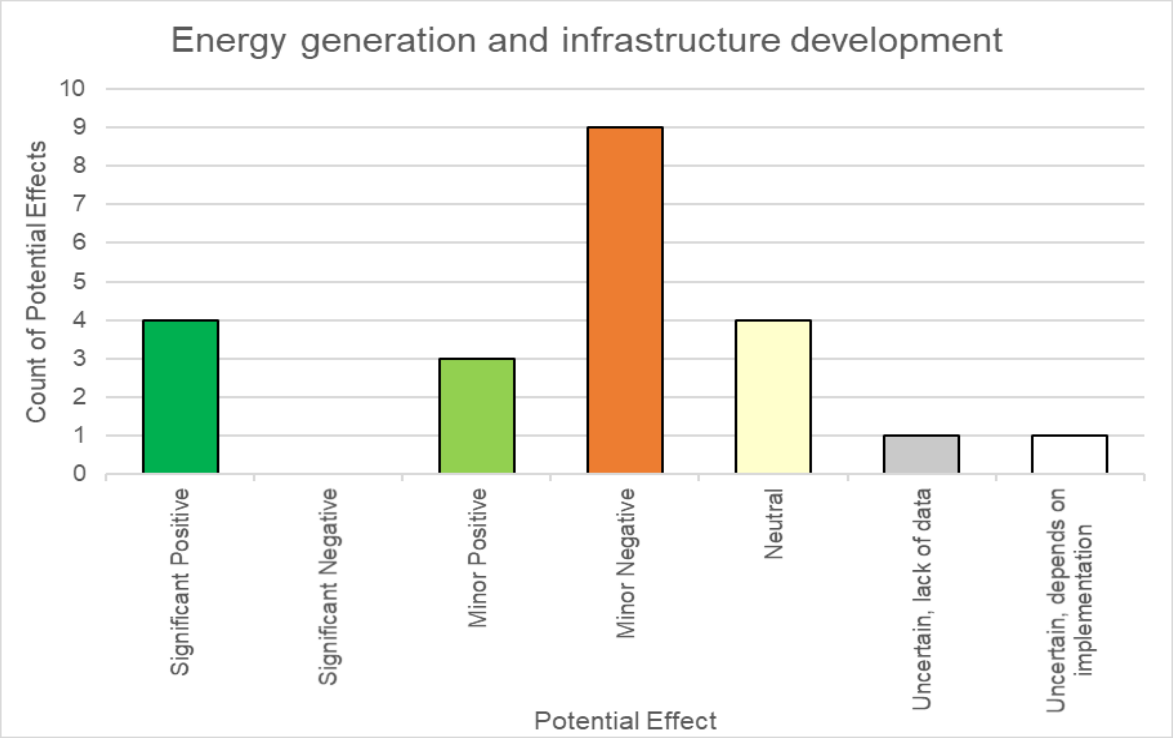
Figure 19: Effects on the Defence SA Sub-Topic.



Uncertainty has been recorded within the access policy grouping, as it is unclear how public access to areas used for defence will be treated. There may be some activities which are incompatible with public access, but it is unclear whether access for the public or defence activities would be given priority.

11.2.3 Energy Generation and Infrastructure Development

Figure 20: Effects on the Energy Generation and Infrastructure SA Sub-Topic.



The baseline has identified the importance that oil and gas contributes to the UK's economy and electrical interconnections with other nations help to contributes to UK energy security, affordability and decarbonisation objectives. The renewable policy grouping supports the UK's Clean Growth Strategy, by offering potential to deliver clean, renewable energy. The cables, renewables and oil and gas policy groupings could help to enable future development within the north west marine plan areas, promote new technologies and help to ensure energy security for the future. For these reasons, potential significant positive effects on the energy generation and infrastructure development SA sub-topic, have been identified.

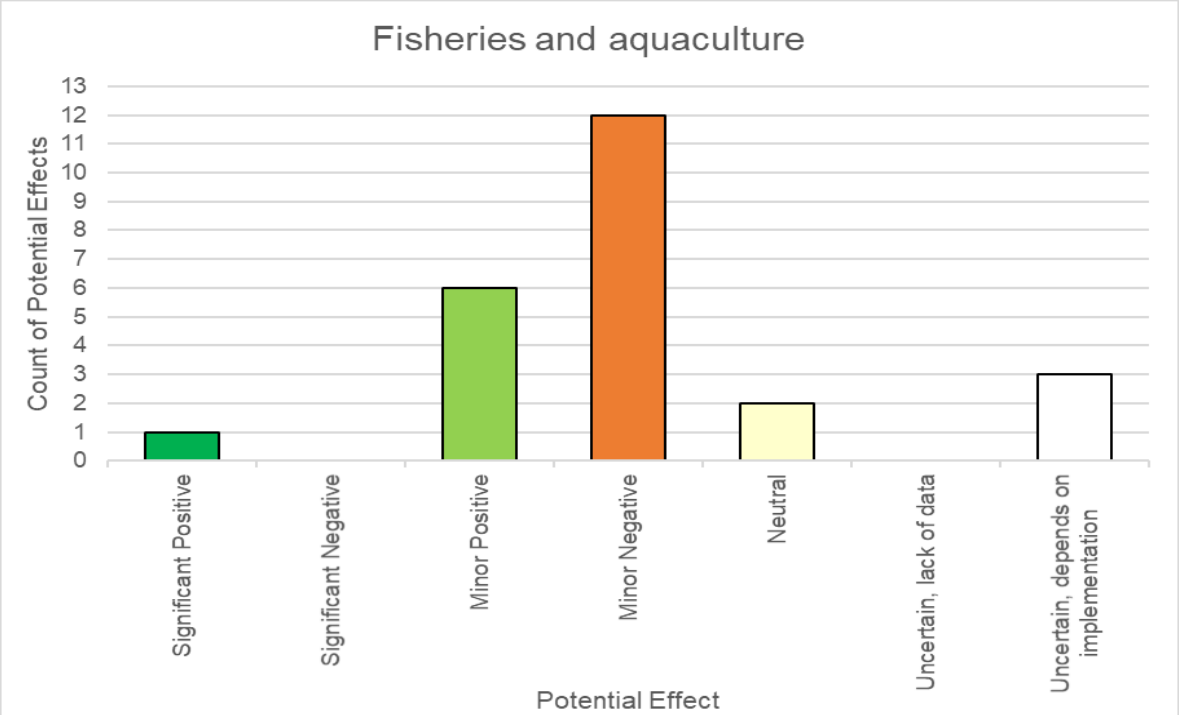
The employment policy grouping has potential to result in significant positive effects on energy generation and infrastructure development, as it could support further development, diversification and employment opportunities.

Uncertainty has been recorded in relation to the air quality policy grouping, as policy NW-AIR-1 could result in the limitation of emissions which has the potential to negatively affect oil and gas developments. There is also potential that the policy could result in a shift towards cleaner energy sources and create new opportunities within the energy sector. The types of proposals targeted by this policy are not clear, and for this reason an uncertain effect has been identified.

An uncertain effect has been recorded, due to the prevalence of both marine protected areas and existing energy generation industry within the north west marine plan areas. It is unclear how existing infrastructure, such as the gas terminal at Barrow-in-Furness would be dealt with under these policy groupings. Therefore, an uncertain effect has been recorded.

11.2.4 Fisheries and Aquaculture

Figure 21: Effects on the Fisheries and Aquaculture SA Sub-Topic.



The fishing industry has suffered decline in recent years, making it increasingly difficult to provide a livelihood. Given that fishing is an important industry within the north west marine plan areas, NW-FISH-1 and NW-FISH-2 have the potential to result in significant positive effects, if new proposals align with local skills and strategies.

Inshore vessel activity is particularly high in the north west inshore marine plan area, with a larger proportion of activity of vessels over 15m vessel than in the other marine plan areas. The fishing industry is dependent on a healthy marine environment. It is dependent on the marine environment being able to support healthy fish stocks which are free of persistent pollutants and heavy metals. It requires these fish stocks to be exploited sustainably, in order to ensure the long-term viability of the fishing sector. However, through its reliance on fish stocks as a natural capital asset, fishing itself has the potential to have a direct adverse effect on the marine environment. It also has the potential to have an indirect adverse effect on the marine environment (and thus several natural capital assets) through the presence of ghost fishing gear, and, in the case of aquaculture, the potential degradation of water quality. It is uncertain, therefore, how this cyclical and interdependent nature of fisheries and aquaculture on the natural capital assets (NW-NG-1) provided by the marine environment would affect the industry specifically.

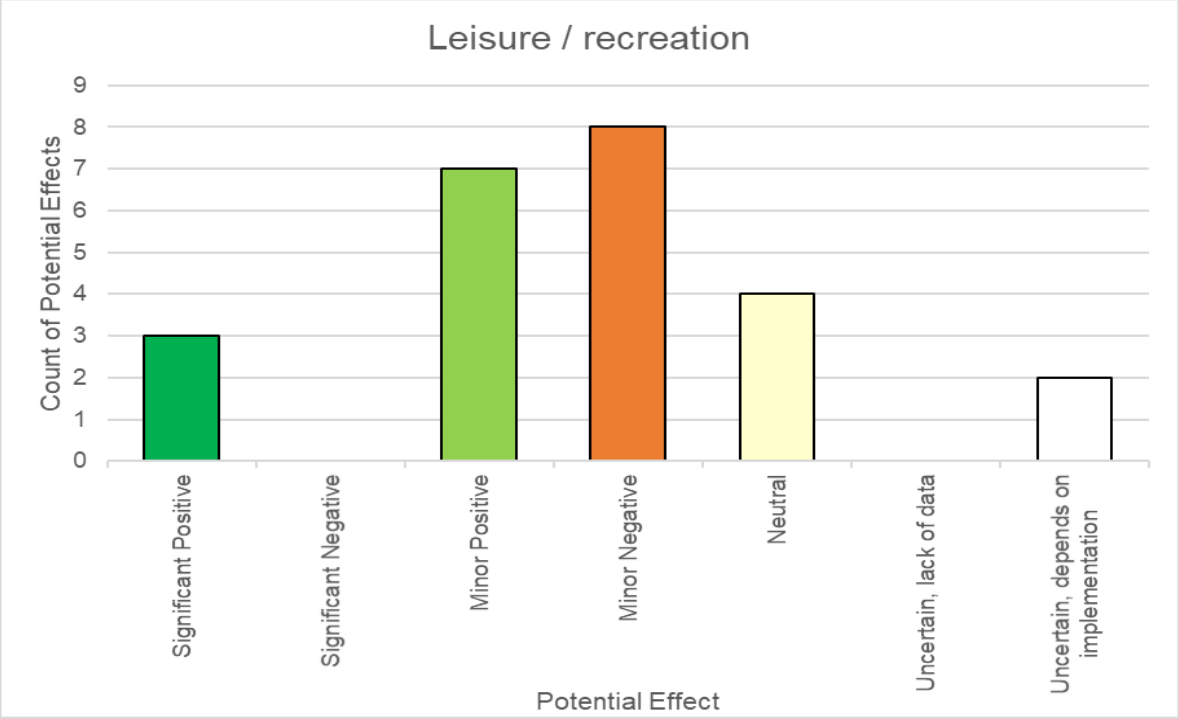
The aquaculture policy grouping has the potential for a positive effect on fisheries and aquaculture. Although there are only four sites farming shellfish, the fishery industry has greater presence within the north west marine plan areas. It directly addresses the need for future development to consider nearby aquaculture faculties,

and encourages sustainable design. However, the terms which would be acceptable for proposals which will adversely affect aquaculture are unclear. For this reason, an uncertain effect has been recorded.

Policy NW-SCP-1 states that where possible proposals should demonstrate that they have considered how highly the seascape and landscapes of an area is valued, its quality, and the areas potential for change. In addition, the scale and design of the proposal should be compatible with its surroundings, and not have a significant adverse effect on the seascape and landscapes of an area or the wider landscape. At this stage, it is not clear the quality and value of the landscape and seascape where future proposals could be developed, or the process of which will be undertaken to establish the value. Therefore, at this stage the overall effect of this policy could have on aquaculture is uncertain.

11.2.5 Leisure and Recreation

Figure 22: Effects on the Leisure and Recreation SA Sub-Topic.



Both the access and tourism and recreation policy groupings aim to increase access to the marine environment providing greater leisure and recreational opportunities across the north west marine plan areas. For these reasons, significant positive effects have been identified.

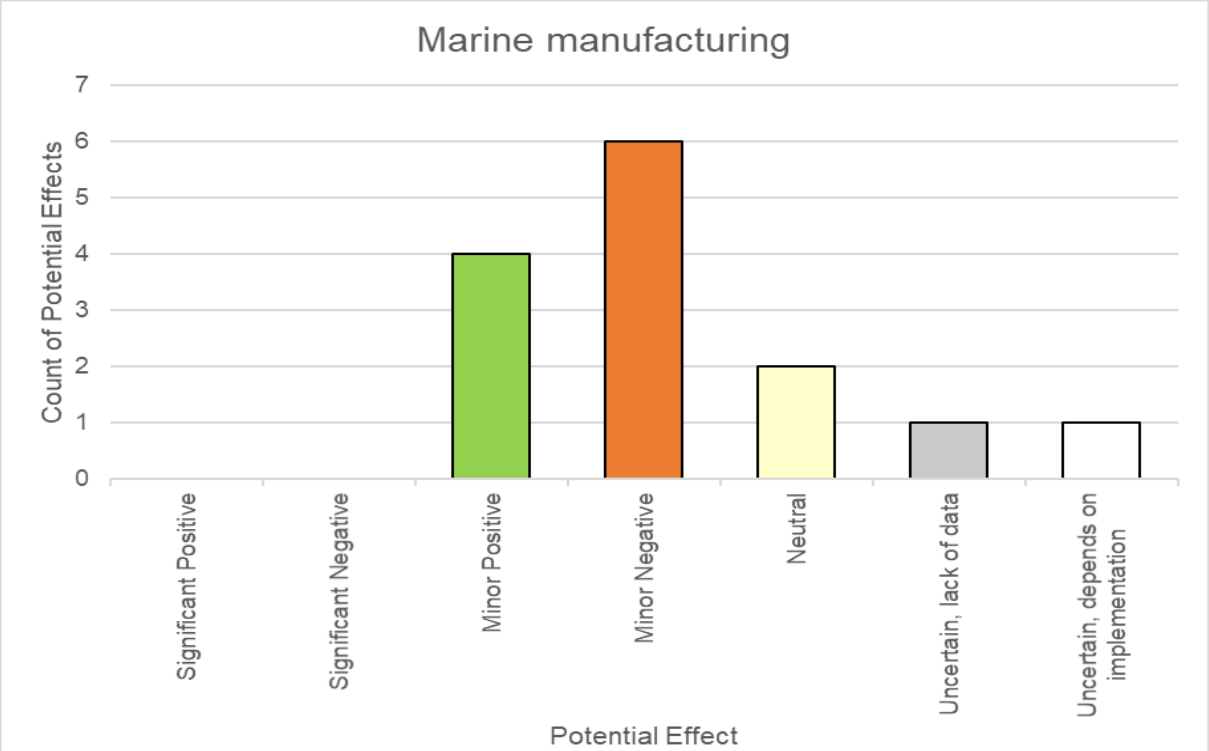
Leisure and recreation opportunities have positive interactions with economic and social topics and implementation of policy NW-EMP-1 have the potential to result in significant positive effects on the leisure and recreation industry.
Sea training is carried out within the north west marine plan areas, with 14% of the inshore plan and offshore plan areas, being dedicated as military practice and exercise (PEXA) training areas. Preference towards defence activities could see some recreational activity and new recreational proposals limited within the north

west inshore marine plan area, and there is potential for issues with relation to access. Uncertainty has been recorded as the proposals will need to be considered on a case by case basis and it is unclear from the policy wording which proposals would require authorisation.

The potential effect which may be had on leisure and recreation by the natural capital policy grouping is uncertain at present, and would be dependent on its implementation. Leisure and recreation associated activities can benefit from the natural capital afforded by the marine environment (economic, outdoor recreation, increased visitor numbers), however, these activities may have a significant adverse effect on elements of marine and coastal natural capital.

11.2.6 Marine Manufacturing

Figure 23: Effects on the Marine Manufacturing SA Sub-Topic.



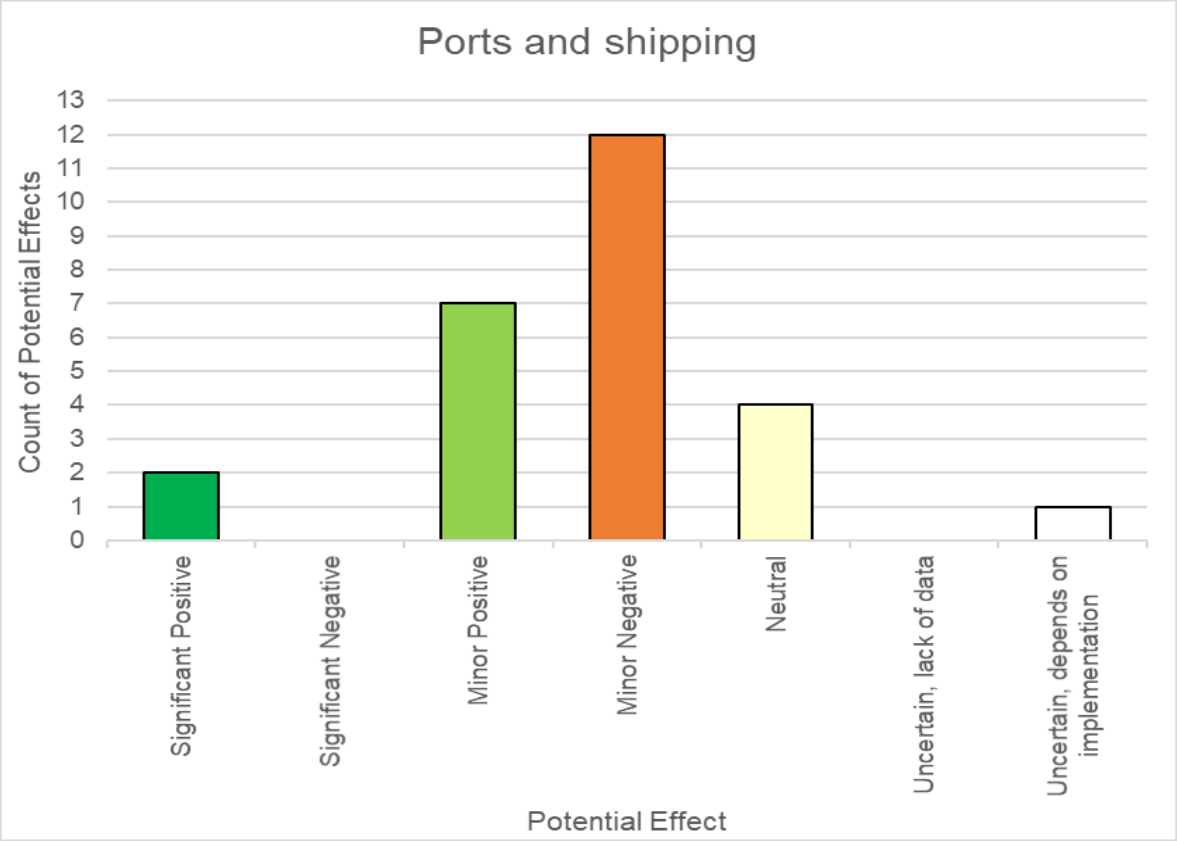
The north west inshore marine plan area is a major manufacturing base and key area for UK exports which receives a large amount of shipping traffic. The Port of Barrow is an important site for marine manufacturing within the north west inshore plan area. The site is in close proximity to the Barrow-in-Furness to the Morecambe Bay Special Area of Conservation (SAC) and Morecambe Bay and Duddon Estuary Special Protection Areas (SPAs). The marine protected areas policy grouping could limit marine manufacturing activity at the Port of Barrow, however, the effects of this manufacturing facility on the MPA sites are currently unclear, and further monitoring of the habitats would be required to establish the interactions between these co-existing sites. For these reasons an uncertain effect has been identified.

Policy NW-WQ-1 has potential to limit future proposed marine manufacturing activities within the north west marine plan areas, as marine manufacturing could be

deemed as a proposal that could cause deterioration in water quality. There are no policies within the plan that offer general protection for marine manufacturing activities within the North West Marine Plan and for this reason an uncertain effect has been identified. There are however several policies which mention several different marine industries individually and their associated supply chains and skills bases.

11.2.7 Ports and Shipping

Figure 24: Effects on the Ports and Shipping SA Sub-Topic.



The north west marine plan areas have 39 ports, which account for 7% of all English Ports. Ports and shipping make a significant contribution to the UK's economy. Policies NW-PS-2 and NW-PS-3, within the ports and shipping policy grouping, could help to safeguard port access and key navigational routes, whilst policies NW-PS-1 and NW-PS-4 have the potential to increase port and shipping activity within the north west marine plan areas. For these reasons, a significant positive effect has been identified.

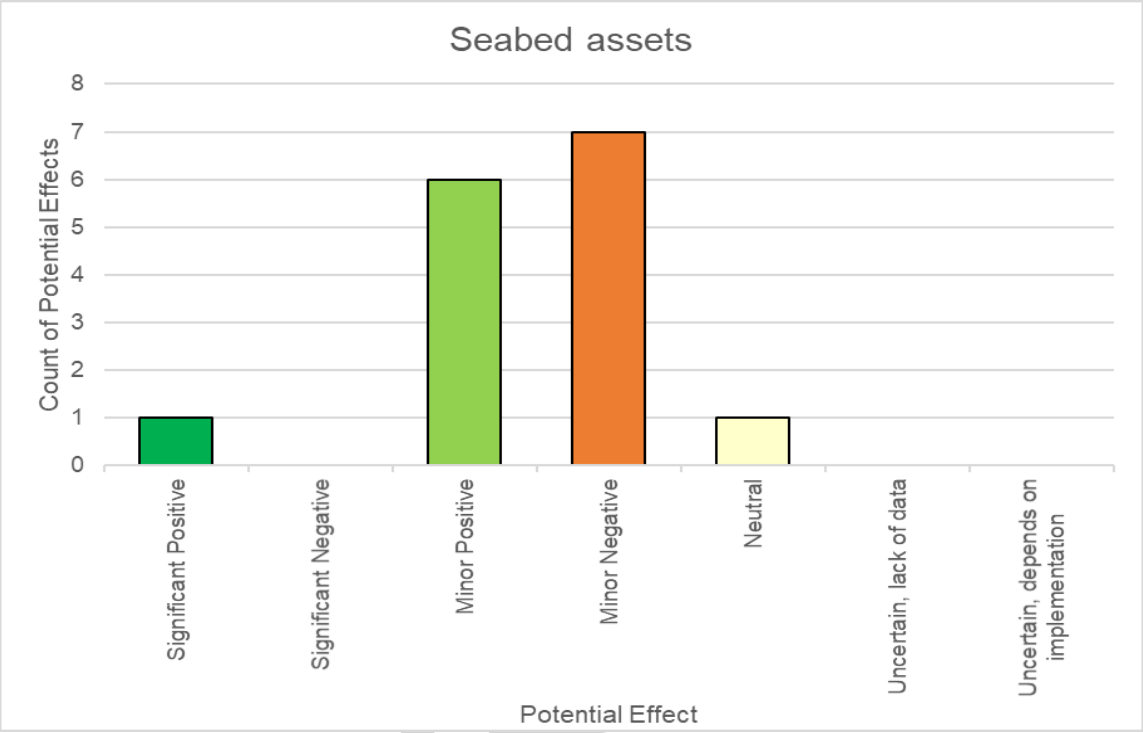
Ports and shipping have positive interactions with economic and social topics and the implementation of NW-EMP-1 has the potential to result in significant positive effects on the posts and shipping industry.

Ports have a vital role in the import and export of energy supplies and will need to be responsive both to changes in different types of energy supplies needed, and to the need for facilities to support the development and maintenance of offshore renewable sites. Within the renewables policy grouping, there is potential for all three

policies to result in significant positive effects on shipping. However, further development as well as the restrictions associated with areas designated for wind development (NW-WIND-1), will further reduce available space and add complexity to already challenging coastal waters.

11.2.8 Seabed Assets

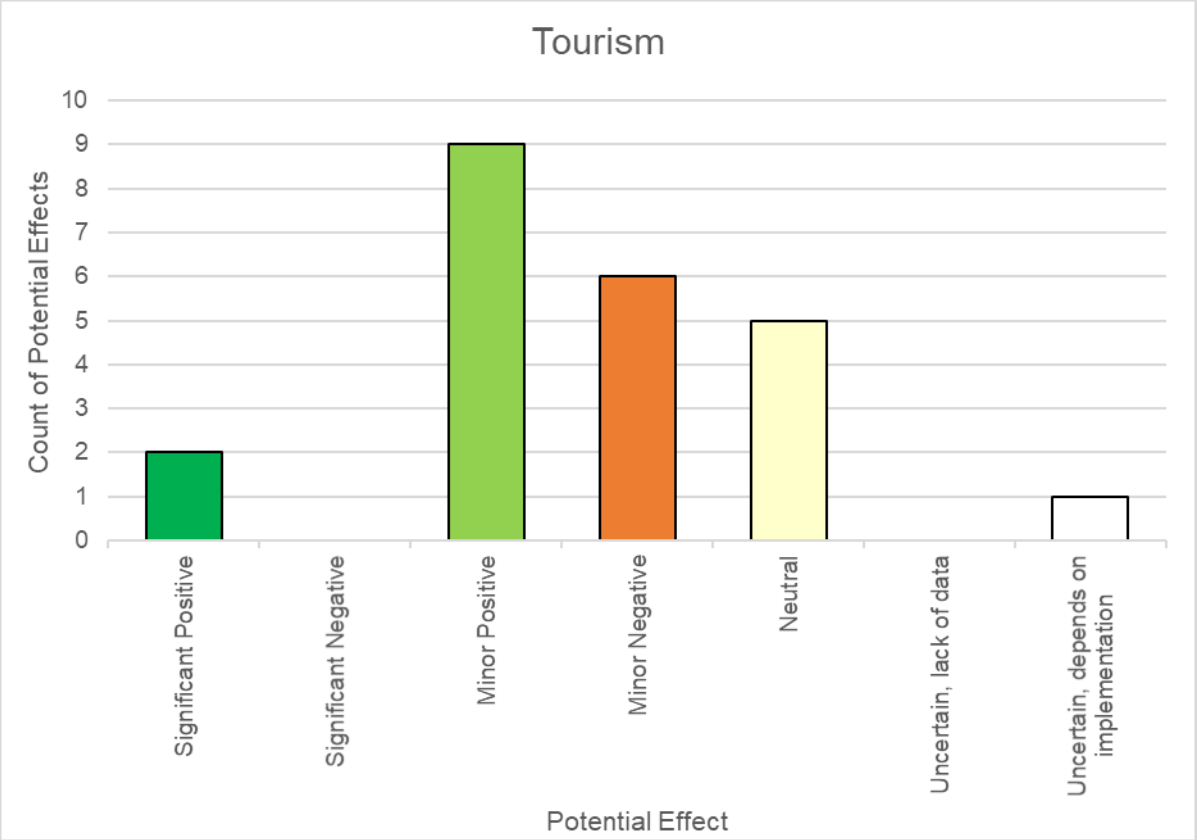
Figure 25: Effects on the Seabed Assets SA Sub-Topic.



Potential significant positive effects have been identified in relation to the cables policy grouping. Policies NW-CAB-1, NW-CAB-2 and NW-CAB-3 aim to support existing cable infrastructure and encouraging new cable developments within the north west marine plan areas.

11.2.9 Tourism

Figure 26: Effects on the Tourism SA Sub-Topic.



The tourism and recreation policy grouping policy has resulted in significant positive effects on the tourism policy grouping. Policy NW-TR-1 aims to protect existing tourism activities and could result in expansion and diversification of existing developments as well as new proposals.

The north west marine plan areas provide various tourism opportunities, with Blackpool, Lancaster, Liverpool and Manchester, being some of the most visited towns and cities visited in the country. The employment policy could provide further employment opportunities and diversification within the industry.

There are two large shipyards within the north west inshore marine plan area; BAE Systems Maritime Submarines at Barrow-in-Furness and Cammell Laird at Birkenhead. Preference towards defence activity, in line with policy NW-DEF-1, has the potential to see some tourism activity and new tourism proposals limited within the inshore north west marine plan area. Uncertainty has been recorded as the policy is not clear as to what types of proposals are likely to affect Ministry of Defence areas.

11.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within the following table.

Table 9: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Economy.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Fisheries and aquaculture	Access	Whether adequate mitigation could be provided would be dependent on whether preference is given to the SA (sub) topic and associated activities or to the policy grouping and activities associated with this. This 'prioritisation' would ultimately be dependent on the project being proposed and the associated effects, and would be decided at a more granular level than the marine plan. As such, no further appropriate mitigation can be suggested. NW-FISH-1, NW-FISH-2, NW-FISH-3 and NW-CO-1 may provide some mitigation for the potential effects which may be incurred on fisheries and aquaculture as a result of increased access.
Fisheries and aquaculture	Aquaculture	The circumstances under which proposals with an adverse effect on aquaculture facilities would be accepted is unclear. Policy supporting text should explicitly state these cases.
Fisheries and aquaculture	Aggregates and Dredging and disposal	Policies NW-AQ-1, NW-FISH-2 and NW-FISH-3 aim to provide protection to aquaculture and fishing from activities that could have an adverse effect. The above policies do not specifically reference aggregates and give the options of minimising and mitigating effects of activities and developments. It is recommended that the wording of both the aggregates and/or AQ/FISH supporting text is changed to reflect the potential effect of aggregates on fisheries and aquaculture. Policy NW-CO-1 could also provide mitigation for fisheries and aquaculture, as it aims to optimise the use of space and incorporate opportunities for co-existence and co-operation with existing activities, within the north west marine plan areas.
Fisheries and aquaculture, Leisure /	Natural capital	Clarity in the supporting text is required in relation to fisheries and aquaculture, to ensure that the cyclical and interdependent nature of

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
recreation and Tourism		this industry with natural capital assets within the marine and coastal environment are adequately and appropriately explained.
Aggregate extraction	Natural capital	Clarity in the supporting text is required in relation to aggregate extraction, to state whether natural capital which benefits aggregate extraction is to be treated as preferential to other natural capital assets such as biodiversity which can be significantly affected by the industry.
Access, Leisure and recreation, Tourism	Defence	Public access and restrictions within military areas are likely to be determined by MOD Byelaws. NW-DEF-1 may provide some mitigation, aims to avoid conflict between defence activities and new proposals within the north west inshore plan area. It will ensure that defence interests are not impeded.
Fisheries and Aquaculture	Renewables	Policy supporting text could be amended to address the potential negative effects that renewable energy could have. Policy NW-FISH-1 could provide some mitigation for the effects of renewable installations on fisheries and aquaculture. Policy NW-CO-1 could provide some mitigation with regards to co-existence.
Marine Manufacturing	Water quality	In order to protect marine manufacturing, it should feature within the planning policies, whether this be within the supporting text to an existing economic policy (for example, infrastructure, defence etc.) or within its own policy. The potential negative implications of marine manufacturing on water quality need to be included with NW-WQ-1 supporting text.
Aggregates	Renewables	NW-AGG-1 and NW-AGG-3 may work to reduce the potential restrictions which may be imposed on aggregate extraction as a result of the renewables policy grouping.
Ports and shipping	Renewables	Policies NW-PS-1 and NW-PS-2 will ensure that important navigational routes will be safeguarded from static sea surface infrastructure.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
		It is assumed that any new developments arising as a result of the policies will require an updated navigational risk assessment in line with the Port Marine Safety Code.

12. Results of the Assessment - Biodiversity, Habitats, Flora & Fauna

12.1 Introduction

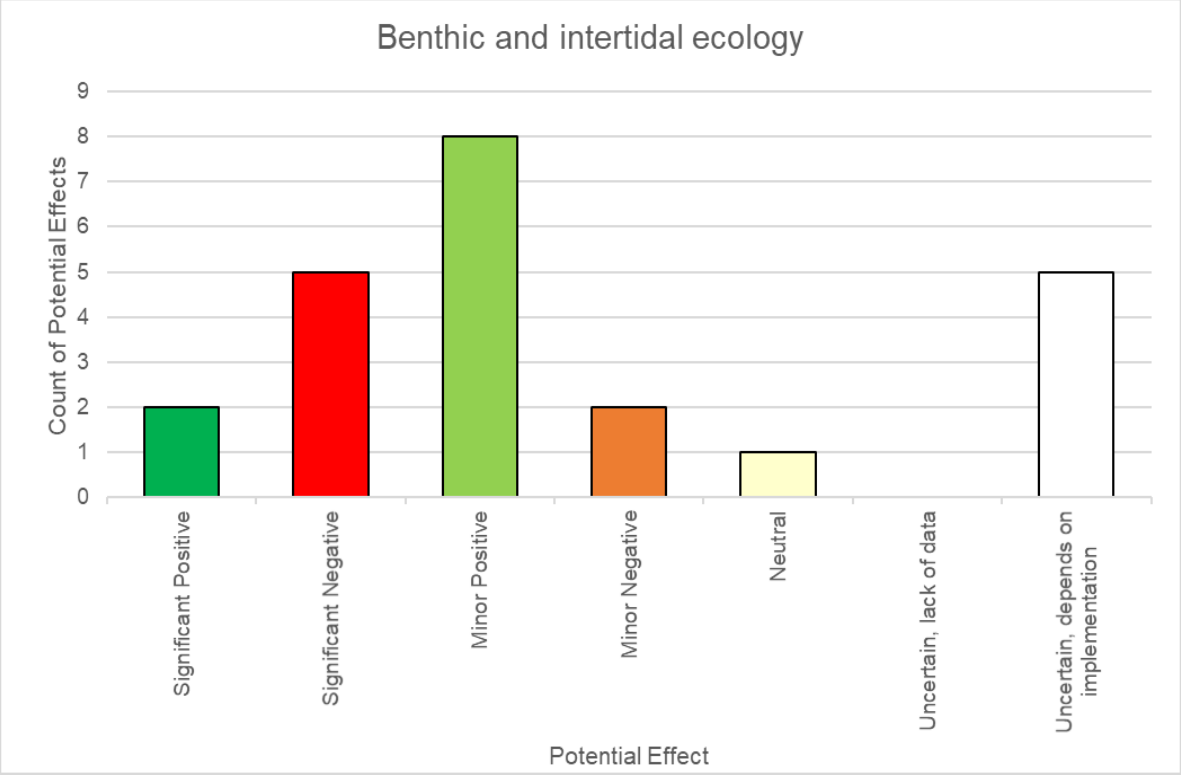
This section of the report presents the performance of the North West Marine Plan in relation to biodiversity, habitats, flora and fauna. This topic encompasses protected sites and species, benthic and intertidal ecology and fish and shellfish, marine megafauna, plankton, ornithology and invasive non-native species. Each of these comprises a separate SA sub-topic.

Sub-section 12.2 is split into seven parts, reflecting the seven SA sub-topics. The full assessment of the biodiversity SA topic can be found in Technical Appendix B.

12.2 Results of the Assessment of all Policy Groupings on Biodiversity, Habitats, Flora & Fauna

12.2.1 Benthic and Intertidal Ecology

Figure 27: Effects on the Benthic and Intertidal SA Sub-Topic.



Policy NW-CE-1 is predicted to have a significant positive effect on the benthic and intertidal environment, as it will address adverse cumulative effects from future proposals. For this reason, a significant positive effect has been identified, in relation to the cumulative effects policy grouping.

The implementation of the marine protected areas policy grouping could have potential for significant positive effects on benthic and intertidal ecology. In particular, policies NW-MPA-2 and NW-MPA-3 may aid in increasing 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. For these reasons, a significant positive effect has been recorded for the SA objective benthic and intertidal ecology.

The installation of buried subsea cables has the potential to disturb benthic and intertidal habitats. The impetus that the cable policy grouping gives to buried cables has resulted in a significant negative effect particularly on benthic habitats within the north west marine plan areas. Subtidal sediment and habitats are also currently being lost as a result of offshore activities and subsequent pollution. The oil and gas policy grouping encourages future development of oil and gas, which has the potential to result in further degradation of benthic and intertidal ecology within the north west marine plan areas. For these reasons, potential significant negative effects have been identified in relation to both the oil and gas and cable policy groupings.

Subtidal sediment and habitats are being lost as a result of offshore energy production within the north west marine plan areas. Benthic and intertidal environments are also being affected by pollution from oil and gas activity. Policies NW-OG-1 and NW-OG-2 may not directly result in further oil and gas developments within the north west marine plan areas, however there are currently 23 licensed areas and 13 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 west region contributes significantly to the UK overall supplies, it is assumed that these policies will ensure that development will continue. Whether F developments come forward as a result of policies NW-CC-1 and NW-CCUS-1 is currently uncertain. The potential effects of CCUS are not fully known; however, the baseline has stated that these are likely to be similar to oil and gas. As development is likely to worsen the current situation, a significant negative effect has been identified.

Associated port and shipping activity, in particular dredging, has potential to effect subtidal sediments and the baseline has identified that at various locations near large ports, subtidal rocky habitat has been lost due to construction, infrastructure (mainly coastal) or via smothering from dredged deposits. Shipping also poses the risk of water pollution which can indirectly affect benthic and intertidal ecology. Policies NW-PS-1 and NW-PS-4, within the ports and harbours policy grouping, have the potential to result in increasing port and shipping activity, which could result in a significant negative effect on benthic and intertidal ecology. Although, dredging policies themselves may not result in the additional dredging activity, any increasing in shipping could increase the need for dredging. Due to the interdependencies between these two policy groupings, a significant negative effect has been identified for both.

The aquaculture policy grouping also has potential to have a significant negative effect on benthic and intertidal ecology. This policy grouping promotes aquaculture developments, particularly policy NW-AQ-2, which could lead to an increase in the

nutrients and pollutants present within benthic and intertidal sediments, altering species composition. The effect of building on benthic habitats could also lead to the direct loss of habitat and species, such as the European spiny lobster (*Palinurus elephas*) currently found within the north west marine plan areas, which could not be mitigated.

Aggregate extraction can lead to the loss of subtidal rocky habitats and benthic species and habitats from both direct removal or smothering from dredge deposits. There are currently no licensed aggregate extraction areas in the north west marine plan areas, however, there is one site located within the Irish Sea which has been included within Round 4 of the Crown Estates leasing rounds. Policies could help to safeguard this site for future aggregate developments, which have the potential to result in significant negative effects, however, there is no certainty on whether development will take place at this stage, and for this reason an uncertain effect has been identified.

Uncertainty has been recorded in regard to the disturbance policy grouping. The NW-DIST-1 policy option 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 west marine plan areas. Whilst NW-BIO-2 may have the potential to mitigate for this, it is uncertain that the "significant adverse effects on native species" would include the effects of disturbance.

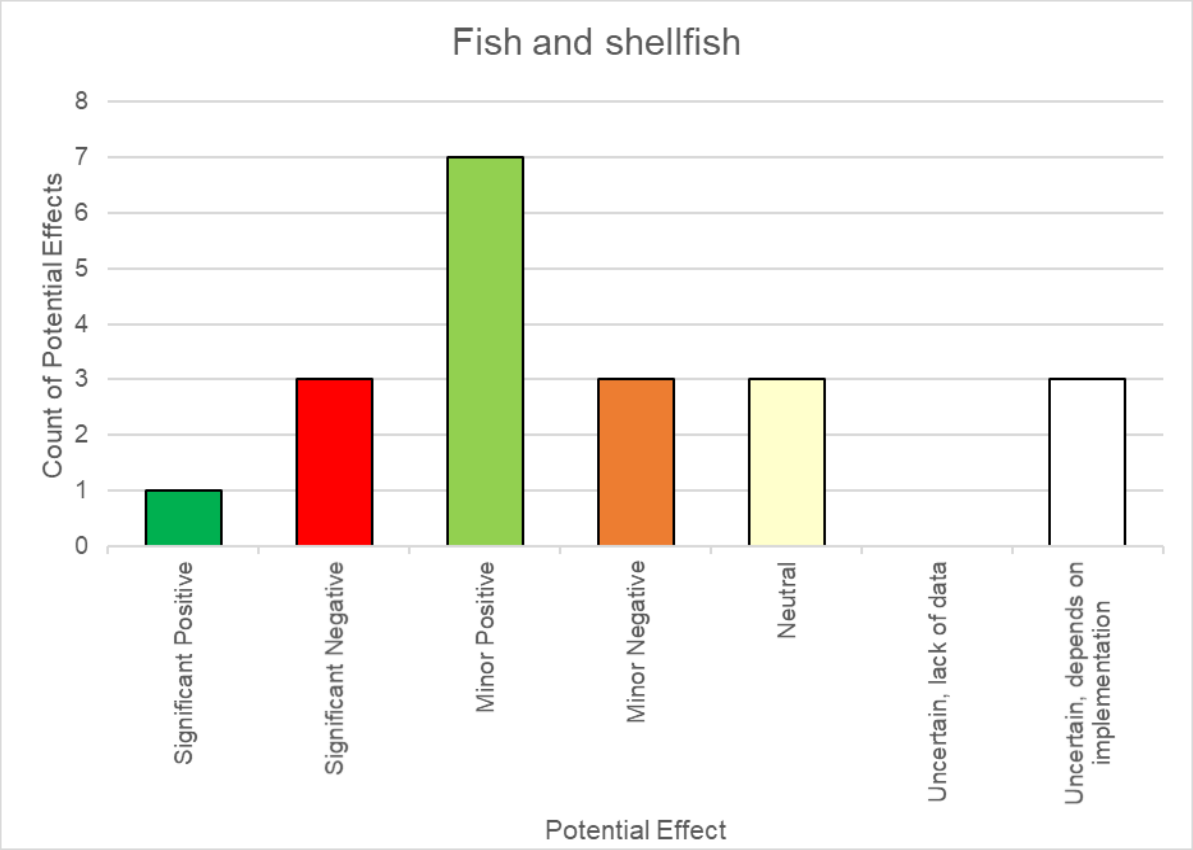
Benthic and intertidal ecology is being heavily affected by a number of industries within the north west marine plan areas (for example, aggregates, dredging, fishing, cables and recreation). The supporting text for Policy NW-CO-1 aims to help protect habitats and species, but it also aims to protect industries that are damaging to benthic and intertidal habitats. The policy text discusses existing activities and does not make refence to opportunities to improve the performance of existing activities with relation to their potential negative effects through co-existence. 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.

Renewable infrastructure has potential to result in adverse effects on the hydrodynamics of the estuarine environments and can effect intertidal and subtidal habitats. The renewable policy grouping has the potential to result in further renewable activity within the north west marine plan areas, however, the likelihood of future proposals and the type of future proposals is not known. For these reasons an uncertain effect has been identified.

Commercial fishing can cause adverse effects on subtidal sediments, resulting in the loss of benthic habitats and species. Whilst policy NW-FISH-3 seeks to protect essential fish habitat, it is unclear whether this would apply only to fish habitat of commercially important species. This would not facilitate the direct protection of benthic and intertidal ecology. The potential effect that the fisheries policy grouping could have is at present uncertain and dependent on implementation.

12.2.2 Fish and Shellfish

Figure 28: Effects on the Fish and Shellfish SA Sub-Topic.



The invasive non-native species policy grouping has the potential to positively effect native fish and shellfish populations, such as the salmon and seat trout populations if the Thames. It clearly outlines the need to prevent the introduction of invasive non-native species through transport and construction, which could subsequently compete with native species. For this reason, a significant positive effect has been recorded.

There are ten ports within the north west inshore marine plan area, all of which required regular dredging. Dredging and dredge disposal has the potential to lead to the loss of subtidal rocky habitats from both direct removal or smothering from dredge deposits. Although the dredging and disposal policies won't explicitly result in increased dredging activity, due to the numbers of ports that currently require dredging, the significant negative effects that are currently occurring, are likely to continue. For these reasons, a significant negative effect has been identified.

There is potential for an indirect significant negative effect to result from the underwater noise policy grouping, as Policy NW-UWN-2 may still allow for developments causing noise due to caveats within the policy, which has potential to disturb fish.

The increased number of aquaculture facilities which could result from the aquaculture policy grouping, may have potential positive effects on local fish and shellfish species, for example, the sandeel population which currently spawns within

Liverpool Bay. However, unless carefully managed, there is potential for increased eutrophication, altering of food sources and increased disease transmission. For this reason, a potential significant negative effect has been identified.

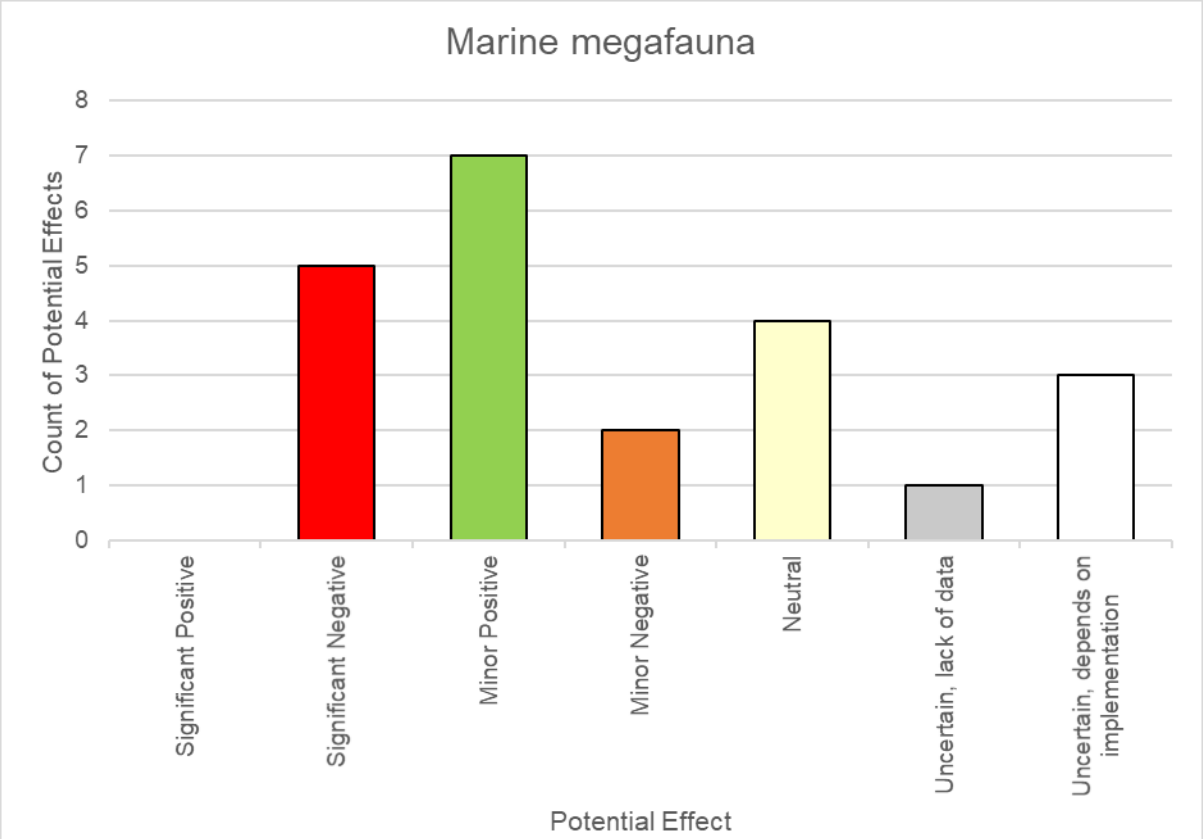
Aggregate extraction has the potential to adversely affect fish and shellfish, through the changes in sediment type and benthos, sediment plumes and loss of habitats. There are currently no licensed aggregate extraction areas in the north west marine plan areas, however, there is one site located within the Irish Sea which has been included within Round 4 of the Crown Estates leasing rounds. Policies could help to safeguard this site for future aggregate developments, which have the potential to result in significant negative effects, however, there is no certainty on whether development will take place at this stage, and for this reason an uncertain effect has been identified.

Policy NW-FISH-3, within the fisheries policy grouping, seeks to protect habitat of such essential fish, however, it is unclear whether this would apply only to habitats of commercially important species, and as it stands it would not include the direct protection of other fish and shellfish. The potential effect that the fisheries policy grouping is uncertain and would be dependent on implementation.

Sewerage pollution remains a significant challenge for fish and shellfish within the north west marine plan areas. Although it is beyond the jurisdiction of the plan to look at existing issues within the north west marine plan areas, it is not clear whether the policy could help to tackle this existing issue, and result in a positive effect on fish and shellfish. For these reasons an uncertain effect has been identified.

12.2.3 Marine Megafauna

Figure 29: Effects on the Marine Megafauna SA Sub-Topic.



Offshore energy and CCUS development have potential to increase noise, which is likely to be significantly worse during construction. The production of noise in the marine environment can have varying effects on marine mammals, including the altering of feeding behaviour, increased energy expenditure and death due to altered dive patterns. Policies NW-OG-1 and NW-OG-2 may not directly result in further oil and gas developments within the north west marine plan areas, however, there are currently 23 licensed areas and 13 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 west region contributes significantly to the UK overall supplies, it is assumed that these policies will ensure that development will continue. Whether CCUS developments come forward as a result of policies NW-CC-1 and NW-CCUS-1 is currently uncertain.

Bycatch of marine mammals by fisheries and their entanglement by marine litter are two separate issues which could be exacerbated by the fisheries policy grouping. Neither of these issues are addressed by the policy grouping, and whilst the latter is partially addressed by policy NW-ML-2, the former is not addressed by other policies within the plan, hence a potential significant negative effect has been recorded.

Ports and shipping activity can increase disturbance as well as potential collisions, with marine megafauna. This can cause increased energy expenditure, reduced resting time and has the potential to cause cetaceans to abandon or not use ideal

habitats. This has potential to result in a reduction of energy reserves which could affect foraging efficiency, overall fitness and reproductive capacity of marine megafauna. For these reasons, significant negative effects have been identified.

Noise effects from marine dredging are already having an effect on marine megafauna within the north west marine plan areas. The dredging and disposal policy grouping might not directly result in increased dredging activity, however, as shipping policies could result in greater shipping activity, and the symbiotic relationship between the two industries, there is a potential for dredging to increase within the north west inshore marine plan area. This could worsen the current situation, and for this reason a significant negative effect has been identified.

Similarly, to dredging and disposal, noise effects from aggregate activity can negatively affect marine megafauna within the north west marine plan areas. There are currently no licensed aggregate extraction areas in the north west marine plan areas, however, there is one site located within the Irish Sea which has been included within Round 4 of the Crown Estates leasing rounds. Policies could help to safeguard this site for future aggregate developments, which have the potential to result in significant negative effects on marine megafauna and birds, however, there is no certainty on whether development will take place at this stage, and for this reason an uncertain effect has been identified.

Megafauna provide popular recreational attractions within the north west region; however, recreational disturbances are regularly recorded, which often affects, seals, cetaceans and sharks. Disturbances are often caused by dogs, boats, surfers canoes and paddle boards. The tourism and recreation policy grouping could result in increased recreational pressures on marine megafauna which has potential to worsen the problem. It is uncertain what 'sustainable tourism and recreation activities' entail, and therefore whether the policy grouping would address disturbance issues.

Marine megafauna are often highly migratory species, and may therefore experience the cumulative effects originating within multiple plan areas. It is unclear if the cumulative effects identified within the cumulative effects policy grouping will extend to those which are cross-boundary cumulative effects. Therefore, an uncertain effect has been recorded.

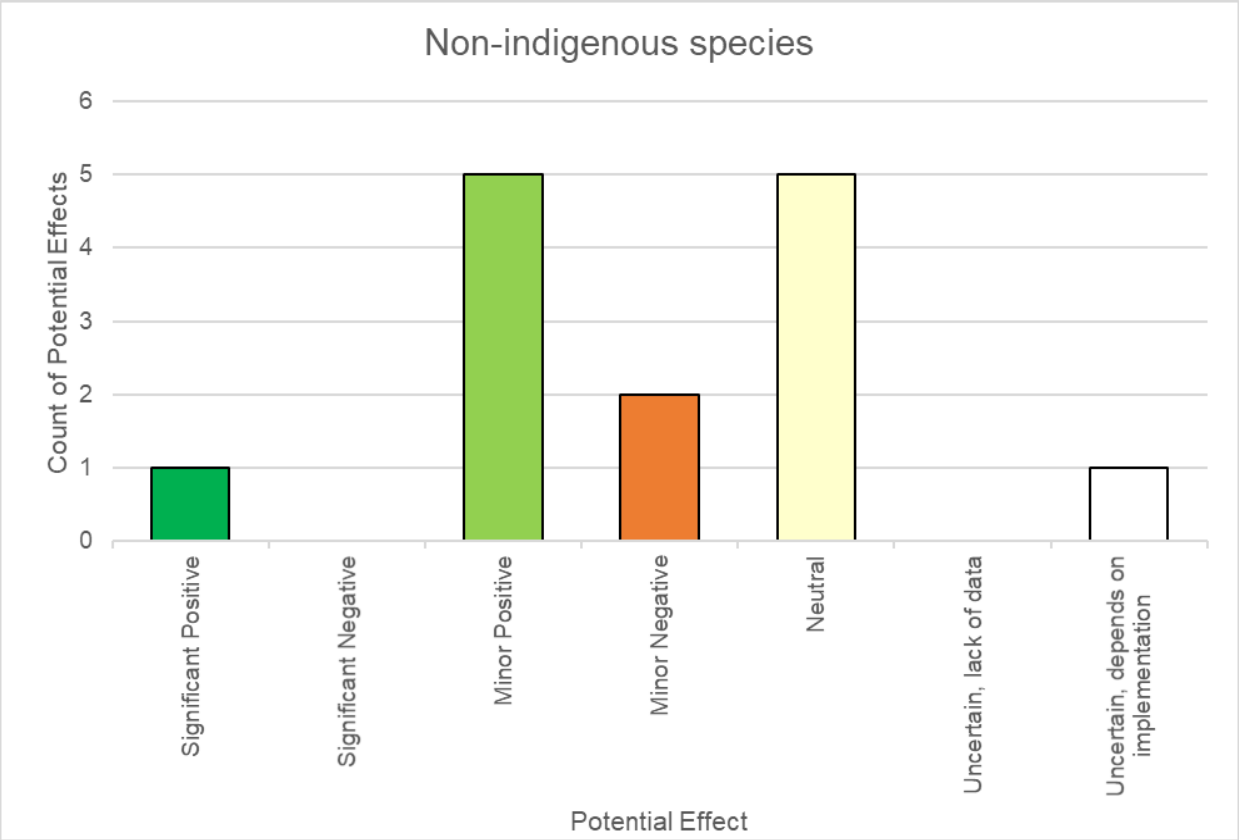
At present the potential effect of the natural capital policy on marine megafauna is uncertain and would be dependent on its implementation. Marine megafauna provide natural capital through, for example, eco-tourism and wildlife tours. However, these activities have been identified as having potential negative effects on marine megafauna. In addition, other sectors which make use of seismic surveys, piling, dredging, defence and shipping can also have negative effects on marine megafauna whilst themselves relying on marine natural capital. It is therefore unclear which natural capital asset, and which sector's exploitation of such an asset, would be prioritised through the implementation of policy NW-NG-1.

There is a potential direct significant negative effect from the implementation of the underwater noise policy grouping due to caveat d of policy NW-UWN-2, which allows for noise emitting developments to occur in some cases without mitigation. This has

the potential to lead to the altering of megafauna migration pathways, interruption of predation and lead to increased energy expenditure, lowering organism fitness.

12.2.4 Invasive Non-Native Species

Figure 30: Effects on the Invasive Non-Native Species SA Sub-Topic.

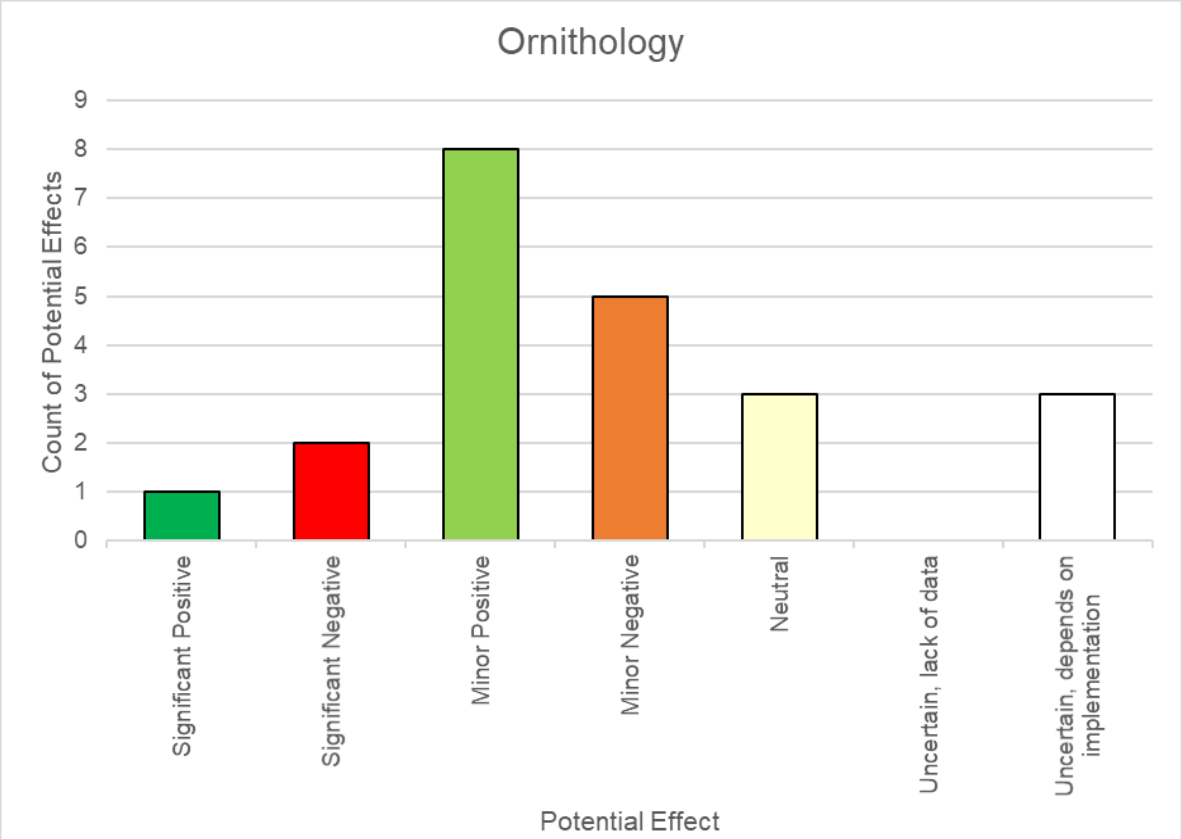


The invasive non-native invasive species policy grouping directly aims to prevent the introduction and increase of invasive non-native species throughout the north west marine plan areas. Transport of invasive species, as well as areas of potential colonisation are addressed within this grouping, which should help to form a well rounded approach to tackling this issue. For this reason, a significant positive effect has been recorded.

It is unclear if invasive non-native species will be given the same protection as native species from disturbance, as described in by policy NW-DIST-1, within the disturbance policy grouping. For this reason, an uncertain effect has been recorded.

12.2.5 Ornithology

Figure 31: Effects on the Ornithology SA Sub-Topic.



There are a high number of bird habitats within the north west marine plan areas, which should be protected by policy NW-MPA-1, as many are currently designated as MPA sites. For example, Liverpool Bay SPA, which supports around 50,000 wintering birds. Policies NW-MPA-2 and NW-MPA-3 should aid in ensuring changes in current habitats due to climate change are considered, with MPA boundaries adjusted accordingly. It is therefore considered that the marine protected areas policy grouping has the potential to significantly positively effect birds within the north west inshore and offshore marine plan areas.

Shipping activity can negatively affect birds, mainly through disturbance and displacement, whilst associated dredging activity can also displace birds and destroy both feeding and breeding grounds. The ports and harbours policy grouping could result in further shipping activity within the north west inshore marine plan area. Although the dredging and disposal policies won't explicitly result in increased dredging activity, increased shipping activity as a result of the ports and shipping policies may call for more dredging activity. For these reasons, a significant negative effect has been identified for both ports and harbours and the dredging and disposal policy groupings.

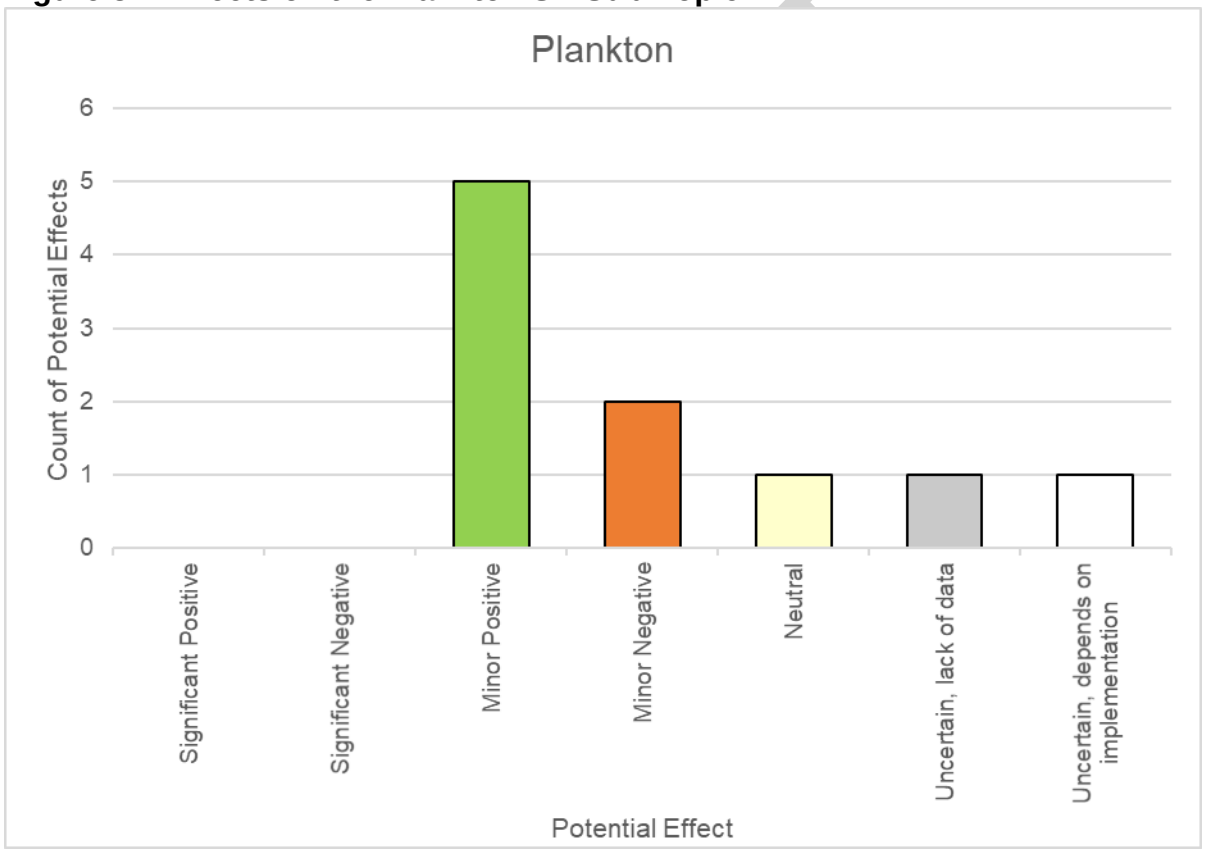
The baseline has identified issues relating to marine developments and the displacement of Red-Throated Divers. Policies that could result in further activity and disturbance within the north west marine plan areas, such as NW-FISH-2 have the potential to cause significant negative effects on the Red-Throated Diver population.

Ornithology provides popular recreational attractions within the north west marine plan areas; however, recreational disturbances are regularly recorded. The tourism and recreation policy grouping could result in increased recreational pressures on marine megafauna which has potential to worsen the problem. It is uncertain what 'sustainable tourism and recreation activities' entail, and therefore whether the tourism and recreation policy grouping would address issues with increased tourism resulting in increased disturbance on ornithology.

Uncertainty has also been recorded in relation to the cumulative effects policy grouping as it is unclear if the cumulative effects identified within this policy grouping will extend to those which are cross-boundary cumulative effects. Bird species are often highly mobile and migratory and may therefore experience the cumulative effects across multiple plan areas.

12.2.6 Plankton

Figure 32: Effects on the Plankton SA Sub-Topic.



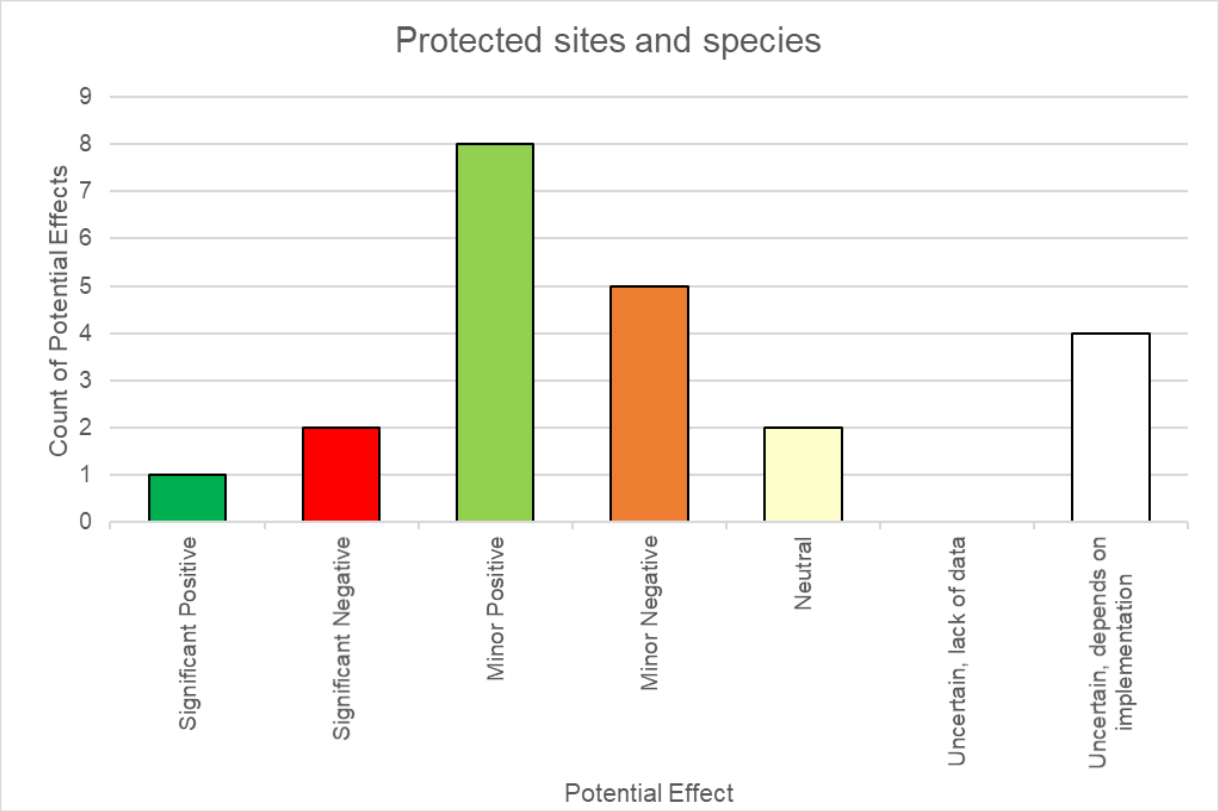
At present, the potential effects of the biodiversity policy grouping are uncertain and would be dependent on the policy implementation. Plankton are the basis of all marine food webs, including those of commercially important species. They are affected by several indirect anthropogenic drivers, including warming sea temperatures and ocean acidification as a result of climate change, and eutrophication through nutrient run-off. As policies NW-BIO-1, NW-BIO-2 and NW-BIO-3 do not seek to target these drivers which are causing permanent and irreversible damage to plankton populations and communities, it is not clear that their implementation would be beneficial for this SA sub-topic. It is uncertain whether net

environmental gains which may be sought as a compensatory route would encompass plankton.

Indirect positive effects may be had on plankton through renewable energy generation indirectly reducing the effects of climate change, such as changes to water temperature and salinity, and through having the potential to minimise demand on fossil fuel generated energy which could in turn minimise carbon dioxide emissions and subsequent ocean acidification. There is however a lack of data on how or whether marine devices can have an adverse effect on plankton, particularly in light of the baseline, which highlights that heavy manufacturing which has a coastal or estuarine location can potentially have a number of effects on the environment and effects on the water environment is a key one. During the construction, operation and decommissioning phases of developments, there can be increased demand for water, discharges to water and adverse ecological effects resulting from physical modifications to the water environment. For these reasons, an uncertain effect has been identified, in relation to the renewables energy grouping.

12.2.7 Protected Sites and Species

Figure 33: Effects on the Protected Sites and Species SA Sub-Topic.



The implementation of the cumulative effects policy grouping is predicted to have a significant positive effect on protected sites and species, as cumulative effects resulting from future developments must be addressed and mitigated. The addition of mitigating cumulative effects which may later arise from "reasonably foreseeable proposals" adds strength to this grouping and further protection for protect sides and species.

Development of aggregate extraction activities have potential to disturb both protected sites and species within the north west marine plan areas. The aggregates policy grouping, along with other activities, has the potential to increase levels of activity in the north west marine plan areas resulting in higher levels of disturbance on protected sites and species.

Shipping activity can negatively affect protected sites and species, mainly through disturbance and displacement, whilst associated dredging activity can also displace protected species and destroy both feeding and breeding grounds. The ports and harbours policy grouping could result in further shipping activity within the north west marine plan areas. A significant negative effect has been identified for the ports and harbours policy grouping.

It is unclear from the oil and gas policy grouping if protected sites and species or oil and gas proposals would be given priority in the policy hierarchy. Future designations of protected sites could be prevented by the implementation of this grouping. Existing sites may also be affected by noise or pollution emitted from oil, gas or carbon capture usage and storage sites, such as the Morecambe Bay SPA. For this reason, an uncertain effect has been recorded.

Aggregate activity can result in adverse effects on marine life and habitats, which in turn could affect protect sites and species. There are currently no licensed aggregate extraction areas in the north west marine plan areas, however, there is one site located within the Irish Sea which has been included within Round 4 of the Crown Estates leasing rounds. Policies could help to safeguard this site for future aggregate developments, which have the potential to result in significant negative effects on birds, however, there is no certainty on whether development will take place at this stage, and for this reason an uncertain effect has been identified.

Fisheries pose a threat to vulnerable or rare species, and there is a lack of understanding of the purpose of Marine Conservation Zones within the sector. Whilst policy NW-FISH-3 seeks to protect essential fish habitat, it is unclear whether this would apply only to fish habitat of commercially important species. This would not include the direct protection of protected sites and species. The potential effect that these policies could have is dependent on implementation and for these reasons, an uncertain effect has been identified.

The tourism and recreation policy has potential to result in increased recreational activity within the north west inshore marine plan area. Recreational pressures can result in disturbance of both protected sites and species. It is not clear what sustainable tourism and recreation activities could entail, and for this reason an uncertain effect has been identified.

There is also potential for an indirect significant negative effect to result from the underwater noise policy grouping, as policy NW-UWN-2 may still allow for developments causing noise due to caveats within the policy, which has potential to disturb protected sites and species.

12.3 Suggested Mitigation Measures

Mitigation measures identified in the assessment to address potential uncertain or significant negative effects are identified within the following table.

Table 10: Suggested Mitigation Measures for Uncertain and Significant Negative Effects on Biodiversity, Habitats, Flora & Fauna.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Protected sites and species, ornithology	Tourism and recreation	Policy supporting text needs to provide clarification on what 'sustainable tourism and recreation activities' entails. Strength could be added to policy NW-MPA-1 by removing options to minimise and mitigate.
Protected sites and species, ornithology, fish and shellfish	Renewables and Aggregates	If future renewable energy proposals were to come forward, the potential negative effects on protected sites and species will need to be addressed through the EIA process. The Crown Estate leasing process and other required consenting schemes also ensures that sensitive biodiversity receptors are taken into account during these processes and conditions frequently applied to limit effects.
Fish and shellfish	Access and Aggregates	Policy NW-BIO-2 and NW-DIST-1 could help to mitigate the cumulative effect, although only 'highly mobile' species will be protected by NW-DIST-1.
Marine megafauna	Access	NW-BIO-1, NW-BIO-2 and NW-BIO-3 may aid in alleviating some negative effects. However, the caveats within NW-ACC-1 grouping allowing for environmental net gains to be used as mitigation elsewhere, may still mean that megafauna within the north west marine plan areas are adversely affected. A minor negative rather than significant effect has been recorded due to the mitigation provided by these other plan policies. Policy NW-BIO-1, NW-DIST-1, NW-UWN-1 and NW-UWN-2 could help to mitigate the cumulative effect, although only 'highly mobile' species will be protected by NW-DIST-1.
Ornithology	Access	Policies within groupings such as those for Marine Protected Areas (NW-MPA-1) and Biodiversity (NW-BIO-2), may help to mitigate these effects. A minor negative rather than significant effect has been recorded due to the mitigation provided by these other plan policies.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
		Policy NW-BIO-2 and NW-DIST-1 could help to mitigate the cumulative effect, although only 'highly mobile' species will be protected by NW-DIST-1.
Ornithology	Aggregates	Policy NW-MPA-1 may offer further protection to Marine Protected Areas through discouraging proposals which may have adverse effects on the objectives of marine protected areas.
Benthic and intertidal ecology	Aquaculture	It should be clear within supporting text that "where appropriate" refers to sites which are not protected, and that direct building on the seabed is to be minimal. For example, raised cages within the water column, which are anchored by several points on the seabed.
Benthic and intertidal ecology, Fish and shellfish, Ornithology, protected sites and species and marine megafauna	Aggregates, and Ports and harbours	All new aggregate, dredging and disposal, ports and harbours and cable proposals would need to be subject to an EIA, which would assess the potential effect on benthic intertidal ecology, fish and shellfish, ornithology, protected sites and species and marine megafauna. This could mitigate both potential negative effects and cumulative effects arising from development.
Marine Megafauna, Ornithology, Invasive non-native species	Climate change	NW-AIR-1 seeks to avoid increased greenhouse gas emissions. NW-FISH-1 supports a sustainable fishing industry, however this focuses on diversification and may not necessarily alleviate pressure on over-exploited fish stocks. NW-ML-1 and NW-ML-2 seek to reduce the quantity of litter within the marine environment, however its introduction will not necessarily be wholly prevented. No policies within the marine plan broach the issue of bycatch of unintended species, including marine mammals, within fishing gear. A neutral rather than negative effect has been recorded due to the mitigation provided by these other plan policies.
Protected sites and species, Benthic and intertidal ecology, Fish and shellfish	Fisheries and aquaculture	The policy wording of NW-FISH-3 should be amended to explicitly state whether either important habitats of commercially important species should be protected, or whether this extends to important habitats of other species, including protected sites and species, such as

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
		benthic and intertidal species and fish and shellfish.
Benthic and intertidal ecology	Oil and gas	Supporting text to policy NW-BIO-2, should be amended to highlight the importance of benthic and intertidal habitats. Strength could be added to the policy by removing options to minimise and mitigate.
Marine megafauna and ornithology	Tourism and recreation	Supporting text for policy NW-TR-1 needs to clearly identify what is meant by 'sustainable tourism and recreational activities' and highlight the importance of water quality to tourism and recreation.
Benthic and intertidal ecology	Aquaculture	It should be clear within supporting text that "where appropriate" refers to sites which are not protected, and that direct building on the seabed is to be minimal. For example, rope methods which are often used for shellfish farms.
Fish and shellfish	Aquaculture	Controls should be put in place to ensure native populations are not hindered by the presence of farmed species within the water column. Disease control should be addressed, as well as aquaculture facility density. Whilst it is recognised that this is outside the remit of the MMO, the supporting text could signpost to relevant good practice, such as the CEFAS Shellfish Biosecurity Measures Plan NW-BIO-2 and NW-FISH-3 could partially mitigate for the effects identified.
Plankton	Biodiversity	The most applicable definition of 'net environmental gain' as included within the supporting text extends only to mean low water. It is therefore recommended that a definition is included within the supporting text for both this grouping, else for the policy/supporting text to signpost to the most relevant and recent advice. The same approach should be taken for the Natural Capital grouping, to ensure that the policies encompass the marine environment and are therefore applicable to proposals within the north west marine plan areas.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Benthic and intertidal ecology	Co-existence	There is no indication within the supporting text whether the protection of industries or the protection of habitats take priority. NW-BIO-1, NW-BIO-2 and NW-BIO-3 and provide some mitigation but do not specifically reference benthic and intertidal ecology.
Ornithology	Natural Capital	It should be clarified within the supporting text whether activities such as tourism which derive economic benefits from ornithology as a natural capital asset would take precedence over the protection of ornithology which is the natural capital asset. It is also noted that the most applicable definition of 'net environmental gain' as included within the supporting text of the Biodiversity grouping extends only to mean low water. It is therefore recommended that a definition is included within the supporting text for both the Natural Capital and the Biodiversity groupings which encompasses the marine environment and is therefore applicable to proposals within the north west marine plan areas.
Marine megafauna	Natural Capital	At present there is no approved marine natural capital approach from government. We would anticipate that following an approved approach, clarity could be provided within the supporting text to state whether natural capital which is derived from marine megafauna is treated preferentially and takes priority over exploitation of other natural capital assets (aggregate extraction, dredging etc.). It is also noted that the most applicable definition of 'net environmental gain' as included within the supporting text of the Biodiversity grouping extends only to mean low water. It is therefore recommended that a definition is included within the supporting text for both the Natural Capital and the Biodiversity groupings which encompasses the marine environment and is therefore applicable to proposals within the north west marine plan areas.

SA Sub-Topic	Causal Grouping	Mitigation Measures Identified in the Assessment
Ornithology	Natural Capital	At present there is no approved marine natural capital approach from government. We would anticipate that following an approved approach, clarity could be provided within the supporting text to state whether activities such as tourism which derive economic benefits from ornithology as a natural capital asset would take precedence over the protection of ornithology which is the natural capital asset. It is also noted that the most applicable definition of 'net environmental gain' as included within the supporting text of the Biodiversity grouping extends only to mean low water. It is therefore recommended that a definition is included within the supporting text for both the Natural Capital and the Biodiversity groupings which encompasses the marine environment and is therefore applicable to proposals within the north west marine plan areas.
Ornithology	Dredging and disposal	Policy NW-BIO-2 and NW-BIO-3 encourage proposals to enhance habitats and promote net gains, which could help to protect birds from negative effects associated with dredging and disposal. Policy NW-DIST-1 could provide some mitigation, however, supporting text should be amended to identify the potential effect dredging and disposal activities pose.
Plankton	Renewables	The Crown Estate leasing process and other required consenting schemes also ensures that sensitive receptors are taken into account during these processes and conditions frequently applied to limit effects. More data is needed on the potential effects of marine renewable energy devices on the water column and subsequently on plankton.

13. Cumulative Effects Assessment

13.1 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 and/or
- where 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 West Marine Plan may interact to cause cumulative effects on a receptor and
- how the North West Marine Plan can cause cumulative effects in association with other programmes, plans, policies and projects.

Potential cumulative effects of different elements of the North West Marine Plan which may have a combined effect are reported in Section 13.2.

Potential cumulative effects of the North West Marine Plan in association with other programmes, plans, policies and projects are presented in Section 13.3.

13.2 Potential Cumulative Effects of all Policy Groupings

Should multiple proposals from within a single sector or from a combination of sectors come forward which would be located within relatively close proximity to one another, there is the potential for negative cumulative effects to be had on SA topics. The damage which may be incurred as a result of potential cumulative effects would have the potential to vary, dependent on:

- the nature (susceptibility to damage) and spatial extent of the features in question
- the installation methods opted for
- the proximity of future developments to designated sites or features;
- the type and number of proposals, policies or developments which may come forward
- how different policies address common issues
- the preference given to certain policies.

Cumulative effects which have been identified as having potential to occur on features within the north west marine plan areas as a result of proposals from various industries have been summarised in Table 11 and described within Table 12.

Table 11: Cumulative Effects Identified within the Policies Assessments.

	Policy Grouping																												
SA Topic/SA Sub-topic	**Access**	**Aggregates**	**Air Quality**	**Aquaculture**	**Biodiversity**	**Cables**	**Climate change**	**Co-existence**	**Cumulative effects**	**Defence**	**Disturbance**	**Dredging and Disposal**	**Employment**	**Fisheries**	**Cross Boundary Considerations**	**Heritage Assets**	**Infrastructure**	**Marine Litter**	**Marine Protected Areas**	**Natural Capital**	**Invasive non-native Species**	**Oil and Gas**	**Ports and Harbours**	**Renewables**	**Seascape and Landscape**	**Social benefits**	**Tourism and recreation**	**Underwater Noise**	**Water Quality**
Cultural Heritage																													
Heritage Assets within marine plan areas		-				-						-					-					-	-	-					
Heritage Assets adjacent to marine plan areas						-																							
Geology, Substrates and Coastal Processes																													
Coastal features and processes		-										-																	
Seabed substrates and bathymetry		-										-												-					
Seascape and landscape																													
Effects on seascape and landscape																	-					-		-	+				
Water																													
Marine litter														-													-		
Pollution and water quality								-														-	-						
Water temperature and salinity																													
Air																													

	Policy Grouping																												
SA Topic/SA Sub-topic	**Access**	**Aggregates**	**Air Quality**	**Aquaculture**	**Biodiversity**	**Cables**	**Climate change**	**Co-existence**	**Cumulative effects**	**Defence**	**Disturbance**	**Dredging and Disposal**	**Employment**	**Fisheries**	**Cross Boundary Considerations**	**Heritage Assets**	**Infrastructure**	**Marine Litter**	**Marine Protected Areas**	**Natural Capital**	**Invasive non-native Species**	**Oil and Gas**	**Ports and Harbours**	**Renewables**	**Seascape and Landscape**	**Social benefits**	**Tourism and recreation**	**Underwater Noise**	**Water Quality**
Air pollutants																							-						
Climate																													
Climate change resilience and adaptation																						-							
Greenhouse gas emissions																						-	-						
Communities, Health and Wellbeing																													
Effects on communities																													
Effects on protected equality groups																													
Health and the wider determinants of health																													
Economy																													
Aggregate extraction																													
Defence																													
Energy generation and infrastructure development																												-	
Fisheries and aquaculture		-									-	-										-		-					
Leisure / recreation																													

	Policy Grouping																												
SA Topic/SA Sub-topic	**Access**	**Aggregates**	**Air Quality**	**Aquaculture**	**Biodiversity**	**Cables**	**Climate change**	**Co-existence**	**Cumulative effects**	**Defence**	**Disturbance**	**Dredging and Disposal**	**Employment**	**Fisheries**	**Cross Boundary Considerations**	**Heritage Assets**	**Infrastructure**	**Marine Litter**	**Marine Protected Areas**	**Natural Capital**	**Invasive non-native Species**	**Oil and Gas**	**Ports and Harbours**	**Renewables**	**Seascape and Landscape**	**Social benefits**	**Tourism and recreation**	**Underwater Noise**	**Water Quality**
Marine manufacturing																												-	
Ports and shipping											-										-			-				-	
Seabed assets																													
Tourism																													
Biodiversity																													
Benthic and intertidal ecology		-				-						-		-								-		-					
Fish and shellfish	-	-										-		-															
Marine megafauna		-																				-					-		
Invasive non-native species																													
Plankton																													
Protected sites and species		-				-						-		-															
Ornithology		-										-										-				-			

Table 12: Potential Cumulative Effects of all Policy Groupings.

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
Cultural Heritage	• The nature (susceptibility to damage) and spatial extent of the archaeological features in question, and • the type and number of proposals which may occur within close proximity to the archaeological features.	Potential negative cumulative effects are associated with the following policy groupings: Assets within plan areas: • aggregates • cables • dredging and disposal • infrastructure • oil and gas • ports and harbours • renewables. Adjacent to marine plan areas: • cables • renewables.	Both within and adjacent to the north west marine plan areas in relation to the seascape and landscape policy grouping working in combination with the heritage assets policy grouping could result in positive cumulative effects.	• It is assumed that where applicable, new infrastructure proposals will require an EIA under the EIA regulations. This could minimise the effect of negative cumulative effects occurring on heritage assets. • Policy NW-CE-1 aims for all new proposals to consider their potential cumulative effects • Policy NW-HER-1 aims to provide protection to heritage assets.
Geology, Substrates and Coastal Processes	• The type and number of proposals which may occur within close proximity to one another; and • the installation methods opted for.	Potential negative cumulative effects are associated with the following policy groupings: Seabed substrates and bathymetry: • aggregates • dredging and disposal • Renewables.	N/A	• It is assumed that where applicable, new infrastructure proposals will require an EIA under the EIA regulations. This could minimise the effect of negative cumulative effects occurring on geology, substrate and coastal processes. • Policy NW-CE-1 aims for all new proposals to consider their potential cumulative effects

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
		Coastal features and processes: • aggregates • co-existence • dredging and disposal.		• Policy NW-MPA-4 could provide some protection, however, supporting text could be strengthened by making reference to Geological Conservation review Sites.
Seascape and landscape	• The type and number of proposals which may occur within close proximity to both existing and future developments; and • The proximity of future developments to designated sites, local beauty spots and areas considered to be of a high landscape value.	Potential negative cumulative effects are associated with the following policy groupings: • aggregates • cables • infrastructure, • oil and gas • renewables.	Seascape and landscape policy grouping working in combination with the marine protected areas and heritage assets policy groupings, could result in positive cumulative effects.	• It is assumed that where applicable, new infrastructure proposals will require an EIA under the EIA regulations. This could minimise the effect of negative cumulative effects occurring on landscape and seascape • Policy NW-SCP-1 could help to provide adequate mitigation for cumulative effects identified • Policy NW-CE-1 aims for all new proposals to consider their potential cumulative effects.
Water	• The type and number of proposals which may occur, particularly those developments that	Potential negative cumulative effects are associated with the following policy groupings: Pollution and water quality: • co-existence	Biodiversity policies have potential to result in minor positive cumulative effect if used in combination with marine litter policies.	• It is assumed that where applicable, new infrastructure proposals will require an EIA under the EIA regulations. This could minimise the effect of negative cumulative effects

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
	contribute to water pollution and marine litter (e.g. shipping, ports and harbours, fisheries and tourism and recreation); and • How different policies address common issues, in particular marine litter.	• oil and gas • ports and harbours • tourism and recreation. Marine Litter: • aquaculture • fisheries • marine litter • ports and harbours • tourism and recreation.	Seascape and landscape policy NW-SCP-1 working in combination with NW-ML-2 has potential to result in significant positive cumulative effects on marine litter.	occurring on water quality and marine litter • Policy NW-WQ-1 could help to prevent further water pollution • Policies NW-ML-1 and NW-ML-2 could help to mitigate effects on marine litter. • Policy NW-CE-1 aims for all new proposals to consider their potential cumulative effects.
Air Quality	• The type and number of proposals which may come forward particularly those developments that contribute to air pollution.	Potential negative cumulative effects are associated with the following policy groupings: • ports and harbours • tourism and recreation.	N/A	• It is assumed that where applicable, new infrastructure proposals will require an EIA under the EIA regulations. This could minimise the effect of negative cumulative effects occurring on air quality • NW-AIR-1 could help to mitigate significant negative cumulative effects identified, by ensuring that all proposals assess their direct and indirect effects upon air quality and greenhouse gas emissions • Policy NW-CE-1 aims for all new proposals to consider their potential cumulative effects.

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
Climate	• The type and number of proposals which may come forward particularly those developments that contribute to climate change.	Potential negative cumulative effects are associated with the following policy groupings: Greenhouse gas emissions: • oil and gas • ports and harbours. Climate change resilience and adaptation: • oil and gas.	N/A	• NW-CC-1 and NW-AIR-1 could help to mitigate both the potential negative effects and negative cumulative effects, that could rise from oil and gas developments. • Policy NW-AIR-1 could help to ensure that future ports and shipping proposals consider their effects upon greenhouse gas emissions, which could mitigate potential negative effects. • As oil and gas developments are classed as Schedule 1 developments, under the EIA regulations, any oil and gas development that would come forward as a result of this policy, would be subjected to an EIA. It is assumed that ports, shipping and harbours developments would also be subjected to an EIA. The specific reference to greenhouse gas emissions in the EIA regulations seek to address this issue with the intention of embedding climate change consideration.

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
				• Policy NW-CE-1 aims for all new proposals to consider their potential cumulative effects.
Economy	• the type and number of policies which may come forward, particularly those that could result in developments that could inhibit economic activity (e.g. Air quality restrictions) • the preference given to economic policies • the type and number of developments that come forward as a result of policy implementation (e.g. effect of multiple renewable developments on ports and shipping).	Potential negative cumulative effects are associated with the following policy groupings: • aggregates • aquaculture • climate change • disturbance • invasive non-native species • marine litter • oil and gas • renewables • underwater noise.	N/A	• Policy NW-CO-1, supports co-existence within the marine environment, which could help mitigate pressures on ports and shipping, tourism and recreation and fisheries and aquaculture, from the competition of space with other marine industries. • Policy NW-FISH-1 could provide some mitigation for the cumulative effects of renewable installations on fisheries and aquaculture. • Policies NW-PS-1, NW-PS-2, NW-PS-3 and NW-PS-4 may help to alleviate the cumulative effects of non-native invasive species on ports and shipping.

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
Biodiversity	• the type and number of developments that come forward as a result of policy implementation • the preference given to biodiversity policies • the nature (susceptibility to damage) and spatial extent of the biodiversity in question.	Potential negative cumulative effects are associated with the following policy groupings: • access • aggregates • cables • climate change • disturbance • dredging and disposal • fisheries • oil and gas • ports and harbours • tourism and recreation • renewables.	A positive cumulative effect has been identified as having the potential to occur on fish and shellfish, in relation to the marine protected areas policy grouping working in combination with the fish and shellfish and policy grouping.	• It is assumed that where applicable, new infrastructure proposals will require an EIA under the EIA regulations. This could minimise the effect of negative cumulative effects occurring on biodiversity • Policy NW-BIO-1, NW-BIO-2 NW-BIO-3 and NW-DIST-1 could help to mitigate the cumulative effect, of access on fish and shellfish, marine mega-fauna and ornithology, although only 'highly mobile' species will be protected by NW-DIST-1. • Policy NW-FISH-3 encourages proposals to enhance essential fish habitats including spawning, nursery and feeding grounds, and migratory routes. This could provide some mitigation for fish and shellfish, from the potential negative cumulative effects arising from economic developments. • Policy NW-BIO-1, NW-BIO-2 and NW-BIO-3 encourage proposals to enhance habitats. NW-BIO-3 promotes net gains which could

SA Topic	Cumulative effects vary dependant on:	Potential Negative cumulative effects	Potential positive cumulative effects	Mitigation
				provide mitigation for ornithology from economic developments. • NW-INNS-1 may partially mitigate for the cumulative effect identified specifically in relation to aquaculture, although the release of invasive non-native species from aquaculture sites cannot be ensured through this. • Policy NW-MPA-1 may offer further protection to marine protected areas from negative cumulative effects, as the policy discourages proposals which may have adverse effects on the objectives of marine protected areas. • NW-ML-1 and NW-ML-2 seek to reduce the quantity of litter within the marine environment, which could address the cumulative effects of marine litter on biodiversity. • Policies NW-UWN-1 and NW-UWN-2 could help to provide some protection from the negative cumulative effects arising from proposals that generate underwater noise.

13.3 Cumulative Effects from Existing Plans and Policies

The SA Database in Appendix A was reviewed for plans and policies which may give rise to significant effects as follows:

- International plans, policies and strategies
- National plans, policies and strategies
- Regional plans, policies and strategies

Legislation from the database is not included in the review as it is assumed that this will be complied with. The MPS was also not included separately as it requires implementation of the marine plans. Effects from other marine plans are included so effects of the MPS have been identified at a regional level. Local Plans are considered cumulatively, but beyond this level of planning, individual local or area action plans are not identified individually. This is because, given the spatial scale of the broad policies and geographic areas identified in the plan, it is more appropriate to identify the higher tier plans and policies which identify the same effects, but at a regional or national level. It should also be noted that at the strategic level, this list is not exhaustive and cumulative effects arising from individual projects and plans should be revisited as part of their assessment at the application stage.

Further, the MMO conducted a sub-national policy analysis exercise which aimed to take into account interactions between terrestrial and marine planning. This analysis formed part of the evidence base when developing policies for the plan areas within this assessment and should therefore help mitigate any adverse effects or conflicts caused by the marine plans in combination with terrestrial planning.

Table 13 presents the reviewed plans, policies and strategies and identifies potential cumulative effects that could result from them in combination with the North West Marine Plan.

The majority of the policies and plans assessed in Table 13 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 affect receptors. There are a number of policies within the North West Marine Plan which do help to mitigate these effects:

- Cumulative Effects Policy NW-CE-1
- Natural Capital Policy NW-NG-1
- Co-existence Policy NW-CO-1
- Cross boundary considerations Policy NW-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.

Table 13: Potential Cumulative Effects with other Plans, Policies and Strategies

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
International				
Scotland's National Marine Plan: a single framework for managing our seas, The Scottish Government, 2015	This Plan covers both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). It also applies to the exercise of both reserved and devolved functions. This National Marine Plan sets out strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles. It is required to be compatible with the UK Marine Policy Statement and existing marine plans across the UK, in particular where there is interaction between England inshore and offshore marine plans and Northern Ireland Marine Plans.	All	Scotland's Marine Plan provides marine planning and similar policies in the areas neighbouring the North West Marine Plan. Policies for environmental protection may give rise to positive cumulative effects with the Plan. However, policies for aggregates, offshore renewables energy, oil and gas, sea fisheries, shipping, ports and harbours, cables may give rise to cumulative negative effects with similar policies in the marine plan.	Significant positive/Significant negative

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
Irish National Marine Planning Framework (Draft plan not yet available)	In 2014 the European Parliament and the Council of the European Union adopted Directive 2014/89/EU. This directive established a framework for MSP and details the main goals (Article 5) and minimum requirements (Article 6). The Marine Spatial Plan must be in place by March 2021.	All	Alignment of marine planning with other planning, regulation and management bodies is necessary in order to manage pressures, further environmental health and achieve sustainable development across the coastal areas of the north west. The UK MPS states that marine plans are required to co-ordinate planning across administrative boundaries and to sit alongside existing terrestrial planning regimes. The National Planning Policy Framework states: 'In coastal areas, planning policies and decisions should take account of the UK MPS and marine plans. Integrated	Significant positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
			Coastal Zone Management should be pursued across local authority and land/sea boundaries, to ensure effective alignment of the terrestrial and marine planning regimes.'	
Welsh National Marine Plan (WNMP) 2019	WNMP sets out the policy for the next 20 years for the sustainable use of Welsh seas. Welsh Ministers are the planning authority for the Welsh: Inshore region (out to 12 nautical miles) offshore region (12 to 200 nautical miles). Marine planning will: • support our vision for clean, healthy, safe and diverse seas • guide future sustainable development • support the growth of marine space and	All	Alignment of marine planning with other planning, regulation and management bodies is necessary in order to manage pressures, further environmental health and achieve sustainable development across the coastal areas of the north west. The UK MPS states that marine plans are required to co-ordinate planning across administrative boundaries and to sit alongside existing	Significant Positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	natural resources (’blue growth’).		terrestrial planning regimes. The National Planning Policy Framework states: ‘In coastal areas, planning policies and decisions should take account of the UK MPS and marine plans. Integrated Coastal Zone Management should be pursued across local authority and land/sea boundaries, to ensure effective alignment of the terrestrial and marine planning regimes.’	
International Maritime Organisation, 2018, Initial Strategy on the reduction of greenhouse gas emissions from ships	The initial strategy envisages for the first time a reduction in total greenhouse gas emissions from international shipping which, it says, should peak as soon as possible and to reduce the total annual greenhouse gas	Climate	The “levels of ambition” in the Strategy would seek to reduce greenhouse gas emissions and benefit emissions from ports and shipping under the North West Marine Plan.	Significant positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	emissions by at least 50% by 2050 compared to 2008, while, at the same time, pursuing efforts towards phasing them out entirely. The strategy includes a specific reference to “a pathway of carbon dioxide emissions reduction consistent with the Paris Agreement temperature goals”.			
National				
Clean Growth Strategy 2017	The Emissions Intensity Ratio (EIR): This measures the amount of greenhouse gases (tonnes of carbon dioxide equivalent) produced for each unit of Gross Domestic Product (GDP) created. Currently the EIR is 270 tonnes/£ million and it was 720 tonnes/£ million in 1990. By 2032, the UK expect the EIR will need to be	Air Quality, Climate.	Renewable energy offers the potential for significant broad-scale environmental benefits through mitigating greenhouse gas emissions from energy production.	Significant positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	nearly as low as 100 tonnes/£ million to meet their ambitions.			
Clean Air Strategy 2019	The government is committed to driving down emissions from ships and reducing the effect of emissions from the maritime sector on the environment and public health. In 2016, domestic shipping (ships that start and end their journey in the UK) accounted for 10% of the UK's total domestic NOx emissions, 2% of PM2.5 and 7% of SO2.	Air Quality, Climate.	Production of Air Quality Strategies by all major English ports by May 2019 should reduce emissions across the port estate including ship and shore activities which will benefit emissions from ports and shipping under the North West Marine Plan.	Significant positive
Maritime 2050, Navigating the Future, Department for Transport, 2019	Maritime 2050 sets out the government's vision and ambitions for the future of the British maritime sector. It is built on seven high level themes: the UK's competitive advantage, environment, infrastructure, people,	Air Quality, Climate, Economy.	In addition to positive effects on economic policies for Ports and Shipping, there will also be cumulative benefits for air quality and climate. The strategy includes targets for greenhouse gas emissions – by 2050, the	Significant positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	security, technology and trade.		UK will actively drive the transition to zero emission shipping in its waters; in addition to planning for adaptation to climate change – flood risk, tidal surges, extreme weather and coastal erosion.	
Draft National Flood and Coastal Erosion Risk Management Strategy for England, Environment Agency 2019	The strategy builds on existing approaches to flood and coastal risk management and promotes the use of a wide range of measures to manage risk. Risk should be managed in a co-ordinated way within catchments and along the coast and balance the needs of communities, the economy and the environment. This strategy will form the framework within which communities have a	Climate, Communities, Economy, Geology, Biodiversity, Water.	There is the potential for cumulative positive effects in relation to management of flood risk and coastal erosion in coastal areas which affects communities, tourism, biodiversity and economic development in particular. Effects are likely to be limited as the Strategy is aimed at governance and funding.	Minor positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	greater role in local risk management decisions and sets out the Environment Agency's strategic overview role in flood and coastal erosion risk management (FCERM).			
25 Year Environment Plan, Defra, 2018	The 25 Year Environment Plan sets out government action to help the natural world regain and retain good health.	Biodiversity, Economy, Communities, Water, Natural Capital.	Chapter 5: Securing clean, healthy, productive and biologically diverse seas and oceans seeks to: • Implement a sustainable fisheries policy as we leave the EU. • Achieve good environmental status of our seas while allowing marine industries to thrive, and complete our ecologically coherent network of well-managed	Significant positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
			marine protected areas (MPAs). There is potential for cumulative positive effects arising with marine plan policies on fisheries, ecosystem approach, marine protected areas and water quality.	
Blue New Deal Good jobs for coastal communities through healthy seas & action plan of priorities, New Economics Foundation, 2015 & 2016	Aims to deliver stronger economies for UK coastal communities, supporting more and better jobs through a healthier marine environment. It has, so far, identified five key policy areas that offer the opportunity to respond to the different socio-economic and environmental challenges that the UK's coastal communities currently face.	Communities, Economy.	Key focus areas for the Blue New Deal: ▪ Sustainable fisheries and aquaculture ▪ Renewable energy ▪ Responsible tourism, leisure and recreation ▪ Innovative coastal management ▪ Re-connecting people with nature. These have potential for positive cumulative effects in combination with policies relating to access, fisheries and	Significant positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
			aquaculture, social benefits, employment, energy, habitats, fisheries, recreation and tourism.	
Sporting Future: A New Strategy for an Active Nation; Department for Digital; Culture, Media and Sport, 2015	The Government sports strategy 'Sporting Future: A New Strategy for an Active Nation' contains targets in relation to the social effect of sport along with policies around elite sport. The strategy states that the Government will aim to ensure the potential for natural capital to meet physical activity needs is realised.	Communities	Potential for positive effects on policies associated with recreation and tourism. Effects are likely to be limited as the Strategy is aimed at governance and funding.	Minor positive
National Planning Policy Framework, 2019	The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for	Air Quality, Climate, Communities, Cultural Heritage, Economy, Geology, Seascape and Landscape, Water.	There is potential for positive cumulative effects with NPPF policies for climate change, conserving the natural and historic environment, promoting a strong economy and healthy communities.	Significant positive / significant negative

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	housing and other development can be produced.		However, there may also be negative cumulative effects where economic or housing development has negative effects in combination with marine plan policies for example, energy or port development on water quality designated landscapes, seascapes, coastal biodiversity or historic environment.	
The Crown Estate 2018/2019 Marine Aggregate Round	Eight areas of seabed have been selected as potentially suitable for the extraction of marine aggregates, seven of which lie within English waters, with one area overlapping English and Welsh waters. The shortlist was announced following a bid assessment process undertaken by The Crown Estate.	Biodiversity, Cultural Heritage, Economy, Geology, Seascape and Landscape, Substrates and Coastal Processes, Water	One site is located within the marine plan areas, on the border with Wales, which could result in aggregate activity within the marine plan areas. Development could result in significant negative cumulative effects on biodiversity, cultural heritage, geology, seascape, coastal processes, water	Significant positive/ Significant negative

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
			and seascape and landscape. There is potential for positive cumulative effects on economic SA topics.	
The Crown Estate Round 4, Offshore Wind Leasing	The following regions were announced as not being taken forward to Round 4 in November 2018: • South West • Bristol Channel (English and Welsh) • West Isle of Wight Development areas taken forward in November 2018 include; South East, East Anglia, Dogger Bank, North Wales, Irish Sea and Southern North Sea.	Biodiversity, Cultural Heritage, Economy, Geology, Seascape and Landscape, Substrates and Coastal Processes, Water	Developments within North Wales and the Irish Sea that are being brought forward as part of Round 4, could affect on the north west marine plan areas. This could result in offshore wind developments taking place within the offshore plan area, which has potential to have positive cumulative effects on economic topics, particularly renewables. Conversely, development could also result in significant negative cumulative effects on biodiversity, ports and shipping, coastal processes,	Significant positive/ Significant negative

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
			heritage and seascape and landscape.	
Regional & Local				
Shoreline Management Plans (SMPs): • Great Ormes Head to Scotland.	SMPs in the UK provide a large scale assessment of the risks associated with coastal processes that result in both flooding and erosion and presents a policy framework to reduce these risks.	Climate, Geology, Biodiversity, Communities.	Provision of long term coastal defence, including planning for hold the line, no active intervention or managed retreat will enable better planning of coastal activities associated with the marine plan.	Significant positive
Local Plans in the north west: • Wirral Development Plan (adopted February 2000) • Chester West and Chester Local Plan (Part one) Strategic Policies (adopted January 2015) • Halton Core Strategy Local Plan (adopted April 2013) • Warrington Local Plan Core Strategy (adopted July 2014) • Liverpool Core Strategy (Submission draft 2012) 2018 Pre Submission Draft Local Plan	Local plans are prepared by the Local Planning Authority (LPA), usually the Council or the national park authority for the area. They provide a vision for the future of each area and a framework for addressing housing needs and other economic, social and environmental priorities. Current versions are provided here but it	Air Quality, Climate Cultural Heritage, Communities, Seascape and Landscape, Economy.	There is potential for positive cumulative effects with local plan policies for climate change, conserving the natural and historic environment, promoting a strong economy and healthy communities. There is also potential for negative cumulative effects from coastal development in local plans and marine plan from transport and energy emissions, local	Significant positive / significant negative

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
• Sefton Local Plan (adopted April 2017) • West Lancashire Local Plan 2012-2027 (adopted October 2013) • South Ribble Local Plan 2012-2026 (adopted July 2015) • Preston Local Plan 2012-26 (adopted July 2015) • Fylde Local Plan to 2032 (adopted October 2018) • Blackpool Local Plan Part 1: Core Strategy 2012-2027 (adopted January 2016) • Wyre's Local Plan 2011-2031 (adopted February 2019) • Lancaster Core Strategy 2003-2021 (adopted July 2008) • South Lakeland Local Development Framework Core Strategy (adopted October 2010)	should be noted that Local Plan development takes several years and iterations, so cumulative effects will also apply to other versions.		air quality effects, heritage assets and landscape/ seascape, loss of biodiversity, water quality.	

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
• Barrow in Furness/ Barrow Borough Local Plan 2016-2031 (adopted June 2019) • Copeland Local Plan 2013-2028 Core Strategy and Development Management Policies (adopted December 2013) • Allerdale Local Plan Part 1- Strategic and Development Management Policies (adopted July 2014) • Carlisle District Local Plan 2015-2030(adopted November 2016).				
AONB Management Plans: • Solway Coast • Arnside • Silverdale.	AONB Management Plans set the overall strategy for achieving the primary purpose of AONB designation: conserving and enhancing landscape.	Cultural Heritage, Landscape & Seascape	Potential for positive cumulative effects on seascape, access and tourism.	Minor positive
Eel Management Plans North West.	Eel Management Plans (EMPs) implemented within the 14 UK River Basin Districts (RBDs) in accordance with Article 9	Biodiversity	Potential for positive cumulative effects on biodiversity from environmental protection of migratory species.	Minor positive

Policy/Plan/Programme	Description	Related SA Topic(s)	Potential cumulative effects with NW Marine Plan	Likely significant effect (scoring)
	of Regulation No 1100/2007.			
The North East Atlantic Environment Strategy, OSPAR 2010 and Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic, OSPAR, 2014	OSPAR Strategy by 2020 is to substantially reduce marine litter in the OSPAR maritime area to levels where properties and quantities of marine litter do not cause harm to the coastal and marine environment. The OSPAR Marine Litter Regional Action Plan brings together a large number of actions, with target dates, that have been assigned to lead parties (countries) to lead. These focus on actions to combat marine sources of litter, terrestrial sources of litter, removal actions and education and outreach.	Water	There is potential for positive cumulative effects on water quality, particularly through policies reducing marine litter.	Significant positive

14. 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 West Marine Plan as part of the SA, and as part of the implementation and monitoring of the adopted North West Marine Plan, should help to:

- monitor the significant effects of the draft North West Marine Plan
- track whether the North West 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 and unforeseen effects of the Marine Plan. Therefore, the SA monitoring framework should be focused only on monitoring those effects which are significantly negative or uncertain.

Following the consultation period, the MMO will prepare the final North West Marine Plan and the final SA will be prepared alongside this. Any revisions to the Plan at this stage in response to suggested mitigation or consultee comments will be reviewed and the SA amended accordingly. Following this, the residual significant effects will be identified and a monitoring framework for these effects will be proposed.

The North West 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 intention is that the SA framework will be linked to this where practical.

15. Next Steps

The SA Report will be consulted on alongside the draft North West Marine Plan during Quarter 1 of 2020.

Comments received on the SA during this period will then be reviewed and amendments made to the next iteration of the SA Report as appropriate. Amendments may also be made to the North West Marine Plan following this consultation period in response to consultation comments received. Should any changes made to the plan be deemed to be significant, the SA will be updated to reflect the amended version of the North West Marine Plan.

The North West Marine Plan and an up to date version of the SA Report will be submitted to the Secretary of State in mid-2020 and the intention is for the Government to adopt the North West Marine Plan in 2021. The adopted North West Marine Plan will be accompanied by an SA Statement as required by the SEA Regulations.