

Water - Tides and Currents

Baseline/issues: North West Plan Areas 10 11

(Please note that the figures in brackets refer to the SA scoping database. This is available on the MMO website)

- Most of the region has a tidal range of between 8m and 5m (Water_201)
- Annual mean significant wave heights are some of the smallest around England, with wave heights at the coast of <0.76m and offshore up to 1.5m (Water_202)
- The area has been identified as having potential for wave, tidal stream and tidal range energy resources (Water_264)

Baseline/issues: North East Plan Areas 1 2

- Annual mean significant wave heights onshore are low, around 1m. Slightly further offshore these wave heights increase to up to 1.5m and further offshore may reach up to 2.5m (Water_221)
- Most of the region has a tidal range of between 1m to 4 m. This area has not been indicated an important area for potential for wave, tidal stream and tidal range energy resources (Water_222)
- Surfing activities occurs at various beaches in the inshore area and are an important sport in this region. Any pressures that cause hydro morphological changes could affect the integrity of the surfing breaks (Water_271)
- The continued presence of structures in the North Sea will also have impacts on hydro geomorphology (Water_280)

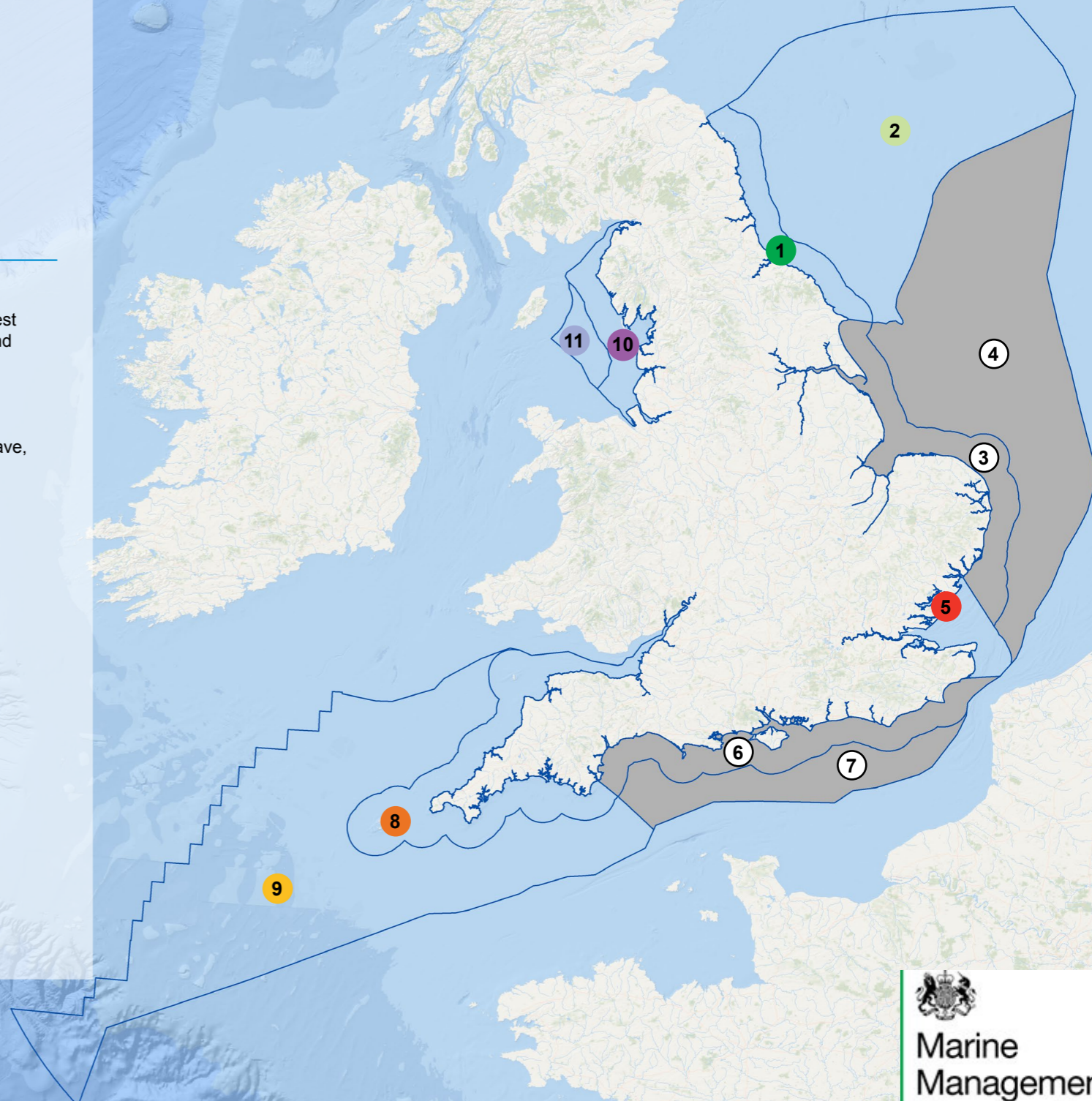
Baseline/issues: South West Plan Areas 8 9

- Most of the region has a tidal range of between 1m and 5m. The region around the Bristol Channel has a far higher tidal range, in excess of 12m in places, which is one of the biggest in the world (Water_184)
- Annual mean significant wave heights are some of the greatest around England, with wave heights at the coast of 1m to 1.5m and just offshore 1.5m to 2m. Moving further offshore wave heights reach up to 2.75m (Water_185)
- The South West has been identified as having potential for wave, tidal stream and tidal range energy resources. The first tidal range technology has been consented to be developed just outside the South West plan area on the Welsh side of the Bristol Channel system (Water_264)
- Surfing activities occurs at various beaches in the inshore area and are an important sport in this region. Any pressures that cause hydro morphological changes could affect the integrity of the surfing breaks (Water_271)

Baseline/issues: South East Plan Areas 5

- Annual mean significant wave heights are some of the smallest around England, with wave heights at the coast of <0.76m and offshore up to 1.5m (Water_202)
- Most of the region has a tidal range of between 1m to 4 m (Water_222)
- The South East has been identified as having potential for wave, tidal stream and tidal range energy resources. (Water_264)

- 1 North East inshore
- 2 North East offshore
- 3 East Inshore
- 4 East Offshore
- 5 South East inshore
- 6 South inshore
- 7 South offshore
- 8 South West inshore
- 9 South west offshore
- 10 North West inshore
- 11 North West offshore



Water - Tides and Currents

Summary of the legislative / policy context

The [Marine Strategy Framework Directive](#) (MSFD) includes a qualitative descriptions of Good Environmental Status (GES) for hydrological conditions: The nature and scale of any permanent changes to the prevailing hydrographical conditions (including but not limited to salinity, temperature, pH and hydrodynamics) resulting from anthropogenic activities (individual and cumulative), having taken into account climatic or long-term cyclical processes in the marine environment, should not lead to significant long term impacts on those biological components considered under Descriptors 1,4, and 6 (Water_169). In December 2015 a program of measures for achieving GES were put in place for MSFD for achieving Descriptor 7 (hydrological conditions), which included a large number of measures that are being or will be implemented that are sufficient to maintain the GES for descriptor 7 (Water_166)

Key cross cutting baseline / issues across all plan areas

- The status currently for hydrographic conditions, based on the [MSFD Initial Assessment](#), indicated there are no significant broad scale alterations of hydrographic conditions affecting ecosystems in UK waters beyond those currently covered by provisions of the Water Framework Directive, through classification as heavily modified water bodies, plus the wider application of the Environmental Impact Assessment Directive through the marine licensing process (Water_166)
- Tidal ranges and wave heights vary with region and exploitation of these resources is being considered for energy production. The South West, South East and North West have been identified as having potential for wave, tidal stream and tidal range energy resources (Water_264)
- Whilst unlikely to be directly impacted by climate change, sea level risk and storminess will impact upon hydrological impacts and could exacerbate the impacts of tides and currents for risk to coastal areas (Water_298)

The likely evolution of the environment over the plan duration

For Descriptor 7 (hydrographical conditions) of the MSFD, it is considered that the application of the WFD in the coastal area, plus the wider application of the Environmental Impact Assessment Directive through the marine licensing process, will be sufficient to achieve GES for this Descriptor across the UK's marine waters (Water_166)

Potential interactions with other topics

Sea level rise and coastal flooding may potentially cause an increase in demand for aggregates for building and maintaining sea defences. This may result in hydrological impacts. The removal of energy from the marine system due to wave and tidal energy devices could have impacts upon sedimentation.

Potential transboundary issues

- Scotland has set ambitious targets for renewable energy by aiming to generate the equivalent of 100% of Scotland's own electricity demand from renewable resources by 2020 and to deliver an 80% reduction in greenhouse gas emissions by 2050. Offshore wind and marine renewables will play a part in this and the role of offshore generation will increase further into the 2020s and beyond. There may be consequences on currents due to these structures and effects on potential future wind, wave and tidal within the English plan regions post 2020 should be assessed. This would need to be considered in the North West and North East marine plan areas (Water_307)
- Development of wave and tidal energy is particularly prominent in Wales at present, which could have transboundary effects on hydrodynamics in the South West and North West marine plan areas.

Key data gaps

Further research is needed to develop a better understanding of the potential impacts that newer renewable energy technologies might have on potentially sensitive environmental features. The cumulative impact of tidal lagoons at the various locations they are being considered is unknown and extensive additional work is needed before the effect on flooding, biodiversity and sedimentation transport is fully understood. The Offshore Renewables Joint Industry Programme (ORJIP) is a UK-wide collaborative programme of environmental research with the aim of reducing consenting risks for wave, tidal stream and tidal range projects. Their [Forward Look report](#) dated February 2016 includes a prioritised list of strategic research projects to address key environmental and ecological issues. This research programme and its findings is likely to be useful evidence that can be used as part of the SA assessment stage. On 10 February 2016 the Government announced an independent review into the feasibility and practicality of tidal lagoon energy in the UK. This is expected to commence soon and conclude before the end of the year and this may prove to be useful in predicting the future baseline for this area (Economy_518)

The UK Government has just published the UK Offshore Energy Strategic Environmental Assessment 3 (OESEA3) and this contains a lot of useful information relevant to the effects of energy removal due to wave and tidal energy devices and this information can be used as part of the marine plans SA assessment stage.

Water - Marine Litter, Water Temperature and Salinity

Baseline/issues: North West Plan Areas 10 11

(Please note that the figures in brackets refer to the SA scoping database. This is available on the MMO website)

- There is a problem with beach litter in the inshore area, although less so than in the South West (Water_273)
- Warming in this area is one of the most pronounced in the UK (0.7°C per decade over the last 3 decades) (Water_266)
- The salinity of the Irish Sea shows no significant long-term trend (Water_322)

Baseline/issues: North East Plan Areas 1 2

- There is a problem with beach litter in the inshore area, although less so than in the South West (Water_273)
- Warming has been identified to be between approx. 0.3 and 0.5°C per decade (Water_279)
- The salinity of the upper ocean has been generally increasing since a fresh period in the 1970s. A minimum occurred in the mid-1990s, and present day conditions are relatively saline. North of the UK, the deep water (800 m) flows from the Nordic Seas; they have freshened since 1950 but salinity has been steady for the last decade. In the northern North Sea (Region 1) the salinity is heavily influenced by inflowing North Atlantic water and has become more saline since the 1970s, though the trend is not clear (Water_322)

Baseline/issues: South West Plan Areas 8 9

- This area has the highest densities of beached litter in the inshore area attributed to pressure from tourism and fishing as well as litter entering UK waters through prevailing currents (Water_233). There is evidence to suggest the problem is getting worse (Water_254)
- Marine litter issues have been associated with combined sewer overflows in the inshore area, particularly in the South West. The occurrence of overflows may increase in the future (Water_256)
- Warming has been identified to be the lowest of all the UK waters at approx. 0.3°C per decade (Water_258)
- The salinity of the upper ocean has been generally increasing since a fresh period in the 1970s. The western English Channel (Region 4) is influenced by North Atlantic Water, tidal currents and local weather conditions. There is no discernible long-term trend in over a century of observations, but in recent years salinity has been higher than average (Water_322).

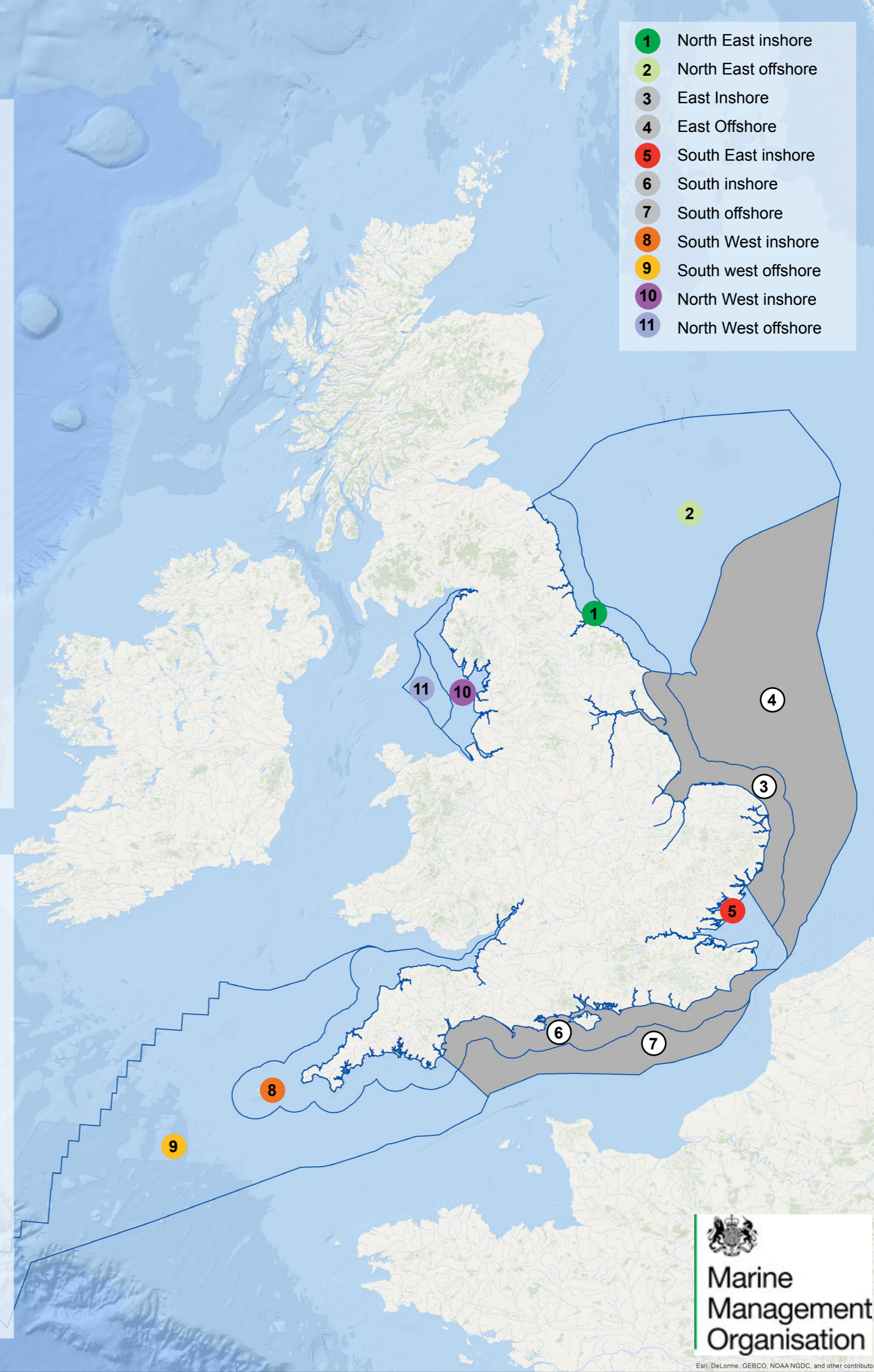
Baseline/issues: South East Plan Areas 5

- There is a problem with beach litter in the inshore area, although less so than in the South West (Water_273)
- Warming in the South East is one of the most pronounced areas in the UK (0.7°C per decade over the last three decades) (Water_259)
- The salinity of the upper ocean has been generally increasing since a fresh period in the 1970s. A minimum occurred in the mid-1990s, and present day conditions are relatively saline. The salinity of the southern North Sea (Region 2) is dominated by river run-off balanced with flow through the Dover Strait and there is no clear trend since the 1970s (Water_322)

Summary of the legislative / policy context

- [The Marine Strategy Framework Directive](#) includes a qualitative description of Good Environmental Status (GES) for marine litter: the properties and quantities of marine litter do not cause harm to the coastal and marine environment (Water_22). In December 2015 a program of measures for achieving GES were finalised for marine litter and these included a range of measures aimed at reducing marine litter and the introduction of surveillance indicators for marine litter on the seafloor and in the stomachs of fulmars (Water_241). The surveillance indicators will allow a target for 2018 to be developed (Water_243)
- It is expected that these measures will contribute towards an overall reduction in the number of visible items on coastlines and in the marine environment. However, it is recognised that there is little understanding of marine litter, its biodegradability and toxicity. It is recognised that further action may be needed should the monitoring programme show that the effect of the combined measures will not deliver GES in line with expectations (Water_244)
- In accordance with the provisions of the [OSPAR Convention](#) which is in support of the MSFD, contracting parties aim to facilitate and coordinate the work of other relevant contracting parties in achieving GES by 2020. The OSPAR Strategy aims to (by 2020) 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 (Water_24)
- In December 2015 OSPAR announced that industry representatives will meet with key policy makers, NGOs and experts to discuss potential measures to reduce microplastic emissions from sources as diverse as paints, abrasive cleaning agents, clothing and tyres. The conference will identify and prioritise measures to stem the flow of microplastics from land-based sources that end up in the marine environment and help develop common policies that can be implemented by the 15 governments which are signatories to the OSPAR Convention together with the EU (Water_28)
- Particularly important legislation includes; the International Convention for the Prevention of Pollution from Ships ([MARPOL](#)). One of the most important feature of the Annex is includes a complete ban imposed on the disposal into the sea of all forms of plastics (Water_5)
- [The Bathing Water Directive \(2006/7/EC\)](#) requires that bathing waters are inspected visually for pollution including litter and that measures are taken to remove any such items found (Water_23)
- The Marine Strategy Framework Directive includes a qualitative descriptions of Good Environmental Status for hydrological conditions: The nature and scale of any permanent changes to the prevailing hydrographical conditions (including but not limited to salinity, temperature, pH and hydrodynamics) resulting from anthropogenic activities (individual and cumulative), having taken into account climatic or long-term cyclical processes in the marine environment, should not lead to significant long term impacts on those biological components considered under Descriptors 1,4, and 6 (Water_169)

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Water - Marine Litter, Water Temperature and Salinity

Key cross cutting baseline / issues across all plan areas

- Marine litter is comprised mainly of synthetic material and is found in oceanic water, and as sediments on beaches (Water_252). Marine litter can accumulate in certain areas dependent upon currents and winds (Water_253), however there has only been limited surveying of this. Other problems include issues with ghost fishing gear (fishing gear which has been lost, dumped or abandoned (Water_240, Water_253))
- There is an oceanic garbage patch in the North Atlantic (Water_288). Higher densities of offshore litter have been found at specific locations (Water_253)
- Microplastics in seawater in Eastern Atlantic and the North Sea have been measured between 0.01 to 0.32 cm³/m³, however there are no reliable estimates. Even if all sources of plastic were to immediately stop, the number of microplastics would continue to increase due to fragmentation (Water_320)
- Marine litter on UK beaches is a particular problem because the geographical location of the UK worsens this problem (the English channel being one of the busiest shipping lanes in the world, proximity to the industrialised nations of Northern Europe and the Atlantic gulf stream) (Water_289). The Marine Conservation Society's Beachwatch programme reported that, based upon beaches included in the programme, 35% of litter on beaches came from beach users, 14% from fishing activities and up to 40% of litter items remain unassigned each year, either because they are too small or too weathered to identify a source, or because they could have come from a number of sources. Around 70% of beached marine litter is plastic (Water_234). Levels of marine litter are considered problematic in all areas where there are systematic surveys of beached litter density (Water_240) and is thought to have almost doubled between 1994 and 2007 (Water_233)
- The main risks to marine life include entanglement of, and ingestion by, marine species and transport of non-indigenous species. Impacts have been particularly recognised with regard to marine mammals, seabirds and turtles (Water_231). Additional risks are thought to exist from ingestion of microplastics which can cause physical and chemical toxicity effects (Water_291, Water_321)
- Warming is indicated in all regions during all seasons and in all areas. [The UK Climate Predictions 2009 \(Lowe et al., 2009\)](#) indicate that the seas in all of the regions will continue to increase in temperature. In the surface waters, the temperature is predicted to increase by between 1.5-3.5 degrees (relative to the 1961-90) by the 2080s.
- The salinity of the upper ocean (0-800 m) to the west and north of the UK (Region 8) has been generally increasing since a fresh period in the 1970s. A minimum occurred in the mid-1990s, and present day conditions are relatively saline. The pattern of change over the last ten years around the UK reflects the conditions of the North Atlantic. Trends in salinity elsewhere are more variable and predictions for the future are unclear (Water_322). There are likely to be effects on commercial fisheries if salinity changes in the future as this will affect the range and distribution of many marine species (Water_328)

The likely evolution of the environment over the plan duration

- Densities of beached litter recorded in the UK have increased since monitoring commenced in 1994. There have been reductions in the density of beach litter on the south coast of England, driven primarily by reductions in public litter. The highest densities of beached litter are found in the South West. The MSFD Programme of Measures for achieving Descriptor 10 (marine litter) includes a large number of measures that are being or will be implemented to reduce marine litter. It is expected that these measures will contribute towards an overall reduction in the number of visible items on coastlines and in the marine environment. However, it is recognised that there is little understanding of marine litter, the understanding of biodegradability and toxicity is minimal and it is recognised that further action may need to be taken should the monitoring programme show that the effect of the combined measures will not deliver GES in line with expectations. There is likely to be a mixed picture with regard to the likely future evolution of the issue. However, this is against a backdrop of a general increase (Water_233)
- Microplastics, as a specific type of marine litter, are unlikely to decrease in the marine habitat, despite any reductions in litter entering the marine environment, as macro plastics (e.g. plastic bottles) etc. already present in the environment will continue to fragment over time, eventually forming microplastics
- The UK Climate Predictions 2009 (Lowe et al., 2009) indicate that the seas in all of the regions will continue to increase in temperature. There is considerable uncertainty regarding future salinity. The projections currently available weakly suggest that the shelf seas and adjacent ocean may be slightly fresher (less saline) in the future than at present. On the shelf the oceanic influence will dominate the mean long-term salinity. There remains uncertainty in quantifying large-scale, long-term changes in salinity as there are considerable uncertainties on the effects of climate-driven changes in precipitation, evaporation, ocean circulation and ice-melt. For Descriptor 7 (hydrographical conditions, including salinity and temperature) of the MSFD, it is considered that the application of the WFD in the coastal area, plus the wider application of the Environmental Impact Assessment Directive through the marine licensing process, will be sufficient to achieve GES for this Descriptor across the UK's marine waters (Water_165)

Potential interactions with other topics

- The key inter-relationships are with communities and health (as litter can affect recreation and tourism) and marine biodiversity. The main risks to marine life include entanglement of and ingestion by, marine species and transport of non-indigenous species. Microplastics can become globally distributed and have been found on beaches, in surface waters, seabed sediments and in a wide variety of biota (invertebrates, fish, birds, mammals), from the Arctic to Antarctic. Effects have been indicated in marine organisms due to the plastics and also due to chemicals adsorbed to the plastic materials (Water_252). See also the Biodiversity report cards, especially that dealing with marine mega fauna.
- There are also potential links to seascape and landscape with litter obviously being unsightly whether on the sea or washed up on beaches. Increases in temperature and/or salinity could result in the following effects (both positive and negative), for a range of industries and habitats/species. An increase in temperature may allow more ships to use Arctic shipping routes with benefits to ports. There may be impacts on the abundance and distribution of species. There may be an increased prevalence of diseases and infections in aquaculture species and also nuisance species in aquaculture. Ocean acidification may impact fish and shellfish reproduction and growth (wild and aquaculture). Increased sea temperature rise may increase the numbers of people involved in recreational fishing and visitors to coastal areas and associated recreational use of the water. Acidification could affect the behaviour and bioavailability of contaminants in the marine environment (Water_301). Please see the climate report card for more details on temperature.

Potential transboundary issues

- Litter is a transboundary issue as it does not respect borders and tends to accumulate in certain areas as a result of wind and currents. The highest densities of beached litter are found in the South West of England, which has been attributed to the busyness of the English Channel and associated resulting levels of litter entering the marine environment, pressure from tourism and fishing as well as prevailing currents and wind patterns
- [Scotland's National Marine Plan](#) includes a policy whereby users of the marine environment must take measures to address marine litter where appropriate. One of the pilot areas for Scottish regional marine spatial plans, Shetland, has included a policy on the development of waste/litter minimization. Northern Ireland marine plans, subject to the consultative process, will require decision-makers to consider the potential risks of litter entering the marine area and demonstrate proportionate measures to reduce the risk. It is anticipated that future plans will play a stronger role in shaping activities and their impacts in the marine environment, including marine litter
- Changes to water temperature and salinity also have transboundary links, as clearly the effects of climate change are the result of worldwide activities

Key data gaps

- Seabed litter has been surveyed at only a few sites and data are sparse, which limits the possibilities for an assessment of changes in quantities of litter over time or between regions. The available data indicate that there is a generally low, but variable, abundance of litter on the seabed ranging from 0 to 17 items per hectare. Surveillance of seafloor litter has been included in the MSFD program of measures. This data should be used to drive targets in the future (Water_232)
- There are currently no agreed assessment tools to quantify the impacts on marine life at the population level from the presence of marine litter. Impacts have been particularly recognised on marine mammals, seabirds and turtles. Surveillance of litter in the stomach of fulmars has been included in the MSFD program of measures. This data should be used to drive targets in the future. (Water_231)
- Evidence regarding the potential for effects on organisms from microplastics is uncertain at present, including the potential for toxicity effects of chemicals associated with the plastics relative to chemical exposure from other sources, e.g. in sediments and the water phase (Water_320)
- Data on the trends in salinity indicate very variable patterns and predictions about what will occur in the future are unclear (Water_322)

Water - Water Pollution and Water Quality (Including Eutrophication)

Baseline/issues: North West Plan Areas 10 11

(Please note that the figures in brackets refer to the SA scoping database. This is available on the MMO website)

- Key: High/Good/Moderate Ecological Status (HES) (GES) (MES); Poor/Bad Ecological Status (PES) (BES); Good/Poor Chemical Status (GCS) (PCS); groundwater Good/Poor Chemical Status (gGCS) (gPCS); Heavily Modified Water Body (HMWB)
- There are three River Basin Management Plans (RBMPs) in this area: the North West, Dee; and Solway Tweed RBMPs (Water_197). The North West draft 2016 RBMP: coastal and estuarine waters between Whitehaven and Carlisle are of MES. Between Whitehaven and Fleetwood waters are of GES and the majority southwards of Fleetwood are MES, other than the Ribble estuary (PES) and Morecambe (BES). The areas between Whitehaven and Carlisle, Wyre, Mersey are of PCS. All other water coastal and estuarine water bodies are of GCS. The majority of groundwater in coastal areas is of gGCS. The Solway Tweed 2015 RBMP: the coastal area around Southernness and Solway AONB is classified as MES. There are at least eight Shellfish Waters that are failing to achieve the designated assessment criteria (Water_198)
- There is an active nuclear power station at Heysham and a spent fuel reprocessing site at Sellafield. Discharges from Sellafield have been shown to be reducing. A new nuclear facility is planned at Heysham (Water_228)
- The number of beaches classified as bathing waters is the lowest of the entire UK (approximately 26) but the area has the highest number of beaches classified as poor including Allonby, Cleveleys and Silloth. There are no blue flag beaches (Water_195)
- There are two agglomerations of <150000 people at Shotwich and Glanydon (in Wales but likely to be having an effect), that may be causing pollution of the coastal areas (Water_196)
- An estimated 30% of the sea pollution is due to Combined Sewer Overflows (CSOs) (Water_315)

Baseline/issues: South West Plan Areas 8 9

- There are two RBMPs in this area: the South West and Severn RBMPs (Water_186). The Severn draft 2016 RBMP: the Severn estuary is a HMWB of MES. Much of the western area of the Severn Estuary is of PCS, however the Inner Severn estuary is achieving GCS. Small estuaries, such as the Severn River and Avon are achieving GCS (Water_182). The South West draft 2016 RBMP: most coastal areas are GES and areas on the north Coast of Cornwall are of HES. Most estuaries are of MES or lower. Estuaries that are MES are the Fal, Helford, Fowey, Erne, Kingsbridge, Camel and Taw. All estuaries and coastal waters are achieving GCS, other than an estuary and adjoining coastal waters in the Falmouth area that is of PCS. The groundwaters are of gPCS in most areas. In the South West RBMP of the 33 classified Shellfish Waters, only 2 are achieving the objectives. 1.3% deterioration of surface water bodies (includes freshwater and water bodies outside of the South West Plan area) occurred between 2009 and 2015 (Water_187).
- There are approximately 126 bathing beaches and approximately 91% are achieving either good or excellent status. Four are classified as poor. There are 10 blue flag beaches and a high level of surfing/water sports activity throughout the year. Water quality is vital for tourism / human health (Water_181)
- There are five problem areas for eutrophication in the South West (Truro, Tresillian and Fal estuaries, Taw estuary and Lower Fal Estuary) (Water_208)
- There are just over 1,700 CSOs and from 2000 to 2010 South West Water has invested £75 million to reduce the volume and improve the quality of discharges in the most sensitive areas including bathing and shellfish waters (Water_312)
- Large scale farming in the area between Trevoise head to Stepper Point can have large scale impacts for example soil run off into the sea in heavy rainfall (Water_39). Devonport is the only defence site in England able to discharge radioactivity into the waters (Water_183).

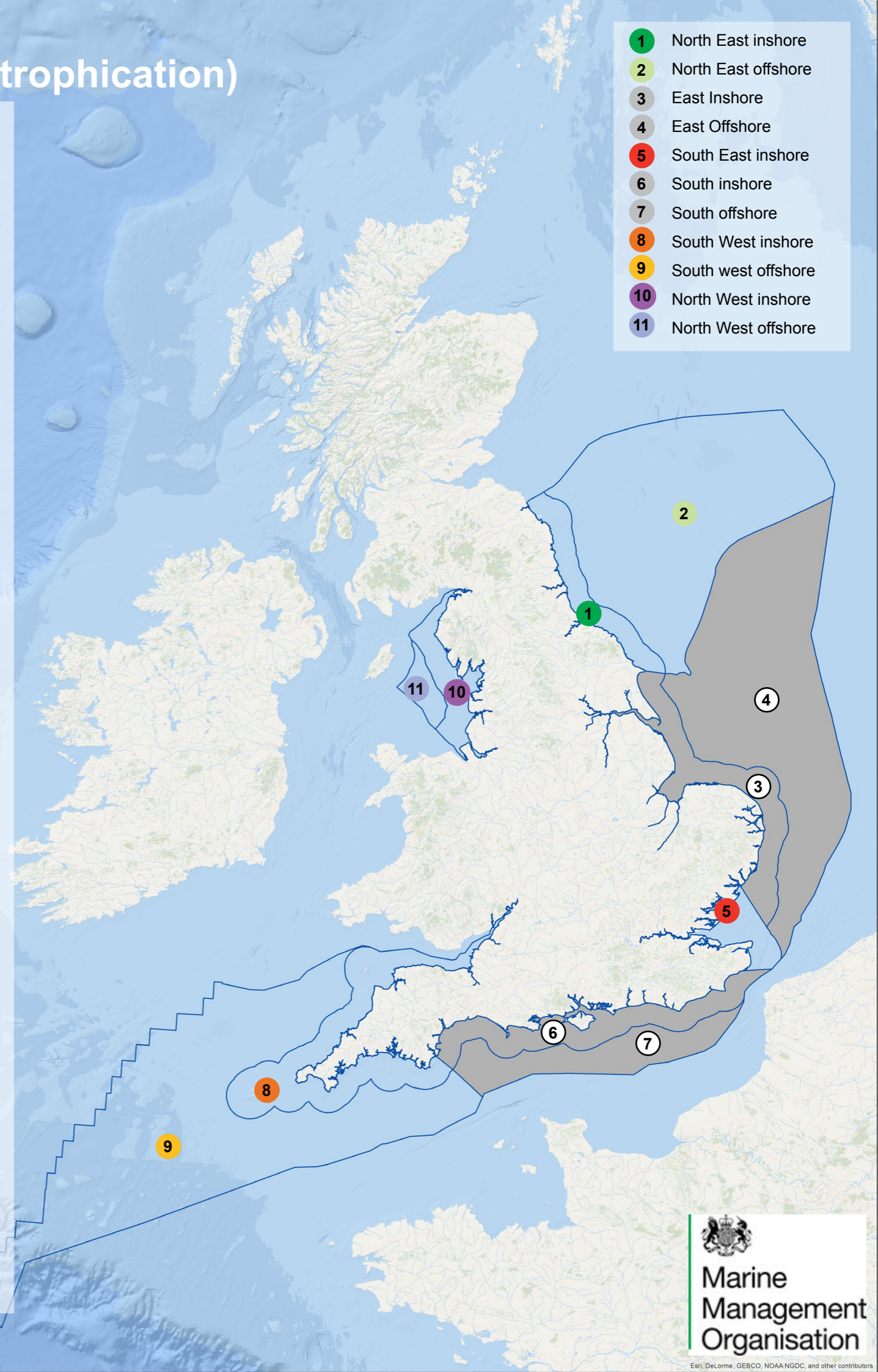
Baseline/issues: North East Plan Areas 1 2

- There are two RBMPs in this area: the Northumbria and the Humber RBMPs (Water_205). Northumbria draft 2016 RBMP: much of the coastal and estuarine waters are of GES, however, the small estuaries and coastal area between Hartlepool and Staithes are of MES. All estuarine and coastal waters, apart from between Seahouses and Dunbar are of GCS. Much of the coastal groundwaters are of gPCS. There is one designated shellfish area (Lindisfarne National Nature Reserve area) and this is failing to achieve the assessment standards (Water_206). The Humber draft 2016 RBMP: the coastal and estuarine waters are HMWB of MES. The coastal areas, other than the Esk, are all of GCS. Much of the groundwater in coastal and estuarine areas is of gPCS (Water_207).
- There are approximately 48 beaches classified as bathing beaches and 90% are classified as good or better. There are seven blue flag beaches. Water quality is vital for tourism / human health. Spittal and Staithes were rated as Poor in 2015. (Water_204)
- There are two areas related to eutrophication (Seal Sands in the Tees Estuary and Lindisfarne National Nature Reserve) (Water_208)
- Data from the oil and gas industry 2000 to 2014: a decrease in discharges (concentration less than 50% OSPAR recommended limit). No accidental releases > 200 tonnes of chemicals (2014) (Water_225) (Water_226)
- 31 out of the 34 bathing beaches are affected by CSOs (Water_316)

Baseline/issues: South East Plan Areas 5

- There are three RBMPs in this area: the South East RBMP, the Thames and the Anglian RBMP (Water_191). The Thames draft 2016 RBMP: this includes the Thames which is a HMWB of MES and many smaller estuaries which are mainly of GES, other than two smaller estuaries (including the Swale) of MES. All of the coastal and estuarine waters are of GCS. Groundwaters in the coastal areas include a large area of gPCS. There are two classified shellfish waters, one is achieving the Shellfish Waters Objectives and one is failing (Water_192). The South East draft 2016 RBMP: all coastal and estuarine waters are HMWB of MES, other than a small estuary (assumed to be the Stour) of PES. All of the estuarine and coastal areas are of GCS. Much of the groundwater in coastal areas is of gPCS. The designated Shellfish Waters are failing to achieve the assessment standards for shellfish waters (Water_193). The Anglian draft 2016 RBMP: all coastal and estuarine waters are HMWB of MES and GCS. Large areas of groundwater in the coastal area are of gPCS. There are a large number of designated shellfish waters in the area of which the majority are failing to comply with the Shellfish waters assessment (Water_194)
- Although a small plan area, there are approximately 42 bathing beaches. Nearly 90% of these are achieving good or above status. 22 beaches are Blue Flag. Beaches identified as having 'Poor' water quality were Clacton (Groyne 41), and Walpole Bay, Margate (Water_188)
- There is an agglomeration with a generated load of 150000-1000000 at Southend on Sea with is not compliant with EU legislation. There are three agglomerations of <150000 at Holland on Sea, Jawick and Canvey Island that are not compliant and may be causing pollution of the coastal areas (Water_190)
- The Thames Tideway Tunnel is a 15 mile-long sewer which will run beneath the River Thames and transfer the sewage to Beckton works where it will be treated. The project will be completed by 2023 and will modernise London's water and sewer networks (Water_261)
- There has been a significant reduction in the number of Category 3 (minor) pollution incidents but there are more Category 2 (significant) incidents than ideal (Water_309)

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Water - Water Pollution and Water Quality (Including Eutrophication)

Summary of the legislative / policy context

- [The Water Framework Directive](#) is designed to improve and integrate the way water bodies are managed in Europe. The Directive takes a holistic approach to water management, preventing deterioration of aquatic ecosystems and restoring surface waters (which includes rivers, lakes, estuarine and other transitional waters, and extends to 1nm beyond the baseline from which territorial waters are drawn) and groundwater to "good status" in terms of ecological and chemical objectives for surface waters and quantitative and chemical objectives for groundwater by 2015. Many waterbodies also have objectives set up to 2027 in the second cycle plans. Two daughter directives accompany the WFD; the [Groundwater Directive \(2006/118/EC\)](#) and the [Priority Substances Directive \(2008/105/EC\)](#). This legislation underpins the requirements of the WFD with regard to groundwater and surface water pollution. The latter will not only contribute to the decline in the emission of priority substances, but also the cessation of their discharge by 2020. Please note that where different water quality objectives apply to a water body (for example, where this overlaps with a Natura 2000 site), the most stringent standard will apply (Water_37)
- The Marine and Coastal Act (2009) provides the legal mechanism to deliver European and International marine conservation commitments such as the [OSPAR Convention](#) and the [Marine Strategy Framework Directive](#). The MSFD aims to achieve Good Environmental Status (GES) by 2020 and includes specific qualitative descriptors of GES including those related to human-induced eutrophication (and its effects), concentrations of contaminants, and contaminants in fish and other seafood for human consumption. In accordance with the provisions of the OSPAR Convention, which is in support of the MSFD, contracting parties shall take all possible steps to prevent and eliminate pollution and protect the maritime area so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore affected marine areas (Water_1). The convention includes a range of strategies for dealing with problems in the UK such as hazardous substances, agricultural inputs, radioactive substances and eutrophication (Water_10, Water_11, Water_12).
- Other important pieces of legislation include:
 - [The Bathing Water Directive \(2006/7/EC\)](#) (Water_23)
 - [The Urban Wastewater Treatment Directive \(91/271/EC\)](#) (Water_15)
 - [The Nitrates Directive](#) (Water_16),
 - [The Priority Substances Directive \(2008/105/EC\)](#) (Water_17)
 - [The Environmental Quality Standards \(2008/105/EC\)](#) (Water_170)
 - [International Convention for the Prevention of Pollution from Ships \(MARPOL Convention\)](#) (Water_4)

Key cross cutting baseline / issues across all plan areas

- Developments and other activities can have adverse effects on transitional waters, coastal waters and marine waters. This includes increased demand for water, discharges to water, adverse ecological effects resulting from physical modifications to the water environment and increased risk of spills and leaks and transmission of invasive non-native species. Movement of water offshore between catchments means that action in one catchment can have a profound impact on water quality in waters at some distance away along the coast. These interactions are important in managing catchment activities (Water_286)
- Most of the areas in UK seas where there are problems from contamination with hazardous substances are local in nature and are particularly in industrialised estuaries and coasts and generally associated with historic discharges and emissions (Water_176)
- Aquaculture is being promoted strongly in the [Blue Growth Strategy](#), the [Atlantic Strategy](#) and the reformed [Common Fisheries Policy](#) and some UK administrations have also adopted specific aquaculture policies and strategies to encourage or support industry growth and development. Aquaculture has the potential to lead to eutrophication and release chemicals into the water (Water_274)
- Environmental concentrations of monitored hazardous substances in the sea have generally fallen, for example concentrations of TriButyl Tin (TBT) (Water_276) and radioactivity (Water_163) have shown large improvements, however for other contaminants they are still above levels where there is a risk of pollution in many coastal areas (Water_177). Particularly of concern are the Persistent Organic Pollutants (POPs) in water and sediments (Water_237) which may become mobilised, e.g. due to dredging and disposal of dredged material (Water_172, Water_173) and have been demonstrated to bio accumulate in marine organisms (Water_263, Water_171)
- At present the UK does not propose implementing measures to reduce persistent legacy contamination in sediments on the grounds that the actions would be disproportionately costly (Water_237)
- Persistent oestrogenic compounds in waters in estuaries have also been indicated as an increasing problem (Water_251)
- There are relatively few eutrophication problem areas in UK waters at present (Water_178). Pressure on eutrophication status is biggest in the East, South and North West of England where nutrients of human origin have enriched coastal waters. Microbial contamination of coastal waters from sewage treatment plants has fallen significantly but some areas still experience problems and climate change and the potential increased storminess may exacerbate this problem (Water_287, Water_300, Water_302)

The likely evolution of the environment over the plan duration

- Hazardous substances in the sea have shown a general decreasing trend, and it is likely these trends will continue overtime, with the continued implementation of ever more stringent regulatory controls. Exceptions are likely to be chemicals of a particularly persistent nature, such as Persistent Organic Pollutants (POPs). Sediment contamination is also likely to remain a problem into the future and may present a risk to the water habitat where it becomes remobilised, for example in the North Sea as a result of oil and gas decommissioning operations or in dredging or extraction operations
- Wetter winter weather is expected to result in a greater number of overflows from CSOs with potential for water quality issues, in particular eutrophication and microbiological
- Pollution events resulting from industry and construction are likely to become less significant as the [Environmental Damage Regulations \(Prevention and Remediation\) 2009](#) will provide tougher penalties and fines for those causing environmental damage
- Particular problems are the chemical quality of groundwater, and failure to reach the shellfish waters standards. Remediation of these is likely to be over the long term
- Climate change resulting in more frequent extreme storms and waves may exacerbate problems caused by pollutants and contaminants in the marine environment

Potential interactions with other topics

- The key-inter-relationships are with marine biodiversity, communities, health and wellbeing, and geology, geomorphology and coastal processes. Also see the report cards for these topics
- The main potential risks to marine life are from acute pollution events, e.g. oil spills from ships or industrial discharges. Events of this nature can result in the immediate death of organisms. Acute toxicity from low level environmental contamination is also a concern, which can have chronic effects of marine biodiversity, e.g. the recent publication in Science journal indicating the high bioaccumulation rates of POPs in killer whales and bottlenose dolphins, which is thought to have caused impacts on reproduction. Acidification could affect the behaviour and bioavailability of contaminants in the marine environment (Water_263)
- The potential risks to communities, health and wellbeing are mainly around the potential health effects of using waters for recreational purposes at times when they have dangerous concentrations of microbial contaminants. Monitoring is only carried out during the summer when recreational usage is at its highest, however some beaches continue to have large numbers of water users all year round (Water_14)
- The risks associated with geology, geomorphology and coastal processes are due to the linkage between the water environment and the sediment. Most contaminants enter the water environment, however, many will enter the sediment environment, where they can often remain for long durations. Remobilisation of these sediments back into the water phase can occur (Water_66)



Water - Water Pollution and Water Quality (Including Eutrophication)

Potential transboundary issues

- Decommissioning of oil and gas infrastructure is forecast to increase dramatically, particularly post 2020. Much of this will take place in the North Sea but also includes the Irish Sea and may have impacts on the North East and North West plan areas. Decommissioning activities are subject to regulatory processes and are controlled by DECC. This may include the production of an environmental statement. 'Making safe' activities must be carried out in line with environmental and safety considerations in preparation for removing a facility or decommissioning a pipeline. 'Making safe' of facilities includes cleaning, freeing equipment of hydrocarbons, disconnection and physical isolation, and waste management (Water_281)
- The [Scottish National Plan](#) details the belief that carbon capture and storage (CCS) technology is a critical component in the decarbonisation of Scotland's energy supplies. It states that 'the North Sea is the largest CO2 storage resource in Europe and this, coupled with our existing oil and gas capabilities, ready supply chain and existing infrastructure means that Scotland is in a strong position to be at the centre of CCS development in Europe'. The potential for environmental impacts is dependent upon the extent to which it is possible to use existing pipelines, installations and wells. Potential impacts include siltation, reduction in water quality, acidification/salinity changes, pollution from contaminants used (Water_306)
- Development of wave and tidal energy is particularly prominent in Wales at present and there are multiple existing and proposed new nuclear power stations in the Wales region, which could have transboundary effects on water quality in the South West and North West Marine Plan areas. Turbidity issues may arise where there are changes to sediment transfer patterns (as potentially in plans for Cardiff tidal energy scheme).
- The North West and South West plan areas both encompass River Basin Management Plans that are under Welsh jurisdiction.

Key data gaps

- Although there are key data on reasons for not achieving good status (RNAGs) under the Water Framework Directive, the source of failures in bathing water quality are not always known, e.g. Allonby Bay North and these need to be understood resolved before changes can be implemented to improve water quality (Water_195)
- Due to the timescales of the project the 2016 Draft River Basin Management Plans (RBMPs) have been reviewed as the final RBMPs were published very shortly before the publication of the SA scoping report. It may be useful to review the final RBMPs before the SA assessment stage begins
- While no measures are currently proposed to address legacy contaminated sediments, Defra is under taking an in-situ contaminated sediments audit. This is likely to show serious issues associated with legacy contaminated sediments in the NE inshore plan area, and to a lesser extent in the South East plan and North West inshore plan (Water_329)