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**Natural England and JNCC guidance on key sensitivities of habitats and
Marine Protected Areas in English waters to aggregate resource extraction**

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Summary

This document provides high level advice for environmental considerations that are essential for aggregate operations in English inshore and offshore waters, compiled by Natural England (NE) and the Joint Nature Conservation Committee (JNCC), the government's advisers on the marine environment within English territorial waters and UK-wide offshore waters, respectively.

The advice highlights the pressures associated with the aggregate industry, as well as the impacts that dredging can have on the marine environment. It further discusses the habitats and species that are the most sensitive to the impacts. While there is an emphasis on benthic habitats, other receptors are also addressed including birds, marine mammals, sandeel, herring, and benthic species.

A comprehensive overview of each dredging region is given, supplemented with maps highlighting marine protected areas that are sensitive to dredging activity and its associated impacts and pressures.

The advice given within this document is non-binding and provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England and JNCC. The final advice on any proposals by Natural England and JNCC is reserved until a relevant consent application is made and will be made on the information available, including any modifications to the proposal.

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1 Introduction

In support of the 2021 marine aggregate licensing round, The Crown Estate (TCE) engaged Natural England (NE) and the Joint Nature Conservation Committee (JNCC) to provide operators with information on the key sensitivities of habitats and species, and Marine Protected Areas (MPAs), in the English inshore and offshore areas. The aim is to highlight higher risk areas and ensure that operators are aware of environmental sensitivities and risks at the outset when selecting their sites.

Starting with overarching advice that applies throughout English waters (Section 2), the guidance then looks at the pressures from aggregate extraction with the potential to impact mobile features (birds, marine mammals, sandeels and herring) within MPAs (Section 3).

Section 4 reviews the key pressures associated with aggregate extraction on marine habitats and species. Section 5 goes into more detail, looking at the habitats and species considered to be highly sensitive to these pressures. Finally, Section 6 gives region-specific guidance, highlighting MPAs in each of the aggregate areas around England at risk of a significant impact from aggregate extraction activities.

2 Overarching advice

When selecting a new licence area, the following approach should be used to try and minimise the impacts as much as possible, following the 'avoid, reduce, mitigate' hierarchy, as shown in Figure 1.

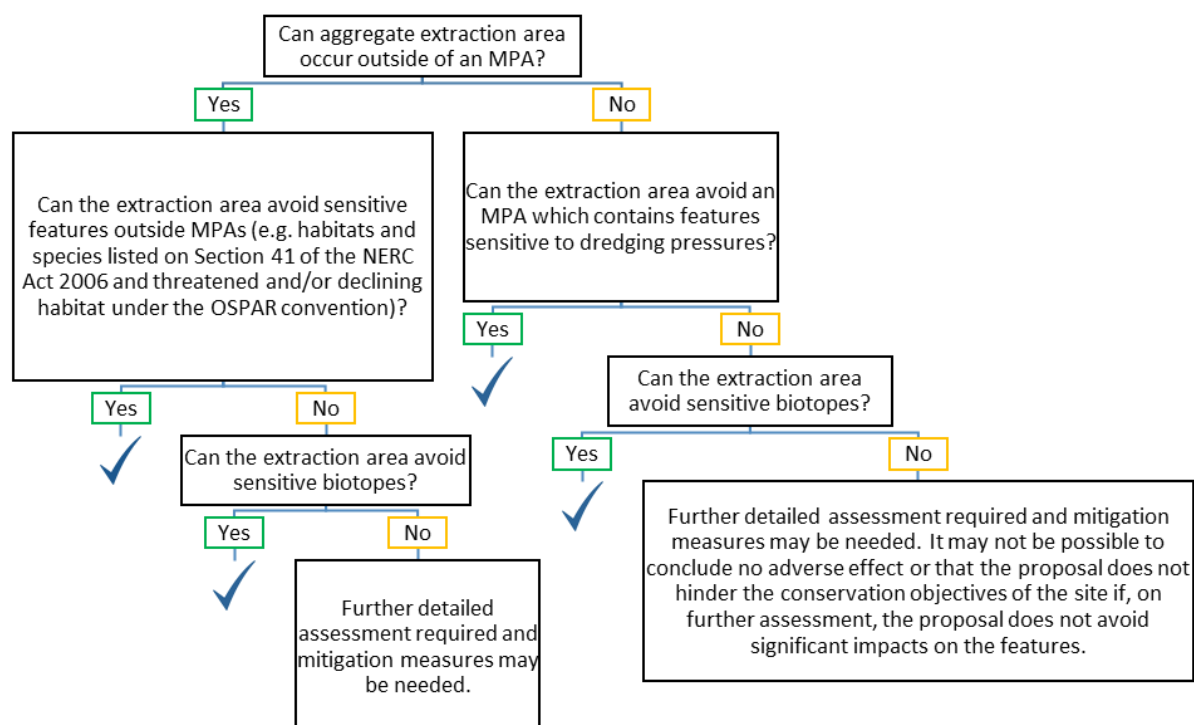


Figure 1: Avoid, reduce, mitigate hierarchy (after GOV.UK 2019).

2.1 Avoid

2.1.1 Avoid MPAs

Natural England and JNCC recommend that MPAs should be avoided in their entirety for aggregate extraction, as this avoids the direct impacts on the conservation features within the MPAs. This also carries the least environmental consenting risk.

2.1.2 Avoid sensitive features within MPAs

If it is not possible to avoid MPAs, designated features found within MPAs should be avoided as much as practically possible. For additional information, please see Section 5: 'Features sensitive to aggregate operations'.

2.1.3 Avoid areas where there are existing cumulative impacts on sensitive features of MPAs and/or MPAs that are in unfavourable condition

In areas where other marine activities are frequent, the ability of sites to withstand pressures may already be reduced. This often results when a site or a feature within a site is considered to be in unfavourable condition or has a restore or recover conservation objective to ensure that they return to favourable condition. If features or sites are already in an unfavourable condition, additional impacts will likely be detrimental on the conservation objectives of those sites. Although different activities will vary in impact, any additional pressures may increase the sensitivity of conservation features and sites.

2.1.4 Avoid sensitive features outside of MPAs

Sensitive features of conservation interest outside of MPAs should be avoided wherever practically possible. Additional resources on sensitive features (Table 1), as well as additional resources on MPAs can be found below (Table 2).

Table 1: Features of conservation interest.

Features of conservation interest
Habitats Directive Annex I habitats (list of Annex I habitats known to occur within the UK)
Species and habitats listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (UK Biodiversity Action Plan (BAP) Priority Habitats)
Threatened and/or declining habitats and species under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)
Broadscale habitats and Features of Conservation Interest (FOCI)
Priority Marine Features (PMFs) in Scottish waters

Table 2: Additional online resources on MPAs.

Resources
JNCC's MPA Marine Mapper
Natural England's Magic Map
Inshore MPA Information
Offshore MPA Information
UKSeaMap
EUSeaMap
Natural England Conservation Advice Packages Guidance
JNCC Conservation Advice Packages Guidance

2.2 Reduce/Mitigate

If impacts on MPAs are unavoidable, the next step would be to try and reduce the impacts as much as possible within the MPAs, and to mitigate for any remaining impacts. These efforts may include (but are not limited to):

- reducing the impact area within the site;
- careful siting of extraction areas, to minimise interaction with sensitive features;
- careful consideration of dredging techniques (screening, overspill) to reduce sediment plumes;
- avoiding dredging operations at sensitive times of the year.

3 Note on pressures with the potential to impact mobile features in MPAs

3.1 Marine birds

Marine birds are mobile by nature and may be able to avoid impacts due to aggregate extraction activities. However, some species may have limited ability to alter their use of the marine environment during certain times of the year when constraints are high. For example, during the chick-rearing period when they are constrained by the need to return frequently to the colony to feed and care for chicks, or during post-breeding moult periods when they are flightless. Other constraints include limited alternative suitable foraging locations and competition for resources, which could both alter individual fitness.

Within and around an aggregate extraction site, marine birds may be impacted by several pressures associated with the operations and activities, in particular these include:

- visual disturbance - resulting in avoidance of the area;
- above water noise - resulting in disturbance and avoidance of the area;
- changes in suspended solids (water clarity) - limiting the ability to successfully forage.

There are a variety of foraging strategies amongst marine birds, with some species being partially or primarily water-column feeders, whilst others feed primarily on surface or benthic prey. The availability of benthic and water-column prey for marine birds can be affected by various aggregate extraction-related activities and pressures, such as smothering and siltation rate changes, physical change, suspended solids, abrasion and/or disturbance of the seabed, and removal of non-target species. Sediment plumes generated during dredging activities can reduce successful foraging directly by decreasing the ability to forage visually. Sedimentation can indirectly affect marine birds by smothering the eggs and larvae of prey species. Sediment plumes can travel several kilometres from the source, therefore a larger area than the dredge site can be affected. These can occur during both aggregate screening and extraction.

Marine birds can also be sensitive to disturbance from vessel traffic. Particularly sensitive species such as divers, grebes, sea ducks and auks, and most waders are prone to flushing from vessel traffic by distances exceeding 2km (Burt *et al.* 2017).

Species groups can be impacted differently by various pressures, based on their sensitivity (tolerance or intolerance to changes in environmental conditions) and exposure to a pressure (Table 3). Divers, grebes, and sea ducks are likely to be the most vulnerable to the effects of aggregate extraction. There are several Special Protection Areas (SPAs) around the coast designated for divers where aggregate extraction has occurred in the past.

Particular attention should be given to these sensitive species, and activities within designated sites should be avoided where possible. Similarly, considerations should be afforded to tern species, which are designated at SPAs around the country where aggregate extraction occurs and may be sensitive to suspended sediment.

Table 3: Marine Birds.

Functional Group	Information
Divers, grebes, and mergansers	<p>This group includes great northern diver, black-throated diver, red-throated diver, Slavonian grebe, and red-breasted merganser. These species tend to aggregate in coastal waters, and in bays, estuaries and firths. They can aggregate in large numbers in specific areas over the winter, whilst during the breeding season they tend to forage within restricted ranges from their breeding areas. Some of these species have a flightless period following breeding (moulting), during which they may be particularly sensitive to some pressures. They are largely thought to be water column feeders, although there is some evidence that some species may also be benthic feeders (Duckworth <i>et al.</i> 2020).</p> <p>This group of species is highly sensitive to noise and visual disturbance, such as from vessel traffic (Fliessbach <i>et al.</i> 2019). Since some of these species may not resetttle quickly after being flushed, the vessel transit route plus a buffer of several kilometres may be effectively lost as habitat to some diver and grebe species, with evidence for this being particularly strong for red-throated diver (Mendel <i>et al.</i> 2019). Aggregate extraction and vessel transits through SPAs for these species should be avoided when the species is present within the SPA. These species are thought to have some sensitivity to underwater noise and may be impacted by changes in suspended solids when foraging in the water column.</p>
Seaducks, geese and swans	<p>This group includes common eider, goldeneye, scaup, long-tailed duck, common scoter, velvet scoter, whooper swan, Bewick's swan, greylag goose, barnacle goose, pink-footed goose, dark-bellied brent goose, light-bellied brent goose, shelduck, pintail, pochard, shoveler, wigeon, teal, mallard and gadwall. This category includes species which breed in the UK, migrate through UK waters, and/or winter in the UK. They can use a variety of waters both inshore and offshore. They are benthic, surface or grazing feeders. While some diving sea duck species like eiders and scoters specialise in foraging on shellfish and crustaceans, others such as long-tailed duck, goldeneye and scaup are generalist feeders and their diet can include aquatic plants, polychaetes, amphipods, aquatic insects and some small fish. Other duck, swan and goose species within this group are surface feeders, utilising prey on the surface of intertidal habitats such as the small gastropod mollusc <i>Hydrobia</i>, as well as grazing on saltmarsh and coastal grazing marsh.</p> <p>Most species within this group are sensitive to visual and noise disturbance from vessel traffic (Fliessbach <i>et al.</i> 2019). In two studies looking at the disturbance effects caused by vessels, common scoters were not observed resettling after being flushed (Schwemmer <i>et al.</i> 2011; Fliessbach <i>et al.</i> 2019). However, for</p>

Functional Group	Information
	<p>most species in this group, it is not known if or how quickly they recover and move back to areas once a vessel has passed through. It is unknown whether species within this group are sensitive to underwater noise. For species which are benthic feeders, activities that are likely to disturb seabed habitats and species may affect the availability of suitable prey.</p>
Auks	<p>There are four auk species commonly found in waters around the UK: Atlantic puffin, black guillemot, common guillemot and razorbill. They aggregate around the UK in inshore and offshore waters throughout the year. During the breeding season, they tend to form large colonies, and impacts occurring in favoured foraging areas within range of these colonies can have implications for their ability to successfully raise chicks. Adults have a flightless moult period immediately after chicks fledge, which can last several months. When chicks fledge, they too are flightless for several weeks. During these periods adults and chicks may be particularly sensitive to some pressures, including noise and visual disturbance. Auks are water-column feeders, feeding largely on pelagic and demersal fish.</p> <p>Auks are sensitive to noise and visual disturbance. Aggregate extraction and vessel transits through important foraging areas or aggregations of these species should be avoided. While there is evidence for underwater anthropogenic noise affecting the foraging behaviour of related species (African penguins; Pichegru <i>et al.</i> 2017), it remains unclear how sensitive auks are to this pressure. As these are species that feed in the water column, they may be affected by changes in water turbidity due to increases in suspended sediments during aggregate extraction, which would affect their ability to successfully forage for their prey. In addition, disturbance and loss of seabed habitats can affect availability of suitable prey (e.g., sandeel).</p>
Terns, gulls, kittiwakes and gannets	<p>This group includes common tern, Sandwich tern, Arctic tern, little tern, roseate tern, great black-backed gull, lesser black-backed gull, herring gull, common gull, black-headed gull, Mediterranean gull, little gull, black-legged kittiwakes, petrel species and northern gannet. These species aggregate around the UK in inshore and offshore waters, with terns being present during the spring and autumn migrations and the breeding season, while others can be present in UK waters throughout the year. During the breeding season, they tend to breed in colonies, and impacts occurring in favoured foraging areas within range of these colonies can have implications for their ability to successfully raise chicks. Except for gannets, all species in this group are surface feeders, with some species also feeding in exposed tidal areas. They feed on a wide variety of marine prey including fish, squid, crustaceans, jellyfish and offal.</p> <p>These species are low to moderately sensitive to noise and visual disturbance, and some species within this group may be attracted to some vessels, potentially in hope of fishery discards/offal. It is unknown whether species within this group are sensitive to underwater noise. As most species in this group are</p>

Functional Group	Information
	surface feeders, they may be affected by changes in suspended solids that would affect their ability to successfully forage for their prey (van Kruchten & van der Hammen 2011; Cook & Burton 2010).
Waders and harriers	<p>This group includes wader species which breed, migrate and winter along the UK coast. Wader species have various foraging strategies, but all are surface or near-surface feeders, making use of open coast, mud and sandflats, saltmarshes, saline lagoons, rocky coasts (e.g., purple sandpiper, oystercatcher) and nearby grazing marsh and arable land to both feed and roost. Some, such as oystercatcher, are more (but not exclusively) reliant on localised food resources such as cockle and mussel beds whilst others are more generalist. Some species are largely restricted to certain breeding habitats (e.g., avocet: saline lagoons, salt pans and scrapes; ringed plover: sand and shingle, saltmarsh edges) whilst other species utilise a broader range of coastal and adjacent habitats.</p> <p>This group also includes marsh and hen harrier. Both species can use intertidal habitats extensively in winter for foraging and roosting. Marsh harrier will also utilise coastal habitats in the breeding season and may also breed in saline reedbeds.</p> <p>This group is sensitive to visual and noise disturbance from vessel traffic. Waders and other species using intertidal habitats are at risk from disturbance caused by people and machinery related to aggregate extraction across and adjacent to those habitats. In general, there is less risk of disturbance of those habitats from shipping associated with aggregate extraction in the offshore environment, except where vessels capable of navigating shallow waters are employed.</p> <p>Activities that are likely to disturb their intertidal habitats and prey species may affect the availability of suitable prey for these species.</p>

3.2 Marine Mammals

UK waters are home to several marine mammal species, all of which are protected under national and international legislation. All species of cetacean are classified as European Protected Species (EPS) and are protected throughout their natural range. In addition, 23 Special Areas of Conservation (SAC) have been designated for marine mammals in UK waters (for harbour porpoise, bottlenose dolphin, harbour seal and grey seal).

Activities associated with aggregate extraction are generally not considered a major concern for marine mammals. Underwater noise during aggregate industry operations is not considered enough to cause a temporary or permanent threshold shift. Additional vessels will be present in the area which could result in additional underwater noise and provide a potential collision risk to marine mammals. Given the small number of vessels likely to be involved, it is unlikely that noise associated with these vessels will be detectable above ambient noise levels already dominated by vessel noise. It is considered unlikely that a passing vessel would cause more than trivial disturbance to marine mammals (JNCC *et al.* 2010).

Marine mammal injury or death following collision with vessels is well documented. However, the speeds at which vessels undertaking dredging activities usually travel, combined with following best practice when transiting to and from a site (e.g., defined routes, no erratic movement) will normally reduce this risk to negligible levels.

Seabed disturbance is generally not considered a concern for marine mammals, including that resulting in increased suspended sediment, as they are not reliant on visual cues when feeding, communicating, etc. Seabed disturbance and extraction may, however, impact potential prey species, i.e., sandeel, and if this is predicted to be significant, this secondary impact to marine mammals will need to be considered.

Should unexploded ordnance (UXO) be found and need clearing, an assessment of potential impacts from detonating UXOs is mandatory in marine licence applications and key when determining mitigation requirements. Potential ranges at which injury and disturbance will begin to occur must be estimated, usually by modelling the propagation of sound and shock waves and relating these to published injury thresholds¹. A marine mammal mitigation plan will also need to be agreed/approved through discussion with the regulator and appropriate statutory nature conservation bodies (SNCBs) before removal operations can commence. If predicted injury ranges cannot be mitigated, an application for an EPS licence for injury will be required.

Some groups can be impacted differently by various pressures, based on their sensitivity (tolerance or intolerance to changes in environmental conditions) and exposure to a pressure. For example:

- Grey and harbour seals: marine mammals are mobile by nature and are usually able to avoid various offshore activities. Seal species, however, are central place foragers and rely on marine habitats adjacent to their haul-out sites. Seal foraging ranges should subsequently be considered when assessing potential impacts from extraction activities. In addition, work taking place near a protected site will need to assess disturbance, especially during sensitive times (e.g., pupping) in terms of disturbance from, or barriers/access to their haul out sites.
- Harbour porpoise: [noise management procedures \(JNCC 2020a\)](#) have been implemented for the harbour porpoise SACs in the North and Irish Seas². Given that noise disturbance is considered unlikely from aggregate extraction, these procedures do not need to be considered.

However, these sites also include a conservation objective protecting the supporting habitats and prey of harbour porpoise. Supporting habitats, in this context, means the characteristics of the seabed and water column, and encompasses the movements and physical properties of the habitat. The maintenance of supporting habitats contributes to ensuring that prey is maintained within the site and is available to harbour porpoises using the site. There are several operations which could potentially affect the achievement of this conservation objective, for example trenching, dredging, deposits, pre-sweeping and disposal activities. However, further work is needed to assess historic, existing and planned levels of plans/projects in the sites and to better understand their impacts on the habitats and prey

¹ Injury criteria required by the SNCBs were updated in 2016 (NMFS 2018) and most recently in 2019 (Southall *et al.* 2019). They reflect the most comprehensive and up-to-date scientific knowledge relating to the risk of auditory injury to marine mammals. These updated thresholds / functional hearing groups must be used for any marine mammal noise assessment.

² NatureScot (formerly Scottish Natural Heritage (SNH)) are developing separate guidance for the SAC in Scottish waters.

within the sites. Whilst some plans/projects are unlikely to have a significant effect alone, an effect might become significant when considered in combination with other plans/projects and against the background of existing activities/pressures on a site. Potential mitigation could include restricting or avoiding operations during key species spawning seasons (e.g., herring) to limit disturbance to adult fish, eggs and hatching larvae from increased turbidity and sediment deposition.

3.3 Sandeel and Herring spawning

There are possible direct effect-receptor pathways between marine aggregate extraction and herring and sandeel, as both have life stages with strong dependence on specific particle size benthic habitats, such as gravel for herring and sandy sediments for sandeel.

Atlantic Herring

Atlantic herring *Clupea harengus* are of particular interest because they are highly vulnerable to habitat loss due to their life history and population structures. They lay benthic eggs, primarily in coarse sand and gravel but possibly other substrates too. They have a complex population structure made up of multiple metapopulations which are spatio-temporally dynamic. Some populations spawn in spring, others spawn in autumn. Even sub-populations spawning in proximity can be physically and genetically distinguished from each other, to the extent that fisheries managers have recognised the importance of individually managing these discrete sub-populations to maintain the stability of the wider population. Therefore, detailed information on which specific stock(s) are using that locality is needed in planning and mitigation. New spawning locations are still being discovered.

The International Council for the Exploration of the Sea (ICES 2020) states that: “Activities that have a negative impact on the spawning habitat of herring should not occur, unless the effects of these activities have been assessed and shown not to be detrimental to the productivity of the stock (ICES 2003, 2015). There has been an increase in marine anthropogenic activity. Activities that have a negative impact on the spawning habitat of herring, such as the dumping of dredge spoil, the extraction of marine aggregates (e.g., gravel and sand), and the erection of structures in the vicinity of spawning grounds, are a cause for concern (see for example Groot 1979, 1996; ICES 2003, 2015). This is because a gravel substratum is an essential habitat for herring spawning.”

Herring are also an important food source for some seabirds and marine mammals, including species which show high prey item selectivity, such as terns during their breeding season.

Sandeel (*Ammodytidae* spp.)

Sandeel (as a group of five species in UK seas) are of particular interest because they are highly vulnerable to habitat loss due to their life history and population structures. Although each of the species do exhibit unique traits, these should not be heavily relied upon as identification to species level is notoriously difficult, and even data collected from scientific trawl surveys should be flagged as of uncertain data quality with regards the correct species identification (Ellis *et al.* 2012). Sandeel have a strong preference for sandy habitats or mixed sand and gravel habitats, burying themselves in the sediment as a predator avoidance mechanism. In the spring and summer months they have diurnal movements, feeding on plankton in the water column by day and burying themselves at night. During autumn and winter they hibernate, emerging only occasionally, including for spawning. They produce benthic eggs. Sandeel populations show evidence of sub-structures, suggesting that localised populations may be vulnerable to local impacts.

4 Impacts from aggregate dredging activities

Within JNCC's Pressures-Activities Database (PAD; JNCC 2021a) and Natural England's Advice on Operations for specific sites, the following activities relating to aggregate dredging operations have been identified:

- Aggregate dredging
- Aggregate screening
- Vessel movements

The full description of these activities can be found within the PAD and Advice on Operations database. Based on these activities, Table 4 lists the main pressures associated with aggregate extraction activities.

The full range of pressures associated with aggregate extraction activities must be considered at any given location. Consideration should be given to the scale of the pressure, both spatially (size of area impacted, depth of footprint, volume of sediment displaced or removed) and temporally (discrete event, persistent, temporary, or permanent effects), and to the sensitivity (resistance to pressure and resilience in terms of recovery from pressure) of any features which may be impacted. In any assessment, the worst-case scenario should always be considered.

Table 4: Main potential pressures associated with aggregate dredging activities

Activity	Pressure
Aggregate dredging	Abrasion/disturbance of the substrate on the surface of the seabed
	Changes in suspended solids (water clarity)
	Emergence regime changes – local, including tidal level change considerations
	Habitat structure changes – removal of substratum (extraction)
	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
	Physical change to another seabed type
	Physical change to another sediment type
	Physical loss to land or freshwater habitat
	Removal of non-target species
	Smothering and siltation rate changes (heavy)
	Smothering and siltation rate changes (light)
	Water flow (tidal current) changes – local, including sediment transport considerations
	Wave exposure changes - local
Aggregate screening	Abrasion/disturbance of the substrate on the surface of the seabed
	Changes in suspended solids (water clarity)
	Physical change to another seabed type
	Siltation rate changes (high) including smothering (depth of vertical sediment overburden)
	Siltation rate changes (low) including smothering (depth of vertical sediment overburden)
Vessel movements	Above water noise
	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)
	Introduction of light

	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
	Smothering and siltation rate changes (light)
	Underwater noise changes
	Wave exposure changes
	Visual disturbance

In the subsequent sections, the relevant pressures for each feature sensitive to aggregate operations and their corresponding MPAs are highlighted. These are also summarised in Appendix 2.

5 Features sensitive to aggregate operations

In this section we consider the impacts of aggregate operations on features of conservation interest (Table 1) using the JNCC's Pressures-Activities Database (PAD). These summaries should be used as a starting point by operators to highlight potential nature conservation issues. These sensitivities are our current understanding as to what is available from the database at the time of writing. This is not an exhaustive list: if a feature is not listed it may still be impacted by aggregate extraction activities.

5.1 Sensitivity

Sensitivity of a feature is broadly defined by its resistance (the likelihood of damage because of a pressure) and its resilience (the rate of recovery from damage following the complete removal of the pressure in question). A feature is therefore most sensitive to a pressure when the likelihood of damage is high, and the rate of recovery is slow (if at all). Sensitivity is dependent on the magnitude, extent, frequency and duration of the pressure on the feature (JNCC 2020b; Marlin 2021).

5.2 Habitat features

Subtidal sand (A5.2)

Subtidal sand is often found on open coasts, or closer to the shore, where the seabed is disturbed by waves and tides. Further offshore, sandy seabeds are home to flat fish and sandeel, feeding on polychaete (bristle) worms and molluscs buried within the sand. Towards the coast in sheltered areas, finer silty sediment combines with the sand, creating a sandy-muddy mix, where species such as heart urchins, razor shells and sea cucumbers can be found.

Subtidal sand habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rates (heavy)
- Water flow (tidal current) changes including sediment transport considerations

Subtidal mixed sediment (A5.4)

Subtidal mixed sediment can be made up of many different types of sediment, ranging from finer mud or sand, to coarser gravel or cobbles and pebbles. Mosaics of these different habitats are often formed, and mixed areas could also include seabed where sand waves form upon the surface of a gravel bed. Due to the variable habitat present, a wide range of species can be found, including bivalve molluscs, polychaete worms, anemones, starfish, sea urchins and mats of bryozoans.

Subtidal mixed sediment habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations

Subtidal coarse sediment (A5.1)

Subtidal coarse sediments are areas of coarse sand, gravel and shingle seabed, found in areas of higher wave or tidal energy, which prevents finer sediments, such as sands and mud, from settling. This habitat supports a variety of species which tend to bury into the seabed, such as polychaete worms, burrowing anemones, cockles and clams, with generally very little seaweed or algae present.

Subtidal coarse sediment habitats are sensitive to the following pressures:

- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (heavy)

Biogenic reefs

Biogenic reefs are those made by living creatures with hard exteriors, such as tube worms (honeycomb and Ross worms *Sabellaria* spp.) or mussels (blue mussel *Mytilus edulis* and horse mussel *Modiolus modiolus*). These reefs are found on a range of sediments, such as sand, mud or gravel, across UK waters. These reefs provide home to a huge range of marine plants and animals, acting as a shelter in an otherwise flat seabed. Reefs are listed as an Annex I habitat under the EU Habitats Directive.

Biogenic reef habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type

- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

Sandbanks

‘Sandbanks which are slightly covered by sea water all the time’ are comprised of sandy sediments that are permanently covered by shallow sea water. The habitats consist of raised ‘banks’ or irregular ‘mound’ shapes that are formed by horizontal or sloping plains of sandy sediment. These diverse habitats occur widely around the UK coast, and are often home to a variety of epifauna and infauna. ‘Sandbanks which are slightly covered by sea water all the time’ are listed as an Annex I habitat under the EU (European Union) Habitats Directive.

Sandbanks are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

Maerl Beds

Maerl is the collective name for a number of red seaweeds that possess hard, calcified ‘skeletons’ that create colourful, finely-branched structures on the seabed. Maerl beds develop on coarse sands and gravels where waves and tidal currents are strong enough to prevent the deposition of fine sediments but not strong enough to damage their delicate structure. Healthy, living beds support a range of crustaceans, bivalve molluscs, sea-firs, sponges, sea cucumbers and a diverse algal flora. Dead maerl can still provide the same structure and continue to support similar plant and animal communities. The accumulated debris also provides opportunities for numerous worms, molluscs and crustaceans able to burrow into this coarse material. Extensive maerl beds can also provide nursery grounds for a range of fish and shellfish.

Maerl beds are sensitive to the following pressures:

- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed
- Changes in suspended solids (water clarity)
- Smothering and siltation rate changes (light and heavy)
- Abrasion/disturbance of the substrate on the surface of the seabed
- Water flow (tidal current) changes including sediment transport considerations
- Removal of non-target species

Infralittoral muddy sand and sandy mud

Infralittoral muddy sand habitat is a non-cohesive muddy sand found in the infralittoral zone. It supports a variety of animal-dominated communities, particularly polychaetes, bivalves and urchins.

Infralittoral sandy mud habitat is a cohesive sandy mud, generally found in sheltered bays or marine inlets and along sheltered areas of open coast. Typical species found in this habitat include a variety of polychaetes, tube-building amphipods and deposit feeding bivalves. Sea pens and brittle stars may be present, but not in the same abundances found in deeper circalittoral waters.

Both infralittoral sediments are sensitive to the following pressures:

- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed
- Changes in suspended solids (water clarity)
- Smothering and siltation rate changes (light and heavy)
- Abrasion/disturbance of the substrate on the surface of the seabed
- Water flow (tidal current) changes including sediment transport considerations
- Physical change to another sediment type
- Removal of non-target species

Seagrass beds

Intertidal seagrass beds comprise dense stands of *Zostera* species on intertidal muds and sands in sheltered estuaries and bays in brackish or near-marine conditions. The associated animal community comprises lugworms, ragworms, snails and bivalve molluscs, although this is heavily influenced by sediment type, salinity, and exposure.

Subtidal seagrass beds comprise dense, permanently submerged stands of *Zostera marina* (eel or seagrass). These grow on sandy muds, sands and gravels to a depth of 4-5m (or even deeper where light levels allow) that are sheltered from significant wave action but where tidal currents are strong enough to remove the finest sediments. They are found in sheltered inlets, bays and estuaries in brackish or fully marine conditions. The ribbon-like leaves can be colonised by diatoms, algae, stalked jellyfish and anemones. The sediment can provide conditions suitable for a common but sometimes abundant community of amphipods, polychaete worms, bivalve molluscs and echinoderms. The combination of food resource and shelter make seagrass beds an important nursery ground for a range of marine fish and a valuable feeding ground for seabirds.

Seagrass beds may be sensitive to the following direct and indirect pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Emergence regime changes including tidal level change considerations
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed
- Physical change (to another sediment type)
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

5.3 Species features

The sensitive species features of some MPAs are listed below. Slow moving and sessile species have high sensitivity to pressures associated with aggregate dredging.

Ocean quahog *Arctica islandica*

Ocean quahog *Arctica islandica* is a bivalve that is found in sand or muddy sand habitats in UK offshore waters. It lives burrowed in sediment, which makes it difficult to detect as their siphons are not always visible through video survey methodology. It is a long-lived and slow-growing species, which is why it is considered a sensitive species and is listed on the OSPAR list of threatened and/or declining species (OSPAR 2021).

Ocean quahog are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
- Physical change to another seabed type
- Physical change to another sediment type

Fan mussel *Atrina fragilis*

The fan mussel *Atrina fragilis* is one of the largest species of bivalve in UK waters and can be found in sublittoral fringe, subtidal muds, sandy muds or gravels. They can grow up to 30-48cm in length and are a long-lived and slow-growing species, often found living alone or in small patchy groups with other individuals. It is also one of the most threatened species in UK waters.

Fan mussels are sensitive to the following pressures:

- Abrasion or disturbance of the surface of the substratum or seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
- Physical change to another seabed type
- Smothering and siltation rate changes (light and heavy)

6 Region-specific advice

In this section we look at the MPAs in English waters that are particularly at risk of significant impact from aggregate activities, starting in the north-east and moving clockwise around England. It should be noted that MPAs were included based on presence of a designated feature or species sensitive to pressures associated with aggregate dredging operations. We have also included those MPAs that have already been impacted or where there is historic aggregate activity. Whilst this document aims to highlight only those sites at particular risk, the expectation is that all MPAs will need to be considered fully for future aggregate dredging licence applications.

The [JNCC MPA Mapper](#) is a useful source of information on all MPAs in English waters. Where available, we have provided links to the JNCC [Site Information Centres](#) (SICs; JNCC 2021b) and [NE Designated Sites View](#) pages for offshore and inshore sites respectively. These include important information on the designation, location, and legislation of each site. It also includes the current conservation status of these sites and their protected features – as this can sometimes change.

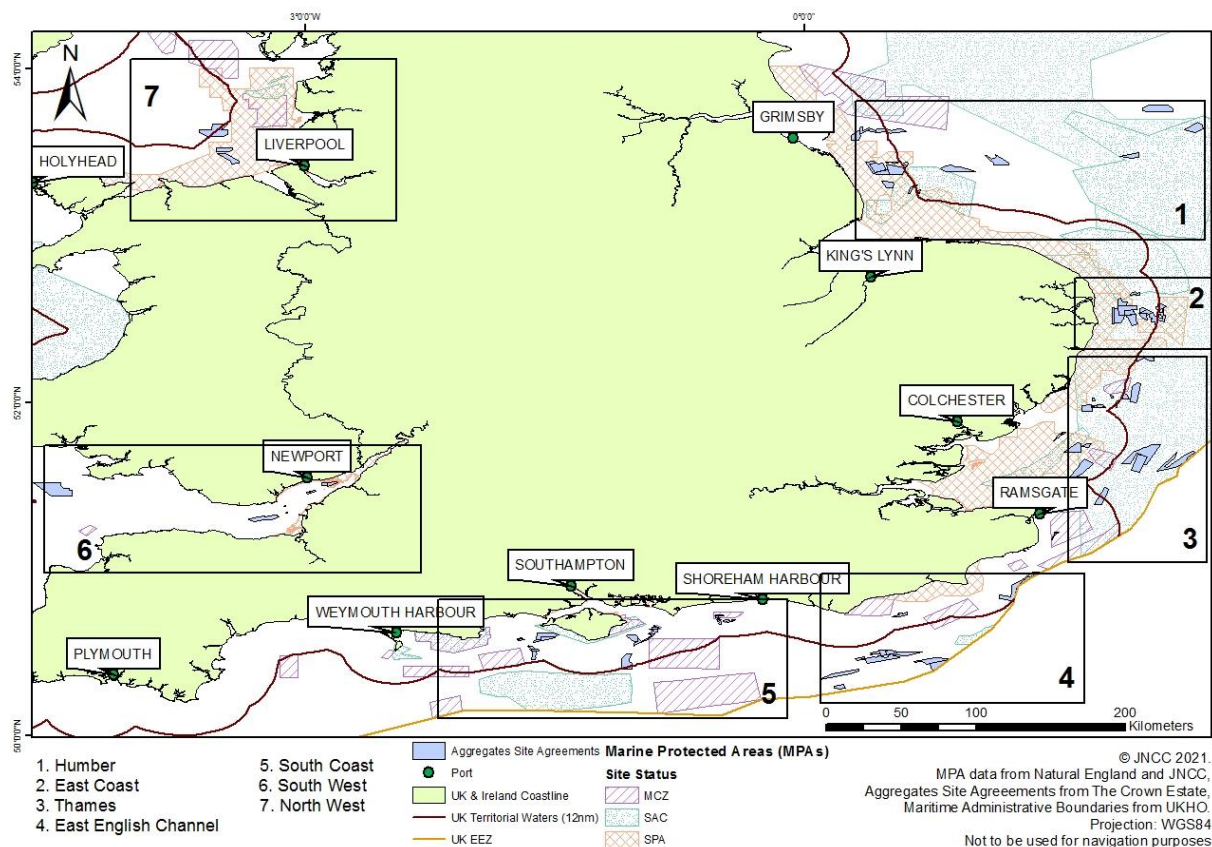


Figure 2: English aggregate areas.

6.1 Humber Region

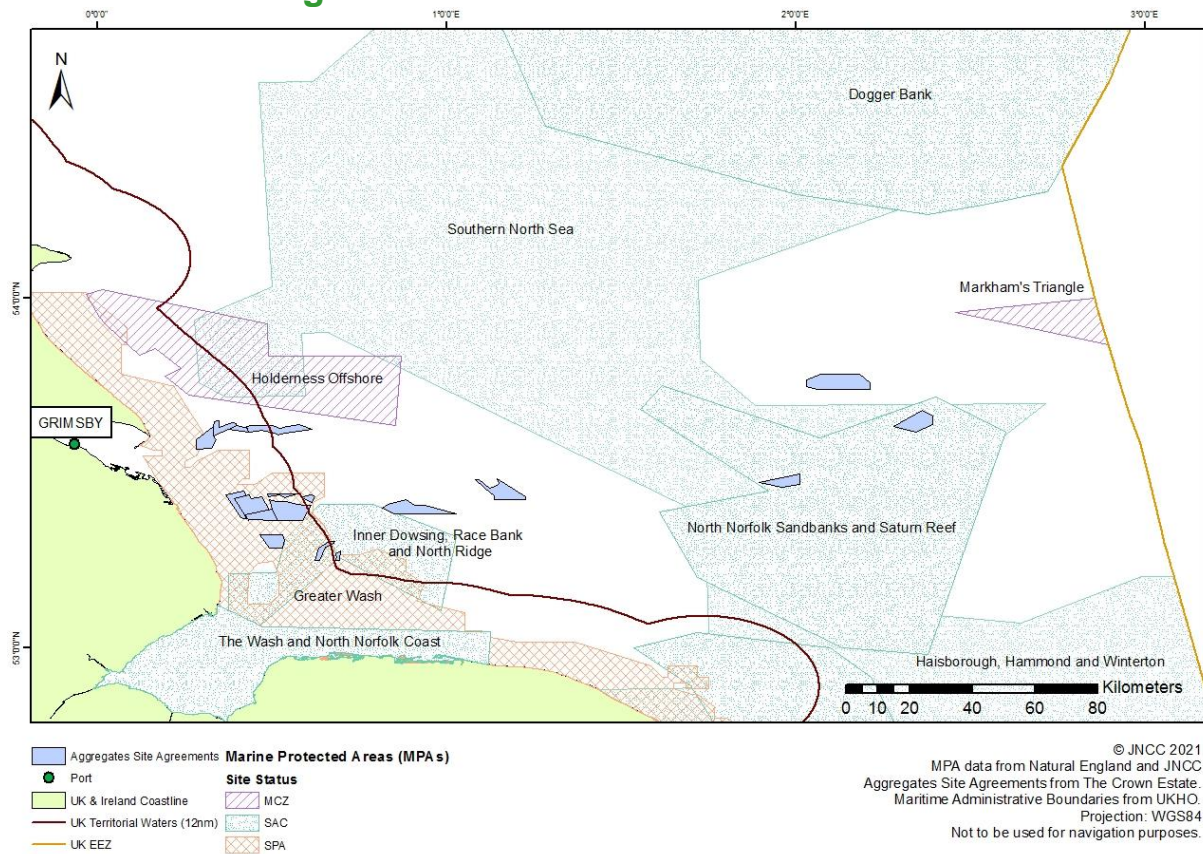


Figure 3: Humber region, existing aggregate sites and MPAs.

6.1.1 The Wash and North Norfolk Coast SAC

This SAC encompasses the largest embayment in the UK and is designated for its saltmarsh features, coastal lagoons, large shallow inlets and bays, mudflats, sandflats, and sandbanks. It is also designated for harbour (common) seals and otters.

The [Eastern Inshore Fisheries and Conservation Authority \(IFCA\) Marine Protected Areas Byelaw](#) restricts certain fishing activities in certain areas, for example prohibiting bottom-towed gear in areas where biogenic reef occurs.

There are existing impacts on the SAC due to cable installation.

As some of the features and sub-features of this SAC are in unfavourable condition, adding further pressure would likely have a significant impact on the site's conservation objectives and may impede restoration of the features. Therefore, these should be avoided as outlined in the hierarchy of approach.

Subtidal stony reef, circalittoral rock, and *Sabellaria spinulosa* reefs are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species

- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.1.2 Greater Wash SPA

The Greater Wash SPA is located along the east coast of England and extends through the Humber and East Coast Region. This site spans inshore and offshore waters and is designated for the protection of Annex I bird species, all of which have 'maintain' or 'restore' conservation objectives. There are multiple aggregate extraction areas currently overlapping the Greater Wash SPA.

Protected species include:

- In non-breeding season, red-throated diver *Gavia stellata*, little gull *Hydrocoloeus minutus*, and common scoter *Melanitta nigra*;
- In breeding season, Sandwich tern *Sterna sandvicensis*, Little tern *Sternula albifrons*, and common tern *Sterna hirundo*.

This site includes a diverse range of broadscale habitats within the marine environment which support a variety of prey species for foraging seabirds. These habitats include subtidal and intertidal sediments, rock and biogenic reef.

The supporting habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.1.3 Haisborough, Hammond and Winterton SAC

The Haisborough, Hammond and Winterton SAC is located off the coast of Norfolk, in inshore and offshore waters and spans the Humber and East Coast Regions. This site is designated for 'reefs' and 'sandbanks which are slightly covered by sea water all the time'.

A multitude of sandbanks that run parallel to the coast can be found in this site, along with areas of troughs consisting of more gravelly sediment that are home to *Sabellaria spinulosa* reef. This SAC already has several industries operating within it, including oil and gas, fisheries, offshore wind farms, aggregate extraction and telecommunication cables. Further impacts caused by additional activity within the SAC would slow or stop the progress to restore the sensitive features of this SAC.

'Reefs' and 'sandbanks slightly covered by seawater all the time' are both in unfavourable condition. They are sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

Reefs and sandbanks are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.1.4 Holderness Offshore MCZ

The Holderness Offshore Marine Conservation Zone (MCZ) is located off Yorkshire's Holderness coast. It is split between inshore and offshore waters. This site is designated for various broadscale habitats, including subtidal mixed sediment, subtidal sand, and subtidal coarse sediment. This site has high species biodiversity and is home to the threatened and/or declining ocean quahog (*Arctica islandica*). This site also contains the North Sea glacial tunnel valleys, which are a feature of geological interest.

Ocean quahog, subtidal mixed sediment, subtidal sand and subtidal coarse sediment are sensitive to direct pressures from aggregate dredging activity, and in unfavourable condition. Therefore, these should be avoided as outlined in the hierarchy of approach.

These protected features are sensitive to the following pressures

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance of the substratum subsurface
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rate changes (heavy)

6.1.5 Inner Dowsing, Race Bank and North Ridge SAC

The Inner Dowsing, Race Bank and North Ridge SAC is located off the Lincolnshire coast, and is situated in both inshore and offshore waters. The site is designated for two Annex I habitats: 'reefs', and 'sandbanks which are slightly covered by sea water all the time'. *Sabellaria spinulosa* agglomerations have been recorded in certain areas of the site, as well as a large range of sandbank types.

'Reefs' and 'sandbanks slightly covered by seawater all the time' are both in unfavourable condition. They are sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

There are existing aggregate extraction licensed areas within Inner Dowsing, Race Bank and North Ridge SAC.

These protected features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes – removal of substratum (extraction)

- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.1.6 Dogger Bank SAC

The Dogger Bank SAC is home to the UK's largest single continuous sandbank. As such, this site is designated for Annex I 'sandbanks which are slightly covered by seawater all the time'. It also overlaps with the Southern North Sea SAC, a site designated for the protection of harbour porpoise *Phocoena phocoena*.

This SAC already has several industries operating within it, including oil and gas, fisheries, offshore wind farms and telecommunication cables. Further impacts caused by additional activity within the SAC would slow or stop the progress to restore the sensitive features of this SAC.

The 'sandbanks slightly covered by seawater all the time' feature is currently in unfavourable condition. It is sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

Sandbanks are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.1.7 Markham's Triangle MCZ

Markham's Triangle MCZ is located approximately 137km offshore and has a variety of sediment types. This site is designated for various broadscale habitats including subtidal coarse sediment, subtidal mixed sediments, subtidal sand, and subtidal mud.

These broadscale habitats are all in unfavourable condition. They are sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

These designated habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (heavy)

6.1.8 North Norfolk Sandbanks and Saturn Reef SAC

The North Norfolk Sandbanks and Saturn Reef SAC is in the southern North Sea and has some of the most extensive examples of sandbanks in UK waters. It is also home to a large variety of invertebrates and areas of biogenic reef (*Sabellaria spinulosa*), which are also a protected feature of this site.

Although the site consists of 10 main sandbanks and smaller banks, the entire site has been designated and treated as an example of the Annex I habitat 'sandbanks which are slightly covered by sea water all the time'.

This SAC already has several industries operating within it, including oil and gas, fisheries, offshore wind farms and telecommunication cables. Further impacts caused by additional activity within the SAC would slow or stop the progress to restore the sensitive features of this SAC.

'Reefs' and 'sandbanks slightly covered by seawater all the time' are both in unfavourable condition. They are sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

There are existing aggregate extraction licensed areas within North Norfolk Sandbanks and Saturn Reef SAC.

These protected features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.1.9 Southern North Sea SAC

The Southern North Sea SAC is the UK's largest protected area for the Annex II species harbour porpoise *Phocoena phocoena*. This SAC spans the Humber, East Coast, and Thames Estuary regions.

The primary objective for this SAC is to ensure that the site integrity is maintained, and that harbour porpoise remain in a favourable conservation status. This will be achieved by ensuring that certain conservation objectives are met. There are three conservation objectives for this site, including Conservation Objective 3 (CO3) which requires that 'the condition of supporting habitats and processes, and the availability of prey is maintained'. Supporting habitats, in this context, means the characteristics of the seabed and water column and encompasses the movements and physical properties of the habitat. The maintenance of supporting habitats contributes to ensuring that prey is maintained within the site and is available to harbour porpoises using the site.

Sandeel are a preferred prey source for harbour porpoise, and their displacement has the potential to indirectly impact on the harbour porpoise population.

There are multiple aggregate extraction areas currently overlapping the Southern North Sea SAC.

6.2 East Coast Region

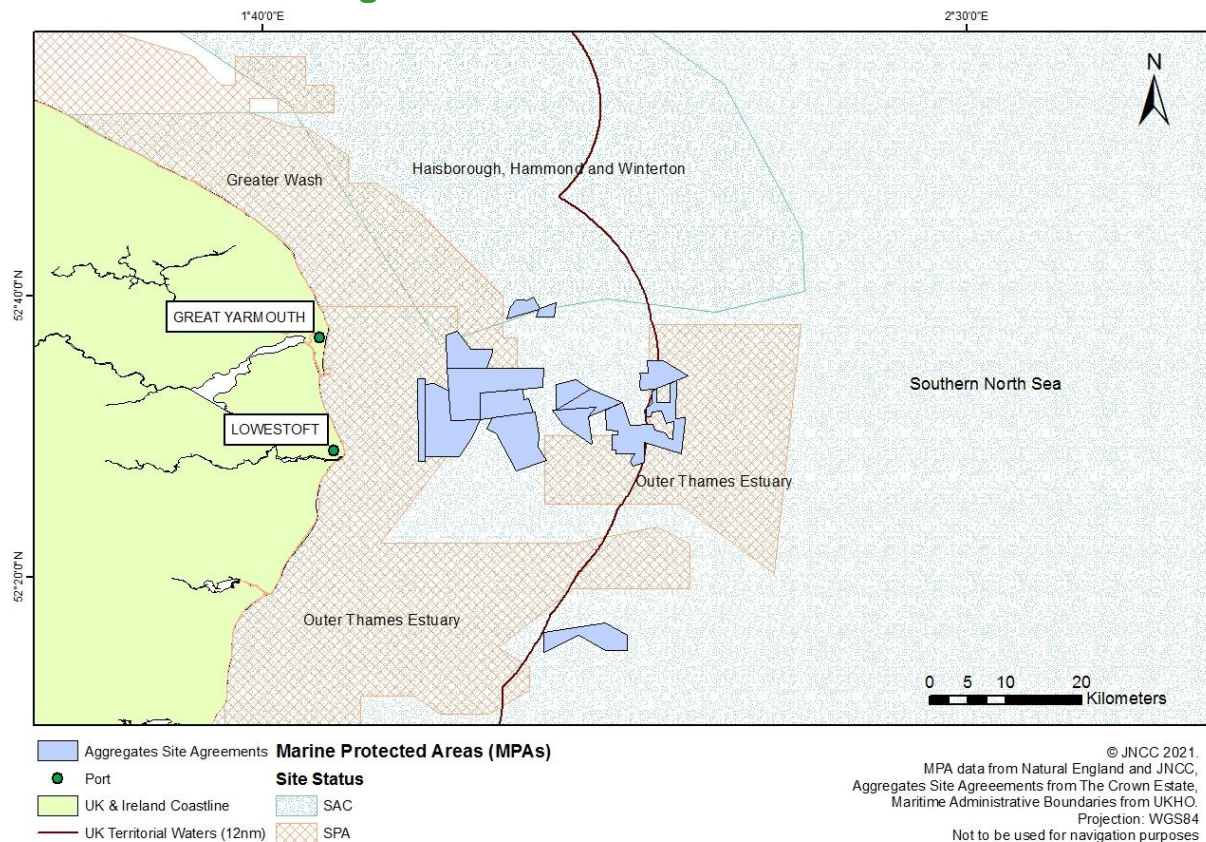


Figure 4: East coast region, existing aggregate sites and MPAs.

6.2.1 Greater Wash SPA

The Greater Wash SPA is located along the east coast of England and extends through the Humber and East Coast Region in both inshore and offshore waters. It is designated for the protection of Annex I bird species, all of which have 'maintain' or 'restore' conservation objectives.

There are multiple aggregate extraction areas currently overlapping the Greater Wash SPA. Protected species include:

- In non-breeding season, red-throated diver *Gavia stellata*, little gull *Hydrocoloeus minutus*, and common scoter *Melanitta nigra*.
- In breeding season, Sandwich tern *Sterna sandvicensis*, little tern *Sternula albifrons*, and common tern *Sterna hirundo*.

This site includes a diverse range of broadscale habitats within the marine environment which support a variety of prey species for foraging seabirds. These habitats include subtidal and intertidal sediments, rock and biogenic reef.

The supporting habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)

- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.2.2 Haisborough, Hammond and Winterton SAC

The Haisborough, Hammond and Winterton SAC is located off the coast of Norfolk, in inshore and offshore waters and spans the Humber and East Coast Regions. This site is designated for 'reefs' and 'sandbanks which are slightly covered by sea water all the time'.

A multitude of sandbanks that run parallel to the coast can be found in this site, along with areas of troughs consisting of more gravelly sediment that are home to *Sabellaria spinulosa*.

This SAC already has several industries operating within it, including oil and gas, fisheries, offshore wind farms, aggregate extraction and telecommunication cables. Further impacts caused by additional activity within the SAC would slow or stop the progress to restore the sensitive features of this SAC.

'Reefs' and 'sandbanks slightly covered by seawater all the time' are both in unfavourable condition. They are sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

Reefs and sandbanks are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.2.3 Outer Thames Estuary SPA

The Outer Thames Estuary SPA is located along the east coast of England and extends into offshore waters along the Norfolk coast, spanning the Thames Estuary and the East Coast regions. This site is designated for the protection of Annex I bird species, all of which have 'maintain' or 'enhance' favourable condition conservation objectives.

Protected species include red-throated diver *Gavia stellata*, common tern *Sterna hirundo*, and little tern *Sternula albifrons*.

There are multiple aggregate extraction areas currently overlapping the Outer Thames Estuary SPA.

This site includes a diverse range of broadscale habitats within the marine environment which support a variety of prey species for foraging seabirds. These habitats include subtidal and intertidal sediments and rock.

The supporting habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes- removal of sediment
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations

6.2.4 Southern North Sea SAC

The Southern North Sea SAC is the UK's largest protected area for the Annex II species harbour porpoise *Phocoena phocoena*. This SAC spans the Humber, East Coast, and Thames Estuary regions.

The primary objective for this SAC is to ensure that the site integrity is maintained, and that harbour porpoise remain in a favourable conservation status. This will be achieved by ensuring that certain conservation objectives are met. There are three conservation objectives for this site, including CO3 which requires that 'the condition of supporting habitats and processes, and the availability of prey is maintained'. Supporting habitats, in this context, means the characteristics of the seabed and water column and encompasses the movements and physical properties of the habitat. The maintenance of supporting habitats contributes to ensuring that prey is maintained within the site and is available to harbour porpoises using the site.

Sandeel are a preferred prey source for harbour porpoise, and their displacement has the potential to indirectly impact on the harbour porpoise population.

There are multiple aggregate extraction areas currently overlapping the Southern North Sea SAC.

6.3 Thames Estuary Region

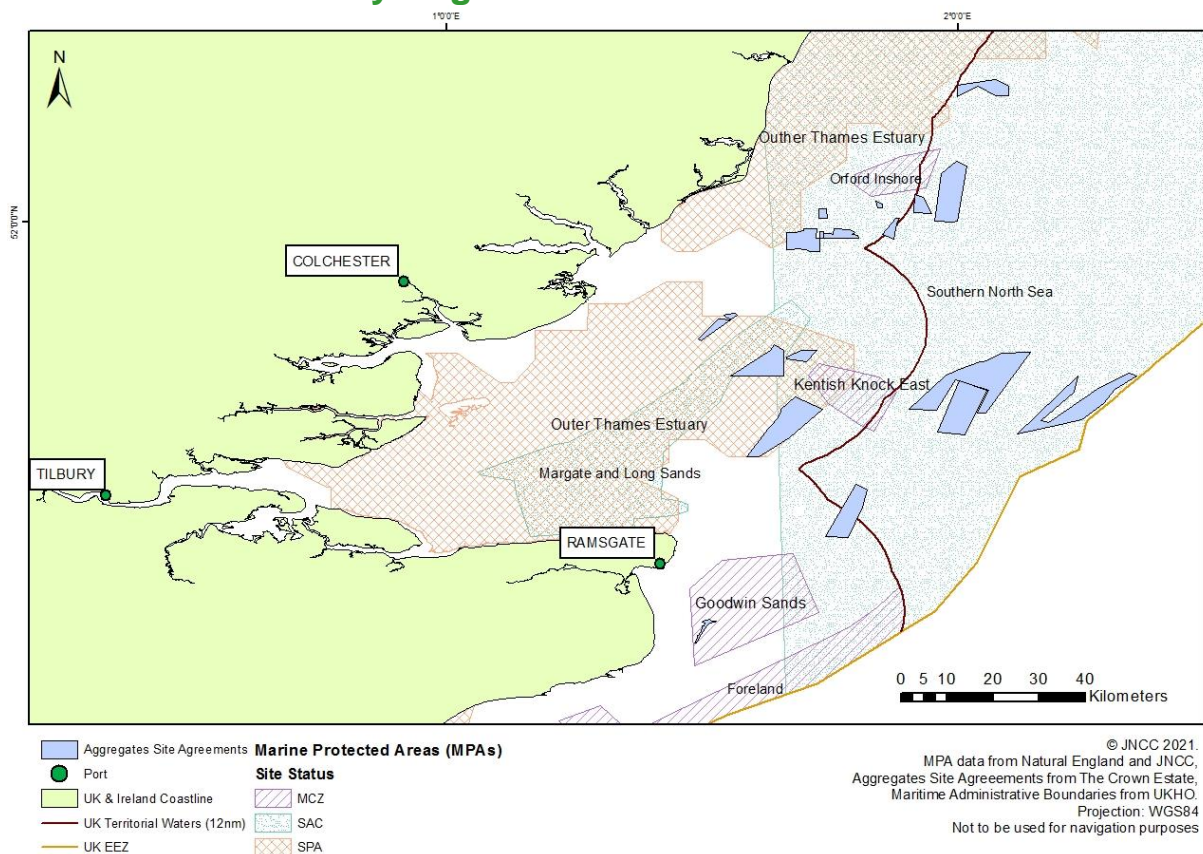


Figure 5: Thames Estuary region, existing aggregate sites and MPAs.

6.3.1 Orford Inshore MCZ

The Orford Inshore MCZ is located off the Suffolk coast. This site is designated for subtidal mixed sediment, which provides important nursery and spawning grounds for fish, including several nationally important shark species. The rich biodiversity within the MCZ also provides prey resources for Annex I bird species and harbour porpoise.

The feature has a conservation objective to 'recover' to favourable condition. Subtidal mixed sediment is sensitive to direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

Subtidal mixed sediment habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.3.2 Goodwin Sands MCZ

This MCZ is designated for its dynamic sand and coarse sediment, as well as rock features, Ross worm *Sabellaria spinulosa* reefs and blue mussel *Mytilus edulis* beds. The site includes deeper areas of subtidal coarse sediment that are known to be of particularly high biodiversity. The site also protects the English Channel outburst flood features, which form a deep channel in the eastern side.

The rock and biogenic reef features have a conservation objective to recover to favourable condition, whilst the subtidal sediment features have a conservation objective to maintain in favourable condition.

The features subtidal sand, subtidal coarse sediment, blue mussel beds, Ross worm reef and the English Channel outburst flood feature are sensitive to several direct pressures from aggregate dredging activity and therefore should be avoided as outlined in the hierarchy of approach.

There is an existing aggregate extraction area within Goodwin Sands MCZ. It should also be noted that Kent and Essex IFCA are considering management options for this site, particularly for the protection of Ross worm reef. The protected features in this site are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.3.3 Kentish Knock East MCZ

This MCZ is designated for subtidal sand, mixed and coarse sediment. This range of sediment habitats support a wide variety of animal species, including worms, sponges, bivalve molluscs and echinoderms such as brittlestars and sea urchins. Fish species supported by the site include the small spotted cat shark *Scyliorhinus canicula* and flatfish species. Ross worm *Sabellaria spinulosa* reefs have been observed in three locations at the site, though the extent of these reefs is unknown.

The subtidal sediment features have an objective to recover to favourable condition and additional pressures may prevent or delay the site reaching its conservation objectives.

The subtidal sediment features are sensitive to several direct pressures from aggregate dredging activity and therefore should be avoided where possible, as outlined in the hierarchy of approach.

The protected broadscale habitats in this site are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed

- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.3.4 Margate and Long Sands SAC

This SAC is designated for subtidal sandbanks. The site also supports fish species such as sole *Solea solea* and herring *Clupea harengus*. Although not proposed as an interest feature, there is a significant amount of the reef-forming Ross worm *Sabellaria spinulosa* at this site, which when formed as a reef qualifies as an Annex I habitat (biogenic reef). However, the available data indicate that the distribution of this species is patchy, or that the aggregations form crusts rather than reefs.

There are existing pressures on this SAC due to offshore windfarm turbines, cabling, cable protection, interconnector cables, aggregate extraction, fishing activity and a dredge disposal site. Therefore, adding any further pressure to the SAC could impact the conservation objectives.

Additionally, there is a [Kent and Essex IFCA Byelaw](#) and the Marine Management Organisation ([MMO Margate and Long Sands European Marine Site \(Specified Areas\) Bottom Towed Fishing Gear Byelaw 2017](#)) in place prohibiting bottom-towed fishing gear within the site.

‘Sandbanks which are slightly covered by sea water all the time’ are sensitive to several direct pressures from aggregate dredging activity and therefore should be avoided as outlined in the hierarchy of approach.

Sandbanks are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.3.5 Foreland MCZ

Foreland MCZ spans the Thames Estuary and English Channel regions. It contains a variety of different habitats, ranging from subtidal sand to coarse sediments and rocky habitats, and supports a wide diversity of species. The north of the site is known for its distinct richness of species living on or in the seabed. The site also protects the very northern section of the English Channel outburst flood feature.

The rock and subtidal coarse sediment features have an objective to recover to favourable condition, whilst the objective for subtidal sand is to maintain in favourable condition.

The features subtidal sand, subtidal coarse sediment and the English Channel outburst flood feature are sensitive to several pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's protected habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rate changes (heavy)

6.3.6 Outer Thames Estuary SPA

The Outer Thames Estuary SPA is located along the east coast of England and extends into offshore waters along the Norfolk coast. It spans the Thames Estuary and the East Coast regions. This site is designated for the protection of Annex I bird species, all of which have 'maintain' or 'enhance' favourable condition conservation objectives.

Protected species include red-throated diver *Gavia stellata*, common tern *Sterna hirundo*, and little tern *Sternula albifrons*.

There are multiple aggregate extraction areas currently overlapping the Outer Thames Estuary SPA.

This site includes a diverse range of broadscale habitats within the marine environment which support a variety of prey species for foraging seabirds. These habitats include subtidal and intertidal sediments and rock.

The supporting habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes- removal of sediment
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations

6.3.7 Southern North Sea SAC

The Southern North Sea SAC is the UK's largest protected area for the Annex II species harbour porpoise *Phocoena phocoena*. This SAC spans the Humber, East Coast, and Thames Estuary regions.

The primary objective for this SAC is to ensure that the site integrity is maintained, and that harbour porpoise remain in a favourable conservation status. This will be achieved by ensuring that certain conservation objectives are met. There are three conservation objectives for this site, including CO3 which requires that 'the condition of supporting habitats and processes, and the availability of prey is maintained'. Supporting habitats, in this context, means the characteristics of the seabed and water column and encompasses the movements and physical properties of the habitat. The maintenance of supporting habitats contributes to ensuring that prey is maintained within the site and is available to harbour porpoises using the site.

Sandeel are a preferred prey source for harbour porpoise, and their displacement has the potential to indirectly impact on the harbour porpoise population.

There are multiple aggregate extraction areas currently overlapping the Southern North Sea SAC.

6.4 East English Channel Region

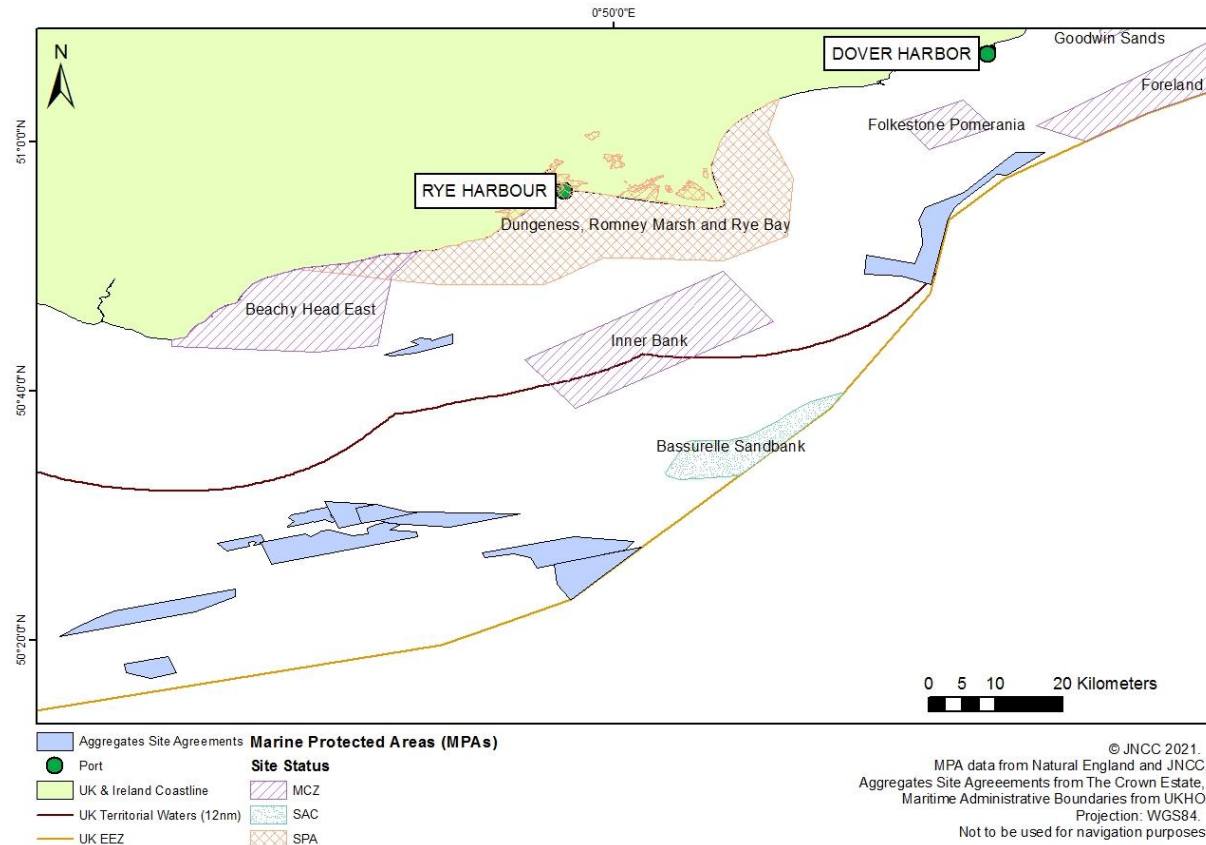


Figure 6: East English Channel region, existing aggregate sites and MPAs.

6.4.1 Beachy Head East MCZ

Beachy Head East is an inshore site located along the coast near Eastbourne in East Sussex. It has a sandstone and chalk reef system that provides a home for a wide range of species. Beachy Head East is designated for its sediment, rock and chalk features, peat and clay exposures, and *Sabellaria spinulosa* reef. This site provides important feeding grounds for many species, including the designated short-snouted seahorse, black seabream, native oyster and European eel. The rock, chalk, peat and clay exposures and *Sabellaria* reef have an objective to recover to favourable condition. The conservation objectives for the sediment features and short-snouted seahorse are maintain in favourable condition.

There is existing aggregate dredging activity near to Beachy Head East MCZ. It should also be noted that Sussex IFCA is developing fisheries management measures for this site.

Subtidal coarse sediment, subtidal sand, *Sabellaria* reef and the short-snouted seahorse are sensitive to direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's protected habitats and features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.4.2 Dungeness, Romney Marsh and Rye Bay SPA

Designated features of this site include the Sandwich tern *Thalasseus sandvicensis*, common tern *Sterna hirundo* and little tern *Sternula albifrons*, which are sensitive to several direct pressures from aggregate dredging activity. This site should therefore be avoided as outlined in the hierarchy of approach.

This site includes a diverse range of broadscale habitats within the marine environment which support a variety of prey species for foraging seabirds. These habitats include subtidal and intertidal sand and muddy sand, subtidal biogenic reef, intertidal stony reef, coarse and mixed sediments, and moderate energy infralittoral and circalittoral rock.

The supporting habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.4.3 Folkestone Pomerania MCZ

Folkestone Pomerania MCZ is composed of high-energy circalittoral rock with extensive areas of subtidal sand and coarse sediment. The MCZ is also designated for two types of biogenic reef - Ross worm reef *Sabellaria spinulosa* and the honeycomb worm reef *Sabellaria alveolata* - as well as fragile sponge and anthozoan communities. All features, except the sediment features, have an objective to recover to favourable condition.

This site also supports important fish species, including sole *Solea solea*, cod *Gadus morhua*, mackerel *Scomber scombrus* and herring, which are known to use this area as a nursery and spawning ground. As such, there is a [Kent and Essex IFCA Byelaw](#) in place prohibiting bottom-towed fishing gear within the site boundary.

Subtidal sand, subtidal coarse sediment and Ross worm *S. spinulosa* are sensitive to several direct pressures from aggregate dredging activity and therefore should be avoided.

This site's protected features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations
- Wave exposure changes

6.4.4 Foreland MCZ

Foreland MCZ spans the Thames Estuary and English Channel regions. It contains a variety of different habitats, ranging from subtidal sand to coarse sediments and rocky habitats, and supports a wide diversity of species. The north of the site is known for its distinct richness of species living on or in the seabed. The site also protects the very northern section of the English Channel outburst flood feature.

The rock and subtidal coarse sediment features have an objective to recover to favourable condition, whilst the objective for subtidal sand is to maintain in favourable condition.

The features subtidal sand, subtidal coarse sediment and the English Channel outburst flood feature are sensitive to several pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's protected habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rate changes (heavy)

6.4.5 Inner Bank MCZ

This MCZ is designated for subtidal coarse sediment, subtidal mixed sediment and subtidal sand. All three features have a recover to favourable condition objective.

All features are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

These broadscale habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.4.6 Bassurelle Sandbank SAC

The Bassurelle Sandbank SAC is in the Dover Strait on the boundary of UK and French offshore waters. The entire site consists of one open shelf, ridge sandbank and has been designated as an Annex I protected feature 'sandbanks which are slightly covered by seawater all the time'.

'Sandbanks slightly covered by seawater all the time' are in unfavourable condition. They are sensitive to aggregate dredging activity and should be avoided, as outlined in the hierarchy of approach.

Sandbanks are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.5 South Coast Region

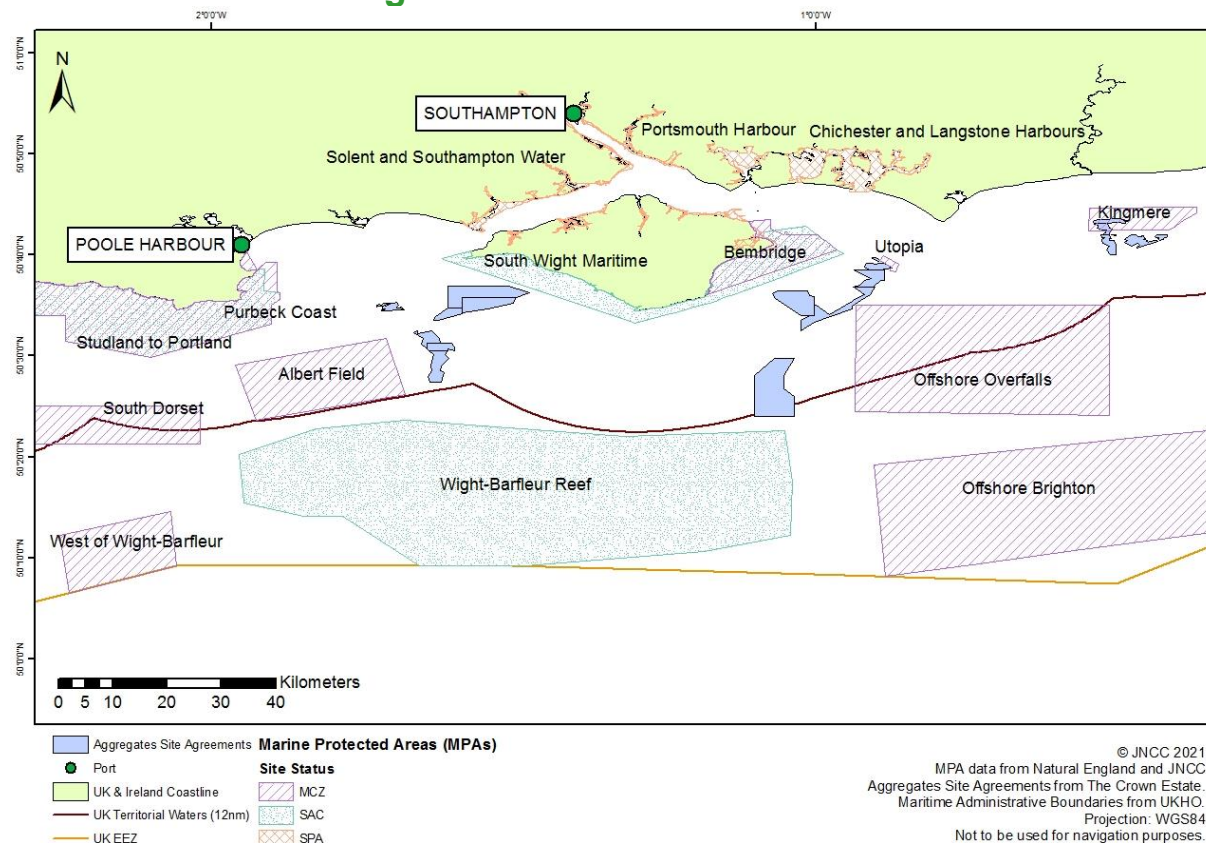


Figure 7: South coast region, existing aggregate sites and MPAs

6.5.1 Albert Field MCZ

Albert Field MCZ comprises primarily subtidal sediments ranging from muddy, gravelly sands through to mosaics of cobbles and pebbles in or on a sand, gravel or mud seabed,

with outcropping areas of bedrock and boulders. Both the subtidal coarse sediment and subtidal mixed sediments features have an objective to recover to favourable condition.

The subtidal sediment features are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's protected features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.5.2 Bembridge MCZ

This MCZ overlaps with the South Wight Maritime SAC (which protects reef habitat) and has been designated for a variety of habitats and species. The 13 protected features include particularly sensitive habitats such as: maerl beds; seagrass beds; sea-pens and burrowing megafauna communities; and sheltered muddy gravels. Seven of these features (maerl beds, native oyster *Ostrea edulis*, peacock's tail *Padina pavonica*, sea-pens and burrowing megafauna, seagrass beds, subtidal mixed sediments, and subtidal mud) have an objective to recover to favourable condition. In addition, the MCZ protects the following broadscale habitats: subtidal mud, subtidal mixed sediments, subtidal sand, and subtidal coarse sediment.

The subtidal sediment features, maerl beds, native oyster, seagrass beds, short-snouted seahorse and stalked jellyfish *Calvadosia campanulate* and *Haliclystus* spp. are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's protected features are sensitive to the following pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations

6.5.3 Kingmere MCZ

This MCZ is designated for black seabream *Spondyliosoma cantharus*, infralittoral rock and thin mixed sediment, and subtidal chalk. All features have an objective to recover to favourable condition. There are already existing aggregate dredging licences within the MCZ, and potential additional activity would need to be assessed to ensure progress towards meeting the site's conservation objectives.

Aggregate dredging pressures may result in impacts to nesting black seabream and their breeding habitat, which is rock covered in a thin layer of sediment. The breeding season is currently understood to be March to July, during which time there is high sensitivity to

smothering and siltation rate changes. It should be noted that black seabream also nests outside of Kingmere MCZ along the south coast during March to July, and consideration should also be given to avoiding noise impacts and smothering/siltation pressures outside the MCZ during nesting periods for black seabream.

There is a [Sussex IFCA byelaw](#) in place prohibiting bottom-towed gear within the whole site in the black seabream breeding season (March to July), and across the majority of the site (except the current aggregate dredging area) for the rest of the year.

Infralittoral rock and black seabream are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Underwater noise changes
- Water flow (tidal current) changes including sediment transport considerations

6.5.4 Purbeck Coast MCZ

Purbeck Coast MCZ protects a variety of intertidal and subtidal habitats ranging from coarse sediment to rocky reef. The subtidal sediments comprise cobbles, pebbles, and sand and gravel, which support a range of species including barnacles, algae, sea cucumbers, tube worms and anemones. In the shallow subtidal areas, coarse sediment with seaweeds provides the key habitat for stalked jellyfish. Maerl, a rare, slow-growing and long-lived calcareous pink seaweed, is found in the east of the site. Purbeck Coast MCZ is also an important site for nesting black seabream.

Black seabream and maerl beds have an objective to recover to favourable condition. All other features have an objective to maintain favourable condition.

The subtidal sediment features, stalked jellyfish *Haliclystus* spp., maerl beds and black seabream are sensitive to several direct pressures from aggregate dredging activity and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Underwater noise changes
- Water flow (tidal current) changes including sediment transport considerations

6.5.5 South Dorset MCZ

South Dorset MCZ is a mosaic of sediment and rocky areas. It is designated for high-energy circalittoral rock, moderate energy circalittoral rock, subtidal coarse sediment and subtidal chalk. Subtidal coarse sediment can provide a nursery ground for many ecologically and commercially important fish species, including sea bass and flat fish such as sole *Solea solea* and plaice *Pleuronectes platessa*.

Subtidal coarse sediment is sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rate changes (heavy)

6.5.6 South Wight Maritime SAC

This SAC is designated to protect the reefs, sea caves and vegetated sea cliffs present. The reefs and sea caves are in favourable condition, with a 'maintain' conservation objective.

The reef and sea cave features are sensitive to the following pressures:

- Changes in suspended solids (water clarity)
- Emergence regime changes
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes, including sediment transport considerations
- Wave exposure changes

6.5.7 Studland to Portland SAC

The Studland to Portland SAC lies off the Dorset coast, and comprises two sections: the Studland Bay to Ringstead Bay reefs and the Portland reefs. The site contains a diverse range of reef habitats, which exhibit a large amount of geological variety and biological diversity. The reefs are in favourable condition.

The subtidal stony reef, infralittoral rock and circalittoral rock features are sensitive to the following pressures:

- Changes in suspended solids (water clarity)
- Emergence regime changes
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes, including sediment transport considerations
- Wave exposure changes

6.5.8 Utopia MCZ

The Utopia MCZ is designated for subtidal sediment and rock features as well as fragile sponge and anthozoan communities. The site is also part of an important pupping ground for the protected tope shark *Galeorhinus galeus*.

There are already existing aggregate dredging licences within and adjacent to the MCZ, and potential additional activity would need to be assessed to ensure the site's conservation objectives are met. A [Sussex IFCA Byelaw](#) prohibits the use of towed gear within the site boundary.

All features have an objective to maintain in favourable condition.

The subtidal sediment features are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.5.9 Wight-Barfleur Reef SAC

The Wight-Barfleur Reef SAC is in the central English Channel in between English and French offshore waters. It is an area consisting of bedrock and stony reef which support a diverse range of wildlife. The protected features of this site include Annex I Reefs, which are in unfavourable condition.

Reefs are sensitive to the following pressures:

- Changes in suspended solids (water clarity)
- Emergence regime changes
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes, including sediment transport considerations

6.5.10 West of Wight-Barfleur MCZ

The West of Wight-Barfleur MCZ is also located in the central English Channel approximately 50km off the Dorset coast. It is home to several protected broadscale habitats including subtidal coarse and mixed sediments.

The subtidal sediment features are sensitive to several direct pressures from aggregate dredging activity and are in unfavourable condition. Therefore, they should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)

- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.5.11 Offshore Overfalls MCZ

The Offshore Overfalls MCZ is in the eastern English Channel, south-east of the Isle of Wight. This site has been designated for various broadscale habitats such as subtidal coarse sediments, subtidal mixed sediments, and subtidal sand. It also includes a geomorphological feature of interest – English Channel outburst flood features (Quaternary fluvio-glacial erosion features).

All the broadscale habitats have been assigned a 'recover' to favourable condition conservation objective. Subtidal coarse sediments, subtidal mixed sediments, and subtidal sand are sensitive to direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.5.12 Offshore Brighton MCZ

The Offshore Brighton MCZ is in the eastern English Channel and has been designated for various broadscale habitats. These include high-energy circalittoral rock, subtidal coarse sediment and subtidal mixed sediments.

High-energy circalittoral rock is in unfavourable condition and may be sensitive to indirect aggregate dredging activity pressures such as smothering and siltation rate changes in suspended solids.

Subtidal coarse sediment and subtidal mixed sediments are sensitive to direct pressures from aggregate dredging activity and are in unfavourable condition. Therefore, they should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.6 South-West Region

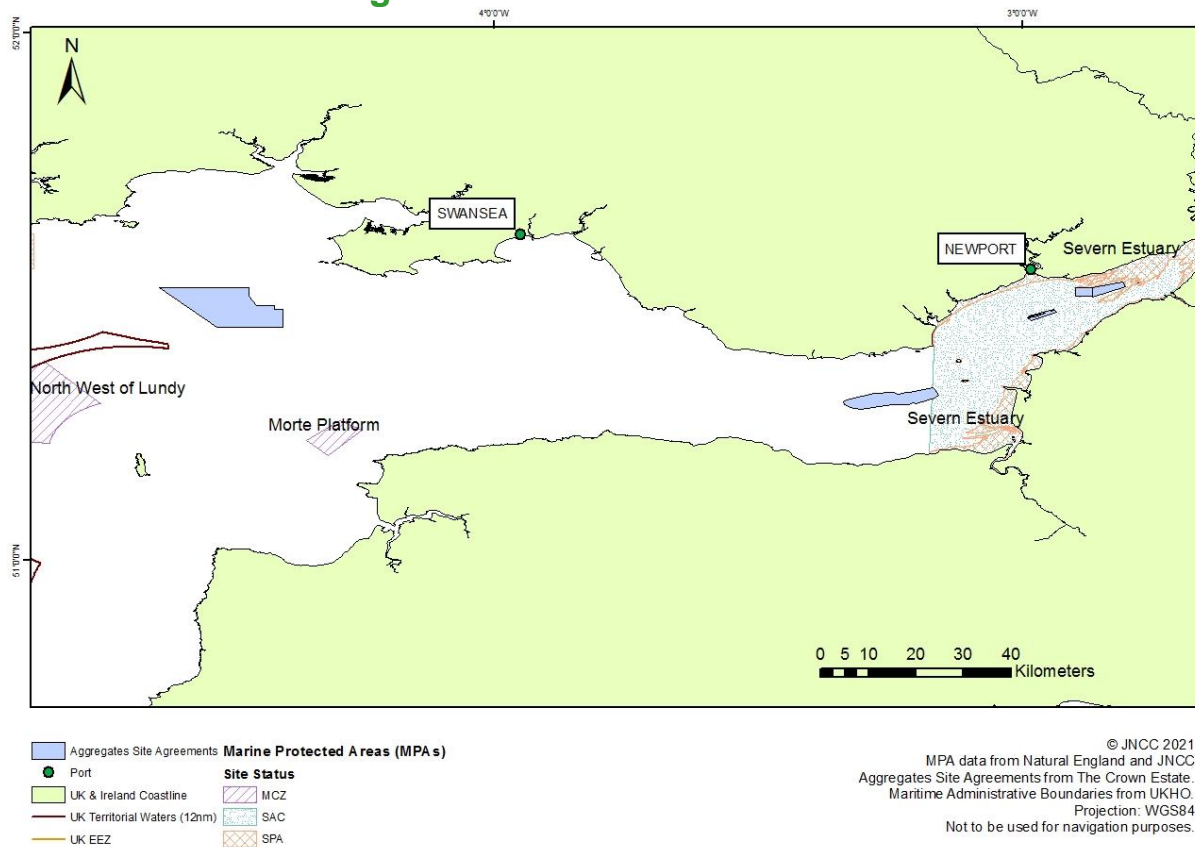


Figure 8: South-west region, existing aggregate sites and MPAs

6.6.1 Morte Platform MCZ

Morte Platform MCZ lies off the coast of north Devon. It contains a mix of habitats rarely represented elsewhere in the UK. Subtidal sediment provides important nursery grounds for many ecologically and commercially important fish such as flatfish (e.g., sole *Solea solea*, plaice *Pleuronectes platessa*), seabass and sandeel, as well as supporting nationally rare Ross worm *Sabellaria spinulosa* reefs.

This site is designated for high-energy circalittoral rock, moderate energy circalittoral rock, and subtidal coarse sediment which are all in unfavourable condition.

The subtidal coarse sediment feature is sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach. The subtidal coarse sediment feature is sensitive to the following pressures:

- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rate changes (heavy)

6.6.2 North West of Lundy MCZ

The North West of Lundy MCZ contains a large area of subtidal coarse sediment which provides habitat that supports a variety of species, for example segmented bristle worms, Venus clams and small crustaceans living within and on top of the sediment. Coarse sediments include coarse sand, gravel pebbles and shingle.

The subtidal coarse sediment feature is sensitive to several direct pressures from aggregate dredging activity and is in unfavourable condition. Therefore, it should be avoided as outlined in the hierarchy of approach.

The subtidal coarse sediment feature is sensitive to the following pressures:

- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rate changes (heavy)

6.6.3 Severn Estuary/Mor Hafren SAC

The Severn Estuary is large, with extensive intertidal mudflats, sandflats, rocky platforms and islands. The subtidal seabed is rock and gravel with subtidal sandbanks. The site supports reefs of the tube-forming honeycomb worm *Sabellaria alveolata*. Of note are sandeel, listed in the assemblage of fish species (part of the estuary feature), which are vulnerable to aggregate extraction activity pressures.

There are already existing aggregate dredging licences within the SAC and potential additional activity would need to be assessed to ensure the site's conservation objectives can be met.

The subtidal sediment features, *Sabellaria alveolata* reefs, river lamprey, sea lamprey and Twaité shad are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.6.4 Severn Estuary/Mor Hafren SPA

The Severn Estuary SPA forms part of the complex chain of estuary sites along the western coast of the UK that provide habitats for migratory waterfowl, including suitable feeding and roosting habitat. This site is designated for the protection of Annex I bird species, regularly occurring migratory species and a waterbird assemblage.

Protected overwintering species include:

- Bewick's swan *Cygnus columbianus bewickii*
- Common shelduck *Tadorna tadorna*
- Gadwall *Anas strepera*
- Dunlin *Calidris alpina alpina*
- Common redshank *Tringa tetanus*
- Greater white-fronted goose *Anser albifrons albifrons*

The site also regularly supports at least 20,000 waterfowl.

The water column and subtidal seagrass bed supporting habitats are sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

The intertidal rock, sediment and seagrass supporting habitats are sensitive to the following pressures:

- Changes in suspended solids (water clarity)
- Emergence regime changes, including tidal level change considerations.
- Smothering and siltation rate changes
- Water flow (tidal current) changes, including sediment transport considerations
- Wave exposure changes

It is important to note that activities taking place within or adjacent to the SPA will need to consider the use of areas outside the boundaries of the SPA by some species.

6.7 North-West Region

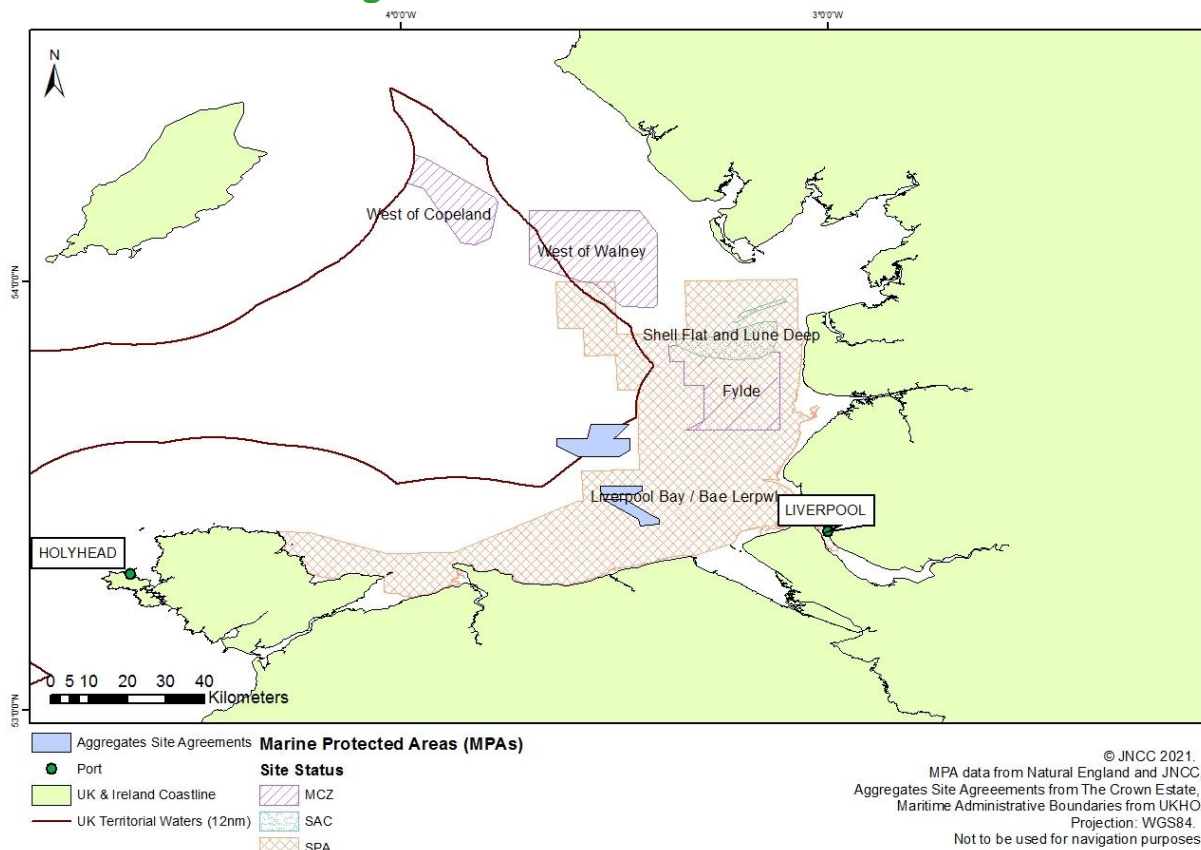


Figure 9: North-west region, existing aggregate sites and MPAs.

6.7.1 Fylde MCZ

This site protects subtidal mud and sand habitats, considered to be good representatives of the seabed habitats found on the eastern side of Liverpool Bay. The site includes important nursery and spawning grounds for several important fish species including sole *Solea solea*, plaice *Pleuronectes platessa* and whiting *Merlangius merlangus*.

The site is designated for subtidal sand and subtidal mud, both of which have a 'maintain' in favourable condition conservation objective. The subtidal sand feature is sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

Subtidal sand habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rates (heavy)

6.7.2 Shell Flat and Lune Deep SAC

The Shell Flat and Lune Deep SAC is located off the Lancashire Coast, at the mouth of Morecambe Bay. The site is characterised by a deep-water channel (Lune Deep) and a large sandbank feature (Shell Flat) surrounded by shallower areas to the north and south. It is designated for its reef and sandbank features.

There are impacts from existing offshore windfarm cables on sandbank features, which may mean the capacity of the SAC to withstand any further pressures is reduced.

The subtidal sand and sandbank feature is sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.7.3 West of Walney MCZ

The West of Walney MCZ is located on the Cumbrian coast of north-west England. Designated features of this site include extensive areas of subtidal mud, small areas of subtidal sand, and sea-pen and burrowing megafauna communities.

All three features have a 'recover' to favourable condition conservation objective. This MCZ already has several industries operating within it, including oil and gas, fisheries, offshore wind farms and telecommunication cables. Further impacts caused by additional activity within the MCZ would slow or stop the progress to restore the sensitive features of this MCZ.

The subtidal sand feature is sensitive to several direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach.

Subtidal sand habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Smothering and siltation rates (heavy)

6.7.4 West of Copeland MCZ

The West of Copeland MCZ is in the eastern region of the Irish Sea and has been designated for various broadscale habitats. These include subtidal coarse sediment, subtidal sand, and subtidal mixed sediments.

All these broadscale habitats are sensitive to direct pressures from aggregate dredging activity, and therefore should be avoided as outlined in the hierarchy of approach. Additionally, subtidal coarse and mixed sediments have a 'recover' to favourable condition conservation objective.

This site's features are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Habitat structure changes - removal of substratum (extraction)
- Penetration and/or disturbance of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)

6.7.5 Liverpool Bay SPA

The Liverpool Bay SPA is located along the coastlines of north-west England and north Wales. This site is designated for the protection of Annex I bird species, a waterbird assemblage, and regularly occurring migratory species, all of which have 'maintain' or 'restore' to favourable condition conservation objectives.

There are aggregate extraction licensed areas within and close to Liverpool Bay SPA.

Protected species include:

- In non-breeding season, red-throated diver *Gavia stellata*, little gull *Hydrocoloeus minutus*, and common scoter *Melanitta nigra*.
- In breeding season, little tern *Sternula albifrons*, and common tern *Sterna hirundo*.

The 'waterbird assemblage' includes all the non-breeding qualifying features, as well as two species, the red-breasted merganser *Mergus serrator* and the great cormorant *Phalacrocorax carbo*.

This site includes a diverse range of broadscale habitats within the marine environment which support a variety of prey species for foraging seabirds. These habitats include subtidal and intertidal sediments and rock.

The supporting habitats are sensitive to the following pressures:

- Abrasion or disturbance of the substrate on the surface of the seabed
- Changes in suspended solids (water clarity)
- Habitat structure changes- removal of sediment
- Penetration or disturbance (or both) of the substrate below the surface of the seabed
- Physical change to another seabed type
- Physical change to another sediment type
- Removal of non-target species
- Smothering and siltation rate changes (light and heavy)
- Water flow (tidal current) changes including sediment transport considerations

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Appendices

Appendix 1: Abbreviations

BAP	Biodiversity action plan
CO3	Conservation objective 3
EPS	European protected species
EU	European union
FOCI	Features of conservation interest
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authority
JNCC	Joint Nature Conservation Committee
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MPA	Marine protected area
NE	Natural England
NERC	Natural Environment and Rural Communities Act 2006
NMFS	National Marine Fisheries Service
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
PAD	JNCC's Pressures-Activities Database
PMF	Priority marine features (Scottish waters)
SAC	Special Area of Conservation
SIC	Site information centre
SNCB(s)	Statutory Nature Conservation Body/Bodies
SNH	Scottish Natural Heritage
SPA	Special Protection Area
TCE	The Crown Estate
UXO	Unexploded ordnance

Appendix 2: Summary table of pressures from aggregate operations by habitat, species and MPA

	Aggregate Dredging												Aggregate Screening				Vessel Movements								
	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids (water clarity)	Emergence regime changes – local, including tidal level change considerations	Habitat structure changes – removal of substratum (extraction)	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Physical change (to another seabed type)	Physical change (to another sediment type)	Removal of non-target species	Smothering and siltation rate changes (light)	Smothering and siltation rate changes (heavy)	Water flow (tidal current) changes – local, including sediment transport considerations	Wave exposure changes - local	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids	Physical Change (to another seabed type)	Siltation rate changes (low) including smothering (depth of vertical sediment overburden)	Siltation rate changes (high) including smothering (depth of vertical sediment overburden)	Above water noise	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery and structures)	Introduction of light	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Smothering and siltation rate changes (light)	Underwater noise changes	Wave exposure changes	Visual Disturbance
Habitats																									
Subtidal sand	x			x	x	x	x	x		x	x		x		x						x				
Subtidal mixed sediment	x	x		x	x	x	x	x	x	x	x		x		x	x	x				x	x			
Subtidal coarse sediment				x	x	x	x	x		x					x		x				x				
Biogenic reefs	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Sandbanks	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Maerl Beds	x	x		x	x			x	x	x	x		x	x		x	x				x	x			
Infralittoral muddy sand and sandy mud	x	x		x	x		x	x	x	x	x		x	x		x	x				x	x			
Seagrass beds	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x				x	x		x	
Species																									
Arctica Islandica	x			x	x	x	x						x		x						x				
Atrina fragilis	x	x		x	x	x			x	x			x	x	x	x	x				x	x			
Marine Protected Areas																									
Humber Region																									
The Wash and North Norfolk Coast SAC	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Greater Wash SPA	x	x			x	x	x	x	x	x	x	x						x							x

	Aggregate Dredging												Aggregate Screening				Vessel Movements								
	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids (water clarity)	Emergence regime changes – local, including tidal level change considerations	Habitat structure changes – removal of substratum (extraction)	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Physical change (to another seabed type)	Physical change (to another sediment type)	Removal of non-target species	Smothering and siltation rate changes (light)	Smothering and siltation rate changes (heavy)	Water flow (tidal current) changes – local, including sediment transport considerations	Wave exposure changes - local	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids	Physical Change (to another seabed type)	Siltation rate changes (low) including smothering (depth of vertical sediment overburden)	Siltation rate changes (high) including smothering (depth of vertical sediment overburden)	Above water noise	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery and structures)	Introduction of light	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Smothering and siltation rate changes (light)	Underwater noise changes	Wave exposure changes	Visual Disturbance
Haisborough, Hammond and Winterton SAC	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Holderness Offshore MCZ	x			x	x	x	x			x			x		x		x				x				
Inner Dowsing, Race Bank and North Ridge SAC	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Dogger Bank SAC	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Markham's Triangle MCZ	x			x	x	x	x	x		x			x		x		x				x				
North Norfolk Sandbanks and Saturn Reef SAC	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Southern North Sea SAC																									
East Coast Region																									
Greater Wash SPA																		x							x
Haisborough, Hammond and Winterton SAC	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Outer Thames Estuary SPA	x	x		x	x	x	x	x	x	x	x							x							x
Southern North Sea SAC																									
Thames Estuary Region																									
Orford Inshore MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Goodwin Sands MCZ	x	x		x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Kentish Knock East MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			

	Aggregate Dredging												Aggregate Screening				Vessel Movements								
	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids (water clarity)	Emergence regime changes – local, including tidal level change considerations	Habitat structure changes – removal of substratum (extraction)	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Physical change (to another seabed type)	Physical change (to another sediment type)	Removal of non-target species	Smothering and siltation rate changes (light)	Smothering and siltation rate changes (heavy)	Water flow (tidal current) changes – local, including sediment transport considerations	Wave exposure changes - local	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids	Physical Change (to another seabed type)	Siltation rate changes (low) including smothering (depth of vertical sediment overburden)	Siltation rate changes (high) including smothering (depth of vertical sediment overburden)	Above water noise	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery and structures)	Introduction of light	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Smothering and siltation rate changes (light)	Underwater noise changes	Wave exposure changes	Visual Disturbance
Margate and Long Sands SAC	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Foreland MCZ	x			x	x	x	x			x			x		x		x				x				
Outer Thames Estuary SPA	x	x		x	x	x	x	x	x	x	x							x							x
Southern North Sea SAC																									
East English Channel Region																									
Beachy Head East MCZ	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Dungeness, Romney Marsh and Rye Bay SPA	x			x	x	x	x	x	x	x	x	x	x		x	x	x	x			x	x		x	x
Folkestone Pomerania MCZ	x			x	x	x	x	x	x	x	x	x	x		x	x	x				x	x		x	
Foreland MCZ	x			x	x	x	x			x			x		x		x				x				
Inner Bank MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Bassurelle Sandbank SAC	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
South Coast Region																									
Albert Field MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Bembridge MCZ	x	x		x	x			x	x	x	x		x	x		x	x				x	x			
Kingmere MCZ	x	x		x	x		x	x	x	x	x		x	x		x					x	x	x		
Purbeck Coast MCZ	x	x		x	x			x	x	x	x		x			x	x				x	x	x		
South Dorset MCZ				x	x	x	x			x					x		x				x				
South Wight Maritime SAC		x	x						x	x	x	x		x		x	x					x			

	Aggregate Dredging												Aggregate Screening				Vessel Movements								
	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids (water clarity)	Emergence regime changes – local, including tidal level change considerations	Habitat structure changes – removal of substratum (extraction)	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Physical change (to another seabed type)	Physical change (to another sediment type)	Removal of non-target species	Smothering and siltation rate changes (light)	Smothering and siltation rate changes (heavy)	Water flow (tidal current) changes – local, including sediment transport considerations	Wave exposure changes - local	Abrasion/disturbance of the substrate on the surface of the seabed	Changes in suspended solids	Physical Change (to another seabed type)	Siltation rate changes (low) including smothering (depth of vertical sediment overburden)	Siltation rate changes (high) including smothering (depth of vertical sediment overburden)	Above water noise	Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery and structures)	Introduction of light	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Smothering and siltation rate changes (light)	Underwater noise changes	Wave exposure changes	Visual Disturbance
Studland to Portland SAC		x	x						x	x	x	x		x		x	x					x			
Utopia MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Wight-Barfleur Reef SAC		x	x						x	x	x			x		x	x					x			
West of Wight-Barfleur MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Offshore Overfalls MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Offshore Brighton MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
South-West Region																									
Morte Platform MCZ				x	x	x	x			x					x		x				x				
North West of Lundy MCZ				x	x	x	x			x					x		x				x				
Severn Estuary/Mor Hafren SAC	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Severn Estuary/ Mor Hafren SPA		x	x					x	x	x	x	x		x		x	x		x			x		x	x
North-West Region																									
Fylde MCZ	x			x	x	x	x			x			x		x						x				
Shell Flat and Lune Deep SAC	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
West of Walney MCZ	x			x	x	x	x			x			x		x						x				
West of Copeland MCZ	x			x	x	x	x	x	x	x			x		x	x	x				x	x			
Liverpool Bay SPA	x	x		x	x	x	x	x	x	x	x							x							x