Devon and Severn IFCA

Follow-up to Applicant Comments (MLA/2023/00467)

9th December 2024

Introduction and Scope of Response

Given the potential harm to protected sites and fish populations in D&S IFCA's District, D&S IFCA responded to the general consultation on MLA/2023/00467 on 13th March 2024, in order to outline its concerns in relation to fish and the Severn Estuary SAC. Following comments from the Applicant, D&S IFCA then provided a follow-up response on 23rd July 2024.

Subsequently, the Applicant (via Marine Management Organisation) provided a letter with additional comments on 14th November 2024. This letter is shown as Annex 1 to this document. The main text of this document represents D&S IFCA's response to those comments.

Issue 1: Shellfish

The response from ABPmer, on behalf of the Applicant, states that

> "*Although benthic fauna, including crustaceans, are considered more at risk from entrainment than highly mobile species, it has been noted that entrainment of shellfish has minimal population level effects (Todd et al., 2015).*"

It is important to note that this reference focuses on marine mammals, and says nothing about population level effects of entrainment on shellfish. Evidence used to support statements/assumptions *must* be relevant to the question at hand.

ABPmer/the Applicant also state that mobile crustacea are likely to colonise elsewhere in part because of the high levels of aggregate dredging disturbance that has been occurring since 2008/2011. If this is the case, then this displacement effect must be considered as a negative impact on affected species, since the other areas will have a finite carrying capacity, so displacement is likely to equate to reduced carrying capacity/population size in the estuary.

Issue 2 (a): Commercial Fisheries (Part I)

On page 5 of the response, it is stated that

> "*it is unlikely that sandeel are present in significant numbers due to the limited food resources that they would burrow for (British Sea Fishing, 2024).*"

The reference to this sea angling webpage (British Sea Fishing, 2024), which is a source of information on the general ecology of sandeel, is inappropriate evidence for the presence or absence of sandeel in specific areas. However, D&S IFCA recognises the value of local anecdotal evidence that can be gleaned from such pages – including for example a sea angling forum page on which an individual angling on a boat from Portishead (near to the proposed extraction site) noted a catch of several cod which came up "full of sandeel", supported by observations from another individual. This highlights the likely (at least historical) presence of sandeel in the area, which is contrary to the Applicant's position.

As outlined elsewhere, an appropriate assessment "*requires a high standard of investigation*" (e.g. R (Mynydd y Gwynt Ltd) v SSBEIS [2018] PTSR 1274, at paragraph 8). Later in that judgment, it is acknowledged that:

> "*Absolute certainty is not required. If no certainty can be established,* ***having exhausted all scientific means and sources*** *it will be necessary to work with probabilities and estimates, which must be identified and reasoned*".

In this case, all scientific means and sources have not been 'exhausted' and it is clear that more site-specific surveys targeting sandeel are required in order to establish the magnitude of likely impacts, as currently-available data do not appear to be sufficient to rule out significant adverse effects beyond reasonable scientific doubt. Currently there remains reasonable scientific doubt regarding adverse effects on sandeel and, by extension, the marine fish assemblage of the Severn Estuary SAC Estuaries feature.

Issue 2 (b): Commercial Fisheries (part II)

On page 8 of the response, ABPmer/the Applicant has acknowledged that

> "*In conclusion, it is evident that sandeel and herring are highly dependent on the habitats of the Severn Estuary SAC and* ***cumulative/in-combination effects are anticipated from aggregate dredging activities at the site*** *with other stressors […]*".

Now that cumulative/in-combination effects have been acknowledge, D&S IFCA would like to request that the relevant SNCB update the HRA for the proposed Project, and looks forward to the opportunity to review project-specific mitigation measures that will, presumably, be proposed by the Applicant to ensure no adverse effect on integrity of the Severn Estuary SAC. The scale of the required mitigation measures should be informed by site-specific monitoring of sandeel, as outlined above, to identify measures that are appropriately targeted and of an appropriate scale.

Issue 3: Designated Habitats: Regulation 33 standard data form & advice package for Severn Estuary SAC.

Section 4.3 of the Regulation 33 standard data form (vulnerability) states that

> "*the conservation of the site features is dependent on the tidal regime. The tidal range in the Severn Estuary is the second-highest in the world and the scouring of the seabed and strong tidal streams result in natural erosion of the habitats and the presence of high sediment loads.* ***The estuary is therefore vulnerable to large-scale interference, mainly as a result of human actions. These include*** *land-claim,* ***aggregate extraction****, physical developments such as barrage construction and other commercial construction activities, flood defences, industrial pollution, oil spillage and tourism-based activities and disturbance*" (D&S IFCA's emphasis).

Section 4.2 of the Regulation 33 standard data form (quality and importance) describes how the Severn Estuary SAC is considered to support a *significant presence* of the habitat "sandbanks which are slightly covered by seawater all the time", and that the feature 'mudflats and sandflats not covered by seawater at low tide' of the Severn Estuary SAC is '*considered to be one of the best areas in the United Kingdom*'.

These are the features targeted by the Applicant for aggregate dredging, and the basis of much of the Applicant's environmental assessments depend on the Applicant's assertion that the fauna of the habitats in the target areas are "highly impoverished", with the implication that dredging is therefore unlikely to have an impact.
This approach does not recognise the fact that, despite the nature of the sediment fauna, these areas are still SAC designated habitats that are *significant* and among *the best areas in the United Kingdom* for such habitats. Building on this, the Regulation 33 advice package also outlines that the selection of UK SACs represent the range of variation within the four main sandbank sub-types, and that "*the differing character of this habitat around the UK coast has also been taken into account".* Therefore, despite assertions of impoverished

fauna, these designated habitats require the level of protection afforded by the Habitats Regulations.

This should also be understood in the context of the in-combination impacts on features with climate change, among other pressures; for example, the Regulation 33 advice package highlights that the Severn Estuary CHaMP (an ABPmer publication) *predicts losses of intertidal mudflats and sandflats and saltmarsh habitats over the next 100 years in response to rising sea-level*.

The Applicant's Environmental Statement states that:

> "*Against the pressure 'habitat structure changes – removal of substratum' the MarESA assigns a medium sensitivity to all biotopes recorded in the Renewal Areas […]. The medium sensitivity from MarESA translates to a sensitivity of 'moderate' as used within the EIA methodology for this ES. For other relevant pressures relating to this potential impact (i.e. 'abrasion/disturbance of the surface of the substratum or seabed' and 'penetration or disturbance of the substratum subsurface'), a sensitivity of 'low' is assigned to all biotopes*".

However, this appears to be at odds with the Severn Estuary Regulation 33 advice package advice on mudflats and sandflats. Specifically, section 5.6.3 of the Severn Estuary Regulation 33 package states that:

> "*The mudflats and sandflats and their associated biological communities are **moderately to highly** exposed to: substratum loss [and] abrasion and physical disturbance*", and goes on to state that "*The intertidal mudflats and sandflats feature is currently considered to have **high sensitivity** and **high exposure** and therefore **high vulnerability to substratum loss***", and that "*the intertidal mudflats and sandflats feature is currently considered to have **moderate sensitivity** and **high exposure** and therefore **high vulnerability to physical disturbance and abrasion**. <u>The activities most likely to cause abrasion to mudflats and sandflats include […] aggregate extraction</u>*".

Rectifying this issue appears likely to arrive at conclusions of more than minor adverse effects of aggregate dredging on designated features.

Annex 1. Letter from ABPmer and Breedon Group Services Ltd to Marine Management Organisation ref. Bedwyn Sands and North Middle Ground (NMG) (Areas 455 and 459) Marine Aggregate Application – MLA/2023/00467.

ABPmer
Quayside Suite, Medina Chambers
Town Quay, Southampton SO14 2AQ
www.abpmer.co.uk

Our ref: R/5154

[redacted]
Lancaster House
Newcastle Business Park
Newcastle Upon Tyne
NE4 7YH

[redacted]
Associate

D: +44[redacted]
T: +44[redacted]
E: [redacted]

14 November 2024

Dear [redacted]

Bedwyn Sands and North Middle Ground (NMG) (Areas 455 and 459) Marine Aggregate Application – MLA/2023/00467 – Applicants Response to Third round consultation – Changes and clarifications required

Please find below the further evidence in response to your letter dated 17 October 2024. I hope this now provides all the information that you require in order to make a decision on the above Marine Licence Application.

On behalf of the applicant, Breedon Group Services Ltd, I wish to stress the importance of receiving a Marine Licence determination in a timely manner. The application was submitted on 1 November 2023 and we are now more than a year on, and still responding to what in our view are relatively minor requests for changes and clarifications that do not change the significance of impacts or conclusions of the assessment.

As you are aware, the proposed activity is for the continuation of ongoing marine aggregate extraction at Bedwyn Sands and North Middle Ground (Areas 455 and 459) which only takes place within a small proportion of English waters (1.9 km^2). The majority of the activity takes place in Welsh Waters (12.3 km^2) for which the applicant has already received a Marine Licence. The Marine Licence Application was submitted to NRW on the same date as the Marine Licence Application that was submitted to the MMO, and following one round of consultation a Marine Licence from NRW was received by the applicant on 18 October 2024.

Marine licence decisions need to be proportionate and as such, requests for further changes and clarifications should be appropriate and balanced in relation to the potential impact of the proposed activities on the marine environment. The level of evidence that has supported the assessment is sufficiently robust and proportionate to the nature and scale of the proposed activity, and the level of risk associated with the renewal of an existing and ongoing aggregate activity that has taken place at Bedwyn Sands for over 16 years. I kindly ask you to review the further evidence that is being provided with these considerations in mind.

The remainder of this letter has been structured in line with the MMO's comments highlighted in your letter.

1. Shellfisheries

MMO comments

"The MMO, in consultation with Cefas, considers that you (the Applicant) have not fully addressed the initial comments regarding a lack of evidence to support the statement of there being a low likelihood of brooding crustacea presence within Bedwyn Sands or North Middle Ground. You (the Applicant) stated that "the statement quoted within the ES is not based on direct evidence but is rather based on the assumption that there is considered to be a lower likelihood of exposure for brooding crustacea...". To evaluate this statement and the one previously made, a reference or further evidence must be provided to support the assumption that there is considered to be a lower likelihood of exposure. The MMO cannot assess whether these assumptions are correct without the provision of appropriate evidence and therefore this must be provided."

ABPmer response

As requested, further research and evidence has been sought to support the assumption made regarding a low likelihood of brooding crustacea within Bedwyn Sands or North Middle Ground.

Although benthic fauna, including crustaceans, are considered more at risk from entrainment than highly mobile species, it has been noted that entrainment of shellfish has minimal population level effects (Todd *et al.*, 2015). It is worth also noting that brooding invertebrate species, with a limited capacity for dispersal, are generally more vulnerable than those with planktonic larval stages that may facilitate the colonisation of new, undisturbed habitats (Fraser *et al.*, 2017).

Bedwyn Sands and North Middle Ground are in a highly dynamic estuary that experiences significant natural disturbance as evidenced in the monitoring data which shows that the areas that are dredged, naturally infill and return to existing bed levels within a tide. Furthermore, aggregate extraction in Bedwyn Sands and North Middle Ground have been occurring since 2008 and 2011, respectively. It is therefore considered likely that mobile brooding crustacea, that exhibit planktonic larval stages, would colonise more undisturbed habitats rather than those present in the highly mobile area comprising these aggregate areas. In support of this, Pittman and McAlpine (2003) outline that crustaceans have evolved a wide range of strategies that show significant phenotypic plasticity in response to different environmental conditions, including anthropogenic disturbance (Johannes, 1978; Morgan and Christy, 1994; Rochet, 2000).

Additionally, most decapod crustaceans have a highly-tuned sensory ability and great mobility throughout most of their life cycle, which provide an enhanced ability to relocate in response to adverse conditions (Sogard, 1994), such as aggregate dredging. Several activities can create situations where crustaceans may seek an alternative home range location. For instance, planktonic stages arriving in areas with sub-optimal conditions for growth and survival may settle and redistribute, or on not receiving the necessary cues, will delay transition to the benthos and keep moving (Pittman and McAlpine, 2003). Direct human activity such as physical disturbance to the benthos from dredging can also result in some resident animals abandoning or temporarily avoiding an area and opportunistic species moving in to use the disturbed area (Jennings and Kaiser, 1998).

In conclusion, the evidence outlined above demonstrates that it is unlikely that brooding crustacea would find refuge in the Bedwyn Sands and North Middle Ground areas given that ongoing disturbance, predominantly due to the natural dynamic environment of this estuary, as well as to less of an extent the ongoing aggregate dredging activities that have been taking place for many years, lead to suboptimal environmental conditions.

MMO comments

"Additionally, in your previous response, you (the Applicant) stated that brooding crustaceans "retain a relatively high mobility during incubation and are likely to be able to more easily move away from dredging plumes that are already taking place in these existing aggregate dredge areas". While this is true for European lobster (Homarus Gammarus) who do retain a relatively high level of mobility, in relation to edible crab (Cancer pagarus), the MMO, in consultation with Cefas, does not agree with this statement. Female edible crabs typically exhibit limited mobility during this period, which directly contradicts the statement made by you (the Applicant). Therefore, references of the evidence base used to make this statement must be provided."

ABPmer response

Although the evidence demonstrates that female edible (brown) crabs (*Cancer pagurus*) generally do not move away from dredged areas during incubation (Hunter *et al.*, 2013), brown crabs are known to be associated with rocky substrates, and also inhabit mixed sediments (i.e., coarse, sand, and soft sediments) particularly offshore where they dig into mud in search of food, or bury themselves to avoid strong currents (Hall *et al.*, 1993; Mesquita *et al.*, 2021). In support of this, brown crabs thrive in areas with weak to moderately strong tidal currents (Neal and Wilson, 2008).

The banks of both Bedwyn Sands and the North Middle Ground are exposed to strong tidal currents and sand is the dominant substrate (HR Wallingford, 2016), and therefore, do not provide brown crabs with their preferred tidal strength or habitat preference. In addition, surveys conducted in 2005 (Henderson *et al.*, 2006) found both areas to be highly impoverished with almost "no benthic fauna" recorded. Stations within the Licence Renewal Areas were characterised by sand habitat with a very low number of taxa and organism abundance. This would be expected, as tide swept, sand environments in highly dynamic estuaries have limited food availability and are typically characterised by a species poor, macrofaunal community consisting of epistrate or mobile opportunistic predators (HR Wallingford, 2016).

Although the surveys were conducted in 2005, the area continues to be a highly natural dynamic environment, and aggregate extraction and dredging activities at Bedwyn Sands and North Middle Ground have been occurring since 2008 and 2011, respectively. Thus, it is unlikely that any crustacea, including brown crabs, are present in the highly disturbed area.

2. Fisheries

MMO comments

"The MMO, in consultation with Cefas, welcomes the commitment made by you (the Applicant) to follow the Regional Seabed Monitoring Programme (RSMP) approach to monitoring which includes the periodic collection of seabed sediments to identify any physical and faunal changes to the seabed during the term any marine licence the MMO is minded to grant. The RSMP approach is supported by the MMO and Cefas advisors as this method can be used to inform habitat suitability assessments for herring and sandeel. In the event that a marine licence is granted, the MMO recommend that site-specific particle size analysis (PSA) data continue to be collected as part of the RSMP in order to monitor herring spawning and sandeel suitability of the primary impact zone (PIZ) and secondary impact zone (SIZ). It is also recommended that discussion of any changes in the suitability and distribution of sediments with potential to support sandeel, including suitable presentations of sediment composition in mapped form, is provided at the Year 5 and Year 10 substantive review stages."

ABPmer response

Site-specific PSA data will be collected as part of the RSMP in order to monitor herring spawning and sandeel suitability of the PIZ and SIZ.

As recommended, a discussion of any changes in the suitability and distribution of sediments with potential to support sandeel, including suitable presentations of sediment composition in mapped form, will be provided at the Year 5 and Year 10 substantive review stages.

3. Commercial Fisheries

MMO comments

"The MMO, in consultation with the Devon and Severn Inshore Fisheries Conservation Authority (D&S IFCA), considers that an assessment of the impacts of entrainment on Sandeel on a precautionary basis must be provided. While it is clear that section 4.4. of the ES outlines the approach to impact assessment, the definitions of terms are not clear, and are also not clearly evidence-based (e.g. in terms of defining magnitude of occurrence, probability of impact, and sensitivity), so it is not clear that the vulnerability of Sandeel to the effects of aggregate dredging is low, as suggested - especially considering that Sandeel will be affected by removal of substrate (potentially affecting both spawning and adult habitat), behavioural disturbance and mortality through entrainment. Given their role in the marine food web, Sandeel are arguably an important component of the fish assemblage sub-feature of the Estuaries feature. The reliance on old data and lack of new surveys to inform Sandeel distribution/density undermines confidence in the ES assumptions/conclusions. A more appropriate precautionary approach should be to consider the impact on Sandeel as being minor to moderate adverse.

The Regulation 33 advice for the Severn Estuary Special Area of Conservation (SAC) lists the Estuaries feature as having high sensitivity and high exposure and therefore high vulnerability to substratum loss; the Regulation 33 advice specifically mentions aggregate dredging in this regard. As Sandeel are highly dependent on this substrate throughout their lifecycle and are a component species in the fish assemblage sub feature of the Estuaries feature, it follows that they would have high sensitivity, high exposure and high vulnerability to substratum loss.

Considering the above on sensitivity, vulnerability and exposure, and assessing the impacts on an 8 hour per day basis (i.e., one third of the total time), the MMO, in consultation with D&S IFCA request that the ES is updated accordingly."

ABPmer response

A full audit trail of the assessment of the impact of entrainment on sandeel is provided below. It is not considered proportionate to update the Environmental Statement (ES) given that the significance of this impact remains minor adverse.

An assessment of the impacts of entrainment on sandeel was provided in Section 9.3.4 of the ES and in our previous comments logs. A standard impact assessment methodology has been applied which has been developed from a range of sources, including the Marine Works EIA Regulations, the EIA Directive (2014/52/EU), statutory guidance, consultations and ABPmer's previous (extensive) EIA project experience. ABPmer has an Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark, demonstrating their service excellence in leading the co-ordination of statutory EIAs in the UK. The assessment has also followed the principles of relevant guidance, including the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for ecological impact assessment in the UK and Ireland (which consolidate advice for terrestrial, freshwater, and coastal environments) (CIEEM, 2018) and IEMA guidelines (IEMA, 2016).

As explained in Section 4.4 of the ES, the impact assessment methodology involves understanding the 'magnitude or scale' of any potential change in baseline conditions. Magnitude of change needs to be considered in spatial and temporal terms (including duration, frequency and seasonality), and against background environmental conditions in a study area.

The following criteria has been used to assess the magnitude of change:

- Negligible: Changes that are barely discernible from existing baseline conditions;
- Small: Relatively localised changes that are often temporary in nature and / or a receptor has limited exposure to change;
- Medium: Receptors are subject to changes that occur over a large spatial area but the effects are considered temporary; and
- High: Receptors are subject to changes over a large spatial area with effects that are considered permanent / long-term duration.

Once a magnitude has been assessed, this should be considered in terms of the 'probability of occurrence' to derive an overall level of exposure. The probability of occurrence is effectively a measure of whether the change or pressure has a chance of taking place. Appropriate defining criteria for this element of the assessment methodology have therefore been considered as follows:

- High (i.e. certain to take place);
- Medium (i.e. likely and possible to take place);
- Low (i.e. possible but unlikely to take place); and
- Negligible (i.e. highly unlikely to take place).

The following standard criteria have been used to assess sensitivity:

- Negligible: Pressures in which there is unlikely to be any damage to individuals or populations;
- Low: Pressures in which the likelihood of damage to individuals or populations is low with recoverability expected to occur over short timescales;
- Moderate: Pressures in which damage to individuals or populations could occur but recoverability is expected to occur over short to moderate timescales; and
- High: Pressures in which damage to individuals or populations is highly likely with either no recoverability or recoverability expected to occur over longer timescales.

Sandeel demonstrate high habitat specificity and are highly reliant upon the availability of suitable sandy substrates (Wright *et al.* 2000, Holland *et al.* 2005, Tien *et al.* 2017, Langton *et al.* 2021; Scottish Government, 2023a). Bedwyn Sands and North Middle Ground are characterised by sand habitat (HR Wallingford, 2016), and therefore sandeel could reside in these areas. Furthermore, sandeels prefer habitats with sandy seabeds, as they burrow into the sand for protection and to hunt for food. They are typically found in shallow inshore waters, around beaches, estuaries, harbours, and piers (British Sea Fishing, 2024).

The banks of both Bedwyn Sands and the North Middle Ground are exposed to strong natural tidal currents and sand is the dominant substrate (HR Wallingford, 2016), and therefore, these areas provide sandeel with their optimal habitat preference. However, surveys conducted in 2005 (Henderson *et al.*, 2006) found both areas to be highly impoverished with almost "no benthic fauna" recorded. Stations within the Licence Renewal Areas were characterised by sand habitat with a very low number of taxa and organism abundance. This would be expected, as tide swept, sand environments have limited food availability and are typically characterised by a species poor, macrofaunal community consisting of epistrate or mobile opportunistic predators (HR Wallingford, 2016). Thus, it is unlikely that sandeel are present in significant numbers due to the limited food resources that they would burrow for (British Sea Fishing, 2024).

Furthermore, sandeels often form shoals in the water column during the day, but they return to the sand at night to burrow (Marine Gov Scot, 2024). Therefore, if aggregate extraction were in operation during the day, then it is less likely that sandeels would become entrained as they are more likely to be in the water column. As noted in the ES and previous comments logs, the assessment has been undertaken on the basis that the dredging could take place 24/7 as a worst case and thus could include activity during either the day or night. This notwithstanding, the intertidal nature of the extraction areas means that actual access to the sites is only possible for the dredger for up to around 2 hours either side of HW. Consequently, rather than being a possible 24/7 activity, extraction would only be taking place for an absolute maximum 33% of the day on a spring tide (assuming that dredging takes place continuously day and night over the full available tidal window per day of up to 8 hours on a spring tide which is an absolute worst case and highly unlikely to take place in reality).

Variations in the abundance and availability of sandeel can have important effects on both ends of the marine food web (top-down regulation of lower trophic levels and bottom-up effects on marine predators such as mammals, seabirds and predatory fish) (Scottish Government, 2023b). For instance, local stock collapses of sandeel caused breeding failure of several seabird species of Shetland and Scotland in the years before 2000 (Frederiksen *et al.* 2007; Johnsen *et al.*, 2017). Additionally, sandeel are a key prey species for marine mammals in Scottish waters, comprising a large proportion of the diet of seals and some cetaceans (Santos *et al.*, 2004; Wilson and Hammond, 2019), although the importance of sandeel to marine mammal diet varies with species and season.

In conclusion, it is evident that sandeel are highly dependent on sand substrate and have an important role in the marine food web. Thus, sandeel are a significant component of the fish assemblage sub-feature of the Severn Estuary SAC Estuaries feature. We fully appreciate that a precautionary approach for impacts on sandeel should be taken into consideration.

The proposed activity is for the continuation of ongoing marine aggregate extraction at Bedwyn Sands and North Middle Ground (Areas 455 and 459). In terms of the Marine Licence Application (MLA/2023/00467), only a small proportion of Bedwyn Sands is located within English waters (1.9 km^2) which represents a very small fraction of the total area of potentially suitable sand habitat for sandeels in the Severn Estuary. This activity has taken place at Bedwyn Sands since 2008. Overall, it is considered that only a very small percentage of the suitable substrate available to sandeels would be affected at any one time by the continuation of this existing and ongoing activity. Thus, taking a precautionary approach, the probability of occurrence is assessed as medium, and magnitude of change is assessed as small, leading to a low exposure to change.

Based on the evidence base presented in the ES and in previous comments logs, entrainment sensitivity is still considered moderate and consequently vulnerability is assessed as low. The importance of sandeels, however, has been reassessed as high given that they are considered an important component of the Estuaries feature and are also an important prey resource for protected features. Overall, therefore, when the standard assessment methodology is applied, a potentially **minor adverse** impact is re-assessed.

MMO comments

"In relation to the previous response provided by you (the Applicant) to comment 5.1 in the MMO's second changes required letter (dated 9 August 2024), although a range of dredging related stressors have been considered, the cumulative/in combination effects of these with other stressors such as climate change, pollution, and how the effects of one stressor can reduce resilience to other stressors have not been sufficiently considered. This must be included within the ES. The review also notes that "Although there are significant dredging operations undertaken across a range of aquatic environments, and an increasing body of literature documenting dredging-related effects on fish is available (e.g. Wenger et al. 2015), our knowledge of the relationships between multiple dredging-related pressures and of their cumulative or interactive effects on fish is still poor" and also "highlights the need for in situ studies on the effects of

dredging on fish which consider the interactive effects of multiple dredging-related stressors and their impact on sensitive species of ecological and fisheries value", suggesting that more site-specific evidence is required to understand the impacts on species such as sandeel and herring in the Severn Estuary SAC. Therefore, this must be provided for review."

ABPmer response

Requests for further site-specific evidence should be appropriate and balanced in relation to the potential impact of the proposed activities on the marine environment. The level of evidence that has supported the ES is sufficiently robust and proportionate to the nature and scale of the proposed activity, and the level of risk associated with the renewal of an existing and ongoing aggregate activity that has taken place at Bedwyn Sands for over 16 years.

A range of available scientific studies have been used to support the assessment of cumulative impacts of stressors from dredging activities on fish as noted in our previous comments logs.

It is recognised that there are a number of cumulative and in-combination effects on sandeel such as climate change, pollution, and fishing activities. Climate change can have negative impacts on sandeel populations as the rising sea temperatures can affect the availability of plankton, which is a primary food source for sandeels (Scottish Environment LINK, 2022). Other impacts, such as habitat loss and disturbance can detrimentally impact sandeel abundance as activities such as aggregate dredging and bottom trawling disturb the seabed, damaging the sandy habitats that sandeels rely on for burrowing. Furthermore, commercial fishing can result in overfishing, particularly industrial sandeel fishing which has significantly decreased sandeel populations (RSPB, 2024a). Overfishing not only impacts the sandeels, but also the species that rely on them for food, such as seabirds, larger fish, and marine mammals (RSPB, 2024b).

These cumulative stressors are having a knock-on effect throughout the food chain. Food webs in the North Atlantic are said to have a "wasp-waist" structure (i.e. pinched in the middle) in which there is a relatively low diversity of fish in the middle of the food chain and a much higher diversity of species above and below it. Consequently, any change in the abundance of 'mid-level' species like sandeels is likely to impact a significant number of animals, from the disproportionately large variety of species that feed on them to the similarly extensive variety of species that they themselves feed on (Scottish Seabird Centre, 2023).

As a result, all these cumulative and in-combination effects on sandeel lead to declining populations. These threats highlight the importance of conservation efforts to protect sandeel habitats and ensure the stability of marine ecosystems.

As outlined in the MMO's comment, the Severn Estuary SAC supports the Estuaries feature with unique environmental conditions that impact various species, including sandeel and herring.

Sandeel are specifically vulnerable to changes in sediment composition and water quality. The estuary's dynamic sediment flows and high turbidity can impact their spawning grounds and food source. In addition, as discussed above, aggregate dredging activities in the estuary can disturb the seabed which can have knock-on effects on sandeel habitats by altering the sediment structure and decreasing prey availability (Atterbury *et al*, 2021). Herring particularly depend on specific substrates for spawning . Therefore, any changes in sediment deposition and water quality within the estuary can disrupt these fundamental areas. Furthermore, nutrient run-off and pollution can cause eutrophication, which can affect water quality and the availability of plankton, which herring larvae feed on (Natural England, 2024).

In conclusion, it is evident that sandeel and herring are highly dependent on the habitats of the Severn Estuary SAC and cumulative/in-combination effects are anticipated from aggregate dredging activities at the site with other stressors, in particular climate change, pollution and fishing.

4. Migratory Species

MMO comments

"The MMO notes that the Environment Agency (EA), objects to the proposed dredging due to the current risk to eels. You (the Applicant) have acknowledged that there is a risk to European eels during the dredging process, albeit that the risk is predominantly during operations on the ebb tide. The EA have advised the MMO that where there is a risk to eels through an operation such as dredging, compliance with the Eels (England & Wales) Regulations 2009 is necessary.

The MMO has been advised by the EA that it is therefore necessary that the EA conducts a primary assessment to understand what the actual risk to eels is from the proposed operation. Depending on the outcome of this assessment, an exemption notice may be served if the risk to eels is considered acceptable. If the risk to eels is not acceptable, then the alternative measures process will be followed to determine necessary options to minimise the risk to eels. For this primary assessment to be conducted, the EA have advised that they will require details of the dredging system being used, such as detailed methodology, pump design, screening present, maximum abstracted volumes, timing of operation, location etc. Some of the information regarding the location and timing of operation is already available in the ES, however detailed information on the methodology and equipment being used in the operation must be provided to the EA.

In order to start the primary assessment process, you (the Applicant) must contact Jody Armitage, Fisheries Technical Specialist (Environment Agency) by email onsw_nwessexfrb@environmentagency.gov.uk."

ABPmer response

The further details that have been requested to be able undertake a primary assessment of the Bedwyn Sands and North Middle Ground (NMG) (Areas 455 and 459) Marine Aggregate Application – MLA/2023/00467 has been provided to the Environment Agency in an email dated 7 November 2024.

I hope the additional information included in this letter provides all the evidence you need to be able to determine the licence variation application.

Should you have any further queries, I suggest that a meeting would be the most appropriate manner to discuss and resolve any outstanding issues, and to assist in expediting the licence determination process. I look forward to hearing from you.

Yours sincerely
for ABPmer

[redacted]
Associate

5. References

Atterbury, A., Canning, S., Dinwoodie, K., Hall, R., Piesinger, N., Stewart, D., Thorpe, E. & West, L. (2021) Natural England and JNCC guidance on key sensitivities of habitats and Marine Protected Areas in English waters to aggregate resource extraction. JNCC Report No. 694. JNCC, Peterborough, ISSN 0963-8091.

British Sea Fishing (2024). Greater and Lesser Sandeel. Available at: https://britishseafishing.co.uk/greater-and-lesser-sandeel/

Carlin, D., Rogers, S (2002) A Procedure to Assess the Effects of Dredging on Commercial Fisheries. Prepared by CEFAS Lowestoft in support of CSG Contract A0253.

Charted Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for ecological impact assessment in the UK and Ireland (terrestrial, freshwater and coastal). CIEEM, London, 94p.

Drabble, R., 2012. Projected entrainment of fish resulting from aggregate dredging. *Marine Pollution Bulletin, 64*(2), pp.373-381.

Fraser, M.W., Short, J., Kendrick, G., McLean, D., Keesing, J., Byrne, M., Caley, M.J., Clarke, D., Davis, A.R., Erftemeijer, P.L. and Field, S., 2017. Effects of dredging on critical ecological processes for marine invertebrates, seagrasses and macroalgae, and the potential for management with environmental windows using Western Australia as a case study. *Ecological Indicators, 78*, pp.229-242.

Frederiksen M, Furness RW, Wanless S (2007) Regional variation in the role of bottom-up and top-down processes in controlling sandeel abundance in the North Sea. Mar Ecol Prog Ser 337: 279–286

Hall, S., Robertson, M., Basford, D., and Fryer, R. 1993. Pit-digging by the crab Cancer pagurus: a test for long-term, large-scale effects on infaunal community structure. Journal of Animal Ecology, 62: 59–66.
Henderson, P.A., Searby, R.M and Somes, J.R, 2006. The benthic fauna of the North Middle Grounds and Bedwyn Sands, Severn Estuary. Pisces Conservation Ltd.

Henderson, P.A., Searby, R.M and Somes, J.R, 2006. The benthic fauna of the North Middle Grounds and Bedwyn Sands, Severn Estuary. Pisces Conservation Ltd.

Holland, G.J., Greenstreet, S.P., Gibb, I.M., Fraser, H.M. & Robertson, M.R., 2005. Identifying sandeel Ammodytes marinus sediment habitat preferences in the marine environment. Marine Ecology Progress Series, 303, pp.269-282.

HR Wallingford. 2016. Review of aggregate dredging off the Welsh coast. Review of evidence. October 2016. Available online: https://www.gov.wales/sites/default/files/publications/2018-05/review-of-aggregate-dredging-off-the-coast.pdf

HR Wallingford. 2016. Review of aggregate dredging off the Welsh coast. Review of evidence. October 2016. Available online: https://www.gov.wales/sites/default/files/publications/2018-05/review-of-aggregate-dredging-off-the-coast.pdf

Hunter, E., Eaton, D., Stewart, C., Lawler, A. and Smith, M.T., 2013. Edible crabs "Go West": migrations and incubation cycle of Cancer pagurus revealed by electronic tags. *PLoS One*, *8*(5), p.e63991.
Jennings, S. and Kaiser, M. J. (1998). The effects of fishing on marine ecosystems. Advances in Marine Biology 34, 201–352.
Johannes, R. E. (1978). Reproductive strategies of coastal marine fishes in the tropics. Environmental Biology of Fishes 3, 65–84.

Johnsen, E., Rieucau, G., Ona, E. and Skaret, G., 2017. Collective structures anchor massive schools of lesser sandeel to the seabed, increasing vulnerability to fishery. *Marine Ecology Progress Series, 573*, pp.229-236.

Langton R., Boulcott P., Wright P.J. (2021) A verified distribution model for the lesser sandeel Ammodytes marinus. Mar. Ecol. Prog. Ser. 667: 145-159.

Marine Gov Scot. (2024). Lesser Sandeel habitat. Available online: https://marine.gov.scot/information/lesser-sandeel-habitat

Morgan, S. G. and Christy, J. H. (1994). Plasticity, constraint and optimality in reproductive timing. Ecology 75, 2185–2203.

Natural England. (2024). European Site Conservation Objectives for Severn Estuary SAC (UK0013030). Available online: https://publications.naturalengland.org.uk/publication/6081105098702848

Neal, K.J. & Wilson, E. 2008. Cancer pagurus Edible crab. In Tyler-Walters H. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 05-11-2024]. Available from: https://www.marlin.ac.uk/species/detail/1179

Newell, R.C., Seiderer, J.L., Hitchcock, D.R., 1998. The impact of dredging works in coastal waters: a review of sensitivity to disturbance and subsequent recovery of biological resources on the seabed. Oceanography and Marine Biology: an Annual Review 1998 (36), 127–178.

Pittman, S.J. and McAlpine, C.A., 2003. Movements of marine fish and decapod crustaceans: process, theory and application. *Advances in marine biology*, *44*(1), pp.205-294.

Rochet, M. J. (2000). A comparative approach to life–history strategies and tactics among four orders of teleost fish. ICES Journal of Marine Science 57, 228–239.

RSBP. (2024b). New hope for Puffins returning to UK shores following Sandeel fishing closure. Posted 16 April 2024. Available online: https://www.rspb.org.uk/media-centre/new-hope-for-puffins-returning

RSPB. (2024a). A huge moment for our struggling seabirds. Available online: https://www.rspb.org.uk/whats-happening/news/a-huge-moment-for-struggling-seabirds-sandeel-fishing

Santos, M.B., Pierce, G.J., Learmonth, J.A., Reid, R.J., Ross, H.M., Patterson, I.A.P., Reid, D.G. & Beare, D. (2004). Variability in the diet of harbor porpoises (Phocoena phocoena) in Scottish waters 1992–2003. Marine Mammal Science 20:1-27.

Scottish Environment LINK. (2022). Nature Champions: Sandeel. Available online: https://www.scotlink.org/species/sandeel/

Scottish Government. (2023a). Sandeel fishing consultation: review of scientific evidence. Published: 21 July 2023. From Marine Directorate. Available online: https://www.gov.scot/publications/sandeel-consultation-review-scientific-evidence/pages/1/

Scottish Government. (2023b). Sandeel fishing: consultation. Published: 21 July 2023. From Cabinet Secretary for Rural Affairs, Land Reform and Islands, Director of Marine. Available online: https://www.gov.scot/publications/sandeel-consultation-consultation-paper/pages/6/

Scottish Seabird Centre (2023). What's so great about Sandeels? By Emma Marriott, Conservation Assistant. 5 August 2023. Available online: https://www.seabird.org/blog/sandeels

Sogard, S. M. (1994). Use of suboptimal foraging habitats by fishes: consequences to growth and survival. In "Theory and Application in Fish Feeding Ecology" (D. J. Stouder, ed.), pp. 103–132. University of South Carolina Press, Columbia, South Carolina.

Tien N.S.H., Craeymeersch J., van Damme C., Couperus A.S., Adema J. &Tulp I. (2017) Burrow distribution of three sandeel species relates to beam trawl fishing, sediment composition and water velocity, in Dutch coastal waters. J. Sea Res. 127: 194–202.

Todd, V.L., Todd, I.B., Gardiner, J.C., Morrin, E.C., MacPherson, N.A., DiMarzio, N.A. and Thomsen, F., 2015. A review of impacts of marine dredging activities on marine mammals. *ICES Journal of Marine Science, 72*(2), pp.328-340.

Wilson & Hammond, P. (2019). The diet of harbour and grey seals around Britain: Examining the role of prey as a potential cause of harbour seal declines. Aquatic Conservation, Marine and Freshwater Ecosystems Vol 29 1:71-85.

Wright P.J., Jensen H. & Tuck I. (2000). The influence of sediment type on the distribution of the Lesser Sandeel, Ammodytes marinus. J. Sea Res. 44: 243–256.