Vision

The Eastern Inshore Fisheries and Conservation Authority will lead, champion and manage a sustainable marine environment and inshore fisheries, by successfully securing the right balance between social, environmental and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry

**Regulation and Compliance Sub Committee meeting**

**Addendum to Action Item 6 (Appendix 4)**

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**Addendum to Action Item 6 (Appendix 4) Marine Protected Areas Byelaw 2017**

**Appendix 4: Consideration of Natural England advice and feedback in the development of spatial closures**

Introduction

This document describes feedback from Natural England, the statutory nature conservation body, relating to the development of fishery management measures for marine protected areas in the Eastern IFCA district. It sets out how this advice has been considered during the selection of closed areas in the Marine Protected Areas 2017 byelaw. This document also explains where Eastern IFCA’s proposals deviate from Natural England’s advice, and the rationale for this.

The Marine Protected Areas byelaw introduces new spatial fisheries restrictions in two designated sites, namely The Wash & North Norfolk Coast Special Area of Conservation; and Haisborough, Hammond & Winterton Site of Community Importance. Natural England’s advice for each site is discussed separately below.

The Wash & North Norfolk Coast

Natural England’s advice has been provided in the form of feedback on Eastern IFCA’s Habitats Regulations Assessment of beam trawling in the Wash & North Norfolk Coast SAC. The assessment showed that two seabed habitats in this site were identified to be sensitive to damage from trawling. Eastern IFCA outlined proposed mitigation in the form of spatial restrictions and effort management. These proposals were submitted to Natural England with the assessment. Eastern IFCA officers have been in close liaison throughout the development of mitigation measures, resulting in general agreement on the approach taken. However, Natural England NE raised some questions (outlined in blue); EIFCA’s response to these is given below each one.

**1. What is the rationale to show why particular areas of sub-features were identified for closures and others were excluded? In particular:**

**a. How closures relate to sub-feature sensitivity.**

Closures are targeted at areas of each sub-feature in water deeper than 10m below chart datum (CD), where sub-features are considered most sensitive to the pressures arising from the trawl feet. In areas deeper than 10 metres below CD, there is little natural disturbance since wave energy is unlikely to regularly reach the seabed (with the exception of storms); therefore, sub-feature is likely to be more sensitive to disturbance from fishing than in shallower areas where there is more natural disturbance. Combining very high exposure to physical damage pressures with moderate feature sensitivity (as a worst case), vulnerability is considered moderate and supports the case for closures.

There is also a case for closing some areas of each sub-feature in waters shallower than 10 below CD. This is because some areas of these more shallow areas may have relatively little exposure to natural disturbance, but are frequently fished. A high exposure to fishing pressures combined with moderate feature sensitivity (as a worst case), can result in moderate vulnerability, supporting the case for closures.

**b. Closure size in the Wash seems small (especially 1 and 2)- resilience is limited if features move locally.**

Closure 1 and 2 (areas K and L) have a fishery buffer which, to some extent, could support resilience even if the sub-feature were to move locally. However, feature margins factoring in movement have not been applied. The reason for this is that NE advised that margins are not required due to not closing 100% of either sub-feature.

Closure 1 (K) incorporates an area of both sensitive sub-features, where there is confidence in the underlying evidence. Natural England have advised that this area be extended to incorporate a greater area of the sub-features, but evidence outside of the proposed closed area is weaker. It is therefore proposed to undertaken additional habitat survey in this area (planned for December 2016) to ascertain the value of extending this closed area.

In the case of closure 2 (L), lateral movement of either sub-feature is likely to result in the features becoming more intertidal as water depth shallows close to the adjacent mudflats. Also, movement of sub-features down the channel is likely to result in sand becoming more prevalent and potentially, changing the category of sub-feature altogether.

Eastern IFCA have attempted to select closure areas that will protect a significant proportion of the sensitive features across the site, and where feature evidence is sufficiently robust. For many parts of the Wash embayment where Natural England data shows sub-feature to be present, subsequent Eastern IFCA survey has contradicted this, leading to Eastern IFCA rejecting such areas from possible management. These decisions have been made in liaison with Natural England’s feature extent specialists and marine advisors.

The forthcoming review of the initial closures (for *Sabellaria spinulosa* reef and for boulder & cobble communities), planned for 2017, will include consideration of “mosaic” habitat surrounding features. This might create an opportunity for closure of wider areas that incorporate a range of sub-features, increasing resilience in relation to movement of features.

**c. How closures relate to fishing activity location.**

Inevitably, the nature of mitigation against fishing impacts means there will be restrictions on fishing activity. Closures 1, 2 and 3 (K, L and M) are located in areas of The Wash where shrimping is known to occur. Areas 1 and 2 (K and L) are particularly valued shrimping grounds for King’s Lynn and Boston vessels respectively. This is based on feedback from shrimp fishers (e.g. EIFCA questionnaire, EIFCA shrimp workshops, discussions) and EIFCA sightings data. However, these areas have been selected because of the relatively high confidence in feature data at these locations, and for area 2 (L) the added benefit of protecting the red-risk feature *Sabellaria spinulosa* reef. Wherever possible, and reflecting an approach taken with the red-risk closures introduced in 2014, closed areas have been selected to provide optimum protection for features with minimum impact on fishing activity – for example by trimming closure boxes around features.

Closure 4 (areas N, O and “seasonal restricted area”) is fished but to a lesser extent than activity in The Wash and again, balances sub-feature protection with impact to the shrimp fishery. It captures a relatively large area of both sub-features.

Closure 5 (area P) replicates an existing closed area under EIFCA byelaw 12 (closure to towed gear fisheries). This has been chosen to protect a second large, coherent area of the sub-features without additional impact on the fishery.

Feature evidence for closures 4 and 5 (N, O, seasonal restricted area and P) has not been verified or discounted by additional Eastern IFCA surveys. It is considered more important to focus limited survey resource on the more contentious closure (1) (area L) where impact to fishing activity will be greater.

**d. Consider inclusion of existing red closures as these are likely to provide additional protection for subtidal sediment subfeatures (where reef is absent).**

Closure 2 (area L) contains a small area of *S.spinulosa* reef from area A of the Protected Areas Byelaw 2014. Closure 3 (area M) will protect *S.spinulosa* reef that was not previously identified in the 2014 byelaw, but is likely to be proposed for closure as “new” red risk feature in the 2017 review of existing red risk closures.

It is likely that existing red risk closures do incorporate some areas of subtidal mud and mixed sediment, although the *Sabellaria* closures are relatively small areas.

**2. Are buffers proposed suitable for shrimp gears in shallow waters? Are the relatively longer than usual warps that are used in shallow shrimp fisheries taken into account?**

Shortened warps are used in shallower water so that the angle of the warp in the water achieves optimal gear seabed contact. The proposed depth-based buffers are thus considered adequate.

**3. Inclusion of rationale behind including only shoes as part of the footprint and not the rest of the ground gear. This will also affect effort management considerations. Reducing exposure from high to moderate levels for each sub-feature is a good approach. However, current calculations are based on the presumption that an impact is only caused by shoes and not the whole ground gear.**

The beam shoes are designed to penetrate the seabed surface during a tow and so are considered to exert significant shallow/sub-surface penetration and biological disturbance pressures.

The net does not dig into the seabed in such a way as to impart shallow or sub-surface penetration, nor significant biological disturbance pressures.

Physical abrasion of the seabed and siltation rate change are likely to be exerted to a greater extent and magnitude through natural disturbance, compared with these pressures generated by the net and ground gear. Hence these gear components have been assessed as not exerting significant physical abrasion or siltation rate change.

Ground gear (bobbins on a ground rope) are not included in the impact footprint as this gear component is not considered to exert significant shallow and sub-surface penetration and resulting biological disturbance pressures. This is because where vessels use ground gear, the bobbin rope curves during a tow and so only some of the bobbins are in full seabed contact and for a temporary duration. This is supported by evidence from a trawling impact study on *Sabellaria spinulosa* reef, where bobbins made seabed contact for 39% of the overall trawl duration (20 mins) (Vorberg, 2000). Added to which, not all vessels use bobbins and so this reduces the likelihood of the pressures being exerted in the first place.

Vorberg, R (2000). Effects of shrimp fisheries on reefs of *Sabellaria spinulosa* (Polychaeta). *ICES Journal of Marine Science.* 57, 1416-1420.

Notwithstanding this, Eastern IFCA recognised there should be some consideration of impacts from ground gear on seabed habitats. The footprint calculations within the habitats regulations assessment have been revised to incorporate this. The proposed effort limitation measures reflect this updated approach.

**4. A monitoring and control plan is required. Full details for this may not be available now, but it is important to have a clear statement of timelines and how management will respond to monitoring results.**

Eastern IFCA officers have been working with Marine Management Organisation and Natural England to develop the concept of monitoring and control plans for commercial fishing activities in marine protected areas. Eastern IFCA did not intend to complete a Monitoring and Control Plan for inclusion within the final assessment document for this site, but have outlined principles to be addressed in the Monitoring and Control Plan for consideration by Natural England.

**Areas of uncertainty**

**1. Sub-feature vulnerability:**

**a. Sensitivity information- often based on sensitivity assessments that are not specific to level of pressure and/or subfeature. Limited direct evidence.**

Assessment for subtidal mixed refers to Hall et al., (2008) rating of moderate sensitivity and moderate levels of light towed demersal gear.

Evidence for subtidal mud looked in detail for sensitivity of biotopes of the sub-feature and in the case of the broader sub-feature, sensitivity is inferred from analogous habitats and pressures. Sensitivity is linked to biotopes (sediment types and key species present within or on the surface of the sediment), as considered within the assessment document.

The gear trial study may help in the assessment of sensitivity for subtidal mixed sediment in the SAC and thus fill this evidence gap.

**b. Exposure: Shrimp fishing activity location and level uncertain.**

The fishing activity evidence summary (annex 2) of the habitats regulations assessment does highlight the limitations of fishing activity data and resulting uncertainty.

Through the proposed Monitoring and Control Plan, EIFCA’s shrimp returns scheme, and forthcoming i-VMS, we are planning to improve activity evidence for shrimping.

**c. Recoverability – evidence for length of time for recovery is weak and there is uncertainty around length of time available for recovery for an ongoing fishery.**

Sub-feature recoverability has relied on published literature to infer recovery times. The published literature that have been used are considered best available evidence at the time of the assessment. If further evidence becomes available about recoverability with existing fishing pressures, then we would seek to review and incorporate this into the assessment.

**2. Natural disturbance:**

**a. Limited evidence for natural disturbance as an indicator for tolerance of sediment communities to trawling impacts.**

There is evidence from primary literature to show that areas where natural disturbance is high, the effects on fishing pressure on infauna are less likely to be significant e.g. Kaiser *et al.,* (1998), Szostek *et al.,* (2015), Lambert *et al.,* (2011), Diesing *et al.,* (2013). This is because high natural disturbance can increase resilience to fishing disturbance in two ways: firstly, by selecting for fast-growing opportunistic species and secondly, these areas may favour species with traits that pre-adapt them to withstand disturbance such as hard shells, deep burrowing and high mobility (Diesing *et al.,* 2013).

There is variation between different habitats; therefore, this is reasonable justification for choosing areas that have a lower natural disturbance for closures as these require greater protection than areas that are naturally disturbed. Areas with high natural disturbance are likely to be less sensitive to disturbance from fishing, because the species that are in the area are more likely to survive.  
  
Natural disturbance such as wave and tidal scouring form a background against which other disturbances occur (Kaiser *et al.,* 1999). These other disturbances (particularly fishing) will have an additive effect on benthic communities. Due to the long-time scales in which fishing disturbance has occurred, predictions of long and short term ecological changes are complicated. And this is backed by a plethora of scientific literature:

Kaiser M,J. (1998). Significance of Bottom-Fishing Disturbance. *Conservation Biology*. 12, (6), 1230-1235.

Diesing M, Stephens D, Aldridge, J . (2013). A proposed method for assessing the extent of the seabed. *ICES Journal of Marine Science*. 70, (6),1085-1096.

Collie JS, Hall SJ, Kaiser MJ, Poiner IR. (2000). A quantitative analysis of fishing impacts on shelf-sea benthos. *Journal of Animal Ecology,* 69, 785-798

Szostek CL, Murray LG, Bell E, Rayner G, Kaiser MJ. (2015). Natural vs. fishing disturbance: drivers of community composition on traditional king scallop, Pecten maximus, fishing grounds. *ICES Journal of Marine Science*. doi:10.1093/icesjms/fsv152.

Lambert GI, Jennings S, Kaiser MJ, Hinz H, Hiddink JG. (2011). Quantification and prediction of the impact of fishing on epifaunal communities. *Marine Ecology Progress Series*. 430, 71-86.

Bolam SG, Coggan RC, Eggleton J, Diesing M, Stephen D. (2014). Sensitivity of macrobenthic secondary production to trawling in the English sector of The Greater North Sea: A biological trait approach. *Journal of Sea Research*. 85, 162-177.

Dellapenna TM, Allison MA, Gill GA, Lehman RD, Warnken KW. (2006). The impact of shrimp trawling and associated sediment resuspension in mud dominated, shallow estuaries. *Estuarine coastal and Shelf Science*. 69, 519-530.

Diesing M, Stephens D, Aldridge J. (2013). A proposed method for assessing the extent of the seabed significantly affected by demersal fishing in the Greater North Sea. *ICES Journal of Marine Science*. 70 (6), 1085-1096.

**b. Limited evidence for depth cut-off point (10 m) used to indicate sensitive and less sensitive areas.**

Depth of the sub-feature is an important consideration in understanding fishing disturbance in relation to natural disturbance. A depth of 10 m below chart datum (CD) has been chosen in this assessment to distinguish shallow from deep areas of sub-features as chart datum is equivalent to the lowest expected astronomical tide. In water shallower than 10 m below CD, wave energy reaches the seabed and sub-features as water depth is less than half a wave length. Whereas in water deeper than 10m below CD, the depth of water is half the wavelength especially with tidal height; therefore, typical wave energy is not likely to reach the sub-features on the seabed[[1]](#footnote-1). Occasionally, storms generate wave energy that is capable of affecting sub-features deeper than 10m below chart datum and will definitely affect sub-features in water shallower than 10 metres from CD.

**3. Impact of gear:**

**a. No evidence relating specifically to shrimping gear.**

This is noted. It is intended that the Wash shrimp gear trial, to be undertaken with industry and academic support and utilise European Maritime & Fisheries Fund funding, will provide further site based evidence for shrimping gear that is unique to this area.

**b. Uncertainty around impacts of various gear parts e.g. shoes, ground gear.**

Best available evidence has been utilised. This includes primary literature where pressures arising from beam trawl gear components have been modelled:

Eigaard et al., (2015) Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions. *ICES Journal of Marine Science*. doi:10.1093/icesjms/fsv09.

Depestele et al., (2015) Measuring and assessing the physical impact of beam trawling. *ICES Journal of Marine Science,* 73, (1). doi:10.1093/icesjms/fsv056

Again, the Wash shrimp gear trial should provide further site based evidence for shrimping gear.

**4. Lack of a baseline: Given ongoing fishing, there is no information available to indicate how undisturbed subtidal sediment communities would look.**The W&NNC SAC was designated in 1996 and at this time, shrimp trawling had been on-going for a long time. As such the environmental baseline for the SAC being used as a basis for management already incorporates the effects of shrimping and so will not be reflective of undisturbed sedimentary communities.

Haisborough, Hammond & Winterton

Eastern IFCA was not required to undertake a habitats regulations assessment for the effect of towed demersal gear on *Sabellaria spinulosa* reef, since this is a “red risk” interaction. This category requires restrictions be applied without assessment, since impacts of such gear on such sensitive features are widely understood and agreed.

For this site, Natural England advised Eastern IFCA on “areas to be managed as *Sabellaria spinulosa* reef”. This advice was based on the mapped extent of this feature in the site; the extent was derived from the outputs of five benthic habitat models applied after a regional survey undertaken in 2010. This modelling approach was very different from the core reef approach that Eastern IFCA has used to select restricted areas in the Wash & North Norfolk Coast for *Sabellaria* reef.

The core reef approach had been developed over several years and agreed with Natural England and the Joint Nature Conservation Committee as the best approach to managing this feature. It is dependent upon a time series of data (repeat survey) with information on the presence and quality of the feature (e.g. reef elevation, patchiness, occupancy of tubes and area).

Eastern IFCA officers had been involved in the development of the core reef approach and its application in the Wash and North Norfolk Coast. The contrasting (modelled extent) approach for Haisborough Hammond and Winterton presented a challenge, in that officers considered there to be insufficient evidence to justify closing extensive areas where reef had been predicted by models where this had not been verified with ground truthing (video and grab samples). The data provided by Natural England were rigorously checked by Eastern IFCA and four priority areas were identified for potential management, subject to further verification. The priority areas were selected on the basis of how well the five models agreed (in predicting extent of *Sabellaria* reef) and where ground truthing data supported this.

A workshop was arranged in September 2016 to examine the available evidence for reef in the inshore part of this site (i.e. the area in Eastern IFCA’s district) and to agree a way forward. It was agreed that one reef area (area R) had sufficient evidence to warrant a closure, and that Eastern IFCA would commission a survey to verify predicted reef areas at the three remaining priority areas. Furthermore, Eastern IFCA obtained video data from a Cefas survey in summer 2016 which was used to refine the priority survey areas.

Eastern IFCA undertook video surveys at the three priority areas in October 2016. The results were analysed and a survey report produced. A combination of the original modelled extent information, Cefas video data and Eastern IFCA video verification results were used to draw up the proposed areas S and T for closure in the Marine Protected Areas Byelaw 2017. One of the priority areas was rejected from the byelaw because verification showed it contained an extensive area of sand with no indication of *Sabellaria spinulosa*.

Eastern IFCA officers consider that areas R, S and T contain high quality *Sabellaria spinulosa* reef and are therefore justified for closure to towed demersal fishing activity.

1. The calculation for wave lengths in deep water (water depth > half a wavelength) is wavelength (L) =1.56xT2 (where T=wave period). This generates a wavelength of approximately 25m for a wave of period 4 seconds. A typical wave of period 4 seconds will affect the seabed in a measurable manner down to depth of 25 / 2 = 12.5 metres below CD. However, with inclusion of tidal height, it is likely that 10 metres is a depth that wave energy reaches in deepest waters. [↑](#footnote-ref-1)