Kent and Essex Inshore Fisheries Conservation Authority

Fisheries in EMS Habitats Regulations Assessment for the Thames Estuary Cockle Permit Fishery Outside the Area covered by the Thames Estuary Cockle Fishery Order Area Fishery 1994 (AREA 7 ONLY)

European Marine Sites: Essex Estuaries SAC

- Outer Thames Estuary SPA
- Mid Essex Coast SPA
  - Phase 1: Dengie
  - Phase 5: Foulness

- Mid Essex Coast Ramsar
  - Phase 1: Dengie
  - Phase 5: Foulness

Fishing activities assessed: Cockle suction dredging
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ii. Revision history

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<thead>
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<th>Version</th>
<th>Date</th>
<th>Author</th>
<th>Reason</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>20/08/2020</td>
<td>A Plumeridge</td>
<td>Draft for NE</td>
<td>Draft</td>
</tr>
</tbody>
</table>
1. Introduction

1.1 Need for a Habitats Regulations Assessment

This HRA covers the exploitation and management of cockle stocks within the Thames Estuary Cockle Permit Fishery Outside the Area covered by the Thames Estuary Cockle Fishery Order Fishery (TECFO) 1994. In 2020, the permit fishery will only occur in Area 7 (Figure 1).

Permits for cockle harvesting outside the TECFO area are issued by Kent and Essex Inshore Fisheries and Conservation Authority (KEIFCA) each year under strict management regulations. The issuing of these permits is subject to provisions of Article 6(3) of the Habitats and Birds Directives.

The purpose of this site specific assessment document is to assess whether, in the view of KEIFCA, the fishing activity of cockle suction dredging in the KEIFCA Cockle Permit Fishery (area 7 in Figure 1) have a likely significant effect on features of EMS (Essex Estuaries SAC, Outer Thames Estuary SPA, Mid Essex Coast SPA (Phases 1: Dengie, and 5: Foulness) and Mid Essex Coast Ramsar (Phases 1: Dengie and 5: Foulness) (Figure 1) and, on the basis of this assessment, conclude whether or not cockle suction dredging will have an adverse effect on the integrity of EMS designated features. This document is to be used in conjunction with tests of Likely Significant Effect already completed and approved by Natural England (NE). Conservation features and sub-features of these European Marine Sites are listed in Table 1 below.

Due to restrictions caused by the COVID19 pandemic in 2020, KEIFCA have been unable to complete this year’s cockle survey, usually conducted in April of each year, that allows for the calculation of a Total Allowable Catch (TAC). As such, historical data from the 2019 survey will be used as a proxy to determine the current year’s TAC for the fleet. KEIFCA have collected stock assessment data for the cockle permit fishery for the past 20 years, with results published in the annual Cockle Report (https://www.kentandessex-ifca.gov.uk/about-us/corporate-publications/cockle-report/). The method used to set a TAC has been used by KEIFCA for over two decades and resulted in a sustained population of cockles. KEIFCA are therefore, confident that the use of historical data and knowledge of the fishery will result in an appropriate TAC for this year (Section 6).

Table 1: Conservation features of European Marine Sites potentially impacted by the Thames Estuary Cockle Permit Fishery outside the Area covered by TECFO occurring in Area 7.

<table>
<thead>
<tr>
<th>Site</th>
<th>Feature</th>
<th>Sub Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid Essex Coast SPA and RAMSAR</td>
<td>Phase 1: Dengie</td>
<td>Waterbird assemblage</td>
</tr>
<tr>
<td></td>
<td>Phase 5: Foulness</td>
<td>Waterbird assemblage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outer Thames Estuary SPA</td>
<td>Breeding birds - Common tern, Little tern</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overwintering birds - Red throated diver</td>
<td></td>
</tr>
<tr>
<td>Essex Estuaries</td>
<td>Atlantic salt meadows</td>
<td></td>
</tr>
<tr>
<td>SAC</td>
<td>Estuaries</td>
<td>Intertidal coarse sediment, mud, seagrass beds, rock, sand and muddy sand, mixed sediments. Subtidal mud, mixed sediments, coarse sediment, sand, seagrass beds. Atlantic salt meadows</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mediterranean and thermo-Atlantic halophilous scrubs</td>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
<td>Intertidal mixed sediments, sand and muddy sand, coarse sediment, seagrass beds, mud</td>
</tr>
<tr>
<td>Salicornia and other annuals colonising mud and sand</td>
<td>Sandbanks which are slightly covered by sea water all the time</td>
<td>Subtidal coarse sediment, sand, seagrass beds, mud, mixed sediments</td>
</tr>
<tr>
<td>Spartina swards</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Location of Cockle permit fishery harvesting areas and relevant European Marine Sites.

The permit cockle fishery comprises seven harvesting areas within the KEIFCA district. In 2020, the only harvesting area to be opened for the cockle permit fishery will be area 7. As a result, only European Marine Sites which overlap area 7 will be included in this assessment.
In addition, while the northern end of the Mid Essex Coast SPA Phase 5 (Foulness) does fall within harvesting area 7, this area is closed to cockle boats during the permit fishery. The Crouch channel separating the Maplin Sands from the Ray and Buxey Sands is patrolled during the season to ensure no boats fish on the Foulness or Maplin Sands. As a result of this, the Mid Essex Coast SPA and RAMSAR Phase 5 (Foulness) can also be screened out from the assessment.

The management decision to allow fishing activity to occur in Area 7 means there is the potential for fishing activity to overlap with the Mid Essex Coast Phase 1 (Dengie) SPA and Ramsar site. However, the number of cockles on the Dengie has been consistently low since the opening of the fishery and remained so in the 2019 survey. In addition, since 2014, no boats have been known to fish for cockles on the Dengie part of Area 7 as it is considered uneconomical in comparison to more productive sites such as the Buxey and Ray Sands, due to the far larger numbers of cockles on these parts of the area (Table 5). Survey results are supplied to the industry, they are therefore aware of the significantly lower numbers and it is anticipated that no harvesting activity will take place on the Dengie Sand. The Dengie has therefore been scoped out of this assessment. The fishery also takes place outside of the highly sensitive period for SPA designated bird species (Table 1), therefore, it is highly unlikely that they will incur any significant impact as a result of the permit cockle fishery.

The EMS which may be impacted and will be assessed in this document are:
- Essex Estuaries SAC
- Outer Thames Estuary SPA

The permit cockle fishery season is only 3 days long, running from Tuesday the 6th of October to Thursday 8th October 2020. During this time each of the 30 permitted boats will be allowed to complete one trip, landing a maximum of 13.6 m³ of cockles. In reality, this TAC for the fleet, being set for only one fishing trip, results in a fishery which is completed within the first 24 hours of the fishery opening.

2. Conservation objectives

Conservation objectives ensure that the integrity of an EMS is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which qualifying natural habitats rely

Natural England have provided conservation advice for each of the EMS to be assessed, although in the case of Ramsar sites, Defra and Natural England have chosen not to produce conservation advice packages, instead relying on the conservation advice packages for the overlapping SPA designations.

3. Interest features of the EMS categorised as ‘Red’ risk and overview of management measures

Red risk interaction:
- **Feature**: Estuaries; Seagrass; eelgrass bed communities, red throated divers, common tern, little tern
- **Gear type**: Towed (demersal); towed (demersal/pelagic); dredges (towed); dredges (other)
In December 2013 KEIFCA issued a byelaw prohibiting the use of all bottom towed fishing gear within specified areas of the Essex Estuaries SAC to protect seagrass (Zostera spp) and therefore prevent damage to or deterioration of the sites (please refer to www.kentandessex-ifca.gov.uk for the full byelaw conditions).

4. Overview of fishing activities within the EMS designated areas

Area 7 of the permit fishery covers portions of both the Essex Estuaries SAC and the Outer Thames SPA (Figure 1) with a variety of fishing methods undertaken across the site. The SAC contains one of Essex’s main commercial fishing ports, West Mersea, which is home port to 28 vessels, all of which are under 10 m (MMO registered fishing vessel list, February 2019). In addition, there are 10 smaller fishing ports within the SAC boundaries, with a total of 16 registered fishing vessels working out of them, only 1 of which is over 10 m. The ports of Clacton-on-Sea, Leigh-on-Sea and Southend-on-Sea are outside the SAC boundaries, but vessels from these ports are known to work within the boundaries of the SAC on occasion. There are an additional 36 vessels registered at these three ports, with 14 over 10 m. Fishing in Essex Estuaries SAC is primarily conducted by a non-nomadic fleet.

It should be noted that the Cockle Permit Fishery does attract boats from outside the district specifically to dredge for cockles before leaving the district. In total 30 permits have been issued for the 2019 fishery: 14 permits for the TECFO cockle boats; 7 permits for other boats within the KEIFCA district; and 9 permits for boats from the EIFCA district.

Table 2. Number of fishing vessels registered at each port within, or close to, Essex Estuaries SAC. Taken from UK Fleet Register for February 2019.

<table>
<thead>
<tr>
<th>Port</th>
<th>No under 10 m</th>
<th>No over 10 m vessels</th>
<th>Total No vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradwell</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Brightlingsea</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Burnham-on-Crouch</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Clacton-on-Sea</td>
<td>9</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>Colchester</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Great Wakering</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Leigh-on-Sea</td>
<td>7</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>Maldon</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Paglesham</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Rochford</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Southend-on-Sea</td>
<td>6</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Tollesbury</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>West Mersea</td>
<td>28</td>
<td>-</td>
<td>28</td>
</tr>
<tr>
<td>Wivenhoe</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>14</td>
<td>80</td>
</tr>
</tbody>
</table>

Commercial fishing occurs within the site using a variety of gears;

- **Potting**: Common year-round, primarily for whelks, lobsters and edible crabs.
- **Static and drift netting**: Common year-round in the SAC, targeting bass during the summer and cod or mullet in the winter. Drift netters also target sole.
- **Trawling**: Otter trawls and multi-rig trawls are common year-round, with one pair of vessels regularly engaged in pair trawling in the area. Sole, cod, bass and thornback ray are the target species.
- **Mussel dredging:** Occurs very occasionally for seed mussel, but is done under KEIFCA permit and is closely monitored.

- **Cockle suction dredging:** The site boasts an extensive cockle fishery which has been managed under the Thames Estuary Cockle Fishery Order (TECFO) since 1994. This is a seasonal fishery from June to September/October. Outside of the TECFO, cockle fishing is managed by KEIFCA cockle byelaw which requires vessels to have a permit to cockle suction dredge. In 2015 and 2016 no permits were issued, while 35 permits were issued in 2017 and 2018.

- **Oyster dredging:** Public native oyster (*Ostrea edulis*) beds are closed under the new Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone Native Oyster Permit Fishery Byelaw, and will remain closed until such time as the native oyster stocks are deemed to have recovered to sufficient levels to allow sustainable harvesting. Dredging for Pacific oysters (*Crassostrea gigas*) on public grounds is still permitted, and Natural England are providing advice on this fishery as it removes this non-native species from the estuary.

- **Mariculture (bivalve molluscs):** Common within the site for oysters (both native and Pacific) and mussels. There is low level commercial clam dredging in the river Crouch.

- **Bait digging/hand gathering:** Harvesting of bait and shellfish occurs on the shores both commercially and recreationally. There is one known area of commercial crab tiling within the SAC.

Additionally, there is a thriving recreational angling industry in the area, as well as a few small hobby shrimp fishermen.
5. Test of Likely Significant Effect (LSE)

The Habitats Regulations assessment (HRA) is a step-wise process and is subject to a coarse test of whether a plan or project will cause a likely significant effect on a European marine site¹.

5.1 Completed and approved tests for LSE

As part of the Defra revised approach to managing fisheries in EMS, tests of LSE were completed by KEIFCA for impacts of cockle suction dredging on features of the SPAs and SAC. Table 2 summarises the tests completed and approved by Natural England (NE). These tests of LSE were reviewed by KEIFCA in April 2016 and are still valid. Features that have already been assessed and found to not be significantly impacted by cockle suction dredging will not be assessed further in this document. From the initial tests of LSE, any interactions of cockle suction dredging with features where no LSE could not be concluded will be assessed further (Table 3).

Table 3: Summary of completed and approved tests of LSE for the impact of cockle suction dredging on EMS features and sub-features. A result of ‘NO’ concludes there is no likely significant impact of cockle suction dredging on that feature, conversely a result of ‘YES’ concludes that a result of no LSE could not be proved and a full appropriate assessment is required to determine the impacts, if any, on the EMS features.

<table>
<thead>
<tr>
<th>EMS and feature/sub-feature</th>
<th>Document reference</th>
<th>Result of test of LSE</th>
<th>Date approved by NE</th>
<th>Date last reviewed by KEIFCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essex Estuaries SAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sandbanks which are slightly covered by seawater all the time</td>
<td>KEIFCA/EE/23</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Salicornia and other annuals colonizing mud and sand</td>
<td>KEIFCA/EE/24</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Spartina swards (Spartinion maritimae)</td>
<td>KEIFCA/EE/24</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</td>
<td>KEIFCA/EE/24</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticose)</td>
<td>KEIFCA/EE/24</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
<td>KEIFCA/EE/25</td>
<td>YES</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Estuaries</td>
<td>KEIFCA/EE/26</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
<tr>
<td>Outer Thames SPA - Red Throated Diver, Common Tern, Little Tern</td>
<td>KEIFCA/EE/26</td>
<td>NO</td>
<td>22/09/2015</td>
<td>13/04/2016</td>
</tr>
</tbody>
</table>

Feature/fishing gear interaction assessed by MMO and concluded to have no LSE on Red Throated Diver. (see section 5.1.1 below). The Common and Little Terns are a protected feature of the EMS during breeding season which runs from May until August. With the fishing season running for 3 days at the start of October no interaction is anticipated.

5.1.1 Supporting Habitat of Red Throated Diver

The main pressures on red throated diver populations and their associated supporting habitats from commercial suction dredging activities are:

• Physical disturbance to red throated divers by fishing activity, potentially reducing available habitat for foraging birds, displacing birds from feeding or resting grounds and altering behaviour.

• Biological disturbance from fishing gear causing mortality of birds through direct entanglement or extraction of food availability

• Physical damage to the supporting seabed habitat from suction dredges which could reduce prey and/or foraging areas.

Due to the seasonality of the fishery and with such a short duration (potentially 3 days, but in reality only 24 hours), Natural England advises that the red throated diver is unlikely to be directly affected by suction dredging for cockles in Area 7. Additionally, the supporting habitats listed for the Outer Thames SPA (water column, subtidal sediments and circalittoral mud) are unlikely to be significantly impacted in a way that impact the red throated diver population when individuals are using the site outside of the cockle fishery season.

Figure 2: Heatmap showing fishing activity from the 2017 and 2018 outside cockle permit fisheries.

5.2 Assessment of LSE

Table 4: test of Likely Significant effect of cockle suction dredging on intertidal mud and sand communities (Essex Estuaries SAC).
1. Is the activity/activities directly connected with or necessary to the management of the site for nature conservation?  

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

2. What potential pressures such as abrasion/physical loss by gear type(s) are likely to affect the interest features? (reference to conservation objectives)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Abrasion/disturbance of the surface of the seabed</td>
<td></td>
</tr>
<tr>
<td>2. Genetic modification &amp; translocation of indigenous species</td>
<td></td>
</tr>
<tr>
<td>3. Introduction of microbial pathogens</td>
<td></td>
</tr>
<tr>
<td>4. Introduction or spread of non-native species</td>
<td></td>
</tr>
<tr>
<td>5. Organic enrichment</td>
<td></td>
</tr>
<tr>
<td>6. Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion</td>
<td></td>
</tr>
<tr>
<td>7. Physical change (to another seabed type)</td>
<td></td>
</tr>
<tr>
<td>8. Removal of non-target species</td>
<td></td>
</tr>
<tr>
<td>9. Siltation rate changes (high &amp; low), including smothering</td>
<td></td>
</tr>
</tbody>
</table>

3. Are the qualifying features potentially exposed to the pressure(s)?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Yes – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure</td>
<td></td>
</tr>
<tr>
<td>2. No - Fishing mortality/trait selectivity would have to be at very high levels to lead to genetic modification; considered unlikely for this activity</td>
<td></td>
</tr>
<tr>
<td>3. No – Insufficient activity levels to pose risk at level of concern</td>
<td></td>
</tr>
<tr>
<td>4. No – Fleet operates in local area so risk considered to be extremely low</td>
<td></td>
</tr>
<tr>
<td>5. No – Insufficient activity levels to pose risk at level of concern</td>
<td></td>
</tr>
<tr>
<td>6. Yes – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure</td>
<td></td>
</tr>
<tr>
<td>7. Yes – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure</td>
<td></td>
</tr>
<tr>
<td>8. Yes – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure</td>
<td></td>
</tr>
<tr>
<td>9. Yes – Need to consider spatial scale/intensity of activity to determine likely magnitude of pressure</td>
<td></td>
</tr>
</tbody>
</table>
4. Potential scale of pressures and mechanism of effect/impact (if known)

The Essex Coast is home to two highly managed cockle fisheries: one within the Thames Estuary Cockle Fishery Order (TECFO) and one outside (managed by the KEIFCA cockle permit byelaw).

The Thames Estuary Cockle Fishery Order (TECFO) was established in 1994 and manages an area that includes sections of the Essex Estuaries SAC, Foulness, Benfleet and Southend Marshes and the Thames Estuary and Marshes SPAs. The TECFO enables KEIFCA to limit the number of licences issued to persons wishing to exploit the commercial fishery within these areas, which is reviewed every year. This has been restricted to 14 vessels for a number of years, which has restricted effort on the grounds within the TECFO. Activity is also restricted temporally. The TECFO allows the restriction of vessels fishing time on the grounds by control of landings and fishing days. Fishing is opened for a limited season by KEIFCA, based on stock surveys and fishery monitoring. During this time, vessels are restricted in the number of trips they can take. These factors limit the potential impacts of suction dredge fishing on benthic features of Essex Estuaries SAC.

Outside of the TECFO, cockle fishing is managed by KEIFCA cockle byelaws. This applies to Dengie, St. Peters Flats and Buxey Sand areas of Essex Estuaries SAC. The byelaw restricts fishing activity by requiring that fishers are in possession of a permit to fish in these areas. When these areas have been opened to fishing, an average of 30 to 35 vessels have taken part in fishing during the limited 1 week open period under the permit fishery byelaw. This restricts effort on the grounds.

Primary impact of dredge fisheries on benthic habitats is reduction in diversity and abundance of biota. This includes benthic infauna such as burrowing shrimps as well as surface dwelling erect epifauna and flora (Kaiser et al., 2006). Clarke and Tully (2014) concluded that in addition to the expected reduction in bivalve abundances, cockle suction dredging also impacted on the wider ecosystem, although these effects were mainly seasonal and spatial.

Eastern IFCA (Sebastian, 2012) examined the impacts of cockle suction dredging on particle size and benthic epifauna and recovery over time. No significant difference was found in sediment composition between control sites and sites that had been dredged, either directly after dredging had occurred or after three months. The study also suggested that cockle dredging had little or no immediate impact on associated biota and that recovery occurs within one month.

Alteration of the physical structure of the seabed can lead to degradation of overall communities supporting an ecosystem within an area. Abrasion and dispersal of material from benthic habitats can occur at various levels through the use of dredge fisheries.

Burial and smothering can occur through suspension of material in the course of dredging and settlement. Hiddink (2003) suggested that disturbance of benthic habitats through dredge activity could reduce density of non-target fauna through redistribution of fauna and sediment.
5. Potential effects in combination with other plans and projects

Essex Estuaries SAC covers a large area, and as such there are numerous fishing activities which occur in it. Drift netting occurs within the site (see HRA document ref. KEIFCA/EE/50). Trawling (KEIFCA/EE/07), clam dredging (KEIFCA/EE/18), potting (KEIFCA/EE/38) and static netting (KEIFCA/EE/47) also occur in the subtidal region and full appropriate assessments have been carried out for these activities.

Additional licenced activities include:

- **Maintenance dredging:** Occurs at harbours within the site including Burnham Harbour (MMO ref. MLA/2015/00165). This is likely to effect this subtidal feature and as such should be mitigated for as part of the HRA process for this activity.
- **Shipping channel:** Beyond the site are several major shipping channels leading to the Thames Estuary. This should not affect this subtidal feature.
- **Wallasea Island Wild Coast Project:** MMO ref. 34763/100304/2. An RSBP project to breach sea walls and create new intertidal habitats. This may affect this subtidal feature through changes in sediment loading.
- **Private fisheries:** There are numerous private fisheries within the SAC, primarily for shellfish with two areas with private fin fisheries. The licence holders will be required to complete HRAs for private fishing activities, which take into consideration their effects in combination with other public fisheries activities.
- **Gunfleet Sands wind farm:** In the vicinity of the site is a large windfarm which is regularly access by service vessels from Brightlingsea. There is a licence for cable repairs to be undertaken when necessary, but these emergency works will likely occur on a small spatial and temporal scale.

In all nearshore areas there is regularly ongoing maintenance work on coastal infrastructure, including repairs to piers and jetties and capital dredging. Currently progressing through the MMOs marine licencing process include applications to remove an offshore structure at Bradwell Power Station (MMO ref. MLA/2015/00265), flood defence repairs at Shoeburyness (MMO ref. MLA/2015/00025) and pontoon/jetty maintenance at West Mersea (MMO ref. MLA/2015/00012). These projects are generally on a small spatial scale and are one-off or very occasional (annual or bi-annual) occurrences. All future projects will be required to consider their effect in combination with licenced fishing activities in the region.

There are no national infrastructure projects planned in or near the Essex Estuaries SAC site (National Infrastructure Planning Portal, 2018).

<table>
<thead>
<tr>
<th>6. Is the potential scale or magnitude of any effect likely to be significant?</th>
<th><strong>Alone:</strong> YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments:</td>
<td>It is possible that if cockle suction dredging activities have a negative impact on intertidal mud and sand communities (Essex Estuaries SAC). In general, these activities may have a significant effect on the site integrity.</td>
</tr>
<tr>
<td><strong>In-combination:</strong></td>
<td>N/A</td>
</tr>
<tr>
<td>Comments:</td>
<td>In-combination effects will be considered in full in the appropriate assessment.</td>
</tr>
</tbody>
</table>

7. Have NE been consulted on LSE? If yes, what was NE’s advice?

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\(^{2}\) Yes or uncertain: completion of AA required. If no: LSE required only.
6. Appropriate Assessment

6.1 Location and scale of cockle suction dredging

Since 2010 Kent and Essex IFCA have implemented a documentation procedure for recording all fishing vessel sightings whilst at sea on patrol vessels. Enforcement patrols on land and from sea are targeted to monitor the cockle fishery operating under the TECFO and in the permitted fishery.

6.1.1 Additional cockle suction dredging monitoring under the Cockle Permit fishery in areas outside the TECFO area

A requirement of the permit fishery cockle licence is that licence holders phone a dedicated phone line, ‘the cockle line’ at least 2 hours before departing on a trip, and also at least 2 hours before landing into port every time they are fishing for cockles. They must leave a message stating the date, estimated time of departure/landing into port, port of landing and the area (to be) fished. This data is entered daily into a database to track the number of fishing trips made by each vessel and the fishing effort over defined areas outside the TECFO area. A list of vessels fishing each day/night is given to enforcement officers and used in their targeted patrols from vessels or on shore. The volume of cockles landed by each vessel is checked by enforcement officers to ensure that the limit of 13.6 m$^3$ of cockles per trip (category 1 permit), or 3.4 m$^3$ (category 2 permit) is not exceeded. Failure of licence holders to adhere to the reporting requirements or to the maximum catch per trip results in action taken by KEIFCA officers (e.g. written warnings, financial administrative penalties or further legal proceedings).

6.1.2 Total Allowable Catch (TAC)

KEIFCA conducts annual stock assessments of cockle populations in the main cockle harvesting areas inside and outside of the TECFO in the spring. The abundance, age and biomass of size fractionated cockles is determined and the data from the spring survey are used to set a total allowable catch (TAC) for the summer cockle fishery. This TAC is set at no more than 33 % of the total adult biomass and is based on previously used stock models (Cefas) that allocated a third of the stock for the fishery, a third as food supply for birds and other animals and a third to remain to restock the population. The age structure of the cockle population is also analysed to determine the health and sustainability of the stock. Autumn surveys on the main cockle harvesting beds provide information on annual recruitment into the fishery and allow measurements of winter losses due to natural causes or predation to be assessed. This method has been applied to set a TAC to the TECFO fishery for over 20 years and has resulted in a sustained population of cockles. An annual report of the cockle stock assessments is provided to all cockle licence holders, Natural England and published on the KEIFCA website in May each year.

This year, due to COVID 19 restrictions, KEIFCA were unable to carry out their annual spring cockle surveys for the outside fishery. Therefore, the data collected in 2019 surveys and presented in the 2019 Cockle Report has been used to calculate the 2020 TAC. The following methodology for calculation of the TAC is detailed below.

In 2019, the permit fishery took place in a subsection of Area 7, the Buxey Sand, with no fishing permitted to the west of a line of 1-degree longitude, nor south of the crouch channel. Last year (as with all previous years for the permit fishery), the TAC for the Buxey Sand was calculated using only adults over 16 mm in width (1715 tonnes).
Assuming the same value for ≥16mm cockles for 2020 at 1715 tonnes and deducting the fishing mortality of last year’s TAC (330 tonnes for the whole fleet), an estimated 1385 tonnes of cockle biomass is present on the Buxey Sand in 2020.

A portion of the population do not survive the winter each year, therefore, winter mortality must also be taken into consideration. Over the past ten years of surveying the TECFO population, the average winter survival rate is 75.3%. Applying this survival rate to the 1385 tonnes of cockle biomass gives 1043 tonnes of available adult stock ≥16 mm on the Buxey Sand. This value is further divided into thirds as mentioned above, to allow for equal proportioning for bird, restocking next year’s population and providing for the fishery. This results in 344 tonnes available to the fishery in 2020 to be split across 30 boats.

Each vessel with a category one permit (all the 2020 permit applications were for category one permits), may land 13.6m3. This is equivalent to 11 tonnes per vessel. The 29 vessels will therefore land a combined 316.4 tonnes, which is less than the 344 tonnes available as calculated above.

The above methodology is considered highly precautionary, and therefore appropriate for the 2020 permit fishery for the following reasons:

- The biomass of adults between 14mm and 16mm on the Buxey Sand in 2019 was more than equal to the biomass of adult cockles ≥16 mm at 1788 tonnes. These 14-16mm cockles were not included in the 2019 TAC calculation. It can be assumed that a significant proportion of this cohort will have grown to >16 mm for this year and will have been recruited into the larger size class. However, this has not being considered in the calculations.
- The biomass for only the Buxey Sands has been used to set a TAC for the wider Area 7, with the biomass of Ray Sands not considered. In 2019, the biomass of cockles ≥14 mm on the Ray Sand was 1180 tonnes, much of which will have increased to ≥16 mm this year and was not subject to fishing mortality from last year’s permit fishery.
- The total >14mm stock surveyed during the 2019 survey was therefore 4302 tonnes, of which, after taking into account 2019 fishing mortality as well as winter mortality, 2979 tonnes remains, before any growth in the cockles over the past year.

Further information on survey results can be found in the KEIFCA annual Cockle Reports (https://www.kentandessex-ifca.gov.uk/about-us/corporate-publications/cockle-report/).

To demonstrate that the above methodology is appropriate for predicting this year’s TAC, KEIFCA applied the same methodology to data from the past five years (since the introduction of the permit byelaw in 2015), to see how it compares with the real calculations of the following year.

The boxes highlighted in green show the predicted TAC using the above detailed methodology. The boxes highlighted in blue show the actual recommended TAC for that year based on real survey data. The results show that the methodology KEIFCA have used to predict this year’s TAC is highly precautionary as it consistently predicts a considerably lower TAC value than the actual recommended TAC. In addition, it must be noted that the recommended TAC and decision to open the fishery also relies on spat fall, and numbers of adult cockles below 16 mm. Therefore, in some years, consideration of spat fall and small adult cohort (<16 mm) resulted in KEIFCA deciding not to open the fishery. Lower biomass levels are subsequently seen in 2016 (Table 5). The same considerations have been made when predicting the 2020 TAC.
In addition, in most years not all of Area 7 was open, so the recommended TAC applies to the Buxey or Ray Sands alone and does not include the total ≥16 mm cockle biomass for the entirety of Area 7. Generally, the landings each year are less than the possible max TAC due to the fact permit holders are allocated TAC by number of trips rather than a specified tonnage. Their maximum tonnage for any one trip is 11 tonnes, therefore, however many whole numbers of trips per boat can be fitted into the recommended TAC is the number of trips they will be allocated. This method naturally leaves surplus. Since 2015, all boats have been allocated only one trip unless the fishery has been closed. Further detail on the number of fishing vessels applying for permits, determination of TAC’s from survey data and proposed trips set for each year can be found in the respective yearly May Authority Papers at https://www.kentandessex-ifca.gov.uk/about-us/committee/committee-meetings/.

In addition, the biomass of landed cockles is often even lower than the allocated TAC as not all boats who apply for permits will use them. For example, in 2019, 30 permits were allocated but only 19 vessels turned up for the opening of the fishery. As all boats are only allowed one trip (defined as a single landing), if a boat lands less than their max 11 tonnes, they are not able to return to fulfil their quota and this again reduces the total cockle landings for a season.

**Table 5.** The biomass of cockles ≥16 mm for the whole of Area 7 of the permit fishery from 2016 to 2020. The above detailed methodology is applied to the data to see how conservatively it predicts the following years TAC.

<table>
<thead>
<tr>
<th>Year</th>
<th>Biomass of cockles ≥16 mm in previous year (tonnes)</th>
<th>≥16 mm stock minus previous years landings (tonnes)</th>
<th>Minus winter mortality of 24.7% (tonnes)</th>
<th>Possible TAC based on previous years data (tonnes)</th>
<th>Possible max TAC based on this year’s actual survey data (tonnes)</th>
<th>This year’s landings (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Buxey 758.7, Ray 1279.9, Dengie 563.2</td>
<td>2601</td>
<td>1959</td>
<td>653</td>
<td>Fishery closed</td>
<td>Fishery closed</td>
</tr>
<tr>
<td>2017</td>
<td>Buxey 70.6, Ray 274.6, Dengie 0</td>
<td>345.2</td>
<td>259.9</td>
<td>86.6</td>
<td>482</td>
<td>300</td>
</tr>
<tr>
<td>2018</td>
<td>Buxey 1166.7, Ray 380.5, Dengie 60.9</td>
<td>1808.1</td>
<td>1361.5</td>
<td>453.8</td>
<td>535</td>
<td>264</td>
</tr>
<tr>
<td>2019</td>
<td>Buxey 708.0, Ray 219.9, Dengie 15.9</td>
<td>679.8</td>
<td>511.8</td>
<td>170.6</td>
<td>480</td>
<td>330</td>
</tr>
<tr>
<td>2020</td>
<td>Buxey 1715.2, Ray 155.2, Dengie 130.3</td>
<td>1670.7</td>
<td>1258</td>
<td>419.3</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

6.1.3 Summary of Cockle Permit Fishery in Areas outside the TECFO fishing effort from 2009 to 2019

2009: The fishery remained closed for 11 months of the year with fishing permitted from 1st September to 1st October only. During this period a total of 15 days fishing per vessel was permitted. Catches were monitored throughout and an increasing number of beds were closed as stocks were reduced.

2010-2013: The fishery was not opened during this period as a precautionary measure to prevent any causes of mortality being transported into the district from other parts of the country.
2014: The fishery was opened for 1 week only on 5th October and 38 vessels applied for a permit to harvest cockles. All 38 vessels were inspected by KEIFCA officers during the week prior to the fishery opening for the purposes of biosecurity checks and technical measures inspections. The TAC was set by KEIFCA based on stock assessment from the annual cockle surveys. This allowed the 38 permitted vessels to carry out 2 trips, harvesting 13.6 m$^3$ per trip.

2015-2016: The fishery was not opened during this period.

2017-2018: The fishery was opened for 1 week only on 3rd October, and 35 vessels applied for a permit to harvest cockles. All vessels were inspected by KEIFCA officers during the week prior to the fishery opening for the purposes of biosecurity checks and technical measures inspections. The TAC was set by KEIFCA based on stock assessment from the annual cockle surveys. This allowed the 35 permitted vessels to carry out 1 trip, harvesting 13.6 m$^3$ per vessel.

2019: The fishery was opened from October 8th to October 10th, with 30 vessels applying for a permit to harvest cockles. All vessels were inspected by KEIFCA officers during the week prior to the fishery opening for the purposes of biosecurity checks and technical measures inspections. The TAC was set by KEIFCA based on stock assessment from the annual cockle surveys. This allowed the 30 permitted vessels to carry out 1 trip, harvesting 13.6 m$^3$ per vessel, landing a total of 330 tonnes.

6.2 Co-location of cockle suction dredging and SAC features

Cockles inhabit clean sand, muddy sand, mud and muddy gravel in the intertidal range, most commonly found from the middle to lower intertidal range (Tyler-Walters, 2007). They burrow into the sediment up to 5 cm deep. Modelled benthic habitat maps provided by Natural England show the location of sub features of the Essex Estuaries SAC within cockle harvesting area 7 (Fig. 3) and show cockle harvesting in area 7 does not occur over intertidal mixed sediment or intertidal mud. The area of the Buxey Sand (the dense heatmap patch on Figure 3 below) where the Area 7 cockle fishery occurred in 2019, and will likely be most focused this year, is primarily intertidal sand with other sediments. Intertidal sand is a dynamic habitat and is resilient to short term disturbance from suction dredging.
6.3 Types of fishing gear – cockle suction dredges

All permitted cockle fishing vessels within the Cockle Permit Fishery outside the TECFO must comply with byelaw restrictions. There are restrictions on vessel length of 14m and beam of 5m.

Cockle suction dredges use a hydraulic jet to fluidise sediment immediately in front of a blade which funnels the softened sediment and contents into the dredge body. The dredge body consists of parallel metal bars that are required to be spaced no less than 16 mm. The width of the blade which funnels the softened sediment into the dredge body must be no greater than 760 mm. During normal operation, the only part of the dredge in contact with the seabed are the skids used to slide the dredge along the ground and the dredge blade which interacts only with the fluidised sediment and is set at a higher level than the skids upon which the dredge sits to prevent it digging into the seabed (Fig. 3a).

A solids pump is used to suction solids from inside the dredge body up via a pipe to a rotating mechanical riddle operating over the side of the vessel. The cockle harvesting equipment must incorporate a riddle which is at least 1750 millimetres in length and which is designed and operated so that the retained cockles are in contact with the riddle for its full length (Fig. 3b). The spacing between the riddle bars is the same requirement as for the dredge body, i.e. no less than...
16 mm. This reduces the catch of undersized cockles and maximises the return of sediment and any other species that would pass through the 16 mm bars to the sea.

**Fig. 3:** Cockle suction dredge (a) and sorting riddle (b)

6.4 **Potential impacts of cockle suction dredging**

6.4.1 **Physical effects**

- Abrasion/disturbance of the surface of the seabed
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
➢ Physical change (to another seabed type)
➢ Siltation

The impact of a hydraulic suction dredge on the seabed will be determined by its weight, structure (Grieve et al., 2014) and force and size of hydraulic jet contacting the seabed.

Intertidal sand, mud and mixed sediments generally feature widespread, small scale, low relief topographic features such as ripples (Kaiser et al., 2002; Grieve et al., 2014). Habitat complexity is further enhanced through bioturbation creating mounds, burrows and polychaete tubes (Nilsson and Rosenberg, 2003; Grieve et al., 2014). Demersal towed gear has been shown to create greater topographic relief than is normally present in these habitats in the form of furrows, whilst the sediment disturbance caused both by gear penetration and turbulence resulting from its passing flattens out small-scale topography, reducing the habitat complexity (Kaiser et al., 2002; Nilsson and Rosenberg, 2003; Grieve et al., 2014). These studies have been conducted on trawls and dredges and are not specific to cockle suction dredges.

The impact of cockle suction dredges that are used in the Thames Estuary on sediment and macrofauna has been studied in the Wash, Norfolk (Sebastian 2012) on similar intertidal muddy sand habitats as targeted in Essex. Experimental sites were dredged by one of the TECFO licenced cockle vessels (FV Mary Amelia), using a cockle suction dredge of dimensions and specifications in line with the TECFO licence requirements. Sediment composition was analysed by particle size analysis (PSA) and the abundance and diversity of macrofauna was assessed immediately after (day 0), 2 weeks, 1 month and 3 months following dredging in dredged and undredged, control sites. Sediment composition, biota abundance and diversity were all more variable between replicates and within dredged and undredged areas than between dredged and undredged areas and there was no significant difference in sediment composition between dredged and undredged areas.

In addition to changing the topography of the soft sediment habitat, the impact of suction dredges may cause sediment to be re-suspended and redeposited elsewhere. However, as cockle suction dredging in Essex Estuaries SAC occurs at high tide in intertidal areas, soft sediments would naturally be re-suspended by wave and tidal action during every tidal cycle and the re-suspending effects of suction dredges on top of this natural variation would probably be minimal.

6.4.2 Biological effects

➢ Abrasion/disturbance of the surface of the seabed
➢ Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion
➢ Siltation
➢ Removal of non-target species

Disturbance of the seabed by the water injection jet of the dredge can mobilise surface and upper sediment dwelling species other than cockles. These can be moved into the body of the dredge and if they don’t pass through the 16 mm wide gaps in the bars, they may get pumped up to the vessel via the solids pump along with any cockles. In addition to the opportunity to reduce the by-catch of other species by having 16 mm bar spacing on the dredge body, the catch is passed immediately through the sorting riddle which allows any undersize cockles and associated species to pass through the bars and be returned to the sea in approximately the same location as they were taken from. Any associated species that are larger than 16 mm will be retained in the catch unless removed by hand by the fishermen.
Infauna such as Baltic tellins (*Macoma baltica*) and white furrow shells (*Abra alba*) are considered to be relatively resistant to certain fishing activities as their environmental position confers protection (Roberts et al., 2010; Tilin et al., 2010). However, emergent organisms, especially those with erect body forms are more likely to be susceptible to damage or removal through contact with towed demersal gear, such as a cockle suction dredge (Roberts et al., 2010; Tilin et al., 2010). Cockle suction dredging on soft intertidal substrates is likely to have several effects on benthic organisms, including direct impact/removal, uprooting and smothering by re-suspended sediment. Previous research has shown an increase in mortality of infauna due to cockle suction dredging with up to a 30% decrease in species numbers and a 50% decrease in abundance compared to undredged areas (Hall and Harding, 1998). In the Wadden Sea, cockle suction dredging had a negative impact on the abundance of 4 non-target species; shrimp (*Crangon crangon*), polychaetes (*Heteromastus filiformis*), blue mussel (*Mytilus edulis*) and razor clam (*Ensis americanus*). All other 16 non-target species were not significantly impacted by cockle suction dredging apart from the bivalve *Tellina tenuis* which increased in abundance in response to cockle suction dredging (Kraan et al, 2007). Another study in Ireland showed that the only significant impact of hydraulic cockle suction dredging on non-target fauna was a short lived impact on the tellin bivalve *Angulus tenuis* (Clarke and Tully, 2014).

An impact study of cockle suction dredges on muddy sediments and biodiversity of infauna in the Wash, Norfolk (Sebastian 2012) showed a significantly lower species diversity in dredged areas compared to undredged areas after 2 weeks, however this was an isolated result and was not found immediately following the dredging on day 0 or in subsequent sampling points. As was found for the sediment composition, the variance between replicates in each area was greater than any difference between the dredged and undredged areas. Given the inconsistency in these results and the lack of a clear difference between dredged and undredged areas immediately following dredging, it can be concluded that cockle suction dredging did not have a significant impact on the sediment composition or associated macrofauna and that natural variability and the patchy distribution of organisms was responsible for the differences observed at the 2 week time point.

6.4.3 Resistance/Tolerance

Soft sediments, especially muddy sands have been found to be particularly intolerant to fishing impacts from towed demersal fishing gear such as trawling or dredging (Kaiser et al., 2006). The primary impact of cockle suction dredges is via the water injection jet and the skids sliding on the seabed, this is in contrast to trawling or dredging using a box dredge where physical parts of the fishing gear, e.g. otter trawl doors, nets, tickler chains or dredge blades cause abrasion to the surface or penetrate the seabed. Although there will be some abrasion from the action of the skids sliding over the seabed, the penetration of the water jet into the surface of the seabed is likely to be less damaging to the sediment composition or biota than traditional dredge blades or trawling gear and the impact has been assumed to be small (Bell and Walker, 2005).

6.4.4 Resilience/Recovery

The ability of the biota to regenerate or recolonize after damage by static fishing gear is dependent on the organism’s life cycles, regenerative abilities and mobility. Long lived species will recover more slowly, as will sessile species which may rely on spawning events to recolonize areas which have been impacted (Roberts et al., 2010). The ability of colonial organisms such as sponges to regenerate means they are likely to recover from damage more quickly (Roberts and Cairns, 2014).
Decreases in the abundance and species number of associated fauna in cockle beds have been shown to persist for less than 2 months with research showing recovery to undredged levels within 56 days (Hall and Harding, 1998).

### 6.4.5 Sensitivity

Tilin et al. (2010) created a matrix of the sensitivity of different habitats to pressures that can be linked to human activities in the marine environment. For cockle suction dredging the most applicable impacts are from abrasion or penetration of the seabed, removal of non-target species and siltation. The dredge skids and water injection jet are the main parts of the dredge that are in contact with the seabed. The dredge skids could cause abrasion to the seabed surface but are unlikely to penetrate. The water injection jet disturbs the seabed and will penetrate into the surface of the seabed but it is unlikely to penetrate more than 25 cm and previous reports have stated a 5 cm penetration depth for cockle suction dredges (Bell and Walker, 2005). Tilin et al (2010) reported a low sensitivity of intertidal sand and muddy sediments to surface damage and penetration of the seabed up to 25 cm (Table 1). The sensitivity of intertidal mixed sediment to penetration of the seabed is medium to high but with low confidence. The small areas of intertidal mixed sediment on the Maplin and Foulness sands as shown on the modelled feature maps provided by NE are sand and muddy sand dominated by cockles and dead shell in the surface 5 cm (KEIFCA officer knowledge).

There is a high sensitivity of intertidal sand and muddy sand to physical change of the seabed and a medium sensitivity of intertidal mixed sediment however, as any sediment disturbed by the water jet of the cockle suction dredge is returned to the same location by passing through the dredge body or sorting riddle, it is unlikely that the seabed type would be altered.

There is low confidence in the sensitivity estimations for both features to the removal of non-target species, ranging from not sensitive to medium sensitivity. Previous research in the Wadden Sea (Kraan et al, 2007) and Ireland (Clarke and Tully, 2014) have revealed that the majority of cockle bed associated infauna species are not affected by cockle suction dredging.

**Table 1:** Sensitivity of SAC features to pressures as identified by Tilin et al. (2010). Confidence in sensitivity assessments is included in brackets.
7. Mitigation - Existing management measures

The TECFO (annex 6) defines spatial, temporal and effort restrictions on cockle harvesting in the Thames Estuary along with gear restrictions and vessel size limitations to reduce the impact to EMS features. A summary of the regulations in place and enforcement and monitoring practices followed by KEIFCA to mitigate any negative impacts of cockle suction dredging on EMS feature is shown below.

- Vessel size limit of 14 m in length and 5 m width (beam)
- Limit of 14 vessels in the fishery – licences issued annually
- A total allowable catch (TAC) set at no more than 33 % of the total biomass over 16 mm as determined by bi-annual stock assessment surveys
- Limit of 13.6 m$^3$ of cockles to be landed per fishing trip which can be reduced by KEIFCA to 6 m$^3$
- Restriction on fishing season length and number of fishing trips per week to reduce intensity, dependent on TAC set but no more than 4 fishing trips per week, average of 2-3 trips per vessel per week
- Cockle harvesting areas are not fished for at least 7 months every year
- No cockle fishing is permitted from 17:00 on Friday to 21:00 on Sunday every week during the cockle harvesting season
- Minimum of 16 mm bar spacing in the dredge body and sorting riddle
- Maximum width of dredge blade of 76 cm
- Minimum length of sorting riddle of 1.75 m
- Requirement that not more than 10 % of undersize cockles returned to the sea are damaged – checked by KEIFCA officers at the start of every cockle harvesting season
- All fishing gear checked at the start of each cockle harvesting season by KEIFCA officers and a compliance certificate issued by KEIFCA is required
- Minimum harvesting rate of 1 tonne cockles per hour. If the harvesting rate falls below this, the cockle management area will be closed due to low density
- Requirement of fishermen to give 2 hours’ notice prior to landing following every cockle harvesting trip
- Targeted shore and sea patrols to check for compliance
- Detailed catch return logs required to be submitted by all licence holders

8. Conclusion

The exceptional circumstances caused by the COVID19 pandemic have resulted in KEIFCA being unable to undertake spring cockle surveys in 2020. As a result, the TAC for the 2020 permit cockle fishery has been calculated using 2019 survey data. KEIFCA consider the methodology (detailed in Section 6) to calculate the TAC as highly precautionary, and therefore, unlikely to have a significant impact on the features of the EMS.

A TAC set at a maximum of 33 % of the adult biomass, a minimum landing size of 16 mm width and monitoring to ensure that less than 10% of undersized cockles returned to the sea are damaged, ensures sufficient numbers of adult cockles and all smaller cockles remain and are available as a food supply for birds and other animals. A limit to the length of the cockle harvesting season and its occurrence around high tides in the summer months also limits disturbance to

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3 If conclusion of adverse affect alone an in-combination assessment is not required.
wintering bird populations and feeding birds that use the area at low tide as detailed in the tests of LSE for the SPAs. Intertidal sand, muddy sands, mixed sediment and gravel habitats in Essex Estuaries SAC are exposed to the pressure of cockle suction dredging but effort limitation (TAC, temporal restrictions and minimum size), gear restrictions (dredge width, riddle and dredge bar spacing and riddle length), along with extensive monitoring (targeted sea and shore patrols, cockle line reporting and catch return forms) and enforcement (targeted patrols and analysis of monitoring data) reduce, control and actively monitor the pressure exerted by cockle suction dredging on EMS features.

It can be concluded that cockle suction dredging, alone or in combination, could have a significant effect on the intertidal sand, mud, muddy sand or mixed sediment features of Essex Estuaries SAC and bird features of Outer Thames SPA if it was not managed. However, the extensive management, monitoring and enforcement of the cockle permit fishery as described here, mitigate potential significant effects to the features of the SAC and SPA ensuring that no adverse effect to EMS features occurs and this fishery will not affect site or feature integrity. This conclusion has been drawn using expert knowledge and best available evidence.

This assessment will be reviewed annually and a new document using the latest available evidence will be produced annually for each cockle fishing season. Natural England will be consulted annually and the opening of the permit cockle fishery will be dependent on approval of the TAC and HRA by Natural England prior to the start of the cockle harvesting season.
Annex 1: Reference list


http://www.marlin.ac.uk/speciesinformation.php?speciesID=3519
Annex 2: Natural England Conservation Advice


Annex 3: Thames Estuary Cockle Fishery Order

KENT AND ESSEX INSHORE FISHERIES AND CONSERVATION AUTHORITY

THE THAMES ESTUARY COCKLE FISHERY ORDER 1994 REGULATIONS

MAY 2012

The local fisheries Authority for the Kent and Essex Inshore Fisheries and Conservation District in exercise of the powers conferred on them by Article 3 of the Thames Estuary Cockle Fishery Order 1994 under the Sea Fisheries (Shellfish) Act 1967, as amended, hereby makes the following regulations:-

REGULATION No. 1 - CONSTRUCTION OF INSTRUMENTS AND FISHING GEAR

No person shall, without the written consent of the Authority, operate any instrument or fishing gear for the purpose of taking, riddling, sorting or grading cockles unless all surfaces acting to retain the catch be constructed of parallel bars with an average space between bars of no less than 16 millimetres.

This requirement shall not apply to pipes used to convey water or catch between the seabed and any fishing vessel.

The Authority may give written consent for the use of instruments or fishing gear, otherwise prohibited by this Regulation, to all licence holders for a specified area and for a specified period of time for specific purposes including the thinning of overpopulated stock, removal and thinning of cockles which have not shown good growth or for the purposes of relaying. Consent will only be given where the Authority is satisfied that the quality of a bed would be enhanced by the removal of cockles.

When operating within Harvesting Areas 1, 2, 3, 4 & 5a described in Part I of the Schedule and shown for illustrative purposes only on the map in Part II of the Schedule, no person shall operate equipment used for the purpose of riddling, sorting or grading cockles unless all surfaces acting to retain the catch be constructed of parallel bars with an average space between bars of no less than 16 millimetres and no more than 16.5 millimetres.

REGULATION No. 2 - PROHIBITION ON THE REMOVAL OF SMALL COCKLES

No person shall, without the written consent of the Authority, remove from the regulated fishery cockles of which more than 10% by weight, of a representative sample, will pass through a space 16 millimetres in width. A representative sample will consist of no less than 200 kilograms of cockles. Small cockles rejected as a result of the requirements of this Regulation shall be returned immediately to the sea.

The Authority will give written consent for a specified area and specified period of time to all licence holders to permit the removal of cockles otherwise prohibited by this regulation,
when written consent has been given by the Authority under the regulation relating to the Construction of Instruments and Fishing Gear.

REGULATION No. 3 - LIMITATION ON THE MAXIMUM QUANTITY OF COCKLES THAT MAY BE REMOVED FROM THE FISHERY

Except as permitted by the written authority of the Kent and Essex Inshore Fisheries and Conservation Authority no licence holder shall, within any fishing trip carry on board or land more than 13.6 cubic metres of cockles taken from the area of the Thames Estuary Cockle Fishery Order.

Any such written authority shall permit all licence holders to take specified quantities of cockles greater than 13.6 cubic metres during specified periods, subject to annual Total Allowable Catch limits. Such written authority shall be granted only where cockle stocks are sufficiently plentiful to permit increased quantities of cockles to be taken during the periods so specified.

For the purpose of this regulation:

(a) 13.6 cubic metres of cockles is deemed equivalent to 500 baskets, at 6 gallons of cockles per basket.

(b) When calculating the quantity of cockles removed no allowance shall be made in respect of the quantity of any dead shell, sand, other species or debris mixed with the catch

REGULATION No. 4 - REGULATION OF FISHING OPERATIONS

Persons taking cockles from within the area of the Thames Estuary Cockle Fishery Order 1994 must land their catch before commencing fishing during another specified fishing period.

No cockles shall be carried on board a fishing vessel at the time of commencement of fishing for cockles within the area of the Thames Estuary Cockle Fishery Order 1994.

Except as permitted by the written authority of the Kent and Essex Inshore Fisheries and Conservation Authority when a vessel is engaged in, or has during a specified fishing period been engaged in, dredging, fishing or taking cockles within the area of the Thames Estuary Cockle Fishery Order 1994 all cockles carried on board or landed shall be considered to have been taken from within the area of the Thames Estuary Cockle Fishery Order 1994.

Such written authority shall only be given if :-

(a) A licence holder has applied in writing for such authority, specifying where and when they shall be fishing during the specified fishing period to which the application relates; and

(b) the Kent and Essex Inshore Fisheries and Conservation Authority is satisfied that the total quantities of cockles to be taken from the Regulated Fishery, by that licence holder, during the relevant specified fishing period will not exceed the quantities permitted for that licence holder for that period.
For the purpose of this regulation a "specified fishing period" is one of the permitted fishing periods specified in license conditions made under Section 4 (6) of the Thames Estuary Cockle Fishery Order 1994.

**REGULATION No. 5 - REPORTING OF COCKLE LANDINGS**

Persons landing cockles taken from within the area of the Thames Estuary Cockle Fishery Order 1994 must give at least 2 hours notice of landing.

Notice of landing shall be given either directly to an appointed officer of the Kent and Essex Inshore Fisheries and Conservation Authority or by leaving a message on an appointed telephone line.

Details of the appointed officer, or officers, of the Kent and Essex Inshore Fisheries and Conservation Authority and telephone line on which messages should be left will be given to each licence holder.

**REGULATION No. 6 - CARRIAGE OF COCKLES**

No person shall carry on board or remove cockles from the Thames Estuary Cockle Fishery Order 1994 unless they are loaded into bags or containers that have a capacity of 1.13 cubic metres.

All such bags or containers shall be clearly marked with a load line if capacity is not level with the top of the side surfaces.

The capacity of all such bags or containers shall have been checked by an officer of the Authority and shall be marked to show that this check has taken place.

As an alternative to the above requirements it shall be permitted for a licence holder to carry cockles loose in the hold of their vessel provided that a hold load line has been calculated by a Maritime and Coastguard Agency authorised organisation appointed vessel surveyor to show the level to which the hold may be filled to contain 13.6 cubic metres of cockles or other quantity that may be specified under Regulation No. 3. Documentation of these calculations shall be submitted to the Authority and a clear mark shall be placed on all four sides of the hold showing this calculated load line.

In addition the hold capacity at the load line must be cross-checked by means of transferring a loaded catch of cockles into a straight-sided container in the presence of an officer of the Authority who will measure the volume of the container. The volume of cockles loaded into the container will be calculated by the Authority officer and any error in the position of the load line marking on the vessel hold will be adjusted to arrive at an approved loadline. As the cockles loaded into the straight-sided container will not have settled as they would have done in the hold of the vessel an additional allowance of 0.4 cubic metres will be added. Making a total container volume of 14.00 cubic metres. Once the position of the hold load line has been approved it shall be permanently marked by fixing a straight shelf or ledge along two parallel sides of the hold by means of welding or other permanent means. In addition a straight edged rod of a length equal to the distance between the two parallel sides of the hold shall be kept on each vessel for the purpose of laying from one ledge to the other to ensure that the catch is loaded level and not above the permitted load line.
In addition, the full permitted catch of vessels loading into approved bags shall be cross-checked in a similar manner.

In normal circumstances these cross checks will be carried out no more than once per year or when hold/bag dimensions are changed.

To enable checks for compliance with these Regulations cockles carried loose in a vessel hold shall be stowed level.

For the purpose of Regulations made under this Order the quantity of cockles taken from the fishery shall be that quantity of cockles contained within a volume as specified under Regulation No. 3.

**REGULATION No. 7 - LIMITATION ON THE MAXIMUM NUMBER OF LANDINGS PER SPECIFIED FISHING PERIOD**

No person shall make more than a specified number of landings of cockles removed from the Thames Estuary Cockle Fishery Order 1994, during any one specified fishing period.

A list specifying the maximum number of landings that licence holders may make per specified fishing period will be provided to each licence holder.

For the purpose of this regulation a "specified fishing period" is one of the permitted fishing periods specified in license conditions made under Section 4 (6) of the Thames Estuary Cockle Fishery Order 1994.

**REGULATION No. 8 - APPROVAL OF FISHING GEAR**

No person shall operate any instrument or fishing gear for the purpose of taking cockles from within the area of the Thames Estuary Cockle Fishery Order 1994 unless a certificate of approval for the instrument or fishing gear has been issued by the Authority. A certificate of approval shall be available to all applicants who fulfil the conditions set out below.

A certificate of approval will not be granted if the instrument or fishing gear, when operating at its normal speed over the ground, results in more than 10% of cockles, measured by weight, being visibly damaged. Damage rate will be assessed by taking a representative sample of cockles taken by the dredging operation. This will include cockles that are being retained and also cockles rejected by the riddle. For the purpose of this regulation cockles will be considered to be visibly damaged when on examination it is seen that there are visible cracks, chips or there is other damage to the shell.

All rakes used by hand to take cockles are exempt from this regulation.

The certificate of approval will be valid until the following 31st December.

Approval will take account of the performance and assessment during inspections of the instrument of fishing gear whilst in operation, during the preceding 12 months.

New instruments or fishing gear may be given a provisional certificate of approval for a period of one month in order to permit assessment.