Eastern Inshore Fisheries and Conservation Authority

Habitats Regulations Assessment for the Hand Worked Cockle Fishery in The Wash

May 2026

Eastern IFCA

Version 1

Revision History				
Date	**Version**	**Edits**	**Status**	**Author**
13/05/2026	v.1	Document created	Draft	ERC
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This document should be viewed in conjunction with the following documents:

- Wash Cockle Fishery Management Plan (FMP) (2019)[1]

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[1] https://www.eastern-ifca.gov.uk/wp-content/uploads/2019/09/WFO-Cockle-Fishery-Management-Plan-2019.pdf

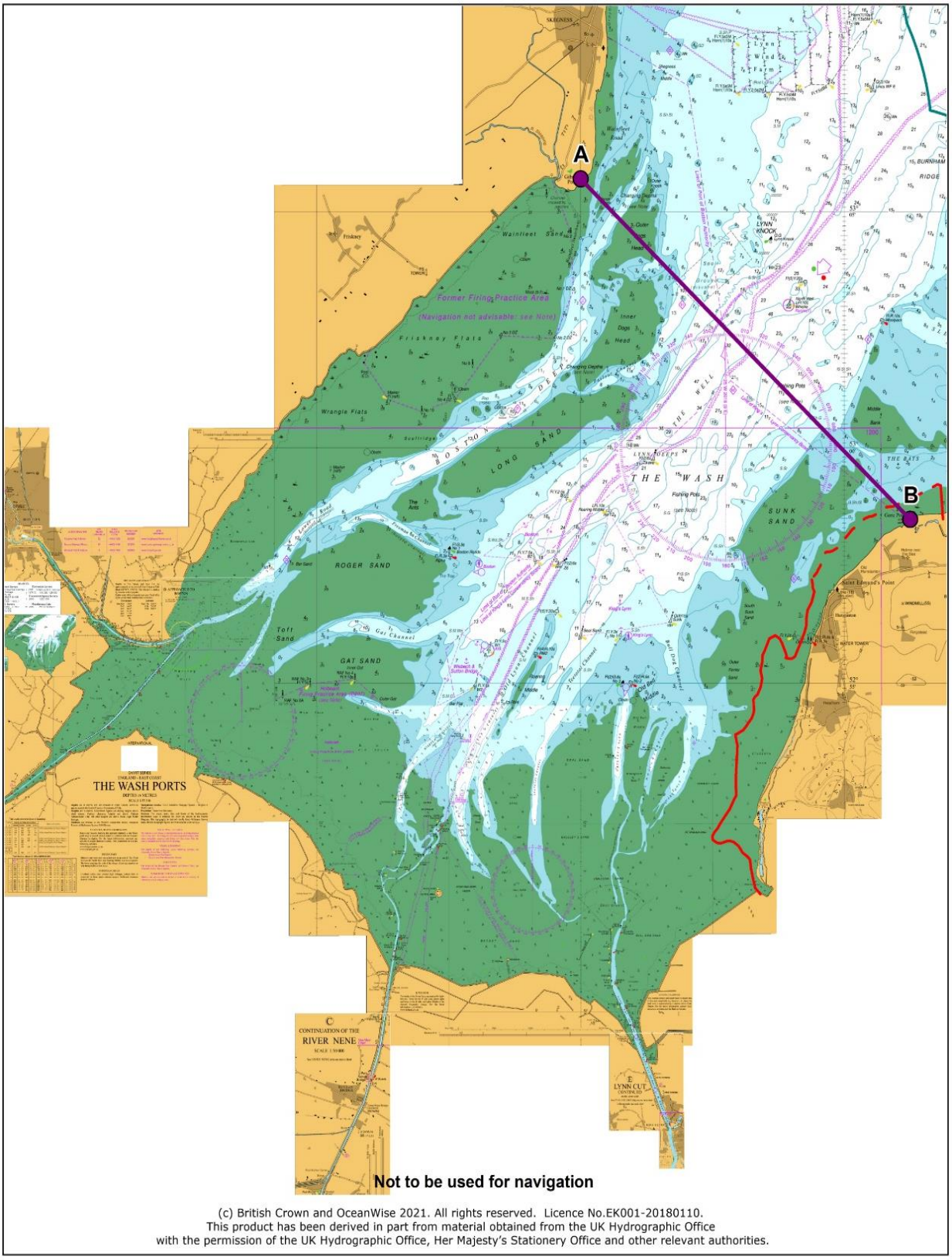
1 Introduction

1.1 Type of permission/ activity

Eastern IFCA is seeking assent for the permitting of the 2026 Wash hand-worked cockle fishery, under the Wildlife & Countryside Act 1981 (as amended by the Countryside & Rights of Way Act 2000). The fishery will be regulated by Eastern IFCA under the Wash Cockle and Mussel Byelaw 2021[2] (referred to hereafter as the WCMB), which manages the cockle fishery via permits, and will take place within the areas defined in the byelaw as 'The Wash' (Figure 1). The distribution of cockle beds within this area are shown in Figure 2.

This is a record of the Appropriate Assessment, required by Regulation 63 of the Habitats Regulations 2017, undertaken by the Eastern Inshore Fisheries and Conservation Authority, in respect of the above plan/project, in accordance with the Habitats Directive (Council Directive 92/43/EEC).

[2] Wash Cockle and Mussel Byelaw 2021 - Eastern IFCA



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Wash Cockle and Mussel Byelaw 2021

- Fixed le Strange Boundary
- le Strange Boundary which will move in accordance with any movement of lowest astronomical tide
- 'The Wash' seaward Boundary
- Eastern IFCA District boundary

Date:15/11/21 Drawn by:SC
Projection: Lat Long WSG84
Source data - EIFCA:
Eastern IFCA boundary
The Wash Several Order
High Court Ref. HC07C02289:
Le Strange boundary
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Figure 1. Chart indicating the area of sea referred to in the WCMB Byelaw as The Wash

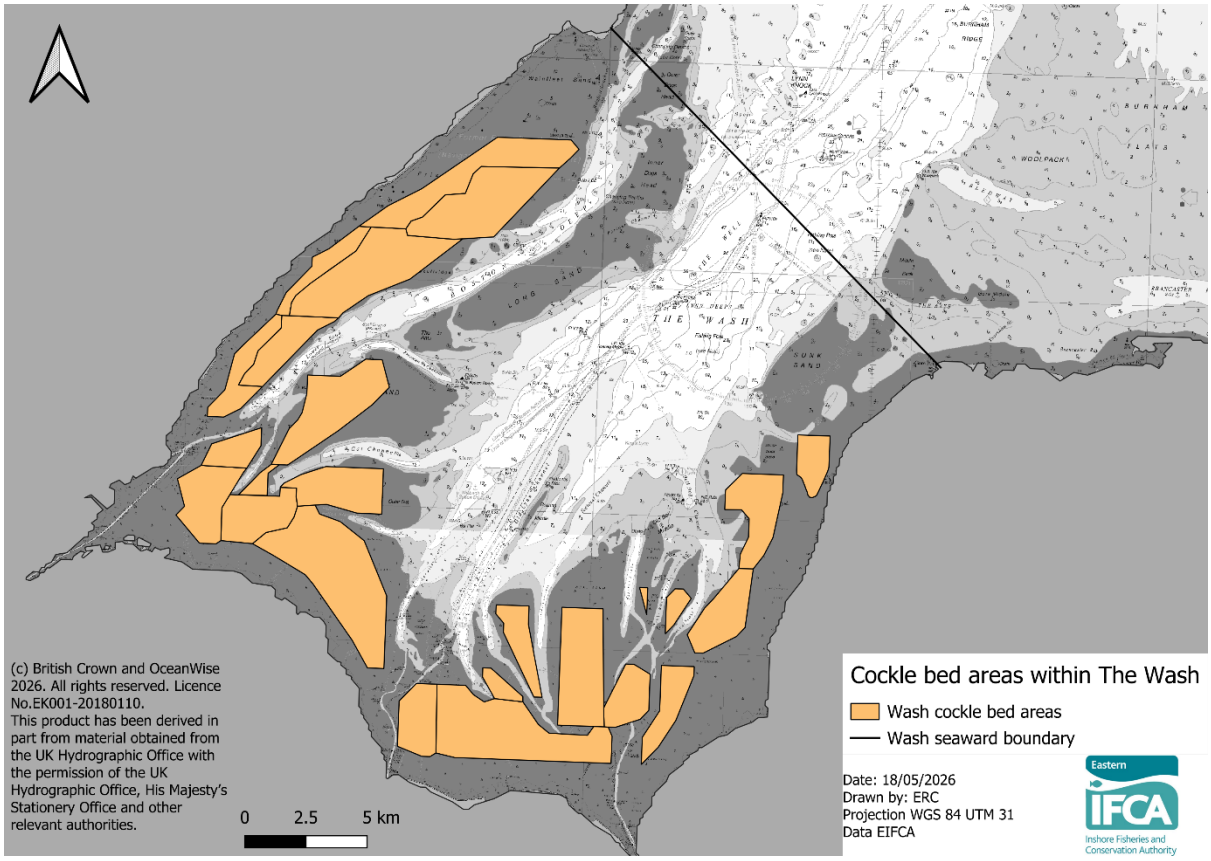

Figure 2. Distribution of cockle bed areas within The Wash

1.1 Description of proposal

This proposal details enabling a commercial hand worked cockle fishery within The Wash, Eastern England. This fishery, hereon referred to as The Wash cockle fishery, operates within the areas of the Wash Cockle and Mussel Byelaw area (Figure 1). The proposal is not directly connected with or necessary to the management of the site for nature conservation.

The hand work cockle fishery is accessed from the sea, using vessels that are deliberately beached ("dried out") on the intertidal cockle beds at low water. The intertidal flats in The Wash cover approximately 30,000 ha and the extent of the cockle beds is approximately 7,000 ha (Figure 2). Stocks are assessed on an annual basis via Eastern IFCA's spring (March/April) cockle surveys. These surveys provide information about the distribution, biomass and age and size structures of the cockle stocks. The results from the stock assessment are considered in the context of the Wash Cockle Fishery Management Plan[3] to determine key management measures including the Total Allowable Catch (TAC) and open/closed areas for the fishery.

Appendix 1 contains a report summarising the results from the 2026 cockle surveys and Appendix 2 discusses the proposals for the 2026 Wash cockle fishery in more

[3] https://www.eastern-ifca.gov.uk/wp-content/uploads/2019/09/WFO-Cockle-Fishery-Management-Plan-2019.pdf

detail. All cockle beds are proposed to be open to the fishery, however, there will be multiple closures proposed to protect high density patches of year-0 cockle (Appendix 2, Figures 12-14). These closures have the potential to be opened or adapted in line with our adaptive management of juvenile cockle closed areas detailed in Appendix 4.

The proposed TAC for the fishery is **4992 tonnes**. This represents one sixth of the total cockle stock which is a divergence from the Wash Cockle Fishery Management Plan to reflect the changes to stock dynamics observed as a consequence of 'atypical mortality'. Calculation of the TAC according to this method was explored in detail in the 2023 Wash Cockle Fishery HRA[4]. In summary, permitting removal of cockle from the stock to this extent is considered to be within acceptable environmental parameters.

1.2 Proposed duration

The closing date of the fishery will be immediately prior to the commencement of Eastern IFCA's cockle surveys in March 2027, or on exhaustion of the TAC prior to this. The main effort is anticipated to occur in July, August and September 2026.

Proposal start date: 15th June 2026

Proposed duration: June 2026 to March 2027 (or on exhaustion of the TAC)

The Authority may close the fishery at any time if there is a risk to the achievement of the conservation objectives of the site including, for example, due to severe weather considerations[5] to protect protected bird populations.

1.3 Designated sites

The cockle fishery overlaps with several designated marine sites in the Wash and North Norfolk Coast (Figure 3). These are:

- The Wash and North Norfolk Coast SAC
- The Wash SPA
- The Wash SSSI
- The Wash Ramsar site
- The Greater Wash SPA

[4] Submitted to Natural England 19 June 2023 (NE Ref: 438609).

[5] Eastern IFCA monitors weather daily between 1st of November and the 28th of February each year to identify any prolonged periods of severe weather where the fishery is required to be closed to protect sensitive SPA species. The data used to measure severe weather are minimum daily temperature (with a threshold of 1° C) and grass temperature (with a threshold of -2° C). If both of these values drop below thresholds for seven consecutive days with no more than two thaw days (days within the period which do not drop below the threshold) then this period is judged to be of "prolonged severe weather", in line with the JNCC Scheme to reduce disturbance to waterfowl during severe winter weather https://jncc.gov.uk/our-work/severe-weather-scheme/ .

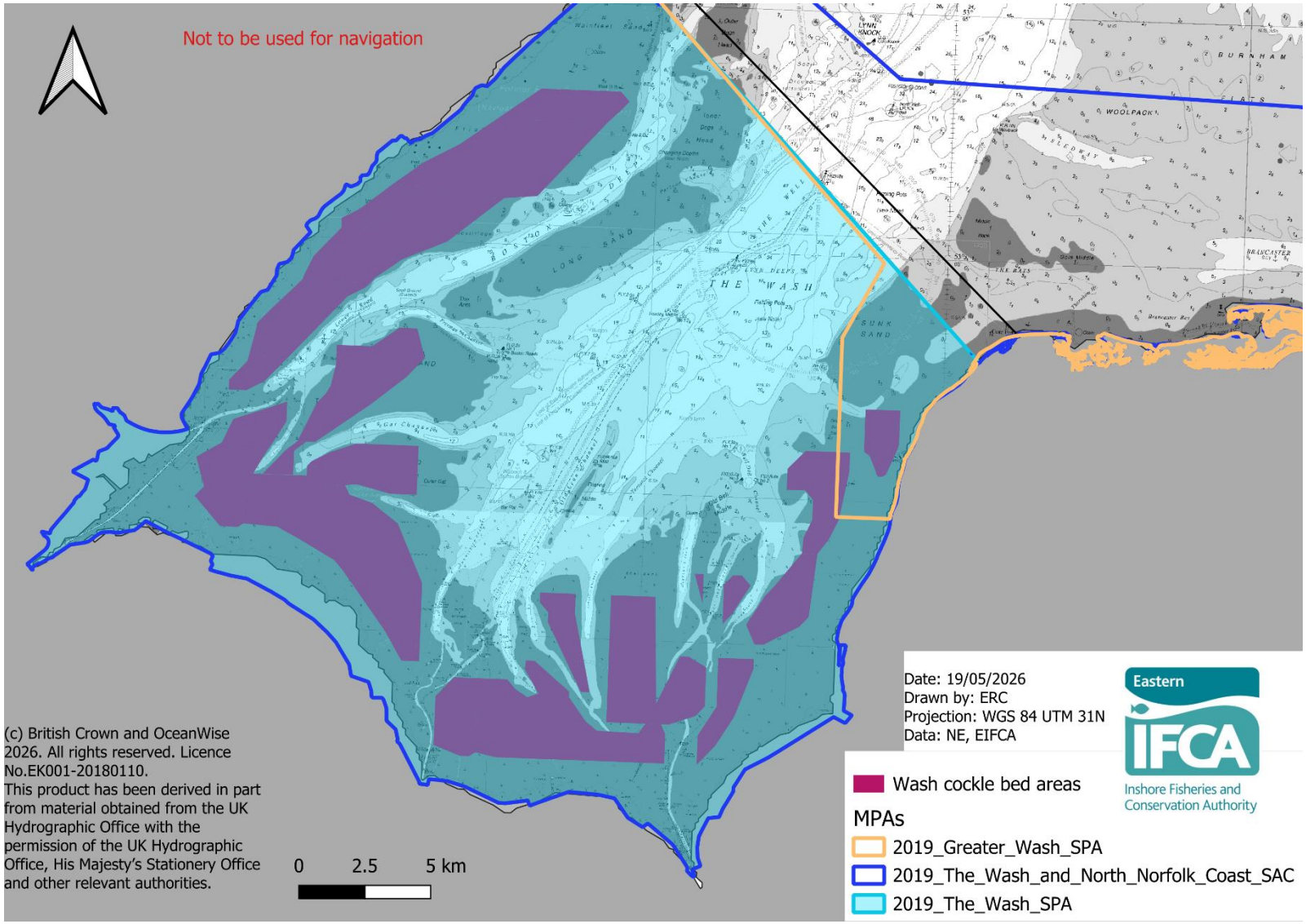

Figure 3. The distribution of cockle beds within The Wash and the overlapping Marine Protected Areas.

2 Test of likely significant effect

2.1 Scoping

A scoping exercise was performed for the features and sub-features of the site to identify where there is a pathway for interaction from the fishery with features. The results of this can be seen in Table 1. Several sub-features were scoped into the assessment and are summarised in Table 2.

Table 1. Screening of site features and sub-features for each designation that overlaps with the cockle fishery. Orange – intertidal or SPA features that may interact with the cockle fishery, these features have been scoped into the assessment. Blue - sub-tidal features have been scoped out as they don't interact with the fishery (not relevant to this assessment). Green – intertidal features that do not interact with the fishery have been scoped out (not relevant to this assessment). Yellow - no interaction with feature due to known behaviour or management measures.

EMS Designation	Feature	Sub-feature(s)
Wash and North Norfolk Coast SAC	Sandbanks which are slightly covered by sea water all the time	Subtidal mixed sediments
		Subtidal coarse sediments
		Subtidal sand
		Subtidal mud
	Mudflats and sandflats not covered by seawater at low tide	Intertidal coarse sediments
		Intertidal mixed sediments
		Intertidal mud
		Intertidal sand and muddy sand
		Intertidal seagrass beds
	Coastal lagoons	
	Large shallow inlets and bays	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
		Circalittoral rock
		Intertidal biogenic reef: mussel beds[6]
		Intertidal biogenic reef: *Sabellaria* spp.
		Intertidal coarse sediment
		Intertidal rock

[6] Cockle beds do not overlap with mussel beds and intertidal mussel beds are assessed in the annual Wash Mussel Fishery HRA.

		Intertidal mud
		Intertidal sand and muddy sand
		Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)
		Subtidal biogenic reefs: mussel beds
		Subtidal biogenic reefs: *Sabellaria* spp.
		Subtidal coarse sediment
		Subtidal mixed sediments
		Subtidal mud
		Subtidal sand
		Subtidal stony reef
	Reefs	Circalittoral rock
		Intertidal biogenic reef: mussel beds[7]
		Intertidal biogenic reef: *Sabellaria* spp.
		Intertidal rock
		Subtidal biogenic reef: mussel beds
		Subtidal biogenic reef: *Sabellaria* spp.
		Subtidal stony reef
	Salicornia and other annuals colonising mud and sand	
	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	
	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	
	Otter (*Lutra lutra*)	
	Harbour (common) seal (*Phoca vitulina*)	
The Wash SPA	Bar-tailed godwit (*Limosa lapponica*), Non-breeding	
	Bewick's swan (*Cygnus columbianus bewickii*), Non-breeding	
	Black-tailed godwit (*Limosa limosa islandica*), Non-breeding	
	Common scoter (*Melanitta nigra*), Non-breeding	
	Common tern (*Sterna hirundo*), Breeding	
	Curlew (*Numenius arquata*), Non-breeding	

[7] Cockle beds do not overlap with mussel beds and intertidal mussel beds are assessed in the annual Wash Mussel Fishery HRA.

	Dark-bellied brent goose (*Branta bernicla bernicla*), Non-breeding
	Dunlin (*Calidris alpina alpina*), Non-breeding
	Gadwall (*Anas strepera*), Non-breeding
	Goldeneye (*Bucephala clangula*), Non-breeding
	Grey plover (*Pluvialis squatarola*), Non-breeding
	Knot (*Calidris canutus*), Non-breeding
	Little tern (*Sternula albifrons*), Breeding
	Oystercatcher (*Haematopus ostralegus*), Non-breeding
	Pink-footed goose (*Anser brachyrhynchus*), Non-breeding
	Pintail (*Anas acuta*), Non-breeding
	Redshank (*Tringa totanus*), Non-breeding
	Sanderling (*Calidris alba*), Non-breeding
	Shelduck (*Tadorna tadorna*), Non-breeding
	Turnstone (*Arenaria interpres*), Non-breeding
	Waterbird assemblage, Non-breeding
	Wigeon (*Anas penelope*), Non-breeding
The Wash SSSI	Coastal saltmarsh
	Saline lagoon
	Vegetated shingle
	Littoral sediment[8]
	Sub-littoral sands and gravels
	Sabellaria reefs
Greater Wash SPA[9]	Sandwich tern, (*Sterna sandvicensis*), Breeding
	Little tern (*Sternula albifrons*), Breeding
	Common tern, (*Sterna hirundo*), Breeding
	Red-throated diver, (*Gavia stellate*), Non-breeding
	Common scoter, (*Melanitta nigra*), Non-breeding
	Little gull, (*Hydrocoloeus minutus*), Non-breeding

[8] Littoral sediment refers to intertidal sediments and is therefore not considered to be separate to the other intertidal features. Considering this, littoral sediment will be covered by the assessments for intertidal mud and intertidal sand and muddy sand, and is not specifically considered further.
[9] Designated features for the Greater Wash SPA are plunge diving birds and do not target cockles as a food source or utilize the intertidal cockle bed areas where fishing activity will be occurring.

Table 2. Screened in interest features requiring further consideration in a TLSE

Type of feature	Feature

Habitat features (including supporting habitats) and sub-features	• Large shallow inlets and bays
	  ○ Intertidal mud
	  ○ Intertidal sand and muddy sand
	• Water column

Species features	• Harbour (common) seal (*Phoca vitulina)*
Bird features	• Bar-tailed godwit (*Limosa lapponica*), Non-breeding • Bewick's swan (*Cygnus columbianus bewickii*), Non-breeding • Black-tailed godwit (*Limosa limosa islandica*), Non-breeding • Common scoter (*Melanitta nigra*), Non-breeding • Common tern (*Sterna hirundo*), Breeding • Curlew (*Numenius arquata*), Non-breeding • Dark-bellied brent goose (*Branta bernicla bernicla*), Non-breeding • Dunlin (*Calidris alpina alpina*), Non-breeding • Gadwall (*Anas strepera*), Non-breeding • Goldeneye (*Bucephala clangula*), Non-breeding • Grey plover (*Pluvialis squatarola*), Non-breeding • Knot (*Calidris canutus*), Non-breeding • Little gull (*Hydrocoloeus min*utus), Non-breeding • Little tern (*Sternula albifrons*), Breeding • Oystercatcher (*Haematopus ostralegus*), Non-breeding • Pink-footed goose (*Anser brachyrhynchus*), Non-breeding • Pintail (*Anas acuta*), Non-breeding • Redshank (*Tringa totanus*), Non-breeding • Red-throated diver (*Gavia stellata*), non breeding • Sanderling (*Calidris alba*), Non-breeding • Sandwich tern (*Sterna sandvicensis*), Breeding • Shelduck (*Tadorna tadorna*), Non-breeding • Turnstone (*Arenaria interpres*), Non-breeding • Waterbird assemblage, Non-breeding • Wigeon (*Anas penelope*), Non-breeding

2.2 Sensitivity of interest features

The Wash cockle beds provide a valuable resource for the local fishing industry, an important food resource for many bird species that reside or over-winter and low tide haul-out sites for the local Harbour seal population, making them an important fishery and conservation resource.

The overlap of habitat features with the cockle bed areas is shown in Figure 4. The sensitivities of interest features to potential pressures arising from the proposed activity are shown in Tables 3 and 4 (as identified in Natural England's conservation advice: Advice on Operations, under fishing - shore-based activities (the closest activity category available), for The Wash and North Norfolk Coast SAC and The Wash SPA, accessed online 15th May 2026). Tables 3 and 4 also identifies pressures which require further consideration in an Appropriate Assessment and which can be ruled out as having no likely significant effect, the justification for which is provided in section 2.4.

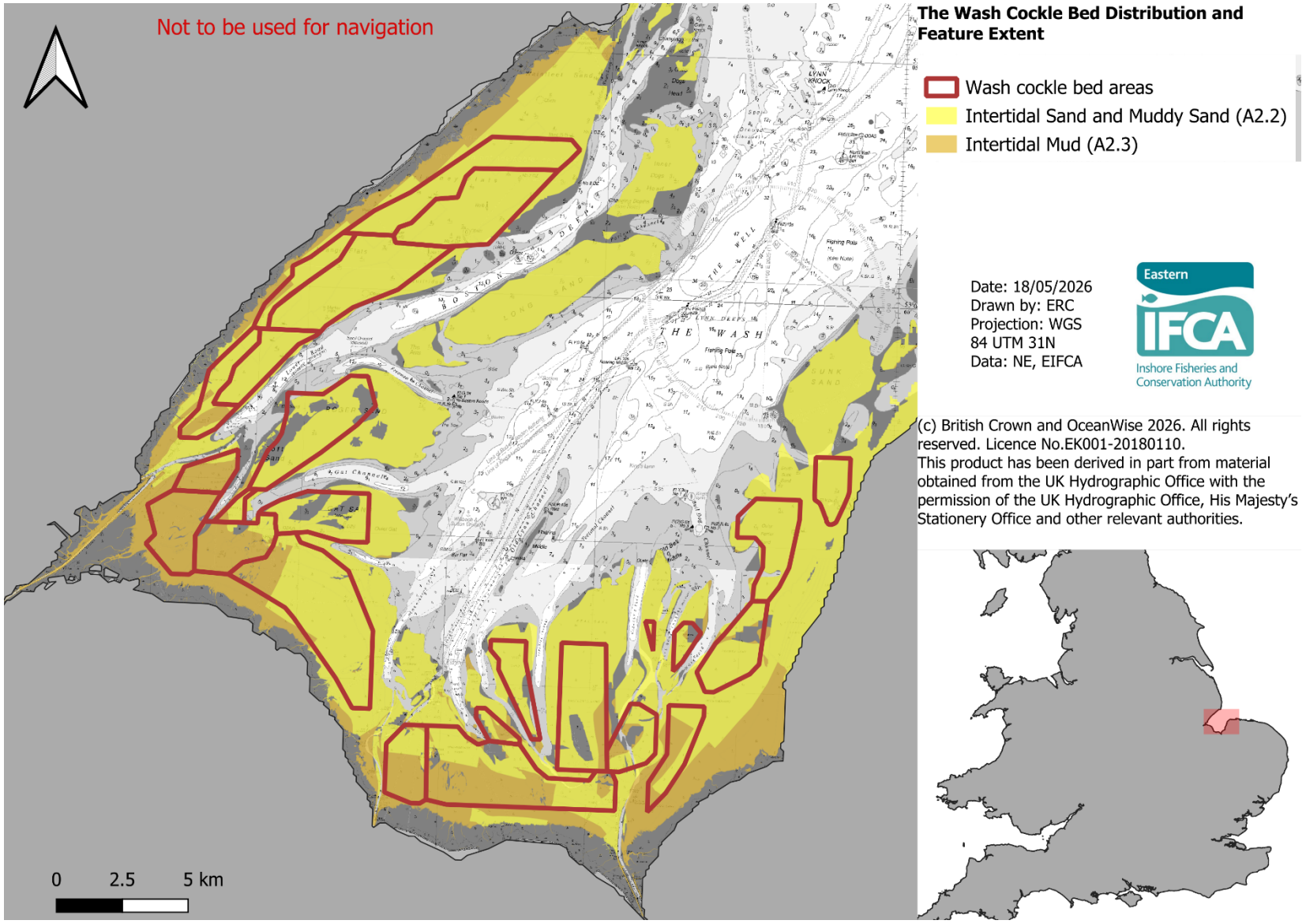

Figure 4. Extent of scoped in designated features within the Wash and overlap with cockle beds

Table 3. Pressure table showing the sensitivity of relevant SAC features designated under The Wash and North Norfolk Coast SAC from the proposed fishery (Natural England's Advice on Operations, Fishing – shore-based activities, accessed 15/05/2026) and which interactions require an appropriate assessment. Medium-high risk pressures are highlighted in red, and low risk pressures are highlighted in yellow. Pressure-feature sensitivities highlighted in blue have been identified as not relevant and have been screened out at this stage, those highlighted in green have been identified as not likely to have a significant effect and no need to be assessed further and those in bold and not highlighted require further consideration as in an appropriate assessment as have been identified as having potential to result in a significant effect on the feature.

(NS – Not sensitive, L – Low sensitivity, M – Medium sensitivity, H – High sensitivity, NR – Not relevant, IE – Insufficient evidence, NA – Not assessed)

Pressure	Sensitivity to pressure				
	Intertidal mud	**Intertidal sand and muddy sand**	**Harbour seal**	**Water column**	**AA required?**
Abrasion/disturbance of substrate on surface of seabed	L	NS - M	NR	NR	**Yes**
Habitat structure changes – removal of substratum (extraction)	M - H	M	NR	M	**Yes**
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	L	NS - H	NR	NR	**Yes**
Removal of non-target species	L	L - M	H	H	**Yes**
Removal of target species	L	L - M	H	H	**Yes**
Visual disturbance	NR	NS	L	L	**Yes**
Above water noise	NR	NR	H	NR	No

Collision BELOW water with static or moving objects not naturally found in the marine environment.	NR	NR	H	NR	No
Deoxygenation	NS	NS - L	NR	H	No
Hydrocarbon & PAH contamination	L-M	NA-M	NA	NA	No
Introduction of light	NS	NS – L	IE	L	No
Introduction or spread of invasive non-indigenous species (INIS)	NS – M	NS – H	IE	H	No
Litter	NA	NA	M	H	No
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	IE-M	NA-M	NA	NA	No
Transition elements & organo-metal (e.g. TBT) contamination	L-M	NA-M	NA	NA	No
Underwater noise changes	NR	NR	H	H	No

Table 4. Pressure table showing the sensitivity of the SPA species designated under The Wash SPA from the proposed fishery (Natural England's Advice on Operations, Fishing – shore-based activities, accessed 15/05/2026) and which interactions require an appropriate assessment. Medium-high risk pressures are highlighted in red, and low risk pressures are highlighted in yellow. Pressure-feature sensitivities highlighted in blue have been identified as not relevant and have been screened out at this stage, those highlighted in green have been identified as not likely to have a significant effect and no need to assess further and those not highlighted require an appropriate assessment as have been identified as having potential to result in a significant effect on the feature.

(NS – Not sensitive, L – Low sensitivity, M – Medium sensitivity, H – High sensitivity, NR – Not relevant, IE – Insufficient evidence, NA – Not assessed)

Pressure	SPA Assemblage sensitivity	AA required?
Abrasion/disturbance of substrate on surface of seabed	NR	No
Habitat structure changes – removal of substratum (extraction)	NR	No
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	NR	No
Removal of non-target species	**H**	**Yes**
Removal of target species	**NR**	**Yes**
Visual disturbance	**L – H**	**Yes**
Above water noise	L – H	No
Collision BELOW water with static or moving objects not naturally found in the marine environment.	NS – H	No
Collision ABOVE water with static or moving objects not naturally found in the marine environment	NS - H	No

Deoxygenation	NR	No
Hydrocarbon & PAH contamination	NA	No
Introduction of light	EI – M	No
Introduction or spread of invasive non-indigenous species (INIS)	NS - H	No
Litter	IE - M	No
Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)	NA	No
Transition elements & organo-metal (e.g. TBT) contamination	NA	No
Underwater noise changes	IE - NS	No

2.3 Description of activity

The hand work cockle fishery is accessed from the sea, using vessels that dry out on the intertidal cockle beds at low water. Fishers then hand rake cockles during the low water period and collect them in 1 tonne bags. It is common practice for cockle hand workers to prepare the area to be fished by manoeuvring the fishing vessel in shallow water in such a manner as to displace the upper layer of sediment from the substratum, effectively bringing cockles to the surface of the seabed. The impacts of this activity, referred to as “prop washing”, have previously been assessed and were not found to cause significant adverse effects to the seabed habitat (Pears *et al*., 2011).

The fishery is managed using a suite of management measures including an overall quota (TAC) and a daily catch restriction. The fishery operates during specified opening times (typically 15 days/month) on tides above 6m; the tidal cycle will influence the number of consecutive days that the fishery could be open. Fishers must spread any unharvested cockles that remain piled within the ‘prop-wash’ rings to prevent them from smothering. Established management measures for the fishery are set out in the Wash Cockle Fishery Management Plan[10] and are implemented via the WCMB.

In addition, with support from Natural England, Eastern IFCA have developed a Code of Best Practice[11] (Appendix 3) for the hand work cockle fishery to minimise physical impacts to the seabed. The Code of Best Practice is auxiliary to the WCMB; as such the Code is not the main mechanism to prevent damage but provides additional mitigation against damage. The Authority has ensured that fishermen are made aware that if their activities are considered to be damaging to the site, the Authority may close the fishery. Key measures applicable to the cockle fishery are summarised in Table 5 along with the mechanisms under which they are implemented.

Whilst there are currently 54 vessels eligible to access the cockle fishery, several vessels are likely to receive eligibility prior to the fishery opening, consequently, up to 63 vessels could be eligible. Currently none of these vessels hold cockle permits, however, as permits are issued annually and can be applied for at any time, they will likely be obtained by those wanting to take part in the fishery between now and the opening date. Whilst historically it has been extremely rare for all vessels with permits to take part in the fishery, the assessment considers the ‘worst-case-scenario’ of up to 63 vessels entering into the fishery. Table 6 details the number of vessels which took part in the Wash cockle fishery in recent years, alongside the number with permits and eligibility.

The 2026 stock assessment indicates that the fishery will be spread over several beds, but the main focus will be large clusters of vessels on Hunstanton, the Gat and the Roger and to a lesser extent IWMK and Hook Hill/Mare Tail. A small number of vessels will seek smaller patches of cockles on other beds. Depending on how effectively the proposed closures on Wrangle/Friskney enclose the Year-0's (Appendix 2), there

[10] https://www.eastern-ifca.gov.uk/wp-content/uploads/2021/03/2019_07_WFO_cockle_fishery_management_plan1.5_Final.pdf

[11] While referred to as the Wash Fishery Order Code of Best Practice, this still applies under the new Wash Cockle and Mussel Byelaw (2021). The title will be updated to reflect this.

could also be several vessels that try fishing around the edges of the closed areas. In addition, there is a tendency for smaller vessels to fish closer to their home ports, so Boston vessels may target the Dills and Butterwick, while Kings Lynn vessels fish the Daseley's, Breast etc. Activity generally peaks between June and September, after which effort typically declines with very few vessels continuing into the winter months. Fishing activity and behaviour will be closely monitored by Eastern IFCA throughout the duration of the fishery.

Table 5: Measures and mechanisms used to manage the Wash cockle fishery

Measure	Detail	Mechanism
Permits	A requirement for a permit to fish for cockles	Wash Cockle and Mussel Byelaw 2021
Opening and closure of fishery	Ability to close the fishery on exhaustion of the TAC (4,992 tonnes) Ability to close areas within the fishery to protect the sustainability of the stock (e.g. protection of small cockles) or to achieve conservation objectives (e.g. closures for the protection of birds and seals). Closures will be specified in permit conditions.	
Operating times	Typically 4-5 days / week based on industry preference and tide heights. Operating times will be specified in permit conditions.	
Catch returns	Permit holders must complete catch return forms within 24 hours of fishing activity, and submit to the Authority no later than the Wednesday of the following week.	
Fishing methods	Certain gear types may be prohibited.	
Maximum vessel size	14m	Wash Cockle and Mussel Byelaw 2021 Schedule 2 Restrictions
Sorting of catch	Any material rejected through sorting of catch must be immediately returned to the sea or seabed and spread evenly over that area.	
Prohibition of transhipping	Cockles cannot be transhipped or otherwise relocated from one vessel to another.	
Daily Quota	2 tonnes or the maximum specified in a permit condition[12].	
Requirement to land cockles	Cockles must be taken to port and landed immediately, and only once per calendar day. Cockles must not be left on the sand or deposited in the water in any container.	
Prop-washing	A person fishing for cockles must not use an anchor during prop-washing. Cockles dislodged by prop-washing must be spread evenly over the ground before leaving the area.	
Dual fishing prohibition	A person fishing for cockles or mussels must not remove both on the same day	

[12] It should be noted that a three tonne quota is being considered for this year's fishery.

Standard bags	A requirement to land cockles in a standard bag	

Table 6 Number of vessels with eligibility and a permit to take part in the cockle fishery and number of vessels that actually took part.

Year	Number of vessels with eligibility to take part in cockle fishery	Number of vessels with cockle permits	Number of vessels that took part in the cockle fishery
2023	NA – WCMB not in force		52
2024			61
2025	63	51	49
2026 (as of 26/05/2026)	54	0	NA

2.4 Test of likely significant effect

This section examines whether there is likely to be a significant effect on sensitive site features as a result of pressures which have the potential to result from the activity. The outcome of the assessment is summarised in Tables 3 and 4.

Natural England's online Conservation Advice (Advice on Operations)[13] has been reviewed to inform the types of pressures that could be caused by the hand-worked fishery on the designated site features. Pressures have then been considered as to whether they are likely to have a significant effect on relevant site features. As set out in the conservation advice[14], low risk pressures have been scoped out unless there are site specific factors which result in an increased risk. For thoroughness, consideration of low risk pressures are provided below.

2.4.1 Low-risk pressures

Above water noise

Relevant only for Harbour seal and the SPA assemblages. Harbour seal have a high sensitivity to the pressure and SPA species have a low to high sensitivity to the pressure. This pressures poses highest disturbance risk to diving or surface feeding birds. The recently added Hunstanton cockle bed is within the Greater Wash SPA, and is likely to be one of the more active beds in terms of fishing activity. This bed is also unique in that a large portion of it does not fully uncover at low water for the majority of tides. Whilst this means that activities can occur in shallow water introducing above

[13] Available at: https://designatedsites.naturalengland.org.uk/Marine/FAPMatrix.aspx?SiteCode=UK0017075&SiteName=The+Wash+and+North+Norfolk+Coast&SiteNameDisplay=The+Wash+and+North+Norfolk+Coast+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=2, accessed 17/5/2025

[14] NE advice for Low risk pressures: "Unless there are evidence-based case or site specific factors that increase the risk, or uncertainty on the level of pressure on a receptor, this pressure generally does not occur at a level of concern and should not require consideration as part of an assessment".

water noise, significant noise levels are not likely due to the vessels remaining grounded for the duration of the activity (no engine noise) and the hand gathering nature of activities. Further, it is considered unlikely that plunge feeding birds would target such shallow areas. In conclusion, this pressure is not likely to have a significant effect on designated site features.

Collision BELOW water with static or moving objects not naturally found in the marine environment.
Relevant only for Harbour seal and the SPA assemblage. Harbour seal have a high sensitivity to the pressure and the sensitivity of SPA species to the pressure ranges from not sensitive to high. The only part of the proposed activities that could result in this pressure is the travelling of fishing vessels to and from the cockle bed. However, it is not likely that seals or birds will collide with fishing vessels below water because they will be aware of their presence and will avoid colliding with them. Therefore, this pressure is not likely to have a significant effect on designated site features.

Collision ABOVE water with static or moving objects not naturally found in the marine environment.
Relevant only for the SPA assemblage which have a not sensitive to high sensitivity to the pressure. SPA species will be visually aware of fishing vessels and will avoid colliding with them. Therefore, this pressure is not likely to have a significant effect on designated site features.

Deoxygenation
The activity will not result in this pressure; thus, it is not considered any further.

Hydrocarbon & PAH contamination
This pressure is the subject of existing legislation, which is considered as adequate mitigation against potential impacts. There is not considered to be a realistic risk of these pressures resulting from the proposed fishery.

Introduction of light
The activity will not result in this pressure; thus, it is not considered any further.

Introduction or spread of non-indigenous species (INIS)
Relevant for Intertidal Mud, Intertidal Sand and Muddy Sand, Water Column the SPA assemblage. Sensitivity ranges from not sensitive to high for Intertidal Sand and Muddy Sand and the SPA assemblage, and high for Intertidal Mud and Water Column. The hand work cockle fishery in The Wash and North Norfolk Coast (WNNC) SAC has however not been highlighted as a high-risk pathway for the introduction or spread of non-indigenous species. The activity does not involve any intentional introduction or translocation of species, and participating vessels do not use ballast water, which has been identified as a major vector of invasive species connected with shipping (Ware, 2009). The fishing vessels participating in the cockle fishery are local to the Wash ports, meaning it is highly unlikely that they will unintentionally introduce non-indigenous species to the site through travel outside of and return to the local area. During the fishing process, cockles are raked and bagged on the cockle bed itself, and not redistributed in other parts of The Wash, so the spread on non-indigenous species is not likely.

Litter
Although relevant to Harbour seal, Water column and SPA species (not assessed for intertidal mud and intertidal mud and muddy sand), this pressure is low risk, based on best practice by fishermen and is not considered likely to have a significant effect on designated site features. Because of the nature of the fishery, the likelihood of fishing gear being lost as a result of the activity is very low.

Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals)
This pressure is the subject of existing legislation, which is considered as adequate mitigation against potential impacts. There is not considered to be a realistic risk of these pressures resulting from the proposed fishery.

Transition elements & organo-metal (e.g. TBT) contamination
This pressure is the subject of existing legislation, which is considered as adequate mitigation against potential impacts. There is not considered to be a realistic risk of these pressures resulting from the proposed fishery.

Underwater noise changes
Relevant for harbour seal, water column features, both of which have a high sensitivity to the pressure. Also relevant for SPA species, but these are not sensitive to the pressure. The interaction is low risk and as the actual fishing activity occurs intertidally over the period of low water, there will be no underwater noise generated, other than vessels transiting to and from the cockle bed. The “prop washing” aspect of the activity is routine boat operation in very shallow water, which will limit the transmission of underwater noise. Thus, when considering the nature of the proposed activities, this pressure is not likely to have a significant effect on designated site features.

2.4.2 High-risk pressures

It is assessed that the proposed cockle fishery could result in the pressures identified in Table 5. An Appropriate Assessment (AA) has therefore been undertaken to assess whether these pressures could significantly impact relevant features (Table 7) and consequently result in an adverse effect on site integrity (Section 3).

Table 7. High-risk pressures and their relevant sub-features to be assessed in the AA.

Pressure	Relevant sub-feature
Abrasion/disturbance of substrate on surface of seabed	Intertidal mud Intertidal sand and muddy sand
Habitat structure changes – removal of substratum (extraction)	Intertidal mud Intertidal sand and muddy sand
Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	Intertidal mud Intertidal sand and muddy sand
Removal of non-target species	Intertidal mud Intertidal sand and muddy sand Harbour seal Water column SPA assemblage
Removal of target species	Intertidal mud

	Intertidal sand and muddy sand SPA assemblage
Visual disturbance	Harbour seal Water column SPA assemblage

3 Appropriate assessment

Possible pathways for an impact to occur on sensitive features from the remaining pressures are discussed below.

3.1 Abrasion/disturbance of substrate on the surface of seabed; Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion.

The above two pressures and their interactions with sensitive features have been considered together as the potential impacts are of a similar nature. Features considered sensitive to the above two pressures:

- Intertidal mud
- Intertidal sand and muddy sand

Abrasion/disturbance of substrate on the surface of the seabed may be generated by the fishers walking on the sediment, and movement of equipment, such as baskets being dragged across the surface. The effects of this pressure are relevant to epiflora and epifauna (Natural England Conservation Advice – Advice on operations – abrasion pressure).

Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion may be generated by the use of rakes by fishing when hand raking for cockles but also by the action of vessels prop-washing, lying on the seabed and drying out during the low tide period. Hand-raking activities will generate very shallow penetrations, of the order of a few cm, however, vessel activities could generate penetrations of 20 to 30cm if best practice is not followed. This could potentially have local impacts on sediment composition (for example if finer components of sediment were lost after disturbance) or on infauna.

A bespoke study was conducted in 2010 to assess the impacts of prop washing on sediment and biological communities. Pears et al (2011) found that, “Aside from significant differences in numbers of the edible cockle, *Cerastoderma edule*, between fished and control areas, statistical analysis could not detect a consistent effect on community structure or sediment composition as a result of propeller wash preparation of the cockle beds as part of hand-worked cockle fishing activity”. However, Eastern IFCA has taken a precautionary approach to protect both the sediment and the re-settlement of discarded cockles by implementation of Restrictions 20 and 21 under Schedule 2 of the of the WCMB. Paragraph 20 restricts the use of an anchor whilst prop-washing and paragraph 21 requires cockles dislodged by prop-washing to be spread out thinly and evenly over the ground before leaving the area fished[15]. Additionally, the Code of Best Practice specifies that prop-washing should be restricted to the minimum required to uncover the amount of cockle which can be harvested in one day.

[15] Eastern IFCA Wash Cockle and Mussel Byelaw: Available at [https://www.eastern-ifca.gov.uk/wp-content/uploads/2025/03/EIFCA_WCM_Byelaw_2021_SIGNED-26-February-2025.pdf]. Accessed 13/05/2025.

Eastern IFCA follow a risk-based approach to compliance activity and monitoring as directed by monthly Tactical Coordination Group (TCG) meetings in order to prevent and detect non-compliance with management measures. This includes monitoring of prop-washing activities as required via TCG during the fishery.

Most of the cockle beds are proposed to be open to the fishery (Appendix 2) and whilst some beds will be more targeted than others it is not predicted that any one bed will receive the majority of effort or excessive fishing pressure. The fishing activity will be spread across multiple cockle beds, resulting in a spread of pressure across individual beds.

Within the feature Intertidal mud, all biotopes are identified as having low sensitivity and high resilience to both pressures. Within the feature Intertidal sand and muddy sand, all biotopes are identified as being not sensitive or having low sensitivity and high resilience to the pressure, with the exception of the biotopes: *Macoma balthica* and *Arenicola marina* in muddy sand shores and *Cerastoderma edule* and polychaetes in littoral muddy sand. The former biotope has been assessed as having medium sensitivity and medium resilience to Abrasion/disturbance of substrate on surface of seabed and high sensitivity and low resilience to Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion. The latter biotope is identified as having medium sensitivity and medium resilience to the pressure: Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion.

The location of intertidal beds in an open embayment results in appreciable natural seabed energy from tide and wave action, resulting in an infauna which is pre-adapted to disturbance pressures. Furthermore, there is effectively no sessile epifauna in the location of the fishery, because of the lack of attachment surfaces, shelter or screening from predators.

The proposed fishery will be operated under the same management parameters (albeit with annual variation in quota and open areas) as it has been for many years. Eastern IFCA conducts extensive surveys of cockle beds every year. During this time there has been no evidence that the fishery causes a level of abrasion that results in adverse effects on site integrity through abrasion (e.g. Pears *et al*., 2011; Jessop *et al*., 2010).

Inshore Fisheries and Conservation Officers (IFCOs) conduct patrols to ensure fishing activities are conducted in compliance with regulations (and the code of best practice) and do not cause excessive disturbance to the site features as required through the TCG. This may include observation of fishing activities at low-tide on the sands, measuring and recording prop-wash impacts on the beds. If activities are found to be having damaging effects on seabed features, the Authority will consider closure of the fishery in whole or in part “where it is judged necessary to do so to meet the conservation objectives of The Wash and North Norfolk Coast European Marine Site or for the sustainability or the viability of the fishery”. This has become standard practice and has been in place for several years.

Both pressures are considered not relevant for harbour seal, water column or SPA species.

Conclusion

The low-impact nature of the fishery and the resilience of the intertidal mud / intertidal sand and muddy sand biotopes to abrasion and penetration, evidenced by the bespoke impact study (Pears et al 2011), minimise the impacts from pressures caused by the fishery. In addition, as the regulator, Eastern IFCA has the ability to respond quickly to poor behaviour that could result in excessive damage to the intertidal habitat. Therefore, it is concluded that the pressures Abrasion/disturbance of substrate on the surface of seabed and Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion caused by the proposed fishery will not have an adverse effect on site integrity.

3.2 Habitat structure changes – removal of substratum (extraction)

Features considered sensitive to the pressure:

- Intertidal mud
- Intertidal sand and muddy sand

This pressure could be generated by the raking of cockles into nets without adequate cleaning or sorting, resulting in the removal of sediment or dead shell collected with the cockles. However, the extent of this occurring would be very limited because it is not in fishers' interests to retain sediment or shell. It is extremely unlikely that the amount of substrate removed during hand working activities will be significant enough to result in any changes to habitat structure.

This pressure is not relevant for harbour seal, water column and SPA species.

Conclusion

The pressure Habitat structure changes – removal of substratum (extraction) is considered to have a negligible impact on sensitive features, and it is concluded that it will not have an adverse effect on site integrity.

3.3 Removal of non-target species

Features considered sensitive to the pressure:

- Intertidal mud
- Intertidal sand and muddy sand
- Water column
- Harbour seal
- SPA assemblage

The hand work cockle fishery is an extremely selective fishery, with negligible bycatch and therefore negligible removal of non-target species. The fishery will occur in known cockle bed areas which typically contain a low diversity of species, being generally devoid of epifauna and having infauna strongly dominated by cockles. Furthermore, it is extremely unlikely that any finfish species considered as food for birds or seals

would be taken as a bycatch, and because of the nature of fishing activities there is no pathway identified by which the fishery could catch either harbour seal or seabirds as bycatch.

Conclusion

The low diversity of species within the areas where the fishery will occur coupled with the high selectivity of the fishing method support the conclusion of no adverse effect on site integrity from the pressure: Removal of non-target species.

3.4 Removal of target species

Features considered sensitive to the pressure:

- Intertidal mud
- Intertidal sand and muddy sand
- Water column
- Harbour seal
- SPA assemblage

Intertidal mud and Intertidal sand and muddy sand

Excessive removal of cockles has the potential to cause significant impacts. This is managed through the implementation of a Total Allowable Catch (TAC) and the application of minimum biomass thresholds to ensure the fishery does not prevent the SSSI Conservation Objective targets from being achieved. These minimum thresholds are:

- Maintain cockle stock above 11,000 tonnes;
- Maintain spawning stock (≥14mm width) 3,000 tonnes;
- Maintain Ash-Free Dry Mass above shellfish biomass threshold[16].

Since 2008, atypical mortality has resulted in a decrease in the number of adult cockles. This in turn, has shifted fishing practices towards the harvesting of smaller individuals. Traditionally, the TAC for the fishery was calculated as a third of the adult cockle stock, which was appropriate for the fishery prior to 2008. However, this approach has resulted in disparity in recent years between the size of the TAC (based purely on the biomass of adult cockles) and the available fishable stocks (which include cockles that were considered juveniles at the time of the survey but have grown to a fishable size by the time the fishery opens some months later). Therefore, after careful consideration, in 2023 the method for calculating the TAC was changed from a third of the adult cockle stock to a sixth of the total stock. This approach provides better parity between the abundance of the cockles being targeted and the size of the TAC compared to the previous model. There had been some initial concern raised that the new approach would lead to much higher TAC's being allocated, or more juvenile cockles being removed. Past stock data, however, show that over time the two

[16] AFDM required to support 24,000 oystercatchers as per site conservation objective.

methods result in roughly the same size of TAC allocated and that for the 2024 and 2025 fisheries, the TAC was slightly smaller than it otherwise would have been.

To protect juvenile cockle stocks, areas supporting high densities (>1,000/m2) of Year-0 juvenile cockles will remain closed to the fishery unless stock survey data shows it would be more beneficial to open them[17]. This adaptive management approach to the management of juvenile cockles is discussed in detail in Appendix 4. Charts outlining the areas to be closed (along with co-ordinates) are provided to all licence holders and their representatives and deputies prior to the opening of the fishery (Appendix 2, Figure 12-14). In addition to this, management measures also include a requirement for fishermen to use either a cockle net or a riddle when Year-0 juvenile cockles are present in significant densities to protect juvenile stocks by allowing them to be returned to the cockle beds rather than being landed (removed from the fishery).

The 2026 cockle survey revealed a total cockle biomass of 29,951 tonnes, showing an increase in biomass from last year's 23,432 tonnes and resulting in an larger TAC. The 2026 survey showed that there was a good spatfall in 2025, with multiple high-density patches of Year-0 cockles. These patches are most prevalent at Wrangle and Friskney. The 2026 cockle stock assessment estimated a total cockle stock of 29,951 tonnes, with the total adult stock accounting for at least 10,932 tonnes[18], both well above the minimum thresholds of 11,000 and 3,000 tonnes respectively. We predict that the total stock, even with the removal of the TAC's allocated amount, will not deplete either of the minimum thresholds below their targets.

The fishery will close immediately prior to the commencement of the 2027 cockle surveys in March, or on exhaustion of the yearly TAC. The fishery could also close earlier, for example, if the density of cockles is reduced to un-fishable levels, regardless of the status of the TAC. It is important to note that a hand-worked fishery is less efficient than a mechanised fishery and it is only financially viable when cockle densities are relatively high. Once stocks fall below these relatively high densities, hand-working becomes commercially unviable and stops. As the densities required for commercial hand-worked fisheries are higher than those required for successful stock sustainability, the fishery is highly unlikely to reduce cockle densities to unsustainable levels.

Fishing trends and behaviours will be closely monitored throughout the duration of the fishery to firstly, ensure compliance with management measures and the code of conduct, but also to ensure the level of effort and the spatial extent of activities do not go beyond that predicted and assessed within this Appropriate Assessment. Eastern IFCA officers also monitor cockle beds throughout the duration of the fishery to identify any environmental factors that may require a change to the management measures in place. The Authority may close the fishery if it is found that fishing activities are

[17] On occasions when cockle mortality is predicted to be high on specific beds, fishers may be directed to harvest these stocks in preference to other beds to reduce the potential in combination effects the mortalities would otherwise cause.

[18] The adult stock estimate does not include 25 unsurveyed stations on the Breast sand. Whilst the total stock supported by this area has been estimated using the trends from the rest of the bed that was surveyed, it is not known what proportion of this stock is of adult size. Therefore, these stations are not included in the estimate for total adult stock. This is explained in further detail in appendix 1.

damaging to the site. Similarly, closed areas might be opened if deemed necessary, for instance, if widespread ridging-out[19] is imminent (Appendix 4).

After consideration of the above, it is concluded that these factors adequately mitigate the potential for adverse effect on site integrity from this pressure on intertidal mud and intertidal mud and muddy sand features.

Harbour seal and Water column

Cockles are benthic species and are not known to be a food source to species found in the water column, i.e. finfish or harbour seal. Whilst there is a pathway for impact via trophic links within the food chain, it is highly unlikely that these features will be significantly impacted by removal of cockles at this scale. It is concluded that the proposed fishery will have no adverse effect on site integrity via this pressure pathway.

SPA assemblage

Whilst the online conservation advice describes this pressure as not relevant to the SPA assemblage (Table 4), Eastern IFCA disagrees and has included it in this assessment. Cockles form key prey items for several bird species in the SPA assemblage and are particularly important for the cockle-predating oystercatcher *Haematopus ostralegus*, knot (*Calidris canutus*) and turnstone (*Arenaria interpres*).

As adult cockles form the main prey species for oystercatcher, the cockle fishery has the potential to significantly affect oystercatcher populations in The Wash and therefore requires an in-depth assessment to ensure it does not have impacts on oystercatcher populations through the removal of prey species. The assessment is detailed in Table 8. It considers both mussel and cockle stocks, as mussels also provide an important prey species for Oystercatcher. For a fishery to go ahead, current stock levels of cockles and mussels in the Regulated beds of The Wash outside of the TAC must exceed the conservation objective target of 40kg Ash Free Dry Mass (AFDM) per oystercatcher. The latest WeBS five year mean peak count (2020/21 – 2024/25) for Oystercatcher in The Wash SPA is **22,806** individuals[20]. At 40kg per bird, a total of 912 tonnes AFDM are required to support this number of Oystercatchers, however, Natural England advise that a minimum of 24,000 oystercatchers should be supported by the site, which equates to 960 tonnes AFDM.

The current combined mussel (≥25mm length) stock (25,006t) and total cockle stock (29,951t) contributes to a total of 2349t AFDM (Table 8). Removal of the proposed cockle TAC (4,992t) and the mussel relaying fishery TAC of 5,779 tonnes reduces this ADFM contribution to 1,864 tonnes AFDM, which is sufficient to support **46,598** Oystercatchers (Table 8), well above the conservation objective target of 24,000.

In addition to the shellfish stocks in the public fisheries, there are also additional cockle stocks within the Wash Several Fishery Shellfish Lays and the Le Strange Estate. The

[19] Ridging-out is a phenomenon whereby dense patches of cockles are forced to the surface as a result of competition for available space as they grow. Already weakened by this competition, whole beds are vulnerable to being washed away or smothering when this occurs. Opening a fishery to thin out such areas can prevent these losses from occurring.
[20] Available at: BTO WeBS Reports

Several fishery lays are estimated to support 342 tonnes of cockles, which could, in theory, be harvested in addition to the TAC. As these stocks were not included in the minimum conservation objective threshold or bird food model AFDM calculations, however, their removal would not prevent the conservation objective targets from being achieved. As it is unlikely that the stocks in these areas would be completely removed, they add additional food stocks for the relevant SPA species.

Knot and turnstone are small wading birds that feed predominantly on spat[21] (Dekinga and Piersma, 1993), which will not be targeted in this fishery; therefore, it is unlikely there will be a significant effect on these species and so no further assessment is required.

After consideration of the above it is concluded that the proposed fishery will not have an adverse effect on SPA features through the removal of target species.

Conclusion

This assessment considers the above stock estimations of both cockles and mussels in regards to minimum thresholds using an established and proven bird food model. The model ensures sufficient stock remains for both the food needs of overwintering birds and breeding stock for future populations. The model demonstrates that the remaining stock after removal of the TAC is well above what is required to support bird populations. Therefore, it is concluded that the proposed fishery **will not have an adverse effect on site integrity** from the Removal of target species.

[21] NE advice for the Wash SPA has identified knots main source of prey to be cockle spat, and a large proportion of turnstones diet to be cockle and mussel spat.

Table 8: 2026 cockle and 2025/26 mussel stock biomass, proposed fishery TAC (using 1/6 method) with conversion to Ash Free Dry Mass (AFDM) and calculation of the numbers of oystercatchers which the stock supports.

Stock Assessment (tonnes)	TAC	Total stock (All cockles, Mussels >/=25mm)
Mussel	**5,779**	**25,006**
Cockle	**4,992**	**29,951**

	Cockle biomass (t)	Equivalent AFDM (t)	Mussel biomass >/=25mm (t)	Equivalent AFDM (t)	Cockle & mussel equivalent AFDM (t)	No. oystercatchers supported (at 40kg/bird)
	a	b = a*0.030	c	d = c*0.058	e = b+d	f = (e*1000)/40
			Required to meet conservation Objective*:		**960**	**24,000**
Pre-fishery (x)	**29,951**	898.53	**25,006**	1,450.35	2,348.88	58,721.95
Proposed TAC (y)	**4,992**	149.76	**5,779**	335.18	484.94	12,123.55
Remaining amount (z, = x - y)	24,959	748.77	19,227	1,115.17	**1,864**	**46,598**

*Based on NE conservation target of 24,000 oystercatchers supported within the site

3.5 Visual disturbance

Features considered sensitive to the pressure:

- Harbour seal
- Water column
- SPA assemblage

The hand-worked cockle fishery is limited to low water periods on certain days of each tidal cycle (where tide height exceeds 6m; approx. 4 days per week), since most sands are only exposed on the larger tides. Based on previous fisheries, the fishery is open approximately 15 days per month.

Furthermore, the limited daily quota ensures that this is a low intensity fishery and its quiet and slow nature means that it is not likely to cause any significant non-physical disturbance effects to interest species. This is supported by reliable anecdotal evidence which has shown birds and seals habituate to the presence of fishing vessels and fishermen engaged in hand working activities on intertidal sands.

Harbour seal

Harbour seals use the extensive intertidal flats of The Wash as safe locations to “haul out” (heave themselves out of the water onto land) over low water periods to rest, thermoregulate, socialise, moult and give birth (London *et al*., 2012). In 2025, there were 226 seal-haul out sites recorded in The Wash (SMRU, 2025). Harbour seals have been identified as sensitive to low tide activities that occur on, or within a range of haul out sites and have the potential to cause disturbance, particularly during the breeding and moulting season (June - August) which coincides within the main cockle season.

The Sea Mammal Research Unit (Thompson et al 2022) states that there is no evidence that the hand-worked fishery is having an impact on the Harbour seal population in The Wash. However, Eastern IFCA recognises current concerns about Harbour seal population declines in The Wash and therefore, the potential for disturbance is considered in more detail below.

This interaction requires an annual in-depth assessment to identify whether mitigation is required and to ensure the fishery does not have an adverse effect on the harbour seal population. This assessment is detailed in Appendix 5. The assessment reports on a spatial analysis undertaken to determine whether the proposed fishery will coincide with seal haul-out sites, as reported in the latest available data (Sea Mammal Research Unit, 2025 *unpublished*). The analysis involves considering each haul out site based on percentage usage (the percentage of the total Harbour seal population in The Wash that uses each site) and identifying overlap with areas likely to be targeted by the cockle fishery. Each area of overlap is considered in detail in relation to:

- Site usage and fidelity of each haul-out site (over 3 years);
- Likely fishery pressure at each overlap;
- Local knowledge of effects of local topography on visual disturbance; and
- Availability of alternative haul outs within 3km.

Where the analysis identifies seal haul out sites that are particularly vulnerable to visual disturbance, precautionary fishery closures are proposed to mitigate the risk of the pressure *Visual disturbance* on the Harbour seal population during the sensitive pupping/moult season.

The assessment detailed in Appendix 5 concludes that there is a high risk of visual disturbance from the fishery due to the overlap of a high usage seal haul-out site with fishable cockle stocks on Hook Hill, Mare Tail, Holbeach and Butterwick EXT, as well as the medium risk site of Wrangle. However, with the proposed closure on Hook Hill and Mare Tail, Butterwick EXT, Holbeach, and Wrangle during the sensitive period for pupping (1st June – 31st August), which includes a 100m buffer around the associated haul out area (Appendix 5), adverse effect can be ruled out.

SPA assemblage

The sensitivity of bird species within the SPA assemblage has been identified as high to the pressure visual disturbance. The hand work fishery occurs over the low water period; therefore, consideration is given to the potential for disturbance to wading birds that utilise the site at low water, in particular, those that feed on or are associated with cockle beds.

An in-depth assessment has been completed to assess whether the fishery could have adverse effects on the SPA assemblage as a result of visual disturbance and is detailed in Appendix 6. The assessment used the most recent Centre for Ecology and Hydrology Low Tide Bird Survey counts (2019/2020[22]) to assess the potential for disturbance of SPA species that have an association with cockle beds, by using a disturbance risk assessment matrix and conducting a spatial analysis (Appendix 6).

The assessment detailed in Appendix 6 concludes that the proposed fishery will not have an adverse effect on SPA features through the pressure of visual disturbance.

Water column

The sensitivity of the water column feature to disturbance has been identified as low. When considering the nature of the proposed activities; hand working at low tide, it is concluded that this pressure will not have an adverse effect on the water column and the species that it supports.

Conclusion

It is assessed that the proposed fishery **will not have an adverse effect on designated features, as a result of visual disturbance.**

[22] CEH completed low tide bird survey counts in December 2019 and January 2020, whilst the results of these surveys have not yet been published, we have been able to use the data from these surveys in our assessment.

4 In-combination assessment

There is some potential for in-combination effects with other consented activities affecting intertidal features of the site, discussed below.

4.1 The Wash private fisheries

The Authority managed private (Several) fisheries in The Wash under the Wash Fishery order 1992 until its expiry in January of 2023 and, currently, under interim measures pending the outcome of an application for a new Several Order. The interim measures effectively maintain the *status quo* with regards to access to the several fishery and its management.

The Several fishery consists of 50 “lays” (marine allotments) located on intertidal mudflats, which cover a total of 276 ha (<1% of the total area of intertidal flats of approx. 30,000 ha). Seed mussel (juvenile mussel typically less than 45mm in length) is ‘re-laid’ onto lays. Seed mussel comes from a variety of sources including, the Welland Wall in the south-west of The Wash, intertidal mussel beds of The Wash or from other parts of the coast (e.g. historically, Morecombe Bay) when permitted by Eastern IFCA. Lays may be inspected on foot at low water periods by owners after re-laying.

Mussel is harvested from lays using up to two, 1m-wide dredges operated from vessels over high water periods. Activity in the private fishery is limited by their limited spatial extent and by the number of registered lay holders: no more than 32 vessels take part in this fishery at any one time. In practice, this level of activity does not occur because the lays are not fully utilised but 32 is taken as a theoretical worst-case scenario if all lay holders were active on any one day. At times, (ordinarily between September and March) fishers may visit lays up to three times per week to harvest stock, however the level of harvesting will depend on stock levels and in some cases, lays can remain unvisited for periods of over a year. Mussel seed can be re-laid throughout the year, although more commonly between March and April, and the re-laying process (depositing mussels on lays) can take up to one hour each day.

Although the mussels on lays will in reality be contributing to available food for mussel-predating species, the mussels are private property and are not part of the designated features of the site. Harvesting from mussel lays is not assessed in terms of removal of target species, abrasion, penetration or food availability pressures. It is however considered in relation to the following:

- Introduction of Invasive Non-Native Species - There is no potential for relaying activities from Welland Wall or the intertidal beds of The Wash to result in the introduction of invasive non-native species (INNS) as all mussels will be relayed within The Wash or at Brancaster. If mussels are imported from areas outside of The Wash, consent is required from Eastern IFCA and consideration of such considers biosecurity (and disease) risks associated with the shellfish movement. Individual fishers are required under the Wildlife and Countryside Act 1981 and the Alien Invasive Species (Enforcement and Permitting) Order 2019 to ensure INNS are not present in mussel to be relayed. In addition, formal guidance on preventing the spread of INNS has been distributed to lay holders.

With these processes in place the risk of the several fishery introducing INNS is assessed to be minimal.

- Smothering and Siltation - Fishing using mussel dredges could result in localised smothering and changes in siltation rates. However, compared to the high levels of suspended sediments/high turbidity observed within The Wash, activities resulting from this fishery have been assessed as highly unlikely to result in significant smothering of benthic habitats as a result of entrainment and subsequent resettlement of sediments disturbed during harvesting (ESFJC, 2008).
- There is potential for visual disturbance to SPA species during lay inspections. The total area of the lays, including a 300m buffer, is 1543.43ha, which is around 8.5% of the intertidal mudflats and sandflats. However, it is highly unlikely that all of the lays will be inspected at the same time, and activity close to this level has never been observed and lays are not visited regularly. Therefore, the area of disturbance at any one time is likely to be very small compared to the available intertidal feeding habitat. The majority of lay holders are likely to participate in the proposed cockle fishery. Therefore, activity on the lays is not likely to be additive to activity in the cockle fishery.

4.2 Wash Mussel fisheries

When there is adequate mussel stock on wild beds in The Wash, the Authority may manage mussel fisheries which are subject to a separate Habitats Regulations assessment. Wash mussel fisheries include re-laying and harvestable mussel fisheries, targeted by hand or dredges and managed under the WCMB.

In re-laying mussel fisheries, fishers harvest mussels less than 45mm in length from certain beds opened by the authority and “re-lay” them onto their lays or other parts of the Wash and North Norfolk Coast SAC. The fishery can be a dredge and/or hand-worked fishery, and in recent years has been utilised by no more than five vessels. There is currently a mussel relaying fishery operating in The Wash under the 2025 TAC, however, a maximum TAC of 2,396 tonnes has been assessed and agreed[23].

Harvestable mussel fisheries target adult (>45mm length) mussels for the purpose of selling for human consumption. A harvestable mussel fishery is currently open in The Wash and whilst is currently operating under the 2025 TAC, a maximum TAC of 3,383 tonnes has been assessed and agreed[24].

Currently only three vessels currently hold permits for the mussel dredge fishery and one for the mussel handwork fishery. The same vessels also target cockles during a cockle fishery, and therefore result in no additional effort added by the opening of a relaying fishery.

Fifteen mussel beds will be available to fish across The Wash across both fisheries. While these fisheries have been assessed separately in their own Habitats

[23] This TAC was assessed in the 2025/26 Wash Mussel Fishery HRA, this is the maximum TAC (combined dredge and hand-work).
[24] This TAC was assessed in the 2025/26 Wash Mussel Fishery HRA, this is the maximum TAC (combined dredge and hand-work).

Regulations Assessments, pressures that have potential to cause in combination effects with the proposed Wash cockle fishery have been considered:

- Removal of target species, in terms of bird food availability, is already considered in combination with the mussel fisheries through the bird food model calculations (Table 8), this ensures enough bird food remains if both the cockle and mussel TACs are harvested.
- Visual disturbance from the mussel fisheries is not likely to have adverse effects in combination with the proposed cockle fishery, in part because these fisheries are largely dredged (which causes less visual disturbance than hand-working), and because it is likely that fishers who target mussels will also take part in the cockle fishery, reducing the amount of additional disturbance.
- Fishing using mussel dredges could result in localised smothering and changes in siltation rates. However, compared to the high levels of suspended sediments/high turbidity observed within The Wash, activities resulting from this fishery have been assessed as highly unlikely to result in significant smothering of benthic habitats as a result of entrainment and subsequent resettlement of sediments disturbed during harvesting (ESFJC, 2008). Smothering and changes in siltation rates are not likely to result from the cockle fishery and so no in combination effects are anticipated.
- Introduction of invasive non-native species (INNS) is not likely to occur, as mussel will only be relayed within the Wash and North Norfolk Coast, and does not involve importing mussel from elsewhere. This is also a low risk pressure with a limited pathway for interaction from the cockle fishery, consequently, no likely significant effects are anticipated in combination.
- Penetration into the substratum does not tend to occur in the mussel fisheries as hand-gathering and dredging only disturbs the surface layer of mussels, rather than penetrating the sediment itself. Furthermore, impacts of abrasion are likely to be minimal, as the activity is confined to mussel/cockle beds, and any disturbance of the soft sediment is negligible in the context of the already mobile environment. Consequently, no likely significant effects are anticipated in combination.
- Removal of non-target species is assessed to have no likely significant effect in combination, due to the selectivity of the hand-worked cockle fishery, which means the risk of the pressure occurring is considered negligible and therefore has no additive effect with the mussel fisheries.

Upon consideration of these pressures, no significant effects on site integrity are predicted in combination with The Wash hand work cockle fishery due to the small scale, and limited geographic extent of mussel relaying and harvestable fishery activities.

4.3 Eastern IFCA intertidal surveys and activities

Eastern IFCA conduct a range of survey and enforcement activities in the intertidal areas of The Wash. These have been subject to a long-term HRA which considered

the “in combination” effect of The Wash Cockle Fishery and identified that there would be no such in combination activities which would preclude features from achieving the conservation objectives of the site.

Eastern IFCA intertidal activities that may overlap with the cockle fishery include:

- EHO sample collection
- SWEEP productivity monitoring
- Enforcement activities and inspections

Enforcement activities and inspections, in most cases, will occur in the same location as the fishery, so any in-combination effects are assessed as negligible.

EHO and SWEEP sample collections are conducted on 1-2 days per month and involve two individuals moving slowly on foot for up to a maximum of 3 hours in each location, up to a maximum of 8 locations (within a tidal window of around 4 hours per day). Sampling is mostly conducted at low water, however some samples are occasionally collected at high water if required due to weather, tide, vessel availability and staff availability. Collecting the samples at high water gives no opportunity for visual disturbance of seals or birds on intertidal flats, however collecting the samples on foot could present opportunities for disturbance. There are no overlaps between sample collection locations and Oystercatcher medium or high-count areas. Two sites overlap with low count areas; the Ouse Mouth site and Thief site. There is no overlap between sample collection locations and 2025 seal haul-out sites (including 100m buffers).

In summary, because of the short duration and infrequency of activities, their quiet nature and occurrence in areas that are not considered high risk to Oystercatcher and Harbour seal populations, potential effects of Eastern IFCA intertidal activities are extremely small so even combined with effects from the fishery they would not result in adverse effects on site integrity.

4.4 Natural England and the Environment Agency

Occasionally NE and the EA conduct their own intertidal surveys throughout the year. These surveys undergo their own assessments, alone and in combination with The Wash cockle fishery. No significant in-combination effects on site integrity are predicted due to the small scale, limited geographic extent and short duration of surveys in-combination with cockle fishing activities.

4.5 Le Strange (private) cockle and mussel fisheries:

Eastern IFCA do not have details of the quotas and restrictions applied to these fisheries. Natural England liaise with the private estate regarding the management of the fishery to ensure activities are in line with conservation objectives for the site. Eastern IFCA liaise with NE to ensure any impacts from the private fishery are duly considered in assessments and have no adverse effects, alone and in-combination, on site integrity.

4.6 The King Charles III England Coast Path

The newly opened coast path runs around the perimeter of The Wash and North Norfolk Coast so may be a potential source of in-combination effects. No direct impact on the intertidal zone is likely but birds displaced from the vicinity of the path could be disturbed again during the cockle fishery. We anticipate no in-combination effects that will have an adverse effect on site integrity as intertidal areas are excluded from public access and the route follows pre-existing access in most places (therefore additional visual disturbance will be limited). The sections for the Eastern Wash (Hunstanton to Sutton Bridge) and the Western Wash (Sutton Bridge to Skegness) are now open.

4.7 The Wash brown shrimp (*Crangon* sp.) fishery

It is not anticipated that there will be an in-combination effect between the shrimp fishery and the anticipated cockle fishery. This is because there is minimal spatial overlap between the intertidal cockle fishery and the predominantly shallow sub-littoral shrimp fishery (some shrimp fishing occurs on intertidal areas which targets edges of mudflats rather than mid- or upper-shore areas where cockle beds are more typically found). Furthermore, many of those participating in the cockle fishery are the same fishers and vessels that participate in the shrimp fishery. As there is a need to remove the shrimp fishing gear before a vessel can go cockle fishing, there is no practical way for the same vessel to participate in both fisheries within a short (day/days) time period.

4.8 Conclusion

On consideration of the above activities and their associated pressures, no significant in-combination effects are anticipated which could result in an adverse effect on site integrity.

5 Mitigation

The fishery has been proposed in line with the management measures detailed in the Wash Cockle Fishery Management Plan, including the application of a TAC (Appendix 2), adaptive management of juvenile cockles (Appendix 2 and 4) and seasonal closures to protect harbour seals during the sensitive pupping and moulting period (Appendix 5). It has been assessed that no further mitigation is required.

6 Integrity Test

It has been concluded that, with the proposed management measures, the proposal will not have an adverse effect on site integrity alone or in combination with other plans or projects.

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Appendix 1 – Summary of the Annual Spring Cockle Surveys 2026

The 2026 Wash intertidal cockle surveys were conducted between March 16th and April 30th, which is consistent with the timing of previous surveys. During the course of the surveys 1,045 stations were sampled from a total of 23 survey areas. These included Hunstanton for the first time, following stocks being found there by the industry in 2025. Unusually small spring tides meant the vessel could not reach some of the higher stations close to the saltmarshes, but where access was possible from shore, these were sampled on foot. Unfortunately, poor weather and a vessel breakdown towards the end of the survey period resulted in some of the stations we couldn't access from shore remaining unsurveyed. These included the Blackguard, Styleman's and the eastern part of the Breast sands.

Figure 1 shows the extent of the stations surveyed.

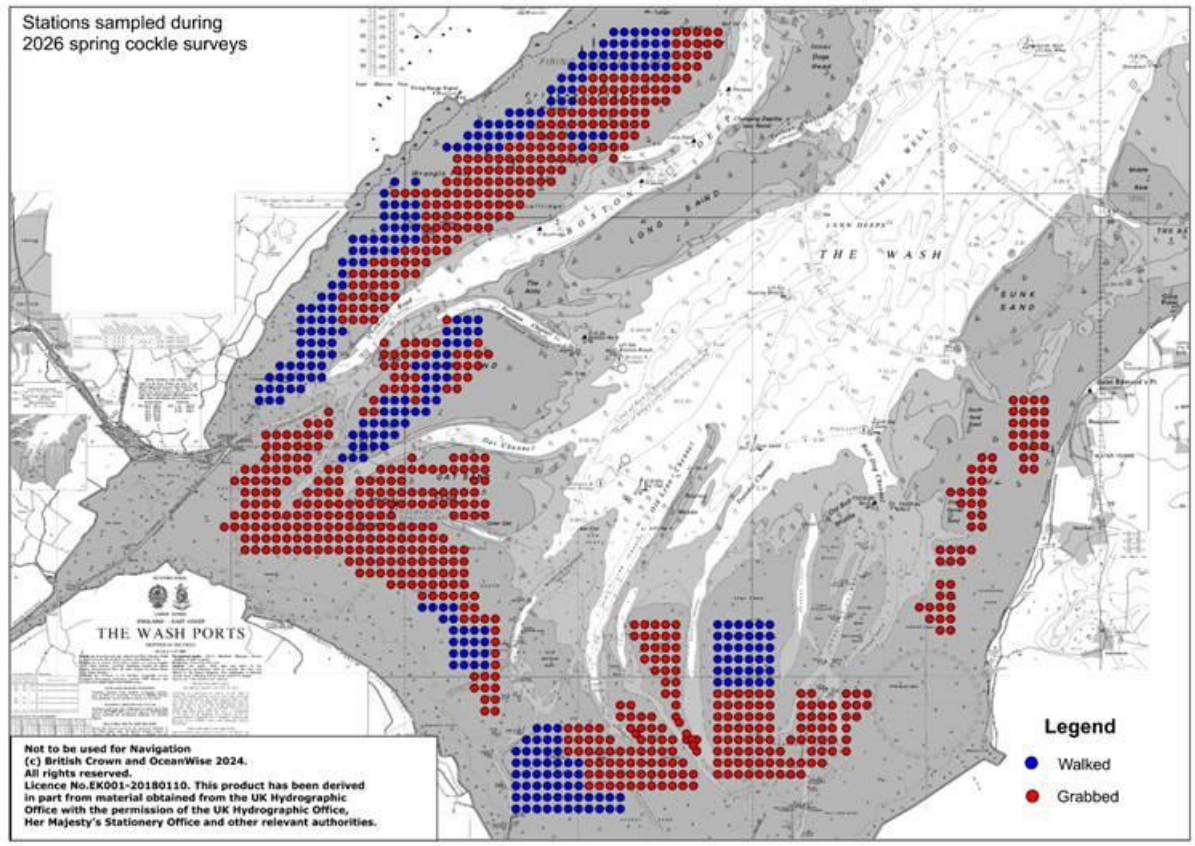


Figure 1 – Chart showing stations sampled during the 2026 Wash cockle surveys (red – grabbed, blue – walked)

Summary of 2026 cockle stocks

From the survey date, the following stock biomasses were calculated:

- Total Adult Stock (≥14mm width) 10,932 tonnes
- Total Juvenile Stock (<14mm width) 18,589 tonnes
- Total Stock (all sizes) 29,521 tonnes

Figure 2 compares the biomass of this year's cockle stock with those from previous years. This chart shows the total biomass has been increasing steadily since 2022 and is currently above average for the time series.

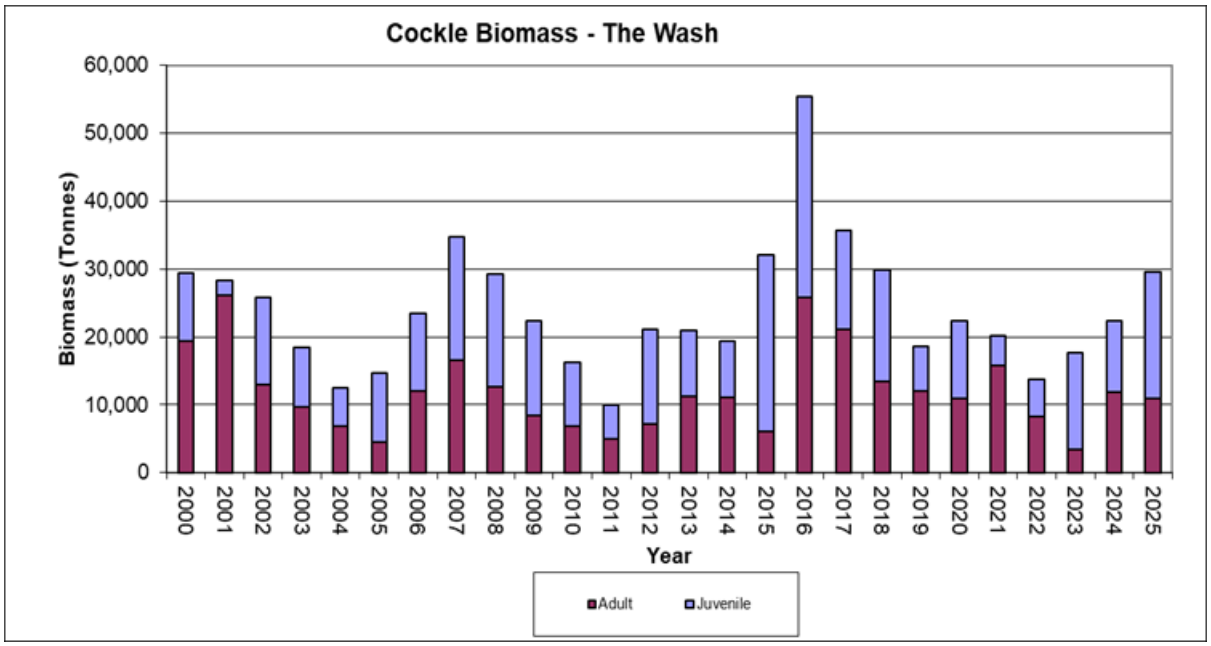


Figure 2 - Adult and juvenile cockle stock biomass between 2000 and 2026 on the regulated beds

While figure 2 shows there has been an increase in overall biomass since last year, mainly due to the increase in the juvenile stock, more detailed analysis of the population composition shows the changes are more complex than this. These changes are seen better in figure 3, which shows the population structures of the stocks in 2025 and 2026. When surveyed last year, the stocks were dominated by the Year-0 population of juveniles that had settled during the summer of 2024 and the larger Year-2 cockles from the 2022 cohort. The recent survey found that there had been a large decline in the numbers of the 2022 cohort, with their biomass declining from 9,169 tonnes to 728 tonnes. Further losses had also occurred among the Year-3, 2021 cohort, which had declined from 2,978 tonnes to 197 tonnes. While some of the cockles from these two cohorts were targeted by the fishery between surveys, the reduction in their combined biomass greatly exceeds the total weight of cockles that were harvested, indicating high natural mortality has also occurred. As cockles of their size range and age have previously been found to be particularly vulnerable to "atypical" mortality, losses were anticipated to be high.

Offsetting these losses are the inclusion of 5,708 tonnes of new Year-0 cockles from the 2025 summer settlement and the growth of the 2024 cohort cockles, which despite being the main target of the 2025 fishery, have increased in biomass from 8,787 tonnes to 19,277 tonnes. The inclusion of Hunstanton into the survey programme has also added a further 3,534 tonnes to the overall biomass, although their inclusion has

contributed to some stations on the Breast and Styleman's sands not getting surveyed, which are estimated to support approximately 500 tonnes.

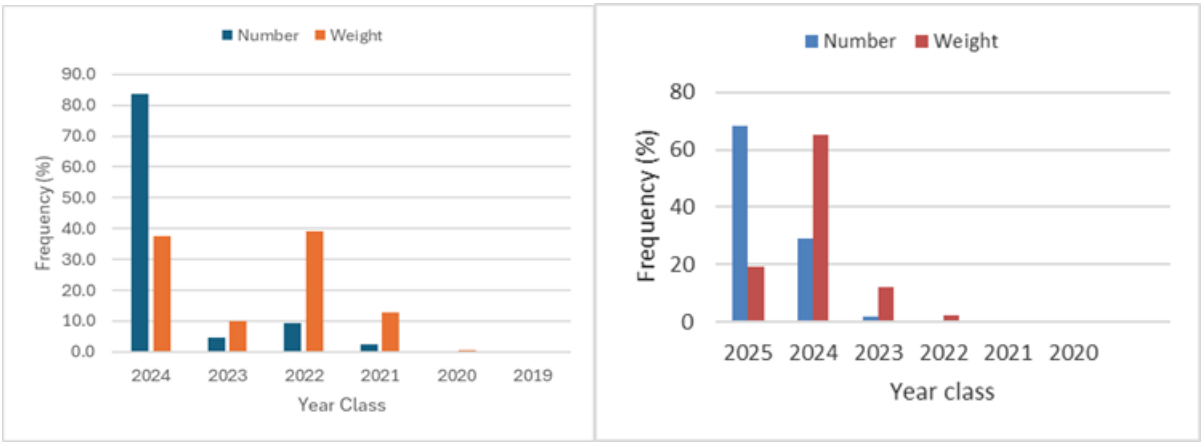


Figure 3 – Changes to the cockle population structure between 2025 (left) and 2026 (right). Graphs show the proportionate sizes of each year-class cohort in terms of numbers (blue) and weight (red/amber) of cockles sampled.

Cockle distribution

Table 1 and charts 4-10, below, provide details about the stocks found on each bed during the 2026 surveys and their distribution on the sands.

Figures 4 and 5, show the distribution of cockles ≥14mm width (adult) cockles and <14mm width (juvenile) cockles in terms of their numbers. While there are almost 11,000 tonnes of ≥14mm width (adult) cockles, in most areas they are distributed sparsely over widespread areas. The only place their density exceeds 500/m^2 is at Hunstanton. There, the cockles were markedly larger than elsewhere surveyed and present in high densities. However, that particular bed is relatively low and some parts only dry on the largest spring tides, limiting access to the fishery. It is likely, therefore, that the fishery will continue to target the high-density patches of juvenile cockles, as they have done in recent years.

Figures 6-10 show the distribution of the individual year-class cohorts in terms of their numbers. The distribution of Year-0 cockles seen in figure 6 shows there was a successful settlement of spat in 2025, though not as large as that from the previous year (5708 tonnes compared to 8,787 tonnes). While benefiting several sands, the settlement was particularly high at Wrangle and Friskney, where widespread areas exceed 1,000/m^2.

Although not as numerous as the Year-0 cohort, in terms of cockle weight, this year the stocks are dominated by the 2024 cohort of Year-1 cockles (19,277 tonnes) shown in figure 7. At the time of the survey, these were mostly between 9-13mm width, so fall into the juvenile population. Nevertheless, this cohort is anticipated to support a high proportion of the 2026 fishery. From past trends, it is anticipated these cockles will grow approximately 2mm by the start of the cockle fishery.

Figures 8-10 show there are only low distributions of older cockles. Of particular note is the decline of the 2022 year-class cohort, which has fallen from 9,169 tonnes last year to 728 tonnes this year. High losses among this cohort had been anticipated last

year, however, as they were of a size previously seen to be highly susceptible to "atypical[25]" mortality.

While figures 6-10 are useful for showing the distributions of individual cohorts, it can be difficult to interpret from them where the best fishing opportunities are. While generally more numerous than older cohorts, younger cockles also tend to be smaller. Further, it can be difficult visually interpreting from individual charts what the total stock is like if an area supports mixed populations of two or more cohorts. For fisheries that target a wide range of cockle sizes, including smaller individuals, charts showing cockle densities based on biomass are, therefore, better indicators of where the best fishing opportunities are situated. Figure 11 shows the cockle distribution in terms of biomass of total stock. In this chart Year-0 cockles have been excluded from the biomass as they should not be targeted. Those sites coloured yellow and red in figure 11 are areas most likely to support good fishing opportunities. The best of these appear to be on the Roger, Hunstanton, Gat and Hook Hill sands, with several smaller patches scattered over other beds.

[25] While still referred to as "atypical", research by Cefas has identified three diseases that have strong correlation with moribundity in Wash cockles. These include a protozoan parasite, *Marteilia cocosarum,* a bivalve iridovirus 1 (BiIV1) and disseminated haemocytic neoplasia.

Table 1 - Summary of cockle stocks on the Wash intertidal beds – April 2026

	Adult (≥14mm)				Juvenile (<14mm)					
SAND	Area (ha)	Mean Density (no/m2)	Mean Weight (t/ha)	Biomass (t)	Area (ha)	Mean Density (no/m2)	Mean Weight (t/ha)	Biomass (t)	Total Biomass (t)	% Adult
Black Buoy	75	28.33	1.06	80	199	321.25	3.50	696	776	10
Breast	323	31.48	1.21	391	528	222.44	1.46	774	1165	34
Butterwick	187	18.00	0.78	145	348	218.93	2.51	874	1020	14
Butterwick EXT	162	30.77	1.25	202	274	240.91	2.62	716	919	22
Daseleys	460	20.54	0.88	404	784	114.76	0.97	756	1161	35
Friskney	697	28.75	1.91	1328	896	742.36	2.06	1842	3169	42
Friskney EXT	174	14.29	0.64	112	498	68.25	0.34	168	279	40
Gat	299	71.25	2.60	775	299	252.08	4.78	1428	2203	35
Herring Hill	87	14.29	0.52	45	348	131.07	1.13	395	441	10
Holbeach	299	39.58	1.20	357	709	1069.65	2.71	1919	2276	16
Hook Hill	25	15.00	0.55	14	62	126.00	1.53	95	109	13
Hunstanton	224	236.67	14.77	3307	224	51.11	1.01	227	3534	94
IWMK	187	27.33	1.35	252	336	496.30	3.21	1079	1331	19
Mare Tail	137	35.45	1.26	173	386	350.32	3.90	1502	1675	10
Outer Ferrier	74	118.57	4.38	326	29	66.67	1.52	43	369	88
Pandora	134	25.45	0.90	121	149	210.83	1.27	189	310	39
Peter Black	75	35.00	1.38	103	87	84.29	0.46	40	143	72
Roger	464	54.25	2.13	987	550	552.17	5.85	3216	4203	23
South Ferrier	100	27.50	1.26	125	37	93.33	0.49	18	144	87
Thief	142	85.88	3.39	480	148	234.12	2.44	362	843	57
Whiting Shoal	124	42.00	1.52	189	149	210.83	1.63	243	433	44
Wrangle	704	36.84	1.42	1002	891	499.44	2.19	1951	2953	34
Wrangle EXT	25	10.00	0.49	12	149	92.50	0.36	54	67	18
Total	**5,176**			**10,932**	**8,080**			**18,589**	**29,521**	**37**

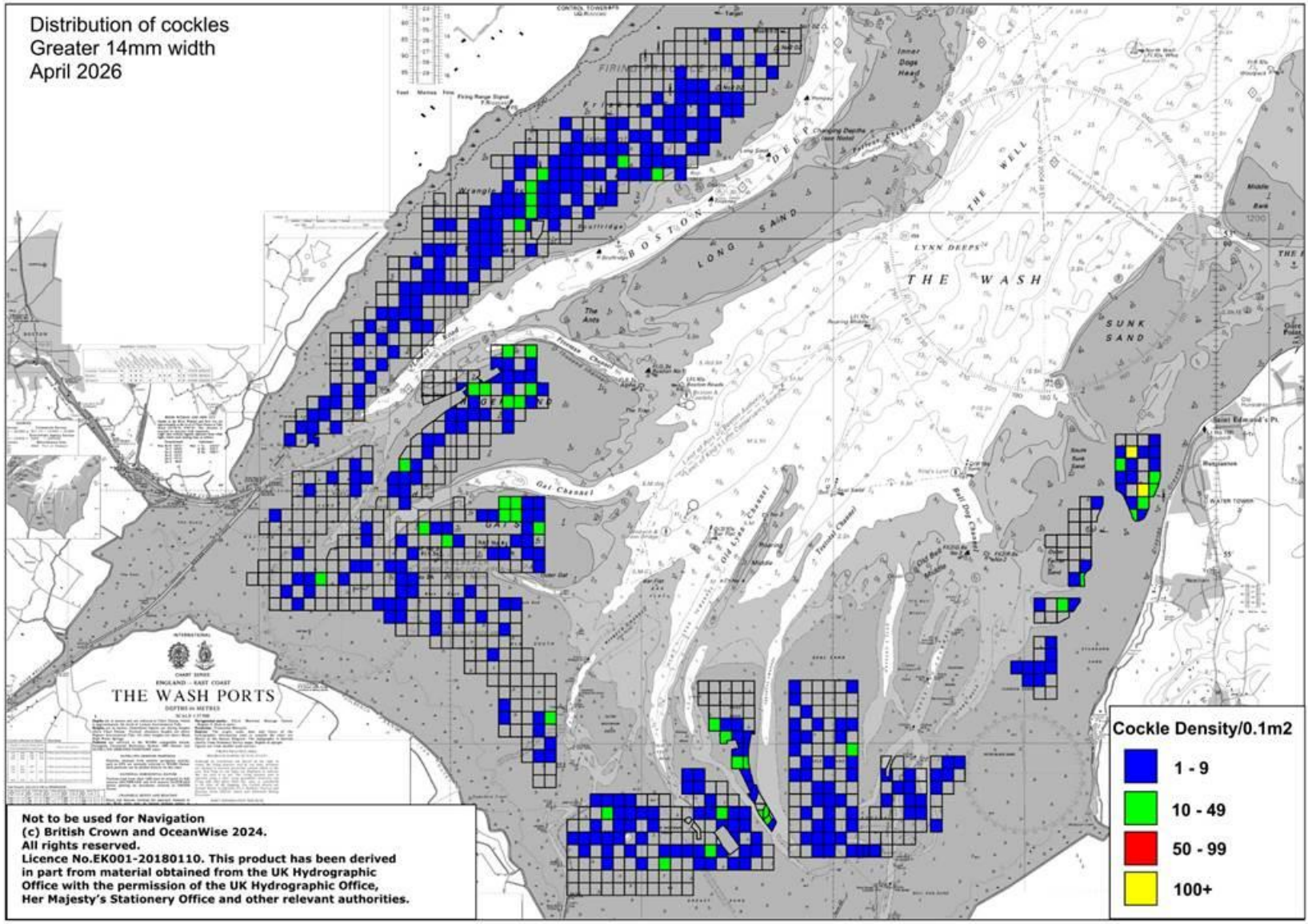


Figure 4 – Chart showing the distribution of adult cockles (≥14mm width) at the time of the 2026 spring surveys

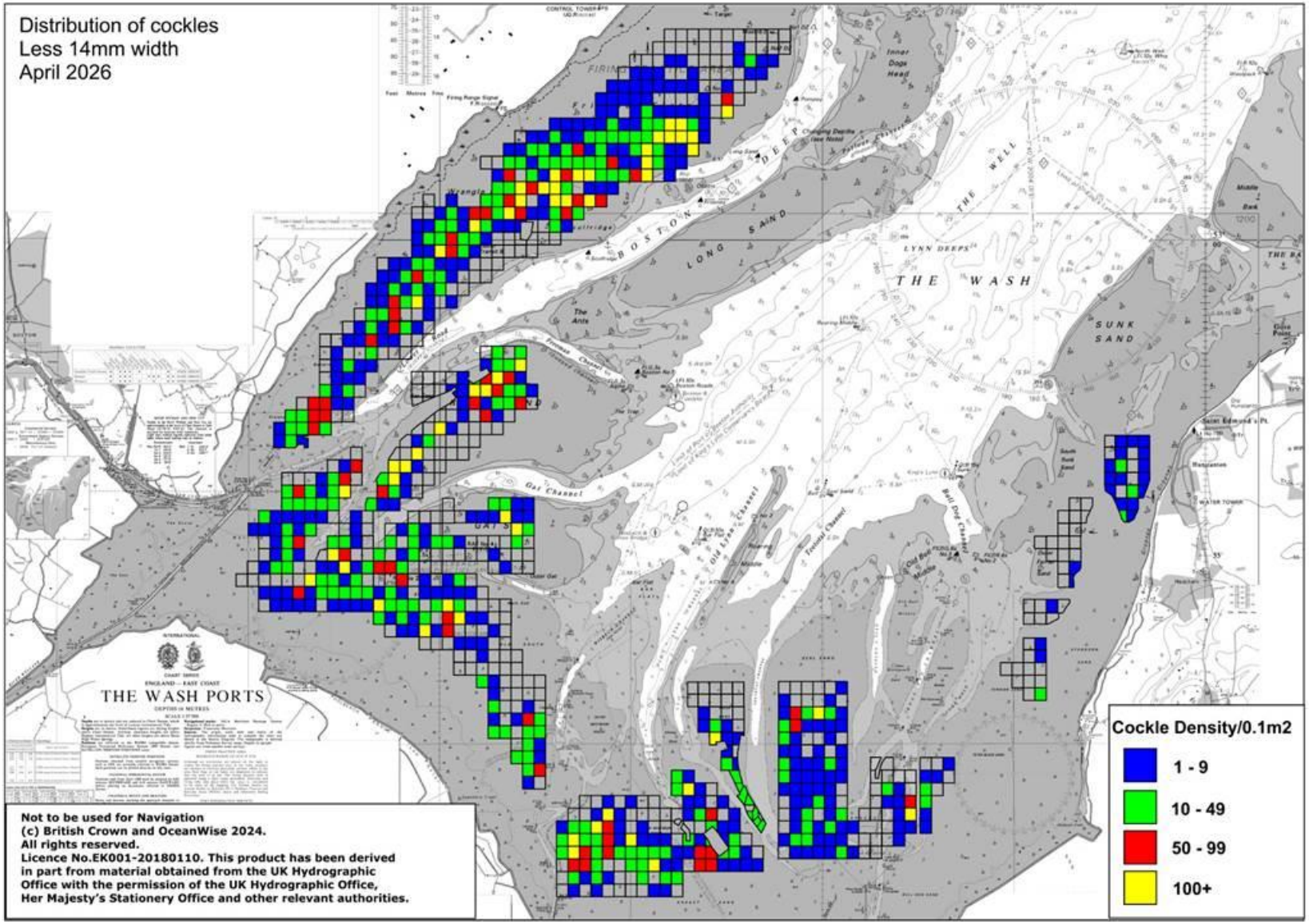


Figure 5 – Chart showing the distribution of juvenile cockles (<14mm width) at the time of the 2026 spring surveys

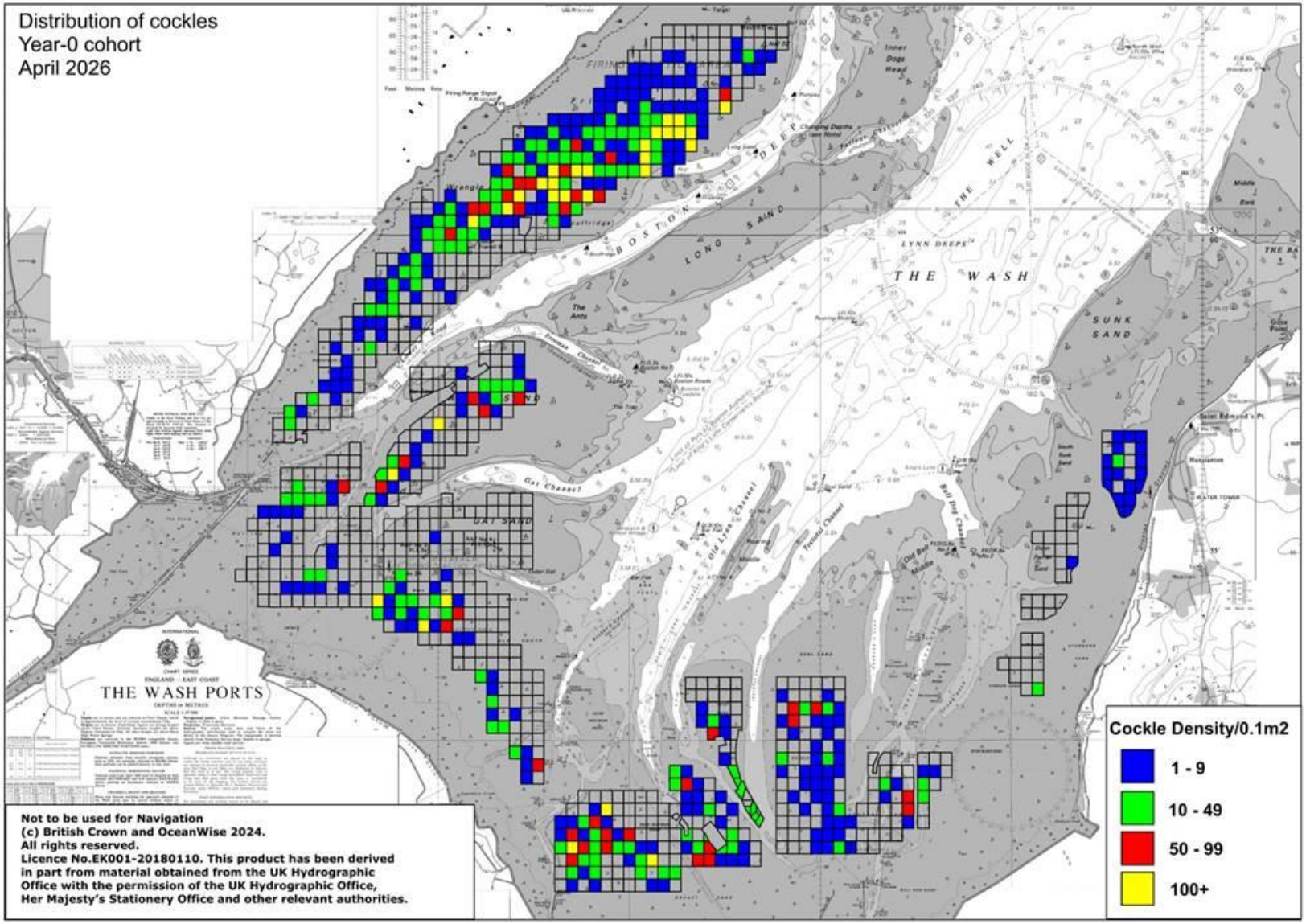


Figure 6 – Chart showing the distribution of Year-0 (2025 year-class) cockles at the time of the 2026 spring surveys

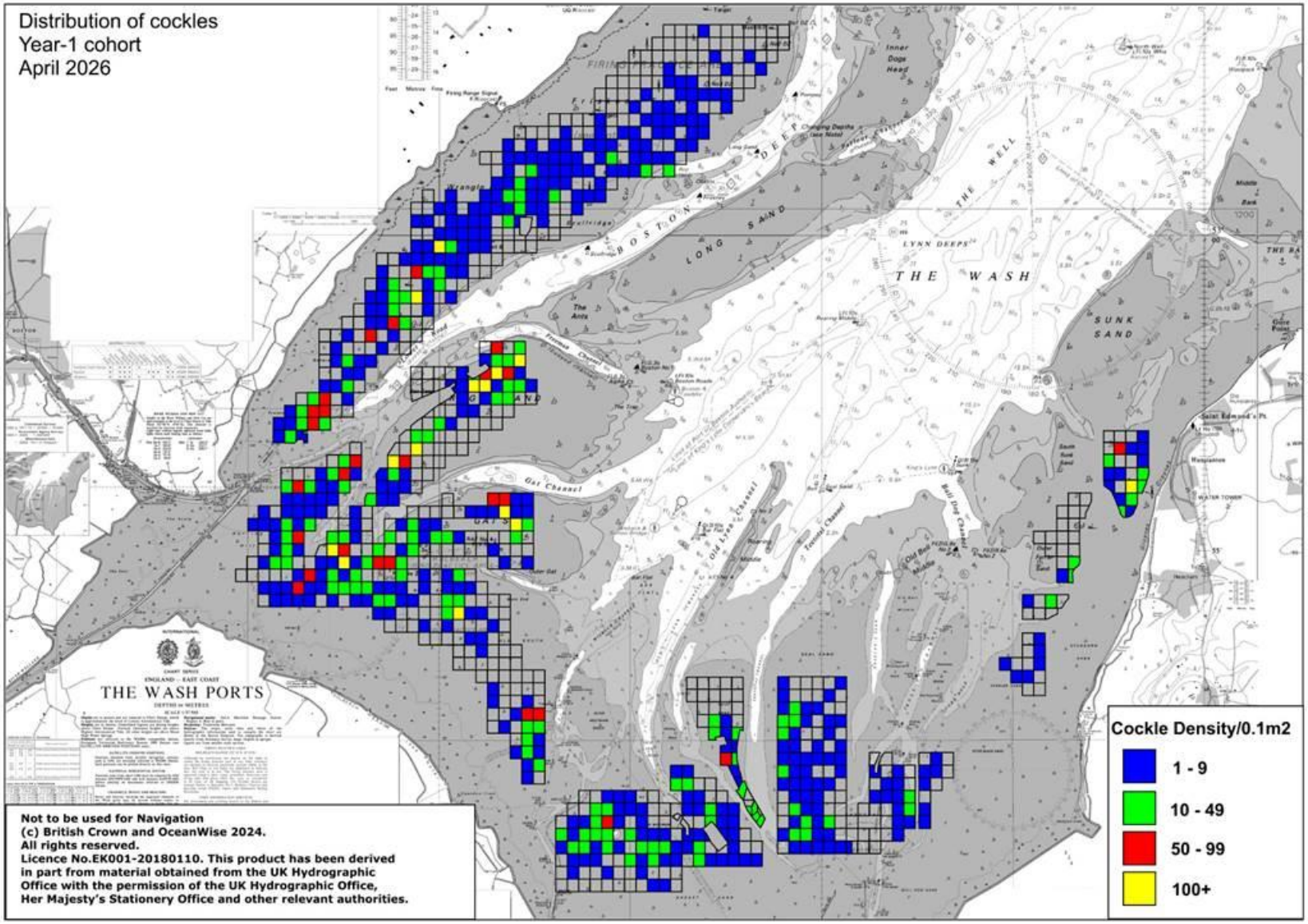


Figure 7 – Chart showing the distribution of Year-1 (2024 year-class) cockles at the time of the 2026 spring surveys

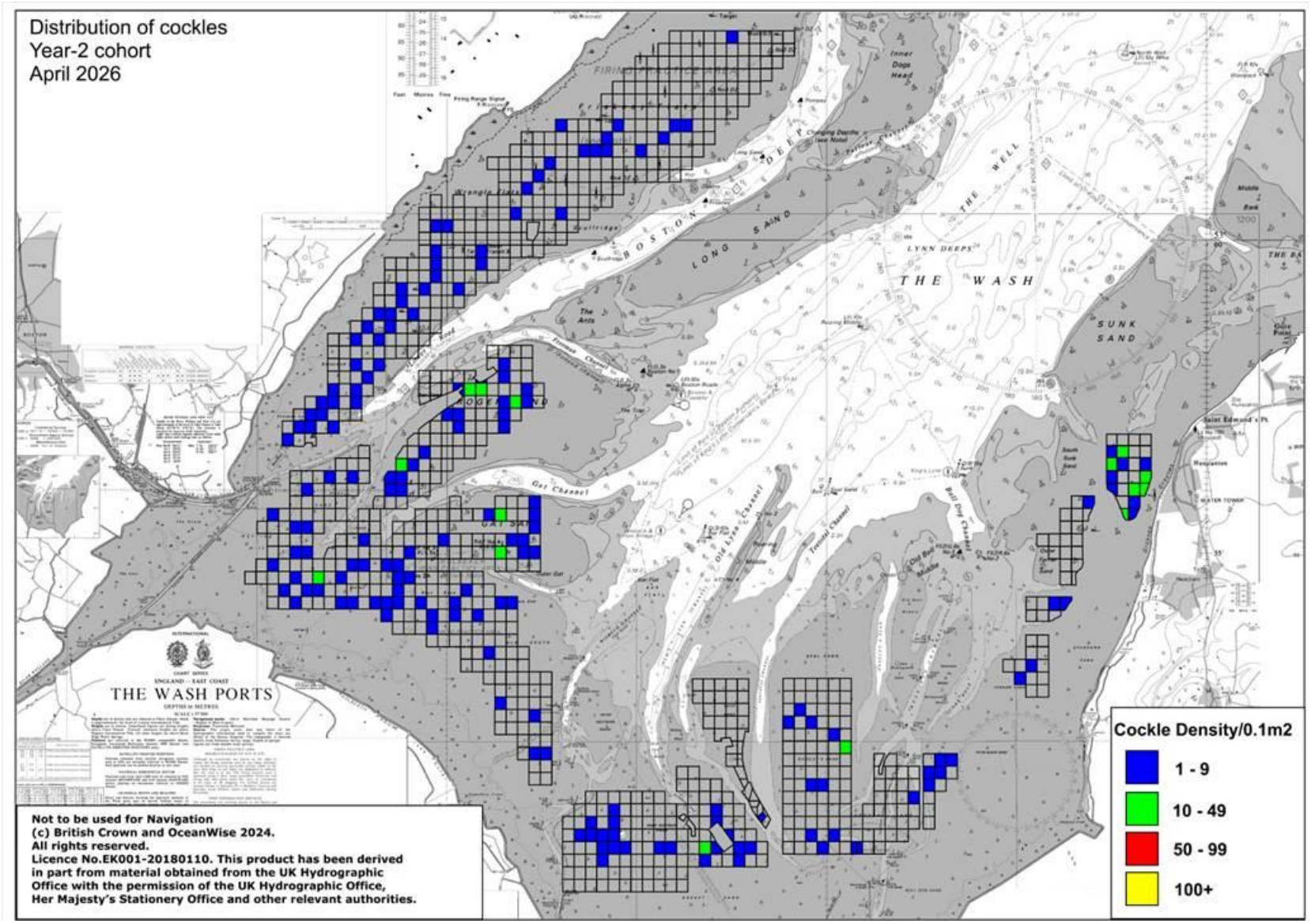


Figure 8 – Chart showing the distribution of Year-2 (2023 year-class) cockles at the time of the 2026 spring surveys

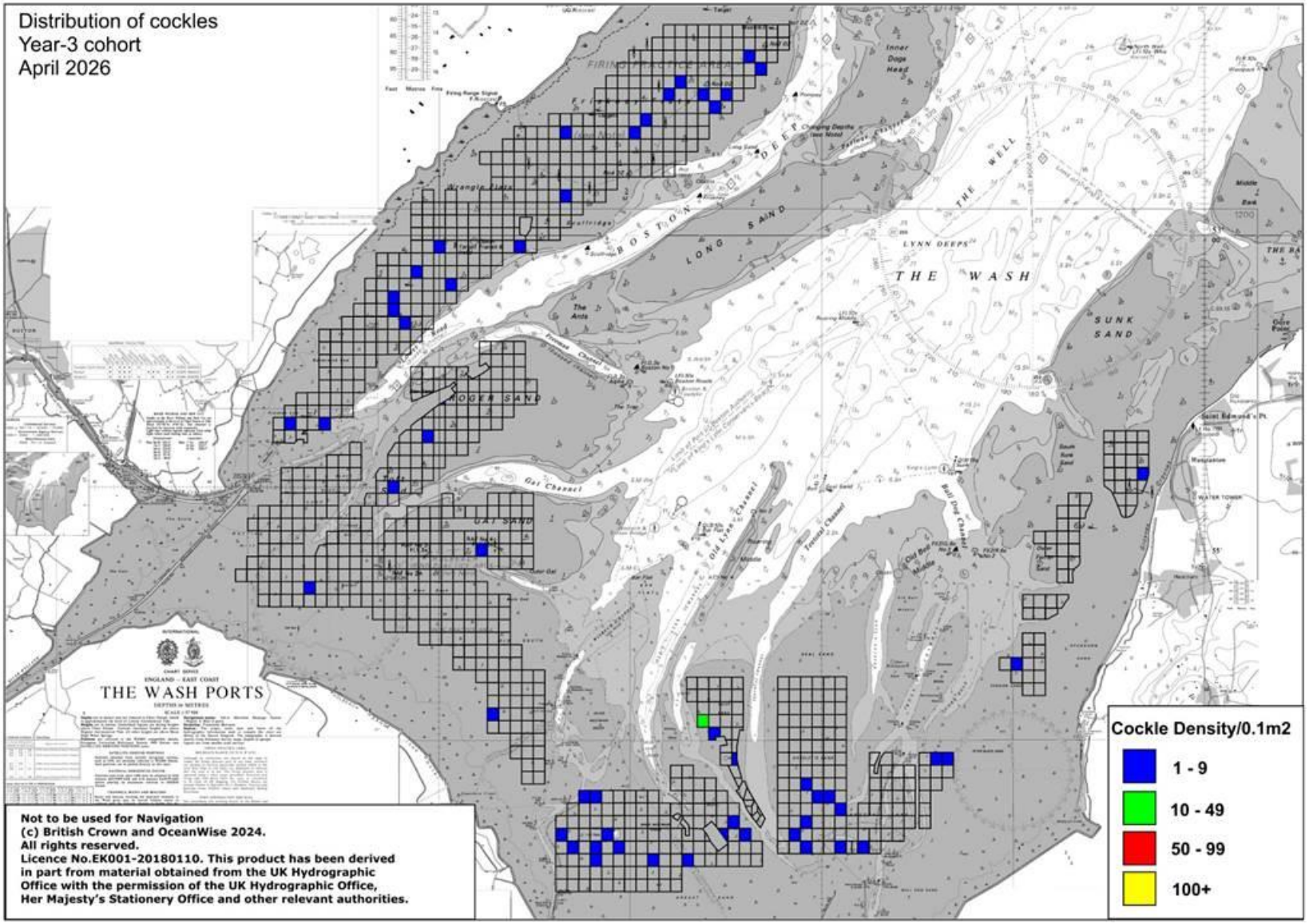


Figure 9 – Chart showing the distribution of Year-3 (2022 year-class) cockles at the time of the 2026 spring surveys

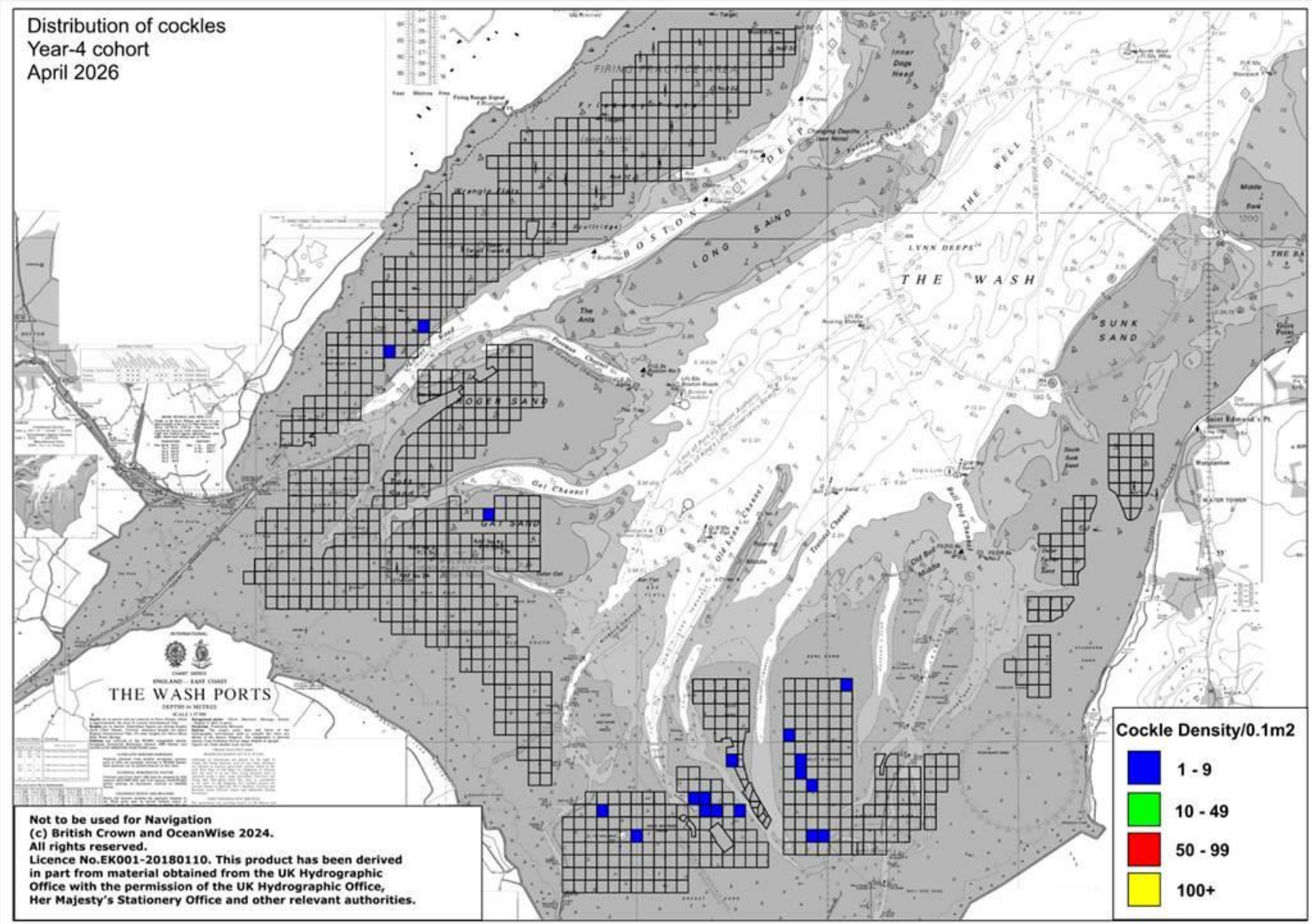


Figure 10 – Chart showing the distribution of Year-4 (2021 year-class) cockles at the time of the 2026 spring surveys

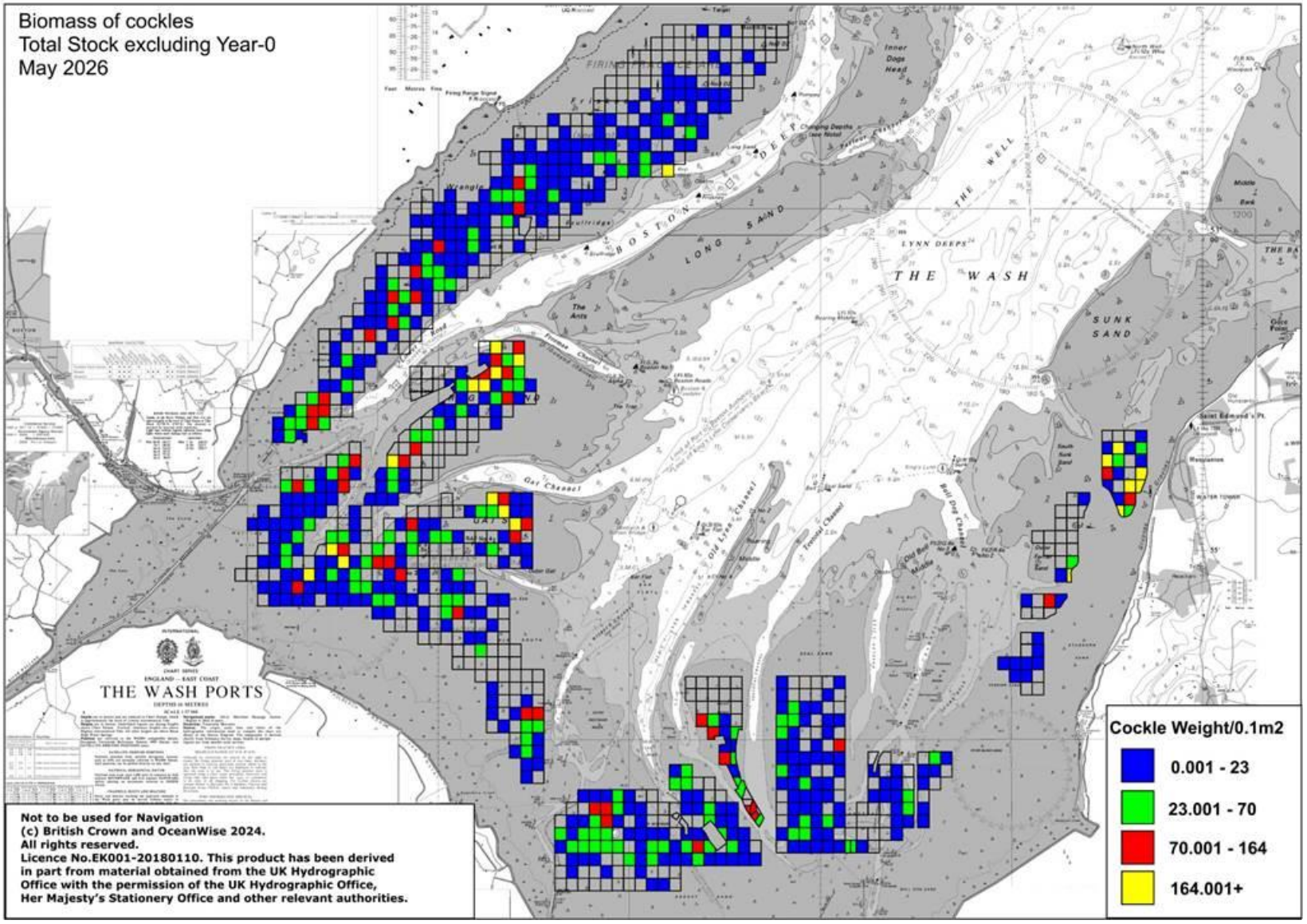


Figure 11 – Total biomass (g/0.1m^2) of cockles at each station (excluding Year-0s) at the time of the 2026 spring surveys

Estimation of stocks in unsurveyed areas

Due to a combination of poor weather, small spring tides, vessel breakdowns and the inclusion of Hunstanton into the survey programme, it was not possible to complete sampling of all of the stations usually surveyed. This included the failure to survey the Blackguard and Styleman's sands, plus 25 stations on the eastern side of the Breast sand. The dynamic nature of cockle stocks, which are subject to growth and high mortality, makes it difficult to estimate stocks without conducting a survey. Where some sampling has been conducted in the vicinity, however, observed trends can be utilised to help estimate stocks on unsurveyed parts of beds. No samples were collected from the Blackshore or Styleman's beds that could support this approach, so no estimations have been made of their stocks. On the Breast sand, however, 70 stations had been surveyed that could be used to estimate trends for the remaining 25 stations. This was done by looking at what changes had occurred to the biomass of individual cohorts from the 2025 survey (Table 2) and applying those changes to the remaining 25 stations (Table 3).

Table 2 – Changes to cohort biomass between 2025 and 2026 at 70 stations sampled on the Breast sand.

	Year-class cohort					
Year	**2025**	**2024**	**2023**	**2022**	**2021**	**Total**
2025	0	390	250	1163	638	2440
2026	233	761	168	81	6	1249

It can be seen from table 2 that the 2024 year-class cohort has almost doubled in biomass between the two surveys, but the 2023 cohort has declined by about a third and the 2022 and 2021 cohorts by 93% and 99% respectively. The 2025 cohort had not settled at the time of the 2025 survey, so are absent from that dataset and cannot be used to estimate trends.

Table 3 – Estimated changes to cohort biomass between 2025 and 2026 at 25 stations unsampled on the Breast sand

	Year-class cohort					
Year	**2025**	**2024**	**2023**	**2022**	**2021**	**Total**
2025	0	166	52	951	378	1583
2026	?	325	35	66	4	430

In Table 3, the 2025 stocks at the 25 stations that were not surveyed in 2026 were subjected to the same trends seen on the 70 stations that were surveyed. Using this approach, **it is estimated a further 430 tonnes of cockles are situated in these sites**, although it is difficult to determine what proportion would fall into the adult and

juvenile populations**.** Taking these additional cockles into account would result in an **estimated total stock of 29,951 tonnes.**

It should be noted that no estimation has been made for the 2025 cohort as there is no baseline data from 2025 that can support the calculations.

Appendix 2 – Proposed Management Measures for the 2026 Fishery

Total Allowable Catch

Since its introduction in 1998, the Total Allowable Catch (TAC) has been instrumental in maintaining the sustainability of the fishery. For most of that period, the TAC has been calculated as a third of the adult cockle stock (cockles ≥14mm width). In recent years, however, the impacts of atypical mortality killing disproportionate numbers of adult cockles resulting in the fishery shifting towards targeting smaller cockles, has caused disparity between the size of the annual TAC and the abundance of available cockle stocks of the target size. After careful consideration, therefore, in 2023 the calculation for the TAC was changed from a third of the adult cockle stock to a sixth of the total stock. Based on this latter calculation, the **TAC for the 2026 fishery should be 4,992 tonnes**.

There are other additional minimum stock thresholds that need to be achieved to ensure the SSSI Conservation Objective targets are met. These include:

- Maintaining a total cockle stock biomass above 11,000 tonnes
- Maintaining a minimum spawning stock biomass (cockles ≥14mm width) above 3,000 tonnes
- Maintaining sufficient cockle and mussel stocks to feed 24,000 oystercatchers (as determined by the Bird Food Model)

The total cockle stock at the time of the survey was estimated to be 29,951 tonnes and the adult stock to be at least 10,932 tonnes (not including the 25 unsurveyed stations on the Breast sand). The removal of 4,992 tonnes would not reduce either of these below their minimum thresholds.

The food requirement for 24,000 oystercatchers is 960 tonnes Ash Free Dry Mass (AFDM), which both the intertidal cockle and mussel stocks contribute towards. Even if both of the 2026 cockle and mussel fisheries fully exhaust their respective TACs, the remaining stocks will still equate to 1,864 tonnes AFDM. This is well within the requirement and sufficient to support a further 22,600 oystercatchers.

As all three of these SSSI Conservation Objective targets have been met, the TAC for the cockle fishery does not need to be reduced. **The TAC should, therefore, be 4,992 tonnes.**

Protection of Year-0 juvenile cockles

There was a relatively good spatfall in 2025, which while benefiting several sands were particularly prevalent at Wrangle and Friskney. Where these Year-0 juveniles exceed densities of 1,000/m^2, spatial closures have been proposed to protect them from the fishery. Time constraints within the survey period do not allow the exact extent of the cockle patches to be precisely mapped, so these proposed closures have followed the same approach used in previous years, whereby 12.44 hectare boxes representative of the sample station have been drawn around sample sites supporting Year-0 cockle densities exceeding 1,000/m^2. It should be noted that due to the 400 yard resolution

of the sampling grid, this is the minimum granularity that can be used for the proposed closures. These will seldom match the actual extent of the juvenile distribution, which on occasions might only occupy part of the closed box, or may on other occasions extend out of the box. Figures 12-14 show the locations of these proposed closed areas.

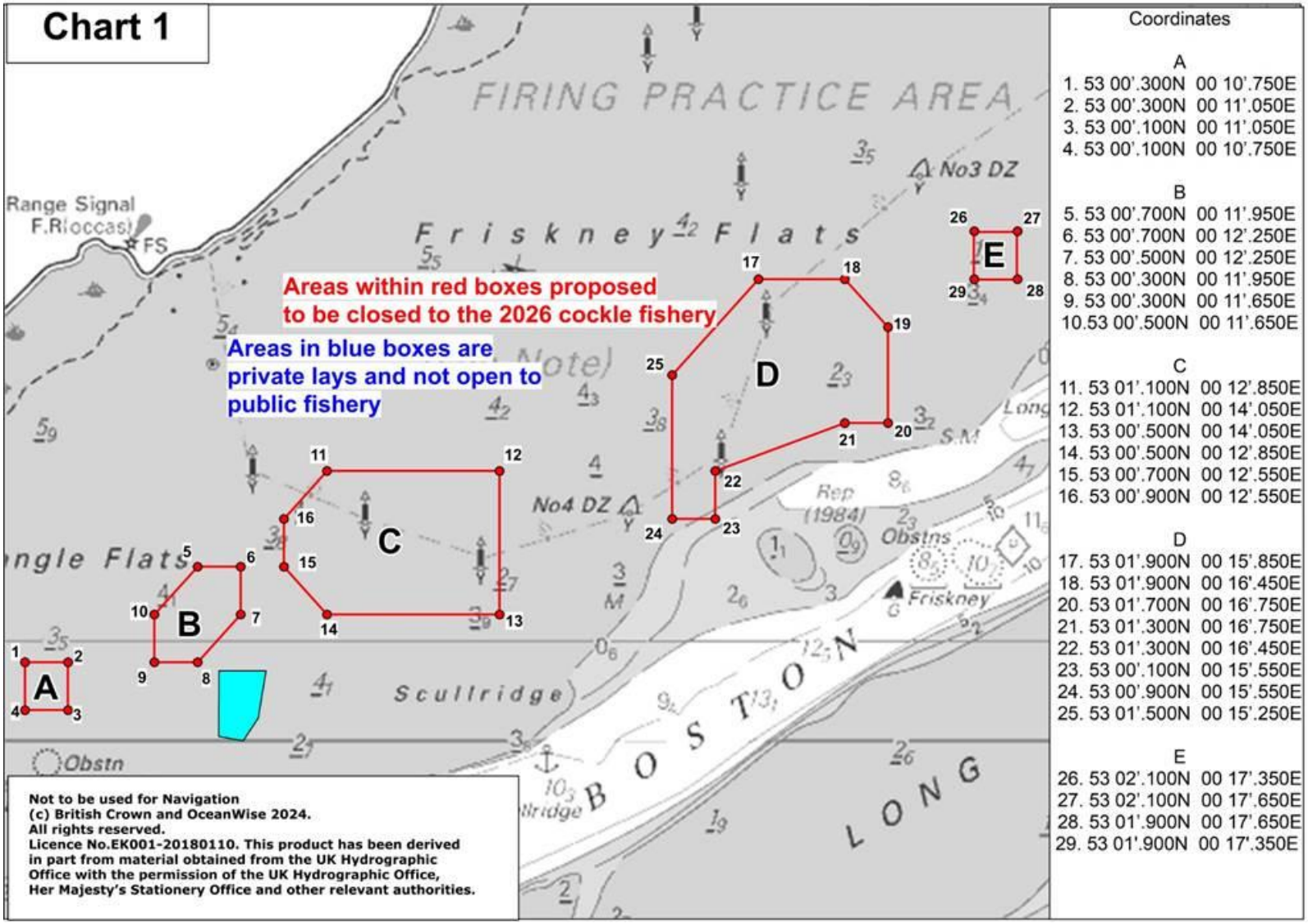


Figure 12 – Positions of proposed closures on Wrangle and Friskney to protect Year-0 juvenile cockles during 2026 cockle fishery

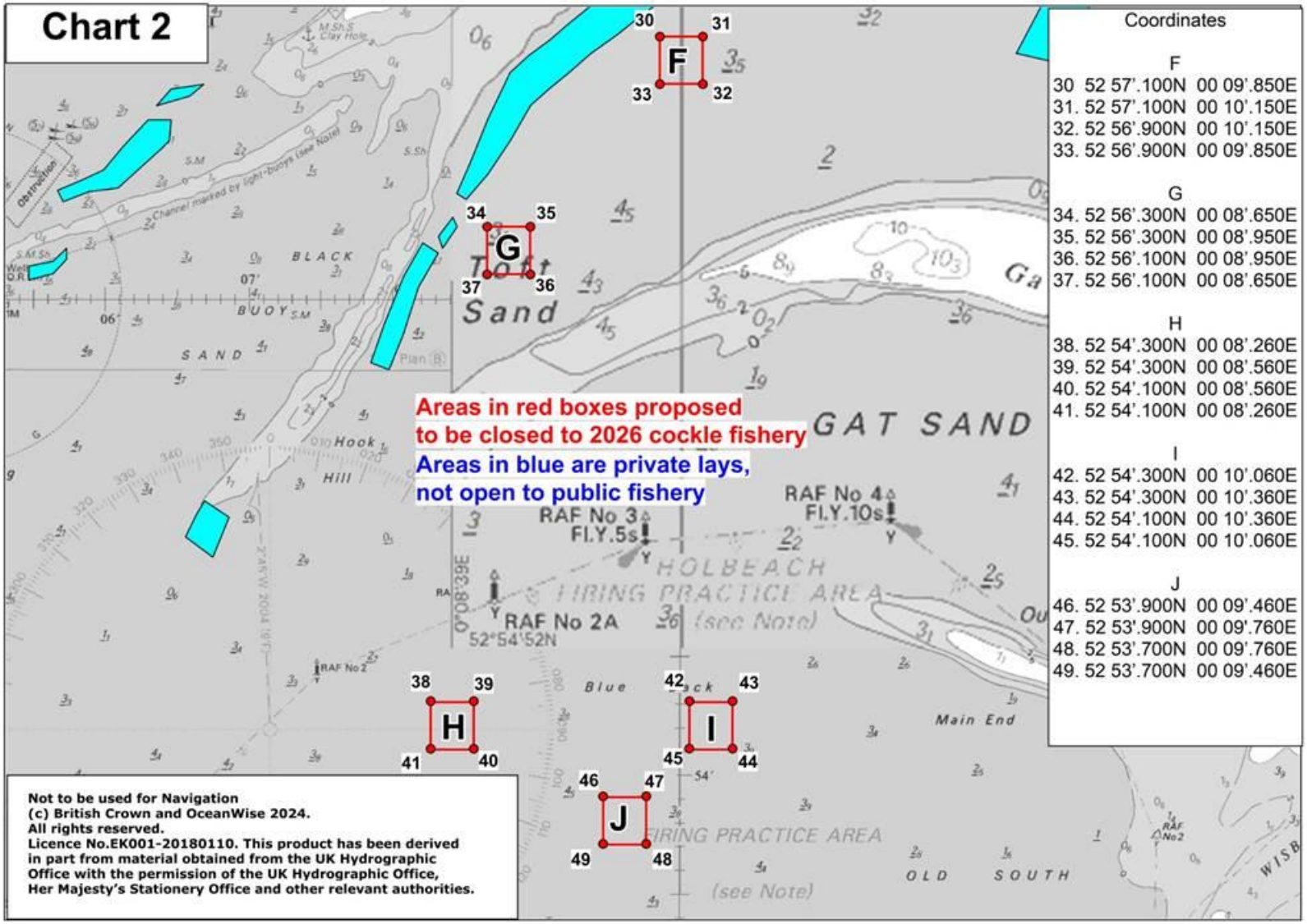


Figure 13 – Positions of proposed closures on Tofts, Mare Tail and Holbeach to protect Year-0 juvenile cockles during 2026 cockle fishery

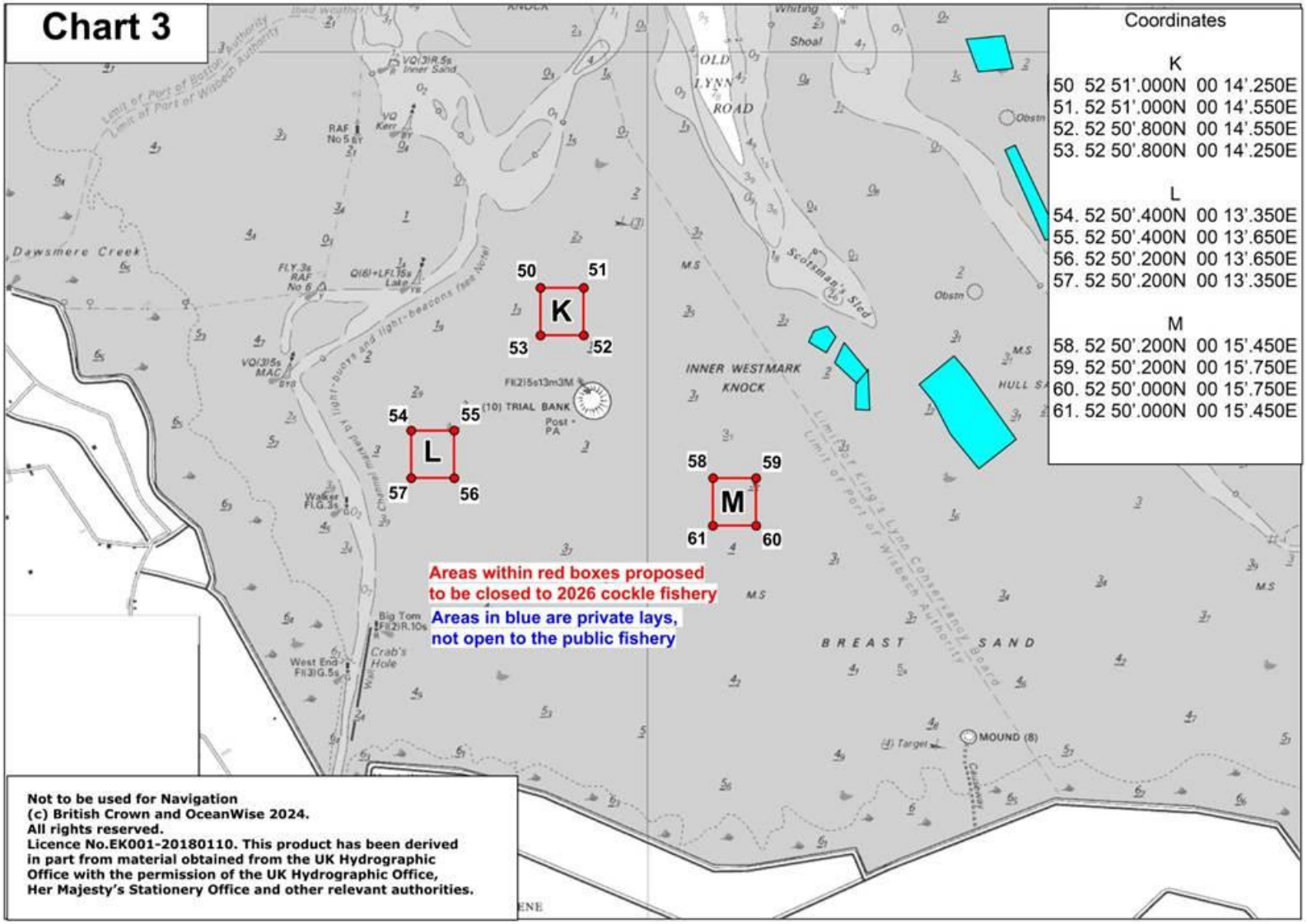


Figure 14 – Positions of proposed closures on IWMK and Breast to protect Year-0 juvenile cockles during 2026 cockle fishery

While the majority of the proposed closed areas have followed the described procedure of enclosing a 12.44 hectare box around sample stations supporting densities of Year-0 cockles ≥1,000/m^2, three of the proposed closures at Wrangle and Friskney are proposed to be more precautionary. These are shown in figure 15, overlaid with the Year-0 distribution grid. It can be seen from this chart that in this area the yellow grid cells denoting where densities of Year-0 cockles exceed 1,000/m^2 form clusters of more than one cell. As the Year-0 cockles may extend beyond these cells, the closures are proposed to incorporate the whole cluster.

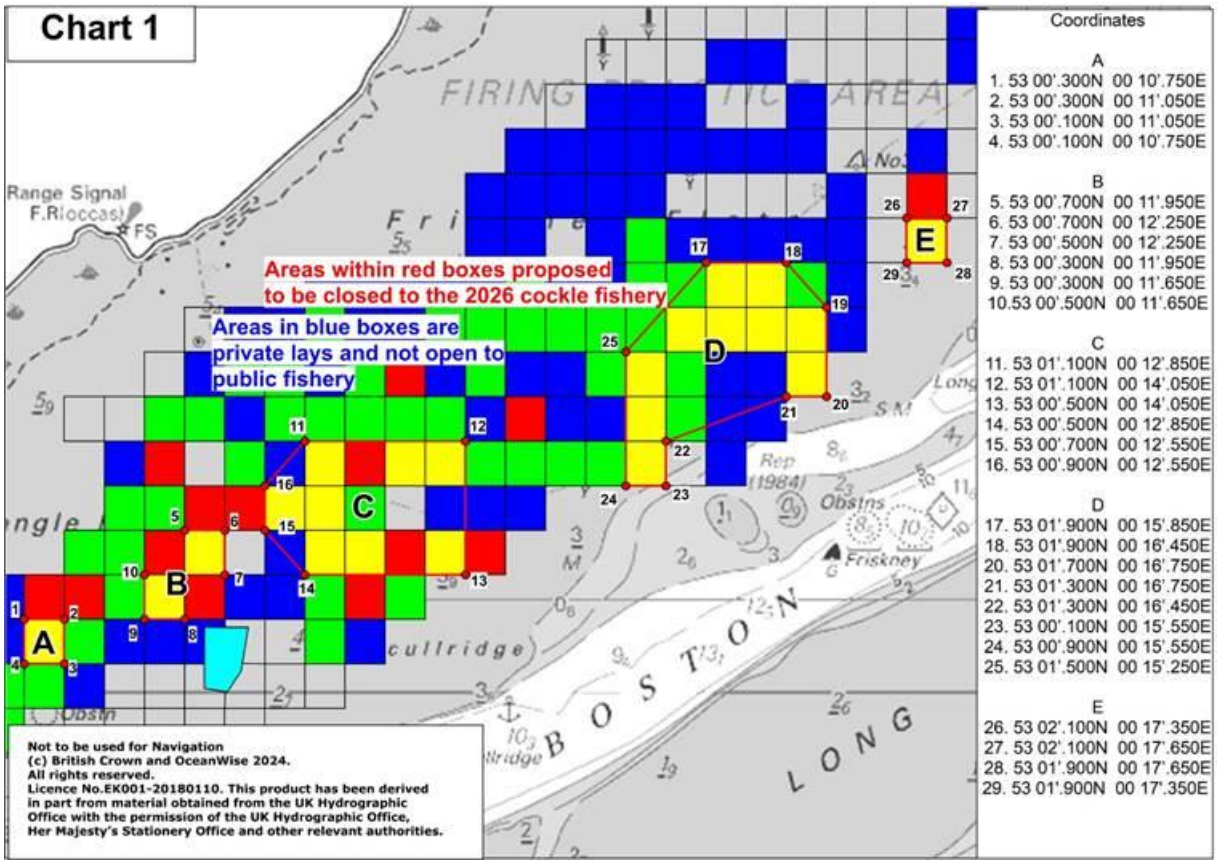


Figure 15 – Chart showing the proposed closures on Wrangle and Friskney, overlaid with the Year-0 distribution grid.

Whenever closures are implemented to protect juvenile stocks, there is always the danger that they will overlap with stocks of fishable cockles. In figures 16-18, the proposed closures have been overlaid with the cockle distribution grid showing the biomass of cockle stocks (minus Year-0's). This grid highlights where the best fishing opportunities are located, whereby areas coloured red and yellow denote the highest biomass. In these charts, it can be seen that in the majority of the closures, the biomass of Year-1 and older cockles is relatively low and unlikely to be fished. The exceptions to this are at Site B at Wrangle and Site K at IWMK, both of which overlap with red areas of biomass. Further to this, Site G on the Tofts is directly adjacent to a yellow biomass cell. It is proposed that foot surveys are conducted in these three areas to more accurately align the borders of the closures with the actual extent of cockles.

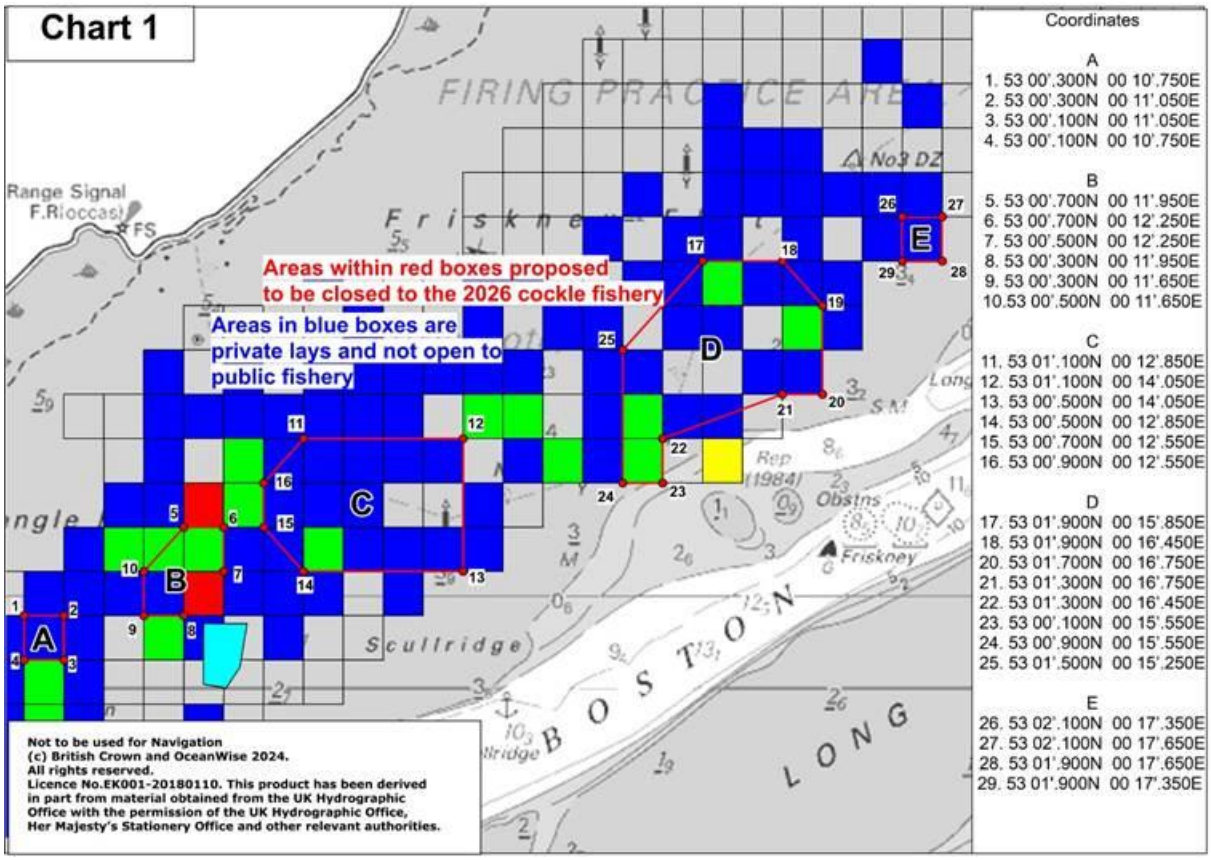


Figure 16 – Chart showing the proposed closures on Wrangle and Friskney, overlaid with the Total Biomass (minus Year-0) distribution grid.

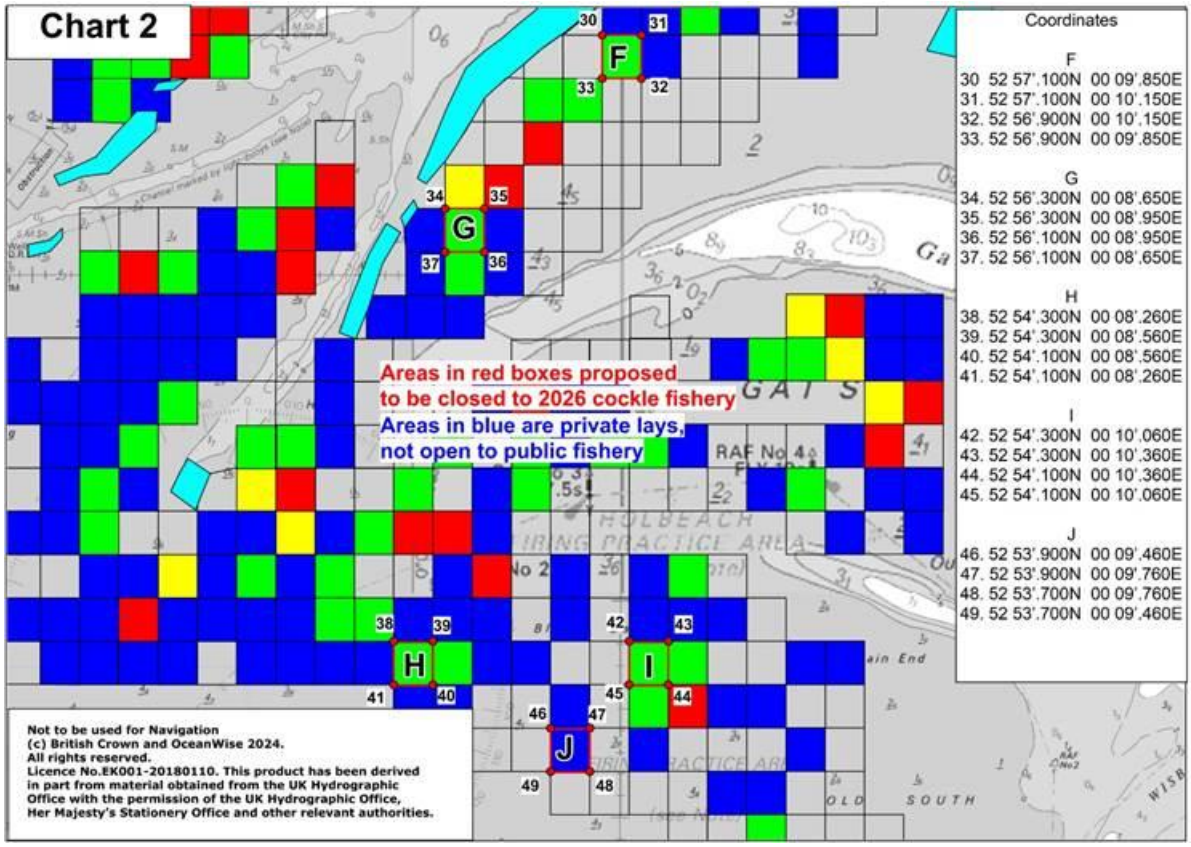


Figure 17 – Chart showing the proposed closures on Tofts, Mare Tail and Holbeach, overlaid with the Total Biomass (minus Year-0) distribution grid.

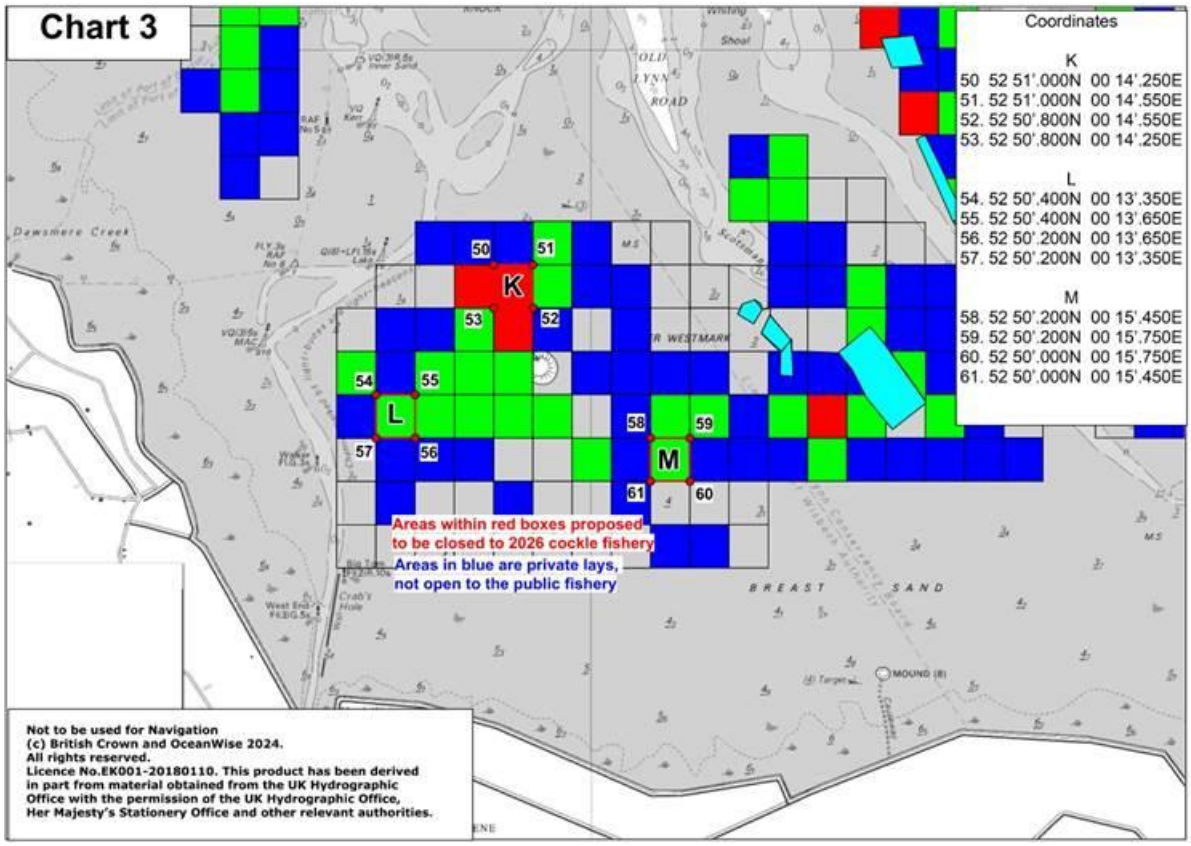


Figure 18 – Chart showing the proposed closures on IWMK and Breast, overlaid with the Total Biomass (minus Year-0) distribution grid.

Table 4 shows the biomass of cockles from each age cohort within the proposed closed areas. This shows that these closures would protect an estimated 3,133 tonnes of Year-0 cockles, representing 54.9% of the overall biomass of that cohort. In doing so, the fishery would lose access to 5.3% of the biomass of cockles ≥14mm width and 4.2% of the total biomass of cockles older than Year-0. These closures, therefore, offer a good protective value to the stocks, while causing minimal restriction on access to larger cockles.

Table 4 – Biomass of cockles within the proposed closed areas

Bed	Yr-0	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Grt 14mm	Total-Yr0
Breast	56	34	0	31	0	0	56	65
Friskney	1390	261	39	0	0	0	285	300
Holbeach	917	69	30	0	0	0	42	99
IWMK	102	142	8	9	0	0	17	159
Roger	158	157	6	0	0	0	51	163
Wrangle	510	202	9	16	0	0	133	226
Total	3133	865	92	55	0	0	584	1012
Percentage	54.9	4.5	2.6	7.6	0.0	0.0	5.3	4.2

The high densities of juvenile cockles within some of the closed areas suggest that ridging out could occur during the summer as they grow and compete for space. These areas should be monitored during the summer months for signs of widescale ridging out, with the option of opening them if ridging does appear imminent.

Appendix 3 - Wash Cockle Fishery - Code of Best Practice[26]

This code sets out the best practice activities for hand working cockles in The Wash. The intention of the code is to reduce the impacts of the fishery on the marine protected area of The Wash. Any evidence that indicates the handwork fishery is causing excessive disturbance to the site may lead to the immediate closure of the fishery.

1. To avoid damage to the seabed from the keel and hull of the vessel do not attempt to steam off the sand before the vessel is adequately afloat;
2. Ensure the area to be harvested is assessed and marked out prior to the day that harvesting occurs, in order to understand the distribution and abundance of the stock to be harvested;
3. A Daily Vessel Quota (DVQ) of 2 tonnes is in operation;
4. Propeller wash activity should be restricted to the minimum required to uncover the cockle that can be harvested in one day bearing in mind the DVQ. As cockles occur just below the surface, only use sufficient wash to uncover the cockles so as not to create deep rings in the sediment;
5. Each vessel should set a maximum of two marker buoys to mark out the stocks to be targeted and provide a marker around which to steer and help minimise the area of impact. Such buoys should be labelled with the associated vessel's PLN. Fishers should not use plastic bottles or similarly recycled items but should use marker buoys made of marine grade plastics or cork. Any buoys must be removed from beds which are no longer being fished.
6. Evenly rake any cockles left exposed (e.g. from riddling or if more cockle is exposed by propeller washing than is required) over the bed at the end of the day;
7. Fishers should avoid taking small cockle (under 14mm width) to enable this cockle to grow on for future fisheries;
8. Raise awareness of this code with other fishers if they are not fishing in line with best practice;
9. Avoid disturbance to seals by keeping away from seals. Seals respond to disturbance first by raising their heads, then by fleeing into the water. Fishers should not approach seals and should move away if seals are observed reacting to their presence

26 Please note that, while this is titled as the Wash Fishery Order code of best practice, the code still applies now that the Wash Cockle and Mussel Byelaw is in place and will soon be updated.

Appendix 4 – Adaptive management of juvenile cockle closed areas

Introduction

The Authority has duties to balance the viability of sea fisheries exploitation with the duty to maintain sustainable fisheries as set out in our main duties (s.153 Marine and Coastal Access Act 2009) and summarised in our vision statement: "… *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*." However, the main duties of the Authority should be seen in the context of an overriding duty to further the conservation objectives of MPAs.

The Wash cockle fisheries exist within a heavily designated area including Special Areas of Conservation, Special Protection Areas, Sites of Special Scientific Interest and Ramsar sites. Together, these designations are referred to as The Wash Marine Protected Areas (MPAs). The Authority has legal duties to protect these sites from the detrimental impacts of fisheries though management.

With regards to the Wash cockle fishery, annual HRA's are conducted to ensure the fisheries do not prevent the condition of the site's conservation objectives from being achieved. Various technical measures described in the 2018 Cockle Fishery Management Plan (including the implementation of an annual Total Allowable Catch, daily catch quotas, spatial closures etc) are implemented annually. These include some measures which are required to ensure that cockle fisheries do not impact the site integrity of The Wash MPAs, for example, maintaining minimum thresholds of cockle and mussel biomass to serve as food resource for over-wintering birds. While there is little flexibility in measures designed to protect the site's conservation features, the Authority has greater discretion in implementing other measures which more generally seek stock sustainability, when taking into account its wider duties including stock general sustainability and fishery viability.

The 2018 Cockle Fisheries Management Plan was revised in the context of atypical mortality which has had a significant impact on cockle stock dynamics. In particular, it refers to revoking 'high density juvenile closures' intended to protect juvenile cockles in support of stock sustainability, in the context of sudden die-off within the cockles. Whilst this measure will have a beneficial effect with regards to maintaining site integrity of The Wash MPAs, it primarily serves to ensure that fishery can be maintained over consecutive years, rather than to ensure that the cockle stocks will persist at a level capable of supporting the site's conservation objectives.

This report considers the appropriate use and revocation of 'high density juvenile closures' to facilitate rapid decision making as is often required in the context of die-of events typically associated with juvenile cockles.

Protection of juvenile cockle stocks

As is the case with most fisheries, the protection of juvenile stocks is an important component when considering the sustainability of the Wash cockle fishery. For many

fisheries, this protection is achieved by implementing a Minimum Landing Size (MLS), tailored to enable individuals in the population an opportunity to breed at least once before being harvested. Because the cockle beds support mixed populations of adult and juvenile cockles, however, and cockles from different beds grow and mature at different rates making it difficult to determine an appropriate MLS, spatial closures are used instead of an MLS to protect high-density patches of juvenile cockles. Such closures are described under the policies in the 2018 Cockle Fishery Management Plan and exacted as license conditions of the permits allowing fishermen to participate in the fishery.

Areas supporting high densities (>1,000/m^2) of Year-0 juvenile cockles will remain closed to cockle fisheries unless EIFCA survey data shows it would be more beneficial to open them (e.g. widespread ridging-out is predicted). Opening such areas would be subject to Natural England approval.

While enabling juvenile cockles to be protected, this policy allows flexibility to keep such sites open (or to subsequently re-open them) if it is more beneficial to do so.

When implementing spatial closures, it should be remembered their purpose is to protect sufficient juvenile cockles from the fishery to support the future sustainability of the cockle stocks (and, thereby, the birds that feed upon them). When considering these closures, therefore, provided sufficient measures are taken to secure the conservation and sustainability responsibilities, it does not necessarily mean that every patch of high-density Year-0 cockles needs to be protected. This is important when considering the Authority's duties extend to ensuring viable fisheries in addition to their future sustainability. Therefore, when considering spatial closures to protect juvenile cockle stocks, the Authority assesses not only the benefit each closure will have towards the sustainability of the stock but also the impact the closure will have on the viability of the coming fishery. The aim is to provide satisfactory protection to ensure sustainability, while ensuring the viability of the fishery.

There are several factors that the Authority takes into consideration when determining whether a site should be closed to protect juvenile cockle stocks. Unfortunately, the majority of these are not as clear cut as the initial step which just involves identifying stations from the spring survey data that support Year-0 cockles in densities of >1,000/m^2. Further, because no two years are ever the same with regards to the stock distribution and composition that underpin these decisions, it is not possible to define them with precise metrics. In the absence of written policies and/or metrics, this document aims to detail the various factors that are taken into consideration each year when determining which areas should be closed to protect juvenile cockle stocks. While this guidance will focus specifically on spatial closures, it should be remembered that these are just one among a suite of measures (including an annual TAC, vessel daily catch quotas, minimum stock thresholds and the use of a bespoke Bird Food Model) that together support stock sustainability, ensuring there are sufficient shellfish remaining for the overwintering wader populations.

Factors requiring consideration when implementing spatial closures to protect juvenile cockle stocks

Data describing the current state of the cockle stock, in terms of its distribution and population dynamics, underpins the process used in determining which areas should be closed. However, as this stock baseline is seldom the same from one year to the next, each year provides a different set of scenarios, problems and solutions. Measures that are appropriate one year are not necessarily applicable the next when conditions have changed. Table 1 lists the various factors that are taken into consideration each year by the Authority when determining where to implement closed areas. It should be noted that these various factors should be considered holistically with each other rather than in isolation.

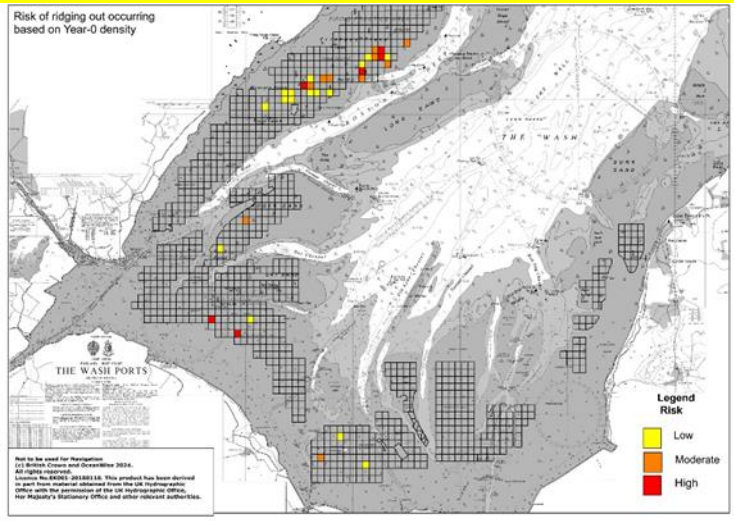
Table 1 – Factors to be considered when determining which sites should be closed to protect Year-0 cockles. Highlighted in yellow applies to the 2026 cockle fishery.

Factor for consideration	Application in 2026 fishery
Does the site support Year-0 cockle densities >1,000/m^2?	Yes – Site should be considered further for closure using factors below.
	No – Usually the site will not be considered further for closure. However, if stocks of Year-0 and Year-1 cockles are both low, meaning there is a high risk that sustainability is threatened, consideration should be given to protecting areas supporting Year-0 cockles in densities >500/m^2.
Are there sufficient combined cockle and mussel stocks to satisfy the conditions of the bird food model and the various minimum thresholds for both species after proposed fisheries have been taken into account?	Yes – Fisheries should be able to proceed within the limits of the BFM without causing an adverse impact on the bird populations. If the shellfish biomass is sufficient to provide comfortable buffers above the target thresholds, greater pragmatism could safely be applied when developing management measures. However, if the biomass is close to the minimum threshold, measures should be more precautionary. Bird Food Model calculations suggest there is sufficient AFDM to support over 46,600 oystercatchers.
	No – This indicates one or the other (or both) of the stocks are in poor condition. Extreme caution should be applied if either fishery is opened to ensure it doesn't result in unsustainability of the stocks and/or an adverse impact on the site's conservation features.
What is the biomass of Year-0 cockles?	<2,500 tonnes These are considered to be poor spatfalls and generally occur between two successful spatfalls. Two of these poor spatfalls in succession will generally result in a significant decline in the population biomass. Under these conditions, there

	aren't likely to be many high-density patches so those that are identified should be protected.
	2,500-6,000 tonnes. These are considered to be successful spatfalls and will support sustainability. The number of high-density patches will depend on the actual size of the spatfall and its distribution. If a high proportion of the juvenile biomass is located within a low number of these patches, they should be protected. However, if the juveniles are distributed over a large number of patches, more flexibility can be afforded in keeping some of them open. 5,708 tonnes
	>6,000-10,000 tonnes. These are considered to be good spatfalls and will generally help the population to recover from declines and support good fisheries over the coming two years. There are likely to be numerous high-density patches that could result in entire beds requiring closing. Due to the extent of these patches, some are likely to overlap with high-density patches of larger cockles. Where this occurs, the larger cockles are likely to be ridged out as the juveniles grow. Provided adequate sites are still protected, it is advisable to either not close these overlapping areas in the first instance, or to monitor them through the summer with the view to opening them if ridging out appears imminent.
	>10,000 tonnes. These are considered "exceptional" spatfalls that will revitalise the cockle population and produce exceptionally high stock levels over the coming 2-3 years. However, due to the current short longevity of cockles in The Wash, they will also result in very high mortality levels after 2 years due to atypical mortality and widespread ridging out is likely to occur wherever the stocks are thickest. The widespread distribution of high-density patches is likely to severely impact the industry's access to the majority of the larger cockles, most of which will overlap with juveniles. Following spatfalls of this size, pre-emptive management is required to minimise the massive natural losses that would otherwise occur. This could involve opening some of the juvenile patches in order to access the overlapping adults, deliberately targeting patches of faster-growing juveniles and increasing daily catch rates to ensure the fishery able to achieve its TAC.

Does the Year-1 cockle biomass exceed 8,000 tonnes?	Yes - Irrespective of the size of the Year-0 population, if the biomass of Year-1 cockles exceeds 8,000 tonnes, the stock is likely to sustainable for at least another year, particularly if they are situated on the slower-growing beds where their longevity tends to be longer. If there is a strong population of Year-1 cockles, it is possible to be more relaxed with the management of the Year-0 cohort. Further, it is advisable to open areas where high-density patches of Year-0 and Year-1 cohorts overlap as the Year-1 cockles will be ridged out and lost. 19,277 tonnes
	No – If the Year-1 biomass is <8,000 tonnes, there is more pressure on the Year-0 population to support the future sustainability of the fishery. This will mean there is less flexibility in whether high-density Year-0 patches are able to remain open.
Are there sufficient densities of larger cockles outside of the proposed areas to support a viable fishery?	Yes – Where there are sufficient densities of large cockles outside of the proposed closed areas, there is less pressure to implement closures. The closed areas restrict access to just 4.2% of the biomass of cockles older than Year-0. 23,231 tonnes are situated outside of the closed areas, which should be sufficient to support the fishery.
	No – If there are not sufficient large cockles outside of the proposed closed areas to support a viable fishery, there is more pressure to enable access to some of those areas. If this is the case, consideration should be given to balancing benefits against potential impacts.
Do significant densities of larger cockles overlap with potential closed areas?	Yes – Closing these areas could have an impact on the industry's viability. The scale of the potential impact will depend largely on whether there are sufficient large cockles in viable densities situated outside of the closed areas to satisfy the TAC. If there are sufficient large cockles elsewhere, implementing these closures will not have a large impact. However, if a high proportion of the larger cockles are within closed areas, the impact can be high. Depending on overall stock levels, consideration should be given to keeping access to these areas open. It should be remembered that in areas such as these, there is a strong possibility that the larger cockles will be ridged out and die if they are not fished.
	No – Closing these areas is unlikely to have a significant impact of industry viability so should be encouraged.

	The closed areas only support 4.2% of the biomass of cockles older than Year-0 **Bed / Yr-0 / Yr-1 / Yr-2 / Yr-3 / Yr-4 / Yr-5 / Grt 14mm / Total-Yr0** Breast 56 34 0 31 0 0 56 65 Friskney 1390 261 39 0 0 0 285 300 Holbeach 917 69 30 0 0 0 42 99 IWMK 102 142 8 9 0 0 17 159 Roger 158 157 6 0 0 0 51 163 Wrangle 510 202 9 16 0 0 133 226 Total 3133 865 92 55 0 0 584 1012 Percentage 54.9 4.5 2.6 7.6 0.0 0.0 5.3 4.2 However, site B at Wrangle and site K on IWMK do overlap with fishable densities of larger sized cockles and site G on the Tofts is directly adjacent to a high-density patch of older cockles that might extend into the proposed closure.
Are the high-density patches situated in vulnerable locations?	Yes – Stocks that settle in vulnerable locations are prone to loss during storms, particularly during winter. Such areas should either not be closed in the first instance or be monitored closely for potential loss.
	No – Stocks situated in more stable areas have greater chance of over-winter survival so provide more long-term benefit from being closed than stocks situated in vulnerable areas. The majority of the closures are situated in sheltered areas. The seaward edge of site D at Friskney has previously been found to be vulnerable.
Are the stocks at high risk of ridging out? *Ridging out occurs when cockles in high-density patches grow to a size where it is no longer possible for them all to fit in the available space. When this occurs, the constant competition to remain buried weakens the whole population to the extent that the majority of the population ridges out in heaps, where they either smother or wash away.*	Yes – This often happens when high-density patches of Year-0 cockles overlap with populations of larger cockles (see above). In these situations, it is the larger cockles that ridge out first. Any high-density patch of cockles is vulnerable to ridging, though. As losses tend to be very high if it occurs, it is generally beneficial to take pre-emptive measures prior to ridging occurring. Opening such areas to the fishery enables harvesting to thin the stocks, thereby reducing the overall losses and increasing the survivability of those that remain. This not only provides the industry with a fishing opportunity that is not additive to the mortalities, but also can lead to a more productive bed the following year than if ridging out does occur. Chart below shows risk assessment of ridging out based on cockle numbers. Some areas on Holbeach and Friskney are high-density. Those in Friskney are

	also anticipated to grow rapidly, increasing the risk of ridging occurring. One site at Wrangle and one site at IWMK also support relatively high desnsities of Year-1 cockles, which will be vulnerable. 
	No – If high-density patches of Year-0 cockles are not considered at risk from ridging out, they should be closed as these will become the more desirable areas to fish in the following years. Occasional monitoring should still be conducted through the summer to ensure the initial assessment was correct and that they are not showing signs of imminent ridging.
Are the potential closures in fast-growing areas where the Year-0 cockles could reach commercial size by the autumn (when they have just turned Year-1)?	Yes – There are a small number of beds where cockles grow fast enough to reach fishable sizes about 12-16 months after they settled. At the time of the spring surveys and the opening of the fishery, they would be considered Year-0. By late summer/early autumn, however, they have turned Year-1. High-density patches growing this rapidly are vulnerable to ridging out in the autumn. Further, should their densities not cause ridging out in the autumn, their size will make them vulnerable to atypical mortality quite early the following summer (possibly before a new fishery can be opened). As there is a high risk that these patches will be lost, their management should be more relaxed. If they are closed at the start of the fishery, they should be monitored closely and potentially be opened in the autumn. Friskney tends to support fast cockle growth. A high proportion of the Year-0s are in this area.
	No – These areas should be offered protection as they will benefit future fisheries.

Summary of conditions supporting precautionary or flexible approaches

Conditions supporting precautionary approach	Conditions supporting flexible approach
The site supports Year-0 cockle densities >1,000/m^2?	Bird Food Model calculations suggest there is sufficient AFDM to support over 46,600 oystercatchers.
There are sufficient densities of large cockles outside of the proposed closed areas to support the fishery	Year-0 population of 5,708 tonnes is considered to be successful spatfall and will support sustainability There are 13 proposed closures, two of which are large areas. This provides more flexibility in keeping some of them open.
	The biomass of Year-1 cockles greatly exceeds 8,000 tonnes providing sustainability for at least another year. Further, it is advisable to open areas where high-density patches of Year-0 and Year-1 cohorts overlap as the Year-1 cockles will be ridged out and lost.
Most of the closures do not overlap with high densities of larger cockles so low mitigation not to close them.	Site B at Wrangle and site K on IWMK overlap with fishable densities of larger sized cockles and site G on the Tofts is directly adjacent to a high-density patch of older cockles that might extend into the proposed closure.
Most of the closed areas are situated in stable areas.	The seaward edge of site D at Friskney has previously been found to be vulnerable.
	Some areas on Holbeach and Friskney are sufficiently high-density to pose a risk of ridging out. Those in Friskney are also anticipated to grow rapidly, increasing the risk. One site at Wrangle and one site at IWMK also support relatively high desnsities of Year-1 cockles, which will be vulnerable.
Majority of closures are in sites where growth won't be sufficient for the Year-0 stocks to attain fishable size this year.	The cockles in the closed area at Friskney are anticipated to be fast growing, so could reach fishable size by autumn.

Recommendations

At 29,951 tonnes, the current stock levels are good. Combined with high mussel stocks, the Bird Food Model requirements and the various Conservation Objective targets are all achieved.

The population of 19,277 tonnes of Year-1 cockles and 5,708 tonnes of Year-0 cockles provides good sustainability prospects for the coming year.

13 areas of high-density Year-0 cockles have been proposed for closure. These include two large areas at Wrangle/Friskney.

In the majority of these sites, there is relatively low overlap with fishable densities of larger cockles. However, site B at Wrangle and site K on IWMK do overlap with fishable densities of larger sized cockles and site G on the Tofts is directly adjacent to a high-density patch of older cockles that might extend into the proposed closure. It is recommended that these three areas are considered in more detail, potentially warranting a further assessment on foot.

The majority of the closures are situated in sheltered areas, so should be safe to close. However, the seaward edge of the large site D at Friskney can be vulnerable to storms. It is also an area supporting rapid growth. It is recommended that this site is closed, but assessed for ridging out during the summer. An assessment should also be conducted during these inspections to determine vulnerability to loss from strong wave action.

The cockles at Friskney could reach fishable size by autumn. However, with high numbers of Year-1 cockles to fish, unless these appear to be at high risk of ridging out, the closure should remain in place as they will provide the best fishing opportunity for the 2027 fishery.

Appendix 5 - Common Seal (Harbour seal) (*Phoca vitulina*) haul-out analysis

Distribution of haul-out sites across The Wash and fishable cockle densities

The Sea Mammal Research Unit's Distribution and abundance of harbour seals most recent report (Thompson, *unpublished*) and data layers for 2023, 2024 and 2025 were used to identify key haul-out sites in The Wash. These are illustrated in Figure 1 and overlayed onto fishable cockle densities identified during the 2026 cockle surveys.

SMRU produce detailed maps of the extents of all seal haul-out sites photographed during their annual aerial surveys of The Wash. This assessment takes into account seal haul-out extents observed during the breeding seasons (June/July) in 2023, 2024 and 2025. Seals are well distributed throughout the Wash, with a small number of sites supporting higher proportions of seals than others. In any given year, the distribution of 1+ ages and pup populations are broadly similar. Eastern IFCA carry out annual cockle surveys in The Wash, to identify the distribution, biomass and size composition of cockle stocks. Together, the 2026 cockle survey areas and most recent three-year's seal haul-out extents (2023, 2024 and 2025) have been used as the basis for the spatial analysis detailed in this Appendix (Figure 1). Layers detailing high and medium usage haul out sites and fishable cockle stocks (total weight excluding yr 0 >70g/0.1m2) were then viewed in QGIS. The lowest densities of cockles (<70g/0.1m2) were not included in this assessment as they are considered unlikely to be targeted by the fishery (Senior MS, *pers comms*).

To undertake the assessment between seal haul-out sites and the proposed cockle fishery, the high usage haul-out sites were first identified. These are sites that were used by ≥2% of the total seal population (averaged over the three years) at one or more occasions since 2023. High usage sites are considered high risk to visual disturbance from the fishery and, consequently, require closure during the sensitive moulting and pupping period.

Next, the medium usage sites were identified (those used by <2% of the total Wash Harbour seal population, averaged over three years, but <0.3% of the total population) and any overlaps between fishable cockle stocks identified. Overlaps between medium density usage polygons and fishable cockle stocks were then assessed in more detail, taking into account available alternative haul-out areas within 3km, geographical information (e.g. creeks and topography affecting line of sight) and site fidelity (Figure 4), to determine risk the Harbour seal population.

Where risk of adverse effect on the Harbour Seal population is determined significant, mitigation has been proposed. For these sites, overlapping medium and high usage haul out sites were identified and merged to create a total haul out area. A 100m buffer was applied to the haul out area (as agreed with Natural England) as a likely maximum distance at which pedestrian activity could disturb hauled-out seals. The resultant area is then proposed as closed to the fishery during the sensitive pupping period (June to August) (Figures 2, 3 and 4).

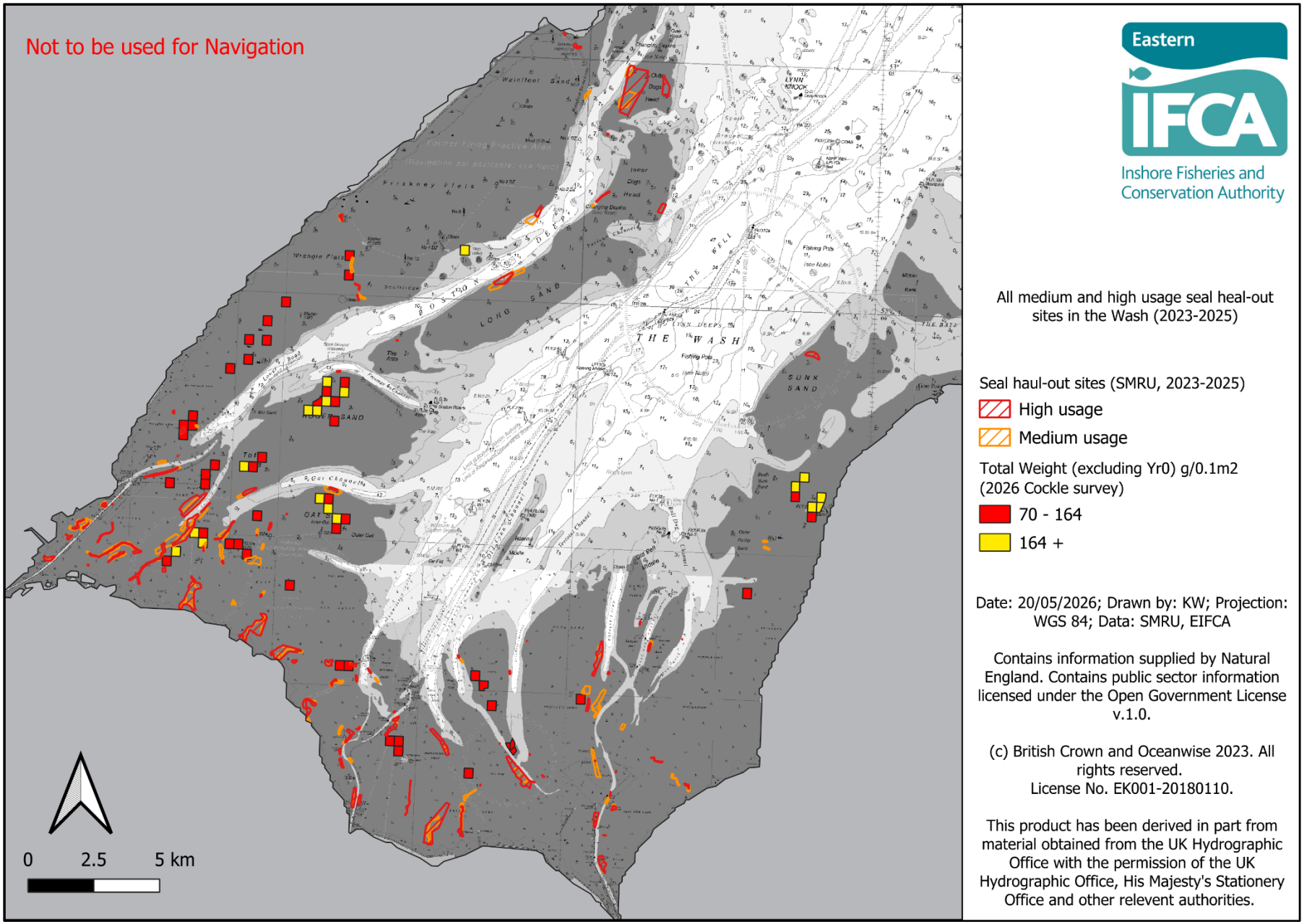


Figure 1. The Wash fishable cockle sample locations by total cockle weight (excluding year 0) surveyed by EIFCA in 2026 and the combined medium and high usage seal haul-out extents for 2023-2025.

Additional consideration in light of recent population declines

Further consideration of potential impacts on Harbour seals from the proposed fishery is warranted because of recent population declines (recorded in moult counts since 2018). However, it is noted that there is no evidence that fishing activity in The Wash results in any impact to seal populations. Anecdotally, the decline in Harbour seal counts is considered likely to be linked to a significant increase in local populations of a natural competitor, the grey seal though specific evidence is limited. Eastern IFCA work with NE and SMRU to obtain annual data layers showing accurate data on the location of the areas where seals haul out, in order to provide the most appropriate management to the site.

SMRU have advised a highly precautionary approach to the management of Harbour seals when using these layers, such that any site harbouring ≥2% of the total population (high) should be closed to a fishery during the sensitive pupping/moulting season, to reflect the concerns around the recent observed population declines. Haul-out sites that harbour between 0.3% and 2% of the total seal population (medium) should then be analysed on a case-by-case basis and those that harbour ≤0.3% of the total population (low) should remain open. Figures 2, 3 and 4 outlines the overlap between high usage haul-out areas and fishable densities of cockles.

It is worth noting that the definition of disturbance is "disturbance likely to cause impacts on populations of a species through either (i) changed local distribution on a continuing basis; and/or (ii) changed local abundance on a sustained basis; and/or (iii) the reduction of the ability of any significant group of birds or seals to survive, breed or rear their young"[27]. SMRU (*2022*) concluded that "currently there is no evidence that fishing activities are impacting seal populations in The Wash" and thus Eastern IFCA's assessment and any proposed closures are considered precautionary measures.

Assessment Outcome

High usage sites (support ≥2% of the total seal population in The Wash)

Analysis of the 2023-2025 SMRU haul-out data layers has identified four high-usage haul out areas (on Hook Hill, Mare Tail, Holbeach and Butterwick Extension) that overlap with likely fishing areas (Figures 2, 3 and 4). The total area of all haul-out sites overlapping with a red site (i.e. cumulative area covered by red and amber haul-out sites if overlapping with a red) are to be closed. Although this results in a closed area larger than the area actually in use by the hauled-out seals at any point, it allows a degree of precaution to reflect that the exact location of hauled-out seals does vary within and around haul-out sites. In addition, a 100m buffer zone is drawn around the haul-out area that has been identified as requiring a closure (Figures 2, 3 and 4). This distance has been selected based on published scientific literature relating to the distance at which hauled-out seals may respond negatively to human presence (Thompson et al., 2022). It adds further precaution to the process to avoid significant disturbance to hauled-out Harbour seals.

[27] The Wash Supplementary Advice on Conservation Objectives

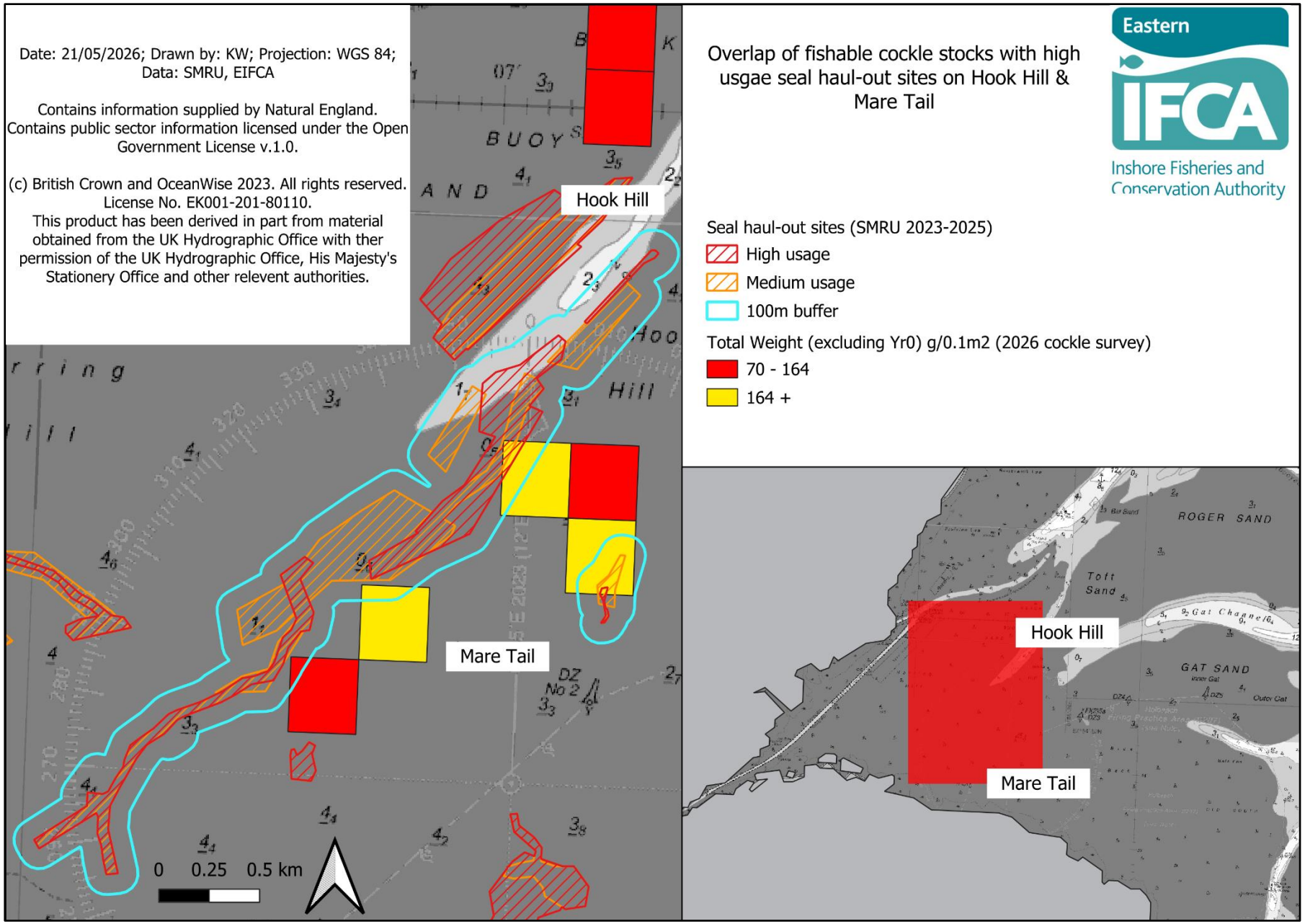


Figure 2. Locations of high usage seal haul-out area sites overlapping with fishable cockle stocks on Hook Hill and Mare Tail. A 100m buffer has been applied to associated haul out area requiring closure.

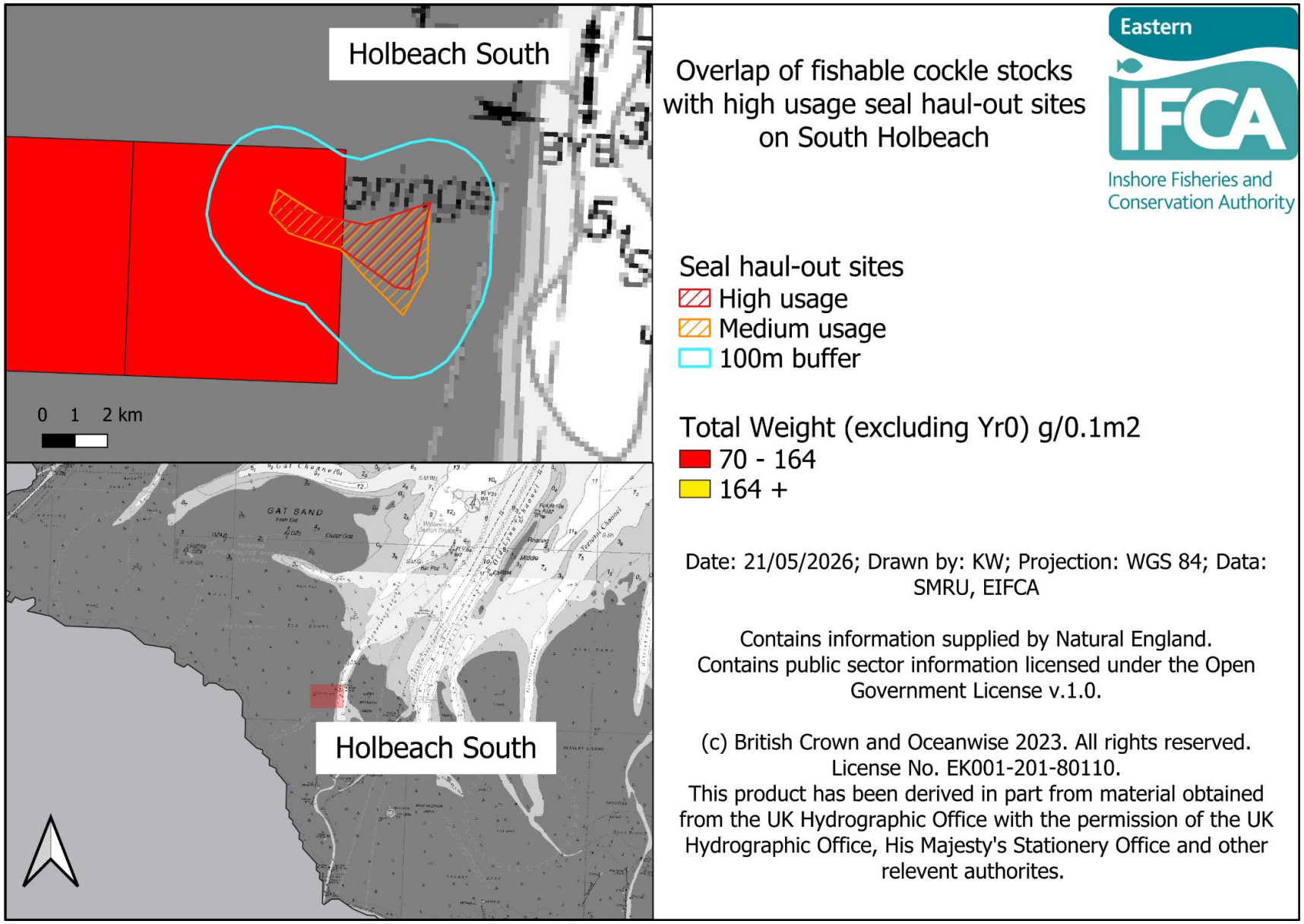


Figure 3. Location of high usage seal haul-out area sites overlapping with fishable cockle stocks on Holbeach South. A 100m buffer area has been applied to associated haul out area requiring closure.

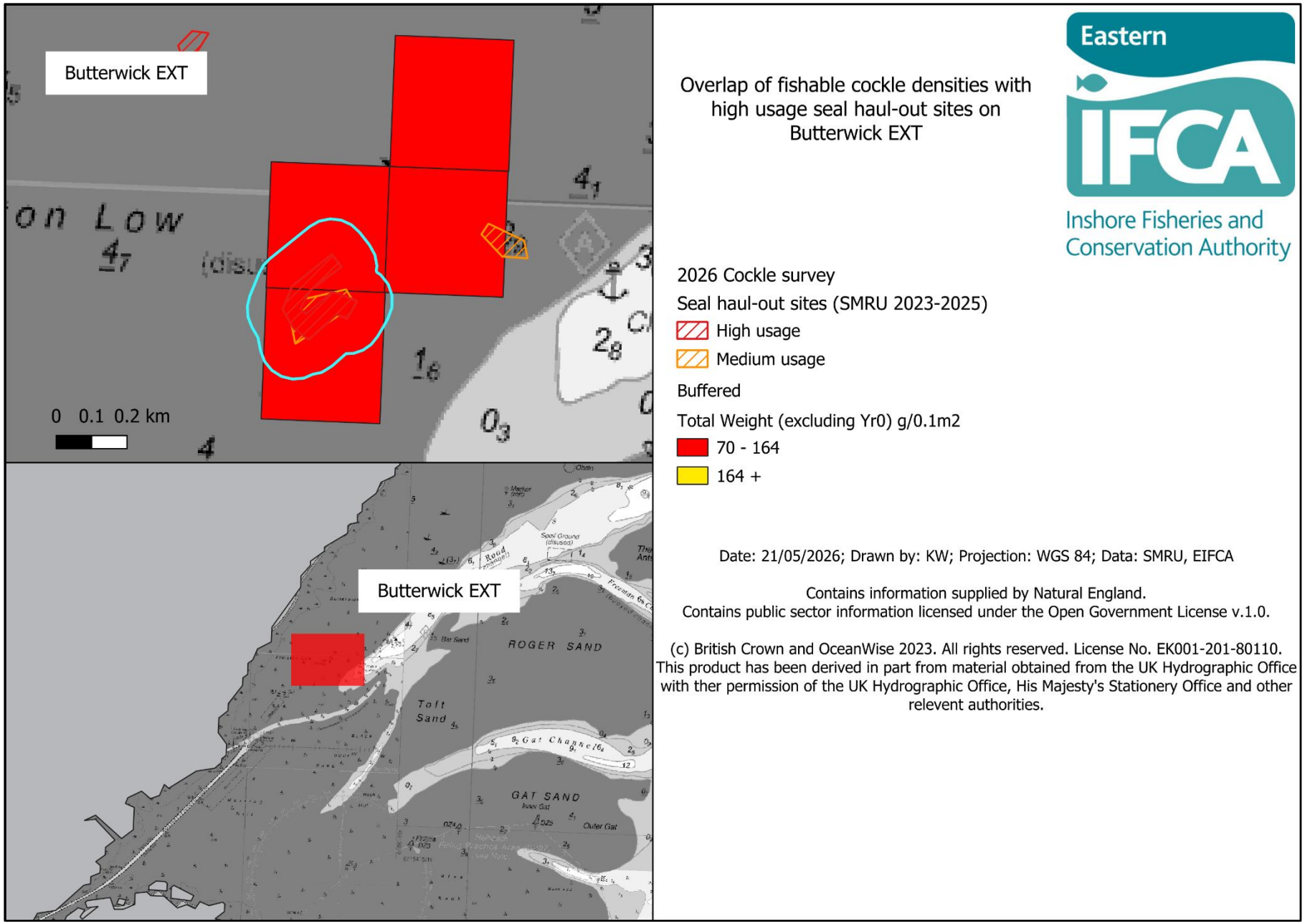


Figure 4. Location of high usage seal haul-out area sites overlapping with fishable cockle stocks on Butterwick EXT. A 100m buffer area has been applied to the associated haul out area requiring closure.

Medium usage sites (support between 0.3% and 2% of the total seal population in The Wash)

Analysis of the 2023-2025 SMRU haul-out data layers has identified three medium-usage haul-out areas (on Butterwick Extension, Holbeach and Wrangle) that overlap with potential fishing areas. These are visualised and assessed individually below (Table 1, Figures 5 and 6) focussing on cockle density at the overlapping areas, site fidelity, alternative haul-out areas within 3km, percentage usage of alternative haul-out sites and geographical information (i.e. location of the haul-out areas in relation to creeks, area of creeks covered by the haul-out area, line of sight etc). These site-specific factors are considered alongside the below which apply across all sites:

- Fishing vessels anchor and sit on the seabed before the sandbanks are exposed, meaning seals are not disturbed from haul-out sites by the arrival of fishing vessels but instead could be displaced to other areas of the Wash.
- Fishers stay close to their vessels when gathering cockles and the nature of this type of activity is quiet and slow, thus any disturbance to hauled out seals from pedestrian activity once the vessel is dried out is minimal.
- The fishery is likely to be open for approximately 15 days per month within the months June, July and August 2024, which equates to approximately 26% of the total low water tide periods during these months where seals could be displaced as a result of the fishery.
- Reliable anecdotal evidence from officers which has shown seals habituate to the presence of fishing vessels and fishermen engaged in hand working activities on intertidal sands.

Butterwick EXT

There is medium usage haul-out site present on the Butterwick EXT sand (Figure 6). This site has been identified as a haul-out site for seals in 2023 (SMRU). The site has 5 alternative haul-out sites within 3km and overlaps with one medium-density cockle fishery area. In 2023 this haul-out site supported 0.76% of the adult seal population. However, line of sight is not considered possible between the fishery and the haul-out site (Senior MSO, *pers comms*). Taking these site-specific factors into account as well as those listed above (including the low frequency, small scale and quiet nature of activity, the ability for seals to habituate and the limited pathway for disturbance), it has been concluded that this site will remain open to the fishery as it is unlikely to cause significant disturbance to the Harbour seal population that utilise the area.

Holbeach North

There is medium usage haul-out site present in the northern part of Holbeach sands (Figure 5). This site has been identified as a haul-out site for seals in 2024 (SMRU). The site has 16 alternative haul-out sites within 3km and overlaps with one medium-density cockle fishery area. In 2024 this haul-out site supported 0.57% of the adult seal population. However, line of sight is not considered possible between the fishery and the haul-out site (Senior MSO, *pers comms*). Taking these site-specific factors into account as well as those listed above (including the low frequency, small scale and quiet nature of activity, the ability for seals to habituate and the limited pathway

for disturbance), it has been concluded that this site will remain open to the fishery as it is unlikely to cause significant disturbance to the Harbour seal population that utilise the area.

Wrangle

There is medium usage haul-out site present on the Wrangle cockle bed (Figure 6). This site has only been identified as a haul-out site in 2023 (SMRU). The site has 4 alternative haul-out sites within 3km and slightly overlaps with two medium-density cockle fishery areas. In 2023 this site supported 0.31% of the adult seal population. Line of sight is considered possible between the cockle bed and the haul-out site, based on advice from the Senior MSO (pers. comm.). Taking these site-specific factors into account as well as those listed above (including the low frequency, small scale and quiet nature of activity, the ability for seals to habituate and the potential pathway for disturbance), it has been concluded that this haul-out site will be closed to the fishery to ensure that no significant disturbance occurs to the harbour seal population utilising the area.

Table 1: Analysis of medium-usage haul-out sites overlapping with fishable cockle beds.

	Wrangle	**Butterwick EXT**	**Holbeach North**
Alternative haul out sites within 3km	4	5	16
Site fidelity	2023	2023,2024, 2025	2024
Cockle density at overlapping areas	Medium (70-164g/0.1m2)	Medium (70-164g/0.1m2)	Medium (70-164g/0.1m2)
Percentage of total adult population in 2023	0.31%	0.76%	N/A
Percentage of total adult population in 2024	N/A	N/A	0.57%
Percentage of total adult population in 2025	N/A	N/A	N/A
Line of sight	Line of sight possible	Line of sight not possible due to topography	Line of sight not possible due to topography

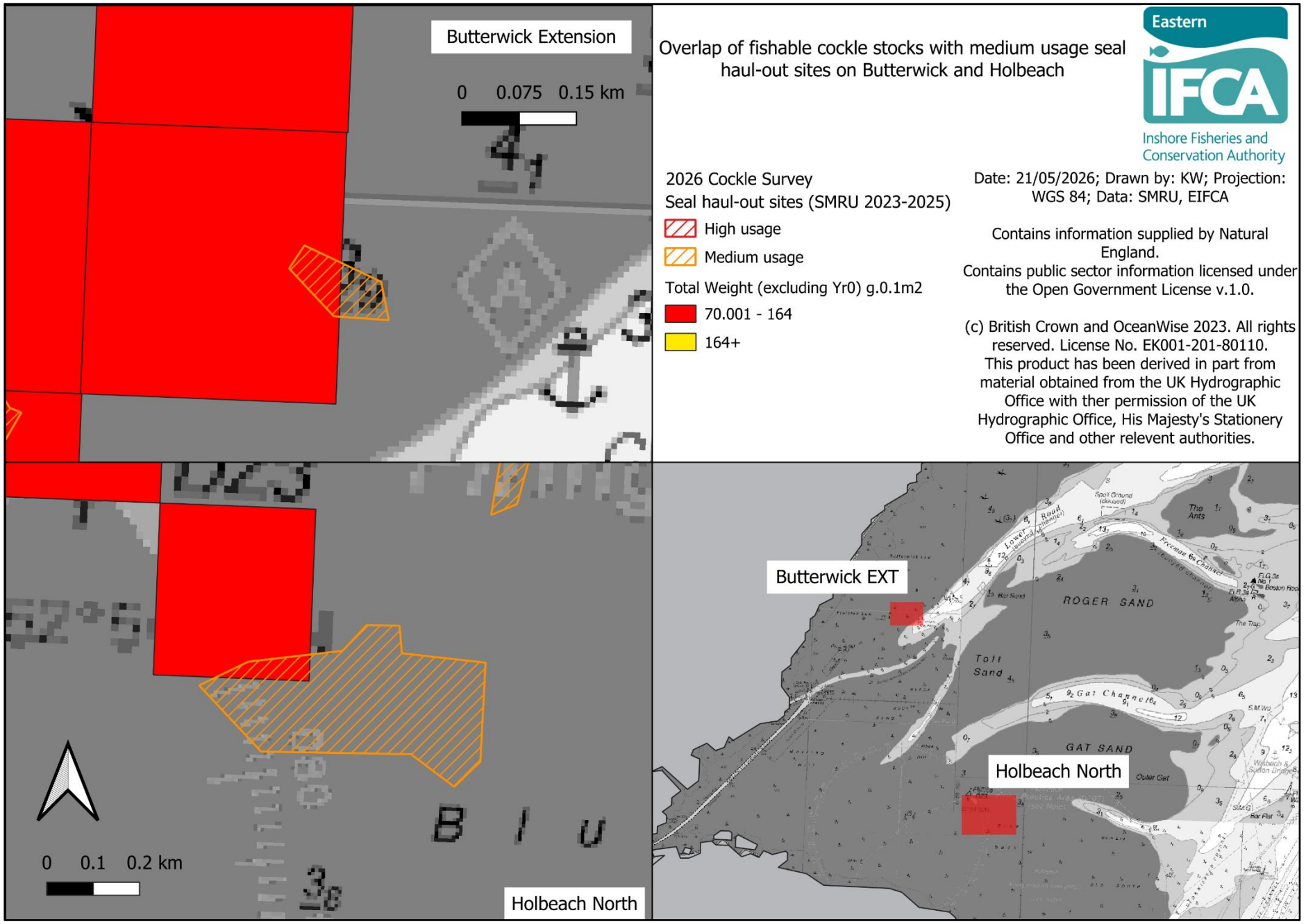


Figure 5: Overlap of medium-usage haul-out site with fishable cockle beds in Butterwick Extension and Holbeach North.

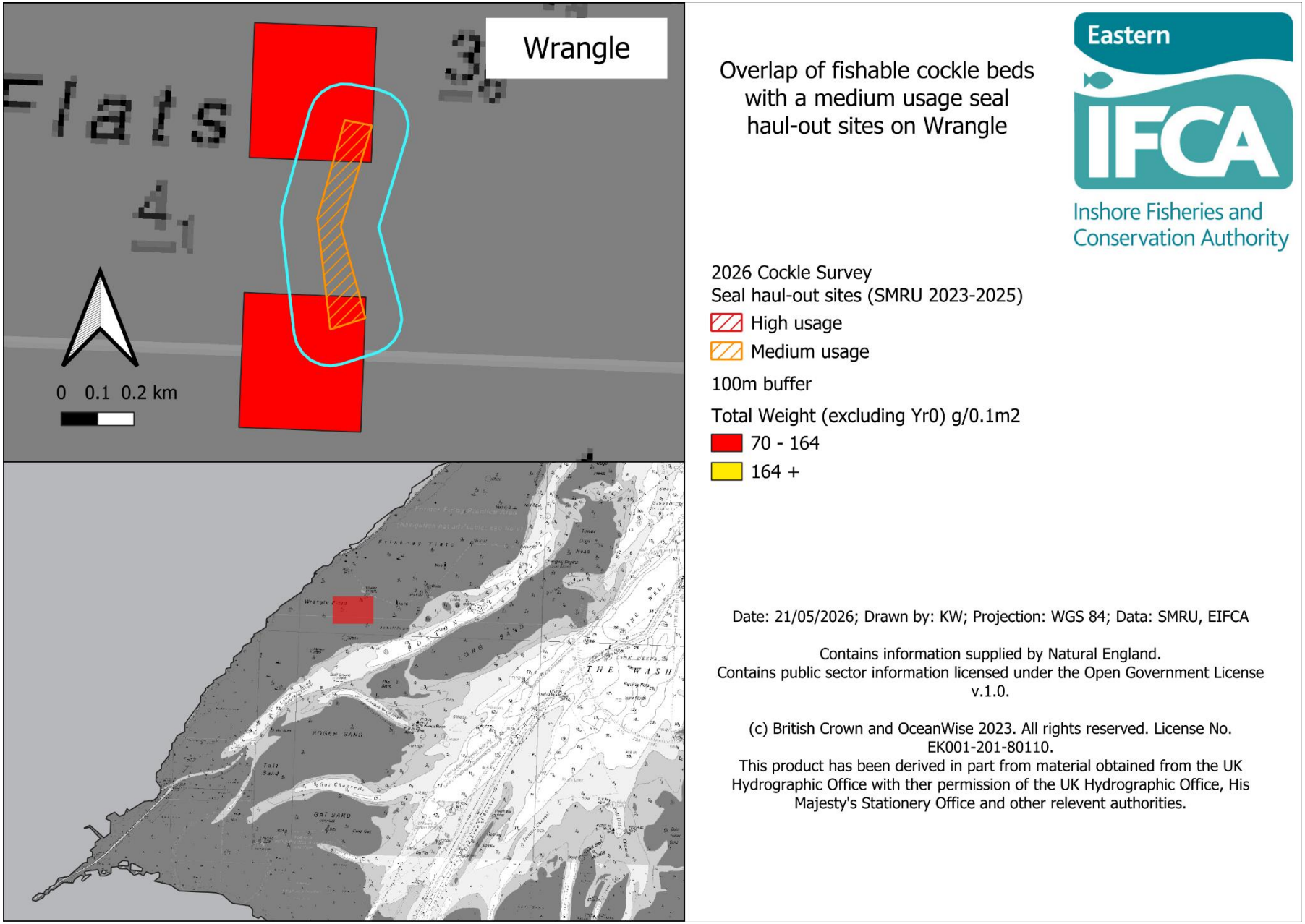


Figure 6: Overlap of the medium-usage haul-out site in Wrangle sands with fishable cockle beds. A 100m buffer area has been applied to associated haul out area requiring closure.

Summary

Eastern IFCA has examined the latest three years' data on the distribution and usage of haul-out areas in relation to cockle stock distribution. Given the declining population of Harbour seals, the precautionary closure of "high usage" haul-out areas and high risk medium usage areas (with buffers) during the pupping and moulting season will provide mitigation against potential disturbance.

Based on the above**, four precautionary spatial closures** have been proposed to mitigate the potential risk of visual disturbance on the Harbour seal population by the fishery during the sensitive pupping period (1 June to 31 August). The final shape and size of closed areas will be determined by Eastern IFCA, accounting for enforceability. Eastern IFCA's approach is to close the smallest possible areas (to maximise fishing opportunities), so long as the necessary conservation effect is achieved (i.e. the seal haul-out area and buffer are completely covered by a closure). Closures would be in place from the 1st of June until the 31st August, during the sensitive pupping and moulting season.

With focused monitoring of fishery behaviour, the proposed mitigation and because of the factors discussed above, it is assessed that the proposed 2026 Wash cockle fishery will not have a significant impact on the harbour seal population.

Appendix 6 – SPA Visual Disturbance Analysis

Consideration of visual disturbance effect on SPA species

This appendix details consideration of the potential for visual disturbance from the 2026/2027 handwork cockle fishery to impact the Wash SPA designated bird populations.

Affected area

Eastern IFCA proposes to open all cockle beds during the 2026/27 fishery, with several small closures within certain beds to protect future cockle stocks. These include proposed closed areas on:

- Wrangle
- Friskney
- Tofts
- Mare Tail
- Holbeach
- IWMK
- Breast

Some of these proposed fishing area closures overlap with bird usage areas. As the closures are currently only proposed and may ultimately be removed, they have been treated as open areas for the purposes of this assessment.

This SPA visual disturbance assessment considers the cockle beds most likely to receive the main fishery effort, based on the assumption that fishers will target areas where the weight of cockle (excluding year zeros) is highest. Cockle distribution and weight data are gathered by Eastern IFCA during annual (spring) cockle surveys. Eastern IFCA provides this information to fishers.

Cockle beds with patches that have a density of cockle greater than **70g/0.1m^2** [28] have been included in the assessment. Stocks with densities of **70-164g/0.01m^2** are deemed “medium-tonnage stocks” and those with densities greater than **164/0.01m^2** are deemed “high-tonnage stocks” (Figure 1). The lowest densities of cockles (**<70g/0.1m2**) were not included in this assessment as they are considered unlikely to be targeted by the fishery (Senior MS, pers comms). Hand-working such low densities is generally not viable and fishermen will only target higher density areas. This year‘s fishery‘s medium and high-density patches contain sufficient stock to support the full 2026 quota.

Medium and high density cockle patches are spread across the Wash intertidal flats and occur on the following beds: Friskney, Wrangle, Butterwick and Butterwick Extension, Black Buoy, Roger Sands, Herring Hill, Mare Tail, Holbeach, Gat, Inner West Mark Knock (IWMK), Breast, Thief, Daseleys, Outer Ferrier and the newly discovered Hunstanton cockle bed (Figure 1).

28 Determined using the data collected during Eastern IFCA’s 2026 Wash cockle stock assessment

The presence of medium-high density cockle areas on most of the beds indicates that it is unlikely that any one bed will be heavily targeted by the fishery and that effort will be spread throughout.

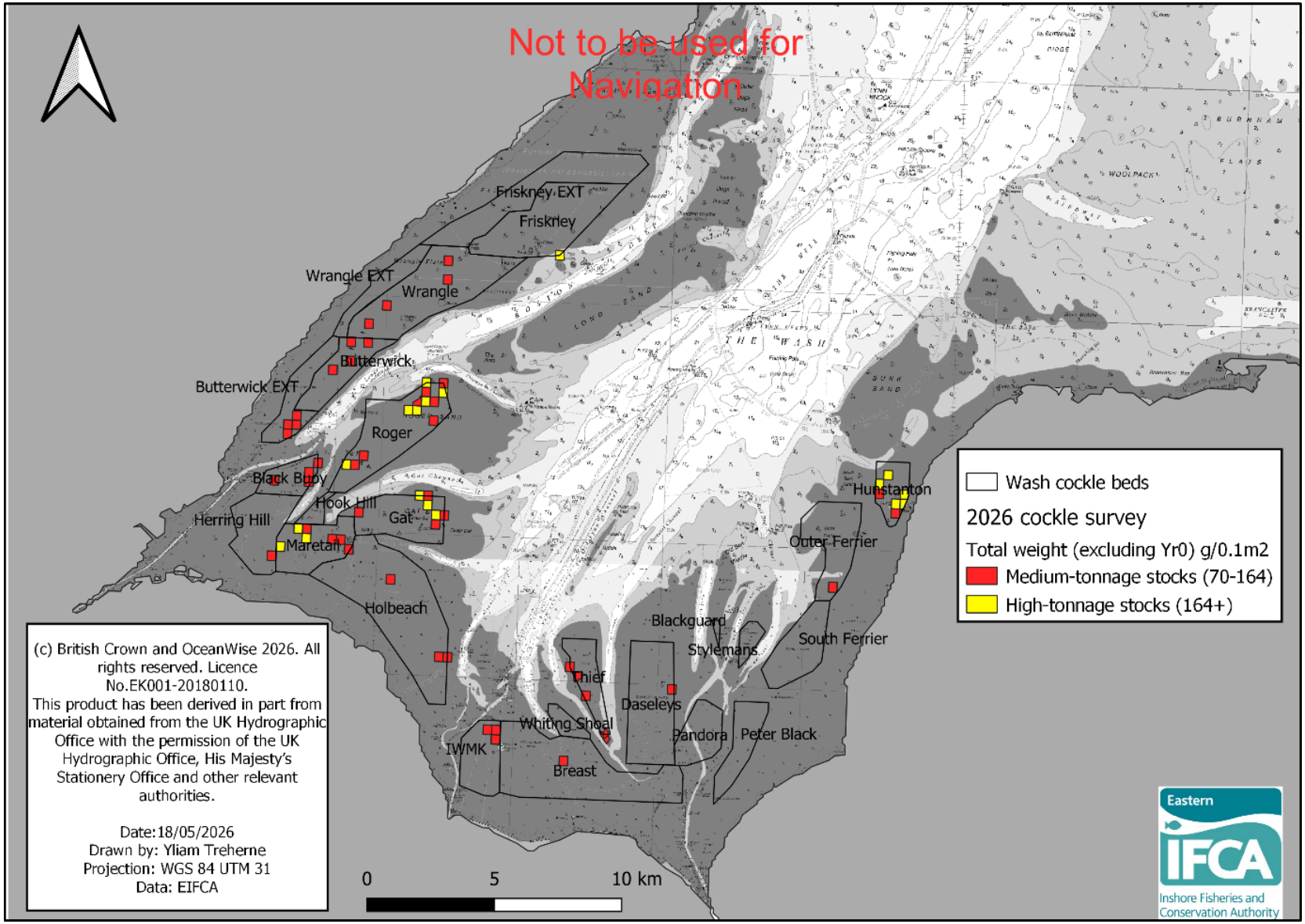


Figure 1. Chart of the Wash showing cockle bed areas and the distribution of fishable cockle densities determined from the Eastern IFCA 2026 cockle stock survey.

Cockle as preferred prey

Different bird species will target different areas depending on their favoured food resource and its availability. Species that prey on cockles are likely to have some preferred feeding areas that overlap with areas targeted by the fishery and have therefore been included in this assessment. Species that utilise similar habitats and have a status of "unfavourable" and a target of "restore" have also been included as there is potential for disturbance by fishers targeting cockles.

Those species designated under The Wash SPA that have an either direct or indirect association with cockles require further consideration in this assessment and are detailed in Table 1. Table 2 outlines each species target and condition status. Where feature condition information isn't available, WeBS data (Frost *et al*, 2026) has been used to identify the trends in total population for each species and assign an "assessed status".

Table 1: SPA species considered in the assessment. All species listed are included in the assessment because of their association with cockle beds, except for Shelduck and Redshank which are included because of their association with muddy sediment features. Natural England's designated sites view was used to identify species feeding behaviours unless otherwise referenced[29].

SPA species	Reason for inclusion in assessment
Bar-tailed godwit	Mainly feed on bristle worms but supplement this diet with *Mytilus* sp.; predominantly on sandy mid- and lower shore areas.
Common Scoter	Feeds on *Mytilus* and *Macoma* which are often found in cockle beds (Carboneras & Kirwan, 2020).
Curlew	Preys on cockles, clams and polychaete worms.
Dunlin	Feeds on cockles and mussels as supplementary species to their main diet of polychaete worms (Martins et al., 2013).
Knot	Feed on cockle spat and Baltic Tellin (Macoma). Aggregate in large feeding flocks.
Oystercatcher	Feed on cockles and mussels[30].
Redshank	Associated with muddy sediments, targets small worms, molluscs and shellfish.
Sanderling	Key prey species includes *Mytilus* spat (Penning et al., 2022).
Shelduck	Associated with muddy sediments and has an unfavourable status/restore target. Primarily feed on oligochaete worms and *Hydrobia ulvae,* occasionally mussels.
Turnstone	Primarily feeds on cockle and mussel spat.

[29] Designated Sites View – Site Detail
[30] Designated Sites View – Feature Condition Assessment

Table 2: Table detailing feature condition for[31]. Where feature condition has not been assessed WeBS data has been used to provide an assessment, considering the latest 5 year mean peak and long term trends in relation to conservation targets.

Species	Target	Latest NE Condition Assessment (2024 - 2026)	Latest 5 year mean peak**	Trend in Peak Counts since 2000	EIFCA Assessed Status
Oystercatcher	**Restore** the size of the non-breeding population at a level which is above 24,000 individuals.	**Unassessed**	22,806	Incline	**Unfavourable Recovery**
Knot	Maintain the size of the non-breeding population at a level which is above 75,000 individuals.	**Favourable**			
Bar-tailed godwit	Maintain the size of the population at a level above 8,200 individuals.	**Favourable**			
Curlew	Maintain the size of the non-breeding population to a level which is above 3,700 individuals.	**Favourable**			
Dunlin	**Restore** the size of the non-breeding population at a level which is above 29,000 individuals.	**Favourable**			
Common Scoter	**Restore** the size of the non-breeding population at a level which is above 830 individuals.	**Unassessed**	324	Incline	**Unfavourable Recovery**
Redshank	Maintain the size of the population to a level which is above 4,331 individuals.	**Favourable**			
Sanderling	Maintain the size of the non-breeding population at a level which is above 500 individuals.	**Favourable**			
Shelduck	**Restore** the size of the population to a level which is above 16,000 individuals.	**Unfavourable declining**			
Turnstone	**Restore** the size of the population at a level which is above 980 individuals.	**Favourable**			

[31] NE's Designated Sites View – Feature Condition Assessment

Potential for disturbance of birds feeding on intertidal flats

As shown in Figure 1, fishing activity from the 2026 hand-worked cockle fishery is likely to be distributed across the majority of intertidal beds. Disturbance to wading birds may occur but is predicted to be limited due to the nature of the fishery.

Visual disturbance is limited as fishing vessels will anchor and lay on cockle beds before the sandbanks are exposed. As wading birds will arrive after the vessels, they will not be disturbed away from intertidal feeding grounds and can choose areas free of fishermen. There is potential for some reaction by nearby birds to the initial arrival of cockle fishers walking on the flats (having disembarked from their vessels) and to fishers moving around when hand raking cockles, however, the quiet and slow nature of these actions means disturbance is likely to be limited to an initial avoidance reaction, quickly followed by habituation.

Goss-Custard & Verboven (1993) conducted a study in the Exe estuary investigating the disturbance caused by hand working activities to shorebirds and found no evidence to suggest that human disturbance significantly affected the feeding and consequently the numbers of waders utilising the estuary, concluding that birds adapt to disturbance by habituating to the presence of people. They also stated that whilst disturbance can reduce the rate at which the most vulnerable Oystercatchers feed by as much as 33-50%, the overall effect is much lower because so much feeding occurs when people are not present.

As discussed in the HRA, the proposed fishery will not occur on more than 50% of low tides per week (as fishers do not target both low tides each day) and the potential for disturbance will be limited to active fishing periods. Furthermore, the cockle fishery is typically only open for an average of 15 days per month, meaning that approximately 26% of all low tides per month are utilised by the fishery (Table 3). This year the locations of high intensity fishing activities are predicted to be clustered mainly around the Gat, Roger and Mare Tail beds, closer to the Boston side of the Wash. The new Hunstanton bed on the opposite side of the Wash will also likely be heavily targeted, however, a significant portion of it remains covered at low water unless tides are significantly large.

As it is unlikely that the fishing fleet will be present on all of these beds at any one time, high and medium tonnage beds are spread throughout the Wash and vessels will be anchored before low tide, displacing rather than disturbing feeding waders, fishing pressure related to visual disturbance is predicted to be relatively low.

Table 3: Number of low tides typically utilised by the Eastern IFCA cockle fishery

Typical low tides per month[32]		Approximate days fished per month	Low tides fished per month
All tides	58	15	25.86%

[32] Assumed based on a typical month being 30 days with two tides per day but with two tides less each month due to the lunar cycle.

Overwinter considerations

Birds are more vulnerable to the effects of visual disturbance during winter due to feeding opportunities being more scarce and increased energy requirements (West *et* al., 2002; Goss-custard *et al*., 2006). The peak cockle fishing season occurs between June and September, with the numbers of vessels taking part in the fishery decreasing into the autumn and winter months as vessels turn to the shrimp fishery instead. Due to this drop off in active vessels fishing pressure will likely be very low during the critical cold weather period for birds (November to Mid-February). However, the increased sensitivity of birds to visual disturbance during this period is accounted for by the procedure described below.

Closure of the fishery prior to the March 2027 cockle surveys provides the maximum duration of the fishery. Early closure of the fishery may be requested, such as if the TAC is exhausted prior to this or if it becomes difficult for fishermen to achieve their daily quota and there are any concerns about damage to the ground with excessive prop-washing.

Eastern IFCA officers also monitor temperatures daily between 1st November and 20th February each winter. **If there is a prolonged period of severe weather (at least 7 days of freezing temperatures), Eastern IFCA will close the intertidal fishery during that period of severe weather. Doing so will help minimise risks to SPA species that are at high risk of mortality in such conditions.**

In these scenarios, “severe weather” is recorded when the minimum daily temperature is lower than 1°C and when grass temperature falls below -2°C. If both these values drop below thresholds for seven consecutive days with no more than two thaw days (days within the period which do not drop below the threshold) then this period is judged to be of "prolonged severe weather" and the fishery will be closed until there is a period of more than two thaw days[33]. to reduce disturbance to waterfowl during severe winter weather.

Finally, the main cockle fishery takes place over the summer months with any winter activity likely to be at an extremely low level. Eastern IFCA has an established process in place to close the fishery during periods of severe cold weather when the SPA birds are most vulnerable to disturbance impacts (Goss-custard *et al*., 2006). Further protection is provided by the Authority's ability to close the fishery if the fishing activities are deemed to be damaging the site.

[33] JNCC Severe Weather Scheme

Visual disturbance assessment

Distribution of vulnerable SPA species in relation to fishery areas

The ten species listed in Table 1 have been identified as being potentially vulnerable to disturbance from the fishery because of their association with cockle beds, intertidal flats and/or their unfavourable population status. The assessment set out below identifies which of these species are at risk of visual disturbance by using data from the most recent CEH Low Tide Bird Survey counts (2019/2020) (Garbutt *et al*., *unpublished*) to calculate the proportion of the population (for each species) that utilise the areas predicted to receive the most fishing effort (Table 5 and 6) and by considering their feature condition or assessed status (Table 2) and applying a risk score following a precautionary risk assessment matrix (Table 4). Those species that score medium or high are then assessed in more detail, i.e., considering the spatial distribution of the species across The Wash and the importance of each open fishery area to each species in relation to the rest of intertidal flats.

It is important to note at this stage that this fishery is not predicted to result in high intensity areas of fishing activity in any one area, thus, this is considered a precautionary approach.

This method of assessing risk of disturbance to birds utilising intertidal flats is based on the best available data (Garbutt *et al*, unpublished) on the distribution of birds. As the precise distribution of birds changes constantly as they move within and between intertidal flats, it is not possible nor appropriate to calculate exact proportions of birds that might interact with fishers. However, this method of considering the likely fishing effort areas alongside typical patterns of bird distribution and core feeding areas within the site is considered to be the best way of assessing the likelihood of disturbance and identifying whether spatial closures in the fishery could be required to mitigate potential disturbance.

Table 4: SPA species disturbance precautionary risk assessment matrix. Note that for species reported to be in unfavourable declining condition, the minimum risk score is medium.

Wash SPA condition assessment: population status	**Population usage (%)**		
	Low <5%	Medium 5-9.9%	High >10%
Favourable	**No risk**	**Low**	**Medium**
Unfavourable recovering	**Low**	**Medium**	**High**
Unfavourable declining	**Medium**	**High**	**High**

Cockle/mussel beds most likely to be targeted	Overlap with core bird feeding area (Garbutt et al., 2010)	Bird Usage (2019-2020) - Overlap with fishable cockle stocks																			
		Oystercatcher		Knot		Bar-tailed godwit		Curlew		Dunlin		Turnstone		Shelduck		Common Scoter		Redshank		Sanderling	
		no.	% total	no.	% total	no.	% total	no.	% total	no.	% total	no.	% total	no.	% total	no.	% total	no.	% total	no.	% total
Friskney + EXT	Yes	300	1.03	4	0.01	45	0.56	10	0.51	100	0.45	4	1.67	0	0.00	0	0.00	5	0.22	4	5.19
Wrangle + EXT	Yes	437	1.50	0	0.00	6	0.07	26	1.32	46	0.21	0	0.00	0	0.00	0	0.00	30	1.32	0	0
Butterwick + EXT	Yes	410	1.40	7	0.01	12	0.15	46	2.33	240	1.09	7	2.92	0	0.00	0	0.00	5	0.22	0	0
Roger	Yes	625	2.14	4	0.01	203	2.51	30	1.52	425	1.93	4	1.67	0	0.00	0	0.00	25	1.10	0	0
Black Buoy	Yes	146	0.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
Herring Hill	Yes	235	0.80	0	0.00	0	0.00	0	0.00	520	2.36	0	0.00	432	7.72	0	0.00	0	0.00	0	0
Maretail	Yes	2482	8.50	5	0.01	576	7.12	21	1.06	450	2.05	5	2.08	0	0.00	0	0.00	47	2.06	0	0
Gat	Yes	24	0.08	0	0.00	7	0.09	10	0.51	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
Holbeach	Yes	195	0.67	7	0.01	2	0.02	25	1.27	125	0.57	7	2.92	0	0.00	0	0.00	0	0.00	0	0
IWMK	Yes	252	0.86	23	0.03	680	8.41	2	0.10	0	0.00	23	9.58	0	0.00	0	0.00	21	0.92	0	0
Breast	Yes	123	0.42	0	0.00	20	0.25	12	0.61	0	0.00	0	0.00	55	0.98	0	0.00	0	0.00	0	0
Thief	Yes	92	0.32	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	40	1.75	0	0
Daseleys	Yes	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
Outer Ferrier	No	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
Hunstanton	No	0	0.00	0	0.00	0	0.00	0	0.00	0											
Grand total		**29201**		**75047**		**8088**		**1976**		**21998**		**240**		**5596**		**576**		**2280**		**77**	
Condition assessment/ Assessed status[34]		Unfav recovery		Favourable		Favourable		Favourable		Favourable		Favourable		Unfav decline		Unfav recovery		Favourable		Favourable	

Assumptions made in/limitations of this analysis:

- Data were collected during winter 2019/2020 CEH low tide bird surveys and provides the best available evidence.
- Bird count numbers are calculated based on overlap of bird count areas with open cockle beds.

Where bird count polygons extend beyond the boundaries of a bed the entire polygon is included in the count, thus, the importance of each bed for each species is likely to be an overestimate.

[34] Where no condition assessment has been completed, status has been assessed using available WeBS data in Table 1.

Table 6. Summary of SPA species disturbance risk scores for cockle bed areas most likely to receive main fishery effort in the 2026/2027 hand-worked cockle fishery. The colour coding corresponds to that used in Table 4.

Cockle bed area	Oystercatcher	Knot	Bar-tailed godwit	Curlew	Dunlin	Turnstone	Shelduck	Common Scoter	Redshank	Sanderling
Friskney + EXT										
Wrangle + EXT										
Butterwick + EXT										
Roger										
Black Buoy										
Herring Hill										
Mare Tail										
Gat										
Holbeach										
IWMK										
Breast										
Thief										
Daseleys										
Outer Ferrier										
Hunstanton										

Core feeding areas

As part of this assessment the cockle fishery areas have also been compared to the distribution of winter core (bird) feeding areas, shown in Garbutt *et al*., 2010. Core feeding areas have been identified within all fifteen beds (Table 5, Figure 2), although the core areas do not extend across the entirety of each cockle bed. Whilst we have low tide bird count data from the more recent 2019/2020 surveys, the full report for these surveys has not yet been published and core bird feeding areas based on this more recent data have yet to be been mapped. However, it is judged to be appropriate to consider the core feeding areas from the previous (2010) report in addition to the CEH 2019/2020 data despite the data being older, because it is understood that these core feeding areas are not likely to change considerably over time.

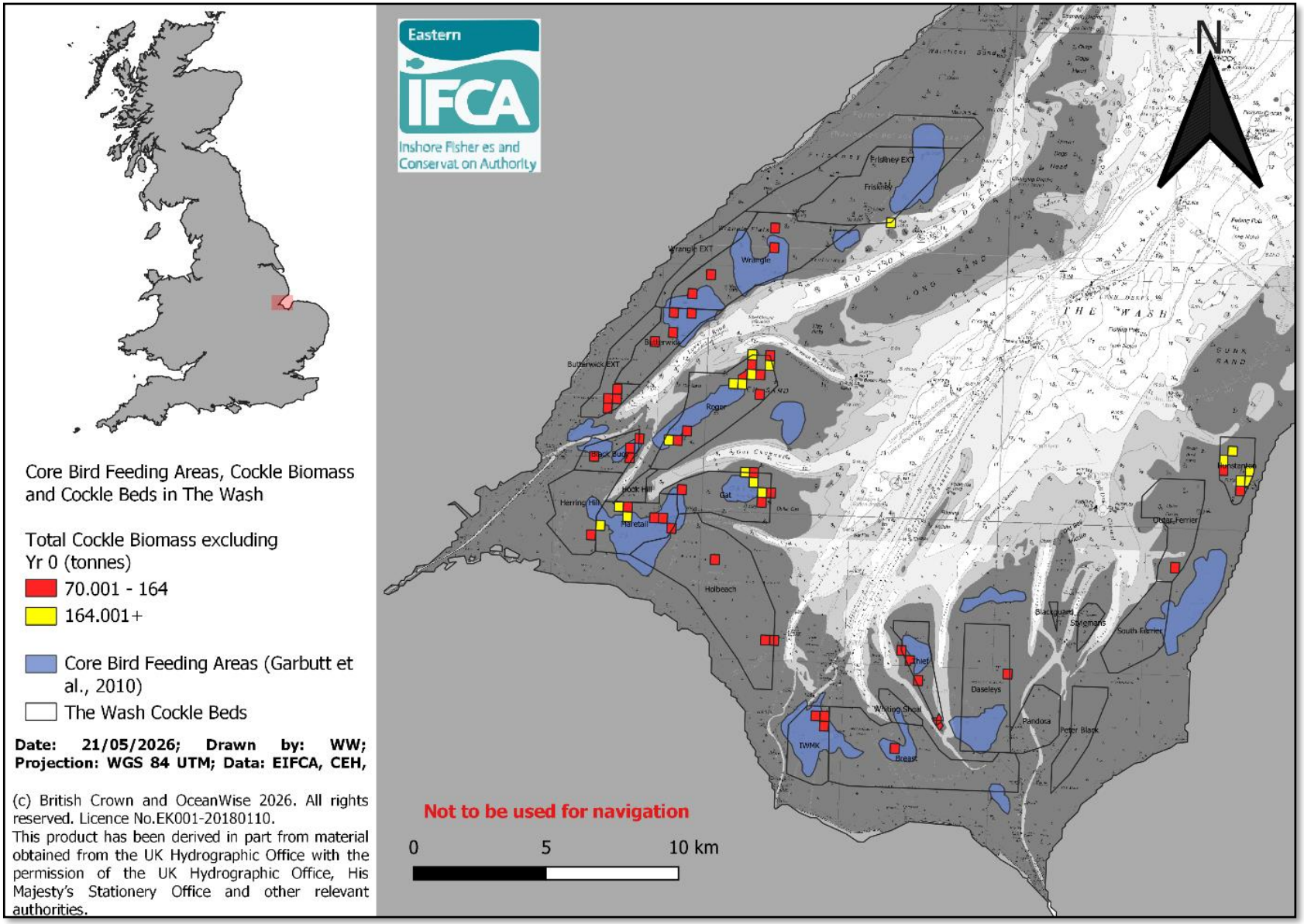


Figure 2. Chart of the Wash showing the distribution of winter core (bird) feeding areas (Garbutt *et* al., 2010) and cockle biomass (medium and high tonnage) across the cockle beds.

Assessment overview

Of the ten species assessed, five (Knot, Curlew, Dunlin, Common Scoter, and Redshank) were identified as at no risk from the proposed cockle fishery in relation to visual disturbance. Bar-tailed Godwit, Turnstone, and Sanderling were assessed as not at risk for most cockle beds, with only some low risk scores. Oystercatchers are assessed as *"unfavourable recovering"*, with one bed identified as medium risk and the remainder as no risk. Shelduck are assessed as *"unfavourable declining"* and were identified as high risk on one bed and medium risk on another, with all other beds scored as no risk.

Due to the no risk and low risk scores for Knot, Bar-tailed Godwit, Curlew, Dunlin, Turnstone, Common Scoter, Redshank and the precautionary approach already applied, the fishery is concluded not to significantly affect these species. However, Oystercatchers and Shelducks are associated with medium and high risk scores and are therefore considered in more detail in the assessment.

Oystercatcher

One of the conservation objectives for Oystercatcher under The Wash SPA is to restore the size of the non-breeding population to a level above 24,000 individuals[35]. The latest WeBS 5-year mean peak counts (2020/21–2024/25) recorded the population at 22,806 individuals (Frost *et al.,* 2026). WeBS reports indicate that the number of Oystercatcher over-wintering within The Wash SPA have remained relatively stable since significant declines in the 1990's which were linked to a collapse in mussel and cockle stocks. The trend on this site does not appear to be tracking that of either the region or the British trend. Numbers across the Anglian region have fluctuated, whilst across Great Britain they have been decreasing long-term (Woodward *et al*., 2019). However, the stable proportion of regional numbers supported by this site suggests that environmental conditions in The Wash remain relatively favourable for the species (Woodward *et al.,* 2019). The most recent number of Oystercatchers recorded in 2024/25 was 23,950 (Frost *et al.,* 2026); the highest number since 2020/21, indicating a recovery trajectory to baseline levels.

Given the recently recorded positive population trends for Oystercatcher, it was considered appropriate that "*unfavourable recovering*" status was used for this species where conducting the risk assessment which resulted in the following disturbance risk results (Table 7).

[35] Designated Sites View

Table 7. Overview of the Oystercatcher usage at each cockle bed area (blue – no risk, orange = medium risk,).

Cockle bed area	Risk to Oystercatcher
Friskney + EXT	
Wrangle + EXT	
Butterwick + EXT	
Roger	
Black Buoy	
Herring Hill	
Mare Tail	
Gat	
Holbeach	
IWMK	
Breast	
Thief	
Daseleys	
Outer Ferrier	
Hunstanton	

The 2019-20 CEH low tide count spatial data indicates that Oystercatcher usage (at the time of the survey) across the Wash is evenly spread throughout the intertidal areas, with very few of these areas supporting particularly high numbers in any one place (Figure 3). The assessment identified Oystercatcher to be at no risk from visual disturbance on fourteen of the fifteen beds considered due to low proportions of the population from utilising medium and high stock areas and an unfavourable but recovering population status. Mare Tail was the only bed identified where Oystercatcher was assessed to be at a medium risk due to an overlap of 8.5% (2,482 individuals) with high and medium cockle areas and is considered in more detail below.

It should be noted that total number of individuals using a specific bird count area overlapping with a high/medium cockle area are used in the assessment, meaning the total counts are likely to be an overestimate and activities that occur in these areas would be unlikely to displace all birds that utilise a specific feeding area.

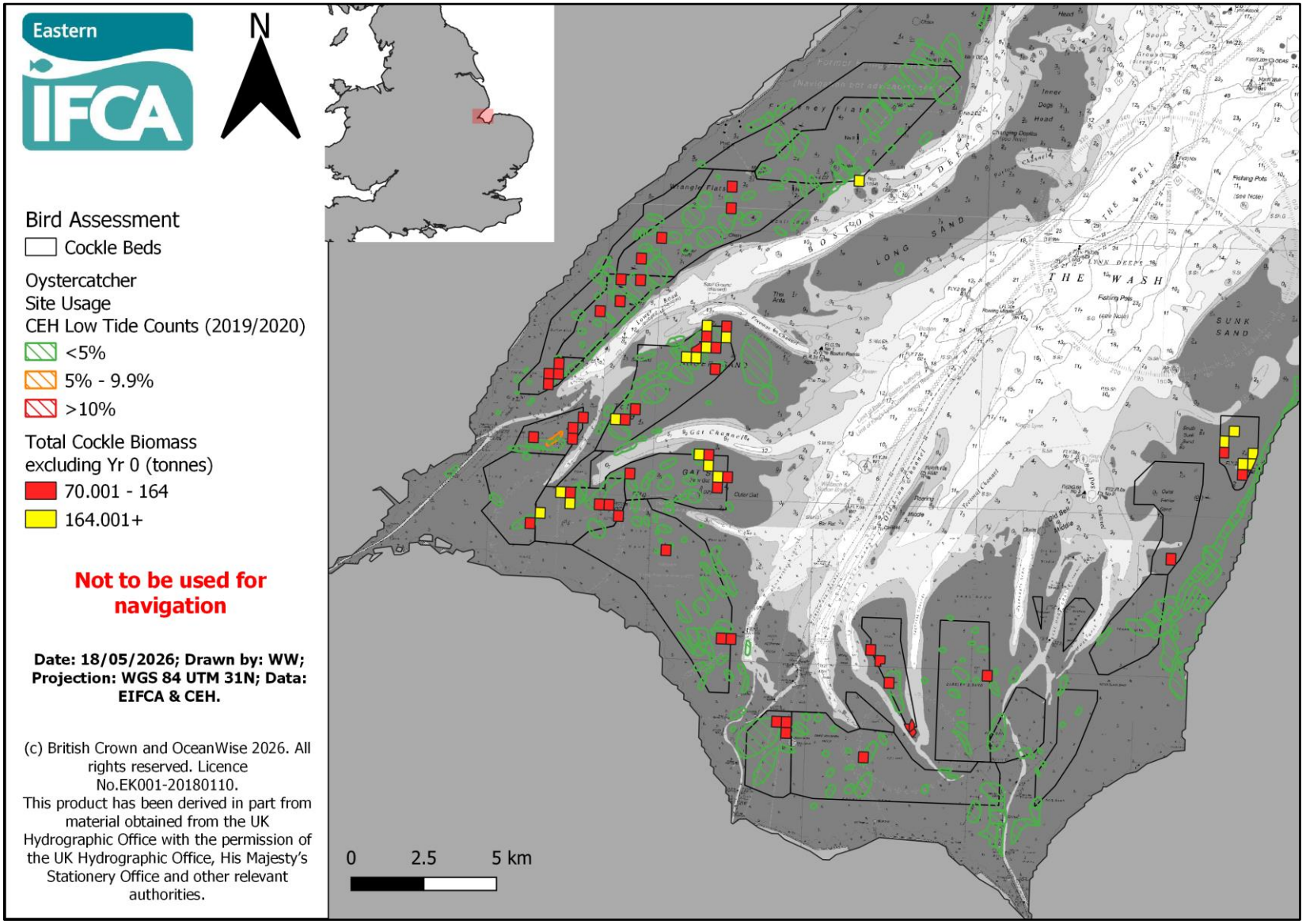


Figure 3: Chart showing fishable cockle densities (high = yellow and medium = red) in relation to Oystercatcher usage (low = green, medium = orange and high = red).

Analysis of Oystercatcher usage areas that overlap with fishable tonnages of cockles on Mare Tail indicate medium usage across the high and medium cockle stocks (2,482 individuals, 8.5% of the total population) (Figure 4). Within the bed there are five medium and high tonnage cockle patches that overlap with bird count areas. The most highly utilised area had a count of 1,320 individuals, which amounts to 4.52% of the total population and partially overlaps with two high tonnage cockle patches and overlaps with the majority of one medium tonnage cockle patch. The next highest usage area recorded a count of 927 individuals, representing 3.17% of the total population, and is similarly likely to be targeted by the cockle fishery as it overlaps with a single medium tonnage patch. The lowest count area overlaps with a very small proportion of a high tonnage cockle patch which lies on the western boundary of the Mare Tail bed, accounting for 0.80% of the population (236 individuals).

Given the availability of fishable stocks on Mare Tail and adjacent beds and the low levels of overlap between Oystercatcher feeding areas and medium and high cockle tonnage patches, combined with the numerous alternative feedings areas for Oystercatcher within the vicinity and the wider Wash, it is concluded that adverse effect from visual disturbance to this species can be ruled out.

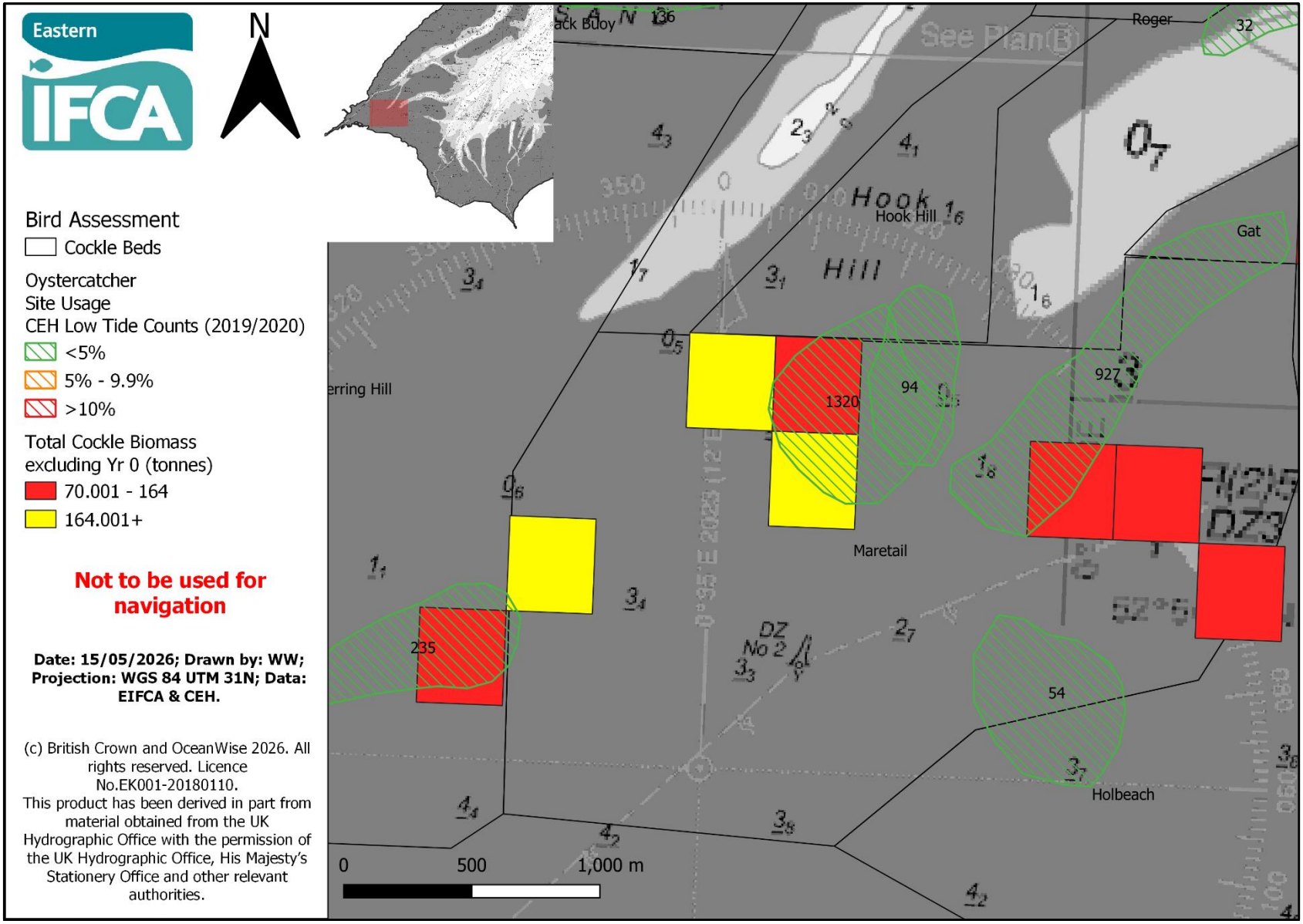


Figure 4: Close-up of the low-usage Oystercatcher areas that overlap with areas of fishable cockles on the Mare Tail intertidal bed.

Shelduck

Shelduck are deemed to be in "*unfavourable declining*" condition, with a "restore" target of 16,000 individuals. The 5-year mean peak average for the years 2020/21 – 2024/25 recorded 3,065 individuals in The Wash, and the 2024/25 count recorded 2,445 individuals. Shelduck numbers in the Wash have fluctuated over the past five years with numbers ranging between 1,335 (2022/23) and 3,065 (2023/24).

The WeBS reports indicate that Shelduck declines in The Wash are matching that of the region and countrywide trends (Frost et al., 2026), which suggest they reflect a shift in the distribution of the Shelduck towards the Netherlands in response to milder winters in the UK rather than localised impacts (Green *et al*., 2019). Additionally, it should be noted that cockles are not Shelducks primary food source, therefore, this species does not rely on being in or adjacent to cockle beds to feed. The preferred feeding areas of Shelduck are mussel beds, which are separate to cockle beds and are not targeted by the fishery.

As reflected within Natural England's latest condition assessment for this species, the "*unfavourable declining*" status was used to inform the disturbance risk assessment which resulted in the risks detailed in Table 8.

Table 8: Overview of the Shelduck usage at each cockle bed area (blue = no risk, orange = medium risk, red = high risk).

Cockle bed area	Risk to Oystercatcher
Friskney + EXT	
Wrangle + EXT	
Butterwick + EXT	
Roger	
Black Buoy	
Herring Hill	
Mare Tail	
Gat	
Holbeach	
IWMK	
Breast	
Thief	
Daseleys	
Outer Ferrier	
Hunstanton	

The 2019-20 CEH low tide count spatial data indicates that Shelduck usage of the Wash is evenly spread throughout the inner intertidal areas, with only three areas supporting medium sized populations (Figure 5). The assessment identified Shelduck as being at no risk from visual disturbance on thirteen of the fifteen beds considered. Shelduck were assessed as being at high and medium risk on two beds: Herring Hill and Breast, respectively. Overlap with the medium and high cockle tonnage patches is limited to these two beds, with all remaining areas showing no overlap.

Likely fishing areas overlap only slightly with Shelduck count areas, yet the total count area and number of Shelduck per area were used in the assessment, meaning the total counts are likely to be an overestimate and activities that occur in these areas would be unlikely to displace all birds that utilise a specific feeding area.

The high and medium risk beds (Herring Hill and Breast) are considered in more detail below.

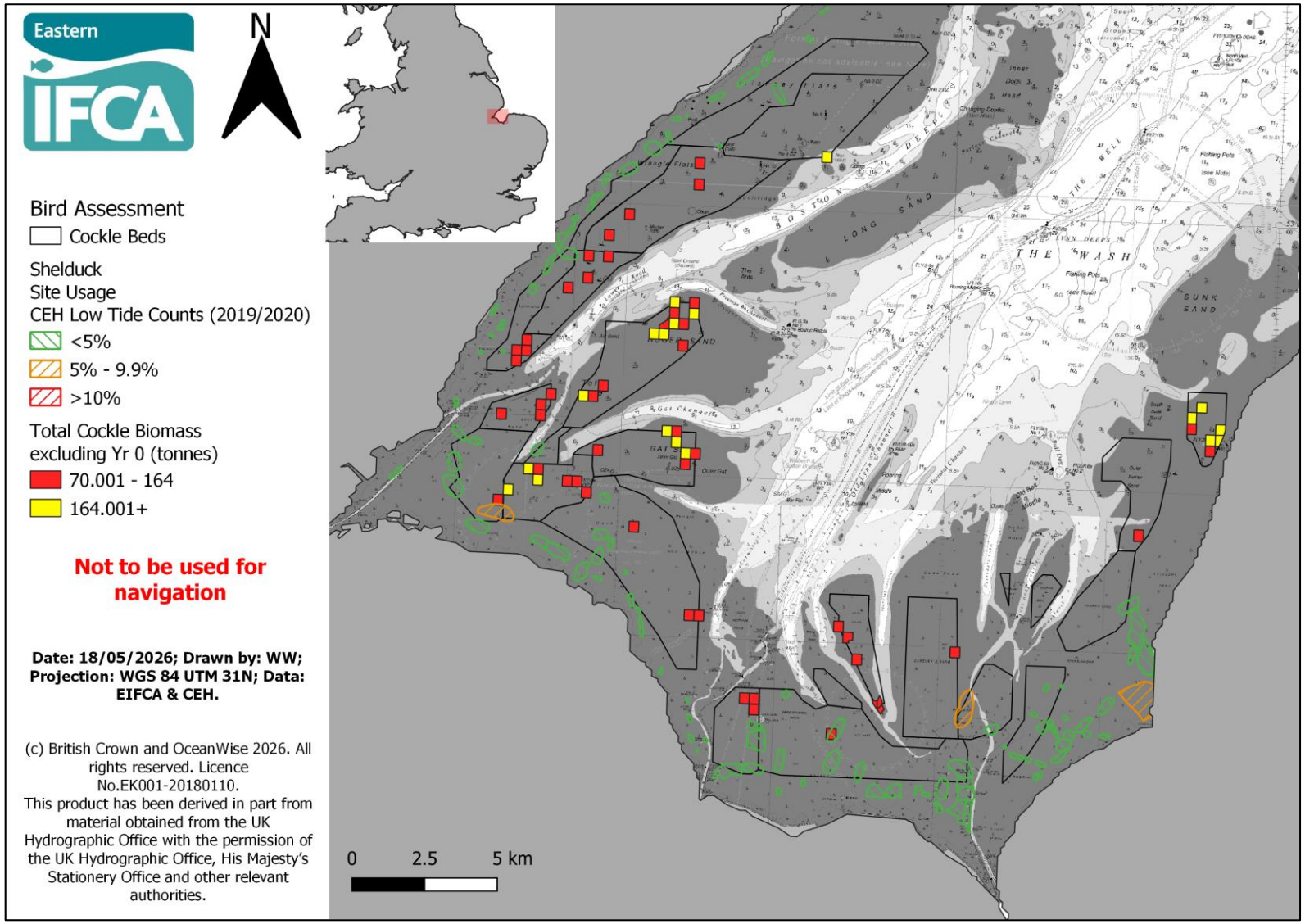


Figure 5: Chart showing fishable cockle densities (high = yellow, medium = red) in relation to Shelduck usage (low = green, medium = orange, and high = red).

On Herring Hill cockle bed a medium usage area has a slight overlap with the southern edge of a medium tonnage cockle area, representing 7.72% (432 individuals) of the population (Figure 6). Although this accounts for <10% of the total population, the "*unfavourable declining*" status for this species has upgraded the risk level from low/medium to high.

Within the Herring Hill bed, there are no other medium and high tonnage cockle beds that could be potentially targeted by the fishery. However, this bed is unlikely to be fished intensely due to the presence of more high density cockle areas located on other beds such as Roger, Hunstanton and the Gat beds, further reducing the risk of disturbance of Shelduck in this area. Additionally, the medium tonnage area on Herring Hill appears to be located high up, which may reduce its accessibility during certain tidal ranges. Due to Shelducks preference for other food sources and the marginal overlap with this cockle area, visual disturbance from the fishery is unlikely to be significant and adverse effect can be ruled out.

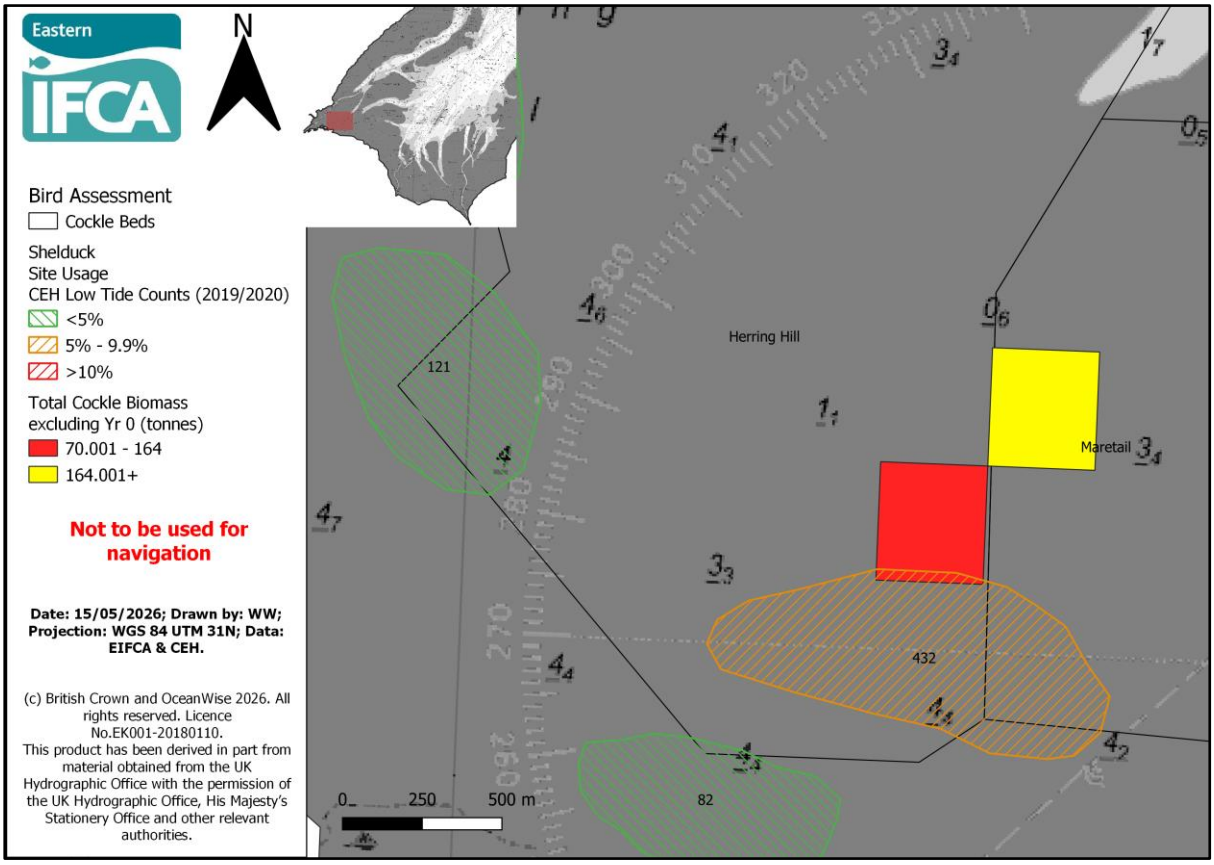


Figure 6: Close-up of the medium-usage Shelduck area that is overlapping with an area of fishable cockles on the Herring Hill intertidal bed.

On the Breast intertidal cockle bed a low usage Shelduck area overlaps with the majority of a medium tonnage cockle area (Figure 7). The Shelduck count area, supported 55 individuals (0.98% of the total population) at the time of the survey, accounting for <1% of the total population. The "*unfavourable declining*" status for this species meant the risk level of medium was assigned. Similarly to Herring Hill, there are no other medium or high tonnage cockle areas located on the Breast bed that are

likely to be targeted by the fishery. In addition, there are no other high or medium cockle tonnage patches located adjacent or nearby, which is unlikely to attract significant interest from fishery. Other beds with higher tonnage cockle areas (Roger, Hunstanton and Gat) are present elsewhere, which will likely experience more fishing activity. Further, Shelduck are not reliant on cockles as a primary food source, resulting in the conclusion that an adverse effect from visual disturbance from the fishery can be ruled out on the Breast for the Shelduck population.

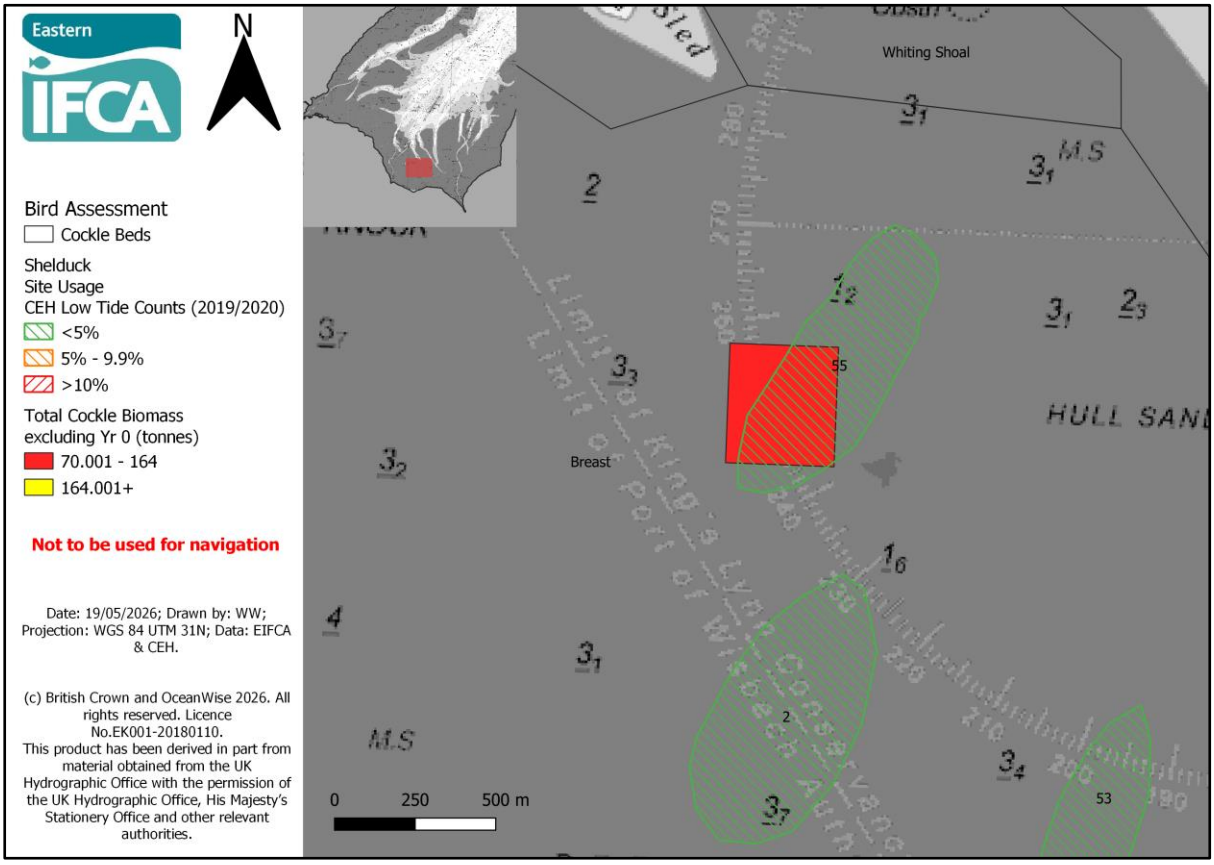


Figure 7: Close-up of the low-usage Shelduck area that is overlapping with an area of fishable cockles on the Breast intertidal bed.

The assessment indicates that there is negligible potential for significant disturbance to Shelduck by the cockle fishery. Therefore, it is concluded that the potential for visual disturbance caused by the fishery to impact the Shelduck population is minimal and an adverse effect can be ruled out.

Conclusion

To ensure no adverse effect on bird populations consideration has been made of the above data and assessment alongside management measures and rationale already discussed in the HRA:

- The fishery takes place on a limited number of days over a tidal cycle (most sands are only sufficiently exposed to support fishing on spring tides, is only

typically open on average 15 days per month) and the activity is predominantly carried out during daylight hours. Therefore, the potential for disturbance does not exist for every low tide period. In addition, “rest periods” will be worked into the fishing patterns, based on tidal patterns.

- The limited daily quota ensures that the fishery is a low intensity activity, and the quiet and slow nature of the hand work fishery means that it is not likely to cause any significant non-physical disturbance effects to the SPA interest species. This is supported by reliable anecdotal evidence which has shown birds (and seals) habituate to the presence of fishing vessels and fishermen engaged in hand working activities on intertidal sands.

- The peak fishing season generally occurs between June and September with the level of activity declining after September into the winter months when birds are at a higher risk as have increased food requirements. In addition, Eastern IFCA will temporarily close the fishery to eliminate disturbance risk if there is a period of severe winter weather.

- Eastern IFCA closes areas of high density spat (juvenile) cockle, as identified in the spring cockle surveys prior to each fishery. Therefore, bird species that prey on spat cockle should not be affected by fishing effort. A caveat of the annual cockle surveys is that stations are ~400m apart and thus areas of spat cockle could be present between stations and unprotected by closures. However, Eastern IFCA maintain regular communications with fishers during the cockle fishery and if additional areas of high density spat are confirmed, more closures could be implemented.[36]

For all designated SPA species, it is concluded that there is no significant risk of adverse effect on the Wash populations. It should be noted that this is considered a precautionary assessment because of the unfavourable declining status of some of the populations.

[36] It should be noted that on occasions such closures could be opened if high atypical mortality or ridging out is observed

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