Horseshoe Point Cockle Stock Assessment

August 2025

Eastern IFCA Research Report

Ella Constable

Contents

Figures

Introduction

When Sea Fisheries Committees transformed into Inshore Fisheries and Conservation Authorities (IFCAs) in 2011, Eastern IFCA gained a small section of the Lincolnshire coast, formerly under the jurisdiction of North Eastern Sea Fisheries Committee (NESFC). This area, which incorporates the coast between Donna Nook and Haile Sand fort included a small cockle (*Cerastoderma edule*) bed at Horseshoe Point. For survey and reporting purposes, this bed has been divided into three component beds: Horseshoe Point, Grainsthorpe Haven West and Grainsthorpe Haven East (Figure 1).

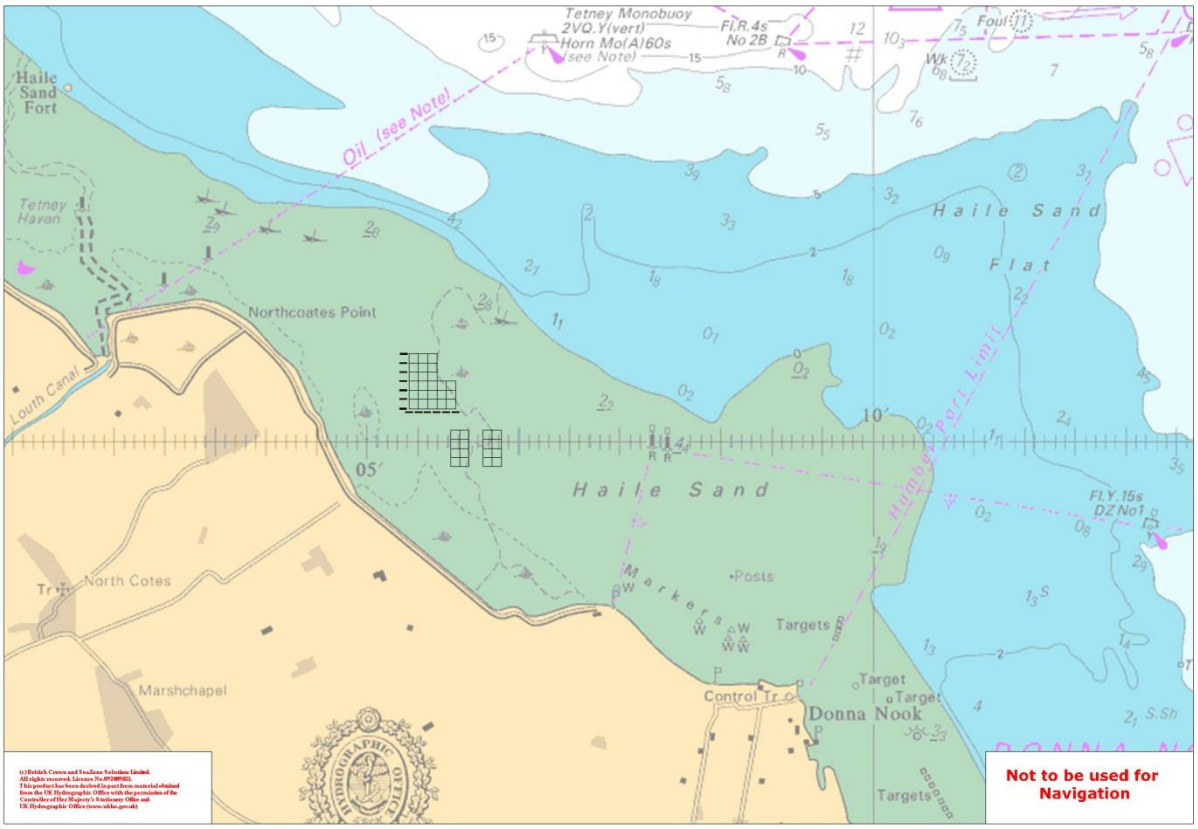

Figure 1: Location of Horseshoe Point cockle beds (Horseshoe Point, Grainsthorpe Haven West and Grainsthorpe Haven East) on Haile Sand.

Historically, these beds supported small but valuable fisheries, attracting fishermen from Boston and King's Lynn in addition to local hand-gatherers. On occasions, transient fishers have also exploited the stocks from further afield, some travelling from as far away as Wales and the west coast. Annual landings from this fishery have exceeded 700 tonnes, however, the stocks in the area are by no means consistent (MacDonald, 2008).

Management of these beds is conducted under NESFC Byelaw XXIV (Humber Estuary Cockle Fishery Byelaw), which was adopted by Eastern IFCA in 2011 during the transition from Eastern Sea Fisheries Joint Committee (ESFJC). This byelaw restricts cockle fishing on these beds to hand gathering between the months of September and April. Permit holders may harvest a maximum of 500 kg of cockle per day (otherwise 5 kg/day for non-permit holders).

In 1996, NESFC commenced bi-annual surveys to estimate the weight of commercial sized stock in the beds. In 2000, it was estimated that there were >400 tonnes of commercially available cockles within the Horseshoe Point beds. Stock, however, declined to 60 - 90 tonnes by 2003 (NESFC, 2004). In the spring of 2004 fishable stock was estimated at just 9 tonnes, but in the autumn the same year a stock of 226 tonnes was recorded. NESFC attributed this discrepancy in the figures to a change in survey method and the ephemeral nature of the bed rather than a dramatic increase in stock. By the autumn of the following year the stocks declined back to 85 tonnes, and to 51 tonnes by autumn, 2006 (NESFC, 2005; NESFC, 2006).

Eastern IFCA have conducted thirteen stock surveys to date (January and August 2011, January 2012, February and August 2013, August 2014, July 2015, July 2016, July 2017, August 2018, July 2019, May 2023 and July 2024) (Jessop *et al*., 2011; Jessop *et al*., 2012; Strigner, 2014; Jessop, 2015; Jessop, 2016; Quinn and Jessop, 2017; Quinn, 2018; Jessop, 2023; Constable, 2024). These surveys have shown a fluctuation in stocks similar to those that were recorded previously by NESFC. Between 2010 and 2012 moderate spatfalls were recorded, but most of these cockles died during the following summer before reaching 16mm minimum landing size[1], producing stocks that varied between 12 and 105 tonnes. Another moderate settlement in 2013 fared better and their survival resulted in a stock of 928 tonnes by August 2014. Eastern-IFCA planned to open these stocks in March 2015 but several issues (including obtaining water classification and access to the beds) prevented the fishery from being opened before these cockles died. Following this peak in stock biomass, there was a good settlement in 2017 that resulted in a stock of 417 tonnes in 2018, but this had died by the following summer, replaced by 90 tonnes from the 2018 year-class cohort. The survey in 2023 estimated a stock of 441 tonnes. While this would have been sufficient stock to open a fishery, high mortality was seen on the beds the following month (June 2023). As this fishery faces other challenges that need to be overcome before the fishery can be opened (see Jessop, 2023), the rate of die-off suggested the majority of the stocks were likely to die before these could be met. Last year's survey estimated a drop in stock to 72.5 tonnes, with only 0.5 tonnes out of the total stock being adult stock. There had been a decent spatfall, however, with an estimated 39.05 tonnes of year-0 spat.

The survey data from 2010 onwards show the fluctuating stock levels are due a short longevity of the cockles at the site, which tend to suffer high mortalities within 12-18 months of settling. High numbers of unburied moribund cockles have also been observed during warm weather periods, which suggests the cockles at this site are suffering similar "atypical" mortality to that observed in The Wash since 2008 and the Burry Inlet since 2004. This was first noted by ESFJC officers in 2010, prior to taking over the management of the site in 2011 but the fluctuating stocks recorded prior to this by NESFC suggest it may have been occurring for longer. Cefas, who have been studying the mortalities in The Wash since 2021 and have attributed those die-offs to

[1]The Eastern IFCA Byelaw XXIV: Humber Estuary Cockles Fishery Byelaw defines the Minimum Landing Size for cockles at Horseshoe Point as: "*no person shall remove from the fishery any cockle which will pass through a gauge having a square aperture of 20 mm measured over each side of the square, except in accordance with the prior written authority of the Clerk*". This approximately equates to a 15.5 mm cockle, resulting in the use of a 16 mm minimum landing size for analysis of stock data.

a novel *Marteilia* parasite. Sampling at Horseshoe Point in 2023 revealed that the Marteilia parasite was present at the site.

Method

The survey was conducted on foot over the low water period on July 28th, 2025.

The sampling method used was consistent with previous surveys; collecting samples from a predetermined regular grid of sample stations, in which stations were approximately 100 metres apart. The same stations have been used since 2013 for these surveys. Prior to then the spatial extent of the surveys was slightly smaller but the stations were closer together. The Horseshoe Point bed consisted of 36 sampling stations, while Grainsthorpe Haven West and East consisted of 15 sampling stations each (see figures 2 and 3). However, some stations in the Grainsthorpe Haven East and West beds were not sampled due to encroachment of saltmarsh or because the stations were underwater. Hand-held GPS units were used to locate the position of the stations in the field.

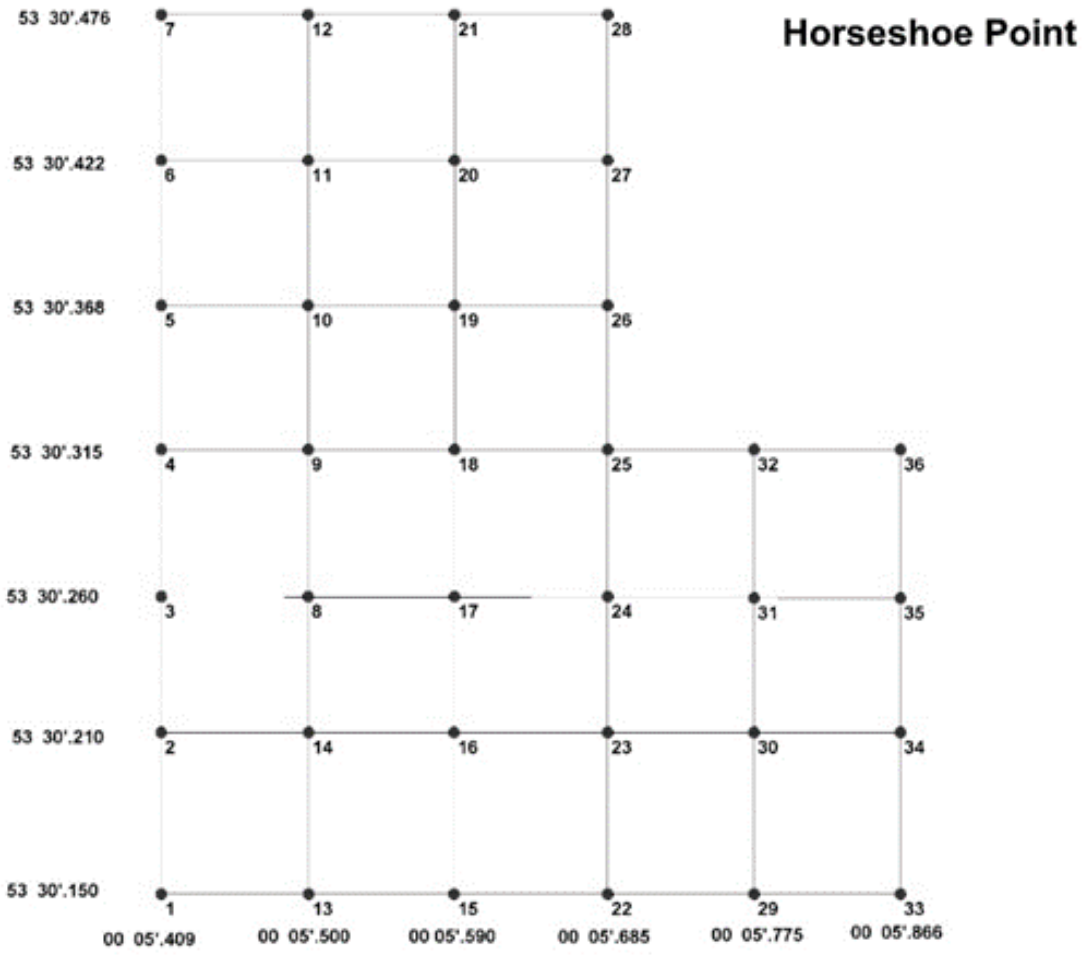

Figure 2 – Positions of sample stations surveyed at the Horseshoe Point bed

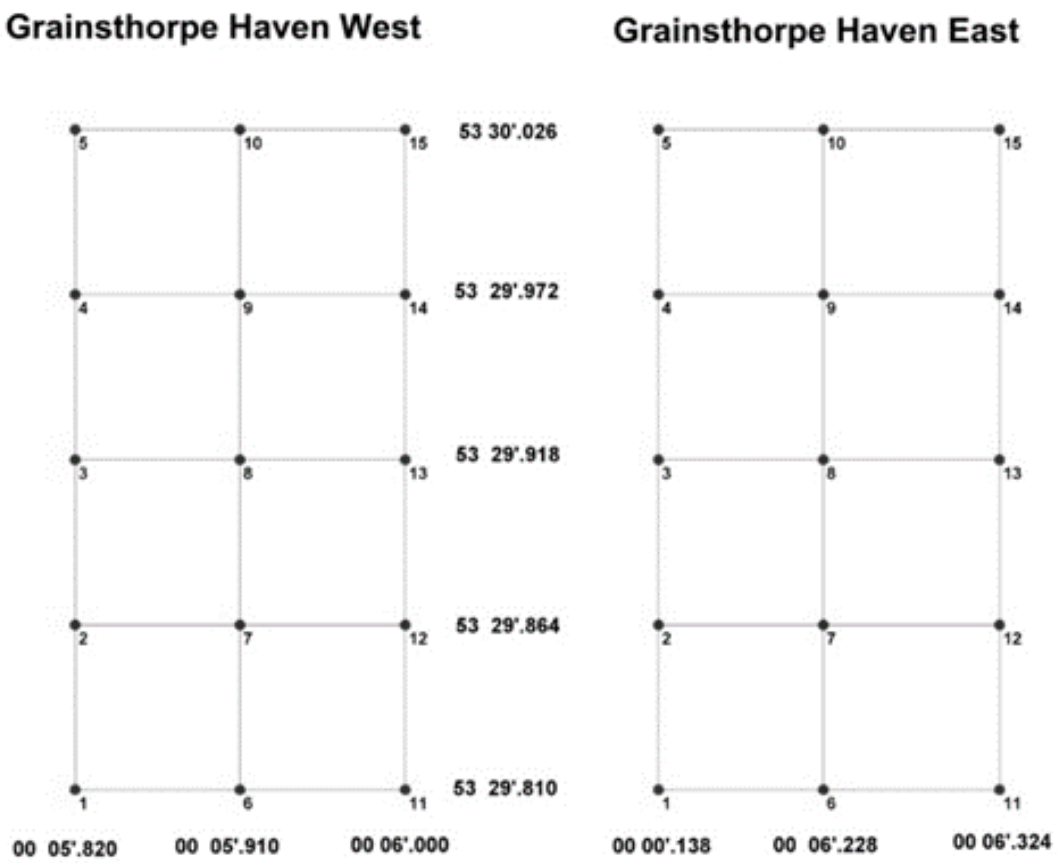

Figure 3 – Positions of sample stations surveyed at the Grainsthorpe beds

Samples were collected by sieving the sediment taken from 0.1 m^2 quadrats. All cockles found in the samples were washed and retained in bags, one per station. Each bag was labelled by bed name and station number.

Once ashore the retained cockles were measured by width to the nearest millimetre. These were divided into year-class groups that were further sub-divided into two size groups of ≥16 mm and <16 mm widths, differentiating those that had attained minimum landing size from those that had not. Each group was then weighed using electronic scales accurate to 0.01 g.

Data was entered into Microsoft Excel and transferred to MapInfo to produce interpolated density models around the data points. Separate layers were created to display the following cockle densities:

- 10 – 99 cockles/m^2
- 100 – 499 cockles/m^2
- 500 – 999 cockles/m^2
- ≥1,000 cockles/m^2

For the 10 - 99 cockles/m^2 layer, the borders of the polygon extended halfway between stations that supported cockles and those that didn't. For subsequent layers, consideration was given to densities at neighbouring stations when considering how

far borders extended. Separate layers were drawn to show the extent of ≥16 mm cockles and <16 mm cockles.

The 10 - 99 cockles/m^2 density layers were used to estimate the area of cockle coverage in each bed. Structured Query Language tools in MapInfo were used to determine the mean numbers of cockles present and mean cockle biomass at each station. The biomass of each group on each bed was determined by multiplying mean biomass by bed area.

Results

At the time of the survey, the cockle stocks on these beds were found to be:

- ≥16mm width – 106 tonnes
- <16mm width – 409 tonnes
- **Total stock – 515 tonnes**

More details of these results are summarised in tables1-3, while figures 4 and 5 show the distribution of the ≥16mm and <16mm width cockles on the three beds. Figure 6 shows the distribution of spat (Yr 0 cockles). It should be noted that spat is also counted in the <16 category.

Table 1: Summary of cockle stocks at Horseshoe Point bed on July 28th, 2025

Cockle Width (mm)	Bed Area (ha)	Mean Density (cockles m^{-2})	Mean Weight (t ha^{-1})	Stock biomass (t)
≥16	10.11	57	2.59	26.23
<16	27.68	926.1	12.61	349.10
Yr-0 Spat	22.86	363.91	0.99	22.54

Table 2: Summary of cockle stocks at the East Grainsthorpe bed on July 28th, 2025

Cockle Width (mm)	Bed Area (ha)	Mean Density (cockles m^{-2})	Mean Weight (t ha^{-1})	Stock biomass (t)
≥16	0.98	10	0.38	0.37
<16	6.48	200	3.65	23.62
Yr-0 Spat	2.75	36.67	0.28	0.77

Table 3: Summary of cockle stocks at the West Grainsthorpe bed on July 28th, 2025

Cockle Width (mm)	Bed Area (ha)	Mean Density (cockles m^{-2})	Mean Weight (t ha^{-1})	Stock biomass (t)
≥16	7.44	200	10.68	79.43
<16	6.37	300	5.69	36.26
Yr-0 Spat	6.21	148.33	0.54	3.33

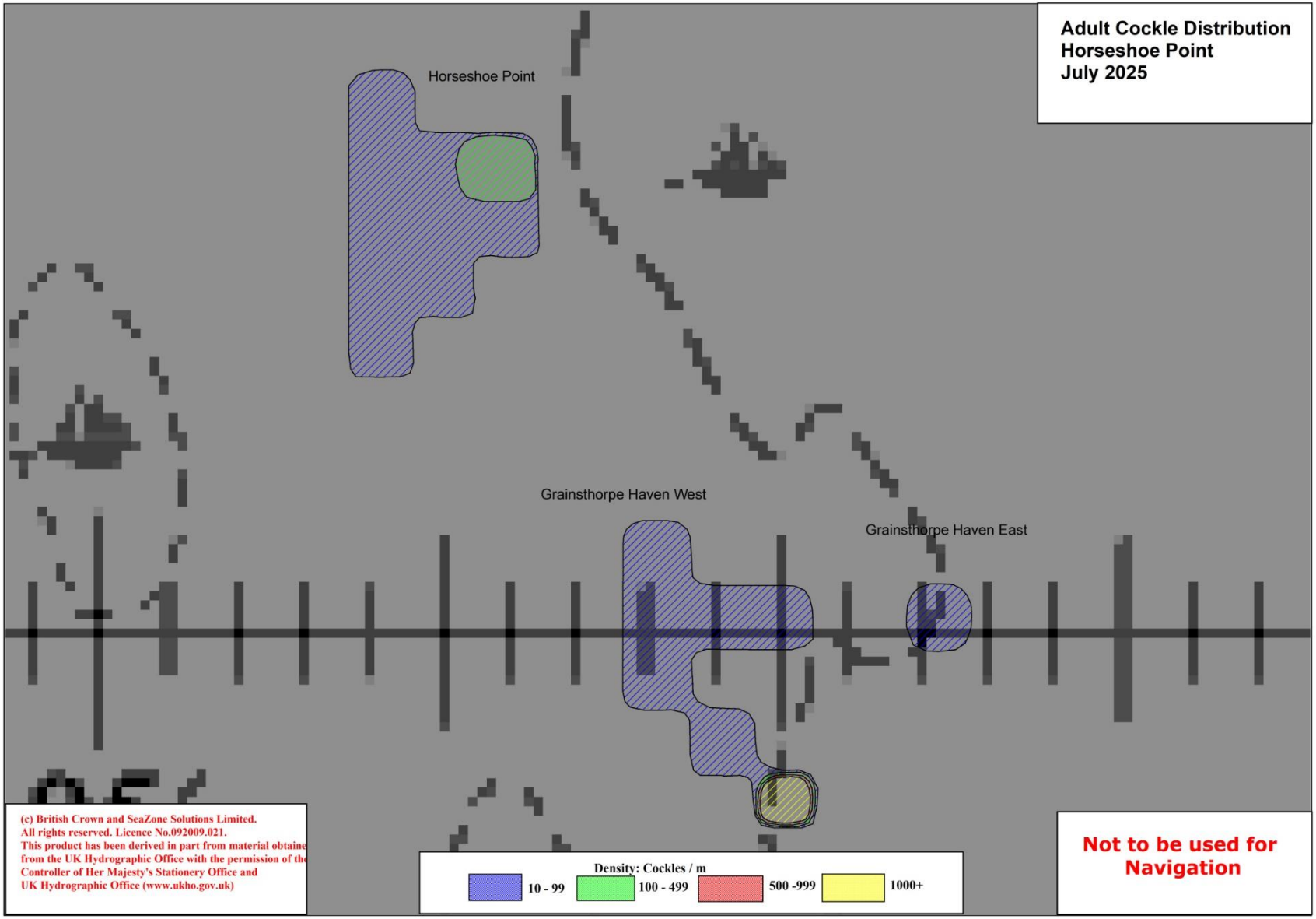

Figure 4 – Distribution of ≥16mm width cockles at the Horseshoe Point and Grainsthorpe beds – July 2025.

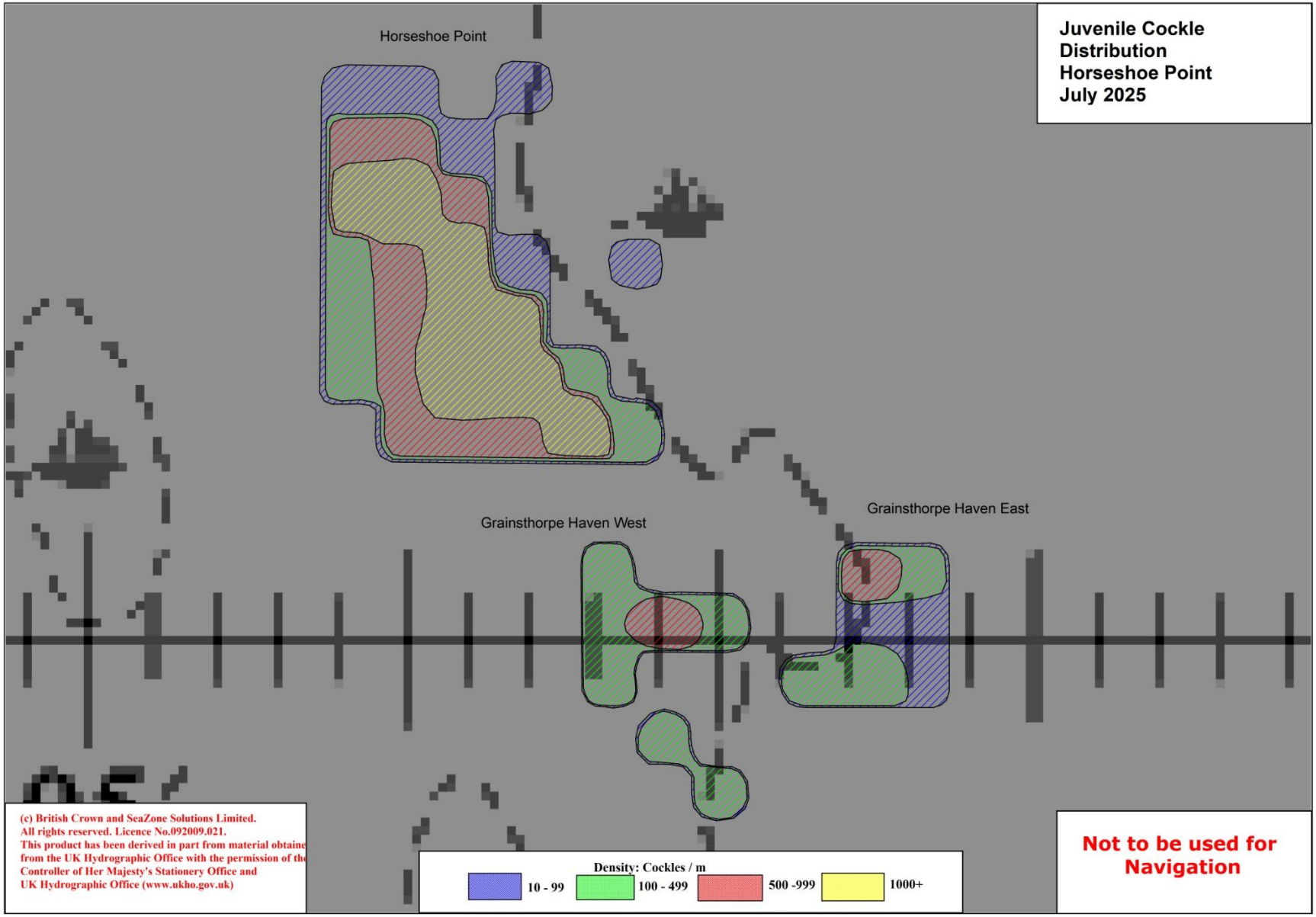

Figure 5 – Distribution of <16mm width cockles at the Horseshoe Point and Grainsthorpe beds – July 2025.

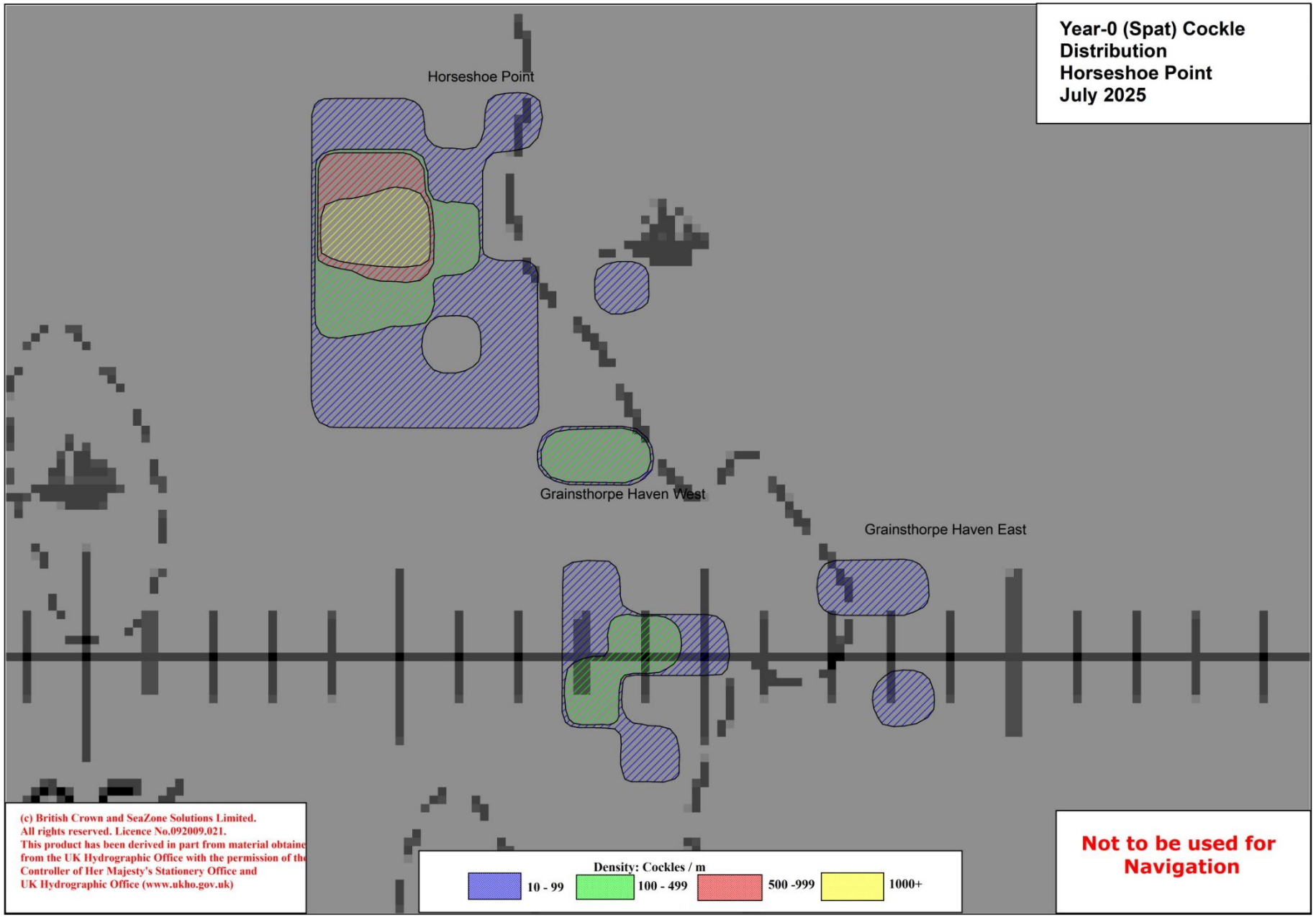

Figure 6 – Distribution of Year-0 cockles at the Horseshoe Point and Grainsthorpe beds – July 2025.

Figures 7 to 10 show the size and age frequencies of the cockles found on the three beds. Figure 11 shows the frequency of spat, <16mm and >16mm cockles compared to previous surveys. On the Horseshoe Point bed, year-1 cockles dominate the stock, accounting for 67.8% of the frequency and 93.99% of the biomass. The rest of the stock is year-0 spat. On this bed, there is a fairly even spread of widths, with year-0 cockles between 4-10mm and year-1 cockle between 8-18mm. Cockles greater than 16mm in width account for only 6.98% of the total biomass on this bed. Stocks on Grainsthorpe East are also dominated by individuals from the 2024 year-class cohort (year-1 cockles), accounting for 92.2% of the cockle frequency and 96.78% of the biomass. Year-0's were around 6mm (ranging from 5-7mm), while year-1s were around 12mm (ranging from 9-16mm). Only one cockle was found to be over 16mm on this bed. Grainsthorpe Haven West is also dominated by year-1 cockles, which account for 74.57% of the frequency and 97.11% of the biomass. The cockles on this bed are slightly larger than the other two, with year-0's around 7mm (ranging from 5-10mm) and year-1's around 16mm (ranging from 11-22mm). This bed has the highest density of over 16mm cockles, accounting for 68.6% of the biomass. These are mostly concentrated in one small area of Grainsthorpe Haven West (Figure 4). None of the samples on any of the three beds found any individuals older than the 2024 cohort.

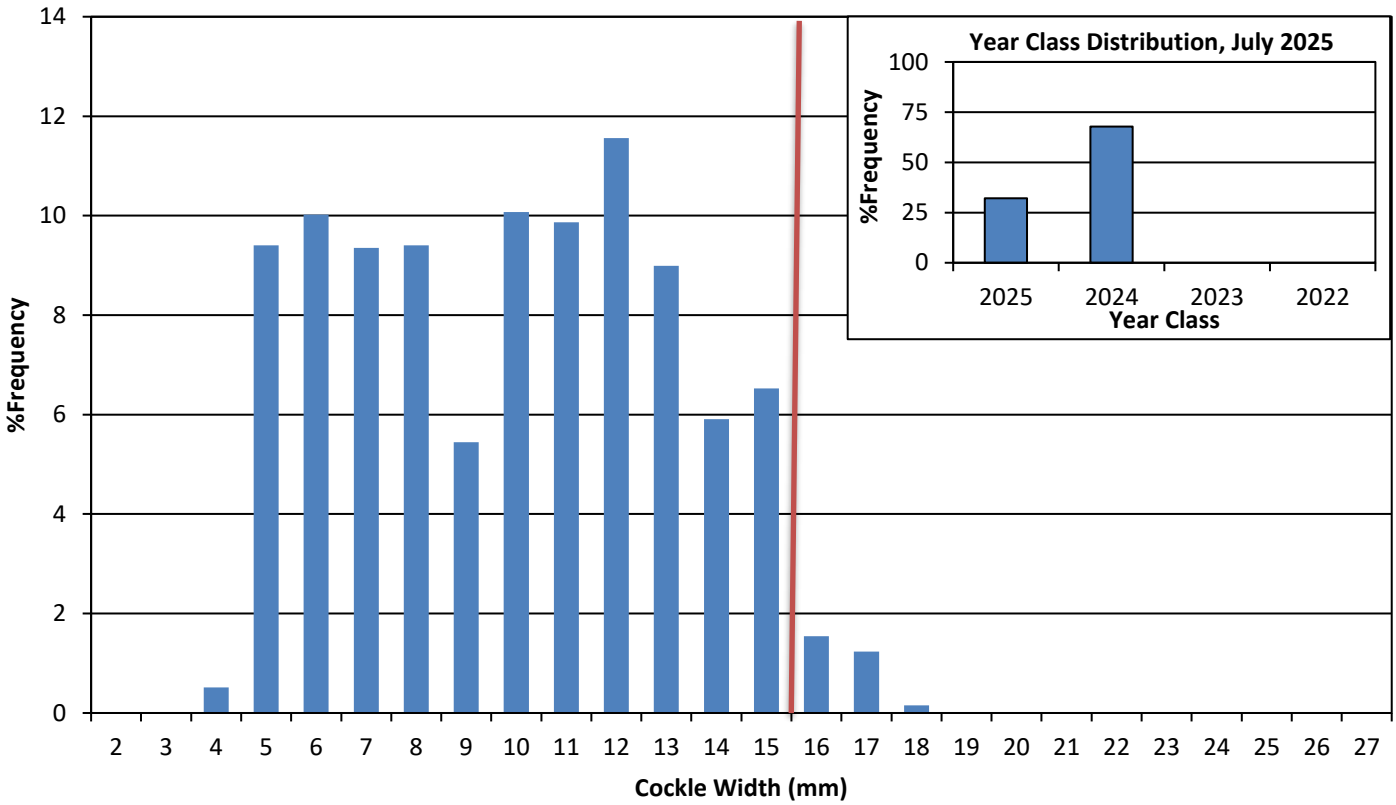

Figure 7 – Cockle size and age frequency on Horseshoe Point – July 2025

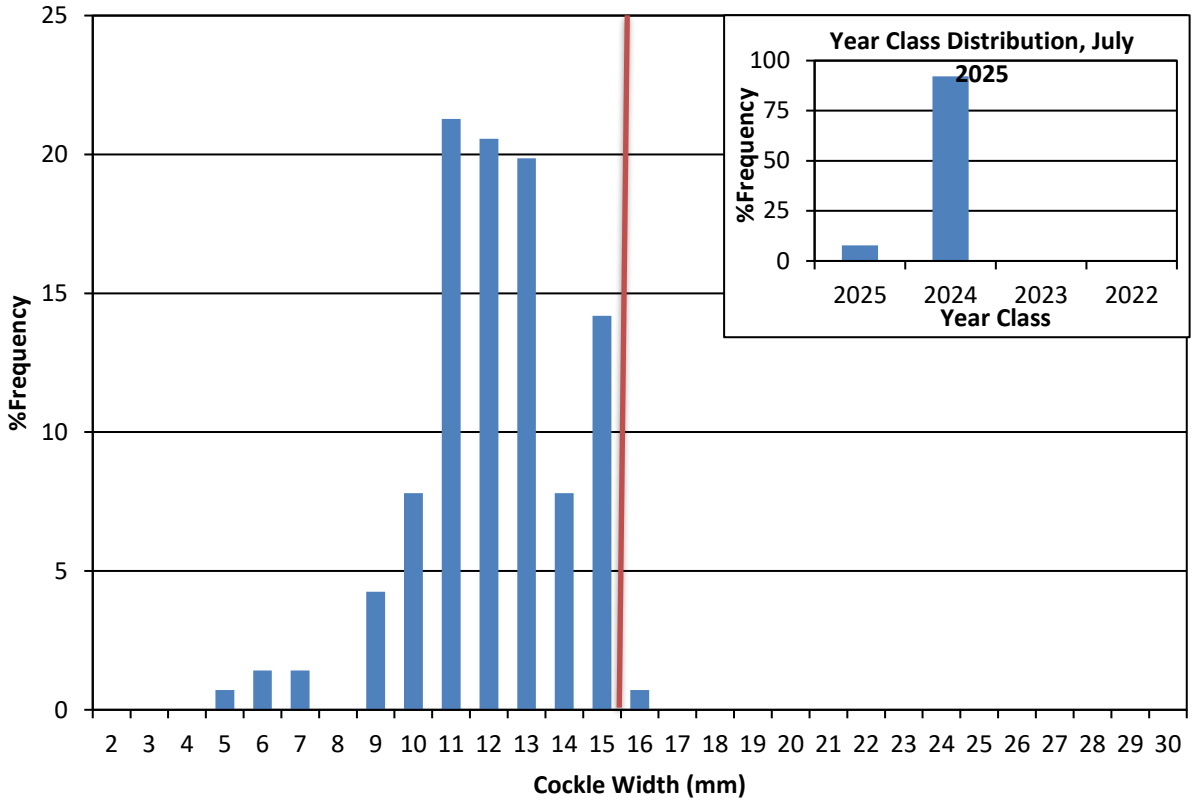

Figure 8 – Cockle size and age frequency on East Grainsthorpe – July 2025

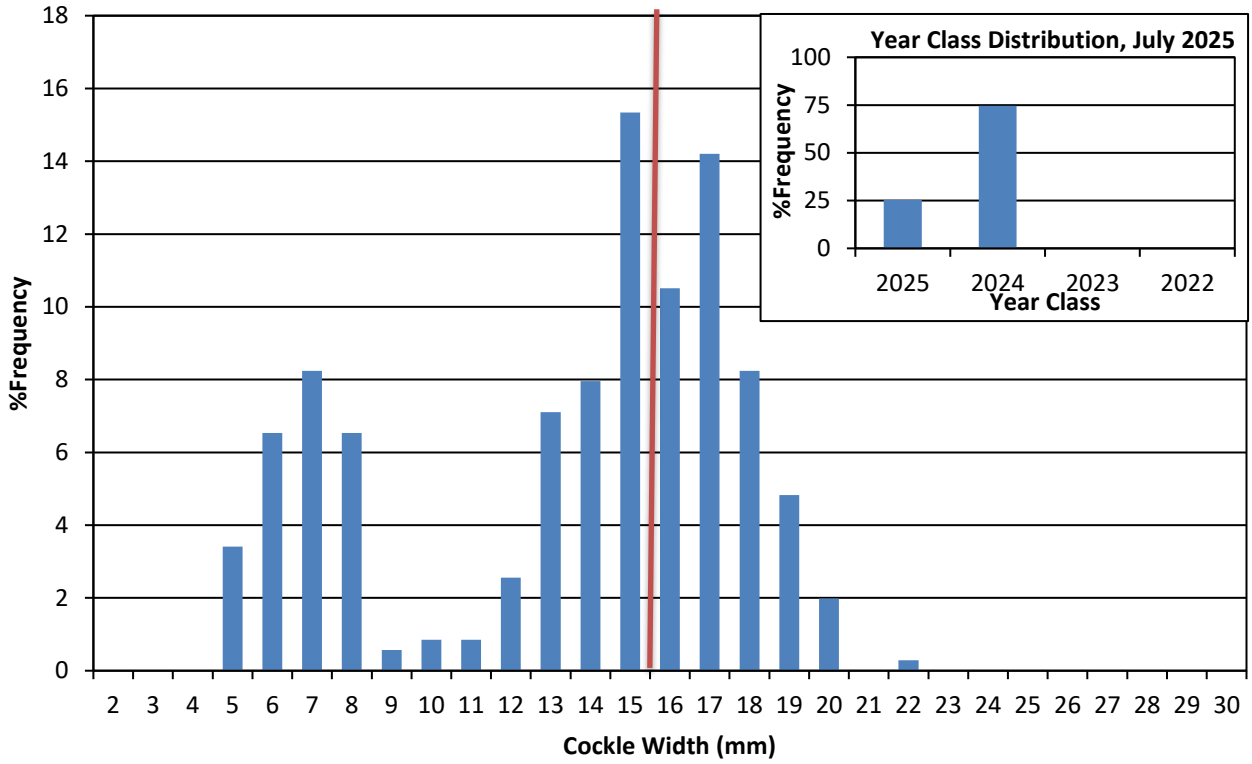

Figure 9 – Cockle size and age frequency on West Grainsthorpe – July 2025

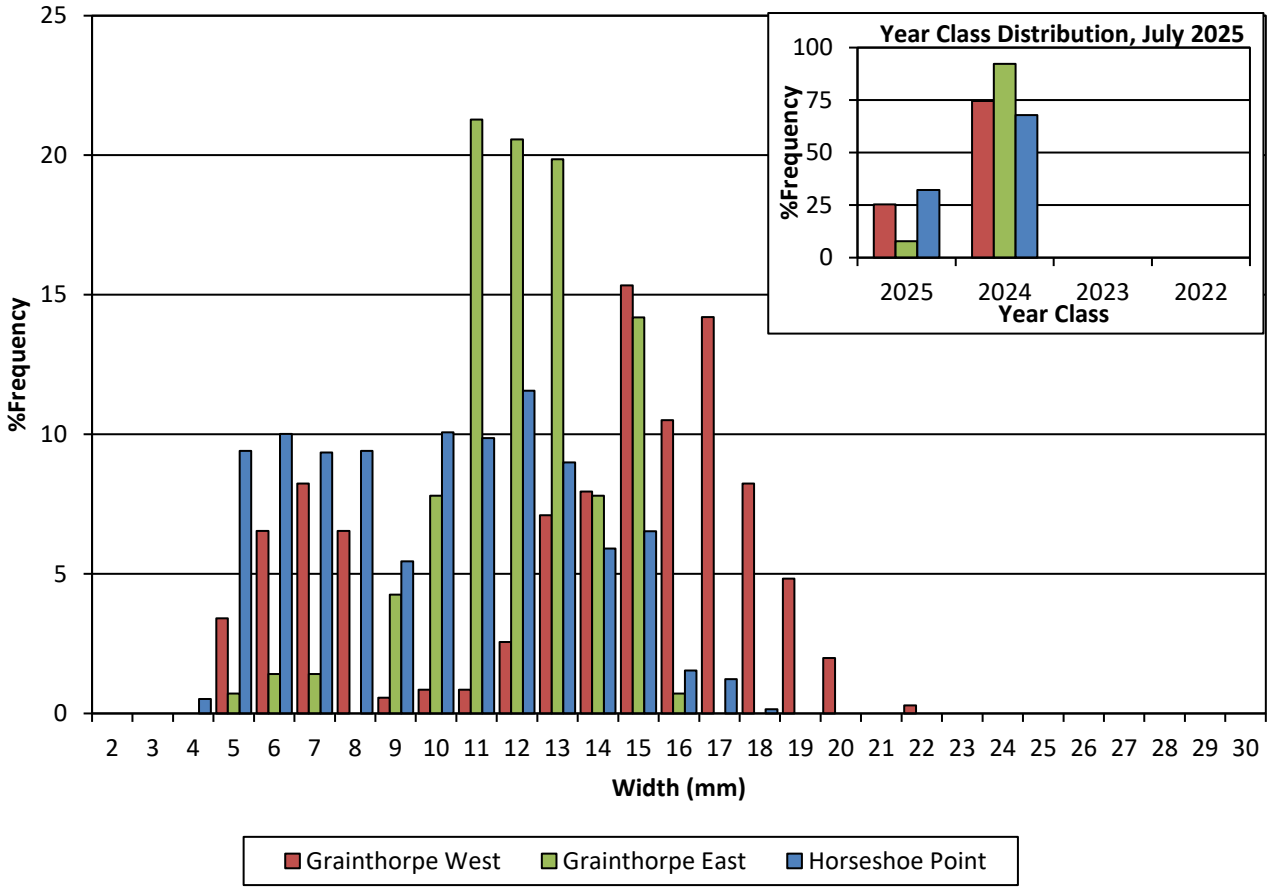

Figure 10 – Cockle size and age frequency comparing the beds at Horseshoe Point – July 2025

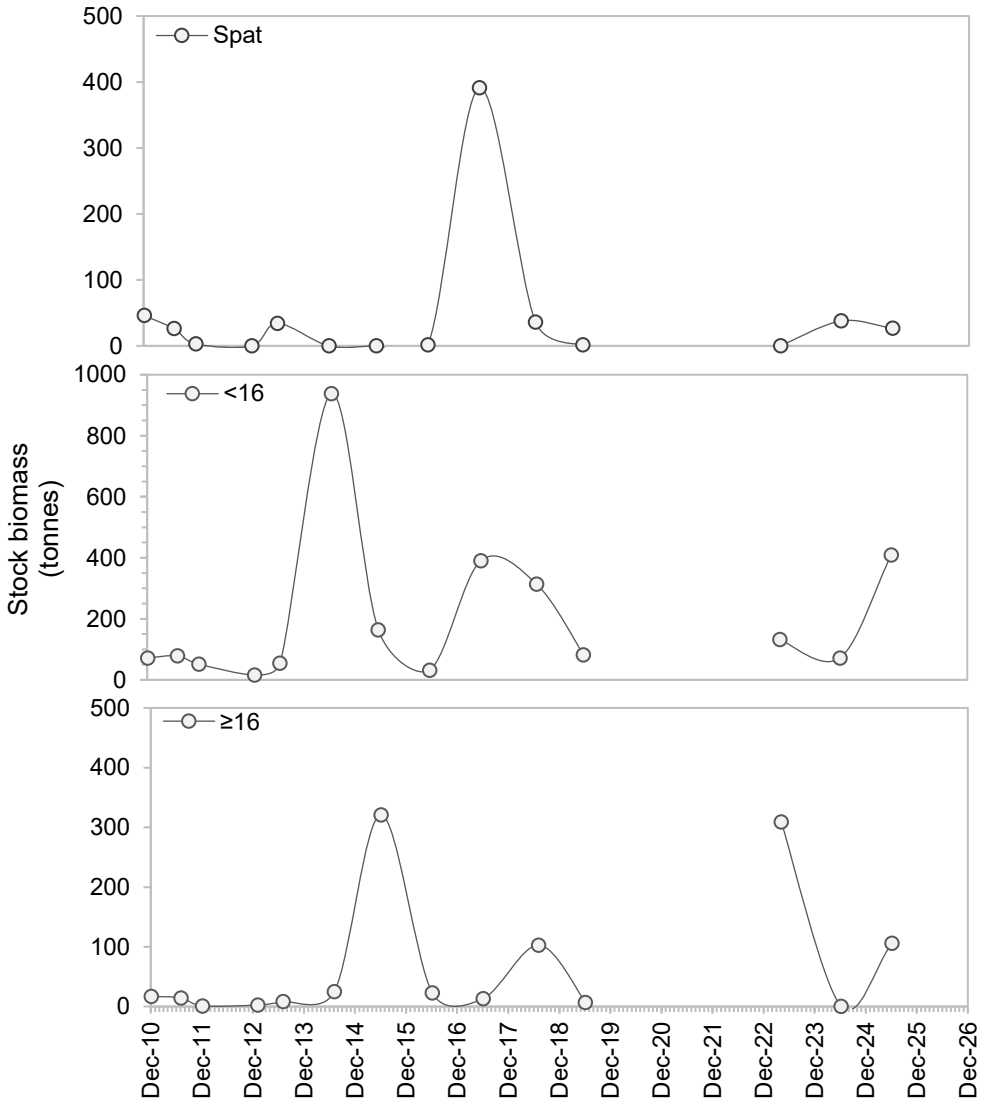

Figure 11 – Cockle stock biomass over the three beds at Horseshoe Point of each size class (top: Year-0 spat and <16 mm, bottom: ≥16 mm) from 2010 to 2025. Note the vertical axis scale for stock biomass differs between figures.

Discussion

Although historically the Horseshoe Point beds supported a regular, small-scale hand-worked cockle fishery, they have remained closed since 2002. Initially, these were closed by NESFC to facilitate the recovery of the then poor stock levels. Sufficient recovery did not occur until 2014, however, by which time the jurisdiction of the site had transferred to Eastern-IFCA. Figure 11 shows the stock biomass found on the beds during the surveys conducted between 2010 and 2025. This shows stocks remained low until 2014 when the abundance of <16mm width cockles peaked at over 900 tonnes. Although the majority of these were smaller than the minimum landing size, Eastern-IFCA planned to open the fishery as soon as the bulk of the stock

achieved the MLS. There were a number of difficulties that were encountered, however, that together prevented that fishery from being opened. Before these challenges could be overcome, the bulk of the fishable stock died. There was a further settlement that would have supported a small fishery in 2018, but the issues that had confounded the 2014-15 fishery had not been overcome in the interim, so this was not pursued. The 2023 survey also identified sufficient stocks for a fishery, but as high levels of mortality were witnessed on this bed in June 2023, it was concluded that the stocks would die before the challenges facing the fishery could be overcome and the fishery opened. The challenges associated with the fishery are explored in more detail in the Jessop, 2023 Horseshoe Point Cockle Survey Report. The survey in July 2024 revealed a juvenile dominant stock across the three beds, with only 0.5 tonnes of adult stock estimated. This is far under what would be required for a fishery to be opened, and even the spat biomass was low compared to historical peaks. This is in line with the high levels of mortality seen on this bed in previous years.

The recent survey in July 2025 showed that, while figures are still lower than historical peaks, there has been an increase in cockle biomass at Horseshoe Point. The stock is dominated by year-1 cockles indicating the survival of the spatfall seen in 2024. This 2024 cohort appears to have grown fairly rapidly in some areas, and the 2025 stock contains larger cockles than seen at the point of last year's survey. As shown in Figure 11, there has been an increase in biomass of both juvenile (<16mm) and adult (>16mm) stock. This is particularly noticeable for the adult stock, as in 2024 only one >16mm cockle was found. Despite this increase, the biomass is still relatively low compared to the peak seen in 2023 (Figure 11). The adult stock found in this survey was almost exclusively on Grainsthorpe Haven West bed, which appears to be faster growing than the other two beds. Some of the adult stock was on the Horseshoe Point bed, but this is much more spread out. No older age classes were found, indicating that last year's year-1 cockles have died off, which is in line with the atypical mortality previously seen at this site.

While not part of the official sampling, some observations were made during the survey. An area containing high density cockles on Grainsthorpe Haven West was observed that was between sample stations and therefore not captured. This area was mapped using a handheld GPS (figure 12), and is approximately 1.3 hectares. While no additional samples were able to be taken, observations were made that the cockles in the area were high density (>1000/m^2) and a similar size range to the other cockles sampled on the bed. As this area was not sampled, it cannot be incorporated into the stock assessment, however, it may mean that the stock on Grainsthorpes Haven West is a slight underestimation. This area should be noted for comparison in future years.

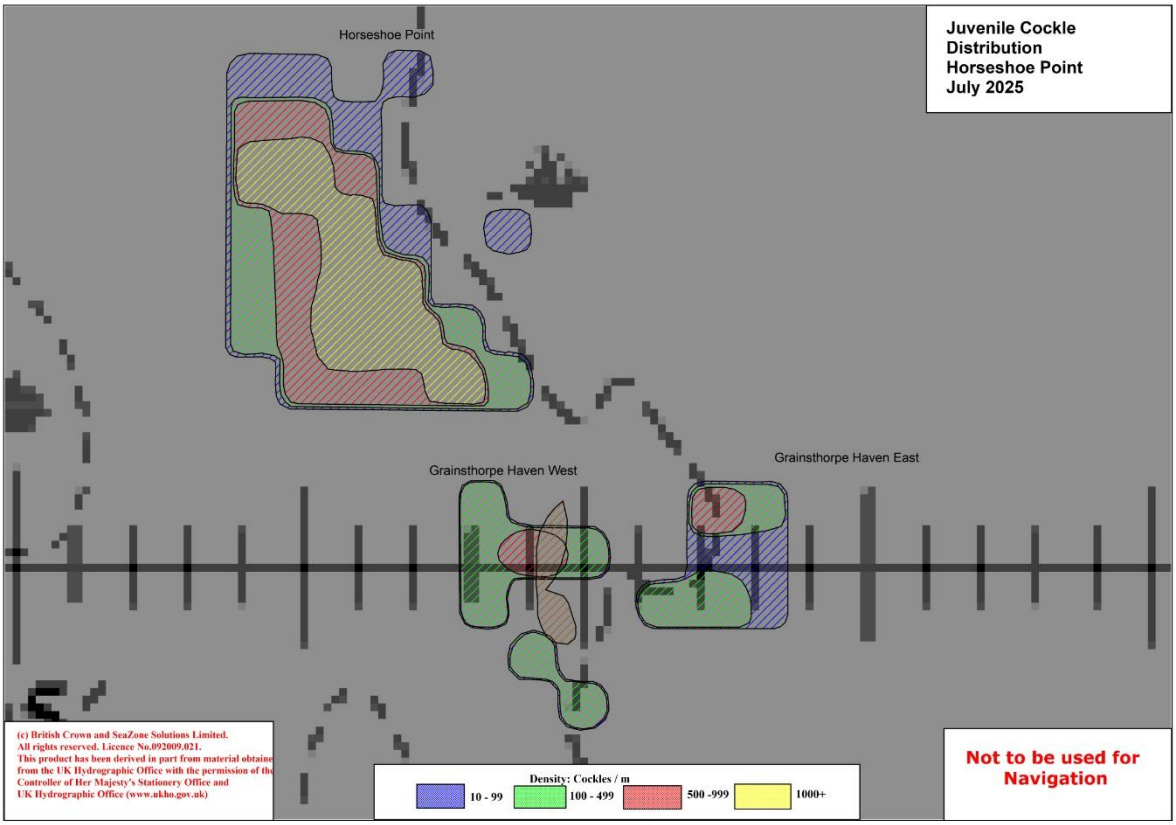

Figure 12: Distribution of <16mm width cockles at the Horseshoe Point and Grainsthorpe beds with the approximate area of high density cockles observed by RWJ (orange) – July 2025.

To conclude, whilst there is 106 tonnes of adult stock, the challenges associated with opening a fishery on these beds remain. Combined with the mortality rates seen on these beds in recent years, a fishery is unlikely to be possible.

References

Constable, E.R. 2024. Horseshoe Point Stock Assessment. Eastern IFCA Research Report 2024.

Jessop, R.W. 2015. Eastern IFCA Research Report - Horseshoe Point Stock Assessment 2015.

Jessop, R.W. 2016. Horseshoe Point Cockle Stock Assessment. Eastern IFCA Research Report 2016.

Jessop, R.W. 2023. Horseshoe Point Cockle Stock Assessment. Eastern IFCA Research Report 2023.

Jessop, R.W., Akesson, O., and Smith, L.M. 2012. Eastern IFCA Annual Research Report Research Report 2012.

Jessop, R.W. and Maxwell, E. 2011. Eastern IFCA Annual Research Report 2011.

Jessop, R.W., Strigner, R., Thompson, S. and Welby, P.R. 2013. Eastern IFCA Annual Research Report 2013.

MacDonald, M. 2008. Pilot Shellfish Fisheries Strategic Environmental Assessment. Environmental Report. North Eastern Sea Fisheries Committee.

NESFC, 2004. Fisheries and Environmental Monitoring Summary Report 2003/2004. North Eastern Sea Fisheries Committee.

NESFC, 2005. Cockle Final Report 2005. North Eastern Sea Fisheries Committee.

NESFC, 2006. Cockle Final Report 2006. North Eastern Sea Fisheries Committee.

Quinn, E.S. 2018. Horseshoe Point Cockle Stock Assessment. Eastern IFCA Research Report 2018.

Quinn, E.S. and Jessop, R.W. 2017. Horseshoe Point Cockle Stock Assessment. Eastern IFCA Research Report 2017.

Strigner, R. 2014. Horseshoe Point Cockle Stock Assessment. Eastern IFCA Research Report 2014.