2024 Wash intertidal cockle survey report

The 2024 Wash intertidal cockle surveys were conducted between March 23rd and April 25th, which is consistent with previous surveys. During the course of the surveys 1,052 stations were sampled from a total of 24 survey areas. Figure 1 shows the extent of the stations surveyed.

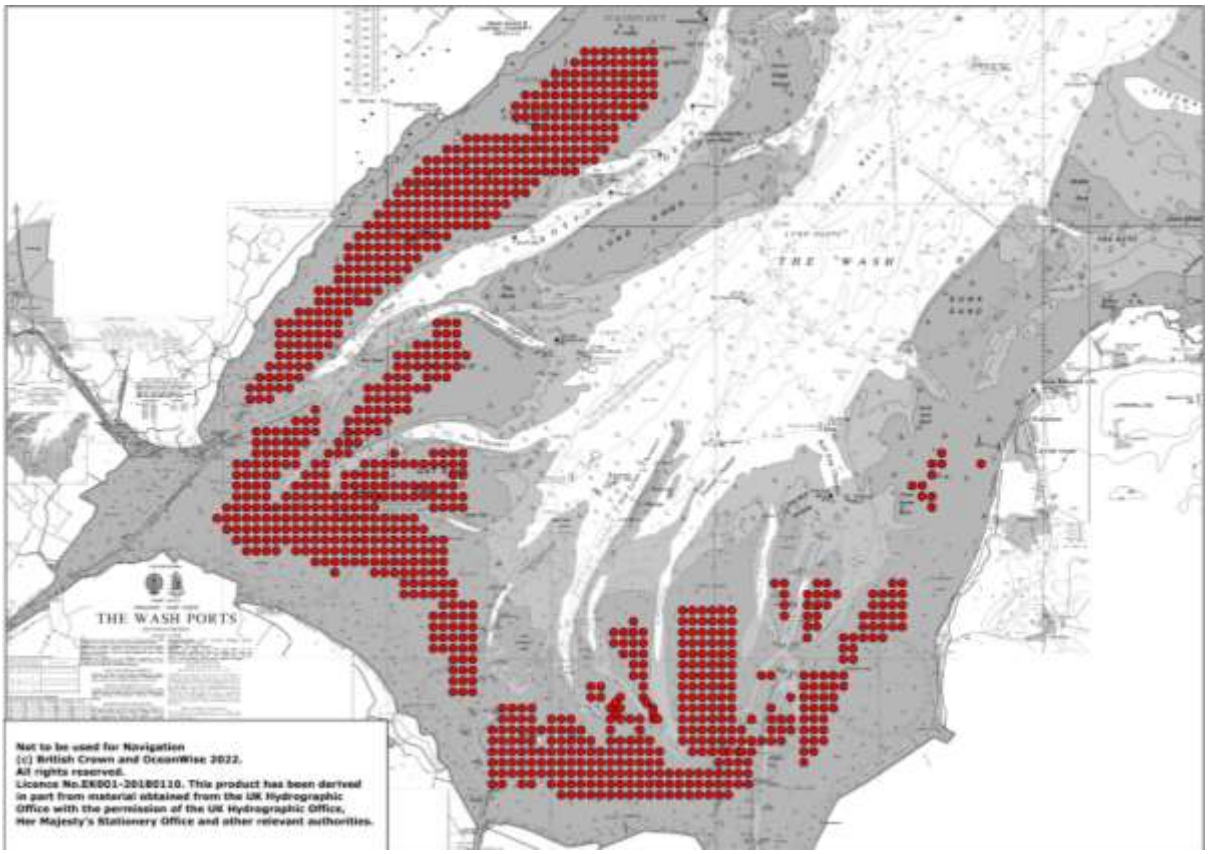

Figure 1 – Chart showing stations sampled during the 2024 Wash cockle surveys

Summary of 2024 cockle stocks

Total Adult Stock (≥14mm width)	11,882 tonnes
Total Juvenile Stock (<14mm width)	10,463 tonnes
Total Stock (all sizes)	22,346 tonnes

These figures are shown in figure 2, which compares this year's cockle stock with previous years. This shows the current stock biomass has continued to improve from the past two years and is roughly average for the time period shown.

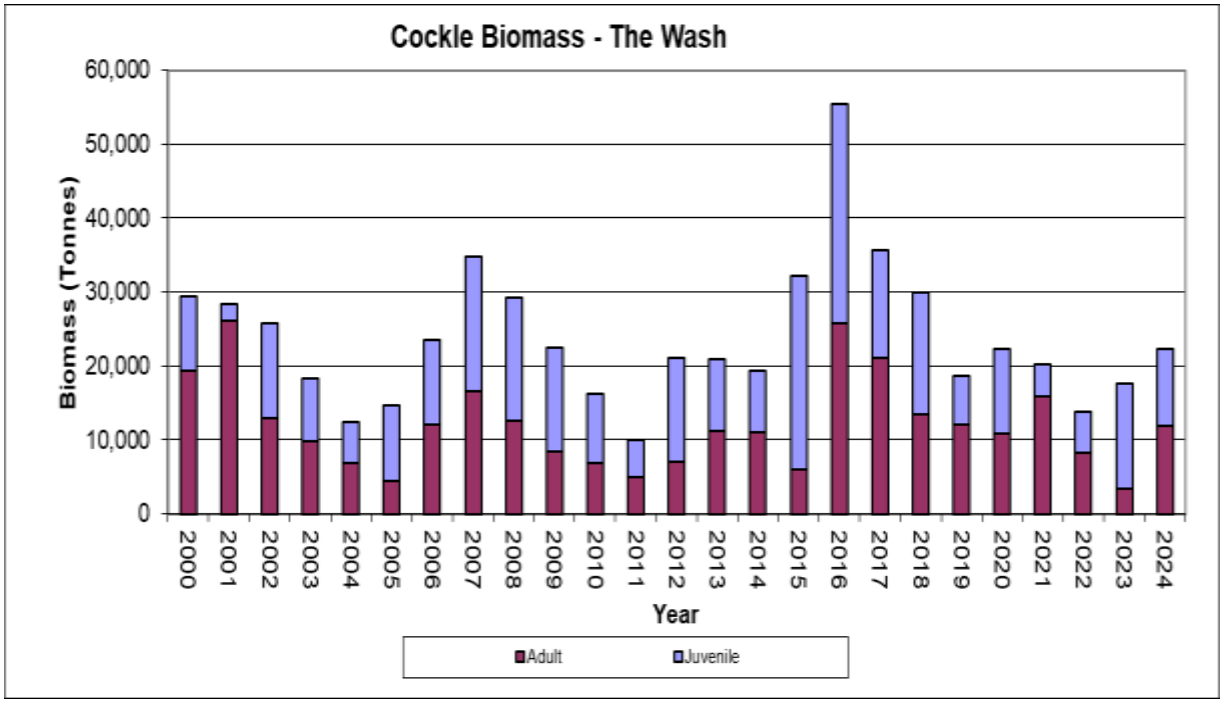

Figure 2 - Adult and juvenile cockle stock biomass between 2000 and 2024 on the regulated beds

Stock composition

At the time of the 2023 survey, the adult cockle biomass was only 457 tonnes above the SSSI Conservation Objective target of 3,000 tonnes. This could have severely limited the size of the fishery last year, had there not been sufficiently large numbers of juvenile cockles of a size that were believed would soon recruit into the adult population. An additional short survey (of 139 stations) was conducted in July 2023 to ensure this growth and the resulting recruitment of juveniles into the adult population had occurred sufficiently to open a wider fishery. That assessment estimated the biomass of adult stocks had increased to somewhere between 8,869 tonnes and 14,651 tonnes, enabling the fishery to proceed with a TAC of 2,937 tonnes[1]. The current adult stock of 11,882 tonnes is a good increase on the 3,457 tonnes present last year and demonstrates the amount of growth and recruitment into the adult population that took place, particularly when the impacts of subsequent atypical mortality, predation and the fishery are also taken into consideration.

As would be expected, considering the amount of recruitment from juvenile to adult stocks that occurred last year, the 10,463 tonnes of juvenile stock estimated to be present this year is lower than the 14,163 tonnes present last year. Overall, though, the total stock has increased from 17,620 tonnes to 22,346 tonnes.

[1] For the first time since its introduction in 1998, the TAC was calculated as being 1/6th of the total cockle biomass, rather than 1/3rd adult cockle biomass.

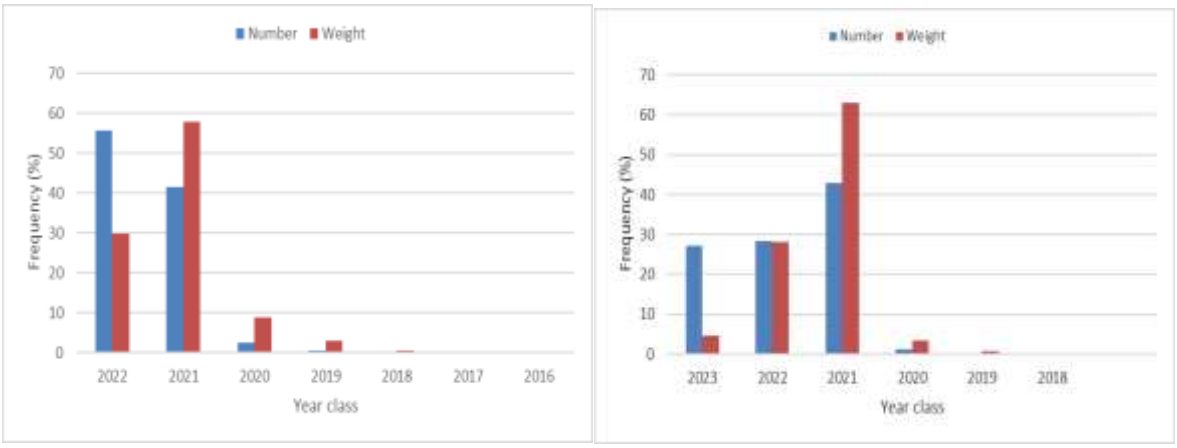

Figure 3 – Changes to the cockle population structure between 2023 (left) and 2024 (right). Graphs show the proportionate sizes of each year-class cohort in terms of numbers (blue) and weight (red)

The graphs in figure 3 show the proportion of each year-class cohort in their respective populations last year and now. Last year the stocks were dominated by Year-1 cockles from the 2021 year-class cohort, which at the time of the survey were predominantly <14mm width, so considered to be juveniles. There was also a reasonable cohort of Year-0 juvenile cockles that had settled in 2022 within the population, too. Trends in past atypical mortality patterns had suggested both of these cohorts should be fairly safe from widespread die-offs. There was some concern in July 2023, however, when large numbers of the 2021 cohort were seen to be dying on the Thief sand. This was during a particularly warm heatwave, however, and this year's figures indicate those high levels of mortality must have slowed down once the weather cooled, as the 2021 cohort is still the dominant stock (including on the Thief sand). A high proportion of this year class now exceed 14mm width and form the bulk of the adult biomass. Past trends would indicate this cohort will be vulnerable to atypical mortality this year, although some of their population that are situated on slower-growing beds are still of a size whereby they should survive for another year. Because the 2022 cohort is currently smaller than the 2021 cohort had been last year, their own growth is unlikely to fully compensate for the losses that are anticipated to occur among the 2021 cohort this year. It is expected, therefore, that stocks will decline somewhat by next year's survey. There are too many variables to estimate how large this decline will be (if at all), but it is not anticipated to be as severe as resulted in last year's poor level of adult stocks, which was caused by a cumulation of two failed spatfalls.

Cockle distribution

Table 1 and charts 4-10, below, provide details about the stocks found on each bed during the 2024 surveys and their distribution on the sands.

Table 1 - Summary of cockle stocks on the Wash intertidal beds – April 2024

	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	187	92.67	3.31	618	187	70.00	1.41	262	881	70
Blackguard	12	20.00	0.82	10	25	55.00	1.28	32	42	24
Breast	759	77.21	2.85	2162	995	127.50	2.24	2234	4396	49
Butterwick	199	71.88	2.51	499	249	103.00	2.17	540	1039	48
Butterwick EXT	162	57.69	1.87	303	199	116.88	2.09	417	719	42
Daseley's	634	39.02	1.38	878	722	84.83	1.71	1233	2111	42
Friskney	622	23.80	1.15	718	386	15.81	0.29	111	829	87
Friskney EXT	261	17.62	0.82	215	323	20.38	0.28	92	307	70
Gat	137	19.09	1.49	204	37	10.00	0.16	6	210	97
Herring Hill	12	20.00	0.67	8	299	100.42	1.26	377	385	2
Holbeach	634	57.06	2.36	1496	684	93.64	1.67	1146	2641	57
Hook Hill	25	75.00	4.31	107	37	1800.00	5.11	191	298	36
IWMK	274	124.09	4.36	1194	299	184.58	3.81	1138	2331	51
Mare Tail	348	65.71	2.44	851	361	268.62	2.97	1073	1924	44
Outer Ferrier	0	0.00	0.00	0	12	140.00	1.20	15	15	0
Pandora	62	12.00	0.44	27	87	130.00	2.28	198	226	12
Peter Black	50	12.50	0.45	22	224	26.11	0.45	100	123	18
Roger	236	28.95	1.40	331	174	817.86	2.61	455	785	42
South Ferrier	224	48.33	2.17	487	174	42.14	1.04	182	669	73
Styleman's	37	43.33	2.01	75	0	0.00	0.00	0	75	100
Thief	149	177.50	6.70	1000	137	89.09	2.21	302	1303	77
Whiting Shoal	75	25.00	1.37	102	37	10.00	0.29	11	113	90
Wrangle	460	27.84	1.18	544	398	44.38	0.78	310	854	64
Wrangle EXT	62	14.00	0.50	31	100	37.50	0.40	40	71	44
Total	**5623**			**11882**	**6145**			**10463**	**22346**	**53**

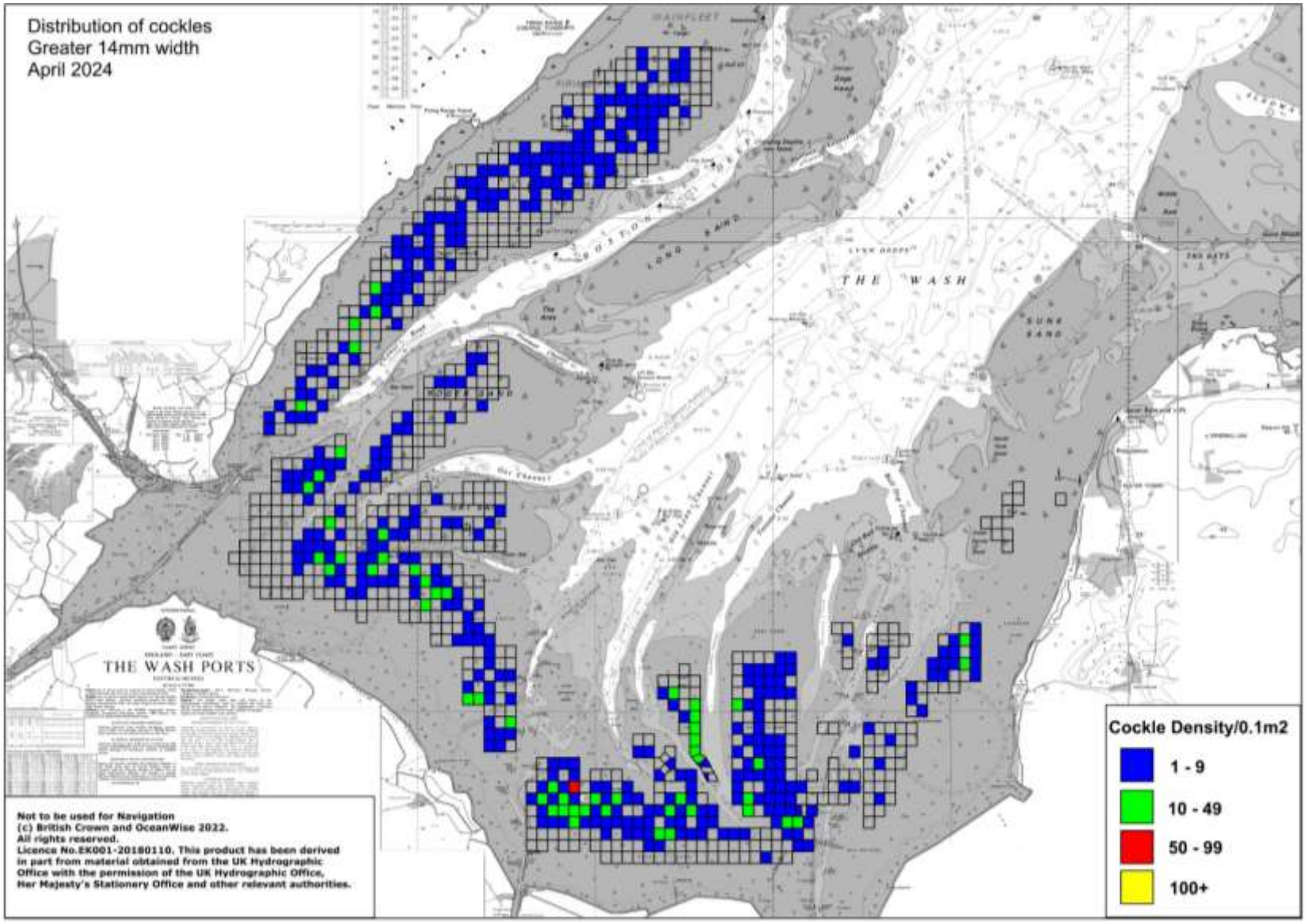

Figure 4 – Chart showing the distribution of adult cockles (≥14mm width) at the time of the 2024 spring surveys

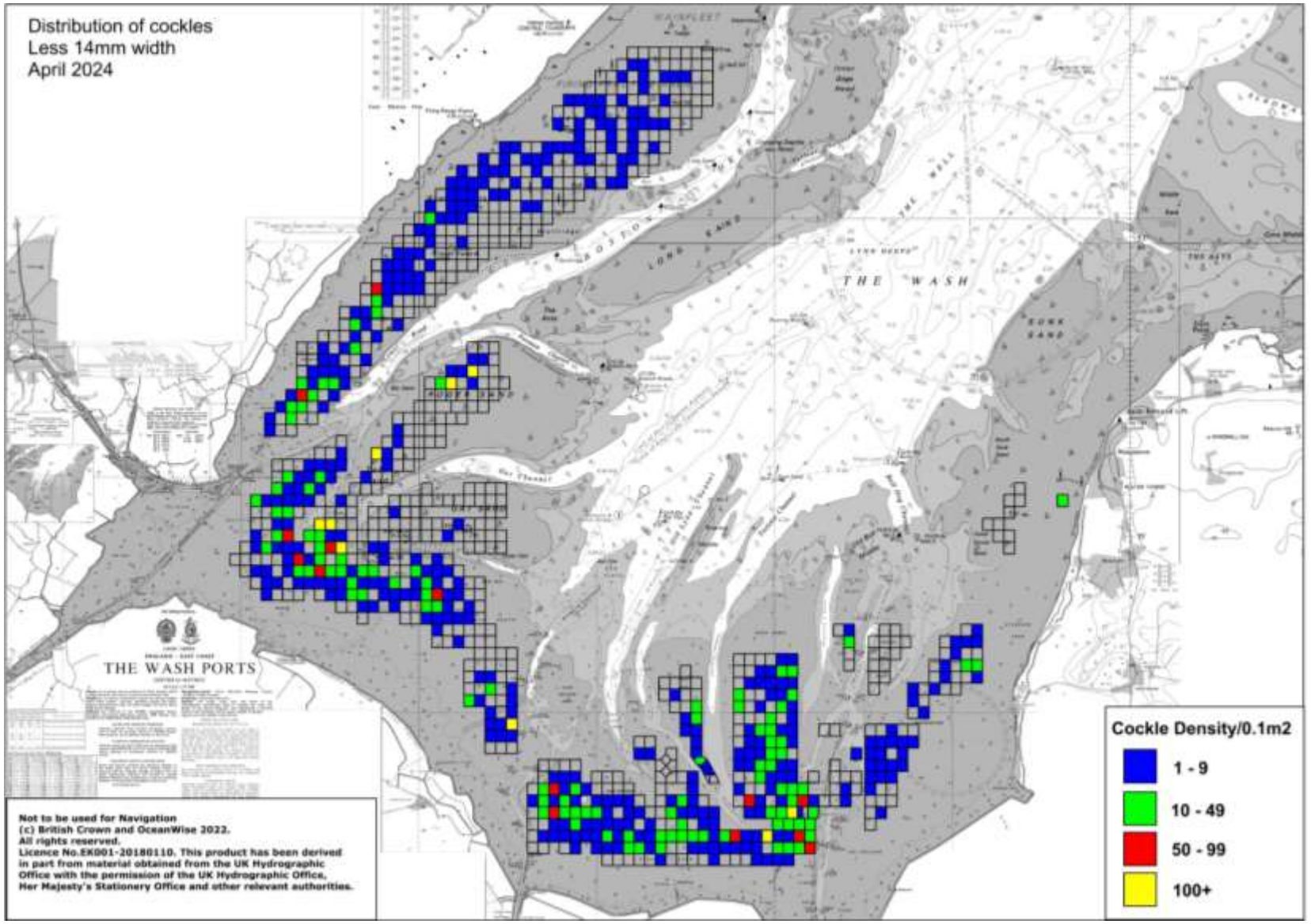

Figure 5 – Chart showing the distribution of juvenile cockles (<14mm width) at the time of the 2024 spring surveys

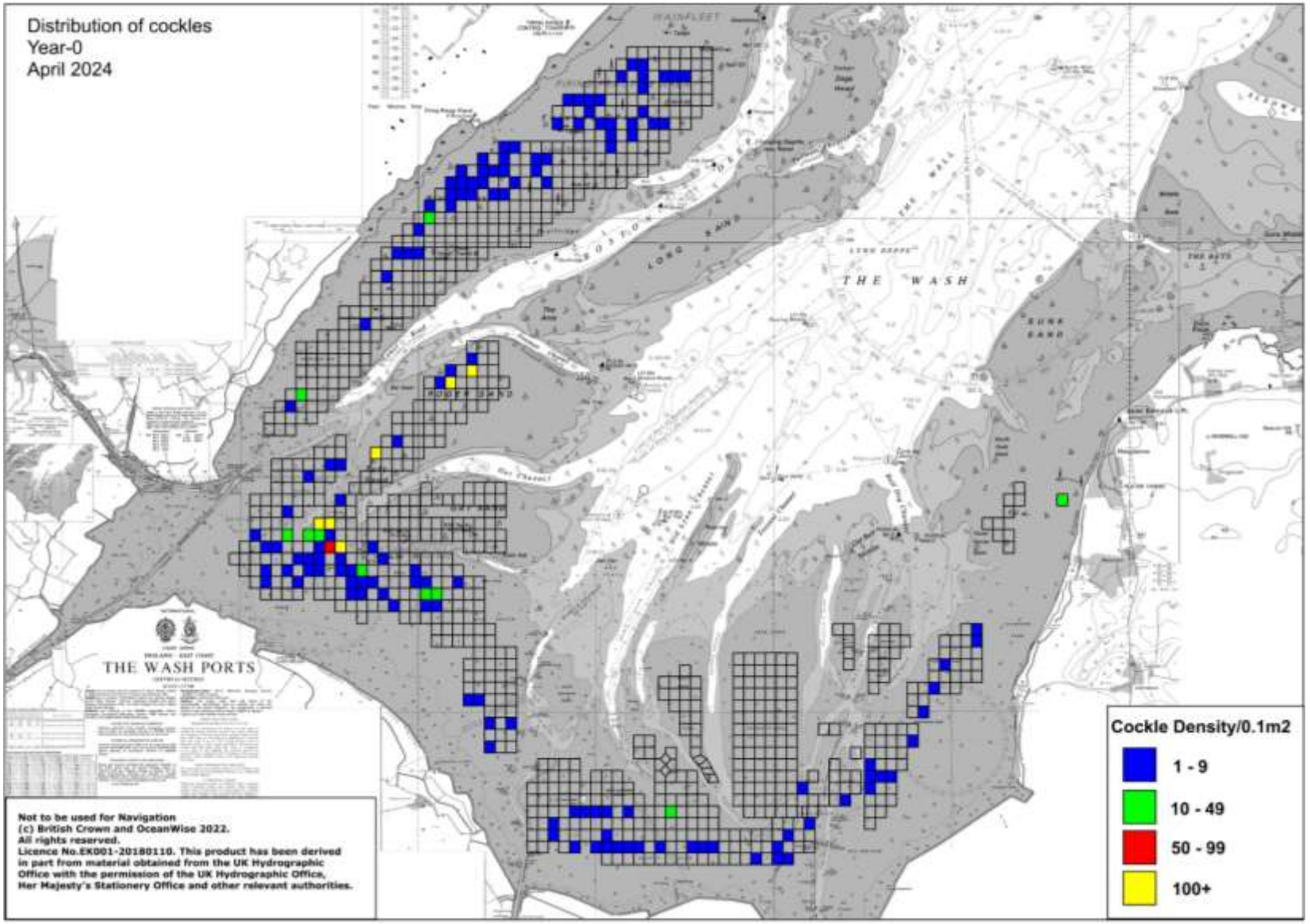

Figure 6 – Chart showing the distribution of Year-0 (2023 year-class) cockles at the time of the 2024 spring surveys

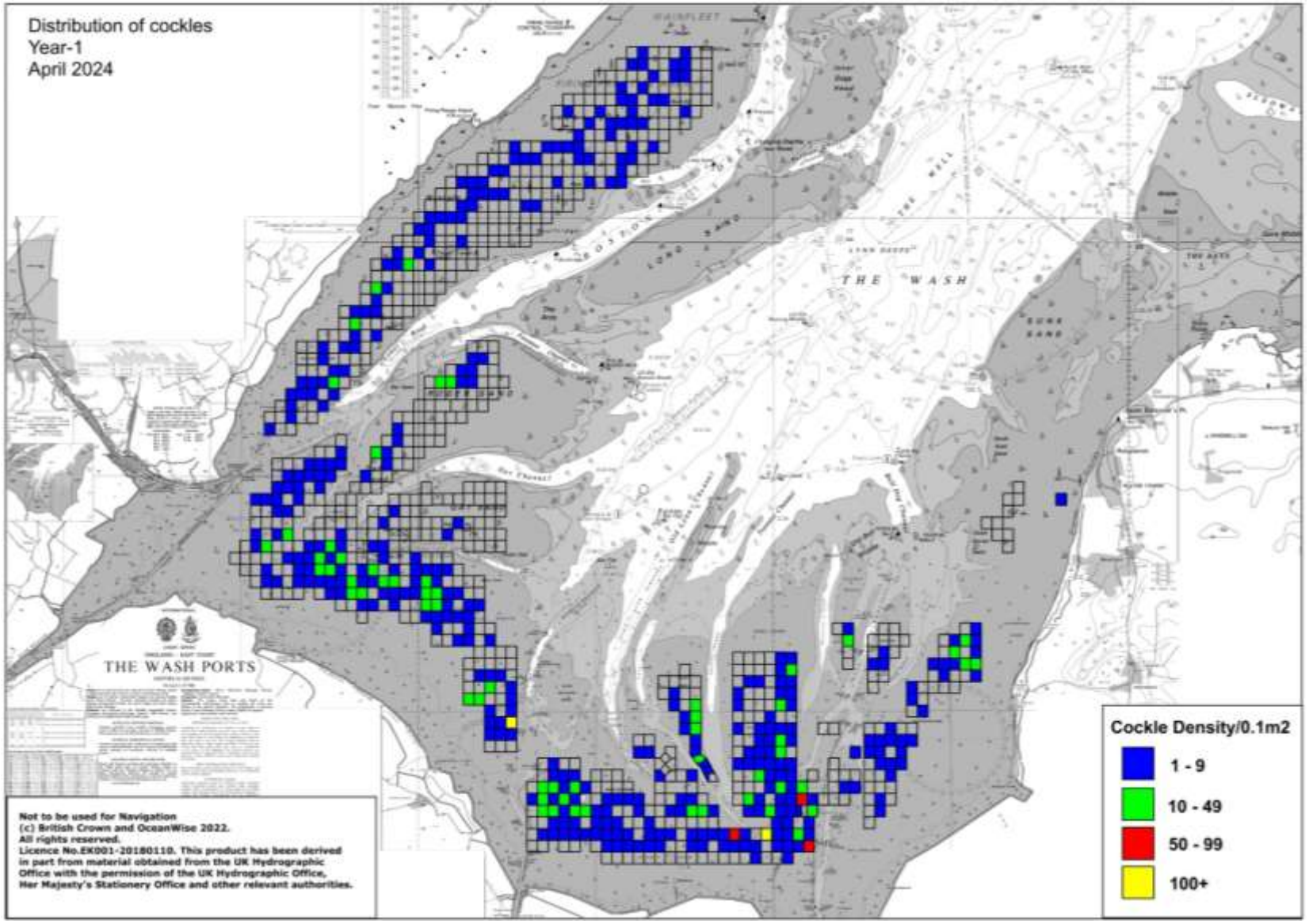

Figure 7 – Chart showing the distribution of Year-1 (2022 year-class) cockles at the time of the 2024 spring surveys

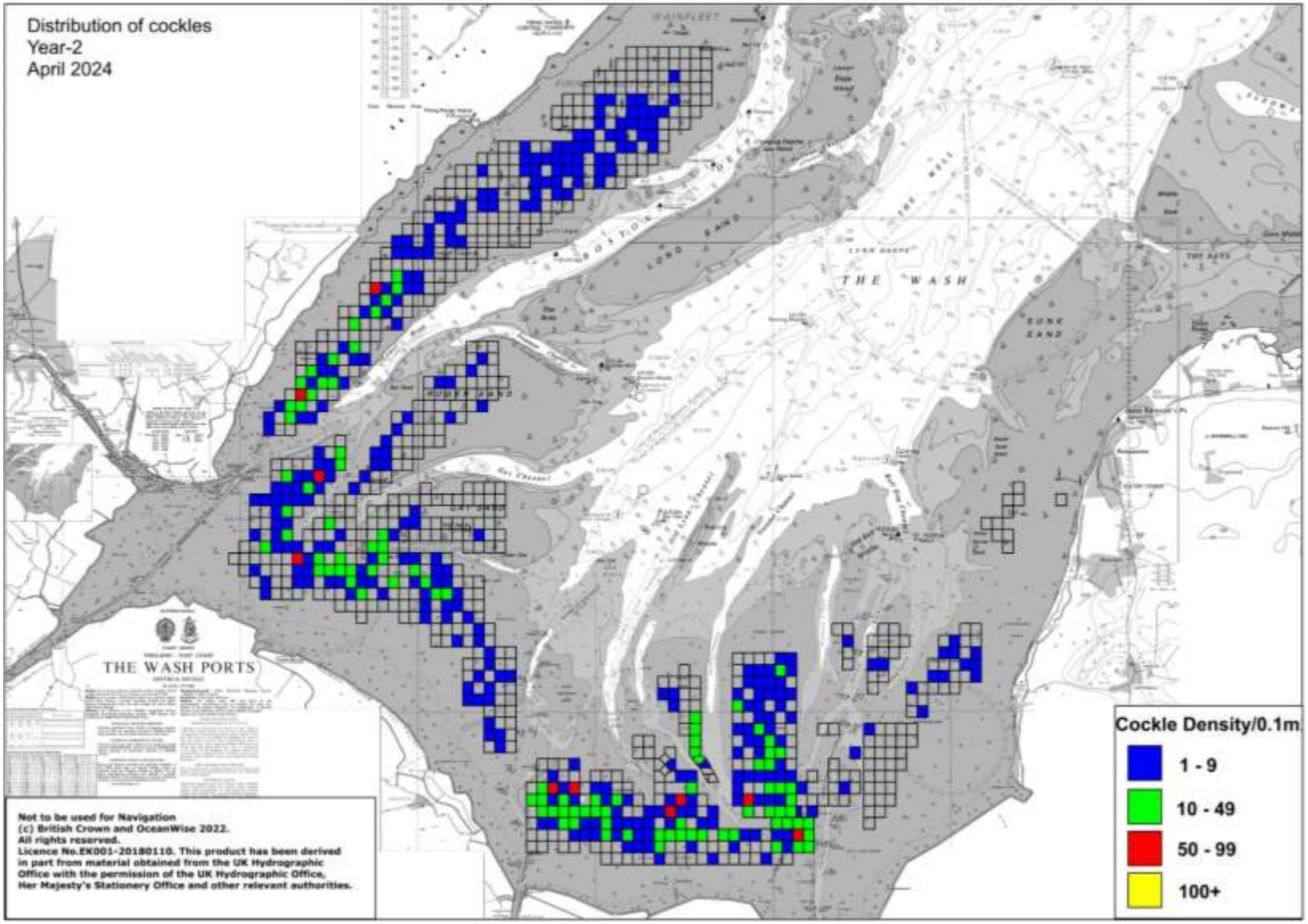

Figure 8 – Chart showing the distribution of Year-2 (2021 year-class) cockles at the time of the 2024 spring surveys

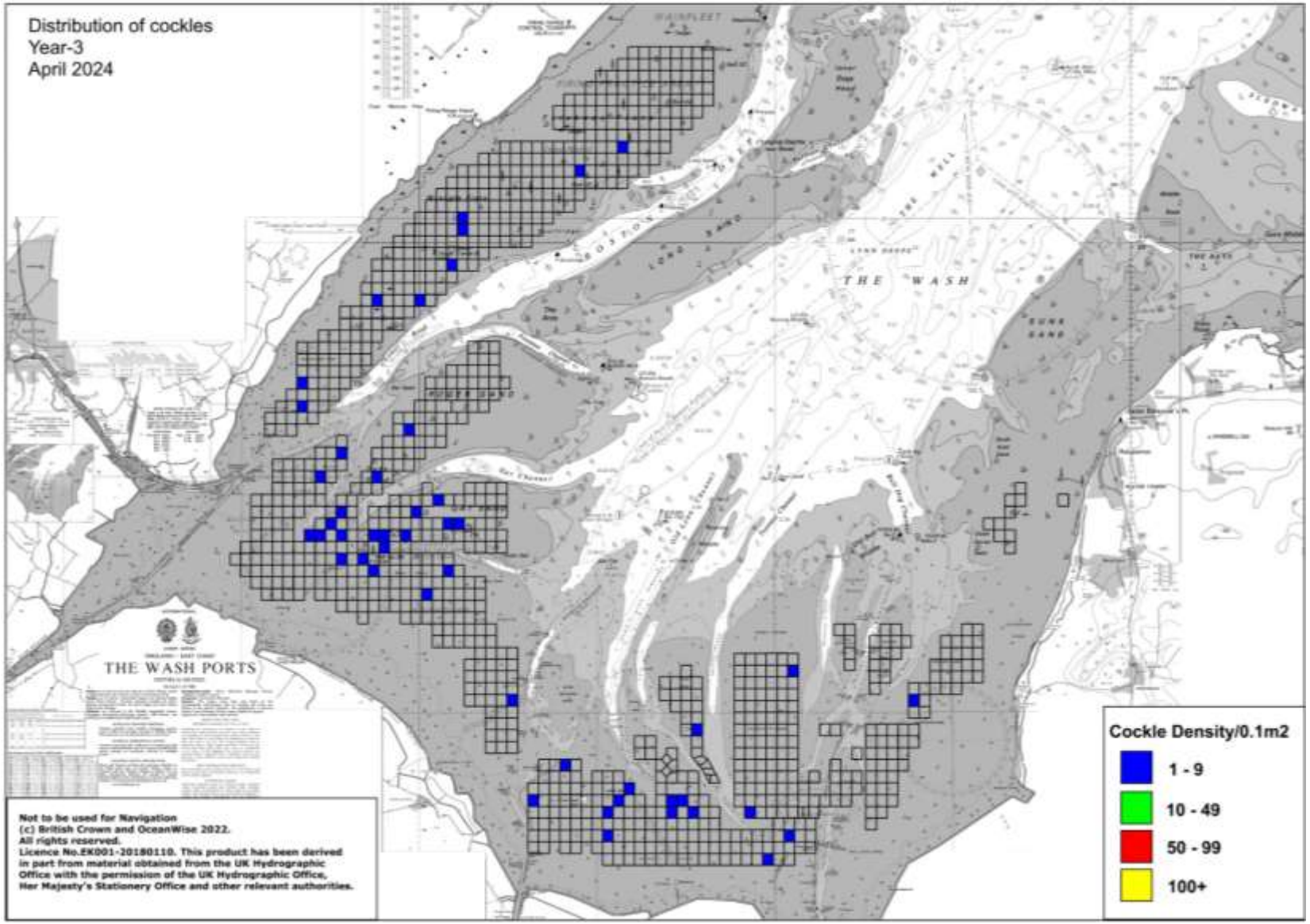

Figure 9 – Chart showing the distribution of Year-3 (2020 year-class) cockles at the time of the 2024 spring surveys

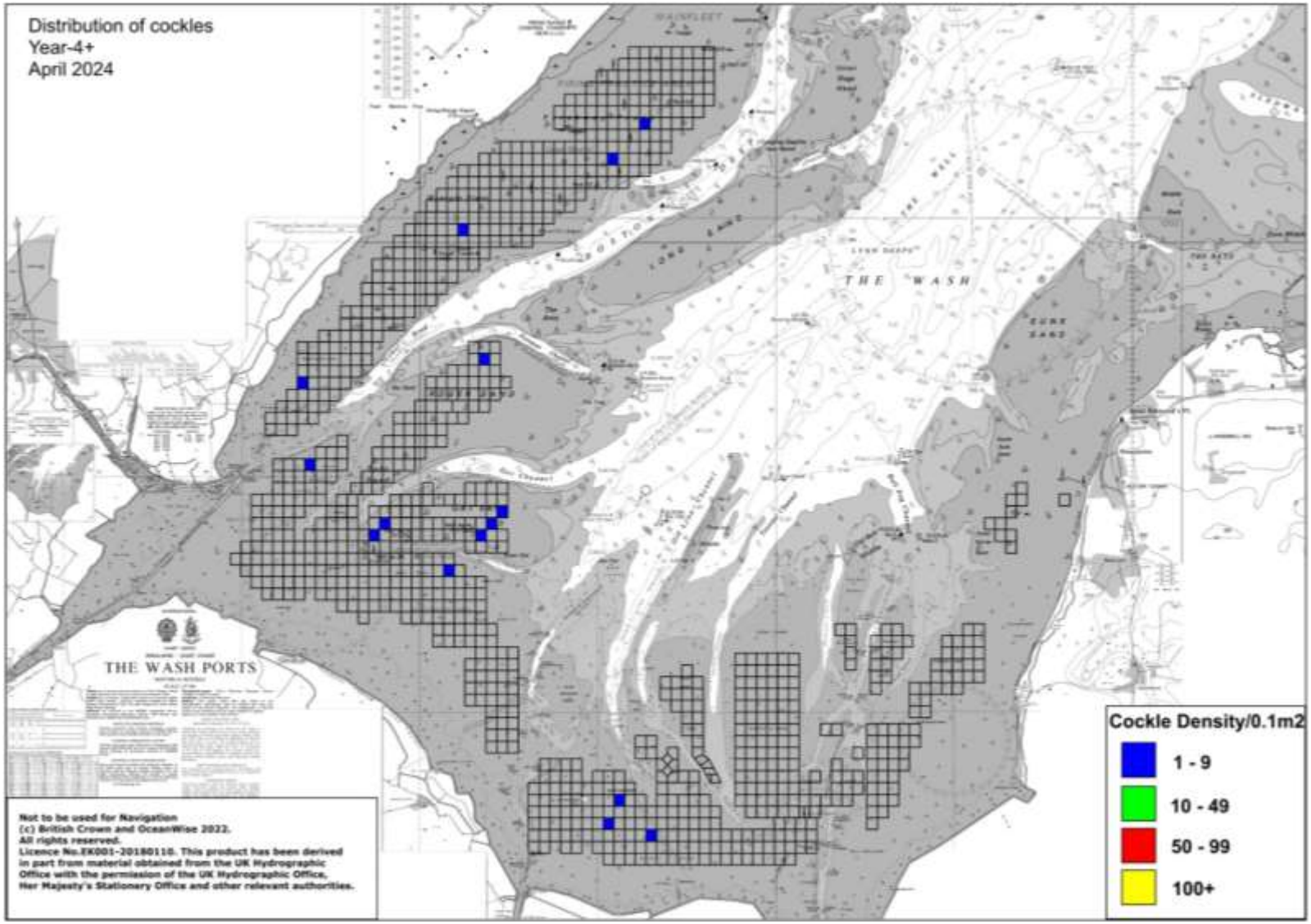

Figure 10 – Chart showing the distribution of Year-4 (2019 year-class) and older cockles at the time of the 2024 spring surveys

Figure 4 shows the distribution of adult (≥14mm width) cockles. Although there were an estimated 11,882 tonnes of them present at the time of the survey, the chart shows they are mostly distributed thinly over a widespread area. There is only a single site on IWMK where they were found to exceed 500/m^2. These adult stocks are mainly comprised of Year-2 (2021 year-class) cockles but also include low densities of Year-3 and older cockles. Figures 8-10 show the distributions of these cohorts. The distribution of Year-2 cockles seen in figure 8 shows they are present in higher densities than the distribution of adult stocks in figure 4, and include 10 sites in which their densities exceed 500/m^2. This is because at some sites, particularly on slower-growing beds, not all of this cohort have reached 14mm width yet.

Figure 5 shows the distribution of juvenile (<14mm width) cockles. These comprise a mixture of Year-0 and Year-1 cockles, the distributions of which are shown in figures 6 and 7, and also include some of the slower-growing Year-2 cockles. They have a widespread distribution over several beds but are also present in high-density aggregations at several sites. While some of the slower-growing Year-2 and faster-growing Year-1 cockles will reach 14mm width over the summer and be targeted by the fishery, the survival of the Year-0 cohort is important for the sustainability of future fisheries. For this reason, where Year-0 densities exceed 1,000/m^2 (areas coloured yellow in figure 6) it is policy under the Wash Cockle Fishery Management Plan to protect them with spatial closures[2]. There was only a poor settlement in 2023, so on most of the beds there are no or only low densities of Year-0 cockles. There are some localised patches, however, mainly around Mare Tail and the Roger/Tofts where Year-0's exceed densities of 1,000/$m^2$and will need protecting.

Fishing opportunities

Prior to 2008, when atypical mortality first began causing widespread die-offs of adult-sized cockles in The Wash, the fishing industry primarily targeted these cockles. The mortalities have had such a large impact, however, the industry have needed to start targeting smaller cockles. Therefore, while charts showing the distribution of adult cockles, as seen in figure 4, would have previously highlighted where the best fishing opportunities were to be found, these are no longer suitable for this purpose. Because charts showing cockle numbers tend to be biased in favour of younger/smaller individuals, density charts based on cockle numbers do not always reflect the better fishing opportunities. For fisheries that target a wide range of cockle sizes, including smaller individuals, charts showing cockle densities based on biomass are 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 this chart are the areas most likely to support good fishing opportunities.

[2] It should be noted that while the Management Plan only specifies protecting Year-0 cockles in areas exceeding 1,000 cockles/m^2, even outside of these areas, Year-0 cockles should not be deliberately targeted by the fishery.

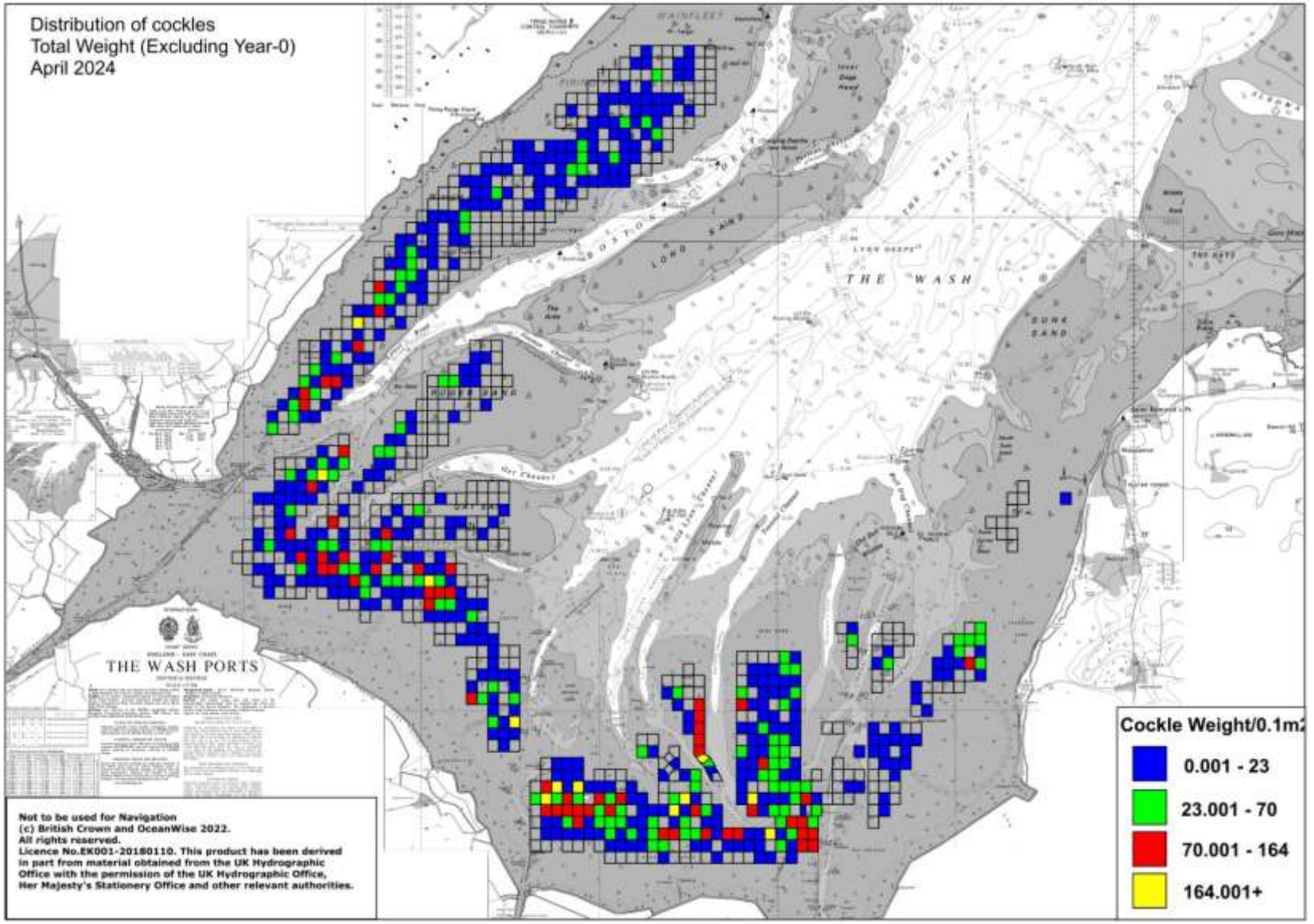

Figure 11 – Total biomass (g/0.1m^2) of cockles at each station (excluding Year-0s) at the time of the 2024 spring survey

Proposed Management Measures for 2024 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, last year 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 2024 fishery should be 3,724 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 22,346 tonnes and the adult stock to be 11,882 tonnes. The removal of 3,724 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 the 2024 cockle and the relaying mussel fisheries fully exhaust their respective TACs, the remaining stocks will still equate to 1,625 tonnes AFDM. This is well within the requirement and sufficient to support a further 16,000 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 3,724 tonnes.**

Protection of Year-0 juvenile cockles

Although there was only a poor spatfall in 2023, there are nevertheless some localised patches of Year-0 juvenile cockles that exceed densities of 1,000/m^2 and, therefore, require protecting with spatial closures (areas coloured yellow in figure 6). Figures 12 and 13 provide more detail of these proposed closures. As recruitment often occurs within existing beds of cockles, closures intended to protect Year-0 cockles will often also support fishable densities of larger cockles. Figure 13 provides an indication of the fishable stocks that are within each closed area. Baring the eastern part of the closure on Hook Hill, the surveys only identified low densities of fishable stocks in most of the closed areas. At Hook Hill, however, the closure was found to contain fishable cockles in densities of 140/m^2 among Year-0 cockles in densities exceeding 4,000/m^2.