

Southern IFCA Survey Report

Solent Native Oyster Survey 2024

1. Introduction

As part of Southern IFCA's management of Bivalve species in the Solent, a survey is carried out to provide data on the population and range of native oyster (*Ostrea edulis*) within its traditional beds in the Solent. The survey was previously undertaken by CEFAS until 2011, with Southern IFCA commencing the survey again in 2014 following a requirement for data to inform local management of the fishery. From 2014 to 2022 the survey occurred annually (asides from 2020 due to COVID-19 restrictions) and became a biennial survey from 2022 due to consistently low stock levels across the Solent.

Survey data adds to an ongoing time series and provides a data source, as Catch Per Unit Effort (CPUE), which may be used, in conjunction with any other available evidence, to inform management of the Solent oyster fishery through the provisions of the Solent Dredge Permit Byelaw, as described in the Management Intentions Document¹. The Solent is separated into 6 Bivalve Management Areas (BMA), and data is collected from each.

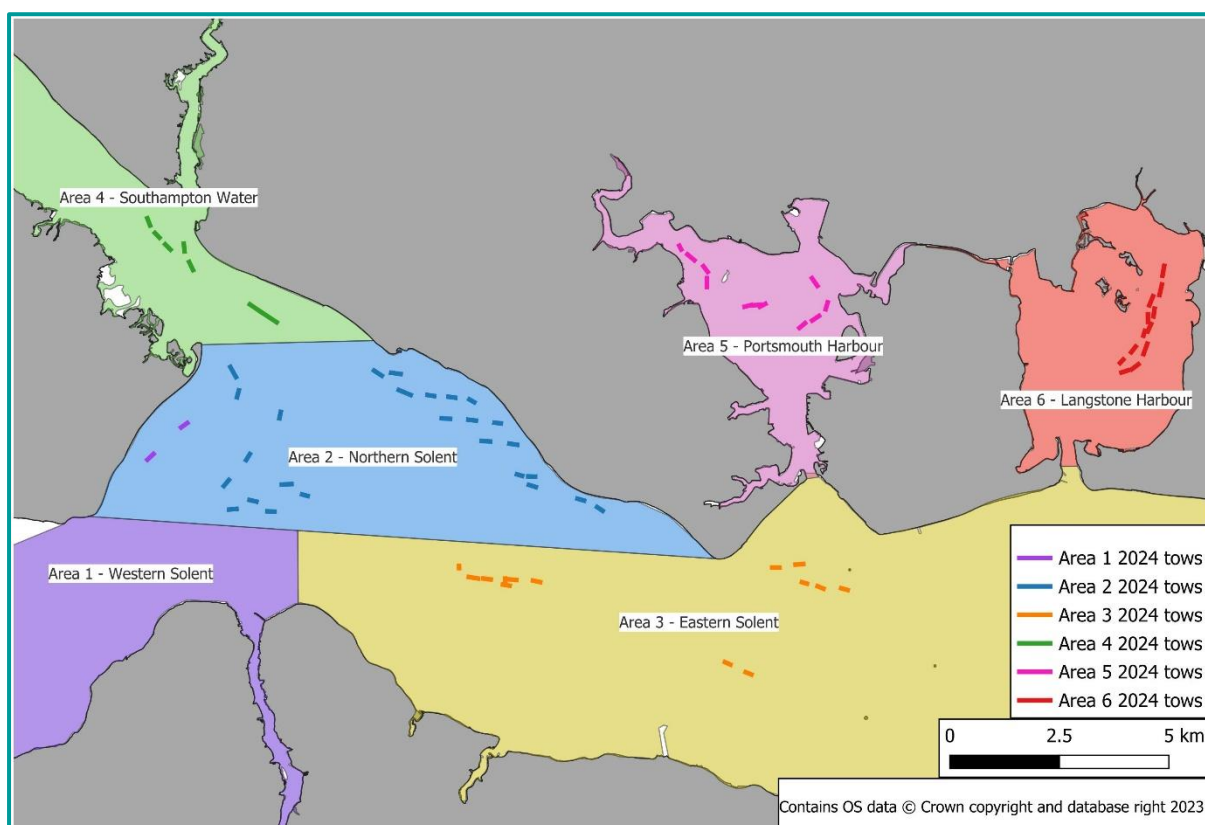


Figure 1: Map portraying the Solent Bivalve Management Areas and the locations of the tows undertaken in the 2024 Solent Oyster survey.

¹ Solent Dredge Permit Byelaw Management Intentions document:
<https://secure.toolkitfiles.co.uk/clients/25364/sitedata/Redesign/Solent-Dredge-Fisheries/Management-Intentions-Document-SDPB.pdf>

2. Method

Beds currently surveyed reflect adaptations from the historic CEFAS survey, combined with additional survey sites determined by Southern IFCA at the point at which the survey was recommenced in 2014. Sampling stations are distributed across these shellfish beds.

Sampling involves the chartering of a local fishing vessel to provide local knowledge and engage and involve stakeholders in the process of evidence collection. A 1.2m ladder dredge is used to undertake sampling, similar to those traditionally used within the fishery.

The Minimum Conservation Reference Size (MCMS) for Native Oyster is 70mm.

In 2024 the survey took place over 3 days between the 22nd and 24th of July.

At each station:

- The ladder dredge is towed for 2 minutes with the skipper choosing the direction/speed of the tow depending on conditions.
- The following metadata is collected:
 - Start and end time,
 - Start and end location,
 - Depth,
 - Speed.
- On completion of the tow the dredge is emptied onto the sorting table and the contents sorted removing oysters and any other bycatch of interest.
- Oysters are measured across their widest edge, split into $\geq 70\text{mm}$ and $< 70\text{mm}$ (MCRS).
- Oysters $\geq 70\text{mm}$ were weighed before being returned to the fishery.
- Oysters $< 70\text{mm}$ were weighed where possible, though were often attached to rock or shell making accurate measurements difficult (note that the weight of oysters $< 70\text{mm}$ is not required for CPUE calculations).
- CPUE was calculated for each tow by dividing the weight of oysters $\geq 70\text{mm}$ sampled by the area of the dredge, then multiplying that figure by the duration of the tow ($\text{kg m}^{-1} \text{hr}^{-1}$). CPUE values for beds/BMAs were then calculated by averaging all the tow/bed CPUE values from within that bed/BMA.
- As required other commercial bycatch may be measured, and additional data on associated species in the dredge recorded.



Figure 2: The Ladder Dredge.

3. Results

Across the 6 BMAs in the Solent, 16 shellfish beds were surveyed completing 72 tows. In total, 42 oysters ≥ 70 mm were caught, measured, and weighed, and 56 oysters < 70 mm were recorded. The CPUE values are calculated only for oysters ≥ 70 mm.

Area 1 - Western Solent				
Shellfish Bed	No. Tows	Total No. Oysters	% >70 mm	Average CPUE
Stanswood	2	0	N/A	0.00
BMA Total	2	0	N/A	0.00
Area 2 - Northern Solent				
Shellfish Bed	No. Tows	Total No. Oysters	% >70 mm	Average CPUE
Browndown	2	10	100.0	14.46
Lee-On-Solent	8	3	33.3	1.38
North Channel	3	12	50.0	17.55
Chilling	2	10	0.0	0.00
Thorn Knoll	3	0	N/A	0.00
Bramble Bank	5	5	60.0	4.97
Calshot Spit	2	4	0.0	0.00
BMA Total	22	44	40.6	5.48
Area 3 - Eastern Solent				
Shellfish Bed	No. Tows	Total No. Oysters	% >70 mm	Average CPUE
Ryde Middle	7	27	40.7	6.68
Spit Sand	5	1	0.0	0.00
Sturbridge	2	4	50.0	10.22
BMA Total	14	32	30.3	5.63
Area 4 - Southampton Water				
Shellfish Bed	No. Tows	Total No. Oysters	% >70 mm	Average CPUE
Hamble	5	5	0.0	0.00
BMA Total	5	5	0.0	0.00
Area 5 - Portsmouth Harbour				
Shellfish Bed	No. Tows	Total No. Oysters	% >70 mm	Average CPUE
Fareham	4	0	N/A	0.00
Bomb Ketch	3	12	75.0	8.00
Portchester	4	1	0.0	0.00
BMA Total	11	13	37.5	2.67
Area 6 - Langstone Harbour				
Shellfish Bed	No. Tows	Total No. Oysters	% >70 mm	Average CPUE
Langstone	12	4	0.0	0.00
BMA Total	12	4	0.0	0.00

Table 1: Results summary of the Solent native oyster survey split into Bivalve Management Area (BMA) and shellfish bed. Average CPUE values are recorded in $\text{kg m}^{-1} \text{hr}^{-1}$ (kg per metre of dredge per hour) of oysters over 70mm.

3.1 CPUE

The average CPUE for each BMA was calculated by averaging the $\text{kg m}^{-1} \text{hr}^{-1}$ of oysters caught in all of the beds within that BMA. Section 4.3 of the Solent Dredge Permit Management Intentions Document sets baseline CPUE thresholds which indicate either a closure if CPUE is below the threshold, or the consideration of management intervention if CPUE is above the threshold. The threshold for individual beds is $15.00 \text{kg m}^{-1} \text{hr}^{-1}$ and for individual BMAs is $5.00 \text{kg m}^{-1} \text{hr}^{-1}$. It should be noted that CPUE values are one source of evidence that the Authority may consider in guiding management.

The Eastern Solent (BMA 3) had the highest average CPUE, at $5.63 \text{kg m}^{-1} \text{hr}^{-1}$, followed by the Northern Solent (BMA 2) with an average of $5.48 \text{kg m}^{-1} \text{hr}^{-1}$. These are the only two BMAs that have a CPUE value above the threshold value of $5.00 \text{kg m}^{-1} \text{hr}^{-1}$. Considering the individual beds within these BMAs, for Eastern Solent, there were 2 beds which showed CPUE values, Ryde Middle at $6.68 \text{kg m}^{-1} \text{hr}^{-1}$ and Sturbridge at $10.22 \text{kg m}^{-1} \text{hr}^{-1}$, corresponding to 11 oysters over 7 tows and 2 oysters over 2 tows respectively. For the individual beds within Northern Solent, four out of the seven beds showed CPUE values, North Channel at $17.55 \text{kg m}^{-1} \text{hr}^{-1}$ (6 oysters over 3 tows), Browndown at $\text{kg m}^{-1} \text{hr}^{-1}$ (10 oysters over 2 tows), Bramble Bank at $\text{kg m}^{-1} \text{hr}^{-1}$ (3 oysters over 5 tows) and Lee-On-Solent at $1.38 \text{kg m}^{-1} \text{hr}^{-1}$ (1 oyster over 8 tows).

For the other three BMAs, average CPUE ranged from $2.67 \text{kg m}^{-1} \text{hr}^{-1}$ (Portsmouth Harbour [BMA 5]) to $0.00 \text{kg m}^{-1} \text{hr}^{-1}$ (Western Solent [Area 1], Southampton Water [Area 4], and Langstone Harbour [Area 6]).

The individual shellfish bed with the highest average CPUE was North Channel (Northern Solent – BMA2) at $17.55 \text{kg m}^{-1} \text{hr}^{-1}$, and is the only bed to cross the threshold value. As noted above this corresponded to 6 oysters over 3 tows.

The Chilling, Calshot Spit, Spit Sand, Hamble, Portchester, and Langstone beds returned oysters, however there were no oysters $\geq 70\text{mm}$ across 30 tows returning a value of $0.00 \text{kg m}^{-1} \text{hr}^{-1}$. Stations at Stanswood, Thorn Knoll, and Fareham returned no oysters.

Ryde Middle (Eastern Solent – BMA3) returned the greatest number of oysters with 27 caught, however 59.3% of these were $< 70\text{mm}$. Both North Channel and Bomb Ketch stations recorded 12 oysters in total, with 50% and 75% being $\geq 70\text{mm}$ respectively.

3.2 Length

Northern Solent (BMA 2), Eastern Solent (BMA 3), and Portsmouth Harbour (BMA 5) displayed a majority of undersized oysters, with 59.44%, 69.75%, and 62.50% of oysters sampled $> 70\text{mm}$. In Southampton Water (BMA 4) and Langstone Harbour (BMA 6) only undersized oysters were sampled.

Figure 3 highlights the frequent occurrence of large oysters over the size of 100mm within Northern Solent (BMA 2), which will have contributed to the high CPUE values seen within this BMA.

Figure 3 also reveals that for the BMAs with the highest average CPUE values (Northern Solent – BMA 2 and Eastern Solent – BMA 3), the most frequent size class sampled was oysters $25 - 30\text{mm}$, under the MCRS of 70mm thus these oysters would not have contributed to CPUE calculations.

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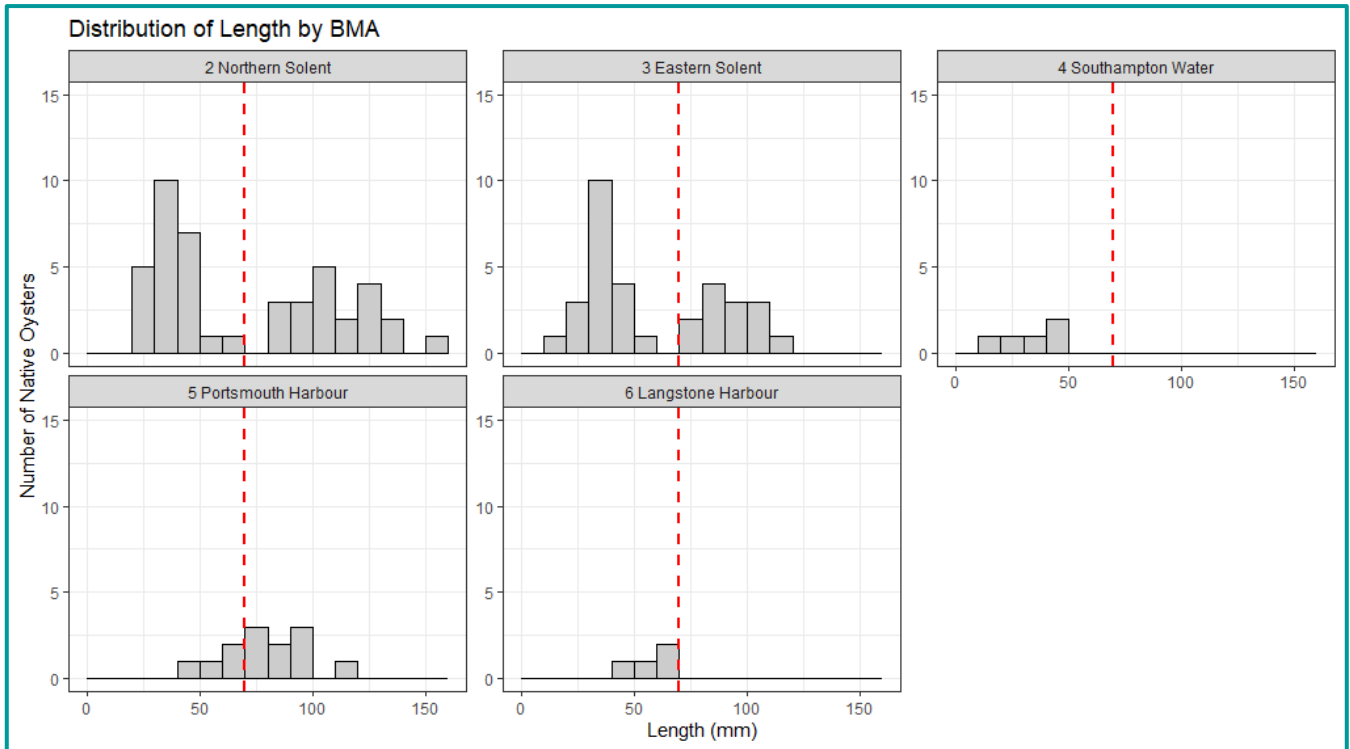


Figure 3: Length histograms by Bivalve Management Area of all Native Oysters sampled during the 2024 Solent Native Oyster Survey. The red dashed line indicated 70mm, the Minimum Conservation Reference size for native oysters.

3.2.1 Limitations

Saddle Oysters (*Anomia sp.*) are present in waters around the UK coast (Neal, 2004) and are visually similar to Native Oysters, especially at smaller sizes. This similarity can lead to misidentification and a distortion in count data. Saddle Oysters were regularly identified during this survey and excluded from the count when noted. Weight data is based on oysters over 70mm and is therefore not affected.

4. Time Series

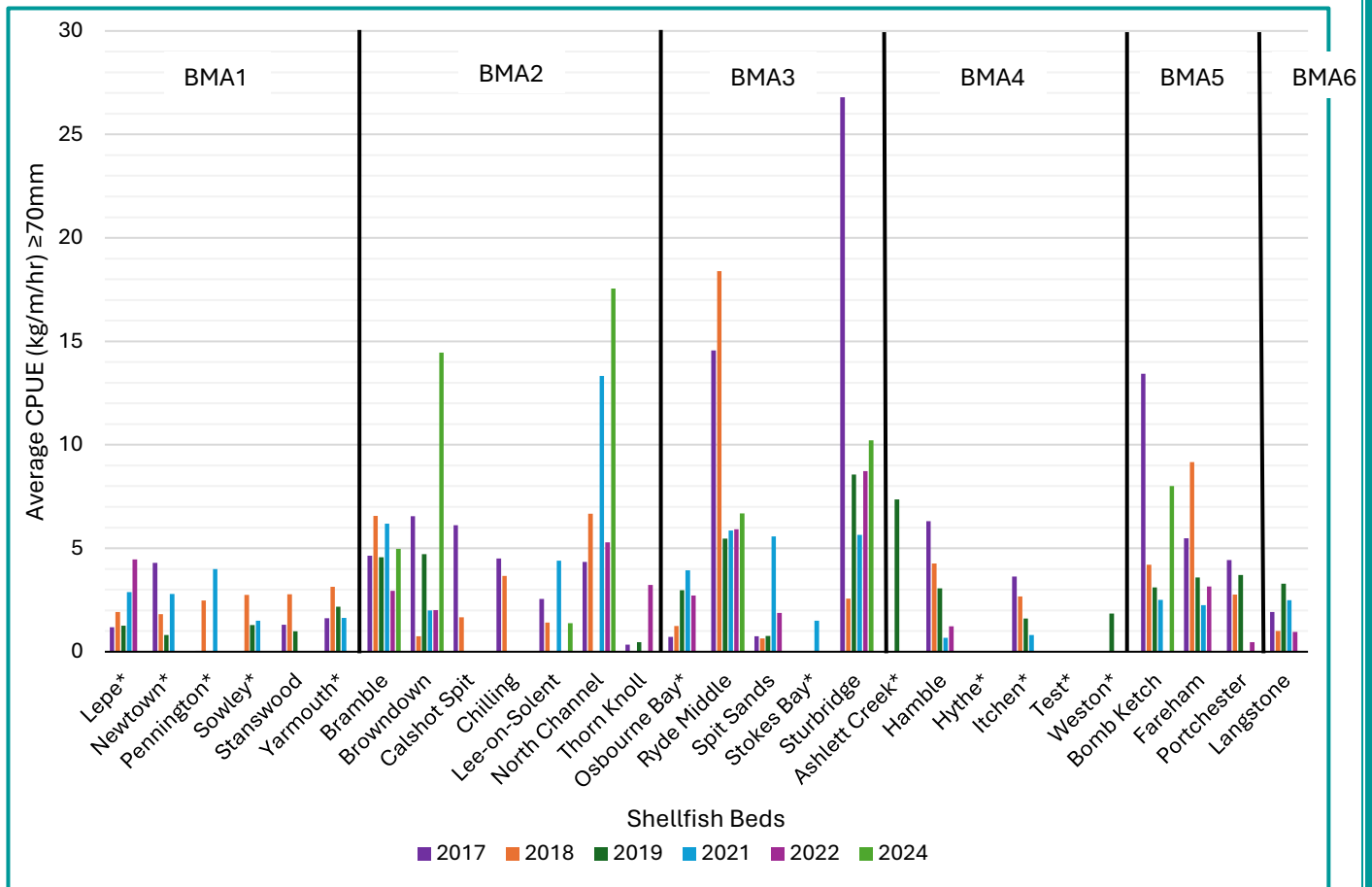


Figure 4: Timeseries of the Average Catch per Unit Effort (CPUE) ($\text{kg m}^{-1} \text{hr}^{-1}$) values for oysters $\geq 70\text{mm}$ from each shellfish bed in the Solent from 2017 – 2022, excluding 2020, when no sampling took place due to COVID-19 restrictions, and 2023, when no sampling occurred due to a change to survey occurrence, moving to every two years. * Represents shellfish beds that were not sampled in 2024. BMAs: 1 – Western Solent, 2 – Northern Solent, 3 – Eastern Solent, 4 – Southampton Water, 5 – Portsmouth Harbour, 6 – Langstone Harbour.

Figure 3 displays the average CPUE for oysters $\geq 70\text{mm}$ for each shellfish bed from 2017 – 2024. No surveys occurred in 2020 due to COVID-19 restrictions or 2023 as the decision was made for the survey to become biennial.

The general data pattern is inconsistent between survey years. Since 2018, only North Channel bed (Northern Solent – BMA2) has reached the threshold CPUE value of $15.00 \text{ kg m}^{-1} \text{ hr}^{-1}$. Previously, the threshold was only reached at Sturbridge in 2017 ($26.80 \text{ kg m}^{-1} \text{ hr}^{-1}$, 11 oysters over 3 tows) and Ryde Middle in 2018 ($18.40 \text{ kg m}^{-1} \text{ hr}^{-1}$, 63 oysters over 18 tows) (both Eastern Solent – BM3).

When compared to the 2022 survey, the average CPUE for oysters $\geq 70\text{mm}$ in 2024 increased for 7 of the 16 beds sampled. Browndown and North Channel (both Northern Solent – BMA2) saw the largest increase between 2022 and 2024, from $2.01 \text{ kg m}^{-1} \text{ hr}^{-1}$ (2 oysters over 4 tows) to $14.46 \text{ kg m}^{-1} \text{ hr}^{-1}$ (10 oysters over 2 tows) for Browndown and $5.28 \text{ kg m}^{-1} \text{ hr}^{-1}$ (3 oysters over 9 tows) to $17.55 \text{ kg m}^{-1} \text{ hr}^{-1}$ (6 oysters over 3 tows) for North Channel.

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Of the 7 beds that saw an increase in average CPUE from 2022 to 2024, 3 increased for a second successive survey - Browndown, Ryde Middle and Strubridge. However, only the 2024 values for Browndown ($14.00 \text{ kg m}^{-1} \text{ hr}^{-1}$) (Northern Solent – BMA2) are higher than those values recorded in 2017 with CPUE fluctuating between 2017 and 2021.

3 beds (Stanswood, Calshot Spit, and Chilling) maintained an average CPUE of $0.00 \text{ kg m}^{-1} \text{ hr}^{-1}$ from 2022 to 2024.

The 6 sites that saw a decrease in average CPUE for oysters $\geq 70\text{mm}$ from 2022 to 2024, all recorded values of $0.00 \text{ kg m}^{-1} \text{ hr}^{-1}$, the lowest value to date for 4 of the sites (Spit Sands, Hamble, Fareham, & Langstone).

The largest decrease in CPUE from 2022 to 2024 was seen at Thorn Knoll ($3.23 \text{ kg m}^{-1} \text{ hr}^{-1}$ to $0.00 \text{ kg m}^{-1} \text{ hr}^{-1}$) and Fareham ($3.16 \text{ kg m}^{-1} \text{ hr}^{-1}$ to $0.00 \text{ kg m}^{-1} \text{ hr}^{-1}$).

None of the BMA CPUE trends documented through the Solent Oyster timeseries have been found to be statistically significant (Kruskal Wallis test, $p < 0.05$).

5. Conclusions

- As displayed in Table 1 and Figure 3, CPUE remains low across all the Solent Oyster beds sampled.
- Only the North Channel oyster bed (Northern Solent – BMA2) and the Northern Solent and Eastern Solent BMAs reached the respective CPUE threshold levels for consideration of management as set out in the Management Intensions Document ($15.00 \text{ kg m}^{-1} \text{ hr}^{-1}$ and $5.00 \text{ kg m}^{-1} \text{ hr}^{-1}$ respectively).
- For individual shellfish beds, North Channel (Northern Solent – BMA2) had the highest average CPUE for oysters $\geq 70\text{mm}$ ($17.55 \text{ kg m}^{-1} \text{ hr}^{-1}$)
- The Eastern Solent BMA had the highest average CPUE for the 2024 survey ($5.63 \text{ kg m}^{-1} \text{ hr}^{-1}$), which is consistent throughout the survey timeseries.
- The results of the Solent Oyster Survey provide data on the catch rate of bivalves (CPUE), the proportion of bivalves which are immature or below MCRS and the proportion of mature bivalves intended to promote recruitment (over MCRS).
- When analysing survey outcomes, it is important to consider other data available for consideration alongside CPUE values. In this case, the CPUE values for individual beds should be viewed alongside the count data for oysters over 70mm as although weight data is the most suitable for informing CPUE, a few larger, heavier oysters have the potential to increase the overall weight, thus increasing the average CPUE whilst the number of oysters harvested remains low. For the Northern Solent, the CPUE value above the threshold of $15.00 \text{ kg m}^{-1} \text{ hr}^{-1}$, corresponds to 6 oysters over 3 tows. Of those 6 oysters, all were above 100mm, one above 150mm which will increase the weight relative to the number of oysters sampled.
- For the two BMAs over the threshold level of $5.00 \text{ kg m}^{-1} \text{ hr}^{-1}$, average BMA CPUE values were influenced by high bed CPUE values in some of the shellfish beds. The Northern Solent (BMA 2) was influenced by higher bed values for Northern Channel (6 $\geq 70\text{mm}$ oysters over 3 tows) and Browndown (10 $\geq 70\text{mm}$ oysters over 2 tows) and the Eastern Solent by beds at Ryde Middle (11 $\geq 70\text{mm}$ oysters over 7 tows) and Sturbridge (2 $\geq 70\text{mm}$ oysters over 2 tows, one of which measured over 100mm). As for Northern Channel, the CPUE values may have been

affected by the weight of individual oysters and therefore it is important that CPUE values are viewed alongside the count and tow numbers for oysters over 70mm.

- The findings from the 2024 survey show no consistent improvement in average CPUE across the Solent. Whilst there are demonstrated increases in some areas, these are not consistent between years for all but three sites (looking at 2021-2024), suggesting a fluctuating pattern rather than a general increase across the Solent. There are also decreases, which, where observed showed the lowest values in 2024 compared to all previous survey years, and a consistency in certain areas of $0.00 \text{ kg m}^{-1} \text{ hr}^{-1}$. Whilst one oyster bed and two BMAs are above defined CPUE threshold levels, the values for the BMAs are only slightly over the threshold of $5.00 \text{ kg m}^{-1} \text{ hr}^{-1}$ (by 0.48 and $0.63 \text{ kg m}^{-1} \text{ hr}^{-1}$) and the site showing an above threshold level is in isolation from all other areas surveyed in being the only site above $15.00 \text{ kg m}^{-1} \text{ hr}^{-1}$. In addition, in all cases the number of oysters providing weight data for CPUE calculations is very low. On the basis of consideration of CPUE and additional data underpinning the CPUE values, the data indicates that the native oyster population in the Solent continues to show a fluctuating pattern of stock abundance with the general trend being low CPUE and/or low oyster numbers, both over and under the MCRS of 70mm.
- There are ongoing restoration efforts for native oyster in the Solent with the species subject to research and active restoration work. The data produced through this survey and made available through this report will be able to be utilised by such projects to provide information on stocks and changes over time within the Solent.

References

Neal, K.J. 2004. *Anomia ephippium* Saddle oyster. In Tyler-Walters H. and Hiscock K. *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 05-08-2022]. Available from: <https://www.marlin.ac.uk/species/detail/2053>

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