# LIFE Recreation ReMEDIES –

# River Medina and Osborne Bay, Isle of Wight Subtidal Seagrass Survey 2020

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Joe Kenworthy


June 2021



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# Project details

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### Further information

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LIFE Recreation ReMEDIES

# River Medina and Osborne Bay, Isle of Wight Subtidal Seagrass Surveys 2020

Kenworthy, Joe
ENVIRONMENT AGENCY

**LIFE Recreation ReMEDIES (*LIFE18 NAT/UK/000039***
*Reducing and Mitigating Erosion and Disturbance impacts affecting the Seabed.*

# River Medina and Osborne Bay, Isle of Wight Subtidal Seagrass Surveys 2020

Joe Kenworthy

Coastal and Estuarine Assessment

National Monitoring: Fish and Ecology

Version 2.0, March 2021.

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can’t do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

# Executive summary

In 2020, Natural England commissioned the Environment Agency to undertake a survey to monitor the extent and density of seagrass beds in Osborne Bay and River Medina on the Isle of Wight.

This work was funded as part of the LIFE Recreation ReMEDIES project (LIFE18 NAT/UK/000039) and contributes to Action D1 – monitoring by conducting echosounder and drop down video surveys to provide a baseline for future monitoring of the ReMEDIES project. This funding was supplemented by funding from Environment Agency to allow a wider area to be surveyed, the areas shown in this report as lying outside of Solent Maritime Special Area of Conservation (SAC), so that an accurate picture of the entire seagrass bed could be obtained which, whilst outside of the scope of LIFE ReMEDIES, will ultimately be beneficial for the project.

A drop-camera and single beam echosounder survey of subtidal seagrass beds took place in September 2020. Photos were analysed for percentage cover of *Zostera marina*, macroalgae, non-native species and anthropogenic impacts such as litter.

The Osborne Bay bed was dense (mean percentage cover within quadrats was 68.12 %), over 60% of the total bed extent consisted of a density of > 50 % cover. The total extent of the bed was 164.7 ha, this was greater than previous extent records show, however different methodologies were used. There was some evidence of high epiphyte and algal overgrowth cover within the centre of the seagrass bed, near Kings Quay.

The River Medina seagrass bed was surveyed and found to be approximately 12Ha in size. The image quality was too poor to get an accurate measurement of density however, visible quadrats tended to have high coverage.

The seagrass in the smaller patch north of Cowes expanded further than the previous records detailed. Poor visibility in the photo survey restricted measurements of extent and density of this bed, however the area sampled over which seagrass was present was approximately 0.13 ha in size. Results from the echosounder indicate that this is likely to be larger.

Similarly, the water was too turbid at Gurnard Bay to approximate density accurately. This bed measured approximately 0.93 ha in size. The echosounder indicated the bed potentially extends further westward than surveyed.

These surveys will be supplemented by diver surveys planned for Summer 2021 (Covid-19 restrictions allowing).

# Contents

# 1. Introduction

LIFE Recreation ReMEDIES: Reducing and Mitigating Erosion and Disturbance Impacts affecting the Seabed (LIFE18 NAT/UK/000039) is a four year project which aims to reduce the negative impacts of recreational activities on the marine environment, in Natura 2000 sites where pressure from recreational boating is greatest and having the most impact.

In 2020 Natural England commissioned the Environment Agency to undertake a survey to monitor the extent and density of seagrass beds within Osborne Bay and the River Medina on the Isle of Wight in 2020 to help meet Action D1 - monitoring by conducting echosounder and drop down video surveys to provide a baseline for future monitoring of the LIFE Recreation ReMEDIES project. Two smaller patches were also surveyed just off of Cowes and in Gurnard Bay. All sites are located within or part of the Solent Maritime Special Area of Conservation (SAC) and Solent and Dorset Coast Special Protection Area (SPA). In addition, Gurnard Bay is also within the Yarmouth to Cowes MCZ. Only the western side of the Osborne Bay seagrass bed is within the Solent Maritime SAC, however, the full area was able to be surveyed due to some supplementary funding provided by the Environment Agency. The nearshore areas on the west of this site are also within the Solent and Southampton Water SPA, and the inshore area around Palmers Brook is located within the Kings Quay Shore Site of Special Scientific Interest (SSSI; Figure 1).

The Solent Maritime SAC is part of the Solent European Marine Site (EMS). It is located along the Hampshire, Sussex and Isle of Wight coasts, and includes the embayments/estuaries of Chichester Harbour, Langstone Harbour, Newtown Harbour, Beaulieu, Medina, Hamble, Lymington, Western Yar and Kings Quay Shore, as well as coastal parts of Southampton Water. It has a total area of 11,325.09 ha, and overlaps with 16 SSSIs and three SPAs (Chichester and Langstone Harbours SPA, Solent and Southampton Water SPA and Solent and Dorset Coast SPA).

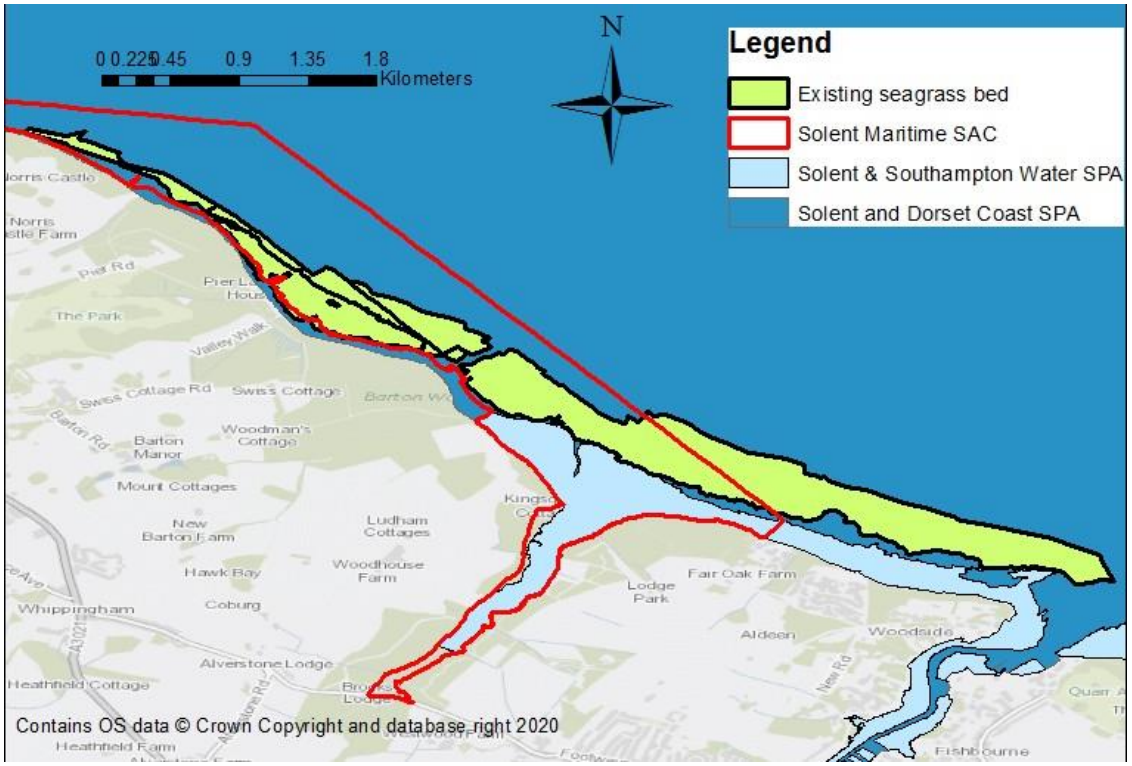
The site is designated for, amongst other features, Sandbanks which are slightly covered by sea water all the time, of which Subtidal seagrass beds (Zostera marina, EUNIS code A5.53) is a subfeature. The most extensive beds are found between Yarmouth and Bouldnor, off the Medina estuary and in Osbourne Bay on the north coast of the Isle of Wight, and off the mouth of the Beaulieu estuary along the north Solent coast. Intertidal seagrass beds are also present throughout the site.

## 1.1. Survey objectives

1. Survey the extent and record percentage cover of the *Zostera marina* for River Medina and Osborne Bay beds using drop down cameras.
2. Record any anthropogenic impacts to the seagrass beds during the survey and any invasive non-native species (notably the wireweed *Sargassum muticum*).
3. Produce a map of the current extent of the *Zostera marina* beds and using appropriate interpolation methods a contour map of percentage cover.
4. Within each of the subtidal seagrass beds, test the use of a portable echosounder to record the extent and patchiness of the *Zostera marina* beds, producing a map of the extent and patchiness of the *Zostera marina* beds using the echosounder data.

5. Compare the current extent of the *Zostera marina* beds with previous surveys and report on the condition of the extent attribute for this feature.

a)




b)

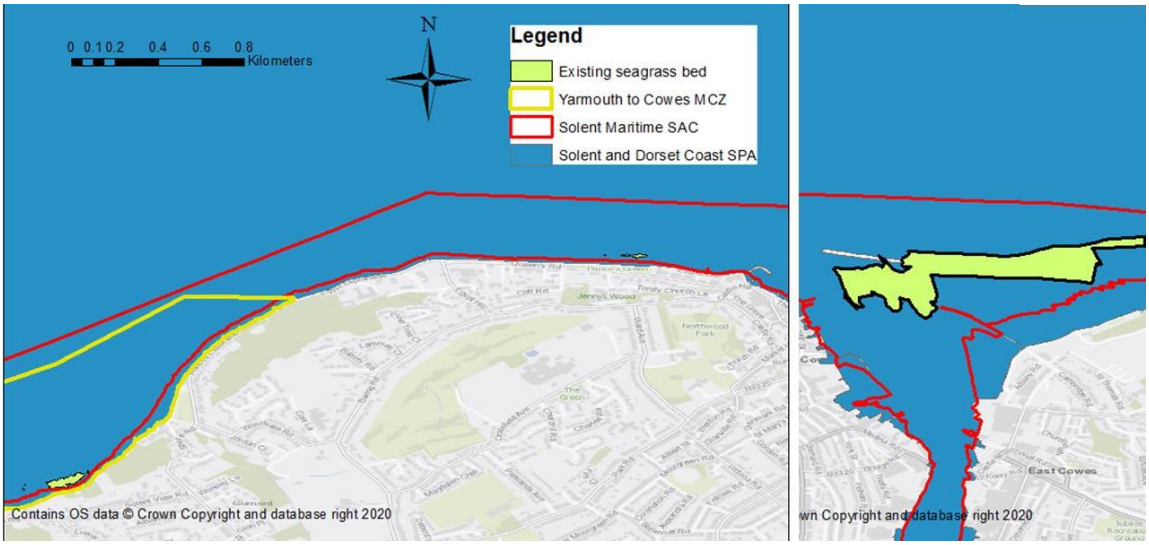



**Figure 1.** Location of subtidal seagrass beds shown in previous extent records in Osborne Bay (a); River Medina, North of Cowes and within Gurnard Bay (b).

# 2. Survey methods

## 2.1. Survey design

Surveys were designed based upon the location of seagrass recorded in previous surveys. In Osborne Bay, Figure 1a shows the outline of previous surveys which comprised a mix of surveys completed between 2006 and 2018 including from the 2006 Survey of the Subtidal Sediments of the Solent Maritime SAC, and Hampshire And Isle Of Wight Wildlife Trust (HIWWT) seagrass surveys. The previous survey in the Medina (Figure 1b) was part of the

2006 Survey of the Subtidal Sediments of the Solent Maritime SAC. Surveys of Gurnard Bay and North Cowes (Figure 1b) recorded seagrass using expert judgement as part of the 2018 HIWWT seagrass surveys.

For the drop-camera survey, in Osborne Bay and the Medina a 50 m triangular grid of stations was overlaid in the survey areas where seagrass had been previously recorded, with an additional line of stations added outside of the recorded boundaries to take account of any changes in extent. A triangular grid enables patchiness within beds to be better mapped than a square grid. Due to poor visibility in the Medina, the number of quadrats were reduced compared to what was planned. For the smaller, narrower beds in Cowes and Gurnard Bay a 20m triangular grid was used.

## 2.2. Drop-camera method

The drop-camera survey was undertaken between 2nd and 9th September 2020. The equipment was deployed from a davit on the port side of the vessel. A 12-megapixel Go-Pro HERO7 camera in underwater housing was attached to a 1 m x 1 m (1 $m^2$) photo-quadrat frame (**Figure 2**) constructed out of plastic piping weighted with lead weights and weighted rope. A live feed from the camera was fed back to a tablet computer on the vessel, allowing the surveyor to observe when the frame was on the seabed.

At each station the frame was lowered into the water and a still image captured once on the seabed. The location was fixed with the Garmin dGPS stationed at the davit.

Sampling aimed to take place up to 2 hours +/- high or low water, to ensure the seagrass canopy was at a constant height to provide consistent estimation of percentage cover. Some sampling took place outside this window, but this was targeted to stations that were considered to have a low chance of seagrass being present. If the current was strong and pulled the camera underneath or away from the vessel, the sampling was paused at that station until the current speed reduced.

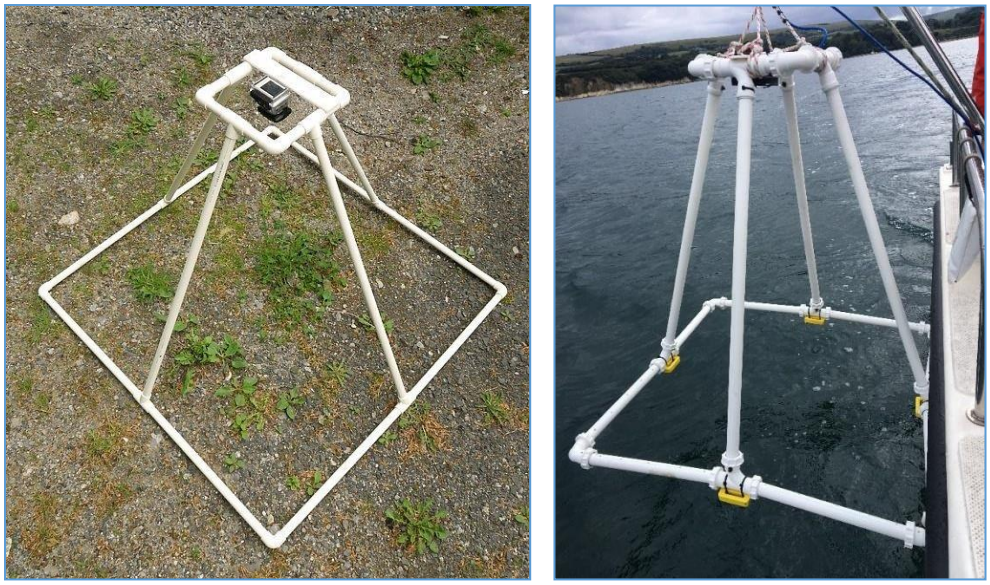


**Figure 2.** The 1 $m^2$ photo-quadrat with GoPro camera mounted directly above the quadrat

## 2.3. Echosounder survey

The echosounder survey was undertaken between 21st and 23rd August 2020 in Osborne Bay and between 8th and 9th September for the remaining sites. A BioSonics DT-X Extreme split-beam echosounder with a 200 kHz transducer was used to survey the seagrass beds (**Figure 3**), following methods developed by Egerton and Sotheran (2011) and Green (2018). The pole-mounted transducer was positioned 60 cm below the water surface, and was mounted on a davit off the port side of the vessel.


**Figure 3**. The BioSonics DT-X Extreme surface unit (left) and pole-mounted 200 kHz transducer (right).

Lines were run at 50 m intervals parallel to the shore and across the full extent of the beds. Lines had to be moved around moorings and other obstructions. Surveying took place at 1 hour +/- high water, to ensure the seagrass canopy was not reduced by tidal currents.

The vessel survey speed was 5 knots, and the ping rate was 10 pings $s^{-1}$.

## 2.4. Image analysis

Still images were assessed for visibility and initial observation of seagrass presence and absence before further analysis in the office. Visibility was highly variable. The images were classed into one of four visibility categories ranging from 1-4 (Table 1).

Still images collected from the drop camera were assessed by eye (following a standard Environment Agency protocol (Annex 1) for percentage cover of *Z. marina*, green and red/brown macroalgae, kelp, the invasive non-native wireweed *Sargassum muticum* and bare sediment. A 25-square grid was overlaid over the 1 $m^2$ quadrat of each image. The percent cover was estimated by counting the number of squares, to the nearest half square, that were covered by seagrass/macroalgae. Full covered squares are counted as 4 % each, half squares as 2 %.

An assessment of visibility and presence of seabed litter were also noted. No particle size analysis samples were collected during the survey, but the seabed substrate type was categorised by eye into 'gravel', 'rock', 'sand', 'muddy sand' and 'gravelly sand/sandy gravel'.

The images were analysed by trained Environment Agency officers. 10 % of the images were selected and re-analysed by the project manager.

Seagrass extents were mapped using ArcGIS. The bed extent was defined using the threshold identified by OSPAR (2009); beds only include areas that were ≥ 5 % cover of *Z. marina*. Mean seagrass cover of the bed was assessed from the images ± standard error. The data points of percentage cover were interpolated to form an extent using the Natural Neighbour tool in ArcGIS Spatial Analyst.

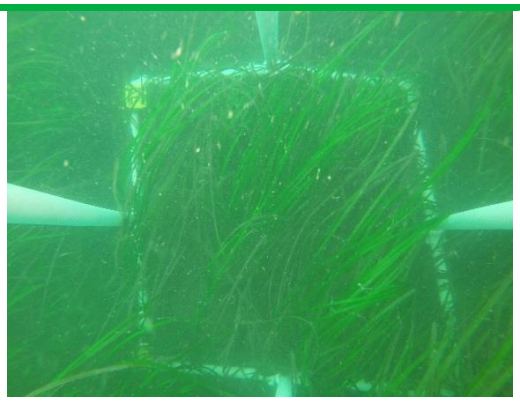
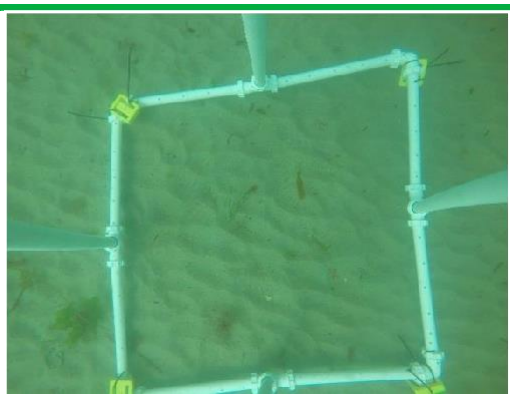
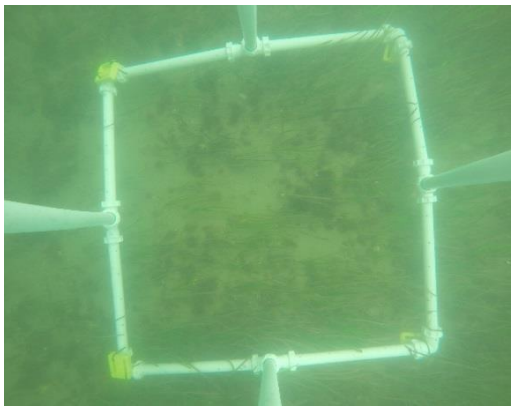
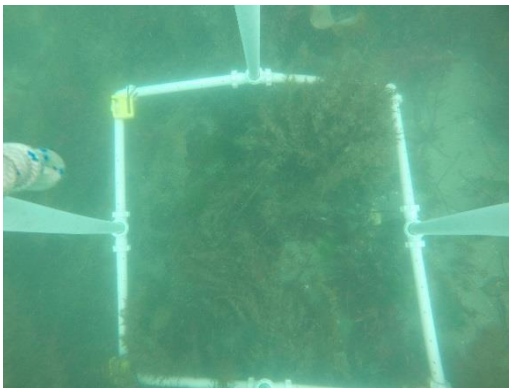
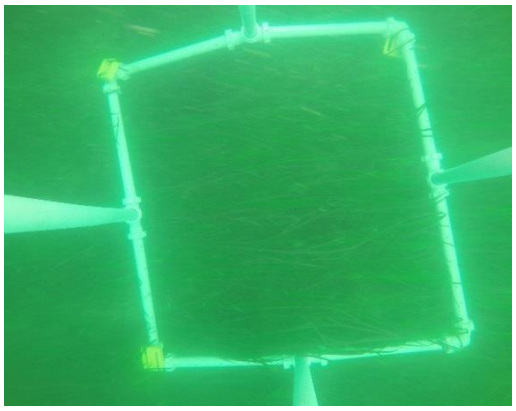
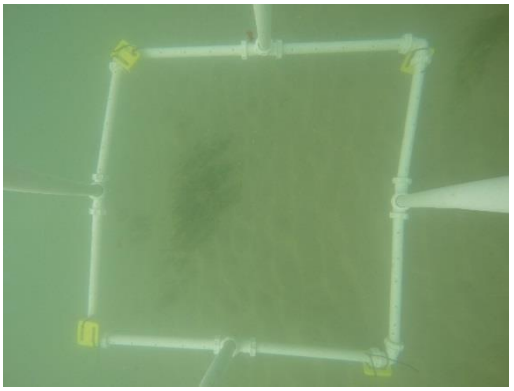
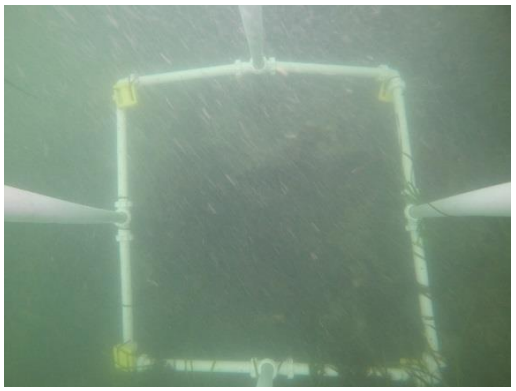
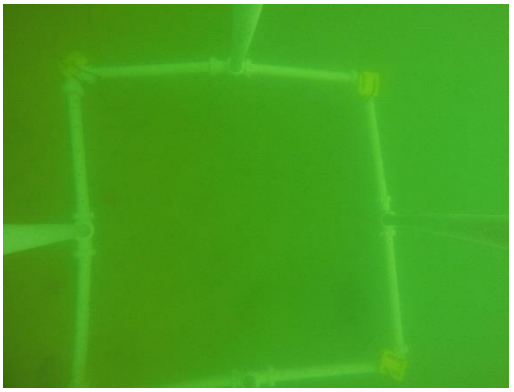
Visibility was extremely poor in the Medina, Gurnard Bay and the Cowes site which impacted the accuracy of density measurements. Where identified the presence of seagrass cover ≥ 5 % was obvious however interpreting the exact density was not always possible therefore best judgement was used where necessary. Due to the low number of clear images, this aided in clarifying the extent of the bed.

## 2.5. Echosounder analysis

The echosounder data was analysed using the macrophyte package within the Sonar5Pro software (Balk and Lindem 2015). Seagrass roots and canopy detection thresholds were set at -40 dB and -60 dB respectively, and features with a canopy height < 10 cm were assumed to be close-cropping macroalgae and removed from the analysis. Pings were aggregated into 20-ping sampling units for calculating metrics.

Two metrics were calculated from the echosounder data: Percentage Volume Inhabited (PVI) is considered a proxy for seagrass percentage cover; Mean Bioheight measures the mean seagrass canopy height above the seabed over 20 pings. More detail on the metrics and analysis can be found in Green (2018). Results were interpolated using the Natural Neighbour tool in ArcGIS Spatial Analyst.

**Table 1.** Visibility assessment scale of still images.

| | | |
|---|---|---|
| 1 - **Good visibility**<br>Although may not be perfectly clear, can still identify all features and species on the seabed. |  |  |
| **2 - Moderate visibility**<br>Some turbidity or slightly out of focus. Can identify % cover, other algae, detail on leaf blades. |  |  |
| **3 - Poor visibility**<br>Possible to identify substrate, algae, if seagrass is present / 100% cover). Possibly considerable green tinting if sampled at low tide. |  |  |
| **4 – Very poor visibility**<br>Not possible to ID any species present. Can possibly ID if seagrass is present or not. Camera out of focus. |  |  |

# 3. Results

## 3.1. Osborne Bay

- Still images were sampled at 928 stations in the Osborne Bay seagrass bed (**Figure 4**). Visibility was moderate within the bay. Sixteen images were classed with very poor visibility and were not included in the analysis, 204 images were classed with poor visibility. 710 of the images contained *Z. marina*, of which 676 contained *Z. marina* densities that were ≥ 5% cover (**Figure 5**).

- The substrate was primarily muddy sand however due to poor visibility in many of the photos and the very dense seagrass cover these are best estimates (**Figure 6**).

- Overall, the seagrass bed was considered to be dense. The mean percentage cover within the bed (defined as coverage greater than 5%) was **68.12 ± 1.31 %**.

- The **total extent of the seagrass bed (≥ 5 % cover) was 164.7 ha** (**Table 2, Figure 7**). The portion of this bed that is within the boundaries of the Solent Maritime SAC is 95.5 ha.

- By comparison, the previous extent of this seagrass bed has been estimated to be approximately 130 (HIWWT 2015) ha. While this indicates that this bed is potentially larger than previous records show, it is important to note that previous surveys used different methodologies, previous extent polygons were amalgamated using information taken from multiple surveys between 2006 and 2018.

- The interpolated results (**Figure 7**) show that the seagrass was very dense, 61 % of the total extent of the bed had a density of >50 % cover.

- There was an even split among the different density categories within the bed (**Table 2**). The lower density regions were mainly located on the seaward side and edges of the bed indicating limited patchiness.

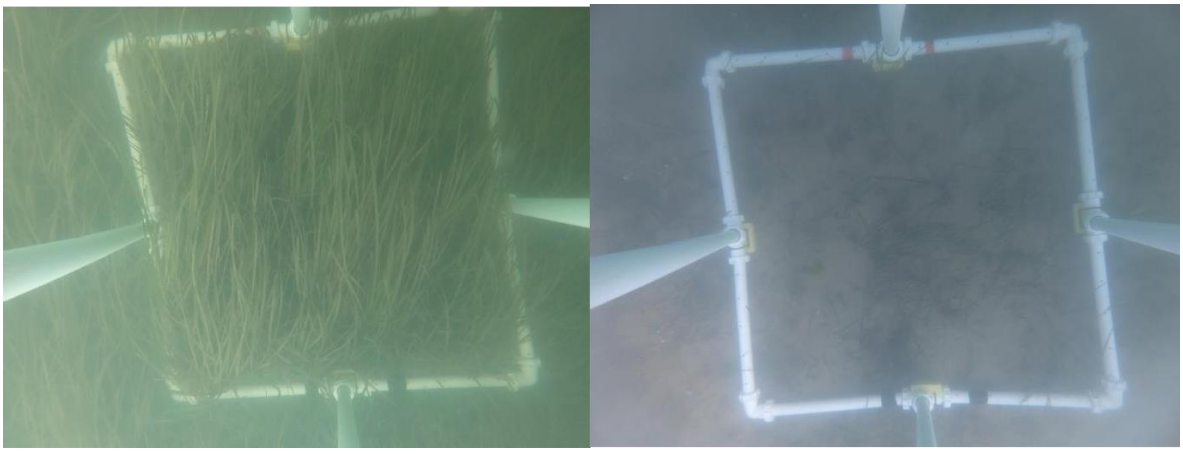


**Figure 4.** Examples of dense (left) and sparse (right) *Zostera marina* beds from Osborne Bay.


**Figure 5.** Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations collected in Osborne Bay seagrass bed compared to previous extent records.

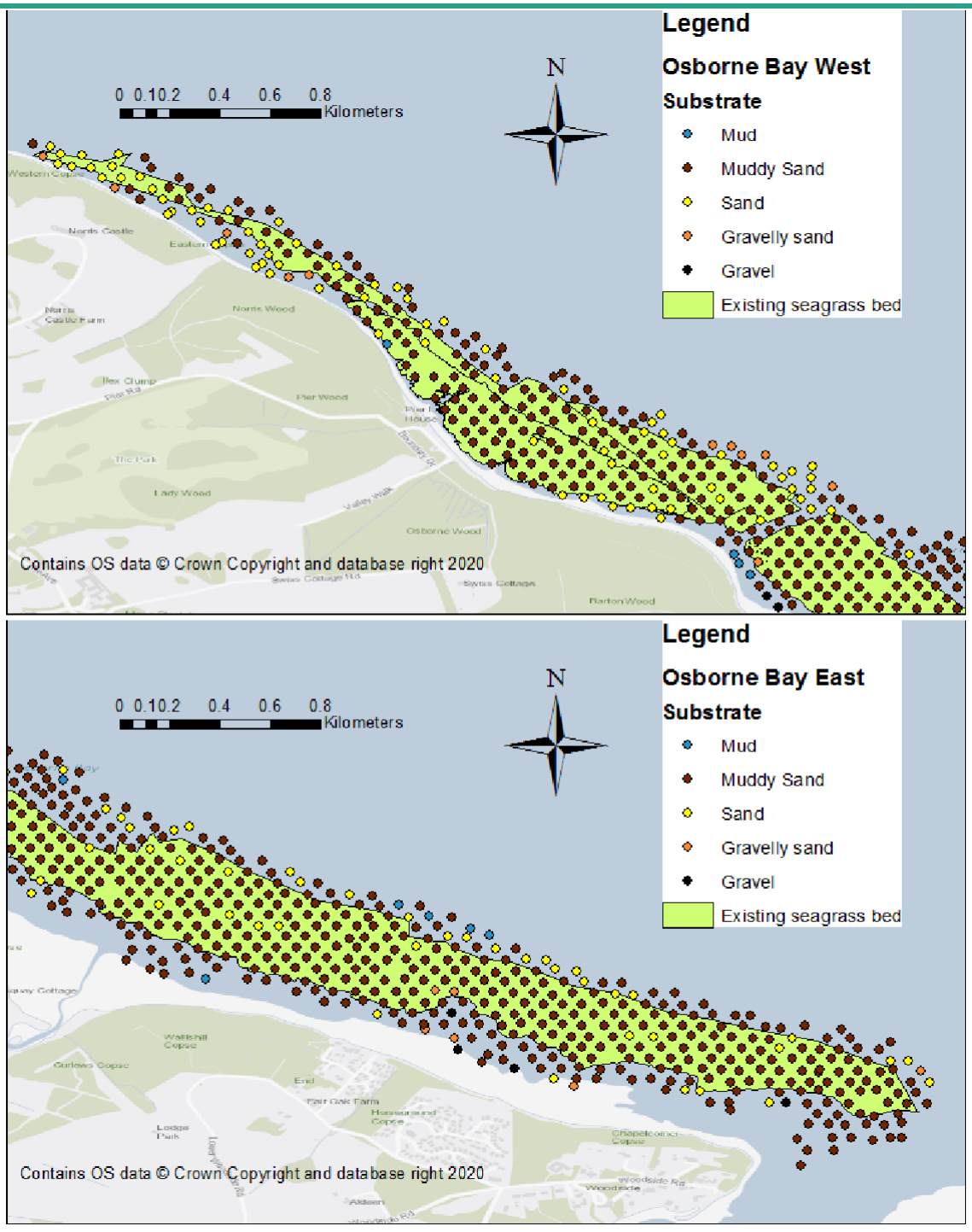



**Figure 6**. Seabed substrate from visual assessment of drop-camera stills from the 2020 Osborne Bay survey.

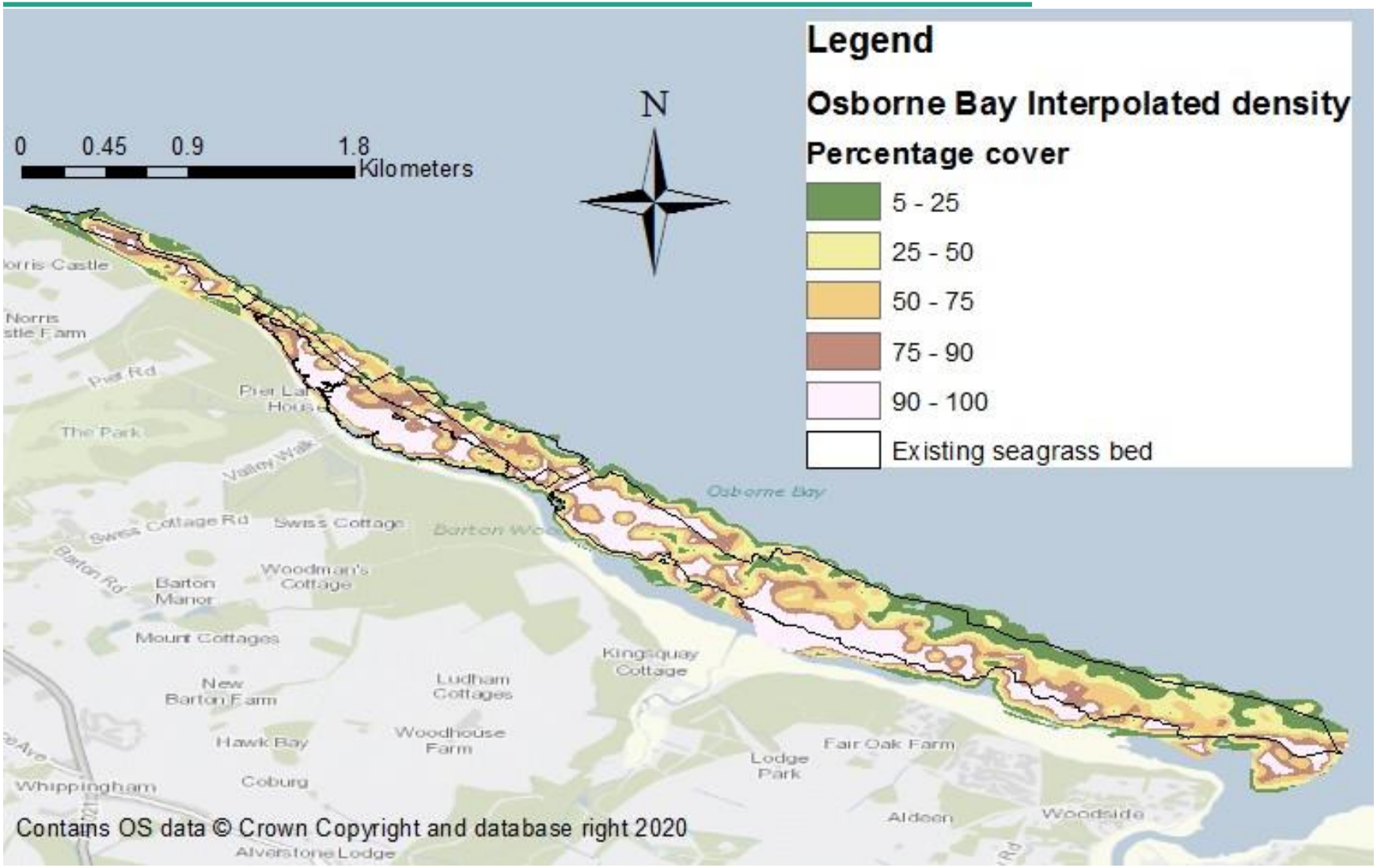



**Figure 7.** Interpolated map (using the Natural Neighbour algorithm) of subtidal seagrass extent from Osborne Bay from still images collected during the 2020 drop-camera survey.

**Table 2.** Interpolated seagrass bed extent for various per centage cover categories within Osborne Bay.

| | Osborne Bay | |
|---|---|---|
| | Extent (ha) | % of bed extent |
| **5 - 25 %** | 32.95 | 20.0 |
| **25 - 50 %** | 31.30 | 19.0 |
| **50 - 75 %** | 36.24 | 22.0 |
| **75 - 90 %** | 26.52 | 16.1 |
| **> 90 %** | 37.72 | 22.9 |

- Wireweed *Sargassum muticum* was noted at two sites at either end of the bay. Further suspected sightings were noted throughout the site however the visibility was too poor to confirm from the photos (**Figure 8**). Slipper limpet shells were noted in two quadrats on the seaward side of the bed (**Figure 8**).

- Epiphyte cover was considered to be low within the majority of the seagrass bed, however high epiphyte coverage and algal overgrowth was observed around the centre near Kings Quay. Depth data indicates that this area is located within the intertidal region, potentially close to and above mean low water in some areas (**Figure 8**).

- There was evidence in two photos on the eastern parts of the seagrass bed with evidence of potting or mooring. In one there appeared to be an old potting or mooring line and in the second, the quadrat landed on an old lobster pot (Figure 8).

- Macroalgae was predominately absent from the site. No kelp was observed. Green and red macroalgae were noted within the bed (**Figure 9**).

- The echosounder results showed that the seagrass was relatively short within the bay, averaging between 0.2 – 0.6 m as recorded by the BioHeight metric (**Figure 10**).

- The interpolated seagrass bed extent with a PVI >2 aligns closely with the image analysis results (**Figure 11**). The interpolated area over which the echosounder measured a PVI ≥ 0.2 was **167.54 ha**.

- The echosounder surveyed further seaward and north-eastward in comparison with the drop camera survey. The results confirmed the seaward edge of the seagrass bed. In the north-East section the echosounder survey showed potential extension of the seabed close inshore.

- Neither the echosounder or the drop camera survey captured the edge of the bed on Wootton Creek on the east, it is therefore possible that seagrass extends further eastwards and into the creek.

**Figure 8**. Records of epiphytes, wireweed and other sightings within Osborne Bay. Intertidal zone represents the area above mean low water

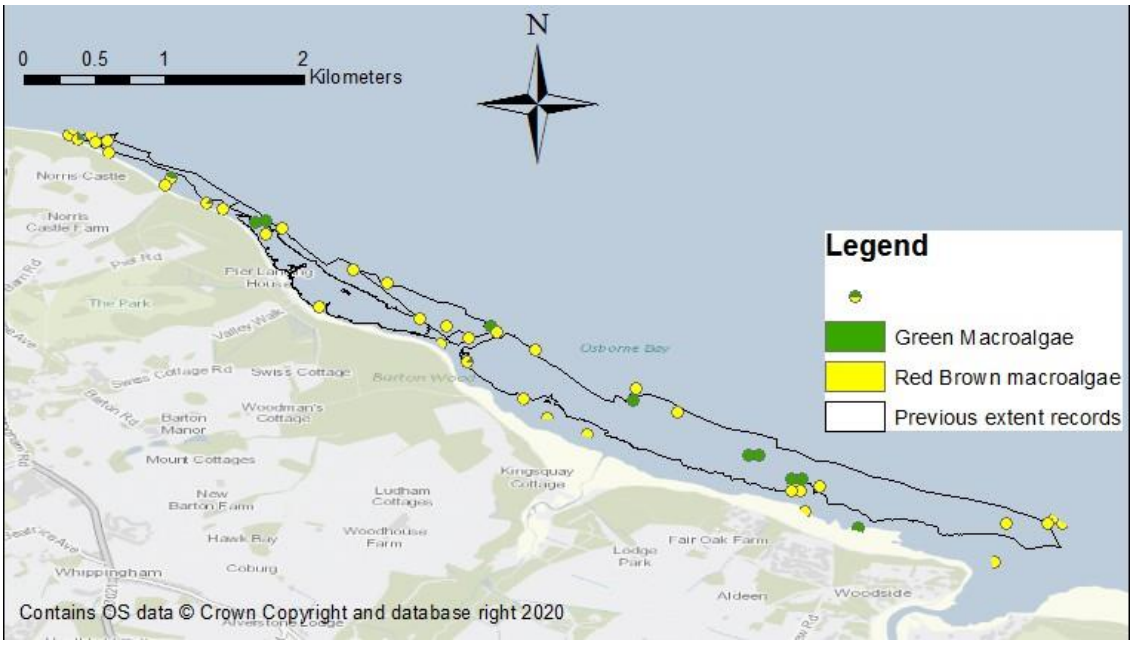



**Figure 9.** Macroalgal presence within Osborne Bay from visual assessment of drop-camera stills from the 2020 survey.


**Figure 10**. Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations overlaying BioHeight (m) echosounder metric.

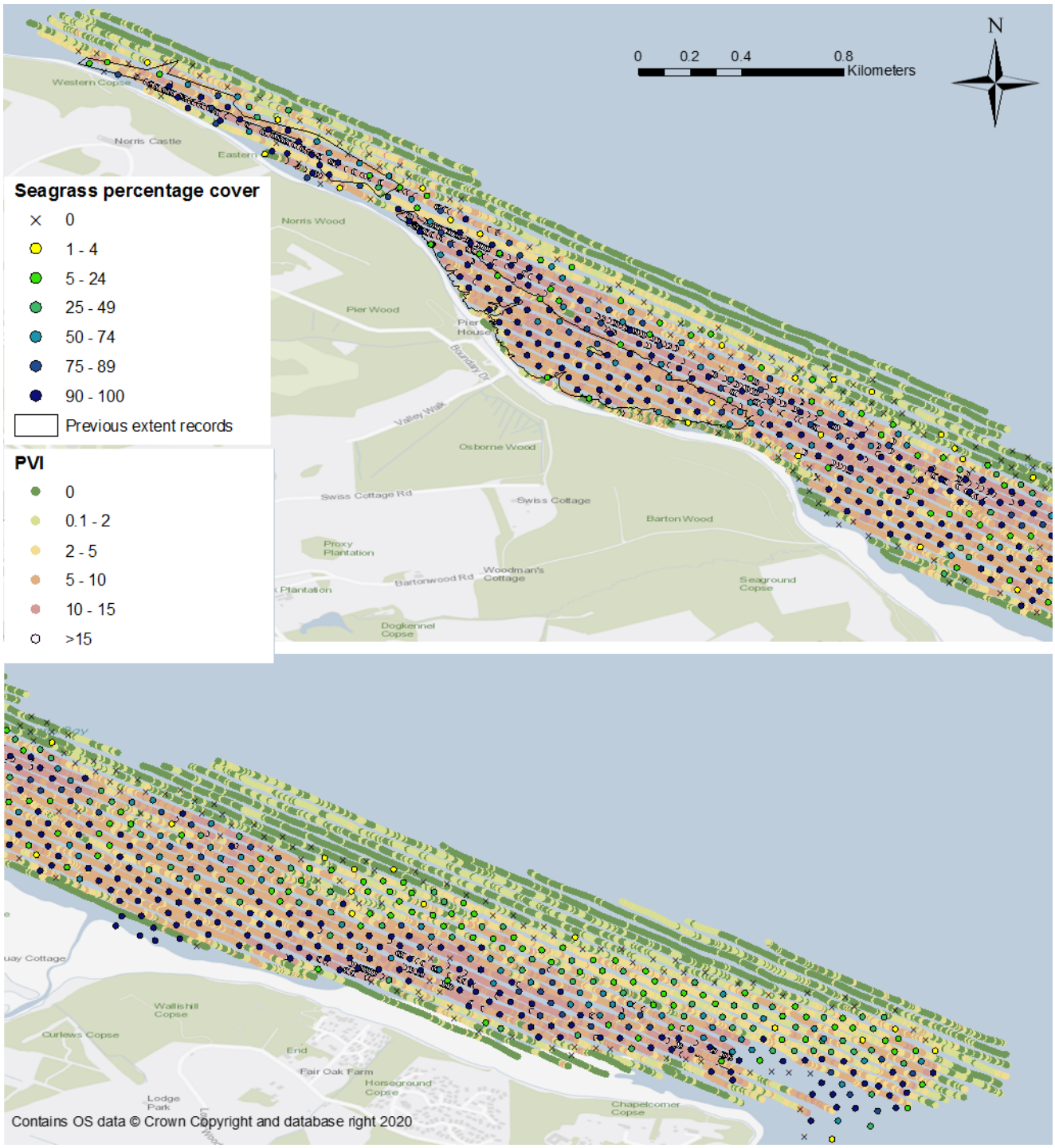



**Figure 11**. Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations overlaying Percentage Volume Inhabited (PVI) echosounder metric.

## 3.2. River Medina

- Still images were sampled at 93 stations in the River Medina. Visibility was predominantly poor, 26 images were classed as very poor and removed from the analysis. Poor visibility resulted in less accurate estimates of seagrass densities in the remaining images. Due to the number of missing quadrats the interpolated extent figures should be interpreted with some caution.
- 25 of the 93 images contained *Z. marina* coverage ≥ 5% (**Figures 12**).
- The substrate in the Medina bed was primarily muddy sand however poor visibility made this difficult to determine.
- The interpolated **extent** of the surveyed seagrass bed (defined as ≥ 5 % cover) was **12.08 ha** in the Medina (**Table 3; Figure 12**), however images were not captured of the edge of the bed. Due to the reduced number of usable photos there were larger gaps between quadrats than planned limiting the precision of interpolation.
- By comparison, the polygon used to map the previous extent of this bed measured 12.22 ha.
- The mean percentage cover of seagrass was **73.39 ± 5.72 %**.
- Macroalgae was generally absent in the sampled area. Epiphytes were not visible or difficult to determine due to poor visibility. The wireweed *Sargassum muticum* was not identified.
- The drop-camera survey did not capture the edges of the bed on the eastern and southern sections, however the echosounder survey was able to confirm these. The PVI metric indicates that the bed likely extends further East than indicated in the previous extent records. (**Figure 13**).
- Further analysis of the echosounder results indicate that the height of the seagrass was short, between **0.1-0.4m**.
- To the east of the breakwater, the interpolated area over which the echosounder measured a PVI ≥ 0.2 was **15.37 ha** however the entirety of this area was not verified through photographic analysis.

**Table 3.** Interpolated seagrass bed extents for percentage cover categories of the Medina seagrass bed, derived from the drop-camera stills.

| ***Z. marina*** **Percentage cover** | **Medina** | |
|---|---|---|
| | Extent (ha) | % of total area |
| **5 - 25 %** | 2.40 | 19.9 |
| **25 - 50 %** | 2.62 | 21.7 |
| **50 - 75 %** | 3.33 | 27.6 |
| **75 - 90 %** | 2.30 | 19.0 |
| **> 90 %** | 1.43 | 11.8 |

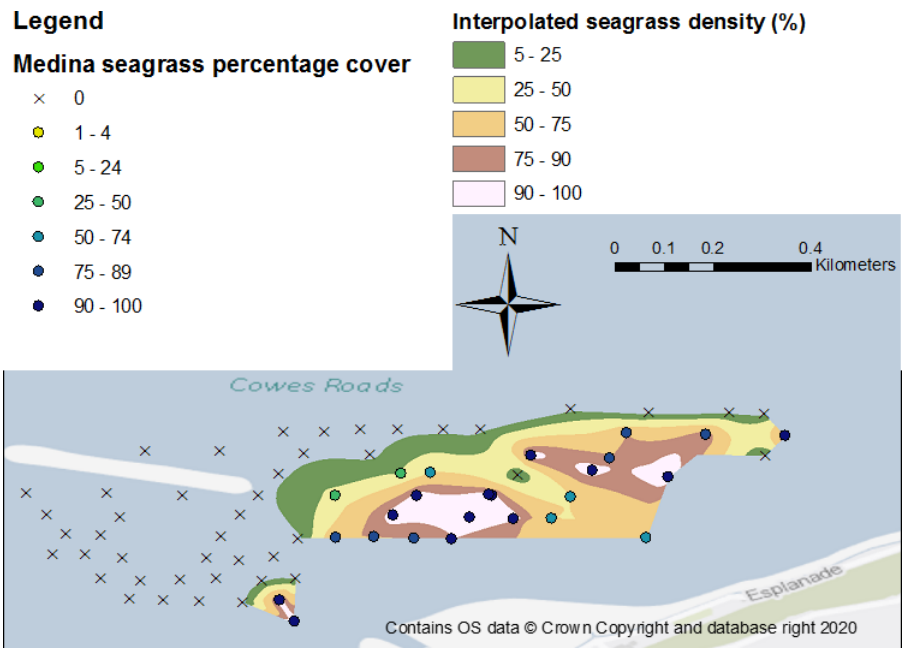



**Figure 12.** Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations collected in the River Medina seagrass beds compared to interpolated map (using the Natural Neighbour algorithm) of subtidal seagrass extent.

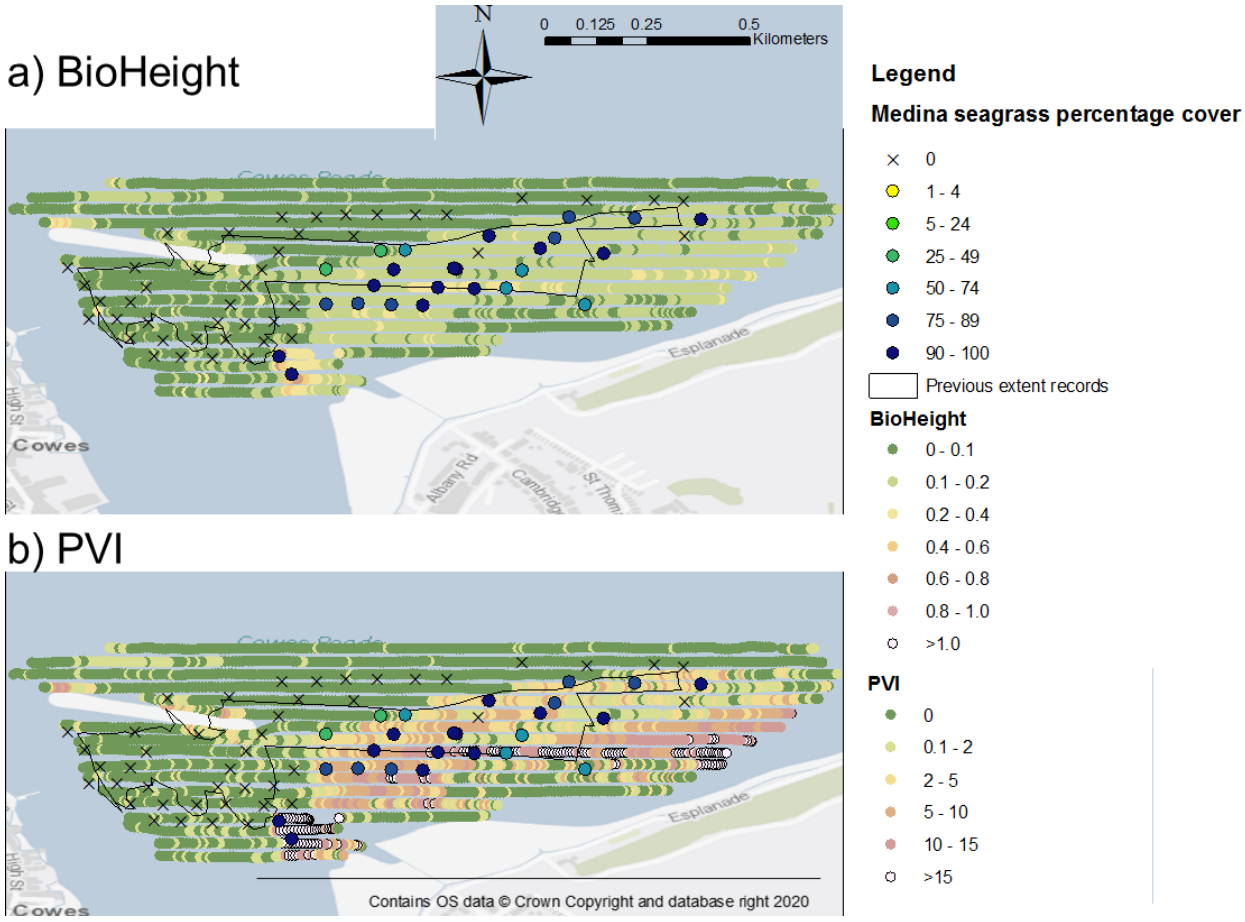



**Figure 13.** Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations overlaying echosounder metrics: a) Bioheight (m) and b) Percentage Volume Inhabited (PVI).

## 3.3. North Cowes

- Still images were sampled at 23 stations off of Princes Green, North of Cowes. Visibility was poor at this site. 10 images were judged to have very poor visibility so could not be analysed. Estimates were made on the remaining images based upon expert judgement. 6 of these images contained seagrass (**Figure 14**).
- Due to low number of clear photos and poor visibility it was not possible to accurately interpolate the area of seagrass from the drop camera stills. However, the area over which seagrass was positively identified using the drop-cameras was **0.13 ha**. By comparison, the polygons used to map the previous extent of this bed measured 0.06 ha.
- The previous extent records showing two larger patches towards the east of the site can be confirmed by both the echosounder and drop-camera surveys. The echosounder results indicate that these patches could expand further east than previously assumed (**Figure 14**).
- The echosounder results indicate another patch to the west of the site which matches the location identified in the previous extent records.
- Where visible, the substrate looked to be muddy sand within photos. No epiphytes or macroalgae, including *Sargassum*, were able to be determined within the photos.
- The interpolated area over which the echosounder measured a PVI ≥ 0.2 was **0.69 ha** however the entirety of this area was not verified through photographic analysis.


**Figure 14.** Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations overlaying echosounder metrics: a) Bioheight (m) and b) Percentage Volume Inhabited (PVI).

## 3.4. Gurnard Bay

- Still images were sampled at 48 stations In Gurnard Bay. Visibility was also poor at this site, 15 images were judged to have very poor visibility so could not be analysed. Estimates were made on the remaining images based upon expert judgement. 21 of these images contained seagrass.

- Where visible, the substrate looked to be muddy sand within photos. No epiphytes or macroalgae, including Sargassum, were able to be determined within the photos.

- The interpolated **extent** of the surveyed seagrass bed (defined as ≥ 5 % cover) was **0.93 ha** in Gurnard Bay (**Table 4; Figure 15**). By comparison, the polygon used to map the previous extent of this bed measured 0.37 ha.
- The mean percentage cover of seagrass was **66.43 ± 6.87 %**.
- The interpolated results (**Figure 15**) show that the seagrass bed mainly consisted of coverage within the 50 - 75 % interpolated percentage cover category, making up 34.41 % of the total extent of the bed. 60.21 % of the total extent of the seagrass bed had a density of >50 % cover.

- The photographic survey did not capture the bed edges on the eastern side of the bed, however the echosounder results indicate that it does begin to become less dense over the area surveyed (**Figure 16**).
- The western patch of the bed seen in the previous extent records was not captured by the drop cameras, however this patch is corroborated by the echosounder results. It likely extends further west than previously indicated.
- A potential landward patch is indicated by the echosounder results (PVI of 10-15), however this could not be verified by photographic analysis. Care should be taken for interpretation of this section as the area became increasingly shallow which could be impacting the echosounder analysis in this section (**Figure 16b**).
- The interpolated area over which the echosounder measured a PVI ≥ 0.2 was **1.37 ha** however, the entirety of this area was not verified through photographic analysis.

**Table 4.** Interpolated seagrass bed extents for percentage cover categories of the Gurnard Bay seagrass bed.

| ***Z. marina*** **Percentage cover** | **Gurnard Bay** | |
|---|---|---|
| | Extent (ha) | % of total area |
| **5 - 25 %** | 0.17 | 18.28 |
| **25 - 50 %** | 0.20 | 21.51 |
| **50 - 75 %** | 0.32 | 34.41 |
| **75 - 90 %** | 0.12 | 12.90 |
| **> 90 %** | 0.12 | 12.90 |

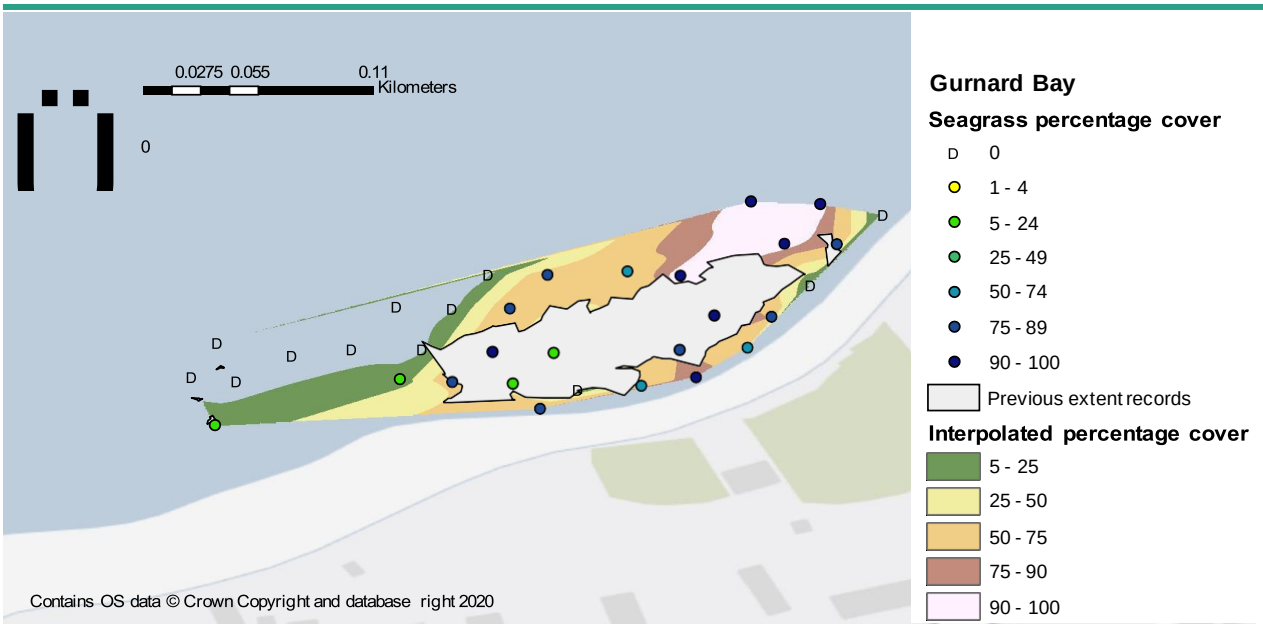



**Figure 15.** Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations collected in Gurnard Bay seagrass beds compared to interpolated map (using the Natural Neighbour algorithm) of subtidal seagrass extent.

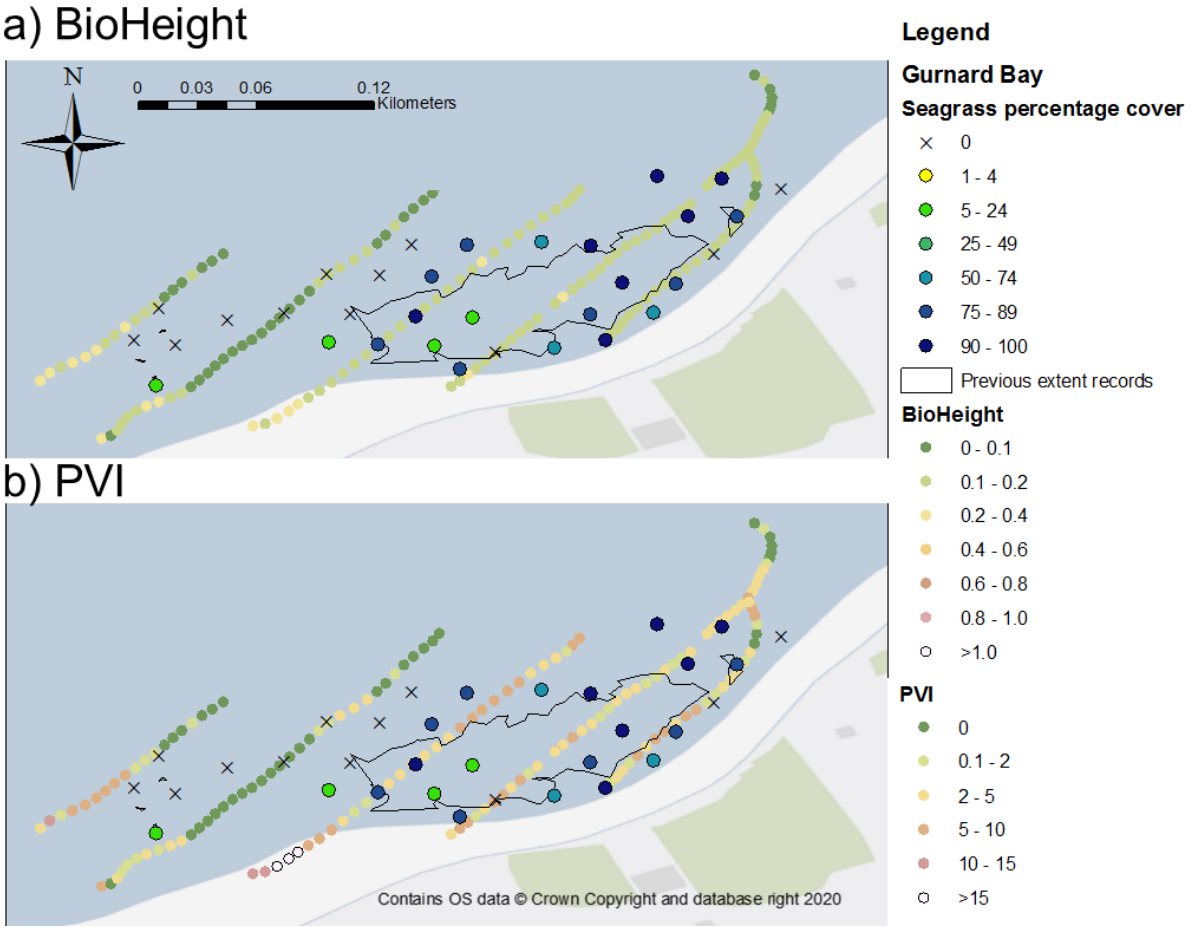



**Figure 16.** Percentage cover of seagrass (*Zostera marina*) from still images at drop-camera stations overlaying echosounder metrics: a) Bioheight (m) and b) Percentage Volume Inhabited (PVI).

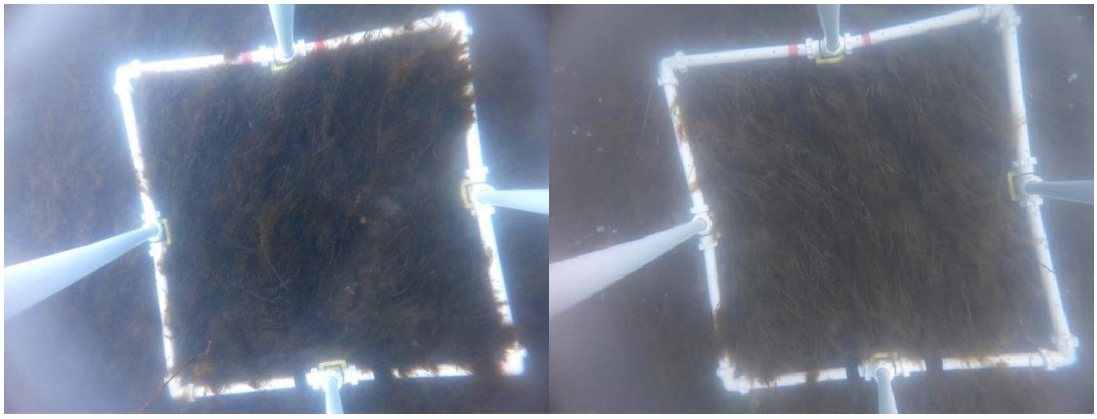
# 4. Discussion

## 4.1. Survey outcome

- The 2020 survey of the Osborne Bay, Medina, Cowes and Gurnard Bay seagrass beds provides an updated extent and percentage cover information for Natural England.

- Poor visibility at the Medina, Cowes and Gurnard Bay sites restricted the number of photos and therefore density measurements in these beds, however the echosounder provided an indication of the extent.

- Due to poor visibility at the other sites, epiphytes could only be identified within Osborne Bay – mainly between Barton Wood and Kings Quay. In a number of quadrats there was high epiphyte and algal overgrowth observed (**Figure 17**). Depth measurements and GIS analysis indicate that part of this surveyed area was at or close to intertidal (**Figure 8**). The shorter blades observed in some of the photos with clearer visibility (**Figure 17**) combined with the near intertidal location could indicate the presence of *Zostera noltei* in this location.



- **Figure 17.** Examples of high algal growth in Osborne Bay seagrass bed

- Limited epiphytic cover was noted within the other parts of Osborne Bay, the presence of these shorter blades were also restricted to the Kings Quay area.

- No epiphytes were identified within other sites however this could be an indication of the poor visibility within photos rather than an absence of epiphytes.

- The seagrass images from Osborne Bay also showed evidence of invasive species, both wireweed *Sargassum muticum* and slipper limpets *Crepidula fornicata* were seen.

- There was no evidence seen in the photographs of anchor scarring, however poor visibility may have masked this. There was evidence of potting within the Osborne Bay bed.

- The results from these surveys will provide baseline information and data which will be supplemented by seagrass dive surveys planned in June 2021. The data collected from the dives surveys planned for June 2021, combined with the baseline information from this report will provide information required for Natural England to determine condition.

The echosounder and drop down video surveys will be repeated at the end of the project to see if the condition and / or extent of the seagrass beds has improved as a result of the LIFE Recreation ReMEDIES project.

## 4.2. Comparison to previous datasets

- Seagrass cover within the Osborne Bay bed was extremely dense and did not appear patchy. The interpolated extent showed that the area was greater than previous extent records show, however it is important to note that different methodologies were used to calculate these extents.

- The 2015 HIWWT report (Marsden and Scott, 2015) provides estimates of bed size for Osborne Bay – between 125 and 136 ha depending on survey, compared with 164.7 ha recorded in the 2020 survey. Previous estimates were recorded at different times of year and using a mix of drop camera, transects, towed video and walking surveys to map the edges of the bed. These surveys captured the landward edges of the bed but due to visibility problems some surveys failed to record the seaward boundary, not all surveys mapped the whole bed in one go.

- Seagrass was found to extend further seaward in some locations and eastward into Wootton Creek than shown in previous records. It is unclear if this was due to expansion of seagrass in these areas; the small gains observed may instead be due to incomplete surveys using different methodological approaches. The area expanding into Wootton Creek does not appear to have had a camera tow to verify the edges in the previous surveys (Marsden and Scott, 2015), indicating that seagrass could have been present but not recorded.

- In comparison to previous extent records, large areas of expansion were identified on the landward edge of the beds, particularly around Kings Quay within the Kings Quay Shore SSSI and Solent and Southampton Water SPA.

- The Kings Quay area surveyed was partly intertidal so the intertidal seagrass species *Zostera noltei* could make up some of this shoreward extent, as evidenced by the shorter seagrass noted in the images and echosounder. Previous records have shown *Z. noltei* is present in the near shore areas intermixed with *Z. marina* (Marsden and Scott, 2015). Given that in the previous surveys the landward boundaries were assessed on foot, this could represent a significant expansion in these areas, however the surveys have not been conducted at the same time of year which could impact the recorded extents.

- Limited patchiness was observed within the Osborne Bay bed, density was high (>50% cover) close to shore and in the middle of the bed, becoming less dense at the edges. The average density is similar to what was noted in the 2015 HIWWT report.

- While in the Medina the overall area was similar in size to polygons mapping previous extent, these polygons were derived from the 2006 survey of the subtidal sediments of the Solent Maritime SAC and based on a limited number of points. The 2020 survey indicated that the seagrass instead extended further east of the breakwater.

- More recent HIWWT surveys have shown seagrass occupies a similar area as shown in this survey.

- In the 2015 HIWWT report (Marsden and Scott, 2015), seagrass in the Medina was estimated to occupy 27.1 ha although this figure includes the intertidal beds which were not surveyed in 2020. This survey indicated that the extent of the subtidal seagrass was approximately 12 ha as derived from the drop camera. Due to visibility issues the complete extent could not be mapped through this method, however the echosounder detected seagrass extending further inshore and further east than could be determined by the photos.

- Where photos were visible, the bed had high density seagrass short in height with limited patchiness over a narrow strip – this was confirmed by both the echosounder and photographic analysis.

- The previous extent records showed small beds in both Gurnard Bay and off of Cowes. The 2020 surveys confirmed these locations however indicate that these beds occupy a larger area than previous records show. It is unclear if the previous HIWWT surveys mapped the full extent of these beds.

- The extent of seagrass in these beds was confirmed by the echosounder however due to poor visibility this could not be verified through photo analysis. The echosounder showed that for these two beds, relatively short seagrass was observed. Given that these areas are located above chart datum and that some photos displayed relatively short seagrass, it could indicate the presence of *Z. noltei,* however poor visibility meant that this could not be confirmed.

- Interpreting density data from the photos taken within the Medina, Gurnard Bay and Cowes should be done with caution. Where seagrass was observed density was high, however high density seagrass was more easily identifiable compared with empty or patchy quadrats. Certain quadrats could have been misattributed to higher density classes due to the inability to make out the base of seagrass shoots.

- All the extent figures are subject to a degree of caution, as different survey methods and interpolation approaches may impact the results. Future surveys should use similar sampling, interpretation and interpolation approaches to ensure consistency in the results.

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The ***LIFE Recreation ReMEDIES: Reducing and Mitigating Erosion and Disturbance Impacts affecting the Seabed*** project (LIFE18 NAT/UK000039) runs from July 2019 – October 2023 and will improve the condition of five SACs between Essex and Isles of Scilly. This will be achieved by restoration, demonstration and reducing recreational pressures. Promoting awareness, communications and inspiring better care of sensitive seabed habitats will be key.

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